Consulting Engineers
• Structural • Civil •

FLOOD RISK ASSESSMENT

For

NEW INDUSTRIAL UNITS

PARK HOUSE, RADFORD HOLDINGS

MILE END ROAD

COLWICK

NOTTINGHAM

DATE: January 2023

REF: 6142/FRA01

REV: B

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CONTENTS

1.0 INTRODUCTION

Keith Simpson Associates Limited have been appointed by Radford Holding to undertake a Flood Risk Assessment (FRA) in support of a planning application for the redevelopment of 5 new industrial units at Park House, Mile End Road, Colwick, Nottingham.

The proposed development site lies within flood zone 3 according to the Environment Agency flood map, which means it is in an area at high risk of flooding. This indicates that the site could be flooded from a river by a flood that has a 1 percent (1 in 100) or greater chance of happening each year or flooded from the sea by a flood that has a 0.5 percent (1 in 200) or greater chance of happening each year.

This document details the findings of an FRA carried out in January 2023. In the preparation of this FRA reference has been made to The National Planning Policy Framework.

1.1 SOURCES OF INFORMATION

An assessment and review of existing sources of information has been undertaken. The assessment has been based on the following sources:

- Existing and proposed drawings
- Environment Agency Product 4: Basic Flood Risk Assessment Data
- Environment Agency Flood Zone Maps

All comments and conclusions are based on information available to KSA at the time of writing, however KSA accepts no liability if any of the existing sources of information are found to be inaccurate or misleading.

2.0 SITE LOCATION AND PROPOSALS

The site is located approximately 4km East of Nottingham City Centre. The grid reference is 461494(E) & 340104(N). The site is bound to the south by Mile End Road and to the east by industrial units. Residential dwellings bound the site to the north and west.

The River Trent is located 500m to the south of the site and flows in a north-eastern direction. An un-named watercourse is located to the south of the development which outfalls to the River Trent, this watercourse is culverted below the adjacent industrial unit.

The site consists of an existing office buildings and asphalt car park. A topographical survey has been carried out, see Appendix A. The site is relatively flat with existing levels ranging from 20.95mAOD to 21.35mAOD.

It is proposed to demolish the existing buildings on site and construct 5 new industrial units with associated car parking. For proposed drawings see Appendix B. It is proposed to match the existing building floor level of 21.350mAOD.

Fig 1: Aerial photo of site

3.0 FLOOD RISK TO THE SITE

Source of Flooding	Applicable to Site	Justification
Fluvial	Yes	Site is located within EA Flood Zone 3
Tidal	No	Not in the tidal influence zone
Ground Water	No	No disruption to existing pathways
Dry Islands	No	Limited potential for dry islands to form
Existing Sewers	No	Site is elevated compared to public sewers
Surface water	Yes	Low risk flooding identified on the EA flood map

Table 1: Potential Sources of Flooding

3.1 FLUVIAL

The site is within EA flood zone 3, therefore is in an area which has a high risk of fluvial flooding, see section 4.1.

3.2 GROUNDWATER

The existing groundwater pathways through the site are currently unknown. It is unlikely that seasonal variation in the water table depth would result in flooding and we are not aware of any times this has occurred in the past.

3.3 EXISTING SEWERS

The proposed development will be sufficiently elevated in relation to the existing sewers in the adjacent highways.

3.4 SURFACE WATER

Low water risk flooding is identified on part of the site, see section 4.2.

4.0 PROBABILITY OF FLOODING

4.1 ENVIRONMENT AGENCY FLOOD RISK MAP

The Environment Agency (EA) produces Flood Risk Maps which identifies areas that are prone to flooding and what the likelihood and extent of flooding will be. Land area is divided into three zones; Flood Zone 1, 2 and 3. These are defined as below:

Flood Zone	Shading	Risk	Flood Risk Probability
1	Clear	Low	Less than 0.1% (1 in 1000 yrs)
2	Light blue	Medium	Rivers: between 1% (1 in 100 yrs) and 0.1% (1 in 1000 yrs) Sea: between 0.5% (1 in 200 yrs) and 0.1% (1 in 1000 yrs)
3	Dark Blue	High	Rivers: greater than 1% (1 in 100 yrs) Sea: greater than 0.5% (1 in 200 yrs)

Table 2: Flood Zones – Risk and Probability

The map below shows the Flood Zones to the area of the proposed development:

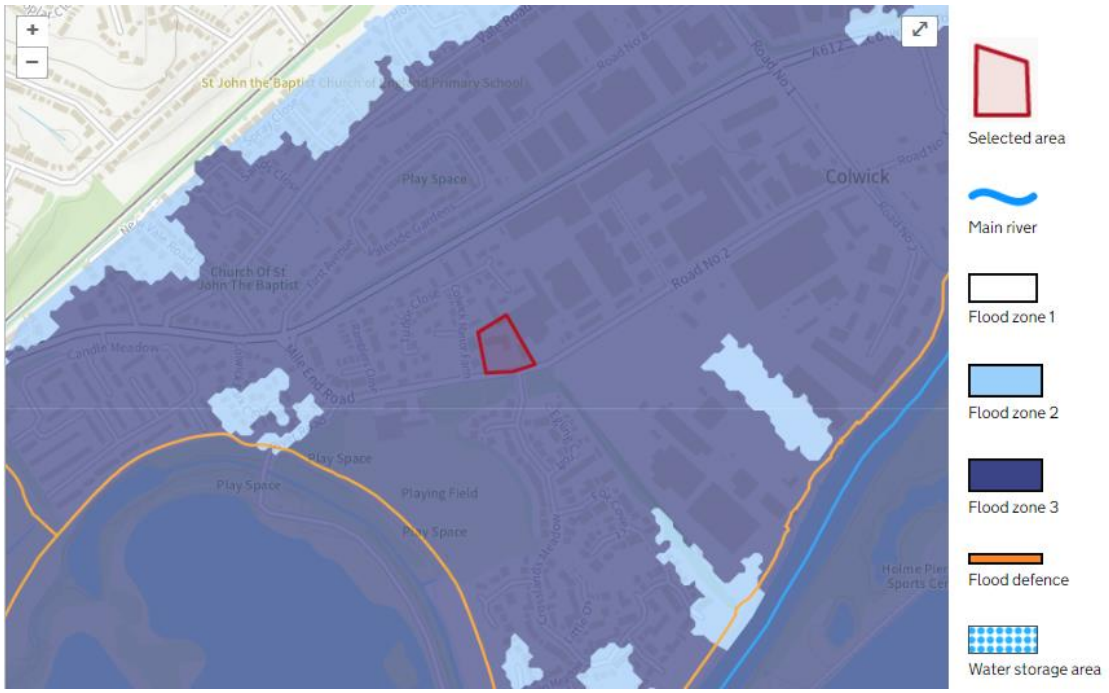

Fig 2: EA Flood Map

The proposed development site lies within flood zone 3 according to the Environment Agency flood map, which means it is in an area at high risk of flooding.

