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Flood Risk Assessment

Replacement Dwelling at

32 Valley Road, Chandlers Ford

On behalf of

Mr M Ragi

April 2020

Document History and Status

Project Number 23169

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CONTENTS

1	Non Technical Summary	1
2	Planning Policy Context	2
2.1	National Planning Policy Framework	2
2.2	Planning Policy Guidance Flood Risk and Coastal Change	3
2.3	National Planning Policy Framework – Technical Guidance	4
2.4	Hampshire County Council	4
2.5	Local Planning Policy	4
3	Existing Site	6
3.1	Existing Development Site	6
3.2	Existing Drainage	7
3.3	Geology and Groundwater	7
4	Flood Zone and Flood History	8
4.1	Flood Zone	8
4.2	Flood Defences	8
4.3	Flood History	8
5	Flooding Potential	9
5.1	Fluvial Flooding	9
5.2	Surface Water Flooding	9
5.3	Foul Water Flooding	9
5.4	Groundwater Flooding	9
5.5	Flood Routing	10
6	Development Proposals	11
6.1	Description	11
6.2	Foul Water	11
6.3	Surface Water	11
7	Safe Development and Flood Risk Management	12
7.1	Safe Development	12
7.2	Risk to Others	13
7.3	Flood Risk Management During Construction	13
8	Policy Compliance	15
8.1	National Planning Policy Framework	15
8.2	Planning Policy Guidance Flood Risk and Coastal Change	16
8.3	National Planning Policy Framework – Technical Guidance	16
8.4	Eastleigh Borough Council Policy DM5 Managing Flood Risk	16
9	Conclusions	18
10	List of Appendices, Images and Tables	19

1 Non Technical Summary

- 1.1 This Flood Risk Assessment has been undertaken in accordance with the National Planning Policy Framework on behalf of Mr M Ragi and is submitted in support of a Full Planning Application for the replacement of an existing dwelling.
- 1.2 This Assessment is to be read in conjunction with all planning, architectural and other reports that accompany the Full Planning Application for the proposed development.
- 1.3 The existing site and dwelling are located in Flood Zone 3.
- 1.4 The proposed building footprint of 175m² matches that proposed under extant Planning Permission F/17/80453. There is no loss in floodplain storage as a result of the development.
- 1.5 The single replacement dwelling has been enhanced to provide flood risk mitigation including the anticipated impacts of climate change.
- 1.6 No climate change data or modelling is available for the site therefore the highest available flood level has been used in determining finished floor levels.
- 1.7 Finished floor levels of 29.31m AOD are proposed providing approximately 150mm of freeboard over the predicted 1:1000 flood level, which is the highest viable level given the site constraints.
- 1.8 Flood resilient measures will be incorporated within the design of the replacement dwelling providing further betterment compared to the existing dwelling.
- 1.9 The proposed development will use the existing onsite surface water and foul water connections.
- 1.10 This report concludes that the proposed development is suitable at this location, will reduce flood risk and will remain safe throughout its lifetime based upon the best data available.

2 Planning Policy Context

2.1 National Planning Policy Framework

2.1.1 The National Planning Policy Framework was updated in July 2018.

2.1.2 With regard to planning and flood risk the policy framework states that *‘when determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment.*

Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

- a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*
- b) the development is appropriately flood resistant and resilient;*
- c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*
- d) any residual risk can be safely managed; and*
- e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.’*

2.1.3 With regard to minor developments the NPPF states that *‘applications for some minor development and changes of use (reference footnote 51) should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 50.’*

2.1.4 Footnote 50 reads *‘a site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.)’*

2.1.5 Footnote 51 reads *‘this includes householder development, small non-residential extensions (with a footprint of less than 250m²) and changes of use; except for changes of use to a caravan, camping or chalet site, or to a mobile home or park home site, where the sequential and exception tests should be applied as appropriate.’*

2.1.6 Paragraph 163 states *‘When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that: a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location; b) the development is appropriately flood resistant and resilient; c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate; d) any residual risk can be safely managed; and e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.’*

2.2 Planning Policy Guidance Flood Risk and Coastal Change

2.2.1 Paragraph 30 Planning Policy Guidance Flood Risk and Coastal Change states that

The objectives of a site-specific flood risk assessment are to establish:

- *whether a proposed development is likely to be affected by current or future flooding from any source;*
- *whether it will increase flood risk elsewhere;*
- *whether the measures proposed to deal with these effects and risks are appropriate;*
- *the evidence for the local planning authority to apply (if necessary) the Sequential Test, and;*
- *whether the development will be safe and pass the Exception Test, if applicable*

2.2.2 Paragraph 31 states *‘The information provided in the flood risk assessment should be credible and fit for purpose. Site-specific flood risk assessments should always be proportionate to the degree of flood risk and make optimum use of information already available, including information in a Strategic Flood Risk Assessment for the area, and the interactive flood risk maps available on the Environment Agency’s web site.*

A flood risk assessment should also be appropriate to the scale, nature and location of the development. For example, where the development is an extension to an existing house (for which planning permission is required) which would not significantly increase the number of people present in an area at risk of flooding, the local planning authority would generally need a less detailed assessment to

be able to reach an informed decision on the planning application. For a new development comprising a greater number of houses in a similar location, or one where the flood risk is greater, the local planning authority would need a more detailed assessment.

2.3 National Planning Policy Framework – Technical Guidance

2.3.1 NPPF Technical Guidance identifies that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere.

2.3.2 NPPF Technical Guidance Paragraph 10 states *‘that Minor developments are unlikely to raise significant flood risk issues unless they would:*

have an adverse effect on a watercourse, floodplain or its flood defences; would impede access to flood defence and management facilities; or where the cumulative impact of such developments would have a significant effect on local flood storage capacity or flood flows.’

2.4 Hampshire County Council

2.4.1 Hampshire 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.

2.4.2 As part of their role Hampshire County Council commissioned and produced the following documents:

- Preliminary Flood Risk Assessment dated June 2011
- Local Flood Risk Management Strategy dated July 2013
- Eastleigh Surface Water Management Plan December 2012

The above documents have been reviewed in the preparation of this report.

2.5 Local Planning Policy

2.5.1 Eastleigh Borough Council’s Emerging Local Plan 2016-2036 was submitted to Central Government on 31 October 2018 and was awaiting adoption at the time of writing.

2.5.2 The following proposed policies are of specific relevance to this Flood Risk Assessment

2.5.3 **Policy DM5 Managing Flood Risk** states that *‘Development will only be permitted within the areas at risk of flooding, now and in the future, as identified*

on the Environment Agency most recent flood maps and the Council's Strategic Flood Risk Assessment provided that'

- a. It meets the sequential and exception test (where required) as outlined in Government guidance;*
- b. a site-specific flood risk assessment demonstrates that the development, including the access, will be safe without increasing flooding elsewhere, and where possible, will reduce flood risk overall;*
- c. the scheme incorporates flood protection, flood resilience and resistance measures appropriate to the character and biodiversity of the area and the specific requirements of the site;*
- d. appropriate flood warning and evacuation plans are in place; and*
- e. new site drainage systems are designed taking account of events which exceed the normal design standard.*

Development should not increase flooding elsewhere.

3 Existing Site

3.1 Existing Development Site

3.1.1 The development site is located on land at 32 Valley Road, Chandlers Ford, Eastleigh at Ordnance Survey reference SU 432 214. The nearest postcode is SO53 1GP.



Image 1: Site Location

3.1.2 The site is bounded by residential dwellings and is located in an established residential area.

3.1.3 The site is approximately 680m² in area and currently comprises the existing single-story residential dwelling with detached garage having a total floor plan area of approximately 132m².

3.1.4 Permission was granted on a total floor plan area of 175m² in 2017 at the existing finished floor levels. The proposed development seeks to implement this previously agreed development with additional flood risk mitigation measures.

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

3.1.6 Existing ground levels are highest at the north-eastern side of the site at approximately 28.70mAOD. The site falls towards the south-eastern extent at 27.70mAOD. Ground levels immediately to the rear of the property are at approximately 28.30mAOD.

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

3.2 Existing Drainage

- 3.2.1 Southern Water sewer records identify a 450mm diameter public surface water sewer which is located between the development site and the adjacent property to the west and conveys water from the area north of Valley Road into an open watercourse to the southeast of Neilson Close. The culvert is identified as Main River by the Environment Agency.
- 3.2.2 Southern Water sewer records also identify an existing 175mm diameter public foul sewer located beneath Valley Road.
- 3.2.3 The existing dwelling is connected to both the surface and foul water sewers.
- 3.2.4 A copy of the Southern Water sewer records is located in Appendix 3 at the rear of this report.

