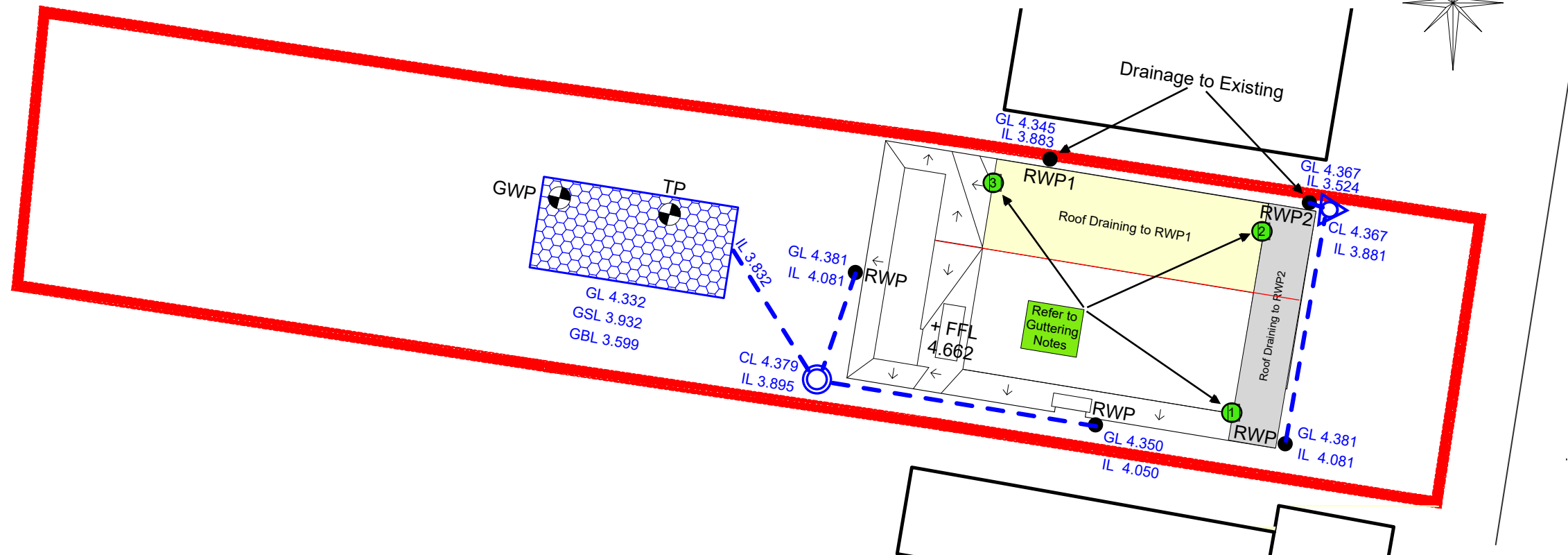
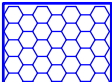


Detailed Drainage Layout scale 1:200



KEY

-  Proposed surface water drainage.
 100mm diameter PVC pipe.
 Minimum fall of 1:100
-  **GWP** Groundwater Monitoring Test Point.
-  **TP** Soil Infiltration Testing BRE365 Test Pit.
-  Proposed 250mm diameter surface water inspection chamber.
 Osma shallow IC or similar approved.
-  Proposed silt trap inspection chamber
-  Proposed Geocellular Soakaway.
 7.50 metres long x 3.50 metre wide
 giving a footprint of 26.25 square
 metres of 333mm deep geocells.
- GL #####** Ground level at detailed items
CL ##### Cover level of surface water chambers
IL ##### Invert level of surface water drains
GSL ##### Soffit (top) level of Geocell structure
GBL ##### Base level of Geocell structure
- + 5.999 All levels are to AOD unless otherwise stated

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

Surface Water Drainage Design Notes

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

In mid November 2019 a test BoreHole was augered to a depth of 1318mm (3.099 AOD) below ground level and groundwater was encountered at a depth of 872mm below ground level. An Open Head Piezometer (a slotted Groundwater Monitoring Pipe) was installed to this maximum depth at the position of the proposed soakaway and groundwater was monitored on a weekly basis from mid November 2019 to end February 2020. During the monitoring period, the monitoring pipe indicated changing levels of groundwater with three peaks, one in mid December 2019 of 773mm below ground level, one in late December 2019 of 781mm below ground level and one in late February 2020 of 776mm below ground level. A highest level of groundwater of 773mm below ground level ie 3.559 AOD was recorded on 18th December 2019. This highest level of groundwater precluded the use of infiltration at depths greater than ~750mm bgl, since no Freeboard would then be available. Note the Met Office (the national meteorological service for the UK) determined February 2020 as being the wettest, month of February, on record.

