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LIDL, HAYLING ISLAND

FLOOD RISK ASSESSMENT AND SUDS REPORT

MARCH 2017



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REVISION A



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Client: Lidl UK GmbH

Revision / Date	Prepared by	Checked by	Approved by
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1.0 INTRODUCTION

- 1.1 Hemsley Orrell Partnership (HOP) has been instructed by Lidl UK GmbH to carry out a Flood Risk Assessment and SuDS report for a proposed development on land off of Manor Road, Hayling Island, near postcode PO11 0QN – herein referred to as ‘the site’ or ‘the plot’.
- 1.2 The plot is currently greenspace, being used seasonally as paddocks. Proposals are for a commercial development consisting of a Lidl supermarket with associated access, car-parking, and landscaping.
- 1.3 The plot resides within Flood Zone 2 and 3 and therefore a FRA is required to be submitted as part of the planning application for the development.
- 1.4 The information contained within this report also provides the evidence required by Hampshire County Council as Lead Local Flood Authority to review the SuDS design against the criteria specified with their Guidance for Developers, Designers and Planners document. A checklist has been provided in Section 11 demonstrating compliance.
- 1.5 This report has been carried out in accordance with data and guidance provided by the Environment Agency EA; the British Geological Survey (BGS); The Partnership for Urban South Hampshire (PUSH) Strategic Flood Risk Assessment (SFRA); and is in line with the guidance on Flood Risk and Development as provided in the National Planning Policy Framework (NPPF) and its associated Planning Practice Guidance (PPG).
- 1.6 Information in this report has been received from a number of external parties and HOP does not accept liability for the accuracy of this information. Should there be a material change to the development proposals, legislation or a change in end use, this report will need to be revised to reflect those changes.
- 1.7 A site walkover survey was undertaken by Elliott Flynn and Ivan Ramirez of HOP on 7th February 2017.



Figure 1.1. Location map.

2.0 SITE SETTING

- 2.1 The site location could be considered approximately central within Hayling Island, being located north of most of the island development. The southern shoreline (Hayling Bay) is approximately 2km from site, the western shoreline (Langstone Harbour) is some 1km away and the eastern shoreline (Chichester Harbour) is approximately 700m away. A location map is shown in Figure 1.1.
- 2.2 With reference to the immediate area surrounding the site; the north is bounded by the A3023 Manor Road, small patches of woodland are located to the west, east – beyond which is Church Road – and most of the southern boundary, with a residential plot on the south east corner. Separate drainage ditches surround the plot, except on the south/south-east boundary which features a stream – categorised as a Main River by the EA.
- 2.3 The site is approximately 1.16 ha in size being of approximate rectangular shape – see Figure 2.1. It is currently accessed by vehicles via a gate on the north-west corner. The land is made-up of maintained grass which is utilised as pasture land for horses and, aside from a number of paddock fences, could be considered flat and relatively featureless – see Figure 2.2. The topographical survey by RPS (Appendix II) depicts higher land at an approximate average of 4.25m AOD to the east and lower land at 3.80m on the west, which results in an approximate slope across site of 1:300.



Figure 2.1. Aerial view of the plot

- 2.4 With the exception of the northern boundary mature and semi-mature trees surround the site. The tree roots from the neighbouring trees are thought to be limited under the plot, as the majority of tree trunks are featured on the opposing side of the drainage ditches or stream bank to the plot – however, if required, the true root extents will need to be defined by an Arboriculturalist.
- 2.5 The stream to the south east is purportedly known as Church Road Stream according to neighbouring residents, and is referred to as such in this report. The stream flows north

towards the site, bounding the rear of Church Road properties, before returning eastwards as it reaches the site just within the site boundary. As the stream flows eastwards it enters a small patch of woodland beyond the site boundary and reaches a brick headwall with a 225mm diameter outlet which conveys the stream into a public drainage network – see Appendix II for Sewer Records. The EA have confirmed (Appendix III) that the headwall and the 225mm dia outlet is the responsibility of the Highways Authority.

- 2.6 The stream depth that was encountered during the site walkover was not surveyed, however visual observations show that the stream level was approximately 80mm above the surveyed invert level (3.07m) of the discharge pipe depicted in figure 2.3. This gives an approximate top of stream level as 3.15m AOD (above Ordnance Datum) at this location at approximately 11:00am 7th February 2017.
- 2.7 According to forecasts at the time the weather preceding the site visit was understood to have been moderate sustained precipitation over a period of about a week, and the Site Investigation Consultant (Opus) confirmed that the preceding day had substantial, albeit unmeasured, precipitation. The catchment serving the Church Road Stream is relatively small with reference to OS contour maps and has low permeable top soil therefore the catchment is considered ‘flashy’ in nature and reactive to short time periods of precipitation. The conditions and levels of the stream observed during the walkover could be considered ‘typical’ for the wetter winter period.
- 2.8 The surrounding drainage ditches were observed to be generally ‘dry’ during the site walkover, with their depth estimated at about 0.7m deeper than the plot level. A small ponded area of ditch was present on the north east corner about 100mm deep. Ponded water was observed at multiple local low points on the site; this was believed to be due to the recent rain and the clayey makeup of the topsoil.



Figure 2.2. View southwards of the site

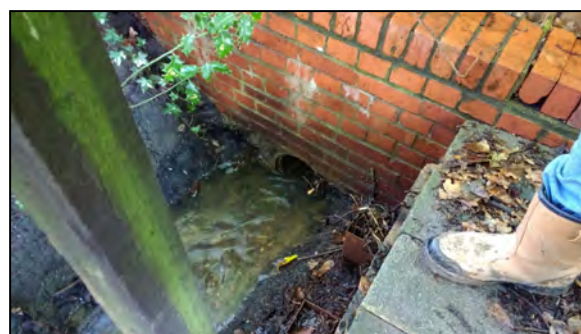


Figure 2.3. Church Road Stream Headwall

- 2.9 Information available through the BGS online mapping service shows that the site bedrock geology is anticipated to be of the London Clay Formation, described by BGS as ‘clay, silt and sand’, with superficial deposits recorded as River Terrace deposits, described by BGS as ‘sand, silt and clay’.
- 2.10 An initial site investigation by Opus was undertaken 6th December 2016 which involved borehole drilling and installation of monitoring wells. The descriptions of the soils match what was anticipated from BGS records. The underlying soils were generally clayey with pockets of more sandy soil, while the topsoil was described as clayey sand topsoil.
- 2.11 Return groundwater monitoring visits were undertaken by Opus on at least two other occasions; 16/12/16 and 21/12/16 which recorded variable groundwater levels across the site between 3.79m bgl (below ground level) and 0.52m bgl – See Appendix VIII.
- 2.12 Opus returned to site 6th-7th February 2017 under the request of HOP to undertake shallow soakage tests in locations that were previously identified as having a lower groundwater. Soakage test proved that the ground was not suitable for infiltration, with the groundwater

generally rising to 1.0-0.5m bgl in all test locations. The testing was further complicated by the observations of perched surface water on the topsoil flowing into the open trial pits.

- 2.13 The site is not shown to be within a groundwater Source Protection Zone (SPZ) according to EA online mapping service.

3.0 DEVELOPMENT PROPOSALS

- 3.1 The development proposals include the erection of a food store with a footprint of 2,481m², being two storeys in height. A new vehicle crossover, access road and parking will serve the site. A significant portion of the land will remain as landscaping as depicted in figure 3.1. Architectural proposals are included in Appendix VI.

