

ENVIRONMENT

William Davis Ltd Bromwich Lane Pedmore Flood Risk Assessment



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EXECUTIVE SUMMARY

This Flood Risk Assessment (FRA) has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance. It has been produced on behalf of William Davis Ltd in respect of a planning application where it is proposed that the site be developed to accommodate up to 100 dwellings. Vehicular access and egress is proposed to be taken from Bromwich Lane, Pedmore (approximate grid reference: SO911815).

This report demonstrates that the proposed development is not at significant flood risk, subject to the recommended flood mitigation strategies being implemented.

The site is shown to be located within Flood Zone 1, which is land defined as having low probability of flooding from rivers or sea. The nearest Flood Zone extents are located approximately 1.67km north-west of the site associated with River Stour. 1m resolution Light Detection and Ranging (LiDAR) data shows the site to be raised approximately 30-50m above the River Stour.

The majority of the site is shown to be at a very low risk of flooding from pluvial sources. Due to the surrounding topography, the northern boundary of the site is mapped as being at low to medium risk. However, the source of this accumulated runoff is considered to be generated from within the site itself. Therefore, this relatively minor flood risk may be resolved through developing the site and implementing formal surface water drainage infrastructure. More details of the proposed surface water drainage strategy are provided within the accompanying Sustainable Drainage Statement (reference: PBL-BWB-ZZ-XX-RP-CD-0001).

Flood risk posed to the site by canals, reservoirs, and sewers is considered to be low.

The risk of groundwater flooding to the finished development is also considered to be low. However, an intrusive ground investigation within the site identified shallow perched groundwater levels beneath the lower elevations of the site. Therefore, it is recommended that groundwater levels are monitored during the construction phase of development, especially within excavations, and where necessary dewatering should be undertaken by a specialist contractor.

The proposed development will increase the area of impermeable surfaces leading to a potential increase in surface water runoff. To mitigate this, a drainage strategy has been proposed, which will offer attenuated storage to ensure that the runoff rate from the site does not exceed the existing greenfield rate.

In compliance with the requirements of NPPF, and subject to the mitigation measures proposed, the development could proceed without being subject to significant flood risk. Moreover, the development will not increase flood risk to the wider catchment area as a result of suitable management of surface water runoff discharging from the site.



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1. INTRODUCTION

- 1.1 This Flood Risk Assessment (FRA) has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance. The FRA has been produced on behalf of William Davis Ltd in respect of a planning application where it is proposed that the site be developed to accommodate up to 100 dwellings.
- 1.2 This FRA is intended to support a full planning application and as such the level of detail included is commensurate and subject to the nature of the proposals at the planning stage. Summary information is included as **Table 1.1**.

Site Name	Bromwich Lane
Location	Pedmore
NGR (approx.)	SO911815
Application Site Area (ha)	Approx. 4.20
Development Type	Residential
Flood Zone Classification	Flood Zone 1
NPPF Vulnerability	More Vulnerable
Anticipated Development Lifetime	100+ years
Environment Agency Office	West Midlands
Lead Local Flood Authority	Dudley Metropolitan Borough Council
Local Planning Authority	Dudley Metropolitan Borough Council

Table 1.1: Site Summary

Sources of Data

- i. Topographical Survey by Survey Solutions, reference 20454cv-01
- ii. OS Explorer Series mapping
- iii. Risk of Surface Water Flood Risk Maps
- iv. The Black Country Strategic Flood Risk Assessment
- v. The Dudley Metropolitan Borough Council Preliminary Flood Risk Assessment
- vi. The Dudley Borough Development Strategy
- vii. Ground Investigations undertaken by GRM Development Solutions reference GRM/P8139/F.1



- viii. Severn Trent Water Sewer Records
- ix. British Geological Survey Maps
- x. 1m LiDAR Contour Data
- xi. Sustainable Drainage Statement, reference PBL-BWB-ZZ-XX-RP-CD-0001_SDS

Existing Site

- 1.3 The greenfield site is located off Bromwich Lane, approximately 1km north of Hagley. The A491 (Hagley Road) is located approximately 110m east of the site. The site is bound by residential development immediately north, east and north-west and greenfield land to the south.
- 1.4 An unnamed ordinary watercourse is located approximately 530m south-west and approximately 470m south of the site.
- 1.5 The site's location is illustrated within **Figure 1.1**.





Figure 1.1: Site Location

1.6 A topographical survey of the site has been undertaken and is included as **Appendix 1**. The site is shown to generally fall in a south westerly direction with levels shown to range from approximately 130.7m Above Ordnance Datum (AOD) in the east to approximately 116.5m AOD in the south-west.

Proposed Development

1.7 It is proposed that the site be developed to accommodate up to 100 dwellings. Vehicular access and egress is proposed to be taken from Bromwich Lane to the west. A sketch masterplan is included as **Appendix 2**.



2. FLOOD RISK PLANNING POLICY & GUIDANCE

National Planning Policy Framework

- 2.1 The NPPF¹ sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. Planning Practice Guidance is also available online².
- 2.2 The Planning Practice Guidance sets out the vulnerability to flooding of different land uses. It encourages development to be located in areas of lower flood risk where possible and stresses the importance of preventing increases in flood risk off site to the wider catchment area.
- 2.3 The Planning Practice Guidance also states that alternative sources of flooding, other than fluvial (river flooding), should be considered when preparing a FRA.
- 2.4 The Planning Practice Guidance includes a series of tables that define Flood Zones (Table 1), the flood risk vulnerability classification of development land uses (Table 2) and 'compatibility' of development within the defined Flood Zones (Table 3). Table 2 and Table 3 are recreated within **Appendix 3** of this report for reference.
- 2.5 This FRA is written in accordance with the NPPF and the Planning Practice Guidance.

Flood Map for Planning

2.6 With particular reference to planning and development, the Flood Map for Planning identifies Flood Zones in accordance with Table 1 of the Planning Practice Guidance. Further details on the Flood Zone classifications are outlined in **Table 2.1**.

Flood Zone	Description
Flood Zone 1 (Low Probability)	Land having less than a 1 in 1000 annual probability of river or sea flooding (<0.1% Annual Exceedance Probability). All land outside of Flood Zone 2 and 3.
Flood Zone 2 (Medium Probability)	Land having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1% AEP); or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1% AEP).
Flood Zone 3a (High Probability)	Land having a 1 in 100 or greater annual probability of river flooding (>1% AEP); or land having a 1 in 200 or greater annual probability of flooding from the sea (>0.5% AEP). This is represented by "Flood Zone 3" on the Flood Map for Planning.
Flood Zone 3b (The Functional Floodplain)	Flood Zone 3b (The Functional Floodplain) is defined as land where water must flow or be stored in times of

Table 2.1: Flood Zone Classifications

¹ Revised National Planning Policy Framework, Ministry of Housing, Communities & Local Government, amended 2021

² Planning Practice Guidance: https://www.gov.uk/government/collections/planning-practice-guidance



Flood Zone	Description
	flood. This is not identified or separately distinguished from Zone 3a on the Flood Map for Planning.

2.7 The site is shown to be located within Flood Zone 1, as shown in **Figure 2.1**.



Figure 2.1: Flood Map for Planning

The Design Flood

2.8 The Planning Practice Guidance identifies that new developments should be designed to provide adequate flood risk management, mitigation, and resilience against the 'design flood' for their lifetime.



2.9 This is a flood event of a given annual flood probability, which is generally taken as fluvial (river) and surface water (pluvial) flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year), or tidal flooding with a 0.5% annual probability (1 in 200 chance each year), against which the suitability of a proposed development is assessed and mitigation measures, if any, are designed.

Climate Change

Peak River Flow

- 2.10 Predicted future changes in peak river flows caused by climate change are provided by the Environment Agency (EA)³, with a range of projections applied to regionalised 'River Basin Districts', which are further subdivided into Management Catchments.
- 2.11 The site falls within the Severn Middle Worcestershire Management Catchment of the Severn River Basin District. **Table 2.2** identifies the relevant peak river flow climate change allowances from this Management Catchment.

 Table 2.2: Peak River Flow Climate Change Allowances for the Severn Middle

 Worcestershire Management Catchment within the Severn River Basin District

Allowance Category '2020s' (2015 to 2039)		Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2125)
Upper End	25%	38%	67%
Higher Central	16%	21%	40%
Central	12%	15%	30%

2.12 When determining the appropriate allowance for use in a FRA the Flood Zone classification, flood risk vulnerability and the anticipated lifespan of the development should be considered. **Table 2.3** provides a matrix summarising the EA's guidance on determining the appropriate allowance(s).

Flood Zone	Essential Highly Infrastructure Vulnerable		More Vulnerable	Less Vulnerable	Water Compatible	
1	Use the central	I allowance where a location may fall within Flood Zone 2 or 3 in the future.				
2	Use the higher central allowance	Use the central allowance				

Table 2.3: Application of Appropriate Peak River Flow Climate Change Allowanc

³ Environment Agency, Flood risk assessments: climate change allowances: https://www.gov.uk/guidance/flood-risk-assessments-climate-changeallowances



Flood	Essential	Highly More Less		More Less		
Zone	Infrastructure	Vulnerable Vulnerable Vulnerable		Vulnerable Vulnerable		
3а	Use the higher central allowance	Development should not be Use the central allowance permitted			ance	
3b	Use the higher	Use the			Use the	
	central	Development should not be permitted			central	
	allowance	allowance			allowance	
If development is considered appropriate by the local authority when not in accordance with Flood Zone vulnerability categories, then it would be appropriate to use the higher central allowance.						

2.13 The site is located entirely within Flood Zone 1. The Environment Agency guidance states that for a site in Flood Zone 1 and identified to potentially fall within Flood Zones 2 or 3 in the future the Central allowances should be used; however, the distance of the site from surrounding watercourses, and the intervening topography, means that the site is not anticipated to be located within Flood Zones 2 or 3 now or in the future. Therefore, no allowance for climate change has been included within the fluvial flood risk assessment within this report.

Strategic Flood Risk Assessment

- 2.14 A Strategic Flood Risk Assessment (SFRA) is a study carried out by one or more local planning authorities to assess the risk to an area from flooding from all sources, now and in the future.
- 2.15 The Black Country Authorities Level SFRA⁴ has been reviewed in the production of this FRA. The SFRA provides information specific to the site location in the form of fluvial, surface water and groundwater flood risk mapping, as well as records of historical flooding. Information from the Level 1 SFRA will be referenced within **Section 3** where applicable.

Preliminary Flood Risk Assessment

- 2.16 A Preliminary Flood Risk Assessment (PFRA) is an assessment of floods that have taken place in the past and floods that could take place in the future. It generally considers flooding from surface water runoff, groundwater and ordinary watercourses, and is prepared by the Lead Local Flood Authorities (LLFA).
- 2.17 The Dudley Metropolitan Borough Council PFRA⁵ considers flooding from surface water runoff, groundwater, ordinary watercourses and canals. However, no historical instances of flooding at the site are referenced. Information from the PFRA will not be referenced further within this report.

⁴ Level 1 Strategic Flood Risk Assessment (JBA Consulting, June 2020)

⁵ Preliminary Flood Risk Assessment (Dudley Metropolitan Brough Council, June 2011)



2.18 A PFRA Addendum⁶ was prepared in 2017 and states that have been no major changes to the assessment of risk since the preliminary assessment was published in 2011.

Local Flood Risk Management Strategy

- 2.19 A Local Flood Risk Management Strategy (LFRMS) is prepared by a Lead Local Flood Authority to help understand and manage flood risk at a local level.
- 2.20 The LFRMS aims to ensure that the knowledge of local flood risk issues is communicated effectively so that they can be better managed. The LFRMS also aims to promote sustainable development and environmental protection.
- 2.21 The Black Country LFRMS⁷ has been reviewed and will not be referenced further within this report.

Development Strategy

- 2.22 The Dudley Borough Development Strategy⁸ guides development within the Borough until 2026 by providing allocations and local planning policies to give greater certainty to the development process.
- 2.23 Policy S4 states 'The Council will require Flood Risk Assessments (FRAs) to be prepared in support of planning applications for;
 - all developments within Flood Zone 1 (low risk) for development proposals of 1 hectare or greater and all proposals for new development in Flood Zone 2 (medium risk) or Flood Zone 3 (high risk) as identified in the Environment Agency's flood maps which are updated quarterly and represent the best available information and the Council's surface water flood risk maps and Preliminary Flood Risk Assessment (PFRA) report;
 - all developments identified as at risk from other sources of flooding as identified in the updated flood maps included in the Council's Preliminary Flood Risk Assessment produced in 2011 including surface water, sewer and groundwater flooding;
 - all developments identified as at risk from flooding in the PFRA report and indicated on the Council's updated Flood Maps for Surface Water which now represent the Council's locally agreed surface water Information as defined in the PFRA including information on flood extents, depths and velocity (speed and direction); and
 - all other developments identified as at risk of flooding by the Council as LLFA.

⁶ Preliminary Flood Risk Assessment Addendum (Dudley Metropolitan Borough Council, December 2017)
⁷ Local Flood Risk Management Strategy (Dudley Metropolitan, Sandwell Metropolitan Borough Council, Walsall Council, City of Wolverhampton Council,

February 2016) ⁸ The Dudley Borough Development Strategy (Dudley Metropolitan Borough Council, March 2017)



Other Relevant Policy and Guidance

2.24 This FRA has considered the following documents when assessing sources of flood risk and when recommending mitigation and resilience measures.

Flood Risk to People and New Developments

- 2.25 The Flood Risk to People (FD2321/TR1)⁹ document was prepared as a research project considering flood hazard and factors that affect it.
- 2.26 Flood Risk Assessment Guidance for New Development (FD2320/TR2)¹⁰ provides a framework and guidance for assessing and managing flood risks for new developments and sets flood hazard thresholds.
- 2.27 Hazard ratings are derived using the following equation in line with the above:

Hazard Rating =
$$D * (V+0.5) + DF$$

Where: D = depthV = velocity DF = debris factor

2.28 A supplementary note¹¹ provides clarification of the hazard rating thresholds which should be used for development planning and control use. Table 2.4 identifies the thresholds of the flood hazard categories.

Threshold for Flood Hazard Rating	Degree of Flood Hazard	Description
< 0.75	Low	Caution "Flood zone with shallow flowing water or deep standing water"
0.75 - 1.25	Moderate	Danger for some (i.e.: children, the elderly and the infirm) "Danger: Flood Zone with deep or fast flowing water"
1.25 - 2.0	Significant	Danger for most (includes the general public) "Danger: Flood Zone with deep fast flowing water"
2.0 >	Extreme	Danger for all (includes the emergency services) "Extreme Danger: Flood Zone with deep fast flowing water"

Table 2.4: Hazard to People¹²

⁹ Flood Risk to People Methodology (FD2321/TR1), Defra/Environment Agency, 2006

¹⁰ Flood Risk Assessment Guidance for New Development (FD2320/TR2), Defra/Environment Agency, 2005

¹¹ Supplementary Note on Flood Hazard Ratings and Thresholds for Development Planning and Control Purpose – Clarification of the Table 13.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1. (http://randd.defra.gov.uk/Document.aspx?Document=FD2321_7400_PR.pdf) ¹² 2008, DEFRA. Supplementary Note on Flood Hazard Ratings and Thresholds for Development Planning and Control Purposes.

3. POTENTIAL SOURCES OF FLOOD RISK

3.1 Flooding can occur from a variety of sources, or combination of sources, which may be natural or artificial. **Table 3.1** below identifies the potential sources of flood risk to the site in its current condition, and the impacts which the development could have in the wider catchment, prior to mitigation. These are discussed in greater detail in the forthcoming section. The mitigation measures proposed to address flood risk issues and ensure the development is appropriate for its location are discussed within **Section 4**.

	Potential Risk				Description
Flood Source	High	Medium	Low	None	Description
Fluvial				Х	The site is located in Flood Zone 1 and there no ordinary watercourses within the immediate vicinity of the site.
Canals				Х	The nearest canal to the site is the Staffordshire & Worcestershire Canal located 5.35km west of the site. 1m Light Detection and Ranging) LiDAR data shows the site to be elevated 70-90m above this canal.
Groundwater			Х		The overall risk to the completed development is considered to be low, but intrusive ground investigations identified localised shallow groundwater levels that could be encountered during the construction phase.
Reservoirs and waterbodies				Х	EA reservoir flood risk mapping indicates that the site is far removed from any areas at risk of reservoir failure.
Pluvial runoff			Х		The majority of the site is shown to be at very low risk of flooding from pluvial sources.
Sewers			Х		No public or private sewers are indicated to be located within the site. LiDAR data has shown that in the event of exceedance by any surrounding sewer flooding, flows are expected to be directed to the north-west away from the site.
Effect of Development			Х		Development will not result in impedance of pluvial and fluvial flow routes.

Table 3.1: Pre-Mitigation Sources of Flood Risk

	Potential Risk				Description
Flood Source	High	Medium	Low	None	Description
on Wider Catchment		Х			The development will increase the area of impermeable surfaces leading to a potential increase in runoff, unless mitigated.

