Lime Down Solar Park

# Environmental Statement

## Volume 3, Appendix 11-2: Flood Risk Assessment and Drainage Strategy – Lime Down A (Tracked)

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# Appendix 11-2: Flood Risk Assessment and Drainage Strategy – Lime Down A

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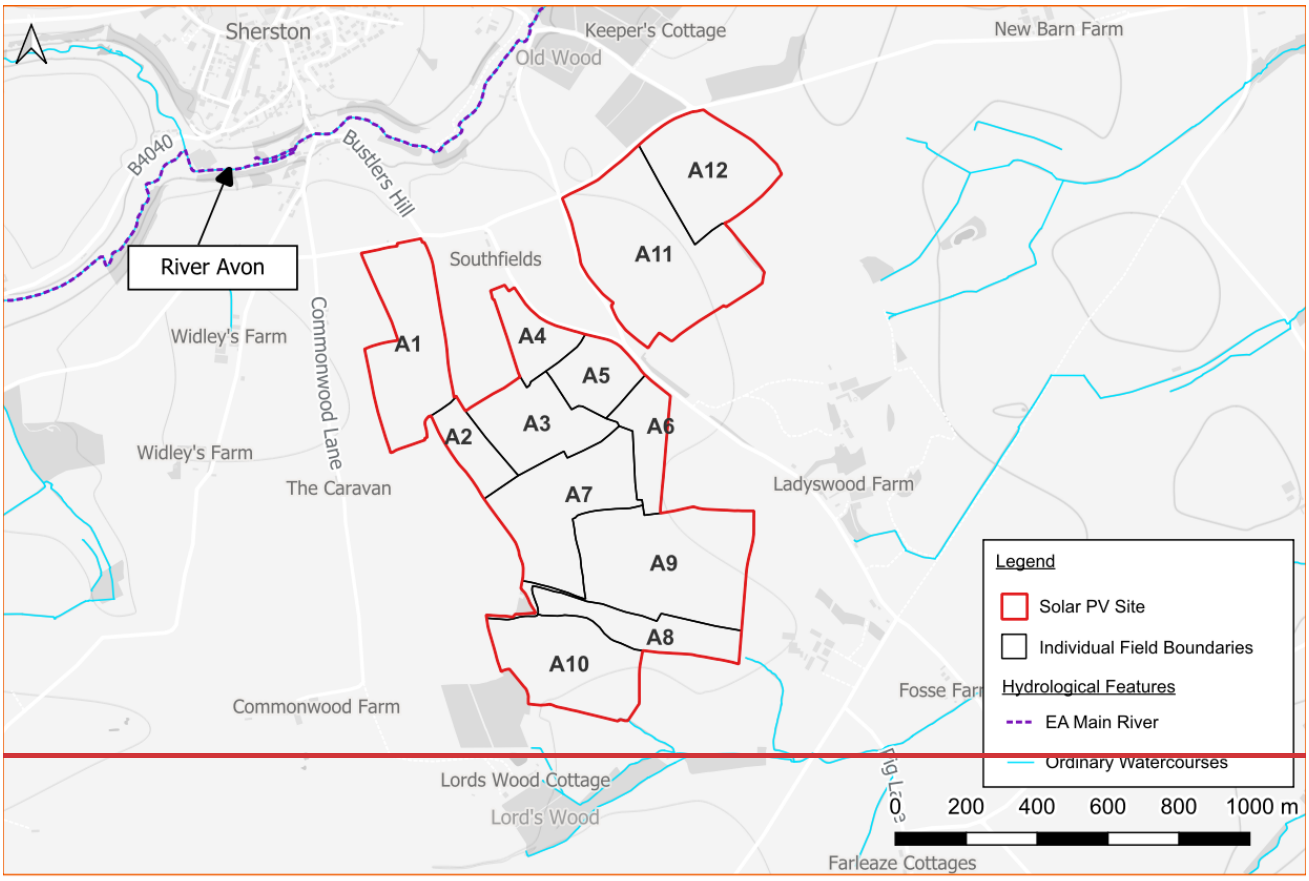
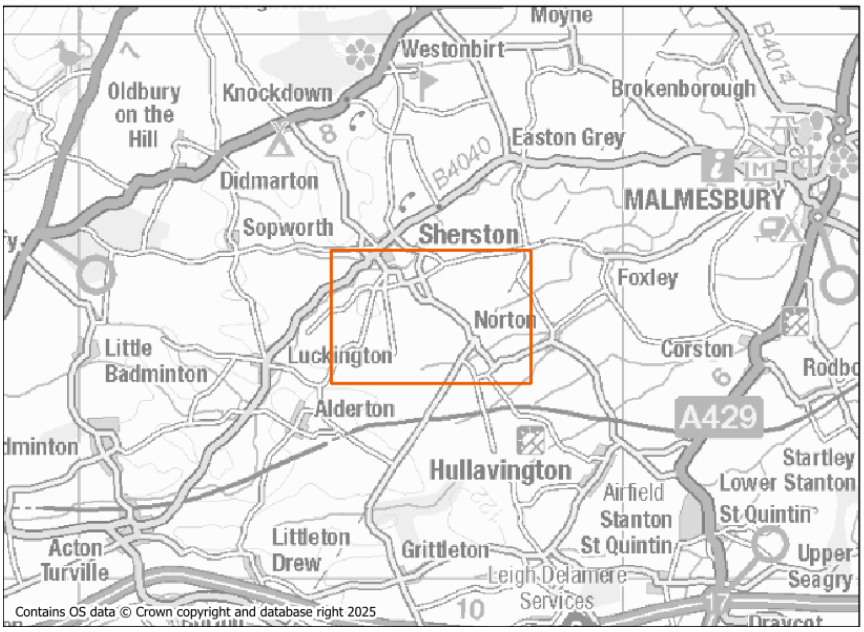
# 1. Site Details

1.1.1 The aim of this section of the report is to outline key environmental information associated with the baseline environment of Lime Down A.



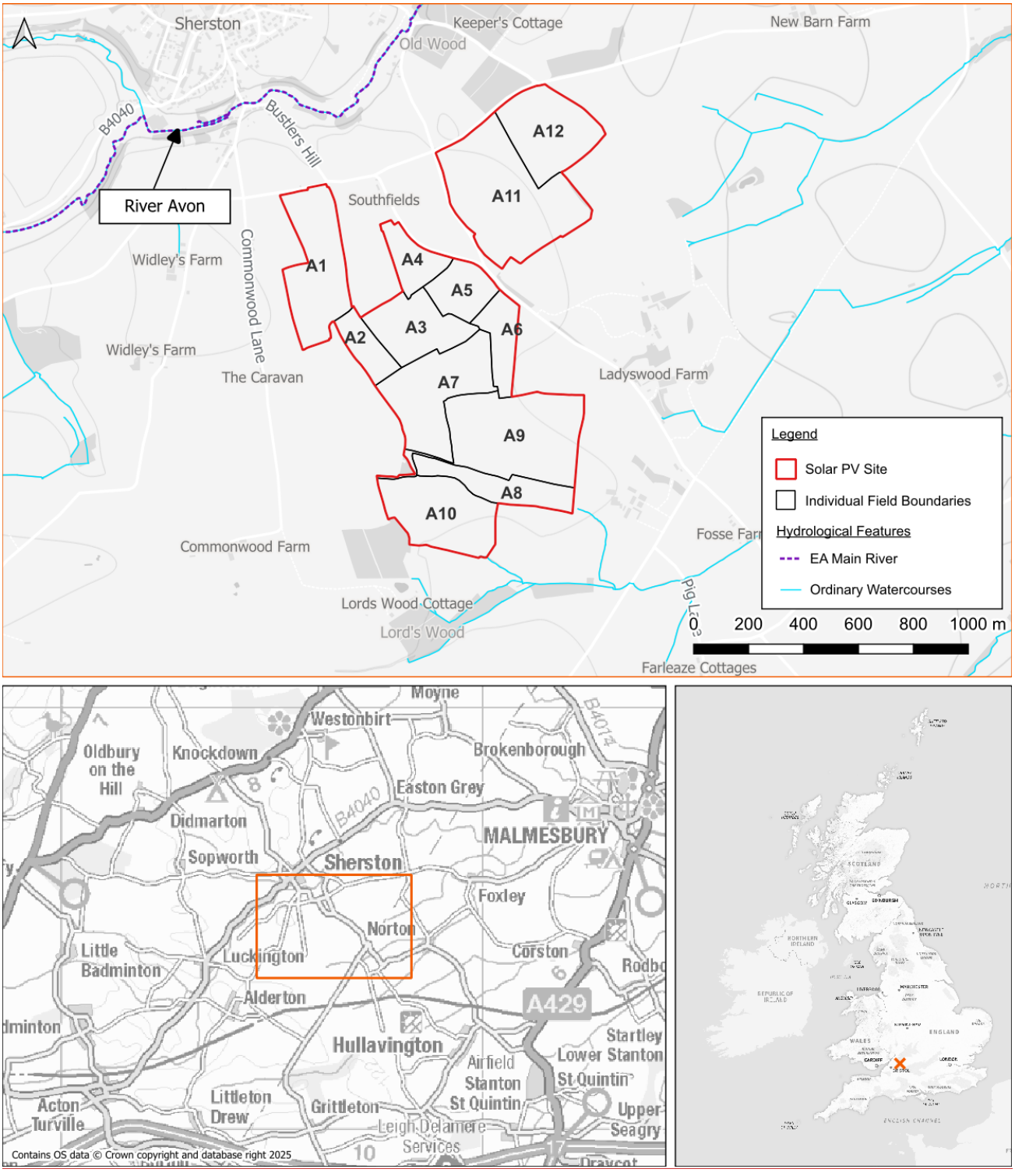




**Figure 1: Site Location**

## 1.2 Site Location

1.2.1 Lime Down A is located in an agricultural area, approximately 500m to the south of Sherston, a village west of Malmesbury, Wiltshire. The furthest point north is at grid reference 386500E, 185700N, and the furthest point south is at 386000E, 183900N.

## 1.3 Existing Site Conditions

1.3.1 Online mapping (including Google Maps/Google Streetview imagery[i] accessed 28/05/2025) shows that Lime Down A is greenfield comprising agricultural fields. Additionally, no watercourses are located within Lime Down A.

## 1.4 Topography

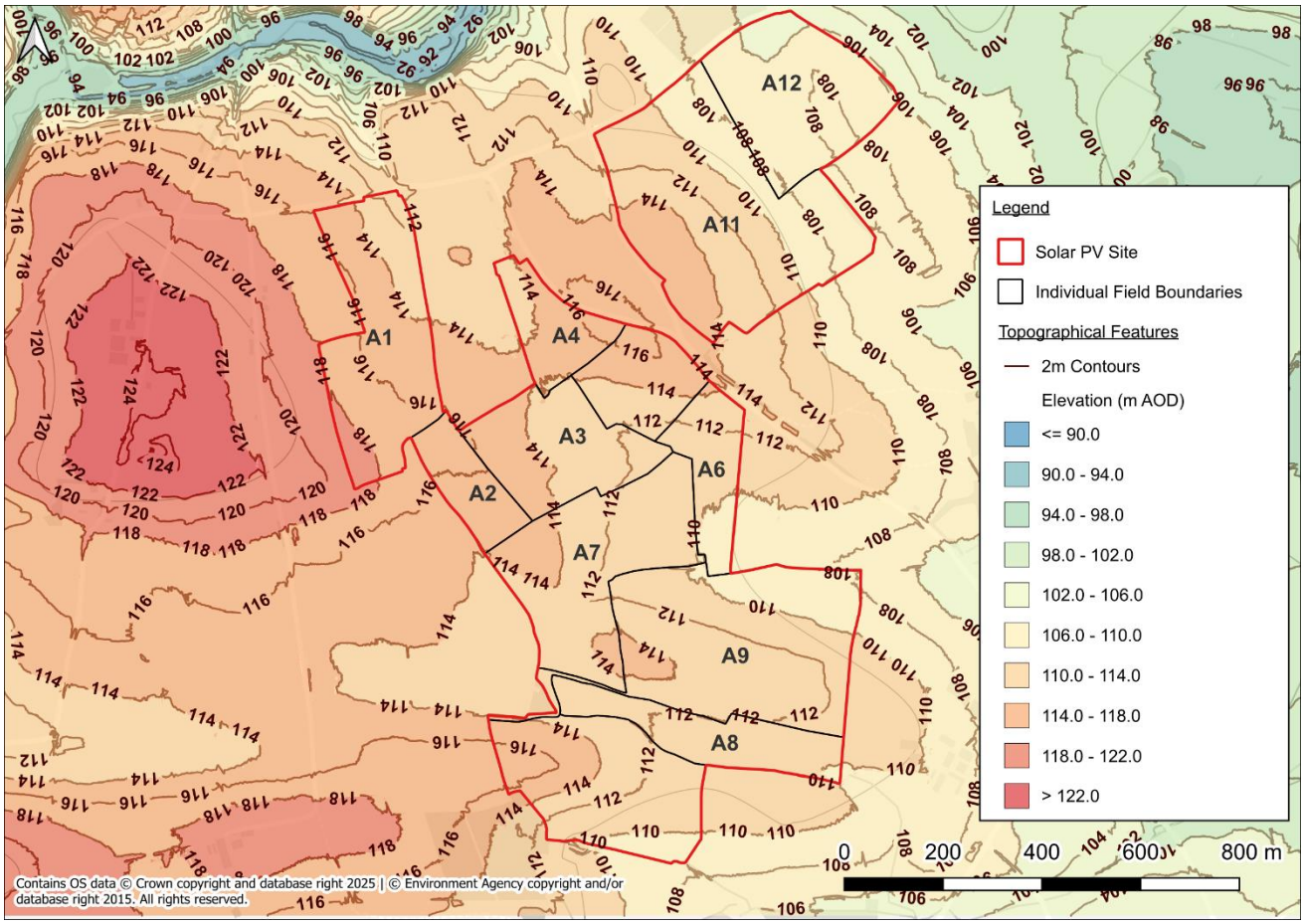



**Figure 2: LiDAR Plan**

1.4.1 Topographic levels to metres Above Ordnance Datum (m AOD) have been derived from a 1m resolution Environment Agency (EA) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). A review of LiDAR ground elevation data shows that Lime Down A has a topographic highpoint of approximately 119m AOD along the northwest boundary. The elevation then slopes to the east and southeast. The lowest elevation at Lime Down A is approximately 108m AOD along the southeast boundary (Figure 2).

## 1.5 Hydrology

1.5.1 The nearest EA Main River is the River Avon situated approximately 240m north of Lime Down A, which is discussed further in Section 2.0. There are also two unnamed land drainage ditches that are adjacent to the southern boundary.

1.5.2 The River Avon flows in a northeasterly direction towards Malmesbury before flowing in a southerly direction. The two unnamed land drainage ditches flow in a southerly direction.

1.5.3 Main Rivers fall within the responsibility of the EA to maintain, whereas Ordinary Watercourses fall within the responsibility of the Lead Local Flood Authority (LLFA) (Wiltshire Council).

## 1.6 Water Framework Directive Status

1.6.1 Lime Down A is located within the Avon Bristol and North Somerset Streams, specifically the Sherston Avon Water Body and the Tributary (source to conf Sherston Avon) Water Body Catchment.

1.6.2 The Sherston Avon Water Body Catchment has a Cycle 3 ecological status of Poor in 2019 and 2022 and a failing chemical status in 2019 (no data in 2022). The Tributary (source to conf Sherston Avon) has a Cycle 3 ecological status of Good in 2019 and 2022 and a failing chemical status in 2019 (no data in 2022).

1.6.3 A summary of the Water Body Classifications can be found in Annex A.

## 1.7 Geology

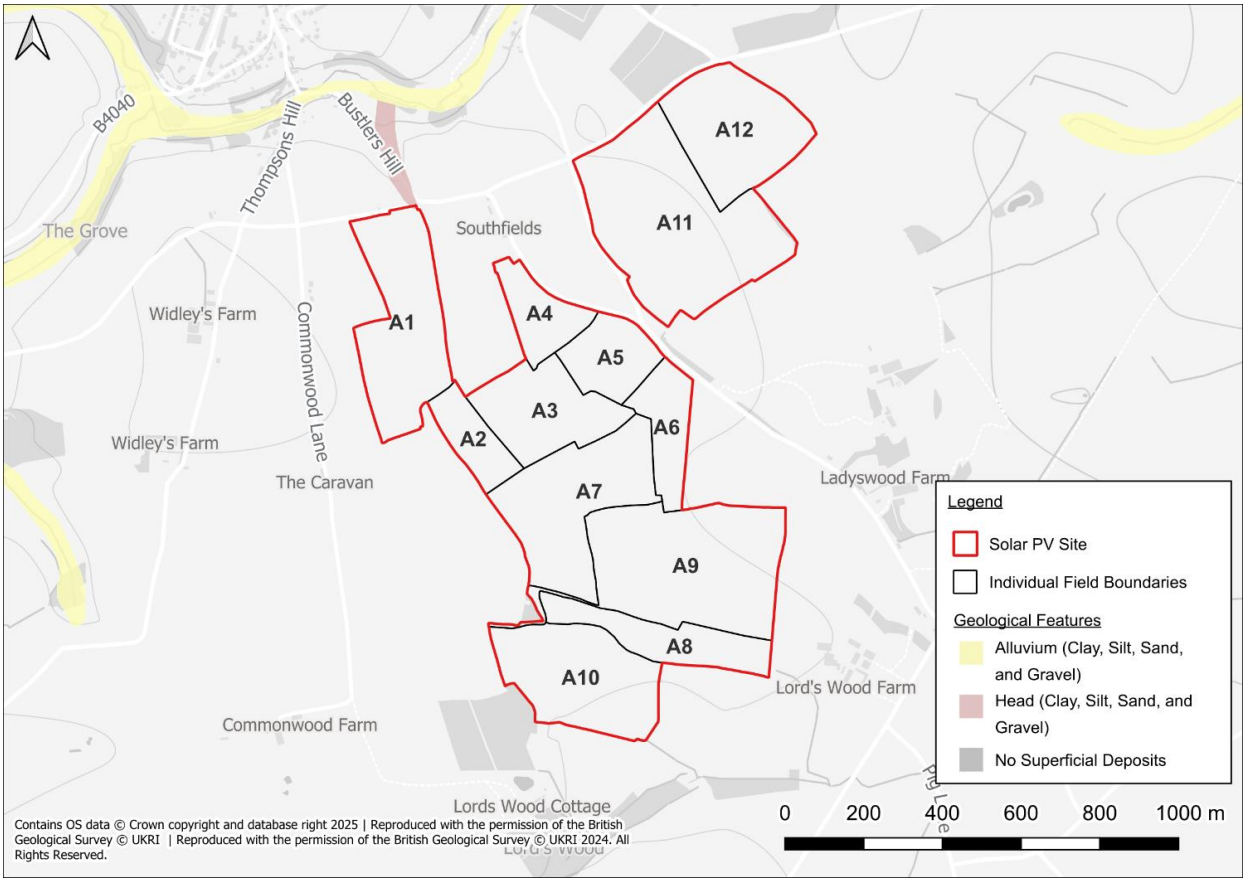



**Figure 3: Superficial Deposits**

1.7.1 Reference to the British Geological Survey[ii] (BGS) online mapping (1:50,000 scale) indicates that Lime Down A is underlain by no superficial deposits (Figure 3). The underlying bedrock at Lime Down A comprises Forest Marble Formation consisting of mudstone.

1.7.2 The geological mapping is available at a scale of 1:50,000 and as such may not be accurate on a Site-specific basis.

1.7.3 The closest historical BGS borehole record (BGS Ref: ST88SE9) is located in the centre of Lime Down A (Eastings and Northings: 386700, 184920). The borehole record indicates that the following geology was encountered:

- Clay to 8.8m below ground level (bgl); and
- Blue Stone from 8.8 to 9.7m bgl.

