



**CHANGE OF USE FROM  
OFFICES TO A  
RESIDENTIAL USE,  
RECTORY FARM BARN,  
AKEMAN STREET,  
LANDBEACH,  
CAMBRIDGESHIRE**

**FLOOD RISK ASSESSMENT**

**NOVEMBER 2022**

**REF: 1932/RE/10-17/01 REVISION A**

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## **CONTRACT**

Evans Rivers and Coastal Ltd has been commissioned by Quail Property to carry out a flood risk assessment for a change of use of existing offices to residential, Rectory Farm Barns, Akeman Street, Landbeach, Cambridgeshire.

## **QUALITY ASSURANCE, ENVIRONMENT AND HEALTH AND SAFETY**

Evans Rivers and Coastal Ltd operates a Quality Assurance, Environmental, and Health and Safety Policy.

This project comprises various stages including data collection; depth analysis; and reporting. Quality will be maintained throughout the project by producing specific methodologies for each work stage. Quality will also be maintained by providing specifications to third parties such as surveyors; initiating internal quality procedures including the validation of third party deliverables; creation of an audit trail to record any changes made; and document control using a database and correspondence log file system.

To adhere to the Environmental Policy, data will be obtained and issued in electronic format and alternatively by post. Paper use will also be minimised by communicating via email or telephone where possible. Documents and drawings will be transferred in electronic format where possible and all waste paper will be recycled. Meetings away from the office of Evans Rivers and Coastal Ltd will be minimised to prevent unnecessary travel, however for those meetings deemed essential, public transport will be used in preference to car journeys.

The project will follow the commitment and objectives outlined in the Health and Safety Policy operated by Evans Rivers and Coastal Ltd. All employees will be equipped with suitable personal protective equipment prior to any site visits and a risk assessment will be completed and checked before any site visit. Other factors which have been taken into consideration are the wider safety of the public whilst operating on site, and the importance of safety when working close to a water source and highway. Any designs resulting from this project and directly created by Evans Rivers and Coastal Ltd will also take into account safety measures within a "designers risk assessment".

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## CONTENTS

|   |           |
|---|-----------|
| <b>CONTRACT</b>   | i         |
| <b>QUALITY ASSURANCE, ENVIRONMENT AND HEALTH AND SAFETY</b> | i         |
| <b>DISCLAIMER</b>   | i         |
| <b>COPYRIGHT</b>  | i         |
| <b>CONTENTS</b>   | ii        |
| <b>1. INTRODUCTION</b>                                      | <b>1</b>  |
| 1.1 Project scope   | 1         |
| <b>2. DATA COLLECTION</b>                                   | <b>3</b>  |
| <b>3. SITE CHARACTERISTICS</b>                              | <b>4</b>  |
| 3.1 Existing Site Characteristics and Location              | 4         |
| 3.2 Site Proposals  | 5         |
| <b>4. BASELINE INFORMATION</b>                              | <b>6</b>  |
| 4.1 Environment Agency Flood Zone Map                       | 6         |
| 4.2 Flood Data  | 6         |
| 4.3 Flood Warning and Emergency Planning                    | 7         |
| <b>5. FLUVIAL FLOOD RISK</b>                                | <b>9</b>  |
| <b>6. FLOOD RISK MITIGATION AND EVACUATION</b>              | <b>10</b> |
| 6.1 Reducing Exposure to the Hazard                         | 10        |
| 6.2 Reducing Vulnerability to the Hazard                    | 10        |
| 6.3 Vulnerable Groups                                       | 11        |
| 6.4 Safe Access/Egress                                      | 11        |
| 6.5 Insurance   | 12        |
| <b>7. OTHER SOURCES OF FLOODING</b>                         | <b>13</b> |
| 7.1 Groundwater Flooding                                    | 13        |
| 7.2 Surface Water Flooding and Sewer Flooding               | 13        |
| 7.3 Reservoirs, Canals And Other Artificial Sources         | 14        |
| <b>8. CONCLUSIONS</b>                                       | <b>15</b> |
| <b>9. BIBLIOGRAPHY</b>                                      | <b>16</b> |
| <b>DRAWINGS</b>   |           |
| <b>1025_S(E10)_100</b>                                      |           |
| <b>1025_S(P10)_100</b>                                      |           |

## **1. INTRODUCTION**

### **1.1 Project Scope**

1.1.1 Evans Rivers and Coastal Ltd has been commissioned by Quail Property to carry out a flood risk assessment for a change of use of existing offices to residential, Rectory Farm Barns, Akeman Street, Landbeach, Cambridgeshire.

1.1.2 It is understood that this Flood Risk Assessment will be submitted to the Planning Authority as part of a planning application. Specifically, this assessment intends to:

- a) Consider the impacts of a range of fluvial flood events in accordance with NPPF;
- b) Review any literature and guidance specific to this area such as the SFRA;
- c) Determine the extents of the aforementioned NPPF Flood Zones across the site, together with depths of floodwater and hazard;
- d) Assess the risks to people and property and propose mitigation measures accordingly;
- e) Review existing evacuation and warning procedures for the area;
- f) Carry out an appraisal of flood risk from any other sources such as groundwater as required by NPPF;
- g) Report findings and recommendations.

1.1.3 This assessment is carried out in accordance with the requirements of the National Planning Policy Framework (NPPF) dated 2021. Other documents which have been consulted include:

- DEFRA/EA document entitled *Framework and guidance for assessing and managing flood risk for new development Phase 2 (FD2320/TR2)*, 2005;
- Communities and Local Government 2007. *Improving the Flood Performance of New Buildings*. HMSO.
- DEFRA/EA document entitled *The flood risks to people methodology (FD2321/TR1)*, 2006;
- EA *Supplementary Note on Flood Hazard Ratings and Thresholds for Development Planning and Control Purpose*, 2008;
- National Planning Practice Guidance – Flood Risk and Coastal Change.
- South Cambridgeshire and Cambridge City Level 1 Strategic Flood Risk Assessment dated 2010.
- Environment Agency Cambridge Water Cycle Strategy Scoping Study dated 2007.
- Cambridgeshire Horizons Detailed Water Cycle Strategy up to 2031 Major Growth Areas in and around Cambridge Phase 2 – Detailed Strategy dated 2011.

