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ABBAY FARM, ROCHESTER
Flood Risk Assessment and Drainage Strategy

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Flood Risk Assessment and Drainage Strategy

Clients: Provectus Development Management Ltd

Engineer: Create Consulting Engineers Limited
3-7 Temple Avenue,
Temple
London
EC4Y 0HP

Tel: 020 7822 2300
Email: enquiries@createconsultingengineers.co.uk
Web: www.createconsultingengineers.co.uk

Report By: Grace Beard, Bsc (Hons), Msc GradCIWEM

Reviewed By: Graham Sinclair, BSc (Hons), MSc, DIC, C.WEM, MCIWEM

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Registration of Amendments

Revision and Date	Amendment Details	Revision Prepared By	Revision Approved By

1.0 INTRODUCTION

Brief

- 1.1 Create Consulting Engineers Ltd were instructed on behalf of Provectus Development Management Ltd to undertake a Flood Risk Assessment (FRA) inform a planning application for prior approval of barn conversion.

Project Context

- 1.2 The Site comprises a parcel of 0.069 ha of land, as shown in Figure 1.1. The Clients intend to submit a prior approval planning application to develop the Site with five terraced units and associated access and infrastructure. Architect's Layouts showing the proposed scheme are included on Drawing P05 22005.

Planning Policy Context

- 1.3 The potential consequences of inappropriate development in a flood risk area for occupiers, either of the development or elsewhere, pose significant risks in terms of personal safety and damage to property.

National Policy

- 1.4 The National Planning Policy Framework¹ (updated 2021) includes Government policy on development and flood risk stating that:

167. When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

- a) Within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*
- b) The development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;*
- c) It incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*
- d) Any residual risk can be safely managed; and*
- e) Safe access and escape routes are included where appropriate, as part of an agreed emergency plan.*

¹ Ministry of Housing, Communities & Local Government., 2021. *National Planning Policy Framework (NPPF)*. [Online]. Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2> [Accessed December, 2022].

- 1.5 The Planning Practice Guidance to the NPPF² (updated August 2022) requires that at the planning stage, the developer should prepare and submit an appropriate FRA to demonstrate how flood risk from all sources of flooding to the development itself and flood risk to others will be managed now and when taking climate change into account.
- 1.6 To comply with the NPPF a FRA must be submitted for planning applications for developments within flood zones 2 and 3 (medium or high risk of fluvial or tidal flooding) and for all developments located in Flood Zone 1 (low risk) which are 1 hectare or greater; which has been identified by the Environment Agency as having critical drainage problems; identified in a strategic flood risk assessment as being at increased flood risk in future; or that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.
- 1.7 An FRA should be appropriate to the scale, nature and location of the development and should identify and assess the risk from all sources of flooding to and from the development and demonstrate how any flood risks will be managed over the lifetime of the development.
- 1.8 An assessment of surface water and drainage is also required as part of the FRA in order to demonstrate how flood risk to others will be managed following development and taking climate change into account.

County Council Policy

- 1.9 Kent County Council act as Lead Local Flood Authority (LLFA) for the area and are a statutory consultee for all major developments⁴, which includes the following:
- the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or
 - development carried out on a site having an area of 1 hectare or more.
- 1.10 The LLFA have produced a number of Flood Risk to Communities reports which cover the main settlement areas within the county⁵, a Drainage and Planning Policy Statement⁶ and District Level Surface Water Management Plans⁷ which together include construction standards and provide assistance to developers in creating sustainable drainage systems on their sites as well

² Ministry of Housing, Communities & Local Government., 2021. *Planning Practice Guidance (PPG) - Flood Risk and Coastal Change*. [Online]. Available at: <http://planningguidance.planningportal.gov.uk/> [Accessed December 2022].

⁴ The Town and Country Planning (Development Management Procedure) (England) Order 2015 (Accessed December 2022) http://www.legislation.gov.uk/ukxi/2015/595/pdfs/ukxi_20150595_en.pdf

⁵ Kent County Council. *Flood Risk to Communities*. [Online]. Available at: <https://www.kent.gov.uk/about-the-council/strategies-and-policies/environment-waste-and-planning-policies/planning-policies/flooding-drainage-and-water-management-policies-and-guidance/flood-risk-to-communities> (Accessed December 2022)

⁶ Kent County Council. *Drainage and Planning Policy Statement*. [Online]. Available at: <https://www.kent.gov.uk/about-the-council/strategies-and-policies/environment-waste-and-planning-policies/planning-policies/flooding-drainage-and-water-management-policies-and-guidance/drainage-and-planning-policy-statement> (Accessed December 2022)

⁷ Kent County Council. *Surface Water Management Plans*. [Online]. Available at: <https://www.kent.gov.uk/about-the-council/strategies-and-policies/environment-waste-and-planning-policies/planning-policies/flooding-drainage-and-water-management-policies-and-guidance/surface-water-management-plans> (Accessed December 2022)

as the LLFA's consenting policy and various protocols. Kent County Council also provide guidance within their Preliminary Flood Risk Assessment (PFRA)⁸ and Local Flood Risk Management Strategy⁹ on development and flood risk.

District Council Planning Policy

- 1.11 Gravesham Borough Council are the district council for the area, however, the LLFA (KCC) are authority for all ordinary watercourses, surface water flooding, private drainage, river and coastal flooding and groundwater flooding.

Other Policy

- 1.12 The Thames Estuary 2100 project (TE2100) is an EA initiative established in 2002 to facilitate the development of long-term tidal flood risk management options for London and the Thames Estuary.
- 1.13 The Project has divided the Thames Estuary into 23 separate Policy Management Units (PMU) based upon the character of the local area and the likely floodwater flow paths during a flood event. The TE2100 Plan has divided Thurrock into four PMUs covering Shellhaven and Fobbing Marshes; East Tilbury and Mucking Marshes; Purfleet, Grays and Tilbury; Rainham Marshes and the Mardyke. The TE2100 Plan highlights that defences should be maintained to their current level into the future, although this would result in an increase in flood risk over time as sea-levels rise due to the impacts of climate change. Opportunities in these areas to manage the floodplain through effective land-use and emergency planning, as well as making space for water must therefore be sought.

Climate Change

- 1.14 Climate change has important implications for the assessment and management of flood risk. The NPPF requires that climate change is considered when making an assessment of flood risk posed to future development.
- 1.15 Climate change has the potential to affect all identified sources of flooding at the Site. The likely impacts of climate change include increased severity of rainfall events as well as wetter winters leading to higher groundwater levels and increased frequency and severity of surface water flooding.

⁸ Kent County Council., 2011. *Preliminary Flood Risk Assessment*. [Online]. Available at: https://www.kent.gov.uk/_data/assets/pdf_file/0013/12091/Preliminary-flood-risk-assessment.pdf (Accessed December 2022)

⁹ Kent County Council., 2017-2023. *Local Flood Risk Management Strategy*. [Online]. Available at: https://www.kent.gov.uk/_data/assets/pdf_file/0010/79453/Local-Flood-Risk-Management-Strategy-2017-2023.pdf (Accessed December 2022)

- 1.16 The influence of climate change on rainfall intensity has been taken into account during the flood review based on EA correspondence confirming that this was the most appropriate level to use in regard to this site. This has been undertaken in accordance with NPPF requirements, and 'Flood Risk Assessments: Climate Change Allowances'¹⁰.

Objectives

- 1.17 The following specific objectives were set by Create Consulting Engineers Ltd after a review of the available data:
- To assess the suitability of the scheme in relation to all sources of flooding;
 - To assess the flood risk posed by the scheme once it is complete and operational;
 - To suggest mitigation measures in order to reduce any residual risks to acceptable levels.

Constraints and Limitations

- 1.18 The copyright of this report is vested in Create Consulting Engineers Ltd and the Clients, Provectus Development Management Ltd. The Clients, or their appointed representatives, may copy the report for purposes in connection with the development described herein. It shall not be copied by any other party or used for any other purposes without the written consent of Create Consulting Engineers Ltd or the Clients.
- 1.19 Create Consulting Engineers Ltd accepts no responsibility whatsoever to other parties to whom this report, or any part thereof, is made known. Any such other parties rely upon the report at their own risk.
- 1.20 The Flood Risk Assessment addresses the flood risk posed to and from the proposed development, the extent of which is shown by the Site boundary, as indicated on the attached drawings.
- 1.21 This report has been undertaken with the assumption that the Site will be developed in accordance with the above proposals without significant change. The conclusions resulting from this study are not necessarily indicative of future conditions or operating practices at or adjacent to the Site.
- 1.22 Create Consulting Engineers Ltd has endeavoured to assess all information provided to them during this appraisal. The report summarises information from a number of external sources and cannot offer any guarantees or warranties for the completeness or accuracy or information relied upon. Information from third parties has not been verified by Create Consulting Engineers Ltd unless otherwise stated in this report.

¹⁰ Environment Agency., 2022. *Flood Risk Assessments: Climate Change Allowances*. [Online]. Available at: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances> [Accessed December , 2022].

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- 1.23 The revised Construction (Design and Management) Regulations 2015¹¹ (CDM Regulations) came into force in April 2015 to update certain duties on all parties involved in a construction project, including those promoting the development. One of the designer's responsibilities is to ensure that the client organisation, in this instance Provectus Development Management Ltd, is made aware of their duties under the CDM Regulations. Further information on the CDM Regulations is provided in the client guide and is available online. It has been assumed for the purposes of this assessment that the lead designer will be responsible for advising the Client.
- 1.24 The approach to this FRA follows the ethos of the CDM Regulation, in as much as during the assessment process the proposed development is considered and any foreseeable associated health and safety flood risks are identified. It is then considered how these flood risk can be eliminated, or mitigations identified to reduce or control them. The outcome of this assessment process is presented in this report. While preparing this FRA no other noteworthy or unique health and safety risk have been identified.

¹¹ Health and Safety Executive., 2015. *Construction (Design and Management) Regulations*. [Online]. Available at: <http://www.hse.gov.uk/pubns/indg411.pdf> [Accessed December2022].

2.0 SOURCES OF INFORMATION

- 2.1 The information contained in this report is based on a review of existing information and consultation with interested parties.

Records Review

- 2.2 Key reports and websites reviewed as part of this study are listed in Table 2.1 below.

Document/Website	Author/Publisher	Date
Fluvial/Tidal Flood Maps, Groundwater Mapping – https://flood-warning-information.service.gov.uk/long-term-flood-risk/map	Environment Agency (EA)	Accessed December 2022
Surface Water and Reservoir Flood Mapping – Data.gov.uk	GOV.UK	Accessed December 2022
BGS GeoIndex – Geology and borehole records - www.bgs.ac.uk/geoindex	British Geological Survey	Accessed December 2022
Architect layout plans (Drawings P 05 2022 08 23 ABBEY FARM)	Architect	August 2022
Existing Site Layout (Topographic Survey) Drawing: 16541-22	Surveyor	August 2022
SW clean water asset plans (included as Appendix A) and SW water asset plans (included as Appendix B)	Southern Water	October 2022
Surface Water Management Plan for Hoo and Rainham, Kent	JBA Consulting	May 2020
Preliminary Flood Risk Assessment	Kent County Council	September 2011
Strategic Flood Risk Assessment	Kent County Council	June 2013
Local Flood Risk Management Strategy	Kent County Council	June 2013
P05/2022 08 23 ABBEY FARM	Proposed Site plan	April 2022
P 02 REV 2 2022 08 23 ABBEY FARM	Proposed plans	April 2022
P 03 REV D 2022 08 23 ABBEY FARM	Proposed plans	April 2022
P 04 2022 08 23 ABBEY FARM	Elevations	April 2022
P 05 2022 08 23 ABBEY FARM(1.0)	Existing and proposed block plan	August 2022
16541-22	Topographic Survey	August 2022

Table 2.1: Key Information Sources

Consultation

- 2.3 The agencies and individuals consulted as part of this exercise to obtain records or seek input to the proposals as part of this FRA are listed in Table 2.2 and key records are included in the appendices.

Consultee	Form of Consultation	Topics Discussed and Actions Agreed
Southern Water Developer Services Team	Request for Asset Plans	Asset plans were requested in order to inform the foul and surface water drainage strategies. The clean and foul water plans (Appendix A and Appendix B respectively), dated 31 st ,October, 2022 show foul water assets in the vicinity of the Site. Clean water plans show a water main and a hydrant near the vicinity of the site. Foul water asset plans do not show any asset plans within the vicinity of the site.
Layo Oluwole Flood & Coastal Risk Management Officer Partnership & Strategic Overview - South East London & North Kent Environment Agency	Request for Product 4/5/6/7/ data	A product 4 report was requested on 3 rd October 2022 details of which are included in subsequent chapters of the report below. The data was received on the 18/10/22 and contained the data discussed in the report below.
	Correspondence with the EA	Email was sent to query the data that was received.

Table 2.2: List of Parties Consulted**Site Walkover**

- 2.4 A site walkover has not been undertaken by Create Consulting Engineers Ltd.

Site Investigation

- 2.5 No Site Investigation has been carried out for the purposes of this assessment.

3.0 SITE SETTING

Site Location

- 3.1 The Site lies to the West of Gravesend, Kent, at Ordnance Survey grid reference 571689E, 174211N. The Site lies within the administrative area of Kent County Council (KCC) and consists of an existing barn surrounded by agricultural fields and assumed agricultural buildings. There is also a residential area to the south of the proposed site boundary and a dairy farm 0.64 km south of the site boundary.

Description of Site and Surroundings

- 3.2 The site comprises approximately 0.069 ha of brownfield land, with ditches and a watercourse to the north and east of the site and arable fields to the west.
- 3.3 The Site is regularly shaped and is formed mainly of undeveloped arable land bounded by a mixture of hedgerow and woodland vegetation. There are also areas of grassland and trees along field boundaries. and a watercourse number of small ponds at various places along the Site boundary. The site comprises of an existing barn with a road and associated infrastructure surrounding it.
- 3.4 The Topographic Survey, included with this report on Drawing 16541-22, summarises elevations in the area of the Site. The site levels are generally between 3.2mAOD (in the north) and 3.5 mAOD (to the south).

Geological/Hydrological Setting

Underlying Geology

- 3.5 British Geological Survey (BGS) mapping (1:50,000 scale)¹² (Figure 3.1) identifies bedrock geology at the Site to comprise Lambeth Group (sand, silt and clay).
- 3.6 Superficial deposits across the majority of the Site (Figure 3.2) comprise the Alluvium (clay, silt, sand and gravel).
- 3.7 There are no Proximate BGS borehole records¹³ but a borehole (TQ77SW3) 527 m south west from the site details Alluvium until 39 mbgl, Upper Chalk to 112 mbgl, middle chalk until 104 mbgl, lower chalk until 246 mbgl and gault until 302 mbgl.

¹² British Geological Survey (BGS) Onshore GeoIndex., 2022. *DiGMapGB-50 Bedrock Geology and Superficial Deposits*. [Online]. Available at: www.bgs.ac.uk/geoindex [Accessed December, 2022].

¹³ British Geological Survey (BGS) Onshore GeoIndex., 2022. *Borehole records*. [Online]. Available at: www.bgs.ac.uk/geoindex [Accessed December, 2022].

Surface Watercourses

3.8 The nearest watercourse to the site is 56.0 m to the north, as shown on Figure 3.3. There are also ordinary watercourses to the south of the site which form part of the larger Shome and Higham marshes, these are primarily used to reduce groundwater levels with pumps or sluice gates to discharge flows to the sea. The Thames and Medway Canal is 0.96 km to the south west and the Medway River is 5.49 km to the south east. The River Thames is located 1.72 km north of the site and is tidal at this location .

3.9 The EA's river quality maps¹⁴ indicate that the water quality in the Cliffe Pools South downstream of the Site, which is the receiving watercourse for runoff from the Site, has "Good" ecological quality.

3.10 According to the Defra Magic website¹⁵, the Site is within a Nitrate Vulnerable Zone (NVZ). NVZ guidance states that an NVZ 'is designated where land drains and contributes to the nitrate found in "polluted" waters'. It defines polluted waters as:

- Surface or ground waters that contain at least 50mg per litre (mg/l) nitrate;
- Surface or ground waters that are likely to contain at least 50mg/l nitrate if no action is taken; and
- Waters which are eutrophic, or are likely to become eutrophic if no action is taken;

3.11 The DEFRA guidance states that water is eutrophic if:

"it contains levels of nitrogen compounds that cause excessive plant growth resulting in "an undesirable disturbance to the balance of organisms present in the water and to the quality of the water".

3.12 The EA website indicates that the NVZ designation for the Site relates to polluted surface water.

Groundwater

3.13 The site is underlain by a Secondary A bedrock aquifer¹⁶ defined by the Environment Agency as:

¹⁴ Environment Agency (EA)., 2022. *Catchment Data Search*, [Online]. Available at: <https://environment.data.gov.uk/catchment-planning/> [Accessed December, 2022].

¹⁵ Department for Environment and Rural Affairs (DEFRA) Magic Website., 2017. [Online]. *Nitrate Vulnerable Zones (NVZ) – Combined (Final Designations)*. Available at: <https://magic.defra.gov.uk/MagicMap.aspx> [Accessed December, 2022].

¹⁶ Department for Environment and Rural Affairs (DEFRA) Magic Website., 2010. [Online]. *Environment Agency Aquifer Designation Data*. Available at: <https://magic.defra.gov.uk/MagicMap.aspx> [Accessed December, 2022].

‘permeable strata capable of supporting water supplies at a local rather than strategic scale and in some cases forming an important source of base flow to rivers’.

- 3.14 The site is also underlain by a Secondary (undifferentiated) superficial deposit aquifer¹⁰.
- 3.15 The Site does not lie within any Groundwater Source Protection Zones¹⁷, as identified by the Environment Agency.
- 3.16 Groundwater was not identified within any proximate boreholes provided by the BGS online mapping service⁷, however it is assumed to be shallow given the local drainage networks present.

Artificial Water Bodies

- 3.17 The nearest water body to the Site is a pond located approximately 386 m north east of the site.

Public Sewers and Water Supply Mains

- 3.18 Southern Water (SW) are the statutory sewerage undertaker for the area and responsible for the operation and maintenance of public sewers serving the area.
- 3.19 There are no foul sewers present in the immediate vicinity of the Site as shown within sewerage asset mapping provided by SW (Appendix B)
- 3.20 SW are also the potable water supplier for the area, asset plans contained within Appendix A, indicate that water supply assets are generally located within the service corridors of the roads in close proximity to the Site, including Church Street to the south and the ‘track’ to the west as described below:
- There is a 3” CL water main running along Church Street past the Old Vicarage and another main following the ‘track, just to the south of Abbey Farm Barn. There are also several water hydrants in the vicinity of the site.

Existing Site Drainage

- 3.21 It is understood that there is no formal drainage network serving the Site, therefore it is assumed that at present rainfall either infiltrates or runs off overland towards the watercourse to the north and west of the site. The roof drainage from the barn is currently assumed to informally runoff to surrounding areas or informally infiltrate.

¹⁷ Department for Environment and Rural Affairs (DEFRA) Magic Website., 2019. [Online]. *Environment Agency Source Protection Zones (Merged)*. Available at: <https://magic.defra.gov.uk/MagicMap.aspx> [Accessed December, 2022].

