

Walters Land (Rogerstone) Limited

**JUBILEE PARK, ROGERSTONE - LAND
PARCELS LC1 & LC2**

**Geoenvironmental & Geotechnical
Assessment**

11183/RB/21/LC1&LC2

CLIENT: Walters Land (Rogerstone) Limited

PROJECT: Jubilee Park, Rogerstone – Land Parcels LC1 & LC2

TITLE: Geoenvironmental & Geotechnical Assessment

JOB NO: 11183

DOCUMENT REF: 11183/RB/21/LC1&LC2

Revision	Purpose Description	Originated	Reviewed	Authorised	Date
0	Final	LP	RB	HP	May 2021

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1.0 INTRODUCTION

1.1 GENERAL

Walters Land (Rogerstone) Limited acquired the site of the former Novelis Aluminium Works in Rogerstone, now known as Jubilee Park, in March 2012 and Outline Planning Permission (Application No. 12/0886) was approved in April 2013. The location of the site is shown on Figure 1.

The site was divided into a number of land parcels, comprising H1-H9 for housing/residential end use, a school site, and LC1 and LC2 for commercial end use. The land parcels were subsequently reclaimed/remediated in phases in accordance with the approved Outline Planning Permission.

Walters Land (Rogerstone) Limited now propose a change in use for land parcels LC1 and LC2 from commercial end use to residential end use. The locations of LC1 and LC2 are shown on Figure 2.

Intégral Géotechnique (Wales) Limited have been appointed as the Geotechnical Engineers to undertake a review of available information in order to produce a geoenvironmental and geotechnical assessment with respect to Land Parcels LC1 and LC2.

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1.2 PROPOSED DEVELOPMENT

Future development will comprise the construction of a number of traditional residential properties and associated infrastructure including access roads, car parking areas and private driveways. The development is also likely to comprise areas of landscaping and private gardens.

2.0 THE SITE

2.1 SITE LOCATION AND DESCRIPTION

Land parcels LC1 and LC2 are located on the north eastern boundary of the Jubilee Park development in Rogerstone approximately 4km west of Newport city centre, at a National Grid Reference of 326984, 187814, see Figure 1.

The boundaries of the Jubilee Park site are defined by Tregwilym Road, adjacent residential properties and Tregwilym Industrial Estate to the north and northeast, various industrial units of the Tregwilym Industrial Estate to the southeast/east, the River Ebbw to the southwest/west and Rogerstone Welfare Ground/Community Centre to the north and northwest. Figure 2 shows the extent of the Jubilee Park site and identifies Development Parcels LC1 and LC2.

The two land parcels are separated by an existing access road and associated roundabout which provides access to the wider Jubilee Park development. Land parcel LC1 is located to the north of the road and land parcel LC2 is located to the south. A site plan is presented in Figure 2.

Land parcels LC1 and LC2 occupy areas of approximately 0.5 hectares and 0.9 hectares respectively. The boundaries of LC1 are defined by the main Jubilee Park access road and roundabout to the south, residential development to the northwest and an existing road with residential properties beyond to the northeast. The boundaries of LC2 are defined by the main Jubilee Park access road to the north and west and residential development to the southeast and northeast.

The sites are situated on relatively level ground with LC1 at an approximate elevation of 28m AOD and LC2 at approximately 27.6m to 27.8m AOD.

The former buildings that were present across most of the Jubilee Park site were demolished to ground level and the former basements were backfilled with demolition materials prior to sale of the site to Walters Land (Rogerstone) Limited.

The site was subsequently subjected to a site wide remediation/reclamation earthworks operation to prepare the site to a standard suitable for development.

Land parcels LC1 and LC2 are currently undeveloped and have been used as temporary compounds during the development of the wider site area.

2.2 BRIEF HISTORY

A brief history of the LC1 and LC2 land parcels has been traced with the aid of available historical maps as presented within the Envirocheck Report obtained previously for the entire Jubilee Park development area and included in Intégral Géotechnique's Site Investigation Report – Proposed Remediation/Reclamation Works Ref. 10953/RB/12/SI/RevB dated August 2012.

The earliest edition of the map dated 1886-1887 indicated LC1 and LC2 land parcels to be undeveloped land with the remains of Rogerstone Castle indicated to the northeast. A tramway to access the Tin Works located within the north western area of the wider site area (now referred to as Jubilee Park) was located to the south of the LC1 area and crossed LC2. A rifle range also followed approximately the path of the tramway through LC2. Rogerstone Iron Works was located to the south of the LC1 and LC2 land parcels. A road formed the northern boundary and the area beyond was largely undeveloped.

By 1901 the Iron Works had become Castle Steel Works. These works continued to expand over the subsequent years, but the LC1 And LC2 land parcels remained undeveloped.

It is understood that the Castle Steel Works were closed and operations relocated to Cardiff in 1935. The Air Ministry then began production of Aluminium, flat sheet and extrusions at the site in 1939. The Northern Aluminium Company, later named Alcan (Aluminium Company of Canada) was selected to design, construct and operate the works.

The aerial photo dated 1947 indicated the area of the former Castle Steel Works building to now have been redeveloped and the new building crossed the southern boundary of the LC2 area. The LC1 area remained undeveloped.

The 1972 edition of the map indicated that the Aluminium Works continued to expand in the vicinity of land parcels LC1 and LC2. An additional building, which was known to be utilised as offices, was constructed across the LC1 area and also encroached across the northern boundary of LC2.

The site and the immediate surrounding areas remained relatively unchanged until the edition of the map dated 1992 which indicated the construction of the A467 dual carriageway to the northeast of the site.

In 2005 the works were taken over by Novellis and in 2007 Novellis was taken over by Hindalco, the flagship company of the Aditya Birla Group based in India.

2.2 BRIEF HISTORY (CONTINUED)

The 2009 Google Earth image indicated the east works buildings which crossed into LC2 to have been demolished. The office building and associated car parking area within LC1 remained.

By the 2013 Google Earth image the works buildings across the larger Jubilee Park area to the southwest of the site had also been demolished.

