Great Harmeston Solar Farm

Flood Consequence Assessment and Surface Water Drainage Strategy

Development of National Significance
Pre-Application Consultation

March 2026

FLOOD CONSEQUENCE ASSESSMENT AND SURFACE WATER DRAINAGE STRATEGY

Great Harmeston Solar Farm

Land Surrounding Great Harmeston Buildings, Pembrokeshire, SA62 3HN

On behalf of Arise Renewable Energy UK Ltd
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1. Introduction

Background

1.1. Pegasus Group have been appointed by Arise Renewable Energy UK Ltd to undertake a Flood Consequence Assessment (FCA) and Surface Water Drainage Strategy for a proposed solar farm on Land Surrounding Great Harmeston Buildings, Pembrokeshire, SA62 3HN.

Relevant Policy and Guidance

1.2. In accordance with Natural Resources Wales (NRW) guidance, this FCA considers flood risk to the Proposed Development from rivers and the sea, surface water and small watercourses, groundwater and reservoirs.

1.3. This FCA also demonstrates, where appropriate, that the Proposed Development has sufficient mitigation measures in place to reduce flood risk and consequences, is as safe as possible and causes no increased flood risk elsewhere. This is in accordance with NRW guidance.

1.4. The SuDS Approval Body (SAB) was introduced in Wales in January 2019 and must approve proposed drainage strategies for all Proposed Developments with more than 1 dwelling or with an area greater than 100m^2. As such, any new applications which meet these criteria will require submission of drainage scheme and must demonstrate the use of Sustainable Drainage Systems (SuDS).

1.5. Pembrokeshire SAB approval of the proposed surface water drainage strategy will be required before construction.

1.6. The Site is located within the Local Planning Authority of Pembrokeshire County Council.

1.7. This assessment has reviewed the information and requirements included in the South West Wales Stage 1 Strategic Flood Consequences Assessment (November 2022). The SFCA (2022) covers six Local Planning Authorities (LPAs) in South West Wales, including Pembrokeshire County Council. The SFCA will be referred to as SFCA (2022) throughout this report.

1.8. Technical Advice Note 15 (TAN15) by Planning Policy Wales discusses policy in relation to 'development, flooding and coastal erosion' and has also been used to inform this FCA. TAN15 was first issued in July 2004 and last updated in March 2025.

1.9. Key to the updated TAN15 (March 2025) was the implementation of NRW's Flood Map for Planning which replaces the Development Advice Map for planning purposes. The updated TAN15 continues to take a risk-based approach, setting out which category of land use is acceptable within each flood risk zone.

2. Existing Site and Hydrology

Site Location & Existing Conditions

2.1. The Site is located on Land Surrounding Great Harmeston Buildings, Pembrokeshire, SA62 3HM and is approximately 128 hectares (ha) in area.

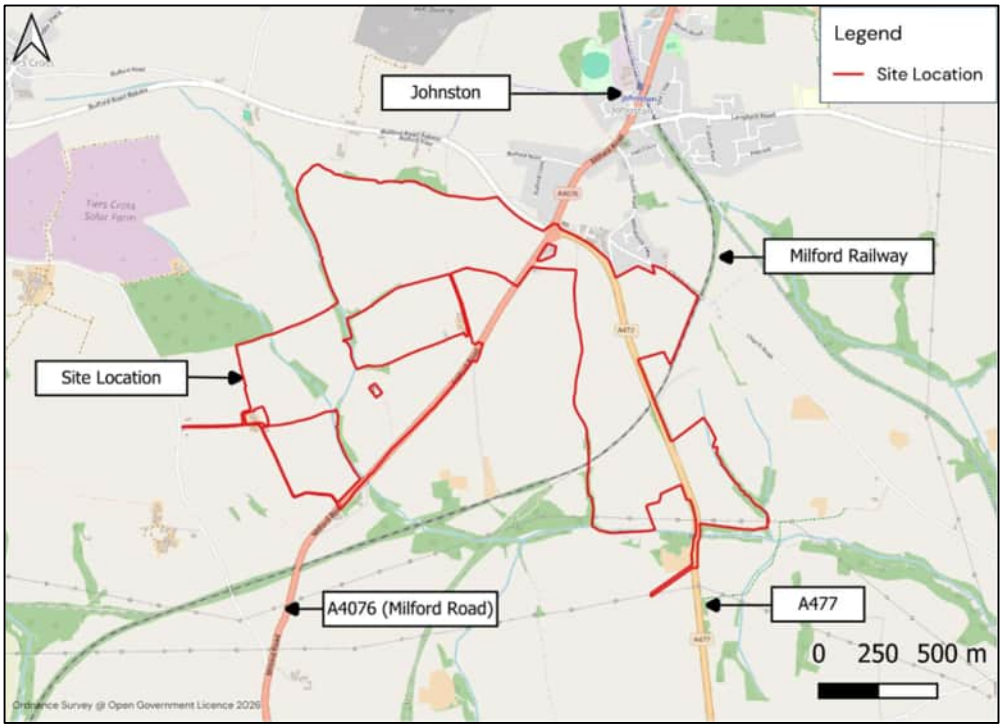
2.2. The Site currently comprises of fields predominantly for arable use, bound by a mixture of woodland, hedgerows, roads and Milford railway line.

2.3. The village of Johnston lies immediately north of the Site, and the village of Steynton is located approximately 1.1km to the south. The Site is segregated by two 'A' roads (A4076 Milford Road and A477) and a Transport for Wales (TfW) railway line (Milford Railway).

2.4. Approximate co-ordinates at the centre of the Site are E:192702, N:209950.

2.5. The Site location is shown in Figure 2.1.

Figure 2.1 – Site Location



2.6. A topographic survey of the Site was completed in September 2024 by Landmark Surveys Wales Ltd, a pdf of which is included in **Appendix A**. The topographical survey indicates that the highest level of the Site is along the northern extent at approximately 77 meters above Ordnance Datum (mAOD). From here, levels fall both to the east, west and south towards Ordinary Watercourses to approximately 27mAOD.

Existing Drainage and Hydrology

2.7. There are no Main Rivers[1] located within the Site according to DataMapWales[2]. The closest Main River, known as 'Merlins Brook' is located approximately 1.8km north of the Site.

2.8. There are several Ordinary Watercourses[3] along the field boundaries and through the western portions of the Site (refer to Figure 2.2 below).

2.9. The Site is not located within an Internal Drainage District (IDD).

2.10. Geological data from the British Geological Survey (BGS) shows the majority of the Site is underlain by the "Rosemarket Formation – sandstone, argillaceous rocks and conglomerate" bedrock geology. The southern extent of the Site is underlain by the "Milford Haven Subgroup – argillaceous rocks and sandstone" bedrock geology.

2.11. The majority of the Site is not recorded to be underlain by any superficial deposits. An area along an Ordinary Watercourse in the western and southern extent of the Site is underlain by "Alluvium – clay, silt, sand and gravel" superficial deposits.

2.12. Soilscapes mapping shows that the Site comprises of "freely draining slightly acid loamy soils".

2.13. The hydrogeology 625K digital hydrogeological map of the UK highlights that the entire Site is underlain by a "low productivity aquifer".

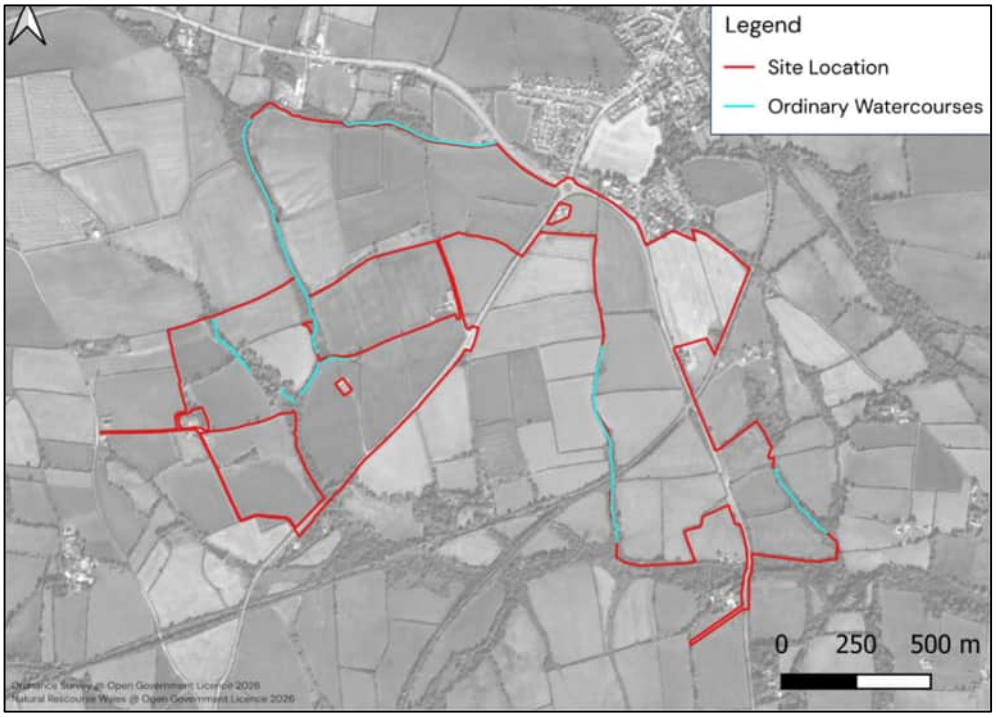
2.14. The Site is not located in Source Protection Zone.

2.15. The Site is located within the WFD catchment area of the WFD River Water Body 'Westfield Pill – headwaters to tidal limit' which is located within the 'Cleddau and Pembrokeshire Coastal Rivers Catchment' which has an overall water status of 'Moderate'.

2.16. Given the agricultural nature of the Site, it is understood that it is likely there are no existing sewers within the application boundary.

[1] Main rivers' are usually larger streams and rivers, but some of them are small watercourses of significance. They include certain structures that control or regulate the flow of water in, into or out of the channel.
[2] https://datamap.gov.wales/maps
[3] Ordinary Watercourses include all other water channels not classified as Main Rivers. This broad category encompasses smaller streams, brooks, ditches, drains, culverts, and dykes.

Figure 2.2 – Ordinary Watercourses



3. Proposed Development

3.1. The Proposed Development is for the "*installation of ground mounted solar photovoltaic arrays (with a capacity of up to 65MWac) together with all associated work, equipment, infrastructure and onsite point of connection via underground cable*" on Land Surrounding Great Harmeston Buildings, Pembrokeshire, SA62 3HM.

3.2. The Proposed Site Plan is included in **Appendix B.** The Site is proposed to be accessed via the existing A4076 Milford Road

4. Flood Risk and Land Use Vulnerability

Planning Policy Wales Edition 12 (2024)

4.1. Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It was last updated in July 2024.

4.2. PPW outlines that all new development should:

1. Consider all flood risk at an early stage in the development.
2. Reduce, and must not increase, flood risk arising from river and/or coastal flooding on and off the development Site itself.
3. Not cause additional run-off, which can be achieved by controlling surface water as near to the source as possible by the use of SuDS.

TAN15 – Development, Flooding and Coastal Erosion (2025)

4.3. Technical Advice Note 15 (TAN15) reflects the core principles of the National Strategy for Flood and Coastal Erosion Risk Management in Wales, to adopt a risk-based approach in respect of new development in areas at risk of flooding and coastal erosion. TAN15 was last updated in March 2025.

4.4. TAN15 (2025) discusses how flood risk encompasses 2 things:

1. The likelihood of an event happening
2. The impact that will result if flooding or coastal erosion occurs.

4.5. The risk-based approach set out in TAN15 (2025) is based on:

a) A Flood Map for Planning identifying flood zones;

b) Defining development types by their vulnerability in flood events;

c) Advice on permissible uses in relation to the location of development and the consequences of flooding;

d) The preparation of strategic flood consequences and flood consequences assessments at the local level to refine understanding of flood risk;

e) Planning authorities incorporating local flood risk considerations into their planning policies and decisions.

4.6. Based on the above consideration of flood risk, TAN15 (2025) sets out the different requirements that apply to different types of new development in different areas.

Suitability of the Proposed Development

4.7. The proposed solar farm is defined as "less vulnerable development" in TAN15 (2025), falling under the category of "renewable energy generation facilities".

4.8. The majority of the Site and all Proposed Development is located in Flood Zone 1 for risk of flooding from Rivers and Sea. Flood Zone 1 is classified as having the lowest probability of flooding. The majority of the Site is also located within Flood Zone 1 for risk of flooding from Surface Water and Small Watercourses, however there are some small areas of the Proposed Development located within Flood Zone 2 and 3 risk of flooding from Surface Water and Small Watercourses.

4.9. Section 11 of TAN15 (2025) details that any development that is permitted to be located in flood risk areas must ensure the following conditions are met:

- No increase in flooding elsewhere.
- Occupiers aware of flood risk.
- Escape/evacuation routes present.
- Flood emergency plans and procedures agreed and in place.
- Flood resistant and resilient design.
- Acceptable consequences for type of use.

4.10. In addition to the above, TAN15 (2025) details that new developments should be flood free during a 1 in 100 year river flood and 1 in 200 year tidal flood, plus an allowance for climate change over the lifetime of the development.

4.11. Tolerable conditions are also set out in TAN15 (2025) which aim to ensure flooding does not endanger life by defining tolerable flood depths for various developments when assessed against an extreme 1 in 1,000 year flood event. For less vulnerable development, as proposed here, TAN15 (2025) defines a maximum tolerable depth of flooding during a 1 in 1,000 year event of 600mm.

5. Site Specific Flood Risk

5.1. In accordance with NRW guidance, this FCA considers the risk of flooding from:

a) Rivers
b) The Sea
c) Surface Water and Small Watercourses
d) Groundwater
e) Reservoirs

5.2. In addition to requirements set out above, the following sources of flooding have also been considered as part of this FCA:

a) Sewers

Flood Map for Planning Flood Risk Classification

5.3. As discussed in Section 1, NRW's Flood Map for Planning was implemented into planning policy alongside the updated TAN15 (2025). The Flood Map for Planning includes several layers reflecting flood risk from Rivers, Rivers & Sea, Sea and Surface Water and Small Watercourses. The risk from each source is defined as Flood Zone 1, Flood Zone 2 and Flood Zone 3. The flood risk classification defined by NRW's Flood Map for Planning is summarised in Table 5.1 below.

Table 5.1 – NRW Flood Map for Planning – Risk Classification

Flood Risk Classification	Risk of Flooding (including the effects of climate change)
Rivers – Flood Zone 1	Less than 1 in 1,000 year
Rivers – Flood Zone 2	Less than 1 in 100 year but greater than 1 in 1,000 year
Rivers – Flood Zone 3	Greater than 1 in 100 year
Sea – Flood Zone 1	Less than 1 in 1,000 year
Sea – Flood Zone 2	Less than 1 in 200 year but greater than 1 in 1,000 year
Sea – Flood Zone 3	Greater than 1 in 200 year

Surface Water and Small Watercourses – Flood Zone 1	Less than 1 in 1,000 year
Surface Water and Small Watercourses – Flood Zone 2	Less than 1 in 100 year but greater than 1 in 1,000 year
Surface Water and Small Watercourses – Flood Zone 3	Greater than 1 in 100 year

Rivers

Flood Map for Planning

5.4. The Flood Map for Planning Rivers Dataset produced by Natural Resource Wales (NRW) shows that the majority of the Site is located in Flood Zone 1, not predicted to be impacted by a 1 in 1,000 year fluvial flood event) (refer to Figure 5.1).

5.5. There are some small areas along the southern boundaries of the Site which are located within Flood Zone 2 and 3. Intentionally through design, there is no Proposed Development including infrastructure within areas of Flood Zone 2 and 3 for Rivers.

5.6. According to the NRW Flood Map for Planning Interactive map, there are no recorded flood extents on Site. Recorded flood extents are defined as "*areas recorded to have flooded in the past from rivers, sea or surface water*".

5.7. To ensure maintenance access to Ordinary Watercourses on Site is not impacted by the Proposed Development, an easement of 5m from the top of bank from all Ordinary Watercourses on Site has been left clear of development. This easement has been agreed with the SAB during consultation (see **Appendix E**).

NRW Consultation

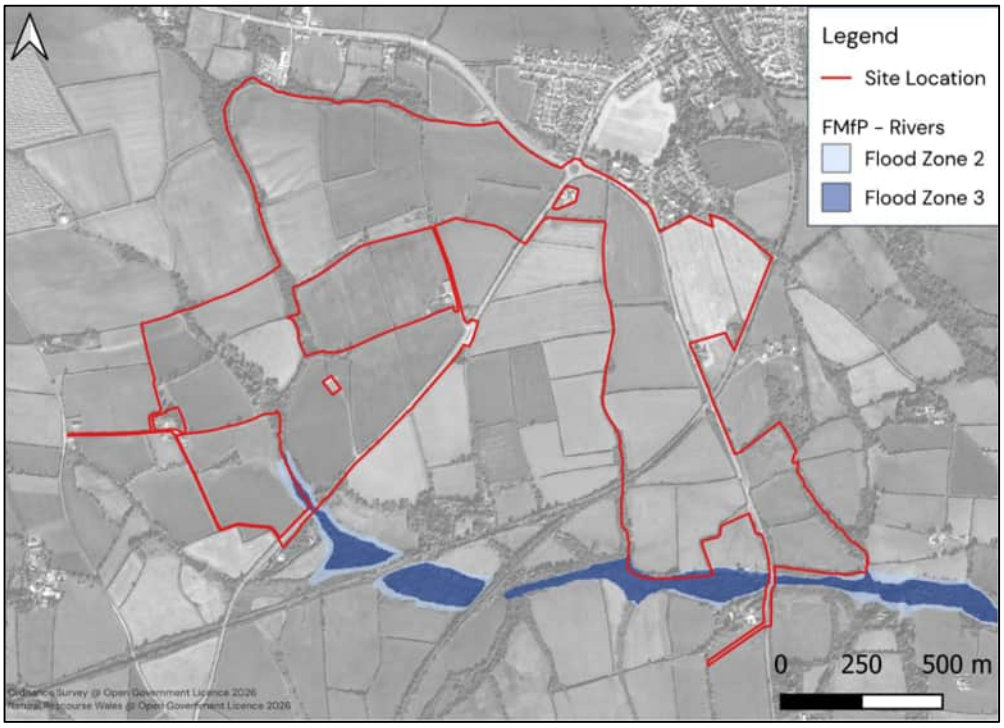
5.8. Given the small areas of Flood Zone 2 and 3 along the Site's southern boundary, NRW were consulted for any guidance or advice which should be followed to allow an assessment of flood risk that adheres to their requirements. NRW responded stating that "*as such a small area of the Site is within flood zones relating to fluvial or tidal flooding I don't think we could add much value to a pre-application at this stage*".

5.9. Based on this response, it is concluded that NRW agree risk is minimal on Site. The NRW response is included as **Appendix C**.

Conclusion

5.10. Overall, based on the above, the Site is considered to be at **Very Low** risk of flooding from rivers.

Figure 5.1 – Flood Map for Planning – Rivers



Sea

5.11. NRW's Flood Map for Planning for Sea defines that the entire Site is located in Flood Zone 1, not predicted to be impacted by a 1 in 1,000 year tidal flood event. The nearest Flood Zone 2 and 3 extent for tidal flood risk is located over 2km south of the Site and therefore the Site is considered to be at negligible risk of tidal flooding.

5.12. The SFCA (2022) states that "*areas within Pembrokeshire Coast National Park are predominantly those at risk of tidal flooding*", the Site is not located within this area of risk.

5.13. Overall, based on the above, the Site is considered to be at **Very Low** risk of flooding from the sea.

Surface Water and Small Watercourses

5.14. NRW's Flood Map for Planning for Surface Water and Small Watercourses shows that the majority of the Site is in Flood Zone 1. There are some Flood Zone 2 and 3 flow paths located within the Site, however these are mainly associated with existing watercourses on Site (refer to Figure 5.2).

5.15. The layout will be designed to ensure no more vulnerable infrastructure proposed such as substation and inverters/transformers are located within areas at risk of Flooding

from Surface Water and Small Watercourses. Currently the layout shows one inverter/transformer within a Flood Zone 2 extent for Surface Water and Small Watercourses. The layout provided in **Appendix B** is intended to be further refined post consultation to ensure all greater infrastructure is not at risk of flooding from surface water and small watercourses.

5.16. Moreover, the lowest edge of solar panels proposed on Site will be raised 0.8m above the ground which will ensure existing surface water flow patterns will be maintained. The typical details of the panels are provided in **Appendix B**.

5.17. There are some areas of proposed internal access tracks which are located within Flood Zone 2 for risk of Flooding from Surface Water and Small Watercourses. Despite the identified flood risk along the proposed internal tracks, it is noted that the Site access will primarily be used during the construction phase and during the operation phase it will be managed remotely and only visited occasionally for maintenance.

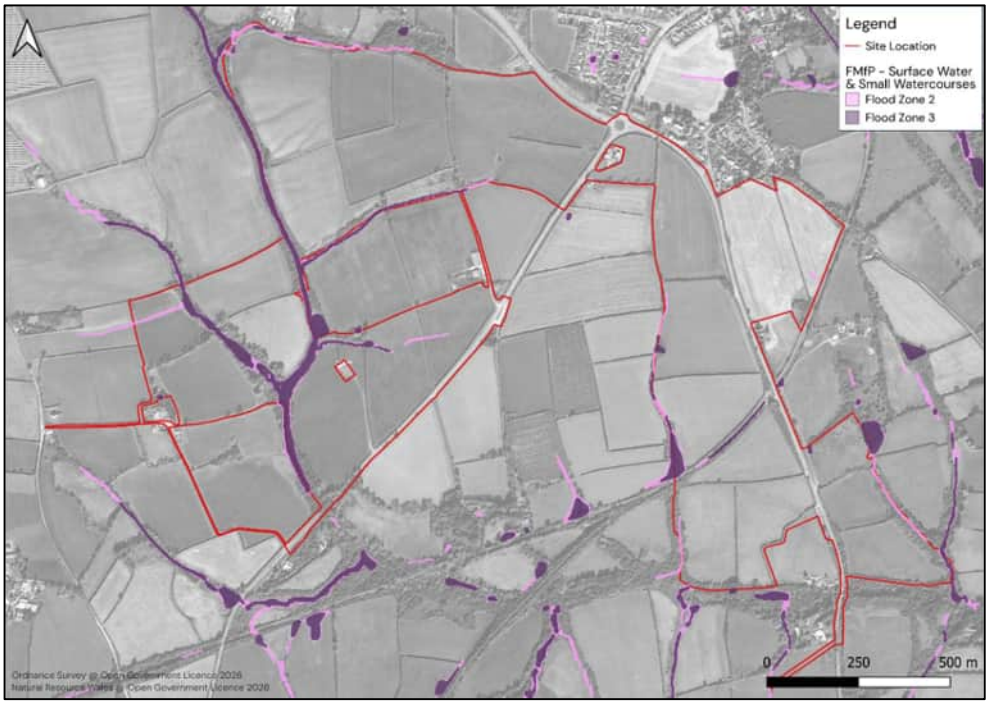
5.18. There is one proposed access track which will be used to access a section of the development via a watercourse crossing over an Ordinary Watercourse within the western extent of the Site. This access will cross a Flood Zone 2 and 3 extent for risk of flooding from Surface Water and Small Watercourses. During detailed design, the watercourse crossing will be designed to ensure existing flows in the watercourse will not be impacted.

5.19. The SFCA (2022) states that "*surface water flooding is predicted to predominantly follow topographical flows paths of existing watercourses or dry valleys in rural parts of the county*" which is typically shown in the NRW Flood Map for Planning for Surface Water and Small Watercourses for the Site.

5.20. A surface water drainage strategy will be implemented on Site to ensure surface water runoff rates from the Site and associated flood risk, do not increase as a result of the Proposed Development. The proposed surface water drainage strategy is included in Section 7.

5.21. Overall, given the above, the flood risk to the Site from surface water and small watercourses is considered to be **Low.**

Figure 5.2 – Flood Map for Planning for Surface Water and Small Watercourses



Groundwater

5.22. The hydrogeology 625K digital hydrogeological map of the UK highlights that the entire Site is underlain by a "low productivity aquifer" which will reduce the risk of groundwater emergence.

5.23. The SFCA (2022) states "*in the south of Pembrokeshire, including areas of Pembrokshire Coast National Park (south of Hill Mountain), groundwater is predominantly between 0.025m and 5m below ground level*".

5.24. The Infiltration Testing Report for the Site (provided in **Appendix D**) states that several trial pits encountered groundwater at 1.00 – 2.11mbgl.

5.25. The solar panels will be raised 0.8m above ground and therefore above any likely groundwater flooding depths. The proposed solar panels will generally comprise a 'fixed system' with vertical supports driven directly into the ground and no need for concrete foundations.

5.26. Topography on Site is not considered conducive to groundwater flooding – any groundwater to emerge would follow the existing Site topography and flow in either a, easterly, westerly or southerly direction without accumulating to significant depths on Site.

5.27. Overall, given the above, the risk of groundwater flooding on Site is considered to be **Low.**

Reservoirs

5.28. NRW's Flood Risk from Reservoirs mapping highlights that the Site is not within a Reservoir flood risk area. The nearest reservoir flood risk area is located approximately 4km north-east of the Site.

5.29. The SFCA (2022) states "*the failure of a reservoir can cause catastrophic damage due to the sudden release of large volumes of water. Reservoirs in the UK have an excellent safety record and NRW is the enforcement authority for the Reservoirs Act 1975 in England and Wales. All large reservoirs must be inspected and supervised by reservoir panel engineers. It is assumed that these reservoirs are regularly inspected, and essential safety work is carried out. Therefore, these reservoirs present minimal risk*".

