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PROPOSED RESIDENTIAL DEVELOPMENT
ON LAND ADJACENT TO ROMNEY AVENUE
FOLKESTONE
KENT, CT20 3QJ
GROUND WATER ASSESSMENT

FOR
VILLAGE HOMES FOLKESTONE LTD

7th August 2020

Report no: 3066 Groundwater

REV 1st Issue

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Report Status: Preliminary **Project no:** 3066 **Date:** 07/08/2020

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Contents

1 Introduction and Brief

This report has been prepared for Village Homes Folkestone Ltd to assess groundwater runoff concerns on the site. This should be read in conjunction with the Slope Stability Report by Peter Baxter Associates and the Construction Stability Report by Considine all of which give guidance on safe methods for the safe construction of the proposed residential development on land adjacent to Romney Avenue, Folkestone, Kent, CT20 3QJ. Specifically, this report addresses the concerns of the local authority that *'There are issues with ground water run off locally and the submitted reports identify groundwater in the site. Southern Water will not accept the drainage of ground water into the public sewer.'* The requirement of this report is to provide clarification on how groundwater within the site is going to be dealt with during and after construction,

The proposal is to construct 8 dwellings with associated access road and parking.

Figure 1.1 – Development Proposals – full drawing within Appendix 1

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2 Existing Site Conditions

2.1 Location

The development site is located at land adjacent to Romney Avenue, Folkestone, Kent, CT20 3QJ.The British National Grid Reference is: E: 620590, N: 136059. The figures below show the site in the wider area, more locally and then an aerial image to show the site in its current context.

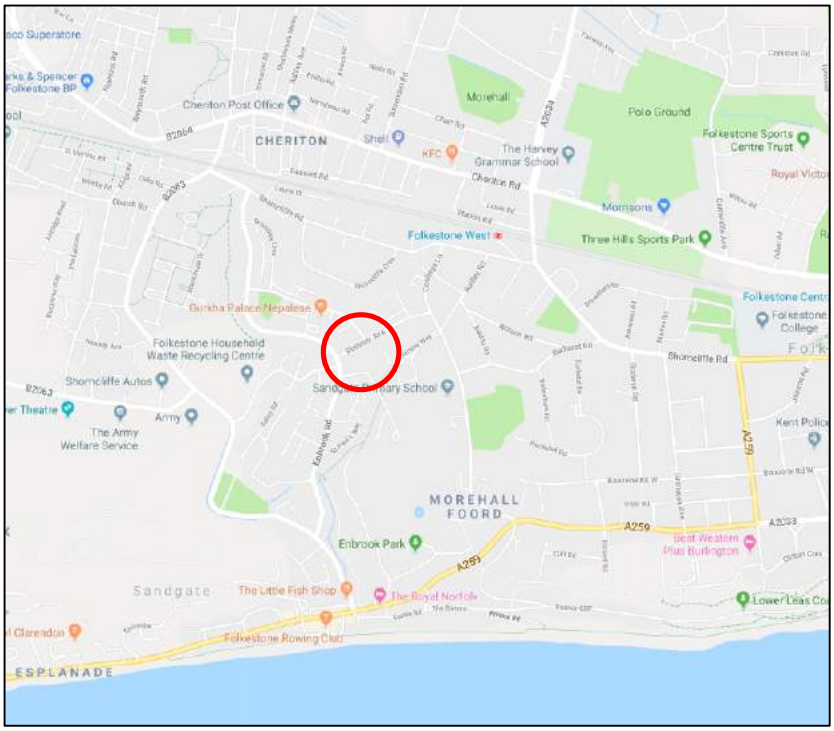

Figure 2.1 – Site location general area. Location shown by red circle. © Google Maps