3.3 Geology and Groundwater

- 3.3.1 British Geological Survey maps historic borehole data which was recorded approximately 300m to the east of the site identifies varying local geology that is dependent on the presence of superficial alluvium deposits and typically consists of gravel, silty sand and clay. Groundwater was recorded as 0.9m below ground level.
- 3.3.2 The online “Magic Map” available from Defra confirms that the site is located above a minor aquifer and is classified as having a high vulnerability designated as Secondary A.
- 3.3.3 A copy of the geological borehole data is located in Appendix 4 at the rear of this report.

4 Flood Zone and Flood History

4.1 Flood Zone

4.1.1 The site is located in Flood Zone 3.

4.2 Flood Defences

4.2.1 There are no flood defences located in this area.

4.3 Flood History

4.3.1 Environment Agency

4.3.1.1 The Environment Agency has no records of previous flooding events at the site. There is no evidence of the existing property flooding in notable flood events recorded in 2013, 2015 and 2020.

4.3.2 Hampshire Country Council

4.3.2.1 Neither the Preliminary Flood Risk Assessment dated June 2011 nor the Local Flood Risk Management Strategy dated July 2013 identify any specific flood incidents in the immediate vicinity of the site.

4.3.3 Eastleigh Borough Council

4.3.3.1 The Eastleigh Surface Water Management Plan dated December 2012 does not identify any recorded historic flood events at the site location.

4.3.3.2 Within the Eastleigh Surface Water Management Plan, Gordon Road and Neilson Close which are located within close proximity of the site, are reported to have flooded in the past. There is no reference or recorded flooding in Valley Road.

4.3.3.3 Copies of the available flood maps and correspondence are located in Appendix 5 at the rear of this report.

5 Flooding Potential

5.1 Fluvial Flooding

- 5.1.1 The site is shown on Environment Agency Product 4 data to be at risk from fluvial flooding.
- 5.1.2 Whilst the source of flooding is shown as fluvial the watercourse identified is part of a local surface water sewer network which acts as a tributary of the main downstream watercourse within the Monks Brook catchment.
- 5.1.3 This is identified within the Eastleigh Surface Water Management Plan '*Much of the flooding known to occur is as a result of high river flows and, during heavy rainfall, the interaction of fluvial and surface water processes.*'

5.2 Surface Water Flooding

- 5.2.1 The Environment Agency's surface water flood maps identify areas of the site at Medium flood risk (between 1% and 3.3% annual chance of flooding). The surface water flood maps generally mimic the fluvial inundation maps due to linkage between surface water and fluvial flows.
- 5.2.2 Southern Water and Environment Agency records show the Environment Agency defined Main River watercourse conveys via a 450mm diameter pipe from Common Road to the north of the site, beneath Valley Road before heading through the land of 34 Valley Road. The outfall from the site is south of Neilson Close.

5.3 Foul Water Flooding

- 5.3.1 Foul drainage is currently discharged to the existing 175mm foul sewer located beneath Valley Road. It is noted from Southern Water records that 'Anti Flood Devices' are installed on neighbouring properties indicating a potential flood risk from the local foul sewer network.

5.4 Groundwater Flooding

- 5.4.1 British Geological Survey borehole log information located 300m northeast of the site recorded groundwater at approximately 0.9m below ground level in sand, silty clay ground. Based on this information and the local watercourses near the site there is high potential for shallow groundwater to be present.
- 5.4.2 There are no records of groundwater flooding identified within Hampshire County Council Preliminary Flood Risk Assessment, Local Flood Risk Management Strategy or in the Eastleigh Borough Council Strategic Flood Risk Assessment.

5.4.3 The Hampshire County Council Groundwater Management Plan shows 25-50% of properties in this area as being susceptible to groundwater flood emergence.

5.5 Flood Routing

5.5.1 The natural route for flood waters to dissipate, should any event occur on the site, is towards the Main River open channel to the southwest of the site following the natural ground levels.

6 Development Proposals

6.1 Description

6.1.1 The development proposals are for the demolition of the current dwelling and construction of a replacement dwelling on the building footprint granted permission under Planning Permission F/17/80453.

6.1.2 A copy of the proposed site layout plan is located in Appendix 6 at the rear of this report.

6.1.3 A copy of the planning submission comparison plan is located in Appendix 7 at the rear of this report.

6.2 Foul Water

6.2.1 Foul water will be discharged via the existing onsite connections. The usage of the proposed replacement dwelling remains similar to the existing with no increased loadings on the public foul sewer network as a result of the development.

6.3 Surface Water

6.3.1 The footprint of the proposed dwelling matches that of the permitted development under Planning Permission F/17/80453 meaning there will not be an increase in surface water runoff from the site. Hard landscaped areas of the site will use permeable surfaces wherever viable to provide a betterment in comparison to the existing dwelling.

7 Safe Development and Flood Risk Management

7.1 Safe Development

- 7.1.1 The proposed finished floor level is 29.31m AOD, thereby providing approximately 150mm freeboard above the predicted 1:1000 flood level reducing the onsite flood risk in comparison to both the existing development and permitted development granted under Planning Permission F/17/80453.
- 7.1.2 There is no climate change modelling data available for the site from the Environment Agency and the finished level has been set at the highest practical levels within the wider site constraints.
- 7.1.3 Environment Agency documentation demonstrates that modelled 1:1000 flood flows are greater than the 'Higher Central' 1:100 plus 45% climate change allowance values used in the southeast of England. Considering this evidence, the use of the 1:1000 is proportionately appropriate in this case where further climate change data and modelling is unavailable. This approach is supported by local Environment Agency Climate Change guidance for the southeast released in September 2016.
- 7.1.4 The preferred 300mm of freeboard is unfeasible within the constraints of the site which are limited by existing ground levels and the Tree Preservation Order on the northwest corner of the site. Additional flood resistant and resilience measures will therefore be incorporated within the design of the replacement dwelling.
- 7.1.5 The development will use methodologies for flood resistance and resilience within the construction of the dwellings in accordance with Building Regulations Approved Document C and best practice methods from 'Improving the Flood Performance of New Buildings' – Flood Resilient Construction, Communities and Local Government, Defra and the Environment Agency, (May 2007) where viable.
- 7.1.6 All electrical switchgear will be located above a minimum level of 29.46mAOD providing a minimum 300mm of freeboard over the 1:1000 year flood level. The final level of all electrical switchgear is installed must comply with electrical regulations and may result in the switchgear being placed higher than the minimum level noted.
- 7.1.7 Specific detail of flood resilient and resistant measure will be provided at the detailed design stage.
- 7.1.8 The whole property is to be located above the existing 1:1000 level and therefore will provide a 'safe haven' to residents during extreme flood events.

- 7.1.9 Residents will be encouraged to sign up to the Environment Agency's flood warning service.

7.2 Risk to Others

- 7.2.1 Offsite flood risk will not be increased as a result of the proposed development compared to the previously permitted development under Planning Permission F/17/80453.
- 7.2.2 The existing site levels provide no opportunity for any form of compensatory flood storage for the small area comprising raised patios and therefore open voids beneath these areas are proposed allowing the existing floodplain storage capacity to be retained.
- 7.2.3 The impermeable area of the site drains as existing and additional areas of permeable landscaping will be introduced around the site to ensure that surface water runoff from the site is reduced.
- 7.2.4 The replacement dwelling will remain of similar use as the existing dwelling, therefore no increase on foul water loadings will occur.
- 7.2.5 Overall flood risk at the site will be reduced as a result of the development.

7.3 Flood Risk Management During Construction

- 7.3.1 The public surface water sewer (culvert) located beneath the western boundary of the site is identified on Southern Water records. Southern Water maintains this infrastructure with access and easement rights typically set at 3 metres either side of the culvert.
- 7.3.2 The surface water sewer is also under the jurisdiction of the Environment Agency as a classified Main River. A Flood Risk Activity Permit will be obtained prior to construction for all activities to be undertaken within 8m of the main river.
- 7.3.3 Standalone permission will also be obtained from Southern Water as asset owner prior to construction in accordance with the Water Industry Act and Southern Water Policies.
- 7.3.4 The condition of the culvert is to be recorded via a CCTV survey in agreement with both Southern Water and the Environment Agency prior to construction and upon completion of the works.
- 7.3.5 Southern Water and Environment Agency permissions for working within easements are covered by standalone legislation separate from the Planning Application process with all permissions obtained prior to construction of the development.

7.3.6 Details of all management systems required under the Flood Risk Activity Permit will be provided and agreed with all parties prior to commencement. All works will be completed during low summer flows.

