

Appendix 10. Land, Soils and Geology

**10.1 Wuxi Biologics WwPTP Site
Investigation Report' (Murphy Group, 2023)**

**10.2 Dundalk Bio-Pharmaceutical Facility
Ground Investigation Report' (Ground
Investigations Ireland, 2019)**

10.1 Wuxi Biologics WwPTP Site Investigation Report' (Murphy Group, 2023)

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LINK TO PROCEDURE & PROCESS MAP

[Preparation and Issue of Method Statements and
Setting to Work Procedure](#)[Preparation and Issue of Method Statements and
Setting to Work Process Map](#)

CLIENT	Wuxi Biologics
CONTRACT TITLE	Wuxi Biologics Wastewater Pre-Treatment Plant
CONTRACT NUMBER	1011-000121
OPERATING UNIT	M6

METHOD STATEMENT

Wuxi Biologics WwPTP Site Investigation Report

Conchubhar O'Tuairisg
Senior Engineer

24/11/23

Graham Sheeran
Project Manager

24/11/23

Ciaran Beirne
Contracts Manager

24/11/23

Wuxi Biologics Ltd
Client / Consultant

AUTHOR	REVIEWER	ACCEPTED BY	ACCEPTED BY CLIENT (if applicable)
DOCUMENT No.		1011-000121_SI_Z_0001_Wuxi Biologics WwPTP Site Investigation	
CURRENT REVISION	CURRENT STATUS CODE	SECURITY CLASSIFICATION	
P01	S4	Official	

REVISION HISTORY

REVISION	STATUS CODE	DATE	REVISION DESCRIPTION
P02	S4	24/11/23	Revised following internal review
P01	S4	23/11/23	Revised following internal review



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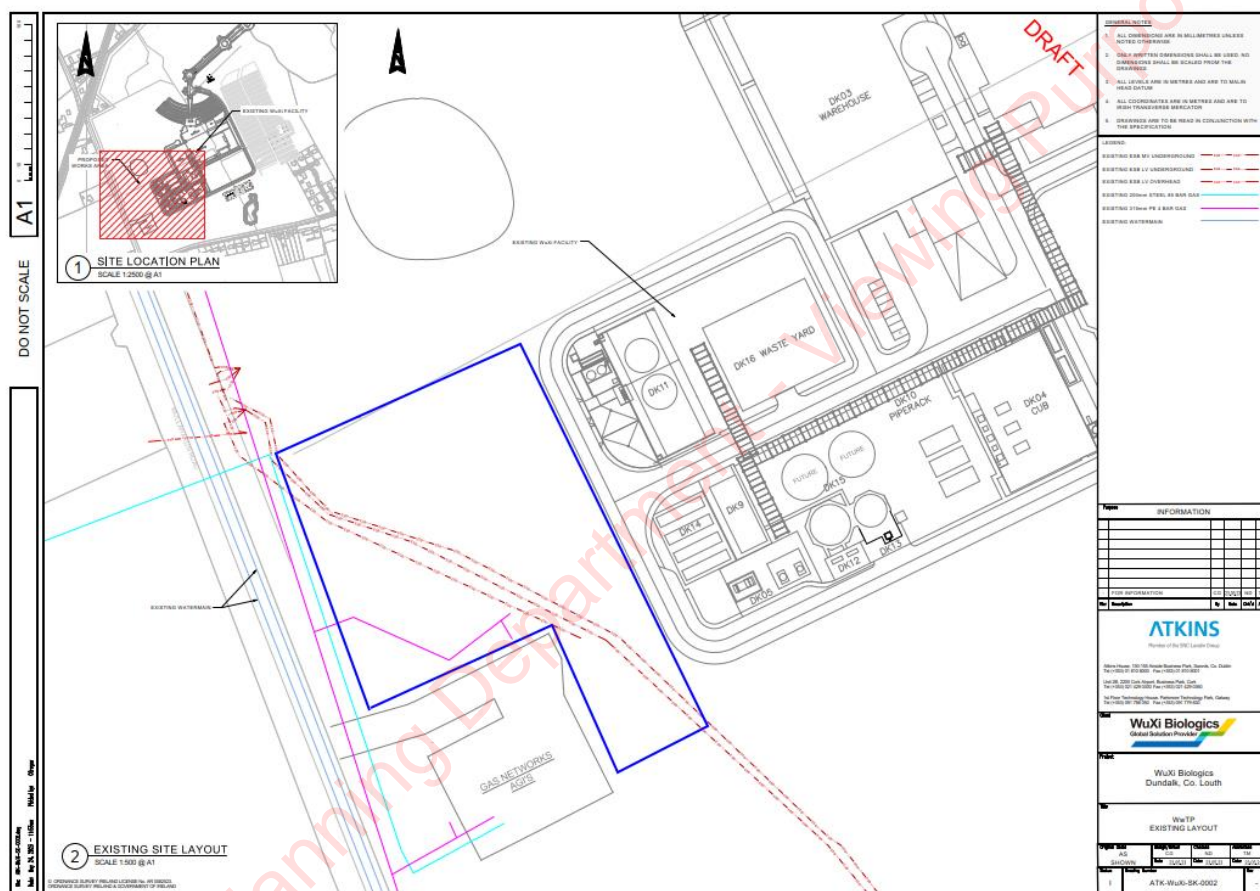
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1 Introduction – Scope of Works

This document sets out the results of the site investigation works at a greenfield site west of the Wuxi Biologics Plant in Dundalk Co Louth. A wastewater pre treatment facility is being proposed at this location.

The proposed location is in a field with known Gas and Electric services. The ESB and GNI were contacted and the latest service drawings consulted. The area outlined in blue is where the proposed WwPTP The red dashed lines below denote the ESB services and the pink and cyan solid lines, denote the Gas services. We also needed to find the gas main feeding the plant from the AGI side, we had no as built information of this pipeline.



The S! was carried commenced on the 15th of Nov 23 and took approximately 1 week to finish, this included mobilising to and demobilising from site.



2 Results and Outcomes

We had a WuXi archaeologist observing our trial pits as they had some potential archaeological interest. No evidence or artifacts found. A GNI inspector was present for excavations on gas mains. We contacted the ESB prox work office each day before excavating near ESB cables and again at the end of the day. (to log on and off). Trial pits and slit trenches were excavated as follows

- 8 no trial pits to determine depth of bedrock and general soil condition.
- 13 no. Slit trenches to confirm location and depth of gas and ESB services

The drawing below shows all the confirmed locations of the services, measured and surveyed with a GPS unit. Individual trial hole sheets have been prepared for all the trial holes and slit trenches, and are attached in the Appendices.

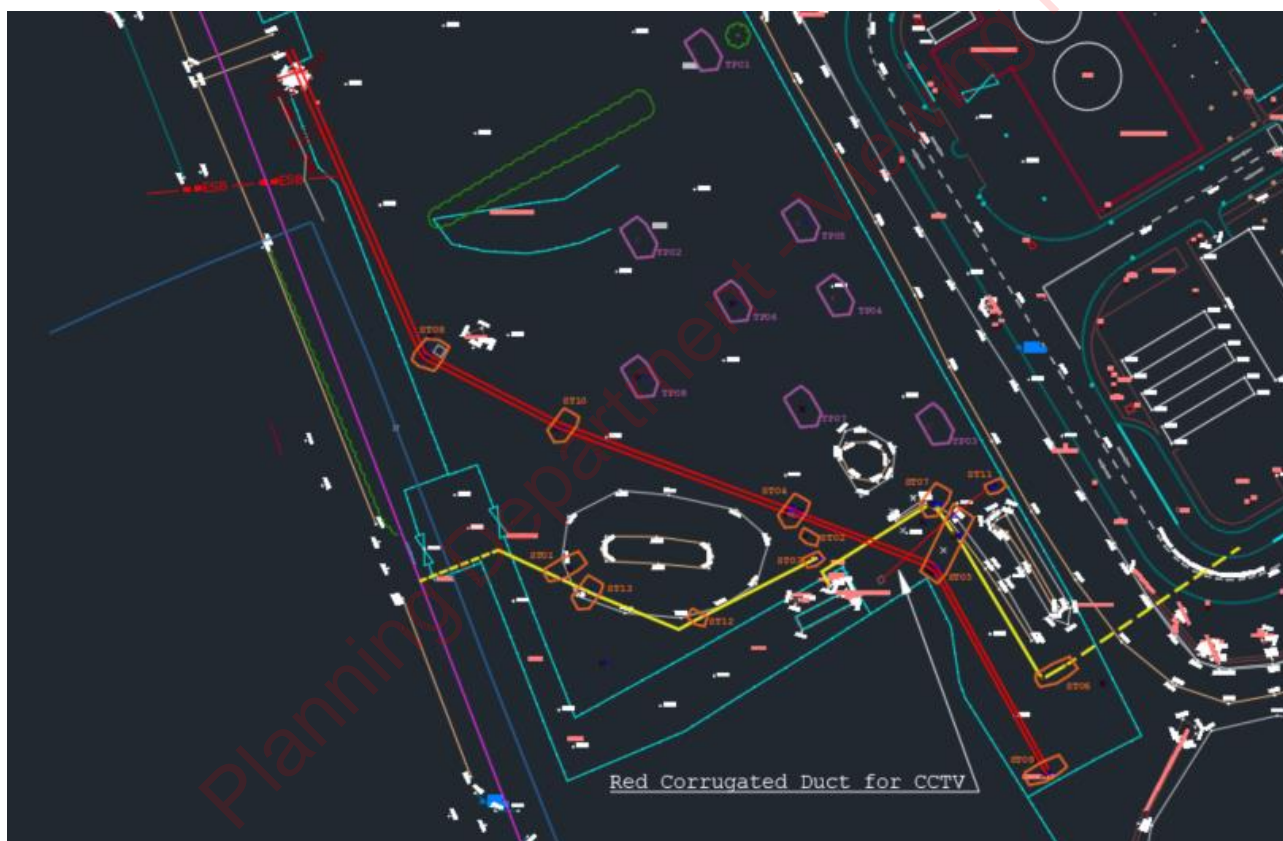


Fig 1: Site :Layout showing Cofirmed Service Locations and Site Investigation Excavations

3 Summary

1. Following discussions on site with Wuxi we were satisfied that we had traced and confirmed the ESB cables all the way as far as the substation. We have excavated down on the cables at 5 locations along their route and confirmed with the CAT that the cables were going into the substation.
2. The whole field between the fences was scanned with the CAT and Genny on Power/Radio/ Combined and Genny mode. We had 3 CSCS LUGS trained people on site who were involved in the tracing. The ESB cables were emitting very strong clear and distinct signals. The red corriduct with

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the CCTV cables was the only other signal we got using the CAT & Genny. There was no definable signal on the gas lines.

3. Regarding TP01, we reached a depth of 3.7m before we encountered a large boulder. The WuXi archaeologist directed that we couldn't widen the excavation to go deeper, due to its proximity to an area of archaeological value. TP01 had already been repositioned by the archaeologist to an adjacent location after we had taken the first scrape, It was the most sensitive location from an archaeological view.

