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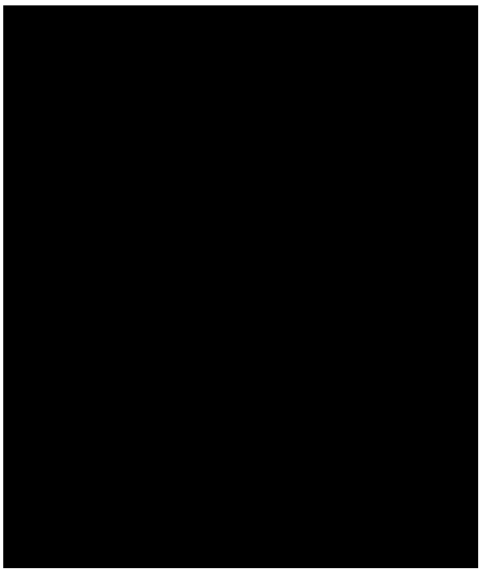

Flood Risk Assessment

Proposed industrial development at

Wicks Farm, Ford Lane

On behalf of

Stock Estate Partnership

June 2018

ARUN DISTRICT COUNCIL F/11/19/PL

Document History and Status

Project Number 22979

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1 Non Technical Summary

1.1 This Flood Risk Assessment has been undertaken in accordance with the National Planning Policy Framework on behalf of Stock Estate Partnership in support of a Planning Application for the construction of a mixed B1 and B8 business unit with associated access roads and car parking area on land at Wicks Farm, Ford Lane, Arundel, West Sussex.

1.2 This Assessment is to be read in conjunction with all planning, architectural and other reports that accompany the Planning Application for the proposed development.

1.3 The proposed site is located in Flood Zones 1, 2 and 3.

1.4 The type of development proposed is classified as less vulnerable and suitable in Flood Zone 1, 2 and 3a.

1.5 The proposed development will incorporate a sustainable drainage system. Surface water runoff can be discharged either via infiltration to ground or into the existing watercourse.

1.6 The exact nature of the storage and infiltration system will be confirmed at detailed design stage but can be accommodated using a variety of methods such as permeable paving, voided subbase or cellular tanks.

1.7 Foul drainage will be discharged into the existing onsite foul drainage system.

1.8 This report concludes that the proposed development is suitable at this location and the level of flood risk is appropriate for the type of development proposed.

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2 Planning Policy Context

2.1 National Planning Policy Framework

2.1.1 National Planning Policy Framework aims to reduce flood risk through development opportunities. The policy framework aims to ensure flood risks and the predicted effects of climate change have been taken into account and appropriate measures put in place to ensure that:

- ¿ The development is safe
- ¿ Where possible the flood risk overall is reduced
- ¿ Increased flood risk does not occur elsewhere
- ¿ Appropriate mitigation measures are employed to deal with these effects and risks.

2.2 Lead Local Flood Authority

2.2.1 West Sussex County Council became a Lead Local Flood Authority under the Flood and Water Management Act 2010 and was given a series of new responsibilities to coordinate the management of local flood risk.

2.2.2 As part of their role West Sussex County Council have produced the following documents

- ¿ Local Flood Risk Management Strategy dated May 2014
- ¿ Preliminary Flood Risk Assessment dated May 2011
- ¿ Strategic Flood Risk Assessment dated January 2010

2.2.3 All documents have been reviewed in the preparation of this report.

2.3 Arun District Council

2.3.1 Arun District Council adopted the Strategic Flood Risk Assessment (Strategic Flood Risk Assessment) in August 2016.

2.3.2 Arun District Council adopted the 2011-2031 Local Plan on 18 July 2018. This replaces the saved policies within the 2003 Local Plan.

2.3.3 All documents have been reviewed in the preparation of this report.

2.4 Arun Local Plan 2011-2031

2.4.1 The following policies of the adopted Local Plan of relevance to this Flood Risk Assessment are as follows:

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2.4.2 Policy W DM1 Water supply and quality states that :to ensure good water quality in the District, all major developments must:

a. Illustrate, where necessary, how they have contributed to the protection and enhancement of waterbodies identified by the South East River Basin Management Plan objectives; and

b. Demonstrate, where it will materially increase foul and/or surface water discharges, adequate drainage capacity exists or can be provided as part of the development. Where adequate capacity does not exist, there will be a requirement that facilities are adequately upgraded prior to the completion and occupation of development. In sewered areas, there will be a general presumption against the use of non-mains foul water drainage.

Developments with respect to all of the above shall also be consistent with all other Local Plan policies.˘

2.4.3 POLICY W DM2 Flood Risk states :Development in areas at risk from flooding, identified on the latest Environment Agency flood risk maps and the Council's Strategic Flood Risk Assessment (SFRA), will only be permitted where all of the following criteria have been satisfied:

a. The sequential test in accordance with the National Planning Policy Guidance has been met.

b. A site-specific Flood Risk Assessment demonstrates that the development will be safe, including access and egress, without increasing flood risk elsewhere and reduce flood risk overall.

c. The sustainability benefits to the wider community are clearly identified.

d. The scheme identifies adaptation and mitigation measures.

e. Appropriate flood warning and evacuation plans are in place; and

f. New site drainage systems are designed to take account of events which exceed the normal design standard i.e. consideration of flood flow routing and utilising temporary storage areas.

The reports prepared as part of the criteria above must take into account contingency allowances, taking climate change into account as set out in Flood Risk Assessments: climate change allowances section of the NPPG.

In locations where strategic flood defence or resilient and resistant construction measures are necessary within the site itself, proposals will be required to demonstrate how measures have been incorporated

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as an intrinsic part of the scheme in a manner which is compatible with the latest Strategic Flood Risk Assessment.

All development proposals must take account of relevant Surface Water Management Plans, Catchment Flood Management Plans and related Flood Defence Plans and strategies such as the Lower Tidal River Arun Strategy. The council may require financial contributions from development on sites where measures to address flood risk or to improve the environmental quality of watercourses have been identified by these Plans and Strategies.˘

2.4.4 POLICY W DM3 Sustainable Urban Drainage Systems states :To increase the levels of water capture and storage and improve water quality, all development must identify opportunities to incorporate a range of Sustainable Urban Drainage Systems (SUDS), appropriate to the size of development, at an early stage of the design process.

