

# INITIAL EVALUATION REPORT:

## Theddlethorpe Gas Terminal Site and surrounding area within the East Lindsey Area

**PREPARED FOR:** Lincolnshire County Council

**SITE REFERENCE:** Theddlethorpe Gas Terminal Site and surrounding area within the East Lindsey Area

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# Preface

Society has benefitted from nuclear technology for over sixty years through electricity generation, defence, medicine, research and industry. These benefits have been realised through processes that generate waste products. Most of this waste is low in radioactivity and is disposed of safely every day, however, some waste can remain more radioactive for many years. Currently this type of waste is held safely in stores on the surface, mainly within the country's existing nuclear sites, but this is only an interim measure. The UK needs a permanent solution and having reaped the benefits of nuclear technology, it is our responsibility to deal with the waste.

As set out in the UK Government's Working with Communities Policy<sup>1</sup> (the "Policy"), the UK Government, along with many of the world's major nuclear nations, believes the safest option is to dispose of this higher activity radioactive waste in a Geological Disposal Facility (GDF), where the waste is packaged and isolated in a series of vaults and tunnels deep underground in suitable rock. Indeed, many countries with a similar radioactive waste legacy already have well developed programmes in place to build GDFs as the most responsible long-term option (for example, Finland, Sweden, France, Switzerland and Canada).

Radioactive Waste Management Ltd (RWM), a wholly owned subsidiary of the Nuclear Decommissioning Authority, has been given the responsibility for implementing geological disposal of higher activity radioactive waste in the UK. As the delivery body for a GDF, RWM is responsible for safety, security and environmental protection throughout the lifetime of the programme.

Providing a permanent solution for the UK's higher-activity radioactive waste is a UK Government priority and is the right thing for today's society and for future generations. Without action now, we would be extending unnecessarily the environmental risk and costs of handling this waste above ground and leaving future generations to deliver a permanent solution.

The development of a GDF is a multi-billion pound investment and one of the country's largest and most important infrastructure and engineering projects. The project will span many generations and provide the community that hosts it with great economic development opportunities and growth potential for over 100 years.

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<sup>1</sup> *Implementing Geological Disposal – Working with Communities, An updated framework for the long-term management of higher activity radioactive waste. HM Department for Business, Energy and Industrial Strategy (December 2018).*

We will work in partnership with communities across the country, exploring the potential for them to host a GDF and the impacts and potentially transformational benefits the GDF programme could provide to a consenting host community. Working together, we will help shape a community's vision of how it could benefit from the investment, infrastructure and employment along with associated education and training opportunities that a GDF could bring over future decades.

This is a hugely important, challenging, and exciting project for the country and for the community that elects to host a GDF.

This report has been developed by Radioactive Waste Management Ltd. (RWM) as part of the process to identify a suitable site for a GDF within a willing host community.

It summarises the initial work that RWM has undertaken as part of Initial Discussions being held with Lincolnshire County Council in response to paragraph 6.15 of the Policy, which states that during Initial Discussions:

*"Under all scenarios RWM will undertake initial work to understand whether the land identified has any potential to host a GDF."*

Paragraph 6.15 goes on to say:

*"At this point discussions may remain confidential (subject to disclosure requirements contained in information law legislation, including the Freedom of Information Act 2000 and the Environmental Information Regulations 2004), though they should be made public at the earliest opportunity if the interested party and RWM decide to move forward."*

# Executive Summary

This report has been produced as part of initial discussions Radioactive Waste Management Ltd (RWM) has been holding with Lincolnshire County Council. It sets out our findings of whether the Theddlethorpe Gas Terminal (TGT) Site and surrounding area located within the administrative area of East Lindsey District Council, including the adjacent inshore area off the coast, has potential to host a Geological Disposal Facility (GDF).

The area of consideration in this Initial Evaluation Report (IER) therefore covers the administrative unit of East Lindsey district and the adjacent inshore area of the sea, referred to in this report as the “East Lindsey Area” with a particular focus on the TGT Site and surrounding area. The TGT Site is located within part of the East Lindsey Area as shown on **Figure 1** of this report.

A particular focus of the report is on the Theddlethorpe Gas Terminal Site as a potential surface facility location in order to align with the commitment contained within East Lindsey District’s Local Plan<sup>2</sup> to redevelop brownfield sites.

A GDF is expected to bring substantial benefits to the community which hosts it. As a major infrastructure project, a GDF is expected to generate several hundred well-paid jobs each year for over 100 years in construction, engineering, administration, safety operations and project management. The construction and operation of a GDF has the potential to provide significant direct and indirect employment opportunities within its host community (including, for example, the potential to develop supporting education and skills programmes). This would seek to maximise the ability of those in the host community and the surrounding area to benefit from the significant number of highly skilled jobs and apprenticeship schemes that are likely to be available throughout the life of the GDF project. This could bring opportunities to assist in the retention of younger people in the area and the potential to develop and support a more balanced and sustainable demographic. Given the scale of a GDF, it is likely it could require a significant upgrade to local transport infrastructure, which could bring significant benefits to local residents and businesses and assist in making the area more attractive for inward investment. In addition, the community would benefit from opportunities to use community investment funding for locally important priorities early in the siting process. The UK Government has also committed in the Policy to providing significant additional investment to the community that hosts a GDF.

The initial evaluation of the TGT Site and the surrounding area within the East Lindsey Area has been based on the six ‘siting factors’ of Safety and Security, Community, Environment, Engineering Feasibility, Transport and Value for Money, established by RWM following a public consultation, and which are discussed in RWM’s published document ‘Site Evaluation – How we will evaluate sites in England’<sup>3</sup>.

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<sup>2</sup> East Lindsey Local Plan, Core Strategy (Adopted July 2018), paragraph 4.18.

<sup>3</sup> Site Evaluation – How we will evaluate sites in England, 18 February 2020.

Based on a review of readily available information relevant to each of the six siting factors, initial findings indicate that the TGT Site and the surrounding area has the potential to host a GDF and could as a result gain the significant benefits a GDF could provide for the surrounding communities and economies for over 100 years.

Existing geological information, as compiled in the National Geological Screening exercise, shows there are several clay-rich layers occurring within the depth range of interest (200 – 1000m) throughout the East Lindsey Area. Such layers are of interest as clay-rich, or Lower Strength Sedimentary Rocks (LSSR), are potentially suitable as a host rock for a GDF.

