

Victoria North Flood Defence and Alleviation Scheme Geoarchaeological Borehole Modelling Victoria North Flood Defence and Alleviation Scheme Manchester, Greater Manchester: Geoarchaeological Borehole Monitoring.

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Victoria North Flood Defence and Alleviation Scheme Geoarchaeological Borehole Monitoring

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#### Abstract

This report presents the results of a geoarchaeological deposit model carried out by York Archaeology at the Victoria North Flood Defence and Alleviation Scheme, Manchester between November 2021 and March 2022. The work was commissioned by RSK ADAS Limited on behalf of Manchester City Council.

A GI survey was carried out at the site which was subject to intermittent monitoring, including visits to the core storage facility at Ian Farmer Associates. Using this data a deposit model was produced for the site to give a baseline understanding of the deposits.

The extensive post-medieval and modern development of the site is likely to have truncated the majority of the deposits associated with the River Irk, if any such deposits were ever present. The river, prior to its canalisation, was fast flowing and is likely to have eroded away the majority of deposits overlying the sandstone bedrock in this location. The presence of pockets of sand and gravel may relate to the reworking and redepositing of Devensian Till within remnants of the pre-19<sup>th</sup> century valley contour, which are shown as hacheurs on the 1<sup>st</sup> and 2<sup>nd</sup> Edition OS mapping. The difficulties in recovering this material, and its lack of cohesion, coupled with the lack of organic remains make the palaeoenvironmental potential of this site low. The lack of cultural material from these deposits would also suggest a low potential for pre-19<sup>th</sup> century archaeological remains.

The borehole carried out in the Scotland Weir structure recovered a plug of timber which was identified as Pinus sylvestris sp (Scots pine) making it unsuitable for dendrochronological dating due to the lack of a long-lived pine chronology for the region. The lack of sapwood also makes it of limited use for radiocarbon dating, in addition to the likely late post-medieval date (c.1814) of the material which would return a generic late post-medieval to modern date. The timber also contained the remains of two nails, which were examined by a specialist as being undiagnostic in terms of date due to the lack of a head and are classed as broadly postmedieval.

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#### 1. INTRODUCTION

### 1.1. Site Background

1.0.1 York Archaeology Nottingham (the new trading name of Trent and Peak Archaeology) were commissioned by RSK ADAS Limited on behalf of Manchester City Council to undertake geoarchaeological monitoring and assessment in advance of the Victoria North Flood Defence and Alleviation Scheme. The Scheme is centred at approximately NGR SJ 843 993 and is an approximately 500m section of the River Irk running from a point upstream of Union Bridge to Scotland Weir downstream (Figure 1).

### 1.2. Geology and Topography

- 1.2.1 The underlying bedrock geology for the site area is the Chester Formation Sandstone, a sedimentary bedrock formed between 250 and 247.1 million years ago during the Triassic period (BGS, 2021). There are no superficial deposits mapped for the site directly but the surrounding area records Devensian Till overlying the bedrock.
- 1.2.2 There are numerous BGS logs available from previous boreholes drilled along the scheme, listed as follows:
- 1.2.3 CLEMSON & CO. BACK BOUNDARY STREET RED BANK SJ89NW202 records Bunter soft red sandstone to a depth of 25 m. This overlies hard red marl and sandstone to a depth of 79.5 m, which in turn seals hard red sandstone to a depth of 106.5 m (BGS, 2021).
- 1.2.4 NEW ROGER STREET BRIDGE 2 SJ89NW2901 records road setts up to 0.15 m deep, soft cinder, ash, and sandy clay with brick rubble from 0.15 to 2.03 m, an old storm water brick drain from 2.03 to 2.54 m, loose sand and stone fill from 2.54 to 3.18 m, soft/loose very moist to wet brown silty fine to medium grained sand with occasional cobbles from 3.18 to 4.06 m, an obstruction, possible wood, from 4.06 to 4.27 m, and very dense reddish brown silty medium grained partially cemented sand from 4.27 m to the max depth of the borehole at 6.30 m (BGS, 2021).
- 1.2.5 NEW ROGER STREET BRIDGE 1 SJ89NW2900 records road setts to a depth of 0.23, compact clay and cinder fill with minor brick rubble and sand inclusions from 0.23 to 2.36 m, compact dirty sand with brick rubble from 2.36 to 2.90 m, a partial void from 2.90 to 2.97 m, brick rubble and sandstone from 2.97 to 3.10 m, moderately compact reddish brown and grey stratified sand with sandstone from 3.10 to 3.56 m, very dense shattered sandstone in a sand matrix from 3.56 to 4.11 m, and very dense reddish and orange brown slightly silty medium grained partially cemented sand from 4.11 to the max depth of 7.54m (BGS, 2021).
- 1.2.6 CHARLES SMITH RED BANK SJ89NW203 records red marl to a depth of 28.35 m (BGS, 2021).

### 1.3. Planning Background

- 1.3.1 The works being carried out for Manchester City Council do not require planning and the works were carried out as part of the preliminary ground investigation works.
- 1.3.2 The WSI for archaeological and geoarchaeological monitoring and recording was designed to address the Client's archaeological obligations to the treatment of the historic environment, and to ensure that all impacts on the historic environment resource are mitigated or avoided (ADAS 2021). The Historic England Science Advisor was not consulted a it was not deemed necessary.

### 1.4. Scope of Report

1.4.1 This report presents the geoarchaeological results following a programme of Ground Investigation (GI) works carried out to support the Victoria North Flood Defence and Alleviation Works scheme. The report also outlines the geoarchaeological potential of the deposits observed in addition to the specialist analysis of wood and metalwork recovered within the vertical coring of the Scotland Weir. The fieldwork and report were undertaken by Tom Keyworth and Richard Lowther (Geoarchaeology Project Officers). The project was managed by Kristina Krawiec (Geoarchaeology Project Manager).

### 2. GEOARCHAEOLOGICAL BACKGROUND

### 2.1. Pleistocene

2.1.1 Most of the superficial deposits of the River Irk are unmapped by the BGS, however immediately surrounding the study area are substantial glacial deposits (Till and Glaciofluvial outwash) formed within the Devensian Glaciation (115,000-12,000 years before present; BGS, 2022), mostly likely during the Late Devensian stage (28,000-15,000 years before present; Stone et al., 2010).

### 2.2. Holocene

- 2.2.1 Holocene deposits are not mapped for the study area, however a short distance upstream on the Irk and downstream of confluence of the Irk with the Irwell, alluvial deposits are recorded (BGS, 2021) likely reflecting river sediment deposition through the Holocene (c.11,500 years ago to present).
- 2.2.2 The River Irk, rises to the east of Royton before joining the River Irwell at Dulcie Bridge, Hunt's Bank, Manchester. This is a fast-flowing river with sand and gravel dominated alluvial sequences both up and downstream of the site. The character of the valley as a whole is such that organic and fine-grained sediment deposition is not expected.

### 2.3 Archaeological context

### Prehistoric period (Pre- AD 43)

2.3.1 The name of the River Irk is probably of Brittonic origin (a Celtic language originating from the Iron Age), suggested to relate to the Welsh *iwrch*, meaning roebuck (James, 2020).

### **Romano-British period (AD 43-410)**

- 2.3.2 A fortification was established in Manchester, with five great roads branching off to Chester, Stockport, Wigan, York, and Ribchester (Farrer and Brownbill, 1911).
- 2.3.3 Numerous excavations across Manchester have revealed Roman wares, including coins, jewellery, inscribed tile fragments and foundations of a villa (Thompson Watkin, 1887).
- 2.3.4 Findspots of coins from the Romano-British period and later (MGM1767 and MGM1928) are recorded on the riverbank across from where the proposed groundworks will be carried out (Arup, 2021b).

### Anglo-Saxon, Medieval, and post-Medieval period (410-1750)

- 2.3.5 The GMHER records a single early medieval asset. A 6<sup>th</sup> century funerary urn (MGM1768) is recorded just north of the Red Bank although its precise location is unknown (Arup, 2021b).
- 2.3.6 The GMHER records a watermill (MGM9863) within the western Site boundary which was recorded in Manor Surveys from 1320-1322. A later survey carried out in 1434 noted the presence of an oven associated with the watermill (Arup, 2021b).
- 2.3.7 The Irk was considered a very flood-prone and destructive river, with written testimony of the burgesses in 1480 explaining that 'the water of the Irk had worn out' part of the highway between Manchester and Collyhurst (Farrer and Brownbill, 1911).

#### Modern period (1750-present)

- 2.3.8 The Irk was a key part of Manchester's industrial revolution, with an array of industrial activities lying on its banks within the study area present on historic mapping (1840s-1890s; National Library of Scotland, 2022), including gas, chemical, rubber, bolt, print, and dye, oil, and tanning works. A former Tannery was located on part of the site of the modern Red Bank Car park, on the northern bank of the Irk and a short distance upstream of the Scotland Weir.
- 2.3.9 The river provided an important source of water power for the textile industry. The industry along the Irk was once considered to have the greatest number of mill seats along its course than any other similar streams in England (Reynolds Clarke, 1830).
- 2.3.10 Seven bridges over the River Irk were completed by the time of the publication of Aston's *A Picture of Manchester* in 1816, including the Ducie Bridge located adjacent

2.3.11 Historic England records four Grade II Listed Buildings within the Study Area which will not be impacted by the proposed works.

Weir is of unknown age, but is potentially associated with a now demolished mill.

- The Grade II Listed Charter Street Mission (formerly Charter Street Ragged School and Working Girls' Home) (NHLE: 1461979) was constructed between 1892 and 1900 by Maxwell and Tuke (NHLE, 2021).
- The Grade II Listed Ashton House (NHLE: 1197764), a woman's hotel built in 1910 (NHLE, 2021).
- The Grade II Listed Parkers Hotel (NHLE: 1208963). They were formerly commercial offices and now a hotel constructed between 1900 and 1910 (NHLE, 2021).
- The Grade II Listed Union Bridge (NHLE: 1255163), a circa 18<sup>th</sup> century bridge, formerly a bridge now only used by pedestrians which crosses the River Irk (NHLE, 2021).
- 2.3.12 A desk-based assessment was undertaken in 2006 for a proposed development within the site boundary. This desk-based assessment concluded that the area has moderate to high potential related to the 19<sup>th</sup> century textile industry (ADS, 2021).
- 2.3.13 The GMHER records thirteen assets within the site boundary dated to the postmedieval, 19<sup>th</sup> century, and modern periods. These assets (MGM11060, MGM16895, MGM17186, MGM17187, MGM17188, MGM17189, MGM17190, MGM17192, MGM17193, MGM17194, MGM17195, MGM17196, and MGM17197) are the recorded sites of industrial and domestic buildings (Arup, 2021).

### 2.4 Project Aims and Objectives

- 2.4.1 The aims of the archaeological monitoring and recording as set out in the WSI are as follows:
  - To ensure that any archaeological features/deposits exposed during ground works associated with the development are identified, recorded and interpreted to an acceptable standard;
  - To ensure that any significant discoveries of artefactual evidence are recorded and analysed to an acceptable standard; and
  - To inform a strategy to avoid or mitigate the impacts of the proposed development on any surviving archaeological remains identified.
- 2.4.2 The specific aims of the project as set out in the WSI will be to:
  - Monitor the proposed vertical and horizontal cores and boreholes through Scotland Weir and to take timber samples if appropriate. Particular focus

should be on recording any material which may give an indication of the date, the structure, and its original nature and purpose; and

- Identify any deposits of archaeological or palaeoenvironmental interest in the river channel.
- 2.4.3 The fieldwork takes place within and will contribute to the goals of the regional frameworks set out in the North West England Regional Research Framework (Research Frameworks, 2021). The site has the potential to address the following:

*R08*: What evidence is there for the impact of Roman occupation on the environment?

*R10*: What was the impact of Roman industrialisation on the environment?

EARLY MEDIEVAL (410AD-1066AD)

*EM04*: What can a better understanding of urban stratigraphic sequences tell us about early medieval site activities?

LATE MEDIEVAL (1066AD-1540AD)

*LM01*: How can we improve the dendrochronological sequencing for the medieval period in the north-west?

*LM5.02:* Improve the dendrochronology sequence for the region, with more samples taken from standing buildings as well as excavated preserved wooden objects

POST MEDIEVAL (1540AD-1750AD)

**PM05**: How can dendrochronology sequences inform our understanding of building evolution, development and change during the Post-Medieval period?

INDUSTRIAL (1750AD-present)

*Ind04*: How well do we understand the survival and significance of historic water management features for industrial purposes including power and textile processing?

### 3. GEOARCHAEOLOGICAL METHODOLOGY

#### 3.1. Fieldwork Methodology

- 3.1.1. All works were undertaken in accordance with the WSI (ADAS, 2021), as approved by the Greater Manchester Archaeological Advisory Service, in their capacity as Archaeological Advisors to Manchester City Council and to standards defined by CIFA Guidelines for Recording of Archaeological Sites (2019; 2020a; 2020b).
- 3.1.2. The full specification of the Ground Investigation (GI) proposed to support the Victoria North Flood Defence and Alleviation Works scheme (Arup, 2021a) included:
  - Vegetation clearance to allow structural inspection;
  - Structural visual inspection of the channel walls, bridges and structures;
  - 3D survey of the river and neighbouring structures;
  - 21 No. vertical boreholes to approximately 8-10m depth to confirm existing foundations, stratigraphy of back of wall fill materials and rockhead level;

- 1 No. vertical rotary core immediately behind the crest of the existing Scotland Weir structure in order to confirm material and geometry of existing structure and obtain samples for testing
- 9 No. samples of river bed material to determine geotechnical, geomorphological properties and chemical classification
- There may also be a requirement for constructing boreholes in the centre of the river channel at several positions along the length. An allowance has been made for 5 No. boreholes within the river channel
- Sampling of river water.
- 3.1.3. On-site geoarchaeological monitoring and archaeological recording was carried out for the vertical core through Scotland Weir, in addition to monitoring of river channel boreholes. Waterlogged wood was recovered from the Scotland Weir core and was retained for further analysis at York Archaeology. Off-site recording of core samples occurred during multiple visits to the Ian Farmer Associates storage facility.
- 3.1.4. Where possible, core material was described using the Troels-Smith method of sediment classification. The scheme breaks down a sediment sample into four main components and allows the inclusion of extra components that are also present, but that are not dominant. Key physical properties of the sediment layers are darkness (Da), stratification (St), elasticity (El), dryness of the sediment (Sicc) and the sharpness of the upper sediment boundary (UB). A summary of the sedimentary and physical properties classified by Troels-Smith (1955) and a stratigraphic breakdown of the deposits was recorded on proforma log sheets. The logs are supplemented by digital photography (Plates 1-5).
- 3.1.5. Waterlogged wood was subject to species identification with reference to Schweingruber (1990) and Schoch et al. (2004). The consideration of preservation within the deposits was made with specific reference to Historic England's guidance document for Preserving Archaeological Remains (2016).
- 3.1.6. Small grab samples were retained from the disturbed samples examined at Ian Farmer Associate facilities.

### 3.2. Fieldwork constraints

- 3.2.1. The samples that were retained by Ian Farmer Associates were already subjected to environmental testing and therefore were incomplete. Other material that was retained was recovered in bulk bags (disturbed) not in sleeved liners. A visual record was made of the material in the bulk bags but is of limited use (Plate 1).
- 3.2.2. The drillers logs were made available and these were used in the construction of the model. The access for the river cores was restricted due to the small working platform and therefore cores were monitored at a distance.

### 3.3. Deposit modelling methodology

- 3.3.1. A deposit model was constructed using the results of the GI works undertaken at the site. The modelling was undertaken with reference to *Historic England Guidance for Deposit Modelling and Archaeology* (2020). The data was entered into Rockworks in order to generate cross sections.
- 3.3.2. The data is archived in an excel spreadsheet.

### 3.4. Archive

3.4.1. The site archive is currently held at the offices of YA and transferred to ADAS in due course. The local museum declined to provide an accession number or site code, the YA site code used for the work was VFD. The contents of the archive are tabulated below (Table 1).

Borehole/test pit sheets	4
Rockworks spreadsheet	1
Section sheets	0
Plans sheets	0
Colour photographs	0
B&W photos	0
Digital photos	73
Sample register	0
Drawing register	0
Watching brief forms	0
Trench Record forms	0

Table 1: Quantification of site paper archive

Bulk finds (quantity e.g. 1 bag, 1 box, 0.5 box 0.5	2 nails				
of a box )					
Registered finds (number of)	0				
Flots and environmental remains from bulk	0				
samples					
Palaeoenvironmental specialists sample	4 Grab samples				
samples (e.g. columns, prepared slides)					
Waterlogged wood	One wood plug				
Wet sieved environmental remains from bulk	0				
samples					

Table 2: Quantification of artefact and environmental samples.

### 4. RESULTS

### 4.1. Lithology

4.1.1. Across the site bedrock was encountered at almost all locations. The recovery of some of the coarser, gravel-dominated made ground deposits was poor with often

no material recovered. The majority of the samples recovered were as disturbed bagged samples (Plate 1). The site has been subject to intensive development which is most clearly displayed on the 1<sup>st</sup> Edition OS mapping (Figure 3).

- 4.1.2. The made ground, for the most part, directly overlay the sandstone bedrock but in three locations (RE11, RE12 and RE15) sequences of clean sand and gravel up to 3.00m thick were recorded (Figure 2). The origin of this material is unclear and may be derived from reworked Devensian Till, which is mapped by the BGS in the areas surrounding the site, or may be derived from eroded sandstone bedrock. This material was not cohesive so was not recovered intact. These deposits may be preserved within a localised depression in the sandstone surface in the general vicinity of RE11-RE12 and RE15 (Figure 4).
- 4.1.3. The sand and gravel sequence was most extensive in RE11 and RE12, with alternating deposits of fine to coarse gravel and sand. If these deposits are derived from the weathering and reworking of the Devensian till/bedrock they may reflect the changing energy conditions within the River Irk over time.
- 4.1.4. The site as a whole was devoid of organic deposits and both the made ground and the underlying deposits were sand and gravel dominated. In RE11, the sand and gravel sequence contained at thin layer (0.40m) of gravelly sandy clay with an 'organic odour', however no organic remains were visible.

#### Made Ground

4.1.5. Across the site the made ground was characterised by sand and gravel mixed with rubble, ash and concrete. The average depth was between 2.00-4.50m and in three locations was found to be contaminated with hydrocarbons (RE05A, RE07 and RE08). In three locations the material was too coarse to be recovered (RE09, RE10, RE17B). The vertical cores recorded possible structural remains in RE02A, with successive layers of mortared brick and sandstone recorded to 4.00m below ground level. In RE09 and RE10A cobbles were found constructing the cutting shoe which may indicate the presence of a surface.

#### Scotland Weir

- 4.1.6. The borehole carried out in the Scotland Weir structure recovered a plug of timber which was identified as *Pinus sylvestris* sp (Scots pine) making it unsuitable for dendrochronological dating due to the lack of a long-lived pine chronology for the region (Plates 2-5). There was also a faint hydrocarbon odour noted. The lack of sapwood also makes it of limited use for radiocarbon dating, in addition to the likely late post-medieval date of the material which would return a generic late post-medieval to modern date. If the material is also contaminated with hydrocarbons then this will also effect the reliability of any dating.
- 4.1.7. The timber also contained the remains of two nails, which were examined by a specialist as being undiagnostic in terms of date due to the lack of a head and are classed as broadly post-medieval.

#### 4.2. Deposit model

- 4.2.1. The limited results from the GI investigations were entered in to a rockworks database. An interpolated surface was also produced in ArcGis (Figure 4). The cross-sections demonstrate the level of made ground across the site.
- 4.2.2. Cross section A-B shows the thickness of potentially reworked Till within the sequence traversing the current course of the river (Figure 5). The sand recorded in RE19A is likely to represent recent deposition or weathered bedrock. The two boreholes either side of the river represent deposition of unknown age but likely pre-dated the canalisation of the river.
- 4.2.3. Cross section C-D represents the deposits at the south western end of the site, with almost all locations recording made ground straight onto bedrock (Figure 6). There were thin skims of gravel recorded in RE02A and 05A but these are likely to be related to the made ground rather than representing undisturbed river deposits.

### 5. THE FINDS

### 5.1. Summary

5.1.1. A section of waterlogged wood was recovered from the vertical core through the Scotland Weir. This find also contained embedded metalwork, fragments of which were extracted and sent for specialist analysis by Ian Riddler. The assessments of the finds are detailed below.

### 5.2. Waterlogged wood by Stacey Adams

- 5.2.1. A 0.53m long piece of wood, with a further two small c. 0.01-0.03m fragments, were recovered underlying a 0.53m layer of concrete from the vertical core undertaken on Scotland Weir (Plate 2). Wooden material was thought to extend to the base of the core but was not recovered, suggested to be due to softer sediments/wood towards the base of the core (Engineers pers comm.), potentially totalling a sequence of c.1.80m of wooden material. The wood also had a faint odour of hydrocarbons.
- 5.2.2. Both ends of the piece are damaged, likely by the coring process, suggesting that the recovered section represents a central section of a longer piece. As a result, the recovered section's depth below ground level is unknown, but ranges between the base of the concrete (0.53m BGL) and the base of the core (2.40m BGL, Plate 3). It is likely that the top of the piece was soft and degraded, possibly due to loss of waterlogging, resulting in an unknown length being damaged through coring. A similar process may have occurred towards the base of the core, with recovery impeded by soft wood and unconsolidated wet sediments. Smaller fragments of wood were recovered jammed within the coring barrel, demonstrating the difficulty coring the wooden section of the Scotland Weir (Plate 4). In addition the small part of the intact surface containing the nails was badly degraded and as such no toolmarks were preserved.
- 5.2.3. Two metal nails are present within the large piece (Plate 5), the longest of the two, pierces through the wood fully, with the other smaller nail embedded within the material. The nail heads have been sheared off through coring. Two/three faint cut marks, potentially from an axe, are also exhibited which may initially be suggested to have been made as finishing touches after the wood had been sawn.
- 5.2.4. The intact length of the wood suggests that coring occurred through an upright timber. The flat face of the wood exhibiting the nails potentially suggests of a fixing position for horizontal pieces of wood as part of the weir structure.
- 5.2.5. Specialist analysis has identified the wood as Scots Pine (*Pinus sylvestris*). This identification unfortunately means this find is unsuitable for dating by dendrochronology. The specialist analysis of the metalwork was subsequently commissioned to provide a broad age for the recovered find.

#### 5.3. Metalwork by Ian Riddler

- 5.3.1. The two fragments of iron submitted for identification can both be identified as nails. The lower part survives of a large nail with a square-sectioned shaft, which tapers to a point. It is straight throughout its length, suggesting that it was hit accurately into the wood. The upper part is missing and it is not possible to determine the form of the head. Five different head forms were identified for post-medieval iron nails from the Dockyard at Deptford (Riddler 2004). Most of the nails from that site also had square-sectioned shafts, although in some cases they were rectangular in section.
- 5.3.2. The second nail lacks both its point and its head. It has the same section, but with smaller dimensions, and the shaft is lightly curved.

### 6. THE ENVIRONMENTAL SAMPLES

### 6.1. Summary

6.1.1. The lack of intact material prevented the recovery of samples. A small number of grab samples were retained although these are disturbed and are not recommended for assessment.

Core number	Depth
RE11	6.75m BGL, oxidised clay with sand
RE11	7.00m BGL, sandy clay with slight organic component
RE13A	4.00-4.50m BGL, slightly organic clayey sand. Drillers logs
	note the presence of concrete, hinting at likely reworking /
	contamination
RE14	3.20-4.00 m BGL, sand with occasional shell fragments with
	slightly organic clay lenses / laminations

Table 3: Grab samples recovered from the site.

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### 7. DISCUSSION AND CONCLUSIONS

### 7.1. Overview of lithological sequence

- 7.1.1 The GI survey monitoring and subsequent examination of the drillers logs, has allowed a basic model of the site to be produced. In general there was between 2.00-4.50m of made ground overlying the sandstone bedrock across the site. The made ground was mainly characterised as loose, gravel-dominated rubble with three locations indicating hydrocarbon contamination.
- 7.1.2 The borehole carried out through Scotland Weir recovered a plug of timber identified as Scot's Pine. This also contained the remains of two nails, however these were not chronologically diagnostic and the timber is not suitable for dendrochronological or radiocarbon dating.
- 7.1.3 There is the suggestion of pre-19<sup>th</sup> century sand and gravel deposits in the centre of the site but these lack organic remains and are therefore of low palaeoenvironmental potential. As a whole the site has a low potential to preserve in situ remains which relate to the early evolution of the River Irk. The pockets of potentially pre-industrial preservation did not record archaeological remains and therefore the pre-industrial archaeological potential of the site is considered low.

