Appendices

Appendix PJ1 – Paul Jenkin CV



Paul Jenkin – Director of Flood Risk Management

CEng, C.WEM, FCIWEM

[redacted]

Areas of Expertise:

Paul has gained over 29 years experience in providing expert technical advice across a wide range of flood risk projects involving river, coastal and drainage problems. Paul has particular expertise in hydraulic modelling and hydrology and application to complex multi disciplinary development and infrastructure projects. Paul has been responsible for the delivery of 1000s of FRAs and Drainage Strategies as well as may ES Chapters and the like.

Having begun his career as a modeller Paul has a expert understanding of surface water hydrology and how this applies to assessing exiting risk and how to manage future risk.

.

Experience Includes:

Forest Road, Binfield
Undertaking detailed modelling to assess the existing extent of surface water flood risk and then developing practical solutions for both surface water drainage and floodplain compensation to ensure no increase in flood risk.

High Street, Tonbridge
Acting as expert witness for a proposed development of retirement properties in central Tonbridge. Assessing the risk of flooding from all sources and establishing safe design parameters as well as determining a safe process for access and egress during design and extreme floods.

Chitley Lane, Liphook
Undertaking detailed modelling to assess the extent of existing surface water flood risk and then developing solutions for both surface water drainage and floodplain storage to ensure no increase in flood risk.

Clanage Road, Bristol
Using existing modelling to assess the risk of flooding and provide design solutions for flood defence, flood risk management and the safe access and egress during and before floods. Paul acted as expert witness and continues to support the development of a camping and caravanning site at this location.

Projects:

- Environment Agency Flood Risk Mapping
- University of Reading Flood Risk Projects
- Shinfield Studios Flood Risk Projects
- Purton groundwater flood risk assessment
- Llandudno flood consequence assessment
- Hebden Bridge flood risk assessment and strategy
- Warrington Relief Road, modelling and FRA

Appendix PJ2 – Environment Agency Flood Maps

Flood map for planning

Your reference	Location (easting/northing)	Created
WIE16835	**546714/122145**	**18 Sep 2023 14:45**

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger that 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2022 OS 100024198. https://flood-map-for-planning.service.gov.uk/os-terms



Environment Agency

Flood map for planning

Your reference
WIE16835

Location (easting/northing)
546714/122145

Scale
1:10000

Created
18 Sep 2023 14:45

- Selected area
- Flood zone 3
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Water storage area

0 100 200 300m

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BETA This is a new service – your feedback will help us to improve it.

< Back

Learn more about flood risk

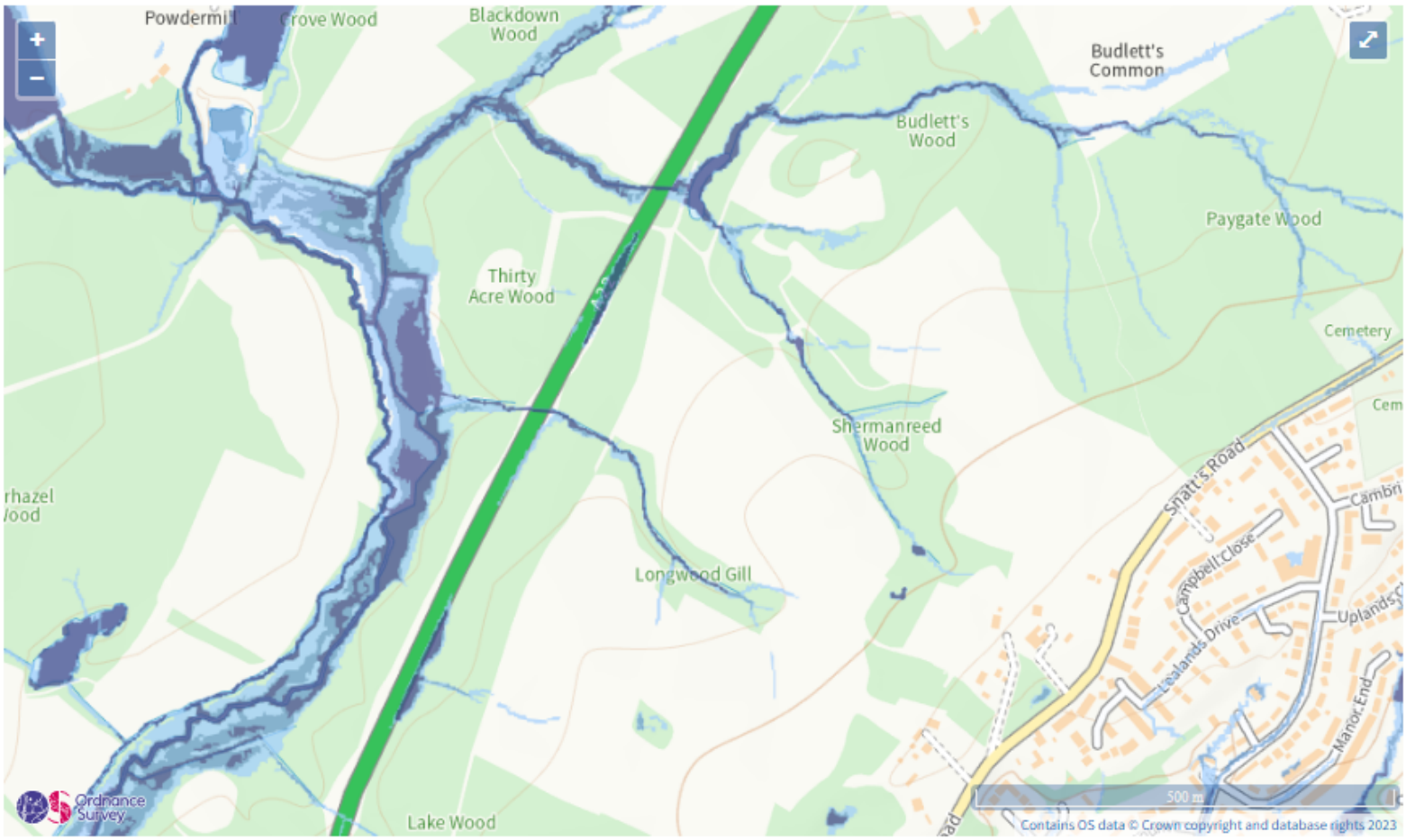
Select the type of flood risk information you're interested in. The map will then update.

Flood risk

Extent of flooding

Location

Enter a place or postcode



Extent of flooding from surface water

High Medium Low Very low

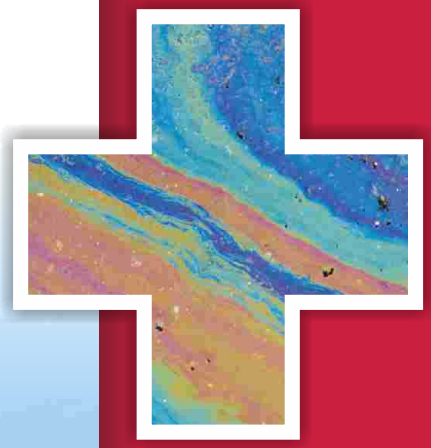
Appendix PJ3 – Industry Proprietary Product Option

NAYLOR
ENVIRONMENTAL

SMART sponge®

Oil Filtration & Pathogen Reduction Products

Solutions for Water Framework Directive Compliance



The smarter solution to deal with hydrocarbon pollution and comply with the Water Framework Directive

- Treats stormwater & urban run-off
- Removes hydrocarbons
- Destroys bacteria
- Filters heavy metals
- Allows solid waste recycling
- Complies with the Water Framework Directive
- Complies with Bathing Water Directive

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Winners - Growing Business

MX 2008
The MANUFACTURING EXCELLENCE Awards
Winner - Best SME

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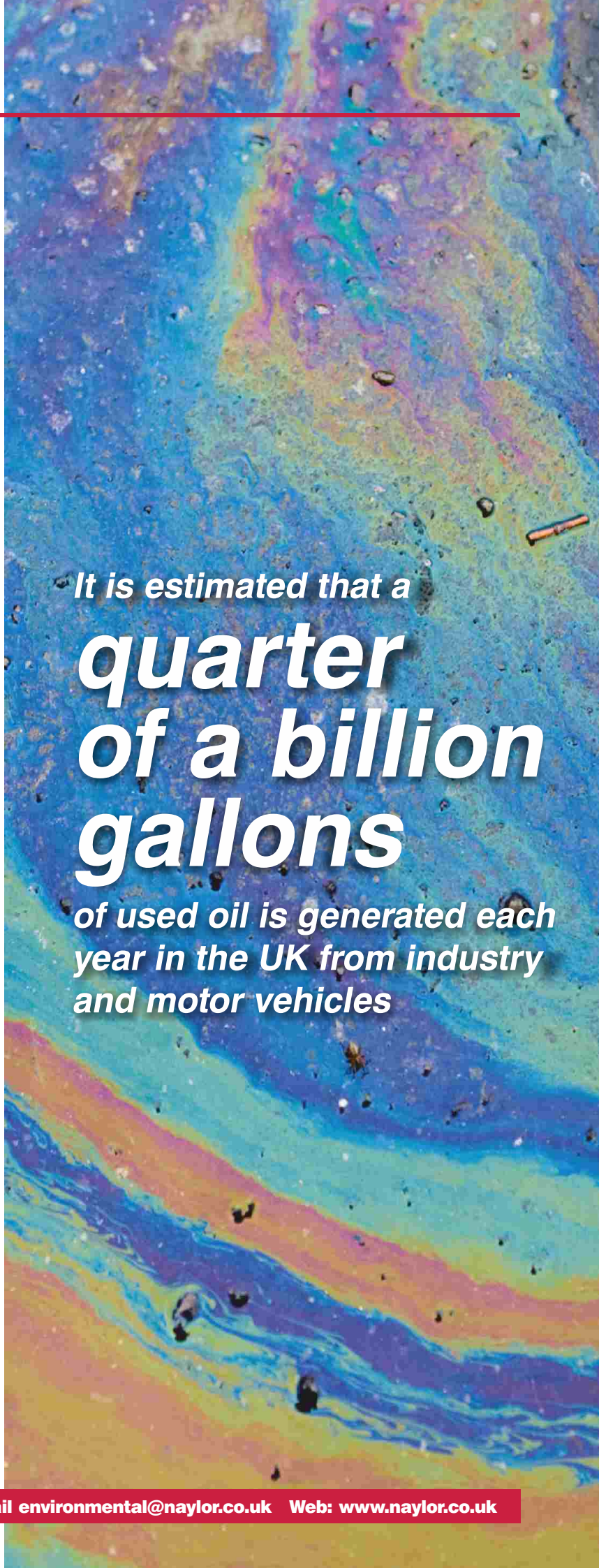
SMART sponge®

Used Oil Facts

- It is estimated that a quarter of a billion gallons of used oil is generated each year in the UK from industry and motor vehicles
- The fate of much of this used oil is unknown but a large proportion is presumably disposed of improperly
- 1 in 5 households carry out a do-it-yourself oil change
- The oil from a single oil change (1 gallon) can contaminate 1 million gallons of drinking water - a year's supply of water for 50 people
- Oil contributes to 20% of all UK water pollution incidents
- Used oil is a useful substance that, when recovered, can be used as a fuel and saves resources

Used Oils Impact on the Environment

- 10 litres of oil from one car can pollute a lake the size of two football pitches
- Used motor oil contains toxic substances such as toluene, lead, cadmium and benzene
- Oil films prevent replenishment of dissolved oxygen, impair photosynthesis and block sunlight
- Sump oil accounts for 40% of oil pollution of the nation's harbours and waterways
- Concentrations of 50 to 100 parts per million of used oil can foul sewage treatment plants
- Oil dumped on land reduces soil productivity
- Many industrialised countries, worldwide, recover a greater portion of their used oil as fuel and lubricants than the United Kingdom



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THE SMARTER SOLUTION TO:

Treat surface water pollution

"A revolutionary new product that is taking the global surface water market by storm"



Smart Sponge®

- Treats stormwater & urban run-off
- Removes hydrocarbons
- Destroys bacteria
- Filters heavy metals & sediment

Smart Sponge® was developed for the oil industry, the Smart Sponge® is based on patented polymer technologies and is the only non-toxic, fully recyclable filtration system that destroys bacteria and absorbs hydrocarbons on contact. Contaminated stormwater run-off, known as 'non-point source pollution', is a major source of contamination for lakes, streams, rivers, estuaries, coastal waters and even groundwater and forms part of the focus for the Water Framework Directive and Bathing Water Directive.

Smart Sponge® is a proprietary combination of synthetic polymers with a unique molecular structure that is chemically selective to hydrocarbons. Smart Sponge® fully encapsulates recovered oil, preventing absorbed oil from leaching and is also capable of removing low levels of oil from water, thereby successfully removing sheen. The spent product is able to be used within a Waste for Energy process as it produces between 10,000 - 18,000 BTU per pound, thereby creating a closed-loop solution with no resultant waste product.

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THE SMARTER SOLUTION TO:

Spill kits

The Smart Sponge® technology, Smart Sponge® is NOT a spill kit

"Smart Sponge® has the capacity to absorb up to five times its own weight (depending on the type of oil contaminant) and remove up to 95% of the hydrocarbons present in stormwater run-off."

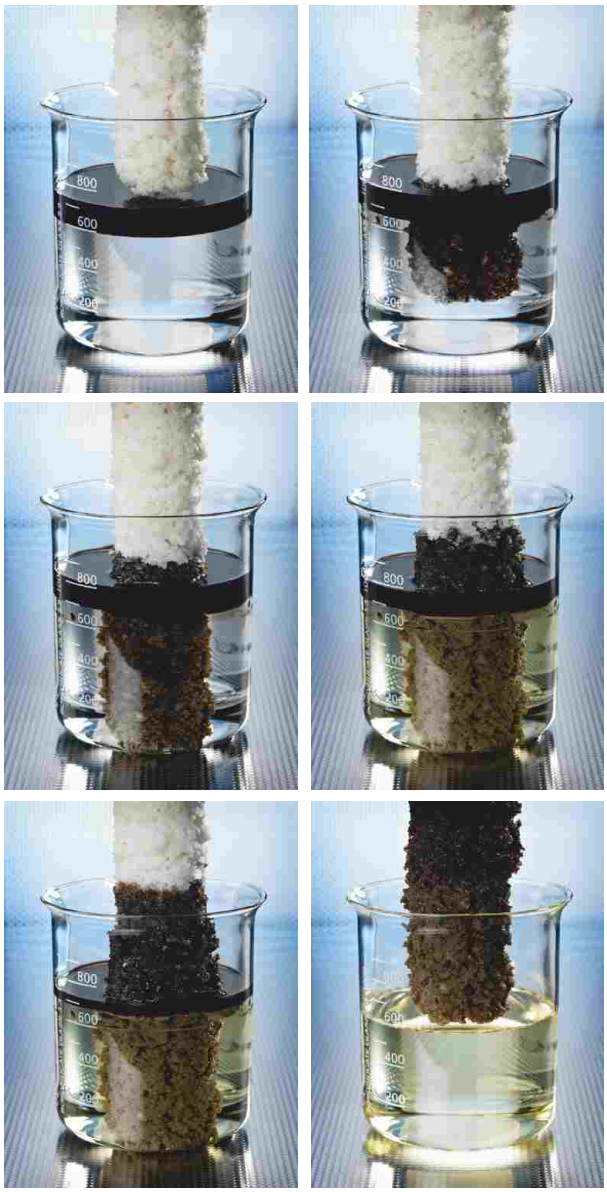
Absorbent VS Adsorbent

The Smart Sponge® proprietary blend of polymers is oleophilic – an absorbent, which means that hydrocarbons are bonded within its chemical matrix. Therefore, absorption is permanent and saturated product cannot be washed off, squeezed out, or leached from the material during subsequent rain events.

Once absorbed, those pollutants are transformed into a stable solid for easy recycling, providing a closed-loop solution to water pollution. Traditional adsorbents lack this absorbent characteristic. Instead they feature an adsorbent capability that merely attracts hydrocarbons to their surface, but cannot prevent them from leaching back into the environment.

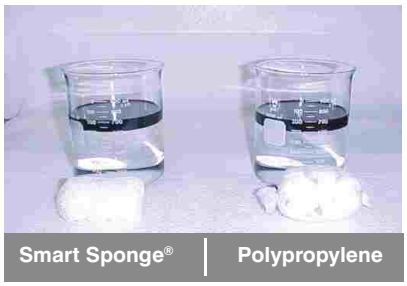
Smart Sponge® Key Features:

- Chemically selective to hydrocarbons
- Removes surface sheen
- Transforms pollutants into a stable solid
- Non-leaching
- Fully recyclable



Smart Sponge® - a proprietary polymer technology unique in its ability to effectively remove, absorb and retain hydrocarbons from flowing or static water. Smart Sponge® technology maximises the effectiveness of its oil-absorbing polymers by forming them into an extremely porous structure that allows effective, long-lasting absorption, without clogging or chanelling, which is common among any other filtration media in a powder, particulate or fibre form.

Oil contributes to 20% of all UK water pollution incidents.



Smart Sponge® | Polypropylene







The Smart Sponge® polymers are also hydrophobic and oleophilic - allowing water to pass through while hydrocarbons are absorbed. The structure is so effective, that even as it swells with contaminants, high flow rates and filtering capabilities are still maintained. Field and laboratory tests have confirmed the Smart Sponge® capacity to absorb 2-4 times its own weight or more (depending on the type of oil contaminant) and remove up to 95% of the hydrocarbons present in stormwater run-off.

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THE SMARTER SOLUTION TO:

Support infrastructure

Wiltshire Council Gully Trials Case Study

"Wiltshire Council is always seeking ways of improving its service to the community while at the same time remaining as kind to the environment as possible. So when Wiltshire Council was introduced to the Smart Sponge® technology (SST) with its synthetic polymers used for removing hydrocarbons and oil derivatives from surface water, we decided to trial the product.

The various tests demonstrated just how the technology built into the Smart Sponge® system offered an easy solution to the problem many local authorities face when dealing with gullywaste and the ever-increasing costs associated with its disposal. Currently Wiltshire Council disposes of gully waste by way of landfill, which has environmental and cost implications.

Wiltshire Council undertook its own year long trials that clearly show that financial savings can be made by reducing the volume of contaminated waste as the Smart Sponge® transforms captured pollutants into a solid waste for recycling as a Waste to Fuel energy or as landfill waste. In addition this also had a significant reduction in environmental impact!







Water quality samples and weight of SS were taken every three months from each test gully over a 12 month period. Eight road gullies and one interceptor had PAH values averaging 8500ppm. **The PAH levels have decreased over this 12 month period to under 1ppm**. To date, the trial has clearly proven that SS reduces the level of PAH in contaminated surface water run-off, far exceeding EU legislations criteria. In the future, Wiltshire Council is aiming to recycle the spent SS as a waste to fuel energy, which burns at 10 - 18,000 BTU per pound. In the immediate future we are installing Smart Sponge technology in all of the depots we use to tip out gully waste.

Wiltshire Council
Where everybody matters

Brian Lanham
Weather and Drainage Manager

"Working alongside the Smart Sponge® team whilst investigating this product has made the decision making so much easier, and I believe we have chosen the right product for the right job."

Sarah Peterson
Technical Assistant

"Smart Sponge® has shown excellent results throughout our entire trial. I have been impressed with every aspect of Smart Sponge,® especially the ease of using and maintaining the product. I am very much looking forward to the next developments involving the use of Smart Sponge® within Wiltshire."

West Lothian River Protection Trials Case Study

In February 2012, West Lothian Council decided to trial the Smart Sponge® Ultra Urban Filters at the downpipes for the A899 Road Bridge a four-lane carriageway over 700 metres long which drains runoff directly into the River Almond through four 225mm diameter pipes to see how much hydrocarbon pollution could be prevented from entering the river.

They decided to trial the Naylor Smart Sponge® Ultra Urban Filters (UUF) positioned at the base of the down pipes from the bridge - this is one of several Smart Sponge® bridge solutions that is available and was chosen to allow ground level easy access for monitoring and changeover purposes.

Four UUF units were installed in February 2012 and monitored by SAC Consulting Limited under an Environmental Monitoring Contract with West Lothian Council as part of their remit to monitor various water courses. The four units were removed in October 2013 and found to have absorbed over 48 litres of hydrocarbons from the run off into the river as well as high levels of silt & sedimentation changing the liquid contaminant into a solid waste.

The project has successfully demonstrated the ability of Smart Sponge® to absorb hydrocarbons from the runoff from the bridge and of the three treatment options available from Smart Sponge® the Ultra Urban Filter provides the greatest absorption rates whilst also intercepting detritus from the bridge deck.







West Lothian Council

Graeme Hedger
Officer with West Lothian Council

"The pilot scheme has tested Smart Sponge® products in a variety of challenging locations. Evidence from the monitored trial suggests that the products are effective at intercepting and locking up hydrocarbons in runoff preventing pollution from reaching receiving watercourses helping the council meet its obligations under the European Water Framework Directive. The use of Smart Sponge® products is to be continued beyond duration of the pilot scheme in a number of the locations included in the pilot scheme."

THE SMARTER SOLUTION TO:

Remove pathogens from stormwater

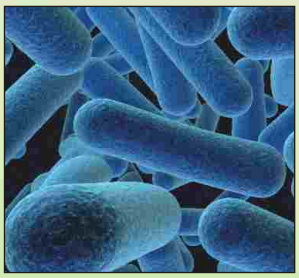
"The presence of bacteria in stormwater is a serious problem and poses significant health risks that increasingly result in the contamination of water bodies."

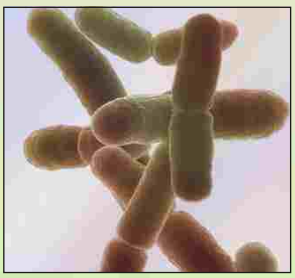
Roger Goulding - National Advisor, EA.
"We've looked at the capability of Smart Sponge® Plus to remove bacteria from urban streams and drainage affecting bathing waters. Following dramatic successes in the laboratory, field trials have shown potential for it to work....."

Smart Sponge® PLUS

Apart from the standard Smart Sponge® there is also Smart Sponge® PLUS which has all the features of being able to remove hydrocarbons as well as being the only non-toxic, fully recyclable filtration system that destroys bacteria at street level.

The presence of bacteria in stormwater is a serious problem and poses significant health risks that increasingly result in the contamination of water bodies. The greatest opportunity to reduce this bacterial count is during rain events through the control and treatment of stormwater run-off. This can be achieved by the Smart Filter® system fitted with Smart Sponge® PLUS which can also be adapted and used as part of a full treatment system for Combined Sewer Overflows (CSO's)







Smart Sponge® Plus's
ability to remove E.coli, Enterococci, Salmonella and many more pathogens from moving water makes it the ideal solution.

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THE SMARTER SOLUTION TO:

Remove pathogens from stormwater

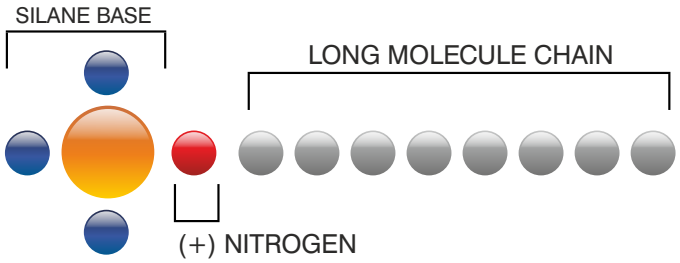
Smart Sponge® PLUS technology

Smart Sponge® PLUS for Hydrocarbons Plus Bacteria

- Smart Sponge® **PLUS** dramatically reduces coliform bacteria found in stormwater, industrial wastewater and municipal wastewater
- Smart Sponge® **PLUS** can be engineered using controlled test parameters (such as modifying flow rates and coliform bacteria concentration) to meet your performance requirements
- Smart Sponge® **PLUS** is designed to assist water systems to meet Total Maximium Daily Load Limits (TMDLs) for coliform bacteria
- When properly installed and maintained Smart Sponge® **PLUS** provides a significant reduction in coliform bacteria

Smart Sponge® **PLUS** – has all the features of standard Smart Sponge® as well as the dual action capability of destroying disease-causing micro-organisms from surface water such as:

- Aspergillus Niger • Trichophyton Mentagrophytes • Penicillium Pinophilum
- Chaetomium Globosum • Trichoderma Virens • Aureobasidium Pullulans
- Escherichia Coli • Salmonella • Streptococcus • Enterococci



Environment Agency laboratory tests confirmed a 99.9% removal of E. Coli and 99.5% reduction for Enterococci with a Smart Sponge® Plus treatment train, clearly demonstrating its effectiveness in achieving Log 1 and Log 2 reduction levels.

Roger Goulding - National Advisor, EA

"We've looked at the capability of Smart Sponge® Plus to remove bacteria from urban streams and drainage affecting bathing waters. Following dramatic successes in the laboratory, field trials have shown potential for it to work, if silt and sediment can be successfully removed before the treatment train."

Anti-microbial agent

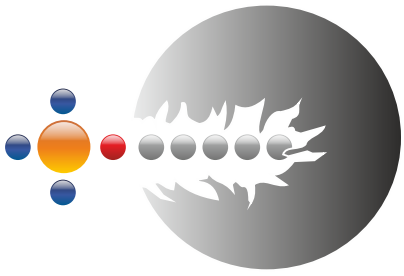
In the Smart Sponge® **PLUS**, the anti-microbial agent is chemically and permanently bound to the polymer surface and serves to control fungi, static odour and mildew.

The anti-microbial mechanism is based on the agent's electromagnetic interaction with the micro-organism cell membrane, causing the micro-organism disruption but no chemical or physical change in the agent.

Anti-microbial activity does not reduce the agent capability or cause its depletion and, therefore, maintains long-term effectiveness. Test results demonstrated the maximum bacterial removal rates of Smart Sponge® **PLUS** in both dry and wet weather sampling for fecal coliform ranged from 89.4 to 99.6 percent; and for Enterococcus, 96.2 to 99.9 percent.