East Lindsey is the third largest district in the UK and is one of the most sparsely populated. The main economic sectors are agri-food and tourism, the nature of which contributes to seasonal variations in employment levels. The community demographic is influenced by an above national average number of retired people as many residents have migrated to the district for retirement. There are pockets of social deprivation in the East Lindsey Area, particularly along the coast where seasonal and temporary unemployment is common.

East Lindsey District Council has outlined, in its adopted Core Strategy, a vision with six key objectives<sup>4</sup>, that by 2031 East Lindsey will be a district with:

1. A high quality of life and increased sense of wellbeing and new development that addresses the needs of the economy, community and environment;
2. High quality, affordable and open market housing to meet the differing needs of the district's residents;
3. A growing and diverse economy which extends the importance of the agriculture and tourism base and supports the creation of all types of employment;
4. A commitment to address the issues of deprivation and rural isolation in order to enable an inclusive, equal and diverse district;
5. A high-quality environment that makes the most of its special qualities, particularly the coast, the Lincolnshire Wolds and the historic market towns; and
6. A commitment to tackling the causes and effects of global climate change through local action.

The development of a GDF and associated community funding could be tailored to support initiatives in-line with these Core Strategy objectives.

Parts of the East Lindsey Area, including sites close to the TGT Site, are protected for their nature conservation interest and RWM understands and fully supports the priority given to these protected areas. RWM would seek to work with the community and relevant stakeholders to understand the natural environment in greater detail when considering the implications of delivering a GDF on such protected areas and the natural environment.

The development of a GDF would be subject to a Flood Risk Assessment considering worst case climate change predictions for sea level rise. The design of the GDF would incorporate appropriate mitigation measures to protect against flood risk to the GDF and to ensure there were no adverse impacts on flood risks elsewhere as a result of the project. There may also be potential for significant additional investment (available to a community that eventually hosts a GDF) related to the GDF project, which could, for example, include additional flood protection measures.

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<sup>4</sup>East Lindsey Local Plan, Core Strategy (Adopted July 2018), paragraph 1.5.

Improved transport infrastructure would be required to move the required materials, personnel and the packaged waste to support the development and operation of a GDF. This could have significant benefits for local communities within the East Lindsey Area, which are currently underserved by connections to the strategic road and rail networks in the wider region and could have the additional benefit of making the area more attractive for supplementary development and inward investment. The area has an extensive coastline, so the option of sea transport via a dedicated facility could also be explored further with the community. Using sea transport could present additional benefits, for example, through required infrastructure upgrades, as well as reducing the impact of land-based transport.

This initial work has not confirmed that the TGT Site and the surrounding area is suitable to host a GDF. Rather, it has enabled the confirmation that the TGT Site and surrounding area holds the potential to host a GDF, together with early identification of known constraints and uncertainties. Further analysis drawing on additional sources of information and data will be required if the TGT Site and surrounding area is considered further in the siting process.

If the TGT Site and surrounding area within the East Lindsey Area is to be considered further in the siting process, RWM would work collaboratively with the local community and relevant stakeholders to enhance current understanding of aspirations for the area and how delivery of a GDF could be aligned to local priorities. RWM would also wish to focus on the sensitivities of the local natural environment, together with the implications of future climate change. RWM would also consider the existing transport-related challenges of the area and potential transport options and how local community benefits could be realised as a consequence of any infrastructure upgrades that may be required.

The next part of the siting process would be to begin discussions with the community through the formation of a Working Group involving RWM, Lincolnshire County Council and other organisations as appropriate. An independent chair and facilitator would be appointed, and all other Relevant Principal Local Authorities would be informed and invited to join the Working Group. Such a Working Group is a preliminary step to begin engagement on the siting process within the community, sharing information, scoping an area to potentially be considered in more detail by a Community Partnership and getting that more enduring partnership body established.

An early task for the Working Group would be to identify a Search Area. The Search Area is the geographical area within which RWM would seek to identify potentially suitable sites to host a GDF. The Policy confirms that a Search Area is to be delineated using the district electoral ward boundaries.

The Working Group will start to gather information about the people and organisations in the area who are likely to be affected or have an interest in a GDF with a view to identifying initial members for a Community Partnership. This Community Partnership will provide a vehicle for sharing information with the community and for finding answers to the questions the community may have about geological disposal, the siting process and how they, as a community, could benefit. If it is to be successful, it will be important for a Community Partnership to reflect, both in its composition and views, the community it is representing and be respectful of a wide range of opinions. The area would also benefit from Community Investment Funding should a Community Partnership be formed.

A community can be withdrawn from the siting process at any time up until it has taken the Test of Public Support that is required before RWM is able to proceed with the statutory licensing, environmental permitting and development consent application processes to build a GDF. The Relevant Principal Local Authorities on the Community Partnership will have the final say on withdrawal from the process and on when to take the Test of Public Support in order to seek the potential host community's views on hosting a GDF. The Test of Public Support would only be taken after extensive community engagement when the community has had time to ask questions, raise any concerns and learn about a GDF.



# 1. Introduction

## Objective of this Report

This Initial Evaluation Report (IER) has been prepared to help understand the potential for a Geological Disposal Facility (GDF) to be located at the Theddlethorpe Gas Terminal (TGT) Site and surrounding area within the East Lindsey Area (as defined below), to inform ongoing discussions between Lincolnshire County Council and Radioactive Waste Management Ltd (RWM) in respect of the siting process for a GDF<sup>5</sup>.

It presents the findings of initial evaluation work carried out by RWM to understand whether, based on existing readily available information, the TGT Site and surrounding area within the East Lindsey Area, has any potential to host a GDF.

The initial evaluation work is not designed to confirm whether or not the TGT Site and surrounding area is suitable to host a GDF. The overall siting process will take several years due to the need to properly investigate and assess potential sites to host a GDF, and to ensure that communities involved in the siting process have a full understanding of how the GDF project might affect them.

A wealth of additional information and resources regarding geological disposal and the siting process is available online [i].

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<sup>5</sup> A GDF will have both surface and underground facilities. They will be linked by access tunnels and/or shafts, depending on the layout of these facilities. The underground facilities do not need to be located directly below the surface facilities – they could be separated by a distance of many kilometres. The precise layout and design of the facilities will depend on the inventory for disposal and the specific geological characteristics at the site in question.

