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Appendix 10.1 Flood Risk Assessment & Drainage Strategy Addendum

10 WATER RESOURCES

10.1 Introduction

10.1.1 This chapter of the Environmental Statement (ES) addendum documents the implications of the proposed changes on water resources and the water environment of the local area, including flood risk. It also identifies other documents relating to the amended scheme which provide flood risk and/or drainage strategy information.

10.1.2 The contents of this chapter draw upon the findings of the accompanying Flood Risk Assessment and Drainage Strategy Addendum (Appendix 10.1).

10.2 Related Guidance

10.2.1 The principal planning guidance for flood risk and drainage management is the Flood Risk and Coastal Change section of the Planning Practice Guidance website.

10.2.2 The detailed design guidance relating to drainage comes from the Building Regulations (Section H) and the CiRIA C753 SuDS Manual. Past consultations with Sunderland City Council's Drainage Officers had identified specific limits to the rate of surface water discharge from the site drainage systems.

Guidance Changes

10.2.3 There has been one material change to the guidance since the original application was approved. This took place in May 2022 and involves the climate-change allowances to be used for fluvial flood risk and for surface drainage design.

10.2.4 The hydraulic modelling as recorded in the 2021 Flood Risk Assessment used a design-flood climate change allowance of up to 50% (the 'upper end' figure), classing the development as 'highly vulnerable' under Annex 3: Flood risk vulnerability classification of the PPG due to the nature of materials being handled on site.

10.2.5 Amendments to Planning Policy Guidance in 2022 revised the design climate-change allowance to the 'central' figure for development in Flood Zone 2 (as the closest category to Flood Zone 1 in the listings) and introduced new geographical areas as source for allowances (the peak river flow map). The site is split between both the Wear Management Catchment, for which the relevant factor is 25%, and the Tyne Management Catchment, for which the relevant factor is 34%, both from the 2080s epoch.

- 10.2.6 Neither of these factors had been explicitly modelled previously: the original report recorded results for allowances of 20% and 50%, giving flood levels of 35.58 and 35.62mOD respectively. The updated design flood level lies between those two values and is not substantially different from the value used previously.
- 10.2.7 Similar changes apply to the guidance for climate change allowances for rainfall values as part of surface drainage design. A peak rainfall map is now used to identify the prevailing allowances. The upper end allowance applies (for a scheme lifetime to a date prior to 2060) from the 2070s epoch and should be tested at the 3.3% and 1% annual event probabilities.
- 10.2.8 The site is again split between the Wear and Tyne Management Catchments, for which the respective factors for the two return periods are 40 and 45% in both cases. It is understood however that Sunderland City Council (as Lead Local Flood Authority) is satisfied for the design to rely only on the 40% factor in line with the standard applied to the original approved scheme.

10.3 Flood Risk Assessment

Flood Information

- 10.3.1 The main flood risks affecting the site were identified in the 2021 Flood Risk Assessment as being from fluvial flooding from the River Don or from surface flooding due to the poor drainage characteristics of the land inhibiting rainfall from soaking into the ground.
- 10.3.2 The River Don is throttled at Hylton Bridge when in flood and backs up west of this structure. In severe floods the upstream water level was predicted to rise to over 35mOD. The design flood level (100-year + climate change allowance: Flood Zone 3) was forecast to reach 35.58mOD at the site (Table 1, SYSTRA 2021 report). The 1,000-year flood level (Flood Zone 2) was estimated at 35.89mOD. These figures were derived from a site-specific hydraulic model compiled by JBA Consulting Ltd for the IAMP development.
- 10.3.3 The original scheme's external and floor levels were set above 38mOD and were clearly high enough to sit above the predicted water levels.

Revised Flood Risk Assessment

- 10.3.4 The amended scheme clearly sits well above predicted flood levels. The proposed

floor level is 39.0mOD and external levels on the access roads and parking areas are mainly above 38mOD. The lowest cover levels on the surface drainage system are just below 37mOD, still clear above the predicted flood levels. The risk of fluvial flooding upon the proposed scheme is therefore unchanged from the level of risk identified for the original scheme with the site classed as Flood Zone 1 for fluvial flooding.

