10 WATER ENVIRONMENT

10.1 Introduction

10.1.1 This chapter of the Environmental Statement (ES) identifies and assesses effects of the development proposals upon the local water environment during construction and operation. This includes consideration of surface and groundwater, qualitative and quantitative effects and water resources used to supply the development.

10.1.2 This chapter has been prepared by SYSTRA as has the supporting Flood Risk Assessment and Drainage Strategy report (Appendix 10.1). That, in turn, has been informed by river modelling of the Usworth Burn and River Don (JBA Consulting) and detailed design of the scheme drainage (RPS).

10.1.3 The proposed development is described in Chapter 1 and Chapter 3 of this ES.

10.1.4 In terms of the water environment itself, the main features are as follows.

- Usworth Burn: a minor watercourse that originates in south Washington west of the site and which flows past the northern edge of the proposed development to a confluence with the River Don nearby, upstream of Hylton Bridge. Designated as 'main river'. Eventually discharges to the River Tyne.
- Hylton Dene Burn: a minor watercourse that passes through Hylton east of the A19 and which eventually outfalls into the River Wear. Part of the site and land to the east form part of the headwaters of this watercourse.
- Field ditches and land drains serving the former farmland on and near by the proposed development. Classed as 'ordinary watercourses'.
- IAMP surface drainage system, serving that project immediately east of AESC UK Plant 3 and includes the surface drainage from Plant 2. This system ultimately flows into the headwaters of Hylton Dene Burn east of the A19 via a culvert alongside Washington Road and the Nissan factory's northern edge.
- Such shallow groundwater as may be present onsite is considered to be perched and confined within granular layers or lenses contained within the superficial soil and dislocated from other similar features.

10.1.5 The local water table beneath the site is heavily constrained by the ground conditions which are poorly permeable and not amenable to a free flow of groundwater near the surface. The typical soil profile onsite is that of glacial till and/or Pelaw clay underlying the topsoil, with mudstones and sandstones forming the bedrock. Consideration of

groundwater impacts for this proposed development relate only to the shallow water table in the near-surface soil. The characteristics of the ground and the constraints imposed on groundwater movement as a result are considered to negate the need to consider the other aspects of the water environment in this Environmental Statement.

10.2 Policy and Legislation

Background

10.2.1 Much of the current environmental policy and legislative framework in England has derived from EU practices and sources, the principal example of which has been the Water Framework Directive. The UK's withdrawal from the EU has been managed thus far mainly by the Environment (EU Exit) Regulations 2019 which took effect upon departure, though more recent actions by government to reduce the extent to which historical EU-derived legislation remains in statute risks removing some environmental legislation and the associated protections of the water environment.

Water Framework Directive

10.2.2 The Water Framework Directive (WFD) Directive 2000/60/EC is a European Parliament directive designed to improve and integrate the way water, from all sources, is managed throughout Europe. In the UK, much of the implementation work was intended to be undertaken by competent authorities such as the Environment Agency (EA) and Local Authorities. It came into force in 2000 and was transposed into UK law in 2003. This was revisited further in 2017 under the Water Environment (WFD) (England & Wales) Regulations of that year.

10.2.3 Member States were originally required to achieve good chemical and ecological status for inland and coastal waters by 2015 though that date has since been deferred.

10.2.4 An associated 'daughter directive', Directive 2006/118/EC (the Groundwater Daughter Directive) came into force in 2006, intended to protect groundwater against pollution and deterioration.

National Planning Policy Framework / Planning Practice Guidance

10.2.5 The NPPF was implemented in 2012, last updated in December 2023. Its chief role in drainage and flood-risk terms was to carry on the principles set out in PPS25 Development and Flood Risk - which it superseded - at national, regional, strategic and local levels. The purpose was to ensure that development-planning decisions were made in a manner that delivered sustainable development in terms of flood-risk and

drainage management.

10.2.6 The broad aim of NPPF was to minimise the number of people and properties at risk from flooding. To achieve this aim, planning authorities were required to ensure that flood-risk both affecting and generated by a particular project was properly assessed and addressed during the planning and design stages.

10.2.7 The Planning Practice Guidance (PPG) replaced the Technical Guidance to the NPPF in 2014. This provided additional guidance to local planning authorities to ensure effective implementation of the NPPF policies concerning development in areas at risk of flooding. It reinforced the sequential approach to assessing development in areas at risk of flooding in order to direct vulnerable development away from areas at highest risk. Where development was necessary, the approach taken was to deliver flood resilience of a project without increasing flood risk elsewhere.

The Flood and Water Management Act (FWMA) 2010

10.2.8 This Act set out how flood and coastal risk management in England and Wales were to be managed and, amongst other provisions, created a formal framework for design and adoption of sustainable drainage systems (SuDS), which had not hitherto existed. However some parts of the Act still remain to be implemented which affect the site and the main element of those parts is the section introducing new SuDS design and adoption arrangements.

10.2.9 Key intentions of the Act with regard to this scheme are summarised below:

- Clarify responsibilities for managing all sources of flood-risk;
- Encourage more sustainable forms of drainage in new developments through new arrangements for adoption and future operation of such features.

10.2.10 The other main legacy of this Act was the creation of the Lead Local Flood Authority role, assigned to the upper tier local authority and given responsibility for oversight of 'ordinary watercourses' and general flood management role through the planning process as a statutory consultee. In this instance, the LLFA role is undertaken by Sunderland City Council (SCC).

Local Policy: Sunderland Core Strategy and Development Plan 2015-2033

10.2.11 The Sunderland Core Strategy & Development Plan (CSDP) was adopted in January 2020. In relation to flood-risk, the CSDP's strategic priority 9 is: "*To adapt to and minimise the impact of climate change by … … seeking to reduce the risk/impact of*

flooding."

10.2.12 In terms of drainage design and management, the CSDP's Policy NE1 *Green and blue infrastructure* promotes the Green Infrastructure Network with multifunctional green and blue spaces that are to be well connected to each other and the wider countryside. Requirements for developments to achieve this include:

- Applying climate change mitigation and adaptation measures, including flood risk and watercourse management.
- Incorporating and/or enhancing formal and natural greenspace and blue space provision.
- The protection, enhancement and restoration of watercourses, ponds, lakes, and water-dependent habitats.

10.1.1 The CSDP's Policy WWE3 *Water management* relates to flood risk (onsite and offsite) and sets out requirements for developments to comply with in order to manage the risk of flooding to or from such projects. These can be summarised as:

- Provision of a Flood Risk Assessment (FRA).
- Demonstrating that they pass the sequential test (and - if relevant - an exceptions test).
- Meeting specific greenfield runoff rates for surface water drainage.
- Incorporating Sustainable Drainage Systems (SuDS) to manage surface water drainage for both qualitative and quantitative performance, including arrangements for whole-life management and maintenance.
- Identifying where and how surface runoff is to be discharged.
- Ensuring adequate protection against surface flooding.
- Incorporating allowances for climate change in accordance with current national guidance.
- Making any necessary developer contribution to drainage infrastructure.
- Demonstrating control of surface water runoff during construction and operation, in addition to the management of water generally.
- Not adversely impacting on aquifers or groundwater protection zones and improving water quality where possible.

