

Source Protection Strategy

MyActive Leisure Centre, Pavillion Gardens, Buxton

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CONTENTS

1	INTRODUCTION	5
1.1	TERMS OF REFERENCE	5
1.2	STATEMENT OF AUTHORITY	5
1.3	REGULATORY CONTEXT	5
1.4	OBJECTIVES OF THE STRATEGY	5
2	SITE DETAILS	7
2.1	SITE LOCATION	7
2.2	SITE DESCRIPTION	7
2.3	DEVELOPMENT PROPOSAL	7
3	SITE SETTING	8
3.1	GROUND CONDITIONS	8
3.1.1	<i>Published Bedrock Geology</i>	8
3.1.2	<i>Mapped Linear Features</i>	8
3.1.3	<i>Soils</i>	8
3.1.4	<i>Superficial Deposits</i>	8
4	HYDROGEOLOGICAL SETTING	9
4.1	HYDROGEOLOGY	9
4.1.1	<i>Aquifer Characteristics and Vulnerability</i>	9
4.1.2	<i>Groundwater Recharge</i>	9
4.1.3	<i>Groundwater Quality Data</i>	9
4.1.4	<i>Expected Groundwater Conditions</i>	9
4.2	SURFACE WATER ENVIRONMENT	10
4.2.1	<i>Surface Watercourses</i>	10
4.3	GROUNDWATER ABSTRACTIONS AND WATER SUPPLIES	10
4.3.1	<i>Groundwater Abstractions</i>	10
4.4	HYDROGEOLOGICAL SENSITIVITY AND SOURCE PROTECTION DESIGNATIONS	11
4.4.1	<i>Core Protection Area</i>	11
4.4.2	<i>Source Protection Zones (SPZs)</i>	11
4.4.3	<i>Designated Sites and Sites of Environmental Interest</i>	12
4.4.4	<i>Priority Habitats</i>	12
4.4.5	<i>Karst Features</i>	13
4.5	CONTAMINATION AND POLLUTION SOURCES	13
4.5.1	<i>Current / Previous Land Use</i>	13
4.6	KEY IDENTIFIED RECEPTORS	13
5	BUXTON THERMAL SPRINGS	14
5.1	OVERVIEW	14
5.2	HYDROGEOLOGICAL SETTING	14
5.3	HYDROGEOLOGICAL SENSITIVITY	14
5.4	SITE-SPECIFIC SOURCE PROTECTION CONSIDERATIONS	14
6	CONCEPTUAL SITE MODEL (CSM)	15
6.1	POTENTIAL SOURCES	15
6.2	POTENTIAL PATHWAYS	15
6.3	RECEPTORS	15
6.4	CORE POLLUTANT LINKAGES	15
6.5	CSM UNCERTAINTY	17
7	SOURCE PROTECTION STRATEGY	18
7.1	SOURCE PROTECTION OBJECTIVES	18
7.2	REGULATORY GUIDANCE AND POLLUTION PREVENTION	18
7.3	EXCAVATION AND GROUND PENETRATION CONTROLS	18
7.4	GROUNDWATER PROTECTION AND GROUNDWATER ENCOUNTER	19
7.5	MANAGEMENT OF EXCAVATED MATERIALS AND POTENTIALLY CONTAMINATED GROUND	19
7.6	FUELS, OILS AND CHEMICALS	20
7.7	CONCRETE, CEMENT, GROUT AND CONSTRUCTION MATERIALS	20
7.8	CONSTRUCTION PLANT AND EQUIPMENT	20
7.9	SURFACE WATER, RUNOFF AND SEDIMENT CONTROL	20
7.10	EXCAVATION REINSTATEMENT AND SEALING OF PATHWAYS	21
7.11	EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES	21
7.11.1	<i>Fuel, Oil or Chemical Spill</i>	21
7.11.2	<i>Unexpected Contamination</i>	21
7.11.3	<i>Unexpected Groundwater</i>	21

7.11.4	<i>Suspected Thermal Groundwater</i>	22
7.11.5	<i>Uncontrolled Discharge to Surface Water</i>	22
7.12	MONITORING AND VERIFICATION	22
7.13	ROLES, RESPONSIBILITIES AND DOCUMENTATION	22
8	CONCLUSIONS AND RECOMMENDATIONS	23
8.1	CONCLUSIONS	23
8.2	RECOMMENDATIONS	23

LIST OF TABLES

TABLE 4-1: BGS REGISTERED GROUNDWATER WELLS	11
TABLE 4-2: ENVIRONMENT AGENCY GROUNDWATER ABSTRACTIONS WITHIN 2KM OF THE SITE	11
TABLE 4-3: DESIGNATED SITES AND SITES OF ENVIRONMENTAL INTEREST WITHIN 1 KM OF THE SITE	12
TABLE 4-4: PRIORITY HABITATS WITHIN 250M OF THE SITE	12
TABLE 6-1: PRINCIPAL POTENTIAL POLLUTANT LINKAGES	16

APPENDICES

APPENDIX A SITE LOCATION PLAN
APPENDIX B PROPOSED DEVELOPMENT PLAN

1 INTRODUCTION

1.1 Terms of Reference

This Source Protection Strategy was commissioned by Leisure Energy Limited and High Peaks Council, in relation to the proposed installation of a substation, and supporting underground cabling within the council car park, adjacent to Buxton MyActive Leisure Centre, SK17 6BJ.

The purpose of the strategy is to identify and manage potential risks to controlled waters and underlying geological resources arising from construction and operation of the proposed development.

This report is prepared in accordance with the requirements of the following documents, in relation to the proposed HV cable trenching works within the Core Protection Area (CPA):

- *Code of Practice: Excavations in the Vicinity of Buxton Thermal Springs (High Peak Borough Council - Version 1.1, 16 September 2021)*;
- *Code of Practice: Drilling of Boreholes in the Vicinity of Buxton Thermal Springs (High Peak Borough Council - Version 1.1, 16 September 2021)*

The assessment considers the potential for the proposed excavations to affect the thermal springs and the measures required to minimise such risks.

1.2 Statement of Authority

This assessment has been prepared and reviewed by qualified professionals with appropriate experience. The key staff members involved in this project are as follows:

- Erin Galbraith *BSc (Hons) MSc PgCert CEnv MEnvSoc* – Senior Consultant / Environmental Engineer experienced in contaminated land risk assessments, geo-environmental investigations, groundwater and hydrogeological/hydrological assessments, environmental management, remediation and mine risk assessment, support projects through planning, design and regulatory approval.
- Myles Watson *BSc MSc PGeo* – Senior Project Consultant & Geoscientist experienced in onshore and offshore drilling projects and is experienced in contaminated land risk assessments, geo-environmental investigations, and groundwater assessments.

1.3 Regulatory Context

The proposed works will be undertaken with consideration of applicable environmental legislation, regulatory requirements and guidance relating to the protection of groundwater and surface water in England.

The Environment Agency's groundwater protection guidance identifies the need to consider activities that may affect groundwater quality or quantity and to prevent pollution arising from activities undertaken on or below the ground. Where activities have the potential to result in pollutants entering groundwater, the relevant environmental permitting requirements shall be considered.

The site-specific requirements of the *Code of Practice (CoP): Excavations in the Vicinity of Buxton Thermal Springs* (High Peak Borough Council, Version 1.1, 16 September 2021) have also been considered, given the location of the proposed works within the Core Protection Area (CPA), associated with the Buxton Thermal Springs.

Any applicable environmental permits, consents, notifications or other regulatory requirements identified in relation to the proposed works shall be addressed prior to the commencement.

1.4 Objectives of the Strategy

The key objectives of this Source Protection Strategy are to:

- Identify the groundwater, surface water, and other environmental receptors that could potentially be affected by the proposed excavation and construction works;

- Identify potential sources and pathways by which the proposed works could affect groundwater quality, groundwater flow conditions or surface water receptors;
- Identify potential sources and pathways by which the proposed works could affect groundwater quality, groundwater flow conditions or surface water receptors;
- Establish appropriate source protection and pollution prevention measures to prevent or minimise potential impacts to groundwater and the Buxton Thermal Springs;
- Establish appropriate controls for excavations, handling of excavated materials, construction activities and reinstatement;
- Define contingency measures to be implemented in response to unexpected contamination, groundwater conditions, suspected thermal groundwater or uncontrolled discharges; and,
- Establish appropriate monitoring, inspection and verification requirements to confirm implementation of the Strategy and identify any unexpected effects arising during construction.

2 SITE DETAILS

2.1 Site Location

The site is located within lands adjacent to Buxton MyActive Leisure Centre, Worksop, SK17 6BJ, United Kingdom (centroid BNG 405411, 373384). The site boundary occupies an area of c.0.4 acres.

The site context and location are provided in Figure 2-1 below, and a copy of the Site Location Plan is provided in Appendix A.

