A CAF GROUP COMPANY

**ENVIRONMENT**

# First Renewable Developments Ltd
# Kettering Energy Park
# Burton Latimer
# Surface Water Drainage Topic Note

# Kettering Energy Park

| | | | |
|---|---|---|---|
| **Project** | **Kettering Energy Park** | | |
| **Document Number** | KEP-BWB-ZZ-XX-RP-CD-0001 | **BWB Ref** | LDP2474 |
| **Authors** | G Littlewood | **Status** | S1 |
| **Checked** | M Bailey | **Revision** | 2 |
| **Approved** | G Littlewood | **Date** | 09/12/2021 |

# DRAINAGE

## 1. Introduction

1.1. This topic note has been prepared by BWB Consulting Ltd to provide a summary of the drainage assessment for proposed employment units which connect to the existing and future renewable energy infrastructure in the surrounding area.

1.2. Its purpose is to inform the preparation of a masterplan, through identifying sustainable drainage constraints and opportunities on the site, and the overall site suitability for the proposed uses from a sustainable drainage perspective. Specifically, this note focuses on the employment development that will introduce impermeable areas at the site.

1.3. This technical note provides the results of the constraints review and recommendations for further assessment work required to support any future planning applications consultation and baseline surveys

## 2. Site Details

2.1. The predominantly greenfield site is located approximately 1.6km east of Burton Latimer. Greenfield, agricultural land is located along the northern, south-eastern and south-western margins. The north-eastern boundary is bound by the A510 whereas the north-west boundary is bound by an unnamed ordinary watercourse (UOW 2), described below.

2.2. A series of unnamed ordinary watercourses (UOWs) are located either within or adjacent to the site.

2.3. The illustrative masterplan is shown below in **Figure 1.1**.

# Kettering Energy Park

**Figure1.1: Illustrative Masterplan**

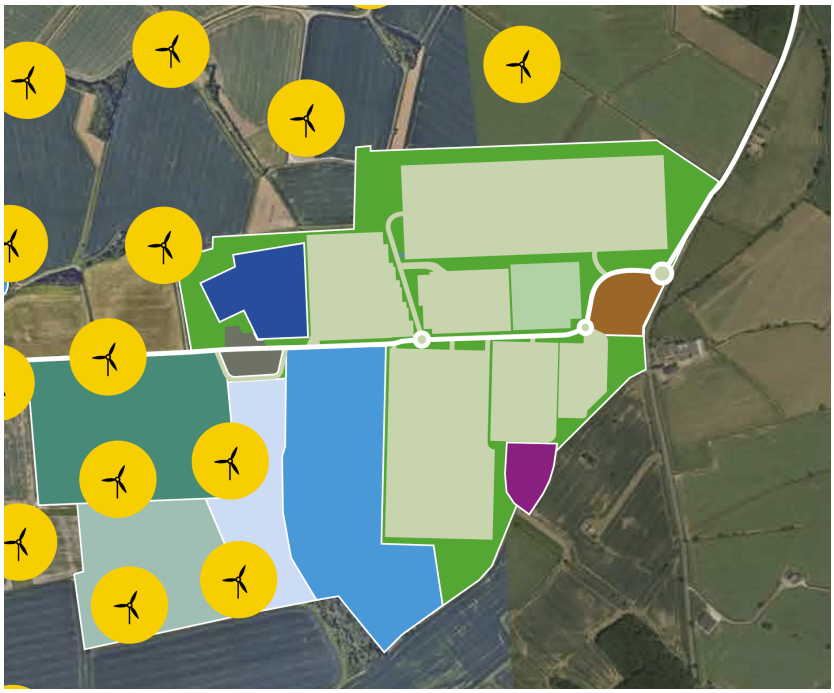

*Table 1.1: Site Summary*

| | |
|---|---|
| **Site Name** | **Kettering Energy Park** |
| **Location** | Burton Latimer, Northamptonshire |
| **NGR (approx.)** | SP 930 745 |
| **Study Site Area (ha)** | 109.96 |
| **Development Type** | Renewable Energy, Office Space, Industrial, Commercial Storage and Distribution |
| **Flood Zone Classification** | Flood Zone 1 |
| **NPPF Vulnerability** | Essential Infrastructure / Less Vulnerable |
| **Environment Agency Office** | Lincolnshire and Northamptonshire |
| **Sewage Undertaker** | Anglian Water |
| **Lead Local Flood Authority** | North Northamptonshire Council |
| **Local Planning Authority** | North Northamptonshire Council |

2.4. A topographical survey has been undertaken and is included as **Appendix 2**. The site is shown to straddle a ridge-form located in the north-east of the site, such that there are two predominant drainage catchments.

