



ELLEN FARM ROAD

FLOOD RISK ASSESSMENT
& DRAINAGE STRATEGY

SEPTEMBER 2024

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Root Power (North) Limited

Flood Risk Assessment & Drainage Strategy

CONFIDENTIAL

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1 INTRODUCTION

- 1.1.1 This Flood Risk Assessment (FRA) and Drainage Strategy (DS) has been provided at the request of Root Power (North) Limited, hereafter referred to as “the client”, to assess the flood risks associated with the proposed development of Ellen Farm Road, hereafter referred to as “the site”.
- 1.1.2 The purpose of this FRA and DS is to:
- ▶ Identify the possible hazards posed from all major sources of flooding (fluvial, surface water, groundwater, infrastructural and coastal sources);
 - ▶ Provide a qualitative assessment of the probability of each potential flood hazard representing a constraint on the proposed development, based on the proposed land use type for the development and likelihood of flood occurrence;
 - ▶ Investigate and define any potential drainage impacts associated with the site;
 - ▶ Determine and define necessary surface water management controls to ensure no exacerbation of flood risk on the site or to external receptors due to any increase in surface water runoff; and
 - ▶ Recommend appropriate and necessary mitigation measures and additional assessments that may be required to progress the sustainable development of the site.
- 1.1.3 The FRA and DS comprises the following:
- ▶ A desktop review of publicly available information, including information from the Environment Agency (EA) and Rochdale Borough Council who are the Lead Local Flood Authority (LLFA) for the proposed development area; and
 - ▶ An assessment and outline design of hydraulic controls and drainage requirements and drainage elements required to support the development of the site.
- 1.1.4 This report further details the methodologies employed within this study and provides recommendations as to any further work or investigations required to support the development of the site through the planning application process.

1.2 REGULATORY POLICY AND LEGISLATION

- 1.2.1 This assessment has been carried out in line with the current Government legislation, the National Planning Policy Framework (NPPF) 2023.
- 1.2.2 It has been assessed with reference to the following documents and legislative guidelines:
- ▶ CIRIA 753 The SUDS Manual V6 (2016);
 - ▶ DEFRA “Flood Risk Assessment Guidance for New Developments” (2006);
 - ▶ DEFRA “Surface Water Management Plan Technical Guidance” (2010);
 - ▶ BS 8533 2011 Assessing & Managing Flood Risk in Development Code of Practice (2011);
 - ▶ BS 8582:2013 Code of practice for surface water management for development Sites (2013);
 - ▶ National Planning Practice Guidance (2012 – updated 2016);
 - ▶ C624 Development and Flood Risk – Guidance for the Construction Industry’ (2004);
 - ▶ Design and Construction Guidance for Sewage Sector (DCGSS) (2020);
 - ▶ Planning Policy Guidance – Flood Risk and Climate Change (2014 and as amended).

1.2.3 In addition to the above, this report has also been informed by the following documents:

- ▶ Rochdale Adopted Core Strategy 2016
- ▶ Rochdale Borough's Strategy for Flood Risk Management 2014 – 2024
- ▶ Bury Rochdale and Oldham Strategic Flood Risk Assessment Volume 1 SFRA 2009

1.3 SCOPE OF FLOOD RISK ASSESSMENT

1.3.1 The objective of this analysis and report is to provide an FRA in accordance with local and national guidance.

1.3.2 The detail and complexity of the FRA will reflect the level of risk to the site and consider the appropriateness of the proposed development type. This will also include assessment of potential risk to property and livelihoods, consideration of climate change, and the definition of appropriate flood risk mitigations required to satisfy the planning process.

1.3.3 Based on the assessment of requirements for a site-specific FRA as defined within NPPF 2023 technical guidance, the site is indicated as being located within Flood Zone 1 however, due to the nature of the development, it is necessary to provide a site-specific FRA. Flood Zone 1 refers to an area assessed as having less than a 1 in 1,000 annual probability (<0.1%) of river or sea flooding in any one year.

1.3.4 Similarly, as the site is indicatively located in an area that may be subject to other assessable sources of flooding, such as pluvial (surface water) flooding, it is necessary to undertake a further site-specific assessment to verify the proposals for development.

1.3.5 Policy G8 of the Rochdale Adopted Core Strategy states that all future development must ensure that:

- ▶ We will ensure that new development (including flood risk mitigation measures) does not lead to any form of increased flooding locally or further downstream, does not impede natural water and flood risk management, is not detrimental to existing or potential flood storage areas, contributes where possible to alleviating existing flood risk, is itself well protected from flood risk and ensures prudent use of water resources. We will require:
 - ▶ a. Compliance with a 'sequential' approach to new development and flood risk, directing development away from areas of high risk, in accordance with the National Planning Policy Framework;
 - ▶ b. Full regard to and compliance with the advice of the Environment Agency (or equivalent agency) and the objectives and priorities for flood risk management set out in the Local Flood Risk Management Strategy, including any mitigation measures recommended for particular sites;
 - ▶ c. Full regard to the published evidence of local flood risk and its significance as included in Strategic Flood Risk Assessments, Surface Water Management Plans and other recognised sources of flood risk data and the production of additional Flood Risk Assessments (FRAs) as appropriate;
 - ▶ d. Incorporation of appropriate measures for the management of surface and flood water, including flood storage areas, Sustainable Urban Drainage Systems (SUDS) and the protection of 'overland flow paths';
 - ▶ e. Compliance with any Surface Water Management Plan or drainage strategies produces, such as for the identified critical drainage areas of Littleborough and Heywood;

- ▶ f. The avoidance of culverting, and support the opening up of existing culverts wherever possible;
- ▶ g. The incorporation of measures for the conservation of water to minimise potable water consumption, including rainwater collection measures, which should be integral to the design of buildings and spaces;
- ▶ h. Development that does not directly or indirectly lead to pollution of existing water resources such as watercourses and groundwater or the derogation of the quantity of groundwater;
- ▶ i. The incorporation of measures to improve water quality; and
- ▶ j. The taking of opportunities to improve the habitat value of watercourses and water bodies.
- ▶ In addition, we will identify additional flood storage areas which will be protected from development.

1.3.6 Potential flood risk at the site has been assessed against the site layout plan, which has been provided as Appendix A to this report. Significant changes to the site's developable area may necessitate a further review of this document to ensure that risk of flooding is not exacerbated and has been satisfactorily addressed within the development proposal.

1.4 SCOPE OF DRAINAGE STRATEGY

- 1.4.1 Surface water runoff must be effectively managed to ensure that there is no exacerbation of potential surface water flooding issues on the site, or at any external receptors, due to any potential increases in surface water runoff rates and volumes.
- 1.4.2 The drainage hierarchy will be applied in determining the most suitable type and point of discharge of surface waters runoff from impermeable areas on the site. This will ensure that surface water is sustainably managed on the site, and that there is no exacerbation of flood risk elsewhere as a result of undertaking the development. This will be undertaken in accordance with industry best practice principles and guidance, such as the C753 SUDS Manual (2016), Design and Construction Guidance for Sewage Sector (DCGSS) (2020) and applicable sections of the Planning Policy Guidance (PPG).
- 1.4.3 Any increase in surface water runoff rate associated with the development of the site must also be managed in accordance with the guidelines set by LPA, the LLFA for the area.
- 1.4.4 The DS will identify potential opportunities and locations for attenuation infrastructure, as well as potential connection points and provide calculations of permissible discharge rates for runoff generated on site.
- 1.4.5 The DS therefore aims to provide surety that any drainage provided as part of the project development can safely and appropriately convey all flows from the site to appropriate discharge locations. This is to ensure sustainable and safe operation within the site, as well as ensuring sustainable operation of any receiving infrastructure. These assessments have been undertaken in accordance with prescribed best practice and building codes, including prioritising the incorporation of SuDS, where appropriate and practicable for the management of surface water.
- 1.4.6 Following the completion of a final site masterplan the drainage scheme proposed within this report should be reassessed to ensure surface water runoff and foul water drainage can be appropriately managed in accordance with best practise and local and national standard requirements.

2 METHODOLOGY

2.1 INTRODUCTION

- 2.1.1 This report aims to demonstrate that the proposed development is sustainable and will not be impacted by or exacerbate flood risk elsewhere through the development of the site. This assessment will account for the effects of climate change, as well as identifying further opportunities to reduce the probability and consequences of flooding within the site locality.
- 2.1.2 This report aims to identify constraints and opportunities for the site based on the development proposals provided by the client (Appendix A) and provide recommendations for the sustainable provision of drainage and mitigation of any potential flood risk for the site.
- 2.1.3 The assessment methodology is as follows:
- ▶ Desktop review of the geology, hydrology, and other pertinent environmental characteristics of the site, and how these affect flood risk of the proposed development and site drainage.
 - ▶ Obtain and review existing baseline flood risk and drainage guidance information from relevant environmental authorities (EA, LLFA, etc.) as to site specific flood risk from all applicable sources.
 - ▶ Produce design calculations for the DS to determine the requirements for developing the site's surface water drainage and providing adequate storage in line with local planning policy and guidance. This will include the presentation of drawings with a layout for any additional drainage and attenuation infrastructure located on the site.
 - ▶ Review the findings from the above and advise on the suitability of developing the site for the proposed development in consideration of the applicable flood risk and drainage and comment on limitations and opportunities for the site, with recommendations of further mitigation where applicable and appropriate.

3 PROJECT BACKGROUND

3.1 DEVELOPMENT DESCRIPTION AND LOCATION

- 3.1.1 Andrew Moseley Associates (AMA) was appointed by Root Power (North) Limited to provide a Flood Risk Assessment and Drainage Strategy in support of a Battery Energy Storage System, located at Ellen Farm Road, Bentgate St., Newhey, Rochdale, OL16 4NU at NGR: SD 92550 11505.
- 3.1.2 The proposed development is located in the area of Newhey, approximately 3.2km from Rochdale. Proposals for the site are for industrial use, consisting of a battery energy storage system with associated hardstanding infrastructure. A proposed site layout can be found in Appendix A.
- 3.1.3 The Local Planning Authority for this development is Rochdale Metropolitan Borough Council, who are also the Lead Local Flood Authority for the area.
- 3.1.4 This report has been prepared in accordance with the National Planning Policy Framework (NPPF) and the accompanying technical guidance to assess all forms of flooding including the management of surface water on-site.
- 3.1.5 The site is referenced in Table 3-1 and Figure 1 below.

Table 3-1. Site Context

Site Name	Ellen Farm Road
Location	Rochdale
NGR (approx.)	SD 92550 11505
Application Site Area (ha)	1.12
General Locality	The site is located on undeveloped greenfield land and borders the M62 to the north and east, and undeveloped land to the south and west. Pedestrian and vehicular access to the site is provided via Bentgate Street, which is located to the south of the site.
Development Type	Battery Energy Storage System
EA Flood Zone	Flood Zone 1
EA Office	Greater Manchester, Merseyside and Cheshire
Local Planning Authority	Rochdale Borough Council

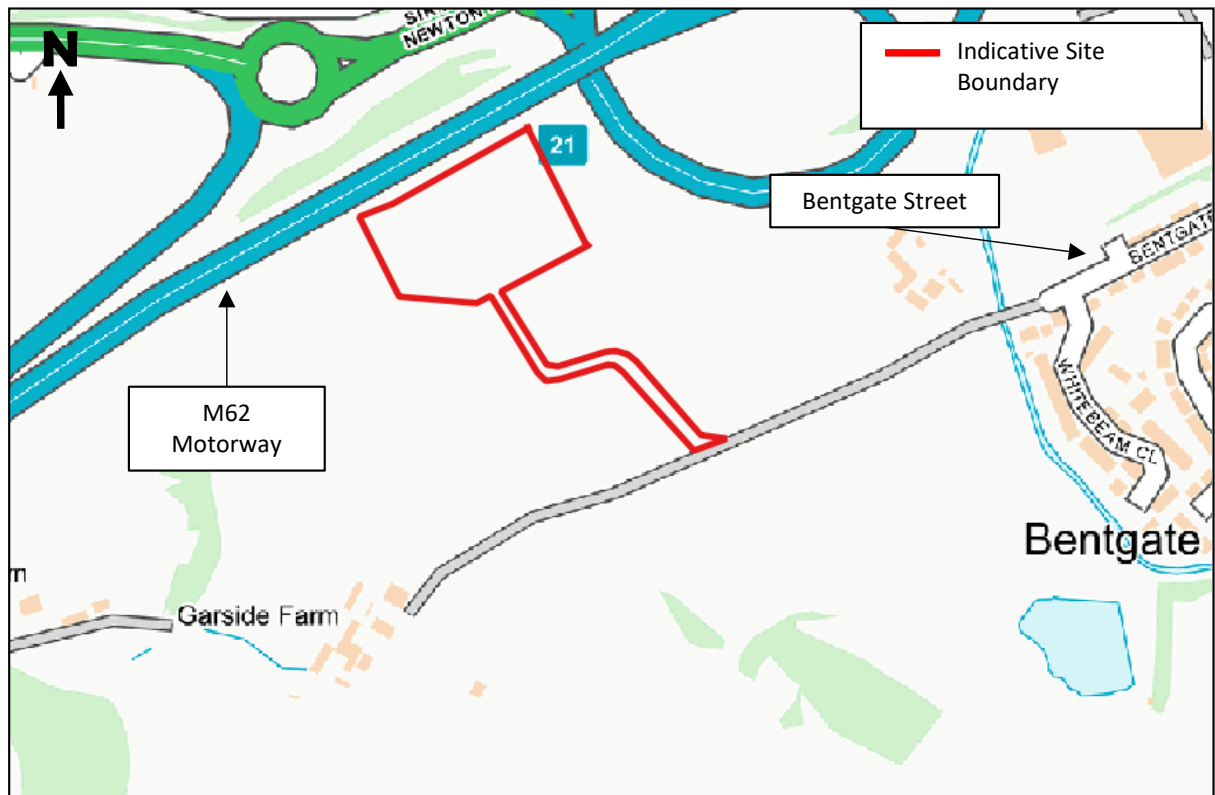


Figure 1. Site Location

3.2 CURRENT SITE CONDITIONS

Ground Cover and Topography

- 3.2.1 A topographic survey provided by the client and undertaken by greenhatch group (ref: 51272_T) shows ground levels at the site are shown to be in the region of 166.0 to 174.6 m Above Ordnance Datum (m AOD). The topographic survey can be found in Appendix B.
- 3.2.2 Further review of topographical data shows site levels to be lowest at the northeast corner of the site, while greatest levels are located at the southwest corner of the site. A general fall in gradient from the southwest to northeast is observed across the site.
- 3.2.3 As indicated by aerial imagery, the site consists of grass land consisting of light vegetation.

3.3 GEOLOGY

- 3.3.1 British Geological Survey (BGS) Open Geoscience website¹ indicates that the entire site is underlain by Pennine Lower Coal Measures Formation – Mudstone, siltstone and sandstone with overlying superficial deposits of Till, Devensian – Diamicton.

¹ Available at: <http://mapapps.bgs.ac.uk/geologyofbritain/home.html> accessed on 19/06/2024

- 3.3.2 The BGS website information indicates that there is no borehole record within close proximity to the site.

3.4 HYDROGEOLOGY

- 3.4.1 According to the Department for Environment, Food and Rural Affairs (DEFRA) MAGIC map², the site is indicated as being located in a Groundwater Source Protection Zone (SPZ), as defined by the Environment Agency (EA) for the protection of a potable groundwater supply.
- 3.4.2 The site is located as being in an area of medium-low ground water vulnerability and located above a Secondary A bedrock aquifer and a Secondary (undifferentiated) superficial drift aquifer.
- 3.4.3 Information obtained from the Cranfield University's Soilscape website³ indicates that the north of the site is classified as being Soilscape 6, which is defined as having freely draining slightly acid loamy soils. The south of the site is classified as being Soilscape 17, which is defined as having slowly permeable seasonally wet acid loamy and clayey soils.