Contaminants	Concentration Range	P.S.D d50	Performance	Filter bed depth
Oil & Grease	> 100ppm	-	>95%	> 100mm
	< 100ppm	-	>75%	> 100mm
Bacteria				
E.coli	$1x10^3$ CFU*/100ml	-	>90%	>1.5m
Fecal Coliform	$1x10^3$ CFU*/100ml	-	>90%	>0.9m
Enterococcus	$1x10^4$ CFU*/100ml	-	>90%	>0.9m
Total Coliforms	$1x10^4$ CFU*/100ml	-	>90%	>1.5m
TSS	100-300ppm	>15μ	>80%	>1.5m
TSS	>100ppm	>100μ	>80%	>0.6m
T. Phosphorous		>15μ	>40%	>1.5m

* Colony Forming Units



Physical inactivation of Bacteria - Rupture of the Cell Wall

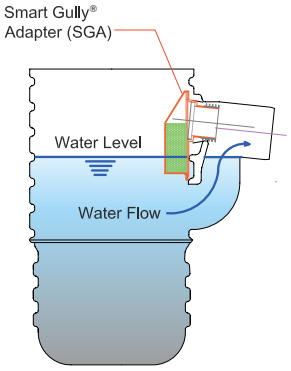
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THE SMARTER SOLUTION TO:

Remove hydrocarbons from carriageway run-off

"In tests, Wiltshire County Council reduced hydrocarbon concentrations in their road gullies from 8,000ppm to 1ppm"





Naylor Smart Gully® Showing SGA inserted into rodding eye, resulting in no reduction in flow.

Smart Gully® Range

The clever push fit design incorporates a finned rubber gasket ensuring a snug fit replacing the rodding bung ensuring no loss of hydraulic capacity or engineering design. Smart Gully® incorporates the unique Smart Sponge® technology that removes hydrocarbons from stormwater.

The Smart Gullies® have a Smart Gully Adaptor® already fitted and are supplied complete with a purpose designed Smart Pak® already installed and are available for both plastic and concrete gullies.

Range table (Complete Smart Gully® units)

Prod No.	Description	Dims (mm)
SGCO2	Concrete Smart Gully®	375 ID 900 deep
SGCO3	Concrete Smart Gully®	450 ID 750 deep
SGCO4	Concrete Smart Gully®	450 ID 900 deep
SGCO5	Concrete Smart Gully®	450 ID 1050 deep
SGP67004	Plastic Smart Gully®	450 ID 900 deep x 160 outlet
SGP67005	Plastic Smart Gully®	450 ID 750 deep x 160 outlet
SGP67003	Plastic Smart Gully®	450 ID 900 deep x 178 outlet
SGP67009	Plastic Smart Gully®	450 ID 750 deep x 178 outlet
SGP67002	Plastic Smart Gully®	375 ID 750 deep x 178 outlet
SGV07536	Vitrified Clay Smart Gully®	300 ID 610 deep x 100 outlet
SGV07537	Vitrified Clay Smart Gully®	300 ID 610 deep x 150 outlet
SGV07545	Vitrified Clay Smart Gully®	375 ID 760 deep x 150 outlet
SGV07556	Vitrified Clay Smart Gully®	450 ID 915 deep x 150 outlet

* all Smart Gullys® c/w 1 x Adaptor.

The special Smart Gully Adaptors® (SGA) are also available for retrofitting in existing gullies:



SGA - Backplate



SGA - Frontplate

Range table (Smart Gully Adaptor® units & spares)

Prod No.	Description	Dims (mm)
SGA01 - 12	Smart Gully Adaptor® (body only)	H260 x W160 x D75 Not including spigot
SGA02 - 12	Smart Gully Adaptor® c/w Smart Pak & seal	H260 x W160 x D75 Not including spigot
SGS01	Smart Seal for SGA (spare)	100 x 110 dia
SMPK66-2.5	Smart Sponge® Smart Pak refill	150 x 150 x 62.5

Smart Sponge® technology is based on its proprietary blend of synthetic polymers aimed at removal of hydrocarbons and oil derivatives from surface water.

This unique process creates a very porous structure with hydrophobic and oleophilic characteristics capable of selectively removing hydrocarbons while allowing high flow through rates for water.

As hydrocarbons are absorbed into its structure, the Smart Sponge® swells and maintains porosity and filtering capabilities.





The Smart Sponge® unique molecular structure is based on innovative polymer technologies that are chemically selective to hydrocarbons.

The SGA's have a purpose designed Smart Pak® fitted to absorb the hydrocarbons - it is specially designed to last 12 months in a worst case scenario and maintenance is simplicity itself and takes just a few seconds.

The Smart Sponge® technology transforms the pollutants into a stable solid waste for easy recycling.

Smart Sponge® waste to energy finalises the closed-loop solution with the spent Smart Sponge® creating 10,000-18,000 BTU per pound with no resulting waste product.

Smart Sponge® can also be used as an anti-microbial technology capable of destroying disease causing micro-organisms from surface water such as E.coli, Streptococcus and Enterococci to name but a few.

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THE SMARTER SOLUTION TO:

Remove hydrocarbons from oil water interceptors

In recent tests carried out on a 'typical' MOD facility, it was shown that a 64% saving in maintenance costs could be achieved together with a 99% saving in the volume of environmental waste



Passive Skimmer / Interceptor Enhancer Range

The Smart Sponge® Passive Skimmers are installed within existing interceptors/separators (OWI's) to dramatically increase the effectiveness of the OWI (from typically 45% removal to 95% removal) whilst at the same time reducing annual maintenance costs by up to 64%.

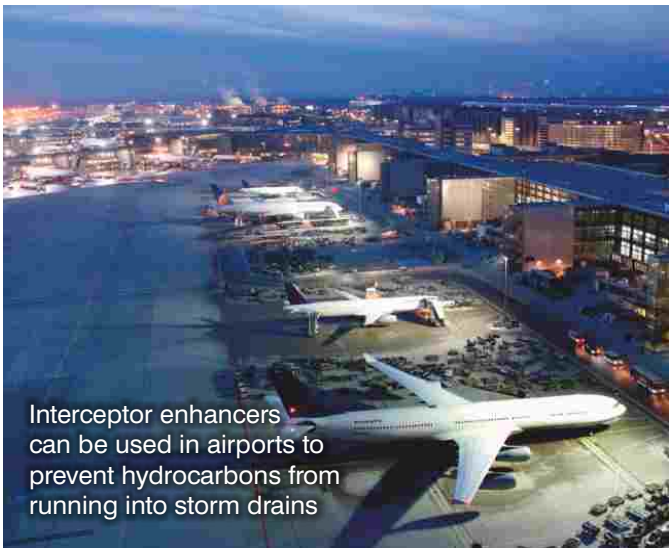
The regulations controlling the maintenance of interceptors/separators (OWI's) advise six monthly inspections and emptying and recharging with clean water when required. A new method of reducing both maintenance costs and environmental waste when servicing OWI's by the use of the Smart Sponge® Interceptor Enhancers has shown dramatic results.

The Smart Sponge® absorbs the hydrocarbon contamination and locks it into the molecular structure of the polymer, transferring the hydrocarbons into a solid waste suitable for either controlled disposal or for use as an alternative fuel. This unique ability means that instead of disposing of tonnes of contaminated liquid waste it is now possible to reduce this dramatically to a few kilos of solid waste, thus achieving dramatic savings in both cost and environmental benefits.

Range table (Interceptor Enhancers/Passive Skimmers)

Prod No.	Description	Dims (mm)
PS1313-40	Small Passive Skimmer	330 X 330
PS1818-20	Medium Passive Skimmer	457 X 457
PS2727-10	Large Passive Skimmer	686 X 686

Pack sizes: Small - 40pk, Medium - 20pk, Large - 10pk



Interceptor enhancers can be used in airports to prevent hydrocarbons from running into storm drains

Traditionally, maintenance of an OWI would consist of a tanker with a 2 man gang extracting the whole volume of the OWI (in the case of even a medium sized OWI this could amount to 110,000 litres or 110 tonnes) which would take many trips plus the disposal costs of the contaminated waste. The tanker would then have to re-charge the OWI to bring it back to operating condition.

Taking the same OWI as an example and now using a Smart Sponge® Passive Skimmer as a solution, this would transform the 116 tonnes of liquid waste into just 145 kg of solid waste and the maintenance procedure becomes just a 2 man job with a van. The cost and environmental benefits of this new system are obvious, particularly when many such OWI's can be serviced in a typical day.

In recent tests carried out on a 'typical' MOD facility, it was shown that a 64% saving in maintenance costs could be achieved together with a 99% saving in the volume of environmental waste – and even this 1% of remaining waste can be used as an alternative fuel as part of the Waste for Energy initiative creating a truly closed-loop system of maintenance where everyone benefits.

Deployment Guidance (Oil Water Interceptors)

		No of PS to absorb hydrocarbon		
NSB*	Area Drained	PS1313	PS1818	PS2727
1.5S	833	10	6	3
3.0S	1,666	19	11	5
4.5S	2,499	28	16	8
6.0S	3,332	38	22	10
10S	5,553	NA	36	17
12S	6,670	NA	43	20
15S	8,330	NA	NA	25
20S	11,106	NA	NA	34
25S	13,883	NA	NA	42

* Nominal Size Bypass

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The Smart Sponge® Family

Smart Filter®, Smart Brake® & Smart Stop® Range

The Smart Filter®:

Specifically designed for end of pipe applications and installations through which contaminated or polluted water flows. The unique design allows the Smart Filter® to either sit inside or outside the pipe connection and will absorb hydrocarbons that pass through the system during normal conditions. The Smart Filter® is available in 2 different standard sizes and will accommodate standard pipe sizes.
Flow rates are catered for through the design of the Smart Filter®, sized to take the first flush effect plus a safety factor of 2x with any excess passing through the bypass facilty.



Smart Filter®



Orifice Plate

The Smart Brake®:

Is a collaboration of design from the Smart Filter® and houses the Smart Paks within a more confined area which allows normal flow through the system. The Smart Brake's® unique design works during an event and slows the flow rate whilst absorbing any hydrocarbons present, allowing the final outfall flow to disperse reducing flooding, resulting in the contaminated flow from travelling further along a water course. The Smart Brake® will also absorb any hydrocarbons present within a normal flow, effectively acting as a Smart Filter®.



Unit showing overflow connection

The Smart Stop®:

Uses the basic principles of the Smart Filter® but houses the Smart Paks within a more confined area which allows normal flow through the system. The Smart Stop's® unique design works during an event where more hydrocarbons are present within the resulting flow and the volume of hydrocarbons are quickly absorbed within the Smart Paks which swell into the defined cage and seal the outfall pipe providing the contaminated flow from travelling further along a water course. The contaminated water is then stopped at source enabling the hydrocarbon clean up to be targeted in one area reducing the impact to the environment. The Smart Brake® will also absorb any hydrocarbons present within a normal flow, effectively acting as a Smart Filter®.

N.B. A suitable silt trap device is recommended prior to the Smart Filter® chamber to prolonge the life of the Smart Sponge®. If this is impractical a silt sump is recommended within the Smart Filter® chamber.

Smart Filter® Standard Range

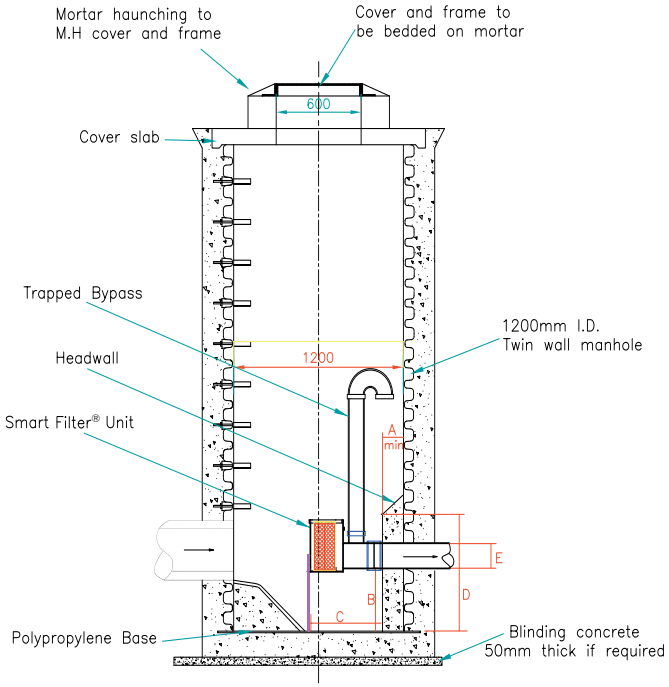
Prod No.	Description	Dims (mm)	Qty
SF01-30302	Smart Filter® c/w 2 No. 305 x 305 Std Smart Paks. 150 dia outlet for flow up to 14 l/s	360 x 330 x 330	1
SF02-38382	Smart Filter® c/w 2 No. 380 x 380 Std Smart Paks. 150 dia outlet for flow up to 22 l/s	400 x 400 x 400	1
SF01-30302P	Smart Filter® c/w 2 No. 305 x 305 Plus Smart Paks. 150 dia outlet for flow up to 14 l/s	360 x 330 x 330	1
SF02-38382P	Smart Filter® c/w 2 No. 380 x 380 Plus Smart Paks. 150 dia outlet for flow up to 22 l/s	400 x 400 x 400	1

Smart Brake® Range

Prod No.	Description	Dims (mm)	Qty
SB01-30302	Smart Brake® c/w 2 No. 305 x 305 Std Smart Paks. Specify orifice size for desired flow	360 x 330 x 330	1
SB02-38382	Smart Brake® c/w 2 No. 380 x 380 Std Smart Paks. Specify orifice size for desired flow	400 x 400 x 400	1

Smart Stop® Range

Prod No.	Description	Dims (mm)	Qty
SS01-30302	Smart Stop® c/w 2 No. 305 x 305 Std Smart Paks. 150 dia outlet for flow up to 14 l/s	360 x 330 x 330	1
SS02-38382	Smart Stop® c/w 2 No. 380 x 380 Std Smart Paks. 150 dia outlet for flow up to 22 l/s	400 x 400 x 400	1



Typical Installation showing overflow connection and silt trap.

The Smart Sponge® Family

Smart Filter® Chamber Range

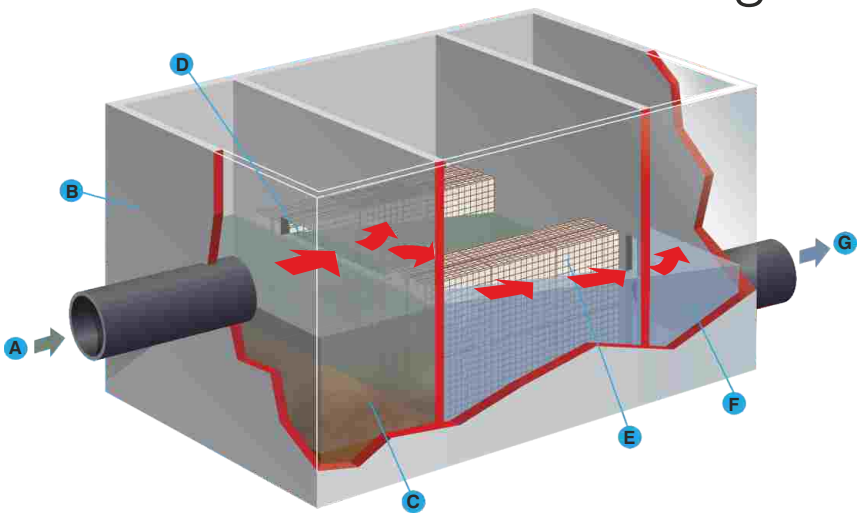


Diagram Key

A. Inflow

B. Lightweight composite chamber with vehicle loading capability

C. Chamber with weir to trap sediment

D. Flow passes through Smart Paks and through side orifices

E. Smart Paks to absorb hydrocarbons

F. Collection chamber with outlet to sewer

G. Outflow

Note: Arrows show direction of water flow

Smart Filters® for Highways, Large Catchment Areas etc:

Specifically designed for extreme storm events and larger flow situations, the basic principles of the smaller Smart Filters® can be adapted to virtually any flow and also adapted to site restrictions.

The Smart Filters® come in several standard modular chamber sizes but can also be manufactured bespoke to suit specific site conditions. Contaminated wastewater enters the system into a settlement chamber and passes through an orifice into a distribution chamber and then is passed through the Smart Sponge® units (Paks) which removes up to 95% of all hydrocarbons. The cleaned water then passes through purpose designed side orifices to exit the treatment chamber via the outlet pipe.



Smaller Smart Filter® being lowered into position

Smart Filter's® Advantages:

- Treats 100% of the storm flow
- Removes 95% of hydrocarbons
- Removes heavy metals & silts
- Can cope with extreme conditions
- Shallow excavations
- Low head drop
- Modular design
- Virtually any flow catered for
- Waste product 100% recyclable
- Easy maintenance procedure

Prod No.	Description	Dimensions WxLxH	Treated Flow (l/s)	Max Flow (l/s)	380 x 380 Smart Paks	Pak Height (no.)	Aux Silt Capacity	Max Oil Capacity	Head Drop across unit
SF03.1A	Smart Filter® 44 l/s Flow, c/w 200mm dia pipes	0.8 x 1.2 x 1.2	10.9	44	4	1	190 litres	48 litres	380mm
SF03.1B	Smart Filter® 88 l/s Flow, c/w 300mm dia pipes	0.8 x 1.2 x 1.2	21.7	88	8	1	75 litres	96 litres	380mm
SF03.2A	Smart Filter® 130 l/s Flow, c/w 300mm dia pipes	1.2 x 1.8 x 2.0	32.6	130	12	1	210 litres	144 litres	380mm
SF03.2B	Smart Filter® 265 l/s Flow, c/w 300mm dia pipes	1.2 x 1.8 x 2.0	70.4	265	24	2	420 litres	288 litres	760mm
SF03.2C	Smart Filter® 350 l/s Flow, c/w 300mm dia pipes	1.2 x 1.8 x 2.0	94	350	32	2	75 litres	384 litres	760mm
SF03.3A	Smart Filter® 400 l/s Flow, c/w 300mm dia pipes	1.2 x 1.8 x 2.0	117	425	40	2	275 litres	480 litres	760mm

N.B. A suitable hydrodynamic separator (HDS) should be utilised prior to the Smart Filter® to remove the majority of silt from entering the filter. An auxilary silt storage, is provided as a fail safe on all units. Treated Flow calculations are calculated according to first flush effect for typical storms.

The Smart Sponge® Family

Ultra-Urban® Filter Range

The **Ultra-Urban® Filter** with **Smart Sponge®** is an innovative low-cost BMP that helps meet anti-pollution requirements with effective filtration, efficient application and moderate maintenance. The **Ultra-Urban® Filter** absorbs oil and grease and captures trash and sediment from stormwater run-off before it enters the storm drain system. The **Ultra-Urban® Filter** is ideal for commercial, industrial and construction applications. The filter is available in two standard designs; one designed to clip onto the side of a catch basin in a row according to the flow (CO) and the other which is a single unit designed for typical drop-in catch basins and gullies (DI).

The **Ultra-Urban® Filter,** made of a high strength corrugated recycled content plastic, is designed for use in surface water drains that experience oil and grease pollution accompanied by sediment and debris. Rubbish and sediment accumulate in the upper basket chamber while oil and grease are absorbed in the filtration media.

Code	Max Flow (l/s)	Area Drained (m^2)	Oil Capacity (litres)	Silt Capacity (cm^3)	Typical Life (Years)	Media Life (Years)	Head Drop (mm)
DI1414N	17.7	1,275	21	425	2.3	1-3	790
DI1414H	12.0	860	13	230	2.1	1-3	560
DI1616N	22.7	1,635	25	510	2.1	1-3	790
DI1616H	17.0	1,225	19	285	2.1	1-3	560
DI2020N	31.5	2,260	31	850	1.9	1-3	790
DI2020H	23.3	1,675	24	480	1.9	1-3	560

N.B. The above drained areas and Min Life calculations are based on a typical 50mm rainfall with an anticipated worse case hydrocarbon contamination level of 30mg/100ml (a more typical level would be 10mg for normal use).



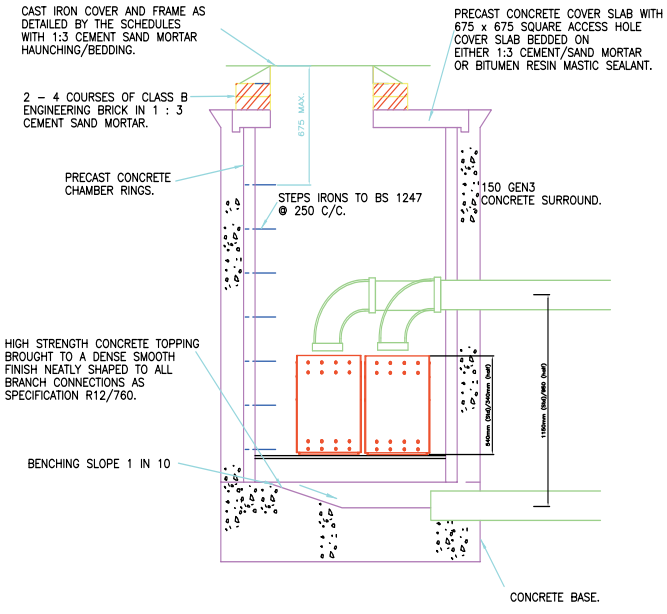
Sectional view of UUF showing Smart Sponge®

Performance

Field and laboratory tests have confirmed the capability of the Smart Sponge® to absorb, depending on the type of oil contaminant, up to 2-3 times its own weight and remove 70% to 95% of the hydrocarbons present in stormwater run-off, typically in the range of 5 to 30 mg/litre (ppm). The captured oil is permanently bound within the Smart Sponge,® eliminating leaching and allowing for easy disposal of the filtration media. Flow rates through the DI1616H filters exceed 17 l/s.

Installation

The **Ultra-Urban® Filter** is easily installed and installation time varies depending upon mounting devices selected. A single mounting bracket made of 16 gauge galvanised steel is required for the installation of the CO series of UUF. The **Ultra-Urban® Filter** should not be installed where modules obstruct the drain pipe outlet. The size of the drain should allow room for stormwater overflow. The Drain Inlet (DI) series **Ultra-Urban® Filter** will suspend from the drain into the catch basin through a structural plastic mount and funnel mechanism (see drawings).



Twin Ultra Urban® Filters installed in typical chamber

Maintenance

The **Ultra-Urban® Filter** should be serviced as needed to remove sediment and debris, according to expected debris accumulation. The sediment and debris can be quickly vacuumed out of the modules through the opening of the drain with conventional maintenance equipment. For example, a CO installation with four to five **Ultra-Urban® Filter** modules can be typically serviced in 10 minutes or less. Under normal operating conditions the **Ultra-Urban® Filter** should be replaced every 1-3 years.

Design

The Ultra-Urban® Filters can be positioned within a chamber to take run-off from any area and require a difference in invert according to the drawing above. There is a range of sizes to choose from according to the area to be drained, with additional units able to be positioned alongside one another to increase the flow capability. Units should be emptied with a standard vacuum pipe on a regular basis and changed when they weigh approximately twice the installation weight.

Tel 01226 794135 Fax 01226 791531 E-mail environmental@naylor.co.uk Web: www.naylor.co.uk

The Smart Sponge® Family

Line Skimmers

Line Skimmers are ideal for creating lines of hydrocarbon protection in areas such as ponds and streams as well as clarifying wells and marinas. Installation is carried out by placing the line skimmers across the water course, tied off to fixed points. The line skimmers can also be tied to one another to create longer protection booms as required. Smart Sponge® Line Skimmers are non leaching so cannot contaminate the water during replacement



Prod No.	Dry Weight	Spent Weight	Litres
LS104-10 (1.2m)	0.7kg	2.8kg	2.4Ltr
LS110-04 (3m)	1.9kg	7.6kg	9.0Ltr
LS304-04 (1.2m)	2.2kg	8.8kg	6.5Ltr
LS308-04 (2.4m)	4.4kg	17.6kg	13.0Ltr
LS408-04 (2.4m)	5.9kg	23.6kg	17.0Ltr

Line Skimmer weights before and after application

Applications

- Preserving Ecologically Sensitive Areas
- Coastal Marshlands
- Estuaries
- Grass Flats
- Fishing and Breeding Grounds
- Boat Docks and Marinas
- Marine Fueling Locations
- Clarifying Wells









Line Skimmers deployed at Linlithgow Loch

Disposal Options

As local conditions, product use and exposure can vary widely, the end user must determine the most appropriate disposal method for a spent Smart Sponge® or Smart Sponge® Plus product. However Smart Sponge® samples saturated with hydrocarbons both in the lab and in the field have been tested according to the USA EPA's Toxicity Characteristic Leaching Procedure ("TCLP"). These tests show that Smart Sponge® is a "non-leaching" (i.e., non-detect or "N.D.") product. As a result, Smart Sponge® technology can afford many cost effective and environmentally friendly disposal options. The following waste disposal and resource recovery systems are available for disposal and/or recycling of the spent Smart Sponge® products.

Waste to Energy Facilities

This is a specialised segment of the solid waste industry and within the USA this is a recognised route for used spent Smart Sponge® as an alternative fuel in the production of electricity. The spent Smart Sponge® generates between 10,000 – 18,000BTU per pound (0.45kg).

Cement Kilns

This industry has used the spent Smart Sponge® as an alternative fuel in the production process of Portland Cement. This process is considered a beneficial re-use of waste products. The BTU value of spent Smart Sponge® is consistently above the average acceptable levels set for this high temperature process.

Landfills

As mentioned above, spent Smart Sponge® products have been classified as a solid waste within the USA and have been accepted at Subtitle D Landfills. Discussions are ongoing with the Environment Agency to establish similar classification for the UK.

THE SMARTER SOLUTION TO:
Quick Installation & Maintenance

Passive Skimmers

It is intended that proactive checks are completed on a six monthly basis, any remedial work will be managed reactively.

1. Fix a tether rope to the absorbent Passive Skimmer and record the weight in Kg
2. Fix the tether so that the Passive Skimmers can be recovered but allowing the skimmer to float freely.
3. Every 6 months withdraw the Passive Skimmer, shake off excess water and check and record weight. If weight is above trigger value replace skimmer.

Passive Skimmers are deemed spent if their weights are greater than:

Size	Dry Weight	Spent Weight
PS1313 (Small)	0.5kg	2.0kg (approx. 2.4 litres)
PS1818 (Medium)	0.9kg	3.6kg (approx. 4.2 litres)
PS2727 (Large)	1.9kg	7.6kg (approx. 9.0 litres)



Passive Skimmers are available in Small, Medium and Large packs
PS1313 (Small) shown

Smart Gully Adaptor®

Smart Gully Adaptor® Instructions for SGA Installation and Maintenance.



Insert the back plate into the rodding eye of the gully



Slide the front plate with Smart Pak in down onto the back plate



Back plate will lock into position on the tabs provided



Remove the front plate by sliding upward



Weigh the unit with Smart Pak in



Remove and replace spent Smart Pak



Install new Smart Pak and refit

Size	Dry Weight	Spent Weight
SMPK (150X150X62.5)	0.5kg	1.2kg (approx. 1.4 litres)

Smart Paks - Smart Filters®

It is intended that proactive checks are completed on a six monthly basis, any remedial work will be managed reactively.