Fluvial Flood Risk

- 3.2 Flooding from watercourses occurs when flows exceed the capacity of the channel, or where a restrictive structure is encountered, which leads to water overtopping the banks into the floodplain. This process can be exacerbated when debris is mobilised by high flows and accumulates at structures.
- 3.3 The site is shown to be located within Flood Zone 1, as illustrated in **Figure 2.1**, which is land defined as having low probability of flooding from rivers or sea. The nearest Flood Zone extents are located approximately 1.67km north-west of the site associated with River Stour. 1m resolution LiDAR data shows the site to be raised approximately 30-50m above the River Stour.
- 3.4 The unnamed ordinary watercourse located approximately 530m south-west and approximately 470m south of the site are not represented on the Flood Map for Planning as the catchment area is likely to be too small (<3km²). Following a review of available contour data, ground levels fall to the south-west of these watercourses away from the site meaning that any flood flows will be routed away from the site.
- 3.5 The Environment Agency and LLFA do not hold any information of historical fluvial flooding.
- 3.6 As such, there is not considered to be a risk of fluvial flooding at the site.

Groundwater Flood Risk

- 3.7 Groundwater flooding occurs when the water table rises above ground elevations, or it rises to depths containing basement level development. It is most likely to happen in low lying areas underlain by permeable geology. This is most common on regional scale chalk aquifers, but there may also be a risk on sandstone and limestone aquifers or on think deposits of sands and gravels underlain by less permeable strata such as that in a river valley.
- 3.8 British Geological Survey (BGS) mapping shows the sites bedrock to be entirely underlain by the Helsby Sandstone Formation – Sandstone. BGS mapping shows that there is no record of superficial deposits located within the site.
- 3.9 The EA designates the bedrock geology within the site to be Principal Aquifers. Principal Aquifers provide significant quantities of drinking water, and water for business needs. They may support rivers, lakes and wetlands.



- 3.10 There are no historical BGS borehole logs located within the site boundary. The nearest borehole log to the site (Borehole log reference: SO98SW509) is located approximately 125m south-east of the site and is underlain by the same bedrock. However, this log did not record a groundwater strike.
- 3.11 The SFRA identifies that the risk of groundwater flooding is relatively low throughout the Black Country, with the exception of Wolverhampton and also on the Sandwell and Dudley borders all of which are well removed from the site. Additionally, the PFRA does not include any reports of historical groundwater flooding incidents in the local area.
- 3.12 A ground investigation was undertaken by GRM Development Solutions in January 2018. The report (reference: GRM/P8139/F.1) states that Topsoil, Made Ground and Helsby Sandstone Formation was encountered during the investigation. Groundwater ingress was only encountered in 7 of the 34 exploratory holes as shown in **Appendix 4**.
- 3.13 SA02 and TP08 located within the northern corner of the site, encountered slight to moderate ingress at depths of 2.0m and 2.8m below ground level (bgl) respectively. This was reported to most likely represent the depth of the local water table.
- 3.14 Five exploratory holes in the south west of the site (SA01, TP10, TP12, TP18 and WS08), located in an area of low topography, encountered groundwater in the form of minor seepages up to the moderate ingress at depths of between 0.40m and 1.80m bgl. This was reported to most likely be associated with localised perched water.
- 3.15 It is reported that the groundwater is mostly likely to be flowing towards the west, following the general fall of the topography.
- 3.16 Based on the available data and lack of any historical incidents, and given the groundwater was only encountered in isolated areas of the site, and when it was struck it was either found to be localised perched volumes, or to be at a level over 2mBGL, the risk of groundwater exceeding ground levels and causing flooding in the site is considered to be low. However, as also reported in the ground investigation report, there is a risk that groundwater could be encountered during excavations particularly within the south-western corner. Appropriate mitigation measures to manage this risk of groundwater flooding are proposed within **Section 4**.

Flood Risk from Reservoirs & Large Waterbodies

- 3.17 Flooding can occur from large waterbodies or reservoirs if they are impounded above the surrounding ground levels or are used to retain water in times of flood. Although unlikely, reservoirs and large waterbodies could overtop or breach leading to rapid inundation of the downstream floodplain.
- 3.18 To help identify this risk, reservoir failure flood risk mapping has been prepared (see **Figure 3.1**), this shows the largest area that might be flooded if a reservoir were to fail and release the water it holds. The map displays a worst-case scenario and is only intended as a guide.



3.19 There are two flooding scenarios shown on the reservoir flood maps: a 'dry-day' and a 'wet-day'. The dry-day scenario predicts the flooding that would occur if the dam or reservoir failed when rivers are at normal levels. The wet-day scenario predicts how much worse the flooding might be if a river is already experiencing an extreme flood.



Figure 3.1: Reservoir Failure Flood Risk Map

- 3.20 The site is shown to be far removed from any areas at risk of reservoir failure in both the 'dry-day' and 'wet-day' scenarios. Additionally, there are no large impounded artificial waterbodies within the vicinity of the site.
- 3.21 Based on the above information, the site is not considered to be at risk of flooding from reservoir and/or large waterbodies.

Pluvial Flood Risk

3.22 Pluvial flooding can occur during prolonged or intense storm events when the infiltration potential of soils, or the capacity of drainage infrastructure is overwhelmed leading to the accumulation of surface water and the generation of overland flow routes.



3.23 Risk of flooding from surface water (RoFSW) mapping has been prepared by the EA, this shows the potential flooding which could occur when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead. An extract from the mapping is included as **Figure 3.2**.



Figure 3.2: Surface Water Extents Mapping

- 3.24 The majority of the site is shown to be at very low risk of flooding from pluvial sources.
- 3.25 A low-risk overland flow route along the west site boundary which culminates in a medium risk area of ponding. Within the area of medium flood risk, the EA's flood risk mapping indicates potential flood depths of up to 300mm during the 1 in 100-year (Medium Risk) design event. The flood hazard rating in this location is classified as 'Low Caution'.
- 3.26 The surface water flood risk area shown on the EA's flood risk mapping is associated with the existing topography of the site and the uncontrolled runoff of surface water through the greenfield site from east to west before collecting within a topographical depression between the site boundary and Bromwich Lane.



- 3.27 Overall, the site is considered to be at a low risk of flooding from surface water.
- 3.28 The low-risk overland flow route may be resolved following implementation of a suitably designed surface water drainage system which will capture and convey surface water through the site, towards an attenuation pond, hence re-directing overland flows away from the topographical depression.
- 3.29 Additionally, there will be opportunities to contain any residual overland flow routes within a green infrastructure corridor along the north west boundary of the site. However, the inclusion of any green / blue corridors will be subject to inclusion within future development masterplans and will be confirmed as the scheme progresses.
- 3.30 More information relating to the proposed surface water drainage mitigation measures are discussed within **Section 4**.

Flood Risk from Sewers

- 3.31 Sewer flooding can occur when the capacity of the infrastructure is exceeded by excessive flows, or as a result of a reduction in capacity due to collapse or blockage, or if the downstream system becomes surcharged. This can lead to the sewers flooding onto the surrounding ground via manholes and gullies, which can generate overland flows.
- 3.32 The local sewerage undertaker is Severn Trent Water. A copy of their asset records is included as **Appendix 5**. There are no public sewers within the site boundary.
- 3.33 The records show a 150mm to 225mm foul water public sewer to be located to the west of the site in Bromwich Lane and that this flows in a south westerly then north westerly direction. A 225mm public surface water sewer is shown to be located to the south west of the site in Redlake Drive, directing flows in a north westerly direction.
- 3.34 Available contour data has shown that in the event of exceedance by sewer flooding, any overland flows would be expected to be directed to the north-west away from the site.
- 3.35 There is no private drainage infrastructure shown to be within the site on the topographical survey, presented as **Appendix 1**.
- 3.36 According to the EA, LLFA, and the SFRA there have been no incidences of sewer flooding within the vicinity of the site.
- 3.37 Overall, the risk of flooding from sewer sources is considered to be low.



Effect of Development on Wider Catchment

Development Land Use/Drainage Considerations

3.38 The proposed development will increase the area of impermeable surfaces leading to a potential increase in surface water runoff. Appropriate mitigation measures to address this risk are outlined in **Section 4**.

4. FLOOD RISK MITIGATION

4.1 **Section 3** has identified the sources of flooding which could potentially pose a risk to the site and the proposed development. This section of the FRA sets out the mitigation measures which are to be incorporated within the proposed development to address and reduce the risk of flooding to within acceptable levels.

Development Levels

- 4.2 Where possible, it is recommended that finished floor levels are raised 150mm above surrounding ground levels to mitigate any residual risk of flooding from groundwater, surface water and sewer sources.
- 4.3 Additionally, development should not be located in topographical depressions, and ground levels should be profiled to encourage pluvial runoff and overland flows away from the built development and towards the nearest drainage point.
- 4.4 It is recommended that no below ground/basement structures are implemented for any dwellings located within areas observed to have shallow resting groundwater levels.

Surface Water Drainage

- 4.5 To mitigate the development's impact on the current runoff regime it is proposed to incorporate surface water attenuation and storage as part of the development proposals. Further information on the drainage approach is provided within the accompanying Sustainable Drainage Statement (SDS), reference PBL-BWB-ZZ-XX-RP-CD-0001_SDS.
- 4.6 In brief, the development will discharge surface water to the local public surface water sewer at the calculated Greenfield Mean Annual Flow Rate (QBAR) for all events up 1 in 100-year + 40% climate change allowance. Attenuated surface water storage will be provided in the form of a Sustainable Drainage System (SuDS) attenuation pond with capacity for the 1 in 100-year storm with an allowance for climate change. This will ensure that the additional impermeable surfaces and sewers that will be introduced by the development do not create a flood risk to third parties or pose a flood risk to the development itself.
- 4.7 The development should be designed with exceedance in mind. The road network and landscape corridors should be used to convey excess overland flows towards the attenuation points.
- 4.8 Finished floor levels of the development should be set above the maximum water levels within attenuation features, and also above the water levels on potential exceedance flow pathways.

Foul Water Drainage

4.9 It is proposed to drain used water from the development separately to surface water.



4.10 The local surface operator has confirmed capacity for the proposed development. Further information on the drainage approach is provided within the accompanying SDS.

Land Drainage Considerations

4.11 There is a risk that groundwater could be encountered during the construction phase, particularly during deep excavations. It is recommended that water levels are monitored during the construction phase and appropriate dewatering implemented where necessary.



5. CONCLUSIONS AND RECOMMENDATIONS

- 5.1 This FRA has been prepared in accordance with requirements set out in the NPPF and the associated Planning Practice Guidance. The FRA has been produced on behalf of William Davis Ltd in respect of a planning application where it is proposed that the site be developed to accommodate up to 100 dwellings.
- 5.2 This FRA is intended to support a planning application and as such the level of detail included is commensurate and subject to the nature of the proposals at the planning stage.
- 5.3 This report demonstrates that the proposed development is not at significant flood risk, subject to the recommended flood mitigation strategies being implemented. The identified risks and mitigation measures are summarised within **Table 5.1**:

Flood Source	Risk & Proposed Mitigation Measures
	Finished floor levels of the proposed development should be raised a minimum of 150mm above surrounding ground levels to mitigate any residual risk of flooding.
	The development should be designed with exceedance in mind. The road network and landscape corridors should be used to convey excess overland flows towards the attenuation points.
Sewers, Pluvial, Groundwater	Finished floor levels of the development should be set above the maximum water levels within attenuation features, and also above the water levels on potential exceedance flow pathways.
	It is recommended that no basement structures are implemented for any dwellings located within areas observed to have shallow resting groundwater levels.
	Groundwater water levels should be monitored during the construction phase and appropriate dewatering implemented where necessary.
Impact of the Development	To mitigate the development's impact on the current runoff regime it is proposed to incorporate surface water attenuation and storage as part of the development proposals. For more information on the proposed mitigation strategy refer to the accompany SDS report (PBL-BWB-ZZ-XX-RP-CD-0001).
This summary s the S	should be read in conjunction with BWB's full report. It reflects an assessment of ite based on information received by BWB at the time of production.

Table 5.1: Summary of Flood Risk Assessment

5.4 In compliance with the requirements of NPPF, and subject to the mitigation measures proposed, the development could proceed without being subject to significant flood risk. Moreover, the development will not increase flood risk to the wider catchment area as a result of suitable management of surface water runoff discharging from the site.



APPENDICES



Appendix 1: Topographical Survey



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Private property +



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Private property

TOPOGRAPHICAL & MEASURED BUILDING SURVEYS ABBREVIATIONS & SYMBOLS

ABBI	REVIATIONS & SY	MBOL	5
AH	Arch Head Height	FH	Fire Hydrant
AR	Assumed Route	FBD	Floor Board Di
AV	Air Valve	FH	Fire Hydrant
BB	Belisha Beacon	FL	Floor Level
BH	Bore Hole	FP	Flag Pole
BL	Bed Level	FW	Foul Water
BO	Bollard	GG	Gully Grate
BrP	Brace Post	GV	Gas Valve
BS	Bus Stop	HH	Head Height
BU	Bush	IC	Inspection Cov
B/W	Barbed Wire Fence	IL	Invert Level
BX	Box (Utilities)	I/R	Iron Railings
C/B	Close Board Fence	KO	Kerb Outlet
СН	Cill Height	LP	Lamp Post
CL	Cover Level	MH	Manhole
C/L	Chain Link Fence	MP	Marker Post
C-Lev	Ceiling Level	NB	Name Board
Col	Column	OHL	Overhead Line
C/P	Chestnut Paling Fence	Pan	Panel Fence
CR	Cable Riser	PB	Post Box
DC	Drainage Channel	PM	Parking Meter
DH	Door Head Height	PO	Post
DP	Down Pipe	P/R	Post & Rail Fe
DR	Drain	P/W	Post & Wire Fe
EL	Eaves Level	P/Wall	Partition Wall
EP	Electric Pole	RE	Rodding Eye
ER	Earth Rod	RL	Ridge Level
ET	EP+Transformer	RP	Reflector Post
FB	Flower Bed	RS	Road Sign
FBD	Floor Board Direction	RSD	Roller Shutter
DRAV	VING NOTE		

ant	RSJ	Rolled Steel Joist
ard Direction	SI	Sign Post
ant	SP	Arch Spring Point Height
rel	SV	Stop Valve
	SW	Surface Water
er	SY	Stay
ite	Тас	Tactile Paving
e	тс	Telecom Cover
ght	ΤН	Trial Pit
n Cover	THL	Threshold Level
vel	TL	Traffic Light
ngs	ToW	Top of Wall
let	TP	Telegraph Pole
st	TV	Cable TV Cover
	UB	Universal Beam
ost	UC	Unknown Cover
ard	UK	Unknown Tree
d Line (approx)	USB	Under Side Beam
nce	UTL	Unable To Lift
	VP	Vent Pipe
/leter	WB	Waste Bin
	WH	Weep Hole
ail Fence	WL	Water Level
lire Fence	WM	Water Meter
Wall	WO	Wash Out
Eye	\otimes	Floor to Ceiling Height
vel	-	
Post	(XX)F/C	Floor to False Ceiling Ht
n	-	
utter Door	Δ	Survey Control Station

	Surface Water
	Stay
	Tactile Paving
	Telecom Cover
	Trial Pit
	Threshold Level
	Traffic Light
	Top of Wall
	Telegraph Pole
	Cable TV Cover
	Universal Beam
	Unknown Cover
	Unknown Tree
	Under Side Beam
	Unable To Lift
	Vent Pipe
	Waste Bin
	Weep Hole
	Water Level
	Water Meter
	Wash Out
	Floor to Ceiling Height
10	Floor to False Ceiling H

F/C Floor to False Ceiling Ht er Shutter Door 🔬 Survey Control Station

Topographical Surveys Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type including roof line details are indicative only and taken externally from ground level. All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including; sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting

work. Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.