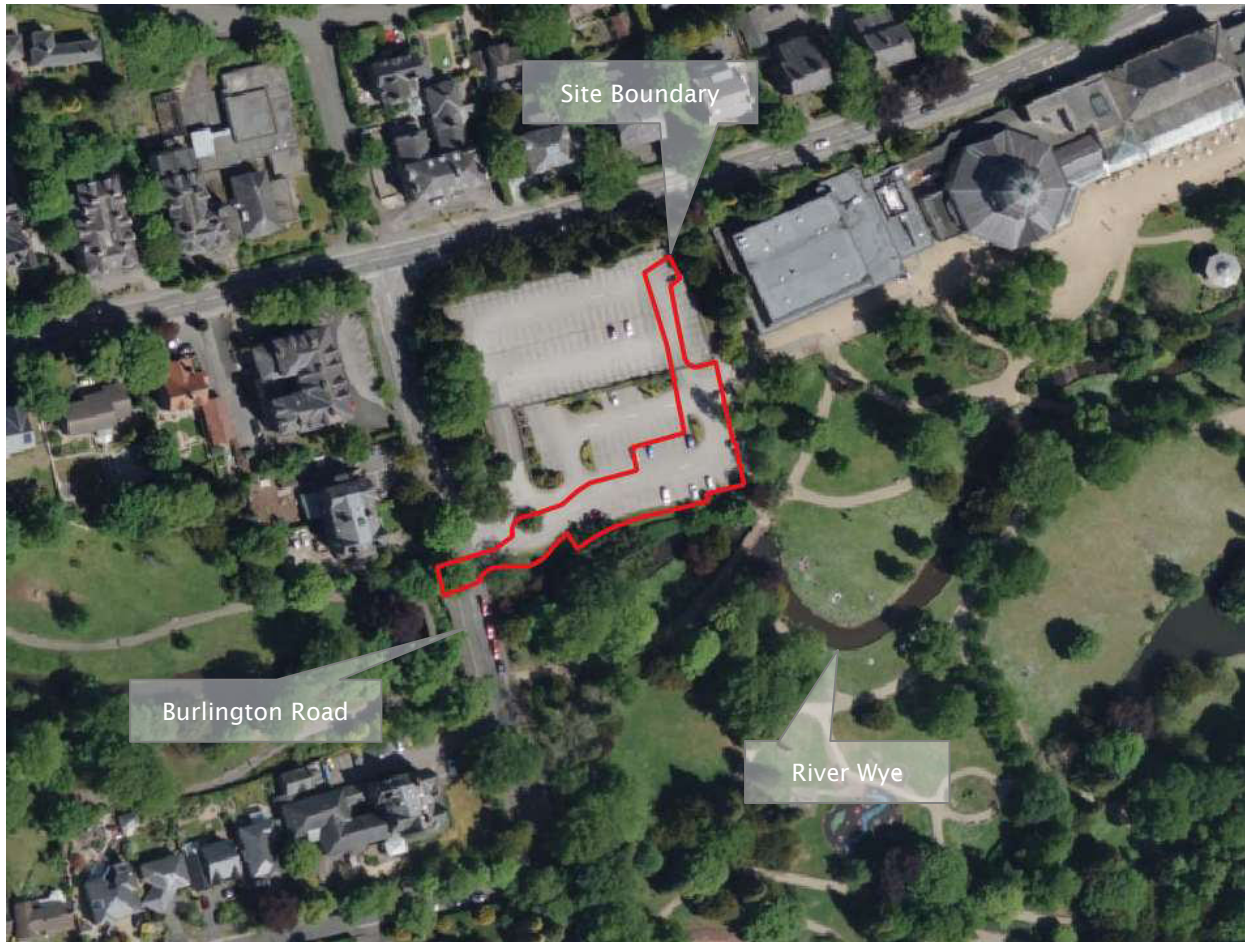


Figure 2-1 Approximate Site Boundary

2.2 Site Description

The site currently comprises a public multi-storey car park, under the control of the local council.

The site is located on the northern bank of the River Wye, with lands generally sloping to the south and southeast. The highest point of the site, comprising the raised-level car park is situated at c.299.58mOD. The ground-level car park slopes generally southwards, from c.295.95mOD to c.295.09mOD across the southeastern portion of the site, while the lowest point is c.294.47mOD at the western site boundary.

2.3 Development Proposal

The proposed development comprises the installation of a new electrical substation and associated underground high-voltage (HV) cabling within the council car park adjacent to Buxton MyActive Leisure Centre, SK17 6BJ. The proposed cable routes will include sections of trenching exceeding 1.0 metres below ground level (mbgl) and runs greater than 5m in length, with works extending into the Core Protection Area (CPA) associated with the Buxton Thermal Springs.

A copy of the Proposed Development Plan and plans detailing the maximum assumed excavations for the proposed development is provided in Appendix B.

3 SITE SETTING

3.1 Ground Conditions

3.1.1 Published Bedrock Geology

A review of the British Geological Survey (BGS) GeoIndex Spatial Resources Map Viewer¹ published (1:50,000 scale) indicates the bedrock underlying the site is the Asbian Bowland Shale Formation comprised mainly of dark grey fissile and blocky weakly calcareous mudstone, with subordinate sequences of interbedded limestone and sandstone.

The Bowland Shale Formation, together with shales and sandstones of the Namurian Millstone Grit Group, overlie Dinantian aged marine limestones, referred to as 'Carboniferous Limestone'². Both of these units are and understood to be underlain the site.

Carboniferous Limestone forms a regionally significant and karstified aquifer for potable and industrial use³. In the Buxton area, it hosts groundwater temperatures ranging up to 27.5°C, discharging locally to thermal springs. Primary porosity (<1%) and intergranular hydraulic conductivity of the limestone are generally very low (ranging from 0.001 – 0.01 m d⁻¹). Groundwater flow is facilitated primarily by solution enlarged joints, fractures and bedding planes. The Dinantian section in the vicinity of Buxton includes the Monsal Dale Formation, comprised of thickly-bedded and bioturbated well-sorted biosparites and pelsparites, to poorly sorted biomicrites, and Bee Low Limestone Formation fine to medium grained calcarenites, and peloidal calcarenites.

3.1.2 Mapped Linear Features

A review of BGS Linear Features (1:50,000 scale) dataset does not identify any structural features on site. The closest mapped feature was a north-northeast to south southwest trending fault located c.880m south of the site.

3.1.3 Soils

A review of the BGS Spatial Resources Map Viewer (1:50,000 scale)⁴ indicates that the topsoil across most of the site is classified under the European Soil Bureau (ESB) dataset as being derived from mudstone and sandstone material. The soils across the majority of the site are described as Heavy to Medium, clay-rich but locally medium, clay-loam soil and subsoil. Soil depth across the majority of the site is classified as intermediate to shallow, with soil depth in the southwest corner described as deep.

An area in the southwest corner is described as ALL, clay-rich but locally medium, clay-loam soil and subsoil, with soil depth classified as Deep.

3.1.4 Superficial Deposits

A review of the British Geological Survey (BGS) GeoIndex (1:50,000 and 1:625,000 scale) indicates that no superficial deposits are mapped across the majority of the site, with only a small area of Quaternary Alluvium (comprising clay, silt, sand and gravel) encroaching onto the southwest corner of the site.

¹ <https://www.bgs.ac.uk/map-viewers/geoindex-onshore/>

² <https://webapps.bgs.ac.uk/memoirs/docs/B01565.html>

³ <https://nora.nerc.ac.uk/id/eprint/5671/1/DerbyshireCarbLimestoneOR08028.pdf>

⁴ https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.115084622.816555794.1787214538-579469084.1787214538

4 HYDROGEOLOGICAL SETTING

4.1 Hydrogeology

4.1.1 Aquifer Characteristics and Vulnerability

A review of the BGS GeoIndex (1:625,000 scale) database⁵ identifies the bedrock aquifer is the Bowland High Group and Craven Group (undifferentiated), comprising highly indurated rocks with limited groundwater, and is classified as 2B, described as a moderately productive aquifer. Flow mechanics are described as being via fractures and other discontinuities.

The underlying Dinanatian Carboniferous Limestone comprises a massive karstic limestone aquifer with rapid response to rainfall. It is described as a moderately productive aquifer with yields highly variable from dry to 40 L/s.

A review of the BGS Aquifer Designation Dataset⁶ identifies the site as located within a 'Secondary A' bedrock aquifer designation area.

A review of the Environment Agency Groundwater Vulnerability Maps⁷ indicates that the site is classified as moderate vulnerability.

4.1.2 Groundwater Recharge

Diffuse recharge generally occurs via rainfall percolating through the subsoil being higher in areas where subsoil is thinner and/or more permeable. The proportion of effective rainfall that recharges the aquifer is largely determined by the thickness and permeability of the soil, and subsoil, and by the slope.

Long term climate records indicate an average annual precipitation of 1,245.843mm for the 1991 – 2020 period⁸ in the 12km grid square encompassing Worksop and including the site area. A review of the Environment Agency potential evapotranspiration (PET) rates for the site for the most recent full calendar year 2025⁹ identified a range of -0.806mm/day (Dec 2025) to 3.98mm/day (Aug 2025). Summation of the daily PET values for 2025 gives an estimated annual PET of 786mm/year. The resulting difference between annual precipitation and PET indicates a theoretical annual water surplus of approximately 459mm/year, prior to accounting for runoff, changes in soil moisture storage and other components of the site water balance.

4.1.3 Groundwater Quality Data

A review of the Water Framework Directive Groundwater Bodies Cycle 2 2019¹⁰ indicates the Wye from Source to Monk's Dale Water Groundwater Body (Water Body ID: GB104028058460) has an Overall Waterbody Classification and Overall Chemical Groundwater Status of 'Poor' (2019) and has a Quantitative Groundwater Status of 'Good' (2019).

4.1.4 Expected Groundwater Conditions

The River Wye is located c.10m south of the site and has an elevation of c.293mOD, compared with a site elevation of c.295mOD. The proposed excavation is limited to c.1.0mbgl, corresponding to an anticipated excavation formation level of c.294mOD.

The River Wye therefore, lies approximately 1m below the anticipated base of excavation. Given the close proximity of the River Wye, its elevation provides an indicative reference level for the local shallow

⁵https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.204017813.445741183.1762344967-690252330.1762344967

⁶ <https://www.bgs.ac.uk/datasets/aquifer-designation-data/>

⁷ <https://www.data.gov.uk/dataset/42d7d021-538c-46e2-abbb-644e01c63551/groundwater-vulnerability-maps-2017-on-magic>

⁸ Annual Precipitation Observations 1991-2020 12km | The Met Office climate data portal

⁹<https://www.data.gov.uk/dataset/7b58506c-620d-433c-afce-d5d93ef7e01e/environment-agency-potential-evapotranspiration-dataset>

¹⁰ <https://environment.data.gov.uk/catchment-planning/WaterBody/GB104028058460>

groundwater regime. Although groundwater levels cannot be assumed to directly coincide with river level in the absence of site-specific groundwater monitoring data.