Proposals for both major and minor development proposals must incorporate SUDS within the private areas of the development in order to provide source control features to the overall SUDS design. These features include:

¿ Green roofs
¿ Permeable driveways and parking
¿ Soakaways
¿ Water harvesting and storage features including water butts.

Proposals for major development must also integrate SUDS within public open spaces and roads, reflecting discussion with the appropriate bodies. SUDS must therefore be integrated into the overall design of a development and must:

a. Contribute positively to the appearance of the area, integrating access to allow maintenance of existing watercourses and the system.

b. Effectively manage water (including its quality)

c. Accommodate and enhance biodiversity by making connections to existing Green Infrastructure assets and

d. Provide amenity for local residents (ensuring a safe environment)

e. Retain the existing drainage network of the site and the wider area,

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f. Be maintained in perpetuity, supported through a Maintenance and Management Plan/Regime, including its financing, agreed with the Local Planning Authority.

In order to ensure that SUDS discharge water from the development at the same or lesser rate, as prior to construction, developers must:

f. Follow the hierarchy of preference for different types of surface water drainage disposal systems as set out in Approved Document H of the Building Regulations and the SUDS manual produced by CIRIA.

g. Undertake up to six months groundwater monitoring within the winter period.

h. Undertake winter percolation testing in accordance with BRE365.

i. The proposed drainage system must be designed to ensure that there is no flooding on a 1 in 30-year storm event.

j. The design must also take account of the 1 in 100-year storm event plus 30% allowance for climate change, on stored volumes, to ensure that there is no flooding of properties or the public highway or inundation of the foul sewerage system. Any excess flows must be contained within the site boundary, and within designated storage areas.

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3 Existing Site

3.1 Site Location

3.1.1 The development site is located on the land east of Wicks Farm, Ford Lane, Arundel. The nearest postcode is BN18 0DF, Ordnance Survey reference SU 993 040.

3.1.2 A copy of the site location plan is located in Appendix 1 at the rear of this report.

3.2 Site Description

3.2.1 The site is approximately 2.5ha in area and currently in industrial and agricultural use.

3.2.2 Existing ground levels are at their highest point on the eastern boundary of the site at approximately 5.9m AOD.

3.2.3 The land slopes toward the north east and south east where the lowest point of the site is at a level of approximately 2.6m AOD.

3.2.4 The site is bounded to the north and east by undeveloped farm land, to the south by Ford Lane and to the west by Wicks Farmhouse.

3.2.5 There is an existing watercourse adjacent to the eastern site boundary.

3.2.6 The depth of the existing watercourse varies between 0.6 ¯ 1.2m.

3.2.7 A copy the existing site layout plan is attached in Appendix 2 at the rear of this report.

3.3 Existing Drainage

3.3.1 The existing site currently discharges partly by infiltration to ground and partly overland into the existing watercourse to the east.

3.3.2 The existing greenfield runoff rate for the site has been established using XP Solutions Micro Drainage.

3.3.3 Q_{bar} for the site has been established as 8.9l/s and the 1:100 year peak runoff at 28.5l/s. The equivalent greenfield runoff rates are 3.56l/s/ha and 11.4 l/s/ha respectively.

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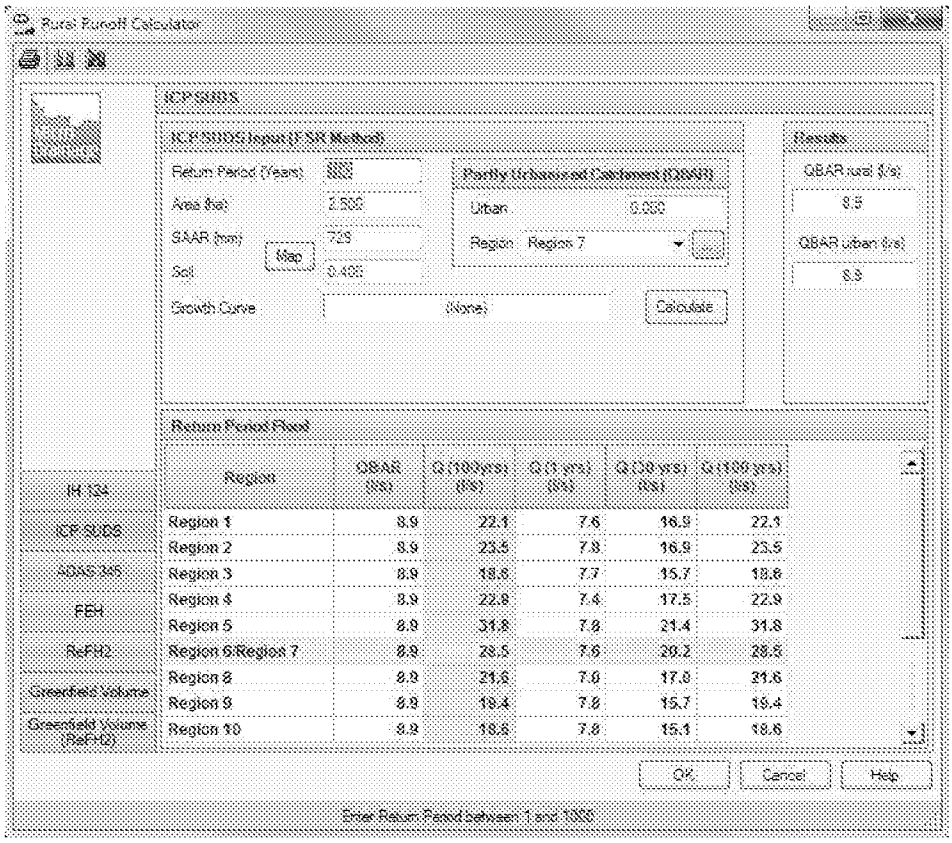

Micro Drainage Runoff Calculations

3.3.4 The Southern Water asset plans confirm that there are no existing public foul sewers in the immediate vicinity of the site.

3.3.5 It is assumed that foul drainage is currently discharged to an onsite Septic Tank or Cess Pit.

3.3.6 A copy of the sewer records is located in Appendix 3 at the rear of this report.

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3.4 Geology and Groundwater

3.4.1 British Geological Survey borehole information indicates a variety of silty clays underlain by chalk layers in the wider locality.