1.7.4 No water strikes were encountered.

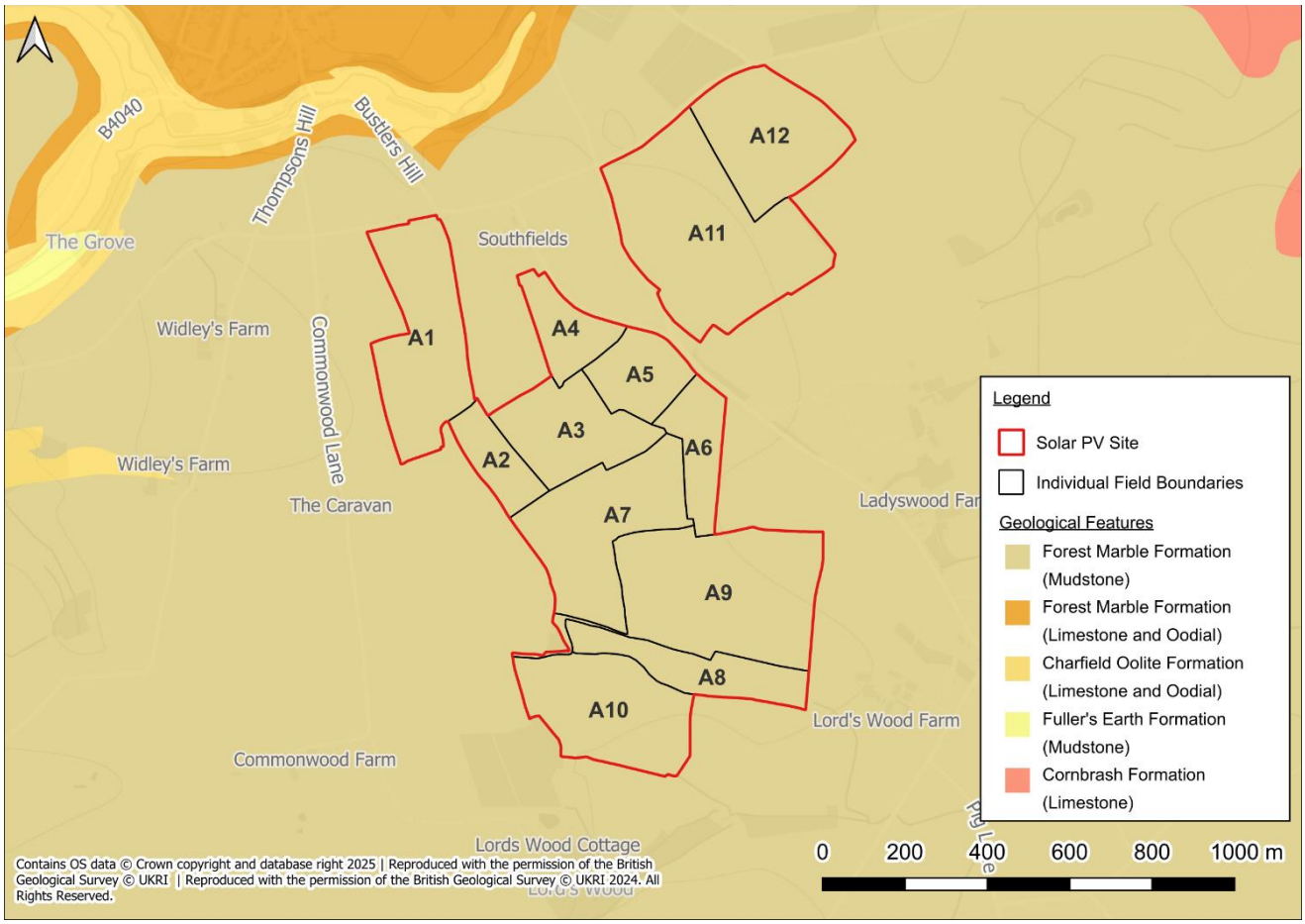



**Figure 4: Bedrock Deposits**

## 1.8 Hydrogeology

1.8.1 According to the EA's Aquifer Designation data, obtained from MAGIC Map's online mapping[iii] [accessed 28/05/2025], the Forest Marble Formation is classified as a Principal Aquifer.

1.8.2 The EA's 'Source Protection Zones' data, obtained from MAGIC Map's online mapping [accessed 28/05/2025], indicates that Lime Down A is located wholly within a Groundwater Source Protection Zone. Lime Down A falls within the Source Protection Zone II Subsurface Activity area.

## 1.9 Proposed Site Conditions

1.9.1 Lime Down A proposes a ground mounted solar photo-voltaic plant and associated electrical infrastructure and access. See Chapter 3: Scheme Description of the ES.

1.9.2 An **Outline Landscape and Ecological Management Plan (Outline LEMP) [EN010168/APP/7.18]** has been developed to support the DCO application, and details that the vast majority of the Site is proposed to be utilised for solar panels, supporting infrastructure, internal access and peripheral areas will comprise landscaped buffers in line with the embedded mitigation described throughout the ES.

1.9.3 Where a 132 kV or 400 kV substation is proposed within this area, the detailed design will include a controlled drainage strategy for the substation compound. This will include sealed drainage or sealed drainage components where required, together with suitable treatment, interception, containment and isolation measures to prevent spills, leaks or firewater from affecting ground or controlled waters. The drainage principles for substations are set out in the **Firewater Containment and Drainage Strategy – Lime Down Substation [EN010168/EXAM/9.9],** which is the governing reference for containment and release matters.

# 2. Assessment of Flood Risk

2.1.1 The aim of this section of the report is to assess and summarise the existing flood risk at Lime Down A.

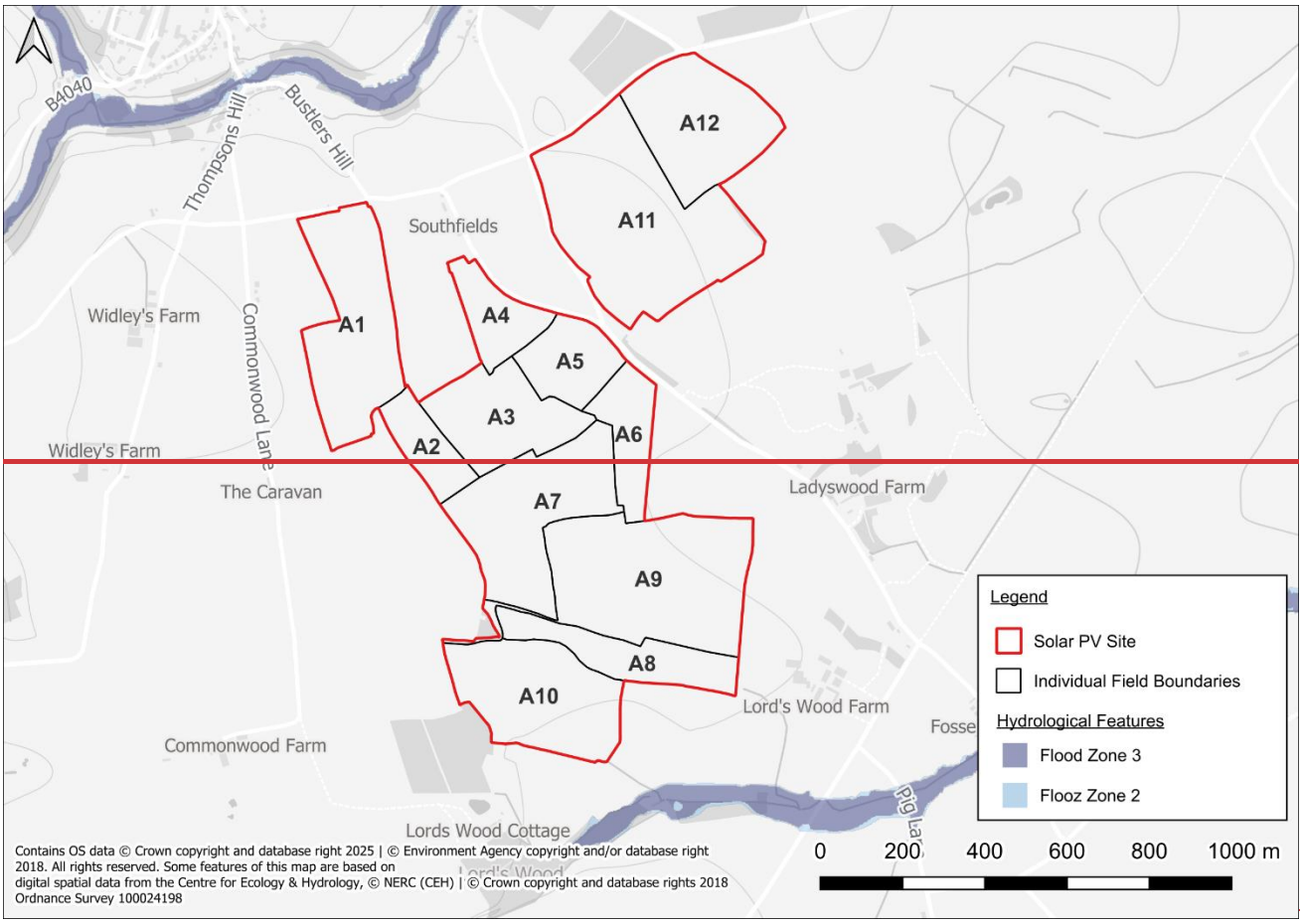
## 2.2 Tidal Flood Risk

2.2.1 Lime Down A is situated at a minimum of approximately 108m AOD and is significantly above sea level. Therefore, there is **Negligible** risk from tidal flooding.

## 2.3 Fluvial Flood Risk

2.3.1 According to the EA's Flood Map for Planning (updated in March 2025)[iv], Lime Down A is situated wholly in Flood Zone 1, meaning it is an area considered to have <0.1% annual probability of flooding from rivers or the sea.

2.3.2 The nearest EA Main River is the River Avon situated approximately 240m north of Lime Down A. There are also two unnamed land drainage ditches that are adjacent to the southern boundary. The River Avon flows in a northeasterly direction towards Malmesbury before flowing in a southerly direction. The two unnamed land drainage ditches flow in a southerly direction.



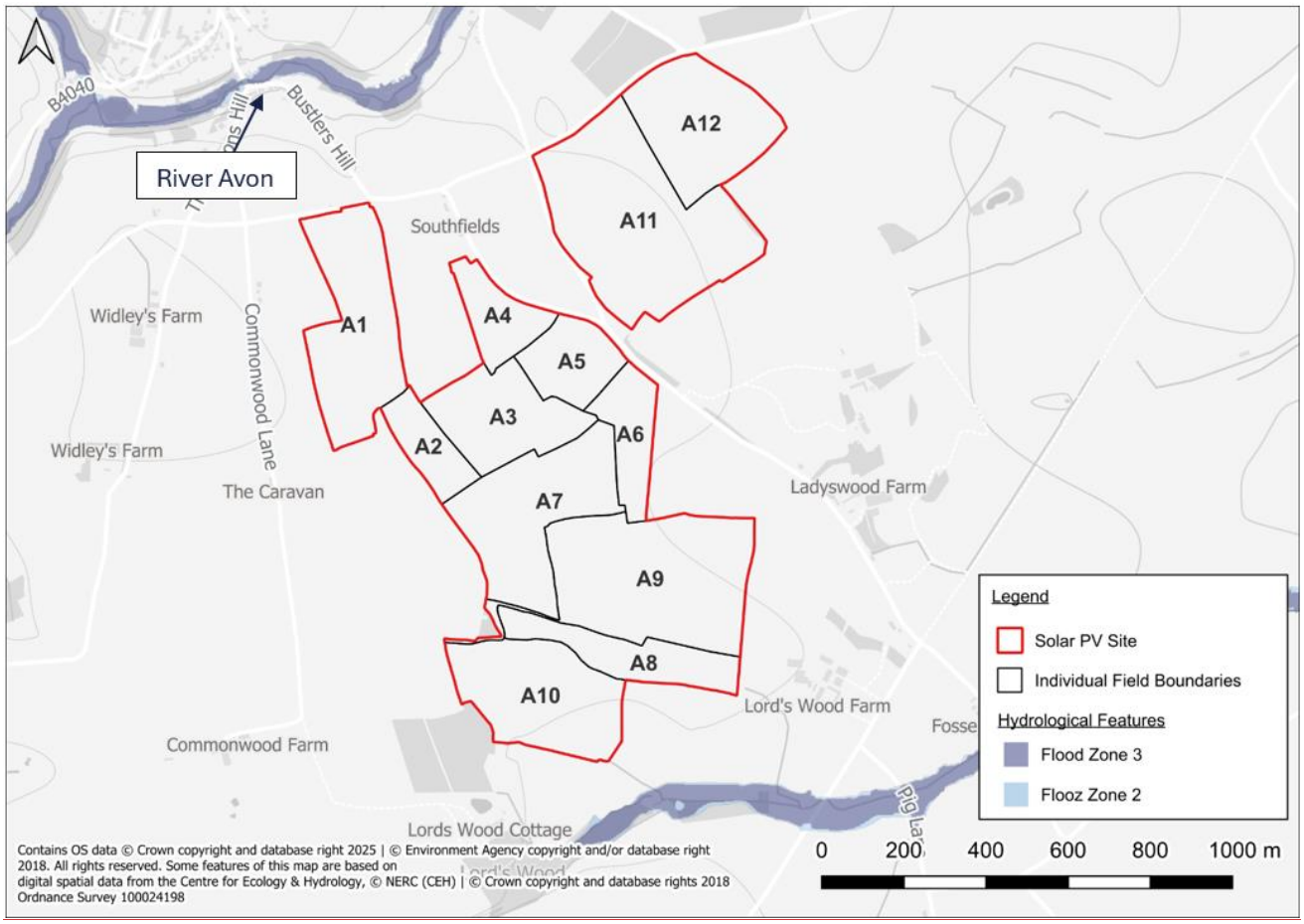



**Figure 5: EA's Flood Map for Planning**

2.3.3 Fluvial flooding could occur if the land drainage ditches overtopped their banks during or following an extreme rainfall event. However, any out of channel flooding will likely flow to the southeast following local topography.

2.3.4 It is worth noting that the EA Flood Map for Planning extents, which show the potential flood extents of the watercourse south of Lime Down A appear to not cover the whole area. Flow paths identified on the EA's Long Term Flood Risk Map (Surface Water)[v] identify the potential flood extent of the watercourses to the south and the on-Site land drainage ditches. These maps (updated in January 2025) are considered to effectively illustrate the potential extent of fluvial flooding, as illustrated in Figure 5.

2.3.5 The EA 'Historical Flood Map' indicates that there have been no incidents of flooding at Lime Down A. The nearest flood extent is approximately 200m north associated with the River Avon which occurred in 1925.

2.3.6 There is no Site-specific information within third party reports relating to fluvial flood risk.

2.3.7 To estimate flood levels for a 1% Annual Exceedance Probability (AEP) event with a 71% climate change allowance[vi], Manning's open channel flow formula was applied. A detailed explanation of the calculation, including sources of data and the chosen coefficients, is provided in Annex B. This method was selected as it provides a practical estimate of flow characteristics based on channel shape, roughness, and gradient, particularly where detailed hydraulic modelling has not been undertaken. Cross-sectional data from EA LiDAR, captured in Q1 2020 and detailed in Annex B, informed the calculations. The estimated flood levels suggest limited extents, expected to be smaller than those

shown on the EA's 0.1% surface water mapping. This mapping is referenced for context only and was not used as an input to the calculation.

2.3.8 It is noted that the Manning's calculation was completed prior to the release of updated NaFRA2 mapping in January 2025. The revised mapping shows a reduction in surface water flood extents across the Site. This supports the view that the current Manning's calculation remains conservative, and there is no requirement to update it.

2.3.9 Based on the analysis, the surface water flood maps offer a suitable and conservative basis for assessing fluvial flood risk at Lime Down A. A more detailed exploration of surface water flood risks can be found in Section 2.4.

**Consultation**

2.3.10 The EA were consulted in October 2024 for any Site-specific flood data and modelling; a response was received on the 13/11/24 and is included as Annex C. Product 4 data received for the area has been produced using the EA's National Generalised Model- JFLOW. This modelling is fit for the purpose of the Flood Zones; However, it is not based on a specific channel survey. The basic JFLOW water depths for the 1% Annual Exceedance Probability event and the 0.1% Annual Exceedance Probability Event are also included in Annex C. The JFLOW mapping finds that at Lime Down A, there are no flood depth on Site during both the 1% Annual Exceedance Probability scenario and the 0.1% Annual Exceedance Probability scenario, with corresponds with Lime Down A being situated wholly within Flood Zone 1.

2.3.11 Consultation has been undertaken throughout the EIA process with the EA and Wiltshire Council. Comments and recommendations received have been noted and applied throughout this Flood Risk Assessment and Drainage Strategy. A record of consultation and the Applicant's responses are included in **ES Volume 1, Chapter 11: Hydrology, Flood Risk and Drainage [EN010168/APP/6.1].**

2.3.12 Lime Down A is not located within an Internal Drainage Board (IDB).

**Summary**

2.3.13 Lime Down A is considered to be at **Low** risk of fluvial flooding.

## 2.4 Surface Water Flood Risk

2.4.1 The EA's National Flood Risk Assessment Mapping (NaFRA), known as the Long-Term Flood Risk Map (Surface Water), was updated in January 2025. The NaFRA mapping provides an updated view of surface water flooding across the Site, however it should be noted that at the time of writing, the NaFRA mapping only delivers climate change insight up to the year 2060.

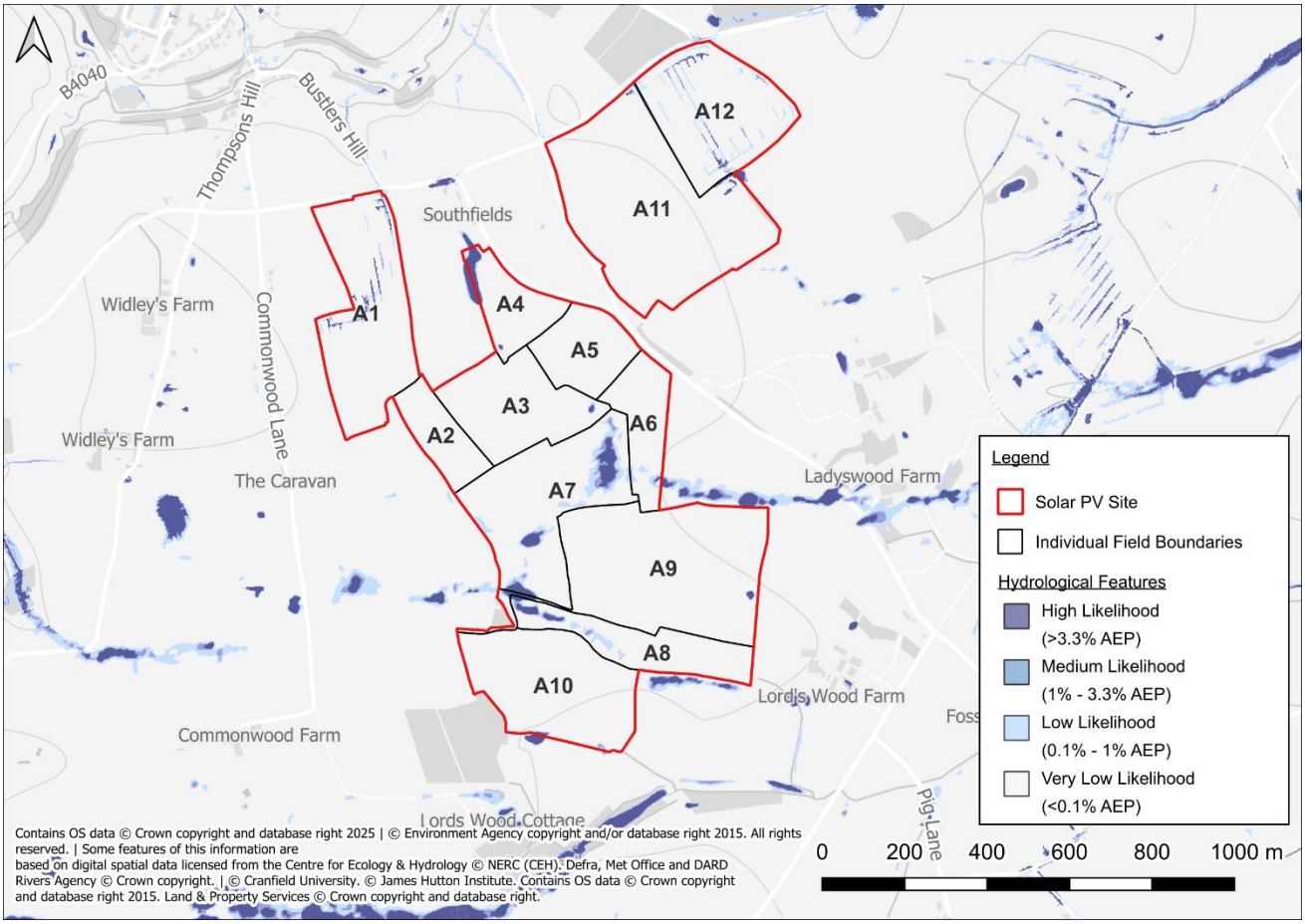



**Figure 6: EA's Long-Term Flood Risk Map (Flood Risk from Surface Water)**

2.4.2 According to the EA's Long Term Flood Risk Map (Surface Water) the majority of Lime Down A is at Very Low risk of surface water flooding, meaning it has a <0.1% annual probability of flooding. However, there are areas of Low to High risk (0.1 - >3.3% annual chance of flooding), particularly across Fields A4, and A6 – A9.