The 2015 Google Earth image indicated that the new estate access road had been constructed in between LC1 and LC2. At this time land parcels LC1 and LC2 were utilised as site compounds for the adjacent residential developments. The surrounding areas have continued to be developed for residential use up until the present day.

2.3 BRIEF GEOLOGY

The 1:50,000 scale geological map of the area indicates the site to be underlain by Raglan Mudstone Formation of the Silurian period. These rocks typically comprise red mudstones and silty mudstones with calcretes and sandstones.

The site is indicated to be overlain by a combination of Alluvium within the south western area and Devensian Till deposits within the north eastern area, both of the Quaternary period. The Alluvium deposits typically comprise soft to firm compressible silty clay, but can contain layers of silt, sand, peat and basal gravel. A stronger, upper desiccated surface zone may be present. The Devensian Till deposits are typically poorly sorted and variable in nature comprising clays, sands and gravel. A variable thickness of made ground is anticipated above the superficial deposits across the site as a result of the past development history.

A summary of the geological succession is given below in Table 1.

Table 1: Summary of Anticipated Site Geology		
Geological unit	Horizon	Description
Recent	Made ground	Various materials
Quaternary	Alluvium	Sands and gravels with varying matrix
	Devensian Till	Poorly sorted and variable clays, sands and gravel
Silurian	Raglan Mudstone Formation	Red mudstones and silty mudstones with calcretes and sandstones

2.4 AVAILABLE SITE INVESTIGATION DATA

A number of site investigations have been carried out across the site between circa 2002 and 2011, prior to the site being acquired by Walters Land (Rogerstone) Limited. These comprised a combination of desk studies, trial pitting, cable tool boring and rotary drilling, with associated sampling and laboratory testing of soils and groundwater.

The available information was assigned to Walters Land (Rogerstone) Limited and the most recent obtained by SKM Enviros between August 2010 and July 2011 reviewed by Intégral Géotechnique and used to produce a site investigation and proposed remediation/reclamation works report for the site.

The following report was prepared by Intégral Géotechnique:

- Site Investigation Report, Proposed Remediation/Reclamation Works Ref.10953/RB/12/SI/RevB dated August 2012.

Following submission of the above report to the local planning authority, Outline Planning Permission (Application No. 12/0886) was approved in April 2013, for the comprehensive redevelopment of the former aluminium factory complex to create a new neighbourhood containing a range of new homes, a new primary school, a local centre for commercial use, together with a network of open spaces, footpaths, access roads, etc.

Following approval of the outline planning, the site was subject to detailed human health and groundwater risk assessments to derive site specific remedial target levels that were adopted as part of the remediation strategy for the site. A technical note was also provided as an addendum to the Remediation Strategy Report, detailing the soil and groundwater monitoring methodology proposed to be undertaken during the progression of the site reclamation earthworks. The following reports were produced by Intégral Geotechnique:

- Risk Assessment Report Ref. 10953/RB/13/RA dated April 2013,
- Remediation Strategy Report Ref. 11183/RB/13/RSR dated May 2013,
- Technical Note 1: Soil and Groundwater Monitoring Methodology Ref. 11183/RB/13/TN1 dated September 2013.

The Remediation Strategy Report and Technical Note 1 listed above included details of the site wide grid sampling and groundwater monitoring to be carried out during the remediation/reclamation works. These works included the land parcels referred to as LC1 and LC2.

2.4 AVAILABLE SITE INVESTIGATION DATA (CONTINUED)

A grid sampling exercise was carried out across the site prior to commencement of the reclamation/remediation earthworks in order to supplement the existing data and inform the earthworks. The grid sampling was carried out across the entire site area, including land parcels LC1 and LC2. Intégral Géotechnique provided the following report:

- Report on Grid Sampling and Testing Results Ref. 11183/RB/14/GS dated June 2014.

All of the above listed reports included land parcels LC1 and LC2 and are considered to provide relevant information to these areas.

3.0 PRE-RECLAMATION GROUND CONDITIONS AND CONTAMINATION

3.1 REVIEW OF GROUND CONDITIONS

A grid sampling exercise was undertaken pre-reclamation with the findings presented within Report on Grid Sampling & Testing Reference 11183/RB/14/GS, dated June 2014.

Copies of the trial pit logs relevant to land parcels LC1 and LC2, together with a copy of the site plan showing the respective trial pit locations/grid references are presented in Appendix A. The trial pits were excavated at the centre of the grid square and are referenced to that grid square (e.g.L15). The grid square locations are provided on the figure included in Appendix A.

The grid sampling confirmed the ground conditions beneath the site to comprise typically a variable layer of made ground over alluvial deposits. The base of the alluvial materials was not proven during the grid sampling works.

Made ground was encountered across both land parcels LC1 and LC2 and could be divided two layers. The near surface made ground comprised typically of recent demolition materials of crushed brick and concrete with metal fragments, re-bar, etc. These materials were present at the ground surface/shallow depth in the vicinity of the former East Works, which crossed into LC2, and used to backfill the former pits and basements in the northern and central parts of the Jubilee Park site. Older made ground was encountered beneath the thin layer of recent made ground/demolition materials and typically comprised sandy ash and gravels of clinker, slag, with metal fragments, plastic, timber and coal. Occasional re-worked natural materials were identified.

The made ground in the northern part of the site adjacent to Tregwilym Road, formerly occupied by the stores area, car park and offices, was found to be typically 0.1m to 2.0m in thickness, with an average thickness of 0.6m. The made ground was locally thicker or the thickness not proved in the area of the former East Works. Obstructions comprising concrete floor slabs was also encountered within LC2.

The made ground was typically underlain by variable alluvial deposits comprising sandy clays, silts, sandy gravel, clayey gravel, and sand and gravel horizons, with frequent cobbles.

The sides of trial pit excavations were generally stable in the short term although some localised collapses were noted within the granular in-situ materials.

3.2 REVIEW OF IDENTIFIED CONTAMINATION

The locations of land parcels LC1 and LC2 were not located within the more industrial areas of the site. Whilst the southern extent of LC2 was within the former East Works area of the site, the remaining area of LC2 and LC1 were located in areas occupied by offices and car parking.

