



Harborough Cemetery: Site Assessment, Site 4: Land off Kettering Road

For: Harborough District Council

CRM.1287.002.P.R.002.A



Contact Details:

Enzygo Ltd.
The Byre
Woodend Lane
Cromhall
Gloucestershire
GL12 8AA

tel: 01454 269237
email: lee.searles@enzygo.com
www: enzygo.com

Harborough Cemetery: Site Assessment, Site 4: Land off Kettering Road

Project:	CRM.1287.002
For:	Harborough District Council (HDC)
Status:	DRAFT
Date:	May 2017
Author:	Bethany Kington, Senior Planning Consultant Derek Allan, MCIEEM, Principal Ecologist Verena Meyer, CMLI, MARborA, Senior Arboriculturist and Landscape Architect James Griffiths, FGS, Senior Geo-Environmental Engineer Ian Hopkinson, Consultant Hydrologist Sarah Strauther, Senior Transport Planner
Reviewer:	Lee Searles, MRPTI, Director of Planning

Disclaimer:

This report has been produced by Enzygo Limited within the terms of the contract with the client and taking account of the resources devoted to it by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

Enzygo Limited Registered in England No. 6525159
Registered Office Stag House Chipping Wotton-Under-Edge Gloucestershire GL12 7AD

Contents

1	INTRODUCTION.....	4
2	OVERVIEW OF FINDINGS	6
3	INTRODUCTION TO SITE.....	8
4	PLANNING REVIEW	11
5	ECOLOGICAL ASSESSMENT	19
6	LANDSCAPE/ VISUAL/ARBORICULTURAL EFFECTS.....	23
7	HYDROLOGY/ WATER ENVIRONMENT AND FLOOD RISK.....	26
8	HIGHWAYS, ACCESS, SAFETY AND SUSTANABILITY	44
9	CONCLUSION	49

Figures and Tables

Figure 1.	Harborough road, north of the site	8
Figure 2.	Unnamed access road to the immediate north of the site	9
Figure 3.	View of the site from the north-west	9
Figure 4.	Site within the local policy proposals map.....	14
Figure 5.	Site within Kettering Borough Council planning policy.....	15
Figure 7.	Anglian Water asset plans.....	32
Figure 8.	Fluvial Flooding	35
Figure 9.	Surface Water Flooding	36
Figure 10.	Groundwater Susceptibility Map	37

Table 1. Historic applications within the site16

Table 2. Ecological features/ constraints21

Table 3. Potential Contaminative Historical Land Use/Ground Working Features.....34

Table 4. Elemental components of a typical human body “Assessing the Groundwater Pollution Potential of Cemetery Developments, Ref: SCHOO404BGLA-E-A, April 2004”38

Table 5. Source: Table 4 Potential contaminant release (kg) from a single 70kg burial “Assessing the Groundwater Pollution Potential of Cemetery Developments, Ref: SCHOO404BGLA-E-A, April 2004”.39

Plans

Plan	Reference
Site location plan	CRM.1287.002.PL.D.003.1
Site boundary plan	CRM.1287.002.PL.D.003.2
Phase I Habitat Map	CRM.1287.002.EC.D.004
Landscape and Arboricultural Appraisal	CRM.1287.002.L.D.007
Visual Appraisal	CRM.1287.002.L.D.008

1 INTRODUCTION

1.1 Introduction

- 1.1.1 In April 2017, Enzygo Ltd were commissioned by Harborough District Council (HDC) to prepare detailed site assessments for four identified sites. The assessments were to evaluate the potential of each site for future development of a cemetery. The assessments took into account landscape and visual factors, highways and access factors, hydrological factors, ground conditions and ecological constraints.
- 1.1.2 An initial review of a larger number of sites was undertaken by HDC, and the outcome of this review identified four sites to be considered in further detail.
- 1.1.3 This report provides a detailed site assessment for 'Site 4', referred to as 'Land at Kettering Road'. The site is located at postal code LE16 8BB, Grid Reference SP 75446 86496. Plans CRM.1287.002.PL.3.003.1 and CRM.1287.002.PL.D.003.2 show the location of the site.

1.2 Background









- 1.2.1 In 2016, Enzygo Ltd undertook a review of cemetery capacity within HDC. This considered the existing cemetery capacity within the District, along with the forecasted capacity within the forthcoming Local Plan period (until 2031), based on the forecasted population and mortality rate. The report identified that additional cemetery capacity would be required in a number of Parishes and within Market Harborough.
- 1.2.2 Based on the report findings, HDC are currently seeking to find a suitable site to be allocated as a cemetery site within the forthcoming Local Plan, to provide cemetery capacity for Market Harborough. HDC have undertaken an initial review of a large number of potential cemetery sites. This review considered the size of the site, the potential capacity, access, topography, potential visual and heritage impacts, management constraints, development costs, and the potential for the site to accommodate different religious denominations and non-conformists.
- 1.2.3 The initial review undertaken by HDC identified 4 potential sites. Enzygo Ltd have been tasked with looking at these four sites in much more detail. The output of this will identify any further potential constraints, if these exist, which could preclude a cemetery development from coming forward within the site.

1.3 Methodology

1.3.1 Within each technical chapter of this report (Chapters 5-8), the methodology used to undertake the assessment is detailed. In most cases, this is based on a combination of a desk-top review, available data relating to the site, and where possible and necessary, a site visit.

1.4 Report format

1.4.1 This report has the following format:

-  Chapter 2 provides an overview of the findings, provided in a table format for clarity, and using a traffic-light grading system;
-  Chapter 3 provides a more specific introduction to the site being assessed;
-  Chapter 4 provides a planning review of the site. This includes a consideration of local and national planning policy, relevant designations, current land use, surrounding land use, historic land use, and planning history for the site.
-  Chapter 5 provides an ecological assessment of the site, based on both a desk-top review, and where possible, a site walkover.
-  Chapter 6 considers the landscape, visual and arboricultural effects of the development of a cemetery within the site.
-  Chapter 7 considers the effect of the development of a cemetery on hydrology, the water environment and flood risk.
-  Chapter 8 considers the potential highways, access, safety and sustainability effects of the development of a cemetery within the site.
-  Chapter 9 summarises the above information, and provides an overall conclusion

2 OVERVIEW OF FINDINGS

2.1 Introduction

2.1.1 This chapter provides an overview of the findings detailed within this report. For clarity, this is provided in a table format, using a traffic light system.

2.2 Overall findings

Assessment considerations	Beneficial	Neutral	Adverse
National Planning policy Current national planning policy			
Local Planning policy Current local planning policy designation, proposed designation			
Designations National/ local designations within/ adjoining the application site			
Current land use Current use of the land, impact of development on the current use of the site			
Surrounding land use Current use of the surrounding land, impact of the development on the surrounding land use			
Sensitive receptors Nearest residential and commercial receptors			
Historic land use Previous land uses within the site			
Planning history Planning history within the site. Details of any applications that have been refused, reasons for refusal			
Ecological constraints Current ecological value of the site and offsite ecological features.			
Landscape/ townscape Effects Impact on pattern/ density, tranquillity, culture and landcover/ layout.			
Arboricultural impacts Assessment of trees/ shrubs/ hedges within the site, and their quality			
Visual Effects Visual impacts on sensitive receptors within 1km of the site			
Water Environment – Groundwater Source Protection Zone (SPZ) 1			

Assessment considerations	Beneficial	Neutral	Adverse
Water Environment -Groundwater abstraction/wells/springs supplying water for human use.			
Water Environment -Soil/ Superficial Deposit thickness =>1.8m to give =>1m cover over coffin/body Graves should not be dug in bedrock			Not known
Groundwater Table: => 1 metre clearance between the base of the grave and the top of the water table – they shouldn't have any standing water in them when dug [water table depth should be =>2.8m]			Not known
Water Environment – Surface water The site is at least 30m from any spring or watercourse not used for human consumption			
Water Environment – Historic and current industrial land use			
Water Environment – Off site or perimeter ditch drainage: Burial sites should be at least 10 metres from any field drain, including dry ditches			Not known
Water Environment -Field/ditch drainage			Not known
Water Environment -Highway drainage			
Water Environment -Artificial pathways: Groundwater movement along sewerage alignments e.g. coarse backfills.			
Flood risk - Fluvial			
Flood risk - Surface Water			
Flood risk - Tidal			
Flood risk - Groundwater			
Flood risk - Artificial Drainage Systems			
Flood risk - Infrastructure Failure			
Flood risk - Site Drainage			
Highways Potential for significant highways impacts associated with development			
Access Existing access into the site and the suitability of this			
Sustainability lighting, bus facilities, footpaths, cycle routes,			
Highway Safety speed, parking on-street, lighting			

3 INTRODUCTION TO SITE

3.1 Introduction

3.1.1 This chapter provides an introduction into the site being assessed. Further detail regarding the site is provided within the following chapters, where relevant.

3.2 Site location

3.2.1 The site being considered within this report is located as postal code LE16 8BB (Grid Reference SP 75446 86496). Figures CRM.1287.002.PL.D.003.1 and CRM.1287.002.PL.D.003.2 show the location of the site.

3.2.2 The site is located approximately 2.2km east of the centre of Market Harborough, and approximately 550m east of the edge of the town.

3.2.3 The site lies to the south of the A6 (Harborough Road), via Kettering Road and a smaller unnamed access road. Figures 1 and 2 show Kettering Road and the unnamed access road to the north of the site.



Figure 1. Harborough road, north of the site



Figure 2. Unnamed access road to the immediate north of the site

- 3.2.4 Fields lies to the east, west and south of the site. There appears to be a pond towards the southern half of the site, and on the eastern boundary. These would have to be considered as part of the design of a cemetery within the site.
- 3.2.5 figure 3 shows the site from the north west. The patch of trees within the centre of the site appear to surround the pond.



Figure 3. View of the site from the north-west

3.3 Landownership and access

- 3.3.1 The landownership information for the site was obtained from the Land Registry. The land owner was contacted using the postal address detailed on the Register. However, no response was received, and thus access into the site was not obtained.