5.30. Overall, the Site is considered to be at **Very Low** risk of reservoir flooding.

Sewers

5.31. The SFCA (2022) provides details of historic sewer flood incidents in Johnston, with four incidents being recorded in this Electoral Ward where the Site is located. There are however no known records of sewer flooding impacting the Site.

5.32. Based on the agricultural nature of the Site it is unlikely that the there is an existing sewerage network serving the Site or its immediate vicinity. Site topography is not conducive to sewer flooding – any sewer flood waters to reach the Site would follow the existing Site topography and flow either in an easterly, westerly or southerly direction without accumulating to significant depths on Site.

5.33. Overall, the Site is considered to be at **Low** risk of sewer flooding.

Access & Egress

5.34. The Site is proposed to be accessed via the existing A4076 Milford Road. The proposed access is located within the redline boundary and as such, has been considered within the above assessment, with the conclusion that the Site including access is at Very Low to Low risk of flooding from all sources. The Site access will primarily be used during the construction phase and during the operation phase it will be managed remotely and only visited occasionally for maintenance.

Flood Risk Summary

5.35. The risk of flooding from all sources is summarised in Table 5.2:

Table 5.2 – Flood Risk to the Site from All Sources

Flood Source	Flood Risk	Mitigation/Comments
Rivers	Very Low	• The Flood Map for Planning Rivers Dataset produced by NRW shows that the majority of the Site is located in Flood Zone 1. • There are some small areas along the southern boundaries of the Site which are located within Flood Zone 2 and 3. Intentionally through design, there is no Proposed Development including infrastructure within areas of Flood Zone 2 and 3. • According to the NRW Flood Map for Planning Interactive map, there are no recorded flood extents on Site. • Consultation with NRW confirms the risk is minimal on Site.
Sea	Very Low	• The Flood Map for Planning for the Sea does not predict the Site to be impacted by a 1 in 1,000 year tidal flood event. • The nearest Flood Zone 2 and 3 extent is located over 2km south of the Site and therefore the Site is considered to be at negligible risk of tidal flooding.
Surface Water & Small Watercourses	Low	• NRW's Flood Map for Planning for Surface Water and Small Watercourses shows that the majority of the Site is in Flood Zone 1. There are some Flood Zone 2 and 3 flow paths located within the Site, however these are mainly associated with existing watercourses on Site. • The layout will be designed to ensure more vulnerable infrastructure proposed such as substation and inverters/transformers are located within areas at risk of Flooding from Surface Water and Small Watercourses. Currently the layout shows one inverter/transformer within a Flood Zone 2 extent. The layout is intended to be further refined post consultation to ensure all

		greater infrastructure is not at risk of flooding from surface water and small watercourses. • The lowest edge of solar panels will be raised 0.8m above the ground which will ensure existing surface water flow patterns will be maintained • Watercourse crossings for internal tracks will be designed to ensure existing flows will not be impacted.
Groundwater	Low	• According to the NRW Interactive Map Viewer, the Site is located within a medium to high groundwater vulnerability zone. • The Infiltration Testing Report for the Site states that several trial pits encountered groundwater at 1.00 – 2.11mbgl, indicating shallow groundwater depths on Site. • The solar panels will be raised 0.8m above the ground and therefore above any likely groundwater flooding depths. This alongside the low productivity aquifer recorded will ensure that the risk of groundwater emergence on Site is minimal.
Reservoirs	Very Low	• The Site is not located within an area at flood risk from Reservoirs mapping, the likelihood of a reservoir breach is considered to be very low.
Sewers	Low	• There are four records of sewer flood incidents in the nearby town of Johnston. There are no known records of sewer flooding impacting the Site.

6. Mitigation Measures and Surface Water Drainage

6.1. This section summarises the proposed mitigation measures proposed on Site to ensure that:

a) The development is not at risk of fluvial flooding and would not increase fluvial flood risk.

b) The development is not at risk of surface water flooding and would not increase surface water flood risk.

c) Maintenance access to Ordinary Watercourses on Site is not impacted by the development.

6.2. The potential impacts of the development on surface water runoff have also been considered.

Fluvial Flood Risk

6.3. Intentionally through design, all Proposed Development including infrastructure is located within Flood Zone 1 for Rivers.

Surface Water Flood Risk

6.4. As discussed in Section 5 of this assessment, the NRW Flood Map for Planning for Surface Water and Small Watercourses shows that the majority of the Site is in Flood Zone 1. There are however some Flood Zone 2 and 3 flow paths located within the Site, which are mainly associated with existing watercourses on and near to the Site. The following mitigation measures have been implemented into the Site design to ensure the development remains safe from surface water and small watercourse flooding over its lifetime;

- Currently the layout shows one inverter/transformer within a Flood Zone 2 extent for Surface Water and Small Watercourses. The layout provided in **Appendix B** is intended to be further refined post consultation to ensure all greater infrastructure is not at risk of flooding from surface water and small watercourses.

- As standard, the lowest edge of solar panels proposed on Site will be raised 0.8m above the ground which will ensure existing surface water flow patterns will be maintained.

6.5. As such, considering the above mitigation measures in place, the Proposed Development will not be at significant risk from surface water flooding.

Ordinary Watercourse Easements

6.6. To ensure maintenance access to Ordinary Watercourses on Site is not impacted by the Proposed Development, an easement of at least 5m from the top of bank from all Ordinary Watercourses has been left clear of development. These easements have been based on the Topographical Survey and LiDAR defined top of bank locations. The Ordinary Watercourses on Site are shown in Figure 2.2.

Impact on Surface Water Runoff

Solar Panels

6.7. The proposed solar panels will generally comprise a 'fixed system' with vertical supports driven directly into the ground and no need for concrete foundations. Therefore, there will be negligible increase in impermeable area.

6.8. As standard, all proposed solar panels will have their lowest edge raised at 0.8m above the ground. This will ensure that surface water can continue to flow freely below the panels and existing surface water drainage patterns will not be affected.

6.9. Overall, the impact of the proposed solar panels on surface water runoff rates and flow patterns on Site is considered to be negligible, with the land use changes discussed below providing an improvement over the baseline conditions. Despite this, taking a conservative approach to ensure maximum betterment on Site, a surface water drainage strategy has been developed for the proposed solar panels and is included in Section 7.

Substation Compound and Inverters/Transformers

6.10. Alongside the solar areas, there are multiple inverters/transformers and a substation compound with O&M storage comprising of a number of small buildings proposed on Site.

6.11. Runoff from the proposed infrastructure will be managed with the surface water drainage strategy detailed in Section 7.

6.12. Although this infrastructure will increase the area of hardstanding and may therefore increase surface water runoff from the Site and associated flood risk, considering the small size of these features and the maintained grassland across the Site that will help surface water runoff dissipate, the impact on surface water runoff patterns is considered to be negligible.

6.13. Typical design details of the substation and inverters/transformers can be found in **Appendix B**.

Access Tracks

6.14. The proposed internal access tracks will be constructed with permeable aggregate (details provided in **Appendix B**). Surface water runoff will therefore be able to discharge into the crushed stone and encourage infiltration into the surrounding ground.

Proposed Land Use Change

6.15. The proposals will result in the change of use of the land for the lifetime of the development which will in turn, result in a variety of beneficial effects which will serve to reduce soil compaction and runoff rates from the Site, as listed below:

- The Site will not be left without vegetation cover during the winter as experienced with arable farming;
- The Site will not be intensively trodden or over grazed; and
- The Site will not be regularly traversed by heavy machinery.

6.16. The Site will be permanently vegetated with grassland located beneath and around the solar arrays to improve the biodiversity from previous arable use and allow soil ecosystems to rest and restore over time in the absence of intensive agriculture and nutrient loading.

6.17. If grazing is undertaken on Site following development, a grazing density will be used to limit compaction and maintain sufficient grass cover. Permanent grass cover on the Site will be maintained to ensure the risk of erosion below solar panels is minimised.

7. Surface Water Drainage Strategy

7.1. To ensure surface water runoff from the Site and associated flood risk does not increase as a result of the Proposed Development and to provide maximum surface water betterment, a surface water drainage strategy will be implemented on Site.

7.2. As discussed in the previous Section of this assessment, the Proposed Development will have only a negligible impact on existing surface water runoff and associated flood risk, however a surface water drainage strategy has been prepared which would result in betterment over the baseline scenario.

SAB Consultation

7.3. Consultation has been undertaken with Pembrokeshire SAB regarding initial guidance for the proposed solar farm development in relation to surface water flood risk, drainage requirements, infiltration testing and Ordinary Watercourse easements.

7.4. The SAB confirmed that percolation tests should be carried out to BRE 365 guidelines and advised that the proposed number of infiltration tests 'seemed reasonable at this stage' (refer to **Appendix E**)

7.5. The SAB also confirmed a preference for 5m Ordinary Watercourse easements (Refer to **Appendix E**).

7.6. The SAB recommended that a formal Pre-App should be undertaken. This will be submitted before the planning application is finalised and submitted to Planning and Environment Decisions Wales (PEDW).

Surface Water Management

7.7. The Sustainable Drainage Systems (SuDS) hierarchy demands that surface water run off should be disposed of as high up the following list as practically possible:

- Into the ground (infiltration) and re-use, or then;
- To a surface water body, or then;
- To a surface water sewer, highway drain or another drainage system, or then;
- To a combined sewer.

7.8. In order to determine the most suitable method of surface water disposal from the Site the options listed above have been considered as follows:

Infiltration

7.9. Infiltration testing was completed at the Site in January 2026 (refer to **Appendix D**). The results of the testing were summarised as follows; There are generally mixed results across the entire area to be developed, however, '*It is clear that the ground is generally poorly draining with groundwater encountered in numerous trial pits, to*

shallow depths. As noted on the Trial Pit drawing provided, infiltration could be possible in the fields where Trial Pits 1 and 6 have been excavated, however, it is unlikely to be approved without groundwater monitoring given the areas surrounding containing groundwater to shallow depths".

7.10. It is noted where Trial Pits 1 and 6 were excavated that solar panels only are proposed. All other Trial Pit locations show the site to be unsuitable for infiltration-based SuDS, including where the proposed substation is located and where more formal SuDS are therefore required.

7.11. As such infiltration as the primary means of surface water disposal is considered unfeasible.

Surface Water Body

7.12. The next option in the SuDS hierarchy is to discharge surface water runoff into an existing surface water body.

7.13. There are several Ordinary Watercourses along the boundaries of the Site and through western portions of the Site (refer to Figure 2.2) which will provide a suitable outfall location for larger areas of infrastructure such as the substation.

SuDS selection process

7.14. Various methods of SuDS (Sustainable Drainage Systems) should be considered for use as different methods have constraints which may not be suitable for this development.

7.15. An assessment of the suitability of different SuDS techniques is summarised in Table 7.1 below. Guidance from 'The SuDS manual' C753 has been used to form the basis of this assessment.

Table 7.1 – Assessment of SuDS Suitability

SuDS Technique	Potentially suitable for this development	Justification
Rainwater Harvesting	No	Not considered suitable for solar development.
Green Roofs	No	Not considered suitable for solar development.
Infiltration Systems (Soakaways, etc.)	No	Infiltration not suitable based on infiltration testing results.

SuDS Technique	Potentially suitable for this development	Justification
Filter Drains	Yes	Could be used to help convey surface water runoff on Site. Proposed here to manage surface water runoff from the inverters.
Swales	Yes	Could be used to help convey surface water runoff on Site. Proposed here to help manage surface water runoff from the proposed solar panel areas.
Bioretention Systems	No	Not considered suitable.
Tree Pits	Yes	Could be considered but would not significantly reduce the storage requirements
Underground storage	Yes/No	Could be considered, however open SuDS features such as attenuation basins and ponds are preferable.
Attenuation basins & ponds	Yes	Proposed to manage surface water runoff from the proposed Substation.
Wetlands	No	Not considered suitable due to land take.
Permeable Paving	Yes	Access tracks are to be constructed from permeable aggregates.

Surface Water Drainage Strategy – Solar Panel Areas

7.16. As discussed above, although the proposed solar panels are considered to have a negligible impact on existing surface water runoff rates and associated flood risk, a surface water drainage strategy has been prepared which would result in improvement over the current baseline.

7.17. The surface water drainage strategy for the proposed solar panel areas comprise perimeter swales on the downslopes of solar arrays where ground levels are shown to be falling offsite.

7.18. Swales on Site will help capture overland flows on Site to reduce the risk of impacting neighbouring land and will also help promote infiltration of surface water. Any surface

water runoff to exceed the capacity of the proposed swales would simply slowly overtop the downslope swale berm and disperse into the surrounding grassland, as per the existing condition.

7.19. The proposed surface water drainage strategy plans are included in **Appendix F.**

7.20. In order to inform the proposed swale design, high-level attenuation calculations (Quick Storage Estimates using Causeway Flow software – refer to **Appendix G**) have been completed. The swales have been designed to attenuate flows up to and including the design 1 in 100-year plus 40% climate change event.

7.21. The climate change allowance of 40% is based on guidance from the TAN15 Table 2 – Change in Extreme Rainfall Intensity which states that for non-residential developments a design life of at least 75 years should form the basis for assessment. Whilst a design life of 75 years is likely to be greater than that of the proposed solar farm, as a conservative estimate 75 years has been used to inform the design.

7.22. Given the proposals for the swales to capture overland flows and simply overtop if the storage volume is exceeded, when calculating required storage volumes discharge rates have been set to 0 litres per second (l/s) for Quick Storage Estimates conducted using Causeway Flow software.

7.23. The impermeable areas used to complete the Quick Storage Estimate calculations have been calculated for solar panel areas with an allowance of 2% being used in consideration of the panel supports. Nominal increases in surface water run-off can be anticipated as a result of solar panel installation. An allowance of 2% from the panel areas is considered to be a conservative approach.

7.24. Calculations showing the proposed swale attenuation volumes are provided in **Appendix G.**

Surface Water Drainage Strategy – Inverters

7.25. There are several areas on Site where small inverters are proposed. Each inverter covers an area of 19m^2 and is therefore considered to have a negligible impact of surface water runoff rates.

7.26. Despite the above, to manage the inverters and provided further betterment on Site, 400mm gravel trenches are proposed to wrap around the inverters to capture any surface water runoff. Any surface water which exceeds the capacity of the proposed trenches would simply slowly overtop the filter drains and disperse into the surrounding grassland.

7.27. Similarly to the proposed swales, the gravel trenches have been sized assuming a 0l/s discharge rate for the design 1 in 100-year+CC allowance event. Calculations are provided in **Appendix G**.

Surface Water Drainage Strategy –Substation

7.28. The proposed surface water drainage strategy drawings are included in **Appendix F,** with the associated Causeway Flow drainage calculations included in **Appendix G**.

7.29. Surface water runoff from the proposed substation will be collected with a series of perforated collector pipes and solid walled surface water drains and directed towards an attenuation basin.

7.30. The substation SuDS have been designed to manage surface water runoff from 0.196ha of impermeable hardstanding for all storm events up to and including a 1 in 100 year rainfall event plus 40% allowance for climate change. This impermeable area used is a conservative value as in reality, much of the substation will comprise of permeable construction.

7.31. The proposed attenuation basin will outfall into the Ordinary Watercourse at the eastern edge of the substation area at a controlled rate of 1l/s (the calculated 50% Annual Exceedance Probability (AEP) (QBAR) greenfield runoff rate).

SuDS Features Maintenance

7.32. Maintenance of the surface water drainage infrastructure within the bounds of the Site curtilage should be the responsibility of the Site owner or maintenance company appointed by the owner.

7.33. The tables below set out the typical maintenance requirements and associated timescales for the proposed drainage features, in accordance with CIRIA C753 The SuDS Manual. It should be noted that the maintenance activities are not exhaustive.

Table 7.2: Swales Typical Maintenance Schedule

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly, or as required
	Cut grass – to retain grass height within specified design range	Monthly (during growing season), or as required
	Inspect infiltration surface for ponding, compaction, silt accumulation, record areas where water is ponding for >48 hours	Monthly, or as required
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation, establish silt removal frequencies	Half yearly
Occasional maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions if required	As required or if bare soil is exposed over 10% or more of the swale treatment area
Remedial actions	Repair erosion or other damage by re-turfing or reseeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up soil deposits and prevent compaction of the soil surface	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required

Table 7.3 – Attenuation Basin Maintenance Requirements

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly, or as required
	Cut grass – to retain grass height within specified design range	Monthly (during growing season), or as required
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect surface for ponding, compaction, silt accumulation, record areas where water is ponding for >48 hours	Monthly, or when required
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation, establish silt removal frequencies	Half yearly
Occasional maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions if required	As required or if bare soil is exposed over 10% or more of the basin treatment area
Remedial actions	Repair erosion or other damage by re-turfing or reseeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up soil deposits and prevent compaction of the soil surface	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required

Table 7.4 – Pipework & Manholes Maintenance Requirements

Maintenance Schedule	Required Action	Typical Frequency
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Rod through poorly performing runs as initial remediation.	As required
	If continued poor performance jet and CCTV survey poorly performing runs.	As required
	Seek advice as to remediation techniques suitable for the type of performance issue and location.	As required if above does not improve performance
Monitoring	Initial inspection should be provided as post construction CCTV survey.	Monthly for three months after installation
	Inspect for evidence of poor operation via water level in chambers and if required, take remedial action	Three monthly, 48 hours after large storms in first six months

Maintenance Schedule	Required Action	Typical Frequency
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Table 7.5 – Flow Control Chamber Maintenance Requirements

Maintenance Schedule	Required Action	Typical Frequency
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Rod through poorly performing runs as initial remediation.	As required
	If continued poor performance jet and CCTV survey poorly performing runs.	As required
	Seek advice as to remediation techniques suitable for the type of performance issue and location.	As required if above does not improve performance
Monitoring	Initial inspection should be provided as post construction CCTV survey.	N/A
	Inspect for evidence of poor operation via water level in chambers and if required, take remedial action	Three monthly, 48 hours after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Table 7.6 – Filter Drains – Maintenance requirements

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices	Monthly (or as required)
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage.	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies.	Six monthly
	Remove sediment from pre-treated devices	Six monthly, or as required
Occasional Maintenance	Remove or control tree roots where they are encroaching the sides of the filter drain, using recommended methods.	As required

Maintenance Schedule	Required Action	Typical Frequency
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlying filter medium.	Five yearly, or as required
	Clear perforated pipework for blockages	As required

Water Quality

7.34. The SuDS Manual (CIRIA C753) states that the design of surface water drainage should consider minimising contaminants in surface water runoff discharged from the Site. The level of treatment required depends on the proposed land use, according to the pollution hazard indices.

7.35. Table 7.7 shows the pollution indices for the Proposed Development to ensure water quality is maintained under normal operating conditions.

Table 7.7 – Pollution Hazard Indices

Pollutant	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Other roofs (typically commercial/industrial roofs)	Low	0.3	0.2	0.05

7.36. Table 7.8 shows the pollution mitigation indices for the proposed Inverters (filter drain), solar panel areas (swales) and the proposed substation (attenuation basin). It is shown that the pollution mitigation index for each of the individual proposed SuDS features exceeds the Proposed Development pollution index. Therefore, the mitigation measures are deemed adequate for the Site.

Table 7.8 – Indicative SuDS Mitigation Indices

Type of SuDS component	Total suspended solids (TSS)	Metals	Hydrocarbons
Filter Drain (Inverters)	0.4	0.4	0.4
Attenuation Basin (Substation)	0.5	0.5	0.6
Swales	0.5	0.6	0.6

8. Summary

8.1. The Proposed Development is for the "*installation of ground mounted solar photovoltaic arrays (with a capacity of up to 65MWac) together with all associated work, equipment, infrastructure and onsite point of connection via underground ca*ble" on Land Surrounding Great Harmeston Buildings, Pembrokeshire, SA62 3HM.

8.2. Intentionally through design, all Proposed Development including infrastructure is located within Flood Zone 1 for Rivers.

8.3. The NRW Flood Map for Planning for Surface Water and Small Watercourses shows that the majority of the Site is in Flood Zone 1. There are however some Flood Zone 2 and 3 flow paths located within the Site, mainly associated with existing watercourses on and near to the Site. Currently the layout shows one inverter/transformer within a Flood Zone 2 extent for Surface Water and Small Watercourses. The layout provided in **Appendix B** is intended to be further refined post consultation to ensure all greater infrastructure is not at risk of flooding from surface water and small watercourses.

8.4. As standard, the lowest edge of solar panels proposed on Site will be raised 0.8m above the ground which will ensure existing surface water flow patterns will be maintained.

8.5. To ensure maintenance access to Ordinary Watercourses on Site is not impacted by the Proposed Development, an easement of at least 5m from the top of bank from all Ordinary Watercourses has been left clear of development. This easement has been agreed with the SAB during consultation.

8.6. The Site is not considered to be at significant risk of flooding from any source.

8.7. A surface water drainage strategy has been proposed to manage surface water runoff from the development to ensure runoff rates and associated flood risk on Site and elsewhere do not increase.

8.8. Overall, the development is not considered to be at significant risk of flooding, and a surface water drainage strategy will be implemented on Site to ensure flood risk elsewhere is not impacted. It is therefore concluded as acceptable development from a flood risk and surface water drainage perspective.

Appendix A – Topographic Survey

Topographical Survey

Drawing Key

- Bin
- Borehole
- Benchmark
- Bollard
- Camera / CCTV
- Column
- Tree Trunk (Varying Sizes)
- Downpipe
- Downpipe / Gulley
- Electic Post
- Earthing Rod
- Gas Cover
- Small Gully
- Inspection Cover (Round)
- Junction Box
- Letter Box
- Lamp Post
- Marker
- Milestone
- Post
- Rodding Eye
- Road Sign
- Stop Cock
- Sign Post
- Stay
- Tree Stump
- Water Tap
- Traffic Light
- Telegraph Post
- Tree (Varying Sizes)
- TV Point
- Vent Pipe
- Wet Area

- Bottom of Bank
- Bin
- Bottom of Kerb
- Building Line
- Boundary
- Edge of Path/ Back of Pavement
- Centre Line of Road
- Telephone Call Box
- Canopy Line
- Change of Surface
- Door
- Overhead Electric Cable
- Fence
- Gabion Wall
- Gate
- Gutter / Drain
- Hedge / Vegetation
- Metal Railings
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Topographical Survey

Drawing Key

- Bin
- Borehole
- Benchmark
- Bollard
- Camera / CCTV
- Column
- Tree Trunk (Varying Sizes)
- Downpipe
- Downpipe / Gulley
- Electic Post
- Earthing Rod
- Gas Cover
- Small Gully
- Inspection Cover (Round)
- Junction Box
- Letter Box
- Lamp Post
- Marker
- Milestone
- Post
- Rodding Eye
- Road Sign
- Stop Cock
- Sign Post
- Stay
- Tree Stump
- Water Tap
- Traffic Light
- Telegraph Post
- Tree (Varying Sizes)
- TV Point
- Vent Pipe
- Wet Area

- Bottom of Bank
- Bin
- Bottom of Kerb
- Building Line
- Boundary
- Edge of Path/ Back of Pavement
- Centre Line of Road
- Telephone Call Box
- Canopy Line
- Change of Surface
- Door
- Overhead Electric Cable
- Fence
- Gabion Wall
- Gate
- Gutter / Drain
- Hedge / Vegetation
- Metal Railings
- Open Sided Building
- Quarry Face
- Retaining Wall
- French Drain
- Sign
- Step
- Style
- Top of Bank
- Top of Kerb
- Watercourse Bottom
- Watercourse Top
- White Line
- Wall
- Air Valve
- British Telecom Cover
- Cable TV Cover
- Fire Hydrant
- Gas Valve
- Inspection Cover
- Junction Box
- Kerb Outlet
- Gully
- Inspection Cover (Triangle)

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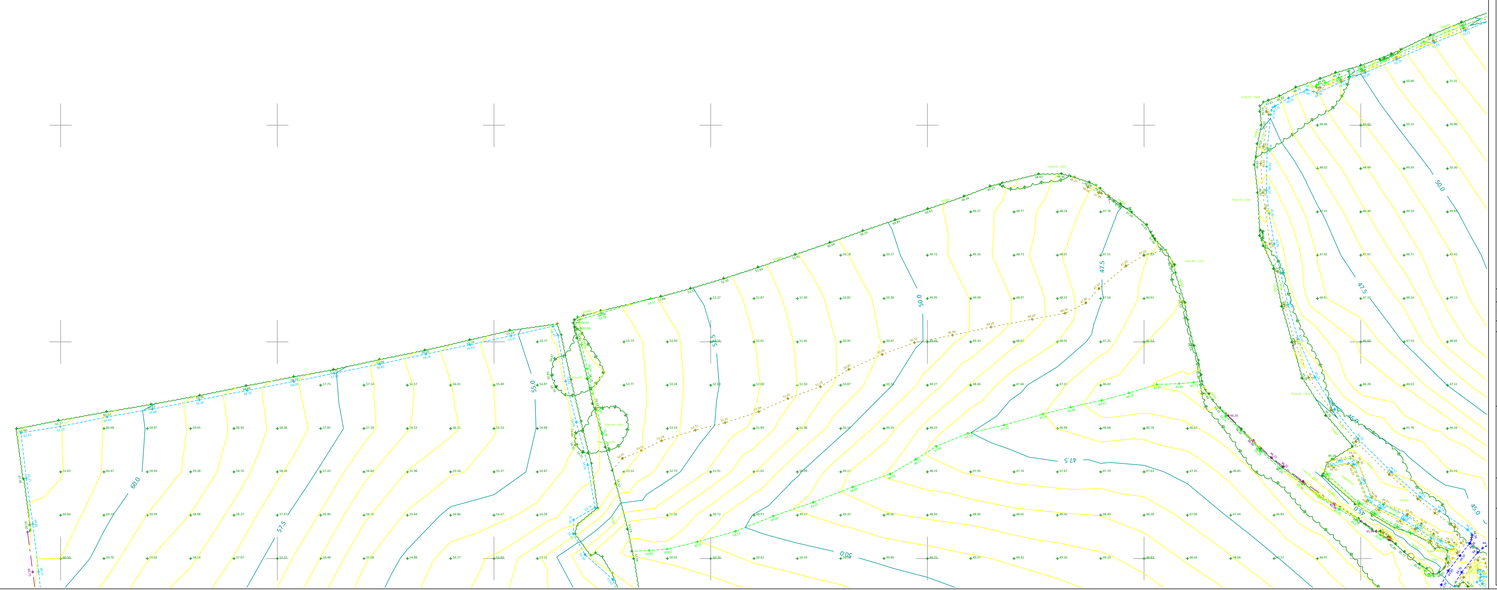