As a result of this, gross contamination associated with the factory plant and processing was not anticipated within these land parcels.

The results of the site investigations carried out across the site identified levels of contamination of the type associated with historic made ground, such as metals, polycyclic aromatic hydrocarbons (PAH) and localised petroleum hydrocarbons. Contamination of the shallow groundwater was not identified within land parcels LC1 and LC2 but was identified within the wider Jubilee Park development site area.

Site specific target levels (SSTLs) were derived for the site and used to assess the results of the grid sampling.

The SSTLs were derived to be protective of both human health and the aquatic environment and calculated on the basis that all gardens and areas of soft landscaping are/will be capped by clean subsoil and topsoil. The SSTLs only apply to the materials that will be present beneath the final garden capping layer.

SSTLs were derived for two depth profiles, 0.6m to 1.6m below finished levels (SSTL1) and 1.6m to 2.6m below finished levels (SSTL2).

The results of the laboratory testing on samples of the made ground from the grid sampling carried out in LC1 and LC2 were compared to both SSTL1 and SSTL2 in order to inform the re-use of materials during the site reclamation/remediation works. Where samples were found to exceed SSTL1, for re-use within the upper 1m of re-engineered fill (0.6-1.6m below finished levels) they were then compared to SSTL2, for re-use within the lower 1m of engineered fill (1.6-2.6m below finished level).

The results of the grid sampling identified contamination levels within the made ground to be within the acceptable SSTL limits for the proposed site wide reclamation/remediation earthworks.

4.0 RECLAMATION/REMEDIAION STRATEGY & IMPLEMENTATION

Following submission and regulatory approval of the site investigation and remediation strategy for the site, the site was subsequently remediated and reclaimed in accordance with the agreed remediation strategy.

The reclamation and remediation earthworks were carried out across the entire site, including land parcels LC1 and LC2. The works carried out in land parcels LC1 and LC2 were completed to the same specification and standard as that for the rest of the site, including the residential development areas and the school site.

The works generally comprised breaking out of residual concrete obstructions (floor slabs, pits, walls, basements, etc.), excavation of the existing made ground to typically 2m below finished ground level, locally deeper, or to natural ground where shallower, sorting, processing, crushing of acceptable materials, removal of any unsuitable materials, and replacement of the acceptable materials to an agreed compaction specification to ensure that the engineered formation levels were achieved.

As the reclamation and remediation earthworks within the various residential land parcels were completed, validation sampling, testing and reporting was carried out in order to discharge the relevant planning conditions.

The main objective of the proposed reclamation and remediation works was to render the site suitable for use as a residential development. The required reclamation and remediation activities defined by IG's Remediation Strategy Report Ref No. 11183/RB/13/RSR dated May 2013 can be summarised as follows:

- To provide an engineered formation free from obstructions to a depth of at least 2m from the underside of foundations and suitable for the construction of concrete raft type foundations/floor slabs with a characteristic applied working load of 75kN/m² (average of less than 30kN/m²), bearing onto the prepared remediated plateau;
- Source removal by excavation and ex-situ remediation to the agreed site-specific remediation criteria or removal/treatment of all free phase hydrocarbon impacted soils that may present a risk to human health via the inhalation of vapours;
- Break any potential pathway between proposed site end users and made ground deposits;
- Removal of redundant sewers and culverts; and,
- Sealing of proposed off site drainage trenches.

4.0 RECLAMATION AND REMEDIATION IMPLEMENTATION (CONTINUED)

Following completion of the reclamation/remediation works, and in order to cut the pathway to the end users of the site, it will be necessary to provide a suitable capping system i.e. a minimum thickness of 600mm of clean imported subsoil/topsoil to all gardens and areas of soft landscaping to effectively cut dermal, ingestion and inhalation of dust pathways to end users.

It should be noted that the final placement of the capping layer should be carried out by the developer as and when individual plots and phases are completed. These works should be inspected and validated independently.

During the site remedial works, a reporting system between Intégral Géotechnique and the appointed contractor was established to identify and report any occurrences of impacted perched water or soils, in order that controlled implementation of the planned remedial measures could be undertaken in a controlled and supervised fashion, if such occurrences were observed.

All surface fly tipped materials were removed from site. The site was protected by existing palisade fencing, which was maintained and supplemented with heras fencing where required. Access to the site was gained from the former site entrance off Tregwilym Road.

The land remediation/reclamation works to reprocess the top 2.0m of the site formation and reprocess the suitable materials on site for re-use were carried out across the Jubilee Park site during 2014 and 2015.

Materials excavated from the site were subject to screening and processing to remove any unacceptable materials such as concrete, timber, etc. Granular materials were subject to crushing prior to materials being approved for re-use at the site.

All surplus deleterious materials were removed off-site. All acceptable excavated materials for re-use were stockpiled on site. The processing, sorting, crushing and removal of unacceptable materials resulted in a uniform/more consistent material suitable for re-engineering.

Previously excavated and processed material was returned to the works and placed and compacted in conventional engineered layers.

All earthworks materials were selected placed and compacted in accordance with DTp Specification for Earthworks.

5.0 VERIFICATION AND VALIDATION

Whilst the reclamation and remediation earthworks within land parcels LC1 and LC2 have been completed, the validation testing and reporting is yet to be carried out. These areas have been used as temporary compounds by the house builders during the development of the wider Jubilee Park site. Once these areas are cleared, the required validation works will be carried out and validation reports provided.

It is proposed to validate the reclaimed areas of LC1 and LC2 by the following measures:

Re-engineering Works

A series of plate bearing tests will be carried out across the development parcels.

The test will be carried out at existing remediated plateau level, approximately 600mm-800mm below final finished ground level, in engineered fill materials. The plate load tests will be taken to a maximum applied pressure of typically 150kN/m².

Contamination

The site has been reclaimed and remediated in accordance with the previously agreed and approved remediation strategy. Up to approximately 2.0m of materials has been excavated, processed and replaced in well-compacted layers. Representative soil samples will be taken following the same grid as used during the grid sampling and testing works. A testing schedule will be prepared to provide a screen for commonly occurring contaminants and potential contaminants identified from the historical use of the site and the findings of the desk study and the preliminary conceptual site model/conceptual exposure model. Screening for asbestos will also be undertaken on all validation samples.