### 7.2. Deposit survival and existing impacts

- 7.2.1 The site has seen extensive development with the River Irk altered from its natural planform. The 1<sup>st</sup> edition Ordnance Survey map demonstrates the range of industry practiced at the site and the surrounding area. This ranges from corn milling, iron working, bleaching, dyeing (Figure 3). This has resulted in extensive truncation of the deposits and this can be seen across the majority of the site.
- 7.2.2 The centre of the site does record a clean sand and gravel sequence which may represent intact pre-19<sup>th</sup> century deposits. These were devoid of organic remains but were fully saturated making recovery problematic and in some cases no material was able to be recovered.
- 7.2.3 From a single core, the structural extent of the weir cannot be established and therefore it is difficult at this stage to ascertain its condition. The conditions within the current weir are conducive to the preservation of the wooden inner structure of the weir, as evidenced by the large wood plug recovered during the survey, but the age of this is still unknown. The wood recovered also had a faint hydrocarbon odour which makes it unsuitable for radiocarbon dating.
- 7.2.4 In three locations the made ground was found to be contaminated with hydrocarbons (RE05A, RE07 and RE08) but for the most part the site appeared to be relatively free of contamination.

### 7.3. Discussion of deposits

- 7.3.1. The site as a whole demonstrated very little in the way of pre-19<sup>th</sup> century deposits and for the most part the made ground overlay the sandstone bedrock. In three locations (RE11, RE12 and RE15) sequences of clean sand and gravel up to 3.00m thick were recorded. The origin of this material is unclear and may be derived from reworked Devensian Till, which is mapped by the BGS in the areas surrounding the site, or may be derived from eroded sandstone bedrock. This material was not cohesive so was not recovered intact. These deposits may be preserved within a localised depression in the sandstone surface in the general vicinity of RE11-RE12 and RE15 (Figure 4).
- 7.3.2. Further to the north of Manchester the BGS records similar sand and gravel dominated sequences within the Irk Valley and there seems to be a general lack of fine-grained and organic deposition. This is likely due to a combination of river gradient, steep valley sides, energy and parent material. The river has mainly been fast-flowing with historical accounts of flash-flooding which overwhelmed several bridges (VCH, Farrer and Brownbill 1911).

'In 1480, in the testimony of the burgesses respecting the highway between Manchester and Collyhurst occurs the statement that 'the water of Irk had worn out' the said highway; Hulme D. no. 22. In 1787 part of Salford Bridge was carried away by a flood of the Irwell'

7.3.3. The later history of the Irk would see it described as 'not only the blackest but the most sluggish of all rivers' by Thomas Wentworth in the 1890's. But he also suggests the name Irk is a reference to 'Irke' or roebuck and is a 'reference to its fleetness' (Wentworth 1892, 5). The industrial pollution recorded in the 19<sup>th</sup> century has likely been flushed out by subsequent periods of fast flowing conditions. The sand and gravel deposits recorded at the site demonstrate fluctuations in energy within the system although they lack any organic component that might further elucidate the conditions of the surrounding landscape. The historic mapping available for the site shows the River Irk to broadly follow the same course with alterations to its planform at the junction of Scotland bridge and Red Bank (Figure 7).

#### Scotland Weir

- 7.3.4. The borehole carried out in the Scotland Weir structure was designed to understand the nature of the structure and to determine a more precise age. A large plug of timber which was identified as *Pinus sylvestris* sp (Scots pine) making it unsuitable for dendrochronological dating due to the lack of a long-lived pine chronology for the region. In addition, it must be considered that the timber may be derived from Baltic or wider European imports given the likely post-medieval date for the structure. From the 17<sup>th</sup> century Britain increasingly imported Scot's pine for ship-building and waterfront structures due to shortages of appropriate timber and as part of wider economic strategy (Bridge 2016, 59).
- 7.3.5. The lack of sapwood also makes it of limited use for radiocarbon dating, it is likely of late post-medieval date would return a generic late post-medieval to modern

date if submitted for AMS age determination. The slight hydrocarbon odour also suggests a level of contamination which may also adversely affect a radiocarbon date. The timber contained the remains of two nails, which were examined by a specialist as being undiagnostic in terms of date due to the lack of a head and are classed as broadly post-medieval.

7.3.6. The weir clearly has a timber core or frame but this in itself is not sufficient to suggest an early date for the structure. The timber was overlain by a large sandstone block 0.60m thick and a third attempt coring recovered a small amount of coarse sand and gravel which is suggested to be infill material (Appendix 1). Therefore the character of the construction as defined by the coring is one of a possible timber frame infilled with sand and gravel and capped with sandstone blocks. The William Green map of 1794 does not record a weir structure but Laurent's plan of 1793 does record several straight weirs. The river here is narrower that further downstream and therefore there probably wasn't the space to construct a more robust horseshoe weir. Despite the lack of more chronologically diagnostic material in the weir it is still considered likely that the structure post-dates the 18<sup>th</sup> century (Figure 7).

### Made ground

- 7.3.7. The made ground at the site was characterised by sand and gravel mixed with rubble, ash and concrete. The average depth was between 2.00-4.50m (Figure 5) and in three locations was found to be contaminated with hydrocarbons (RE05A, RE07 and RE08).
- 7.3.8. There are recorded possible structural remains in RE02A, with successive layers of mortared brick and sandstone identified to 4.00m below ground level. In RE09 and RE10A cobbles were found obstructing the cutting shoe which may indicate the presence of a surface. This suggests that parts of the site preserve subsurface structures and former ground surfaces which likely represent 19<sup>th</sup>-20<sup>th</sup> century remains.

### 7.4 Consideration of research aims and conclusions

- 7.4.1. The monitoring and interrogation of the GI data has allowed a baseline understanding of the nature of the deposits at the site. A basic deposit model has been created which reflects the level of truncation at the site which in many locations was down to bedrock. There are pockets of potentially undisturbed River Irk deposits but these are sand and gravel dominated and are therefore of low palaeoenvironmental potential.
- 7.4.2. Unfortunately, the timber recovered from Scotland Weir was found to be unsuitable for dendrochronological dating, and so the regional research objectives related to this study outlined in section 2.4 cannot be contributed to. However, the structure does still preserve a timber core, as shown by the large plug of wood with nails recovered during the coring, and if further opportunities are available to study the structure, i.e. repairs To the weir that involve open sections, further dating evidence may be forthcoming.

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Kristina Krawiec (YA Geoarchaeology Project Manager).



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Figure 05 - Cross-section A to B VFD- Victoria Flood Defences and Alleviation Scheme

Drawn by: kk

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Plates



Plate 1: Example of sediment recovery RE14.



Plate 2: Coring undertaken through the Scotland Weir.

Victoria North Flood Defence and Alleviation Scheme Geoarchaeological Borehole Monitoring



Plate 3: The sample retrieved from coring VC01 through the Scotland Weir. Note that the depth that the wood recovered from is unknown due to coring difficulties.



Plate 4: Additional parts of wood retrieved initially stuck within the barrel of the hand coring machine VC01.



Plate 5: Nails within the wood recovered from the Scotland Weir.

## **OASIS** Form

OASIS ID (UID)	yorkarch3-506471
Project Name	Victoria North Flood Defence and Alleviation Scheme Manchester, Greater Manchester: Geoarchaeological Borehole Monitoring
Activity type	Assessment And Analysis
Project Identifier(s)	VFD
Planning Id	N/A
Reason For Investigation	Planning requirement
Organisation Responsible for work	York Archaeology
Project Dates	01-Nov-2021 - 01-Mar-2022
Location	Victoria North Flood Defence and Alleviation NGR : SJ 84300 99300 LL : 53.4901722004131, -2.23809339327504 12 Fig : 384300,399300
Administrative Areas	Country : England County : Greater Manchester District : Manchester Parish : Manchester, unparished area
Project Methodology	A GI survey was carried out at the site, which was subject to intermittent monitoring, including visits to the core storage facility at Ian Farmer Associates. Using this data, a deposit model was produced for the site to give a baseline understanding of the deposits.

Project Results	The extensive post-medieval and modern development of the site is likely to have truncated the majority of the deposits associated with the River Irk, if any such deposits were ever present. The river, prior to its canalisation, was fast flowing and is likely to have eroded away the majority of deposits overlying the sandstone bedrock in this location. The presence of pockets of sand and gravel may relate to the reworking and redepositing of Devensian Till within remnants of the pre-19th century valley contour, which are shown as hacheurs on the 1st and 2nd Edition OS mapping. The difficulties in recovering this material, and its lack of cohesion, coupled with the lack of organic remains make the palaeoenvironmental potential of this site low. The lack of cultural material from these deposits would also suggest a low potential for pre- 19th century archaeological remains. The borehole carried out in the Scotland Weir structure recovered a plug of timber which was identified as Pinus sylvestris sp (Scots pine) making it unsuitable for dendrochronological dating due to the lack of a long-lived pine chronology for the region. The lack of sapwood also makes it of limited use for radiocarbon dating, in addition to likely late post-medieval to modern date. The timber also contained the remains of two nails, which were examined by a specialist as being undiagnostic in terms of date due to the lack of a head and are classed as broadly post-medieval.
HER	Greater Manchester HER - noRev - LITE

## Appendix 1

Darkness		Degree	e of Stratification	Degree	of Elasticity	Degree	of Dryness
nig.4	black	strf.4	well stratified	elas.4	very elastic	sicc.4	very dry
nig.3		strf.3		elas.3		sicc.3	
nig.2		strf.2		elas.2		sicc.2	
nig.1		strf.1		elas.1		sicc.1	
nig.0	white	strf.0	no stratification	elas.0	no elasticity	sicc.0	water

	Sharpness of Upper Boundary
lim.4	< 0.5mm
lim.3	< 1.0 &> 0.5mm
lim.2	< 2.0 &> 1.0mm
lim.1	< 10.0 &> 2.0mm
lim.0	>10.0mm

8									
	Sh	Substantia humosa	Humous substance, homogeneous microscopic structure						
	Тb	T. bryophytica	Mosses +/- humous substance						
l Turfa	T/	T. lignosa	Stumps, roots, intertwined rootlets, of ligneous plants						
	Th	T. herbacea	Roots, intertwined rootlets, rhizomes of herbaceous plants						
	DI	D. lignosus	Fragments of ligneous plants >2mm						
ll Detritus	Dh	D. herbosus	Fragments of herbaceous plants >2mm						
	Dg	D. granosus	Fragments of ligneous and herbaceous plants <2mm >0.1mm						
III Limus	Lf	L. ferrugineus	Rust, non-hardened. Particles <0.1mm						
	As	A.steatodes	Particles of clay						
IV Argilla	Ag	A. granosa	Particles of silt						
	Ga	G. arenosa	Mineral particles 0.6 to 0.2mm						
V Grana	Gs	G. saburralia	Mineral particles 2.0 to 0.6mm						
	Gg(min)	G. glareosa minora	Mineral particles 6.0 to 2.0mm						
	Gg(maj)	G. glareosa majora	Mineral particles 20.0 to 6.0mm						
	Ptm	Particulaetestaemolloscorum	Fragments of calcareous shells						

# Physical and sedimentary properties of deposits according to Troels-Smith (1955)

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								0.45m: Stror	ng hydrocarbon D: Soft_reddi	, <i>odour.</i> ish bro	wn mottled	black (	aravelly	/	ž.			
- 1.00 - 1.00	B3 ES2						sandy	, reworked	d CLAY. Grav	el is su	ubangular, f	fine to c	oarse		1			
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	mie Com	nlina	Location:	0/02/202	.2		Ground level:	Loaged by:	Vertical scale		Shee Proie	<u>t 1 of 1</u> ct ID:	
and Ro	nic San tarv Bor	ina Loa					-	MD	1:50	)	,	2230	502
	Sample	s & In Situ Te	esting				Strata D	l Details				Grou	indwater
Depth	Sample ID		Test Result	Level (mOD)	Depth (m) (Thickness)		Stra	ta Description		Legend		Water Strike	Backfill/ Installation
0.20 0.20 0.50 - 0.8 0.50 - 0.8	D2 ES1 B3 ES4 20 ES5				0.10 (0.30) 0.40 0.50 (1.00)	MADE MADE coars subar Cobb MADE MADE SANE	E GROUND: Concrete. E GROUND: Loose, bro es SAND with medium cr ngular, fine to coarse inc les are angular including E GROUND: Concrete. E GROUND: Loose, bro D of ash, with medium co	wn and grey, very grav obble content. Gravel sluding clinker, coal an g brick. wn and grey, gravelly, obble content. Gravel	velly, fine to is angular to d brick. fine to coarse is angular to		1		
					1.50	Cobb	ngular, fine to coarse inc les are angular including E GROUND: 2 course o	fred brown brick.	d brick.				
					(0.38) 2.18 2.34	MADE MADE MADE	E GROUND: SANDSTO E GROUND: Yellowish g E GROUND: Purplish br E GROUND: 5 courses	NE (no recovery). grey, coarse grained S rown, medium grained red brown BRICK cen	ANDSTONE.		2		
1.80 - 3.3 	80			SANDSTONE.		3							
-					(0.54) 3.64	MADE MADE 10-20	nented by 30mm thick).						
3.30 - 4.8	100 38 31				3.90 <b>4</b> .18	MADE Black sands	E GROUND: Black, dec , rounded, medium grain stone and siltstone.	includes		4			
		7				Very v Bei spa	NE. es, closely		5				
4.80 - 6.3	100 30 100 67				(3.65)	Po	tween 6 20m and 6 50m as			6			
6.30 - 7.8	87 30 57 44	AZCL 15 NI 6				Bei spa cla Bei spa	tween 6.50m and 6.80m; dis aced, undulating, rough clea tween 6.50m and 7.10m; ab sts of sandstone and mudst tween 6.80m and 7.10m; no tween 7.10m and 7.80m; dis aced, undulating, rough clea	scontinuities are 0-5 degre n. undant fine and medium g one. Clasts are subangula n intact. ccontinuities are 0-5 degre n.	es, closely ravel sized r to rounded. es, closely		7		
					7.80		End of B	orehole at 7.80m			8		
											9		
F	TCR/SCR/RQI	FI	Samples & Tests								- 10		
<u>Top (m)</u> <u>B</u> 1.20	Inspection     File     Samples & Tests       Dynamic Sample Recovery     Remarks:       pp (m)     Base (m)     Dia (mm)       Recovery %     Remarks:       Inspection pit dug to 1.20m.       Mater Strikes       Strike (m)       Cased (m)       Strike (m)									∫ Ionitoring Base (m) [	Insta	llations Type	Dia (mm)
Checke Log sta	d by: atus:	PRELIM	IFA DS v01.01										

Plant used: Project:											Locat	tion ID:	
G	AN FA	RMER	C	Comacchio 2	205		Manchester Northern	Gateway Flood Defence	and Alleviation	Works		RE	03
	45500	JAIES	Dales.	11/10/202	1		Client.	Volker Stevin					•••
Dunon	nia Sam	nling	Location:	11/10/202			Ground level:	Logged by:	Vertical scale:		Shee Proje	t 1 of 1 ct ID:	
and Rota	arv Bori	na Loa	38414	2.39E 3992	216.74N	١	28.67mOD	OG/CG	1:50			2230	502
	Samples	& In Situ Te	esting				Strata D	etails		T		Grou	undwater
Depth	Sample ID		Test Result	Level (mOD)	Depth (m) (Thickness)		Strat	a Description		Legend		Water Strike	Backfill/ Installation
0.20 - 0.57	B1			28.47	0.20	MADE subar	E GROUND: Black tarma Igular to very angular, fir	acadam consisting of 3 ne and medium diorite,	-25mm granite and		ŧ		
0.25	ES2 D3				(0.37)		t. E GROUND: Light grev (	mottled dark grev GRA	/FL Gravel is		Ē		
0.57 - 1.50	B4			28.10	0.57		angular to angular, fine to	o coarse granite.	/				
0.70	D6				(0.00)	GRAV	E with frequent cobble	es. Gravel is very angula	ar to angular,		L 1		
1.20		SPT(S) 5	0 (4,4/50 for		(0.93)	angula	ar (>180mm) of fine grait	ined igneous.	are very		ŧ'		
- 1.20 - 1.65	D7	275mm)		27 17	1 50						Ē		
1.50 - 2.00	D8			21.11	1.00	Possil mediu	ble made ground: Very l ım SAND.	oose, orangish brown,	fine and				
2 00		SPT(S) N	=0 (1 0/0 0 0 0	<b>`</b>							- 2		
2.00 - 2.45	D9		0 (1,0/0,0,0,0,0	,	(1.50)	Bet	ween 2.00m and 3.00m: No	recovery. Possible sand ba	nd.				
					(1.00)								
											E		
				25.67	2 00								
			3.10m - D10	25.57	3.10	Reddi	sh brown, fine to coarse	e SAND.	/		- 3		
			3.34m - C 3.46m - C			Weak	, reddish brown, thickly d SANDSTONE, Disco	to very thickly bedded, ntinuities are 0-5°, very	fine to coarse closelv		Ē		
	100		an.	,									
3.10 - 4.60	3.10 - 4.60 95 7 3.80m - C (1.70)												
65 4.10m - C 4.24m - C (1.70)											- 4		
			4.24m - C 4.36m - C										
-	-	AZCI									Ē		
			4.88m - C	23.87	4.80	Weak	, reddish brown, thickly	to very thickly bedded,	fine to coarse		Ē		
	87	8	5.00m - C			graine	ed SANDSTONE. Discoled, undulating rough clea	ntinuities are 0-5°, very an.	closely		-5		
4.60 - 6.10	67				(1.30)	Bet	ween 5 40m and 5 50m; rec	covered as non intact					
	40		5.64m - C		(1.00)								
		7											
-		NI		22.57	6.10	Very v	weak, reddish brown, fin	e to coarse SANDSTO	NE.	· · · · · ·	6		
		6		22.47	(0.50)	Weat	nered to a soft, friable cl	ayey sand.	fine to coarse				
	100			21 97	6 70	graine	ed SANDSTONE. Disco	ntinuities are 0-5°, very	closely		Ē		
6.10 - 7.60	87			21.57	0.70	Very v	weak, reddish brown be	coming light brown, thic	kly bedded,				
	33				(0.60)	fine and closel	nd medium grained SAN y spaced, undulating ro	NDSTONE. Discontinuit ugh both tight clean an	ies are 0-60°, d wide with a		7		
		10		21.37	7.30	soft re	eddish clay infill through ween 7.10m and 7.30m: lard	out. ge 55-60 degree fracture ioi	nted against	<u> </u>	ł		
-					(0.70)	∖ <u>red</u> Stiff. r	dish clay with visible striation eddish brown, verv sand	ns. dy CLAY.					
						, .	, <b>,</b>				ł		
	73			20.67	8.00	Weak	, reddish brown, thickly	bedded, fine and mediu	im grained		8		
7.60 - 9.00	73 40		8.38m - C			undula	ating rough, tight clean.	A soft clayey sand pen	etrating				
		6			(1.00)	trough Bet	1 IFACTURES. tween 8.00m and 8.10m: larg	ge 55-60 degree fracture.					
-				19.67	9.00		End of B	orehole at 9.00m			9		
											E		
		FI	Samples & Test	ts Domortic							- 10		
Top (m) Bas	se (m) Dia	(mm) Reco	very % Remar	ks	».								
1.20 1	.50	1	00										
				SPT Har	nmer: N/F	R, Ener	gy Ratio: N/R						
				Strike (m	) Cased (r	m) Seala	Water Strikes	n) Remarks	Ton (m) B	onitoring	Insta	llations	Dia (mm)
					, 1003eu (I	, jocale				300 (111)	i ipe	The	י שום (וווווו)
Checked	by:	RC	IFA D	S									
Log statu	IS:	PRELIM	v01.0	)1									

			Plant used:				Project:				Locat	ion ID:	
	IAN FA	RMER	Comr	nachio	205		Manchester Northern	Gateway Flood Defence	and Alleviation	Works		RF	04
	ASSOC	CIATES	Dates:	40/000			Client:						74
			U3/	12/202	1		Cround lovel:	Volker Stevin	Vortical apple		Shee	t 1 of 1	
Dynan	nic Sam	pling	38/1/5 8	3 = 300-	106 201	J				)	Fioje	27201	502
and Rot			304 143.00	JE 299	190.201	N	Strata D		1.50	)		ZZ30	
Depth	Sample ID		Test Result	Level	Depth (m)		Stra	ta Description		Legend		Water	Backfill/
-				27.51	0.15	CONC	CRETE.					Guino	
0.25	B2 FS1			27.36	0.30	MADE with n	E GROUND: Greyish bro nedium cobble content.	own, gravelly, fine to coa Gravel is subangular, fir	arse SAND ne to coarse		-		
0.50	B4					includ	ling brick, concrete, san	dstone and coal. Cobble	es are				
0.50	E33					MADE	E GROUND: Medium de	ense becoming dense, g	reyish		-		
1.00	B6					pocke	ets of ash. Gravel is sub	angular, fine to coarse i	ncluding		1		
1.20		SPT(S) N	I=10 (1,2/2,4,3,1)		(2.20)	brick, includ	shells, coal and sandst ling sandstone.	one. Cobbles are suban	gular		-		
					(2.20)		5						
2.00		SPT(S) N	I=39 (4,3/4,4,10,21)								2		
											-		
				25.16	2.50	No re	covery Advancing throu	iah dense coarse soil st	rata		-		
						NOTE	covery. Advancing thou		lala.				
3.00		SPT(S) 5	0 (25 for 135mm/50								3		
		for 70mm	)		(1.50)								
-											-		
					4.00						- 4		
		NR	4.00m - SPT(S) 50 (25 for 25mm/50	23.66		SANE	, reddish brown, thickly OSTONE. Discontinuities	bedded, fine and mediu s are 0-8°, closely space	m grained ed, wide,				
			for 30mm)			undula	ating rough. Some soft,	sandy infilling througho	ut.				
4 00 5 50	80										-		
4.00 - 5.50	35				(0.00)								
		8			(2.00)						- 5		
											-		
:											-		
											-		
-	93			21.66	6.00	Weak	, reddish brown, thickly	bedded, fine and mediu	m grained		6		
5.50 - 7.00	93 50					SANE rough	STONE. Discontinuities , lightly weathered.	s are 0-6°, tight clean, u	ndulating				
-	00	6											
		-									7		
		NI			(2.55)								
	100										-		
7.00 - 8.55	93												
	93	3									8		
-				19.11	8.55		End of D	lorobolo at 9 55-					
							End of B	OUTENULE AL 0.00M					
											9		
ŧ.													
-	100,000		Complete 0 T 1								- 10		
	Dynamic	Sample Re	Samples & Tests	Remarks	l S:					1	-		
Top (m) Ba 1.20 2	se (m) Dia 2.00	(mm) Reco 1	very % Remarks 00	Inspectic	n pit dug	to 1.20r	m.						
2.00	3.00	1	00										
				SPT Har	nmer: N/F	R, Enerç	gy Ratio: N/R						
				Strike (m	) Cased (I	m) Seale	Water Strikes ed (m) Time (mins) Rose to (i	m) Remarks	Top (m) E	1onitoring Base (m)	Insta Pipe	lations Type	Dia (mm)
									0.00 2.00	2.00 4.00	Pl Slo	ain tted	50 50
Checked	by:	RC	IFA DS								5,5		
Log statu	us:	PRELIM	VU1.01										