- 3.2 Surface water proposals are discussed in Section 5 of this report and some of the landscape proposals and the proposed finished floor level of the building are discussed in Section 6.

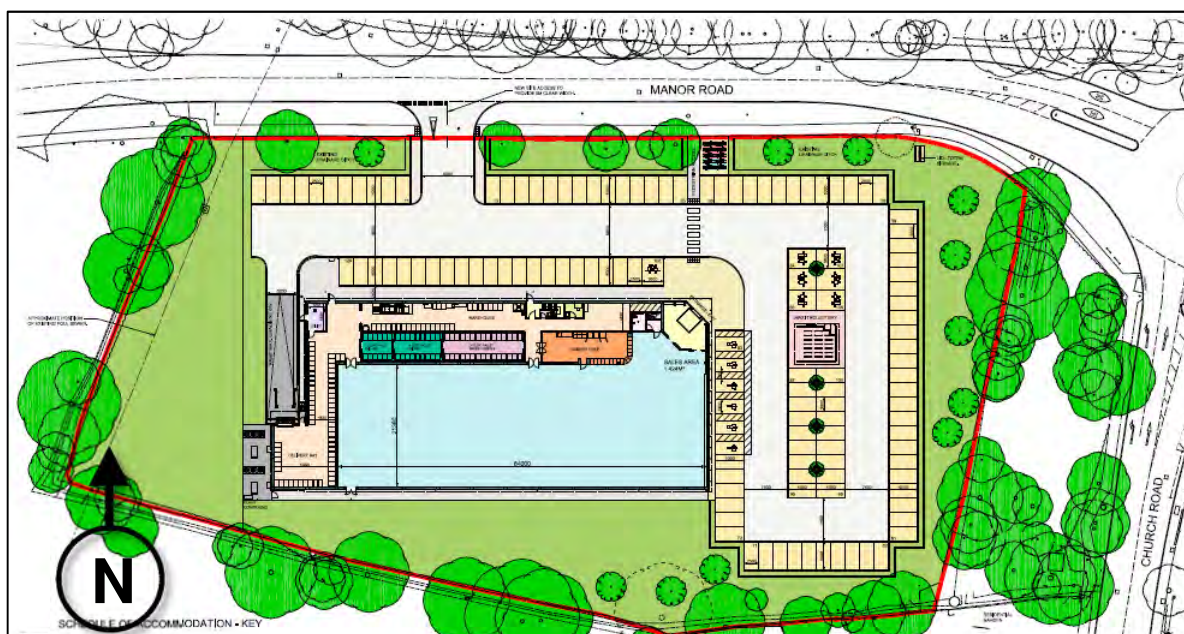


Figure 3.1. Extract from architect's proposed plan.

4.0 FLOOD HAZARD DEFINITION

Fluvial and Tidal Flooding

- 4.1 Flood data for the site has been obtained from the EA and is included in Appendix V. The site is shown to be within Flood Zone (FZ) 1, 2 and 3. Flood Zone 3 representing portions of land with the highest probability of flooding – 1 in 100 (1%) chance of flooding each year – from rivers and the sea. The EA provided modelled flood data for the site, giving the modelled depth of flooded water at 6No. points within the site boundary, as depicted in Figure 4.1.
- 4.2 Modelled values were provided for the 1 in 100 year (FZ3) storm return period, and the 1 in 1000 year (FZ2) storm return period, tabulated within Figure 4.1.
- 4.3 A pre-planning meeting was undertaken with Flood Risk officer Daniel Watson of the EA and Elliott Flynn and Ivan Ramirez of HOP on 08.03.17. Daniel Watson confirmed verbally that the modelled flood levels are based on fluvial flooding and not tidal flooding. It was also recognised that the flood level for node 5 was potentially an anomaly within the model and

was not representative of the typical flood level height predicted across the site which was 4.02m AOD - represented by point 2,4 and 6. For the purposes of designing to a flood level 4.02m AOD - being the next highest level - was initially agreed to be adopted for design purposes.

- 4.4 Dan Watson issued updated modelled information 05.04.17 which included the impacts of climate change for the 1 in 100 and 1 in 1000 storm return period. Therefore the flood level 4.07m AOD is considered representative of the typical maximum flood level of the 1 in 100 year storm return period when accounting for the effects of climate change, and has been adopted for design purposes.

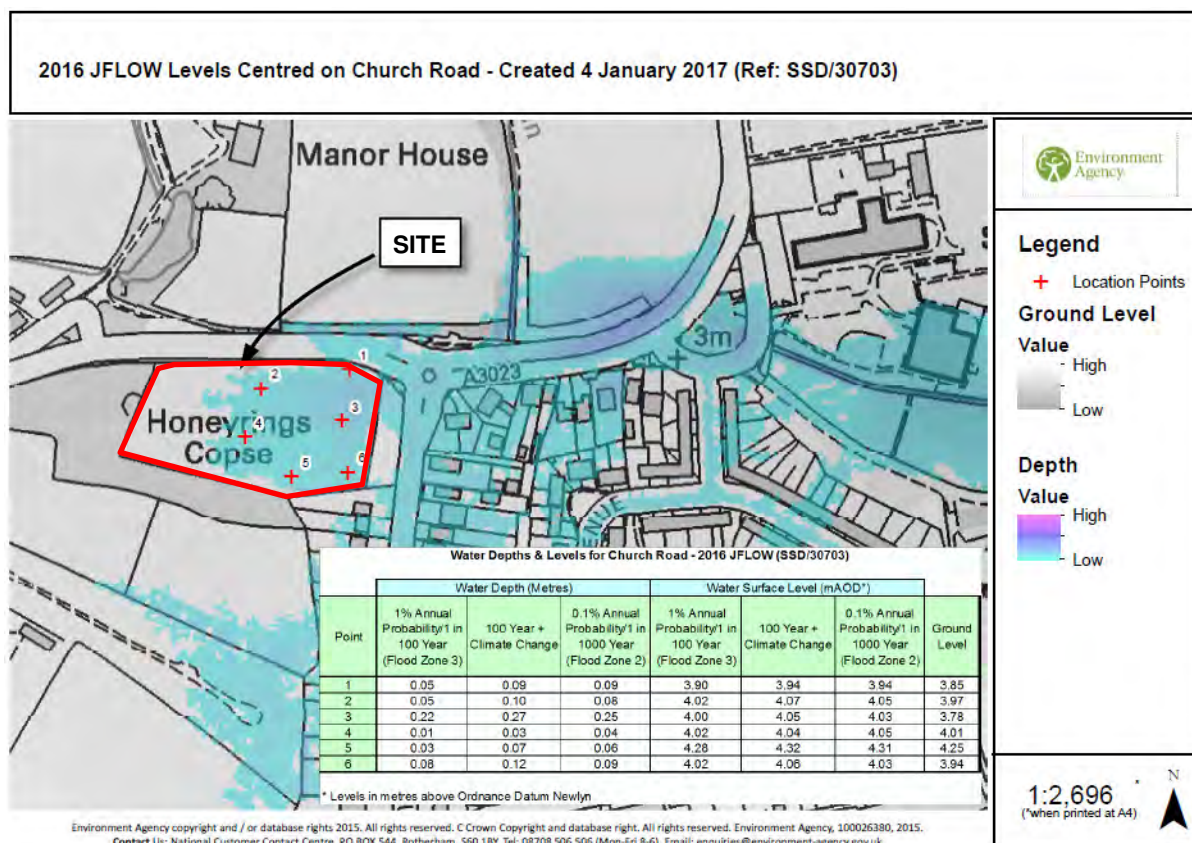


Fig.4.1. Extract of EA flood data with water depths tabulated.