3.4.2 No groundwater was recorded to at least 7m below ground.

3.4.3 The `Magic Map_ available from DEFRA confirms that the site is located above a major aquifer classified as having an intermediate vulnerability.

3.4.4 A copy of the geological borehole data is located in Appendix 4 at the rear of this report.

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4 Flood Zone and Flood History

4.1 Flood Zone

4.1.1 The Environment Agency's Product 4 mapping confirms that the western part of the site is located in Flood Zone 1 and eastern part of the site is located in Flood Zone 3.

4.1.2 Maps available from Arun District Council's Strategic Flood Risk Assessment confirm the site is located partially in Flood Zone 3a.

4.2 Flood History

4.2.1 Environment Agency

4.2.1.1 The Environment Agency has confirmed they have no record of historic flooding affecting the site.

4.2.2 West Sussex County Council

4.2.2.1 Neither the Preliminary Flood Risk Assessment dated May 2011, the Strategic Flood Risk Assessment dated January 2010 nor the Local Flood Risk Management Strategy dated May 2014 identify any specific flood incidents in the immediate vicinity of the site.

4.2.3 Arun District Council

4.2.3.1 The Strategic Flood Risk Assessment dated August 2016 does not identify any specific flood related incidents within the vicinity of the site.

4.2.3.2 Copies of correspondence received from the Environment Agency together with the Product 4 Information and Flood Maps are located in Appendix 5 at the rear of this report.

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5 Flooding Potential

5.1.1 The Environment Agency's flood maps identify the site as being within Flood Zone 1, 2 and 3 affected by the 1:200 year tidal event and the 1:100 year fluvial event.

5.1.2 The Environment Agency have provided four node points of modelled data, nodes 3 and 4 are outside the site boundary.

5.1.3 For this assessment the worst case level between node 1 and 2, which are located on the site has been used.

5.2 Tidal Flooding

5.2.1 The site is located approximately 3.40km from the coast.

5.2.2 The Environment Agency provided modelled tidal flood levels and confirmed the current 1:200 year defended tidal flood level as 3.01m AOD and 4.21m AOD for future 2110 year tidal event.

5.2.3 The site is at risk of tidal Flooding for the predicted future 2110 1:200 year tidal rainfall event. Therefore, at some point in its life time the proposed site will become part of Flood Zone 3 and suitable mitigation should be provided.

5.3 Fluvial Flooding

5.3.1 The Environment Agency have provided modelled fluvial flood levels indicating the future 1:100 year rainfall plus climate change defended flood levels as 3.01m AOD within the proximity to the area of the new industrial unit location.

5.3.2 The existing site levels within the area of proposed industrial unit location vary between 3.11m AOD at the proposed entrance and 2.7m AOD at the rear of the building adjacent to the existing stream.

5.3.3 It is proposed that the new industrial unit floor level will be set at a minimum level of 3.41m AOD to provide a minimum of 300mm freeboard above the modelled fluvial flood level.

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5.4 Groundwater Flooding

5.4.1 Borehole logs hosted on the British Geological Survey website confirm groundwater has not been recorded to at least 7m below ground level.

5.4.2 The Arun District Council Strategic Flood Risk Assessment identifies the existing watercourse as being at risk of flooding during a 1:100 year rainfall event.

5.5 Pluvial Flooding and Flood Potential for Overland Flow

5.5.1 Pluvial flooding typically arises when intense rainfall, often of short duration is unable to soak into the ground or enter drainage systems.

5.5.2 Any overland flow from the site would discharge to the existing stream at the eastern site boundary and not to any adjoining land.

5.5.3 There is no evidence of any overland surface water flow affecting the site and the surface water flood risk to the site is considered as low.

5.5.4 Copies of the available flood maps are included in Appendix 5 at the rear of this report.

5.6 Flood Routing

5.6.1 The natural route for flood waters to dissipate should any ever occur on the site is towards the existing watercourse at the eastern site boundary.

5.6.2 A plan showing the existing flow paths is located in Appendix 6 at the rear of this report.

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6 Development Proposals

6.1 Description

6.1.1 The development proposal is for the construction of a mixed B1 and B8 business unit and associated parking area on land north of Ford Lane, Ford, Arundel.

6.1.2 The roof and external hard standing will be approximately 750m^2.

6.1.3 A plan showing the proposed building outline and location is attached at Appendix 7 at the rear of this report.

6.2 Drainage Strategy

6.2.1 There is no public surface water sewer in the vicinity of the site.

6.2.2 The area is currently drained to the existing watercourse adjacent to the eastern site boundary.

6.2.3 Based on the geology of the area either infiltration solution or restricted discharge into the existing watercourse may be achievable. This will be further investigated at detailed design stage and will require infiltration tests to be undertaken in accordance with BRE 365.

6.2.4 The surface water drainage system will be designed to comply with National Planning Policy Framework and its supporting guidance documents including the Non Statutory Technical Standards for SuDS.

6.2.5 For the purpose of the Planning Application a drainage strategy has been prepared for both infiltration and a restricted discharge to the local watercourse.

6.2.6 Infiltration method:

6.2.6.1 An assumed infiltration rate of 2.0x10^{-5} m/s has been adopted for the preliminary calculations which is typical infiltration for chalk layers and should be achievable within proposed development location.

6.2.6.2 Surface water runoff will be collected and channelled through a positive drainage system and discharged into the ground via cellular soakaways.

6.2.6.3 Cellular soakaways will be constructed with a 1.2m minimum cover over allowing for HGV movements.

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6.2.6.4 Based on the assumed infiltration a total volume of 33m^3 of storage would be required.

6.2.7 Restricted discharge to the existing watercourse method:

6.2.7.1 As previously noted the Q_{bar} greenfield runoff rate for the site is 1.4l/s/ha. This equates to an equivalent Q_{bar} greenfield runoff rate for the proposed developed area of 0.25l/s.

6.2.7.2 Preliminary calculations have been prepared in order to establish the required storage for a 1:100 year storm including an additional 40% increase in rainfall intensity to account for future climate change.

6.2.7.3 For practical purposes a restricted discharge of 2l/s has been used for preliminary design work.

6.2.7.4 A total volume of 34.45m^3 of storage would be required to store the surface water runoff generated by the development for a 100 year plus climate change rainfall event.

