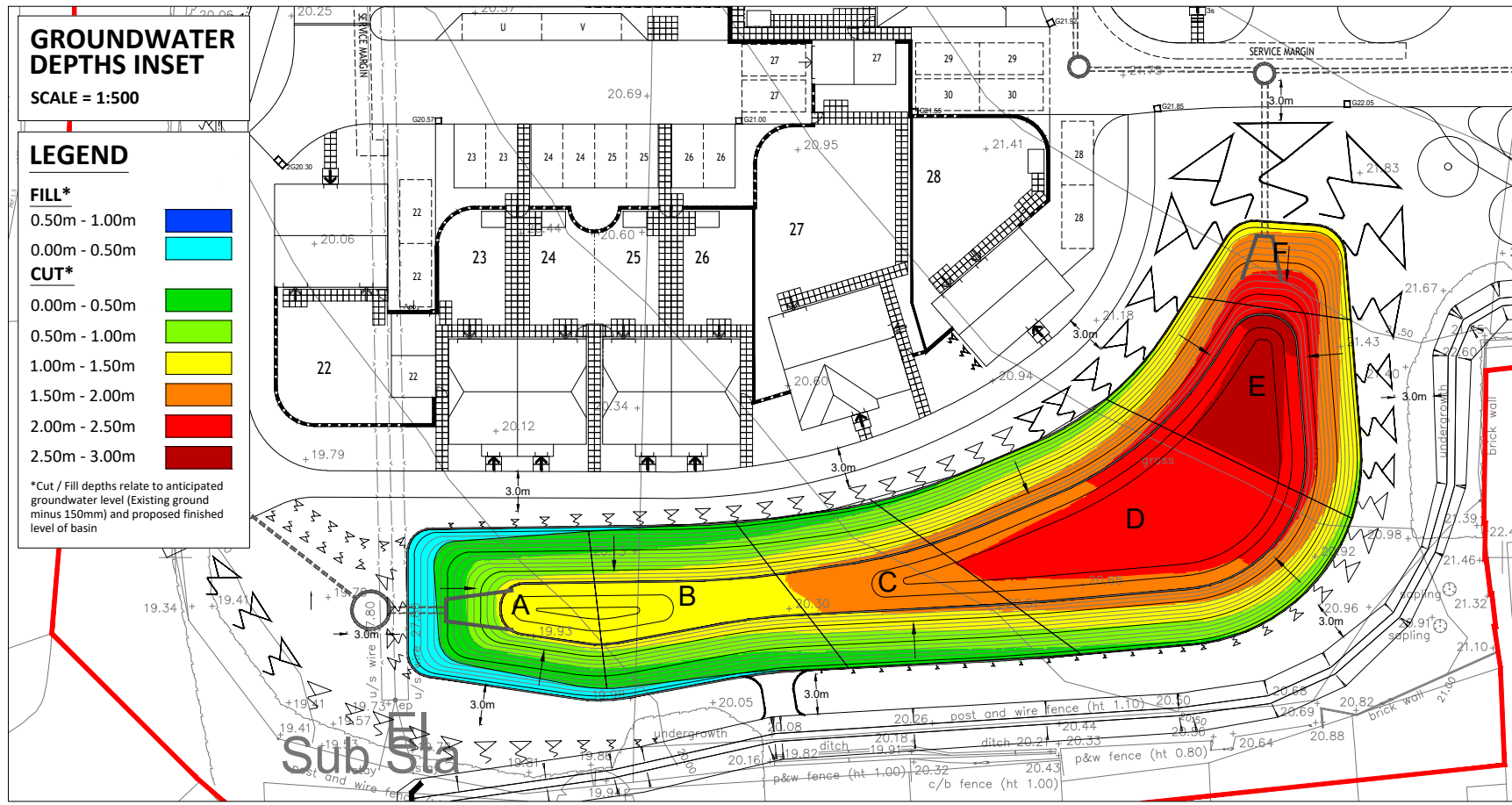




Basin Floatation Calculations

General Assumptions

- Assumed Ground Water Density = 1000 kg/m³
- Assumed Topsoil Density = 1600 kg/m³
- Assumed London Clay Density = 1800 kg/m³
- Factor Of Safety Applied = 1.20 (20%)