8 Policy Compliance

8.1 National Planning Policy Framework

8.1.1 Flood Zone Compatibility

The site is located in Flood Zone 3.

With reference to the Technical Guidance to the National Planning Policy Framework:

- Table 2: Flood Risk Vulnerability Classification.
- Table 3: Flood Risk Vulnerability and Flood Zone Compatibility.

8.1.2 The type of development proposed is classified as C3-Dwelling house 'More Vulnerable'.

8.1.3 This development is a householder development with the footprint of the proposed dwelling less than 250m². The application of the Sequential and Exception Test is not considered applicable for this site as the site is already developed as outlined in NPPF, including Footnote 50 and 51 as defined within Sections 2.13 to 2.15 of this report.

8.1.4 In accordance with the National Planning Policy Framework and as referenced within Section 2.1.2 and 2.1.6 of this report:

- Flood Risk has not been increased elsewhere as a result of the development in line with the extant Planning Permission granted under application F/17/80453
- Levels across the site are at similar levels of flood risk and therefore the development is within one of the lowest areas of flood risk with access close to Valley Road.
- Flood resistant and resilient measures have been incorporated within the development and will be further enhanced during the detailed design stage.
- Sustainable drainage systems have been introduced by increasing permeable surfaces and reducing the overall impermeable surface area of the site.
- Residual risk can be safely managed on the site as escape is viable through shallow flood water to Valley Road, however given the expected flashy nature of the catchment the property will become a 'safe haven' during major flood events with the entire build footprint of the dwelling above the maximum modelled flood level.

8.2 Planning Policy Guidance Flood Risk and Coastal Change

8.2.1 All requirements of Paragraph 30 Planning Policy Guidance Flood Risk and Coastal Change stated within Section 2.2.1 of this Flood Risk Assessment have been met.

8.2.2 In accordance with Paragraph 31 of PPG Flood Risk and Coastal Change stated within Section 2.2.2 of this Flood Risk Assessment the site specific flood risk assessment provided is proportionate to the degree of flood risk and has made optimum use of the best information already available as well as the latest Product 4 information provided from the Environment Agency with a reasoned assessment made on the 1:1000 flood event and potential impacts in light of climate change.

8.2.3 The flood risk assessment is appropriate to the scale, nature and location of the development. The number of people present in the area at flood risk will not be increased. Raising finished floor levels reduces flood risk to occupants compared with the approved development granted Planning Permission under reference F/17/80453.

8.3 National Planning Policy Framework – Technical Guidance

8.3.1 As per Paragraph 10 the development has been made safe without increasing flood risk elsewhere and there will be no adverse effects on the watercourse, floodplain, or defences as a result of the proposed development. There is no loss of floodplain storage in comparison to the extant permission or impact on flood flows as a result of the proposed development.

8.4 Eastleigh Borough Council Policy DM5 Managing Flood Risk.

8.4.1 The development meets all the requirements of Eastleigh Borough Council DM5 Managing Flood Risk outlined in Section 2.5.3 of this Flood Risk Assessment are as follows:

- The sequential and exception test are not required as outlined in Government guidance
- A site specific Flood Risk Assessment has been provided demonstrating that a greater level of access to the development can be maintained in comparison to that previously approved with the development becoming a 'safe haven'. Overall flood risk is reduced as a result of the development
- Flood protection, resilience and resistant measures are proposed and will be appropriate to the character of the development

- The homeowner will sign up to the Environment Agency Flood Warning System and will either evacuate prior to the anticipated flood event or use the property as a 'safe haven' throughout the event.
- The existing drainage system will be improved upon and the site runoff reduced as a result of the development.

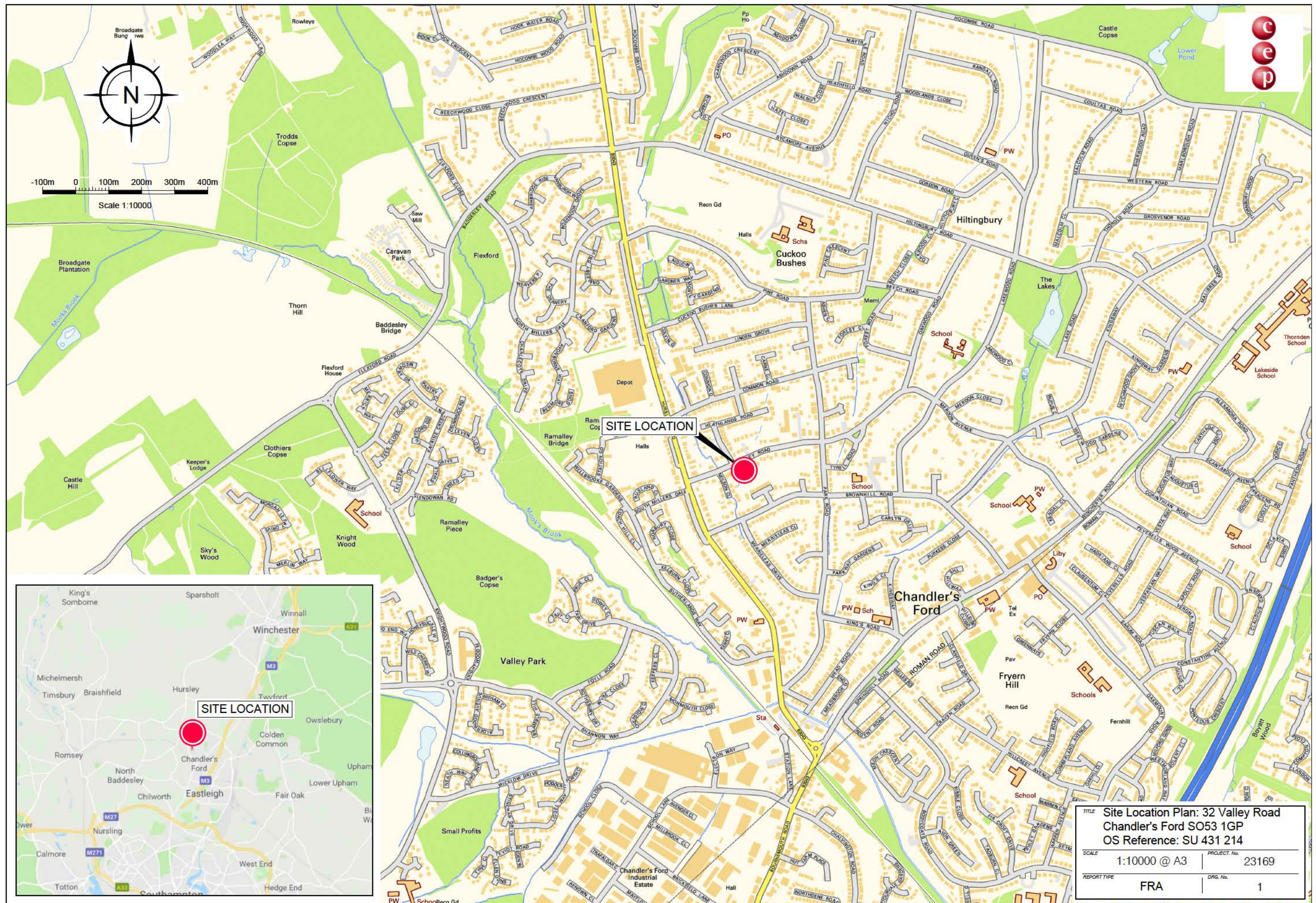
9 Conclusions

- 9.1 The site is at risk of both fluvial and surface water flooding and is classified as being located in Flood Zone 3.
- 9.2 The area in which the site is located does not have a recorded history of flooding.
- 9.3 The flood risk of the site and surrounding area will not be increased as a result of the proposed development.
- 9.4 Environment Agency surface water flood maps show the site at medium risk of surface water flooding between 3.3% and 1% chance in any year which is shown to be 300mm or lower across the site.
- 9.5 The proposed development is for a single replacement dwelling. The proposed finished floor level will be 29.31m AOD thereby providing approximately 150mm freeboard over the predicted 1:1000 year flood level the maximum available within the sites constraints.
- 9.6 The proposed development is over 500mm above the existing property and the permission granted under Planning Application F/17/80453. Additional protective measures such as non-return valves for the sewers are proposed meaning overall flood risk is reduced.
- 9.7 The property is designed to remain safe from flooding throughout the lifetime of the development with appropriate flood resilient and resistant measures to be implemented.
- 9.8 Local historic BGS borehole data identifies groundwater at shallow depths. There is however no history of groundwater flooding at the site.
- 9.9 In terms of flood risk planning the proposed development complies with all published policy, will be safe for the lifetime of the development and will not increase flood risk on or off site with an overall reduction in flood risk.