The results of the validation grid sampling will be screened against the agreed site-specific target levels.

Post Reclamation Gas Monitoring

Post reclamation gas monitoring standpipes will be constructed, and a programme of gas monitoring undertaken.

Final Garden Capping Validation

The development will not be complete, in accordance with the previously agreed and approved remediation strategy for the site, until placement of the final 600mm (minimum thickness) of capping soils to soft finished areas. Checks, in the form of site supervision, further sampling and testing of the placed subsoil and topsoil should be undertaken in order to confirm that an adequate thickness of inert soils are in place.

5.0 VERIFICATION AND VALIDATION (CONTINUED)

The capping system is to comprise imported clean inert materials conforming to the appropriate soil guideline values for a residential with homegrown produce end use.

Samples of topsoil and subsoil should be taken for laboratory analysis, as above, at the rate of approximately one in every five gardens.

Monitoring and validation of the final 600mm capping is typically late in the works, usually on a plot-by-plot basis and should be maintained until the completion of the development.

Reporting of the clean capping to garden areas should be submitted independently of the reclamation works.

6.0 CONCLUSION

Land parcels LC1 and LC2 have been subjected to appropriate site investigation, sampling, testing, and risk assessment (both human health and controlled waters). A remediation strategy was produced to detail how the site would be remediated and reclaimed to a standard suitable for residential development. The site investigation reports, risk assessments and remediation strategy were all agreed by the Local Planning Authority.

Land parcels LC1 And LC2 were subsequently reclaimed/remediated during 2014/2015 as part of the wider Jubilee Park site works. Any residual buried foundations, floor slabs, pits, walls etc. were broken out and removed to the required level and the existing made ground excavated, sorted, and processed. The acceptable materials have been placed back in controlled layers and compacted in accordance with the agreed earthworks specification.





Following completion of the earthworks in land parcels LC1 and LC2, the areas have been used as site compounds by the housebuilders.



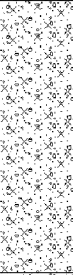
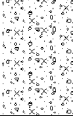

Following clearance of the compounds, the land parcels will be subject to appropriate validation testing, in accordance with the previously agreed and approved remediation strategy, and validation reports will be issued.



Following completion of the proposed residential developments, the gardens and any areas of soft landscaping will need to be capped by a minimum thickness of 600mm of clean imported subsoil/topsoil. The placement of the capping soils and the materials chemical suitability will need to be validated.



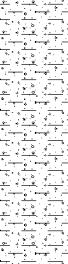


APPENDIX A



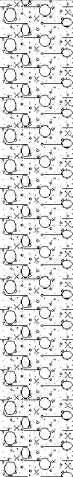


RELEVANT GRID SAMPLING TRIAL PIT LOGS (2013)


 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name : Jubilee Park			Project No.: 11183		Trial Pit No.: TP L14 Sheet 1 of 1	
Location : Rogerstone			Client : Walters Land (Rogerstone) Limited			Logged By : JJ		Scale : 1:25	
Equipment : JCB 8085			Coordinates : -			<div> <div>Dimensions</div> <div> <div>Depth :</div> <div>2.10m</div> </div> <div> <div>0.70m</div> <div>2.00m</div> </div> </div>			
Date Excavated : 03/10/2013			Level : -						
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.50	ES		0.80			Medium dense brown and black slightly silty sandy GRAVEL with occasional cobbles and boulders (0.3 x 0.3 x 0.2m) of limestone and conglomerate. Gravel is fine, medium and coarse brick, ash and concrete (Made Ground)	0		
						Medium dense orange brown slightly silty SAND and GRAVEL with occasional cobbles of subrounded to rounded sandstone. Gravel is fine, medium and coarse subangular to subrounded sandstone	1		
			2.10		Trial Pit Complete at 2.10 m				
							2		
							3		
							4		
							5		
Remarks:			Groundwater : Groundwater struck at 2.1m			Key : D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability : Sides stable						


		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name : Jubilee Park		Project No.: 11183		Trial Pit No.: TP L15 Sheet 1 of 1				
Location : Rogerstone				Client : Walters Land (Rogerstone) Limited				Logged By : DH		Scale : 1:25		
Equipment :				Coordinates : -				<div> <div>Dimensions</div> <div> <div>Depth :</div> <div>2.00m</div> </div> <div> <div>0.70m</div> <div>1.90m</div> </div> </div>				
Date Excavated : 16/10/2013				Level : -								
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description						
Depth (m)	Type	Results										
0.40	D					Medium dense brown silty sandy gravel and cobbles of crushed brick and concrete with fragments of metal and plastic onto concrete slab (MADE GROUND)						0
			0.70			Medium dense brown silty gravelly SAND with occaional cobbles of subrounded sandstone						1
			1.60			Medium dense to dense brown silty sandy GRAVEL and COBBLES of subrounded and rounded sandstone						2
			2.00		Trial Pit Complete at 2.00 m						2	
											3	
											4	
											5	
Remarks:				Groundwater : Groundwater observed at 1.8m depth				Key : D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample				
				Stability : Stable in the short term								




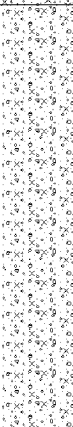

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name : Jubilee Park			Project No.: 11183		Trial Pit No.: TP L16 Sheet 1 of 1	
Location : Rogerstone			Client : Walters Land (Rogerstone) Limited			Logged By : DH		Scale : 1:25	
Equipment :			Coordinates : -			<div> <div>Dimensions</div> <div> <div>Depth :</div> <div>2.40m</div> </div> <div> <div>0.70m</div> <div>1.90m</div> </div> </div>			
Date Excavated : 16/10/2013			Level : -						
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.80	D					Loose to medium dense yellow brown mottled orange silty sand (MADE GROUND)	0		
						Medium dense yellow brown mottled red brown and purple silty gravelly SAND with occasional cobbles and rare blocky sandstone boulders (0.5m x 0.6m) (Disturbed Ground)	1		
						Medium dense brown silty very sandy GRAVEL and COBBLES of subrounded and rounded sandstone	2		
						Trial Pit Complete at 2.40 m	3		
							4		
							5		
Remarks:			Groundwater : Dry			Key : D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability : Local collapse below 2.0m depth						




