PHASE I GEO-ENVIRONMENTAL SITE ASSESSMENT

Land at Potato Wharf
Manchester
M3 4NB

Prepared for:
Shepherd Gilmour Infrastructure

Report Ref: 10-609-r1
Date Issued: June 2015



e3p | Environmental | Energy | Engineering

E3P

Heliport Business Park,
Liverpool Road,
Eccles,
Manchester,
M30 7RU

Tel : + 00 (0) 161 707 9612
http:\\www. e3p.co.uk

Registered in England
No.: 807255262

QUALITY ASSURANCE

REMARKS	Final
DATE	June 2015
PREPARED BY	A Smith
QUALIFICATIONS	BSc, FGS
SIGNATURE	
CHECKED BY	A. Edgar
QUALIFICATIONS	BSc, MSc, AIEMA, MIEnvSc, CEnv
SIGNATURE	
AUTHORISED BY	M Dyer
QUALIFICATIONS	BSc, FGS, AIEMA, MIEnvSc, CEnv
SIGNATURE	
PROJECT NUMBER	10-609

Executive Summary

Site Address	Potato Wharf, Manchester, M3 4NB	
Grid Reference	382860, 397580	
Site Area	1.12 Ha	
Current Site Use	The site a disused concrete batching plant and container sales/hire business. There are numerous plant items still on-site associated with the concrete works including hoppers, conveyors and what appears to be below ground pits/sumps used for the storage of water.	
Proposed Development	The site is to be redeveloped into two multi-storey residential apartment blocks with associated access roads and areas of public open space.	
Environmental Setting	*Drift Geology*	Absent
	Bedrock Geology	Chester Pebble Beds Formation
	Hydrogeology	The underlying Chester Pebble Peds is classified as a Principal Aquifer. No groundwater abstractions have been identified with the immediate surrounding area and the site is not located within groundwater source protection zone. The aquifer may be important for base flow to the adjacent River Medlock.
	Hydrology	River Medlock is located adjacent to the subject site with the Bridgewater Canal approximately
	Flood Risk	Flood Risk Zone 2.
	Ecology	The River Medlock adjacent to the site has been classified as having a poor ecological status
	Compressible Ground and Subsidence Hazards	No hazard identified in data searches.
Site History	The western sector of the site was historically a canal basin with an associated storage building along the western site boundary. The rest of the site was undeveloped at this time. By the 1980s the canal basin is no longer mapped with a depot marked in that area of the site, suggesting that the basin was backfilled. Also by this time, the central sector of the site is marked as a concrete works. Planning information suggests that the concrete works was constructed in the mid-1970s.	
Utility Locations	A formal utility survey has not yet been completed. However, services are likely to be present within the immediate surround area. There is a former water storage pit on-site associated with the concrete works and a relatively large area of standing water was noted adjacent to it.	
Landfill Sites & Ground Gases	No recorded landfill sites (current or historic) are located within influencing distance of the proposed development. Made Ground associated with historic construction and demolition activities may be a potential source of hazardous round gas.	
Radon	Unaffected – No special precaution required.	
Coal Mining / Land Stability	Unaffected – No special precautions required.	

Geotechnical Risk

According to the BGS and preliminary intrusive investigations the site is underlain by granular soil matrices which is in turn underlain by shallow sandstone bedrock (>3m bgl), which is likely to offer an ABP in excess of 500kN/m².

Buried obstructions, pits and relict foundations are likely to be presence and loose materials may be presence within the area of the backfilled canal basin. Consideration of shallow perched water within this structure may also be required.

The underlying predominantly granular drift deposits may be re-engineered to provide a sub-grade formation to support proposed roads and infrastructure with a likely CBR in excess of 5%;

The granular drift and Sandstone bedrock geology is likely to offer suitable permeability for soakaway drainage systems. The use of soakaways will need to take into consideration the potential for contamination associated with historical uses of the site.

Contaminated Land Risk Assessment

Human Health
The historic presence of a range of industrial works and processes on site and within the immediate locality may give rise to a number of potential contaminants within the Made Ground including heavy metals, PAHs, hydrocarbon compounds and Asbestos Containing Material (ACM).

In consideration of the proposed development, the site will be redeveloped with multi-storey residential structures, with associated hard-standing cover (access roads / parking) thus removing any potential exposure pathway and risk to human health. In areas of landscaping, a cover system may be required.

Controlled Waters
Shallow bedrock (Principal Aquifer) is anticipated to be present beneath the site and this while no abstractions have been identified it may be important for base flow to the adjacent River Irwell. If mobile contaminants are present the presence of permeable strata may permit lateral migration to the Irwell and therefore there is considered to be a potential risk to controlled waters. Should the banks of the Irwell contain any retaining structures this may reduce the potential risk by removing the lateral migration pathway. Furthermore, it should be noted that the Irwell has been given a Poor ecological status by the EA reflecting its urban surroundings.

Ground Gas
Made Ground underlying the site may be a source of hazardous ground gases which can accumulate within deep excavations / internal spaces and pose a potential risk to construction workers and future end users, respectively.

Recommendations

A detailed Phase II intrusive Geo-Environmental Ground Investigation should be undertaken in order to confirm the findings of the initial conceptual site model and determine an economic foundation design.

Table of Contents

1. INTRODUCTION 5
1.1 Background 5
1.2 Proposed Development 5
1.3 Objectives 6
1.4 Limitations 6
1.5 Sources of Information 6
1.6 Confidentiality 6
1.7 Risk Classification 7

2. SITE SETTING 8
2.1 Site Details 8
2.2 Current Site Use 8
2.3 Surrounding Area 9

3. SITE HISTORY 10
3.1 On-Site Historical Development 10
3.2 Off-Site Historical Development 11
3.3 Planning History 12
3.4 Anecdotal Information 12
3.5 Unexploded Ordnance Risk Assessment 13

4. ENVIRONMENTAL SETTING 14
4.1 Geology and Hydrogeology 14
4.2 Geotechnical Data 14
4.3 Coal Mining 14
4.4 Hydrology 15
4.5 Radon Risk Potential 15
4.6 Industrial Land Uses 15
4.7 Sensitive Land Uses 15
4.8 Site Sensitivity Assessment 16
4.9 Preliminary Geotechnical Assessment 16

5. CONSULTATIONS 17
5.1 Local Authority Contaminated Lane Officer 17
5.2 Landfill Sites and Waste Treatment Sites 17
5.3 Regulatory Database 17

6. INITIAL CONCEPTUAL SITE MODEL 19
6.1 Initial CSM 19

7. CONCLUSIONS AND RECOMMENDATIONS 21

APPENDICES

Appendix I Limitations
Appendix II Glossary
Appendix III Drawings
Drawing No 10-609-001 – Site Location Plan
Drawing No 10-609-002 – Current Features Plan
Drawing No 10-609-003 – Historical Features Plan
Appendix IV Photographs
Appendix V Historical Maps

1. INTRODUCTION

1.1 Background

E3P Ltd have been commissioned by Shepherd Gilmour to undertake a Phase I Geo-Environmental Site Assessment of their site located at Potato Wharf, Manchester.