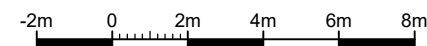
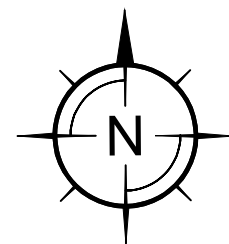
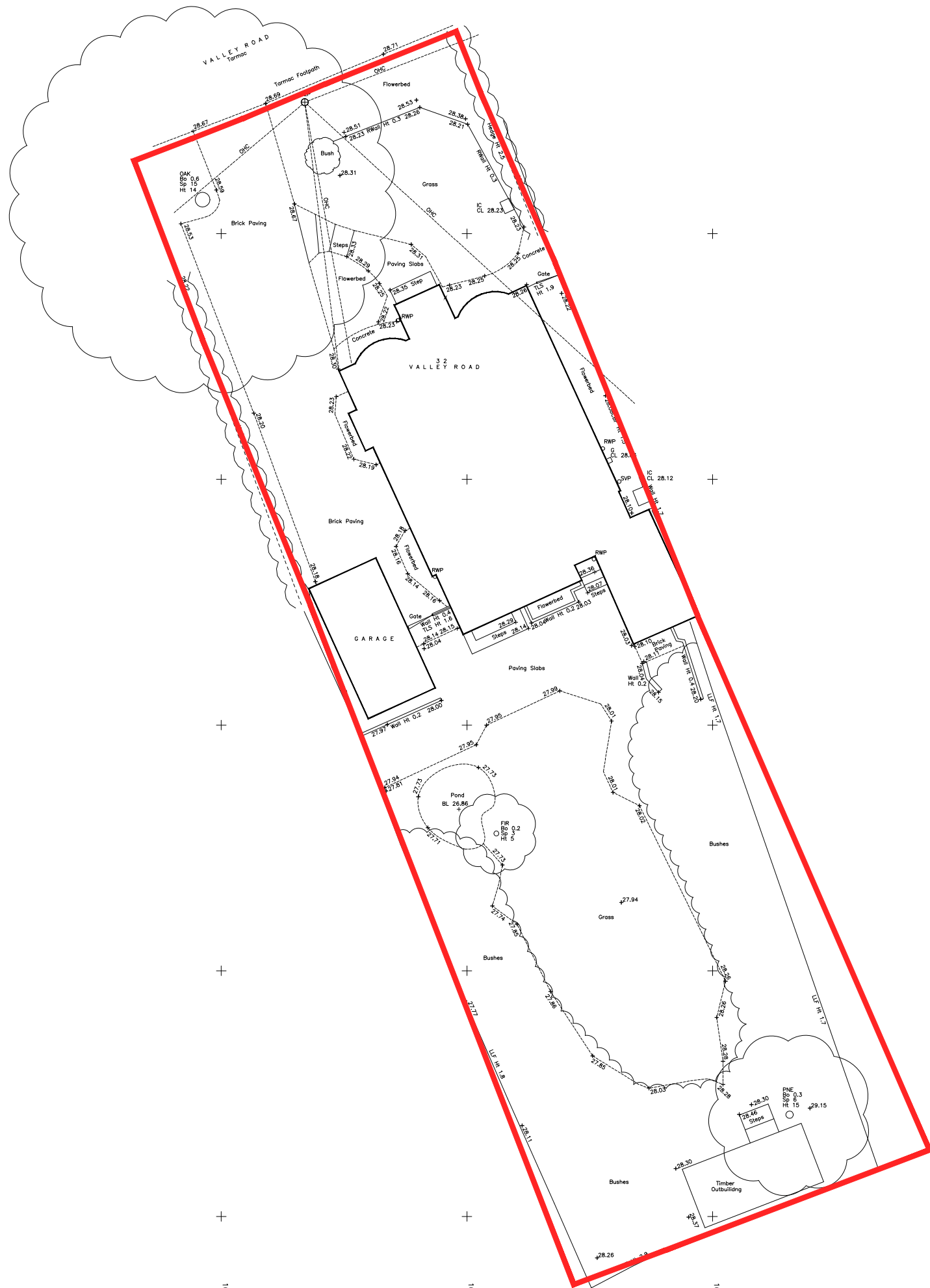
10 List of Appendices, Images and Tables

Appendix 1	Site Location Plan
Appendix 2	Existing Site Layout Plan
Appendix 3	Southern Water Sewer Records
Appendix 4	BGS Borehole Records
Appendix 5	Flood Maps and Correspondence
Appendix 6	Proposed Site Layout Plan
Appendix 7	Planning Submission Comparison Plan
Image 1	Site Location

Appendix 1
Site Location Plan

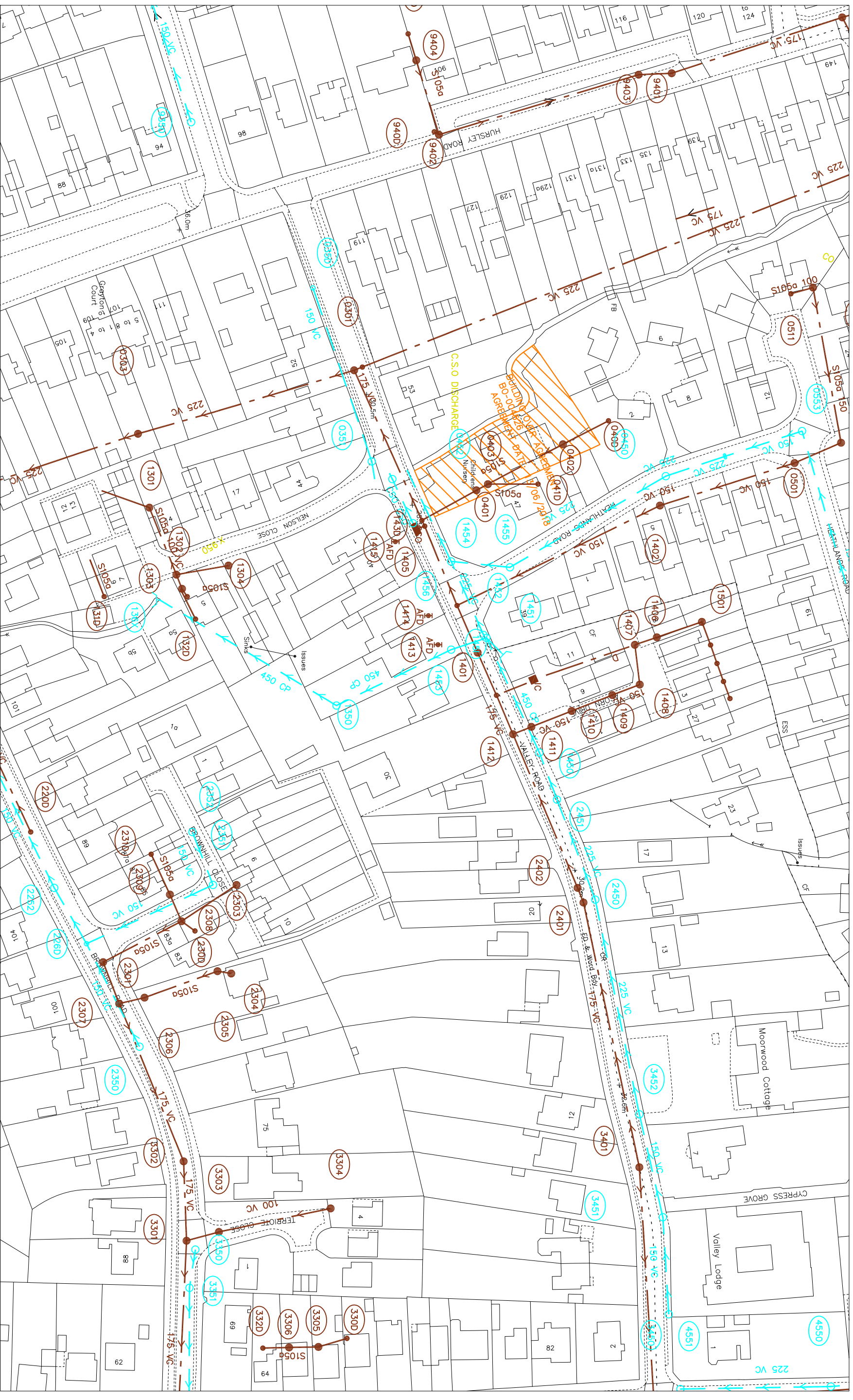


Appendix 2
Existing Site Layout Plan



TITLE	
Existing Site Plan	
SCALE	PROJECT No.
1:200 @ A3	23169
REPORT TYPE	DRG. No.
FRA	02

Appendix 3
Southern Water Sewer Records



121270

121558

O.S. REF.