4.2 ENVIRONMENT AGENCY SURFACE WATER FLOOD MAP

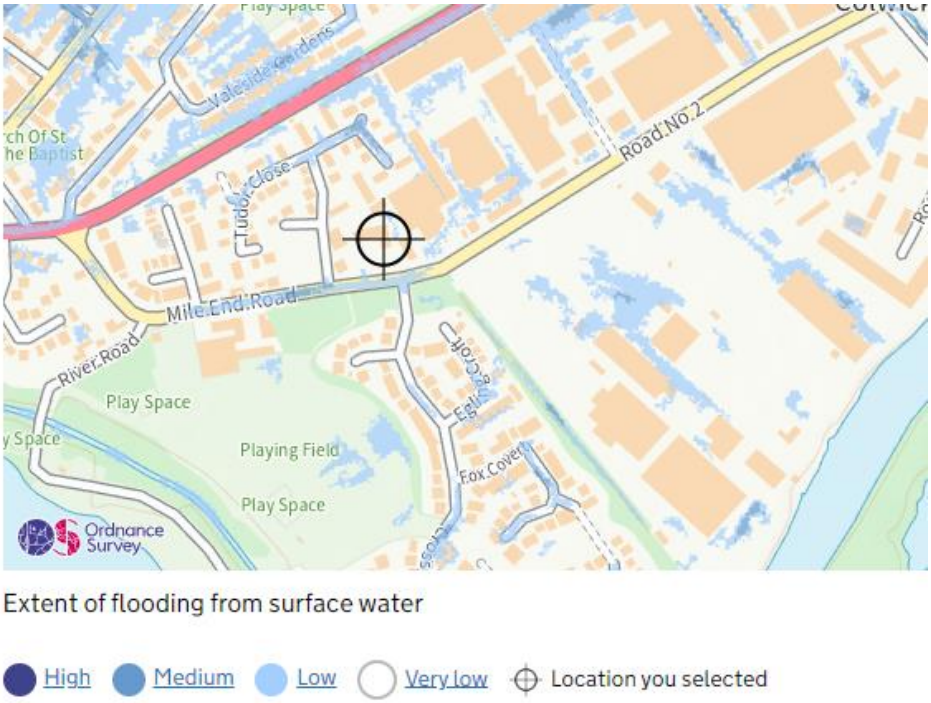

Fig 3: EA Surface Water Flood Map

The surface water flood map above shows that part of the site to the east is identified at low risk of surface water flooding, low risk depths are below 300mm.

5.0 HISTORIC FLOODING / FLOOD MODEL DATA

A 'Product 4' package of information has been obtained from the EA. This includes details of modelled max channel flow levels on the River Trent for various flood events.

5.1 HISTORIC FLOODING

The EA records show fluvial flooding occurred at this location in 1932, 1946 & 1947.

5.2 FLOOD DEFENCES

This area is protected by the Nottingham Left Bank scheme which was completed in 2012 and offers a 1 in 100 year (1%) standard of protection. The provided data does not include the height of the defences or the condition rating. The defences are owned and maintained by the EA.

5.3 MODELLED LEVELS

Modelled max channel flow levels have been provided for various flood events:

Flood Event	Modelled Flood Level (mAOD)
1 in 20yr	21.12
1 in 100yr	21.83
1 in 1000yr	22.22

Table 3: Channel Flow Levels for Various Flood Events

5.4 CLIMATE CHANGE SCENARIO

Modelled flood extents have been provided for the 100 year +20%, +30% and +50% climate change scenarios. None of these events affect the development site.

5.5 BREACH SCENARIO

Modelled flood levels have been provided for the 100 year +30% climate change breach scenario. The predicted flood level on site is 22.32mAOD, this is approximately 1m above existing ground levels.

6.0 CLIMATE CHANGE

The UK Climate Projections (UKCP09) provide climate change information designed to assist those planning how to adapt to the changes in the UK climate. UKCP09 projections are based on methodology designed by the Met Office. The model reflects scientists' best understanding of how the climate operates and how it might change in the future, however, it is not a definitive answer to what the future will look like. The models are based on several greenhouse gas emission scenarios and probability levels.

The map below shows anticipated change in winter precipitation by the 2080s based on medium greenhouse gas emissions and a 50% probability level.

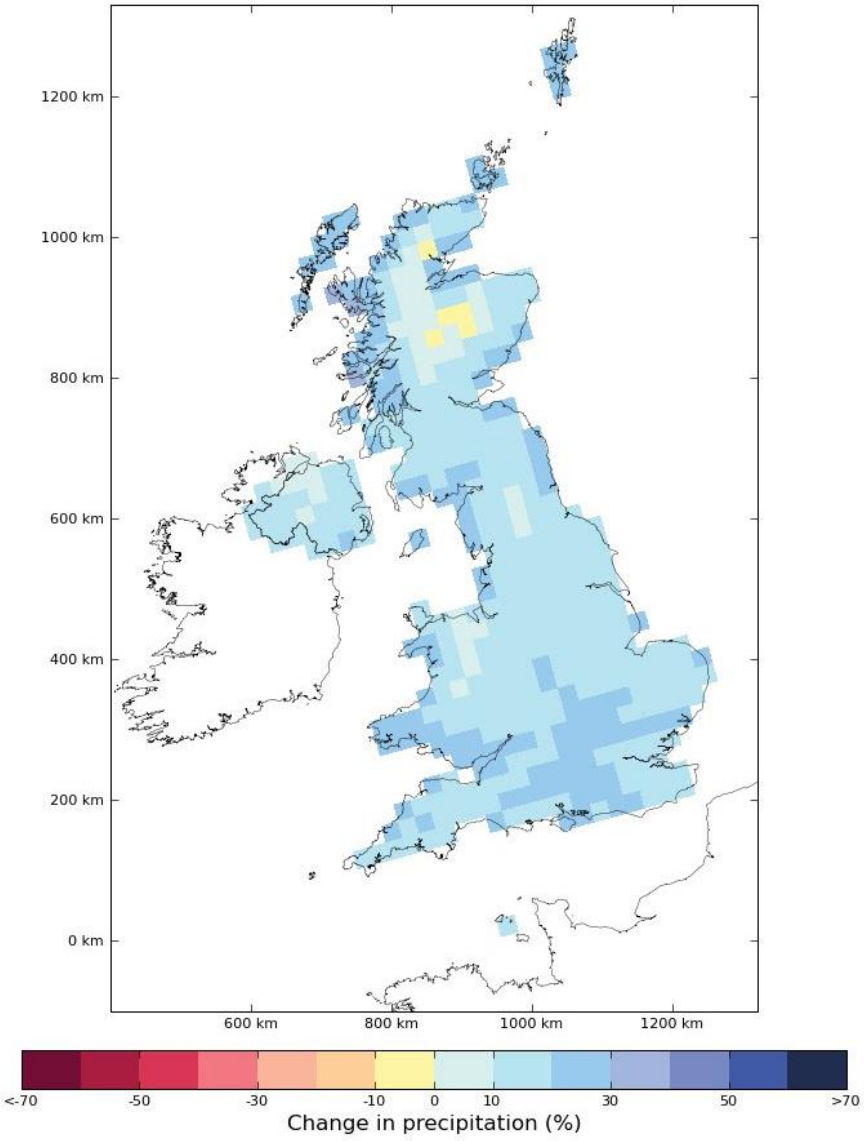

Fig 4: UKPC09 Change in Precipitation Map

The data indicates that for the Nottinghamshire County area the winter precipitation is predicted to increase by 30% by the 2080s. The most likely result of this increased precipitation will be larger scale flood events in winter. The UKPC09 model also predicts that the severity of summer droughts will increase, which followed by heavier rainfall events will result in more frequent flash flooding.

7.0 PLANNING CONTEXT

The Planning Practice Guidance provides guidance on the classification of vulnerability of development types.

Vulnerability to Flooding	Definition
Essential Infrastructure	Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. Wind turbines.
Highly Vulnerable	Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding. Emergency dispersal points. Basement dwellings. Caravans, mobile homes and park homes intended for permanent residential use. Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'Essential Infrastructure').
More Vulnerable	Hospitals. Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. Non–residential uses for health services, nurseries and educational establishments. Landfill and sites used for waste management facilities for hazardous waste. Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.