2.4.3 As described in the fluvial section above, the surface water flooding extents largely match the courses of the unnamed land drainage ditches which flow adjacent to the southern boundary.

2.4.4 Depths are predicted to remain below 300mm during all scenarios across the majority of Lime Down A, with some very small, isolated areas in Fields A1 and A12 expected to reach depths between 300mm – 600mm. Depths of below 300mm are considered passible by vehicles and people, therefore Lime Down A is deemed passible.

2.4.5 There is no indication within relevant third-party reports (listed in 'Sources of Information' on the main body of **ES Volume 3, Appendix 11-1: Flood Risk Assessment and Drainage Strategy – Covering Report [EN010168/APP/6.3]**) to suggest that Lime Down A has historically experienced surface water flooding.

2.4.6 Based on the above and considering the embedded mitigation as part of the design of the solar panels, the overall risk of surface water flooding is considered to be **Low**. The proposed solar panels will be raised above surrounding ground levels and will be appropriately waterproofed thereby reducing the potential to be impacted in the event of surface water flooding.

2.4.7 In addition to the solar panels, smaller electrical components such as conversion units, where present,

are minor in scale and will be protected through elevation or localised resilience measures, consistent with the approach outlined in **ES Volume 3, Appendix 11-1: Flood Risk Assessment and Drainage Strategy – Covering Report [EN010168/APP/6.3].**

2.4.8 The impact of the Scheme on surface water risk is covered in **ES Volume 3, Appendix 11-1: Flood Risk Assessment and Drainage Strategy – Covering Report [EN010168/APP/6.3]** to ensure that surface water risk is not exacerbated through appropriate Sustainable Drainage Systems (SuDS) measures.

## 2.5 Groundwater Flood Risk

2.5.1 The geology is identified above in Section 1.0.

2.5.2 There is no information within relevant third party reports (listed 'Sources of Information' on the Covering Report) to suggest that Lime Down A has experienced historical groundwater flooding.

2.5.3 The 2019 Wiltshire Strategic Flood Risk Assessment (SFRA) Data Explorer Map[vii] indicates that Lime Down A is within an area of no risk of groundwater flooding.

2.5.4 No buildings and no basement levels are identified on plans which may otherwise be at increased risk from groundwater seepage.

2.5.5 It can be concluded that the risk of groundwater flooding is **Low** and no Site-specific mitigation measures are required.

## 2.6 Sewer Flooding

2.6.1 No Site-specific incidents of sewer flooding have been identified from relevant third-party reports.

2.6.2 On the basis of Lime Down A's rural setting, the presence of sewerage infrastructure is unlikely. Utility records have been checked, and no public sewers are identified as within Lime Down A.

2.6.3 It can therefore be concluded that the risk of sewer flooding is **Negligible**, therefore, no Site-specific mitigation measures are required.

## 2.7 Reservoir and Canal Flooding

2.7.1 There are no canals within the vicinity of Lime Down A and, therefore, there is Negligible associated risk.

2.7.2 The EA 'Flood Risk from Reservoirs' map shows that Lime Down A is not at risk of flooding from reservoirs.

2.7.3 It can therefore be concluded that there is **Negligible** risk of flooding from artificial sources, therefore, no Site-specific mitigation measures are required.

## 2.8 Residual Flood Risks

2.8.1 A residual risk is an exceedance event, such as the 1 in 1000 year (0.1% AEP) flood event that would overtop the land drainage ditches and potentially impact Lime Down A. As the probability of a 1 in 1000 year flood event occurring is 0.1% in any given year, the probability is low and, therefore, no further mitigation beyond what is proposed is required.

2.8.2 In the event of the defences failing or an exceedance event occurring, the residual risk to people working or present in the vicinity, as construction workers, residents, or Public Right of Way (PRoW) users, within Lime Down A can be managed through the implementation of an appropriate Outline

CEMP This plan will recognise the residual risks and outline the actions to be taken by staff in the event of a flood to ensure that occupants are placed in a place of safety.

## 2.9 Summary of Flood Risk

2.9.1 It can be concluded that the risk to Lime Down A from all sources of flooding is **Negligible** to **Low**, however, it would be prudent to include the below mitigation measures.

## 2.10 Embedded Mitigation

2.10.1 Embedded Mitigation is detailed in **ES Volume 3, Appendix 11-1: Flood Risk Assessment and Drainage Strategy – Covering Report [EN010168/APP/6.3]**.

## 2.11 Impact on Off-Site Flood Risk

2.11.1 The solar panels and associated electrical infrastructure, including inverters, transformers, cabling, and substations, will, where possible, be located outside the flood extent. If this is not feasible, they will be elevated with appropriate freeboard above the local flood level. These components will be installed on concrete foundations or pads mounted on frames, allowing floodwater to flow freely underneath. This approach prevents any loss of floodplain volume and ensures there is no increase in flood risk elsewhere – areas where panels are proposed in Flood Zones 2 / 3 have undergone the appropriate floodplain storage calculations – see **ES Volume 3, Appendix 11-6 and 11-8: Flood Risk Assessment and Drainage Strategy – Lime Down D and Lime Down E2 [EN010168/APP/6.3]**. The components are insignificant in size with detailed dimensions provided in **ES Volume 1, Chapter 3: The Scheme [EN010168/APP/6.1]**. Additionally, any units incorporating hardstanding will feature SuDS measures to mitigate any increase in surface water runoff. Together, these measures ensure the Scheme does not contribute to an increase in flood risk.

2.11.2 Surface water management has been considered in **ES Volume 3, Appendix 11-1: Flood Risk Assessment and Drainage Strategy – Covering Report [EN010168/APP/6.3]**.

# 3. Conclusions and Recommendations

3.1.1 Lime Down A comprises land for a ground mounted Solar PV Panels and associated Scheme including internal access tracks, inverters, transformers, cabling and substations.

## 3.2 Conclusions

**Flood Risk**

3.2.1 Lime Down A is situated wholly in Flood Zone 1, meaning it is an area considered to have <0.1% annual probability of flooding from rivers or the sea.

3.2.2 The majority of Lime Down A is at Very Low risk of surface water flooding; however, there are areas of Very Low to High risk, particularly across Fields A4, and A6 – A9. Depths are associated with the land drainage ditches / watercourses present across / in the vicinity of the Site and largely remain <300mm.

3.2.3 The risk of flooding from all sources has been assessed and the flood risk is considered to be **Negligible to Low** and, therefore, does not require Site-specific mitigation measures.

3.2.4 The solar panels and other electrical infrastructure, including inverters, transformers, cabling and substations, which is to be sat on a concrete foundation/pad that will be mounted on frames and raised above ground level allowing flood water to flow freely underneath. Therefore, there will be no loss of floodplain volume as a result of the Scheme.

## 3.3 Recommendations

3.3.1 Embedded Mitigation is detailed in **ES Volume 3, Appendix 11-1: Flood Risk Assessment and Drainage Strategy – Covering Report [EN010168/APP/6.3]**, from which this FRA has informed.

# Annexes

# Annex A- Water Body Catchment Classifications Summaries

## Sherston Avon Water Body Catchment Classification Summary

| Classification Item | 2019 Classification | | 2022 Classification | Cycle 3 Objectives | | |
|---|---|---|---|---|---|---|
| | Cycle 2 | Cycle 3 | Cycle 3 | Status | Year | Reasons |
| Ecological | Poor | Poor | Poor | Good | 2027 - Low Confidence | Disproportionately expensive: Disproportionate burdens |
| Biological Quality Elements | Poor | Poor | Poor | Good | 2027 - Low Confidence | Disproportionately expensive: Disproportionate burdens |
| Invertebrates | High | High | High | Good | 2027 - Low Confidence | |
| Macrophytes and Phytobenthos Combined | Poor | Poor | Poor | Good | 2027 - Low Confidence | Disproportionately expensive: Disproportionate burdens |
| Physio-Chemical Quality Elements | Moderate | Moderate | Good | Good | 2027 - Low Confidence | Disproportionately expensive: Disproportionate burdens |
| Acid Neutralising Capacity | N/A | N/a | N/A | Good | 2015 | |
| Ammonia (Phys-Chem) | High | High | High | Good | 2015 | |
| Dissolved Oxygen | Moderate | Moderate | N/A | Good | 2015 | |
| Phosphate | Good | Good | Good | Good | 2027 | Disproportionately expensive: Disproportionate burdens |
| Temperature | High | High | High | Good | 2015 | |
| pH | High | High | High | Good | 2015 | |
| Hydromorphological Supporting Elements | Supports Good | Supports Good | Supports Good | Supports Good | 2015 | |
| Supporting Elements (surface Water) | N/A | N/A | N/A | N/A | N/A | |
| Mitigation Measures Assessment | N/A | N/A | N/A | N/A | N/A | |
| Specific Pollutants | N/A | N/A | N/A | N/A | N/A | |
| Iron | N/A | N/A | N/A | N/A | N/A | |
| Maganese | N/A | N/A | N/A | N/A | N/A | |
| Chemical | Fail | Fail | N/A | Good | 2063 | Natural conditions: Chemical status recovery time |
| Priority Hazardous Substances | Fail | Fail | N/A | Good | 2063 | Natural conditions: Chemical status recovery time |
| Benzo(a)pyrene | Good | Good | N/A | Good | 2015 | |
| Dioxins and dioxin-like compounds | N/A | Good | N/A | Good | 2015 | |
| Heptachlor and cis-Heptachlor Epoxide | Good | Good | N/A | Good | 2015 | |
| Hexabromocyclododecane | Good | Good | N/A | Good | 2015 | |
| Hexachlorobenzene | Good | Good | N/A | Good | 2015 | |
| Hexachlorobutadiene | Good | Good | N/A | Good | 2015 | |
| Mercury and Its Compounds | Fail | Fail | N/A | Good | 2040 | Natural conditions: Chemical status recovery time |
| Perfluorooctane sulphonate | Good | Good | N/A | Good | 2015 | |
| Polybrominated diphenyl ethers (PBDE) | Fail | Fail | N/A | Good | 2063 | Natural conditions: Chemical status recovery time |
| Priority substances | Good | N/A | N/A | Good | 2015 | |
| Cypermethrin (Priority) | Good | Good | N/A | Good | 2015 | |
| Fluoranthene | Good | Good | N/A | Good | 2015 | |
| Other Pollutants | N/A | N/A | N/A | N/A | 2015 | Did not require assessment |

**Tributary (source to conf River Sherston Avon) Catchment Classification Summary**

| Classification Item | 2019 Classification | | 2022 Classification | Cycle 3 Objectives | | |
|---|---|---|---|---|---|---|
| | Cycle 2 | Cycle 3 | Cycle 3 | Status | Year | Reasons |
| Ecological | Good | Good | Good | Good | 2015 | |
| Biological Quality Elements | Good | Good | Good | Good | 2015 | |
| Invertebrates | Good | Good | Good | Good | 2015 | |
| Macrophytes and Phytobenthos Combined | Good | Good | Good | Good | 2015 | |
| Physio-Chemical Quality Elements | Good | Good | Good | Good | 2015 | |
| Acid Neutralising Capacity | N/A | N/A | N/A | Good | 2015 | |
| Ammonia (Phys-Chem) | Good | Good | Good | Good | 2015 | |
| Dissolved Oxygen | High | High | High | Good | 2015 | |
| Phosphate | Good | Good | Good | Good | 2015 | |
| Temperature | High | High | High | Good | 2015 | |
| pH | High | High | High | Good | 2015 | |
| Hydromorphological Supporting Elements | Supports Good | Supports Good | Supports Good | Supports Good | 2015 | |
| Supporting Elements (surface Water) | N/A | N/A | N/A | N/A | N/A | |
| Mitigation Measures Assessment | N/A | N/A | N/A | N/A | N/A | |
| Specific Pollutants | N/A | N/A | N/A | N/A | N/A | |
| Iron | N/A | N/A | N/A | N/A | N/A | |
| Maganese | N/A | N/A | N/A | N/A | N/A | |
| Chemical | Fail | Fail | N/A | Good | 2063 | Natural conditions: Chemical status recovery time |
| Priority Hazardous Substances | Fail | Fail | N/A | Good | 2063 | Natural conditions: Chemical status recovery time |
| Benzo(a)pyrene | Good | Good | N/A | Good | 2015 | |
| Dioxins and dioxin-like compounds | N/A | Good | N/A | Good | 2015 | |
| Heptachlor and cis-Heptachlor Epoxide | Good | Good | N/A | Good | 2015 | |
| Hexabromocyclododecane | Good | Good | N/A | Good | 2015 | |
| Hexachlorobenzene | Good | Good | N/A | Good | 2015 | |
| Hexachlorobutadiene | Good | Good | N/A | Good | 2015 | |
| Mercury and Its Compounds | Fail | Fail | N/A | Good | 2040 | Natural conditions: Chemical status recovery time |
| Perfluorooctane sulphonate (PFOS) | Good | Good | N/A | Good | 2015 | |
| Polybrominated diphenyl ethers (PBDE) | Fail | Fail | N/A | Good | 2063 | Natural conditions: Chemical status recovery time |
| Priority substances | Good | Good | N/A | Good | 2015 | |
| Cypermethrin (Priority) | Good | Good | N/A | Good | 2015 | |
| Fluoranthene | Good | Good | N/A | Good | 2015 | |
| Other Pollutants | N/A | N/A | N/A | N/A | 2015 | Did not require assessment |

# Annex B – Manning's Open Channel Flow Mapping

317212 Lime Down Solar A

# Manning's Open Channel Flow Calculation

## Methodology

Cross-sections through the floodplain were extracted from Environment Agency (EA) LiDAR DTM data (flown March 2020) at the locations shown in Figure 1. These cross-sections can be considered representative of the channel and general floodplain adjacent to the site and at the location of the proposed development. The cross-sections were imported into Flood Modeller and the "tabulate cross section properties" tool was utilised to establish the level-flow relationship for the channel and wider floodplain. This tool utilises the Manning's open channel flow equation. Manning's 'n' roughness was set to 0.03s/$m^{1/3}$ for the channel and 0.04s/$m^{1/3}$ for the floodplain. These values were chosen based on Chow (1959)* and aerial imagery. The channel slope was set for each cross-section based on underlying LiDAR.

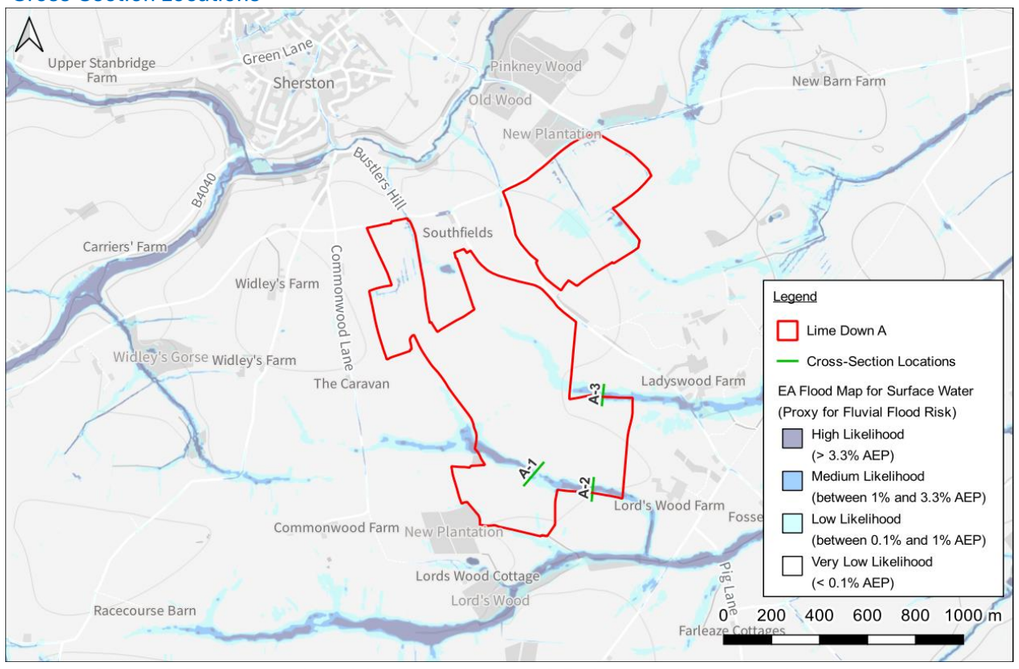
In the absence of detailed flood extent data covering the site, the extents of the EA surface water flood map (0.1% AEP event, present day) have been compared to underlying LiDAR data to provide an estimate of water levels. The surface water flood map has been used as a proxy for fluvial flooding given the similarity to the EA Flood Zone 2 extent and the additional detail it affords.

Within this excel workbook, the xlookup function has been used along with the Flood Modeller level-flow relationship for the cross-sections to determine the equivalent flow for each estimated water level, rounding up where a direct match is not found. The appropriate climate change uplifts have then been applied to these flows and a second xlookup used to determine the equivalent level for the increased flow.

Cross-sections have been located at suitable locations throughtout the proposed development. Whilst it is acknowledged that the Manning's open channel flow equation used to determine the level-flow relationship does not constitute detailed hydraulic modelling, the calculation can still be considered suitable to demonstrate the scale of the changes in water level that can be expected when considering a +71% uplift in flows (Avon Bristol and North Somerset Streams Management Catchment, 2080's higher allowance).