Measured Building Surveys Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

Cill heights are measured as floor to the cill and head heights are measured from cill to the top of window. General

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STATIONS S201 S202 ST01 ST02					
S201 S202 ST01 ST02	EASTINGS	NORTHINGS	LEVEL	DESCRIP	TION
S202 ST01 ST02	390941,793	281441.693	116.690	Peo	3
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ST02	390881.370	281413.901	116.379	PK Na	Ì
	390919.484	281440.588	116.373	PK Na	i
ST03	390930.590	281460.748	116.492	PK Na	i
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ST05	390978.010	281518.715	116.532	PK Na	I
ST06	391024.294	281562.737	117.400	PK Na	il 👘
ST07	391115.527	281647.548	120.734	PK Na	i
ST08	391118.676	281730.394	122.212	PK Na	1
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PEDMORE, DUDLEY

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DRAWING DETAIL TOPOGRAPHICAL SURVEY Sheet 1 of 6

CLIENT

SCALE 1:500 WILLIAM DAVIS LIMITED
 SURVEYOR
 SURVEY DATE
 CHECKED BY
 APPROVED BY
 DWG STATUS

 IM
 19/9/17
 PDS
 PDS
 FINAL

 DRAWING NUMBER
 20454cv-01
 ISSUE DATE
 25/9/17



118.49 119.39 + 118.30 119.84 + Stones 118.35 +118.32 118 34 Grass 118.34 118.25 #118 ×118.22 118.28 + Vegeataion/Trees 15h 119.32 + + Grass 118.25 118.83 + 118.08 117.95 117.79 + 119.46 + UK 15h 118.66 + 119.00 + 119.68 + 118.60 118.99 + + 118.02 118.65 + 119.11 + + + + 117.98 + +118.79 + 119.35 + 118.13 + + 117.70 119.61 + 118.15 + 117.73 + 118.99 + 118.24 + 117.79 + + 119.04 117.95 117.84 + 118.26 + 118.67 + 118.04 + 118.38 + Grass + ^{119.23} + +118.82 + 118.62 + 118.35 + 119.45 + 119.00 + 118.75

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Asphalt

+ 117.11 117.47 + 116.81 + + + 117.44 + 117.00 + 117.71 +

116.87 + 117.57 + 117.89 + 117.01 + 117.81 117.33 +

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118.13 + 117.35 + + 117.99 118.34 + 118.16

+ +

+ + +



Grass

+ 117.27

117.18 +

+

117.54 +

+

+ 117.91

117.71 +

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118.16 +

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TOPOGRAPHICAL & MEASURED BUILDING SURVEYS ABBREVIATIONS & SYMBOLS



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Tel No: 0845 0405 969 Fax No: 0845 0405 970 www.survey-solutions.co.uk enquiries@survey-solutions.co.uk LAND SURVEYING BUILDING SURVEYING UNDERGROUND SURVEYING

PROJECT TITLE BROMWICH LANE PEDMORE, DUDLEY

DRAWING DETAIL TOPOGRAPHICAL SURVEY Sheet 3 of 6

SCALE 1:500 WILLIAM DAVIS LIMITED SURVEYOR SURVEY DATE CHECKED BY APPROVED BY DWG STATUS IM 19/9/17 PDS PDS FINAL REVISION ISSUE DATE 25/9/17 DRAWING NUMBER 20454cv-01



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+ +^{121.80}

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+ + (122.90 + (123.07 +

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+ ^{127.97}, 128.06 + + + ^{126.88}

+^{126.98}

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121.31 + + 120.94

TOPOGRAPHICAL & MEASURED BUILDING SURVEYS ABBREVIATIONS & SYMBOLS

AH	Arch Head Height	FH	Fire Hydrant	RSJ	Rolled Steel Joist
AR	Assumed Route	FBD	Floor Board Direction	SI	Sign Post
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ER	Earth Rod	RL	Ridge Level	Ŭ	
ΕT	EP+Transformer	RP	Reflector Post	(XX)F/C	Floor to False Ceiling Ht
FB	Flower Bed	RS	Road Sign	\smile	
FBD	Floor Board Direction	RSD	Roller Shutter Door	\triangle	Survey Control Station
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Topographical Surveys

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CONTROL	CO-ORDIN	JATES		
STATIONS	FASTINGS	NORTHINGS	I EVEI	DESCRIPTION
\$201	3909/1 793	281441 693	116 690	Peg
S201	391103 566	281441.443	119.951	Pea
ST01	390881 370	281413.901	116.379	PK Nail
ST02	390919.484	281440.588	116.373	PK Nail
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ST07	391115.527	281647.548	120.734	PK Nail
ST08	391118.676	281730.394	122.212	PK Nail
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EV DESCRIPTI	Doventry Yeov Doventry Yeov Solutions.co.uk TEYING BUILD LE CH LANE E, DUDLEY TAIL APHICAL SU 6	SUSSESSESSESSESSESSESSESSESSESSESSESSESS	DRAV RRAV DEPUTION Erth Notting Fax enquiries@sui G UNDERGR	APPR DATE
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PDSDWG STATUS
FINALDRAWING NUMBER
20454cv-01PDSISSUE DATE
25/9/17



	TOPOGRAPHICAL & MEASURED BUILDING SURVEYS ABBREVIATIONS & SYMBOLS
	AH Arch Head Height FH Fire Hydrant RSJ Rolled Steel Joist AR Assumed Route FBD Floor Board Direction SI Sign Post AV Air Valve FH Fire Hydrant SP Arch Spring Point Height
	BB Belisha Beacon FL Floor Level SV Stop Valve BH Bore Hole FP Flag Pole SW Surface Water BL Bed Level FW Foul Water SY Stay BO Bollard GG Gully Grate Tac Tactile Paving
	BrP Brace Post GV Gas Value TC Telecom Cover BS Bus Stop HH Head Height TH Trial Pit BU Bush IC Inspection Cover THL Threshold Level B/W Barbed Wire Fence II Inspecti Level TI Troffici Linkt
	BX Box (Utilities) I/R Iron Railings ToW Top of Wall C/B Close Board Fence KO Kerb Outlet TP Telegraph Pole CH Cill Height LP Lam Post TV Cable TV Cover CI Cover Level Met Models Line ToW Top of Wall
	C/L Cover Level NH Mainfole OB Oniversal Beam C/L Chain Link Fence MP Marker Post UC Unknown Cover C-Lev Ceiling Level NB Name Board UK Unknown Tree Col Column OHL Overhead Line (approx) USB Under Side Beam
+	C/P Chestnut Paing Fence Pan Panel Fence UTL Unable To Lift CR Cable Riser PB Post Box VP Vent Pipe DC Drainage Channel PM Parking Meter WB Waste Bin DH Door Head Height PO Post WH Weep Hole
	DP Down Pipe P/R Post & Rail Fence WL Water Level DR Drain P/W Post & Wire Fence WM Water Meter EL Eaves Level P/Wall Partition Wall WO Wash Out EP Electric Pole RE Rodding Eye Image: Constraint of the co
	ER Earth Rod RL Ridge Level ET EP+Transformer RP Reflector Post Image: Compare the compared to the c
	DRAWING NOTE Topographical Surveys
	All building names, descriptions, number of storeys, construction type including
	roof line details are indicative only and taken externally from ground level. All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features
	including; sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting work.
	Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.
	Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.
	Cill heights are measured as floor to the cill and head heights are measured from cill to the top of window.
	The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work. Any
	errors or discrepancies must be notified to Survey Solutions immediately. The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.
	The survey control listed is only to be used for topographical surveys at the stated scale. All control must be checked and verified prior to use.
+	© Land Survey Solutions Limited holds the copyright to all the information contained within this document and their written consent must be obtained before copying or using the data other than for the purpose it was originally supplied.
	Do not scale from this drawing. The coordinate system established for this survey is related to Ordnance Survey
	(US) national grid at a single point using Smartnet, then orientated to grid north with a scale factor of 1.000. The level datum established for this survey is related to Ordnance Survey (OS)
	using GPS Smartnet. To avoid discrepancies any coordinated data used in conjunction with this survey must be derived directly from this control data.
+	
Private property	
	CONTROL CO-ORDINATES STATIONS EASTINGS NORTHINGS LEVEL DESCRIPTION
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Private property	
	REV DESCRIPTION DRAWN APPR DATE
	SURVEY
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	Ipswich Coventry Yeovil Norwich Perth Nottingham Brentwood Tel No: 0845 0405 969 Fax No: 0845 0405 970
	www.survey-solutions.co.uk enquiries@survey-solutions.co.uk LAND SURVEYING BUILDING SURVEYING UNDERGROUND SURVEYING
	PROJECT TITLE
	BROMWICH LANE PEDMORE,DUDLEY
	TOPOGRAPHICAL SURVEY Sheet 6 of 6
	CLIENT SCALE WILLIAM DAVIS LIMITED 1:500 SURVEYOR SURVEY DATE CHECKED BY APPROVED BY DWG STATUS
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Appendix 2: Layout Plan



Sketch Masterplan





Appendix 3: NPPF Flood risk Vulnerability and Flood Zone Compatibility
Vulnerability Classification	Description
Essential infrastructure	 Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including infrastructure for electricity supply including generation, storage and distribution systems; including electricity generating power stations, grid and primary substations storage; and water treatment works that need to remain operational in times of flood. Wind turbines. Solar farms.
Highly Vulnerable	 Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding. Emergency dispersal points. Basement dwellings. Caravans, mobile homes and park homes intended for permanent residential use. Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'Essential Infrastructure'.)
More Vulnerable	 Hospitals Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. Non-residential uses for health services, nurseries and educational establishments. Landfill* and sites used for waste management facilities for hazardous waste. Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
Less Vulnerable	 Police, ambulance and fire stations which are not required to be operational during flooding. Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'more vulnerable' class; and assembly and leisure. Land and buildings used for agriculture and forestry. Waste treatment (except landfill* and hazardous waste facilities). Minerals working and processing (except for sand and gravel working). Water treatment works which do not need to remain operational during times of flood. Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place. Car parks.
Water- Compatible Development	 Flood control infrastructure. Water transmission infrastructure and pumping stations. Sewage transmission infrastructure and pumping stations. Sand and gravel working. Docks, marinas and wharves. Navigation facilities. Ministry of Defence installations. Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. Water-based recreation (excluding sleeping accommodation). Lifeguard and coastguard stations. Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

	O I I			• • • • •
Flood Risk Vulnerability	Classifications	(recreated from the	NPPF Plannina Practise	Guidance)

Flood Zone De Flood Zone 1 (Low Probability) De Flood Zone 2 (Medium Probability) De Flood Zone 2 (Medium Probability) De Flood Zone 3a (High Probability) To Flood Zone 3a (High Probability) the out Ad inff de out Ad inff fer	Vulnerability Classification									
	Essential infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible					
Flood Zone 1 (Low Probability)	Development is appropriate	Development is appropriate	Development is appropriate	Development is appropriate	Development is appropriate					
Flood Zone 2 (Medium Probability)	Development is appropriate	 To be deemed appropriate an exception test is required to demonstrate: The development will be safe for its life time without increasing flood risk elsewhere, and where possible reduce overall flood risk the sustainability benefits of the development to the community outweigh the flood risk. 	Development is appropriate	Development is appropriate	Development is appropriate					
Flood Zone 3a (High Probability)	 To be deemed appropriate an exception test is required to demonstrate: The development will be safe for its life time without increasing flood risk elsewhere, and where possible reduce overall flood risk the sustainability benefits of the development to the community outweigh the flood risk. Additionally, essential infrastructure should be designed and constructed to remain operational and safe in times of flood. 	Development should not be permitted	 To be deemed appropriate an exception test is required to demonstrate: The development will be safe for its life time without increasing flood risk elsewhere, and where possible reduce overall flood risk the sustainability benefits of the development to the community outweigh the flood risk. 	Development is appropriate	Development is appropriate					

Flood Zone Compatibility (recreated from the NPPF Planning Practise Guidance)

Flood Zone	Vulnerability Classification										
	Essential infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible						
Flood Zone 3b (The Functional Floodplain)	 To be deemed appropriate an exception test is required to demonstrate: The development will be safe for its life time without increasing flood risk elsewhere, and where possible reduce overall flood risk the sustainability benefits of the development to the community outweigh the flood risk. Additionally, development should be designed and constructed to: remain operational and safe for users in times of flood; result in no net loss of floodplain storage; not impede water flows and not increase flood risk elsewhere. 	Development should not be permitted	Development should not be permitted	Development should not be permitted	Development is appropriate if designed and constructed to: • remain operational and safe for users in times of flood; • result in no net loss of floodplain storage; • not impede water flows and not increase flood risk elsewhere.						



Appendix 4: Ground Investigation Report Extract



GRM 10.8 BURIED CONCRETE

Based on the mean of the highest 20% of recorded water soluble sulphate and pH levels in the soils below the site and assuming mobile groundwater conditions, in accordance with requirements of BRE Special Digest 1 (2005), 'Concrete in Aggressive Ground', the Design Sulphate Class for buried concrete at the site should be assumed as DS-1 and the ACEC Class as AC-2z.

For unreinforced trench-fill foundations with a width of greater than 450mm, the classifications above equate to a concrete designated as GEN1 in BS8500 and engineer designed FND2Z for reinforced foundations.

The results of the water soluble sulphate and pH testing of are presented in Appendix I.

10.9 SLOPE STABILITY AND RETAINING STRUCTURES

The western half of the site slopes down to the west at shallow gradients, and the eastern half of the site slopes down to the west at moderate gradients of up to approximately one in ten. Therefore, there a low risk of slope instability occurring on the site at present gradients.

Grading of the site, cut and fill operations, removal of trees/vegetation from existing slopes, interference with drainage around existing slopes or the cutting of the toe or surcharging of the crest of existing slopes may cause instability and failure to occur.

The present gradients on site are likely to be adjusted by minor earthworks. Future ground profiles may require earth retaining structures, for which further advice may be required when more information is available.

10.10 SOAKAWAY DRAINAGE

Soakaway tests were carried out, in line with the methodology in BRE365, in the granular and rock quality strata present across the site at five locations (SA01 to SA05). A plan showing the approximate locations of the tests is presented in Appendix D.

Infiltration rates have been calculated for each test pit from the data obtained from site. The calculated infiltration rates are presented below in the order in which they were tested:

		Infiltration Rates							
Location	Encountered Geology	Test 1	Test 2	Test 3					
SA01	Clay over Sandstone	Negligible and groundwater ingress.							
SA02	Clay over Sandstone	Negligible (water level dropped 6cm in 24 hours).							
SA03	Sand	1.05 x 10 ⁻⁵ m/s	1.20 x 10 ⁻⁵ m/s	5.90 x 10 ⁻⁶ m/s					
SA04	Sand	4.50 x 10 ⁻⁵ m/s	3.10 x 10 ⁻⁵ m/s	2.35 x 10 ⁻⁵ m/s					
SA05	Sand	2.10 x 10 ⁻⁵ m/s	1.70 x 10 ⁻⁵ m/s	Not possible due to time constraints.					
SA03 Te	SA03 Test 3 experienced partial sidewall collapse prior to test, which could have silted up the test zone.								

The results show that the granular strata are potentially suitable for the disposal of surface water using a soakaway drainage system. These deposits are more dominant in the south eastern corner and along the central section of the north western boundary as illustrated on the Foundation Zone Plan presented in Appendix M.

The granular strata along the central section of the north western boundary were encountered towards the end of fieldwork and soakaway testing was not feasible in this area due to time constraints. Depending on the assessment of the Drainage Strategy it may be considered beneficial to conduct additional targeted soakaway testing in this area.

If soakaway drainage is considered, the drainage design should ensure that their use does not lead to groundwater flooding or ponding down gradient at the central and western areas of the site. Although not expected to be present in the areas of granular strata, if groundwater is present at relatively shallow depths, then this may affect the use of soakaways.

The cohesive strata across the site are unlikely to be suitable for soakaway drainage and an alternative drainage system should be considered for the disposal of surface water.

The results of the testing should be provided to the project's drainage engineer for inclusion within the site's surface water drainage design after taking into account suitable factors of safety.

If soakaway drainage is to be considered please see Section XV in Appendix A.

It is recommended that the Local Authority and Environment Agency be consulted with regards to the use of soakaway drainage within a Principal Aquifer.

10.11 NEW ACCESS ROADS

Site observations suggest that natural materials will have CBR values of between 2% and 5%, when suitably drained. Proof rolling and the improvement of soft spots may result in increased CBR values and the incorporation of a geotextile grid into sub-base layers may allow for reduced capping thickness.

Once a development layout is produced site observations should be confirmed by in situ or laboratory testing in the footprint of proposed roads in accordance with the adopting Local Authority's preference.

