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22nd March 2019

By email only

For the attention of Mr. James Ayres

Scheme : w10833 – Abbey Road, Wrexham Industrial Estate

Subject : Assessment of Ditch

This letter supports work undertaken to determine the origin of a ditch within the proposed development site on land north of Abbey Road, Wrexham Industrial Estate.

Development Proposal

The development proposal is for the construction of a gas fired Power Station comprising the installation of six engine generator sets with associated radiators, electrical equipment, gas supply equipment, 2No. engine control rooms and amenity / client cabins. A Proposed Site Plan is enclosed.

Site Walkover

A walkover of the site was completed by a Waterco Engineer on 11th January 2019.

The purpose of the site walkover was to assess an identified ditch within the site to confirm its connectivity, if any, to the public drainage system or river network and whether its removal as a result of a proposed development would have a detrimental effect on flood risk elsewhere.

The findings of the site walkover are summarised below. A photographic log of the principal

File Ref: W10833-190322- Letter



observations is enclosed.

During the walkover the weather was damp, with the ground underfoot slightly damp but not wet. Antecedent weather conditions in the week prior to the site walkover had been dry with intermittent showers.

Site Setting and Reconnaissance

The site covers an area of approximately 3,385m² and is located at the southern extent of Wrexham Industrial Estate at National Grid Reference: 338686, 349512 (photographs 1 and 2). A site location plan and aerial image are enclosed. The site comprises an area of disused land which was overgrown with several large trees, bushes and brambles covering the site (photograph 3). The site is bordered by Abbey Road with industrial units to the west, industrial units to the north and east and Oak Road with scrubland beyond to the south.

The Ditch

A ditch, approximately 46m in length, was identified running north-west to south-east, across the central extent of the site (photograph 4). The ditch was between 0.5m-1m deep and approximately 3.5m wide. The ditch was edged with stone at the north-western extent for approximately 4m (photograph 5). The remainder of the ditch appeared to be edged by natural banks. The ditch was overgrown and contained small trees and other vegetation (photograph 6). The ditch appeared generally dry (taking account of the damp conditions) with no significant evidence of flowing water or standing water within the ditch.

A 1.5m wide x 1.5m long x 1.2m deep manhole chamber (external measurements) was identified at the north-western extent of the ditch (photographs 7 and 8). The manhole chamber is brick built with a concrete cover. No inspection cover associated with the manhole was identified, or evidence of any openings observed. A 0.5m diameter clay pipe outfall was identified protruding from the base of the manhole chamber (photograph 9). No water was witnessed flowing from the clay pipe outfall, although the surrounding ground was wet with silt over vegetation observed at the outfall, indicating evidence of recent flows (photograph 10).

Approximately 4m east of the manhole chamber a 0.4m diameter clay pipe outfall was identified protruding from the ground (photograph 11 and 12). The 0.4m clay pipe outfall appears to feed into the ditch with silt over vegetation observed at the outfall, however no water was witnessed flowing

File Ref: W10833-190322- Letter



from the pipe. The 0.4m clay pipe outfall also contained debris and was overgrown with vegetation (photograph 13).

A stone wall was located at the south-eastern extent of the ditch (approximately 2.5m from the southern boundary of the site) (photographs 14 and 15). The stone wall is 2m wide x 0.5m deep and forms the end of the ditch. The ground at the south-eastern extent of the ditch was dry with no evidence of water present. An outlet was not identified within the wall however, if present this may have been obscured from view by vegetation and/or siltation. An annotated Site Plan, which shows key features and photograph locations is enclosed.

Local Topography

Topographic levels to metres Above Ordnance Datum (m AOD) have been derived from a 1m resolution Natural Resources Wales (NRW) composite 'Light Detecting and Ranging (LiDAR) Digital Terrain Model (DTM)'. A review of LiDAR shows that the site is generally flat with levels ranging from 30.733m AOD to 30m AOD. The base of the ditch is shown to be 29.4m AOD. A LiDAR extract is enclosed.

Flood Risk

The nearest watercourse is Redwither Brook which is located approximately 320m south-west of the site. Redwither Brook flows south-east to join the River Clywedog approximately 480m south-east of the site. Other watercourses in the area include a land drain located approximately 365m north of the site. The land drain flows south-west and becomes culverted in this location.

The combined NRW 'Flood map for Planning' and 'Risk of Flooding from Surface Water' map enclosed, shows that the site is located within Flood Zone 1 – an area outside of the extreme flood extent, considered to have a less than 0.1% annual probability of flooding from rivers or the sea.

The NRW 'Risk of Flooding from Surface Water' map enclosed, shows that the central extent of the site (in the location of the ditch) is shown at low risk of surface water flooding, meaning it has between a 1% and 0.1% annual probability of flooding. No surface water flow route from off-site is shown. The low risk of surface water shown on the NRW 'Risk of Flooding from Surface Water' map corresponds to the location of the ditch and is therefore associated with the low topographical level at the base of the ditch compared with the surrounding area. As shown on the NRW 'Risk of

File Ref: W10833-190322- Letter



Flooding from Surface Water' map, there are no flow routes directing any surface water towards the site.