Less Vulnerable	Police, ambulance and fire stations which are not required to be operational during flooding. Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'More Vulnerable' class; and assembly and leisure. Land and buildings used for agriculture and forestry. Waste treatment (except landfill and hazardous waste facilities). Minerals working and processing (except for sand and gravel working). Water treatment works which do not need to remain operational during times of flood. Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.
Water Compatible Development	Flood control infrastructure. Water transmission infrastructure and pumping stations. Sewage transmission infrastructure and pumping stations. Sand and gravel working. Docks, marinas and wharves. Navigation facilities. Ministry of Defence installations. Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. Water-based recreation (excluding sleeping accommodation). Lifeguard and coastguard stations. Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

Table 4: Flood Risk Vulnerability Classification (reproduced from Planning Practice Guidance)

Flood Zones	Flood Risk Vulnerability Classification				
	Essential Infrastructure	**Highly Vulnerable**	**More Vulnerable**	**Less Vulnerable**	**Water Compatible**
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test Req'd	✓	✓	✓
Zone 3a	Exception Test Req'd	✗	Exception Test Req'd	✓	✓
Zone 3b	Exception Test Req'd	✗	✗	✗	✓

Table 5: Flood Risk Vulnerability and Flood Zone 'Compatibility' (reproduced from Planning Practice Guidance)

The proposed development falls into the 'less Vulnerable' category and is in flood zone 3. Therefore, the development is considered appropriate according to planning practice guidance.

8.0 FLOOD RISK MANAGEMENT MEASURES

8.1 FLUVIAL

The site is at low risk of flooding and is predicted to remain free from flooding for all modelled flood events except in the unlikely event in which the flood defences are breached. In this event the flood water depth would be in excess of 1m. It is not a requirement to raise less vulnerable commercial development above this level and it would not be practical to do so given the flood depth and the requirement for vehicle access into the units.

We recommend the building floor level is set approximately 150mm above the external ground level at 21.350.

8.2 SURFACE WATER

Low risk surface water flooding is identified on part of the site. As this area is small and localised it appears to be due to an insufficient surface water drainage system. As the development will include a new surface water drainage system designed in accordance with current standards no mitigation is considered necessary. The new drainage system will be designed to reduce the peak runoff rate compared to the current site, this will reduce surface water flood risk downstream.

9.0 CONCLUSIONS

This FRA demonstrates that although the development is in flood zone 3 it is at low risk of flooding, it is appropriate according to planning practice guidance and does not increase risk to the surrounding area.

We conclude that the proposed development can proceed without causing a risk to users or neighbouring properties.

Appendix A

Proposed Drawings

UK Planning Maps

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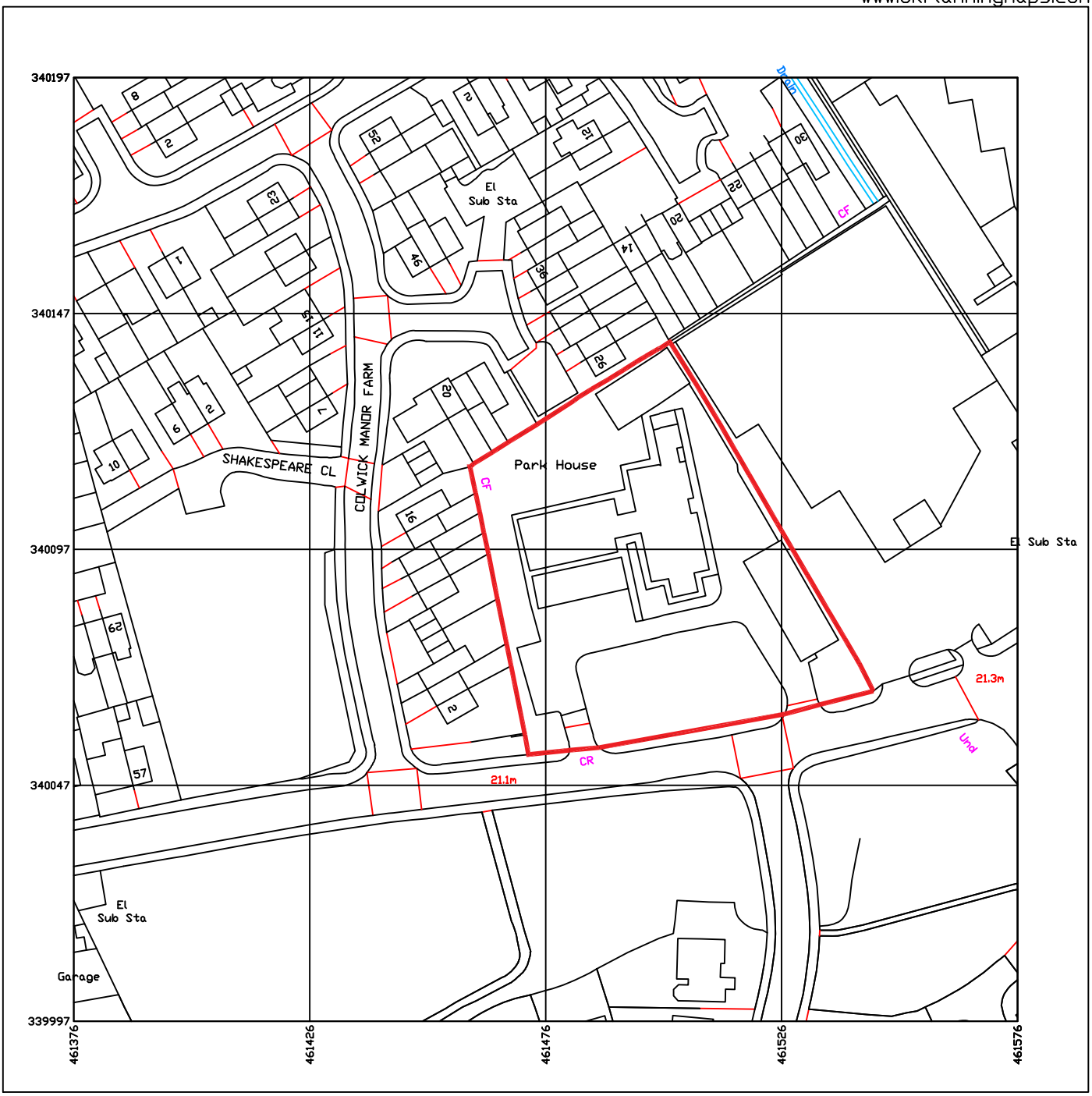
01856 898 022
www.UKPlanningMaps.com



10 0 10 20 30 40 50

sanderson associates consulting engineers Highways | Traffic | Transportation | Water T 01924 844080 mail@sandersonassociates.co.uk F 01924 844081 www.sandersonassociates.co.uk	Client: Meller Ltd	Project Title: Mile End Road, Colwick, Nottingham	Drawing Title: Proposed Layout					Scale 1:250	Drawn By AA
								Drawing Size A2	Checked By KS
								Date January 2023	Approved By KS
								Drawing Number 151532-001	Rev A
			Rev	Amendment	Drawn	Date	Checked		
			A	Amended for updated layout	CP	06.09.23	KS		

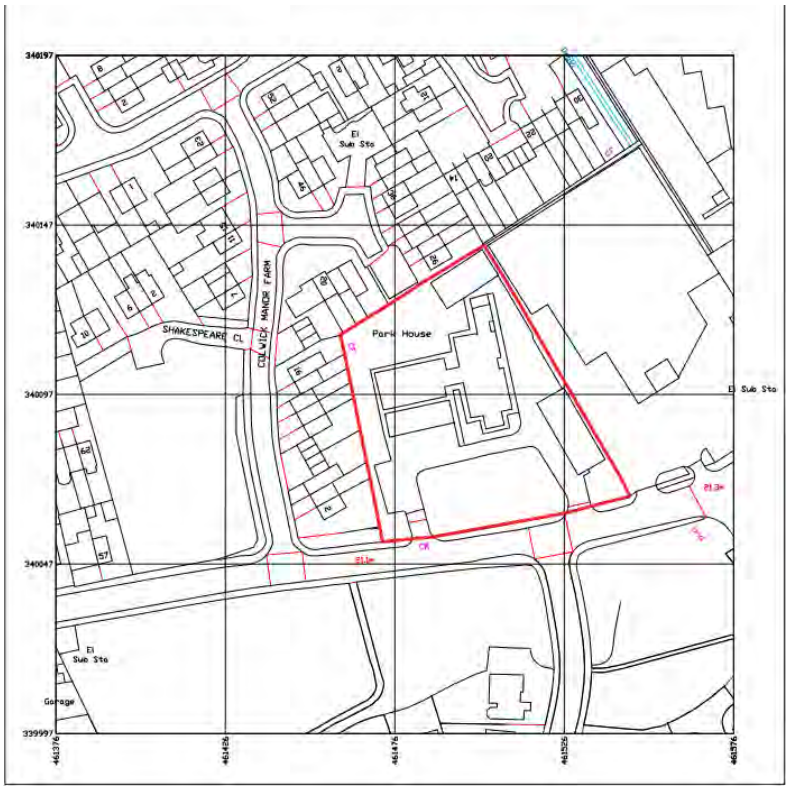
FILE REF:

Appendix B

Environment Agency Data

Product 4 : Flood Risk Data Package for
Radford Holdings Ltd,
Park House, Mile End Road, Colwick, Nottingham, NG4 2DW – SK 61498 40101

EMD 289693 **Date: 01/12/2022**



Flood Map for Planning:
The Flood Map for Planning is now classed as Open Data. As such it can be downloaded free of charge under an open data licence from the following addresses:

- https://data.gov.uk/publisher/environment-agency
- https://flood-map-for-planning.service.gov.uk/

Your development is in **flood zone 3.**
It's important to remember that the flood zones on this map: refer to the land at risk of flooding and do not refer to individual properties refer to the probability of river and sea flooding, ignoring the presence of defences do not take into account potential impacts of climate change This data is updated on a quarterly basis as better data becomes available.

Updated Climate Change Guidance: On 19th February 2016, the Flood risk assessments: climate change allowances' was published on www.gov.uk website. It has replaced previous guidance Climate Change Allowances for Planners. The climate change guidance can be found at: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

Modelled Information: Greater Nottingham SFRA, Black & Veatch, 2010

Node point reference	Location	5% (1 in 20 year) modelled level (mAOD)	5% (1 in 20 year) modelled flow (m^3/s)	1% (1 in 100 year) modelled level (mAOD)
404012540	SK 61761 39514	21.22	590.02	21.87
404012280	SK 61911 39721	21.12	581.03	21.83
404012070	SK 62026 39921	21.10	588.52	21.84
404011810	SK 62188 40119	21.04	593.29	21.81
404011560	SK 62390 40237	20.93	593.36	21.74

Node point reference	Location	1% (1 in 100 year) modelled flow (m^3/s)	0.1% (1 in 1000 year) modelled level (mAOD)	0.1% (1 in 1000 year) modelled flow (m^3/s)
404012540	SK 61761 39514	777.89	22.24	870.05
404012280	SK 61911 39721	710.74	22.22	788.23
404012070	SK 62026 39921	671.24	22.23	729.83
404011810	SK 62188 40119	649.93	22.22	677.47
404011560	SK 62390 40237	648.83	22.17	675.69

Please note: The flows provided represent **in channel flow only** and do not take into account flow on the floodplain.

Breach Information: It is recommended that a site specific breach analysis is carried out for the site using the joint DEFRA/Environment Agency document Flood Risk Assessment Guidance for New Development (FD2320). This document can be downloaded directly using the following link (FD2320.pdf).

Defence Information The Nottingham Left and Right Bank schemes offer a 1 in 100 year (1% chance of occurring in any given year) standard of protection in this area.

Historic Information We have records of historic fluvial flooding at this location in **1932, 1946 and 1947.** Please note that we may or may not hold the original records in question. We do not make any claim as to the reliability of recorded flood extents or that all flood events in the area have been recorded. Please also be aware that flood defences may have been built subsequent to these historic flood events. Note - This information relates to the area the above named property is in, and is not specific to the property itself - it ***does not*** provide an indicator of flood risk ***at individual property level***.

Surface Water & Drainage: The Environment Agency (empowered under the Water Resources Act 1991) concentrates on the major elements of the drainage system, managing flood risk arising from designated "main rivers" and the sea. The Flood & Water Management Act (2010) has given Lead Local Flood Authorities (LLFAs) responsibility for the management of local flood risk, which includes surface runoff, groundwater and flooding from ordinary watercourses (smaller rivers and streams). The LLFA for this area is **Nottinghamshire County Council,** and we recommend that you contact them with concerns about any flooding issues for this area. Further information and maps for surface water, ordinary watercourses, and reservoir flooding can be found here https://www.gov.uk/check-long-term-flood-risk

Open Data Information: The below datasets are now classed as Open Data and as such can be downloaded free of charge under an open data licence from the following address: https://data.gov.uk/publisher/environment-agency

- LiDAR Data; Flood Map for Planning (Rivers and Sea); Historic Flooding Data

Permitting Information: Under the Environmental Permitting (England and Wales) Regulations 2016, any permanent or temporary works in, over or under a designated main river will require an Environmental Permit for Flood Risk Activities from the Environment Agency. Any permanent or temporary works within 8 metres of the top of bank of a designated main river, or landward toe of a flood defence may require an Environmental Permit for Flood Risk Activities from the Environment Agency. In addition, any permanent or temporary works within the floodplain of a designated main river may also require an Environmental Permit for Flood Risk Activities. To find out whether your activity requires a permit or falls under a relevant exclusion, exemption or standard rule please follow this link:
https://www.gov.uk/guidance/flood-risk-activities-environmental-permits

Please note that a permit is separate to and in addition to any planning permission granted.

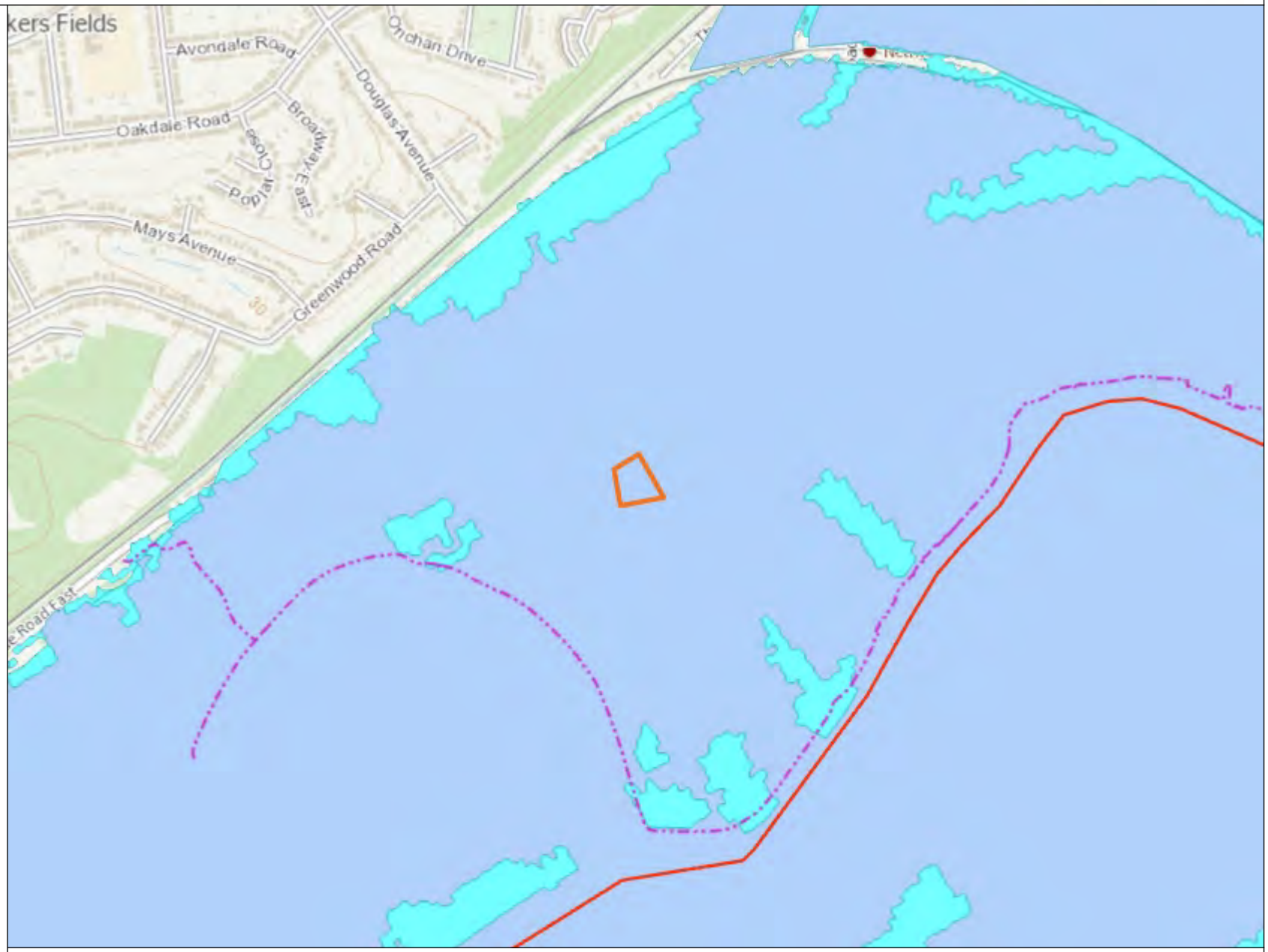
Strategic flood risk assessments: We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment. This should give you information about: the potential impacts of climate change in this catchment areas defined as functional floodplain flooding from other sources, such as surface water, ground water and reservoirs. This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