6.2.7.5 This surface water drainage strategy could incorporate the combined use of sustainable drainage techniques such permeable surfacing, filter strips and French drains.

6.2.8 The final drainage design will be confirmed at detailed design stage but both methods outlined above are able to provide a solution with sufficient storage which can be provided within a variety of possible facilities such as permeable paving, voided subbase and cellular crates.

6.3 Flood Mitigation

6.3.1 It is proposed that suitable mitigation in the form of temporary measures such as flood resistance products e.g. door flood guards, flexible free-standing barriers or frame barriers are proposed to be installed. This will provide flood resilience for up to 1.5m above the ground level which will also be approximately 300-400mm above the modelled future 2110 1:200 year tidal flood level.

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6.4 Foul Water

6.4.1 Foul drainage will be discharged into the existing onsite foul drainage system.

6.4.2 Preliminary surface water drainage calculations and an indicative surface water drainage strategy plan are located in Appendix 8 at the rear of this report.

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6.5 Water Quality

6.5.1 The proposed development is for industrial use only. In accordance with CIRIA SuDS Manual 2015 (Report C753) the pollution hazard level for such types of development are considered medium. Where surface water runoff is to be discharged into watercourses the SuDS components are only required to control potential contaminants for the frequent low intensity rainfall events as the natural high volume of flows within the receiving water body during a high intensity rainfall event is likely to dilute any contaminants within the water body.

6.5.2 The surface water drainage scheme will include mitigation to ensure water quality before the discharge point will be suitably treated and any pollution risk mitigated prior to its discharge to the receiving water body.

6.5.3 Table 26.2 in Chapter 26 of CIRIA report C753 The SuDS Manual provides Pollution Hazard Indices for varying land types and uses and defines runoff from industrial roofs to be at low risk potential for pollution. Runoff from industrial yard and delivery areas are considered to be at medium risk potential for pollution. The following table summarises the anticipated pollution index from the proposed development.

Land Use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Industrial Roofs	Low	0.30	0.20	0.05
Industrial Yard and Delivery Areas	Medium	0.70	0.60	0.70

Table 1: Pollution Hazard Indices

6.5.4 Where multiple drainage components are used in series the individual mitigation index of secondary and tertiary components is lowered due to reduced performance associated with primary treatment. In accordance with Tables 26.3 and 26.4 of The SuDS Manual the mitigation indices for the different drainage components are shown in the following table.

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SuDS Type	Total suspended solids (TSS)	Metals	Hydro-carbons
Filter Strip	0.4	0.4	0.5
Permeable Paving	0.7	0.6	0.7
Swale	0.5	0.6	0.6
Detention Basin	0.5	0.5	0.6
Pond	0.7	0.7	0.5
Soakaway with 300mm minimum depth underlying soil drainage media	0.4	0.4	0.4

Table 2: Mitigation Indices

6.5.5 Surface water will require prior treatment from one or more of the alternative SuDS features noted in the mitigation indices.

6.5.6 The proposed drainage strategy will incorporate measures to meet or exceed the water quality target requirements and will comply with the Water Framework Directives for discharge of runoff into controlled waters.

6.5.7 The site will be maintained by the operator. An outline drainage maintenance schedule is located in Appendix 9 at the rear of this report.

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7 Safe Development

7.1 Site Location

7.1.1 The proposed site is located in Flood Zones 1, 2 and 3.

7.1.2 The topographical survey confirms that the site levels place the proposed new building within Flood Zone 3.

7.1.3 With reference to Table 2 (Flood Risk Vulnerability Classification) and Table 3 (Flood Risk Vulnerability and Flood Zone Compatibility) of the Technical Guidance to the National Planning Policy Framework the proposed development is classified as less vulnerable and is considered suitable in Flood Zones 1, 2 and 3a.

7.2 Review of Suitability for Development

7.2.1 Paragraph 67 of the National Planning Policy Framework (NPPF) details the Flood Risk Vulnerability Classification and suitability of development for each flood zone. A copy of the table is reproduced below:

	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	V	V	V	V	V
Zone 2	V	Exception Test Required	V	V	V
Zone 3a	Exception Test Required	ǔ	Exception Test Required	V	V
Zone 3b	Exception Test Required	ǔ	ǔ	ǔ	V

Table 3: Flood Risk Vulnerability Classification

7.3 Risk to Others

7.3.1 The proposed surface water drainage system will be designed to current standards incorporating SuDS elements providing treatment, attenuation and storage which will minimise runoff leaving the site during times of heavy rain.

7.3.2 Allowance has been made for 40% increase in rainfall intensities which is in accordance with the latest figures published by the Environment Agency and in accordance with the requirements under the National Planning Policy Framework.

7.3.3 The proposed surface water drainage system will incorporate treatment prior to final discharge destination thus mitigating the risk of pollution from the site.

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7.3.4 The risk of flooding to others due to the development proposals is negligible.

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8 Conclusions

8.1 The site is located in Flood Zone 1, 2 and 3.

8.2 The type of development proposed is classified as less vulnerable and suitable in Flood Zones 1, 2 and 3a.

8.3 It is proposed that the new industrial unit floor level is set at a minimum of 3.41m AOD providing a 300mm of freeboard above the modelled 100 year defended fluvial flood level including allowance for climate change.

8.4 The proposed industrial unit will also be affected by the future tidal flooding. The highest predicted future 2110 1:200 year tidal flood level is 1.2m higher than existing ground level and will be 1.1m higher than the proposed finished floor level.

8.5 Mitigation in the form of temporary measures such as flood resistance products e.g. door flood guards, flexible free-standing barriers or frame barriers will be installed to protect the property and provide flood against the modelled future 2110 1:200 year tidal flood level.

8.6 Surface water runoff generated by the proposed development can be attenuated onsite for all rainfall events up to the 1:100 year event including an allowance for climate change.

8.7 Foul drainage will be discharged into the existing onsite foul drainage system.

8.8 In terms of flood risk planning the proposed development is suitable at this location and the level of flood risk is appropriate for the type of development proposed.