3.3.2 In addition, the unnamed access road to the north of the site was marked as private land, and therefore could not be accessed. As a result, this report is based on viewing the site from a distance, and a desk top review.

4 PLANNING REVIEW

4.1 Introduction

4.1.1 This chapter provides a review of the site from a planning perspective. This considers the impacts of planning policies on the development potential of the site for cemetery use. This includes a consideration of local and national planning policy; current land use; surrounding land use; historic land use; and previous planning applications submitted within the site.

4.1.2 The table at the beginning of this chapter provides a summary of the findings. Further detail to support the table is provided within the chapter.

4.2 Overview of findings

4.2.1 The table below provides a summary of the findings within this chapter. Further detail is provided within the text following the table.

Assessment considerations	Beneficial	Neutral	Adverse
National Planning policy Current national planning policy	<p>The only direct reference to cemetery sites within national planning policy is not relevant to this site.</p> <p>Development within the site would not conflict with national planning policy.</p> <p>The development would constitute sustainable development, subject to the technical reports within this assessment, as is thus consistent with national policy</p>		
Local Planning policy Current local planning policy designation, proposed designation	<p>The site is not allocated within local policy for any specific use.</p> <p>The site currently comprises open land. Policy CS8 supports the development of</p>		

Assessment considerations	Beneficial	Neutral	Adverse
	cemeteries and burial grounds in open space		
Designations National/ local designations within/ adjoining the application site		There are no relevant planning designations that would either support or preclude the development of a cemetery within the site	
Current land use Current use of the land, impact of development on the current use of the site			The development would result in the loss of grade 3 agricultural land. However, this is unlikely to preclude development
Surrounding land use Current use of the surrounding land, impact of the development on the surrounding land use		The development is unlikely to have either a negative or positive impact on surrounding land use. It would not preclude the use of, or development on, surrounding land	
Sensitive receptors Nearest residential and commercial receptors	The site is situated away from residential and commercial receptors		
Historic land use Previous land uses within the site		Historic maps do not show historic development within the site	
Planning history Planning history within the site. Details of any applications that have been refused, reasons for refusal		Surrounding planning applications should not preclude development of a cemetery within the site. It should be confirmed with the land owner that the solar park application is no longer being considered	

4.3 National Planning Policy

4.3.1 The National Planning Policy Framework (NPPF) sets out the national planning policy for the country. Within the NPPF, the only reference to cemetery sites is within paragraph 89. This states that 'A local planning authority should regard the construction of new buildings as

inappropriate in Green Belt. Exceptions to this are... provision of appropriate facilities for outdoor sport, outdoor recreation and for cemeteries...'

- 4.3.2 Although this site is not within the Green Belt, and thus the above policy is not directly relevant, this paragraph does suggest that the development of cemeteries within open countryside is acceptable in principle.
- 4.3.3 Beyond this, the key focus of the NPPF is sustainable development. This must consider social, economic and environmental aspects of development. Environmental aspects are considered in detail within the following chapters of this report.
- 4.3.4 In terms of social impacts, an adequate supply of cemetery spaces is essential to ensure a sufficient supply of burial space for residents. The development of a cemetery within the site is unlikely to result in any adverse social impacts.
- 4.3.5 In terms of economic impacts, a good supply of burial space is essential to ensure residents can be buried or cremated within the local area. If there is insufficient burial space within the local area, residents are forced to bury their family/ friends further afield, which often results in significantly higher costs.
- 4.3.6 In addition, cemetery capacity supports other services which are dependent on cemeteries for their business. This includes funeral directors, hearse providers and drivers, florists etc. As such, a good local supply of cemetery capacity results in wider economic benefits. The development of a cemetery within the site is unlikely to result in any adverse economic impacts.
- 4.3.7 As such, the development of a cemetery within the application site would not conflict with national planning policy, and is considered to comprise sustainable development.

4.4 **Local Planning Policy**

- 4.4.1 The current adopted planning policy for Harborough District Council comprises the following:
 - The District Local Development Framework Core Strategy (2006-2028)
 - Retained policies from the Local Plan (2001)
- 4.4.2 Within the proposals map updated following the adoption of the Core Strategy, the site is not allocated for a specific use (see figure 4 below). Land surrounding the site is also not allocated for any specific use.

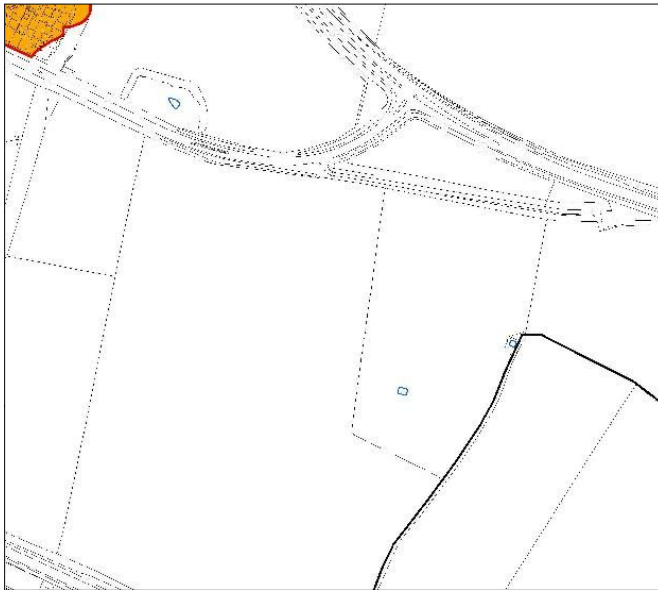


Figure 4. Site within the local policy proposals map

- 4.4.3 Further afield, land to the north-west of the site is allocated for housing (orange area on figure 5). Given the distance between the site and this allocation, the development is unlikely to impact upon future housing.
- 4.4.4 Policy CS8 within the Core Strategy relates to ‘Protecting and Enhancing Green Infrastructure’. Section C of this policy (open space, sport and recreation assets) states that *‘The contribution that open space, sport and recreation facilities make to the District’s Green Infrastructure network and the well-being of communities will be strengthened by... Securing new provision to help address identified deficiencies in existing open space provision, including cemeteries and burial grounds, both in quantity and quality...’*.
- 4.4.5 Policy CS12 relates to ‘Delivering Development and Supporting Infrastructure’. This states that *‘...Other community facilities not referenced in the Infrastructure Schedule (including facilities for Burials and Cremation, Places of Worship, Arts and Culture) will be supported subject to compliance with transport and design policies (Policies CS5 and CS11)...’* Policy CS5 relates to ‘Providing Sustainable Travel’ and policy CS11 considers ‘Promoting Design and Built Heritage’. The above policies are considered within the transport and landscape chapters of this report respectively.
- 4.4.6 The emerging Harborough District Local Plan does not set out any policies or land use designations which would conflict with the proposed development of this site for cemetery use. Broad compliance with emerging local plan policies was a key part of HDC’s stage one site review for the identification of potential cemetery sites. **(MATTHEW – PLEASE CONFIRM)**

- 4.4.7 Land immediately adjacent to the application site falls within Kettering Borough Council. Within the adopted planning policy for Kettering Borough Council, the land immediately east of the site is not allocated for any use (figure 5).



Figure 5. Site within Kettering Borough Council planning policy

- 4.4.8 Based on the above, the development of a cemetery would not conflict with local planning policy, subject to the factors considered later within this report.

4.5 Relevant designations

- 4.5.1 A review of Defra's Magic mapping tool has been undertaken. Relevant ecological and landscape designations will be considered within the relevant chapters of this report.
- 4.5.2 From a planning perspective, there do not appear to be any nationally designated constraints that would preclude development within the site.

4.6 Current and surrounding land use, including sensitive receptors

- 4.6.1 The current land use comprises agricultural land, with a pond towards the southern part of the site, and a pond towards the east of the site. Land to the east and west of the site comprises agricultural land. To the north of the site is a private access road, beyond this a vegetated area, and beyond this the A6 road (see figures 1-4 earlier within this report).
- 4.6.2 The development of a cemetery within the site would result in the loss of agricultural land. The land is allocated as having an agricultural value of grade 3 (good to moderate), and is clearly currently used for agricultural purposes. Details regarding the loss of agricultural land may be required as part of a planning application. However, this should not preclude the development of a cemetery within the site.

4.6.3 The development of a cemetery within the site is unlikely to significantly impact surrounding land uses, and would not preclude the surrounding land from being used for agricultural purposes.

4.6.4 There do not appear to be any residential or commercial receptors within the vicinity of the site. The nearest residential receptors are located approximately 430m west of the site, off Roundhill Close. Given the distance between the application site and the closest receptors, there is unlikely to be significant objection from nearby residents.

4.7 **Historic land use**

4.7.1 Historic maps do not appear to show any historic development within the site. As such, there is no significant concern that historic land use could preclude the site from being used as a cemetery.

4.8 **Planning history**

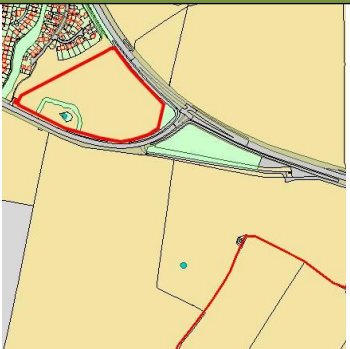
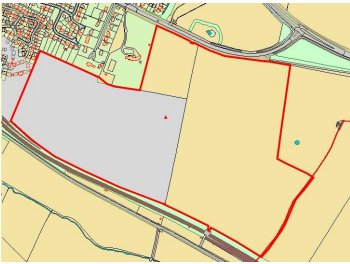
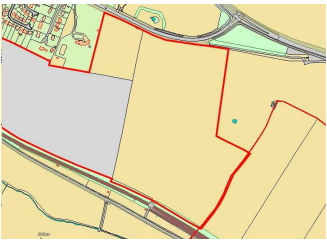
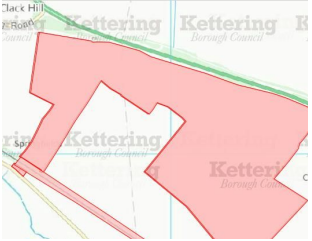
4.8.1 A review of HDC's planning application search shows a number of planning application on land to the west of the site. In addition, a review of Kettering Borough Councils planning history has been undertaken, and this shows that an EIA Scoping and Screening opinion request have been submitted within the site boundary (detailed within table 1).