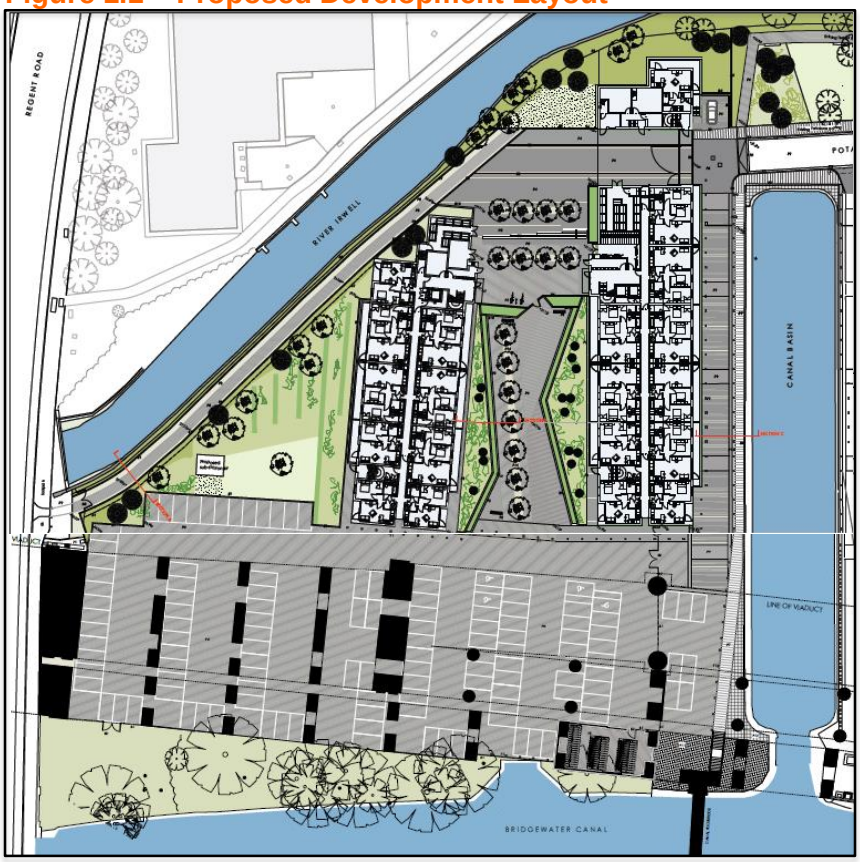
This report is required to determine potential contaminated land and geotechnical liabilities associated with a proposed future residential development.

1.2 Proposed Development

E3P understands that the client will redevelop the site for residential end use comprising the construction of three multi-storey apartment blocks with associated access roads / parking areas, landscaped areas and adopted utility infrastructure.

An excerpt of the proposed development plan is shown below.

Figure 1.1 – Proposed Development Layout



1.3 Objectives

The objectives of the Geo-Environmental Investigation are to:

- Review historical plans, geology, hydrogeology, site sensitivity, flood-plain issues, mining records and any local authority information available in order to complete a Desk Study in line with Environment Agency (EA) document Model Procedures for the Management of Contaminated Land (Contaminated Land Report 11 (CLR11));
- Assess the implications of any potential environmental risks, liabilities and development constraints associated with the site in relation to the future use of the site and in relation to off-site receptors;
- Assess the desk study information and where possible, provide preliminary recommendations in relation to foundations, pavement construction and floor slabs; and,
- Provide recommendations regarding future works required and undertake a preliminary pre-construction cost appraisal.

1.4 Limitations

The limitations of this report are presented in Appendix I.

1.5 Sources of Information

Background information was sought from the following sources:

- Envirocheck Search;
- Historical mapping dated 1848 to 2014. A selection of historical maps are reproduced in Appendix IV;
- On-line planning records held by Manchester City Council;
- Consultations with representatives of the Manchester City Council;
- Environment Agency Groundwater Vulnerability Map (www.environment-agency.gov.uk/wiyby);
- Radon: Guidance on protective measures for new buildings (BRE Document BR 211, 2007); and,
- British Geological Survey Map.

1.6 Confidentiality

E3P has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from E3P; a charge may be levied against such approval.

1.7 Risk Classification

E3P has utilised the available data to classify the site on the basis of its likely contaminated land liability and potential for geotechnical constraints in relation to the site development. The risk classification definitions are summarised below:

RISK	DEFINITION
Low	There are unlikely to be significant contaminated land liabilities/geotechnical constraints associated with the property.
Low-Moderate	There are unlikely to be significant contaminated land liabilities/geotechnical constraints associated with the property with regard to the proposed use. However, minor issues may require further consideration in the event of a future redevelopment of the site etc.
Moderate	Some potential contaminated land liabilities/geotechnical constraints are likely to affect the property as a result of historical and/or current activities. The risks identified are unlikely to pose an immediate significant issue but the purchaser/developer may wish to make further enquiries of the vendor or undertake further environmental improvements. Redevelopment of the site will likely require further site investigation.
Moderate-High	Some potentially significant contaminated land liabilities/geotechnical constraints have been identified at the property that requires further assessment including intrusive ground investigations.
High	Significant potential contaminated land liabilities/geotechnical constraints have been identified at the property. Further assessment including intrusive ground investigation will be required to determine to level of risk and associated liability.

2. SITE SETTING

2.1 Site Details

Site Address	Potato Wharf, Manchester, M3 4NB
National Grid Reference	382860, 397580
Site Area	1.06 Ha

All acronyms used within this report are defined in the Glossary presented in Appendix II.

A site location map is presented in Appendix III as Drawing 10-651-001.

2.2 Current Site Use

SITE DESCRIPTION		
Occupancy/use	The site is currently un-used through was previously occupied by a Hanson Concrete Works that occupied the majority central and western sectors of the subject site. The eastern sector of the site was occupied by a building a yard associated with HJ Hanson Ltd with signage indicating that this sold or hired steel and plastic containers.	
Structures	The plant and areas of hardstanding associated with the concrete works are still present at the site. A site map and the entrance indicates that addition to office and administrations areas, the site also comprised: ▪ Technical Labs ▪ Hoppers ▪ Portland Cement Regeneration facilities ▪ Concrete and aggregate storage facilities ▪ Water recycling, ▪ Truck wash ▪ Water catchment pit ▪ Waste tank ▪ External and ground water storage ▪ Electrical substation The hardstanding between the plant items was observed to be in a variable condition with areas of standing water noted in areas, perhaps in the vicinity of the below ground water storage items. Aggregate storage appeared to be located between the arches of the adjacent railway viaduct. Some small stockpiles were still present. The HJ Hambley Ltd yard area did not contain any plant and was observed to be surfaced with cobbles.	
Access	Access to the site via Potato Wharf which forms the northern and western site boundary.	
Slope	The site is level but a slope is present to the north where it falls to the River Irwell. The site is level with the canal basin to the east.	
Retaining structures	No retaining structures are apparent but a structure may be present with the bank to the River Irwell. This was overgrown at the time of the site inspection.	
Surface Cover (%)	Buildings:	10%
	Hardstand:	90%

	Soft cover:	Limited
Vegetation/Ecology	Areas of self-seeding vegetation are present throughout the subject site with denser vegetation along the boundary with the River Irwell.	
Hazardous Material Storage	No obvious above ground chemical storage was noted at the time of the site inspection but full access could not be obtained to the site.	
Asbestos Containing Material (ACM)	No obvious ACM was noted at the subject site. Given the age of the HJ Hambley building its presence cannot be discounted. Furthermore, based on the likely industrial use of the site, ACM may also be present within any Made Ground beneath the site.	
Polychlorinated Biphenyls (PCBs)	An electrical sub-station is present at the Hanson concrete facility. Historical maps and planning data indicate that the facility has been present since the 1970s and if the sub-station was present then it may be a potential source of PCBs as it may pre-dates the ban on PCBs.	
Waste Storage	There is a waste storage compound that is signed as being operated by Lend Lease. The compound was locked but contained a number of wheeled bins. No areas of potential concern were noted.	
Drainage	A formal drainage survey has not been completed. As discussed, there are areas of standing water within the Hanson facility which may be related to the site's drainage.	