- 4.5 The site walkover identified the headwall with the 225mm diameter outfall which serves the Church Road Stream as a location vulnerable to blockages. Substantial leaf litter and branches were observed within the stream channel, which have the potential to block the outfall. The neighbouring land owner on the south east corner of site stated that they clear litter periodically here in an attempt to prevent blockages. Should the stream outfall block then topographical levels suggest that the Church Road Stream would likely back-up around the eastern portion of the plot and within the adjoining east woodland patch before overflowing to Church Road and the roundabout on Manor Road.
- 4.6 A larger stream is located to the north of Manor Road running parallel to the road, with a flow westwards. The walkover identified a number of pipe connections to this stream, which are likely from highway drainage.
- 4.7 In summary the risk of fluvial flooding at the site is considered to be high.

Groundwater Flooding

- 4.8 As discussed in paragraph 2.11, the groundwater level at the site was variable, but is generally considered high. The highest groundwater level recorded was 0.52m bgl, and so for the purposes of design this worst case level has been assumed across the site. Groundwater levels were recorded over several winter months, and so whilst it is recognised that the groundwater height will vary seasonally, the recordings were taken during the more onerous winter period.
- 4.9 The PUSH SFRA identifies the area as having low bedrock permeability.

Surface Water Flooding

- 4.10 Surface water flooding extents have been obtained from the online EA data and shows that there is a low risk of surface water flooding for a small portion of land on the north east extent and the central southern boundary, with a very low risk identified for the remaining site.

Flooding from Sewers

- 4.11 The PUSH SFRA identifies one nearby location of 'Southern Water observed flooding incidence' some 80m east of site beside a residential property; the cause of this flooding was unknown.
- 4.12 Anecdotal evidence obtained during the site walkover has suggested that the drainage network that receives the Church Road Stream may be in poor condition or have insufficient capacity. Ponding has purportedly occurred around the roundabout to the north east of site, which has seen a clean-up response from authorities. The exact cause of the flooding and the true extents are unknown.
- 4.13 The PUSH SFRA does not identify any historical flooding around the roundabout, but it does identify an extent of flooding some 80m south of the roundabout within Church Road; the source of this flooding is unknown.
- 4.14 Daniel Watson of the EA stated that he believed there were issues with a sewer within Church Road and recalled a CCTV survey within the vicinity. Attempts were to be made to forward the CCTV survey to HOP for review, but this has not yet been received.

Flooding from canals, reservoirs and artificial sources

- 4.15 The risk of flooding from canals, reservoirs and artificial sources is considered to be very low.

Sequential and Exception Tests

- 4.16 The Sequential Test provides a framework for Local Planning Authorities (LPA) through which development is steered towards the most appropriate Flood Zone. A detailed Sequential Test has been presented in the Planning and Retail Statement (Ref LIDW3001) and for the purposes of this report it is considered that the Sequential Test is demonstrated to be passed in this instance.
- 4.17 The proposed development use is commercial, as such it is classified as 'Less Vulnerable Development' according to Table 2 of the NPPF Planning Practice Guidance. As such, the proposals for the development are considered compatible development within Flood Zone

3a, as described in Table 3 of the NPPF Planning Practice Guidance and therefore do not require the Exception Test.

5.0 SURFACE WATER DRAINAGE

- 5.1 As a greenfield site the plot does not have any positive drainage networks. A Greenfield runoff rate has been calculated using the HR Wallingford tool, producing a Qbar of 3.27l/s – see Appendix VI.
- 5.2 In line with guidance issued by DEFRA and the EA (report number SC030219) a practical discharge rate of 5l/s can be utilised for the proposed controlled discharge, where greenfield runoff has been calculated less than 5l/s.
- 5.3 Proposed surface water designs are depicted on HOP drawing DR01 but are summarised in the following text: Storm water volume will be managed by attenuating runoff within the proposed high void sub-base (MOT Type 3 material or suitable graded approved material) which will be contained within a membrane tanked system. The surface course of the hardstandings will likely be impermeable and so gradients will be designed to convey runoff to gullies which will discharge to the permeable sub-base material via rigid perforated pipes; roof runoff will also connect to the permeable sub-base material. The perforated pipes will be roddable from both ends via an inspection chamber and gully to assist with maintenance and allow the collection of silt and debris. Runoff will migrate through the permeable sub-base material to multiple outlets that will be restricted by a flow control device to 5l/s. An outlet pipe will then discharge to a filter strip that is connected to a proposed conveyance swale and ultimately discharge to the Church Road Stream.
- 5.4 A flood risk activity permit will be required to connect a headwall outlet to the stream which is designated a Main River by the EA.
- 5.5 The hardstanding's consisting of the car-park area and access road makeup approximately 4200m². A 250mm, 300mm, and 350mm deep permeable sub-base with minimum 30% void space will therefore generate 315m³, 378m³ and 441m³ of potential attenuation respectively. The sub-base depth will be determined at detailed design according to the CBR value of the soils, but it is stipulated that the sub-base will be of sufficient depth to contain the 1 in 100 year storm return event + a 20% allowance for climate change, which has been calculated to produce a peak volume of 306m³ with a 5l/s discharge using Microdrainage software – see Appendix VI.
- 5.6 A sump and pump will serve the small loading bay ramped area, which will drain surface water runoff only. The ramp wall will need to be designed to resist the ingress of groundwater. The rising main will discharge to the Type 3 sub-base and enter the SuDS train as described above.
- 5.7 Flood flow routes are depicted on HOP drawing DR01, the accurate construction of which will ensure that surface water will flow away from the building and surrounding infrastructure into the surrounding landscaping.
- 5.8 Flood Zone compensation is discussed in Section 7.

Water Quality

- 5.9 Reference to Table 26.2 of the SuDS Manual (CIRIA C753) shows that the proposed land use at the development predominantly comprises a commercial car-park with frequent change, which represents a medium risk of pollution hazard level. The guidance for this level

of risk is to use the simple index approach to pollution control requirements for discharging to surface waters.

- 5.10 The notes to Table 26.2 state that extra measures may be required for discharges to protected resources, the guidance clarifies that in England and Wales, protected groundwater resources are represented by the catchment of a SPZ 1 classification. As discussed previously, the development site lies outside of any SPZ and therefore no additional pollution control measures are required in this regard.
- 5.11 The simple index approach is outlined in the SuDS Manual and provides pollution hazard indices for different land use classifications. An extract applicable to the development site is provided in Table 5.2 below. This shows total pollution hazard indices of total suspended solids (TSS) 0.7; Metals 0.6; and Hydrocarbons 0.7.

Pollution hazard indices for different land use classifications				
Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7

Table 5.2. Extract of Table 26.2 from the SuDS Manual.

- 5.12 These hazard indices are to be compared against mitigation indices for individual SuDS components, as provided in Table 26.3 of the SuDS Manual, an extract of which is provided in Table 5.3.