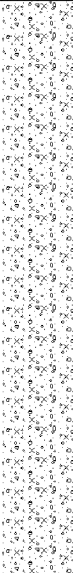

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Location : Rogerstone				Client : Walters Land (Rogerstone) Limited				Logged By : JJ		Scale : 1:25	
Equipment : JCB 8085				Coordinates : -				<div> <div>Dimensions</div> <div> <div>Depth :</div> <div>1.70m</div> </div> <div> <div>0.70m</div> <div>2.00m</div> </div> </div>			
Date Excavated : 03/10/2013				Level : -							
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description					
Depth (m)	Type	Results									
0.30	ES					Medium dense dark brown and black slightly silty SAND and GRAVEL with occasional cobbles of subrounded sandstone. Gravel is fine, medium and coarse subangular to subrounded sandstone with some brick and concrete (Made Ground)	0				
			0.50			Firm orange brown mottled grey very sandy very gravelly CLAY	1				
			1.40			Medium dense orange brown slightly silty clayey SAND and GRAVEL with frequent cobbles and rare boulders (0.2 x 0.2 0.2m) of subrounded sandstone					
			1.70			Trial Pit Complete at 1.70 m	2				
							3				
							4				
							5				
Remarks:				Groundwater : Groundwater struck at 1.5m				Key : D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
				Stability : Minor collapse below 1.4m							



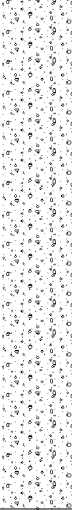

		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name : Jubilee Park		Project No.: 11183		Trial Pit No.: TP M16 Sheet 1 of 1				
Location : Rogerstone				Client : Walters Land (Rogerstone) Limited				Logged By : DH		Scale : 1:25		
Equipment :				Coordinates : -				<div> <div>Dimensions</div> <div> <div>Depth : 2.50m</div> <div>0.70m</div> <div>1.80m</div> </div> </div>				
Date Excavated : 16/10/2013				Level : -								
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description						
Depth (m)	Type	Results										
1.00	D					Wood chippings (MADE GROUND)						0
			0.40			Medium dense silty sandy GRAVEL with occasional cobbles and boulders (0.3m x 0.4m) of blocky sandstone (Disturbed Ground)						1
			2.00			Dense silty GRAVEL and COBBLES of subrounded sandstone						2
			2.50		Trial Pit Complete at 2.50 m						3	
											4	
												5
Remarks:				Groundwater : Dry				Key : D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample				
				Stability : Stable in the short term								



 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name : Jubilee Park			Project No.: 11183		Trial Pit No.: TP M17 Sheet 1 of 1	
Location : Rogerstone			Client : Walters Land (Rogerstone) Limited			Logged By : DH		Scale : 1:25	
Equipment :			Coordinates : -			<div> <div>Dimensions</div> <div> <div>Depth : 3.00m</div> <div>0.70m</div> <div>1.90m</div> </div> </div>			
Date Excavated : 16/10/2013			Level : -						
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.60	D					Firm brown silty gravelly clay with roots and rootlets (TOPSOIL)		0	
						Medium dense orange brown slightly clayey silty gravelly SAND with occasional subrounded cobbles of sandstone. Gravel is fine, medium and coarse subrounded and subangular sandstone		1	
						Medium dense yellow brown silty SAND with occasional gravel and cobbles of subrounded sandstone		2	
						Trial Pit Complete at 3.00 m		3	
								4	
								5	



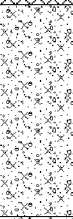
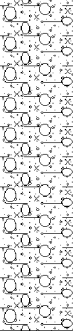

Remarks:	Groundwater : Dry	Key : D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample	
	Stability : Stable in the short term		




		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name : Jubilee Park		Project No.: 11183		Trial Pit No.: TP N16 Sheet 1 of 1				
Location : Rogerstone				Client : Walters Land (Rogerstone) Limited				Logged By : DH		Scale : 1:25		
Equipment :				Coordinates : -				<div> <div>Dimensions</div> <div> <div>Depth :</div> <div>2.30m</div> </div> <div> <div>0.70m</div> <div>1.90m</div> </div> </div>				
Date Excavated : 16/10/2013				Level : -								
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description						
Depth (m)	Type	Results										
0.20	D		0.30			Medium dense dark brown silty sandy gravel with occasional boulders (0.4m x 0.4m) of blocky limestone. Gravel is crushed brick and wood chippings (MADE GROUND)						0
			0.90			Medium dense orange brown silty gravelly SAND with occasional cobbles of subrounded sandstone						
			2.30			Dense brown silty sandy GRAVEL and COBBLES of subrounded and rounded sandstone. Occasional boulders (0.3m x 0.4m) of blocky sandstone						1
						Trial Pit Complete at 2.30 m						2
												3
												4
												5
Remarks:				Groundwater : Groundwater seepage at 2.1m depth				Key : D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample				
				Stability : Local collapse below 1.2m depth								




		Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com		Project Name : Jubilee Park		Project No.: 11183		Trial Pit No.: TP N17 Sheet 1 of 1				
Location : Rogerstone				Client : Walters Land (Rogerstone) Limited				Logged By : DH		Scale : 1:25		
Equipment :				Coordinates : -				<div> <div>Dimensions</div> <div> <div>Depth :</div> <div>2.60m</div> </div> <div> <div>0.70m</div> <div>1.90m</div> </div> </div>				
Date Excavated : 16/10/2013				Level : -								
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description						
Depth (m)	Type	Results										
0.20	D		0.30			Firm dark brown silty clay with roots and rootlets (TOPSOIL)						0
			0.70			Medium dense orange and red brown silty gravelly SAND with rootlets						
			2.60			Medium dense becoming dense brown silty sandy GRAVEL and COBBLES of subangular and subrounded sandstone						1
						Trial Pit Complete at 2.60 m						2
												3
												4
												5
Remarks:				Groundwater : Dry				Key : D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample				
				Stability : Stable in the short term								

