



**TOPPING
ENGINEERS**

CONSULTING CIVIL &
STRUCTURAL ENGINEERS

FLOOD RISK ASSESSMENT

LOCATION:
Crosland Moor HD4 5FA

CLIENT:
Lidl GB Ltd

DOCUMENT REF:
21561-FRA-001

REVISION/DATE:
Revision C

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Revision	Description	Date	Author	Checked
A	First Issue	Aug 2022	O Gill	S Fenwick
B	Updated to suit new site layout	April 2023	J Sellers	P Beeley
C	Updated to suit clients comments	April 2023	J Sellers	P Beeley

1.0 INTRODUCTION

This Flood Risk Assessment (FRA) is compliant with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance. The FRA has been produced on behalf of Lidl GB Ltd in respect of a planning application for the Food Retail store and car park.

Site Name	Crosland Moor, Huddersfield
Location	Land to south of Blackmoorfoot road, Crosland Moor, Huddersfield, HD4 5FA
NGR (approx.)	412556, 415502
Application Site Area (ha)	0.675 ha
Development Type	Retail
NPPF Vulnerability	Low
EA Flood Zone	Flood Zone 1
EA Office	Yorkshire
Local Planning Authority	Kirklees Council

Table 1.1 - Site Summary

1.1 SOURCES OF DATA

The report is based on the following information:

- Site Location Plan by HTC Architects (Appendix A)
- Proposed Site Layout by HTC Architects (Appendix B)
- Topographical Survey (Appendix C)
- Environment Agency information
- Kirklees Council Strategic Flood Risk Assessment

1.2 EXISTING SITE

The site in question is located to the west of the centre of Huddersfield, approximately 2.2km away from the city centre. The site is approximately 0.675ha in size and is bounded by Blackmoorfoot Road to the north a residential estate to the east and residential development to the south and west.

From Appendix C it can be considered that the development area is sloped from west to east. At the far west region of the site, the highest level is approximately 154.00 AOD. Contrastingly, in the far Eastern area, the lowest level is approximately 148.00 AOD. Therefore, there is a 6.00m change in levels on this site.

There are two watercourses within the neighbouring areas of the site. Approximately 0.43km to the north of the site lays a watercourse. Furthermore, 1.1km to the south of the site lies a watercourse. Both watercourses are believed to flow away from the site in an eastern direction.



Figure 1.1 - Site Location

1.3 PROPOSED DEVELOPMENT

The proposed development is set to consist of the erection of a foodstore (use class E) with associated access, parking, services, and land scaping.

1.4 FLOOD RISK PLANNING POLICY

National Planning Policy Framework

The NPPF sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. Planning Practice Guidance is also available online.

The Planning Practice Guidance sets out the vulnerability to flooding of different land uses. It encourages development to be located in areas of lower flood risk where possible and stresses the importance of preventing increases in flood risk off site to the wider catchment area.

The Planning Practice Guidance also states that alternative sources of flooding, other than fluvial (river flooding), should also be considered when preparing a Flood Risk Assessment.

This Flood Risk Assessment is written in accordance with the NPPF and the Planning Practice Guidance.

Flood Zones

The Flood Zone Map for Planning has been prepared by the Environment Agency. This identifies areas potentially at risk of flooding from fluvial or tidal sources. An extract from the mapping is included as Figure 1.2.



Extent of flooding from rivers or the sea

● High ● Medium ● Low ● Very low ⊕ Location you selected

Figure 1.1 - Environment Agency Flood Zone Mapping

The site is shown to be located entirely within Flood Zone 1 (Low Probability) therefore the site is considered to be low risk of flooding. Flood Zone 1 is defined as land assessed as having less than a 0.1% annual probability of flooding from fluvial and tidal sources.

Table 2 of the Planning Practice Guidance classifies land use. Under these classifications the proposed health care unit is considered to be 'Less Vulnerable' to the potential impacts of flooding.

Table 3 of the Planning Practice Guidance identifies that any development is considered appropriate within Flood Zone 1.

Flood Risk Vulnerability Classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone 1	✓	✓	✓	✓	✓
Flood Zone 2	✓	✓	Exception test required	✓	✓
Flood Zone 3a	Exception test required	✓	x	Exception test required	✓
Flood Zone 3b	Exception test required	✓	x	x	x

1.5 OTHER RELEVANT POLICY AND GUIDANCE

Strategic Flood Risk Assessment

The Kirklees Council Strategic Flood Risk Assessment (SFRA) was prepared to review flood risks on a much wider scale to assess the potential for new development within the study area. The SFRA was used as an evidence base for Local Development Frameworks for each Local Planning Authority.