Table 5.3. Extract of Table 26.3 from the SuDS Manual.

Indicative SuDS mitigation indices for discharges to surface waters			
Type of SuDS component	Mitigation indices ¹		
	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4 ²	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond ⁴	0.7 ³	0.7	0.5
Wetland	0.8 ³	0.8	0.8
Proprietary treatment systems ^{5,6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

- 5.13 The SuDS Manual also allows for proprietary systems such as oil interceptors, smart filters, membranes and silt/debris traps to be utilised to minimise the risk of watercourse pollution.
- 5.14 The proposed water quality treatment (SuDS Train) is depicted on HOP drawing DR01 with a summary bulleted below:
1. Trapped gullies or drainage channels to assist with sediment and hydrocarbon removal.
 2. Permeable sub-base material providing extensive filtration.
 3. Bypass separator for hydrocarbon removal.
 4. Discharge to a filter strip.
 5. Conveyance via a swale before final discharge to watercourse (The Church Road Stream).
- 5.15 With reference to table 26.3 of the SuDS Manual, the SuDS pollution mitigation indices are greater than each of the three pollution hazard indexes and are therefore considered fit for purpose in regard to water quality.

SuDS maintenance

- 5.16 Details of SuDS operation and maintenance activities are provided within Chapter 32 of the SuDS Manual. A summary of typical key SuDS components is given in Table 5.4.
- 5.17 As can be seen, all SuDS components require regular inspection and for the first year the guidance states that monthly inspections are carried out and documented to inform the ongoing maintenance regime of the site drainage.
- 5.18 SuDS components at the site will not be adopted and will be maintained for their lifetime by the site owner or the managing company of the development for the site-wide SuDS features.
- 5.19 Contractors should protect SuDS components from adverse sediment runoff during the construction phase and an initial pre-handover inspection is recommended to ensure that the drainage system has been constructed as designed.

Table 5.4. Extract of Table 32.1 of the SuDS Manual.

Typical key SuDS components operation and maintenance activities (for full specifications, see Chapters 11–23)													
Operation and maintenance activity	SuDS component												
	Pond	Wetland	Detention basin	Infiltration basin	Soakaway	Infiltration trench	Filter drain	Modular storage	Pervious pavement	Swale/bioretention/trees	Filter strip	Green roofs	Proprietary treatment systems
Regular maintenance													
Inspection	■	■	■	■	■	■	■	■	■	■	■	■	■
Litter and debris removal	■	■	■	■	□	■	■	□	■	■	■		□
Grass cutting	■	■	■	■	□	■	■	□	□	■	■		
Weed and invasive plant control	□	□	□	□		□	□		□		□	■	
Shrub management (including pruning)	□	□	□	□					□	□	□		
Shoreline vegetation management	■	■	□										
Aquatic vegetation management	■	■	□										
Occasional maintenance													
Sediment management ¹	■	■	■	■	■	■	■	■	■	■	■		■
Vegetation replacement	□	□	□	□						□	□	■	
Vacuum sweeping and brushing									■				
Remedial maintenance													
Structure rehabilitation /repair	□	□	□	□	□	□	□	□	□	□	□	□	
Infiltration surface reconditioning				□	□	□	□		□	□	□		

Key

■ will be required

□ may be required

Notes

¹ Sediment should be collected and managed in pre-treatment systems, upstream of the main device.

6.0 FLOOD RISK MANAGEMENT MEASURES

- 6.1 The risk of fluvial flooding to the development has been identified as high. Primary mitigation to reduce the risk of flooding has been proposed in the form of elevating levels. The building is proposed at a minimum FFL of 4.600m AOD, which is 530mm higher than design flood level recognised in paragraph 4.4. External hardstanding levels should also be a suggested minimum of 4.300m AOD to protect the users assets (cars) and generally reduce the risk of inundation and potential obstruction to the operations of Lidl.
- 6.2 By raising the building and external levels this also mitigates against flooding from other sources identified as groundwater, potential drainage failures and back-up from the Church Road Stream in the event of blockages or storm return periods beyond the design capacity.
- 6.3 Surface water runoff is to be managed through SuDS to limit the peak flow from the development to 5l/s – near to the calculated greenfield runoff rate. Flows above this agreed rate will be managed on-site using attenuation proposed in a permeable sub-base released in a controlled manner to the adjoining watercourse.
- 6.4 Private surface water drainage will be designed to accommodate the 1 in 100 year storm event with an allowance of an additional 20% increase in rainfall intensity to mitigate the predicted effects of climate change. This will minimise the risk of surface water flooding at the site by ensuring that surcharged pipework does not manifest in surface flooding up to this storm design parameter.
- 6.5 The ground levels for the development are designed so that potential overland conveyance routes direct water around and away from buildings to less vulnerable landscape areas within the site.

7.0 OFF SITE IMPACTS

- 7.1 Through the use of SuDS to manage surface water runoff at source, the peak rate of runoff from the development to the watercourse can be limited to a level that is near to the existing greenfield runoff rate.
- 7.2 The site-wide levels are to be engineered so that runoff is managed within the site boundaries and that no off-site conveyance routes can be established - unless during an exceedance event or drainage failure.
- 7.3 The development footprint overlies Flood Zone 2 and 3 and therefore, due to the proposal to raise the FFL and hardstandings, flood zones are displaced. The volume of displaced flood zone has been calculated using the water depths provided by the EA (figure 4.1) in tandem with the flood extents depicted. HOP drawing FRA01 (Appendix VII) has calculated the displaced volume by attributing defined areas to the depths given at each given point.
- 7.4 The total displaced Flood Zone 3 (1% annual probability) area equates to 243m³. The total displaced Flood Zone 2 (0.1% annual probability) area equates to 365m³. The total displaced Flood Zone 3 + 105% climate change (CC) area equates to 385m³.
- 7.5 In line with EA guidance the effects of climate change on the compensated flood volume must be accounted for. As a result, the displaced Flood Zone 3 (+ CC) volume must be compensated elsewhere on the development – outside of the current extents of the depicted flooding which occurs centrally and on the east of the plot. Therefore flood zone compensation is featured predominantly on the western portion of the site – see HOP drawing DR01 and FRA01.
- 7.6 These proposed measures ensure that flood risk to neighbouring and downstream properties is not adversely effected by the development.

8.0 RESIDUAL RISK

- 8.1 Residual risk stems from an extreme rainfall event or failure/blockage of the sewer and river networks. As discussed in Section 6, the ground levels for the development are designed so that potential overland conveyance routes direct water around and away from buildings to less vulnerable landscape areas within the site.
- 8.2 The loading bay ramp area will be drained by a pump due to the low levels. In the event of pump failure through power loss or mechanical malfunction the area is susceptible to substantial ponding. The levels around the ramp are to be designed such that any build-up of water will not reach threshold levels and enter the building. A dual pump system, incorporating a back-up pump and alarmed system is recommended.

9.0 CLIMATE CHANGE

- 9.1 Increased rainfall volumes, longer storm durations and rising sea levels are all attributed to global climate change. This may increase the risk of fluvial, pluvial, groundwater and surface water flooding. Engineering and drainage designs take into account the effects of climate change by sizing drains and SuDS for the additional rainfall discharge due to climate change.