2.5. The presence of several valleys also causes local undulation of topography. Most of the site falls towards the west and north-west. Maximum and minimum levels across the site range from 94.14 metres Above Ordnance Datum (mAOD) to 75.89 mAOD.

## 3. Sustainable Drainage Guidance

3.1. Sustainable Drainage Systems (SuDS) aim to reduce the impact of development by replicating the natural runoff regime in a sustainable, cost effective manner whilst protecting water quality and reducing pollution. The four key objectives of SuDS design are to achieve improvements in water quantity, water quality, amenity provision and biodiversity.

3.2. Northamptonshire County Council has published the Local Standards and Guidance for Surface Water Drainage in Northamptonshire[1], which provides guidance on the design of SuDS and has been used to inform the drainage strategy outlined within this report. Some of the local requirements specific to this site include:

i. For outline planning applications, the drainage strategy should contain sufficient detail of typical development layouts to indicate the likely location of all the SuDS features and connecting flow paths. It should clearly identify peak discharge rates and total attenuation storage volumes required within each package of the overall development.

ii. For full planning applications, the layout of the proposed drainage network, the location of storage within the proposed development and how these relate to submitted calculations should be provided.

iii. All applications should demonstrate that the SuDS management train has been appropriately applied and include a SuDS Management Plan which states who will own and maintain all elements of the drainage system.

iv. Greenfield sites should discharge at no greater than the current greenfield rate so that the site behaves like the original site across the range of events.

v. As Flood Estimation Handbook (FEH) rainfall data is more up to date, calculations should use FEH data for surface water drainage design, except where the critical storm duration is less than 60 minutes.

vi. All surface storage features should provide a minimum 300mm residual uncertainty allowance (freeboard) above the design maximum water level to top of bank and to finished floor levels around the site.

vii. At least one surface feature should be deployed within the drainage system for water quality purposes, or more features for runoff which may contain higher levels of pollutants in accordance with the CIRIA SuDS Manual C753.

[1] Local Standards and Guidance for Surface Water Drainage in Northamptonshire, Northamptonshire County Council (2017)

3.3. Given the development proposals a 40% allowance for the potential implications of climate change has been applied, in accordance with the Environment Agency's (EA) guidance[2] (most recently updated in October 2021).

3.4. The local guidance has been considered in conjunction with the Non-Statutory Technical Standards for Sustainable Drainage Systems[3] and The SuDS Manual[4] in the development of the drainage strategy.

## 4. Development Proposals

4.1. The proposed development is understood to involve the construction of a new renewable energy park consisting of employment development, potential hydroponics and solar farms alongside associated access, car parking, drainage, highways, and landscaping.

4.2. Further to the proposed energy infrastructure, the proposals are understood to include employment space comprising of circa. 400,000m2 of new floor space, potentially including office research and development, or industrial processes (B1), General Industrial Use (B2) and commercial storage and distribution (B8) uses. More specific uses or occupiers for the site are yet to be defined.

4.3. The site has been identified for use as a renewable energy park within the North Northamptonshire Joint Core Strategy (JCS) under Policy 26 - Renewable and Low Carbon Energy'.

## 5. Proposed Surface Water Drainage

5.1. The proposed drainage scheme is being developed to meet the following points

5.2. Proposed flows from the site will discharge at or below greenfield runoff rates (Max rate greenfield **QBAR 3.44 l/s/ha**), for all storms up to and including the 1 in 100 year plus climate change event.

5.3. The impact on the receiving watercourses is mitigated by discharging the flow throughout the management train, where practicable, rather than relying upon a single point of discharge

5.4. SuDS Source Control measures will manage water quantity and water quality and will be implemented wherever practicable throughout the management train of the development.

5.5. Where practicable the strategy will mimic the existing drainage characteristics of the site by retaining and where practicable utilising any existing drainage features

[2] Environment Agency, Flood risk assessments: climate change allowances: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances
[3] 2015, DEFRA. Non-statutory technical standards for sustainable drainage systems
[4] The SuDS Manual, CIRIA (2015)

# Kettering Energy Park

5.6. Details will be provided of how the proposed and existing drainage features on the site will be maintained and managed after completion.