Nevertheless, the available elevation data could be used to infer that the proposed excavation is likely to remain above the local river level and is therefore considered unlikely to directly intercept shallow groundwater under typical groundwater conditions. The potential for localised or perched groundwater above this level, particularly during periods of elevated groundwater levels or rainfall, cannot however be entirely discounted.

4.2 Surface Water Environment

4.2.1 Surface Watercourses

A review of WFD River Water Bodies, the Environment Agency Statutory Main Rivers Map¹¹ and site reconnaissance identified the nearest watercourse as the River Wye, located c.10m south of the site and flowing to the east. The River Wye eventually discharges into the River Derwent, located c.21.8km southeast of the site.

Additionally, 3no. surface water bodies (lakes/ponds) were identified within Pavillion Gardens, which lies to the southeast of the site. The identified surface water bodies are located c.140m south, c.160m east, and c.240m south of the site. It is considered that the River Wye provides hydraulic separation between the site and these surface water bodies, such that direct hydraulic connection is unlikely. As such, these surface water bodies are not considered further as potential receptors within this assessment.

4.3 Groundwater Abstractions and Water Supplies

4.3.1 Groundwater Abstractions

A search of the British Geological Survey (BGS) Water Well database¹² was conducted to identify registered wells within 1km of the site and returned 10no. records of registered well. Details are provided below in Table 4-1.

A review of the Environment Agency Water Abstraction Licences database¹³ returned 2no. abstraction licences within 1km of the site. Details are provided below in Table 4-2.

¹¹ <https://www.arcgis.com/apps/webappviewer/index.html?id=17cd53dfc524433980cc333726a56386>

¹² https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.204017813.445741183.1762344967-690252330.1762344967

¹³ <https://www.arcgis.com/apps/mapviewer/index.html?layers=a49161b5e30e45a9a78c29db2e5b7588>

Table 4-1: BGS Registered Groundwater Wells

Reference	Location / Name	Drill Date	Depth (m)	Minimum Distance from Site
SK07/23B	Buxton Mineral Springs	-	-	c.320m east
SK07/23A	Buxton Mineral Springs	-	-	c.360m east
SK07/22	Buxton Hydro	-	118	c.300m southeast
SK07/25	Empire Hostel Messrs Spiers & Pond	-	49.5	c.450m northwest
SK07/28	Mineral Spring Well Buxton	-	8.7	c.1km northeast
SK07/23C	Burbage	-		c.1.1km southwest
SK07/55	Nestle Waters Lightwood Road Buxton	-	151.8	c.1.5km north
SK07/24	Nithen End	-	10.5	c.1.5km northwest
SK07/2	Ladmanlow Harper Hill	1951	177.1	c.1.8km southwest
SK07/50	Buxton Real Ale Staden Business Park	2013	95	c.1.9km southeast

Table 4-2: Environment Agency Groundwater Abstractions within 2km of the Site

Licence Number	Location / Name	Licence Holder Name	Sector / Purpose	Max Daily Yield m ³	Category	Minimum Distance from Site
03/28/39/0066	The Town Hall	High Peak Borough Council	Process Water	782	High	c.320m east
03/28/39/0111/R01	1A City Place	Nestle Waters Uk Limited	Water Bottling	750	High	c.1.5km north

4.4 Hydrogeological Sensitivity and Source Protection Designations

4.4.1 Core Protection Area

The site is located within a Core Protection Area for Buxton Thermal Springs, as designated by High Peak Borough Council.

The Core Protection Area corresponds to the area where the Namurian strata are expected to be less than 50m thick, the ground level is below 300m AOD and the location is within 250m of known thermal groundwater associated with Buxton Thermal Springs.

4.4.2 Source Protection Zones (SPZs)

A review of Environment Agency Source Protection Zones (merged) dataset confirmed that the site is located within Inner Groundwater Source Protection Zone (SPZ1) for Buxton Thermal Springs and is located c.20m south of Zone I Source Protection Zone¹⁴ (SPZ1c) for Buxton Thermal Springs.

A groundwater SPZ1 is the area immediately around an abstraction point for domestic supply or for food production purposes. Groundwater in a SPZ1 is most vulnerable to pollution given the close proximity of the abstraction point and the water's intended use for human consumption.

A SPZ1c designation is indicative of an inner groundwater protection zone, where the underlying drinking-water aquifer is confined beneath a protective, impermeable geological layer.

¹⁴ <https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs>

4.4.3 Designated Sites and Sites of Environmental Interest

Environmental receptors sensitive to change in the water environment such as Sites of Special Scientific Interest (SSSI)¹⁵, Nature Reserves (LNR)¹⁶, Special Protection Areas (SPA), National Parks England, Special Areas of Conservation (SAC), and RAMSAR¹⁷ sites have been considered within this assessment.

There were 1 no. designated sites or sites of Environmental interest identified within 1km of the site; details are provided below in Table 4-3.

Table 4-3: Designated Sites and Sites of Environmental Interest within 1km of the Site

Designated Site Name	Type	Location from Site
Poole's Cavern and Grin Low Wood SSSI	SSSI	c.840m southwest

4.4.4 Priority Habitats

Priority habitats under the UK Biodiversity Action Plan such as peatland, heathland, and fens have been considered within this assessment.

A review of Natural England Environmental¹⁸ database indicates that 13no. priority habitats were recorded within 250m of the site. Details are included in Table 4-4.

Table 4-4: Priority Habitats within 250m of the Site

Object ID	Description	Area (ha)	Location from Site
627996	No main habitat but additional habitats present (ponds)	0.06	c.25m east
207401	Deciduous woodland	0.13	c.110m southeast
207407	Deciduous woodland	0.04	c.110m southeast
206908	Deciduous woodland	0.39	c.115m southwest
207442	Deciduous woodland	0.18	c.120m southeast
206937	Deciduous woodland	0.03	c.125m southwest
207422	Deciduous woodland	0.48	c.125m northeast
207450	Deciduous woodland	0.04	c.140m southeast
207459	Deciduous woodland	0.02	c.140m southeast
207525	Deciduous woodland	0.28	c.170m southeast
206778	Deciduous woodland	0.52	c.170m southwest
207469	Deciduous woodland	0.16	c.200m northeast
206752	Deciduous woodland	0.48	c.205m west

¹⁵ <https://magic.defra.gov.uk/MagicMap.html>

¹⁶ <https://naturalengland-defra.opendata.arcgis.com/datasets/Defra::local-nature-reserves-england/explore?location=53.350015%2C-1.168030%2C11.85>

¹⁷ <https://naturalengland-defra.opendata.arcgis.com/datasets/Defra::ramsar-england/explore?location=53.008148%2C-1.386907%2C9.49>

¹⁸ https://naturalengland-defra.opendata.arcgis.com/datasets/39403df11c8044d998772db5b54ad86c_0/explore?location=53.339426%2C-1.096105%2C15.37

4.4.5 Karst Features

The Bowland Shale Formation immediately underlying the site is not considered prone to the formation of karst features.

The deeper-lying Dinantian Carboniferous Limestone forms the bedrock aquifer supplying the Buxton Thermal Springs and is therefore considered a sensitive groundwater receptor.

Carboniferous Limestone has low primary porosity (<1%) and intergranular hydraulic conductivity of the limestone are generally very low (0.001–0.01 md⁻¹). However, it is prone to karstification, with groundwater flow facilitated primarily by solution enlarged joints, fractures and bedding planes.

Although separated by the intervening Bowland Shale Formation, the potential for groundwater quality impacts to the deeper limestone aquifer and associated thermal springs has been considered within the hydrogeological risk assessment, particularly in relation to potential preferential flow pathways associated with dissolution features, geological fractures and/or faults.

4.5 Contamination and Pollution Sources

4.5.1 Current / Previous Land Use

The site currently comprises a public multi-storey car park, with historical uses including tennis courts, pathway and a rink partially encroaching onto the site. The Pavillion Gardens Electricity Substation (331971) was identified in the northwestern corner of the site during the site walkover. No PCB signage was observed during the walkover; however, the presence of PCB-containing equipment cannot be confirmed through visual inspection.

These current and historical uses represent potential sources of contamination to shallow soils and/or made ground. Potential contaminants include petroleum hydrocarbons, PAHs, VOCs, and metals. Construction activities may also introduce temporary pollution sources, including fuels, oils, concrete and other construction materials.

The potential contaminant sources, pathways and receptors are incorporated within the Conceptual Site Model presented in Section 6.

The potential for land contamination to affect groundwater and the Buxton Thermal Springs should be assessed in accordance with *Code of Practice (CoP): Excavations in the Vicinity of Buxton Thermal Springs (High Peak Borough Council, Version 1.1, September 2021)*. Where required, a Contaminated Land Risk Assessment should be undertaken in accordance with the Environment Agency's Land Contamination Risk Management (LCRM) guidance, with consideration given to the potential mobilisation of contaminants during excavation and the potential for migration to the underlying groundwater and thermal groundwater system.

4.6 Key Identified Receptors

A review of available databases, consultation with Environment Agency and the site walkover identified the following potential significant water receptors:

- The River Wye (located c.10m south of the site);
- Buxton Thermal Springs;
- The underlying bedrock aquifers;
- The potential underlying superficial aquifer;
- Nearby registered water supplies;
- Source Protection Zones (SPZ1 and SPZ1c);
- Nearby designated sites and priority habitats;
- Designated Core Protection Area; and
- Karst features

5 BUXTON THERMAL SPRINGS

5.1 Overview

The Buxton Thermal Springs are naturally occurring thermal groundwater discharges located in Buxton, Derbyshire. The springs are associated with the underlying Carboniferous Limestone aquifer, and are an important hydrogeological receptor. The thermal waters have historically been utilised for their mineral content and therapeutic properties.