10.0 FRA CONCLUSIONS

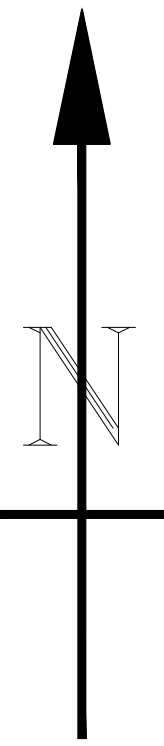
- 10.1 This report demonstrates that the site is at significant risk of flooding from fluvial and groundwater sources, but that mitigation, mainly in the form of elevating the hardstandings, greatly reduces the risk of flooding to acceptable levels.
- 10.2 According to the NPPF, the development is appropriate in Flood Zone 3a without the need for an exception test to be applied.
- 10.3 Surface water discharge to the nearby watercourse is to be limited to 5l/s – near to the calculated greenfield runoff rate of 3.27l/s. The drainage system has been design to accommodate a 1 in 100 year storm return period + 20% allowance for climate change.
- 10.4 A Flood Risk Activity Permit is required from the EA to discharge the storm network to The Church Road Stream which is designated a Main River by the EA.
- 10.5 Flood management is further mitigated through the consideration of external levels throughout the site to ensure that any potential overland conveyance routes arising from residual risks are directed away from the building to less vulnerable areas within the site.
- 10.6 This report has identified measures that reduce the level of flooding risk to the development and ensures that the runoff volumes are mitigated through the use of attenuation SuDS. This report shows that the proposals for the development can be successfully implemented and managed sustainably and that there should be no increase in risk to future users and neighbouring properties in regard to flooding over the expected lifetime of the development.

11.0 SUDS CHECKLIST FOR LLFA (HAMPSHIRE CC)

- 11.1 Below is a checklist based on Hampshire County Council (HCC) Guidance for Developers, Designers and Planners document. HCC criteria is stated in italics, while a reference has been provided to direct the reader to the required evidence within this report.
- 11.2 *Information on existing flood risk from modelled and historical sources* – See Section 4.
- 11.3 *Information on the proposed SuDS Strategy* – See Section 5 and HOP drawing DR01.
- 11.4 *Information on the potential discharge points and locations including the sensitivity of those locations* – See Section 5 and HOP drawing DR01. Note that EA data does not provide the sensitivity of the watercourse which is proposed to connect to. The watercourse is conveyed into the public drainage network just beyond the extents of the site and so it is assumed that the watercourse is not significantly sensitive.
- 11.5 *Information on the existing drainage regime of the site including where appropriate existing drainage locations and networks* – See Section 5.
- 11.6 *Information on existing ground conditions: Contamination that may affect the use of infiltration devices; Ground investigation; Groundwater levels; Infiltration tests* – See Section 2 and Appendix VIII. Note that infiltration is not proposed and therefore a contamination assessment of the soils has not been undertaken.
- 11.7 *Information on the existing and proposed runoff rates and volumes* – See Section 5 and Appendix VI.
- 11.8 *Information on how surface water flows and volumes will be contained on site* – See Section 5 and HOP drawing DR01.
- 11.9 *Information on what happens if the proposals exceed the design event* – See Section 8 and HOP drawing DR01.

APPENDIX I

Topographic Survey



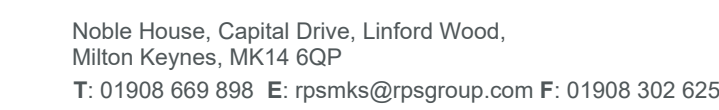
Notes

1. This drawing has been prepared in accordance with the scope of RPS's appointment with its client and is subject to the terms and conditions of that appointment. RPS accepts no liability for any use of this document other than by its client and only for the purposes for which it was prepared and provided.
2. If received electronically it is the recipient's responsibility to print to correct scale. Only written dimensions should be used.
3. This drawing should be read in conjunction with all other relevant drawings and specifications.

[illegible]

1. UNDERGROUND DRAINAGE INFORMATION HAS BEEN MEASURED FROM SURFACE INSPECTION ONLY AND SHOULD BE CONFIRMED BY SPECIALISTS IF CRITICAL.
2. TREE AND HEDGE SPECIES HAVE BEEN IDENTIFIED AS ACCURATELY AS POSSIBLE BUT SHOULD BE CONFIRMED BY SPECIALISTS IF CRITICAL.
3. SURVEY GRID & LEVELS RELATED TO ORDNANCE SURVEY NATIONAL GRID. OBTAINED THROUGH REAL TIME GPS OBSERVATIONS. BASED ON STATION 54 (472197.199E, 100527.518N). NO SCALE FACTOR HAS BEEN USED.
4. LEVEL CONTOURS AND 3D TRIANGLES ON FROZEN LAYER.

Rev	Description	By	Ckd	D
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Title TOPOGRAPHICAL SURVEY

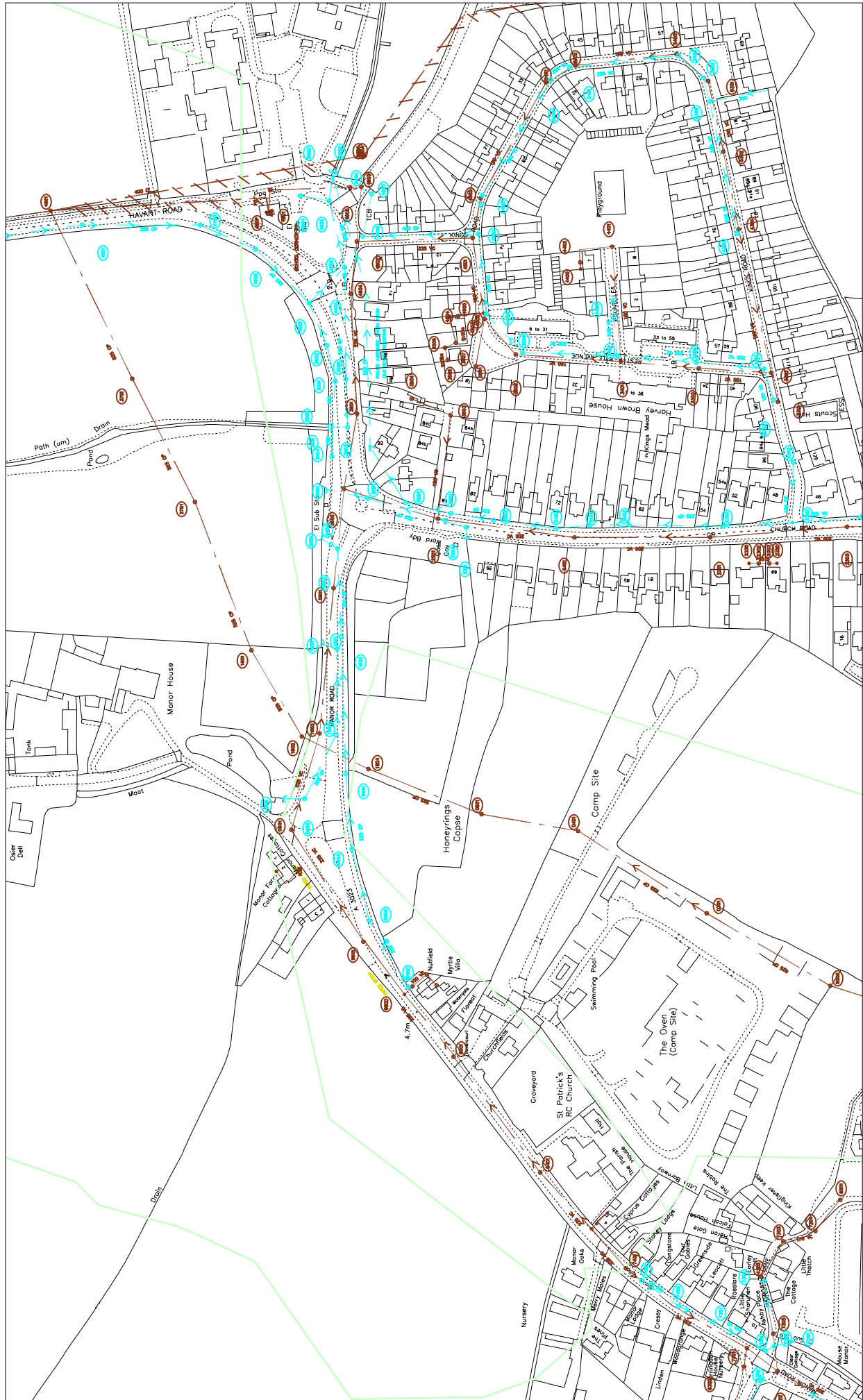
Document Number	Revision	Sub
JKK9364 - 2	A	