**Chow, V.T. (1959). Open-Channel Hydraulics. New York, NY: McGraw-Hill.*

## Cross-Section Locations






## Calculated Flows and Levels

| Cross-Section | Level Description | Estimated Flood Level (m AOD) | Estimated Equivalent Flow ($m^3/s$) | Flow +71% CC Uplift ($m^3/s$) | Equivalent Flood Level (m AOD) |
|---|---|---|---|---|---|
| A-1 | 0.1% AEP EA FMfSW water level | 112.00 | 9.3 | 15.9 | 112.05 (+54mm) |
| A-2 | 0.1% AEP EA FMfSW water level | 110.80 | 11.4 | 19.6 | 110.91 (+111mm) |
| A-3 | 0.1% AEP EA FMfSW water level | 108.70 | 3.6 | 6.1 | 108.75 (+54mm) |

## Tabulated Cross-Section Properties // A-1

*(Calculated by Flood Modeller)*

| Node | Flow ($m^3/s$) | Stage (m AOD) | Depth (m) | Velocity (m/s) | Froude no. | Area ($m^2$) | Conveyance ($m^3/s$) | Width (m) | W Perim. (m) | Slope |
|---|---|---|---|---|---|---|---|---|---|---|
| A-1 | 0.000 | 111.731 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0158 |
| A-1 | 0.000 | 111.743 | 0.011 | 0.100 | 0.423 | 0.004 | 0.003 | 0.698 | 0.700 | 0.0158 |
| A-1 | 0.003 | 111.754 | 0.023 | 0.160 | 0.475 | 0.016 | 0.020 | 1.396 | 1.400 | 0.0158 |
| A-1 | 0.009 | 111.767 | 0.036 | 0.253 | 0.533 | 0.036 | 0.072 | 1.541 | 1.547 | 0.0158 |
| A-1 | 0.019 | 111.781 | 0.049 | 0.327 | 0.568 | 0.057 | 0.148 | 1.686 | 1.694 | 0.0158 |
| A-1 | 0.031 | 111.794 | 0.063 | 0.388 | 0.592 | 0.080 | 0.248 | 1.831 | 1.841 | 0.0158 |
| A-1 | 0.047 | 111.807 | 0.076 | 0.443 | 0.612 | 0.105 | 0.372 | 1.975 | 1.989 | 0.0158 |
| A-1 | 0.053 | 111.812 | 0.081 | 0.458 | 0.675 | 0.117 | 0.425 | 2.481 | 2.495 | 0.0158 |
| A-1 | 0.055 | 111.813 | 0.082 | 0.458 | 0.855 | 0.120 | 0.437 | 4.106 | 4.121 | 0.0158 |
| A-1 | 0.058 | 111.815 | 0.084 | 0.450 | 0.916 | 0.129 | 0.463 | 5.265 | 5.280 | 0.0158 |
| A-1 | 0.064 | 111.818 | 0.087 | 0.431 | 0.984 | 0.148 | 0.510 | 7.589 | 7.605 | 0.0158 |
| A-1 | 0.064 | 111.818 | 0.087 | 0.431 | 0.984 | 0.148 | 0.510 | 7.589 | 7.605 | 0.0158 |
| A-1 | 0.078 | 111.823 | 0.092 | 0.405 | 0.927 | 0.192 | 0.620 | 9.863 | 9.880 | 0.0158 |
| A-1 | 0.089 | 111.826 | 0.095 | 0.391 | 0.949 | 0.227 | 0.706 | 13.091 | 13.109 | 0.0158 |
| A-1 | 0.093 | 111.827 | 0.096 | 0.386 | 0.928 | 0.240 | 0.738 | 13.617 | 13.635 | 0.0158 |
| A-1 | 0.107 | 111.830 | 0.099 | 0.377 | 0.893 | 0.284 | 0.853 | 15.609 | 15.627 | 0.0158 |
| A-1 | 0.107 | 111.830 | 0.099 | 0.377 | 0.893 | 0.284 | 0.853 | 15.609 | 15.627 | 0.0158 |
| A-1 | 0.117 | 111.832 | 0.101 | 0.370 | 0.883 | 0.317 | 0.934 | 17.755 | 17.775 | 0.0158 |
| A-1 | 0.117 | 111.832 | 0.101 | 0.370 | 0.883 | 0.317 | 0.934 | 17.755 | 17.775 | 0.0158 |
| A-1 | 0.122 | 111.833 | 0.102 | 0.364 | 0.878 | 0.336 | 0.973 | 19.171 | 19.191 | 0.0158 |
| A-1 | 0.144 | 111.836 | 0.105 | 0.361 | 0.865 | 0.398 | 1.146 | 22.359 | 22.380 | 0.0158 |
| A-1 | 0.158 | 111.838 | 0.107 | 0.357 | 0.827 | 0.444 | 1.261 | 23.397 | 23.418 | 0.0158 |
| A-1 | 0.158 | 111.838 | 0.107 | 0.357 | 0.850 | 0.444 | 1.261 | 24.702 | 24.723 | 0.0158 |
| A-1 | 0.165 | 111.839 | 0.108 | 0.352 | 0.825 | 0.469 | 1.315 | 25.224 | 25.246 | 0.0158 |
| A-1 | 0.165 | 111.839 | 0.108 | 0.352 | 0.825 | 0.469 | 1.315 | 25.224 | 25.246 | 0.0158 |
| A-1 | 0.246 | 111.846 | 0.115 | 0.377 | 0.784 | 0.654 | 1.964 | 27.846 | 27.868 | 0.0158 |
| A-1 | 0.288 | 111.849 | 0.118 | 0.389 | 0.778 | 0.740 | 2.295 | 28.976 | 29.000 | 0.0158 |
| A-1 | 0.334 | 111.852 | 0.121 | 0.403 | 0.776 | 0.828 | 2.660 | 30.068 | 30.092 | 0.0158 |
| A-1 | 0.334 | 111.852 | 0.121 | 0.403 | 0.776 | 0.828 | 2.660 | 30.068 | 30.092 | 0.0158 |
| A-1 | 0.419 | 111.857 | 0.126 | 0.423 | 0.798 | 0.990 | 3.338 | 34.501 | 34.526 | 0.0158 |
| A-1 | 0.419 | 111.857 | 0.126 | 0.423 | 0.813 | 0.990 | 3.338 | 35.806 | 35.831 | 0.0158 |
| A-1 | 0.580 | 111.865 | 0.134 | 0.451 | 0.788 | 1.287 | 4.623 | 38.586 | 38.614 | 0.0158 |
| A-1 | 0.627 | 111.867 | 0.136 | 0.459 | 0.793 | 1.366 | 4.995 | 39.950 | 39.979 | 0.0158 |
| A-1 | 0.632 | 111.868 | 0.137 | 0.450 | 0.771 | 1.406 | 5.037 | 40.553 | 40.582 | 0.0158 |
| A-1 | 0.632 | 111.868 | 0.137 | 0.450 | 0.771 | 1.406 | 5.037 | 40.553 | 40.582 | 0.0158 |
| A-1 | 1.054 | 111.882 | 0.151 | 0.527 | 0.790 | 1.998 | 8.397 | 44.045 | 44.077 | 0.0158 |
| A-1 | 1.054 | 111.882 | 0.151 | 0.527 | 0.790 | 1.998 | 8.397 | 44.045 | 44.077 | 0.0158 |
| A-1 | 1.303 | 111.889 | 0.158 | 0.563 | 0.801 | 2.313 | 10.380 | 45.823 | 45.857 | 0.0158 |

| Node | Flow ($m^3/s$) | Stage (m AOD) | Depth (m) | Velocity (m/s) | Froude no. | Area ($m^2$) | Conveyance ($m^3/s$) | Width (m) | W Perim. (m) | Slope |
|---|---|---|---|---|---|---|---|---|---|---|
| A-1 | 1.383 | 111.891 | 0.160 | 0.575 | 0.804 | 2.405 | 11.019 | 46.089 | 46.123 | 0.0158 |
| A-1 | 1.868 | 111.902 | 0.171 | 0.640 | 0.823 | 2.918 | 14.883 | 47.295 | 47.331 | 0.0158 |
| A-1 | 2.060 | 111.906 | 0.175 | 0.662 | 0.839 | 3.111 | 16.415 | 48.914 | 48.951 | 0.0158 |
| A-1 | 2.110 | 111.907 | 0.176 | 0.668 | 0.853 | 3.160 | 16.809 | 50.674 | 50.711 | 0.0158 |
| A-1 | 2.210 | 111.909 | 0.178 | 0.677 | 0.863 | 3.263 | 17.613 | 51.956 | 51.994 | 0.0158 |
| A-1 | 2.422 | 111.914 | 0.183 | 0.687 | 0.857 | 3.528 | 19.298 | 53.906 | 53.945 | 0.0158 |
| A-1 | 3.200 | 111.928 | 0.197 | 0.746 | 0.854 | 4.292 | 25.501 | 55.231 | 55.273 | 0.0158 |
| A-1 | 3.331 | 111.930 | 0.199 | 0.757 | 0.858 | 4.402 | 26.539 | 55.537 | 55.580 | 0.0158 |
| A-1 | 3.463 | 111.932 | 0.201 | 0.767 | 0.862 | 4.514 | 27.593 | 55.851 | 55.894 | 0.0158 |
| A-1 | 4.149 | 111.942 | 0.211 | 0.816 | 0.878 | 5.082 | 33.057 | 57.689 | 57.734 | 0.0158 |
| A-1 | 4.660 | 111.949 | 0.218 | 0.849 | 0.888 | 5.490 | 37.130 | 59.007 | 59.054 | 0.0158 |
| A-1 | 5.126 | 111.955 | 0.224 | 0.877 | 0.897 | 5.847 | 40.842 | 60.050 | 60.099 | 0.0158 |
| A-1 | 5.528 | 111.960 | 0.229 | 0.899 | 0.911 | 6.152 | 44.050 | 61.981 | 62.032 | 0.0158 |
| A-1 | 5.947 | 111.965 | 0.234 | 0.920 | 0.919 | 6.465 | 47.390 | 63.260 | 63.311 | 0.0158 |
| A-1 | 6.383 | 111.970 | 0.239 | 0.941 | 0.926 | 6.785 | 50.859 | 64.541 | 64.593 | 0.0158 |
| A-1 | 7.356 | 111.982 | 0.251 | 0.972 | 0.912 | 7.564 | 58.611 | 65.300 | 65.355 | 0.0158 |
| A-1 | 8.611 | 111.994 | 0.263 | 1.031 | 0.926 | 8.352 | 68.616 | 66.059 | 66.117 | 0.0158 |
| A-1 | 9.270 | 112.000 | 0.269 | 1.059 | 0.934 | 8.750 | 73.866 | 66.755 | 66.814 | 0.0158 |
| A-1 | 10.148 | 112.008 | 0.277 | 1.092 | 0.944 | 9.289 | 80.865 | 68.036 | 68.098 | 0.0158 |
| A-1 | 11.065 | 112.016 | 0.285 | 1.125 | 0.953 | 9.839 | 88.167 | 69.319 | 69.383 | 0.0158 |
| A-1 | 12.174 | 112.025 | 0.294 | 1.163 | 0.963 | 10.468 | 97.003 | 70.446 | 70.512 | 0.0158 |
| A-1 | 13.332 | 112.034 | 0.303 | 1.200 | 0.973 | 11.107 | 106.231 | 71.574 | 71.643 | 0.0158 |
| A-1 | 14.675 | 112.044 | 0.313 | 1.241 | 0.983 | 11.829 | 116.934 | 72.785 | 72.856 | 0.0158 |
| A-1 | 15.078 | 112.047 | 0.316 | 1.252 | 0.985 | 12.048 | 120.147 | 73.225 | 73.297 | 0.0158 |
| A-1 | 16.041 | 112.054 | 0.323 | 1.277 | 0.992 | 12.565 | 127.819 | 74.492 | 74.566 | 0.0158 |
| A-1 | 16.761 | 112.059 | 0.328 | 1.295 | 0.998 | 12.939 | 133.555 | 75.285 | 75.362 | 0.0158 |
| A-1 | 17.202 | 112.062 | 0.331 | 1.307 | 1.000 | 13.166 | 137.072 | 75.689 | 75.766 | 0.0158 |
| A-1 | 18.624 | 112.071 | 0.340 | 1.345 | 1.009 | 13.851 | 148.398 | 76.510 | 76.589 | 0.0158 |
| A-1 | 20.095 | 112.080 | 0.349 | 1.382 | 1.017 | 14.543 | 160.121 | 77.332 | 77.412 | 0.0158 |
| A-1 | 21.958 | 112.091 | 0.360 | 1.426 | 1.028 | 15.400 | 174.966 | 78.502 | 78.584 | 0.0158 |
| A-1 | 23.359 | 112.099 | 0.368 | 1.457 | 1.035 | 16.031 | 186.130 | 79.328 | 79.411 | 0.0158 |
| A-1 | 24.801 | 112.107 | 0.376 | 1.488 | 1.042 | 16.669 | 197.621 | 80.155 | 80.240 | 0.0158 |
| A-1 | 25.181 | 112.109 | 0.378 | 1.496 | 1.052 | 16.831 | 200.646 | 81.609 | 81.693 | 0.0158 |
| A-1 | 25.372 | 112.110 | 0.379 | 1.500 | 1.053 | 16.913 | 202.166 | 81.735 | 81.820 | 0.0158 |
| A-1 | 25.372 | 112.110 | 0.379 | 1.500 | 1.053 | 16.913 | 202.166 | 81.735 | 81.820 | 0.0158 |
| A-1 | 26.532 | 112.116 | 0.385 | 1.524 | 1.073 | 17.412 | 211.415 | 84.754 | 84.840 | 0.0158 |
| A-1 | 26.925 | 112.118 | 0.387 | 1.531 | 1.078 | 17.582 | 214.545 | 85.470 | 85.556 | 0.0158 |
| A-1 | 28.528 | 112.126 | 0.395 | 1.561 | 1.090 | 18.274 | 227.318 | 87.322 | 87.409 | 0.0158 |
| A-1 | 30.179 | 112.134 | 0.403 | 1.590 | 1.100 | 18.980 | 240.473 | 89.173 | 89.262 | 0.0158 |
| A-1 | 30.179 | 112.134 | 0.403 | 1.590 | 1.100 | 18.980 | 240.473 | 89.173 | 89.262 | 0.0158 |
| A-1 | 30.385 | 112.135 | 0.404 | 1.593 | 1.110 | 19.070 | 242.112 | 90.846 | 90.935 | 0.0158 |
| A-1 | 31.230 | 112.139 | 0.408 | 1.607 | 1.122 | 19.437 | 248.844 | 92.968 | 93.058 | 0.0158 |
| A-1 | 31.444 | 112.140 | 0.409 | 1.610 | 1.124 | 19.530 | 250.548 | 93.315 | 93.405 | 0.0158 |
| A-1 | 32.075 | 112.143 | 0.412 | 1.619 | 1.135 | 19.813 | 255.576 | 95.579 | 95.670 | 0.0158 |
| A-1 | 32.075 | 112.143 | 0.412 | 1.619 | 1.135 | 19.813 | 255.576 | 95.579 | 95.670 | 0.0158 |
| A-1 | 34.497 | 112.154 | 0.423 | 1.652 | 1.144 | 20.879 | 274.881 | 98.174 | 98.266 | 0.0158 |
| A-1 | 34.959 | 112.156 | 0.425 | 1.659 | 1.144 | 21.076 | 278.559 | 98.336 | 98.428 | 0.0158 |
| A-1 | 38.528 | 112.171 | 0.440 | 1.708 | 1.146 | 22.561 | 306.999 | 99.704 | 99.798 | 0.0158 |
| A-1 | 42.293 | 112.186 | 0.455 | 1.758 | 1.145 | 24.060 | 336.998 | 100.175 | 100.271 | 0.0158 |
| A-1 | 46.239 | 112.201 | 0.470 | 1.809 | 1.146 | 25.567 | 368.443 | 100.646 | 100.744 | 0.0158 |
| A-1 | 50.358 | 112.216 | 0.485 | 1.860 | 1.147 | 27.080 | 401.262 | 101.117 | 101.217 | 0.0158 |
| A-1 | 51.202 | 112.219 | 0.488 | 1.870 | 1.157 | 27.386 | 407.988 | 102.951 | 103.052 | 0.0158 |
| A-1 | 52.838 | 112.225 | 0.494 | 1.887 | 1.160 | 28.006 | 421.023 | 103.846 | 103.948 | 0.0158 |
| A-1 | 56.753 | 112.238 | 0.507 | 1.931 | 1.161 | 29.394 | 452.221 | 104.338 | 104.441 | 0.0158 |
| A-1 | 60.803 | 112.252 | 0.521 | 1.975 | 1.163 | 30.788 | 484.489 | 104.828 | 104.933 | 0.0158 |
| A-1 | 64.989 | 112.265 | 0.534 | 2.019 | 1.166 | 32.189 | 517.846 | 105.320 | 105.426 | 0.0158 |
| A-1 | 68.530 | 112.276 | 0.545 | 2.055 | 1.169 | 33.351 | 546.057 | 105.940 | 106.048 | 0.0158 |
| A-1 | 72.160 | 112.287 | 0.556 | 2.090 | 1.173 | 34.520 | 574.985 | 106.561 | 106.670 | 0.0158 |
| A-1 | 73.165 | 112.290 | 0.559 | 2.100 | 1.181 | 34.842 | 582.993 | 108.205 | 108.315 | 0.0158 |
| A-1 | 76.475 | 112.300 | 0.569 | 2.129 | 1.183 | 35.928 | 609.370 | 108.815 | 108.926 | 0.0158 |
| A-1 | 79.959 | 112.310 | 0.579 | 2.160 | 1.186 | 37.018 | 637.132 | 109.424 | 109.536 | 0.0158 |
| A-1 | 84.560 | 112.323 | 0.592 | 2.199 | 1.192 | 38.450 | 673.791 | 110.784 | 110.898 | 0.0158 |
| A-1 | 87.417 | 112.331 | 0.600 | 2.222 | 1.198 | 39.342 | 696.559 | 112.123 | 112.237 | 0.0158 |
| A-1 | 93.007 | 112.346 | 0.615 | 2.267 | 1.204 | 41.034 | 741.101 | 113.491 | 113.607 | 0.0158 |
| A-1 | 97.205 | 112.357 | 0.626 | 2.299 | 1.208 | 42.289 | 774.544 | 114.641 | 114.759 | 0.0158 |
| A-1 | 97.975 | 112.359 | 0.628 | 2.304 | 1.209 | 42.518 | 780.682 | 114.861 | 114.979 | 0.0158 |
| A-1 | 100.638 | 112.366 | 0.635 | 2.323 | 1.215 | 43.326 | 801.903 | 116.233 | 116.351 | 0.0158 |
| A-1 | 104.654 | 112.376 | 0.645 | 2.352 | 1.217 | 44.492 | 833.900 | 116.811 | 116.931 | 0.0158 |
| A-1 | 108.127 | 112.384 | 0.653 | 2.377 | 1.225 | 45.492 | 861.573 | 118.540 | 118.660 | 0.0158 |
| A-1 | 111.657 | 112.393 | 0.662 | 2.401 | 1.233 | 46.507 | 889.705 | 120.268 | 120.389 | 0.0158 |
| A-1 | 112.245 | 112.395 | 0.664 | 2.401 | 1.230 | 46.747 | 894.389 | 120.425 | 120.545 | 0.0158 |
| A-1 | 115.841 | 112.404 | 0.673 | 2.425 | 1.233 | 47.775 | 923.043 | 121.159 | 121.280 | 0.0158 |
| A-1 | 119.491 | 112.412 | 0.681 | 2.448 | 1.235 | 48.808 | 952.126 | 121.892 | 122.013 | 0.0158 |
| A-1 | 124.802 | 112.424 | 0.693 | 2.482 | 1.237 | 50.274 | 994.444 | 122.441 | 122.564 | 0.0158 |
| A-1 | 130.222 | 112.436 | 0.705 | 2.517 | 1.239 | 51.746 | 1037.632 | 122.990 | 123.113 | 0.0158 |
| A-1 | 135.757 | 112.448 | 0.717 | 2.551 | 1.241 | 53.225 | 1081.738 | 123.540 | 123.664 | 0.0158 |
| A-1 | 136.229 | 112.449 | 0.718 | 2.554 | 1.241 | 53.349 | 1085.499 | 123.549 | 123.673 | 0.0158 |
| A-1 | 143.407 | 112.464 | 0.733 | 2.598 | 1.244 | 55.206 | 1142.694 | 124.127 | 124.252 | 0.0158 |
| A-1 | 150.766 | 112.479 | 0.748 | 2.642 | 1.247 | 57.073 | 1201.330 | 124.705 | 124.831 | 0.0158 |
| A-1 | 158.297 | 112.494 | 0.763 | 2.685 | 1.250 | 58.948 | 1261.340 | 125.283 | 125.410 | 0.0158 |