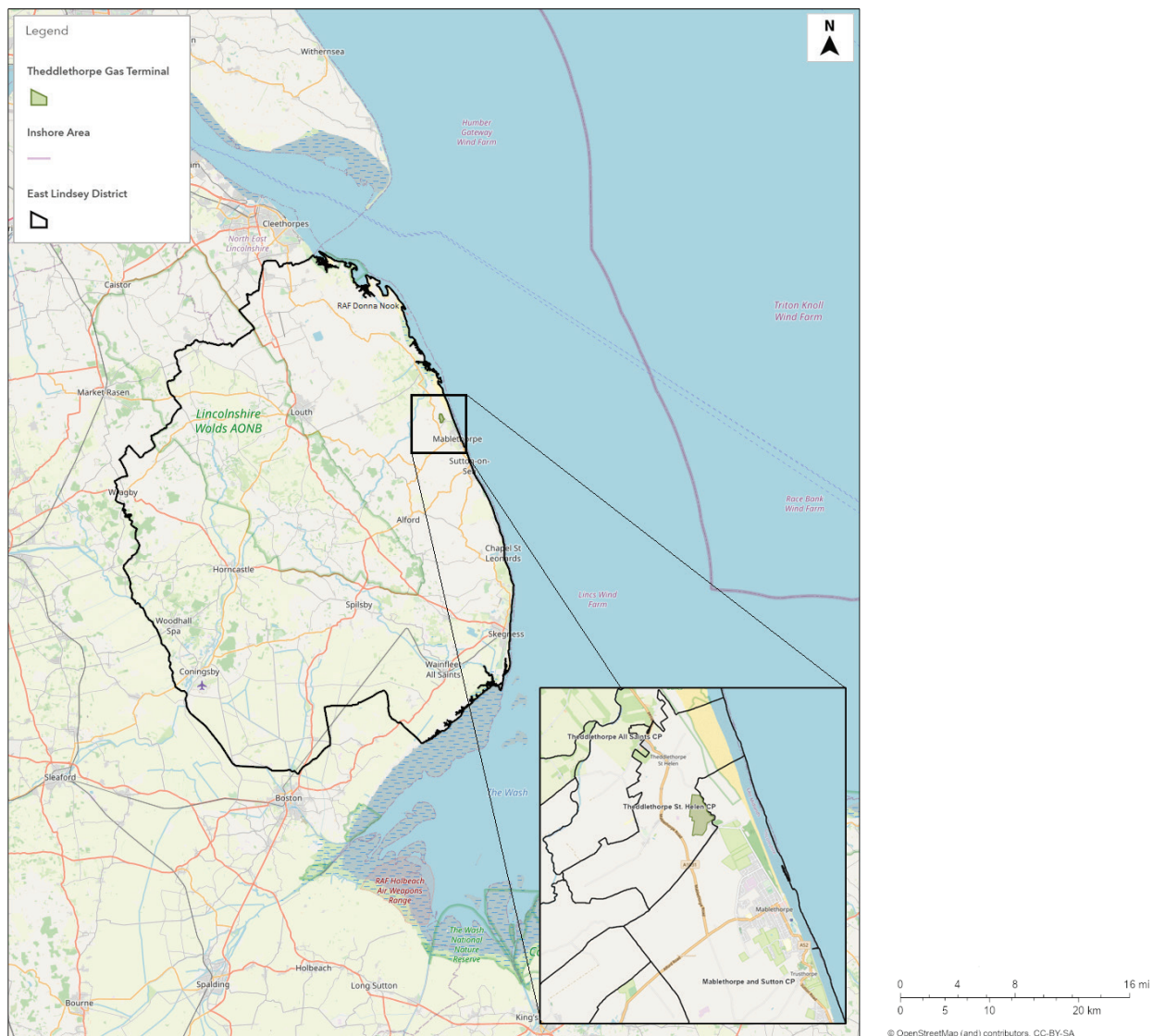
# East Lindsey Area

The ‘East Lindsey Area’ comprises the administrative area of East Lindsey district and the adjacent inshore area<sup>6</sup> off the coast. In discussions with Lincolnshire County Council, and in keeping with East Lindsey District Council’s commitment in its Local Plan to redevelop brownfield sites, the developed industrial TGT Site located in the East Lindsey Area has been given particular focus, but the evaluation has considered the whole of the East Lindsey Area.

East Lindsey District Council is a district authority located in the County of Lincolnshire in the east of England. The administrative area of East Lindsey occupies an area of approximately 1,762 square kilometres, making it the third largest district in England. The East Lindsey District Council’s adopted Core Strategy [ii] identifies the district as one of the most sparsely populated in the England with no single dominant urban centre. The district has evolved with a widespread settlement pattern which is a legacy of small farming communities with local markets.

Figure 1 below shows the location of the TGT Site within the East Lindsey administrative area together with the inshore area off the coast.

**Figure 1: Map of the ‘East Lindsey Area’**



<sup>6</sup> The inshore is defined as the UK Territorial Waters which extend up to 12 nautical miles (22.2 km) from the Mean Low Water Mark.



A GDF would have both surface and underground facilities. The surface facilities would be linked to the larger underground GDF facilities by sloping tunnels and/or vertical shafts. The primary purpose of the surface facilities would be to receive solid waste packages from the transport network and transfer them to the underground facilities.

The layout of GDF surface facilities would depend on a particular site, how much space was available, and the arrangement of existing infrastructure. There is also potential to locate some of the buildings such as offices and stores off-site in nearby locations.

GDF surface facilities could require in the region of one square kilometre of land depending on how the site was laid out and if any of the facilities were located off-site, the specific land requirements would need to be worked out later in the process. RWM would seek to ensure that the delivery of a GDF is sensitive to the local area and that the designs of surface facilities are sympathetic to the local environment, as far as practicable.

It is important to note the sub-surface area of a GDF would not necessarily be directly underneath the surface facilities and can be offset by a several kilometres. This means there is an opportunity for the sub-surface facilities to be located in appropriate geological settings deep in the rock beneath the seabed in the inshore area.