4.0 SCHEME DESCRIPTION

The Scheme

- 4.1 The Client intends to apply for prior planning permission to develop the site with five terraced units and associated access and infrastructure.
- 4.2 The proposed scheme is shown on Drawing 'P05 2022 08 23 ABBEY FARM' appended with this report.

Proposed Land Use Vulnerability Classification

- 4.3 The development is proposed to include residential dwellings which is defined as a 'more vulnerable' use according to the NPPF.
- 4.4 Given the nature of the application, the Sequential and Exception tests are not required.

5.0 FLOOD RISK ASSESSMENT

Scope of Work

- 5.1 The scope of this FRA was refined to meet the brief outlined in Chapter 1 of this report and considers the following:
- Flood risk to the development from all sources;
 - Potential for the design, construction and operation of the Site to increase the risk of flooding to neighbouring properties;
 - Any necessary mitigation measures to mitigate identified potential flood risks;
 - Climate change;
 - Residual flood risks.
- 5.2 The approach is consistent with the NPPF¹ and its associated Technical Guidance² along with the requirements of local planning policy.

Flood Risk to the Proposed Development

Flood Risk from Fluvial/Tidal Sources

- 5.3 EA flood mapping¹⁸, as shown on Figure 5.1, indicates that the Site is located within Flood Zone 3. Flood Zone 3 is defined as areas with a 'high' probability of inundation defined as having 1% or greater probability of flooding from rivers or 0.5% or greater probability of flooding from the sea.
- 5.4 This flood zone designation does not take into account the presence of existing or proposed defences. The EA flood map shows that the Site is in fact located within 'an area benefitting from flood defences'.
- 5.5 In order to further assess the tidal flood risk at the site, modelled flood data was requested from the EA. We received the North Kent Coast Modelling (2018) and the Thames Tidal Downriver Breach Inundation Modelling (2018) which combined, contain various 'defended' and 'undefended' scenarios for the site boundary. As the site is currently 'defended', according to the EA flood map, the modelled 'defended' scenarios have been used to form this assessment. This is because the 'undefended' model scenarios are based on the assumption that the existing defences have been entirely removed, which is not the most appropriate for this site.

¹⁸ Environment Agency., 2022. *Flood Map for Planning (Rivers and Sea) - Flood Zone 2 and Flood Zone 3*. [Online]. Available at: <https://data.gov.uk/dataset/cf494c44-05cd-4060-a029-35937970c9c6/flood-map-for-planning-rivers-and-sea-flood-zone-2> [Accessed December, 2022].

- 5.6 The modelled ‘defended’ scenarios show flood levels for a variety of return periods for both the current day (2016) and climate change (2115) scenarios. For the defended case the 1 in 30 year present day (Figure 5.2), 1 in 200 year present day (Figure 5.3), 1 in 1000 present day (Figure 5.4) and the 1 in 200 climate change design event (Figure 5.5) are all depicted as not encroaching into the site boundary. The maximum flood levels for three events 1 in 30 (2016), 1 in 1000 (2016) and 1 in 200 (2115) are detailed below.

Return Period	Modelled flood levels within the site boundary (mAOD)
1 in 30 year (3.3%) (Present day- 2016)	0.0
1 in 200 (0.5%) (Present day- 2016)	0.0
1 in 1000 (0.1%) (Present day- 2016)	0.0
1 in 200 (0.5%) (climate change- 2115)	0.0

Table 5.1: Modelled EA Flood Levels from the North Kent Coast Model.

- 5.7 As is clear from Table 5.1 the proposed development does not flood during any of the return periods and is also protected by the existing tidal defence structures as the site remains unaffected by flooding during the 1 in 200-year return period event under both the current day (2016) and climate change scenarios (2115). After conversations with the EA, it was confirmed that the minimum defence crest level in proximity to the site boundary is 5.85 mAOD and the 1 in 200 plus climate change in channel flood level (2115) is 6.165 mAOD (1D in channel flood levels from the North Kent coast 2018 (dom) model). Although this means that the water is overtopping the current defence levels (by 0.315 mA), the flood waters do not reach the site boundary due to the distance from the defences to the site and the finite volume of water available to overtop the defences during this flood event (see Figure 5.5).

Breach Flood Risk

- 5.8 The site boundary is known to be in an area benefiting from flood defences but there will always be a risk that these defences will fail structurally, via a breach. Therefore, the risk of flooding through a scenario such as this is termed ‘residual risk’.
- 5.9 The ‘Thames Tidal Downriver Breach Inundation Modelling (2018)’ has been used to assess this residual risk given it include a 1 in 200 year 2115 climate change enhanced scenario, with breach locations shown in Figure 5.6.
- 5.10 This modelling essentially shows a combined output for the breaches along the River Thames (Figure 5.6) (from the Thames Barrier and Gravesend) and the predicted flood extents for these breaches as a result of the 1 in 200 year plus climate change design event. Therefore,

this was deemed the most appropriate to assess the residual risk to the site as a result of a breach flood event.

- 5.11 Using the combined outputs for the 1 in 200 year plus climate change (2115) event, the results show that if there was a breach within the Thames defences (currently protecting the site boundary), the entire site would be flooded (Figure 5.7). The maximum flood level for this event is 3.95 mAOD and the minimum ground level on the site in the immediate vicinity of the barn (using the topographic survey 'P 05 2022 08 23 ABBEY FARM') is 3.14 mAOD. This means that the flood level will be up to 0.73 m in the north and 0.70 m in the south (based on the lowest ground levels).

Flood Risk from Surface Water

- 5.12 The EA Surface Water Flood Mapping²¹, as shown on Figure 5.8, suggest that the site is primarily at a 'very low' risk of surface water flooding from extreme rainfall, which is defined as having a less than 1 in 1000 ($\leq 0.1\%$) probability of flooding. There are a few areas that experience a 'low' risk of surface water flooding, these are within the triangle shaped area to the west of the site just south of the rail track and then south of the site boundary, directly below the southernmost barn.
- 5.13 During the High and Medium risk events (Figures 5.9 and 5.10 respectively) show below 150 mm of surface water flood risk whereas the Low risk event (Figure 5.11), all of the areas described above experience flooding of up to 300-600 mm.
- 5.14 Given the nature of the proposed development and the fact dwellings will be placed away from primary flow routes, it is considered that the risk from surface water flooding is generally low.
- 5.15 Flooding from surface water remains a residual risk due to the potential for rainfall to exceed the design standard of the proposed drainage system and the effects of climate change on the frequency and severity of rainfall events, appropriate mitigation measures are therefore included in Table 7.1 of this report.

Flood Risk from Groundwater

- 5.16 There are no records of groundwater flooding within the Kent County Council PFRA²⁴ nor any within the surrounding area. The PFRA indicates has a Groundwater Risk Areas map (See Figure 6) which shows that the site is within an area of medium risk of groundwater flooding.

²¹ Environment Agency., 2022. *Risk of Flooding from Surface Water Extent: 3.3 percent annual chance, 1 percent annual chance and 0.1 percent annual chance*. [Online]. Available at: <https://data.gov.uk/dataset/95ea1c96-f3dd-4f92-b41f-ef21603a2802/risk-of-flooding-from-surface-water-extent-3-3-percent-annual-chance> [Accessed December, 2022].

²⁴ Kent County Council., 2011. *Preliminary Flood Risk Assessment*. Available at: https://www.kent.gov.uk/_data/assets/pdf_file/0013/12091/Preliminary-flood-risk-assessment.pdf (Accessed December, 2022)

- 5.17 No evidence of water seepage was encountered in the above BGS borehole record (TQ77SW3).
- 5.18 Given the nature of the proposed development, the risk of groundwater flooding in this location is considered to be low.
- 5.19 The effect of climate change on groundwater flooding is also currently uncertain. Milder wetter winters may increase the scale and frequency of flooding however, warmer drier summers may counteract this effect by drawing down groundwater levels to a greater extent during the summer months. This is considered as part of the residual risk identified above and appropriate mitigation measures are included in Table 7.1 of this report.

Flood Risk from Artificial Water bodies

- 5.20 The nearest artificial waterbody to the site is Bucklands Nature reserve located approximately 1.32 km to the north east.
- 5.21 The Site is also not in an area at risk from flooding during a reservoir breach event according to Figure 5.12, therefore flooding from this source is not considered a significant risk and will not be considered further in this report.

Flood Risk from Public Sewers

- 5.22 The PFRA shows no record of sewer flooding affecting the site or the immediate area. The asset plans also confirms that there are no public sewer assets owned or operated by Southern Water on the site or surrounding area.
- 5.23 The risk of sewer flooding is therefore considered to be low.
- 5.24 Sewer flooding from blockage of private site and building drainage is, however, a residual risk managed by the design of the Site drainage and regular inspection and maintenance of the public and private sewer network. The flood risk associated with this source may also increase over time due to the effects of climate change. Appropriate mitigation measures are therefore included in Table 6.1 of this report.

Flood Risk from Water Mains

- 5.25 Flood risk from this source is considered to be a residual risk with no existing mains shown within the supplied SW asset plans (Appendix A) crossing the site or within the immediate area. The main threat therefore will be from damage to newly constructed internal pipe work during the construction phase or as a result of any future individual property building works. Appropriate mitigation measures are discussed in Table 7.1 below.

Flood History

- 5.26 A review of the PFRA confirms no records of flooding affecting the site itself. The only notable event described by the PFRA was the 1953 storm surge affecting the North Kent Coast, this did not affect the site boundary.

Flood Risk Summary

- 5.27 In summary, the risk of flooding from all sources is generally considered to be low to moderate, however a number of residual flood risks remain. Therefore a number of mitigation measures are recommended in Table 7.1 to address and manage the residual risks from these forms of flooding.

6.0 FOUL AND SURFACE WATER DRAINAGE AND FLOOD RISK FROM THE DEVELOPMENT

Existing Foul Water Drainage

- 6.1 As the Site is currently a barn surrounded by both arable land and agricultural buildings it is assumed that there is no existing foul drainage present.

Proposed Foul Water Drainage Strategy

- 6.2 Foul drainage from the proposed dwellings will drain most likely via a private treatment system given the proximity to the Southern Water network.

Existing Surface Water Drainage

- 6.3 it is assumed that at present rainfall either infiltrates or runs off overland towards the watercourse to the north and west of the site. The roof drainage from the barn is currently assumed to informally runoff to surrounding areas or informally infiltrate.

Proposed Surface Water Drainage Strategy

- 6.4 Given the proposals are for internal changes only, and therefore the impermeable area of the Site will remain as existing, following conversion the surface water flow regime will not change (in terms of both volume and rate of runoff). It is therefore proposed that the surface water drainage system for the Site remains as existing, albeit with any necessary repairs/upgrades being carried out to formalise the system.

Drainage Impact from the Proposed Development

- 6.5 There will be a marginal change in the foul water runoff rates, and no change to the surface water runoff from the Site, however, these changes are unlikely to have a significant impact on the local public sewer network.

7.0 MITIGATION MEASURES

7.1 Flood Risk Mitigation measures are proposed in Table 7.1 in order to both mitigate flood risk posed to the development and to ensure the development poses no risk to the surrounding area.

Type of Flooding (Source)	Issue	Mitigation Measures	Justification	Residual Risk *
Flooding from tidal or fluvial sources- the River Thames and River Medway.	Residual from of flooding from a breach of tidal flood defences currently protecting the site from a tidal flood.	- Due to the breach flood level of 3.95 mAOD, the lowest FFL should be 4.55 mAOD (600 mm above the design breach flood level). This is 1.41 m above the current ground levels and FFLs based on the topographic survey (P 05 2022 08 23 ABBEY FARM). If this is not practically possible (as the proposed development is a conversion), then the ground floors will need to be purely sacrificial with no living accommodation at this level. - The Flood Warning and Evacuation plan (See further details below) should be followed by all occupants in the event of a Flood Warning being issued. - Flood Resilient design measures should be implemented and could include, but are not limited to: - Electrical wiring feeding low level points and switches should drop from the ceiling rather than be fed from floor level. Switches and points should be raised as high as reasonably practicable and within Building Regulations standards. - Use of dry-proofing and wet-proofing building materials; - Water resistant coatings for external walls; - Raise plant as high as practically possible; - Use of concrete or hard surfaced floors rather than timber or soft coverings. Or use of waterproof floor coverings with appropriate sealing such as Aquastep; - Location of boilers as high as possible; - PVC windows and external finishes should be used; - Use of plastic or metal alternatives to chipboard or MDF; - Use of concrete ground bearing slab as opposed to a suspended floor to avoid water entry beneath the floor structure; - Partition walls should be constructed such that replacement is not required following a flood event (i.e., solid walls should be used); - Underfloor services using ferrous metals will be avoided where practicable; - Use of self-closing airbricks or air brick covers; - Waterproof pointing to any brickwork; - Inclusion of liquid DPMs over floor screeds; and, - Use of full cell insulation in all walls and floors instead of fibre.	Will ensure the residual risk is minimised for the lifetime of the development.	Low
Flooding from proposed water mains (proposed internal water supply system).	A residual risk of flooding associated with internal water supply and distribution systems may result in flooding of dwellings.	Routine inspection of the Site and public water supply and distribution system by the Site owner and SW.	Will ensure the residual risk is minimised for the lifetime of the development.	Low

Type of Flooding (Source)	Issue	Mitigation Measures	Justification	Residual Risk *
Sewer flooding from existing public and private drainage (foul and surface water).	Blockages or surcharges in the Site drainage (including pump failure) or the public sewer network crossing the Site or in the Site vicinity may result in flooding of the Site.	- Where connections are proposed to a private foul sewer network, required upgrades will be carried out prior to the occupation of the relevant development areas, to ensure suitable capacity is available. - All sewers within development areas will be suitably located and marked prior to the commencement of construction to minimise the risk of strikes during excavation works. - Floor levels of dwellings will be raised above the surrounding area (as per Building Regulations standards). - At the detailed design stage consideration will be given to flood flow routes in the event of a system surcharge/blockage, these will ensure any surcharged water is kept within kerb line and away from properties and all access points. - Consider opportunities for flood resilient design, as above. - A management plan for the maintenance of drainage assets should be prepared and agreed with appropriate authorities as part of the detailed design.	In the event of foul and surface water flooding occurring, these measures will ensure the effects of flooding to external areas and dwellings will be minimised.	Low
	A residual risk of flooding associated with the blockage/surcharge or failure of existing foul and surface water drainage networks remains.		Will ensure the risk of flooding is minimised as far as possible including as part of the detailed design stage	
Flooding from perched/shallow groundwater	Perched or Shallow groundwater may be present or may affect the site in the future during periods of prolonged extreme rainfall, due to the increasing effects of climate change (for rainfall above the design event). This may result in flooding of the internal building in extreme cases.	- Consider the need for groundwater monitoring - Consider the need for dewatering during the construction phase. - Consider the need for waterproofing substructures and any below ground services as part of the detailed design. - Carry out de-watering as necessary through the construction phase. - Where surface and foul water drainage networks are to be placed within any water bearing strata, they should be constructed such that water ingress cannot occur.	Will ensure the risk of flooding and moisture ingress is minimised.	Low
Flooding from surface water runoff – overland flow / ponding	Risk of flooding from rainfall events in exceedance of the site drainage design and by run-off from surrounding areas, may result in on-site property flooding.	- The detailed design of the development will make an allowance for flow routing from rainfall events in exceedance of the drainage design capacity (i.e. the 100 year plus 40% climate change) in accordance with best practice guidance; - External areas will also be profiled so as any runoff will be directed away from dwellings and into the roads and designated open space areas; - Floor levels of all units will be raised above the surrounding area (as per Building Regulations standards); - Appropriate maintenance of downstream riparian watercourses, culverts and main rivers by the respective riparian owners and EA.	Will ensure flood risk from this source is minimised for the lifetime of the development and as updated modelling becomes available, whilst also ensuring no	Low

Type of Flooding (Source)	Issue	Mitigation Measures	Justification	Residual Risk *
	The proposed development areas are outside of all areas of mapped surface water flood risk. A residual risk of flooding for events in excess of those assessed however, remains for development parcels nearest the flood zone, including potential roadway and services crossings and any identified and potential future flow routes within the development parcels.		downstream impacts arise.	
	The development of the Site will increase foul water flows in the local network.	• Routine inspection and maintenance of both the foul water drainage systems private owners, management companies and the adopting authority.		

Table 7.1: Mitigation Measures

*Following adoption of the mitigation measures

Flood Warning and Evacuation Plan

7.2 Table 7.2 summarises the EA Flood warning levels and associated meanings.

Flood Alert Category	What it Means	When it is Used
 Flood Alert (2 hours- 2 days).	Flooding is possible, be prepared	Two hours to two days in advance of flooding
 Flood Warning (30 mins to 1 day).	Flooding is expected, immediate action required	Half an hour to one day in advance of flooding
 Severe Flood Warning	Danger to life	When flooding poses significant threat to life
Warnings No Longer in Force	No further flooding expected in your area	When river conditions begin to return to normal

Table 7.2: Environment Agency Flood Warning Levels.

7.3 It is recommended that in all instances the first port of call should be to evacuate people from the site and away from danger, prior to the onset of flood waters, with refuge being the last resort. This much reduces the burden placed on emergency services during such a flood event, particularly given the significant number of people that could be present on site in this instance.

7.4 The below therefore summarises the recommended flood response procedures recommended for the site. These should be reviewed by the Local Planning Authority, formalized into a standalone document and made available to all future occupants and site management as required.

Information for Residents

7.5 The Site is located in an area which is at risk of tidal flooding from the Coastline from the north of the site. The risk of flooding from tidal sources is likely to be increased due to climate change and the EA should be contacted periodically to check whether the flood levels and/or degree

of protection has changed as this may affect the risk to your site and subsequent safety in the event of a flood.