Detailed Flood Map, centred on Mile End Road, Colwick [EMD289693]

Environment Agency

Legend

- Statutory Main Rivers
- Defences
- Flood Storage Areas
- Flood Zone 3
- Flood Zone 2



1: 10,000

0 250

Metres

N W E S

Surface Water Flood Map, centred on Mile End Road, Colwick [EMD289693]

Environment Agency

Legend

- Flood Extent 1 in 30
- Flood Extent 1 in 100
- Flood Extent 1 in 1000

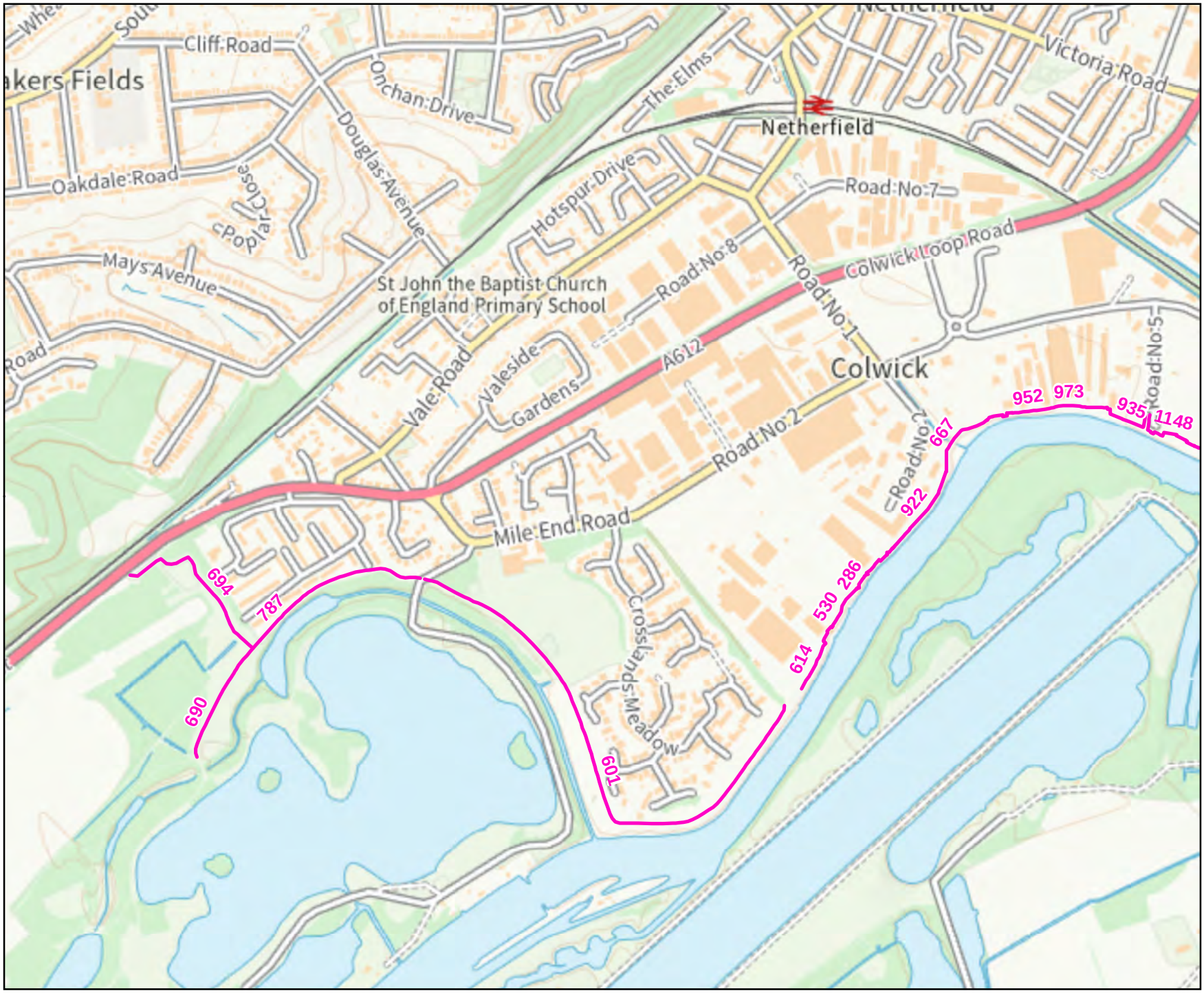
1: 2,500

0 62

Metres

N W E S

Flood Defence Map centred on Mile End Road, Colwick
Ref: [EMD289693]



Environment Agency

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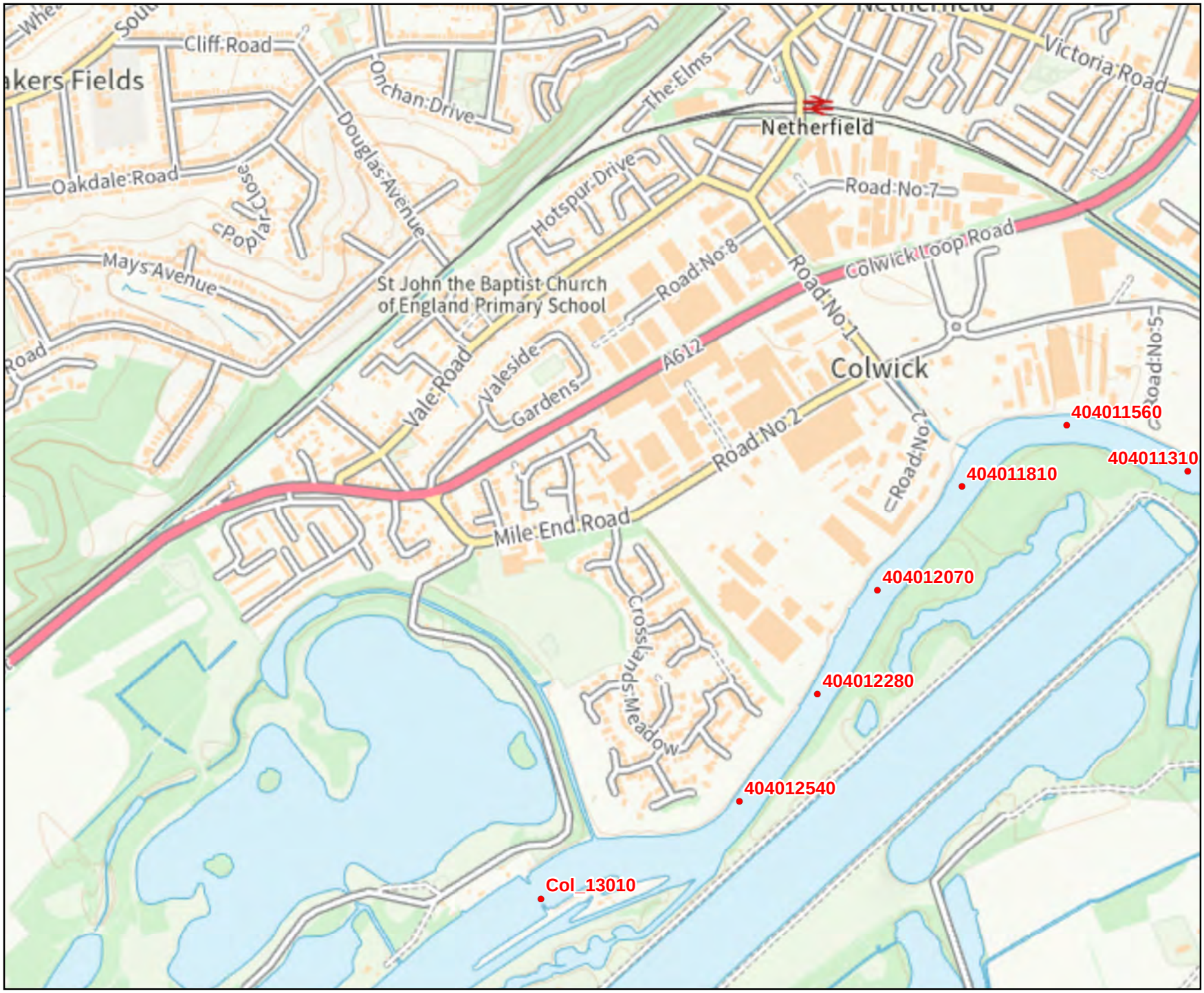
Scale 1:10,000