The SFRA therefore aims to bring together all available flood risk information for a variety of sources to provide a robust assessment. The SFRA therefore is useful for this site-specific FRA by highlighting available data and instances of known flooding in the area. Although written under the guidance of Planning Policy Statement 25, the SFRA is still considered to include relevant information.

2.0 POTENTIAL SOURCES OF FLOOD RISK

The table below identifies the potential sources of flood risk to the site, and the impacts which the development could have in the wider catchment prior to mitigation. These are discussed in greater detail in the forthcoming section. The mitigation measures proposed to address flood risk issues and ensure the development is appropriate for its location are discussed within Section 3.0.

Flood Source	Potential Risk				Description
	High	Medium	Low	None	
Fluvial			X		The site is located in flood zone 1.
Tidal				X	There are no tidal influences effecting the site.
Canals			X		The site is located in flood zone 1.
Groundwater			X		Ground conditions are not conducive to fluctuating groundwater levels.
Reservoirs and waterbodies				X	The site is shown to fall outside of the catchment for reservoir and waterbodies flooding.
Sewers			X		The site in question is higher than the surrounding sewers therefore there is a very low risk.
Pluvial runoff				X	There are no areas of the site that are at risk of surface water flooding.
Effect of Development on Wider Catchment	X				The impermeable area of the site is being altered.

Table 2.1 - Pre-Mitigation Sources of Flood Risk

2.1 FLUVIAL FLOOD RISK

As previously mentioned, the site is shown to be within Flood Zone 1 and therefore poses a low risk to the proposed development.

The risk of flooding posed to the proposed development is low. This is because there are two watercourses near the site that can pose a threat. However, the watercourses are 0.43km and 1.1km away from the site and is at a lower level.

Mitigation measures to address the residual risk posed by the watercourses surrounding the site are discussed within Section 3.0 of this report.

2.2 GROUNDWATER FLOOD RISK

Subject to completion of site investigation to confirm we would assume that natural ground water level is located well below the site surface and the nature of the strata means it is unlikely that there will be perched water above this level.

We therefore do not consider there is a risk of groundwater flooding affecting the development subject to final confirmation upon completion of suitable site investigation.

2.3 FLOOD RISK FROM RESERVOIRS & LARGE WATERBODIES

Reservoir failure flood risk mapping has been prepared by the Environment Agency, this shows the largest area that might be flooded if a reservoir were to fail and release the water it holds. The map displays a worst-case scenario and is only intended as a guide. An extract from the mapping is included as Figure 2.1.



Maximum extent of flooding from reservoirs:

Figure 2.1 - Environment Agency Reservoir Failure Flood Risk Map

Mapping demonstrates the site and possible access routes are far removed from the flood extent associated with flooding from large reservoirs. A review of Ordnance Survey mapping shows that no areas or reservoir flooding encroach the site.

As such, there is considered to be no risk from reservoir flooding.

2.4 FLOOD RISK FROM SEWERS

The site in question lies above any main roads which is potentially where any Yorkshire Water sewers will lie.

As such, it is considered that there is no risk of flooding from sewers.

2.5 PLUVIAL FLOOD RISK

Risk of flooding from surface water mapping has been prepared by the Environment Agency, this shows the potential flooding which could occur when rainwater does not drain away through the normal drainage systems or soak into the ground but lies on or flows over the ground instead. An extract from the mapping is included as Figure 2.