IAN FARMER         Commachio 205         Mancheske Kenthen Getwary Prode Defence and Alleviation Works         RE05a           Dynamic Sampling and Rotary Boring Log and Rotary Boring Log and Rotary Boring Log and Rotary Boring Log ascrete k financian Depth         Location: 14/10/2021 - 15/10/2021         Gin:: United level: 29.04mOD         Variate Stevin         Shaet 1 of 2         Physical II: Physical II: 20.04mO         Physical II: 20.04mO         Stress Lotals         Concording Physical II: 20.04mO         Stress Lotals         Concording Physical II: 20.04mO         Concording Physical II: 20.04mO         Stress Lotals         Concording Physical II: 20.04mO         Concording Physical II: 20.04mO         Stress Lotals         Concording Physical II: 20.04mO         Concording Physical II: 20.04mO				Plant used:				Project:				Locati	on ID:	
Client:         Client: <t< td=""><td></td><td>AN FA</td><td>RMER</td><td>Comr</td><td>nachio</td><td>205</td><td></td><td>Manchester Northern</td><td>Gateway Flood Defence a</td><td>nd Alleviation</td><td>Works</td><td>F</td><td>250</td><td>52</td></t<>		AN FA	RMER	Comr	nachio	205		Manchester Northern	Gateway Flood Defence a	nd Alleviation	Works	F	250	52
Unmarket         14/10/2021 - 15/10/2021         Volker Stevin         Beet 1 of 2           Dynamic Sampling and Rotary Boring Log         Calculation: 384200.46E 399230.81N         Canual evel: 29.04mOD         Logged by: CG         Volker Stevin         Protect ID: 2230502           Sample & In Skin Learing         Logid by: Sample & In Skin Learing         Logid by: CG         Intel Result         Calculation: Canual evel: Dept         Skin Learing         Canual evel: Calculation         Learing         Canual evel: Calculation         Learing         Canual evel: Calculation         Learing         Calculation         Canual evel: Calculation         Calculation         Calcul		ASSOC	IATES	Dates:				Client:				I.		Ja
Dynamic Sampling and Rotary Boring Log         Location: 334204.048E 399230.81M         Cr         Logged by 29.04mOX         Vertical scale: CG         Project ID 1:50         2230502           amplin & 10 Stb. Reing         Exet Reing         State Detains         CG         1:50         2230502           amplin & 10 Stb. Reing         Exet Reing         State Detains         CG         1:50         2230502           0.50         B1         Exet Reing         MADE GROUND. Concrete core.         Logger ID         Were Reing         Concrete Were Reing         Concrete Reing				14/10/202	21 - 15/	10/2021			Volker Stevin			Sheet	1 of 2	
and Rotary Boring Log         398/2000,46E 399/200381N         29,04mOU         C3         1:00         22230502           Sumplex in Situ Endity         Communication         CC3         Communication         Communication         Communication         Communication         Communication         Communication <th< td=""><td>Dynam</td><td>nic Sam</td><td>pling</td><td>Location:</td><td></td><td></td><td></td><td>Ground level:</td><td>Logged by:</td><td>/ertical scale:</td><td></td><td>Projec</td><td>t ID:</td><td></td></th<>	Dynam	nic Sam	pling	Location:				Ground level:	Logged by:	/ertical scale:		Projec	t ID:	
Sample & In Sub Tesh 2         Level (mode)         Stata Decorption         Level (mode)         Concentration         Concentration         Level (mode)         Concentration         Concentration         Concentration         Concentration         Concentration         Concentration         Concentration         Concentration         Concente <t< td=""><td>and Rota</td><td>ary Bori</td><td>ng Log</td><td>384200.46</td><td>6E 3992</td><td>230.81N</td><td></td><td>29.04mOD</td><td>CG</td><td>1:50</td><td>)</td><td>2</td><td>22305</td><td>502</td></t<>	and Rota	ary Bori	ng Log	384200.46	6E 3992	230.81N		29.04mOD	CG	1:50	)	2	22305	502
Depart         Vertex         Name         (inclustree)         (in	Denth	Samples	& In Situ Te	asting	Level	Depth (m)		Strata De	etails		Legend		Grou Water	ndwater Backfill/
0.50 - 0.60 0.55 0.50 0.50 0.50 0.50 0.50 0.50	:				(mOD)	(Thickness)	MADE	E GROUND: Concrete co	ore.		Logona	:	Strike	Installation
0.50 - 0.60 0.55 0.60       P1 0.55 0.60       28.54 0.60       0.50 0.60       MADE GROUND. Recovered as light grey, slightly sandy GRAVEL. Gravel is very angular to angular, fine to coarse including concrete (Broken out material).       -1         1.20       SPT(5) N=34 (4.7/8,0.9.8)       27.44       1.60 0.30         1.60 - 1.90 1.80       B4 ES5 5.07       SPT(5) N=13 (4.7/3,4.3.3)       27.44       1.60 0.30         2.85       ES7 2.00       SPT(5) N=13 (4.7/3,4.3.3)       27.44       1.60 0.30         2.85       ES8 5.07       SPT(5) N=27 (3.3/4,5.9.9)       26.24 26.09       2.80 25.00       MADE GROUND. Bick motiled red, slightly slity, sandy GRAVEL Gravel is very angular to angular, fine to coarse SAND (25 for 40mm/50)       -2         3.00 3.00       ES9 100       SPT(5) N=27 (3.3/4,5.9.9)       25.04 25.04       26.04 (0.40)       24.04 (0.40)         4.00 - 5.50       7.00 0       N       4.00m - SPT(5) 50 25.07 r.00       25.04 (0.40)       24.34       4.00 (0.40)         5.50 - 7.00       47 0       N       -2       23.54       5.50       -5         7.00 - 8.50       100 0       N       -2       23.54       5.50       -6       -6         7       -7       23.54       5.50       -7.00       -7       -7       -6       -7         5.50 - 7						(0.50)								
0.80 0.80 0.80 120         ES2 03         CRAPEL SPT(S) N=34 (4,7/8,9,9,8)         CRAPE SPT(S) N=33 (4,7/3,4,3,3)         CRAPE SPT(S) N=31 (4,7/3,4,3,3)         CRAPE SPT(S) N=37 (3,3/4,5,9,9)         CRAPE SPT(S) N=27 (3,3/4,5,9,9)         CRAPE SPT(S) SPT(S)	0.50 - 0.60	B1			28.54	0.50	MADE	GROUND: Recovered	as light grey slightly sa	ndv				
1.20         SPT(S) N=34 (4,7/8,9,9,8)         (1.10)           1.60 - 1.90         ES           1.70         1.80           1.80         ESS           2.00         EST           2.01         EST           2.02         SPT(S) N=13 (4,7/3,4,3,3)           2.05         ESS           2.00         EST           2.01         SPT(S) N=13 (4,7/3,4,3,3)           2.02         ESS           3.00         3.00           3.00         SPT(S) N=27 (3,3/4,5,9,9)           26.54         ES8           SPT(S) N=27 (3,3/4,5,9,9)         25.64           4.00 - 5.50         73           10         Arm - C           3.10         D11           73         NI           4.00 - 5.50         73           10         Arm - C           5.30 - 7.00         70           10         NR           7.00 - SPT(S) 50         22.74 </td <td>0.55</td> <td>D3</td> <td></td> <td></td> <td></td> <td></td> <td>GRAV</td> <td>/EL. Gravel is very angu</td> <td>lar to angular, fine to coa</td> <td>arse</td> <td></td> <td></td> <td></td> <td></td>	0.55	D3					GRAV	/EL. Gravel is very angu	lar to angular, fine to coa	arse				
1.20         SPT(S) N=34 (4,7/8,9,9,8)         27.44         1.60           1.60 - 1.90         B4         25.5         SPT(S) N=13 (4,7/3,4,3,3)         27.14         1.90           2.85         ES8         SPT(S) N=27 (3,3/4,5,9,9)         26.24         2.80         2.95           3.00         3.00         SPT(S) N=27 (3,3/4,5,9,9)         26.24         2.80         2.95           4.00 - 5.50         73         N         4.74m - C         24.64         4.00           4.00 - 5.50         73         N         4.74m - C         24.54         4.70           5.50 - 7.00         0         N         4.74m - C         23.54         5.50           7.00         N         22.74         0         0.80         0.80         0.80           5.50 - 7.00         0         N         7.00m - SPT(S) 50         22.54         5.50         7.00         7.00m - SPT(S) 50         22.74         0.20           7.00 -	-					(1.10)	moluu	ing concrete (broken ou	it material).			- 1		
1 60 · 1 30 1 80 1 80 1 80 1 80 1 80 1 80 1 80 1 8	1.20		SPT(S) N	J=34 (4,7/8,9,9,8)										
1.80       1.80       1.80       27.44       1.80       MADE GROUND. Recovered as grey very lose GRAVEL.       Gravel is very angular on angular, medium and coarse including grante and brick.       MADE GROUND. Recovered as grey very lose GRAVEL.       Gravel is very angular coarse including grante and brick.       MADE GROUND. Recovered as grey very lose GRAVEL.       Gravel is very angular coarse including grante.       2         2.85       ES8       SPT(S) N=27 (3,3/4,5,9.9)       26.24       2.80       MADE GROUND. Dark greyish brown, fine to coarse SAND.       MADE GROUND. Dark greyish brown, fine to coarse SAND.       MADE GROUND. Dark greyish brown, fine to coarse SAND.         3.00       3.00       SPT(S) N=27 (3,3/4,5,9.9)       25.04       4.00       (0.90)       MADE GROUND. Dark greyish brown, fine to coarse SAND.       3         3.00 - 4.00       5.10       7.3       N       4.00m - SPT(S) 50       25.04       (0.00)       (0.40)       No recovery.       4 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td>1.00</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						1.00								
1.80 1.95 2.00       D6 ES7       27.14       1.90       grante and bftx, and on sigue, nonlocal and outsain and outsai	1.60 - 1.90	ES5			27.44	1.60 (0.30)	MADE	E GROUND: Recovered	as grey, very loose GRA	VEL.				
2.00       AMADE GROUND: Black motiled red, slightly slip, sandy GRAVEL.	1.80 1.95	D6 FS7			27.14	1.90	granite	e and brick.				- 2		
2.85 - 3.00 3.00 3.00 - 4.00 3.10         ES8 BT(S) N=27 (3.3/4,5.9.9)         26.24 2.6.9         2.80 2.95         MADE GROUND: Brown, slightly clayey, fine to coarse SAND MADE GROUND: Dark greyish brown, fine to coarse SAND with occasional brick fragments (20-60mm). Medium to strong hydrocarbon odur.         -3           4.00 - 5.50         B10 3.10         NR 4.00m - SPT(S) 50 10         25.04 4.00         4.00 (0.40)         -3           4.00 - 5.50         NR 3.30 10         NR 4.74m - C 4.74m - C 5.39m - C         25.04 4.74m - C 5.39m - C         4.00 4.74m - C 5.39m - C         4.00 4.74m - C 5.39m - C         24.34 4.70         No recovery.         -5           5.50 - 7.00         NR 0         Redish brown, fine and medium grainel SANDSTONE, hat m - C 5.39m - C         -5         -5           7.00 - 8.50         100 0         NR 4.7         7.00m - SPT(S) 50 7.00m - SPT(S) 50 0         22.04 7.00m - SPT(S) 50 0         22	2.00		SPT(S) N	J=13 (4,7/3,4,3,3)			MADE Grave	E GROUND: Black mottle I is very angular, coarse	ed red, slightly silty, san e brick (Ash fill).	dy GRAVEL.				
2.85 3.00 3.00 3.10         ES8 B10 D11         SPT(S) N=27 (3.3/4,5.9.9)         26.24 26.09         2.80 2.95         MADE GROUND: Brown, slightly clayey, fine to coarse SAND. MADE GROUND: Dark greyish brown, fine to coarse SAND. (1.05)           3.00 3.10         D11         NR         4.00m - SPT(S) 50 (25 for 40mm/50) for 48mm/ 10         25.04 4.40         4.00 (0.40)           4.00 - 5.50         73 31         NR         4.77m - C 4.77m - C 4.77m - C 5.39m - C         24.34 5.50         4.00 (0.40)           5.50 - 7.00         0 0         NR         7.00m - SPT(S) 50 (25 for 30mm/50)         22.04 (0.40)         0.00           5.50 - 7.00         0 0         NR         7.00m - SPT(S) 50 (25 for 30mm/50)         22.04 (0.40)         7.00           7.00 - 8.50         100 0         NR         7.00m - SPT(S) 50 (25 for 30mm/50)         22.04 (0.70)         7.00           7.00 - 8.50         100 0         NR         7.00m - SPT(S) 50 (25 for 30mm/50)         22.04 (0.70)         7.00           7.00 - 8.50         100 0         4         7.00m - SPT(S) 50 (25 for 30mm/50)         22.04 (2.10)         7.00           7.00 - 8.50         100 0         4         7.00m - SPT(S) 50 (25 for 30mm/50)         22.04 (2.10)         7.00           7.00 - 8.50         100 0         4         7.00m - SPT(S) 50 (25 for 30mm/50)         22	-					(0.90)								
2.85 3.00 3.00       ES8 BT(S) N=27 (3,3/4,5,9,9)       25.24       2.40       2.40       MADE GROUND: Brown gliphly clayey, fine to coarse SAND. MADE GROUND: Dark greyts brown, fine to coarse SAND. MADE GROUND: Dark greyts brown, fine to coarse SAND.						0.00								
3.00 3.00 - 4.00 3.10         ES9 B10 D11         Or (c) (PEP (0.040000) (0.000) B10         MR         4.00 - (0.040000) (0.000) (0.00000) (0.00000) (0.00000) (0.00000) (0.00000) (0.00000) (0.00000) (0.000000) (0.000000) (0.000000) (0.0000000) (0.00000000) (0.000000000) (0.0000000000	2.85	ES8	SPT(S) N	J=27 (3 3/4 5 9 9)	26.24 26.09	2.80	MADE	GROUND: Brown, slig	htly clayey, fine to coars	e SAND.		- 3		
3.10       A100       B10       Difference       hydrocarbon odour.         3.10       Difference       A00m - SPT(S) 50       25.04       4.00         4.00 - 5.50       33       N       4.00m - SPT(S) 50       24.34       4.00         4.00 - 5.50       33       10       A.74m - C       4.44m - C       0.00         4.00 - 5.50       33       10       A.74m - C       24.34       4.70         5.57 - 7.00       N       4.84m - C       (0.80)       S.27m - C       S.39m - C       23.54       5.50         5.50 - 7.00       N       Reddish brown, fine and medium grained SANDSTONE, heavily weathered to a reddish clayey sand.       5       5         5.50 - 7.00       N       N       22.74       6.30       No recovery. Possible sandstone.       6         7.00 - 8.50       100       NI       7.00m - SPT(S) 50       22.04       7.00       No       SAND STONE. Fractures are 0-10°, closely spaced tight clean, with rare sand infill.       7       6         7.00 - 8.50       100       40       7.56m - C       22.04       7.00       8       8       8	3.00	ES9		1-27 (0,014,0,0,0,0)			occas	ional brick fragments (2)	0-60mm). Medium to str	ong		5		
4.00 - 5.50         NR         4.00m - SPT(S) 50 (25 for 40mm/50 for 85mm)         25.04         4.00 (0.40)           4.00 - 5.50         NI         4.74m - C 4.77m - C 4.84m - C         24.34         4.70           Main - SPT(S) 50 0         25.7m - C 8.39m - C         24.34         4.70           Meak, reddish brown, fine and medium grained SANDSTONE, heavily weathered to a reddish clayey sand.         5           Between 5.5 and 5.7 m - C 8.39m - C         23.54         5.50           5.50 - 7.00         NI         7.00m - SPT(S) 50 0         22.74         6.30 (0.70)           7.00m - SPT(S) 50 0         22.74         6.30 (0.70)         Reddish brown, slightly gravelly, slightly clayey, fine to coarse SAND. Gravel is subrounded, fine to coarse grained SAND. Gravel is subrounded, fine to coarse grained SAND.TONE. Fractures are 0-10°, closely spaced tight clean, with rare sand infill.         7	3.00 - 4.00	D11				(1.05)	hydroo	carbon odour.						
NR         R         4.00m - SPT(S) 50 for 85mm)         25.04 (0.40)         4.00 (0.40)         No recovery.           4.00 - 5.50         73 310         NI         4.74m - C 4.77m - C 4.84m - C 5.39m - C         24.34         4.70 (0.80)         Dense, greyish brown GRAVEL. Gravel is subangular to subrounded, fine to coarse including grainte, sandstone and greeous lithologies.         Mo recovery.           4.00 - 5.50         73 310         NI         4.74m - C 4.77m - C 4.84m - C 5.39m - C         24.34         4.70           5.50 - 7.00         0         NI         5.27m - C 5.39m - C         23.54         5.50           7.00 - 8.50         0         NI         22.74         6.30           7.00 - 8.50         100         7.00m - SPT(S) 50 0         22.04         7.00           40         7.56m - C         21.04         7.00         22.04         7.00           100         100         4         7.56m - C         22.04         7.00         22.04         7.00						(1.00)								
4.00 - 5.50         NR         4.00m - SPT(S) 50 (or 85mm)         25.04 (0.40)         4.00 (0.40)         No recovery.         No recover						1.00							-	
4.00 - 5.50       73       NI       24.64       4.40         4.00 - 5.50       33       4.74m - C       24.34       4.70         4.00 - 5.50       33       4.74m - C       24.34       4.70         4.00 - 5.50       33       4.74m - C       24.34       4.70         0.00       4.77m - C       4.84m - C       (0.80)       Weak, reddish clayey sand.       5.27m - C         5.27m - C       5.39m - C       23.54       5.50       No recovery. Possible sandstone.       No recovery. Possible sandstone.       6         6.30       NR       22.74       6.30       Reddish brown, slightly gravelly, slightly clayey, fine to coarse SAND. Gravel is subrounded, fine to coarse including quartz.       6         7.00 - 8.50       100       4       7.56m - C       22.04       7.00       22.04       7.00         7.00 - 8.50       100       4       7.56m - C       22.04       7.00       22.04       7.00       8       8       8	-		NR	4.00m - SPT(S) 50	25.04	4.00	No red	covery.				- 4	_	
4.00 - 5.50       73 33 10       NI       4.74m - C 4.77m - C 4.84m - C 5.39m - C       24.34       (0.30) 4.70       Ubres, greysb forwn forkVeL. Gravet is subangular to subrounded, fine to coarse including granite, sandstone and igneous lithologies. Weak, reddish brown, fine and medium grained SANDSTONE, heavily weathered to a reddish clayey sand.       —       —       5         8       0.80       5.27m - C 5.39m - C       23.54       5.50       (0.80)       Between 5.15 and 5.24m engineer notes: weathered to a soft clayey sand.       —       =       =       =				for 85mm)	24.64	4.40	Dana			4-				
4.00 - 5.50       33 10       4.74m - C NI       24.34       4.70       igneous lifehologies. Weak, reldish brown, fine and medium grained SANDSTONE, heavily weathered to a reddish clayey sand.         -       5.27m - C 5.39m - C       23.54       5.50         -       0       0       0       0         -       0       0       0       0       0         -       47 5.50 - 7.00       0       0       0       0       0         -       47 5.50 - 7.00       0       0       0       0       0       0         -       0       0       0       0       0       0       0       0         -       7.00m - SPT(S) 50 (0.70)       22.74       6.30       Reddish brown, slightly gravelly, slightly clayey, fine to coarse SAND. Gravel is subrounded, fine to coarse grained SANDSTONE. Fractures are 0-10°, closely spaced tight clean, with rare sand infill.       7         7.00 - 8.50       100 60       -       -       -       -       -       -         100       100       -       -       -       -       -       -       -         100       100       -       -       -       -       -       -       -         100       -       -	-	73	NI		24.24	(0.30)	subro	e, greyish brown GRAVE unded, fine to coarse inc	cluding granite, sandstor	to le and				
NI         4.84m - C         (0.80)         heavily weathered to a reddish clayey sand.         5           5.27m - C         5.39m - C         23.54         5.50         5.50         Between 5.15 and 5.24m engineer notes: weathered to a soft clayey sand.         6           8         NR         0	4.00 - 5.50	33 10		4.74m - C 4.77m - C	24.34	4.70	∖igneoι Weak	us lithologies. , reddish brown, fine and	d medium grained SAND	STONE,				
5.27 m - C       5.39m - C       23.54       5.50         5.50 - 7.00       0	-		NI	4.84m - C		(0.80)	heavil	y weathered to a reddisl	h clayey sand.	ft alavay	· · · · · · · · · · · · · · · · · · ·	- 5		
47         0				5.27m - C 5.39m - C			san	nd.	eer noles. weathered to a so	i clayey				
$\begin{bmatrix} & & & \\ $					23.54	5.50	No red	covery. Possible sandsto	one.					
5.50 - 7.00       47 0 0       -       -       6.30       Reddish brown, slightly gravelly, slightly clayey, fine to coarse SAND. Gravel is subrounded, fine to coarse including quartz.       -       6         NI       7.00m - SPT(S) 50 (25 for 30mm/50 for 40mm) 7.23m - C 7.56m - C       22.04       7.00       Weak, reddish brown, thickly bedded, fine to coarse grained SANDSTONE. Fractures are 0-10°, closely spaced tight clean, with rare sand infill.       7			NR			(0.80)								
5.50 - 7.00       0 <td< td=""><td></td><td>47</td><td></td><td> </td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>- 6</td><td></td><td></td></td<>		47										- 6		
NI         7.00m - SPT(S) 50         22.04         7.00         SAND. Gravel is subrounded, fine to coarse including quartz.         7           7.00 - 8.50         100         4         7.00m - C         7.00m - C         7.00m - C         7.00m - C         7.56m - C         8         8         8         8	5.50 - 7.00	0			22.74	6.30	Reddi	sh brown, slightly grave	lly, slightly clayey, fine to	coarse				
100         4         7.00m - SPT(S) 50 (25 for 30mm/50 for 40mm) 7.23m - C 7.56m - C         22.04         7.00         Weak, reddish brown, thickly bedded, fine to coarse grained SANDSTONE. Fractures are 0-10°, closely spaced tight clean, with rare sand infill.         7           7.00 - 8.50         100 60         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         7         -         -         -         -         -         -         7         -         -         -         -         -         -         -         7         -	-		NI			(0.70)	SAND	). Gravel is subrounded,	fine to coarse including	quartz.				
7.00m - SPT(S) 50 (25 for 30mm/50 for 40mm) 7.23m - C         22.04         7.00         Weak, reddish brown, thickly bedded, fine to coarse grained SANDSTONE. Fractures are 0-10°, closely spaced tight clean, with rare sand infill.         7           7.00 - 8.50         100 60         - </td <td></td> <td></td> <td></td> <td> </td> <td></td>														
7.00 - 8.50         100 60         4         for 40mm) 7.23m - C 7.56m - C         SANDSTONE. Fractures are 0-10°, closely spaced tight clean, with rare sand infill.           100         100         7.56m - C         (2.10)         (2.10)				7.00m - SPT(S) 50 (25 for 30mm/50	22.04	7.00	Weak	, reddish brown, thickly l	bedded, fine to coarse g	rained		7		
7.00 - 8.50     100 60     4     7.56m - C       100     10       100     10				for 40mm) 7 23m - C			with ra	are sand infill.	U-10°, closely spaced tig	nt clean,				
	-	100	4	7.56m - C										
	7.00 - 8.50	100 60												
	-					(2.10)						8		
			10											
8.57m - C			-	8.57m - C							:::::			
			NI											H
	ŀ	100			19.94	9.10	10/0-1	roddiob brown - Patri	alayou fine to come	ainad	····	9		
8.50 - 10.00 87 9.23m - C (0.40) SANDSTONE. Gravel is subrounded to rounded, fine to coarse	8.50 - 10.00	87 40	5	9.23m - C 9.36m - C		(0.40)	SAND	STONE. Gravel is subro	bunded to rounded, fine	to coarse				I.
19.54     9.50     including quartz and fine grained sandstone. Fractures are 0-6°, including quartz and fine grained sandstone. Fractures are 0-6°, including quartz and fine grained sandstone. Fractures are 0-6°, including quartz and fine grained sandstone. Fractures are 0-6°, including quartz and fine grained sandstone. Fractures are 0-6°, including quartz and fine grained sandstone. Fractures are 0-6°, including quartz and fine grained sandstone. Fractures are 0-6°, including quartz and fine grained sandstone. Fractures are 0-6°, including quartz and fine grained sandstone. Fractures are 0-6°, including quartz and fine grained sandstone. Fractures are 0-6°, including quartz and fine grained sandstone. Fractures are 0-6°, including quartz are 0-6°, includin			Ĭ	-	19.54	9.50	Includ	ing quartz and fine grair <u>y spaced, tight</u> with rare	ed sandstone. Fracture	s are 0-6°,				
9.77m - C (0.50) Weak, reddish brown, thickly bedded, fine to coarse grained				9.77m - C		(0.50)	Weak SAND	, reddish brown, thickly l STONE. Fractures are (	bedded, fine to coarse g 0-10°. closelv spaced tig	rained ht clean.				
TCR/SCR/ROD FI Samples & Tests 19.04 10.00 Continued next sheet 10	·	TCR/SCR/RQD	FI	Samples & Tests	19.04	10.00		Continu	ued next sheet	,		- 10		
Dynamic Sample Recovery         Remarks:           Top (m)         Base (m)         Dia (mm)         Recovery %         Remarks:	Top (m) Bas	Dynamic S se (m) Dia	Sample Re (mm) Reco	ecovery very Remarks	Remarks Inspectio	s: on pit dua t	to 1.20r	m.						
SPT Hammer: N/R Energy Ratio: N/R						nmer NI/D	Enor	ny Ratio: N/R						
Water Strikes Monitoring Installations								Water Strikes		N	lonitoring	Install	ations	
Strike (m)         Cased (m)         Sealed (m)         Remarks         Top (m)         Base (m)         Pipe Type         Dia (mr           4.00         7.00         0         0.00         0.00         4.00         Plain         50					Strike (m 4.00	) Cased (m 7.00	n) Seale	td (m) Time (mins) Rose to (m 0 0.00	n) Remarks	Top (m) E 0.00	Base (m) 4.00	Pipe Pla	Гуре in	Dia (mm) 50
Checked by: RC IFA DS 4.00 10.00 Slotted 50	Checked I	by:	RC	IFA DS						4.00	10.00	Slot	ted	50
Log status: PRELIM v01.01	Log statu	s:	PRELIM	v01.01										