10.1.2 Policy WWE4 *Water quality* sets out the means by which the quantity and quality of

surface and groundwater bodies and bathing water are to be protected and, where possible, enhanced in accordance with the Northumbria River Basin Management Plan. This includes the incorporation of appropriate water pollution control measures within SuDS elements and in particular within infiltration SuDS components.

10.1.3 Policy WWE5 relates to the disposal of foul water and identifies the hierarchy to be applied to foul drainage, as well as any disposal of trade effluent.

10.3 Consultation & Scope of Assessment

Related parties

10.3.1 The key roles for flood-risk and drainage in relation to the water environment components associated with this scheme are as follows.

- Usworth Burn: main river. Environment Agency
- Surface drainage via IAMP drainage: IAMP LLP and SCC
- Groundwater: Environment Agency
- Foul drainage: Northumbrian Water Ltd (NWL)

10.3.2 The scheme's proximity to the IAMP project which abuts it to the east meant that the consultations for this specific project drew heavily upon the guidance and comments provided by the relevant parties listed above for IAMP. The main step taken to update baseline information was the commissioning of an update to the hydraulic model of Usworth Burn and the River Don by JBA Consulting in order to align the modelled return periods and climate-change allowances with current guidance, those allowances having been adjusted since the original modelling work was done.

10.4 Assessment Methodology and Significance Criteria

10.4.1 The following issues have been considered within this chapter.

- Flood risk.
- Surface and foul drainage.
- Water quality.
- Water resources.

10.4.2 The assessment methodology of these issues has primarily been a desk-study to collate relevant information and applying appropriate analytical methods to predict the impact of the Project. Details of the specific assessment methodology and significance criteria for each issue stated above are given below.

10.4.3 The key assessment criteria will relate firstly to likelihood of Occurrence, then Impact and Sensitivity.

10.4.4 Results from this work have been used to inform the baseline and the assessment of impacts associated with the proposed works hence are incorporated within the 'Baseline Conditions' and 'Potential Effects and Assessment of Effects' sections as appropriate.

Flood risk

10.4.5 The assessment methodology for the impact of flood-risk is based on the NPPF-compliant FRA prepared for the Project. This document identifies and quantifies the risk from various sources of flood-risk to the site and the surrounding area. It also addresses how the Project will impact on the surrounding environment during construction and once completed. This assessment has drawn on flood-risk information provided by the EA and the LLFA through direct consultation, information in publicly available reference documents and on evaluation of the site itself.

10.4.6 The FRA has addressed the following primary potential sources of flooding affecting the site and the surrounding area:

- Fluvial
- Pluvial
- Drainage

10.4.7 Groundwater flooding was also considered in the FRA but concluded as being of no material risk to the site or development and this source is not considered further in this chapter.

10.4.8 A summary of the significance criteria used to assess the flood-risk impact is given in Table 10.1.

TABLE 10.1: FLOOD-RISK IMPACT SIGNIFICANCE CRITERIA

Impact significance	Fluvial	Sewers	Groundwater	Pluvial
Substantial	Change of risk resulting in a change of more than one Flood Zone e.g. Zone 1 – 3 or 3 – 1.	Significant change of instances of sewer flooding.	Significant change in groundwater levels affecting the whole annual variation.	Significant change in surface water runoff.
Moderate	Change of risk resulting in a change	Moderate change of	Significant change in groundwater levels	Moderate change in

	of a single Flood Zone.	instances of sewer flooding.	affecting maximum levels only.	surface water runoff.
Minor	Change in risk of insufficient magnitude to change the Flood Zone.	Small change in instances of sewer flooding.	Minor change in groundwater levels with annual variation left largely unchanged.	Small change in surface water runoff.
Negligible	No change in flood-risk.	No change in flood-risk.	No change in groundwater levels	Surface runoff unchanged.

Foul and surface drainage

10.4.9 NWL has been consulted regarding the impact of the Project upon the local foul water sewerage system. The impact upon the Washington Wastewater Treatment Works (WwTW) which handles the sewage from the IAMP project and will do so for this development has also been considered.

10.4.10 The EA and LLFA have been consulted regarding the surface water drainage strategy. The FRA & DS report provides details of the existing conditions and the proposed drainage strategy from which the likely impact on the local surface water sewerage system can be assessed, where relevant. NWL has not been consulted on this topic as the surface drainage from the proposed development will discharge to the Usworth Burn or to the IAMP drainage system and in either case will remain outside of NWL's responsibility.

10.4.11 A summary of the significance criteria used to assess the impact on the local foul and surface water sewerage systems is given in Table 10.2.

TABLE 10.2: FOUL & SURFACE DRAINAGE IMPACT SIGNIFICANCE CRITERIA	
Impact significance	**Foul and surface water sewerage**
Substantial	System requires large-scale works over a large geographical area to operate within recognised standards.
Moderate	System requires localised works to operate within recognised standards.
Minor	Change in system behaviour not requiring any works to accommodate.
Negligible	No changes needed to existing system.

Water Quality

10.4.12 The assessment of the likely impact of the Project on water quality considers the impact on both watercourses and groundwater.

10.4.13 The land drains naturally to either the Usworth Burn or eastwards towards the IAMP

project and (eventually) the Hylton Dene Burn. The land is relatively impermeable with slow infiltration of rainfall.

10.4.14 The assessment of the likely impact of the Project on water quality will be qualitative. Details of the corresponding impact significance criteria are given in Table 10.3.

TABLE 10.3: WATER QUALITY IMPACT SIGNIFICANCE CRITERIA		
Impact significance	**Watercourses**	**Groundwater**
Substantial	Change in both biological and chemical water quality.	Change in both chemical and quantitative water quality.
Moderate	Change in either biological or chemical water quality.	Change in either chemical or quantitative water quality.
Minor	Minor change in water quality.	Minor change in water quality.
Negligible	No change in quality.	No change in quality.

Water Supply

10.4.15 The region is supplied by NWL. The impact significance criteria to be used for the water supply assessment are given in Table 10.4.

TABLE 10.4: WATER SUPPLY IMPACT SIGNIFICANCE CRITERIA	
Impact significance	**Water supply**
Substantial	Large change in demand requiring large-scale works to accommodate.
Moderate	Change in demand sufficient to require local works on the water supply system.
Minor	Minor change in demand, not requiring works on the existing supply system.
Negligible	No change in demand.