3.5 HYDROLOGY

- 3.5.1 As shown in Figure 2, the River Beal is located approximately 300m to the east of the site at its closest point. The River Beal is classified as a main river and flows in a northerly direction in the vicinity of the site. The river is a tributary of the River Roch.
- 3.5.2 The EA's Catchment Data Explorer website⁴ indicates that the site resides within the Roch Irk Medlock operational catchment and the Beal sub catchment.

² Available at: <https://magic.defra.gov.uk/MagicMap.aspx?startTopic>, accessed on 19/06/2024

³ Available at: <http://www.landis.org.uk/soilscales/>, accessed on 19/06/2024

⁴ Available at: <https://environment.data.gov.uk/catchment-planning/>, accessed on 19/06/2024

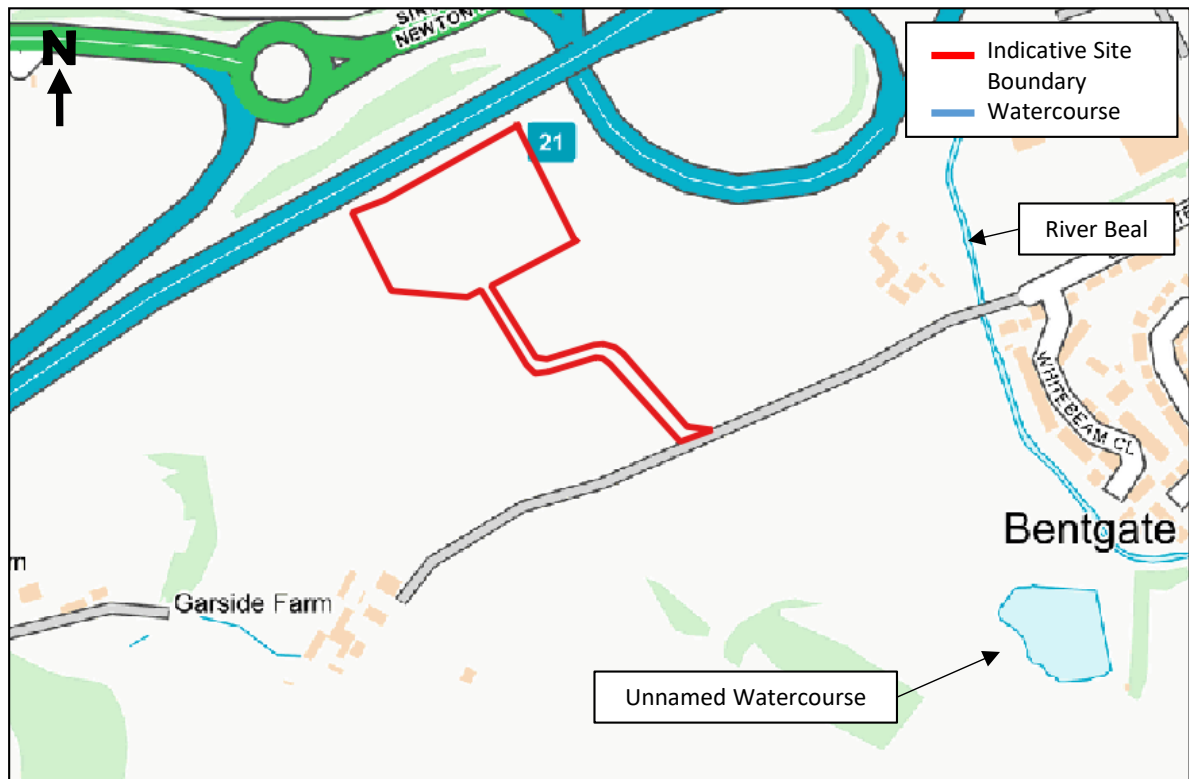


Figure 2. Watercourse Location

4 POTENTIAL FLOOD RISK

4.1 SOURCES OF FLOODING

- 4.1.1 This report is to consider flood risk from all potential sources. Section 5 then discusses in further detail the probability of flooding, any potential impacts and necessary mitigation, where required.
- 4.1.2 The NPPF (2023) also requires site developers to consider the impact of additional runoff generated by the proposed development on the receiving downstream catchment, and to assess the risk of runoff from the surrounding. This is further discussed in Section 6.

4.2 ENVIRONMENT AGENCY FLOOD ZONES

- 4.2.1 The EA Flood Map for Planning shows the site is located within Flood Zone 1, i.e. land assessed as having less than 1 in 1,000 annual probability (<0.1%) of river or sea flooding in any one year. This potential fluvial/coastal flood risk to the site has been illustrated in Figure 3.

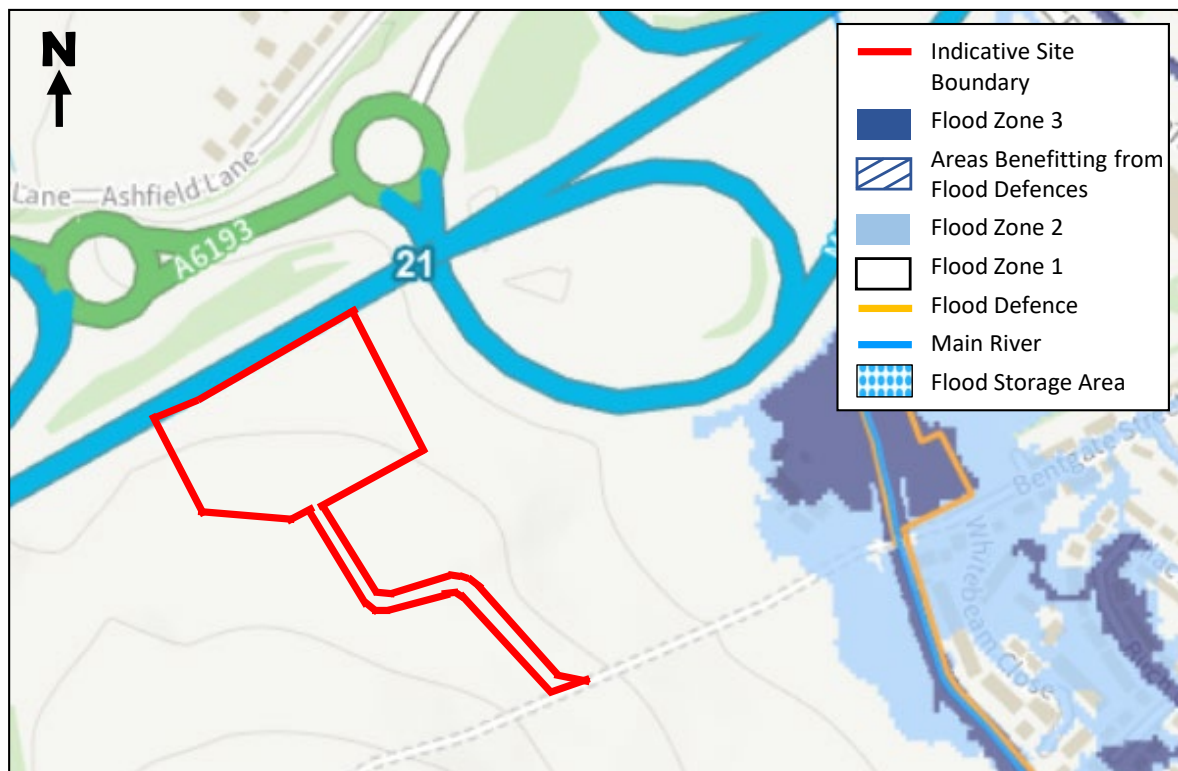


Figure 3. Environment Agency Long Term Flood Map for Planning

4.3 FLUVIAL AND COASTAL FLOODING

- 4.3.1 The EA Long Term Flood Risk Map for fluvial and coastal flooding shown in Figure 4 indicates that the site is at very low risk of fluvial flooding. As the site is situated 33 miles from the nearest coastline the site is also considered to not be at risk from coastal flooding.

4.3.2 The risk of flooding posed to the proposed development is classed as very low.

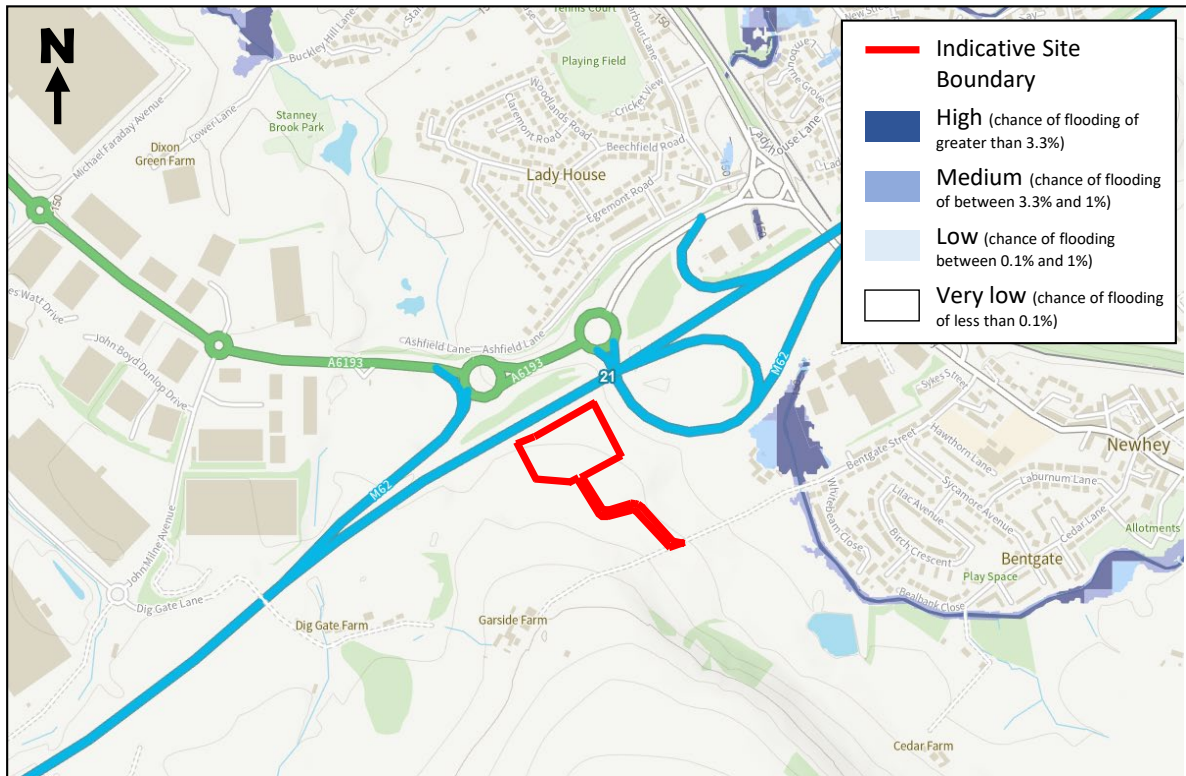


Figure 4. Environment Agency Long Term Flood Map – Rivers and Sea

4.4 PLUVIAL (SURFACE WATER) FLOODING

- 4.4.1 The EA Long Term Flood Risk Map as shown in Figure 5 shows the site is located within an area at very low risk of surface water flooding.
- 4.4.2 As the proposed development of the site may potentially reduce the overall site permeability and potentially increase surface water runoff rates and volumes, the surface water discharge controls must ensure that any proposal for drainage, or discharge, does not adversely impact upon downstream drainage infrastructure or offsite receptors.
- 4.4.3 The site is therefore considered to have very low potential risk of flooding from pluvial sources.

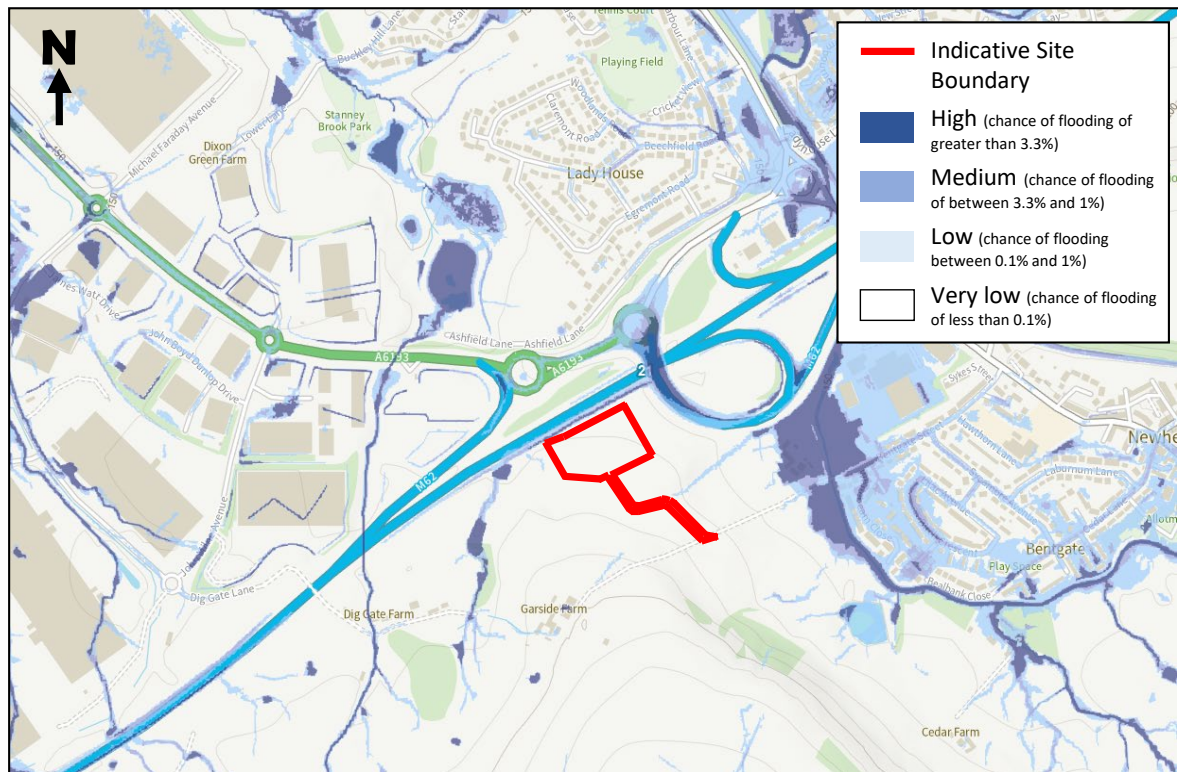


Figure 5. Environment Agency Long Term Flood Risk Map – Pluvial (Surface Water) Flooding

4.5 GROUNDWATER FLOODING

- 4.5.1 Ground conditions at the site consist of Pennine Lower Coal Measures Formation – Mudstone, siltstone and sandstone with overlying superficial deposits of Till, Devensian – Diamicton, therefore the propensity for groundwater emergence at the site is considered to be low, and the potential risk of groundwater emergence affecting the site development is considered to be low.
- 4.5.2 Given the impermeable nature of the proposed site's hardstanding areas subsequent to development, potential elevation of groundwater or groundwater emergence within the superficial geology causing flooding within the site post-development will be largely eliminated.
- 4.5.3 During long periods of heavy rainfall, the water table within an area can rise above the natural ground level, resulting in groundwater flooding.
- 4.5.4 Site specific investigations should be able to prove the presence of ground water and propose remedial mitigation where required. Flood risk to the proposed development due to groundwater emergence is therefore considered to be low.
- 4.5.5 Flood risk to the proposed development due to groundwater emergence is considered to be low provided that all reasonable and practicable mitigation measures for any subsurface construction associated with the development are adhered to.

