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environmental consultants

Harborough Cemetery: Site Assessment, Site 15: Land off Harborough Road

For: Harborough District Council

CRM.1287.002.P.R.005.A

'Experience and expertise working in union'

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Harborough Cemetery: Site Assessment, Site 15: Land off Harborough Road

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Contents

Figures and Tables

Plans

Plan	Reference
Site location plan	CRM.1287.002.PL.D.006.2
Site boundary	CRM.1287.002.PL.D.006.2
Phase I Habitat Map	CRM.1287.002.EC.D.005
Landscape and Arboricultural Appraisal	CRM.1287.002.L.D.005
Visual Appraisal	CRM.1287.002.L.D.006

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 15', referred to as 'Land off The Lealand'. The site is located at postal code LE16 9SQ, Grid Reference SP 89423 01651. Plan CRM.1287.002.PL.3.006.1 and CRM.1287.002.PL.D.006.2 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 Parishes and within Market Harborough.

1.2.2 Based on the report findings, HDC are currently seeking to find a suitable site to 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 sites. This review considered 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 now been tasked with looking at these four sites in much more detail. The output of this should identify 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 The 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 -Highway drainage			Not known
Water Environment -Artificial pathways: Groundwater movement along sewerage alignments e.g. coarse backfills.			Not known
Flood risk - Fluvial	Within FZ1		Drain nearby
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 a detailed 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 9SQ (Grid reference SP 89423 01651). The site lies within Daventry District Council, approximately 350m from the edge of Harborough District Council boundary.

3.2.2 The site is located approximately 1.9km south west of the centre of Market Harborough, and approximately 310m south west of the edge of the town.

3.2.3 The site lies to the west of Harborough Road (figures 1 and 2).

Figure 1. Harborough Road, looking north

Figure 2. Harborough Road, looking south

3.2.4 The site comprises agricultural land (figure 3). Figure 4 shows the site from the south (off the Lealand). Figure 5 shows the view from the north, from the new housing development. This demonstrates that a significant amount of screening has been planted between the site being considered and the new development.

Figure 3. Looking into the site from the east

Figure 4. View from The Lealand to the south of the site

Figure 5. View from the residential development to the north of the site

3.3 Landownership

3.3.1 The landownership information for the site was obtained for the site from the Land Registry. The land owner was contacted using the postal address detailed on the Register. However, as the site was been used for growing crops at the time, access into the site was not obtained. Therefore, the following report is based on viewing the site from the highway, and desktop research.

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	The only direct reference to cemetery sites within national planning policy is not relevant to this site. Development within the site would not conflict with national planning policy. The development would constitute sustainable development, subject to the technical assessments within this report, as is thus consistent with national policy		
Local Planning policy Current local planning policy designation, proposed designation	The site is not allocated within local policy for any specific use. The site currently comprises Green Infrastructure. Policy		

Assessment considerations	Beneficial	Neutral	Adverse
	BN1 supports the retention and management of GI		
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		Residential dwellings are approximately 80m from the site. The development would not have adverse impacts on surrounding land use	
Sensitive receptors Nearest residential and commercial receptors		Residential dwellings are approximately 80m from the site. There are no nearby sensitive commercial receptors	
Historic land use Previous land uses within the site		The site does not appear to have been historically used for any use.	
Planning history Planning history within the site. Details of any applications that have been refused, reasons for refusal		There are no historic applications within the site.	

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. 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.

4.3.4 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.

4.3.5 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.

4.3.6 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 planning policy for the site comprises the following:

- West Northamptonshire Joint Core Strategy (adopted Dec 2014)
- Saved Policies of The Daventry District Local Plan (1997)

4.4.2 Within the Daventry District Local Plan map and the West Northamptonshire Joint Plan interactive map, the site and land immediately surrounding the site is not allocated for any specific use (figure 6 and 7). Land to the south and east of the site is allocated as a Special Landscape Area (EN1) (green on figures 6 and 7).