Summary of Outline Flood Warning Procedures

7.6 The following summarises the flood warning system and sets out the recommended procedures for responding to flood warnings and for evacuation in the event of a flood:

- All residents should have a pre-prepared Flood Kit as outlined below and should be prepared for refuge at the site in the event evacuation cannot be carried out due to rapid onset of flood waters.
- Residents should monitor the online EA flood warnings both online and through signing up to the EA flood warning service whereby telephone messages are provided by the EA to warn occupants of any impending floods. The EA flood warning system is shown in Table 7.2 above and its interpretation for this site is as follows:
 - When the flood warnings reach 'Flood Alert' all residents should prepare for evacuation of the site.
 - When the warning level changes to 'Flood Warning' all residents should evacuate. Evacuation should be made towards to the west of the Site as detailed on Figure 7.1.
 - If safe to do so, residents should also isolate all gas, electricity, and water supplies to the site before they evacuate. In addition, all vehicles should be moved to safety, although it is assumed most will be used to aid occupants' evacuation of the site.
- If flood waters have progressed to the site and the water is fast moving all occupants should not progress through the potentially dangerous flood waters away from the site. Instead, they should take refuge within the ground floor of the proposed development (if the minimum FFL's have been raised to 4.55 mAOD) or they should take refuge in the upper storeys of the development.
- On receipt of a severe warning, occupants are advised to remain at the site as above. A severe flood warning means that severe flooding is expected, this will be issued when flooding poses a significant threat to life and different actions are required, hence the suggestion to take refuge in this instance.
- If taking refuge occupants should remain in contact with the emergency services by phone and cooperate with any instructions issued by the police or other emergency services. As long as occupants make themselves known to the emergency services they will be rescued.
- Residents should not turn services such as gas supply back on again until the service provider confirms it is safe to do so.
- An emergency grab kit should also be kept in each dwelling within the safe refuge areas and maintained on a regular basis. Examples of the contents are detailed below:
 - Bottled water;
 - Non-perishable food items;

- First-aid kits, including a supply of any essential medication;
- Blankets and appropriate items to keep occupant warm and comfortable;
- Appropriate battery powered torches/lighting;

7.7 It should be noted the above plan is outline only and should be developed into a stand-alone document.

8.0 RESIDUAL FLOOD RISKS AND IMPACTS TO SURROUNDING AREAS

Residual Risks

- 8.1 A number of residual risks have been identified mostly associated with the breach of tidal defences and the site flooding as a result of this.
- 8.2 As long as the guidance in the mitigation table (Table 7.1) is followed and the minimum FFL's are at least 600 mm above the design flood level (3.95 mAOD) then the residual risks will be minimised.

Impact on Flood Risk of Surrounding Areas

- 8.3 Given that the proposed development is a conversion of an existing building and the flood risks are residual only, it has been concluded that there will be no major impact to the risks of flooding in other areas, surrounding the Site, assuming the measures proposed in Table 7.1 are implemented throughout the lifetime of the development.

9.0 CONCLUSIONS AND RECOMMENDATIONS

- 9.1 Based on our understanding of the Site setting and the development proposals, it is considered that the risk of flooding from all sources is generally low to moderate with the residual risk of tidal breach flooding being high, development can be operated safely and without significantly increasing flood risk elsewhere as long as mitigation measures (Table 7.1) are implemented.
- 9.2 We recommend that the assessment of residual risks should be reviewed by site owners as new flood risk information becomes available, and the flood risk associated with adjacent sewers may also increase over time in the area due to climate change.

10.0 REFERENCES

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- viii. Environment Agency., 2022. Flood Map for Planning (Rivers and Sea) - Flood Zone 2 and Flood Zone 3. [Online]. Available at: <https://data.gov.uk/dataset/cf494c44-05cd-4060-a029-35937970c9c6/flood-map-for-planning-rivers-and-sea-flood-zone-2> [Accessed December, 2022].
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 - xii. Kent County Council, 2011. Preliminary Flood Risk Assessment. [Online]. https://www.kent.gov.uk/__data/assets/pdf_file/0013/12091/Preliminary-flood-risk-assessment.pdf [Accessed December, 2022]
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FIGURES

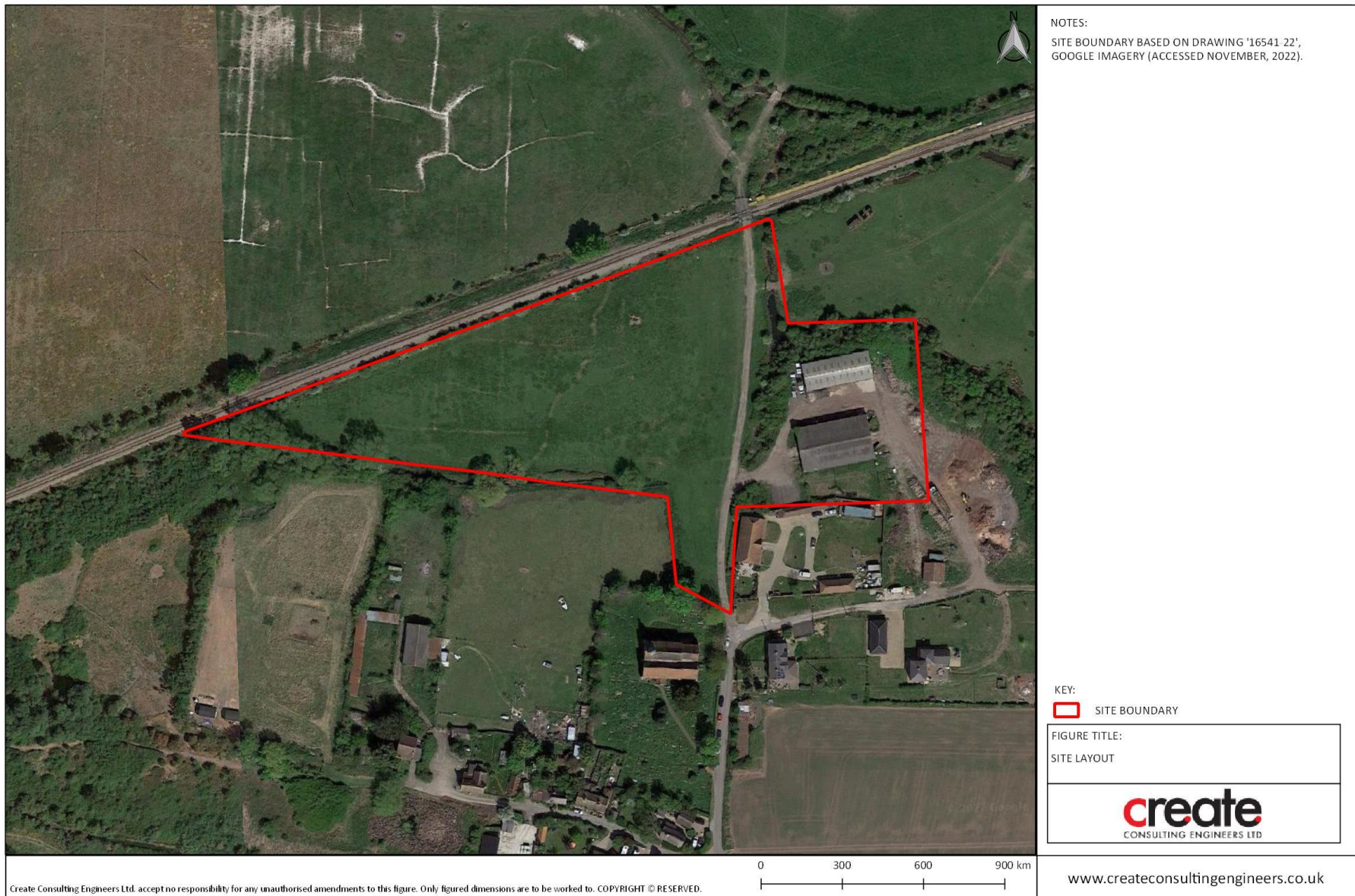


Figure 1.1 Site Location

Source: Google Earth Mapping (2022)

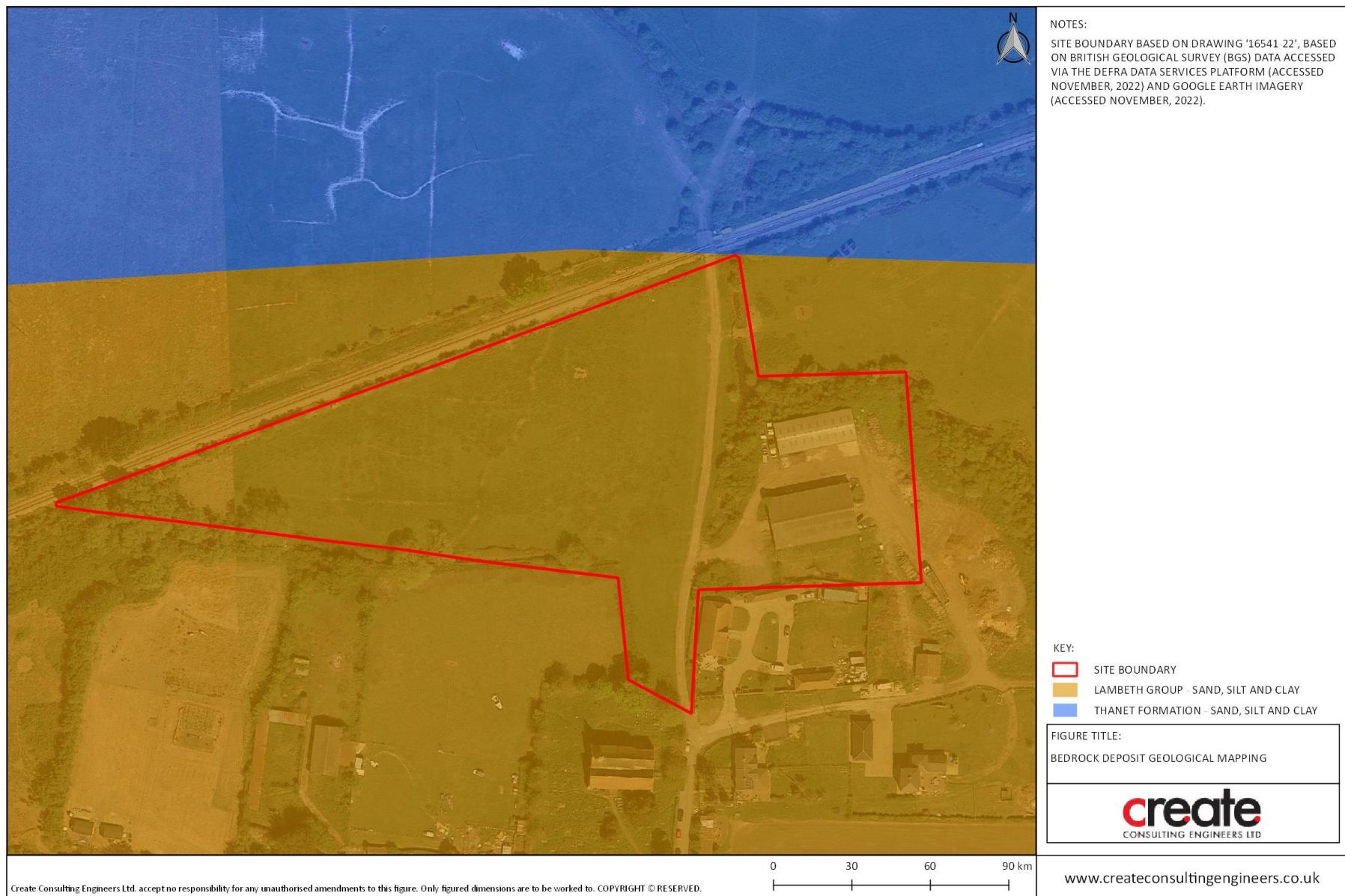


Figure 3.1 British Geological Survey Bedrock Geology Mapping Extract (1:50,000 scale)

Source: BGS Web Map Services (<https://www.bgs.ac.uk/data/services/wms.html>)

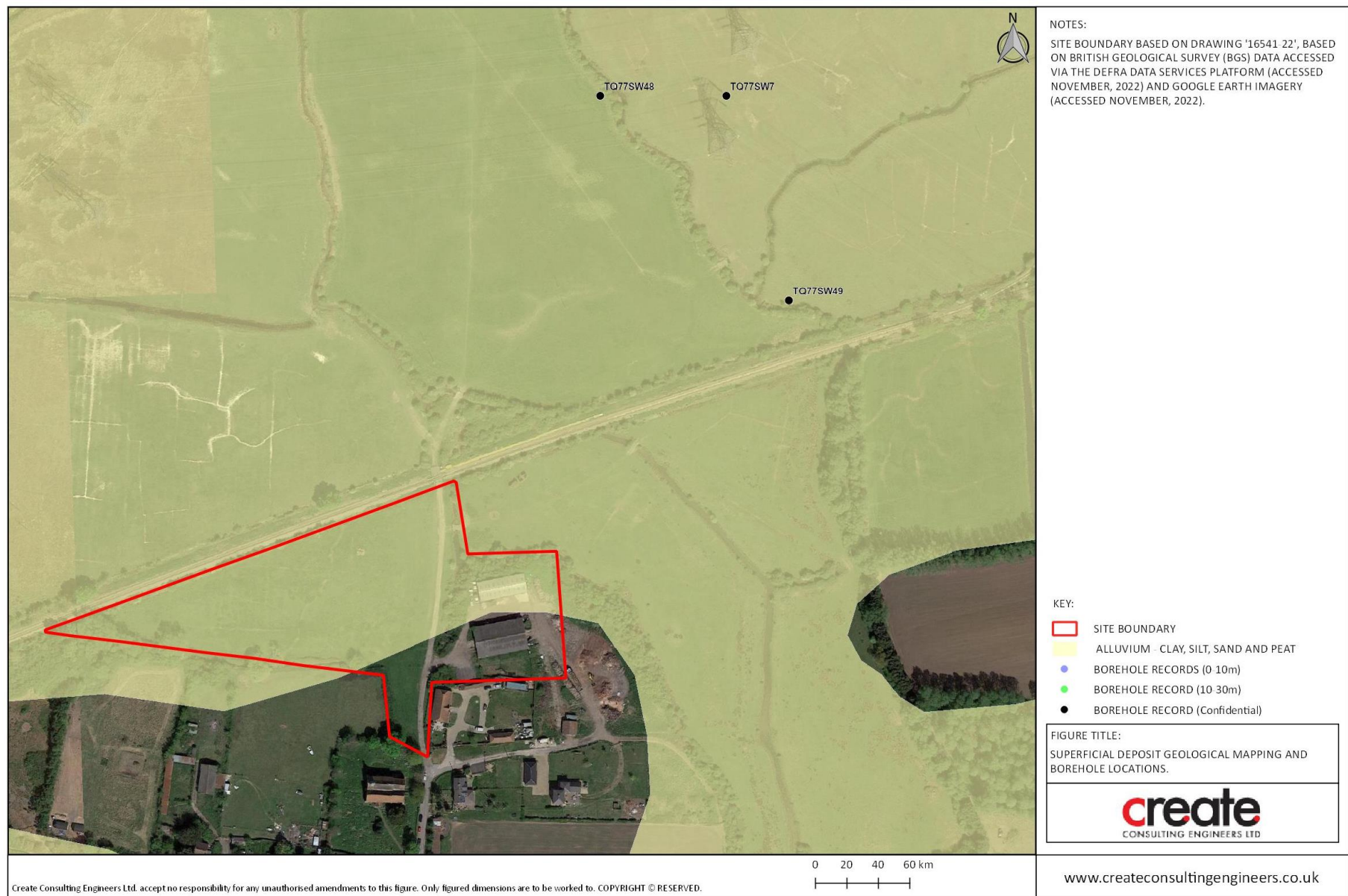


Figure 3.2 British Geological Survey Superficial Geology Mapping Extract (1:50,000 scale)

Source: BGS Web Map Services (<https://www.bgs.ac.uk/data/services/wms.html>)

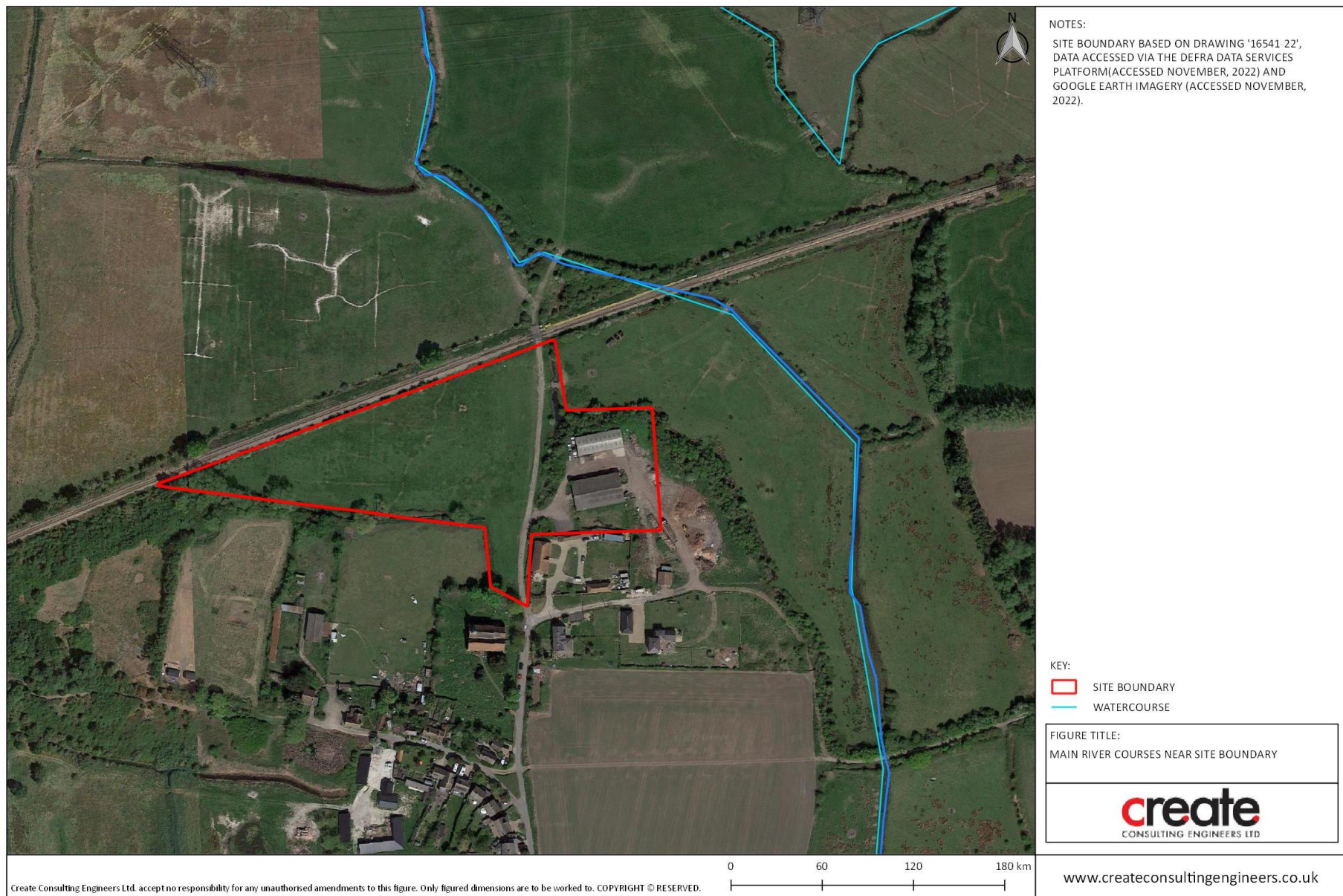


Figure 3.3: Identified Local Watercourse Map

Source: Defra Data Services Platform (<https://environment.data.gov.uk/>)

