MAES MAWR SOLAR PARK

Flood Consequence Assessment

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Contents

Appendices

Appendix A – Correspondence with Natural Resources Wales
Appendix B – Correspondence with Rhondda Cynon Taff County Borough Council
Appendix C – Topographic Survey
Appendix D – Site Layout

1 INTRODUCTION

RPS Consulting Services Ltd (RPS) have been commissioned by Elgin Energy EsCO Ltd to prepare a Flood Consequence Assessment (FCA) to support the proposed Solar Farm development located at Maes Mawr Farm, Maesmawr Road, Tonteg, Pontypridd, CF38 1SL.

The site covers an area of approximately 40.06 hectares and currently comprises greenfield land, used for agricultural purposes.

The aim of the FCA is to outline the potential for the site to be impacted by flooding, the impacts of the proposed development on flooding in the vicinity of the site, and the proposed measures which could be incorporated into the development to mitigate the identified risk.

This report has been prepared in consultation with Natural Resources Wales (NRW) and Rhondda Cynon Taff County Borough Council (RCTCBC).

The report has been produced in accordance with the guidance detailed in Planning Policy Wales and Technical Advice Note 15 (TAN15): Development and Flood Risk. Reference has also been made to the Rhondda Cynon Taf Local Development Plan, RCTCBC Strategic Flood Consequence Assessment and RCTCBC Local Flood Risk Management Strategy.

The desk study was undertaken by reference to information provided / published by the following bodies:

- Natural Resources Wales;
- British Geological Survey (BGS);
- Ordnance Survey (OS); and
- Rhondda Cynon Taff County Borough Council.

2 PLANNING POLICY

2.1 National Planning Policy

2.1.1 Planning Policy Wales

Planning Policy Wales sets out the land use planning policies of the Welsh Government. Chapter 13 'Minimising and Managing Environmental Risk and Pollution' outlines the Welsh Government's objectives in terms of addressing flood risk.

Section 13.4 of Planning Policy Wales states:

"Development proposals in areas designed as being of high flood hazard should only be considered where:

New development can be justified in that location, even though it is likely to be at risk from flooding; and

The development proposal would not result in the intensification of existing development which may itself be at risk; and

New development would not increase the potential adverse impacts of a flood event."

Planning Policy Wales is supplemented by a series of Technical Advice Notes (TAN). TAN15 provides technical guidance on development and flood risk.

2.1.2 Technical Advice Note (TAN) 15: Development and Flood Risk

TAN 15 provides technical guidance to supplement the policy set out within Planning Policy Wales in relation to development and flooding. The guidance relates to sustainability principles and provides a framework to allow risks arising from river flooding, coastal flooding and additional run off from developments to be assessed.

In relation to flood risk, TAN 15 indicates that the Assembly has a duty to ensure that development is sustainable and does not create problems for future generations. Managing flooding has an important role to ensure sustainable development by: guiding developments to locations with little or no risk from river, tidal or coastal flooding, managing consequences of flooding where developments can be justified and making provision for climate change.

TAN 15 confirms that each planning authority in Wales must prepare a Development Plan for its area. The development plans provide locational guidance for development, detailed site-specific policies, and identification of proposals for development. Catchment Flood Management Plans aim to take a holistic approach to flood management at a catchment scale and can provide guidance on managing risk to future developments. The information provided in local development plans and catchment flood management plans will aid with the application of the Justification Test.

2.1.3 Requirements of TAN 15

A Flood Consequence Assessment, to support a development application, should be proportionate to the risk and appropriate to the scale, nature and location of the development. The following will need to be considered;

The consequences of flooding on the development, the consequences of the development on flood risk elsewhere and if appropriate mitigation measures can be incorporated into the design.

Mechanisms of flooding, including sources of floodwater, how floodwater enters and flows across a site, height, and speed of floodwaters.

Uncertainties in estimating flood events including use of historical records and forecasting.

Security of proposed developments over their lifetime and ensuring those using the development have an awareness of the potential risks from flooding.

Description of consequences under a range of extreme events including: mechanisms, sources, depths, speed, rate of rise, overland flood routes, velocity, access and egress, impacts on natural heritage, impact on flood risk in surrounding areas.

Structural adequacy of defences to contain flows and withstand overtopping and if required the suitability of implementing a buffer zone adjacent to defences.

Measures required to ensure flooding is managed to acceptable levels and ensure that the impact upon flood risk elsewhere in the flood plain is managed.

2.2 Local Planning Policy

2.2.1 Local Development Plan

The Rhondda Cynon Taf Local Development Plan (LDP) was adopted by the council on 2nd March 2011. This LDP provides the framework for decisions to be made up until 2021 on how land is used and developed. An updated LDP is currently in development. The Rhondda Cynon Taf LDP does not contain any specific policies regarding flood risk.

2.2.2 Strategic Flood Consequence Assessment

A Strategic Flood Consequence Assessment (SFCA) dated October 2008 was prepared for RCTCBC by Scott Wilson. The SFCA provides an evidence base to inform the revision of policies and realistic approaches to managing the risk of flooding, which can be taken forward into the LDP.

The SFCA assesses flood risk to 9 strategic sites, one of these sites is Treforest Industrial Estate. Treforest Industrial Estate is located to the northeast of the main area of the site, however the northern spur of the site boundary is located within the estate. A summary of the assessment of flood risk to the industrial estate is provided below:

- The estate suffered severe flooding during the December 1960 flood event. Subsequently, Hawthorn major river improvement scheme, including the building of earth flood defences, was carried out in the late 1960s to mid 1970s to provide flood protection up to the 1 in 100 year return period.
- During the 1979 flood event minor flooding did occur when the defences were overtopped. No flooding has been recorded at the estate after 1979.
- No groundwater flooding issues have been identified.
- No incidents of surface water flooding at the industrial estate have been recorded. However given that the River Taff can rise to a level above that of the ground behind the defence there will be times when the existing surface water system cannot discharge due to insufficient head.
- No artificial sources of flooding have been identified.

The information provided within the SFCA will be considered within this report.

2.2.3 Local Flood Risk Management Strategy

A Local Flood Risk Management Strategy (LFRMS) was produced in January 2013 by RCTCBC as LLFA. The LFRMS aims to understand the risks of various flooding sources that Rhondda Cynon Taf may face, take proactive steps to mitigate these risks, raise awareness across communities and prepare for any such event. Local flood risk is any flood risk that derives from surface runoff, groundwater, or ordinary watercourses. Relevant information has been referenced throughout this report.

3 CONSULTATION

3.1 Natural Resources Wales

Natural Resources Wales (NRW) was contacted on 7th March 2022 regarding the site, the responses dated 7th and 10th March 2022 are provided in Appendix A for reference. Links were provided to the online flood maps and historic mapping. NRW advise that they are unable to provide modelled flood data from the Lower Taff v3 model, as the modelling report is currently unavailable for distribution outside of NRW. The information provided will be considered within this report.

3.2 Rhondda Cynon Taff County Borough Council

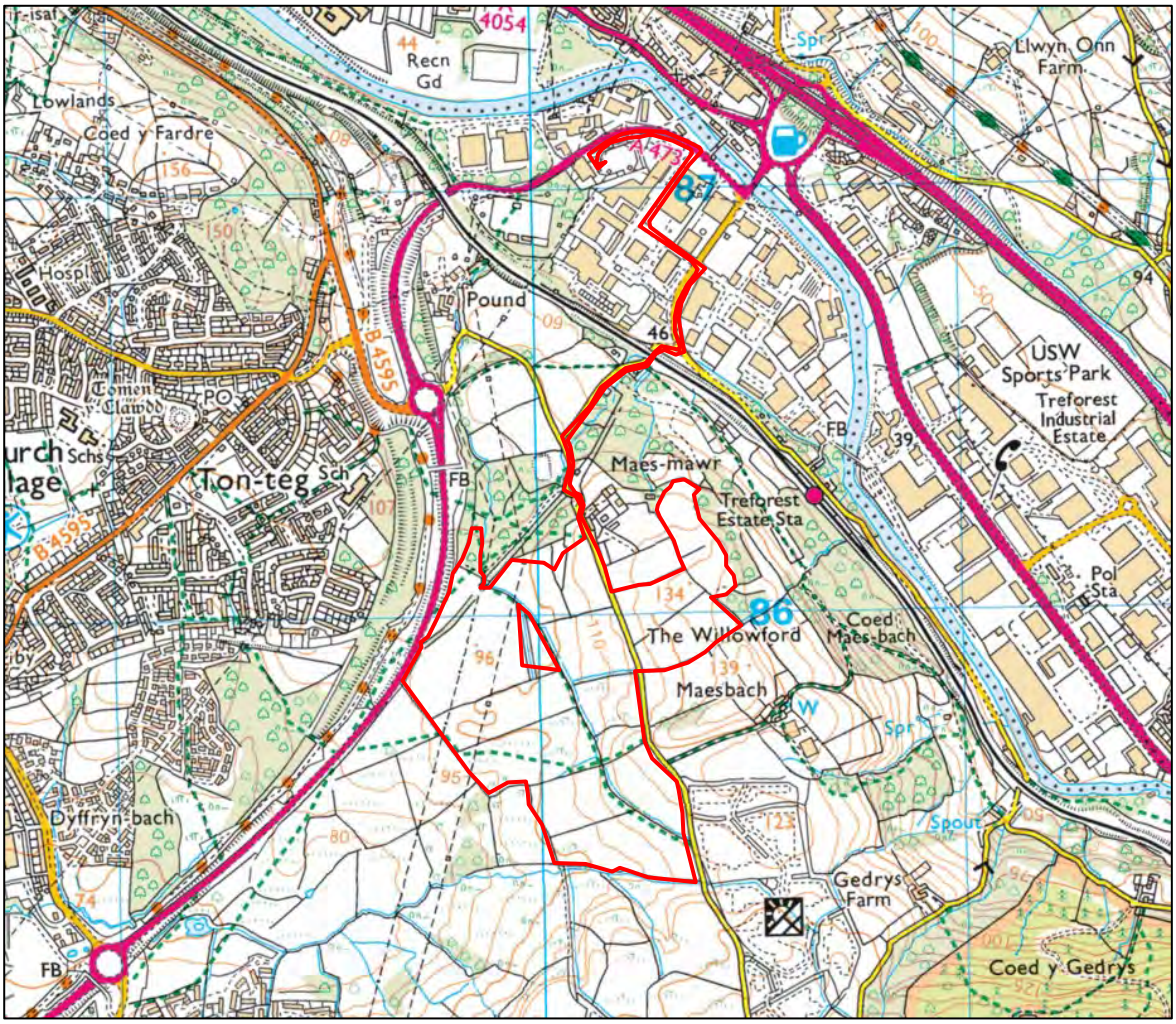
RCTCBC were contacted on 7th March 2022 regarding the site, a response is still awaited, which will be provided in Appendix B once received.

4 SITE DESCRIPTION

4.1 Site Description

The site is located at Maes Mawr Farm, Maesmawr Road, Tonteg, Pontypridd, CF38 1SL. The site covers an area of approximately 40.06 hectares and is illustrated in Figure 4.1 below.

The site comprises greenfield land, used for agricultural purposes. Maesmawr Road runs through part of the site.



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Approximate site boundary indicated red, for location purposes only.

Figure 4.1: Site Location Plan

4.2 Surrounding Land Uses

Forested areas are located beyond the northern and eastern site boundaries, whilst the A473 is located to the west of the site. Agricultural land is situated to the south of the site, including an existing solar farm development.

The northern spur of the site follows Maesmawr Road and heads into Treforest Industrial Estate, located to the northeast of the site.

4.3 Topography

The topography of the site generally falls towards the west, from a level of approximately 132.0m Above Ordnance Datum (AOD) to a level of approximately 80.5m AOD. Some areas in the north of the site fall towards the north.

The topography in the eastern areas of the site is relatively steep, whilst the terrain in the west of the site is flatter. The topographic survey is provided in Appendix C for reference.

5 PROPOSED DEVELOPMENT

Elgin Energy EsCO Ltd proposes to develop a solar photovoltaic electricity generating station (or 'solar farm') with an installed generation capacity of 30MW and associated ancillary development, including a substation. The point of connection is proposed to be located at existing WPD substation to the northeast within the Treforest Industrial Estate, which would be connected to the site by a cable route of less than 2km. The Site Layout is provided in Appendix D for reference.

The main components of a solar farm are:

1. Solar panels and frames;
2. Inverters;
3. Transformers;
4. Cabling; and
5. Substation.

During construction and decommissioning temporary site compounds will be required to host staff facilities, take deliveries of components and store plant and equipment securely while not in use.

The solar panels 'over sail' between 25% and 40% of the land which they occupy, typically, and are arranged in series of rows up to a maximum height of 3.2 m at the highest point and tilted southwards at an angle of 10-25 degrees.

No significant ground works are required for the development – the support frame uprights are pile driven into the ground; 'string' inverters are usually mounted onto the support frames while some excavation is required for the transformers' foundations.

The majority of the cabling associated with the development will be laid underground via surface dug trenches of approximately 1 m deep and 50 cm wide and backfilled. These will utilise existing access tracks and road options wherever possible, particularly where sensitive habitats or archaeology is potentially present, such as through the adjacent Site of Importance for Nature Conservation (SINC).

Several existing access points will be used for access for the construction, maintenance and decommissioning of the solar park. If necessary, some minor modifications to enable access to the site by all vehicles anticipated to visit it will be undertaken. Existing farm tracks will be used for internal access within the site wherever possible. New access tracks, where required, will be formed, normally, using a layer of permeable crushed stone. Construction is anticipated to take approximately 6-8 months while decommissioning will take up to 6 months.

A solar farm is a temporary and fully reversible use, unlike housing for example, with all equipment removed from site at the end of the installation's operational life (approximately 40 years). The methods used in construction (limited concrete) mean that remediation works following the removal of the panels and associated infrastructure are relatively minor and will return the site to its previous greenfield character.

The solar farm will be designed to accommodate sheep grazing beneath and between the rows of panels, providing an efficient dual use of land for renewable energy generation and agriculture. The solar farm will be enclosed by 2 m tall post and wire 'deer' fencing with 3 m tall security cameras in selected locations.

6 HYDROLOGICAL SETTING

6.1 Nearby Watercourses

A small watercourse is located within the site boundary, flowing in a north-westerly direction through the site before existing the site along the northern boundary. Another small watercourse converges with this watercourse is the centre of the site.

The River Taff, a designated main river, runs through Treforest Industrial Estate and is located adjacent to the northern spur of the development site. Another main river, called Nant Dowlais, is located approximately 360m to the west of the site.

No reservoirs or canals have been identified within 1km of the site.

6.2 Published Flood Zone

The Welsh Assembly Government produces Development Advice Maps (DAM) to accompany TAN 15. These maps show the degree of flood risk which is to be applied to the site for the planning process and thus establish the suitability of the site for development. These maps are based upon the Natural Resource Wales flood maps and similarly they can be modified through the presentation of data (i.e. hydraulic modelling) to illustrate that a site is within a different flood zone.

The Development Advice Map, shown in Figure 6.1, indicates that most of the site is located within Zone A. The northern spur of the site is located in Zones B and C1.

Three development advice zones (A, B, C) are described on the Development Advice Map, which are attributed different planning actions. Zones A and B areas are areas of generally low risk (i.e. outside the main river flood plain). Zones C represents the extreme flood outline (equal to or greater than 0.1% flood risk), and is further subdivided into two zones, C1 and C2.

- Zone C1: described as "areas of the floodplain which are developed and served by significant infrastructure, including flood defences".
- Zone C2: described as "areas of the floodplain without significant flood defence infrastructure".