- Cambridgeshire Flood Risk Management Partnership, Cambridge and Milton Surface Water Management Plan Detailed Assessment and Options Appraisal Report dated 2011.
- UK Government's climate change allowances guidance.
- Environment Agency guidance entitled *Flood risk assessments: Climate change allowances – East Anglia; Essex, Norfolk, Suffolk, Cambridgeshire and Bedfordshire*.
- The Old West Internal Drainage Board Policy Statement on Flood Protection and Water Level Management.

## **2. DATA COLLECTION**

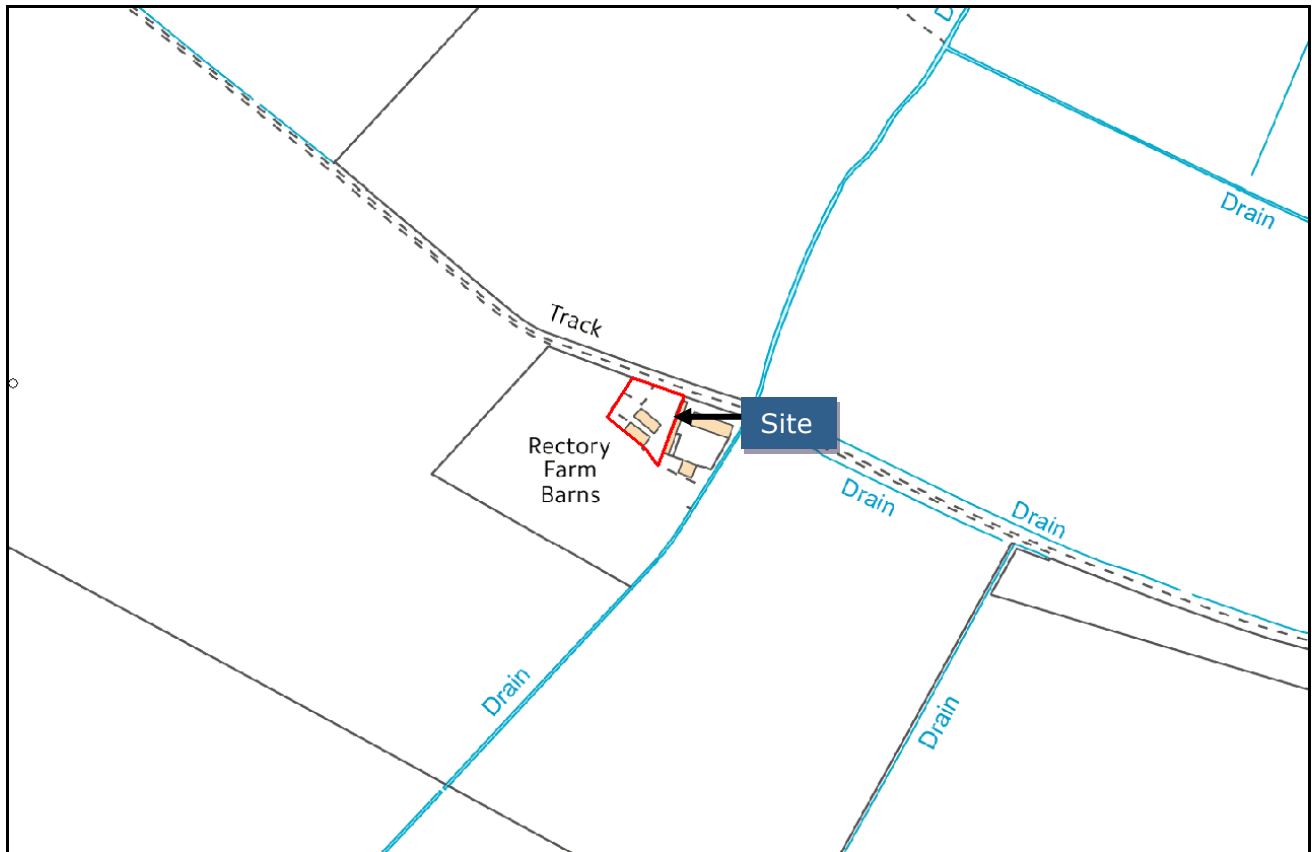
2.1 To assist with this report, the data collected included:

- Ordnance Survey 1:10,000 street view map (Evans Rivers and Coastal Ltd OS licence number 100049458).
- Filtered LIDAR survey at 1m resolution.
- 1:250,000 *Soil Map of Eastern England* (Sheet 4) published by Cranfield University and Soil Survey of England and Wales 1983.
- 1:625,000 *Hydrogeological Map of England and Wales*, published in 1977 by the Institute of Geological Sciences (now the British Geological Survey).
- British Geological Survey, *Online Geology of Britain Viewer*.
- British Geological Survey, *Groundwater flooding susceptibility map*.
- Environment Agency JFLOW modelled flood extent data for Flood Zone 2 and 3 (from EA Geodata [www.data.gov.uk](http://www.data.gov.uk)).