2.3 Surrounding Area

The surrounding area land uses are summarised below:

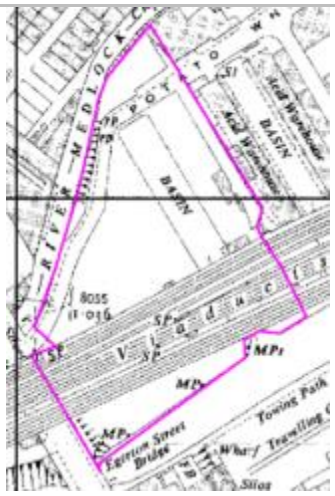
DIRECTION	LAND USE
North	River Irwell with industrial properties beyond.
East	Canal basin with residential apartments beyond.
South	Railway viaduct with Bridgewater Canal and residential apartments beyond.
West	River Irwell with industrial properties beyond.

3. SITE HISTORY

3.1 On-Site Historical Development

A review of historical mapping pertinent to the site is summarised in Table 3.1 below. In addition, historical site features are presented on Drawing No 10-609-003 in Appendix III.

Table 3.1 Site Historical Development

MAP EDITION	HISTORICAL LAND USE	HISTORICAL MAP EXCERPT
1848 **(1:1000)**	The site is predominantly undeveloped with the exception of the eastern section, whereby a number of unspecified structure and a canal basin extend to within the site boundary.	
1908 **(1:2500)**	The former structures are still present with the addition of the construction of an elevated railway which transects the southern portion of the site (SE/SW). A road, Potato Wharf, also lies within the site bounds along the north and western boundary.	
1950/55 **(1:2500)**	An additional building is now present in the east sector of the site along the site boundary. No other significant changes. It is to be noted, adjacent to the western boundary, there is an acid workhouse.	

1960/80 **(1:1250)**	The site is now predominately developed with the map denoting a works in the westerns sector and depot in the east. Mapped features include hoppers, conveyor and a sub-station in the central southern are of the site. These are similar to the current concrete works suggesting that this use was being undertaken. The canal basin in the east appears to have been filled and is now part of the depot. Also the northern half of the railway has been dismantled. The aforementioned acid work house is now an unspecified warehouse.	
1992/95 **(1:1250)**	The aforementioned unspecified workhouse is no longer evident on the map. No other significant changes. The site is now recorded in its present day configuration.	

3.2 Off-Site Historical Development

The site is located within the historic Manchester and Salford Docklands and the immediate locality has undergone extensive industrial development throughout the 20th century (see Section 3.4). A review of potentially contaminative uses identified on historical Ordnance Survey maps within a 100m radius of the site is summarised in Table 3.2 below:

Table 3.2 Summary of Surrounding Historical Development

SURROUNDING FEATURE	DISTANCE	DATES	DIRECTION
Viaducts Railway	Adjacent	Pre 1882 - Present	S / E
St Canal Flower Mill …Then unspecified Mill ...*Then* Worsely Mill	20m	Pre 1908 - Pre 1955 Pre 1956- Pre 1965 Pre 1978 – Pre 1990	South
Warehouse/traveling cranes/basin ...*Then* warehouse …*Then* Depot and warehouse ….*Then* Depot warehouse demolished ….*Then* unidentified building and basin	20m	Pre 1908 - Pre 1965 Pre 1972 - Pre 1969 Pre 1970 – Pre 1991 Pre 1991 – Pre 1994 Pre 1994 - Present	South southeast
Basins …*Then* Acid warehouse ... *Then* warehouse … *Then* warehouses/ garage/ basin	Adjacent	Pre 1908 – Pre1922 Pre 1908 - Pre 1955 Pre 1956 - Pre 1980 Pre 1982 – Pre1990	North Northeast

… *Then demolished* … Then *Basin*		Pre1991 – Pre 1995 Pre 1995 - Present	
Wholesale Meat Market …*Then* Wholesale meat market, warehouse ... *Then* Unspecified buildings … *Then Depot*	10m	Pre 1922 - Pre 1944 Pre 1945 - Pre 1960 Pre 1961 – Pre 1995 Pre 1996 – Present	Northwest
Manchester South Junction (railway) …*Then* Viaduct Railway … *Then a Railway*	50m	Pre 1908 - Pre 1942 Pre 1948 – Pre1984 Pre1985 – Present	Northeast

3.3 Planning History

EP3 has undertaken a review of on-line planning records held by Manchester City Council and the following environmentally pertinent information has been obtained for the site.

Application Received: 30 Aug 1994
Address: Land bounded by Dawson Street, Potato Wharf and Bridgewater Canal, Castlefield, City.
Proposal: CERTIFICATE OF LAWFULNESS. Use of land as a scrap metal yard.
Status: Application Approved

Application Received: 08 Nov 1985
Address: Ellis Everard site, Potato Wharf, City CENTRAL
Proposal: Use of former chemical works for the storage and processing of scrap metals and stabling facilities for horses
Status: Application Approved

Application Received: 05 Apr 1977
Address: Potato Wharf, Off Liverpool Road, City.
Proposal: Retention of Portakabin to serve as temporary office/staff shelter within scrap metal yard and waste container depot. (Previously approved to 31.12.76 on 17.10.75 as per Ref. TP. No. F03411).
Status: Application Approved

Application Received: 06 Nov 1973
Address: Potato Wharf, Cornbrook.
Proposal: Erection of a concrete batching plant with ancillary office, mess room, toilet accommodation, septic tank and storage bays.
Status: Application Approved

These records indicate that the site may have previously been used in part as a scrap metal yard and that the concrete works were likely constructed in the early to mid-1970s.

3.4 Anecdotal Information

No anecdotal information has been obtained.

3.5 Unexploded Ordnance (UXO) Risk Assessment

A specific UXO desk study has not been completed as part of these works however, based on local knowledge and the historical development of the site, the following can be stated:

- Historical maps do not indicate the presence of any ruins on maps dating from the mid-1940s to early 1950s at the subject site;
- The dockland area surrounding Potato Wharf was known to have been a target during WWII;
- While UXO is unlikely to present within areas of existing hard surfacing, it may be present within soft silts associated with canal basin etc. Part of the subject site comprised a canal basin that was understood to have been backfilled in the 1970s. There is an increased risk of UXO within this structure;
- Based on the above, E3P consider there to be a moderate risk associated with the potential presence of UXO in the eastern sector of the site and further assessment is likely to be required as part of any future site investigation or construction activity.

4. ENVIRONMENTAL SETTING

4.1 Geology and Hydrogeology

The British Geological Survey (BGS) map for the site, (Sheet 85, 1:50,000, Solid & Drift edition) and online records indicates the site is underlain by the following geological sequence:

GEOLOGICAL UNIT	CLASSIFICATION	DESCRIPTION	AQUIFER CLASSIFICATION
Drift	No Drift deposits identified	-	-
Solid	Chester Pebble Bed Formation	Sandstone	Principal Aquifer

E3P has reviewed the online borehole records held by the BGS. An exploratory hole was completed adjacent to the railway (>10m) east of the site by the Manchester Corporation (Ref: SJ89NW121) although the date was no specified. The ground conditions comprised Made Ground (Fill) to a recorded depth of 1.83m bgl underlain by a loamy SAND to a proven depth of 3.66m bgl. The sand strata was in turn underlain by a soft red SANDSTONE proven to completion depth of 11.38m bgl.