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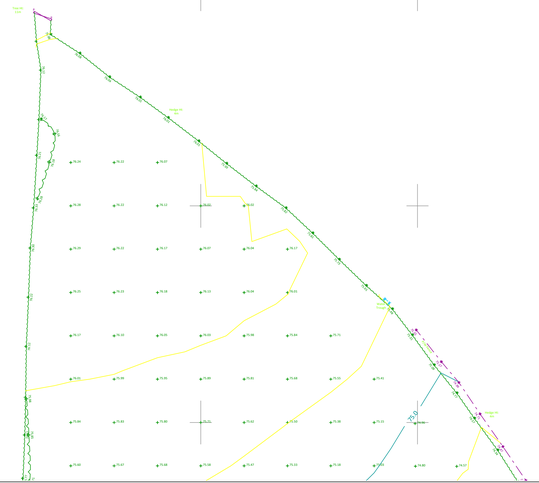

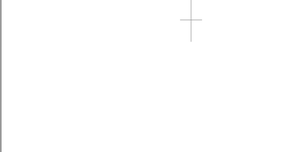

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Appendix B – Proposed Site Layout and Design Details

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W E

S

20M DEEP BELT OF NEW WOODLAND

50M DEEP BIODIVERSITY PLANTING

50M DEEP BIODIVERSITY PLANTING

GAP UP AND EXISTING HEDGEROW AND MAINTAIN TO 2.5M HEIGHT

EXTEND EXISTING HEDGEROW AND MAINTAIN TO 2.5M HEIGHT

EXTEND EXISTING AND GAP UP HEDGEROW AND MAINTAIN TO 2.5M HEIGHT

EXTEND EXISTING AND GAP UP HEDGEROW AND MAINTAIN TO 2.5M HEIGHT TO CONNECT HABITATS

SUBSTATION

O&M SPARES & STORAGE

GRID CONNECTION ROUTE

P.O.C

0M 100M 200M 300M 400M 500M 600M 700M 800M

LEGEND

- SITE BOUNDARY (HLP)
- GROUND MOUNTED SOLAR PANEL
- 132KV VILLAGE BRIDGES
- PERIMETER SECURITY FENCING
- NEW 132KV TRANSFORMER

arise

93.11MWp

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GREAT HARMESTON

PROPOSED SITE PLAN

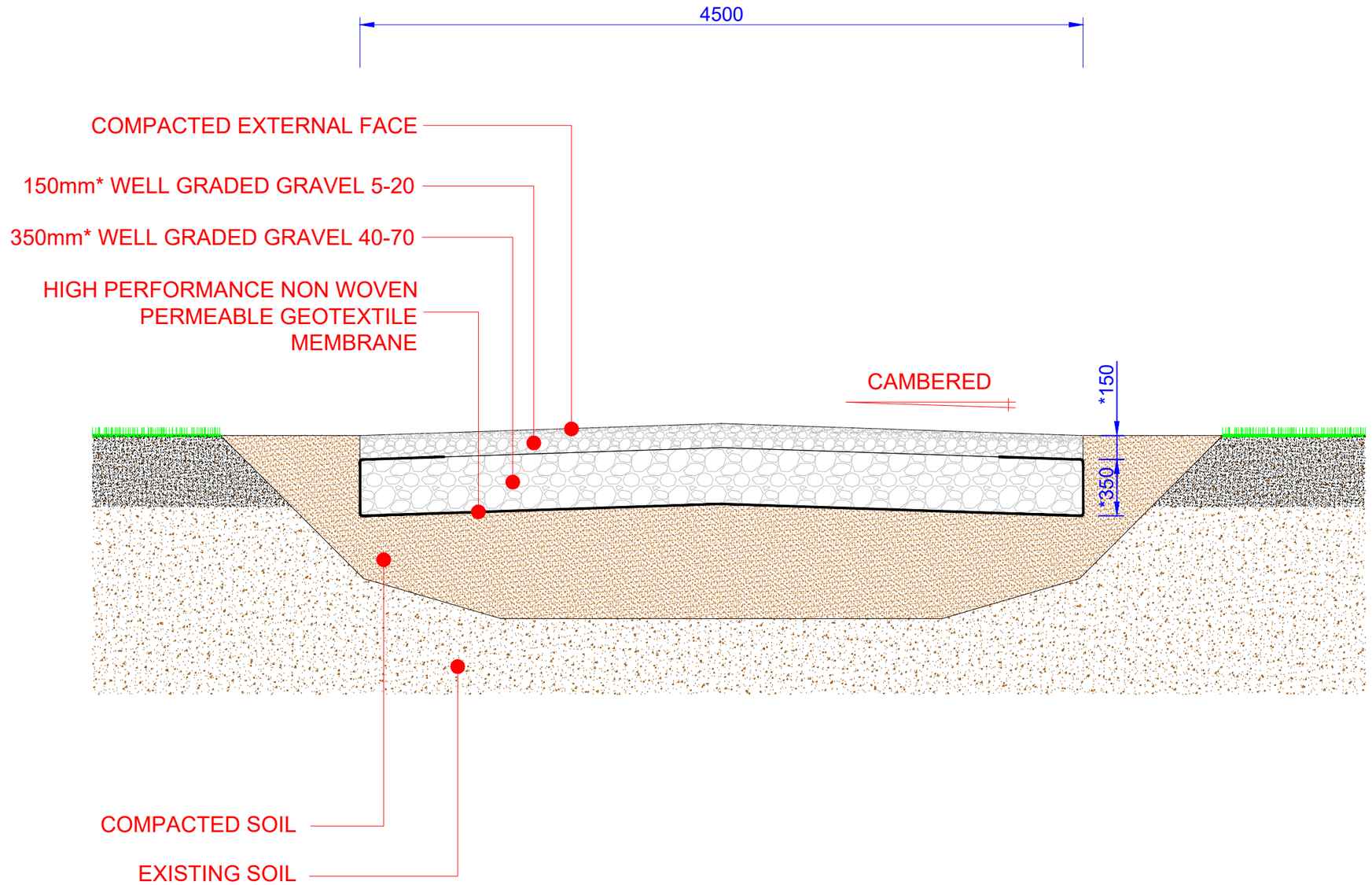
LAND EAST & WEST OF JUNCTION OF MILFORD ROAD A4076 A477, JOHNSTON SA62 3HL

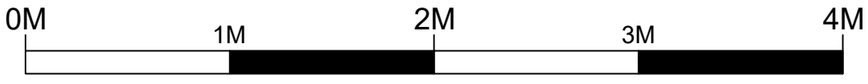
PRE-PLANNING

1:2500@A1 | JUL 25

HSF-RRL-V1-00-CRV-0002-S0-P09

* TYPICAL GENERIC SECTION , ALL DIMENSIONS AND BUILD UP SHOWN ARE NOMINAL, SITE ENGINEER TO SPECIFY EXACT BUILD UP AND SECTIONS FOLLOWING SITE INVESTIGATION





* TYPICAL GENERIC SECTION , ALL DIMENSIONS AND BUILD UP SHOWN ARE NOMINAL, SITE ENGINEER TO SPECIFY EXACT BUILD UP AND SECTIONS FOLLOWING SITE INVESTIGATION

SITE :

TITLE :
ACCESS ROADS

LOCATION :

STATUS :
PLANNING

SCALE :
1:30@A3

DATE :
JUN 24

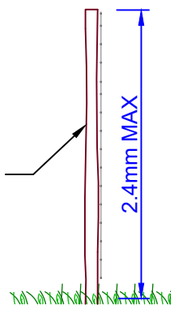
DRAWING NUMBER :
FSF-RHL-V1-00-CM-Y-**0006**-S0-**P01**

DO NOT SCALE FROM DRAWING, USE ANNOTATED DIMENSIONS ONLY

TYPICAL GATE IMAGE

ELEVATION

PERMEABILITY FOR SMALL MAMMALS
ENABLED BY NATURAL UNDULATIONS
IN GROUND LEVEL



SECTION A'A

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SITE :

TITLE :
PERIMETER FENCING

LOCATION :

STATUS :
PLANNING

SCALE :
1:50@A3

DATE :
JUN 24

DRAWING NUMBER :
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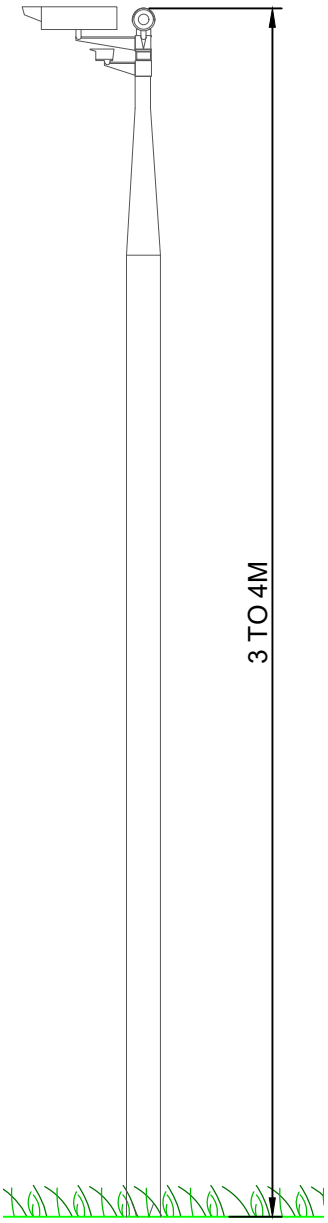
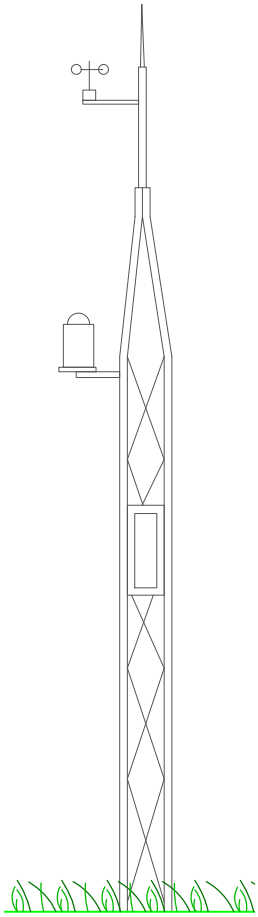
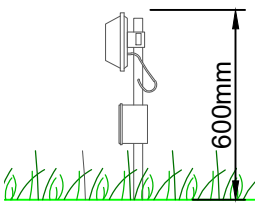


POLE MOUNTED - THERMAL IMAGING, INWARD-FACING CCTV
COLOUR : PLAIN GALV STEEL



MET DATA COLLECTION
COLOUR : DARK GREEN



GROUND MOUNTED RADAR
COLOUR : DARK GREEN

SITE :

TITLE :
SECURITY & MET DATA

LOCATION :

STATUS :
PLANNING

SCALE :
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DATE :
JUN 24

DRAWING NUMBER :
FSF-RHL-V1-00-CM-Y-**0009**-S0-**P01**

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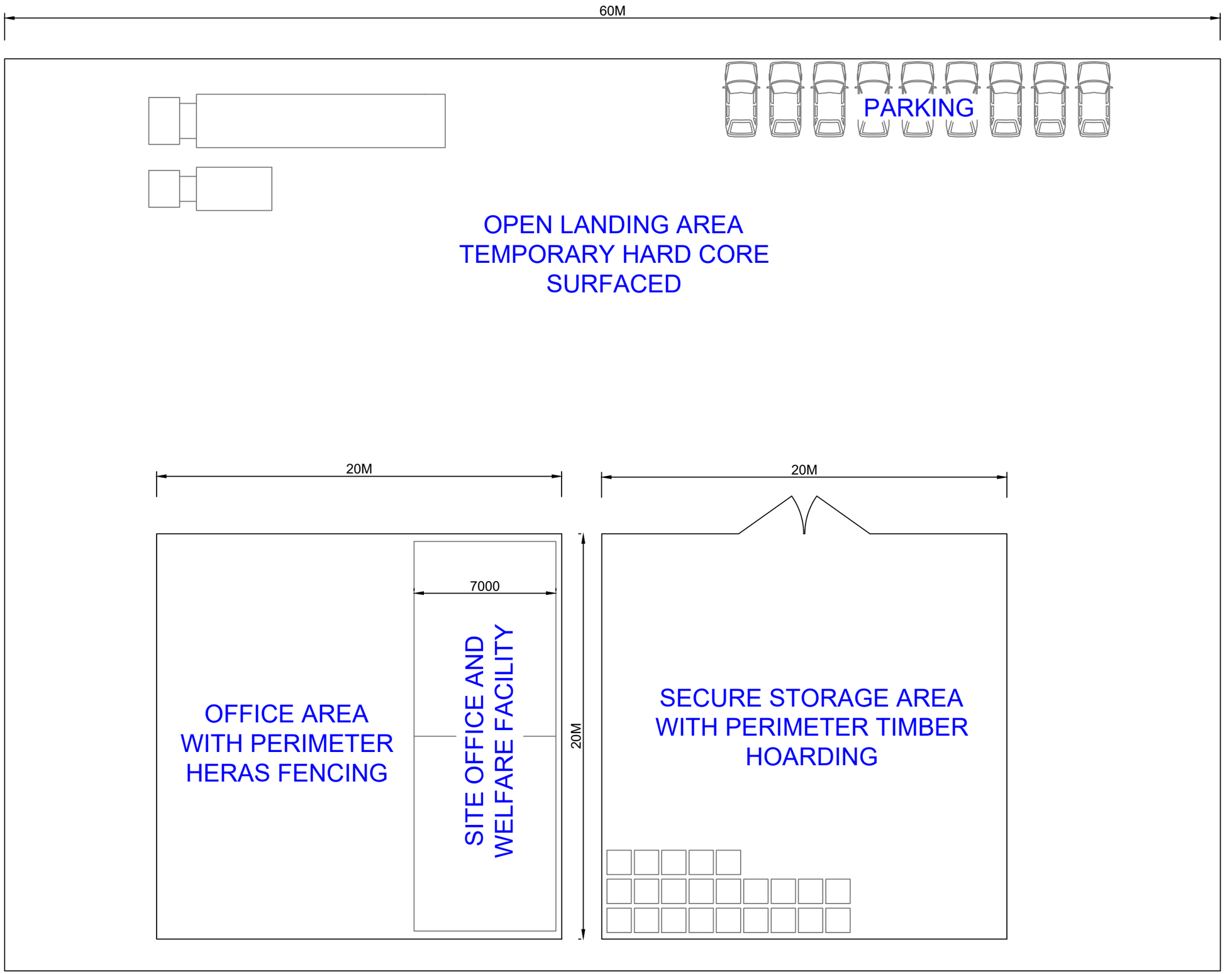

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TYPICAL TEMPORARY CONSTRUCTION COMPOUND

STATUS :
PLANNING

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DATE :
JUN 24

DRAWING NUMBER :

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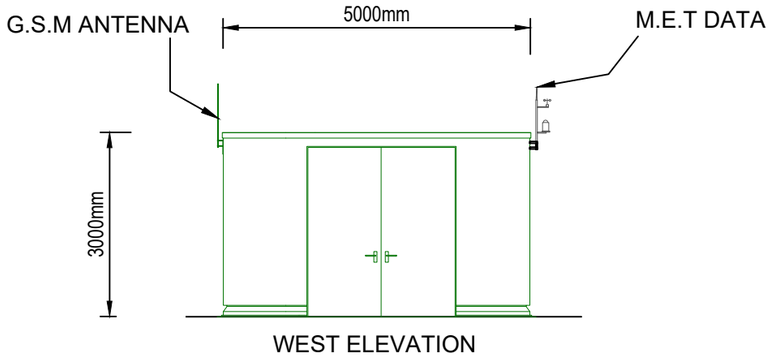

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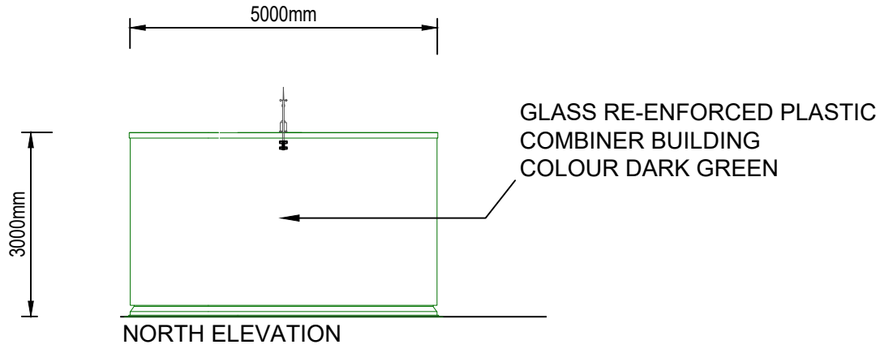

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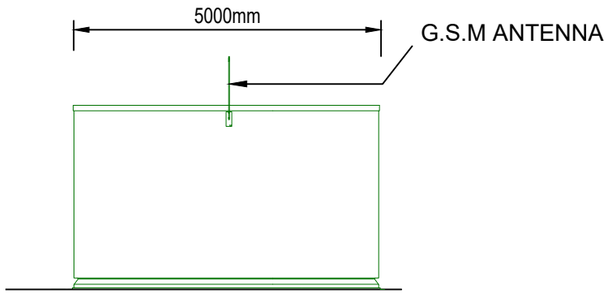

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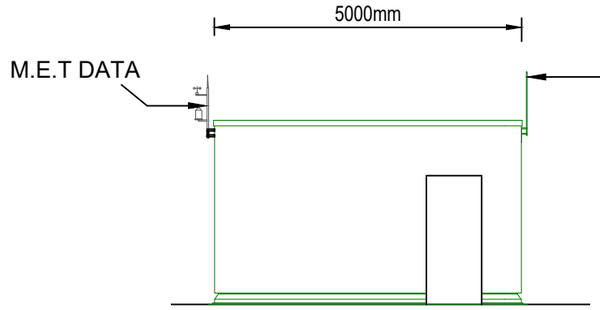
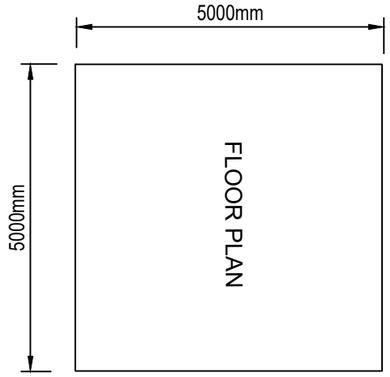


EAST ELEVATION



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TITLE : DNO SUB

LOCATION :

STATUS : PLANNING

SCALE : 1:50@A3

DATE : JUN 24

DRAWING NUMBER : FSF-RHL-V1-00-CM-Y-**0017**-S0-**P01**

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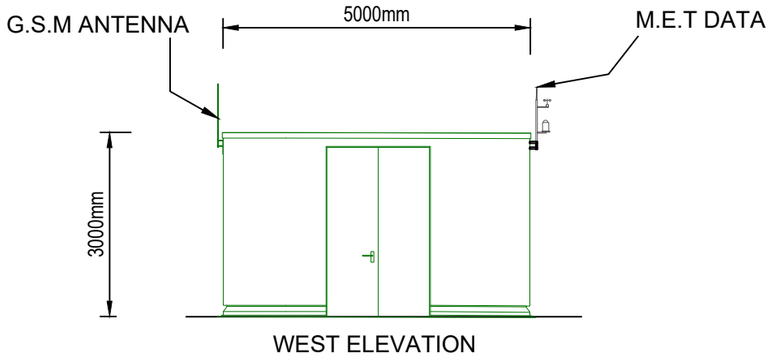

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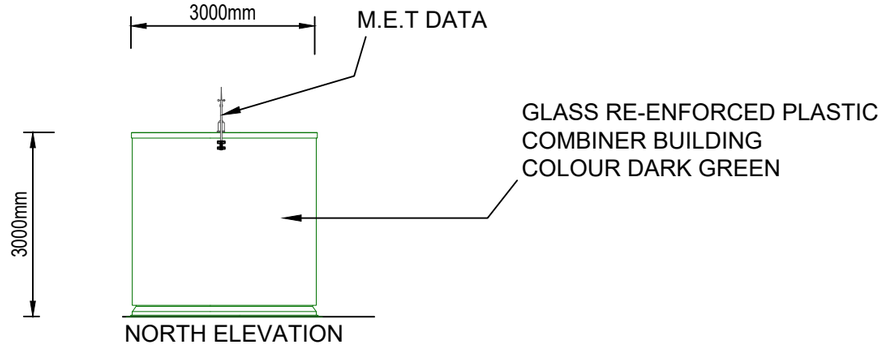

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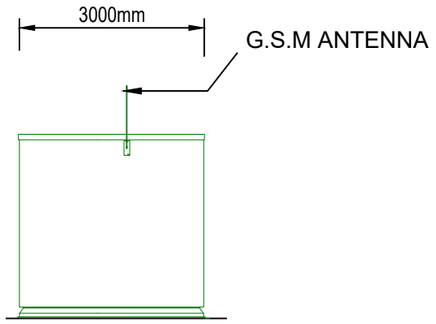

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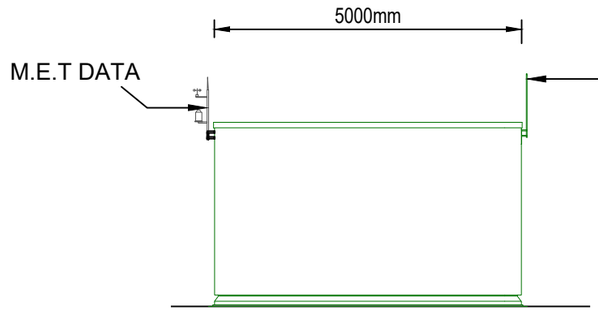

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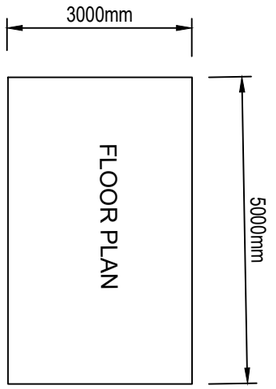


SITE :

TITLE :
SITE SUBSTATION

LOCATION :

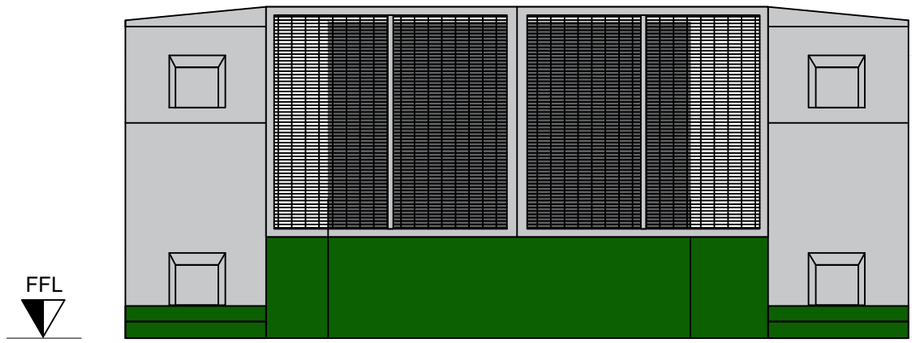
STATUS :
PLANNING

SCALE :
1:100@A3

DATE :
JUN 24

DRAWING NUMBER :
FSF-RHL-V1-00-CM-Y-**0015**-S0-**P01**

DO NOT SCALE FROM DRAWING, USE ANNOTATED DIMENSIONS ONLY



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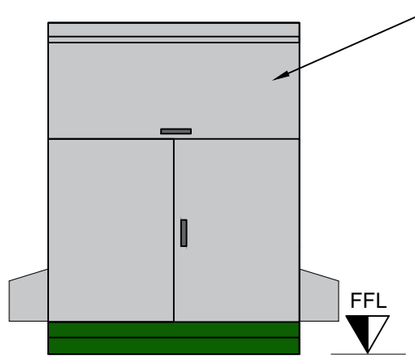
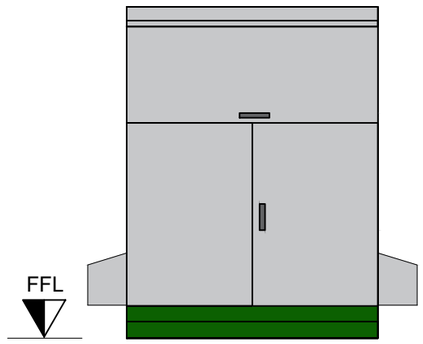