5.2 Hydrogeological Setting

The thermal groundwater system is associated with the Carboniferous Limestone of the Derbyshire Dome. Groundwater is understood to recharge across the wider limestone outcrop, circulate to depth, and return towards the surface along preferential pathways, potentially associated with geological structures such as faults and fissures.

The precise configuration of the groundwater flow pathways and the extent of the hydraulic connectivity between the thermal springs and the wider aquifer are not fully established.

5.3 Hydrogeological Sensitivity

The thermal springs are sensitive to changes in groundwater quality and the hydraulic regime of the underlying aquifer. Potential impacts include:

- Contamination of groundwater through the introduction of pollutants
- Alterations of groundwater levels, pressures and flow pathways
- Creation of preferential pathways between groundwater-bearing formations
- Changes to temperature, flow rate or chemical composition of spring discharge

The overlying Namurian strata, comprising predominantly mudstones, shales and sandstones, which provide varying degrees of confinement to the underlying Carboniferous Limestone. The thickness and continuity of these strata are important factors influencing the vulnerability of the underlying thermal groundwater system.

5.4 Site-Specific Source Protection Considerations

The site is underlain by Namurian strata, with the deeper Carboniferous Limestone forming the principal aquifer associated with the Buxton thermal groundwater system. The proposed works therefore have the potential to interact with the shallow groundwater regime and, depending on excavation depth and local geological conditions, the underlying limestone aquifer.

Source protection measures should focus on preventing contamination of groundwater and maintaining groundwater quality, avoiding changes to groundwater flow pathways or hydraulic conditions, and preserving the hydraulic integrity of the thermal groundwater system. Particular consideration should be given to intrusive works, including excavations, drilling, piling and dewatering, which could penetrate the Namurian strata, provide a preferential pathway to the underlying Carboniferous Limestone or alter groundwater flow pathways.

Given the proximity of the River Wye and the sensitivity of the Buxton thermal groundwater system, appropriate controls should be implemented during construction to prevent uncontrolled groundwater discharge, contaminant migration and disturbance of the underlying hydrogeological regime. A precautionary approach is warranted given the uncertainty surrounding the precise configuration of the thermal groundwater system.

6 CONCEPTUAL SITE MODEL (CSM)

6.1 Potential Sources

Potential sources relevant to the hydrogeological conceptual site model comprise:

- Existing contamination potentially present within potentially reduced quality made ground and/or shallow soils associated with current and historical site uses;
- Potential PCB-containing equipment associated with the existing substation;
- Fuels, oils and other hazardous substances associated with construction plant and vehicles;
- Concrete, cement, grout and other construction materials;
- Ground disturbance and excavation, with the potential to mobilise existing contamination; and,
- Constriction runoff and sediment generated during the works.

6.2 Potential Pathways

For the purpose of this risk assessment a pathway is defined as the route along which a particle of water, substance, or contaminant moves through the environment. The main potential pathways by which contaminants or construction activities could affect groundwater and surface-water receptors comprise:

- Infiltration and leaching through made ground and the unsaturated zone;
- Migration of contaminants within shallow groundwater;
- Hydraulic connectivity between shallow groundwater and the underlying bedrock aquifer;
- Migration within fractures, fissures or other preferential pathways within the bedrock;
- Creation or alteration of preferential groundwater pathways through excavation or other intrusive works;
- Groundwater interception or changes to groundwater flow conditions during excavations; and
- Surface water runoff or uncontrolled discharge to the River Wye, including via the existing outfall located c.10m south of the site.

6.3 Receptors

Receptors are defined by their potential for being adversely affected by a contaminant. For the purpose of this risk assessment a receptor is defined as any controlled water or abstraction point that is or could be harmed by a potential pollutant.

The principal water-related receptors identified for the site are:

- Buxton Thermal Springs, as the primary sensitive groundwater receptor;
- Carboniferous Limestone aquifer, representing the principal underlying bedrock groundwater receptor;
- Shallow groundwater, where present and hydraulically connected to the underlying aquifer,
- The River Wye (located c.10m south of the site); and
- Nearby registered water supplies, where a credible hydraulic pathway exists.

The potential underlying superficial aquifer is also considered where present and hydraulically connected to the site.

The site's location within the Source Protection Zone and Core Protection Area is considered within the assessment of groundwater sensitivity rather than as a receptor. Similarly, karst features represent potential preferential groundwater pathways and/or features influencing aquifer vulnerability rather than receptors in their own right.

Designated sites and priority habitats are considered where there is a demonstrable dependence on groundwater or surface-water and a credible pathway from the proposed works exists.

6.4 Core Pollutant Linkages

The principal potential pollutant and hydrogeological linkages are summarised below in Table 6-1:

Table 6-1: Principal Potential Pollutant Linkages

Source	Pathway	Receptor
Existing potentially reduced quality made ground and / or shallow soils associated with current and/or historical site uses.	Infiltration and leaching through potentially reduced quality made ground and the unsaturated zone, followed by migration within shallow groundwater and/or the underlying bedrock aquifer.	Carboniferous Limestone aquifer Buxton Thermal Springs Shallow groundwater (where hydraulically connected)
Potential PCB-containing equipment associated with the existing substation	Leakage or release of contaminants to shallow soils, followed by infiltration, leaching and groundwater migration	
Fuel, oils and other hazardous substances associated with construction plant, vehicles and fuel storage	Accidental spills or leaks, followed by infiltrations into the ground and migration through shallow groundwater or the underlying bedrock aquifer	Shallow groundwater Carboniferous Limestone aquifer River Wye
Ground disturbance and excavation with the potential to mobilise existing contamination	Exposure, mobilisation and migration of contaminants through disturbed soils, infiltration or groundwater movement	Carboniferous Limestone aquifer Buxton Thermal Springs Shallow groundwater (where hydraulically connected)
Excavation and other intrusive works within the Core Protection Area	Creation or alteration of preferential groundwater pathways, or interception of groundwater, potentially affecting groundwater flow conditions	Carboniferous Limestone aquifer Buxton Thermal Springs
Construction runoff and sediment generated during the works	Surface water run off or uncontrolled discharge, including via the existing outfall located c.10m south of the site	River Wye
Existing potential contamination or construction-related pollutants mobilised at the site	Migration through groundwater or surface water pathways, where a credible hydraulic connection exists	Nearby registered water supplies Potential superficial aquifer Designated sites and priority habitats where water dependent and hydraulically connected

The potential pollutant linkages are preliminary and require consideration alongside the site's geological and hydrogeological conditions. The significance of each linkage depends on the presence and distribution of contamination, the nature of the proposed works and degree of hydraulic connectivity between the site and identified receptors.

6.5 CSM Uncertainty

The precise configuration of groundwater flow pathways contributing to the Buxton Thermal Springs is not fully established. In particular, the degree of hydraulic connectivity between shallow groundwater at the site, the Carboniferous Limestone and the deeper thermal groundwater system is subject to uncertainty.

The source protection strategy therefore adopts a precautionary approach to intrusive works and potential contaminant sources, with controls designed to prevent both groundwater contamination and physical disturbance off groundwater flow pathways.

7 SOURCE PROTECTION STRATEGY

The proposed development comprises the construction of a new electrical substation and associated underground HV cabling, within the existing car park. The cable installation will require trench excavations exceeding 1.0m below ground level (mbgl) and extending for more than 5m in length. The works are located within the Core Protection Area (CPA) associated with the Buxton Thermal Springs, and therefore require appropriate controls to minimise the potential for contamination of groundwater and disturbance of groundwater flow pathways.

The Source Protection Strategy has been developed with consideration of the site-specific Conceptual Site Model (CSM), the sensitivity of the underlying hydrogeological environment and the requirements of the *Code of Practice (CoP): Excavations in the Vicinity of Buxton Thermal Springs* (High Peak Borough Council, Version 1.1, September 2021).

7.1 Source Protection Objectives

The key objectives of this Source Protection Strategy are as follows:

- Prevent deterioration in groundwater quality and protect the Buxton Thermal Springs and the underlying Carboniferous Limestone aquifer
- Avoid disturbance of groundwater flow pathways and hydraulic conditions
- Prevent mobilisation of existing potential contamination during excavations
- Prevent uncontrolled discharge of pollutants to the River Wye, Buxton Thermal Springs, and local water supplies
- Establish appropriate controls for excavation, construction and reinstatement
- Ensure safe handling of potentially reduced quality made ground and any unexpected contamination
- Comply with Environment Agency guidance and the *Code of Practice (CoP): Excavations in the Vicinity of Buxton Thermal Springs* (High Peak Borough Council, Version 1.1, September 2021).

7.2 Regulatory Guidance and Pollution Prevention

The development shall ensure appropriate management of storage of fuel and chemicals, plant refuelling, waste management and the prevention of pollution to groundwater and surface water.

Pollution prevention measures shall be developed with reference to relevant Environment Agency guidance and applicable good practice for construction activities, including the prevention of pollution from spills, uncontrolled discharges and contaminated runoff.

The excavation methodology, associated with method statements and mitigation measures shall be developed and implemented with reference to the *Code of Practice (CoP): Excavations in the Vicinity of the Buxton Thermal Springs* (High Peak Borough Council, Version 1.1, September 2021), with particular regard given to Section 3.

Any consultation, notifications, consents or additional requirements arising from the CoP or from relevant regulatory and local authority bodies shall be identified prior to the commencement of works. Where required, these shall be incorporated into the final construction method statement and communicated to the relevant site personnel.

7.3 Excavation and Ground Penetration Controls

The proposed HV cable installation will require trenching exceeding 1.0mbgl and extending for more than 5m. Excavation works shall therefore be undertaken in accordance with an appropriate excavation method statement prepared with consideration of the requirements of the CoP.