### 3. SITE CHARACTERISTICS

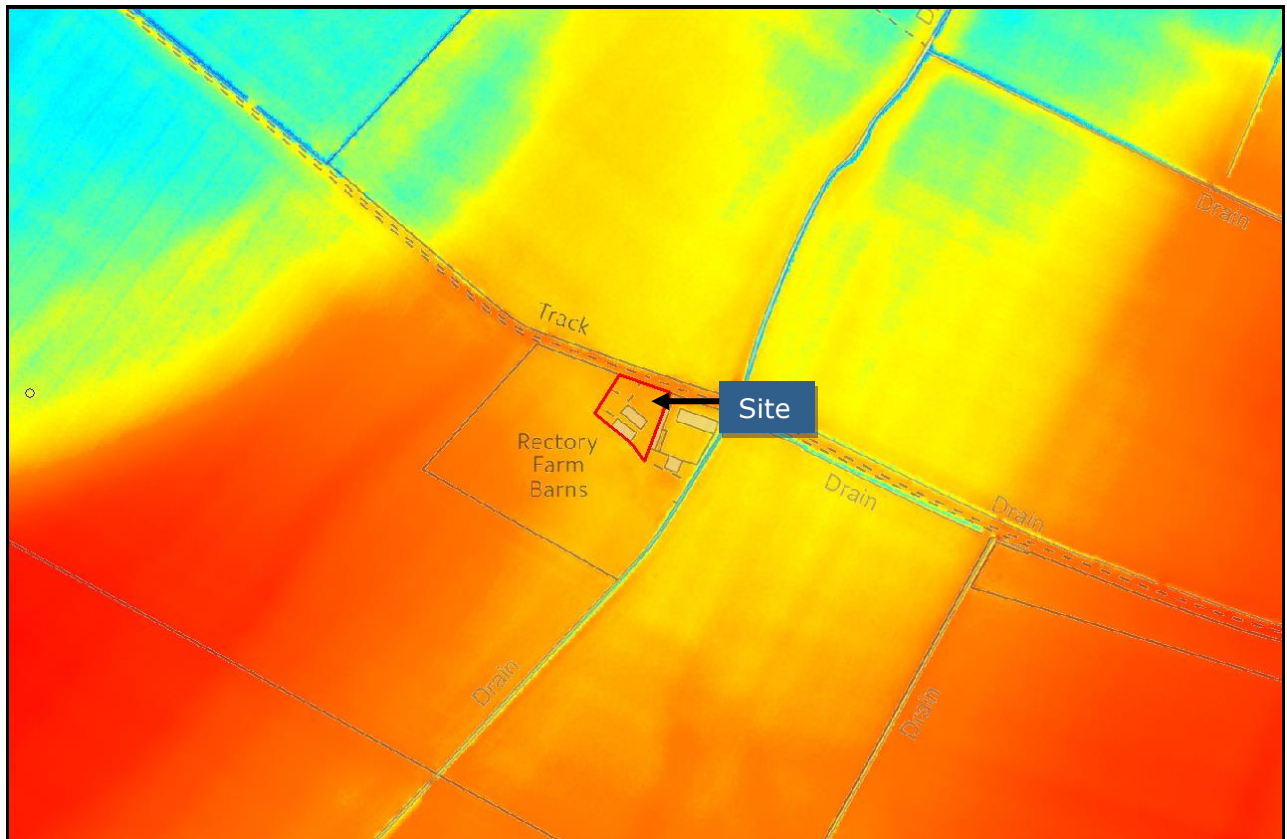
#### 3.1 Existing Site Characteristics and Location

3.1.1 The site is located at Rectory Farm Barns, Akeman Street, Landbeach, Cambridgeshire. The approximate Ordnance Survey (OS) grid reference for the site is 546525 265339 and the location of the site is shown on Figure 1.



**Figure 1: Site location plan (Source: Ordnance Survey)**

- 3.1.2 The site is square in shape and currently comprises two existing former barns which are used as offices. The site is accessed via a track which leads from the barns to the west and onto Akeman Street and main urban area of Landbeach. The existing site layout can be seen on Drawing Number 1025\_S(E10)\_100.
- 3.1.3 The site is located within the Old West Internal Drainage District (IDB) as shown on Drawing Number 1402-B-1.2 of the SFRA. The IDB maintains the watercourse located 40m south east of the site.
- 3.1.4 Filtered LIDAR at 1m resolution has been obtained in order to determine and illustrate the topography across the site and wider area (Figure 2).
- 3.1.5 The survey data and on-site inspections indicate that the buildings are set 150mm higher than existing ground levels and at 6.55m AOD.



**Figure 2: Filtered LIDAR data at 1m resolution**

### 3.2 Site Proposals

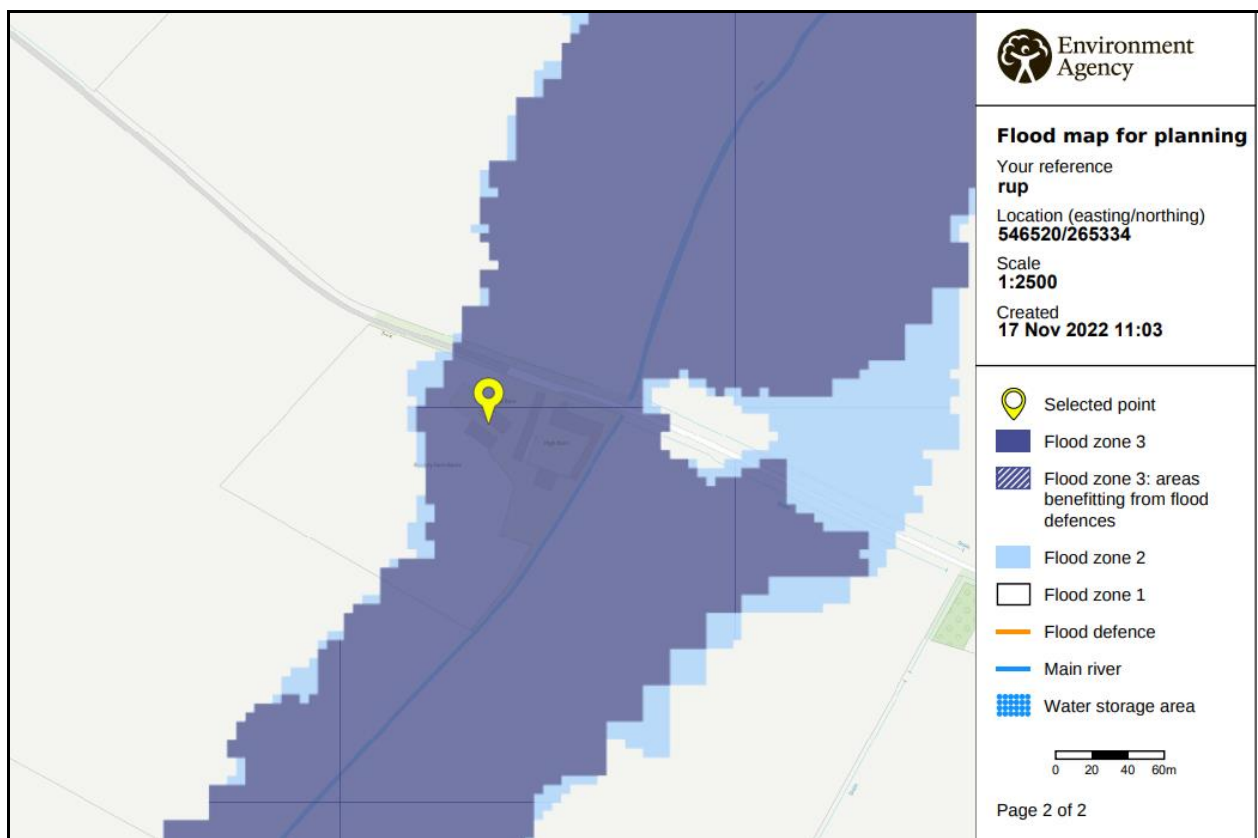
- 3.2.1 It is the Client's intention to change the use of the existing buildings from offices to a residential use.
- 3.2.2 The site proposals can be seen on Drawing Number 1025\_S(P10)\_100.
- 3.2.3 Paragraph 33 (ID 7-033-20140306) of the NPPF Planning Practice Guidance (NPPG) states that the Sequential Test does not apply to change of use applications.