1. Open the top of the Smart Filter® & using the plastic ties lift out the wire cage containing the Smart Paks, snip the plastic ties & remove the individual Smart Pak, shake off excess water & weigh the Smart Pak and record this on the maintenance schedule.
2. If the recorded weight is greater than twice the dry weight, replace the Smart Paks accordingly with new ones. If less than twice the weight, a changeover date can be calculated based on the relative weights.
3. Relace the Smart Paks back in the wire cages, renewing any plastic ties to hold the cages closed and slide the cage back into

Size	Dry Weight	Spent Weight	Size	Dry Weight	Spent Weight
SMPK1212-2.5	1.95kg	4.6kg	SMPK1515-2.5	2.9kg	7.2kg
SMPK1212-3	2.22kg	5.5kg	SMPK 1515-3	3.5kg	8.7kg

Smart Pak weights before and after application (assumes a non confined unit).

THE SMARTER SOLUTION TO:
Quick Installation & Maintenance

Ultra-Urban® Filters

The Ultra-Urban® Filters can be installed as a drop in unit with a collar or as a slot in system secured to the side of the gully or inlet with brackets.






The Ultra-Urban® Filter Is Easily Installed

Installation time varies depending upon mounting devices selected. A single mounting bracket made of 16-gauge galvanised steel is required for the installation of the Curb Opening (CO) series. The Ultra-Urban ® Filter should not be installed where modules obstruct the drain pipe outlet. The size of the drain should allow room for stormwater over flow. The Drain Inlet (DI) series Ultra-Urban® Filter will suspend from the drain into the catch basin through a structural plasic mount and funnel mechanism.

Low Maintenance

The Ultra-Urban® Filter should be serviced as needed to remove sediment and debris, according to expected debris accumulation. The sediment and debris can be quickly vacuumed out of the modules through the opening of the drain with conventional maintenance equipment. Under normal operating conditions the Ultra-Urban® Filter should be replaced every 1-3 years.

Prod No.	Dry Weight	Spent Weight	Litres
UUF1414N	9.1kg	27kg	21Ltr
UUF1414H	5.9kg	17kg	13Ltr
UUF1616N	10.9kg	32kg	25Ltr
UUF1616H	8.2kg	24kg	19Ltr
UUF2020N	13.6kg	40kg	31Ltr
UUF2020H	10kg	30kg	24Ltr

Solutions for Water Framework Directive Compliance

Smart Sponge® & Smart Sponge® **PLUS** technology effectively and efficiently reduces the amount of coliform bacteria, debris and hydrocarbons, to keep the UK's beaches, marinas, airports regulations in compliance with Bathing Water Directive and Stormwater regulations.



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SMART sponge®

A revolutionary new product that is taking the global surface water market by storm

BRITISH WATER
expertise worldwide

Naylor Industries plc - more than 100 years of manufacturing and supply to the Construction Industry

- Vitrified clay pipe systems for trench and trenchless installation
- Thermachem - Chemical Drainage and Industrial Ceramics
- Band-Seal couplings for the repair of and connections into existing pipelines
- Plastic Land Drainage, Twinwall Ducting Systems and Access Boxes
- Yorkshire Flowerpots, a range of frostproof plant pots

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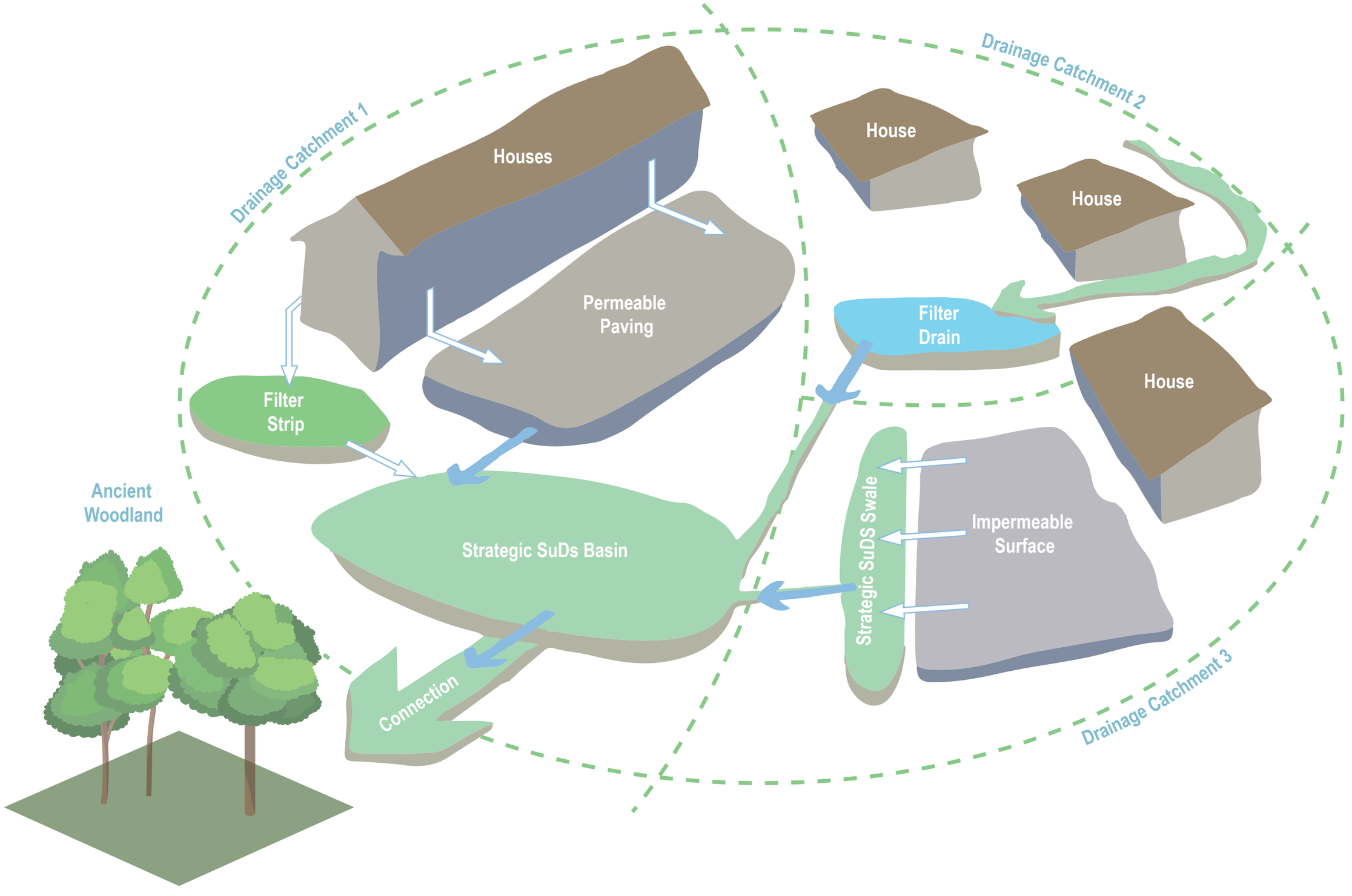
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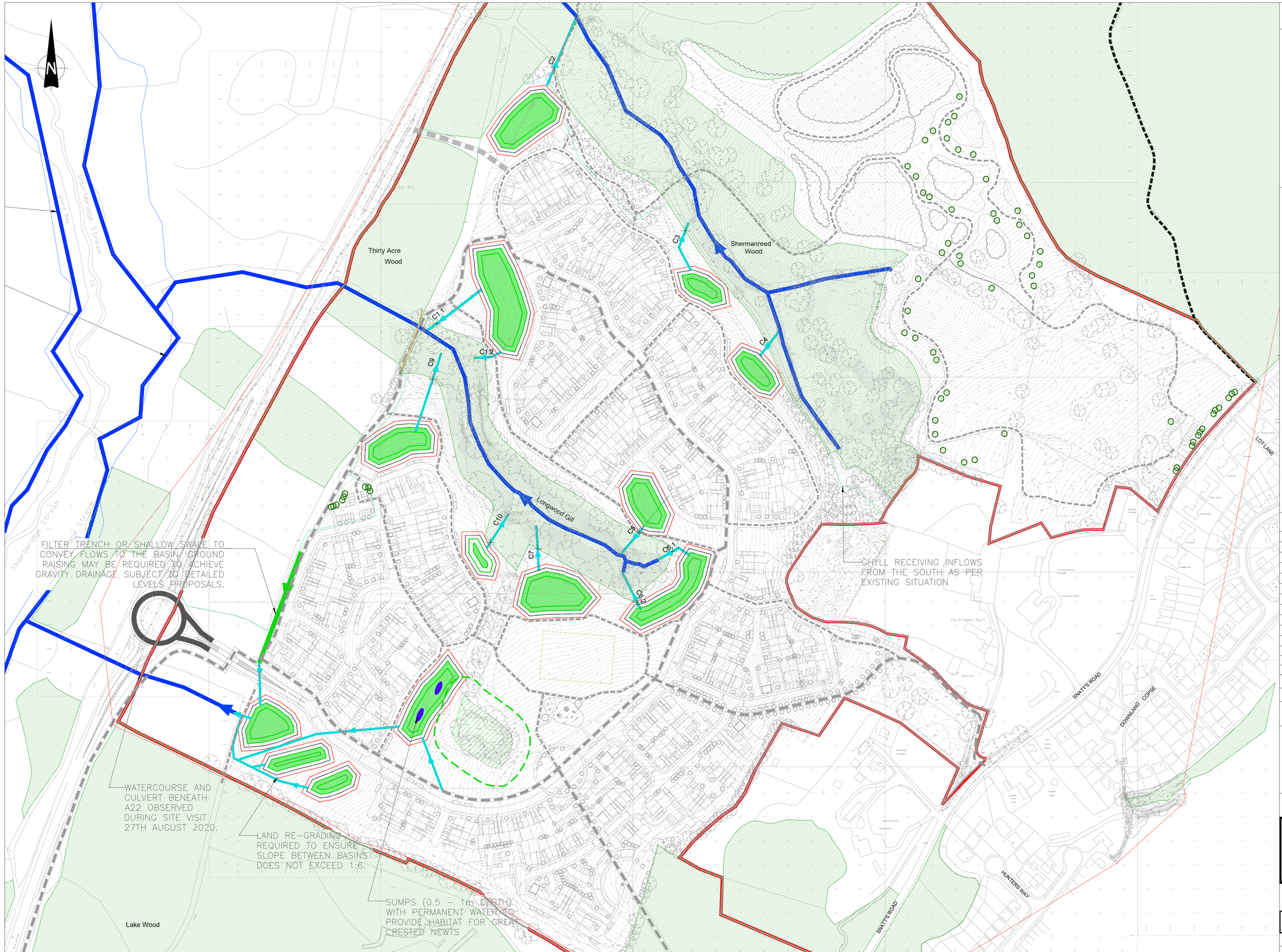
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Appendix PJ4 – SuDS Management Treatment Train

SuDS Management Treatment Train
Conceptual Diagram



Appendix PJ5 – Directional Drilling Method Statement and Relevant Experience



PLAN
SCALE 1:1500

AS SHOWN 0 20m 40m 60m 80m 100m 120m 140m 160m 180m 200m
1:1 0 10 20 30 40 50 60 70 80 90 100

GENERAL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEER'S, ARCHITECT'S OR OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
2. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO PREPARING ANY WORKING DRAWINGS OR COMMENCING ON SITE.
3. THE CONTRACTOR MUST ENSURE AND WILL BE HELD RESPONSIBLE FOR THE OVERALL STABILITY OF THE BUILDING/STRUCTURE/EXCAVATION AT ALL STAGES OF THE WORK.
4. ALL WORK BY THE CONTRACTOR MUST BE CARRIED OUT IN SUCH A WAY THAT ALL REQUIREMENTS UNDER THE HEALTH AND SAFETY AT WORK ACT ARE SATISFIED.
5. ALL WORK IS TO BE CARRIED OUT IN COMPLIANCE WITH THE REQUIREMENTS OF THE RELEVANT STATUTORY AUTHORITIES AND REGULATIONS.

KEY

- SITE BOUNDARY
- ANCIENT WOODLAND
- WATERCOURSE
- SURFACE WATER (SW) CONNECTION

DETENTION BASIN

- FLOOD ZONE 3
- EARTHWORKS EXTENT (ASSUMED)
- MAINTENANCE BUFFER (3m)

Rev	Date	Description	By
P14	22.09.23	ISSUED FOR APPEAL	TK
P13	11.09.23	FOR POE	TK
P12	12.10.22	CONTOURS ADDED	BM
P11	25.05.22	INCLUDED DIRECTIONAL DRILLING SECTIONS	POF
P10	09.05.22	AMENDED MASTERPLAN	POF
P09	25.01.22	AMENDED MASTERPLAN	KT
P08	01.12.20	AMENDED MASTERPLAN	NB
P07	06.11.20	SHERMANREED WOOD BASINS AMENDED	NB
P06	30.10.20	BASINS AMENDED	NB
P05	29.10.20	BASINS AMENDED	NB
P04	26.10.20	BASINS/DISCHARGE POINTS AMENDED	NB
P03	30.10.20	AMENDED MASTERPLAN	NB
P02	29.07.20	BASINS AMENDED	NB
P01	20.07.20	FIRST ISSUE	NB

Amendments

Project
DOWNLANDS FARM, UCKFIELD

Title
LAYOUT PLAN

Client
GLEESON LAND

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Drawing Status
PRELIMINARY

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WIE	ZZ	92	001	P14

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A E YATES DIRECTIONAL DRILLING
A E YATES GROUP

High profile environmental projects

Job Number	Area	Job description	Crossing under	Client
D453	Holton Heath/ Keysworth	2000m of 225mm including a 600m drill under RAMSAR and SSSI	RAMSAR and SSSI and Ancient Woodlands	Wessex Water
D461	Wellington, Taunton	Installation of 2 way 180mm cable ducts for electric cables	SSSI	WPD
D476	Achmelvic , Highlands	Installation of a 125mm SDR11 Potable water pipe as a sleeve for a 90mm internal potable water pipe	Salmon River	Caledonia Water Alliance
D494	Allonby	Installation of a 315mm SDR11 Black foul outfall sewer	SSSI and Beach	C2V+
D534	Dunball	Installation of twin 2000m of 125mm SDR11 Potable water	Roads, stream and SSSI	Wessex Water
D546	Long Load	Installation of twin 140m of 250mm and twin 90m of 250mm	Rainbow Trout river	Wessex Water
D555	Warminster	St Andrews Pipeline Installation of approx 2000m of 125mm	Roads, Streams and Ancient Woodlands	Wessex Water
DD0005	The Common, Merevale	Installation of a 125mm and a 180mm electric duct	Road and Ancient Woodland	Biogen
DD0020	Bramley Substation	Installaion of 4 large bundles of pipes comprising of 3 x 180mm and 2 x 125mm of lengths from 210m up to 240m	Ancient Woodland and Ditch	J1M, National Grid
DD0024	Goole	Installation of 3 Ducts to the Swing Bridge	River Ouse, Lamprey River	Network Rail

A E YATES DIRECTIONAL DRILLING
A E YATES GROUP

HORIZONTAL DIRECTIONAL DRILLING (HDD) METHOD STATEMENT
Downlands Farm
Uckfield

Written by:	Reviewed by:
Dean Robinson Drilling Manager	

Revision History

Doc Ref	Rev Status	Revision Date	Status Description / Amendment Notes
MST001	Rev 01	22/09/2023	Issued for Approval

This Document is Uncontrolled when printed

Printed version valid for 3 months after: **26/09/2023**

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Contract Nr:	TBC	Contract Name:	Downlands Farm, Uckfield				
Method Statement Ref:		MST 01	Rev Nr:	01	Issue Date:	22/09/2023	
Method Statement Title:		Horizontal Directional Drilling					

For guidance on how to complete this template see IMS document GDN C13

1 Introduction of the activity covered in this Method Statement

This method statement has been produced following a site visit from Dean Robinson (AE Yates) and Robert Forsyth (Waterman Group) on the 16 August 2023 to define the method to be adopted and controls to be implemented for the Installation of various HDPE pipes into the ancient woodland, on the Downlands Farmland, Uckfield, East Sussex. These trenchless installations will be completed by a Horizontal Directional Drilling technique.



A Horizontal Directional Drilling Rig

Contract Nr:	TBC	Contract Name:	Downlands Farm, Uckfield				
Method Statement Ref:		MST 01	Rev Nr:	01	Issue Date:	22/09/2023	
Method Statement Title:		Horizontal Directional Drilling					



Site visit photo of incision within the Ancient Woodland

Contract Nr:	TBC	Contract Name:	Downlands Farm, Uckfield		
Method Statement Ref:	MST 01	Rev Nr:	01	Issue Date:	22/09/2023
Method Statement Title:	Horizontal Directional Drilling				

2 Hazards

Hazard Identified	Associated Risk Assessment Ref:
1: Electric Shock / Explosion due to contact with buried services / Apparatus 2: Entrapment due to mechanically moving / rotating parts. 3: Manual handling of drill tooling 4: Working near live electric cables 5: Working Near Water 6: Use of Drilling fluid 7: Environmental	Hazards 1 to 6 – HDD/RA01 Hazards 7 – ERA01

3 HDD Introduction

HDD is one of the most versatile trenchless methods used for the installation of many product pipelines including service connections, mains pipes, cables, crossings under highways, rail tracks, watercourses, runways, landfill sites etc.
HDD is a multi-phase operation which uses a special design drilling rig which initially bores a pilot hole through the ground along a pre-determined route.

- The works will be located within the main contractor's easement. We will deliver the drilling rig on our support lorry and trailer; the drilling rig is a self-propelled machine on rubber tracks and can be driven over most terrain.
- The support lorry has the carrying capacity of 10,000 ltrs of water and has a built-in mixing system, the mixing system is required to enable drilling mud products and additives mixed on board to enable the bore to stay open until the product pipe is installed.
- The bore diameter would be approx. 130mm to allow a 100mm diameter pipe connection to be installed.
- These products can come in powder form or liquid, and they are added into the mixing system on the support lorry for the ground conditions found on site. This is known as drilling mud. The recipe for the drilling mud can change at each location, each product and quantity per ltr of water can be changed whenever required.
- The use of HDD avoids the need for any machinery and excavation within the Ancient Woodland.
- Any machinery required within the 15m buffer zone of the Ancient Woodland would run on temporary ground protection in accordance with BS5837:2012.

Contract Nr:	TBC	Contract Name:	Downlands Farm, Uckfield			
Method Statement Ref:		MST 01	Rev Nr:	01	Issue Date:	22/09/2023
Method Statement Title:		Horizontal Directional Drilling				



The access will be coordinated with the site, the mud mixing plant will either be lorry mounted, or in inclement weather, this will be transferred onto a tractor trailer to get close to the drilling rig for delivering the drilling fluid.

4 Work Details

This method statement has been produced to define the method to be adopted and controls to be implemented for the Installations of HDPE Drainage pipes into the ancient woodland.

- **Plan of Works**

- At each location for the drainage run into the woodland, the drilling rig would sit at the highest point in the field surrounding the woodland, where the drainage chambers are to be located and a small launch pit of 2m x 2m and 1.2m deep with battered sides will be excavated (outside of

Contract Nr:	TBC	Contract Name:	Downlands Farm, Uckfield				
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Method Statement Title:		Horizontal Directional Drilling					

the Ancient Woodland) and fenced off with double clips to act as a retaining pit for any drilling fluid to be captured.

- A predetermined line will then be plotted between the drilling rig and the point of exit in the woodland.
- The line of the drainage run can be straight with a constant fall on the pipe, but due to the steering capabilities of the drilling rig and bend radius of the drilling rods, these runs can be drilled through the woodland as far away from the trees as possible, the woodland has various walking routes between the trees as they are not in close proximity of one another. It is understood that the depth of the driller will be approximately 1m below ground level in order to miss the tree roots.
- The drilling rig would be set up and the drilling line set up by the use of marker pegs and ranging rods.
- When the agreed point of exit is located, a wall made from temporary sandbags will be built to create an exit pit, required for any biodegradable/unpolluting drilling fluid that will travel down the pilot rods. The exit pit will be fenced off the same as the launch pit. This method avoids the need for any excavation within the Ancient Woodland.
- Once set up and on the line, carry out a final CAT Scan as a final check of the drill line to ensure that all electric services have been positively identified / exposed and logged onto the permit to drill.
- Fill the mud tanks with clean water, then mix the biodegradable/unpolluting drilling fluid products to the correct specification for the ground conditions found on site.
- Position the mud-mixing support lorry adjacent as close as possible to the drilling rig and connect delivery hose from the mud plant to the drilling rig, Once the drilling fluid has been mixed, check that all the fluid hoses are correctly fastened before transferring any fluid to the rig.
- With the drill rig in position, assemble the drilling head, consisting of the sonde housing and steering shoe, the steering shoe can either be an angled flat plate or an angled 3 toothed picked head, the pilot rods are steered by pushing and rotating the rods and head and the force of the ground in front of the drilling head can be used to steer the pilot head to where it is required, and the steering head is then attached to the first (lead) drill rod.
- Install the earthing rod on the drilling rig and test the rig strike alarm (this is in case of any unknown service strikes, we do not expect any on this site, due to it being a green site).
- A Sonde will be placed in the drilling head, this will send a signal up to surface that can be found with a remote locating box, the drilling sonde can give precise depths, distance, angle of drill head and ground temperatures, these sondes can have a signal that can be located down to 19m below depth at + or – 5% accuracy, the shallower the depth, the more accurate the equipment is.

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Drilling Guidance Sonde

- Carry out calibration of the location equipment (sonde and remote locator) on the surface to ensure information on depth, gradient and orientation is correct before commencing the drill.



Locating receiver, sonde and drilling operative's screen.

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HOLD POINT:

Ensure that a Permit to Drill has been completed and counter signed for acceptance by the site appointed person.

Make final checks on the full system to ensure all equipment is working correctly – Ensure that there is sufficient mudflow to the drill head. Ensure that the rig and working area are sufficiently fenced to prevent entry of persons during operation of rig or equipment.

The drilling rig operator and drilling locator will have a radio each, this will be required for communications in the steering process. Ensure that radios are working correctly and carry out test of radio equipment. This must be done before any drilling takes place. Radio communication must be working between rig and exit side.

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If for any reason, radio communication is lost, drilling MUST STOP immediately until communication is back. Under no circumstance is anyone to continue drilling after loss of communication.

REFER to APPENDIX 5 RADIO COMMUNTICATION PROCEDURE

The drilling steering engineer (locator) and client engineer will determine the exact line and level of the drilling profile by either using the target steering method, this enable a predetermined depth and line to be relayed back to the drill rig operator by placing the locating box on the line of the drill and in front of the drill head, this system will then give the drilling rig operator a target to aim for on his drilling screen by the means of cross hairs and a tear drop, the teardrop indicates the centre of the drill head, the driller can rotate and push the drilling rods and head to get the tear drop into the centre of the target, this is a very accurate method of drilling guidance on a predetermined line. The other process is where the steering engineer verbally communicates with the drilling rig operator and tells them how much line or level to take off each drilling rods, also a very precise and accurate steering method.
Each drilling rod is either 3m in length or 4.5m in length dependant on rig chosen for the project, both have the same installation method and pullback capability.





The drill head accuracy, the photo on the right shows a tie bar installation of a 127mm drilling head

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exiting through a sheet pile with a 150mm hole cut out for the drill head to come through, this technique is done for pulling sheet walls together on network rail crossings and road crossings to stop the banks collapsing when we install the metal tie rods.



Accuracy of drilling installations through CFA and Sheet piling for tie bars.

- Check Radios and are working and in place.
- Commence drilling.
- As the first rod enters the ground confirm that all the required location information is being received to the rig and remote tracking receiver as required.
- As the pilot drill progresses steering will be required to maintain the required drill profile, this will be achieved by continuous monitoring / locating of the drill head. If the drill head is moved by an obstruction in the ground, pull back and try again to correct the steering, if no movement in the head, to the correct line, mark up in the as-laid book and inform the client. Obstruction is unlikely to cause issues based on reviewing the site investigations (BRD Environmental Limited).
- Continue with the installation of the pilot rods along the planned route / profile. The drilling rig operator will load each drilling rod on the drilling rig with the self-loading capability of the machines. Ensure that the drill head is on-line and within allowable tolerances through constant communication between drill operator and drilling locator (Lead Driller) continuously write down the depths in the as-laid book and highlight any drifting or ground obstacles.
- Continue the monitoring of the drill head along the plotted route.
- On approaching the exit position, turn down the drilling mud to a minimum and slowly rotate and push the drilling head out of the ground. The drilling fluid that has travelled down with the pilot rods will travel into the exit pit.
- Once the pilot drill has been successfully guided to the drill exit position, the rig will be isolated, the drilling head removed, and a back reamer will be put in the drilling heads placed on to the drill string. The size of the reamer is dependent on the ground conditions encountered.

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The reaming process (making the bore the correct size for the pipe installation).

- The reamer has teeth and fluid holes on the body on it these holes (jets) are made clear and sufficient mud is pumped through the reamer.
- Commence reaming by rotating and pulling the pilot rods back towards the drill rig; this process enables ground to be cut and mixed with drilling fluid to produce slurry (mix of ground and fluid), these slurry cuttings will be caught it the made bund, /pit at the exit point.
- Every drill rod will be removed on the rig while the reaming process is happening, then the drilling fluid will be turned off before entering the launch pit.
- The drilling rods will then be pushed and rotated, and the reamer will then travel in the same bore that it has just cut, this swabs the bore and clears it ready for the pipe.

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Hold Point

The pipe will be pre welded up by butt fusion welding, the pipe will either arrive in 6m sticks and be guided through the woods on rollers to minimise any damage to the forest floor.

- Once the pipe is in position at the exit pit, the pipe will have a sponge pig and a mud tight (pipe) towing head inserted into the pipe, the towing head will expand and hold the pipe from the inside.
- Then the towing head (pipe) will be connected to the rear of the reamer by using “D” or a bow shackle.
- Then the mud flows will be checked on the reamer (unblocking jets if required).
- Then the final checks will be made on the drilling fluid reserves, and the connections between towing head and the reamer.
- Commencement of the pipe installation will be made, by rotating and pulling the drilling rods back towards the drill rig while pumping drilling fluid; this process enables the fluid in the bore to be mixed with any excess ground to aid the sliding of the pipe within the bore.
- During reaming / pipe installation, the pull back and rotational pressures will be constantly monitored by the drill operator to ensure that torque and pull back forces do not exceed the safe working limit of the rig and product pipe.
- Drilling fluid will be pumped through the rotating reamer into the borehole to aid lubrication of the pipe and maintain fluid flow during pipe installation.
- Once the pipe has been successfully installed, the rig will be isolated, then disconnected form the towing head, and the sponge pig will be removed from the pipe. Remove the reamer from the drill rods and clean down the machine and works area.
- **The excess drilling fluid in the launch pit and exit pit will be removed by a tractor and vacuum tanker, the tractor will lay hoses down to the exit pit to suck up any liquid then removed from site to a waste transfer station.**
- The pits will be backfilled with as dug material and any sandbags removed from the exit pit.