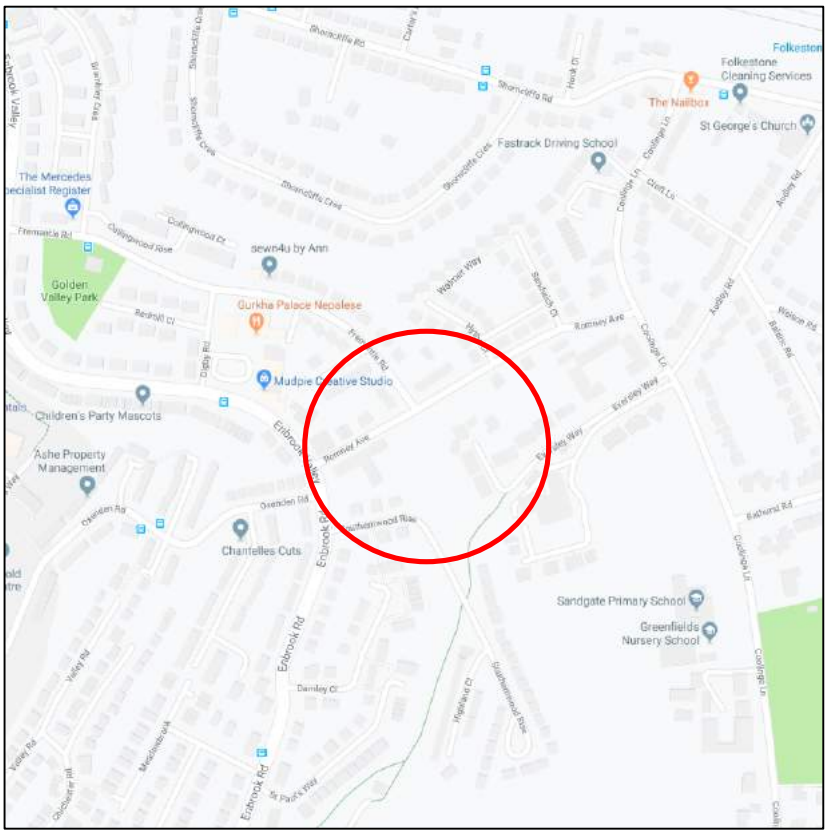

Figure 2.2 – Site Location shown by red circle. © Google Maps

The following aerial image provides additional information about the context of the site and surrounding areas.

Figure 2.3 – Aerial image of site © Google Maps. Approximate site boundary shown in red.

The site is currently undeveloped and steeply sloped. It is bounded by Romney Avenue on the north west boundary, and residential dwellings on all other boundaries.

2.2 Site Topography

A review of the topographical survey indicates that the site generally falls from the east to west. Overall, there is a fall of approximately 17m as can be seen from the extract of the survey below.

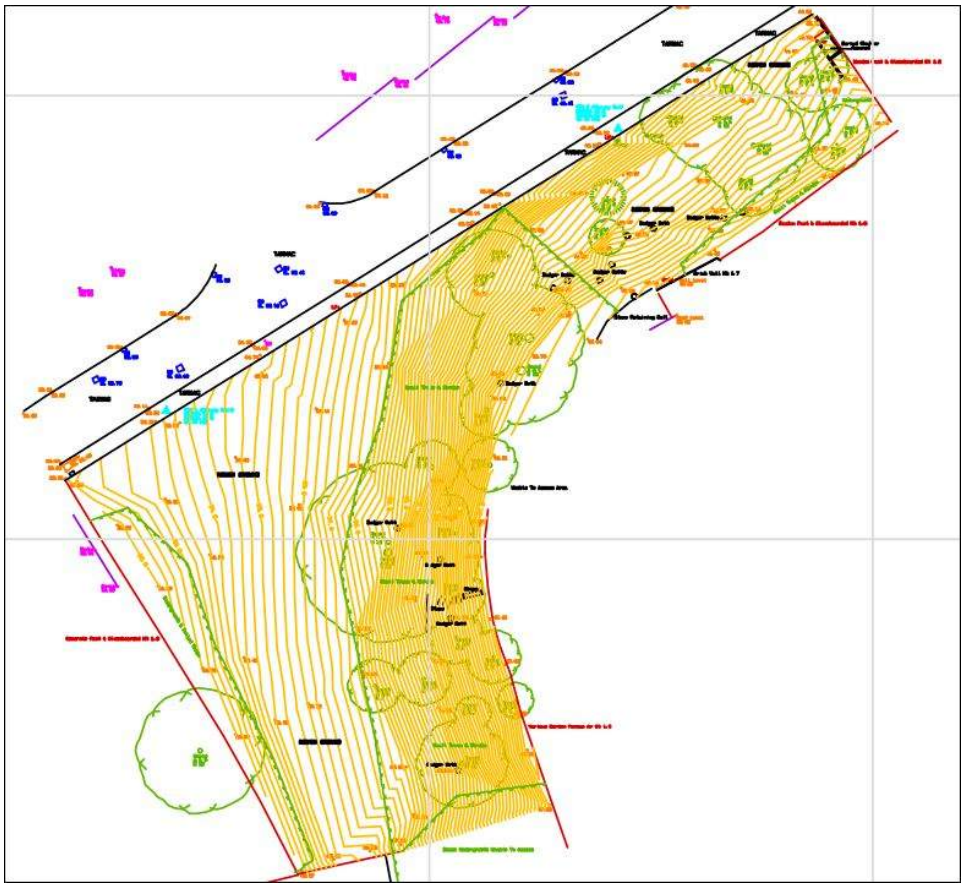

Figure 2.4 – extract of Topographic Survey

It can be seen that there are significant trees planted within the higher levels of the site and these are coincidentally the steeper parts of the site. It is noted that, from the Google Earth imagery at Figure 2.3, there is housing above the site – that housing has drainage systems to capture and dispose of rainwater falling on the area.