10.4.16 Impacts that are classed as moderate or substantial are considered to be 'significant'. Impacts that are minor or negligible are considered to be 'not significant'.

10.5 Limitations of study

10.5.1 This assessment has been carried out using available on-line resources to supplement such intrusive site investigations, surveys or design works as have been carried out.

10.6 Baseline Conditions

Flood Risk - fluvial

10.6.1 The proposed development lies directly south of the Usworth Burn which flows eastwards and northwards towards its confluence with the River Don before reaching Hylton Bridge. A detailed hydraulic model of the Burn and River was compiled in 2016

to identify in detail the associated floodplain associated with the IAMP project and the IAMP LLP has permitted use of that model for the flood risk assessment for this scheme.

10.6.2 The model has been revisited in relation to this scheme. The primary reason for doing so was to update the climate-change allowances used for the design flood extents work since those figures have been updated since the original work was done.

10.6.3 The site is located within the Northumbria River Basin but is itself split between two local catchments. The majority of the site drains into the Usworth Burn and eventually the River Tyne. The remainder feeds into the headwaters of the Hylton Dene Burn and through to the River Wear.

10.6.4 Future rainfall patterns over the lifetime of this development are currently predicted to grow more intense, increasing runoff and the associated flood behaviour. The original river model used allowances of 20% and 50% for the 'central' and 'upper end' conditions respectively under the prevailing guidance of the time. The current guidance relates to the Tyne Management Catchment and identifies the 'central' and 'higher central' allowances to be the relevant figures, subject to the vulnerability definition of the proposed development. The corresponding allowance values are 34% and 42% respectively. The presence of certain hazardous materials to be used in the battery manufacturing process mean that the proposed development is classed as 'highly vulnerable'. The 'central' climate-change allowance is the corresponding value to be used in the flood risk assessment process and scheme design.

10.6.5 The model shows that, south of the Burn, flooding spreads towards North Moor Farm, occupying lower ground between the proposed development and the Farm. The proposed development is located on higher ground and lies outside Flood Zone 3 (the area up to the design flood condition of a 1% annual event probability flood and the corresponding climate-change allowance). The development platform, where higher than existing ground, is to be supported by a retaining wall so as to limit the extent of supporting earthworks and, inter alia, avoid any conflict with the design flood extents. The eastern end of the access road falls partly within Flood Zone 2. The majority of the site and all of the proposed development buildings (AESC Plant 3 and the associated warehouse) sit within Flood Zone 1, the area of lowest risk.

Flood Risk – Surface

10.6.6 The site is currently undeveloped other than the North Moor Farm complex. The land

is poorly permeable and surface ponding in low spots during or after prolonged wet weather is a common occurrence. The ground conditions onsite typically comprise a subsoil of glacial till and/or (Pelaw) clay overlying a bedrock of mudstones or sandstones.

10.6.7 The indicative surface-flood mapping from the EA's website shows a substantial area at high risk of surface flooding on the low ground north and east of the farm but away from the proposed development. A corridor of low-risk surface flooding follows the proposed access route towards International Drive, in the same manner as the fluvial Flood Zone 2 pattern.

10.6.8 The future rainfall patterns are predicted to change in the same way as noted above for river flooding. In terms of rainfall, this translates into a future increase in rainfall intensity of up to 45% above current values.

10.6.9 The AESC Plant 2 is currently under construction to the east of the proposed development. This will create a substantial built and paved area that will generate considerable volumes of runoff. This will be managed by provision of a new surface drainage system to capture and manage runoff to the required standard. There is a slight fall from west to east on the existing ground and the Plant 2 development platform is slightly lower (FFL 39.0).

10.6.10 Any overland flow originating in the Nissan complex south of the A1290 will either be intercepted by the A1290 and its drainage if flows head north towards the site or will flow away from the site in any other direction. In either case, no significant source of surface flow originating outside the site that might threaten the site itself is considered to be present.

10.6.11 The site is otherwise at no significant risk of surface flooding.

Flood Risk – Drainage

10.6.12 The only formal property drainage within the proposed development extent is that associated with the North Moor Farm complex. There is no associated risk of flooding to the wider development site as the quantity of water involved from that drainage would be minimal in comparison to the site size. Any such overflow would drain following the natural terrain topography into one or other of the local land drains or field ditches and would pose little or no risk to the proposed development site.

Surface and Foul Drainage

10.6.13 The only formal property drainage within the proposed development extent is that associated with the North Moor Farm complex which plainly is wholly inadequate to act as a viable drainage outlet for the proposed development. The land otherwise relies for surface drainage upon the land drain channels or field ditches to convey water away from the site, feeding principally northwards into Usworth Burn or southwards into a roadside ditch alongside the A1290.

10.6.14 The south-eastern corner of the proposed development drains naturally eastwards and historically would be part of the catchment of the culvert alongside Washington Road leading eastwards toward the A19 and the headwaters of Hylton Dene Burn. The ongoing construction of AESC UK Plant 2 is re-working the intervening area and until the proposed development is completed then part of the site will be diverted to discharge temporarily into a system that outfalls into Usworth Burn.

10.6.15 The foul drainage needs of the Farm are believed to have been met by septic tank or by cess tank: there is no historical nearby sewer system to which the Farm could have been connected. The recent construction of the first phase of the IAMP project has included a new foul sewer system leading to a sewage pumping station situated off International Drive to the north-east of the proposed development but this has been sized only to serve the IAMP project. It transfers flow westwards alongside the A1290 to discharge to a large combined sewer just short of Washington. At present four parcels on IAMP have been or are being constructed and two further parcels are planned to accommodate sub-stations and other power management equipment. The other remaining parcel has not yet been taken up for development.

Water Quality

10.6.16 Neither the Usworth Burn nor the Hylton Dene Burn constitute a water framework surface water body in their own right. Instead – and in the absence of any detailed information upon their characteristics – they are assumed to be of good qualitative character until shown otherwise.

10.6.17 The Usworth Burn originates in north Washington and initially passes through an urban area before the farmland east of the town. Diffuse highway and agricultural pollution are highly likely to compromise the water quality in the Burn. The Hylton Dene Burn has a similar background but with the farmland prior to the urban area in the sequence of surroundings.

10.6.18 South Tyneside Council commissioned a study in 2017 to look at opportunities for a

catchment-wide integrated management approach. This found that the Don was classified as a Heavily Modified Waterbody and was failing under the WFD as a consequence of its overall ecological status. Water quality was classed as Moderate Status due to high levels of ammonia and phosphate from both diffuse and point sources from farmland, consented intermittent discharges, potential misconnections into surface water drains and areas of contaminated land. The study did not look directly at Usworth Burn but it is very similar to the Don in character and would therefore have shared most if not all of those characteristics.