This borehole log shows the prevailing ground conditions generally confirm that of the published BGS mapping detailed above.

The Envirocheck Report indicates that the site is not located within a Groundwater Source Protection Zone (GPZ). There are no potable water abstractions within a 1km radius of the subject site, however, a single groundwater abstraction licence is located 974m southwest for general industrial cooling registered to Colgate Palmolive Ltd on Ordsall Lane.

Based on the local topography and location of surface watercourses it is considered likely that shallow groundwater, if present, will flow in a northerly direction, towards the River Irwell.

4.2 Geotechnical Data

Geotechnical Data presented within the Envirocheck report identifies the following ground conditions:

HAZARD	DESIGNATION
Shrink-Swell Clay	No Hazard
Landslides	Very Low Risk
Ground Dissolution	No Hazard
Compressible Ground	No Hazard
Collapsible Deposits	Very Low Risk
Running Sand	No Hazard

4.3 Coal Mining

E3P has reviewed the Coal Authority Interactive Map which confirms the following:

- The site is not located within a Development High Risk Area;

- There are no mine entries, mine gas sites, surface mining (past or current), past shallow coal mine workings or coal outcrops within influencing distance of the site; and,
- The site is not located in proximity to any mine entry potential zone of influence.

Based on the above, the site is not considered to be located within an area that may be affected by shallow coal mining.

The Envirocheck report indicates the presence of a sandstone mine ca.600m to the west of the subject site. There is no evidence of any such activity at the subject site.

4.4 Hydrology

Surface water features in the vicinity of the subject site are as follows:

SURFACE WATER FEATURE	QUALITY*	DISTANCE FORM SITE (m)	DIRECTION
River Irwell	Ecology - Poor	Adjacent	North and West
Bridgewater Canal	Ecology - Good	30m	East

*Chemical water quality as classified under the EA's General Quality Assessment (GQA) Scheme

One surface water abstraction is identified approximately 330m to the southwest (downstream) on the River Irwell. The water is utilised for general cooling purposes.

According to the Environmental Agency web-site the subject property is located within Flood Zone 2.

4.5 Radon Risk Potential

The Envirocheck Report indicates the site is situated in an area where less than 1% of homes are above the Action Level and that the BGS reports that full radon protective measures are not necessary in the construction of new dwellings or extensions.

4.6 Industrial Land Uses

The subject site is located within a historically industrial area of a large urban conurbation and as such the Trade Directory has 22 No. registered entries within 250m of the site; of which 3 No. are still active. The closest relate to a Brewers positioned to the road within the address or location, Great Man Beer services are located 59m northeast of the site, respectively.

One fuel station is located within a 250m radius of the site. The Castefield travellers check fuel station is located 34m south west of the subject site, the current status of it is obsolete.

4.7 Sensitive Land Uses

The closest residential properties (multi-storey apartment buildings) are located within 30m to northeast of the subject site.

No other environmentally sensitive land uses have been identified within close proximity to the site.

4.8 Site Sensitivity Assessment

The site is considered to be located within a **Low to Moderate** sensitivity setting due to the following reasons:

- There are residential properties located in close proximity;
- Drift deposits are mapped as being absent;
- The underlying solid geology is classified as a Principal Aquifer;
- There are no potable groundwater abstractions within a 1km radius of the site;
- The site is not located within a Groundwater Source Protection Zone (SPZ);
- Surface watercourses are located immediately north and south of the site;
- Water from the River Irwell downstream of the site is abstracted for cooling purposes; and,
- There is little vegetation cover to provide suitable habitat for wildlife.

4.9 Preliminary Geotechnical Assessment

Based on the desk study information, the following geotechnical assessment has been made:

- The site is potentially underlain by Made Ground;
- A number of shallow relict structures and foundations may be present underlying the site;
- Shallow sandstone bedrock is likely to be present;
- The site is not considered to be within a coal mining risk areas;

5. CONSULTATIONS

5.1 Local Authority Contaminated Lane Officer

E3P has undertaken an enquiry with Laura Miller (Contaminated Land Officer) at Manchester City Council regarding potential contaminated land issues and a response is awaited.

5.2 Landfill Sites and Waste Treatment Sites

There is one historical landfill site identified 249m to the northwest at Wilburn Street, Salford. No other information is provided. No other landfill site are identified within a 250m radius of the subject site.

A small (<10,000tons per year) waste transfer station was located ca.100m to the north of the site but this is reported to have been found to be exempt from waste permitting.

Manchester Wharf Steel operated a waste treatment site for scrap metal approximately 120m to the northeast. This site has most likely closed as the licence is listed as having been revoked or cancelled.

5.3 Regulatory Database

The following information has been obtained from a commercially available environmental database. The summary table only includes records from within 250m of the subject site and not otherwise detailed in the report.

ENTRY	ENTRIES WITHIN 250m	DETAILS
Contaminated Land Register Entries and Notices	0	None Identified (N/A).
Authorised industrial processes (IPC/IPPC/LAPPC).	1	Hanson Aggregates (on-site) is listed as having
Fuel Stations Entries	1	Castlefield Travellers fuel station was located 34m south west of the site. This site is now Obsolete.
Licensed radioactive substances	0	N/A
Enforcements, prohibitions or prosecutions	0	N/A
Discharge Consents	24	The majority of entries are operated by United Utilities Water Plc and relate to discharge of Public Sewerage: Storm Sewerage Overflow from a point source on the River Medlock located 17m SW of the site.
Pollution Incidents	2	All recorded entries occurred over 19 years prior to the issue of this report and relate to Minor Incidents (Category 3) of Oils and Chemical Detergents/Surfactant (where pollutant known) impacting the Manchester Ship Canal or Bridgewater Canal.

Consents issued under the Planning (Hazardous Substances) Act 1990	0	N/A
Control of Major Accident Hazard (COMAH) sites	0	N/A

6. INITIAL CONCEPTUAL SITE MODEL

6.1 Initial CSM

In accordance with Environment Agency, CLR 11 (2004) and BSI 10175 (Code of Practice for Investigation of Potentially Contaminated Land), E3P Ltd have developed an initial CSM to identify potential contamination sources, migration pathways and receptors within the study area.

SOURCE	EXPOSURE	POTENTIAL PATHWAY
Human Health		
Heavy Metals / PAHs	Dermal Contact and Ingestion	Construction Workers Residential (apartment) End Users
Discussion The site has historically been uses as warehouse, canal basin and later a cement works. These uses can be a source of heavy metals and PAH associated with the deposition of ash from coal burning or from the storage of oil/fuel. Additionally, the subsequent demolition of these structures and backfilling of the canal basin may have resulted localised impact associated with building products such as lead based paints or pipework. Construction workers may be at risk during any future earthworks when impacted soils may be exposed. The duration of any exposure is likely to be limited and the risk associated dermal contact and ingestion may be mitigated through the use of a well-managed construction process and personal protective equipment. The residential end users for this proposed development may come into contact with impacted soils within any proposed landscaped areas or public open space. These risk can be appropriately managed through the use of a suitably designed cover system.		
Semi Volatile Organic Compounds & Volatile Organic Compounds	Dermal Contact & Ingestion Vapour Inhalation/Accumulation	Construction Workers Residential End Users
Discussion As discussed above the site has been used for a variety of industrial uses and the storage and use of fuels, oils and or solvents cannot be entirely discounted. Any such uses may give rise to localised areas of volatile organic compound (SVOC and VOC) impact. The presence of SVOC and VOC impact may pose a risk construction workers through dermal contact but as discussed above this can managed safely. Inhalation of vapour outdoors is considered unlikely though if impacted soils are present measures to test any confined spaces or deep excavations will be required. VOC vapours may pose a risk to future residential users as they can migrate along service entries and foundations and accumulate indoors. The risk can be mitigated through the completion of localised remediation or the placement of hydrocarbon resistance membranes within the foundations of the proposed units.		
Asbestos Containing Materials (ACM)	Fibre / Dust Inhalation	Construction Workers Residential End Users Third Party Property
Discussion Dust associated with any Made Ground underlying the site may potentially contain ACMs which could be released during future earthworks and then subsequently inhaled by construction workers and possibly third party property. However, with the appropriate construction phase health and safety controls, asbestos containing material is likely to represent a low risk. Furthermore, the development is likely to comprise predominantly hardstanding that will prevent exposure by end users. If identified, garden and/or landscaped areas are likely to require a cover system.		