4 Appendices

4.1 Appendix A – Trial Pits 1-8

4.2 Appendix B – Slit Trenches 1-13

4.3 Appendix C - Sketch showing SI Locations

PROJECT	Wuxi Biologics WwPTP	CONTRACT NO	1011-000121
LOGGED BY	C ÓTuairisg	DATE	15/11/23
WEATHER CONDITIONS	Dry Bright Cold	CO-ORDINATES	704099.725, 803010.537
TRIAL PIT NO.	TP01	Sheet of	

Strata				
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)	
		Ground level 23.056 mOD		
0 - 0.6m		Wide grading bucket. Archae advised previous trench so moved north by 1m.		
0.6m – 1.3m		Narrow bucket. Brown clay soil, with small to medium shale pieces		
2.7m		Large boulder across the trial hole, moves slightly		
3.7m		Can go to 3.7m beside boulder, no bedrock encountered		
Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

Photos - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation ☒

Spoil heap ☐

All excavated faces ☒

Location/context ☐

Base of excavation ☒

After reinstatement ☐



Service Location Trial Pits: Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

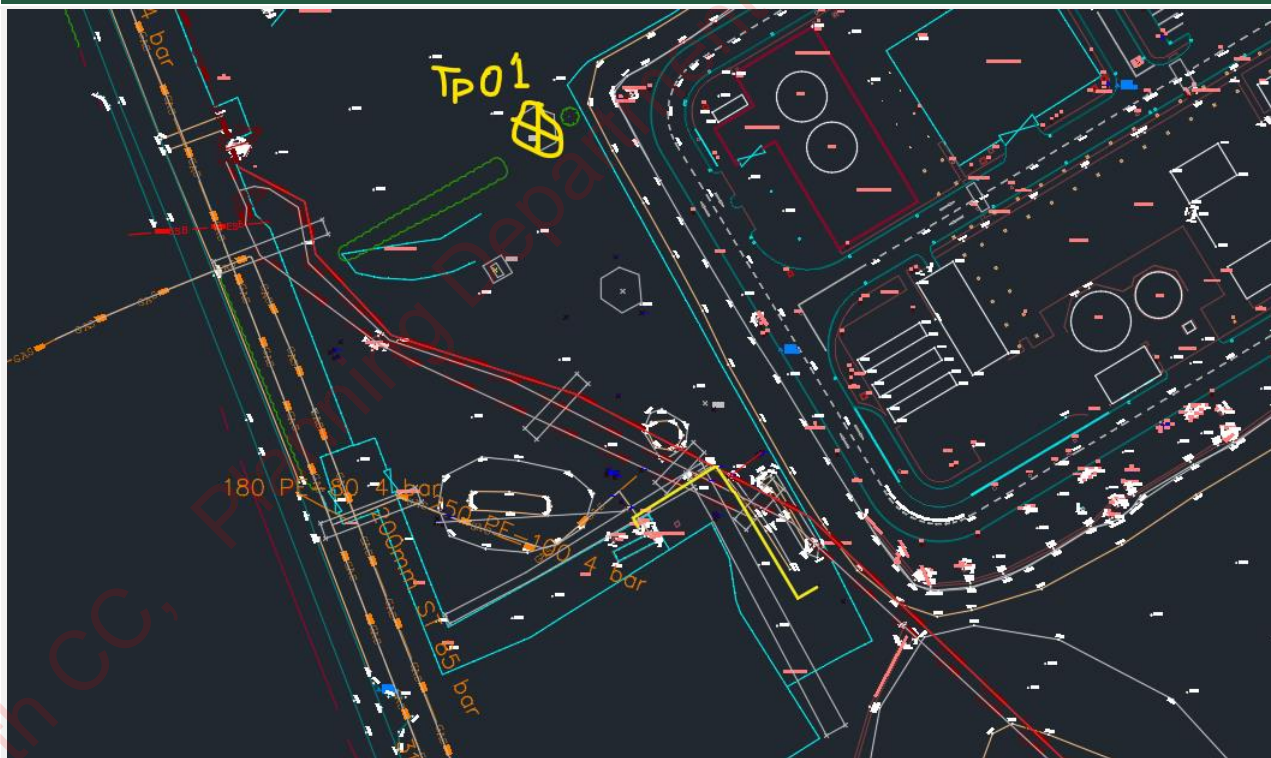
GL 23.056 mOD Brown Clay soil with blue shale angular small to medium boulders.

2.8 mBGL large boulder encountered, could move it slightly with the bucket and blue flakes of shale were broken off with the bucket.

3.7m depth beside the boulder, no bedrock encountered. Could dig no deeper without widening excavation.

Soils ample taken, Archaeologist in attendance.

Sketches/Additional Notes



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PROJECT	Wuxi Biologics WwPTP	CONTRACT NO	1011-000121
LOGGED BY	CÓTuairisg	DATE	15/11/23
WEATHER CONDITIONS	Dry Bright Cold	CO-ORDINATES	704090.235, 802979.212
TRIAL PIT NO.	TP02	Sheet of	

Strata				
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)	
		23.831mOD		
0 - 1.3m		Dig with wide grading bucket – brown clay-soil		
1.3m – 2.8m		Continue with narrow bucket – angular shale		
2.8m		Large shale boulders, need to widen the dig to go deeper		

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

Photos - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation <input checked="" type="checkbox"/>	Spoil heap <input type="checkbox"/>
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All excavated faces ☒

Location/context ☐

Base of excavation ☒

After reinstatement ☐

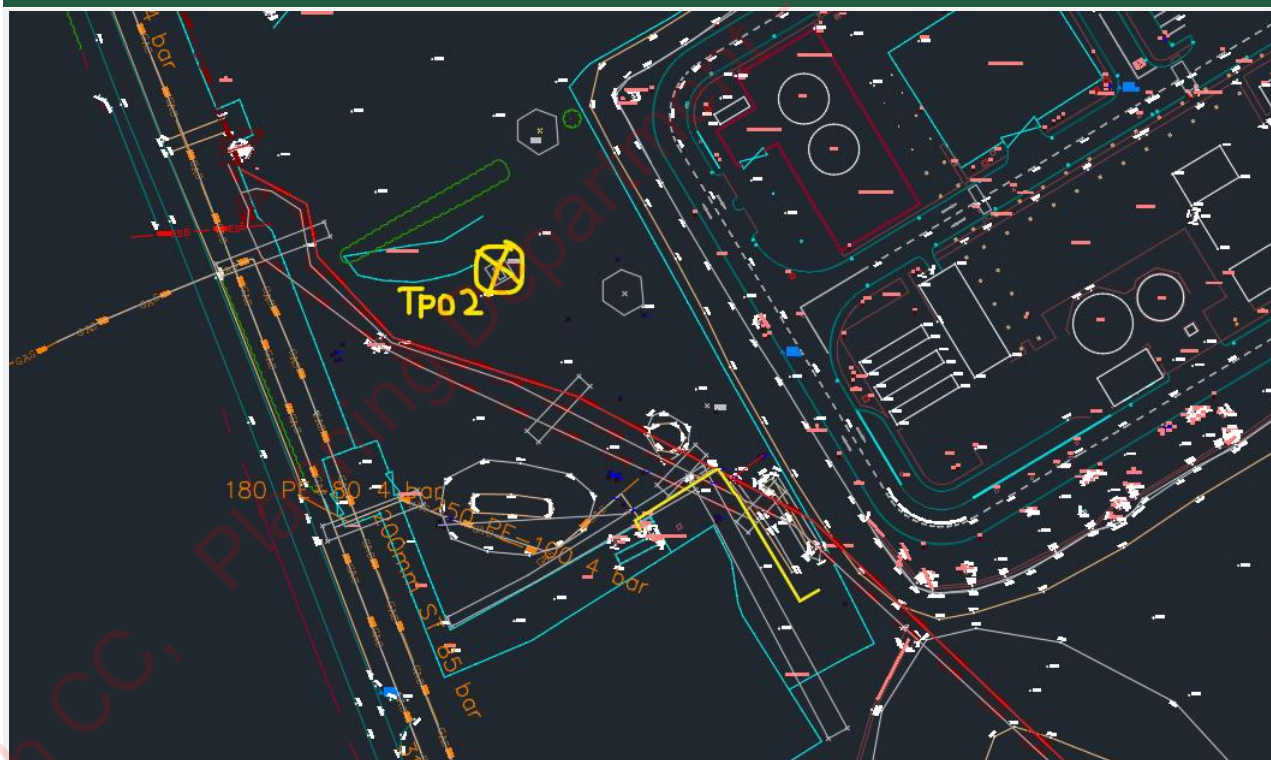


Service Location Trial Pits: Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

Large Shale boulders encountered at 2.8m BGL so approx. 21.000 mOD. Angular rock that smokes and breaks easily when pulled with the machine bucket. Flakes of blue shale

Soil sample taken, Archaeologist in attendance

Sketches/Additional Notes



PROJECT	Wuxi Biologics WwPTP	CONTRACT NO	1011-000121
LOGGED BY	CÓTuairisg	DATE	15/11/23
WEATHER CONDITIONS	Dry Bright Cold	CO-ORDINATES	E: 704138.573 N: 802948.375
TRIAL PIT NO.	TP03	Sheet of	

Strata				
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)	
		23.447mOD		
0 - 1.4m		Dig with wide grading bucket – brown clay-soil		
1.4m – 1.8m		Continue with narrow bucket – angular shale breaking when pulled		
1.8m		Bedrock, shale (blue/grey)		

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

Photos - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

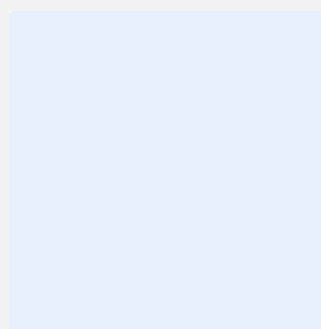
Before excavation <input checked="" type="checkbox"/>	Spoil heap <input type="checkbox"/>
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All excavated faces ☒