## Tabulated Cross-Section Properties // A-2

*(Calculated by Flood Modeller)*

| Node | Flow ($m^3/s$) | Stage (m AOD) | Depth (m) | Velocity (m/s) | Froude no. | Area ($m^2$) | Conveyance ($m^3/s$) | Width (m) | W Perim. (m) | Slope |
|---|---|---|---|---|---|---|---|---|---|---|
| A-2 | 0.000 | 110.240 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0028 |
| A-2 | 0.000 | 110.258 | 0.018 | 0.057 | 0.192 | 0.004 | 0.004 | 0.413 | 0.416 | 0.0028 |
| A-2 | 0.001 | 110.276 | 0.036 | 0.091 | 0.215 | 0.015 | 0.025 | 0.827 | 0.832 | 0.0028 |
| A-2 | 0.004 | 110.294 | 0.054 | 0.119 | 0.230 | 0.033 | 0.075 | 1.240 | 1.248 | 0.0028 |
| A-2 | 0.008 | 110.311 | 0.071 | 0.141 | 0.241 | 0.058 | 0.155 | 1.649 | 1.659 | 0.0028 |
| A-2 | 0.015 | 110.328 | 0.088 | 0.163 | 0.249 | 0.090 | 0.276 | 2.058 | 2.070 | 0.0028 |
| A-2 | 0.023 | 110.345 | 0.105 | 0.183 | 0.257 | 0.128 | 0.443 | 2.467 | 2.482 | 0.0028 |
| A-2 | 0.035 | 110.362 | 0.122 | 0.203 | 0.263 | 0.173 | 0.664 | 2.876 | 2.893 | 0.0028 |
| A-2 | 0.050 | 110.379 | 0.139 | 0.221 | 0.269 | 0.226 | 0.944 | 3.284 | 3.304 | 0.0028 |
| A-2 | 0.068 | 110.396 | 0.156 | 0.239 | 0.275 | 0.285 | 1.287 | 3.693 | 3.715 | 0.0028 |
| A-2 | 0.094 | 110.416 | 0.176 | 0.259 | 0.280 | 0.364 | 1.779 | 4.182 | 4.207 | 0.0028 |
| A-2 | 0.126 | 110.436 | 0.196 | 0.278 | 0.285 | 0.452 | 2.375 | 4.671 | 4.699 | 0.0028 |
| A-2 | 0.131 | 110.439 | 0.199 | 0.280 | 0.297 | 0.467 | 2.475 | 5.140 | 5.168 | 0.0028 |

| Node | Flow ($m^3/s$) | Stage (m AOD) | Depth (m) | Velocity (m/s) | Froude no. | Area ($m^2$) | Conveyance ($m^3/s$) | Width (m) | W Perim. (m) | Slope |
|---|---|---|---|---|---|---|---|---|---|---|
| A-2 | 0.136 | 110.442 | 0.202 | 0.282 | 0.315 | 0.484 | 2.578 | 5.937 | 5.966 | 0.0028 |
| A-2 | 0.138 | 110.443 | 0.203 | 0.282 | 0.327 | 0.490 | 2.614 | 6.441 | 6.470 | 0.0028 |
| A-2 | 0.144 | 110.446 | 0.206 | 0.281 | 0.378 | 0.513 | 2.726 | 9.093 | 9.123 | 0.0028 |
| A-2 | 0.144 | 110.446 | 0.206 | 0.281 | 0.378 | 0.513 | 2.726 | 9.093 | 9.123 | 0.0028 |
| A-2 | 0.147 | 110.447 | 0.207 | 0.281 | 0.384 | 0.522 | 2.774 | 9.583 | 9.613 | 0.0028 |
| A-2 | 0.155 | 110.450 | 0.210 | 0.279 | 0.418 | 0.555 | 2.926 | 12.221 | 12.251 | 0.0028 |
| A-2 | 0.155 | 110.450 | 0.210 | 0.279 | 0.418 | 0.555 | 2.926 | 12.221 | 12.251 | 0.0028 |
| A-2 | 0.158 | 110.451 | 0.211 | 0.278 | 0.422 | 0.568 | 2.981 | 12.831 | 12.861 | 0.0028 |
| A-2 | 0.181 | 110.458 | 0.218 | 0.272 | 0.421 | 0.668 | 3.426 | 15.729 | 15.761 | 0.0028 |
| A-2 | 0.193 | 110.461 | 0.221 | 0.269 | 0.417 | 0.717 | 3.648 | 16.845 | 16.877 | 0.0028 |
| A-2 | 0.197 | 110.462 | 0.222 | 0.269 | 0.417 | 0.734 | 3.726 | 17.302 | 17.334 | 0.0028 |
| A-2 | 0.201 | 110.463 | 0.223 | 0.268 | 0.417 | 0.751 | 3.806 | 17.822 | 17.855 | 0.0028 |
| A-2 | 0.210 | 110.465 | 0.225 | 0.266 | 0.428 | 0.789 | 3.973 | 19.989 | 20.023 | 0.0028 |
| A-2 | 0.215 | 110.466 | 0.226 | 0.265 | 0.426 | 0.809 | 4.057 | 20.505 | 20.539 | 0.0028 |
| A-2 | 0.230 | 110.469 | 0.229 | 0.263 | 0.419 | 0.873 | 4.341 | 21.751 | 21.785 | 0.0028 |
| A-2 | 0.235 | 110.470 | 0.230 | 0.262 | 0.418 | 0.895 | 4.436 | 22.303 | 22.338 | 0.0028 |
| A-2 | 0.263 | 110.475 | 0.235 | 0.260 | 0.405 | 1.010 | 4.965 | 24.017 | 24.052 | 0.0028 |
| A-2 | 0.269 | 110.476 | 0.236 | 0.260 | 0.402 | 1.035 | 5.088 | 24.215 | 24.250 | 0.0028 |
| A-2 | 0.283 | 110.478 | 0.238 | 0.261 | 0.397 | 1.083 | 5.345 | 24.608 | 24.643 | 0.0028 |
| A-2 | 0.297 | 110.480 | 0.240 | 0.262 | 0.393 | 1.133 | 5.612 | 25.020 | 25.056 | 0.0028 |
| A-2 | 0.304 | 110.481 | 0.241 | 0.262 | 0.393 | 1.158 | 5.737 | 25.503 | 25.539 | 0.0028 |
| A-2 | 0.317 | 110.483 | 0.243 | 0.262 | 0.392 | 1.210 | 5.995 | 26.550 | 26.587 | 0.0028 |
| A-2 | 0.374 | 110.490 | 0.250 | 0.266 | 0.385 | 1.404 | 7.060 | 28.872 | 28.910 | 0.0028 |
| A-2 | 0.389 | 110.492 | 0.252 | 0.266 | 0.380 | 1.462 | 7.358 | 29.177 | 29.216 | 0.0028 |
| A-2 | 0.480 | 110.501 | 0.261 | 0.277 | 0.371 | 1.731 | 9.066 | 30.484 | 30.524 | 0.0028 |
| A-2 | 0.513 | 110.504 | 0.264 | 0.281 | 0.375 | 1.824 | 9.687 | 31.801 | 31.842 | 0.0028 |
| A-2 | 0.523 | 110.505 | 0.265 | 0.282 | 0.376 | 1.856 | 9.892 | 32.324 | 32.365 | 0.0028 |
| A-2 | 0.546 | 110.507 | 0.267 | 0.284 | 0.383 | 1.923 | 10.313 | 34.385 | 34.426 | 0.0028 |
| A-2 | 0.560 | 110.509 | 0.269 | 0.281 | 0.381 | 1.994 | 10.587 | 36.032 | 36.074 | 0.0028 |
| A-2 | 0.560 | 110.509 | 0.269 | 0.281 | 0.381 | 1.994 | 10.587 | 36.032 | 36.074 | 0.0028 |
| A-2 | 0.564 | 110.510 | 0.270 | 0.278 | 0.375 | 2.030 | 10.650 | 36.255 | 36.297 | 0.0028 |
| A-2 | 0.642 | 110.516 | 0.276 | 0.285 | 0.372 | 2.251 | 12.130 | 37.594 | 37.638 | 0.0028 |
| A-2 | 0.681 | 110.519 | 0.279 | 0.288 | 0.372 | 2.366 | 12.861 | 38.768 | 38.811 | 0.0028 |
| A-2 | 0.888 | 110.531 | 0.291 | 0.311 | 0.368 | 2.853 | 16.790 | 39.169 | 39.215 | 0.0028 |
| A-2 | 1.126 | 110.544 | 0.304 | 0.337 | 0.370 | 3.345 | 21.279 | 39.571 | 39.619 | 0.0028 |
| A-2 | 1.487 | 110.561 | 0.321 | 0.370 | 0.374 | 4.025 | 28.110 | 40.445 | 40.495 | 0.0028 |
| A-2 | 1.580 | 110.565 | 0.325 | 0.377 | 0.380 | 4.190 | 29.851 | 41.737 | 41.788 | 0.0028 |
| A-2 | 1.967 | 110.581 | 0.341 | 0.405 | 0.380 | 4.860 | 37.174 | 42.101 | 42.155 | 0.0028 |
| A-2 | 2.417 | 110.597 | 0.357 | 0.436 | 0.386 | 5.537 | 45.671 | 42.465 | 42.522 | 0.0028 |
| A-2 | 2.907 | 110.613 | 0.373 | 0.467 | 0.392 | 6.219 | 54.928 | 42.829 | 42.888 | 0.0028 |
| A-2 | 3.167 | 110.622 | 0.382 | 0.479 | 0.394 | 6.609 | 59.846 | 43.868 | 43.929 | 0.0028 |
| A-2 | 3.768 | 110.639 | 0.399 | 0.511 | 0.400 | 7.382 | 71.217 | 44.431 | 44.494 | 0.0028 |
| A-2 | 4.416 | 110.657 | 0.417 | 0.541 | 0.405 | 8.164 | 83.454 | 44.994 | 45.060 | 0.0028 |
| A-2 | 4.814 | 110.667 | 0.427 | 0.557 | 0.408 | 8.639 | 90.972 | 45.533 | 45.601 | 0.0028 |
| A-2 | 5.228 | 110.678 | 0.438 | 0.573 | 0.411 | 9.120 | 98.793 | 46.072 | 46.142 | 0.0028 |
| A-2 | 5.679 | 110.689 | 0.449 | 0.590 | 0.414 | 9.630 | 107.326 | 46.613 | 46.685 | 0.0028 |
| A-2 | 6.148 | 110.700 | 0.460 | 0.606 | 0.417 | 10.146 | 116.190 | 47.154 | 47.228 | 0.0028 |
| A-2 | 6.683 | 110.712 | 0.472 | 0.624 | 0.420 | 10.715 | 126.298 | 47.699 | 47.774 | 0.0028 |
| A-2 | 7.238 | 110.724 | 0.484 | 0.641 | 0.423 | 11.291 | 136.790 | 48.244 | 48.321 | 0.0028 |
| A-2 | 8.079 | 110.741 | 0.501 | 0.667 | 0.427 | 12.115 | 152.681 | 48.805 | 48.885 | 0.0028 |
| A-2 | 8.386 | 110.747 | 0.507 | 0.676 | 0.431 | 12.411 | 158.479 | 49.635 | 49.716 | 0.0028 |
| A-2 | 8.962 | 110.758 | 0.518 | 0.691 | 0.441 | 12.969 | 169.370 | 51.840 | 51.923 | 0.0028 |
| A-2 | 8.962 | 110.758 | 0.518 | 0.691 | 0.441 | 12.969 | 169.370 | 51.840 | 51.923 | 0.0028 |
| A-2 | 9.231 | 110.763 | 0.523 | 0.698 | 0.444 | 13.230 | 174.440 | 52.634 | 52.719 | 0.0028 |
| A-2 | 9.558 | 110.769 | 0.529 | 0.705 | 0.448 | 13.549 | 180.627 | 53.689 | 53.775 | 0.0028 |
| A-2 | 9.724 | 110.772 | 0.532 | 0.709 | 0.451 | 13.712 | 183.772 | 54.435 | 54.522 | 0.0028 |
| A-2 | 9.724 | 110.772 | 0.532 | 0.709 | 0.451 | 13.712 | 183.772 | 54.435 | 54.522 | 0.0028 |
| A-2 | 9.892 | 110.775 | 0.535 | 0.713 | 0.456 | 13.877 | 186.939 | 55.724 | 55.811 | 0.0028 |
| A-2 | 10.061 | 110.778 | 0.538 | 0.716 | 0.462 | 14.046 | 190.139 | 57.272 | 57.361 | 0.0028 |
| A-2 | 10.119 | 110.779 | 0.539 | 0.717 | 0.464 | 14.104 | 191.224 | 57.852 | 57.941 | 0.0028 |
| A-2 | 10.886 | 110.792 | 0.552 | 0.731 | 0.479 | 14.887 | 205.723 | 62.704 | 62.795 | 0.0028 |
| A-2 | 10.947 | 110.793 | 0.553 | 0.732 | 0.480 | 14.950 | 206.875 | 63.075 | 63.165 | 0.0028 |
| A-2 | 11.131 | 110.796 | 0.556 | 0.735 | 0.482 | 15.141 | 210.349 | 63.919 | 64.010 | 0.0028 |
| A-2 | 11.255 | 110.798 | 0.558 | 0.737 | 0.483 | 15.269 | 212.697 | 64.311 | 64.402 | 0.0028 |
| A-2 | 11.255 | 110.798 | 0.558 | 0.737 | 0.483 | 15.269 | 212.697 | 64.311 | 64.402 | 0.0028 |
| A-2 | 11.442 | 110.801 | 0.561 | 0.740 | 0.483 | 15.462 | 216.231 | 64.640 | 64.732 | 0.0028 |
| A-2 | 12.350 | 110.815 | 0.575 | 0.754 | 0.483 | 16.377 | 233.396 | 66.025 | 66.117 | 0.0028 |
| A-2 | 13.300 | 110.829 | 0.589 | 0.768 | 0.485 | 17.314 | 251.337 | 67.803 | 67.897 | 0.0028 |
| A-2 | 13.369 | 110.830 | 0.590 | 0.769 | 0.485 | 17.382 | 252.641 | 67.933 | 68.026 | 0.0028 |
| A-2 | 13.647 | 110.834 | 0.594 | 0.773 | 0.491 | 17.658 | 257.902 | 70.035 | 70.129 | 0.0028 |
| A-2 | 13.858 | 110.837 | 0.597 | 0.776 | 0.494 | 17.869 | 261.896 | 71.107 | 71.201 | 0.0028 |
| A-2 | 13.858 | 110.837 | 0.597 | 0.776 | 0.494 | 17.869 | 261.896 | 71.107 | 71.201 | 0.0028 |
| A-2 | 14.495 | 110.846 | 0.606 | 0.783 | 0.493 | 18.514 | 273.923 | 72.131 | 72.225 | 0.0028 |
| A-2 | 14.709 | 110.849 | 0.609 | 0.785 | 0.496 | 18.732 | 277.975 | 73.229 | 73.323 | 0.0028 |
| A-2 | 15.778 | 110.863 | 0.623 | 0.798 | 0.494 | 19.764 | 298.168 | 74.258 | 74.353 | 0.0028 |
| A-2 | 16.468 | 110.872 | 0.632 | 0.806 | 0.493 | 20.436 | 311.217 | 75.031 | 75.127 | 0.0028 |
| A-2 | 17.248 | 110.882 | 0.642 | 0.814 | 0.494 | 21.194 | 325.965 | 76.461 | 76.556 | 0.0028 |
| A-2 | 17.649 | 110.887 | 0.647 | 0.818 | 0.494 | 21.577 | 333.538 | 77.059 | 77.154 | 0.0028 |
| A-2 | 18.348 | 110.895 | 0.655 | 0.827 | 0.494 | 22.197 | 346.744 | 77.794 | 77.889 | 0.0028 |
| A-2 | 19.800 | 110.911 | 0.671 | 0.844 | 0.495 | 23.451 | 374.176 | 78.917 | 79.014 | 0.0028 |
| A-2 | 19.892 | 110.912 | 0.672 | 0.845 | 0.498 | 23.530 | 375.927 | 80.249 | 80.345 | 0.0028 |
| A-2 | 19.985 | 110.913 | 0.673 | 0.846 | 0.502 | 23.611 | 377.683 | 81.580 | 81.677 | 0.0028 |
| A-2 | 20.102 | 110.915 | 0.675 | 0.846 | 0.502 | 23.775 | 379.886 | 82.113 | 82.210 | 0.0028 |
| A-2 | 20.463 | 110.919 | 0.679 | 0.849 | 0.503 | 24.105 | 386.714 | 83.179 | 83.275 | 0.0028 |
| A-2 | 22.403 | 110.938 | 0.699 | 0.871 | 0.501 | 25.730 | 423.370 | 83.456 | 83.553 | 0.0028 |
| A-2 | 24.438 | 110.958 | 0.718 | 0.893 | 0.499 | 27.360 | 461.832 | 83.733 | 83.831 | 0.0028 |
| A-2 | 26.403 | 110.977 | 0.737 | 0.913 | 0.497 | 28.913 | 498.962 | 84.188 | 84.287 | 0.0028 |
| A-2 | 28.448 | 110.995 | 0.755 | 0.933 | 0.497 | 30.475 | 537.626 | 84.644 | 84.742 | 0.0028 |
| A-2 | 28.901 | 110.999 | 0.759 | 0.938 | 0.497 | 30.814 | 546.179 | 85.015 | 85.114 | 0.0028 |
| A-2 | 30.942 | 111.017 | 0.777 | 0.956 | 0.500 | 32.361 | 584.753 | 86.830 | 86.930 | 0.0028 |
| A-2 | 31.875 | 111.025 | 0.785 | 0.964 | 0.503 | 33.061 | 602.377 | 88.279 | 88.379 | 0.0028 |
| A-2 | 32.465 | 111.030 | 0.790 | 0.969 | 0.504 | 33.504 | 613.540 | 88.914 | 89.014 | 0.0028 |
| A-2 | 33.312 | 111.039 | 0.799 | 0.971 | 0.504 | 34.313 | 629.545 | 90.773 | 90.873 | 0.0028 |
| A-2 | 33.445 | 111.040 | 0.800 | 0.972 | 0.504 | 34.404 | 632.053 | 90.795 | 90.896 | 0.0028 |
| A-2 | 34.922 | 111.051 | 0.811 | 0.986 | 0.506 | 35.405 | 659.957 | 91.299 | 91.400 | 0.0028 |
| A-2 | 36.431 | 111.062 | 0.822 | 1.001 | 0.507 | 36.412 | 688.476 | 91.804 | 91.905 | 0.0028 |
| A-2 | 38.874 | 111.079 | 0.839 | 1.023 | 0.508 | 38.006 | 734.646 | 92.140 | 92.242 | 0.0028 |
| A-2 | 41.393 | 111.097 | 0.857 | 1.045 | 0.510 | 39.606 | 782.255 | 92.477 | 92.579 | 0.0028 |
| A-2 | 43.987 | 111.114 | 0.874 | 1.067 | 0.511 | 41.212 | 831.282 | 92.813 | 92.915 | 0.0028 |

| Node | Flow ($m^3/s$) | Stage (m AOD) | Depth (m) | Velocity (m/s) | Froude no. | Area ($m^2$) | Conveyance ($m^3/s$) | Width (m) | W Perim. (m) | Slope |
|---|---|---|---|---|---|---|---|---|---|---|
| A-2 | 46.604 | 111.131 | 0.891 | 1.089 | 0.513 | 42.792 | 880.739 | 93.065 | 93.168 | 0.0028 |
| A-2 | 49.292 | 111.148 | 0.908 | 1.111 | 0.514 | 44.376 | 931.523 | 93.317 | 93.421 | 0.0028 |
| A-2 | 52.049 | 111.165 | 0.925 | 1.132 | 0.516 | 45.965 | 983.640 | 93.569 | 93.673 | 0.0028 |
| A-2 | 54.874 | 111.182 | 0.942 | 1.154 | 0.517 | 47.558 | 1037.029 | 93.821 | 93.926 | 0.0028 |
| A-2 | 57.534 | 111.198 | 0.958 | 1.173 | 0.519 | 49.030 | 1087.283 | 94.157 | 94.262 | 0.0028 |
| A-2 | 60.252 | 111.213 | 0.973 | 1.193 | 0.521 | 50.508 | 1138.647 | 94.494 | 94.599 | 0.0028 |
| A-2 | 63.025 | 111.229 | 0.989 | 1.212 | 0.523 | 51.991 | 1191.064 | 94.830 | 94.936 | 0.0028 |
| A-2 | 65.359 | 111.242 | 1.002 | 1.228 | 0.525 | 53.227 | 1235.163 | 95.334 | 95.440 | 0.0028 |
| A-2 | 67.732 | 111.255 | 1.015 | 1.243 | 0.527 | 54.470 | 1280.021 | 95.839 | 95.945 | 0.0028 |