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name : Jubilee Park			Project No.: 11183		Trial Pit No.: TP N18 Sheet 1 of 1	
Location : Rogerstone			Client : Walters Land (Rogerstone) Limited			Logged By : RB		Scale : 1:25	
Equipment : 20T Tracked Excavator			Coordinates : 327069 mE - 187811 mN			Dimensions Depth : <div style="border: 1px solid black; width: 100px; height: 30px; display: inline-block;"></div>			
Date Excavated : 02/12/2013			Level : 33.3 mAOD						
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.20	D		0.20	33.15		TOPSOIL: Uncompact dark brown sandy silt with many rootlets.		0	
						Loose to medium dense brown/red brown clayey sandy cobbly GRAVEL with occasional boulders (0.2x0.3m). Gravels and cobbles are fine, medium and coarse, sub rounded, occasionally tabular of sandstone. Old cable at 0.2m depth		1	
			1.90	31.45		Trial Pit Complete at 2.50 m		2	
								3	
								4	
								5	
Remarks:			Groundwater : No Water			Key :			
			Stability : Local overbreak due to boulders			D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name : Jubilee Park			Project No.: 11183		Trial Pit No.: TP 016 Sheet 1 of 1	
Location : Rogerstone			Client : Walters Land (Rogerstone) Limited			Logged By : DH		Scale : 1:25	
Equipment :			Coordinates : -			<div> <div>Dimensions</div> <div> <div>Depth :</div> <div>2.00m</div> </div> <div> <div>0.70m</div> <div>1.90m</div> </div> </div>			
Date Excavated : 16/10/2013			Level : -						
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.60	D					Medium dense silty sandy gravel and cobbles of crushed concrete, brick, tiles, plastic, metal, wire, timber, metal pipe. Un sorted, uncrushed demo rubble (MADE GROUND)		0	
			2.00			Trial Pit Complete at 2.00 m		2	
								3	
								4	
								5	
Remarks:			Groundwater : Dry			Key : D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability : Frequent collapse						

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name : Jubilee Park			Project No.: 11183		Trial Pit No.: TP 017 Sheet 1 of 1	
Location : Rogerstone			Client : Walters Land (Rogerstone) Limited			Logged By : DH		Scale : 1:25	
Equipment :			Coordinates : -			<div> <div>Dimensions</div> <div> <div>Depth : 2.20m</div> <div>0.70m</div> <div>1.90m</div> </div> </div>			
Date Excavated : 16/10/2013			Level : -						
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.30	D		0.40			Medium dense silty sandy clayey gravel of sandstone, brick, tarmac with black electrical wiring and cable (MADE GROUND)	0		
			1.10			Medium dense orange brown silty gravelly SAND with occasional cobbles of subrounded and rounded sandstone	1		
			2.20			Medium dense to dense light brown silty sandy GRAVEL and COBBLES of subrounded and rounded sandstone. Rare blocky boulders of subangular sandstone (0.4m x 0.5m)	2		
						Trial Pit Complete at 2.20 m			
						3			
						4			
						5			
Remarks:			Groundwater : Dry			Key :			
			Stability : Local collapse below 1.4m depth			D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name : Jubilee Park			Project No.: 11183		Trial Pit No.: TP 018 Sheet 1 of 1	
Location : Rogerstone			Client : Walters Land (Rogerstone) Limited			Logged By : JJ		Scale : 1:25	
Equipment :			Coordinates : -			Dimensions Depth : <div style="border: 1px solid black; width: 100px; height: 30px; display: inline-block;"></div>			
Date Excavated : 17/10/2013			Level : -						
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.20	ES		0.30		 Loose light red brown SAND and GRAVEL with frequent cobbles of brick and concrete. Gravel is fine, medium and coarse angular brick and concrete (Made Ground)	Trial Pit Complete at 0.30 m			
						0			
						1			
						2			
						3			
						4			
						5			
Remarks: Excavation terminated at 0.3m below existing ground level due to refusal on concrete slab			Groundwater : Pit dry			Key : D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability :						

 Intégral House, 7 Beddau Way Castlegate Business Park Caerphilly CF83 2AX Tel. 029 20807991 Fax. 029 20862176 mail@integralgeotec.com			Project Name : Jubilee Park			Project No.: 11183		Trial Pit No.: TP P18 Sheet 1 of 1	
Location : Rogerstone			Client : Walters Land (Rogerstone) Limited			Logged By : JJ		Scale : 1:25	
Equipment :			Coordinates : -			<div> <div>Dimensions</div> <div> <div>Depth :</div> <div>0.80m</div> </div> <div> <div>0.70m</div> <div>1.90m</div> </div> </div>			
Date Excavated : 17/10/2013			Level : -						
Samples & In-situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description			
Depth (m)	Type	Results							
0.50	ES		0.80			Compact grey brown SAND and GRAVEL with occasional cobbles of angular brick and concrete (Made Ground)	0		
						Trial Pit Complete at 0.80 m			
						1			
						2			
						3			
						4			
						5			
Remarks: Excavation terminated at 0.8m below existing ground level due to refusal on concrete slab			Groundwater : Pit dry			Key : D - Small disturbed sample B - Bulk disturbed sample ES - Environmental soil sample W - Water sample			
			Stability : Sides stable in short term						

