

CONTAMINATED LAND RISK ASSESSMENT

Phase 1 Desk Study Report

Site Address

Blakes Lock
Kennet Side
Reading
RG1 3DS

Client

Marcus Sutcliffe
Elite Systems GB Ltd

Report Reference

PH1-2020-000028

Prepared by

STM Environmental Consultants Ltd

Date

06/04/2020



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2 DOCUMENT CONTROL



CONTAMINATED LAND RISK ASSESSMENT Phase 1 Desk Study Report



Site Address:	Blakes Lock Kennet Side Reading RG1 3DS
Site Coordinates:	472724, 173545
Prepared for:	Marcus Sutcliffe Elite Systems GB Ltd
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3 DISCLAIMER

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It is noted that some of the findings presented in this report are based on information obtained from third parties (i.e. Environmental Search Report). Whilst we assume that all information is representative of the site and of present conditions, we can offer no guarantee as to its validity regarding the short term or long-term history of the Site.

This report excludes consideration of potential hazards arising from any activities at the Site other than normal use and occupancy for the intended land uses. Hazards associated with any other activities have not been assessed and must be subject to a specific risk assessment by the parties responsible for those activities.

It should be noted that this report has been produced for environmental purposes only. It should not in any way be construed to be or used to replace a geotechnical survey, structural survey, asbestos survey, buried services survey, unexploded ordnance survey or Invasive Plant Survey.

4 EXECUTIVE SUMMARY

SECTION	SUMMARY
Site Location And Size	The site is located at Blakes Lock, Kennet Side, Reading, RG1 3DS and is centred at national grid reference 472724, 173545. The site has an area of approximately 0.29 ha.
Current Use	The site currently comprises storage and welfare facilities for the Lock Keeper.
Proposed Development	The development proposal is for the erection of a new welfare facility.
Site History	Examination of Ordnance Survey historic maps revealed that in c. 1879 the site comprised an island within Kennet and Avon Canal and was labelled as Blakes Lock. There were approximately 4no. unspecified buildings located on the site. In c. 1972, a few of the buildings were demolished and 2no. of the existing buildings were labelled as Sea Cadets Huts. The surrounding area to the north comprised a Gas Works until the 2010s when this area was redeveloped as a residential area. The surrounding area to the south comprises a residential area.
Geology	The bedrock geology beneath the site consists of Seaford Chalk Formation and Newhaven Chalk Formation (Undifferentiated) while superficial deposits of Alluvium comprising clay, silt, sand and gravel were identified.
Topography	The site is at an elevation of approximately 38.0 mAOD (above Ordnance Datum).
Hydrogeology	The site is underlain by a Secondary A Superficial Aquifer and Principal Bedrock Aquifer. The site is also located within Source Protection Zone 3.
Hydrology	The site is located within Kennet and Avon Canal.
Contamination Assessment	No onsite PCLUs were identified while off site PCLUs include Unspecified Tanks, Gas Works and Gasholders. A conceptual site risk model was developed and a qualitative risk assessment carried out. Potentially significant potential pollutant linkages were identified in respect of:  Human Health – i.e. construction workers;  Property receptors – i.e. services
Recommendations	Due to the nature and scale of the development, an intrusive site investigation is not recommended. However, given that potentially significant potential pollutant linkages (PSPPLs) were identified, it is recommended that a Watching Brief is kept during the proposed development. Any unexpected contamination encountered should be reported immediately to the Local Planning Authority.

This table is intended as a summary of the desk study findings and should be read in conjunction with the main report.

5 INTRODUCTION

STM Environmental Consultants Ltd (STM) were commissioned by Marcus Sutcliffe, Elite Systems GB Ltd (Client) to undertake a Phase 1 Contaminated Land Risk Assessment (CLRA) at a site located at Blakes Lock, Kennet Side, Reading, RG1 3DS.

The study is required to support a planning application for the erection of a new welfare facility.

6 CONTEXT AND OBJECTIVES FOR THE RISK ASSESSMENT

6.1 Legislative Context

6.1.1 Part IIA

Part IIA of the Environmental Protection Act 1990, which came into force in England in April 2000 and in Wales in July 2001, introduced a new statutory regime for the identification and remediation of contaminated land in the United Kingdom.

The legislation considers risks from contaminated land to human beings, controlled waters (surface and ground water), protected ecological systems and property. Under the legislation "contaminated land" is defined as:

"Any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land that: -

- (a) Significant harm is being caused or there is significant possibility of such harm being caused: or
- (b) Pollution of controlled waters is being caused, or is likely to be, caused."

In order for land to be considered contaminated, there must be a contaminant, a receptor and a pathway (via which the contaminant can reach the receptor) present at the site. When these three components are identified at a site, a *pollutant linkage* is said to exist.

Pollutant Linkage = Contaminant → Pathway → Receptor

In order for a local authority to determine that a site is contaminated land, it must be satisfied that the pollutant linkage is a *significant pollutant linkage* and that the land in question is causing, or that there is a significant possibility that it will cause significant harm (SPOSH) to humans, habitats, buildings or livestock and crops if remedial work is not carried out.

6.1.2 National Planning Policy Framework

The National Planning Policy Framework (NPPF) sets out the government's policy on dealing with land contamination through the planning process. It states that planning policies and decisions should ensure that:

- a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation);
- after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and
- adequate site investigation information, prepared by a competent person, is presented.

6.1.3 Environmental Damage Regulations

The Environmental Damage (Protections and Remediation) Regulations 2015 transpose the provisions of the EU Environmental Liability Directive into law in England and Wales.

The Regulations require action in response to the most significant cases of environmental damage. They cover specific types of:

-  damage to species and habitats;
-  damage to water; or
-  risks to human health from contamination of land.

The Regulations apply to both imminent threats and actual cases of damage. Where these arise, those responsible must take immediate action to prevent damage occurring or remediate damage where it does occur.

The Regulations are based on the polluter pays principle 'requiring those responsible to meet the cost of preventive and remedial measures.

6.2 Objectives

This Desk Study has been written so as to provide an initial overview of the nature and extent of contamination hazards that may exist at the site. It has been undertaken in accordance with the specifications outlined in the British Standard BS 10175:2011+A2:2017 Code of Practice for the Investigation of potentially contaminated sites and the Environment Agency Document, CLR11 Model Procedures for the Management of Land Contamination.

The main objectives of the study were to:

-  Enable a conceptual site risk model to be constructed;
-  Provide sufficient information for a preliminary qualitative risk assessment to be undertaken;
-  Inform the need for and scope of any intrusive investigations that may be required.

6.3 Summary of Research Undertaken

Details of information sources researched in order to compile this desk study are given below.

-  Environment Agency Open Data (GIS)
-  English Nature Open Data (GIS)
-  English Heritage Open Data (GIS)
-  British Geological Survey GeoIndex Web Map Service
-  Coal Authority Open Data and Web Map Service.
-  Historical Ordnance Survey Maps
-  Local Authority Planning Application Portal
-  Groundsure Enviro Insight Report & Historical Maps

7 SITE DESCRIPTION

7.1 Site Location and Size

The site is located at Blakes Lock, Kennet Side, Reading, RG1 3DS at grid reference is 472724, 173545. The site has an area of approximately 0.29 ha.

The site lies within the jurisdiction of Reading Borough Council in terms of the planning process.



Site Current Use

The site currently comprises storage and welfare facilities for the Lock Keeper.

7.2 Surrounding Land Uses

A description of current land uses surrounding the boundaries of the site is given below in Table 1 below.

Table 1: Summary of surrounding land uses

Boundary	Land Use Description
Northern	Kennet and Avon Canal
Eastern	Kennet and Avon Canal
Southern	Kennet and Avon Canal
Western	Kennet and Avon Canal

7.3 Proposed Development

The development proposal is for the erection of a new welfare facility.

The proposed development plans are contained in [Appendix 1](#).

8 SITE HISTORY

8.1 Analysis of Historical Ordnance Survey Mapping

Historical maps published by the Ordnance Survey dating back to the late 1800's were reviewed in order to ascertain any previous industrial use at the site. The Groundsure Historical Maps are presented in [Appendix 2](#). A summary of the historic map analysis is provided in Table 2.

Table 2: Summary of historical land use identified from historical maps

Map Year & Scale	POTENTIALLY CONTAMINATIVE LAND USES	
	On Site	Off Site
1872 1:2,500	Partial mapping only.	Partial mapping only.
1878 1:10,560	Partial mapping only.	Partial mapping only.
1879 1:500 1:2,500	The site comprises an island within Kennet and Avon Canal and is labelled as Blakes Lock. There are approximately 4no. unspecified buildings located on the site.	The surrounding area to the S is developed and comprises a residential area. The surrounding area to the N comprises open land labelled as King's Mead with some sparse areas of development. Gas Works 223m W, Sewage Pumping Station 110m W and Railway Line 149m N.
1897-98 1:10,560	No significant changes.	Industrial development to the N comprising Gas Works 14m N, Biscuit Factory 133m W, Railway Sidings 53m N and Unspecified Tanks 45m NW, 48m N, 81m NW, 160m W, 160m NE, Smithy 122m SW and Gasometer 87m N.
1899-1900 1:2,500 1:10,560	1no. further unspecified building has been developed	No significant changes.
1910-13 1:2,500 1:10,560	No significant changes.	Unspecified Tanks 50m N, 83m NW and 129m N, 166m W, and Gasometer 98m N.

Table 2: Summary of historical land use identified from historical maps

Map Year & Scale	POTENTIALLY CONTAMINATIVE LAND USES	
	On Site	Off Site
1914 1:10,560	No significant changes.	No significant changes.
1931-32 1:2,500	No significant changes.	Unspecified Tanks 47m NE, 87m N, 98m N and 114m NW and Unspecified Heap 87m N.
1933-38 1:10,560	No significant changes.	No significant changes.
1956 1:1,250 1:2,500	No significant changes.	Unspecified Tanks 82m NE, 98m N, 146m N, 157m NW and 165m W.
1957 1:1,250	No significant changes.	No significant changes.
1962 1:10,560	No significant changes.	Unspecified Pit 207m N.
1966-71 1:1,250	Partial mapping only.	Partial mapping/no significant changes.
1972-73 1:1,250 1:10,000	A few of the buildings in have been demolished and 2no. of the existing buildings have been labelled as Sea Cadets Huts.	Unspecified Tanks 126m N and 163m E, Gasholders 46m NE, 47m NW and 113m NE, 166m NE, and Electrical Substations 57m NW, 121m E and 127m NW.
1979 1:10,000	No significant changes.	No significant changes.
1980-83 1:1,250	No significant changes.	Electrical Substation 70m S, 130m SW and 152m W.
1983-90 1:1,250 1:10,000	No significant changes.	Unspecified Tanks 155m W and 165m S and Depot 83m N.
1989-93 1:1,250	No significant changes.	No significant changes.