5.7. Where practicable the scheme will use green, shallow/above ground SuDS measures.

5.8. The scheme will not be using green roofs for the following reasons:

- Green roofs will increase the weight on the structure (minimum 70mm depth = approx. 125kg/m2 saturated weight = 1.25 kN/m2) on a roof which is normally designed for a 0.25 kN/m2 service load. This increase in weight will lead to a larger structural frame, in turn adding additional load to the foundations resulting in larger bases. This increase in steel and concrete to accommodate the additional loadings would result not only in significantly increased construction costs but also higher embodied carbon that would be more than the resultant carbon saving of the green roof.
- Green roofs are more appropriate for urban office block construction where the increase in weight is not a substantial factor in the overall building loads.
- The maximization of natural light by installing 15% roof lights to reduce the requirement for artificial lighting during the daytime and the inclusion of roof mounted PVs excludes the possibility to do anything other than small areas of green roof on industrial units.
- The nature of the building means that the roof is quite high, in excess of 18m, which means that only qualified operatives can access and maintain the roof. A green roof, by its nature requires maintenance and this form of building does not lend itself to regular access.
- There can be a fire risk in hot summer months if the green roof is not irrigated correctly which increases occupiers' insurance premiums. The irrigation can either be done using an irrigation system (which is expensive and increases the carbon footprint) or by manual watering (very expensive and not recommended due to health and safety issues of working at height)
- Due to the nature of the potential use of the buildings (distribution of products direct to sale) there may concern from any tenant that the installation of a green roof could increase the possibility of birds (and bird feaces) and other vermin being near products.
- There is an issue of overall warranty for the envelope of the building and, since these buildings are occupied under Full Repairing and Insuring Leases by the Occupiers, green roofs would likely be strongly resisted by Tenants.

5.9. Where areas of other development may come forwards, such as for the potential hydroponics, the same drainage principles will be incorporated.

# Kettering Energy Park

## Appendix A: Outline Surface Water Drainage Strategy and Calculations

Point of discharge to ditch
Invert level 74.5m AOD
Greenfield QBAR
Limited Rate: 52l/s

Point of discharge to ditch
Invert level 80.8m AOD
Greenfield QBAR
Limited Rate: 253l/s

Catchment Area: 38.2ha
Limited Discharge Rate: 144 l/s
Approx Storage: 30,600m³

Catchment Area: 14.0ha
Limited Discharge Rate: 53 l/s
Approx Storage: 11,500m³

Catchment Area:
18.1ha
Limited Discharge
Rate: 68l/s
Approx Storage:
14,500m³

Catchment Area: 2.5ha
Limited Discharge Rate: 9l/s
Approx Storage: 2,000m³

Catchment Area: 5.5ha
Limited Discharge Rate: 20l/s
Approx Storage:4,400m³

ROPONICS
'LOT D

SOLAR FARM
PLOT A

SOLAR FARM
EXTENSION

SOLAR PARK



U:\LDP\LDP2474_Kettering Energy Park, Northamptonshire\02. Project Delivery\01. WIP\Drawings\KEP-BWB-ZZ-XX-DR-C-0500_Proposed Surface Water Drainage Strategy_[S0-P0.1].dwg

## Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.

Key Plan

Legend

| Rev | Date | Details of issue / revision | Drw | Rev |
|---|---|---|---|---|
| P1 | 27.07.21 | Preliminary Issue | GSL | GSL |

Issues & Revisions

BWB A CAF GROUP COMPANY
■ Birmingham | 0121 233 3322
□ Leeds | 0113 233 8000
□ London | 020 7407 3879
□ Manchester | 0161 233 4260
□ Nottingham | 0115 924 1100
www.bwbconsulting.com

Client
**FIRST RENEWABLE**

Project Title
**KETTERING ENERGY PARK**

Drawing Title
**PROPOSED OUTLINE SURFACE WATER DRAINAGE STRATEGY**

| Drawn: | GSL | | Reviewed: | GSL | |
|---|---|---|---|---|---|
| BWB Ref: | LDP 2474 | Date: | 27.07.21 | Scale@A1: | 1:2500 |

Drawing Status
**PRELIMINARY**

| Project - Originator - Zone - Level - Type - Role - Number | Status | Rev |
|---|---|---|
| **KEP-BWB-ZZ-XX-DR-C-0500** | **S2** | **P1** |

## IH 124 Mean Annual Flood

Input

| | | | |
|---|---|---|---|
| Return Period (years) | 2 | Soil | 0.450 |
| Area (ha) | 88.900 | Urban | 0.000 |
| SAAR (mm) | 600 | Region Number | Region 5 |

**Results l/s**

| | |
|---|---|
| QBAR Rural | 306.1 |
| QBAR Urban | 306.1 |
| Q2 years | 273.5 |
| Q1 year | 266.3 |
| Q2 years | 273.5 |
| Q5 years | 394.9 |
| Q10 years | 506.6 |
| Q20 years | 640.0 |
| Q25 years | 692.4 |
| Q30 years | 735.4 |
| Q50 years | 869.9 |
| Q100 years | 1089.7 |
| Q200 years | 1282.5 |
| Q250 years | 1343.8 |
| Q1000 years | 1763.1 |