END ELEVATION

IMAGE



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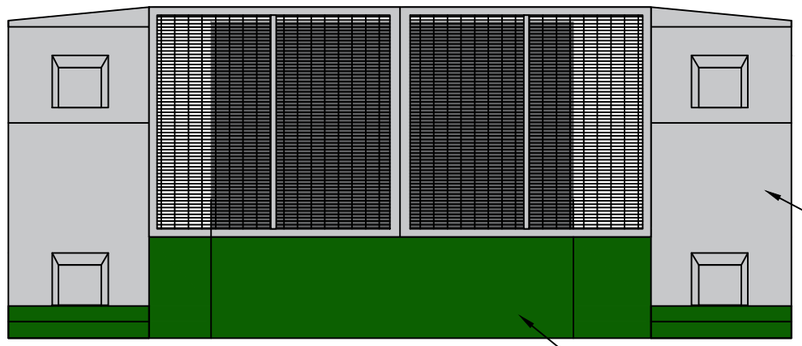
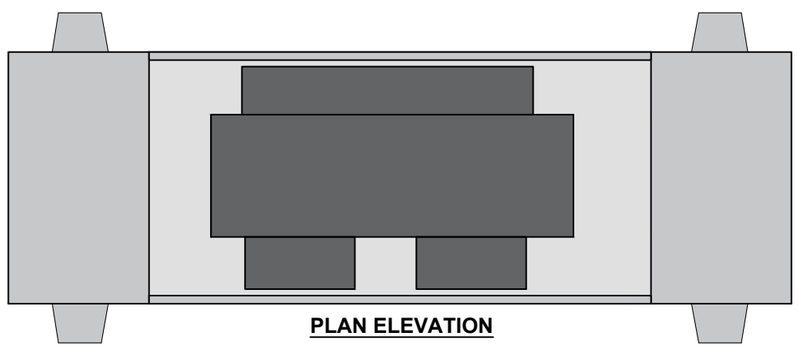


REAR ELEVATION



PLAN ELEVATION

SITE :

TITLE :
INVERTER / TRANSFORMER

LOCATION :

STATUS :
PLANNING

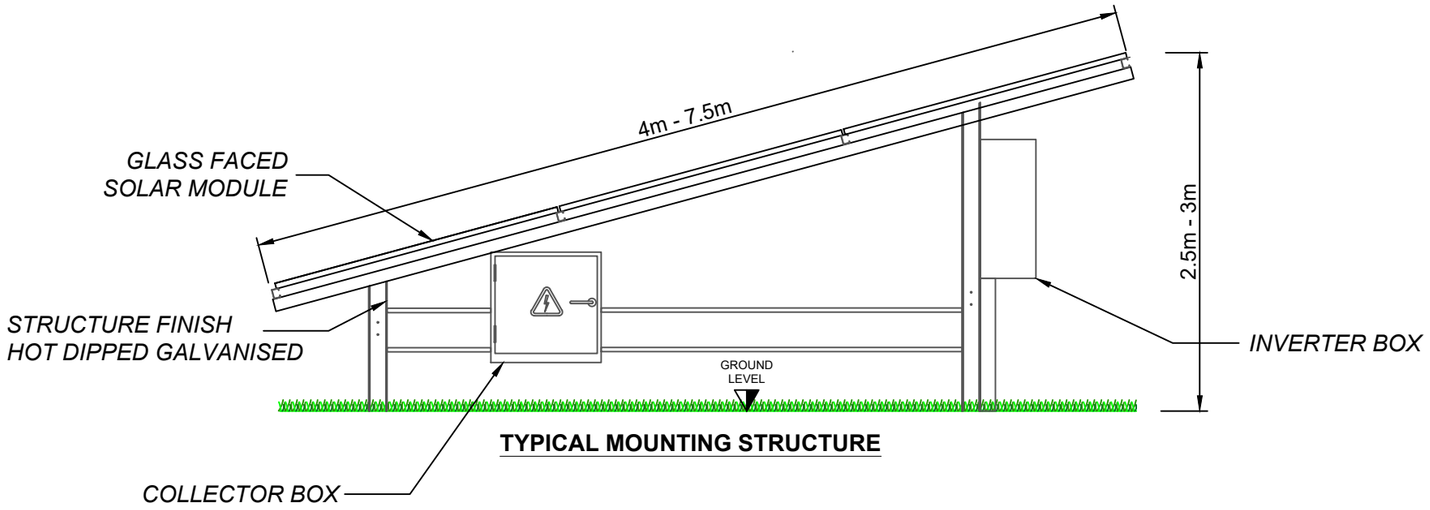
SCALE :
1:50@A3

DATE :
JUN 24

DRAWING NUMBER :
FSF-RHL-V1-00-CM-Y-**0012**-S0-**P02**

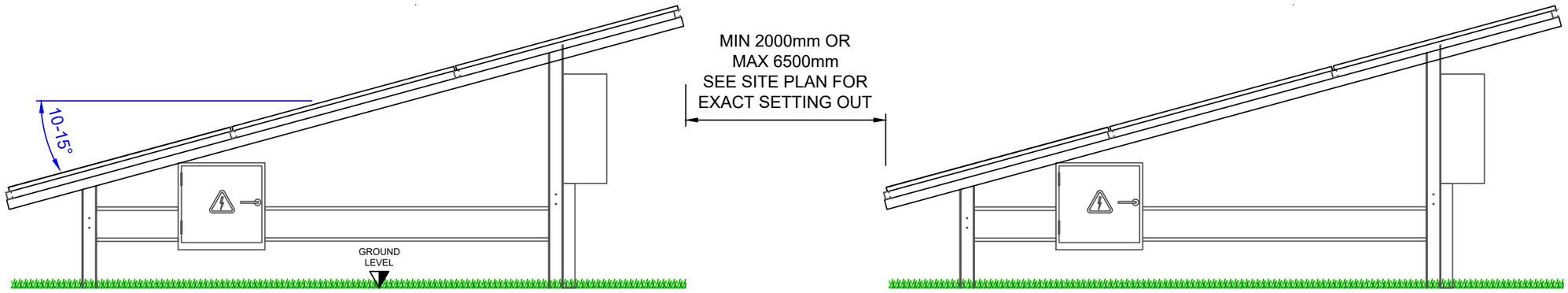
DO NOT SCALE FROM DRAWING, USE ANNOTATED DIMENSIONS ONLY

SECTIONS

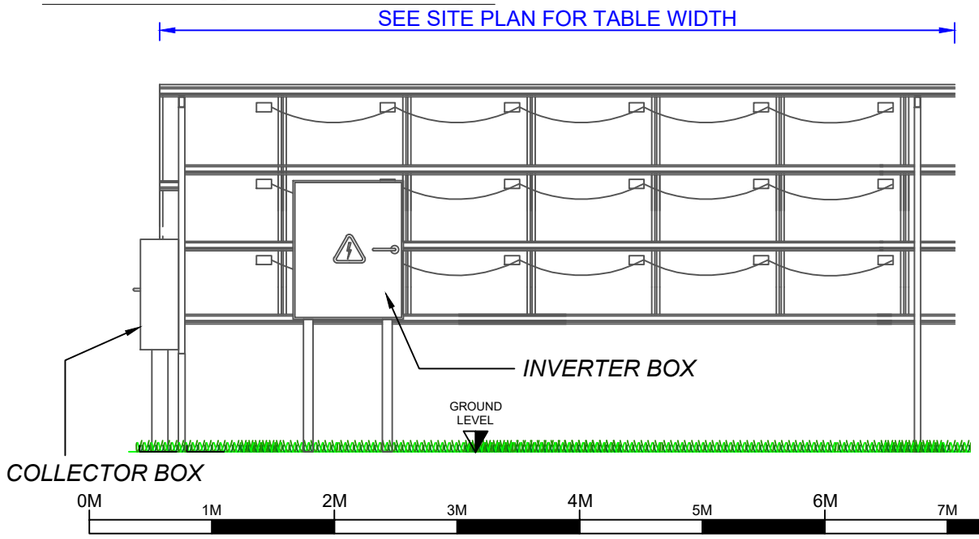


TYPICAL MOUNTING STRUCTURE

TYPICAL SETTING OUT



TYPICAL NORTH ELEVATION



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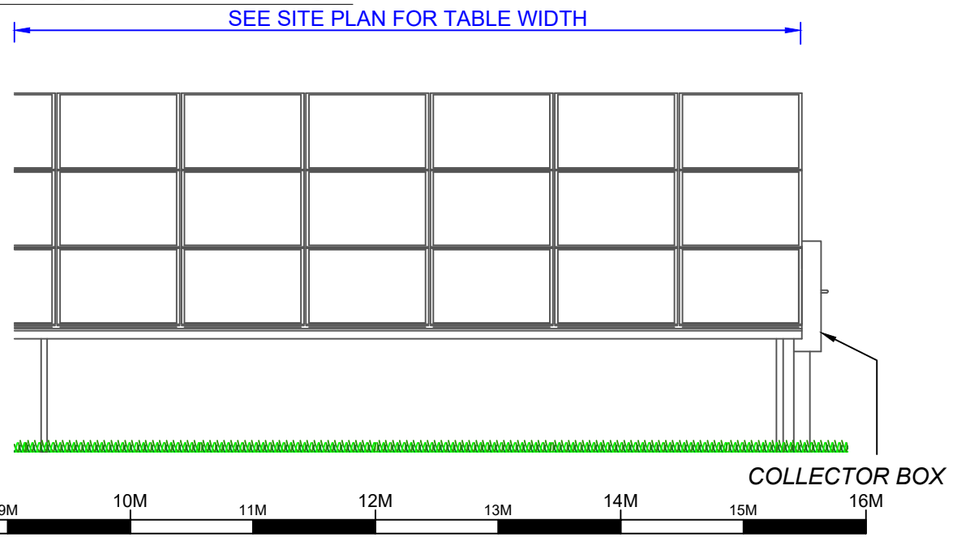


SITE :

TITLE :
MODULES & MOUNTING

LOCATION :

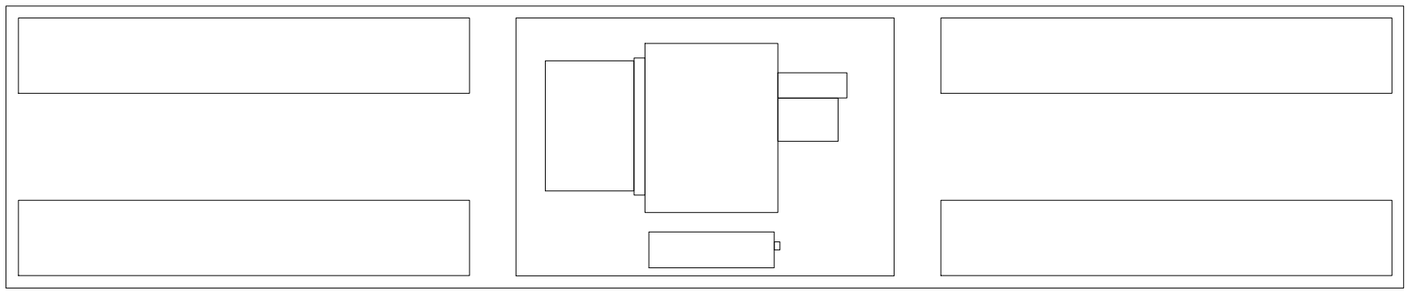
STATUS :
PLANNING

SCALE :
1:50@A3

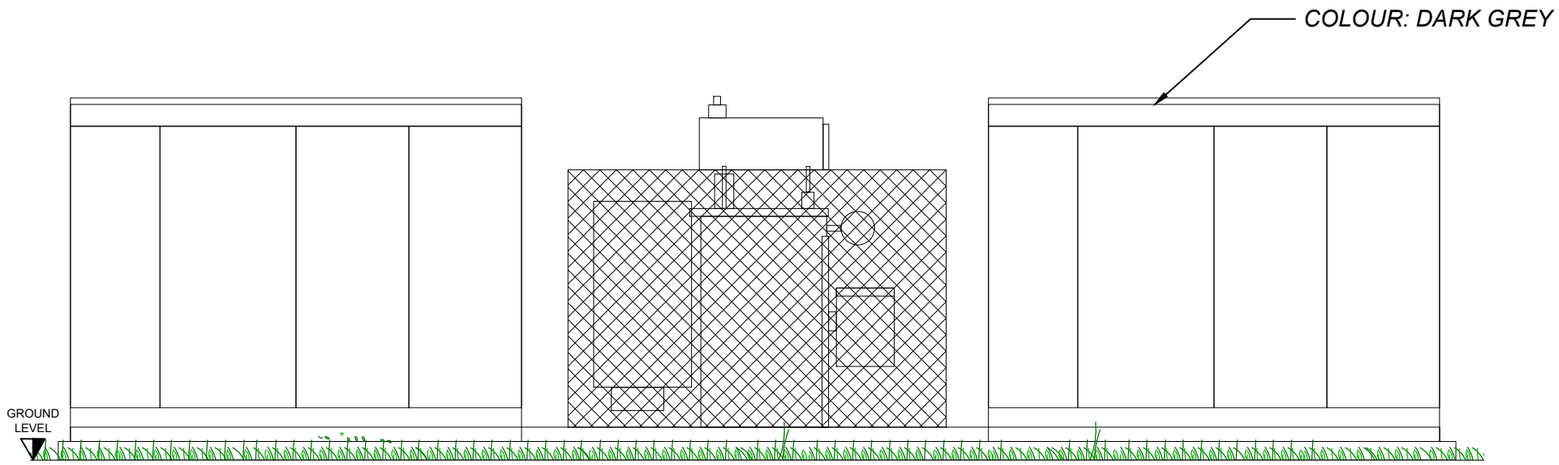
DATE :
JUN 24

DRAWING NUMBER :
FSF-RHL-V1-00-CM-Y-**0013**-S0-**P02**

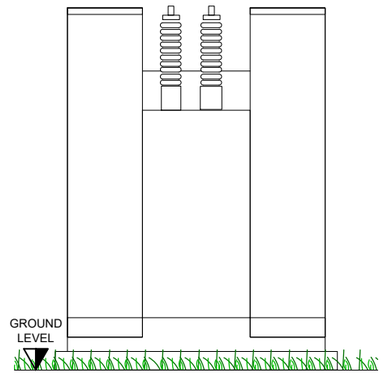
DO NOT SCALE FROM DRAWING, USE ANNOTATED DIMENSIONS ONLY



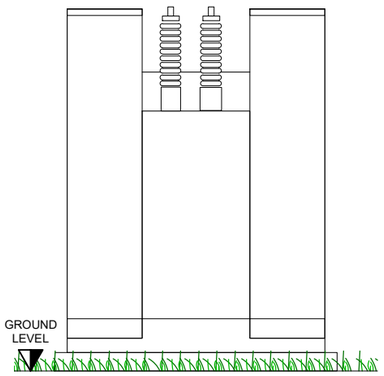
PLAN



FRONT ELEVATION



SIDE ELEVATION



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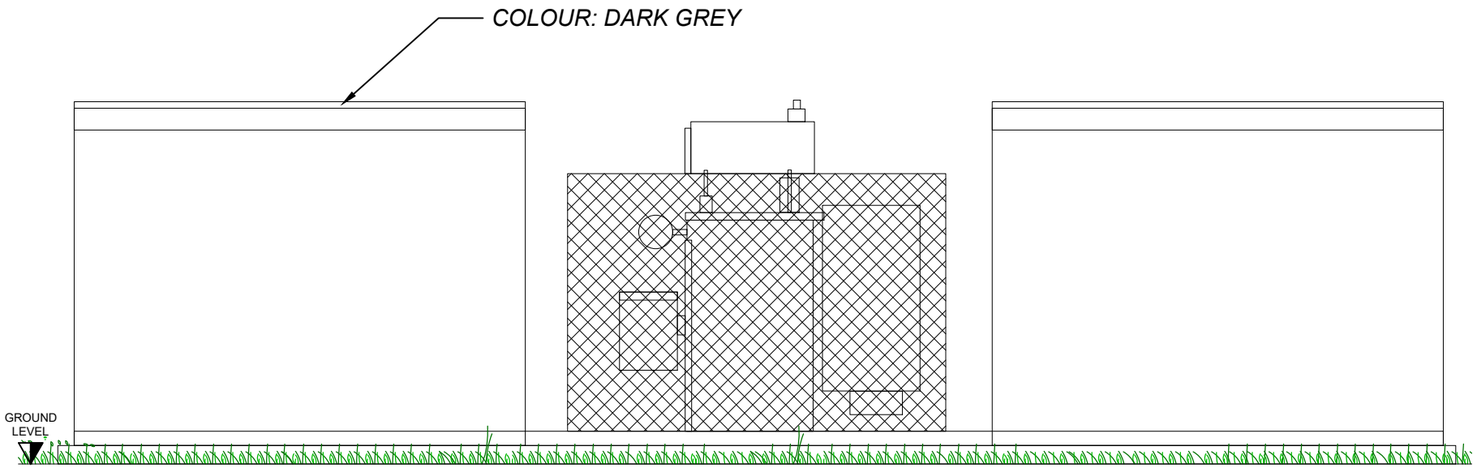


REAR ELEVATION

0M 1M 2M 3M 4M 5M 6M 7M 8M 9M 10M 11M 12M 13M 14M 15M 16M

SITE :

TITLE :
OUTDOOR AUX EQUIPMENT

LOCATION :

STATUS :
PLANNING

SCALE :
1:50@A3

DATE :
JUN 24

DRAWING NUMBER :
FSF-RHL-V1-00-CM-Y-**0007**-S0-**P00**

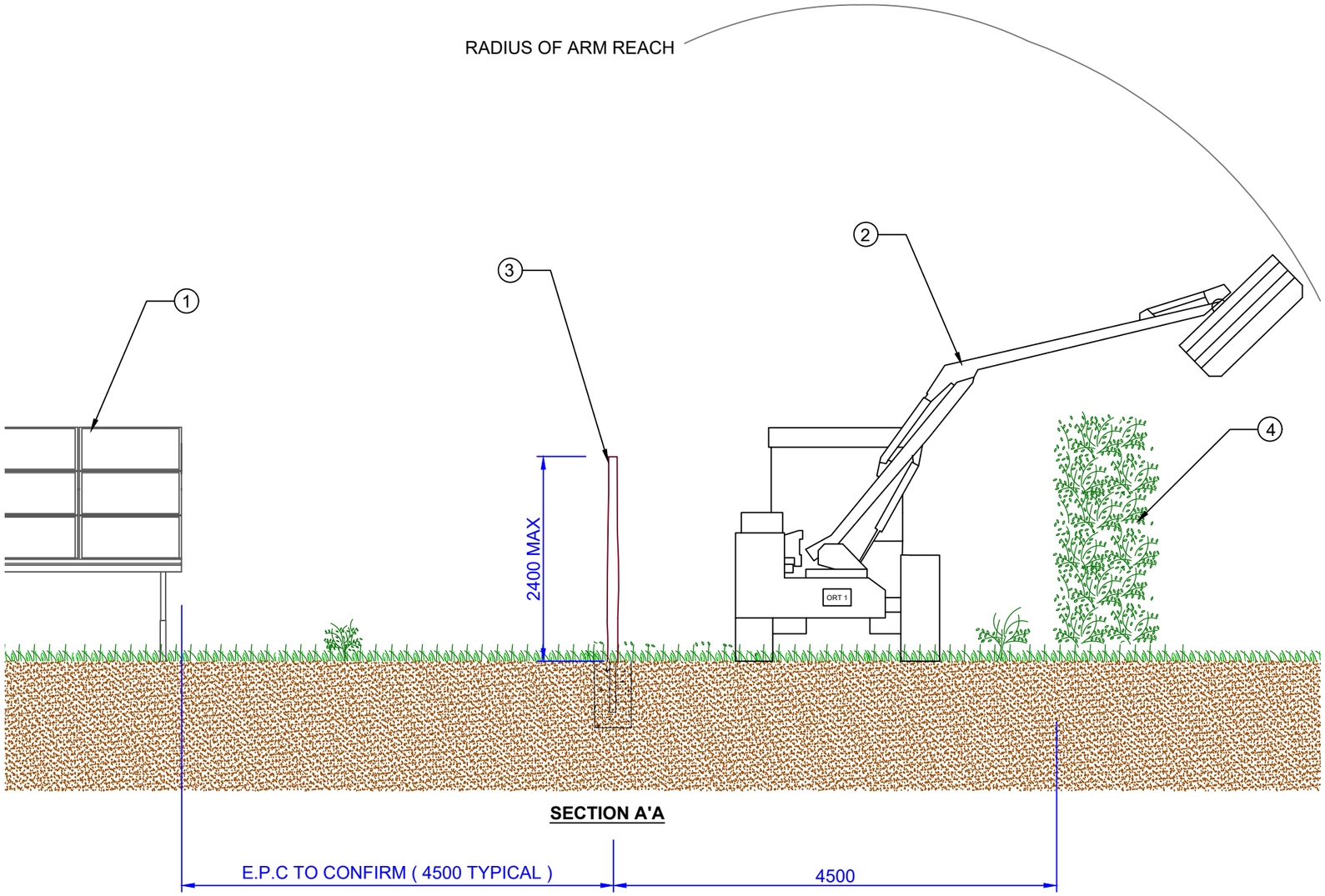
DO NOT SCALE FROM DRAWING, USE ANNOTATED DIMENSIONS ONLY

① = GLASS FACED PV MODULE

② = TRACTOR WITH MOVING HEAD

③ = FENCING

④ = EXISTING BOUNDARY HEDGEROW



SECTION A'A

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SITE :

TITLE :
PERIMETER MAINTENANCE

LOCATION :

STATUS :
PLANNING

SCALE :
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DATE :
JUN 24

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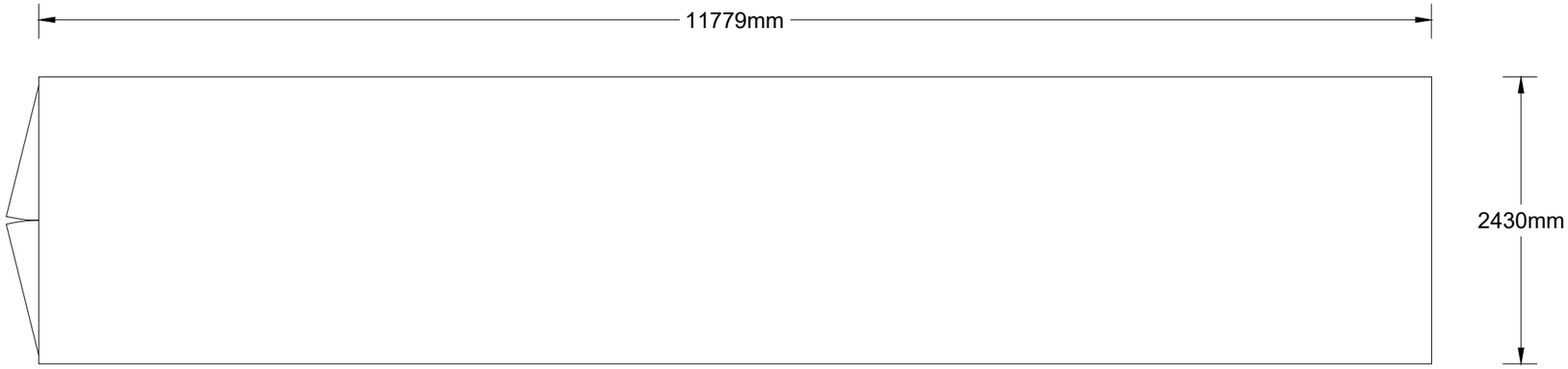
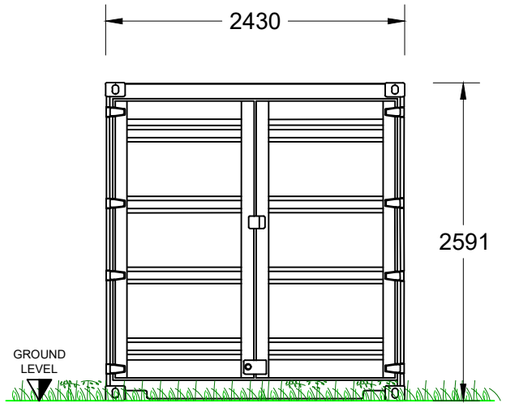
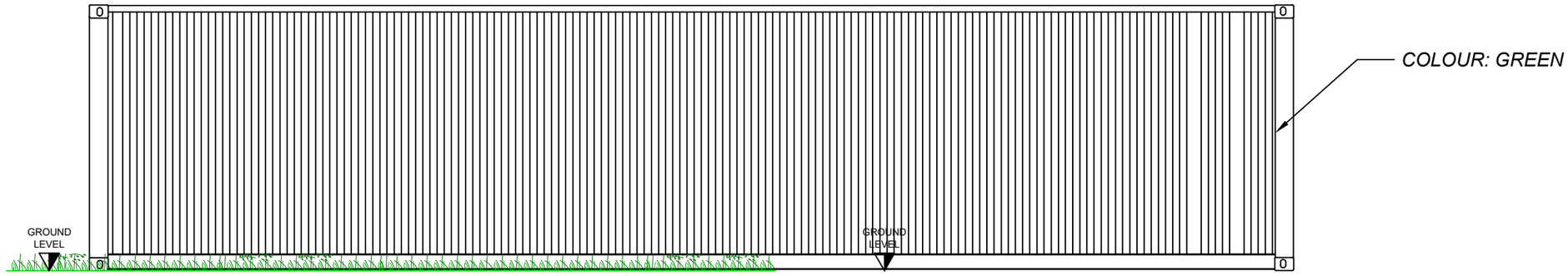


FLOOR PLAN



FRONT ELEVATION



SIDE ELEVATION

REAR ELEVATION

SITE :

TITLE : SITE STORAGE

LOCATION :

STATUS : PLANNING

SCALE : 1:50@A3

DATE : JUN 24

DRAWING NUMBER : FSF-RHL-V1-00-CM-Y-**0016**-S0-**P01**

Appendix C – NRW Consultation

Katie Moore

From: Scott, Jonathan <Jonathan.Scott@cyfoethnaturiolcymru.gov.uk>
Sent: 11 November 2025 10:28
To: Katie Moore
Cc: SW Planning
Subject: Great Harmeston solar farm Discretionary advice
Attachments: We found suspicious links

Follow Up Flag: Follow up
Flag Status: Flagged

Good Morning Katie,

With regard to the attached request, as such a small area of the site is within flood zones relating to fluvial or tidal flooding I don't think we could add much value to a pre-application at this stage. Land drainage is a matter for the lead local flood authority who are usually (and in this case) the local authority and information regarding this could be obtained from those.