4.6 FLOODING FROM ARTIFICIAL SOURCES

- 4.6.1 The EA Long Term Flood Risk Map of flood risk from reservoir and canal failure as shown in Figure 6 indicates that the site and its surroundings, are not affected by potential flood waters from artificial sources such as dam or canal failure. The figures provided within the EA mapping principally indicate the worst-case flooding extents. Therefore, the potential risk of flooding from reservoir and/or canal failure is considered to be negligible.

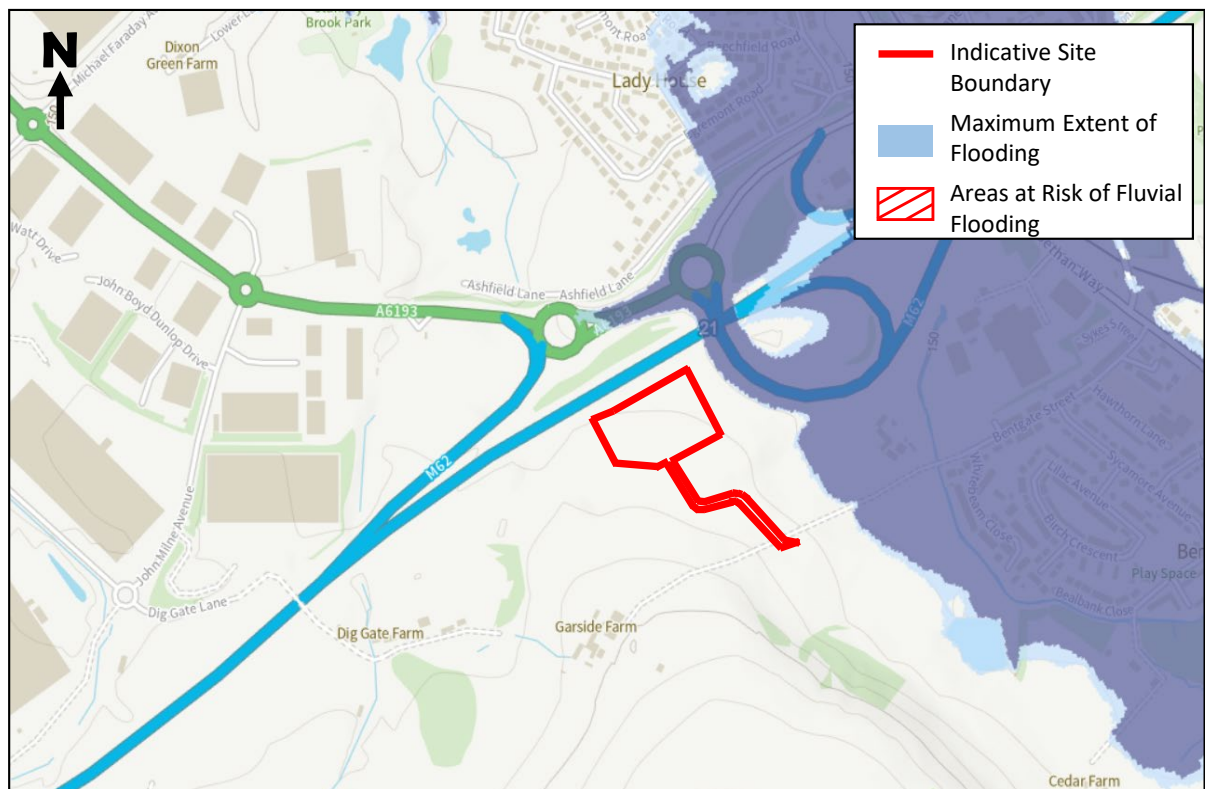


Figure 6. Environment Agency Long Term Flood Risk Map – Artificial Sources

4.7 FLOODING FROM SEWERS

- 4.7.1 The site currently consists of greenfield land and is not identified as having any drainage infrastructure within its boundary. As the site is surrounded by drainage ditches on all sides, any sewer flooding originating off site would be intercepted before it could be conveyed onto and across the site. Furthermore, these drainage ditches would convey any sewer flooding away from the site before building to any significant depth. The site is therefore considered to have very low potential risk of flooding from sewer flooding.

4.8 HISTORIC FLOODING

- 4.8.1 The EA historic flood map shows the site to not have experienced historic flooding.
- 4.8.2 A review of the Rochdale Borough's Strategy for Flood Risk Management 2014-2024 confirms the EA historic flood mapping and indicates that the site has not experienced any historic flooding.

4.9 FLOOD WARNING AND ALERT AREAS

- 4.9.1 The site is located within close proximity to the EA Flood Warning and Alert area, as shown in Figure 7. Flood warning areas are defined as areas where flooding can be expected to occur from rivers or the sea and in some areas or from groundwater during a predicted scenario. Flood Alert areas are defined as areas where it is possible for flooding to occur from rivers, sea, and in some locations groundwater during a predicted scenario.
- 4.9.2 Properties and businesses within this area can sign up to receive free flood alerts via email and text to inform them upon the risk of flooding prior to flood events (Available: <https://www.gov.uk/sign-up-for-flood-warnings>). It is recommended that the client does so as part of the future site flood risk management for this area.
- 4.9.3 In the scenario where a Flood Warning or Flood Alert is issued, the closest accessible land not located within a Flood Warning and Flood Alert area is just south of the site. Emergency access and egress can be provided to this point via the access track, leading onto Bentgate Street.
- 4.9.4 A Flood Emergency and Evacuation Plan has been provided by AMA for the proposed development in Appendix C.

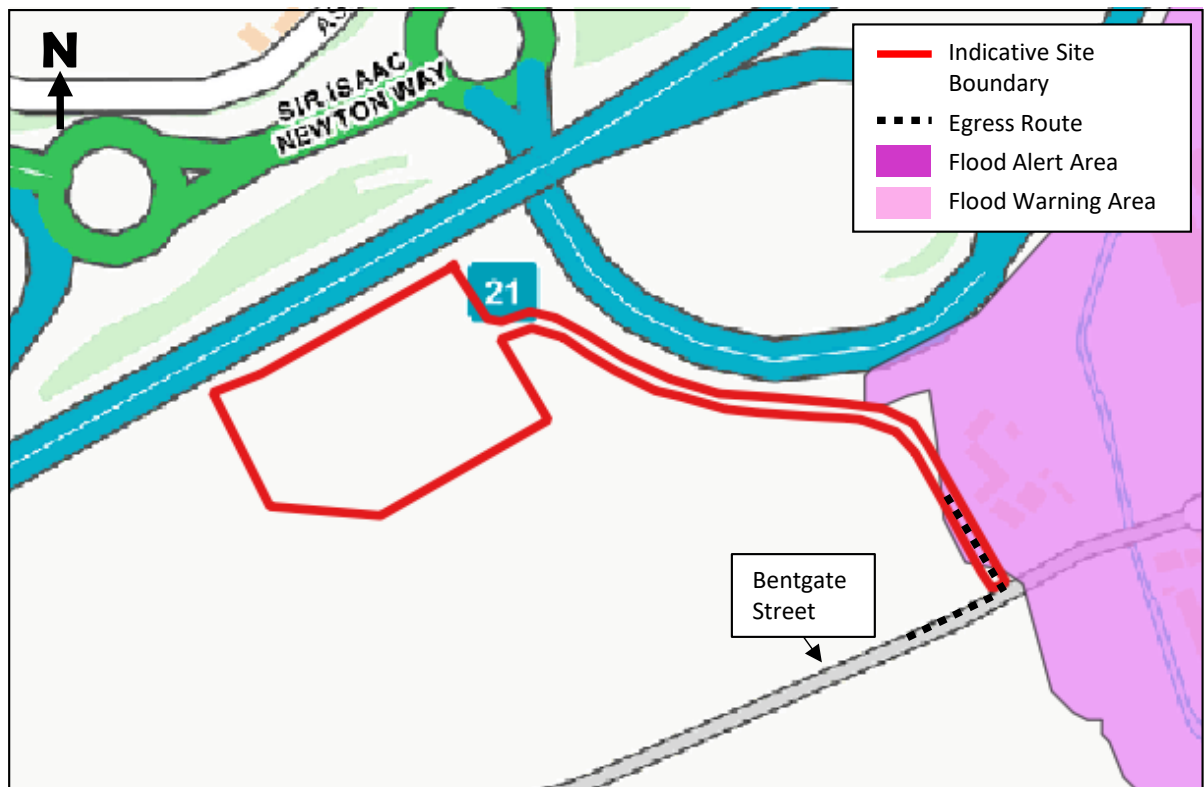


Figure 7. Environment Agency Flood Warning and Alert Areas

5 FLOOD RISK ASSESSMENT

5.1 FLOOD RISK PLANNING POLICY

National Planning Policy Framework

- 5.1.1 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.
- 5.1.2 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.
- 5.1.3 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.
- 5.1.4 This Flood Risk Assessment is written in accordance with the NPPF and the Planning Practice Guidance.
- 5.1.5 The EA Flood Map for Planning locates the site within Flood Zone 1, i.e. probability of annual fluvial / coastal flooding of Flood Zone 1, i.e. land assessed as having less than 1 in 1,000 annual probability (<0.1%) of river or sea flooding in any one year.
- 5.1.6 The flood map extents indicated on this map show the potential for flooding from fluvial and coastal sources, and although they are indicative, they are a key tool in defining the appropriateness of a development type or the requirement for further assessment.
- 5.1.7 Under the NPPF (2023), Flood Zone 1 is defined as having a low probability flood risk. The proposed development includes a battery energy storage system with associated hardstanding infrastructure, which are defined within Table 2 of the NPPF technical guidance as being 'Essential Infrastructure'. Therefore, according to the criteria in Table 3 of the NPPF Technical Guidance (Flood Risk Vulnerability and Flood Zone 'Compatibility'), the proposed development may be deemed as 'Appropriate'.

5.2 SEQUENTIAL AND EXCEPTION TEST

- 5.2.1 Both the NPPG and the SFRA require the 'Sequential Test' to be applied to ensure that proposed developments are carried out in area that are at the least risk of flooding, before considering development in areas that are at risk of flooding. The proposed site falls within Flood Zone 1 and is considered to come under the 'Less Vulnerable' category as a battery energy storage system.
- 5.2.2 Based on Table 3 in the National Planning Practice Guidance for Flood Risk and Coastal Change, the proposed use of the site is acceptable due to it being located in Flood Zone 1 and an Exception Test is not required.

Table 5-1. Development Appropriateness Based on Vulnerability and Flood Zone

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

5.3 CONCLUSION

- 5.3.1 In light of this assessment against the sites applicable flood zone (Flood Zone 1), further assessment against the Sequential or Exception Test is not required. This should be confirmed with the LPA prior to development of the site.
- 5.3.2 Table 5-2 summarises the pre mitigation flood risk associated with the site as well as the impacts of the flood risk on the wider catchment prior to mitigation. The mitigation measures proposed to address flood risk issues and ensure the development is appropriate for its location are discussed within Section 3.0.

Table 5-2 Pre-Mitigation Flood Risk Summary

Sources	Probability of Flood Risk	Impacts	Description
Tidal	N/A	N/A	The site is located inland and therefore, is not tidally influenced.
Fluvial	Very Low	Very Low	The site is not shown to be located in an area susceptible to fluvial flooding.
Surface Water (Pluvial)	Low	Low	The majority of the site is shown to be located in an area at very low risk of surface water flooding. However, there are two small areas within the access track at low risk of surface

			water flooding, with projected depths of below 0.30m.
Groundwater	Low	Low	Ground water flood risk is considered to be low.
Artificial Sources	Low	Low	Review of information from multiple sources (EA, LLFA) reveals that the east of the access is identified as being at risk of flooding from reservoirs and canals. However, the likelihood of this event is minimal.
Sewers	Very Low	Very Low	The risk of flooding from the surcharging of sewers is considered to be low.
Effect of development on wider catchment	N/A	N/A	The impermeable area of the site is being altered.

5.3.3 Based on the assessable information presented, the site is considered to meet the requirements of the NPPF, given the assessed potential flood risk posed from all applicable sources, the means of adopting suitable mitigation measures to prevent increase in the potential for flood risk and based on the vulnerability of the development type. Further consideration of necessary surface water runoff mitigation measures will be provided, so as to address the potential for increase of surface water arising from the proposed development of the site.

6 FLOOD RISK MITIGATION

6.1 FLOOD RISK MITIGATION

- 6.1.1 Section 4 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.

6.2 EFFECT OF DEVELOPMENT ON WIDER CATCHMENT

Development Drainage

- 6.2.1 The current site is considered to be greenfield. The amount of impermeable area will not be altered. Therefore, the existing drainage systems will not be suitable to discharge the surface water from the site alongside the additional run off from the proposed development. A sufficient drainage strategy will be therefore provided by AMA.

6.3 SITE ARRANGEMENTS

Sequential Arrangement

- 6.3.1 The Flood Zone mapping shows the site to be located within Flood Zone 1.

Finished Floor Levels

- 6.3.2 Given the site's location within Flood Zone 1, there are no specific requirements for finished floor levels with regard to flood risk. However, it is recommended that an FFL of 0.15m above adjacent ground level is set for the proposed development.

7 FOUL WATER DRAINAGE

7.1 INTRODUCTION

- 7.1.1 Due to the nature of the proposed development, there is no requirement for a foul water outfall from the site.

8 SURFACE WATER DRAINAGE STRATEGY

8.1 INTRODUCTION

- 8.1.1 The National Planning Policy Framework (NPPF) and accompanying Technical Guidance indicate that surface water run-off should be controlled as near to its source as possible through a sustainable drainage approach to surface water management.
- 8.1.2 Consideration should therefore firstly be given to using sustainable drainage (SuDS) techniques including soakaways, infiltration trenches, permeable pavements, grassed swales, ponds and wetlands to reduce flood risk by attenuating the rate and quantity of surface water run-off from a site. This approach can also offer other benefits in terms of promoting groundwater recharge, water quality improvement and amenity enhancements. Approved document Part H of the Building Regulations (2015) sets out a hierarchy for the disposal of surface water which encourages a SuDS approach.

8.2 OVERVIEW AND CONCEPT

- 8.2.1 As detailed in Section 3.1, development proposals for the site consist of industrial, consisting of a battery energy storage system with associated hardstanding infrastructure. The site plan shows the developable area of the site to be restricted to the red line boundary, as shown in Appendix A, with an approximate total developable area of 1.12 ha.
- 8.2.2 Review of the site plan shows proposals to consist of an approximate total impermeable area of 0.04 ha, which equates to approximately 4% of the total proposed developable area (Table 8-1). The contributing areas have been identified within the Drainage Layout Drawing, in Appendix D.
- 8.2.3 It is considered that green open space and landscaped areas will not produce or contribute run-off to the surface water management infrastructure proposed as part of this strategy. This has been taken into account when deriving the impermeable area for the site.

Table 8-1. Contributing Surface Water Drainage Areas

Drainage area	Area (ha)	% Impermeable	Contributing area
Green open spaces and landscaped areas	0.82	0	0.73
Impermeable areas	0.04	100	0.04
Permeable surfacing	0.26	0	0.23
Totals	1.12	-	1.00

8.3 PRE-DEVELOPMENT SURFACE WATER RUN-OFF

Greenfield

- 8.3.1 The site is approximately 1.12 ha in area and currently comprises of greenfield land.
- 8.3.2 For the purposes of determining the existing rate of surface water run-off the site is considered to greenfield therefore the run-off will be estimated using the IH124 method.
- 8.3.3 The table below summarises the existing greenfield run-off rates generated by the development for a range of storm return periods. A calculation summary sheet from the UK SuDS website can be found in Appendix E.