Hazardous Ground Gases	Inhalation Accumulation	Construction Workers Residential End Users
Discussion Made Ground underlying the site may be a source of hazardous ground gases which can accumulate within deep excavations and pose a potential risk to construction workers. Ground gas can also migrate through permeable strata, foundation structures and/or service ducting and accumulate within confined spaces where they may pose a risk to residential end users. Based on the information currently available there is considered to be a low risk to future site users.		
Controlled Waters		
Petroleum Hydrocarbons, SVOC and VOC	Vertical / Lateral Migration	Principal Aquifer River Irwell
Discussion Shallow bedrock (Principal Aquifer) is anticipated to be present beneath the site and this while no abstractions have been identified it may be important for base flow to the adjacent River Irwell. If mobile contaminants are present the presence of permeable strata may permit lateral migration to the Irwell and therefore there is considered to be a potential risk to controlled waters. Should the banks of the Irwell contain any retaining structures this may reduce the potential risk by removing the lateral migration pathway. Furthermore, it should be noted that the Irwell has been given a Poor ecological status by the EA reflecting its urban surroundings.		
Buildings and Infrastructure		
pH & Sulphate	Corrosion of Concrete	Foundations / Concrete
Discussion Presence of pH and sulphate within Made Ground deposits may result in corrosion of buried concrete within the proposed development. Assessment must be undertaken to confirm the levels of pH and sulphate within Made Ground deposits and thus determine the concrete classification.		
Ecology		
None Identified	Lateral Migration	River Irwell
Discussion EA data indicates that the River Irwell is of poor ecological quality and ecological receptors may not be present.		

7. CONCLUSIONS AND RECOMMENDATIONS

Current Environmental Impact
The site is currently un-used but there are still structure present associated with the site's former use as a concrete works and container sales and hire business. Based on the absence of any current activities there are not considered likely to be on-going environmental issues.
Contamination Issues
The historic presence of a range of industrial works and processes on site and within the immediate locality may give rise to a number of potential contaminants within the Made Ground including heavy metals, PAHs, hydrocarbon compounds and Asbestos Containing Material. In consideration of the proposed development, the site will be redeveloped multi-storey residential structures, with associated hard-standing cover (access roads / parking) thus removing any potential dermal contact and soil ingestion exposure pathways. In areas of landscaping, a cover system may be required. Should any mobile impact be present, this may pose a risk to the adjacent River Irwell as there is a potential migration pathway through the underlying shallow Sandstone bedrock which may provide base flow. The underlying Sandstone aquifer itself is considered to be lower sensitivity receptor as there are no current groundwater abstractions within the immediate surrounding area. Made Ground underlying the site may be a source of hazardous ground gases which can accumulate within deep excavations / internal spaces and pose a potential risk to construction workers and future end users, respectively. Should gas be present the risk can be mitigated though the provision of appropriate gas measures.
Geotechnical Issues
Based on the historical development of the site there is likelty to be Made Ground present beneath the site particularly in the vicinity of the backfilled former canal basin. In addition to this there are likely to shallow relict structures and foundations underlying the site. Information from BGS data indicates that shallow sandstone bedrock is likely to be present but the site is not considered to be within a coal mining risk areas.

END OF REPORT

APPENDIX I
LIMITATIONS



1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between E3P and the Client as indicated in Section 1.2.

2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information it has been assumed it is correct. No attempt has been made to verify the information.

3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.

4. During the site walkover reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not be made known or accessible.

5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.

6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.

7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials this is for indicative purposes only and do not constitute or replace full and proper surveys.

8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.

9. E3P cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by E3P is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by E3P in this connection without their explicit written agreement there to by E3P.

10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

APPENDIX II
GLOSSARY

TERMS

AST	Above Ground Storage Tank
BGS	British Geological Survey
BSI	British Standards Institute
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CIEH	Chartered Institute of Environmental Health
CIRIA	Construction Industry Research Association
CLEA	Contaminated Land Exposure Assessment
CSM	Conceptual Site Model
DNAPL	Dense Non-Aqueous Phase Liquid (chlorinated solvents, PCB)
DWS	Drinking Water Standard
EA	Environment Agency
EQS	Environmental Quality Standard
GAC	General Assessment Criteria
GL	Ground Level
GSV	Gas Screening Value
HCV	Health Criteria Value
ICSM	Initial Conceptual Site Model
LNAPL	Light Non-Aqueous Phase Liquid (petrol, diesel, kerosene)
ND	Not Detected
LMRL	Lower Method Reporting Limit
NR	Not Recorded
PAH	Poly Aromatic Hydrocarbon
PCB	Poly-Chlorinated Biphenyl
PID	Photo Ionisation Detector
QA	Quality Assurance
SGV	Soil Guideline Value
SPH	Separate Phase Hydrocarbon
Sp.TPH (CWG)	Total Petroleum Hydrocarbon (Criteria Working Group)
SPT	Standard Penetration Test
SVOC	Semi Volatile Organic Compound
UST	Underground Storage Tank
VCCs	Vibro Concrete Columns
VOC	Volatile Organic Compound
WTE	Water Table Elevation