Please let me know if you would like us to proceed with this request, but our response would be quite limited.

Regards.

Enw / **Name Jonathan Scott**
Teitl swydd / Job title Development Planning Team Leader SW Wales.
Adran / Department Development Planning Advice Service
Rhif ffôn / Phone number 03000653302

Rhagenwau / Pronouns He/ Him

Croesewir gohebiaeth yn Gymraeg a byddwn yn ymateb yn Gymraeg, heb i hynny arwain at oedi.
Correspondence in Welsh is welcomed, and we will respond in Welsh without it leading to a delay.

Appendix D – Infiltration Testing Report

Nijhuis Saur Industries | UK & Eire

Our Ref: J-16076-P01

Date: 22/01/2026

Arise Renewable Energy UK Limited
78 York Street, London

RE: Proposed installation of a Solar Farm and Battery Storage Area on land at Great Harmeston, Pembrokeshire – Percolation Testing Cover Letter.

Introduction

It is proposed to install a 100ha Solar Farm on land to the south of Haverfordwest, Pembrokeshire.

Arise Renewable Energy UK Limited have approached Nijhuis Industries UK & Ireland, to undertake percolation testing to assess the viability of on-site infiltration systems to address surface water runoff concerns from the development.

This cover letter outlines the work undertaken on site from the 13/01/26 until the 16/01/26, including Trial Pit conditions, any issues encountered and suggestions for on site surface water disposal. Suggestions made will provided the basis for additional consultants to undertake the Flood Consequence Assessment for the Site, as well as the Surace Water Drainage Strategy.

Site Description

The proposal outlined a total of 14 Trial Pits, split into 6 Trial Pits to the Eastern extent, and 8 Trial Pits to the West. It was anticipated that the Eastern site would be addressed first on the 13th and 14th of January, with the Western site addressed on the 15th and 16th. The proposed original Trial Pit locations are shown in Figure 1 below.

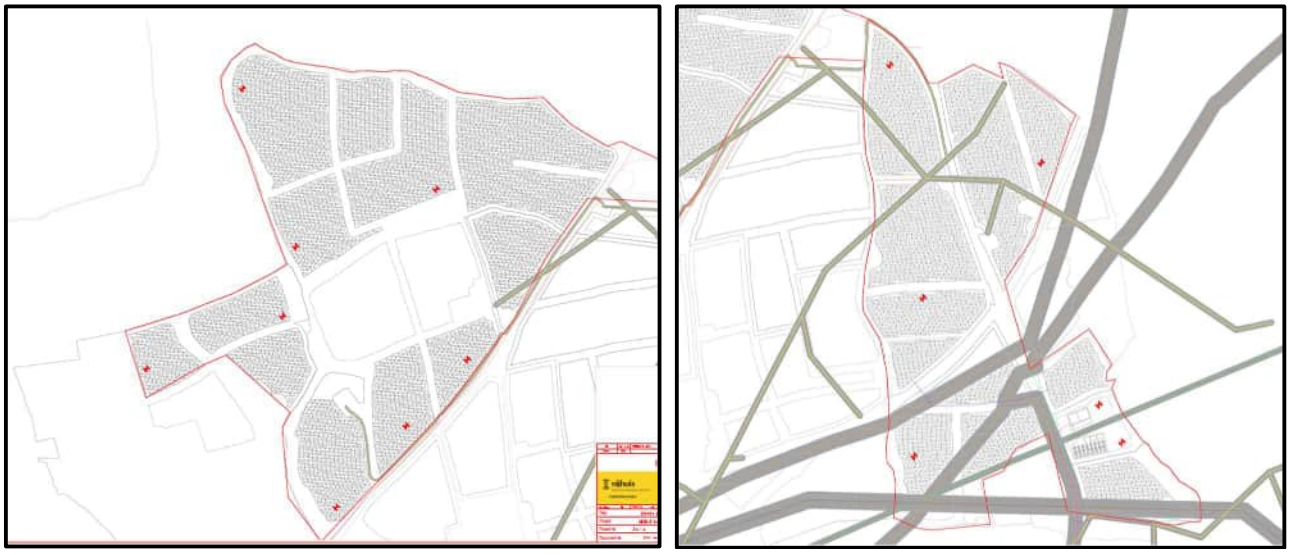


Figure 1. Original Trial Pit Locations

The on-site investigations were completed as noted above, however, actual Trial Pit numbers and locations varied due to site constraints, groundwater encountered and discussions with landowners. Therefore, the actual Trial Pit locations are shown below in Figure 2, which is also provided as separate drawings to accompany this cover letter (J16076-XX-XX-DR-D-3001-S1 and J16076-XX-XX-DR-D-3002-S1).

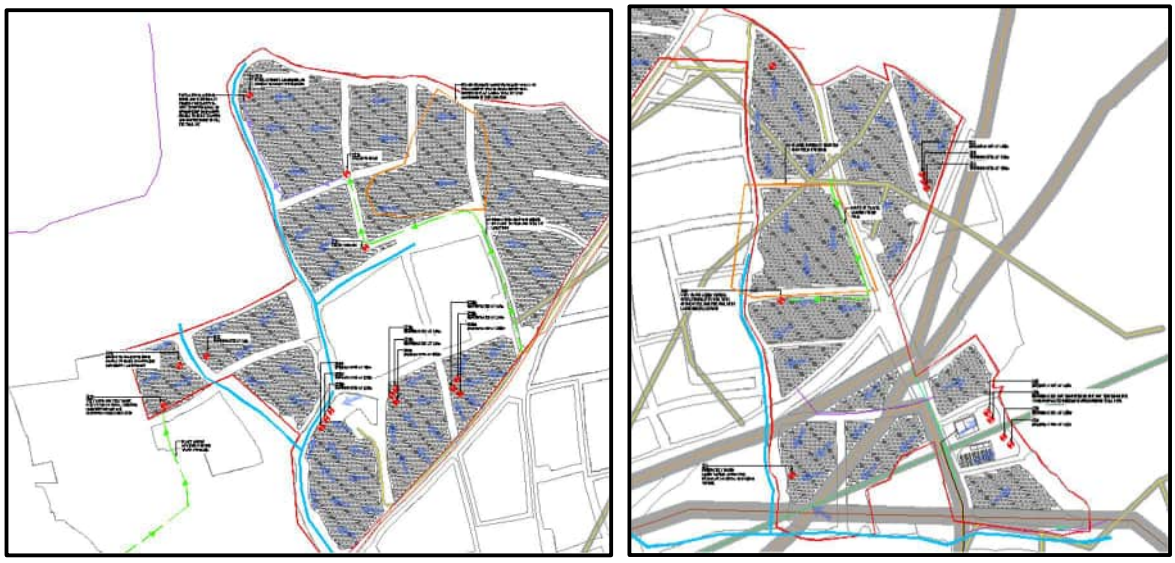


Figure 2. Updated Trial Pit locations following on site investigations

Information from each Trial Pit is included below, as well as data supplied with this cover letter including photographs, log sheets and on site sketches.

Trial Pits

Below details the total number of Trial Pits excavated on site (a total of 19).

TP1

What three words location: ///glow.haystack.explain

Trial Pit 1 was excavated to a length of 1.9m x 1.03m width and 2.04m depth. It is generally noted as loose topsoil with granular material. This Trial Pit drained well, with three tests undertaken successfully with a maximum time to drain of 54 minutes.

TP2

What three words location: ///configure.noted.holograph

Trial Pit 2 was excavated to a length of 1.8m x 0.65m width and 1.90m depth. It is generally noted as boggy wet ground with wet material within. Groundwater was encountered at 1.90m, rising to 1.65m BGL after 2 hours. As such the pit was abandoned.

TP3

What three words location: ///streaks.modern.sugars

Trial Pit 2 was excavated to a length of 1.7m x 0.65m width and 1.85m depth. It is generally noted as boggy wet ground with wet material within. Groundwater was encountered at 1.85m, rising to 1.08m BGL after 2 hours. As such the pit was abandoned.

TP4

What three words location: ///branching.frozen.speedy

Trial Pit 4 was excavated to a length of 1.8m x 0.65m width and 2.07m depth. It is generally noted as boggy wet ground with wet material within. Groundwater was encountered at 2.07m, rising to 2.00m BGL after 2 hours. As such the pit was abandoned.

TP5

What three words location: ///abode.corn.doubts

Trial Pit 5 was excavated to a length of 1.5m x 0.65m width and 1.97m depth. It is generally noted as boggy wet ground with wet material within. Groundwater was not encountered, but given the three surrounding it had all contained groundwater it was decided not to perform a test.

TP6

What three words location: ///boss.baker.pool

Trial Pit 6 was excavated to a length of 1.75m x 0.65m width and 2.12m depth. It is generally noted as loose topsoil with clay based soil with stone, overlying fine soil with granular rock. This Trial Pit drained well, with three tests undertaken successfully with a maximum time to drain of 15 minutes.

TP7

What three words location: ///shepherds.grove.liberated

Trial Pit 4 was excavated to a length of 1.8m x 0.65m width and 2.07m depth. It is generally noted as loose topsoil with underlying clay soil with granular rock. Groundwater was encountered at 2.00m, rising to 1.98m BGL after an hour. As such the pit was abandoned.

TP8

What three words location: ///arise.doctor.rarely

Trial Pit 8 was excavated to a length of 1.6m x 0.65m width and 1.90m depth. It is generally noted as loose topsoil with underlying clayey soil with granular material. Groundwater was encountered at 1.73m.. As such the pit was abandoned.

TP9

What three words location: ///heads.strikers.honest

Trial Pit 9 was excavated to a length of 1.6 m x 0.65m width and 1.74m depth. It is generally noted as boggy wet ground with wet material within. Groundwater was encountered at 1.74m, rising to 1.53m BGL after 10 minutes. As such the pit was abandoned.

TP10

What three words location: ///intricate.shares.smokers

Trial Pit 10 was excavated to a length of 1.7m x 0.65m width and 1.87m depth. It is generally noted as boggy wet ground with wet material within. The pit was filled but drained only 0.07m in an hour and 9 minutes. Therefore, this is deemed to be a fail to drain.

TP11a, TP11b, TP11c

TP11a What three words location: ///mass.stoned.computers
TP11b What three words location: ///grunt.print.join
TP11c What three words location: ///finishes.digests.crumples

Three Trial Pits were excavated in the vicinity of each other and therefore have been given sub-letters a,b and c.

All three Trial Pits consisted of clay based material and all contained groundwater to depths of 1.20m, 1.39m and 1.13m respectively.

TP12a. TP12b, TP12c

TP12a What three words location: ///outbid.important.overdrive
TP12b What three words location: ///train.milder.riverside
TP12c What three words location: ///mergers.scar.corkscrew

Three Trial Pits were excavated in the vicinity of each other and therefore have been given sub-letters a,b and c.

All three Trial Pits consisted of clay based material and all contained groundwater to depths of 1.74m, 2.11m and 2.01m respectively.

TP13a, TP13b, TP13c

TP13a What three words location: ///driven.proven.walked
TP13b What three words location: ///stalemate.pillows.those
TP13c What three words location: ///discrepancy.lifelong.postings

Three Trial Pits were excavated in the vicinity of each other and therefore have been given sub-letters a,b and c.

All three Trial Pits consisted of clay based material and all contained groundwater to depths of 1.10m, 1.00m and 1.09m respectively.

TP14

What three words location: ///sized.mallets.logged

Trial Pit 14 was excavated at the base of the field noted to be covered in a ground crop. A trial pit was excavated to a length of 1.2m x 0.6m width and 1.85m depth.

Generally, there was minimal topsoil and the remaining ground contained large stones and clay bound material.

This Trial Pit was not filled after lengthy conversations with the landowner and Arise concluded that we could not get a bowser to this location without significant damage to the crop. Therefore, it was observed for groundwater (none) and backfilled.

TP15

What three words location: ///ourselves.raised.ballparks

Trial Pit 15 was excavated following the discussions with the landowner and Arise, whereby it was agreed that two trial pits could excavated to the top of the crop field to minimise crop damage. A trial pit was excavated to a length of 1.4m x 0.7m width and 1.50m depth.

Generally, there was minimal topsoil and the remaining ground was noted to be particularly dry, even though there was surface water present. The ground was particularly difficult to excavate, very hard, formed of clay generally with stone.

This trial pit was filled successfully and drained within an hour. The second test, the pit failed to drain (the level remained the same for 50 minutes). Therefore, it was abandoned and deemed unsuitable.

PLEASE NOTE, this was at the top of the field in a gateway following existing tracks. The area is generally flat but given the previous weather and the uncompacted ground, the bowser got stuck when trying to reach the trial pit – which resulted in some crop damage (please see attached photos).

TP16

What three words location: ///sinkhole.remains.teamed

Trial Pit 16 was excavated further along at the top of the ground crop field as noted on the attached drawing. A trial pit was excavated to a length of 1.3m x 0.7m width and 1.5m depth.

Again, there was surface water present, however the trial pit was dry and generally formed of large stoney material.

The pit was filled with water but drained 0.1m in 45 minutes and was therefore deemed insufficient for infiltration purposes.

Given the issues experienced here with the ground conditions and plant movements it was determined that a trial pit would not be excavated in the wheat field. Furthermore, this area of site is not favorable for an infiltration based drainage system,

TP17

TP17 and TP18 are exploratory Trial Pits to determine ground conditions at the base of the field. The landowner was on site on the day of excavation and requested we did not attempt to take the bowser to the base of the field as it is steep and it has been an area previously noted for plant to get stuck. Therefore, he was happy with the tracked digger undertaking exploratory holes, and then one trial pit excavated at the entrance of the field at the top to fill with the bowser.

What three words location: ///hindered.historic.revisit

Trial Pit 17 was excavated to a length of 1.3m x 0.8m width and 1.20m depth.

It was generally noted to be formed of clay and stone, however groundwater was encountered at 1.1m.

TP18

What three words location: ///relief.locate.waggled

Trial Pit 14 was excavated at the base of the field noted to be covered in a ground crop. A trial pit was excavated to a length of 1.4m x 0.7m width and 1.85m depth.

Generally, there was minimal topsoil and the remaining ground contained large stones and clay bound material.

TP19

What three words location: ///hiding.panther.blotches

Trial Pit 14 was excavated at the base of the field noted to be covered in a ground crop. A trial pit was excavated to a length of 1.4m x 0.8m width and 1.80m depth.

This Trial Pit was very easily excavated, within a flat area of the field at the gateway and suggested that this ground had been previously excavated. The ground did not appear to be virgin ground and can therefore only be assumed as ‘made ground’ previously tampered with.

The Trial Pit was filled with water and drained very rapidly, three times (the longest being 6 minutes). It is therefore ruled out as a suitable result to utilise given the likelihood of this area being made ground and not a

true representative, given the base of the field contained hard ground and groundwater.

Overview of suggested method of surface water disposal

There are generally mixed results across the entire area to be developed, however, it is clear that the ground is generally poorly draining with groundwater encountered in numerous trial pits, to shallow depths. As noted on the Trial Pit drawing provided, infiltration could be possible in the fields where Trial Pits 1 and 6 have been excavated, however, it is unlikely to be approved without groundwater monitoring given the areas surrounding containing groundwater to shallow depths.

Our suggestion would be to attenuate the development into individual conveyance swales with storage capacity and individual flow control to the base of the fields. There are numerous watercourses on site which would allow a direct discharge.

Yours sincerely

For and on behalf of Nijhuis Industries Ltd.

Abi Gallacher
Flood Risk and Drainage Engineer

Enclosed Drawings 3001 and 3002

Trial Pit log sheets and on site sketches

Photographs of the Trial Pits

TP14
EXCAVATED BUT ABANDONED AS UNABLE TO REACH WITH BOWSER

PURPLE ROUTE HUGGING HEDGE AND EXISTING ATV TRACKS TO REACH TP14. VERY STEEP FIELD FULL OF GROUND CROP (MUSTARD?) UNABLE TO DRIVE TRACTOR AND BOWSER DOWN TO FILL THE TRIAL PIT

ORANGE BOUNDARY DENOTES FIELD OF WHEAT. NO TRAM LINES TO TRAVEL. GIVEN ISSUES WITH BOWSER ON FLAT LAND A TRIAL PIT WAS ABANDONED IN THIS LOCATION

TP15
FAILED TO DRAIN

GREEN TRACK DENOTING ACCESS BY PLANT TO FIELD AND TRIAL PIT LOCATIONS

TP16
FAILED TO DRAIN

TP12a
GROUNDWATER AT 1.61m

TP13b
GROUNDWATER AT 2.01m

TP13c
GROUNDWATER AT 2.00m

TP11a
GROUNDWATER AT 1.07m

TP13b
GROUNDWATER AT 1.31m

TP13c
GROUNDWATER AT 0.98m

TP17
GROUNDWATER AT 1.1m

TP18
UNABLE TO FILL DUE TO BEING UNABLE TO REACH WITH BOWSER (ADVISED BY LANDOWNER)

TP13c
GROUNDWATER AT 1.01m

TP13a
GROUNDWATER AT 0.98m

TP13b
GROUNDWATER AT 0.95m

TP19
VERY RAPID AND VERY LOOSE EXCAVATION MATERIAL. ASSUMED MADE GROUND AND HAS PREVIOUSLY BEEN EXCAVATED

PLANT ACCESS UTILISING EXISTING TRACK TO FIELDS.

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PROPOSED TRIAL PIT

ARROWS DENOTING TOPOGRAPHY

EXISTING WATERCOURSES

Name	Date	Remarks	Revision
AG	22:01:26	PRELIMINARY	P01

INFORMATION

nijhuis
Nijhuis Saur Industries | UK & Eire
#missionwater

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NI Office	UK	Drawn by	AG	Date	22:01:26	Status	S2

Title	TRIAL PIT LOCATIONS AND ON SITE INFORMATION	Version	V01
Project	GREAT HARMESTON SOLAR	Revision	P01
Project №	J16076	Released by	AG
Quotation №		Release Date	22:01:26
Document №	J16076-XX-XX-DR-D-3001-S1	Size	A1
		Sheet	1/2
		Scale	1:2500
		Unit	MM

TRACK DENOTING ACCESS
ANT TO FIELD AND TRIAL PIT
IONS

ORANGE BOUNDARY DENOTES
CROP FIELD (TURNIPS)

ROUTE OF TRAVEL
AROUND TURNIP
FIELD

TP7
GROUNDWATER AT 1.98m

TP8
GROUNDWATER AT 1.73m

TP9
GROUNDWATER AT 1.53m

TP6
VERY RAPID. LOOSE TOPSOIL
OVERLYING CLAYEY SOIL WITH
STONE OVERLYING FINE SOIL WITH
LARGE GRANULAR ROCK

TP2
GROUNDWATER AT 1.69m

TP5
GROUNDWATER NOT ENCOUNTERED BUT NOT TESTED ON DUE
TO GROUNDWATER INGRESS IN SURROUNDING TRIAL PITS

TP3
GROUNDWATER AT 2.00m

TP2
GROUNDWATER AT 1.68m

TP1
MODERATELY RAPID
LOOSE TOPSOIL OVERLYING
GRANULAR MATERIAL WITH SOME
TOPSOIL

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PROPOSED TRIAL PIT

ARROWS DENOTING TOPOGRAPHY

EXISTING WATERCOURSES

Name	Date	Remarks	Revision
AG	22.01.26	PRELIMINARY	P01

INFORMATION

nijhuis
Nijhuis Saur Industries | UK & Eire
#missionwater

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NI Office	UK	Drawn by	AG	Date	22.01.26	Status	S2

Title	TRIAL PIT LOCATIONS AND ON SITE INFORMATION	Version	V01
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Project №	J16076	Released by	AG
Quotation №		Release Date	22.01.26
Document №	J16076-XX-XX-DR-D-3002-S1	Size	A1
		Sheet	2/2
		Scale	1:2500
		Unit	MM

Appendix E – SAB Consultation Emails

Katie Moore

From: SAB <sab@pembrokeshire.gov.uk>
Sent: 09 October 2025 13:34
To: Katie Moore
Cc: Llewelyn, Angharad
Subject: RE: P24-1037 - Great Harmeston Solar Proposal - SAB

Follow Up Flag: Follow up
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Hi Katie

Percolation tests should be carried out to BRE 365 guidelines.

The number of test locations seem reasonable at this early stage. Depending on final design more targeted testing may be required later on.

Access tracks can be made up of permeable materials – normally type 3 sub-base to allow infiltration. Care should be taken to avoid natural run-off routes becoming blocked due to tracks.

Although the panel areas shouldn't need draining there may be a need for swales etc to deal with the slight increase in run-off on the steeper areas of land.

We look forward to receiving your pre app in due course.
Regards

SAB Team

From: Katie Moore <Katie.Moore@pegasusgroup.co.uk>
Sent: 08 October 2025 16:40
To: SAB <sab@pembrokeshire.gov.uk>
Cc: Lucy Ginn <Lucy.Ginn@pegasusgroup.co.uk>
Subject: RE: P24-1037 - Great Harmeston Solar Proposal - SAB

EXTERNAL EMAIL – Exercise care with links and attachments *E-BOST ALLANOL – Byddwch yn ofalus wrth agor dolenni ac atodiadau.*

Hi Laura,

Many thanks for confirming. The client has confirmed they would like to proceed with the Pre-App. Please note that we are still in the process of finalising plans, testing arrangements and drainage design but I will get the Pre-App form completed and sent over in due course.

In the meantime, further to your initial advice on 1st October regarding the requirement for detailed drainage/SuDS calculations, I'd be grateful if you could advise on what should be included within the infiltration testing scope, specifically how many tests would typically be required on site. Given the size of the site and cost of testing, we a keen to get things agreed before the testing is instructed.

Based on the attached layout, we would look to propose approximately 8 test locations within the western parcel (west of Milford Road – A4076), and 6 test locations within the eastern extent of the site (east of Milford Road), with 2 of these situated in the field proposed to accommodate the substation and O&M storage (other tests to be spread across the parcels). This totals 14 test locations across the site. Would you agree with this approach? And do you have any specific depths of testing you would require?

In terms of the drainage strategy, our view is that surface water flow from the access tracks would be negligible as they will comprise of crushed stone and will be of permeable nature, not requiring additional drainage features to manage. We would plan to formally drain greater vulnerability infrastructure such as inverters/transformers and the substation and would suggest including 5% of the solar array within the drainage calculations. Would you agree with this approach?

Please let me know if you would require a fee for this advice.

Kind Regards,

Katie Moore
Flood Risk Consultant - Infrastructure

E Katie.Moore@pegasusgroup.co.uk
M 07385 503066 | **T** 01454 625945
First Floor | South Wing | Equinox North | Great Park Road | Almondsbury | Bristol | BS32 4QL

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From: SAB <sab@pembrokeshire.gov.uk>
Sent: 08 October 2025 10:47
To: Katie Moore <Katie.Moore@pegasusgroup.co.uk>
Subject: RE: P24-1037 - Great Harmeston Solar Proposal - SAB

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Good Morning Katie,

Yes I would agree that £1000 would be the correct fee for this application if the site construction area exceed 0.99 hectares

Thanks

Laura

From: Katie Moore <Katie.Moore@pegasusgroup.co.uk>
Sent: 08 October 2025 09:29
To: SAB <sab@pembrokeshire.gov.uk>
Cc: Lucy Ginn <Lucy.Ginn@pegasusgroup.co.uk>
Subject: RE: P24-1037 - Great Harmeston Solar Proposal - SAB

EXTERNAL EMAIL – Exercise care with links and attachments *E-BOST ALLANOL – Byddwch yn ofalus wrth agor dolenni ac atodiadau.*

Hi Laura,

Many thanks for your response and the information provided. The Pre-App fees indicate that the site would be categorised under "3. The making of a material change in the use of a building or land" and as the site exceeds 0.99 hectares the Pre-App fee would be £1,000. Please could you confirm this is correct?