			Plant used:					Project:						Locat	ion ID:	
	IAN FA	RME	R	Comn	nachio 2	205		Manchester N	lorthern	Gateway Floo	d Defence	and Alleviatio	n Works			52
	ASSOC	CIATE	S Dates:					Client:							ΛĽŪ	Ja
			14/1	0/202	21 - 15/1	0/2021				Volker S	Stevin			Shee	t 2 of 2	
Rotan		n l oa	Location:					Ground level:		Logged by:		Vertical scal	e:	Proje	ct ID:	
T T T T T T T T T T T T T T T T T T T	y Donne	JLUY	3842	200.46	3E 3992	230.81N		29.04mC	D	CG	6	1:5	0		2230	502
(	Coring, Sam	nples & In	Situ Testing		Level	Denth (m)			Strata D	etails			<u> </u>		Grou	ndwater Backfill/
Depth	RQD	FI	Samples & Test	Result	(mOD)	(Thickness)	Wook	raddiab brown	Strat	a Description	to operad	arainad	Legend	_	Strike	Installation
				ſ			SANE	STONE. Fractu	res are	0-10°, closely	/ spaced ti	ght clean,	1	-		
				ſ			with ra	are sand infill. F	nd of Bo	prehole at 10.0	)0m					
				l				-		in the second second						
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	Flush	Details		Boreh	ole Diamet	er		Borina Progr	ess		Remarks:			20		
Top (m) Ba	ISE (m) Flu	ish Type	Flush Return %	Depth (	(m) Dia (m	m) Dat		Time Depth (m)	Cased (n	m) Water (m)						
0.00 1	0.00 \	valei				14/	10 1	15:00 10.00	7.00	4.30						
											007.1					
				Casir	ng Diamete	er		W	/ater Strik	kes	SP1 Han	nmer: N/R, E	nergy Rati Monito	o: N/R rina Ins	stallation	s
				Depth (	m) Dia (m	m) Strike (	(m) Case	ed (m) Sealed (m) Ti	me (mins)	Rose to (m)	Remarks	s Top	(m) Base	(m)   Pi	ре Туре	Dia (mm)
Checked Log state	by: us: r	RC PRELIM	IFA RC v01.01													

			Plant used:				Project:					Locat	ion ID:		
-	IAN FA	RMER	Comacchio 2	05/Com	machio	205	Manchester Northern	Gatew	ay Flood Defence a	nd Alleviation	Works		DE	٨C	
	ASSOC	CIATES	Dates: 15	/10/202	1		Client:	Vo	lker Stevin			Shoo		00	
Dynar	nic Sam	nlina	Location:				Ground level:	Logge	ed by:	/ertical scale:		Proje	ct ID:		
and Rot	ary Bori	ing Log	384210.7	7E 3992	209.55N	1	29.91mOD		OG/CG	1:50	)		2230	502	<u>'</u>
	Samples	s & In Situ To	esting		-		Strata D	etails					Gro	undwa	iter
Depth	Sample ID		Test Result	Level (mOD)	Depth (m) (Thickness)		Strat	ta Desc	ription		Legend		Water Strike	Ba Insta	ckfill/ allation
				29.76	0.15	MADE	E GROUND: Tarmacada	am. Town C	OBBLES with con	crete infill					
0.40 - 1.20	) B1			29.56	0.35	(old co	obble road). Cobbles ar	e very	angular (120-300r	nm)	<b>XXXXX</b>				
0.45	ES2					MADE	ing sandstone. E GROUND: Reddish br	own. f	ine to coarse SAN	/ D and					
0.50	00				(4.45)	GRAV	/EL. Gravel is very angu	lar to	well rounded, fine	to coarse					
1.00	ES4				(1.15)	hydro	carbon odour.	iuain a	Ind weak to model	ale		1			
1.20		SPT(S) N	N=6 (1,1/1,2,3,0)												`.
-				28.41	1.50	Driller	notes void / possible di	rainag	e pipe			<u>x</u>			-
					(0.60)	21		anag	e pipe.						<b>∃</b> ∶.
-					(0.00)							2			<b>-</b>
				27.81	2.10	Extrer	nely weak, reddish brow	vn, fine	e to coarse grained	ł					
						SAND	STONE. Weathered an	id reco	overed as non intac	xt.				•••••	
											::::	-		·	
2.80	ES5	SPT(S) N	N=15 (4,5/3,4,3,5)		(1.75)										
3.00	ES7											- 3			
:	3.50m - SPT(S) 50 (25 for 30mm/50														
NI (25 for 30mm)50 for 30mm) 26.06 3.85 Weak, reddish brown, fine to coarse grained, thickly b															
100 100 100 100 100 100 100 100 100 100									e grained, thickly b -8°, closely space	edded d. tiaht	::::	4			
3.50 - 5.00	3.50 - 5.00         50         8         (0.80)         clean, undulating rough.									, 5	::::				
25.26 4.65 Extremely weak, reddish brown, fine to									e to coarse grained	1		-			
		NI			(0.50)	SAND with s	STONE. Weathered an	id reco	overed as mainly no	on intact		5			
				24.76	5.15	Weak	reddish brown fine to	coarse	arained thickly b	edded	· · · · · ·				
						SAND	STONE. Discontinuities	s are 0	-14°, closely space	ed, tight,					
	100					undula	aung rougn.					-			
: 5.00 - 6.50 -	73	6			(1.20)							-			
-												6			
				23.56	6.35	Maak	raddiab brown fina ta				· · · · · ·				
:		NI		22.26	(0.30)	recove	ered as non intact.	coarse	grained SANDS I	ONE		-			
				23.20	0.05	Weak SAND	, reddish brown, fine to	coarse s are 1	e grained, thickly b	edded aced tight					
-	100	10				undula	ating rough. 2) 40°, clos	ely sp	aced, slightly open	with a		7			
6.50 - 8.00	87					sandy	r infill.								
-	56														
												-			
												8			
					(2.85)							Ē			
		5													
	100	5													
: 8.00 - 9.50 -	73														
-												- 9			
				20.41	9.50		End of B	orehole	e at 9.50m		+	Ē			
<u>-</u>	TCR/SCR/RQL	FI	Samples & Tests									- 10			
Top (m) Be	Dynamic ase (m) Dia	Sample Reco	ecovery	Remarks	s: n pit dua	to 1 20+	m Gas nine encountors	d at 8	00mm from surface		sketch f	or furt	her det	aile	
			nong ng nonaina		n pit uug	.0 1.20		-u ai 01		5. 1 ICase See	SIGUIT		ier uel	ans.	
				0.5-11											
				SPT Har	nmer: N/F	≺, Enero	gy Ratio: N/R Water Strikes			M	lonitoring	Insta	llations		
				Strike (m	) Cased (r	m) Seale	d (m) Time (mins) Rose to (r	n)	Remarks	Top (m) B	Base (m)	Pipe	Type	Dia	(mm)
0	las u			-						0.50	3.00	Slo	tted		
	us:		IFA DS 1 v01.01												
				I											

Plant used: Project:											Locat	ion ID:
	AN FA	RMER	Coma	acchio 2	205		Manchester Northern	Gateway Flood Defence	and Alleviation	Works		
A Inc.	ASSOC	IATES	Dates:				Client:				1	KEU/
			16/	12/202	1			Volker Stevin			Shee	t 1 of 1
Dynam	nic Sam	pling	Location:				Ground level:	Logged by:	Vertical scale:		Proje	ct ID:
and Rota	ary Bori	ng Log	384233.14	4E 3992	219.30N	l	25.77mOD	CG	1:50			2230502
Denth	Samples	& In Situ Te	esting Test Result	Level	Depth (m)		Strata De	etails		legend		Groundwater Water Backfill/
: 0.00 - 0.50	ES1			(mOD)	(Thickness)	Dark,	blackish brown, sandy (	GRAVEL with common of	cobbles.	Legend	-	Strike Installatio
			1 00m - SPT(S)	24 77	(1.00)	Grave sands sands	I is subangular to subro tone, brick, coal and sla tone and bricks. Engine	unded, fine to coarse in g. Cobbles are subang er notes strong hydroca gh dense coarse soil st	cluding ular including arbon odour. rata		1	
			N=36 (5,7/7,8,11,10)		(1.50)			g				
			2.50m - SPT(S) 50	23.27	2.50	Week	raddiab brawn thiadu	haddad fina ta agaraga	aroinod		2	
-2.50 - 3.50	60 55	10	(25 for 125mm/50 for 130mm)		(0.60)	SAND wide,	STONE. Discontinuities clean, undulating rough.	s are 0-10 degrees, clos	ely spaced,			
	STONE.			-								
				rately weathered, weak,	reddish brown, thickly	bedded, fine		4				
3.50 - 5.00	73 67 10	12			(1.10)	to coa closel	rse grained SANDSTON y spaced, tight and wide	NE. Discontinuities are e, clean, undulating roug	0-8 degrees, gh.			
		NR		20.77 20.67	5.00 5.10	No ree Mode to coa	covery. Probable SANDS rately weathered, weak, Irse grained SANDSTON	STONE. reddish brown, thickly NE. Discontinuities are (	bedded, fine 0-10		5	
5.00 - 6.50	80 65 40	8			(1.20)	degre	es, closely spaced, tight	t, clean, undulating rou <u>c</u>	Jh.		6	
 		NR		19.47 19.27	6.30 6.50	No ree	covery. Probable SANDS End of Bo	STONE. orehole at 6.50m				
											7	
											8	
											9	
											10	
	TCR/SCR/RQD	FI Sample Re	Samples & Tests	Remarks	:						10	
Top (m) Bas	se (m) Dia	(mm) Reco	very % Remarks	Drilled fro Strata de	om pontoc pths belo	on. w river	bed.					
				SPT Han	nmer: N/F	R, Energ	gy Ratio: N/R Water Strikes		M	onitoring	Insta	llations
				Strike (m)	) Cased (n	n) Seale	d (m) Time (mins) Rose to (m	n) Remarks	Top (m) B	ase (m)	Pipe	Type Dia (mn
Checked	hv:	П										
Checked by:     TD     IFA DS       Log status:     PRELIM     v01.01												

			Plant used:				Project:				Locat	ion ID:	
6	IAN FA	RMER	Con	nacchio 2	205		Manchester Northern	Gateway Flood Defence	and Alleviation	Works		DE	ng
	ASSOC	CIATES	Dates:				Client:						00
			10	6/12/202	1			Volker Stevin			Shee	t 1 of 1	
Dyna	mic Sar	nple	Location:				Ground level:	Logged by:	Vertical scale:		Proje	ct ID:	
Bor	ehole L	og	384233.1	18E 3992	213.09N		25.22mOD	CG	1:50			2230	502
	Samples	s & In Situ Te	esting	Level	Depth (m)		Strata D	etails		I		Grou	ndwater
Depth	Sample ID		lest Result	(mOD)	(Thickness)	No rec	Strat	a Description	rata	Legend		Strike	Installation
					(0.60)	140100			rata.				
					(0.00)						-		
: 0.60 - 1.00 :	ES1			24.62	0.60	Dark,	blackish brown, sandy (	GRAVEL with frequent of	obble		Ļ		
				04.00	(0.40)	conter sands	nt. Gravel is subangular tone_brick_slag_glass	to rounded, fine to coal pottery and material an	rse including d plastic bag		È.		
-				24.22	1.00	Cobbl	es are subrounded inclu	uding brick and sandsto	ne. Strong				
						nyaro	carbon odour. End of B	orehole at 1.00m	]		-		
-											-		
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-											- 10		
Ton ( ) IT	Dynamic	Sample Re	ecovery	Remarks	s:								
Iop (m) Ba	ise (m) Dia	(mm) Reco	very %  Remarks	Drilled fro Strata de	om pontoo pths belov	on. w river∣	bed.						
				Obstructe	ed on pos	sible co	oncrete at 1.00m. Reloca	ated to RE08A.					
									-				
				Strike (m	) Cased (m	n) Seale	Water Strikes d (m) Time (mins) Rose to (m	n) Remarks	Top (m) B	onitoring	Insta Pipe	llations Type	Dia (mm)
						,,				<u>、··/</u>			
Checked	by:	TD	IFA DS	1									
Log stat	us:	PRELIM	v01.01										

Owner of holder Gatesing: Food Definite and Alregion Works         CREASE         Sec. 1 of 1         PERSON           Dynamic Sample         16/12/2021         Volker Stevin         Sec. 1 of 1         Sec. 1         Sec. 1 of 1         Sec.					Plant ι	used:				Project:						Loca	tion ID:	
Determine         Determine <thdetermine< th=""> <thdetermine< th=""> <thd< td=""><td>6</td><td>IAN</td><td>FA</td><td>RMER</td><td></td><td>Coma</td><td>acchio 2</td><td>205</td><td></td><td>Manches</td><td>ter Northern</td><td>Gateway Flo</td><td>od Defence a</td><td>and Alleviation</td><td>Works</td><td>F</td><td></td><td>80</td></thd<></thdetermine<></thdetermine<>	6	IAN	FA	RMER		Coma	acchio 2	205		Manches	ter Northern	Gateway Flo	od Defence a	and Alleviation	Works	F		80
Dynamic Sample         Docent         Operation         Description         Description <thdescription< th="">         Description         <t< td=""><td></td><td>ASSO</td><td>C</td><td>IATES</td><td>Dates:</td><td>10</td><td>40/000</td><td></td><td></td><td>Client:</td><td></td><td></td><td><u>.</u></td><td></td><td></td><td></td><td></td><td></td></t<></thdescription<>		ASSO	C	IATES	Dates:	10	40/000			Client:			<u>.</u>					
Dynamic Sample Borchole L         Column Ease.         Call         Description (2000 Bits)         Column Ease.         Call         Column Ease.         Call         C					1 4	16/	12/202	1		One of the		Volker	Stevin	(		Shee	t 1 of 1	
Dependencing         Operation         Data State Action         CAS         1.00         CONCRETE           Support is the forther         Import is the forther         Impor	Dyn	amic S	Sam	ple	Locali	201222 6'	DE 2002	014 20N				Logged by:				Proje	2220	502
Doub         Source 10         Tread Result         Jack         No rescuery Advancing Brough Series coares and statu.         Legren         Series.           -         <	ВС	Sam	e LO	9 <b>9</b> & In Situ Te	stina	304233.02	20 3992	14.201		20.42	Strata D	)etails	9	1.50			Grou	
Dynamic Sample Recovery         Remarks         Image: Constraint of the second	Depth	Samp	le ID		Test Re	sult		Depth (m) (Thickness)			Stra	ta Description			Legend		Water	Backfill/
-         -							(1100)	(	No ree	covery. Adva	ancing throu	ugh dense co	oarse soil stra	ata.		-		
Image: Surget Pressey         Parate:           Theready Unit Started Pressey         Remarks:																[		
Dynamic Sample Recovery       Remarks:         Topol Base my Dia (mm)Recovery       Remarks:         Market by Dia (mm)Recovery       Remarks:         Dia (mm)Recovery       Remarks:         Dia (mm)Recovery       Remarks:	-															-		
Dynamic Sample Recovery:     Romarks:       Tor ron Itseed (or) Disead (or) Disead (or) The principal concrete bit 1, 00m.     -       December by:     TD								(1.60)								-		
Operating Sample Recovery Tayling Used (m) Data (m) Recovery Tayling	-															-1		
Overdeed by:         TO         # 4 0.00           Overdeed by:         TO         # 6 0.00																-		
Checked by:         TD         FADE           Checked by:         TD         FADE	-						00.00	4.00								-		
Dynamic Sample Recovery     Remarks:       Top (m) Base on [Nacoury 30]     Remarks:							23.82	1.60			End of B	Borehole at 1.	60m			Ē		
Deceded by:         TD         FALL         Fall         Image: Strike and Strike an																2		
Checked by:     TO     FRAMAKE         Checked by:     TO     FRAMAKE																-		
-         -	-															[		
Dramic Sample Recovery      Promotion     To																-		
Drnanic Sample Recovery      To     (m) Recovery      (m) Recov																- - 2		
Decked by: TD     PROLW     PROLW     PROL																- 3		
Dynamic Sample Recovery      To     Dynamic Sample Recovery      To																-		
Dramic Sample Recovery     Benafts:       Top (m) Base (m) Data (m) Recovery Strikes     Benafts:       Top (m) Base (m) Data (m) Recovery Strikes     Benafts:       Strike (n) Cased (m) Sealed (m) Immo (mon) Roce to (m)     Top (m) Base (m) Pre-Type Dia (m)																-		
Dynamic Sample Recovery     Remarks:       Top (m) [Base (m)]Necovery 30]     Remarks:       Dynamic Sample Recovery     Top (m) [Sealed (m)]Necovery 30]       Top (m) [Base (m)]Necovery 30]     Remarks:       Strike (m)[Cased (m)]Necovery 30]     Strike (m)[Cased (m)]Necovery 30]       Strike (m)[Cased (m)]Necovery 30]     Strike (m)[Cased (m)]Necovery 30]																-		
A state of the state of th	-															- 4		
A Provide a stand of the second stand of the second stand second se																		
	-															-		
Dynamic Sample Recovery     Remarks:       Top (m) Base (m) Dia (mm) Recovery '%     Remarks:       Distructed on possible concrete at 1.1.60m. Borehole abandoned.       Checked by:     TD       Checked by:     TD       Checked by:     TD       V101																-		
Image: Sample Recovery       Remarks:         Dynamic Sample Recovery M       Remarks:         Dynamic Sample Recovery M       Remarks:         Dynamic Sample Recovery M       Remarks:         Distribution of the second of	-															- 5		
Checked by:       TD       IFA DS         Checked by:       TD       IFA DS																-		
Image: status       TD       IFA DS         Checked by:       TD       IFA DS         Status:       PRELIM       V1.01	-															-		
Image: Sample Recovery       Remarks:         Top (m) Base (m) Dia (mm) Recovery 3()       Remarks:         Top (m) Base (m) Dia (mm) Recovery 3()       Remarks:         Top (m) Base (m) Dia (mm) Recovery 3()       Remarks:         Top (m) Base (m) Dia (mm) Recovery 3()       Remarks:         Top (m) Base (m) Dia (mm) Recovery 3()       Remarks:         Top (m) Base (m) Dia (mm) Recovery 3()       Remarks:         Top (m) Base (m) Dia (mm) Recovery 3()       Remarks:         Top (m) Base (m) Dia (mm) Recovery 3()       Remarks:         Top (m) Base (m) Dia (mm) Recovery 3()       Remarks:         Top (m) Recover 3()       Remar																[		
Image: Checked by:     TD     IFA DS       Checked by:     TD     IFA DS	-															- 6		
Image: Checked by:     TD     IFA DS       Checked by:     TD																-		
Image: Checked by:       TD       IFA DS         Checked by:       TD       IFA DS         Checked by:       TD       IFA DS	-															[		
Image: Checked by:       TD       IFA DS         Checked by:       TD       IFA DS         Checked by:       TD       IFA DS																-		
Dynamic Sample Recovery     Remarks:       Top (m) [Base (m)]Dia (mm)Recovery %]     Remarks:       Dynamic Sample Recovery %]     Remarks:       Dynamic Sample Recovery %]     Striked depths below river bed. Obstructed on possible concrete at 1.1.60m. Borehole abandoned.       Checked by:     TD       Value     Strikes       Strike (m) Cased (m)Sealed (m) Time (mms) Rose to (m)     Remarks:       Top (m) Base (m) Dia (mm) Recovery %]     Fragmenta depths below.																		
Image: Checked by:       TD       IFA DS         Checked by:       TD       IFA DS         V0.101       V1.01																- '		
																-		
Dynamic Sample Recovery       Remarks:         Top (m) Base (m) Dia (mm) Recovery % Remarks       Priled from pontoon.         Strata depths below river bed.       Obstructed on possible concrete at 1.1.60m. Borehole abandoned.         Checked by:       TD         Image:																Ē		
Dynamic Sample Recovery       Remarks:         Dynamic Sample Recovery       Remarks:         Top (m) Base (m) Dia (mm) Recovery % Remarks       Orliled from pontoon.         Strata depths below river bed.       Obstructed on possible concrete at 1.1.60m. Borehole abandoned.         Water Strikes       Monitoring Installations         Strike (m) Cased (m) Sealed (m) Time (mins) Rose to (m)       Remarks         Checked by:       TD         IFA DS       v01.01																-		
	-															8		
Image: Sample Recovery       Remarks:         Top (m) Base (m) Dia (mm) Recovery %       Remarks:         Top (m) Base (m) Dia (mm) Recovery %       Remarks:         Strike depths below river bed.         Obstructed on possible concrete at 1.1.60m. Borehole abandoned.         Strike (m) Cased (m) Sealed (m) Time (mins) Rece to (m)         Remarks:         Top (m) Base (m) Dia (mm) Recovery %         Remarks:         Strike (m) Cased (m) Sealed (m) Time (mins) Rece to (m)         Remarks:         Top (m) Base (m)         Pipe Type         Dia (mm)         Checked by:         TD         IFA DS         V01.01																ŀ		
Image: Dynamic Sample Recovery     Remarks:       Top (m) Base (m) Dia (mm) Recovery %     Remarks:       Drilled from pontoon.     Strata depths below river bed.       Obstructed on possible concrete at 1.1.60m. Borehole abandoned.       Image: Decovery %     Top (m) Base (m) Dia (mm) Recovery %       Remarks:     Drilled from pontoon.       Strata depths below river bed.     Obstructed on possible concrete at 1.1.60m. Borehole abandoned.       Image: Decovery %     TD       Image: Decovery %     Image: Decovery %       Image: Decovery %     Remarks:       Drilled from pontoon.     Strike (m) Cased (m) Sealed (m) Time (mins) Rose to (m)       Remarks:     Top (m) Base (m)       Pipe Type     Dia (mm)       Vol.01     Vol.01	ŀ															-		
Dynamic Sample Recovery     Remarks:       Top (m) [Base (m)]Dia (mm)]Recovery %]     Remarks       Drilled from pontoon.     Strata depths below river bed.       Obstructed on possible concrete at 1.1.60m. Borehole abandoned.       Water Strikes     Monitoring Installations       Strike (m) [Cased (m)]Sealed (m)]Time (mins)]Rose to (m)     Remarks       Checked by:     TD       Log status:     PRELIM																[		
Dynamic Sample Recovery       Remarks:         Top (m) Base (m) Dia (mm) Recovery %       Remarks:         Drilled from pontoon.       Strata depths below river bed.         Obstructed on possible concrete at 1.1.60m. Borehole abandoned.       Strata depths below river bed.         Obstructed on possible concrete at 1.1.60m. Borehole abandoned.       Monitoring Installations         Strike (m) Cased (m) Sealed (m) Time (mins) Rose to (m)       Remarks         Obstructed on possible concrete at 1.1.60m. Borehole abandoned.       Dia (mm)         Strike (m) Cased (m) Sealed (m) Time (mins) Rose to (m)       Remarks         Top (m)       Base (m)       Pipe Type         Dia (mm)       V01.01       V1.01	-															- 9		
Dynamic Sample Recovery       Remarks:         Top (m) Base (m) Dia (mm) Recovery %       Remarks:         Drilled from pontoon.       Strata depths below river bed.         Obstructed on possible concrete at 1.1.60m. Borehole abandoned.       Strata lations         Strike (m) Cased (m) Sealed (m) Time (mins) Rose to (m)       Remarks         Checked by:       TD         IFA DS       v01.01	ł															Ē		
Dynamic Sample Recovery       Remarks:         Top (m) Base (m) Dia (mm) Recovery Remarks       Drilled from pontoon.         Strata depths below river bed.       Obstructed on possible concrete at 1.1.60m. Borehole abandoned.         Water Strikes       Monitoring Installations         Strike (m) Cased (m) Sealed (m) Time (mins) Rose to (m)       Remarks         Checked by:       TD         IFA DS       v01.01	-															ŀ		
Dynamic Sample Recovery     Remarks:       Top (m) Base (m) Dia (mm) Recovery % Remarks     Drilled from pontoon.       Strata depths below river bed.     Obstructed on possible concrete at 1.1.60m. Borehole abandoned.       Water Strikes     Monitoring Installations       Strike (m) Cased (m) Sealed (m) Time (mins) Rose to (m)     Remarks       Checked by:     TD       IFA DS     V01.01																-		
Dynamic Sample Recovery       Remarks:         Top (m) Base (m) Dia (mm) Recovery Remarks       Drilled from pontoon.         Strata depths below river bed.       Strata depths below river bed.         Obstructed on possible concrete at 1.1.60m. Borehole abandoned.       Monitoring Installations         Water Strikes       Monitoring Installations         Strike (m) Cased (m) Sealed (m) Time (mins) Rose to (m)       Remarks         Checked by:       TD         IFA DS       v01.01	-															- 10		
Water Strikes     Monitoring Installations       Strike (m) [Cased (m)]Sealed (m)]Time (mins) Rose to (m)     Remarks     Top (m)     Base (m)     Pipe Type     Dia (mm)       Checked by:     TD     IFA DS     v01.01	Top (m)	Dynar	nic S	ample Re	covery	Remarks	Remarks	i: pm.nonter	'n									
Ubstructed on possible concrete at 1.1.60m. Borehole abandoned.         Water Strikes       Monitoring Installations         Strike (m) [Cased (m)]Sealed (m)]Time (mins) [Rose to (m)]       Remarks       Top (m)       Base (m)       Pipe Type       Dia (mm)         Checked by:       TD       IFA DS         V01.01	10p (iff)  E	ase (III)	ום (ו	nin jrtecov	rciy 70	INCHIdIKS	Strata de	pths belov	w river	bed.	4 00 -							
Water Strikes     Monitoring Installations       Strike (m) [Cased (m)]Sealed (m)]Time (mins) [Rose to (m)]     Remarks     Top (m)     Base (m)     Pipe Type     Dia (mm)       Checked by:     TD     IFA DS     v01.01     V01.01     V01.01     V01.01							Obstructe	ea on pos	sible co	oncrete at 1.	1.60m. Bore	enole aband	oned.					
Strike (m)         Cased (m)         Sealed (m)         Rese to (m)         Remarks         Top (m)         Base (m)         Pipe Type         Dia (mm)           Checked by:         TD         IFA DS         v01.01         v01.01 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Water</td> <td>Strikes</td> <td></td> <td></td> <td>N/</td> <td>onitoring</td> <td>Insta</td> <td>llations</td> <td></td>										Water	Strikes			N/	onitoring	Insta	llations	
Checked by:     TD     IFA DS       Log status:     PRELIM     v01.01							Strike (m)	) Cased (n	n) Seale	d (m) Time (m	ins) Rose to (	m) Re	marks	Top (m) B	ase (m)	Pipe	Туре	Dia (mm)
Checked by: ID IFA DS Log status: PRELIM v01.01		-1 L T		TE														
	Log sta	u by: atus:		PRELIM	-+	IFA DS v01.01												

