East Midlands Gateway
Phase 2 (EMG2)

Document DCO 6.14/MCO 6.14

ENVIRONMENTAL STATEMENT

Main Statement

Chapter 14

Ground Conditions

August 2025

14

The East Midlands Gateway Phase 2 and Highway Order 202X and The East Midlands Gateway Rail Freight and Highway (Amendment) Order 202X

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14. Ground Conditions

14.1. Introduction

14.1.1. This Chapter of the ES assesses any potential effects relating to the existing ground conditions, geological setting, hydrogeology and land contamination aspects of the EMG2 Project, as described in full in **Chapter 3: Project Description** (**Document DCO 6.3/MCO 6.3**).

14.1.2. In summary, the EMG2 Project comprises the three components presented within **Table 14.1** below, forming the DCO Application / DCO Scheme and the MCO Application /MCO Scheme.

Table 14.1: The EMG2 Project Components

Main Component	Details	Works Nos.
DCO Application made by the DCO Applicant for the DCO Scheme		
EMG2 Works	Logistics and advanced manufacturing development located on the EMG2 Main Site south of East Midlands Airport and the A453, and west of the M1 motorway. The development includes HGV parking and a bus interchange. Together with an upgrade to the EMG1 substation and provision of a Community Park.	DCO Works Nos. 1 to 5 as described in the draft DCO (**Document DCO 3.1**). DCO Works Nos. 20 and 21 as described in the draft DCO (**Document DCO 3.1**).
Highway Works	Works to the highway network: the A453 EMG2 access junction works (referred to as the EMG2 Access Works); significant improvements at Junction 24 of the M1 (referred to as the J24 Improvements), works to the wider highway network including the Active Travel Link, Hyam's Lane Works, L57 Footpath Upgrade, A6 Kegworth Bypass/A453 Junction Improvements and Finger Farm Roundabout Improvements, together with other works.	DCO Works Nos. 6 to 19 as described in the draft DCO (**Document DCO 3.1**).
MCO Application made by the MCO Applicant for the MCO Scheme		
EMG1 Works	Additional warehousing development on Plot 16 together with works to increase the permitted height of the cranes at the EMG1 rail-freight terminal, improvements to the public transport interchange, site management building and the EMG1 Pedestrian Crossing.	MCO Works Nos. 3A, 3B, 5A, 5B, 5C, 6A and 8A in the draft MCO (**Document MCO 3.1**).

14.1.3. In recognition that this Chapter forms part of a single ES covering both the DCO Scheme and the MCO Scheme, it makes a clear distinction between the component parts and, consistent with the dual application approach**,** separately assesses the impacts arising from:

i. the DCO Application (Section 14.5);

ii. the MCO Application (Section 14.6);

iii. the DCO and MCO together as the EMG2 Project (Section 14.7); and

iv. an assessment of the cumulative impacts of the EMG2 Project with other existing and, or approved developments (Section 14.8).

14.1.4. The assessment of the cumulative impacts of the EMG2 Project with other existing and, or approved developments has been completed using the list of projects identified in **Appendix 21B** to **Chapter 21: Cumulative Impacts** (**Document DCO 6.21B/MCO 6.21B**). A summary of the effect and their significance is provided in the summary and conclusions section at the end of this Chapter.

14.1.5. This Chapter describes the methodology of the assessments, the current baseline conditions, any likely significant environmental impacts, the mitigation measures intended to avoid, minimise or remedy the identified impacts, and the residual effects post implementation of these measures.

14.1.6. For the purposes of this Chapter, all references to the EMG2 Works scopes out the upgrade to the EMG1 substation, as this will not result in any material effects to ground conditions.

14.1.7. This Chapter should be read in conjunction with the following supporting information, provided within **Appendix 14A** to **14M** (**Documents DCO/MCO 6.14A** to **6.14M**) as follows:

DCO Application:

EMG2 Works

- **Appendix 14A (Document DCO 6.14A):** Fairhurst, East Midlands Gateway Phase 2, Land south of East Midlands Airport, Derby, Phase 1 Geo-Environmental and Geotechnical Preliminary Risk Assessment (Ref. 148749/R5.2, dated August 2025);

- **Appendix 14B (Document DCO 6.14B)**: Fairhurst, East Midlands Gateway Phase 2, Land south of East Midlands Airport, Derby, Ground Investigation Report (Ref. 148749/R7.3, dated August 2025);

- **Appendix 14C (Document DCO 6.14C)**: Fairhurst, East Midlands Gateway Phase 2, Land south of East Midlands Airport, Derby, Minerals Safeguarding Assessment (Ref. 148749/R5, dated July 2024);

- **Appendix 14D (Document DCO 6.14D)**: Fairhurst, EMG Phase 2, Derby, Technical Note: Surface Water Sampling (Ref. 146959, TN01_Rev2, dated October 2024)

Highway Works

- **Appendix 14E (Document DCO 6.14E)**: BWB East Midlands Gateway Phase 2, Preliminary Sources Study Affecting Leicestershire County Council (Ref No. 220500, dated August 2025);

- **Appendix 14F (Document DCO 6.14F)**: BWB East Midlands Gateway Phase 2, Preliminary Sources Study Affecting National Highways (Ref No. 220500, dated August 2025);

- **Appendix 14G (Document DCO 6.14G)**: BWB East Midlands Gateway 2, Geotechnical Statement of Intent for Works Affecting National Highways (Ref No. 220500, dated March 2025).

MCO Application:

- **Appendix 14H (Document MCO 6.14H)**: Fairhurst, East Midlands Gateway Phase 2, Land south of East Midlands Airport, Derby, Addendum Minerals Safeguarding Assessment (Ref.148748/R9, dated November 2024);

- **Appendix 14I (Document MCO 6.14I)**: RSK Ltd East Midlands Gateway Strategic Rail Freight Interchange, Zone 1 Main Development Plateau and Rail Freight Terminal, Factual Ground Investigation Report (Ref. 312494-01-02 (00), dated December 2013);

- **Appendix 14J (Document MCO 6.14J)**: RSK Ltd East Midlands Gateway Strategic Rail Freight Interchange, Zone 1 Main Development Plateau and Rail Freight Terminal, Preliminary Ground Investigation Interpretative Report (Ref. 312494/1-03(00), dated December 2013).

Regulatory Correspondence:

- **Appendix 14K (Document MCO 6.14K)**: Leicestershire County Council Mineral and Waste Planning Authority (MWPA) email correspondence decision to scope out minerals safeguarding from the ES chapter (dated December 2024);

- **Appendix 14L (Document MCO 6.14L)**: Mining Remediation Authority email correspondence decision to scope out risks associated with coal mining features at the surface or at shallow depth from the ES chapter (dated February 2025).

Figures - Appendix 14M (Document DCO 14M/MCO 14M):

DCO Application:

- **Figure 14M.1**: **EMG2 Works** Potential Sources of Contamination Plan;
- **Figure 14M.2**: **EMG2 Works** Exploratory Hole Location Plan;
- **Figure 14M.3**: **EMG2 Works** Cross Sections Plan and corresponding cross sections;
    - **Figure 14M.3.1**: Cross Section A-A
    - **Figure 14M.3.2**: Cross Section B-B
    - **Figure 14M.3.3**: Cross Section C-C
    - **Figure 14M.3.4**: Cross Section D-D
    - **Figure 14M.3.5**: Cross Section E-E

    - **Figure 14M.3.6**: Cross Section F-F
    - **Figure 14M.3.7**: Cross Section G-G
    - **Figure 14M.3.8**: Cross Section H-H
- **Figure 14M.4**: **EMG2 Works** Groundwater Levels Plan;
- **Figure 14M.5: EMG2 Works** Cut and Fill Plan; and
- **Figure 14M.6: EMG2 Works** Finished Levels.

MCO Application:

- **Figure 14M.7**: **EMG1 Works** Exploratory Hole Location Plan.
- **Figure 14M.8: EMG1 Works** Cut and Fill Plan

14.1.8. This Chapter provides an assessment of the ground conditions at the land within the DCO Application comprising the EMG2 Works and Highways Works and also the land upon which the EMG1 Works are to be constructed pursuant to the MCO Application. This Chapter should be read alongside the corresponding Parameters Plans which are presented within **Document DCO 2.5**/**MCO 2.5** and the DCO Scheme Highway Works General Arrangement Drawings which are provided as **Document DCO 2.8**.

14.2. Scope and Methodology of the Assessment

14.2.1. To inform the assessments, the existing land use, soil, geological, hydrological and hydrogeological conditions have been reviewed for both the DCO Application and the MCO Application:

- For the DCO Application, the Preliminary Risk Assessment Report at **Appendix 14A** (**Document DCO 6.14A**) and Ground Investigation Report at **Appendix 14B** (**Document DCO 6.14B**) have been reviewed for the EMG2 Works, as well as the Preliminary Sources Study Reports (PSSRs) completed by BWB for the Highways Works provided at **Appendix 14E** and **14F** (**Documents DCO 6.14E** and **DCO 6.14F**).
- For the MCO Application, the Preliminary Ground Investigation Interpretative and Factual Reports at **Appendix 14I** and **14J** (**Documents MCO 6.14F** and **MCO 6.14J**) have been reviewed for the EMG1 Works**.**

14.2.2. The process of Land Contamination Risk Management (LCRM) has been generally adhered to, where a ground investigation has been undertaken to characterise potential contaminant linkages identified within the Preliminary Risk Assessment, and subsequent refinement of the assessment completed through intrusive investigation to further characterise the ground conditions and present associated mitigation, as required.

Scoping Consultation

14.2.3. A Scoping Report (**Document DCO 6.1C/MCO 6.1C**) was submitted to PINS on behalf of the Applicant in August 2024, in which Fairhurst proposed the 'scoping out' of ground conditions / contamination pertaining to the EMG2 Works.

14.2.4. A Scoping Opinion was adopted by PINS on the 24th of September 2024 (**Document DCO 6.1D/MCO 6.1D**). **Table 14.2** below summarises the comments from the Scoping Opinion accompanied by relevant commentary.

Table 14.2: Scoping Opinion Comments and Commentary

Originator	Summary of Scoping Opinion Comments	Response to Comments
PINS ID 3.1.2	Stated that ground conditions and contamination should not be scoped out of the assessment, due to the fact that the scoping report does not provide evidence of the land use history for the EMG2 Works nor any information in relation to EMG1 Works and Highway Works. The Ground Investigation Report also identifies Made Ground within areas currently identified as agricultural land within the EMG2 Works, indicating that infilling may have occurred.	This ground conditions chapter has been prepared considering the EMG2 Works, Highways Works and EMG1 Works (including Plot 16), pertaining to the DCO Application and the MCO Application, respectively.

Originator	Summary of Scoping Opinion Comments	Response to Comments
PINS ID 3.03	Stated that the Minerals Assessment Report does not extend to the Highway Works or EMG1 Works.	Fairhurst prepared an Addendum Minerals Safeguarding Assessment (dated November 2024), which covers the Highways Works and EMG1 Works **(Appendix 14H- Document DCO 6.14H/MCO 6.14H)** and submitted this to Leicestershire County Council (see below)**.**
Leicestershire County Council	Confirmed that there are no objections from a mineral safeguarding perspective and is satisfied that minerals safeguarding can be scoped out of the ground conditions chapter, following receipt of the Fairhurst Addendum Minerals Safeguarding Assessment. This response is presented within **Appendix 14K – Document DCO 6.14K/MCO 6.14K.**	Minerals Safeguarding has not been considered further.
Mining Remediation Authority	Confirmed that the EMG2 Project is not located within an area where records indicate coal mining features at surface or at shallow depth are present (i.e. the EMG2 Project is located outside of the defined coalfield). This response is presented within **Appendix 14L – Document DCO 6.14L/MCO 6.14L.**	Potential risks associated with coal mining features have not been considered further.

Consultation

14.2.5. A six-week period of statutory consultation was undertaken between Monday 3rd February 2025 and Monday 17th March 2025. This included the presentation of draft application material for the EMG2 Project, including draft ES Chapters. A further additional consultation was undertaken between Tuesday 1st July and Tuesday 29th July on more advanced draft application material, including ES Chapters which had taken on board comments received to the statutory consultation.

14.2.6. The responses received are summarised within **Table 14.3** below, accompanied by the ways in which the responses have been addressed in this Chapter.

Table 14.3: Summary of Consultation Comments and Response

Originator	Summary of Consultation Comments	Response to Comments
Statutory Consultation		
Environment Agency (EA)	The EA have requested additional information in regard to the ground conditions and land contamination risks pertaining to the Highway Works**.**	Preliminary Sources Study Reports (PSSRs) pertaining to the Highway Works have been reviewed to inform the ground conditions in this part of the EMG2 Project **(Appendix 14E** and **14F).** See Section 14.5.
	The EA have provided comment on the sensitivity classification of some Secondary Aquifers.	The sensitivity of the Secondary Aquifers has been reconsidered and updated and is presented within **Table 14.4** of this Chapter.
	The EA have suggested the 'Environment Agency Groundwater Protection Position Statements' should be reviewed to inform the risk to groundwater beneath the EMG2 Project.	This has been reviewed and referenced within Paragraph 14.3.22 of this Chapter.
	The EA have requested to be provided with the source data pertaining to the Waste Transfer Station on the EMG2 Works, suspected to be a geo-referencing error.	Fairhurst has provided the data requested by the EA which supports the fact that the Waste Transfer Station is a geo-referencing error. This was accepted by the EA on 21st April 2025.
	The EA have requested additional information regarding the groundwater monitoring completed at the EMG2 Works.	This has been added to the Chapter, with additional information regarding the locations of the monitoring points, duration of the monitoring and the time of year it was undertaken (Paragraph 14.5.18). Shallow groundwater encountered as part of the monitoring has also resulted in the consideration of dewatering in the earthworks (Paragraph 14.5.104). **Appendix 14M, Figure 14M.4** presents a Groundwater Levels Plan at the EMG2 Works, which shows the locations and monitored levels at the groundwater monitoring wells.
	The EA have requested additional information regarding the soil testing which has been	This has been added to the Chapter, with **Tables 14.5 and 14.13** presenting the types of laboratory test and number of tests completed.