The excavation method statement should as a minimum, define:

- The location, width, extent and maximum depth of the proposed excavations;
- The proposed excavation methodology and plant to be used;

- Measures to minimise unnecessary disturbance of the ground and underlying geological strata;
- Procedures for inspection of exposed ground conditions;
- Arrangements for managing excavated materials;
- Measures to prevent mobilisation of existing contamination;
- Procedures for managing groundwater if encountered;
- Measures to prevent uncontrolled discharge of water from excavations; and
- Proposed backfilling and reinstatement arrangements.

Excavations shall be limited to the minimum depth and extent required to construct the proposed infrastructure. Excavation below the approved formation level shall not be undertaken unless required for construction and subject to appropriate assessment. The final excavation dimensions and construction methodology will be confirmed as part of the detailed construction design and shall be consistent with the requirements of the CoP.

Where unexpected geological or hydrogeological conditions are encountered, including evidence of significant groundwater flow, voids, fissures, or other preferential pathways, the affected works shall be paused and the conditions assessed before excavation proceeds.

Particular care shall be taken to avoid unnecessary creation or enlargement of preferential pathways through the underlying strata.

7.4 Groundwater Protection and Groundwater Encounter

The proposed works shall be undertaken on the basis that groundwater is to be protected from contamination and that uncontrolled discharge will not be permitted. No specific dewatering requirement has been assumed at this planning stage.

If groundwater is encountered during excavation:

- Excavation shall be assessed to determine the nature and extent of groundwater ingress;
- Groundwater shall not be discharged directly to the ground, drainage system or River Wye without appropriate assessment, and where required, treatment and / or authorisation;
- Measures shall be implemented to prevent mobilisation of sediment or contaminants from the excavations;
- Any groundwater requiring removal shall be appropriately contained and managed;
- The source and characteristics of the groundwater shall be considered where significant groundwater ingress occurs, and appropriate hydrogeological advice obtained where necessary; and
- Specialist hydrogeological advice shall be contained where groundwater conditions indicate potential interaction with the underlying groundwater system or where thermal groundwater is suspected.

If water exhibiting unusual temperature, chemistry, flow characteristics or other features indicative of a connection with the thermal groundwater system is encountered, the affected excavation shall be paused and the appropriate responsible parties consulted before works recommence

No permanent alteration to groundwater levels, pressures or flow pathways shall be permitted as part of the proposed works.

7.5 Management of Excavated Materials and Potentially Contaminated Ground

Excavated materials shall be visually inspected during the works for evidence of contamination, including staining, odour, unusual materials or other indications of potentially contaminated ground.

Where potentially contaminated material is identified:

- The affected material shall be segregated from clean excavated materials;
- Stockpiles shall be located and managed to prevent contact with surface water and uncontrolled runoff;
- Potentially contaminated materials shall not be placed directly adjacent to drainage channels or the River Wye;

- Appropriate covering or containment shall be provided, where required;
- Material shall be characterised and managed in accordance with applicable waste and contaminated land requirements; and
- Contaminated material shall not be reused as backfill unless its suitability has been demonstrated.

The excavation and management of potentially contaminated material shall be undertaken in accordance with the findings and recommendations of the relevant Contaminated Land Risk Assessment, where required.

7.6 Fuels, Oils and Chemicals

Fuels, oils and other potentially polluting substances required during construction shall be stored and handled in a manner that minimises the risk of release to ground or surface water.

The following measures shall be implemented:

- Fuels and chemicals shall be stored in secure, designated areas away from the River Wye and surface water drainage features;
- Appropriate secondary containment shall be provided for stored liquids, where required;
- Quantities of hazardous substances stored onsite shall be minimised;
- Refuelling shall be undertaken in designated areas and away from watercourses, drainage channels and open excavations, wherever practicable;
- Storage containers, tanks, and associated equipment shall be regularly inspected for leaks or damage;
- Spill response equipment shall be readily viable; and
- Any spill or leakage shall be contained and managed immediately in accordance with the site's emergency response procedures.

7.7 Concrete, Cement, Grout and Construction Materials

Concrete, cement, grout and other cementitious materials shall be managed to prevent uncontrolled release to ground, groundwater or surface water.

Concrete washout and cleaning of equipment shall be undertaken only within designated areas with appropriate containment. Cementitious wash water shall not be discharged to the ground, surface water drainage system or River Wye.

Where grout or other cementitious materials are used in association with the proposed infrastructure, their use shall be controlled to minimise unnecessary migration into the surrounding ground or creation of unintended preferential pathways.

7.8 Construction Plant and Equipment

Construction plant and vehicles shall be maintained in good working order and inspected regularly to minimise the risk of fuel, oil or hydraulic fluid leakage.

Where practicable:

- Plant shall be parked away from the River Wye and drainage features when not in use;
- Plant shall not be left unattended over open excavations where leakage could result in direct contamination;
- Refuelling shall be undertaken within designated areas;
- Defective or leaking plant shall be removed from service until appropriately repaired; and
- Spill response materials shall be available at the working area.

7.9 Surface Water, Runoff and Sediment Control

Given the proximity to the River Wye, (c.10m south of the site) appropriate measures shall be implemented to prevent contaminated runoff, sediment and construction materials entering the watercourse.

Measures shall include, as appropriate:

- Maintaining excavated areas and stockpiles in a manner that minimises runoff;
- Preventing uncontrolled discharge from excavations;
- Diverting clean surface water away from disturbed areas, where practicable;
- Controlling sediment generated during excavation and construction;
- Protecting existing drainage infrastructure from sediment and construction materials;
- Preventing contaminated or silty water from entering the existing outfall located c.10m south of the site, and
- Inspecting drainage and runoff controls during construction and following significant rainfall events, where appropriate

Prior to commencement of excavation, the final cable alignment shall be reviewed against existing drainage infrastructure. Where excavation or construction activities are undertaken in proximity to drainage infrastructure, appropriate measures shall be implemented to prevent damage to the infrastructure and uncontrolled discharge of sediment, contaminated water or construction materials.

Clean and potentially contaminated runoff shall be appropriately managed, and no uncontrolled discharge of contaminated or sediment-laden water to the River Wye shall be permitted.

7.10 Excavation Reinstatement and Sealing of Pathways

Excavations shall be reinstated as soon as reasonably practicable following installation of the proposed infrastructure.

Backfill materials shall be appropriate for the proposed use and shall not introduce a contamination source or create an unnecessary preferential pathway for groundwater movement.

Where appropriate, excavated materials may be reused, subject to confirmation of their suitability and compliance with the applicable requirements.

Particular consideration shall be given to ensuring that the completed cable trenches do not provide a persistent preferential pathway for groundwater movement between different geological or hydrogeological units. Where site conditions indicate that additional sealing or low permeability measures are required, these shall be incorporated into the reinstatement design.

7.11 Emergency Response and Contingency Procedures

An appropriate pollution incident and emergency response procedure shall be in place prior to commencement of construction.

The procedures shall address, as a minimum, the potential incidents and unexpected conditions described in the following sections:

7.11.1 [Fuel, Oil or Chemical Spill](#)

The source of the spill shall be stopped where safe to do so, the material contained and the spread of the contamination prevented. Spill response materials shall be used to prevent migration to ground, drainage systems or the River Wye. Contaminated materials shall be appropriately collected and managed.

7.11.2 [Unexpected Contamination](#)

Where previously unidentified contamination is encountered, the affected area shall be isolated and assessed. The material shall not be disturbed further until an appropriate management approach has been established by a suitably qualified and competent person.

7.11.3 [Unexpected Groundwater](#)

Where significant groundwater ingress occurs, the excavation shall be assessed and uncontrolled discharge prevented. Appropriate hydrogeological advice shall be obtained where necessary.

7.11.4 Suspected Thermal Groundwater

Where groundwater is encountered that is considered potentially associated with the Buxton thermal groundwater system, the affected works shall be paused and appropriate specialist advice obtained before works recommence.

7.11.5 Uncontrolled Discharge to Surface Water

Any discharge to the River Wye or associated drainage infrastructure shall be stopped, where practicable, contained and reported in accordance with the applicable incident response procedure.

All environmental incidents and unexpected ground or groundwater conditions shall be recorded, with corrective actions documented.

7.12 Monitoring and Verification

Monitoring and verification during construction shall be proportionate to the scale and nature of the proposed works and shall focus on demonstration compliance with the Source Protection Strategy.

As a minimum, construction monitoring shall include:

- Inspection of excavations for unexpected ground conditions, contamination and groundwater;
- Inspection of excavated materials and stockpiles;
- Inspection of surface water and sediment controls;
- Inspection of fuel, chemical and waste storage areas;
- Recording of groundwater encounters and any significant groundwater ingress;
- Recording of environmental incidents and corrective actions; and,
- Verification that excavations have been appropriately backfilled and reinstated.

The requirement for formal groundwater quality or level monitoring shall be reviewed following confirmation of the final construction methodology and based on the groundwater conditions encountered during the works. Where significant groundwater is encountered, or evidence of hydraulic connectivity with the deeper groundwater system is identified, additional monitoring or assessment shall be undertaken where appropriate.

7.13 Roles, Responsibilities and Documentation

Prior to the commencement of the works, responsibility for implementation of the Source Protection Strategy shall be assigned to an appropriately competent person.

The contractor shall ensure that:

- The approved excavation methodology and relevant mitigation measures are communicated to site personnel;
- Appropriate pollution prevention and spill response equipment is available;
- Personnel undertaking excavation are aware of the potential for groundwater and unexpected contamination to be encountered;
- Environmental incidents and unexpected ground conditions are recorded and reported;
- The requirements of the Source Protection Strategy are incorporated into the relevant construction method statements and site environmental controls; and
- The required records are retained for verification purposes.

The detailed construction methodology and site-specific risk assessments shall be finalised prior to the commencement of the relevant works and shall be consistent with the requirements of this Source Protection Strategy and the High Peak Borough Council CoP.