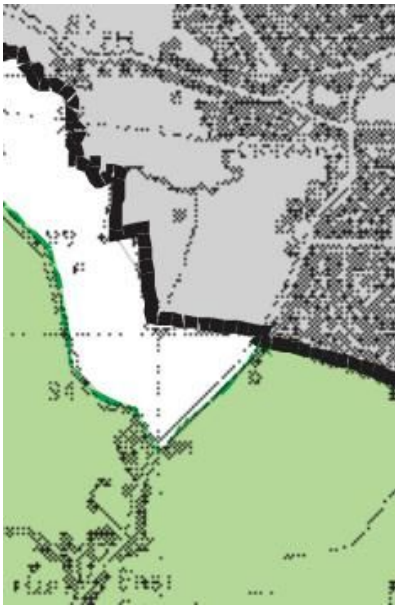


Figure 6. Site with The Daventry District Local Plan

Figure 7. Site within the West Northamptonshire Joint Core Strategy

4.4.3 Figure 7 within the Core Strategy shows the Green Infrastructure Network. There appears to be a local corridor running across the application site.

4.4.4 The Core Strategy identifies Green Infrastructure as *'…a network comprising the broadest range of multifunctional green spaces, their connections and other environmental features including but not limited to parks, private green spaces, woodlands, wetlands, open and running water, wastelands and disturbed grounds, rivers and canals and their banks, roads and rail corridors, public rights of way, allotments, cemeteries and churchyards…'.* Based on this, the development of a cemetery within the site would retain the site's function as Green Infrastructure.

4.4.5 Policy BN1 relates to Green Infrastructure Connections. This states that 'G*reen Infrastructure corridors of sub-regional and local importance as set out in figure 6 of the joint core strategy*

will be recognised for their important contribution to sense of place and conserved, managed and enhanced by… incorporating existing and identified future networks into new development proposals;…'

4.4.6 The development is consistent with the above policy, as it would allow the continued use of the site as Green Infrastructure, and enable the site to be managed for this use.

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 grade 3 agricultural land, with a small number of trees along the eastern boundary. Harborough Road lies immediately to the east of the site. Land immediately to the north, south and west of the site also appears to be agricultural land.

4.6.2 Further afield, there is residential development approximately 80m to the south of the site. To the north, residential development is currently being constructed approximately 350m north of the site. There is a significant amount of screening between the application site and the new dwellings (see figure 5).

4.6.3 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). 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.

4.6.4 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.

4.7 Historic land use

4.7.1 Historic maps do not appear to show any historic development within the site.

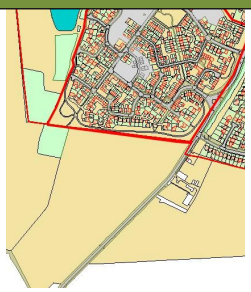
4.8 Planning history

4.8.1 A review of Daventry District Council's planning search does not appear to show any historic planning applications within the site.

4.8.2 A review of HDCs planning search shows planning applications on land to the north of the wider field within which the site is located (table 1). This search shows that consent was granted in 2007 for 629 dwellings. The consent has been implemented.

4.8.3 The application to the north of the site is unlikely to impact upon the development of a cemetery within the site. Cemetery sites are commonly found adjacent to residential areas.

Table 1. Historic applications within the site

Reference	Development	Decision	Red line boundary
07/00360/REM	Erection of 629 dwellings with associated garaging, construction of access roads and provision of landscaping and surface water balancing area (reserved matters of 01/00181/OUT)	Approved March 2007	

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.

4.9.2 The site and surrounding land is currently used for agricultural purposes, and there are residential receptors within proximity to the site. A search of the sites planning history demonstrates that there are no historic applications within the site.

4.9.3 Overall, 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.

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 offsite ecological features.		The site is of low ecological value with a low number of Phase II surveys required (IF impacts cannot be avoided) which could require 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		
Potential LWS to SE	No details	No (off-site)
England HPI, Local BAP Habitats, Ancient Woodland, Important Hedgerows, Veteran Trees, TPOs and Conservation Areas		
Deciduous Woodland HPI	Off-site to north	No (off-site)
Hedgerow HPI (potentially Important)	Around site boundaries	Yes – AVOID impacts (need to retain and use existing gate) or survey required
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. No mature trees. Boundary hedgerows provide low bat suitability (Collins, 2016)	Yes – AVOID impacts (retain) or survey required
Badger	No evidence	-
Dormouse	Potential within boundary hedgerows.	Yes – AVOID impacts (retain boundary hedgerows) or survey required
Otter	None	-
Water Vole	None	-
Other Protected Mammals	None	-

Specially Protected Birds	None	-
All Other Birds	Records of 24 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 in area. EPS Licences in area around Harborough. Waterbodies within 500m radius, and suitable terrestrial habitat.	Yes – AVOID impacts (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 and Methodology

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 broadly 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 Daventry 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 broadly 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.005 and CRM.1287.002.L.D.006.