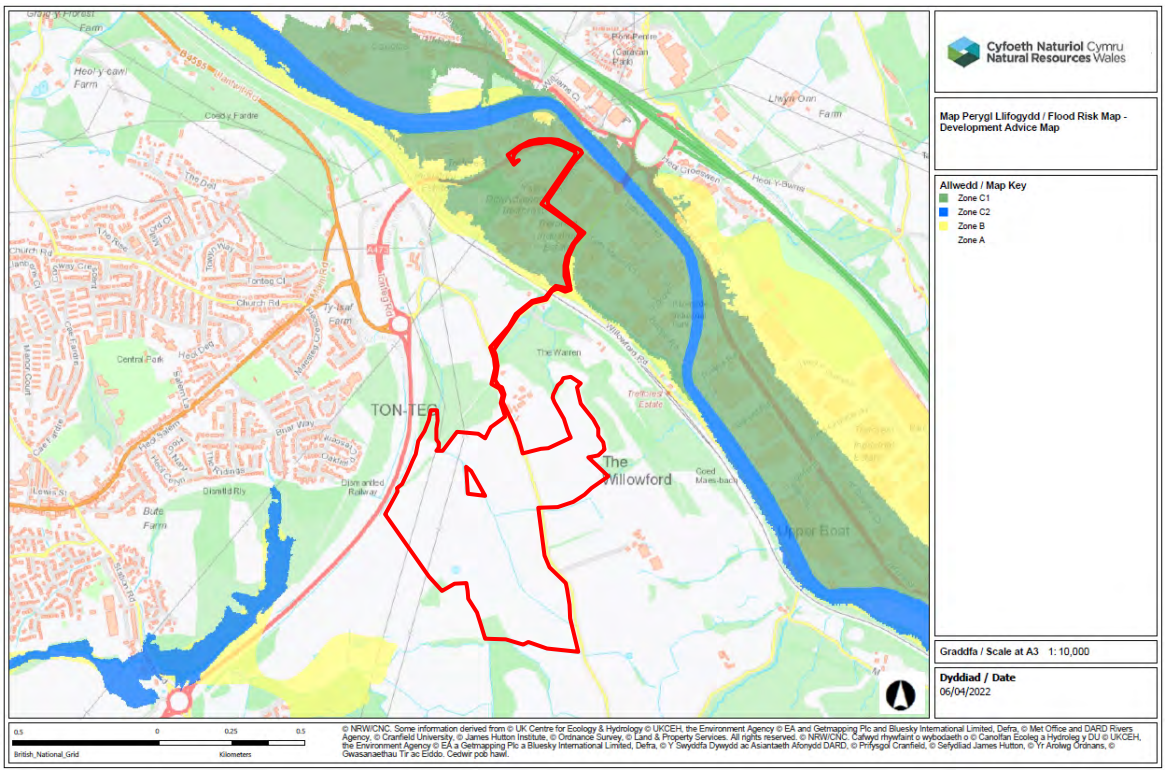


Figure 6.1: Natural Resources Wales Development Advice Map

6.3 Fluvial Flood Risk Classification

The current NRW Flood Risk from River's map, in Figure 6.2, shows that most of the site is at very low risk of flooding. The northern spur of the site in Treforest Industrial Estate is at low to medium risk of fluvial flooding.

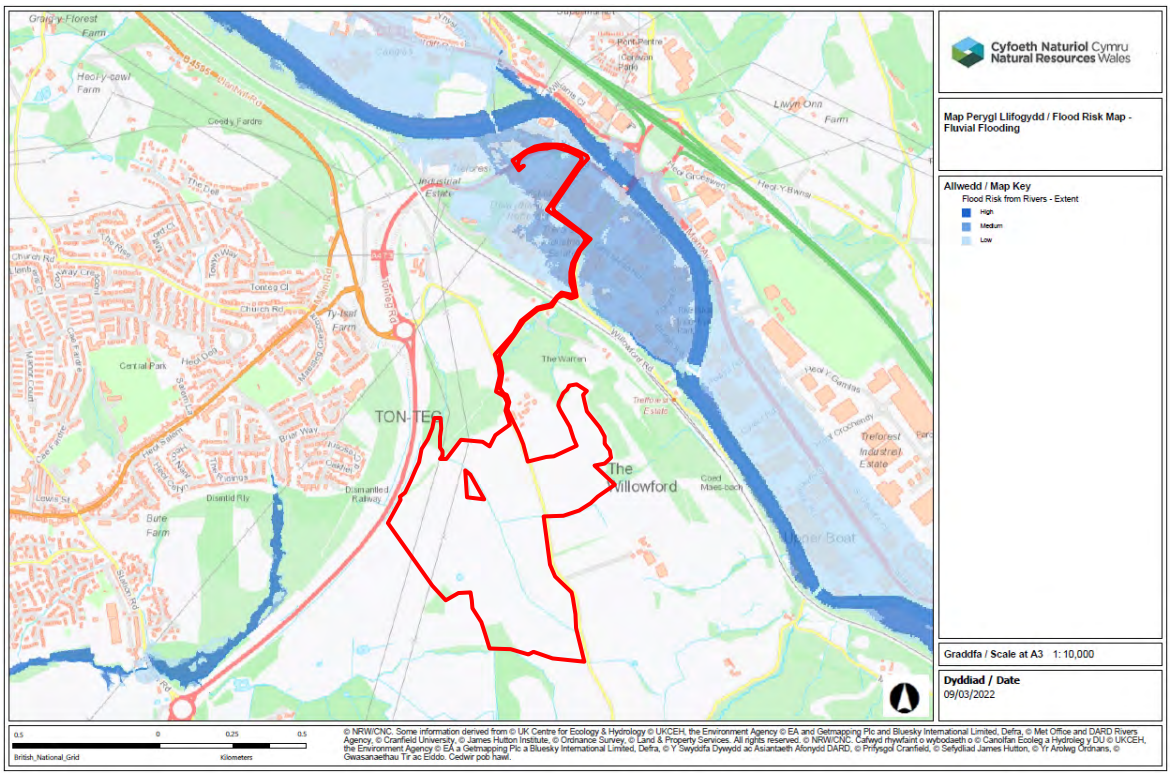


Figure 6.2: Natural Resources Wales Flood Risk from Rivers Map

6.4 Surface Water Flood Risk Classification

The NRW Flood Risk from Surface Water Map is provided in Figure 6.3. The surface water flood map indicates that most of the site is at very low risk of flooding. Some areas of the site are at low to high risk of surface water flooding, primarily located in the western corner of the site.

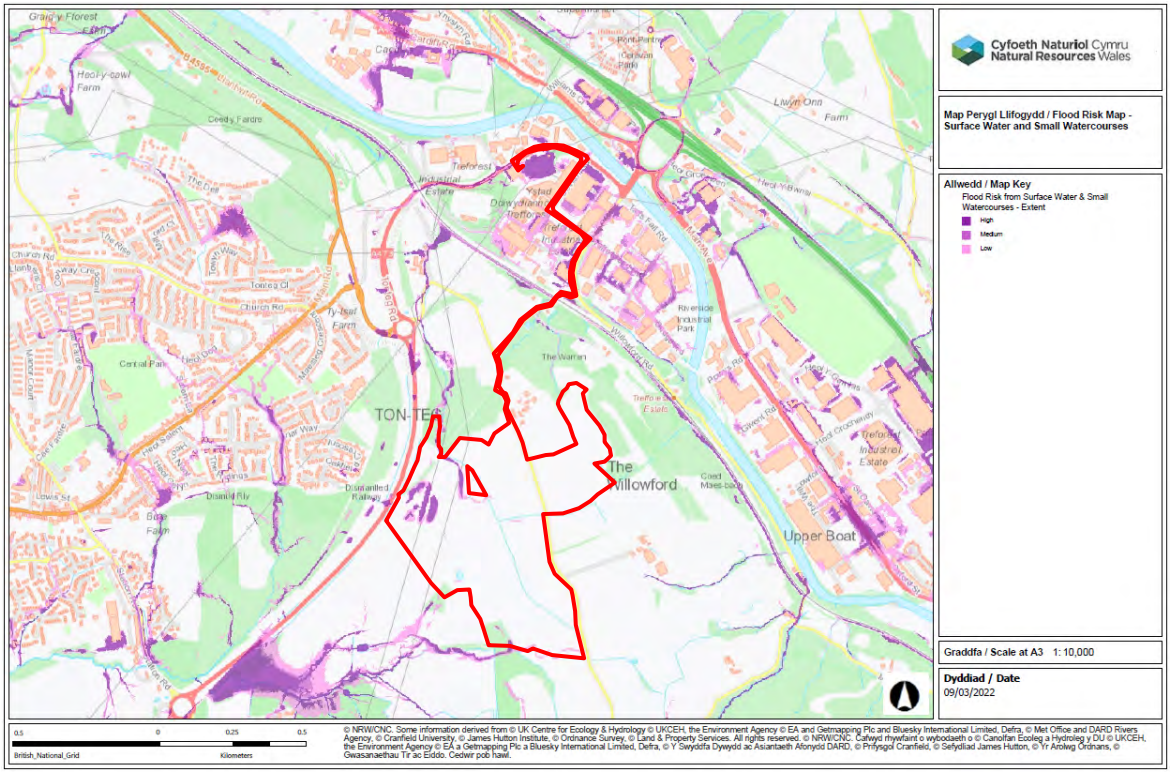


Figure 6.3: Natural Resources Wales Flood Risk from Surface Water & Small Watercourses Map

6.5 Reservoir Flood Risk Classification

The NRW Flood Risk from Reservoirs Map, provided in Figure 6.4 below, illustrates that the main area of the site is located outside of the maximum extent of reservoir flooding. The northern spur of the site in Treforest Industrial Estate is located within an area that is at risk from reservoir flooding.

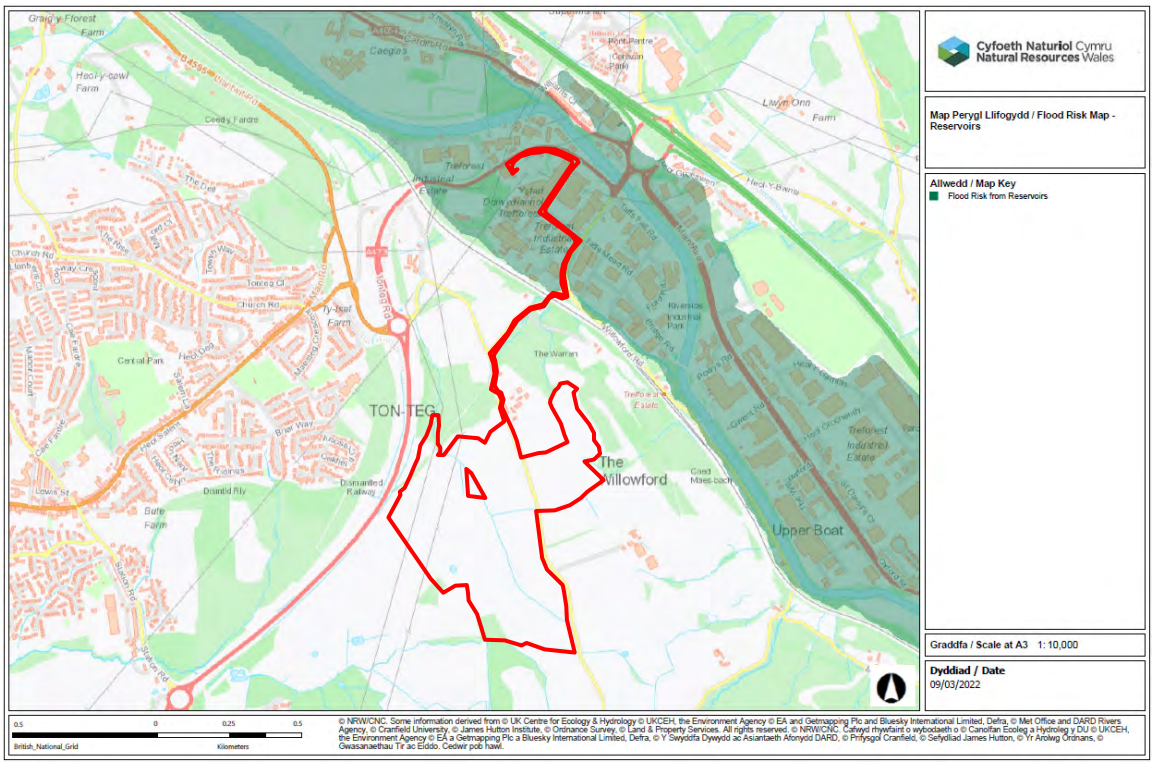


Figure 6.4: Natural Resources Wales Flood Risk from Reservoirs Map

7 HYDROGEOLOGICAL SETTING

British Geological Survey (BGS) online mapping (1:50,000 scale) indicates that most of the site is situated on Till and Glaciofluvial Deposits, the northern spur of the site in Treforest industrial Estate is situated on Alluvium. This is underlain by Grovesend Formation (mudstone, siltstone and sandstone) and Hughes Member (Sandstone).

Borehole records from within the site indicate that the groundwater table is approximately 1.3m below ground level.

The soils in the southern and western areas of the site are described as *'slowly permeable seasonally wet acid loamy and clayey soils'* by the National Soils Research Institute. Soils in the northern and eastern areas comprise *'freely draining acid loamy soils over rock'* and *'freely draining floodplain soils.'*

According to the BGS GeoIndex Aquifer Designation Mapping, the Till and Glaciofluvial Deposits at the surface are classified as Secondary A Aquifer and Secondary Undifferentiated Aquifer. The aquifer descriptions are provided below:

- Secondary A Aquifer: These formations are formed of permeable layers capable of supporting water supplies at a local scale, in some cases forming an important source of base flow to rivers.
- Secondary Undifferentiated Aquifer: These formations have varying characteristics in different locations.

8 FLOOD RISK AND MITIGATION

The key sources of flooding that could potentially impact the site are discussed below.

8.1 Fluvial / Tidal Flooding

The Development Advice Map, shown in Figure 6.1, indicates that most of the site is located within Zone A. The northern spur of the site is located in Zones B and C1.

Although some of the site is located in Zones B and C1, this part of the site will not include any above ground development. All above ground development will be located within Zone A, which is described in TAN15 as those areas “considered to be at little or no risk of fluvial or coastal/tidal flooding”.

The current NRW Flood Risk from River’s map, in Figure 6.2, shows that most of the site is at very low risk of flooding. The northern spur of the site in Treforest Industrial Estate is at low to medium risk of fluvial flooding. As illustrated by the Planning Layout (Appendix D) all proposed above ground development will be located in areas at very low risk of flooding.

Flood defences are located within the vicinity of the site, located along the banks of the River Taff to the northeast. The SFCA indicates that these defences were constructed in the late 1960s to mid 1970s and provide flood protection up to the 1 in 100 year return period. NRW mapping indicates that the site is not located in an area that benefits from these flood defences.

Safe access and egress from the site can be achieved via Maesmawr Road, which runs through the site.

The site is located inland and therefore not considered to be at risk from tidal flooding.

Based on the information assessed, the proposed development is not considered to be at risk from fluvial or tidal flooding. Although the northern spur of the site boundary is located in an area of fluvial flooding risk, no above ground development will take place here. Consequently, no mitigation measures are proposed.

8.2 Flooding from Sewers

Due to the nature of the proposed development, being a solar farm, it is not anticipated that any sewers or formal drainage features will be constructed within the site. Therefore, the site is not considered to be at risk from sewer flooding.

8.3 Surface Water Flooding (Overland Flow)

This can occur during intense rainfall events, when water cannot soak into the ground or enter drainage systems.

The NRW Flood Risk from Surface Water Map is provided in Figure 6.3. The surface water flood map indicates that most of the site is at very low risk of flooding. Some areas of the site are at low to high risk of surface water flooding, primarily located in the western corner of the site.

There are some areas of predominantly low risk located along the southern boundary of the site, this is due to a surface water flow route associated with an ordinary watercourse that runs along the southern site boundary. Another surface water flow route is located in the northwest corner of the site, which flows in a northernly direction off site, following the route of an ordinary watercourse.

Some low to high risk of surface water flooding is located in the western corner of the site, this is due to surface water ponding within the low point in the topography.

Most areas of the site where surface water flooding has been identified will remain undeveloped, with the exception of the surface water ponding located in the western corner of the site. The proposed solar panels will be elevated above ground level and therefore not impacted by any surface water flooding. The proposed development will not interfere with the existing surface water runoff and flows paths currently present within the undeveloped site, these will remain as existing.

Based on the surface water flood maps and the nature of the proposed development, the site is considered to be at low risk of flooding from surface water.

8.4 Groundwater Flooding

Groundwater flooding can occur in low-lying areas when groundwater levels rise above surface levels, or within underground structures.

The SFCA states that no groundwater flooding issues have been identified within the area. Historic borehole records indicate that the groundwater table is approximately 1.3m below ground level.

Based on the information currently available, the risk of groundwater flooding is considered to be low.

8.5 Reservoir Flooding

The NRW Flood Risk from Reservoirs Map, provided in Figure 6.4 below, illustrates that the main area of the site is located outside of the maximum extent of reservoir flooding. The northern spur of the site in Treforest Industrial Estate is located within an area that is at risk from reservoir flooding.

There are no major reservoirs located within the vicinity of the site.

Although the northern spur of the site boundary is located within the reservoir flood extent, no development is proposed here, all development will be located outside of the maximum extent of reservoir flooding. The risk of reservoir flooding is therefore low.

8.6 Proposed Mitigation

Based on the flood risks identified and the nature of the proposed development, no mitigation measures are required to alleviate the risk of flooding.

9 DEVELOPMENT IMPACTS

9.1 Introduction

Defra Construction Code of Practice for the Sustainable Use of Soils on Construction Sites identifies that development and construction has the potential to detrimentally change a soil's physical, chemical and biological properties including drainage characteristics.

Modelling work (Cook and McCuen 2013) shows that solar panels themselves do not have a significant effect on runoff volumes, peak flows or times to peak. However, where design decisions or lack of maintenance lead to bare ground then the peak discharge may increase requiring storm water management.

9.2 Effects of solar panel arrays on runoff

Compared to agricultural (arable & livestock) use, a solar farm is likely to be inherently better for surface water drainage than a continuation of the existing use. If a solar farm proposal avoids the creation of new hardstanding, includes mitigation for ancillary buildings, and will not alter existing landforms (e.g. levelling or bunds), a solar farm will not change existing characteristics and should be a positive improvement even with no additional SuDS measures.