8 CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

The proposed development comprises the installation of a new electrical substation and associated underground high-voltage (HV) cabling within the council car park, adjacent to Buxton MyActive Leisure Centre, SK17 6BJ. The proposed cable routes will include sections of trenching exceeding 1.0m below ground level (mbgl) and runs greater than 5m in length, within the Core Protection Area (CPA) associated with the Buxton Thermal Springs.

There will be no engineered discharge of any effluent / run-off from the site direct to ground as part of the design proposals.

The Source Protection Strategy sets out measures to protect groundwater, the Buxton Thermal Springs, and surface water receptors during the proposed excavation and construction works.

Given the site's location within the Core Protection Area, a precautionary approach to excavation and ground disturbance is required. Subject to implementation of the measures set out within this Strategy and compliance with the *Code of Practice (CoP): Excavations in the Vicinity of Buxton Thermal Springs* (High Peak Borough Council, Version 1.1, September 2021), the potential risks associated with the proposed works can be appropriately managed.

8.2 Recommendations

The following measures shall be incorporated into the detailed construction methodology:

- A detailed excavation method statement shall be prepared prior to commencement of the works, addressing the final excavation extent, depth and methodology and demonstrating compliance with the CoP.
- Excavations shall be undertaken in a manner that minimises disturbance of the underlying ground and avoids the creation of preferential groundwater pathways.
- Excavated materials shall be inspected and appropriately managed, with potentially contaminated materials segregated and managed in accordance with applicable requirements.
- Appropriate controls shall be implemented for fuels, oils, chemicals, concrete, cement, grout, construction plant and waste to prevent pollution of groundwater and surface water.
- No uncontrolled discharge from excavations or construction areas shall be permitted to ground, drainage infrastructure or the River Wye.
- If significant groundwater, unexpected contamination, voids, fissures or evidence of preferential groundwater flow are encountered, the relevant works shall be paused and the conditions assessed before proceeding.
- The final cable alignment shall be reviewed against existing drainage infrastructure prior to construction, including the outfall located c.10m south of the site.
- Excavations shall be appropriately backfilled and reinstated to minimise the potential for persistent preferential groundwater pathways.
- Construction inspections and verification shall be undertaken to confirm implementation of this Source Protection Strategy, with additional hydrogeological assessment or monitoring undertaken where unexpected groundwater conditions are encountered.

Appendix A

Site Location Plan



LEGEND

 Site Boundary



Mossley Mill,
Lower ground (West),
Carnmoney Road North,
Newtownabbey, BT36 5QA

T: 028 9084 8694
E: info@mccloyconsulting.com
W: www.mccloyconsulting.com

DESCRIPTION				
Site Location Plan				
PROJECT / FIGURE NO.				
M03668-01 Leisure Energy Ltd, Buxton				
DRAWN BY	SCALE	REVISION	DATE	
MW	AS SHOWN	01	21/08/2026	

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BACKGROUND MAP CONTAINS OpenStreetMap data, which is licensed under the Open Data Commons Open Database License (ODbL) by the OpenStreetMap Foundation (OSMF), and Bing aerial map data.

Appendix B

Proposed Development Plan

Notes:

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Hatches shown are indicative and for illustrative purposes. Setting out should be done from levels and dimensions provided.

All dimensions and levels should be checked on site prior to installations, fabrications and/or construction.

Key

Application Site

Land relating to Official Title Plan and Registry DY393576

T1, T2 etc Trees identified within EPD Landscaping / Glendale Countryside Limited survey

P02	Position updated	AF	13.08.26
P01	Initial issue	AF	07.08.26
Rev	Description	By	Date



A-Tech

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Derbyshire

SK17 8PD

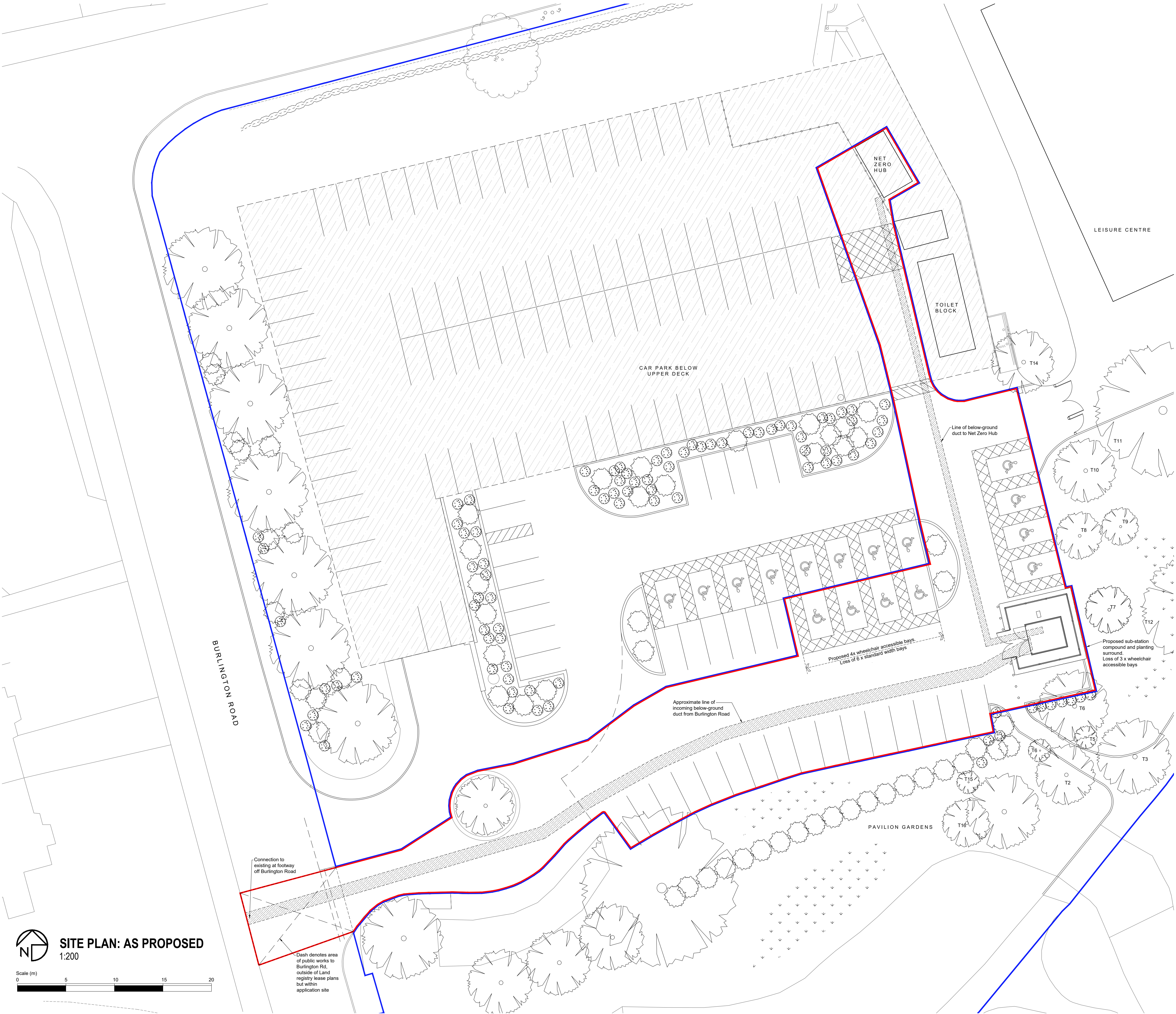
Email: info@a-tech.studio

Tel: 01298 601400

Web: www.a-tech.studio

Client:	Leisure Energy
Project:	Proposed Sub-Station Car Park Adjacent MyActive Buxton Pavilion Gardens
Drawing:	Site Plan As Proposed

Project	Author	Volume	Level	Type	Role	Drw. Number
26026 - XX - XX - XX - XX - X - 31001						
Status	S0	INITIAL STATUS				
Revision	P02	PRELIMINARY				
Scale	1:200	Drawn	AF	Date	07.08.26	
Sheet	A1	Checked	-	A-Tech Job No.	26026	



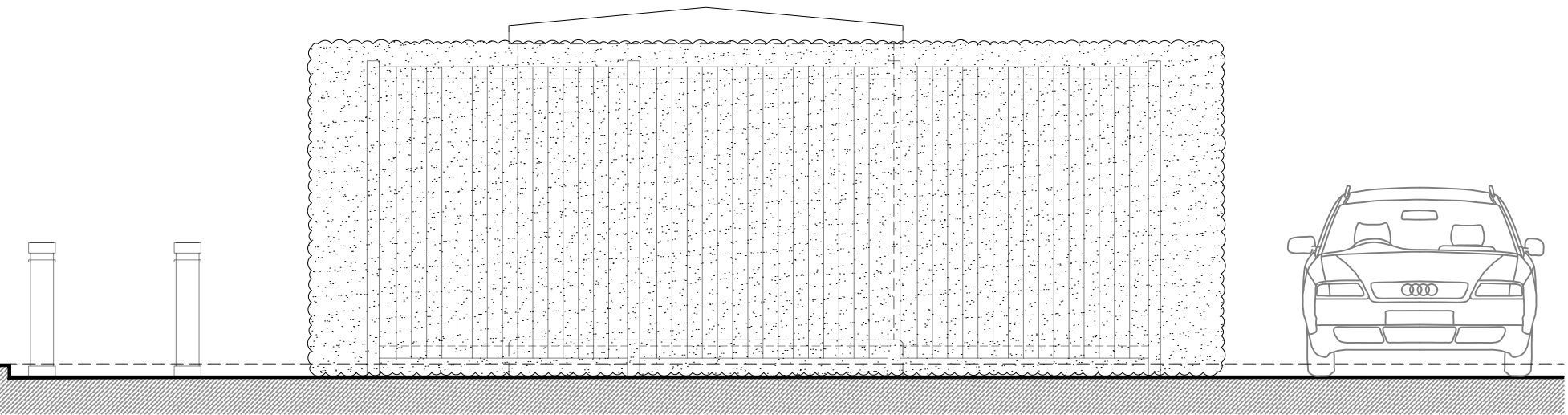
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Scale (m)