## Tabulated Cross-Section Properties // A-3

*(Calculated by Flood Modeller)*

| Node | Flow ($m^3/s$) | Stage (m AOD) | Depth (m) | Velocity (m/s) | Froude no. | Area ($m^2$) | Conveyance ($m^3/s$) | Width (m) | W Perim. (m) | Slope |
|---|---|---|---|---|---|---|---|---|---|---|
| A-3 | 0.000 | 108.253 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0076 |
| A-3 | 0.000 | 108.265 | 0.012 | 0.073 | 0.296 | 0.001 | 0.001 | 0.226 | 0.227 | 0.0076 |
| A-3 | 0.001 | 108.278 | 0.025 | 0.116 | 0.333 | 0.006 | 0.007 | 0.451 | 0.454 | 0.0076 |
| A-3 | 0.002 | 108.290 | 0.037 | 0.152 | 0.356 | 0.013 | 0.022 | 0.677 | 0.681 | 0.0076 |
| A-3 | 0.004 | 108.302 | 0.049 | 0.184 | 0.373 | 0.022 | 0.047 | 0.902 | 0.908 | 0.0076 |
| A-3 | 0.007 | 108.315 | 0.062 | 0.214 | 0.388 | 0.035 | 0.086 | 1.128 | 1.135 | 0.0076 |
| A-3 | 0.012 | 108.327 | 0.074 | 0.241 | 0.400 | 0.050 | 0.139 | 1.353 | 1.362 | 0.0076 |
| A-3 | 0.018 | 108.340 | 0.087 | 0.267 | 0.410 | 0.068 | 0.210 | 1.579 | 1.589 | 0.0076 |
| A-3 | 0.026 | 108.352 | 0.099 | 0.292 | 0.419 | 0.089 | 0.300 | 1.805 | 1.816 | 0.0076 |
| A-3 | 0.037 | 108.365 | 0.112 | 0.321 | 0.429 | 0.114 | 0.420 | 2.004 | 2.017 | 0.0076 |
| A-3 | 0.049 | 108.378 | 0.125 | 0.347 | 0.438 | 0.141 | 0.564 | 2.204 | 2.218 | 0.0076 |
| A-3 | 0.063 | 108.390 | 0.137 | 0.373 | 0.445 | 0.170 | 0.728 | 2.380 | 2.396 | 0.0076 |
| A-3 | 0.080 | 108.403 | 0.150 | 0.397 | 0.452 | 0.201 | 0.916 | 2.556 | 2.574 | 0.0076 |
| A-3 | 0.098 | 108.415 | 0.162 | 0.420 | 0.459 | 0.234 | 1.128 | 2.732 | 2.751 | 0.0076 |
| A-3 | 0.119 | 108.428 | 0.175 | 0.442 | 0.465 | 0.269 | 1.366 | 2.908 | 2.929 | 0.0076 |
| A-3 | 0.142 | 108.440 | 0.187 | 0.464 | 0.470 | 0.306 | 1.631 | 3.084 | 3.107 | 0.0076 |
| A-3 | 0.167 | 108.453 | 0.200 | 0.485 | 0.475 | 0.345 | 1.924 | 3.260 | 3.285 | 0.0076 |
| A-3 | 0.195 | 108.465 | 0.212 | 0.505 | 0.480 | 0.387 | 2.246 | 3.436 | 3.463 | 0.0076 |
| A-3 | 0.226 | 108.478 | 0.225 | 0.524 | 0.485 | 0.431 | 2.597 | 3.612 | 3.641 | 0.0076 |
| A-3 | 0.259 | 108.490 | 0.237 | 0.544 | 0.489 | 0.477 | 2.980 | 3.788 | 3.818 | 0.0076 |
| A-3 | 0.282 | 108.497 | 0.244 | 0.557 | 0.532 | 0.506 | 3.238 | 4.541 | 4.572 | 0.0076 |
| A-3 | 0.292 | 108.500 | 0.247 | 0.559 | 0.603 | 0.522 | 3.354 | 5.955 | 5.986 | 0.0076 |
| A-3 | 0.340 | 108.512 | 0.259 | 0.567 | 0.591 | 0.599 | 3.905 | 6.390 | 6.422 | 0.0076 |
| A-3 | 0.395 | 108.525 | 0.272 | 0.580 | 0.586 | 0.682 | 4.544 | 6.825 | 6.859 | 0.0076 |
| A-3 | 0.400 | 108.526 | 0.273 | 0.581 | 0.586 | 0.688 | 4.598 | 6.860 | 6.893 | 0.0076 |
| A-3 | 0.435 | 108.533 | 0.280 | 0.587 | 0.615 | 0.740 | 4.998 | 7.973 | 8.007 | 0.0076 |
| A-3 | 0.461 | 108.538 | 0.285 | 0.589 | 0.635 | 0.783 | 5.296 | 8.925 | 8.959 | 0.0076 |
| A-3 | 0.500 | 108.545 | 0.292 | 0.588 | 0.665 | 0.851 | 5.752 | 10.675 | 10.710 | 0.0076 |
| A-3 | 0.532 | 108.550 | 0.297 | 0.587 | 0.666 | 0.907 | 6.114 | 11.472 | 11.508 | 0.0076 |
| A-3 | 0.539 | 108.551 | 0.298 | 0.587 | 0.666 | 0.918 | 6.191 | 11.616 | 11.652 | 0.0076 |
| A-3 | 0.636 | 108.564 | 0.311 | 0.589 | 0.656 | 1.079 | 7.305 | 13.145 | 13.183 | 0.0076 |
| A-3 | 0.711 | 108.573 | 0.320 | 0.591 | 0.660 | 1.205 | 8.177 | 14.733 | 14.772 | 0.0076 |
| A-3 | 0.798 | 108.582 | 0.329 | 0.597 | 0.636 | 1.338 | 9.174 | 14.921 | 14.961 | 0.0076 |
| A-3 | 0.902 | 108.591 | 0.338 | 0.611 | 0.638 | 1.476 | 10.370 | 15.774 | 15.815 | 0.0076 |
| A-3 | 1.016 | 108.600 | 0.347 | 0.626 | 0.640 | 1.622 | 11.675 | 16.627 | 16.669 | 0.0076 |
| A-3 | 1.055 | 108.603 | 0.350 | 0.631 | 0.656 | 1.673 | 12.130 | 17.749 | 17.792 | 0.0076 |
| A-3 | 1.069 | 108.604 | 0.351 | 0.632 | 0.656 | 1.691 | 12.288 | 17.838 | 17.881 | 0.0076 |
| A-3 | 1.126 | 108.608 | 0.355 | 0.638 | 0.672 | 1.766 | 12.936 | 19.270 | 19.313 | 0.0076 |
| A-3 | 1.155 | 108.610 | 0.357 | 0.639 | 0.697 | 1.806 | 13.271 | 21.066 | 21.109 | 0.0076 |
| A-3 | 1.215 | 108.614 | 0.361 | 0.642 | 0.699 | 1.892 | 13.968 | 21.974 | 22.018 | 0.0076 |
| A-3 | 1.263 | 108.617 | 0.364 | 0.645 | 0.702 | 1.959 | 14.515 | 22.784 | 22.829 | 0.0076 |
| A-3 | 1.329 | 108.621 | 0.368 | 0.647 | 0.712 | 2.053 | 15.277 | 24.394 | 24.440 | 0.0076 |
| A-3 | 1.363 | 108.623 | 0.370 | 0.648 | 0.719 | 2.103 | 15.670 | 25.414 | 25.460 | 0.0076 |
| A-3 | 1.363 | 108.623 | 0.370 | 0.648 | 0.719 | 2.103 | 15.670 | 25.414 | 25.460 | 0.0076 |
| A-3 | 1.396 | 108.625 | 0.372 | 0.648 | 0.726 | 2.155 | 16.046 | 26.517 | 26.564 | 0.0076 |
| A-3 | 1.465 | 108.629 | 0.376 | 0.647 | 0.725 | 2.264 | 16.842 | 27.892 | 27.939 | 0.0076 |
| A-3 | 1.577 | 108.635 | 0.382 | 0.647 | 0.722 | 2.437 | 18.123 | 29.788 | 29.836 | 0.0076 |
| A-3 | 1.636 | 108.638 | 0.385 | 0.647 | 0.720 | 2.528 | 18.801 | 30.731 | 30.779 | 0.0076 |
| A-3 | 1.715 | 108.642 | 0.389 | 0.647 | 0.714 | 2.653 | 19.715 | 31.724 | 31.773 | 0.0076 |
| A-3 | 1.836 | 108.647 | 0.394 | 0.653 | 0.708 | 2.813 | 21.102 | 32.438 | 32.487 | 0.0076 |
| A-3 | 1.861 | 108.648 | 0.395 | 0.654 | 0.706 | 2.846 | 21.390 | 32.543 | 32.593 | 0.0076 |
| A-3 | 2.180 | 108.660 | 0.407 | 0.671 | 0.697 | 3.247 | 25.054 | 34.292 | 34.343 | 0.0076 |
| A-3 | 2.180 | 108.660 | 0.407 | 0.671 | 0.707 | 3.247 | 25.054 | 35.299 | 35.350 | 0.0076 |
| A-3 | 2.259 | 108.663 | 0.410 | 0.674 | 0.704 | 3.353 | 25.958 | 35.916 | 35.967 | 0.0076 |
| A-3 | 2.376 | 108.667 | 0.414 | 0.679 | 0.704 | 3.499 | 27.303 | 36.863 | 36.915 | 0.0076 |
| A-3 | 2.467 | 108.670 | 0.417 | 0.683 | 0.703 | 3.610 | 28.351 | 37.519 | 37.571 | 0.0076 |
| A-3 | 2.529 | 108.672 | 0.419 | 0.686 | 0.705 | 3.686 | 29.066 | 38.223 | 38.275 | 0.0076 |
| A-3 | 2.623 | 108.675 | 0.422 | 0.690 | 0.708 | 3.803 | 30.148 | 39.294 | 39.346 | 0.0076 |
| A-3 | 2.682 | 108.677 | 0.424 | 0.691 | 0.714 | 3.883 | 30.819 | 40.761 | 40.814 | 0.0076 |
| A-3 | 2.715 | 108.678 | 0.425 | 0.692 | 0.715 | 3.924 | 31.199 | 41.083 | 41.136 | 0.0076 |
| A-3 | 2.886 | 108.683 | 0.430 | 0.698 | 0.715 | 4.132 | 33.171 | 42.523 | 42.577 | 0.0076 |
| A-3 | 3.066 | 108.688 | 0.435 | 0.705 | 0.715 | 4.349 | 35.240 | 43.858 | 43.912 | 0.0076 |
| A-3 | 3.246 | 108.693 | 0.440 | 0.710 | 0.707 | 4.569 | 37.300 | 44.455 | 44.509 | 0.0076 |
| A-3 | 3.364 | 108.696 | 0.443 | 0.715 | 0.714 | 4.705 | 38.666 | 45.999 | 46.054 | 0.0076 |
| A-3 | 3.405 | 108.697 | 0.444 | 0.717 | 0.724 | 4.752 | 39.129 | 47.548 | 47.603 | 0.0076 |
| A-3 | 3.528 | 108.700 | 0.447 | 0.721 | 0.724 | 4.896 | 40.546 | 48.419 | 48.475 | 0.0076 |
| A-3 | 3.528 | 108.700 | 0.447 | 0.721 | 0.724 | 4.896 | 40.546 | 48.419 | 48.475 | 0.0076 |
| A-3 | 3.570 | 108.701 | 0.448 | 0.722 | 0.730 | 4.944 | 41.034 | 49.626 | 49.681 | 0.0076 |
| A-3 | 3.570 | 108.701 | 0.448 | 0.722 | 0.730 | 4.944 | 41.034 | 49.626 | 49.681 | 0.0076 |
| A-3 | 3.867 | 108.708 | 0.455 | 0.730 | 0.729 | 5.300 | 44.437 | 51.858 | 51.914 | 0.0076 |
| A-3 | 3.867 | 108.708 | 0.455 | 0.730 | 0.729 | 5.300 | 44.437 | 51.858 | 51.914 | 0.0076 |
| A-3 | 4.135 | 108.714 | 0.461 | 0.736 | 0.728 | 5.617 | 47.520 | 53.921 | 53.978 | 0.0076 |
| A-3 | 4.604 | 108.723 | 0.470 | 0.751 | 0.717 | 6.134 | 52.908 | 54.911 | 54.969 | 0.0076 |
| A-3 | 5.123 | 108.733 | 0.480 | 0.769 | 0.711 | 6.661 | 58.872 | 55.902 | 55.960 | 0.0076 |
| A-3 | 5.123 | 108.733 | 0.480 | 0.769 | 0.711 | 6.661 | 58.872 | 55.902 | 55.960 | 0.0076 |
| A-3 | 5.346 | 108.737 | 0.484 | 0.776 | 0.711 | 6.886 | 61.442 | 56.707 | 56.766 | 0.0076 |
| A-3 | 5.404 | 108.738 | 0.485 | 0.778 | 0.714 | 6.943 | 62.104 | 57.377 | 57.436 | 0.0076 |
| A-3 | 5.462 | 108.739 | 0.486 | 0.780 | 0.724 | 7.001 | 62.772 | 59.145 | 59.204 | 0.0076 |
| A-3 | 5.520 | 108.740 | 0.487 | 0.782 | 0.724 | 7.060 | 63.445 | 59.404 | 59.463 | 0.0076 |
| A-3 | 5.820 | 108.745 | 0.492 | 0.790 | 0.730 | 7.363 | 66.890 | 61.617 | 61.676 | 0.0076 |
| A-3 | 5.943 | 108.747 | 0.494 | 0.794 | 0.733 | 7.487 | 68.298 | 62.557 | 62.616 | 0.0076 |
| A-3 | 6.039 | 108.749 | 0.496 | 0.793 | 0.729 | 7.613 | 69.404 | 63.066 | 63.125 | 0.0076 |
| A-3 | 6.364 | 108.754 | 0.501 | 0.802 | 0.729 | 7.931 | 73.139 | 64.194 | 64.255 | 0.0076 |
| A-3 | 7.123 | 108.765 | 0.512 | 0.824 | 0.727 | 8.647 | 81.868 | 66.099 | 66.160 | 0.0076 |

| Node | Flow ($m^3/s$) | Stage (m AOD) | Depth (m) | Velocity (m/s) | Froude no. | Area ($m^2$) | Conveyance ($m^3/s$) | Width (m) | W Perim. (m) | Slope |
|---|---|---|---|---|---|---|---|---|---|---|
| A-3 | 7.123 | 108.765 | 0.512 | 0.824 | 0.733 | 8.647 | 81.868 | 67.106 | 67.167 | 0.0076 |
| A-3 | 7.580 | 108.771 | 0.518 | 0.837 | 0.731 | 9.052 | 87.120 | 67.704 | 67.765 | 0.0076 |
| A-3 | 8.302 | 108.780 | 0.527 | 0.859 | 0.730 | 9.664 | 95.409 | 68.429 | 68.490 | 0.0076 |
| A-3 | 8.804 | 108.786 | 0.533 | 0.873 | 0.737 | 10.082 | 101.177 | 70.524 | 70.585 | 0.0076 |
| A-3 | 8.889 | 108.787 | 0.534 | 0.876 | 0.743 | 10.153 | 102.155 | 71.712 | 71.773 | 0.0076 |
| A-3 | 8.974 | 108.788 | 0.535 | 0.878 | 0.748 | 10.225 | 103.140 | 72.900 | 72.962 | 0.0076 |
| A-3 | 9.147 | 108.790 | 0.537 | 0.882 | 0.749 | 10.371 | 105.129 | 73.358 | 73.420 | 0.0076 |
| A-3 | 9.666 | 108.796 | 0.543 | 0.894 | 0.746 | 10.813 | 111.091 | 73.887 | 73.949 | 0.0076 |
| A-3 | 10.298 | 108.803 | 0.550 | 0.909 | 0.747 | 11.335 | 118.350 | 75.230 | 75.292 | 0.0076 |
| A-3 | 10.582 | 108.806 | 0.553 | 0.915 | 0.747 | 11.561 | 121.621 | 75.495 | 75.557 | 0.0076 |
| A-3 | 10.871 | 108.809 | 0.556 | 0.922 | 0.753 | 11.789 | 124.942 | 77.041 | 77.103 | 0.0076 |
| A-3 | 11.654 | 108.817 | 0.564 | 0.939 | 0.752 | 12.410 | 133.939 | 78.096 | 78.158 | 0.0076 |
| A-3 | 12.801 | 108.828 | 0.575 | 0.964 | 0.751 | 13.274 | 147.120 | 78.885 | 78.947 | 0.0076 |
| A-3 | 13.666 | 108.836 | 0.583 | 0.983 | 0.751 | 13.907 | 157.058 | 79.640 | 79.702 | 0.0076 |
| A-3 | 14.562 | 108.844 | 0.591 | 1.001 | 0.751 | 14.548 | 167.359 | 80.395 | 80.458 | 0.0076 |
| A-3 | 14.790 | 108.846 | 0.593 | 1.006 | 0.752 | 14.709 | 169.975 | 80.613 | 80.675 | 0.0076 |
| A-3 | 15.135 | 108.849 | 0.596 | 1.012 | 0.757 | 14.953 | 173.941 | 82.114 | 82.177 | 0.0076 |
| A-3 | 16.053 | 108.857 | 0.604 | 1.028 | 0.758 | 15.614 | 184.494 | 83.182 | 83.245 | 0.0076 |
| A-3 | 16.923 | 108.864 | 0.611 | 1.045 | 0.758 | 16.198 | 194.492 | 83.573 | 83.636 | 0.0076 |
| A-3 | 18.081 | 108.873 | 0.620 | 1.067 | 0.758 | 16.951 | 207.804 | 83.909 | 83.972 | 0.0076 |
| A-3 | 19.277 | 108.882 | 0.629 | 1.089 | 0.758 | 17.708 | 221.546 | 84.244 | 84.308 | 0.0076 |
| A-3 | 20.512 | 108.891 | 0.638 | 1.111 | 0.759 | 18.468 | 235.734 | 84.580 | 84.644 | 0.0076 |
| A-3 | 21.183 | 108.896 | 0.643 | 1.121 | 0.762 | 18.893 | 243.446 | 85.587 | 85.651 | 0.0076 |
| A-3 | 22.767 | 108.907 | 0.654 | 1.148 | 0.763 | 19.837 | 261.658 | 86.090 | 86.154 | 0.0076 |
| A-3 | 24.409 | 108.918 | 0.665 | 1.174 | 0.765 | 20.787 | 280.521 | 86.594 | 86.658 | 0.0076 |

# Annex C – EA Product Data

[i] https://www.google.co.uk/maps
[ii] https://www.bgs.ac.uk/map-viewers/geoindex-onshore/
[iii] https://magic.defra.gov.uk/
[iv] https://flood-map-for-planning.service.gov.uk/
[v] https://check-long-term-flood-risk.service.gov.uk/postcode
[vi] https://environment.data.gov.uk/hydrology/climate-change-allowances/river-flow
[vii] https://wiltscouncil.maps.arcgis.com/apps/webappviewer/index.html?id=28c00215d87b468a9a0cd79c63d3d270

**From:** Wessex Enquiries <WessexEnquiries@environment-agency.gov.uk>
**Sent:** 04 November 2024 07:50
**To:** [redacted]@mabbett.eu>
**Subject:** 381197 WX 241016/SM07 FW: 317212 Lime Down Data Request

Dear [redacted]

Thank you for your enquiry below.