SU4321SW

Title: 332144_32 Valley Road, Chandle

Drawn by: rohandas

Scale: 1:1250

Date: 20/03/2019

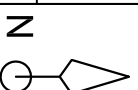
The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy.

The actual positions should be determined on site.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement

Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved
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SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shope	Node	Cover	Invert	Size	Material	Shope	Node	Cover	Invert	Size	Material	Shope	Node	Cover	Invert	Size	Material	Shope
0301X	31.27	26.15	225	VC	CIRC	231DX	33.75	32.3	UNK	UNK	CIRC	231DX	33.75	32.3	UNK	UNK	CIRC						
0303X	28.1	25.7	225	VC	CIRC	2350X	33.93	32.94	150	VC	CIRC	2350X	33.93	32.94	150	VC	CIRC						
0351X	28.84	27.7	150	VC	CIRC	2351X	34.06	33.37	150	VC	CIRC	2351X	34.06	33.37	150	VC	CIRC						
035DX	34.26		150	UNK	CIRC	2352X	30.5	28.24	175	VC	CIRC	2352X	30.5	28.24	175	VC	CIRC						
0401X			UNK	UNK	CIRC	2401X	30.17	29.3	175	VC	CIRC	2401X	30.17	29.3	175	VC	CIRC						
0402X			UNK	UNK	CIRC	2402X	30.53	29.3	225	VC	CIRC	2402X	30.53	29.3	225	VC	CIRC						
0403X			UNK	UNK	CIRC	2450X	29.44	28.45	450	CP	CIRC	2450X	29.44	28.45	450	CP	CIRC						
040DX			UNK	UNK	CIRC	2451X	29.44	28.45	UNK	UNK	CIRC	2451X	29.44	28.45	UNK	UNK	CIRC						
041DX	30.03	28.59	225	VC	CIRC	2451Y	33.63	30.29	175	UNK	CIRC	2451Y	33.63	30.29	175	UNK	CIRC						
0450X	28.5	27.36	225	VC	CIRC	3301X	33.93	31.34	175	VC	CIRC	3301X	33.93	31.34	175	VC	CIRC						
0501X	31.11	29.18	150	VC	CIRC	3302X	34.05	32.63	100	VC	CIRC	3302X	34.05	32.63	100	VC	CIRC						
0508X			150	UNK	CIRC	3303X	34.52	33.22	100	VC	CIRC	3303X	34.52	33.22	100	VC	CIRC						
0509X			150	UNK	CIRC	3304X			UNK	UNK	CIRC	3304X			UNK	UNK	CIRC						
0511X			100	UNK	CIRC	3305X			UNK	UNK	CIRC	3305X			UNK	UNK	CIRC						
0553X	31	29.36	150	UNK	CIRC	3306X			UNK	UNK	CIRC	3306X			UNK	UNK	CIRC						
055DX			225	VC	CIRC	330DX	33.6	32.93	UNK	UNK	CIRC	330DX	33.6	32.93	UNK	UNK	CIRC						
1301Y			UNK	UNK	CIRC	3350X	33.42	31.72	150	VC	CIRC	3350X	33.42	31.72	150	VC	CIRC						
1302X			100	VC	CIRC	3351X	32.88	30.5	UNK	UNK	CIRC	3351X	32.88	30.5	UNK	UNK	CIRC						
1303Y			UNK	UNK	CIRC	3401Y	32.88	30.5	UNK	UNK	CIRC	3401Y	32.88	30.5	UNK	UNK	CIRC						
1304X			UNK	UNK	CIRC	3401X	32.88	30.5	175	VC	CIRC	3401X	32.88	30.5	175	VC	CIRC						
131DX			UNK	UNK	CIRC	3450X	32.05	32.05	150	VC	CIRC	3450X	32.05	32.05	150	VC	CIRC						
132DX			UNK	UNK	CIRC	3451X	33.09	31.82	150	VC	CIRC	3451X	33.09	31.82	150	VC	CIRC						
1406X	10.2	8.646	UNK	UNK	CIRC	3452X	33.77	32.27	225	VC	CIRC	3452X	33.77	32.27	225	VC	CIRC						
1407X			150	VC	CIRC	4550X	36.82	35.58	UNK	UNK	CIRC	4550X	36.82	35.58	UNK	UNK	CIRC						
1408X	9.6	8.234	150	VC	CIRC	9350X	35.15		175	VC	CIRC	9350X	35.15		175	VC	CIRC						
1409X	9.3	7.96	150	VC	CIRC	9401X			UNK	UNK	CIRC	9401X			UNK	UNK	CIRC						
140DX	28.65	26.85	175	VC	CIRC	9402X			UNK	UNK	CIRC	9402X			UNK	UNK	CIRC						
1410X	9	7.647	150	VC	CIRC	9403X			UNK	UNK	CIRC	9403X			UNK	UNK	CIRC						
1411X	8.6	7.285	150	VC	CIRC	9404X			UNK	UNK	CIRC	9404X			UNK	UNK	CIRC						
1412X	7		175	VC	CIRC	940DX			UNK	UNK	CIRC	940DX			UNK	UNK	CIRC						
141DX	28.42	26.45	175	VC	CIRC	941DX			UNK	UNK	CIRC	941DX			UNK	UNK	CIRC						
141DY	28.42		100	VC	CIRC	9502X	33.75		175	VC	CIRC	9502X	33.75		175	VC	CIRC						
142DX			175	VC	CIRC																		
143DX			175	VC	CIRC																		
1450X	29.27	28.3	450	CP	CIRC																		
1451X	28.89	27.77	450	CP	CIRC																		
1452X	28.88	28.07	225	VC	CIRC																		
1453X	28.55	27.23	450	CP	CIRC																		
1454X	28.57	27.7	225	VC	CIRC																		
1455X	29.01	28.17	225	VC	CIRC																		
1456X	28.42	27.77	225	VC	CIRC																		
145X	28.64	28.11	225	CP	CIRC																		
1501X	10.4	9.745	UNK	UNK	CIRC																		
1501X			UNK	UNK	CIRC																		
150DX			UNK	UNK	CIRC																		
151DX			UNK	UNK	CIRC																		
152DX			UNK	UNK	CIRC																		
153DX			UNK	UNK	CIRC																		
155DX			UNK	UNK	CIRC																		
2252X	32.43	30.63	175	VC	CIRC																		
225DX	33.28	31.85	150	VC	CIRC																		
226DX	33.54	31.95	150	VC	CIRC																		
2301X	33.62	31.95	175	VC	CIRC																		
2303X	34.11	32.7	150	VC	CIRC																		
2304X			UNK	UNK	CIRC																		
2305X			UNK	UNK	CIRC																		
2306X			UNK	UNK	CIRC																		
2307X			UNK	UNK	CIRC																		
2308X			UNK	UNK	CIRC																		
2309X			UNK	UNK	CIRC																		
230DX			150	VC	CIRC																		

[illegible]

Drawn by:	rohandas
Title:	332144_32 Valley Road, Chandler
Date:	20/03/2019
	



LEGEND - MAINS

- Distribution Main / Communication pipe
- Trunk Main
- Raw water main
- Non potable
- Abandoned main
- Proposed Main
- Fire main
- Non SWS
- Sluice valve
- Closed valve
- Air valve
- Butterfly valve
- Pressure reducing valve
- Reflux valve
- Motorised valve

Clockwise closing valveFire HydrantWashoutWashout hydrantMeterCapped endEmptying plugStopcockLeak Noise Correlator Survey PointAnodeTelemetry cableAccess point / hatchbox

MATERIALS

- Dialysis machine
- Break pressure tank
- Change node
- Pumping station
- Booster station
- Insertion Flow Meter Point
- Water tower
- Service reservoir
- Water Supply Works
- Bore hole / Well
- Intake
- Customer site
- Swab insertion point

AlkalieneCast ironSpun (grey) ironConcreteDuctile ironBonded Asbestos CementGlass reinforced plasticGlass reinforced epoxy(Unplastidised) Polyvinyl chloridePolyethyleneSteelConcrete segments boltedConcrete segments unboltedGalvanised ironDuctile sleeveConcrete pre-stressedHigh performance polyethyleneUnknown

- AK
- CI
- SI
- CO
- DI
- BAC
- GRP
- GRE
- PVC
- PE
- ST
- CSB
- CSU
- GI
- DS
- CPS
- HPE
- ??