10.6.19 The ES for the AESC Plant 2 (Wardell Armstrong, 2021) recorded that the "*… River Don, from source to tidal limit surface water catchment, has an overall water catchment classification of Moderate, a chemical classification of Good and an ecological classification of Moderate.*" This is understood to have been based upon results from a sampling point near the Wardley Coal Disposal Point. This location precedes the area of farmland between Washington and the A19 and it is therefore possible that diffuse agricultural pollution would degrade the river's quality downstream at the proposed development's location. The channels of both the Don and the Usworth Burn have been historically overdeepened along the reach passing the site – presumably for land drainage purposes to aid farming.

10.6.20 The initial assumption of 'good quality unless shown otherwise' has therefore been revised to consider the Usworth Burn as being of Moderate quality overall.

10.6.21 Given the similarities in catchment with the Don and the Usworth Burn, the same quality conditions are likely to apply to the headwaters of the Hylton Dene Burn.

10.6.22 No discrete information is available for shallow groundwater within the superficial layers at the site. It is, therefore, assumed that the near-surface groundwater quality is similar to that of the surface water. Any deeper groundwater is less likely to be affected due to the limited permeability preventing quick movement of water-borne contamination.

Water Supply

10.6.23 The only property present within the site limits is the vacant farmstead of North Moor Farm. The only other nearby demand points are those of the Hylton farmsteads and homes and of the already-occupied development parcels on IAMP Phase One. Further out from the site, the Nissan complex and the urban areas to east (Hylton) and west (Washington) are served by their respective distribution networks.

10.6.24 The current demand for water supply within the scheme limits is very small and well within the capacity of the existing local water supply network.

10.7 Identification of Potential Effects

10.7.1 This section omits consideration of cumulative effects associated with other proposed or committed developments nearby, other than the AESC Plant 2 abutting this site. Such effects are considered towards the end of this chapter.

10.7.2 The receptors and sources of each aspect are listed and the significance and direction (adverse/beneficial) of each effect is recorded in this section, based upon Tables 10.1 to 10.4.

Flood Risk

10.7.3 The key receptors and sources of flood risk for this aspect of the water environment are as follows together with the sensitivity of each item within ( ):

- The Usworth Burn and River Don (medium)
- Field ditches & land drains (low)
- The proposed AESC Plant 3 (high)
- The under-construction AESC Plant 2 (high)

10.7.4 The nearby small river and tributary (the River Don and Usworth Burn respectively) are the most significant source of flooding to the development site due to the proximity of the Burn to the site's north side and to the size of the watercourses compared to the field ditch network.

10.7.5 Conversely the Burn is a receptor of flood risk created by the proposed development through uncontrolled runoff from newly-created built and paved surfaces reaching the river and worsening flooding away from the site. There are urban areas downstream on the Don that would be vulnerable to such effects.

10.7.6 The Hylton Dene Burn and its headwaters have been omitted from this list for two main reasons. Firstly the Burn proper is some distance from the site and will not directly affect it. Secondly the physical constraint of the drainage systems linking the site to the Burn will gradually attenuate or disperse any increase in runoff via those systems whereas the Usworth Burn is more directly linked to the site.

10.7.7 The field drain network poses a lesser risk due chiefly to the smaller size of the channels involved. This limits the extent to which these features can give rise to or be

affected by flooding.

10.7.8 The two developments, one under construction and one proposed, are rated as highly sensitive due to the nature of their purpose and to their scale in the local landscape.

10.7.9 The overall fluvial flood risk associated with the proposed development is rated at between **Minor to Moderate Adverse**.

10.7.10 The site is located on poorly draining soil due to the presence of glacial till and clay beneath the topsoil. The land is known to become saturated and water to pond on the surface in prolonged or intense rainfall. The absence of any significant built assets within the site would normally mean that the site was not under any significant risk of surface flooding.

10.7.11 The proximity of the AESC Plant 2, currently under construction immediately east of the proposed development, presents a potential risk of surface flooding to the proposed development due to the parity in levels between the two. The new Plant 2 will include a new surface drainage system able to capture and manage runoff from that scheme up to and including the required design standard. This limits the risk of surface flooding from Plant 2 affecting Plant 3.

10.7.12 The creation of large new built and paved areas for Plant 3 will generate significant increases in runoff from the proposed development and raise the potential for surface flooding onsite as well as affecting neighbouring development, if not adequately controlled.

10.7.13 The potential surface flooding impact from the development upon the existing site and surroundings is rated at **Minor to Moderate Adverse**.

Surface and Foul Drainage

10.7.14 The key receptors and sources of flood risk for this aspect of the water environment are as follows. The sensitivity of each item is listed in ():

- The existing storm and foul sewerage on IAMP ONE (low)
- The wider trunk NWL sewerage and WwTW (low)
- The proposed AESC Plant 3 (high)

10.7.15 There is no storm drainage system of note on the site at present. The storm sewer system for IAMP ONE which serves part of the neighbouring Plant 2 has a small portion of capacity reserved for part of the site. This system will not be adversely affected provided that the design adheres to the apportionment of area and flow so assigned.

The potential impact upon existing storm drainage is rated as **Minor Adverse**.

10.7.16 There is no foul drainage system of note on the site at present and the foul sewer system for IAMP ONE was never designed to accommodate this development. The IAMP ONE system relies upon a sewage PS to transfer the flows off-site to the nearest public sewer capable of accommodating the IAMP flows. Parts of the foul sewer network will be operating close to their capacity with the IAMP flows and would be overloaded if additional flows were added to the network.

10.7.17 The proposed development's potential impact upon existing foul drainage is rated as **Moderate Adverse.**

Water Quality

10.7.18 The key receptors and sources of flood risk for this aspect of the water environment are as follows. The sensitivity of each item is listed in ():

- Usworth Burn and River Don (moderate)
- The existing storm and foul sewerage on IAMP ONE (low)
- The wider trunk NWL sewerage and WwTW (low)
- The proposed AESC Plant 3 (high)

10.7.19 Runoff from the existing site is potentially contaminated by diffuse agricultural pollution from fertilisers, pesticides and other agri-chemicals as may be deployed whilst the site is still farmed. Urban runoff feeding the headwaters of Usworth Burn will add to that contamination and this is reflected in the quality of the River Don nearby as described in Section 10.7, which conditions are believed to apply to the Burn as well given the commonality of their catchments upstream.

10.7.20 The development runoff will come mainly from roof runoff, which is comparatively clean, or from road and parking runoff where diffuse highway pollution will compromise the water quality. Materials deliveries pose a significant risk of pollution in the event of spillages due to the hazardous nature of some of those.

10.7.21 The surface water features on or adjacent to the site are most at risk: the new scheme drainage could be contaminated by chemical spillage washed into the drainage or by fire-fighting runoff. If not contained, this contamination would be flushed down-stream into the receiving waters (principally Usworth Burn and the River Don). The West Farm Meadow SSSI borders the Don north of Boldon, close to 3km downstream of the A19. There are no other nearby sites of particular sensitivity.