Table 8-2. Existing Run-Off Rates

Area (Ha)	Q _{BAR} (L/S)	Q ₁ (l/s)	Q ₃₀ (L/S)	Q ₁₀₀ (L/S)	Q ₂₀₀ (L/S)
1.12	0.35	0.30	0.60	0.73	0.83

8.4 GROUNDWATER PROTECTION

- 8.4.1 The proposed development site is not identified as being within a groundwater source protection zone (SPZ), as such no special measures are required to prevent risk to drinking water supplies.

8.5 METHODS OF SURFACE WATER MANAGEMENT

- 8.5.1 There are three methods that have been reviewed for the management and discharge of surface water which are detailed below; these may be applied individually or collectively to form a complete strategy. They should be applied in the order of priority as listed:

- ▶ Discharge via Infiltration
- ▶ Discharge to a Watercourse
- ▶ Discharge to Surface Water Sewer or Highway Drain
- ▶ Discharge to Public Sewer

8.6 INFILTRATION

- 8.6.1 Any impermeable areas that can drain to a soakaway or an alternative method of infiltration would significantly improve the sustainability of any surface water systems.
- 8.6.2 The British Geological Society (BGS) Geology of Britain Viewer indicates that the entire site is underlain by Pennine Lower Coal Measures Formation – Mudstone, siltstone and sandstone with overlying superficial deposits of Till, Devensian – Diamicton.
- 8.6.3 Information obtained from the Cranfield University's Soilscape website indicates that the north of the site is classified as being Soilscape 6, which is defined as having freely draining slightly acid loamy soils. The south of the site is classified as being Soilscape 17, which is defined as having slowly permeable seasonally wet acid loamy and clayey soils.

- 8.6.4 From a desktop review of the geology and soil at the site, it is believed that infiltration could be possible. This would need to be confirmed via infiltration testing on site.

8.7 WATERCOURSE

- 8.7.1 As discussed in Section 3.5 there are the River Beal is located approximately 300m to the east of the site at its closest point. The River Beal is classified as a main river and flows in a northerly direction in the vicinity of the site. The river is a tributary of the River Roch. The EA's Catchment Data Explorer website⁵ indicates that the site resides within the Roch Irk Medlock operational catchment and the Beal sub catchment.
- 8.7.2 The distance and location of the watercourse with a housing estate situated between the site and watercourse means it would be unviable to discharge surface water into the watercourse.

8.8 PUBLIC SEWERS

- 8.8.1 As a last resort and following the hierarchy of surface water, disposal discharge to the public sewer system may need to be considered.
- 8.8.2 In the United Utilities predevelopment enquiry (Appendix F) they state that drainage should follow the drainage hierarchy and that there are no public sewers located within the boundary of the site.
- 8.8.3 Therefore, it would not be possible to discharge surface water from the site into a public sewer.

8.9 PROPOSED DISCHARGE RATES

- 8.9.1 Surface water from the site will be discharged via a soakaway.
- 8.9.2 As the site will be drained of surface water by infiltration via soakaways there is no requirement for a discharge rate.

8.10 ATTENUATION REQUIREMENTS

- 8.10.1 As discussed earlier the site will be drained via a soakaway. The soakaway has been sized based on an infiltration rate of 1×10^{-6} m/s, the minimum acceptable rate for the use of soakaways. The infiltration rate at the site should be confirmed via BRE 365 testing at the site.
- 8.10.2 Causeway Flow drainage design software has been used to estimate the maximum storage volume required on-site for the 100-year storm event plus 30% allowance for climate change. The results of these calculations can be found in Appendix G.
- 8.10.3 The results below are based on the use of a soakaway to discharge surface water, located in the northeast corner of the site.
- 8.10.4 A drainage layout drawing can be found in Appendix D.

⁵ Available at: <https://environment.data.gov.uk/catchment-planning/> , accessed on 19/06/2024

Total Impermeable Area

- 8.10.5 This volume is based on using a soakaway with an infiltration rate of 1×10^{-6} m/s. The details on the attenuation of the soakaway can be found in Table 8-3 below.

Table 8-3. Attenuation Volume

Attenuation Volume			
Gross area (ha)	Infiltration Rate (m/s)	Imp. Area (ha)	Q100+30% Volume (m ³)
1.12	1×10^{-6}	0.04	39.2

8.11 DRAINAGE NETWORK

- 8.11.1 A network hydraulic model has been developed so as to assess the conveyance requirements for the proposed drainage strategy. This includes a combination of surface water pipes and manholes, which will direct surface water runoff from impermeable areas to the soakaway located in the northeast of the site. This will ensure that surface water flows from the site are internally managed before they leave the site and further reduce the potential for impact elsewhere.
- 8.11.2 The final surface water drainage network servicing the site should ideally consist of permeable paving to limit the runoff from any paved areas, whilst extending time of concentration for discharge to the accompanying drainage network.
- 8.11.3 For any portion of the network crossing a highway or an area to be trafficked by heavy grade vehicles (HGV's), a minimum cover requirement of 1.20 m below cover level should be provided where practically possible for the internal drainage network to satisfy Sewers for Adoption standards.

8.12 FIRE WATER RUN-OFF

- 8.12.1 In the event of a fire, a stop tap will be turned which will direct run-off within the drainage network towards the fire water storage tank instead of the soakaway. This can be seen in the drainage layout drawing presented in Appendix D. The contaminated water can then be collected from the fire water storage tank and the system can return to normal function.
- 8.12.2 The fire water storage will require a capacity of 250,000 litres, or 250m³. The exact detail and depth will be confirmed at the detailed design stage.

9 SUSTAINABLE DRAINAGE SYSTEMS

- 9.1.1 Where possible, Sustainable drainage (SuDS) systems/techniques should be used to drain the site of surface water runoff. These could be in the form of permeable paving, rainwater harvesting, ponds, and other above ground green systems. Swales could also be incorporated into the layout to convey surface runoff rather than below ground pipes (which tend to have a higher velocity).

9.2 SUSTAINABLE DRAINAGE (OVERVIEW)

- 9.2.1 Drainage systems can contribute to sustainable development and improve urban design, by balancing the different issues that influence the development of communities. Approaches to manage surface water that take account of water quantity (flooding), water quality (pollution) and amenity issues are collectively referred to as Sustainable Drainage Systems (SuDS).
- 9.2.2 SuDS mimic nature and typically manage rainfall close to where it falls. SuDS can be designed to slow water down (attenuate) before it enters streams, rivers, and other watercourses, they provide areas to store water in natural contours and can be used to allow water to soak (infiltrate) into the ground or evaporated from surface water and lost or transpired from vegetation (known as evapotranspiration).
- 9.2.3 SuDS are technically regarded a sequence of management practices, control structures and strategies designed to drain surface water efficiently and sustainably, while minimising pollution and managing the impact on water quality of local water bodies.
- 9.2.4 SuDS are more sustainable than traditional drainage methods because they:
- ▶ Manage runoff volumes and flow rates from hard surfaces, reducing the impact of urbanisation on flooding,
 - ▶ Protect or enhance water quality (reducing pollution from runoff),
 - ▶ Protect natural flow regimes in watercourses,
 - ▶ Are sympathetic to the environment and the needs of the local community,
 - ▶ Provide an attractive habitat for wildlife in urban watercourses,
 - ▶ Provide opportunities for evapotranspiration from vegetation and surface water,
 - ▶ Encourage natural groundwater/aquifer recharge (where appropriate),
 - ▶ Create better places to live, work and play.

9.3 SUDS PRINCIPALS

- 9.3.1 Sustainable drainage is a departure from the traditional approach to draining sites. There are some key principles that influence the planning and design process enabling SuDS to mimic natural drainage by:
- ▶ Storing runoff and releasing it slowly (attenuation)
 - ▶ Allowing water to soak into the ground (infiltration)
 - ▶ Slowly transporting (conveying) water on the surface
 - ▶ Filtering out pollutants
 - ▶ Allowing sediments to settle out by controlling the flow of the water

9.3.2 The above was replicated from www.susdrain.org

9.4 SUDS TECHNIQUES

9.4.1 The following table is a list of SuDS features that may/may not be feasible for the proposed site.

Table 9-1. SuDS Feasibility Table

SUDS Technique	Can they be feasibly incorporated into the site?	Comments
Green Roofs	✗	The sloping roofs of the proposed development would not permit a green-roof design
Basins and Ponds	✗	The proposed development could not be designed to incorporate these elements due to site constraints such as the topography.
Filter Strips, Swales and Bio-Retention	✗	The proposed development could not be designed to incorporate these elements due to site constraints.
Infiltration techniques	✓	Desktop review of the available data indicate that infiltration would be feasible at the site.
Permeable surfaces and tree pits	✓	Surfacing of the external areas could be in a permeable material, such as permeable paved access roads and driveways.
Rainwater Harvesting	✓	New roofs could be directed to rainwater harvesting tanks for reuse.

10 SUDS MAINTENANCE PLAN

10.1 SURFACE WATER DRAINAGE MAINTENANCE AND MANAGEMENT SCHEDULE

Soakaway

Table 10-1. Soakaway Maintenance Schedule

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Inspect and identify areas that are not operating correctly. If required, take remedial action.	Monthly for the first 3 months of operation, then annually.
	Recover debris from catchment surface area where it may cause risk to performance.	Monthly
	Remove sediment and debris from pre-tank system.	Annually
Remedial Actions	Repair inlets/outlets/vents/overflows.	As necessary
Monitoring	Inspect all inlets/outlets and upstream drainage system to ensure they are in good condition and operating as designed.	Annually
	Survey inside of tank for sediment and build up and remove if necessary.	Every 5 years

11 SUMMARY & CONCLUSION

- 11.1.1 The proposals for the site are for industrial use, consisting of a battery energy storage system with associated hardstanding and infrastructure.
- 11.1.2 The site is in an area identified as having a low probability of flooding on the EA Flood Map and is located in Flood Zone 1.
- 11.1.3 The site is identified as not being at risk of tidal, fluvial, groundwater, or sewer flooding.
- 11.1.4 The majority of the site is located in an area at very low risk of pluvial flooding however, there are two small areas within the access to the site that are at low risk of pluvial flooding which is projected to experience flood depths of up to 0.30m.
- 11.1.5 The access in the east of the site is identified as being at risk of flooding from reservoirs/canals. However, these are regularly maintained by local authorities and as such the probability of a failure of source is minimal.
- 11.1.6 The site is located in close proximity to an EA Flood Warning and Alert area and as such, a Flood Evacuation and Emergency Plan has been provided for the proposed development.
- 11.1.7 As with any drainage system, blockages within the surface water sewer systems constructed to serve the development has the potential to cause flooding or disruption. Any drainage systems which are not to be offered for adoption to either the Water Company or the Local Authority will have a suitable maintenance regime scheduled, and an appropriate management company appointed to carry out the works.
- 11.1.8 The primary option for surface water disposal is to use infiltration.
- 11.1.9 From a desktop review of ground conditions on the site, it seems that infiltration is likely to be viable. This should be confirmed by undertaking infiltration testing on site.
- 11.1.10 There is not a suitable watercourse in the vicinity of the site which could be utilised to dispose of surface water from the site.
- 11.1.11 There is not a suitable public sewer in the vicinity of the site which could be utilised to dispose of the surface water.
- 11.1.12 Attenuation should not be required as the means of surface water disposal is through infiltration. Furthermore, there will be no need for a discharge limit.
- 11.1.13 In the event of a fire, a stop tap will be turned which will direct run-off within the drainage network towards the fire water storage tank instead of the soakaway. The fire water storage will require a capacity of 250,000 litres, or 250m³. The exact detail and depth will be confirmed at the detailed design stage.

12 LIMITATIONS

12.1 LIMITATIONS

- 12.1.1 This report has been prepared for exclusive use by Root Power (North) Limited for the purpose of assisting them in evaluating the potential constraints imposed by flood risk and drainage in making a Planning Application.
- 12.1.2 AMA accepts no liability for any use of this document other than by its client and only for the purposes, stated in the document, for which it was prepared and provided. No person other than the client may copy (in whole or in part) use or rely on the contents of this document, without the prior written permission of AMA. Any advice, opinions or recommendations within this document should be read and relied upon only in the context of the document as a whole.
- 12.1.3 AMA has endeavoured to assess all information provided to them during this appraisal. The report summarises from several external sources and cannot offer any guarantees or warranties for the completeness or accuracy of information relied upon.
- 12.1.4 This report has been undertaken with the assumption that the site will be developed in accordance with the above proposals without significant change. The conclusions resulting from this study are not necessarily indicative of future conditions or operating practices at or adjacent to the site.
- 12.1.5 A topographic survey has been completed for the site and was supplied to AMA by the client. AMA accepts no liability for the accuracy of this survey, and it is recommended that it is verified on-site prior to the commencement of any construction work.
- 12.1.6 Existing drainage information is based on third party survey data and record information which is considered to be incomplete. It is therefore recommended that a FULL drainage investigation survey is commissioned to establish the precise alignment, level, and condition of ALL existing drainage within the development site to inform the masterplan and future detailed design proposals.

APPENDICES

APPENDIX A – PROPOSED SITE LAYOUT

APPENDIX B – TOPOGRAPHIC SURVEY

APPENDIX C – AMA FLOOD EVACUATION AND EMERGENCY PLAN

APPENDIX D – DRAINAGE LAYOUT DRAWING

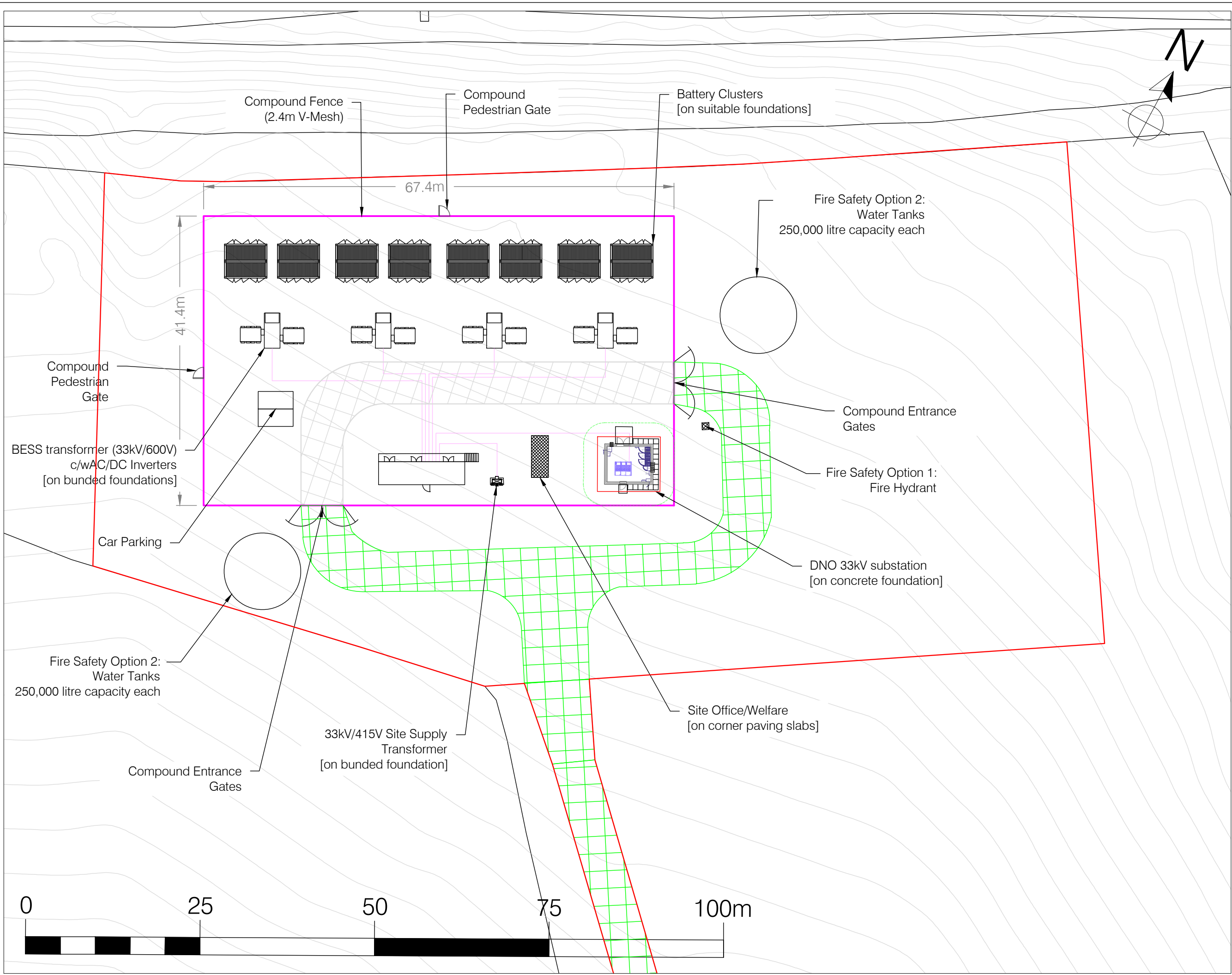
APPENDIX E – UK SUDS GREENFIELD RUN-OFF RATES

