

flood risk assessment

Land at Coldharbour Farm Road
Emsworth,

CCE/X781/FRA-03

July 2019

For Telstar Ltd

Document Review Sheet

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Reference	Date	Author	Checked
CCE/X781/FRA-01	October 2018	JH	
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Site location	West of Coldharbour Farm Road, Emsworth, PO10 7RB Grid reference – 474494,106523
Planning application	Full
Existing site	Undeveloped grassland
Site area	Approximately 1.9 ha
Proposed development	Residential 44 dwellings
Flood Zone	1, 2, and 3
Reservoir Inundation Zone	None
Surface water flooding	Low to High, similar extent to Flood Zones
Surface water management	Restricted discharge to the West Brook. Facilities sized to manage the 1 in 100 storm plus 40 %.

1.0 Introduction

- 1.1 This Flood Risk Assessment (FRA) has been prepared for the use of Telstar Ltd to support a planning application for a proposed residential development on land to the west of Coldharbour Farm Road in Emsworth, PO10 7RB (refer to Figure 1 for the site location).
- 1.2 This assessment takes account of the National Planning Policy Framework (NPPF) and the definitions of sources of flooding within the Flood and Water Management Act (FWMA) 2010. The report has been prepared following a site visit, a review of Environment Agency (EA) and Hampshire County Council (HCC) flood data, and liaison with the EA.
- 1.3 The site is allocated for residential development (as Site UE37) in the current Havant Borough Local Plan (July 2014). The site also has a draft allocation (as Site H10) for “about 53 dwellings” in the Pre Submission Havant Borough Local Plan 2036. Outline permission for the development of 53 residential dwellings on the site was granted in October 2014 (planning reference APP/14/00360).
- 1.4 The site is assessed in the Havant Borough Council (HBC) Strategic FRA (Local Plan Sites) November 2018 under reference EM6B. The SFRA concludes that “the site can be developed safely” and that provision of compensatory flood storage (addressed later in this report) is a key consideration.
- 1.5 The proposed development is for the creation of 44 residential dwellings (see Appendix B for the proposed layout).
- 1.6 The site extends to approximately 1.9 ha and is approximately centred on grid reference 474494,106523. The site is currently laid to grassland with some areas of trees and shrubs.
- 1.7 The land to the north of the site is open agricultural land. The land to the east is occupied by parkland/recreation uses and residential development. The southern boundary is formed by the A27 (which is embanked as it passes the site). Land to the west is occupied by a petrol filling station.
- 1.8 The eastern site boundary is formed by the West Brook which flows broadly southwards from its origin to the north of Southleigh Road (some 750 m to the north of the site). The brook is a designated Main River and as such falls within the jurisdiction of the EA with regards to certain flood risk management duties. Of particular relevance to the site is the need for approval of any works to, or within 8 m of this watercourse. The brook enters a culvert at the south-eastern corner of the site and emerges after some 30 m to flow eastwards along the foot of the A27 before entering a culvert beneath the A27 and flowing south towards the Quay Mill Pond.

- 1.9 A second channel (marked on OS mapping as a “drain”) is shown on mapping as running through the site, broadly parallel to the West Brook. Rather than a watercourse (conveying flows through the site) the feature apparently serves a local land drainage function. From the site visit there was no apparent outfall from the feature (to the West Brook for example). Further survey work will be undertaken at the appropriate detailed design stage with realignment/removal of any pipework present (subject to its location and function) as necessary.
- 1.10 The dominant slope direction of the site is south-eastwards, with levels falling from approximately 9.0 m AOD in the north-western corner, to approximately 4.8 m AOD in the south-east. Levels are shown in the topographical survey included in Appendix A.
- 1.11 The site geology is described on geological mapping as superficial deposits of sands, silt, and clay (River Terrace Deposits) and clay and gravel (Head) over London Clay. An intrusive investigation (appended) shows that the geology is more accurately described as sandy clay over firm clay.
- 1.12 The site is affected by Flood Zones 3 and 2 which emanate from the West Brook. The site is also shown on flood mapping (refer to Figures 2) to be affected by areas of surface water flooding, which broadly mimics the shape and extent of the Flood Zones. The associated flood risk and management measures are discussed in Section 2. The site is not shown to lie in Source Protection Zone (refer to Figure 4).



Images of the site, West Brook and culverts, and A27 underpass.

2.0 Forms of Flooding and Flood Management

The West Brook

- 2.1 The east of the site is shown on the Flood Map for Planning as being affected by Flood Zone 2 and 3 (the medium and high probability flood areas respectively). The EA has provided flood data relevant to the site and confirmed that the data is suitable for use in calculating flood storage. The full data provision is included in Appendix A.
- 2.2 The highest flood level in the EA data is 6.9 m AOD. This is for the 1 in 100 annual probability flood event including a 105 % climate change allowance (0.05 m above the 1 in 1,000 annual probability flood level). Drawing 300 in Appendix B shows the extent of this 'worse case' flood outline when 6.9 m AOD is plotted onto the site topography. The 6.9 m AOD flood outline forms the base line for the proposed realignment of the floodplain to allow the site to be developed in line with the HBC plans/policy and for the residential units to be sequentially sited outside of the floodplain.
- 2.3 The proposed compensatory flood storage proposed at the site is 'indirect storage'. The principle of indirect storage has been agreed with the EA (see email correspondence in Appendix A). Indirect compensation is considered appropriate because the A27 embankment, and the fact that the West Brook enters a pipe at the site boundary means that the site and surrounding area operate as an attenuation basin with a controlled outlet and overflow, rather than a 'traditional' fluvial floodplain. The compensatory plans and calculations in this report are based on a detailed layout and thus differ from the initial results submitted to the EA. However they follow the same principle as was agreed.
- 2.4 For clarity it is worth noting that the pre and post development flood storage calculations (discussed above and provided in Appendix B) consider the volumes and levels within the site boundary. The drawing shows the indicative extent of flooding outside of the boundary, but no compensatory works are proposed beyond the site area. It is also worth noting that the works relate to the creation of a dry platform not the excavation of a basin.
- 2.5 The proposed lower, wider floodplain (at a level of 4.7 m AOD) in the east of the site. The proposed flood storage area allows for more flood storage volume for the lower, more common flood events, and increases the total floodwater storage volume by approximately 1,700 m³. The larger volume afforded by the proposed flood storage area means that development of the site will help to provide a benefit to flood risk in the area.

Surface water flooding

- 2.6 Surface water flood mapping (refer to Figure 2) shows a similar pattern of flooding in the area as the site specific fluvial (river based) floodplains established by updated flood model. This is to be expected as the surface water flood maps will usually highlight floodplains and

watercourses as well as smaller flow routes and localised pooling of rainfall. The J-Flow 2016 flood data provided by the EA is considered to be suitably representative of flooding at the site. A separate assessment of surface water flooding as a source is not considered necessary.

Groundwater

- 2.7 The site geology suggests that whilst some waterlogging of the more permeable material (the sandy clays) may be possible, the clays beneath the site mean that significant groundwater flooding is unlikely. In the unlikely event that groundwater were to break the surface it would tend to flow off the proposed development platform, towards the flood storage area in the east of the site.

Surface Water Sewers

- 2.8 Southern Water asset plans (Appendix A) show surface water sewers to east of the site, but nothing which would pose a realistic threat were they to become overloaded and flood.

Reservoirs

- 2.9 The site is not shown to lie within a reservoir inundation area (see Figure 3).

Flood Management (in addition to compensatory storage).

- 2.10 Finished floor levels of all of the units will be set at or above the 1 in 100 annual probability flood level plus 105 % climate change of 6.9 m AOD.
- 2.11 Access and egress for the site during a flood event would be to the west (via the service station on the western boundary.)

3.0 Surface Water Management

- 3.1 The site geology (sandy clay over clay) is unlikely to support effective disposal of runoff via infiltration. It is therefore proposed to discharge surface water runoff from the proposed development at restricted rate to the West Brook.
- 3.2 Development runoff for the majority of the proposed development (see paragraph 3.6) will be restricted to the annual greenfield rate (Q1) of 3.0 l/s/ha calculated for the site. Based on the approximate post development impermeable area of 0.78 ha, this allowable rate would be 2.3 l/s. Testing the scheme for a 5 % increase in impermeable area (increasing the catchment to 0.82 ha) to allow for the 10 % increase in paved area for urban creep (in line with BS 8582:2013) shows that the discharge rate would not exceed the greenfield rate.
- 3.3 Sufficient on-site surface water storage will be provided to manage the 1 in 100 annual probability storm plus 40 %. In order to make efficient use of the developable space at the site the attenuation will be provided below ground in oversized pipes beneath the road and attenuation crates beneath driveways.
- 3.4 Flows will be conveyed to the attenuation through roadside grassed filter drains, and permeable paved drives (roofwater will pass through the permeable paving by allowing downpipes to spill onto its surface). The permeable paving will be connected to the network via piped outlets.
- 3.5 Water will be filtered before entering the attenuation, thus reducing the risk that the outfall will become blocked. However additional protection for flow controls would be provided within the flow control chamber (a perforated tube/plate protector for example).
- 3.6 A surface water strategy (showing above and below ground features) is included in Appendix B along with MicroDrainage calculations. It is worth noting that due to the proposed levels, a small area of the proposed access road (approximately 180 m²) will require its own attenuation and outlet. This highway 'sub-catchment' is shown on the appended surface water strategy plan, along with nominal attenuation (of 9 m³). The attenuation is based on a discharge of 1.0 l/s as a pro rata greenfield rate for the area would be 0.05 l/s and this is unlikely to be practical. A discharge rate of 1.0 l/s from this sub-catchment (for all storms up to and including the 1 in 100 plus 40 % storm) is not considered to have a notable or measurable increase in flooding in the area.
- 3.7 Overland flow (from excessive storms or blockage) would follow ground levels and tend to pass around the proposed dwellings and run eastwards towards the flood storage area or southwards towards the open space along the southern boundary.

Treatment

3.8 The proposed development can be considered as a low pollution hazard according to Table 26.2 in the SuDS Manual (C753). The proposed treatment techniques (permeable paving and a grassed/improved filter drain) will each provide sufficient treatment based on their individual treatment scores in C753 Table 26.3.

- Low pollution hazard indices = 0.5 total suspended solids, 0.4 metals, 0.4 hydrocarbons
- Treatment scores for permeable paving = 0.7 total suspended solids, 0.6 metals, 0.7 hydrocarbons.
- Treatment scores for grassed filter drain (using scores for a swale to which it is analogous) 0.5 total suspended solids, 0.6 metals, 0.6 hydrocarbons.

Maintenance

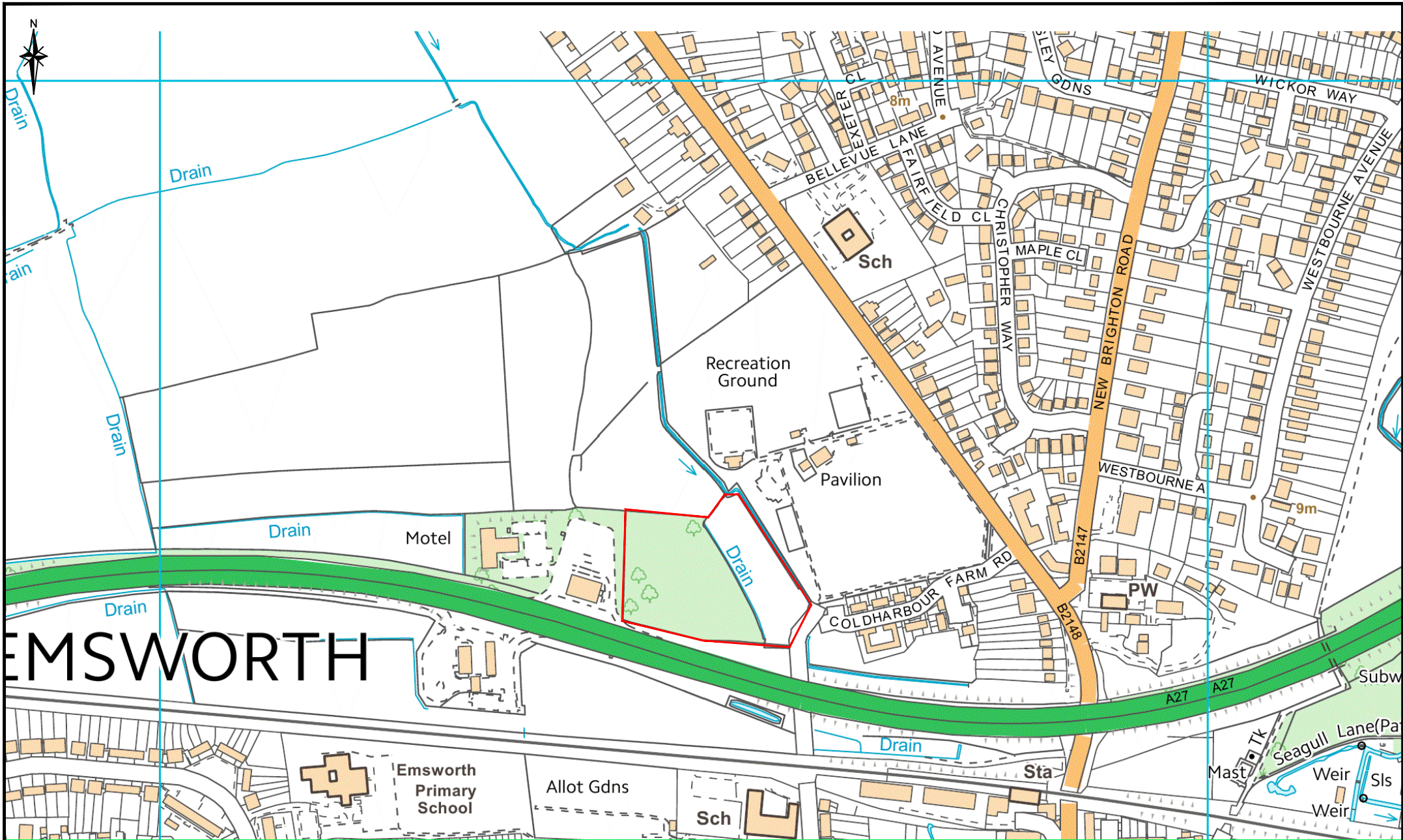
- 3.9 Maintenance of the majority surface water management scheme will be undertaken by a communally funded private management company. Maintenance of the facilities serving the three new build units in the southern plot will be the responsibility of the homeowners.
- 3.10 Suggested management schedules (to be developed and adapted in line with the progression of detailed scheme as necessary) are included in Appendix B.

4.0 Conclusions

- 4.1 The proposed houses will be constructed on a development platform which is at, or above the 1 in 100 annual probability flood level plus 105 % climate change. The platform will be created by raising ground levels at the site but without reducing the flood storage capacity of the site.
- 4.2 As part of the creation of the dry development platform the capacity of the site to accommodate floodwater from the West Brook will be increased. This will help to reduce off-site flooding.
- 4.3 Surface water runoff will be discharged at greenfield rates to the West Brook. Sufficient storage will be provided on-site in order to manage the 1 in 100 annual probability storm inclusive of 40 % climate change.
- 4.4 Development runoff will be treated by the proposed drainage techniques which filter and treat runoff at source.
- 4.5 Maintenance of the surface water management facilities will be undertaken by a communally private management company.