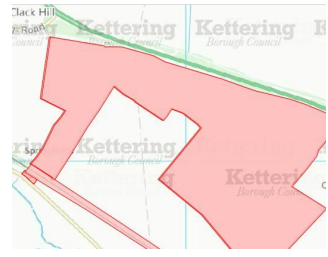
4.8.2 The applications to the west of the site are unlikely to impact upon the development of a cemetery within the site. Cemetery sites are commonly found adjacent to residential areas, and the development of a cemetery within the site would not prevent a residential development coming forward on adjoining land.

4.8.3 The EIA Screening and Scoping opinion requests within the site boundary (submitted to Kettering Council) demonstrate the landowner's intention to allow the development of a solar photovoltaic park within the site at some point. Both requests were submitted in 2014. The significant amount of time that has passed since these requests were submitted, and the change in the government's solar Feed in Tariff, indicate that the application is no longer being considered. However, this should be confirmed with the landowner prior to allocating the site for a cemetery.

4.8.4 On the other hand, the requests do suggest that the land owner is, or at least was, willing to allow the site to be developed.

Table 1. Historic applications within the site

Reference	Development	Decision	Red line boundary
17/00532/OUT	Erection of up to 70 dwellings with all matters reserved except for access	Pending consideration	
16/00459/SCP	Environmental Impact Assessment Scoping Opinion for the erection of up to 600 residential dwellings, a primary school, a local centre comprising A1, A2, A3, B1 and D1, provision of public open space, new roundabout access off Kettering Road, new vehicular link from Overstone House, construction of footways and cycleways and construction of structures to accommodate sustainable urban drainage systems	-	
15/02006/OUT	Erection of up to 600 residential dwellings, a primary school, a local centre comprising A1, A2, A3, B1 and D1, provision of public open space, new roundabout access off Kettering Road, new vehicular link from Overstone House, construction of footways and cycleways and construction of structures to accommodate sustainable urban drainage systems	Pending consideration	
KET/2014/0281	Environmental Statement Scoping Opinion. Proposed Solar Photovoltaic Park on land south of the A6 Harborough Road, Braybrooke	-	

KET/2014/0130	Environmental Statement Screening Opinion. Proposed Solar Photovoltaic Park on land south of the A6 Harborough Road, Braybrooke	-	
---------------	---	---	---





4.9 Conclusion

- 4.9.1 The above chapter considers the suitability of the site for a cemetery development, from a planning perspective. The development of a cemetery within the site appears to be consistent with national and local planning policy, and there do not appear to be any designations that would preclude development within the site.
- 4.9.2 The site and surrounding land and currently used for agricultural purposes, although there appears to be an intention to develop surrounding land for residential purposes. A search of the sites planning history demonstrates that the site subject to this review has previously been considered for the development of a solar farm. However, a formal planning application was never submitted.
- 4.9.3 Assuming the landowner does not intend to pursue a planning application for a solar farm, there do not appear to be any planning constraints for the development of a cemetery within the site.

5 ECOLOGICAL ASSESSMENT

5.1 Methodology

5.1.1 Desk study details were obtained from the following sources on the associated dates to provide background on ecological features in the vicinity of the site. Records over 10 years old for transient species and all species protected from sale only are excluded. In each case the search included the site and the specified area beyond the site boundary. The search radius was based on the professional judgement of the ecologist leading the appraisal, taking into account the scope of the proposed works and associated potential impacts, with reference to current guidelines for preliminary ecological appraisal (CIEEM, 2013). Records obtained included:

-  European statutory sites within a 5km radius, national statutory sites within a 2km radius, and England HPI identified as requiring action in the UK BAP (JNCC, 2015) and Ancient Woodland within a 0.5km radius (Natural England GIS Digital Boundary Database and Natural England Site Designations, on 30th May 2017);
-  TPOs and Conservation Areas within the immediate zone of influence (Leicestershire County Council, 30th May 2017);
-  Waterbodies within a 0.5km radius (Online mapping sources including: Google Maps; MAGIC; and Ordnance Survey Street View, 30th May 2017); and
-  Locally designated wildlife sites, Legally protected species, England SPI identified as requiring action in the UK BAP (JNCC, 2015), Local BAP Habitats/Species, any Notable species (which includes: Species of conservation concern and RDB species (JNCC, 2014a), BOCC (Eaton et al., 2015); and nationally rare and nationally scarce species (JNCC, 2014b)) and Invasive species within a 0.5km radius, and important hedgerows/veteran trees within the immediate zone of influence (Northamptonshire Biodiversity Records Centre, and Leicester and Rutland Environmental Records Centre, 31st May 2017).

5.1.2 The Extended Phase I Habitat Survey was undertaken on 18th May 2017 by a Consultant Ecologist from Enzygo (Kirsty Roger, MZool (Hons) Grad CIEEM) who satisfies all necessary field survey competencies as stipulated by the Chartered Institute for Ecology and Environmental Management (CIEEM). Weather conditions on the day of survey were dry, with

40% cloud cover, a light wind, and a temperature of 17°C. As there was no access to site 04: Kettering Road, this was assessed from public rights of way and on-line mapping sources only.

- 5.1.3 Phase I Habitat Survey (JNCC, 2010) is a standard technique for obtaining baseline ecological information for large areas of land in which the main vegetation types present within the survey area are mapped using a standard set of habitat categories. In addition to mapping, each of the main habitats within the survey area was described; including details of component plant species abundances (recorded using the DAFOR scale: D=Dominant, A=Abundant, F=Frequent, O=Occasional, R=Rare). Incidental observations of Legally protected species, England SPI /Local BAP Species, any Notable species (which includes: Species of conservation concern and RDB species; BOCC; and nationally rare and nationally scarce species) and Invasive species, and the potential for such species to occur on site (and in the surrounding landscape where relevant) were also noted; however, no specific species surveys were undertaken.
- 5.1.4 Potential ecological constraints to development have been identified from desk study and field survey data. Where ecological constraints to development are identified, further survey requirements and/or avoidance, mitigation, compensation measures that are proportionate to the predicted degree of risk to biodiversity and to the nature and scale of the proposed works are described.
- 5.1.5 The English names of flora and fauna species are given in the main text of this report.
- 5.1.6 This document does not contain a comprehensive list of botanical species on site. Only plant species characteristic of each habitat and incidental observations of notable plant species were recorded. In addition, many plant species are only evident at certain times of the year and so some plant species may have gone undetected. Data held by consultees may not be exhaustive. The absence of evidence, does not indicate evidence of absence. Enzygo cannot take responsibility for the accuracy of external data sources and as such discrepancies and inaccuracies may occur. Natural England do not hold information on ancient woodland less than 2ha in size.

5.2 Overview of findings

Assessment considerations	Beneficial	Neutral	Adverse
Ecological constraints Current ecological value of the site and		The site is of low ecological value with a low number of Phase II surveys required (IF impacts cannot be avoided) which could require	

offsite ecological features.		subsequent mitigation. Minor additional fee expenditure required, and/or seasonal timing constraints could be applicable.	
------------------------------	--	---	--

5.2.1 Ecological features identified by the desk study and field survey are summarised along with any identified constraints in Table 2 below.

Table 2. Ecological features/ constraints

Ecological Feature	Details	Constraint
Statutory sites designated or classified under international conventions or European legislation		
None	-	-
Statutory sites designated under national legislation (including IRZ)		
None	-	-
Locally designated wildlife sites		
Market Harborough Overstone Park Oak LWS, 500m SW	Mature Oak with splits and hollowing crown	No (off-site)
Market Harborough, Kettering Rd pond LWS, 250m NW	Pond	No (off-site, and no aquatic runoff)
England HPI, Local BAP Habitats, Ancient Woodland, Important Hedgerows, Veteran Trees, TPOs and Conservation Areas		
Deciduous Woodland HPI	Off-site to north and north-east	No (off-site)
Hedgerow HPI (potentially Important)	Around site boundaries	Yes - AVOID impacts (need to retain and use existing gate) or survey required
Standing Water HPI	2 ponds on-site	Yes – AVOID impacts (retain)
Green/Blue Infrastructure & Dark Zones		
Hedge network	Boundary hedgerows form part of the wider hedger network/ green infrastructure	Yes – AVOID impacts (retain)
Protected and Notable Species		
Bats	Records of 6 species in area. No buildings. Mature trees could contain Potential Roosting Features (PRFs). Boundary hedgerows provide low bat suitability (Collins, 2016)	Yes – AVOID impacts (retain) or survey required

Badger	Several records in area. Potential for setts around field boundaries.	Yes – AVOID impacts (retain field boundaries) or survey required
Dormouse	Potential within boundary hedgerows.	Yes – AVOID impacts (retain boundary hedgerows & trees) or survey required
Otter	None	-
Water Vole	None	-
Other Protected Mammals	None	-
Specially Protected Birds	None	-
All Other Birds	Records of 27 species in area. General nesting opportunities within hedgerows, trees and scrub.	Yes – AVOID impacts (clearance outside nesting period or ECoW checks)
Common Reptiles	Several records in area. Limited potential around field edges.	Yes – AVOID impacts (sensitive clearance of field boundaries under ECoW)
Great Crested Newt	Large number of records & EPS Licences in area around Harborough. Waterbodies on-site and within 500m radius, and suitable terrestrial habitat.	Yes – AVOID impacts (retain waterbodies & works to terrestrial habitats under PWMS) or survey and licence.
Other Protected Herpetofauna	None	-
White-clawed Crayfish	None	-
Fish/Marine	None	-
Protected Invertebrates	None	-
Protected Flora	None	-
England SPI/Local BAP and Notable species	None	-
Invasive Flora	None	-
Invasive Fauna	None	-