10.7.22 The cessation of farming will bring an end to ongoing diffuse agricultural pollution but leaching of residual contaminants from the soil may continue for some time. This source will gradually diminish. It will be offset by the increase in traffic onsite both for staff and for transporting materials and products which will bring diffuse highway pollution onto site to a much greater extent than hitherto.

10.7.23 Overall the potential impact of the changes in pollution sources and the potential severity arising from certain of the raw materials means that this impact is rated as **Substantial Adverse** for surface waters. This is due principally to the new connectivity created between the site and the receiving watercourses by the new drainage system which is a relatively direct link from source to receptor.

10.7.24 The site is located entirely within the Northumbria Groundwater Management Catchment and the Tyne Carboniferous Limestone and Coal Measures groundwater catchment (ID: GB40302G701500). The groundwater catchment was classified as having a quantitative status of Good and a chemical status of Poor. Its Poor chemical status was related to Chemical Dependant Surface Water Body Status and General Chemical Test classifications as a result of point and diffuse pollution from abandoned mines (e.g. Boldon to north-east, Wardley and North Follingsby to north-west, Springwell and Usworth to west, Castletown to south-east).

10.7.25 Contamination of shallow groundwater is considered to be constrained to a large extent by the low permeability of the glacial till and clay subsoils that limits how quickly water can soak into and pass through the ground. The link between source and receptor in this case is less 'free-flowing' than that for surface water linkage. The length of time over which farming has taken place is considered to have had similar effect upon the shallow groundwater quality as it has upon the river-water quality.

10.7.26 The construction of the proposed development will, to a large extent, seal off much of the proposed site from direct infiltration due to the extent of new buildings and pavements. The risk of groundwater contamination arises chiefly at the periphery of the site where surface runoff might shed onto adjacent undeveloped land.

10.7.27 The potential impact upon groundwater quality is considered to be **Minor to Moderate Adverse**.

Water Supply

10.7.28 Historic demand upon water supply within the site limits has been very small, serving only the North Moor Farm complex. The scale of existing water mains serving the site

reflects this level of demand.

10.7.29 The proposed development will have up to 1,900 staff including the AESC office. In addition water is needed for some of the manufacturing process and for operating cooling plant. The overall demand is estimated at 1,358m^3/day. Initially the local water mains can deliver only 12 l/s until improvements lift this to 30 l/s.

10.7.30 As with the drainage elements of IAMP ONE, the water-supply network to that scheme did not plan to provide capacity for this new development as it was not foreseen at the time. The existing water mains network close to the site is therefore likely to struggle to provide enough capacity to meet this new demand.

10.7.31 The provision of water resource for NWL is relatively robust, backed mainly by the supply from Kielder Water. NWL's forward planning for water resource is robust for a considerable period into the future.

10.7.32 The potential impact upon the local water supply network is rated as **Moderate Adverse**. The potential impact upon the availability of water resource in a wider context is rated at **Minor Adverse**.

10.8 Mitigation Measures

10.8.1 This section of the Chapter sets out those measures planned as part of the proposed development's design or identifies where action is needed by the contractors to manage conditions during the construction phase.

Flood Risk

10.8.2 The proposed development is set almost wholly in Flood Zone 1. Where the design flood encroaches onto land within the planning boundary, this only affects areas that will be used for landscaping, whether newly planted or left in current condition. The recent diversion of a high-voltage power lines run around the western and northern sides of the site to enable the development has not altered land levels or the flood extents within that corridor.

10.8.3 The proposed development will not therefore physically impede or interfere with movement of floodwater at the design flood standard (100-year + 34% climate-change).

10.8.4 Part of the access road towards International Drive may be affected by the 1,000-year flood but this is outside the required design standard. An emergency access is to be provided from the proposed development onto the A1290 which will be clear of such

interference.

10.8.5 The only mitigation for flood risk that is directly required for the buildings and ancillary structures is the height by which the proposed floor level for the new buildings is set above the design flood level. This is done to prevent indirect water damage to sub-floor-level construction, even if the water level does not rise to the floor level, and to provide a margin of safety. This height is normally 0.6m above the design flood level. The highest level on the predicted flood profile along the northern frontage of the development is 38.43mOD for which the corresponding minimum floor level is 39.03mOD.

10.8.6 The risk of increased flooding downstream in the watercourses caused by increased surface runoff from the proposed development will be managed by the provision of a new surface drainage system as part of the development that will capture and manage the runoff so as to restrict discharge rates from the site to the equivalent greenfield behaviour in line with the following guidance.

- For discharges to Usworth Burn: parity with greenfield-equivalent flows at the 1, 30 and 100-year return periods (3.3, 6.7 and 8.0 l/s/ha respectively, including climate change allowances.
- For discharges via IAMP storm drainage to Hylton Dene Burn: restricted to the 1-year greenfield-equivalent flow (3.3 l/s/ha) up to and including the 100-year return period including climate change allowances.

10.8.7 The surface drainage arrangements are described in detail in the FRA & DS report appended to this Chapter. The general principles of those arrangements are summarised here and are a continuation of the arrangements for surface drainage for AESC Plant 2.

- The overall discharge will be split in the proportions to which the site splits between existing catchments of the two watercourses.
- Roof runoff will be collected in a separate system with an appropriate level of water quality treatment to the lower level of pollution risk for this source.
- Parking areas and access roads will be drained to a separate system with an appropriate level of water quality treatment to the higher level of pollution risk for this source.
- Delivery bays where hazardous materials or products are to be loaded or unloaded will be physically isolated by the design of level profiles and/or by raised edges

from the main access road catchment. These areas will be roofed over so that the primary surface runoff in these areas originates from the roof and will be managed accordingly. Any runoff that does originate from within these bays (e.g. dripping from vehicles during wet weather) will be collected separately, tested and if necessary treated and/or disposed off-site outside of the main drainage systems.

10.8.8 During construction, the site will be stripped of topsoil and for a period will essentially exist as a bare-earth surface. The nature of the subsoils – glacial till and clay – mean that this change will temporarily reduce the ground's ability to absorb rainfall and increase the amount of surface runoff from the site. The contractor will need to create boundary features which intercept and control how surface runoff leaves the site in order to prevent increased river flows downstream.

10.8.9 The use of land outside of the developed footprint but within the predicted design flood extents will need to be managed to avoid interfering with flood behaviour. No materials should be stored within Flood Zone 3B (functional floodplain, 3.3% AEP) and ground levels should be not be raised, even if only temporarily. Storage within Flood Zone 3A should be reviewed jointly with the EA, taking duration and residual risk into account. North Moor Farm will be demolished (with works to be completed April 2024) and AESC proposes to use the footprint for contractor's compound. The same area had also latterly been used by the power lines diversion contractor. Any existing watercourses on site should be protected from blockage and any temporary access crossings will need to be sized appropriate to their location and duration. Any such features will require the approval of the appropriate drainage authority, likely to be SCC as the LLFA.