The primary reason for this is the significant advantage from full year-round organically managed vegetated ground cover on a solar farm compared with intensive arable or livestock grazing uses. Research undertaken by Cook and McCuen (2013) found that providing full vegetation cover beneath the solar panels is maintained, the change in runoff characteristics from solar farm sites is likely to be insignificant and that ground cover has a much more important control over runoff.

A solar farm already includes designed-in surface water flood risk mitigation. This is something solar PV planning applications do not always effectively communicate. It can be helpful to clarifying some of the ways that surface water flood risk is addressed without adding-in new features.

As stated in Paragraph 8.5 of TAN 15, *developers will need to give good reason why SuDS could not be implemented. If a conventional drainage system does not improve the status quo or has a negative impact then this can be a valid reason for refusal.*

The requirement for SuDS is a "should", not a "must". It is our view that the lack of risk at the proposed development site, coupled with the temporary nature of the development, and a requirement for full reinstatement of the land, makes a case that SuDS beyond the minimum would be inappropriate.

The solar farm is a temporary development and would not be considered "major" development if only its actual ground area impact were considered. Because the land will be returned to full agricultural once the solar farm is no longer in use, SuDS that would require new intrusive or otherwise unnatural elements (e.g. pipework or tanks) or land shaping (e.g. swales) should only be required as a last resort to enable easy restoration to existing agricultural use with minimal ground disturbance or disruption to new and improved ecological features.

If pipework or tanks are installed these would have to be ripped out of the ground to allow arable farming to resume. Likewise, while swales can be non-problematic on pastureland, they are less conducive to the resumption of arable farming and could compromise the quality of the land and soil (non-uniform wetness vs dryness).

One of the multifunctional environmental benefits of a solar farm is soil quality improvement from cessation of intensive arable use and organic management of the land. It is expected that soil health will be improved through increase in soil organic matter, increase in the diversity of soil flora, fauna and microbes, and improved soil structure. All of the elements of a solar farm can be removed very easily with minimal topsoil disturbance which should leave the improved and enriched soil as a benefit for the return to arable use. Significant works to remove filter drains or level out swales that are not complimentary to a return to arable farming would undermine this benefit.

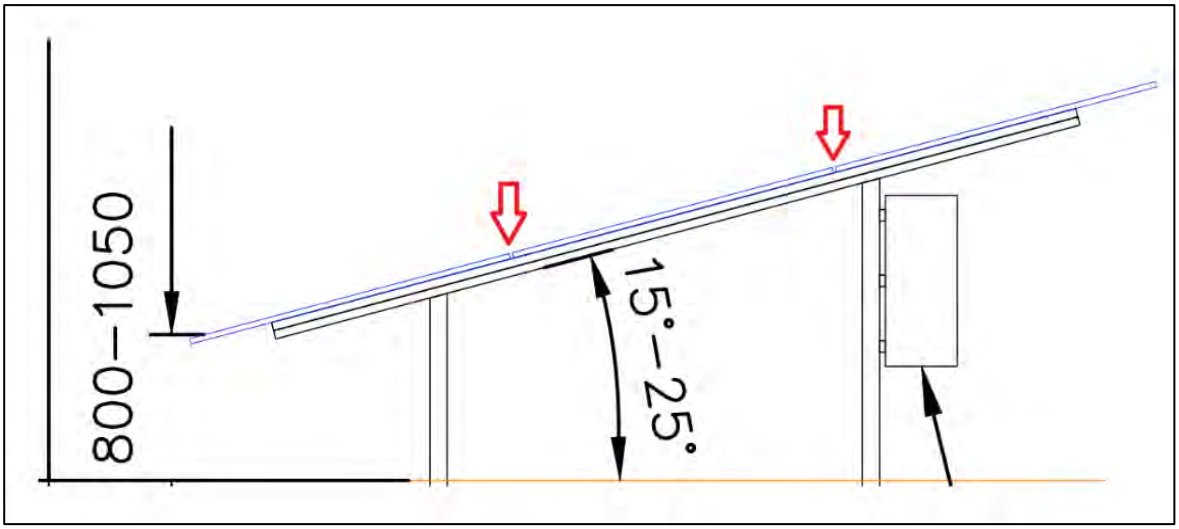
This could also lead to more problems elsewhere. Although a solar farm is a temporary development that does not change the greenfield land classification, its approximate 40-year lifetime is not short. Temporary land drainage measures that might unnaturally change the existing baseline could

subsequently be relied off-site as part of the wider ecosystem services network. When the solar farm is decommissioned and these are removed, there is a risk of adverse “downstream” impacts for those who have relied on the SuDS. Therefore, although SuDS are intended to contribute to flood risk resilience, the nature of a solar farm and its whole-life context needs to be carefully considered so that the sustainable development can be implemented in a sustainable manner and with an eye on the future restoration to existing conditions and the resumption of arable use.

9.2.1 Panel Runoff

The nature of the Proposed Development means that precipitation would be intercepted by between 25% to 40% of the surface of the Site that is typically over-sailed by solar panels. A known concern is the risk of water “sheeting” off a solar array façade, running off at speed onto the same ground, pooling, and over time creating erosion and runoff channels alter existing surface water flows. This issue can arise due to simplified drawings typically submitted with planning applications. These show what looks to be a solid façade when, in actuality, a typical solar array has gaps between each panel on an array which allows surface water to fall off in many locations on to fully vegetated ground beneath.

The first image below is an extract from an elevation plan for a typical (fixed) array and highlights the gaps between the panels making up the solar array. The approx. 10-25 degree pitch (typically 20 degrees) means water is less likely to run down with velocity that helps it to “jump” the gaps. Rather, water runs off at a reduced speed due to the pitch, and drips down through the gaps. There is no actual risk of water sheeting down in one area at the lower edge of the arrays. The image that follows is from the underside of an array providing a helpful visual aid to show what the gaps are like.



The above images are provided for context and comparison only.

As a result of the construction of the solar panels, some rainfall will be intercepted by the surface of the arrays before reaching ground level. Intercepted rainfall will either run down the face of the panels and drip onto the ground below or will be lost due to evaporation from the face of the panels. Without mitigation, there is a risk of erosion of the ground on which rainwater drips. This could then result in the formation of rivulets which could increase the speed at which runoff discharges from the site. However, the potential for erosion to occur as a result of the 'drip effect' is appropriately mitigated by features of the solar arrays themselves, as per the images above. In addition, several mitigation techniques have been suggested as described in the following sections.

9.2.2 Vegetated Ground

In addition to the above, appropriate seeded vegetation will be provided below and between rows of the solar panels to act as a level spreader/energy dissipater to promote low erosivity sheet flow during operation of the solar farm. The vegetation will be managed organically and will either be mowed or used for light grazing. The grassland will not only grow between array gaps, but it includes all ground under the arrays as well. This means that excluding the access tracks and ancillary buildings most of the Site will be fully vegetated species rich pastoral grassland. The exception is areas targeted for different cover like the areas proposed for wildflower meadow planting, screen planting and new calcareous grassland.

This full year-round coverage will be a positive improvement compared to existing arable and intensive grazing use. Without any additional development being required the gaps between the arrays are natural filter strips (SuDS).

The following photos are from UK solar farms where grazing is used for grounds management. Although land may also be managed through quarterly mowing, especially in the early years while the newly operational solar farm is "bedding in", you can see that the ground coverage is good even under arrays. Some of these images includes arrays at a steeper pitch and there is nothing to

suggest that water pools and creates surface water erosion channels. The solar farm with year-round ground coverage is an improvement with respect to surface water infiltration compared to the existing agricultural use where the ground is regularly bare or with only patchy vegetation.

The key takeaway is that the majority of the Site has mitigation and SuDS inherently designed-in. The arrays are designed to avoid sheeting/pooling/erosion. Water drips off at multiple points onto vegetated ground below, and there is significant space between rows (at the Site it is minimum 4m wide) to act as natural filter strips with vegetated ground that slows the movement of surface water.

9.2.3 Potential New Impermeable Surfaces

9.2.3.1 Solar Arrays

The majority of the Maes Mawr Solar Farm developed area will be occupied by solar arrays. Although arrays have a large land take, the actual ground impact is negligible. The only intrusion will be from the pile-driven posts. There will be one post for about 6-7 panels, so likely to be 6-7m between each post. Posts are made of galvanized steel and are not solid poles. Traditional fixed solar arrays have surface area ground impact in the range of 0.0012m^2 - 0.0014m^2.

The number of the modules in this solar farm would be approximately 30,840, with panel width of 1.3m. Assuming that there will be posts ever 6m the total number of posts would be 5,140.

Based on this, if the 0.0014 m^2 per post is assumed, the total solar farm ground impact would be 7.196m^2 on a 40.06 ha (400,600m^2) Site. This means that what covers the majority of the land as "development" will have a ground impact on 0.0018% of the Site.

9.2.3.2 Access Tracks

It is proposed that the internal access tracks will be fully permeable with no tarmac or other hardstanding type surface. As such they will have no impact with respect to surface water drainage. Geotextile membrane layers will help to secure the aggregate to prevent it sinking into the soil and this will help prevent ground compaction.

After the construction of the solar farm the heaviest vehicles likely to use the tracks are occasional van or 4x4 type vehicles. There will be less intensive traffic around the site compared to existing farm use. This means there is low risk of over-use causing compaction that could compromise permeability. Despite this, it will be reasonable to include monitoring and maintenance of the internal accesses over the lifetime of the solar farm.

In construction there will be no HGVs using the internal access tracks around the Site except from the highway into the Site. All HGVs making deliveries to the site for construction will drop off in temporary construction compounds at the access point. Materials will then be delivered around the site by tractor-trailer type vehicles which are the same as vehicles that currently use these routes around the working farm. This means there is low risk of traffic/vehicles causing excess soil compaction either in construction or during operation which could limit the efficacy of the tracks' permeability.

9.2.3.3 Ancillary Buildings

Inverter Units

There will be 16 Inverter Units on the Site. Each unit would be placed on a concrete base 6.93m x 2.43m in size (area of 16.84m^2). Therefore, these 10 Inverter Units across the Site could potentially give rise to 269.44m^2 of new impermeable surface.

Primary Substation

The primary substation would measure up to approximately 6 m long and 4 m wide. This could potentially give rise to 24m^2 of new impermeable surface. The FCA takes a conservative approach and suggests that the building entails new impermeable surfaces. It is proposed to construct a French drain around the building which will have enough capacity to attenuate the runoff from the building during the 1 in 100 plus Climate Change event (40%).

24m^2 of substation control building is dispersed across the 400,600m^2 Site and represent a 0.006% impact based on a top-down view that assumes they create new impermeable surface.

10 OFFSITE IMPACTS AND RESIDUAL RISK

Incorporation of one or more runoff management techniques as outlined in Section 9, will have a positive impact upon field drainage and there will be limited impacts on off-site surface water receptors.

The Proposed Development would maintain the existing rates of runoff, not block any overland flow pathway, reduce the risk of nutrient or pesticide wash off on soil particulates thereby improving water quality in the receiving watercourse, and also contribute to maintenance of the natural drainage regime.

For extreme events, overland exceedance flows will follow the topography of the site, predominantly conveyed in a westerly direction. The main flow routes will be along the ordinary watercourses and drainage ditches located along the field boundaries, in line with current natural drainage patterns.

In summary, providing suitable soil management measures and monitoring of the Site during operation and, if required, SuDS techniques incorporated into the design, the Proposed Development would have negligible effect on flood risk onsite or elsewhere and would preserve the Site's natural drainage regime.

11 SUMMARY AND CONCLUSIONS

11.1 Summary

A site-specific FCA following the guidance detailed in Planning Policy Wales and Technical Advice Note 15 has been prepared for the proposed Solar Farm development located at Maes Mawr Farm, Maesmawr Road, Tonteg, Pontypridd, CF38 1SL.

11.2 Flood Risk

The NRW development advice map indicates that the development area is located Zone A and is at very low risk of fluvial flooding. Although the northern spur of the site boundary is located within an area of low to medium risk, this part of the site will not be developed.

The NRW Flood Risk from Surface Water Map indicates that most of the site is at very low risk of flooding. Limited areas of low to high risk of surface water flooding are located within the site, associated with topographical lows and ordinary watercourses.

The susceptibility to groundwater flooding is low.

The risk of flooding from reservoir failure has been assessed as low.

There are no records of historic flooding at the site in the NRW Historic Flooding dataset.

11.3 Hydrological Appraisal

The percentage increase in impermeable area is negligible and ordinarily would not require any surface water management scheme. The incorporation of appropriate management techniques will mitigate potential increase in runoff from the Proposed Development.

The Proposed Development design, as well as surface water and soil management measures outlined in Section 9, will ensure that there is negligible alteration to local drainage patterns and flow directions and manage suspended sediments from entering the drainage channels.

11.4 Surface Water and Soil Management Measures

SuDS techniques will be incorporated into the design, when and where required, and will work in conjunction with existing field drainage to manage the discharge of any excess water from the Site.

Where construction has resulted in soil compaction, the areas between panel rows would be tilled / scarified to an appropriate depth and then re-seeded with an appropriate vegetation cover.

All areas of the Site, where appropriate, will have vegetation cover at all times.

Any existing field or tile drainage system will be restored, where affected by construction will be maintained by the Applicant for the life of the Proposed Development.

Access tracks will be constructed out of permeable materials (crushed stone or reinforced grass).

The solar panels will be raised to a minimum height of 600 mm. The panels will be located away from the defined floodplain and will not cause any blockage of the overland flow routes.

11.5 Conclusion

This FCA demonstrates:

- The Site is at low risk of flooding from fluvial and tidal flooding;
- It would neither exacerbate existing flooding problems nor increase the risk of flooding on Site or elsewhere;
- Surface water runoff will be mitigated by maintenance of a vegetation cover; and

- With appropriate surface water and soil management measures there is negligible alteration to local drainage patterns direction within the Site.

In summary, the Proposed Development is at 'Low' risk of flooding and with appropriate surface water and soil management measures would cause negligible effects on the hydrological regimes.

Appendix A – Correspondence with Natural Resources Wales

Josh Hughes

From: Data Distribution <datadistribution@cyfoethnaturiolcymru.gov.uk>
Sent: 10 March 2022 15:10
To: Josh Hughes
Subject: ATI-23040a : Flood Information Request - Maes Mawr Farm, Willowford Road, Tonteg, Pontypridd, CF38 1SL

Good Afternoon,

Unfortunately, the Lower Taff v3 Modelling Report is currently unavailable for distribution outside of NRW. Minor discrepancies have been identified and, consequently, supplementary work is currently underway to address these. Therefore, at present, the Lower Taff v3 Report is still classified as 'draft' and unavailable for distribution until the model update has been completed and reviewed. We hope that this update will be completed in the new year to be available by the end of the financial year.

However, in the interim, if there are any specific questions regarding the Lower Taff v3 model then these can be forwarded to the project team to answer. They can be contacted via email at the following address: Huw.Alford@cyfoethnaturiolcymru.gov.uk

Kind Regards

Owen Jones
Cymorth Technegol Cyswllt Cyfoeth / Customer Hub Technical Support
Cwsmer, Cyfarthrebu a Masnach / Customer Communications and Commercial
Cyfoeth Naturiol Cymru/Natural Resources Wales
Ffôn/Tel: 0300 065 3000

E-bost/E-mail: owen.jones@cyfoethnaturiolcymru.gov.uk / owen.jones@naturalresourceswales.gov.uk
Gwefan/Website: http://www.cyfoethnaturiolcymru.gov.uk/ / www.naturalresourceswales.gov.uk

Twitter: twitter.com/NatResWales
Facebook: facebook.com/nNatResWales
Flickr: Flickr.com/NatResWales
Youtube: youtube.com/NatResWales

From: Data Distribution
Sent: 07 March 2022 13:02
To: Josh Hughes <Josh.Hughes@rpsgroup.com>
Subject: RE: Flood Information Request - Maes Mawr Farm, Willowford Road, Tonteg, Pontypridd, CF38 1SL

Dear Mr Hughes,

Thank you for your email concerning the above site.

Please follow these links for information on:

1. Flood Maps – http://lle.gov.wales/Catalogue?lang=en&text=flood%20map
2. Surface Water – http://lle.gov.wales/catalogue/item/FloodRiskAssessmentWales/?lang=en
3. Groundwater – Unfortunately we do not hold records on instances of groundwater flooding. Please contact the Lead Local Flood Authority in the relevant Local Authority as they are the lead on mitigating risk from groundwater flooding in its area.
4. Reservoir – http://lle.gov.wales/Catalogue?lang=en&text=reservoir
5. Historical Mapping - http://lle.gov.wales/catalogue/item/HistoricFl/?lang=en
6. Hazard Mapping – http://lle.gov.wales/catalogue/item/NationalFloodHazardMaps/?lang=en
7. Drainage strategy – https://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/advice-for-developers/sustainable-drainage-systems-suds/?lang=en
8. Development advice - https://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/advice-for-developers/building-in-flood-risk-areas/?lang=en

We will be in touch in due course, concerning the remaining elements (products 5&6 which are the flood report and raw output data), of your email.