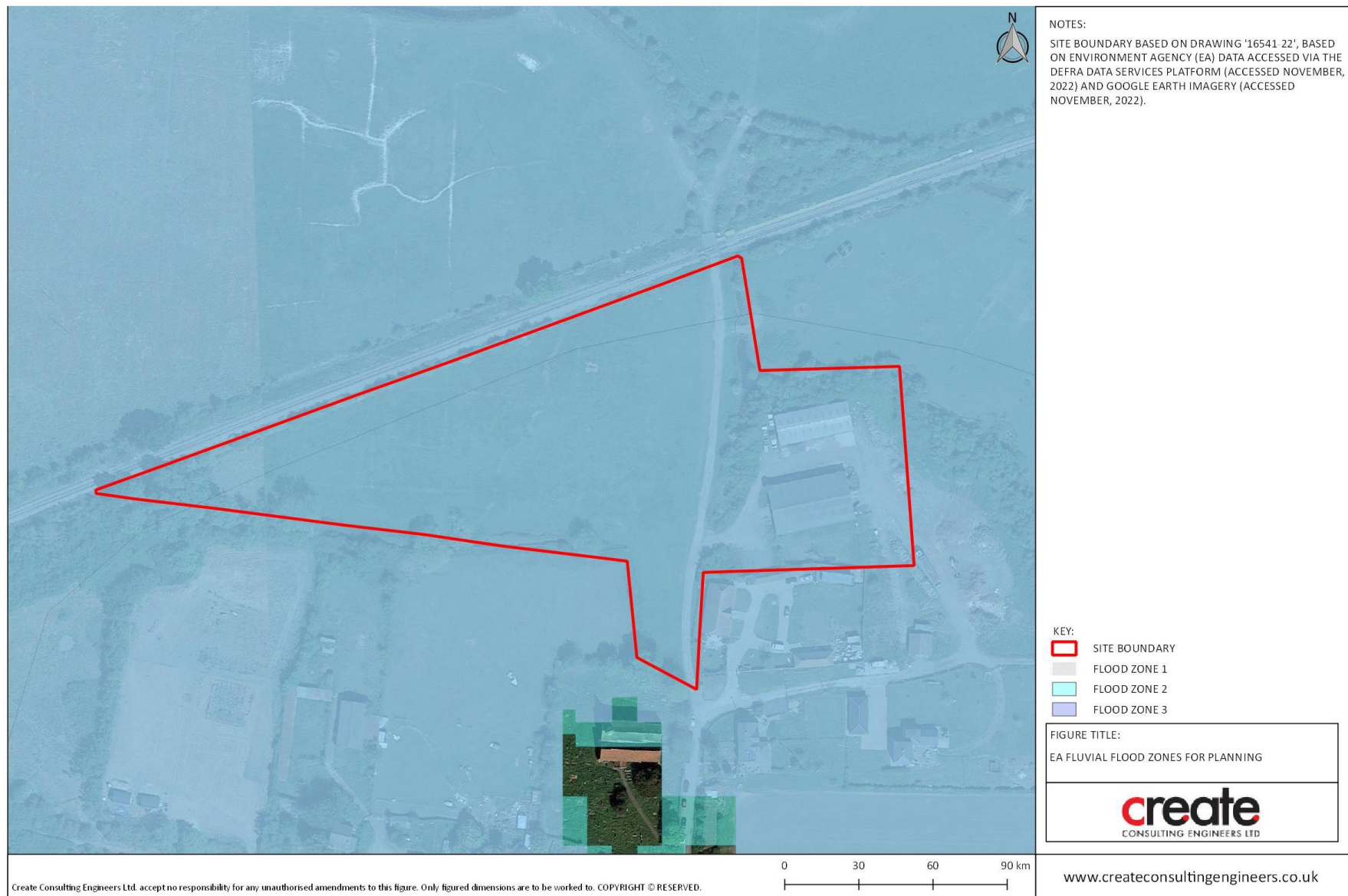


Figure 5.1: Environment Agency's Fluvial/Tidal Flood Map

Source: Defra Data Services Platform (<https://environment.data.gov.uk/>).

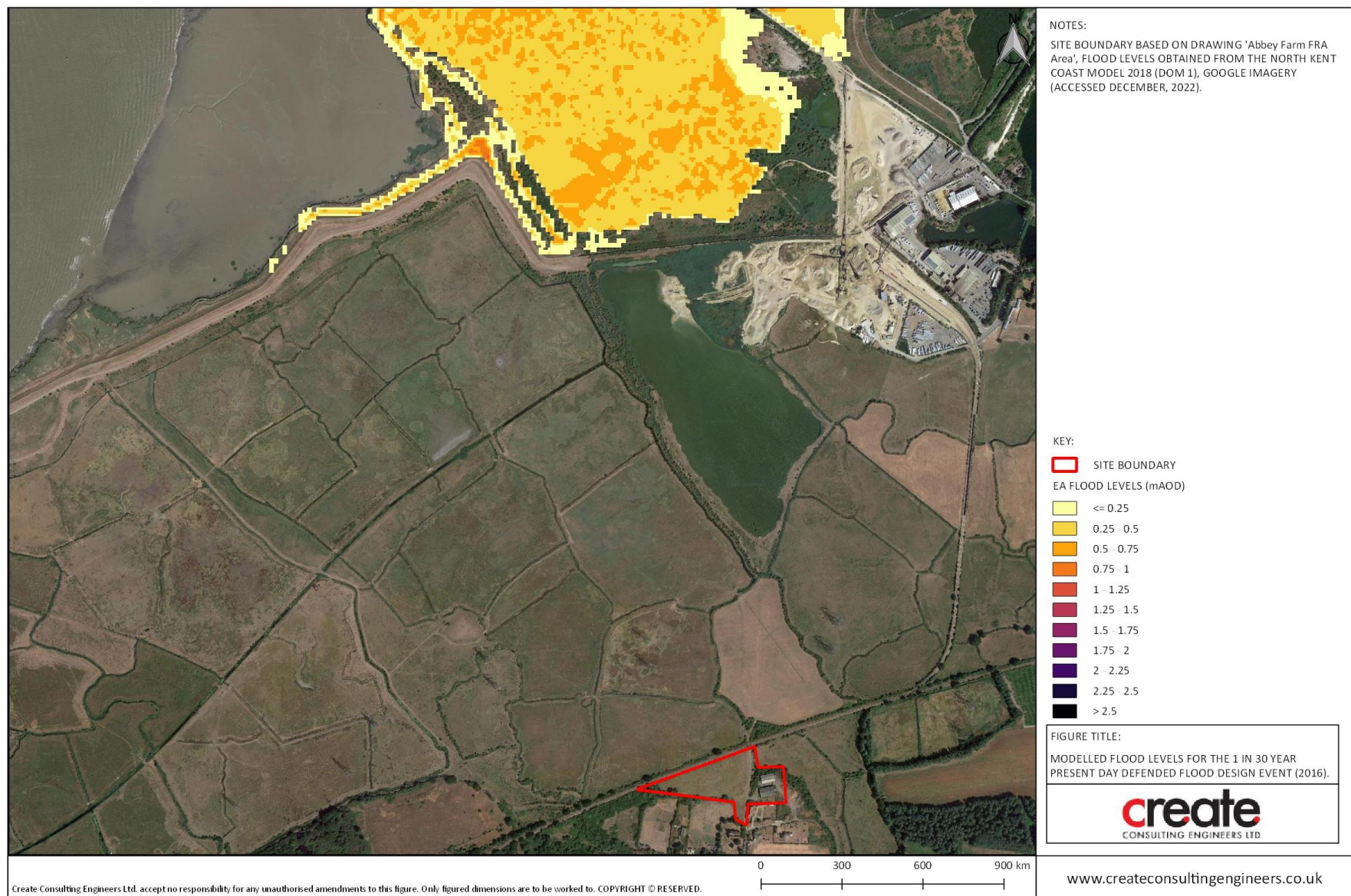


Figure 5.2: Flood Extent for the 1 in 30 year present day defended scenario (2016)

Source: Environment Agency's North Kent Coast Model (2018)

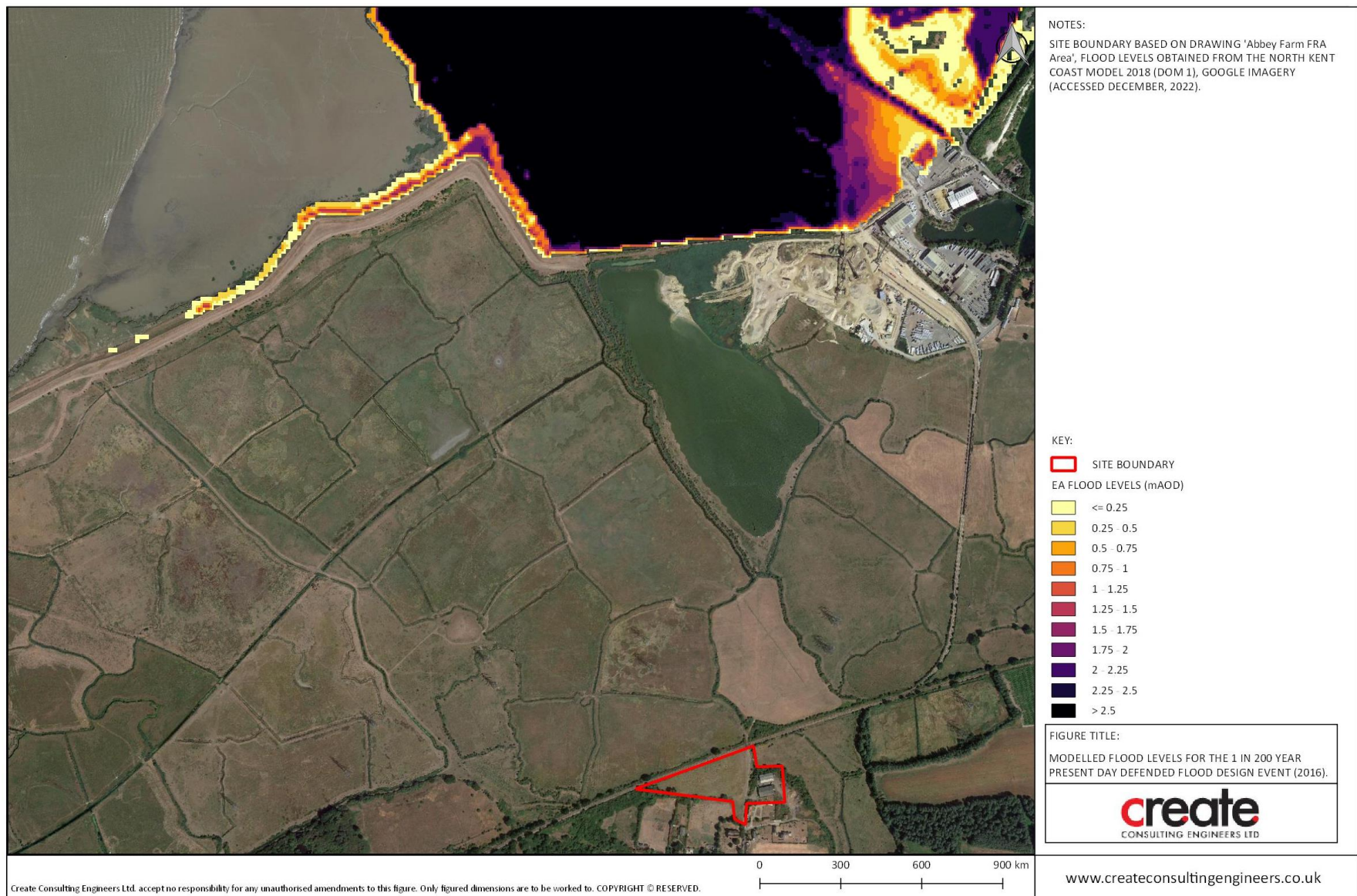


Figure 5.3: Flood Extent for the 1 in 200 year present day defended scenario (2016)

Source: Environment Agency's North Kent Coast Model (2018)

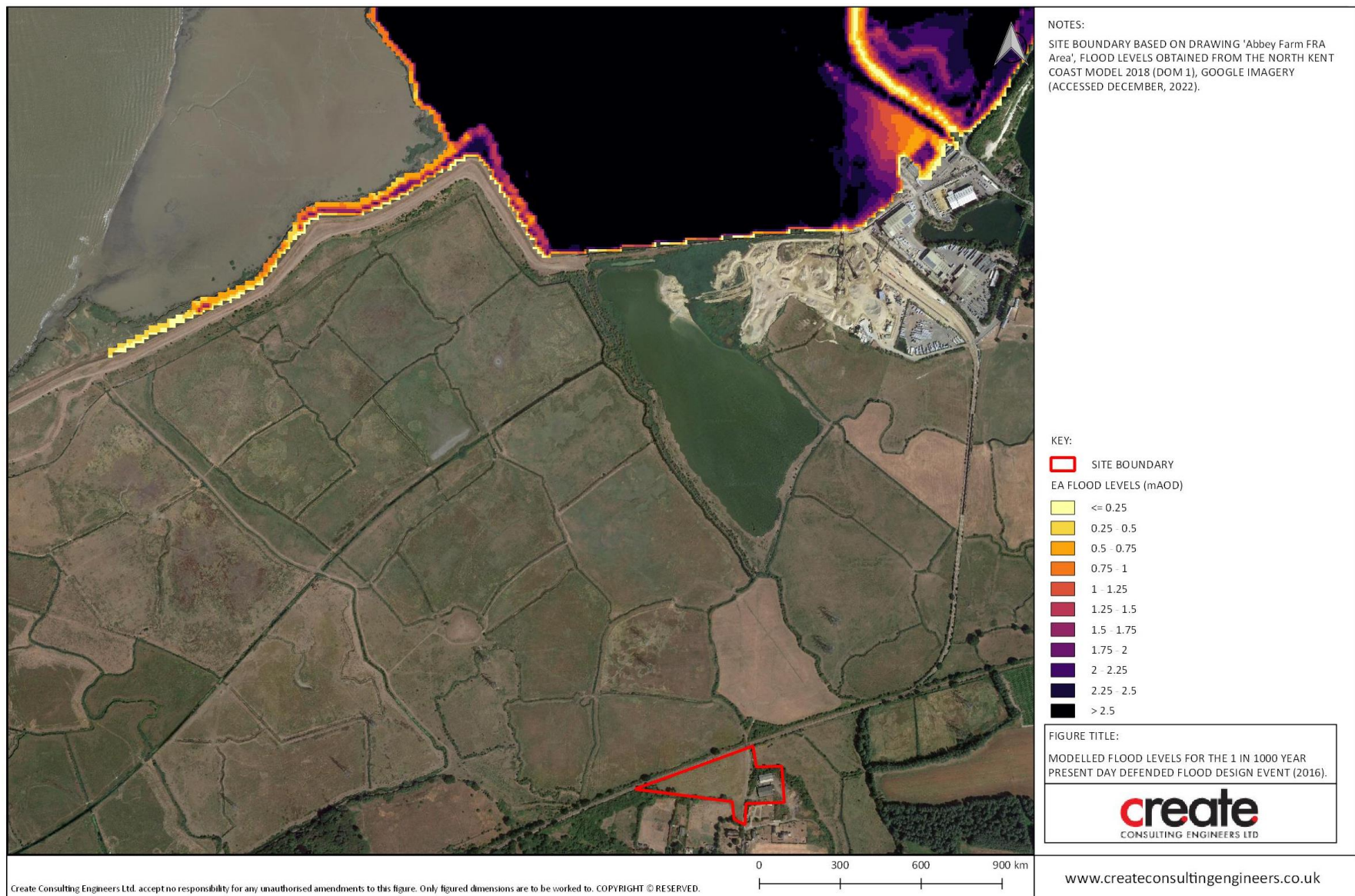


Figure 5.4: Flood Extent for the 1 in 1000 year present day defended scenario (2016)

Source: Environment Agency's North Kent Coast Model (2018)

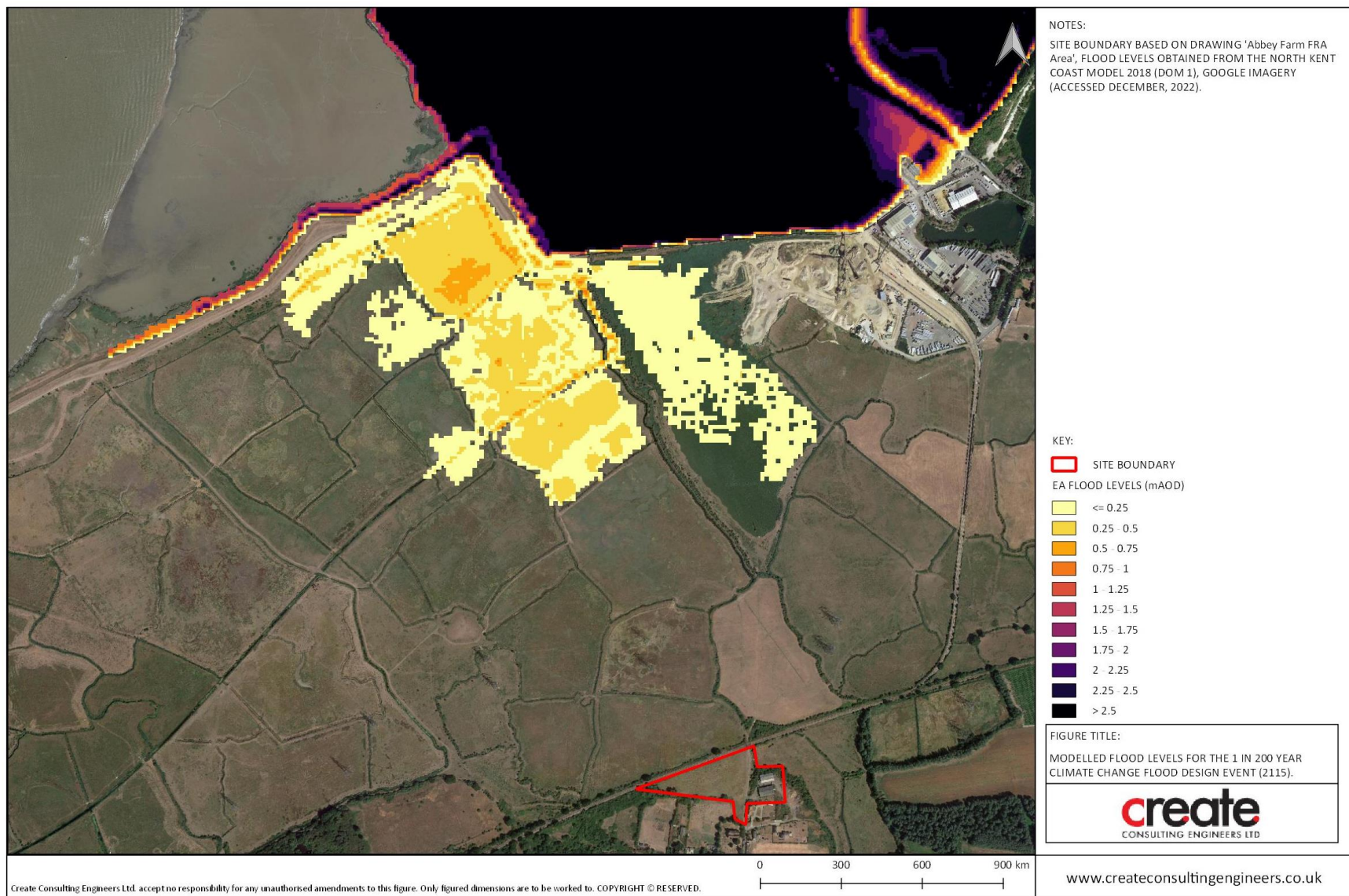


Figure 5.5: Flood Extent for the 1 in 200 year climate change defended scenario (2115)

Source: Environment Agency's North Kent Coast Model (2018)



Figure 5.6: Breach Locations in proximity to the site.