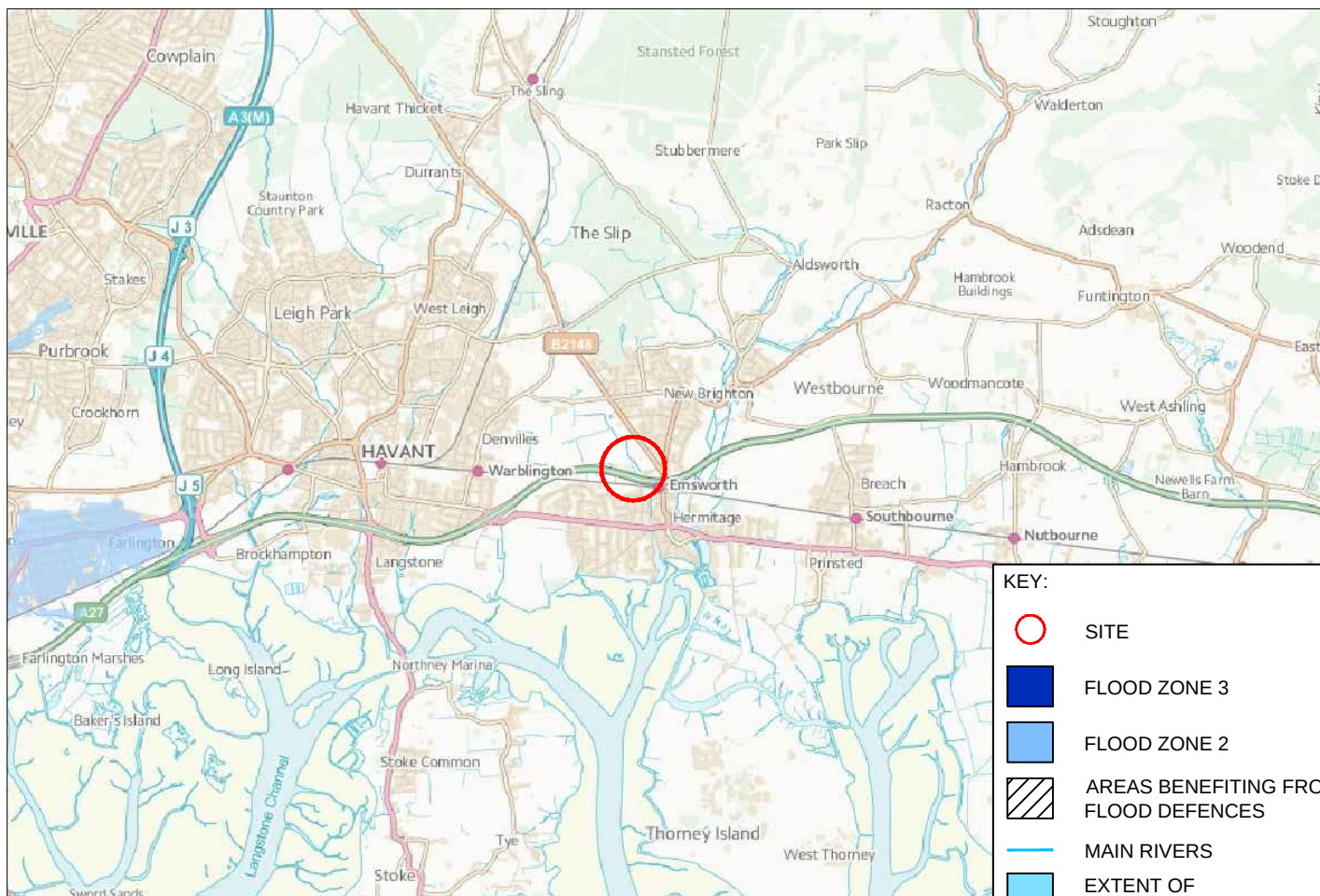
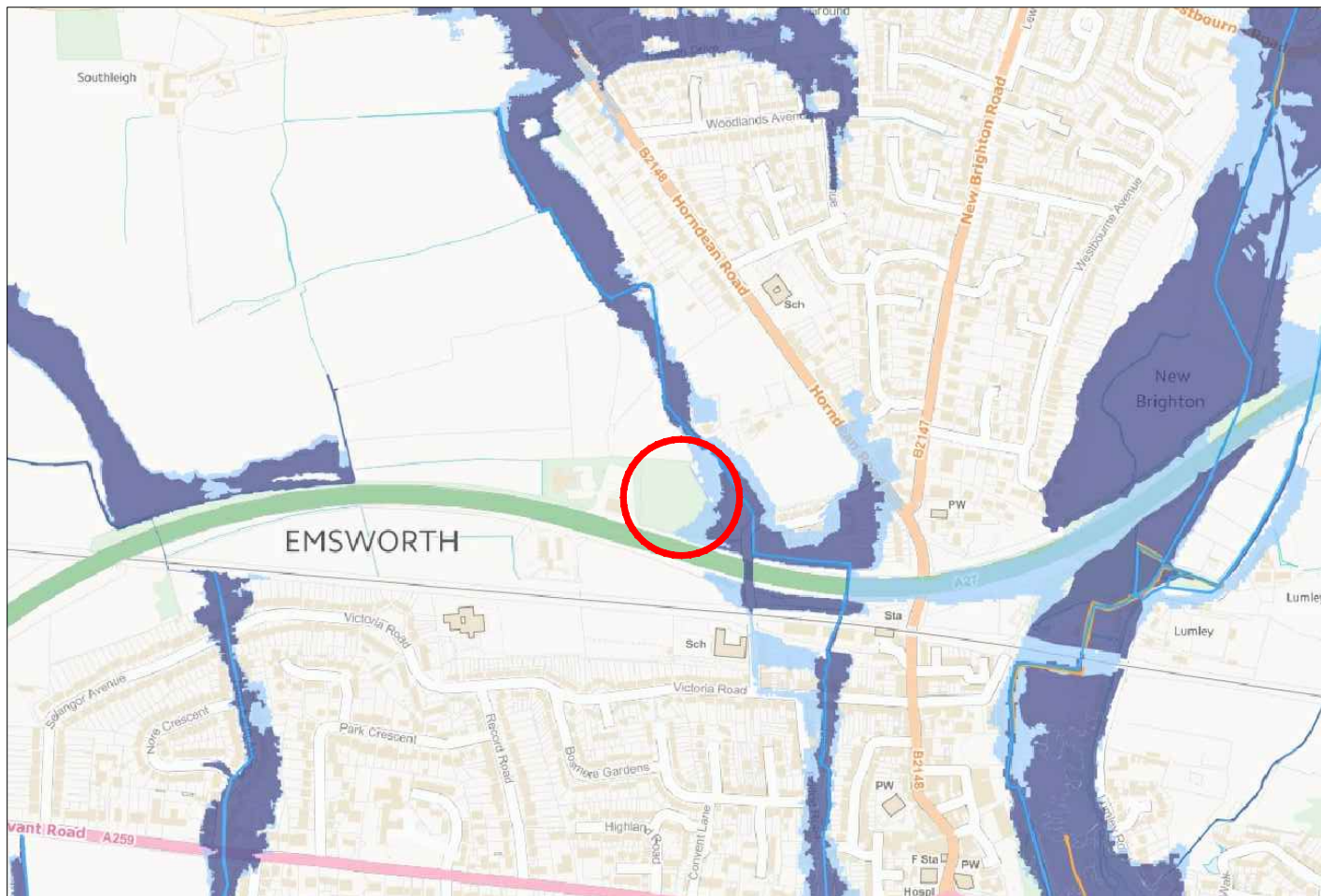
Figures

1. Site Location Plan
2. Flood Zone and Reservoir Inundation Map
3. Source Protection Zones
4. Surface Water Flood Map



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Scale: D.N.S.	Job Title: COLDHARBOUR ROAD, EMSWORTH	Figure Title: SITE LOCATION PLAN	Cannon Consulting Engineers Cambridge House, Kentford, Newmarket, Cambs, CB8 7PN Tel: +44 (0)1638 555 107 info@cannonco.co.uk www.cannonco.co.uk	CANNON CONSULTING ENGINEERS Highways, Transport & Infrastructure Planning	Project Number: X781
Date: 28/06/2019	REPORT: FLOOD RISK ASSESSMENT				Figure Number: 01
Drawn by: JH					



KEY:

- SITE
- FLOOD ZONE 3
- FLOOD ZONE 2
- AREAS BENEFITING FROM FLOOD DEFENCES
- MAIN RIVERS
- EXTENT OF RESERVOIR FLOODING

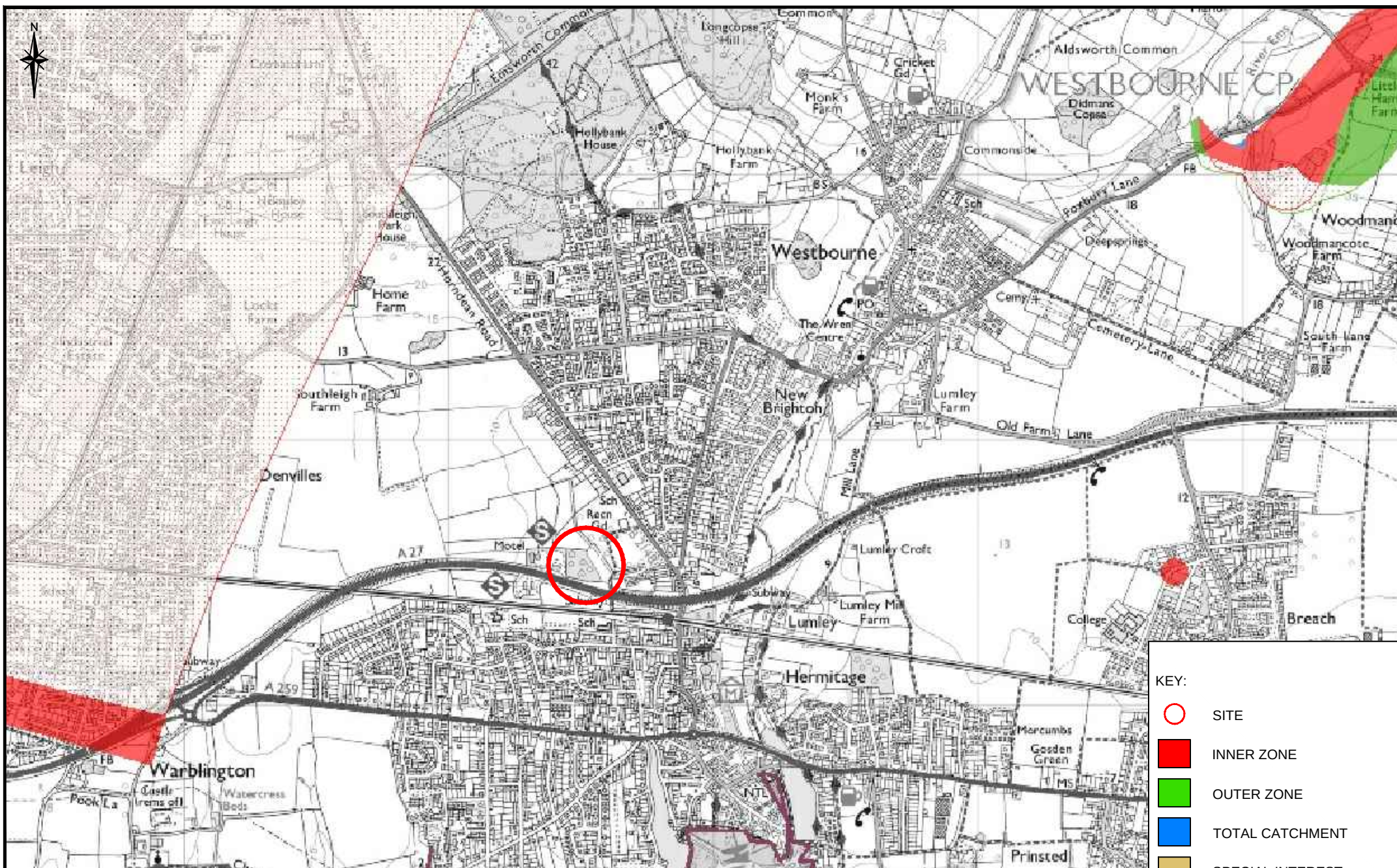
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Scale: D.N.S.	Job Title: COLDHARBOUR ROAD, EMSWORTH	Report: FLOOD RISK ASSESSMENT
Date: 26/10/2018	Figure Title: FLOOD ZONE AND RESERVOIR INUNDATION MAPS	
Drawn by: DP		

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Highways, Transport & Infrastructure Planning

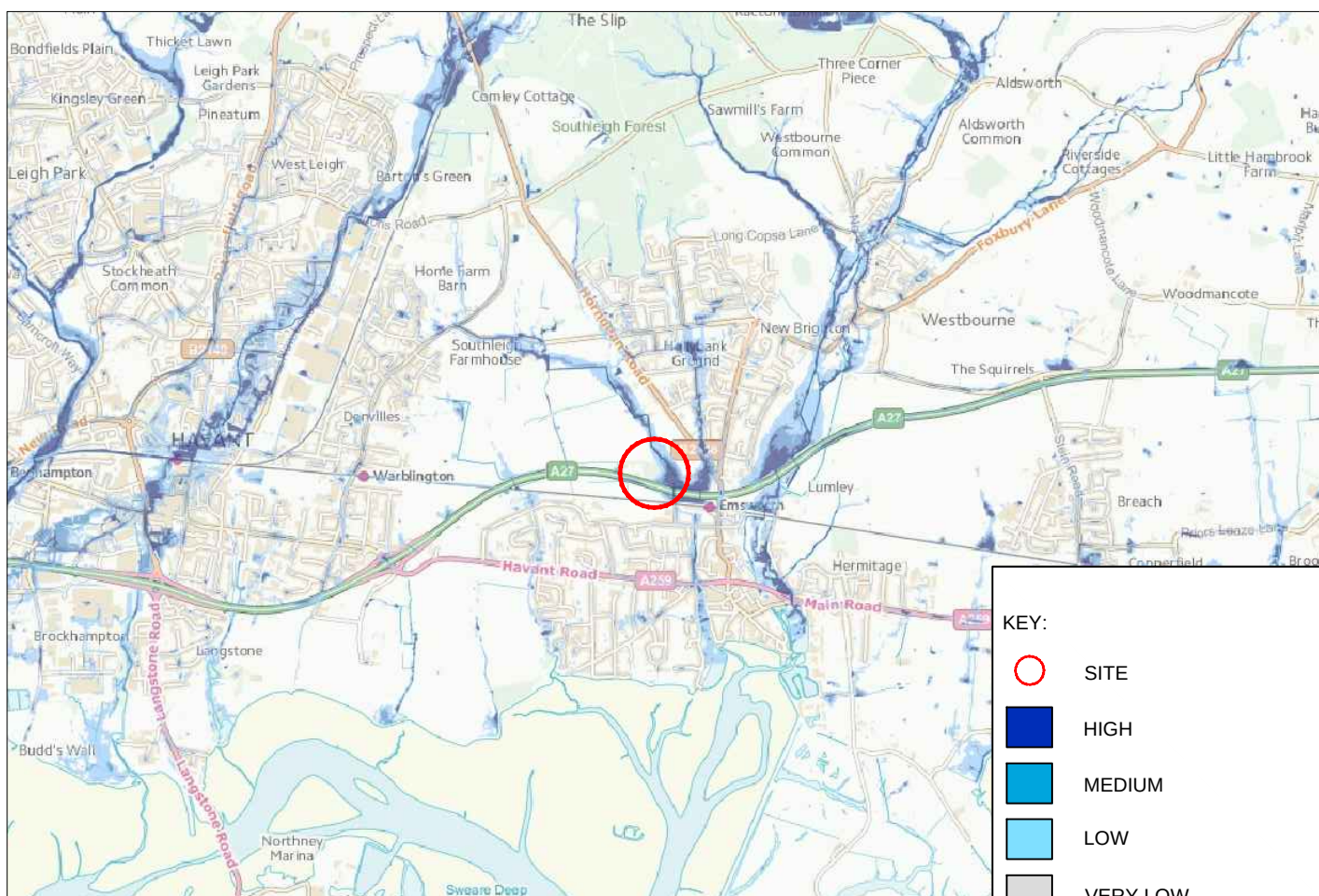
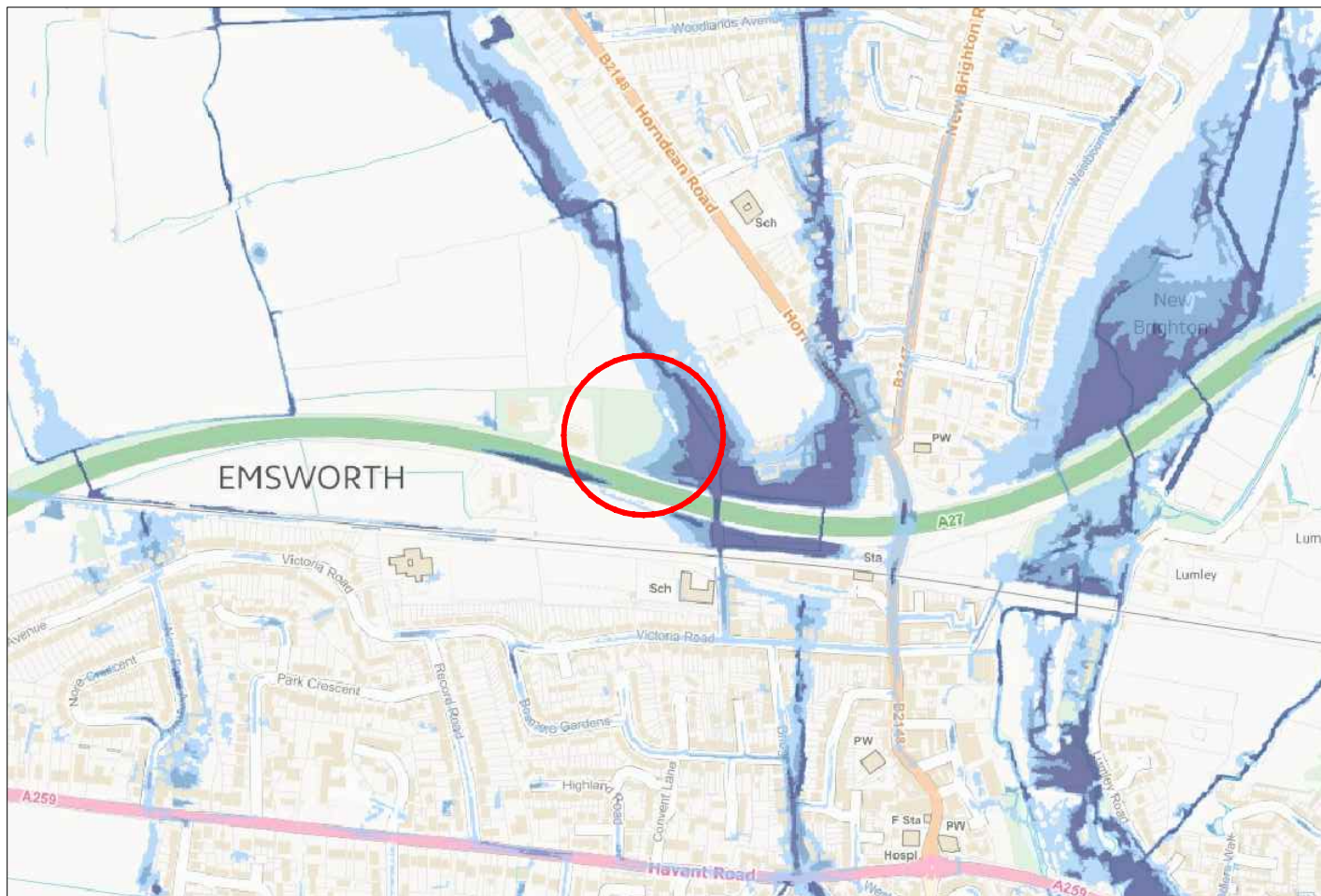
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Project Number: X781
Figure Number: 02