#### 4. BASELINE INFORMATION

##### 4.1 Environment Agency Flood Zone Map

- 4.1.1 The Environment Agency’s Flood Zone Map (Figure 3) shows that the site is located within the NPPF defined Flood Zone 3.
- 4.1.2 The Flood Zone 3 is divided into two sub-categories, the Flood Zone 3a and Flood Zone 3b. The extent of the Flood Zone 3a ‘High Probability’ is defined as the 1 in 100 year return period fluvial event in this case.
- 4.1.3 Flood Zone 3b functional floodplain is defined in Table 1 of the NPPG as the area where water flows or is stored during flood events. The functional floodplain is generally defined by the limit of the 1 in 20 year flood envelope. Drawing Number 1402-D-1.2 of the SFRA shows that the site is not located within the Flood Zone 3b.



**Figure 3: Environment Agency Flood Zone Map (Source: Environment Agency, 2022)**

##### 4.2 Flood Data

- 4.2.1 Drawing Number 1402-C-1.7 of the SFRA shows that there are no formal raised defences along the watercourse at this location.
- 4.2.2 It is understood that there are no modelled flood levels available at this location as the local watercourse network is not shown to be modelled on Figure 1402-D-1.2 of the SFRA.
- 4.2.3 JFLOW data for Flood Zones 2 and 3 have therefore been downloaded from EA Geodata [www.data.gov.uk](http://www.data.gov.uk) as this approach is in line with the nature and scale of development.

- 4.2.4 The UK Government’s climate change allowances guidance states that for more-vulnerable development, the “Central” climate change allowance should be used in FRA’s. For the Cam and Ely Ouse management catchment the climate change allowance is 9% up to year 2080s.
- 4.2.5 Figure 1402-D-1.2 of the SFRA states that in the absence of hydraulic modelling the EA’s Flood Zone 2 should be taken as the 1 in 100 year climate change outline.
- 4.2.6 Further analysis is carried out in Chapter 5.

### 4.3 Flood Warning and Emergency Planning

- 4.3.1 The site is located within Environment Agency Flood Alert Area 052WAFCTLD - Cottenham Lode in Cambridgeshire.
- 4.3.2 Sites at risk of fluvial flooding could have a minimum of 2 hours warning before any of the levels of flood warning is issued (the Agency’s warning scheme only applies to areas at risk of flooding from Main Rivers and not IDB controlled drains).
- 4.3.3 Flood Alerts, Flood Warnings and Severe Flood Warnings are issued to residents and businesses within flood risk areas by the Agency’s *Floodline Warnings Direct* (FWD) service. This system is managed by the Environment Agency and dials out a message to the recipient when a particular category of flood warning is being advised. The message is conveyed by a constant ringing of the telephone or can alternatively be communicated to mobile phones and computers. The system functions at all times, issuing flood warnings and alerts in conjunction with announcements on radio and other media. Owners and occupiers of dwellings or businesses thought to be at risk can sign up to the scheme. **The owners are encouraged to confirm details with the Agency and to sign up for these warnings.**
- 4.3.4 The various flood warning codes can be seen on Figure 4.

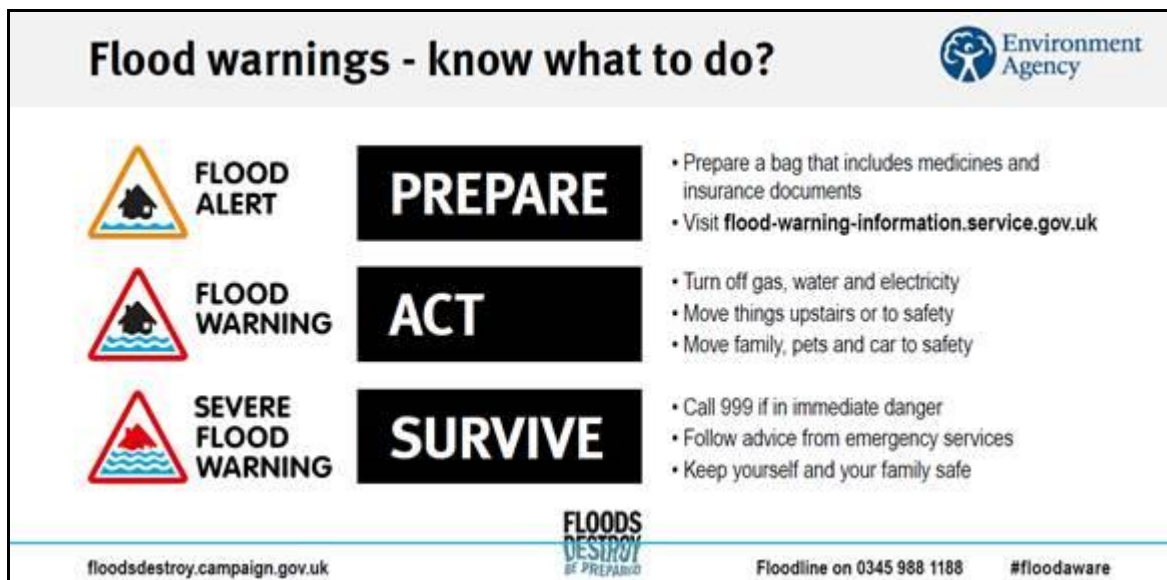


Figure 4: Flood warning codes (Source: Environment Agency)