- 10.3.5 The increased risk of surface flooding on or adjacent to the site, generated by the change from farmland to built surfaces, will be managed as in the original scheme by a new surface drainage system to capture and manage development run-off, operating to the same standards of performance that applied to the original scheme design. The same principle applies to the risk of increased flood risk off-site that would otherwise occur as a result of uncontrolled development run-off from the site.
- 10.3.6 The risk of flooding from drainage is also unchanged as the revised version is designed to the same strategic standard as the approved scheme (i.e. 100-year + climate change).
- 10.3.7 The changes in the proposed scheme do not make any material difference to the other potential flood-risk sources and how those might affect or be affected by the scheme.
- 10.3.8 Overall, proposed changes to the approved scheme that are presented in the S.73 application do not materially alter the previous flood risk assessment's conclusions for this development. The prevailing levels of flood risk are compatible with the amended version of the approved scheme subject to implementation of the control measures identified to manage development run-off and the design-exceedance fluvial flood behaviour of the River Don.

10.4 Drainage Strategy

Surface Drainage

- 10.4.1 RPS has produced a detailed report of the amended drainage approach for the revised scheme (Drainage Strategy – Planning, May 2023). This addresses the scheme needs for both surface and foul water generated by the new development and is referred to hereafter as the 2023 Drainage Strategy. This Note should be read in conjunction with that document.
- 10.4.2 The overall strategy is unchanged from that presented as part of the approved scheme. Run-off from the new buildings, access roads and parking areas will be

attenuated on site prior to discharge either to the Usworth Burn to the north-west or into storm sewers beneath International Drive beside the site's eastern flank.

- 10.4.3 The attenuation storage is provided principally in proprietary cellular storage features beneath the car park area. From here water is pumped to the respective discharge points and the pumps provide the regulation of flow rates.
- 10.4.4 The climate change allowance used in the surface drainage highest design standard for the S.73 version is the same value – 40% - as that used in the original scheme's design. The Lead Local Flood Authority is understood not to have insisted upon the interim design check for the 3.3% AEP storm standard.
- 10.4.5 The water-quality management aspects of the new surface drainage will also take an unchanged approach to that of the approved scheme. Proprietary units – vortex separators and silt/oil interceptors – are provided as appropriate to the run-off origin. The design of the treatment trains is again based upon pollution hazard ratings and water quality treatment indices as per the methodology in Chapter 26 of the CiRIA SuDS Manual.
- 10.4.6 The details of the surface drainage design are recorded in the 2023 Drainage Strategy.

Foul Drainage

- 10.4.7 The overall strategy for foul drainage for the development is unchanged from that for the approved scheme. Sewage from the development will be discharged to a foul sewer under International Drive that leads to a nearby sewage pumping station. That in turn transfers the sewage off site to a trunk combined sewer near Washington.
- 10.4.8 The scale of the scheme in terms of the working population remains as planned under the approved version. An element of process-water-use is now included in the Gigafactory's operation and discussions are ongoing between the designers and Northumbrian Water over the rate of discharge that can be accommodated within the design allowance for the Gigafactory site within the wider IAMP ONE scheme and what pre-treatment of the effluent might be required before that element of the foul water can be discharged to the main system.
- 10.4.9 The details of the foul drainage design are recorded in the 2023 Drainage Strategy.

10.5 Environmental Assessment

- 10.5.1 The environmental impact and mitigation provision for the water-related aspects of

the scheme were recorded as Chapter 10 of the original Environmental Impact Assessment, compiled by Wardell Armstrong and referred to hereafter as the '2021 EIA'. The 2021 FRA formed an appendix to the chapter.