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Scale: D.N.S.	Job Title: COLDHARBOUR ROAD, EMSWORTH	Figure Title: GROUND WATER SOURCE PROTECTION ZONE	Cannon Consulting Engineers Cambridge House, Kenilford, Newmarket, Cambs, CB8 7PN Tel: +44 (0)1638 555 107 info@cannonce.co.uk www.cannonce.co.uk	CANNON CONSULTING ENGINEERS Highways, Transport & Infrastructure Planning	Project Number: X781 Figure Number: 03
Date: 26/10/2018	REPORT: FLOOD RISK ASSESSMENT				
Drawn by: DP					



- KEY:**
- SITE
 - HIGH
 - MEDIUM
 - LOW
 - VERY LOW

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Scale:	D.N.S.	Job Title:	COLDHARBOUR ROAD, EMSWORTH	Report:	FLOOD RISK ASSESSMENT
Date:	26/10/2018	Figure Title:	SURFACE WATER FLOODING PLAN		
Drawn by:	DP				

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Project Number:
X781
Figure Number:
04

A. Existing Site

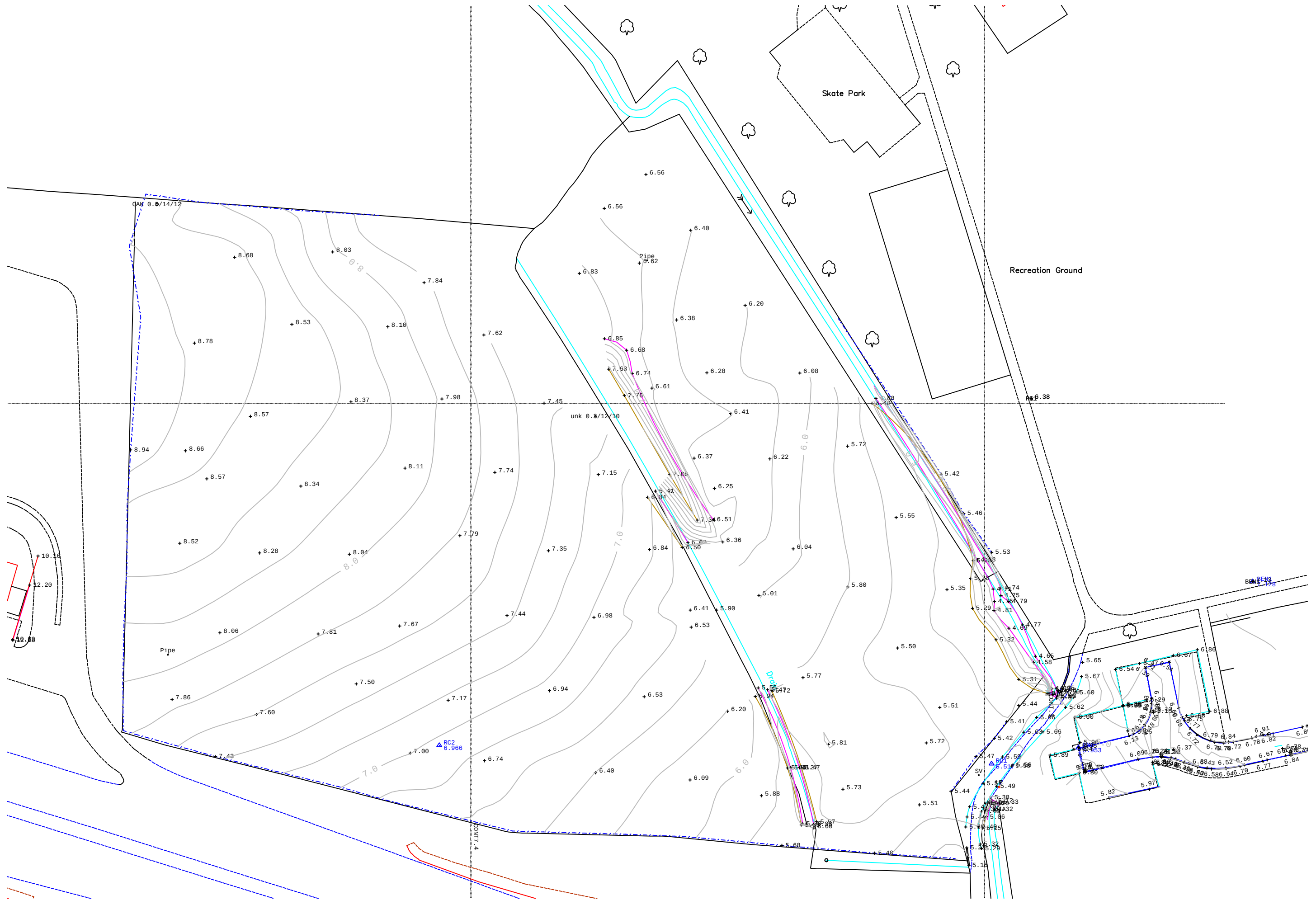
Topographical survey

EA flood data

LLFA data

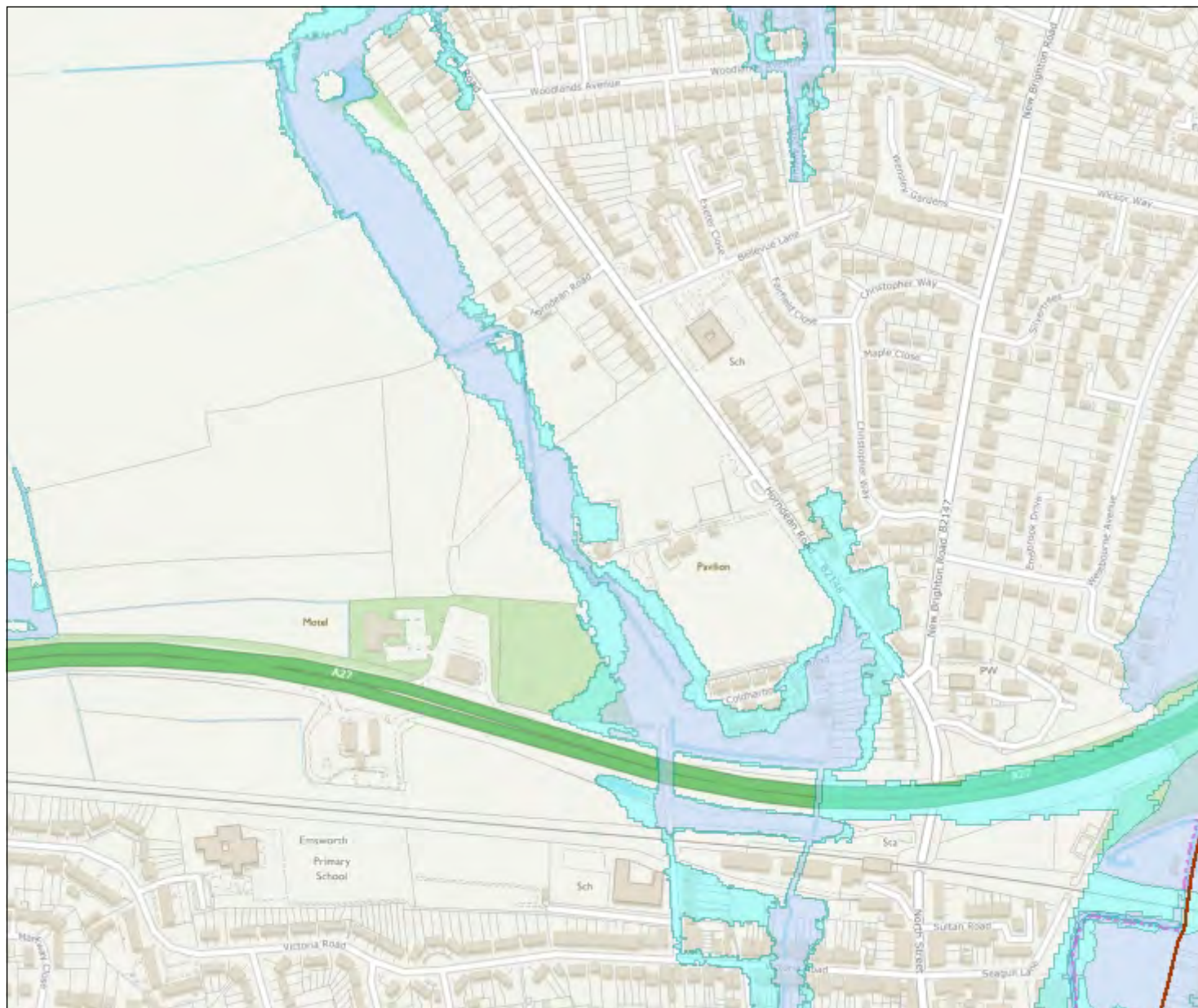
Trial pit logs

Southern Water asset plans



Asset ID	Asset Sub-Type	Length (m)	Asset Maintainer	Actual Condition	Estimated SOP
174929	high_ground	1124.71	private	Fair	1:50
173001	high_ground	1124.37	private	Fair	1:50
174436	high_ground	13.47	unknown	Fair	1:50
174259	high_ground	113.26	unknown	Fair	1:50
174434	high_ground	227	unknown	Fair	1:5
70224	high_ground	228.71	unknown	Fair	1:5
72287	high_ground	72.55	unknown	Fair	
72286	high_ground	71.87	unknown	Fair	
454502	embankment	151.2	environment_agency	Good	
174435	simple_culvert	67.01	private	Fair	1:50

Flood Map for Planning (Rivers and Sea) centred on Grid Ref: SU74501 06523 - created 11/10/2018.



Scale 1: 6,250



Flood Map for Planning (Rivers & Sea)

- Lead Local Flooding Authority
- 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.



Legend

+ Location Points

Ground Level

Value

- High : 200.075



- Low : -13.7875

Depth

Value

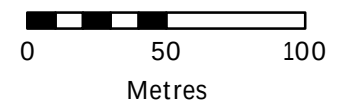
- High : 5.9774



- Low : 0

1:2,721 *

*when printed at A4.

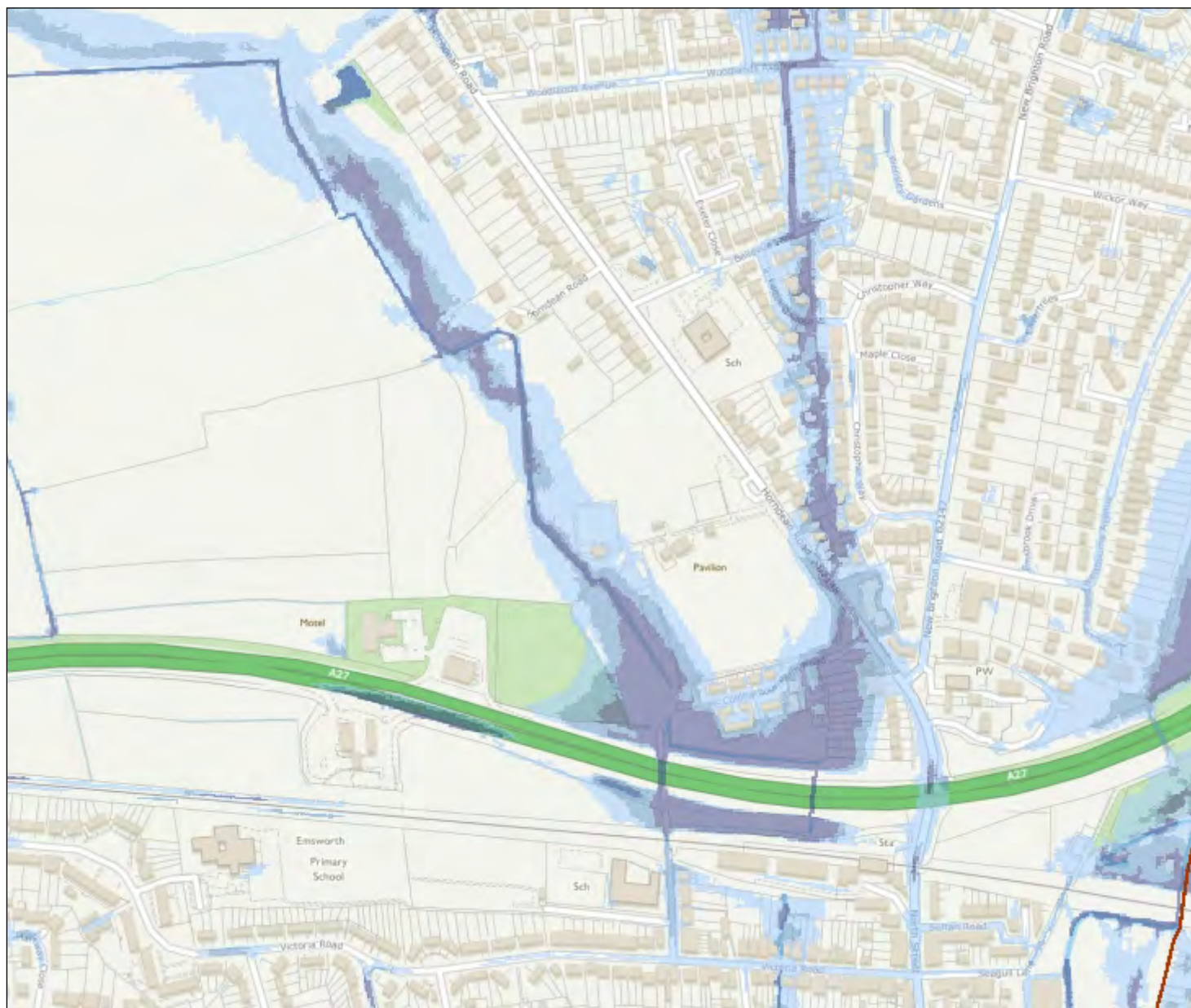


Water Depths & Levels for Cold Harbour Farm Road, Emsworth - 2016 JFLOW

Point	Water Depth (Metres)					Water Surface Level (mAOD*)					Ground Level
	1% Annual Probability/ 1 in 100 Year (Flood Zone 3)	1% Annual Probability/ 1 in 100 Year + 35% Climate Change	1% Annual Probability/ 1 in 100 Year + 45% Climate Change	1% Annual Probability/ 1 in 100 Year + 105% Climate Change	0.1% Annual Probability/ 1 in 1000 Year (Flood Zone 2)	1% Annual Probability/ 1 in 100 Year (Flood Zone 3)	1% Annual Probability/ 1 in 100 Year + 35% Climate Change	1% Annual Probability/ 1 in 100 Year + 45% Climate Change	1% Annual Probability/ 1 in 100 Year + 105% Climate Change	0.1% Annual Probability/ 1 in 1000 Year (Flood Zone 2)	
1	No Data	0.02	0.11	0.36	0.30	No Data	6.55	6.64	6.89	6.83	6.53
2	No Data	No Data	0.01	0.25	0.20	No Data	No Data	6.66	6.90	6.85	6.65
3	0.20	0.61	0.70	0.95	0.89	6.10	6.51	6.60	6.85	6.79	5.90
4	No Data	No Data	0.05	0.30	0.25	No Data	No Data	6.63	6.88	6.83	6.58
5	No Data	0.14	0.25	0.49	0.44	No Data	6.51	6.62	6.86	6.81	6.37
6	0.21	0.60	0.71	0.96	0.91	6.11	6.50	6.61	6.86	6.81	5.90
7	0.42	0.81	0.92	1.16	1.11	6.12	6.51	6.62	6.86	6.81	5.70
8	0.73	1.19	1.23	1.48	1.43	6.13	6.59	6.63	6.88	6.83	5.40
9	0.54	0.93	1.04	1.29	1.23	6.12	6.51	6.62	6.87	6.81	5.58
10	0.48	0.88	0.97	1.22	1.17	6.06	6.46	6.55	6.80	6.75	5.58

* Levels in metres above Ordnance Datum Newlyn

Risk of flooding from Surface Water centred on Grid Ref: SU74501 06523 - created 11/10/2018.