Date created: 01 December 2022

Legend

EA Maintained Defences 2021

Modelled Nodes Map centred on Mile End Road, Colwick
Ref: [EMD289693]



Environment Agency

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Scale 1:10,000

Date created: 01 December 2022

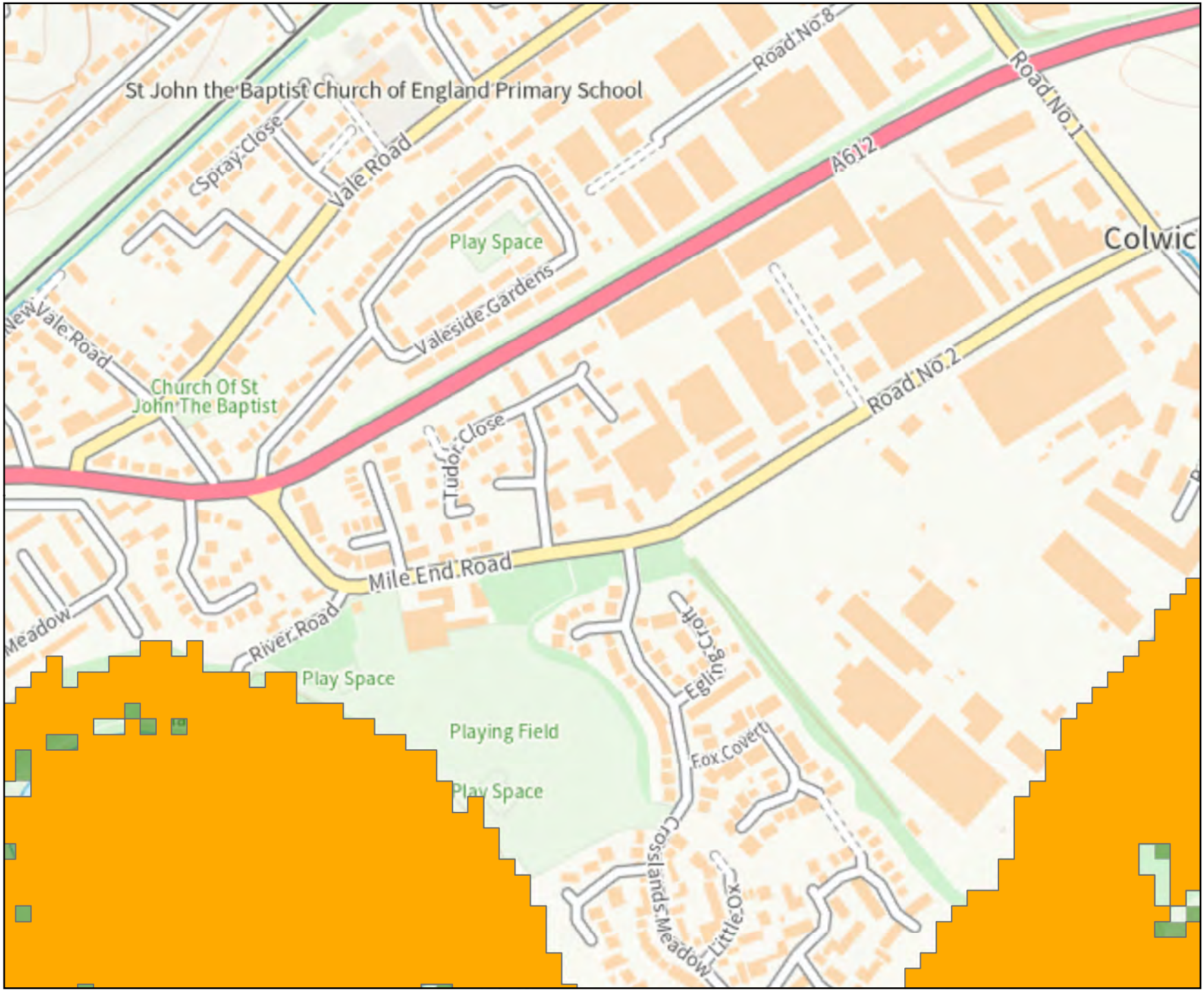
Legend

- Modelled_Nodes_Dec22

SOURCE
Greater Nottingham SFRA
Black & Veatch, 2010

Greater Nottingham,
River Trent
Climate Change Scenario
Environment Agency 2016

Modelled Flood Extents Map centred on Mile End Road, Colwick
Ref: [EMD289693]