6 LANDSCAPE/ VISUAL/ARBORICULTURAL EFFECTS

6.1 Introduction

- 6.1.1 Any potential effects on the local landscape and the landscape of the site itself, the visual amenity and any arboricultural features on and around the site (trees and hedgerows) were examined in a desk study and during a visit of the site carried out on 11th May 2017.
- 6.1.2 The desk study established the type of land use and landscape character of the location and created a list of potential visual receptors which may be sensitive to any changing views of the site. The online Magic Map Application provided by the Department for Environment, Food and Rural Affairs (DEFRA) has also been checked for any landscape designations within a 1km radius of the site which may be affected by development of the site.
- 6.1.3 To establish the legal status of any arboricultural features on site, i.e. trees, tree groups, woodland and hedgerows, Enzygo have liaised with Harborough District Council to confirm whether there are any Tree Preservation Orders (refer to *Town and Country Planning Act 1990* and the *Town and Country Planning (Tree Preservation) (England) Regulations 2012*) protecting any trees within or around the site boundary and whether there are any Conservation Areas (refer to *Section 211* of the *Town and Country Planning Act 1990*) affecting the site. It is further highlighted that hedgerows within and around the site may be protected (refer to *The Hedgerow Regulations 1997*).
- 6.1.4 Following the desk study, the site was visited to describe the landscape character of both the site and its surroundings using a number of parameters, including the landscape pattern and density, tranquillity, cultural aspects and landcover and layout of the site. The value and sensitivity of any arboricultural features to development were also assessed. As access into the site was not permitted at the time, the assessment was carried out from publicly accessible points along the site boundaries.
- 6.1.5 In a final step, the potential views established in the desk study were assessed for their potential sensitivity and quality by visiting visual receptors where access allowed this.
- 6.1.6 The findings of the desk-study and the site visits are shown in plans CRM.1287.002.L.D.007 and CRM.1287.002.L.D.008.
- 6.1.7 The assessments were broadly based on recommendations made in *Guidelines For Landscape And Visual Impact Assessment* by the Landscape Institute and British Standard *BS 5837:2012 Trees in relation to design, demolition and construction*.

6.2 Overview of findings

6.2.1 Based on the findings of both the desk-study and the site visit, the following broad assessments have been made of the effects the development would have on the local landscape, views, trees and hedgerows:

Assessment considerations	Beneficial	Neutral	Adverse
<p>Landscape/ townscape Effects Impact on pattern/ density, tranquillity, culture and landcover/ layout.</p>			<p>Whilst it is expected that the traditional pattern of open fields and straight hedgerows in the wider landscape will not be disturbed by the development, the change of land use will have a significant impact on the agricultural character of the site and its surrounding landscape, in particular the wide stretches of arable fields to the east, south and west of the site.</p>
<p>Arboricultural impacts Assessment of trees/ shrubs/ hedges within the site, and their quality</p>		<p>There are no trees within the site. There are mature hedgerows and trees of moderate and high value along the site boundary. Sensitive design and construction methodologies can keep the impact on existing features to a minimum. New tree and infill hedgerow planting along the site boundaries can enhance the local pattern of arable fields, straight hedgerows and scattered hedgerow trees.</p>	
<p>Visual Effects Visual impacts on sensitive receptors within 1km of the site</p>		<p>Although the development would change views across the valley to the south of the site, only a very limited number of receptors would be affected by the change on site. These include a Public Right of Way to the east from where views would change slightly but neither deteriorate nor improve.</p>	

6.3 The Landscape/ Arboricultural/ Visual Effects

- 6.3.1 The site is an arable field within an agricultural landscape which is characterised by a traditional pattern of fields and straight hedgerows with scattered hedgerow trees. It is located on a south facing slope overlooking the undulating landscape of the River Jordan valley. Native hedgerows enclose the site and two small ponds are located within the site. To the south, south-east and south-west, the site feels very open and tranquil due to the relative distance to settlements, commercial sites and the local road network. In the north, the site is sheltered by a woodland strip which forms a significant barrier between the site and Harborough Road in the north. This can block some but not all the traffic noise from the main road.
- 6.3.2 No landscape or cultural designations affect the site or any location within a 1km search area around the site.
- 6.3.3 The continuous dense vegetation along the northern boundary and the low managed hedgerow marking the boundary along the west and south are in good and healthy condition. There is a significant gap in the hedge in the south-east and the remainder of the hedgerow in the north-east is fragmented and in places scattered. Only two major trees are located along the site boundary, with no trees within the site. There are no Tree Preservation Orders on site and no Conservation Area designations affect any part of it.
- 6.3.4 Whilst the views from the site are wide and open, only a very limited number of potentially sensitive receptors were identified within the 1km search area. The users of the public footpath approximately 750m to the south-east would notice a slight change of the largely agricultural pattern within their views towards Harborough, but the overall openness of their view would not change. Residential properties within the new development off Kettering Road approximately 450m west of the site would be sensitive but views are limited due to the vegetation along its eastern fringe. Landform and local vegetation cover don't allow any views from the public footpath approximately 400m to the north-west. Views from the north are blocked by the woodland strip between the site and Harborough Road. There are partial views from along Kettering Road, however, receptors are not considered to be sensitive.

7 HYDROLOGY/ WATER ENVIRONMENT AND FLOOD RISK

7.1 Introduction

7.1.1 This chapter provides a qualitative assessment of the site’s baseline hydrology, flood risk and drainage characteristics and assesses the risk of the proposed cemetery development to groundwater and groundwater-fed surface waters. The appraisals have been undertaken through desk-based study and site walkover surveys. This includes a qualitative appraisal to understand the risk of flooding to the Site and the potential impacts the development may present to risks of flooding onsite and/or offsite if flooding is not effectively managed.

7.2 Overview of findings




7.2.1 The table below provides a summary of the findings within this chapter.

Assessment considerations	Beneficial	Neutral	Adverse
Water Environment -SPZ	The Site is outside SPZ 1 and any other designated SPZ.		
Water Environment - Groundwater abstraction/wells/springs supplying water for human use.	The Site is more than 250m away from any well, borehole or spring.		
Water Environment - Soil/ Superficial Deposit thickness: =>1.8m to give =>1m cover over coffin/body Graves should not be dug in bedrock			Superficial deposit thickness not known. This does not preclude cemetery development but further Tier 2 investigation is required.
Water Environment – Groundwater: => 1 metre clearance between the base of the grave and the top of the water table – they shouldn’t have any standing water in them when dug [water table depth should be =>2.8m]			Groundwater table depth not known. This does not preclude cemetery development but further Tier 2 investigation is required.



Water Environment – Surface water: The site is at least 30m from any spring or watercourse not used for human consumption	The Site is more than 30m from any spring or watercourse.		
Water Environment – Historic and current industrial land use	The historic and current land uses of the site and surrounding area are unlikely to have introduced significant pollution.		
Water Environment - off site or perimeter ditch drainage. Burial sites should be at least 10 metres from any field drain, including dry ditches.			Distance from field drains/ dry ditches not known. Further investigation is required.
Water Environment -Highway drainage			Off-site highway drainage into site not known.
Water Environment -Artificial pathways: Groundwater movement along sewerage alignments e.g. coarse backfills	No sewerage runs through the site The closest public surface and foul sewer networks are 500m from the Site.		
Flood risk - Fluvial	The Site is within Flood Zone 1 and at low risk of fluvial flooding		
Flood risk - Surface Water			There are two small ponds (under 5% of the site area) within the Site with associated risk of surface water ponding and a flow pathway within the south-western corner of the Site.
Flood risk - Tidal	The Site is at negligible risk of tidal flooding		

Flood risk - Groundwater	The Site is at negligible risk from groundwater flooding		
Flood risk - Artificial Drainage Systems	There are no reports of sewer flooding incidents at or near to the Site in the SFRA		
Flood risk - Infrastructure Failure	There are no reports of infrastructure failure causing flooding at the Site in the SFRA		
Flood risk - Site Drainage		The superficial deposits beneath the Site are of low to high permeability	<p>The soils beneath the Site are seasonally wet with impeded drainage. The bedrock beneath the Site is of low permeability. Surface water ponding may indicate low rates of drainage.</p> <p>The closest public surface and foul sewer networks are 500m from the Site.</p>

7.2.2 The flood risk at the Site is qualitatively assessed based on a desktop review including:

-  Review of available flood mapping, sewer asset plans, the Strategic Flood Risk Assessment (SFRA), and any other relevant data and documentation;
-  Assessment of flood risk from all sources, including; tidal, fluvial, surface water, groundwater, sewer, and infrastructure failure;
-  Assessment of flood risk against NPPF/PPG ID:7 guidance documents.

7.2.3 The objectives of the Tier 1 groundwater risk assessment are to:

-  Provide information on the environmental quality of the ground present on the site and
-  To assess the potential environmental risks posed by the site to the groundwater.