Location/context ☐

Base of excavation ☒

After reinstatement ☐

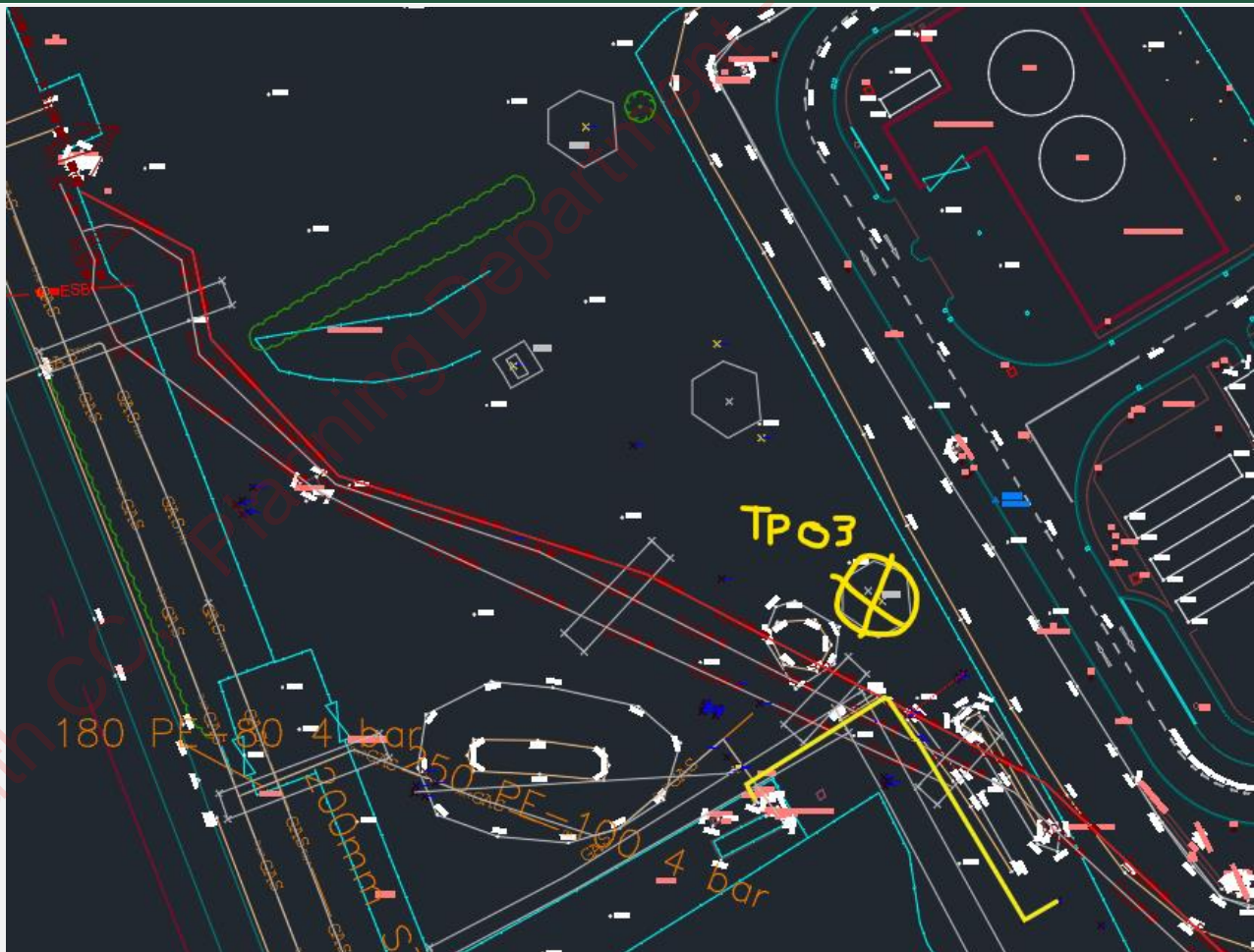


Service Location Trial Pits: Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

Shale bedrock encountered at 1.8m BGL so approx. 21.650 mOD. Angular rock that smokes and breaks when pulled with the machine bucket.

Soil sample taken

Sketches/Additional Notes



PROJECT	Wuxi Biologics WwPTP	CONTRACT NO	1011-000121
LOGGED BY	CÓTuairisg	DATE	15/11/23
WEATHER CONDITIONS	Dry Bright Cold	CO-ORDINATES	E: 704122.715 N: 802969
TRIAL PIT NO.	TP04	Sheet of	

Strata				
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)	
		22.773 mOD		
0 – 0.9m		Dig with wide grading bucket – brown clay-soil		
0.9m – 2.9m		Continue with narrow bucket – angular shale		
2.9m (avg)		Bedrock (slopes upward north to south)		
2.8m – 3.0m				

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

Photos - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation <input checked="" type="checkbox"/>	Spoil heap <input type="checkbox"/>
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All excavated faces ☒

Location/context ☐

Base of excavation ☒

After reinstatement ☐

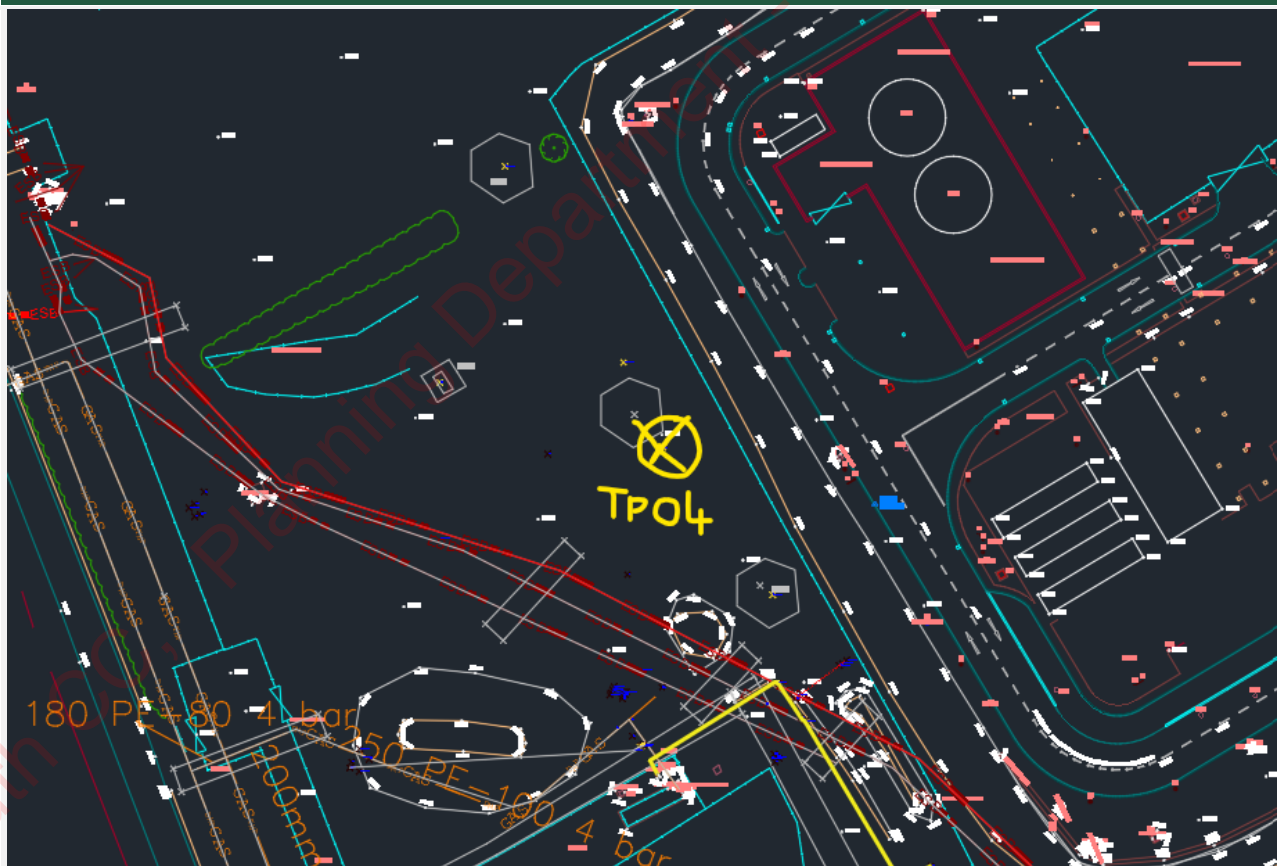


Service Location Trial Pits: Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

Shale Bedrock encountered at 2.9 mBGL so approx. 20.900 mOD. Bedrock slopes upward from north to south approx. 200mm 2.8m – 3.0m BGL

Soil sample taken

Sketches/Additional Notes



PROJECT	Wuxi Biologics WwPTP	CONTRACT NO	1011-000121
LOGGED BY	CÓTuairisg	DATE	15/11/23
WEATHER CONDITIONS	Dry Bright Cold	CO-ORDINATES	E: 704116.926 N: 802982.087
TRIAL PIT NO.	TP05	Sheet of	

Strata				
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)	
		22.403 mOD		
0 – 1.2m		Dig with wide grading bucket – brown clay-soil		
1.2 m – 4.3m		Continue with narrow bucket – medium boulders		
4.3m		Bottom of dig, no bedrock encountered, cant dig further without widening excavation.		
Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

Photos - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation ☒

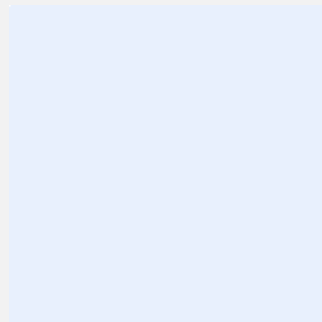
Spoil heap ☐

All excavated faces ☒

Location/context ☐

Base of excavation ☒

After reinstatement ☐

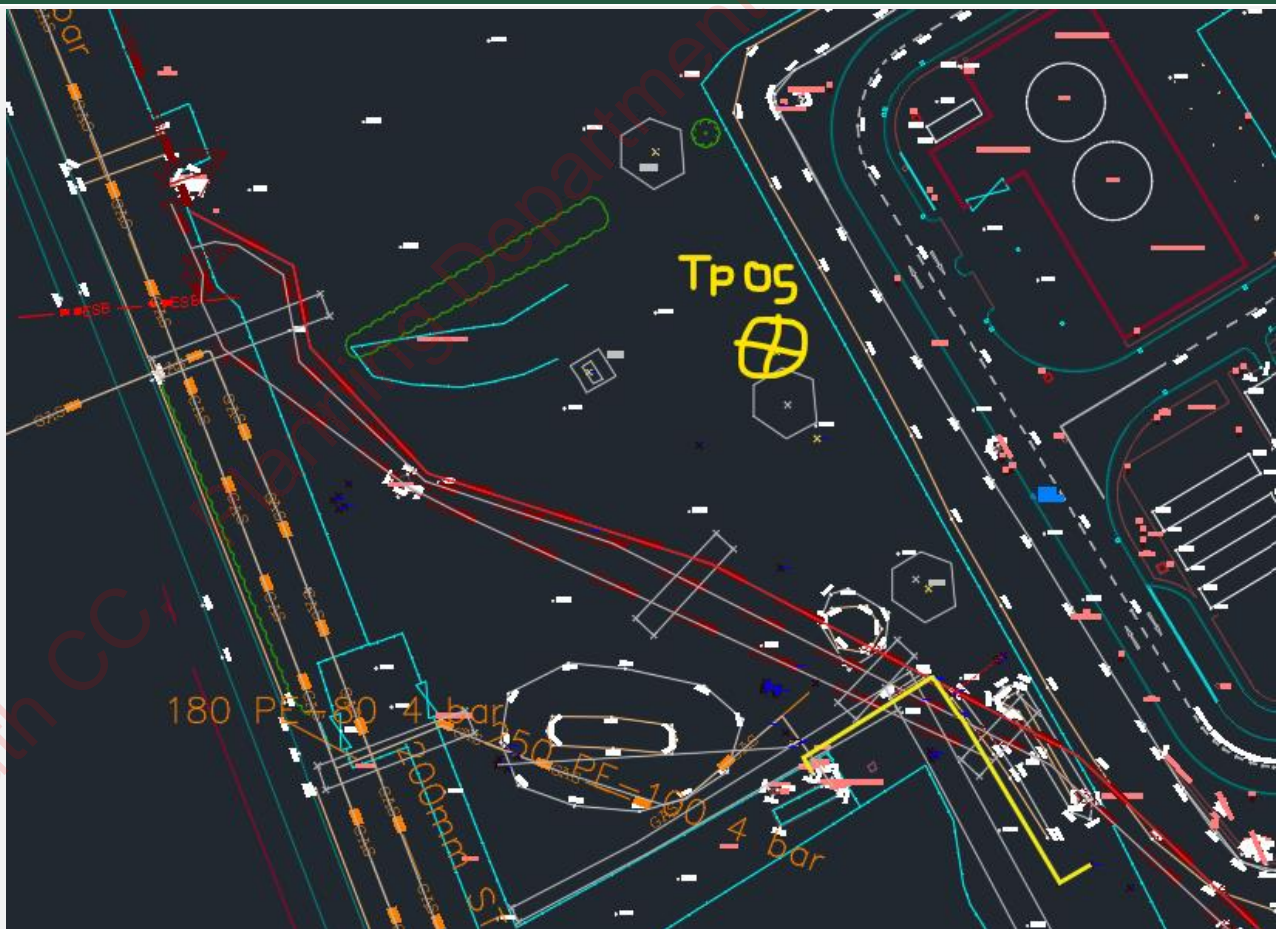


Service Location Trial Pits: Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