East Lindsey is bordered by West Lindsey District, North Kesteven District, Boston District and the Unitary Authority of North East Lincolnshire. The city of Lincoln is located approximately 65 kilometres to the west of Theddlethorpe. East Lindsey District Council is one of seven district councils in Lincolnshire, operating in a two-tier system of local government alongside Lincolnshire County Council. Services, such as education, highways and social services are provided by Lincolnshire County Council whilst the seven district councils provide more local services to the communities they serve.

## Evaluation Approach

The work presented in this Initial Evaluation Report is based on the approach set out in the Policy and RWM's published Site Evaluation document "*Site Evaluation - How we will evaluate sites in England*" [iii].

The Site Evaluation document draws upon the existing legislative, policy and regulatory requirements that RWM will need to satisfy to successfully deliver a GDF and identifies six 'Siting Factors' setting out the broad topic areas that RWM needs to consider as it assesses and evaluates areas and sites. These Siting Factors have then been broken down into a series of 'Evaluation Considerations' to provide greater clarity on the matters that RWM will take into account.

This Initial Evaluation Report is structured around the six Siting Factors:

- Safety and Security
- Community
- Environment
- Engineering Feasibility
- Transport
- Value for Money

As part of the initial discussions with Lincolnshire County Council, a key focus of this initial evaluation has been to consider the six Siting Factors in relation to the TGT Site and surrounding area within the context of the East Lindsey Area. In this initial evaluation, RWM has considered the possibility of the sub-surface elements of a GDF being located at depth, which includes consideration of locating the subsurface facilities in the deep geology beyond the coastline.

At this early stage in the siting process RWM has only drawn upon existing readily available information to inform a desktop study by its technical specialists. A list of the information considered is appended to this report.

# 2. Initial Evaluation

## Safety and Security

**Based on the review of readily available information relating to the Safety and Security Siting Factor, RWM has concluded that the Theddlethorpe Gas Terminal Site and surrounding area within the East Lindsey Area has potential to host a GDF.**

It is essential that a GDF is safe during the period in which it is constructed and operated but it must also remain safe for hundreds of thousands of years after it has been closed and sealed. Safety after closure is often referred to as 'long-term safety' or 'post-closure safety'.

The geological environment is an important consideration to safety after closure as man-made engineered barriers work together with the geology to provide this protection.

Based upon work in the UK and overseas RWM has identified three broad types of potential host rock for a GDF.

- Lower Strength Sedimentary Rocks (LSSR), like clays and mudstones;
- Evaporites, such as rock salt; and
- Higher Strength Rocks (HSR), like granites and slates.

Only one of these potential host rocks (LSSR) occurs within the depth range of interest<sup>7</sup> (200 to 1,000 metres below National Geological Screening (NGS) datum<sup>8</sup>) within the East Lindsey Area. There are understood to be potential HSR occurring in isolated areas just south of the East Lindsey Area, but within the County of Lincolnshire.

<sup>7</sup>The depth range of interest for a GDF is 200 metres to 1,000 metres below the NGS datum (see the NGS web page (<https://www.gov.uk/guidance/about-national-geological-screening-ngs>) Although screening has focused on the 200 to 1,000 metres depth range, which is consistent with Government Policy and the National Geological Screening Guidance, RWM recognises that some rock types may be suitable as host rocks where they occur at depths greater than 1,000 metres.

<sup>8</sup>NGS datum is a level that has been used to enable the production of maps showing the rock types of interests at depths of 200 metres to 1,000 metres below the surface. In flat lying areas the use of the land's surface is fine, however in mountainous and hilly areas this can be misleading. This is because there could be potentially suitable host rocks that appear to be more than 200 metres below the surface, but they are actually higher than, or level with, nearby valleys. To avoid this, a model was developed that consists of flat surfaces between the bases of valleys. This is to ensure that rocks identified as potentially suitable will be below nearby valleys.

The geology of the East Lindsey Area comprises a well-known and predictable sequence of younger sedimentary rocks throughout most of the depth range of interest. LSSR, or clay-rich rocks, are internationally recognised as potentially suitable for hosting a GDF. This is because these rocks are rich in very small clay particles, which only allow water to pass through them very slowly. In addition, the high clay content means that any cracks that form in these rocks reseal, particularly under the weight of hundreds of metres of overlying rock. As a result, there is often almost no movement of water through these rocks. These attributes, together with the engineered barrier system, would contribute to a situation where radionuclides and other non-radioactive materials could be suitably contained for hundreds of thousands of years.

In a situation where the clay-rich rock layers are not in themselves suitable to host a GDF because they are either too thin or do not have suitable engineering properties, these layers may support the siting of a GDF being located within deeper rocks, as they are likely to act as a barrier to any groundwater flow from depth.

There are well developed disposal concepts for the potential host rock type found in the East Lindsey Area. Based on RWM's work and similar work carried out overseas, RWM has confidence that a GDF design could be developed which would provide the high level of safety required to satisfy the UK's strict regulatory regimes. This would be presented in safety cases which will be assessed by the UK's independent regulators.

The present understanding of the East Lindsey Area indicates that there are three major faults (defined as faults that offset adjacent rock layers by 200 metres or more), as identified in the NGS exercise. These are all located in the south of the East Lindsey Area, trending east-west across the East Lindsey Area, extending below the inshore area. This is not unusual: faults are very common in the underground environment. Faults may act as barriers to, or pathways for, groundwater movement, depending upon their characteristics, and these would need to be considered during the siting of a GDF should the TGT Site and surrounding Area within the East Lindsey Area progress through the siting process. There are large parts of the East Lindsey Area, particularly in the vicinity of the TGT site that do not appear to have been subjected to major faulting.

Two small areas, near Saltfleetby and Keddington have been developed for gas and these remain operational. Around these two small areas there are a number of exploration and production boreholes for oil and gas. These areas, as well as areas to the north and west also have Petroleum Exploration and Development Licences. Currently, it is not known whether oil or gas in these licence areas will be exploited in the future and to avoid inadvertent intrusion further assessment would be required.

Much of the inshore area between Grimsby and Mablethorpe from the coast to approximately 4 kilometres off the shore is covered by a Coal Authority Licence Area. It is not known whether coal can be exploited commercially in this Coal Authority Licence Area, but this would need to be considered during the siting process if the TGT Site and surrounding Area within the East Lindsey Area were to progress through the siting process.