Area A
Plan Area = 124.8m²
Buoyancy Calculation (Based on 1500mm Formation depth)
Volumetric Assessment between:
• Existing ground -150mm Groundwater Model - 2021.08.29
• Proposed Basin Model - Area A -1500mm Formation Model - 2021.08.29
Nett Cut Volume from Model Comparison = 270.1m³
270.1m³ x 1000 kg/m³ = **270,100 (Upward Force)**

Design Counter Action Calculation (Using 300mm Topsoil / 1200mm Sub-Soil)
Topsoil
0.30m x 124.8m² = 37.44m³ (Volume of Topsoil laid on top of Liner - within water table)
37.44m³ x 1600 kg/m³ = 59,904 (Downward Force)
Sub-Soil
1.20m x 124.8m² = 149.76m³ (Volume of Sub-Soil laid on top of Liner - within water table)
149.76m³ x 1800 kg/m³ = 269,568 (Downward Force)
Combined Downward Force
59,904 + 269,568 = **329,472 (Total Downward Force)**

Summary
329,472 - 270,100 = **59,372 (Factor of Safety = 1.22)**

Area C
Plan Area = 172.2m²
Buoyancy Calculation (Based on 2400mm Formation depth)
Volumetric Assessment between:
• Existing ground -150mm Groundwater Model - 2021.08.29
• Proposed Basin Model - Area B -2400mm Formation Model - 2021.08.29
Nett Cut Volume from Model Comparison = 606.8m³
606.8m³ x 1000 kg/m³ = **606,800 (Upward Force)**

Design Counter Action Calculation (Using 300mm Topsoil / 2100mm Sub-Soil)
Topsoil
0.30m x 172.2m² = 51.66m³ (Volume of Topsoil laid on top of Liner - within water table)
51.66m³ x 1600 kg/m³ = 82,656 (Downward Force)
Sub-Soil
2.10m x 172.2m² = 361.62m³ (Volume of Sub-Soil laid on top of Liner - within water table)
361.62m³ x 1800 kg/m³ = 650,916 (Downward Force)
Combined Downward Force
82,656 + 650,916 = **733,572 (Total Downward Force)**

Summary
733,572 - 606,800 = **126,772 (Factor of Safety = 1.21)**

Area E
Plan Area = 194.9m²
Buoyancy Calculation (Based on 4500mm Formation depth)
Volumetric Assessment between:
• Existing ground -150mm Groundwater Model - 2021.08.29
• Proposed Basin Model - Area E -4500mm Formation Model - 2021.08.29
Nett Cut Volume from Model Comparison = 1278.8m³
1278.8m³ x 1000 kg/m³ = **1,278,800 (Upward Force)**

Design Counter Action Calculation (Using 300mm Topsoil / 4200mm Sub-Soil)
Topsoil
0.30m x 194.9m² = 58.47m³ (Volume of Topsoil laid on top of Liner - within water table)
58.47m³ x 1600 kg/m³ = 93,552 (Downward Force)
Sub-Soil
4.20m x 194.9m² = 818.58m³ (Volume of Sub-Soil laid on top of Liner - within water table)
818.58m³ x 1800 kg/m³ = 1,473,444 (Downward Force)
Combined Downward Force
93,552 + 1,473,444 = **1,566,996 (Total Downward Force)**

Summary
1,566,996 - 1,278,800 = **288,196 (Factor of Safety = 1.23)**

Area B
Plan Area = 170.1m²
Buoyancy Calculation (Based on 2100mm Formation depth)
Volumetric Assessment between:
• Existing ground -150mm Groundwater Model - 2021.08.29
• Proposed Basin Model - Area B -2100mm Formation Model - 2021.08.29
Nett Cut Volume from Model Comparison = 507.9m³
507.9m³ x 1000 kg/m³ = **507,900 (Upward Force)**