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
Landscape/ townscape Effects Impact on pattern/ density, tranquillity, culture and landcover/ layout.		The fragmentation of a large field and the total loss of agricultural land use would have a significant effect on the land use of the site. The open character may be compromised to a degree, however, due to nature of the development and the mixed use of the surrounding land, this is not expected to significantly affect the character of the wider landscape.	
Visual Effects Visual impacts on sensitive receptors within 1km of the site		There are no trees within the centre of the site. There are mature hedgerows and trees of moderate value along the eastern boundary. Sensitive design and construction methodologies can keep the impact on existing features to a minimum. Where possible, new hedgerow and tree planting along the boundary can improve the site.	
Arboricultural impacts Assessment of trees/ shrubs/ hedges within the site, and their quality	The number of sensitive receptors is limited to residential properties off The Lealands in the south and Marmion Close in the north whose views towards the site may change but are not expected to improve as it would partially screen the residential properties on the respective opposite side of the field. Other receptors are present but not considered sensitive and/or with limited views of the site.		

6.3 The Landscape/ Arboricultural/ Visual Effects

6.3.1 The site is an area of land within a large and flat arable field which is abutted by Harborough Road and arable fields in the east, residential housing in the north and south and arable land in the west. Whilst the site is open to all sides, without any physical site boundaries to the north, south and west, its influence on the wider landscape is limited by roadside vegetation, a tall hedgerow approximately 200m to the west and the respective settlements in the north and south. The relative open character is not expected to be compromised significantly by the development of a cemetery.

6.3.2 No landscape or cultural designations affect the site. Two sites of a Scheduled Ancient Monument (SAM, Medieval settlement remains at East Farndon) are located approx. 500m south-west of the site, however, their setting is not expected to be influenced by any changes on site as it is characterised by its undulating landscape and its proximity to the village of East Farndon.

6.3.3 The low managed hedgerow marking the boundary along the east and its associated hedgerow trees appear to be in good and healthy condition. Both hedgerow and the trees are native and of local importance as roadside and field boundary features and as such should be protected during development. There are no Tree Preservation Orders on site and no Conservation Area designations affect any part of it.

6.3.4 The main potentially sensitive visual receptors of changes on site are the residents on The Lealands/Lubenham Road in the south. Due to the lack of vertical barriers along the southern edge of the field their views of the field and the site are open and extent to the southern fringe of Market Harborough. Residents on Marmion Close in the north would be similarly affected, however, due to the buffer planting to the south their views are limited to the first-floor windows. Both views from the north and south are expected to improve as the planting associated with the proposed development of a cemetery would partially screen the residential properties on the respective opposite side of the field.

6.3.5 Other receptors include viewpoints along the network of Public Rights of Way around the site. Users of the footpaths to the east of Harborough Road have a partial view of the site through roadside vegetation, but these not expected to significantly change if planting proposals are sensitive and allow the site to blend in with the natural vegetation surrounding the field. Views from footpaths in the west and the north are currently blocked by a tall hedgerow enclosing the field in the west and the buffer planting associated with Marmion Close. Partial views from Harborough Road are possible, 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 – Groundwater Source Protection Zone (SPZ) 1	The Site is outside SPZ 1.		
Water Environment - Groundwater abstraction/wells/springs supplying water for human use.	The Site is at least 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			Soil/ superficial deposit thickness and depth to bedrock not known. This does not preclude cemetery development but further Tier 2 investigation is required.
Water Environment – 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]			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 offsite 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			Artificial subsurface pathways (e.g. land drains) not known.
Flood risk - Fluvial	The Site is over 30m from the nearest watercourse and is within Flood Zone 1 and at low risk of fluvial flooding		There is a field drain running along the eastern boundary of the Site and a second drain running along the eastern side of Harborough Road, within 10m of the eastern boundary of the Site
Flood risk - Surface Water			The Site and access route is at risk of surface water flooding
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 highway or infrastructure failure causing flooding at the Site in the SFRA		
Flood risk - Site Drainage	There is a public foul water sewer network 5m from the Site and a public surface water sewer network within 350m of the Site. The Site is underlain by high to very high permeability superficial depostits.		The Site is underlain by slowly permeable seasonally wet soils and the bedrock is low permeability with fracture flow type

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 2017[1]) 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.

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

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 statement[2] 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 Positon 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 C*emeteries 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.

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.

7.2.10 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

[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

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.

7.2.11 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.