Drawn by:	rohandas	O.S.Ref: SU4321SW
Scale:	1:1250	
Date:	20/03/2019	TITLE: 332144_32 Valley Road, Chandle

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 of pipes should be determined on site.

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Appendix 4
BGS Borehole Records

by
ARCH COUNCIL

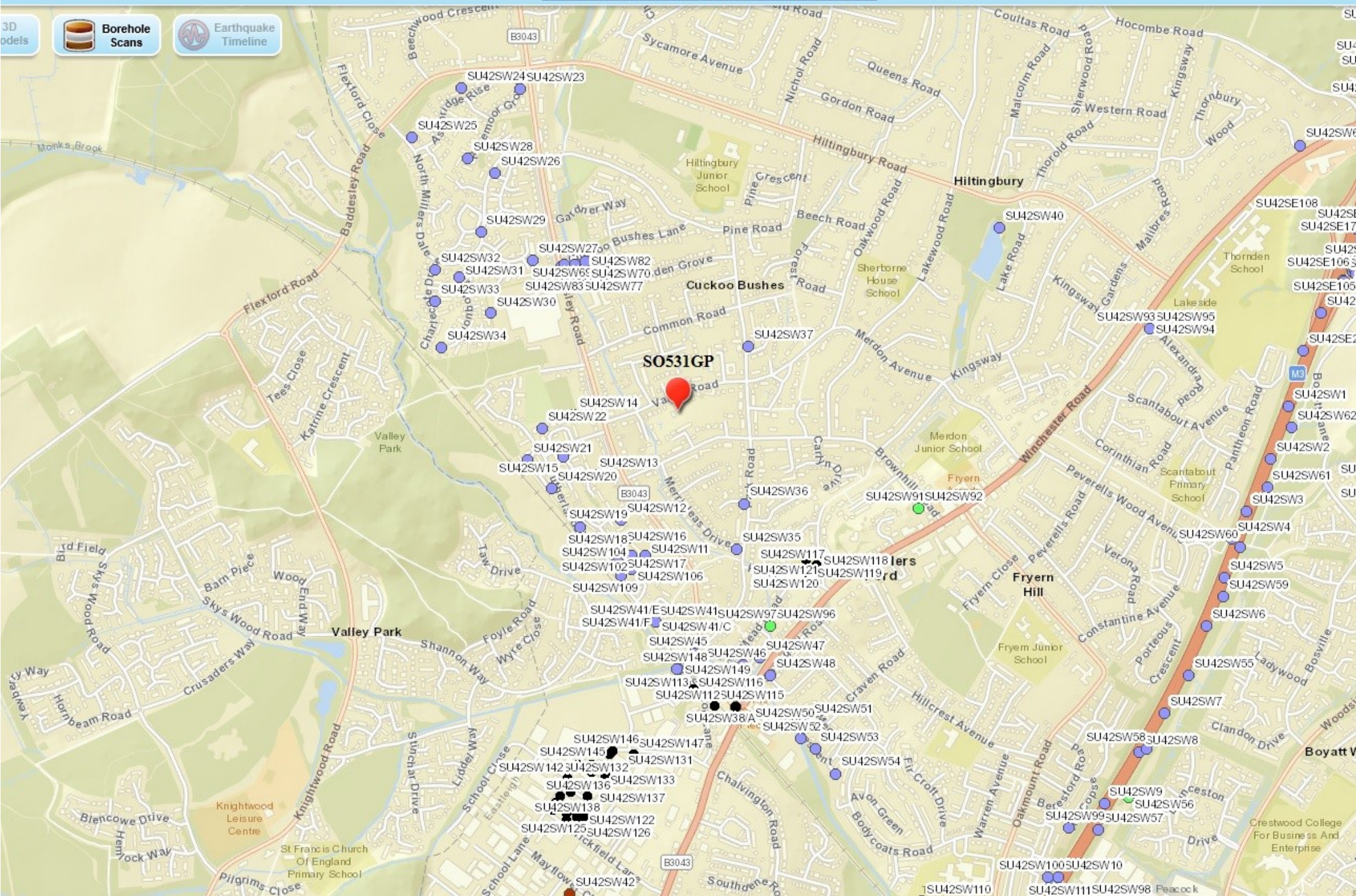
3D models



Borehole Scans



Earthquake Timeline



British Geological Survey

British Geological Survey

British Geological Survey

BH 2

S 4210/36

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

British Geological Survey

PARK ROAD, CHANDLERS FORD

PLAN SHOWING APPROXIMATE POSITION
OF BOREHOLES

British Geological Survey

British Geological Survey

BH 1

S 4210/35-37

MERRIELEAS DRIVE

SITE PARK ROAD, CHANDLERS FORD

FIG. 1c

SU 42 SW/37 NGR ~~4342 2159~~ 4341 2159

British Geological Survey

BOREHOLE

3

British Geological Survey

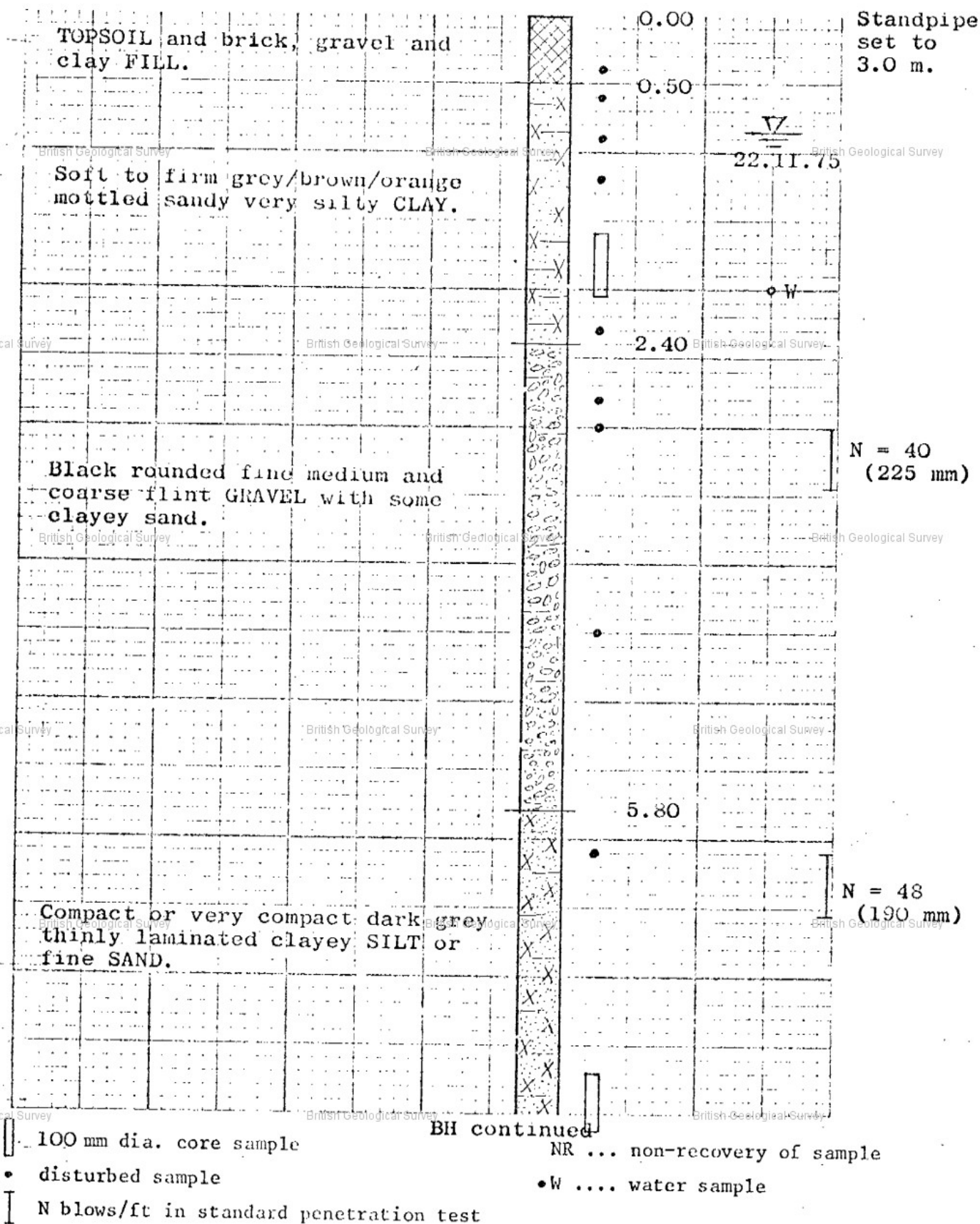
DIAMETER 200

mm

DEPTH 10.0

British Geological Survey

DATE 13/14.11.75



British Geological Survey

British Geological Survey

British Geological Survey

BOREHOLE 3 (cont.)