Table 2: Summary of historical land use identified from historical maps

Map Year & Scale	POTENTIALLY CONTAMINATIVE LAND USES	
	On Site	Off Site
1994 1:10,000	No significant changes.	No significant changes.
2001 1:10,000	No significant changes.	No significant changes.
2003 1:1:2,50	No significant changes.	Industrial area to the N has been redeveloped as a residential area.
2010 1:10,000	No significant changes.	No significant changes.
2020 1:10,000	No significant changes.	No significant changes.
Current Use	The site currently comprises storage and welfare facilities for the Lock Keeper.	The surrounding area comprises residential development.

9 ENVIRONMENTAL CHARACTERISTICS

A variety of Environmental datasets provided by the Environment Agency, British Geological Society, English Heritage and English Nature and others were screened in order to assess the environmental sensitivity of the site. The Groundsure Environmental Screen Report is presented in [Appendix 3](#). The results are summarised below.

9.1 Geology

9.1.1 Published Geology

According to the BGS Geoindex, the site is located on bedrock of Seaford Chalk Formation and Newhaven Chalk Formation (Undifferentiated). The superficial deposits are Alluvium comprising clay, silt, sand and gravel.

9.1.2 Unpublished Geology

BGS borehole records for the immediate surrounding area were reviewed in order to obtain further information on the ground conditions beneath the site. The nearest available log is located approximately 72m N of the site (BGS ref. SU77SW89) and was undertaken in 1990 to a depth of approximately 6.7mbgl. The strata encountered comprised Made Ground, Alluvium and Valley Gravel (refer to [Appendix 4](#) for the borehole logs).

9.2 Hydrogeology

The Environment Agency classifies the superficial deposits as a Secondary A Aquifer. The bedrock is classified as a Principal Aquifer. The site is located within Source Protection Zone (SPZ) 3.

9.3 Water Abstractions

No Surface Water or Potable Water Abstraction Licenses were identified onsite or within 500m of the site. However, the following Groundwater Abstraction Licenses were identified onsite or within 500m of the site:

Table 3: Groundwater Abstraction Licenses identified onsite or within 500m of the site.

Point	Status	Details	Source	Distance/Direction
Former Gasworks, Kenavon Drive	Historical	Pollution Remediation	Thames Groundwater	49m NW

9.4 Groundwater Level

According to BGS, the groundwater is likely to be less than 3.0 metres below the ground surface throughout the year.

9.5 Hydrology

The site is location within Kennet and Avon Canal.

9.6 Flood Risk

The site is within Flood Zones 2 and 3 which are defined by the Environment Agency as follows:

-  Flood Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea;
-  Flood Zones 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year.

9.7 Topography

According to [Elevation Finder](#), the general site level is at 38.0 mAOD.

9.8 Environmentally Sensitive Sites and Ecological Protection Zones

No Ecological Protection Zones (e.g. Special Scientific Interest (SSSI), Ramsar Sites, Special Areas of Conservation (SAC)) were identified onsite or within 250m of the proposed development. However, the following Environmentally Sensitive Sites (e.g. Green Belt land, Ancient Woodlands) were identified onsite or within 250m of the site:

Table 4: Environmentally Sensitive Sites identified onsite or within 250m of the site.

Type	Distance	Direction
Eldon Square Conservation Area	181m	SW

9.9 Designated Protected Buildings and Monuments

The following Listed Buildings were identified onsite or within 50m of the site:

Table 5: Listed Buildings identified onsite or within 50m of the site.

Name of Site	Grade	List Date	Distance & Direction
Fisherman's Cottage Inn	II	1978	29m S

9.10 Discharge Consents

No Red List Discharge Consents were identified onsite or within 500m of the site. However, the following Licensed Discharge Consents were identified onsite or within 250m of the site:

Table 6: Licensed Discharge Consents identified onsite or within 250m of the site.

Site Address	Effluent Type	Receiving Water	Effective Date-Revocation Date	Distance/Direction
Blakes Lock House	Sewage Discharges – Final/Treated Effluent – Not Water Company	River Kennet	1997 – 2006	24m SE
Riverside Development	Miscellaneous Discharges – Surface Water	River Kennet	1991 – 1992	68m NE
Reading Gasworks Site	Miscellaneous Discharges – Surface Water	River Kennet	1987 – 1996	102m W
Reading Blakes Lock	Sewage Discharges – Pumping Station – Water Company	Holly Brook	1989 – 2010	115m S
Reading Blakes Lock	Sewage Discharges – Pumping Station – Water Company	Holly Brook	2010 – Current (2020)	115m S
Reading Gasworks Site	Miscellaneous Discharges – Surface Water	River Kennet	1987 – 1996	204m NE

9.11 Part A(1) and IPPC Authorised Activities

No Part A(1) or Integrated Pollution Prevention Control (IPPC) Authorised Activities were identified onsite or within 500m of the site.

9.12 Part A(2) and Part B Activities and Enforcements

No Part A(2) Activities and Enforcements were identified onsite or within 500m of the site. However, the following Part B Activities and Enforcements were identified onsite or within 250m of the site:

Table 7: Part B Activities and Enforcements identified onsite or within 250m of the site.

Site Address	Process	Permit Type	Status	Distance/Direction
King Road Garage	Petrol Vapour Recovery	Historical Permit	Part B	241m S
Tesco Stores Ltd	Unloading Petrol into Storage at Service Stations	Current Permit	Part B	358m N

9.13 List 1 and List 2 Dangerous Substance Inventory Sites

No List 1 and List 2 Dangerous Substances Inventory Sites were identified onsite or within 500m of the site.

9.14 IPC Authorisations

No Integrated Pollution Control (IPC) Authorisations were identified onsite or within 500m of the site.

9.15 Category 3 or 4 Radioactive Substance Authorisations

No Category 3 or 4 Radioactive Substance Authorisations were identified onsite or within 250m of the site.

9.16 Dangerous or Hazardous Sites

The following Control of Major Accident Hazards (COMAH) or Notification of Installations Handling Hazardous Substances (NIHHS) Sites were identified onsite or within 500m of the site:

Table 8: Control of Major Accident Hazards or Notification of Installations Handling Hazardous Substances Sites identified onsite or within 500m of the site.

Site Address	Company	Operational Status	Distance/Direction
Bg Transco London Road	Bg Plc	Historical COMAH Site	100m NE
Reading Holder Station Gasworks Road	British Gas	Historical NIHHS Site	403m NE

9.17 Pollution Incidents

The following pollution incidents were identified onsite or within 250m of the site:

Table 9: Pollution Incidents identified onsite or within 250m of the site.

Incident Identification	Pollutant	Impact	Incident Date	Distance & Direction
34552	Oils & Fuel	Water: Category 3 (Minor) Land: Category 4 (No Impact) Air: Category 4 (No Impact)	04/10/2001	Onsite
65030	Oils & Fuel	Water: Category 3 (Minor) Land: Category 4 (No Impact) Air: Category 4 (No Impact)	19/03/2002	6m SE
64464	Oils & Fuel	Water: Category 3 (Minor) Land: Category 4 (No Impact) Air: Category 4 (No Impact)	16/03/2002	15m NW
169420	Sewage Materials	Water: Category 3 (Minor) Land: Category 3 (Minor) Air: Category 4 (No Impact)	27/06/2003	217m SW
71997	Oils & Fuel	Water: Category 3 (Minor) Land: Category 4 (No Impact) Air: Category 4 (No Impact)	16/04/2002	229m NE
123096	Sewage Materials	Water: Category 3 (Minor) Land: Category 4 (No Impact) Air: Category 4 (No Impact)	26/11/2002	234m NE
87630	Sewage Materials	Water: Category 3 (Minor) Land: Category 4 (No Impact) Air: Category 4 (No Impact)	26/06/2002	240m NE

9.18 Petrol and Fuel Sites

The following Petrol or Fuels Sites were recorded onsite or within 500m of the site:

Table 10: Petrol or Fuels Sites recorded onsite or within 500m of the site.

Site Address	Company	Status	Distance/ Direction
191 Kings Road	Obsolete	Obsolete	194m S
Napier Road	Tesco Extra	Open	331m N

9.19 Waste Disposal Activities & Landfill Sites

No evidence of Waste Disposal Activities or Landfill Sites were identified onsite or within 250m of the site.

9.20 Coal Mining

The site is not located in an area potentially affected by Coal Mining.

9.21 Non-Coal Mining

The following Non-Coal Mining Areas were identified onsite or within 50m of the site:

Table 11: Non-Coal Mining Areas identified onsite or within 50m of the site.

Commodity	Assessment of Likelihood	Distance/ Direction
Chalk	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered.	17m SE

9.22 Brine Affected Areas

No Brine Affected Areas were identified onsite or within 50m of the site.

9.23 Radon

A search of the BGS Radon dataset indicates that the property lies in an area with <1% chance of being affected by naturally occurring radon gas. Therefore, it is unlikely to be affected by radon.

9.24 Asbestos within Buildings

It is possible that Asbestos may exist within the buildings on the site and that an Asbestos survey may be required in line with The Control of Asbestos Regulations 2012. This is outside the scope of this assessment.

10 RELEVANT PLANNING HISTORY

Reading Borough Council's online planning portal was searched in an effort to identify any relevant planning applications for the site or adjacent sites. No relevant planning applications were identified for the site. Relevant planning applications identified for adjacent sites are discussed below.

10.1 Planning Applications for Adjacent Sites

10.1.1 Gas Works 18m N

Planning application [01/00177/FUL](#) was found on the planning portal for the Gas Works 13m N of the Site. This comprised the '*erection of 86 flats (comprising 74 no. 2 bedroom and 12 no. 3 bedroom flats) including 6 affordable keyworker units, together with associated basement car park and landscaping.*'

No relevant documents were found under this application; however, another application ([141510](#)) was found for the '*confirmation of compliance with condition 17 of planning permission 01-00177-FUL*'. A letter from Planning & Building Control found under this application, stated that the Contaminated Land Condition was discharged in August 2004 on receipt of a satisfactory Site Investigation Report and a Review of Remedial Works. It is therefore presumed that a site investigation was undertaken at the site along with subsequent remedial works, prior to the erection of the residential dwellings.

10.1.2 Gas Works 25m SW

Planning application [160378](#) was found on the planning portal for the Gas Works 25m SW of the Site. This comprised the '*Change of use, conversion, extensions and various associated works to former Gas Works Buildings to create a part 4,5 and 6 storey building adjacent to the River Kennet and a 3 storey building fronting Gas Works Road, providing 20 (10x1, 9x2 and 1x3-bed) residential units (Class C3).*' A site investigation report was found on the

planning portal under this application, which is summarised in the following section. It is unknown whether any remediation was undertaken during the proposed development.

11 PREVIOUS SITE INVESTIGATIONS

11.1 Environmental Investigation and Assessment by Atkins (Ref: 9147, Date: October 2010) - Gas Works 223m W

Intrusive investigation was undertaken by Atkins in June 2010 and comprised 5no. window sampler rig boreholes to a maximum depth of 5.0 metres below ground level (mbgl); 1no. round of groundwater level monitoring; 2no. rounds of soil vapour sampling and 1no. water sampling round taken from the River Kennet. Made Ground was encountered up to a max. depth of 5.0mbgl; therefore, the extent of Made Ground at the site was not proven.