7.2.12 It is noted that Market Harborough 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 177[4].

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: Soilscapes online mapping[8];
- British Geological Survey [BGS] online mapping: Geology of Britain Viewer[9];
- 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:

[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/soilscapes/
[9] http://mapapps.bgs.ac.uk/geologyofbritain/home.html

- Environment Agency – What's in Your Backyard? – online resources; (Groundwater Source Protection Zones, BGS Aquifer Maps, Groundwater Vulnerability Maps)[3];
- National Soils Resources Institute: Soilscapes online mapping[4];
- British Geological Survey (BGS) online map resources[5];
- Environment Agency guidance on preventing hazardous and non-hazardous substances from entering groundwater[10];
- 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 were unable to conducted a walkover of the Site before this report was written.

7.4.2 Based on aerial images, the Site is currently used as a cultivated agricultural field.

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

7.5 Catchment Hydrology

7.5.1 Environment Agency online mapping (Figure 9) and Ordnance Survey mapping shows no 'main rivers' within or near to the Site.

7.5.2 There is an unnamed drain (an Ordinary Watercourse) located along the Sites eastern boundary and Harborough Road. A second unnamed drain (an Ordinary Watercourse) runs along the eastern side of Harborough Road, within 10m of the Sites eastern boundary. Flow directions were unable to be determined.

7.5.3 The Grand Union Canal flows along the boundary of the eastern and southern borders of the Site. Flow direction was unable to be determined.

7.6 Water Assets

[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

7.6.1 Anglian Water asset plans (Figure 8), show no sewer assets within the Site boundary. The closest sewer asset is a public foul water sewer within Harborough Road approximately 5m east of the Site. There is also a network of public surface water sewers within Butler Gardens Close approximately 350m north-east of the Site.

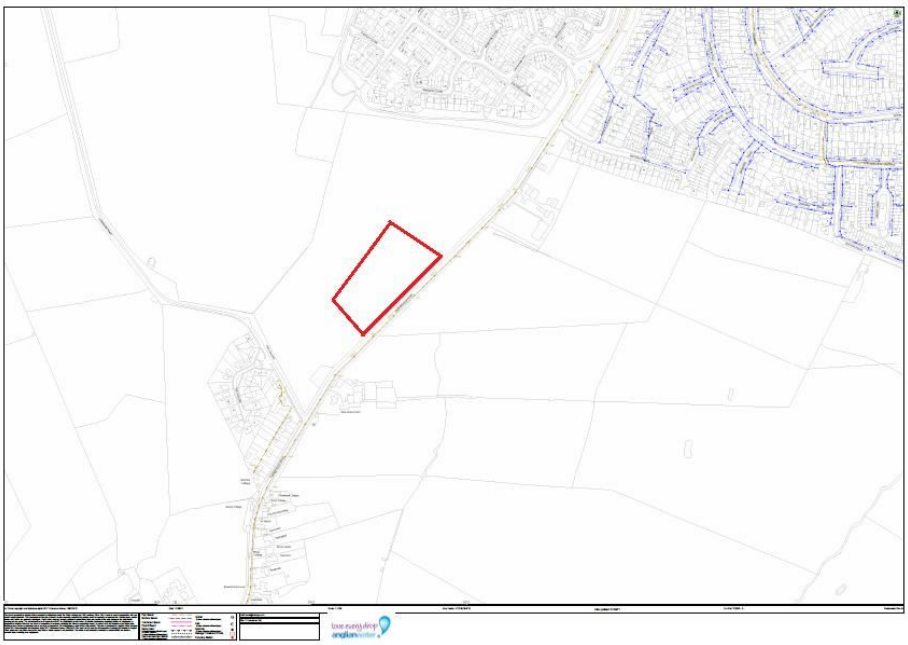


Figure 8. Anglian Water asset plans

7.7 Hydrogeology

Soils

7.7.1 The site is underlain by 'Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils'.

Superficial Deposits

7.7.2 BGS mapping records superficial deposits 8m north of the site; consisting of River Terrace Deposits (Sand and Gravel).

7.7.3 Superficial deposits 37m to the north of the site constitute a Secondary A aquifer, which is defined as 'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.' The permeability of this unit is described as 'intergranular, high to very high'.