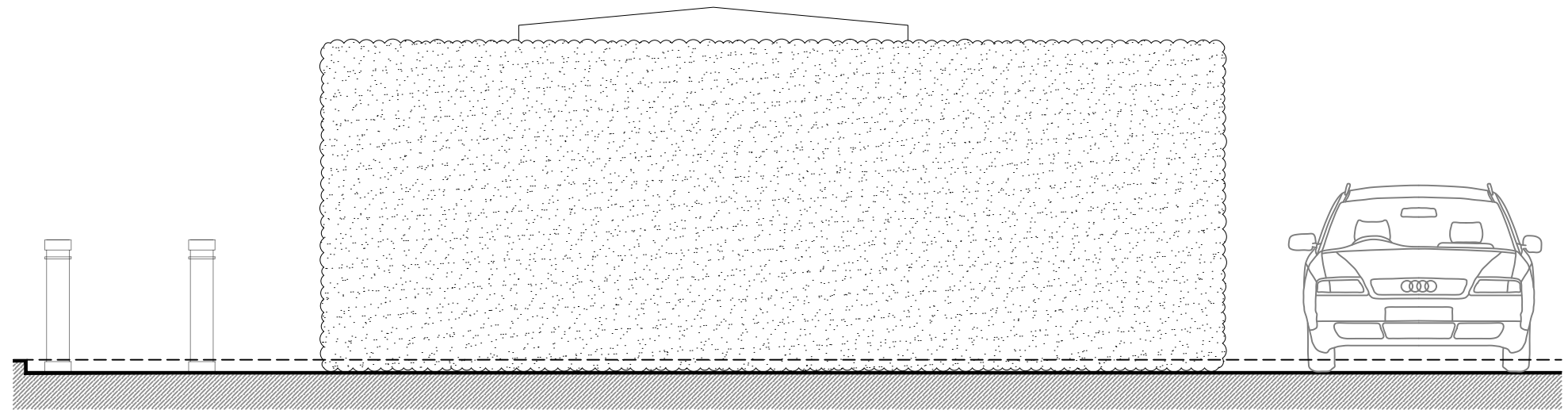
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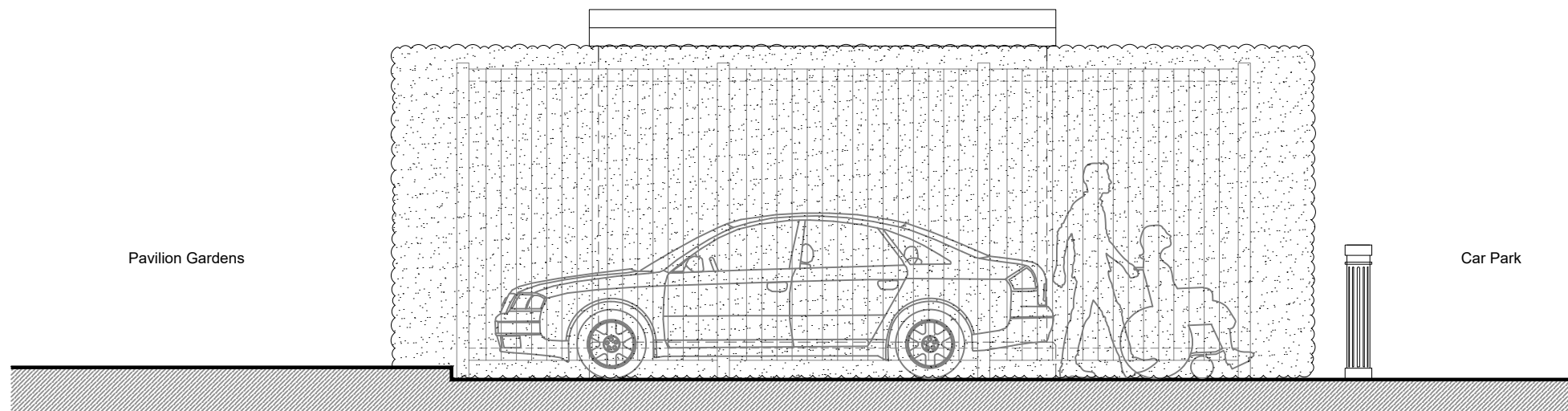
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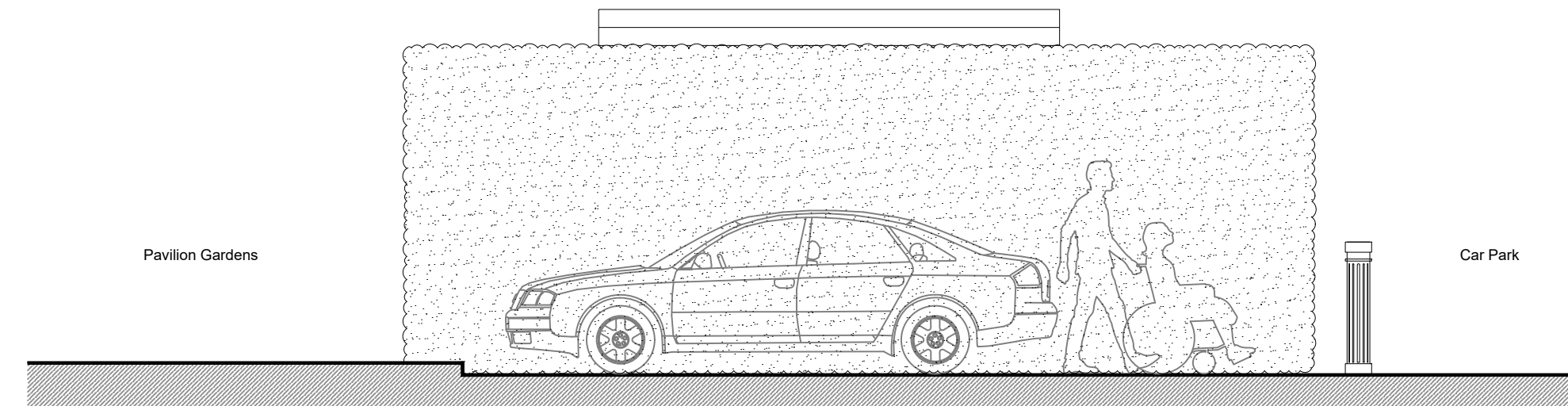
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SHOWING HIDDEN ELEMENTS
1:50



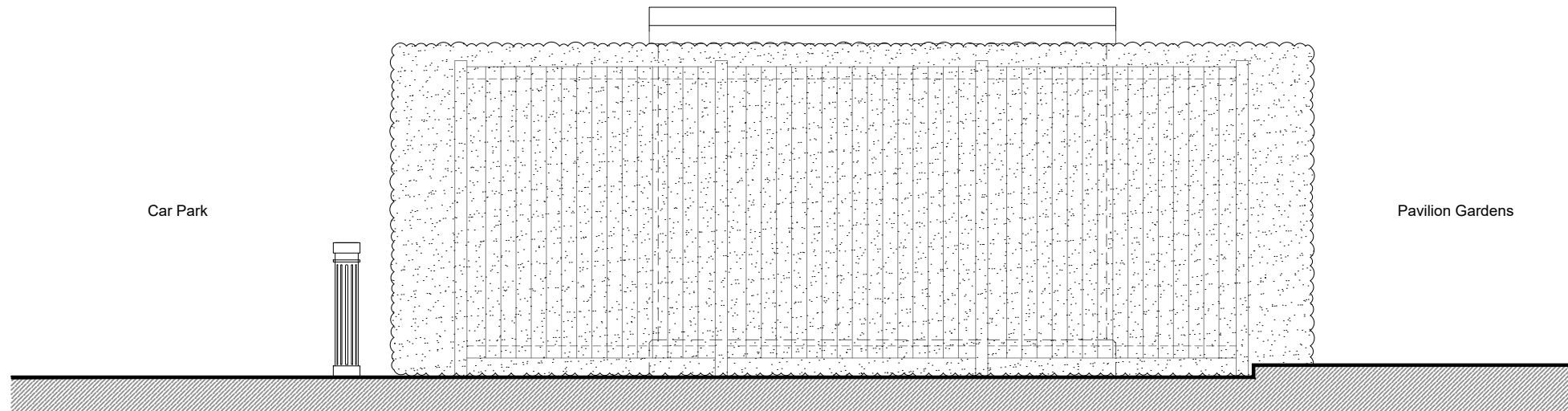
REAR ELEVATION (EAST):
STREETSCENE
1:50



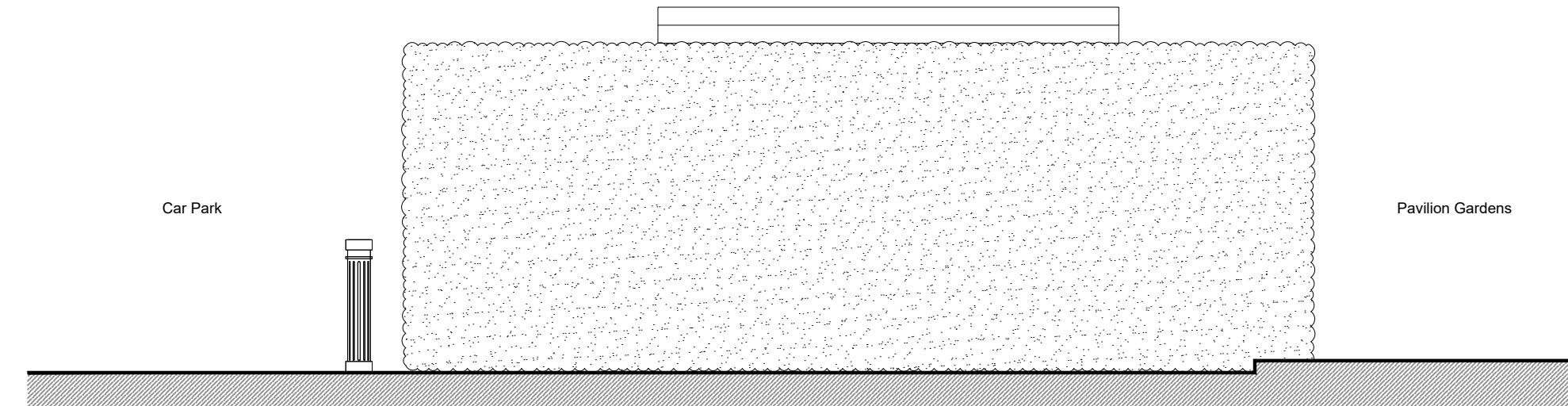
SIDE ELEVATION (NORTH):
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1:50