Source: Environment Agency's North Kent Coast Model (2018)

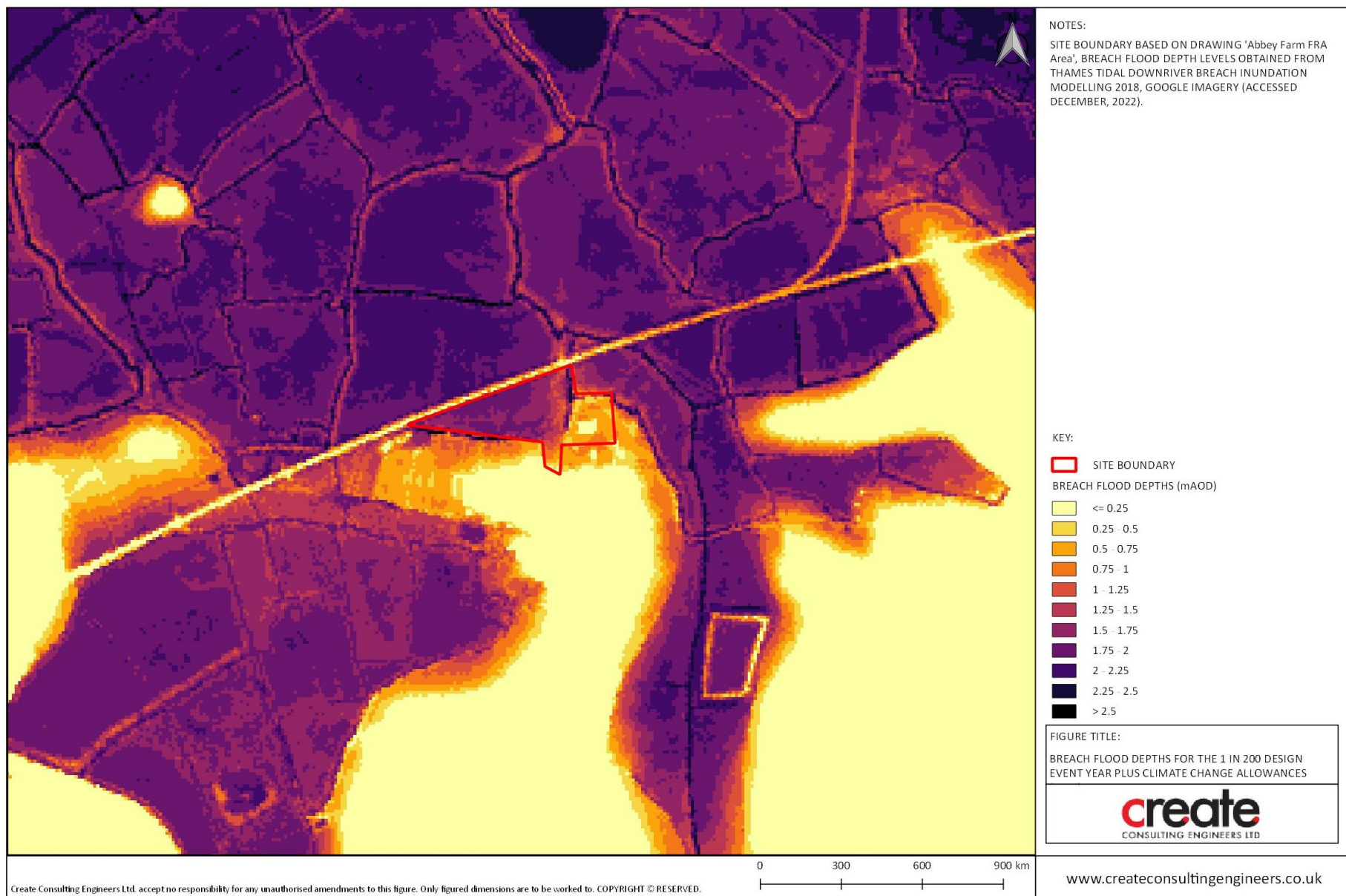


Figure 5.7: Breach Flood Heights for the 1 in 200 year flood event (2115) (plus climate change allowance).

Source: Environment Agency's Thames Tidal Downriver Breach Inundation Model (2018)

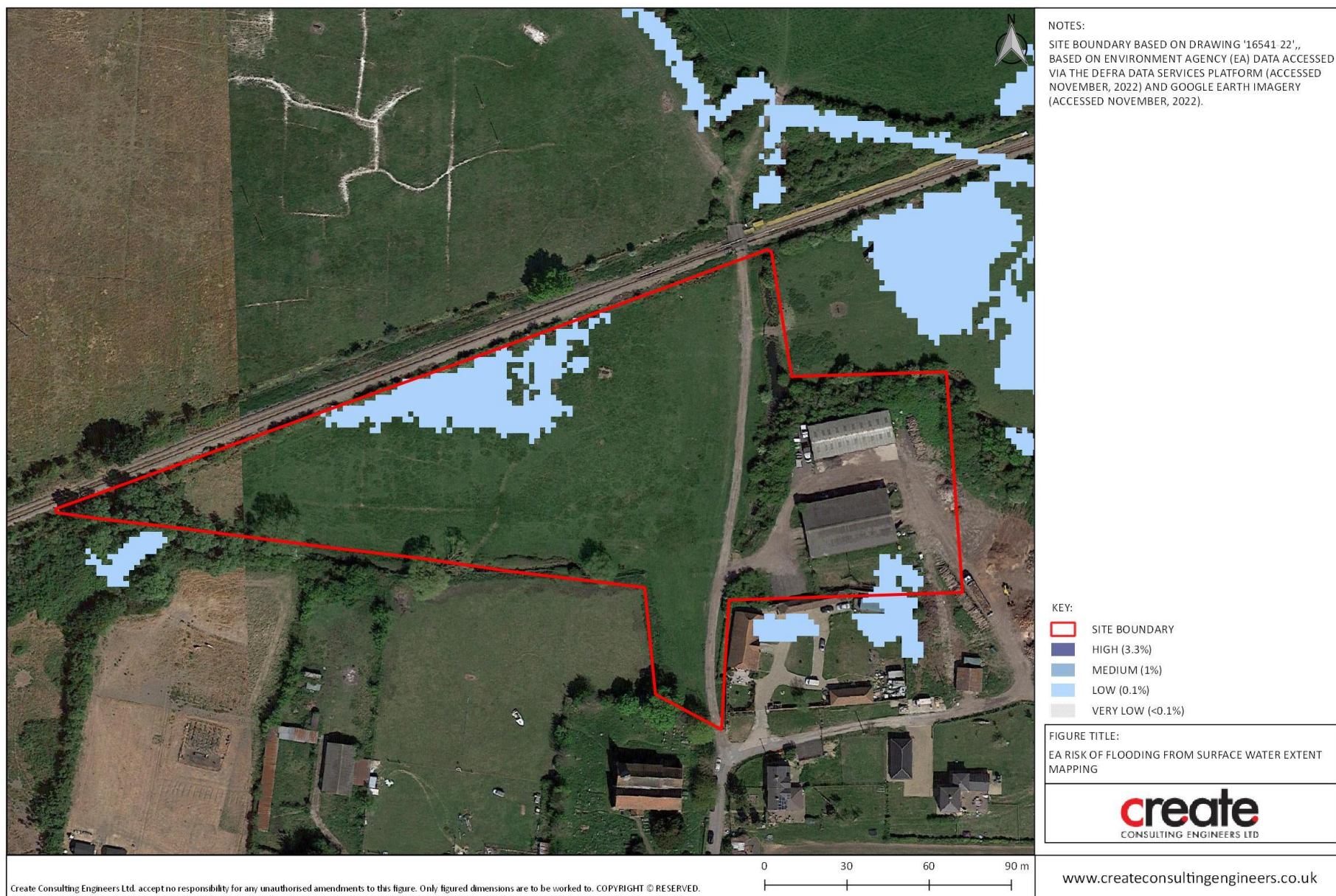


Figure 5.8: Environment Agency's Surface Water Flood Extent Map

Source: Defra Data Services Platform (<https://environment.data.gov.uk/>).

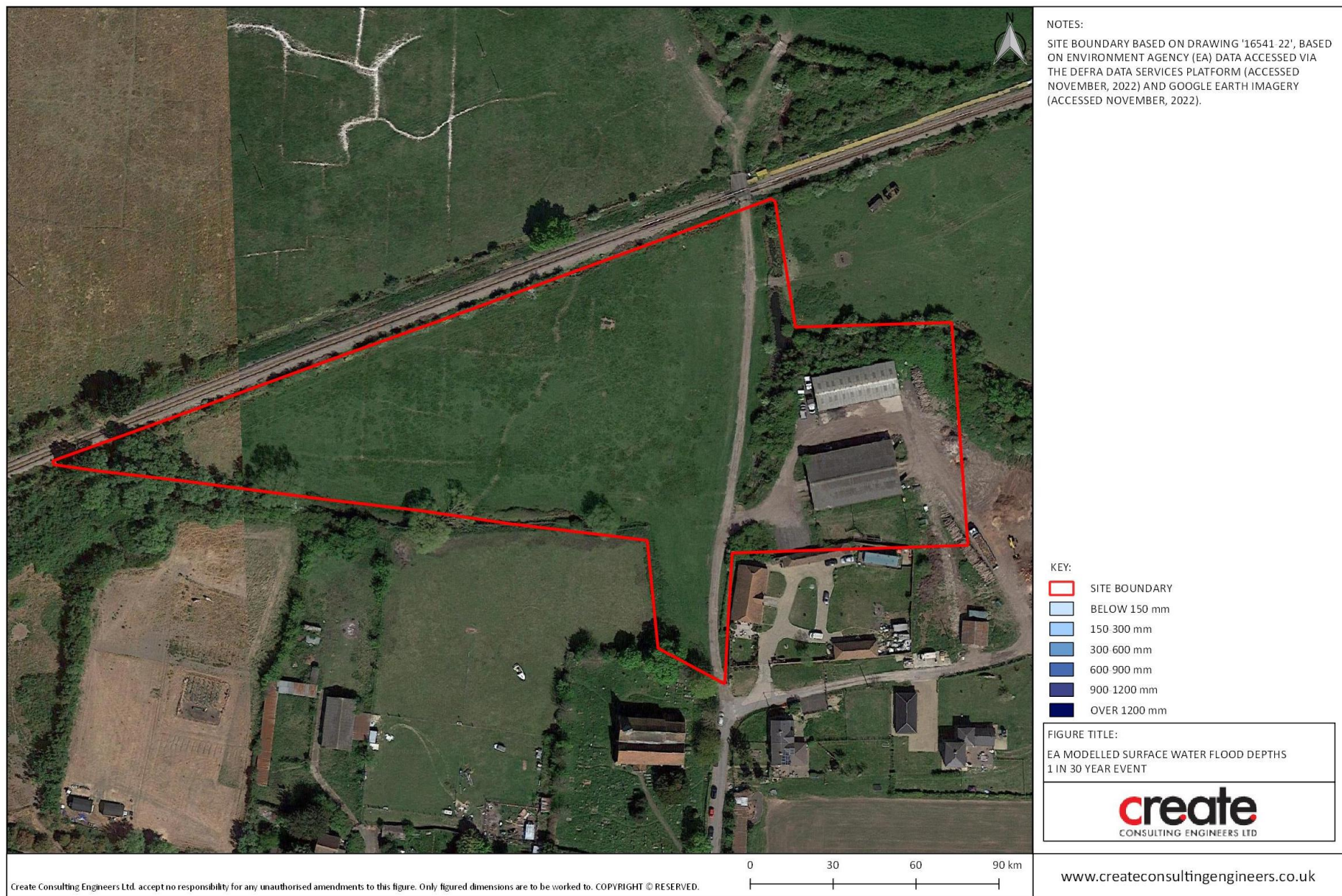


Figure 5.9: Environment Agency's Surface Water Flood Depths Map 1 in 30 Year Event (3.3%)

Source: Defra Data Services Platform (<https://environment.data.gov.uk/>).

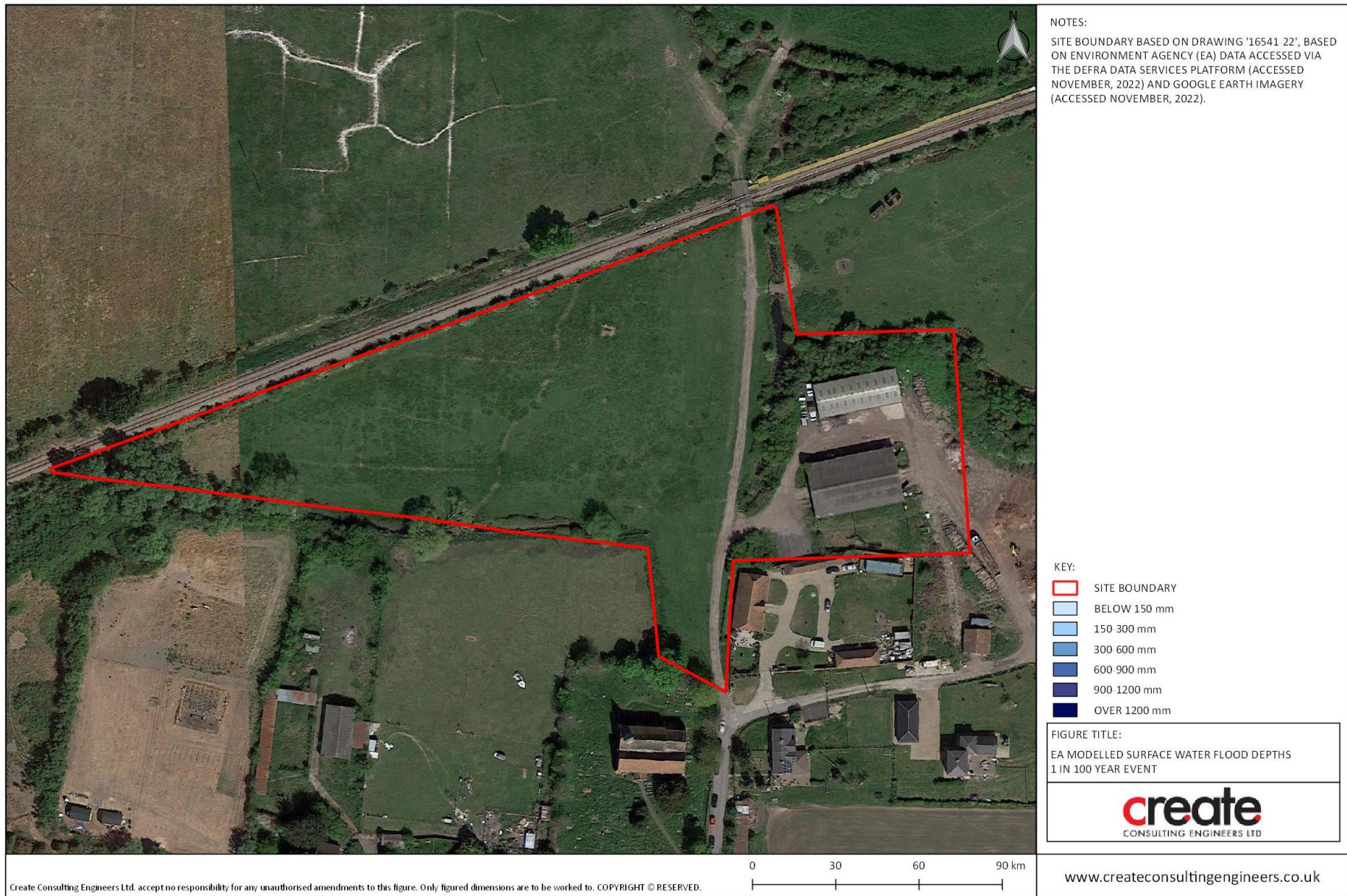


Figure 5.10: Environment Agency's Surface Water Flood Depths Map 1 in 100 Year Event (1%)

Source: Defra Data Services Platform (<https://environment.data.gov.uk/>).

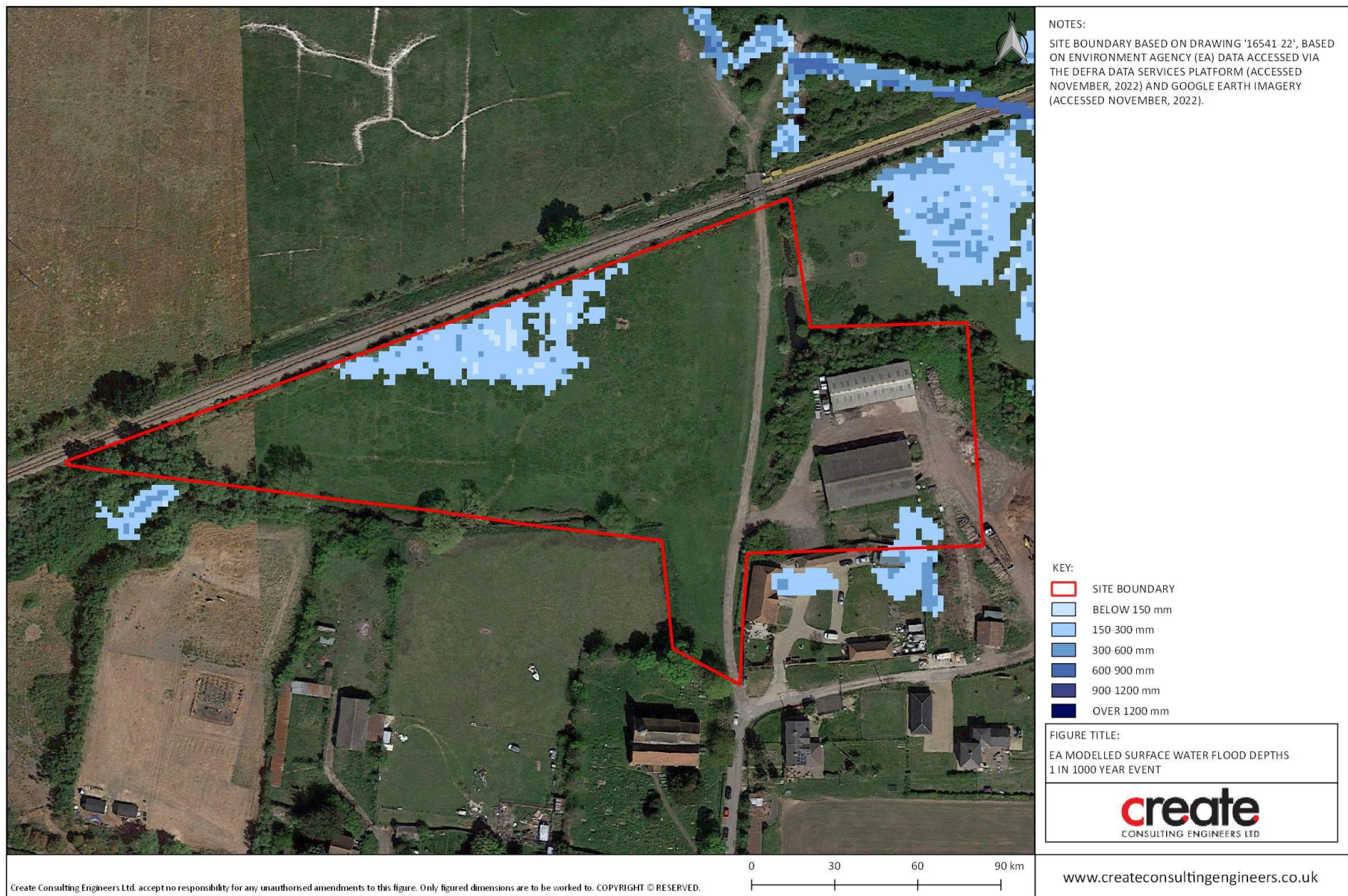


Figure 5.11: Environment Agency's Surface Water Flood Depths Map 1 in 1000 Year Event (0.1%)

Source: Defra Data Services Platform (<https://environment.data.gov.uk/>).