Atkins stated that strong tarry odours were encountered at all of the borehole locations; with heavy staining found in 2no. locations. Atkins stated that as the report was a factual assessment only, there was no interpretation of the results or conceptual risk model present in the report. The laboratory reports were, however, found in the appendices of the report. From these, it could be seen that exceedances of Lead (max. 1800mg/kg) and multiple PAHs were identified.

12 SITE WALKOVER

A site walkover was not undertaken as part of the initial scope of works. Photographs of the site which have been provided by the Client are presented in [Appendix 5](#).

13 PRELIMINARY CONCEPTUAL RISK MODEL (CRM)

A conceptual site risk model (CRM) aims to summarise all the potential pollutant linkages or risk that may be associated with a site. It considers the potential pollution sources, receptors and pathways by which receptors can be impacted.

13.1 Potential Sources

Potentially contaminative land uses (PCLUs) of concern were identified based on their proximity to the site and whether they had the potential to generate significant quantities of ground gases, vapours and/or mobile volatile contamination (i.e. high pollution migration potential).

Any PCLUs within a 50m radius of the site as well as any PCLUs with high pollution migration potential within 250m of the site were considered to be of concern and were included within the assessment.

A summary is provided in Table 12 below.

Table 12: Summary of potential contamination sources, period of operation and distance from site.

Site Name	Industrial Profile	Approx. Year Use Established	Approx. Year Use Ended	Direction	Approx. Distance from Site (m)
Gas Works	Gas Works	c. 1897	c. 1972	N	14
Unspecified Tanks	Tanks	c. 1897	c. 1972	NW	45
Gasholders	Gas Works	c. 1972	c. 1972	NE	46
Unspecified Tanks	Tanks	c. 1931	c. 1972	NE	47
Gasholders	Gas Works	c. 1972	c. 1972	NW	47
Unspecified Tanks	Tanks	c. 1897	c. 1972	N	48
Unspecified Tanks	Tanks	c. 1931	c. 1972	N	50

Typical contaminants associated with the above PCLUs are:

-  Acids & Alkalis
-  Asbestos
-  Chlorinated & Non-Chlorinated Solvents
-  Fuels & Fuel Oils
-  Gases: Methane & Carbon Dioxide
-  Heavy Metals
-  Organic & Inorganic Compounds
-  Polychlorinated Biphenyls (PCBs)
-  Polycyclic Aromatic Hydrocarbons (PAHs)
-  Total Petroleum Hydrocarbons (TPHs)
-  Gas works

Please note, this list is not exhaustive of all contaminants that may be present on or off site.

13.2 Potential Receptors

The potential receptors include human, water, ecological and infrastructure receptors.

13.2.1 Potential Human Health receptors

Potential human health receptors include construction workers and future occupants or users of the site and the proposed development.

13.2.2 Potential Groundwater Receptors

Potential groundwater receptors include the Secondary A Superficial Aquifer, the Principal Bedrock Aquifer and Source Protection Zone 3.

13.2.3 Potential Surface Water Receptors

Potential surface water receptors include Kennet and Avon Canal.

13.2.4 Potential Ecological Receptors

There are no potential ecological receptors in the vicinity of the site.

13.2.5 Potential Property Receptors

Potential property receptors include the proposed development as well as neighbouring properties and associated services.

13.3 Potential Pathways

13.3.1 Potential Pathways for Human Receptors

The main pathways via which on and off-site human receptors are likely to come into contact with, or be affected by any contamination present on the site can be summarised as follows:

-  Dermal contact with contaminated soil (i.e. absorption through the skin) – through garden activities such as children playing, gardening etc.
-  Ingestion of contaminated soil (either directly or via soil adhering to vegetables grown on the site)
-  Inhalation of contaminated soil, fugitive dust and vapours.
-  Explosion of landfill gases leading to death/injury

13.3.2 Potential Pathways for Groundwater Receptors

The principal means by which contaminants can reach the groundwater is by leaching (i.e. downward movement through the soil pores with percolating and infiltrating water).

13.3.3 Potential Pathways for Surface Water Receptors

Routes by which contaminants from the site could reach surface water include via overland run-off, drainage and groundwater entering nearby rivers as base flow.

13.3.4 Potential Pathways for Ecological Receptors

The exposure pathways for terrestrial ecological receptors will be similar to those for humans. Pathways for aquatic receptors are via uptake of contaminated sediments and water.

13.3.5 Potential Pathways for Property Receptors

Pathways by which property receptors are exposed to potential contaminants include ground gas and vapour migration through the unsaturated zone and absorption of water containing dissolved contaminants (i.e. as in the case of sulphate attack).

13.4 Potential Pollutant Linkages

The Potential Pollutant Linkages (PPLs) were identified as part of the CRM. These were concerned with the following:

-  Risk of direct contact with and inhalation of contaminants to on-site human health receptors (PPL1a)
-  Risk of injury/death of on-site human health receptors as a result of explosion due to accumulation of ground gas from on and off-site sources in confined spaces within on-site dwellings. (PPL1b)
-  Risk of direct contact with and inhalation of contaminants to off-site human health receptors as a result of on-site contaminants migrating off-site (PPL2a)
-  Risk of injury/death to off-site human health receptors as a result of explosion due to migration of on-site ground gas and subsequent accumulation in confined spaces in off-site buildings. (PPL2b)

-  Risk of derogation of groundwater quality resulting from the migration of on-site contaminants into the underlying aquifer (PPL3)
-  Risk of derogation of surface water quality resulting from the migration and entry of on-site contaminants into the surface water receptor (PPL4)
-  Risk of damage to buildings and services from on-site contaminants (PPL5a)
-  Risk of damage to property as a result of explosion due to accumulation of ground gas from on and off-site sources in confined spaces within buildings (PPL5b).

14 QUALITATIVE RISK ASSESSMENT

For land to be considered 'contaminated land' under Part IIA, the potential contamination source must be causing or have the significant possibility of causing harm to designated receptors. It is therefore necessary to focus on pollutant linkages that have the potential to be significant (i.e. those that are most likely to lead to a determination).

The identified PPLs were therefore individually qualitatively assessed using a basic risk assessment methodology which considers "Likelihood" and "Severity" to assess the magnitude of the potential risk. The methodology is summarised in [Appendix 6](#).

Table 13 below summarises the conceptual site risk model (CRM) including the identified PPLs and the results of the qualitative risk assessment.

Table 13: Conceptual Site Risk Model - Potential Sources, Pathways and Receptors identified on the site.

Source/ Potential Contaminants	Potential Contaminants Associated with Offsite Land Uses as Unspecified Tanks, Gas Works and Gasholders: i.e. Acids & Alkalis, Asbestos, Chlorinated & Non-Chlorinated Solvents, Gases: Methane & Carbon Dioxide, Fuels & Fuel Oils, Heavy Metals, Organic & Inorganic Compounds, PCBs, PAHs and TPHs.							
	On and Off-Site Contaminants		On Site Contaminants		On Site Contaminants		On and Off-Site Contaminants	
Potential Pathways	• Ingestion of soils, garden vegetables and dust • Ingestion of contaminated drinking water • Dermal absorption • Inhalation of dusts and vapours indoors and outdoors • Migration of ground gases and vapours into properties				Leaching in the unsaturated zone and diffusion in the saturated zone	• Overland run-off • Drainage channels • Base flow	• Migration of ground gases and vapours through the unsaturated zone • Attack on water supply service pipes	
Potential Receptors	ON SITE HUMANS Future users, visitors, construction workers		OFF SITE HUMANS Residents, visitors		GROUNDWATER Secondary A & Principal Aquifers SPZ 3	SURFACE WATER Kennet and Avon Canal	ON SITE PROPERTY Buildings and services	
Potential Hazards	• Adverse health effects • Injury/Death	Explosion/ Fire - Buildup of Methane/ VOCs in confined spaces	• Adverse health effects • Injury/ Death	Explosion/ Methane build up in confined spaces	Derogation of groundwater quality	• Derogation of surface water quality • Ecological impacts	Damage to property and services	Explosion/ Fire - Buildup of Methane/ VOCs in confined spaces
Plausible?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PPL ID	PPL1a	PPL1b	PPL2a	PPL2b	PPL3	PPL4	PPL5a	PPL5b
SEVERITY	Major (4)	Major (4)	Major (4)	Major (4)	Moderate (3)	Moderate (3)	Moderate (3)	Moderate (3)
LIKELIHOOD	Remote (2)	Improbable (1)	Improbable (1)	Improbable (1)	Improbable (1)	Improbable (1)	Remote (2)	Improbable (1)
RISK	Low to Moderate (8)	Low (4)	Low (4)	Low (4)	Very Low (3)	Very Low (3)	Low to Moderate (6)	Very Low (3)
POTENTIALLY SIGNIFICANT?	YES	NO	NO	NO	NO	NO	YES	NO

14.1 Assessment of Potential Significance of Potential Pollutant Linkages

14.1.1 Potential Risks to On-Site Human Health

PPL1a was considered unlikely to have the potential to be significant to future users of the site. Although the surrounding area has had an industrial history, there is no change of use involved during the proposed development. Furthermore, the proposed building will cover the footprint of the two previous buildings. Due to the nature and scale of the development, it is considered that the risk of human health receptors (i.e. future users of the site) being exposed to contamination after completion is low.

However, with regards to the ground and construction workers, it is recommended that a Watching Brief (refer to [Section 16.1](#)) is kept during the development and that the appropriate health and safety regulations (refer to [Section 16.2](#)) are adhered to.

PPL1b was considered unlikely to have the potential to be significant. Although potential sources of explosive ground gases and/or vapours (i.e. Gas Works) were identified in the vicinity of the site, due to the nature and scale of the development and as the proposed building will be located within the same building footprint as the existing buildings, it is considered unlikely that a ground gas risk is present at the site.

14.1.2 Potential Risks to Off-Site Human Health

PPL2a was considered unlikely to have the potential to be significant. Due to the nature, scale and location of the development, it is considered unlikely that any contaminants present at the site could significantly impact off-site human receptors.

PPL2b was considered unlikely to have the potential to be significant as no potential sources of explosive ground gases (i.e. landfills, minable coal) were identified on the site.

14.1.3 Potential Risks to Groundwater Receptors

PPL3 was considered unlikely to have the potential to be significant. Although the site is underlain by a Secondary A Superficial Aquifer, a Principal Bedrock Aquifer and is located within Source Protection Zone 3, due to the nature and scale of the development it is considered unlikely that any contaminants present at the site could significantly impact groundwater receptors.

14.1.4 Potential Risks to Surface Water Receptors

PPL4 was considered unlikely to have the potential to be significant. Although the site is situated within the Kennet and Avon Canal, due to the nature and scale of the development it is considered unlikely that any contaminants present at the site could significantly impact surface water receptors.