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- Repeat all of the above for each drainage location required on the project.



Pipe installation – launch pits

5 Permits

A permit to work system will be used for individual work areas, these areas include:

1. Permit to Dig (Issued by the client) this will be issued for any excavation required and only required on the day of excavation.
2. Permit to Drill. Copy of Permit is included in Appendix 2, the permit is required per pipe installation.

Each drill permit will log all if any underground services that intersect or run parallel to any section of the proposed drill length.

The AEYDD Site Supervisor / Lead driller in consultation with the main contractor will issue and compile each permit based on the Utility Information collated by the client. Once completed, the drill permits will be presented to the client for authorisation before any drilling works can commence.

For reference, a copy of the AEYDD permit to drill has been included as an appendix to this method statement.

6 Supervision

Overall supervision of site activities
AEYDD Director (Visiting) – Nicholas Whitehead – 0775 938 211
AEYDD Drilling Manager (Visiting) – Dean Robinson – 07843 027706

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AEYDD Site Supervisor – TBC
AEYDD Driller and locators - TBC

7 Workforce Details

Training / Qualifications Details of Site Managerial Personnel
AEYDD Site Operatives - TBC
Lead Driller – SSSTS, CSCS, NVQ Directional Driller, EUSR
Driller Tracker – CSCS, NVQ Directional Driller, EUSR
Site operatives – CSCS, CPCS, EUSR
Excavation Operative – CSCS, HSG47

AEYDD HDD Management
D. Robinson (Drilling Manager)– CITB SMSTS, NVQ Directional Driller, NRSW, Blue Water Card. EUSR
N. Whitehead (Director) – CITB Site Safety Manager, CSCS Manager, NRSW manager, Blue Water Card. EUSR

8 Health & Safety Monitoring

The Company's main activities are site based, and thus arrangements for H&S are overseen through Site Management structure. In order to monitor the effectiveness of these arrangements, site will be inspected by the HSQE Manager or by his nominated competent representative. A pro – forma category scorecard check list is used to ensure consistency of approach.

The frequency of inspection will depend on factors such as the size of contract, type of activities, experience of Site Management, frequency of other inspection agents. Since AEYDD generally operate as subcontractors, in many cases the main contractor operates a safety management system which involves carrying out regular inspections, often jointly with the AEYDD Site supervisor.
Any issues will be highlighted to the main client who will report via their procedure.
Any major safety problems encountered during H&S inspections will be brought to the attention of the Site Supervisor immediately and the Contract Manager will be informed. Any such issues will be highlighted in the report prepared by the HSQE Manager and submitted for consideration at the regular HSQE meeting.

The HSQE Manager maintains a computer record of Site Inspections and is thus able to identify performance trends.

Daily inspection of plant equipment to be carried out, PUWER and LOLER records to be kept.

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9 Plant Inspection & Operator Training

Plant / Equipment Required	Operator Competence Required	Inspection / Test Evidence required	Supplier
Toro 4045 / Ditch Witch JT40	YES	YES	AEYDD
Fluid Mixing Unit and Recycler	YES	YES	AEYDD
Support Lorry	YES	YES	AEYDD
Vans	YES	YES	AEYDD
Tractor and vacuum Tanker	YES	YES	TBC

All copies of Maintenance / Inspection Certificates for AE Yates supplied are held by our in – house plant department based at Bolton Head Office.
Where no industry-recognised training is available, operative's competency will be assessed and approved by the Drilling Operations Manager.

10 Disconnection / Reconnection of Services

Not applicable to this activity

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11 Hazardous Substances

Substance / Product Name	Hazard Level (H,M,L) as specified on COSHH Assessment	COSHH details provided and briefed to users	Control measures to be used
Clearbore drilling fluid	Low	Yes	PPE as detailed in the COSHH Assessment. To be used in a well-ventilated area Wash facilities provided
DIESEL	Medium	Yes	PPE as detailed in the COSHH Assessment. Wash Facilities provided
ROD Grease / KOPRKOTE	Medium	Yes	PPE as detailed in the COSHH Assessment. Wash Facilities provided
Engine Oil	Low	Yes	PPE as detailed in the COSHH Assessment. Wash Facilities provided
Grease	Low	Yes	PPE as detailed in the COSHH Assessment. Wash Facilities provided
Hydraulic Oil	Low	Yes	PPE as detailed in the COSHH Assessment. Wash Facilities provided

12 Occupational Health

None of the individual activities covered by this method statement require our operatives to undergo health surveillance, all site operatives may be subjected to a random drugs and alcohol test.

13 PPE

1. The Items of standard PPE provided to all operatives are listed below.
2. The items of standard PPE provided to all operatives are listed below. The **RED** items are mandatory for all operatives and the **BLUE** are task specific.

- Hard – Hat

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- Safety Boots
- Safety Glasses
- Fire resistant hi-vis orange clothing / overalls
- Ear Defenders
- FFP3 Dust Masks
- Nitrile Gloves
- Work Gloves
- Overalls – Fire retardant
- Waterproof Bib and Brace
- Wellington Boots – Task specific

14 Work Specific Emergency Procedures

1. The possible causes of a site emergency arising from Drilling Activities are:

    - Explosion due to damage of buried services
    - Electric Shock caused by damage / contact with live electrical cables.
    - Fire

2. Particular site emergency procedures will be communicated to AEYDD operatives during the 'Site Safety Induction' carried out under CDM regulations by the main client.

3. In the event of an emergency AEYDD operatives will, in the first instance, contact the main contractors site supervisor then the AEYDD management (Name & Contact Numbers listed in the above Supervision section of this document) The main client contact will be introduced in the site induction.

4. There will be an appointed First Aider on site. The details of who the first aider is and where they can be found should be briefed to operatives during the site induction.

5. Copies of the map detailing the route to the nearest **hospital** should also be displayed in the welfare units and copies will be available on site for quick reference and to enable the injured person to get to hospital quickly.

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15 Environmental Controls

Potential threats to the Environment	Control Measures to be implemented
Pollution of any watercourse	Read and follow AEY Form 045 – working near watercourse – use biodegradable drilling fluids only.
Harm / Damage to wildlife	Spill Kit to be used in the event of a fuel or oil leakage
Fuel spills	Spill kits available on site to suit substance and volumes. AEY 10m rule applied.
Hydraulic oil spill	Regularly check all hydraulic hoses for wear and report / replace as necessary spill kits will be available on site.
Types of Waste that will be generated during the works	**Methods of waste treatment / disposal**
Surplus Drilling Fluids / Slurry	Disposal by vacuum tanker (supplier to be confirmed)
Metallic waste in the form of worn tooling / parts	Removal from site by AEYDD drilling crew for disposal in metallic waste skips for re – cycling
Wood / Paper Card (packaging)	Removal from site by AEYDD drilling crew for disposal in general waste skips for recycling.

16 Safety of the Public and Occupiers

The main client will be directly responsible for ensuring the Health and Safety of site operatives, the general public and other contractors. AEY DD will also ensure that the Drilling area is kept tidy and free from any hazards. AEY DD site staff will also inform the main clients site agent of any defects in Traffic Management or site fencing / guarding that they become aware of.

17 Public Nuisance

1. Possible sources of public nuisance would be.

    - Excessive Noise (due to site equipment) all plant to be turned off when not in use.
    - Reduced access, all HDD areas to be fenced off to minimise access.
    - Mud / dust on road etc

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End of Main Document

Appendix 1 Emergency Contacts

Emergency Contacts

- Drilling Manager – Dean Robinson 07843 027706
- Director - Nicholas Whitehead – 07775 938 221

Appendix 2 Permit to Drill

Example of Drilling permit (to be issued by Lead Driller before drilling commences)

PERMIT TO DRILL

A	**Details of Contract where the Permit is being applied:** *(Note: Sections A and B appear on all pages)* **Work MUST STOP if Circumstances or Task Detail Changes from the Permit Requirements.**		
Contract No:		Contract No. and Name:	

B	**Permit Reference Details:**		
Permit Number (sequential):		RAMS Reference:	
Guidance:	*Activity must be covered by RAMS, referenced in Section B above. Refer to SMS Procedure Pro S10 Utility Services and SMS Reference Document HSG47 Avoiding Danger from Underground Services*		

J	**Standard Control Measures: -** Do not drill until services have identified via drawings provided.	**Y or N (Done by Client/PC** as appropriate **)**
	Carry out surveys using Ground Penetrating Radar with valid Test Certificate. Suitable training required.	
	Have locations and depth of services been provided?	
	Are services exposed?	
	Has the line of drill been inspected and checked with a Cable Avoidance Tool (CAT)?	
	Hand dig trial holes to locate and expose services, particularly where a change in direction is identified Ref HSG 47.	
Additional Control Measures (please detail):		

K	**Permit Issuer:**			
	Name:	**Signature:**	**Time:**	**Date:**
Issued By:				

L	**Receipt by Lead Man:**

Date:		**Contract No & Name:**			**Principal Contractor:**				**Installation No. / ID:**							
Distance along drill path from point of entry(m)																
Service / Apparatus and No. Present																
Depth to top / bottom of apparatus (m)																
Minimum Clearance from Service at this point (m)																
Section:			**Plan:**						**Comments:**							
Product (O/D / SDR / Colour):			**Installation Length:**				**Rig Used:**				**Final Ream Diameter:**					
Safety Checks Undertaken	***Visual Check Undertaken Noting any Over Head Lines***		Yes ☐	No ☐	***Strike Alarm Tested***		Yes ☐	No ☐	***Earth Rod Installed***				Yes ☐	No ☐		
Signed by AEYTS Lead Driller (Print & Sign):					**Signed for acceptance by Principal Contractor (Print & Sign):**											

Appendix 3 HSE No Dig Guidance 1

HSE
Health & Safety Executive

Hazardous Installations Directorate, Specialised Industries
Gas and Pipelines Unit - Head of Unit: Steve Wing

PIPELINES 2004 – NO DIG



HDD: Horizontal Directional Drilling



HDD: Hazardous, Danger of Death

Horizontal Directional Drilling and other similar trenchless techniques can reduce the risk from working in open excavations and can save time and money in the right location. The avoidance of existing underground plant, structures, contaminated ground etc. is essential if risks are to be properly controlled.

HSE INSPECTIONS CAN BE EXPECTED TO FOCUS ON

- Site Safety Plan – Utility Drawings available, Site suitability of HDD technique;
- Underground (U/G) Plant Location – U/G Plant Operators contacted, Site visual survey completed, Cable locator used, U/G Plant marked, Underground structures identified?
- Permit to Work/Permit to Drill – Suitable and Sufficient Risk Assessments and safe system of work developed, Site-specific authorised Permit to drill, Method Statement, Plant Electrical Earthing arrangements satisfactory, site communication arrangements;
- Proximity Distances from Identified Plant – Clearly understood on site e.g. Parallel Runs, Lateral Crossings, Crossing points excavated, Utility Operators requirements incorporated;
- Competency – HDD Operators, Training records;
- Emergency Procedures – Detailing what to do if gas mains (LP/HP), other pipelines, Electricity cables (LV/HV), etc are damaged;

Free information is available from: HSE website: www.hse.gov.uk.

Priced publications can be obtained from: HSE Books on Tel:01787 881165 or Fax: 01787 313995

Appendix 4 HSE No Dig Guidance 2

HSE
Health & Safety Executive

HSE Construction Division
Chief Inspector for Construction: Kevin Myers

PIPELINES 2004 – NO DIG





AVOIDING DAMAGE TO BURIED SERVICES

Damage to third party equipment by contractors when undertaking excavation or general utility work is a substantial problem which has caused a number of deaths and injury as well as economic damage.

HSE INSPECTORS WILL EXPECT THAT

- Plans or other suitable information about the location of buried services in the area should be available before excavation starts
- Limitation of plans should be understood; the position of any services in or near the ground should be accurately located
- Excavation around services should be carefully carried out following safe digging practice and excavation
- If electric cable gas pipes are damaged they should be properly repaired and not covered up. Remember damage to a gas pipe may cause damage to connections or service pipes inside a building away from the point of damage.
- All excavations should be assessed for stabiliy and appropriate support should be provided
- Traffic management should be planned and instigated to protect road users and pedestrians and those doing the work

Further advice can be obtained from HSE guidance book HSG 47 Avoiding Danger from Underground Services

Free information is available from : the HSE website :
www.hse.gov.uk.
Priced publications can be obtained from: HSE Books on Tel:01787 881165 or Fax: 01787 313995

Appendix 5
Procedure for radio communicating

This procedure will set security, accuracy and discipline when speaking on a radio.
If radio communication becomes lost or unclear all operations must stop immediately
Radios should be kept clean and free of debris at all times.
Security – think before you speak – use correct procedure.
Accuracy – adequate pauses – slower than usual conversation – speak directly into the microphone – the voice should be pitched at a higher level than for normal conversation.
Discipline – listen before you speak – use correct voice procedure – answer all calls promptly – keep the airways free from unnecessary talk – be brief and to the point
Prior to any communication taking place a radio check should be carried out by calling the following sign -
Initiating a call – whenever you are using a radio for the first time, or there is doubt about the performance of your radio, the simplest check that can be done is what is known as a "radio check". The call should consist of the following:

- The call sign of the station being called
- The words **"this is."**
- The call sign of the station calling.
- The words **"radio check."**
- The pro word **"over"**

No clear communication means "do nothing"

Example:
Reception side **this is** drive side **"radio check over."**
Drive side this is reception side "**radio check received and all clear over."**
Reception side this is drive side "**over and out**"

Once the radio check has been confirmed communications can continue.
Example:
Reception side **this is** drive side **"call back over."**
Drive side **this is** reception side "**receiving over".**
Reception side **this is** drive side **"is it safe to proceed over"**
Drive side **this is** reception side **"it is safe to proceed over"**
Reception side **this is** drive side **"proceeding now over"**
Drive side **this is** reception side **"over and out"**

Radio confirmation must always be confirmed prior to any activities taking place

If no communication is confirmed or communication becomes lost or unclear all operations must stop immediately, and personnel must travel to the work area not responding and reestablish communication protocol.
If a call is made 3 times with no response all operations must stop immediately, and personnel must travel to the work area not responding and reestablish communication protocol.

Appendix 6 — Signing on Register

INTEGRATED MANAGEMENT SYSTEM — A E Yates

RAMS BRIEFING RECORD

Group Company:	A E Yates DD Ltd	Contract Nr:	TBC	Contract Name:	Downlands Farm, Uckfield

The following Risk Assessment / Method Statement information was briefed to the attendees as shown below

(Give RAMS document Reference here)
HDD Method Statement MST001 Rev01 Downlands Farm, Uckfield.
HDD Enviromental Risk Assesment Downlands Farm, Uckfield.
DD0032 HDD Risk Assesment Downlands Farm, Uckfield.

Given by: Name:		Signature:	

Register of Attendees

#	Print Name *(must be legible)*	Your Signature	Your Company	Your Job Title	Date
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					

RAMS Briefing records should be retained on site in accordance with the Site HSQE Filing Index

Document ref: PFM C19 Revision Date 31/03/14

AEYDD Ltd RAMS Briefing Record will also be attached to this Method Statement

Appendix 7

A E Yates Directional Drilling Ltd

Schedule of Attendances

TBC.

Appendix 8

TBT E02 **THE 10 METRE RULE**

WHAT?
The 10 metre rule was issued as an Environmental Alert in June 2008 and should be observed on all sites as standard practice

WHY?
Pollution of a watercourse is one of the worst things you can do on site. It's illegal, it can lead to you and / or the Company being prosecuted, and having to pay big clean up costs as well as fines and legal costs. Often the Client is also prosecuted. If that happens, we are unlikely to remain on their tender lists

The risk of this happening can be greatly reduced by the simple use of the 10 metre rule. It basically says:-

Don't store anything that could pollute a watercourse within 10 metres of a water path

Don't carry out refuelling within 10 metres of a water path

A water path is any route that can lead to a water course. For instance, a gulley, a channel, a ditch, a land drain, a slope running down to body of water





DO

- ✓ Be aware of the water path layout in your working area
- ✓ Where possible keep all mechanised plant (including diesel or hydraulic pumps, compressors and generators) more than 10m away from a water path
- ✓ Where possible use central refuelling. Take the plant to the fuel, rather than risk taking the fuel to the plant. Il's much easier to control spillage if you are using a dedicated location for all refuelling. Of course you must sure that the dedicated location is at least 10m away from any water path
- ✓ Lock fuel tanks when not in use
- ✓ Tell your Supervisor immediately if you've caused some water course pollution
- ✓ Tell your Supervisor about any water pollution that you see on site even if you don't think we caused it. We may need to alert the Authorities or else they might assume that we caused it

DON'T

- ✗ Don't store fuels, oils or any potentially polluting materials (eg cement, chemicals etc) within 10m of a water path
- ✗ Do not carry out any refuelling operations within 10m of a water path
- ✗ Never assume that just because a ditch is dry today it's not a water path. It will very likely become one after a period of heavy rainfall

If you require any further information please contact the HSQE Department

Appendix PJ6 – Proposed Drainage Plan and Long Section Drawings

Design Parameters

– Design Storm Event: 1 in 100 year + 40% climate change.

– Surface water restricted to Qbar greenfield runoff rate (2.0 l/s/ha for sandy catchments 1–6 and 5.1 l/s/ha for clayey catchments 7–12)

– 60% impermeable area, 10% Urban Creep allowance, 10% allowance for runoff from adjacent landscaped areas, 10% attenuated in permeable paving.

– Basins designed as dry, 1 in 3 side slope, 3m maintenance buffer, 1.25m total depth (1.1m maximum water level), basin land take increased by 30% to account for earthworks requirements.

– Existing discharge locations into the ghylls mimicked to retain the existing hydrological characteristics.

– Swales to be incorporated throughout to provide water quality, biodiversity, and amenity benefits, locations to be confirmed.

DESIGNATED MAIN RIVER WITH ASSOCIATED FLOOD ZONE 3 FLOODPLAIN

ORDINARY WATERCOURSE NOT MODELLED SURFACE WATER FLOOD EXTENTS (MEDIUM RISK) USED AS PROXY FOR LIKELY FLUVIAL FLOODPLAIN

SHORTBRIDGE STREAM

FILTER TRENCH OR SHALLOW SWALE TO CONVEY FLOWS TO THE BASIN. GROUND RAISING MAY BE REQUIRED TO ACHIEVE GRAVITY DRAINAGE SUBJECT TO DETAILED LEVELS PROPOSALS.

WATERCOURSE AND CULVERT BENEATH A22 OBSERVED DURING SITE VISIT 27TH AUGUST 2020.

LAND RE–GRADING REQUIRED TO ENSURE SLOPE BETWEEN BASINS DOES NOT EXCEED 1:6.

SUMPS (0.5 – 1m DEPTH) WITH PERMANENT WATER TO PROVIDE HABITAT FOR GREAT CRESTED NEWTS

GHYLL RECEIVING INFLOWS FROM THE SOUTH AS PER EXISTING SITUATION

SPORTS PITCH (DETAILS PROVIDED DURING RESERVED MATTERS) CURRENTLY ASSUMED HARD–STANDING TO DRAIN POSITIVELY INTO THE DRAINAGE SYSTEM. A PROPRIETARY DRAINAGE SYSTEM WOULD LIKELY BE REQUIRED TO ENSURE FULL FUNCTIONALITY THROUGHOUT THE YEAR, WITH DETAILS PROVIDED POST PLANNING.

Thirty Acre Wood

Lake Wood

A22

SNATTS ROAD

LOT LANE

CAMBRIDGE

DOWNLAND CORSE

HUNTERS WAY

1:2000 0 20m 40m 60m 80m 100m 120m 140m 160m 180m 200m

1:1 0 10 20 30 40 50 60 70 80 90 100

GENERAL NOTES

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KEY

- SITE BOUNDARY
- DRAINAGE CATCHMENTS
- ANCIENT WOODLAND
- FLOOD ZONE 3
- PLUVIAL FLOODPLAIN (MEDIUM RISK)
- WATERCOURSE WITH 8m BUFFER
- SURFACE WATER (SW) CONNECTION
- DIRECTION OF SW FLOW
- SWALE (3.5m WIDTH, 0.5m DEPTH)
- PROPOSED FOUL WATER SEWER
- FOUL PUMP STATION WITH 15m ODOUR/NOISE BUFFER

DETENTION BASIN

- TOP & BOTTOM OF BANK
- EARTHWORKS EXTENT (ASSUMED)
- MAINTENANCE BUFFER (3m)
- POTENTIAL DIRECTIONAL DRILLING SW ROUTE

Rev	Date	Description	By
P13	22.12.22	SPOT LEVELS ADDED	SW
P12	12.10.22	CONTOURS ADDED	BM
P11	25.05.22	INCLUDED DIRECTIONAL DRILLING SECTIONS	POF
P10	09.05.22	AMENDED MASTERPLAN	POF
P09	25.01.22	AMENDED MASTERPLAN	KT
P08	01.12.20	AMENDED MASTERPLAN	NB
P07	06.11.20	SHERMANREED WOOD BASINS AMENDED	NB
P06	30.10.20	BASINS AMENDED	NB
P05	29.10.20	BASINS AMENDED	NB
P04	26.10.20	BASINS/DISCHARGE POINTS AMENDED	NB
P03	30.10.20	AMENDED MASTERPLAN	NB
P02	29.07.20	BASINS AMENDED	NB
P01	20.07.20	FIRST ISSUE	NB

Amendments

Project
DOWNLANDS FARM, UCKFIELD

Title
FLOOD RISK AND DRAINAGE CONSTRAINTS PLAN

Client
GLEESON LAND

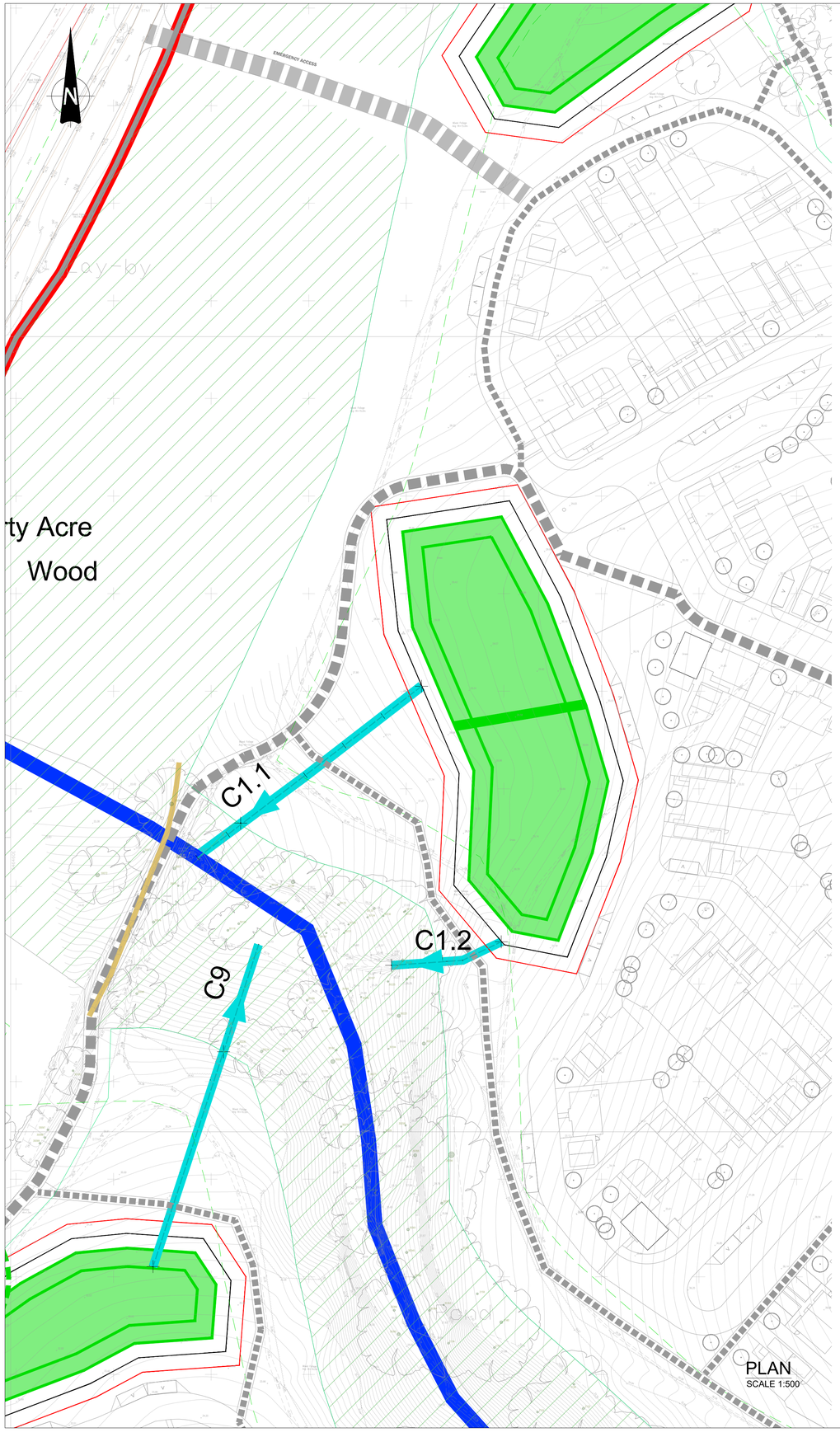
waterman
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mail@watermangroup.com www.watermangroup.com