Yn gywir / Yours sincerely,

Michelle Lewis

Cyfoeth Naturiol Cymru / Natural Resources Wales
Ffôn/ Phone: 03000 653577
Symudol / Mobile: 07917243096
Office Location Llys Afon, Hwlffordd / Office Location River Court, Haverfordwest
Cwsmer, Cyfarthrebu a Masnach - Customer, Communications and Commercial
Oriau gwaith arferol/Normal working hours – Mon-Fri, 9 to 5

Yn falch o arwain y ffordd at ddyfodol gwell i Gymru trwy reoli'r amgylchedd ac adnoddau naturiol yn gynaliadwy.

Proud to be leading the way to a better future for Wales by managing the environment and natural resources sustainably.

cyfoethnaturiol.cymru / naturalresources.wales

Twitter | Facebook | LinkedIn | Instagram

From: Josh Hughes <Josh.Hughes@rpsgroup.com>
Sent: 07 March 2022 12:19
To: Data Distribution <datadistribution@cyfoethnaturiolcymru.gov.uk>
Subject: Flood Information Request - Maes Mawr Farm, Willowford Road, Tonteg, Pontypridd, CF38 1SL

Good Afternoon,

We wish to enquire with you regarding flood information for a proposed solar farm development at Maes Mawr Farm, Willowford Road, Tonteg, Pontypridd, CF38 1SL. Please find attached a site location plan and boundary plan for your reference.

Please could you provide any flood information you hold for the site including flood maps (fluvial, surface water, groundwater, reservoir) and historic flood records within the vicinity of the site.

The River Taff is located to the northwest of the site. If any hydraulic modelling has been undertaken for this watercourse then please provide model reports and outputs, including flood levels, depths and hazard mapping within the vicinity of the site.

We will be completing a Flood Consequence Assessment and Drainage Strategy to support a planning application for this site, therefore do you have any site-specific requirements for this assessment?

If you require any further information then let me know.

Kind Regards,
Josh

Josh Hughes
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E josh.hughes@rpsgroup.com

Appendix B – Correspondence with Rhondda Cynon Taff County Borough Council

A response has not been received from Rhondda Cynon Taff County Borough Council, this will be included within the report once received.

Appendix C – Topographic Survey

Notes:

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The Contractor is to check and verify all building and site dimensions, levels and sewer invert levels at connection points before work starts. The Contractor is to comply in all respects with current Building Legislation, British Standard Specifications, Building Regulations, Construction (Design & Management) Regulations, Party Wall Act, etc. whether or not specifically stated on this drawing. This drawing must be read with and checked against any structural, geotechnical or other specialist documentation provided.

This drawing is not intended to show details of foundations, ground conditions or ground contaminants. Each area of ground relied upon to support any structure depicted (including drainage) must be investigated by the Contractor. A suitable method of foundation should be provided allowing for existing ground conditions. Any suspect or fluid ground, contaminates on or within the ground, should be further investigated by a suitable expert. Any earthwork constructions shown indicate typical slopes for guidance only & should be further investigated by a suitable expert.

Where existing trees are to be retained they should be subject to a full Arboricultural inspection for safety. All trees are to be planted so as to ensure they are a minimum of 5 metres from buildings and 3 metres from drainage and services. A suitable method of foundation is to be provided to accommodate the proposed tree planting. All tree types are provided as a guide only and a full Arboricultural survey to be conducted to determine the exact tree types should be completed.

Sketch proposals are for illustrative purposes only & as such are subject to detailed site investigation including ground conditions/contaminants, drainage, design & planning/density negotiations. Sketch proposals may be based upon enlargements of OS sheets & visual estimations of existing site features, accuracy will therefore need to be verified by survey. Sketch proposals have not been considered in respect of CDM Regulations.

Survey carried out to client specification and in accordance with RICS publication:
SURVEYS OF LAND , BUILDING & UTILITY SERVICES AT SCALES 1:500 & LARGER, 3rd EDITION.

Utility Services Location Note:

This survey has been carried out using a combination of observation and detection using electrolocation and ground probing radar equipment. Connections between reference points such as manholes are assumed to be straight unless bends are indicated. The accuracy is limited to the tolerances normally expected from the equipment used.

The following indications of completeness and accuracy are for guidance only:

In areas where there is a large concentration of services, the completeness will be between 80% and 90%. This will be reduced where there are obstructions at ground level.

Positional accuracy will vary with depth and pipe / duct material; an accuracy of +/- 150 mm is achievable in normal circumstances but this will be reduced for plastic pipes.

Existing information from historical plans is likely to be unreliable and is shown for guidance only.

Excavations in the area should be carried out with care and in accordance with HSG 47. No absolute guarantee of accuracy should be inferred from these plans.

The following text is an extract from Surveys of Land, Buildings and Utility Surveys at scales of 1:500 and Larger, 3rd Edition

"Electronic tracing is a reliable, method of locating buried services. ***On Heavy, built up sites 85% completeness is probably all that can be expected.*** *Plan accuracies of +/- 150mm may be achieved but this figure will depend on the depth of the service below ground level.* ***Where similar services run in close proximity, separation may be impossible. Successful tracing of non-metallic pipes may be limited.*** *Existing record information showing underground services is often incomplete and of doubtful accuracy. It should be regarded only as an indication and cannot be guaranteed"*

Standard Abbreviations

ACO	LINEAR DRAINAGE CHANNEL	FS	FLAG STAFF	RS	ROAD SIGN
AV	AIR VALVE	G	GULLY	RSP	RAILWAY SIGNAL POST
A/R	ASSUMED ROUTE	GIS	GAS INLET POINT	RW	RETAINING WALL
BB	BELISH BEACON	GP	GUIDE POST	RWP	RAN WATER PIPE
BdL	BED LEVEL	GPR	GROUND PROBING RADAR	Sap	SAPLING
BH	BOREHOLE	Grl	GRILLE COVER	SB	SIGN BOARD
Bol	BOLLARD	GV	GAS VALVE COVER	Shlt	SHELTER
BP	BOUNDARY POST	Hrl	HAND RAIL	Si	SPUN IRON
B Pvg	BLOCK PAVING	IC	INSPECTION COVER	SL	SOFFIT LEVEL
BRck	BICYCLE RACK	IL	INVERT LEVEL	Slt	SILT LEVEL
BS	BUS STOP	I/R	IRON RAILING FENCE	SMP	SETTLEMENT MONITORING Pnt
BT	BRITISH TELECOM COVER	KO	KERB OUTLET	SP	SIGN POST
BW	BRICK WALL	Lby	LIFEBUOY	SPt	SAMPLING POINT
BWF	BARBED WIRE FENCE	Lck	LOCK GATE	SS	STRUCTURE POINT
CAP	CABLE WINDING MACHINE	Ldr	LADDER	ST	STAND PIPE / SUPPLY TAP
Cat	CATENARY LEVEL	LOR	LOSS OF REFLECTION (gpr)	Sti	STILE
CATV	CABLE TV COVER	LOS	LOSS OF SIGNAL (eml)	STL	STRUCTURE TOP LEVEL
CB	CONTROL BOX	LP	LAMP POST	Stone Pvg	STONE PAVING SLABS
C/B	CLOSE BOARDED FENCE	Mcy	MACHINERY	STP	STAND PIPE
CD	CHAMBER DEPTH	MH	MANHOLE	StPO	STAY POST
Cgd	CATTLE GRID	MgP	MOORING POST	Stu	STUMP
Ci	CAST IRON	Mkr	MARKER POST	StW	STAYWIRE
CIP	CABLE INLET POINT	MP	MILE POST	SV	STOP VALVE
CL	COVER LEVEL	MS	MILESTONE	SW	STONE WALL
C/L	CHAIN LINK FENCE	MU	ELECTRIC MOTOR	Tac	TACTILE PAVING
Col	COLUMN	NVP	NO VISIBLE PIPE	TBM	TEMPORARY BENCH MARK
Conc	CONCRETE	NP	NAME PLATE	TBol	BOLLARD (Dept' Transport)
Conc Pvg	CONCRETE PAVING	OSA	OUTSIDE SURVEY AREA	TCB	TELEPHONE CALL BOX
CP	CATCHPIT	OSBM	OS BENCH MARK	TCP	TELEPHONE CALL POST
CpL	COPING LEVEL	OGC	OVERGROUND CONDUIT	TEL	TELECOM COVER
Cpsn	CAPSTAN	OHC	OVERHEAD CONDUIT	ThL	THRESHOLD LEVEL
CR	CRANE / HOIST	OHE	OVERHEAD ELECTRIC	TL	TRAFFIC SIGNAL POST
Cul	CULVERT	OHG	OVERHEAD GANTRY	TM	TICKET MACHINE
CW	CONCRETE WALL	OHStruct	OVERHEAD STRUCTURE	ToV	TOP OF VALVE LEVEL
DC	DUCT COVER	OHT	OVERHEAD TELECOMS	TP	TELEGRAPH POLE
Di	DUCTILE IRON	OHU	OVERHEAD UNKNOWN	Tpt	TRIAL PIT
(dilap)	DILAPIDATED	P	POST	Tr	TROUGH
(dis)	DISUSED	PB	POST BOX	UTA	UNABLE TO ACCESS
DPC	DAMP PROOF COURSE	PC	SECURITY CAMERA	UTL	UNABLE TO LOCATE
DS	DIRECTION SIGN	Pcg	PEDESTRIAN CROSSING	UTR	UNABLE TO RAISE
DSW	DRYSTONE WALL	PD	PIT DEPTH	UTS	UNABLE TO SURVEY
Eav	EAVES LEVEL	P/F	PANEL FENCE	UTT	UNABLE TO TRACE (utilities)
EIC	ELECTRICITY COVER	PP	PETROL PUMP	VC	VITRIFIED CLAY
EOT	END OF TRACE (utility)	P/R	POST & RAIL FENCE	VDP	VEHICLE DETECTION PAD
EP	ELECTRICITY POLE	Psk	PENSTOCK	VP	VENT PIPE
ER	EARTH ROD	PV	VERTICAL PIPE	VW	VALVE WHEEL
ESP	ELECTRICITY SUPPLY POINT	Pyl	PYLON	WB	WEIGH BRIDGE
ESW	ELECTRICITY SWITCH BOX	PZ	PIEZOMETER	WG	WATER GAUGE
FB	FOOTBRIDGE	Rdg	RIDGE LEVEL	WL	WATER LEVEL
FL	FLOOR LEVEL	RE	RODDING EYE	WM	WATER METER
FFL	FINISHED FLOOR LEVEL	RG	RAIN GAUGE	W/M	WIRE MESH FENCE
Flgt	FLOOR LIGHT	RL	RIDGE LEVEL	WO	WASHOUT COVER
FLR	FLAT ROOF LEVEL	RMP	RESRVOIR MONITORING Pnt	WS	WIND SOCK POLE
FH	FIRE HYDRANT	RP	REFLECTOR POST	WSR	WATER LEVEL SENSOR

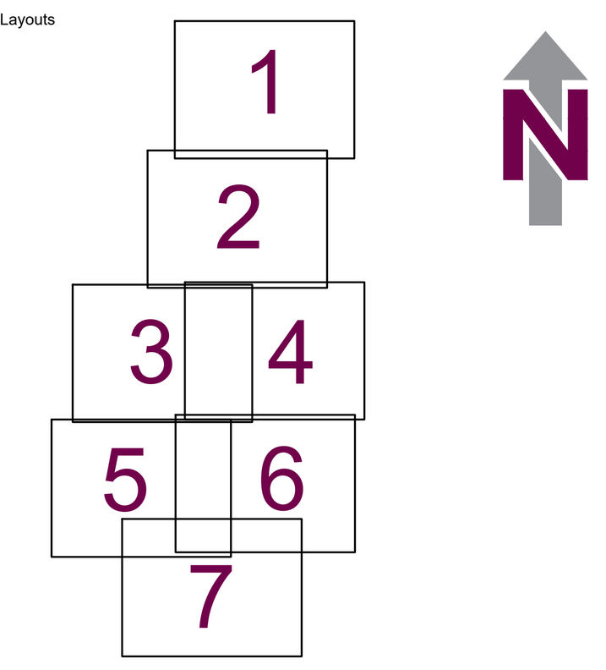
	SURVEY EXTENTS	D=1.00m 1.00d	DEPTH INFORMATION
BT	BRITISH TELECOM	HW	HOT WATER
BT(r)	TAKEN FROM RECORDS	HW(r)	TAKEN FROM RECORDS
CTV	CATV CABLE	O/F	OPTIC FIBRE
CTV(r)	TAKEN FROM RECORDS	O/F(r)	TAKEN FROM RECORDS
CTV	CCTV CABLE	OIL	OIL PIPELINE
CTV(r)	TAKEN FROM RECORDS	OIL(r)	TAKEN FROM RECORDS
CW	COMBINED WATER	PWR	POWER FEATURE
CW(r)	TAKEN FROM RECORDS	SW	SURFACE WATER
DUC	EMPTY DUCT	SW(r)	TAKEN FROM RECORDS
DUC(r)	TAKEN FROM RECORDS	T	TELECOMMUNICATION CABLE
EA	EARTHING FEATURE	T(r)	TAKEN FROM RECORDS
EA(r)	TAKEN FROM RECORDS	TLM	TELEMETRY CABLE
E	ELECTRIC CABLE	TRA	TRAFFIC SIGNALS
E(r)	TAKEN FROM RECORDS	TRA(r)	TAKEN FROM RECORDS
FL	FUEL LINE	UK	UNKNOWN SERVICE
FL(r)	TAKEN FROM RECORDS	UK(r)	TAKEN FROM RECORDS
FW	FOUL WATER	VNT	VENT
FW(r)	TAKEN FROM RECORDS	VNT(r)	TAKEN FROM RECORDS
GAS	GAS	W	WATER
GAS(r)	TAKEN FROM RECORDS	W(r)	TAKEN FROM RECORDS
GPR	GPR FEATURE	HV	HV ELECTRIC
GPR(r)	TAKEN FROM RECORDS	HV(r)	TAKEN FROM RECORDS
Helium	HELIUM FEATURE	REF:GPR02	REFERENCE TO GPR DATA IN REPORT
Helium(r)	TAKEN FROM RECORDS		

PAS 128 Quality Levels:

SURVEY TYPE, QUALITY LEVELS AND ACCURACY	SUPPORTING DATA
VERIFICATION: QL-A: HORIZONTAL ± 50MM VERTICAL ± 25MM	HORIZONTAL & VERTICAL LOCATION OF THE TOP AND/OR BOTTOM OF THE ITEM.
DETECTION: QL-B4	A UTILITY WHICH IS SUSPECTED TO EXIST BUT HAS NOT BEEN DETECTED AND IS SHOWN AS AN ASSUMED ROUTE.
QL-B3/p: HORIZONTAL ±500MM	HORIZONTAL LOCATION ONLY OF THE UTILITY DETECTED BY ONE TECHNIQUE.
QL-B2/p: HORIZONTAL ±250MM/±40% VERTICAL ±40%	HORIZONTAL AND VERTICAL LOCATION OF UTILITY DETECTED BY ONE TECHNIQUE ONLY.
QL-B1/p: HORIZONTAL ±150MM/±15% VERTICAL ±15%	HORIZONTAL AND VERTICAL LOCATION OF UTILITY DETECTED BY MULTIPLE TECHNIQUES.
SITE RECONNAISSANCE: QL-C	---
DESKTOP: QL-D	---

NOTES: HORIZONTAL/VERTICAL VARIABLES BASED ON DETECTED LOCATION OF UTILITY
P = POST PROCESSING
REFER TO FULL PAS128 DOCUMENT FOR FURTHER INFORMATION

Sheet Layouts



Grid: National Grid by GPS Observations to the OS Active Network (OSTN15)

Datum: Ordnance Datum by GPS Observations to the OS Active Network (OSGM15)

Revision:	Amendments:	Date:	Name:
-	-	-	-
-	-	-	-
-	-	-	-
A	ORIGINAL ISSUE	NOV'21	JH

rps — MAKING COMPLEX EASY — THE SURVEY ASSOCIATION AFFILIATE MEMBER

Stafford - Clevedon - Milton Keynes - Warrington - Edinburgh
T: 01785 719 719 E: rps.survey@rpsgroup.com www.rpsgroup.com
Red Deer House, Dunston Business Village, Stafford Road, Dunston, Staffordshire, ST18 9AB