It is recognised that there may be geological information relating to parts of the wider area that was generated through historical surveys and studies previously commissioned with respect to operational and historic oil and gas exploration and mining activities. If the TGT Site and surrounding area within the East Lindsey Area progresses to a point where a Community Partnership is formed RWM would need to review and revisit existing available information. RWM would need to be mindful of the purposes of the historic surveys and studies, and any legislative and regulatory changes that may have occurred in the intervening years. Such additional information could enable RWM to enhance our understanding of the geological environment of the East Lindsey Area.

The initial evaluation work has considered other matters included within the Safety and Security Siting Factor and the work completed to date indicates that there are no fundamental constraints relating to construction and operational safety or security matters which would prevent the TGT Site and surrounding area within the East Lindsey Area from being considered further in the siting process. There are, however, a number of matters relating to the Safety and Security Siting Factor that would need to be investigated further should the TGT Site and surrounding area within the East Lindsey Area progress through the siting process.

This could include, for example, assessment of seismic activity in the East Lindsey Area, engagement with any local industrial, operational or defence sites that may interact with the GDF project and any transport factors that could affect access to and from the GDF.

## Community

**Based on the review of readily available information relating to the Community Siting Factor, RWM has concluded that the Theddlethorpe Gas Terminal Site and surrounding area within the East Lindsey Area has potential to host a GDF.**

The construction and operation of a GDF has the potential to provide direct and indirect employment opportunities over a very long period of time and to support a diverse economy in the East Lindsey Area.

A GDF could assist the district of East Lindsey and the wider Lincolnshire area to be a centre of skilled engineering and low carbon technologies for the longer term as well as helping to diversify local employment. The development of a GDF could support the recognised importance of young people to the area's future by providing them with the opportunity to stay and succeed through potential education and skills partnerships. This would be aligned to local objectives to promote economic diversification and growth in engineering and manufacturing sectors.

In addition to the construction, engineering and other technical skills that would be required to build and operate a GDF a number of other associated services would be needed from the supply chain in areas such as facilities management, hotels and catering and the potential opportunities to enhance growth in the food/agriculture, tourism and transport sectors could be significant.

The East Lindsey Area has a high and rising proportion of residents aged over 65, reflecting its importance as a destination for retirees. This population imbalance is compounded by the outward migration of the young working age population.

The economy of East Lindsey is dominated by agri-food and tourism, both sectors which are associated with seasonal unemployment and therefore offer limited opportunities to the younger generation.

The existing tourism economy of the area is of local importance and RWM recognises the need to treat the features and assets that support it sensitively. There may be an opportunity to create a GDF/scientific centre of excellence, which itself could generate significant visitor traffic and even become a tourism point of interest alongside the existing assets. For example, the French counterpart to RWM has developed an Environmental Observatory, an Environmental Specimen Bank and a Technological Exhibition Facility within the area in which it is intending to construct its GDF. The facilities in France attract over 10,000 visitors per year. Similarly, facilities constructed at Äspö in support of the Swedish spent fuel repository programme host 20,000 visitors per year.

It is acknowledged that there could be a need for additional homes for workers involved in the construction and operation of a GDF in the area. RWM would work closely with relevant stakeholders on this matter, for example it could consider the need to agree a local accommodation plan that complements the overall housing strategy for the area.

Deciding on a suitable site for a GDF will take several years. This means that there is a real opportunity for a community to consider how a GDF could benefit that community over the long-term. There will be a wide range of support available to allow communities that wish to explore more fully what a GDF might mean for them. The process of building a Community Vision by the Community Partnership will help the community to identify and articulate what is important and how it will align with local and regional economic and social priorities.



East Lindsey District Council adopted a Local Plan Core Strategy in July 2018, which aims to match its vision with the Council`s Corporate Strategy, so that, through shared action, their common priorities can effectively be tackled, in order to achieve the delivery of sustainable development in the district.

The visions and objectives<sup>9</sup> for East Lindsey are that by 2031 East Lindsey will be a district with:

- A network of thriving, safer and healthy sustainable communities, where people can enjoy a high quality of life and an increased sense of wellbeing and where new development simultaneously addresses the needs of the economy, communities, and the environment.
- Quality affordable and open market housing to try and meet the differing needs of the District`s residents.
- A growing and diversified economy that not only builds on and extends the important agriculture and tourism base but supports the creation of all types of employment.
- A commitment to address the issues of deprivation and rural isolation to make an inclusive, equal and diverse district.
- A high-quality environment that makes the most of its special qualities, particularly the coast, the Lincolnshire Wolds, and the historic market towns; and
- A commitment to tackling the causes and effects of global climate change through local action.

The Core Strategy has a specific Coastal Policy (SP17)<sup>10</sup>, which states at paragraph 10.11:

- The Council will give a high priority to development that extends and diversifies all-year round employment opportunities, contributes directly to the local economy, infrastructure or extends and diversifies the tourism market.
- The Council will support improvements to the existing flood defences, the creation of new flood defences and infrastructure associated with emergency planning.
- New and replacement community buildings will be supported, providing they are located within or adjoining an existing settlement.
- Development will need to demonstrate that it satisfies a Sequential and Exception Test<sup>11</sup>.
- All relevant development will need to provide adequate flood mitigation.

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<sup>9</sup> East Lindsey Local Plan, Core Strategy (Adopted July 2018), paragraph 1.5.

<sup>10</sup> East Lindsey Local Plan Core Strategy (adopted July 2018), Strategic Policy 17, Coastal East Lindsey, Paragraph 10.11, p.89.

<sup>11</sup> All relevant development in areas of flood risk has to show how it has passed the Sequential and Exception tests. With regard to the Sequential Test this steers development to areas of lowest risk. For the Exception test, the very term exception means that it is development beyond that which would normally be allowed. It is important that all relevant development still does demonstrate that it provides wider sustainability benefits.

East Lindsey Local Plan, Core Strategy (Adopted July 2018) – Annex 2, p.134 – Sequential and Exception Test for development in the Coastal Zone of East Lindsey.