APPENDIX II

Sewer Records

SEWER RECORDS PAGE 1 OF 2

100855



100277

O.S. REF. SU7200NW		Drawn by: yadavsa		472619	
Title: 228330_Hayling Island		Scale: 1:2500			
		Date: 24/11/2016		 N	
The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. WARNING: SAC pipes are constructed of Boronated Asbestos Cement WARNING: Unmarked (UNM) manholes may contain Asbestos Cement					
Based upon Ordnance Survey Digital Data with the permission of the controller of the H.M.S.O. Crown Copyright Reserved Licence No. WU 298630.					

471673

SEWER RECORDS PAGE 2 OF 2

[illegible][illegible]

APPENDIX III

EA Correspondence

Elliott Flynn

From: Watson, Dan <Dan.Watson1@environment-agency.gov.uk>
Sent: 13 March 2017 13:39
To: Elliott Flynn
Cc: Ivan Ramirez; Maskell, Jon
Subject: Preplanning advice Hayling Island

Elliott

It was nice to meet yourself and Ivan last week.

I am writing with regard to the further actions we spoke about in the meeting.

- The volume of flood storage we require to be offset is the level above the existing ground to the level of the 1 in 100 year level including climate change. As we do not have modelling that includes climate change this will need to be done by yourselves.
- The climate change allowance website (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>)
- Any new meeting would be £84 per person per hour with an additional £84 for project management costs too so probably about £252
- Finished floor levels are required to be above the 1 in 100 year levels and we recommend 600mm.
- The culvert is not owned by the EA so this will most likely be Hampshire County Council if not it will be Highways England.
- I will track down the CCTV records of the culvert.

If you have any queries regarding the above please give me a call

Regards

Daniel Watson

Partnership & Strategic Overview (P&SO)

Hampshire & the Isle of Wight

Solent & South Downs

Environment Agency

0208 474 9127

📧 Romsey District Office
Canal Walk
Romsey
Hampshire
SO51 7LP

✉ dan.watson1@environment-agency.gov.uk

🌐 www.gov.uk/environment-agency



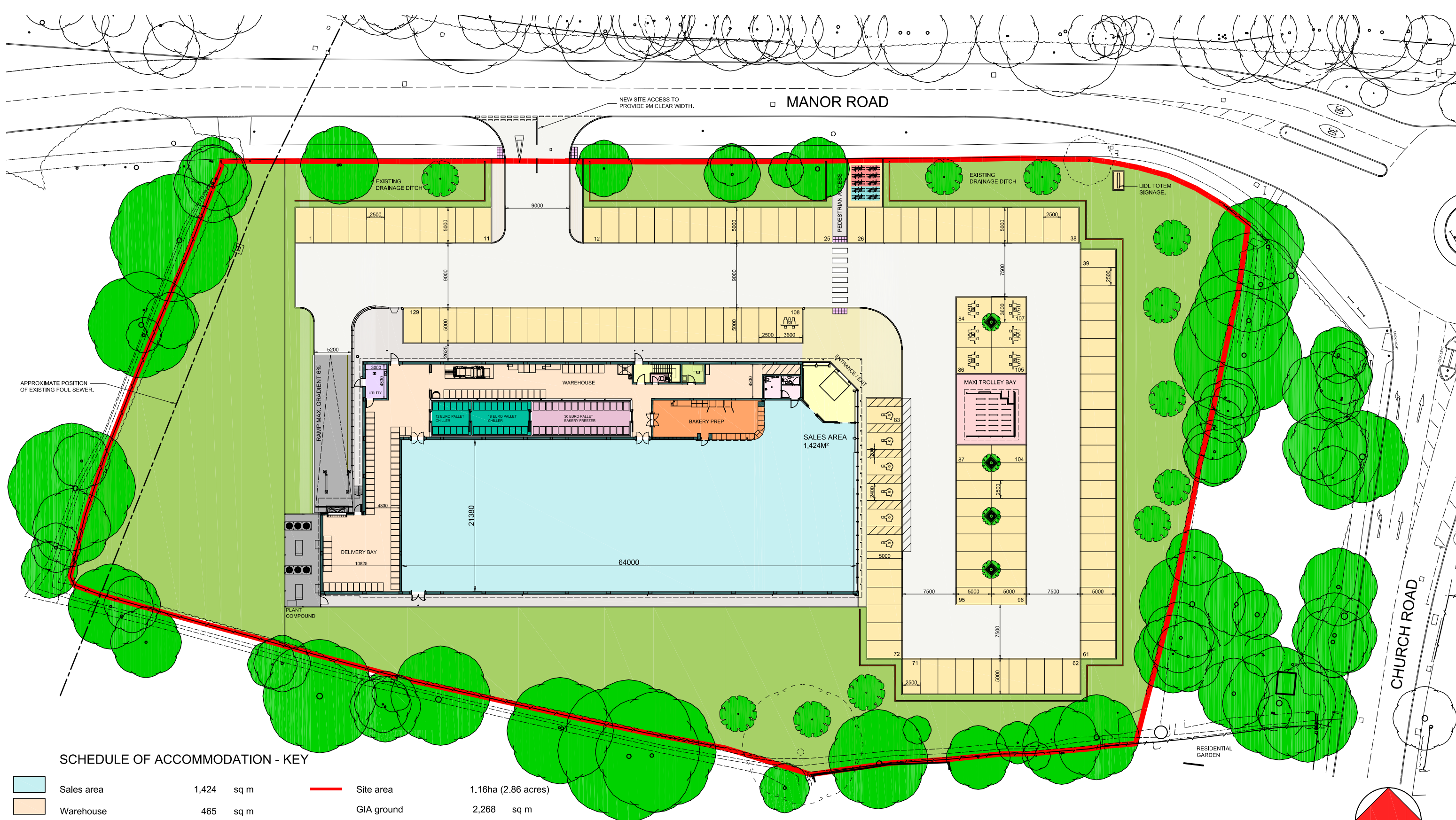
Planning for the
future of water



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APPENDIX IV

Architectural Proposals



SCHEDULE OF ACCOMMODATION - KEY

	Sales area	1,424	sq m		Site area	1.16ha (2.86 acres)
	Warehouse	465	sq m		GIA ground	2,268 sq m
	Bakery Prep	84	sq m		GIA first	200 sq m
	Bakery Warehouse	66	sq m		GIA total	2,468 sq m
	Additional Chillers	66	sq m		GEA ground	2,350 sq m
	Office	8	sq m		PARKING	
	CCTV room	3	sq m		Standard	116
	Public wc, etc	17	sq m		Disabled	6
	Utility	14	sq m		Parent & child	7
	Circulation	64	sq m		TOTAL	129 spaces
	Internal partitions	57	sq m		Short stay cycle parking	11 cycles
					Long stay cycle parking	8 cycles