Drainage Survey

A CCTV drainage survey has been carried out by Invek Surveys Ltd in February 2019 to determine whether the ditch within the site has wider connectivity to local watercourses or the public drainage network and to establish its onward destination from the site. A Drainage Layout Plan is enclosed.

As shown on the Drainage Layout Plan, the ditch crossing the central extent of the site runs from south-east to north-west (not as originally indicated during the site walkover) with the upstream inlet located near the southern boundary in the south-western extent of the site. The upstream inlet to the ditch is shown to originate from beyond the access road from MH11 to the south-east of the site. The upstream inlet to the ditch was found to be 100% blocked with oily sludge, silt and litter, appearing unused and in poor repair.

At the downstream extent of the ditch, the 375mm diameter clay pipe inlet to the ditch located approximately 4m east of concrete manhole chamber SJ38496550-MH01, was surveyed and found to contain water to 6.15m upstream of the inlet. Beyond 6.15m the drain was found to be 90% blocked with sludge and silt. The drain was in poor repair and could not be surveyed beyond 6.15m upstream of the inlet therefore the origin of the drain is unknown.

A survey of the concrete manhole chamber located at the downstream extent of the ditch (manhole MH01) found 3No. inlets which appear to be unused and 2No. 300mm outlet drains flowing north-west to manhole SJ38496552-MH03, which is located in the western extent of the site.

Manhole MH03 was found to contain 4No. drain inlets in addition to the 2No. 300mm drain inlets from MH01. These included a 225mm drain originating from north of the site, a 225mm drain originating from south-west of the site at SJ38496551-MH02 and 2No. surface water highway drains originating from west of the site in Abbey Road. Manhole MH03 is drained via 2No. 300mm drain outlets which flow west beneath Abbey Road to an unidentified manhole.

The drainage survey also identified a drain within the eastern extent of the site (diameter unknown), which flows south-west then south-east following part of the eastern boundary of the site. The drain

File Ref: W10833-190322- Letter



flows to manhole SJ38497453, which is located on the pavement adjacent to the south-eastern corner of the site. This drain was not surveyed.

The drainage survey identified an enclosed concrete pipe in the eastern extent of the site, the use and connectivity of which is unknown.

Conclusions

A review of the surrounding watercourses and anecdotal information with regard the local public drainage system indicates that the ditch is not associated with a culverted watercourse and is not part of the public drainage system.

During the site walkover, the ditch located within the site was found to have no visible standing water present. There was no evidence of any flows into the ditch from the upstream outlet or any significant flows at the downstream extent of the ditch from the 375mm diameter clay pipe inlet 4m east of the main concrete manhole chamber.

The drainage survey shows that the upstream inlet into the ditch is no longer in use and that the 3No. inlets within the chamber immediately downstream of the ditch appear unused, confirming that the ditch no longer functions as originally intended.

At the downstream extent of the ditch the 375mm diameter clay pipe inlet to the ditch was found to contain water to 6.15m upstream of the inlet. However, beyond 6.15m the drain was found to be 90% blocked with sludge and silt. The origin of the 375mm drain is unknown, however it is likely based on the very small flows to the ditch that the drain is redundant or serves a very limited catchment. Based on the very small amount of water observed to be entering the ditch from the 375mm inlet, it can be assumed that the 2No. 300mm outlets from concrete manhole chamber MH01 are largely unused. It can be concluded that the ditch does not have connectivity to the surrounding watercourses and facilitates negligible flows within the public / highway sewer system and could therefore be dismantled and the ditch infilled subject to a diversion of both the upstream and the downstream inlets.

In order to facilitate the infilling of the ditch and the removal of MH01 and associated infrastructure, a new piped drain will be formed from the inlet upstream of the ditch to MH03 within the north-west of the site or MH02, following a path conducive to the development. This will allow the ditch, MH01

File Ref: W10833-190322- Letter



and the 2No. 300mm pipes leading from MH01 to be removed. Given the current condition of the outlet into the ditch this is considered to offer significant betterment over the existing situation.

Furthermore, if the 375mm pipe identified at the downstream extent of the ditch is traced as part of the enabling works and is found to be active, this should be replaced with a new pipe outfalling to MH03 following a path conducive to the development. Alternatively, the 375mm drain could be diverted to the to the drain identified adjacent to the eastern boundary of the site.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Josh Rigby', followed by a horizontal line.