10.8.10 The risk of surface flooding caused by the proposed development will be managed in the same way by virtue of provision of the new surface drainage system. The risk of such flooding from peripheral landscaping areas in prolonged and/or intense wet weather affecting the proposed development is low due to the small size of those spaces and the terrain's topography whereby most of those areas fall away from the proposed development.

10.8.11 The same steps as those taken by the contractor to manage fluvial flood risk during construction phase will address the risk of surface flooding in those conditions.

10.8.12 There are no steps to be taken for managing the risk of flooding from existing drainage onsite as there is no preceding connection between the proposed development and any existing drainage. Where new drainage systems are provided as part of the

scheme, the contractor should protect these from debris entering the system that may cause blockage or damage on-line equipment (e.g. sewage pumps) during the construction period.

Surface and Foul Drainage

10.8.13 As noted above, a new surface drainage system will be provided as part of the proposed development that will capture and manage surface runoff so as to restrict discharge rates from the site to the equivalent greenfield behaviour.

10.8.14 The surface drainage arrangements are described in detail in the FRA & DS report appended to this Chapter. The general principles of those arrangements were summarised in the Flooding section. The very low permeability of the ground means that infiltration is not a practicable mechanism for site-wide surface drainage. Instead the surface drainage strategy is to collect all surface runoff from paved or built areas and to discharge this at restricted rates matching greenfield-equivalent flows in order to avoid increasing flows in the receiving watercourses downstream and to provide attenuation storage onsite to hold the excess water until this can be discharge. The storage will comprise proprietary cellular storage blocks located beneath parking and/or landscape areas.

10.8.15 Each pumping station will be provided with duty/standby pump arrangement, with the number of pumps in each to suit the target discharge flow range. These will be connected to back-up generators to mitigate any risk of flooding deriving from power supply failures.

10.8.16 An additional emergency-storage volume will be provided for each pumping system over and above the design capacity to account for storage required in case of a total pump failure.

10.8.17 Separate systems will be provided to drain roof and trafficked areas so as to manage the respective water quality treatment requirements most efficiently. Control of the outgoing discharge flows will be by pumps, needed also to overcome the relatively horizontal nature of the site topography combined with the distances over which water is to be moved.

10.8.18 A new drainage system will be provided for foul water which originates from the following sources:

- Domestic flows from staff welfare and catering facilities.

- Condensate from cooling plants.
- Process effluent.

10.8.19 The condensate and process effluent will need some pre-treatment onsite before discharge into the public sewer system to prevent damage to the sewage treatment processes downstream. The facility to be provided for the proposed development will also handle process effluent from AESC Plant 2.

10.8.20 The point of discharge to the public sewer network is still to be determined. The IAMP sewage PS does not have the design capacity to handle the additional flows from the proposed development. It may be possible to upgrade this facility. Alternatively a dedicated new PS serving the proposed development only may be needed together with a new off-site rising main to reach the point of discharge. This has not yet been confirmed but may be the same location near Seven Cottages near the A1290 by Washington where the IAMP ONE and TWO rising mains discharge to a NWL combined sewer.

Water Quality

10.8.21 The proposed scheme will manage water quality of the runoff from roofs and paved areas by provision of proprietary equipment – vortex separators and oil interceptor/ silt trap units. The choice of these units and their placement within the surface drainage networks is based upon the pollution hazard and water quality management indices methodology set out in Chapter 26 of the CiRIA SuDS Manual, as described in detail in the FRA and DS report appended to this Chapter.

10.8.22 The use of permeable paving for a source-control element on the parking was considered but deemed unnecessary in tandem with the proprietary elements. The traffic level around the site and residual risk of pollution from materials deliveries was considered to make road-side source-control SuDS features such as filter strips or swales to be too vulnerable to damage to be practicably reliable.

10.8.23 As noted earlier, delivery bays - where materials are loaded or unloaded and the risk of spillage is highest – will be roofed over so that they are shielded from direct rainfall and the amount of water reaching the trafficked surface is limited to that dripping from vehicles in wet weather or carried in on vehicle wheels. This water will be contained separate from the main drainage systems and taken off-site for treatment and disposal.

10.8.24 The change in use from arable farmland to manufacturing within a large built facility

will end the diffuse agricultural pollution source that has affected the land for a long period.

10.8.25 The contractor will need to protect new surface drainage elements during the construction phase from silt carried in runoff from areas still under construction or in use as accesses to such areas, so that the new water quality management components and attenuation features are not overwhelmed during the construction phase and can function properly to meet their intended purpose.

10.8.26 The pollution-control aspect of the new surface drainage is particularly sensitive to the effectiveness and frequency of maintenance, removing collected material (silt, light liquids) from the vortex separators and oil interceptors. The facility operator will need to maintain the systems accordingly during the operational phase of the project.

Water Supply

10.8.27 At the current time AESC estimates that around 1,000 jobs will be created on-site when the building becomes operational. However, in the future the number of jobs could increase to up to 1,900. As such the building has been designed to accommodate the higher staff number. The EIA needs to assess the worst-case environmental effect which in this instance is that of the demand upon the water-supply network and resource to serve 1,900 staff, as well as demand for process water usage. Other aspects of the Proposed Development (e.g. the socio-economic element) have been assessed for the lower value where this presents a more onerous potential effect.

10.8.28 The proposed development will require improvements or extensions to the local water-main network to create sufficient capacity to deliver the flows needed to meet its demands. This will be managed in conjunction with NWL.

10.9 Residual Effects

Flood Risk

10.9.1 The proposed development is mostly located in Flood Zone 1 and, as such, the residual risk of fluvial flooding to the scheme is very low, limited only to the access corridor to the north-east side of its layout and then only at event severities much higher than the design standard conditions. The corresponding residual impact is rated at **Negligible Adverse** which is **Not Significant**.

10.9.2 The risk posed to fluvial flooding off site resulting from increased runoff is negligible

up to and including the design standard by virtue of the provision of a new surface drainage system restricting discharges from the site to greenfield-equivalent flow rates. Above that standard the drainage will not have sufficient capacity to match the conditions and the risk of increased runoff starts to materialise in such extreme conditions. The impact of such residual risk is considered to be **Negligible Adverse**, principally due to the continued contribution that the new surface drainage will make during such design-exceedance behaviour. This is **Not Significant**.

10.9.3 The combined residual impact for fluvial flooding affecting or affected by the proposed development is rated at **Negligible Adverse**.