- 7.2.4 The risk of pollution to groundwater at the Site is assessed by following Environment Agency Guidance on groundwater risk assessments for cemeteries and burial sites (14 March 2017¹) which supersedes all previous guidance.
- 7.2.5 The assessment follows the recommended tiered approach. This means that the greater the risk of groundwater pollution, the more detailed assessment is required. The risk assessment can be stopped at any stage should enough information be obtained to demonstrate that the activity does not pose a pollution risk to groundwater.
- 7.2.6 This assessment is a Tier 1 assessment comprising qualitative risk screening to investigate what the risks are, whether more detailed assessment is needed, and what that assessment would need to focus on (risk prioritisation).
- 7.2.7 The Tier 1 assessment is undertaken in view of the Environment Agency's groundwater position statement² L 1- *Locating cemeteries close to a water supply used for water supply for human consumption*, which is that the Environment Agency will normally object to the locating of any new cemetery or the extension of any existing cemetery, within SPZ1, or 250 metres from a well, borehole or spring used to supply water that is used for human consumption, whichever is the greater distance.
- 7.2.8 Position Statement L3: *Cemeteries: protecting groundwater in highly sensitive locations* also places a high priority on protecting groundwater within principal aquifers and groundwater catchments used for drinking water supply, and new larger cemetery developments in such areas might not be appropriate.
- 7.2.9 *Cemeteries and burials guidance on preventing groundwater pollution*³ provides more detail, in that to meet minimal groundwater protection a burial site must be:
- outside a source protection zone 1 (SPZ1);
 - at least 250 metres from any well, borehole or spring supplying water for human consumption or used in food production – for example at farm dairies;
 - at least 30 metres from any spring or watercourse not used for human consumption or not used in food production; and
 - at least 10 metres from any field drain, including dry ditches.

¹ <https://www.gov.uk/guidance/cemeteries-and-burials-groundwater-risk-assessments>

² The Environment Agency's approach to groundwater protection March 2017 Version 1.0

³ <https://www.gov.uk/guidance/cemeteries-and-burials-prevent-groundwater-pollution>

7.2.10 All graves must:

- have at least 1 metre clearance between the base of the grave and the top of the water table – they shouldn't have any standing water in them when dug;
- not be dug in bedrock or areas susceptible to groundwater flooding; and
- be deep enough so at least 1 metre of soil will cover the top of the coffin or body.

7.2.11 Proposals for new cemetery developments for greater than 100 burials per year are considered high-risk even in a lower sensitivity groundwater scenario. Such proposals will only be agreed by the Environment Agency where a developer can demonstrate through detailed risk assessment that, given the site-specific setting and the engineering methods proposed, groundwater pollution will be avoided.

7.2.12 It is noted that that all cemetery developments and burials must maintain an unsaturated zone below the level of the base of the grave(s). The Environment Agency will work with local authorities to identify alternative site and burial options where necessary.

7.2.13 It is noted that Harborough District Council assume a rate of 3000 burials per ha (25% full burials and 75% ashes burials) and that deaths per annum for the Market Harborough population is estimated as 177⁴.

7.3 Sources of Information

7.3.1 The following information was used in preparation of the hydrology/flood risk assessment:

- Ordnance Survey 1:25,000 mapping (Explorer 223 Northampton & Market Harborough);
- Environment Agency online flood maps ((Flood Map for Planning⁵, Long Term Flood Risk Assessment for Locations in England⁶ and Environment Agency – What's in Your Backyard?⁷);
- Harborough District Strategic Flood Risk Assessment (SFRA) and associated mapping;
- National Soils Resources Institute: Soilscales online mapping⁸;





⁴ A site assessment study for the Market Harborough new cemetery

⁵ <https://flood-map-for-planning.service.gov.uk/>








⁶ <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>

⁷ http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e

⁸ <http://www.landis.org.uk/soilscales/>

-  British Geological Survey [BGS] online mapping: Geology of Britain Viewer⁹;
-  Landmark Promap: Flood Data Package: Additional flood mapping;
-  Geosmart 1 in 100-year groundwater flood risk map;
-  Anglian Water Asset Plans.

7.3.2 The following information was used in the preparation of the Tier 1 Qualitative Groundwater Risk Assessment:

-  Environment Agency – What’s in Your Backyard? – online resources; (Groundwater Source Protection Zones, BGS Aquifer Maps, Groundwater Vulnerability Maps)³;
-  National Soils Resources Institute: Soilsapes online mapping⁴;
-  British Geological Survey (BGS) online map resources⁵;
-  Environment Agency guidance on preventing hazardous and non-hazardous substances from entering groundwater¹⁰;
-  Cemeteries groundwater pollution guidance^{11,12};
-  Groundsure MapInsight, GeoInsight and EnviroInsight reports (www.emapsite.com)¹³;
-  Consultation with the local authority on any private or unlicensed wells boreholes within 1km.

7.4 Site Walkover

7.4.1 Enzygo staff conducted a walkover of the Site on the 11th May 2017, during which a photographic record was made. The site could not be accessed directly, and the photographs were taken some distance away.

7.4.2 The site is currently used as an agricultural field.

7.4.3 Historically the site has always been an open agricultural field.

7.5 Catchment Hydrology

⁹ <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

¹⁰ <https://www.gov.uk/government/publications/protect-groundwater-and-prevent-groundwater-pollution/>

¹¹ <https://www.gov.uk/guidance/cemeteries-and-burials-prevent-groundwater-pollution>

¹² <https://www.gov.uk/guidance/cemeteries-and-burials-groundwater-risk-assessments>

¹³ www.emapsite.com

- 7.5.1 Environment Agency online mapping (Figure 8) and Ordnance Survey mapping shows no ‘main rivers’ or ‘ordinary watercourses’ within or near to the Site.
- 7.5.2 There are two small ponds, one within the south-west corner of the Site and one close to the eastern boundary which form the only surface hydrological features at the Site.
- 7.5.3 It is unclear whether or not field drains are present on the site.

7.6 Water Assets

- 7.6.1 Based on a review of Anglian Water asset plans (see Figure 7), there are no sewer assets located within the Site boundary. The closest sewer asset is a private surface water sewer within Kettering Road approximately 500m west of the Site. There is also a network of public surface and foul sewers within Roundhill Close and Ashley Way approximately 500m west of the Site.



Figure 6. Anglian Water asset plans

7.8 Hydrogeology

Soils

- 7.8.1 The soils in the northern half of the Site have impeded drainage. The southern soils are seasonally wet.

Superficial Deposits

- 7.8.2 The Diamicton Till superficial deposits on and beyond the north boundary of the site and at higher elevation than the Site are classified as a Secondary (undifferentiated) aquifer, and range in permeability from low to high. Groundwater flow is mixed matrix/fissure flow.

Bedrock

- 7.8.3 The Whitby Mudstone Formation bedrock is predominantly clays and is designated as an unproductive aquifer with low permeability and negligible significance for water supply and river baseflow (from Groundsure data).
- 7.8.4 The Dyrham Formation bedrock is predominantly clays and silts. it forms a Secondary B aquifer unit of generally limited resource. Its permeability is typically low ranging from 9.4E-06m/day to 6.9E-04m/day in limited pump tests across England¹⁴
- 7.8.5 The overall Site bedrock permeability is assessed as Low.
- 7.8.6 The nearest permeable aquifer units comprise superficial River Terrace deposits (sands and gravels) and river Alluvium (gravels, sands, silts and clays) 332m south west and 379m south west respectively. These form a secondary A aquifer.

Surface and groundwater abstractions

- 7.8.7 Environment Agency online mapping shows there are no groundwater Source Protection Zones (SPZ) within 500m of the site.
- 7.8.8 There are no groundwater or potable water abstractions within 500m of the Site, according to EA records. The Local Authority (Harborough District Council) was consulted as to the presence of private groundwater abstraction/supply, but no further information was available.
- 7.8.9 The nearest surface watercourse is a Tertiary River 338m south-west of site. The River Jordan, a Primary River passes within ~425m south-west of the site.
- 7.8.10 There are no boreholes within 250m of the site. The closest site investigation work that indicates the nature of superficial deposits and potential groundwater levels was trial pitting for a residential development off Gores Lane, Market Harborough some 600m north west of the site. Soils and sub soils are around 1m in thickness and infiltration is restricted below 800mm-1000mm by grading from weathered to less-weathered Lias clay.

¹⁴ The physical properties of minor aquifers in England and Wales, EA R&D Publ. 68, 2000, Table 6.2

7.8.11 Groundwater levels at Site are controlled by the permeability of the superficial deposits and underlying bedrock, which decreases with depth. Flow is likely to occur as soil/subsoil interflow following the Site topography which falls south and south-eastward.

7.8.12 The topographic elevation of the nearest surface watercourse (River Jordan) is ~90mAOD, approximately 20m lower than the site level.

7.9 Historical Sources of Contamination

7.9.1 Table 3 records potential sources of historical ground contamination from 1:2,500 and 1:10,000 scale mapping, aerial photography and online resources, both on site and within 250m.

Table 3. Potential Contaminative Historical Land Use/Ground Working Features

Map/Imagery Date	On Site	Surrounding Area (within 250m)
1886	Site is used as agricultural land. Pond in south-western part of site.	Surrounding area is predominantly agricultural land. Pond 65m south-west, and pond 112m south-east of site.
1900	No significant changes.	No significant changes.
1901	No significant changes.	Old quarry 233m north-west.
1924	No significant changes.	No significant changes.
1926	No significant changes.	No significant changes.
1938	No significant changes.	Unspecified pit 231m west.
1950	No significant changes.	No significant changes.
1957	No significant changes.	No significant changes.
1960	Small pond on the eastern site boundary.	Kettering Road immediately north of site marked on map.
1970	No significant changes.	Unspecified pit 227m west, unspecified tank 237m north.
1973	No significant changes.	No significant changes.
1974	No significant changes.	No significant changes.
1993	No significant changes.	No significant changes.
1994	No significant changes.	No significant changes.
2002	No significant changes.	Ponds 65m south-west and 145m south-east of site has been backfilled.
2004	No significant changes.	No significant changes.
2005	No significant changes.	No significant changes.
2006	No significant changes.	No significant changes.
2010	No significant changes.	No significant changes.
2011	No significant changes.	No significant changes.

- 7.9.2 There are unlikely to be any significant sources of contamination, based on the historical land use.
- 7.9.3 The only current industrial land use is an electricity pylon, 200m east of the site; which poses a negligible contamination risk.
- 7.9.4 There is a historic landfill site 270m to the east of the site, which received inert waste. The last waste received at the site was on 07/08/93. This poses a negligible risk to the site.
- 7.9.5 Overall it is unlikely that any contamination from off-site has migrated into the site.