No Bedrock encountered at 4.3 mBGL so approx. 18.100 mOD. Medium brown clay soil with small to medium boulders.

Soil sample taken

Sketches/Additional Notes



PROJECT	Wuxi Biologics WwPTP	CONTRACT NO	1011-000121
LOGGED BY	CÓTuairisg	DATE	16/11/23
WEATHER CONDITIONS	Overcast, Drizzly, Cold	CO-ORDINATES	E: 704105.905 N: 802968.803
TRIAL PIT NO.	TP06	Sheet of	

Strata			
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)
		23.339 mOD	
0 – 0.7m		Dig with wide grading bucket – brown clay-soil	
0.7 m – 3.8 m		Continue with narrow bucket – medium boulders	
3.8m		Bedrock encountered at 3.8m	

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

Photos - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation ☒

Spoil heap ☐

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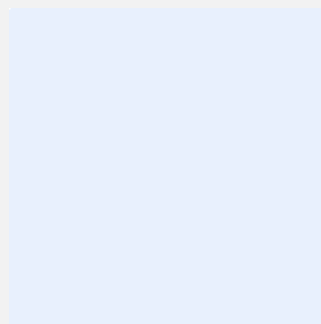
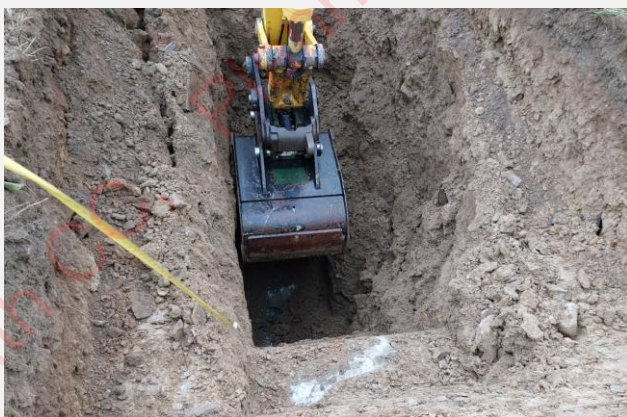
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All excavated faces ☒

Location/context ☐

Base of excavation ☒

After reinstatement ☐

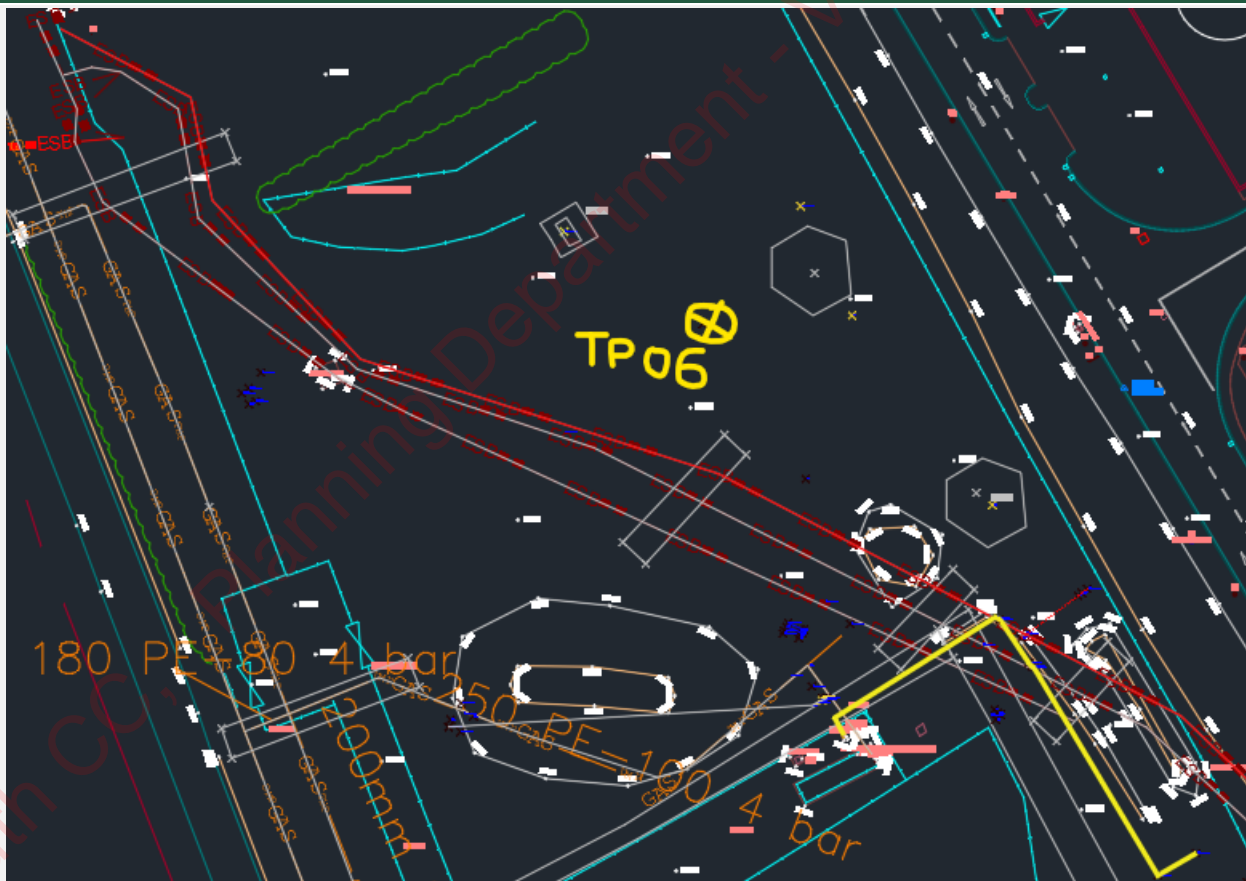


Service Location Trial Pits: Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

Bedrock encountered at 3.8 mBGL so approx. 19.540 mOD. Medium brown clay soil with small to medium boulders.

Soil sample taken

Sketches/Additional Notes



PROJECT	Wuxi Biologics WwPTP	CONTRACT NO	1011-000121
LOGGED BY	CÓTuairisg	DATE	16/11/23
WEATHER CONDITIONS	Overcast, Drizzly, Cold	CO-ORDINATES	E: 704117.495 N: 802951.309
TRIAL PIT NO.	TP07	Sheet of	

Strata			
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)
		23.869 mOD	
0 – 0.8m		Dig with wide grading bucket – brown clay-soil	
0.8 m – 4.0 m		Continue with narrow bucket sloped bedrock from 3m to 4m BGL	
3.0m – 4.0m		Bedrock sloping upward north to south	
Avg 3.5m			

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

Photos - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation ☒

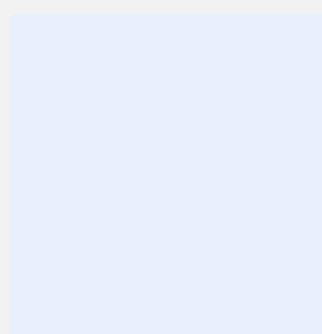
Spoil heap ☐

All excavated faces ☒

Location/context ☐

Base of excavation ☒

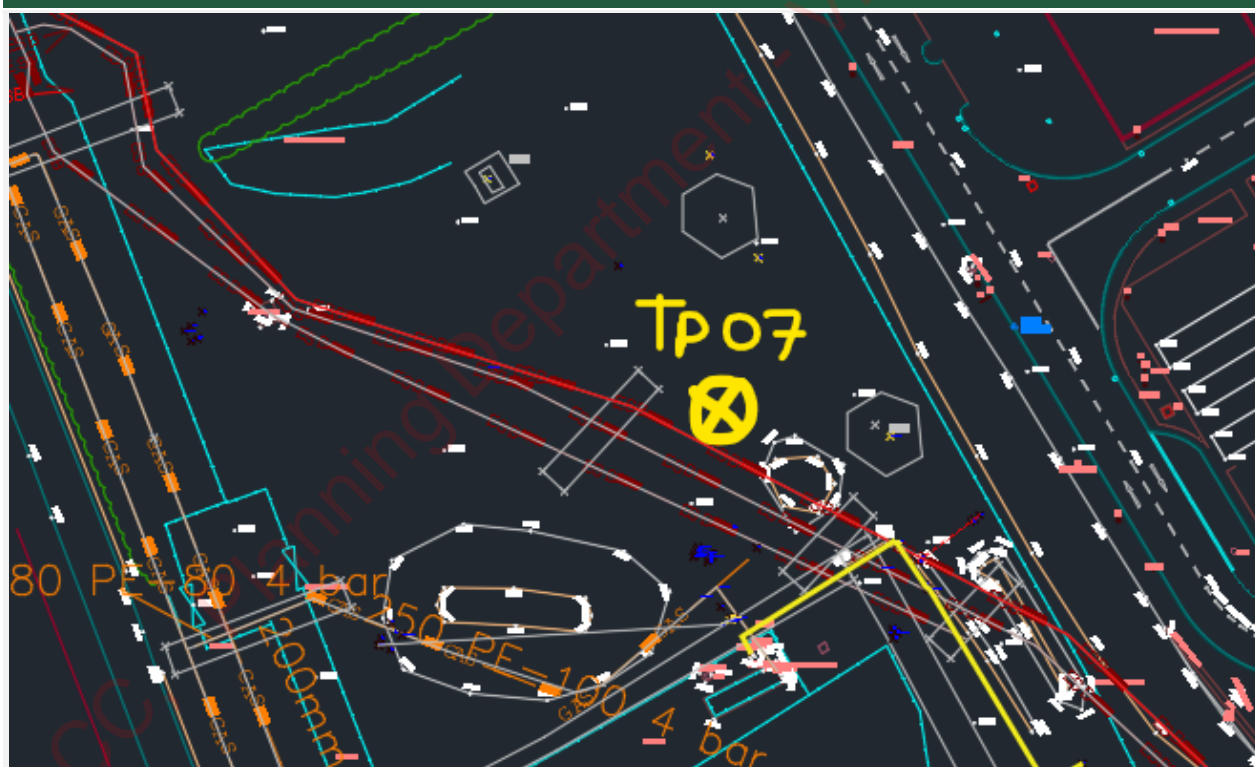
After reinstatement ☐



Service Location Trial Pits: Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

Sloped Bedrock encountered at 3.0 – 4.0 mBGL so taking avg=erage of 3.5m, the bedrock is encountered at approx. 20.370 mOD. Medium brown clay soil with small to medium boulders.