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9 List of Appendices and Tables

Appendix 1	Site Location Plan
Appendix 2	Existing Site Layout Plan
Appendix 3	Sewer Records
Appendix 4	BGS Geological Borehole Data
Appendix 5	Environment Agency Product 4 Information and Flood Maps
Appendix 6	Existing Flow Path Plan
Appendix 7	Proposed Site Layout Plan
Appendix 8	Preliminary Surface Water Drainage Calculations and Indicative Surface Water Drainage Plan
Appendix 9	Outline Drainage Maintenance Schedule

Table 1	Pollution Hazard Indices
Table 2	Mitigation Indices
Table 3	Flood Risk Vulnerability Classification

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Appendix 1

Site Location Plan

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Appendix 2

Existing Site Layout Plan

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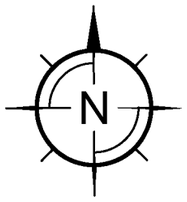

-10m 0 10m 20m 30m 40m

Scale 1:1000

TITLE

Existing Site Layout

SCALE

1:1000 @ A3

DRG. No.

2

Appendix 3

Sewer Records

ARUN DISTRICT COUNCIL F/11/19/PL

Ford Lane Business Park
Victoria Business Park
Clarkson Place
Bond Park
Play Area
Tennis Courts
Bowling Green
Club House
Car Park
Allotments
Sewage Pumping Station
Sewage Treatment Works
Sewage Treatment Filter
Sludge Digestion Tank
Final Settlement Tank
Sludge Thickener
Sludge Digestion Tank
Sludge Drying Beds
Sludge Lagoons
Sludge Lagoon
Sludge Lagoon
Sludge Lagoon

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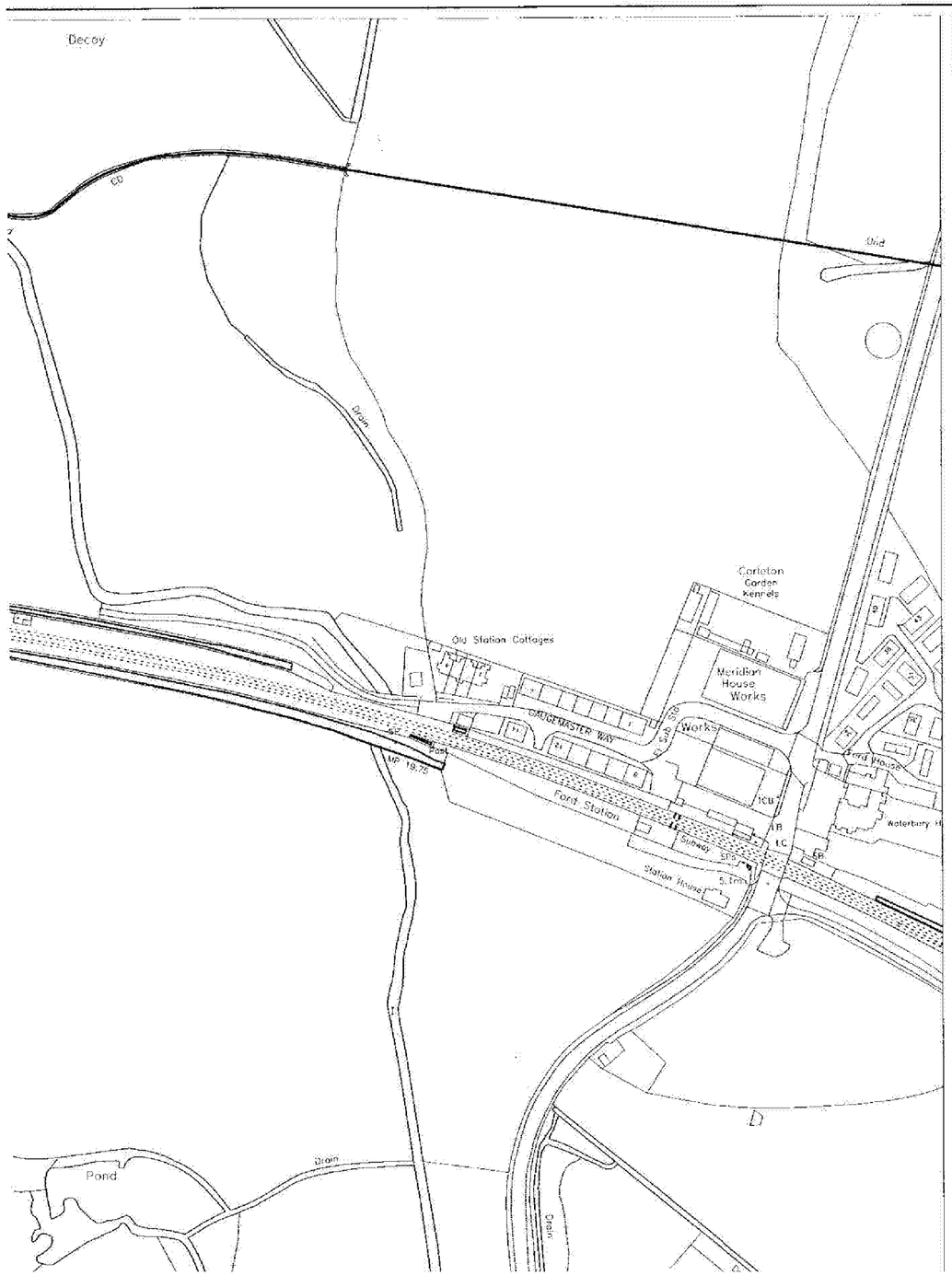

Node	Cover	Invert	Size	Material	Shape
0301X			125	PE	CIRC
0302X	5.065	3.491	150	GRC	CIRC
030AX	5.17	3.95	100	PE	CIRC
031AX	5.1	3.3	100	PE	CIRC
0401X	2.8	1.563	150	GRC	CIRC
0501X	2.7	1.004	225	GRC	CIRC
050PX			100	PE	CIRC
0601X	5.1	2.93	150	GRC	CIRC
0602X	4.05	2.01	150	GRC	CIRC
0701X	4.9	3.325	150	GRC	CIRC

Node	Cover	Invert	Size	Material	Shape

Node	Cover	Invert	Size	Material	Shape

Node	Cover	Invert	Size	Material	Shape

Appendix 4

BGS Geological Borehole Data

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British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 434414 : BGS Reference: SU90SE36
British National Grid (27700) : 499200,104140