0 10 20 30 40 50m

& POOLE PATTLE chartered architects
 TEL: 01473 230580 FAX 01473 231549 E-MAIL mail@pooleandpattle.co.uk
 5 OBSERVATION COURT 84 PRINCES STREET IPSWICH SUFFOLK IP1 1RY

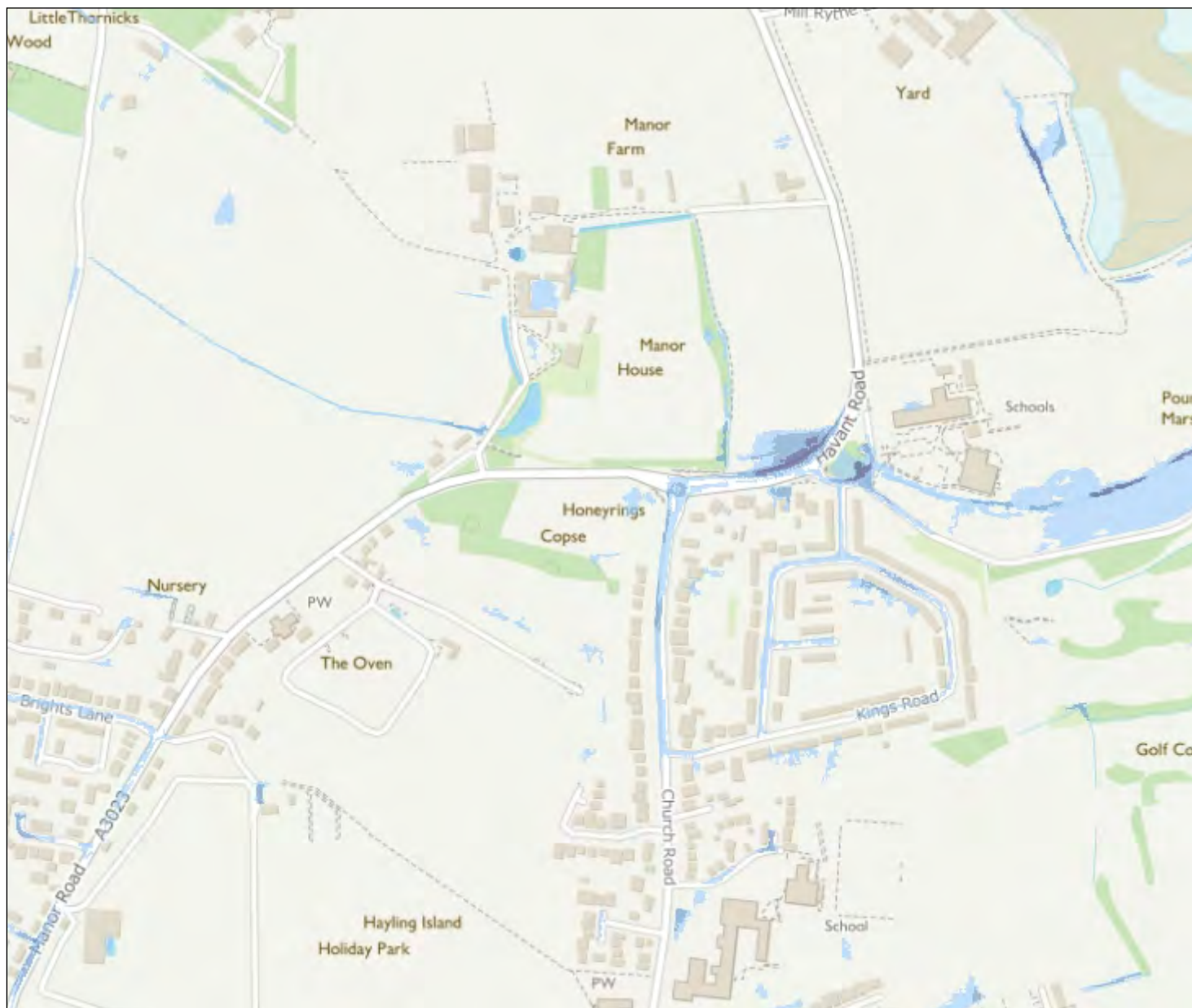
Project Lidl, Hayling Island	Date Nov 2016	Scale 1:500 @ A3
Drawing Site Plan as Proposed	3671	02 B

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APPENDIX V

EA Flood Data

Risk of flooding from Surface Water Centred on Church Road - Created 4 January 2017



Scale 1:6,822



Likelihood of flooding from Surface Water

- High ($\geq 3.3\%$)
- Medium ($3.3\% - 1\%$)
- Low ($1\% - 0.1\%$)
- Very Low

Likelihood of flooding from Surface Water

- High:** Greater than or equal to 3.3% (1 in 30) chance in any given year
- Medium:** Less than 3.3% (1 in 30) but greater than or equal to 1% (1 in 100) chance in any given year
- Low:** Less than 1% (1 in 100) but greater than or equal to 0.1% (1 in 1,000) chance in any given year
- Very Low:** Less than 0.1% (1 in 1,000) chance in any given year

This information is shown on the Risk of Flooding from Surface Water map on our website.

2016 JFLOW Levels Centred on Church Road - Created 4 January 2017 (Ref: SSD/30703)



Legend

+ Location Points

Ground Level

Value

High
Low

Depth

Value

High
Low

1:2,696
(*when printed at A4)



Defences Centred on Church Road - Created 4 January 2017 (Ref: SSD/30703)