Scale 1:6,250



Likelihood of flooding from Surface Water

-  Lead Local Flooding Authority
-  High ($\geq 3.3\%$)
-  Medium ($3.3\% - 1\%$)
-  Very Low ($0.1\% - 0.1\%$)

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.

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

Use of Environment Agency Information for Flood Risk Assessments

Important

The Environment Agency are keen to work with partners to enable development which is resilient to flooding for its lifetime and provides wider benefits to communities. If you have requested this information to help inform a development proposal, then we recommend engaging with us as early as possible by using the pre-application form available from our website:

<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

We recognise the value of early engagement in development planning decisions. This allows complex issues to be discussed, innovative solutions to be developed that both enables new development and protects existing communities. Such engagement can often avoid delays in the planning process following planning application submission, by reaching agreements up-front. We offer a charged pre-application advice service for applicants who wish to discuss a development proposal.

We can also provide a preliminary opinion for free which will identify environmental constraints related to our responsibilities including flooding, waste, land contamination, water quality, biodiversity, navigation, pollution, water resources, foul drainage or Environmental Impact Assessment.

In preparing your planning application submission, you should refer to the Environment Agency's Flood Risk Standing Advice and the Planning Practice Guidance for information about what flood risk assessment is needed for new development in the different Flood Zones. This information can be accessed via:

<https://www.gov.uk/flood-risk-assessment-standing-advice>
<http://planningguidance.planningportal.gov.uk/>

You should also consult the Strategic Flood Risk Assessment or other relevant materials produced by your local planning authority.

You should note that:

1. Information supplied by the Environment Agency may be used to assist in producing a Flood Risk Assessment (FRA) where one is required, but does not constitute such an assessment on its own.
2. This information covers flood risk from main rivers and the sea, and you will need to consider other potential sources of flooding, such as groundwater or surface water runoff. Information produced by the local planning authority referred to above may assist here.
3. Where a planning application requires an FRA and this is not submitted or is deficient, the Environment Agency may raise an objection.



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Further context, best practice and guidance can be found in the [UK Government Licensing Framework section](#) on The National Archives website.



Use of Environment Agency Information for Flood Risk Assessments

Important

The Environment Agency are keen to work with partners to enable development which is resilient to flooding for its lifetime and provides wider benefits to communities. If you have requested this information to help inform a development proposal, then we recommend engaging with us as early as possible by using the pre-application form available from our website:

<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

We recognise the value of early engagement in development planning decisions. This allows complex issues to be discussed, innovative solutions to be developed that both enables new development and protects existing communities. Such engagement can often avoid delays in the planning process following planning application submission, by reaching agreements up-front. We offer a charged pre-application advice service for applicants who wish to discuss a development proposal.

We can also provide a preliminary opinion for free which will identify environmental constraints related to our responsibilities including flooding, waste, land contamination, water quality, biodiversity, navigation, pollution, water resources, foul drainage or Environmental Impact Assessment.

In preparing your planning application submission, you should refer to the Environment Agency's Flood Risk Standing Advice and the Planning Practice Guidance for information about what flood risk assessment is needed for new development in the different Flood Zones. This information can be accessed via:

<https://www.gov.uk/flood-risk-assessment-standing-advice>
<http://planningguidance.planningportal.gov.uk/>

You should also consult the Strategic Flood Risk Assessment or other relevant materials produced by your local planning authority.

You should note that:

1. Information supplied by the Environment Agency may be used to assist in producing a Flood Risk Assessment (FRA) where one is required, but does not constitute such an assessment on its own.
2. This information covers flood risk from main rivers and the sea, and you will need to consider other potential sources of flooding, such as groundwater or surface water runoff. Information produced by the local planning authority referred to above may assist here.
3. Where a planning application requires an FRA and this is not submitted or is deficient, the Environment Agency may raise an objection.

James Howard

From: Waite, Rob <robert.waite@environment-agency.gov.uk>
Sent: 14 November 2018 11:04
To: James Howard
Subject: FW: Coldharbour Farm Road - confirmation of use of flood data

From: Waite, Rob
Sent: 14 November 2018 10:33
To: 'James.Howard@cannon.co.uk'
Cc: PlanningSSD
Subject: RE: Coldharbour Farm Road - confirmation of use of flood data

Dear Mr Howard,
Thank you for your enquiry. The principle of using the JFlow data has been accepted for this site and the data provided is the most up to date information available. When assessing flood risk for the site climate change must be considered and the Higher Central and Upper End allowances for the 2080's should be used for assessment purposes.

If more detailed advice is required on planning or flood risk matters this would be covered by our pre planning charging scheme and details of this can be obtained by contacting email address:
PlanningSSD@environment-agency.gov.uk .

Thank you

Rob Waite

Flood and Coastal Risk Management Advisor – Solent & South Downs Area
Environment Agency
Canal Walk
Romsey
Hampshire
SO51 7LP

Direct Dial tel: 020 8474 5939
Email: robert.waite@environment-agency.gov.uk



From: Partnership and Strategic Overview team, HIOW
Sent: 08 November 2018 09:28
To: Waite, Rob <robert.waite@environment-agency.gov.uk>
Subject: FW: Coldharbour Farm Road - confirmation of use of flood data

Hello Rob,

Would you be able to respond to the enquiry below as I believe you have been dealing with the planning app. I wasn't sure if what he is asking would fall under the pre planning?

Thanks

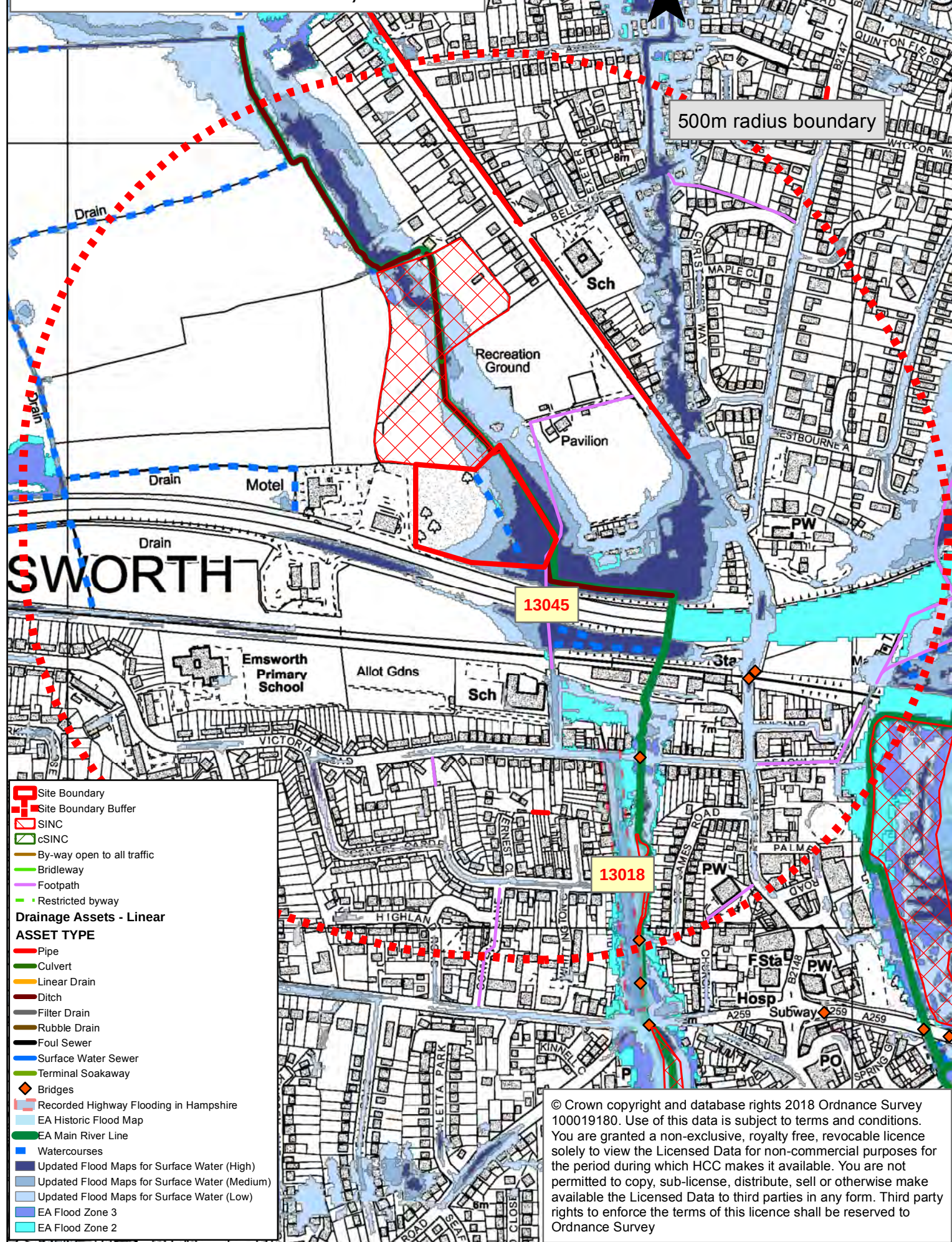
Aimee

Enquiry No: C4C 101192444
 Ref No: LLFA/Advice/2018/0006
 Date: 27.09.2018
 Site: Coldharbour Road, Emsworth

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N
 0 50 100 200 Meters

500m radius boundary



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James Howard

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Elizabeth II Court West, The Castle
Winchester, Hampshire SO23 8UD*

Tel: 0300 555 1375 (General Enquiries)
0300 555 1388 (Roads and Transport)
0300 555 1389 (Planning)
Textphone 0300 555 1390
Fax 01962 847055
www.hants.gov.uk

<i>Enquiries to</i>	Flood & Water Management	<i>My reference</i>	LLFA/Advice/2018/0006
<i>Direct line</i>	01962 846730	<i>Your reference</i>	C4C 101192444
<i>Date</i>	27 th September 2018	<i>E-mail</i>	Swm.consultee@hants.gov.uk

Dear Sir,

Re: Coldharbour Road, Emsworth PO10 7RB

We refer to your request for historic flood information advice on 26th September 2018.

Historic Flood Information advice

As the Lead Local Flood Authority (LLFA) Hampshire County Council is a statutory consultee for Surface Water Drainage on applications for major development. From 15 April 2015 Hampshire County Council were required to be consulted on these developments when a planning application is received by the Local Planning Authority. Further to this we have a regulatory role in relation to consenting works on ordinary watercourses.

Historic Flooding information

We have reviewed our records of flood incidents for this area and have the following records of flooding within a 500m radius of the site. Any improvements in the run-off from this site may help alleviate further flooding incidents. This does not necessarily mean that other flood events have not occurred, they either may not have been reported or events may have occurred prior to 2012 – HCC records have only been maintained since then. The EA may hold data on flood events prior to this date.

- **13045:** Surface water and groundwater flood event in 2014 at Washington Road Underpass. Run off from railway embankment and fields resulting in flooded underpass
- **13018:** Surface water and Tidal flood event in 2011/12 near Bridge Road. If high tide or mill pond gates not opened, pond overflows. Deemed drainage maintenance issue. HCC installed new gullies, EA and SWA planned scheme of root cutting, jetting and CCTV work within 2013/2014 programme

Please refer to attached map for the location of flooding events.

There is a range of modelling information from the EA which highlights the potential risk from surface water flooding in a GIS format. Each model makes different assumptions regarding drainage provision, permeability of the area, routing around buildings etc. Therefore, each model should be considered. The different models are as follows:

Areas susceptible to surface water flooding (AStSWf)

Flood Map for Surface Water (FMfSW)

Updated Flood Map for Surface Water (uFMfSW)

It is recommended that all modelling sets are used to assess the site for surface water flooding events and a suitable model be developed. The level of complexity should be site dependant including for topography and permeability of the area.

In general it is considered that the surface water flood risk within the site boundaries is low and providing flow routes are considered should be manageable. The site is within **Flood Zones 1, 2 and 3**. Advice from the EA is required for development proposals within Flood Zones 2 & 3.

For information regarding Fluvial flooding please contact the Environment Agency. Please refer to the following EA website: <https://flood-map-for-planning.service.gov.uk/>

For information regarding foul flooding, please contact the relevant sewerage provider – Southern Water.

The site is located within the Waterbody Catchments of River Ems with Main River being West Brook. HCC note that the site is located in the proximity of environmentally designated sites and therefore flood risk to these sites should be managed accordingly, increasing or decreasing rates and volumes of surface water to these sites may have an affect on their ecological nature and values. The sites are:

- SINC: Land West of Emsworth Recreation Ground
- SINC: Lumley Meadow

Data relating to the SINC can be obtained from HCC HBIC team:

<https://www.hants.gov.uk/landplanningandenvironment/environment/biodiversity/informationcentre>. Any advice relating to planning in association with the SINC should be obtained from the ecologist at the local planning authority.

Ordinary Watercourse consenting

HCC have no records of Ordinary Watercourse Consents within the search area

Any works to ordinary watercourses that impact on capacity will require Ordinary Watercourse Consent. Please refer to the HCC [OWC website](#) for further information and the forms for consents. Consenting process takes approximately 2 months.

Drainage Assets

Please refer to the attached map which shows known drainage assets.

Please Note: *The data supplied has been compiled from a variety of sources of varying reliability. The data is constantly being revised and validated to ensure the highest accuracy possible. However, the data should not be relied upon or considered completely accurate and the data is provided on the understanding that neither the County Council nor the disclosing officer is to be held responsible should you rely on this data and consequently suffer damage.*

Highway Authorities have a statutory duty to drain the publicly maintainable highway; they have no statutory or common law duty to carry non-highway surface water in publicly maintainable highway drains. For further advice please contact: AssetManagementSchemeConsultation.Shared@hants.gov.uk

Drainage Provision

The SuDS Manual Ciria C753 provides best practise and design advice on SuDS design and should be referred to during the design process. Drainage systems should look to mimic the natural processes as far as practicable, collecting and storing / infiltrating rain water as close to the source as possible. If infiltration is not possible, attenuation options should be considered with a controlled outfall so that water leaving the site is minimised and the 'peak runoff value' flattened.

The site geology appears to be located on a superficial layer of river terrace deposits and clay and gravel over bedrock of London Clay Formation
<http://www.bgs.ac.uk/downloads/start.cfm?id=2920>

Vulnerability of site from surface or ground water information

- EA mapping indicates that the site is at high risk of surface water flooding on the eastern side within Flood Zones 2 & 3. This area has a chance of flooding greater than 1 in 30 in any given year (annual probability of flooding 3.3%)
- The site is at high risk of groundwater flooding. Greater than 75%

For further information on the vulnerability of the area from either surface water or river/sea flooding, please see the maps available from the Environment Agency on the .GOV website.

Hampshire also have a draft [Groundwater Management Plan](#) that was never published but is available on our website which contains useful information

HCC prepared [Surface Water Management Plans](#) which are available on our website however these will be replaced by Catchment Approach Plans over the forthcoming months.

Surface Water Drainage Plan

Please refer to our website for planning application information required by HCC. Reference is made to Greenfield Run-off rates and volumes
<http://www3.hants.gov.uk/flooding/hampshireflooding/drainagesystems/planning-application-guidance.htm>

This response has been provided using the best knowledge and information submitted as part of the planning application at the time of responding and is reliant on the accuracy of that information.

If you have any further queries please contact the Flood and Water Management (FWM) Team quoting the above reference.