On a wider regional basis, the Greater Lincolnshire LEP Strategic Economic Plan 2014-2030 sets out the following priorities for growth:

1. To drive the growth of the area's defining and strongest sectors which offer the most competitive advantage: agri-food; advanced manufacturing and engineering; the low carbon economy, with a particular focus on renewable energy; visitor economy.
2. To grow specific opportunities identified as future defining features of the area: health and care sector; ports and logistics.
3. To drive this growth by putting expansion into new markets, modern telecommunications infrastructure improvements and the skills of individuals and business owners, at the forefront.
4. To promote Greater Lincolnshire as a place for sustainable growth through improved transport infrastructure to connect us with national and international markets enabling wider enjoyment of our world-class heritage sites, culture, and strong communities.
5. To recognise the need for new housing for the existing local population and potential movers to the area, and support balanced housing and economic development through promoting the area's capacity to deliver high-quality growth.

RWM's review of the above local policy documents shows that the hosting of a GDF is likely to have the potential to deliver a transformational effect to both the local and regional economies that would align with the local policy objectives set out above and could, in addition, enhance the existing dominant sectors of the local and regional economy, namely agri-food, manufacturing and engineering, the low carbon sector and tourism/visitor economy.

In addition, Community Investment Funding that is made available during the early site evaluation community partnership stage and throughout the siting process could be directed towards initiatives in support of the above local and regional objectives.

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<sup>12</sup> Greater Lincolnshire LEP, *Strategic Economic Plan, 2014 – 2030 (Refresh Spring 2016)*, *Priorities for Growth, Section 1, pp 10-11.*

## Environment

**Based on the review of readily available information relating to the Environment Siting Factor, RWM has concluded that, with appropriate mitigation, the Theddlethorpe Gas Terminal Site and surrounding area within the East Lindsey Area has potential to host a GDF.**

The delivery of a GDF to dispose of higher activity radioactive waste safely and securely will be one of the largest environmental infrastructure projects in the UK. All major developments can have both positive and negative impacts on the environment. At this early stage in the siting process, it is not possible to assess the specific impacts of delivering a GDF at the TGT Site and surrounding area on the local environment.

At this early stage a detailed assessment of the TGT site's suitability as a surface location has not been undertaken. Taking into account the brownfield nature of the site i.e. it is a previously developed industrial site, our initial high-level evaluations have led to the conclusion that there could be potential for the surface facilities associated with a GDF to be hosted here. However, further detailed assessment would be required to fully understand the risks associated with potential impacts on some of the local habitats, such as those under the protection of the nearby Humber Estuary Special Protection Area (SPA), the southern extent of which is within a few hundred metres of the TGT site.

Large parts of the East Lindsey Area are protected due to their nature conservation interest<sup>13</sup> and RWM understands and fully supports that these protected areas need to be respected. RWM would seek to work with the local authorities, the community, and relevant stakeholders, to understand the natural environment in greater detail and consider the implications of delivering a GDF in line with relevant legislation and policy. There may be opportunities to provide environmental enhancements as part of the delivery of a GDF.

It is recognised that the local tourism economy is influenced by the natural character of the area, as well as cultural heritage assets. These sensitive wildlife habitats and cultural assets are very important locally and RWM would work collaboratively to ensure that local priorities and concerns are understood and influence the work that may be undertaken.

Large areas of coastal East Lindsey are currently subject to significant flood risk and increased risks from predicted sea level rise as a result of climate change. The development of a GDF would be subject to Flood Risk Assessment considering worst case climate change predictions for sea level rise. The design of the GDF would incorporate appropriate mitigation measures to protect against flood risk to the GDF and to ensure there were no adverse impacts on flood risks elsewhere as a result of the project. There may also be potential for significant additional investment (available to a community that eventually hosts a GDF) related to the GDF project, which could, for example, include additional flood protection measures.

Consideration of any potential sites in higher flood risk zones would be subject to the appropriate sequential and exceptions testing required by national planning policy, the application of related local plan requirements and any existing or emerging Shoreline Management Plans.

Based on the initial evaluation work carried out, RWM has not identified any fundamental environmental constraints which would prevent the TGT Site and the surrounding area from being considered further in the siting process. However, more detailed investigations and assessments would be required with respect to a number of environmental matters including flood risk, which could have the potential to influence where the surface facilities of a GDF could be delivered.

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<sup>13</sup> This includes areas that are protected under European and domestic legislation.

# Engineering Feasibility

**Based on the review of readily available information relating to the Engineering Feasibility Siting Factor, RWM has concluded that, with appropriate design measures, the Theddlethorpe Gas Terminal Site and surrounding area within the East Lindsey Area has potential to host a GDF.**

Based on the current geological understanding of the East Lindsey Area, including the TGT Site, there are several layers of potentially suitable host LSSR under the entirety of the East Lindsey Area, including deep beneath the inshore area which could be accessed from a surface facility near the coast such as the TGT Site. Based on current estimates of waste volumes it is anticipated that there would be sufficient suitable rock volume to dispose of the potential inventory for disposal.

The GDF surface facilities could require in the region of one square kilometre of land, however the precise layout cannot be determined at this stage and more specific land requirements will need to be assessed in due course. These surface facilities would be linked to the sub-surface facilities by sloping tunnels and/or vertical shafts. The layout of GDF surface facilities would depend on the geography of a particular site, how much space is available, and the arrangement of existing infrastructure. There could also be the potential, on carrying out further investigation, to consider whether some of the ancillary facilities, such as offices and stores could be located off-site in nearby locations.

Much of the eastern part of the district of East Lindsey is known to be at risk of fluvial and tidal flooding. This has the potential to present challenges to the construction and subsequent operation of a GDF, especially in consideration of anticipated sea level changes. RWM would work collaboratively with relevant stakeholders to consider the potential for, and the implications of, locating the surface facilities in locations that are more resilient to flood risk and the provision of appropriate mitigation measures.

RWM would work collaboratively to develop safe and secure surface facility designs and identify a potential location for a GDF that responds to local priorities and the natural environment. The construction and continued operations of a GDF would result in the generation of excavated spoil and there could be opportunities to reuse the spoil locally, for instance in support of flood mitigations, or habitat creation or enhancement and other potential infrastructure schemes.

By applying 'good design' principles RWM would seek to ensure that the delivery of a GDF is sensitive to the local area, efficient in the use of natural resources and energy used in construction, and that the designs of surface facilities are sympathetic to the local environment, as far as practicable.

RWM would seek to work with the community to ensure that their preferences are taken into account. The TGT Site, in particular, has been considered as part of this initial evaluation work and, pending further detailed analysis (including on flood risks), no fundamental constraints have been identified at this early stage that suggest the TGT site and surrounding area does not have any potential to host a GDF.