2.3 Site Geology

A review of the BGS online bedrock mapping tool has identified that the development site is likely underlain by the Folkestone Formation (Sandstone). These sedimentary rocks are defined by the BGS as 'detrital, ranging from coarse to fine grained forming interbedded sequences'.

The site is also noted to be within the vicinity of the Sandgate Formation (Sandstone, Siltstone and Mudstone). These sedimentary rocks are defined by the BGS as 'detrital, ranging from coarse to fine grained forming interbedded sequences'.

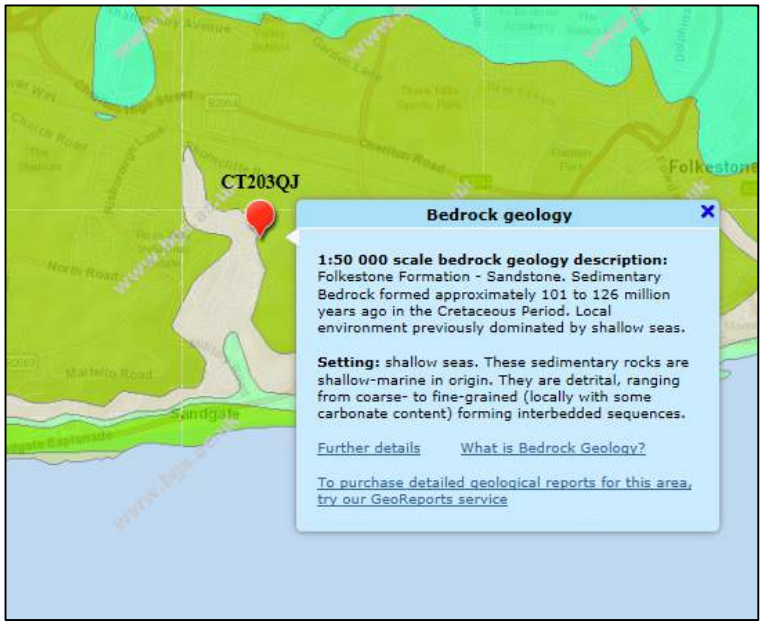

Figure 2.5 – BGS Extracts: Bedrock Geology © BGS

A review of the BGS online superficial deposits mapping tool has identified that the development site is not likely underlain by a superficial deposit. There are, however, superficial deposits within the area, comprising Peat. Peat is a partially decomposed mass of semi-carbonised vegetation which has grown under waterlogged, anaerobic conditions, usually in bogs or swamps.

Figure 2.6 – BGS Extracts: Superficial Geology © BGS

A site investigation carried out by Peter Baxter Associates (Ref: 1145/SI) indicates that the site's geology is as per BGS predictions.

2.4 Groundwater

The Peter Baxter work also identifies that there is groundwater on the site at depths as shown in the table below.

Borehole Reference	Sample Date	Time	Water Level (mbgl)	Depth of Well (mbgl)	GL	WL
BH1	09/10/2018	16:05	2.3	12.0	35.74	33.5
BH2	09/10/2018	16:10	3.6	12.0	36.69	33.1
WS1	09/10/2018	15:45	Dry	5.9	45.15	<39.25
WS2	09/10/2018	15:50	0.7	3.0	38.7	38.0
WS3	09/10/2018	15:55	1.9	3.0	38.78	36.9
WS4	09/10/2018	16:00	2.0	3.0	38.93	36.9

Figure 2.7 – Table 3 of Peter Baxter Report showing Groundwater Levels

The Peter Baxter report also identifies that groundwater is seen on the site seeping out of the ground at a level of about 37m AOD.

Groundwater is typically formed by rainfall falling on permeable ground, seeping down until it either meets an impermeable stratum at which point it flows along the fall of the impermeable stratum or it can accumulate in lower permeable stratum in the form of an aquifer. Some sites which are lower than the surrounding area or surrounded by steep slopes can have naturally occurring springs where the groundwater exits the ground either due to the impermeable stratum coming to ground level or because water has built up within an aquifer to a point where the water level achieves ground level.