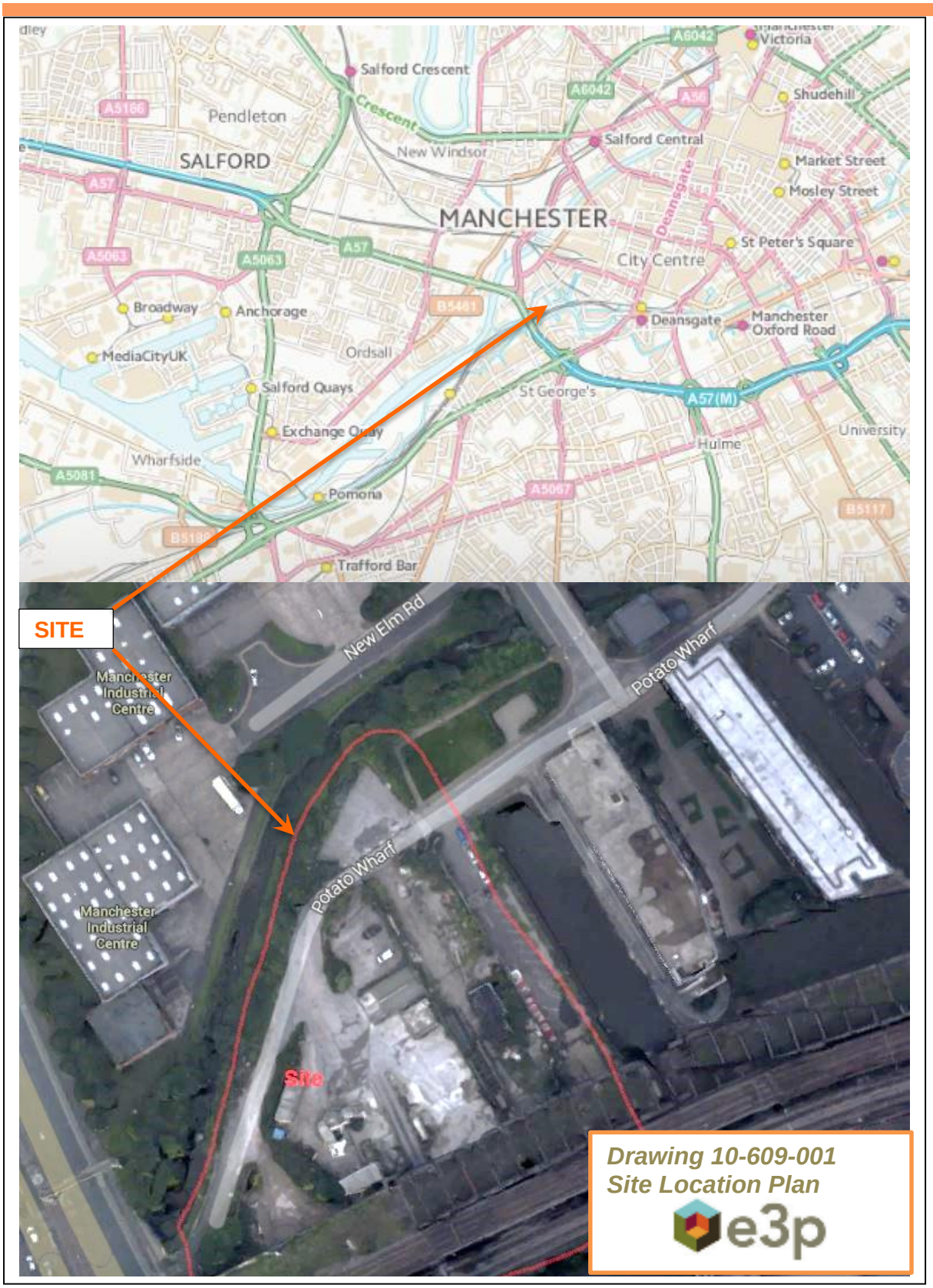
UNITS

m	Metres
km	Kilometres
%	Percent
%v/v	Percent volume in air
mb	Milli Bars (atmospheric pressure)
l/hr	Litres per hour
µg/l	Micrograms per Litre (parts per billion)
ppb	Parts Per Billion

mg/kg	Milligrams per kilogram (parts per million)
ppm	Parts Per Million
mg/m^3	Milligram per metre cubed
m bgl	Metres Below Ground Level
m bcl	Metre Below Cover Level
mAOD	Metres Above Ordnance Datum (sea level)
kN/m^2	Kilo Newtons per metre squared
µm	Micro metre

APPENDIX III
DRAWINGS




Salford Crescent
Pendleton
SALFORD
New Windsor
Salford Central
Victoria
Shudehill
Market Street
Mosley Street
MANCHESTER
City Centre
St Peter's Square
Deansgate
Manchester Oxford Road
Broadway
Anchorage
MediaCityUK
Ordsall
Salford Quays
St George's
Exchange Quay
Wharfside
Pomona
Trafford Bar
Hulme
University
A57(M)
SITE
New Elm Rd
Potato Wharf
Manchester Industrial Centre
Site
Drawing 10-609-001
Site Location Plan
e3p