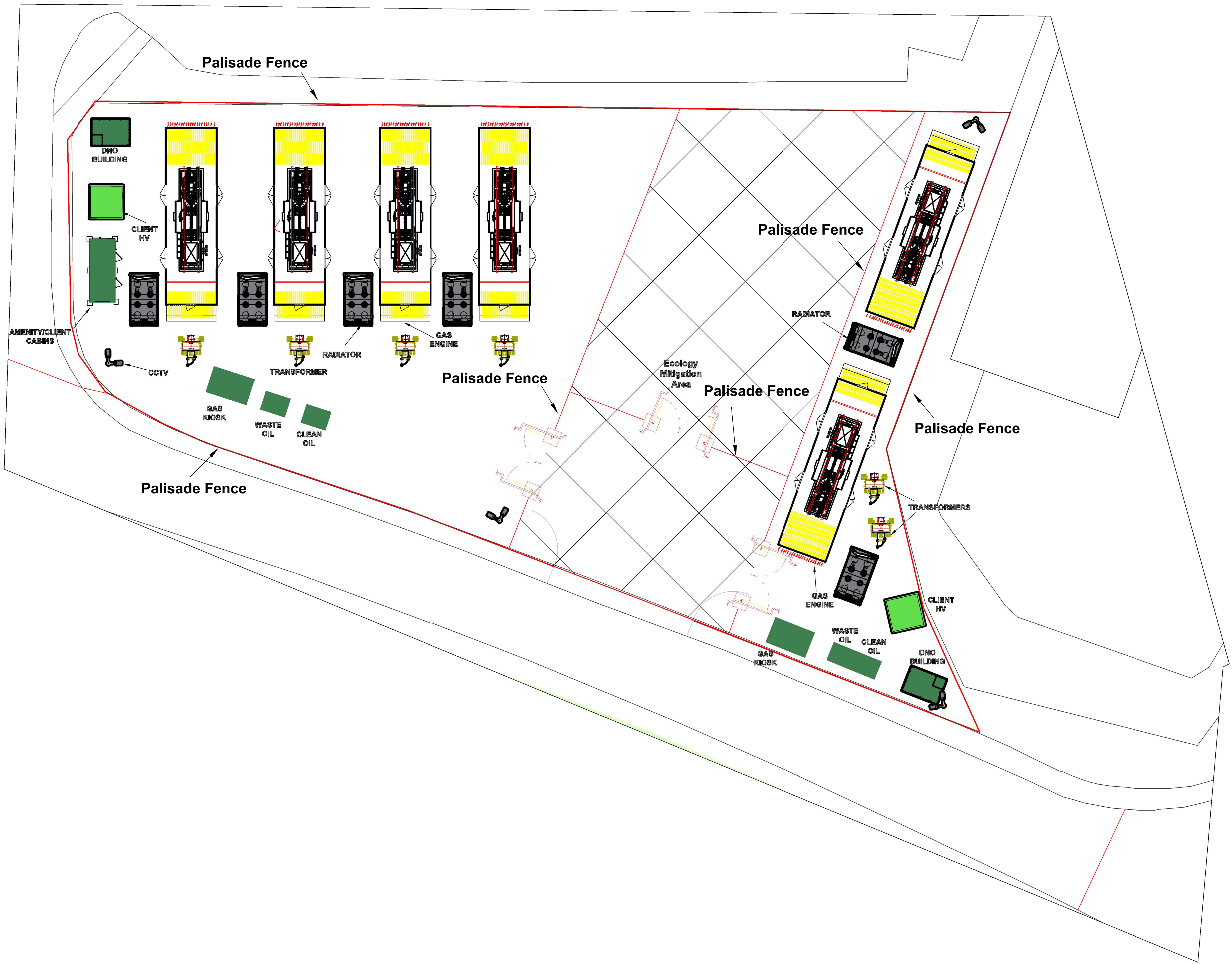
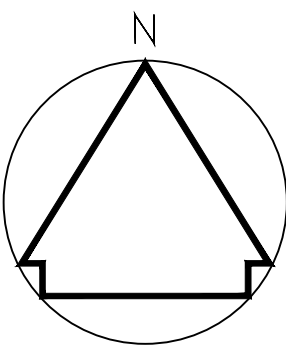
Josh Rigby BSc (Hons)

Josh.rigby@waterco.co.uk

Enclosures

File Ref: W10833-190322- Letter





Rev	Date	By	Details	App'd
E	15-10-18	JS	Layout Change	JA
D	11-10-18	JS	Layout Change	JA
C	01-10-18	JS	Layout Change	JA
B	25-09-18	JS	Transformers Added	JA
A	15-08-18	JS	First Issue	JA



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PROJECT	Wrexham		
CLIENT	Conrad Energy		
TITLE	Proposed Site Plan		
Scale	1:200	Dwg. No.	WXM-PSP-01
Rev	AT		

Photo No. 1 & 2	Job Reference & Number: w10833 – Abbey Road, Wrexham Industrial Estate	
Date: January 2019		
Description: 1. Looking east towards the site. 2. Looking north-east towards the site		