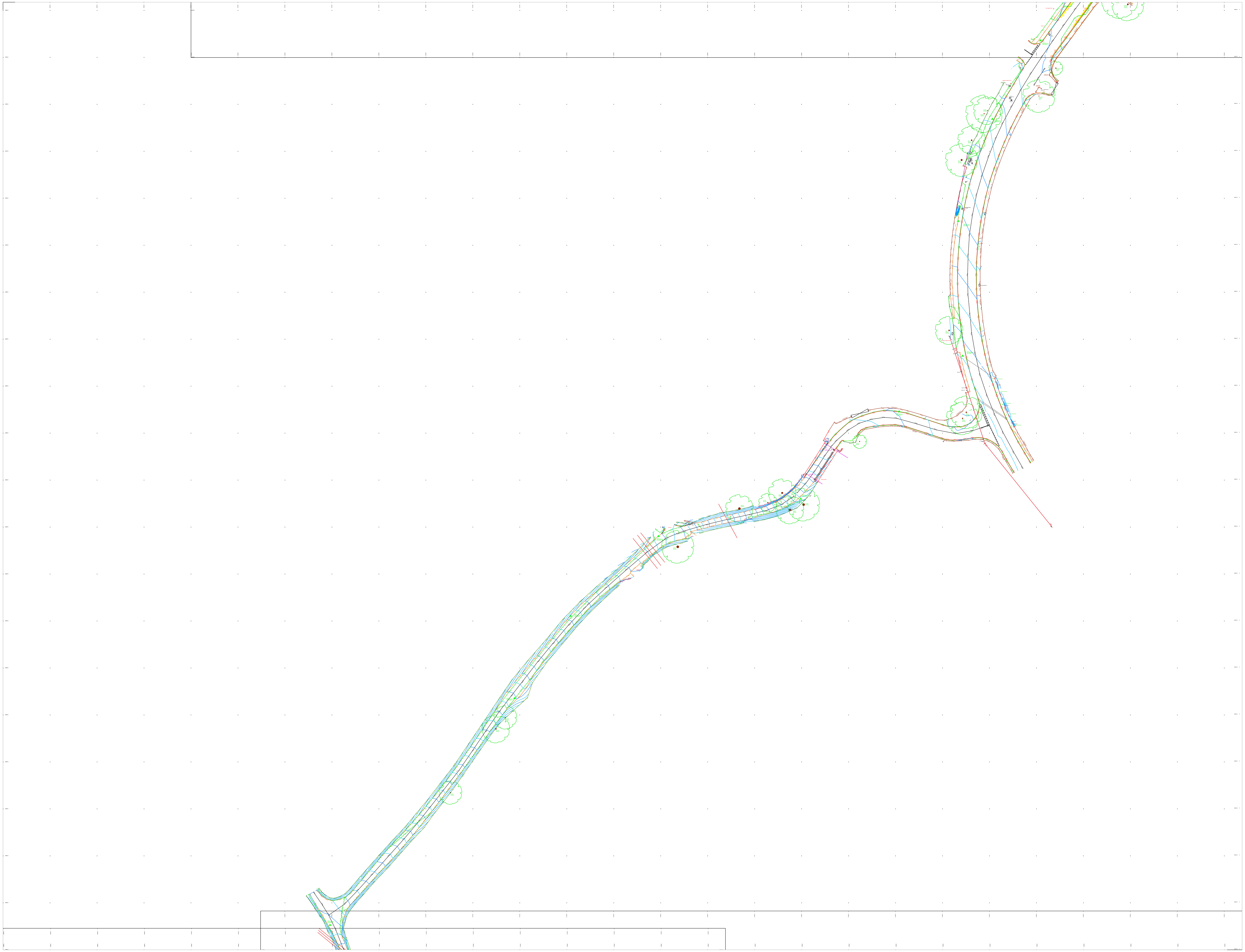
CLIENT: RPS Consulting UK & Ireland

PROJECT: Maes Mawl Solar Farm

TITLE: Topographical Survey

Drawn: VA/JP/DW/JH/JE	Checked: CA
Date: November 21	Scale:1:500 @ A0 (1:200 Text)
Drg No: UAQ3491_A	Sheet: 1 of 7

MAKING COMPLEX EASY



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CAP	CABLE WINDING MACHINE	Ldr	LADDER	ST	STAND PIPE / SUPPLY TAP
Cat	CATENARY LEVEL	LOR	LOSS OF REFLECTION (gpr)	Sti	STILE
CATV	CABLE TV COVER	LOS	LOSS OF SIGNAL (eml)	STL	STRUCTURE TOP LEVEL
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C/B	CLOSE BOARDED FENCE	Mcy	MACHINERY	STP	STAND PIPE
CD	CHAMBER DEPTH	MH	MANHOLE	StPO	STAY POST
Cgd	CATTLE GRID	MgP	MOORING POST	Stu	STUMP
Ci	CAST IRON	Mkr	MARKER POST	StW	STAYWIRE
CIP	CABLE INLET POINT	MP	MILE POST	SV	STOP VALVE
CL	COVER LEVEL	MS	MILESTONE	SW	STONE WALL
C/L	CHAIN LINK FENCE	MU	ELECTRIC MOTOR	Tac	TACTILE PAVING
Col	COLUMN	NVP	NO VISIBLE PIPE	TBM	TEMPORARY BENCH MARK
Conc	CONCRETE	NP	NAME PLATE	TBol	BOLLARD (Dept' Transport)
Conc Pvg	CONCRETE PAVING	OSA	OUTSIDE SURVEY AREA	TCB	TELEPHONE CALL BOX
CP	CATCHPIT	OSBM	OS BENCH MARK	TCP	TELEPHONE CALL POST
CpL	COPING LEVEL	OGC	OVERGROUND CONDUIT	TEL	TELECOM COVER
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CR	CRANE / HOIST	OHE	OVERHEAD ELECTRIC	TL	TRAFFIC SIGNAL POST
Cul	CULVERT	OHG	OVERHEAD GANTRY	TM	TICKET MACHINE
CW	CONCRETE WALL	OHStruct	OVERHEAD STRUCTURE	ToV	TOP OF VALVE LEVEL
DC	DUCT COVER	OHT	OVERHEAD TELECOMS	TP	TELEGRAPH POLE
Di	DUCTILE IRON	OHU	OVERHEAD UNKNOWN	Tpt	TRIAL PIT
(dilap)	DILAPIDATED	P	POST	Tr	TROUGH
(dis)	DISUSED	PB	POST BOX	UTA	UNABLE TO ACCESS
DPC	DAMP PROOF COURSE	PC	SECURITY CAMERA	UTL	UNABLE TO LOCATE
DS	DIRECTION SIGN	Pcg	PEDESTRIAN CROSSING	UTR	UNABLE TO RAISE
DSW	DRYSTONE WALL	PD	PIT DEPTH	UTS	UNABLE TO SURVEY
Eav	EAVES LEVEL	P/F	PANEL FENCE	UTT	UNABLE TO TRACE (utilities)
EIC	ELECTRICITY COVER	PP	PETROL PUMP	VC	VITRIFIED CLAY
EOT	END OF TRACE (utility)	P/R	POST & RAIL FENCE	VDP	VEHICLE DETECTION PAD
EP	ELECTRICITY POLE	Psk	PENSTOCK	VP	VENT PIPE
ER	EARTH ROD	PV	VERTICAL PIPE	VW	VALVE WHEEL
ESP	ELECTRICITY SUPPLY POINT	Pyl	PYLON	WB	WEIGH BRIDGE
ESW	ELECTRICITY SWITCH BOX	PZ	PIEZOMETER	WG	WATER GAUGE
FB	FOOTBRIDGE	Rdg	RIDGE LEVEL	WL	WATER LEVEL
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Flgt	FLOOR LIGHT	RL	RIDGE LEVEL	WO	WASHOUT COVER
FLR	FLAT ROOF LEVEL	RMP	RESRVOIR MONITORING Pnt	WS	WIND SOCK POLE
FH	FIRE HYDRANT	RP	REFLECTOR POST	WSR	WATER LEVEL SENSOR

	SURVEY EXTENTS	D=1.00m 1.00d	DEPTH INFORMATION
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BT(r)	TAKEN FROM RECORDS	HW(r)	TAKEN FROM RECORDS
CTV	CATV CABLE	O/F	OPTIC FIBRE
CTV(r)	TAKEN FROM RECORDS	O/F(r)	TAKEN FROM RECORDS
CTV	CCTV CABLE	OIL	OIL PIPELINE
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CW(r)	TAKEN FROM RECORDS	SW	SURFACE WATER
DUC	EMPTY DUCT	SW(r)	TAKEN FROM RECORDS
DUC(r)	TAKEN FROM RECORDS	T	TELECOMMUNICATION CABLE
EA	EARTHING FEATURE	T(r)	TAKEN FROM RECORDS
EA(r)	TAKEN FROM RECORDS	TLM	TELEMETRY CABLE
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FL(r)	TAKEN FROM RECORDS	UK(r)	TAKEN FROM RECORDS
FW	FOUL WATER	VNT	VENT
FW(r)	TAKEN FROM RECORDS	VNT(r)	TAKEN FROM RECORDS
GAS	GAS	W	WATER
GAS(r)	TAKEN FROM RECORDS	W(r)	TAKEN FROM RECORDS
GPR	GPR FEATURE	HV	HV ELECTRIC
GPR(r)	TAKEN FROM RECORDS	HV(r)	TAKEN FROM RECORDS
Helium	HELIUM FEATURE	REF:GPR02	REFERENCE TO GPR DATA IN REPORT
Helium(r)	TAKEN FROM RECORDS		

PAS 128 Quality Levels:

SURVEY TYPE, QUALITY LEVELS AND ACCURACY	SUPPORTING DATA
VERIFICATION: QL-A: HORIZONTAL ± 50MM VERTICAL ± 25MM	HORIZONTAL & VERTICAL LOCATION OF THE TOP AND/OR BOTTOM OF THE ITEM.
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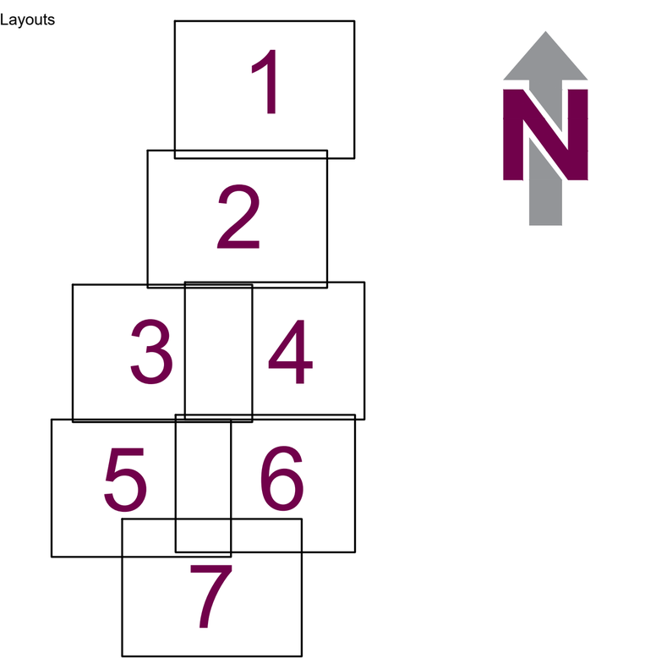
QL-B1/p: HORIZONTAL ±150MM/±15% VERTICAL ±15%	HORIZONTAL AND VERTICAL LOCATION OF UTILITY DETECTED BY MULTIPLE TECHNIQUES.
SITE RECONNAISSANCE: QL-C	---
DESKTOP: QL-D	---

NOTES: HORIZONTAL/VERTICAL VARIABLES BASED ON DETECTED LOCATION OF UTILITY
P = POST PROCESSING
REFER TO FULL PAS128 DOCUMENT FOR FURTHER INFORMATION

Sheet Layouts



Grid:
National Grid by GPS Observations to the OS Active Network (OSTN15)

Datum:
Ordnance Datum by GPS Observations to the OS Active Network (OSGM15)

Revision:	Amendments:	Date:	Name:
-	-	-	-
-	-	-	-
-	-	-	-
A	ORIGINAL ISSUE	NOV'21	JH

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CLIENT:
RPS
Consulting
UK & Ireland

PROJECT:
Maes Mawl
Solar Farm

TITLE:
Topographical Survey

Drawn: VA/JP/DW/JH/JE	Checked: CA
Date: November 21	Scale:1:500 @ A0 (1:200 Text)
Drg No: UAQ3491_A	Sheet: 2 of 7

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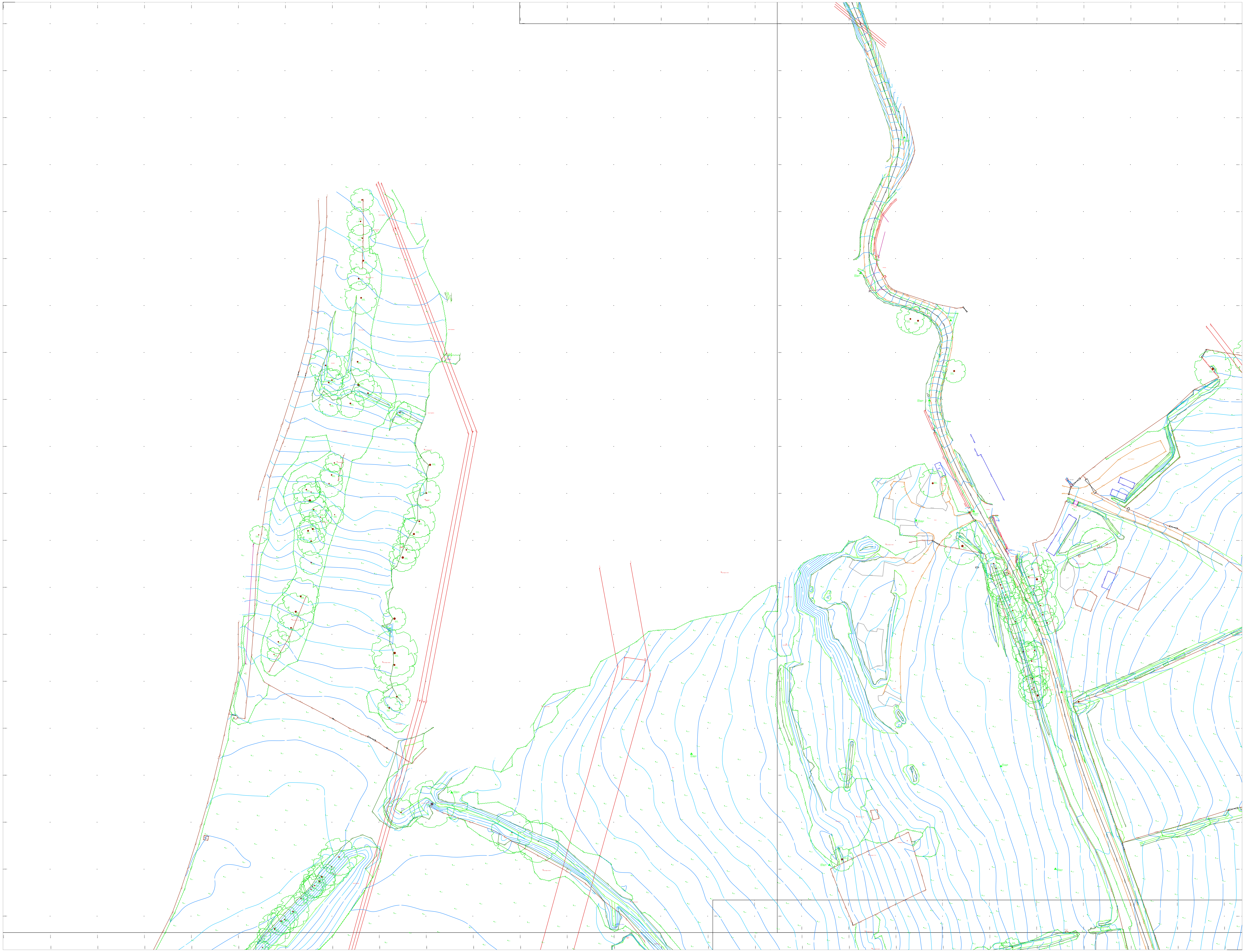

Notes:

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The Contractor is to check and verify all building and site dimensions, levels and sewer invert levels at connection points before work starts. The Contractor is to comply in all respects with current Building Legislation, British Standard Specifications, Building Regulations, Construction (Design & Management) Regulations, Party Wall Act, etc. whether or not specifically stated on this drawing. This drawing must be read with and checked against any structural, geotechnical or other specialist documentation provided.

This drawing is not intended to show details of foundations, ground conditions or ground contaminants. Each area of ground relied upon to support any structure depicted (including drainage) must be investigated by the Contractor. A suitable method of foundation should be provided allowing for existing ground conditions. Any suspect or fluid ground, contaminates on or within the ground, should be further investigated by a suitable expert. Any earthwork constructions shown indicate typical slopes for guidance only & should be further investigated by a suitable expert.

Where existing trees are to be retained they should be subject to a full Arboricultural inspection for safety. All trees are to be planted so as to ensure they are a minimum of 5 metres from buildings and 3 metres from drainage and services. A suitable method of foundation is to be provided to accommodate the proposed tree planting. All tree types are provided as a guide only and a full Arboricultural survey to be conducted to determine the exact tree types should be completed.

Sketch proposals are for illustrative purposes only & as such are subject to detailed site investigation including ground conditions/contaminants, drainage, design & planning/density negotiations. Sketch proposals may be based upon enlargements of OS sheets & visual estimations of existing site features, accuracy will therefore need to be verified by survey. Sketch proposals have not been considered in respect of CDM Regulations.

Survey carried out to client specification and in accordance with RICS publication:
SURVEYS OF LAND , BUILDING & UTILITY SERVICES AT SCALES 1:500 & LARGER, 3rd EDITION.

Utility Services Location Note:

This survey has been carried out using a combination of observation and detection using electrolocation and ground probing radar equipment. Connections between reference points such as manholes are assumed to be straight unless bends are indicated. The accuracy is limited to the tolerances normally expected from the equipment used.