10.9.4 The residual risk of surface flooding up to the flooding and drainage design standards is negligible due to the control of runoff provided by the new surface drainage systems. Above that standard the drainage will not have sufficient capacity to match the conditions and the risk of increased runoff starts to materialise in such extreme conditions. The impact of residual risk of surface flooding is considered to be **Negligible Adverse**, which is **Not Significant**, principally due to the continued contribution that the new surface drainage will make during such design-exceedance behaviour.

Surface and Foul Drainage

10.9.5 The residual impact associated with the new surface drainage arrangements is very small due to the provision of a new storm drainage system capable of handling and managing the development runoff up to the design standard and including provision for future changes in rainfall behaviour as a result of climate change. Where new systems discharge to existing (e.g. into the IAMP ONE storm drainage) this will only be done where design allowance had previously been made for such discharge and capacity is therefore available.

10.9.6 Above that design standard the drainage will not have sufficient capacity to maintain that level of performance and the risk of increased runoff starts to materialise in such extreme conditions. The impact of such residual risk is considered to be **Negligible Adverse** and **Not Significant** due chiefly to the continued contribution of the new drainage system in handling site runoff even in design-exceedance conditions.

10.9.7 The residual effect of the proposed development upon foul drainage is that the new demand for conveyance and treatment of sewage and process effluent originating from the site will pose a **Minor Adverse** impact upon the existing infrastructure. The

increased demand is not believed to be sufficient from this site alone to justify improvements in the treatment works to which the development flows will be directed but may, as part of a wider trend towards increased flows from ongoing development within the treatment works' catchment and pressure for greater effectiveness of sewage treatment and reduction in CSO spills, be used to justify such improvements in the future.

Water Quality

10.9.8 The provision of a new surface water drainage system with sufficient capacity to manage runoff and its water quality up to the design standard means that up to that level of event there is negligible change in current water quality in the receiving rivers. This effect is bolstered by the cessation of farming and associated applications of fertiliser or pesticide which will reduce the amount of diffuse agricultural pollution that affects those rivers.

10.9.9 The facility operator will plan for and provide counter-measures for dealing with spillages of materials that could contaminate the storm drainage and receiving water features further downstream. The storm drainage systems can be isolated by switching off the pumps (e.g. for purposes of containing a spillage). Other internal isolation points may also be provided to protect parts of the system from similar incidents.

10.9.10 These arrangements and cessation of farming practices are considered to be sufficient to manage potential effects upon water quality in the various surface water features on or adjacent to/downstream of the site to a level of **Negligible Adverse** which is **Not Significant**.

10.9.11 The residual effects upon groundwater are most affected by the paving or building over the majority of the site, significantly reducing recharge of the shallow groundwater within the shallow superficial deposits, and the cessation of farming on the residual undeveloped sections or new landscape areas within the site. Deeper groundwater is less directly linked to the site surface due to the very low permeability of the superficial ground and the deeper bedrock

10.9.12 The provision of a new drainage system incorporating new pollution-control elements will, provided that it is properly maintained, limit the impact of the residual effects upon groundwater quality to **Negligible Adverse**. This is **Not Significant**.

Water Supply

10.9.13 The main mitigation for the potential impacts upon the local water supply networks will be to carry out such upgrades as may be needed to provide physical capacity in the local water-mains network to be able to deliver the flow rates needed to serve the proposed development and, if necessary, to improve water treatment facilities upstream to meet the increased demand generated by this scheme.

10.9.14 The residual effect of this upon the local water distribution infrastructure is considered to be **Minor Adverse**, as is the impact upon the wider water resource base in the region that results from the new demand of this new development.

10.10 Cumulative Effects

10.10.1 The Proposed Development's effects upon the local water environment are not confined within the site limits and may extend far enough to compound similar impacts generated by other nearby developments. Similarly effects from other nearby developments may extend to exacerbate those effects generated by the Proposed Development.

10.10.2 Simultaneous construction is a particular concern as the drainage arrangements in place during those periods are less robust than the formal systems being constructed and the sites are in a condition of maximum disturbance. Once the developments are fully constructed, the new drainage systems for each project will manage the quantity and quality of surface and foul flows generated by each site to the relevant standards of performance. Those standards require an extent of control over the developments' flows that delivers a largely unchanged flood behaviour in receiving watercourses or drainage systems or which provide the necessary capacity to handle.

10.10.3 A list of those projects that may potentially contribute to combined effects during simultaneous construction upon the local water environment is listed in Chapter 2 of this Statement.

10.10.4 The following schemes are close to the site (approx. 2km) and within the Usworth Burn River Don catchment and/or the same groundwater catchment as the site unless stated otherwise. It is possible that construction could be simultaneous for two or more of these schemes. These are all within the SCC district and are listed by the main outline or full application reference.

- Application nr. 21/01764/HE4 - erection of industrial unit (AESC Plant 2) to be used for the manufacture of batteries for vehicles with ancillary office / welfare and associated infrastructure provision, accesses, parking, drainage and landscaping

on land north of A1290 Washington Road and west of International Drive. Construction in progress.

- Application nr. 18/00092/HE4 – construction of light industrial, general industrial and storage distribution (IAMP ONE Phase One). The application boundary for IAMP ONE Phase one overlaps with IAMP ONE Phase two and is, therefore, located within the same catchment as IAMP One Phase two. Some parts of IAMP ONE have already been built out and others remain as-yet undeveloped.
- Application nr. 21/02807/HE4 - erection of industrial units (up to 168,000sqm Gross Internal Area) for light industrial, general industrial and storage & distribution uses with ancillary office and research & development floorspace with internal accesses, parking and service yards and associated infrastructure and landscaping (IAMP TWO). Dualling of the A1290 between the A19/A1290 Downhill Lane Junction and the southern access from International Drive, provision of new access road including a new bridge over the River Don and all incidental works
- Application nr. 18/01869/FUL and 19/02161/VAR – proposed 36-bed hotel on land adjacent to the former Three Horseshoes pub at the junction of the Usworth Cottages road and Washington Road near the Air Museum. This application is some distance east of the site and is not located within a WFD Surface Water Catchment but is located within the same groundwater catchment as the Site.
- Application nr. 18/01869/FUL and 19/02161/VAR - erection of two extensions to existing buildings and creation of additional external hardstanding area on the Unipres Site. The Unipres site is situated south of the A1290 close to the Proposed Development. The application area is not located within a WFD Surface Water Catchment but is located within the same groundwater catchment as the Site.
- Application nr. 18/01964/FUL – extension to existing farm shop, tearoom and other facilities at Elm Tree Nursery, A1290 Washington Road. Elm Tree Farm Nursery lies about 1km west of the Site, on the eastern side of Washington Road and is accessed from Infiniti Drive. The existing nursery site lies within the Green Belt. This application proposed generally low-level extensions of the existing parking area and structures. Solar panels are proposed for the south-facing elevation of the existing building. The application area is not located within a WFD Surface Water Catchment but is located within the same groundwater catchment as the Site.
- Application nr. 21/00401/HE4 and 21/00605/OU4 - erection of light industrial,

general industrial and storage distribution at Hillthorn Farm beside the former Leamside railway, 1.2km south west of the Site. The application area is not located within a WFD Surface Water Catchment but is located within the same groundwater catchment as the Site. Construction ongoing. Part, if not all of this site is outside the Usworth Burn catchment.