14.1.5 Potential Risks to Property Receptors

PPL5a was considered to have the potential to be significant. If contaminated, the soil may contain aggressive chemicals (i.e. Sulphates) which may attack building materials and services. Therefore, if any new services are being installed as part of the proposed development, Statutory Water Undertaker should be contacted (refer to [Section 16.3](#)).

PPL5b was considered unlikely to have the potential to be significant. Although potential sources of explosive ground gases and/or vapours (i.e. Gas Works) were identified in the vicinity of the site, due to the nature and scale of the development and as the proposed building will be located within the same building footprint as the existing buildings, it is considered unlikely that a ground gas risk is present at the site.

15 CONCLUSIONS

This Phase 1 Desk Study was carried out to support a planning application for the erection of a new welfare facility.

A review of historical maps and planning records suggests that the site and immediate adjacent land have been subject to previous potentially contaminative land uses (PCLUs). No onsite PCLUs were identified while off site PCLUs include Unspecified Tanks, Gas Works and Gasholders.

A conceptual site risk model was developed and a qualitative risk assessment undertaken. The conclusions of the risk assessment are presented in Table 14 below.

Table 14: Summary of qualitative risk assessment

Potential Receptor	Pathway/Hazard	PSPPLs	Risk
On-Site Human Health	Direct Contact	Yes	Low to Moderate
Off-Site Human Health	-	No	Low
Groundwater	-	No	Very Low
Surface Water	-	No	Very Low
Property	Damage to Services	Yes	Low to Moderate

16 RECOMMENDATIONS

Due to the nature and scale of the development, an intrusive site investigation is not recommended. However, given that potentially significant potential pollutant linkages (PSPPLs) were identified, it is recommended that a Watching Brief is kept during the proposed development. Any unexpected contamination encountered should be reported immediately to the Local Planning Authority.

16.1 Watching Brief and Discovery Strategy

It is recommended that a “watching brief” is kept at all times during the development. Should any unexpected contamination be encountered then the discovery strategy outlined below should be followed.

- Works should be halted if any suspicious ground conditions are identified by groundworkers;
- The Contractor should assess the need for any immediate health and safety or environmental management control measures. If control measures are considered to be required, they should be implemented;
- The Contractor should notify the Client's Environmental Consultant and the Local Planning Authority;
- The Environmental Consultant should attend the site to record the extent of 'contamination' and if necessary, to collect samples;
- If remedial action is considered necessary then the proposed works should be agreed with the Local Planning Authority prior to implementation;
- Once remediation is complete, the Environmental Consultant should collate evidence of work carried out for inclusion in a Remediation Verification Report which should be submitted to the Local Planning Authority.

16.2 Health and Safety

All site works should be carried out in accordance with Health and Safety Executive regulations and guidelines, the Contractor's Construction Health and Safety Plan and the Construction (Design and Management) Regulations 2015.

Precautions should be taken to minimise exposure of site workers during ground works through the implementation of site safety. Such precautions should include, but not be limited to:

-  Provision of appropriate Personal Protective Equipment (PPE);
-  Availability of site welfare;
-  Good personal hygiene, washing and changing procedures;
-  Daily safety briefings.

16.3 Services

The local Statutory Water Undertaker should be contacted in the event that new services are proposed as part of the redevelopment in order to determine their specification for the type of pipework which should be used on this site.

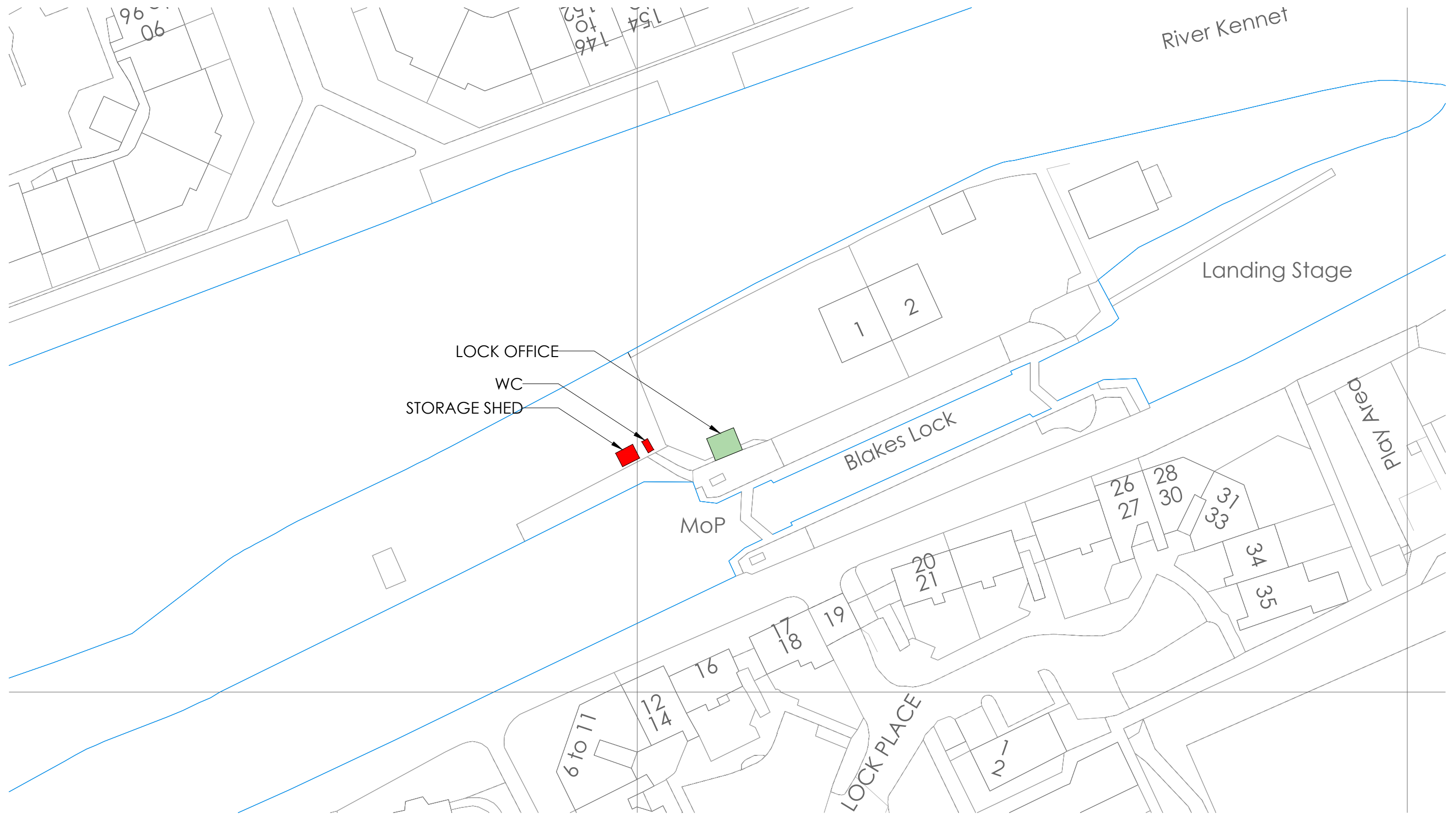
It is recommended that all services, and in particular potable water, should be supplied using materials that are resistant to attack and degradation to chemical attack.

Further information can be found within the published guidance for the '*Selection of Water Supply Pipes to be used in Brownfield Sites*', issued in January 2011 by the UK Water Industry Research.

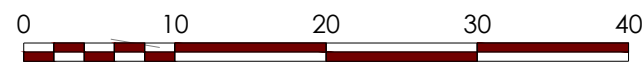
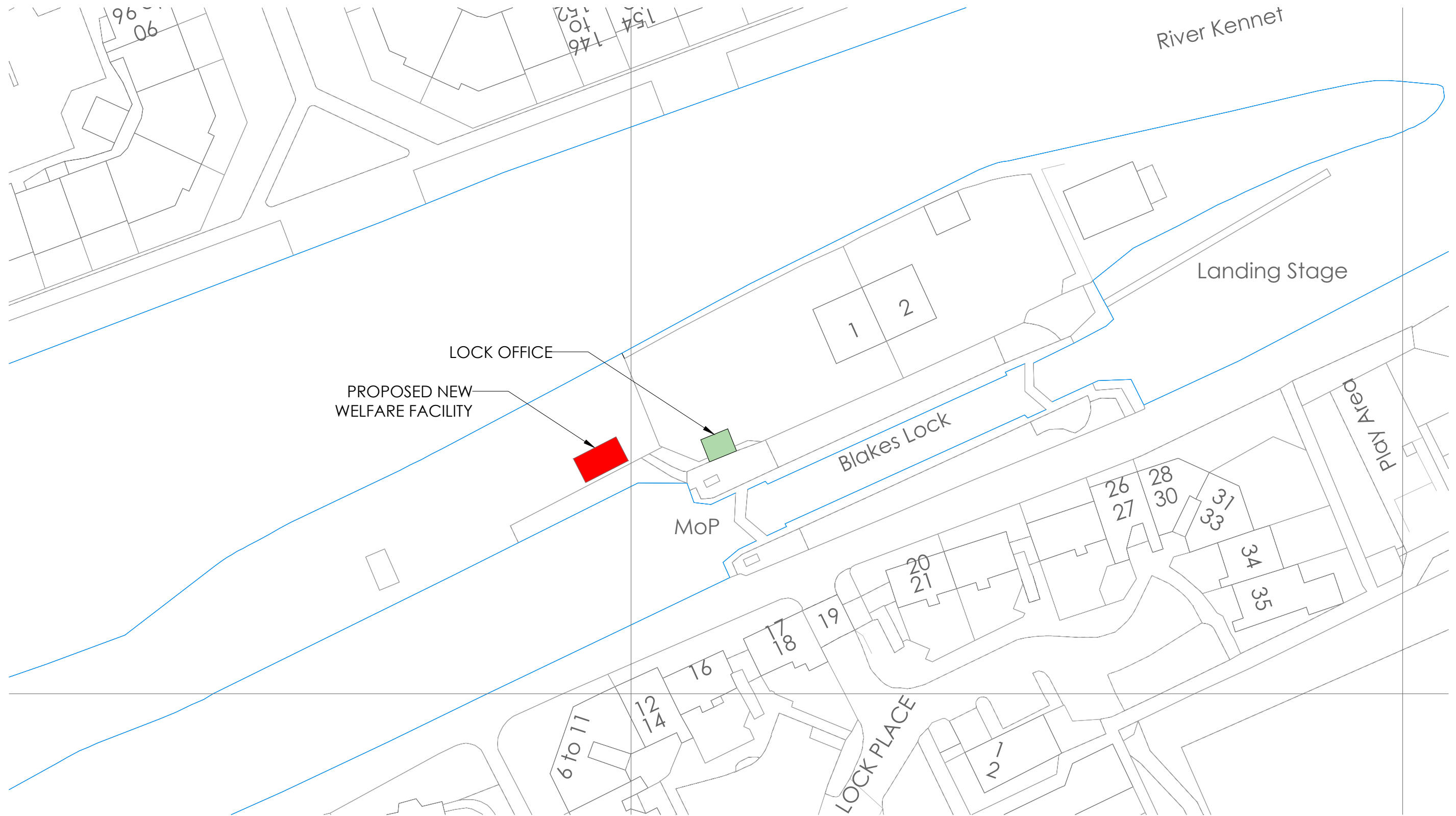
17 INFORMATION GAPS AND UNCERTAINTIES

Assumptions have been made regarding the nature and scale of the activities that took place on the site and the types of potential contaminants that may have resulted. These assumptions will need to be reviewed along with the Conceptual Site Model should further information come to light.