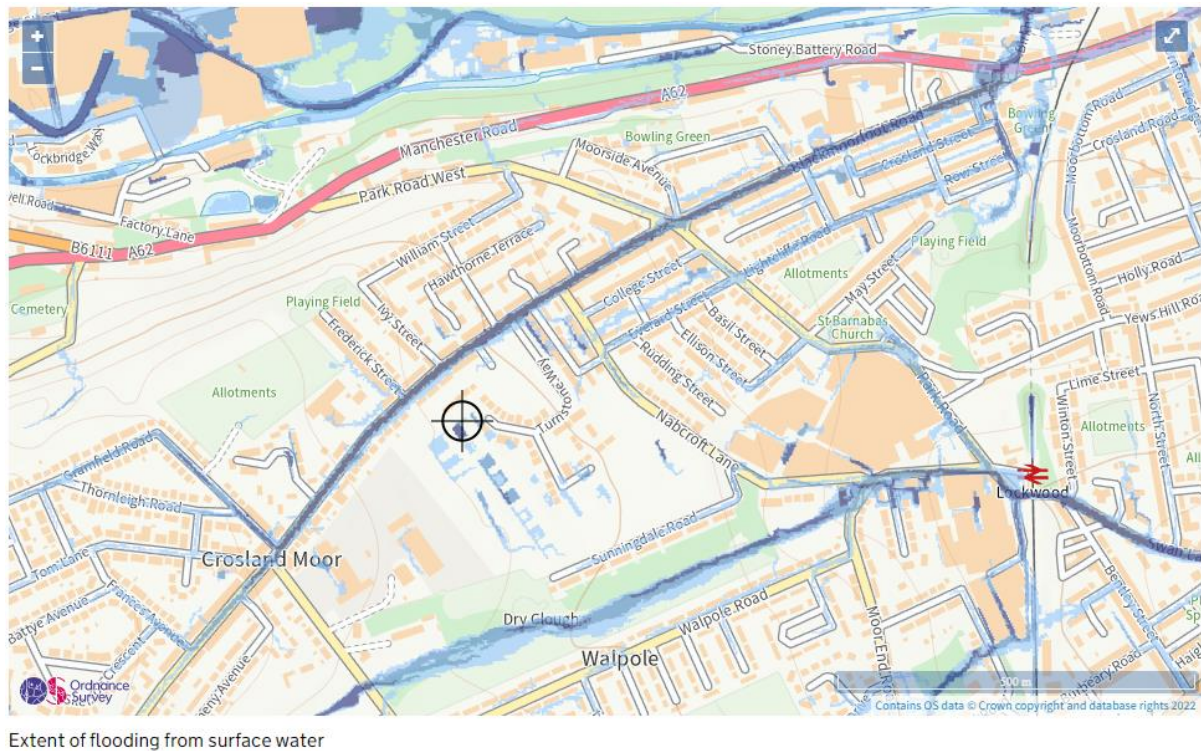


Figure 2.2 - Risk of Flooding from Surface Water Mapping

The mapping produced by the Environment Agency shows that there is a no area of the site that is at risk of surface water flooding.

Therefore, there is no risk posed by this threat.

2.6 EFFECT OF DEVELOPMENT ON WIDER CATCHMENT

2.6.1 Development Drainage

The current site is considered to be greenfield. The amount of impermeable area will be altered. Therefore, the proposed drainage systems will be suitable to discharge the surface water from the site.

3.0 FLOOD RISK MITIGATION

Section 2.0 has identified the sources of flooding which could potentially pose a risk to the site and the proposed development. This section of the FRA sets out the mitigation measures which are to be considered within the proposed development detail design to address and reduce the risk of flooding to within acceptable levels.

3.1 SITE ARRANGEMENTS

3.1.1 Sequential Arrangement

The Flood Zone mapping shows the site to be located within flood zone 1.

3.1.2 Finished Levels

Given the site's location within Flood Zone 1, there are no specific requirements for finished floor levels with regard to flood risk.

4.0 CONCLUSIONS AND RECOMMENDATIONS

This Flood Risk Assessment (FRA) is compliant with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance. The FRA has been produced on behalf of Lidl GB Ltd.

This report demonstrates that the proposed development is not at significant flood risk, and simple mitigation measures have been recommended to address any residual risks that may remain. The identified risks and mitigation measures are summarised within Table 4.1.

Flood Source	Proposed Mitigation Measure
Fluvial	Site is shown to be in Flood Zone 1.
Impact of the Development	Strategic surface water drainage strategy prepared for wider development will ensure a sustainable approach to surface water management.

Table 4.1 - Summary of Flood Risk Assessment

In compliance with the requirements of National Planning Policy Framework, and subject to the mitigation measures proposed, the development could proceed without being subject to significant flood risk. Moreover, the development will not increase flood risk to the wider catchment area as a result of suitable management of surface water runoff discharging from the site.