Originator	Summary of Consultation Comments	Response to Comments
	undertaken as part of the ground investigations.	
	The EA have requested clarification of the range in depth at which the groundwater samples were obtained from the EMG2 Works.	This has been added to the Chapter, whereby 15 No. groundwater samples were obtained (both from the shallow groundwater body and the deeper groundwater body) from selected monitoring wells at the EMG2 Works at depths of between 2.51 m bgl and 19.00 m bgl (Paragraph 14.5.20).
	The EA have requested more information regarding the groundwater Polycyclic Aromatic Hydrocarbon exceedance against the relevant Generic Assessment Criteria.	This Chapter has been updated to include a table which indicates the findings of the controlled waters assessment, including a summary of the groundwater chemical exceedances with the determinant exceedance, contaminant range, number of elevated results and relevant GAC (**Table 14.6).** The laboratory groundwater results are presented within Appendix C of the EMG2 Works Ground Investigation Report **(Appendix 14B).**
	The EA have requested more information regarding the surface water sampling completed as part of the EMG2 Works Ground Investigation.	Additional information has been added to this Chapter, including the locations of the surface water samples, a summary of surface water chemical exceedances (**Table 14.7),** and consideration of the sample exceedance being upstream or downstream of the other sample. Further surface water sampling and testing has also been discussed with the findings presented within the Fairhurst Surface Water Sampling Technical Note (**Appendix 14D**).
	The EA has requested further consideration and acknowledgement regarding the identified groundwater contamination.	Further consideration has been given, and the Chapter has been updated accordingly with reference to the type of groundwater contamination and its potential to reach surface water receptors (Paragraphs 14.5.23 and 14.5.24).
	The EA have requested clarification on the thickness of the Made Ground encountered.	The Chapter has been updated to provide further clarification on the thickness of the Made Ground encountered – Paragraph 14.5.11.
	The EA have requested consideration of the re-use of site won materials and waste.	This has been added to the Chapter, see Paragraphs 14.5.101 to 14.5.103. It is considered that the Made Ground may be re-used as part of the earthworks, subject to appropriate sorting, segregation

Originator	Summary of Consultation Comments	Response to Comments
		and classification testing and controlled placement in accordance with an earthworks specification and associated Materials Management Plan or environmental permit as appropriate (subject to **Chapter 18: Materials and Waste**).
North West Leicestershire District Council	The Environmental Protection (Contaminated Land) Officer raised concerns that CIRIA C665 is used for ground gas assessment rather than the British Standard 8485 and therefore the Chapter should be updated to reflect the more recent guidance	The Chapter has been updated accordingly to use BS 8485 when assessing ground gases (Paragraph 14.5.34).
Additional Consultation		
North West Leicestershire District Council	In March 2025, the Council's Environmental Protection (Contaminated Land) Officer stated that the British Standard (BS) 8485 should be used for the ground gas assessment. It is noted that the amended draft ES Chapter 14 now assesses ground gases in accordance with BS 8485 which is acceptable.	No action required
Environment Agency	In August 2025 the EA provided additional commentary on the ES chapter and associated appendices in relation to impact in CP27, aquifer structure and hydraulic gradient, PFAS, amongst other points of clarification.	The Chapter and relevant appendices (**Appendix 14A** and **Appendix 14B**) have been updated accordingly. Including: • Clarification of interpretation of impact in CP27 and recommendations. • Clarification and consistency of aquifer structure and hydraulic gradient. • Update of ground model in the PSSR for J24 improvement works. • Inclusion of PFAS as a potential off site source associated with East Midlands Airport.

14.2.7. Therefore, taking into consideration the above consultation and statutory comments, this Chapter assesses the likely significant effects on ground conditions of the following:

a. The DCO Scheme comprising the EMG2 Works and Highways Works within the DCO Application at Section 14.5;

b. The MCO Scheme comprising the EMG1 Works within the MCO Application at Section 14.6;

c. The EMG2 Project comprising the DCO Scheme and MCO Scheme together and the intra-project combined effects at Section 14.7; and

d. The cumulative effects comprising the EMG2 Project with other existing and approved developments at Section 14.8.

14.2.8. The baseline conditions for the DCO Scheme and MCO Scheme have been established through existing data referenced within Paragraph 14.1.4 and included within the appendices of this Chapter. This data is discussed further within Sections 14.5 and 14.6.

Prediction Methodology

14.2.9. The sensitivity of potentially affected receptors will be considered on a scale of high, moderate or low, with the associated definitions as follows:

- High sensitivity: the receptor / resource has little ability to absorb change without fundamentally altering its present character, or is of international or national importance.
- Moderate sensitivity: the receptor / resource has moderate capacity to absorb change without significantly altering its present character, or is of high importance.
- Low sensitivity: the receptor / resource is tolerant of change without detriment to its character, or is of low or local importance.

14.2.10. Typical examples of sensitivity and sensitivities of site specific receptors are listed in **Table 14.4**.

Table 14.4: Receptor Sensitivity Criteria

Receptor Sensitivity	Human Health	Built Environment / Infrastructure	Controlled Waters
High	On-site users, off-site residential, youth, construction workers assuming no use of PPE.	Residential, gas/oil infrastructure / pipelines, mainline railway lines, power transmission lines, A roads, dual carriageway, B roads, local power lines.	Aquifers currently in use or are suitable for use, as public potable supplies (Principal Aquifers, EA designated SPZs), waters of national designated areas (SSSI, RAMSAR, SAC).
Moderate	Non-residential off-site users, POS users, construction workers assuming PPE use.	More minor C roads, local services.	Secondary Aquifer which supports abstraction for agricultural (irrigation) or industrial use, controlled waters of regionally designated areas (e.g. local nature reserves).
Low	Limited access / exposure / unoccupied land.	Non-permanent / temporary structures.	Undifferentiated and Unproductive Stratum, undesignated site or controlled water features which considerable enrich the local habitat.

14.2.11. The magnitude of change will be qualitatively described and categorised based on the terminology set out in **Chapter 1: Introduction** of this ES (**Document DCO 6.1/MCO 6.1**).

14.2.12. The construction and operational phases will be considered in the assessments of any potential impacts and likely effects. The level of significance allocated to each identified effect will be assessed on the basis of the magnitude of change and the sensitivity of the affected receptor to that change.

14.2.13. The assessment of significance is based on the 'Effect Significance Matrix' presented within **Chapter 1: Introduction (Document DCO 6.1/MCO 6.1)**. Effects which are 'Moderate' or greater are considered to be significant in the view of the EIA Regulations.

14.2.14. The below terms will be used to define the significance of the identified effects:

- Major beneficial or adverse effect – where the effects would result in a large enhancement (or deterioration) to the current environment;
- Moderate beneficial or adverse effect – where the effects would result in a medium enhancement (or deterioration) to the current environment;
- Minor beneficial or adverse effect – where the effects would result in a small enhancement (or deterioration) to the current environment; and
- Negligible – where the effects will not result in a noticeable enhancement or deterioration.

14.2.15. The anticipated effects can be of differing duration; short term, medium term or long term. The duration of impacts is anticipated within the below sections of this chapter, with the definitions of each duration presented within **Chapter 1: Introduction (Document DCO 6.1/MCO 6.1)**.

14.2.16. The prediction methodology associated with ground conditions and contamination will be completed by comparing the baseline conditions (based on Ground Investigation information) with the conditions during the construction phase as well as the conditions post-development, incorporating the potential magnitude of change and the sensitivity of receptors. It should be noted that the baseline conditions pertaining to the DCO Scheme in relation to the Highway Works has been informed by the Preliminary Sources Study Reports (PSSRs) which comprise mainly desk based information. To start with, the assessment will evaluate the significance of the likely effect, considering both inherent (i.e. the implementation of mitigation measures which would be incorporated into the design) and incorporated (i.e. mitigation which would be expected to be achieved through adhering to best practice and the requirements set out within the DCO) mitigation measures that would be applied.

Limitations and Assumptions

14.2.17. This Chapter has been prepared in accordance with best practice and guidance and is based upon ground investigation data which is available at the time of writing only. Consideration should be given to any changes in industry practices or legislation subsequent to the date of issue of this Chapter.

14.3. Policy, Guidance and Legislative Context

14.3.1. The Ground Conditions and Contamination assessment has been undertaken considering relevant planning policies and published guidance documentation and legislation and is common to both the DCO Scheme and MCO Scheme. These are summarised below.

Legislation and Regulation

14.3.2. The assessments within this Chapter have been performed cognisant of the requirements in the following legislation:

- Part 2A of the Environmental Protection Act (EPA) 1990;
- The Town and Country Planning Act 1990;
- The Water Resources Act 1991;
- The Planning Act 2008 (as amended);
- The Contaminated Land (England) (Amendment) Regulations 2012;
- The Control of Asbestos Regulations 2012; and
- The Water Framework Directive 2017.

Planning Policy

14.3.3. The following planning policy documents are relevant and have informed the assessments.

National Networks National Policy Statement (NNNPS)

14.3.4. NNNPS Guidance (March 2024), presented to Parliament pursuant to Section 9(8) of the Planning Act, includes various general impacts and corresponding mitigations of national road, rail and strategic rail freight interchange (SRFI) developments. Extracts relevant to the assessments are discussed below.

Land Contamination and Instability:

14.3.5. Paragraph 5.154: "*Where necessary, land contamination and instability should be considered in respect of new development. Specifically, the proposals should be appropriate for the location, including preventing unacceptable risks from land contamination or instability. If land instability and/or land contamination may be an issue, applicants should seek appropriate technical and environmental expert advice from a competent person to prepare and carry out the appropriate assessments. Applicants should consult with the Coal Authority, Environment Agency and Local Authority if necessary.*"

14.3.6. Paragraph 5.155: "*For developments on previously developed land, applicants should ensure and demonstrate that they have considered the risks posed by land contamination in accordance with the Land Contamination Risk Management guidance115. A preliminary assessment of land contamination and/or ground instability should be carried out at the earliest possible stage before a detailed application for development consent is prepared.*"

14.3.7. Paragraph 5.156: "*Applicants should ensure that any necessary investigations are undertaken, in accordance with Land Contamination Risk Management guidance, to ascertain the risk from contamination and identify sensitive receptors and that their sites are, and will, remain stable or can be made so as part of the development. The site needs to be assessed in the context of surrounding areas where subsidence, landslides and land compression could threaten the development during its anticipated life or damage neighbouring land or property. This could be in the form of a land stability or slope stability risk assessment report.*"

14.3.8. The following land contamination and instability mitigation measures are stated within the guidance:

Instability

14.3.9. Paragraph 5.157: "*Applicants have a range of mechanisms available to mitigate and minimise risks of land instability. These include:*

- *establishing the principle and layout of new development, for example avoiding mine entries and other hazards*
- *ensuring proper design of structures to cope with any movement expected, and other hazards such as mine and/or ground gases*
- *requiring ground improvement techniques, usually involving the removal of poor material and its replacement with suitable inert and stable material, for development on land previously affected by mining activity, this may mean prior extraction of any remaining mineral resource"*

14.3.10. Paragraph 5.158: "*Applicants should submit a coal mining risk assessment as part of their application in specific Development High Risk areas.*"

Land Contamination

14.3.11. Paragraph 5.159: "*Applicants have a range of options available to mitigate and minimise risks of land and groundwater contamination:*

- *These options should include sustainable remediation, sustainable remediation can provide the opportunity to manage unacceptable risks to human health and the environment, it can help to ensure that the benefit of doing the remediation is greater than its impact in accordance with the Environmental Improvement Plan, disposal of soils to landfill should be minimised."*

National Planning Policy Framework (NPPF) 2024

14.3.12. The National Planning Policy Framework, (NPPF) updated in December 2024 provides the following with reference to contamination and ground conditions:

Paragraph 187: "*Planning policies and decisions should contribute to and enhance the natural and local environment by:*

a) *protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);*

e) *preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, waterer or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and*

f) *remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate."*

14.3.13. Paragraph 196: "*Planning policies and decisions should ensure that:*

a) *a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation);*

b) *after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and*

c) *adequate site investigation information, prepared by a competent person, is available to inform these assessment.*"

14.3.14. Paragraph 197: "*Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.*"

National Planning Practice Guidance

14.3.15. Paragraph 002 (Ref ID. 33-002-20190722) of the National Planning Practice Guidance on Land Affected by Contamination (2019) lists the actions to be taken by local planning authorities in order to determine planning applications with regards to land affected by contamination.

North West Leicestershire Local Plan

14.3.16. The site baseline conditions have also considered the local plan prepared by North West Leicestershire District Council which sets out current planning policies for the District from 2011 to 2031 (adopted in 2017 and underwent partial review in 2021). Policy En6 (Land and Air Quality) is relevant to and has informed this Chapter

14.3.17. Policy En6 – Land and Air Quality:

- *"Proposals for development on land that is (or is suspected of being) subject to land instability issues or contamination, or is located within the defined*

Development High Risk Area or within or close to an Air Quality Management Area or close to a known source of noise will be supported where:

(a) A planning application is accompanied by a detailed investigation and assessment of the issues; and

(b) Appropriate mitigation measures are identified which avoid any unacceptably adverse impacts upon the site or adjacent areas, including groundwater quality.

- *Development should avoid any unacceptably adverse impact upon soils of high environmental value (for example wetland or other specific soils) and ensure that soil resources are conserved and managed in a sustainable way."*

14.3.18. Paragraph 10.45 states that "North West Leicestershire has a long history of coal mining and heavy industry. This has left a legacy of potential land instability and contamination issues. The Coal Authority has defined a 'Development High Risk Area' that covers most of the district. In this area the potential land instability and other safety risks associated with former coal mining activities are likely to be greatest. They include, for example, areas of known or suspected shallow coal mining, recorded mine entries and areas of former surface mining. Other than householder developments and those exceptions as identified on the Coal Authority's exemptions list, all new development proposals within the defined Development High Risk Area must be supported by a Coal Mining Risk Assessment, or equivalent, in order to identify any potential risks to the new development and any required remediation measures. These assessments must be carried out by a suitably qualified person to the current British Standards and approved guidance."

14.3.19. Paragraph 10.47 notes that "Groundwater provides a third of our drinking water in England and Wales, and it also maintains the flow in many of our rivers. It is crucial that we look after these sources and ensure that water is completely safe to drink".

Technical Standards and Guidance

14.3.20. Technical documents produced by the British Standards Institute (BSI) and of relevance include standards for the investigation of potentially contaminated sites in order that appropriate actions can be taken:

- BS10175:2011+A2:2017. Investigation of Potentially Contaminated Sites – Code of Practice;
- BS8485:2015:A1:2019. Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings; and
- BS5930: 2015+A1:200. Code of Practice for Site Investigations.

14.3.21. CIRIA provides a plethora of technical guidance documents to assess the potential risks to new structures and encourage safe site working. Documents which may be relevant to this ES Chapter include:

- CIRIA C552:2001: Contaminated Land Risk Assessment: A Guide to Good Practice;
- CIRIA C681: Unexploded Ordnance (UXO): A Guide for the Construction Industry.

- CIRIA C733: Asbestos in Soil and Made Ground: A Guide to Understanding and Managing Risks;
- CIRIA C762: Environmental good practice on site pocked book; and
- CIRIA Report R13D: A Guide for Safe Working on Contaminated Sites.

14.3.22. The Environment Agency's Pollution Prevention Guidance (PPG) note series with additional related documents supply advice pertaining to the principles of pollution prevention, means to prevent contamination and guidance on responding to pollution incidents. Although the guidelines were withdrawn in 2015, they are still considered as good practice. The below PPGs and related documents are of relevance and thus have informed the assessment

- PPG 1 – Understanding Your Environmental Responsibilities – Good Environmental Practices;
- PPG 2 – Above Ground Storage Tanks;
- PPG 6 – Working at Construction or Demolition sites;
- PPG 21 – Pollution Incident Response Planning;
- Pollution Prevention Pays;
- Prioritisation and categorisation procedure for sites which may be contaminated CLR 6; and
- Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention.

14.3.23. The Environment Agency also provides guidance pertaining to the risk based assessment / quantitative refinement of the initial site conceptual model for contaminated sites. The below documents and guidance are considered vital to this refinement and have informed this assessment:

- Updated Technical Background to the CLEA Model. Science Report SC050021/SR2;
- Human Health Toxicological Assessment of Contaminants in Soil. Science Report SC050021/SR2;
- The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils. Science Report P5-080/TR3;
- Verification of Remediation of Land Contamination. Report SC030114;
- Land Contamination Risk Management webpage, formerly CLR11 (LCRM) (2023); and
- Groundwater Protection Position Statements (February 2018 version 1.2).