Bedrock

7.7.4 The bedrock underlying the site consists of Blue Lias Formation and Charmouth Mudstone (undifferentiated). The Blue Lias Formation consists of thinly-interbedded limestone and calcareous mudstone/siltstone. The Charmouth Mudstone Formation consist of dark grey laminated shales and dark, pale and bluish-grey mudstones. The bedrock forms a Secondary (undifferentiated) aquifer unit, assigned where it is not possible to assign category A or B to a rock type. In general, these layers have been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

7.7.5 The overall Site bedrock permeability is assessed as Low, and of 'Fracture' flow type.

Surface and groundwater abstractions

7.7.6 Environment Agency online mapping shows there are no groundwater Source Protection Zones (SPZ) within 500m of the site.

7.7.7 There are no groundwater or potable water abstractions within 1500m 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.

7.7.8 A Tertiary River runs underneath the site, within a culvert. The nearest surface watercourse is 85m south-east of the site, where the same Tertiary River which flows underneath the site emerges from its culvert.

7.7.9 The nearest BGS borehole to the site is approximately 615m to the north (Ref: SP78NW116). This was drilled into an area of different geology to the site and is therefore not relevant to this report.

7.7.10 Groundwater levels at Site are controlled primarily by the extent of fractured zones within the bedrock. The topographic elevation of the site decreases from south to north, so it is likely that the primary groundwater flow is in this direction.

7.8 Historical Sources of Contamination

7.8.1 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 and scale	On Site	Surrounding Area (within 250m)
1886 (1:2,500)	Site area is used as agricultural fields, and has one internal division. Bordered to the east by Harborough Road.	Ponds 30m east and 150m north and of site. New House Farm 120m south.
1900 (1:2,500)	No significant changes.	Pond 190m north-east.
1901 (1:10,000)	No significant changes.	Nursery 46m north.
1928 (1:10,000)	Nursery on site.	No significant changes.
1929 (1:2,500)	No significant changes.	Pond 90m west.
1950 (1:10,000)	No significant changes.	Pond 90m west backfilled.
1957 (1:10,000)	No significant changes.	No significant changes.
1960 (1:2,500)	No significant changes.	Ponds 30m east and 150m north backfilled.
1961 (1:2,500)	No significant changes.	No significant changes.
1973 (1:2,500)	No significant changes.	No significant changes.
1976 (1:10,000)	No significant changes.	No significant changes.
1978 (1:2,500)	No significant changes.	No significant changes.
1983 (1:10,000)	No significant changes.	No significant changes.
1993 (1:2,500)	No significant changes.	No significant changes.
2002 (1:10,000)	No significant changes.	No significant changes.
2010 (1:10,000)	No significant changes.	No significant changes.
2014 (1:10,000)	No significant changes.	No significant changes.

7.8.2 The presence of any significant sources of contamination on the site is highly unlikely, based on the historical land use (Nursery).

7.8.3 There are no records of potentially contaminative industrial sites within 250m of the site.

7.8.4 There are no landfill/waste treatment sites or transfer stations within 1200m of the site.

7.8.5 Overall it is highly unlikely that any contamination from off-site has migrated into the site.

7.9 Flood Risk Appraisal (Hydrology)

Environment Agency Flood Map

7.9.1 The Environment Agency flood map (Figure 9) 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 9. Fluvial Flooding

7.9.1 The JBA surface water flood map (Figure 10) shows that there is a surface water flow pathway associated with a 1 in 1000-year surface water flooding event running southwards from the north-western corner of the site to the central eastern boundary of the Site.

7.9.2 A second surface water flow pathway to the east of the Site associated with a 1 in 1000-year surface flooding event covers Harborough Road, a potential access road of the Site.