In late November 2019 an initial provisional 160mm diameter test borehole was augered to a depth of 800mm below ground level and a percolation test was carried out. This produced a result of 5.663 E-06 metres / second. This indicated that shallow soakage was feasible. In early February this borehole was enlarged to a BRE365 test pit of size 1100mm long by 350mm wide and to a depth of 750mm.

The drainage design is based on percolation tests carried out in February 2020 to BRE365 principles within this test pit. The Soil Infiltration Rates obtained are detailed in the table below. Testing produced a range of Infiltration Rates and a minimum soil infiltration rate of 3.155 E-06 metres / second was obtained to which a Factor of Safety of 2 has been applied, where the consequence of failure is "no damage / minor inconvenience".

During site investigations it was found that drainage from the north pitched roof discharged into the Foul, via Rainwater Pipe RWP1, probably dating from when the property was built. In addition the front (east) flat roof also drained independently, via Rainwater Pipe RWP2, possibly into the foul, however it was not possible to prove this. It was not possible to remove either of these two flows due to high groundwater levels and low infiltration rates, potentially increasing an already large footprint of designed geocells, and as such both flows are left as 'Existing'. The Invert Level of Rainwater Pipe RWP1 is estimated (calculated) as pro-rata since it drains into the Foul between FWMH#2 and FWMH#3. The Invert Level of Rainwater Pipe RWP2 (assuming it drains into the Foul) is also estimated (calculated) as a constant pro-rata fall between FWMH#3 and the estimated (calculated) Invert Level of the Public Foul Sewer in Arundel Way. The Manhole Cover and Invert Levels of the Public Foul Sewer in Arundel Way are taken from the sewer records. The Invert Level of RWP2 needs to be confirmed when building commences. NB in common with adjacent properties in Arundel Way, there is no final Foul Water Chamber exiting the site, to connect to the Public Foul Water Sewer in Arundel Way.

The existing south aspect pitched roof discharges onto the existing rear (west) flat roofed extension. This in turn drains into the rear (west) garden, probably into an existing soakaway -- this has not been able to be confirmed by investigation. This existing flat roofed extension is being replaced as part of the new planning application, and as such any inherited flows (the south pitched roof) need also to be accommodated. Additionally the existing garage currently drains to an unknown point, possibly the foul (since it goes into a cast iron pipe, as do the other two original existing pipes as detailed above -- it has not been possible to prove this) and, for the reasons above, this flow needs to be accommodated.

A 333mm deep rectangular geocellular soakaway has been designed, 7.50 metres long x 3.50 metres wide, with a cover of 400mm, which will be suitable to drain the proposed new extension plus some of the existing roof, totalling a full Roof Area of 97 square metres, without flooding above ground level on a 1 in 100 year rainfall return event plus 40% climate change addition. The soakaway should be sited a minimum of 5 metres from any habitable building to avoid any saturation of the ground and settlement affecting the building structure.

Guttering Notes

These guttering requirements are necessary to maintain the drainage roof flows as existing, so as not to increase or add any flow into the existing Rainwater Discharge Points.

- 1) -- No return onto the front (south east) roof.
- 2) -- No return onto the front (north east) roof.
- 3) -- No return on to the rear (north west) roof.

Winter Soil Infiltration Testing Results

BH#1 Provisional (800mm deep bgl)
November 21st 2019 -- 5.663 E-06 m/s

TP#1 BRE365 Test Pit
1100mm long x 350mm wide x 750mm deep
February 7th 2020 -- 4.833 E-06 m/s
February 14th 2020 -- 3.155 E-06 m/s
March 2nd 2020 -- 3.980 E-06 m/s

Minimum Rate used in the calculations from the three tests within the Test Pit TP#1 was 3.155 E-06 metres / second.

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

Mate GeoTechnic Services

03	Update Building Design	RC	27-7-20
02	Final	RC	31-5-20
01	Original	RC	28-4-20
Rev.	Description	Drn.	Date

Project

Proposed Extension
#16 Arundel Way
Elmer Sands
Middleton-on-Sea
PO22 6JH

Client	Mr and Mrs Lovegrove
Drawing Title	Surface Water Drainage

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Scale	As Shown	Drawing Original	A3
Drawing Number	MGS -- M/55/20-rev03		