14.4. Approach to Assessment of Applications

14.4.1. In recognition that this Chapter forms part of a single ES covering both the DCO Application and the MCO Application (as explained in Section 14.1 and in full within **Chapter 1: Introduction and Scope**) it makes a clear distinction between the component parts and, consistent with the dual application approach, assesses the impacts arising from the DCO Application and MCO Application separately and then together as the EMG2 Project in combination. An assessment of the cumulative impacts of the EMG2 Project with other existing and, or approved developments, has also been completed using the list of projects identified in **Appendix 21B** to **Chapter 21: Cumulative Impacts** (Document DCO 6.21B/MCO 6.21B).

14.4.2. Accordingly, the remaining sections of this Chapter are structured as follows:

- An assessment of the DCO Scheme within Section 14.5;
- An assessment of the MCO Scheme within Section 14.6;
- An assessment of the EMG2 Project as a whole, comprising the DCO Scheme and MCO Scheme together, within Section 14.7;
- An assessment of the EMG2 Project as a whole in combination with other planned development (i.e. the cumulative effects), within Section 14.8; and
- An overall summary and conclusions of the above within Section 14.9.

14.5. Assessment of DCO Application

14.5.1. As set out in Section 1 of this Chapter, and at **Table 14.1,** the DCO Scheme comprises of the following component parts:

- The EMG2 Works: Logistics and advanced manufacturing development located on the EMG2 Main Site together with the provision of a community park, HGV parking, a bus interchange, and an upgrade to the EMG1 substation;
- The Highway Works**:** Works to the highway network: the A453 EMG2 access junction works; significant improvements at Junction 24 of the M1 (referred to as the J24 Improvements) and works to the wider highway network including active travel works.

14.5.2. Insofar as the upgrade to the EMG1 substation has been scoped out (paragraph 14.1.5), reference to EMG2 Works excludes the upgrades to the EMG1 Substation, unless these works are specifically referenced.

Baseline Conditions

EMG2 Works

14.5.3. The Preliminary Risk Assessment (PRA) (**Appendix 14A – Document DCO 6.14A**) informs the historical setting of the EMG2 Works. Historically, the site comprised undeveloped agricultural fields, with the presence of a stream in the south-eastern area, ponds within the north-east and south-east and a drainage ditch which extended into the western area. By 1921, a potential pump was identified at the pond in the north eastern area, with the addition of further smaller ponds on the site. By 1955, one of the ponds (adjacent to the south eastern corner) previously identified no longer features on available historical maps, and thus is assumed to have been infilled at desk study stage. A further pond was identified in available historical maps dated 1966 – 1969, located within the north eastern area. From 1972 – 2021, no additional significant changes were identified.

14.5.4. Historically, the surrounding area featured agricultural land, with various commercial/light and industrial/heavy uses. The earliest available historical map dated 1883 indicates the presence of a brick yard located 100 m south west (present until 1921), small ponds within a 200 m radius and the Diseworth Brook 100 m south west. In 1955, an airfield is identified 400 m north of the site, subsequently extending to within 50 m north west by 1962, and labelled as East Midlands Airport in maps post 1966. By 1966, the construction of the M1 motorway was completed, located 100 m north-east of the site. Tanks were identified in available historical maps dated 1972, located 260 m north west of the site**.** From the 1980s, there is an evident increase in industrial use with the development of commercial / light industrial land uses within a 250 m radius. These land uses included a depot (250 m north west), unspecified works (190 m south west), Donington Park Service Station (adjacent north east) and additional unnamed buildings. By 2021, two sewage pumping stations are identified 240m west and 50m north east.

14.5.5. The PRA assessed the following potential sources of contamination based on available information at the time of writing:

- On-site sources
    - Two Infilled clay pits in the northern site area;
    - Former diesel generator in the southern site area; and
    - Waste Transfer Site in the centre of the northern site area.
- Off-site sources
    - Service station and associated amenities, 67 – 90 m north east;
    - Numerous works associated with East Midlands Airport, 80 – 160 m north;
    - Historical / current landfill site, 254 m north west

14.5.6. During the site reconnaissance on 1st July 2022, no evidence of the associated infrastructure of a Waste Transfer Station having historically been on site were noted, despite it being recorded on the associated Envirocheck Report. Therefore, it was suspected that this location record may be a geo-referencing error and is more likely associated with the handling of airport waste, on the East Midlands Airport site. Fairhurst has since provided the EA with data which supports the fact that the Waste Transfer Station is a geo-referencing error. The data supporting this erroneous result was accepted by the EA on the 22nd April 2025. As a result, the Waste Transfer Station has been discounted as a potential source of contamination.

14.5.7. **Figure 14M.1** (**Document DCO/MCO 14M**) provides a visual representation of the identified potential sources of contamination on site and in the surrounding site area.

14.5.8. The initial PRA classified the majority of complete pollutant linkages as Moderate/Low or Low risk, Fairhurst recommended further investigation through intrusive methods, to enable refinement of the Initial Conceptual Site Model (CSM), and thus refinement of the site baseline conditions.

Site Investigation

14.5.9. A ground investigation was completed at the EMG2 Works between September 2022 and October 2022. A Ground Investigation Report (GIR) had been prepared subsequent to this, dated August 2024 (**Appendix 14B** - **Document DCO 6.14B**), and thus the information presented below is based on the 2024 assessment.

14.5.10. The ground investigation comprised:

- Buried utility service clearance;
- 27 No. cable percussive boreholes with rotary core follow on;
- 28 No. cable percussive boreholes;
- 38 No. mechanically excavated trial pits with 8 No. soakaway infiltration tests;
- 2 No. variable head permeability tests; and
- 25 No. groundwater and ground gas monitoring well installations and 3 No. return visits for groundwater and ground gas monitoring, including the collection of 2 No. surface water samples.

14.5.11. The GIR **(Appendix 14B – Document DCO 6.14B)** indicates the ground conditions comprise:

- Topsoil (proven from the surface to a maximum depth of between 0.10 m and 0.85 m bgl);
- Isolated occurrences of Made Ground (proven to a maximum depth of between 0.20 m bgl to 3.00 m bgl, with), with the deepest occurrence noted at CP27 located within the south eastern area (3.0 m thickness) and at TP08 located within the north western area (2.80 m thickness). All remaining exploratory locations where Made Ground was encountered generally comprised of less than 1.0 m;
- Superficial deposits of The Oadby Member and Glaciofluvial Deposits (proven to maximum depths of 16.40 m bgl and 17.30 m bgl, respectively); and
- Bedrock geology of The Gunthorpe Member and Diseworth Sandstone (proven to a maximum depth of 18.50 m bgl for the former, with the maximum depth of the latter not proven).

14.5.12. Visual / olfactory evidence of contamination was not recorded in all but one of the exploratory positions during the ground investigation at the site. The only position where this was recorded was at CP27 (far south eastern corner) where an 'iridescent sheen and moderate to strong hydrocarbon odour' was noted within the Made Ground encountered from a depth of 0.30 m bgl to 3.00 m bgl. The source of this contamination is unknown but is stipulated to originate from the historical diesel power generator identified within the PRA, discussed within Section 14.5.3 above.

14.5.13. **Table 14.5** below summarises the soil, groundwater and surface water laboratory tests completed on the samples obtained during the EMG2 Works ground investigation. Paragraph 14.5.31 outlines the supplementary surface water sampling completed in 2024.

Table 14.5: Geo-Environmental Testing - EMG2 Works (DCO Application)

Geo-Environmental Test	Number of Soil Tests	Number of Groundwater Tests	Number of Surface Water Tests
Metals: Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium (total), Chromium III, Chromium VI, Copper, Lead, Mercury, Nickel. Selenium and Zinc	65 (2 No. MG, 15 No. TS, 8 No. ODT, 16 No. GFDU, 23 No. WGM, 1 No. GUN)	15	2

Geo-Environmental Test	Number of Soil Tests	Number of Groundwater Tests	Number of Surface Water Tests
Soil Organic Matter	65 (2 No. MG, 15 No. TS, 8 No. ODT, 16 No. GFDU, 23 No. WGM, 1 No. GUN)	-	-
Total Petroleum Hydrocarbon (TPH) – Aliphatic and Aromatic Split using the Criteria Working Group Methodology – and BTEX	65 (2 No. MG, 15 No. TS, 8 No. ODT, 16 No. GFDU, 23 No. WGM, 1 No. GUN)	15	2
Polycyclic Aromatic Hydrocarbons (PAH) – Speciated (EPA 16)	65 (2 No. MG, 15 No. TS, 8 No. ODT, 16 No. GFDU, 23 No. WGM, 1 No. GUN)	15	2
Selected Volatile Organic Compound (VOC) and Semi-Volatile Organic Compounds (SVOCs)	29 (2 No. MG, 2 No. TS, 2 No. GFDU, 23 No. WGM)	15	2
Methyl Tert-Butyl Ether (MTBE)	63 (2 No. MG, 13 No. TS, 8 No. ODT, 16 No. GFDU, 23 No. WGM, 1 No. GUN)	15	2

Geo-Environmental Test	Number of Soil Tests	Number of Groundwater Tests	Number of Surface Water Tests
Phenol	9 (2 No. MG, 2 No. TS, 2 No. GFDU, 3 No. WGM)	15	2
Asbestos Screen (with quantification, if required)	2 (2 No. MG)	-	-
OCP and OPP Combined Pesticide Suite	-	14	2
PCBs (16MS)	-	14	2
Notes : TS: Topsoil, MG: Made Ground, ODT: Oadby Member, GFDU: Glaciofluvial Deposits, WGM: Weathered Gunthorpe Member, GUN: Gunthorpe Member			

Risks to Human Health

14.5.14. Considering the proposed development across the site (shown in the Parameters Plan – **Document DCO 2.5**), the laboratory soil analytical results were assessed against the Generic Assessment Criteria (GAC) for the commercial end use. Soil Organic Matter test results ranged between 0.2% and 6.1% with an average of 1.6%. Therefore, the LQM/CIEH 'Suitable 4 Use Levels' (S4ULs) were applied on the basis of a 1% SOM as a conservative approach.

14.5.15. Results indicate that all concentrations of contaminants analysed were below the commercial end use assessment criteria where, in the majority of instances, results were below the laboratory limit of detection. Therefore, the overall risks to future end users is considered as Low.

14.5.16. Soil concentrations recorded across the site were also compared against UKIWR "Guidance for the selection of Water Supply Pipes to be used in Brownfield Sites (Ref 10/WM/03/21)". Results of the assessment indicated 2No. exceedances for Polyethylene (PE) pipe and 1 No. exceedance for Polyvinyl Chloride (PVC) pipe specification. However, the use of upgraded drinking water supply pipes is not considered necessary, due to these exceedances being identified within the Topsoil layer (likely stripped during the development as part of the cut and fill scheme) and due to the detection of a hotspot of contamination, identified at CP27 associated with elevated C5-10 and C16-40 aliphatic / aromatic hydrocarbons, whereby remediation via localised excavation/removal is recommended. During this removal, the vertical distribution and associated risks should be suitably assessed.

14.5.17. Although measurable concentrations of SVOCs and VOCs were also recorded within CP27 at a depth of 4.0 m bgl, neither exceeded the PE or PVC threshold.

Risks to Controlled Waters

14.5.18. The initial PRA set out the hydrological and hydrogeological regime of the site. The report suggests a low/moderate risk to Controlled Waters, with regard to the following controlled waters receptors:

- Groundwater within the superficial deposits (Secondary A and Secondary Undifferentiated Aquifers) and bedrock deposits (Secondary B Aquifer); and
- Inland streams identified on and within the vicinity of the site.

14.5.19. 3 No. rounds of groundwater monitoring were completed at 15 No. locations across the site, dated 13/14th October, 26/27th October and 10th to 14th November 2022.

14.5.20. Monitoring suggests that groundwater is present between depths of 1.25m and 15.32m bgl (84.9m AOD and 54.6m AOD) within the Made Ground, Glaciofluvial, Weathered Gunthorpe Member and Gunthorpe Member where the Glaciofluvial deposit is classified as a Secondary A Aquifer and the Gunthorpe Member is classified as a Secondary B Aquifer. The monitoring data indicates groundwater levels beneath the site from depths of 1.25 m bgl to 15.32 m bgl (84.9 m AOD and 54.6 m AOD). Isolated instances of shallow groundwater is considered to be present within the Made Ground and superficial Glaciofluvial Deposits (for example, at 1.25 m bgl within the Made Ground of CP27 and at 3.85 m bgl within the Glaciofluvial Deposits of CP16). (**Figure 14M.6 – Document DCO 6.14M)**.

14.5.21. **Figure 14M.4 (Document DCO 6.14M)** presents a groundwater levels plan for the EMG2 Works, presenting the locations of each monitoring well and the measured groundwater elevations across each of the 3 No. rounds. The groundwater levels plan indicates a southerly groundwater flow.

14.5.22. 15 No. groundwater samples were obtained from selected monitoring wells (comprising both the shallow and deeper groundwater body) at depths of between 2.51 m and 19.00 m bgl, and were scheduled for the geo-environmental tests listed within **Table 14.5** above.

14.5.23. The chemical results from the groundwater laboratory tests were assessed against the UK Drinking Water Standards, or where unavailable, the World Health Organization Drinking Water Standards.

14.5.24. The assessment concluded that contaminant levels within groundwater samples were generally below the Generic Assessment Criteria for the majority of samples, with the exception of 7 No. Polycyclic Aromatic Hydrocarbon (PAH) exceedances. These exceedances are presented within **Table 14.6** below.

Table 14.6: Summary of Groundwater Chemical Exceedances

Determinant	Location of exceedance / depth of sample (m bgl)	Contaminant Concentration (µg/l)	GAC for PAHs (µg/l)
Acenaphthylene	CP06 / 8.07	0.15	0.1
	BH06 / 19.00	0.13	
Naphthalene	CP06 / 8.07	1.14	
	BH06 / 19.00	0.95	
	BH09 / 15.00	0.14	
	BH25 / 5.05	0.24	
	BH21 / 10.44	0.23	
Pyrene	CP27 / 2.51*	0.13	
*Obtained from the shallow groundwater. All remaining exceedances were recorded within the deeper groundwater.			

14.5.25. These exceedances were generally detected in the deeper groundwater in the northern and southern parts of the site (CP06, BH06 and BH09) and (BH21 and BH25), respectively, with the exception of CP27 which was obtained from the shallower groundwater within the Made Ground. Greater PAH exceedances were noted within the deeper groundwater in the northern area (for example, CP06, 1.14 ug/l), with concentrations generally decreasing within samples obtained from the southern site area (for example, BH25, 0.24 ug/l). These exceedances are noted as localised due to them being surrounded by non-detects (for example the Pyrene exceedance noted within CP27 at 2.51 m bgl was not recorded within the nearby boreholes of BH24 at 4.56m bgl or BH25 at 5.05 m bgl.

14.5.26. The proposed localised remediation in the area of CP27 would present a betterment with respect to controlled waters risk.

14.5.27. Considering the absence of abstraction points within 1,000 m of the site, and the proposed betterment through managed drainage systems and reduced infiltration (**Chapter 13: Flood Risk and Drainage** (**Document DCO 6.13)**), the risks to controlled water quality are considered to be low.