			Plant used:	Project:				Loca	tion ID:				
	AN FA	RMER	Coma Dates:	acchio 2	205		Manchester Northern	Gateway Flood Defence	and Alleviation	Works		RE	09
	13300	IAIES	15/	/12/202	1			Volker Stevin			0		
Dynam	ic Sam	plina	Location:				Ground level:	Logged by:	Vertical scale:		Proje	ct ID:	
and Rota	ary Bori	ng Log	384292.27	7E 3992	227.78N		25.68mOD	CG	1:50			2230	502
	Samples	& In Situ T	esting	Level	Depth (m)		Strata D	etails				Grou	Indwater Backfill/
Depth	Sample ID		lest Result	(mOD)	(Thickness)	No ree	Strat	a Description		Legend	5	Strike	Installation
						Driller	notes sampler on susp	ected cobble at 0.20m.			Ē		
					(1.00)						Ē		
-			1.00m - SPT(S) 50	24.68	1.00	No ree	covery.				1		
	0		(3,3/50 for 175mm)			Driller	notes cobble stuck in s	hoe.			Ē		
1.00 - 2.00	0	NR			(1.00)								
-				23.68	2.00	Weak	, reddish brown, thickly	bedded, fine to coarse	grained	::::	2		
		6			(0.90)	space	ed, tight and wide, clean.	(2) 0 - 10 degrees, closed	sely spaced,				
	93	0			(0.30)	wide v	with a soft sandy infill, ur	ndulating rough.			Ē		
2.00 - 3.50	93 60	NI		22.78	2.90	Extrer	mely weak reddish brow	vn weathered SANDS	ONE with	· · · · · ·			
				22.68	3.00		e rounded gravel of san	dstone and quartz.			- 3		
-		8			(0.55)	SAND	STONE. Discontinuities	s are 1) 0-5 degrees, c	losely				
		NI		22.13	3.55 3.75	Extrer	mely weak, reddish brow	vn, thickly bedded, fine	to coarse		Ē		
-		8				degre	es, closely spaced, tight	and wide, clean. 2) 0	· 10 degrees,		4		
3.50 - 5.00	100 83					Weak	y spaced, wide with a so , reddish brown, thickly	bet sandy infill, undulation bedded, fine to coarse	ng rough. grained				
	50					SAND space	OSTONE. Discontinuities ed, tight and clean. 2) 0 -	s are 1) 0 - 5 degrees, · 5 degrees, wide with a	closely a soft sandy		-		
						infill, u	undulating rough.				Ē		
-					(2.75)					· · · · · ·	5		
		5			(2.75)								
	100												
5.00 - 6.50	100 90												
											6		
				19.18	6.50		End of Bo	orehole at 6.50m			Ē		
- - -													
											8		
											-		
											Ē		
: 											- 9		
											E		
	TCR/SCR/RQD	FI	Samples & Tests	Domest							- 10		
Top (m) Bas	e (m) Dia	(mm) Reco	ecovery wery % Remarks	Drilled fro	om pontoc	n.							
				Strata de	pths belov	w river	bed.						
				SPT Han	nmer: N/R	, Energ	gy Ratio: N/R						
				Strike (m)	) Cased (m	1) Seale	Water Strikes d (m) Time (mins) Rose to (n	n) Remarks	M Top (m) B	onitoring ase (m)	Insta Pipe	llations Type	Dia (mm)
											·		/
Checked t	oy: s:		IFA DS v01.01										
	·			1									

Image: Note of the set of the se				Plant used:					Project:					Loca	tion ID:	
ASSOCIATES         Determining         Control         Statution         Statution           Rotary Developed Log         Leasen         Statution         Truzzola         Volker Stevin         Statution         Statution         Statution         Statution         Statution         Statution         Statution         Truzzola         Statution         Lagge by: Statution         Ventical statution         Sta	6	IAN FA	RMER	(	Coma	acchio 2	205		Manchester Northern	Gateway Flood	Defence	and Alleviatior	Works			00
Interview         Under Steven         Description         Description <thdescription< th=""> <thdescription< th=""></thdescription<></thdescription<>		ASSOC	IATES	Dates:					Client:							UA
Column desc         Column desc <thcolumn desc<="" th=""> <thcolumn desc<="" th=""></thcolumn></thcolumn>					17/	12/202	1			Volker S	tevin			Shee	et 1 of 1	
Depine E.og         334/247/26 39/247.30%         23.000/2         0.05         1.90         22.000/2         22.000/2           Original Particle IN Reference         Image: State Addition         State Addition         Image: State Addit		Rotary		Location:	00.00		04.001		Ground level:	Logged by:		Vertical scale		Proje	ect ID:	500
During the set of 1 and part of the set of	Bo	rehole L	og nlag å læ S	3842	99.ZI	JE 3992	24.991		25.80mOD	CG		1:50	J		2230	502
No         Image: Control of the second	Depth	TCR/SCR/	FI	Samples & Test F	Result	Level	Depth (m)		Strate	a Description			Legend		Water	Backfill/
1.00 - 1.30       0       0.41       NR         1.00 - 1.30       NR       23.80       2.00       NR       1.00 - 0.00       1.00         1.00 - 1.30       NR       23.80       2.00       NR       1.00 - 0.00       1.00		RQD				(mOD)	(Thickness)	Pushi	ing cobbles. No recovery	y.				-	Strike	Installation
1.00 - 1.30       OH         1.00 - 1.30       OH         1.00 - 1.30       NR         1.00 - 1.30       NR         1.00 - 1.30       NR         1.00 - 1.30       NR         2.00 - 1.30       S         0.100 - 1.30       NR         2.00 - 1.30       S         0.100 - 1.30       NR         2.00 - 1.30       S         0.100 - 1.30       S         0.100 - 1.30       S         0.100 - 1.30       S         1.30 - 1.50       S         0.300 - 5.00       S <td></td> <td>F</td> <td></td> <td></td>														F		
100 - 100       0       0         1.00 - 200       1       NR         1.00 - 200       1       NR         1.00 - 200       1       NR         2.00 - 3.00       0       1         0       0       1       1         2.00 - 3.00       0       1       1         0       0       1       1       1         2.00 - 3.00       0       1														-		
100 - 130     0     1     N     1														ļ		
1.00 - 1.30       OrH         1.30 - 2.00       NR         1.30 - 2.00       NR         2.00 - 3.00       A         2.00 - 3.00       A         2.00 - 3.00       A         3.00 - 5.00       B         2.00 - 5.00       B         3.00 - 6.00       B         3.00 - 6.00       B         3.00 - 6.00       B				-			(2.00)							-1		
1.30 - 2.00       NR       NR       NR       NR       NR         2.00 - 3.00       873       8       Another intervention of the second boown, mixely bedded, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees, dooley spaced, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees, dooley spaced, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees, dooley spaced, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees, dooley spaced, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees, dooley spaced, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees, dooley spaced, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees, dooley spaced, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees, dooley spaced, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees, dooley spaced, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees, dooley spaced, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees, dooley spaced, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees, dooley spaced, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees, dooley spaced, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees, dooley spaced, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees, dooley spaced, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees, dooley spaced, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees, dooley spaced, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees, dooley spaced, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees, dooley spaced, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees, dooley spaced, fire to coarse gained SANDSTONE. Discontinuities are 0.5 degrees degrees recent are to coarse gained SANDSTONE. Disconted Totargained SANDS	. 1.00 - 1.3	0	ОН											Ē		
1.30 - 2.00       NR       NR       A         2.00 - 3.50       PT       8       2.30       2.00       Moderately strong, greenesh prey, fire and medium grained       2.222       SMORSTONE Cobbin       2.202       SMORSTONE Cobbin														-		
Image: state in the s	1.30 - 2.0	0	NR											F		
2.00 - 3.50         ST 3.60         N         23.60         2.00         Monorately service, generate SANDSTONE. Discontinuities are 0 - 5 degrees, alonely spaced, ight and wide, clean.         -						23 80	2 00							-2		
2.00 - 3.50         97 40         8 8         40			NI	-		23.60	2.20	Mode SANE	rately strong, greenish g DSTONE cobble.	grey, fine and n	nedium gi	rained				
2.00 - 3.0       87/40       8         40       8         3.50 - 5.0       100         57       4         20.80       5.00         End of Borehole at 5.00m       5         Field Details       5         1.00       5.0         Field Details       5         1.00       5.0         Field Details       5         Field Details								Weak	, reddish brown, thickly	bedded, fine to	coarse g	grained		E		
2.00       3.50		87	8					tight a	and wide, clean.	ale o - o degi	003, 003	ciy spacea,		È.		
3.50 - 5.00     100 57     4     20.80     5.00     End of Borehole af 5.00m     4       20.80     5.00     End of Borehole af 5.00m     6     7       1     1     1     1     1     1       1     1     1     1     1     1       1     1     1     1     1     1       1     1     1     1     1     1       1     1     1     1     1     1       1     1     1     1     1     1       1     1     1     1     1     1	. 2.00 - 3.5	40												-		
3.50 - 5.00     100 107 107 4     4       3.50 - 5.00     100 107 10     4       20.80     5.00       End of Barehole at 5.00n       Image: State additional state	-													- 3		
3.50 - 5.00         100 57         4         20.80         5.00         End of Borehole at 5.00m         5         6           -<														-		
3.50 - 5.00       100 57       4       20.80       5.00       End of Borehole at 5.00m       5       6         1       1       1       1       1       6       6       6         1       1       1       1       1       6       6       7       6         1       1       1       1       1       1       1       6       1       7         1			8				(2.80)							-		
3.50 - 5.00       100 107 107 107 100       1 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td></td><td></td></t<>														-		
3.50 - 5.00       100       57       4       20.80       5.00       End of Borehole at 5.00m       5       5         Image: Second S	-	100		-										- 4		
0     4       20.80     5.00       End of Borehole at 5.00m     5       -     - <td>3.50 - 5.0</td> <td>0 100</td> <td></td> <td>Ē</td> <td></td> <td></td>	3.50 - 5.0	0 100												Ē		
Image: Checked by:     Top (m) [Base (m) Fluich Type  Fluich Reum %]     Bornhole Dameter     Boring Progress     Remarks:       Top (m) [Base (m) Fluich Type  Fluich Reum %]     Depth (m) [Dis (mm) ]     Date     Tom (m) State (m) [State (m) ]       Checked by:     Top (m) [State (m) ]     Top (m) [State (m) ]     Top (m) [State (m) ]	-	57	4											-		
Plush Details     Borehole Diameter     Depth (m) Clease (m) State (m) Clease (m) Clea														-		
Top (m) [Base (m)] Fluch Return %       Borehole Diameter       Boring Progress       Remarks:       -						20.80	5.00		End of B	orehole at 5.00	m			5		
Fund Details       Boendad Diameter       Boring Progress       Remarks:       -														-		
Top (m) [Base (m)] Plush Type Flush Return % Borehole Diameter       Boring Progress       Remarks:         Top (m) [Base (m)] Plush Type Flush Return % Depth (m)[Dia (mm)]       Date       Tom (Diased (m)] Water (m)]         Strata depths below river bed.       Casing Diameter       Water Strikes       Monitoring Installations         Checked by:       Top (m) [Base (m)] Flush Type Type (m)]       Strike (m)]Cased (m) [Strike (m)]Cased (m) [Strike (m)]Cased (m)]       Water Strikes       Monitoring Installations	-													E		
Top (m) [Base (m)] Flush Return %       Borehole Diameter       Boring Progress       Remarks:         Top (m) [Base (m)] Flush Return %       Depth (m) [Dia (mm)       Date       Time       Depth (m) [Cased (m)] Water (m)         1.00       5.00       Air mist       Depth (m) [Cased (m)] Sealed (m)] Time (mm) Proze to (m)       Bremarks:       Top (m) [Base (m)] Privater bol.         Checked by:       Top (m) [Base (m)] Strike (m)] Cased (m) [Sealed (m)] Time (mm) Prices to (m)       Remarks:       Top (m) [Base (m)] Privater bol.														ŀ		
Fluch Details       Borehole Diameter       Boring Progress       Remarks:         Top (m) [Base (m) Fluxh Type ] Fluxh Return %       Depth (m)[Dia (mm)       Date       Time [Depth (m)[Cased (m)] Water (m)]         Drifted from pontoon.       Strikta depths below river bed.       Strikta depths below river bed.         Checked by:       Top (m) [Base (m)] Fluxh Type ] Fluxh Return %       Depth (m)[Cased (m)] Water Strikes       Monitoring Installations	-													6		
Image: Second Details       Borehole Diameter       Boring Progress       Remarks:         Top (m)       Base (m)       Flush Return %       Depth (m)       Date       Time       Depth (m)       Cased (m)       Water Strikes       Monitoring Installations         1.00       5.00       Air mist       Image: Cased (m)       Strike (m)       Cased (m)       Water Strikes       Monitoring Installations         Checked by:       Top (m)       Base (m)       Strike (m)       Cased (m)       Water Strikes       Monitoring Installations         Checked by:       Top (m)       Strike (m)       Cased (m)       Strike (m)       Top (m)       Base (m)       Pielow														[		
Flush Details       Borehole Diameter       Boring Progress       Remarks:         Top (m)       Base (m)       Flush Type       Flush Return %       Depth (m)[Dia (mm)         1.0       5.00       Air mist       Casing Diameter       Water Strikes       Monitoring Installations         Checked by:       Top (m)       Base (m)       Flush Type       Flush Return %       Depth (m)[Dia (mm)       Date       Time         Checked by:       Top       Water Strikes       Monitoring Installations	-													F		
Image: Section of the section of th	ŀ													Ē		
Image: Strike (m) Cased (m) Strike (m) Ca														- 7		
Plush Details       Borehole Diameter       Boreho														ŀ .		
Flush Details       Borehole Diameter       Borehole Diameter       Boring Progress       Remarks:         Top (m) [Base (m) [Fush Neturn % Depth (m)]Dia (mm)       Date       Time       Depth (m)[Cased (m) [Water (m)       Drilled from pontoon.         1.00       5.00       Air mist       Casing Diameter       Water Strikes       Monitoring Installations         Checked by:       Top (m) [Base (m)]       If ARC       Vater Strikes       Top (m) [Base (m)]       Monitoring Installations	-													E		
-       -       -       -       -       -       -       -       -       -       8       -       -       8       -       -       8       -       -       8       -       -       8       -       9       -       9       -       9       -       9       -       10       10       -       10														-		
Flush Details       Borehole Diameter       Boring Progress       Remarks:         Top (m)       Base (m)       Flush Return %       Depth (m)[Dia (mm)         1.00       5.00       Air mist       Depth (m)[Dia (mm)         Checkled by:       Top       IFARC       Casing Diameter       Water Strikes       Monitoring Installations         Checkled by:       Top       IFARC       Value       Top (m)       Base (m)       Pipe Type														F _		
Image: Second State Strikes       Image: Second Strike Strikes       Image: Second Strike Strikes       Monitoring Installations         Checked by:       To       IFARC       V101       IFARC       V101	-													8		
Image: Second														ŀ		
-       -       -       -       -       -       -       -       9       -       9       -       9       -       9       -       9       -       10       10       10       10	-													Ē		
Image: Status:       Flush Details       Borehole Diameter       Boring Progress       Remarks:         Top (m)       Base (m)       Flush Type       Flush Return %       Depth (m)         Dog (m)       Base (m)       Flush Return %       Depth (m)       Diameter       Boring Progress         Top (m)       Base (m)       Flush Return %       Depth (m)       Diameter       Boring Progress       Remarks:         Top (m)       Base (m)       Flush Return %       Depth (m)       Diameter       Boring Progress       Remarks:         Top (m)       Base (m)       Flush Return %       Depth (m)       Diameter       Water Strikes       Monitoring Installations         Casing Diameter       Water Strikes       Monitoring Installations       Top (m)       Base (m)       Pipe Type       Dia (mm)         Checked by:       TD       IFA RC       V01.01       V01.01       V01.01       V01.01       V01.01       V01.01														-		
Image: Second State       Image: Second State<	-													- 9		
Image: Second State       Image: Second State       Borehole Diameter       Boring Progress       Remarks:         Top (m)       Base (m)       Flush Type       Flush Return %       Depth (m)       Date       Time       Depth (m)       Cased (m)       Water (m)       Drilled from pontoon.         1.00       5.00       Air mist       Example of the mission of the missi														Ē		
Flush Details     Borehole Diameter     Boring Progress     Remarks:       Top (m) Base (m)     Flush Type     Flush Return %     Depth (m)/Dia (mm)     Date     Time     Depth (m)/Cased (m)     Water (m)     Drilled from pontoon.       1.00     5.00     Air mist       Casing Diameter     Water Strikes     Monitoring Installations       Casing Diameter     Depth (m)/Dia (mm)     Strike (m)/Cased (m)/Sealed (m)/Time (mins)/Rose to (m)     Remarks     Top (m)     Base (m)     Pipe Type     Dia (mm)	-													-		
Flush Details       Borehole Diameter       Boring Progress       Remarks: Drilled from pontoon.         1.00       5.00       Air mist       Depth (m)[Dia (mm)       Date       Time       Depth (m)]Cased (m)       Water (m)         1.00       5.00       Air mist       Casing Diameter       Water Strikes       Monitoring Installations         Checked by:       TD       IFARC       V10.01       IFARC       V10.01														-		
Flush Details       Borehole Diameter       Boring Progress       Remarks:         Top (m)       Base (m)       Flush Type       Flush Return %       Depth (m)       Date       Time       Depth (m)       Cased (m)       Water (m)       Drilled from pontoon.         1.00       5.00       Air mist	_			-										- 10		
1.00     5.00     Air mist     Casing Diameter     Water Strikes     Monitoring Installations       Checked by:     TD     IFARC     V1.01     V1.01     V1.01	Top (m) B	Flush ase (m) Flus	Details sh Tvpe   I	-lush Return %	Boreh Depth	ole Diame (m) Dia (m	er m) Dat	te	Boring Progress Time Depth (m) Cased (r	n) Water (m)	Remarks: Drilled fro	m pontoon				
Casing Diameter     Water Strikes     Monitoring Installations       Depth (m) Dia (mm)     Strike (m) Cased (m) Sealed (m) Time (mins) Rose to (m)     Remarks     Top (m)  Base (m)  Pipe Type  Dia (mm)       Checked by:     TD     IFARC     V01.01	1.00	5.00 Ai	r mist		- 11 1		., Da	- 1		,	Strata de	oths below riv	er bed.			
Casing Diameter     Water Strikes     Monitoring Installations       Depth (m) Dia (mm)     Strike (m) Cased (m) Sealed (m) Time (mins) Rose to (m)     Remarks     Top (m)     Base (m)     Pipe Type     Dia (mm)       Checked by:     TD     IFA RC     v01.01     v01.01     v01.01     v01.01     v01.01																
Casing Diameter Water Strikes Monitoring Installations           Casing Diameter         Water Strikes         Monitoring Installations           Depth (m) Dia (mm)         Strike (m) Cased (m) Sealed (m) Time (mins) Rose to (m)         Remarks         Top (m)         Base (m)         Pipe Type         Dia (mm)           Checked by:         TD         IFA RC         V01.01         V				F	<u> </u>	<b>D</b> :			<b>y = -</b>			I				
Checked by: TD IFARC Log status: PREIM V01.01				Ī	Casir Depth (	ig Diamete (m) Dia (m	er m) Strike	(m) Case	Water Stril ed (m) Sealed (m) Time (mins)	kes Rose to (m)	Remarks	s Top (	Monito m) Base (	ng In: m) P	stallatior	is Dia (mm)
Checked by: TD IFA RC Log status: PRELIM V01.01																
	Checked	d by: tus: ₽	TD RELIM	IFA RC v01.01												