Sketches/Additional Notes



PROJECT	Wuxi Biologics WwPTP	CONTRACT NO	1011-000121
LOGGED BY	CÓTuairisg	DATE	16/11/23
WEATHER CONDITIONS	Overcast, Drizzly, Cold	CO-ORDINATES	E: 704090.162 N: 802956.603
TRIAL PIT NO.	TP08	Sheet of	

Strata			
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)
		24.295 mOD	
0 – 01.0m		Dig with wide grading bucket – brown clay-soil	
1.0 m – 2.3 m		Continue with narrow bucket - bedrock at 2.3m BGL	
2.3m		Blue grey bedrock	

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

Photos - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation ☒

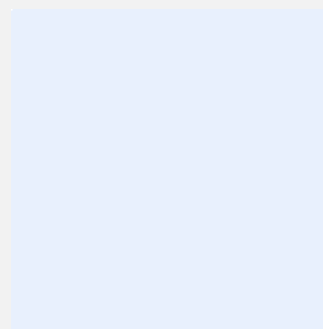
Spoil heap ☐

All excavated faces ☒

Location/context ☐

Base of excavation ☒

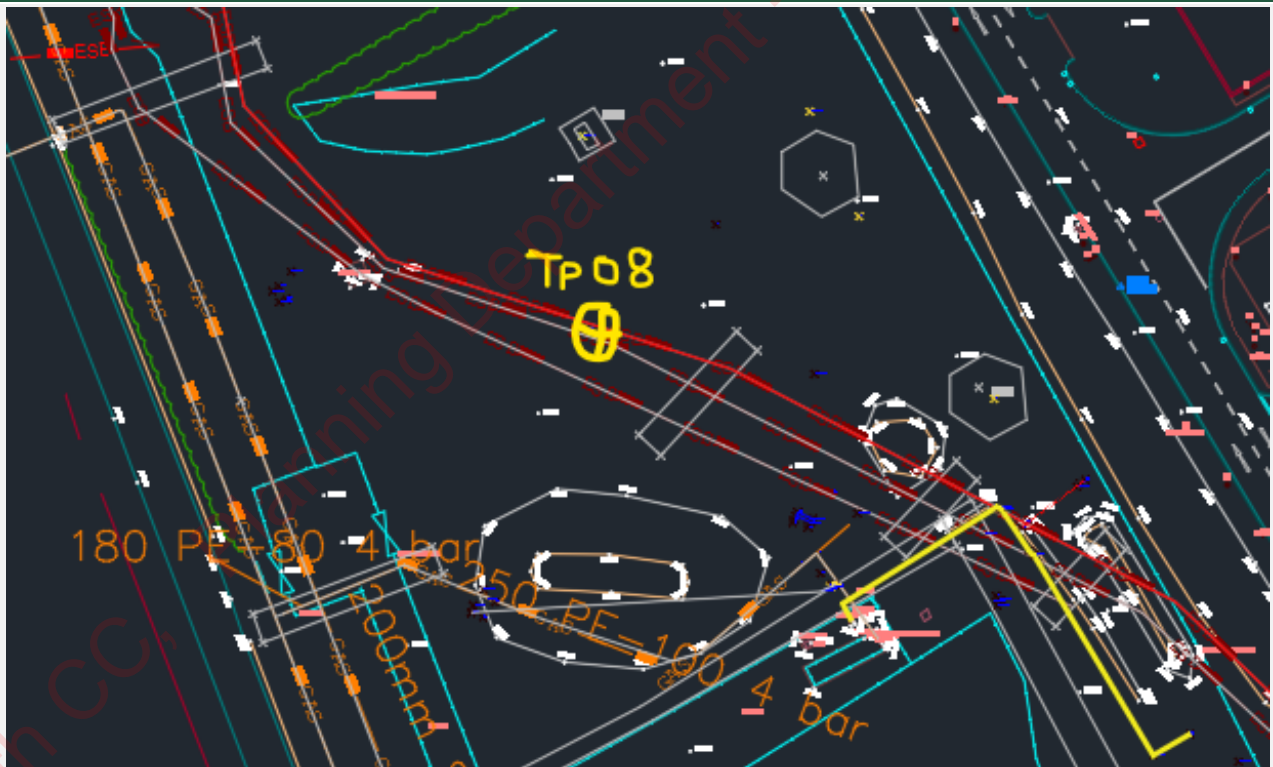
After reinstatement ☐



Service Location Trial Pits: Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

Bedrock encountered at 2.3 mBGL , approx. 21.000 mOD. Blue grey Shale

Sketches/Additional Notes



PROJECT	Wuxi Biologics WwPTP	CONTRACT NO	1011-000121
LOGGED BY	CÓTuairisg	DATE	16/11/23
WEATHER CONDITIONS	Overcast, Drizzly, Cold	CO-ORDINATES	E: 704078.886 N: 802924.843
ST01	ST01	Sheet of	

Strata				
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)	
		25.356 mOD		
0 – 0.8m		Dig with wide grading bucket – brown clay-soil		
0.8 m – 1.3 m		We encountered grey grit, typical of gas pipe surround material – hand dig with insulated spade		
1.3m		We encountered PE Gas distribution main, with warning tape (yellow brown striped main 315mm Dia according to Brendan, the GNI inspector		
		Top of pipe 24.068 mOD – Approx 1.3m below ground level		
Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

Photos - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation ☒

Spoil heap ☐

All excavated faces ☒

Location/context ☐

Base of excavation ☒

After reinstatement ☐



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Service Location Trial Pits: Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

All excavations on gas mains observed by Wuxi Archaeologist and GNI inspector. 315mm Dia PE Gas distribution mains encountered at 1.3 mBGL, approx. 24.068 mOD. Pipe surround is grey grit and yellow Gas main warning tape in place. Location is approx. 2.2m southwest of drawing supplied by GNI



Sketches/Additional Notes



PROJECT	Wuxi Biologics WwPTP	CONTRACT NO	1011-000121
LOGGED BY	CÓTuairisg	DATE	16/11/23
WEATHER CONDITIONS	Overcast, Drizzly, Cold	CO-ORDINATES	E: 704117.921 N: 802930.307 E: 704118.729 N: 802926.107
ST01	ST02-ST03	Sheet of	

Strata				
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)	
		ST02 (24.337 mOD) ST03 (24.304)		
0 – 0.5m		ST02 Dig with wide grading bucket – brown clay-soil- Large Boulders encountered, change location as Gas main unlikely to be backfilled with large boulders over it.		
0 – 0.3m		ST03 We moved closer to AGI for a second slit trench. We encountered grey grit, typical of gas pipe surround material – hand dig with insulated spade		
0.3m – 1.0m		We encountered PE Gas distribution main, with warning tape (yellow brown striped main 315mm Dia according to Brendan, the GNI inspector		
		Top of pipe 23.420 mOD – Approx 0.9m below ground level		
Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

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<p>Photos - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.</p>	
Before excavation <input checked="" type="checkbox"/>	Spoil heap <input type="checkbox"/>
All excavated faces <input checked="" type="checkbox"/>	Location/context <input type="checkbox"/>
Base of excavation <input checked="" type="checkbox"/>	After reinstatement <input type="checkbox"/>
 <p>Galaxy A52s 5G</p>	 <p>Galaxy A52s 5G</p>
 <p>Galaxy A52s 5G</p>	 <p>Galaxy A52s 5G</p>

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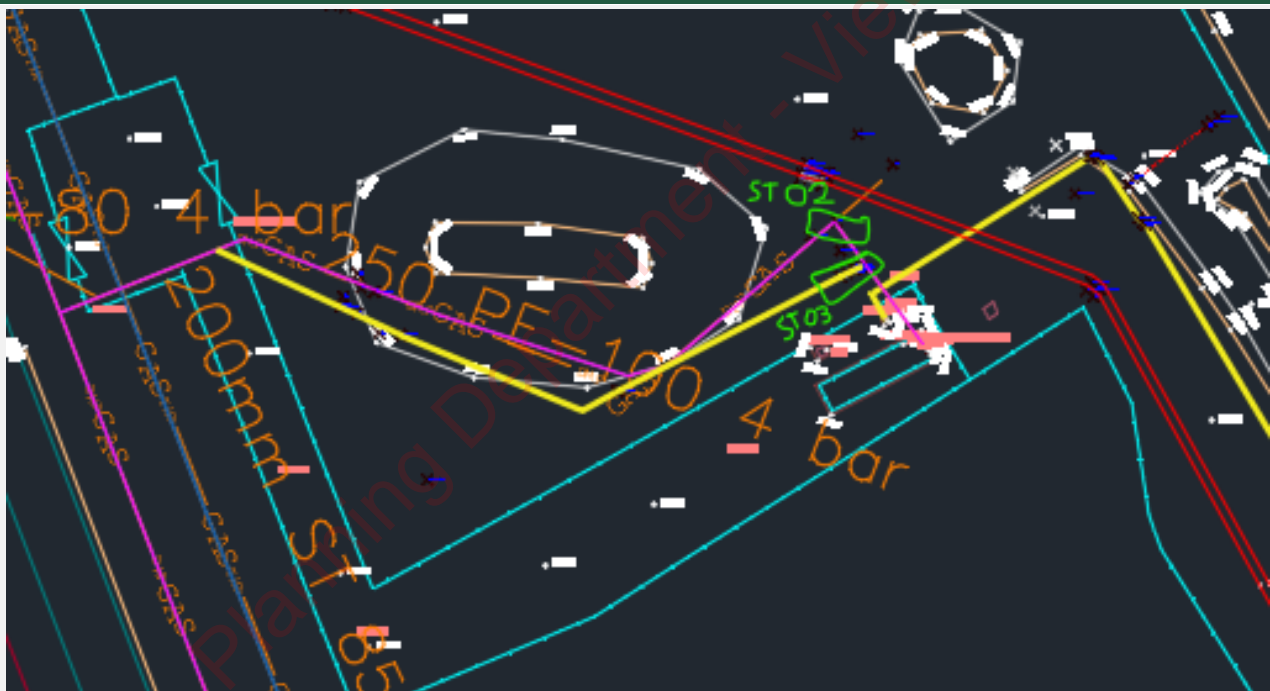


Service Location Trial Pits: Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

All excavations on gas mains observed by Wuxi Archaeologist and GNI inspector. 315mm Dia PE Gas distribution mains encountered at 0.9 mBGL, approx. 23.4 mOD. Pipe surround is grey grit and yellow Gas main warning tape in place. Location is approx. 3m closer to AGI (south of drawing supplied by GNI)

This PE gas main has a capped end and a 60mm Dia test arm and top hat T piece as shown in the photos. This main does NOT branch into the AGI skid as indicated on the drawing provided by GNI, it terminates near the pedestrian gate to the AGI skid.