Risks to Surface Waters

14.5.28. The PRA identified 2 No. watercourses within influential distance of the site, the closest being the Diseworth Brook c. 248 m south west. The Diseworth Brook flows south easterly and intercepts the Long Whatton Brook c. 545 m south east of the site. The Long Whatton Brook appears to be partially fed by drainage ditches which converge in the south eastern corner of the site and continue off-site. As it has been identified that these ditches are in hydraulic connectivity with the shallow groundwater body, it is considered that there is a potential pathway for groundwater contamination to enter the nearby watercourses.

14.5.29. Therefore, 2 No. surface water samples were taken from the drainage ditch (noted to be flowing in a southerly direction) at the western site boundary (SW2 - upstream) and approximately 380 m west of the site (SW3 - downstream). The exploratory hole location

plan included within **Appendix 14M.2 (Document DCO 6.14M)** presents the locations of these samples.

14.5.30. It should be noted that the site GIR indicates the proposed scope of the investigation to comprise 3 No. surface water samples (SW1, SW2 and SW3). However, only 2 No. surface water samples were obtained (SW2 and SW3) as sampling at SW1 at the time of the visit was not possible due to the location being dry.

14.5.31. The chemical results from the surface water samples were assessed against published values from the Environment Agency (Environmental Quality Standards, EQS). Where assessment criteria was unavailable for certain chemical constituents, the UK Drinking Water Standards and World Health Organization Drinking Water Standards were used.

14.5.32. The surface water assessment detected a marginal exceedance in Naphthalene within the downstream sample obtained at SW3, as presented within the summary table below.

Table 14.7: Summary of Surface Water Chemical Exceedances

Determinant	Location	Contaminant Concentration (µg/l)	GAC for PAHs (µg/l)
Naphthalene	SW3 (downstream)	0.18	0.1

14.5.33. The concentration of Naphthalene within the upstream sample of SW2 measured <0.01 µg/l, which is below the laboratory limit of detection of <0.01 µg/l, and below the relevant generic assessment criteria of 0.1 µg/l. All naphthalene exceedances noted within the groundwater were recorded within the deeper groundwater body. Considering this, and the location of SW3 (approximately 380 m west of the site), it is likely that the exceedance is from an off-site source.

14.5.34. Additional surface water sampling and testing at the site was undertaken, with the findings presented within the EMG Phase 2 Technical Note: Surface Water Sampling, dated October 2024 (**Appendix 14D – Document DCO 6.14D).** This involved the collection of 4 No. surface water samples (SW1 to SW4), with the locations presented on the surface water sampling location plan of the Technical Note, and summarised below:

- SW01: Drainage ditch to the immediate north west of the site;
- SW02: Drainage ditch located approximately 230 m west of site;
- SW03: Drainage ditch located along the western order limit of the site; and
- SW04: Drainage outfall located in the south eastern part of the site.

14.5.35. The chemical laboratory test results for all surface water samples collected indicated naphthalene concentrations of <0.01 µg/l, below the relevant GAC used in the GIR assessment and also below the laboratory limit of detection. Therefore, it is considered that the naphthalene exceedance recorded within the surface water sample obtained during the ground investigation was an isolated instance.

14.5.36. Considering the aforementioned evidence, the overall risk to surface waters is classified as low.

Ground Gas

14.5.37. Ground gas / vapour monitoring was undertaken at 15 No. locations across 3 No. monitoring return visits at the EMG2 Main Site. In accordance with BS8485:2015 A1:2019, a Characteristic Situation CS1 is considered appropriate for the site. Therefore, given the CS of the site, Table 4 of BS 8485:2015+A1:2019 indicates that there is no requirement for gas protection measures for both Type C and Type D structures on the EMG2 Works.

Highways Works

14.5.38. The findings of the two Preliminary Sources Study Reports (PSSRs) completed by BWB for the Highway Works part of the DCO Scheme (**Appendix 14E** and **14F – Documents DCO 6.14E and 6.14F)** have been reviewed and have informed the baseline conditions.

Junction 24 Improvements

14.5.39. The upgrade of Junction 24 of the M1 is proposed as part of the Highway Works to provide access and sufficient capacity to facilitate the development of the EMG2 Works.

14.5.40. The BWB PSSR (**Appendix 14E – Document DCO 6.14E**) associated with the Junction 24 Improvements includes desk based information which has been reviewed to inform the baseline conditions and is summarised below.

History

14.5.41. This part of the Highway Works remained as largely undeveloped agricultural land with two roads running through the northern and southern vicinities, from the earliest available historical map of c.1883. By c.1921, air valves and rises (assumed to be associated with Kegworth R.D.O Reservoir) are mapped along the road in the northern vicinity and by c.1966, M1 construction had begun. Ashby Road is mapped in the southern area and is widened and labelled as A453 by c.1982.

14.5.42. A summary of the history of the area surrounding the Highway Works, specifically in regards to the J24 Improvements, is presented below:

- From the earliest map of c.1883, Keyworth Village is mapped 750 m east and Lockington is mapped 500 m north west. A gravel pit and various small lakes are present 250 m north and, by c.1901, a covered reservoir is mapped 100 m south west.
- By c.1912, the gravel pit previously identified to the north is no longer present, suggesting it had been infilled. Air valves, a washout chamber and sluice valves are mapped within this area.
- By c.1966, the air valves and washout chamber are no longer mapped, and the M1 had been constructed over the same area.
- By c. 1971, the covered reservoir is no longer present suggesting it had been infilled.

- By c.1991, commercial / light industrial development had taken place within the surrounding vicinity, with a flood prevention lagoon mapped along the north eastern boundary.
- By c.2024, East Midlands Airport is present 500 m south west and a services with a petrol station is located 400 m south. The A50 eastbound is directly joined to the M1.

Anticipated Geology

14.5.43. Publicly available British Geological Survey (BGS) information indicated localised artificial deposits along the M1 corridor, suggesting areas which have been artificially raised and where the motorway has been constructed on an embankment.

14.5.44. BGS data indicates various superficial deposits in the north of the Highway Works, in regards to the J24 Improvements, and no superficial deposits to the south. These deposits include Wanlip Member, Head Deposits, Hemington Member, Holme Pierrepont Sand and Gravel Member and Eggington Common Sand and Gravel Member.

14.5.45. BGS data records various bedrock deposits across this part of the Highway Works comprising Gunthorpe Member (Siltstone and Mudstone), Diseworth Sandstone, Tarporley Siltstone Formation, Helsby Sandstone Formation, Edwalton Member, Branscombe Mudstone Formation and Arden Sandstone Formation.

14.5.46. BGS also indicates 2 No. faults through the centre of this part of the Highway Works, orientated approximately north west, south east.

Hydrogeology

14.5.47. **Table 14.8** below provides the hydrogeological Environment Agency (EA) classifications for each of the stratum mapped by BGS. This part of the Highway Works is not located within an EA designated Source Protection Zone (SPZ).

Table 14.8: EA Aquifer Designation

Stratum	**EA Aquifer Designation**
Superficial Deposits	
Wanlip Member	Secondary A Aquifer
Head Deposits	Undifferentiated Aquifer
Hemington Member	Secondary A Aquifer
Holme Pierrepont Sand and Gravel Member	Secondary A Aquifer
Egginton Common Sand and Gravel Member	Secondary A Aquifer

Stratum	EA Aquifer Designation
Bedrock	
Gunthorpe Member (Siltstone and Mudstone)	Secondary B Aquifer
Diseworth Sandstone	Secondary B Aquifer
Tarporley Siltstone Formation	Secondary B Aquifer
Helsby Sandstone Formation	Principal Aquifer
Edwalton Member	Secondary B Aquifer
Arden Sandstone Formation	Secondary A Aquifer
Brancsombe Mudstone Formation	Secondary B Aquifer

14.5.48. Part of the A50 Westbound is located within an active groundwater abstraction licence area, licenced to Tarmac Trading Limited. It is assumed that the associated groundwater abstraction is not utilised for potable water, due to the Highway Works not being located within a Source Protection Zone.

14.5.49. There are no discharge consents or pollution incidents relating to groundwater at the site of within 500 m.

Hydrology

14.5.50. There are no licensed abstraction, discharge consents or pollution incidents relating to surface on or within 500 m of this part of the Highway Works.

14.5.51. Tributaries of the Diseworth Brook flow near the A453 / Green Junction and 250 m west of the alternative principal access site. These tributaries flow into the Diseworth Brook southwest of the site.

Additional Environmental Information

14.5.52. This part of the Highway Works is not located within a coal mining reporting area, and there are no underground workings or mineral extractions recorded within the vicinity.

14.5.53. 1 No. Environment Agency (EA) landfill is located 399 m north, operated by Tarmac Aggregates Limited and is reported to receive Inert waste.

14.5.54. 1 No. waste exemption is located within this part of the Highway Works, at the A50 from M1 Junction 24 to B5010 roundabout. This is a ‘using waste exemption’ for the use of waste in construction.

14.5.55. The recorded landfills (>399 m north) are not considered to represent a significant ground gas risk at this part of the Highway Works due to distance, the recorded date of closure and the absence of enclosed spaces where gas could affect a receptor, combined with the fact that there are no sensitive receptors on highways. The waste exemptions are not considered

to present a significant contamination risk due to the requirement of the exemptions for the handling of small quantities of waste (below waste permitting legislation) only.

Ground Investigations

14.5.56. The ground conditions at the J24 Improvements have been informed via the available existing ground investigations and reports, reviewed by BWB:

- RSK Environment Ltd, Factual Ground Investigation Report, East Midlands Gateway Strategic Rail Freight Interchange, Zone 3, Major Trunk Road Improvements, Ref. 312494-03(00), dated December 2013; and
- Amey Arup, Ground Investigation Report, Smart Motorways Programme M1, J23a-25, Ref. HA549342-AMAR-HGT-SWI-RP-CE-000002-Rev P0, dated February 2016.

14.5.57. Based on the aforementioned information, **Table 14.9** below provides a typical ground model for this part of the Highway Works.

Table 14.9: Junction 24 Improvements (Highway Works) Ground Model

Stratum	**Top Depth (m bgl)**		**Base Depth (m bgl)**	
	Min	**Max**	**Min**	**Max**
Topsoil	Ground Level		0.10	0.80
Made Ground	Ground Level		0.40	11.30
Fill / Possible Fill	Ground Level		0.70	1.80
Superficial Deposits	Ground Level		0.70	6.80
Mercia Mudstone (weathered)	Ground Level		Not Proven	
Mercia Mudstone	8.23	11.80	Not Proven	
Note (1) – For PSSR stage ground model does not consider Helbsy Sandstone BGS borehole SK42NE151 although this strata is likely to be encountered at the beginning of the link road from M1 to A50				

14.5.58. The construction of highway infrastructure is proposed as part of the Highway Works, to provide access and sufficient capacity to facilitate the DCO Scheme.

14.5.59. The associated BWB PSSR (**Appendix 14F – Document DCO 6.14F**) includes desk based information pertaining to this part of the DCO Application. This information has been reviewed and is summarised below.

History

14.5.60. This part of the Highway Works remained as largely undeveloped agricultural land from the earliest available historical map of c.1884, until c.1921 where a pit containing an unspecified pump is shown on the planned northward extension of Hyam's Lane (later labelled as a pond

by c.1962). An additional small pond is also mapped in the north east of the site by c.1962. This is thought to have been infilled by c.1971 due to the construction of the A5129 (later labelled A453) within that area. By c.2001, EMG1 access junction is mapped and by c.2024 the pond to the north of Hyam's Lane is not mapped and thus assumed to have been infilled.

14.5.61. The history of the area in relation to the highways infrastructure to facilitate access to the EMG2 Main Site is summarised below:

- Much of the surrounding area comprised agricultural fields from c.1884 with the village of Diseworth located to the southeast, comprising a brick works (250 m south east) and graveyards (200 m and 300 m south east). An old gravel pit is mapped 50 m south east and the Diseworth Brook flows west to east, 300 m south.
- By c.1962, 2 No. ponds are located 100 m south of Hyam's Lane and a disused airport is mapped directly north (later labelled as East Midlands Airport by c.1966). The M1 had been constructed to the east of the site by c. 1967.
- By the 1980s, 2 No. electrical substations are present 200 and 400 m northeast of the A453/The Green Junction.
- By the late 1990s, Finger Farm and Junction 23a had been constructed and resembles its present day configuration.
- By c.2024, a petrol station is located 250 m south, comprising part of Donington Park Services.

Anticipated Geology

14.5.62. Published British Geological Survey (BGS) information indicates localised areas of Made Ground underlying sections of the Active Travel Link and A42 with a small area of Worked Ground just south east of the centre of the EMG2 Main Site.

14.5.63. Superficial deposits are mapped to comprise Glaciofluvial Deposits and Oadby Member within the southern Highway Works, with Alluvium and Head Deposits mapped in close proximity (underlying the A453/ The Green Junction).

14.5.64. Bedrock underlying the majority of these Highway Works is mapped to comprise the Gunthorpe Member and Diseworth Sandstone.

14.5.65. BGS mapping also indicates the presence of five faults located within this part of the Highway Works.

Hydrogeology

14.5.66. **Table 14.10** below provides the hydrogeological Environment Agency (EA) classifications for each of the stratum mapped by BGS. This part of the Highway Works is not located within an EA designated Source Protection Zone (SPZ).

Table 14.10: EA Aquifer Designation

Stratum	EA Aquifer Designation
Superficial Deposits	
Glaciofluvial Deposits	Secondary A Aquifer
Oadby Member	Undifferentiated Secondary Aquifer
Head Deposits	Undifferentiated Secondary Aquifer
Glaciolacustrine Deposits	Unproductive Stratum
Bedrock	
Gunthorpe Member (Siltstone and Mudstone)	Secondary B Aquifer
Diseworth Sandstone	Secondary B Aquifer

Hydrology

14.5.67. There are no active abstraction licenses within a 2km radius of this part of the Highway Works.

14.5.68. There are 2 No. active discharge consents located 260 m west pertaining to trade discharges from East Midlands Airport into Whatton Brook and its tributaries.

Additional Environmental Information

14.5.69. 1 No. historical EA recorded landfill is located 160 m North West of Hyam's Lane, and is reported to have received inert, industrial commercial and household wastes between 1960 and 1970.

14.5.70. There are 79 No. waste exemptions within a 500 m radius, the majority of which are agricultural including the burning of waste in the open, storage of waste in a secure place, use of waste in construction, treatment of waste wood and waste plant matter by chipping and more.

14.5.71. The historical landfill is not considered to be a significant ground gas risk to this part of the Highway Works, due to distance, the recorded date of closure and the absence of enclosed spaces where gas could affect a sensitive receptor, combined with the fact that there are no sensitive receptors for highways. The waste exemptions are also not considered to be of significant contaminative potential, due to the reasons listed within Paragraph 14.5.51 above.

Ground Investigations

14.5.72. The ground conditions at this part of the Highway Works have been informed via the available existing ground investigations and reports, reviewed by BWB:

- Structural Soils, EMG2 Phase 2 Factual Report on Ground Investigation (dated 2023); and
- Geotechnics Ltd Ground Investigation at Land South of East Midlands Airport, Factual Report (dated 2024).

14.5.73. Based on the aforementioned information, **Tables 14.11** and **14.12** below provide a typical ground model for this part of the Highway Works.