Kind Regards,

Katie Moore
Flood Risk Consultant - Infrastructure

E Katie.Moore@pegasusgroup.co.uk
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From: SAB <sab@pembrokeshire.gov.uk>
Sent: 01 October 2025 13:40
To: Katie Moore <Katie.Moore@pegasusgroup.co.uk>
Subject: RE: P24-1037 - Great Harmeston Solar Proposal - SAB

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Good Afternoon Katie,

Thank you for your enquiry around the new solar farm development. As general advice for planning and Sustainable Drainage Approval Body (SAB) considerations regarding Solar PV Development, the Authority has determined that this type of development will alter land use, change the appearance of the site, and impact

land cover patterns. Solar PV developments will increase impermeable surfaces, affect surface water runoff rates, modify existing drainage patterns, and influence the hydrological regime. Solar panels, compared to undeveloped conditions, intensify and concentrate runoff. Rainwater falling on the solar panels will run off and infiltrate in the sheltered areas beneath the down-slope modules. When the panels are not aligned with the natural contours of the land, the runoff may intensify, forming rivulets or small channels beneath the panels, potentially leading to an increase in runoff compared to undeveloped conditions.

To take a practical approach and encourage infiltration across the site, the application should include a detailed drainage plan or specific design details of a Sustainable Drainage System (SuDS), with calculations demonstrating that the system's capacity is sufficient to handle extreme weather events.

The developer is advised to implement additional storage along the site's contours to slow down runoff, ensuring that the runoff rate does not exceed the existing greenfield rate and cause flooding. The developer should also provide the authority with runoff calculations for both pre- and post-development conditions.

For calculating greenfield runoff before and after development, the applicant can use one of two methods:

IH 124 for small catchments, or
The correlation equation of the statistical FEH method.
Using these methods, you will find that runoff cannot be considered negligible. In line with TAN15, the proposal should aim to improve conditions compared to the undeveloped state.

Further information is available on our website at https://www.pembrokeshire.gov.uk/planning-contacts/sustainable-drainage-approving-body-sab

We would encourage a SAB pre-app for the development which I have attached the forms and guidance for.

Kind regards/Diolch,

Laura Parsons (she/her)

Assistant Coastal and Rivers Engineer
Peiriannydd Arfordirol ac Afonydd Cynorthwyol

Tel: 01437 775135

Pembrokeshire County Council

From: Katie Moore <Katie.Moore@pegasusgroup.co.uk>
Sent: 29 September 2025 16:52
To: SAB <sab@pembrokeshire.gov.uk>
Cc: Lucy Ginn <Lucy.Ginn@pegasusgroup.co.uk>
Subject: P24-1037 - Great Harmeston Solar Proposal - SAB

EXTERNAL EMAIL – Exercise care with links and attachments *E-BOST ALLANOL – Byddwch yn ofalus wrth agor dolenni ac atodiadau.*

Good Afternoon,

We are currently undertaking initial site constraint work on flood risk and drainage for a proposed solar farm at a location near Johnston, Haverfordwest (postcode: SA62 3HN). Please find attached a preliminary draft layout for your review.

We would be grateful if you could advise on any guidance or considerations we should take into account for this development and location - particularly in relation to surface water flood risk, drainage (SuDS) and any solar farm advice/guidance.

Thank you in advance for your time and assistance.

Kind Regards,

Katie Moore
Flood Risk Consultant – Infrastructure

E Katie.Moore@pegasusgroup.co.uk
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First Floor | South Wing | Equinox North | Great Park Road | Almondsbury | Bristol | BS32 4QL

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Katie Moore

From: SAB <sab@pembrokeshire.gov.uk>
Sent: 28 January 2026 14:49
To: Katie Moore
Subject: RE: P24-1037 - Great Harmeston Solar Proposal - SAB

Follow Up Flag: Follow up
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Good Afternoon,

If you are asking in relation to construction next to an watercourse then we aim to have 5m clear ground. There are some exceptions where this can drop to 3m but ideally we would like to see 5m.

Thanks

Laura

From: Katie Moore <Katie.Moore@pegasusgroup.co.uk>
Sent: 28 January 2026 14:21
To: SAB <sab@pembrokeshire.gov.uk>
Subject: RE: P24-1037 - Great Harmeston Solar Proposal - SAB

EXTERNAL EMAIL – Exercise care with links and attachments *E-BOST ALLANOL – Byddwch yn ofalus wrth agor dolenni ac atodiadau.*

Hi Laura,

I hope you are well. Please could you advise on an acceptable Ordinary Watercourse easement?

Kind Regards,

Katie Moore
Flood Risk Consultant - Infrastructure

My working days are Monday- Thursday
E Katie.Moore@pegasusgroup.co.uk
M 07385 503066 | **T** 01454 625945
First Floor | South Wing | Equinox North | Great Park Road | Almondsbury | Bristol | BS32 4QL

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Please exercise extreme caution with attachments and website links or instructions to undertake financial transactions.

From: SAB <sab@pembrokeshire.gov.uk>
Sent: 05 November 2025 08:33
To: Katie Moore <Katie.Moore@pegasusgroup.co.uk>
Subject: RE: P24-1037 - Great Harmeston Solar Proposal - SAB

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Apologies Katie,
That's my error. BRE Digest 365.

3.2.3 Rate test

Field investigations are required to confirm infiltration rates. The procedure recommended in this Digest is to excavate a soakage trial pit to the same depth as anticipated in the full-size soakaway. For run-off from 100 m^2 this will be 1 m to 1.5 m below the invert level of the drain discharging to the soakaway. Overall depths of excavation will be typically 1.5 m to 2.5 m for permeable areas >100 m^2 draining to the soakaway.

The soakage trial pit should be 1 m to 3 m long and 0.3 m to 1 m wide. It should have vertical sides trimmed square and, if necessary for stability, should be filled with granular material. When granular fill is used, a full-height, perforated, vertical observation tube should be positioned in the soakage trial pit so that water levels can be monitored with a dip tape. It should be possible to construct a suitably-dimensioned pit with a backhoe loader or mini-excavator.

Narrow, short pits use less water during the soakage tests but may be more difficult to trim and clean prior to testing. Measure the soakage trial pit carefully before trials. For safety reasons do not enter the soakage trial pit. A lot of water will be used to determine the soil infiltration rate so a water bowser may be needed. The inflow should be rapid so that the soakage trial pit can be filled to its maximum effective storage depth in a short time, ie to the design invert level of the drain to the soakaway. Take care that the inflow does not cause the walls of the soakage trial pit to collapse.

Fill the soakage trial pit and allow it to drain three times to near empty. Each time record the water level and time from filling, at intervals sufficiently close to clearly define water level versus time (Figure 1). The filling of the soakage trial pit should be on the same or consecutive days.

Calculate the soil infiltration rate from the time taken for the water level to fall from 75% to 25% effective storage depth in the soakage trial pit, using the lowest f value of the three test results for design:

$$\text{Soil infiltration rate } f = \frac{V_{p75-25}}{a_{s50} \times t_{p75-25}}$$

where:

This is the section I was referring to. Happy to send over a copy of the full document if needed.

Apologies for the confusion.

Thanks

Laura

From: Katie Moore <Katie.Moore@pegasusgroup.co.uk>
Sent: 04 November 2025 13:34
To: SAB <sab@pembrokeshire.gov.uk>
Subject: RE: P24-1037 - Great Harmeston Solar Proposal - SAB

EXTERNAL EMAIL – Exercise care with links and attachments *E-BOST ALLANOL – Byddwch yn ofalus wrth agor dolenni ac atodiadau.*

Hi Laura,

We have reviewed the Circa 365 manual and cannot find any reference as to what is expected for SAB infiltration testing or trial pit size guidance.

If you could provide any guidance on what the SAB would expect, that would be very helpful and will inform our infiltration testing scope before we commence works.

Kind Regards,

Katie Moore
Flood Risk Consultant – Infrastructure

E Katie.Moore@pegasusgroup.co.uk
M 07385 503066 | **T** 01454 625945
First Floor | South Wing | Equinox North | Great Park Road | Almondsbury | Bristol | BS32 4QL

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From: SAB <sab@pembrokeshire.gov.uk>
Sent: 24 October 2025 14:57
To: Katie Moore <Katie.Moore@pegasusgroup.co.uk>
Subject: RE: P24-1037 - Great Harmeston Solar Proposal - SAB

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Good Afternoon Katie,

Infiltration guidance can be found in the Ciria 365 manual which sets out what is expected for SAB testing. There are recommended trial pit sizes and guidance on exactly how to carry out the tests.

Kind Regards

Laura

From: Katie Moore <Katie.Moore@pegasusgroup.co.uk>
Sent: 24 October 2025 12:40
To: SAB <sab@pembrokeshire.gov.uk>
Subject: RE: P24-1037 - Great Harmeston Solar Proposal - SAB

EXTERNAL EMAIL – Exercise care with links and attachments *E-BOST ALLANOL – Byddwch yn ofalus wrth agor dolenni ac atodiadau.*

Hi Laura,

Many thanks, we are proceeding with infiltration testing as set out below based on the attached layout.

Do you have any specific depths of testing you would require? Would you want both shallow and deep tests undertaken?

Kind Regards,

Katie Moore
Flood Risk Consultant – Infrastructure

E Katie.Moore@pegasusgroup.co.uk
M 07385 503066 | T 01454 625945
First Floor | South Wing | Equinox North | Great Park Road | Almondsbury | Bristol | BS32 4QL

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From: SAB <sab@pembrokeshire.gov.uk>
Sent: 20 October 2025 09:51
To: Katie Moore <Katie.Moore@pegasusgroup.co.uk>
Subject: RE: P24-1037 - Great Harmeston Solar Proposal - SAB

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Good Morning Katie,

We will be happy to review this at the pre-app stage.

Kind regards/Diolch,

Laura Parsons (she/her)

Assistant Coastal and Rivers Engineer
Peiriannydd Arfordirol ac Afonydd Cynorthwyol

Tel: 01437 775135

Pembrokeshire County Council

From: Katie Moore <Katie.Moore@pegasusgroup.co.uk>
Sent: 16 October 2025 12:18
To: SAB <sab@pembrokeshire.gov.uk>
Cc: Llewelyn, Angharad <Angharad.Llewelyn@pembrokeshire.gov.uk>; Lucy Ginn <Lucy.Ginn@pegasusgroup.co.uk>
Subject: RE: P24-1037 - Great Harmeston Solar Proposal - SAB

EXTERNAL EMAIL – Exercise care with links and attachments *E-BOST ALLANOL – Byddwch yn ofalus wrth agor dolenni ac atodiadau.*

Hi Laura,

Thank you for your advice.
When the working layout is confirmed, would you be happy for us to send it over for review in regards to our proposed infiltration testing scope?

Kind Regards,

Katie Moore
Flood Risk Consultant - Infrastructure

E Katie.Moore@pegasusgroup.co.uk
M 07385 503066 | T 01454 625945
First Floor | South Wing | Equinox North | Great Park Road | Almondsbury | Bristol | BS32 4QL

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From: SAB <sab@pembrokeshire.gov.uk>
Sent: 09 October 2025 13:34
To: Katie Moore <Katie.Moore@pegasusgroup.co.uk>
Cc: Llewelyn, Angharad <Angharad.Llewelyn@pembrokeshire.gov.uk>
Subject: RE: P24-1037 - Great Harmeston Solar Proposal - SAB

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Hi Katie

Percolation tests should be carried out to BRE 365 guidelines.

The number of test locations seem reasonable at this early stage. Depending on final design more targeted testing may be required later on.

Access tracks can be made up of permeable materials – normally type 3 sub-base to allow infiltration. Care should be taken to avoid natural run-off routes becoming blocked due to tracks.

Although the panel areas shouldn't need draining there may be a need for swales etc to deal with the slight increase in run-off on the steeper areas of land.

We look forward to receiving your pre app in due course.
Regards

SAB Team

From: Katie Moore <Katie.Moore@pegasusgroup.co.uk>
Sent: 08 October 2025 16:40
To: SAB <sab@pembrokeshire.gov.uk>
Cc: Lucy Ginn <Lucy.Ginn@pegasusgroup.co.uk>
Subject: RE: P24-1037 - Great Harmeston Solar Proposal - SAB

EXTERNAL EMAIL – Exercise care with links and attachments *E-BOST ALLANOL – Byddwch yn ofalus wrth agor dolenni ac atodiadau.*

Hi Laura,

Many thanks for confirming. The client has confirmed they would like to proceed with the Pre-App. Please note that we are still in the process of finalising plans, testing arrangements and drainage design but I will get the Pre-App form completed and sent over in due course.

In the meantime, further to your initial advice on 1st October regarding the requirement for detailed drainage/SuDS calculations, I'd be grateful if you could advise on what should be included within the infiltration testing scope, specifically how many tests would typically be required on site. Given the size of the site and cost of testing, we a keen to get things agreed before the testing is instructed.

Based on the attached layout, we would look to propose approximately 8 test locations within the western parcel (west of Milford Road – A4076), and 6 test locations within the eastern extent of the site (east of Milford Road), with 2 of these situated in the field proposed to accommodate the substation and O&M storage (other tests to be spread across the parcels). This totals 14 test locations across the site. Would you agree with this approach? And do you have any specific depths of testing you would require?

In terms of the drainage strategy, our view is that surface water flow from the access tracks would be negligible as they will comprise of crushed stone and will be of permeable nature, not requiring additional drainage features to manage. We would plan to formally drain greater vulnerability infrastructure such as inverters/transformers and the substation and would suggest including 5% of the solar array within the drainage calculations. Would you agree with this approach?

Please let me know if you would require a fee for this advice.

Kind Regards,

Katie Moore
Flood Risk Consultant - Infrastructure

E Katie.Moore@pegasusgroup.co.uk
M 07385 503066 | **T** 01454 625945
First Floor | South Wing | Equinox North | Great Park Road | Almondsbury | Bristol | BS32 4QL

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From: SAB <sab@pembrokeshire.gov.uk>
Sent: 08 October 2025 10:47
To: Katie Moore <Katie.Moore@pegasusgroup.co.uk>
Subject: RE: P24-1037 - Great Harmeston Solar Proposal - SAB

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Good Morning Katie,

Yes I would agree that £1000 would be the correct fee for this application if the site construction area exceed 0.99 hectares

Thanks

Laura

From: Katie Moore <Katie.Moore@pegasusgroup.co.uk>
Sent: 08 October 2025 09:29
To: SAB <sab@pembrokeshire.gov.uk>
Cc: Lucy Ginn <Lucy.Ginn@pegasusgroup.co.uk>
Subject: RE: P24-1037 - Great Harmeston Solar Proposal - SAB

EXTERNAL EMAIL – Exercise care with links and attachments *E-BOST ALLANOL – Byddwch yn ofalus wrth agor dolenni ac atodiadau.*

Hi Laura,

Many thanks for your response and the information provided. The Pre-App fees indicate that the site would be categorised under "3. The making of a material change in the use of a building or land" and as the site exceeds 0.99 hectares the Pre-App fee would be £1,000. Please could you confirm this is correct?

Kind Regards,

Katie Moore
Flood Risk Consultant – Infrastructure

E Katie.Moore@pegasusgroup.co.uk
M 07385 503066 | **T** 01454 625945
First Floor | South Wing | Equinox North | Great Park Road | Almondsbury | Bristol | BS32 4QL

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From: SAB <sab@pembrokeshire.gov.uk>
Sent: 01 October 2025 13:40
To: Katie Moore <Katie.Moore@pegasusgroup.co.uk>
Subject: RE: P24-1037 - Great Harmeston Solar Proposal - SAB

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Good Afternoon Katie,

Thank you for your enquiry around the new solar farm development. As general advice for planning and Sustainable Drainage Approval Body (SAB) considerations regarding Solar PV Development, the Authority has determined that this type of development will alter land use, change the appearance of the site, and impact land cover patterns. Solar PV developments will increase impermeable surfaces, affect surface water runoff rates, modify existing drainage patterns, and influence the hydrological regime. Solar panels, compared to undeveloped conditions, intensify and concentrate runoff. Rainwater falling on the solar panels will run off and infiltrate in the sheltered areas beneath the down-slope modules. When the panels are not aligned with the natural contours of the land, the runoff may intensify, forming rivulets or small channels beneath the panels, potentially leading to an increase in runoff compared to undeveloped conditions.

To take a practical approach and encourage infiltration across the site, the application should include a detailed drainage plan or specific design details of a Sustainable Drainage System (SuDS), with calculations demonstrating that the system's capacity is sufficient to handle extreme weather events.

The developer is advised to implement additional storage along the site's contours to slow down runoff, ensuring that the runoff rate does not exceed the existing greenfield rate and cause flooding. The developer should also provide the authority with runoff calculations for both pre- and post-development conditions.

For calculating greenfield runoff before and after development, the applicant can use one of two methods:

IH 124 for small catchments, or
The correlation equation of the statistical FEH method.

Using these methods, you will find that runoff cannot be considered negligible. In line with TAN15, the proposal should aim to improve conditions compared to the undeveloped state.

Further information is available on our website at https://www.pembrokeshire.gov.uk/planning-contacts/sustainable-drainage-approving-body-sab

We would encourage a SAB pre-app for the development which I have attached the forms and guidance for.

Kind regards/Diolch,

Laura Parsons (she/her)

Assistant Coastal and Rivers Engineer
Peiriannydd Arfordirol ac Afonydd Cynorthwyol

Tel: 01437 775135

Pembrokeshire County Council

From: Katie Moore <Katie.Moore@pegasusgroup.co.uk>
Sent: 29 September 2025 16:52
To: SAB <sab@pembrokeshire.gov.uk>
Cc: Lucy Ginn <Lucy.Ginn@pegasusgroup.co.uk>
Subject: P24-1037 - Great Harmeston Solar Proposal - SAB

EXTERNAL EMAIL – Exercise care with links and attachments *E-BOST ALLANOL – Byddwch yn ofalus wrth agor dolenni ac atodiadau.*

Good Afternoon,

We are currently undertaking initial site constraint work on flood risk and drainage for a proposed solar farm at a location near Johnston, Haverfordwest (postcode: SA62 3HN). Please find attached a preliminary draft layout for your review.

We would be grateful if you could advise on any guidance or considerations we should take into account for this development and location - particularly in relation to surface water flood risk, drainage (SuDS) and any solar farm advice/guidance.

Thank you in advance for your time and assistance.

Kind Regards,

Katie Moore
Flood Risk Consultant – Infrastructure

E Katie.Moore@pegasusgroup.co.uk
M 07385 503066 | **T** 01454 625945
First Floor | South Wing | Equinox North | Great Park Road | Almondsbury | Bristol | BS32 4QL

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We welcome correspondence in Welsh and English and will respond within a maximum of 15 working days. We will respond in the language in which the correspondence is received (unless you ask us to do otherwise). For a copy in large print, easy-read, Braille, audio or an alternative language, please contact the person who sent this email. Pembrokeshire County Council: Website | Contact Us | Privacy Notices	Rydym yn croesawu gohebiaeth yn Gymraeg a Saesneg a byddwn yn ymateb cyn pen 15 diwrnod gwaith fan bellaf. Byddwn yn ymateb yn yr un iaith â'r ohebiaeth a dderbyniwyd (oni bai eich bod yn gofyn i ni wneud yn wahanol). Os am gael copi mewn print bras, fformat hawdd ei ddeall, Braille, sain neu iaith arall, cysylltwch â'r sawl a anfonodd yr e-bost hwn. Cyngor Sir Benfro: Gwefan | Cysylltwch â ni | Rhybudd Preifatrwydd

We welcome correspondence in Welsh and English and will respond within a maximum of 15 working days. We will respond in the language in which the correspondence is received (unless you ask us to do otherwise). For a copy in large print, easy-read, Braille, audio or an alternative language, please contact the person who sent this email. Pembrokeshire County Council: Website | Contact Us | Privacy Notices	Rydym yn croesawu gohebiaeth yn Gymraeg a Saesneg a byddwn yn ymateb cyn pen 15 diwrnod gwaith fan bellaf. Byddwn yn ymateb yn yr un iaith â'r ohebiaeth a dderbyniwyd (oni bai eich bod yn gofyn i ni wneud yn wahanol). Os am gael copi mewn print bras, fformat hawdd ei ddeall, Braille, sain neu iaith arall, cysylltwch â'r sawl a anfonodd yr e-bost hwn. Cyngor Sir Benfro: Gwefan | Cysylltwch â ni | Rhybudd Preifatrwydd

We welcome correspondence in Welsh and English and will respond within a maximum of 15 working days. We will respond in the	Rydym yn croesawu gohebiaeth yn Gymraeg a Saesneg a byddwn yn ymateb cyn pen 15 diwrnod gwaith fan bellaf.

language in which the correspondence is received (unless you ask us to do otherwise). For a copy in large print, easy-read, Braille, audio or an alternative language, please contact the person who sent this email. Pembrokeshire County Council: Website | Contact Us | Privacy Notices	Byddwn yn ymateb yn yr un iaith â'r ohebiaeth a dderbyniwyd (oni bai eich bod yn gofyn i ni wneud yn wahanol). Os am gael copi mewn print bras, fformat hawdd ei ddeall, Braille, sain neu iaith arall, cysylltwch â'r sawl a anfonodd yr e-bost hwn. Cyngor Sir Benfro: Gwefan | Cysylltwch â ni | Rhybudd Preifatrwydd

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We welcome correspondence in Welsh and English and will respond within a maximum of 15 working days. We will respond in the language in which the correspondence is	Rydym yn croesawu gohebiaeth yn Gymraeg a Saesneg a byddwn yn ymateb cyn pen 15 diwrnod gwaith fan bellaf. Byddwn yn ymateb yn yr un iaith â'r

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We welcome correspondence in Welsh and English and will respond within a maximum of 15 working days. We will respond in the language in which the correspondence is received (unless you ask us to do otherwise). For a copy in large print, easy-read, Braille, audio or an alternative language, please contact the person who sent this email. Pembrokeshire County Council: Website | Contact Us | Privacy Notices	Rydym yn croesawu gohebiaeth yn Gymraeg a Saesneg a byddwn yn ymateb cyn pen 15 diwrnod gwaith fan bellaf. Byddwn yn ymateb yn yr un iaith â'r ohebiaeth a dderbyniwyd (oni bai eich bod yn gofyn i ni wneud yn wahanol). Os am gael copi mewn print bras, fformat hawdd ei ddeall, Braille, sain neu iaith arall, cysylltwch â'r sawl a anfonodd yr e-bost hwn. Cyngor Sir Benfro: Gwefan | Cysylltwch â ni | Rhybudd Preifatrwydd

Appendix F – Drainage Strategy

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PROPOSED PERIMETER SWALE TO CAPTURE OVERLAND FLOWS AND OVERTOP NATURALLY.

DIMENSIONS
DEPTH: 0.5m
SIDE SLOPES: 1 in 3
APPROX. STORAGE VOLUME: 1.0m³/m

PROPOSED PERIMETER SWALE TO CAPTURE OVERLAND FLOWS AND OVERTOP NATURALLY.

DIMENSIONS
DEPTH: 0.5m
SIDE SLOPES: 1 in 3
APPROX. STORAGE VOLUME: 1.0m³/m

WHERE EXISTING OFFSITE SURFACE WATER FLOW PATHS HAVE BEEN IDENTIFIED, 'U-SHAPED' CROSS DRAINS SHOULD BE USED ACROSS ACCESS TRACKS IN ORDER TO PRESERVE EXISTING FLOW PATH.

EXAMPLE:

ACCESS TRACK TO BE CONSTRUCTED FROM PERMEABLE AGGREGATES.

PROPOSED PERIMETER SWALE TO CAPTURE OVERLAND FLOWS AND OVERTOP NATURALLY.

DIMENSIONS
DEPTH: 0.5m
SIDE SLOPES: 1 in 3
APPROX. STORAGE VOLUME: 1.0m³/m

INVERTERS ARE PROPOSED TO DRAIN TO A GRAVEL TRENCH. THE TRENCH IS SIZED TO ACCOMMODATE THE DESIGN RAINFALL EVENT.

DIMENSIONS
AREA: 20m²
DEPTH: 0.4m
POROSITY: 30%
STORAGE VOLUME: 2.4m³

Pond
Pond
Wind Turbine
Slurry Bed
Tank
HARMESTON CROSS

N

1:1250
0 31.25m 62.5m

NOTES:

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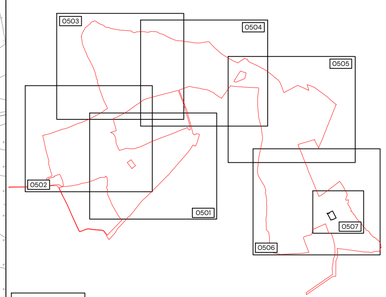
10. EXISTING WATERCOURSE ROUTES HAVE BEEN DETERMINED USING DATA FROM THE TOPOGRAPHIC SURVEY, EA LIDAR DATA, AND OS MAPPING. EXACT WATERCOURSE DEPTHS AND LOCATIONS ARE TO BE CONFIRMED ON SITE.
11. ANY CONNECTION TO AN EXISTING WATERCOURSE IS SUBJECT TO CONFIRMATION FROM THE LLFA.
12. THIS DRAINAGE STRATEGY IS TO BE READ IN CONJUNCTION WITH THE FULL FLOOD CONSEQUENCES ASSESSMENT REPORT (REF: P24-1037).