APPENDIX IV
PHOTOGRAPHS





PLATE 1 – CONCRETE BATCHING PLANT



PLATE 2 – AREAS OF DEEP AND STANDING WATER ARE PRESENT



PLATE 3 – STOCKPILED RUBBLE BELOW RAILWAY ARCHES



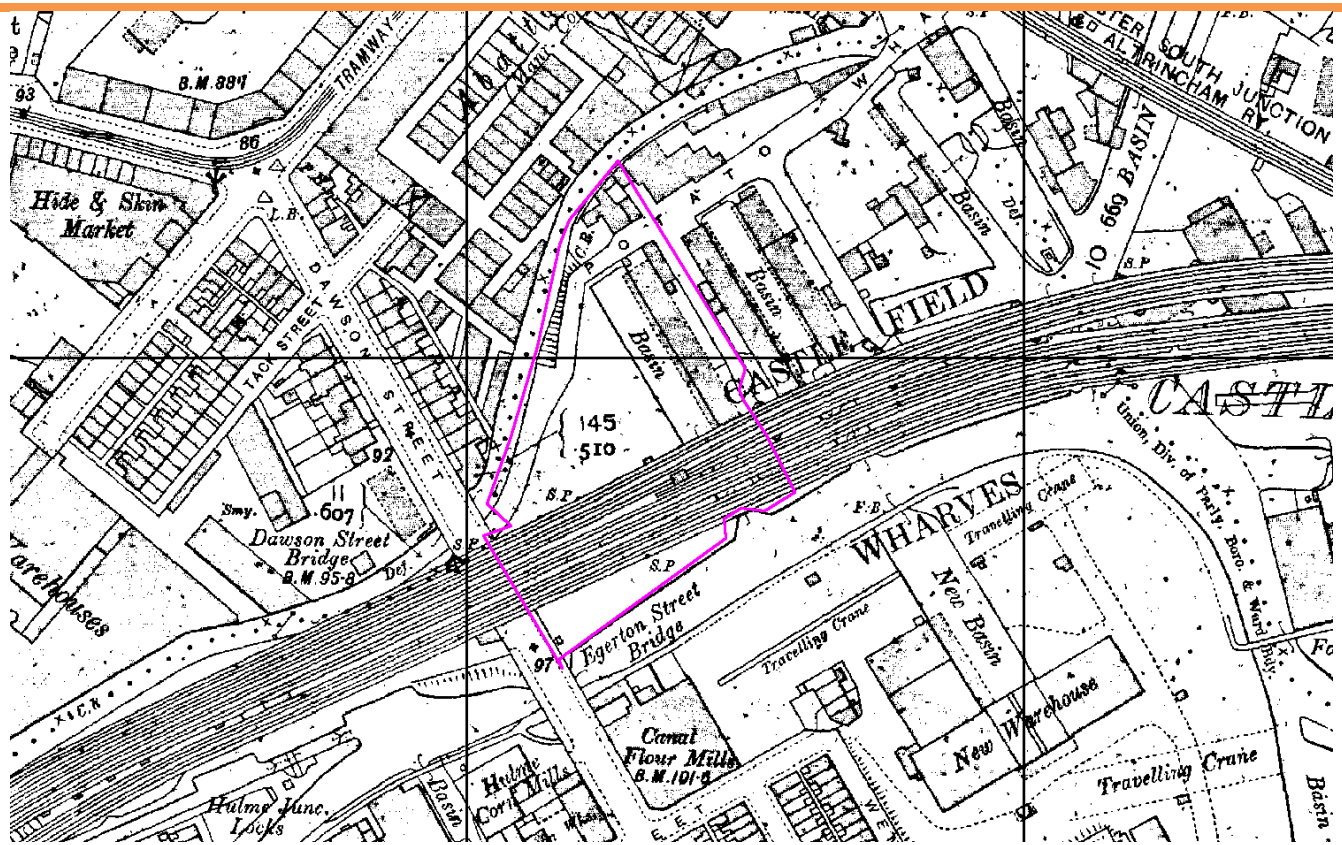
PLATE 4 – HJ HAMBLEY YARD



PLATE 5 – VIEW OF THE RIVER IRWELL FROM WESTERN BOUNDARY

APPENDIX V
HISTORICAL MAPS



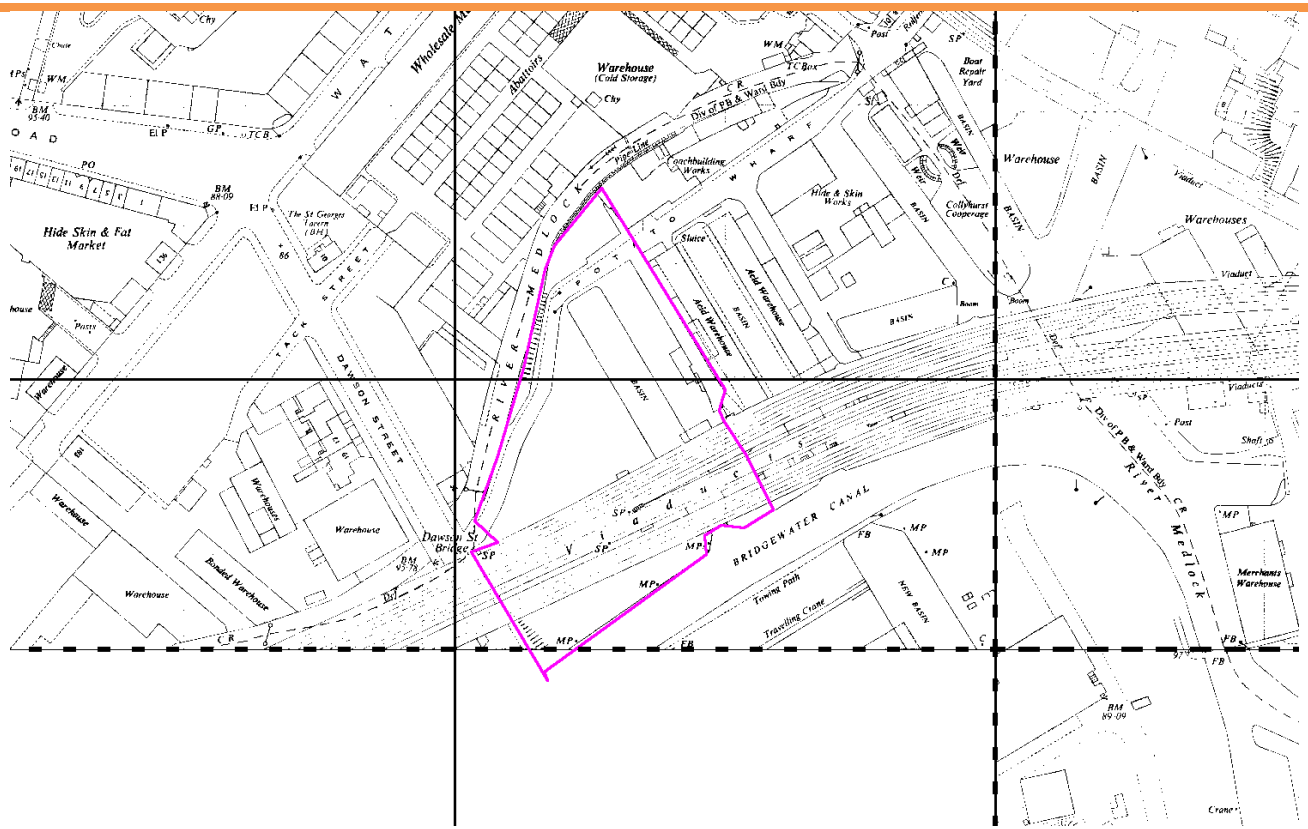


Historical Map

Dated: 1908