Table 14.11: Central and Eastern Area

Stratum	Typical Profile	Description
Hardstanding	0.00 m to 0.30 m	N/A
Made Ground	0.30 m to 0.80 m	
Mercia Mudstone Group (Clay)	0.80 m to 3.50 m	Brown or reddish brown silty very sandy clays.
Weathered Mercia Mudstone Group (Siltstone)	3.50 m to >6.00 m (base not proven)	Gravelly clayey sand and slightly gravelly, sandy silty clay with frequent lithorelicts.

Table 14.12: Western Area

Stratum	Typical Profile	Description
Hardstanding	0.00 m to 0.30 m	N/A
Made Ground	0.30 m to 0.80 m	
Oadby Member or Glaciofluvial Deposits	0.30 m to 0.90 m	Slightly sandy silty gravelly clay or slightly silty slightly gravelly sandy clay.
Mercia Mudstone Group (Clay)	0.90 m to 5.80 m	Reddish brown silty clay.
Weathered Mercia Mudstone Group (Siltstone)	5.80 m to >10.00 m (base not proven)	Gravelly clayey sand and slightly gravelly silty clay with frequent lithorelicts.

Key Receptors

14.5.74. Sensitive receptors to be considered within the Ground Conditions and Contamination assessment for the DCO Scheme include the below:

- Future site users – Commercial users in the form of on-site staff, visitors and occasional building maintenance workers. These users may be exposed via direct contact, ingestion and / or inhalation of contaminated soils (in the presence of soft landscaping), ingress of contaminants into conduits contaminating drinking water supply pipes, and the inhalation of accumulated soil ground gas or vapours. Future site users are considered to be of moderate sensitivity, due to the anticipated length

time they are likely to spend on-site and due to the proposed well-ventilated nature of the Type D Buildings.

- Construction / maintenance workers – These receptors may be exposed to potential contamination within soils and groundwater during the ground works for the proposed development. Construction workers are considered to be of moderate sensitivity, although this is thought to be reduced to moderate/ low sensitivity due to the assumption that health and safety risk assessment and mitigation including basic hygiene and the correct use of personal protective equipment (PPE) / respiratory protective equipment (RPE) will be applied by all competent contractors.
- Off-site users (East Midlands Airport, Lockington, Hemington, Castle Donington and Public) – Potential contamination exposure to surrounding off-site users. Much of the surrounding land is either occupied by commercial land use (such as Donington Park Services), or vacant land, associated with low sensitivity.
- Off-site users (residential) – Immediate High-sensitivity residential receptors are located along Grimes Gate and Cheslyn Crescent in Diseworth.
- Controlled Waters, Aquifers – EA designated aquifers identified to be present beneath the DCO Scheme, including Secondary A Aquifers, Secondary Undifferentiated Aquifers, Secondary B Aquifers, and a Principal Aquifer associated with the Helsby Sandstone Formation located in the centre of the Highway Works boundary. The Secondary Aquifers are considered to be of moderate sensitivity and the Principal Aquifer is considered to be of high sensitivity. However, no part of the DCO Scheme is located within an Environment Agency designated Source Protection Zone (SPZ).
- Controlled waters, surface water – nearby surface water courses / drainage ditches including the inland rivers identified south of the EMG2 Works (Diseworth Brook 320m south and Long Whatton Brook 500m south east of the site) and 2 No. drainage ditches which converge in the south eastern corner of the EMG2 Works. The regional deeper groundwater flow direction is towards the south. As such, the surface water receptors are largely associated with the ponds identified on the EMG2 Works, the aforementioned drainage ditch and tributaries of the Diseworth Brook. Sensitivity is considered to be moderate due to the GIR proving that the drainage ditches are in hydraulic connectivity with the shallow groundwater body, and thus it is considered that there is a pathway for groundwater contamination (PAH exceedances) identified to enter the two nearby watercourses. However, the completeness of this pathway is considered unlikely due to the watercourses being located >300 m from the EMG2 Works and due to the fact that the PAH contamination was generally identified within the deeper groundwater body, with the exception of a localised pyrene exceedance in the shallow groundwater at CP27.
- On-site and off-site buildings and associated infrastructure – could potentially be at risk from ground gas migration, particularly via preferential pathways, aggressive ground / groundwater conditions and contaminants (such as hydrocarbons) with the potential to permeate through underground services, such as water supply pipes. The receptor is considered to be of low sensitivity.
- Plants and vegetation – primarily at risk from phytotoxic contaminants such as copper, nickel and zinc. The sensitivity to proposed on-site plants and vegetation is

considered to be low, due to the GIRs revealing no soil exceedances of the relevant GAC for these phytotoxic contaminants.

14.5.75. The sensitivity of identified receptors is summarised in **Table 14.13** below:

Table 14.13: Receptor Sensitivity

Receptor	Sensitivity
Future site users – commercial	Moderate
Construction / maintenance workers	Moderate
Off-site users – residential	High
Off-site users – commercial	Low
Controlled Waters – Secondary Aquifers	Moderate
Controlled Waters – Principal Aquifer	High
Controlled Waters – surface waters	Moderate
On-site and off-site buildings and infrastructure	Low
Plants and vegetation	Low

Risks to Human Health

14.5.76. The findings of the ground investigation and subsequent geo-environmental assessments at the EMG2 Works indicates no exceedances of the site specific criteria or commercial end use generic assessment criteria (GAC) with respect to human health. Aside from CP27 (where an 'iridescent sheen and moderate to strong hydrocarbon odour' was noted within the Made Ground), no visual or olfactory evidence of contamination was observed.

14.5.77. The Highways Work is considered to be of lowest sensitivity due to proposed end use. BWB PSSRs (**Appendix 14E** and **14F** – **Document DCO 6.14E** and **6.14F**) do not indicate any known sources of contamination.

14.5.78. Therefore, the overall risk to site end users from direct contact with contaminated soils associated with the DCO Application is considered to be low.

Risks to Drinking Water Supply Pipes

14.5.79. The findings of the ground investigation and geo-environmental assessment at the EMG2 Works recorded 2 No. exceedances of the UKWIR threshold for polyethylene pipe and 1 No. exceedance of the threshold for the polyvinyl chloride pipe. Although these exceedances were noted, the use of upgraded drinking water supply pipes at the EMG2 Works is not considered necessary (Paragraph 14.5.15) and therefore the overall risk is considered to be low. A WIR assessment may be required along the proposed drinking water pipe route to demonstrate material suitability, or the use of a barrier pipe may be considered to negate the need for further testing.

Risks to Controlled Waters

Groundwater

14.5.80. Within the EMG2 Works, the groundwater laboratory results were generally recorded as below the generic assessment criteria (UKDWS or WHO drinking water standards), with a small number of PAH exceedances noted within the northern and southern areas, recorded within the deeper groundwater. The PAH exceedances were noted to be localised within the deeper groundwater due to the fact that they were surrounded by non-detects. Greater PAH exceedances were recorded in the northern part of the EMG2 Works compared to the southern part. Due to the lack of PAH contamination within soil samples scheduled, it is considered that this PAH is likely to have leached into the groundwater from an off-site source. This, combined with the absence of groundwater abstraction points within a 1 km radius of the EMG2 Works, results in an overall low risk to groundwater.

14.5.81. The BWB PSSRs do not identify any known sources of contamination within the area of the Highway Works. Therefore, the contaminative risk, including the risk to groundwater, is considered low.

Surface Water

14.5.82. 2 No. surface water samples were obtained during the EMG2 Works ground investigation, and were scheduled for geo-environmental laboratory analysis. The results of such analysis revealed 1 No. marginal exceedance of Naphthalene within the downstream sample obtained from SW3 when compared to the relevant generic assessment criteria. This sample is not located within the EMG2 Works (some 380 m west). All naphthalene exceedances noted within the groundwater were recorded within the deeper groundwater body. Additional surface water sampling completed in 2024 (**Appendix 14D** – **Document DCO 6.14D**) involved the collection of a further 4 No. surface water samples and geo-environmental laboratory analysis. Naphthalene exceedances were not recorded within any of these surface water samples. Considering this, it is likely that the initial exceedance recorded was from an off-site source. Therefore, the overall risk to surface water at the EMG2 Works is considered to be low.

14.5.83. The PSSR for the highways works did not identify potential sources capable of presenting an unacceptable risk to surface waters and as such sampling and testing was not conducted. Risks from the Highway Works and proposed development are considered low.

Risks from Ground Gas

14.5.84. Based on the maximum flow rate and maximum concentrations recorded during the ground gas monitoring at the EMG2 Works, a gas screening value of 0.2025 l/hr was recorded at BH04, based on carbon dioxide concentrations. Review of this data indicates that the elevated flow was not representative of the overall EMG2 Works conditions, as it was only recorded on one occasion in one deep borehole. Also, soil organic matter was generally recorded as low and the Made Ground thicknesses encountered were generally less than 1.0 m (with the exception of CP27). Therefore, the EMG2 Works is considered representative of CS1 conditions, and thus, it is unlikely that a potentially complete contaminant linkage associated with ground gas exists at the EMG2 Works**.**

14.5.85. The BWB PSSRs for the Highway Works indicates the historical presence of landfills with possible ground gas generation potential. However, due to the distance, the recorded dates of closure and the absence of enclosed spaces where gas could affect a sensitive receptor, the risks associated with ground gas at the Highway Works is considered to be low.

Risks to Plants and Vegetation

14.5.86. The risks to the proposed soft landscaping at the EMG2 Works (for example, DCO Works No. 21 – Community Park – of the Components Plan **Document DCO 2.7)** from phytotoxic contaminants (copper, nickel, boron and zinc) is concluded as low, with a potentially complete contaminant linkage unlikely to exist.

Future Baseline Conditions

14.5.87. With the presumption that there is no future development on the land identified for the DCO Scheme or surrounding area that may introduce new sources of potential contaminants, it is expected that there would be no change in the current site baseline conditions at the time of preparing this ES Chapter. This, however, assumes that the risks from any additional potential contaminant sources are appropriately managed and mitigated adhering to the pertinent legislation.

Potential Impacts

14.5.88. This section provides an assessment of the proposed changes to the ground conditions throughout the development project, which are likely to generate effect.

14.5.89. **Chapter 1: Introduction (Document DCO 6.1)** of this ES explains the definitions associated with short term, medium term and long term duration of impacts. This is taken into consideration in the below sections. The construction phase is anticipated to be of short to medium term duration and the operational phase is considered to be of long term duration.

Embedded Mitigation

14.5.90. The assessment in this Chapter takes into account 'embedded' mitigation measures and standard construction practises, such that potential adverse impacts to ground conditions (resulting in baseline deviation) can be mitigated.

14.5.91. The following embedded mitigation measures of relevance to ground conditions will be implemented during the construction phase of the DCO Scheme:

- Managed cut and fill operations – Earthworks will be planned and phased to limit exposed surfaces and reduce erosion risk. The Cut and Fill Plan (**Figure 14M.5 – Document DCO 14M**) identifies an overall cut and fill deficit of 2,700 m^3, requiring the import of material for general fill. All imported material will be assessed on a case-by-case basis, considering engineering behaviour, performance requirements, and end use. Imported soils and recycled aggregates must be free from organics and contaminants, with chemical testing for contamination undertaken prior to import. Detailed geotechnical characterisation will confirm the suitability of all imported materials for their intended purpose.

- Good housekeeping practises – ensuring all developments comprising the DCO Application are kept clean and tidy and free of any debris;
- Any fuels, lubricants, solvents, chemicals etc. should be stored in appropriately bunded areas / with drip trays beneath and appropriate pollution prevention measures should be put in place and adhered to, including on site spill kits.
- Any hazardous materials which are to be stored across the DCO Scheme should be clearly labelled, segregated and stored in designated impermeable areas.

Construction Phase

14.5.92. The potential effects of construction at the DCO Scheme which may result in a change to the previously identified baseline conditions are listed below. Consideration of these effects with reference to the identified receptors is also discussed.

Removal of Topsoil and Shallow Soils

- The EMG2 Works will be subject to a cut and fill procedure to form a series of development platforms as shown within **Figure 14M.5 (Document DCO 6.14M**). EMG2 Works plateau level plans indicate the creation of several plateau levels across the site, ranging from 66.750 m AOD in the far south eastern area to 89.000 m AOD in the far north eastern area. This cut will include the stripping of site topsoil and shallow soils, thus disturbing the natural in-situ strata.

Alterations to Soil and Groundwater Quality

- Construction plant and associated activities may affect the site ground conditions through contaminant introduction or mobilisation via spillages or leakages, for example, from lubricants, oils, fuel and uncured concrete.

14.5.93. The below section considers the identified potential effects as part of the DCO Scheme during construction with reference to the site receptors.

- Construction / maintenance workers – The potential for contamination to be present on the DCO Scheme is considered to be low, and the likely duration of construction is considered short to medium. This, combined with the moderate sensitivity of construction / maintenance workers and the Negligible magnitude of impact results in an overall Negligible significance of effect. This does not consider any potential contamination which has not been identified to date at the site.

- Off-site users (Residential) – It is unlikely that there are any potentially complete human health contaminant linkages at the DCO Scheme and therefore the magnitude of impact is considered Negligible. Although off-site residential receptors are considered to be of high sensitivity, the distance of these receptors to the DCO Scheme (associated with the risk to human health from inhalation pathways) results in an overall Negligible significance.

- Off-site users – Commercial (East Midlands Airport, Lockington, Hemington)– It is unlikely that there are any potentially complete human health contaminant linkages

at the site and therefore the magnitude of impact is considered Negligible. This, combined with the low sensitivity of off-site commercial users, and the distances of the surrounding site users to the DCO Scheme (associated with the risk to human health from inhalation pathways), results in an overall Negligible significance.

- Controlled waters, surface waters – 1 No. Naphthalene exceedance was noted within a surface water sample (SW3) obtained from approximately 380 m west of the EMG2 Works. Provided all Naphthalene exceedances noted within the groundwater were recorded within the deeper groundwater body and that no exceedances were noted within the upstream sample of SW2, or within the supplementary surface water samples obtained within 2024, the magnitude of impact is likely to be Negligible**.** It is considered that the surface water exceedance is likely from an off-site source. This, combined with the moderate sensitivity of surface waters and the short to medium duration of the construction phase, results in a Negligible significance of effect.

- Controlled Waters – Principal Aquifer – The northern part of the Junction 24 improvement Highway Works is underlain by a Principal Aquifer supported by the Helsby Sandstone Formation, which is considered to be of high sensitivity. The Helsby Sandstone Formation is present in the centre of the site in an area of minimal highways amendments therefore associated risks to the Helsby Sandstone is low. Therefore, considering this, the effect of construction to groundwater within the Principal Aquifer is likely to be Negligible**.** It should be noted that Paragraph 3.2.31 of **Chapter 3: Project Description (Document DCO 6.3)** states that the development '*may include piled foundations for the bridge works as part of the J24 Improvements*'. If piled foundations are proposed a Foundation Works Risk Assessment (FWRA) will be required may be required with respect to the Principal Aquifer.

- Controlled waters, Secondary Aquifers – Considering the PAH exceedances within the deeper groundwater samples obtained from the EMG2 Works were noted to decrease in concentration from the northern extent to the southern extent, it is likely that the impact is not mobile (due to low permeability on site). Only 1 No. PAH exceedance was noted within the shallow groundwater (within the Made Ground of CP27), which is considered to be localised. Therefore, considering this, the moderate sensitivity of non-potable aquifers and the short to medium duration of the construction phase, the potential significance of effect of construction to groundwater is considered to be Negligible.