Regards



FWM Team
fwm@hants.gov.uk

Users' declaration

I understand that in using advice provided by the Hampshire Flood and Water Management Team I am aware of the following:

1. The Flood and Water Management (FWM) Team is part of Hampshire County Council ("We/Us/Our"). The Council holds copyright of this information and advice on behalf of the FWM team except where service level agreements state otherwise. No direct reproduction of this advice will be allowed as a direct copy, except for the purpose of Environment Information Requests.
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3. Any personal information supplied in association with these records will not be used, copied, or passed to any third party without the consent of the Hampshire FWM Team and in accordance with GDPR.
4. Whilst every reasonable effort is made to validate information supplied to and by the Hampshire FWM Team owing to the dynamic and judgmental nature of information relating to flooding, the Hampshire disclaims any responsibility for the accuracy or comprehensiveness of the information supplied, and accepts no liability for any indirect, consequential, or incidental damages or losses arising from use of the information.
5. I am aware of the Hampshire FWM Team charging schedule and understand I may be charged for the advice.



NOTES

- 1 This drawing to be read in conjunction with all relevant Architect's and Engineer's reports, drawings and specifications.
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REV	DESCRIPTION	DATE
		
Consulting Civil & Structural Engineers One Little London Chichester West Sussex PO19 1PP Telephone: 01243 788471 Facsimile: 01243 779348 mail@archibaldshaw.co.uk www.archibaldshaw.co.uk		
PROJECT Land at end of Coldharbour Farm Road, Emsworth		
SECTION Trial Pit Location Plan		
DRAWN BY	CHECKED BY	DESIGNED BY
PF	VC	PF
SCALE @ A4	@ DATE	STATUS
1:1000	Dec, 2012	Report
JOB NO.	DRAWING NO.	REVISION
25525	Figure 1	R1



Excavation Method

Trial Pit was machine
excavated using a Yanmar
Excavator

Dimensions

2.04m long x 2.05m deep x 0.535m
wide

Ground Level (mOD)

Client

Les Shipp

**Job
Number**
25525

Location

See Location Plan

Dates

17/12/2012

Engineer

Phil Faulkner

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.25)	Grass over TOPSOIL		
					0.25	Flint gravel in CLAY		
					(0.62)			
					0.87	Orange, brown, sandy CLAY		
					(1.18)			
					2.05	Complete at 2.05m		

Plan

Remarks

Ground water seepage at 1.80m (strong flow)
Pit sides unstable from 0.9m down
Pit filled with water to 790mm from ground level
Water level rose 100mm in 270 minutes

Scale (approx)

1:20

Logged By

PEF/SD

Figure No.

25525.TP1



Excavation Method

Trial Pit was machine
excavated using a Yanmar
Excavator

Dimensions

2.8m long x 0.68m deep x 0.50m
wide

Ground Level (mOD)

Client

Les Shipp

Job
Number
25525

Location

See Location Plan

Dates

17/12/2012

Engineer

Phil Faulkner

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.31)	Grass over TOPSOIL		
					0.31	Orange, brown, sandy CLAY		
					(0.37)			
					0.68	Complete at 0.68m		

Plan

Remarks

No Ground water seepage visible
Pit filled with water to 350mm from ground level
Water level rose 35mm in 260 minutes

Scale (approx)

1:20

Logged By

PEF/SD

Figure No.

25525.TP2



Excavation Method

Trial Pit was machine
excavated using a Yanmar
Excavator

Dimensions

1.9m long x 1.96m deep x 0.51m
wide

Ground Level (mOD)

Client

Les Shipp

**Job
Number**
25525

Location

See Location Plan

Dates

17/12/2012

Engineer

Phil Faulkner

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.28)	Grass over TOPSOIL		
					0.28 (0.27)	Orange, brown, sandy CLAY		
					0.55	Firm brown CLAY		
					(1.35)			
					1.80 (0.08) 1.96	Firm grey, blue CLAY		
						Complete at 1.96m		

Plan

Remarks

No Ground water seepage visible
Pit filled with water to 800mm from ground level
Water level rose 10mm in 225 minutes

Scale (approx)

1:20

Logged By

PEF/SD

Figure No.

25525.TP3



Excavation Method
Trial Pit was machine
excavated using a Yanmar
Excavator

Dimensions
1.90m long x 1.70m deep x 0.51m
wide

Ground Level (mOD)

Client
Les Shipp

**Job
Number**
25525

Location
See Location Plan

Dates
17/12/2012

Engineer
Phil Faulkner

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.28)	Grass over TOPSOIL		
					0.28	Orange, brown, sandy CLAY		
					(0.52)			
					0.80	Firm brown CLAY		
					(0.90)			
					1.70	Complete at 1.70m		

Plan

Remarks

No Ground water visible
Pit sides stable
No infiltration test undertaken in pit

Scale (approx)

1:20

Logged By

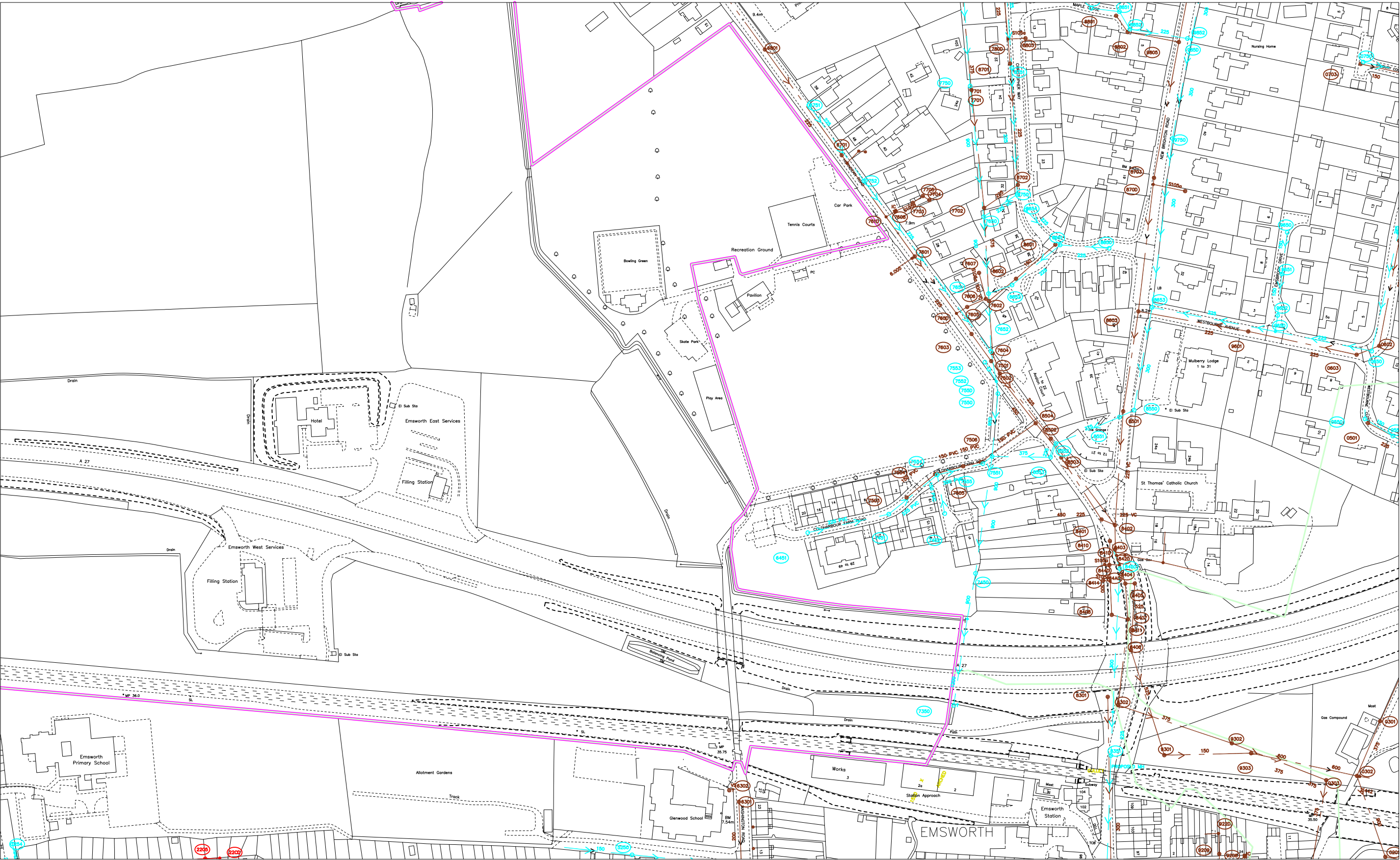
PEF/SD

Figure No.

25525.TP4

SEWER RECORDS PAGE 1 OF 2

106840



106262

74120	O.S. REF. SU7406NE	Drawn by: kumaria	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	 N	
		Scale: 1:2500			
	Title: 342090_Cold Harbour Farm, Emsw	Date: 25/06/2019	Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530.		

SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	
0201X	3.82	0.36	675	CP	CIRC	8351X			UNK	UNK	CIRC	9805X	8.942		UNK	UNK	CIRC							
0301X	5.222	2.822	375	UNK	CIRC	835ZX			225	UNK	CIRC	9852X	8.81	7.27	UNK	UNK	CIRC							
0302X	4.712		900	UNK	CIRC	8401X	7.217	4.047	UNK	UNK	CIRC	985DX			300	UNK	CIRC							
0303X	4.852	2.812	375	UNK	CIRC	8402X	7.432		UNK	UNK	CIRC													
0501X	7.927	6.157	225	UNK	CIRC	8403X	7.463	3.923	375	UNK	CIRC													
0550X	8.022		150	UNK	CIRC	8404Y	8.36		UNK	UNK	CIRC													
0551X	7.52	6.6	UNK	UNK	CIRC	8404X	8.36	3.83	UNK	UNK	CIRC	*												
0602X	8.389	5.699	UNK	UNK	CIRC	8405X	8.121	1.961	525	UNK	CIRC	*												
0603X	8.417	5.647	225	UNK	CIRC	8406X	8.088	1.688	525	UNK	CIRC													
0650X	8.431	7.341	225	UNK	CIRC	8407X			UNK	UNK	CIRC													
0703X	9.246	7.796	150	UNK	CIRC	8408X			300	UNK	CIRC													
0750X	9.228	8.538	225	UNK	CIRC	8409X			300	UNK	CIRC													
1254X	10.763	9.763	225	UNK	CIRC	840DX			UNK	UNK	CIRC													
2205X			UNK	UNK		8410X			UNK	UNK	CIRC													
22CDX			UNK	UNK	UNK	8411X	8.154	1.779	525	UNK	CIRC													
5250X	8.119		150	UNK	CIRC	8414X			UNK	UNK	CIRC													
6301X	6.81	5.01	200	UNK	CIRC	841DX			375	UNK	CIRC													
6451X	6.72	5.27	225	PVC	CIRC	842DX			375	UNK	CIRC													
6701X	8.832	5.322	UNK	UNK	CIRC	844DX			UNK	UNK	UNK													
670DX			UNK	UNK	CIRC	8450X	7.583	4.833	300	UNK	CIRC													
671DX			UNK	UNK	CIRC	84ADX			300	UNK	CIRC													
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7452X	5.836	5.021	150	PVC	CIRC	8504Y	6		450	UNK	CIRC	*												
745ZX			1200	UNK	CIRC	8550X	7.667	6.277	UNK	UNK	CIRC													
7501X	6.314	4.654	UNK	UNK	CIRC	8551X	7.602	5.902	375	UNK	CIRC													
7502X	6.305		225	UNK	CIRC	8552Y	6.41		225	UNK	CIRC	*												
7503X	6.65	5.345	150	PVC	CIRC	8552X	6.41	4.97	225	UNK	CIRC	*												
7504X	6.145	5.18	150	PVC	CIRC	8553X	6.234		375	UNK	CIRC													
7505X	6	5.045	150	PVC	CIRC	8601X	7.872	6.452	150	UNK	CIRC													
7506X	5.9	4.965	150	PVC	CIRC	8602X	6.802	5.452	UNK	UNK	CIRC													
7550X	5.745	4.245	900	UNK	CIRC	8603X	8.221	5.181	UNK	UNK	CIRC													
7551X	5.9		900	UNK	CIRC	8650X	8.183	6.733	225	UNK	CIRC													
7552X	6.375	5.125	UNK	UNK	CIRC	8651X	7.846		225	UNK	CIRC													
7553X	6.341	5.371	UNK	UNK	CIRC	8652X	6.793	5.643	225	UNK	CIRC													
7554X	6.145		300	PVC	CIRC	8653X	8.13		300	UNK	CIRC													
7555X	5.9	4.685	300	PVC	CIRC	8654X	7.594	6.444	225	UNK	CIRC													
755DX			900	UNK	CIRC	8701X	8.014	5.504	225	UNK	CIRC													
7601X	7.505	4.905	225	UNK	CIRC	8702X	7.75	5.06	225	UNK	CIRC													
7602X	6.675		375	UNK	CIRC	8703X	8.822	5.742	UNK	UNK	CIRC													
7603X	6.421	4.691	UNK	UNK	CIRC	870DX			UNK	UNK	CIRC													
7604X	6.313	4.73	UNK	UNK	CIRC	8750X	7.678		225	VC	CIRC													
7605X			100	VC	CIRC	8751X	7.947	6.107	225	UNK	CIRC													
7606X			100	VC	CIRC	8801X	8.784	7.794	150	UNK	CIRC													
7607X			100	VC	CIRC	8802X	8.873	7.653	UNK	UNK	CIRC													
7608X			UNK	UNK	CIRC	8803X			UNK	UNK	CIRC													
760DX			225	UNK	CIRC	8850X	8.742	8.092	225	UNK	CIRC													
761DX			UNK	UNK	CIRC	8851X	8.747	8.007	225	UNK	CIRC													
7650X	6.837		900	UNK	CIRC	8852X	8.949	7.809	225	UNK	CIRC													
7651X	6.655	4.865	900	UNK	CIRC	9208X			UNK	UNK	CIRC													
7652X	6.311		UNK	UNK	CIRC	9209X			UNK	UNK	UNK													
7652Y	6.311		UNK	UNK	CIRC	922DX			UNK	UNK	UNK													
7701X			UNK	UNK	CIRC	9301X	7.759	1.459	150	UNK	CIRC													
7702X	6.631		375	UNK	CIRC	9302X	6.685	3.095	375	UNK	CIRC													
7703X			UNK	UNK	CIRC	9303X	6.233	1.133	600	UNK	CIRC													
7704X			UNK	UNK	CIRC	940DX			UNK	UNK	CIRC													
7705X			UNK	UNK	CIRC	9601X	8.499	5.409	225	UNK	CIRC													
770DX			UNK	UNK	CIRC	9650X	8.535	7.605	150	UNK	CIRC													
7750X	7.142	5.462	900	UNK	CIRC	9651X	8.548	7.468	150	UNK	CIRC													
7752X	8.646	8.066	225	UNK	CIRC	9652X	8.428	7.378	UNK	UNK	CIRC													
780DX			225	UNK	CIRC	965DX			225	UNK	CIRC													
8301X	7.258	3.528	300	UNK	CIRC	9701X			UNK	UNK	CIRC													
8302X	8.138		375	UNK	CIRC	9750X	8.88	7.11	300	UNK	CIRC													

LINE STYLES / COLOURS	MATERIALS	LEGEND - SEWERS
Brown Foul Foul Syphon Sewer Foul Vacuum Main Foul Rising Main Combined Combined Syphon Sewer Combined Rising Main Lateral Drain Building Over Agreement Area Treated Effluent	AK Alkathene BAC Bonded Asbestos Cement BRC Brick (Common) BRE Brick (Engineering) CC Concrete Box Culvert CI Cast Iron CO Concrete (In-Situ) CP Concrete (Pre-Cast) CSB Concrete Segments (bolted) CSU Concrete Segments (unbolted) DI Ductile Iron GRC Glass Reinforced Concrete GRP Glass Reinforced Plastic MAC Masonry in regular Courses MAR Masonry in random Courses PE Polyethylene PF Pitch Fibre PP Polypropylene PVC Polyvinyl Chloride RPM Reinforced Plastic Matrix SI Spun Iron ST Steel VC Vitrified Clay XXX Other ZZZ Unknown	Manhole (SW) Manhole (F&C) Lamp hole (SW) Lamp hole (F&C) Pumping Station (SW) Pumping Station (F&C) Side entry manhole (SW) Side entry manhole (F&C) Blind shaft (SW) Blind shaft (F&C) Ejector station (SW) Ejector station (F&C) Watertight door (SW) Watertight door (F&C) Flushing ch. Min-e (SW) Flushing ch. Min-e (F&C) Flushing ch. No-e (SW) Flushing ch. No-e (F&C) Demarcation Chamber Washout (SW) Washout (F&C) Rodding Eye (SW) Rodding Eye (F&C) Gauging point (SW) Gauging point (F&C) Intercept chamber (SW) Intercept chamber (F&C) Storm Tank (SW) Storm Tank (F&C) Vortex chamber (SW) Vortex chamber (F&C) Label ellipse Dummy/S24 manhole Outfall Penstock chamber Damboards Storm Overflow Backdrop manhole Other (s) Other Change in sewer (s) Change in sewer Reflex valve Flap valve Cascade Anode Valve Closed Valve Air Valve Hatch box (SW) Hatch box (F&C) Direction arrow Emptying valve Catchpit Soakaway Inlet Balancing Pond Wastewater treatment works Marine treatment works Outfall headworks Vent Vent column Tidal storage tank Blank end Head of Public Sewer Micro Pumping Station SHAPES (S) A Arched B Barrel C Circular E Egg H Horseshoe R Rectangular S Square T Trapezoidal U U Shape X Other NODE REFERENCING SYSTEM 1st digit: hundred metre easting identifier 2nd digit: hundred metre northing identifier sewer type identifier 0-4 = Foul/Combined 5-9 = Surface Water 4th digit: next sequential node

Drawn by:	kumaria	
Title:	342090_Cold Harbour Farm, Emsw	
Date:	25/06/2019	

B Proposed Site

Proposed layout

Flood storage plan – existing

Flood storage plan – proposed

Flood storage calculations

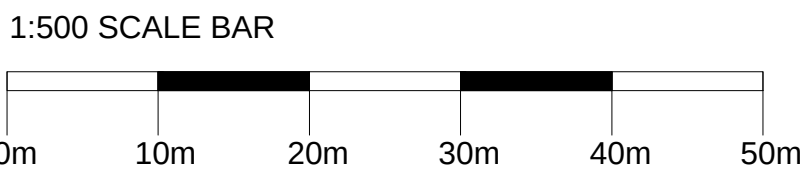
Surface water management strategy

Surface water calculations

Maintenance schedules



01
1003 Proposed Site Plan
Scale: 1:500



02
1003 Proposed Site Plan Key
Scale: Not to scale

This drawing is not to be scaled except for the purposes of planning. The architect is to be informed of any errors before work proceeds. The general contractor is responsible for checking all dimensions

Notes

To be read in conjunction with other submission reports and drawings in support of application.

