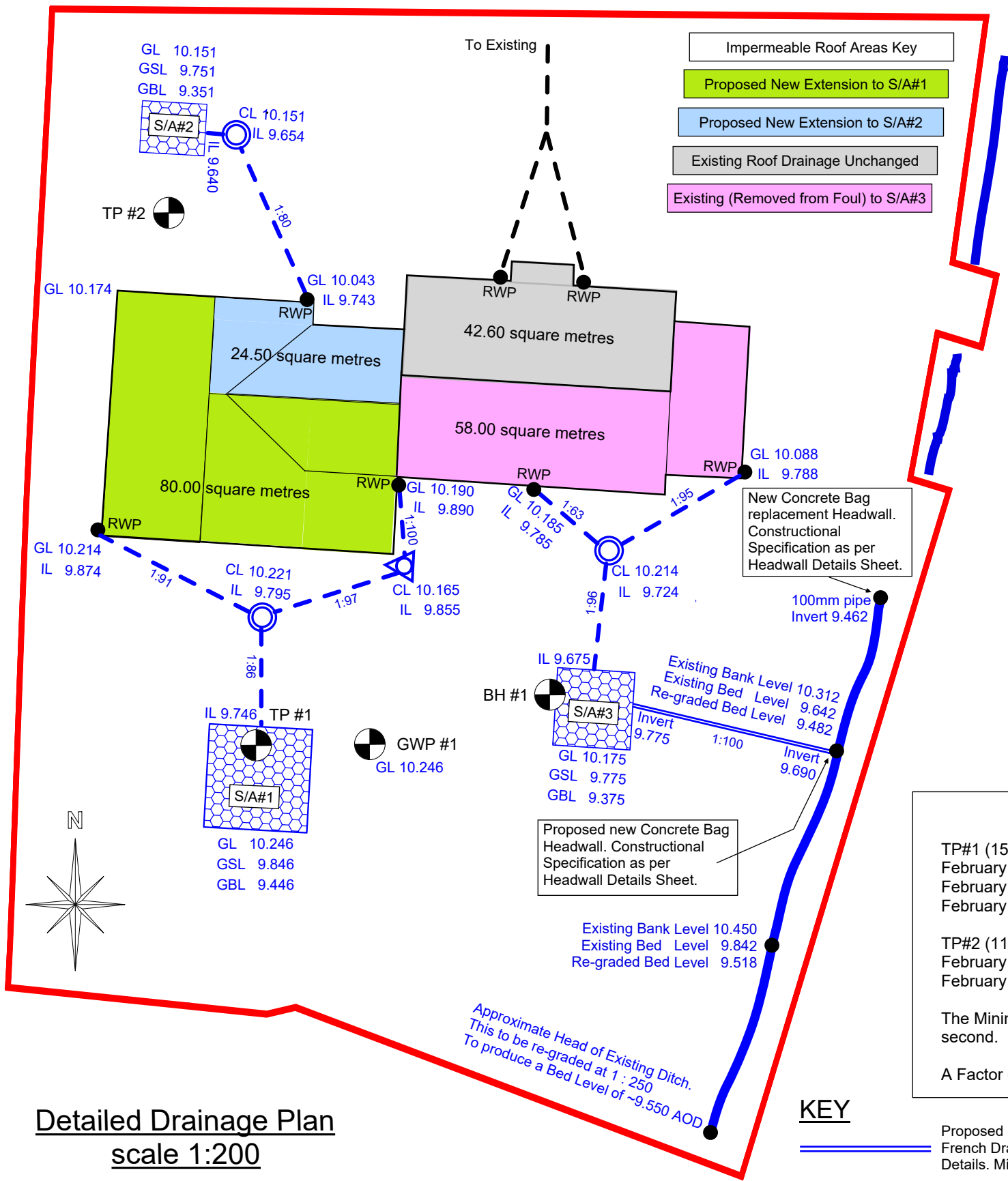




Detailed Drainage Plan
scale 1:200

NOTE
This drawing had been produced for discharge of planning conditions only. All levels and details to be checked for Building Regulations approval and construction purposes

KEY

- Proposed High Level Overflow French Drain. See Construction Details. Minimum fall of 1:100
- Proposed surface water drainage. 100mm diameter PVC pipe. Minimum fall of 1:100
- BH / TP Soil Infiltration Test Hole
- GWP Groundwater Monitoring Point
- Proposed silt trap inspection chamber
- Proposed 250mm diameter surface water inspection chamber. Orsma shallow IC or similar approved.
- + 5.999 All levels are to AOD unless otherwise stated

Surface Water Drainage Design Notes

As detailed from the British Geological Survey, the Superficial Geological ground conditions here indicates River Terrace Deposits of clay, silt and sand over Bedrock of London Clay. The London Clay was not encountered in either the Groundwater Monitoring BoreHole or the Percolation Test Test Pit / BoreHoles.