5.0 APPENDICES

Appendix A – Site Location Plan

Appendix B – Proposed Site Layout

Appendix C – Topographical Survey

Appendix A

Site Location Plan



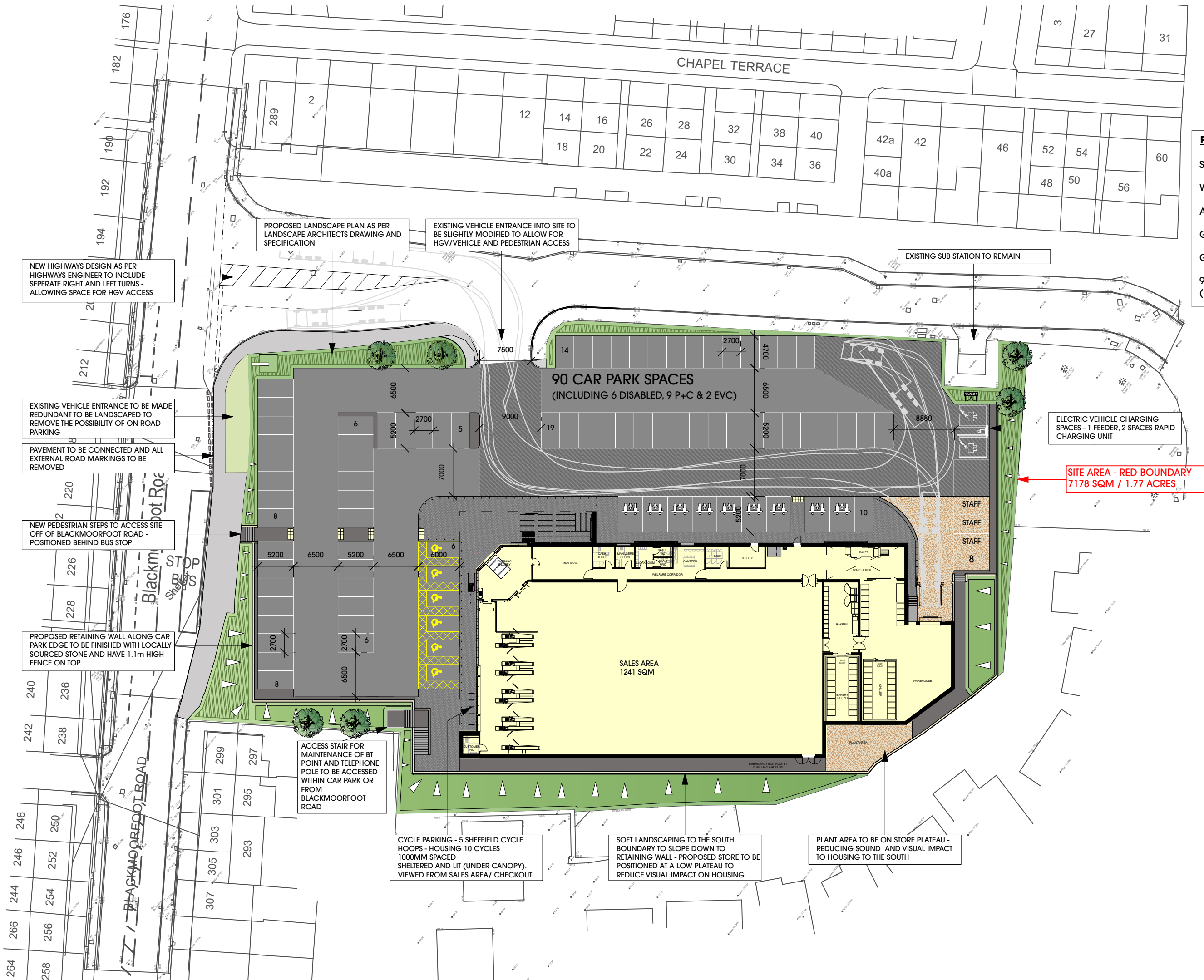
Appendix B

Proposed Site Layout



PROPOSED LIDL KEY

SALES AREA	= 1,241 sqm
WAREHOUSE	= 433 sqm
ANCILLARY	= 228 sqm
GIA	= 1,902 sqm
GEA (INC CANOPY)	= 2,160 sqm
90 CAR PARKING SPACES (6 DISABLED, 9 PARENT AND CHILD)	



Updated Site Plan - Minor adjustments - Annotations				BM
B	14/03/2023	added	Updated HGV turning Kerb as per Highways	BM
A	29/11/2022	Engineers comments		BM
Rev	Date	Description		Drawn