APPENDIX F – UNITED UTILITIES PRE-DEVELOPMENT ENQUIRY

APPENDIX G – CAUSEWAY FLOW CALCULATIONS

Appendix A

PROPOSED SITE LAYOUT



LEGEND

Compound Boundary (area = 2,790m²)

Planning Boundary (area = 11,292m²)

Site access from Farm Track off Bentgate Street (length ~232m)

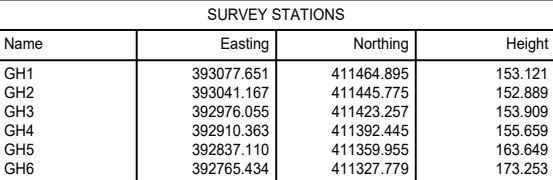
GIA (Gross Internal Access) = 353m²

Rev. Suffix	Date	Details
SITE		
ELLEN ROAD FARM BENTGATE ST, NEWHEY ROCHDALE, OL16 4NU		
TITLE		
30MW BESS SITE LAYOUT PLAN		
DWG. No. ELLEN-BESS-001.5		REV A
SCALE 1:500 @ A3	DATE 27/08/24	
DRAWN KN	STATUS PLANNING	

ROOT POWER

Appendix B

TOPOGRAPHIC SURVEY



This survey has been oriented to the *Ordinance Survey (O.S.)* National Grid OSG836(15) via Global Navigation Satellite Systems (GNSS) and the O.S. Active Network (OS Net).

A true OSG836 coordinate has been established near to the site centre via a transformation using the OSTN15GB & OSGM15GB transformation models.

The survey has been correlated to this point and a further one or more OSG836 (15) points established to create a true O.S. bearing for angle orientation.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.

Please refer to Survey Station Table to enable establishment of the on-site grid and datum.

Some services may have been omitted due to parked vehicles.

Legend:

	Buildings		Overhead Cable		CRV	Control (compression)		RRB	Reduce Babel
	Kathala		Cable		PRW	Price (weight)		BB	Babel
	Routing		Terminals		GRB	Group (request)		BN	Bandwidth
	Link marking		Contra		CDV	Close (value)		VP	Very (value)
	Contra		Contra		PRM	Price (mark)		GR	Group (request)
	Link mark		Bank of link		WLS	Work (link)		SL	Size
	Top down		Station and name		STW	Stop (work)		SL	Size
	Top down		Station		STW	Stop (work)		SL	Size
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	Top down		Station		STW	Stop (work)			

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Rev	Date	Description	Drawn	Q. Ref.
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- ☐ Topographical Surveys
- ☐ Site Engineering
- ☐ Utility / CCTV Surveys
- ☐ Measured Building Surveys
- ☐ 3D Laser Scanning
- ☐ Revit & BIM Models

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Client Root Power (North) Limited

Root Power (North) Limited

PROJECT

Bengate Street,
Newhey, Rochdale,
OL16 7ML

TITLE

Topographical Survey

DATE	DATE SURVEYED
------	---------------

SCALE	DATE SURVEYED
A1@ 1:1000	25/07/2024

AT @ 11000	ES/0712024
DRAWN	QUALITY REF

RCa	GH21705
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Level datum	See note
-------------	----------

Grid orientation	See note
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Job number	51272
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51272	
Drawing No.	Rev.

51272 T	0
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STATE	9
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Comments
This plan should only be used for its original

purpose. Greenhatch Group accepts no responsibility for this plan if supplied to any party other than

All dimensions should be checked on site prior

Drainage information (where applicable) has been

visually inspected from the surface and therefore should be treated as approximate only.

Notes:

Copyright Greenbitch Group, 06/07/13

Appendix C

AMA FLOOD EVACUATION AND EMERGENCY PLAN



ELLEN FARM ROAD

FLOOD EVACUATION &
EMERGENCY PLAN

SEPTEMBER 2024

ELLEN FARM ROAD

FLOOD EVACUATION & EMERGENCY PLAN

Root Power (North) Limited

Flood Evacuation and Emergency Plan

CONFIDENTIAL

Project no: 22821-FEP-002

Date: September 2024

Andrew Moseley Associates

15 St Paul's Street

Leeds, LS1 2JG

www.amatp.co.uk

Q U A L I T Y M A N A G E M E N T

ISSUE/REVISION FIRST ISSUE REVISION 1 REVISION 2 REVISION 3

Remarks	Planning	Updated Layout Site		
Date	August 2024	September 2024		
Prepared by	JE	JE		
Checked by	AY	AY		
Authorised by	GS	GS		

P R O D U C T I O N T E A M

Associate Gavin Shepherd

Consultant Aaron Yesudian

Graduate Jasmine Ellenor

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APPENDICES

Appendix A – Proposed Site Layout
Appendix B – Topographical Survey

1 INTRODUCTION

- 1.1.1 This Flood Evacuation and Emergency Plan (FEP) has been provided at the request of Root Power (North) Limited, hereafter referred to as “the client”, to provide an emergency and evacuation plan in the event of a flood associated with the proposed development of Ellen Farm Road, hereafter referred to as “the site”.
- 1.1.2 The purpose of this FEP is to:
- ▶ Identify the possible hazards posed from all major sources of flooding (fluvial, surface water, groundwater, infrastructural and coastal sources);
 - ▶ Provide a qualitative assessment of the probability of each potential flood hazard representing a constraint on the proposed development, based on the proposed land use type for the development and likelihood of flood occurrence;
 - ▶ Recommend appropriate and necessary emergency measures and additional assessments that may be required to progress the sustainable development of the site.
- 1.1.3 The FEP comprises the following:
- ▶ A desktop review of publicly available information, including information from the Environment Agency (EA) and Rochdale Borough Council, who are the Lead Local Flood Authority (LLFA) for the proposed development area; and
 - ▶ Measures to be used to keep both occupants and developments safe during a flood event.
- 1.1.4 This report further details the methodologies employed within this study and provides recommendations as to any further work or investigations required to support the development of the site through the planning application process.

1.2 REGULATORY POLICY AND LEGISLATION

- 1.2.1 This assessment has been carried out in line with the current Government legislation, the National Planning Policy Framework (NPPF) 2023.
- 1.2.2 It has been assessed with reference to the following documents and legislative guidelines:
- ▶ CIRIA 753 The SUDS Manual V6 (2016);
 - ▶ DEFRA “Flood Risk Assessment Guidance for New Developments” (2006);
 - ▶ DEFRA “Surface Water Management Plan Technical Guidance” (2010);
 - ▶ BS 8533 2011 Assessing & Managing Flood Risk in Development Code of Practice (2011);
 - ▶ BS 8582:2013 Code of practice for surface water management for development Sites (2013);
 - ▶ National Planning Practice Guidance (2012 – updated 2016);
 - ▶ C624 Development and Flood Risk – Guidance for the Construction Industry’ (2004);
 - ▶ Design and Construction Guidance for Sewage Sector (DCGSS) (2020);
 - ▶ Planning Policy Guidance – Flood Risk and Climate Change (2014 and as amended).
- 1.2.3 In addition to the above, this report has also been informed by the following documents:
- ▶ Rochdale Adopted Core Strategy 2016

- ▶ Rochdale Borough's Strategy for Flood Risk Management 2014 – 2024
- ▶ Bury Rochdale and Oldham Strategic Flood Risk Assessment Volume 1 SFRA 2009

1.3 SCOPE OF FLOOD EVACUATION AND EMERGENCY PLAN

- 1.3.1 The objective of this analysis and report is to provide an FEP in accordance with local and national guidance.
- 1.3.2 The detail and complexity of the FEP will reflect the level of risk to the site and consider the appropriateness of the proposed development type. This will also include assessment of potential risk to property and livelihoods, consideration of climate change, and the definition of appropriate flood risk mitigations required to satisfy the planning process.
- 1.3.3 Based on the assessment of requirements for a site-specific FEP as defined within NPPF 2023 technical guidance, the site is indicated as being located within Flood Zone 1 however, due to the nature of the proposed development and its location within a Flood Warning and Alert area, it is necessary to provide a site-specific FEP. Flood Zone 1 refers to an area assessed as having less than a 1 in 1,000 annual probability (<0.1%) of river or sea flooding in any one year.
- 1.3.4 Similarly, as the site is indicatively located in an area that may be subject to other assessable sources of flooding, such as pluvial (surface water) flooding, it is necessary to undertake a further site-specific assessment to verify the proposals for development.
- 1.3.5 Flood evacuation and emergency procedure has been assessed against the site plan, which has been provided as Appendix A to this report. Significant changes to the site's developable area may necessitate a further review of this document to ensure that risk of flooding is not exacerbated and has been satisfactorily addressed within the development proposal.

2 METHODOLOGY

2.1 INTRODUCTION

- 2.1.1 This report aims to demonstrate that the proposed development is sustainable and provide an emergency evacuation plan in the event of the site flooding. This assessment will account for the effects of the worst-case flooding scenario, as well as identifying further opportunities to reduce the consequences of flooding within the site locality.
- 2.1.2 This report aims to identify constraints and opportunities for the site based on the development proposals provided by the client (Appendix A) and provide recommendations for the evacuation and emergency plan upon flooding of the site.
- 2.1.3 The assessment methodology is as follows:
- ▶ Desktop review of the topography, hydrology, and other pertinent environmental characteristics of the site, and how these affect flood risk of the proposed development and site drainage.
 - ▶ Obtain and review existing baseline flood risk and drainage guidance information from relevant environmental authorities (EA, LLFA, etc.) as to site specific flood risk from all applicable sources.
 - ▶ Review the findings from the above and advise on the actions to be taken regarding evacuation and refuge following the receipt of a flood alert from the EA.

3 PROJECT BACKGROUND

3.1 DEVELOPMENT DESCRIPTION AND LOCATION

- 3.1.1 Andrew Moseley Associates (AMA) was appointed by Root Power (North) Limited to provide a Flood Evacuation and Emergency Plan in support of a battery energy storage system, located at Ellen Farm Road, Bentgate St., Newhey, Rochdale, OL16 4NU at NGR: SD 92550 11505.
- 3.1.2 The proposed development is located in the area of Newhey, approximately 3.2km from Rochdale. Proposals for the site are for industrial use, consisting of a battery energy storage system with associated landscaping and infrastructure. A site layout can be found in Appendix A.
- 3.1.3 The Local Planning Authority for this development is Rochdale Borough Council, who are also the Lead Local Flood Authority for the area.
- 3.1.4 This report has been prepared in accordance with the National Planning Policy Framework (NPPF) and the accompanying technical guidance to assess all forms of flooding including the management of surface water on-site.
- 3.1.5 The site is referenced in Table 3-1 and Figure 1 below.

Table 3-1. Site Context

Site Name	Ellen Farm Road
Location	Rochdale
NGR (approx.)	SD 92550 11505
Application Site Area (ha)	1.12
General Locality	The site is located on undeveloped greenfield land and borders the M62 to the north and east, and undeveloped land to the south and the west. Pedestrian and vehicular access to the site is provided via Bentgate Street, which is located to the south of the site.
Development Type	Battery Energy Storage System
EA Flood Zone	Flood Zone 1

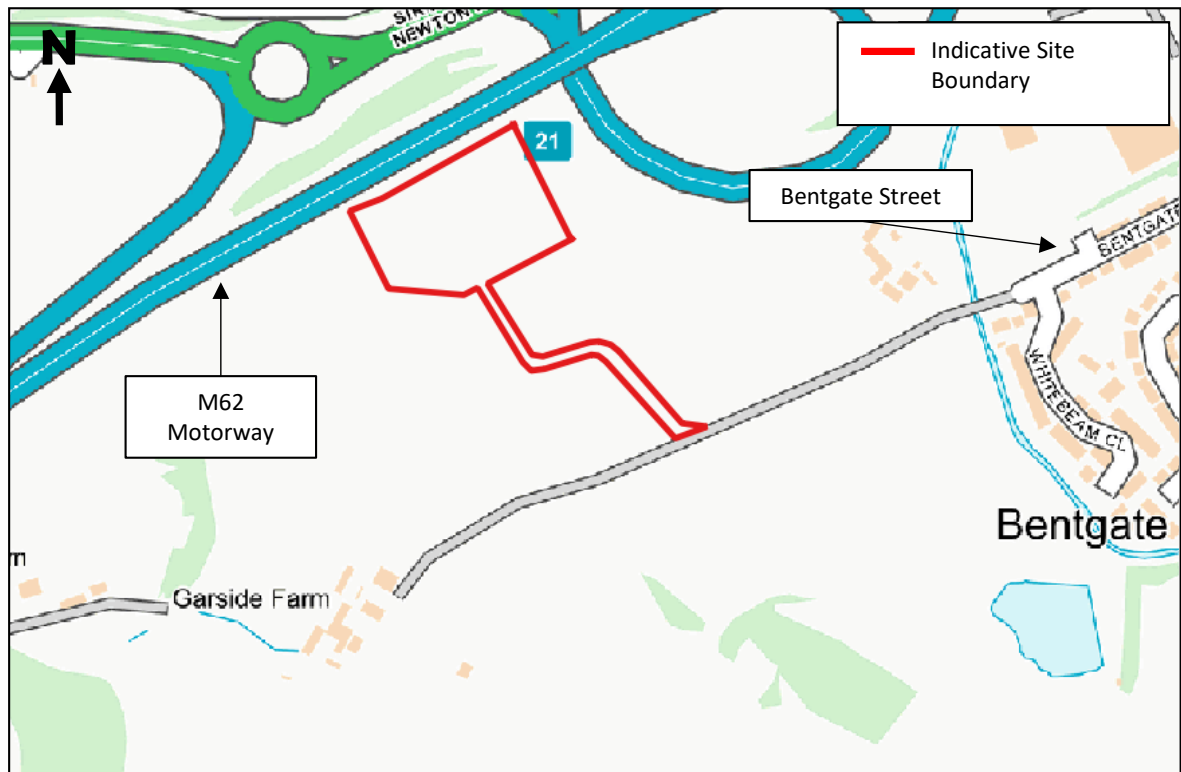


Figure 1. Site Location

3.2 CURRENT SITE CONDITIONS

Ground Cover and Topography

- 3.2.1 A topographic survey provided by the client and undertaken by greenhatch group (ref: 51272_T) shows ground levels at the site are shown to be in the region of 166.0 to 174.6 m Above Ordnance Datum (m AOD). The topographic survey can be found in Appendix B.
- 3.2.2 Further review of topographical data shows site levels to be lowest at the northeast corner of the site, while greatest levels are located at the southwest corner of the site. A general fall in gradient from the southwest to northeast is observed across the site.
- 3.2.3 As indicated by aerial imagery, the site consists of grass land consisting of light vegetation.