The following indications of completeness and accuracy are for guidance only:

In areas where there is a large concentration of services, the completeness will be between 80% and 90%. This will be reduced where there are obstructions at ground level.

Positional accuracy will vary with depth and pipe / duct material; an accuracy of +/- 150 mm is achievable in normal circumstances but this will be reduced for plastic pipes.

Existing information from historical plans is likely to be unreliable and is shown for guidance only.

Excavations in the area should be carried out with care and in accordance with HSG 47. No absolute guarantee of accuracy should be inferred from these plans.

The following text is an extract from Surveys of Land, Buildings and Utility Surveys at scales of 1:500 and Larger, 3rd Edition

"Electronic tracing is a reliable, method of locating buried services. ***On Heavy, built up sites 85% completeness is probably all that can be expected.*** *Plan accuracies of +/- 150mm may be achieved but this figure will depend on the depth of the service below ground level.* ***Where similar services run in close proximity, separation may be impossible. Successful tracing of non-metallic pipes may be limited.*** *Existing record information showing underground services is often incomplete and of doubtful accuracy. It should be regarded only as an indication and cannot be guaranteed"*

Standard Abbreviations

ACO	LINEAR DRAINAGE CHANNEL	FS	FLAG STAFF	RS	ROAD SIGN
AV	AIR VALVE	G	GULLY	RSP	RAILWAY SIGNAL POST
A/R	ASSUMED ROUTE	GIS	GAS INLET POINT	RW	RETAINING WALL
BB	BELISH BEACON	GP	GUIDE POST	RWP	RAN WATER PIPE
BdL	BED LEVEL	GPR	GROUND PROBING RADAR	Sap	SAPLING
BH	BOREHOLE	Grl	GRILLE COVER	SB	SIGN BOARD
Bol	BOLLARD	GV	GAS VALVE COVER	Shlt	SHELTER
BP	BOUNDARY POST	Hrl	HAND RAIL	Si	SPUN IRON
B Pvg	BLOCK PAVING	IC	INSPECTION COVER	SL	SOFFIT LEVEL
BRck	BICYCLE RACK	IL	INVERT LEVEL	Slt	SILT LEVEL
BS	BUS STOP	I/R	IRON RAILING FENCE	SMP	SETTLEMENT MONITORING Pnt
BT	BRITISH TELECOM COVER	KO	KERB OUTLET	SP	SIGN POST
BW	BRICK WALL	Lby	LIFEBUOY	SPt	SAMPLING POINT
BWF	BARBED WIRE FENCE	Lck	LOCK GATE	SS	STRUCTURE POINT
CAP	CABLE WINDING MACHINE	Ldr	LADDER	ST	STAND PIPE / SUPPLY TAP
Cat	CATENARY LEVEL	LOR	LOSS OF REFLECTION (gpr)	Sti	STILE
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(line)	SURVEY EXTENTS	D=1.00m 1.00d	DEPTH INFORMATION
BT	BRITISH TELECOM	HW	HOT WATER
BT(r)	TAKEN FROM RECORDS	HW(r)	TAKEN FROM RECORDS
CTV	CATV CABLE	O/F	OPTIC FIBRE
CTV(r)	TAKEN FROM RECORDS	O/F(r)	TAKEN FROM RECORDS
CTV	CCTV CABLE	OIL	OIL PIPELINE
CTV(r)	TAKEN FROM RECORDS	OIL(r)	TAKEN FROM RECORDS
CW	COMBINED WATER	PWR	POWER FEATURE
CW(r)	TAKEN FROM RECORDS	SW	SURFACE WATER
DUC	EMPTY DUCT	SW(r)	TAKEN FROM RECORDS
DUC(r)	TAKEN FROM RECORDS	T	TELECOMMUNICATION CABLE
EA	EARTHING FEATURE	T(r)	TAKEN FROM RECORDS
EA(r)	TAKEN FROM RECORDS	TLM	TELEMETRY CABLE
E	ELECTRIC CABLE	TRA	TRAFFIC SIGNALS
E(r)	TAKEN FROM RECORDS	TRA(r)	TAKEN FROM RECORDS
FL	FUEL LINE	UK	UNKNOWN SERVICE
FL(r)	TAKEN FROM RECORDS	UK(r)	TAKEN FROM RECORDS
FW	FOUL WATER	VNT	VENT
FW(r)	TAKEN FROM RECORDS	VNT(r)	TAKEN FROM RECORDS
GAS	GAS	W	WATER
GAS(r)	TAKEN FROM RECORDS	W(r)	TAKEN FROM RECORDS
GPR	GPR FEATURE	HV	HV ELECTRIC
GPR(r)	TAKEN FROM RECORDS	HV(r)	TAKEN FROM RECORDS
Helium	HELIUM FEATURE	REF:GPR02	REFERENCE TO GPR DATA IN REPORT
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PAS 128 Quality Levels:

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SITE RECONNAISSANCE: QL-C	---
DESKTOP: QL-D	---

NOTES: HORIZONTAL/VERTICAL VARIABLES BASED ON DETECTED LOCATION OF UTILITY
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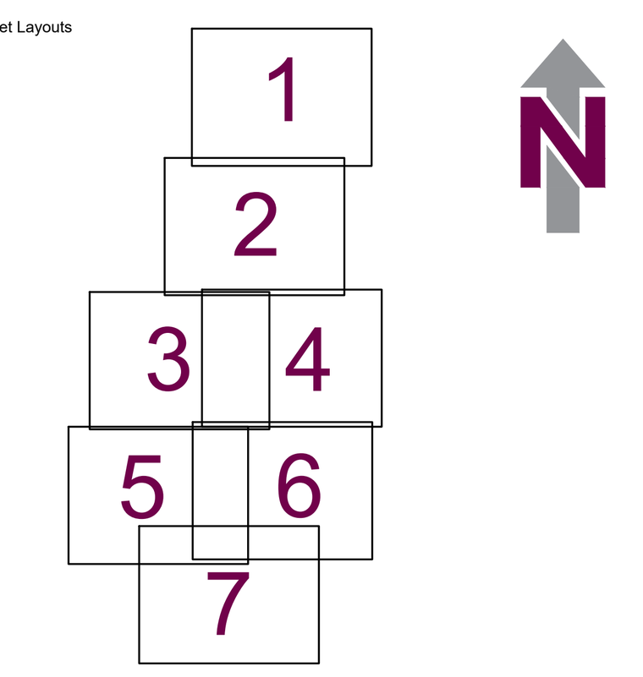
Sheet Layouts



Grid:
National Grid by GPS Observations to the OS Active Network (OSTN15)

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Revision:	Amendments:	Date:	Name:
-	-	-	-
-	-	-	-
-	-	-	-
A	ORIGINAL ISSUE	NOV'21	JH

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Red Deer House, Dunston Business Village, Stafford Road, Dunston, Staffordshire, ST18 9AB

CLIENT:
RPS Consulting UK & Ireland

PROJECT:
Maes Mawl Solar Farm

TITLE:
Topographical Survey

Drawn: VA/JP/DW/JH/JE	Checked: CA
Date: November 21	Scale:1:500 @ A0 (1:200 Text)
Drg No: UAQ3491_A	Sheet: 3 of 7

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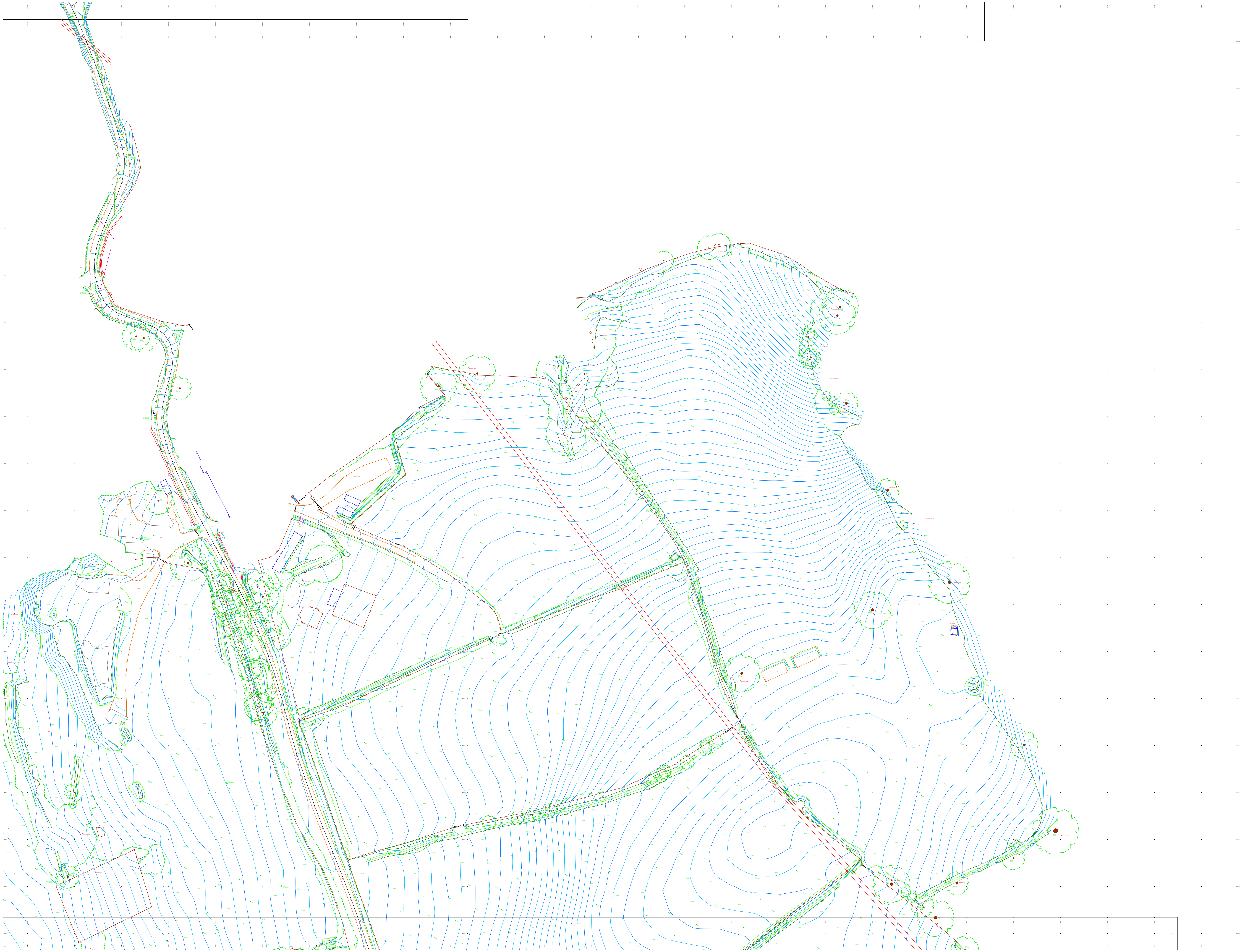

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ER	EARTH ROD	PV	VERTICAL PIPE	VW	VALVE WHEEL
ESP	ELECTRICITY SUPPLY POINT	Pyl	PYLON	WB	WEIGH BRIDGE
ESW	ELECTRICITY SWITCH BOX	PZ	PIEZOMETER	WG	WATER GAUGE
FB	FOOTBRIDGE	Rdg	RIDGE LEVEL	WL	WATER LEVEL
FL	FLOOR LEVEL	RE	RODDING EYE	WM	WATER METER
FFL	FINISHED FLOOR LEVEL	RG	RAIN GAUGE	W/M	WIRE MESH FENCE
Flgt	FLOOR LIGHT	RL	RIDGE LEVEL	WO	WASHOUT COVER
FLR	FLAT ROOF LEVEL	RMP	RESRVOIR MONITORING Pnt	WS	WIND SOCK POLE
FH	FIRE HYDRANT	RP	REFLECTOR POST	WSR	WATER LEVEL SENSOR

(line)	SURVEY EXTENTS	D=1.00m 1.00d	DEPTH INFORMATION
BT	BRITISH TELECOM	HW	HOT WATER
BT(r)	TAKEN FROM RECORDS	HW(r)	TAKEN FROM RECORDS
CTV	CATV CABLE	O/F	OPTIC FIBRE
CTV(r)	TAKEN FROM RECORDS	O/F(r)	TAKEN FROM RECORDS
CTV	CCTV CABLE	OIL	OIL PIPELINE
CTV(r)	TAKEN FROM RECORDS	OIL(r)	TAKEN FROM RECORDS
CW	COMBINED WATER	PWR	POWER FEATURE
CW(r)	TAKEN FROM RECORDS	SW	SURFACE WATER
DUC	EMPTY DUCT	SW(r)	TAKEN FROM RECORDS
DUC(r)	TAKEN FROM RECORDS	T	TELECOMMUNICATION CABLE
EA	EARTHING FEATURE	T(r)	TAKEN FROM RECORDS
EA(r)	TAKEN FROM RECORDS	TLM	TELEMETRY CABLE
E	ELECTRIC CABLE	TRA	TRAFFIC SIGNALS
E(r)	TAKEN FROM RECORDS	TRA(r)	TAKEN FROM RECORDS
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FL(r)	TAKEN FROM RECORDS	UK(r)	TAKEN FROM RECORDS
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FW(r)	TAKEN FROM RECORDS	VNT(r)	TAKEN FROM RECORDS
GAS	GAS	W	WATER
GAS(r)	TAKEN FROM RECORDS	W(r)	TAKEN FROM RECORDS
GPR	GPR FEATURE	HV	HV ELECTRIC
GPR(r)	TAKEN FROM RECORDS	HV(r)	TAKEN FROM RECORDS
Helium	HELIUM FEATURE	REF:GPR02	REFERENCE TO GPR DATA IN REPORT
Helium(r)	TAKEN FROM RECORDS		

PAS 128 Quality Levels:

SURVEY TYPE, QUALITY LEVELS AND ACCURACY	SUPPORTING DATA
VERIFICATION: QL-A: HORIZONTAL ± 50MM VERTICAL ± 25MM	HORIZONTAL & VERTICAL LOCATION OF THE TOP AND/OR BOTTOM OF THE ITEM.
DETECTION: QL-B4	A UTILITY WHICH IS SUSPECTED TO EXIST BUT HAS NOT BEEN DETECTED AND IS SHOWN AS AN ASSUMED ROUTE.
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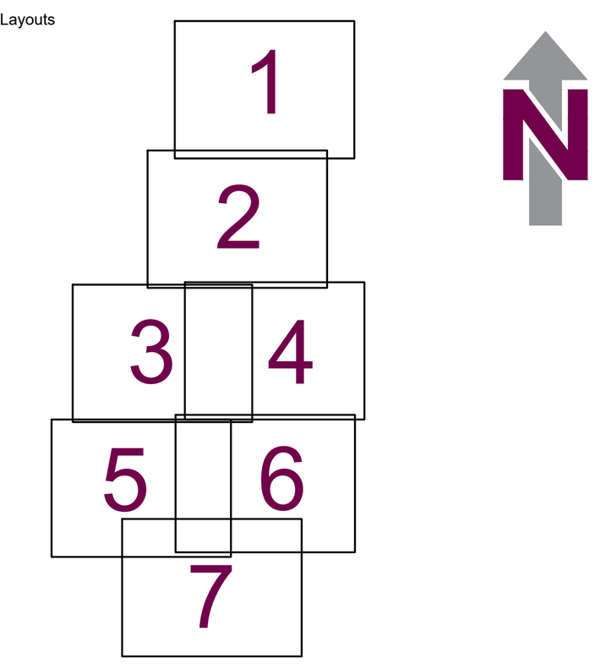
SITE RECONNAISSANCE: QL-C	---
DESKTOP: QL-D	---

NOTES: HORIZONTAL/VERTICAL VARIABLES BASED ON DETECTED LOCATION OF UTILITY
P = POST PROCESSING
REFER TO FULL PAS128 DOCUMENT FOR FURTHER INFORMATION

Sheet Layouts



Grid:
National Grid by GPS Observations to the OS Active Network (OSTN15)

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Revision:	Amendments:	Date:	Name:
-	-	-	-
-	-	-	-
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A	ORIGINAL ISSUE	NOV'21	JH

MAKING COMPLEX EASY

THE SURVEY ASSOCIATION AFFILIATE MEMBER

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T: 01785 719 719 E: rps.survey@rpsgroup.com www.rpsgroup.com
Red Deer House, Dunston Business Village, Stafford Road, Dunston, Staffordshire, ST18 9AB