Original Scale: 1:2,500

North

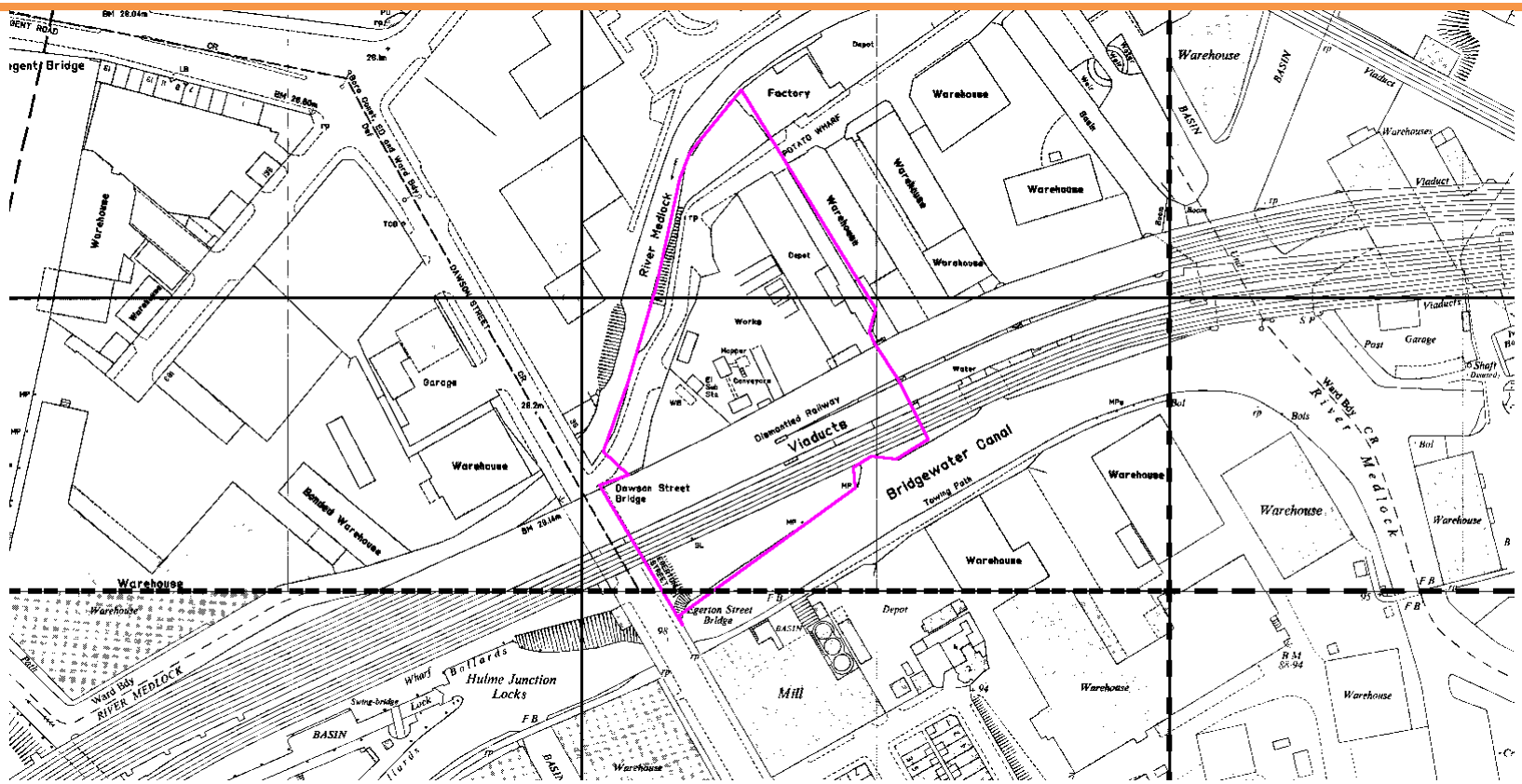


Historical Map

Dated: 1948

Original Scale: 1:2,500

North



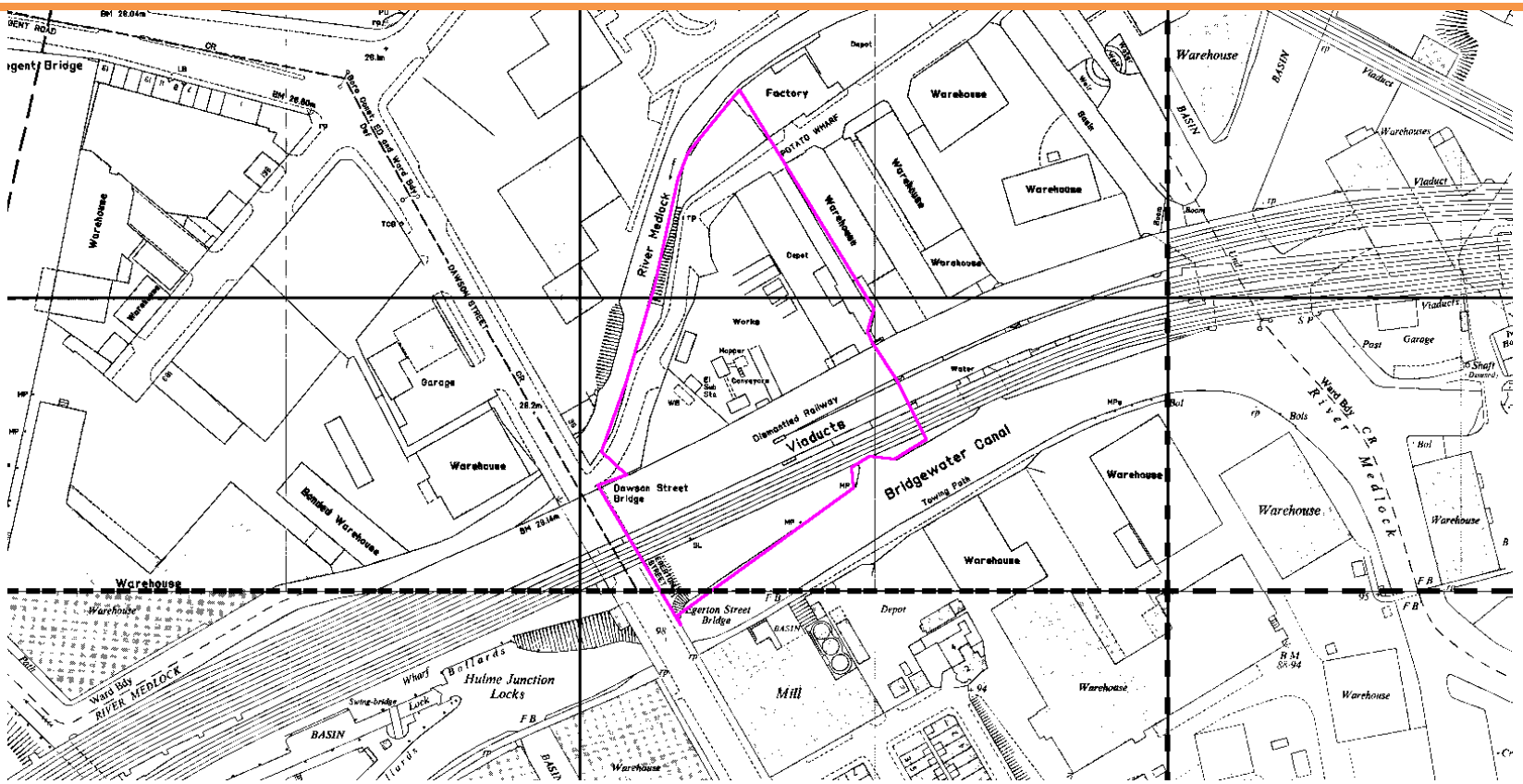
Historical Map

Dated: 1980

Original Scale: 1:2,500

North

e3p

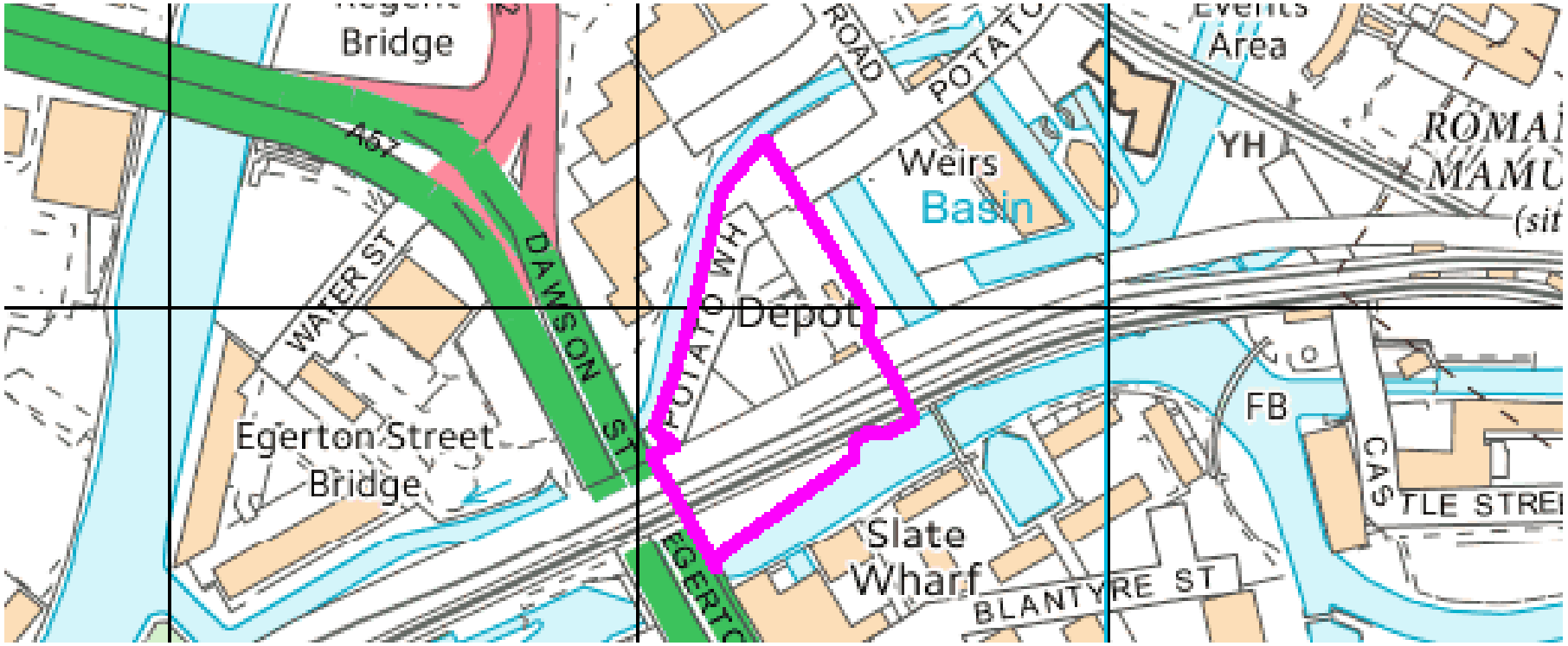


Historical Map

Dated: 1995

Original Scale: 1:2,500

North



Historical Map

Dated: 2014

Original Scale: 1:2,500

North

e3p