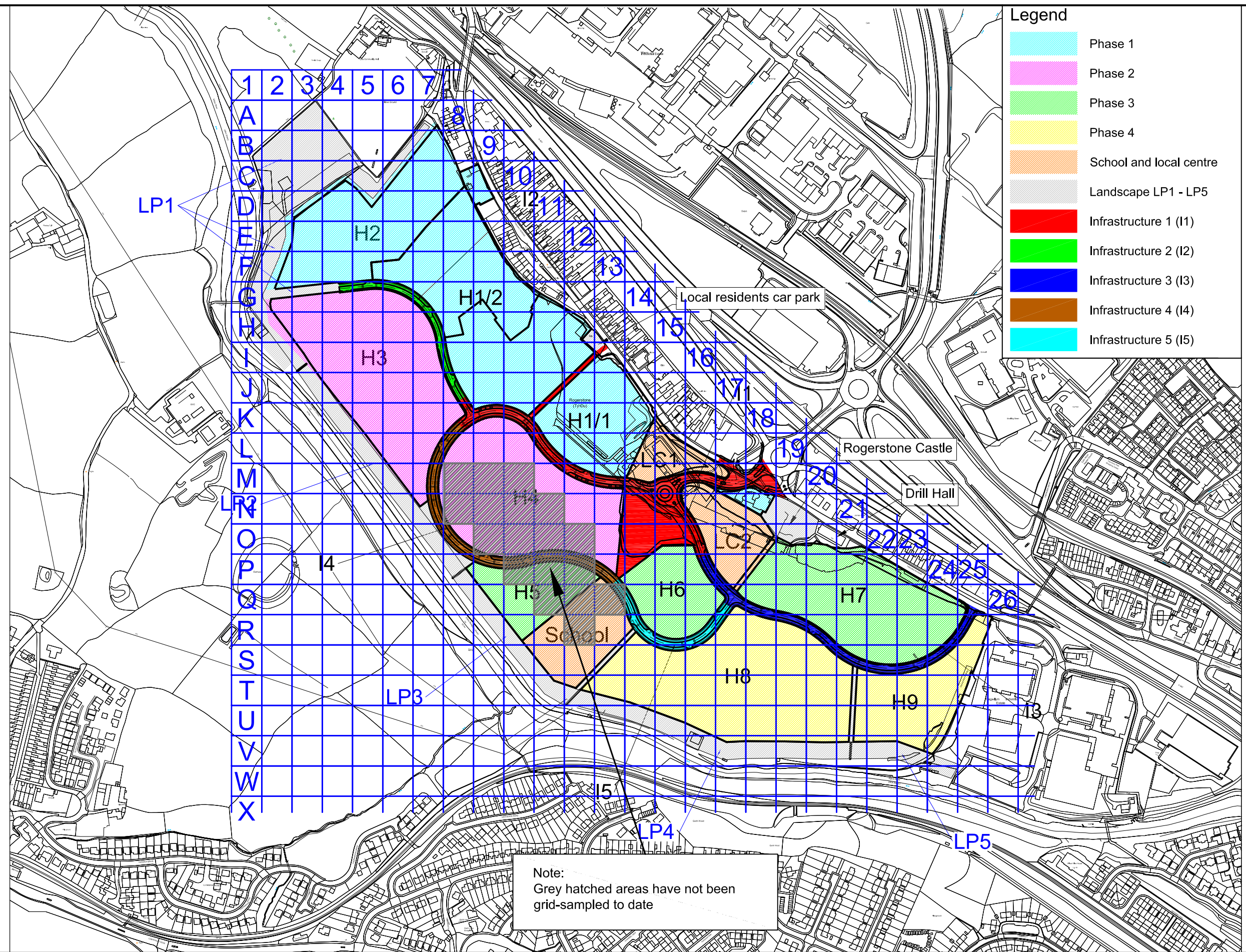


Figure 2: Site Plan

Project: Jubilee Park, Rogerstone

Client: Walters Land (Rogerstone) Limited

Job No.: 11183/SI

Scale: 1:5000 at A3

Intégral
Géotechnique

Integral House,
7 Beddau Way,
Castlegate Business Park,
Caerphilly,
CF83 2AX.
Tel: 029 2080 7991

FIGURES



Jubilee Park, Rogerstone - Land Parcels LC1 & LC2

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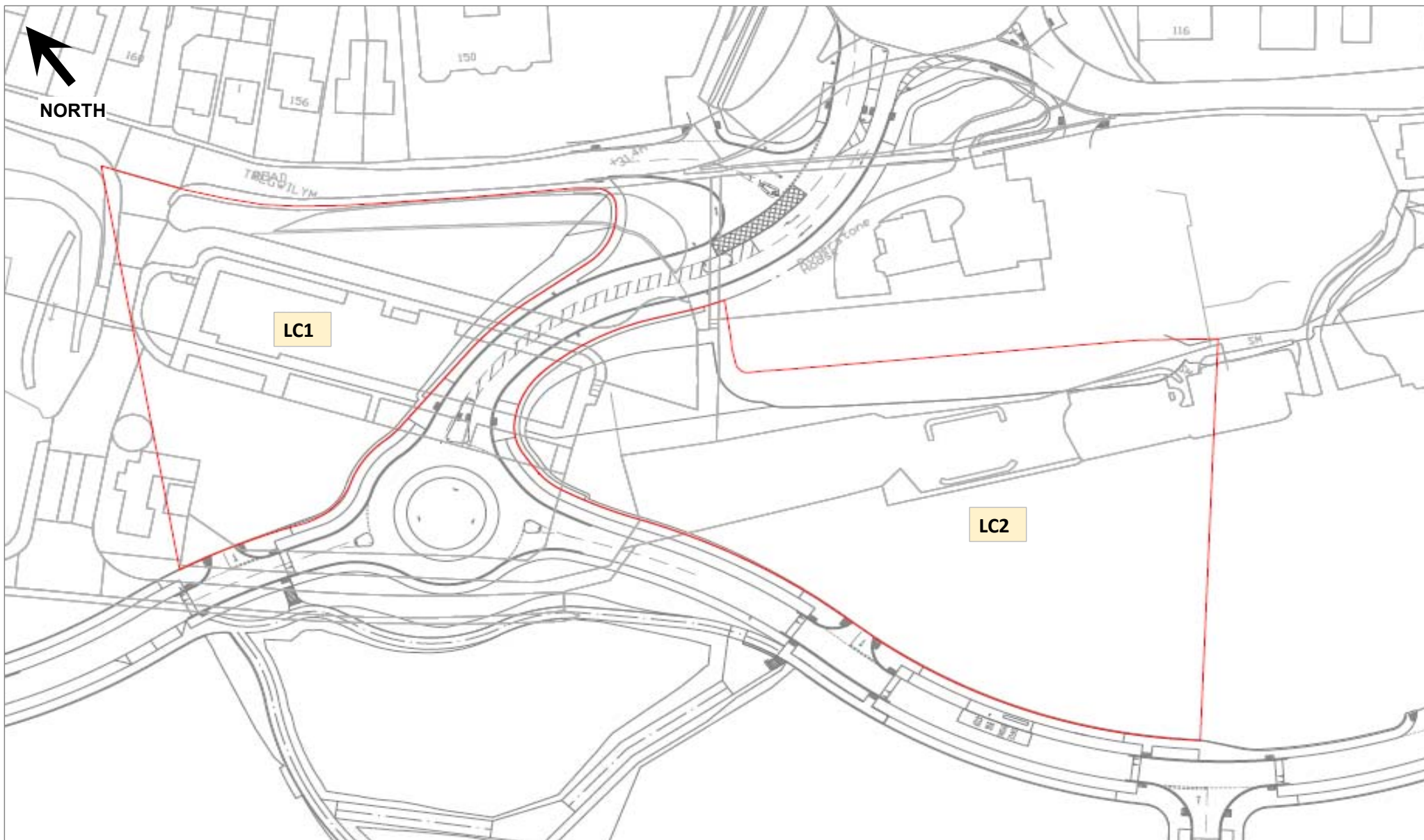