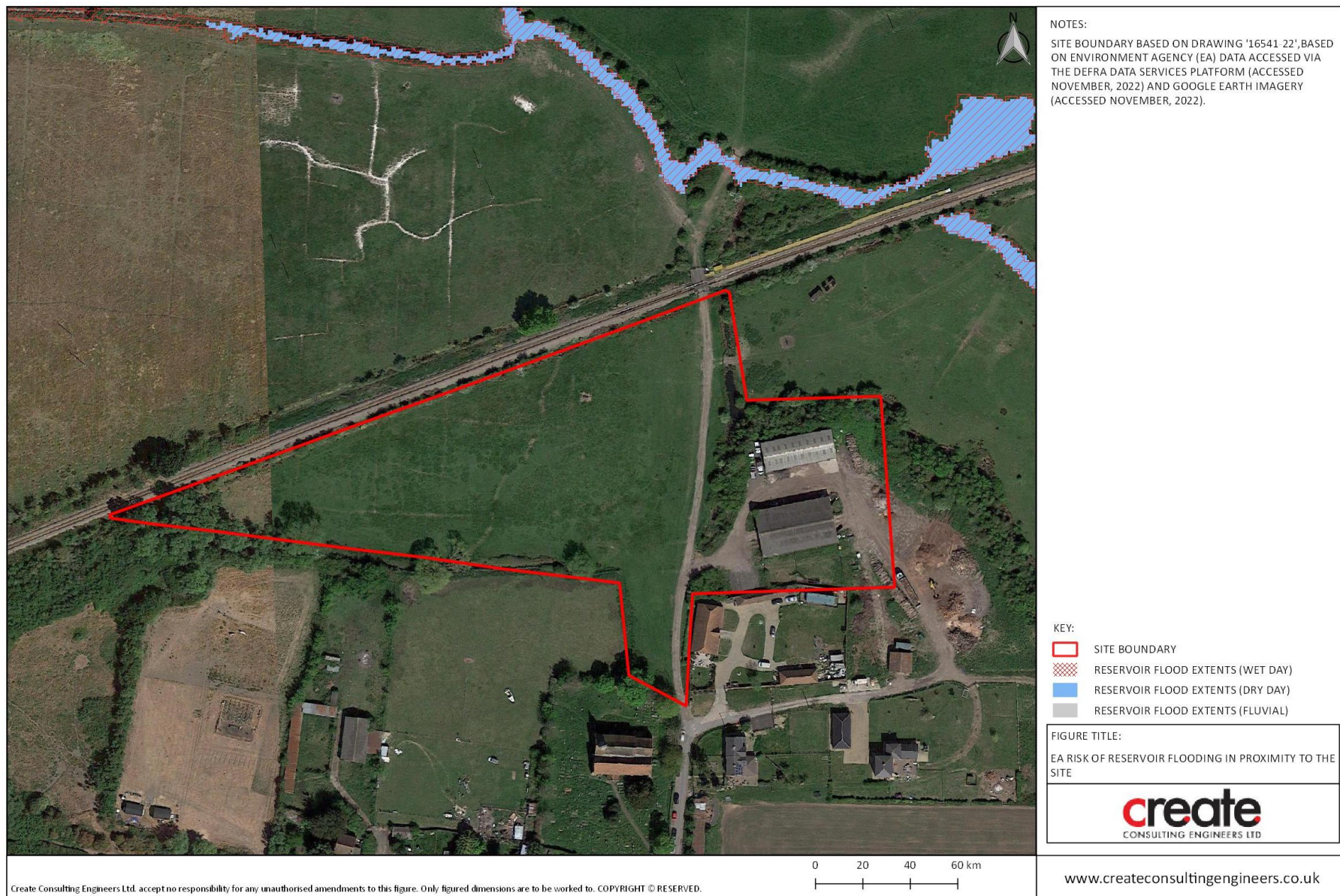


Figure 5.12: Environment Agency's Risk of Flooding from Reservoirs

Source: Defra Data Services Platform (<https://environment.data.gov.uk/>).

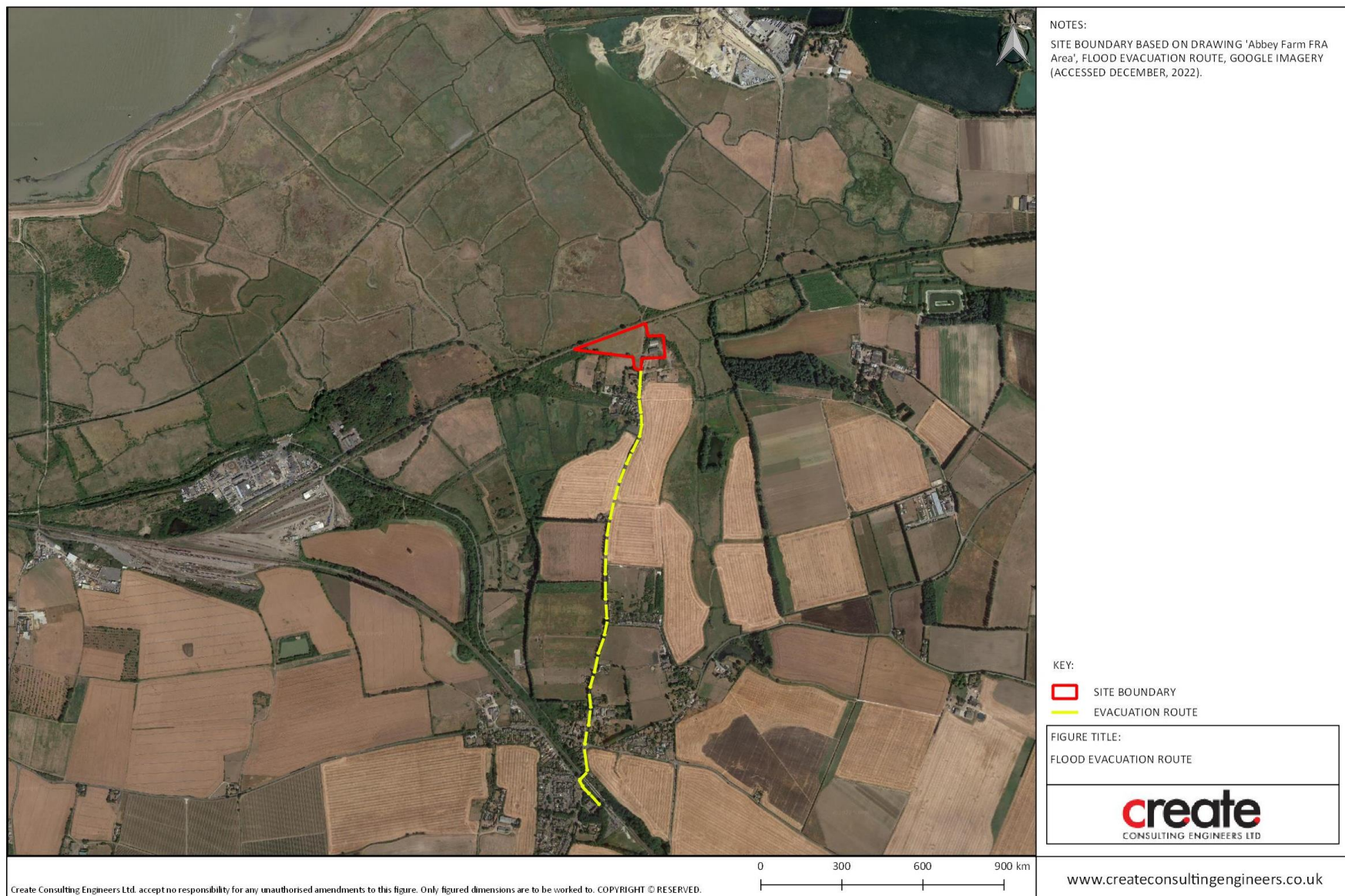
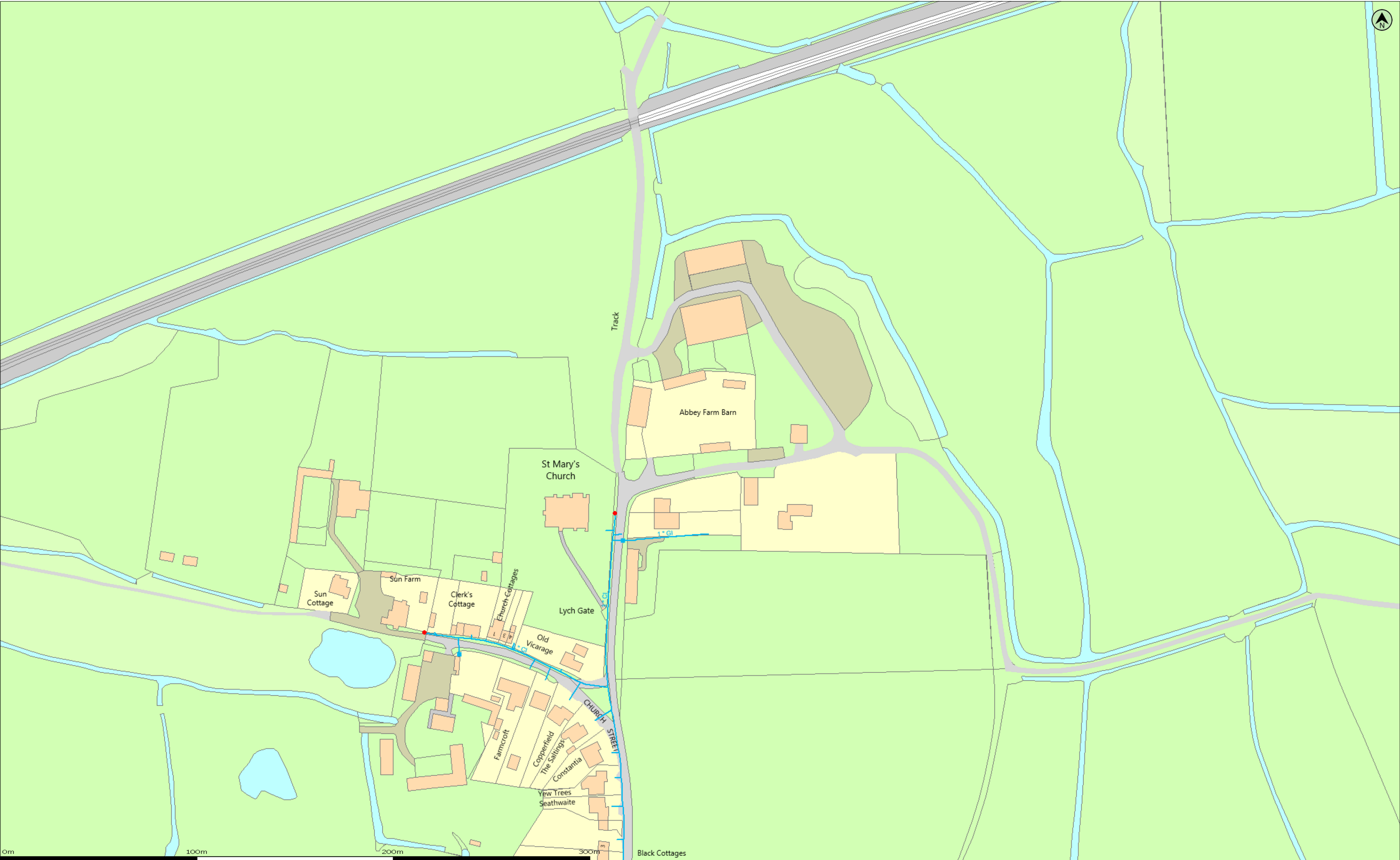


Figure 7.1: Flood Evacuation Route

APPENDICES

APPENDIX A

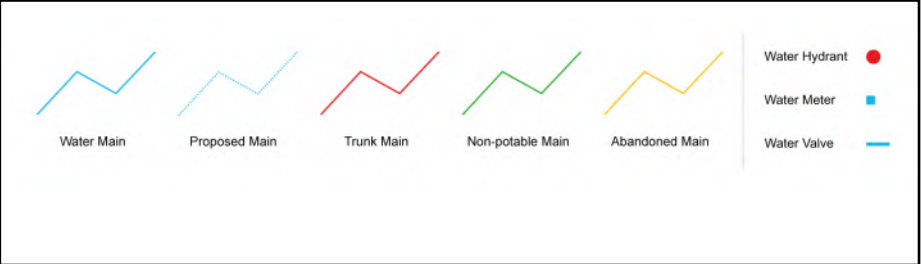
APPENDIX A



The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2022 Ordnance Survey 100031673. This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

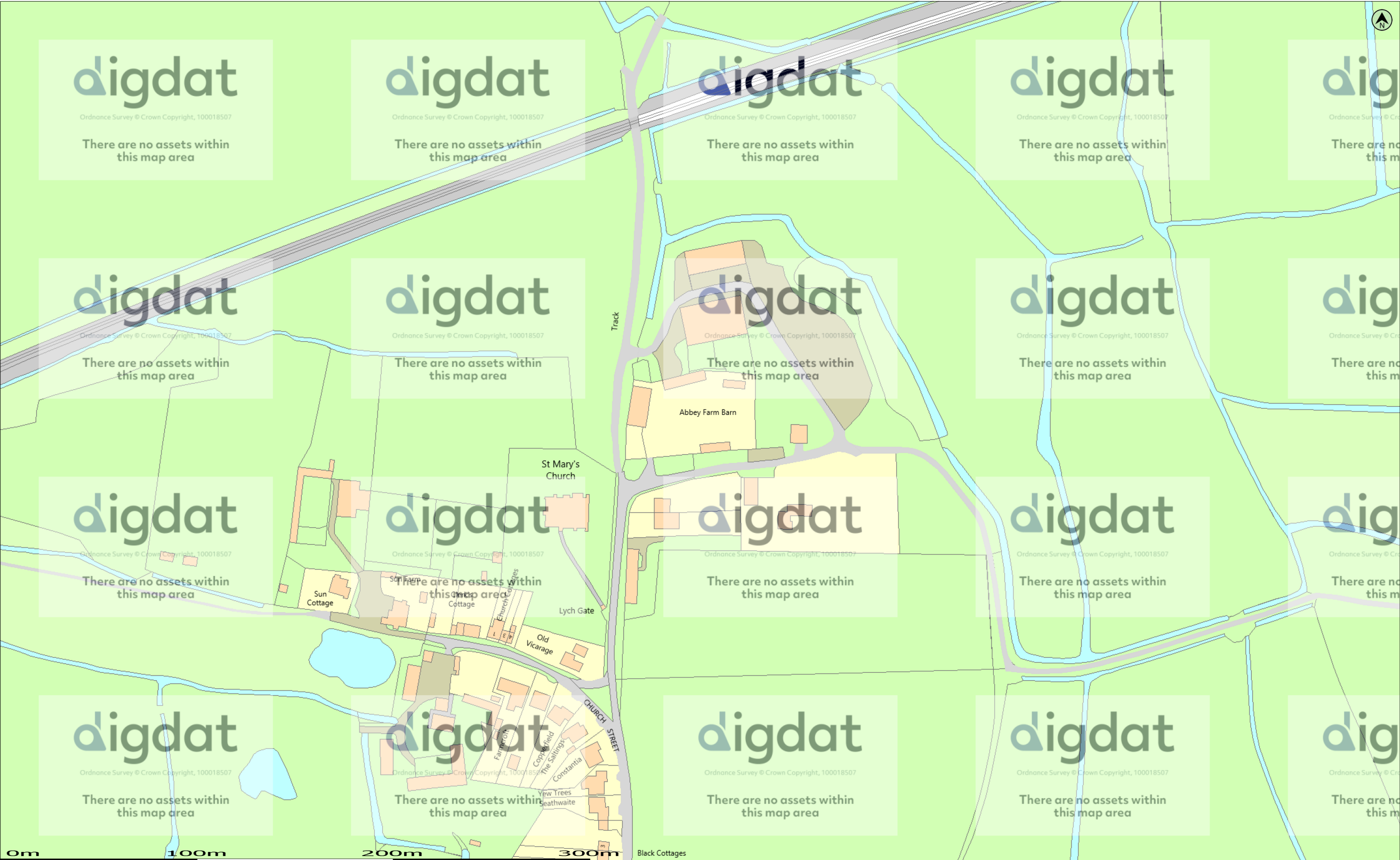
WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.



claire.seymour@createconsultingengineers.co.uk
P22-2731



APPENDIX B

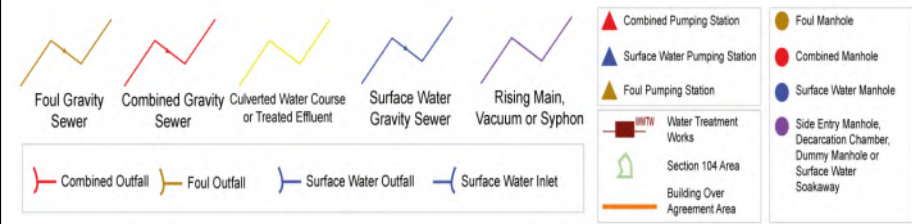


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The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2022 Ordnance Survey 100031673. This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.



claire.seymour@createconsultingengineers.co.uk
P22-2731



APPENDIX C

Vicky Luck

From: KSL PSO SE London & North Kent <PSO.SELondonandNKent@environment-agency.gov.uk>
Sent: 18 October 2022 13:20
To: Grace Beard
Cc: KSL Enquiries
Subject: RE: KSL 283283 RL: Abbey Farm, Church Street, Higham, Rochester, ME3 7LS

Dear Grace,

Re: KSL 283283 RL: Abbey Farm, Church Street, Higham, Rochester, ME3 7LS

Thank you for your enquiry which was received on 3 October 2022.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

You have requested a Product 4, 5, 6, 7 and 8, please see Appendix 1 below detailing each product.

Your request for a Product 4 and 8 falls under the exemption in provision 6(1)(a) and (b) of the Environmental Information Regulations 2004 (EIR), and on this occasion we are not providing the information in the requested format, but in an alternative format. Further detail of the provisions under the EIR can be found in Appendix 2.