Report an issue with this borehole

SU 90 SE 36 9920 0414 **Wick's Farm** **Block N**

Surface level +5.0 m
Water not struck
August 1981

Waste 1.5 m
Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Brickearth	Clay, very silty, brown, with angular and subangular flint pebbles, some peat particles and a few pockets of sand	1.2	1.5
Upper Chalk	Chalk, rubbly, with matrix of olive fine sand near top	1.5+	3.0

SU 90 SE 18

N.G.R. 9928 0390

Geological Classification	Nature of Strata (If measurements start below ground surface, state how far.)	Thickness Feet	Thickness Inches	Thickness Metres	Depth Feet	Depth Inches	Depth Metres
SE DRIFT	Top Soil	1	-	0.30	1	-	0.30
	Brown Clay	3	9	1.13	4	9	1.43
UPPER CRETAC.	Chalk + Flints	20	3	6.84	25	-	7.62

[redacted]

SU 90 SE/16

or Institute use only) GEOLOGICAL CLASSIFICATION	NATURE OF STRATA If measurements start below ground surface, state how far.	THICKNESS Feet	Inches	Metres	
	Top Soil	1	-	0.30	1
Drift	Brown Clay	3	9	1.13	4 9
per Chalk	Chalk & Flints	20	3	6.84	25 -

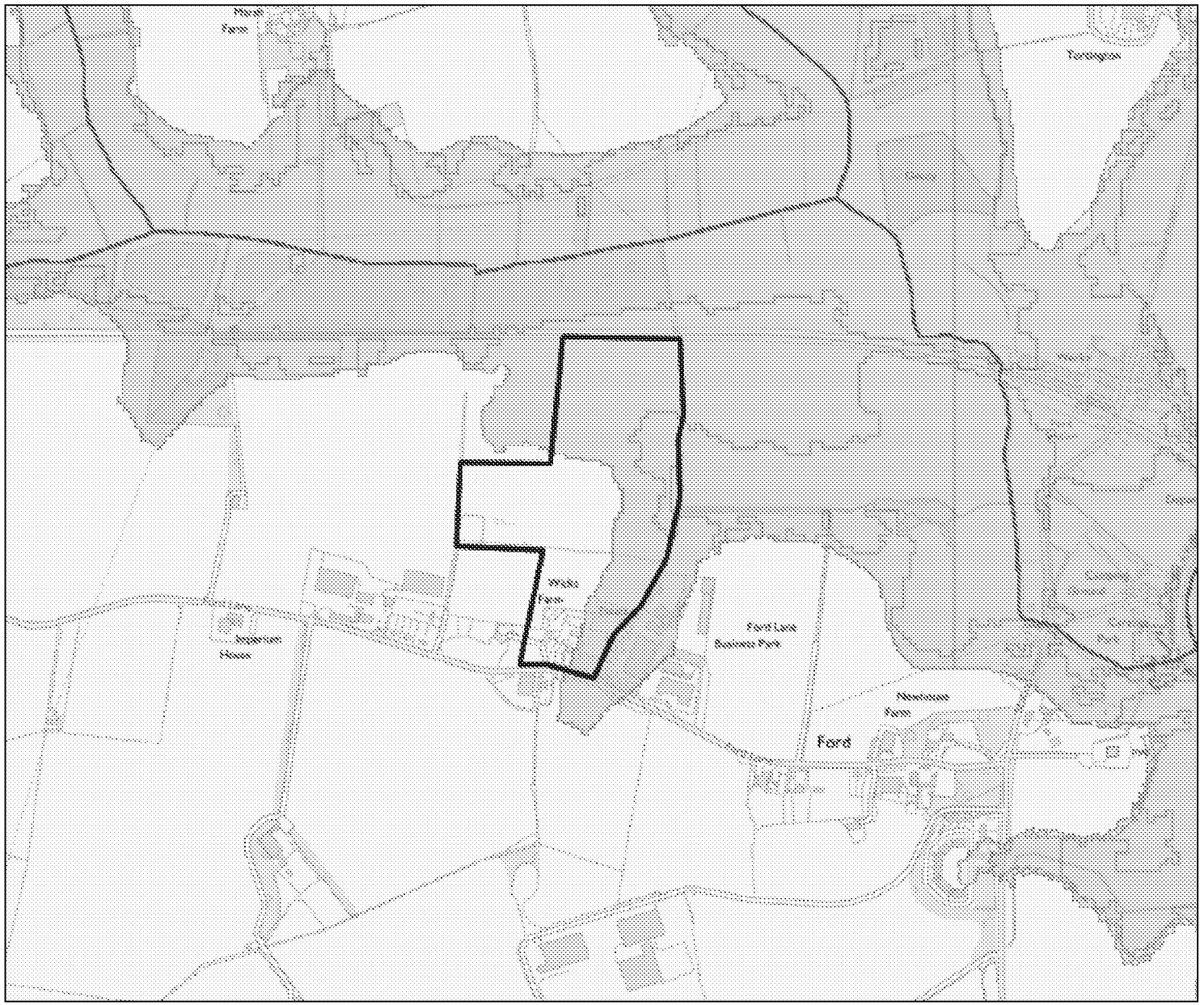
Data Bank

[redacted]

Appendix 5

Environment Agency Product 4 Information and Flood Maps

Flood Map for Planning (Rivers and Sea). Centred on BN18 0DF. Created 6/4/18.



Environment Agency

Scale 1: 10,000

N W E S

Flood Map for Planning (Rivers & Sea)

- Sealed Main Rivers
- Defences
- Flood Storage Areas
- Areas benefiting from flood defences
- Flood Zone 3
- Flood Zone 2

Flood Map Areas (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occuring each year.