Photo No. 3 & 4	Job Reference & Number: W10833 – Abbey Road, Wrexham Industrial Estate	
Date: January 2019		
Description: 3. Looking north-west – Site overgrown with trees and vegetation 4. Looking south-east – location and orientation of ditch hidden by undergrowth		

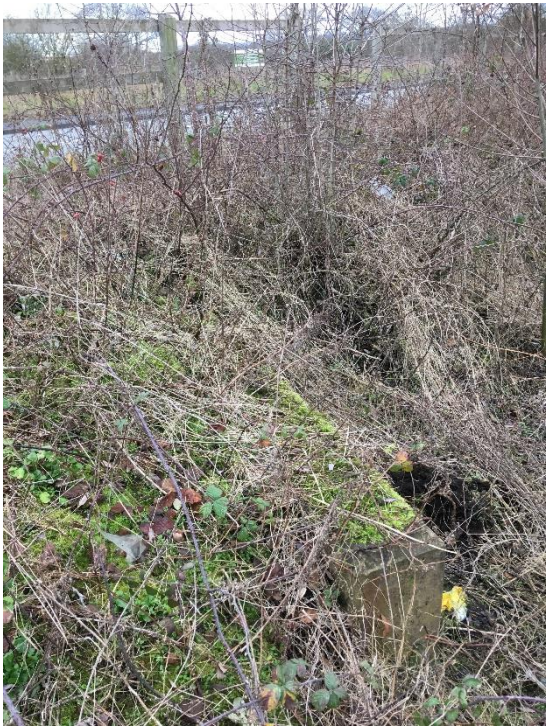
Photo No. 5 & 6	Job Reference & Number: W10833 – Abbey Road, Wrexham Industrial Estate	
Date: January 2019		
Description: 5. Looking north-east – showing stone edge of ditch 6. Looking north-west – showing ditch filled with trees and undergrowth		

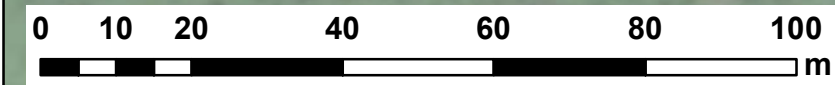
Photo No. 7 & 8	Job Reference & Number: W10833 – Abbey Road, Wrexham Industrial Estate	
Date: January 2019		
Description: 7. Looking north – showing manhole chamber at origin of ditch 8. Looking north-west – manhole chamber from the ditch		

Photo No. 9 &10	Job Reference & Number: W10833 – Abbey Road, Wrexham Industrial Estate	
Date: January 2019		
Description: 9. Looking down at 0.5m clay pipe outfall protruding from manhole chamber 10. Looking at 0.5m clay pipe outfall - showing silt over vegetation within pipe. No water present		

Photo No. 11&12	Job Reference & Number: W10833 – Abbey Road, Wrexham Industrial Estate	
Date: January 2019		
Description: 11. Looking south-east from manhole chamber -showing 0.4m clay pipe outfall approximately 4m east 12. Looking at 0.4m clay pipe outfall - showing debris and silt over vegetation within the pipe		

Photo No. 13&14	Job Reference & Number: W10833 – Abbey Road, Wrexham Industrial Estate	
Date: January 2019		
Description: 13. Looking at 0.4m clay pipe outfall showing debris and silt. No water present in pipe 14. Looking south-east showing stone wall at south-eastern end of ditch		

Photo No. 15&16	Job Reference & Number: W10833 – Abbey Road, Wrexham Industrial Estate	
Date: January 2019		
Description: 15. Looking south at stone wall		

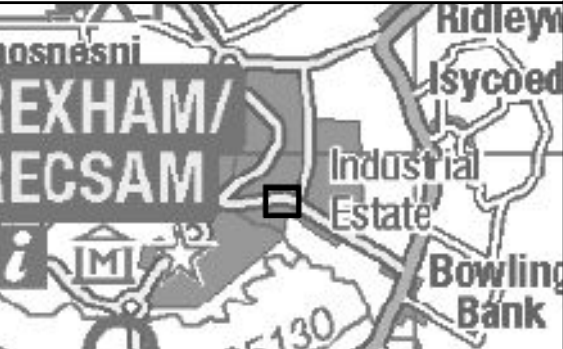


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

 SiteBoundary



CLIENT:



www.waterco.co.uk

SCHEME:

**ABBAY ROAD,
WREXHAM IND. EST**

PLOT TITLE:

AERIAL PLAN

PLOT STATUS:

FINAL

DATE:

22/01/2019

DRAWN:

RP

CHECKED:

SP

APPROVED:

VG

PLOT SCALE @ A3:

1:1,000

(UNLESS STATED OTHERWISE)

PLOT NAME:

w10833 - LOCATION PLAN

REV:

-



NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

SiteBoundary

CLIENT:

www.waterco.co.uk

SCHEME:

**ABBAY ROAD,
WREXHAM IND. EST**

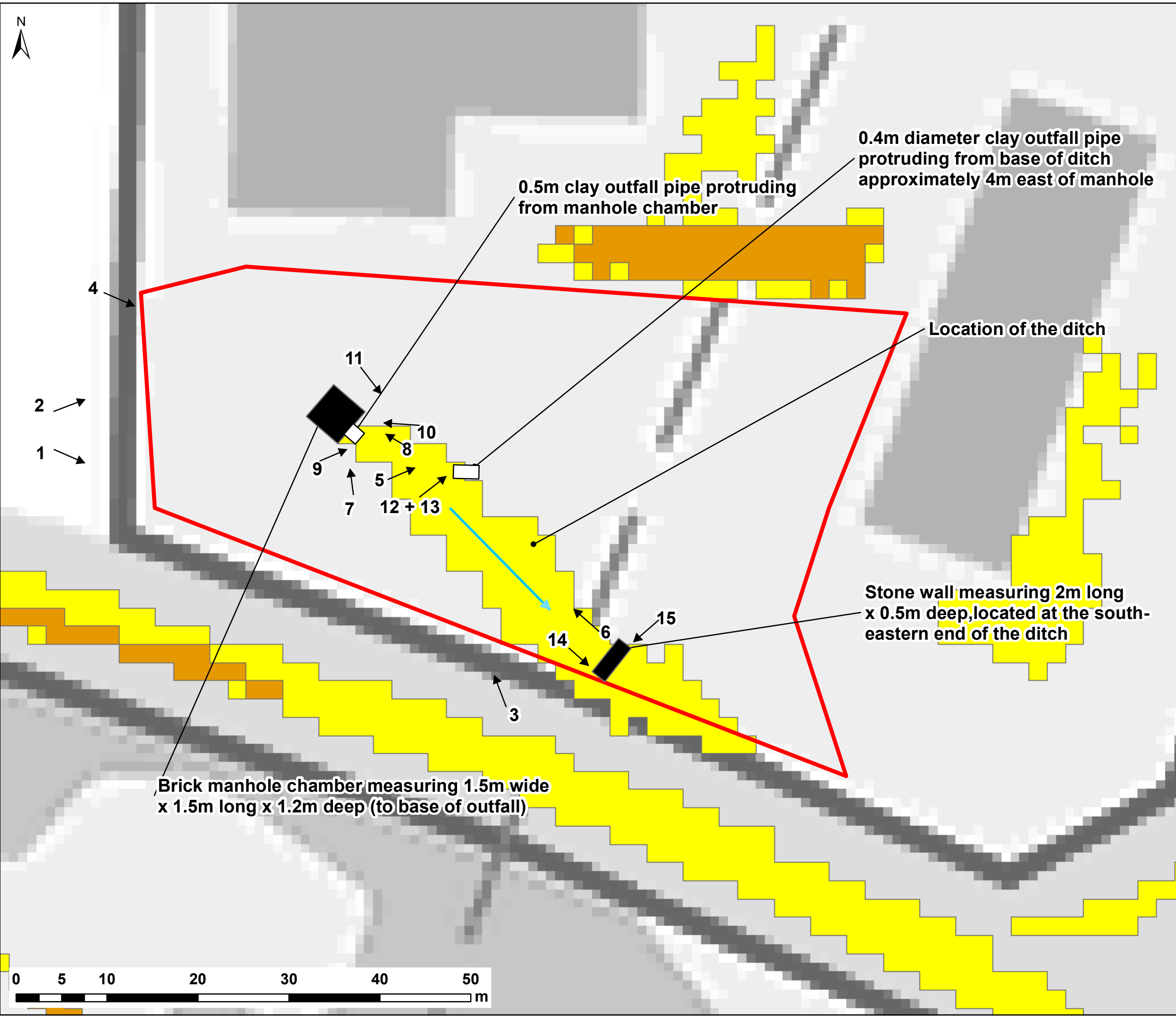
PLOT TITLE:

LOCATION PLAN

PLOT STATUS:			DATE:
FINAL			21/01/2019

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RP	SP	VG	1:1,000
			(UNLESS STATED OTHERWISE)

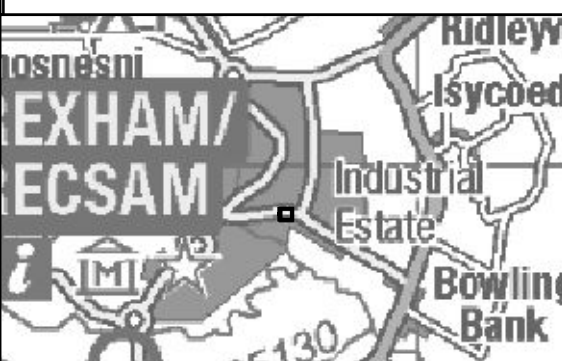
PLOT NAME:	REV:
w10833 - LOCATION PLAN	-