- 4.3.5 It is understood that in the event of flooding, evacuation is managed by a multi-agency team in conjunction with the Police. The multi-agency team provides suitable premises for shelter, first aid, refreshments and possible transportation with consideration given

to the elderly and vulnerable groups. It is essential that occupants produce robust Emergency Flood Plans to avoid putting themselves or emergency services at risk and that they do not rely solely on emergency services during the event.

## **5. FLUVIAL FLOOD RISK**

- 5.1 Drawing Number 1402-B-3.2 of the SFRA confirms that there have been no recorded historical fluvial flood events at the site.
- 5.2 The site is located within the Old West Internal Drainage District (IDB) as shown on Drawing Number 1402-B-1.2 of the SFRA. The IDB maintains the watercourse located 40m south east of the site. The LIDAR survey indicates that this drain is at least 1m deep.
- 5.3 The Old West Internal Drainage Board Policy Statement on Flood Protection and Water Level Management, indicates that the Board monitors the condition of its pumping stations and watercourses. The Board carries out routine maintenance to ensure that the level of protection is met, such as vegetation control and de-silting.
- 5.4 It is understood that the IDB seeks to maintain a general standard capable of providing flood protection to developed areas and agricultural land of 1 in 100 and 1 in 20 years respectively. The IDB, however, stress that these return periods cannot be taken literally but should be considered as the chance of some overspilling from the system occurring in any year being 1% and 5% respectively.
- 5.5 When overlaying the JFLOW data onto the LIDAR data it can be seen that the 1 in 100 year/Zone 3a flood contour is 6.40m AOD and the 1 in 1000 year/Zone 2 flood contour is 6.45m AOD.
- 5.6 As discussed in paragraph 4.2.5 above, the Flood Zone 2 outline can be used as a proxy for the climate change 1 in 100 year flood outline (i.e. 6.45m AOD).
- 5.7 The existing floor level is set at 6.55m AOD and therefore above all modelled flood levels thus providing safe (dry) refuge.

## **6. FLOOD RISK MITIGATION AND EVACUATION**

### **6.1 Reducing Exposure to the Hazard**

- 6.1.1 In order to assess and reduce the exposure to the hazard and the vulnerability to the hazard after the site has been developed, the guidance outlined in the DCLG/DEFRA/EA document entitled *Flood Risk Assessment Guidance for New Development Phase 2; Flood Risks to People, Phase 2; Improving the Flood Performance of New Buildings* has been consulted.
- 6.1.2 Paragraph 060 (ID 7-060-20140306) of the NPPF Planning Practice Guidance suggests that the first preference is to avoid flood risk by raising floor levels above the design flood level (i.e. climate change 1 in 100 year flood level calculated as 6.45m AOD).
- 6.1.3 The buildings are set above the climate change 1 in 100 year level. Therefore, safe (dry) refuge will be available at all times and the proposals comply with the NPPG.


### **6.2 Reducing Vulnerability to the Hazard**

- 6.2.1 The Agency aims to provide up to 2 hours notice before the issue of a *Flood Alert* for fluvial events.
- 6.2.2 It is recommended that the occupants liaise with the Agency in order to register with the Agency's Flood Warnings Direct service and ensure that they are aware of the flood risk so that they have the option to escape/evacuate upon receipt of a *Flood Alert* or upon the instruction of the emergency services.
- 6.2.3 The occupants should develop a *Family Flood Plan*. Further guidance is offered in the Environment Agency's guidance document entitled *What to do before, during and after a flood*. The *Family Flood Plan* should consider, for example, information about vital medication needed and a *Flood Kit*.
- 6.2.4 A *Flood Kit* is a useful precautionary measure especially if evacuation from the site is prolonged. The kit should be stored in an accessible location to ensure that it is not affected by floodwater. The contents should also be checked every 6 months and items replaced if necessary.
- 6.2.5 It may be sensible to compile two *Flood Kit's* to suit each eventuality. For example, a smaller kit could be compiled which would allow the occupants to carry it during evacuation. A larger kit could also be compiled which included additional food and beverage items in case of ongoing refuge within the property. Both kits should contain the necessary items as suggested below.

1. Important documents
2. Torch and batteries
3. Mobile phone (fully charged)
4. First-aid kit
5. Wind-up radio
6. Important telephone numbers
7. Bottled water
8. Non-perishable food provisions
9. Rubber Gloves and wellington boots
10. Medication or information relating to medication and its location
11. Blankets, warm clothes
12. Essential toiletries

- 13. Camera to record any damage
- 14. Emergency cash

**Table 1: Flood Event Action Plan**

| Environment Agency Flood Warning Code  | What to do!   | Evacuate?  |
|--|---|--|
| <p><b>Flood Alert</b> (Flooding Possible. Be aware/prepared! Watch Out).</p>  | <ul style="list-style-type: none"> <li>• Monitor flood risk through media and Floodline Warnings Direct.</li> <li>• Locate occupants and inform them of risk. If away from the site make assessment on risk if considering returning to site (i.e. how long it will take to return etc).</li> <li>• Begin to implement Flood Plan.</li> <li>• Gather Flood Kit and provisions in the event that evacuation is not possible.</li> <li>• Consider advice given from emergency services/Environment Agency.</li> </ul> | <p>Optional.</p> <p>Drive carefully if evacuating as roads may be flooded or closed.</p> <p>If evacuation is not possible people should reside across the building with their flood kit.</p> |
| <p><b>Warnings no longer in force</b> (No further flooding is expected in the area. Be careful).</p>   | <ul style="list-style-type: none"> <li>• Return to site upon instruction from emergency services and assess any damage.</li> <li>• Contact insurance company depending on damage caused.</li> <li>• Beware of flood debris.</li> <li>• Do not touch sources of electricity.</li> </ul>  | <p>Not applicable.</p>   |

**6.3 Vulnerable Groups**

- 6.3.1 The occupants at the site may include vulnerable groups such as elderly people, those with sensory or physical disabilities, minority ethnic groups, or the infirm. Priority will need to be given to these people during the flood event.
- 6.3.2 Vulnerable groups should be identified by the occupants and priority should be given to these groups during the event.