Please find below the link containing the Product 5 and 6

Thames Tidal Downriver Breach Inundation Modelling 2018 <https://defra.sharefile.com/d-s7fa7e1d01734d5a9>

North Kent Coast - Domain 1 2018 <https://defra.sharefile.com/d-sc89140caee24edb9>

Product 8 data can be derived using the depth (d) velocity (v) and hazard (ZKU0) 2D grids which are provided in the Product 6 dataset

We have also enclosed Thames Estuary 2100 information.

We are licensing the supplied data to you under the [Environment Agency Conditional Licence](#), details of which are included in the ShareFile link. You must first check this supporting information, to determine if the conditions of use are suitable for your purposes. If the conditions for use are not suitable for your purposes, this information is not provided with a licence for use, and the data is provided for the right to read only.

The information provided in the ShareFile link is based on the best data available as of the date of this letter. You may feel it is appropriate to contact us at regular intervals, to check whether any amendments/ improvements have been made to the data for this location. Should you re-contact us after a period of time, please quote the above reference in order to help us deal with your query.

Requests for flood products in Kent, South London and East Sussex

Please note that we changed our process in December 2019 for responding to flood product data requests. Where appropriate, we supply the data in its raw form (Product 6), as opposed to in the Product 4 and/or 8 PDF format. This is to improve efficiency within our area of the Environment Agency, and to provide customers with a more rapid and flexible response. Where customers are unable to use the Model Output Data (Product 6), or if the data is particularly complex, we will continue to produce Product 4 and 8 formats.

The Product 4 and 8 itself is not a direct requirement in the planning process, but the data that goes into the Product 4 and 8 is required to inform your Flood Risk Assessment. This data can be extracted from the Product 6 data provided in the ShareFile link and in open data sources listed below. Instructions on how to use the appropriate data are provided on the ShareFile link.

Other flood data sources

The Flood Map for Planning is available to view and export maps for your site at: <https://flood-map-for-planning.service.gov.uk/>

Flood Zone 3 <https://data.gov.uk/dataset/flood-map-for-planning-rivers-and-sea-flood-zone-3>
Flood Zone 2 <https://data.gov.uk/dataset/flood-map-for-planning-rivers-and-sea-flood-zone-2>
Historic Flood Map <https://data.gov.uk/dataset/historic-flood-map1>

Please note that our historic flood event maps may not be comprehensive. We would therefore advise that you make further enquiries locally with specific reference to flooding at your location. You should consider contacting the relevant Local Planning Authority and/or water/sewerage undertaker for the area.

Please be aware that flooding can come from different sources. Examples of these are:

- from rivers or the sea
- surface water (i.e. rainwater flowing over or accumulating on the ground before it is able to enter rivers or the drainage system)
- overflowing or backing up of sewer or drainage systems which have been overwhelmed
- groundwater rising up from underground aquifers

Currently the Environment Agency can only supply flood risk data relating to the chance of flooding from rivers or the sea. The Lead Local Flood Authority is responsible for surface water flooding issues. Please contact them for further information or for details on groundwater flood risk.

Areas Benefiting from Flood Defences

Areas benefiting from flood defences are defined as those areas which benefit from formal flood defences specifically in the event of flooding from rivers with a 1% (1 in 100) chance in any given year, or flooding from the sea with a 0.5% (1 in 200) chance in any given year.

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- Planning applications: assessing flood risk - information about completing flood risk assessments <https://www.gov.uk/planning-applications-assessing-flood-risk>
- Site specific flood risk assessment checklist - a checklist to help ensure you have considered all the relevant factors in your flood risk assessment <http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/site-specific-flood-risk-assessment-checklist/>
- Climate change allowance guidance - <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

We recommend that you discuss your proposals with the Local Planning Authority at the earliest opportunity. They will be able to advise you on a wide range of planning matters in addition to flood risk.

Please see our website for details on how to get planning advice from the Environment Agency, including charged-for discretionary advice <https://www.gov.uk/guidance/developers-get-environmental-advice-on-your-planning-proposals#when-to-consult>. Our planning team can be contacted at kslplanning@environment-agency.gov.uk

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297018/LIT_9015_c2822b.pdf

If you have a new enquiry or would like us to review the information we have provided under the Freedom of Information Act 2000 and Environmental Information Regulations 2004 please contact us within two months by email at KSLE@environment-agency.gov.uk

Regards,

Layo Oluwole
Flood & Coastal Risk Management Officer
Partnership & Strategic Overview - South East London & North Kent
Kent, South London and East Sussex Area
Environment Agency | Orchard House, London Road, Addington, West Malling, ME19 5SH

PSO.SELondonandNKent@environment-agency.gov.uk



Creating a better place
for people and wildlife



Appendix 1

Product 4	Detailed Flood Risk Assessment Map, including flood zones, defences and storage areas, areas benefiting from defences, statutory main river designations, historic flood event outlines and more detailed information from hydraulic models (including model extents and 2D flood level data for specific points)
Product 5	Reports, including flood modelling reports, model user logs and guides, hydrology reports, etc
Product 6	Model Output Data, including product 5. • flood outlines usually provided in shapefile format • 2D grids (level (h), depth (d) velocity (v) and hazard ZKU0) usually provided in ASCII or GeoTIFF format • 1D flow and level data Requires GIS software such as ArcGIS, MapInfo, QGIS or similar.
Product 7	Calibrated and Verified Model Input Data (CaVMID), including product 5. Enables customer to re-run and/or make changes to a hydraulic model. Requires specific hydraulic modelling software such as Flood Modeller, TUFLOW, or ICM InfoWorks.
Product 8	Breach Hazard Map Provides a hazard map of breaches in PDF format including, maximum flood depth, maximum flood velocity and maximum flood hazard. Please note product 8 is not available for fluvial models.

Appendix 2

The exemption in provision 6(1)(a) and (b) of the Environmental Information Regulations 2004 (EIR) states that

‘.....6.—(1) Where an applicant requests that the information be made available in a particular form or format, a public authority shall make it so available, unless—

(a) it is reasonable for it to make the information available in another form or format; or

(b) the information is already publicly available and easily accessible to the applicant in another form or format.....’

On this occasion we are not providing the information in the requested format, for the following reasons:

- Complying with the preference would incur a significant cost, which the public authority [The Environment Agency] cannot pass on to the requester;
- Using a Product 5/6/7 allows us to make the information available at a lower cost; and
- The impact on the available resources of the public authority [The Environment Agency], of supplying a Product 5/6/7, is therefore much less.

From: Grace Beard <Grace.Beard@createconsultingengineers.co.uk>

Sent: 03 October 2022 11:32

To: Enquiries, Unit <enquiries@environment-agency.gov.uk>; Enquiries_THM <enquiries_THM@environment-agency.gov.uk>

Subject: Ref: 221006/GA09-P22-2731 - Abbey Farm

Dear Sir/ Madam,

I am emailing to request a product 4-8 for a site in Rochester. The postcode is ME3 7LS and grid reference is TQ 71689 7421. The site boundary is attached on the figure.

Many Thanks in advance,

Grace Beard
Graduate Flood Risk Consultant

Create Consulting Engineers Ltd

109-112 Temple Chambers|3-7 Temple Avenue|London|EC4Y 0HP

T 020 7822 2300



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Vicky Luck

From: KSL PSO SE London & North Kent <PSO.SELondonandNKent@environment-agency.gov.uk>
Sent: 01 December 2022 11:01
To: Grace Beard
Subject: RE: KSL 283283 RL: Abbey Farm, Church Street, Higham, Rochester ME3 7LS

Dear Grace,

Thank you for your emails of 9 and 16 November 2022. We have supplied information below, which will hopefully answer your questions. Please let us know if you have further questions.

Flood Map for Planning

The Flood Map shows that this site lies within the outline of Flood Zone 3. This zone comprises land assessed as having a 0.5% (1 in 200) or greater annual probability of tidal flooding. The Flood Map at this location has been derived using detailed modelling of the tidal River Thames through the North Kent Coastal Modelling study completed in 2018 by JBA Consulting.

This site is within an area benefiting from flood defences. Areas benefiting from flood defences are defined as those areas which benefit from formal flood defences specifically in the event of flooding from rivers with a 1% (1 in 100) chance in any given year, or flooding from the sea with a 0.5% (1 in 200) chance in any given year. If the defences were not there, these areas would be flooded. An area of land may benefit from the presence of a flood defence even if the defence has overtopped, if the presence of the defence means that the flood water does not extend as far as it would if the defence were not there.

Flood risk

As stated above, your site lies within an area benefitting from flood defences, and can be shown clearly on the North Kent Coast Domain 1 (2018) defended outlines/ grids not affecting your site, but undefended outlines/grids inundating the site.

The site is also covered by the Thames Tidal Downriver Breach Modelling (2018), however the area is only covered by overland flow extents, beyond limit of breach locations (which stop at TQ6801274420). Therefore, depths, velocities, etc are likely to be indicative only and not represent worst case scenario.

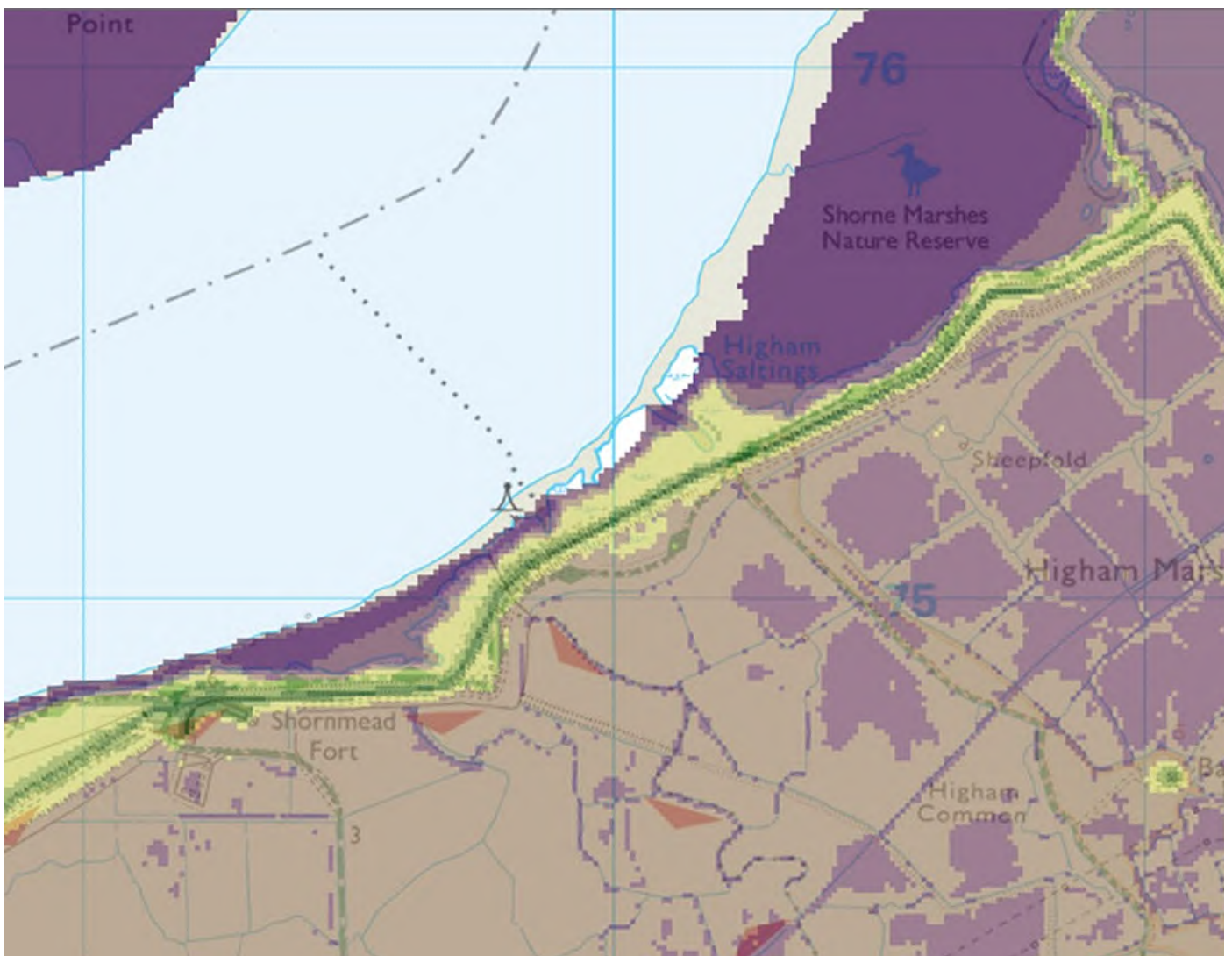
If you are using this data for a flood risk assessment for planning purposes, you may want to contact our planning team at kslplanning@environment-agency.gov.uk so they can advise on the best flood levels to use, depending on your site proposals (residential/commercial etc). It's likely they will advise that the Thames Tidal Downriver Breach Modelling (2018) levels are used to set finished floor levels, specifically the 0.5% AEP 2115 climate change scenario.

Defence height

Our AIMS data suggests an effective crest level of **5.85mAOD**. These defences need to be raised again in regards to the Thames Estuary 2100 for which the levels are set out within the future crest levels document (subject to the latest plan review). The TE2100 defence details can be found contained within a folder on the supplied ShareFile link.

Defence representation in the model

When the model was constructed by JBA, some of the defences were input into the model using z-lines (as you refer), and some were left reliant on the LiDAR, especially where large, wide embankments are present. It's also of note, that defences in many of these parts of the estuary have had two periods of raising, one before the 1953 flood event, and one as a result of that event. You can see the profile of that here, with the post-1953 raising on the land ward side – see screenshots below.



Kind regards,

Layo Oluwole
Flood & Coastal Risk Management Officer
Partnership & Strategic Overview - South East London & North Kent
Kent, South London and East Sussex Area
Environment Agency | Orchard House, London Road, Addington, West Malling, ME19 5SH

PSO.SELondonandNKent@environment-agency.gov.uk



From: Grace Beard <Grace.Beard@createconsultingengineers.co.uk>
Sent: 16 November 2022 12:01
To: KSL PSO SE London & North Kent <PSO.SELondonandNKent@environment-agency.gov.uk>
Subject: RE: KSL 283283 RL: Abbey Farm, Church Street, Higham, Rochester, ME3 7LS

Hi,

Further to my previous email and the query regarding levels (9/11/22- attached), I wanted to confirm the specifics of the case.

The below table shows the defended flood levels (in channel) for the 'North Kent coast 2018 (dom)' model.

Defended

Node	30 (2016) mAOD	1000 (2016) mAOD	200 (2115) NPPF mAOD
3.28_i	4.716	5.521	6.165
3.290	4.704	5.508	6.157

The image below shows these two nodes (yellow dots within the channel). Comparing the defence levels in the area '2d_zln_Dom1_defence_LIDAR_DTM_003_P' - (yellow highlighted dots along the coastline) to the minimum defence level is (3.87 mAOD) suggests that this area is not defended as the water will flow right over the defences as all of the design events in the table above are higher than the defence levels.



Therefore, please could you inform me as to whether these datasets that I am viewing are the correct ones or whether I need to be focusing somewhere else.

Many Thanks in advance,

Grace Beard
Graduate Flood Risk Consultant

Create Consulting Engineers Ltd

109-112 Temple Chambers | 3-7 Temple Avenue | London | EC4Y 0HP
T 020 7822 2300



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Registered Office: 25 Church Close, South Walsham, Norwich, NR13 6DW

From: Grace Beard

Sent: 09 November 2022 16:10

To: 'KSL PSO SE London & North Kent' <PSO.SELondonandNKent@environment-agency.gov.uk>

Subject: RE: KSL 283283 RL: Abbey Farm, Church Street, Higham, Rochester, ME3 7LS

Hi Layo,

Many Thanks for your email and data. I have query regarding the defended levels near my site (Church street, Rochester- attached).

According to the online guidance and the 'North Kent Coast - Domain 1 2018' report, the area is defended and does not experience flooding. However, I have been comparing the defence levels (2d_zln_Dom1_defence_LIDAR_DTM_003_P) and the 1D in channel flood levels (2016s3757_Domain1_defended_1D_levels_flows_v3) and the flood levels are higher than the minimum defence level that I can find. I am therefore wondering if I am looking at the wrong data or whether the area is not actually defended.

If you could look into the above query or put me in contact with someone who might be able to assist me then I would very much appreciate that. I am also available on my mobile (07516629114) for a discussion if that would be easier.

Many Thanks,

Grace Beard
Graduate Flood Risk Consultant

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Registered Office: 25 Church Close, South Walsham, Norwich, NR13 6DW

From: KSL PSO SE London & North Kent <PSO.SELondonandNKent@environment-agency.gov.uk>

Sent: 18 October 2022 13:20

To: Grace Beard <Grace.Beard@createconsultingengineers.co.uk>

Cc: KSL Enquiries <KSLE@environment-agency.gov.uk>

Subject: RE: KSL 283283 RL: Abbey Farm, Church Street, Higham, Rochester, ME3 7LS

Dear Grace,

Re: KSL 283283 RL: Abbey Farm, Church Street, Higham, Rochester, ME3 7LS

Thank you for your enquiry which was received on 3 October 2022.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

You have requested a Product 4, 5, 6, 7 and 8, please see Appendix 1 below detailing each product.

Your request for a Product 4 and 8 falls under the exemption in provision 6(1)(a) and (b) of the Environmental Information Regulations 2004 (EIR), and on this occasion we are not providing the information in the requested format, but in an alternative format. Further detail of the provisions under the EIR can be found in Appendix 2.

Please find below the link containing the Product 5 and 6

Thames Tidal Downriver Breach Inundation Modelling 2018 <https://defra.sharefile.com/d-s7fa7e1d01734d5a9>

North Kent Coast - Domain 1 2018 <https://defra.sharefile.com/d-sc89140caee24edb9>

Product 8 data can be derived using the depth (d) velocity (v) and hazard (ZKU0) 2D grids which are provided in the Product 6 dataset

We have also enclosed Thames Estuary 2100 information.

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Other flood data sources

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Please be aware that flooding can come from different sources. Examples of these are:

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We recommend that you discuss your proposals with the Local Planning Authority at the earliest opportunity. They will be able to advise you on a wide range of planning matters in addition to flood risk.

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Regards,

Layo Oluwole
Flood & Coastal Risk Management Officer
Partnership & Strategic Overview - South East London & North Kent
Kent, South London and East Sussex Area
Environment Agency | Orchard House, London Road, Addington, West Malling, ME19 5SH

PSO.SELondonandNKent@environment-agency.gov.uk



Appendix 1

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- The impact on the available resources of the public authority [The Environment Agency], of supplying a Product 5/6/7, is therefore much less.

From: Grace Beard <Grace.Beard@createconsultingengineers.co.uk>

Sent: 03 October 2022 11:32

To: Enquiries, Unit <enquiries@environment-agency.gov.uk>; Enquiries_THM <enquiries_THM@environment-agency.gov.uk>

Subject: Ref: 221006/GA09-P22-2731 - Abbey Farm

Dear Sir/ Madam,

I am emailing to request a product 4-8 for a site in Rochester. The postcode is ME3 7LS and grid reference is TQ 71689 7421. The site boundary is attached on the figure.