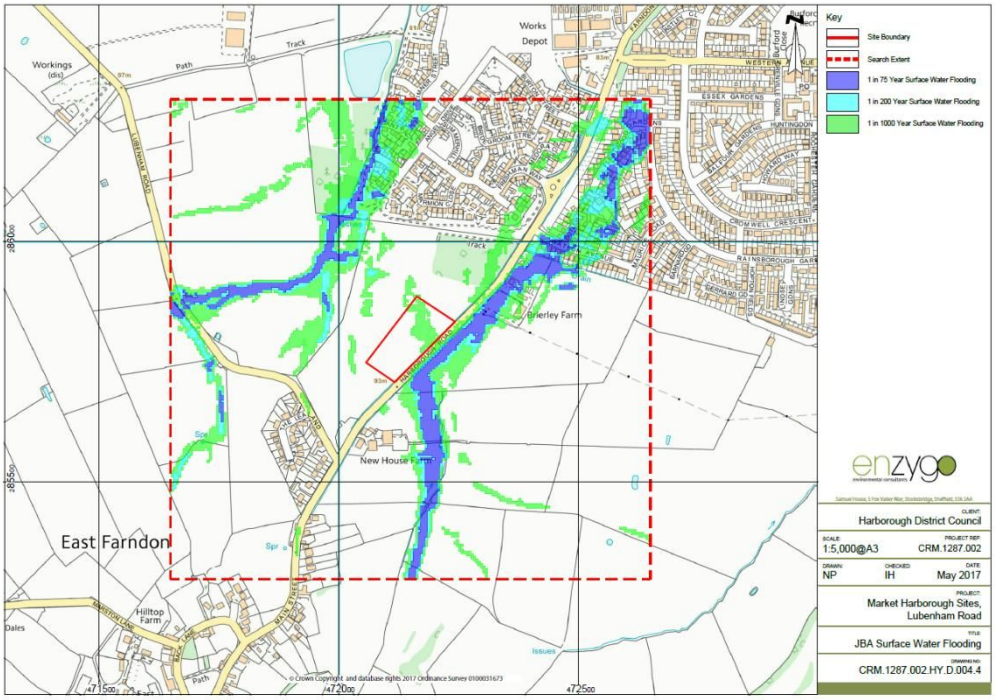


Figure 10. Surface Water Flooding

Tidal Flooding Sources

7.9.3 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

7.9.4 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 outcrops or near-surface.

7.9.5 The BGS Groundwater Flooding Susceptibility Map (Figure 11) indicates that the Site is not susceptible to groundwater flooding. However, neighbouring land to the north of the Site has a potential for groundwater flooding to occur at the surface.

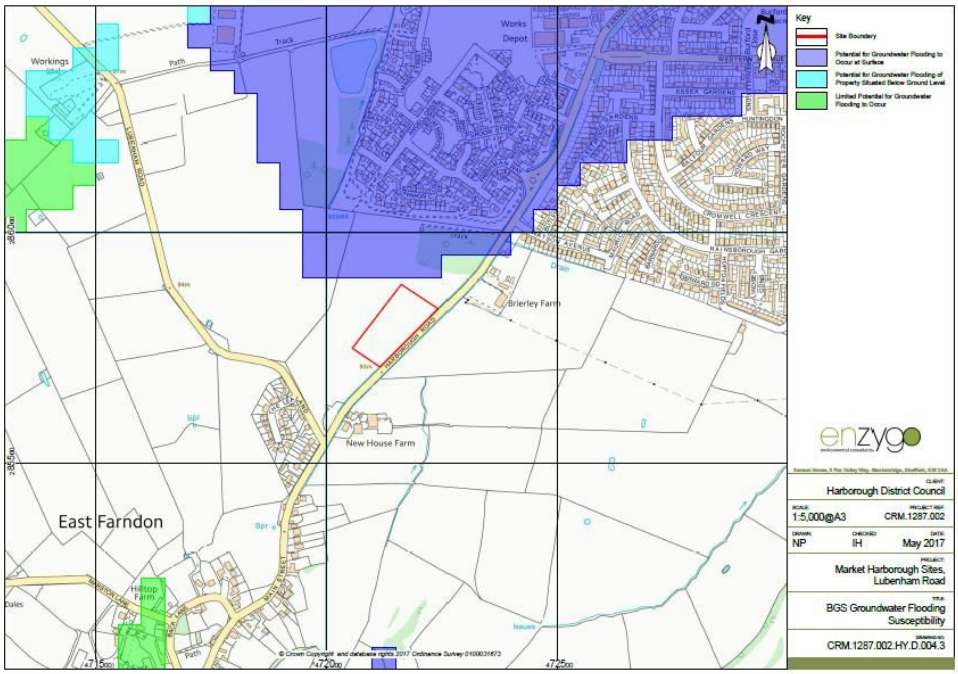


Figure 11. BGS Groundwater Flooding Susceptibility Map

7.9.6 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

7.9.7 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.

7.9.8 Modern sewers are built to the guidelines within Sewers for Adoption[14]. 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).

7.9.9 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.

[14] WRC (2012) Sewers for Adoption 7th Edition.

7.9.10 There are no sewer assets located within the Site boundary. The closest sewer asset is a public foul sewer within Harborough Road approximately 5m east of the Site. There is also a network of public surface water sewers within Butler Gardens Close approximately 350m north-east of the Site. Based on a review of the SFRA, there are no recorded sewer flooding incidents located within or to the immediate vicinity of the Site.