GRM



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Trial Pit Log

Trial Pit No

TP01

Sheet 1 of 1

Ground Level

(mAOD)

S	Site Name: Land of Bromwich Lane, Pedmore				more			(mAOE))
								117.00	1
	Client:	Willia	ım Davis Ltd			GRM	IProject Ref: P8139	390961 281430	EN
Water Strike	Samp Denth	bles & In S	itu Testing Results	Depth (m)	Level (m)	Legend	Stratum Description		
	0.10 0.10 0.50	D ES D		0.40	11 6.60		Soft to firm dark brown slightly gravelly sandy C Sand is fine to medium. Gravel is fine to coarse to well rounded of quartzite and sandstone. Con frequent rootlets. TOP SOIL Firm, friable, reddish brown slightly gravelly slig slty CLAY. Sand is fine to medium. Gravel is fir medium well rounded of quartzite. Approximate	iLAY. ₂ angular ntains htly sandy te to dv medium	
				1.30	11 5.70		strength. HELSBY SANDS TONE FORMATION	SILT. ately	1
	1.50	D					MEDIUM TO HIGH STRENGTH. HELSBY SANDSTONE FORMATION		
	1.90	D		1.80	115.20	• •	Extremely weak reddish brown fine to medium SANDSTONE. Recovered as sandy fie to coars HELSBY SANDSTONE FORMATION	grained se gravel.	
Date	=xcavated:		09/01/2018	Groundwa	ater Obse	ervations:			3
Date E	Backfilled:	(09/01/2018	No Ground	dwaterEn	countered.			
Shori	ng:		None						
Stabil	ity:		Stable	Trial	Pit Dimer	nsions (m)	: Reason for termination of Trial Pit:		
Plant Logg	Used: ed by:		JCB 3CX CRC	0.60			Terminated in rock quality strata.		
Gene	ral Remarks:		-		2.50				
	trata par statu 1 11		to making allow the state		16			1.25	
S	trata consistencies/d	en sities de l	termined by observatio	nonly	Versio	on: HI	NAL Scale: 1	:25	



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Trial Pit Log

Trial Pit No

TP02

Sheet 1 of 1

Ground Level

(mAOD)

S	Site Name: Land of Bromwich I			Lane, Ped	more			(mAO) 128.5	D) 0
	Client:	Willia	m Davis Ltd			GRM	IProject Ref: P8139	Coordin 391200	ates E
e e	Sam	ples&In S	itu Testing	Dopth	Laval			281450	N
V/ate Strik	Depth	Туре	Results	(m)	(m)	Legend	Stratum Description		
	0.30 0.30 0.60	D ES D		0.40	128.10		Loose to medium dense dark brown to dark rec brown slightly clayey slightly gravelly SAND. Sa to medium. Gravel is fine to medium subanguk subrounded of brick, quartzite and sandstone. (frequent rootlets. TOP SOIL Loose to medium dense reddish brown slightly slightly gravelly SAND. Sand is fine to medium. fine to coarse rounded of quartzite and angular sandstone. HELSBY SANDSTONE FORMATION	Idish and is fine ar to Contains clayey Gravel is of	
	1.50	D		1.60	126.90		Extremely weak reddish brown fine to coarse g SANDSTONE. Contains fine to medium rounde quartzite pebbles.	rained d	
	2.00	D				· · · ·	HELSBY SANDSTONE FORMATION		2
				2.20	126.30	. : :	End of Pit at 2.20m		-
									3
DateE	x cavated:	C	09/01/2018	Groundw	ater Obse	rvations:			
Date B	ackfilled:	C	9/01/2018	No Groun	awater Eno	countered.			
04-1-11	·y·		Ctob -						
STADIII	ιy: 		Stable	Trial	Pit Dimen	isions (m)	Reason for termination of Trial Pit:		
Plant l	Jsed:		JCB 3CX	0.60			Terminated in rock quality strata.		
Logge	a by:		CRC		2.30				
Genera Str	al Remarks:	densities det	ermined by observati	ononly	Versio	n: FII	NAL Scale: 1	:25	



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Trial Pit Log

Trial Pit No

TP03

Sheet 1 of 1

S	Site Name:	Land	of Bromwich L	.ane, Ped	more			125.7	0
	Client:	Willia	m Davis Ltd			GRM	IProject Ref: P8139	Coordina 391185 281405	ates E
re e	Samp	oles&InS	itu Testing	Depth	Level	ľľ		201403	
Wat Stri	Depth	Туре	Results	(m)	(m)	Legena	Stratum Description		
	0.20 0.20	D ES		0.30	125.40		Loose to medium dense dark brown to dark redd brown slightly clayey slightly gravelly SAND. Sar to medium. Gravel is fine to medium subangular subrounded of quartzite and sandstone. Contain frequent rootlets. TOP SOIL	ish d is fine to s	
	0.60	D					Loose to medium dense red dish brown slightly c slightly gravelly SAND. Sand is fine to coarse. G fine to coarse rounded of quartzite and angular o sandstone. HELSBY SANDS TONE FORMATION	ayey 'avel is f	1
	1.60	D							
									2
	220	П		2.10	123.60	· · ·	Extremely weak reddish brown coarse grained		
Date I	Excavated:		99/01/2018	2.30	123.40	rvations:	End of Pit at 2.30m	···· /	3
Datel	Backfilled:	C	19/01/2018	No Ground	dwaterEno	countered.			
Shori	ng:		None						
Stabil	lity:		Stable	Trial	Pit Dimen	nsions (m)	: Reason for termination of Trial Pit		
Plant	Used:		JCB 3CX	0.60			Terminated in rock quality strata		
Logge	ed by:		CRC		2.50		rominated in look quality strata.		
Gene s	r al Remarks: itrata consistencies/d	ensities det	emined by observatio	n only	Versio	on: FII	NAL Scale: 1:	25	



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Trial Pit Log

Trial Pit No

TP04

Sheet 1 of 1

Ground Level (mAOD)

s	Site Name:	Land	of Bromwich L	ane, Ped	more			(mAO) 123.0	D) 0
								Coordin	ates
	Client:	Willia	m Davis Ltd			GRM	IProject Ref: P8139	391150 281400	E N
ke r	Samp	les&InS	itu Testing	Depth	Level	Logond	Otratum Deceristics		
Stri	Depth	Туре	Results	(m)	(m)	Legend	Suaum Description		
	0.20 0.20	D ES D		0.30	122.70		Loose to medium dense dark brown to dark re brown slightly clayey slightly gravelly SAND. S to medium. Gravel is fine to medium subangu subrounded of quartzite and sandstone. Conta frequent rootlets. TOP SOIL Loose to medium dense light brown slightly gr SAND. Sand is fine. Gravel is fine to medium quartzite. HELSBY SANDSTONE FORMATION	ddish and is fine lar to ins / avelly silty ounded of	
	1.90	D		1.70	121.30		Medium dense reddish brown slightly slity slig gravelly SAND. Sand is fine to coarse. Gravel coarse angular of sandstone and rounded of o HELSBY SANDSTONE FORMATION	ntly is fine to juartzite.	
				2.10	120.90	·.·	Extremely weak reddish brown medium to coo	readmined	2
	2.20	D		2.30	120.70		SANDSTONE. Contains fine to medium round quartzite pebbles. HELSBY SANDSTONE FORMATION End of Pit at 2.30m	/	3
Date E	Excavated: Backfilled:	(09/01/2018	Groundwa	ater Obse	rvations:			
Shori	ng:	,	None						
Stabil	ity:	Slight	ly unstable from	Triol	Dit Dime-	cione (m)			
Plant	Used:		JCB 3CX				. Reason for termination of Trial Pit:		
Logge	ed by:		CRC	0.60			Terminated in rock quality strata.		
Gene	ral Remarks:				2.90				
s	trata consistencies/d	en sitie s de l	termined by observation	nonly	Versio	n: FIN	VAL Scale:	1:25	



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Trial Pit Log

Trial Pit No

TP 05

Sheet 1 of 1

Ground Level

(mAOD) Land of Bromwich Lane, Pedmore Site Name: 127.80 Coordinates Client: William Davis Ltd **GRM Project Ref:** P8139 391186 Е 281480 Ν Samples & In Situ Testing Water Strike Depth Level Stratum Description Legend (m) (m) Depth Туре Results Loose to medium dense dark brown to dark reddish brown slightly clayey slightly gravelly SAND. Sand is fine to medium. Gravel is fine to medium subangular to 0.20 D subrounded of brick, quartzite and sandstone. Contains 0.20 ES frequent rootlets. 0.40 127.40 TOPSOIL Medium dense reddish brown slightly clayey slightly .:•: gravely SAND. Sand is fine to medium. Gravel is fine to coarse rounded of quartzite and angular of sandstone. HELSBY SANDSTONE FORMATION .:·: D 0.70 . . • . . 1 . . 1.70 D . . . 1.80 126.00 Extremely weak light grey and red dish brown medium to . • D coarse grained SANDSTONE. HELSBY SANDSTONE FORMATION End of Pit at 2.00m 1.90 2.00 125.80 2 3 4 Date Excavated: 09/01/2018 Groundwater Observations: No Groundwater Encountered. Date Backfilled: 09/01/2018 Shoring: None Slightly unstable between Stability: 0.4m begl and 2.0m begl. Trial Pit Dimensions (m): Reason for termination of Trial Pit: Plant Used: JCB 3CX 0.60 Terminated in rock quality strata. Logged by: CRC 2.70 General Remarks: Strata consistencies/densities determined by observation only Version: FINAL Scale: 1:25



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Trial Pit Log

Trial Pit No

TP 06

Sheet 1 of 1

S	Site Name: Land of Bromwich			ane, Ped	more			(mAOI 126.40) 0
	Client:	Willia	am Davis Ltd			GRM	1 Project Ref: P81 39	Coordina 391172	ates
tter ike	Sam	ples & In S	Situ Testing	Depth	Level	Legend	Stratum Description	281525	
St &	0.20	Type D	Results	(m)	(m)		Loose to medium dense dark brown to dark reddi brown slightly clayey slightly gravelly SAND. Sanc to medium. Gravel is fine to medium subangular subrounded of brick guartzite and sandstone. Co	sh 1 is fine to n tains	
	0.20	D		0.30	126.10		TOP SOIL Medium dense reddish brown slightly clayey sligh gravely SAND. Sand is fine to medium. Gravel is coarse rounded of quartzite and angular of sands HELSBY SANDSTONE FORMATION	tly fine to tone.	
	1.40	D		1.20	125.20		Extremely weak light grey and reddish brown med coarse grained SANDSTONE. HELSBY SANDSTONE FORMATION	lium to	1
				1.60	124.80	• •	End of Pit at 1.60m		
									2
Date E	Excavated:		09/01/2018	Groundwa	ater Obse	rvations:			
Date E	Backfilled: na:		09/01/2018 None	No Ground	awater⊢n	countered.			
Stabil	ity:	Slight	ly unstable from 0.5m begi	Trial	Dit Dimor	sione (m)			
Plant Logge	Used: ed by:		JCB 3CX CRC	0.60	200		Reason for termination of Trial Pit: Terminated in rock quality strata.		
Gene	ral Remarks:]	2.30		I		
s	trata consistencies/	'densities de	termined by observation	nonly	Versio	on: FII	VAL Scale: 1:2	25	



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GRM Development Solutions Ltd

Trial Pit Log

Trial Pit No

TP07

Sheet 1 of 1

S	Site Name: Land of Bror		of Bromwich L	_ane, Ped	lmore				(mAO 123.0	D) 00
									Coordin	ates
	Client:	Willia	m Davis Ltd			GRN	Project Ref:	P8139	391150	E
er ée	Sam	ples&InS	itu Testing	Depth	Level	<u> </u>			201000	
Val Stri	Depth	Туре	Results	(m)	(m)	Legend		Stratum Description		
	0.20 0.20 0.60	D ES D		0.40	122.60		Loose to medium brown slightly clay to medium. Graved subrounded of brid frequent rootlets. TOP SOIL Loose to medium SAND. Sand is fin HELSBY SANDST	dense dark brown to dark red ey slightly gravelly SAND. Sa l is fine to medium subangula ck, quartzite and sandstone. C dense, damp, reddish brown s e to medium. FONE FORMATION	dish nd is fine r to contains silty	
	0.90 0.90 0.90 1.00	D	HV P=45 HV P=54 HV P=71	0.90	122.10	· · · · · · · · · · · · · · · · · · ·	Firm, medium stre slightly gravelly sil is fine to medium a HELSBY SANDST	ngth, reddish brown slightly s ty CLAY. Sand is fine to coars angular of sandstone and muc IONE FORMATION	an dy e. Gravel Istone.	1
	1.70	D								
	2.00	D		1.90	121.10		Medium dense red GRAVEL. Sand is angular of sand sto HELSBY SANDST	Idish brown mottled light grey fine to coarse. Gravel is fine t one, TONE FORMATION	sandy o coarse	2
	2.50	D		2.40 2.50	120.60 120.50		Extremely weak to grained SANDST HELSBY SANDST	o weak reddish brown fine to n ONE IONE FORMATION End of Pit at 2.55m	nedium	3
										4
Datel	Excavated:	(09/01/2018	Groundw	ater Obse	ervations:				
Date I	⊐ackfilled:	(09/01/2018 None	No Ground	uwater⊨n	countered.				
Stek:	·····.		Stable							
Stabil	ι υ			Trial	Pit Dimer	nsions (m)	: Reason for	termination of Trial Pit:		
Plant	USECI:		JCB 3CX	0.60			Terminated ir	n rock quality strata.		
Logge	ea by:		UKU		2.60					
Gene	ral Remarks:									
s	trata consistencies/o	densities de	termined by observatio	on only	Versio	on: FI	NAL	Scale: 1	:25	



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Trial Pit Log

Trial Pit No

TP 08

Sheet 1 of 1

S	Site Name:	Land	of Bromwich La	ane, Ped	more				122.00	
	Client:	Willia	m Davis Ltd			GRM	IProject Ref: P8139	Co 39	ordinate	¥S E N
ater ike	Sam	ples & In S	itu Testing	Depth	Level	Legend	Stratum Descripti		1000	<u> </u>
St.	Depth 0.20 0.20	Type D ES	Results	(m)	(m)		Soft to firm dark brown slightly grave Sand is fine to medium. Gravel is fine to well rounded of quartzite and sand frequent rootlets. TOP SOIL	lly sandy CLAY. e to coarse angula stone. Contains	r	
	0.60	D		0.40	121.60		Stiff, locally firm, friable, reddish brow sity CLAY. Sand is fine. Approximate locally medium strength. HELSBY SANDSTONE FORMATION	vn slightly sandy ly high strength, l		-
				1.20	120.80	-	Medium dense reddish brown sity fir	ne SAND.		- - 1 — - - - -
	1.30	D					HELSBY SANDSTONE FORMATION	I		- - - - - - - - - - - - - - - - - - -
	2.30	D			110.40			n dense reddish hrown mottled light grey and		
•	3.20	D		2.60	119.40		Medium dense reddish brown mottle black slightly sandy clayey GRAVEL. coarse. Gravel is fine to coarse angu sandstone. Contain frequent pockets clay. HELSBY SANDS TO NE FORMATION disturbed sample from 3.2m begl is of clay disturbed sample from 3.2m begl is of gra	d light grey and Sand is fine to lar of mudstone ar of very soft grave l	nd Ily	3 —
				3.80	11 8.20		End of Pit at 3.80m			-
									2	- - 4 —
Datel	Excavated:	(09/01/2018	Groundwa	ater Obse	rvations:				
Date I	Backfilled:	()9/01/2018	Moderate	groundwa	ter ingress	noted at 2.6m begl.			
Stabil	ing.	llactabl	o from 2.6m bool							
Diant	llood:	Unstabl		Trial	Pit Dimer	nsions (m)	: Reason for termination of T	rial Pit:		
Loga	ed bv:		CRC	0.60			Terminated in rock quality stra	ata.		
Gono	ral Romarke	Buckets	craning in base of	nit accum	3.00	ad at base				
Cerrer	rai nemarto.	DUCKETS		איז, מסטוו		a bast	~			
s	trata consistencies	/densities de1	ermined by observation	only	Versio	n: FI	NAL	Scale: 1:25		



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Trial Pit Log

Trial Pit No

TP 09

Sheet 1 of 1

Ground Level (mAOD)

s	Site Name:	Land	of Bromwich L	ane, Ped	more			(mAOD))
								119.50)
	Client:	Willia	m Davis Ltd			GRM	IProject Ref: P8139	Coordina 391089 281585	etes E N
Mate r Strike	Sam	oles & In S	itu Testing Results	Depth (m)	Level (m)	Legend	Stratum Description	201000	
	0.20 0.20 0.50	D ES D	results	0.30	119.20		Loose to medium dense dark brown to dark r brown slightly clayey slightly gravelly SAND. to medium. Gravel is fine to medium subang subrounded of quartzite and sandstone. Con frequent rootlets. TOP SOIL Stiff, friable, reddish brown slightly sandy slig CLAY. Sand is fine. Gravel is fine rounded of Approximately high strength, HELSBY SANDSTONE FORMATION	reddish Sand is fine Jular to tains Jhtly gravelly quartzite.	
	1.50	D		1.40	118.10	. · · · . · ·	Loose to medium dense reddish brown sligh sity fine SAND. HELSBY SANDSTONE FORMATION	tly clayey	
	2.00	D		1.90 2.10 2.15	117.60 117.40 117.35		Medium dense reddish brown mottled grey.r sandy GRAVEL. Sand is fine. Gravel is fine t angular of micaceous sandstone. HELSBY SANDSTONE FORMATION Extremely weak to weak reddish brown fine t grained SANDSTONE. HELSBY SANDSTONE FORMATION End of Pitat2.15m	nicace ou s o medium	2
Date E	Excavated:	(09/01/2018	Groundwa	ater Obse	ervations:			
Date E	Backfilled:	(09/01/2018	No Ground	dwaterEn	countered.			
Shorii	ng:		None						
Stabil	ity:		Stable	Trial	Pit Dimer	nsions (m)			
Plant	Used:		JCB 3CX		-		Reason for termination of Trial Pit	:	
Logge	ed by:		CRC	0.00	0.00		ierminated on rockhead.		
Genei	ral Remarks:				2.80				
6	trata consistencias/		termined by observation	n only	\ <i>l</i> amin	<u></u>		• 1.25	
S	uala consistencies/o	iensilies det	lemme a by observatio	noniy	versio	ni. Fil	INAL Scale	. 1.25	