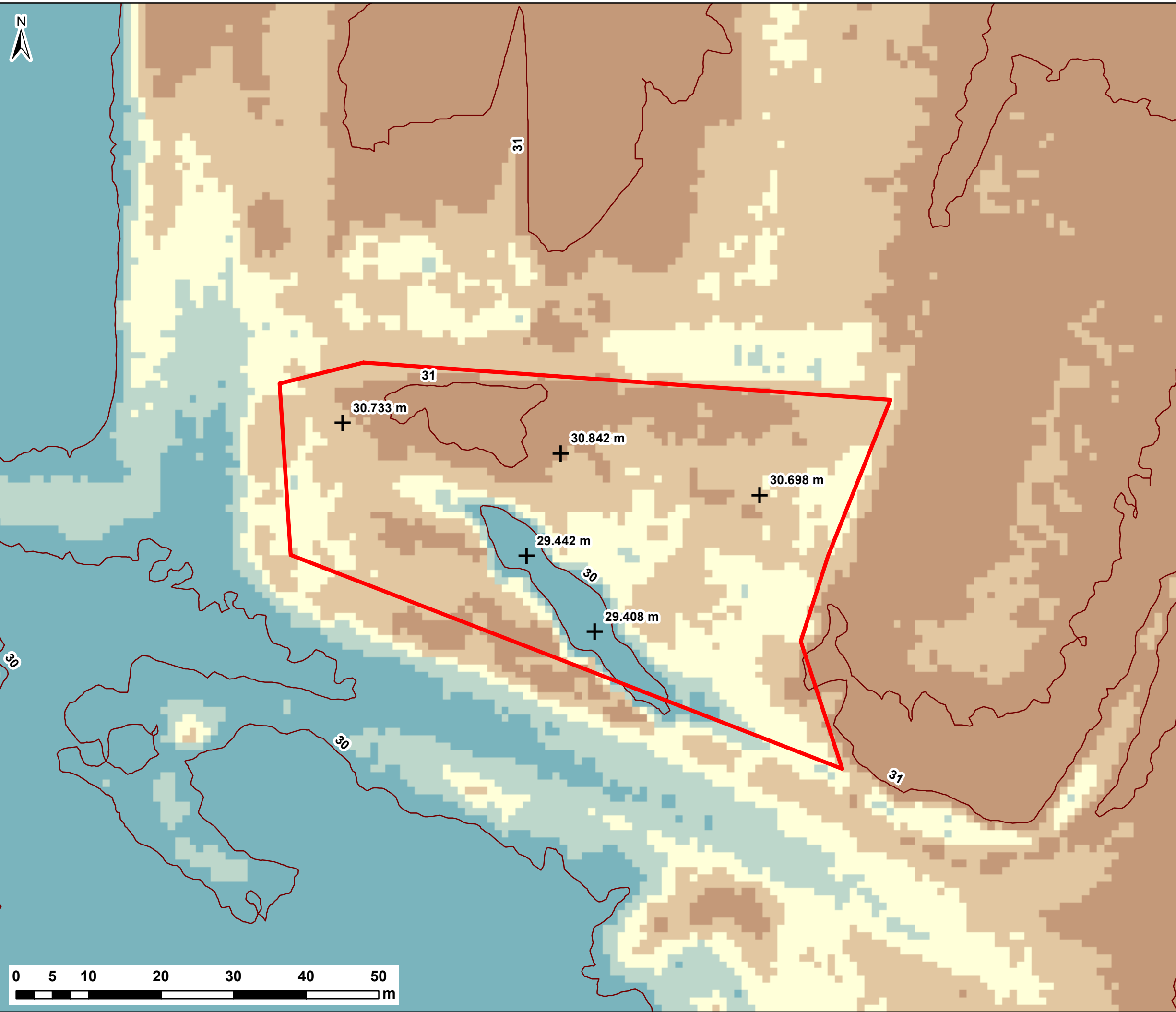
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- SiteBoundary
- High (3.3% AEP Event)
- Medium (1.0% AEP Event)
- Low (0.1% AEP Event)
- Direction and Number of Photographic Log Entries
- Direction of Flow



CLIENT:			
		www.waterco.co.uk	
SCHEME:		ABBEY ROAD, WREXHAM IND. EST	
PLOT TITLE:		NRW FLOOD RISK FROM SURFACE WATER ANNOTATED SITE PLAN	
PLOT STATUS:		FINAL	DATE: 22/01/2019
DRAWN: CM	CHECKED: SP	APPROVED: VG	PLOT SCALE @ A3: 1:400 (UNLESS STATED OTHERWISE)
PLOT NAME: w10833-Annotated_Site_Plan			REV: -



NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

Site Boundary

+ Site Levels

Ground Elevation (mAOD)