18 APPENDIX 1 – PROPOSED DEVELOPMENT PLANS

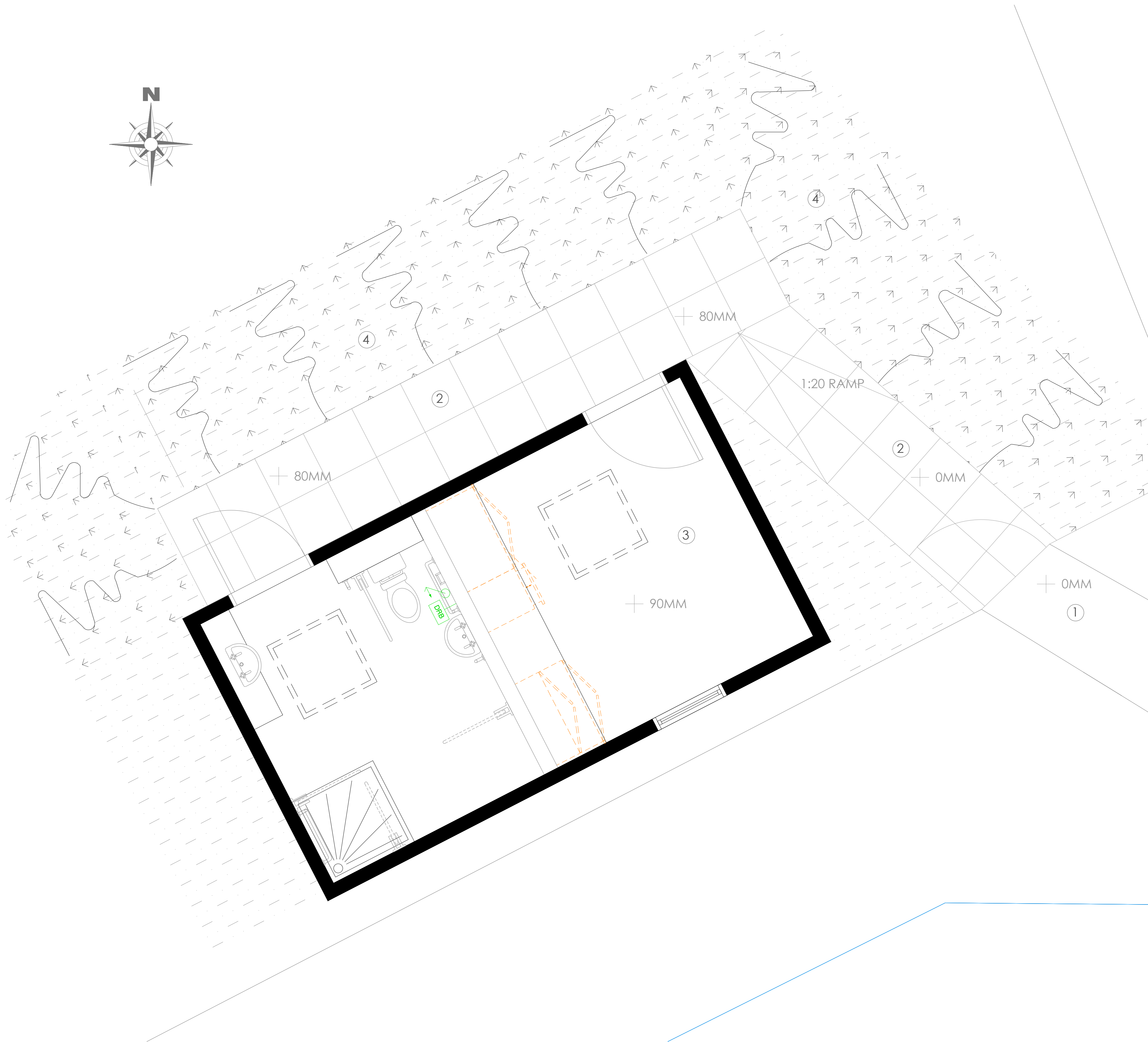


Rev	Description	Date	 elite systems Bedford St. Westgate Cleckheaton BD19 5EA Tel. 01274 873232 Fax. 01274 877779 email, info@elitesystemsgb.co.uk www.elitesystemsgb.co.uk the possibilities are endless.....	PROJECT	DRAWN BY MS	CHECKED BY JG	DATE 30/01/2020
				Blakes Lock New Lock Keepers Facilities	SCALE (@ A3) 1 : 500	PROJECT NUMBER 1912-19	
			TITLE	DRAWING NUMBER 191219-ELT-00-00-DR-1000		REV	
			Existing Site Plan	STATUS: A		A=Approval P=Production T=Tender I=Information	
			CLIENT	Environment Agency			



Rev	Description	Date	PROJECT		DRAWN BY	CHECKED BY	DATE
			Blakes Lock New Lock Keepers Facilities		MS	JG	30/01/2020
			TITLE		SCALE (@ A3) 1 : 500		PROJECT NUMBER 1912-19
			Proposed Site Plan		DRAWING NUMBER 191219-ELT-00-00-DR-1001		REV
			CLIENT		STATUS: A		
			Environment Agency		A=Approval P=Production T=Tender I=Information		

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Cleckheaton BD19 5EA
Tel. 01274 873232 Fax. 01274 877779
email. info@elitesystems.co.uk
www.elitesystems.co.uk
the possibilities are endless.....



1. Existing block paved pathway.
2. New concrete pavior pathway (13.6M2).
3. New welfare facility (GEA 21.6M2).
4. Existing ground sloping away from pathway.



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Rev	Description	Date

PROJECT		
Blakes Lock New Lock Keepers Facilities		
TITLE		
GA		
CLIENT		
Environment Agency		
DRAWN BY	CHECKED BY	DATE
MS	JG	03/02/2020
SCALE (@ A1)		PROJECT NUMBER
1:20		1912-19
DRAWING NUMBER		REV
191219-ELT-00-00-DR-1010		
STATUS: I		
A=Approval P=Production T=Tender I=Information		

19 APPENDIX 2 – HISTORICAL MAPS

Site Details:

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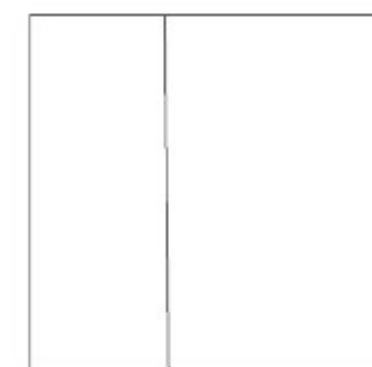
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Map Name: County Series

Map date: 1872

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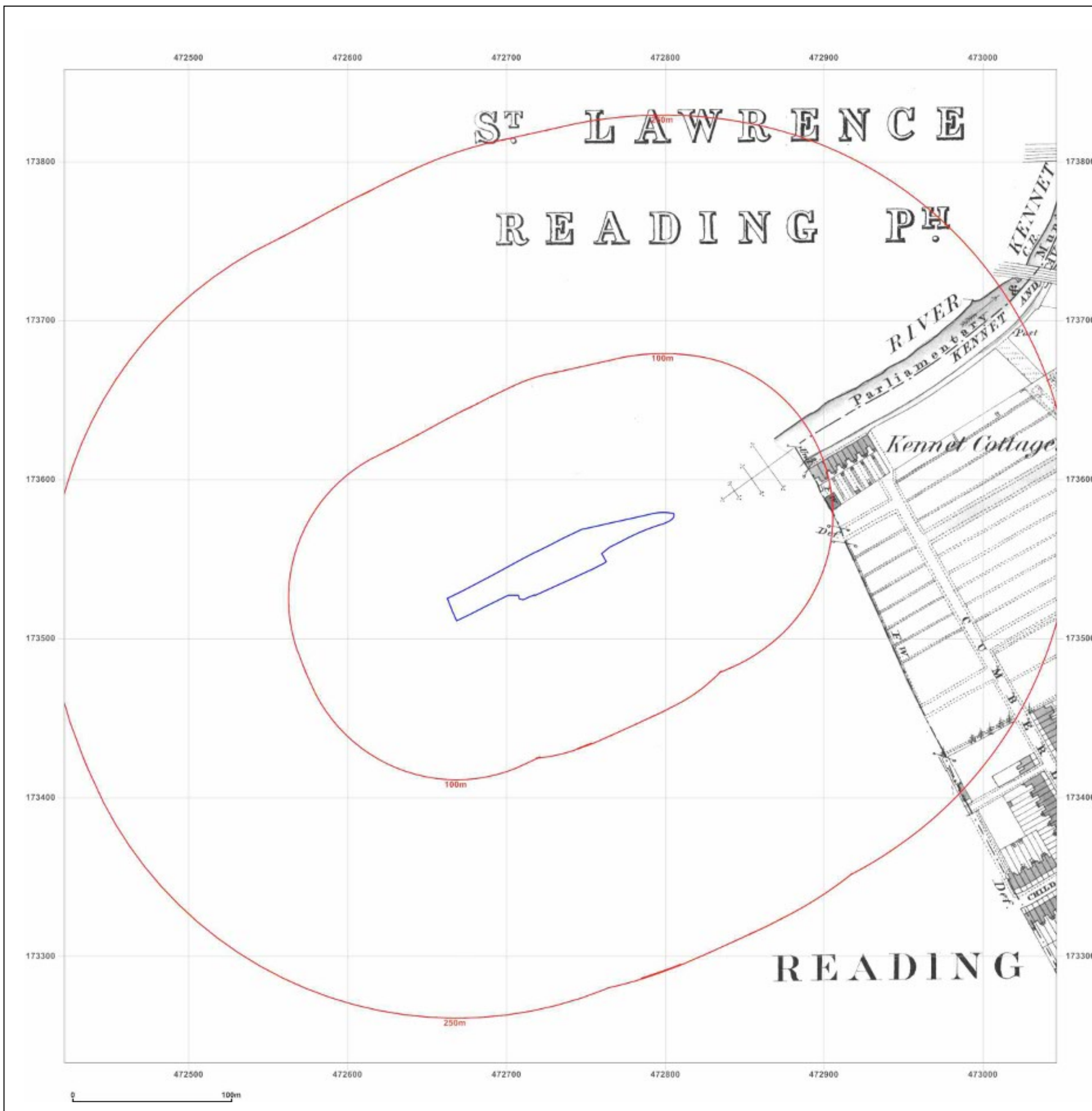


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Report Ref: GS-6728632
Grid Ref: 472734, 173545