Environment Agency

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Scale 1:5,000

Date created: 01 December 2022

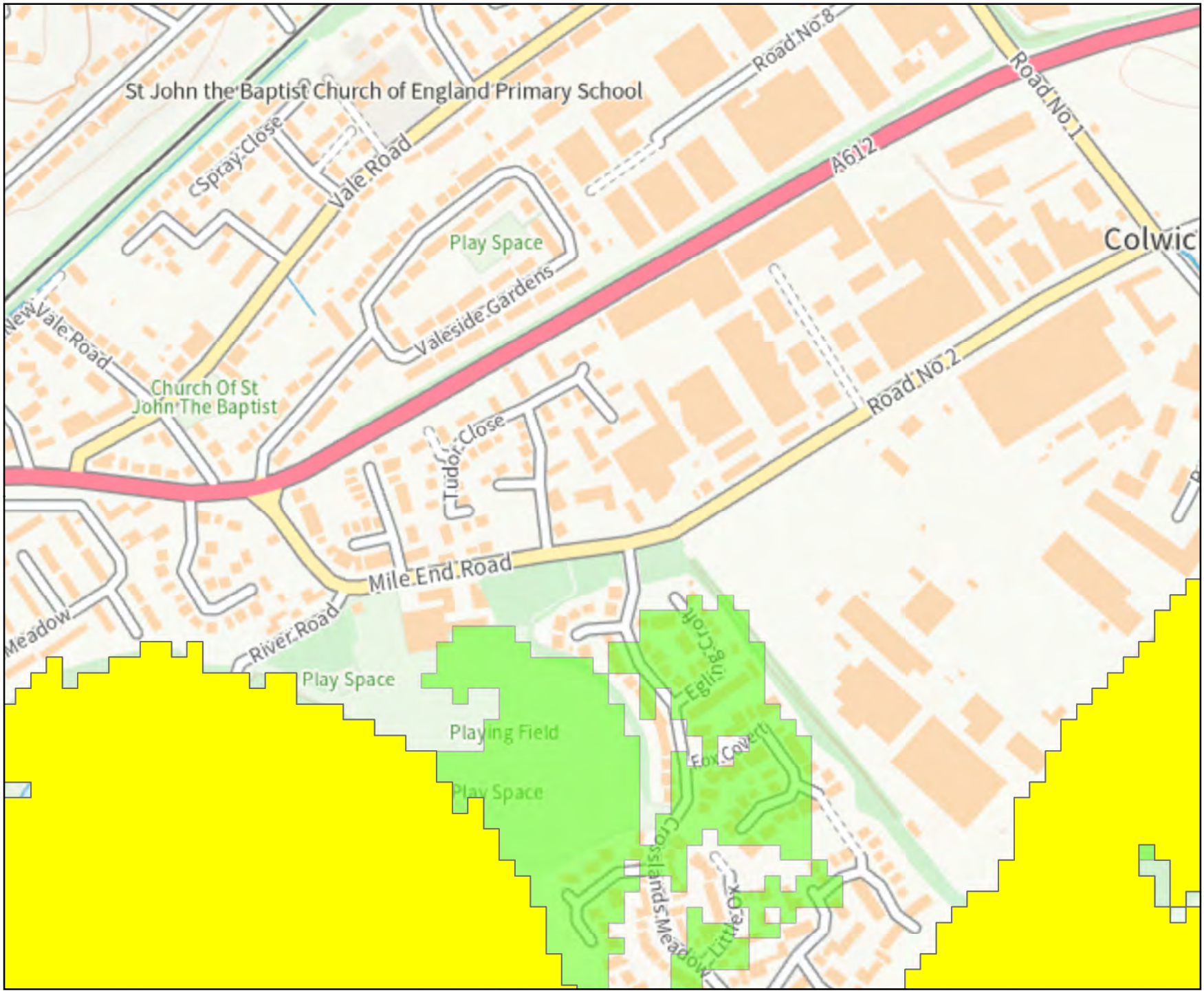
Legend

- 1 in 100 year extent
- 1 in 1000 year extent

SOURCE
Greater Nottingham SFRA
Black & Veatch, 2010

Greater Nottingham,
River Trent
Climate Change Scenario
Environment Agency 2016

Modelled Flood Extents Map centred on Mile End Road, Colwick
Ref: [EMD289693]



Environment Agency

N
W E
S

Scale 1:5,000

Date created: 01 December 2022

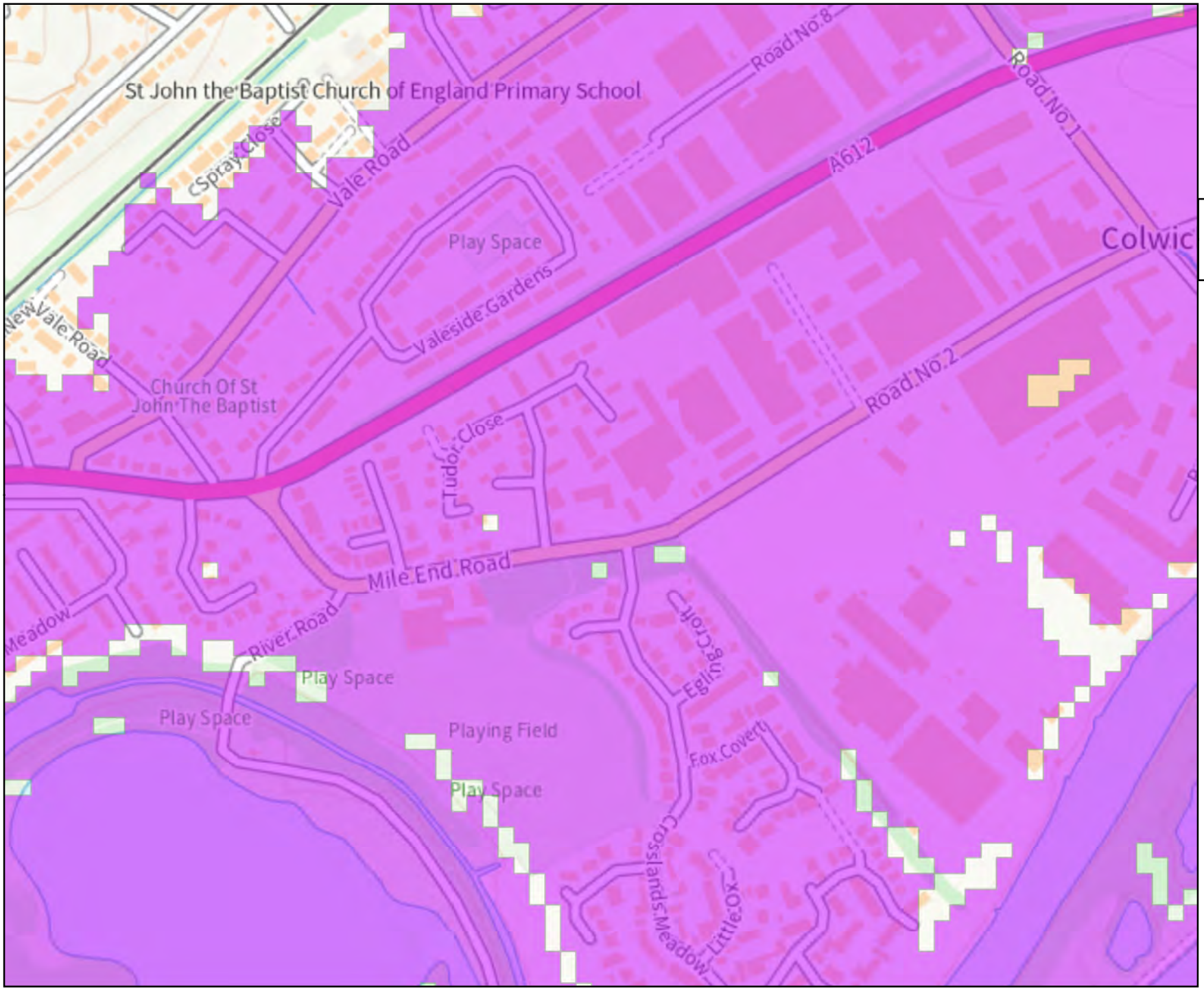
Modelled Flood Extents Climate Change Legend

- 1 in 100 year +20%CC extent
- 1 in 100 year +30%CC extent
- 1 in 100 year +50%CC extent

SOURCE
Greater Nottingham SFRA
Black & Veatch, 2010

Greater Nottingham,
River Trent
Climate Change Scenario
Environment Agency 2016

Modelled Flood Extents Map centred on Mile End Road, Colwick
Ref: [EMD289693]