Design Counter Action Calculation (Using 300mm Topsoil / 1800mm Sub-Soil)
Topsoil
0.30m x 170.1m² = 51.03m³ (Volume of Topsoil laid on top of Liner - within water table)
51.03m³ x 1600 kg/m³ = 81,648 (Downward Force)
Sub-Soil
1.80m x 170.1m² = 306.18m³ (Volume of Sub-Soil laid on top of Liner - within water table)
306.18m³ x 1800 kg/m³ = 551,124 (Downward Force)
Combined Downward Force
81,648 + 551,124 = **632,772 (Total Downward Force)**

Summary
632,772 - 507,900 = **124,872 (Factor of Safety = 1.25)**

Area D
Plan Area = 397.1m²
Buoyancy Calculation (Based on 3600mm Formation depth)
Volumetric Assessment between:
• Existing ground -150mm Groundwater Model - 2021.08.29
• Proposed Basin Model - Area D -3600mm Formation Model - 2021.08.29
Nett Cut Volume from Model Comparison = 2099.6m³
2099.6m³ x 1000 kg/m³ = **2,099,600 (Upward Force)**

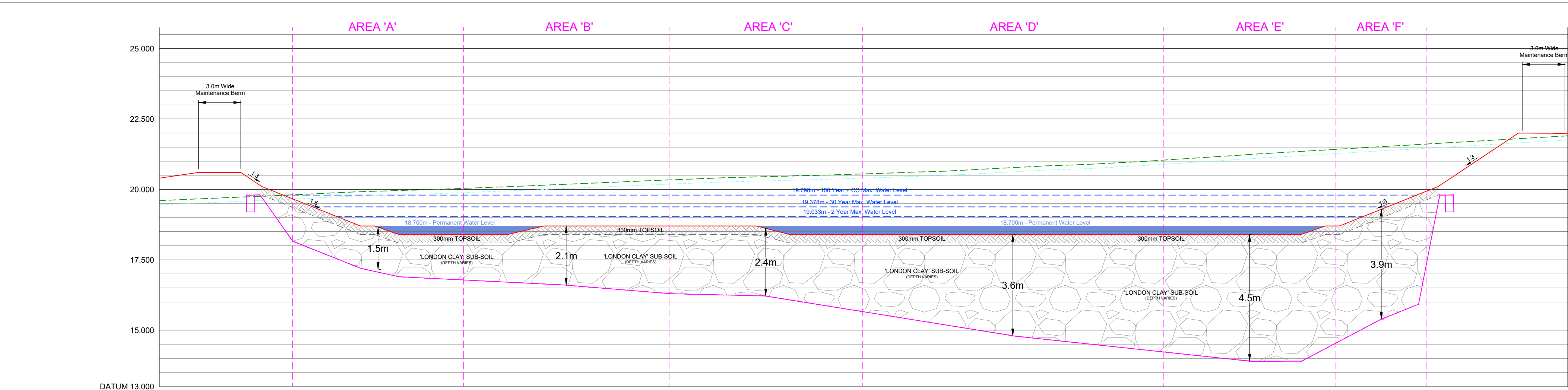
Design Counter Action Calculation (Using 300mm Topsoil / 3300mm Sub-Soil)
Topsoil
0.30m x 397.1m² = 119.13m³ (Volume of Topsoil laid on top of Liner - within water table)
119.13m³ x 1600 kg/m³ = 190,608 (Downward Force)
Sub-Soil
3.30m x 397.1m² = 1,310.43m³ (Volume of Sub-Soil laid on top of Liner - within water table)
1,310.43m³ x 1800 kg/m³ = 2,358,744 (Downward Force)
Combined Downward Force
190,608 + 2,358,744 = **2,549,352 (Total Downward Force)**