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Trial Pit Log

Trial Pit No

TP 10

Sheet 1 of 1

s	ite Name:	Land	of Bromwich L	ane, Ped	more			(mAOD)	
	Client:	Willia	am Davis Ltd			GRM	IProject Ref: P8139	Coordinate 391000 E)s E
2.0	Samp	oles&InS	Situ Testing	Dowth	Laval			281424	N
Wate Strik	Depth	Туре	Results	(m)	(m)	Legend	Stratum Description		
	0.10 0.10	D ES		0.30	11 7.50		Soft to firm dark brown slightly gravelly sandy C Sand is fine to medium. Gravel is fine to coarse to well rounded of quartzite and sandstone. Co frequent rootlets. TOP SOIL	CLAY. e angular ntains	
×	0.50	D					Loose to medium dense reddish brown slightly slightly gravelly sit y SAND. Sand is fine to med Gravel is fine to coarse rounded of quartzite an of sandstone. Locally sandy silt. HELSBY SANDSTONE FORMATION	clayey tium. d angular	1
	1.50	D		160	11620				-
	1.80	D		1.00	110.20		Stiff red dish brown mottled light grey weakly thi laminated slightly sandy CLAY. Sand is fine to r Approximately high strength. HELSBY SANDS TONE FORMATION	nly nedium.	2
				220	11560				-
Data			10/01/2018						3
Date E	=xcavated: Backfilled:		10/01/2018	Slight grou	undwateri	noress note	ed at 1.2m begl.		
Shori	ng:		None		•	0	Ŭ		
Stabil	ity:	Slight	ly unstable from 1.2m begl.	Trial	Pit Dimer	nsions (m)	: Poss on for termination of Trial Dit:		
Plant	Used:		JCB 3CX	0.60			Refusal on rock, no mak recovery		
Logge	ed by:		CRC		2.50				
Gener	ral Remarks:	ensities de	termined by observation	nonly	Versio	on FI	NAI Scale (1.25	
		STOLIO S UE			VEISIC	/11. [1]		.20	



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Trial Pit Log

Trial Pit No

TP 11

Sheet 1 of 1

S	Site Name:	Land	of Bromwich La	ane, Ped	lmore				(MAOI 120.0	0
	Client:	Willia	m Davis Ltd			GRI	M P roje	ect Ref: P8139	Coordina 391100 281400	ates E N
ter İke	Samp	oles & In S	itu Testing	Depth	Level	Logond		Stratum Departmention		
Wa Str	Depth	Туре	Results	(m)	(m)	Legenu		Gradin Description		-
	0.20 0.20	D ES		0.30	119.70		Loos brow to me subre frequ	e to medium dense dark brown to dark redd n slightly clayey slightly gravelly SAND. San edium. Gravel is fine to medium subangular ounded of quartzite and sandstone. Contains rent rootlets.	ish d is fine to s	
	0.50	D					Medi GRA coars HELS	um dense reddish brown slightly clayey SAN VEL. Sand is fine to medium. Gravel is fine t se rounded of quartzite. SBY SANDSTONE FORMATION	ID and o	
								one quartzite cobble encountered at 1.2m begl.		
	1.60	D		1.50	118.50		Medi grave coars	um dense reddish brown slightly clayey slig elly SAND. Sand is medium. Gravel is is fine se rounded of quartzite and angular sandsto SRY SANDSTONE COMMETION	ntly to ne.	
	1.85	D		1.80	118.20	· · ·	EL Extre SAN HEL	so is SANUS TONE FORMATION emely weak reddish brown medium grained DSTONE. Recovered as gravelly sand. SBY SANDS TONE FORMATION End of Pitat 1.90m		3
Date	Excavated:		10/01/2018	Groundw	ater Obse	vations:	:			
Date	Backfilled:		10/01/2018	No Groun	dwaterEn	countered	ł.			
Shori	ng:		None							
Stabil	lity:		Stable	Trial	Pit Dimer	nsions (m	n):			
Plant	Used:		JCB 3CX	0.60			ľ	Corminated in mek quality strata		
Logge	ed by:		CRC	Ľ	3.00			uninaleu III IOUN quality Stiata.		
Gene	ral Remarks:									
S	trata consistencies/c	lensities de	termined by observation	only	Versio	on: Fl	INAL	Scale: 1:	25	



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Trial Pit Log

Trial Pit No

TP 12

Sheet 1 of 1

Ground Level (mAOD)

5	Site Name:	Land	of Bromwich L	ane.Ped	more				(mAO	D)
				,					188.7	0
									Coordin	ates
	Client:	Willia	ım Davis Ltd			GRN	IProject Ref:	P8139	391050 281450	E
r e	Sam	oles & In S	Situ Testing	Donth	Laval				201100	
Vate Strik	Depth	Туре	Results	(m)	(m)	Legend		Stratum Description		
	0.10 0.10	D ES				· ·	Loose to medium brown slightly cla to medium. Grave subrounded of qu frequent rootlets.	dense dark brown to dark redd yey slightly gravelly SAND. Sar el is fine to medium subangular artzite and sandstone. Contain	lish nd is fine ⁻ to s	
	0.50	D		0.40	188.30		TOP SOIL Firm, locally soft, fine. Gravel is fine quartzite. Approxi strength. HELSBY SANDS	slightly gravelly sandy CLAY. S e. Gravel is fine to coarse round mately medium strength, locally TONE FORMATION	and is led of y low	
	1.40	D					becomes stiff, fr	iable, and locally mottled light grey at 1.2r	n begl.	1
	1.70	D		1.50	187.20	· · ·	Extremely weak t micaceous fine to HELSBY SANDS	o weak thinly laminated reddish medium grained SANDSTONE TONE FORMATION	brown E.	
				1.80	186.90			End of Pit at 1.80m		
Date I	Ex ca va te d:		10/01/2018	Groundw	ater Obse	ervations:				3
Datel	Backfilled:		10/01/2018	Slight grou	ınd water i	ngress not	ed at 0.4m begl an	d 1.8m begl.		
Shori	ng:		None							
Stabil	lity:		Stable	Trial	Pit Dimer	nsions (m)	: Reason for	termination of Trial Pit		
Plant	Used:		JCB 3CX	0.60			Terminated	in mock quality strata		
Logge	ed by:		CRC		2.80			n ioon quanty stiala.		
Gene	ral Remarks:									
S	trata consistencies/	lensities de	termined by observatio	n only	Versio	on: Fl	NAL	Scale: 1:	25	



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Trial Pit Log

Trial Pit No

TP 13

Sheet 1 of 1

s	ite Name:	Land	of Bromwich L	ane, Ped	lmore			(mAO	D)
								119.5	0
	Client:	Willia	m Davis Ltd			GRM	MProject Ref: P8139	Coordin 391100	iates E
50	Sam	ples & In S	itu Testing	D #				201300	IN
Wate Strike	Depth	Туре	Results	Deptn (m)	(m)	Legend	Stratum Description		
	0.10 0.10	DES				· ·	Loose to medium dense dark brown to dark brown slightly clayey slightly gravelly SAND to medium. Gravel is fine to medium suban subrounded of ceramic, quartzite and sands Contains frequent rootlets.	reddish Sand is fine gular to tone.	
	0.50	D		0.40	119.10		TOP SOIL Firm to stiff, friable, reddish brown slightly gr sity CLAY. Sand is fine. Gravel is fine to coa of sandstone. Approximately medium to high HELSBY SANDSTONE FORMATION	ave l y sandy rse angular strength.	
	1.50	D					becomes mottled light grey from 1.4m begl.		
	2.15	D		2.10 2.20	117.40 117.30	· · · · · · · · · · · · · · · · · · ·	Extremely weak reddish brown thinly lamina micaceous fine to medium grained SANDST HELSBY SANDS TONE FORMATION End of Pit at 2.20m	led ONE.	2
									3
Date F	- - - - -		10/01/2018	Groundw	ator Obse				
Date F	Backfilled:		10/01/2018	No Groun	dwaterEn	countered			
Shori	ng:		None						
Stahil	- itv:		Stable						
Stabil				Trial	Pit Dime	nsions (m	Reason for termination of Trial Pi	::	
Plant	Used:		JCB 3CX	0.60			Terminated in rock quality strata.		
Logge	ed by:		CRC	"	2.90				
Gene	ral Remarks:	donožie i i	formation of two sets and set	n en h	16		NAL October	· 1.9E	
S	trata consistencies/o	aensities de	termined by observatio	noniy	versio	on: H	INAL Scale	: 1:25	



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Trial Pit Log

Trial Pit No

TP 14

Sheet 1 of 1

S	ite Name:	Land	of Bromwich	Lane, Ped	Imore				(mAO 118.3	D)
		10.515							Coordin	ates
	Client:	Willia	im Davis Ltd			GRI	M Project H	Ref: P8139	391050 281550	E N
Vater Strike	Sam	ples & In S	Situ Testing	Depth (m)	Level (m)	Legend		Stratum Description		
> 00	0.10 0.10 0.10	D ES	Results			· ·	Loose to m brown sligh to medium subround e Contains fr	nedium dense dark brown to dark red htty clayey slightly gravelly SAND. Sa . Gravel is fine to medium subangul d of ceramic, quartzite and sandstor requent rootlets.	ddish and is fine ar to ne.	
	0.60	D		0.40	117.90		TOP SOIL Medium de gravelly fin rounded of HELSBY S	ense reddish brown slightly clayey sl ie to medium SAND. Gravel is fine to f quartzite and angular of sandstone. ANDSTONE FORMATION	ightly o coarse	1
	1.50	D					become brown cla	es gravelly (sandstone) and occasional pockets y from 1.4m begl	of reddish	
	1.85 - 1.90	D		1.85 1.90	116.45		Extremely laminated) HELSBY S	weak reddish brown thinly laminated fine to medium grained SANDSTON SANDSTONE FORMATION End of Pitat1.90m	I (ripple IE.	
Date E	Excavated:		10/01/2018	Groundw	ater Obse	vations:				
Date I	Backfilled:		10/01/2018	No Groun	dwaterEn	countered	l.			
Stohil	ing.		Stable							
Stabil				Trial	Pit Dimer	nsions (m	I): Reaso	on for termination of Trial Pit:		
Plant	Used:		JCB 3CX	0.60			Termir	nated in rock quality strata.		
Logge	su by:				2.80					
Gene	rai Remarks:									
S	trata consistencies/o	den sities de	termined by observati	ion only	Versio	on: Fl	NAL	Scale: 2	1:25	



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Trial Pit Log

Trial Pit No

TP 15

Sheet 1 of 1

Ground Level

(mAOD)

S	ite Name:	Land	of Bromwich La	ane, Ped	more			(mAOD 117.50)
	Client:	Willia	ım Davis Ltd			GRM	A Project Ref: P8139	Coordina 391020	tes E
er (e	Sam	ples&InS	itu Testing	Depth	Level			281538	N
Wat Strij	Depth	Туре	Results	(m)	(m)	Legend	Stratum Description		
	0.10 0.10 0.40	D ES D		0.30	117.20		Loose to medium dense dark brown to dark redo brown slightly clayey slightly gravelly SAND. Sa to medium. Gravel is fine to medium subangula subrounded of quartzite and sandstone. Contair frequent rootlets. TOP SOIL	dish nd is fine r to is	-
							Medium den se reddish brown slightly gravelly cl SAND. Sand is fine to medium. Gravel is fine to rounded to subangular of quartzite. HELSBY SANDSTONE FORMATION	ayey coarse	1 -
	1.40	D					sand stone.		- - - -
	1.70 - 1.80	D		1.70	11 5.80		Extremely weak reddish brown thinly laminated micaceous fine to medium grained SANDSTON HELSBY SANDSTONE FORMATION End of Pit at 1.80m	E	2
									4 -
Date E	Excavated:		10/01/2018	Groundwa	ater Obse	rvations:			
Date E	Backfilled:		10/01/2018	No Ground	twaterEn	countered.			
Snorii	ng:	Slightly	None unstable between						
Stabil	ity:	groun	d le vel and 0.5m begl.	Trial	Pit Dimer	nsions (m)): Reason for termination of Trial Pit-		
Plant	Used:		JCB 3CX	0.60			Torminated in mak quality strate		
Logge	ed by:		CRC	L	200		ieminated in rock quality strata.		
Genei	ral Remarks:				2.30				
S	trata consistencies/	densities de	termined by observation	only	Versio	n: Fl	NAL Scale: 1:	25	



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GRM Development Solutions Ltd

Trial Pit Log

Trial Pit No

TP 16

Sheet 1 of 1

S	Site Name:	Land	of Bromwich L	ane, Ped	more				116.75	5
	Client:	Willia	ım Davis Ltd			GRM	IProject Ref: P8139	Co	ordina	ates F
							-	2	81500	Ň
Water Strike	Depth	oles & In S Type	Situ Testing Results	Depth (m)	Level (m)	Legend	Stratum Description	n		
	0.10 0.10	DES		0.20	116.55	· · · · · · · · · · · · · · · · · · ·	Loose to medium dense dark brown to brown slightly clayey slightly gravelly S to medium. Gravel is fine to medium s subrounded of quartzite and sandston frequent rootlets.	o dark reddish SAND. Sand is fi subangular to e. Contains	ne	
	0.50	D					Medium dense reddish brown slightly of SAND. Sand is fine to medium. Grave rounded of quartzite. HELSBY SANDS TONE FORMATION	clayey gravelly I is fine to coarse] ;	
	1.00	D		0.90	11 5.85		Medium dense reddish brown gravelly fine to medium. Gravel is fine to coars sandstone. HELSBY SANDS TONE FORMATION	SAND. Sand is e angular of		1
	1.80 - 1.90	D		1.80 1.90	114.95 114.85	· · · · · ·	Extremely weak reddish brown thinly la micaceous fine to medium grained SA HELSBY SANDSTONE FORMATION End of Pit at 1.90m	a minated NDSTONE.	/	2
										3
										4
Datel	Excavated:		10/01/2018	Groundw	ater Obse	rvations:				
Datel	Backfilled:		10/01/2018	No Ground	dwaterEn	countered				
Shori	ng:		None							
Stabil	lity:		Stable	Trial	Pit Dimer	nsions (m): Reason for termination of Tr	ial Pit:		
Plant	Used:		JCB 3CX	0.60			Terminated in rock quality strat	ta		
Logge	ed by:		CRC	Ľ	2.80					
Gene	ral Remarks:	lensities de	termined by observatio	n only	Versio	on: Fl	NALS	Scale: 1:25		
F				,	101310	/1. 11				



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Trial Pit Log

Trial Pit No

TP 17

Sheet 1 of 1

S	ite Name:	Land	of Bromwich L	ane, Ped	more			117.75	')	
	Client:	Williar	m Davis Ltd			GRM	I Project Ref	: P8139	Coordina 391016 281470	tes E N
later trike	Samp	les & In Sit	uTesting	Depth	Level	Legend		Stratum Description		
< 00	Depth	Туре	Results	0.30	117.45		Loose to medi brown slightly to medium. Gr subrounded of frequent rootle TOP SOIL Medium dense cobbly gravelly fine to coarse of quartzite. HELSBY SAN	ium dense dark brown to dark redo clayey slightly gravelly SAND. Sar a vel is fine to medium subangular f quartzite and sandstone. Contain ets. e reddish brown slightly clayey slig y SAND. Sand is fine to medium. C rounded of quartzite. Cobbles are IDSTONE FORMATION	lish nd is fine r to s htly Gravel is rounded	
				1.20	116.55		Firm to stiff, fri Sand is fine. C Approximately HELSBY SAN	iable, reddish brown sandy silty CL Contains frequent pockets of sand. r medium to high strength. IDSTONE FORMATION	.AY.	1
				1.70	11 6.05	· .	Medium den so SAND. Sand i angular of san	e reddish brown slightly silty grave s fine to medium. Gravel is fine to idstone.	lly coarse	-
				2.00	11 5.65		Extremely wea medium grain HELSBY SAN	ak reddish brown thinly laminated f ed SANDSTONE. IDSTONE FORMATION End of Pitat 2.10m	ine to	2
										3
Date B	Excavated:	1	0/01/2018	Groundw	ater Obse	vrvations:				
Date I Shori	Backfilled: ng:	1(0/01/2018 None	No Ground	dwaterEn	countered.				
Stabil	ıty:		Stable	Trial	Pit Dimer	nsions (m)	Reason	for termination of Trial Pit:		
Plant	Used: ad by:		CRC	0.60			Terminate	ed in rock quality strata.		
Gene	ral Remarke		5.10		2.90					
Cerrer	ur ne illain 5.									
s	trata consistencies/d	mined by observatio	n only	Versio	on: FII	NAL	Scale: 1:	25		