3.3 HYDROLOGY

- 3.3.1 The River Beal is located approximately 300m to the east of the site at its closest point. The River Beal is classified as a main river and flows in a northerly direction in the vicinity of the site. The river is a tributary of the River Roch.

3.3.2 The EA's Catchment Data Explorer website¹ indicates that the site resides within the Roch Irk Medlock operational catchment and the Beal sub catchment.

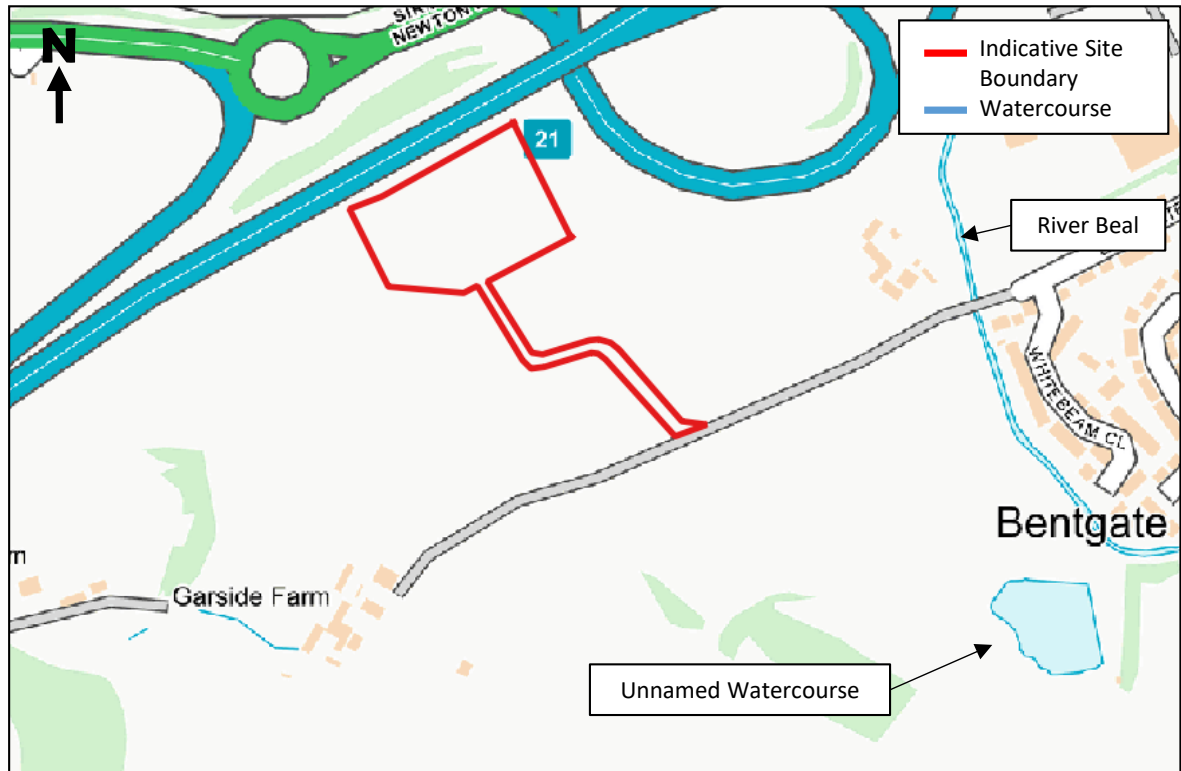


Figure 2. Watercourse Location

¹ Available at: <https://environment.data.gov.uk/catchment-planning/> , accessed on 19/06/2024

4 FLOOD EVACUATION PLAN AND EMERGENCY PROCEDURES

4.1 SCOPE OBJECTIVES AND BACKGROUND

- 4.1.1 A flood evacuation plan is critical in protecting the workers, and the property from flooding events. This Flood Emergency and Evacuation Plan produced for the site at Ellen Farm Road will ensure the safety of both people and the property.
- 4.1.2 This Flood Emergency and Evacuation Plan will support the Flood Risk Assessment produced by AMA in September 2024, which discusses the flood risk associated with the site at Ellen Farm Road, along with mitigation measures recommended for the worst-case flood scenario.

4.2 FLOOD WARNINGS

- 4.2.1 The Environment Agency issues warnings to the public, the media, and partner agencies of impending flooding. The Flood Alert and Flood Warning areas are based on the likelihood and timing of different levels of flood threat within a specific community or catchment. Severe Flood Warnings are based on the likelihood and/or impact of flooding. The client should sign up to these warnings to best protect against damage to property and life.
- 4.2.2 The main source of flooding for the site is fluvial flooding. The EA's flood warnings are only in relation to fluvial and tidal flooding, and do not cover other sources of flooding, such as surface water or groundwater flooding.
- 4.2.3 There are three sources where you are able to get different types of warnings for fluvial flood events and the EA provides a number of methods for receiving flood warnings. These include:
 - ▶ EA Three Day Flood Risk Forecast: <http://www.environment-agency.gov.uk/homeandleisure/floods/125305.aspx>
 - ▶ ¾ EA Flood Warnings in Force by Region (updated every 15 minutes): <http://www.environment-agency.gov.uk/homeandleisure/floods/31618.aspx>
 - ▶ EA Floodline Warnings Direct (phone, text, or email): <https://fwd.environment-agency.gov.uk/app/olr/home>

Table 4-1. Environment Agency Codes

<u>Flood Alert</u> 	Key: Flooding is possible. Be prepared Message: 2 hours to 2 days in advance of flooding Timing: Be prepared for flooding Actions: Prepare a flood kit of essential items Monitor local water levels and flood forecasts
<u>Flood Warning</u> 	Key: Flooding is expected. Immediate Action Required Message: Half an hour to 1 day in advance of flooding Timing: Act now to protect your property Actions: Block doors with flood boards or sandbags and cover airbricks and other ventilation holes Move family, pets and valuables to a safe place Turn off gas, electricity and water supplies if safe to do so Keep a flood kit ready Move cars, pets, food, valuables and important documents to safety
<u>Severe Flood Warning</u> 	Key: Severe flooding. Danger to life Message: When flooding poses a significant threat to life and different actions are required Timing: Stay in a safe place with a means of escape Actions: Be ready should you need to evacuate from your home Co-operate with the emergency services Call 999 if you are in immediate danger
<u>Warnings no longer in force</u> (no icon)	Key: No further flooding is currently expected for your area Message: When river or sea conditions begin to return to normal Timing: Be Careful. Flood water may still be around for several days and could be contaminated Actions: If you've been flooded, ring your insurance company as soon as possible

Warnings are removed to inform people that the threat has now passed.

4.2.4 Other sources of warning include flood wardens, sirens, and the media. Call the EA Floodline for advice on what is available for the proposed development site.

4.2.5 Furthermore, you should contact the EA to understand the lead time for flood warnings. This is the time between the issuing of a warning to when flooding will occur.

- 4.2.6 The organisation that will operate within Ellen Farm Road should sign up to the EA Flood Alert and Warning system to ensure the safety of any staff that may be visiting the site during a flood event to undertake the evacuation procedure.

4.3 FLOOD ALERT NOTICE

The occupiers of the site should display a notice in a prominent, clearly visible place, or places, on the premises and/or site to indicate to everyone the current flood alert status issued by the Environment Agency. Below is an example of a Flood Alert Notice.

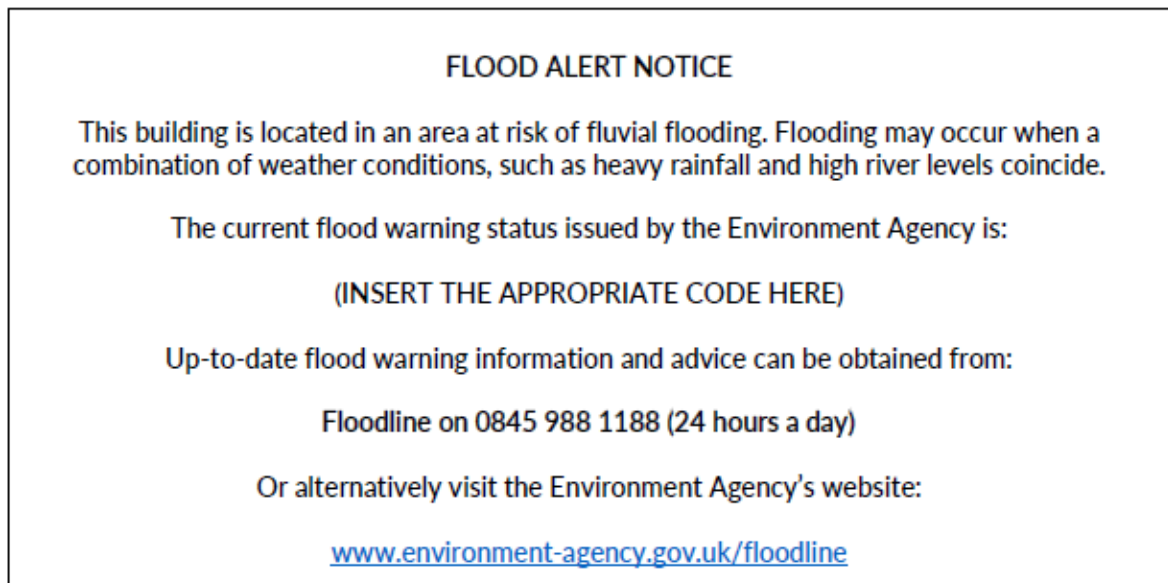


Figure 3. Flood Alert Notice

4.4 ACTIONS UPON RECEIVING ALERTS AND WARNINGS

- 4.4.1 Once a flood alert or warning has been made, the occupiers of the site must take action based upon the alert given. Provided in Table 4-1 are the types of alerts which can be given by the EA along with the action the occupiers must undertake to reduce the risk to life and the property.
- 4.4.2 The proposed development is a battery energy storage system. As stated within the FRA for the development, the site is located within Flood Zone 1 however, the access to the site is located in an EA Flood Warning and Alert area due to the proximity to the River Beal.
- 4.4.3 As the development is for a battery energy storage system, there will be minimal times in which the site is occupied by staff. The owner of the site however, upon receipt of a flood alert or warning, must take action based on the alert given to clear any personnel from the site as quickly as possible.

4.5 SAFE EGRESS PROCEDURE & EVACUATION ROUTES

- 4.5.1 There should be safe access to and from the development. Planning a safe route of egress is important to ensure that people are safe in the event of a flood. Minimising the risk to life is the most important goal of flood management.

- 4.5.2 Once a flood warning has been implemented by the EA, the evacuation procedures must follow – this can be implemented by an alarm system, or a text message sent out by the owner of the site. If the site owner feels the site is becoming at risk, they should make the decision to evacuate the site as well.
- 4.5.3 A flood evacuation point should be created outside of the flood alert and warning area, preferably to the south of the site, on Bentgate Street. Any personnel set to enter the site should be provided with the egress route in case of emergency and should follow main roads in order to increase safety and visibility.
- 4.5.4 If the evacuation procedure is followed, there should be no need for a rescue by emergency services however, as the site is located along a main road, accessing the site by emergency services should not be difficult.
- 4.5.5 It is important to identify, in advance of flooding, where individuals can go instead of a local Emergency Rest Centre, if safe to do so. Time should be allowed for this to occur before any routes become affected by the flooding. Consideration should be given to the road network around the site, especially if these are more likely to flood first and therefore affect evacuation time.
- 4.5.6 The evacuation procedures should include options for the evacuation of ALL people on site, including those with restricted mobility.

4.6 ACTIONS POST-EVACUATION

- 4.6.1 This section should offer site specific guidance on post-evacuation procedures. The Floodline (0845 988 1188) will be an important resource.
- 4.6.2 The EA have published advice on how to react when a flood event occurs: <http://www.environment-agency.gov.uk/homeandleisure/floods/31632.aspx>.
- 4.6.3 In the event of flooding, it is the duty of the Council to coordinate authority responses. An important task that the Council undertakes is to set up Rest Centres. A Rest Centre is a temporary, short-term emergency accommodation (up to 48 hours) where evacuated people can rest and obtain refreshments and information about the flood.
- 4.6.4 Returning to site should only be permitted when advised by emergency services or local authority officials that is safe to do so.
- 4.6.5 Guidance on how to clean up after a flood can be aided using Environment Agency instructions: http://www.direct.gov.uk/en/HomeAndCommunity/WhereYouLive/FloodingInYourArea/DG_180028.

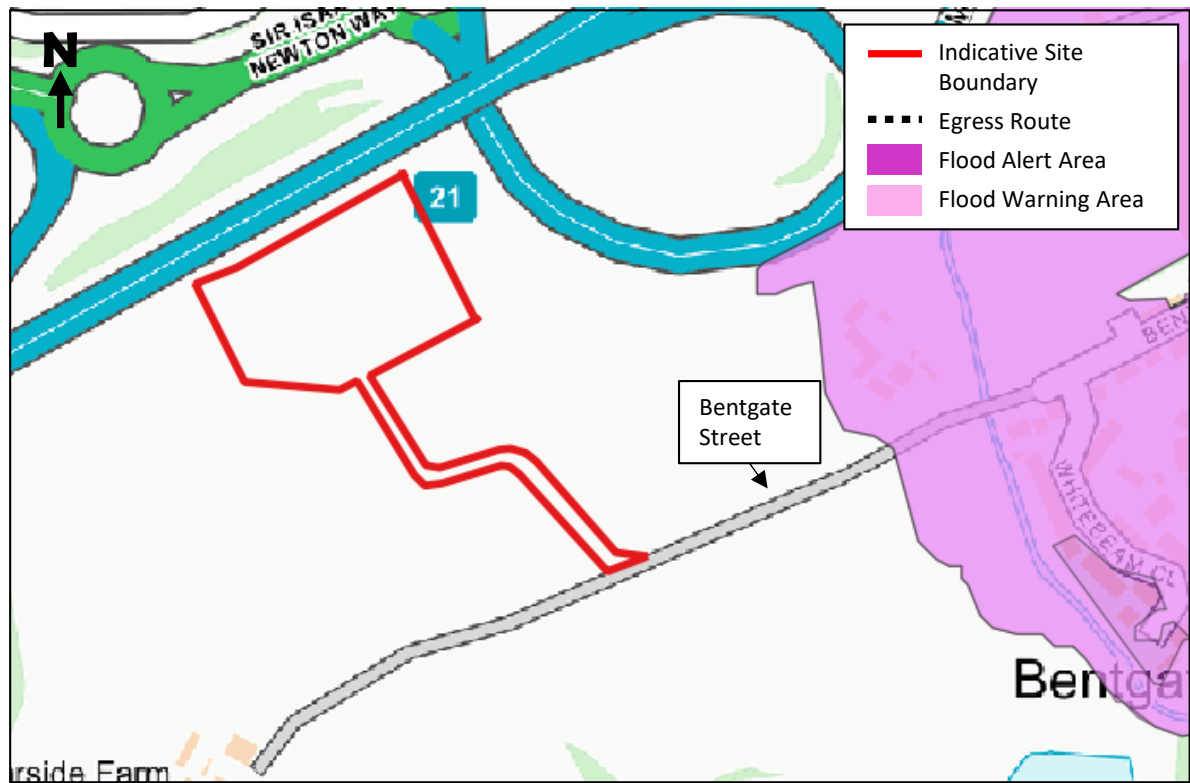


Figure 4. Safe Access and Egress Route from the Site

5 SUMMARY & CONCLUSION

- 5.1.1 The site is in an area identified as having a low probability of flooding on the EA Flood Map and is located in Flood Zone 1.
- 5.1.2 Although the site is located in Flood Zone 1, the site is located within close proximity of an EA Flood Warning and Alert area.
- 5.1.3 The access to the proposed development is located within a Flood Alert and Warning Area, and as such the organisation occupying the site should sign up to receive EA flood warnings in order to protect against damage to property and life.
- 5.1.4 As the proposed development is located within a Flood Warning and Alert area, planning for the evacuation of any personnel is required.
- 5.1.5 In the event of flooding, it is the duty of the Council to coordinate authority responses. An important task that the Council undertakes is to set up Rest Centres. A Rest Centre is a temporary, short-term emergency accommodation (up to 48 hours) where evacuated people can rest and obtain refreshments and information about the flood. Returning to the site should only be permitted when advised by emergency services or local authority officials that it is safe to do so.
- 5.1.6 A safe egress route has been proposed within Section 4.5, leading to a flood evacuation point to the south of the site.