- Application nr. 18/02226/FUL - extension to Unit 1 Spire Road Glover located within Washington approximately 1.4km south east of the site. The application area is not located within a WFD Surface Water Catchment but is located within the same groundwater catchment as the site.

10.10.5 Other schemes nearby that have recently been completed include the Amazon warehouses off Follingsby Lane beyond the former railway and modifications to the A19/A1290 Downhill Lane Junction layout. Those schemes have not therefore been considered further in this part of the assessment.

10.10.6 There are currently two schemes from the list above that are under construction: the AESC Plant 2 and the Hillthorn Farm site (also known as Hillthorn Business Park). The main construction period for AESC Plant 2 is planned to finish prior to commencement of work on AESC Plant 3, though internal fit-out of Plant 2 will overlap with the civils construction of Plant 3. Dualling of the A1290 is expected to commence in 2024 and last for close to two years. The first phase of Hillthorn BP is close to completion, though parts of the scheme are yet to be built.

10.10.7 The smaller scale of the Elm Tree Nursery work and that of the Spire Road site is considered to cause negligible cumulative effects upon the Usworth Burn and the local drainage networks, even if simultaneous with the Proposed Development.

10.10.8 The most likely combination of simultaneous construction is of AESC Plant 3 and dualling of the A1290. The assessment that follows considers those two schemes. Later phases of Hillthorn Business Park may also take place during that period but the scale of the remaining units is comparatively small and that site is remote from both Plant 3 and the road dualling.

Flood Risk

10.10.9 Neither scheme is directly affected by fluvial flooding at the design standard.

10.10.10 The Plant 3 surface drainage discharges mainly to the Usworth Burn. The A1290 drainage discharges wholly to the Washington Road culvert, in part via the IAMP ONE storm sewer outfall, and via that to the Hylton Dene Burn. Given this separation of

discharges, the risk of cumulative downstream fluvial flooding is negligible as there is only a small overlap between the two projects' catchments.

10.10.11 The two schemes do not abut one another: the south-east corner of the Plant 3 complex is close to the very western end of the modified A1290 but there is no material prospect otherwise of surface flooding from one scheme spilling onto the other scheme, should it arise. Again, the two schemes will behave independently of each other in this situation and negligible cumulative impact is anticipated.

Surface and Foul Drainage

10.10.12 The south-east corner of Plant 3 is assigned to drain through Plant 2 into the IAMP ONE surface drainage system but only after the runoff from that area has been attenuated to the appropriate standards. The downstream system incorporates capacity for that provision. Part of the A1290 drainage also discharges to the same system, albeit further downstream. There is a minor adverse risk to the storm sewer system downstream of that point of cumulative impact as any storm event would be expected to affect both sites simultaneously.

10.10.13 The A1290 work has no link to foul drainage and there would be no cumulative impacts upon that system from these two schemes.

Water Quality

10.10.14 As noted in regard to surface flooding above, there is a high degree of independence in these two scheme's behaviour. The likelihood of a pollution event on one scheme spreading onto the other is so low as to be negligible. Similar behaviour on each site during a severe storm which exceeds the capabilities of the sites' respective temporary water quality controls will diverge in line with the general surface water drainage behaviour and affect different watercourses.

10.10.15 The risk of cumulative impacts upon surface water quality during construction is therefore limited in accordance with the independence between the two projects and considered to be negligible overall.

10.10.16 The risk of cumulative impact upon groundwater quality is constrained by the limited permeability of the ground that limits how readily water will infiltrate. The two projects will affect the same groundwater unit. The cumulative impact is considered to lie between negligible and minor adverse.

Water Supply

10.10.17 As with foul drainage, the A1290 has no need of a permanent water supply. There will be a need for water during the construction phase for welfare and other construction activities. The same needs will apply to the Plant 3 construction work. There will be therefore a minor increase in demand upon the local water supply network for the projects' respective construction supplies. This will cease once one or other of the schemes is completed. The completed A1290 work will need no further supply.

10.11 Summary and Conclusion

10.12 The client proposes to construct a substantial manufacturing facility together with a new warehouse on farmland adjoining the AESC Plant 2 complex. New offices, access roads and parking areas will also be provided.

10.13 A minor river known as Usworth Burn flows past the northern side of the complex. Its floodplain, shared with the River Don to the north, lies mainly north of the Burn but the design flood extent – including provision for future climate change - also spreads onto land south of the Burn and towards North Moor Farm. It does not spread far enough to impact upon the proposed construction layout and will only affect land intended for long-term landscaping.

10.14 The proposed floor level for the new buildings is higher than the highest design flood level along the northern frontage though the flood level rises to within about 0.3m of the floor level at the very north-west corner of the site. Peak water levels fall quickly as the Burn proceeds eastwards. The proposed floor level is considered to be adequate in light of that behaviour given the need for a universal floor level within the factory building.

10.15 The Proposed Development will create significant paved and roofed areas which in turn will generate considerable surface runoff. The ground conditions onsite are dominated by clayey subsoil of low permeability and do not support the use of infiltration as a general surface drainage mechanism. Attenuation onsite with discharge flows restricted to greenfield equivalent rates will be used instead to manage surface runoff and prevent or limit any impact upon downstream areas as far as is practicable.

10.16 The site currently has no meaningful drainage system for foul flows. Field ditches and agricultural land drainage runs drain the farmland but there is no widespread existing surface drainage system to which the bulk of the Proposed Development could be connected. There is minimal impact upon existing storm drainage.

10.17 There is a nearby foul drainage network serving the IAMP ONE development but this does not have spare capacity to serve the Proposed Development. A new foul system will be needed to transfer sewage from the site to a connection into local trunk sewers, the nearest of which are approximately 1km west of the scheme. There will be a minor adverse impact upon the local sewer network in general.

10.18 The new surface drainage system will also include features to control and treat water quality of the site runoff. Delivery areas where hazardous materials will be handled will be covered over so that rainfall will not normally reach them and prevents the risk of such substances being flushed into the surface drainage.

10.19 These measures will limit or prevent any effect upon local surface water quality beyond **Minor Adverse**.

10.20 The limited permeability of the land will prevent any minor spillages from infiltrating into the groundwater below the site. The superficial water table is confined to localised features in the general subsoil. The scheme is considered to have **Negligible Adverse** effect upon groundwater quality.