**6.4 Safe Access/Egress**

- 6.4.1 Safe refuge across the site is available during all flood events.
- 6.4.2 The proposed access road would become inundated during flood events. By consulting the flood level of 6.45m AOD, together with LIDAR data and hazard data in Table 13.1 of *FD2320/TR2*, the hazard to people leaving the site would be *Very low*.
- 6.4.3 A flood response plan will be compiled to ensure that the occupants are aware of the flood risk and procedures to take before, during and after a flood.

## **6.5 Insurance**

- 6.5.1 The Association of British Insurers (ABI) published a guidance document in 2012 entitled *Guidance on Insurance and Planning in Flood Risk Areas for Local Planning Authorities in England*.
- 6.5.2 The ABI guidance sets out the requirements of the insurance industry when considering flood risk and insurability of the property. The guidance suggests that properties should be protected for flood events up to the 1 in 100 year event in order to access insurance at a competitive price.
- 6.5.3 The guidance also states that insurers would of course prefer to cover properties which are not at risk of flooding, however, for those properties which are at risk of flooding insurers would prefer that the properties are raised above the flood level, over resistance measures which prevent floodwater from entering the building, or resilience measures which allows floodwater to enter the building.
- 6.5.4 The buildings will be set above the climate change 1 in 100 year event and 1 in 1000 year event. Therefore, the ABI's requirement of protection during a 1 in 100 year event will be met and there will be a good chance of the site being insured at a competitive rate.

## **7. OTHER SOURCES OF FLOODING**

### **7.1 Groundwater Flooding**

- 7.1.1 In order to assess the potential for groundwater flooding during higher return period rainfall events, the Jacobs/DEFRA report entitled *Strategy for Flood and Coastal Erosion Risk Management: Groundwater Flooding Scoping Study*, published in May 2004, was consulted, together with the guidance offered within the document entitled *Groundwater flooding records collation, monitoring and risk assessment (ref HA5)*, commissioned by DEFRA and carried out by Jacobs in 2006.

#### **Soil and Geology at the Site**

- 7.1.2 To assist with determining the soil and geology at the site, the various soil and hydrogeological data, listed in Section 2 has been referred to.
- 7.1.3 It can be seen from the various soil and hydrogeological data, listed in Section 2, that the soils beneath the site comprise clay deposits.

#### **Groundwater Flooding Potential at the Site**

- 7.1.4 There have been no recorded groundwater flood events across the area between 2000 and 2003, as indicated by the Jacobs study. Figure 1402-B-3.2 of the SFRA shows that there have been no historical incidents of groundwater flooding at the site or within the immediate vicinity.

### **7.2 Surface Water Flooding and Sewer Flooding**

- 7.2.1 Surface water and sewer flooding across urban areas is often a result of high intensity storm events which exceed the capacity of the sewer thus causing it to surcharge and flood. Poorly maintained sewer networks and blockages can also exacerbate the potential for sewer flooding. Surface water flooding can also occur as a result of overland flow across poorly drained rural areas.
- 7.2.2 Figure 1402-B-3.2 of the SFRA shows that there have been no historical incidents of sewer or surface water flooding at the site or within the immediate vicinity. Table 4B of the SFRA also confirms that there have been no recorded historical reports of sewer flooding at the site.
- 7.2.3 The Agency's Surface Water Flooding Map (Figure 5) and Figure 1402-B-4.2 of the SFRA shows that there is a very low surface water flood risk (i.e. less than 1 in 1000 year chance) across the buildings.
- 7.2.4 It is generally accepted that the low risk flood event (i.e. between 1 in 1000 years and 1 in 100 years) on the Agency's map is used as a substitute for the climate change 1 in 100 year event to provide a worst-case scenario.





**Figure 5: Environment Agency Surface Water Flooding Map (Source: Environment Agency, 2022)**

### 7.3 Reservoirs, Canals And Other Artificial Sources

- 7.3.1 The failure of man-made infrastructure such as flood defences and other structures can result in unexpected flooding. Flooding from artificial sources such as reservoirs, canals and lakes can also occur suddenly and without warning, leading to high depths and velocities of flood water which pose a safety risk to people and property.
- 7.3.2 The Environment Agency’s “Risk of flooding from reservoirs” map suggests that the site is not at risk of flooding from such sources.

## **8. CONCLUSIONS**

- It is the Client's intention to change the use of the existing buildings from offices to a residential use.
- The site is located within Flood Zone 3a.
- The existing floor level is set at 6.55m AOD and therefore above all modelled flood levels including the climate change 1 in 100 year event thus providing safe (dry) refuge.
- A warning and evacuation strategy has been developed within this assessment. It is proposed that the occupants register with the *Agency's Flood Warnings Direct* and prepare a *Family Flood Plan*.
- It is considered that there is a low risk of groundwater flooding at the site from underlying deposits and a very low risk of surface water flooding and artificial sources.