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Trial Pit Log

Trial Pit No

TP 18

Sheet 1 of 1

S	Site Name:	Land of Bromwic	h Lane, Peo	dmore					(mAO)	D)
									Coordin	ates
	Client:	William Davis Lto	ł		GRI	M P roj	ect Ref: P8139	9	391020	E
ke r	Samp	les & In Situ Testing	Depth	Level			Charter	De a cointi co	201400	
Stri	Depth	Type Results	(m)	(m)	Legena		Stratum	Description		
			0.40	117.85		Loos brow to m subr freq TOP Med sity of q HEL	se to medium dense da vn slightly clayey slightl edium. Gravel is fine to ounded of quartzite an- uent rootlets. SOIL ium dense, damp, redd SAND. Sand is fine. G uartzite and angular of SBY SANDSTONE FO	rk brown to dark red y gravelly SAND. Sa medium subangula d sandstone. Contain ish brown slightly gr ravel is fine to coarso sandstone. RMATION	dish nd is fine ir to ns avelly e rounded	1
▼			1.50	116.75		Stiff, sanc coar sanc stre I HE L	friable, reddish brown dy CLAY. Sand is fine to se angular of sandston Istone. Contains sand p ngth. SBY SANDSTONE FO	slightly gravelly sligh medium. Gravel is f e. Cobbles are angu pockets. Approximate RMATION	ntly cobbly îne to lar of aly high	2 -
			2.40	11 5.85	<u></u>	Med med sand HEL	ium dense reddish bro ium SAND. Gravel is fi Istone. SBY SANDSTONE FO	wn slightly clayey fin ne to coarse angular RMATION	e to of	
			2.80 2.85	115.45 115.40	· · ·	Extr med HEL	emely weak reddish bro lium grained SANDS TO SBY SANDS TONE FO End of I	own thinly laminated INE. RMATION Pit at 2.85m	fine to	3
										-
										4 -
Date E	Excavated:	10/01/2018	Groundw	ater Obse	ervations:	:				
Date E	Backfilled:	10/01/2018	Moderate	groundwa	ter ingress	snoted	at 1.5m begl.			
Shori	ng:	None								
Stabil	ity:	Slightly unstable fro 1.5m beal.	m	Pit Dime	nsions (m	ı):				
Plant	Used:	JCB 3CX				.,.	Reason for terminat	tion of Trial Pit:		
Logge	ed by:	CRC	0.60	0.70			Ierminated in rock qu	iality strata.		
Gene	ral Remarks:			2.70						
s	trata consistencies/d	ensities determined by observ	vation only	Versio	on: Fl	NAL		Scale: 1	:25	



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Trial Pit Log

Trial Pit No

TP 19

Sheet 1 of 1

S	Site Name:	Land	of Bromwich	Lane, Ped	more				(mAO	DD)
									11 7.5	50
	Client:	Willia	m Davis Ltd			GRM	IProject Re	ef: P8139	Coordin 390987	nates E
	Some		tu Tooting		1				281440	N
Water Strike	Depth	Type	Results	Depth (m)	Level (m)	Legend		Stratum Description		
				0.40	117.10		Loose to me brown slight to medium. (subrounded frequent roo TOP SOIL Firm to stiff r Sand is fine of quartzite. HELSBY SA	dium dense dark brown to dark re ly clayey slightly gravelly SAND. S Gravel is fine to medium subangu of brick, quartzite and sandstone. tlets. reddish brown slightly gravelly san to medium. Gravel is fine to coars Approximately medium to high stro NDS TO NE FORMATION	ddish and is fine ar to Contains dy CLAY. e rounded angth.	
				1.40	116.10	· · · · ·	Madium dan	so roddiob brown olightly clovey a	muellu	1 -
							Medium den SAND. Sand angularofs HELSBY SA	ise readisn brown slightly clayey g I is fine to medium. Gravel is fine t and stone. NDSTONE FORMATION	raveily D coarse	2 -
				2.50	11 5.00			End of Pit at 2.50m		-
										3 -
										4 -
Datel	Excavated:	1	0/01/2018	Groundwa	ater Obse	ervations:				
Datel	Backfilled:	1	0/01/2018	No Ground	lwaterEn	countered.				
Shori	ng:		None							
Stabil	ity:		Stable	Trial	Pit Dimer	nsions (m)): _	for the sector of the sector o		
Plant	Used:		JCB 3CX				Reasor			
Logge	ed by:		CRC	0.00			Iermina	ated on rockhead.		
Gene	ral Remarks:				J.2U					
s	trata consistencies/o	densities det	ermined by observation	ononly	Versio	on: Fil	NAL	Scale:	1:25	



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Trial Pit Log

Trial Pit No

SA01

Sheet 1 of 1

S	Site Name:	Land	of Bromwich La	ane, Ped	more				(ITAO) 117.60	0
	Client:	Willia	m Davis Ltd			GRN	/I P roj	ect Ref: P8139	Coordin 391000 281450	ates E N
later trike	Sam	iples & In S	itu Testing	Depth	Level	Legend		Stratum Description		
< 0 <	0.20 0.20	Type D ES	Results			· · ·	Soft San to w fre q TOF	to firm dark brown slightly gravelly sandy CL d is fine to medium. Gravel is fine to coarse a ell rounded of quartzite and sandstone. Conta uent rootlets. 2SOIL	AY. ngular ains	
▼	0.50	D		0.40	117.20		Very San of q HEL	v soft reddish brown slightly gravelly sandy SI d is fine to medium. Gravel is fine to coarse r uartzite. Approximately very low strength. .SBY SANDSTONE FORMATION	LT. ound ed	
	1.20	D		1.10	11 6.50	· · · ·	Stiff	to very stiff, friable, reddish brown locally mo grey slightly sandy CLAY. Sand is fine.	ttled	1 -
							App HE L	IOXIMATELY HIGH TO VERY HIGH STRENGTH.		
	2.10	D					Ê	becomes gravelly. Gravel is fine to coarse angular of muds and sandstone.	to ne	2 -
	2.35	D		2.30 2.40	115.30 115.20		Extr SAN HEL	emely weak reddish brown fine to medium gr IDSTONE. SBY SANDSTONE FORMATION End of Pit at 2.40m	ained/	
										3 -
										4 -
Date I	Excavated:	C	9/01/2018	Groundw	ater Obse	ervations:				
Date	Backfilled:	C	9/01/2018	woderate	groundwa	ter ingress	noted	atu.om begi.		
Snorl		Slightly	Instable between							
Stabil	lity:	0.6mbe	gl and 1.1m begl.	Trial	Pit Dimer	nsions (m)):	Reason for termination of Trial Pit:		
Plant	Used:		JCB 3CX	0.60				Terminated in rock quality strata.		
Loggi	eu by.		CRC		2.70					
Gene	ral Remarks:	Infiltratio	n testing not carrie	ed outdue	to ground	water ingre	ess and	side wall collapse.		
s	trata consistencies	/densities det	ermined by observation	only	Versio	on: FII	NAL	Scale: 1:2	25	
			,	-					-	



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Trial Pit Log

Trial Pit No

SA02

Sheet 1 of 1

Ground Level

(mAOD) Land of Bromwich Lane, Pedmore Site Name: 119.75 Coordinates Client: William Davis Ltd **GRM Project Ref:** P8139 391100 Е 281550 Ν Samples & In Situ Testing Water Strike Depth Level Stratum Description Legend (m) (m) Depth Туре Results Loose to medium dense dark brown to dark reddish brown slightly clayey slightly gravelly SAND. Sand is fine to medium. Gravel is fine to medium subangular to 0.10 D 0.10 ES subrounded of quartzite and sandstone. Contains frequent rootlets. 0.40 119.35 TOPSOIL Firm to stiff reddish brown slightly sandy slightly gravelly . SILT/CLAY. Sand is fine to medium. Gravel is fine to . 0.60 D medium rounded of quartzite. Approximately medium to . . high strength HELSBY SANDSTONE FORMATION . • . 1 1.70 D gravel band of fine to medium angular mudstone and sandstone. 2.00 117.75 2 2.05 Extremely weak reddish brown fine to medium grained D 2.10 117.65 SANDSTONE. HELSBY SANDS TO NE FORMATION End of Pit at 2.10m 3 4 Date Excavated: 09/01/2018 Groundwater Observations: Slight ground water in gress noted at 2.0m begl. Date Backfilled: 10/09/2018 Shoring: Soakaway crates Stability: Stable Trial Pit Dimensions (m): Reason for termination of Trial Pit: Plant Used: JCB 3CX 0.60 Terminated in rock quality strata. Logged by: CRC 2.90 General Remarks: Strata consistencies/densities determined by observation only Version: FINAL Scale: 1:25



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Trial Pit Log

Trial Pit No

SA03

Sheet 1 of 1

S	Site Name: Land of B		of Bromwich La	ane, Ped	more			(ITAOL 123.25	7) 5	
	Client:	Willia	am Davis Ltd			GRN	IProject Ref: P8139	Coordinate 391150 [281450]		
er (e	Sam	ples & In S	SituTesting	Depth	Level			201100		
Stri	Depth	Туре	Results	(m)	(m)	Legend	Stratum Description			
	0.20 0.20	D ES		0.40	122.85		Loose to medium dense dark brown to dark brown slightly clayey slightly gravelly SANE to medium. Gravel is fine to medium subar subrounded of brick, quartzite and sandstor frequent rootlets. TOP SOIL Loose to medium dense reddish brown slig	reddish 9. Sand is fine gular to ne. Contains htty silty		
	0.50	D					slightly gravelly SAND. Sand is fine to med fine to coarse rounded of quartzite and ang sandstone. HELSBY SANDS TONE FORMATION	um. Gravel is ularof		
	1.50	D								
				1.60	121.65		End of Pit at 1.60m		-	
									2	
									3 -	
									-	
									4 —	
Date F	Excavated:	(09/01/2018	Groundw	ater Obse	rvations:				
Date E	Backfilled:	(09/01/2018	No Ground	dwaterEn	countered.				
Shorii	ng:		None							
Stabil	ity:	Unstab	le, major sidewall	Trial	Dit Dimer	sions (m)	.			
Plant	Used:		JCB 3CX	Г			^{/·} Reason for termination of Trial P	it:		
Logge	ed by:		CRC	0.60	0.00		Target depth attained.			
Gener	ral Remarks:	Infiltratio	on testing not carrie	ed outdue	to side wa	all collapse				
Si	trata consistencies	/den sities de	termined by observation	only	Versio	on: Fli	NAL Scale	e: 1:25		



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Trial Pit Log

Trial Pit No

SA03A

Sheet 1 of 1

s	Site Name:	Land of Bromwich	(mAOD)					
							Coordin	ates
	Client:	William Davis Ltd			GRM	IProject Ref: P8139	391150 E	
г ө	Samp	oles & In Situ Testing	Depth	Level			201445	
Vat Strij	Depth	Type Results	(m)	(m)	Legend	Stratum Description		
			0.40	122.85		Loose to medium dense dark brown to dark red brown slightly clayey slightly gravelly SAND. Sa to medium. Gravel is fine to medium subanguk subrounded of quartzite and sandstone. Contai frequent rootlets. TOP SOIL Loose to medium dense reddish brown slightly slightly gravelly SAND. Sand is fine to medium. fine to coarse rounded of quartzite and angular sandstone. HELSBY SANDS TONE FORMATION End of Pit at 1.60m	dish nd is fine ir to ns silty Gravel is of	
								4 -
Date E	Excavated:	09/01/2018	Groundwa	l ater Obse	rvations:			
Date E	Backfilled:	10/09/2018	No Ground	dwaterEn	countered.			
Shorii	ng:	Soakaway crates						
Stabil	ity:	Unstable	Trial	Dit Dimor	sions (m)			
Plant	Used:	JCB 3CX				Reason for termination of Trial Pit:		
Logae	ed by:	CRC	0.60			Target depth attained.		
Geno	al Romarker			2.40				
Seller	rata consistencies/d	lensities determined by observa	tion only	Versio	on: FII	NAL Scale: 1	:25	
	· · ·		- 1					



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Trial Pit Log

Trial Pit No

SA04

Sheet 1 of 1

(mAOD)	

Site Name:		Land	(MAO) 125.1	0					
	Client:	Willia	m Davis Ltd			GRM	MProject Ref: P8139	Coordin 391169 281437	ates E N
ke r	Samp	les&InS	itu Testing	Depth	Level			201101	
Stri	Depth	Туре	Results	(m)	(m)	Legena	Suatum Description		
			0.40		· ·	Loose to medium dense dark brown to dar brown slightly clayey slightly gravelly SANI to medium. Gravel is fine to medium suba subrounded of quartzite and sandstone. Co frequent rootlets. TOP SOL	to dark reddish / SAND. Sand is fine subangular to one. Contains		
				0.40			Loose to medium dense reddish brown slig slightly gravelly medium to coarse SAND. (to coarse rounded of quartzite and angular HELSBY SANDS TONE FORMATION	htly clayey Gravel is fine sandstone.	
				1.10	124.00	· · ·	End of Pit at 1.10m		
Date	Excavated:	1	0/01/2018	Groundwa	ater Obse	rvations:			
Date E	Backfilled:	1	10/09/2018	No Ground	lwaterEn	countered			
Snori	ng:	Soa	kaway crates						
Stabil	ity:		Stable	Trial	Pit Dimen	isions (m): Reason for termination of Trial F	Pit:	
Plant	Used:		JCB 3CX	0.60			Target depth attained		
Logge	ed by:		CRC		2.20				
Gene	ral Remarks:	ensities det	emined by observation	nonly	Versio	n' Fl		e · 1·25	
3					ve1510	<u>11. 11</u>		0. 1.20	



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Trial Pit Log

Trial Pit No

SA05

Sheet 1 of 1

Site Name:		Land o	(ITAOD) 127.00						
	Client:	Willian	n Davis Ltd			GRM	MProject Ref: P8139	Coordina 391186 281436	ates E N
ater ike	Sam	ples&InSit	uTesting	Depth	Level	Legend	Stratum Description		
Str	Depth	Туре	Results	(m) 0.20	(m) 126.80	Legellu	Loose to medium dense dark brown to dark redd brown slightly clayey slightly gravelly SAND. Sar to medium. Gravel is fine to medium subangula subrounded of quartzite and sandstone. Contair frequent rootlets. TOP SOIL Loose to medium dense reddish brown slightly o gravelly SAND. Sand is fine to coarse. Gravel is coarse angular of sandstone. HELSBY SANDSTONE FORMATION	dish nd is fine r to is layey fine to	
				1.50	125.50		End of Pit at 1.50m		2
Date E	Excavated: Backfilled:	1(01/2018		ater Obse	rvations:			
Shori	ng:	Soak	away crates						
Stabil Plant	ity: Used: ad by:	J	Stable CB 3CX CBC	Trial 0.60	Pit Dimer	nsions (m): Reason for termination of Trial Pit: Target depth attained.		
Gener	ral Remarks:	Bucketso	raping in base of	pit, assum	2.30 ned rockhe	ead at base	e.	05	
S	trata consistencies/o	densities dete	mined by observation	only	Versio	on: Fl	INAL Scale: 1:	25	



Windowless Sample Borehole

Borehole No

WS01 Sheet 1 of 1

Crownal Laval

Site Name:		Land		(mAOD) 116.50							
	Clien	t:	Willia	ım Davis Lto	1	G	RMPro	oject Re	f : P8139	Coordin 390955 281472	ates E N
lation/ kfill	ater ike		Sample	s/Tests		Depth	Level	Legend	Stratum Description		
Instal Bac	Str 🕅	Depth	Туре	Result	(Blows per 100mm)	(m)	(m)	Logona		Stratum Description	
	≥ tō	0.50 0.90- 1.00 1.00 1.50- 1.60 1.95- 2.00 2.00	Type D C C D C mpling	Result N=29 (4,4/5,6,7,11) 50 (25 for 50mm/50 for 60mm)	(Blows per 100mm)	(m) 0.40 0.70 1.95 2.00	(m) 116.10 115.80 114.55 114.50		Firm, friable, reddish brown si gravely slightly sandy silty CL is fine to medium. Gravel is fin medium well rounded of quart TOP SOIL Firm, friable, reddish brown si gravely sandy CLAY. Sand is i Gravel is fine to coarse sub-ar quartzite. Approximately medi strength. HELSBY SANDS TONE FORM Medium dense reddish brown clayey fine to medium SAND. HELSBY SANDS TONE FORM Extremely weak reddish brown laminated medium grained SANDSTONE. HELSBY SANDS TONE FORM End of Borehole at 2.00m	ghtly AY. Sand e to zite. ghtly fine. ngular of m ATION IATION IATION IATION	
E	quipm	ent:	Tracke	ed Window Sa	ampleRig						
F	Reaso	n for te	rminatio	on of boreho	ole: Refusal in r	rock.					
Grour No Gr	n dwate oundwa	rRem a terEn	arks: counter	ed.							
Genei	al Rer	narks:									
Hole	Starte	ed:	12/01/	/2018	lole Complete:	12/01/2	2018	Versi	on: FINAL Sc	ale: 1:28	5



Windowless Sample Borehole

Borehole No

WS02

Sheet 1 of 1 Ground Level

(mAOD)