Flooding from Infrastructure Failure

i. Highway Drainage

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

ii. Reservoir

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

7.10 Tier 1 Qualitative Risk Assessment

Contaminant Source-Pathway-Receptor Model

7.10.1 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

7.10.2 The undeveloped site is considered uncontaminated.

7.10.3 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.

7.10.4 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 4:

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

7.10.5 A summary of the main decomposition products of the decay of human remains is summarised in the Environment Agency (EA) guidance [15]. A typical human corpse, approximately 70kg in weight, normally decays completely within 10-12 years.

7.10.6 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

7.10.7 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).

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

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

7.10.9 According to EA guidance[15], the following hazardous substances must not be allowed to enter groundwater:

- Some pesticides;
- Oils;
- Petrol and diesel;
- Solvents;
- Arsenic;
- Mercury;
- Chromium VI.

7.10.10 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.

7.10.11 The mudstone bedrock has a low-moderate permeability and will therefore significantly retard pollutant transport, the significant clay content will attenuate certain pollutants through cation exchange processes. Its permeability is typically low, ranging from 9.4E-06m/day to 6.9E-04m/day in limited pump tests across England[16]

7.10.12 The historic land uses on, and within 250m of the site, pose a very low risk of contamination. The historic ponds that were on site have been backfilled a considerable time ago (approx. 50 years), and therefore any putrescible material which was originally present has, in all likelihood, decayed away.

7.10.13 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.

7.11 Potential Off-site Sources of Contamination

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

7.11.1 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 B6047 roadway immediately west of the site, as any pollutants running off the roadway are likely to be significantly attenuated in the low-permeability subsurface. There are very low risks of contamination from other off-site sources (the businesses on Harborough Airfield Business Park), as it is considered that hardstanding will break the pollutant linkage, and also that bunded tanks/spill kits will be used to ensure that hazardous substances do not enter the ground.

7.12 Potential Pathways for Contaminant Migration

7.12.1 The permeability of the soil beneath the Site is assessed as low to moderate, based on the Groundsure data procured for the site.

7.12.2 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.

7.12.3 The only significant pathway for contaminant migration from this site is near surface groundwater flow with the topography south and south eastward.

7.13 Potential Receptors

7.13.1 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.

7.14 Groundwater Risk Assessment

7.14.1 The site is located on unproductive moderate to low permeability bedrock (former 'non-aquifers').

7.14.2 EA records show that the site is not within any defined Groundwater Source Protection Zone (SPZ) and so is outside SPZ 1.

7.14.3 The site is more than 250 metres from any recorded well, borehole or spring.

7.14.4 The nearest surface watercourses are more than 30 m from the Site (Grand Union Canal 250m south-east of the site).

7.14.5 It is not known whether or not there are dry ditches within or on the perimeter of the site, based on the walkover photos.

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

7.15 Recommendations/Tier 2 Assessment Objectives

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

7.15.2 Soil thickness, based on adjacent BGS borehole records is ~0.2m.

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

7.15.4 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.

7.16 Ground contamination

7.16.1 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.

7.16.2 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.

7.17 Groundwater:

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

7.17.2 An intrusive investigation should also 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.

7.18 Recommendation/Tier 2 Objectives – Cemetery Pollution Prevention:

7.18.1 The Tier 1 Risk Assessment has indicated that across most of the site comprises bedrock of the Dyrham Formation (siltstone and mudstone). It is important to determine the depth and extent of any soils and superficial/weathered deposits overlying the bedrock.

7.18.2 Interments within the Dyrham Formation will pose a low risk to water receptors.

7.18.3 It will be necessary to confirm whether any changes occur within the Dyrham Formation 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.

7.19 References

7.19.1 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	Low levels of anticipated traffic determine that the surrounding road network could easily accommodate traffic associated with the proposed development.		
Access Existing access into the site and		The site has an existing field access which could be developed with	

the suitability of this		infrastructure works and expansion of the access would be necessary to accommodate the culvert in order to provide a suitable access.	
Sustainability lighting, bus facilities, footpaths, cycle routes,			There are no bus routes, cycle routes or footpaths in the vicinity of the site could only reasonably be accessed by private car.
Highway Safety speed, parking on-street, lighting	There have been no recorded accidents in the past 5 years, good visibility and alignment. The site can be safely accommodated from a highway safety perspective.		