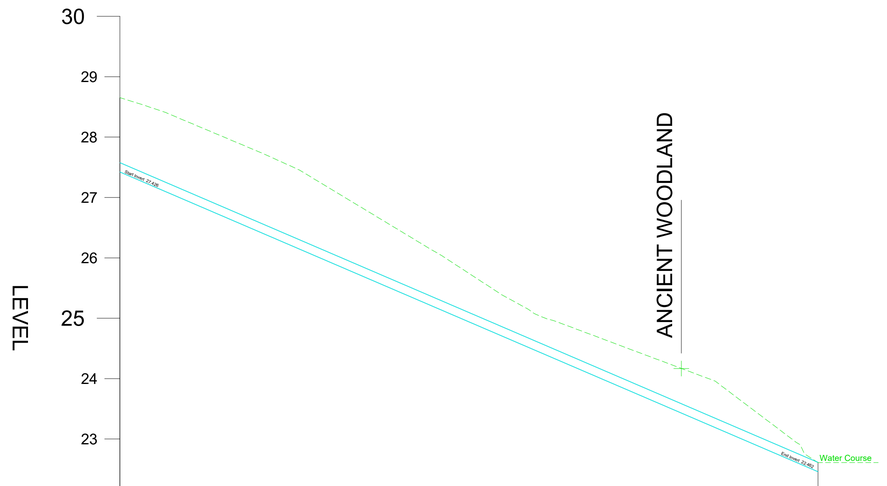
Drawing Status
PRELIMINARY

Designed by	NB	Checked by	POF	Project No	WIE16835
Drawn by	KT	Date	MAY 2022		
Scales @ A1 work to figured dimensions only	1:2000			Computer File No	16835-WIE-ZZ-XX-DR-92001-Bound.dwg

Publisher	Zone	Category	Number	Revision
WIE	ZZ	92	001	P13

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EXISTING LEVELS	28.495	28.305	28.094	27.884	27.669	27.439	27.137	26.835	26.534	26.232	25.927	25.601	25.294	25.020	24.844	24.656	24.469	24.281	24.094	23.853	23.475	23.098	22.650

C1.1 - LONGSECTION
SCALE: H 1:100,V 1:20. : 20.000

AS SHOWN 0 20m 40m 60m 80m 100m 120m 140m 160m 180m 200m
1:1 0 10 20 30 40 50 60 70 80 90 100

GENERAL NOTES

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KEY

- SITE BOUNDARY
- ANCIENT WOODLAND WITH 15M BUFFER
- WATERCOURSE
- SURFACE WATER (SW) CONNECTION

DETENTION BASIN

- FLOOD ZONE 3
- EARTHWORKS EXTENT (ASSUMED)
- MAINTENANCE BUFFER (3m)

PLAN
SCALE 1:500

Rev	Date	Description	By
P14	22.09.23	ISSUED FOR APPEAL	TK
P13	11.09.23	FOR POE	TK
P12	12.10.22	CONTOURS ADDED	BM
P11	25.05.22	INCLUDED DIRECTIONAL DRILLING SECTIONS	POF
P10	09.05.22	AMENDED MASTERPLAN	POF
P09	25.01.22	AMENDED MASTERPLAN	KT
P08	01.12.20	AMENDED MASTERPLAN	NB
P07	06.11.20	SHERMANREED WOOD BASINS AMENDED	NB
P06	30.10.20	BASINS AMENDED	NB
P05	29.10.20	BASINS AMENDED	NB
P04	26.10.20	BASINS/DISCHARGE POINTS AMENDED	NB
P03	30.10.20	AMENDED MASTERPLAN	NB
P02	29.07.20	BASINS AMENDED	NB
P01	20.07.20	FIRST ISSUE	NB

Amendments

Project
DOWNLANDS FARM, UCKFIELD

Title
C1.1 - CONNECTION - LONG SECTION PLAN

Client
GLEESON LAND

Waterman
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Drawing Status
PRELIMINARY

Designed by	NB	Checked by	RF
Drawn by	TK	Date	JULY 2020
Scales @ A1 work to figured dimensions only	AS SHOWN		

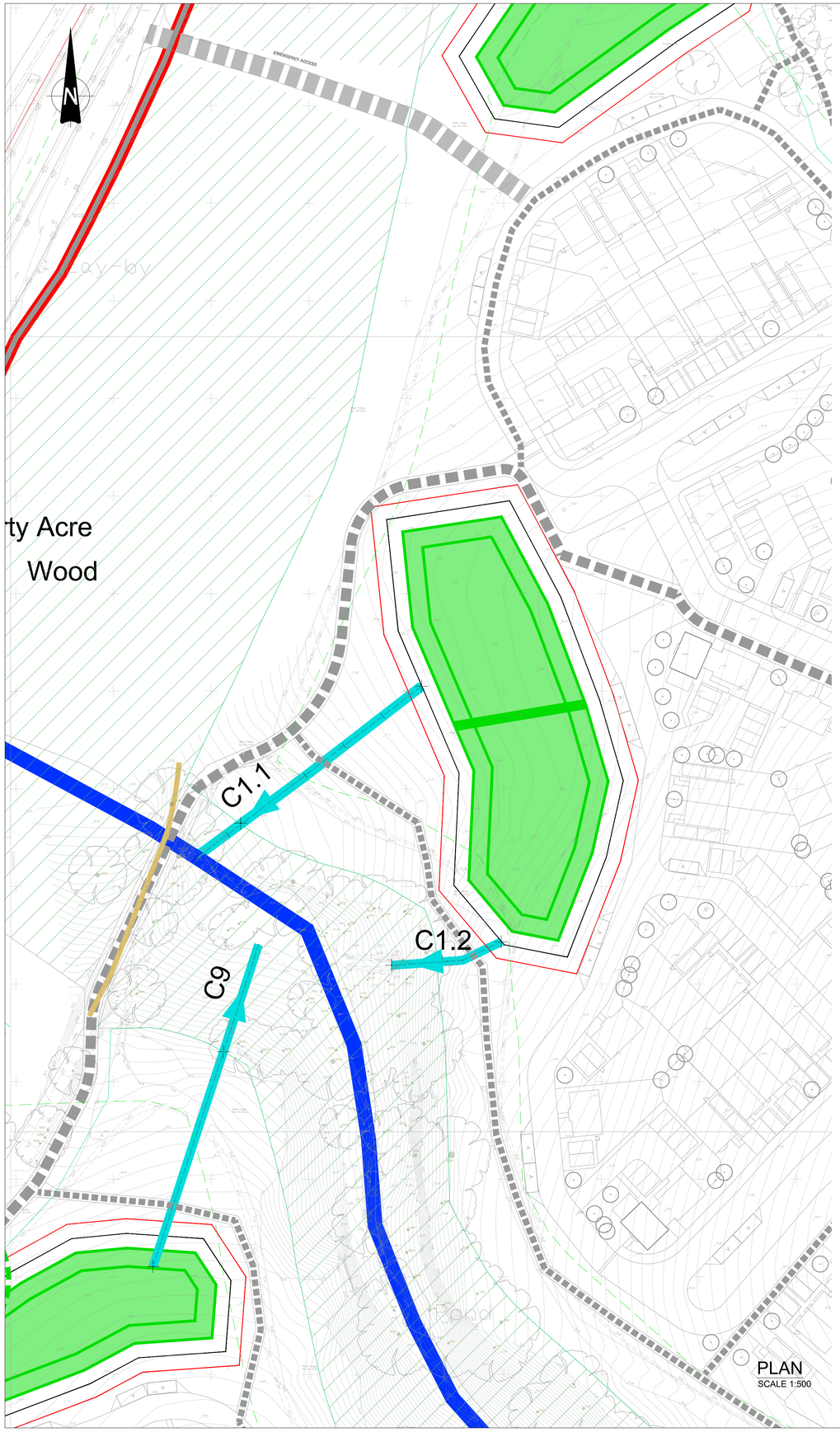
Project No
WIE16835

Computer File No
16835-WIE-ZZ-XX-DR-92002.dwg

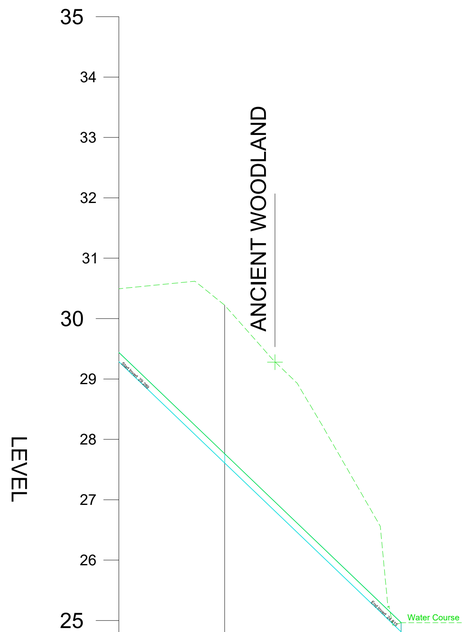
Publisher	Zone	Category	Number	Revision
WIE	ZZ	92	001	P14

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1309_Downlands Farm_Masterplan Drawings_280422, 16835-WIE-ZZ-XX-M-D1-92001, A1-Wat-S, topo



PLAN
SCALE 1:500



CHAINAGE	2.500	5.000	7.500	10.000	12.500	15.000	17.500	20.000	22.500
EXISTING LEVELS	30.544	30.593	30.426	29.942	29.376	28.851	28.003	27.134	25.114

C1.2 - LONGSECTION
SCALE: H 1:100,V 1:20. : 20.000

GENERAL NOTES

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KEY

- SITE BOUNDARY
- ANCIENT WOODLAND WITH 15M BUFFER
- WATERCOURSE
- SURFACE WATER (SW) CONNECTION

DETENTION BASIN

- FLOOD ZONE 3
- EARTHWORKS EXTENT (ASSUMED)
- MAINTENANCE BUFFER (3m)

PLAN
SCALE 1:500

Rev	Date	Description	By
P14	22.09.23	ISSUED FOR APPEAL	TK
P13	11.09.23	FOR POE	TK
P12	12.10.22	CONTOURS ADDED	BM
P11	25.05.22	INCLUDED DIRECTIONAL DRILLING SECTIONS	POF
P10	09.05.22	AMENDED MASTERPLAN	POF
P09	25.01.22	AMENDED MASTERPLAN	KT
P08	01.12.20	AMENDED MASTERPLAN	NB
P07	06.11.20	SHERMANREED WOOD BASINS AMENDED	NB
P06	30.10.20	BASINS AMENDED	NB
P05	29.10.20	BASINS AMENDED	NB
P04	26.10.20	BASINS/DISCHARGE POINTS AMENDED	NB
P03	30.10.20	AMENDED MASTERPLAN	NB
P02	29.07.20	BASINS AMENDED	NB
P01	20.07.20	FIRST ISSUE	NB

Amendments

Project
DOWNLANDS FARM, UCKFIELD

Title
C1.2 - CONNECTION - LONG SECTION PLAN

Client
GLEESON LAND

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Drawing Status
PRELIMINARY

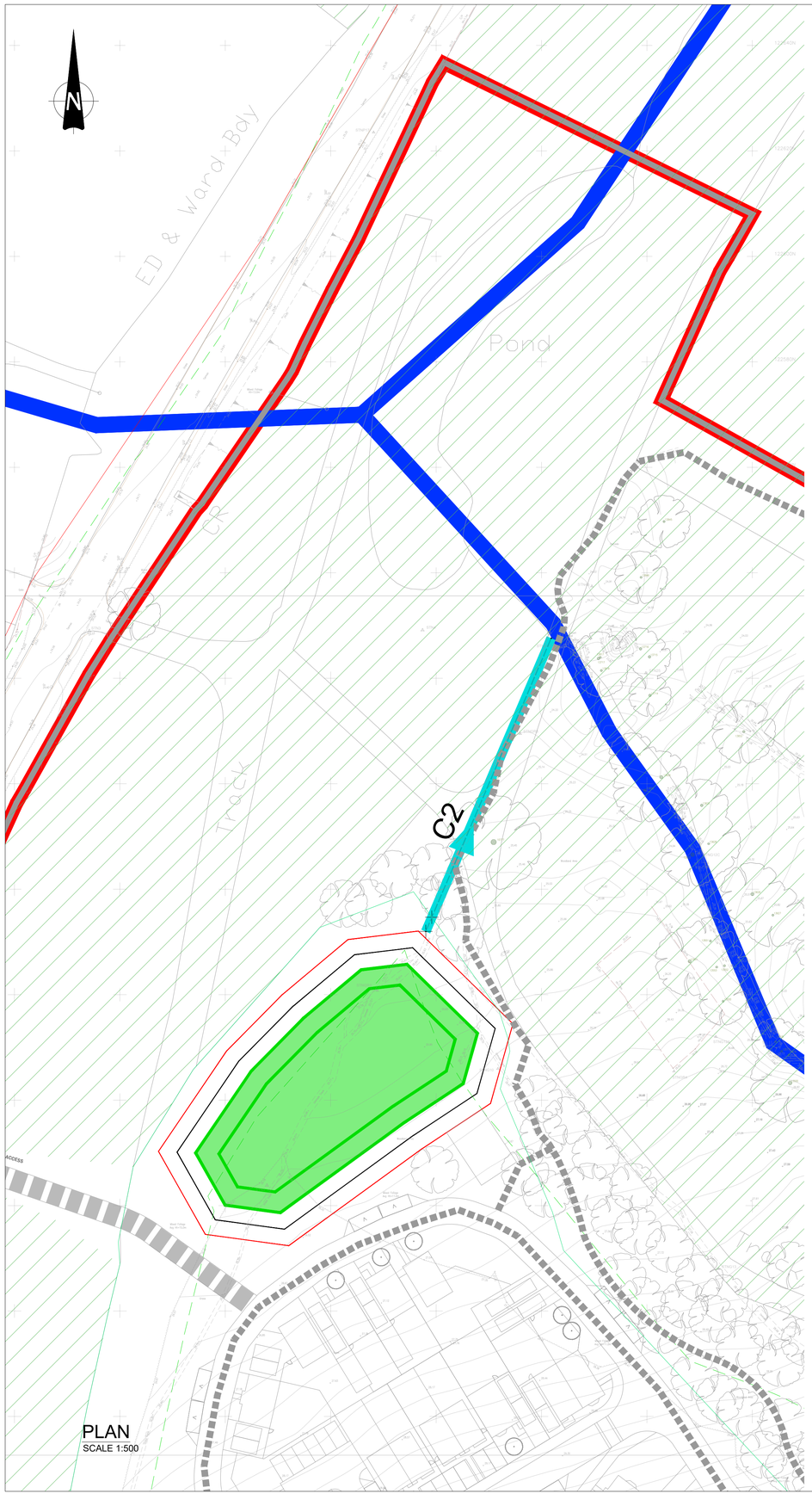
Designed by	NB	Checked by	RF	Project No	WIE16835
Drawn by	TK	Date	JULY 2020		
Scales @ A1 work to figured dimensions only	AS SHOWN			Computer File No	16835-WIE-ZZ-XX-DR-92002.dwg

AS SHOWN 0 20m 40m 60m 80m 100m 120m 140m 160m 180m 200m
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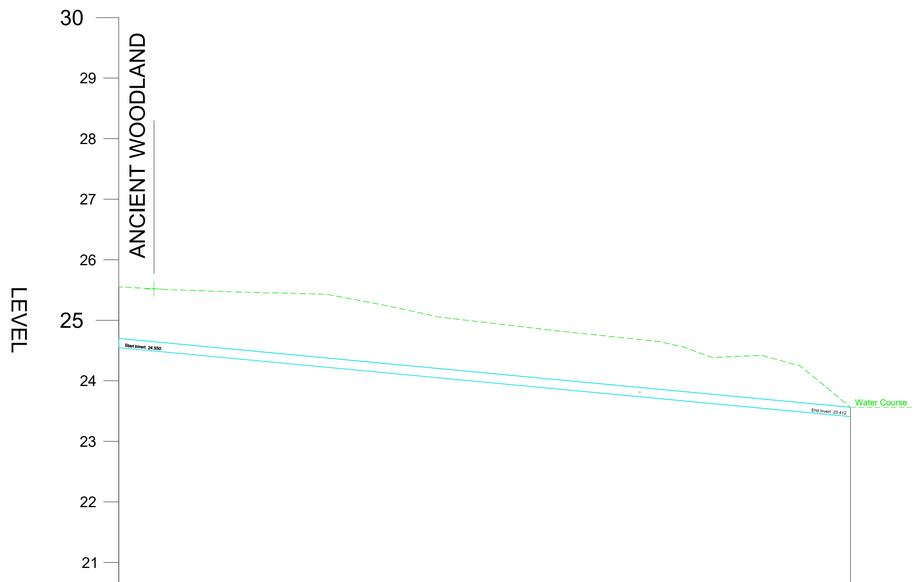
Publisher	Zone	Category	Number	Revision
WIE	ZZ	92	001	P14

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1309_Downlands Farm_Masterplan Drawings_280422, 16835-WIE-ZZ-XX-M-D1-92001, A1-Wat-S, topo



PLAN
SCALE 1:500



CHAINAGE	2.500	5.000	7.500	10.000	12.500	15.000	17.500	20.000	22.500	25.000	27.500	30.000	32.500	35.000	37.500	40.000	42.500	45.000	47.500	50.000	52.500	55.000	57.500	60.000
EXISTING LEVELS	25.524	25.501	25.482	25.467	25.451	25.442	25.418	25.322	25.226	25.117	25.030	24.971	24.912	24.853	24.798	24.746	24.694	24.635	24.496	24.393	24.414	24.317	24.048	23.635

C2 - LONGSECTION
SCALE: H 1:100,V 1:20. : 20.000

GENERAL NOTES

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KEY

- SITE BOUNDARY
- ANCIENT WOODLAND WITH 15M BUFFER
- WATERCOURSE
- SURFACE WATER (SW) CONNECTION

DETENTION BASIN

- FLOOD ZONE 3
- EARTHWORKS EXTENT (ASSUMED)
- MAINTENANCE BUFFER (3m)

PLAN
SOUTH

Rev	Date	Description	By
P14	22.09.23	ISSUED FOR APPEAL	TK
P13	11.09.23	FOR POE	TK
P12	12.10.22	CONTOURS ADDED	BM
P11	25.05.22	INCLUDED DIRECTIONAL DRILLING SECTIONS	POF
P10	09.05.22	AMENDED MASTERPLAN	POF
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P08	01.12.20	AMENDED MASTERPLAN	NB
P07	06.11.20	SHERMANREED WOOD BASINS AMENDED	NB
P06	30.10.20	BASINS AMENDED	NB
P05	29.10.20	BASINS AMENDED	NB
P04	26.10.20	BASINS/DISCHARGE POINTS AMENDED	NB
P03	30.10.20	AMENDED MASTERPLAN	NB
P02	29.07.20	BASINS AMENDED	NB
P01	20.07.20	FIRST ISSUE	NB

Amendments

Project
DOWNLANDS FARM, UCKFIELD

Title
C2 - CONNECTION - LONG SECTION PLAN

Client
GLEESON LAND

waterman
Pickfords Wharf Clink Street London SE1 9DG
t 020 7928 7888
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Drawing Status
PRELIMINARY

Designed by	NB	Checked by	RF
Drawn by	TK	Date	JULY 2020
Scales @ A1 work to figured dimensions only	AS SHOWN		

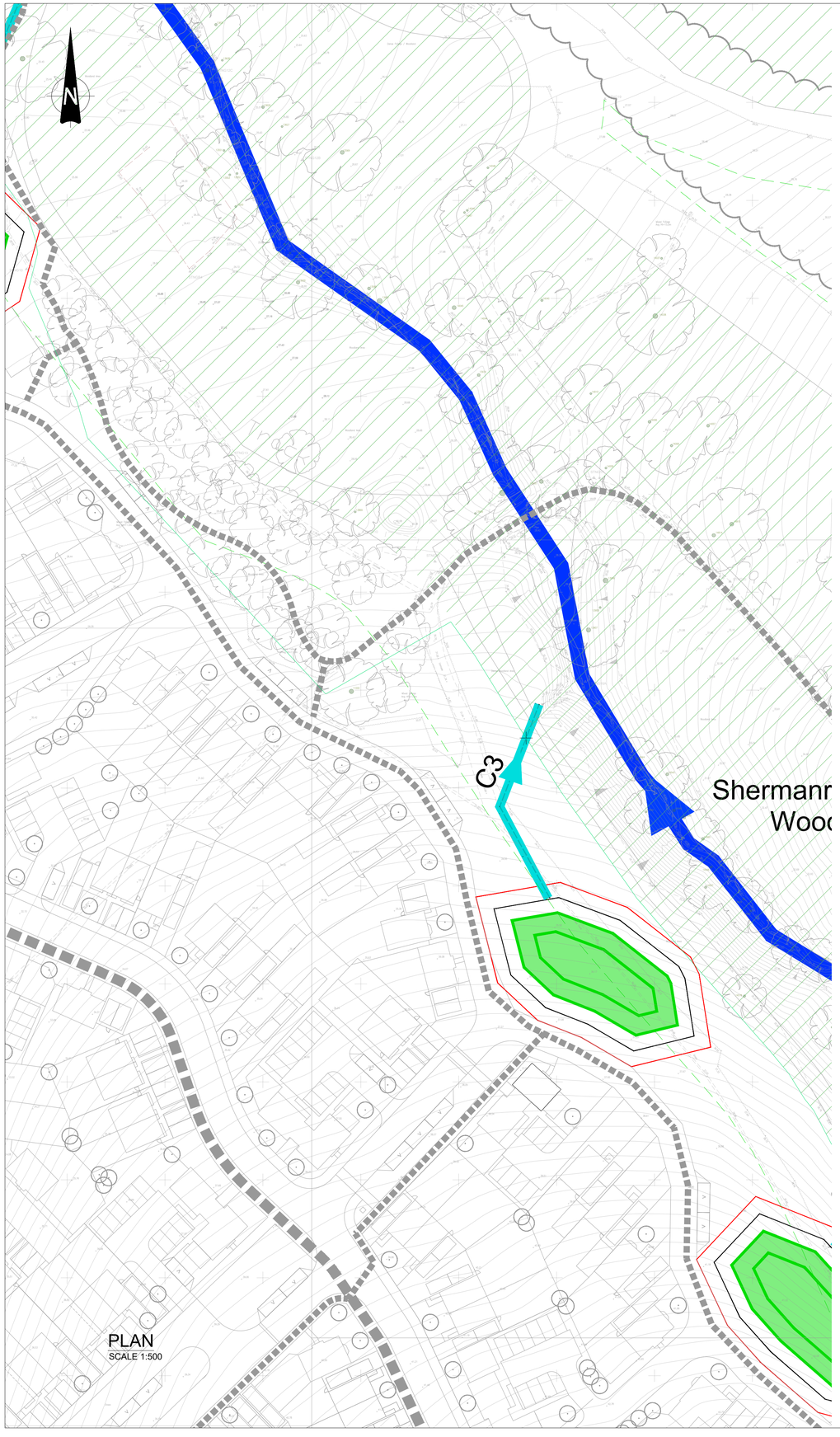
Project No
WIE16835

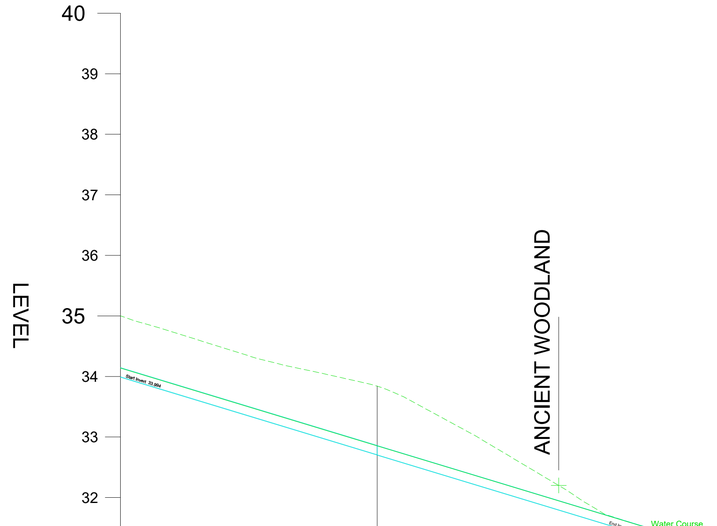
Computer File No
16835-WIE-ZZ-XX-DR-92002.dwg

Publisher	Zone	Category	Number	Revision
WIE	ZZ	92	001	P14

AS SHOWN 0 20m 40m 60m 80m 100m 120m 140m 160m 180m 200m
1:1 0 10 20 30 40 50 60 70 80 90 100

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EXISTING LEVELS	34.844	34.691	34.535	34.378	34.236	34.122	34.013	33.901	33.741	33.489	33.217	32.938	32.640	32.342	32.035	31.724	31.565

C3 - LONGSECTION
SCALE: H 1:100,V 1:20. : 30.000

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KEY

- SITE BOUNDARY
- ANCIENT WOODLAND WITH 15M BUFFER
- WATERCOURSE
- SURFACE WATER (SW) CONNECTION

DETENTION BASIN

- FLOOD ZONE 3
- EARTHWORKS EXTENT (ASSUMED)
- MAINTENANCE BUFFER (3m)

PLAN
SCALE 1:500

Rev	Date	Description	By
P14	22.09.23	ISSUED FOR APPEAL	TK
P13	11.09.23	FOR POE	TK
P12	12.10.22	CONTOURS ADDED	BM
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P09	25.01.22	AMENDED MASTERPLAN	KT
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P06	30.10.20	BASINS AMENDED	NB
P05	29.10.20	BASINS AMENDED	NB
P04	26.10.20	BASINS/DISCHARGE POINTS AMENDED	NB
P03	30.10.20	AMENDED MASTERPLAN	NB
P02	29.07.20	BASINS AMENDED	NB
P01	20.07.20	FIRST ISSUE	NB

Amendments

Project
DOWNLANDS FARM, UCKFIELD

Title
C3 - CONNECTION - LONG SECTION PLAN

Client
GLEESON LAND

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mail@watermangroup.com www.watermangroup.com

Drawing Status
PRELIMINARY

Designed by	NB	Checked by	RF
Drawn by	TK	Date	JULY 2020
Scales @ A1 work to figured dimensions only	AS SHOWN		