Site Name:		Land	of Bromwich	Lane, Pedmore					(mAOE 117.90))	
	Clien	t:	Willia	ım Davis Ltd		G	iRM P ro	ject Ref	: P8139	Coordina 391050 281500	ates E
nsta llation/ Backfill	Water Strike	Depth	Sample Type	s/Tests Result	Dynamic Probing	Depth (m))epth Level Legen (m) (m)		Stratum Description	201300	
						0.40	117.50		Firm, friable, reddish brown slig gravelly slightly sandy silty CL/ is fine to medium. Gravel is fin- medium well rounded of quartz TOPSOIL Soft reddish brown slightly gra sandy CLAY. Sand is fine. Grav to coarse sub-angular of quartz Approximately low strength. HELSBY SANDS TONE FORM	Intly Y. Sand s to ite. velly vel is fine zite. ATION	
		1.00 - 1.20 1.00 1.50 - 1.60	C D	N=10 (1,2/2,2,3,3)		1.20	116.70		Medium dense reddish brown SAND. Contains pockets of cla HELSBY SANDSTONE FORM	ïne y. ATION	
		1.85- 2.00 2.00	C	50 (25 for 135mm/50 for 45mm)		1.85	116.05		Extremely weak reddish brown laminated medium grained SANDSTONE. Recovered as a and gravel. HELSBY SANDSTONE FORM End of Borehole at 2.00m	thinly sand ATION	2
	Dunc	micSo	molina	Tubrand							4
Crew: Ea	Dyna <u>Hard</u> uipmo	amic Sa <u>y</u> ent:	Tracke	-L. Tyler and r	Logger: CR	C		Wea	ather: Overcast		
Groun No Gro	easou dwate	n for te er Rema aterEn	rminationarks:	on of borehol	e: Refusal in r	rock.					
Genera	al Ren	narks:									
Hole	Starte	ed:	12/01/	/2018 Ho	le Complete:	12/01/2	018	Versio	n: FINAL S ca	a le: 1:25	



Windowless Sample Borehole

Borehole No

WS03

Sheet 1 of 1 Ground Level (mAOD)

Site Name:		me:	Land	of Bromwich	Lane, Pedmore					(mAOE 120.90))
	Clien	4.		m Davia Ital				ieet De	f . D9120	Coordinates	
	Chen	ι.	vvilla	m Davis Liu		G		Ject Re	1: Polo9	391111 281619	E N
lation/ kfill	ater ike		Sample	s/Tests		Depth	Level	Legend	Stratum Description		
Install Bac	Wa Str	Depth	Туре	Result	(Blows per 100 mm)	(m)	(m)	Legenu	Stratum Description		
		0.70 - 0.80 1.00	D	N=11 (2,1/2,2,3,4)		0.40	120.50	· · · · · · · · · · · · · · · · · · ·	Loose to medium dense dark b dark reddish brown slightly clay slightly gravelly SAND. Sand is medium. Gravel is fine to mediu subangular to subrounded of q and sandstone. Contains freque rootlets. <u>TOPSOIL</u> Medium dense reddish brown s clayey slightly gravelly SAND. S fine to medium. Gravel is fine to sub-rounded to sub-angular of and sandstone. HELSBY SANDS TONE FORM.	rown to rey fine to im uartzite ent slightly Sand is o coarse quartzite ATION	1
		1.40 - 1.50	D			1.30	119.60		Firm to stiff, high strength, redo brown sandy CLAY. Sand is fin medium. HELSBY SANDS TONE FORM	fish e to ATION	
· · · · · · · · · · · · · · · · · · ·	-	1.90 - 2.00 2.00	D C	50 (25 for 70mm/50 for 65mm)		1.90 2.00	119.00 118.90		Extremely weak reddish brown laminated medium grained SANDSTONE. HELSBY SANDSTONE FORM End of Borehole at 2.00m	thinly ATION	2
											3 3
											4
	Dyna	mic Sa	mplina -	L. Tyler and F							
Crew	Hard	y	Treater	,	Logger: CR			We	eather: Overcast		
	luibu		паске								
F Groun No Gro	Reason Idwate Dundwa	n for te er Rema aterEn	rminatio arks: countere	on of borehol	e: Refusal in i	rock.					
Gener	al Ren	narks:									
Hole	Starte	d:	12/01/	/2018 Ho	le Complete:	12/01/2	2018	Versi	on: FINAL Sca	1:25	



Windowless Sample Borehole

Borehole No

WS04

Sheet 1 of 1 Ground Level

Site Name:		Land	of Bromwich	Lane, Pedmore				(MAOL 123.50))		
	Clien	t:	Willia	m Davis Ltd		C	GRM Pro	ject Re	f : P8139	Coordina 391150	ates E
	5 0		Sample	s/Tests						281500	<u>N</u>
Installati Backfi	Wate Strike	Depth	Туре	Result	Dynamic Probing (Blows per 100mm)	Depth (m)	(m)	Legend	Stratum Description		
		0.60- 0.70 1.00 1.40- 1.50 1.60- 1.80 1.80	D C D C	N=14 (2,1/2,2,4,6) 50 (25 for 20mm/50 for 40mm)		0.40	123.10 121.90 121.70		Loose to medium dense dark t dark reddish brown slightly clay slightly gravelly SAND. Sand is medium. Gravel is fine to medi subangular to subrounded of q and sandstone. Contains frequ rootlets. <u>TOP SOIL</u> Medium dense reddish brown clayey slightly gravelly SAND.3 fine to coarse. Gravel is fine to angular to well rounded of qua and sandstone. HELSBY SANDS TONE FORM Extremely weak reddish brown laminated medium grained SANDSTONE. HELSBY SANDS TONE FORM End of Borehole at 1.80m	thinly	
Crew:	Hard	y			Logger: CR	C		We	eather: Overcast		
Eq	uipme	ent:	Tracke	d Window Sa	mple Rig						
Group	easor	n for te	rminatio	on of boreho	le: Refusal in r	rock.					
No Gro	undwa	aterEn	countere	ed.							
Genera	al Ren	narks:									
Hole	Starte	d:	12/01/	2018 Ho	ole Complete:	12/01/2	2018	Versi	on: FINAL Sca	a le: 1:25	


Windowless Sample Borehole

Borehole No

WS05

Sheet 1 of 1 Ground Level

(mAOD)

Si	te Na	me:	Land	of Bromwich	Lane, Pedmore					(mAOD 130.00))
	Clien	t:	Willia	am Davis Ltd		G	iRM P ro	ject Re	f : P8139	Coordina 391226 281411	ites E
ation/ Kfill	re ex		Sample	es/Tests	Durking	Depth	Level	Limmed		201711	11
Instalk Back	Val Stri	Depth	Туре	Result	(Blows per 100mm)	(m)	(m)	Legend	Stratum Description		
		0.50 - 0.60	D			0.40	129.60	· ·	Loose to medium dense dark b dark reddish brown slightly clay slightly gravelly SAND. Sand is medium. Gravel is fine to medi subangular to subrounded of q and sandstone. Contains frequ rootlets. <u>TOP SOIL</u> Medium dense reddish brown t slightly clayey slightly gravelly Sand is fine to coarse. Gravel i coarse sub-rounded to angular	rown to /ey fine to Jm uartzite ent o brown SAND. s fine to of	
		1.00	С	N=21 (2,4/4,5,6,6)					sandstone and quartzite. HELSBY SANDS TONE FORM	ATION	
· · · · · · · · · · · · · · · · · · ·		1.80- 2.00 2.00	С	50 (25 for 77mm/50 for 65mm)		2.00	128.00		End of Borehole at 2.00m		2
											3 1 1 1 1 1 1 1 1 1
											4 —
	Dvna	amic Sa	mplina	-L.Tvlerand I							
Crew:	Hard	y ont:	Trocks	ad Window So	Logger: CR	C		We	eather: Overcast		
		ent:				rook no					
Groun No Gro	dwate oundwa	r Rema aterEn	arks: counter	ed.	e. Relusation			overy.			
Genera	al Rer	narks:									
Hole	Starte	ed:	12/01	/2018 Ho	le Complete:	12/01/2	018	Versi	on: FINAL Sca	1:25	



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Windowless Sample Borehole

Borehole No

WS06

Sheet 1 of 1

	Site Na	me:	Land	of Bromwic	h Lane, Pedmore					Ground (mAO 119.6	Level D)
	0		VACIE	D : 11					5 D0100	Coordin	ates
	Clien	t:	Willia	im Davis Lto		G	RMPro	ject Re	f: P8139	391100 281450	E N
stallation/ Backfill	Water Strike	Depth	Sample Type	s/Tests Re sult	Dynamic Probing	Depth (m)	Level (m)	Legend	Stratum Description	201100	
Cre Grou	w: Dyna Hard Equipm Reason	0.50 - 0.60 1.00 1.50 - 1.60 1.90 1.90 1.90 amic Sa y ent: n for te r Rema ater En	D C D C Tracke rminatio	N=18 (2,2/3,4,6,5) 50 (25 for 70mm/50 for 77mm) - L. Tyler and ed Window S on of boreho ed.	IK. Logger: CR ample Rig ole: Refusal on	0.40 1.90	119.20 117.70		Loose to medium dense dark to dark reddish brown slightly clay slightly gravelly SAND. Sand is medium. Gravel is fine to medi subangular to subrounded of q carbonace ous material and san Contains frequent rootlets. TOP SOIL Medium dense reddish brown is gravely slity fine to coarse SAN Gravel is fine to coarse well ron angular of sandstone and quar Contains silt/clay pockets. HELSBY SANDS TONE FORM End of Borehole at 1.90m	rown to /ey fine to Jm uartzite, ad stone. Slightly ND. Jnded to tzite. ATION	
Gen	eral Rer	narks:									
Ho	le Starte	ed:	12/01	/2018 •	lole Complete:	12/01/2	018	Versi	on: FINAL Sca	1 le: 1.24	5



Windowless Sample Borehole

Borehole No

WS07

Sheet 1 of 1 Ground Level

(mAOD)

Sit	e Na	me:	Land	ofBromwi	ch Lane, Pedmore						(mAOE 119.00))
	Clien	t:	Willia	ım Davis Lt	d		G	RMPro	ject Ref:	: P8139	Coordina 391050 281409	ites E N
a llation / ackfill	/ater trike		Sample	s/Tests	Dynamic Probing	Dep	oth	Level	Legend	Stratum Description	201100	
<u>st</u>	200	0.50 - 0.60	D		(Blows per 100mm)	0.4	0	118.60	· · · · · · · · · · · · · · · · · · ·	Firm, friable, reddish brown slig gravelly slightly sandy slity CL, is fine to medium. Gravel is fin medium well rounded of quarts TOP SOIL Firm reddish brown slightly gra sandy CLAY. Sand is fine to m Gravel is fine to coarse sub-ar well rounded of quartzite. Approximately medium strengt HELSBY SANDSTONE FORM	ghtly AY. S and e to zite. avelly edium. gular to h. IATION	
		1.00 1.30 -	C	N=14 (2,1/2,2,4,6))	1.2	20	117.80		Medium dense reddish brown clayey gravelly SAND. Sand is medium Comucilis fan to medi	slightly fine to	1 1 - - - - - - - -
		1.40 1.70 - 1.80 1.80	D	50 (25 for		1.6 1.8	50 50	117.40 117.20		Hedum. Gravel is the to medi angular of sandstone. HELSBY SANDSTONE FORM Extremely weak reddish browr laminated micaceous medium SANDSTONE.	IATION hthinly grained	
				55mm)						End of Borehole at 1.80m		2
Crew: Eq	Hard uipme	y ent:	Tracke	ed Window S	Sample Rig	C			Wea	ther: Overcast		
Groun No Gro	eason dwate undwa	n for te F Rema aterEnd	rmination arks: counter	on of boreh	n ole: Refusal in r	rock.						
Genera	al Ren	narks:										
Hole	Starte	d:	12/01/	/2018	Hole Complete:	12/0	01/20	018	Versio	n: FINAL Sc a	ale: 1:25	



Windowless Sample Borehole

Borehole No

WS08

Sheet 1 of 1 Ground Level

Si	te Na	me:	Land	of Bromwich	Lane, Pedmore					(IIIAOL 117.50)
	Clien	t:	Willia	m Davis Ltd		G	RMPro	ject Re	f: P8139	Coordina 390995 281444	ates E N
ullation/ sckfill	ater rike		Sample	s/Tests	Dvnamic Probing	Depth	Level	Legend	Stratum Description		
Insta Be	ĭs ∧	Depth 0.50 - 0.60	Type	Result	(Blows per 100mm)	(m) 0.30	(m) 117.20	· · · · · · · · · · · · · · · · · · ·	Loose to medium dense dark b dark reddish brown slightly clay slightly gravelly SAND. Sand is medium. Gravel is fine to mediu subangular to subrounded of q and sandstone. Contains frequ rootlets.	rown to /ey fine to um uartzite ent	
- - - -		1.00	С	N=15 (1,2/3,3,4,5)		1.00	116.50	•••••	Very soft reddish brown slightly very sandy CLAY. Sand is fine t medium. Gravel is fine to coars rounded of quartzite angular of sandstone. HELSBY SANDS TONE FORM Firm to stiff, high strength, redo brown mottled greenish grey sl sandy CLAY. Sand is fine to me HELSBY SANDS TONE FORM	r gravelly to se well ATION lish lightly edium. ATION	1
		1.50 - 1.60	D								
	-	1.90 - 2.00 2.00	D C	50 (25 for 145mm/50 for 60mm)		1.90 2.00	115.60 115.50		Extremely weak very thinly lam reddish brown mottled greenist fine to medium grained micace SANDSTONE. HELSBY SANDSTONE FORM End of Borehole at 2.00m	inated ngrey ous ATION	2
											4
Cre w:	Dyna	mic Sa v	mpling -	L. Tyler and I	Logger: CR	C		We	eather: Overcast		
Ec	luipme	ent:	Tracke	d Window Sa	mpleRig						
F Groun	&easor Idwate	n for te r Rema	rminatio arks:	on of borehol	e: Refusal in r	ock.					
Slight	seepa	ge note	d at 0.41	m begl.							
Gener	al Ren	narks:									
Hole	Starte	d:	12/01/	2018 H o	le Complete:	12/01/2	018	Versi	on: FINAL Sca	l e: 1:25	



Windowless Sample Borehole

Borehole No

WS09

Sheet 1 of 1 Ground Level

Sit	e Na	me:	Land	ofBromwich	Lane, Pedmore					116.5	D)
	Clien	t:	Willia	am Davis Ltd		G	RMPro	ject Ref	: P8139	Coordin 390938 281444	ates E N
ation/ kfill	lter İke		Sample	e s/Tests	Dun omio Drohing	Depth	Level	Logond	Stratum Description		
Instal Bac	Str	Depth	Туре	Result	(Blows per 100 mm)	(m)	(m)	Legend	Ou atum Description		
		0.03 - 0.10 0.10 - 0.50	D			0.10	116.40		Medium dense dark brown slig clayey slightly sandy GRAVEL. fine to medium. Gravel is fine a of igneous rock, sandstone and Contains abundant organic ma MADE GROUND Soft firm dork brown slightly.	ntly Sand is ngular I chert. terial.	
		0.60 - 0.70	D			0.50	116.00		sandy CLAY. Sand is fine to me Gravel is fine to medium of bric chert. Approximately low to me strength. MADE GROUND Firm, medium strength, friable, brown slightly gravelly sandy si CLAY. Sand is fine to medium.	reddish Ity Gravel	1
		1.20	С	N=7 (1,2/1,2,2,2)					quartzite. Contains frequent sa pockets. HELSBY SANDSTONE FORM	nd ATION	
		1.50 - 1.60	D								
		1.95- 2.00 2.00	D	50 (25 for 145mm/50 for 180mm)		1.95	114.55		Extremely weak reddish brown micaceous fine grained SANDS HELSBY SANDS TONE FORM End of Borehole at 2.00m	STONE.	2
Crew:	Dyna	amic Sa	mpling	- L. Tyler and h	Logger: CR	C		We	ather: Overcast		
Eq	uipm	y ent:	Tracke	ed Window Sar	mple Rig			1			
R	easo	n for te	rminati	ion of borehol	e: Refusal in r	ock.					
Groun No Gro	dwate undw	e r Rema aterEno	arks: counter	red.							
Genera	al Rer	narks:									
Hole	Starte	ed:	12/01	/2018 Ho	le Complete:	12/01/2	018	Versio	on: FINAL Sca	le: 1:25	



GRM Development Solutions Ltd

Laurus House, First Avenue, Centrum 100, Burton-on-Trent, DE14 2WH Tel (HQ.): 01283 551249 Email: info@grm-uk.com

Trial Pit Log

Trial Pit No

SS01

Sheet 1 of 1

Ground Level

S	Site Name:	Land of Bron	nwich Lane,	Pedmore			(mAOD) 116.60)
	Client:	William Davis	s Ltd		GRN	IProject Ref: P8139	Coordinat 390940 281446	es E
re e	Sam	ples & In Situ Testing	D	epth Level			201440	
Stri	Depth	Type Re	sults	(m) (m)	Legend	Stratum Description		
	0.05 0.30 0.30	D ES D ES		0.10 116.50 0.40 116.20		Black mottled grey slightly clayey sandy GF is fine to coarse. Gravel is fine to coarse an igneous rock, chert, sandstone, plastic, bric MADE GROUND Firm reddish brown slightly gravelly sandy (fine to coarse. Gravel is fine to medium rou angular of quartzite and brick. Approximate strength. Sandstone and Igneous rock were observed. However, these may have fallen overlying strata. MADE GROUND End of Pit at 0.40m	RAVEL. Sand gular of k and rope. CLAY. Sand is nded to ly medium a also in from	2
								4
Date	Excavated:	12/01/201	8 Grou	Indwater Obs	ervations:			
Date E	Backfilled:	12/01/201	8 No G	roundwaterE	ncountered.			
Shori	ng:	None						
Stabil	ity:	Slightly unst	able	Trial Pit Dime	ensions (m)	Reason for termination of Trial P	it:	-
Plant	Used:	None (hand	dug)	30		Target depth attained.	-	
Logge	ed by:	CRC		0.30	/			
Gene	ral Remarks: trata consistencies/	Hand dug pit. densities determined by	observation only	Versi	on: FII	VAL Scale	e: 1:25	
				1 00131	<u></u>		<u>.</u> .	