On the development site we can see a steeply sloping site with housing above. Therefore, it is reasonable to assume that the majority of the groundwater on the site is due to rainfall falling on the site with some contribution from the land above. Trees and other planting on sites do adsorb the water within the ground and expel it back to atmosphere in a process called evapotranspiration. At times of heavier rainfall and in winter months when trees and plants are less active, groundwater builds up such that on a steeply sloping site it can spring out of the ground as is the case on this site.

3 Proposed Development – Groundwater

3.1 Proposed Development

The proposal is to construct 8 dwellings with associated access road and parking. The figure below shows the Architect's current proposals with design contour levels shown.

Figure 3.1 – Proposed Site Plan with Proposed Levels – full drawing within Appendix 1.

The proposed development retains the steeper parts of the site as evidenced by the closely banded contours on the above extract. The plan also confirms that the extensive tree and shrub covering on that part of the site will be retained which will provide a continuation of the uptake of some of the groundwater on the site.

The cuttings to form the new dwellings will require significant retaining solutions up to 5.00m in height as shown in figure 3.2 below. These walls will require drainage behind them to

ensure that any surplus groundwater will not build up behind the walls and compromise the structural integrity.

Figure 3.2 – Example of a retaining wall solution - Layout

3.2 Groundwater Post Development

The use of piles as a retaining solution means that it will not be possible to insert a drainage layer behind the wall. Therefore, the detailed design will incorporate a series of openings in the wall either as a result of the piling system or if secant piles are used (i.e. piles embedded within piles to form an impermeable wall) then a series of weepholes will be installed throughout the walls in order to allow groundwater to flow through the wall. That water would be collected at the base of the wall in a simple gravel filled filter drain to allow the water to naturally infiltrate away. This is an accepted and established means of dealing with water from weepholes.

It is noted that the developed part of the site will be designed with a suitable attenuated SW drainage system that will capture and store all rainfall falling on the site before discharging off of the site at an agreed low flow rate. As such there will be a lot less water entering the ground to contribute to local groundwater levels.

3.3 Groundwater – During Construction

It has already been stated that there is groundwater on the site and that the level of water is shallow in places on the site with water springing from the ground at about 37m AOD. This is a known entity and an experienced Contractor will be able to deal with groundwater using standard methods of dewatering.

The method and sequence of construction is expected to require installing the piled retaining walls before any levels are reduced on the site. As levels are then reduced it is anticipated that the contractor will provide temporary catchpits to capture any encountered groundwater from where it can be pumped to an off site outfall under temporary licence from the drainage authority or failing that, pumped to a bowser from where the water will be disposed of offsite to a suitably licenced facility.

Once levels are reduced to final formation level it may be necessary to provide a temporary sump or sumps to collect any remaining water for off-site discharge. The retaining walls will effectively cut off the flow route of groundwater across the site allowing it to be captured firstly in temporary sumps and then into the permanent works from where it will join the on site drainage system. It is expected that the site will become inherently drier following development as the bulk of the rainfall onto the site will be captured in the on-site drainage system.

All of the techniques mentioned above for temporary works are simple, effective and well understood by competent contractors.

4 Conclusions

This document has been produced in accordance with current best practice and recommendations and guidance set out in the National Planning Policy Framework (NPPF).

The report concludes:

- The site is currently undeveloped. It is bounded by Romney Avenue on the north west boundary, and residential dwellings on all other boundaries.
- A review of the BGS online bedrock mapping tool has identified that the development site is underlain by the Folkestone Formation (Sandstone).
- The proposal is to construct 8 dwellings with associated access road and parking.
- The Site Investigation included an assessment of groundwater levels on the site and identified that groundwater levels are shallow on parts of the site including evidence that water comes out of the ground at about 37m AOD.
- It has been identified that the upper level of the site will be retained along with all the trees and planting with that level retained by piled retaining walls. The planting will continue to adsorb groundwater whilst excess water is likely to flow to the retaining wall and thus flow out of suitable weepholes or other openings in the wall. That water will then be captured by a small gravel filled drain at the face of the wall which will allow the water to naturally infiltrate away.
- The developed site will include a substantial SW drainage system including attenuation of outflows such that all the water that falls on the site will be managed within the drainage systems. There will be a lot less water entering the ground than in the undeveloped site and as such less groundwater will be developed.
- During construction if groundwater is encountered it will be managed by the Contractor using simple and well understood dewatering techniques.
- It is evident that groundwater, whilst present on the site, can be suitably and safely managed during construction and within the fabric of the site once developed.
- There will be no impact on the site or surrounding environment from groundwater once the site is developed.