14.5.94. If any unforeseen contamination is encountered during the construction phase, requirement 22 of the draft DCO necessitates this to be investigated with a risk assessment approach and, if required, remediation to be undertaken in consultation with the Local Planning Authority.

Operational Phase

14.5.95. The DCO Scheme (apart from the Community Park) will include substantial areas of impermeable hardstanding, consisting of buildings, roads, staff amenity space and off and on plot pathways. Therefore, any potential effects to the previously discussed baseline

conditions which may have occurred during the construction phase should have been mitigated via a staged process ground investigation and risk assessment, with any necessary remedial measures required to have been implemented at the site prior to its operation.

14.5.96. There is not expected to be any considerable change to the levels (e.g. requiring substantial construction / breaking of ground) across the DCO Scheme during the operational phase, and the risk of soil and groundwater contamination through contaminant introduction or mobilisation via spillages or leakages from machinery is expected to be significantly decreased.

14.5.97. The potential effects of operation at the DCO Scheme are listed below:

- The introduction of EMG2 Works end users to the development, within the buildings and outdoor landscaped space. This may increase the likelihood of contact with potentially contaminated soils, groundwater, and/or surface waters through ingestion, dust inhalation and dermal contact. Albeit, the likelihood of a potentially complete contaminant pathway is considered to be low. The introduction of end users to the Highway Works is considered to be very low sensitivity due to the limited end users of maintenance workers and very occasional use of laybys by broken down vehicle users.
- The introduction of soft landscaped areas comprising plants and vegetation, at the EMG2 Works (particularly the Community Park – DCO Works No. 21 on Components Plan (**Document DCO 2.7**) which may result in the uptake of phytotoxic contaminants.
- The introduction of the buildings to the EMG2 Works, potentially resulting in ground gas accumulation and (worst case) asphyxiation.
- The risk to future building maintenance workers where breaking ground / excavations are required, increasing the likelihood of coming into contact with contaminated soils at the site.

14.5.98. The following section considers the identified potential effects as part of the DCO Scheme during operation with reference to the site receptors:

- Future site users / maintenance workers – the findings of the ground investigation and subsequent geo-environmental assessments for the EMG2 Works have concluded that a potentially complete contaminant linkage with reference to human health is unlikely. The BWB PSSRs for the Highway Works have not identified any potential sources of contamination. Therefore, the magnitude of impact is considered Negligible. The Negligible magnitude of impact combined with the moderate sensitivity of future commercial users results in what is considered to be of Negligible significance.

- Off-site users – considering the low potential for contamination across the DCO Scheme and the limited dust generation potential, the magnitude of impact is considered Negligible. This, combined with low / high (off-site commercial users / residential users) sensitivity of users, with the consideration to pathway distance, results in what is considered to be of Negligible significance.

- Controlled waters – it is considered that the overall risk to groundwater and surrounding surface waters at the site will not change following the proposed development of the DCO Scheme, and therefore the magnitude of impact is considered Negligible. This, combined with the moderate / low sensitivity of controlled waters, relating to non-potable water aquifers and surface waters, respectively, results in an overall Negligible significance.

Mitigation Measures

14.5.99. This section of the ground conditions chapter also considers the additional mitigation measures (in addition to the embedded mitigation measures presented within Paragraph 14.5.88) of the DCO Scheme. These additional measures are discussed within the Construction Environmental Management Plan (CEMP) (**Document DCO 6.3A**) which has been prepared and submitted as part of the DCO Application to manage the environmental impacts during the construction phase. Phase specific construction environmental management plans (P-CEMP) will be drafted in accordance with the principles set out in the CEMP submitted as per draft DCO Requirement 11.

14.5.100. The CEMP includes pollution prevention measures to minimize the risk of any contamination reaching the identified receptors. The additional mitigation measures, relevant to ground conditions, are listed below:

- Where pre-existing contamination has been found to exist, Contractors will be required in accordance with draft Requirement 22, to undertake remediation measures identified in the geo-environmental assessment, investigations and reports in a suitable and acceptable manor at such time as is appropriate. These measures must be agreed with the Environment Agency before any measures are implemented and verification reports shall be prepared and issued to the EA on completion of the remediation.
- A UXO/UXB risk assessment will be undertaken before any intrusive works are undertaken.
- In the event that suspected contaminated material is uncovered during the works, an appropriate area will be protected and all works will be suspended and a suitably qualified person shall be engaged to investigate and develop a suitable strategy for dealing with any contaminated material.
- The Contractor shall plan and execute their work to ensure that hazardous or polluting substances do not cause harm to underlying aquifers, surface water systems, landscaping and associated ecology.
- At the commencement of any component of earthworks, the necessary permanent drainage basins for that component will be constructed and outfalls into the existing water courses will be provided, in accordance with **Chapter 13: Flood Risk and Drainage** (**Document DCO 6.13**), the surface water drainage scheme agreed pursuant to draft Requirement 17 and any approvals required under DCO Article 19.
- Additional settlement and control ponds will be provided as necessary during a component to prevent pollution entering the existing watercourses.

- Contractors shall adopt water pollution prevention procedures in line with good practise and shall include water pollution prevention in all site inductions, including tool box talks. The Silt Management Plan, which is appended onto the CEMP (**Document DCO 6.3A**) should be adhered to at all times throughout the construction phase to reduce the likelihood of silt laden run off.
- All incidents involving water pollution shall immediately be reported to the Project Manager.

Construction Phase

14.5.101. Based on the intrusive information and risk assessments, the following mitigation measures in the construction phase include:

- General construction phase mitigation, to mitigate the potential exposure to construction workers during the progression of the development, including the development of and adherence to a site health and safety plan, pre-approved RAMS, personal hygiene and welfare, correct PPE/RPE, decontamination measures if necessary, the safe and recorded storage of fuels/oils and any other potentially contaminative liquids, and regular cleaning of all site roads. These measures are detailed within the Construction Environmental Management Plan (CEMP) prepared for the DCO Application, provided as **Document DCO 6.3A**. Phase specific construction environmental management plan(s) (P-CEMP) will be drafted in accordance with the principles set out in the CEMP and submitted as per draft DCO Requirement 11**;**
- The CEMP also includes a Silt Management Plan which is intended to limit the volume of potential silt laden run-off throughout the Earthworks. This includes the management of machinery and material movement (e.g. designated machine and dumper tracking routes), control of stockpiled materials (e.g. maximum height of 2.0 m, stockpiles must be sufficiently compacted and should be temporarily covered with the use of a seal), the use of temporary plot drainage (temporary settling basins with silt management deployment techniques) and the completion of monitoring procedures and records;
- Managed and controlled cut and fill operations, ensuring a planned and phased approach to limit exposed surfaces and reduce erosion risk; and
- Selection of appropriate materials for buried water supply pipes.

14.5.102. The potential effects on construction and maintenance workers during the construction phase of the DCO Scheme will be mitigated by appropriate protective site practices, such as dust suppression, safe storage of potential contamination, and the correct utilisation of appropriate PPE / RPE, which is deemed to be suitable. **Table 14.13** identifies the sensitivity of construction and maintenance workers as moderate. Assuming appropriate mitigation, the impact magnitude is Negligible (approximating to a 'no change' situation), with an associated Negligible significance of the effect.

14.5.103. Should unexpected contamination be encountered during the construction phase, the works in the area are expected to stop and the Local Authority and appointed geo-environmental consultant should be contacted, in accordance with draft DCO Requirement 22

(contamination risk). The contamination should be sampled, tested and risk assessed and, if required, a remediation strategy should be agreed, implemented and verified. This, therefore should mitigate the potential effects to future site commercial users, who are of low to moderate sensitivity, as well as the proposed hardstanding.

14.5.104. Soils that are to be potentially re-used on site are to be tested for geo-environmental and geotechnical suitability prior to re-use.

14.5.105. The Made Ground may be re-used as part of the earthworks, subject to appropriate sorting, segregation and classification testing and controlled placement in accordance with the earthworks specification, which should be prepared once design is finalised.

14.5.106. Any soils which are to be imported would also be required to have certification of their chemical concentrations to ensure that the imported soils are not introducing additional contaminants. This may be confirmed by soil chemical testing by the contractor and the associated earthworks to be controlled by engineering site specific specification.

14.5.107. Due to the shallow groundwater levels recorded during the groundwater monitoring rounds at the EMG2 Works and Highway Works (the latter presented within the Factual BWB PSSRs), appropriate dewatering measures should be considered throughout the construction phase. Dewatering measures should be put through the temporary drainage system as outlined within the CEMP (**Document DCO 6.3A**).

14.5.108. The above mitigation measures will also mitigate the potential effects to off-site users (both residential and commercial), who may potentially be exposed to wind-blown dust during the construction phase. The effects on the high sensitivity off site residential users will be mitigated to negligible, provided the implementation of appropriate mitigation measures, such as dust suppression.

Operational Phase

14.5.109. Mitigation measures during the operational phase of the DCO Scheme should focus on ongoing pollution prevention and site stability.

14.5.110. This is to include the following:

- Good housekeeping practises – ensuring all developments comprising the DCO Application are kept clean and tidy and free of any debris;
- Any fuels, lubricants, solvents, chemicals etc. should be stored in appropriately bunded areas / with drip trays beneath and appropriate pollution prevention measures should be put in place and adhered to, including on site spill kits.
- Any hazardous materials which are to be stored across the DCO Scheme should be clearly labelled, segregated and stored in designated impermeable areas.

14.5.111. Where there is any evidence of damage / degradation to the hardstanding surfaces across the DCO Scheme, the damage should be repaired and reinstated promptly and as necessary.

Residual Effects

14.5.112. Residual effects are those that would remain after the implementation of the proposed mitigation measures. Each identified impact has been assessed within this Chapter including the associated mitigation and therefore, the residual effects of the DCO Scheme are presented within Paragraphs 14.5.90 and 14.5.95. It is considered that all residual effects will be negligible and therefore not significant. These effects are presented at the end of this Chapter within **Table 14.16**.

14.6. Assessment of MCO Application

14.6.1. As set out in Section 1 of this Chapter, and at **Table 14.1,** the MCO Scheme comprises of the EMG1 Works which in summary provide for additional warehousing development within Plot 16 of the EMG1 site together with works to increase the permitted height of the cranes at the EMG1 rail-freight terminal, improvements to the public transport interchange, site management building and the EMG1 Pedestrian Crossing.

Baseline Conditions

14.6.2. The findings of the RSK Environment Ltd ground investigation completed within the MCO Scheme and wider area between September 2013 and October 2013 have been reviewed to inform the baseline conditions (**Appendix 14I:Factual Report and 14J:Interpretative Report – Documents MCO 6.14I and 6.14J**). It is acknowledged that these assessments were conducted in support of the previous EIA for EMG1. It is also acknowledged that various key guidance (LCRM, BS10175, BS5930) have undergone iterations of updates, however the core principles of the guidance remains consistent and given the site of the MCO Scheme have not been altered since the assessments, they are considered current and relevant.

14.6.3. The RSK intrusive investigation in relation to the wider EMG1 Scheme comprised:

- 19 No. cable percussive boreholes;
- 27No. trial pits, with the completion of 6No. soakaway tests in general accordance to BRE365;
- 6No. rotary cored boreholes; and
- Installation of 25No. combined groundwater/gas monitoring wells and piezometers to varying depths to facilitate 4No. subsequent groundwater levels/ gas monitoring visits.

14.6.4. The following RSK exploratory hole locations are located within the MCO Scheme and within the close vicinity, and thus have informed the assessment of baseline conditions pertaining to the MCO Application. This includes the development area of Plot 16:

- TP(S)304, TP(S)305, TP309, TP310, TP311, TP312, TP313, TP314, TP(S)352, TP(S)351; and
- CP219, CP220, CP221 and CP222

14.6.5. The corresponding exploratory hole logs located within the MCO Scheme and within close vicinity indicate ground conditions to comprise:

- Topsoil / Subsoil (from surface to depths of between 0.25 m bgl and 0.45 m bgl);
- Made Ground (from surface to a depth of 0.30 m bgl), encountered locally within CP222 located within the northernmost part of the proposed open land/landscaping area of the site;

- Egginton Common Sand and Gravel Member (encountered directly beneath the Topsoil / Subsoil extending to a depths of 2.50 m bgl to 4.60 m bgl) at CP2221 and TP310 located within the north eastern part of the proposed open land/landscaping area of the site;
- Head Deposits (encountered directly beneath the Topsoil / Subsoil extending to depths of between 0.45 m bgl and 1.80 m bgl)| at CP220, TP(S)304, TP309, TP313 and TP314 located within the south western part of the site;
- Thrussington Member (encountered directly beneath the Topsoil extending to depths of 1.80 m bgl) at CP219 located within Plot 16;
- Wanlip Member (encountered directly beneath the Topsoil / Subsoil / Made Ground and extending to depths of between 255 m bgl and 3.40 m bgl) at CP22, TP(S)305, TP(S)351 and TP(S)352 located within the north eastern part of the site;
- Taporley Siltstone Formation (encountered directly beneath Head Deposits / Subsoil / Thrussington member extending to depths of between 2.30 m bgl and 2.80 m bgl) at CP219, TP309, TP313 and TP314 located within Plot 16 and the southern part of the site.
- Edwalton Member (encountered directly beneath Head Deposits / Wanlip Member / Egginton Common Sand and Gravel Member / Taporley Siltstone Formation, extending to depths of between 2.50 m bgl and 10.50 m bgl) at CP220, CP221, CP222, CP219, TP(S)304, and TP311 located within Plot 16 and the northern part of the site; and,
- Arden Sandstone Formation (encountered directly beneath the Edwalton Member extending to 10.94 m bgl) at CP221 only, located to the immediate north west of the site.

14.6.6. No visual or olfactory evidence of soil or groundwater contamination was recorded during the site investigation.

14.6.7. Groundwater strikes were recorded within TP(S)351 at a depth of 2.35 m bgl (36.19 m AOD) within the granular horizons of the Wanlip Member, and within CP221 and CP222 at depths of 9.65 m bgl (32.01 m AOD) and 6.40 m bgl (30.65 m AOD), respectively, within the Edwalton Member.

14.6.8. Four rounds of subsequent groundwater monitoring were completed by RSK on separate occasions over a five week period, between the 16th October 2013 and 11th November 2013 (including one round of groundwater sampling). The results of the groundwater monitoring at CP219 to CP222 indicate a groundwater level of between 2.08 m bgl (41.54 m AOD) at CP220 and 7.34 m bgl (47.12 m AOD) at CP219 within the Edwalton Member.

14.6.9. **Table 14.14** below summarises the geo-environmental soil and groundwater laboratory tests which have been completed across the entirety of the site, including the exploratory positions listed within Paragraph 14.6.4.