7.10 Flood Risk Appraisal (Hydrology)

Environment Agency Flood Map

- 7.10.1 The Environment Agency flood map (Figure 8) shows the entire Site is located within Flood Zone 1; outside the extent of the 1 in 1000-year (0.1% AEP) risk of fluvial (river) and tidal (sea) flooding, and therefore at 'low' risk of fluvial flooding.

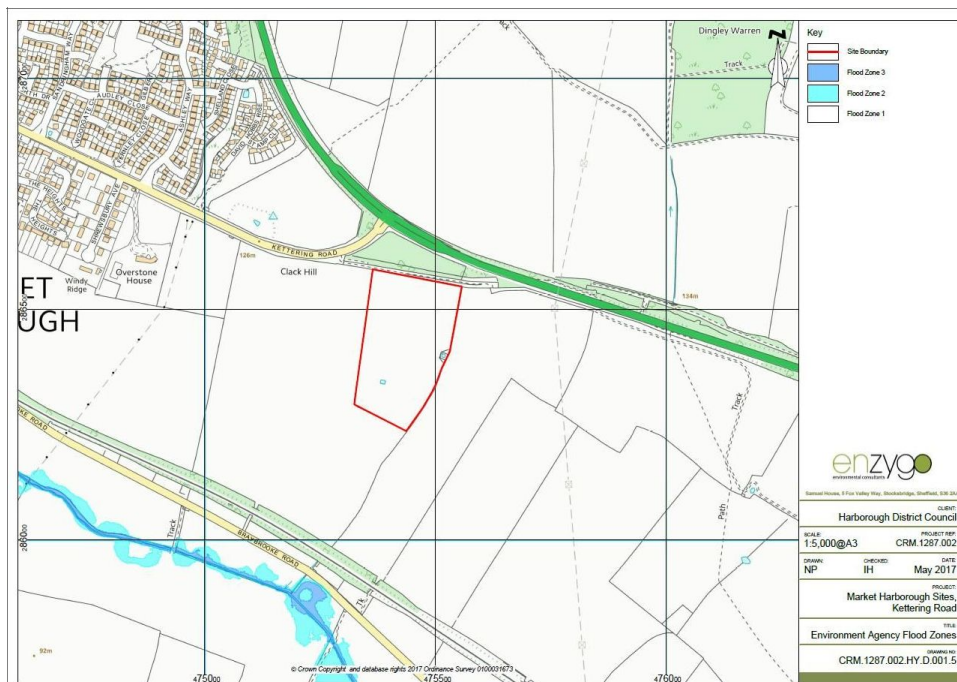


Figure 7. Fluvial Flooding

- 7.10.2 The Environment Agency online surface water flood map (Figure 8) shows the Site is located largely outside the mapped extent of surface water flooding. However, there is a ponded area of surface water flooding located within the Site as well as a surface water flow pathway emanating within the south-western corner of the Site and flowing in a south-eastern

direction out of the Site. The ponded area within the south-western corner of the Site appears to be associated with a topographic low spot.

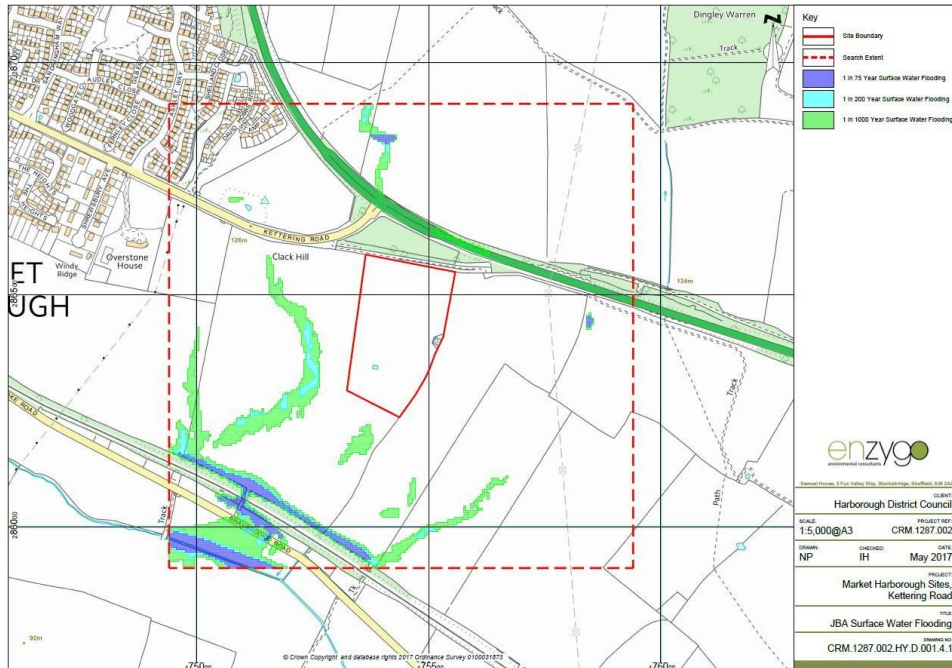


Figure 8. Surface Water Flooding

Tidal Flooding Sources

7.10.3 The Site is not located close to any tidally affected flooding sources. Therefore, flooding from this source is considered negligible.

Flooding from Rising / High Groundwater

7.10.4 Groundwater flooding tends to occur sporadically in both location and time. It tends to affect low-lying areas, below surface infrastructure and buildings (for example, tunnels, basements and car parks) underlain by permeable rocks (aquifers) at outcrop or near-surface.

7.10.5 The BGS Groundwater Flooding Susceptibility Map (Figure 9) indicates that the Site is not susceptible to groundwater flooding.

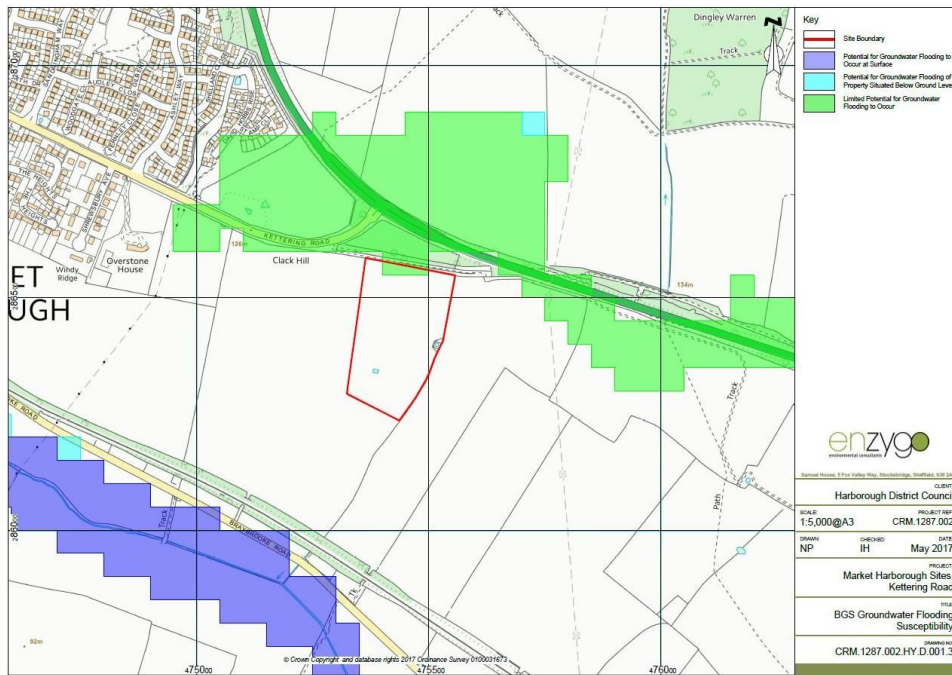


Figure 9. Groundwater Susceptibility Map

7.10.6 The SFRA states that no records of groundwater flooding were found. However, this does not mean that groundwater flooding does not occur within the area, more that it has not been reported. Following periods of sustained rainfall, there may be potential for groundwater flooding to occur, which should be considered in the planning process of any new developments within the district.

Flooding from Artificial Drainage Systems

7.10.7 Sewer flooding occurs when urban drainage networks become overwhelmed and maximum capacity is reached. This can occur due to blockages in the network or where inflows exceed flow capacity.

7.10.8 Modern sewers are built to the guidelines within Sewers for Adoption¹⁵. These sewers have a design standard to the 1 in 30-year flood event and therefore most sewer systems will surcharge during rainstorm events with a return period greater than 30 years (e.g. 100 years).

7.10.9 Anglian Water is responsible for the disposal of waste water within the area. Information with regards to sewer and water main flooding contained within the SFRA has been reviewed as part of this FRA together with their statutory DG5 Flood Register of properties/areas which are at risk of flooding from public sewerage.

¹⁵ WRC (2012) Sewers for Adoption 7th Edition.

7.10.10 There are no sewer assets located within the Site boundary. The closest sewer asset is a private surface water sewer within Kettering Road approximately 500m west of the Site. There is also a network of public surface and foul sewers within Roundhill Close and Ashely Way approximately 500m west of the Site. Based on a review of the SFRA, there are no recorded sewer flooding incidents located within the Site.

Flooding from Infrastructure Failure

i. Highway Drainage

7.10.11 Based on the SFRA, there are no recorded historic highway flooding incidents within the vicinity of the Site.

ii. Reservoir

7.10.12 Based on a review of the Environment Agency online flood mapping, the Site is not at risk of reservoir flooding.

7.11 Tier 1 Qualitative Risk Assessment

Contaminant Source-Pathway-Receptor Model

7.11.1 To constitute an environmental risk, there must exist a source of contamination, a receptor or receptors (such as a groundwater body/aquifer, or river); and a pathway (pollutant linkage) for contaminants to travel along linking the source and receptor.

On-site Sources of Contamination

7.11.2 The undeveloped site is considered uncontaminated.

7.11.3 The proposed development is a cemetery for the burial of human remains. This activity can result in the variety of substances and micro-organisms being released into local ground, and potentially into groundwater/ groundwater-fed rivers. These pollutants are typically dissolved and gaseous organic compounds and ammoniacal nitrogen, along with other nitrogenous compounds. There is also the potential for elevated pH locally because of high calcium levels.