**RE: Request for information under the Freedom of Information Act 2000 (FOIA) / Environmental Information Regulations 2004 (EIR)**

We do not have any records or modelling of groundwater flooding in any of these areas but some of the groundwater monitoring bores (all located in the valleys) do go artesian.

Water level data for the nearby monitoring boreholes is attached.

- Hullavington 1
- Hullavington 2
- Foxley 1
- Foxley 2
- Sherston STW Prod NGR:
- Luckington 3 NGR: ST8336083140

There are no licensed groundwater abstractions in the areas given but there are licences down gradient as listed in the attached spreadsheet.

We do not have records of known contaminated sites but a list of closed pollution incidents is attached.

There are no licensed or historic landfills, or waste management licences in the areas given.

There are several Source Protection Zones in the areas given. Note the 'c' suffix denotes a confined SPZ for deep subsurface activity such as fracking or deep bores, so not applicable to surface activities.

- Lime Down A: SPZ2c and SPZ3
- Lime Down B: SPZ1c and SPZ2c and SPZ3
- Lime Down C1: SPZ2c and SPZ3

- Lime Down C2: SPZ2c and SPZ3
- Lime Down D: SPZ1c and SPZ2c and SPZ3
- Lime Down E1: SPZ1c and SPZ2c
- Lime Down E2: SPZ1c and SPZ2c

The aquifer designations in the areas given are,

- Alluvium – Secondary A Aquifer with Medium to High Vulnerability
- Forest Marble limestone member - Principal Aquifer with High Vulnerability
- Forest Marble mudstone member - Secondary A Aquifer with High Vulnerability
- Cornbrash - Secondary A Aquifer with High Vulnerability
- Kellaways Clay – Unproductive Strata

**Provision of FRA Product 4**

Thank you for your recent request to use Environment Agency flood data. The information is attached.

If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency Information for Flood Risk Assessments and our attached advisory text.
https://www.gov.uk/planning-applications-assessing-flood-risk
https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion

Further details about the Environment Agency information supplied and the permitted use of this information can be found on the GOV.UK website:
https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather
http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3

We respond to requests under the Freedom of Information Act 2000 (FOIA) and Environmental Information Regulations 2004 (EIR).

If you are not satisfied with our response to your request for information you can contact us within 2 calendar months to ask for our decision to be reviewed.

*We really value your thoughts on how we are doing and will always make changes where we can to improve our service. Please click on the link below and fill in our survey.*
http://www.smartsurvey.co.uk/s/EnvironmentAgencyCustomerSurvey/?a=DC *Thank you.*

Kind regards

[redacted]

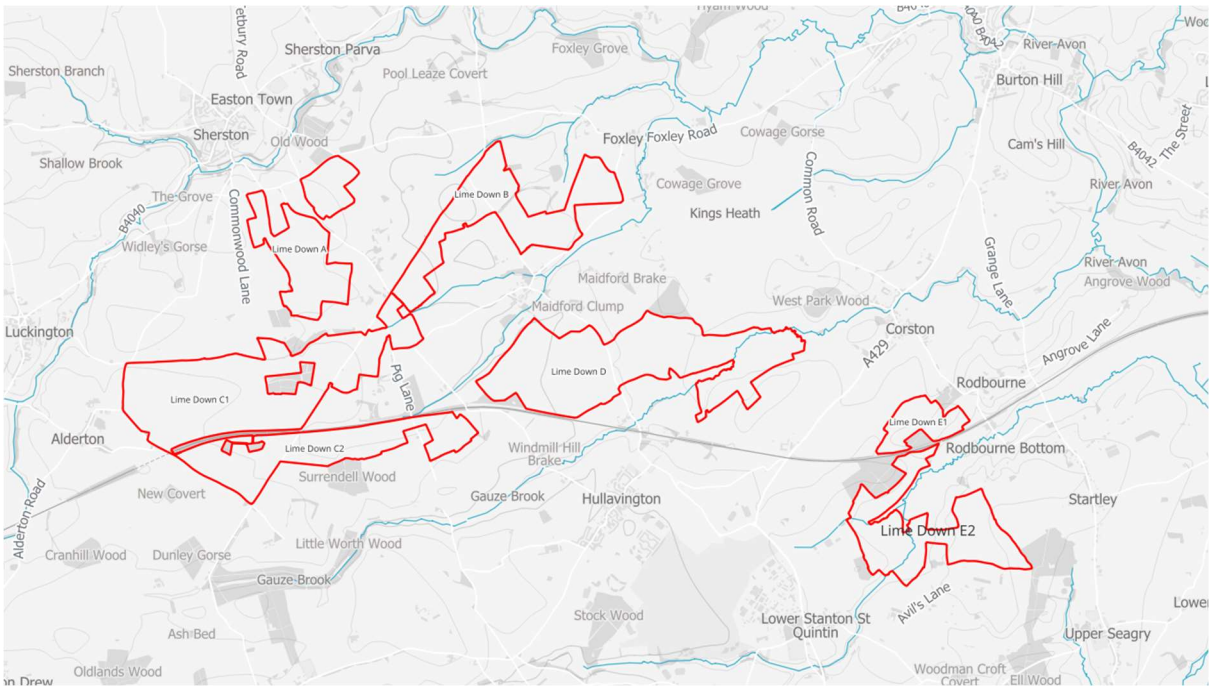
Environment Agency, Wessex Enquiries, Customer & Engagement Team

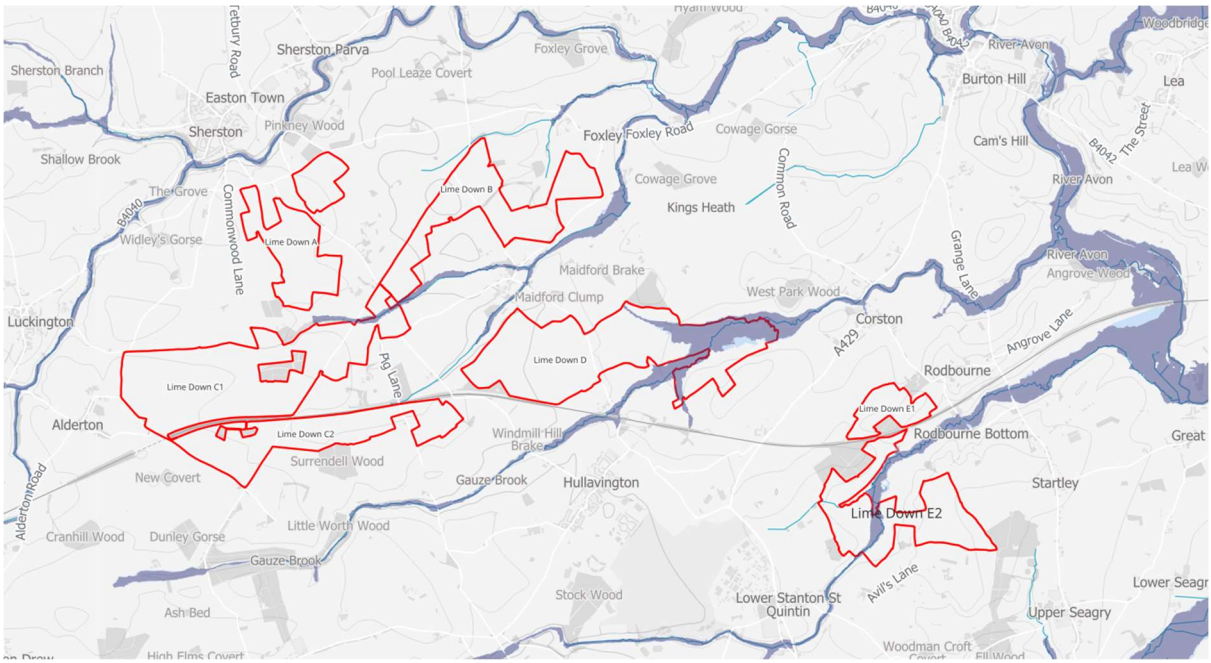
[redacted].- Wessex Enquiries

**From:** [redacted]@mabbett.eu>
**Sent:** 15 October 2024 14:01
**To:** Enquiries, Unit <enquiries@environment-agency.gov.uk>
**Subject:** 317212 Lime Down Data Request

To whom it may concern,

Mabbett & Associates Ltd have been instructed to undertake a Flood Risk Assessment and Drainage Strategy in support of a proposed solar site in Wiltshire, known as the site hereon. I attach a site location plan and the site details below. The site has been split into parcels which can be seen below (Lime Down A, B, C1, C2, D, E1 and E2).






According to the EA online Flood M Planning, the Site is shown to be located within Flood Zones 1, 2 and 3, however we would be grateful if you could provide **any nearby modelled flood level data** in order to inform our assessment of the Site.

It would therefore be useful if you are able to confirm/provide the followiap forng where available:

**Site Details**

| | |
|---|---|
| **Site Name** | Lime Down SOlar |
| **Address** | Lime Down A: SN16 0PU (NGR: 385982, 184814)<br>Lime Down B: SN16 0JS (NGR: 388179, 185419)<br>Lime Down C1: SN14 6NL (NGR: 385300, 183486)<br>Lime Down C2: SN16 0JZ (NGR: 386684, 182717)<br>Lime Down D: SN14 6EU (NGR: 389526, 183654)<br>Lime Down E1: SN16 0EX (NGR: 392655, 183066)<br>Lime Down E2: SN14 6DA (NGR: 393123, 181766) |

**Data Request**

Please provide any of the following information to enable us to complete our assessment:

**Historical Flooding Information**

· Any records, photographs, flood extents from known historic events in the area

**Technical Data**

· Any hydraulic models covering the site

· Raw and processed results for the model(s) above

- Hydraulic modelling report for the model(s) above
- Modelled floodplain levels and flows for node points within and in the immediate vicinity of the Site taking into account the most recent climate change allowances (where these have been modelled);

· Hydrology report and/or flood estimation calculation records for the model(s) above

· Survey data used to build the model or inform nearby studies

**Supporting Data**

- Flood/coastal defence survey data
- Operational procedures for hydraulic structures
- Section 19 flood investigation reports
- The date and type of modelling that flood levels have been derived from;
- The technical report summarising the modelling methodology;
- Confirmation that the data is appropriate/relevant to inform flood risk within the Site;
- Details of any flood defences within the vicinity of the Site (i.e type, crest levels, Standard of Protection, condition, etc) and any associated breach and/or overtopping flood extents and depths;
- Hazard mapping detailing the depth, velocity and associated hazard rating for the Site;
- Any information in relation to surface water flooding including confirmation is located within or outside of a Critical Drainage Area;
- Any information in relation to on-Site drainage;
- Any information in relation to groundwater flooding in the area. Where possible, please provide borehole locations and ground water levels;
- Details of sensitive aquifers and known contamination issues;
- Any information/mapping of historical flooding events on Site from all sources of flooding (i.e fluvial, tidal, surface water, groundwater, sewer, reservoir, canal, etc).

Where available please can you provide flood levels, estimated return periods, photographs and other such data that may be relevant to our assessment;

We trust this request is acceptable but please do not hesitate to contact us if you require any further information to assist with your response or wish to discuss the Site in further detail.

We look forward to hearing from you.

Thanks,

[redacted]

Consultant | Water Environment Team

Mobile: [redacted]

[redacted]@mabbett.eu www.mabbett.eu



**IOSH & IEMA Training Course Provider**

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creating a better place

Environment Agency

[redacted]
Mabbett
[redacted]@mabbett.eu

**Our ref:** 381197-WX
**Date:** 4th November 2024

Dear [redacted]

Thank you for your enquiry which was received on 15th October 2024. We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

**Abstract**

| | |
|---|---|
| Name | Product 4 |
| Description | Flood Risk Information for land at<br>**Lime Down**<br>NGR: ST9009082825 |
| Licence | Open Government Licence |
| Information Warnings | *The mapping of features provided as a background in this product is © Ordnance Survey. It is provided to give context to this product. The Open Government Licence does not apply.* |
| Attribution | Contains Environment Agency information © Environment Agency and/or database rights.<br><br>Contains Ordnance Survey data © Crown copyright 2023 Ordnance Survey *AC0000807064*. |

**Open Data**

The following Environment Agency published datasets are now available on the weblink below as part of the Government's 'Open Data' project and are available for you to download free of charge.

Environment Agency published datasets: https://data.gov.uk/data/search?publisher=environment-agency&unpublished=false

You will need to search and select the name of the following datasets to take you directly to the weblink to enable you to download the data:

- Flood Map for Planning (Rivers and the Sea) – Flood Zones 2 and 3
- Flood Map for Planning (Rivers and Sea) – Areas Benefiting from Defences
- Flood Map for Planning (Rivers and Sea) Spatial Flood Defences
- Flood Map for Planning (Rivers and Sea) Flood Storage Areas
- Recorded Flood Outlines
- Historic Flood Map
- Risk of Flooding from Surface Water Extent for:
  - → 3 percent annual chance
  - → 1 percent annual chance
  - → 0.5 percent annual chance

You can also access the Flood Map for Planning here: https://flood-map-for-planning.service.gov.uk/

You can also access the Risk of Flooding from Surface Water maps and Risk of Flooding from Reservoirs information here: https://flood-warning-information.service.gov.uk/long-term-flood-risk/map

**Recorded Historic Flood Events**

We no longer produce pdf copies of the Historic Flood Map. This information is available to search, select, and download free of charge as part of the Government's 'open data' as

- Recorded Flood Outlines
- the Historic Flood Map

Our historic records indicate that there was flooding in the area in **1925** (fluvial), **1932** (fluvial), **1954** (fluvial), **1979** (fluvial), **1999** (fluvial/unconfirmed source), **2007** (fluvial), **2009** (fluvial), **2012** (fluvial/unconfirmed source) and **2013** (fluvial).

Additionally, our historic records show a record of possible flooding pre 2012 for the area, however we are currently unable to confirm the date and source of this.

Please note - we cannot guarantee that this is an exhaustive list of all past flood events in this location. All reasonable care has been taken to ensure that the historical flood event data is as accurate as possible. The Environment Agency will update its records if new evidence emerges.

**Modelled Fluvial Water Levels**

We have not carried out any detailed fluvial flood risk modelling in this location.

The fluvial Flood Map in this area has been produced using our National Generalised Model (JFLOW). This modelling is fit for the purpose of the Flood Zones. However, it is not based on a specific channel survey. Neither water depths nor water levels were outputs specified when we commissioned this generalised modelling for the Flood Zones. Whilst the modelling process does provide some information on depth of water, it would have been possible to produce the flood extents without storing the water depth values, since water depth is only a 'by-product' of the calculation process. As this type of modelling was developed, tested and reviewed for production of the Flood Zone extents only, we have no information on the accuracy of the water depth data. Water depth or level outputs from this model are only suitable to be used for decision making at a broad catchment scale and is not fit for the purpose of a site-specific flood risk assessment.

For your information we have supplied maps showing the water depths derived from JFLOW for the 1% AEP (100yr) and 0.1% AEP (1000yr) fluvial modelled flood scenarios.

**Please note -** The Environment Agency is currently carrying out a project to update the National Generalised model (JFLOW). The New National Model outputs are expected in Spring 2025. Our published flood risk information for this area will be updated using outputs from the New National Model and this is expected to take place in late 2025 (current programme which may change). This will be carried out as part of the National project to update our National flood risk mapping and modelling information across England and will incorporate outputs from detailed local models together with updated National modelling.
New National Model Details.

The New National Modelling (NNM) is a set of models for rivers, surface water and the sea covering the whole of England. The NNM has been created to fill in gaps where we don't have local

hydraulic models, our local models require updating or we need additional model scenarios such as climate change runs.

**Please also note -** we are currently carrying out a National project to update our flood risk information for the whole of England. We will be updating our flood risk information in 2025 as part of the new National Flood Risk Assessment (NaFRA2). This will include the data displayed on the Check Your Long-Term Flood Risk service and the data displayed in the Flood Map for Planning (Rivers and Sea).

This should result in improvements to our mapping products, especially where we do not currently have any detailed local modelling. This means there will be some changes to our flood risk information in many areas when the new data is published.

You can find further information on the NaFRA2 project here: https://www.gov.uk/guidance/updates-to-national-flood-and-coastal-erosion-risk-information

For more information on climate change allowances please see the guidance on the Gov.UK website here: Flood risk assessments: climate change allowances - GOV.UK. **Please be aware that this information is subject to change, please check the guidance regularly.**

**Environmental Permit for Flood Risk Activities**

In addition to any other permission(s) that you may have already obtained e.g. planning permission, you may need an environmental permit for flood risk activities (formerly known as Flood Defence Consent prior to 06 April 2016) if you want to do work:

- in, under, over or near a main river (including where the river is in a culvert)
- on or near a flood defence on a main river
- in the flood plain of a main river
- on or near a sea defence

For further information and to check whether a permit is required please visit: https://www.gov.uk/guidance/flood-risk-activities-environmental-permits.

For any further advice, please email Blandford.frap@environment-agency.gov.uk.

**Ordinary Watercourse**

Some of the watercourses adjoining this site are classed as an “Ordinary Watercourse” not a “Main River” under our control. Works to ordinary watercourses may require consent from either the Lead Local Flood Authorities or the Local Drainage Board.

**Flood Asset Information**

Please find enclosed details of Flood Assets within the area. This information has been taken from our Asset Information Management System database (AIMS).

Please note that flood defences can increase water levels elsewhere eg through channels being restricted by defences, or because defences prevent flood water flowing back into the river channel.

**Planning**

If you have questions regarding the planning nature of your enquiry, or require advice on floor levels, please contact our Sustainable Places team on wx.sp@environment-agency.gov.uk. Please be aware that we now charge for planning advice when consulted on pre-application enquiries. This new approach provides advice to developers in two ways. Firstly, there is the provision of ‘free’

advice available to everyone where we give a preliminary opinion on a proposed development. This sets out the environmental constraints together with any issues this raises for us. Should you wish us to review in detail any of these issues then we can do this through a chargeable scheme aimed at recovering our costs.

**Strategic Flood Risk Assessment (SFRA)**

When preparing a FRA to support a development proposal in this location you should refer to Wiltshire Council's SFRA Reports Level 1 which is available to download via the following link: https://www.wiltshire.gov.uk/media/5691/Strategic-Flood-Risk-Assessment-Level-1/pdf/Wiltshire_Council_Level_1_SFRA_v5.0.pdf?m=637459765054370000

The Wiltshire Council Local Plan is available via this link: https://www.wiltshire.gov.uk/planning-policy-local-plan-review-consultation

**Further Information**

We advise that you also contact the drainage engineer/ flood risk management team at Wiltshire Council by email: drainage@wiltshire.gov.uk, or by phone: 0300 456 0105, based at: Bythesea Road, Trowbridge, Wiltshire, BA14 8JN, as they may be able to provide further advice with respect to localised flooding and drainage issues.

Further details about the Environment Agency information supplied can be found on our website: https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather

We hope you find this information helpful. It is provided subject to the attached notice 'Use of Environment Agency Information for Flood Risk Assessments', which we strongly recommend you read.

Yours sincerely

[redacted]

Customer & Engagement, Wessex
Rivers House, East Quay, Bridgwater, Somerset, TA6 4YS
Email: wessexenquiries@environment-agency.gov.uk

**Enc:** Use of Environment Agency Information for Flood Risk Assessments (below)
381197-WX 100yr JFLOW Depth Map (1%AEP)
381197-WX 1000yr JFLOW Depth Map (0.1%AEP)
381197-WX Defence Map
381197-WX Defence Data

## Use of Environment Agency Information for Flood Risk Assessments (FRAs)

**Important**
Use of Environment Agency data: you should note that

1. Information supplied by the Environment Agency may be used to assist in producing a Flood Risk Assessment (FRA) where one is required, but the use of Environment Agency information does not constitute such an assessment on its own.