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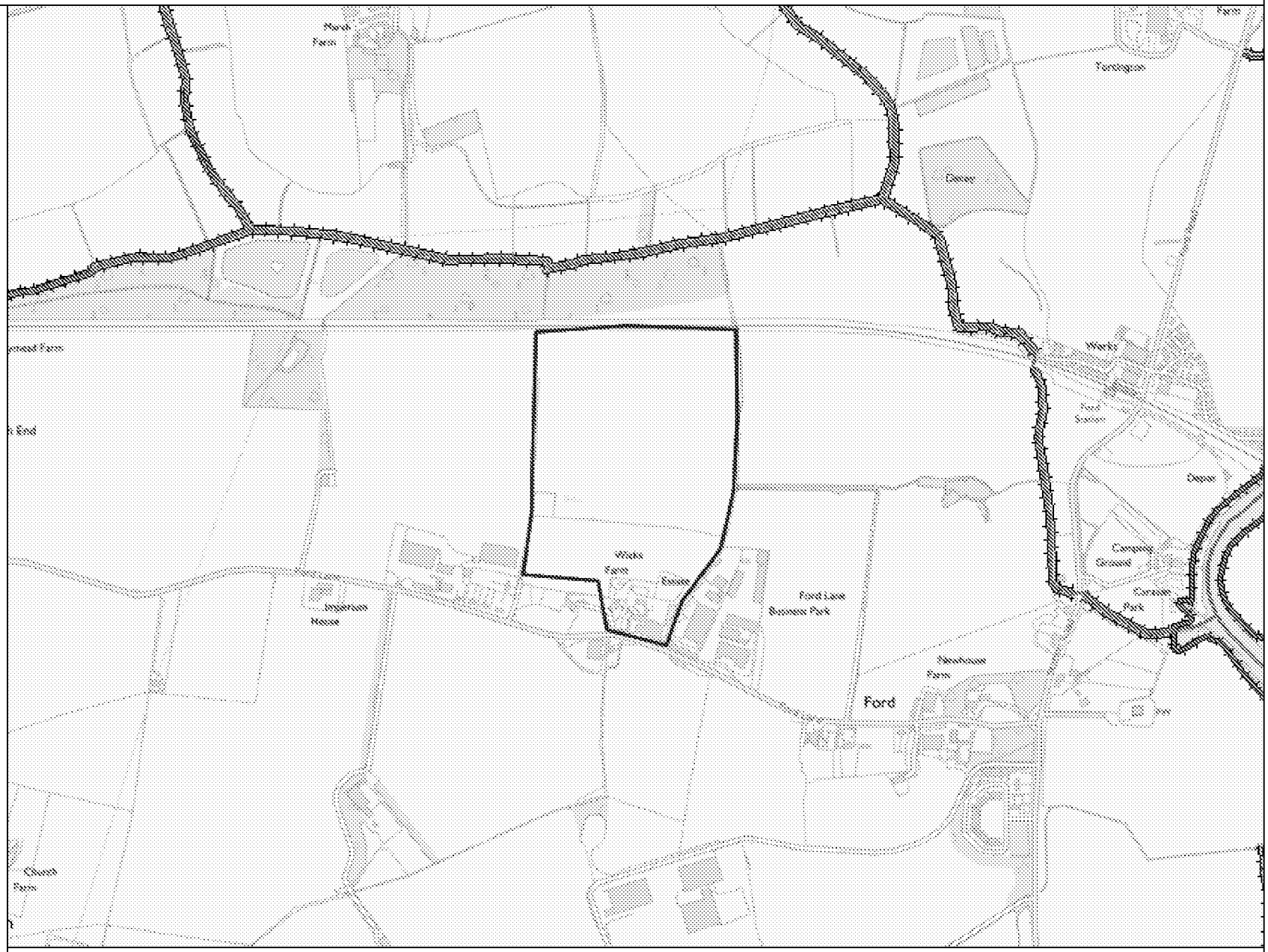
Flood Defence Map. Centred at BN18 0DF. Created on 28/03/18

Environment Agency



Legend

Statutory Main Rivers

Defences (EA maintained)

- Asset type not defined
- Embankment
- Wall
- Flood Gate
- Demountable Defence
- Bridge Abutment
- High Ground
- Beach
- Barrier Beach
- Promenade
- Quay
- Cliff
- Dunes

Defences (3rd party maintained)

- Asset type not defined
- Embankment
- Wall
- Flood Gate
- Demountable Defence
- Bridge Abutment
- High Ground
- Beach
- Barrier Beach
- Promenade
- Quay
- Cliff
- Dunes

Live Flood Warnings (Points)

- Severe Flood Warning

0 100 200 300

Metres

N W E S

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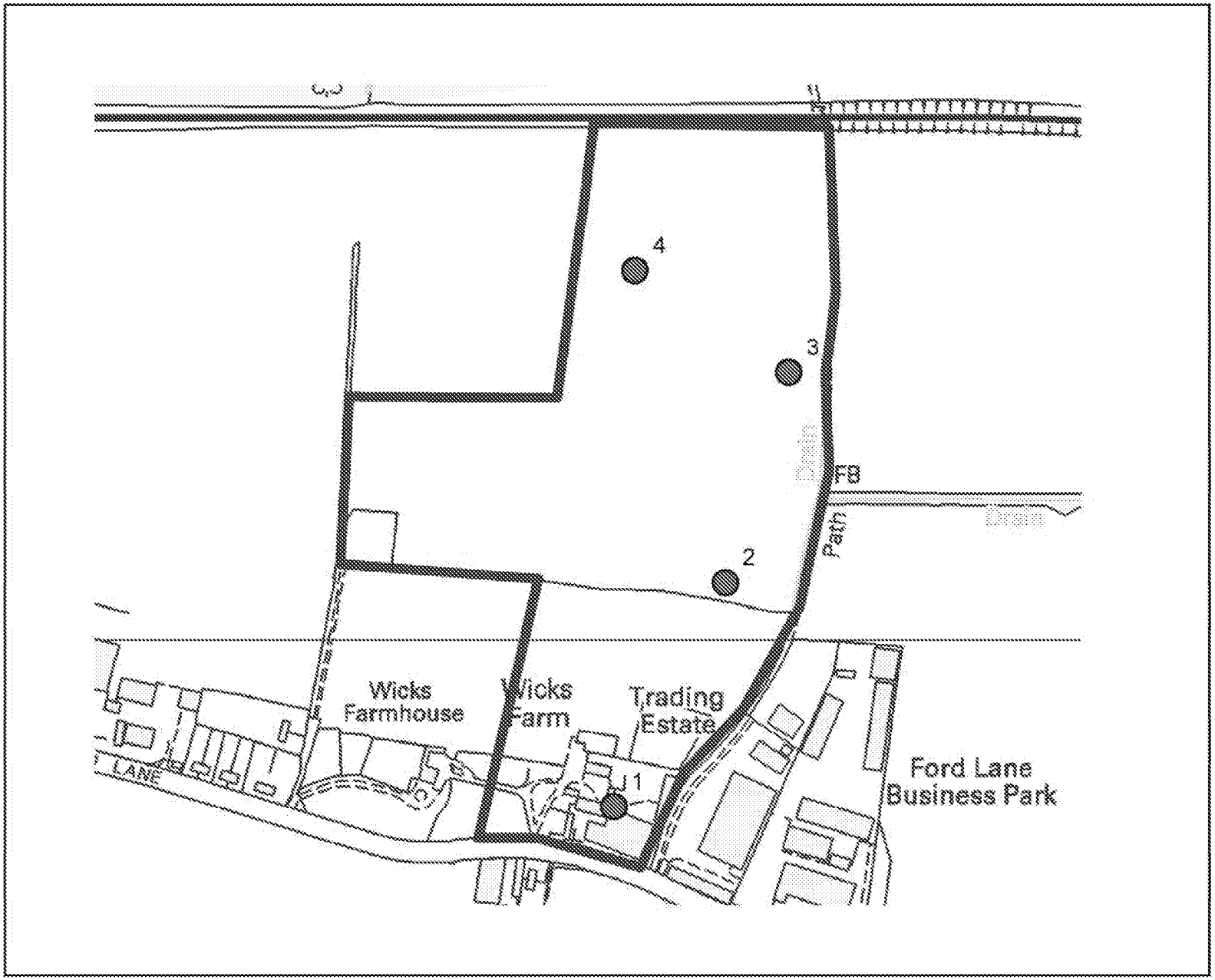
ARUN DISTRICT COUNCIL F/11/19/PL