Many Thanks in advance,

Grace Beard

Graduate Flood Risk Consultant

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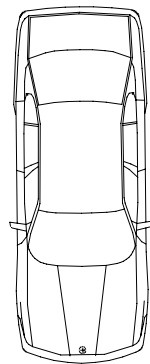
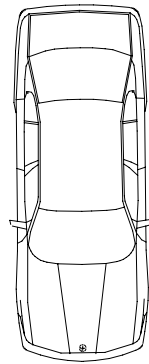
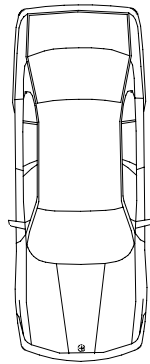
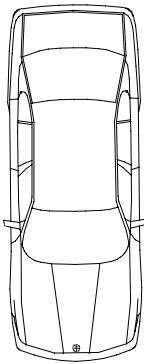
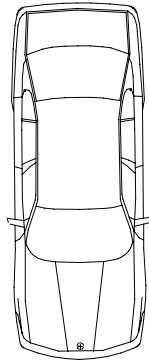


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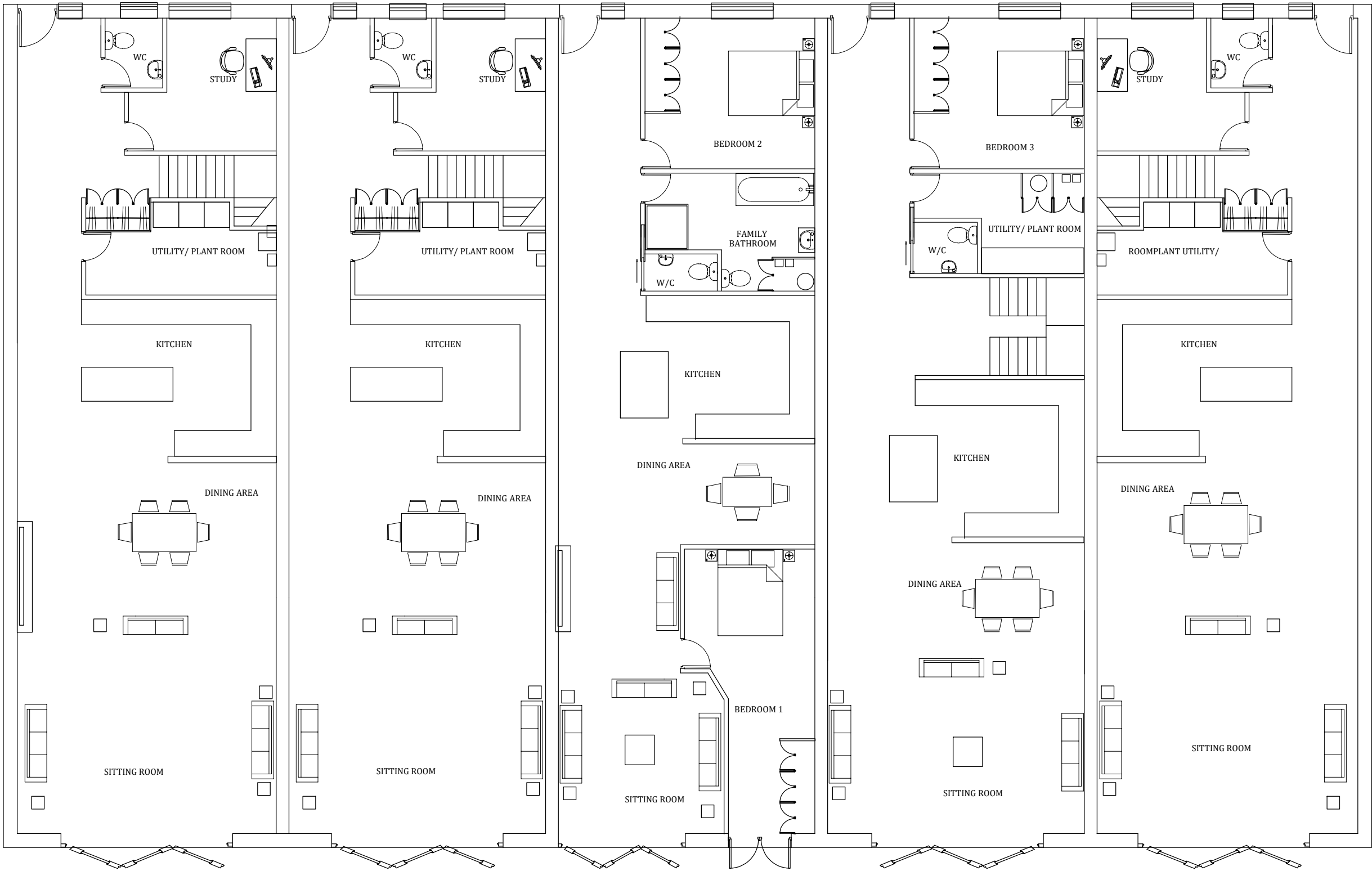
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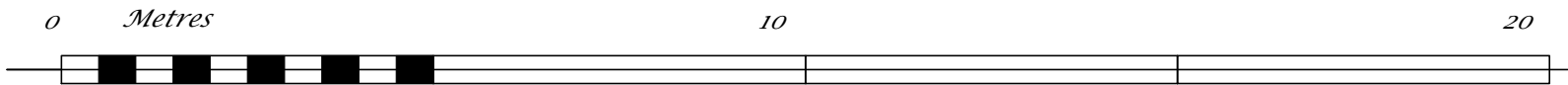
PLANS



GROUND FLOOR PLAN PROPOSED



Ground Floor Plan
EXAMPLE 1 EXAMPLE 2



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CDM Regulations 2015

It is the responsibility for the Client to appoint a Principle Designer (PD) to oversee the responsibility and liability for Health and Safety.

C revised drawings 25/08/2022
B revised drawings 11/05/2022
A revised drawings 06/05/2022

Rev.	Description	Date
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MANOR COTTAGE, MANOR FARM,
LADDINGFORD, KENT ME18 6BX

Allan Robinson
TEL: (01622) 872 081
MOB: 07900 564 987
EMAIL: ajr@tadstudios.uk
WEB: www.tadstudios.uk

Client Name :
Abbey Farm Terraced Cottages
Project :
Higham
Rochester ME3 7LS

Drawing Description:
Proposed plan drawings

Date : 22 04 2022 Scale : 1:100 Size : A2

Drawing number:
P 02 22005 Rev. C

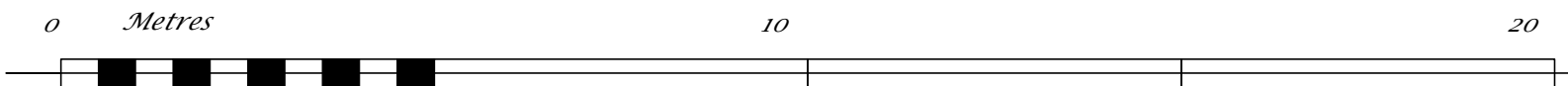
The image displays three architectural floor plans, labeled 'PLAN 1', 'PLAN 2', and 'PLAN 3', arranged horizontally. Each plan shows a symmetrical residential layout. The central area between the plans is labeled '2000mm HEAD CLEARANCE'. The plans are separated by vertical dashed lines, and the central area is also labeled '2000mm HEAD CLEARANCE'.

PLAN 1 (Left): This plan shows a symmetrical layout with three bedrooms (BEDROOM 1, BEDROOM 2, BEDROOM 3), two en-suites (EN-SUITE), and a family bathroom (FAMILY BATHROOM). The layout is symmetrical around a central vertical axis.

PLAN 2 (Middle): This plan shows a symmetrical layout with three bedrooms (BEDROOM 1, BEDROOM 2, BEDROOM 3), two en-suites (EN-SUITE), and a family bathroom (FAMILY BATHROOM). The layout is symmetrical around a central vertical axis.

PLAN 3 (Right): This plan shows a symmetrical layout with three bedrooms (BEDROOM 1, BEDROOM 2, BEDROOM 3), two en-suites (EN-SUITE), and a family bathroom (FAMILY BATHROOM). The layout is symmetrical around a central vertical axis.

EXAMPLE 2



It is the responsibility for the Client to appoint a Principle Designer (PD) to oversee the responsibility and liability for Health and Safety.

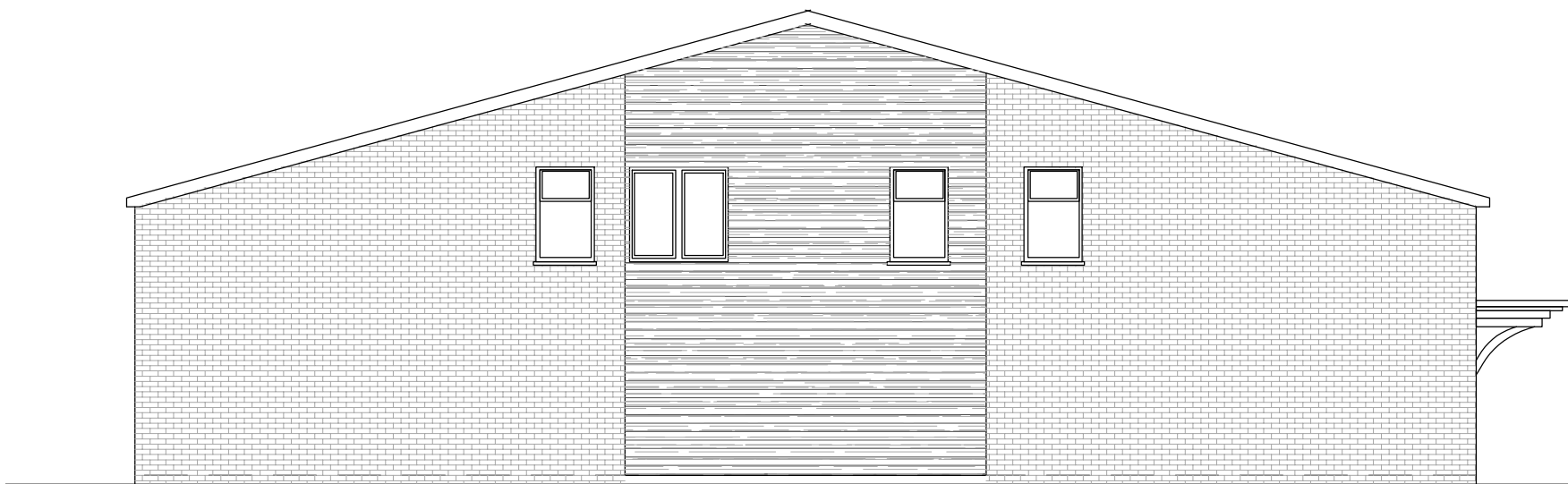
Rev.	Description	Date
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Allan Robinson
TEL: (01622) 872 081
MOB: 07900 564 987
EMAIL: ajr@tadstudios.uk.com
WEB: www.tadstudios.uk.com

Drawing number: P 03 22005	Rev. D
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NORTH WEST ELEVATION PROPOSED



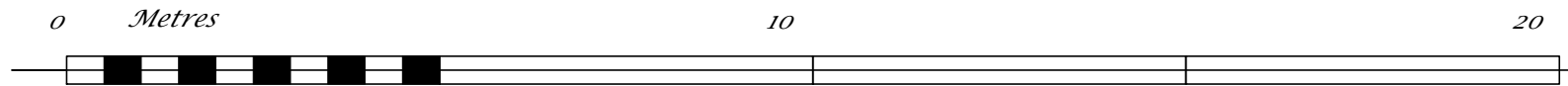
NORTH EAST ELEVATION PROPOSED



SOUTH WEST ELEVATION PROPOSED



SOUTH EAST ELEVATION PROPOSED



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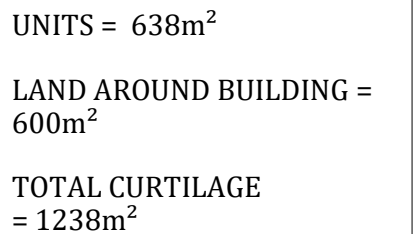
Allan Robinson
TEL: (01622) 872 081
MOB: 07900 564 987
EMAIL: ajr@tadstudios.uk.com
WEB: www.tadstudios.uk.com

Client Name :
Project :
Abbey Farm Terraced Cottages
Higham
Rochester ME3 7LS

Drawing Description:
Proposed Elevation drawings

Date : 22 04 2022
Scale : 1:100
Size : A2

Drawing number:
P 04 22005

[illegible][illegible]

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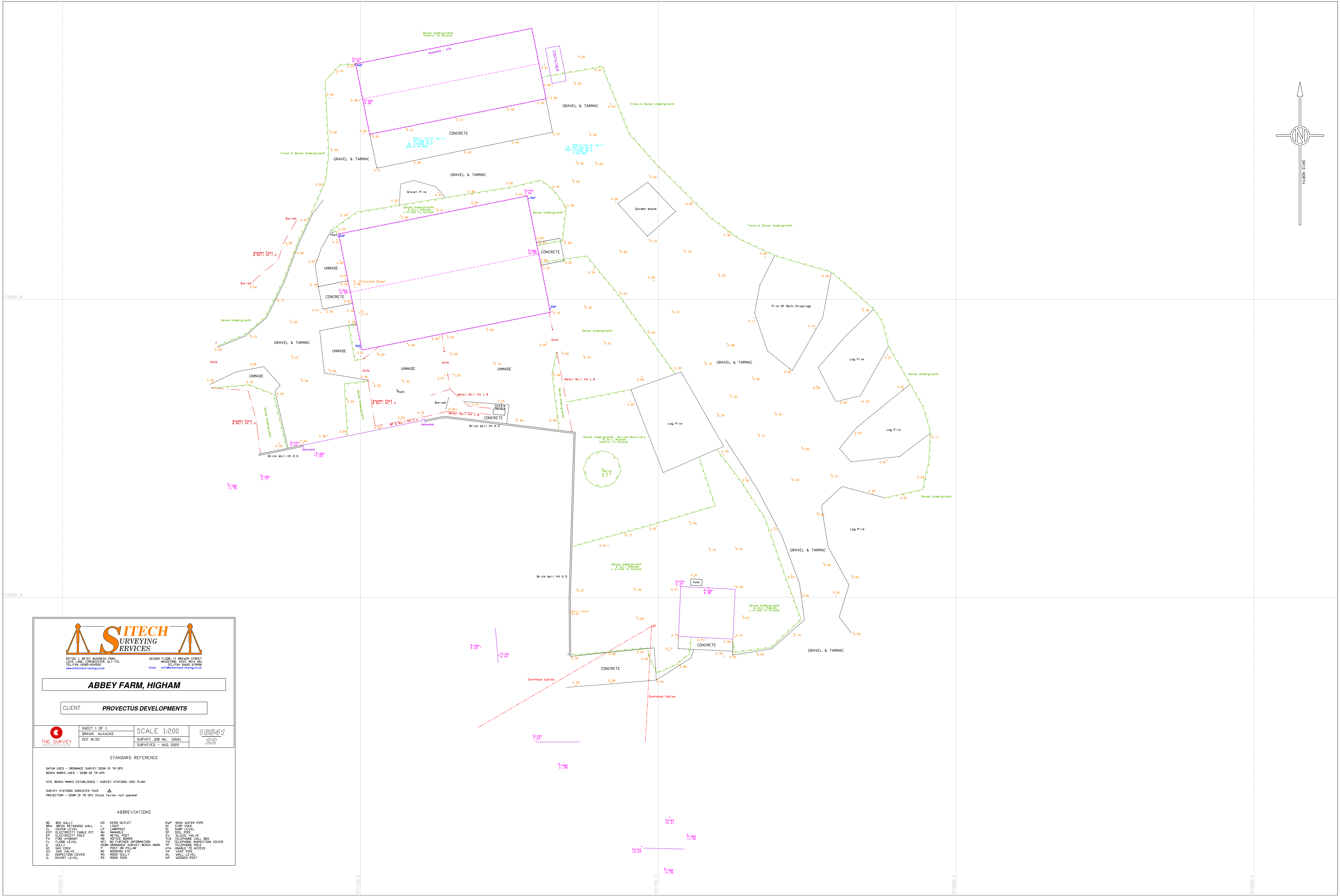
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ARCHITECTURAL SERVICES

MANOR COTTAGE, MANOR FARM,
LADDINGTONFORD, KENT ME18 6BX

Allan Robinson
TEL: (01622) 872 081
MOB: 07900 564 987
EMAIL: ajr@tadstudios.uk.com
WEB: www.tadstudios.uk.com

Drawing Description: Proposed Block plan/OSMap		
Date :	Scale :	Size :
25 08 2022	1:200/1250	A2
Drawing number: P 05 22005		Rev.



OFFICE: 1, METEC BUSINESS PARK,
LEAVE LANE, CHESTER, CH1 1TG
TEL/FAX 01244 454532
www.sitechsurveying.co.uk

SECOND FLOOR, 17 BRICKER STREET
HAULTON, KEEL, ME 16 8BU
TEL/FAX 01662 479990
Email: info@sitechsurveying.co.uk

ABBEY FARM, HIGHAM

CLIENT: PROPECTUS DEVELOPMENTS

	SHEET 1 OF 1	SCALE 1:200	16541
	DRAWN: AUTOCAD	SURVEY JOB No. 12661	22
	SEE ALSO	SURVEYED - AUG 2002	

STANDARD REFERENCE

DATUM USED - ORDNANCE SURVEY OSN 19 TH GPS

BENCH MARK USED - OSN 19 TH GPS

SITE BENCH MARKS ESTABLISHED - SURVEY STATIONS (SEE PLAN)

SURVEY STATIONS INDICATED THIS

PROJECTION - OSN 19 TH GPS (Scale factor not applied)

ABBREVIATIONS

BS - BOX GALLY	KD - KERB OUTLET	RWP - RAIN WATER PIPE
BW - BRICK RETAINING WALL	L - LIGHT	SC - STOP COCK
C - COVER LEVEL	LP - LAMPPOST	SP - SUMP LEVEL
CCP - ELECTRICITY CABLE PIT	HM - MANHOLE	SP - SUMP LEVEL
EP - ELECTRICITY POLE	MT - METAL POST	TC - TELEPHONE CABLE
PH - FIRE HYDRANT	NB - NESTLE BOARD	TB - TELEPHONE CALL BOX
FL - FLOOR LEVEL	NI - NO FURTHER INFORMATION	TC - TELEPHONE INSPECTION COVER
G - GALLY	OSN - ORDNANCE SURVEY BENCH MARK	TP - TELEPHONE POLE
GV - GAS VALVE	POST - POST (SEE PLAN)	UP - UNMADE TO ACCESS
GV - GAS VALVE	RS - ROAD SIGN	VP - VERNIER PIPE
IC - INSPECTION COVER		VL - VALL LEVEL
I - INVERT LEVEL		VP - VERNIER POST