2. As part of your data request, we have provided all of the modelled data we hold for your location. Please note that some of our modelled information may have been produced for purposes other than for flood zone generation. This may mean that some of the modelled data you have been provided with has a lower confidence level, and has not been used in producing our flood map, nor definitively reflects the predicted flood water level at the property/development site scale. To check the suitability of the use of this information in your FRA please contact your local Partnership & Strategic Overview (PSO) team.

3. This information covers flood risk from main rivers and the sea, and you will need to consider other potential sources of flooding, such as groundwater or surface water runoff. The information produced by the Local Planning Authority and the Lead Local Flood Authority (LLFA) may assist in assessing other sources of flood risk.

4. Where a planning application requires a FRA and this is not submitted or deficient, the Environment Agency may well raise an objection.

5. For more significant proposals in higher flood risk areas, we would be pleased to discuss details with you ahead of making any planning application, and you should also discuss the matter with your Local Planning Authority.

**Pre-Planning Advice from the Environment Agency**
If you have requested this information to help inform a development proposal, then we recommend that you undertake a formal pre-application enquiry using the form available from our website:

Pre-application Preliminary Opinion:
https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion

Pre-application Charged Service:
https://www.gov.uk/government/publications/planning-advice-environment-agency-standard-terms-and-conditions

Depending on the enquiry we may also provide advice on other issues related to our responsibilities, including flooding, waste, land contamination, water quality, biodiversity, navigation, pollution, water resources, foul drainage or Environmental Impact Assessment.

**Flood Risk Assessment (FRA) Guidance**
You should refer to the Planning Practice Guidance of the National Planning Policy Framework (NPPF) and the Environment Agency's Flood Risk Standing Advice for information about Flood Risk Assessment (FRA) for new development in the different Flood Zones. These documents can be accessed via:

National Planning Policy Framework Planning Practice Guidance:
http://planningguidance.planningportal.gov.uk/

Environment Agency advice on FRAs:

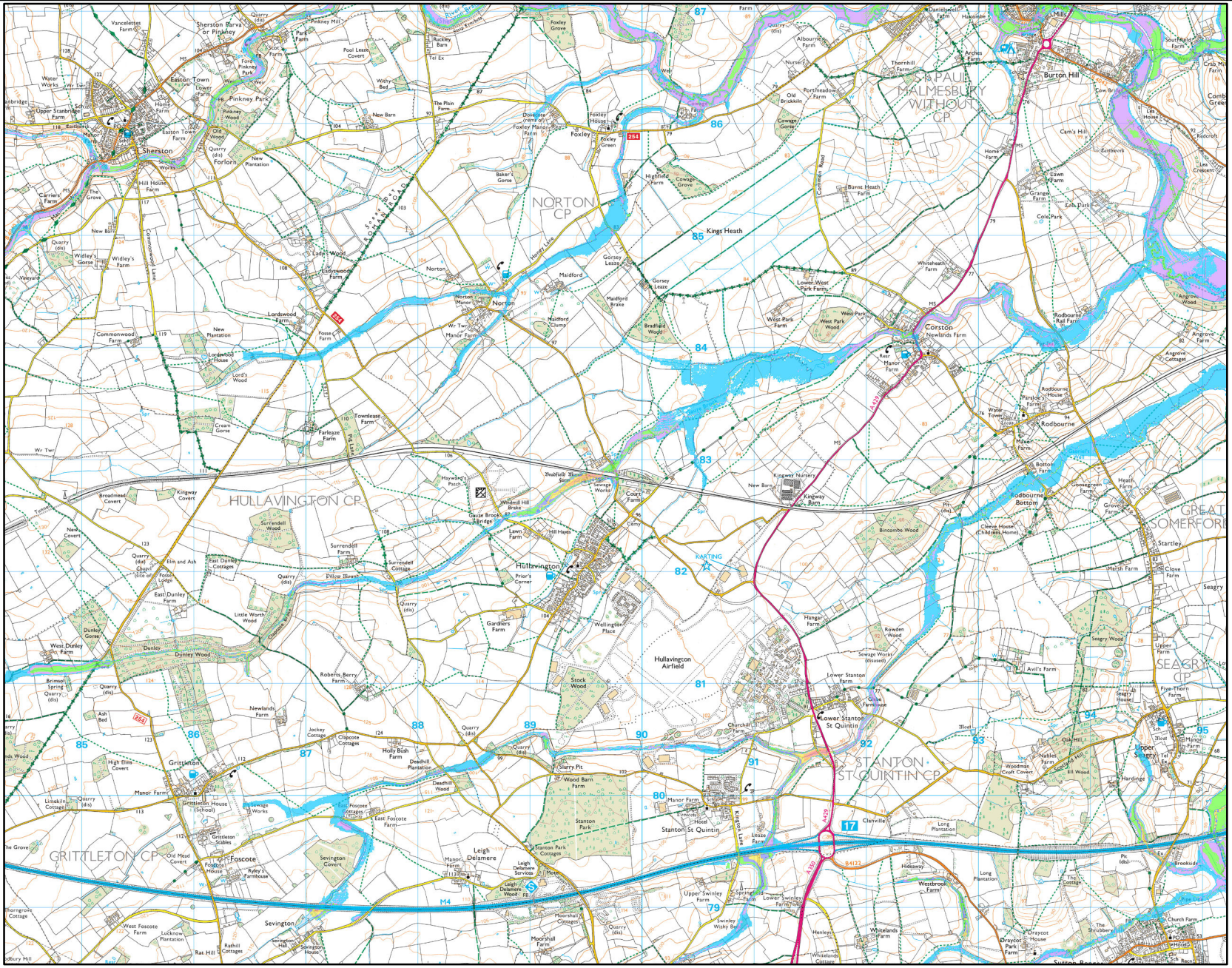
Customer & Engagement, Wessex
Rivers House, East Quay, Bridgwater, Somerset, TA6 4YS
Email: wessexenquiries@environment-agency.gov.uk
www.environment-agency.gov.uk

https://www.gov.uk/flood-risk-assessment-for-planning-applications#when-to-follow-standing-advice

https://www.gov.uk/government/publications/planning-applications-assessing-flood-risk

Customer & Engagement, Wessex
Rivers House, East Quay, Bridgwater, Somerset, TA6 4YS
Email: wessexenquiries@environment-agency.gov.uk
www.environment-agency.gov.uk

381197-WX - JFLOW Fluvial Water depths (m) Without Flood Defences. 100 year (1% AEP) centred on land at Lime Down [390090,182825].
Created 01.11.2024




Environment Agency

Scale 1:50,000

N W E S

**Legend**

**100yr JFLOW Depth**

**Metres**

- 0 - 0.5
- 0.500000000 - 1
- 1.000000001 - 2
- 2.000000001 - 3
- 3.000000001 - 4
- 4.000000001 - 5
- 5.000000001 - 10
- 10.00000001 - 100

Information Warning
We do not recommend the use of water depths/levels derived from JFLOW for site specific investigations such as Flood Risk Assessments.



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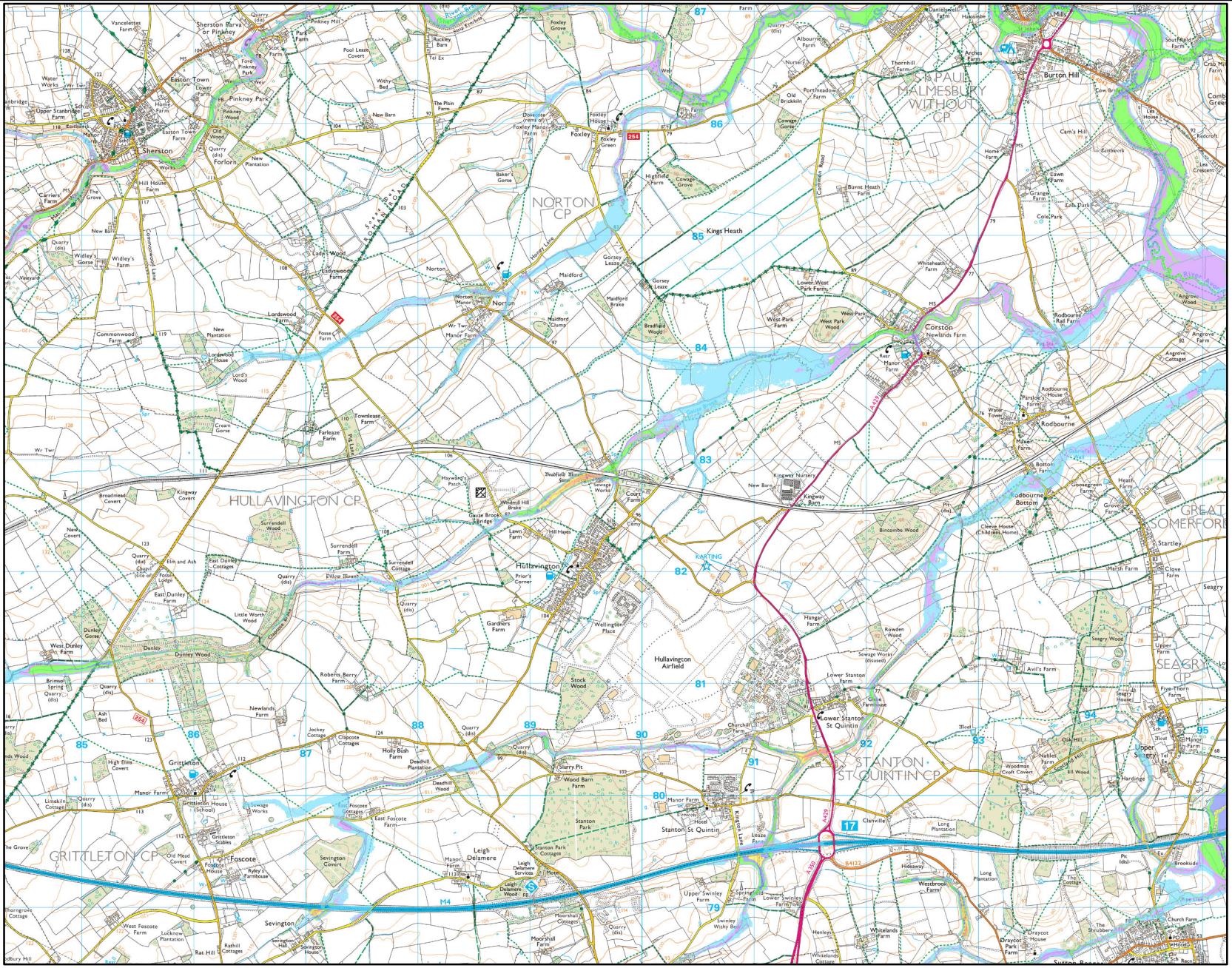
381197-WX - JFLOW Fluvial Water depths (m) Without Flood Defences. 1000 year (0.1% AEP) centred on land at Lime Down [390090,182825].
Created 01.11.2024




Environment Agency

Scale 1:50,000

N
W E
S

**Legend**

**1000yr JFLOW Depth**

**Metres**

- 0 - 0.5
- 0.500000000 - 1
- 1.000000001 - 2
- 2.000000001 - 3
- 3.000000001 - 4
- 4.000000001 - 5
- 5.000000001 - 10
- 10.00000001 - 100

Information Warning
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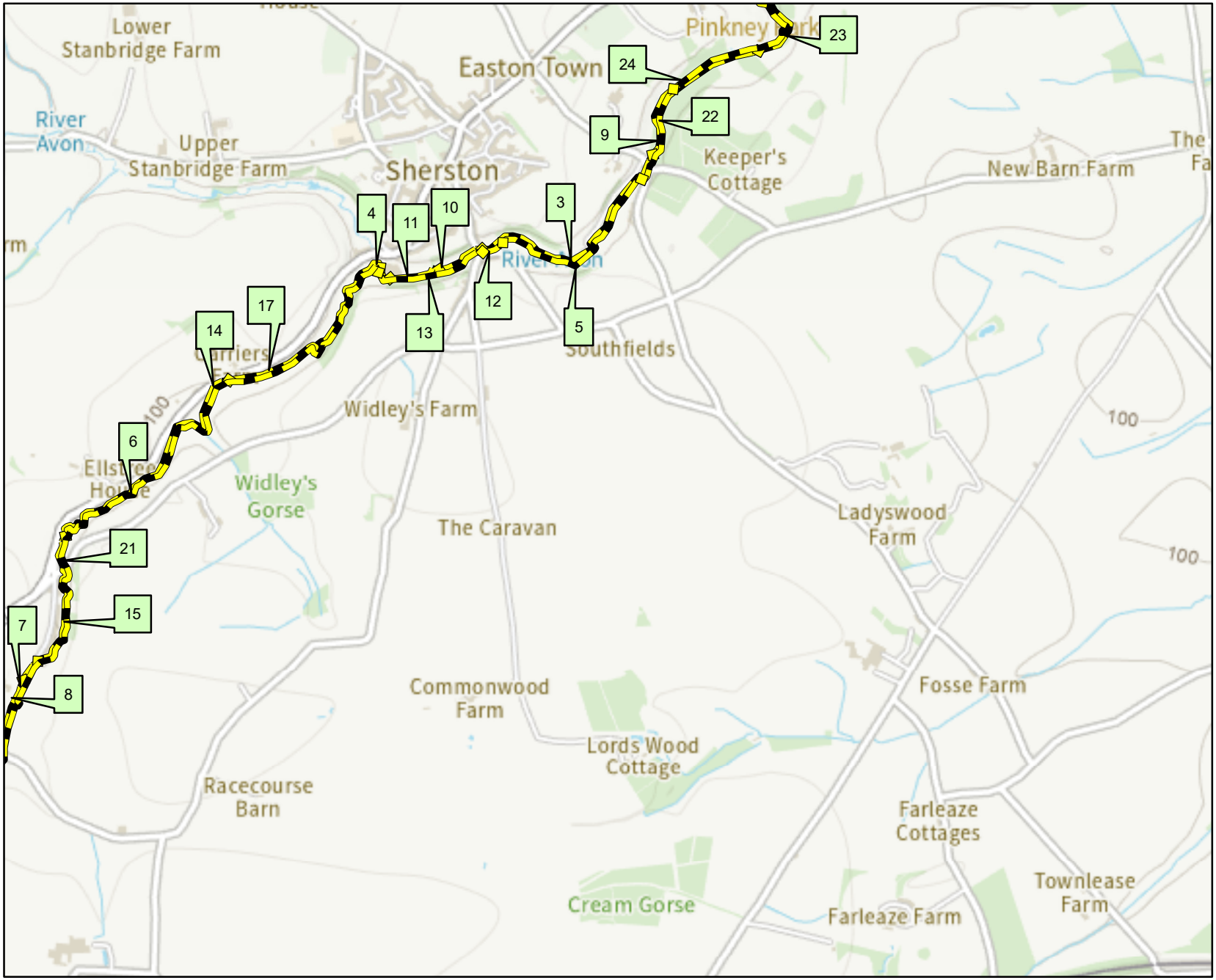
# Current Flood Defences centered on NGR ST 85982 84814 Created 22/10/2024 Ref: 381197-WX




Environment Agency

Scale: 1:20,000

N W E S

**Legend**

**Defences**

- Barrier Beach
- Beach
- Bridge Abutment
- Cliff
- Demountable Defence
- Dunes
- Embankment
- Engineered High Ground
- Flood Gate
- Natural High Ground
- Promenade
- Quay
- Spillway
- Wall

**This data has been extracted from the Asset Information Management System (AIMS OM) which was created to draw various data sources into one database and has been populated with information of varying quality.**



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**Product 4 - AIMS Information** **381197-WX** **Date:** **22/10/2024**

| Map Ref | Asset ID | Asset Type | Right or left bank | Asset Description | Approx length (m) | Actual fluvial downstream crest level (mAOD) | Actual fluvial downstream crest level accuracy | Actual fluvial upstream crest level (mAOD) | Actual fluvial upstream crest level accuracy | Actual fluvial coastal crest level (mAOD) | Actual fluvial coastal crest level accuracy | NGR | Most recent inspection | Overall condition |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 40115 | Natural High Ground | Left | Natural Bank | 878.51 | DNR | DNR | DNR | DNR | DNR | DNR | ST8592785717 | 07/04/2009 | 2 - Good |
| 4 | 40116 | Natural High Ground | Left | Stone wall | 63.60 | DNR | DNR | DNR | DNR | DNR | DNR | ST85158562 | 07/04/2009 | 2 - Good |
| 5 | 40419 | Natural High Ground | Right | Natural Bank | 714.43 | DNR | DNR | DNR | DNR | DNR | DNR | ST85898565 | 07/04/2009 | 2 - Good |
| 6 | 40420 | Natural High Ground | Left | Natural Bank | 959.72 | DNR | DNR | DNR | DNR | DNR | DNR | ST84218478 | 19/12/2007 | 3 - Fair |
| 7 | 4605 | Natural High Ground | Left | Natural channel with masonry retaining wall | 89.38 | DNR | DNR | DNR | DNR | DNR | DNR | ST8389484163 | 23/10/1996 | 3 - Fair |
| 8 | 4606 | Natural High Ground | Left | Natural Bank | 1229.01 | DNR | DNR | DNR | DNR | DNR | DNR | ST83618359 | 19/12/2007 | 3 - Fair |
| 9 | 4730 | Natural High Ground | Left | Natural Bank | 275.81 | DNR | DNR | DNR | DNR | DNR | DNR | ST8615986133 | 07/04/2009 | 3 - Fair |
| 10 | 4731 | Natural High Ground | Left | Natural channel with stone retaining wall | 181.67 | DNR | DNR | DNR | DNR | DNR | DNR | ST85438562 | 07/04/2009 | 2 - Good |
| 11 | 4849 | Natural High Ground | Left | Natural Bank | 189.57 | DNR | DNR | DNR | DNR | DNR | DNR | ST8525585581 | 07/04/2009 | 2 - Good |
| 12 | 4851 | Natural High Ground | Right | Stone Wall | 83.61 | DNR | DNR | DNR | DNR | DNR | DNR | ST85568567 | 07/04/2009 | 2 - Good |
| 13 | 4852 | Natural High Ground | Right | Natural Bank | 425.87 | DNR | DNR | DNR | DNR | DNR | DNR | ST85348558 | 07/04/2009 | 2 - Good |
| 14 | 4853 | Natural High Ground | Left | Natural channel with gabion retaining wall | 35.34 | DNR | DNR | DNR | DNR | DNR | DNR | ST8458185202 | 23/10/1996 | 2 - Good |
| 15 | 4854 | Natural High Ground | Left | Masonry Wall | 537.87 | DNR | DNR | DNR | DNR | DNR | DNR | ST84028445 | 23/10/1996 | 3 - Fair |
| 17 | 88456 | Natural High Ground | Left | Natural Bank | 825.00 | DNR | DNR | DNR | DNR | DNR | DNR | ST8491285333 | 19/12/2007 | 3 - Fair |
| 21 | 89868 | Natural High Ground | Right | Natural Bank | 3685.06 | DNR | DNR | DNR | DNR | DNR | DNR | ST8404084431 | 19/12/2007 | 3 - Fair |
| 22 | 98384 | Natural High Ground | Right | Natural Bank | 708.60 | DNR | DNR | DNR | DNR | DNR | DNR | ST8619186219 | 07/04/2009 | 3 - Fair |
| 23 | 98385 | Natural High Ground | Right | Natural channel with stone retaining wall | 561.70 | DNR | DNR | DNR | DNR | DNR | DNR | ST86538659 | 07/04/2009 | 3 - Fair |
| 24 | 98386 | Natural High Ground | Left | Natural channel with masonry retaining wall | 1001.16 | DNR | DNR | DNR | DNR | DNR | DNR | ST8650586598 | 07/04/2009 | 2 - Good |

**Notes**

* Overall Condition has been taken from the most recent inspection
* Inspections are of a purely visual nature and do not necessarily reflect the true condition of the asset
* Condition: 1 = very good, Condtion 2 = good, Condition 3 = fair, Condition 4 = poor, Condition 5 = very poor
* Crest level accuracy: 1 = ± 0.01 to 0.05m, 2 = ± 0.05 to 0.15m, 3 = ± 0.15 to 0.75m, 4 = ± 0.75 or greater
* DNR = data not recorded