DIAMETER 200 mm

DEPTH 10.0 m

DATE 13/14.11.75

Compact or very compact dark
grey thinly laminated clayey
SILT or fine SAND.

3.80

Compact grey/orange/brown
silty fine SAND.

(10.00)

(See also Table 6.)

SW42SW/37

100 mm dia. core sample

NR ... non-recovery of sample

• disturbed sample

• W water sample

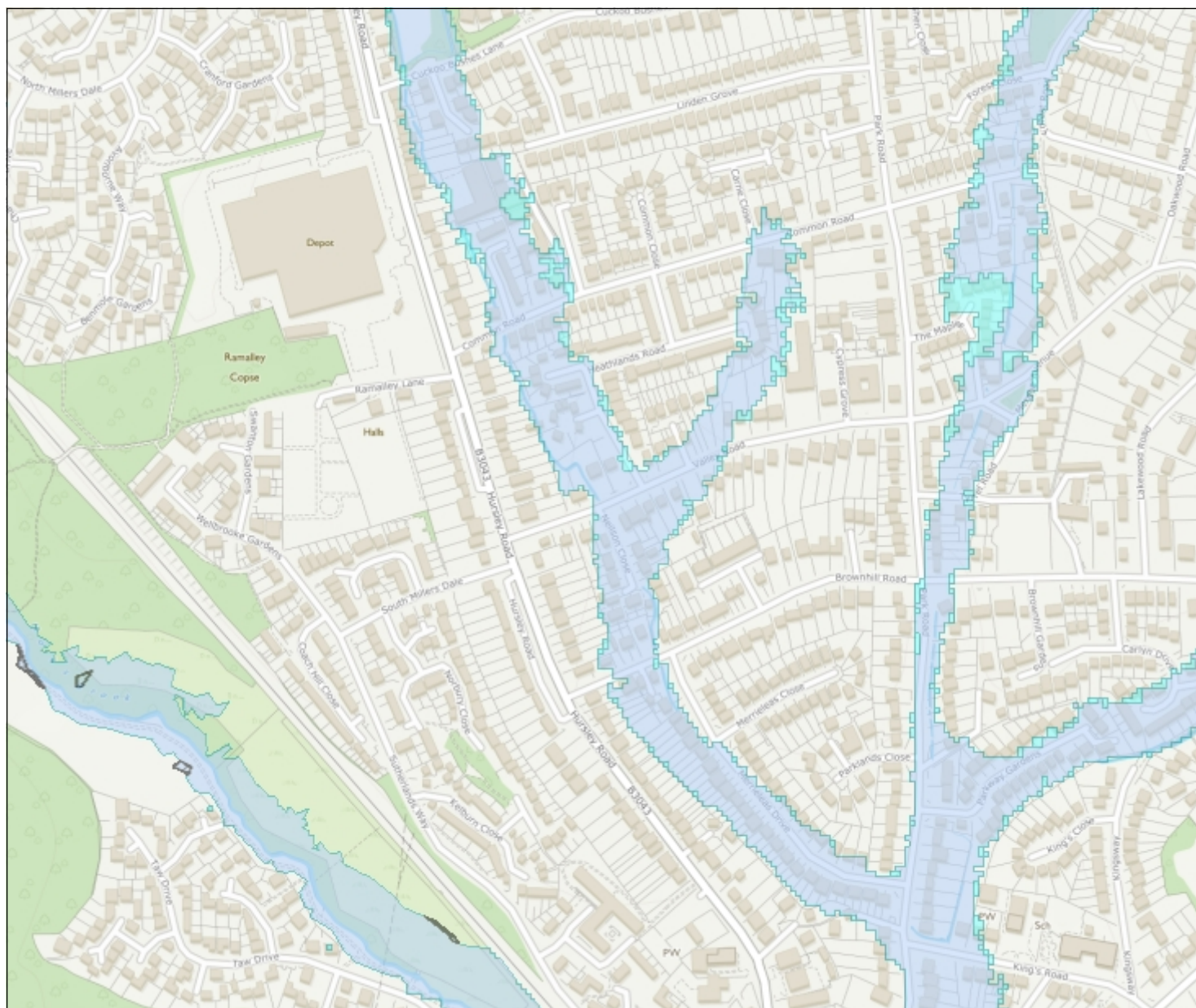
N blows/ft in standard penetration test

Scale: 1 in for 1 m

Appendix 5

Flood Maps and Correspondence

Flood Map for Planning (Rivers and Sea) centred on Valley Road - created 09/04/2019



Scale 1: 6,250



Flood Map for Planning (Rivers & Sea)

- 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 occurring each year.

Flood Defences Map Centred on Valley Road - created 09/04/2019



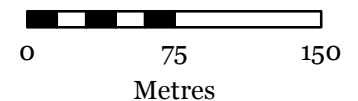
Environment
Agency

Legend

ASSET_ID	137919	84159
136444	404292	136447
136449	404293	136453
136450	404294	137917
136451	404295	330344
136452	404297	393118
136454	404298	393119
137913	404299	393536
137914	404300	393538
137915	511071	410475
137916	511072	
137918	49540	

1:3,861 *

*when printed at A4.