7.11.4 A typical human corpse comprises 64% water, 20% protein, 1% carbohydrate, 5% mineral salt and ~10% fat. The composition in terms of elements is summarised in Table 3 on the following page:

Table 4. Elemental components of a typical human body “Assessing the Groundwater Pollution Potential of Cemetery Developments, Ref: SCHOO404BGLA-E-A, April 2004”.

Element	Mass (g)	Element	Mass (g)
---------	----------	---------	----------

Oxygen	43,000	Chlorine	95
Carbon	16,000	Magnesium	19
Hydrogen	7,000	Iron	4.2
Nitrogen	1,800	Copper	0.07
Calcium	1,100	Lead	0.12
Phosphorous	500	Cadmium	0.05
Sulphur	140	Nickel	0.01
Potassium	140	Uranium	0.00009
Sodium	100	Total Body Mass	70,000

7.11.5 A summary of the main decomposition products of the decay of human remains is summarised in the Environment Agency (EA) guidance ¹⁶. A typical human corpse, approximately 70kg in weight, normally decays completely within 10-12 years.

7.11.6 It is estimated that over half of the pollutant load leaches within the first year and reduces by half in each subsequent year, so that less than 0.1% of the original pollutant loading remains after 10 years. Details are shown in Table 5 below:

Table 5. Source: Table 4 Potential contaminant release (kg) from a single 70kg burial “Assessing the Groundwater Pollution Potential of Cemetery Developments, Ref: SCHOO404BGLA-E-A, April 2004”.

Year	TOC	NH ₄	Ca	Mg	Na	K	P	SO ₄	Cl	Fe
1	6.00	0.87	0.56	0.010	0.050	0.070	0.250	0.210	0.048	0.020
2	3.00	0.44	0.28	0.005	0.025	0.035	0.125	0.110	0.024	0.010
3	1.50	0.22	0.14	0.003	0.013	0.018	0.063	0.054	0.012	0.005
4	0.75	0.11	0.07	0.0001	0.006	0.009	0.032	0.027	0.006	0.003
5	0.37	0.05	0.03	<0.001	0.003	0.004	0.016	0.012	0.003	0.001
6	0.19	0.03	0.02	<0.001	0.002	0.002	0.008	0.006	0.002	<0.001
7	0.10	0.01	0.01	<0.001	0.001	0.001	0.004	0.003	<0.001	<0.001
8	0.05	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001
9	0.02	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
10	0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

7.11.7 Polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/Fs), and heavy metals may also result from the interment of cremated remains (review in Mari & Domingo, 2010).

¹⁶ *Assessing the Groundwater Pollution Potential of Cemetery Developments, Ref.: SCHOO404BGLA-E-A, April 2004*).

7.11.8 Formaldehyde may result from the embalming process and from the burial of certain types of coffin.

7.11.9 According to EA guidance¹⁵, the following hazardous substances must not be allowed to enter groundwater:

- 🏭 Some pesticides;

- 🏭 Oils;

- 🏭 Petrol and diesel;

- 🏭 Solvents;

- 🏭 Arsenic;

- 🏭 Mercury;

- 🏭 Chromium VI.

7.11.10 The following non-hazardous substances should be limited so that they do not cause groundwater pollution. A non-hazardous pollutant is defined as ‘any pollutant other than a hazardous substance’, and includes ammonia and nitrates.

7.11.11 The mudstone bedrock has a low-moderate permeability and will significantly retard pollutant transport, the significant clay content will attenuate certain pollutants through cation exchange processes.

7.11.12 The historic land uses on, and within 250m of the site, pose a negligible risk of contamination. The historic ponds that were on site and in the surrounding 250m have been backfilled a considerable time ago (approx. 20 years), and therefore any putrescible material which was originally present was probably decayed away.

7.11.13 Contaminants are only likely to be present as a because of the use of plant and machinery and will most likely relate to small spillages. Such substances can include: petroleum hydrocarbons, PAH, Volatile Organic Compounds (VOC) and Semi-Volatile Organic Compounds (SVOCs) and BTEX.

7.12 Potential Off-site Sources of Contamination





7.12.1 There is a very low risk of fuel-based pollution (petroleum hydrocarbons, PAH, Volatile Organic Compounds VOC, SVOCs, BTEX) in runoff entering the site from the A6 roadway 70m north of the site, as any pollutants running off the roadway are likely to be significantly attenuated in

the low-permeability subsurface. There are negligible risks of contamination from other off-site sources (old quarry) due to its distance.

7.13 Potential Pathways for Contaminant Migration

- 7.13.1 The permeability of the soil beneath the Site is assessed as low to moderate, based on the Groundsure data procured for the site.
- 7.13.2 Anthropogenic (artificial) pathways for contaminant migration may be present on-site in the form of land drains. However, as there are no obvious significant sources of potential contamination identified from mapping and other resources, the risk to nearby receptors is considered very low.
- 7.13.3 The only significant pathway for contaminant migration from this site is near surface groundwater flow with the topography south and south eastward.

7.14 Potential Receptors

- 7.14.1 A burial site must be:
 -  outside a source protection zone 1 (SPZ1).
 -  at least 250 metres from any well, borehole or spring supplying water for human consumption or used in food production – for example at farm dairies.
 -  at least 30 metres from any spring or watercourse not used for human consumption or not used in food production.
 -  at least 10 metres from any field drain, including dry ditches.

7.15 Groundwater Risk Assessment

- 7.15.1 The site is located on unproductive moderate to low permeability bedrock (former ‘non aquifers’).
- 7.15.2 EA records show that the site is not within any defined Groundwater Source Protection Zone (SPZ) and so is outside SPZ 1.
- 7.15.3 The site is more than 250 metres from any recorded well, borehole or spring.
- 7.15.4 The nearest surface watercourses are more than 30 m from the Site (Tertiary watercourse 338m south-west of site, River Jordan 426m south-west of the site).

7.15.5 It is not known whether there are any dry ditches within or on the perimeter of the site, as the site could not be accessed on the walkover.

7.15.6 It is also not known whether or not there are field drains within or passing through the site.

7.16 Recommendations/Tier 2 Assessment Objectives

7.16.1 This section outlines the potential development constraints that will require further investigation should the site be taken forward.

7.16.2 Soil thickness/ superficial deposit thickness is not known.

7.16.3 Groundwater inflow rates not known and therefore grave excavations left open prior to inhumation may part fill with water.

7.16.4 Present field drainage if any is not known. This does not preclude development as standoff of 10m can be designed but may constrain number of burial plots.

7.17 Ground contamination

7.17.1 An intrusive investigation should be considered to ascertain whether or not potential contaminants of concern are present within the soils underlying the site. On the basis of the Tier 1 Risk Assessment, the following contaminants of concern have been identified:

- Organic pollutants: Ammonia, TOC, Calcium, Magnesium, Nitrogen, Potassium, Phosphorous, Sulphate, Chlorine and Iron.

- Semi-metals and heavy metals including; Arsenic, Cadmium, Chromium (including Chromium VI), Copper, Lead, Mercury, Nickel, Selenium, Vanadium and Zinc.

7.17.2 This does not imply that these chemicals are present on-site, or that they are likely to cause contamination; rather that their presence is a possibility based on the information in the Tier 1 Risk Assessment. The sampling and testing strategy must be conducted in accordance with current applicable standards.

7.18 Groundwater:

7.18.1 At least three groundwater monitoring boreholes should be drilled and installed on the site, so as to allow groundwater level monitoring.

7.18.2 An intrusive investigation should be considered to ascertain whether or not potential contaminants of concern are present within the groundwater underlying the site. On the

basis of the Tier 1 Risk Assessment the following contaminants of concern have been identified:

- Organic pollutants: Ammonia, TOC, Calcium, Magnesium, Nitrogen, Potassium, Phosphorous, Sulphate, Chlorine and Iron.
- Semi-metals and heavy metals including; Arsenic, Cadmium, Chromium (including Chromium VI), Copper, Lead, Mercury, Nickel, Selenium, Vanadium and Zinc.

7.19 Recommendation/Tier 2 Objectives – Cemetery Pollution Prevention:

- 7.19.1 The Tier 1 Risk Assessment has indicated that across most of the site comprises bedrock of the Whitby Mudstone Formation. It is important to determine the depth and extent of any soils and superficial/weathered deposits overlying the bedrock.
- 7.19.2 Interments within the Whitby Mudstone will pose a low risk to water receptors.
- 7.19.3 It will be necessary to confirm whether any changes occur within the Whitby Mudstone with depth. In areas where burials are proposed there is a requirement for 1.0m of non-permeable material below burials with a maximum 1.7m burial depth. It is recommended that rising head tests are undertaken in trial pits to target depth to ascertain whether groundwater poses a risk to interment practices.

7.20 References:

- 7.20.1 1. Mari, M. & Domingo, J. L. (2010). Toxic emissions from crematories: A review. Environment International 36, pp. 131-137.

8 HIGHWAYS, ACCESS, SAFETY AND SUSTANABILITY

8.1 Introduction

- 8.1.1 The investigation into potential traffic impacts at the potential cemetery site was based on a combination of a desk-top review of the site, previous similar development experience, available data relating to the site and a site visit.
- 8.1.2 The potential impact of the proposed development, particularly in terms of highway safety and traffic impact, has been estimated through site observation and also by interrogating previous planning history of developments in the vicinity of the proposed site. This investigation was to identify if the new development will be of any detriment to the local highway network.
- 8.1.3 Site access feasibility has been undertaken to determine if a safe and suitable access to the site can be achieved for all modes, and if transport infrastructure improvements could/would be necessary to serve the new development, in order to allow existing transport networks to continue to perform their identified functions.
- 8.1.4 The desk study explored background information to determine the availability and frequency of public transport services to and from the proposed development site, if wider sustainability and health choices can be promoted, and if people are provided with a real choice on how they travel. The study also identified if the proposed development location includes appropriate provision for pedestrians (including those with special access and mobility requirements) and cycling, in addition to public transport.