	< 30.2
	30.2 - 30.4
	30.4 - 30.6
	30.6 - 30.8
	> 30.8

CLIENT:

www.waterco.co.uk

SCHEME:

**ABBEY ROAD
WREXHAM IND. EST**

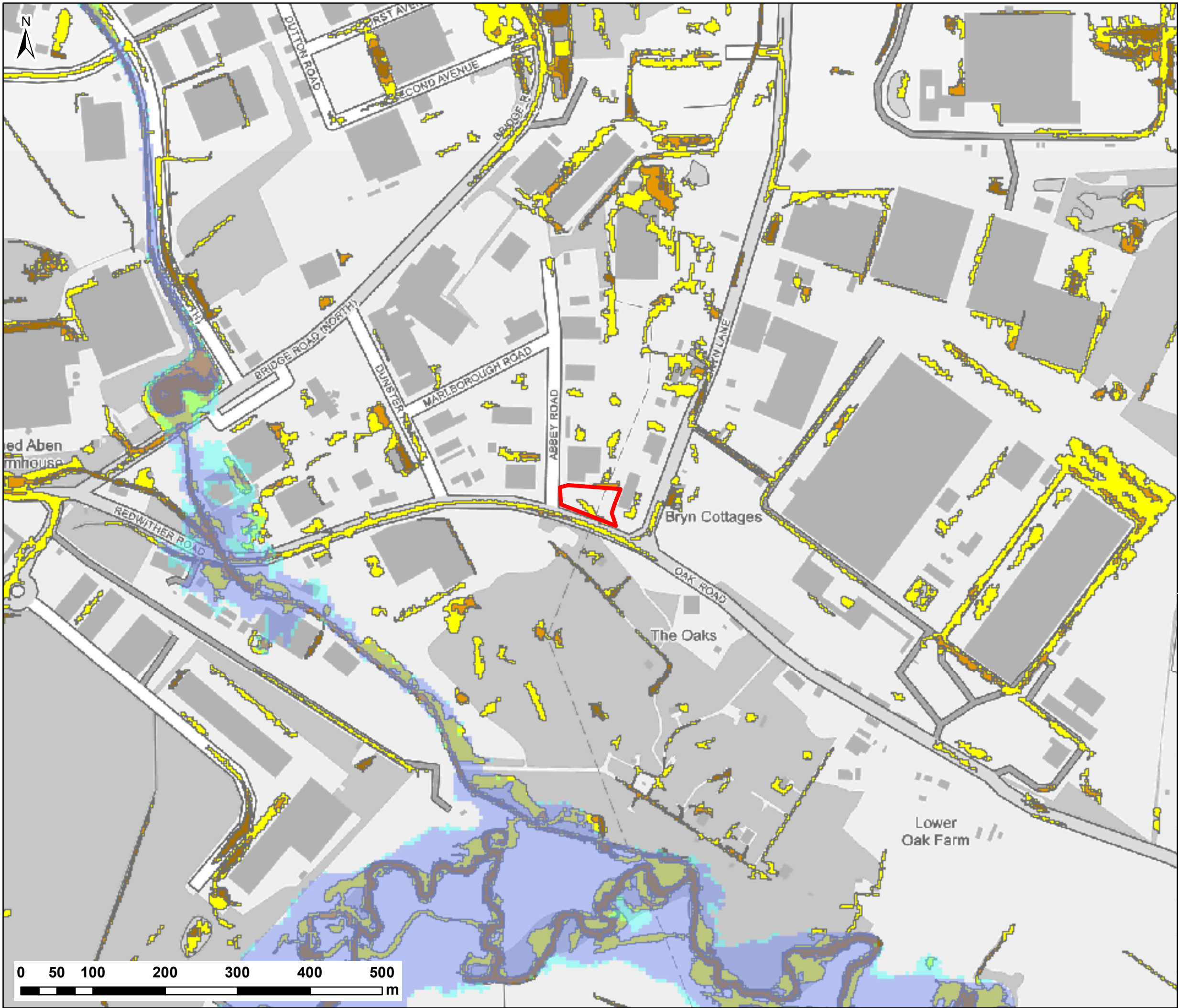
PLOT TITLE:

LIDAR ELEVATIONS
1m RESOLUTION

PLOT STATUS:			DATE:
FINAL			21/01/2019

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
AR	SP	VG	1:500
			(UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w10833_Lidar	-