Map Name: County Series

Map date: 1879

Scale: 1:2,500

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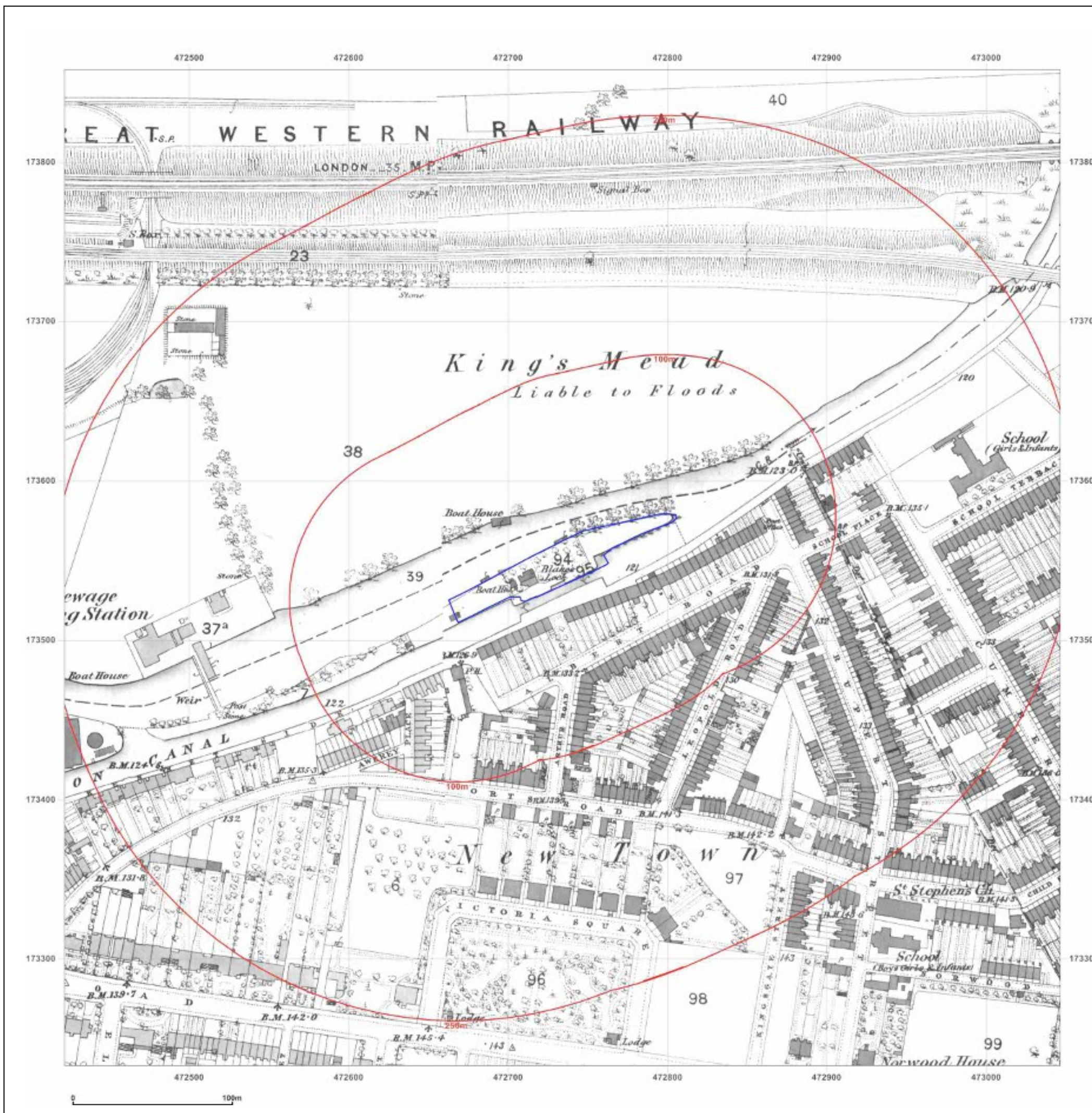


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Client Ref: PH1-2020-000028-1
Report Ref: GS-6728632
Grid Ref: 472734, 173545

Map Name: County Series Town Plan

Map date: 1879

Scale: 1:500

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Report Ref: GS-6728632
Grid Ref: 472734, 173545

Map Name: County Series

Map date: 1899-1900

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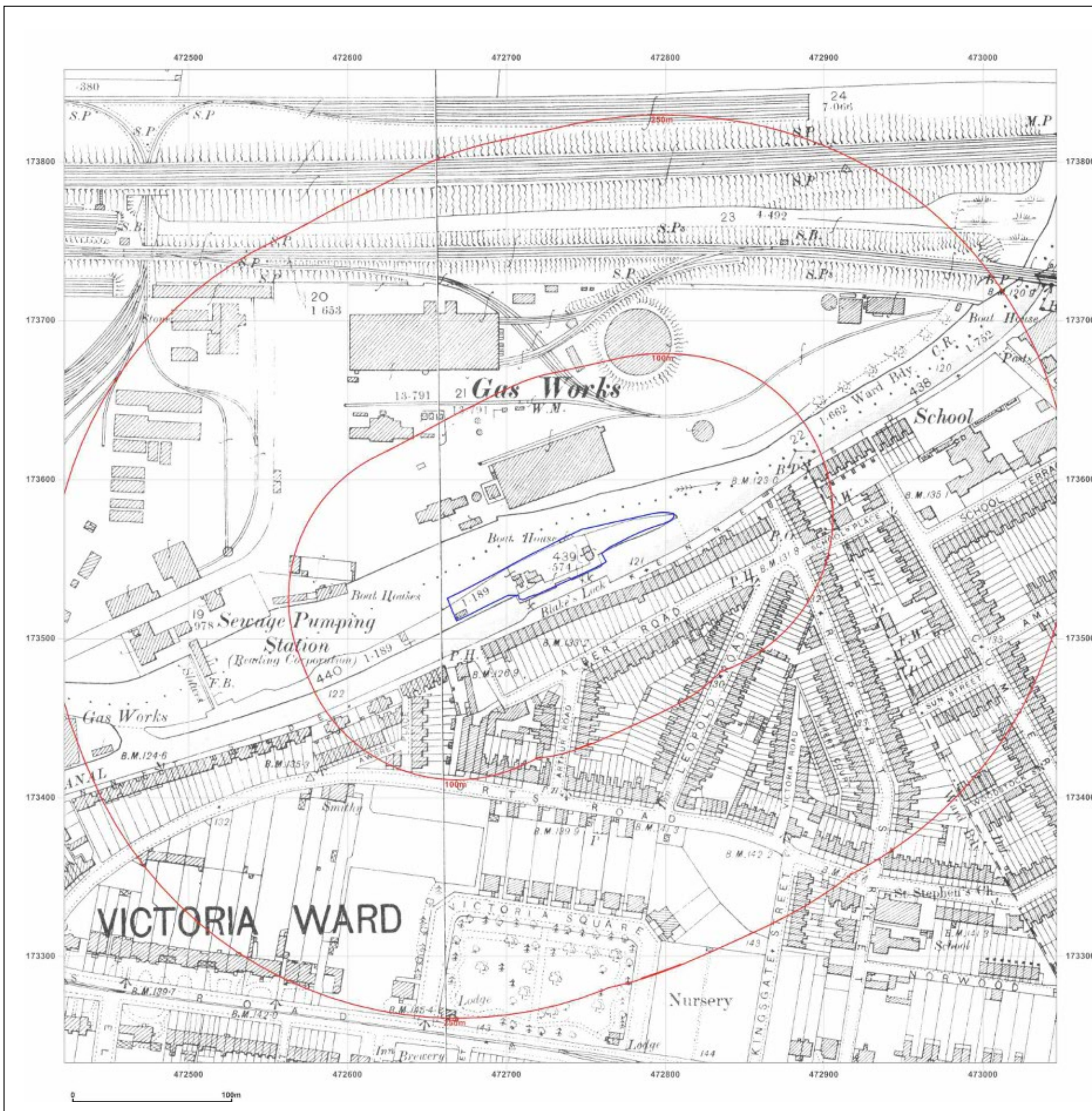


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Grid Ref: 472734, 173545

Map Name: National Grid

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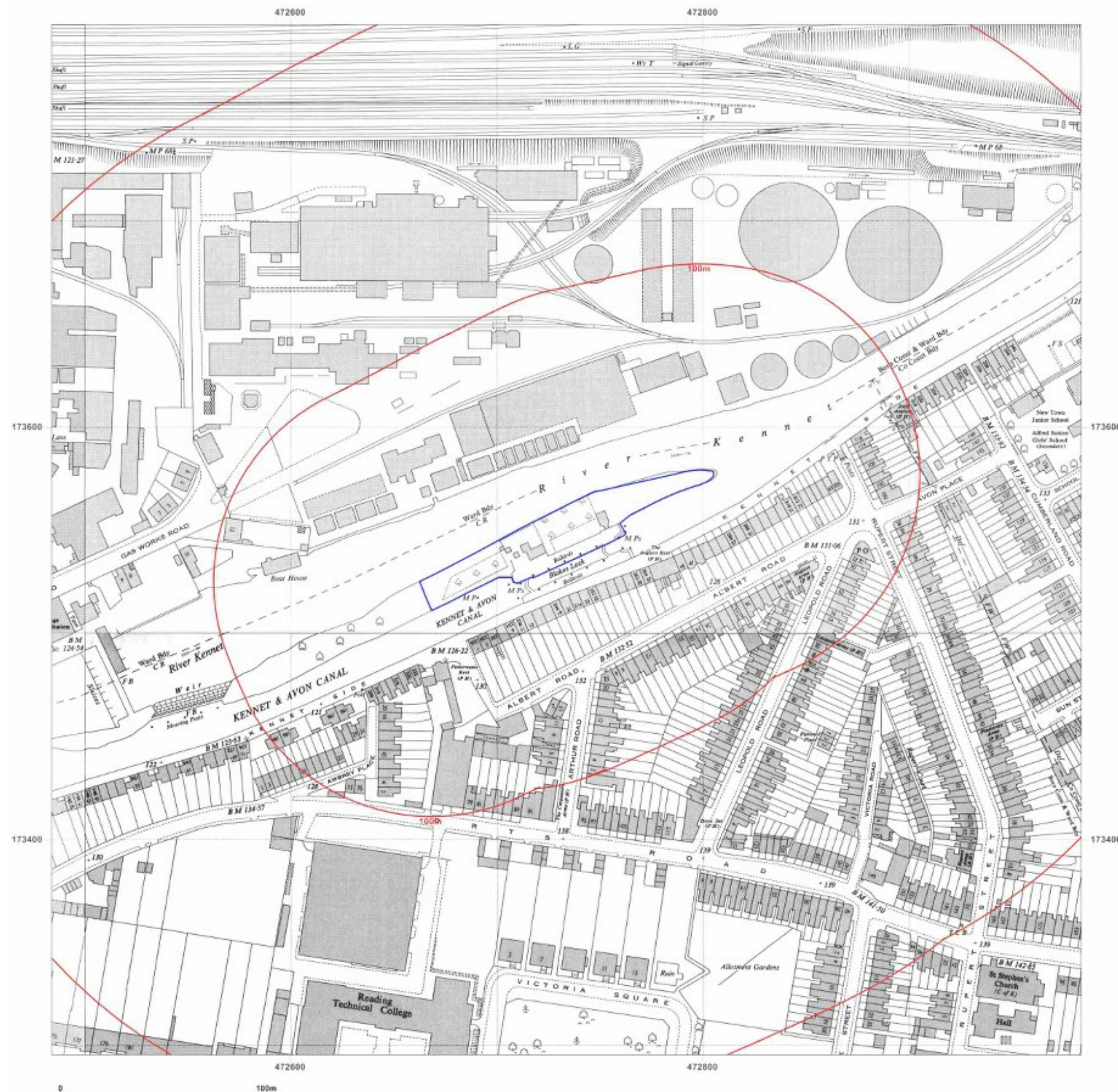