# Transport

**Based on the review of readily available information relating to the Transport Siting Factor, RWM has concluded that the Theddlethorpe Gas Terminal site and surrounding area within the East Lindsey Area has potential to host a GDF.**

Throughout the lifetime of a GDF, transport links to the proposed facility will be vital. Transport would be required for construction materials for the underground and surface facilities and associated infrastructure; radioactive waste for disposal; movement of spoil and backfill materials (this may also include materials for surface bunds and site flood mitigations, if required), and personnel during all phases of the design, construction, operation and eventual closure of a GDF.

Existing transport routes and networks within the East Lindsey Area would need to be enhanced to deliver a GDF. This could have significant benefits for local communities currently underserved by connections to the existing strategic road and rail networks, and which could make the area more attractive for development and inward investment. The delivery of a GDF may open up opportunities to provide sustainable transport infrastructure to support the necessary construction and operational activities. This could also enhance local connectivity that could benefit local businesses and potentially the tourism sector. This could include improvements to the local road and rail networks, both of which have been identified as requiring improvements. RWM would work with relevant stakeholders to understand the improvements that are planned and schedules for delivery.

Lincolnshire contains some very capable railways which are well connected to both the strategic railway network and established ports. However, railway connectivity to the district of East Lindsey is limited, particularly north of Skegness. The Grantham to Skegness line is classified as a rural route and is primarily a passenger service with limited freight utilisation. There may be opportunities to reinstate parts of historic railway lines which serviced the wider East Lindsey Area, such as the Mablethorpe loop, to facilitate a GDF. East Lindsey District Council have recently applied to the Department of Transport for a £50,000 feasibility study grant under the 'Restoring Your Railway Fund'. This study would include an assessment of two railway lines which would be of particular interest to supporting a GDF project, namely the East Lincolnshire Line (Grimsby - Louth - Alford - Boston) and also the Mablethorpe loop line (Louth - Grimoldby - Mablethorpe - Sutton-on-Sea - Mumby Road - Willoughby).

The utilisation of sea transport could bring additional benefits through any required infrastructure upgrades, as well as reducing the impact of land-based transport. The wider regional ports are capable of handling all the sea movements required to construct and operate a GDF. However, it is acknowledged that utilisation of existing ports would require onward movements of goods via rail or road. The East Lindsey Area has an extensive coastline so the option of sea transport via a dedicated port facility could be explored further with the community as a potential benefit to address any adverse transport issues.

The TGT Site and surrounding area is currently not directly serviced by the strategic road network; the closest connections are at Lincoln or Grimsby. The closest motorway, the M180, terminates at Barnetby approximately 14 miles from the East Lindsey border and transitions into the A180 which terminates at Grimsby approximately 4 miles from the East Lindsey border. Access to the strategic road network is provided by the A16 which runs from Grimsby to Boston and the A158 which runs from Skegness to Lincoln.

Any future consideration of transport enhancement options would need to take into account the flood risk context. For example, there could be the potential to explore whether any opportunities and or benefits could be realised from combining transport improvements, particularly road or rail with appropriate flood mitigation works.

## Value for Money

**Based on the review of readily available information relating to the Value for Money Siting Factor, RWM has concluded that the Theddlethorpe Gas Terminal site and surrounding area within the East Lindsey Area has potential to host a GDF.**

At this early stage in the siting process there are many uncertainties that would influence the overall programme cost and delivery schedule. However, at this stage there is nothing to suggest RWM would not be able to secure value for money in delivering a GDF at the TGT Site and surrounding area.

# 3. Conclusion

**Having considered the readily available information, and particularly the National Geological Screening outputs, RWM has concluded that the Theddlethorpe Gas Terminal Site and surrounding area within the East Lindsey Area has potential to host a GDF.**

This Initial Evaluation Report presents the findings of work to evaluate the potential of the TGT Site and the surrounding area within the East Lindsey Area against the six identified Siting Factors set out in RWM's Site Evaluation document. In undertaking this evaluation RWM has used high level, existing and readily available information.

This is the first stage of evaluation and further work drawing upon additional sources of information and data would be required if the TGT Site and surrounding area were to be considered further. However, at this stage no fundamental constraints have been identified which would prevent the development of a GDF. Therefore, RWM has concluded that the TGT Site and surrounding area within the East Lindsey Area has the potential to host a GDF.

This initial work has also developed our understanding of any known constraints, uncertainties, and opportunities for further work if the TGT site and surrounding area within the East Lindsey Area progresses through the siting process.

However, it is important to note that that these initial evaluations have not yet confirmed whether the TGT Site and surrounding area within East Lindsey Area identified is suitable to host a GDF and further work would be required to establish this.

# 4. Potential Future Work

If the TGT Site and surrounding area moves forward in the siting process, RWM would work collaboratively with the local community and relevant stakeholders on the following subjects:

- Existing and future aspirations for the area, and how delivery of a GDF could be aligned to local priorities;
- The existing flooding related challenges in the area, the implications of future climate change and how this may influence the delivery of a GDF. RWM would also explore the potential for delivering additional measures that may protect homes and businesses as well as protecting and enhancing existing wildlife habitats;
- The existing transport related challenges of the area and the transport related implications associated with the development of a GDF. This could include consideration of the potential to transport freight to the area via sea and how benefits could be realised as a consequence of any infrastructure upgrades that may be required;
- The sensitivities of the local natural environment and the potential implications of delivering a GDF and whether there could be alignment with local environmental objectives and the potential to deliver environmental enhancements to designated areas and sites;
- How RWM could work collaboratively with all relevant stakeholders to develop safe and secure potential design solutions and identify potential locations for a GDF that are sensitive to local priorities and the legislative, policy and regulatory frameworks within which RWM must operate;
- How the delivery of a GDF would affect existing residents and businesses and how RWM could support all people living in and around the area by adding real value through the whole siting process such that benefits could start to be realised in the near future including through the use of Community Investment Funding; and
- The implications of a GDF on existing infrastructure, such as the oil and gas operators and defence facilities.