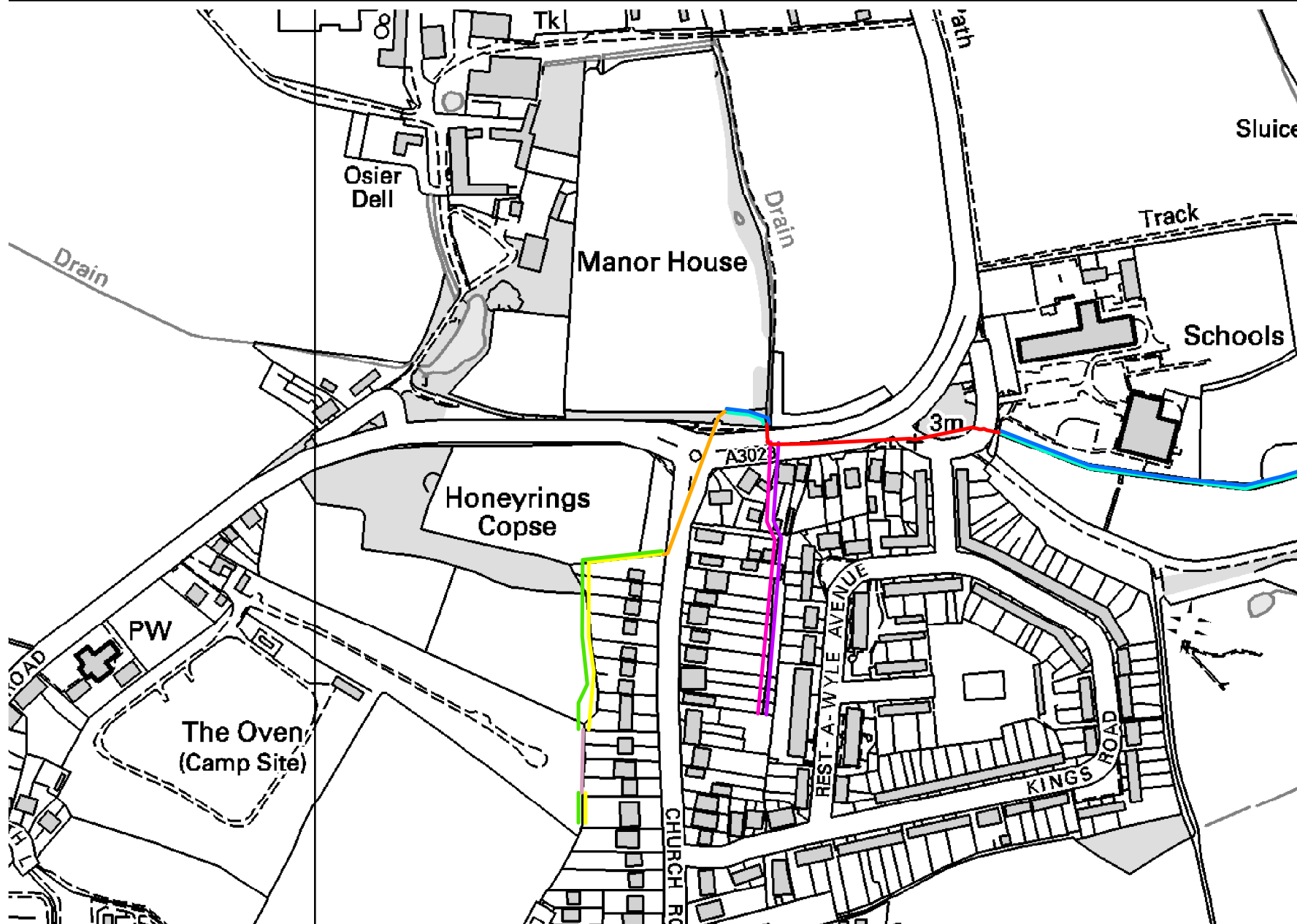


Legend

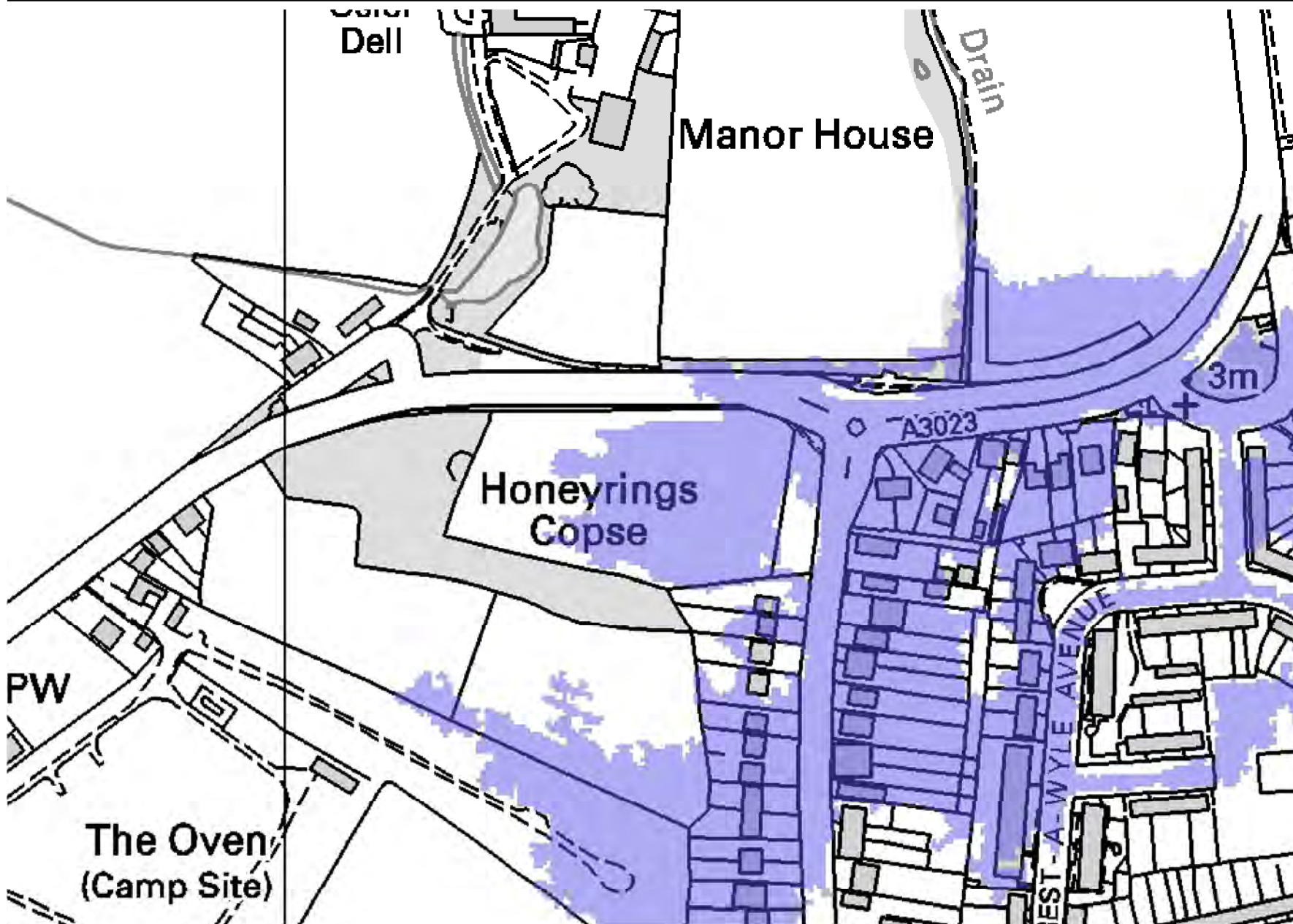
Asset ID

- 7516
- 7517
- 9810
- 9811
- 9812
- 9813
- 180230
- 181895
- 182026

1:4,043
(*when printed at A4)



Asset ID	Description	Asset Maintainer	Estimated Standard of Protection
7516	natural channel	unknown	1:20
7517	natural channel	unknown	1:20
9810	Natural channel	unknown	1:20
9811	Natural channel	unknown	1:20
9812	Natural channel	unknown	1:20
9813	Natural channel	unknown	1:20
180230	Approx 250mm dia pipe running under Manor Road/roundabout	local_authority	1:25
181895	500mm pipe running under A3023	local_authority	1:25
182026	50 m approx culvert	private	1:25



Legend

RETURN_PERIOD

100yr + CC

1:2,696
(*when printed at A4)