Project No
WIE16835

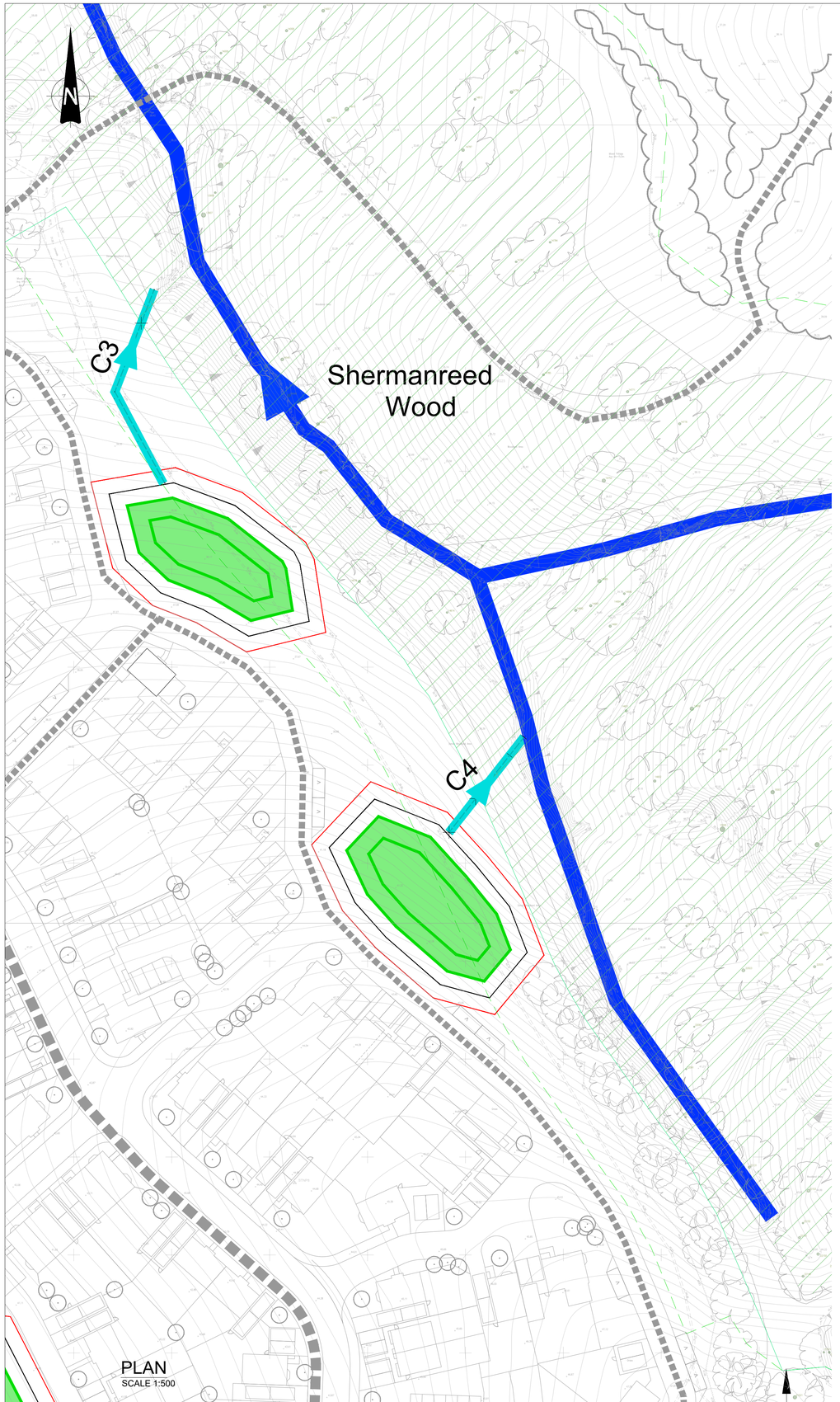
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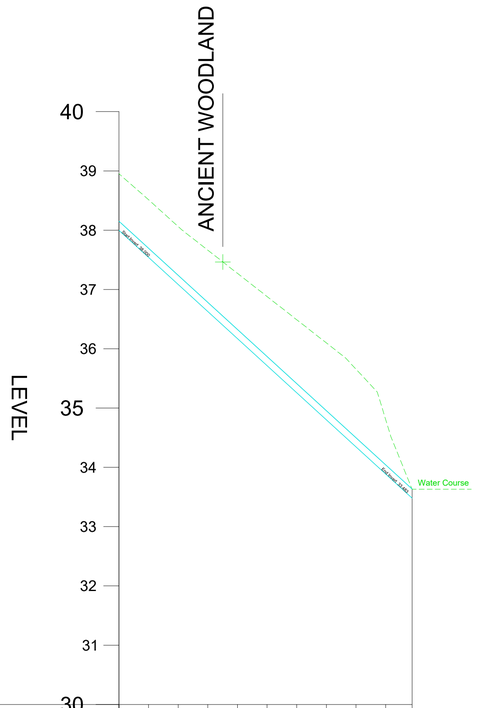
Publisher	Zone	Category	Number	Revision
WIE	ZZ	92	001	P14

AS SHOWN 0 20m 40m 60m 80m 100m 120m 140m 160m 180m 200m
1:1 0 10 20 30 40 50 60 70 80 90 100

1309_Downlands Farm_Masterplan Drawings_280422, 16835-WIE-ZZ-XX-M-D1-92001, A1-Wat-S, topo

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CHAINAGE	2.500	5.000	7.500	10.000	12.500	15.000	17.500	20.000	22.500
EXISTING LEVELS	38.514	38.062	37.663	37.272	36.881	36.489	36.098	35.656	34.807

C4 - LONGSECTION
SCALE: H 1:100,V 1:20. : 30.000

GENERAL NOTES

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KEY

- SITE BOUNDARY
- ANCIENT WOODLAND WITH 15M BUFFER
- WATERCOURSE
- SURFACE WATER (SW) CONNECTION

DETENTION BASIN

- FLOOD ZONE 3
- EARTHWORKS EXTENT (ASSUMED)
- MAINTENANCE BUFFER (3m)

PLAN
SCALE 1:500

Rev	Date	Description	By
P14	22.09.23	ISSUED FOR APPEAL	TK
P13	11.09.23	FOR POE	TK
P12	12.10.22	CONTOURS ADDED	BM
P11	25.05.22	INCLUDED DIRECTIONAL DRILLING SECTIONS	POF
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P08	01.12.20	AMENDED MASTERPLAN	NB
P07	06.11.20	SHERMANREED WOOD BASINS AMENDED	NB
P06	30.10.20	BASINS AMENDED	NB
P05	29.10.20	BASINS AMENDED	NB
P04	26.10.20	BASINS/DISCHARGE POINTS AMENDED	NB
P03	30.10.20	AMENDED MASTERPLAN	NB
P02	29.07.20	BASINS AMENDED	NB
P01	20.07.20	FIRST ISSUE	NB

Amendments

Project
DOWNLANDS FARM, UCKFIELD

Title
C4 - CONNECTION - LONG SECTION PLAN

Client
GLEESON LAND

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Drawing Status
PRELIMINARY

Designed by	NB	Checked by	RF	Project No	WIE16835
Drawn by	TK	Date	JULY 2020		
Scales @ A1 work to figured dimensions only	AS SHOWN			Computer File No	16835-WIE-ZZ-XX-DR-92002.dwg

Publisher	Zone	Category	Number	Revision
WIE	ZZ	92	001	P14

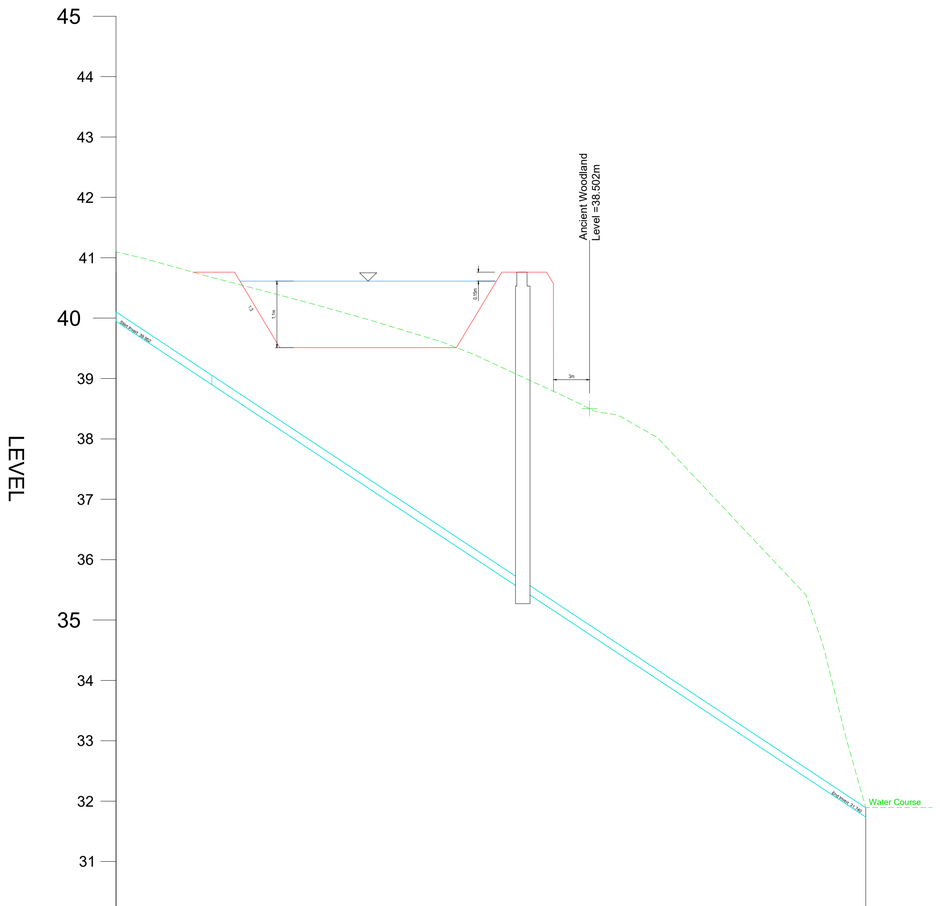
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1309_Downlands Farm_Masterplan Drawings_280422, 16835-WIE-ZZ-XX-M-D1-92001, A1-Wat-S, topo



PLAN
SCALE 1:500



CHAINAGE	2.500	5.000	7.500	10.000	12.500	15.000	17.500	20.000	22.500	25.000	27.500	30.000	32.500	35.000	37.500	40.000	42.500	45.000	47.500	50.000	52.500	55.000	57.500	60.000
EXISTING LEVELS	40.978	40.838	40.700	40.568	40.436	40.304	40.167	40.025	39.878	39.726	39.567	39.364	39.133	38.901	38.670	38.445	38.288	37.988	37.458	36.928	36.398	35.868	35.203	33.417
Finished Levels			40.762	40.762	40.700	39.512	39.512	39.512	39.512	39.512	39.512	39.512	40.114	40.762	40.762	40.575	38.787							
Water Level (m)				40.612	40.612	40.612	40.612	40.613	40.613	40.613	40.613	40.613	40.613											

C5 - LONGSECTION
SCALE: H 1:100,V 1:20. : 30.000

GENERAL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEER'S, ARCHITECT'S OR OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
2. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO PREPARING ANY WORKING DRAWINGS OR COMMENCING ON SITE.
3. THE CONTRACTOR MUST ENSURE AND WILL BE HELD RESPONSIBLE FOR THE OVERALL STABILITY OF THE BUILDING/STRUCTURE/EXCAVATION AT ALL STAGES OF THE WORK.
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5. ALL WORK IS TO BE CARRIED OUT IN COMPLIANCE WITH THE REQUIREMENTS OF THE RELEVANT STATUTORY AUTHORITIES AND REGULATIONS.

KEY

- SITE BOUNDARY
- ANCIENT WOODLAND WITH 15M BUFFER
- WATERCOURSE
- SURFACE WATER (SW) CONNECTION

DETENTION BASIN

- FLOOD ZONE 3
- EARTHWORKS EXTENT (ASSUMED)
- MAINTENANCE BUFFER (3m)

PLAN
SCALE 1:500

Rev	Date	Description	By
P14	22.09.23	ISSUED FOR APPEAL	TK
P13	11.09.23	FOR POE	TK
P12	12.10.22	CONTOURS ADDED	BM
P11	25.05.22	INCLUDED DIRECTIONAL DRILLING SECTIONS	POF
P10	09.05.22	AMENDED MASTERPLAN	POF
P09	25.01.22	AMENDED MASTERPLAN	KT
P08	01.12.20	AMENDED MASTERPLAN	NB
P07	06.11.20	SHERMANREED WOOD BASINS AMENDED	NB
P06	30.10.20	BASINS AMENDED	NB
P05	29.10.20	BASINS AMENDED	NB
P04	26.10.20	BASINS/DISCHARGE POINTS AMENDED	NB
P03	30.10.20	AMENDED MASTERPLAN	NB
P02	29.07.20	BASINS AMENDED	NB
P01	20.07.20	FIRST ISSUE	NB

Amendments

Project
DOWNLANDS FARM, UCKFIELD

Title
C5 - CONNECTION - LONG SECTION PLAN

Client
GLEESON LAND

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Drawing Status
PRELIMINARY

Designed by	NB	Checked by	RF
Drawn by	TK	Date	JULY 2020
Scales @ A1 work to figured dimensions only	AS SHOWN		

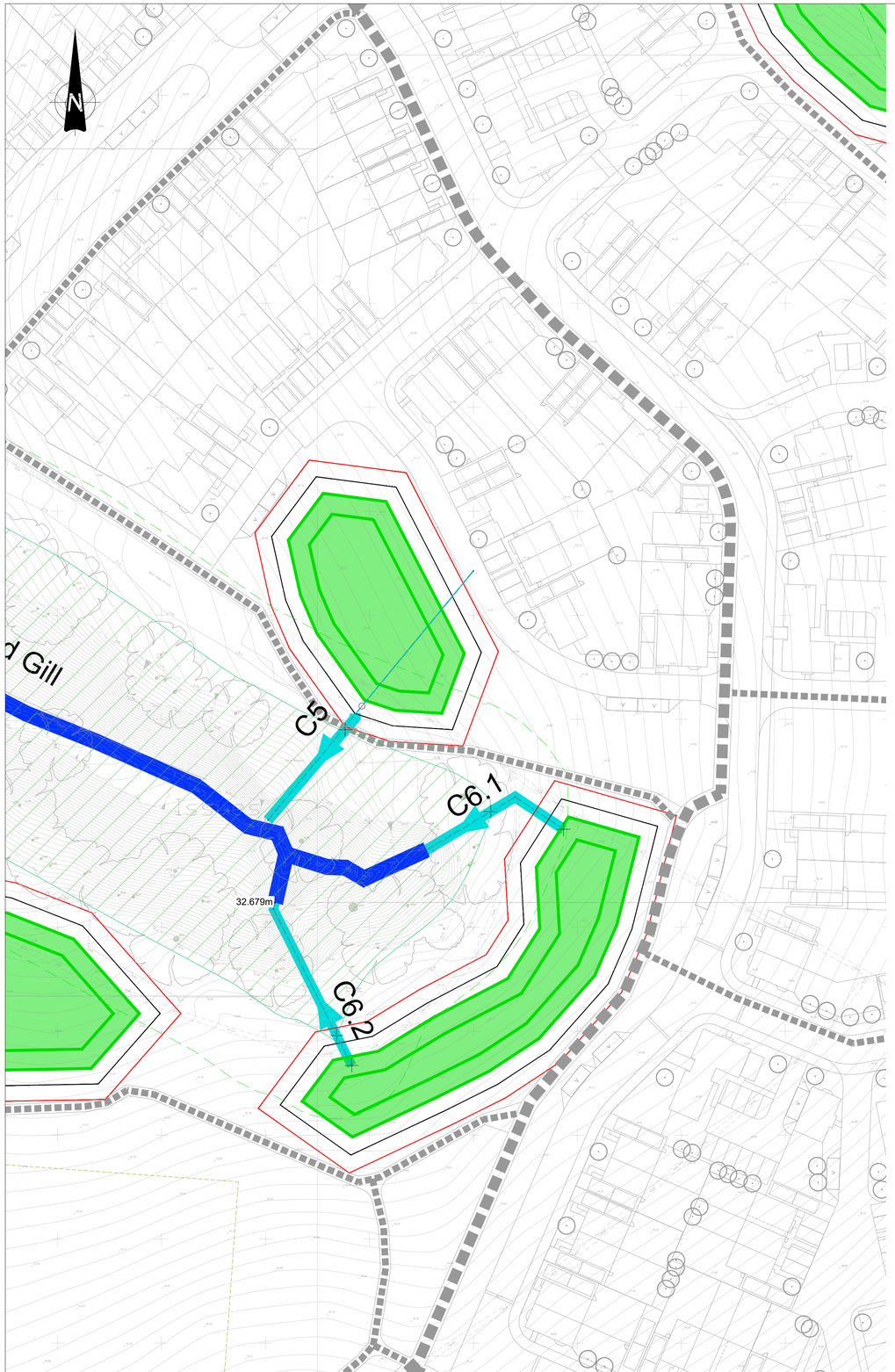
Project No
WIE16835

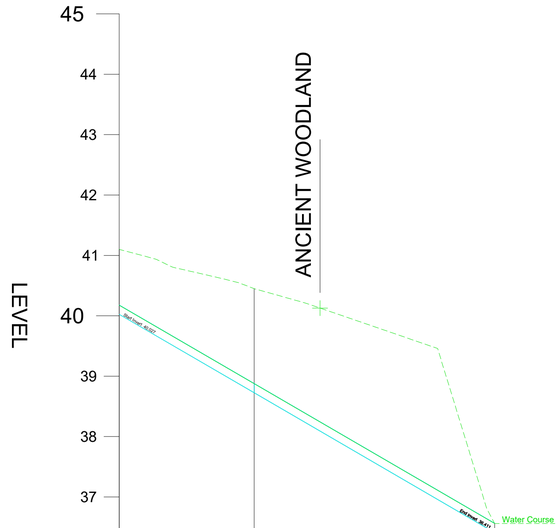
Computer File No
16835-WIE-ZZ-XX-DR-92002.dwg

Publisher	Zone	Category	Number	Revision
WIE	ZZ	92	001	P14

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1:1 0 10 20 30 40 50 60 70 80 90 100

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CHAINAGE	2.500	5.000	7.500	10.000	12.500	15.000	17.500	20.000	22.500	25.000	27.500	30.000
EXISTING LEVELS	40.967	40.778	40.664	40.539	40.375	40.235	40.068	39.896	39.725	39.553	38.721	37.093

C6.1 - LONGSECTION
SCALE: H 1:100,V 1:20. : 35.000

GENERAL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEER'S, ARCHITECT'S OR OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
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KEY

- SITE BOUNDARY
- ANCIENT WOODLAND WITH 15M BUFFER
- WATERCOURSE
- SURFACE WATER (SW) CONNECTION

DETENTION BASIN

- FLOOD ZONE 3
- EARTHWORKS EXTENT (ASSUMED)
- MAINTENANCE BUFFER (3m)

PLAN

Rev	Date	Description	By
P14	22.09.23	ISSUED FOR APPEAL	TK
P13	11.09.23	FOR POE	TK
P12	12.10.22	CONTOURS ADDED	BM
P11	25.05.22	INCLUDED DIRECTIONAL DRILLING SECTIONS	POF
P10	09.05.22	AMENDED MASTERPLAN	POF
P09	25.01.22	AMENDED MASTERPLAN	KT
P08	01.12.20	AMENDED MASTERPLAN	NB
P07	06.11.20	SHERMANREED WOOD BASINS AMENDED	NB
P06	30.10.20	BASINS AMENDED	NB
P05	29.10.20	BASINS AMENDED	NB
P04	26.10.20	BASINS/DISCHARGE POINTS AMENDED	NB
P03	30.10.20	AMENDED MASTERPLAN	NB
P02	29.07.20	BASINS AMENDED	NB
P01	20.07.20	FIRST ISSUE	NB

Amendments

Project
DOWNLANDS FARM, UCKFIELD

Title
C6.1 - CONNECTION - LONG SECTION PLAN

Client
GLEESON LAND

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Drawing Status
PRELIMINARY

Designed by	NB	Checked by	RF
Drawn by	TK	Date	JULY 2020
Scales @ A1 work to figured dimensions only	AS SHOWN		

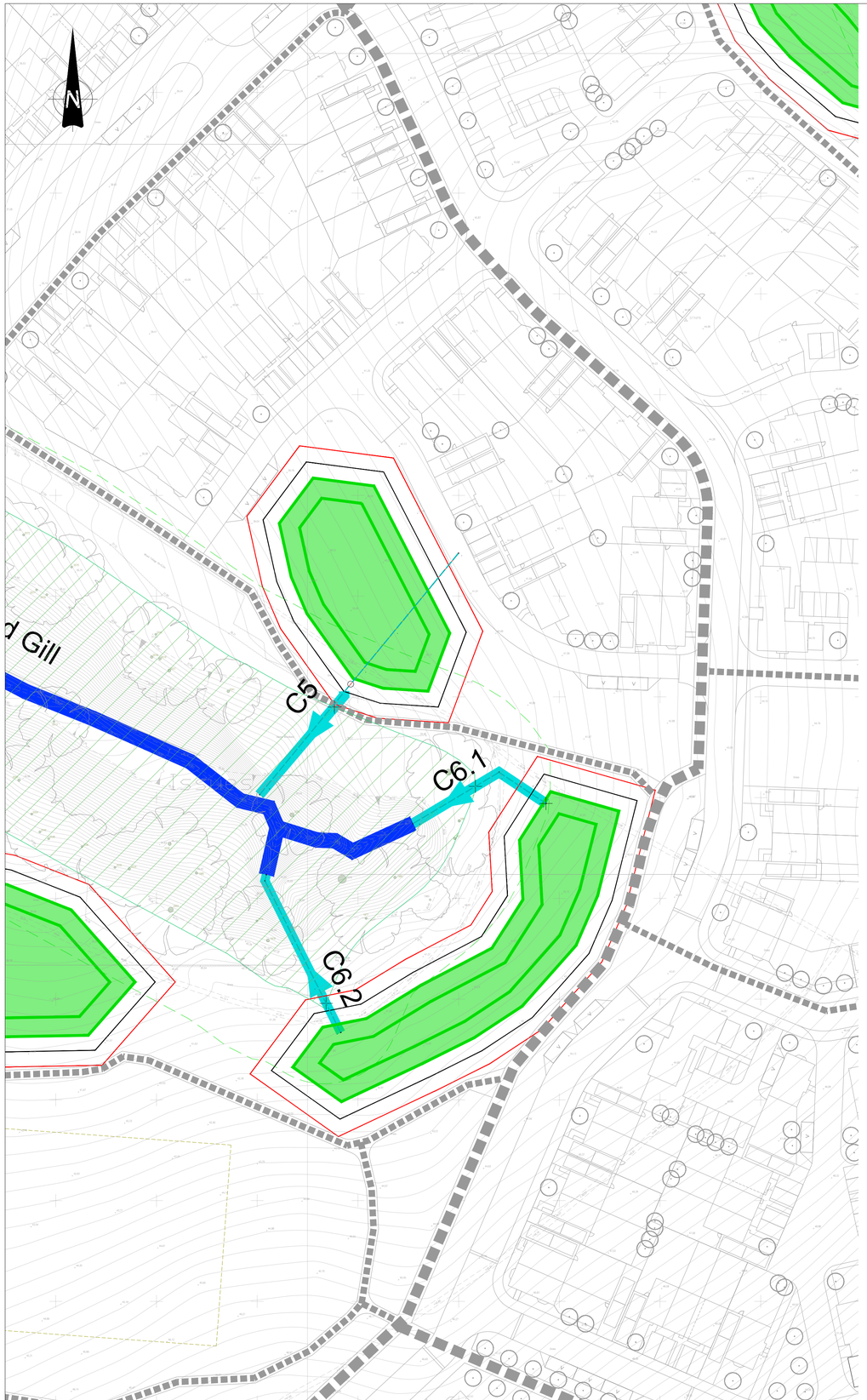
Project No
WIE16835

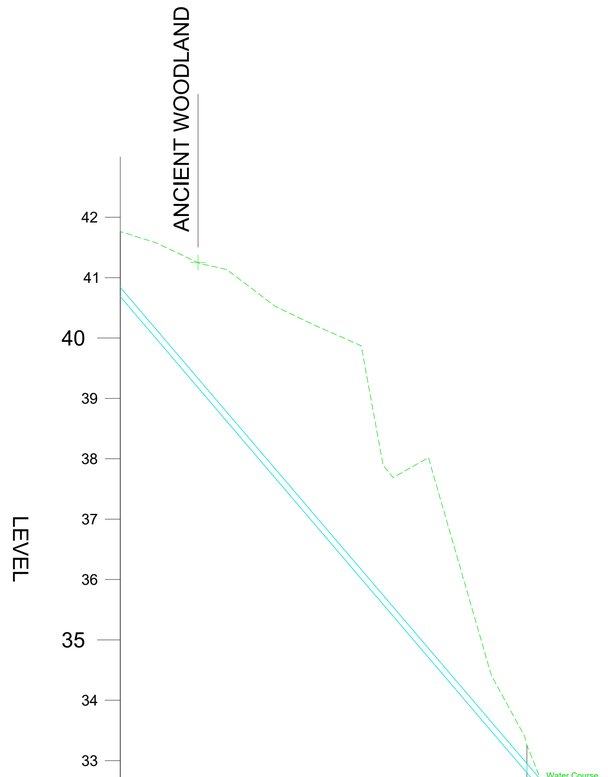
Computer File No
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Publisher	Zone	Category	Number	Revision
WIE	ZZ	92	001	P14

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CHAINAGE	2.500	5.000	7.500	10.000	12.500	15.000	17.500	20.000	22.500	25.000	27.500	30.000	32.500
EXISTING LEVELS	41.606	41.385	41.193	40.955	40.575	40.317	40.089	39.821	37.712	37.960	36.649	34.919	33.766

C6.2 - LONGSECTION
SCALE: H 1:100,V 1:20. : 30.000

GENERAL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEER'S, ARCHITECT'S OR OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
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KEY

- SITE BOUNDARY
- ANCIENT WOODLAND WITH 15M BUFFER
- WATERCOURSE
- SURFACE WATER (SW) CONNECTION

DETENTION BASIN

- FLOOD ZONE 3
- EARTHWORKS EXTENT (ASSUMED)
- MAINTENANCE BUFFER (3m)

PLAN

Rev	Date	Description	By
P14	22.09.23	ISSUED FOR APPEAL	TK
P13	11.09.23	FOR POE	TK
P12	12.10.22	CONTOURS ADDED	BM
P11	25.05.22	INCLUDED DIRECTIONAL DRILLING SECTIONS	POF
P10	09.05.22	AMENDED MASTERPLAN	POF
P09	25.01.22	AMENDED MASTERPLAN	KT
P08	01.12.20	AMENDED MASTERPLAN	NB
P07	06.11.20	SHERMANREED WOOD BASINS AMENDED	NB
P06	30.10.20	BASINS AMENDED	NB
P05	29.10.20	BASINS AMENDED	NB
P04	26.10.20	BASINS/DISCHARGE POINTS AMENDED	NB
P03	30.10.20	AMENDED MASTERPLAN	NB
P02	29.07.20	BASINS AMENDED	NB
P01	20.07.20	FIRST ISSUE	NB