Sketches/Additional Notes



PROJECT	Wuxi Biologics WwPTP	CONTRACT NO	1011-000121
LOGGED BY	CÓTuairisg	DATE	16/11/23
WEATHER CONDITIONS	Overcast, Drizzly, Cold	CO-ORDINATES	E: 704116.758 N: 802934.249
ST01	ST04	Sheet of	

Strata				
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)	
		24.281 mOD		
0 – 0.75m		ST04 Dig with wide grading bucket – brown clay-soil- No gravel/grit/dust encountered		
0.75 m		CAT used to trace likely ESB services		
0.75m		We encountered ESB tile board (brown plastic board with yellow warning top		
		Top of tile board 23.6 mOD Approx Leanmix underneath. Didn't excavate further.		
Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level
				
Photos - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.				

Before excavation ☒

Spoil heap ☐

All excavated faces ☒

Location/context ☐

Base of excavation ☒

After reinstatement ☐



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Service Location Trial Pits: Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

All excavations on ESB Cables observed by Wuxi Archaeologist. Atkins/Wuxi directed that we contact ESB networks before we commence excavating near cables to log onto their system and give a contact no.. This is done again at the end of the shift to log off. ESB cables traced with CAT on power mode with audible tone and shrill alarm and when near and directly above the cables.

We traced 2 separate signals and found 2 distinct lines of ESB warning tile board running NW to SE in ST04. Note that these are approx. 11m further west than indicated on the ESB service drawings and we only found evidence of 2 cables, not 3.

Leanmix concrete under the warning tile board. Good practise would have the tile board located 300mm above the ducts, and this was confirmed by the CAT. We can therefore assume the ESB ducts are approximately **23.300 mOD**

New cable warning tape placed over the tile board approx. 0.5m below surface when backfilling the trench

Sketches/Additional Notes



PROJECT	Wuxi Biologics WwPTP	CONTRACT NO	1011-000121
LOGGED BY	CÓTúairisg	DATE	16/11/23
WEATHER CONDITIONS	Overcast, Drizzly, Cold	CO-ORDINATES	E: 704141.982 N: 802921.817
ST01	ST05	Sheet of	

Strata				
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)	
		24.110 mOD		
0 – 0.55m		ST05 is a long trench Dig with wide grading bucket – brown clay-soil- No gravel/grit/dust encountered		
0.55 m		CAT used to trace likely ESB services near fence corner. Grey gravel material and ESB tileboard encountered at 23.660 mOD, approx. 0.5m below the ground. 2 distinct signals heard.		
0.6m – 1.0m		We encountered gas warning tape (Gas Main Below) approx. 6m east along the trench from the ESB services. Yellow PE gas main approx. 1m BGL		
0.9m		Red 4" corrugated duct for CCTV, as advised by WuXi rep. Yellow mesh warning tape 200mm above duct.		
Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

RECEIVED: 19/04/2024

Photos - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation ☒

Spoil heap ☐

All excavated faces ☒

Location/context ☐

Base of excavation ☒

After reinstatement ☐





Service Location Trial Pits: Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

ST05 All excavations on ESB Cables observed by Wuxi Archaeologist. Atkins/Wuxi directed that we contact ESB networks before we commence excavating near cables to log onto their system and give a contact no.. This is done again at the end of the shift to log off. ESB cables traced with CAT on power mode with audible tone and shrill alarm and when near and directly above the cables.

We traced 2 separate signals and found ESB warning tile board near the corner of the palisade fence of Haynestown AGI. Note that these are approx. 9 m further west than indicated on the ESB service drawings and we only found evidence of 2 cables, not 3. We didn't uncover the tile board of the second ESB service as it is running quite close to the fence and excavating nearer to the fence may have undermined the concrete post foundations. The CAT gave a very strong signal to confirm the location of the cable.

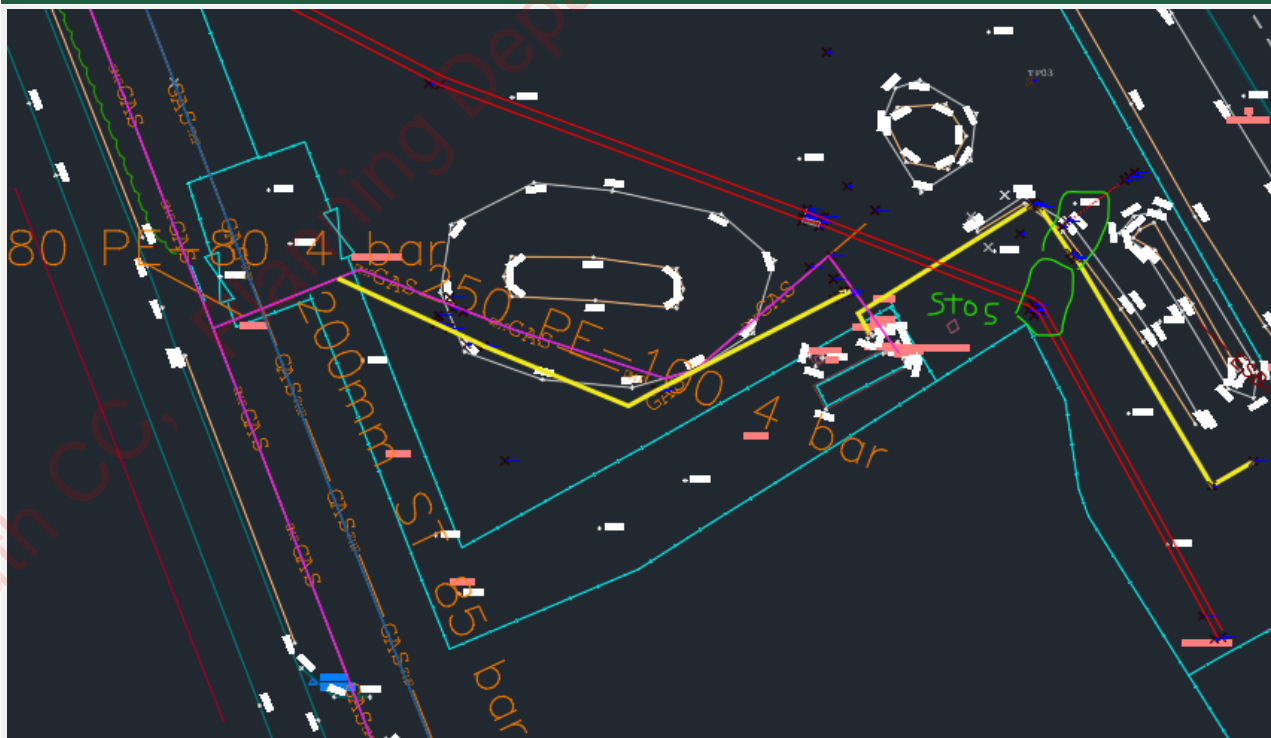
Leanmix concrete found under the warning tile board. Good practise would have the tile board located 300mm above the ducts, and this was confirmed by the CAT. We can therefore assume the ESB ducts are approximately **23.350 mOD**

New cable warning tape placed over the tile board approx. 0.5m below surface when backfilling the trench

We continued north with ST05, as we wanted to find the gas feed to WuXi plant from the AGI skid, We encountered a 315 yellow PE main but it was orientated 90° to what we expected. **23.133mOD** approx. 900mm below ground level. Warning tape and grey grit surrounded the PE gas main.

We also found additional mesh barrier tape and a red 4" corrugated duct which is the CCTV feed from the plant to the AGI. This terminates in a chamber near the pedestrian gate of the AGI skid. **22.490mOD** approx. 850mm below ground level.





Sketches/Additional Notes



PROJECT	Wuxi Biologics WwPTP	CONTRACT NO	1011-000121
LOGGED BY	CÓTuairisg	DATE	17/11/23
WEATHER CONDITIONS	Overcast, Drizzly, Cold	CO-ORDINATES	E: 704056.009 N: 802963.304
ST01	ST06	Sheet of	

Strata				
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)	
		23.400 mOD		
0 – 0.6m		Dig with wide grading bucket – brown clay-soil- no grey grit and yellow warning tape encountered. Move closer to the boundary fence		
0 - 0.6 m		We encountered gas warning tape (Gas Main Below) and grey grit. Dig by hand to uncover yellow PE gas main approx. 1.2m BGL		
0 - 0.6		We moved towrd the AGI to find the 90° bend. We encountered gas warning tape (Gas Main Below) approx. halfway between the fences. 90 collar found.		
1.2m		Yellow PE gas main (suspect 315mm Dia as we found an offcut piece) approx. 1.2m BGL at 22.461m OD		
Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

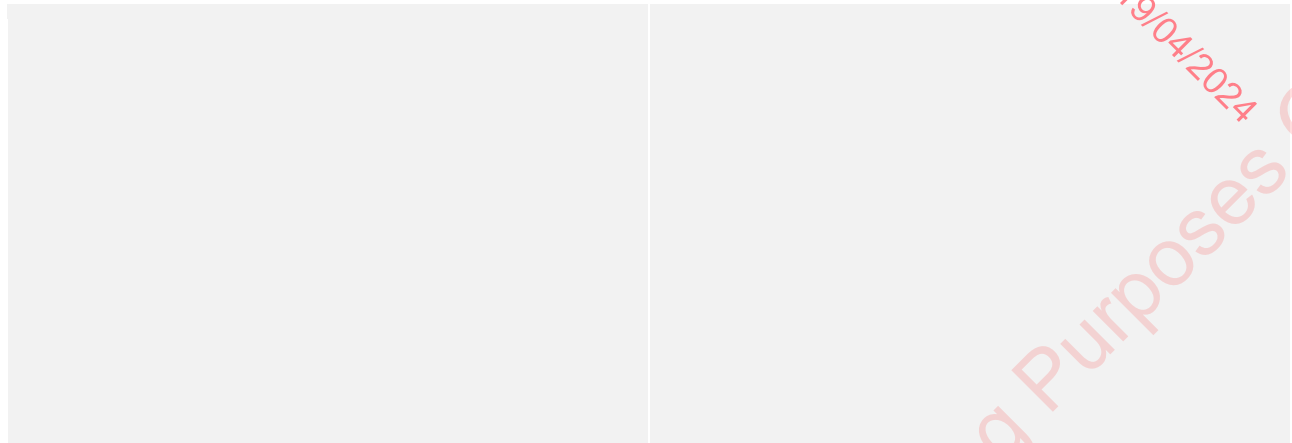
RECEIVED: 19/04/2024
For Internal Purposes Only

Photos - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.					
Before excavation <input checked="" type="checkbox"/>			Spoil heap <input type="checkbox"/>		
All excavated faces <input checked="" type="checkbox"/>			Location/context <input type="checkbox"/>		
Base of excavation <input checked="" type="checkbox"/>			After reinstatement <input type="checkbox"/>		
 <p>Galaxy A52s 5G</p>			 <p>Galaxy A52s 5G</p>		
 <p>Galaxy A52s 5G</p>			 <p>Galaxy A52s 5G</p>		

RECEIVED: 19/04/2024



RECEIVED: 19/04/2024



Service Location Trial Pits: Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

ST06 All excavations on ESB Cables observed by Wuxi Archaeologist and GNI inspector

The gas supply main was found in 2 spots in this trench, approx. 1.2m BGL. We found the yellow straight part and the black 90° fusion collar

Grey grit and warning tape were found and new warning tape installed during backfill.