SITE LAYOUT KEY:

- APPLICATION BOUNDARY

DRAINAGE STRATEGY KEY:

- SWALES
- 3m MAINTENANCE BUFFER
- ATTENUATION BASIN
- NRW FLOOD ZONE 2 (RIVERS AND SEA)
- NRW FLOOD ZONE 3 (RIVERS AND SEA)
- NRW FLOOD ZONE 2 (SURFACE WATER)
- NRW FLOOD ZONE 3 (SURFACE WATER)
- EXISTING WATERCOURSE
- OVERLAND FLOW DIRECTION
- SURFACE WATER MANHOLE
- SURFACE WATER DRAIN
- HEADWALL
- GRAVEL DRAINAGE TRENCH



KEY PLAN
NTS

REV	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
P2	11.03.2026	REVISED SITE LAYOUT	OM	CT	CT
P1	24.02.2026	FIRST ISSUE	OM	CT	CT

GREAT HARMESTON SOLAR FARM SURFACE WATER DRAINAGE STRATEGY

LAND SURROUNDING GREAT HARMESTON BUILDINGS, PEMBROKESHIRE, SA62 3HN

CLIENT:
ARISE RENEWABLE ENERGY LTD

DATE:	SCALE:	DRAWN BY: / CHECKED BY: / APPROVED BY:
24.02.2026	1:1250@A1	OM / CT / CT

DRAWING NUMBER: P24-1037-PEG-XX-XX-DR-C-0501-P2

PG OFFICE / TEAM: BRS-IN

PEGASUS REF No: P24-1037

DRAWING STATUS: S0

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N

1:1250
0 31.25m 62.5m

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SITE LAYOUT KEY:

- APPLICATION BOUNDARY

DRAINAGE STRATEGY KEY:

- SWALES
- 3m MAINTENANCE BUFFER
- ATTENUATION BASIN
- NRW FLOOD ZONE 2 (RIVERS AND SEA)
- NRW FLOOD ZONE 3 (RIVERS AND SEA)
- NRW FLOOD ZONE 2 (SURFACE WATER)
- NRW FLOOD ZONE 3 (SURFACE WATER)
- EXISTING WATERCOURSE
- OVERLAND FLOW DIRECTION
- SURFACE WATER MANHOLE
- SURFACE WATER DRAIN
- HEADWALL
- GRAVEL DRAINAGE TRENCH

PROPOSED PERIMETER SWALE TO CAPTURE OVERLAND FLOWS AND OVERTOP NATURALLY.

DIMENSIONS
DEPTH: 0.5m
SIDE SLOPES: 1 in 3
APPROX. STORAGE VOLUME: 1.0m³/m

WHERE EXISTING OFFSITE SURFACE WATER FLOW PATHS HAVE BEEN IDENTIFIED, 'U-SHAPED' CROSS DRAINS SHOULD BE USED ACROSS ACCESS TRACKS IN ORDER TO PRESERVE EXISTING FLOW PATH.

INVERTERS ARE PROPOSED TO DRAIN TO A GRAVEL TRENCH. THE TRENCH IS SIZED TO ACCOMMODATE THE DESIGN RAINFALL EVENT.

DIMENSIONS
AREA: 20m²
DEPTH: 0.4m
POROSITY: 30%
STORAGE VOLUME: 2.4m³

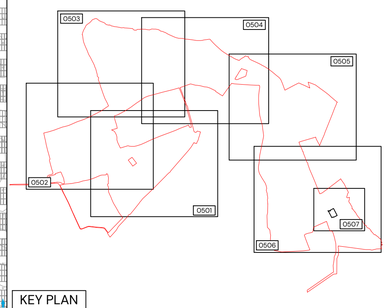
ACCESS TRACK TO BE CONSTRUCTED FROM PERMEABLE AGGREGATES.

PROPOSED PERIMETER SWALE TO CAPTURE OVERLAND FLOWS AND OVERTOP NATURALLY.

DIMENSIONS
DEPTH: 0.5m
SIDE SLOPES: 1 in 3
APPROX. STORAGE VOLUME: 1.0m³/m

Pond
Pond
Pond
Wind Turbine
Track
Track
Deemshill

draft.



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LAND SURROUNDING GREAT HARMESTON BUILDINGS, PEMBROKESHIRE, SA62 3HN

CLIENT:
ARISE RENEWABLE ENERGY LTD

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		APPROVED BY:	CT

DRAWING NUMBER: P24-1037 - PEG - XX - XX - DR - C - 0502 - P2
PG OFFICE / TEAM: BRS-IN

PEGASUS REF No: P24-1037
DRAWING STATUS: SO

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PROPOSED PERIMETER SWALE TO CAPTURE OVERLAND FLOWS AND OVERTOP NATURALLY.

DIMENSIONS
DEPTH: 0.5m
SIDE SLOPES: 1 in 3
APPROX. STORAGE VOLUME: 1.0m^3/m

ACCESS TRACK TO BE CONSTRUCTED FROM PERMEABLE AGGREGATES.

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DIMENSIONS
AREA: 20m^3
DEPTH: 0.4m
POROSITY: 30%
STORAGE VOLUME: 2.4m^3

N

1:1250
0 31.25m 62.5m

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SITE LAYOUT KEY:

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DRAINAGE STRATEGY KEY:

- SWALES
- 3m MAINTENANCE BUFFER
- ATTENUATION BASIN
- NRW FLOOD ZONE 2 (RIVERS AND SEA)
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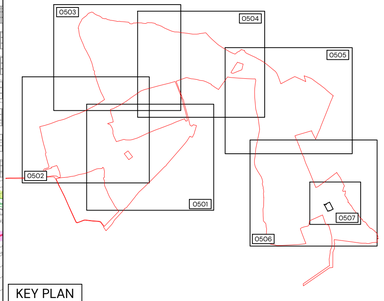
- OVERLAND FLOW DIRECTION
- SURFACE WATER MANHOLE
- SURFACE WATER DRAIN
- HEADWALL
- GRAVEL DRAINAGE TRENCH



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GREAT HARMESTON SOLAR FARM SURFACE WATER DRAINAGE STRATEGY

LAND SURROUNDING GREAT HARMESTON BUILDINGS, PEMBROKESHIRE, SA62 3HN

CLIENT:
ARISE RENEWABLE ENERGY LTD

DATE: 24.02.2026
SCALE: 1:1250@A1
DRAWN BY: OM
CHECKED BY: CT
APPROVED BY: CT

DRAWING NUMBER: P24-1037-PEG-XX-XX-DR-C-0503-P2
PG OFFICE / TEAM: BRS-IN

PEGASUS REF No: P24-1037
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DIMENSIONS
AREA: 20m²
DEPTH: 0.4m
POROSITY: 30%
STORAGE VOLUME: 2.4m³

PROPOSED PERIMETER SWALE TO CAPTURE OVERLAND FLOWS AND OVERTOP NATURALLY.

DIMENSIONS
DEPTH: 0.5m
SIDE SLOPES: 1 in 3
APPROX. STORAGE VOLUME: 1.0m³/m

PROPOSED INTERMEDIATE SWALE TO CAPTURE OVERLAND FLOWS AND OVERTOP NATURALLY.

DIMENSIONS
DEPTH: 0.3m
SIDE SLOPES: 1 in 3
APPROX. STORAGE VOLUME: 0.36m³/m

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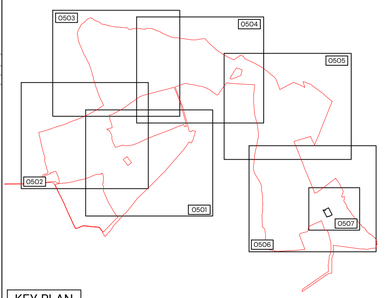

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ARISE RENEWABLE ENERGY LTD

DATE:	SCALE:	DRAWN BY: / CHECKED BY: / APPROVED BY:
24.02.2026	1:1250@A1	OM / CT / CT

DRAWING NUMBER: P24-1037-PEG-XX-XX-DR-C-0505-P2
PG OFFICE / TEAM: BRS-IN

PEGASUS REF No: P24-1037
DRAWING STATUS: S0

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N

1:1250
0 31.25m 62.5m

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12. THIS DRAINAGE STRATEGY IS TO BE READ IN CONJUNCTION WITH THE FULL FLOOD CONSEQUENCES ASSESSMENT REPORT (REF: P24-1037).

SITE LAYOUT KEY:

- APPLICATION BOUNDARY

DRAINAGE STRATEGY KEY:

- SWALES
- 3m MAINTENANCE BUFFER
- ATTENUATION BASIN
- NRW FLOOD ZONE 2 (RIVERS AND SEA)
- NRW FLOOD ZONE 3 (RIVERS AND SEA)
- NRW FLOOD ZONE 2 (SURFACE WATER)
- NRW FLOOD ZONE 3 (SURFACE WATER)
- EXISTING WATERCOURSE
- OVERLAND FLOW DIRECTION
- SURFACE WATER MANHOLE
- SURFACE WATER DRAIN
- HEADWALL
- GRAVEL DRAINAGE TRENCH

SOLAR FARM INFRASTRUCTURE (incl. DRAINAGE FEATURES) WITHIN THE VICINITY OF EXISTING NATIONAL RAIL ASSETS ARE SUBJECT TO CONSULTATION RESPONSES FROM NATIONAL RAIL.

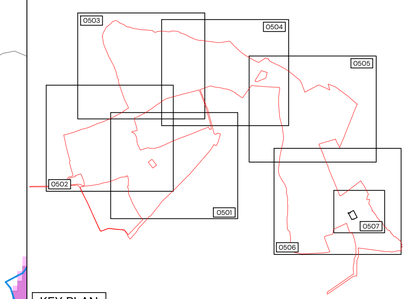
PROPOSED PERIMETER SWALE TO CAPTURE OVERLAND FLOWS AND OVERTOP NATURALLY.

DIMENSIONS
DEPTH: 0.5m
SIDE SLOPES: 1 in 3
APPROX. STORAGE VOLUME: 1.0m^3/m

ACCESS TRACK TO BE CONSTRUCTED FROM PERMEABLE AGGREGATES.

INVERTERS ARE PROPOSED TO DRAIN TO A GRAVEL TRENCH. THE TRENCH IS SIZED TO ACCOMMODATE THE DESIGN RAINFALL EVENT.

DIMENSIONS
AREA: 20m^3
DEPTH: 0.4m
POROSITY: 30%
STORAGE VOLUME: 2.4m^3



KEY PLAN
NTS

REV	DATE	DESCRIPTION	REVISED	CHECKED	APPROVED
P2	11.03.2026	REVISED SITE LAYOUT	OM	CT	CT
P1	24.02.2026	FIRST ISSUE	OM	CT	CT

GREAT HARMESTON SOLAR FARM SURFACE WATER DRAINAGE STRATEGY

LAND SURROUNDING GREAT HARMESTON BUILDINGS, PEMBROKESHIRE, SA62 3HN

CLIENT:
ARISE RENEWABLE ENERGY LTD

DATE:	SCALE:	DRAWN BY: / CHECKED BY: / APPROVED BY:
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DRAWING NUMBER: P24-1037-PEG-XX-XX-DR-C-0506-P2

PG OFFICE / TEAM: BRS-IN

PEGASUS REF No: P24-1037

DRAWING STATUS: SO

PEGASUS GROUP

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ATTENUATION BASIN

PROPOSED TO MANAGE SURFACE WATER FROM THE SUBSTATION AREA.

TOP OF BANK LEVEL: 42.8m AOD
INVERT LEVEL: 41.8m AOD
SIDE SLOPES: 1 in 3
TOTAL AVAILABLE STORAGE VOLUME: 202.4m^3
FREEBOARD: 300mm

MAXIMUM REQUIRED STORAGE VOLUME (1 in 100yr+40%CC event): 202.3m^3

3m FLAT MAINTENANCE STRIP IS SHOWN AT THE TOP OF BANK LEVEL.

DISCHARGE RATES ARE TO BE LIMITED TO THE EQUIVALENT OF THE 50%AEP (Q_{BAR}) GREENFIELD RUNOFF RATE FOR THE SUBSTATION CATCHMENT AREA OF 0.196ha.

DISCHARGE RATES ARE TO BE LIMITED TO 1.0l/s VIA A VORTEX FLOW CONTROL DEVICE (HYDROBRAKE OR SIMILAR).

PROPOSED TO DISCHARGE TO THE WATERCOURSE AT THE EASTERN EDGE OF THE SITE.
THE EXISTING WATERCOURSE IS IDENTIFIED VIA OS MAPPING, THIS IS GIVEN THAT THE TOPOGRAPHIC SURVEY HAS NOT PICKED UP THE TOP OF BANK OR INVERT LEVEL DUE TO DENSE VEGETATION.

THE EXACT ROUTE AND INVERT OF THE WATERCOURSE IS TO BE CONFIRMED AT THE NEXT STAGE OF DESIGN.

ANY CONNECTION TO THE WATERCOURSE IS SUBJECT TO CONSENT FROM THE LLFA.

APPROXIMATE INVERT LEVEL OF OUTFALL: 36.0m AOD

O&M SPARES AND STORAGE AREA LAYOUT TO BE CONFIRMED. PROPOSED ROUTE OF OUTFALL CONNECTION SUBJECT TO CHANGE FOLLOWING CONFIRMATION OF THE LAYOUT IN THIS AREA.

SURFACE WATER GENERATED FROM THE PROPOSED SUBSTATION AREA TO BE CAPTURED AND ROUTED TOWARD THE PROPOSED ATTENUATION VIA PERFORATED COLLECTOR PIPES AND BELOW GROUND SOLID WALLED DRAINAGE.

A 477

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N

1:500
0 12.5m 25m

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- SURFACE WATER DRAIN
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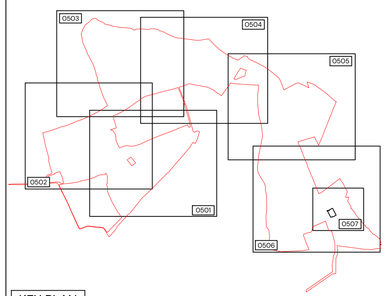

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NTS

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GREAT HARMESTON SOLAR FARM SURFACE WATER DRAINAGE STRATEGY

LAND SURROUNDING GREAT HARMESTON BUILDINGS, PEMBROKESHIRE, SA62 3HN

CLIENT:
ARISE RENEWABLE ENERGY LTD

DATE: 24.02.2026
SCALE: 1:500@A1
DRAWN BY: OM
CHECKED BY: CT
APPROVED BY: CT

DRAWING NUMBER: P24-1037-PEG-XX-XX-DR-C-0507-P2
PG.OFFICE / TEAM: BRS-IN

PEGASUS REF No: P24-1037
DRAWING STATUS: SO

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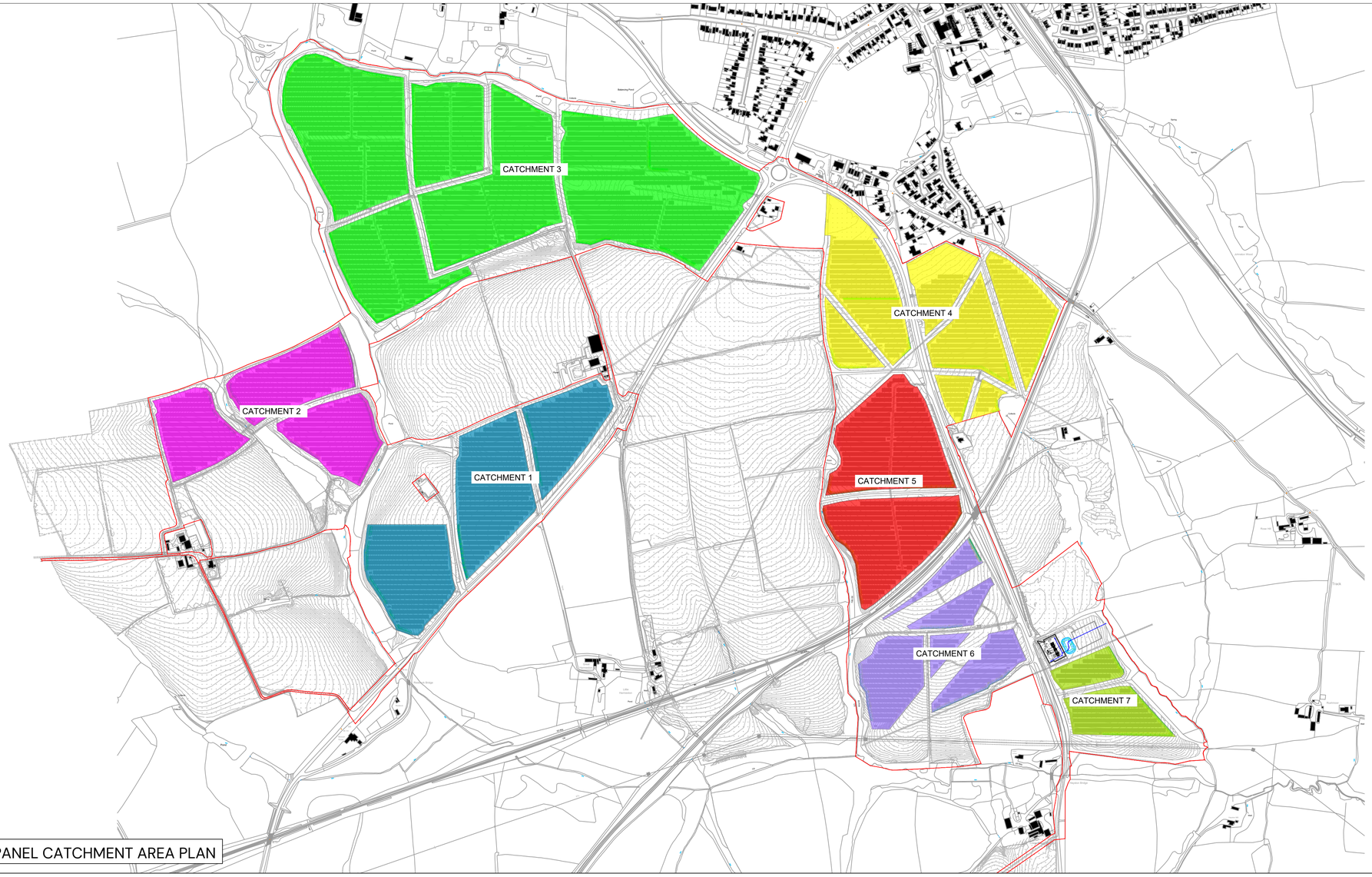

SOLAR PANEL CATCHMENT AREA PLAN

PERIMETER SWALE VOLUME CALCULATIONS

CATCHMENT ID	CATCHMENT AREA (ha)	IMPERMEABLE AREA (2% OF CATCHMENT AREA) (ha)	REQUIRED STORAGE (QSE, m^3)	TOTAL SWALE LENGTH/VOLUME (m/m^3)	DIFFERENCE VOLUME (+/- m^3)
CATCHMENT 1	10.145	0.203	400	441	+41
CATCHMENT 2	7.961	0.159	314	565	+251
CATCHMENT 3	29.799	0.596	1175	1862	+687
CATCHMENT 4	11.101	0.2220	438	563	+125
CATCHMENT 5	8.5900	0.1720	339	597	+258
CATCHMENT 6	5.3000	0.1060	209	395	+186
CATCHMENT 7	2.5380	0.0510	101	342	+241

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N

1:5000
0 125m 250m

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GREAT HARMESTON SOLAR FARM SURFACE WATER DRAINAGE STRATEGY

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PG OFFICE / TEAM: BRS-IN

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Appendix G – Drainage Calculations

Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

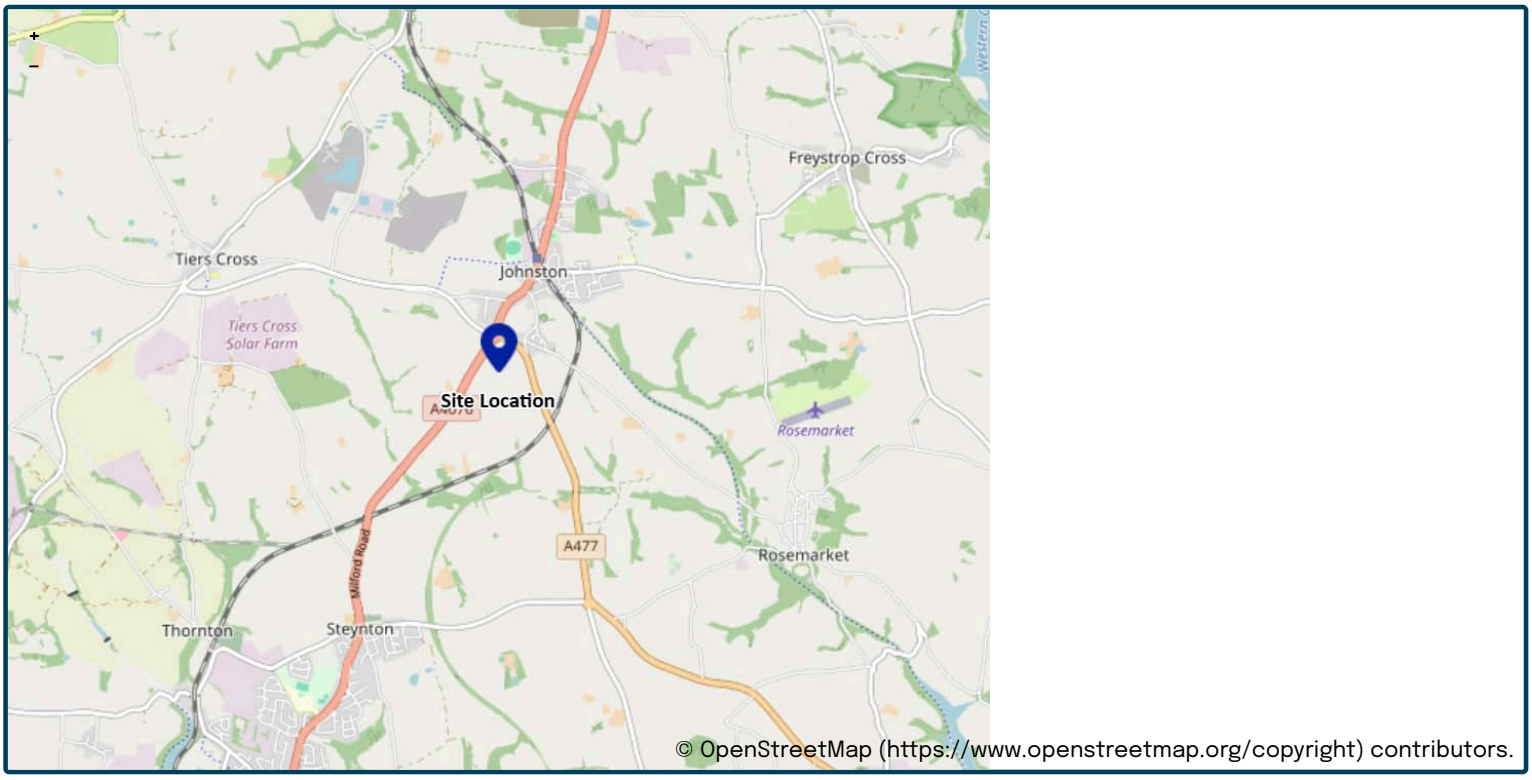
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	10/02/2026
Calculated by	OM
Reference	P24-1037
Model version	2.2.2

Location

Site name	Great Harmeston
Site location	Great Harmeston



Site easting (British National Grid)	192913
Site northing (British National Grid)	209570

Site details

Total site area (ha)	50 ha

Greenfield runoff

Method

Method	FEH statistical (2025)

FEH statistical (2025)

	My value		Map value
SAAR9120 (mm)	1161 mm		
BFIHOST19scaled	0.598		
QMed-QBar conversion	1.075		1.075
QMed (l/s)	250.3 l/s		
QBar (FEH statistical 2025) (l/s)	269.1 l/s		

Growth curve factors

	My value		Map value
Hydrological region	9		9
1 year growth factor	0.88		
2 year growth factor	0.93		
10 year growth factor	1.42		
30 year growth factor	1.78		
100 year growth factor	2.18		
200 year growth factor	2.46		

Results

Method	FEH statistical (2025)
Flow rate 1 year (l/s)	236.8 l/s
Flow rate 2 year (l/s)	250.3 l/s
Flow rate 10 years (l/s)	382.1 l/s
Flow rate 30 years (l/s)	479.0 l/s
Flow rate 100 years (l/s)	586.7 l/s
Flow rate 200 years (l/s)	662.0 l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.2) developed by HR Wallingford and available at uksuds.com (https://www.uksuds.com/). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (https://www.uksuds.com/terms-conditions). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Design Settings

Rainfall Methodology	FEH-22	Maximum Time of Concentration (mins)	30.00	Preferred Cover Depth (m)	1.200
Return Period (years)	2	Maximum Rainfall (mm/hr)	999.0	Include Intermediate Ground	✓
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00	Enforce best practice design rules	✓
CV	1.000	Connection Type	Level Soffits		
Time of Entry (mins)	5.00	Minimum Backdrop Height (m)	0.200		

Nodes

Name	Area (ha)	T of E (mins)	Add Inflow (l/s)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
Substation	0.196	5.00	0.0	100.000	1200			1.000	99.000
Inverters	0.002	5.00		100.000	1200	100.000	100.000	0.400	99.600

Simulation Settings

Rainfall Methodology	FEH-22	Winter CV	1.000	Drain Down Time (mins)	10080	Check Discharge Rate(s)	x
Rainfall Events	Singular	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0	Check Discharge Volume	x
Summer CV	1.000	Skip Steady State	x	Starting Level (m)			

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Node Substation Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	99.000	Product Number	CTL-SHE-0051-1000-0700-1000
Design Depth (m)	0.700	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.0	Min Node Diameter (mm)	1200

Node Inverters Online Head/Flow Control

Flap Valve	x	Replaces Downstream Link	x	Invert Level (m)	99.600

Head (m)	Flow (l/s)	Head (m)	Flow (l/s)
0.001	0.000	0.500	0.000

Node Substation Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	99.000
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	1920

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	227.4	227.4	0.700	353.6	360.4	1.000	416.1	426.3

Node Inverters Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	99.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	20.0	20.0	0.400	20.0	26.3