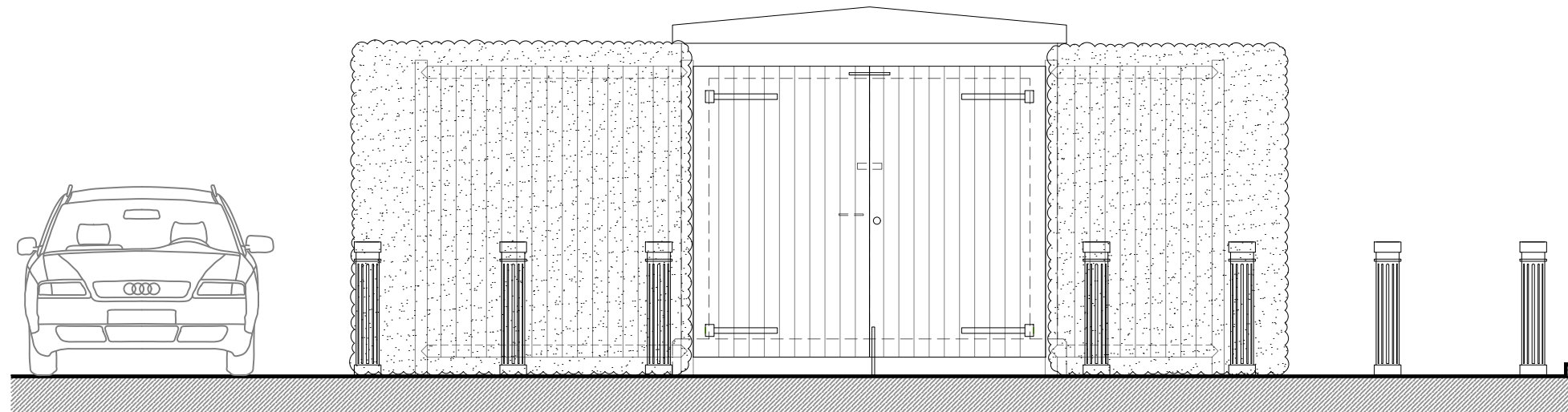
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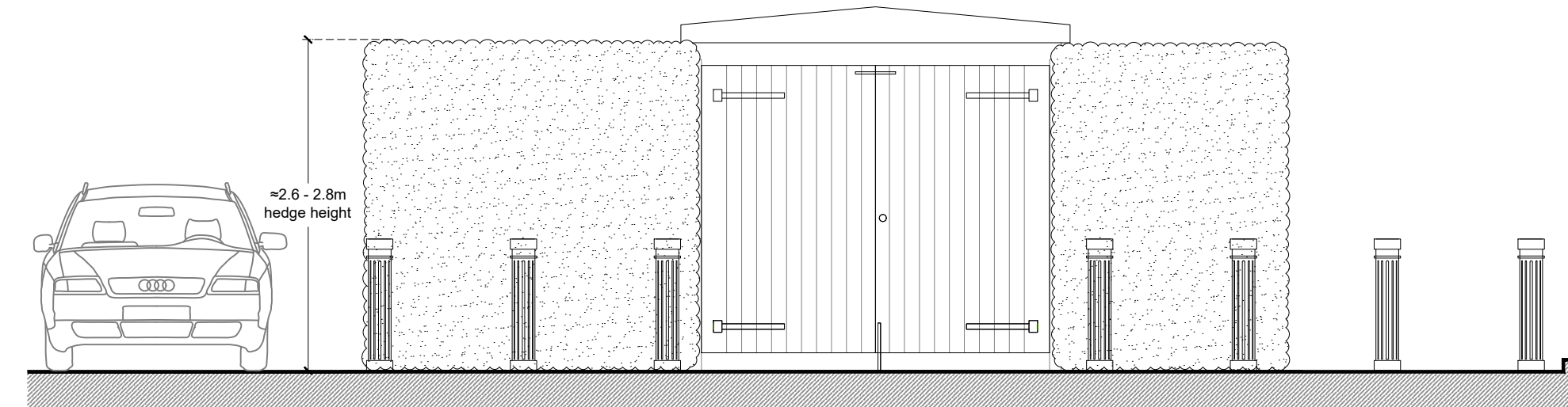
SIDE ELEVATION (SOUTH):
SHOWING HIDDEN ELEMENTS
1:50



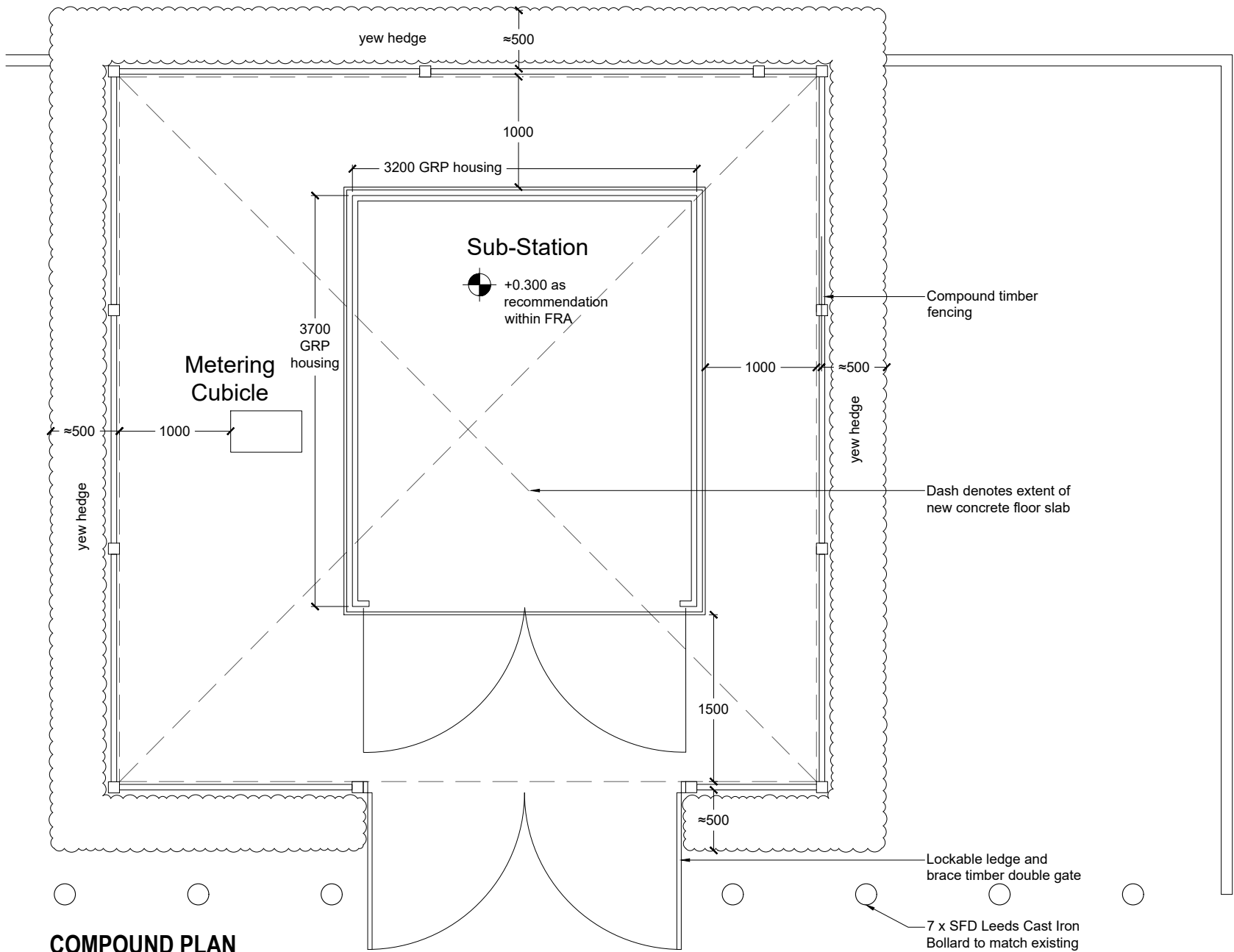
SIDE ELEVATION (SOUTH):
STREETSCENE
1:50



FRONT ELEVATION (WEST):
SHOWING HIDDEN ELEMENTS
1:50



FRONT ELEVATION (WEST):
STREETSCENE
1:50



COMPOUND PLAN
1:50



P02	Amended to site position and levels	AF	13.08.26
P01	Initial issue	AF	07.08.26

Rev	Description	By	Date
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Client:	Leisure Energy
Project:	Proposed Sub-Station Car Park Adjacent MyActive Buxton Pavilion Gardens
Drawing:	Compound Plan and Elevations

Project	Author	Volume	Level	Type	Role	Drig. Number
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26026 - XX - XX - XX - XX - X - 41001

Status S0 INITIAL STATUS

Revision P02 PRELIMINARY

Scale	Drawn	Date
1:50	AF	07.08.26
Sheet	Checked	A-Tech Job No.
A1	-	26026