Amendments

Project
DOWNLANDS FARM, UCKFIELD

Title
C6.2 - CONNECTION - LONG SECTION PLAN

Client
GLEESON LAND

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Pickfords Wharf Clink Street London SE1 9DG
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Drawing Status
PRELIMINARY

Designed by	NB	Checked by	RF
Drawn by	TK	Date	JULY 2020
Scales @ A1 work to figured dimensions only	AS SHOWN		

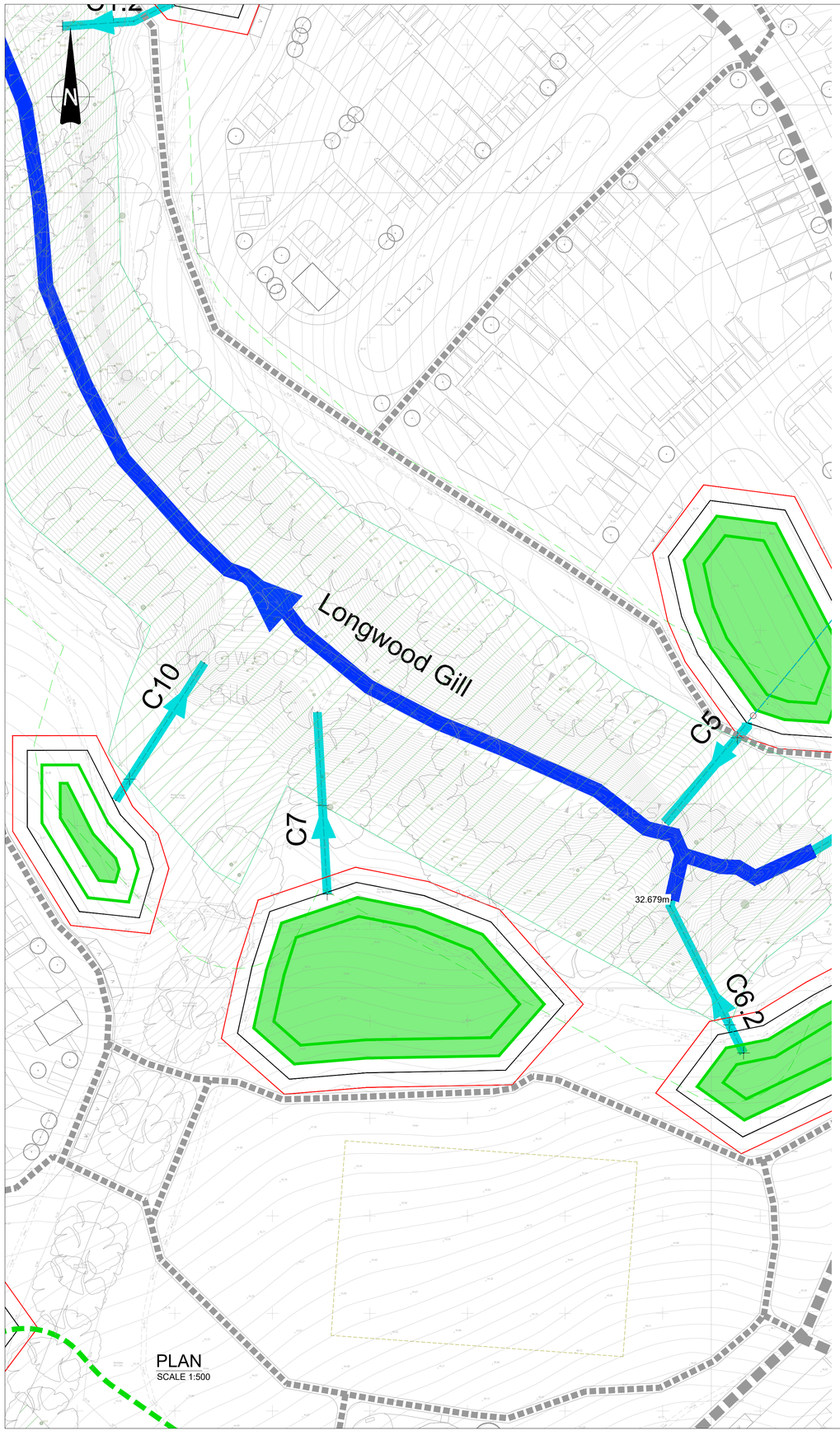
Project No WIE16835
Computer File No 16835-WIE-ZZ-XX-DR-92002.dwg

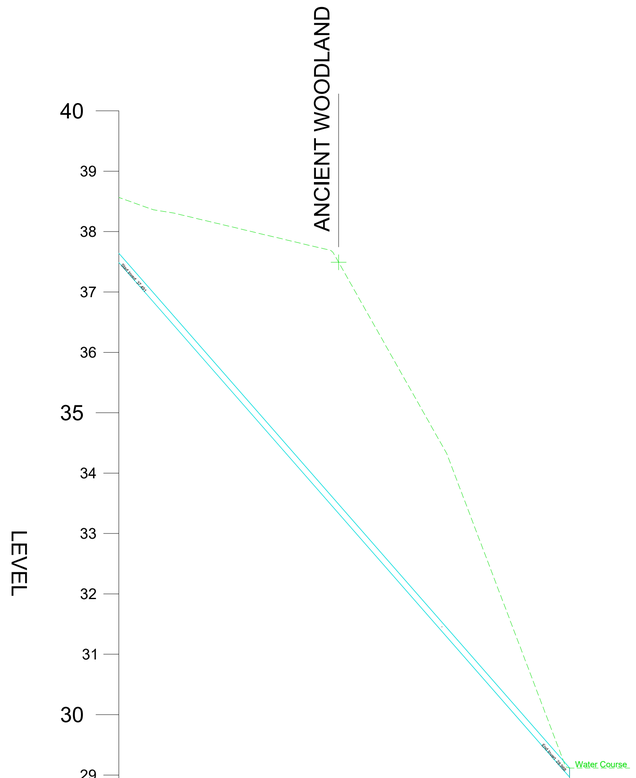
Publisher	Zone	Category	Number	Revision
WIE	ZZ	92	001	P14

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1:1 0 10 20 30 40 50 60 70 80 90 100

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1309_Downlands Farm_Masterplan Drawings_280422, 16835-WIE-ZZ-XX-M-D1-92001, A1-Wat-S, topo





CHAINAGE	2.500	5.000	7.500	10.000	12.500	15.000	17.500	20.000	22.500	25.000	27.500	30.000	32.500	35.000
EXISTING LEVELS	38.387	38.286	38.167	38.048	37.929	37.810	37.691	36.856	35.971	35.086	34.142	32.825	31.509	30.192

C7 - LONGSECTION
SCALE: H 1:100,V 1:20. : 25.000

0 20m 40m 60m 80m 100m 120m 140m 160m 180m 200m
1:1 0 10 20 30 40 50 60 70 80 90 100

GENERAL NOTES

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KEY

- SITE BOUNDARY
- ANCIENT WOODLAND WITH 15M BUFFER
- WATERCOURSE
- SURFACE WATER (SW) CONNECTION

DETENTION BASIN

- FLOOD ZONE 3
- EARTHWORKS EXTENT (ASSUMED)
- MAINTENANCE BUFFER (3m)

PLAN

Rev	Date	Description	By
P14	22.09.23	ISSUED FOR APPEAL	TK
P13	11.09.23	FOR POE	TK
P12	12.10.22	CONTOURS ADDED	BM
P11	25.05.22	INCLUDED DIRECTIONAL DRILLING SECTIONS	POF
P10	09.05.22	AMENDED MASTERPLAN	POF
P09	25.01.22	AMENDED MASTERPLAN	KT
P08	01.12.20	AMENDED MASTERPLAN	NB
P07	06.11.20	SHERMANREED WOOD BASINS AMENDED	NB
P06	30.10.20	BASINS AMENDED	NB
P05	29.10.20	BASINS AMENDED	NB
P04	26.10.20	BASINS/DISCHARGE POINTS AMENDED	NB
P03	30.10.20	AMENDED MASTERPLAN	NB
P02	29.07.20	BASINS AMENDED	NB
P01	20.07.20	FIRST ISSUE	NB

Amendments

Project
DOWNLANDS FARM, UCKFIELD

Title
C7 - CONNECTION - LONG SECTION PLAN

Client
GLEESON LAND

waterman
Pickfords Wharf Clink Street London SE1 9DG
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mail@watermangroup.com www.watermangroup.com

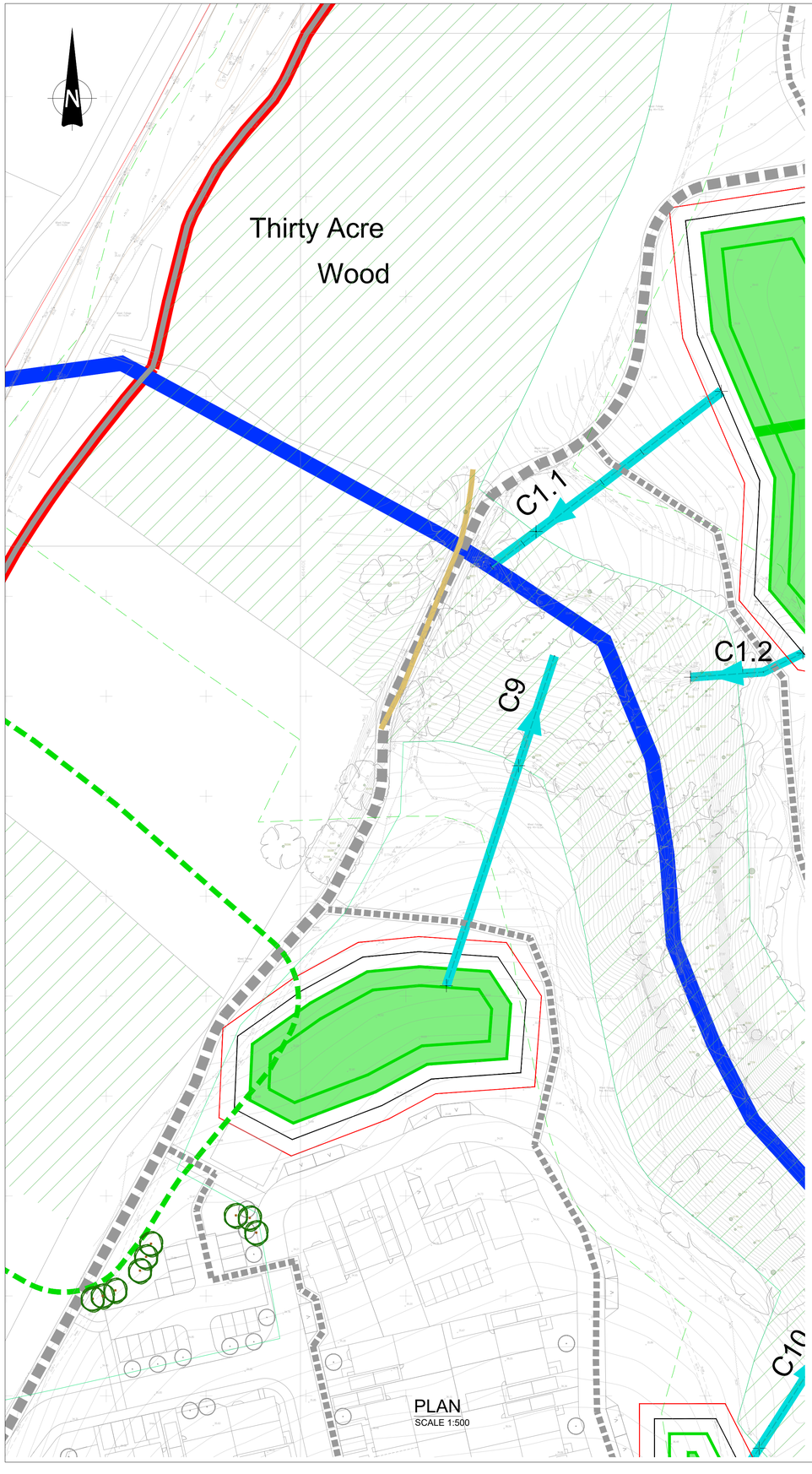
Drawing Status
PRELIMINARY

Designed by	NB	Checked by	RF	Project No	WIE16835
Drawn by	TK	Date	JULY 2020		
Scales @ A1 work to figured dimensions only	AS SHOWN			Computer File No	16835-WIE-ZZ-XX-DR-92002.dwg

Publisher	Zone	Category	Number	Revision
WIE	ZZ	92	001	P14

File Path: \\waterman-consulting.com\dfs\UKS_WIE\Projects\WIE16835\001_CAD\Drawings\

1309_Downlands Farm_Masterplan Drawings_280422, 16835-WIE-ZZ-XX-M-D1-92001, A1-Wat-S, topo





CHAINAGE	2.500	5.000	7.500	10.000	12.500	15.000	17.500	20.000	22.500	25.000	27.500	30.000	32.500	35.000	37.500	40.000	42.500	45.000	47.500	50.000	52.500	55.000	57.500	60.000	62.500	65.000	67.500
EXISTING LEVELS	32.161	31.995	31.828	31.661	31.493	31.321	31.150	30.971	30.793	30.614	30.440	30.319	30.349	30.302	29.966	29.629	29.242	28.777	28.279	27.677	27.076	26.376	25.740	25.104	24.610	24.237	23.880

C9 - LONGSECTION
SCALE: H 1:100,V 1:20. : 20.000

AS SHOWN 0 20m 40m 60m 80m 100m 120m 140m 160m 180m 200m
1:1 0 10 20 30 40 50 60 70 80 90 100

GENERAL NOTES

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KEY

- SITE BOUNDARY
- ANCIENT WOODLAND WITH 15M BUFFER
- WATERCOURSE
- SURFACE WATER (SW) CONNECTION

DETENTION BASIN

- FLOOD ZONE 3
- EARTHWORKS EXTENT (ASSUMED)
- MAINTENANCE BUFFER (3m)

PLAN
SCALE 1:500

Rev	Date	Description	By
P14	22.09.23	ISSUED FOR APPEAL	TK
P13	11.09.23	FOR POE	TK
P12	12.10.22	CONTOURS ADDED	BM
P11	25.05.22	INCLUDED DIRECTIONAL DRILLING SECTIONS	POF
P10	09.05.22	AMENDED MASTERPLAN	POF
P09	25.01.22	AMENDED MASTERPLAN	KT
P08	01.12.20	AMENDED MASTERPLAN	NB
P07	06.11.20	SHERMANREED WOOD BASINS AMENDED	NB
P06	30.10.20	BASINS AMENDED	NB
P05	29.10.20	BASINS AMENDED	NB
P04	26.10.20	BASINS/DISCHARGE POINTS AMENDED	NB
P03	30.10.20	AMENDED MASTERPLAN	NB
P02	29.07.20	BASINS AMENDED	NB
P01	20.07.20	FIRST ISSUE	NB

Amendments

Project
DOWNLANDS FARM, UCKFIELD

Title
C9 - CONNECTION - LONG SECTION PLAN

Client
GLEESON LAND

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Pickfords Wharf Clink Street London SE1 9DG
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mail@watermangroup.com www.watermangroup.com

Drawing Status
PRELIMINARY

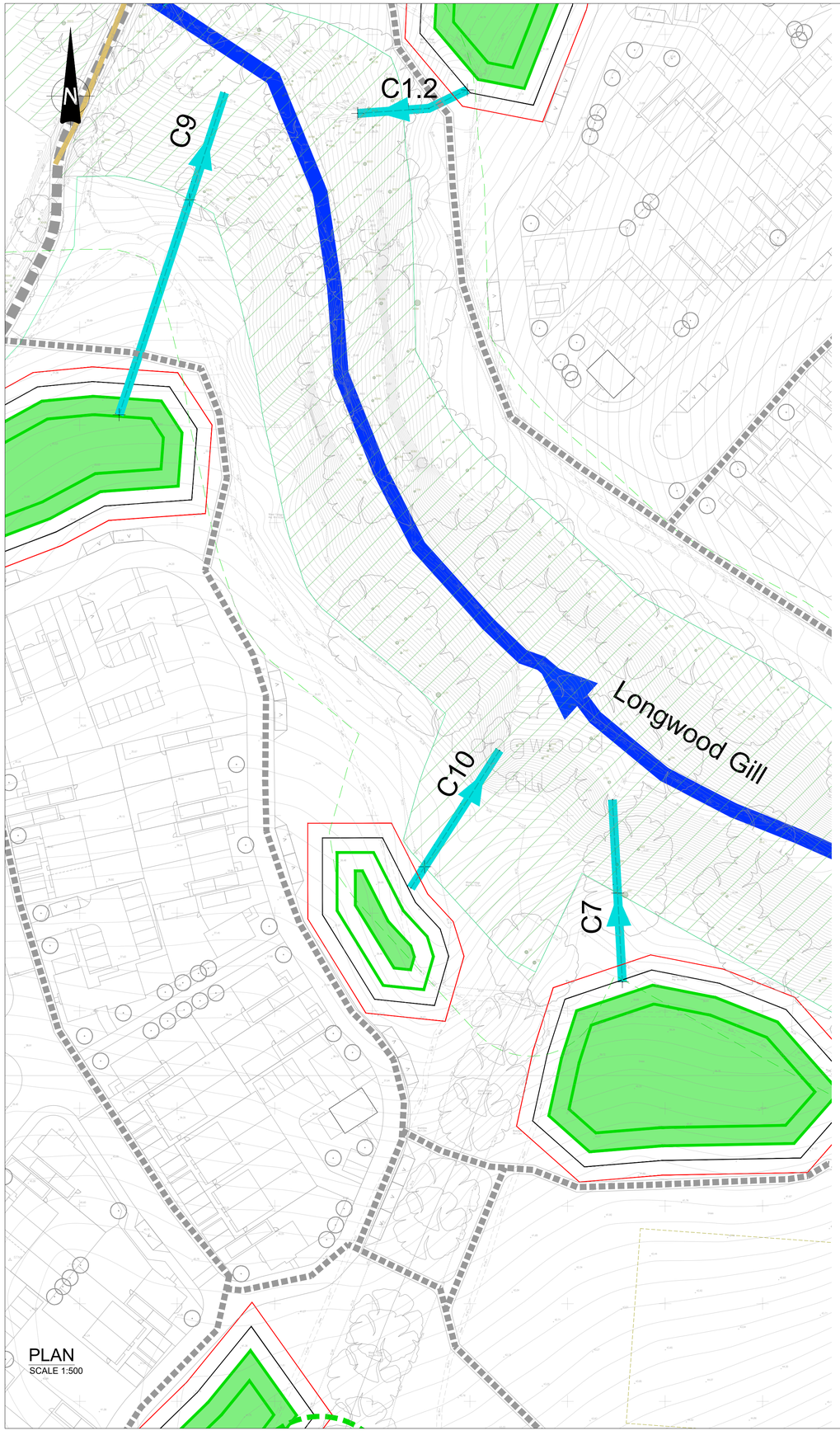
Designed by	NB	Checked by	RF
Drawn by	TK	Date	JULY 2020
Scales @ A1 work to figured dimensions only	AS SHOWN		

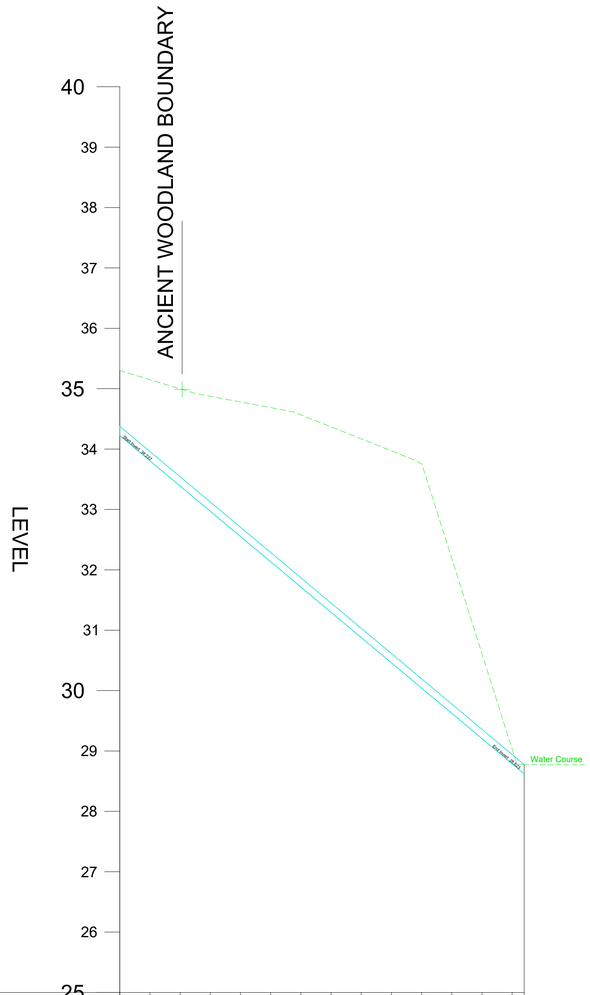
Project No: WIE16835
Computer File No: 16835-WIE-ZZ-XX-DR-92002.dwg

Publisher	Zone	Category	Number	Revision
WIE	ZZ	92	001	P14

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1309_Downlands Farm_Masterplan Drawings_280422, 16835-WIE-ZZ-XX-M-D1-92001, A1-Wat-S, topo





CHAINAGE	2.500	5.000	7.500	10.000	12.500	15.000	17.500	20.000	22.500	25.000	27.500	30.000	32.500
EXISTING LEVELS	35.149	34.997	34.873	34.780	34.686	34.567	34.368	34.169	33.970	33.752	32.186	30.609	29.031

C10 - LONGSECTION
SCALE: H 1:100,V 1:20. : 25.000

GENERAL NOTES

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KEY

- SITE BOUNDARY
- ANCIENT WOODLAND WITH 15M BUFFER
- WATERCOURSE
- SURFACE WATER (SW) CONNECTION

DETENTION BASIN

- FLOOD ZONE 3
- EARTHWORKS EXTENT (ASSUMED)
- MAINTENANCE BUFFER (3m)

PLAN
SCALE 1:500

AS SHOWN 0 20m 40m 60m 80m 100m 120m 140m 160m 180m 200m
1:1 0 10 20 30 40 50 60 70 80 90 100

Rev	Date	Description	By
P14	22.09.23	ISSUED FOR APPEAL	TK
P13	11.09.23	FOR POE	TK
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P08	01.12.20	AMENDED MASTERPLAN	NB
P07	06.11.20	SHERMANREED WOOD BASINS AMENDED	NB
P06	30.10.20	BASINS AMENDED	NB
P05	29.10.20	BASINS AMENDED	NB
P04	26.10.20	BASINS/DISCHARGE POINTS AMENDED	NB
P03	30.10.20	AMENDED MASTERPLAN	NB
P02	29.07.20	BASINS AMENDED	NB
P01	20.07.20	FIRST ISSUE	NB

Amendments

Project
DOWNLANDS FARM, UCKFIELD

Title
C10 - CONNECTION - LONG SECTION PLAN

Client
GLEESON LAND

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t 020 7928 7888
mail@watermangroup.com www.watermangroup.com

Drawing Status
PRELIMINARY

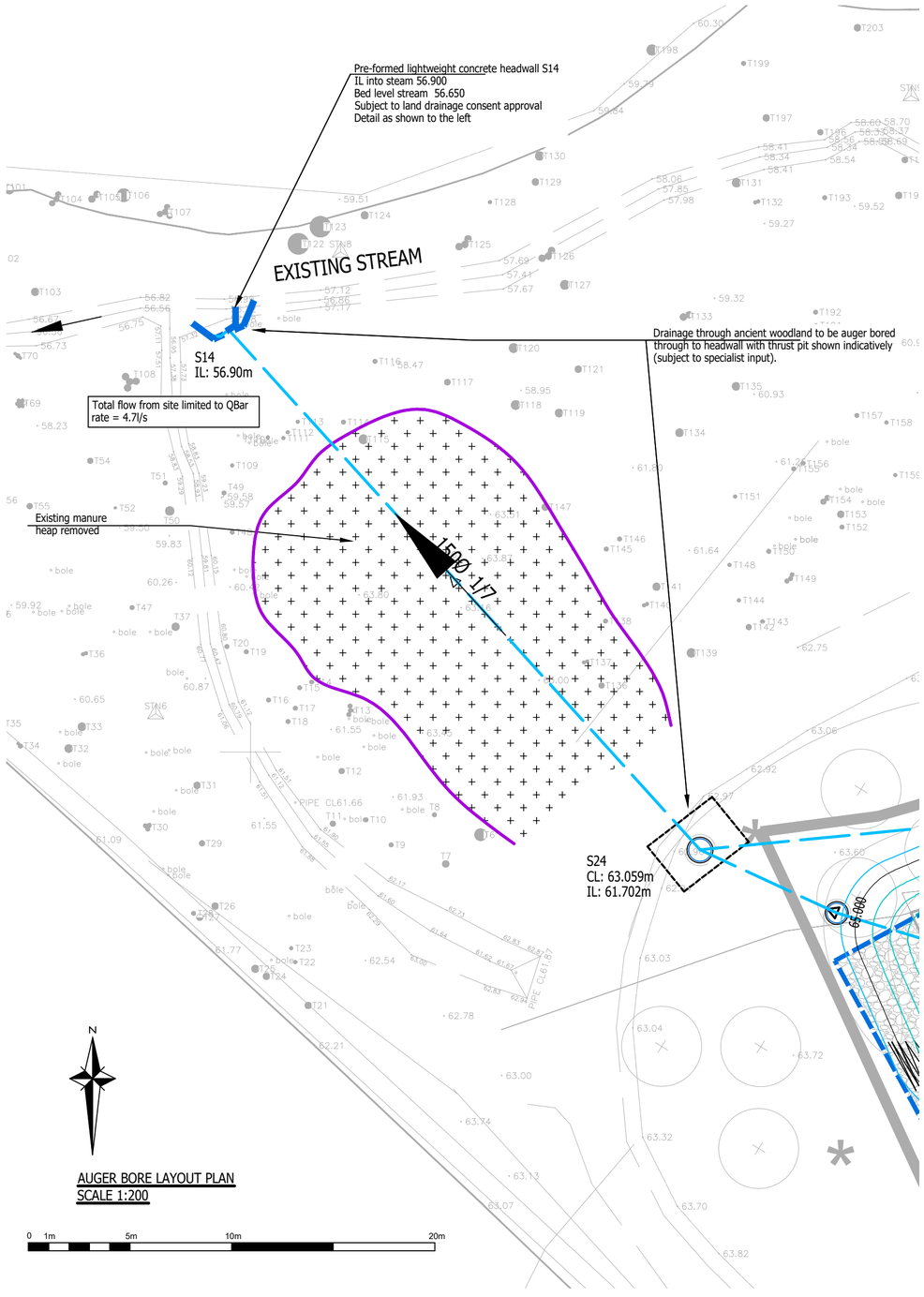
Designed by	NB	Checked by	RF	Project No
Drawn by	TK	Date	JULY 2020	WIE16835
Scales @ A1 work to figured dimensions only	AS SHOWN			Computer File No 16835-WIE-ZZ-XX-DR-60002.dwg

Publisher	Zone	Category	Number	Revision
WIE	ZZ	92	001	P14

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1309_Downlands Farm_Masterplan Drawings_280422, 16835-WIE-ZZ-XX-M-D1-92001, A1-Wat-S, topo

SITE OUTFALL OPTION 1: AUGER BORE
OUTFALL TO EXISTING STREAM TO BE ACHIEVED BY AUGER BORING BENEATH THE ANCIENT WOODLAND.