FIGURE 2: SITE PLAN

Jubilee Park, Rogerstone - Land Parcels LC1 & LC2,

Intégral
Géotechnique

Intégral House
7 Beddau Way
Castlegate Business Park
Caerphilly
CF83 2AX
Tel: 029 2080 7991
Fax: 029 2086 2176

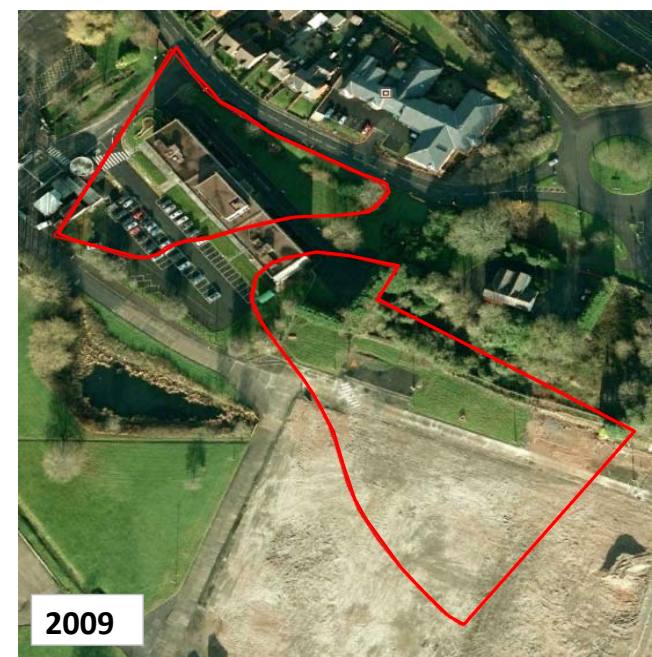
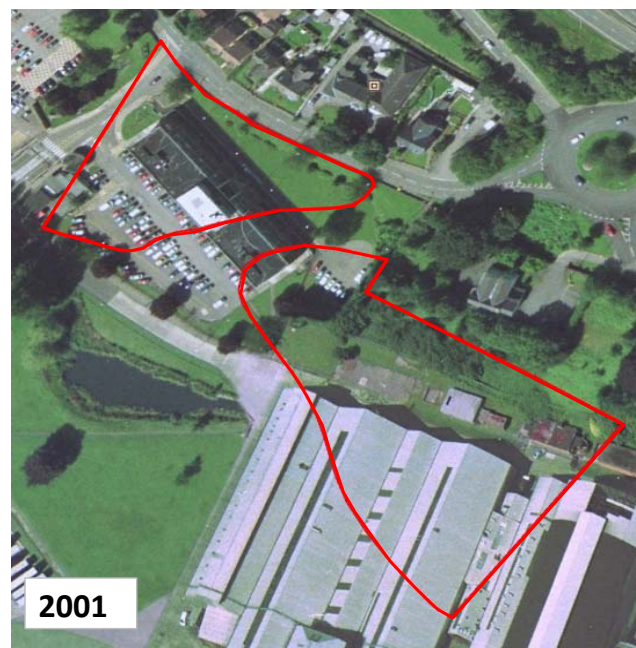
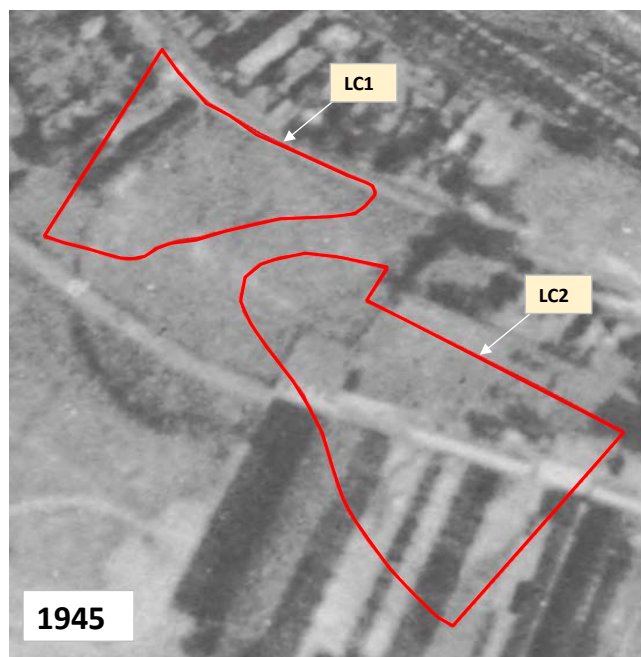


FIGURE 3: GOOGLE EARTH IMAGES

Jubilee Park, Rogerstone - Land Parcels LC1 & LC2