Table 14.14: Geo-Environmental Testing: EMG1 Works – MCO Application

Geo-Environmental Test	Number of Soil Tests	Number of Groundwater Tests
pH, Arsenic, Cadmium, Copper, Chromium, Chromium (hexavalent), Lead, Mercury, Nickel, Selenium, Zinc	10 (4 No. SS, 1 No. MG, 1 No. HD, 1 No. ECSG, 1 No. WM, 3 No. TSF)	-
pH, Redox potential, Electrical conductivity, dissolved oxygen, hardness, ammoniacal nitrogen, Phenols, Arsenic, Cadmium, Copper, Chromium, Chromium (hexavalent), Lead, Mercury, Nickel, Selenium, Zinc	-	7
Total Organic Carbon (TOC)	8 (1 No SS, 1 No. MG, 1 No. HD, 1 No. ECSG, 1 No. WM, 3 No. TSF)	-
Polycyclic Aromatic Hydrocarbons (PAH) – Speciated (EPA 16)	11 (4 No. SS, 1 No. MG, 1 No. HD, 1 No. ECSG, 1 No. WM, 3 No. TSF)	7
Semi Volatile Organic Compounds (SVOCs) and Volatile Organic Compounds (VOCs)	-	7
Total Petroleum Hydrocarbons Criteria Working Group (TPH CWG) + BTEX and MTBE	11 (4 No. SS, 1 No. MG, 1 No. HD, 1 No. ECSG, 1 No. WM, 3 No. TSF)	7
Triazine Herbicides	4 (4 No. SS)	-
Pesticides	4 (4 No. SS)	-
Asbestos Screen (with quantification, if required)	3 (2 No. SS, 1 No. HD)	-
Notes : **SS:** Subsoil, **MG:** Made Ground, **HD:** Head Deposits**, ECSG:** Egginton Common Sand and Gravel**, WM:** Wanlip Member**, TSF:** Tarporley Siltstone Formation		

Risks to Human Health

14.6.10. The laboratory soil chemical results pertaining to the site have been compared directly to the appropriate GAC for each contaminant, based upon a conservative Soil Organic Matter (SOM) of 1%.

14.6.11. Results indicate that all concentrations of contaminants analysed were below the commercial end use assessment criteria and therefore the overall risks to future end users is considered low.

14.6.12. Additionally, no visual evidence of Asbestos Containing Material (ACM) was noted during the investigation, and ACM was not identified in any of the 3 No. soil samples submitted to the laboratory for asbestos screening.

14.6.13. Soil concentrations recorded across the sitewere also compared against UKWIR "*Guidance for the selection of Water Supply Pipes to be used in Brownfield Sites (Ref. 10/WM/03/21*". Results of the assessment indicate a relevant linkage is unlikely to exist associated with organic contaminants and therefore Polyethylene (PE) and/or Polyvinyl Chloride (PVC) water supply pipes are expected to be suitable for use.

Risks to Controlled Waters

14.6.14. Seven groundwater samples obtained from the groundwater monitoring rounds completed were submitted to the laboratory for the geo-environmental testing listed within **Table 14.14**.

14.6.15. The chemical results from the groundwater laboratory tests were assessed against the UK Drinking Water Standards and Freshwater Environmental Quality Standards (EQS), or where unavailable, the World Health Organization Drinking Water Standards to assess the risk to the wider Secondary Aquifer body.

14.6.16. The assessment concluded that, for the groundwater samples obtained from the site, the analytical results are below the relevant GAC.

14.6.17. One sample (CP210) located outside of the site, to the immediate north of East Midlands Airport, returned a phenol concentration of 0.05 mg/l, which exceeds the Freshwater EQS of 0.03 mg/l. This was not reflected within the samples obtained from the site.

Ground Gas

14.6.18. Four rounds of ground gas monitoring were also completed by RSK Environment Ltd over the period of five weeks, from 16th October 2013 to 11th November 2013. Assessment of the screening results, in accordance with BS8485:2015+A1:2019, classifies the whole of MCO Scheme as a Characteristic Situation (CS) 2 - Low Risk. Therefore, in accordance with Table 4 of the aforementioned British Standard reference, a gas resistant membrane is recommended.

Key Receptors

14.6.19. Sensitive receptors to be considered within the MCO Scheme in relation to Ground Conditions and Contamination assessment include the below:

- Future site users – Commercial users in the form of on-site staff, visitors and occasional building maintenance workers. These users may be exposed via direct contact, ingestion and / or inhalation of contaminated soils (in the presence of soft landscaping), ingress of contaminants into conduits contaminating drinking water supply pipes, and the inhalation of accumulated soil ground gas or vapours. Future site users are considered to be of moderate sensitivity, due to the anticipated length time they are likely to spend at the MCO Scheme and due to the proposed well-ventilated nature of the Type D Buildings.
- Construction / maintenance workers – These receptors may be exposed to potential contamination within soils and groundwater during the ground works for the proposed development. Construction workers are considered to be of moderate sensitivity, although this is thought to be reduced to moderate/ low sensitivity due to the assumption that health and safety risk assessment and mitigation including basic hygiene and the correct use of personal protective equipment (PPE) / respiratory protective equipment (RPE) will be applied by all competent contractors.
- Off-site users (East Midlands Airport, Lockington, Hemington, Castle Donington and Public) – Potential contamination exposure to surrounding off-site users. Much of the surrounding land is either occupied by commercial land use, or vacant land, associated with low sensitivity.
- Off-site users (residential) – High sensitivity residential receptors are located within Lockington and Kegworth.
- Controlled Waters, Aquifers – EA designated aquifers identified to be present beneath the MCO Scheme, including Secondary A and B Aquifers supported by superficial deposits and unproductive stratum associated with bedrock deposits. No part of the MCO Scheme is located within an Environment Agency designated Source Protection Zone (SPZ).
- Controlled waters, surface water – unnamed watercourse flowing through Lockington, approximately 725 m west of the existing A453 and an unnamed tributary of the River Soar, located approximately 565 m north east of the MCO Scheme MCO Works Nos. 3A, 5A & 6A boundary (Components Plan **Document MCO 2.7).**
- On-site and off-site buildings and associated infrastructure – could potentially be at risk from ground gas migration, particularly via preferential pathways, aggressive ground / groundwater conditions and contaminants (such as hydrocarbons) with the potential to permeate through underground services, such as water supply pipes. The receptor is considered to be of low sensitivity.
- Plants and vegetation – primarily at risk from phytotoxic contaminants such as copper, nickel and zinc. The sensitivity to proposed on-site plants and vegetation is considered to be low, due to the GIRs revealing no soil exceedances of the relevant GAC for these phytotoxic contaminants.

14.6.20. The sensitivity of identified receptors is summarised in **Table 14.15** below:

Table 14.15: Receptor Sensitivity

Receptor	Sensitivity
Future site users – commercial	Moderate
Construction / maintenance workers	Moderate
Off-site users – residential	High
Off-site users – commercial	Low
Controlled Waters – Secondary Aquifers	Moderate
Controlled Waters – surface waters	Moderate
On-site and off-site buildings and infrastructure	Low
Plants and vegetation	Low

Risks to Human Health

14.6.21. The findings of the ground investigation and subsequent geo-environmental assessments at the MCO Scheme indicates no exceedances of the site specific criteria or commercial / industrial generic assessment criteria (GAC) with respect to human health. Therefore, the overall risk to human health from direct contact with contaminated soils associated with the MCO Scheme is considered to be low.

Risks to Drinking Water Supply Pipes

14.6.22. The findings of the ground investigation and geo-environmental assessment for the MCO Scheme concludes that all soil chemical results are below the UKWIR guidance, and therefore a relevant contaminant linkage is unlikely to exist associated with organic contaminants permeating drinking water supply pipes, corresponding to a low risk.

14.6.23. For the proposed development of the MCO Scheme, the local water company should be contacted to agree the chosen pipe material suitability, across all three components, where necessary.

Risks to Controlled Waters

Groundwater

14.6.24. The findings of the geo-environmental assessment pertaining to the MCO Scheme indicated that the groundwater laboratory results are generally below the controlled waters generic assessment criteria (UK DWS / EQS, or best equivalent). One exceedance of the freshwater EQS was noted for phenols (CP210), however this is located outside of the MCO Scheme and there is no source of phenols on site. Therefore, the overall risk to groundwater associated with the MCO Application is considered to be low.

Surface Water

14.6.25. Surface water sampling was not completed as part of the MCO Scheme ground investigation. However, considering that no significant Made Ground or contamination was encountered, it can be concluded that the potential risks to surface waters associated with the MCO Application are low.

Risks from Ground Gas

14.6.26. Based on the maximum flow rate and maximum concentrations recorded during the RSK Environment Ltd ground gas monitoring at the MCO Scheme, gas screening values of 0.0l/hr were concluded for methane and 0.10l/hr for carbon dioxide. In accordance with BS8485:2015+A1:2019, these GSVs correspond to CS2 conditions. Table 4 of the aforementioned British Standard recommends that a gas resistant membrane is utilised in the development.

Risks to Plants and Vegetation

14.6.27. The risks to the proposed soft landscaping at the MCO Scheme (for example, MCO Works Nos. 3A, 5A & 6A – EMG1 Works - of the Components Plan **Document MCO 2.7)** from phytotoxic contaminants (copper, nickel, boron and zinc) is concluded as low, with a potentially complete contaminant linkage unlikely to exist.

Future Baseline Conditions

14.6.28. With the presumption that there is no future development on the land identified for the MCO Scheme or surrounding area that may introduce new sources of potential contaminants, it is expected that there would be no change in the current site baseline conditions at the time of preparing this ES Chapter. This, however, assumes that the risks from any additional potential contaminant sources are appropriately managed and mitigated adhering to the pertinent legislation.

Potential Impacts

14.6.29. This section provides an assessment of the proposed changes to the ground conditions throughout the development project, which are likely to generate effect.

14.6.30. **Chapter 1: Introduction (Document MCO 6.1)** of this ES explains the definitions associated with short term, medium term and long term duration of impacts. This is taken into consideration in the below sections. The construction phase is anticipated to be of short to medium term duration and the operational phase is considered to be of long term duration.

Embedded Mitigation

14.6.31. The following embedded mitigation measures of relevance to ground conditions will be implemented during the construction phase of the MCO Scheme:

- Managed cut and fill operations for Plot 16 – Earthworks will be planned and phased to limit exposed surfaces and reduce erosion risk (**Figure 14M.8 – Document MCO**

14M). Any imported material will be assessed on a case by case basis, considering engineering behaviour, performance requirements, and end use. Imported soils and recycled aggregates must be free from organics and contaminants, with chemical testing for contamination undertaken prior to import. Detailed geotechnical consideration will confirm the suitability of all imported materials for their intended purpose.

- Good housekeeping practises – ensuring all developments comprising the MCO Application are kept clean and tidy and free of any debris;
- Any fuels, lubricants, solvents, chemicals etc. should be stored in appropriately bunded areas / with drip trays beneath and appropriate pollution prevention measures should be put in place and adhered to, including on site spill kits.
- Any hazardous materials which are to be stored across the MCO Scheme should be clearly labelled, segregated and stored in designated impermeable areas.

Construction Phase

14.6.32. The potential effects of construction at the MCO Scheme which may result in change to the previously identified baseline conditions are broadly similar to those listed above:

Removal of Topsoil and Shallow Soils

- It is anticipated that earthworks will be required to form the required levels across the MCO Scheme. Therefore, it is assumed that there will be a topsoil strip, and potentially shallow soil excavation, to facilitate the development, thus disturbing the natural strata.

Alterations to Soil and Groundwater Quality

- Construction plants and associated activities may affect the site ground conditions through contaminant introduction or mobilisation via spillages or leakages, for example, from lubricants, oils, fuel and uncured concrete.

14.6.33. The below section considers the identified potential effects during construction with reference to the MCO Scheme receptors.

- Construction / maintenance workers – The potential for contamination to be present on the MCO Scheme is considered to be low, and the likely duration of construction is considered short to medium. This, combined with the moderate sensitivity of construction / maintenance workers and the Negligible magnitude of impact results in an overall Negligible significance of effect. This does not consider any potential contamination which has not been identified to date at the site.
- Off-site users – Commercial (East Midlands Airport, Lockington, Hemington) – It is unlikely that there are any potentially complete human health contaminant linkages at the site and therefore the magnitude of impact is considered Negligible. Although the commercial off site users are located within a closer distance to the MCO Scheme, the low sensitivity of the receptor (associated with the risk to human health

from inhalation pathways throughout construction) results in an overall Negligible significance.

- Controlled Waters, Aquifers – The geo-environmental laboratory results pertaining to the groundwater samples obtained from the MCO Scheme during the ground investigation did not reveal any exceedances of the relevant generic assessment criteria (DWS and EQS). One sample (CP210) returned a minor exceedance of the freshwater EQS threshold associated with phenol concentration. However, this sample was obtained from an exploratory hole location which is located outside of the MCO Scheme and there are no known sources of phenols on site. Therefore, considering this, the moderate sensitivity of the non-potable aquifers underlying the MCO Scheme and the short to medium duration of the construction phase, the potential significance of the effect of construction to groundwater is considered to be Negligible.

14.6.34. Similar to the position noted within Paragraph 14.5.91 above, if any significant contamination is encountered during the construction phase, Requirement 24 of the EMG1 DCO necessitates this to be investigated with a risk assessment approach and, if required, remediation to be undertaken in consultation with the Local Planning Authority.

Operational Phase

14.6.35. The majority of the MCO Scheme (apart from the proposed area of open land / landscaping surrounding the warehouse at Plot 16) will be covered with impermeable hardstanding, including the warehouse space, car parking, service yards, amenity buildings, roads, paths utility and infrastructure. Therefore, any potential effects to the previously established baseline conditions which may have occurred during the construction phase should have been mitigated via a staged process ground investigation and risk assessment, with any necessary remedial measures required to have been implemented at the site prior to its operation.

14.6.36. There is not expected to be any considerable change to the levels (e.g. requiring substantial construction / breaking of ground) across the MCO Scheme during the operational phase, and the risk of soil and groundwater contamination through contaminant introduction or mobilisation via spillages or leakages from machinery is expected to be significantly decreased.

14.6.37. The potential effects of operation at the MCO Scheme are listed below:

- Introduction of end users to the development, within the indoor warehouse area and outdoor landscaped space pertaining to Plot 16. This may increase the likelihood of a human health linkage with potentially contaminated soils, groundwater and / or surface waters through dermal contact, ingestion and dust inhalation. However, this is considered Negligible at this stage, due to fact that the ground investigation did not reveal any significant contamination. The introduction of site end users to the remaining areas of the MCO Scheme (including increasing the permitted height of cranes at the rail-freight terminal, improvements to public transport interchange and site management building) is considered to be of lower sensitivity due to the limited anticipated impact on ground conditions.

- The introduction of soft landscaped areas comprising plants and vegetation surrounding Plot 16, which may result in the uptake of phytotoxic contaminants.
- The introduction of the warehouse building to Plot 16, potentially resulting in ground gas accumulation and (worse case) asphyxiation;
- The risk to future building maintenance workers where breaking ground / excavations are required, increasing the likelihood of coming into contact with contaminated soils at the site.

14.6.38. The following section considers the identified potential effects as part of the MCO Application operation with reference to the site receptors:

- Future site users / maintenance workers – the findings of the ground investigation and subsequent geo-environmental assessments for the MCO Scheme concluded that a potentially complete contaminant linkage with reference to human health is unlikely. The ground gas monitoring completed as part of the ground investigation concluded Characteristic Situation (CS) 2, as defined in BS8485, requiring a gas resistant membrane within the warehouse area of Plot 16. Provided the remediation measures are confirmed and implemented, the magnitude of impact is considered Negligible. The Negligible magnitude of impact combined with the moderate sensitivity of future commercial site users results in Negligible significance.
- Off-site users – considering the low potential for contamination across the MCO Scheme**,** the magnitude of impact is considered to be Negligible. This, combined with the low (off site commercial users) to high (off site residential users) sensitivity of users, with the consideration of pathway distance, is considered to be of Negligible significance.
- Controlled waters – it is considered that the overall risk to groundwater and surrounding surface waters will not change following development or throughout the operational phase of the MCO Scheme and therefore the magnitude is considered to be Negligible. This, combined with the moderate sensitivity of controlled waters relating to non-potable aquifers (Secondary A, Secondary B, Undifferentiated) beneath the MCO Scheme, results in an overall Negligible significance.