Appendix 5: Sewer Records

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Do not scale off this Map. This plan and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. In particular this plan and any information shown on it must not be relied upon in the event of any development or works (including but not limited to excavations) in the vicinity of SEVERN TRENT WATER assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems. On 1 October 2011 most private sewers and private lateral drains in Severn Trent Water's sewerage area, which were connected to a public sewer as at 1 July 2011, Transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 October 2012. Private pumping stations, which form part of these assets. These assets may not be displayed on the map. Reproduction by permission of Ordnance Survey on behalf of HMSO. © Crown Copyright and database right 2004. All rights reserved. Ordnance Survey licence number: 100031673. Document users other than SEVERN TRENT WATER business users are advised that this document is provided for reference purpose only and is subject to copyright, therefore, no further copies should be made from it.

Date: 26/08/22

Public Foul Gravity/Lateral Drain 🛛 🔸 🕨 Highway Drain Public Combined Gravity/Lateral Drain Public Surface Water Gravity/Lateral Drain Pressure Foul Pressure Combined Pressure Surface Water



	Manhole Fost	•	
	Manhole Surface	0	
-	Abandoned Pipe	X-8-8-8-8-K	
	Chamber	-	
	Section 104 sewers a	ments in grown	
	Private aswers are ab	court in magazita	

21329

Scale: 1:1250



Map Centre: 391087,281489

GENERAL CONDITIONS AND PRECAUTIONS TO BE TAKEN WHEN CARRYING OUT WORK ADJACENT TO SEVERN TRENT WATER'S APPARATUS Please ensure that a copy of these conditions is passed to your representative and/or your contractor on site. If any damage is caused to Severn Trent Water Limited (STW) apparatus (defined below), the person, contractor or subcontractor responsible must inform STW immediately on: 0800 783 4444 (24 hours)

a) These general conditions and precautions. Such appert to the subject of an Agreement between a developer agrees to build sewers to an agreement for the self-construction of water mains entered into with STW and the assets described at conditions and precautions. Such appert agrees to build sewers to an agreement for the self-construction of water mains entered into with STW and the assets described at conditions and precautions. Such appert agrees to build sewers to an agreement to sewer agrees to build sewers to an agreement for the self-construction b) of these general conditions and precautions. Such appert agrees to build sewers to an agreement for the self-construction b) of these general conditions and precautions. Such appert agrees to build sewers to an agreement between a developer agrees to build sewers to an agreement for the self-construction of water mains entered into with STW and the assets described at conditions and precautions. Such appert agrees to build sewers to an agreement for the self-construction of water mains entered into with STW and the assets described at conditions and precautions. Such appert agrees to build sewers to an agreement for the self-construction of water mains entered into with STW and the assets described at conditions and precautions. Such appertations and precautions. Such appertations and precautions and precautions. Such appertations and precautions and precautions. Such appertations and precautions and precautions and precautions. Such appertations and precautions and precautions. Such appertations and precautions and precautions and precautions. Such appertations and precautions and precautions and precautions. Such appertations and precautions and precautions and precautions. Such appertations and precautions and precautions and precautions and precautions and precautions and precautions. Such appertations a b) Please be aware that due to The Private Sewers Transfer Regulations June 2011, the number of public sewers has increased, but many of these are not shown on the public sewer record. However, some idea of their positions may be obtained from the position of inspection covers and their existence must be anticipated.

- e) The plan must not be relied upon in the event of excavations or other works in the vicinity of STW Apparatus. It is your responsibility to ascertain the precise location of any STW Apparatus prior to undertaking any development or other works (including but not limited to excavations).
- f) No person or company shall be relieved from liability for loss and/or damage caused to STW Apparatus by reason of the actual position and/or depths of STW Apparatus being different from those shown on the plan.

In order to achieve safe working conditions adjacent to any STW Apparatus the following should be observed:

1. All STW Apparatus should be located by hand digging prior to the use of mechanical excavators.

2. All information set out in any plans received from us, or given by our staff at the site of the works, about the position and depth of the mains, is approximate. Every possible for the cost of repairing any loss and/or damage caused (including without limitation replacement parts). 3. Water mains are normally laid at a depth of 900mm. No records are kept of customer service pipes which are normally laid at a depth of 750mm; but some idea of their positions may be obtained from the position of stop tap covers and their existence must be anticipated. 4. During construction work, where heavy plant will cross the line of STW Apparatus, specific crossing points must be agreed with STW and suitably reinforced where required. These crossing points should be clearly marked and crossing of the line of STW Apparatus at other locations must be prevented. 5. Where it is proposed to carry out piling or boring within 20 metres of any STW Apparatus, STW should be consulted to enable any affected STW Apparatus to be surveyed prior to the works commencing. 6. Where excavation of trenches adjacent to any STW Apparatus affects its support, the STW Apparatus must be supported to the satisfaction of STW. Water mains and some sewers are pressurised and can fail if excavation removes support to thrust blocks to bends and other fittings. 7. Where a trench is excavated crossing or parallel to the line of any STW Apparatus, the backfill should be adequately compacted to prevent any settlement which could subsequently cause damage to the STW Apparatus. In special cases, it may be necessary to provide permanent support to STW Apparatus. In special cases, it may be necessary to provide permanent support to STW Apparatus. 8. No other apparatus should be laid along the line of STW Apparatus irrespective of clearance. Above ground apparatus must not be located within a minimum of 3 metres either side for larger sized pipes and 6 metres either side for larger sized pipes and 8 metres either side for larger sized pipes without prior approval. No manhole or chamber shall be built over or around any STW Apparatus.

9. A minimum radial clearance of 300 millimetres should be allowed between any plant or equipment being installed and existing STW Apparatus. We reserve the right to increase this distance where strategic assets are affected. 10. Where any STW Apparatus coated with a special wrapping is damaged, even to a minor extent, STW must be notified and the trench left open until the damage to any STW Apparatus causing leakage, weakening of the mechanical strength of the pipe or corrosion-protection damage, the necessary remedial work will be recharged to you. 11. It may be necessary to adjust the finished level of any surface boxes. Checks should be made during site investigations to ascertain the level of such STW Apparatus in order to determine any necessary alterations in advance of the works. 12. With regard to any proposed resurfacing works, you are required to contact STW on the number given above to arrange a site inspection to establish the condition of any STW Apparatus in the nature of surface boxes or manhole covers and frames affected by the works. STW will then advise on any measures to be taken, in the event of this a proportionate charge will be made. 13. You are advised that STW will not agree to either the erection of posts, directly over or within 1.0 metre of valves and hydrants,

14. No explosives are to be used in the vicinity of any STW Apparatus without prior consultation with STW.

TREE PLANTING RESTRICTIONS

There are many problems with the location of trees adjacent to sewers, water mains and other STW Apparatus and these can lead to the loss of trees and hence amenity to the area which many people may have become used to. It is best if the problem is not created in the first place. Set out below are the recommendations for tree planting in close proximity to public sewers, water mains and other STW Apparatus. 15. Please ensure that, in relation to STW Apparatus, the mature root systems and canopies of any tree planted do not and will not encroach within the recommended distances specified in the notes below.

16. Both Poplar and Willow trees have extensive root systems and should not be planted within 12 metres of a sewer, water main or other STW Apparatus.

18. STW personnel require a clear path to conduct surveys etc. No shrubs or bushes should be planted within 2 metre of the centre line of a sewer, water main or other STW Apparatus. 19. In certain circumstances, both STW and landowners may wish to plant shrubs/bushes in close proximity to a sewer, water main of other STW Apparatus for screening purposes. The following are shallow rooting and are suitable for this purpose. The following are shallow rooting and are suitable for this purpose.

c) On request, STW will issue a copy of the plan showing the approximate locations of STW Apparatus although in certain instances a charge will be made. The position of private sewers and water service pipes to properties are not normally shown but their presence must be anticipated. This plan and the information supplied with it is furnished as a general guide only and STW does not guarantee its accuracy. d) STW does not update these plans on a regular basis. Therefore the position and depth of STW Apparatus may change and this plan is issued subject to any such change. Before any works are carried out, you should confirm whether any changes to the plan have been made since it was issued.

17. The following trees and those of similar size, be they deciduous or evergreen, should not be planted within 6 metres of a sewer, water main or other STW Apparatus. E.g. Ash, Beech, Birch, most Conifers, Elm, Horse Chestnut, Lime, Oak, Sycamore, Apple and Pear. Asset Protection Statements Updated May 2014

Manhole Refe	rence Liquid Ty	pe Cover Lev	el Invert Level	Depth to Invert
	C C		0 0	0 0
	C C		0	0
	F		0	0
	F F		0	0
	F		0	0
	F F		0	0
	F		0	0
	F F		0	0
	F		0	0
	F		0	0
0501	F	116 92	0	0
0601	F.	119.56	117.79	1.77
0901 1601	F F	120.23 121.59	118 119.36	2.23
1602	F	121.26	0	0
1603 1704	F	120.88 122.56	118.47 119.8	2.41
1706	F	121.97	119.29	2.68
1707	F F	122.80	0	0
1904	F	119.94	117.92	2.02
2602	F	126.73	124.78	1.95
2801 3002	F		0	0
3003	F		0	0
3004 3005	F F		0	0
3006	F		0	0
3007 3008	F F		0	0
3009	F		0	0
3010 3011	F F		0	0
3012	F		0	0
3013 3014	F		0	0
3015	F		0	0
3016 3017	F		0	0
3018	F		0	0
3020	F		0	0
3021	F		0	0
3023	F		0	0
3024 3026	F	132 25	0	0
3027	F	132.28	0	0
3029 3030	F	132.03 131.43	0	0
3031	F	127.63	0	0
3032 3100	F F	128.05	0	0
3101	F		0	0
3102 3103	F		0	0
3104	F		0	0
3105 3106	F F		0	0
3107	F		0	0
3108 3109	F		0	0
3110	F		0	0
3112	F		0	0
3113 3114	F F		0	0
3200	F		0	0
3201 3210	F F	133.07	129.33 0	3.74 0
3300	F	400.40	0	0
3302	F	133.43	0	0
3401	F	132.67	0	0
4001	F	128.62	126	2.62
4003 4004	F		0	0
4006	F		0	0
4008 4011	F		0	0
4012	F		0	0
4015 4016	F F		0	0
4101	F	132.74	128.79	3.95
4102 4905	F F	131.08 106.89	128.25 105.18	2.83
5601	F	0	108.44	0
5700 5701	F F	106.69	0 105.16	0 1.53
5801	F	104.32	102.57	1.75
5901	F	104.76	103.18	1.58 1.73
6100 6453	F	112	0	0
6456	F	112.15	0	0
6457 6553	F	112.25	111.04 0	1.21 0
6555	F	112.32	110.65	1.67
6556 6601	F F	112.5 110.12	0 108.41	0 1.71
6602	F	111.18	108.44	2.74
6603 6655	F F	110.88	109 0	1.88 0
6656	F		0	0
6702	F	108.85	0 107.05	0 1.8
6705 6802	F	108.56	106.61	1.95
6804	г F	108.77	106.65	2.37
6806 6807	F	109.25 108.28	106.96 106 14	2.29 2.14
7001	F	139.64	136.58	3.06
7002 7003	F	140.9 136.45	138.24 134.66	2.66 1.79
7005	F	138.74	136.59	2.15
7101 7102	F	140.4 138.72	139.04 137.3	1.36 1.42
7201	F		0	0
7405 7406	F	112.81 112.5	111.66 111.33	1.15 1.17
7407	F	113.06	111.6	1.46
7408 7409	F	113.37 113.35	111.84 111.93	1.53 1.42
7410	F	113.85	112.22	1.63
7501 7502	F	113.2 0	0	0
7601	F	111.21	109.44	1.77
7602 7604	F F	109.97 111.17	108.03 0	1.94 0
7606	F	112.41	110.45	1.96
7803	F	110.52 109.52	108.67	1.85 2.49
7804	F	111.59	109.07	2.52
8453	F	114.2	112.71	1.49
8502 8503	F	114.21	111.57 112 0	2.64
8504	F	113.47	112.26	1.21
8505	F	113.06	111.7 111.09	1.36 1.76
8506		112.00	111.00	

Manhole Refer	rence Liquid Type	Cover Level	Invert Level	Depth to Invert	Manhol
8603	F	112.26	110.44	1.82	
8605 8701	F F	111.76 112.11	109.9 109.87	1.86 2.24	
8703 8705	F	112.31 114 5	110.21	2.1	
8706	F		0	0	
8707 8802	F	112 62	0	0	
3803	F	113.19	111.72	1.47	
3901 3904	F	111.37	109.1	2.27	
9401	F	116.37	114.72	1.65	
9402	F	116.43	113.69	2.74	
9603	F	115.87	112.97	2.9	
9606 9802	F	117.24	115.62 0	1.62	
9803	F	116.43	115.09	1.34	
9902	F	116.16	115.21	0.95	
9903 9904	F	116.64	0	0	
9908 0751	F	110.03	0	0	
0752	S	119.05	118.7	1.05	
0753	S	121.11	119.53	1.58	
0852	S	118.9	117.99	0.91	
0854	S	120.61	119.18	1.43	
0856	S	121.12	118.95	2.11	
0857	S	119	117.26	1.74	
1751	S	121.32	120.22	1.1	
1752	S	123.1	121.65	1.45	
1851	S	120.65	119.06	1.59	
1952 1953	S	119.31	117.46 118.9	1.85	
2400	S	0	0	0	
2401	S	0	0	0	
2552	S	0	0	0	
2651	S	126 71	0	0	
2952	S	124.32	122.62	1.7	
3025 3028	S	132.29	0	0	
3115	S	132.13	0	0	
3403	S	0	0	0	
3551	s S	U	0	0	
3552	S	0	0	0	
4005 4007	S S		0	0	
4013	S		0	0	
4014 4902	S S	107.7	0 106.13	0 1.57	
4903	S	107.71	105.13	2.59	
5754	S S	107.73 107.5	0 106.21	0 1.29	
5852	S	104.31	103.02	1.29	
5952	S S	105.11 103.34	103.93 101.64	1.18 1.7	
5953	S	445 -	0	0	
6351 6451	S S	112.91 111.73	111.71 110.63	1.2	
6452	S	111.6	110.52	1.08	
6454 6455	S S	111.9	111.71 110.88	0.19	
6551	S	110.78	109.38	1.4	
6654 6654	S	112.32	111.1	2.03	
6751	S	109.1	108.26	0.84	
6753 6756	S	108.85	0	0.77	
6757	S	108.04	106.88	1.16	
6851 6853	S S	108.98	107.8 107.39	1.18	
6855	S	108.35	0	0	
6951 7351	S S	108.33	106.7 112.77	1.63 2.76	
7401	S	112.5	111.08	1.42	
7402 7403	S S	113.15	111.99	1.16	
7404	S	113.65	112.47	1.18	
7411 7652	S	112.65	111.14	1.51	
7653	S	111.17	109.77	1.4	
7655 7656	S S	112.42	110.94	1.48	
7659	S	109.98	108.87	1.11	
7851 7852	S S	109.43	107.12	2.31	
7855	S	111.6	109.11	2.49	
7951 8351	S S	107.56 115.1	106.01 113.76	1.55 1.34	
8451	S	114.89	113.09	1.8	
8551	S S	116.09 114.18	114.36 112.42	1.73 1.76	
8557	S	112.83	111.41	1.42	
8651 8654	S S	111.88	110.48 0	1.4 0	
8752	S	112.17	110.85	1.32	
8754 8851	S S	112.73 112.58	111.2 111.26	1.53 1.32	
8854	S	113.14	111.86	1.28	
8952 8953	S S	111.33 111.92	109.59 110.11	1.74 1.81	
9652	S	114.21	112.74	1.47	
9654 9655	S S	115.84 116.79	113.28 115.08	2.56 1.71	
9751	S	116.38	114.6	1.78	
9851 9951	S S	116.07 116.61	114.34 113.67	1.73 2.94	
9955	S	115	113.54	1.46	

	Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Inve
		·,			
_					
_					
-					
-					
-					
-					
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Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

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