Environment Agency

N
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Scale 1:5,000

Date created: 01 December 2022

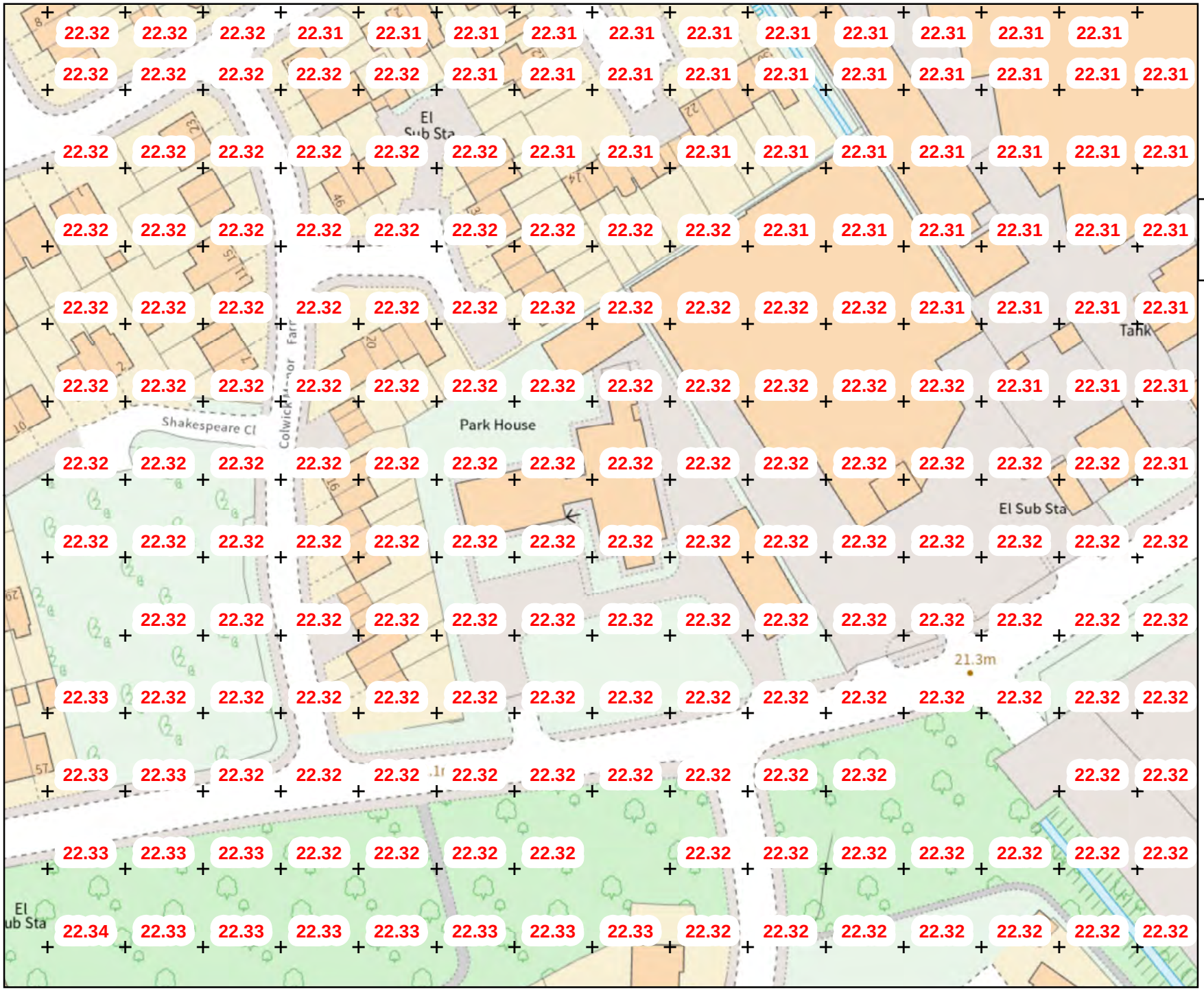
Legend

1 in 100 year +30%CC Breach Extent

SOURCE
Greater Nottingham SFRA
Black & Veatch, 2010

Greater Nottingham,
River Trent
Climate Change Scenario
Environment Agency 2016

Floodplain Heights Map centred on Mile End Road, Colwick
Ref: [EMD289693]



Environment Agency

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W E
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Scale 1:1,000

Date created: 01 December 2022

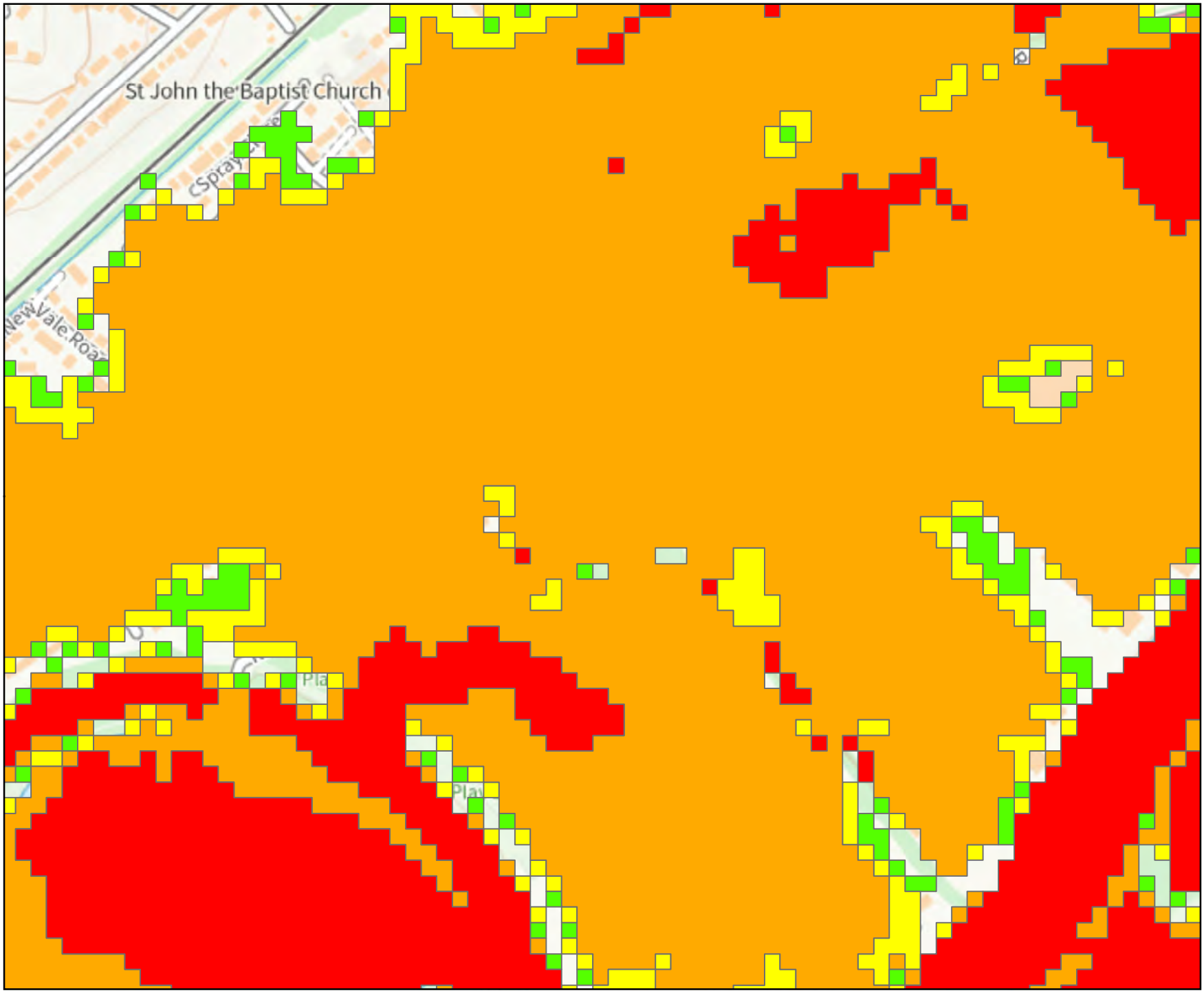
Legend

\+ 100yr+30%CC Breach Height (mAOD)

SOURCE
Greater Nottingham SFRA
Black & Veatch, 2010

Greater Nottingham,
River Trent
Climate Change Scenario
Environment Agency 2016

100yr+30%CC Breach Flood Hazard Map
centred on Mile End Road, Colwick - Ref: [EMD289693]



Environment Agency

N
W E
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Scale 1:5,000

Date created: 01 December 2022

Legend

CATEGORY

- Danger for all (greater than 2)
- Danger for most (1.25 to 2)
- Danger for some (0.75 to 1.25)
- Low (less than 0.75)

SOURCE
Greater Nottingham SFRA
Black & Veatch, 2010

Greater Nottingham,
River Trent
Climate Change Scenario
Environment Agency 2016