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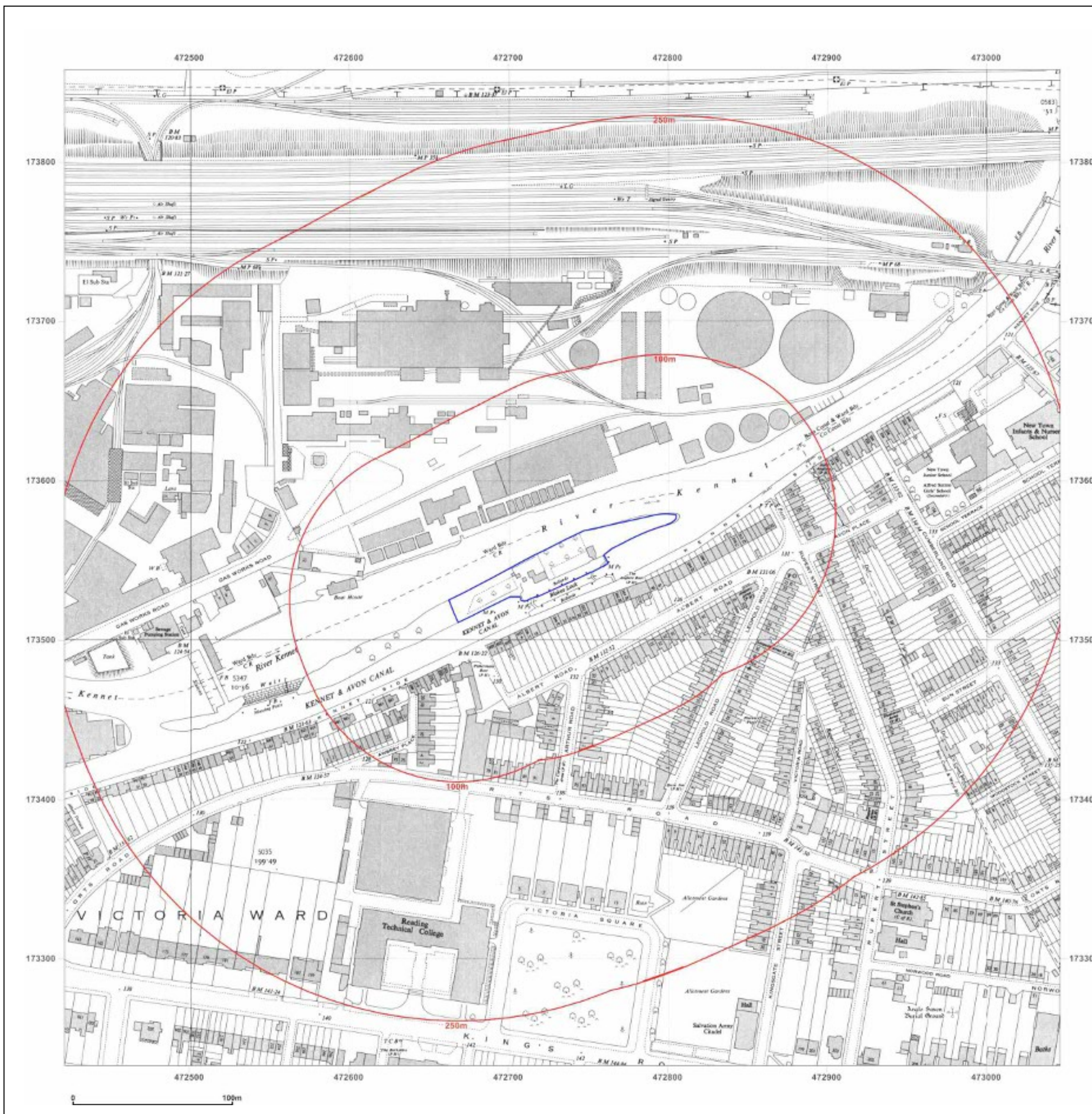


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Map Name: National Grid

Map date: 1957

Scale: 1:1,250

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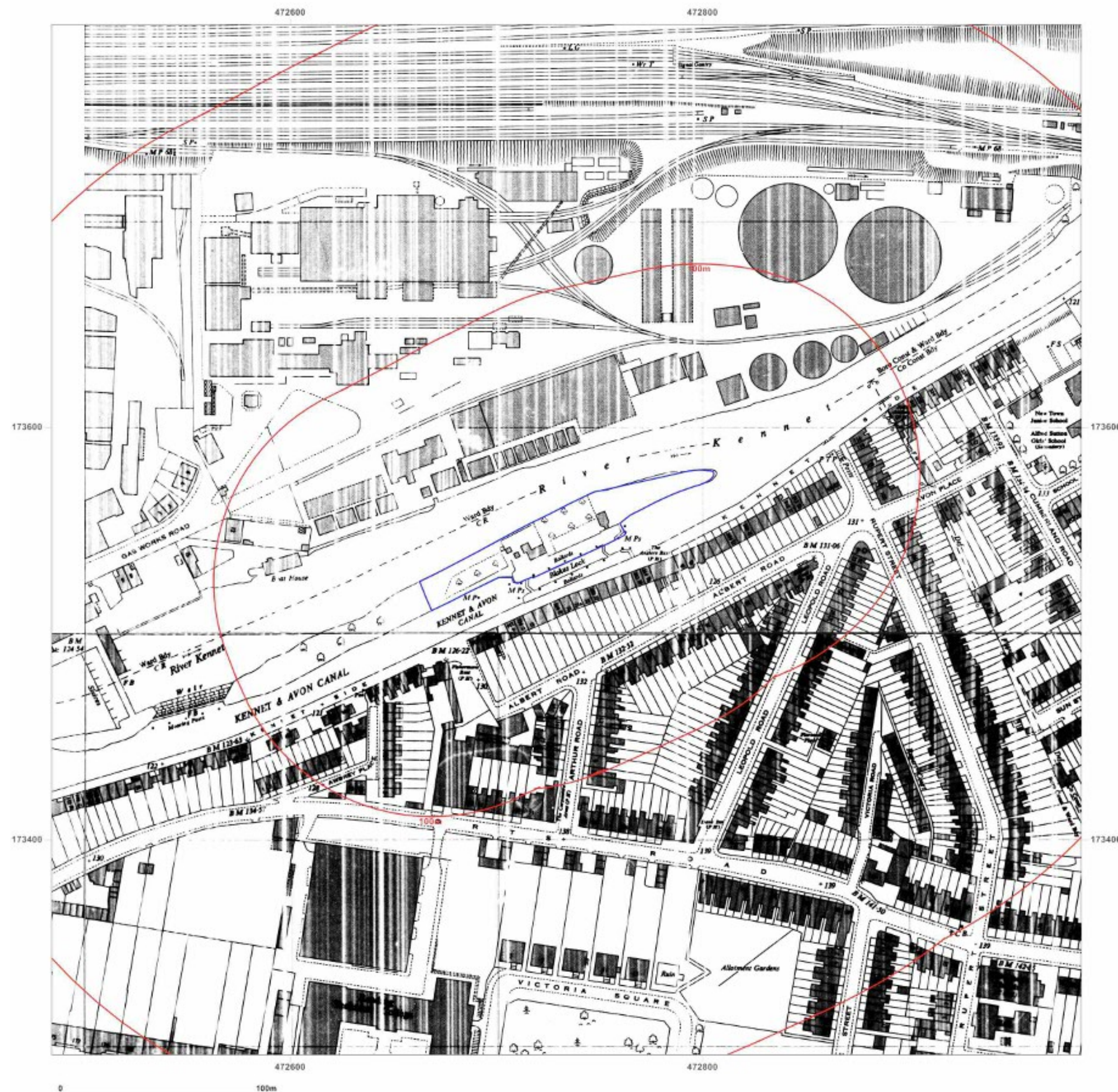


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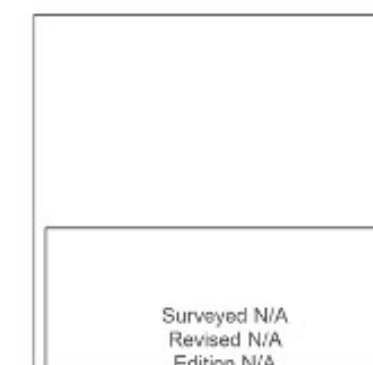
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Grid Ref: 472734, 173545