In early November 2019 a test BoreHole was augered to a depth of 1729mm (8.446 AOD) below ground level and groundwater was encountered at a depth of 1600mm bgl. An Open Head Piezometer (a slotted Groundwater Monitoring Pipe), GWP#1, was installed to this maximum depth at the approximate position of the proposed soakaway and groundwater was monitored on a weekly basis from early November 2019 to end March 2020. Monitoring also occurred in BoreHole BH#1 (deliberately left open and covered safe). During the monitoring period, groundwater peaked three times, once in late December 2019 at 870mm bgl in GWP#1, once in early February 2020 at 891mm bgl in GWP#1 and once in late February 2020 at 852mm bgl in BH#1. A highest level of groundwater of 852mm bgl ie 9.323 AOD was recorded in open BoreHole BH#1 on February 29th 2020. Note the Met Office (the national meteorological service for the UK) determined February 2020 as being the wettest, month of February, on record.

During site investigations it was found that drainage from the rear (south and east) roof went into the Foul possibly dating from when the property was built. It was deemed prudent to remove this flow from the Foul and include this roof area to drain into a separate new Infiltration Structure -- Soakaway with an agreed Storm Return Period of 10 years plus 40% climate change addition and a high level overflow connection into the adjacent eastern ditch.

The drainage design for the extension is based on percolation tests carried out in early to late February 2020 to BRE365 principles within a Test Pit at a depth of 910mm bgl. Additional percolation tests were performed in late February in a smaller Test Pit TP#2 to take the front roof area of the proposed new extension and BH#1 for the existing roof areas currently draining into the foul. The details of the Soil Infiltration Rates obtained are detailed in the table below. The Groundwater Monitoring exercise was indicating a maximum depth of ~900mm bgl, where, testing at this approximate depth, a minimum soil infiltration rate of 5.906 E-06 metres/second was obtained in Test Pit TP#1, to which a Factor of Safety of 2 has been applied, where the consequence of failure is "no damage / minor inconvenience".

S/A#1 is a 400mm deep rectangular geocellular soakaway having been designed, 4.00 metres long x 4.00 metres wide, which will be suitable to drain the side and rear roof areas of the proposed new extension of 80.0 square metres, without flooding above ground level on a 1 in 100 year rainfall return event plus 40% climate change addition.

S/A#2 is a 400mm deep rectangular geocellular soakaway having been designed, 2.50 metres long x 2.00 metres wide, which will be suitable to drain the front roof area of the proposed new extension of 24.5 square metres, without flooding above ground level on a 1 in 100 year rainfall return event plus 40% climate change addition.

S/A#3 is a second separate 400mm deep rectangular geocellular soakaway having been designed, 3.00 metres long x 3.00 metres wide, which will be suitable to drain the existing roof area (previously draining into the Foul) of 58.0 square metres, without surcharging the incoming drainage pipe on a 1 in 10 year rainfall return event plus 40% climate change addition. This structure to have a high level overflow, detailed as a French Drain, draining into the adjacent ditch on the eastern boundary of the property.

All three soakaways should be sited a minimum of 5 metres from any Public Sewer and a minimum of 5 metres from any habitable building to avoid any saturation of the ground and settlement affecting the building structure, and to be separated by a minimum of 5 metres from any other soakaway to exclude any interaction between the infiltrating soils.

The Ditch on the eastern boundary to be cleared of debris and graded as per the note in the French Drain Details.

The site investigation reveals the existing headwall of the culvert in the eastern ditch to be of poor quality so this is to be replaced by a new Concrete Bag Headwall as noted in the French Drain Details.

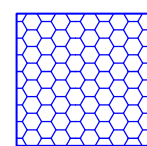
Winter Soil Infiltration Testing Results

TP#1 (1500m x 450mm x 910mm deep bgl)	BH#1 (160mm diameter x 880mm deep bgl)
February 8th 2020 -- 5.906 E-06 m/s	February 24th 2020 -- 1.413 E-05 m/s
February 11th 2020 -- 9.957 E-06 m/s	February 25th 2020 -- 1.207 E-05 m/s
February 12th 2020 -- 9.155 E-06 m/s	February 27th 2020 -- 1.019 E-05 m/s

TP#2 (1100mm x 350mm x 903mm deep bgl)
February 25th 2020 -- 8.601 E-06 m/s
February 27th 2020 -- 8.244 E-06 m/s

The Minimum Rate used in all the calculations was from the testpit TP#1 at 5.906 E-06 metres / second.

A Factor of Safety of 2.0 was used in the calculations for the design.



Proposed Geocellular Soakaways.
S/A#1 4.00 metres x 4.00 metres
S/A#2 2.50 metres x 2.00 metres
S/A#3 3.00 metres x 3.00 metres
Each of 400mm deep geocells.

- GL ##### Ground level at detailed items
- CL ##### Cover level of surface water chambers
- IL ##### Invert level of surface water items
- GSL ##### Soffit (top) level of Geocell structure
- GBL ##### Base level of Geocell structure
- BKL ##### Bank level of Ditch
- BDL ##### Bed level of Ditch

Mate GeoTechnic Services

Rev.	Description	Drn.	Date
04	Ditch / Headwall Details Updated	RC	06-6-20
03	French Drain Details Updated	RC	14-5-20
02	Final	RC	14-5-20
01	Original	RC	16-4-20

Project
Proposed Side Extension (west)
Cox's Farm
Lake Lane
Barnham PO22 0AJ

Client **Mr P. Bradley-Smith**
Drawing Title **Surface Water Drainage**

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Scale **As Shown** Drawing Original **A3**

Drawing Number **MGS - BN/23/19 -- Design**