8.3 Site Location

8.3.1 The proposed site is located on the south west side of Market Harborough outside of the residential area off Harborough Rd, Market Harborough, LE16 9SQ within Daventry District Council. The site is located at the southern edge of Market Harborough, approximately 24km north of Northampton, 23km south-east of Leicester, 19km west of Corby and 18km east of Lutterworth.

8.3.2 The site, which is rectangular in shape and approximately 1.6 hectares and primarily comprises arable land. The site is bound to the north and west by agricultural land and by Harborough Road to the south and east. Harborough Road provides a link to the town of Market Harborough approximately 1.4km to the north, and to the village of East Farndon 1.0km south of the site.

8.3.3 The landscape is an area of flat land that is relatively open with only partial screening from trees and vegetation. Views onto the site from Harborough Rd are readily available. The plot appears to be used for agricultural use associated with farm buildings situated within the wider locality. Numerous shrubs, trees and vegetation are situated within the site.

8.3.4 The nearest residential properties are situated approximately 150m directly south-west of the site. Brierley Farm is located on the opposite side of Harborough road to the east of the proposed plot approximately 120m to the north east. Buildings associated with Brierley Farm known as 'Gardiner FC' are situated south of the main holdings on Harborough Rd with access into the site across the main road.

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.

8.4.2 Traffic flows generated by the proposed cemetery site are envisaged to be relatively low due to the small size of the plot. With low levels of traffic from the cemetery site predicted, it is not envisaged that this level of trips will have a significant impact upon the local road network. The surrounding road network could easily accommodate traffic associated with the proposed development

8.4.3 Therefore, it is seen that overall, the surrounding road network could easily accommodate traffic associated with the proposed development.

8.5 Access

8.5.1 The site could be potentially accessed via the western edge of Harborough Road with an existing field access currently in use by agricultural vehicles, therefore no third party agreements would be required. It is assumed that if any land take is required for this development, it is adopted highways Land.

8.5.2 Visibility and highway safety should not be a major concern given the straight alignment and adequate length of Harborough Road visible from the proposed site access point. Therefore, the surrounding road network could easily accommodate traffic associated with the proposed development.

8.5.3 The preferred option would be to utilise this access point however infrastructure works would be required and expansion of the access would be necessary to accommodate the culvert. Street lighting would need to be installed at the site access location and signing to notify road users of the new development would be recommended.

8.5.4 The site has a moderate access which could be developed to provide a suitable access.

8.6 Sustainability

8.6.1 Harborough Road is approximately 5.0m in width and has a 1.5m footway to the eastern edge and no street lighting is provided.

8.6.2 The footway on Harborough Road connects to footways on Farndon Road to the north of the site which links to a continuous and well paved footway network in Market Harborough. As a result, there are existing footways which provide safe, sustainable access into the centre of Market Harborough.

8.6.3 The local amenities and facilities within Market Harborough are located mostly to the north and east of the site. There are shopping centres with supermarkets and restaurants all within 2.0km walking distance of the development site utilising footways along Harborough and Farndon Road.

8.6.4 The nearest residential properties are situated 300m to the north east of the site on Watson Avenue and Freshman Way.

8.6.5 Sustainability at this site location is very poor, there is no street lighting and there are no bus stops in the vicinity of the site, a 1.5m footway is provided on the eastern side of Harborough Road.

8.6.6 The site could only reasonably be accessed by private car.

8.7 Highway Safety

8.7.1 Highway safety in the vicinity of the proposed site along Harborough Road is good with no recorded collisions in the vicinity of the proposed site access location in the last 5 years. It is predicted that the introduction of a new access off Harborough Road will not exacerbate any highway safety issues. This is due the straight alignment and sufficient forward visibility along Harborough Road.

8.7.2 It is recommended that signage be installed to notify road users of the new development. The site can be safely accommodated from a highway perspective.

8.7.3 The site can be safely accommodated from a highway perspective.

9 CONCLUSION

9.1 Conclusion

9.1.1 This report considers the potential for the development of a cemetery site at 'Land off Harborough 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. There are residential dwellings in relatively close proximity to the site, but this would not preclude the site from development.

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 is considered to only have negligible or beneficial effects.

9.1.6 In terms of hydrological/ flood risk constraints, the site is largely outside of areas of flood risk, although there is some risk of surface water and fluvial flooding. The site is located outside of groundwater source protection zone areas and away from areas used for groundwater extraction.

9.1.7 In terms of traffic and highways impacts, the surrounding highway network could accommodate the development, and there is an existing access into the site. The only adverse effect is the lack of sustainable transport to the site.

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