Flow+ v16.0 Copyright © 1988-2026 Causeway Technologies Ltd

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Substation	1380	99.697	0.697	7.9	202.2619	0.0000	OK
1440 minute winter	Inverters	930	99.960	0.360	0.1	2.1600	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
1440 minute winter	Substation	Hydro-Brake®	1.0	271.9
1440 minute winter	Inverters	Head/Flow	0.0	0.0

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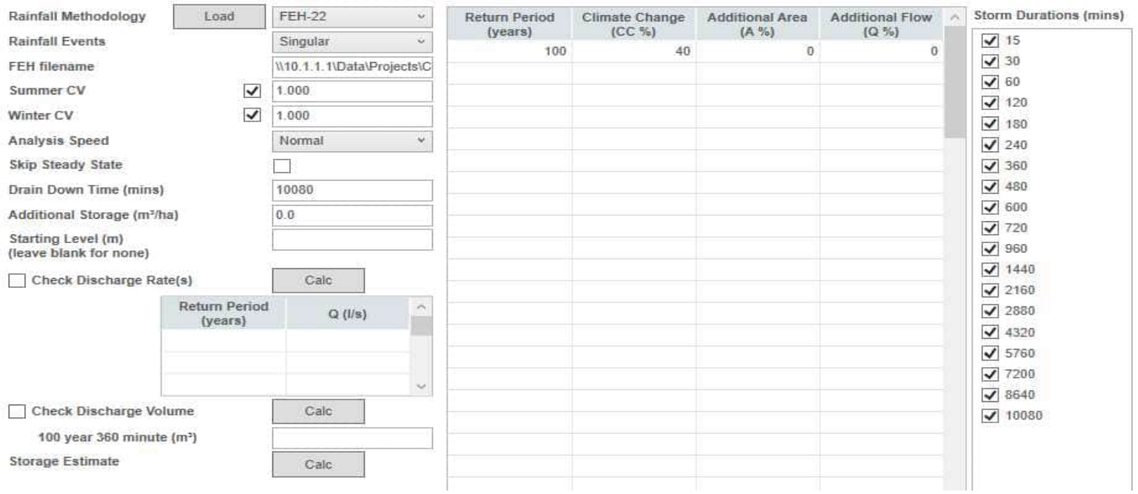
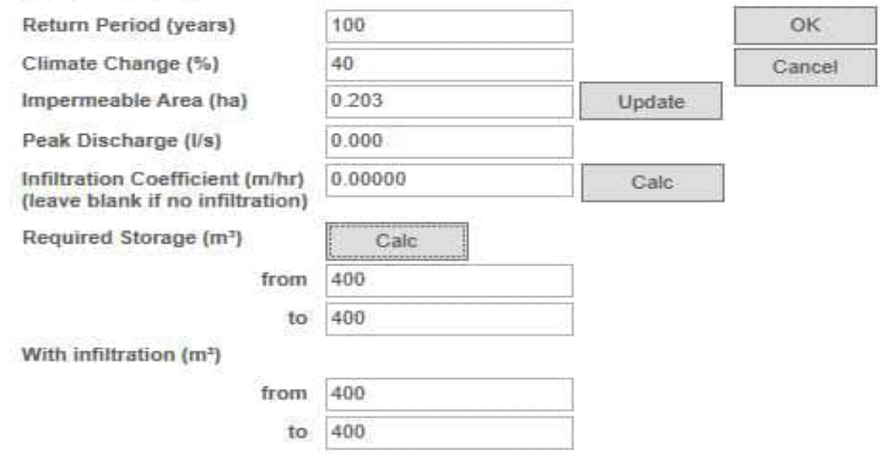
Causeway Flow - Quick Storage Estimates Input



Causeway Flow - Quick Storage Estimates Output



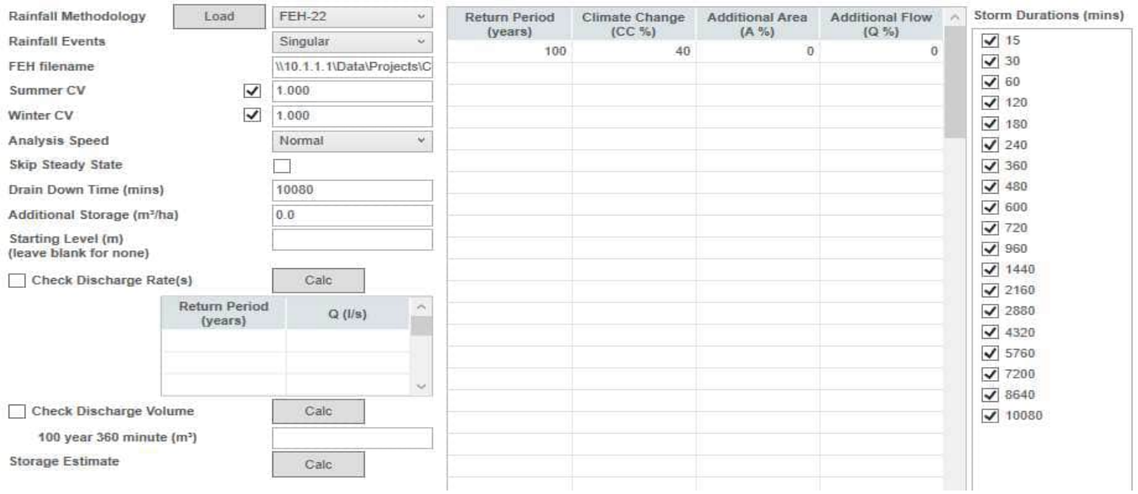
Catchment 1

Swale Type	Total Swale Length (m)	Swale Volume (m^3/m)	Total Volume Provided (m^3)
Perimeter Swale	441	1.0	440.9
		Total Storage Volume Provided (m^3)	440.9

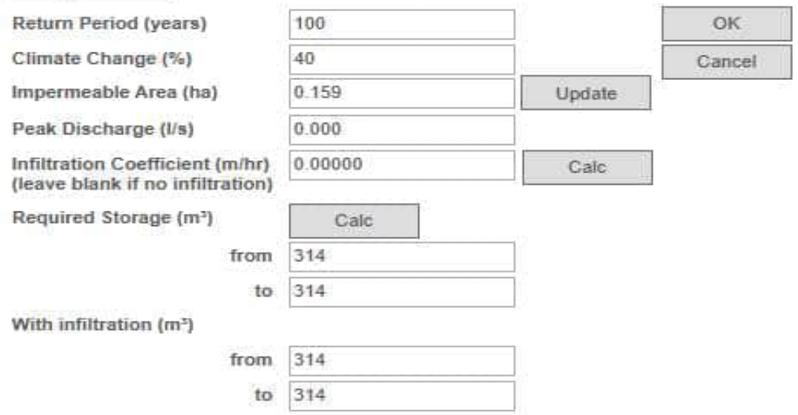
General Site Impermeable Area (2%)	Total Net Impermeable Area (ha)	Storage Required, QSE (m^3)	Storage Provided in DS (m^3)	Difference in Volumes (m^3)
0.202895966	0.203	400	440.9	40.9

General Site Impermeable Area (ha)
10.145
101447.9828

Causeway Flow - Quick Storage Estimates Input



Causeway Flow - Quick Storage Estimates Output



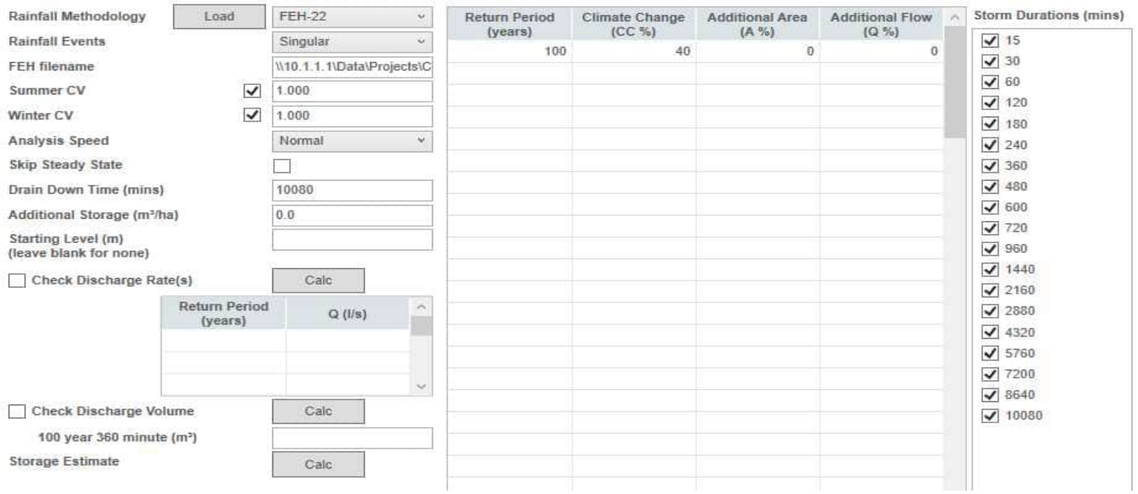
Catchment 2

Swale Type	Total Swale Length (m)	Swale Volume (m^3/m)	Total Volume Provided (m^3)
Perimeter Swale	565	1.0	564.9
		Total Storage Volume Provided (m^3)	564.9

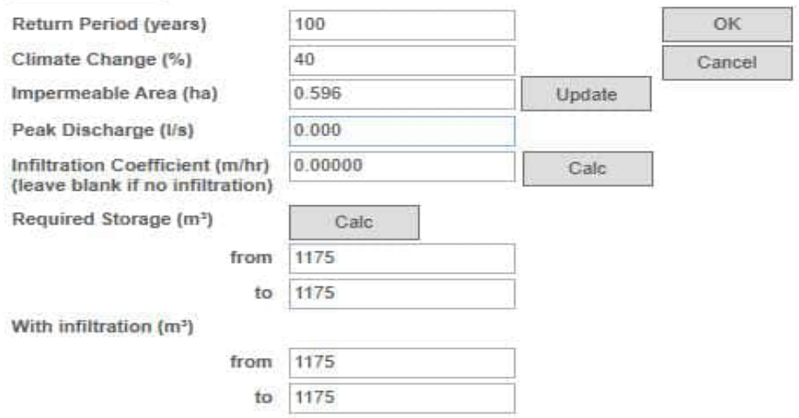
General Site Impermeable Area (2%)	Total Net Impermeable Area (ha)	Storage Required, QSE (m^3)	Storage Provided in DS (m^3)	Difference in Volumes (m^3)
0.159227609	0.159	314	564.9	250.9

General Site Impermeable Area (ha)
7.961
79613.8047

Causeway Flow - Quick Storage Estimates Input



Causeway Flow - Quick Storage Estimates Output



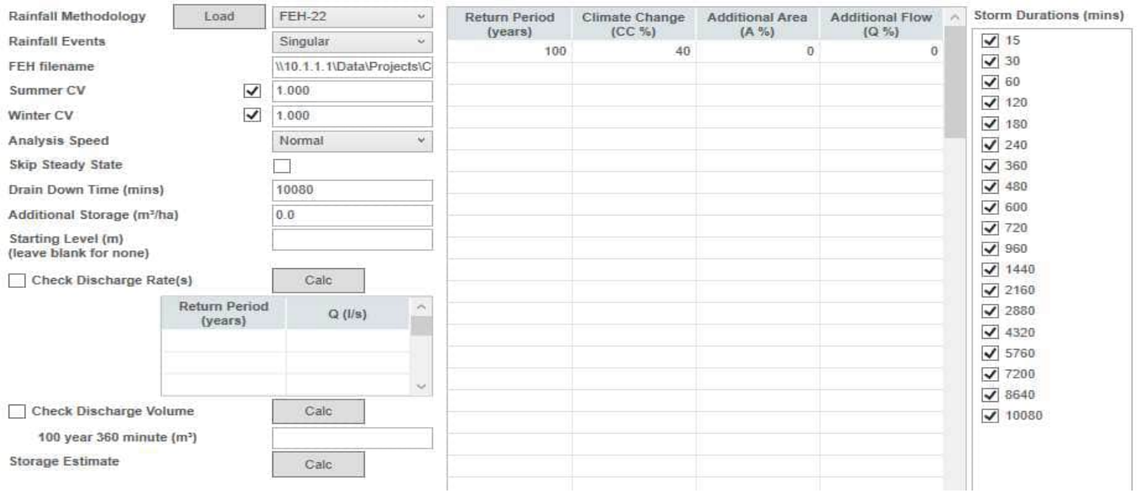
Catchment 3

Swale Type	Total Swale Length (m)	Swale Volume (m^3/m)	Total Volume Provided (m^3)
Perimeter Swale	1862	1.0	1862.2
		Total Storage Volume Provided (m^3)	1862.2

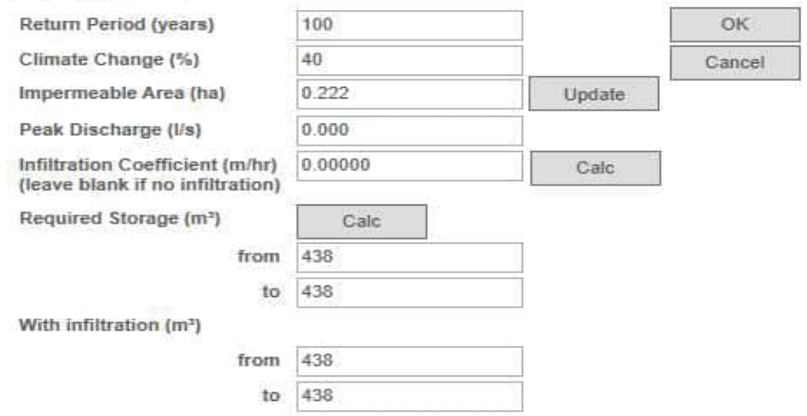
General Site Impermeable Area (2%)	Total Net Impermeable Area (ha)	Storage Required, QSE (m^3)	Storage Provided in DS (m^3)	Difference in Volumes (m^3)
0.595986132	0.596	1175	1862.2	687.2

General Site Impermeable Area (ha)
29.799
297993.066

Causeway Flow - Quick Storage Estimates Input



Causeway Flow - Quick Storage Estimates Output



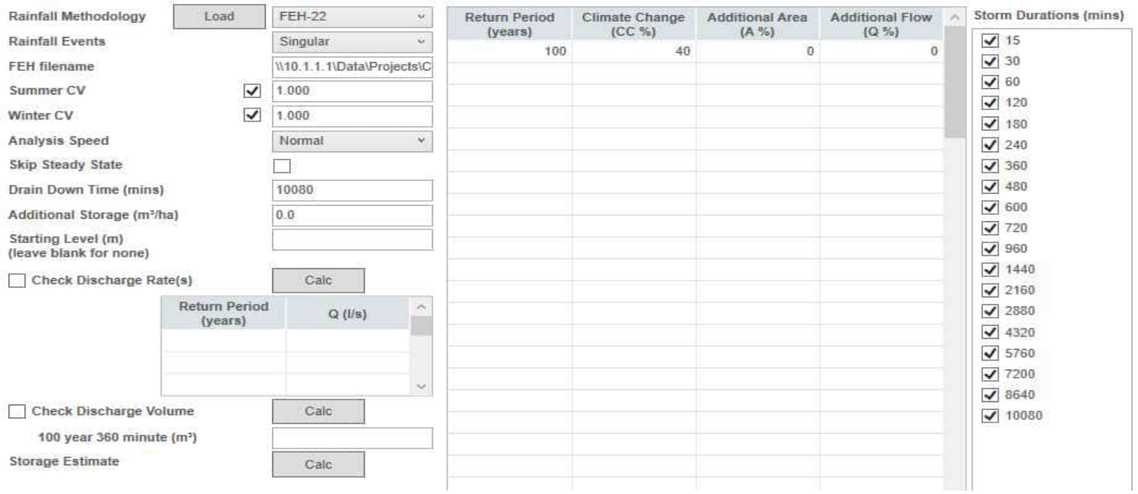
Catchment 4

Swale Type	Total Swale Length (m)	Swale Volume (m^3/m)	Total Volume Provided (m^3)
Perimeter Swale	563	1.0	562.6
		Total Storage Volume Provided (m^3)	562.6

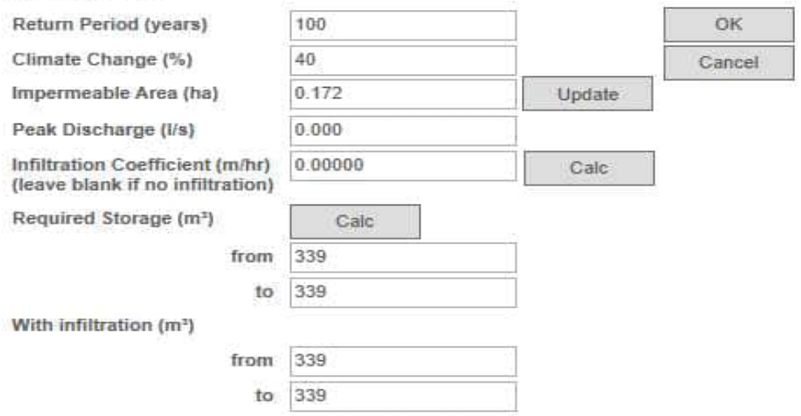
General Site Impermeable Area (2%)	Total Net Impermeable Area (ha)	Storage Required, QSE (m^3)	Storage Provided in DS (m^3)	Difference in Volumes (m^3)
0.222016691	0.222	438	562.6	124.6

General Site Impermeable Area (ha)
11.101
111008.3453

Causeway Flow - Quick Storage Estimates Input



Causeway Flow - Quick Storage Estimates Output



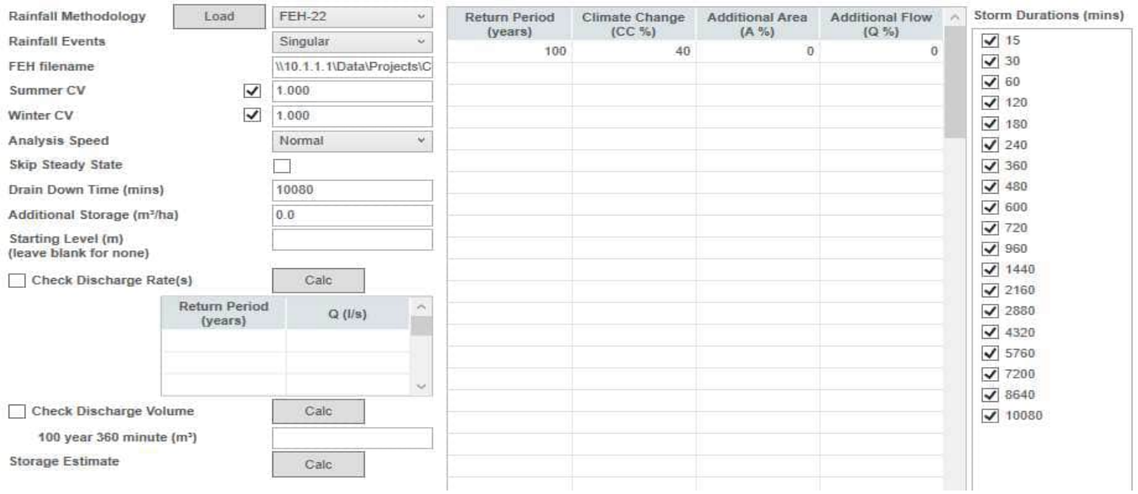
Catchment 5

Swale Type	Total Swale Length (m)	Swale Volume (m^3/m)	Total Volume Provided (m^3)
Perimeter Swale	597	1.0	597.3
		Total Storage Volume Provided (m^3)	597.3

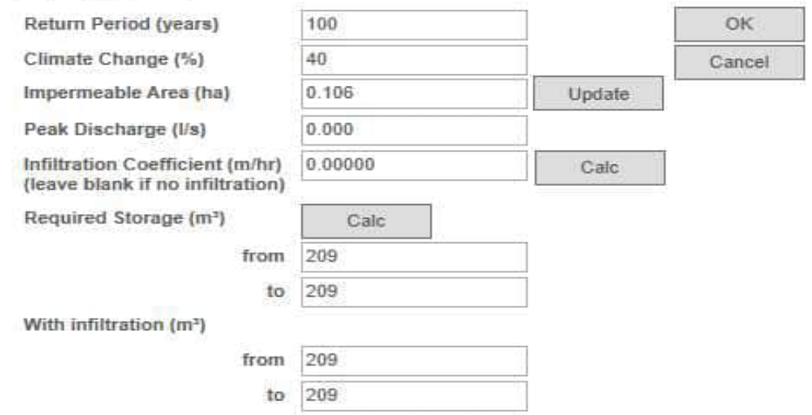
General Site Impermeable Area (2%)	Total Net Impermeable Area (ha)	Storage Required, QSE (m^3)	Storage Provided in DS (m^3)	Difference in Volumes (m^3)
0.171796216	0.172	339	597.3	258.3

General Site Impermeable Area (ha)
8.590
85898.1082

Causeway Flow - Quick Storage Estimates Input



Causeway Flow - Quick Storage Estimates Output



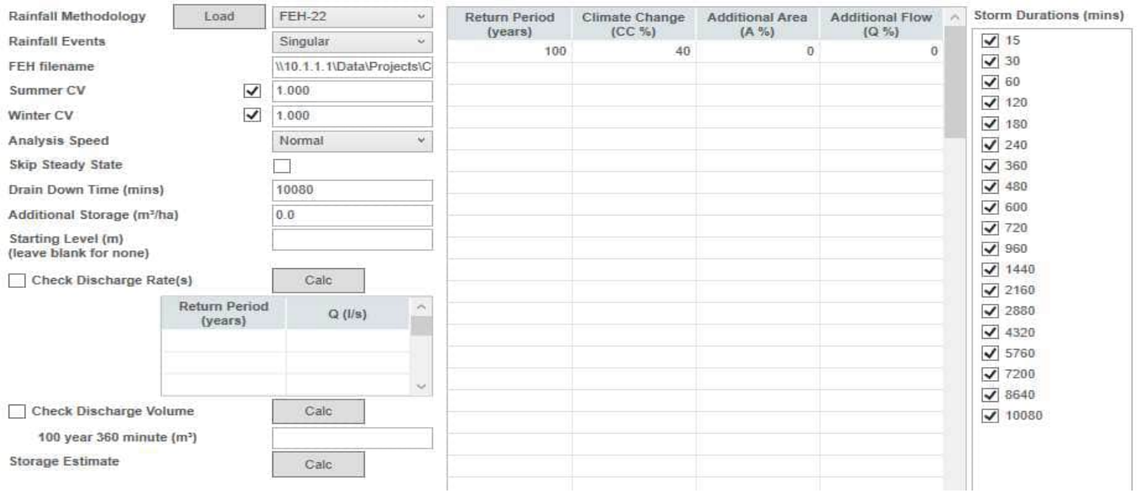
Catchment 6

Swale Type	Total Swale Length (m)	Swale Volume (m^3/m)	Total Volume Provided (m^3)
Perimeter Swale	395	1.0	395.3
		Total Storage Volume Provided (m^3)	395.3

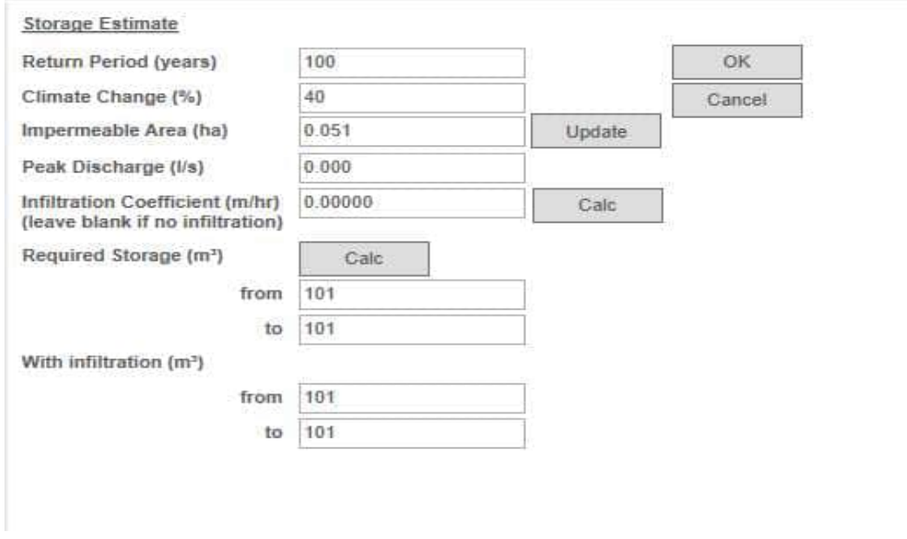
General Site Impermeable Area (2%)	Total Net Impermeable Area (ha)	Storage Required, QSE (m^3)	Storage Provided in DS (m^3)	Difference in Volumes (m^3)
0.105995037	0.106	209	395.3	186.3

General Site Impermeable Area (ha)
5.300
52997.5184

Causeway Flow - Quick Storage Estimates Input



Causeway Flow - Quick Storage Estimates Output



Catchment 7

Swale Type	Total Swale Length (m)	Swale Volume (m^3/m)	Total Volume Provided (m^3)
Perimeter Swale	342	1.0	342
		Total Storage Volume Provided (m^3)	342

General Site Impermeable Area (2%)	Total Net Impermeable Area (ha)	Storage Required, QSE (m^3)	Storage Provided in DS (m^3)	Difference in Volumes (m^3)
0.05075758	0.051	101	342	241

General Site Impermeable Area (ha)
2.538
25378.7898

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