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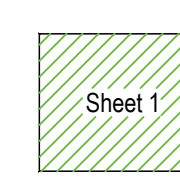
project
Blackmoorfoot Road
Huddersfield

drawing title
Proposed Site Plan

date August 2022
status Planning
scale 1:500 @ A3
drawn NG checked BM
job no. 2783 dwg no. P401 rev. B

Appendix C

Topographical Survey

Sheet[illegible]

Dataset	Model	Model description
DenseNet	G1 ⁰	Horizontal (x512m) and vertical (x256m) pooled vertical visual
	G2 ⁰	Horizontal (x512m) and vertical (x256m) pooled vertical visual
	G3 ⁰	Horizontal (x512m) and vertical (x256m) pooled vertical visual
	G4 ⁰	Horizontal (x512m) and vertical (x256m) pooled vertical visual
	G5 ⁰	Horizontal (x512m) and vertical (x256m) pooled vertical visual
	G6 ⁰	Horizontal (x512m) and vertical (x256m) pooled vertical visual
	G7 ⁰	Horizontal (x512m) and vertical (x256m) pooled vertical visual
	G8 ⁰	Horizontal (x512m) and vertical (x256m) pooled vertical visual
	G9 ⁰	Horizontal (x512m) and vertical (x256m) pooled vertical visual
	G10 ⁰	Horizontal (x512m) and vertical (x256m) pooled vertical visual
L1net	G1 ¹	Horizontal (x512m) and vertical (x256m) pooled vertical visual
	G2 ¹	Horizontal (x512m) and vertical (x256m) pooled vertical visual
	G3 ¹	Horizontal (x512m) and vertical (x256m) pooled vertical visual
	G4 ¹	Horizontal (x512m) and vertical (x256m) pooled vertical visual
	G5 ¹	Horizontal (x512m) and vertical (x256m) pooled vertical visual
	G6 ¹	Horizontal (x512m) and vertical (x256m) pooled vertical visual
	G7 ¹	Horizontal (x512m) and vertical (x256m) pooled vertical visual
	G8 ¹	Horizontal (x512m) and vertical (x256m) pooled vertical visual
	G9 ¹	Horizontal (x512m) and vertical (x256m) pooled vertical visual
	G10 ¹	Horizontal (x512m) and vertical (x256m) pooled vertical visual

Topographical features	
	Approximate center marker
	Bank - Bottom
	Bank - Top
	Building
	Concrete
	Drainage Channel
	Fence
	Kerb - Bottom
	Kerb - Chop
	Kerb - Top
	Road marking - yellow
	Road marking - white
	Road - center line
	Roof - Gables
	Roof - Slope
	Surface drainage
	Utility Trench-Line
	Wall

HAZID warning flag - this symbol means there is important information that needs to be read regarding an asset

The diagram illustrates various symbols and methods for GPR data collection and interpretation:

- Unshaded area:** Unable to survey area with GPR due to poor ground conditions.
- Red hatched area:** Area NOT surveyed.
- Red dashed line:** Undetected subsurface distortion (displaced) with GPR.
- X4:** Number of dips warning or editing the inspection pit.
- Buildings:** Represented by a grey rectangle.
- OS Buildings:** Represented by a yellow rectangle.
- Overhead electrical tower:** Represented by a red dashed rectangle.
- GPR Baseline:** Represented by a vertical line with a downward arrow.

SERVICE DEPTHS:

- Depth of services can be measured from different points:
 - A:** Indicate where GPR depth is measured from.
 - B:** Indicate where depth is measured from when you have two readings.
 - C:** Indicate where depth is taken from on drainage pipes using a slope measure.

[illegible]

SURVEY STATIONS			
Name	Easting	Northing	Height
STN04	412556.416	415514.374	147.666
STN01	412556.979	415531.290	151.234
STN02	412481.579	415565.548	151.216
STN03	412555.159	415583.365	148.070
STN03A	412562.383	415566.302	146.822

Services shown outside the survey boundary are for information only and may not be complete. If information is required outside our survey boundary, please contact a Technics Project Manager.

WEATHER CONDITIONS:

DO NOT SCALE!

Project	Blackfoot Road, Crosland Moor, HD4 5RL						
Survey Quality:	Topographical Survey						
Start Date of Survey	02/07/2021						
Drawing Status:	Final	Surveyed:	2/V	Drawn:	L/W	Approved:	LJM
Digital File	5328-0721-01B.dwg	Original Scale:	AD	Scale:	1:200	Sheet:	1 of 1
Drawing No.:	5328-0721-01					Revision:	B