			Plant used:	2000		achia (	005	Project:				al Allassiations	A/	Locat	ion ID:	
	ASSOC		Dando Dates:	2000	/Comm	achio 2	205	Client:	ortnern C	Jateway Floo	d Defence ar	nd Alleviation	VVOrks	-	RE <sup>r</sup>	11
	A3300	AILS	12/1	0/202	21 - 13/ <sup>,</sup>	10/2021				Volker S	Stevin			Ohaa	4 - 60	
Cable	Percus	sion	Location:					Ground level:	L	_ogged by:	V	ertical scale:		Proje	ct ID:	
and Rot	ary Bori	ng Log	3843	872.07	7E 3992	297.25	١	30.37mO	D	OG/C	G	1:50			2230	502
	Samples	& In Situ Te	esting		Level	Denth (m)		:	Strata De	tails					Grou	ndwater Backfill/
Depth	Sample ID		lest Result		(mOD) 30.27	(Thickness)	MADE	GROUND: Loo	Strata	arev mottled	d black and r	red, sandv		5	Strike	Installation
0.20	ES1 B2					(0.45)	GRAV	EL. Gravel is ve	ry angula	ar to angular	, fine to coa	rse		ŧ		
0.50	ES3				29.82	0.55	MADE	E GROUND: Red	ldish bro	wn, sandy G	RAVEL with	occasional		ŧ		
						(0.35)	includ	es. Gravel is very ing red brick and	/ angula l mortar.	r to subangu Cobbles are	e very angula	oarse ar to				
0.90 - 1.20 1.00	B4 ES5				29.47	0.90	angula MADE	ar (63-210mm) re E GROUND: Con	ed brick. crete sla	ab recovered	l as grey gra	ivel/		-1		
1.20 1 20 - 1 70	B6	SPT(S) N	I=43 (5,7/6,7,	15,15)			cobble are ve	es. Gravel is very erv angular (63-1	/ angula 50mm) o	r to angular, concrete (bre	fine to coars ak out of co	se. Cobbles				
	20					(1 = 0)	slab).		k mottle	, d red slight	ly gravelly s					
1 85	D7					(1.50)	Grave	l is very angular,	fine to c	coarse includ	ling concrete	e and				
2.00	5.	SPT(S) N	l=18 (2,4/5,6,	5,2)			CIINKE	r (black ash).						2		
2.00	E58 D10				07.07	0.40										
2.00 - 2.50 B9 MADE GROUND: Black mottled red, gravelly, silty SAND. Gra 2.75 D11 (2.75) 2.40 MADE GROUND: Black mottled red, gravelly, silty SAND. Gra											ID. Gravel		-			
2.75	D11					(0.80)		, ungului, into to	oouroo i	including rod	briok.					
3.00	E 6 1 0	SPT(S) N	I=8 (3,5/3,1,2	,2)										3		
3.00 - 3.45	D14				27.17	3.20	MADE	GROUND: Re	ddish bro	own mottled	grey GRAVE	EL. Gravel				
3.00 - 3.50	B13				26.87	3.50	is very	/ angular to angl r.	llar, fine	to coarse in	cluding brick	( and/				
3.75	D15					(0.50)	MADE very a	E GROUND: Dar Ingular to angula	k brown, r, fine to	sandy, silty coarse inclu	GRAVEL. G Iding brick.	ravel is		E		
4.00	ES16	SPT(S) N	I=6 (1,1/2,1,2	,1)	26.37	4.00	Loose	, brown, slightly	gravelly,	silty SAND.	Gravel is su	ıbangular		4		
4.00 - 4.45	D18						to sub	rounded, fine an	d mediu	m of mixed I	ithologies.		× × × × ×			
4.00 - 4.50													× × × × ×			
4.75	D19					(1.60)							× × × × ×			
5.00 - 5.45	D21	SPT(S) N	I=4 (1,1/1,1,1	,1)									× × × ×	5		
5.00 - 5.50	B20												× ×××			
					24.77	5.60	Loose	brownish arev.	sandv G	RAVEL. Gra	avel is angul	ar to well	Âx XÎ			
5.75	D22						round	ed, fine to coarse	e of mixe	ed lithologies	i.			Ē		
- 6.00 6.00 - 6.45	D24	SPT(S) N	l=17 (4,5/7,6,	2,2)		(1.10)								6		
6.00 - 6.50	B23															
6.75	Dae				23.67	6.70	0.00				<u></u>					
7.00	DZ5		1-18 (2 2/2 5	5 6)		(0.40)	organi	ic odour. Gravel	avelly, si is suban	igntly sandy igular to sub	CLAY with s rounded of r	nixed		- 7		
7.00 - 7.45	D27		-10 (2,2/2,0,	0,0)	23.27	7.10	Mediu	gies. Im dense, reddis	h brown	, fine to coar	se SAND.					
1.00 - 7.50	620					(0.70)										
7.00	D00				00 F7	7.00										
8.00	D20	SPT(S) N	I=33 (4.7/7.8.)	9.9)	22.57	7.00	Reddi	sh brown GRAVI m and coarse in	EL. Grav cluding v	vel is very an weak sandst	gular to ang one.	ular,		8		
8.00 - 8.45 8.00 - 8.50	D29 B30		(,,,,						5							
-						(1.20)										
8.75	D31													E.		
8.90	D32	1	9 00m - SPT	(S) 50	21 37	9.00	Verv	lense light grev	to dark (		I Gravel is			9		
	100		(25 for 75mm	/50	21.27	9.10	subrou	unded, coarse to	very co	arse includir	ig schist and	l igneous				
9.00 - 10.50	D 90	7	9.00m - D33			(1.60)	Weak	, reddish brown f	ine to m	edium graine	ed SANDST	ONE.				
	40		9.57m - C				Bet	ween 9.10 and 10.7	ony ciose '0m: occa	sional weather	ing to very we	ə sanu intill. ak				
E	TCR/SCR/RQD	FI	9.72m - C 10.@@mplesC& T	ests					Continu	ed next shee	t	·····		- 10		
From (m) To	Chis o (m) Tim	elling e (mins)	Remarks	Boreh Depth	ole Diame (m) Dia (m	ter m) Da	te	Boring Progre Time Depth (m)	ess Cased (m	) Water (m)	Remarks: Inspection	pit dug to 1.2	0m.			
8.90 9	9.00	60		9.00	) 150 0 122	12/	10 1 10 0	17:00 9.00 )8:00 9.00	9.00	6.30			-			
						13/	10 1	4:00 12.00	9.00	5.10	0.00					
				Casir	ng Diamete	er		W	ater Strike	es	SPTHamm	ner: N/R, Ene	ergy Rati Monito	o: N/R ring Ins	tallation	s
				Depth 9.00	(m) <mark> Dia (m</mark> ) 150	m) Strike 5.00	(m) Case 0 4.3	d (m) Sealed (m) Tin 30	ne (mins)F 20	Rose to (m) 4.50	Remarks	Top (m	i) Base (	m) Pi	ре Туре	Dia (mm
Checked	by:	RC	IFA CP													
Log statu	US: P	RELIM	v01.01													

			Plant used:					Project:					Locat	tion ID:	
-	IAN FA	RMER	Dando	2000	/Comm	achio 2	205	Manchester Norther	n Gateway Floo	od Defence	and Allevia	tion Works		РΕ	44
	ASSOC	IATES	Dates:					Client:					1	RE	11
-			12/1	0/202	21 - 13/1	10/2021			Volker S	Stevin			Shee	t 2 of 2	
			Location:					Ground level:	Logged by:		Vertical so	ale:	Proje	ct ID:	
Rota	ry Boring	l Log	3843	372.07	7E 3992	297.25N	1	30.37mOD	OG/0	CG	1	:50		2230	502
	Coring, Sam	ples & In S	itu Testing					Strata	Details					Grou	undwater
Depth	TCR/SCR/ RQD	FI	Samples & Test	Result	Level (mOD)	Depth (m) (Thickness)		Str	ata Description			Legend		Water Strike	Backfill/ Installation
-			10.14m - C				Weak	, reddish brown fine to	medium grain	ed SANDS	STONE.		Ē		
						1	Fractu	ures are 0-70°, very cio	osely spaced, t	ignt with ra	are sand in		Ē		
-		1	10.56m - C			1							Ē	ĺ	
			10.04m 0		19.67	10.70	Weak	, reddish brown, slight	ly gravelly SAN	DSTONE	. Gravel is		ŧ		
_			10.64m - C			1	suban	igular to subrounded, f	fine to coarse i	ncluding q	uartz,	ad	- 11		
10.50 -	100		11.12m - C			1	tight a	and locally wide with a	soft, sand infill		sely space	eu,			
12.00	47	7				(1.30)									
			11 68m - C			1							Ē		
			11.79m - C			1									
:			-		18.37	12.00		End of E	Borehole at 12.0	00m			12		
						1									
E .						1							Ē	ĺ	
						1									
						1									
						1							- 13		
						1									
-						1									
						1									
-						1							- 14		
						1									
						1							Ē		
						1									
						1									
-						1							15		
						1									
-						1									
						1									
-						1							16		
						1									
						1									
Ē						1									
						1									
-						1							- 17		
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						1							Ē		
						1									
						1									
-						1							- 18		
						1									
-						1									
						1									
						1							10		
						1							19		
						1									
				ļ									Ē		
				ļ											
<u>-</u>			-	ļ									- 20		
Top (m-)	Flush	Details	luch Beturn 0	Boreh	ole Diamet	ier	to	Boring Progress	(m) Materia	Remarks:			<u> </u>	·	L
12.00	ase (m)   Flus 9.00 V	sn rype   I Vater	-iusn Return %	uepth (	.m) Dia (m	m) Dat	le	inne jueptn (m) Cased	(m) vvater (m)	-					
										SPT Har	nmer: N/R	. Enerav Rati	o: N/F	ł	
				Casir	ig Diamete	ər		Water St	rikes			Monito	ring Ins	stallation	IS
				Depth (	m)Dia (m	m) Strike (	(m) Case	ed (m) Sealed (m) Time (min	s)Rose to (m)	Remark	s To	op (m)  Base (	_m)  Pi	ре Туре	Dia (mm)
Obs. 1	al las u														
Log sta	a by: itus: P'	RELIM	IFA RC v01.01												

			Plant used:				Project:				Locati	on ID:	
	AN FA	RMER	Comr	nachio	205		Manchester Northern	Gateway Flood Defence a	and Alleviation	Works		DE	12
	SSOC	IATES	Dates:				Client:						14
			29/11/202	21 - 30/	11/2021		Ground level:		Vertical scale:		Sheet	1 of 2	
Dynam	ic Sam	pling	384367.29	9E 3992	277.56N	I	29.83mOD	CG	1:50		riojec	2230	502
	Samples	& In Situ Te	sting			-	Strata De	etails				Grou	ndwater
Depth	Sample ID		Test Result	Level (mOD)	Depth (m) (Thickness)		Strat	a Description		Legend		Water Strike	Backfill/ Installation
0.35	B2 ES1			29.76 29.68 29.33	0.07 0.15 (0.35) 0.50	MADE MADE beddii	E GROUND: Block pavin E GROUND: Yellowish b ng SAND. Gravel is suba e including sandstone.	ng. rown, slightly gravelly, fi angular to subrounded,	ine to coarse fine to				
0.80 0.80	B4 ES3			29.18	0.65	MADE Grave MADE	E GROUND: Yellowish b el is angular, fine to coars E GROUND: Concrete sl	rown, gravelly, fine to co se including bricks and s lab.	oarse SAND. sandstone.		4		
1.20 1.20 1.20	B6 ES5	SPT(S) N	=10 (2,2/2,2,3,3)			MADE SAND	E GROUND: Loose, darł ).	< brown, very silty, fine a	and medium				
- 2.00		SPT(S) N	=14 (2,1/2,3,6,3)		(3.05)						2		
- 3.00		SPT(S) 2 150mm)	(1 for 75mm/2 for								3		
4.00		SPT(S) N	=7 (2,1/2,1,2,2)	26.13 25.83	3.70 (0.30) 4.00	Loose	e, brownish black, very s	ilty, fine and medium SA	AND.		- 4	▼	
					(0.50)								
				25.33	4.50	Mediu SAND	ım dense, brownish grey ).	ι, slightly silty, fine and r	nedium	× × × × × × ×			
					(1.00)						5		
5.50		SPT(S) N	=27 (3,5/5,7,7,8)	24.33	5.50	Mediu SAND	ım dense, reddish browr ). Gravel is rare subroun	n, slightly clayey, fine an ded, fine grained igneoi	d medium us noted.		6		
6.50		SPT(S) N	=36 (6,8/10,9,7,10)	23.33	6.50	No rec	covery Advancing through	ah dense coarse soil str	rata		0		
						Becor	ning very dark brown wi	th depth.	ala.		-7		
7.50		SPT(S) N: (9,11/10,1	=49 2,12,15)		(1.50)								
8.00 - 9.00	7 7 7 7	NR (	8.00m - SPT(S) 50 (11,13/50 for 120mm)	21.83	8.00 (0.90)	Dense GRAV cobble	e, greyish brown, subang /EL with rare subangular es are grey, fine grained	gular to subrounded, fin r to subrounded cobbles igneous lithologies.	e to coarse a. Gravel and		8		
			9.00m - SPT(S) 50 (25 for 45mm/50 for 55mm)	20.93 20.83	8.90 9.00	Weak SAND Extrer	, reddish brown, thickly l STONE. Weathered an nely weak, reddish brow	bedded, fine and mediu d coated in reddish clay /n, fine and medium gra	m grained ey sand. / ined		9		
9.00 - 10.50	66 40 17	NI	,	19.98	(0.85) 9.85	Weath	reddish brown thickly i	hedded fine and mediu	marained				
	TCR/SCR/RQD	FI	Samples & Tests	<u> </u>		vveak	Continu	ued next sheet	m yraineu		- 10		
Top (m)         Base           1.20         2.           2.00         3.           3.00         4.	Dynamic S e (m) Dia ( 00 00 00	Sample Re (mm) Recov 6 10 10	covery /ery % Remarks 0 00 00	Remarks	s: n pit dug t	to 1.20r	m.						
				SPT Har	nmer: N/F	k, Energ	gy Ratio: N/R Water Strikes	A) Dome l	M	onitoring	Instal	lations	Dia (=)
Checked b	y:	RC	IFA DS	4.00	)  Cased (n	n) Seale	a (m)  11me (mins)   Rose to (n 20 4.00	וון Remarks	0.00 0.50	ase (m)   0.50 3.50	Pipe Pla Slot	iype ain tted	<u>ו טום (mm)</u> 50 50
Log status	s:	PRELIM	v01.01										

			Plant used:				Project:						Locat	ion ID:	
	AN FA	RMER	Con	machio	205		Manchester No	orthern G	Sateway Flood	Defence an	d Alleviation	Works		DE	10
	ASSOC	IATES	Dates:				Client:							ΚE	12
			29/11/20	21 - 30/	11/2021				Volker S	tevin			Shee	t 2 of 2	
Potory	Boring		Location:				Ground level:	L	ogged by:	Ve	ertical scale	:	Proje	ct ID:	
Rotary	Bonng	LUY	384367.	29E 3992	277.56N		29.83mOI	D	CG		1:50	)		2230	502
C	oring, Sam	oles & In S	itu Testing	Level	Depth (m)		S	Strata De	tails			1		Grou	Indwater Backfill/
Depth	RQD	FI	Samples & Test Resul	(mOD)	(Thickness)	Wook	roddich brown t	Strata	Description	nd modium	grainod	Legend	-	Strike	Installation
						weath	ered SANDSTON	NE. Disc	continuities a	e 0-10°, clo	sely		-		
		8			(1.00)	space throug	d, undulating rough	gh, tight	t. A soft sand	y infill peneti	rating				
							<b>.</b>								
	100			18.98	10.85	Extrer	nely weak, reddis	sh browr	n, fine and m	edium graine	ed				
<del>1</del> 0.50 - 11.50	43 26	NI		18.63	(0.35)	weath	ered SANDSTON	NE. Bou	nd by a soft,	slightly claye	ey sand.		- 11		
		6		10.00	(0.30)	Extrer	nely weak, reddis	sh browr Discont	n, thickly bed tinuities are (	ded, fine and -8° closely	d medium spaced				
-		NI		18.33	11.50	tight,	undulating rough,	soft sa	ndy infill.						
	100			18.03	11.80	weath	nely weak, reddis iered SANDSTON	sh browr NE.	n, fine and m	edium graine	ed				
<del>1</del> 1.50 - 12.50	47					Weak	, reddish brown, t	hickly b	edded, fine a	nd medium	grained		12		
	0					soft, s	andy infill.	munics	aie 0-10 , lig	ni, unuulain	ig rougn,				
		10			(1.15)										
													-		
12.50 -	100			16.88	12.95	Extra	nely wook roddin	h brow	n fine and m	edium arain	əd	· · · · · ·	- 12		
13.50	0	NI			(0.55)	weath	ered SANDSTON	NE. Bou	nd by a soft,	slightly claye	ey sand.				
				10.00	(0.00)										
				10.33	13.50		En	d of Bor	ehole at 13.50	)m					
-													- 14		
-													15		
													-		
: -													- 16		
													-		
													-		
-													- 17		
													-		
ŀ													18		
													10		
													19		
<u> </u>													- 20		
Top (m) Bas	Flush e (m) Flus	Details sh Type   F	Bore Iush Return % Dept	hole Diame n (m) Dia (m	ter m) Dat	te	Boring Progre Time Depth (m)	ss Cased (m)	) Water (m)	Remarks:					
0.00 6	.50 Ai	r mist /ater		`	29/* 30/*	1 <u>1 1</u> 11 (	17:00 6.50 08:00 6.50	6.50 6.50	4.00						
					30/	11 1	17:00 13.50	10.50	0.10						
				ing Diamet	>r		\^/o	ter Strike	25	SPT Hamm	er: N/R, En	ergy Rati	o: N/R	tallation	s
			Dept	n (m) Dia (m	im) Strike (	(m) Case	ed (m) Sealed (m) Tim	ie (mins)R	tose to (m)	Remarks	Тор (і	m) Base (	m) Pi	pe Type	Dia (mm)
Checked b Log status	DY: S: PI	RC RELIM	IFA RC v01.01												

			Plant used:				Project:					Loca	tion ID:	
	IAN FA	RME	2	Comacchi	o 205		Manchester Northerr	n Gateway Floor	d Defence and Alle	eviation	Works			2 4
	ASSOC	IATES	S Dates:				Client:					1	KE1	3A
-			11/1	0/2021 - 1	2/10/202	1		Volker S	Stevin			Shee	at 1 of 1	
	Rotany		Location:				Ground level:	Logged by:	Vertica	al scale:		Proje	ct ID:	
Bo	rehole l	oa	3844	445.89F 39	9351.58	N	29.97mOD			1:50			2230	502
	Coring Sam	nles & In S	Situ Testina			•	Strata	Details					Grou	Indwater
Denth	TCR/SCR/	FI	Samples & Test	Result Leve	Depth (m)		Stra	ata Description			Legend		Water	Backfill/
Dopui	RQD		0.00m - B2	(mOl	) (Thickness	MADE	E GROUND: Dark grev	mottled black.	sandv GRAVEL.			-	Strike	Installation
[			0.10m - ES1	29.7	7 0.20	Grave	el is subangular to angu	lar fine to coar	se including con	crete,		Ŧ		100 B.A
E			0.15m - D3 0.40m - B5	29.5	7 0.40		te and tarmacadam. E GROUND <sup>:</sup> Recovered	d as light grev	COBBLES Cobt	/				
ł			0.60m - ES4			are su	ubangular to angular co	oncrete. (Concr	ete slab)			ž.		
ł					(0.80)	MADE	E GROUND: Reddish b	rown, sandy G	RAVEL with freq	uent		2		
F		ОН	1 10m - D6			concr	ete. Cobbles are subar	igular including	g concrete.	anu		1		
ł.			1.1011 20	28.7	7 1.20	MADE	E GROUND: Black san	d / ash fill (drille	ers description).					
L .					(0.70)	Possi	ble backfilled basemen	t / void.				Ł		
					(0.70)							-		
				28.0	7 1.90							\$		
F					(0.30)	subar	= GROUND: Grey, sligr	cluding concret	e. Possible conci	rete		2		
			-2.20m - B8 2.30m - ES7	27.7	7 2.20	slab /	basement floor.			/		\$		
ŀ			2.00011 201			cobbl	e content. Gravel is and	gular to subanc	gular including br	ium ick		-		
					(0.90)	and c	ement. Cobbles are su	bangular includ	ding brick.			ŧ		
			2.00											
			3.00M - D9	26.8	7 3.10	MADE	= GROUND <sup>,</sup> Dark grev	aravelly slight	tly clavey fine to			- 3		
						coars	e SAND with frequent p	ockets of light	greyish clay with	n black		F		
ŀ			3.50m - SPT	(S)		organ	iic specks. Gravel is an ete	gular to suban	gular including			ł		
			N=3 (1,1/0,1,	1,1)	(1.40)	3.1	0 to 4.50m: organic odour					Š.		
			4 00m - B11		(1.40)	At	3.50m: very loose					4		
			4.00m - ES10	D								\$ 7		
l.			4.40m - D12									-		
		AZCI	4.50m - SPT	(S) 50 25.4	7 4.50	Weak	, reddish brown, fine to	coarse graine	d, massive			×		
	75	70202	(25 for 40mm)	1/50		SANE	OSTONE. Discontinuitie	s are 0-45°, cl	osely spaced,	uab		È.		
- 	) 75					fractu	res throughout.	. A clayey sand	penetrating the	ugn		-5		
	30	12					-					-		
												ļ.		
		NI	1									-		
					(2.60)							F		
ŀ		6	5.93m - C								::::	6		
5 50 - 7 00	100		6.00m C									F		
	40		0.2911 - C									F		
-		NI										F		
[		INI										E		
		-		22.8	7 7 10							- 7		
			7.20m - C	22.0	/ /.10	Weak	, reddish brown, fine to	coarse graine	d, massive			Ł		
ŀ			7.40m - C			undul	ating rough, tight clean		dium spaced,			Ł		
	100		7.67m - C								::::	È.		
. 7.00 - 8.50	67		7.77m - C									È.		
-			7.98m - C									- 8		
												¢.		
		4	8.50m - C		(2.90)							F		
			8.72m - C		(2.00)							F		
												Ē		
F	100											-9		
8.50 - 10.0	0 93											F		
-	93		9.50m - C									F		
[			9.67m - C									E		
				10 0	7 10.00							± 10		
	Elust	Details		Borchole Di-	, 10.00		End of B	orehole at 10.0	0m Remarka:			10		
Top (m) Ba	ase (m) Flu	sh Type	Flush Return %	Depth (m) Dia	(mm) Da	ate	Time Depth (m) Cased (	(m) Water (m)	Inspection pit du	ig to 1.2	20m.			
4.50 1	10.00 Āi	r mist			11	/10 (	00:00 2.20 00:00 10.00 5.50	1.60						
					12	, 10 1		. 0.00						
									SPT Hammer: N	V/R, Ene	ergy Rati	io: N/F	٤	
				Casing Diar	(mm) Strike	(m) Coor	Water Str	ikes	Remarks	Ton (m	Monito	ring In: (m) I □	stallation	IS Dia (mm)
					Surke	(III)  Case		0.00	i toniai Na	0.00	0.5	0	Plain	50
Charles	by:	RC I		4						0.50	3.00	0 9	Slotted	50
Log stat	us: P	RELIM	v01.01											

				Plant	used:				Project:				Locat	tion ID:		
G	IAN F	AR	MER		Comn	nachio	205		Manchester Northern	Gateway Flood Defence	and Alleviation	Works		RF	14	
	ASSC	CL	ATES	Dates	:				Client:						14	
					18/10/202	21 - 19/	10/2021			Volker Stevin			Shee	t 1 of 1		
Dyna	mic Sa	mpl	ling	Locati	ion:				Ground level:	Logged by:	Vertical scale:		Proje	ct ID:		
and Ro	tary Bo	pring	g Log		384460.32	2E 3993	338.83N	l	29.69mOD	MD/CG	1:50			2230	502	
	Samp	les &	In Situ Te	esting		l evel	Depth (m)	1	Strata D	etails		T		Grou	undwa	ter skfill/
Depth	Sample	ID		lest Re	esult	(mOD)	(Thickness)		Strat	ta Description		Legend	-	Strike	Insta	llation
						29.55	0.14	MADE	E GROUND: Recovered	as dark grey GRAVEL	with frequent		Ē			
						20 10	(0.36)	Cobble	es. Gravel is very angul les are very angular (63	ar, fine to coarse includi -150mm) including cond	ng concrete.		Ē			
0.60	ES1					20.10	0.00	MADE	E GROUND: Dark grey,	silty, sandy GRAVEL wi	th occasional		l.			
0.00 - 1.2	D3						(0.80)	tarma	es. Gravel is very angul icadam, brick, concrete	ar to angular, fine to coa and sandstone.	arse including		ŧ			
1.00	ES4			4 (0 )									- 1			
1.30 - 2.3	0 B5	5	P1(5) N	=1 (2,	1/0, 1,0,0)	28.39	1.30	MADE	E GROUND: Verv loose	and loose dark brown r	nottled black.		E			
1.40	ES6	;						slightl	ly gravelly, clayey, fine to	o coarse SAND. Gravel	is very		Ē			
1.00							(1.00)	sands	stone and other mixed life	thologies. Medium to str	ong		ŧ			
2.00		s	PT(S) N	=5 (1, <sup>-</sup>	1/0,0,2,3)			hydro	carbon odour.				2			
						27 20	2 30						Ē			
2.40	ES8					21.39	2.30	MADE fine to	E GROUND: Dark brown	nish grey mottled red, si asional shell fragments	lty, gravelly,		E			
							(0.00)	mode	rate hydrocarbon odour	. Gravel is very angular,	medium and		ŧ			
							(0.90)	coars	e including brick.				Ē.			
		S	PI(S) N	=16 (3	,4/4,3,4,5)	06.40	2.00						- 3			
: 3.20 - 4.0	0 89					26.49	3.20	Mediu	um dense, dark yellowis	h brown SAND with occ	asional shell		Ē			
3.50	D11						(0.00)	nayin	ients.				-			
							(0.90)									
4.00		s	PT(S) N	=37 (4	,3/4,5,11,17)	25 50	4.10						- 4			
4.20	ES1	2				20.09	4.10	Dense	e, reddish brown, fine to	coarse SAND (weather	red		E			
					007(0) 50		4.50	Sanus					Ę			_
				4.50m (25 for	- SPT(S) 50 30mm/50	25.19		Weak SAND	STONE. Fractures are	0-8°, closely spaced, tig	grained t clean with					<b>]</b>
				for 60r	nm)			sand i	infill. tween 4 50 and 9 00m: frequ	ent weathering to a soft sar	nd		Ē _			<b>]</b>
	100							200					- 5			<b>-</b>
: 4.50 - 6.0	0 95 20		15										Ē			
													Ē			
													6			``.
			NI										Ē			-
																<b>∃</b> °.
6.00 - 7.5	100 0 84			6.62m	- C		(4.50)						Ē			1.
	20		8				(					:::::	- 7			1.
			Ŭ	7.06m	- C								Ę '			
				7.38m	- C								Ē			
-													Ē			
				7.79m	- C								Ē			
-	100			8.10m	- C								- 8			
7.50 - 9.0	0 95		6										Ē			
	54			8 60m	- C								Ē			
				0.0011	-0								Ē		-	-
						20.69	9.00		End of P	arabala at 0.00m			-9			]
									End of B	orenole at 9.00m			Ē			
													Ē	ĺ		
													Ę	ĺ		
													Ē.	ĺ		
<u> </u>	TCR/SCR/		FI _	Sam	nples & Tests								- 10	Ĺ		
Top (m) B	Dynami ase (m) D	c Sa ia (m	mple Re m) <u>Re</u> cov	ecovery	/ Remarks	Remarks Inspectio	s: n pit dua	to 1.20r	m.							
1.20	2.00		ç	90 90			. 5									
3.00	4.00		ç	90		е <b>рт</b> и -	nmer N/F	) <b>F</b>	av Patio: N/D							
4.00	4.50		8	sU		SPI Har	nmer: N/F	k, ⊨nerę	Water Strikes		M	lonitoring	Insta	llations		
						Strike (m	) Cased (r	n) Seale	ed (m) Time (mins) Rose to (r	m) Remarks	Top (m) B	ase (m)	Pipe	Type	Dia	(mm)
Chealer	d by:		PC			0.00	5.00		20 5.50		4.50	9.00	Slo	otted	5	50
Log sta	tus:	F	PRELIM		IFA DS v01.01											