6 LIMITATIONS

6.1 LIMITATIONS

- 6.1.1 This report has been prepared for exclusive use by Root Power (North) Limited for the purpose of assisting them in evaluating the potential constraints imposed by flood risk and drainage in making a Planning Application.
- 6.1.2 AMA accepts no liability for any use of this document other than by its client and only for the purposes, stated in the document, for which it was prepared and provided. No person other than the client may copy (in whole or in part) use or rely on the contents of this document, without the prior written permission of AMA. Any advice, opinions or recommendations within this document should be read and relied upon only in the context of the document as a whole.
- 6.1.3 AMA has endeavoured to assess all information provided to them during this appraisal. The report summarises from several external sources and cannot offer any guarantees or warranties for the completeness or accuracy of information relied upon.
- 6.1.4 This report has been undertaken with the assumption that the site will be developed in accordance with the above proposals without significant change. The conclusions resulting from this study are not necessarily indicative of future conditions or operating practices at or adjacent to the site.
- 6.1.5 A topographic survey has been completed for the site and was supplied to AMA by the client. AMA accepts no liability for the accuracy of this survey, and it is recommended that it is verified on-site prior to the commencement of any construction work.
- 6.1.6 Existing drainage information is based on third party survey data and record information which is considered to be incomplete. It is therefore recommended that a FULL drainage investigation survey is commissioned to establish the precise alignment, level, and condition of ALL existing drainage within the development site to inform the masterplan and future detailed design proposals.

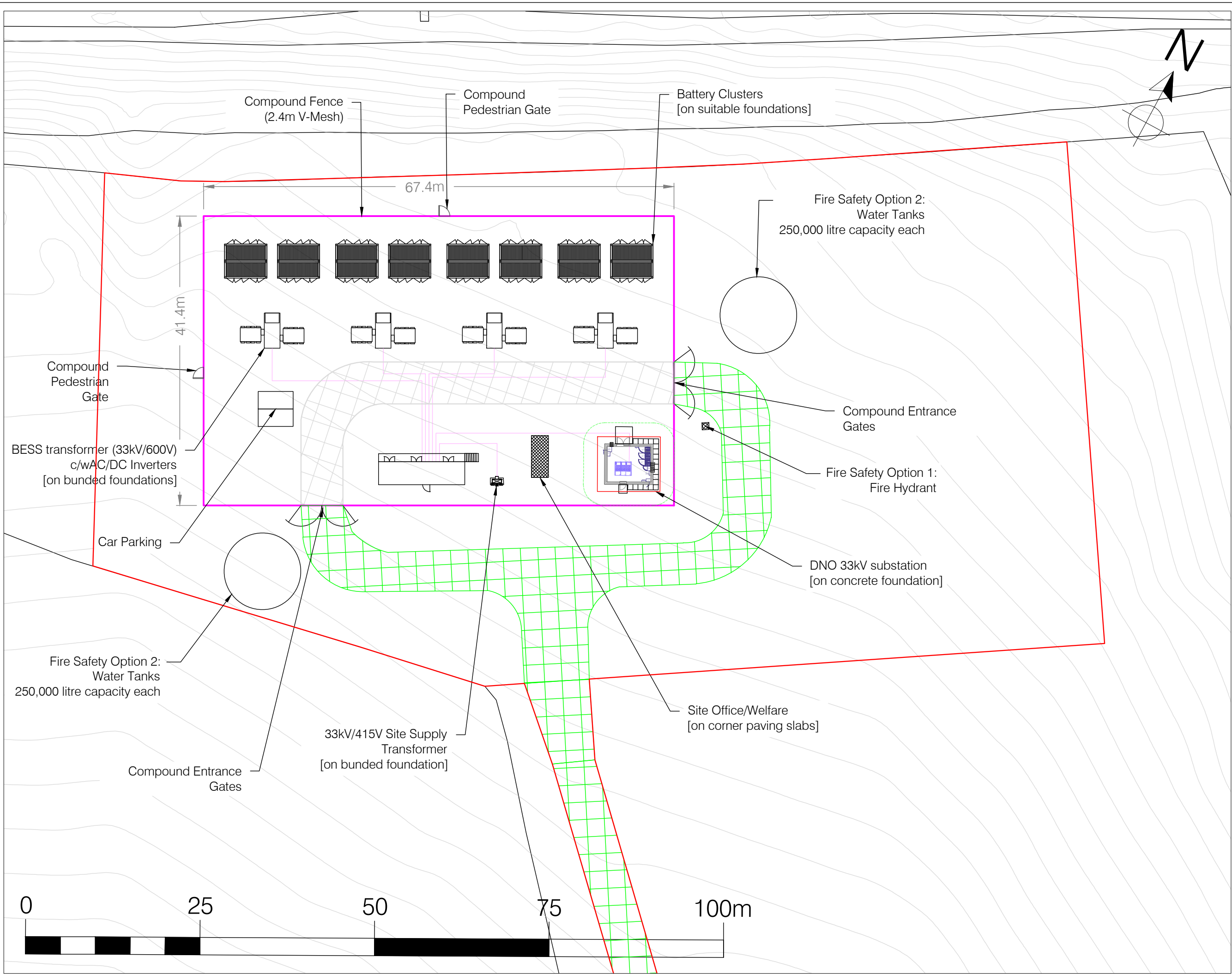
APPENDICES

APPENDIX A – PROPOSED SITE LAYOUT

APPENDIX B – TOPOGRAPHIC SURVEY

Appendix A

PROPOSED SITE LAYOUT



LEGEND

Compound Boundary
(area = 2,790m²)

Planning Boundary
(area = 11,292m²)

Site access from Farm
Track off Bentgate Street
(length ~232m)

GIA (Gross Internal Access)
= 353m²

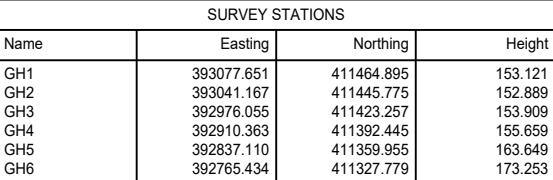
Rev.	Suffix	Date	Details
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TITLE			
30MW BESS SITE LAYOUT PLAN			
DWG. No. ELLEN-BESS-001.5		REV A	
SCALE 1:500 @ A3		DATE 27/08/24	
DRAWN KN		STATUS PLANNING	

ROOT 

POWER

Appendix B

TOPOGRAPHIC SURVEY



This survey has been oriented to the *Ordinance Survey (O.S.)* National Grid OSG836(15) via Global Navigation Satellite Systems (GNSS) and the O.S. Active Network (OS Net).

A true OSG836 coordinate has been established near to the site centre via a transformation using the OSTN15GB & OSGM15GB transformation models.

The survey has been correlated to this point and a further one or more OSG836 (15) points established to create a true O.S. bearing for angle orientation.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.

Please refer to Survey Station Table to enable establishment of the on-site grid and datum.

Some services may have been omitted due to parked vehicles.

Legend:

	Buildings		Overhead Cable		CRV	Crane (crane)		RRB	Reduce Baffle
	Kitchen		Cable		RRB	Reduce Baffle		BB	Bolted
	Roofs		Terminals		BB	Bolted		BN	Not Baffle
	Line Marking		Conc		CRV	Crane (crane)		VP	Vert Pipe
	Conc		Conc		CRV	Crane (crane)		VP	Vert Pipe
	Conc		Conc		CRV	Crane (crane)		VP	Vert Pipe
	Conc		Conc		CRV	Crane (crane)		VP	Vert Pipe
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	Conc		Conc		CRV	Crane (crane)		VP	Vert Pipe

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Rev	Date	Description	Drawn	Q. Ref.
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- ☐ Topographical Surveys
- ☐ Site Engineering
- ☐ Utility / CCTV Surveys
- ☐ Measured Building Surveys
- ☐ 3D Laser Scanning
- ☐ Revit & BIM Models

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Alban Park	Amethyst Road	Regents Park
St Albans	Newcastle Bus. Park	London
Hertfordshire	Newcastle-U-Tyne	NW1 5LL
AL4 0LA	NE4 7YL	
t (01727) 854481	t (01912) 736391	t (02072) 245100

Client Root Power (North) Limited

Root Power (North) Limited

PROJECT
Bengate Street,
Newhey, Rochdale,
OL16 7ML

TITLE

Topographical Survey

DATE	DATE SURVEYED
------	---------------

SCALE	DATE SURVEYED
A1@ 1:1000	25/07/2024

AT @ 11000	ES/0712024
DRAWN	QUALITY REF

RCa	GH21705
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Level datum	See note
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Grid orientation	See note
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Job number	51272
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51272	
Drawing No.	Rev.

51272 T	0
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STATE	9
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Comments
This plan should only be used for its original

purpose. Greenhatch Group accepts no responsibility for this plan if supplied to any party other than

All dimensions should be checked on site prior

Drainage information (where applicable) has been

visually inspected from the surface and therefore should be treated as approximate only.

Notes:

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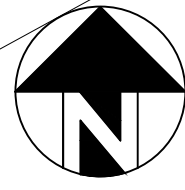
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Andrew Moseley Associates, 15 St Paul's Street, Leeds, LS1 2JG

www.amatp.co.uk

Appendix D

DRAINAGE LAYOUT DRAWING



Gantry

162.50

Soakaway 7.0 x 7.0 x 0.8m deep
to provide 39.2m³ of storm water
storage for a 1in100year + 30%
CC storm event.
CL: 167.41
IL: 166.01
Infiltration rate: 1x10⁻⁶ m/s

85.0m

Battery Clusters
[on suitable foundations]

Fire Safety Option 2:
Water Tanks
250,000 litre capacity each

SW MH 2
1200Ø
CL: 168.63
IL: 167.88

Tank 16.0 x 16.0 x 1.0m
deep to provide 250m³
of fire water storage.

Compound Pedestrian Gate
225.0m

Compound Fence
(2.4m V-Mesh)

67.4m
Pipe 1.000 150Ø 1in 29.6 (64.2m)>>

Pipe 1.001 150Ø 1in 99.2 (36.7m)>>

Pipe 1.002 225Ø 1in 19.3 (29.0m)>>

SW MH 5
1200Ø
CL: 168.90
IL: 167.51

Fire Safety Option 1:
Fire Hydrant

DNO 33kV substation
[on concrete foundation]

30m

Key:
---○--- Proposed Surface Water Drainage
▨ Permeable Surfacing

Drainage Strategy

Surface Water

The proposed impermeable area is 400m². Using Causeway Flow software, the attenuation requirement for a peak 1in100year + 30% climate change storm event has been calculated.

A singular soakaway will provide attenuation for the impermeable areas of the site. The dimensions will be 7.0 x 7.0 x 0.8m deep to provide 39.2m³ of storm water storage.

The infiltration rate has been based on 1x10⁻⁶ m/s as a minimum acceptable rate for the use of a soakaway. The infiltration rate at the site should be confirmed by BRE 365 testing at the site.

Fire Water Storage

In the event of a fire, the stop tap will be turned so run-off entering the drainage system will be directed to the fire water storage tank rather than the soakaway, which can then be collected to minimise the risk of contamination with ground.

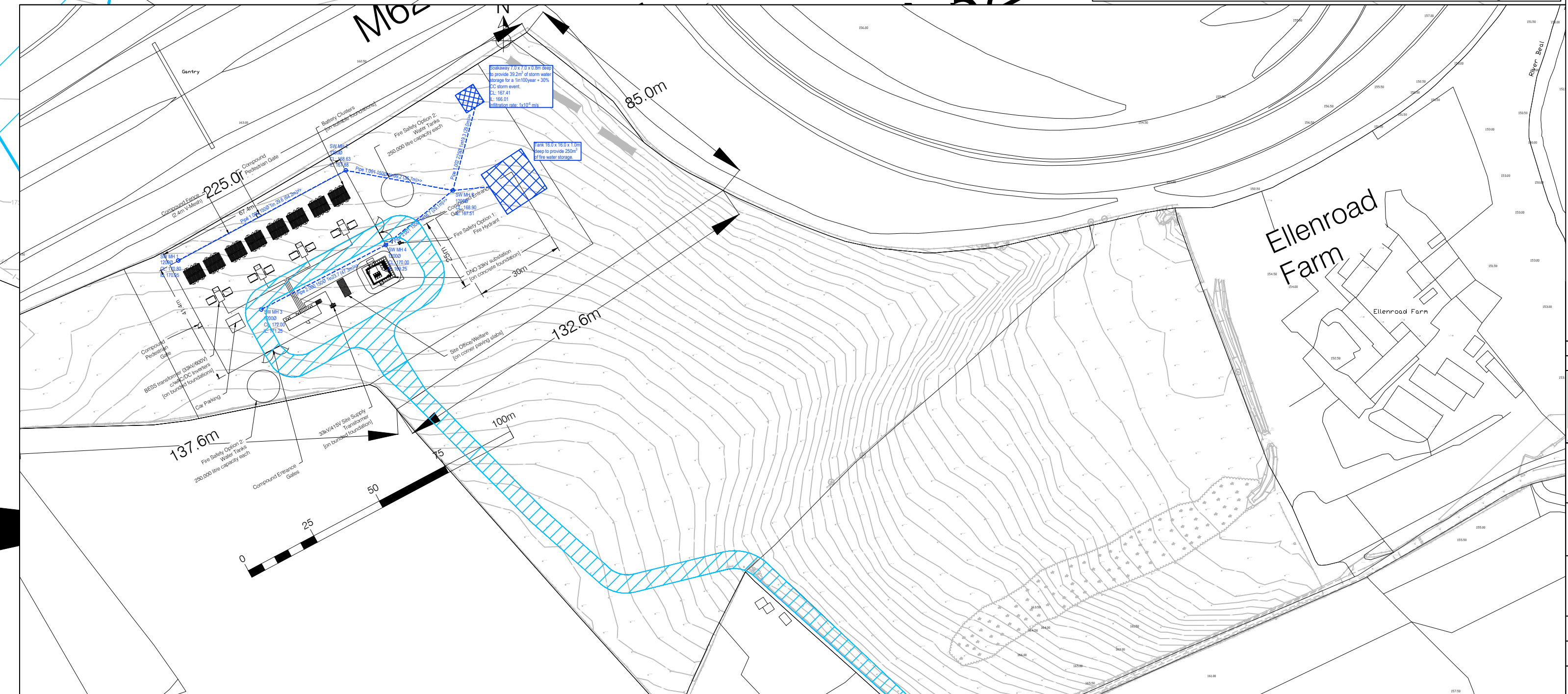
Off-Site Drainage Plan (1:1250)

32.6m

Compound Pedestrian Gate

Proposed Impermeable Area (1:500) = 400m²

33kV/415V Site Supply
Transformer
[on bunded foundation]



P02	Updated Site Layout	06.09.24	JE
P01	Preliminary Issue	06.09.24	JE
AMA ANDREW MOSELEY ASSOCIATES			
Project: Ellen Farm Road			
Client: Root Power (North) Limited			
Drawing: Drainage Layout Drawing			
Drawn By: JE	Date: 06.09.2024		
Checked: TM	Scale: 1:250	Paper: A1	
Drawing No: AMA-22821-DS-001	Rev: P02		

Appendix E

UK SUDS GREENFIELD RUN-OFF RATES

Calculated by:	Emma Pavlin
Site name:	Ellen Farm Road
Site location:	Newhey

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	53.59953° N
Longitude:	2.11362° W
Reference:	3606429321
Date:	Jun 19 2024 14:43

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):	1.289
-----------------------	-------

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Notes

(1) Is $Q_{BAR} < 2.0$ l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

Soil characteristics

	Default	Edited
SOIL type:	1	1
HOST class:	N/A	N/A
SPR/SPRHOST:	0.1	0.1

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

Hydrological characteristics

	Default	Edited
SAAR (mm):	1191	1191
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

(3) Is $SPR/SPRHOST \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

Default

Edited

Q_{BAR} (l/s):	0.4	0.4
1 in 1 year (l/s):	0.35	0.35
1 in 30 years (l/s):	0.69	0.69
1 in 100 year (l/s):	0.84	0.84
1 in 200 years (l/s):	0.96	0.96

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Appendix F

UNITED UTILITIES PRE-DEVELOPMENT ENQUIRY

From: seweradoptions@uuplc.co.uk
To: [Jasmine Ellenor](#)
Subject: RE: 05993284 Ellen Farm Road Bentgate Street Newhey Rochdale OL16 4NU
Date: 10 July 2024 11:04:21

Good morning Jasmine,

Pre Development Enquiry for: Ellen Farm Road, OL16 4NU UU Reference Number : 05993284

We have carried out an assessment of your application which is based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your drainage strategy will need to be reviewed by other competent authorities as part of the planning process, and we advise that you carry out the necessary site investigations to confirm the viability of your proposals.