8.2 Overview of findings

- 8.2.1 The following table summarises the findings of the assessment:

Assessment considerations	Beneficial	Neutral	Adverse
Highways Potential for significant highways impacts associated with development			Traffic flows associated with the proposed development could be a cause for concern for the local road network, specifically queueing at the junction of Kettering Road and A6 Harborough Road. The development would likely have a significant impact on the surrounding highway network. Significant infrastructure work would be required to enable the surrounding highway to accommodate the proposed development.

Access Existing access into the site and the suitability of this			The site has no existing access, and there is not a clear location for a new access to be located. Development of a new access would require a significant amount of development, and will require agreement from third parties.
Sustainability lighting, bus facilities, footpaths, cycle routes,			There are no public transport facilities available from the site. No footways, footpaths or cycleways exist in the vicinity of the site. The site could only reasonably be accessed by private car.
Highway Safety speed, parking on-street, lighting			The development would present highway safety concerns due to the traffic flows, the positioning of the access in relation to the A6 Harborough Road, the lack of visibility and the national speed limit of Kettering Road.

8.3 The Site Location

- 8.3.1 The proposed site is located on the south eastern side of Market Harborough off Kettering Road, Market Harborough, LE16 8BB within Harborough District Council. The site lies approximately 25km north of Northampton, 23.5km south-east of Leicester, 14km west of Corby and 21km east of Lutterworth.
- 8.3.2 The site is approximately 1.5km south east of town centre and approximately 700m north of the River Jordan. The site currently comprises agricultural fields primarily used for arable purposes.
- 8.3.3 The site, which is irregular in shape, primarily comprises arable land. The site is approximately 4.7 hectares and is bound to the north by a private access road, the south and west are agricultural fields with potential planning application for up to 600 residential dwellings, a primary school and local centre, and to the east are agricultural fields accessible via the private access road onto Kettering Road.
- 8.3.4 The landscape is an area of open, relatively flat land partially screened by trees and vegetation. The plot appears to be used for agricultural use associated with farm buildings within the wider locality.
- 8.3.5 The nearest residential property is situated approximately 500m to the west of the proposed site (Overstone House). Terrace housing is located on Shrewsbury Avenue beyond. Local amenities and facilities within Market Harborough are located to the north west of the site.


8.3.6 Kettering Road provides a link to the A6 Harborough Road 100m to the north east of the junction with the private access road, and also 4.5km to Market Harborough town, 1.5km to the north west of the site.


8.4 Highway Impact

8.4.1 Peak hour flows to and from the cemetery site typically fall on a Sunday. The highest cemetery vehicle trips therefore will not impact on the peak hour highway flows which are assumed to be during the hours of 08:00 – 09:00 and 17:00 – 18:00 Monday to Friday. As the development site is relatively small, high levels of traffic from the cemetery site are not anticipated along the residential routes.


8.4.2 A planning search of the site revealed an Environmental Impact Assessment Scoping Opinion 16/00459/SCP for Land Adjacent to Overstone House, Kettering Road, Market Harborough, Leicestershire. This was for the erection of up to 600 residential dwellings, a primary school, a local centre comprising A1, A2, A3, B1 and D1, provision of public open space, new roundabout access off Kettering Road, new vehicular link from Overstone House, construction of footways and cycleways and construction of structures to accommodate sustainable urban drainage systems. This 600 dwelling development is in the land adjacent to the proposed cemetery site.

8.4.3 Northamptonshire Highways has provided comments following the submission of the scoping opinion for the 600 dwelling development. It was suggested that a traffic forecasting year of 2031 should be used for the junction assessments as part of the Transport Assessment in support of the development. Junctions specified for assessment included:

-  A6 / A427 Harborough Road / A4304 Rockingham Road / Dingley Road;


-  A6 / B576 Harborough Road, Desborough;


-  A6 / Kettering Road Junction; and

-  J3 of the A14.

8.4.4 Northamptonshire Highways detailed committed developments that should be taken into account from the towns of Desborough and Rothwell;

-  Bellway Homes, Harborough Road, Desborough (165 units under construction);

-  The Grange, phase 2, Desborough (700 units consented but possible expansion to 800);

-  Magnetic Park (employment), Harborough Road, Desborough;

- Persimmon Homes, Harrington Road, Desborough (75 homes consented);
- Central England Co-op, Land to South of Desborough (304 units under consideration);
- Persimmon Homes, Rothwell North (700 units consented); and
- Morris Homes, Harrington Road, Rothwell (under construction but with 21 new on phase 2);

8.4.5 Proposed 600 dwelling development, committed developments and cemetery site traffic flows associated with the proposed development could be a cause for concern for the local road network, specifically queueing at the junction of Kettering Road and A6 Harborough Road. The development would likely have a significant impact on the surrounding highway network.

8.5 Access

- 8.5.1 Kettering Road is approximately 7.5m in width, has no footways and the presence of street lights only at the junction of the A6 and Kettering Road, no lighting is provided to the west of the private access junction with Kettering Road. No bus stops or cycle routes are in the vicinity of the proposed cemetery site.
- 8.5.2 The nearest residential properties are situated 450m to the west of the application site on the northern boundary on Ashley Way.
- 8.5.3 The site could be potentially accessed via the private access road to the north of the site. The private access leads directly onto Kettering Road approximately 90m to the west of the site. As the site is relatively small, high levels of traffic from the cemetery site are not anticipated.
- 8.5.4 If the private access road were to be utilised for development traffic, then the existing junction onto Kettering Road would need significant improvements to its gradient, layout and signage to improve visibility and safety.
- 8.5.5 It is unlikely that a suitable access in terms of visibility could be developed at this location without considerable infrastructure and landscaping works. There are no formal access points off the private road into the site, the private road leads directly into the adjacent field. Development of a new access would require a significant amount of development and would require agreements from third parties.

8.6 Sustainability

- 8.6.1 Kettering Road provides a link to the A6 Harborough Road approximately 120m north east of the private road access, and to Market Harborough 1.5km to the west along Kettering Road.
- 8.6.2 Street lighting is provided at the A6 Harborough Road junction although there is none present at the private road / Kettering Road junction. There are no bus stops, footways, footpaths or cycleways in the vicinity of the site.
- 8.6.3 The proposed site is located approximately 1.5km south-east of Market Harborough railway station. The station has a 24 hour car park, which has 219 spaces. Sheltered cycle storage is also available at the station. The station lies on the Nottingham to London line, which operates Monday to Sunday with a frequency of two trains per hour in both directions. Interchange is possible at Leicester and Nottingham Stations to access larger cities including London, Sheffield and Birmingham.
- 8.6.4 Sustainability at this site location is very poor, the site could only reasonably be accessed by private car.

8.7 Highway Safety

- 8.7.1 Collision data for the past five years shows 10 collisions in the vicinity of the site, one slight in severity on the bend where the existing site access is located, and 9 at the junction with the A6 Harborough Road. Two of these 9 collisions were serious in severity.
- 8.7.2 It is predicted that the introduction of a new access off the southern edge of Kettering Road has the potential to exacerbate highway safety issues due to the traffic flows, the positioning of the access in relation to the A6 Harborough Road, the lack of visibility and the national speed limit of Kettering Road.
- 8.7.3 There is the possibility that these issues could be mitigated somewhat with the implementation of streetlighting and signage.
- 8.7.4 On this basis, it is concluded that the could present highway safety concerns.

9 CONCLUSION

9.1 Conclusion

- 9.1.1 This report considers the potential for the development of a cemetery site at 'Land at Kettering Road'. HDC have previously considered the development potential based on the size of the site, capacity, access, topography, potential visual and heritage impacts, management constraints, development costs, and the potential for the site to accommodate different religious denominations and non-conformists.
- 9.1.2 This report provides a more detailed consideration of potential planning constraints; ecological constraints; landscape/ visual/ arboricultural constraints; hydrological/ flood risk constraints; and highways/ access constraints.
- 9.1.3 From a planning perspective, there are no significant constraints within the site. However, the site has previously been considered for the development of a solar park. It should be confirmed with the landowner that the site is no longer being considered for this use.
- 9.1.4 In terms of ecology, the site is of low ecological value, however a number of additional surveys would be required as part of a planning application.
- 9.1.5 In terms of landscape/ visual and arboricultural constraints, the development of a cemetery could have adverse impacts on the agricultural character of the site and its landscape. However other effects are considered to be neutral.
- 9.1.6 In terms of hydrological/ flood risk constraints, the site is largely outside of areas of flood risk, although there is risk of surface water drainage. The site is located outside of groundwater source water protection zone and areas used for the abstraction of water for human consumption.
- 9.1.7 The main constraints associated with the site relate to impacts on the surrounding highway network. The report identifies that the development of a cemetery within the site could require significant infrastructure works to accommodate the traffic flows. In addition, a new access would be required (the location of which is not obvious); the site is not accessible by public transport; and the development of a cemetery could present highways safety concerns.



Enzygo specialise in a wide range of technical services:

Property and Sites

Waste and Mineral Planning

Waste Technologies and Renewables

Landscape and Visual Impact

Environmental Assessment Co-ordination

Hydrology and Flood Risk

Waste Contract Procurement

Noise and Vibration

Environmental Permitting and Regulation

Development Planning & Policy

Ecology Services

Contaminated Land and Geotechnical

Traffic and Transportation

BRISTOL OFFICE

The Byre,
Woodend Lane,
Cromhall,
Gloucestershire GL12 8AA
Tel: 01454 269 237

SHEFFIELD OFFICE

STEP Business Centre
Wortley Road
Deepcar
Sheffield S36 2UH
Tel: 0114 321 5151

MANCHESTER OFFICE

76 King Street,
Manchester,
M2 4NH

Tel: 0161 413 6444

Please visit our website for more information.

enzygo.com