# 5. Next Steps

If the area progresses in the siting process to further explore the potential to host a GDF, discussions would need to be considered more widely with the community, through a Working Group involving RWM, Lincolnshire County Council, an independent chair and a facilitator, plus other organisations (as appropriate). All relevant principal local authorities would be invited to join the Working Group but, as this early part of the process is essentially about fact-finding and exploratory discussions, it is not a requirement that local authorities join. Such a Working Group is just a preliminary step to begin engagement, scope out an area to be considered in more detail by a wider Community Partnership and to get that larger partnership body established.

An early task for the Working Group would be to identify a Search Area. The Search Area is the geographical area within which RWM would seek to identify potentially suitable sites to host a GDF and any supporting infrastructure and would be defined by electoral ward boundaries.

The Working Group would also start to gather information about the people and organisations in the area that are likely to be affected or have an interest in a GDF with a view to identifying members for a formal Community Partnership. Further information can be found in RWM's Community Guidance document [iv].

This Community Partnership would provide a vehicle for sharing information with the community and for finding answers to the questions the community may have about geological disposal, the siting process and how they, as a community, could benefit. If it is to be successful, it will be important for a Community Partnership to reflect, both in its composition and views, the community it is representing and be respectful of a wide range of opinions.

A community can withdraw from the siting process at any time up until it has taken the Test of Public Support that is required before RWM is able to proceed with the statutory licensing, environmental permitting and development consent application process to build a GDF. The relevant principal local authorities on the Community Partnership will have the final say on potential withdrawal from the process and on when to undertake this direct Test of Public Support in order to seek the community's views on hosting a GDF, once site-specific proposals have been developed sufficiently to provide clarity on what is actually being proposed.

## **Community Guidance**

Guidance that RWM has developed to provide information, help and advice in support of the policy frameworks that exist in England and Wales. It is for anyone who is interested in learning more about geological disposal and the process for identifying a site for a GDF.

## **Community Partnership**

The partnership between the members of the community, at least one Relevant Principal Local Authority and RWM.

## **Geological Disposal Facility (GDF)**

A geological disposal facility is a highly engineered facility capable of isolating radioactive waste within multiple protective barriers, deep underground, to ensure that no harmful quantities of radioactivity ever reach the surface environment.

## **Initial Discussions**

Early contact with an Interested Party to help them to find out more about the Siting Process; to understand whether a site/area put forward has any potential to host a GDF; and to help them to decide whether they want to seek to form a Working Group and open up a wider discussion.

## **Interested Party**

The group, organisation, or individual(s) who first started discussions with RWM.

## **Inshore Area**

The inshore is defined as the UK Territorial Waters which extend up to 12 nautical miles (22.2 km) from the Mean Low Water Mark.

## **Inventory for Disposal**

The specific types of higher activity radioactive waste (and nuclear materials that could be declared as waste) which may need to be disposed of in a GDF.

## **National Geological Screening (NGS)**

The National Geological Screening provides a high-level summary of the existing geological information of relevance to the safety of a GDF to inform initial discussions with communities.

## **Nuclear Decommissioning Authority (NDA)**

A non-departmental public body established by the Energy Act 2004 to ensure the safe and efficient clean-up of the UK's public sector, civil nuclear legacy. The NDA has statutory responsibility for decommissioning and cleaning-up 17 UK sites and the associated liabilities and assets. It reports to the Department for Business Energy and Industrial Strategy (BEIS); for some aspects of its functions in Scotland, it is responsible to Scottish Ministers.

**Policy – The Working with Communities Policy**

*‘Implementing Geological Disposal – Working with Communities’*, An updated framework for the long- term management of higher activity radioactive waste, HM Department for Business, Energy and Industrial Strategy, (December 2018).

**Potential Host Community**

The Potential Host Community is the community within a geographical area that could potentially host a GDF.

**Radioactive Waste Management Ltd (RWM)**

A wholly-owned subsidiary of the Nuclear Decommissioning Authority, established in 2014 for the purpose of delivering geological disposal and providing solutions for the management of higher activity waste.

**Relevant principal local authorities**

A principal local authority is a district, county or unitary authority. Relevant principal local authorities will be the principal local authorities that represent people in all or part of the area under consideration, whether the Search Area or the Potential Host Community.

**Right of Withdrawal**

The ability for a community or RWM to withdraw from the siting process.

**Search Area**

The Search Area is the geographical area encompassing all the electoral wards within which RWM will be able to search for potential sites. For areas which include potential for development under the seabed, the Search Area will comprise only that area on land.

**Test of Public Support**

A mechanism to establish whether residents of the Potential Host Community support the development of a GDF within their community.

**Working Group**

The Working Group is formed in the early part of the GDF siting process in order to gather information about the community and provide information to the community about geological disposal before a Community Partnership is formed. It comprises the Interested Party, RWM, an independent facilitator, an independent chair and any relevant principal local authorities that wish to join.

# Sources of Information used to support Initial Evaluations

British Geological Survey (BGS) - *National geological model*

BGS, *National Geological Screening: The Eastern England - Minerals and Waste Programme Commissioned Report CR/17/092, 2018*

East Lindsey District Council, *East Lindsey Local Plan Core Strategy Adopted July 2018*

East Lindsey District Council, *East Lindsey Economic Baseline 2016*

East Lindsey District Council, *East Lindsey STEAM (tourism) Report 2018*

Greater Lincolnshire Local Enterprise Partnership, *Greater Lincolnshire LEP Strategic Economic Plan 2014-2030 – Refresh Spring 2016, 2016*

Neighbourhood Statistics 2011. Office for National Statistics.

RWM - *National Geological Screening – Eastern England – Regional Geology, 2018*

RWM - *National Geological Screening – Eastern England Subregion 2, 2018*

RWM, *Geological Context Brief, East Lindsey District (and wider Lincolnshire County), June 2020*

RWM, *Environment Context Brief, East Lindsey District (and wider Lincolnshire County), June 2020*

RWM, *Community Context Brief, East Lindsey District (and wider Lincolnshire County), June 2020.*

# Mapping Data

## Endnotes

### Mapping Data

Source
OS Boundary Line Open Data, June 2019 Ordnance Survey data © Crown copyright and database rights

### Endnotes

- i. Geological Disposal - GOV.UK ([www.gov.uk](http://www.gov.uk))
- ii. East Lindsey Core Strategy 2018.
- iii. Site Evaluation – How we will Evaluate Sites in England, RWM (February 2020).
- iv. Community Guidance for England, RWM (December 2018).



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