ARUN DISTRICT COUNCIL F/11/19/PL

Site Boundary & Node Point Map. Centred BN18 0DF. Created 9/4/18.



Environment Agency

N

Legend

- Site Nodes
- Site Boundary

Scale: 1:4,000

0 90 180
Meters

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Product 4 Flood Risk Data Requested by: The Civil Engineering Practice

Site: Wick Farm, Ford Lane, Arundel, BN18 0DF

Table 1: Water Levels: Fluvial Undefended

	NGR		Modelled Flood Levels in Metres Undefended Annual Exceedance Probability			
Node Ref	Eastings	Northings	5%	1%	1% +CC	0.1%
1	499390	103874	3.01	3.01	3.29	3.01
2	499473	104042	2.40	2.40	3.29	2.40
3	499520	104200	2.05	2.14	3.29	2.40
4	499405	104276	2.45	2.45	3.29	2.45

Table 2: Water Levels: Fluvial Defended

	NGR		Modelled Flood Levels in Metres Defended Annual Exceedance Probability			
Node Ref	Eastings	Northings	5%	1%	1% + CC	0.1%
1	499390	103874	3.01	3.01	3.01	3.01
2	499473	104042	2.40	2.40	2.40	2.40
3	499520	104200	2.05	2.12	2.32	2.25
4	499405	104276	2.45	2.45	2.45	2.45

Table 3: Water Levels: Tidal Undefended

	NGR		Modelled Flood Levels in Metres Undefended Annual Exceedance Probability			
Node Ref	Eastings	Northings	5%	0.5%	0.5% (2110)	0.1%
1	499390	103874	3.01	3.06	4.03	3.24
2	499473	104042	2.40	3.07	4.03	3.23
3	499520	104200	2.56	3.07	4.03	3.23
4	499405	104276	2.56	3.07	4.03	3.23

[redacted]

ARU

Table 4: Water Levels: Tidal Defended

	NGR		Modelled Flood Levels in Metres Defended Annual Exceedance Probability			
Node Ref	Eastings	Northings	5%	0.5%	0.5% (2110)	0.1%
1	499390	103874	3.01	3.01	4.21	3.01
2	499473	104042	2.40	2.40	4.21	2.40
3	499520	104200	2.05	2.05	4.20	2.05
4	499405	104276	3.01	3.01	4.21	3.01

Table 5: Water Depth: Fluvial Undefended

	NGR		Modelled Flood Depths in Metres Undefended Annual Exceedance Probability			
Node Ref	Eastings	Northings	5%	1%	1% +CC	0.1%
1	499390	103874	N/A	N/A	0.29	N/A
2	499473	104042	N/A	N/A	0.89	N/A
3	499520	104200	N/A	0.08	1.24	0.35
4	499405	104276	N/A	N/A	0.84	N/A

Table 6: Water Depth: Fluvial Defended

	NGR		Modelled Flood Depths in Metres Defended Annual Exceedance Probability			
Node Ref	Eastings	Northings	5%	1%	1% + CC	0.1%
1	499390	103874	N/A	N/A	N/A	N/A
2	499473	104042	N/A	N/A	N/A	N/A
3	499520	104200	N/A	0.07	0.27	0.20
4	499405	104276	N/A	N/A	N/A	N/A

Table 7: Water Depth: Tidal Undefended

	NGR		Modelled Flood Depths in Metres Undefended Annual Exceedance Probability			
Node Ref	Eastings	Northings	5%	0.5%	0.5% (2110)	0.1%
1	499390	103874	N/A	0.06	1.02	0.23
2	499473	104042	N/A	0.67	1.63	0.84
3	499520	104200	0.51	1.02	1.98	1.18
4	499405	104276	0.10	0.62	1.57	0.78

[redacted]

Table 8: Water Depth: Tidal Defended

	NGR		Modelled Flood Depths in Metres Defended Annual Exceedance Probability			
Node Ref	Eastings	Northings	5%	0.5%	0.5% (2110)	0.1%
1	499390	103874	N/A	N/A	1.20	N/A
2	499473	104042	N/A	N/A	1.81	N/A
3	499520	104200	N/A	N/A	2.15	N/A
4	499405	104276	N/A	N/A	1.20	N/A

All levels taken from: Lower Tidal River Arun Strategy Study, completed in 2010 by Atkins.

Produced on: 09/04/2018

There is no additional information or health warnings for these levels/depths or the model from which they have been produced.

[redacted]