Key

- Application Boundary
- 4m high acoustic fence
- Existing Tree
- Tree or hedge removed / trimmed
- Proposed Tree

For proposed and existing tree information, hard and soft landscaping and roadway finishes please refer to Landscape Architect and Highways Engineer's drawings.

Accommodation schedule

House Type A - 2 bed 4 person house - 16 units

House Type B - 3 bed 5 person house - 16 units

House Type C - 4 bed 6 person house - 1 units

Apartment Type D - 1 bed 2 person flat - 6 units

House Type E - 3 bed 5 person house - 5 units

Total number of units - 44

- c - cycle Store
- b - bin store
- cc-communal cycle store
- cb-communal bin store
- g - garage
- s - substation

Parking Strategy

- allocated parking space - 46
- U - unallocated parking space - 28
- V - visitors parking space - 15

P1 28/06/2019
Issued for planning. JW SH

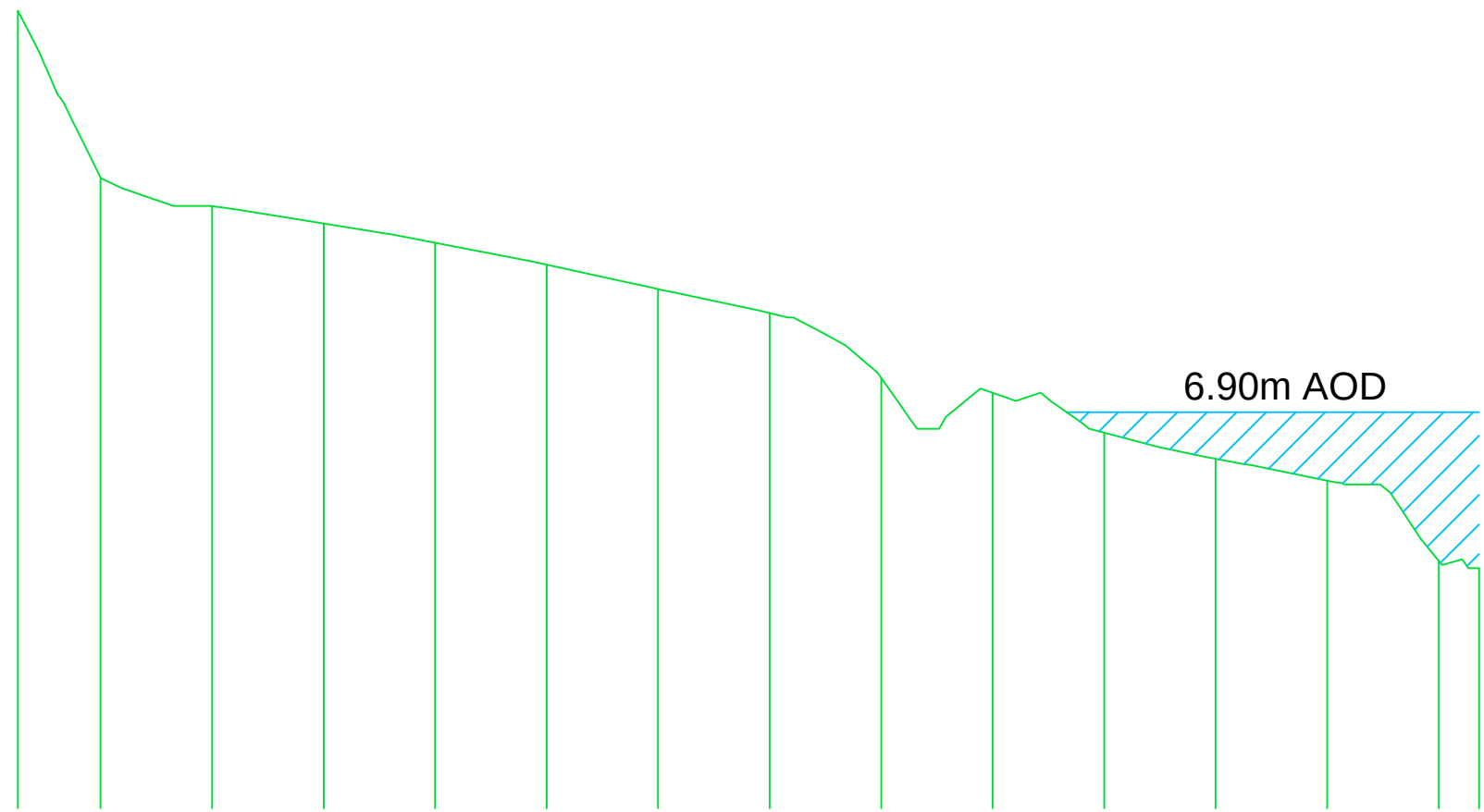
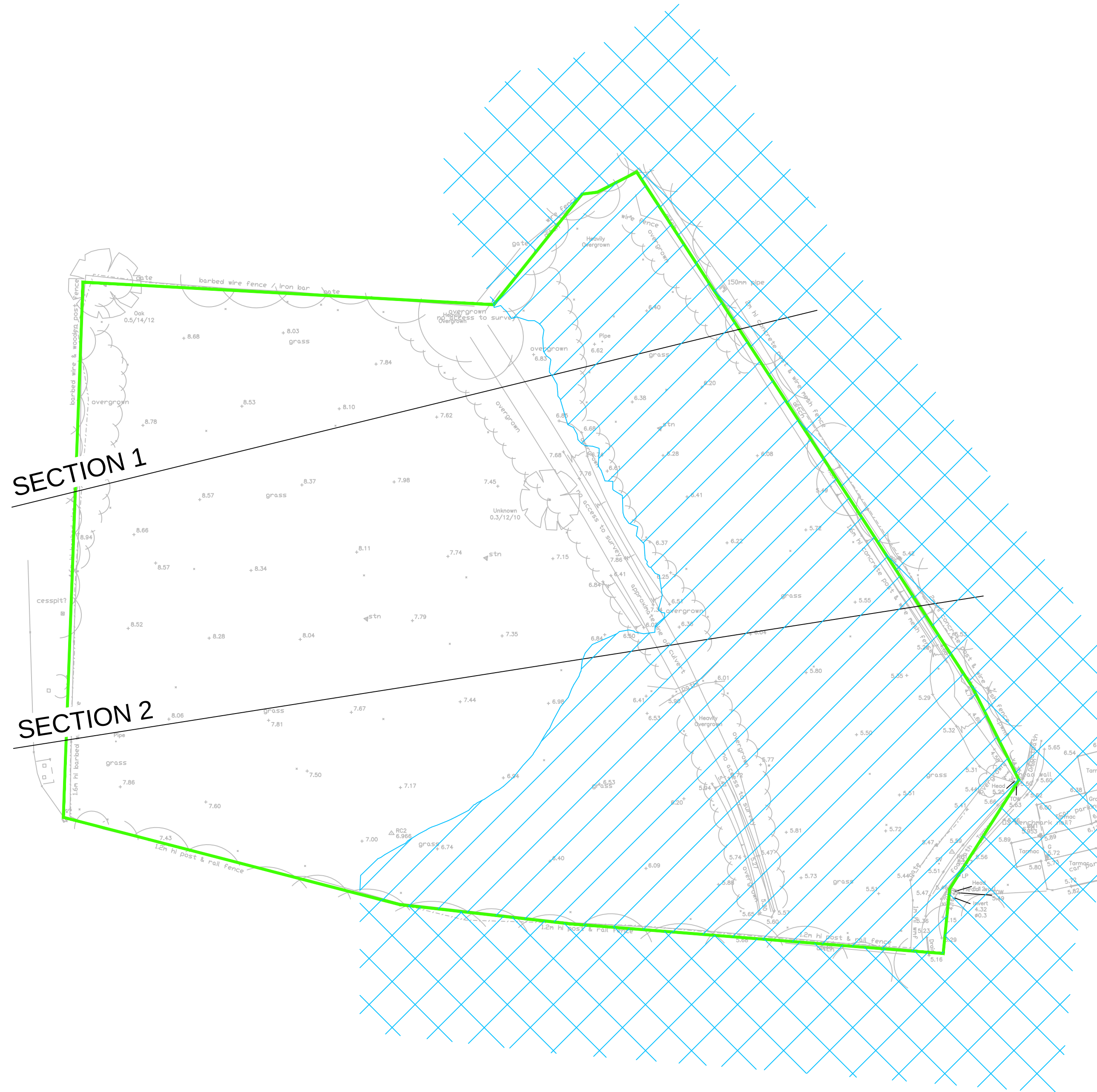
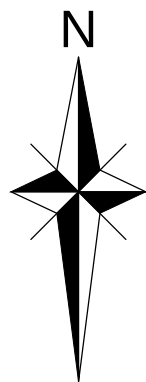
Rev Date + notes Drwn Chkd

rhp r h partnership architects
30-31 Foundry Street Brighton BN1 4AT
T 01273 645220
www.rhpartnership.co.uk
brighton@rhpartnership.co.uk

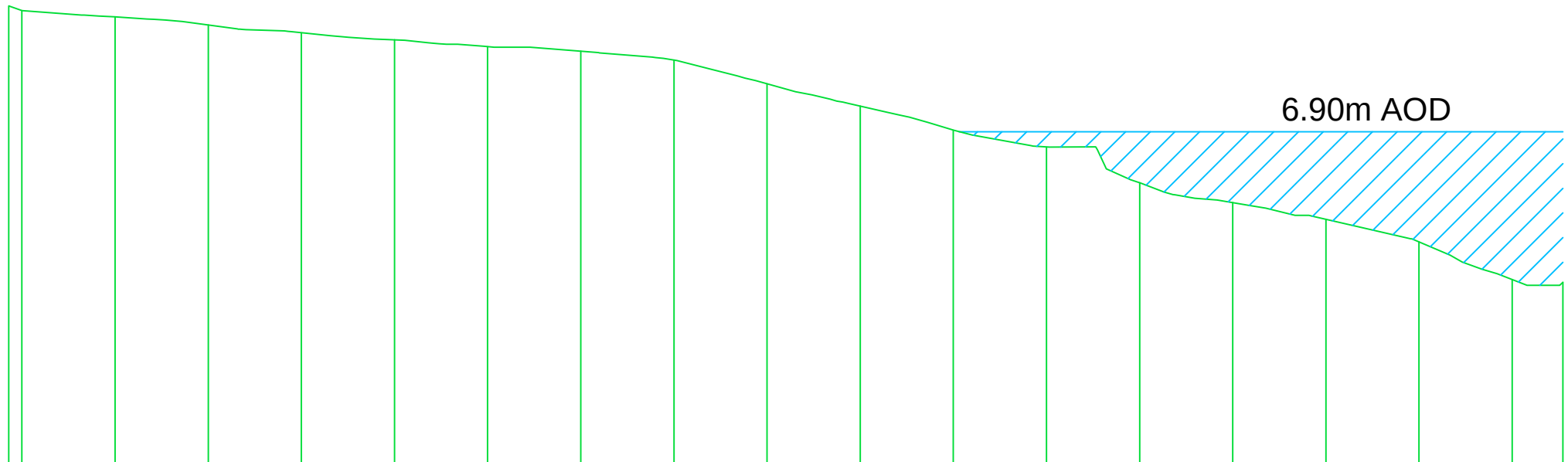
Project
Land to the West of Coldharbour
Farm Road, Emsworth

Drawing
Proposed Site Plan

Project	originator	volume	level	type	role	number	revision
P0768-RHP-00-ZZ-PL-A-1003	P1						
Scale(s) @ A1	RHP Project			Drwn	Chkd		
1:500	P0768			JW	SH		
Status							Suitability
Planning							S2