If your investigations require access to our public sewer network, we ask that you contact our network engineers with a request for an access certificate via our main contact telephone number 0345 6723 723 or refer to the link below:

<https://www.unitedutilities.com/builders-developers/working-near-our-assets/>

Foul Water

Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.

Our preferred point of discharge would be to the 600mm diameter public combined sewer located to the East of your proposed development at unrestricted rate.

If you are able to identify an alternative, more suitable point of discharge, we request that you contact us at your earliest convenience so that we can assess suitability.

In accordance with our infrastructure plans we may ask you to change your point of connection. Therefore please contact us when you are ready to formalise your drainage proposals, we would suggest before you submit for Full Planning.

Surface Water

All surface water flow from the proposed development should drain in-line with the drainage hierarchy, as outlined in Paragraph 80, (Reference ID: 7-080-20150323), of the National Planning Practice Guidance. We also recommend you prioritise the use of multi-functional sustainable drainage systems for the management of surface water in accordance with national planning policy.

Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.

This is outlined as follows, in order of priority:

1. **into the ground (infiltration);**
2. **to a surface waterbody;**
3. **to a surface water sewer or highway drain;**
4. **to a combined sewer.**

For guidance, The [North West SuDS Pro-Forma](#) provides information on the appropriate evidence required at each stage of the hierarchy, to demonstrate how each level has been

discounted.

The Lead Local Flood Authority has responsibility for all surface water drainage concerns and their input to your proposal is critical. You should also consider whether it is necessary to discuss your proposal with the Environment Agency, or Internal Drainage Board (if operating in your area).

The Local Planning Authority are the determining authority for any application for planning permission and the appropriate authority for determining cost viability of a proposed drainage scheme, such assessments are outside of the jurisdiction of United Utilities.

Infiltration

Surface water runoff generated from this development should discharge to the ground via infiltration system where feasible.

A detailed evidence based feasibility assessment must be carried out in line with Chapter 25 of the CIRIA SuDS Manual 2015 to determine whether infiltration is a suitable method of surface water disposal.

Particular attention must be paid to Ground Water Source Protection Zones to ensure that the risk of pollution to these valuable resources is not compromised. Details can be obtained from the government website:

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

If your site is in a Groundwater Source Protection Zone, you should have regard to the Environment Agency's approach to Groundwater Protection. Information on this is available via the link below:

<https://www.gov.uk/government/publications/groundwater-protection-position-statements>

Please note that such a location could have implications for the principle of your development and the need for additional mitigating measures to protect the groundwater environment and public water supply in the detailed design of your site.

Waterbody

If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you contact the Lead Local Flood Authority and/or Environment Agency to discuss a point of discharge to the main river located 300m East of the proposed site.

We would encourage you to identify and engage with any third party landowner and riparian owner to agree access and discharge rights to the water body if this is not in your ownership.

Highway Drainage

If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you investigate the possibility of draining surface water to the highway drain where this ultimately discharges to a watercourse, by contacting the relevant Highway Authority.

Levels

For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should

be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist, we recommend that you contact us to discuss further. It could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.

Land drainage / Overland flows / track drainage

United Utilities have no obligation, and furthermore we do not accept land drainage, overland flows or track drainage into the public sewerage network under any circumstances

Existing Wastewater Assets Crossing the Site

We have reviewed our records and can confirm that there does not appear to be any charted public sewers located within the boundary of proposed development. However, due to the accuracy of the records and the public sewer transfer legislation in 2011, not all public sewers are shown on our records so we would ask that you proceed with caution and carry out your own site investigation works. If any uncharted sewers are identified while carrying out your works we would ask that you contact United Utilities at the earliest opportunity so that we can offer guidance and update our records

Existing Water Assets Crossing the Site

It is the developer responsibility to identify utilities on-site. Where clean water assets are shown on our records, we recommend that you contact our Water Pre-Development Team, via the following email address: DeveloperServicesWater@uuplc.co.uk. Further information for this service can be found on our website via the link below:

<https://www.unitedutilities.com/builders-developers/larger-developments/pre-development/water-pre-dev/>

Connection Application

Although we may discuss and agree discharge points and rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below:

<https://www.unitedutilities.com/builders-developers/wastewater-services/sewer-connections/sewer-connection/>

We recommend that the detailed design should confirm the locations of all utilities in the area and ensure that any proposed drainage solution considers routing and clash checks where required.

If we can be of any further assistance please don't hesitate to contact us further.

Kind Regards

Lewis Barr

Assistant Developer Engineer
Developer Services & Metering
Customer Services
07827286541



Assistant Developer Engineer
Developer Services & Metering
Customer Services
07827286541
unitedutilities.com

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----- Original Message -----

From: seweradoptions@uuplc.co.uk [seweradoptions@uuplc.co.uk]

Sent: 10/07/2024 10:39

To: jasmine@amatp.co.uk

Subject: 05993284 Ellen Farm Road Bentgate Street Newhey Rochdale OL16 4NU

Dear jasmine

PRE DEVELOPMENT APPLICATION AT: – UU Ref 05993284

Please accept this email as receipt of your application received on 8.7.2024 for the above development. This has now been logged on our system and the job reference is 05993284 we would ask that you quote this reference in all future correspondence.

I have reviewed your application (and attachments) and can confirm this is suitable to be passed to Lana Jaundrell for technical assessment. You will receive their response within 8 working days.

Kind regards jill

Jill Ellis

Customer Advisor Advanced
Developer Services & Metering
Customer Services

Direct Tel: 01925 233 064

Tel: 0345 072 6067

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Customer Advisor Advanced
Developer Services & Metering
Customer Services
Direct Tel: 01925 233 064
Tel: 0345 072 6067
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----- Original Message -----

From: [donotreply@uu-web.co.uk]

Sent: 08/07/2024 14:27

To: seweradoptions@uuplc.co.uk; webmaster@uuplc.co.uk

Subject: Wastewater Pre-Development Enquiry Submission

Question	Answer
Section 1 - Your Details	
Developer/Consultant/Land owner/Other	Consultant
Name	Jasmine Ellenor
Company Name	Andrew Moseley Associates
Address	15 St Pauls St Leeds West Yorkshire LS1 2JG
Contact Number	07742668250
Email Address	jasmine@amatp.co.uk
Section 2 - Development Details	
Do you intend to offer any of the sewers for adoption by United Utilities under S104?	No
Site Address	Ellen Farm Road Bentgate Street Newhey Rochdale OL16 4NU
Site Postcode	#Development postcode#
Site Name	Ellen Farm Road
Grid Reference Number	SD 92550 11505
Development Type	Commercial
Approx. Number Units	1
Total Site Area (hectares)	1.12
Does this site have planning permission?	No
Planning Reference Number	
Council Area	Rochdale
Have you approached us about this site previously?	No
If yes, please provide reference number	
Is the development part of a larger site that will be developed in phases?	No

Location Plan	ELLEN-BESS-001.1 Location.pdf
Section 3: Previous Land Use	
Please confirm what the land was previously used for:	Greenfield
Brownfield evidence of positive drainage to the public sewer	
Section 4 - Drainage Strategy	
Foul connection: How are you proposing to drain foul flows from the site?	Via a new connection to the public sewer
Via an existing connection to the public sewer?	No
Surface water connection: How are you proposing to drain your site, following the surface water hierarchy, as outlined in National Planning Policy Guidance?	Surface water sewer/Highway Drain
SuDS: Have SuDS features been considered in the surface water drainage strategy?	Yes



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Appendix G

CAUSEWAY FLOW CALCULATIONS

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.300	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
MH 1	0.008	5.00	170.800	1200	0.750
MH 2	0.008	5.00	168.630	1200	0.750
MH 3	0.008	5.00	172.000	1200	0.750
MH 4	0.008	5.00	170.000	1200	0.750
MH 5	0.008	5.00	168.900	1200	1.390
Soakaway	0.000	5.00	167.410	1200	1.400

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	MH 1	MH 2	64.200	0.600	170.050	167.880	2.170	29.6	150	6.07	50.0
1.001	MH 2	MH 5	36.700	0.600	167.880	167.510	0.370	99.2	150	6.68	50.0
2.000	MH 3	MH 4	47.300	0.600	171.250	169.250	2.000	23.7	150	5.79	50.0
2.001	MH 4	MH 5	29.100	0.600	169.250	167.510	1.740	16.7	150	6.27	50.0
1.002	MH 5	Soakaway	29.000	0.600	167.510	166.010	1.500	19.3	150	7.16	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.858	32.8	1.4	0.600	0.600	0.008	0.0	21	0.932
1.001	1.009	17.8	2.9	0.600	1.240	0.016	0.0	41	0.743
2.000	2.079	36.7	1.4	0.600	0.600	0.008	0.0	20	1.007
2.001	2.475	43.7	2.9	0.600	1.240	0.016	0.0	26	1.406
1.002	2.301	40.7	7.2	1.240	1.250	0.040	0.0	42	1.738

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	64.200	29.6	150	Circular	170.800	170.050	0.600	168.630	167.880	0.600
1.001	36.700	99.2	150	Circular	168.630	167.880	0.600	168.900	167.510	1.240
2.000	47.300	23.7	150	Circular	172.000	171.250	0.600	170.000	169.250	0.600
2.001	29.100	16.7	150	Circular	170.000	169.250	0.600	168.900	167.510	1.240

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	MH 1	1200	Manhole	Adoptable	MH 2	1200	Manhole	Adoptable
1.001	MH 2	1200	Manhole	Adoptable	MH 5	1200	Manhole	Adoptable
2.000	MH 3	1200	Manhole	Adoptable	MH 4	1200	Manhole	Adoptable
2.001	MH 4	1200	Manhole	Adoptable	MH 5	1200	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.002	29.000	19.3	150	Circular	168.900	167.510	1.240	167.410	166.010	1.250

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.002	MH 5	1200	Manhole	Adoptable	Soakaway	1200	Manhole	Adoptable

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
MH 1	170.800	0.750	1200					
				0	1.000	170.050	150	
MH 2	168.630	0.750	1200		1	1.000	167.880	150
				0	1.001	167.880	150	
MH 3	172.000	0.750	1200					
				0	2.000	171.250	150	
MH 4	170.000	0.750	1200		1	2.000	169.250	150
				0	2.001	169.250	150	
MH 5	168.900	1.390	1200		1	2.001	167.510	150
				2	1.001	167.510	150	
				0	1.002	167.510	150	
Soakaway	167.410	1.400	1200		1	1.002	166.010	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.300	Additional Storage (m³/ha)	20.0
Summer CV	1.000	Check Discharge Rate(s)	x
Winter CV	1.000	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	------

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	40	0	0

Node Soakaway Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00360	Invert Level (m)	166.010	Depth (m)	
Side Inf Coefficient (m/hr)	0.00360	Time to half empty (mins)	13949	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	7.000	Number Required	1
Porosity	1.00	Pit Length (m)	7.000		

Results for 1 year Critical Storm Duration. Lowest mass balance: 98.30%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	MH 1	11	170.070	0.020	1.3	0.0268	0.0000	OK
15 minute summer	MH 2	11	167.917	0.037	2.5	0.0494	0.0000	OK
15 minute summer	MH 3	10	171.269	0.019	1.3	0.0256	0.0000	OK
15 minute summer	MH 4	11	169.274	0.024	2.5	0.0327	0.0000	OK
15 minute summer	MH 5	11	167.555	0.045	6.0	0.0562	0.0000	OK
1440 minute winter	Soakaway	960	166.242	0.231	0.5	11.6033	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	MH 1	1.000	MH 2	1.2	0.561	0.038	0.1514
15 minute summer	MH 2	1.001	MH 5	2.3	0.627	0.131	0.1429
15 minute summer	MH 3	2.000	MH 4	1.2	0.804	0.034	0.0740
15 minute summer	MH 4	2.001	MH 5	2.5	0.807	0.057	0.0917
15 minute summer	MH 5	1.002	Soakaway	6.2	2.305	0.152	0.0915
1440 minute winter	Soakaway	Infiltration		0.0			

Results for 30 year Critical Storm Duration. Lowest mass balance: 98.30%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	MH 1	10	170.081	0.031	3.2	0.0419	0.0000	OK
15 minute summer	MH 2	11	167.940	0.060	6.3	0.0809	0.0000	OK
15 minute summer	MH 3	10	171.280	0.030	3.2	0.0399	0.0000	OK
15 minute summer	MH 4	10	169.288	0.038	6.3	0.0514	0.0000	OK
15 minute summer	MH 5	10	167.580	0.070	15.2	0.0872	0.0000	OK
720 minute winter	Soakaway	690	166.551	0.541	1.5	27.1306	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	MH 1	1.000	MH 2	3.1	0.710	0.094	0.2960
15 minute summer	MH 2	1.001	MH 5	6.1	0.869	0.340	0.2639
15 minute summer	MH 3	2.000	MH 4	3.1	1.049	0.085	0.1418
15 minute summer	MH 4	2.001	MH 5	6.2	1.106	0.141	0.1685
15 minute summer	MH 5	1.002	Soakaway	15.9	2.617	0.390	0.2535
720 minute winter	Soakaway	Infiltration		0.0			

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.30%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	MH 1	10	170.092	0.042	5.8	0.0569	0.0000	OK
15 minute summer	MH 2	11	167.967	0.087	11.5	0.1166	0.0000	OK
15 minute summer	MH 3	10	171.290	0.040	5.8	0.0539	0.0000	OK
15 minute summer	MH 4	10	169.302	0.052	11.5	0.0702	0.0000	OK
15 minute summer	MH 5	10	167.607	0.097	27.8	0.1207	0.0000	OK
1440 minute winter	Soakaway	1380	167.121	1.111	1.5	55.6899	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	MH 1	1.000	MH 2	5.7	0.821	0.173	0.4677
15 minute summer	MH 2	1.001	MH 5	11.1	1.016	0.622	0.4069
15 minute summer	MH 3	2.000	MH 4	5.7	1.244	0.156	0.2183
15 minute summer	MH 4	2.001	MH 5	11.3	1.335	0.259	0.2544
15 minute summer	MH 5	1.002	Soakaway	28.7	2.706	0.707	0.4064
1440 minute winter	Soakaway	Infiltration		0.0			



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