Map Name: National Grid

Map date: 1966-1971

Scale: 1:1,250

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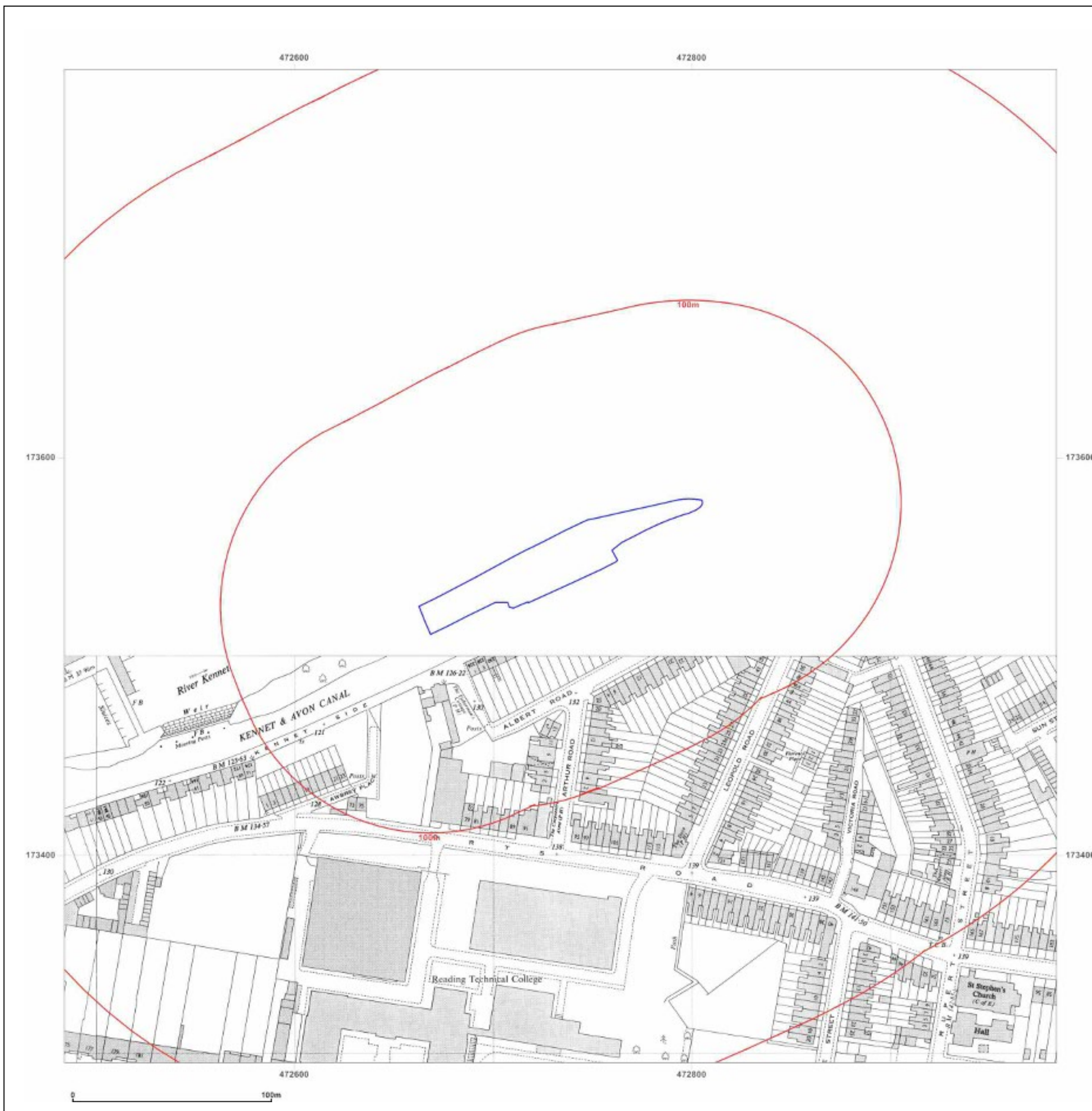


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Site Details:

BLAKES LOCK, KENNET SIDE,
READING, RG1 3DS

Client Ref: PH1-2020-000028-1
Report Ref: GS-6728632
Grid Ref: 472734, 173545

Map Name: National Grid

Map date: 1972-1973

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1956
Revised 1972
Edition N/A
Copyright 1973
Levelled 1951

Surveyed 1956
Revised 1971
Edition N/A
Copyright 1972
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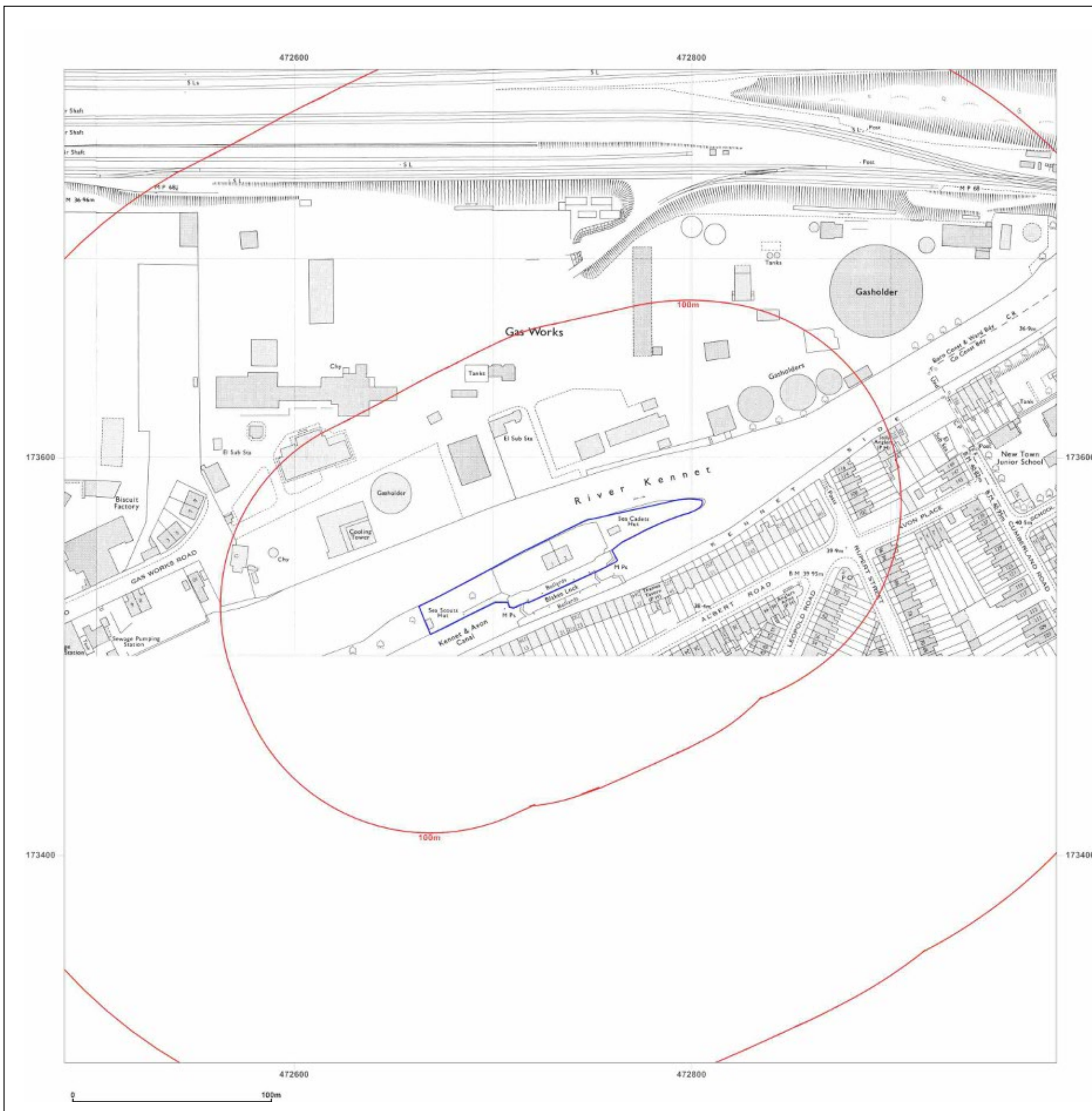


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Site Details:

BLAKES LOCK, KENNET SIDE,
READING, RG1 3DS

Client Ref: PH1-2020-000028-1
Report Ref: GS-6728632
Grid Ref: 472734, 173545

Map Name: National Grid

Map date: 1983

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1972
Revised 1983
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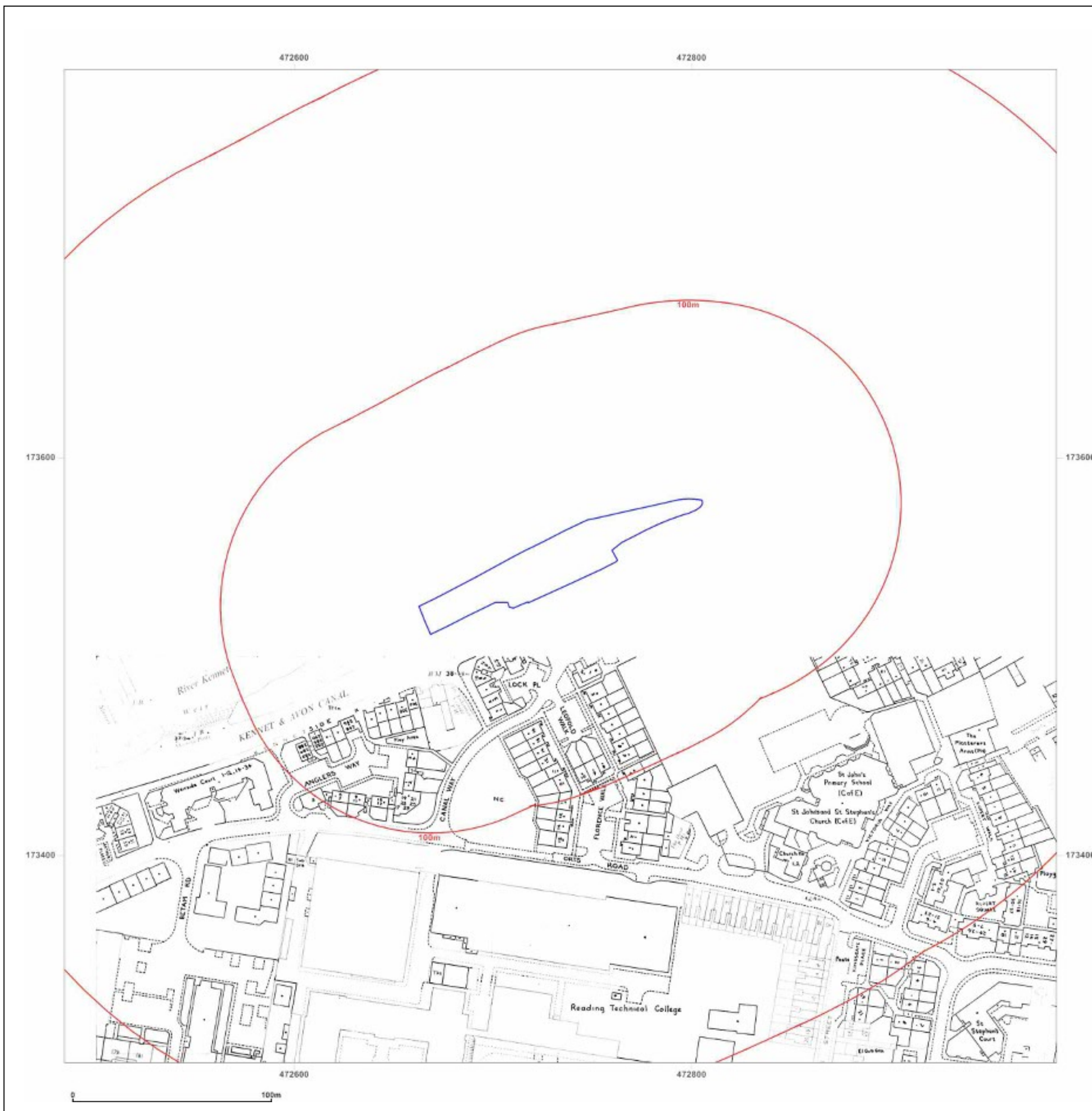


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Site Details:

BLAKES LOCK, KENNET SIDE,
READING, RG1 3DS

Client Ref: PH1-2020-000028-1
Report Ref: GS-6728632
Grid Ref: 472734, 173545

Map Name: National Grid

Map date: 1980-1983

Scale: 1:1,250

Printed at: 1:2,000



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