Mitigation Measures

14.6.39. This section considers the additional mitigation measures (in addition to the embedded mitigation measures presented within Paragraph 14.6.31) for the MCO Scheme. These additional measures will comprise those which are listed within the Construction Management Framework Plan that was previously approved in accordance with Requirement 11 of the EMG1 DCO.

Construction Phase

14.6.40. The construction phase mitigation measures outlined above (Paragraphs 14.5.97 to 14.5.104) also apply to the MCO Application. Albeit the additional mitigation measures for the MCO Scheme will arise from the CEMP for the development of Plot 16 to be approved pursuant to Regulation 11 of the EMG1 DCO and will accord with the Construction Management Framework Plan that has already been approved.

14.6.41. Dewatering measures should also be considered throughout the construction phase of the MCO Scheme, due to the shallow groundwater levels recorded within the ground investigation.

Operational Phase

14.6.42. Mitigation measures during the operational phase of the MCO Scheme should focus on ongoing pollution prevention and site stability.

14.6.43. This is to include the following:

- Good housekeeping practises – ensuring all developments comprising the MCO Scheme are kept clean and tidy and free of any debris;
- Any fuels, lubricants, solvents, chemicals etc. should be stored in appropriately bunded areas / with drip trays beneath and appropriate pollution prevention measures should be put in place and adhered to, including on site spill kits.
- Any hazardous materials which are to be stored across the MCO Scheme should be clearly labelled, segregated and stored in designated impermeable areas.

14.6.44. Where there is any evidence of damage / degradation to the hardstanding surfaces across the MCO Scheme, the damage should be repaired and reinstated promptly and as necessary.

Residual Effects

14.6.45. Residual effects are those that would remain after the implementation of the proposed mitigation measures. Each identified impact has been assessed within this Chapter including the associated mitigation and therefore, the residual effects of the MCO Scheme are presented within Paragraphs 14.6.33 and 14.6.37. It is considered that all residual effects will be negligible and therefore not significant. These effects are presented at the end of this Chapter within **Table 14.16**.

14.7. Assessment of EMG2 Project

14.7.1. As set out in Section 1 of this Chapter, and at **Table 14.1,** the EMG2 Project as a whole is the combination of the DCO Scheme and the MCO Scheme which have been assessed in Sections 14.5 and 14.6 of this Chapter.

Baseline Conditions

14.7.2. The baseline conditions for the EMG2 Project as a whole have been described at Section 14.5 in respect of the DCO Scheme and at Section 14.6 for the MCO Scheme.

Potential Impacts

14.7.3. The potential effects of the DCO and MCO Applications have been assessed in the preceding sections and are set out in **Table 14.16** attached at the end of this Chapter. The combination of the EMG2 Project is considered to have no greater effect than the associated components, given the effects are negligible (DCO Scheme and MCO Scheme) individually.

Mitigation Measures

14.7.4. A number of embedded and additional mitigation measures will be applied during the construction and operational phases of the two applications as set out at Paragraphs 14.5.87 and 14.5.96 (DCO Scheme – embedded and additional mitigation, respectively) and 14.6.31 and 14.6.39 (MCO Scheme – embedded and additional mitigation, respectively).

Residual Effects

14.7.5. Residual effects are those that would remain after the implementation of the proposed mitigation measures. Each identified impact has been assessed within this Chapter including the associated mitigation and therefore, the residual effects are presented within Paragraphs 14.5.90 and 14.5.95 (construction and operational effects – DCO Application) and Paragraphs 14.6.33 and 14.6.37 (construction and operational effects – MCO Application). It is considered that all residual effects will be negligible and therefore not significant. These effects are presented at the end of this Chapter within **Table 14.16**.

14.8. Cumulative Effects

Intra Project Effects

14.8.1. The effects of climate change on ground conditions should be considered, predominantly through alterations in rainfall patterns and an increase in temperature. These, in turn, are likely to result in a variety of effects to groundwater, including the shortening of the groundwater recharge season, increased groundwater flooding (in areas of adequate infiltration) and potential long term declines in groundwater storage. **Chapter 19: Climate Change (Document DCO 6.19/MCO 6.19)** includes a more detailed assessment of the impact of climate change on the EMG2 Project. Furthermore, the local groundwater bodies and the EMG2 Project's potential impact on their Water Framework Directive (WFD) status are discussed within **Chapter 13: Flood Risk and Drainage** (**Document DCO 6.13/MCO 6.13**).

Inter Project Effects

14.8.2. Inter-Project Effects are the interactions between all of the different developments (past and present) within the same area, which individually may not be significant, but when considered together could create a significant cumulative effect on a shared receptor.

14.8.3. **Chapter 21: Cumulative Effects (Document DCO 6.21/MCO 6.21)** sets out the methodology and scope of the cumulative assessment and outlines a Zone of Influence for each of the environmental aspects identified, considering the ground conditions across the EMG2 Project which have been identified in this Chapter.

14.8.4. The inter-project effects have been assessed based on methodology outlined in PINS Advice Note 17 in the aforementioned Chapter. Paragraph 21.4.3 of the Chapter considers a total of 12 sites in relation to inter-project effects (**Document DCO 21A/MCO 6.21A**).

14.8.5. It is assumed that similar mitigation measures will be incorporated and adhered to for these developments, in accordance to best practise and legislation. Therefore, the inter-project effects of such surrounding site developments are considered unlikely to effect the ground conditions across the EMG2 Project**.**

14.9. Summary of Effects and Conclusions

14.9.1. To summarise, neither the DCO Scheme or MCO Scheme or the EMG2 Project as a whole, is anticipated to have any significant adverse effects upon ground conditions provided there are appropriate mitigation measures in place.

14.9.2. The baseline conditions at the DCO Scheme and MCO Scheme have been informed through desk based and intrusive investigation findings, which in turn have informed the appropriate recommended mitigation measures throughout the construction and operational phases.

14.9.3. The mitigation measures to be completed during the construction phase of the DCO Scheme include:

- General construction phase mitigation, to mitigate the potential exposure to construction workers during the progression of the development, including the development of and adherence to a site health and safety plan, pre-approved RAMS, personal hygiene and welfare, correct PPE/RPE, decontamination measures if necessary, the safe and recorded storage of fuels/oils and any other potentially contaminative liquids, and regular cleaning of all site roads. These measures are detailed within the Construction Environmental Management Plan (CEMP) prepared for the DCO Application (Document DCO 6.3A).
- Mitigation measures presented within the CEMP and submitted as part of the DCO Application, intend to limit the volume of potential silt laden run-off throughout the Earthworks. This includes the management of machinery and material movement (e.g. designated machine and dumper tracking routes), control of stockpiled materials (e.g. maximum height of 2.0 m, stockpiles must be sufficiently compacted and should be temporarily covered with the use of a seal), the use of temporary plot drainage (temporary settling basins with silt management deployment techniques) and the completion of monitoring procedures and records.
- Managed cut and fill operations, ensuring earthworks are planned and phased throughout to limit exposed surfaces and reduce erosion risk.
- Selection of appropriate materials for buried water supply pipes.
- Due to the shallow groundwater levels recorded during the groundwater monitoring rounds at the EMG2 Works and Highway Works (the latter presented within the Factual BWB PSSRs), appropriate dewatering measures should be considered throughout the construction phase. Dewatering measures should be put through the temporary drainage system as outlined within the CEMP.
- Soils that are to be potentially re-used on site are to be tested for geo-environmental and geotechnical suitability, comprising part of the site materials and waste management plan submitted as part of this application (as per **Chapter 18: Materials and Waste, Document DCO 6.18**).
- The Made Ground may be re-used as part of the earthworks, subject to appropriate sorting, segregation and classification testing and controlled placement in accordance with the earthworks specification, which should be prepared once design is finalised.

- Any soils which are to be imported would also be required to have certification of their chemical concentrations to ensure that the imported soils are not introducing additional contaminants. This may be confirmed by soil chemical testing by the contractor and the associated earthworks to be controlled by engineering site specific specification. Detailed geotechnical characterisation will confirm suitability of all imported materials for their intended purpose.

14.9.4. The mitigation measures to be implemented during the construction phase of the MCO Scheme include:

- The construction phase mitigation measures outlined above, noting that the mitigation measures for the MCO Scheme will arise from the Construction Management Framework Plan that was approved within the EMG1 DCO.

14.9.5. The mitigation measures to be implemented during the operational phase of both the DCO Scheme and MCO Scheme (EMG2 Project) include:

- Good housekeeping – ensuring all developments are kept clean and tidy and free of any debris (reducing the potential for leachate);
- Any fuels, lubricants, solvents, chemicals etc. should be stored in appropriately bunded areas / with drip trays beneath and appropriate pollution prevention measures should be put in place and adhered to, including on site spill kits.
- Any hazardous materials which are to be stored across the EMG2 Project should be clearly labelled, segregated and stored in designated impermeable areas.
- Where there is any evidence of damage / degradation to the hardstanding surfaces across the EMG2 Project, the damage should be repaired and reinstated promptly and as necessary.

14.9.6. With reference to the sensitivity of identified receptors, magnitude of potential impacts and mitigation measures that may apply, the potential effects during the construction and operational phases are summarised within **Table 14.16** below. This table is separated into the DCO and MCO Schemes. It is considered that there aren't any cumulative effects. Therefore, the intra-project cumulative effects presented within the Table have been combined.

14.9.7. Based on the implementation of the mitigation measures specified within this Chapter (included embedded mitigation measures), it is considered that there will not be significant effects of ground conditions on the identified receptors for the DCO Application, MCO Application, or the combined EMG2 Project.

Table 14.16: Summary of Potential Effects

Receptor	Sensitivity	Activity	Effect	Mitigation	Magnitude of Impact	Significance of effect	Additional mitigation	Significance of residual effect
DCO Application/Scheme – EMG2 Works and Highway Works								
Construction / maintenance workers	Moderate / low	Groundworks	Potential human health exposure to contaminated soils and groundwater	Adhere to good working practice and correct and appropriate use of PPE / RPE*	Negligible	Negligible	None	Negligible
Surrounding off-site users (residential)	High		Exposure through indirect pathways, e.g. ingestion of air borne dust	Good site working practices, including dust management, for example through dampening with use of a fine spray*.	Negligible	Negligible	None	Negligible
Surrounding off-site users (commercial)	Low							
Controlled surface waters: Diseworth Brook 320 m S and Long Whatton Brook, 500 m SE, on site drainage ditches	Moderate		Potential for contamination identified to adversely affect receptor	Where unexpected contamination is encountered, the works should cease and LA and geo-environmental consultant to be contacted, in accordance with requirement 22 (Land Contamination). The contamination to be sampled, tested and risk assessed and remedial strategy to be agreed, if required*. It is understood that piled foundations may be proposed within the Junction 24 improvements of the Highway Works. If piling is proposed, a Foundation Works Risk	Negligible	Negligible	None	Negligible
Controlled Waters: Principal Aquifer supported by Helsby Sandstone Formation	High				Negligible	Negligible	None.	Negligible
Controlled Waters (non-potable aquifers): Secondary A Aquifer supported by Glaciofluvial Deposits and Secondary B Aquifer supported	Moderate				Negligible	Negligible	None	Negligible

Receptor	Sensitivity	Activity	Effect	Mitigation	Magnitude of Impact	Significance of effect	Additional mitigation	Significance of residual effect
by Gunthorpe Member)				Assessment will be required. The Silt Management Plan submitted as part of the CEMP, outlines mitigation measures to be implemented in the construction phase, for example the use of temporary drainage.				
Site maintenance workers	Moderate	Maintenance involving breaking ground / excavation	Exposure potential to residual contamination post construction	Much of the proposed development to be hard landscaping, use of correct PPE / RPE*	Negligible	Negligible	None	Negligible
Future commercial site users	Moderate	Presence on Site / Direct Contaminant Pathway	Introduction of new human health receptors on site (commercial workers)	The majority of the EMG2 Works and Highway Works development comprises impermeable hardstanding. No significant contamination was revealed during the site investigation.	Negligible	Negligible	None	Negligible
MCO Application/Scheme – EMG1 Works								
Construction / maintenance workers	Moderate / low	Groundworks	Potential human health exposure to contaminated soils and groundwater	Adhere to good working practice and correct and appropriate use of PPE / RPE.	Negligible	Negligible	None	Negligible
Surrounding off-site users (residential)	High		Exposure through indirect pathways, e.g. ingestion of air borne dust	Good site working practices, including dust management, for example through dampening with use of a fine spray.	Negligible	Negligible	None	Negligible
Surrounding off-site users (commercial)	Low							

Receptor	Sensitivity	Activity	Effect	Mitigation	Magnitude of Impact	Significance of effect	Additional mitigation	Significance of residual effect
Controlled surface waters: unnamed river through Lockington (725 m W) and a tributary of the River Soar (565m NE).	Moderate		Potential for contamination identified to adversely affect the receptor	Where unexpected contamination is encountered, the works should cease and LA and geo-environmental consultant to be contacted, in accordance with requirement 22 (Land Contamination). The contamination to be sampled, tested and risk assessed and remedial strategy to be agreed, if required. The Silt Management Plan submitted as part of the CEMP, outlines mitigation measures to be implemented in the construction phase for the DCO Scheme, for example the use of temporary drainage. These approaches should be reviewed and also applied to the MCO Scheme.				
Controlled Waters (non-potable aquifers): Secondary A Aquifer within Eggington Common Sand and Gravel Member, Wanlip Member and Arden Sandstone Formation, Secondary B Aquifer within Tarpoley Siltstone and Edwalton Member, Secondary Undifferentiated Aquifer within Head Deposits.	Moderate				Negligible	Negligible	None	Negligible
Site maintenance workers	Moderate	Maintenance involving breaking ground / excavation	Exposure potential to residual contamination post construction	Much of the proposed development to be hard landscaping, use of correct PPE / RPE.	Negligible	Negligible	None	Negligible

Receptor	Sensitivity	Activity	Effect	Mitigation	Magnitude of Impact	Significance of effect	Additional mitigation	Significance of residual effect
Future commercial site users	Moderate	Presence on Site / Direct Contaminant Pathway	Introduction of new human health receptors on site (commercial workers)	Ground gas protection measures to CS2 of BS8485 (MCO Scheme -Plot 16 warehouse), majority of proposed development comprises impermeable hardstanding and no significant contamination was revealed during the ground investigation.	Negligible	Negligible	None	Negligible
Notes: *Mitigation method refers to the best / safe practices and measures outlined within the CEMP for the EMG2 Works and Highway Works (**Document DCO 6.3A**) which includes the Silt Management Plan. The mitigation measures identified for the MCO Application (EMG1 Works) are secured in Requirement 11 to the EMG1 DCO as part of the Construction Management Framework Plan which will require a phase specific CEMP to be prepared for the EMG1 Works.								