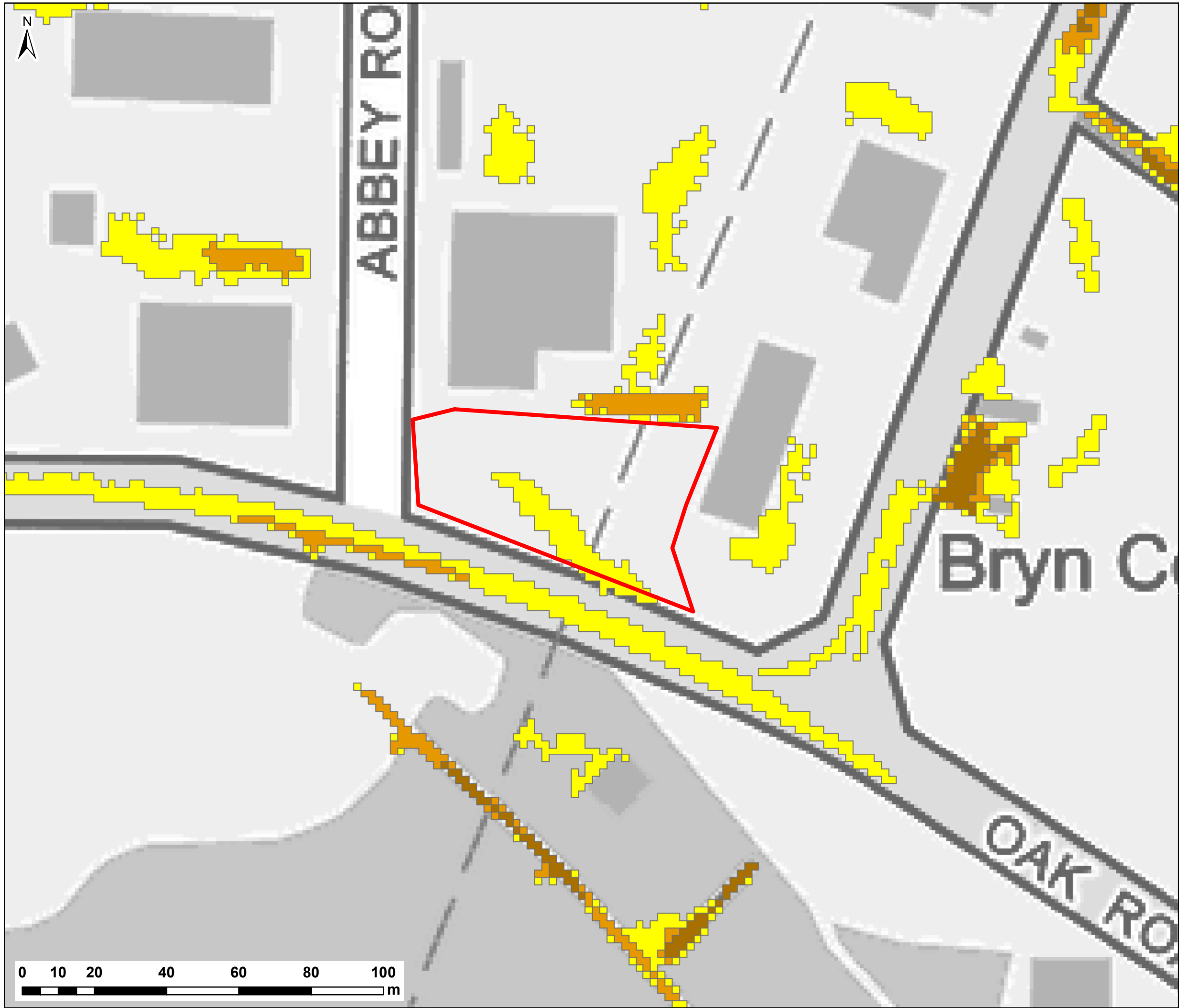
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- SiteBoundary
- NRW Flood Zone 3
- NRW Flood Zone 2
- High (3.3% AEP Event)
- Medium (1.0% AEP Event)
- Low (0.1% AEP Event)



CLIENT:			
		www.waterco.co.uk	
SCHEME:		ABBEY ROAD, WREXHAM IND. EST	
PLOT TITLE:		NRW SURFACE WATER AND FLOOD ZONE MAP JANUARY 2019	
PLOT STATUS:		FINAL	DATE: 21/01/2019
DRAWN: RP	CHECKED: SP	APPROVED: VG	PLOT SCALE @ A3: 1:5,000 (UNLESS STATED OTHERWISE)
PLOT NAME: w10833 - LOCATION PLAN			REV: -



NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- SiteBoundary
- High (3.3% AEP Event)
- Medium (1.0% AEP Event)
- Low (0.1% AEP Event)

CLIENT:

www.waterco.co.uk

SCHEME:

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WREXHAM IND. EST**

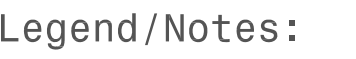
PLOT TITLE:

**NRW FLOOD RISK FROM
SURFACE WATER**

PLOT STATUS:			DATE:
FINAL			09/01/2019

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
AR	SP	-	1:1,000
			(UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w10833-NRW_SW	-



- smas**  **CHAS**
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Approved
- builder's
PROFILE**
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Sheet Size, Drawing Number & Revision

A1_1449/01_Rev_01