			Plant used:					Project:					Locat	tion ID:	
	AN FA	RMER	Dando	2000/Co	nmac	hio 2	205	Manchester Northern	Gateway Floor	d Defence a	nd Alleviation	Works		<b>DC</b>	4 -
	ASSOC	IATES	Dates:					Client:					1	KE	15
				11/10/2	021				Volker S	stevin			Chao	+ 1 = 5 1	
Cabla	Dorouo	aian	Location:					Ground level:	Logged by:	V	ertical scale:		Proje	ct ID:	
	Percus		3844	76.01E.3	99396	3 98N	J	30.17mOD		G	1.50			2230	502
	Samples		esting	0.012 0	00000			Strata D	etails		1.00			Grou	
Depth	Sample ID		Test Result	Lev	el De	epth (m)		Strat	a Description			Legend		Water	Backfill/
0.10 - 0.50	B1			(mC	D) (Th	ickness)	MADE	E GROUND: Dark grev r	nottled black	and reddish	. sandv			Strike	Installation
0.20	ES2				(0	0.40)	GRAV	/EL. Gravel is subangula	ar to angular,	fine to coars	se concrete,		Į		
-				29.	77 0	0.40	tarma	cadam, brick and dolerit	te. Iah				ŧ		
0.70 - 1.20	B3			20	47 (0	0.30) 0.70	Ver	ry dense					Ę.		
0.70 - 1.20				20.	"	5.70	MADE	E GROUND: Reddish br	own, sandy G v angular to ar	RAVEL with	n medium ding red		Ę		
- 1.00	ES4						brick.	Cobbles are subangula	r including rec	l brick.	angrea		<u></u> [−1]		
1.20		SPT(S) N	I=36										Ę		
1.20 - 1.65	D6	(21,19/7,	10,7,4)										Ę		
1.20 - 1.70	B5												Ę		
1.85	D7				(2	2.30)							Ę		
2.00	ES8	SPT(S) N	I=14 (5,4/3,2,4	,5)									2		
2.00 - 2.45	D10												Ę		
2.00 - 2.50	B9												Ę		
2 75	D11												Ę		
2.10		007/010			.								Ę		
- 3.00		SPI(S)0 0mm)	(1 for 450mm	U TOR 27.	17   3	5.00	MADE	E GROUND: Dark grey r	nottled reddis	h brown, sli	ightly		3	ĺ	
3.00 - 3.45	D13				((	1 70)	grave	Ily, fine to coarse SAND ling brick	. Gravel is sub	pangular to	angular		Ę		
3.00 - 3.50	B12 FS21												Ę		
3.75	D14			26.	47 3	3.70	1.0056	reddish brown clavev	fine to coarse	SAND with	occasional		4		
3.80	ES22						pocke	ets of reddish sand.		SAND WII	loccasional	-	Ę,		
4.00	D16	SPT(S) N	l=7 (1,2/1,3,1,2	2)								-	4		
4.00 - 4.50	B15														
					(1	1.50)							F		
4.75	D17												ŧ		
5.00			0 /8 0/50 for										5		
5.00		95mm)	0 (0,9/30 10)	24		5 20							5		
5.00 - 5.40	B18			24.		5.20	Grey,	slightly silty, sandy GRA	VEL. Gravel i	s subangul	ar to	X			
. 5.00 - 5.45	019	4701	5.40m - SPT(0	C) 50 24.	77 j	5.50		ar including brick.	scription)		/	1 + + + + + + + + + + + + + + + + + + +			
		AZCL	for 0mm)	24.	41 5	5.76	Assur	med zone of core loss. F	Probable SAN	DSTONE.	/				
<u> </u>			5.40m - B20				Weak	, reddish brown, thickly	bedded to ma	ssive, fine t	o coarse		6		$\square$
	83		6.15m - C				undul	ating rough, tight. Soft re	eddish sandy,	clay penetr	ating	:::::			
5.50 - 7.00	60	5			(1	1.24)	throug	gh fractures.	athorad to a cof	t raddiab aa	-				
-		-	G GEm C		ì	,	Bei	tween 6.09m and 6.13m. we	alliered to a sor	i, reddisri, sai	ndy ciay.				
			6.65M - C				Bei	tween 6.65m and 6.75m: We	eathered, soft an	d infilled with	sand.				
				23.	17 7	7.00							7		
		AZCL		22.	97 7	7.20	Assur	med zone of core loss. F	robable SAN	JSTONE.		:::::: 	Ę .		
		INI	7.32m - C				SANE	, reddish brown, massiv DSTONE, Discontinuities	e, fine to coar are 0-8°, clos	se grained selv spaced	l. undulating				
	87						rough	, tight clean.			.,	:::::			
7.00 - 8.50	80		7.82m - C				Bei	tween 7.27m and 7.30m: We	eathered.				Ē		
E .	60		7.86m - C									::::	- 8		
														ĺ	
			0.50- 0										Ē	ĺ	
		4	8.50m - C		(2	2.80)							Ē	ĺ	
													Ē	ĺ	ŀ.∃∴
F	100		8.95m - C									:::::	-9	ĺ	
8,50 - 10 00	100											:::::	Ē	ĺ	
	87		0.50m 0										Ē		
Ē			9.63m - C										Ē		
			9.82m - C										Ē		
-	TCR/SCR/RQD	FI	Samples & Te	sts 20.	17   1	0.00		End of Bo	prehole at 10.0	Om		<u> </u>	- 10		
	Chis	elling		Borehole Di	ameter	-		Boring Progress		Remarks:		<u></u>			
rom (m) To 5.40	o (m)   Tim	e (mins)   60	Remarks	Depth (m) D	a (mm)	Dat 11/*	te   10 (	Ime         [Depth (m)] Cased (n           00:00         5.40         5.40	n) Water (m) 3.00	Inspection	pit dug to 1.2	.0m.			
						12/	10 (	00:00 10.00 5.50	5.30						
			ŀ	Casing Die	meter			Motor Stril	(es	SPIHamr	ner: N/R, Ene	ergy Ratio	o: N/R	stallation	ns
			Ī	Depth (m) D	a (mm)	Strike (	(m) Case	ed (m) Sealed (m) Time (mins)	Rose to (m)	Remarks	Top (m	i) Base (	m) Pi	ipe Type	Dia (mm)
					Ţ	3.80	0 3.	.00 3.00 20	3.50		0.00	5.50	) 0 <	Plain	50
Checked	by:	RC	IFA CP								5.50	10.0	5 6	Jouga	50
Log statu	IS: P	RELIM	v01.01												

			Plant used:				Project:				Locat	ion ID:	
	AN FA	RMER	Com	machio	205		Manchester Northern	Gateway Flood Defence	and Alleviation	Works			4.0
	ASSOC	IATES	Dates:				Client:					KE'	16
			21	/10/202	1			Volker Stevin			0		
Dunan	aia Cam	مانمم	Location:				Ground level:	Logged by:	Vertical scale:		Proie	ct ID:	
Dynan	nic Sam arv Bori	piing	384493.8	4F 399	383.03N	J	29 59mOD	CG	1.50			22304	502
	Samples		osting		000.001		Strata D	etails	1.00			Grou	ndwater
Denth	Sample ID		Test Result	Level	Depth (m)		Strate	a Description		Legend		Water	Backfill/
i Dopui			loot i toodat	(mOD)	(Thickness)	MADE	E GROUND: Black tarma	acadam		20g0		Strike	Installation
				29.39	0.20	MAD	E GROUND: Recovered	as grev GRAVELS/CO	BBLES with				
					(0.40)	horizo	ontal (6mm re-bar) grid.	Gravel is very angular o	oncrete and				
0.65	ES1			28.99	0.60	flint. (	Cobblers are very angula int	ar (63x150mm) concrete	e, aggregate	here was a second secon			
					(0.40)	MADE	E GROUND: Dark grey, s	sandy GRAVEL with oc	casional				
1 10	ES4			28.59	1.00	cobbl	es. Gravel is very angula	ar to angular, fine to coa and sandstone	arse including	here was a second secon	-1		
1.20	201	SPT(S) N	I=33 (1,3/6,12,11,4)			MADE	E GROUND: Reddish bro	own, mottled black, slig	htly sandy,				
-						grave	Ily CLAY. Gravel is very a e including sandstone of	angular to subrounded, wartz and concrete with	fine to		-		
					(1.30)	hydro	carbon odour.						
- 2.00		SPI(S) N	1=22 (4,5/5,5,6,6)								2		
				27.29	2.30	Modiu	m donso, dark grov mot	ttlod vollowish grov, slig	htly gravally				
2.40	ES7				(0.40)	SANE	). Gravel is very angular	to subangular of mixed	lithologies.		-		
2.00	E 640			26.89	2.70	Soft	reddish brown slightly ar	avelly sandy CLAY Gr	avel is verv				
2.00	E310				(0.30)	angul	ar to subangular of mixe	d lithologies.					
-			3.00m - SPT(S) 50	26.59	(0.30)	Very of	dense, reddish brown, sl	ightly clayey, fine to coa	arse SAND.		- 3		
	100		3.15m - SPT(S) 50	26.29	3.30	Weak	to verv weak, reddish b	rown, thickly bedded, fi	ne to coarse				
3.00 - 4.00	0		(25 for 75mm/50		(0.70)	graine	ed SANDSTONE, weath	ered to a soft clayey sa	nd with rare		-		
	0		101 3311111)		(0.70)	comp	etent sections.			:::::			
	_			25.59	4.00						4		
						SANE	, reddish brown, thickly i DSTONE, Discontinuities	bedded, fine to coarse are 0-8° with common	sandv				
	100		4.30m - C			infillin	g. Some sections weath	ered.	,				
4.00 - 5.00	100	11											
	20				(1.50)								
-	-										5		
		14											
				24.00	5 50					:::::	-		
	100	NI	5.61m - C	24.09	5.60	Weak	, reddish brown, fine to o	coarse grained, gravelly	/				
5.00 - 6.50	90	5				includ	ling quartz and sandston	ngular to subrounded, n 1e.					
E C						Weak	, reddish brown, thickly l	bedded, fine to coarse	candy	:::::	6		
						infillin	g. Some sections weath	ered.	sanuy				
-		-			(1.65)						-		
		11											
			6.80m - C										
-	94									:::::	- 7		
6.50 - 8.00	80	NI		22.34	7.25	Very	weak, reddish brown, fin	e to coarse grained SA	NDSTONE.				
-	20	NI	7.00 0	22.09	7.50	Weat	hered to a soft, slightly c	layey sand.	/	1	-		
		9	7.62m - C	21.87	7:77	Weak	, reddish brown, thickly l	bedded, fine to coarse	/				
		AZCL		21.82	7.90	SANE	STONE. Discontinuities	are 0-8° with common	sandy		- 8		
				21.59	0.00	Very	weak, light yellowish bro	wn, thinly bedded, fine	to medium				
			8.40m - C			graine Rei	ed SANDSTONE. tween 7.72 and 7.77m <sup>-</sup> weat	hered to sand					
Ē	87	4			(1.00)	Weak	, reddish brown, thickly I	bedded, fine to coarse	grained				
8.00 - 9.50	87		8.81m - C			Assur	ned zone of core loss P	u-o <sup>-</sup> , closely spaced tig Probable SANDSTONF	ni, ciean.				
F	0/	470		20.59	9.00	Weak	, reddish brown, thickly I	bedded, fine to coarse	grained		9		
		AZUL		20.39	9.20	∖ <u>SANE</u> ∖Assur	ned zone of core loss. P	u-∠5⁻, closely spaced ti Probable SANDSTONE.	gnt, clean.		Ē		
		15		20.00	(0.30)	Weak	, reddish brown, thickly l	bedded, fine to coarse	grained	<u></u> .	-		
				20.09	3.30		UNE. Fractures are ( tween 9.20 and 9.50m: weath	u-o <sup>-</sup> , closely spaced tig <u>hering to a stiff cl</u> ay	ni and open.	1			
							End of Bo	orehole at 9.50m					1
<u> </u>	TCR/SCR/RQD	FI	Samples & Tests								- 10		
Top (m) D-	Dynamic S	Sample Re	ecovery	Remarks	S:	to 1 00							
10p (m)  Bas	se (m) Dia	(mm)  Keco	very 70 Remarks	Inspectio	n pit dug	ιο 1.20							
				SPT Har	nmer: N/F	R, Ener	gy Ratio: N/R						
				Otailes /-		n) [ !	Water Strikes	Doma-li-		lonitoring	Insta	lations	Die (norm)
				Junke (m	) Loased (r	njjoeale		memarks	10p (in)   B	ase (III)	ripe	туре	ויש (INM)
Checked	bv:	RC		1					1				
Log statu	us:	PRELIM	v01.01						1				
			1	i					1				

			Plant used:				Project:				Locat	tion ID:	
	AN FA	RMER	Com	machio	205		Manchester Northern	Gateway Flood Defence	and Alleviation	Works		DE	17
	ASSOC	CIATES	Dates:				Client:					κe	17
			06	/12/202	1			Volker Stevin			Shee	t 1 of 1	
Dynam	nic Sam	pling	Location:				Ground level:	Logged by:	Vertical scale		Proje	ct ID:	
and Rota	ary Bori	ng Log	384150.6	2E 3992	210.39N	1	25.67mOD	CG	1:50	)		2230	502
	Samples	& In Situ Tes	sting	Level	Depth (m)		Strata D	oetails		I		Grou Water	ndwater Backfill/
Depth	Sample ID		est Result	(mOD)	(Thickness)	No rec	Strat	ta Description		Legend	-	Strike	Installation
0.20 - 1.00	B4			25.47	0.20	MADE	E GROUND: Medium de	ense, brownish black, g	ravelly, silty		Ē		
0.40 - 0.50	ES1					SAND	) with medium cobble co	ontent. Gravel is suban	gular to		È.		
					(0.80)	coal.	Cobbles are subangula	ir to subrounded includi	ng sandstone,		Ē		
: 0.80 - 0.90	ES2			04.67	1 00	quartz	z, fine grained igneous a	and brick.					
				24.07	1.00	No ree	covery.				Ē		
					(0.70)						Ē		
-				00.07	4 70						Ē		
1.80 - 1.90	ES3			23.97	(0.30)	MADE	E GROUND: Dense, gre	eyish brown, gravelly, fir	ne to coarse		ŧ		
2 10		SPT() N=2	91 (4 5/7 5 5 4)	23.67	2.00	subro	unded, fine to coarse in	cluding sandstone, fine	grained		2		
		0			(0.50)	igneo	us and brick. Cobbles a	re subrounded of fine g	rained	/	Ē		
-				23.17	2.50	No red	covery. Advancing throu	igh dense coarse soil s	trata.		ŧ.		
							End of B	orenole at 2.50m			Ē		
3.00		SPT() N=3	2 (5,7/7,8,8,9)								- 3		
- - -													
											-		
											Ē		
											4		
											Ē		
											Ē		
-											5		
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-											-9		
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											Ē		
											10		
	Dynamic 9	Sample Reg	coverv	Remarks	 S:						10		
Top (m) Bas	se (m) Dia	(mm) Recove	ery % Remarks	Drilled fro	om ponto	on.	h - d						
				Strata de Borehole	ptns belo terminate	w river ed at 2.5	bed. 50m due to gravels.						
				SPT Har	nmer: N/F	R, Enero	gy Ratio: N/R						
				01.1		,	Water Strikes		N N	Ionitoring	Insta	llations	Dia
				Strike (m	)  Cased (r	n) Seale	a (m)  time (mins) Rose to (r	m)  Remarks	Iop (m) E	sase (m)	Pipe	туре	⊔ua (mm)
Checked I	by:	RC	IFA DS	1									
Log statu	s:	PRELIM	v01.01										

			Plant used:				Project:				Loca	tion ID:	
	AN FA	RMER	Comr	nachio 2	205		Manchester Northern	Gateway Flood Defence	and Alleviation	Works		2 2 1	7R
	ASSOC	IATES	Dates:				Client:						
			09/	12/202	1		-	Volker Stevin	<b>b a b b</b>		Shee	t 1 of 1	
Dynan	nic Sam	pling	Location:				Ground level:	Logged by:	Vertical scale:		Proje	ct ID:	500
and Rota	ary Bori	ng Log	384152.30	UE 3992	210.78N		25.66mOD	CG	1:50			2230	502
Denth	Samples	& In Situ Te	esting	Level	Depth (m)		Strata D	etails		Lowers		Grou Water	undwater Backfill/
Depth	Sample ID			(mOD)	(Thickness)	No rec	Strat	a Description	d or soil	Legend	-	Strike	Installation
						strata.		.g course made groun			Ē		
-											-		
											Ē		
											ŧ.		
-													
					(2.50)						Ē		
											Ē		
											Ē		
F											2		
											Ē		
	-	   1		22.40	2.50	10/0-1	roddiob brown thinks	haddad fina ta	aroined		Ē		
		NR		23.10		SAND	STONE. Fractures are	0-8° closely spaced, wi	de with a		Ē		
-2 50 - 3 50	81 75				(1.00)	sandy	r infill, undulating rough.				2		
2.00 - 0.00	55	9			(1.00)						Ē		
ŧ.			0.50m 0.00T(0) (5	00.40	0.50					::::	É		
-		NR	3.50m - SPT(S) 46 (2,4/46 for 85mm)	22.16	3.50	Weak	, reddish brown thickly b	pedded fine to medium	grained	::::	Ē		
ŧ						soft sa	andy infill, undulating rol	ugh.	พนธ พเป่า ส		Ē		
E .	87	6									4		
3.50 - 5.00	77	NII									Ē		
	4/				(2.00)						É		
		12									Ē		
ļ		12									5		
											Ē		
		NR		20.16	5.50	10/- 1	veddieb berne 41111	added firsts	anaine -		Ę		
5.00 - 6.50	80 77				-	SAND	) reduish brown thickly b STONE. Fractures are (	0-8° closely spaced, wi	grained de, clean		Ē		
	40	7			(1.00)	undula	ating rough.				E e		
											Ē		
: :				10.46	6 50					· · · · · ·	Ē		
				19.10	0.50		End of Be	orehole at 6.50m			Ē		
											Ē		
											F 7		
											É		
											Ē		
-											8		
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E											Ē		
											Ē		
Ē											Ē		
	TCR/SCR/RQD	FI	Samples & Tests								- 10		
Top (m) Ba	Dynamic S se (m) Dia (	sample Re (mm) Reco	ecovery very % Remarks	Remarks	: om pontoc	on.							
				Strata de	pths belo	w river l	bed.	n Relocated to PE17P	1				
						, A due		m. Relocated to RE1/E					
				SPT Han	nmer: N/F	k, Energ	gy Ratio: N/R Water Strikes		M	onitoring	Insta	llations	
				Strike (m)	) Cased (n	n) Seale	d (m) Time (mins) Rose to (n	n) Remarks	Top (m) B	ase (m)	Pipe	Туре	Dia (mm)
Ohavi i	hu u												
	uy: Is:	PRFI IM	IFA DS v01.01										
Log statt													

			Plant used:				Project:				Locat	ion ID:
	IAN FA	RMER	Comr	nachio 2	205		Manchester Northern	Gateway Flood Defence	and Alleviation	Works		
	ASSOC	IATES	Dates:				Client:					RE18
-			07/12/202	21 - 09/*	12/2021			Volker Stevin			Shee	t 1 of 1
Dynar	nic Sam	nlina	Location:				Ground level:	Logged by:	Vertical scale:		Proje	ct ID:
and Rot	arv Bori	na Loa	384195.98	8E 3992	218.86N		25.83mOD	CG	1:50			2230502
	Samples	& In Situ Te	esting				Strata D	etails				Groundwater
Depth	Sample ID		Test Result	Level (mOD)	Depth (m) (Thickness)		Strat	a Description		Legend		Water Backfill/ Strike Installation
						MADE Grave brick,	E GROUND: Dark browr el is angular to rounded, tile and slag.	n, gravelly, silty, fine to o fine to coarse including	coarse SAND. g sandstone,	* * * * * * * *	-	
0.60 - 1.00	) ES1				(1.00)					`*`*` *`*`*		
1.00		SPT() N=	41 (6,9/9,10,9,13)	24.83	1.00	No re coars	covery. Advancing casin e made ground / soils.	g through dense to ver	y dense		1	
					(2.50)						2	
2.50		SPT() N=	:36 (4,8/11,9,8,8)								- 3	
					3 50							
		NI	3.50m - SPT() 50 (25 for 145mm/50	22.33	3.75	Grey, cobble	coarse GRAVEL with a es are subrounded to su	high cobble content. Gi Ibangular including sar	ravels and ndstone,			
-3.50 - 4.50	) 70 70 40	8	for 85mm)	22.00	(0.85)	∖granit Weak SANE wide (	e and fine grained igned , reddish brown, thickly STONE. Discontinuities (10mm) clean, undulatin	bus. bedded, fine to coarse are 0-6°, closely space g rough	grained ed, tight and		- 4	
-		-		04.00	4.00			5 5		· · · · · ·	-	
		NI		21.23 21.13	4.60 4.70	Extrei SAND grave	mely weak, reddish brow OSTONE. Weathered. In I of coarse grained ignee	vn, fine to coarse graine clusions of coarse, sub ous lithology.	ed angular		5	
4.50 - 6.00	) 100 87 74	7			(1.14)	Weak SANE with s rough	a, reddish brown, thickly DSTONE. Discontinuities andy infill, undulating ro a.	bedded, fine to coarse s are 1) 0-8°, closely sp ugh. 2) 1No. 60° tight u	grained aced, tight ındulating	·       ·       ·       ·       ·         ·       ·       ·       ·       ·       ·         ·       ·       ·       ·       ·       ·         ·       ·       ·       ·       ·       ·         ·       ·       ·       ·       ·       ·         ·       ·       ·       ·       ·       ·         ·       ·       ·       ·       ·       ·         ·       ·       ·       ·       ·       ·         ·       ·       ·       ·       ·       ·         ·       ·       ·       ·       ·       ·         ·       ·       ·       ·       ·       ·         ·       ·       ·       ·       ·       ·         ·       ·       ·       ·       ·       ·       ·		
		NI		19.99 19.88	5.84 5.95	Weak \SANE	, reddish brown, thickly DSTONE.	bedded, fine to coarse	grained/	· · · · · · ·	6	
	100	11			(1.50)	Weak coars space fractu	<ul> <li>locally very weak, redc</li> <li>grained SANDSTONE</li> <li>d, tight with sandy infill,</li> <li>red, tight clean, undulation</li> </ul>	lish brown, tickly bedde . Discontinuities are 1) undulating rough. 2) 0- ng rough.	ed, fine to 0-8°, closely 90°,			
: 0.00 - 7.50	60				(						7	
[	_			18.38	<del>7</del> : <del>5</del> ð	Extrei	mely weak, reddish brow	vn, thickly bedded SAN	DSTONE,		-	
				18.33		bound	by soft reddish, sandy	clay.	/		Ē	
											- 8	
											9	
	TCR/SCR/ROD	FI	Samples & Tests								- 10	
<b>_</b>	Dynamic	Sample Re		Remarks	5:					1		I
Top (m) Ba 0.00	ase (m) Dia 1.00	(mm) Reco 2	very % Remarks 40	Drilled fro Strata de	om pontoo pths belov	on. w river	bed.					
				SPT Han	nmer: N/R	R, Energ	gy Ratio: N/R		· -		L /	11 - 42
				Strike (m)	) Cased (m	n) Seale	vvater Strikes ed (m) Time (mins) Rose to (n	n) Remarks	Top (m) B	onitoring ase (m)	Insta Pipe	Type Dia (mm)
				-								
Checked	by:	RC	IFA DS									
Log stat	us:	PRELIM	1 101.01	I								