Summary
2,549,352 - 2,099,600 = **449,752 (Factor of Safety = 1.21)**

Area F
Plan Area = 65.0m²
Buoyancy Calculation (Based on 3900mm Formation depth)
Volumetric Assessment between:
• Existing ground -150mm Groundwater Model - 2021.08.29
• Proposed Basin Model - Area F -3900mm Formation Model - 2021.08.29
Nett Cut Volume from Model Comparison = 368.4m³
368.4m³ x 1000 kg/m³ = **368,400 (Upward Force)**

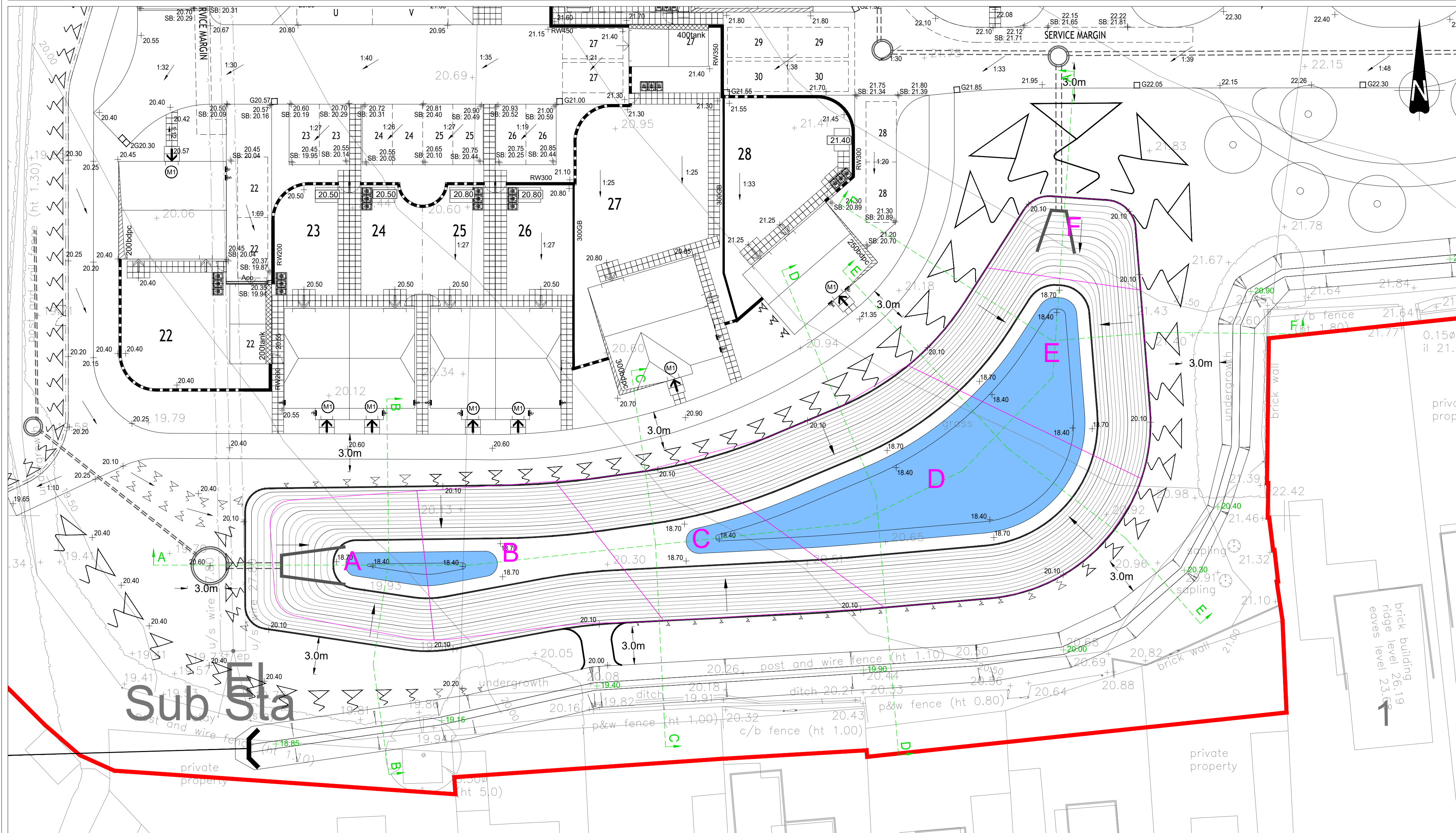
Design Counter Action Calculation (Using 300mm Topsoil / 3600mm Sub-Soil)
Topsoil
0.30m x 65.0m² = 19.50m³ (Volume of Topsoil laid on top of Liner - within water table)
19.50m³ x 1600 kg/m³ = 31,200 (Downward Force)
Sub-Soil
3.30m x 65.0m² = 234.0m³ (Volume of Sub-Soil laid on top of Liner - within water table)
234.0m³ x 1800 kg/m³ = 421,200 (Downward Force)
Combined Downward Force
31,200 + 421,200 = **452,200 (Total Downward Force)**