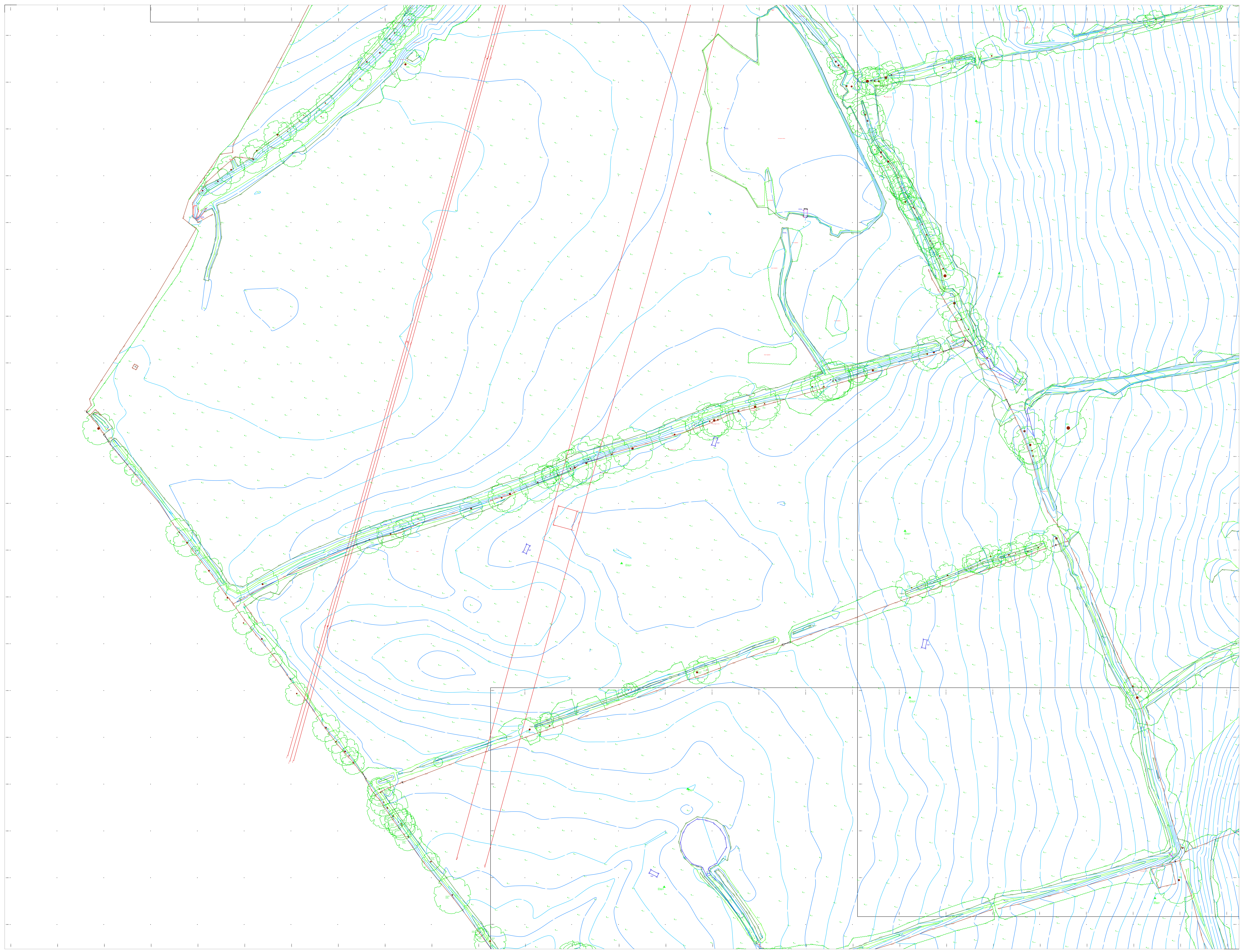
CLIENT:
RPS Consulting UK & Ireland

PROJECT:
Maes Mawl Solar Farm

TITLE:
Topographical Survey

Drawn: VA/JP/DW/JH/JE	Checked: CA
Date: November 21	Scale:1:500 @ A0 (1:200 Text)
Drg No: UAQ3491_A	Sheet: 4 of 7

MAKING COMPLEX EASY



Notes:

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The Contractor is to check and verify all building and site dimensions, levels and sewer invert levels at connection points before work starts. The Contractor is to comply in all respects with current Building Legislation, British Standard Specifications, Building Regulations, Construction (Design & Management) Regulations, Party Wall Act, etc. whether or not specifically stated on this drawing. This drawing must be read with and checked against any structural, geotechnical or other specialist documentation provided.

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Where existing trees are to be retained they should be subject to a full Arboricultural inspection for safety. All trees are to be planted so as to ensure they are a minimum of 5 metres from buildings and 3 metres from drainage and services. A suitable method of foundation is to be provided to accommodate the proposed tree planting. All tree types are provided as a guide only and a full Arboricultural survey to be conducted to determine the exact tree types should be completed.

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Survey carried out to client specification and in accordance with RICS publication:
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Utility Services Location Note:

This survey has been carried out using a combination of observation and detection using electrolocation and ground probing radar equipment. Connections between reference points such as manholes are assumed to be straight unless bends are indicated. The accuracy is limited to the tolerances normally expected from the equipment used.

The following indications of completeness and accuracy are for guidance only:

In areas where there is a large concentration of services, the completeness will be between 80% and 90%. This will be reduced where there are obstructions at ground level.

Positional accuracy will vary with depth and pipe / duct material; an accuracy of +/- 150 mm is achievable in normal circumstances but this will be reduced for plastic pipes.

Existing information from historical plans is likely to be unreliable and is shown for guidance only.

Excavations in the area should be carried out with care and in accordance with HSG 47. No absolute guarantee of accuracy should be inferred from these plans.

The following text is an extract from Surveys of Land, Buildings and Utility Surveys at scales of 1:500 and Larger, 3rd Edition

"Electronic tracing is a reliable, method of locating buried services. ***On Heavy, built up sites 85% completeness is probably all that can be expected.*** *Plan accuracies of +/- 150mm may be achieved but this figure will depend on the depth of the service below ground level.* ***Where similar services run in close proximity, separation may be impossible. Successful tracing of non-metallic pipes may be limited.*** *Existing record information showing underground services is often incomplete and of doubtful accuracy. It should be regarded only as an indication and cannot be guaranteed"*

Standard Abbreviations

ACO	LINEAR DRAINAGE CHANNEL	FS	FLAG STAFF	RS	ROAD SIGN
AV	AIR VALVE	G	GULLY	RSP	RAILWAY SIGNAL POST
A/R	ASSUMED ROUTE	GIS	GAS INLET POINT	RW	RETAINING WALL
BB	BELISH BEACON	GP	GUIDE POST	RWP	RAN WATER PIPE
BdL	BED LEVEL	GPR	GROUND PROBING RADAR	Sap	SAPLING
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Bol	BOLLARD	GV	GAS VALVE COVER	Shlt	SHELTER
BP	BOUNDARY POST	Hrl	HAND RAIL	Si	SPUN IRON
B Pvg	BLOCK PAVING	IC	INSPECTION COVER	SL	SOFFIT LEVEL
BRck	BICYCLE RACK	IL	INVERT LEVEL	Slt	SILT LEVEL
BS	BUS STOP	I/R	IRON RAILING FENCE	SMP	SETTLEMENT MONITORING Pnt
BT	BRITISH TELECOM COVER	KO	KERB OUTLET	SP	SIGN POST
BW	BRICK WALL	Lby	LIFEBUOY	SPt	SAMPLING POINT
BWF	BARBED WIRE FENCE	Lck	LOCK GATE	SS	STRUCTURE POINT
CAP	CABLE WINDING MACHINE	Ldr	LADDER	ST	STAND PIPE / SUPPLY TAP
Cat	CATENARY LEVEL	LOR	LOSS OF REFLECTION (gpr)	Sti	STILE
CATV	CABLE TV COVER	LOS	LOSS OF SIGNAL (eml)	STL	STRUCTURE TOP LEVEL
CB	CONTROL BOX	LP	LAMP POST	Stone Pvg	STONE PAVING SLABS
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Ci	CAST IRON	Mkr	MARKER POST	StW	STAYWIRE
CIP	CABLE INLET POINT	MP	MILE POST	SV	STOP VALVE
CL	COVER LEVEL	MS	MILESTONE	SW	STONE WALL
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Col	COLUMN	NVP	NO VISIBLE PIPE	TBM	TEMPORARY BENCH MARK
Conc	CONCRETE	NP	NAME PLATE	TBol	BOLLARD (Dept' Transport)
Conc Pvg	CONCRETE PAVING	OSA	OUTSIDE SURVEY AREA	TCB	TELEPHONE CALL BOX
CP	CATCHPIT	OSBM	OS BENCH MARK	TCP	TELEPHONE CALL POST
CpL	COPING LEVEL	OGC	OVERGROUND CONDUIT	TEL	TELECOM COVER
Cpsn	CAPSTAN	OHC	OVERHEAD CONDUIT	ThL	THRESHOLD LEVEL
CR	CRANE / HOIST	OHE	OVERHEAD ELECTRIC	TL	TRAFFIC SIGNAL POST
Cul	CULVERT	OHG	OVERHEAD GANTRY	TM	TICKET MACHINE
CW	CONCRETE WALL	OHStruct	OVERHEAD STRUCTURE	ToV	TOP OF VALVE LEVEL
DC	DUCT COVER	OHT	OVERHEAD TELECOMS	TP	TELEGRAPH POLE
Di	DUCTILE IRON	OHU	OVERHEAD UNKNOWN	Tpt	TRIAL PIT
(dilap)	DILAPIDATED	P	POST	Tr	TROUGH
(dis)	DISUSED	PB	POST BOX	UTA	UNABLE TO ACCESS
DPC	DAMP PROOF COURSE	PC	SECURITY CAMERA	UTL	UNABLE TO LOCATE
DS	DIRECTION SIGN	Pcg	PEDESTRIAN CROSSING	UTR	UNABLE TO RAISE
DSW	DRYSTONE WALL	PD	PIT DEPTH	UTS	UNABLE TO SURVEY
Eav	EAVES LEVEL	P/F	PANEL FENCE	UTT	UNABLE TO TRACE (utilities)
EIC	ELECTRICITY COVER	PP	PETROL PUMP	VC	VITRIFIED CLAY
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DUC(r)	TAKEN FROM RECORDS	T	TELECOMMUNICATION CABLE
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FW(r)	TAKEN FROM RECORDS	VNT(r)	TAKEN FROM RECORDS
GAS	GAS	W	WATER
GAS(r)	TAKEN FROM RECORDS	W(r)	TAKEN FROM RECORDS
GPR	GPR FEATURE	HV	HV ELECTRIC
GPR(r)	TAKEN FROM RECORDS	HV(r)	TAKEN FROM RECORDS
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SITE RECONNAISSANCE: QL-C	---
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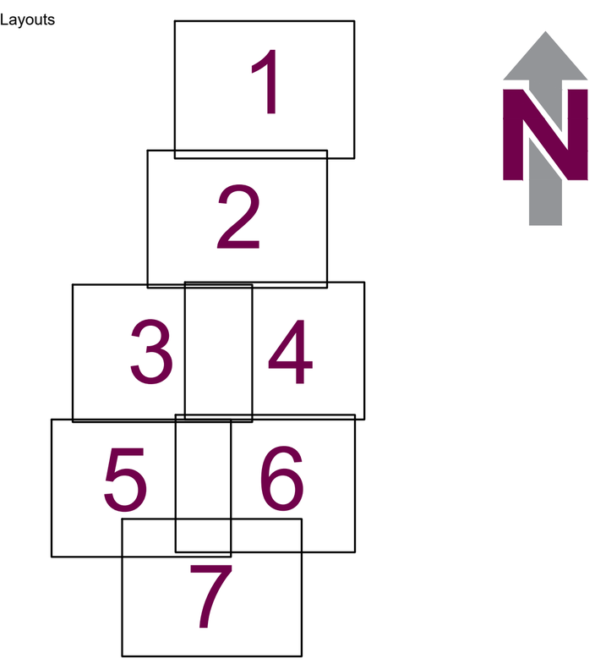
Sheet Layouts



Grid:
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Revision:	Amendments:	Date:	Name:
-	-	-	-
-	-	-	-
-	-	-	-
A	ORIGINAL ISSUE	NOV'21	JH

rps MAKING COMPLEX EASY
THE SURVEY ASSOCIATION AFFILIATE MEMBER
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T: 01785 719 719 E: rps.survey@rpsgroup.com www.rpsgroup.com
Red Deer House, Dunston Business Village, Stafford Road, Dunston, Staffordshire, ST18 9AB

CLIENT:
RPS Consulting UK & Ireland

PROJECT:
Maes Mawl Solar Farm

TITLE:
Topographical Survey

Drawn: VA/JP/DW/JH/JE	Checked: CA
Date: November 21	Scale:1:500 @ A0 (1:200 Text)
Drg No: UAQ3491_A	Sheet: 5 of 7

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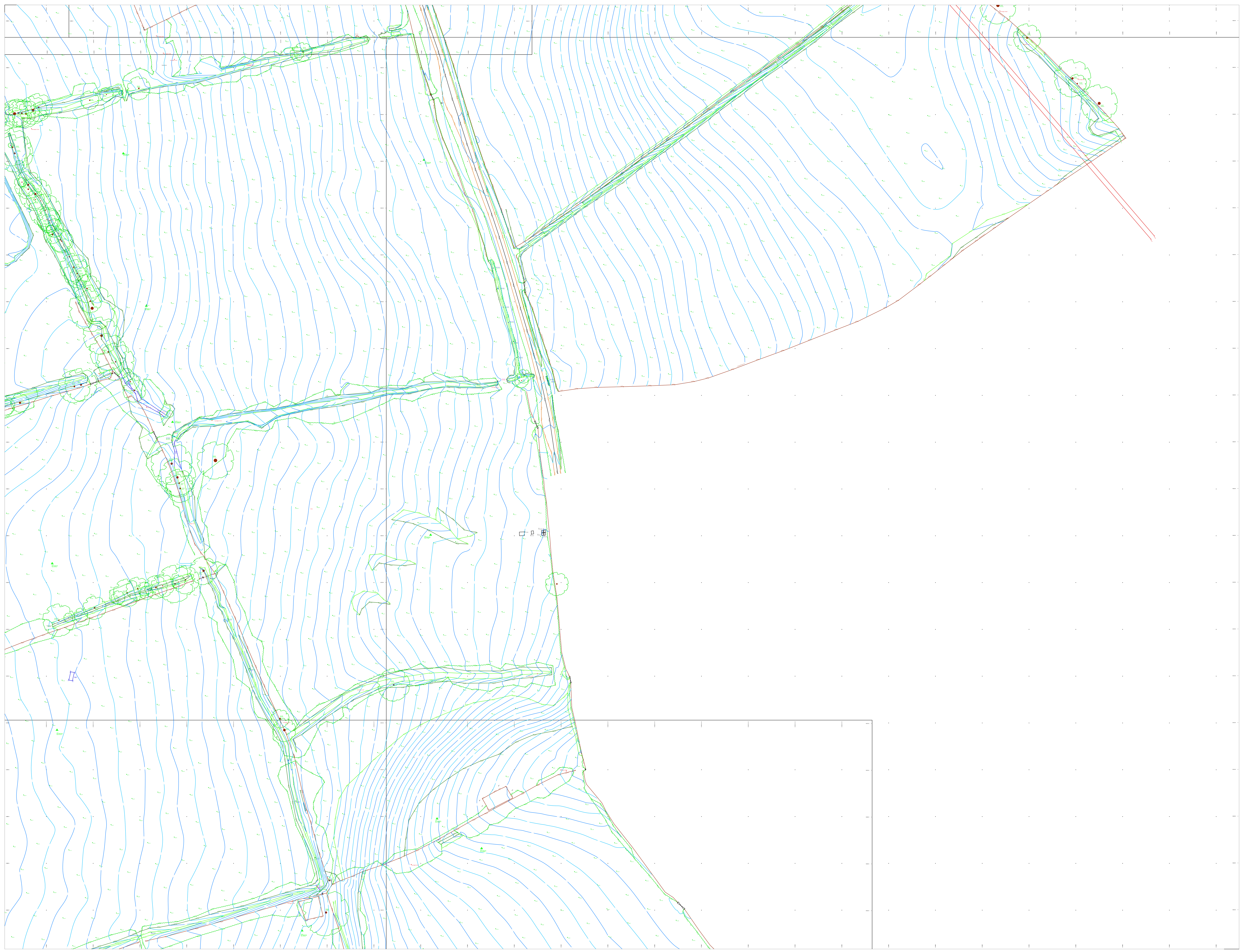

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DPC	DAMP PROOF COURSE	PC	SECURITY CAMERA	UTL	UNABLE TO LOCATE
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FL(r)	TAKEN FROM RECORDS	UK(r)	TAKEN FROM RECORDS
FW	FOUL WATER	VNT	VENT
FW(r)	TAKEN FROM RECORDS	VNT(r)	TAKEN FROM RECORDS
GAS	GAS	W	WATER
GAS(r)	TAKEN FROM RECORDS	W(r)	TAKEN FROM RECORDS
GPR	GPR FEATURE	HV	HV ELECTRIC
GPR(r)	TAKEN FROM RECORDS	HV(r)	TAKEN FROM RECORDS
Helium	HELIUM FEATURE	REF:GPR02	REFERENCE TO GPR DATA IN REPORT
Helium(r)	TAKEN FROM RECORDS		

PAS 128 Quality Levels:

SURVEY TYPE, QUALITY LEVELS AND ACCURACY	SUPPORTING DATA
VERIFICATION: QL-A: HORIZONTAL ± 50MM VERTICAL ± 25MM	HORIZONTAL & VERTICAL LOCATION OF THE TOP AND/OR BOTTOM OF THE ITEM.
DETECTION: QL-B4	A UTILITY WHICH IS SUSPECTED TO EXIST BUT HAS NOT BEEN DETECTED AND IS SHOWN AS AN ASSUMED ROUTE.
QL-B3/p: HORIZONTAL ±500MM	HORIZONTAL LOCATION ONLY OF THE UTILITY DETECTED BY ONE TECHNIQUE.
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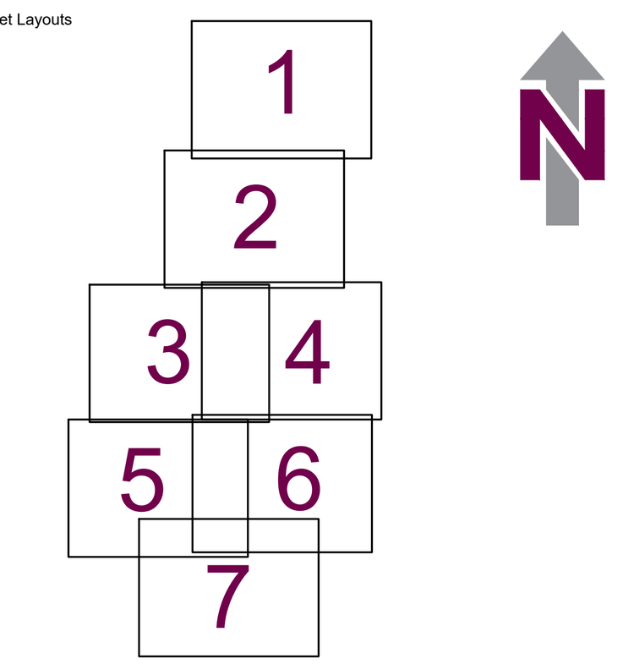
QL-B1/p: HORIZONTAL ±150MM/±15% VERTICAL ±15%	HORIZONTAL AND VERTICAL LOCATION OF UTILITY DETECTED BY MULTIPLE TECHNIQUES.
SITE RECONNAISSANCE: QL-C	---
DESKTOP: QL-D	---

NOTES: HORIZONTAL/VERTICAL VARIABLES BASED ON DETECTED LOCATION OF UTILITY
P = POST PROCESSING
REFER TO FULL PAS128 DOCUMENT FOR FURTHER INFORMATION

Sheet Layouts



Grid:	Datum:
National Grid by GPS Observations to the OS Active Network (OSTN15)	Ordnance Datum by GPS Observations to the OS Active Network (OSGM15)

Revision:	Amendments:	Date:	Name:
-	-	-	-
-	-	-	-
-	-	-	-
A	ORIGINAL ISSUE	NOV'21	JH

MAKING COMPLEX EASY

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Red Deer House, Dunston Business Village, Stafford Road, Dunston, Staffordshire, ST18 9AB

CLIENT:
RPS
Consulting
UK & Ireland

PROJECT:
Maes Mawl
Solar Farm

TITLE:
Topographical Survey

Drawn: VA/JP/DW/JH/JE	Checked: CA
Date: November 21	Scale:1:500 @ A0 (1:200 Text)
Drg No: UAQ3491_A	Sheet: 6 of 7

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Notes:

The Contractor is to check and verify all building and site dimensions, levels and sewer invert levels at connection points before work starts. The Contractor is to comply in all respects with current Building Legislation, British Standard Specifications, Building Regulations, Construction (Design & Management) Regulations, Party Wall Act, etc. whether or not specifically stated on this drawing. This drawing must be read with and checked against any structural, geotechnical or other specialist documentation provided.

This drawing is not intended to show details of foundations, ground conditions or ground contaminants. Each area of ground relied upon to support any structure depicted (including drainage) must be investigated by the Contractor. A suitable method of foundation should be provided allowing for existing ground conditions. Any suspect or fluid ground, contaminates on or within the ground, should be further investigated by a suitable expert. Any earthwork constructions shown indicate typical slopes for guidance only & should be further investigated by a suitable expert.

Where existing trees are to be retained they should be subject to a full Arboricultural inspection for safety. All trees are to be planted so as to ensure they are a minimum of 5 metres from buildings and 3 metres from drainage and services. A suitable method of foundation is to be provided to accommodate the proposed tree planting. All tree types are provided as a guide only and a full Arboricultural survey to be conducted to determine the exact tree types should be completed.

Sketch proposals are for illustrative purposes only & as such are subject to detailed site investigation including ground conditions/contaminants, drainage, design & planning/density negotiations. Sketch proposals may be based upon enlargements of OS sheets & visual estimations of existing site features, accuracy will therefore need to be verified by survey. Sketch proposals have not been considered in respect of CDM Regulations.

Survey carried out to client specification and in accordance with RICS publication:
SURVEYS OF LAND , BUILDING & UTILITY SERVICES AT SCALES 1:500 & LARGER, 3rd EDITION.

Utility Services Location Note:

This survey has been carried out using a combination of observation and detection using electrolocation and ground probing radar equipment. Connections between reference points such as manholes are assumed to be straight unless bends are indicated. The accuracy is limited to the tolerances normally expected from the equipment used.

The following indications of completeness and accuracy are for guidance only:

In areas where there is a large concentration of services, the completeness will be between 80% and 90%. This will be reduced where there are obstructions at ground level.

Positional accuracy will vary with depth and pipe / duct material; an accuracy of +/- 150 mm is achievable in normal circumstances but this will be reduced for plastic pipes.

Existing information from historical plans is likely to be unreliable and is shown for guidance only.

Excavations in the area should be carried out with care and in accordance with HSG 47. No absolute guarantee of accuracy should be inferred from these plans.

The following text is an extract from Surveys of Land, Buildings and Utility Surveys at scales of 1:500 and Larger, 3rd Edition

"Electronic tracing is a reliable, method of locating buried services. ***On Heavy, built up sites 85% completeness is probably all that can be expected.*** *Plan accuracies of +/- 150mm may be achieved but this figure will depend on the depth of the service below ground level.* ***Where similar services run in close proximity, separation may be impossible. Successful tracing of non-metallic pipes may be limited.*** *Existing record information showing underground services is often incomplete and of doubtful accuracy. It should be regarded only as an indication and cannot be guaranteed"*

Standard Abbreviations

ACO	LINEAR DRAINAGE CHANNEL	FS	FLAG STAFF	RS	ROAD SIGN
AV	AIR VALVE	G	GULLY	RSP	RAILWAY SIGNAL POST
A/R	ASSUMED ROUTE	GIS	GAS INLET POINT	RW	RETAINING WALL
BB	BELISH BEACON	GP	GUIDE POST	RWP	RAN WATER PIPE
BdL	BED LEVEL	GPR	GROUND PROBING RADAR	Sap	SAPLING
BH	BOREHOLE	Grl	GRILLE COVER	SB	SIGN BOARD
Bol	BOLLARD	GV	GAS VALVE COVER	Shlt	SHELTER
BP	BOUNDARY POST	Hrl	HAND RAIL	Si	SPUN IRON
B Pvg	BLOCK PAVING	IC	INSPECTION COVER	SL	SOFFIT LEVEL
BRck	BICYCLE RACK	IL	INVERT LEVEL	Slt	SILT LEVEL
BS	BUS STOP	I/R	IRON RAILING FENCE	SMP	SETTLEMENT MONITORING Pnt
BT	BRITISH TELECOM COVER	KO	KERB OUTLET	SP	SIGN POST
BW	BRICK WALL	Lby	LIFEBUOY	SPt	SAMPLING POINT
BWF	BARBED WIRE FENCE	Lck	LOCK GATE	SS	STRUCTURE POINT
CAP	CABLE WINDING MACHINE	Ldr	LADDER	ST	STAND PIPE / SUPPLY TAP
Cat	CATENARY LEVEL	LOR	LOSS OF REFLECTION (gpr)	Sti	STILE
CATV	CABLE TV COVER	LOS	LOSS OF SIGNAL (eml)	STL	STRUCTURE TOP LEVEL
CB	CONTROL BOX	LP	LAMP POST	Stone Pvg	STONE PAVING SLABS
C/B	CLOSE BOARDED FENCE	Mcy	MACHINERY	STP	STAND PIPE
CD	CHAMBER DEPTH	MH	MANHOLE	StPO	STAY POST
Cgd	CATTLE GRID	MgP	MOORING POST	Stu	STUMP
Ci	CAST IRON	Mkr	MARKER POST	StW	STAYWIRE
CIP	CABLE INLET POINT	MP	MILE POST	SV	STOP VALVE
CL	COVER LEVEL	MS	MILESTONE	SW	STONE WALL
C/L	CHAIN LINK FENCE	MU	ELECTRIC MOTOR	Tac	TACTILE PAVING
Col	COLUMN	NVP	NO VISIBLE PIPE	TBM	TEMPORARY BENCH MARK
Conc	CONCRETE	NP	NAME PLATE	TBol	BOLLARD (Dept' Transport)
Conc Pvg	CONCRETE PAVING	OSA	OUTSIDE SURVEY AREA	TCB	TELEPHONE CALL BOX
CP	CATCHPIT	OSBM	OS BENCH MARK	TCP	TELEPHONE CALL POST
CpL	COPING LEVEL	OGC	OVERGROUND CONDUIT	TEL	TELECOM COVER
Cpsn	CAPSTAN	OHC	OVERHEAD CONDUIT	ThL	THRESHOLD LEVEL
CR	CRANE / HOIST	OHE	OVERHEAD ELECTRIC	TL	TRAFFIC SIGNAL POST
Cul	CULVERT	OHG	OVERHEAD GANTRY	TM	TICKET MACHINE
CW	CONCRETE WALL	OHStruct	OVERHEAD STRUCTURE	ToV	TOP OF VALVE LEVEL
DC	DUCT COVER	OHT	OVERHEAD TELECOMS	TP	TELEGRAPH POLE
Di	DUCTILE IRON	OHU	OVERHEAD UNKNOWN	Tpt	TRIAL PIT
(dilap)	DILAPIDATED	P	POST	Tr	TROUGH
(dis)	DISUSED	PB	POST BOX	UTA	UNABLE TO ACCESS
DPC	DAMP PROOF COURSE	PC	SECURITY CAMERA	UTL	UNABLE TO LOCATE
DS	DIRECTION SIGN	Pcg	PEDESTRIAN CROSSING	UTR	UNABLE TO RAISE
DSW	DRYSTONE WALL	PD	PIT DEPTH	UTS	UNABLE TO SURVEY
Eav	EAVES LEVEL	P/F	PANEL FENCE	UTT	UNABLE TO TRACE (utilities)
EIC	ELECTRICITY COVER	PP	PETROL PUMP	VC	VITRIFIED CLAY
EOT	END OF TRACE (utility)	P/R	POST & RAIL FENCE	VDP	VEHICLE DETECTION PAD
EP	ELECTRICITY POLE	Psk	PENSTOCK	VP	VENT PIPE
ER	EARTH ROD	PV	VERTICAL PIPE	VW	VALVE WHEEL
ESP	ELECTRICITY SUPPLY POINT	Pyl	PYLON	WB	WEIGH BRIDGE
ESW	ELECTRICITY SWITCH BOX	PZ	PIEZOMETER	WG	WATER GAUGE
FB	FOOTBRIDGE	Rdg	RIDGE LEVEL	WL	WATER LEVEL
FL	FLOOR LEVEL	RE	RODDING EYE	WM	WATER METER
FFL	FINISHED FLOOR LEVEL	RG	RAIN GAUGE	W/M	WIRE MESH FENCE
Flgt	FLOOR LIGHT	RL	RIDGE LEVEL	WO	WASHOUT COVER
FLR	FLAT ROOF LEVEL	RMP	RESRVOIR MONITORING Pnt	WS	WIND SOCK POLE
FH	FIRE HYDRANT	RP	REFLECTOR POST	WSR	WATER LEVEL SENSOR

	SURVEY EXTENTS	D=1.00m 1.00d	DEPTH INFORMATION
BT	BRITISH TELECOM	HW	HOT WATER
BT(r)	TAKEN FROM RECORDS	HW(r)	TAKEN FROM RECORDS
CTV	CATV CABLE	O/F	OPTIC FIBRE
CTV(r)	TAKEN FROM RECORDS	O/F(r)	TAKEN FROM RECORDS
CTV	CCTV CABLE	OIL	OIL PIPELINE
CTV(r)	TAKEN FROM RECORDS	OIL(r)	TAKEN FROM RECORDS
CW	COMBINED WATER	PWR	POWER FEATURE
CW(r)	TAKEN FROM RECORDS	SW	SURFACE WATER
DUC	EMPTY DUCT	SW(r)	TAKEN FROM RECORDS
DUC(r)	TAKEN FROM RECORDS	T	TELECOMMUNICATION CABLE
EA	EARTHING FEATURE	T(r)	TAKEN FROM RECORDS
EA(r)	TAKEN FROM RECORDS	TLM	TELEMETRY CABLE
E	ELECTRIC CABLE	TRA	TRAFFIC SIGNALS
E(r)	TAKEN FROM RECORDS	TRA(r)	TAKEN FROM RECORDS
FL	FUEL LINE	UK	UNKNOWN SERVICE
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DESKTOP: QL-D	---

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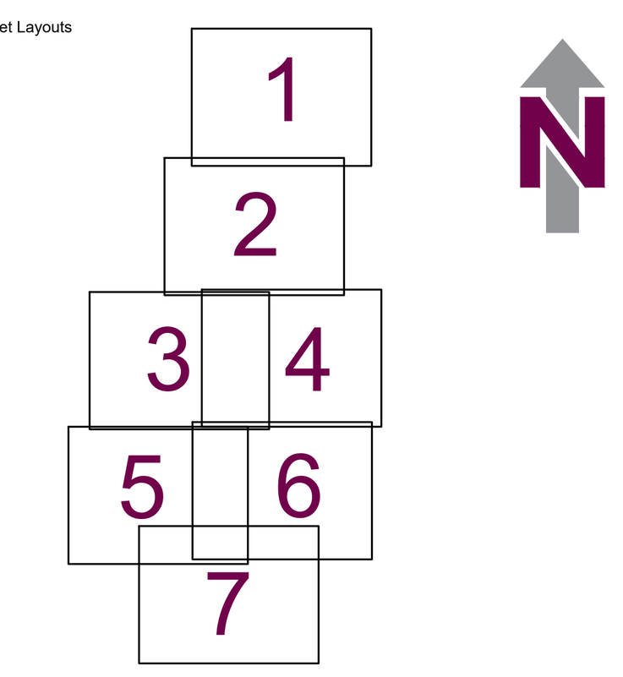
Sheet Layouts



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THE SURVEY ASSOCIATION AFFILIATE MEMBER

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Red Deer House, Dunston Business Village, Stafford Road, Dunston, Staffordshire, ST18 9AB

CLIENT:
RPS Consulting UK & Ireland

PROJECT:
Maes Mawl Solar Farm

TITLE:
Topographical Survey

Drawn: VA/JP/DW/JH/JE	Checked: CA
Date: November 21	Scale:1:500 @ A0 (1:200 Text)
Drg No: UAQ3491_A	Sheet: 7 of 7

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Appendix D – Site Layout

Primary Substation

Section of PROW DRE/50b/1 to be diverted

Proposed route of diverted PROW DRE/50b/1

The Willowford

OAKFIELD CRESCENT

A 4 7 3

Play Area

Reservoir

Track

Drain

Pond

Issues

Maesbach

Well

FB

Notes

1. Verifying Dimensions: The contractor shall verify dimensions against such other drawings or site conditions as pertain to this part of the work.
2. Existing Services: Any information concerning the location of existing services (above and below ground) indicated on this drawing is intended for general guidance only. All services should be checked on site prior to any work commencing.
3. If received electronically it is the recipients responsibility to print to correct scale. Only written dimensions should be used.
4. © Crown copyright and database rights 2022 Ordnance Survey 0100031673.

LEGEND

- SITE BOUNDARY
- 2 x 12 = 24 MODULE PANEL (12m)
- 2 x 24 = 48 MODULE PANEL (24m)
- 3.5m ACCESS TRACK
- INVERTER SUBSTATION
- SECURITY FENCE
- PROPOSED WINTER BIRD SEED MIX AREAS

NOTE:
This plan is for planning purposes only and is intended to give a general indication of the proposed solar layout subject to final design. It should not be used for construction purposes.

Rev	Description	By	CB	Date
A	Design optimisation	GG	RK	15/06/2022

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Project MAESMAW SOLAR FARM

Title SOLAR LAYOUT PLAN

Status	Drawn By	PM/Checked by
Planning	Gareth Gardener	Rob Kelly

Site Ref	Scale @ A0	Original Date Created
1166	1:1250	13/06/22

Drawing Number 1166-MEASMAWR-001

Rev A

C:\Users\Gareth\Elgin Energy\1166 - Maesmawr - Documents\4.0 Planning\4.6 Drawings\DWG\1166-MAESMAWR-001RevA_D220615_(Maesmawr Solar Layout).dwg