			Plant	used:				Project:		Locat	ion ID:			
6	IAN F	ARM	1ER	Comn	nachio 2	205		Manchester Northern	Gateway Flood Defence	and Alleviation	Works		10	
	ASSO	CIAT	TES Dates	:				Client:						19
				19/	'11/202 <i>'</i>	1			Volker Stevin			Shee	t 1 of 1	
Dyn	amic Sa	ample	e <sup>Locat</sup>	ion:				Ground level:	Logged by:	Vertical scale:		Proje	ct ID:	
Bo	orehole	Log		384383.54	1E 3992	294.82N		25.38mOD	OG	1:50			2230	502
Denth	Samp	les & In	Situ Testing		Level	Depth (m)		Strata D	etails		Lonond		Grou Water	ndwater Backfill/
0 10	FS1		Iest Re	suit	(mOD)	(Thickness)	MADE	- GROUND <sup>,</sup> Reddish br	own verv sandv GRAV	FL Gravel is			Strike	Installation
							very a	angular to angular includ	ling sandstone, brick, co	pal, quartz				
0.40	D2					(0.80)	and p	orcelain.				-		
0.90	D3				24.58	0.80	Recov	vered as slightly sandy (	GRAVEL. Gravel angula	ir to	******			
1.00		SPT	r(S) N=18 (9	,9/5,5,4,4)			mudst	unded, fine to coarse ind tone.	cluding granite, sandsto	ne and				
						(1.00)								
1.60		SPT	r(S) N=16 (1	0,13/6,4,4,2)		(1.30)						-		
												-		
F					23.28	2 10						2		
2.20	ES4				20.20	(0.40)	Reddi with w	sh brown mottled black veak organic odour. Grav	and brown, slightly grav	/elly SAND Il rounded.				
2.40	D5				22.88	2.50	fine a	nd medium including mi	xed lithologies.					
2.60	D6					(0.40)	granit	e and red brick.	subangular GRAVEL Ir	iciuaing		-		
Ŀ					22.48	2.90		End of B	orehole at 2.90m			-3		
												-		
ŀ												-		
-												- 4		
												-		
F												-		
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-												- 5		
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ŀ												- 10		
Dynamic Sample Recovery Remarks:						:								
Top (m) E	Base (m) D	ia (mm)	Recovery %	Remarks	Drilled fro	om pontoc	on.	bed						
0.90	1.50		34		ou ata ue	hri i preio,	wiivef	bed.						
1.50 2.50	2.50 2.90		50 20		SPT Han	nmer: N/F	R, Ener <u>c</u>	gy Ratio: N/R						
						Coord /-	0)8001-	Water Strikes	n) Domarka	M Top (m)	onitoring	Instal	llations	Dia (mm)
						ucaseo (n	Joeale			iop (in)   B	ase (III)	ripe	туре	נימ (inm)
Checke	Checked by: RC IFA DS									1				
Log sta	Log status: PRELIM v01.01													

			Plant used:					Project:						ation ID:	
	IAN F	ARME	R	Comr	nachio	205		Manchester Northern	Gateway Floo	d Defence an	nd Alleviati	ion Works			0.4
	ASSO	CIATE	S Dates:					Client:						RE	ЭA
-				10/	/11/202	1			Volker S	Stevin			She	et 1 of 2	,
	Rotan	,	Location:					Ground level:	Logged by:	Ve	ertical sca	ale:	Proj	ect ID:	•
Bo	rehole	loa	384	380.04	4E 3992	293.25	١	25.31mOD	OG	i	1:	50		2230	502
	Coring, Sa	mples & I	n Situ Testina					Strata De	etails				-	Gro	undwater
Depth	TCR/SC	R/ FI	Samples & Tes	t Result	Level	Depth (m)		Strata	a Description			Leger	ıd	Water	Backfill/
	RQD				(mod)	(THICKHESS)	Debri	s and SAND and GRAVE	EL (Drillers de	escription)			∞-	Suike	Installation
													8		
-													⊗		
													8		
													8		
ł													∰ <sup>1</sup>		
						(2.90)							8		
-						(2.00)							∭-		
[													æ		
-													∭		
													` \$		
													8		
-													≫-		
			2.80m - SPT	(S) 50	22.51	2.80	0		Duilleur de cou	··· 4! - ·· )			×.		
È.			(25 for 135m	m/50			Orang	je SAND and GRAVEL (	Drillers descr	iption)			. <b>⊢</b> 3		
			ior 70mm)												
						(1.10)							-		
													-		
[					21.41	3 00									
-					21.41	(0.40)	SANE	OSTONE (Drillers descrip	otion)				÷ – 4		
			4.30m - SPT	(S) 50	21.01	4.30						::::	:-		
-			(25 for 40mn	n/50	21.01	4.00	Assur	med zone of core loss.					Ł		
			for 65mm)										Ł		
	17	A7C				(1 24)							ŀ		
4.30 - 5.80	0 17	120				(1.2.1)							5		
	17												F		
-					19 77	5 54							_		
		1			10.51	5.00	SANE	ly bedded, reddish browi STONE Discontinuities	n, fine to coar are closely to	se grained v closelv spa	veathered aced		:		
					19.51	5.80	∖plana	r rough, horizontal.	a.e eleccij t	o olocol) ope			Ŧ.,		
F							Assur	ned zone off core loss.					6		
-													E		
5.80 - 7.30	0 0	AZC	L			(1.50)							F		
	0												Ł		
-													-7		
													ţ.		
-					18.01	7.30	Weak	, reddish brown, fine to o	coarse graine	d SANDSTC	DNE.	::::	:		
	100	NI			17.65	(0.36)	Disco	ntinuities are open, undu	ulating rough	infilled with r	reddish fine and	: : : :	:		
. 1.30 - 0.05	40				17.00		mediu	im sandstone gravel.		siy angulal,	o anu		:[		
<b> </b>		5				(0.53)	Thick	ly bedded, reddish brown STONE, Discontinuities	n, fine to coar	se grained v	veathered aced	a  ::::	: <b>-</b> 8		
-	100	4	=		17.12	8:29	plana	r rough, horizontal.					÷		
8.05 - 8.80	0 66	4			16 70	852	Reddi	isn brown, fine to coarse ntinuities are extremely o	grained wea	thered SANE	USTONE I, planar	· <u> ::::</u> :	:		
	0	NI			16.61	8.70	rough	(6mm) infilled with fine	grained yellov	vish cream,	fine sand		<u>;</u>		
		AZC	L		16.51	8.8Ŏ	SANE	iy beaded, readish brown DSTONE. Discontinuities	are closelv to	se grained v o closely spa	weatnered aced,	J	<del>;</del>		
ŀ					16.31	9.00	plana	r rough, horizontal.					: 9		
	93	4	_		16.01	9.30	Weak	, reddish brown, fine to o ntinuities are open, undi	coarse graine Jating rough	a SANDSTC infilled with r	ONE. reddish		֠		
8.80 - 10.3	50 49 27					(0.50)	browr	n, fine to coarse sand, su	ibangular to v	ery angular,	fine and		:‡		
						(0.00)	Thick	um sandstone gravel. ly bedded, reddish browi	n, fine to coar	se grained v	veathered	$\frac{1}{2}$	:		
E					15.45	9.86	SANE	STONE. Discontinuities	are closely to	o closely spa	aced,	· · · · · · · · · · · · · · · · · · ·	÷		
Ē		h Det-il		Der-/	olo Diam	bor		Continu Roring Drogger	ued next sheet	Pomork			1(	,	
Top (m) Ba	Flus ase (m) F	lush Type	Flush Return %	Boreh Depth	oie Diame (m) Dia (m	m) Da	te	Time Depth (m) Cased (m	n) Water (m)	Drilled from	pontoon				
						10/	11 '	16:30 10.30 5.55	0.40	Strata depth	ns below	river bed.			
				1											
				1						SPT Hamm	ner: N/R, I	Energy Ra	atio: N/	R	
				Casir Depth	ng Diamete	er m) Strike	(m) Case	Water Strik	(es Rose to (m)	Remarks	Tor	Moni	toring I	nstallatio	ns Dia (mm)
				Берин		JUIKE	(iii)  Case	a (in) localed (in) filme (inins)	(11)	NGIIIdI NS	10		~ (III)]	ihe tàbi	(ווווו) אישן ג
Checked	l hv:	RC.		-											
Log stat	tus:	PRELIM	v01.01												

				Plant used:					Project:	Location ID:					
6	IA	N FA	RME	2	Comr	nachio	205		Manchester Northern	Gateway Floor	d Defence and Al	leviation Works	F	<b>D</b> E1	٥٨
	A	SSOC	CIATES	S Dates:					Client:						JА
					10/	11/202	1			Volker S	Stevin		Shee	t 2 of 2	
	R	otary		Location:					Ground level:	Logged by:	Vertic	al scale:	Proje	ct ID:	
Bo	orel	hole L	og	3843	380.04	1E 3992	293.25	N	25.31mOD	OG		1:50		2230	502
Dauth	Col	ring, Sam TCR/SCR/	ples & In :	Situ Testing	Dentit	Level	Depth (m)		Strata D	Details			+	Grou Water	ndwater Backfill/
Depth		RQD	FI	Samples & les	Result	(mOD)	(Thickness)	Thick	Stra	ta Description	se grained weat	hered	<u> </u>	Strike	Installation
			4			15 01	(0.44)	SANE	STONE. Discontinuitie	s are closely to	closely spaced	l,	[ ]		
-						10.01		Assur	r rougn, norizontal. med zone of core loss. I	Probable SAN	DSTONE.				
								Thick	ly bedded, reddish brow STONE Discontinuitie	vn, fine to coar s are closely to	se grained weat	hered			
E								plana	r rough, horizontal.			,	[ 11		
								Disco	ntinuities are open, und	ulating rough	infilled with redd	ish	; ···		
								mediu	n, fine to coarse sand, s um sandstone gravel.	ubangular to v	ery angular, fine	and	E		
								Thick	ly bedded, reddish brow	vn, fine to coar	se grained weat	hered			
								plana	r rough, horizontal.			',			
									End of B	orehole at 10.3	Um				
-															
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<b>—</b>		Fluck	Details		Borch	ole Diame	er l		Boring Progress		Remarks:		20		
Top (m)	Base	(m) Flush	sh Type	Flush Return %	Depth	m) Dia (m	m) Da	ate	Time Depth (m) Cased (	m) Water (m)	ncinalNo.				
											SDT Hommon	N/D Enorm D-		,	
					Casir	ng Diamete	er		Water Stri	ikes	SPI Hammer:	Monite	o: N/R	stallation	S
					Depth	(m) Dia (m	m) Strike	(m) Case	ed (m) Sealed (m) Time (mins	Rose to (m)	Remarks	Top (m) Base	(m) Pi	іре Туре	Dia (mm)
0	- L		DC 1		4										
	:u Dy	/. · P	RELIM	IFA RC v01.01											

			Plant used:				Project:				Location ID:			
G	IAN FA	RMER	Com	nachio	205		Manchester Northern	Gateway Flood Defence	and Alleviation	Works	4	RF	20	
	ASSOC	IATES	Dates:	04 00 <i>1</i>	11/0004		Client:							
			05/11/202	21 - 08/	11/2021		One week lawale	Volker Stevin	N/		Shee	t 1 of 1		
Dyna	mic Sam	pling		55 300	251 501							ວດ ວາງວາມ:	502	
and Ro	Sampler		304437.7	 ∩⊏288′	101.091	N	ZU. IOIIIUU		1:50			223U		
Depth	Sample ID		Test Result	Level	Depth (m)		Strata	a Description		Legend		Water	Backfill/	
					(0.30)	MAD	E GROUND: Light browr	n, fine to coarse SAND	and		ŧ	Juike	Installation	
0.30 - 0.5	i0 ES1			25.88	0.30	GRA	/EL. Gravel is subangula us lithologies including s	ar to subrounded, fine t andstone, quartz, fine g	o coarse of Irained		ţ			
- 0.50 <b>-</b> 1.0	0 B2				(0.70)		us lithologies and shard	s of glass.	silty gravelly		ŧ			
					(0.70)	fine to	coarse SAND with low	cobble content. Gravel	is		ŧ			
-1.00 - 1.5	5 B3			25.18	1.00	subar	igular to subrounded, fir ling sandstone, quartz a	ne to coarse of various ind fine grained igneous	ithologies , fragments		1			
					(0.55)	of tile	also noted. Cobble are rained igneous.	subrounded including s	andstone and					
-					1.55	Light	grey, slightly sandy GRA	AVEL with low cobble co	ontent. Gravel		ŧ			
			1.55m - SPT(S) 50 (25 for 105mm/50	24.63		incluc	angular to subrounded, ling sandstone, quartz a	fine to coarse of igneou nd fine grained igneous	us lithologies					
-			for 70mm) 1 55m - C			Weak	, reddish brown, fine to	coarse grained, thickly	bedded and medium		2			
1 55 2 0	100	6	2.05m - C		(1 50)	graine	ed gravel of sandstone a	and quartz. Discontinuiti	es are 0-8°,					
1.00 - 3.0	70	Ū	2.36m - C		(1.50)	tight c	clean, undulating rough.				-			
			2.55m - C											
			2.78m - C											
-		NR	3.15m - C	23.13	3.05	Weak	, locally very weak, fine	to coarse grained, thick	ly bedded	· · · · · ·	-3			
			3.26m - C			graine	DSTONE with rare subro ed gravel of sandstone a	ounded to rounded, fine and quartz. Discontinuiti	and medium es are 0-8°,		Ē			
Ē	91	4	3.55m - C			tight o	clean, undulating rough.	0-45° open, undulating	rough.		-			
3.05 - 4.5	5 83	NI	3.02m C		(1.50)									
È-	70		4.04m - C								- 4			
		4												
-				21.63	4.55	Accur	mod zono of coro loss I	Inable to recover same	lo duo to		Ę			
						water		Shable to recover samp						
-											5			
4 55 - 6 0	15	AZCI	5.18m - C		(1.50)									
		1202			(1.00)						Ē			
											-			
-				00.40	0.05						6			
				20.13	6.05		End of B	orehole at 6.05m			Ē			
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	Dynamic	FI Sample Re	Samples & Tests ecovery	Remarks	 s:									
Top (m) B	Base (m) Dia	(mm) Reco	very % Remarks	Drilled fro	om ponto	on.	bod							
	ouata depuis delow river ded.													
				SPT Har	nmer: N/F	R, Ener	gy Ratio: N/R							
				Strike (**		n) 900-	Water Strikes	n) Domorica		lonitoring	Insta	llations	Dia (mm)	
					, judaseu (f	iiiiloeale				ase (III)	- ipe	туре	(חחו) אים (	
Checke	d by:	RC	IFA DS	1										
Log sta	itus:	PRELIN	1 v01.01											

			Plant used:				Project:		Location ID:				
:0	IAN FA	RME	R Co	ommachio	205		Manchester Northern	Gateway Flood De	efence and Alle	viation Works		DE	24
	ASSOC	CIATES	S Dates:				Client:					KE4	21
				04/11/202	1			Volker Stev	vin		Shee	et 1 of 1	
	Rotary		Location:				Ground level:	Logged by:	Vertical	scale:	Proje	ect ID:	
Bo	orehole L	og	38448	8.75E 3993	399.55N	1	26.20mOD	CG		1:50		2230	502
	Coring, Sam	ples & In :	Situ Testing	Level	Dopth (m)		Strata D	Details				Grou	ndwater Bookfill/
Depth	RQD	FI	Samples & Test Re	sult (mOD)	(Thickness)	SILT	Stra	ata Description		Legend		Strike	Installation
					(0.40)	SILT	and debits (Dimers desc	cription).			ŧ		
[				25.80	0.40	Granu	ular material, probable S	SAND and GRAVE	L. (Drillers		2 -		
		ОН			(0.70)	descri	iption).		,		• •		
					(0.70)								
				25.10	1.10	SAND	OSTONE (Drillers descri	iption)			· - 1		
			1.40m - SPT(S)	50 24.80	(0.30)	Week	raddiah brown fina ta	occurse grained th					
-		NR	(25 for 60mm/50	D		SAN	STONE with rare subro	ounded, fine grained, tr	ed gravel of q	uart	- -		
		8	1.70m - C		(0.82)	and so	andstone. Discontinuitie , undulating rough.	es are 0-5°, closely	y spaced, tigh	t			
-	87		1.86m - C 1.96m - C			,	,			: <b>-</b> 2			
1.40 - 2.5	60	NI		23.98 23.93	2:27	Reddi	ish brown, clayey, suba	ngular to subround	ded, fine to co	arse	,		
ŀ		6	2.4011 - C			\GRAV Weak	GRAVEL including quartz and sandstone. // Weak, reddish brown, fine to coarse grained, thickly bedded						
:			2.68m - C		(0.91)	SAND	OSTONE with rare subro	ounded, fine grain	ed gravel of q	uart	:		
F		NR	1		cle	clean,	clean, undulating rough.						
-			3.33m C	23.02	3.18	Weak	, locally extremely weal	ine to coarse	· · · · · ·	:-			
-	80		3.33m - C			graine	ed, thickly bedded SAN	DSTONE. Discont	inuities are 0-	12°, ····	-		
2.90 - 4.4	0 77					throug	gh, undulating rough. W	/eathered in place	s.				
	47		3.93m - C										
		5								• • • •	4		
-			4.44m - C							••••	: - 		
-					(2.72)					••••	Ē		
											:[		
440-50	100		5.08m - C								5		
. 4.40 - 3.3	80	NI	_							• • • •	:		
-		6	5 60m - C								: [		
		0	0.00111 0								:		
-				20.30	5.90		End of E	Borehole at 5.90m			6		
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E											- 10		
	Flush	Details	B	orehole Diame	ter		Boring Proaress	Rer	narks:				<u> </u>
Top (m) E	Base (m) Flu	sh Type	Flush Return % De	epth (m) Dia (m	nm) Da	te	Time Depth (m) Cased (	m) Water (m) Dril	led from ponte	oon.			
					04/		10.00 0.90 1.40	Stra	ata ueptris Del	ow river bea.			
								en	T Hammor: N	R Energy Det		2	
			(	Casing Diamet	er		Water Stri	ikes	i nammer. N	Monite Monite	oring In	stallation	s
			De	epth (m)∣Dia (m	nm) Strike	(m) Case	ed (m) Sealed (m) Time (mins	Rose to (m) R	emarks	Top (m) Base	(m) P	іре Туре	Dia (mm)
Cheek	d by:												
Log sta	atus: P	RELIM	IFA RC v01.01										

			Plant used:				Project:						Location ID:			
G	IAN FA	RMER	Com	acchio	205		Manchester Norther	n Gateway Flo	bod Defence a	and Alleviation	Works	_	RE	22		
	ASSOC	JATES	09	/02/202	2		Client.	Volker	Stevin							
	Potony		Location:	02,202			Ground level:	Logged by:		Vertical scale:		Shee Proje	et 1 of 1 ect ID:			
Bo	brehole L	og						N	ID	1:50	1		2230	502		
	Coring, Sam	ples & In S	Situ Testing	Laval	F	1	Strata	Details			1		Grou	undwater		
Depth	TCR/SCR/ RQD	FI	Samples & Test Result	(mOD)	Depth (m) (Thickness)		Str	ata Description	1 		Legend	1	Water Strike	Backfill/ Installation		
			N=25 (1,3/4,4,3,14)		(0.50)	metal	cobbles of sandstone	, foam and ti	mber.	e, corroded		t.				
-			-0.50m - SPT(C) 70		0.50	No.ro			. No recovery.	vn modium		<u> </u>				
			(11,14/70 for 236mm)			graine	ed SANDSTONE.		eak, ieu biol	vii, mealain		: [				
0.50 - 1.5	50 0	NR	,		(1 15)	NO	recovery, assumed zone o	ir core loss.				: - 1				
	0				(1.13)											
-		4701	-			Bet	ween 1 50m and 1 65m a	ssumed zone o	f core loss			· -				
-		AZCL	1		1.65	Very v	weak, medium grained	, red brown S	SANDSTONE	with rare						
—1.50 - 2.5	85 50 62	10			(0.95)	fine a	nd medium gravel size z. Clasts are subround	d clasts of sa ed to rounde	sts of sandstone, mudstone and rounded.			: - 2				
	34				(0.65)	Bet spa	tween 1.65m and 2.40m: a aced, undulating clean.	iscontinuities ai	re 0-5 degrees,	closely		: [				
-		NI	2.50m - SPT(C) 50		2.50	Bet	tween 2.40m and 2.50m: n	on intact.				:				
			(25 for 30mm/50 for 40mm)			graine	covery, assumed to be ed SANDSTONE. Drille	extremely we r notes sand	eak, red brov Istone breaki	vn, meaium ng up to		: [				
			3.00m - SPT(C) 44			sand a Bet	and jamming between tween 2.50m and 5.50m: n	inner and ou o recovery.	ter barrels.			- 3				
: 2.50 - 4.0			(25 for 20mm/44													
-	0											:				
												·				
-		NR										: - 4				
					(3.50)							· - : -				
-					()							:[				
4 00 - 5 5	50 0											:  - :  -				
	0											- 5				
		AZCI				Bet	ween 5.50m and 6.00m: a	ssumed zone o	f core loss.							
L L					6.00							· - 6				
5 50 - 7 0	66 00 33	NI			0.00	Very v freque	weak, medium grained ent fine and medium g	, red brown S avel sized cla	SANDSTONE asts of sands	with stone,		:				
	27		_			mudst unwea	tone and quartz. Clast athered.	s are subrour	nded to round	led., partially		: [				
						Bet Bet	ween 6.00m and 6.50m: n ween 6.50m and 8.00m: o	on intact. Iiscontinuities a	are 0-5 degrees	, closely		:				
-						spa	aced, undulating clean and	infilled with me	dium sand.			- 7				
-		10			(2.50)											
-					( /							: -				
7.00 - 8.5	100 50 49											: -				
_	10						0.00					: [ · – 8				
		0				Bet	ween 8.00m and 8.10m. n ween 8.10m and 8.50m: (	discontinuities a	re 0-5 degrees	, closely						
		0	_		8.50	unc	dulating, smooth clay infille	d. Desetede et 0	Com			:				
ŀ							End of	DUI ENDIE AT 8.	.5011			ŀ				
ŀ												- 9				
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-			-									- 10				
Ton (m)	Flush	Details	Boreh	ole Diame	ter	to	Boring Progress	(m) Materia	Remarks:	m no=+	1	1	1	1		
10p (iff) [E	лаъс (III)  FlU	эн туре		(iii)[Dia (fř	09/	02 (	00:00 8.50 3.0	) vvater (m	Strata dep	ths below rive	er bed.					
				na Diamot			M/-4- 01	rikoo	SPT Ham	mer: N/R, Ene	ergy Rat	tio: N/F	۲ etollotia			
					nm) Strike	(m) Case	vvater St ed (m) Sealed (m) Time (min	s)Rose to (m)	Remarks	Top (n	n) Base	(m) P	ipe Type	e Dia (mm)		
Checke Log sta	d by: atus:	RELIM	IFA RC v01.01													
-											_	_				

		RMER	Plant used:				Project: Manchester Northern Gateway Flood Defence and Alleviation W						Location ID:				
<b>iP</b>	ASSOC	IATES	Dates:				Client:	,,,,,,,,				- RE23					
-			17	/02/202	2			Volker S	Stevin			Shee	t 1 of 1				
	Rotary		Location:				Ground level:	Logged by:	Vertica	al scale:		Proje	ct ID:	502			
Во		oles & In S	itu Testina	1			Stra	ata Details	)	1.50			Grou	JUZ			
Depth	TCR/SCR/ RQD	FI	Samples & Test Result	Level (mOD)	Depth (m) (Thickness)		0	Strata Description			Legend		Water Strike	Backfill/ Installation			
- 0.00 - 1.0	0		0.00m - B2 0.00m - ES1		(	MADE to coa includ	E GROUND: Bed se arse SAND. Gravel i ding brick, coal, ash,	ediments consistir is angular to subr , clinker, quartz ar	ng of black gravell ounded, fine to co nd pottery.	ly, fine barse		-					
- 1.00 - 2.0	0		1.00m - ES3		(2.00)							- 					
- - - - - -					2.00	No re cases	ecovery, driller record s through.	ds coarse gravel a	and cobbles. Drille	ər		- 2					
- 2.00 - 3.0	0				(1.00)							3					
. 3.00 - 4.5	81 0 58 48	AZCL 4 NI				Weak unwe	<, red brown, mediur athered.	n grained SANDS	TONE, partially								
		2 NI	-			Bei sub and	low 4.50m: with occasic brounded to rounded, fii d mudstone.	onal gravel size clast ne and medium inclu	s. Clasts are ding quartz, sandsto	ne		- - - - - - - -					
4.50 - 6.0	100 0 86 61	. 15			(4.50)												
: - - : 6.00 - 7.5 - -	93 0 86 82	6										- - - - - - - - - - - - - - - - - - -					
		AZCL			7.50		End	of Borehole at 7.5	0m		· · · · · · · · · · · · · · · · · · ·	-					
												- 8					
												- 9					
- - 												- - 10					
Top (m) B	Flush ase (m) Flus	Details sh Type   I	Boret	nole Diame (m) Dia (n	nm) Dat	te	Boring Progress Time Depth (m) Car	sed (m) Water (m)	Remarks:		Morite	ing la-	stallation				
				(m) Dia (n	nm) Strike	(m) Case	ed (m) Sealed (m) Time (	mins)Rose to (m)	Remarks	Top (m	) Base (i	m) Pi	pe Type	Dia (mm)			
Checkee Log sta	d by: tus: P	RELIM	IFA RC v01.01														