New cable warning tape placed over the tile board approx. 0.5m below surface when backfilling the trench



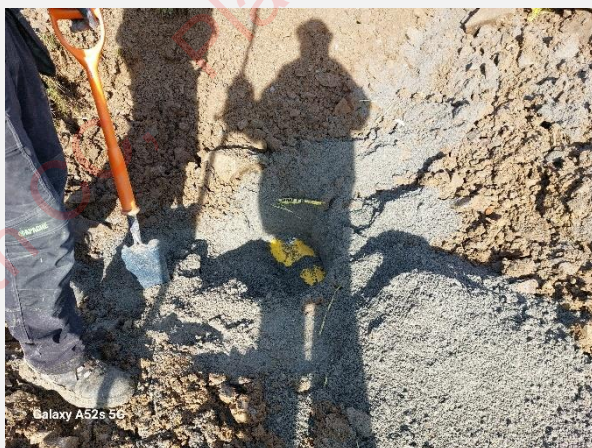
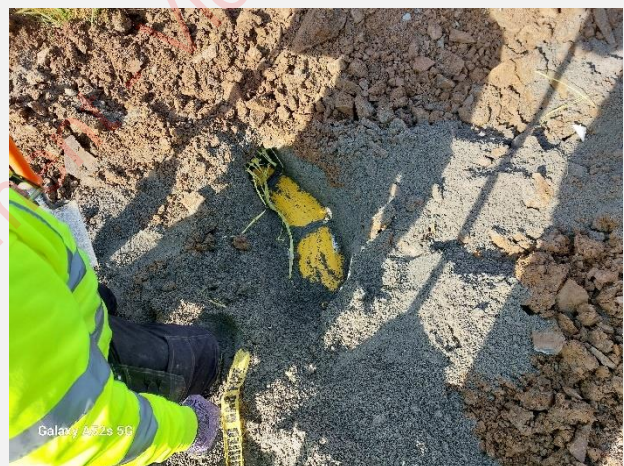
PROJECT	Wuxi Biologics WwPTP	CONTRACT NO	1011-000121
LOGGED BY	CÓTuairisg	DATE	17/11/23
WEATHER CONDITIONS	Overcast, Drizzly, Cold	CO-ORDINATES	E: 704138.613 N: 802935.597
ST01	ST07	Sheet of	

Strata				
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)	
		23.970 mOD		
0 – 0.55m		Dig with wide grading bucket – brown clay-soil- no grey grit and yellow warning tape encountered. Move closer to the boundary fence		
0 - 0.6 m		We encountered gas warning tape (Gas Main Below) and grey grit. Dig by hand to uncover yellow PE gas main approx. 1.2m BGL		
0 - 0.6		We moved towrd the AGI to find the 90° bend. We encountered gas warning tape (Gas Main Below) approx. halfway between the fences. 90 collar found.		
1.2m		Yellow PE gas main (suspect 315mm Dia as we found an offcut piece) approx. 1.2m BGL at 22.461m OD		
Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

RECEIVED: 19/04/2024
For Development Purposes Only

<p>Photos - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.</p>	
Before excavation <input checked="" type="checkbox"/>	Spoil heap <input type="checkbox"/>
All excavated faces <input checked="" type="checkbox"/>	Location/context <input type="checkbox"/>
Base of excavation <input checked="" type="checkbox"/>	After reinstatement <input type="checkbox"/>
 <p>Galaxy A52s 5G</p>	 <p>Galaxy A52s 5G</p>
 <p>Galaxy A52s 5G</p>	 <p>Galaxy A52s 5G</p>

RECEIVED: 19/04/2024



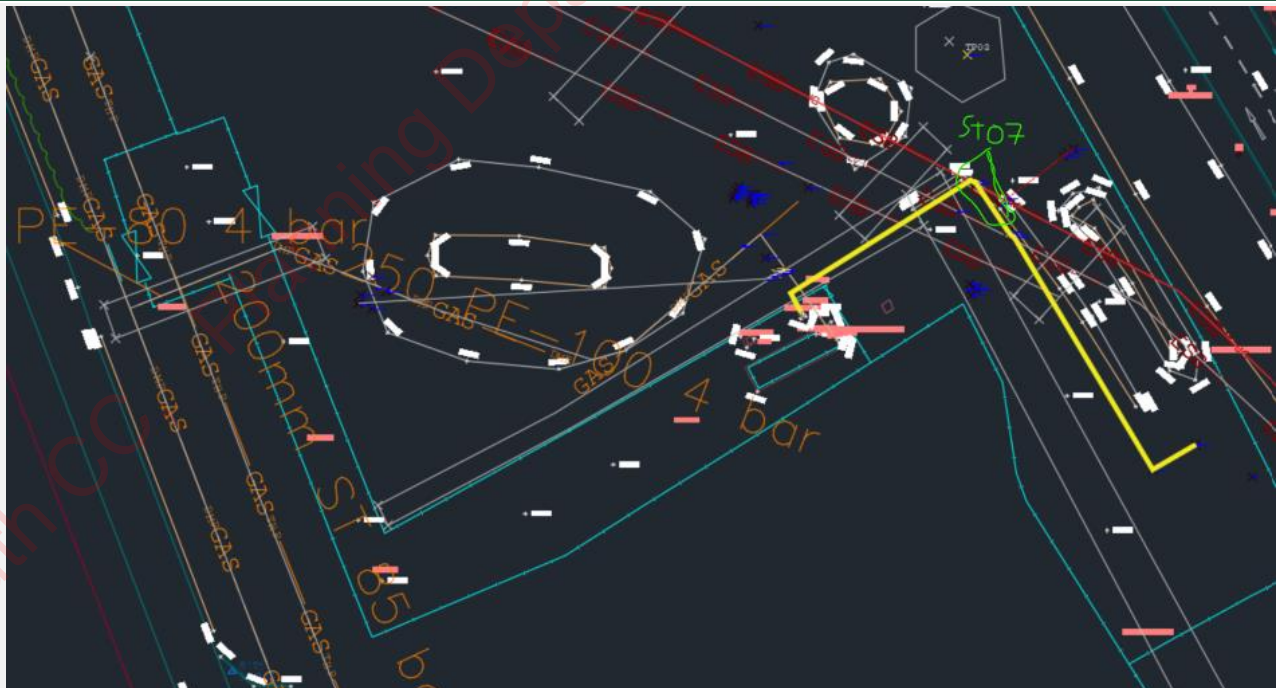
RECEIVED: 19/04/2024

Service Location Trial Pits: Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

All excavations on gas mains observed by Wuxi Archaeologist and GNI inspector

The gas supply main was found in 2 spots in this trench, approx. 0.75 BGL. We found the yellow straight part and the yellow 90° swept fusion bend at 23.211 mOD

We can now be confident of the route and level of the PE gas main that feeds the Wuxi plant from the AGI skid



PROJECT	Wuxi Biologics WwPTP	CONTRACT NO	1011-000121
LOGGED BY	CÓTuairisg	DATE	17/11/23
WEATHER CONDITIONS	Overcast, Drizzly, Cold	CO-ORDINATES	E: 704056.009 N: 802963.304
ST01	ST08	Sheet of	

Strata				
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)	
		25.221 mOD		
0 – 0.4m		Trace Cables from substation with CAT, Medium brown clay soil with small boulders		
0 - 0.4 m		Leanmix found 400mm down, no tile board or warning tape. 2 distinctive very strong signals from CAT.		
0.4m		Concrete slab uncovered near cables. Wuxi rep suggested it was part of a concrete viewing platform set up to view the WuXi site.		
Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

Photos - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation ☒

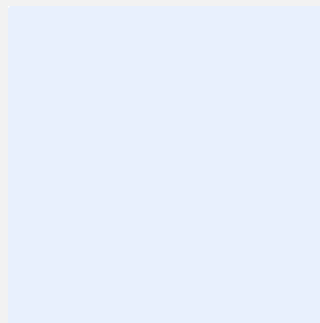
Spoil heap ☐

All excavated faces ☒

Location/context ☐

Base of excavation ☒

After reinstatement ☐

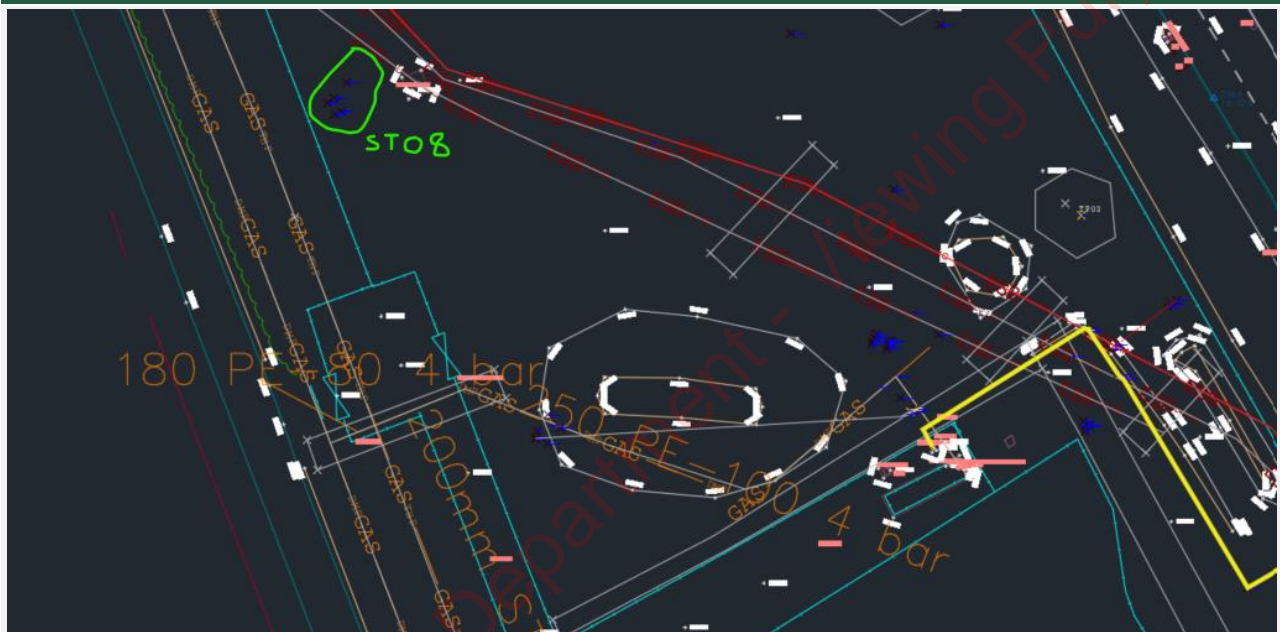


Service Location Trial Pits: Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

All excavations on ESB lines registered with ESB Prox work centre.