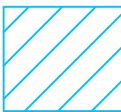
ILLUSTRATIVE SECTION 1



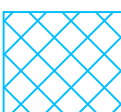
ILLUSTRATIVE SECTION 2

ILLUSTRATIVE SECTIONS

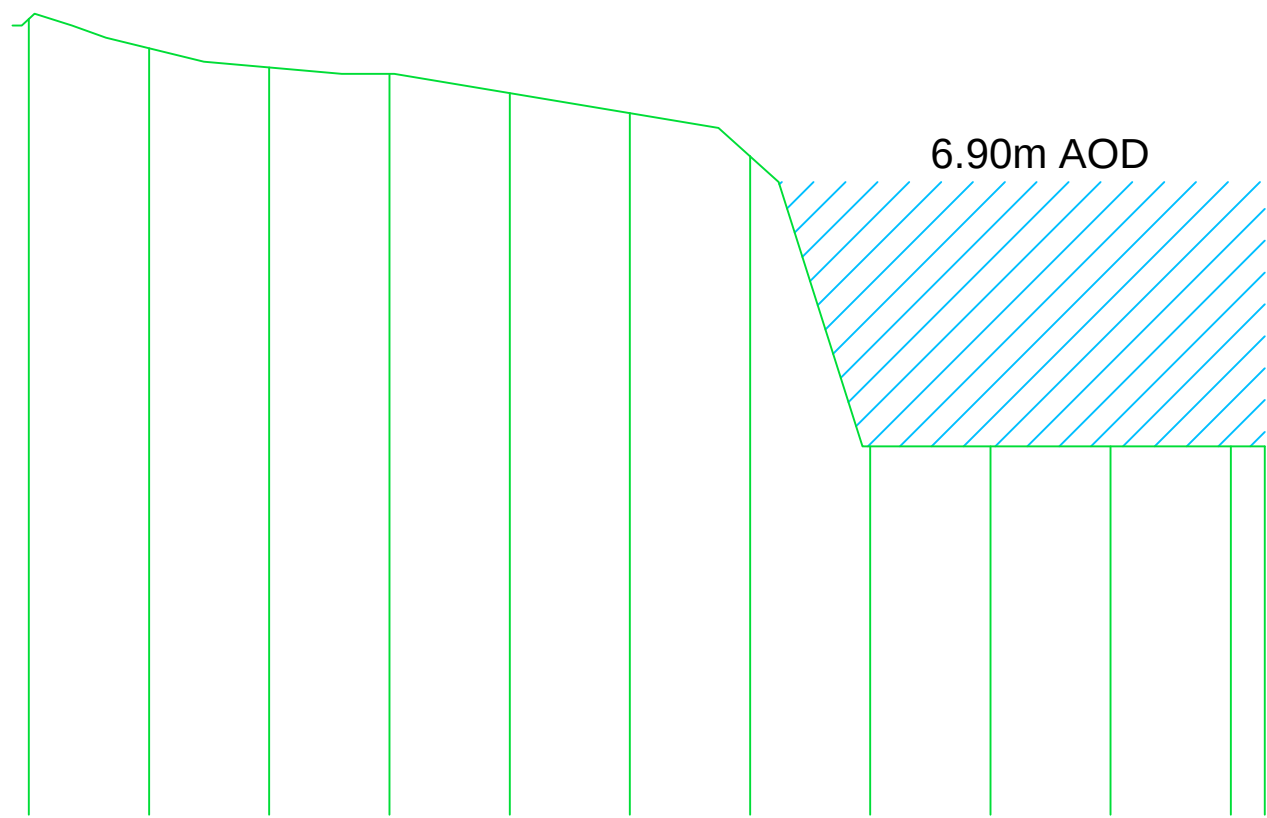
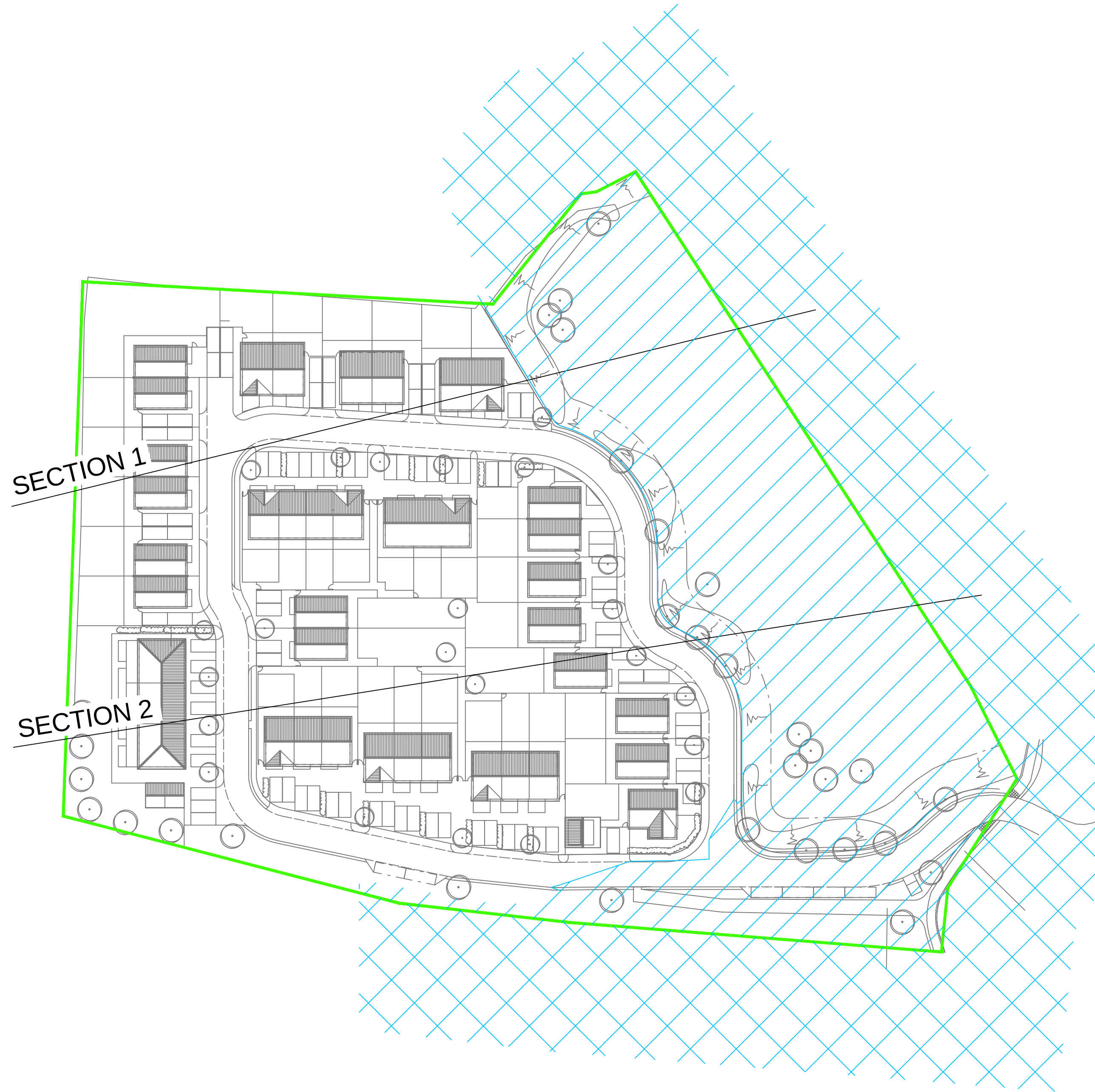
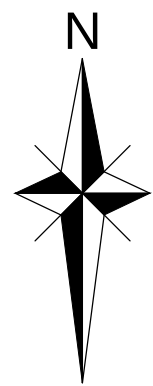
KEY

-  STUDY AREA
-  ON-SITE FLOOD EXTENT (6.9m AOD CONTOUR)

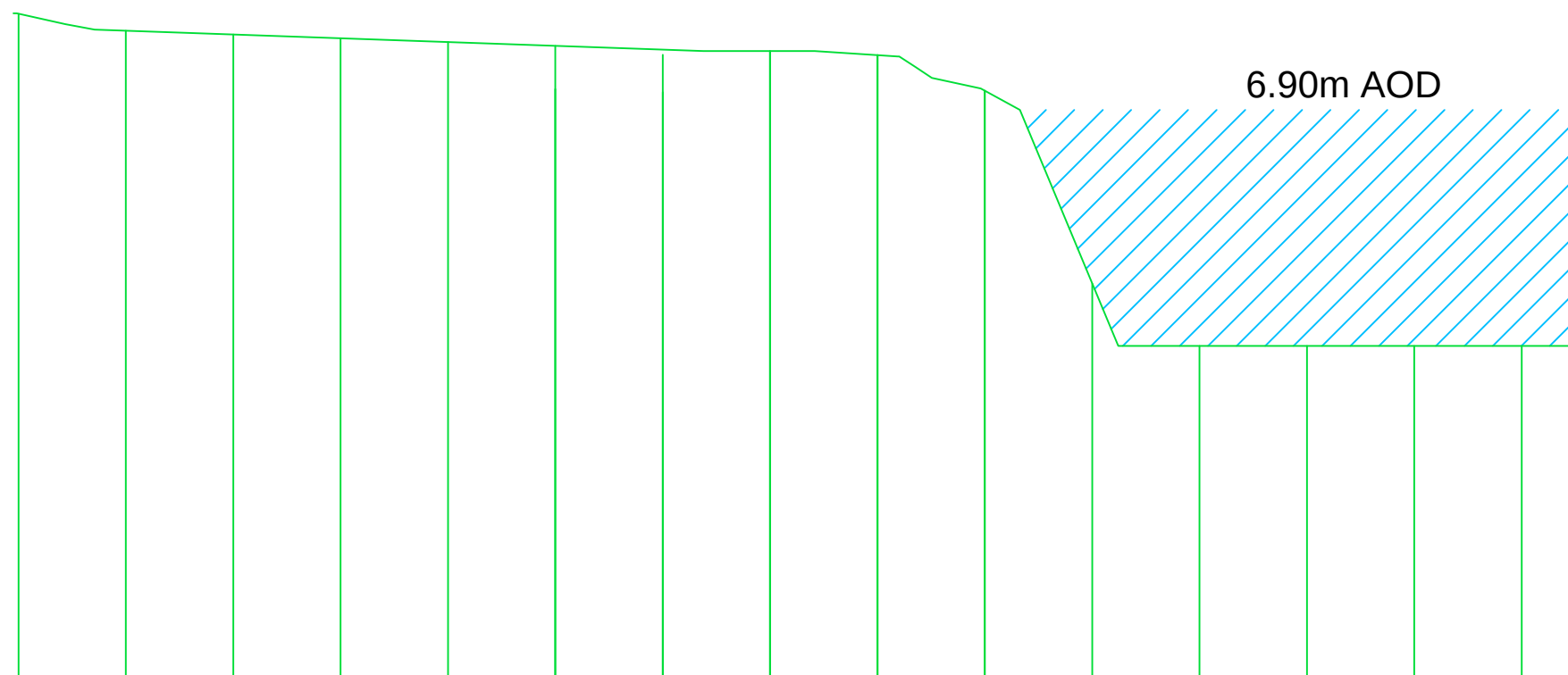
NOTES

-  NOTE THIS PLAN DOES NOT SHOW FLOODING BEYOND THE SITE BOUNDARY. REFER TO STRATEGIC FLOOD DATA/MAPPING FOR OFF-SITE FLOODPLAIN EXTENT.

P02	SECTIONS REVISED			DP	07/2019		
P01	TOPOGRAPHICAL SURVEY UPDATED			JH	28/06/2019		
REV	DESCRIPTION			DE	DR	CH	DATE
DESIGNED BY		DRAWN BY		CHECKED BY			
-		DP		-			
SCALE @ A1 SIZE				DATE			
D.N.S.				11/01/2019			
PROJECT TITLE							
LAND WEST OF COLDHARBOUR FARM							
DRAWING TITLE							
FLOOD STORAGE ASSESSMENT - EXISTING							
CLIENT							
TELSTAR LTD							
CANNON CONSULTING ENGINEERS Highways, Transport & Infrastructure Planning Peekhouse, 20 Eastcheap London, EC3M 1EB Tel: 020 7717 5870 info@cannon.co.uk Cambridge House, Lanwades Business Park, Kentford, Newmarket, CB8 7PN Tel: 01638 555107 www.cannon.co.uk							
DRAWING NUMBER							REV.
X781 - PL - SK - 300							P02



ILLUSTRATIVE SECTION 1



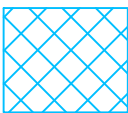
ILLUSTRATIVE SECTION 2

ILLUSTRATIVE SECTIONS

KEY

-  STUDY AREA
-  ON-SITE FLOOD EXTENT (6.9m AOD CONTOUR)

NOTES

-  NOTE THIS PLAN DOES NOT SHOW FLOODING BEYOND THE SITE BOUNDARY. REFER TO STRATEGIC FLOOD DATA/MAPPING FOR OFF-SITE FLOODPLAIN EXTENT.

P01.	SECTIONS REVISED AND MASTERPLAN ADDED.	-	DP	-	07/2019
REV.	DESCRIPTION	DE	DR	CH	DATE
DESIGNED BY		DRAWN BY DP		CHECKED BY -	
SCALE @ A1 SIZE		DATE			
D.N.S.		11/01/2019			
PROJECT TITLE					
LAND WEST OF COLDHARBOUR FARM					
DRAWING TITLE					
FLOOD STORAGE ASSESSMENT - PROPOSED					
CLIENT					
TELSTAR LTD					
CANNON CONSULTING ENGINEERS Highways, Transport & Infrastructure Planning Peekhouse, 20 Eastcheap London EC3M 1EB Tel: 020 7717 5870 info@cannonce.co.uk Cambridge House, Lanwades Business Park, Kentford, Newmarket, CB8 7PN Tel: 01638 555107 www.cannonce.co.uk					
DRAWING NUMBER					REV.
X781 - PL - SK - 301					P01

Flood Storage VolumeResult existing
X781 Cold Harbour Farm, Emsworth

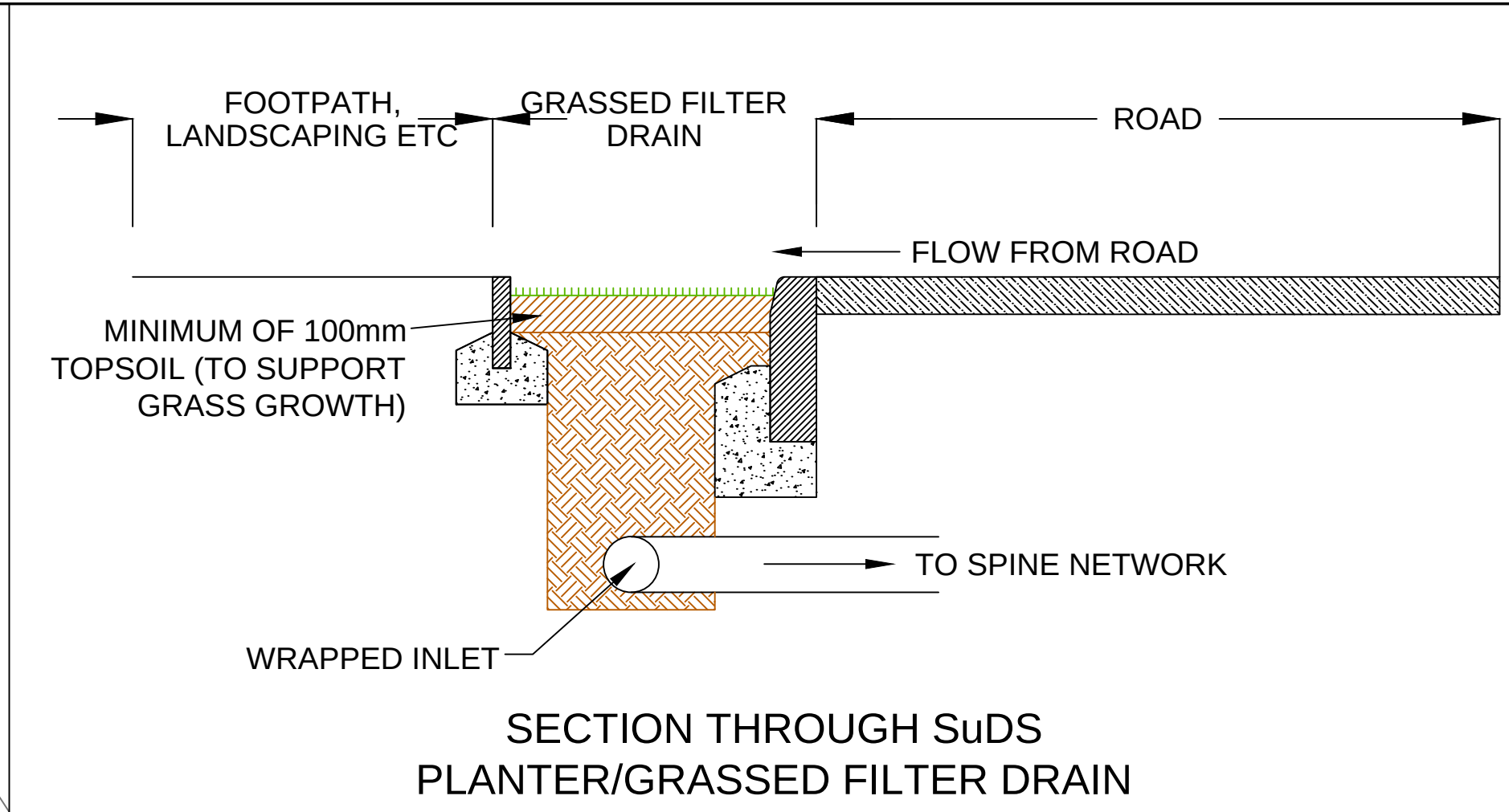
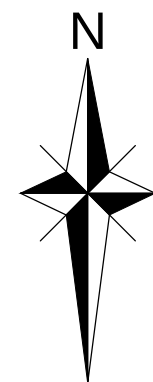
Pond Model: Emsworth ground model existing survey and LiDAR draped outline.kgm
Folder: M:\X781 Cold Harbour Farm, Emsworth, HAMPSHIRE\3 PLANS\DRAWINGS\KTF
Water top level: 6.900
Lowest level of Pond Model: 4.057
Band thickness: 0.100
Volume at top level: 7703

Elevation	Area	Band volume	Total volume
4.10	0	0	0
4.20	0	0	0
4.30	1	0	0
4.40	3	0	0
4.50	5	0	1
4.60	11	1	1
4.70	23	2	3
4.80	49	3	6
4.90	68	6	12
5.00	88	8	20
5.10	110	10	30
5.20	150	12	42
5.30	288	21	63
5.40	651	45	108
5.50	1132	88	196
5.60	1937	144	341
5.70	2690	233	573
5.80	3319	300	873
5.90	3807	357	1230
6.00	4308	398	1628
6.10	4787	460	2089
6.20	5313	503	2591
6.30	5892	560	3151
6.40	6627	623	3774
6.50	7124	687	4461
6.60	7661	739	5200
6.70	8127	790	5990
6.80	8586	835	6825
6.90	8967	878	7703

Flood Storage VolumeResult proposed
X781 Cold Harbour Farm, Emsworth

Pond Model: Emsworth ground model proposed floodplain 14.kgm
Folder: M:\X781 Cold Harbour Farm, Emsworth, HAMPSHIRE\3 PLANS\DRAWINGS\KTF
Water top level: 6.900
Lowest level of Pond Model: 4.580
Band thickness: 0.100
Volume at top level: 9470