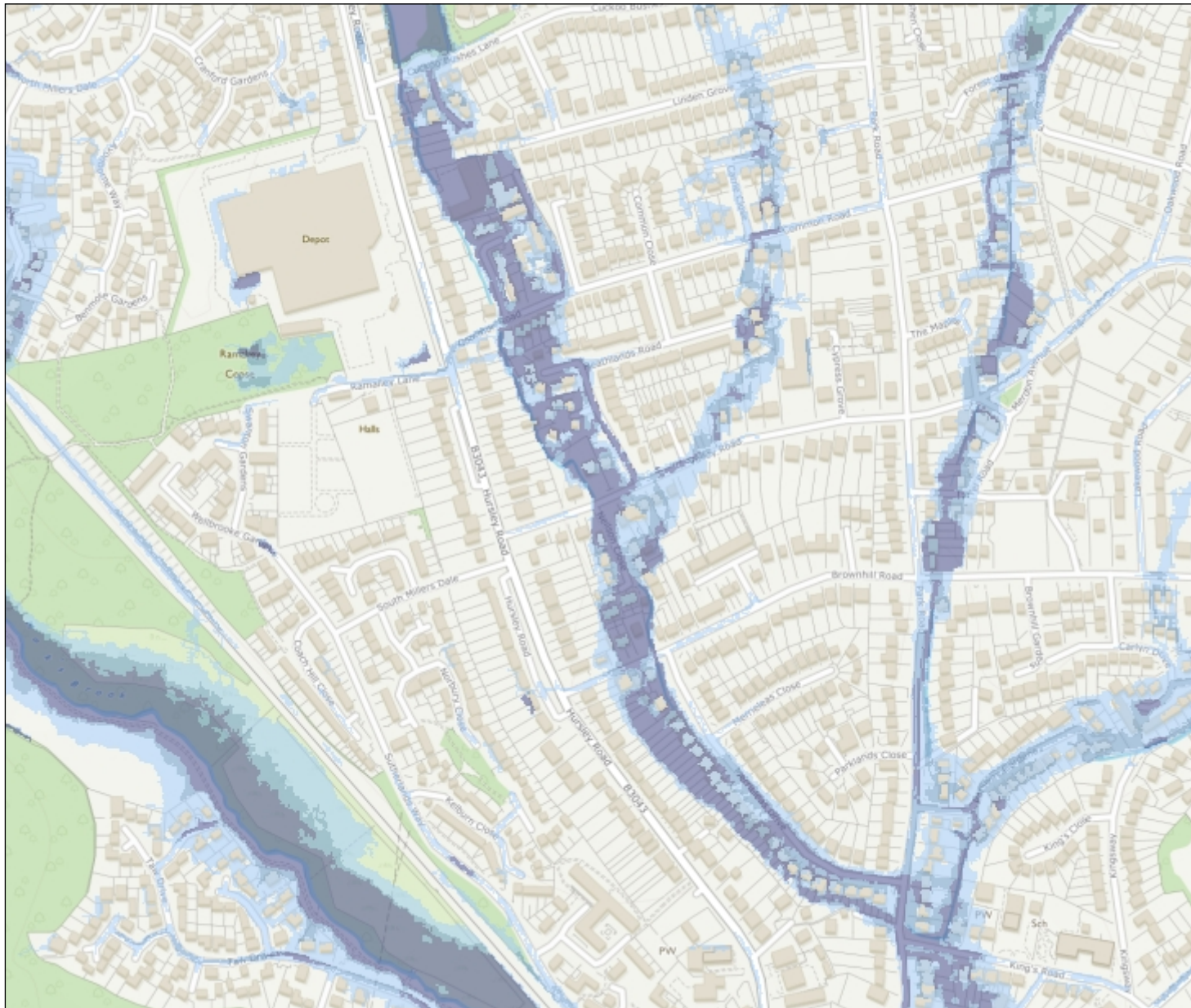


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Contact Us: National Customer Contact Centre, PO BOX 544, Rotherham, S60 1BY. Tel: 08708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Asset ID	Asset Sub-Type	Length (M)	Asset Maintainer	Actual Condition	Estimated SOP	Last Inspection Date
136452	high_ground	216.1	unknown	Fair		17/09/2018
136449	high_ground	215.98	unknown	Fair		17/09/2018
137915	high_ground	31.95	unknown	Good		24/09/2018
137913	high_ground	31.32	unknown	Good		24/09/2018
137916	high_ground	22.59	unknown	Good		01/10/2018
137914	high_ground	23.56	unknown	Good		17/09/2018
136451	high_ground	9.54	unknown	Fair		17/09/2018
137918	high_ground	10.43	unknown	Fair		17/09/2018
136454	high_ground	89.57	unknown	Fair		17/09/2018
136450	high_ground	90	unknown	Good		17/09/2018
137919	high_ground	112.84	unknown	Good		17/09/2018
136444	high_ground	112.89	unknown	Good		17/09/2018
404292	high_ground	9.91	unknown	Fair		17/09/2018
511071	high_ground	51.24	unknown	Fair		20/09/2018
404293	high_ground	9.77	unknown	Fair		17/09/2018
511072	high_ground	50.42	private	Fair		20/09/2018
404294	high_ground	7.74	unknown	Fair		01/10/2018
404295	high_ground	7.62	unknown	Fair		01/10/2018
404297	high_ground	25.67	unknown	Fair		01/10/2018
404298	high_ground	25.19	unknown	Fair		01/10/2018
404299	high_ground	27.95	unknown	Fair		17/09/2018
404300	high_ground	28.32	unknown	Fair		17/09/2018
393118	simple_culvert	46.66	unknown	Very Poor		17/09/2018
393119	simple_culvert	155.24	unknown	Fair		01/10/2018
393538	simple_culvert	30.36	unknown	Fair		01/10/2018
393536	simple_culvert	70.76	unknown	Fair		08/02/2019
410475	simple_culvert	10.98	unknown	Fair		17/09/2018
49540	simple_culvert	361.6	unknown	Fair		24/09/2018
84159	simple_culvert	35.84	unknown	Fair		17/09/2018
136447	simple_culvert	45.23	private	Good	1:5	17/09/2018
136453	simple_culvert	12.53	private	Good		17/09/2018
137917	simple_culvert	96.95	private	Good		17/09/2018
330344	complex_culvert	18.88	private	Fair		24/09/2018

Risk of flooding from Surface Water centred on Valley Road - created 09/04/2019



Scale 1:6,250



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.

2008 JFLOW Levels centred on Valley Road - Created 9 April 2019



Water Depths & Levels for Valley Road - 2008 JFLOW

Point	Water Depth (Metres)		Water Surface Level (mAOD*)		Ground Level
	1% Annual Probability/1 in 100 Year (Flood Zone 3)	0.1% Annual Probability/1 in 1000 Year (Flood Zone 2)	1% Annual Probability/1 in 100 Year (Flood Zone 3)	0.1% Annual Probability/1 in 1000 Year (Flood Zone 2)	
1	0.13	0.14	29.12	29.13	28.99
2	0.54	0.56	28.85	28.87	28.31
3	0.60	0.61	29.24	29.25	28.64
4	0.49	0.51	28.84	28.86	28.35
5	0.98	0.99	29.16	29.17	28.18
6	0.32	0.58	28.37	28.63	28.05
7	0.63	0.67	29.17	29.21	28.54
12	No Data	0.38	No Data	28.70	28.32

* Levels in metres above Ordnance Datum Newlyn

Legend

Location Points

Ground Level

Value

 High
 Low

Depth

Value

 High
 Low

1:400 *

*when printed at A4.

0 8 16
 Metres



JFLOW - Appendix

- Our work to produce Flood Zones followed a 10 year programme which delivered more detailed mapping for 821 locations. However, in order to complete Flood Zones we needed national coverage, hence a generalised approach was used to provide this national coverage within the time available, to fill the gaps between the 821 locations where we had more detailed information. The Flood Zones are therefore not as accurate as we would normally specify for river modelling, but they do provide an adequate indication of the extent of flood risk such that developers can consider flooding as part of their proposals to ensure they are not unknowingly putting additional lives at risk. This is the purpose for which the Flood Zones were produced.
- Neither water depths nor water levels were outputs that were specified when we commissioned this generalised modelling for Flood Zones. Whilst the modelling process does provide some information on depth of water, it would have been possible to produce the flood extents without storing the water depth values, since water depth is only a 'by-product' of the calculation process. As the JFLOW modelling method was developed, tested and reviewed for production of the Flood Zone extents only, we currently have no information on the accuracy of the water depth data.
- The models were run using a Digital Terrain Model (DTM) with a 5m x 5m grid. However the DTM grids were generalised to between 5m and 100m (depending on the type of model and location, for reasons such as processing speed). Fluvial modelling produced depth data which can be processed using the DTM to provide water level data. However the differing grid sizes means that there is a significant potential for inaccuracy in producing level data, because of the DTM generalisation.
- Therefore because of the nature of the model and the DTM, in many cases it will not be possible to confidently assess whether or not a site is above the resulting water level. This is because there are further inherent uncertainties in the depth calculation and within the DTM itself
- Depth or level outputs from the National Generalised Modelling (JFLOW) are only suitable to be used for decision making at a broad catchment or Shoreline Management Plan coastal cell scale (or larger).
- **They are not suitable for use in site specific Flood Risk Assessments or Strategic Flood Risk Assessments and must not normally be used for these studies. However, where in exceptional circumstances Nationalised Generalised Modelling outputs are requested to be used for anything other than at a broad catchment or Shoreline Management Plan coastal cell scale further verification must be undertaken. As part of this verification the outputs must be proven to be suitable and appropriate bearing in mind the conclusions the user wishes to draw from them and this use must be agreed in writing by the local Environment Agency staff.**
- If any agreement is given by the Environment Agency in pursuance of the above, the User accepts and agrees that such agreement by the Environment Agency that that National Generalised Modelling outputs are suitable for a particular use does not imply agreement that the proposals are appropriate or that the Environment Agency has no further comment on flood risk, rather that following verification the User has proven that the outputs are suitable to help assess the flood risk in the particular circumstances.
- Any assessment of Flood Risk undertaken must be appropriate for the decisions that need to be based upon it, consider the risks and also take into account any limitations of the data used
- Please read the enclosed Notice and be aware that the Environment Agency does not guarantee that this data is suitable for your purposes.
- **The consultants employed to deliver JFLOW Flood Zones to the Environment Agency were Jeremy Benn Associates (JBA). I should make you aware that JBA will not release information that either is owned by the Environment Agency or based upon Environment Agency information as they are not licensed to do so. You will need to request any information you require from the Environment Agency.**
- Information provided relates solely to flood risk issues and is based on the best available information to date in the Environment Agency. If further information becomes available to the Environment Agency (on flood risk issues or on other environmental issues which affect a FRA) or policy changes, we reserve the right to comment further or to supply further information or to amend information sent.
- If this information is supplied in connection with a flood risk assessment of development proposals and any material amendments made thereto at any stage prior to the submission of a planning application, the User should be aware of the need to consult the Environment Agency further

Appendix 6
Proposed Site Layout Plan



Proposed Layout Planning Reference - F/19/85935

TITLE Proposed Site Layout Plan			
SCALE	1:200 @ A3	PROJECT No.	23169
REPORT TYPE	FRA	DRG. No.	05 A

Appendix 7

Planning Submission Comparison Plan



TITLE Planning Submission Comparison Plan			
SCALE	1:200 @ A3	PROJECT No.	23169
REPORT TYPE	FRA	DRG. No.	04 A