Leanmix uncovered about 400mm below ground. Strong CAT signals (2 not 3)

Assume if ESB ducts are 300mm below leanmix (good practice), they are approx. 24.700m OD



PROJECT	Wuxi Biologics WwPTP	CONTRACT NO	1011-000121
LOGGED BY	CÓTuairisg	DATE	20/11/23
WEATHER CONDITIONS	Overcast, Drizzly, Cold	CO-ORDINATES	E: 704156.311 N: 802893.093
ST01	ST09	Sheet of	

Strata				
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)	
		22.953 mOD		
0 – 0.3m		Trace Cables from substation with CAT, Medium brown clay soil with small boulders		
0.3 m		Leanmix material, loose and gravelly		
0.3 - 0.5m		Grey gravelly material, warning tape encountered.		
0.75m		ESB warning tile found beneath warning tape		
Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

Photos - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

RECEIVED: 19/04/2024

Before excavation ☒

Spoil heap ☐

All excavated faces ☒

Location/context ☐

Base of excavation ☒

After reinstatement ☐





Service Location Trial Pits: Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

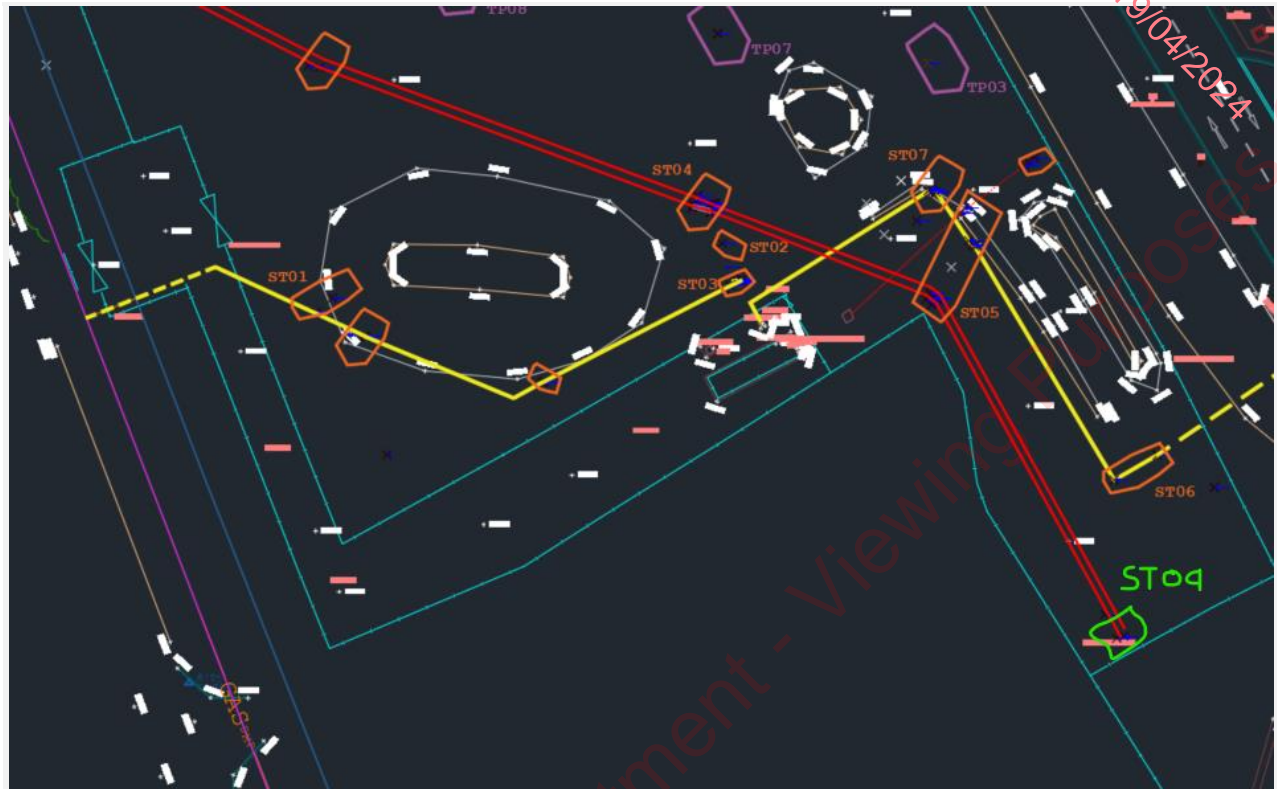
All excavations on ESB lines registered with ESB Prox work centre.

Leanmix/gravel material uncovered about 300mm below ground. Strong CAT signals (2 not 3)

Warning tape encountered 500mm BGL

ESB tile warning board encountered 750mm BGL

Assume if ESB ducts are 300mm below leanmix (good practice), they are approx. 24.700m OD



PROJECT	Wuxi Biologics WwPTP	CONTRACT NO	1011-000121
LOGGED BY	CÓTuairisg	DATE	20/11/23
WEATHER CONDITIONS	Overcast, Drizzly, Cold	CO-ORDINATES	E: 704076.441 N: 802948.078
ST01	ST10	Sheet of	

Strata			
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)
		25.132 mOD	
0 – 0.3m		Trace Cables with CAT, Medium brown clay soil with small boulders	
0.5 m		Leanmix material, with cable warning tape	
0.6m		ESB Warning tile board found	

Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

Photos - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation ☒

Spoil heap ☐

All excavated faces ☒

Location/context ☐

Base of excavation ☒

After reinstatement ☐



Service Location Trial Pits: Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

All excavations on ESB lines registered with ESB Prox work centre.

Strong CAT signals (2 not 3) where the cables are expected to be

Warning tape encountered 500mm BGL

ESB tile warning board encountered 600mm BGL leanmix beneath.


Assume if ESB ducts are 300mm below leanmix (good practice), they are approx. 24.200m OD



PROJECT	Wuxi Biologics WwPTP	CONTRACT NO	1011-000121
LOGGED BY	CÓTúairisg	DATE	20/11/23
WEATHER CONDITIONS	Overcast, Drizzly, Cold	CO-ORDINATES	E: 704148.666 N: 802938.449
ST01	ST11	Sheet of	

Strata				
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)	
		23.400 mOD		
0 – 0.6m		Trace Cables with CAT, Medium brown clay soil with small boulders, warning mesh tape found		
0.6 m		Grey grit material, with cable warning tape		
0.9m		Red corrugated 4" duct found. CCTV Power signal and radio signal from CAT		
		This duct goes as far as a concrete chamber outside the AGI gate		
Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

Photos - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation <input checked="" type="checkbox"/>	Spoil heap <input type="checkbox"/>
All excavated faces <input checked="" type="checkbox"/>	Location/context <input type="checkbox"/>
Base of excavation <input checked="" type="checkbox"/>	After reinstatement <input type="checkbox"/>
 <p>Galaxy A52s 5G</p>	 <p>Galaxy A52s 5G</p>
<p>Service Location Trial Pits: Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.</p>	

All excavations on ESB lines registered with ESB Prox work centre.

medium CAT signals on power and radio mode

Warning tape encountered 600mm BGL grey grit material

Duct uncovered 900mm BGL it is approx. 22.490 m OD

We traced it to a concrete chamber outside the AGI pedestrian access gate.



PROJECT	Wuxi Biologics WwPTP	CONTRACT NO	1011-000121
LOGGED BY	CÓTuairisg	DATE	20/11/23
WEATHER CONDITIONS	Overcast, Drizzly, Cold	CO-ORDINATES	E: 704100.121 N: 802916.467
ST01	ST12	Sheet of	

Strata				
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)	
		24.420 mOD		
0 – 0.6m		Medium brown clay soil with small boulders,		
0.6 m		Grey grit material, with gas warning tape		
0.95m		Yellow brown striped PE gas main 315mm Dia		
0 – 0.4m		Tried a different location to find the bend, but could not locate		
Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

Photos - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation ☒

Spoil heap ☐

All excavated faces ☒

Location/context ☐

Base of excavation ☒

After reinstatement ☐





Service Location Trial Pits: Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

Gas main (315mm Dia) brown and yellow pipe installed by GNI

Warning tape encountered 600mm BGL grey grit material

pipe uncovered 950mm BGL it is approx. 23.360 m OD

Second location further west excavated to find the bend, but large boulders near the surface confirmed not in this location.



PROJECT	Wuxi Biologics WwPTP	CONTRACT NO	1011-000121
LOGGED BY	CÓTuairisg	DATE	20/11/23
WEATHER CONDITIONS	Overcast, Drizzly, Cold	CO-ORDINATES	E: 704080.368 N: 802921.158
ST01	ST13	Sheet of	

Strata				
Depth from mBGL	Depth to mBGL	Description	In-Situ Testing (e.g. HSV, Resistivity)	
		24.542 mOD		
0 – 0.5m		Medium brown clay soil with small boulders,		
0.5 m		Grey grit material, with gas warning tape		
0.55m		Yellow brown striped PE gas main 315mm Dia		
		Can now connect the straights, to find the route of the main		
Groundwater (Depth & Flow Rate)	Stability / Shoring	Dimensions	Plant	Ground Level

Photos - Take photos (the more the better) detailing the trial pit excavation, spoil pile and surroundings including fencing, trees, ditches, service markers, nearby structures, topography etc.

Before excavation ☒

Spoil heap ☐

All excavated faces ☒

Location/context ☐

Base of excavation ☒

After reinstatement ☐



Service Location Trial Pits: Describe and photograph each service including number, diameter, pipe/duct material, crown depth and interaction.

Gas main (315mm Dia) brown and yellow pipe installed by GNI

Warning tape encountered 500mm BGL grey grit material

pipe uncovered 550mm BGL it is approx. 24.010 m OD

Pipe very shallow in this location. But ground rises in a small hill just above it.



Information on this drawing may only be used for the purpose for which it was prepared. No liability is accepted for any use of this drawing and all copies must be returned on demand.

- PE Gas Main 315mm Dia
- ESB Cables
- Trial Pit
- Silt Trench



MURPHY INTERNATIONAL LTD

Site Investigation Results

Scale	CAD		Date
	CAD	CÓT	
	Surveyor	CÓT	
NTS			23/11/2023
	Checked	CB	

MIL-000121-SI-001	A
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