Elevation	Area	Band volume	Total volume
4.60	0	0	0
4.70	2028	0	0
4.80	2602	233	233
4.90	2770	269	502
5.00	2915	284	786
5.10	3033	297	1084
5.20	3388	310	1394
5.30	3521	345	1739
5.40	3679	360	2099
5.50	3866	375	2474
5.60	4083	398	2872
5.70	4247	417	3289
5.80	4407	433	3721
5.90	4568	449	4171
6.00	4706	463	4634
6.10	4862	479	5113
6.20	4994	493	5606
6.30	5148	508	6114
6.40	5272	521	6634
6.50	5425	536	7170
6.60	5575	550	7720
6.70	5732	565	8285
6.80	5931	584	8869
6.90	6120	600	9470

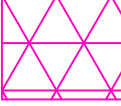
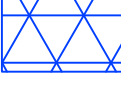


KEY	
	APPROXIMATE SITE BOUNDARY
	PERMEABLE PAVING
	GRASSED FILTER DRAIN
	HIGHWAY SUB-CATCHMENT
	FLOW ROUTE

NOTES

P01	NEW MASTERPLAN ADDED		-	DP	07/2019
REV	DESCRIPTION		DE	DR	CH DATE
DESIGNED BY		DRAWN BY	CHECKED BY		
-		DP	-		
SCALE @ A1 SIZE		DATE			
D.N.S.		28/06/2019			
PROJECT TITLE					
LAND WEST OF COLDHARBOUR FARM					
DRAWING TITLE					
SURFACE WATER MANAGEMENT STRATEGY - ABOVE GROUND					
CLIENT					
TELSTAR LTD					
CANNON CONSULTING ENGINEERS Highways, Transport & Infrastructure Planning 					
Peek House, 20 Eastcheap London, EC3M 1EB Tel: 020 7717 5870 info@cannonce.co.uk			Cambridge House, Lanwades Business Park, Kentford, Newmarket, CB8 7PN Tel: 01638 555107 www.cannonce.co.uk		
DRAWING NUMBER					REV.
X781 - PL - SK - 303					-



KEY	
	APPROXIMATE SITE BOUNDARY
	3 x 0.4m HIGH AQUACELL CELLULAR STORAGE OR SIMILAR APPROVED
	2 x 0.4m HIGH AQUACELL CELLULAR STORAGE OR SIMILAR APPROVED
	450mm TANK SEWER AT 1:500
	ORIFICE CONTROL CHAMBER
	HEADWALL & FLAP VALVE
	CHANNEL/SLOT DRAIN
	SHALLOW CHANNEL (200mm APPROXIMATE) TO WEST BROOK

NOTES					
P01	NEW MASTERPLAN ADDED			-	DP - 07/2019
REV	DESCRIPTION			DE	DR CH DATE
DESIGNED BY -		DRAWN BY DP		CHECKED BY -	
SCALE @ A1 SIZE			DATE		
D.N.S.			28/06/2019		
PROJECT TITLE					
LAND WEST OF COLDHARBOUR FARM					
DRAWING TITLE					
SURFACE WATER MANAGEMENT STRATEGY - BELOW GROUND					
CLIENT					
TELSTAR LTD					
CANNON CONSULTING ENGINEERS Highways, Transport & Infrastructure Planning Peek House, 20 Eastcheap London. EC3M 1EB Tel: 020 7717 5870 info@cannonece.co.uk Cambridge House, Llanwades Business Park, Kentford, Newmarket, CB8 7PN Tel: 01838 555107 www.cannonece.co.uk					
DRAWING NUMBER					REV.
X781 - PL - SK - 304					P01

Cannon Consulting		Page 1
Cambridge House Lanwades Business Park Kentford		
Date 27/06/2019 15:01 File	Designed by DJP Checked by	
Micro Drainage	Source Control 2018.1	
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 100 SAAR (mm) 824 Urban 0.000 Area (ha) 1.000 Soil 0.374 Region Number Region 7 Results 1/s QBAR Rural 3.6 QBAR Urban 3.6 Q100 years 11.4 Q1 year 3.0 Q30 years 8.1 Q100 years 11.4		
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[illegible]

Cannon Consulting

Cambridge House

Lanwades Business Park

Kentford

Main catchment

Date 28/06/2019 16:58

File X781 - Attenuation.srcx

Designed by DJP

Checked by

Micro Drainage

Source Control 2018.1

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
8640 min Summer	6.152	1.152	0.0	2.1	2.1	859.1	O K
10080 min Summer	6.181	1.181	0.0	2.2	2.2	879.5	O K
15 min Winter	5.360	0.360	0.0	1.2	1.2	264.6	O K
30 min Winter	5.474	0.474	0.0	1.4	1.4	353.2	O K
60 min Winter	5.596	0.596	0.0	1.5	1.5	449.4	O K
120 min Winter	5.691	0.691	0.0	1.6	1.6	523.0	O K
180 min Winter	5.751	0.751	0.0	1.7	1.7	569.4	O K
240 min Winter	5.796	0.796	0.0	1.8	1.8	603.1	O K
360 min Winter	5.859	0.859	0.0	1.8	1.8	650.0	O K
480 min Winter	5.903	0.903	0.0	1.9	1.9	682.5	O K
600 min Winter	5.936	0.936	0.0	1.9	1.9	706.6	O K
720 min Winter	5.962	0.962	0.0	2.0	2.0	725.3	O K
960 min Winter	6.000	1.000	0.0	2.0	2.0	751.9	O K
1440 min Winter	6.041	1.041	0.0	2.0	2.0	781.1	O K
2160 min Winter	6.068	1.068	0.0	2.1	2.1	799.9	O K
2880 min Winter	6.077	1.077	0.0	2.1	2.1	806.4	O K
4320 min Winter	6.081	1.081	0.0	2.1	2.1	809.1	O K
5760 min Winter	6.094	1.094	0.0	2.1	2.1	818.4	O K
7200 min Winter	6.111	1.111	0.0	2.1	2.1	830.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
8640 min Summer	1.283	0.0	1012.2	5880
10080 min Summer	1.178	0.0	995.6	6672
15 min Winter	136.640	0.0	91.4	35
30 min Winter	91.280	0.0	106.7	49
60 min Winter	58.240	0.0	224.9	78
120 min Winter	34.090	0.0	244.6	136
180 min Winter	24.886	0.0	255.7	194
240 min Winter	19.880	0.0	263.1	254
360 min Winter	14.443	0.0	272.3	370
480 min Winter	11.497	0.0	277.5	486
600 min Winter	9.624	0.0	280.4	604
720 min Winter	8.318	0.0	281.8	720
960 min Winter	6.602	0.0	281.8	954
1440 min Winter	4.760	0.0	274.6	1416
2160 min Winter	3.443	0.0	548.6	2092
2880 min Winter	2.750	0.0	543.1	2744
4320 min Winter	2.029	0.0	515.3	3496
5760 min Winter	1.655	0.0	1006.3	4392
7200 min Winter	1.432	0.0	1016.6	5336

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Cannon Consulting		Page 5
Cambridge House Lanwades Business Park Kentford	Main catchment	
Date 28/06/2019 16:58 File X781 - Attenuation.srcx	Designed by DJP Checked by	
Micro Drainage Source Control 2018.1		

Model Details

Storage is Online Cover Level (m) 6.900

Complex Structure

Pipe

Diameter (m) 0.450 Length (m) 303.000
Slope (1:X) 500.000 Invert Level (m) 5.000

Cellular Storage

Invert Level (m) 5.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	740.0	740.0	1.201	0.0	870.6
1.200	740.0	870.6			

Orifice Outflow Control

Diameter (m) 0.031 Discharge Coefficient 0.600 Invert Level (m) 5.000

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Cannon Consulting

Cambridge House

Lanwades Business Park

Kentford

Date 28/06/2019 16:56

File X781 - Attenuation highw...

Highway sub catchment

Designed by DJP

Checked by

Source Control 2018.1

Micro Drainage

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 74 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	5.030	0.430	0.0	0.9	0.0	0.9	4.9	O K
30 min Summer	5.135	0.535	0.0	0.9	0.0	0.9	6.1	O K
60 min Summer	5.188	0.588	0.0	0.9	0.0	0.9	6.7	O K
120 min Summer	5.134	0.534	0.0	0.9	0.0	0.9	6.1	O K
180 min Summer	5.092	0.492	0.0	0.9	0.0	0.9	5.6	O K
240 min Summer	5.050	0.450	0.0	0.9	0.0	0.9	5.1	O K
360 min Summer	4.969	0.369	0.0	0.9	0.0	0.9	4.2	O K
480 min Summer	4.893	0.293	0.0	0.9	0.0	0.9	3.3	O K
600 min Summer	4.826	0.226	0.0	0.9	0.0	0.9	2.6	O K
720 min Summer	4.768	0.168	0.0	0.9	0.0	0.9	1.9	O K
960 min Summer	4.680	0.080	0.0	0.9	0.0	0.9	0.9	O K
1440 min Summer	4.601	0.001	0.0	0.9	0.0	0.9	0.0	O K
2160 min Summer	4.600	0.000	0.0	0.6	0.0	0.6	0.0	O K
2880 min Summer	4.600	0.000	0.0	0.5	0.0	0.5	0.0	O K
4320 min Summer	4.600	0.000	0.0	0.4	0.0	0.4	0.0	O K
5760 min Summer	4.600	0.000	0.0	0.3	0.0	0.3	0.0	O K
7200 min Summer	4.600	0.000	0.0	0.3	0.0	0.3	0.0	O K
8640 min Summer	4.600	0.000	0.0	0.2	0.0	0.2	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Summer	136.640	0.0	5.8	0.0	17
30 min Summer	91.280	0.0	7.8	0.0	31
60 min Summer	58.240	0.0	9.9	0.0	60
120 min Summer	34.090	0.0	11.6	0.0	90
180 min Summer	24.886	0.0	12.7	0.0	124
240 min Summer	19.880	0.0	13.6	0.0	158
360 min Summer	14.443	0.0	14.8	0.0	224
480 min Summer	11.497	0.0	15.8	0.0	288
600 min Summer	9.624	0.0	16.5	0.0	350
720 min Summer	8.318	0.0	17.0	0.0	410
960 min Summer	6.602	0.0	18.1	0.0	522
1440 min Summer	4.760	0.0	19.5	0.0	734
2160 min Summer	3.443	0.0	21.2	0.0	0
2880 min Summer	2.750	0.0	22.6	0.0	0
4320 min Summer	2.029	0.0	25.0	0.0	0
5760 min Summer	1.655	0.0	27.2	0.0	0
7200 min Summer	1.432	0.0	29.4	0.0	0
8640 min Summer	1.283	0.0	31.6	0.0	0

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Cambridge House

Lanwades Business Park

Kentford

Highway sub catchment

Date 28/06/2019 16:56

File X781 - Attenuation highw...

Designed by DJP

Checked by

Micro Drainage

Source Control 2018.1

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Overflow (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
10080 min Summer	4.600	0.000	0.0	0.2	0.0	0.2	0.0	O K
15 min Winter	5.032	0.432	0.0	0.9	0.0	0.9	4.9	O K
30 min Winter	5.140	0.540	0.0	0.9	0.0	0.9	6.2	O K
60 min Winter	5.197	0.597	0.0	0.9	0.0	0.9	6.8	O K
120 min Winter	5.130	0.530	0.0	0.9	0.0	0.9	6.0	O K
180 min Winter	5.069	0.469	0.0	0.9	0.0	0.9	5.3	O K
240 min Winter	5.006	0.406	0.0	0.9	0.0	0.9	4.6	O K
360 min Winter	4.884	0.284	0.0	0.9	0.0	0.9	3.2	O K
480 min Winter	4.779	0.179	0.0	0.9	0.0	0.9	2.0	O K
600 min Winter	4.694	0.094	0.0	0.9	0.0	0.9	1.1	O K
720 min Winter	4.632	0.032	0.0	0.9	0.0	0.9	0.4	O K
960 min Winter	4.600	0.000	0.0	0.8	0.0	0.8	0.0	O K
1440 min Winter	4.600	0.000	0.0	0.6	0.0	0.6	0.0	O K
2160 min Winter	4.600	0.000	0.0	0.4	0.0	0.4	0.0	O K
2880 min Winter	4.600	0.000	0.0	0.3	0.0	0.3	0.0	O K
4320 min Winter	4.600	0.000	0.0	0.2	0.0	0.2	0.0	O K
5760 min Winter	4.600	0.000	0.0	0.2	0.0	0.2	0.0	O K
7200 min Winter	4.600	0.000	0.0	0.2	0.0	0.2	0.0	O K
8640 min Winter	4.600	0.000	0.0	0.2	0.0	0.2	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
10080 min Summer	1.178	0.0	33.8	0.0	0
15 min Winter	136.640	0.0	5.8	0.0	17
30 min Winter	91.280	0.0	7.8	0.0	31
60 min Winter	58.240	0.0	10.0	0.0	58
120 min Winter	34.090	0.0	11.7	0.0	94
180 min Winter	24.886	0.0	12.7	0.0	132
240 min Winter	19.880	0.0	13.6	0.0	168
360 min Winter	14.443	0.0	14.8	0.0	236
480 min Winter	11.497	0.0	15.7	0.0	300
600 min Winter	9.624	0.0	16.4	0.0	356
720 min Winter	8.318	0.0	17.0	0.0	404
960 min Winter	6.602	0.0	18.1	0.0	0
1440 min Winter	4.760	0.0	19.5	0.0	0
2160 min Winter	3.443	0.0	21.2	0.0	0
2880 min Winter	2.750	0.0	22.6	0.0	0
4320 min Winter	2.029	0.0	25.0	0.0	0
5760 min Winter	1.655	0.0	27.2	0.0	0
7200 min Winter	1.432	0.0	29.4	0.0	0
8640 min Winter	1.283	0.0	31.6	0.0	0

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 474650 106450 SU 74650 06450
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.950
Cv (Winter)	0.950
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.018

Time (mins)	Area
From:	To: (ha)
0	4 0.018

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Model Details

Storage is Online Cover Level (m) 6.100

Cellular Storage Structure

Invert Level (m) 4.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	12.0	12.0	0.801	0.0	23.1
0.800	12.0	23.1			

Orifice Outflow Control

Diameter (m) 0.014 Discharge Coefficient 0.600 Invert Level (m) 0.000

Weir Overflow Control

Discharge Coef 0.544 Width (m) 5.000 Invert Level (m) 6.100

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Pervious Pavement Maintenance

Maintenance schedule	Required action	Frequency
Regular maintenance	Brushing and vacuuming.	Annual, depending on site conditions and any specific recommendations (from the manufacturer).
Occasional maintenance	Removal of weed.	As required, annual on high use pavements
	Stabilise and mow areas which shed flow to the paving	As required
Remedial actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving.	As required.
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users.	As required.
	Rehabilitation of surface and upper sub-structure.	As required
Monitoring	Initial inspection	Monthly for 3 months post installation
	Inspect for evidence of poor performance (pooling of water in areas for example) and for weed growth, correct as necessary	Quarterly and up to 48 hours after large storm events
	Inspect silt accumulation and adjust brushing if necessary	Annually
	Inspect flow control, connecting pipework and manholes/inspection chambers (clean as necessary)	Quarterly

(Based on advice in CIRIA C753)

Swale / Grassed Filter Drain Maintenance

Maintenance schedule	Required action	Frequency
Regular maintenance	Litter and debris removal	Monthly, as required
	Grass cutting	Monthly, as required by season
	Upkeep of any other planting	Monthly, then decreasing in frequency, as required by season
	Inspect the swale bed for any ponding (a possible indication of reduced infiltration).	Monthly, as required
	Inspect inlets, outlets, overflows for debris and condition	Monthly
	Inspect system for silt (traps, chambers and surfaces)	Half yearly
Occasional maintenance	Reseed and replant bare areas, consider reasons for poor growth and failure of plants to establish and amend planting, improve soil etc	As required
Remedial actions	Repair erosion or other damage (reseed or re-turf)	As required.
	Relevel uneven surfaces	As required.
	Scarify topsoil, remediate soil to improve any reduction in infiltration	As required.
	Remove notable accumulations of sediment	As required.
	Remove and safely dispose of any oils or petrol residues.	As required

(Based on advice in CIRIA C753)

Crate Maintenance

Maintenance schedule	Required action	Frequency
Regular maintenance	Inspect to identify any area of underperformance and correct (repair, improve etc)	Monthly for 3 months then annually
	Remove debris from drained area to prevent entry to the system	Monthly
	Check any infiltration surfaces which allow water to percolate into the tanks for blockages, correct as necessary	Annually
	Remove sediment from traps	Annually/as required
Remedial actions	Repair/replace inlets, outlets, overflows, and vents	As required.
Monitoring	Check that outlets, inlets, vents, and overflows are in good condition and working as intended	Annually
	Inspect tank internally, remove any sediment if present and if required	Every 5 years (or more frequently if necessary)

(Based on advice in CIRIA C753)