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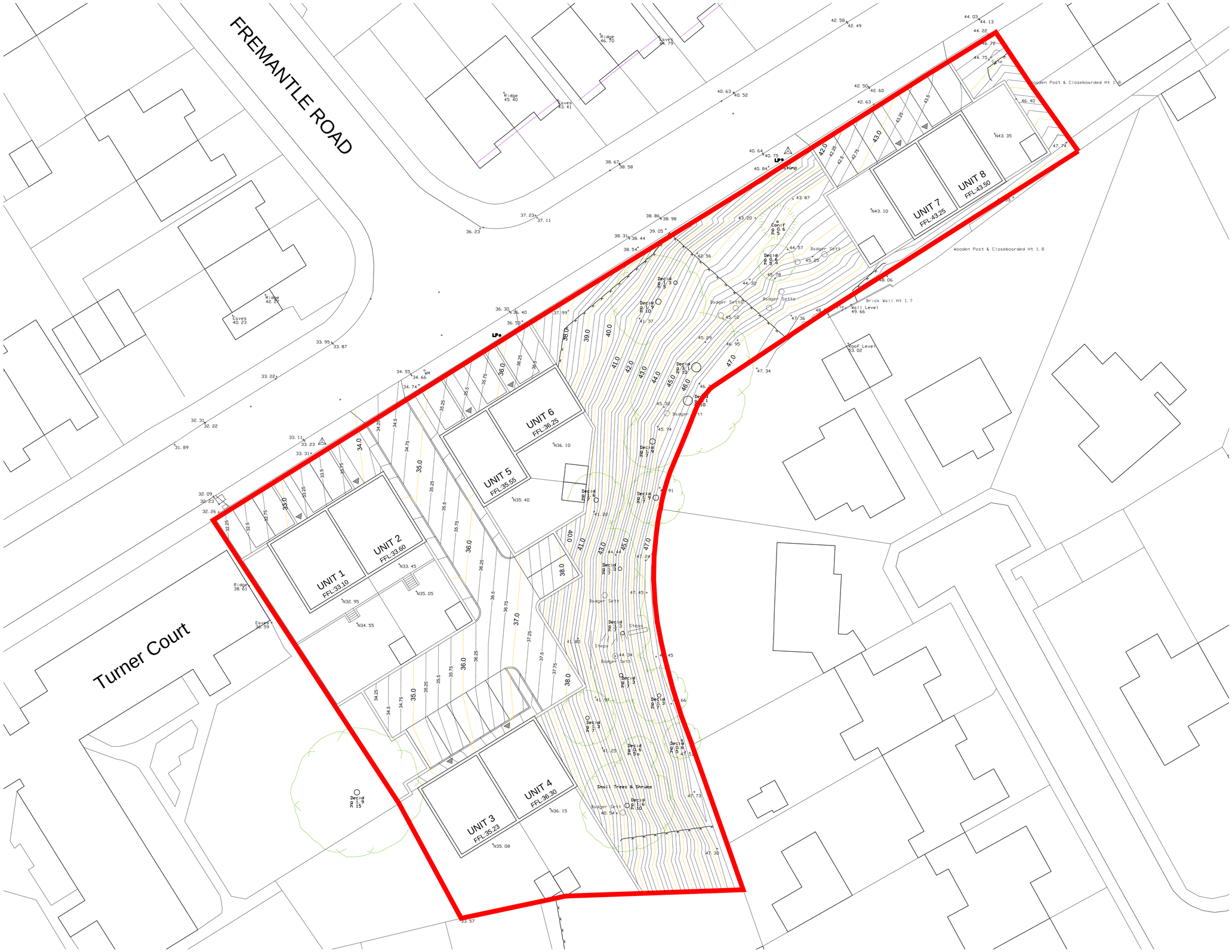
Appendix 1

Proposed Site Plan with Levels



Proposed Site Plan with Levels 1:200

Proposed Residential Development

Do not scale this drawing
Architects to be informed of all discrepancies in dimensions
Contractor to check all dimensions on site

Revision	Date / Details	Revised by
P1	10/06/2019 First Issue	BB

Levels Key:

+36.93 = Existing Level

+N36.93 = New Level

FFL:36.25 = Finished Floor Level of Ground Floor

N

0 5 10 20m

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Project Title
Proposed Residential Development on land adjacent to Romney Avenue, Folkestone

Drawing Title
Proposed Site Plan with Levels

Scale 1:200 @ A1

Job No 17026

Drawn	Status	Checked	Date
BB	Planning		June 2019

Dwg No PL03

Rev No P1