Summary
452,200 - 368,400 = **84,000 (Factor of Safety = 1.23)**



CHAINAGE	0.000	5.000	10.000	15.000	20.000	25.000	30.000	35.000	40.000	45.000	50.000	55.000	60.000	65.000	70.000	75.000	80.000	85.000	90.000	95.000	100.000
PROPOSED GROUND LEVEL	20.100	18.700	18.400	18.400	18.400	18.700	18.400	18.400	18.700	18.400	18.400	18.400	18.400	18.400	18.400	18.400	18.400	18.400	20.100	22.000	21.901
EXISTING GROUND LEVEL	19.600	19.710	19.818	19.929	20.006	20.101	20.206	20.312	20.411	20.476	20.550	20.634	20.757	20.870	20.997	21.159	21.316	21.464	21.610	21.756	21.901

A-A



The Contractor is to check and verify in conjunction with the Architects details all setting out points, building and site dimensions, levels and sewer invert levels at connection points and ensure that they are fully consistent with the contents and requirements of the site investigation report below and any other relevant documents. The Contractor is to comply with all aspects of the current building legislation, British Standard BS5939:2005, Building Regulations and any other relevant documents. This drawing is not intended to show details of ground conditions or ground constraints. Each area of ground relied upon to support any structure (including drainage) must be investigated by the Contractor any areas of formation for rain structures which do not meet with the relevant conditions as described in the site investigation report are to be remediated notified to the Engineer, where appropriate. Any earthworks shown indicate typical slopes for guidance only and should be investigated further by a suitable geotechnical report. Where existing lines are shown to be retained they should be subject to full geotechnical investigation for safety. All trees are to be planted as to ensure they are a minimum of 5 metres from buildings and 3 metres from drainage and services, where applicable. A condition is to be provided to accommodate for proposed tree planting, where applicable. © This drawing and the building works depicted are the copyright of Bannars Gate Ltd and may not be reproduced or amended except by written permission. No liability will be accepted for amendments made by other persons.

Rev	Description	Date	By
1	Design levels for pond liner and soil depths updated. Floatation calculations added. Comparison between existing groundwater depths and proposed basin levels added.	31.08.2021	DR
2	Check dimensions updated to reflect revised basin design and drainage strategy. Design levels for pond liner and soil depths added.	26.08.2021	DR
3	Basin shape and Embankments updated to suit latest strategy barriers to basin Q1 in 2.5.	08.01.2021	LH
4	Final design.	28.10.2020	LH



Client
Dappers Lane, Angmering,
West Sussex

Project
Attenuation Basin Cross Sections
Sheet 1 of 2

Title

Drawing Status

PRELIMINARY

Scale: A1 @ 1:200 Horiz & 1:100 Vert

Date: October 2020

File: 20079/dwgs/civils/current

Drawn: LH

Checked:

Drawing: 20079 - 211 C

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