AUGER BORE LAYOUT PLAN
SCALE 1:200

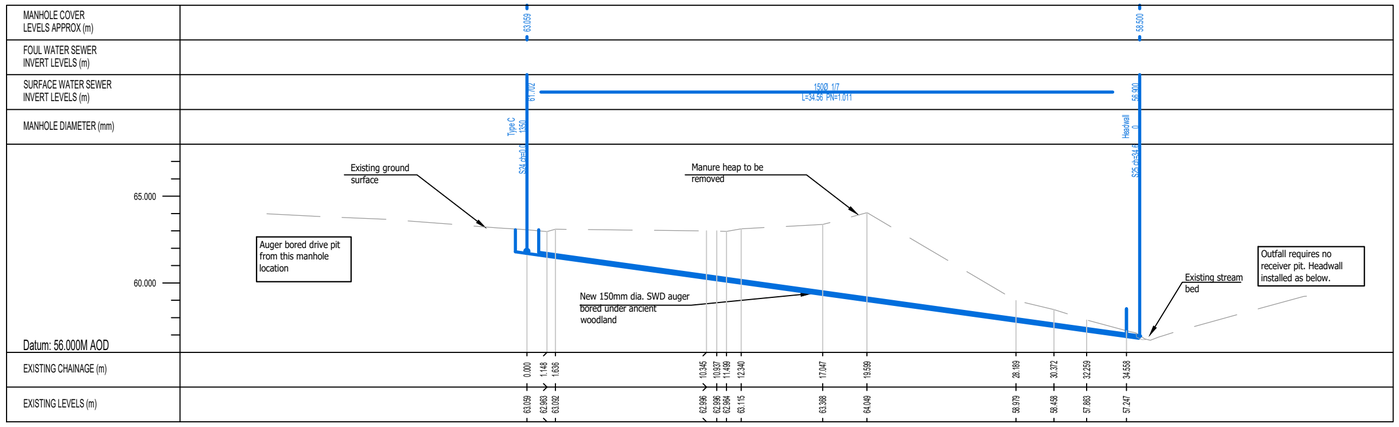
DESIGN NOTES

1. FLOW RATE FROM SITE SHALL BE LIMITED TO GREENFIELD QBAR. ATTENUATION TO BE PROVIDED VIA AN ATTENUATION POND AND BLANKET, AND ADDITIONAL STORAGE TANK.

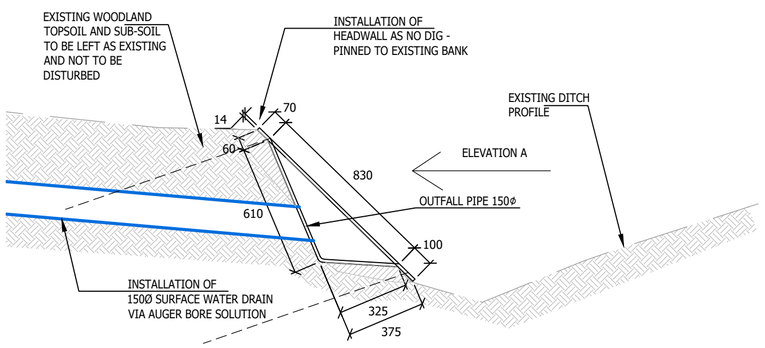
2. THE PROVISION OF PERMEABLE PAVING, FILTER DRAINS, AND THE POND, WILL PROVIDE UPSTREAM TREATMENT IN LINE WITH CIRIA GUIDELINES.

3. NO RECEIVER PIT IS REQUIRED FOR THE AUGER BORE. REFERENCE SHOULD BE MADE TO THE GUIDED AUGER BORING METHOD STATEMENT BY CHILTERN THRUST BORE, MARCH 2022, FOR FURTHER INFORMATION.

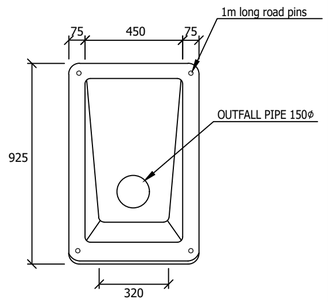
4. PREFABRICATED HEADWALL TO BE PLACED AT THE END OF THE AUGER BORE ROUTE WITH MINIMAL IMPACT ON THE EXISTING CONDITION.



SECTION THROUGH AUGER BORE
SCALE 1:250 (H)
1:50 (V)



PRE-FABRICATED OUTFALL HEADWALL DETAIL
SCALE 1:20



ELEVATION A

GENERAL NOTES

1. The location, size, depth and identification of existing services that may be shown or referred to on this drawing have been assessed from non intrusive observations , record drawings or the like. The contractor shall safely carry out intrusive investigations, trial holes or soundings prior to commencing work to satisfy himself that it is safe to proceed and that the assessments are accurate. any discrepancies shall be notified to gta prior to works commencing.

2. Tender or billing drawings shall not be used for construction or the ordering of materials.

3. Do not scale. All dimensions and levels to be site confirmed.

4. This drawing shall be read in conjunction with all relevant architects, consultants drawings and specifications, together with H&S plan requirements

5. Copyright : This drawing must not be copied, amended nor reproduced without the prior written agreement of gta.

6. All drawings specifications and recommendations made by gta are subject to Local Authority and other relevant Statutory Authorities approval. Any works or services made abortive due to the client proceeding prior to these approvals is considered wholly at the Clients risk. gta hold no responsibility for resulting abortive works or costs.

Rev	Amendments	Date	Dsn	Chk
P4	Further detail added to outfall headwall detail	14.06.22	FVV	MR
P3	Updated to latest layout	18.05.22	FVV	MR
P2	DESIGN NOTES ADDED	10.03.22	FVV	MR
P1	INITIAL ISSUE	08.03.22	FVV	MR

Status: PLANNING

Client: WHITEHALL HOMES

Architect: OMEGA

Project: CLEARVIEW FARM HORAM

Title: AUGER BORE OUTFALL DETAILS

Date: MARCH 2022
Scale @ A2: AS SHOWN
Clients Ref.:
Project Ref.: 11005

gta Civils & Transport
Gloucester House, 66a Church Walk,
Burgess Hill, West Sussex, RH15 9AS
Tel.01444 871444 Web: www.gtacivils.co.uk

Drawing Number: 11005/110
Rev.: P4

Appendix PJ7 – Industry Erosion Control Option

CI/SfB
(11.1) (11.3)
Common Arrangement R12

Uniclass
D1372/L141

Landlok®



Bio-degradable Erosion Control

Geosynthetics

Landlok®

Bio-degradable Erosion Control







Geosynthetics Limited offers a complete range of degradable Erosion Control Blankets (ECB) and non-degradable Turf Reinforcement Mats (TRM) designed to handle almost any storm water, drainage or erosion prevention application.



Natures answer

The Landlok® range of products control erosion, minimise sediment run-off and crucially; encourage the growth of vegetation. While hard armour such as rock riprap or concrete can be used, its widespread use is costly, unattractive and often unnecessary.

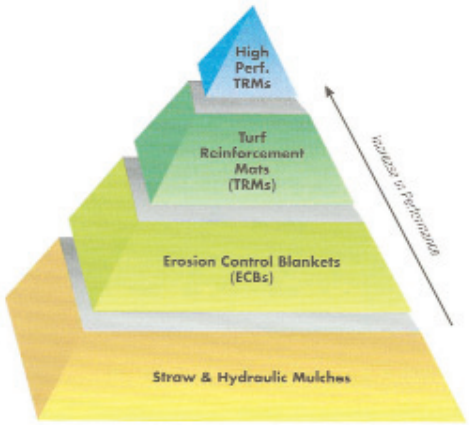
Using Landlok® and its ability to promote vegetation gives you distinct advantages for channel and slope protection.

Advantages:

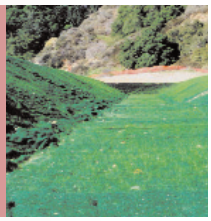
- Captures 700% more sediment than channels lined with hard armour.
- Gives an environmentally friendly solution.
- More attractive, natural appearance.
- Highly effective protection from the effects of wind and rain.

Erosion Control Blankets and Turf Reinforcement Mats facilitate the growth of vegetation by providing the necessary stability for plants to root and grow.

The Erosion Control Pyramid (below) shows how the Landlok® range can be applied to differing site needs.



Product function

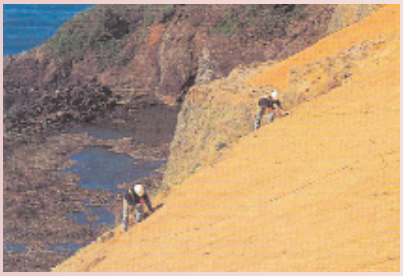




This channel bottom was reinforced with Landlok® TRM.



By promoting vegetation, designers can provide effective erosion protection in high flow channels, improve water quality, and maintain a more natural appearance.



Landlok® ECB helps protect a newly sealed slope.

Storm water management

Erosion prevention –
the most cost-effective solution.

SI Geosolutions' industry leading Landlok® family of products prevent erosion before it occurs. Protecting and promoting the growth of vegetation, they prevent soil from washing away and capture sediment.

Erosion control blankets (ECB)

Channel and Slope Protection

ECB's act as dimensionally stable reinforced mulches to hold seed and soil in place, and degrade over time as vegetation becomes established. Available in a variety of organic and synthetic compositions including straw, coconut and polypropylene, you can choose from a wide range of ECB's to give you the optimal performance and longevity for any project.

Manufactured from re-processed agricultural straw and /or coconut fibres, Landlok® ECB's give you the advantage of reducing disposal costs and waste into landfills. Protecting emerging seedlings and accelerating vegetative development, they gradually decompose, resulting in secure vegetation and providing long-term erosion protection.

Geosynthetics Ltd is a leading dis

Please call
01455 617 139
or email sales@geosyn.co.uk
for further information.

Wide product range

Large stock holding

Next day delivery



Landlok® TRM's are ideal for providing protection and vegetation reinforcement on steep slopes.

Turf reinforcement mats (TRM)

Unlike ECB's, Landlok® TRM's are non-degradable and when vegetated, will provide twice the erosion protection of vegetation alone. Effective from the moment they are installed, they provide immediate erosion protection, vegetative reinforcement and long-term erosion resistance.

Composed solely of synthetic materials, and featuring fibres containing recycled polypropylene, our green coloured TRM's give you superior performance and water-cleansing capabilities. As the preferred alternative to concrete and riprap, TRM's in lining systems for open channels, drainage ditches and steep slopes, give excellent long-term protection and reduce maintenance.



Pyramat® HPTRM reinforces vegetation and forms a safe and attractive permanent protection system around this pipe outlet.

High performance turf reinforcement mats (HPTRM)

For demanding applications such as extreme slopes, wrapped-face slopes, pipe inlets and high-flow channels, the three-dimensional characteristics of Pyramat® are an outstanding alternative to hard armour.

More than ten times stronger than TRM's, highly durable Pyramat® HPTRM is the most effective way to enhance the performance of vegetation. What's more with it's availability in natural shades of tan and green it blends inconspicuously into the surrounding environment.



Tan coloured Pyramat® lines a channel running through a residential development in the Southwestern U.S. Reinforced concrete was originally specified for the project, but use of the HPTRM resulted in savings of approximately $1.2 million (U.S.)

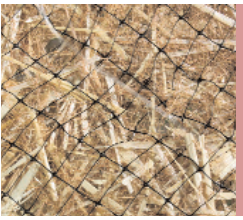
stributor of geosynthetic materials in the UK

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Geosynthetics



Product features

Erosion control blankets (ECB)

Channel and slope protection

- Protecting seed and soil while vegetation matures, then degrading over time as vegetation becomes established.
- Improving water quality by promoting the growth of vegetation and filtering sediment from storm water runoff.
- Providing a cost-effective and aesthetically pleasing way to protect against erosion.

Turf reinforcement mats (TRM)

High flow channels and steep slopes

- Landlok® TRM's are designed for durability and stabilised against ultraviolet degradation.
- Permanently reinforce mature vegetation by anchoring the root structure - providing twice the erosion protection of vegetation alone.
- Help to reduce costs - typically between 33 to 50% of the price of traditional hard armour systems, such as rock riprap.

High performance turf reinforcement mats (HPTRM)

Heavy flow channels and extremely steep slopes.

- Ten times stronger than traditional TRM's for the ultimate in permanent erosion protection.
- Three times the ultraviolet (UV) protection of conventional TRM's to withstand the most inhospitable climates.
- Ideal for arid environments or sites where limited vegetation growth is expected.
- Provides exceptional erosion protection from storm water runoff for pipe inlets and outlets.

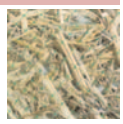
Geosynthetics Ltd is committed to offering the best solutions for soil stabilisation, erosion control, drainage and environmental protection problems.

Well trained staff are always available to discuss which materials are best suited to any particular application.

Technical specification



Erosion control blankets (ECB)

Product	Description	Application	Life Span	
Landlok S2	Composed of straw fibres stitch-bonded to two nets. Photodegradable netting on top and bottom.	Ideal for low-flow channels and moderate slopes.	One year	
Landlok CS2	A blend of straw and slowly degrading coconut fibre, stitch-bonded to two nets. Photodegradable netting on bottom and UV-stabilised on top.	Ideal for medium slopes.	Two years	
Landlok C2	100% coir fibre stitch-bonded to two nets. Photodegradable, UV-stabilised netting on top and bottom.	Ideal for steep slopes and moderate flow channels.	Three years	

Turf reinforcement mats (TRM)

Product	Description	Application	Life Span	
Landlok TRM 450	Permanent polypropylene, turf reinforcement mat manufactured from 100% synthetic materials using X3 TM fibre technology.	Areas requiring immediate protection, rapid vegetative establishment and outstanding long term erosion resistance. For example open channels, drainage ditches, detention basins and steep slopes.	Non-degradable	

High performance turf reinforcement mats (HPTRM)

Product	Description	Application	Life Span	
Pyramat High performance turf reinforcement mats	Three dimensional, lofty, woven polypropylene geotextile specially designed for erosion control applications.	Designed for the most demanding slope and storm water channel applications.	Non-degradable	

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Geosynthetics Limited

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Fax: 01455 617 140

Email: sales@geosyn.co.uk

Geosynthetics

Appendix PJ8 – Industry Pipeline Repair Maintenance Options



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Drain and pipe repairs



Drain renovation and pipe repair

For partially collapsed, worn out or damaged drains and sewer pipes, UKDN Waterflow's no-dig or trenchless technology is the most efficient and least intrusive solution.

It requires little or no excavation and works equally well for drainage under roads, railways, canals and rivers; residential, commercial or industrial buildings and open spaces.

What does that mean for you?

It is like replacing the pipe, but without all the fuss of excavation. Pipes are repaired by putting a new lining into the existing pipe. Without excavation or fuel-heavy apparatus, this no-dig

technology method is a quicker, greener and cleaner solution than traditional dig and replace methods. It is cost-effective too.

Why choose UKDN?

Whatever shape and size the pipe repair project, you can rely on UKDN Waterflow for the best renovation solution. We do full length linings and patch repairs, and we repair sewers and drains from 100 mm diameter up to 4000 mm diameter.

Want to know more UKDN Waterflow's no-dig solutions? Just call us on 0333 344 2937. Or fill in the contact form on this page.

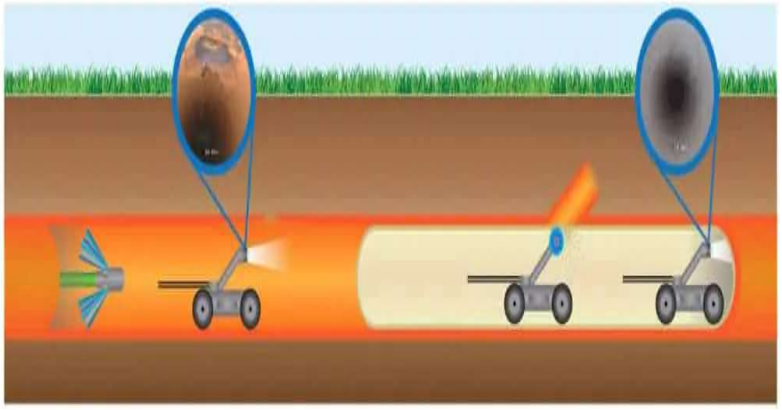
What is no-dig technology?

No-dig or trenchless technology is a way of repairing a pipe by installing a liner inside the damaged structure. The liner is then cured in place so that it creates a new pipe inside the old one. There are three main methods — UV cured GRP relining, ambient cure polyester resin and heat cured thermosetting resin — so we select the most appropriate one for your sewer fix. For very large diameter pipes we may also use other techniques including panel systems, segment panel systems and joint repairs.

How do we do it?

1. We use pan and tilt cameras and sonde tracing to establish the structural condition of the pipes and locate any damage
2. We clean the drains and sewers by high pressure jetting to avoid damaged areas being hidden by scale, debris or sludge
3. Finally, we repair and restore the defective drains or sections of the pipe using our advanced no-dig methods.

In addition to our sewer and drain repair service, we also upsize and install new pipelines using a range of specialist techniques such as auger boring, pipe jacking, pipe bursting, timber headings, microtunnelling, impact moling, shaft sinking and GRP segmental lining.



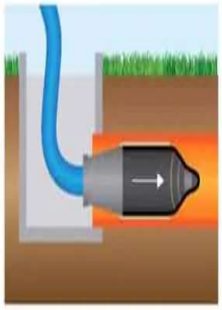
Stage 1
Clean drain with Jet Vac.

Stage 2
Use robotic CCTV unit to identify defects and record connections and junctions.

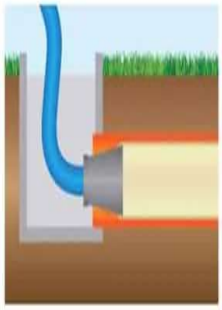
Stage 3
Install suitable resin impregnated liner material and commence curing procedure.

Stage 4
Reopen connections and junctions where required with robotic cutting unit.

Stage 5
Post robotic CCTV unit of installed liner in ensure installation is perfect.



Stage 3a - Patch liner location
Patch liner is wrapped around the inflatable packer to maneuvred into place.



Stage 3b - Patch liner inflation
Packer is inflated to diameter of pipe whilst resin cures in situ.

The experts

UKDN Waterflow is one of the UK's leading contractors for the trenchless repair of drains and sewers. We have pioneered new, innovative techniques when others have failed to deliver. That is why so many organisations rely on us for their wastewater infrastructure solutions.

Testimonials

"Had a couple of UKDN Waterflow guys turn up to carry out emergency works to my home, emailing to say how impressive these two guys were, hard work is putting it mild to be honest, they were superb, very polite and considerate and explained everything. They worked really hard all day, cannot fault any of their work, in fact, my friends could not believe where the work had been carried out, it was put back together so well. Excellent employees, credit to the company. Thank you so much for sending such terrific guys."

Mrs Allen

“Just a very quick note to pass on our sincere thanks for all of your efforts in putting right our recent issues with our mains underground drainage pipe. From the first contact right through to the actual completion of the job in hand, all matters were dealt with in a professional yet extremely friendly manner. In horrible conditions what with the weather and magnitude of the task in hand, the team always remained cheerful/friendly and at all times kept us updated as to what was going on and why, something which was really most appreciated along with the fact that the job came in on the quotation price and within the estimated time scales given. We cannot thank you all enough and going forward, it will be our absolute pleasure to recommend you all to both colleagues and friends alike.”

4th Bexleyheath Scout Group

Get in touch

We would love to tell you more about our drain renovation service. For advice about the best repair method for your drains and sewers, complete our contact form or call us now on 0333 344 2937

To learn more about relining process, take a look at our step by step guide below:

Request a call back

Your name

Your company

Your Address/ Site Address*

Your email

I need help with...

Your phone number

Details of enquiry*

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UKDN Waterflow Limited
17 Parkside Lane, Parkside Industrial Estate, Leeds,
LS11 5TD

Registered in England and Wales No:6241527

VAT No: 164 8378 73

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Get in touch

Complete the form below to request a call and our experts will ring you right back.

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Your company*

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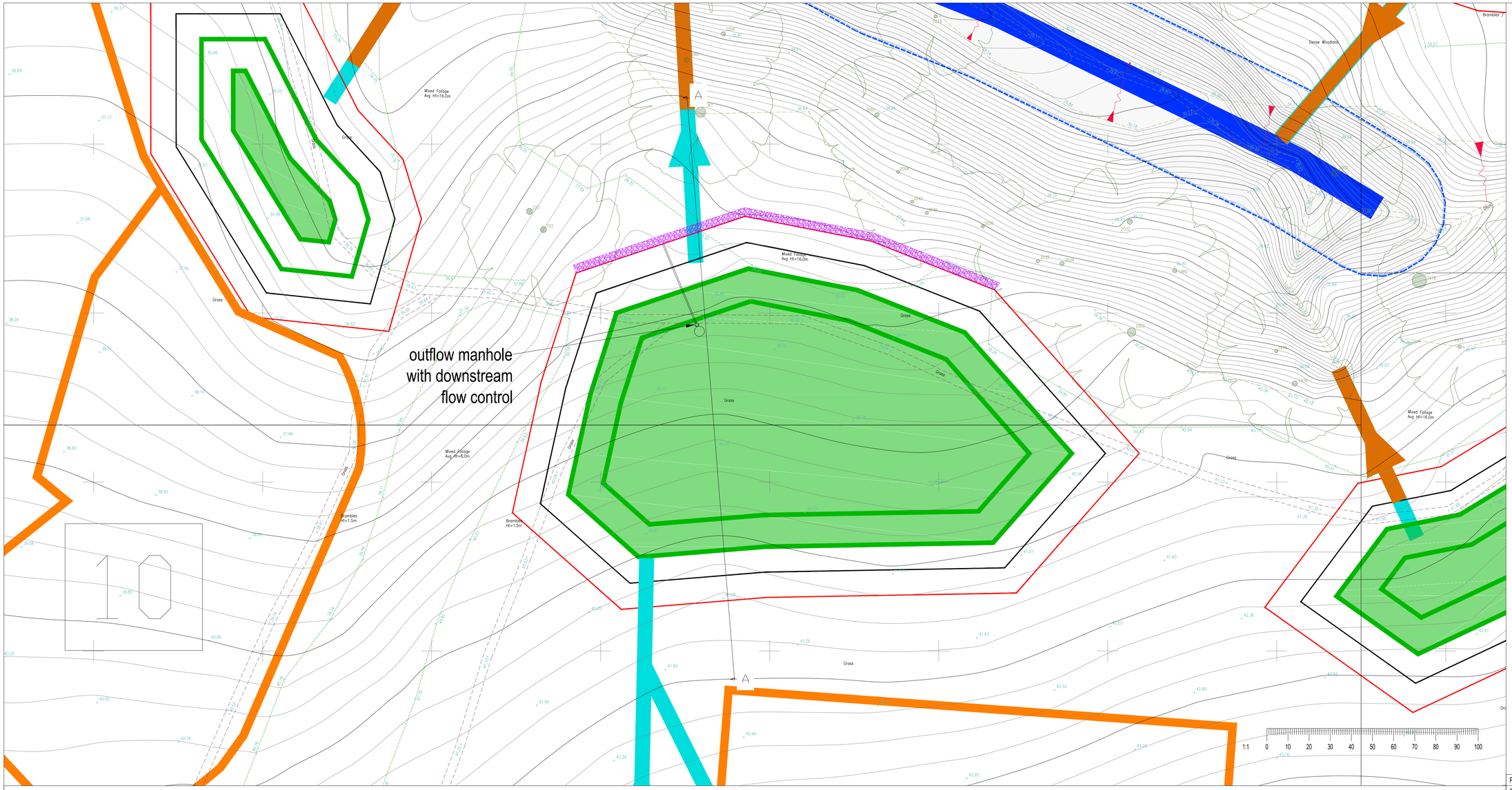
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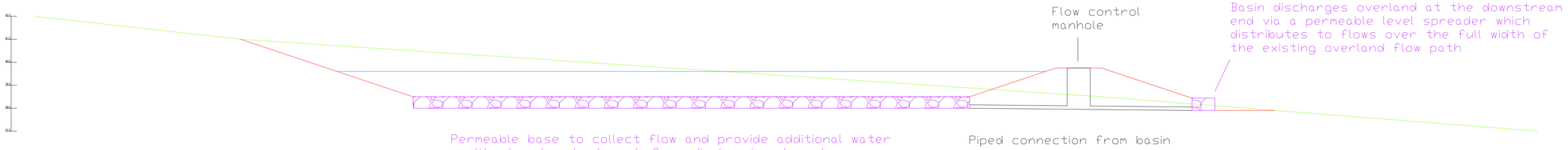
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Appendix PJ9 – Alternative Outfall Detail Option



SECTION A-A



KEY

- EXISTING GROUND LEVEL
- DESIGN WATER LEVEL
- GRAVEL (permeable)
- PROPOSED GROUND LEVEL

Rev	Date	Description	By	Chk
P02	26.09.23	TEXT ADDED FOR CLARITY	SW	RF
P01	05.09.23	ISSUED FOR DISCUSSION	SW	RF

Amendments

Project

DOWNLANDS FARM

Title

ALTERNATIVE BASIN
OUTFALL ARRANGEMENT

Client

GLEESON LAND

waterman

Pickfords Wharf, Clink Street, London SE1 9DG
+44 207 928 7888
mail@watermangroup.com www.watermangroup.com

Suitability			
WIP			S0
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SW	RF	onsultin	
Drawn By	Date	Scales @ A1	
SW	05/09/2023	varies	

Project - Originator - Volume - Level - Type - Role - Number	Revision
16835-WIE-ZZ-XX-DR-92003	P01

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