- 10.5.2 The only change of significance to the standards against which the original appraisal was measured is the change to climate-change allowances for drainage and flood-risk management design.
- 10.5.3 There have been no material changes in the baseline conditions at site or its immediate surroundings. No further development of IAMP ONE has taken place since 2021. National Highways has recently modified the junction of the A19 with the A1290 but that work came no closer than about 0.6km to the nearest part of the Gigafactory site.
- 10.5.4 The variations to the original approved scheme are minor in comparison to the overall scale of the scheme and do not represent changes to the nature or scale of the proposed development that would be sufficient to alter the level or significance of effects that were identified in the 2021 EIA. The levels of mitigation required (e.g. for managing surface run-off) are provided by the amended scheme. The residual impacts that either cannot be avoided as a result of the scheme (e.g. increase in local water demand) or which occur in design-exceedance conditions (e.g. residual flood risk) remain comparable with those that applied to the original approved scheme.
- 10.5.5 The assessment summary (Table 10:13, 2021 EIA) is not considered to be changed as a result of the adjustments to the approved scheme.

Cumulative Assessment

- 10.5.6 A number of additional schemes have been added to the set of projects considered for cumulative effects since the original 2021 assessment:
- Albany Park, Spout Lane, Washington (19/01252/FUL): 70+ residential units.
 - Vantec, Turbine Way (23/00805/PCZ): installing PV panels on existing building.
 - Land west of International Drive (22/02384/FU4): new electrical sub-stations.
 - Factory 1, Stephenson Road, Washington (22/02538/FUL): installing PV panels on existing building.
 - Land north of International Drive (23/01097/FU4): new electrical sub-station.
- 10.5.7 The impacts of the PV installations upon water resources are minimal as these involve

existing structures without changes to drained areas. The sub-station works involve relatively small drained areas and both of these schemes will be managed as part of the IAMP ONE surface drainage scheme. The Albany Park scheme represents the largest potential impacts from drainage or flood risk perspective but will incorporate mitigation measures to address those potential impacts. The main unmitigated impact will be a gradual increase in water-supply demand on the local network due to these additional schemes.

- 10.5.8 Given the resources available in the Kielder Water Resource Zone, this impact is considered to be manageable but may need reinforcement of the distribution network to handle the increased flows locally.

10.6 Water Framework Directive

- 10.6.1 No formal Water Framework Assessment (WFA) was undertaken specifically for the original approved scheme. This relied instead upon a WFA (JBA Consulting, 2019) that was produced for the IAMP TWO project and which covered the entire IAMP area including the proposed scheme.

- 10.6.2 The only development of any significance that has taken place since 2019 in the River Don catchment is the FollingsbyMax scheme west of the old Leamside railway. This comprises a two large commercial units and associated access and parking. It has been assumed for the purpose of this assessment that the development in question has provided adequate mitigation for potential adverse impacts upon the water environment and that there has been no change in the water-body classifications as a result.

- 10.6.3 The recent modifications to the A19/A1290 junction are similarly assumed to have incorporated suitable mitigation for the same outcome.

10.7 Summary and Conclusions

- 10.7.1 The modifications have resulted in minor changes to layout and size of the building and associated infrastructure including drainage. The site drainage arrangements have been adjusted to cater for those changes in line with the principles applied to the approved scheme's drainage design.

- 10.7.2 Standards of mitigation to surface water discharge rates and run-off quality treatment have been maintained in the revised design. The foul water discharge rates remain in

accordance with the values planned under the IAMP ONE scheme.

- 10.7.3 Where changes in design requirements have occurred since the original planning award in 2021, those have either been incorporated in the updated design or omitted by agreement with the relevant approving authorities.
- 10.7.4 The levels of flood risk that potentially affect the scheme, principally due to fluvial or surface-water causes, do not pose material risks to the development or to neighbouring areas. Levels of residual risk are comparable with those that were assessed as affecting the approved scheme. The modified development is still compatible with the prevailing levels of flood risk in accordance with national planning guidance.
- 10.7.5 The findings of the original scheme's environmental impact assessment remain essentially the same. Such changes as have occurred in legislation or background information have not caused any changes to the level or significance of the development's effects upon water resources.
- 10.7.6 In conclusion, the modifications to the proposed Gigafactory development have either incorporated suitable changes to the drainage arrangements for the scheme or do not require any change in the development infrastructure to manage flood risk, whether from fluvial, surface-water or other sources