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## **DRAWINGS**

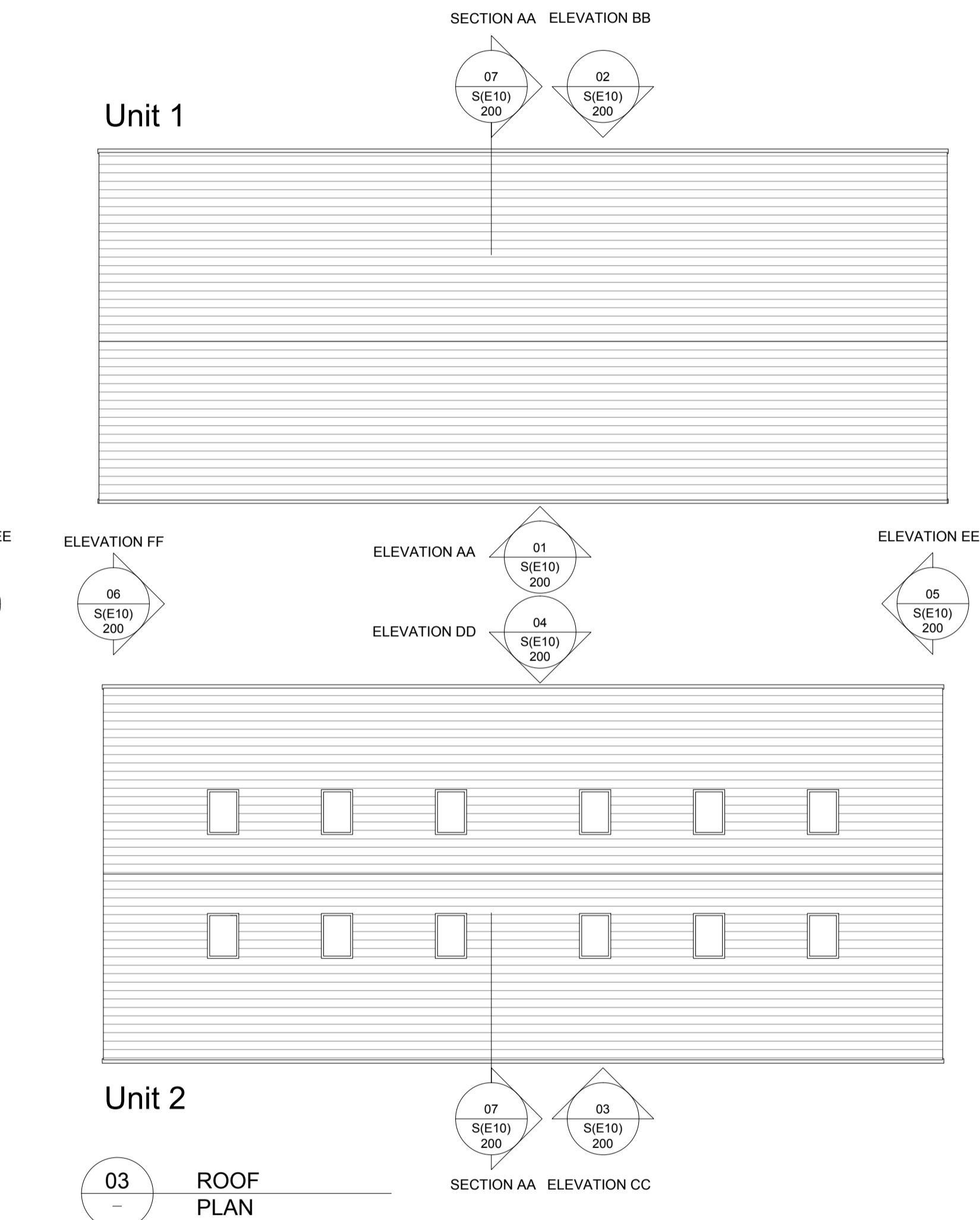
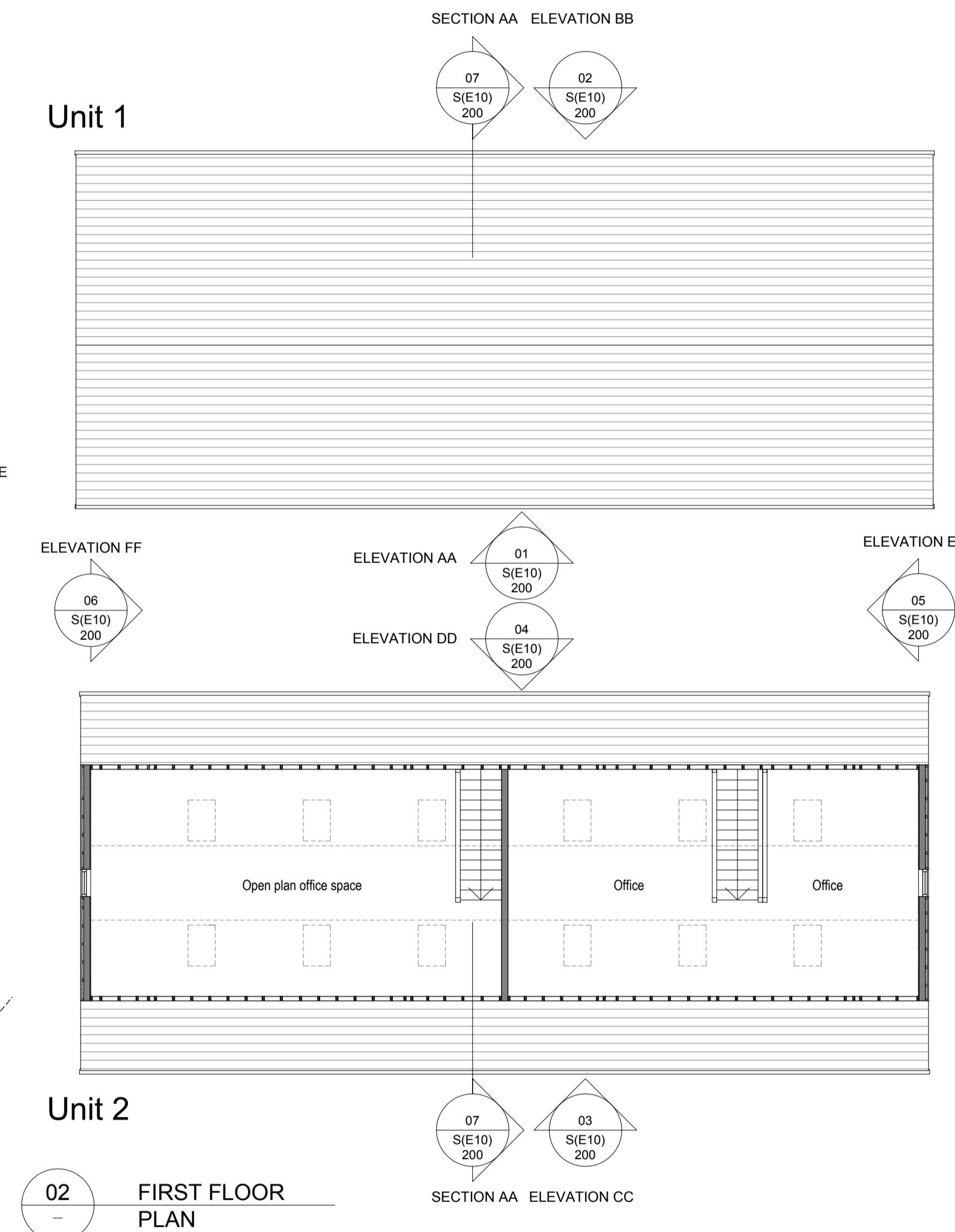
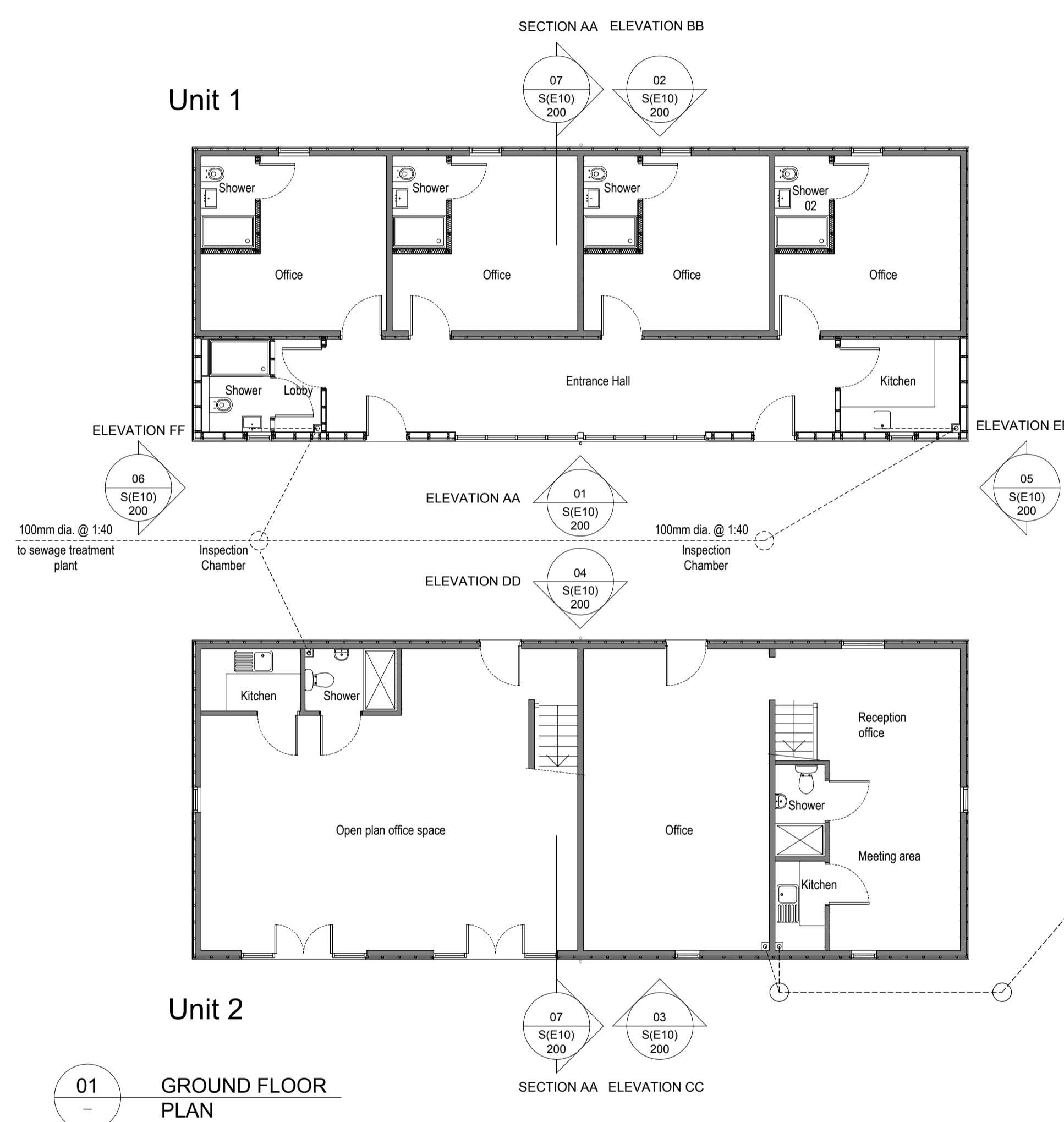
**Notes:**

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It is the contractor's responsibility to ensure compliance with the Building Regulations.

It is the contractor's responsibility to check all dimensions on site, any discrepancy to be reported immediately

Details and sizes shown are indicative only and are subject to confirmation by the relevant Specialist Sub-contractor.



|        |                |           |           |
|--------|----------------|-----------|-----------|
| REV: - | DATE: 11.10.22 | DRAWN: CD | CHECK: CD |
|--------|----------------|-----------|-----------|

**CHIRAG DESAI ARCHITECTS**

|                                      |                             |
|--------------------------------------|-----------------------------|
| CLIENT: Quail Property Charles Quail | PROJECT: Rectory Farm Barns |
|--------------------------------------|-----------------------------|

|                      |                  |
|----------------------|------------------|
| Existing Floor Plans | SCALE: 1:100 @A3 |
|----------------------|------------------|

|                         |        |
|-------------------------|--------|
| DRG No. 1025_S(E10)_100 | REV: - |
|-------------------------|--------|

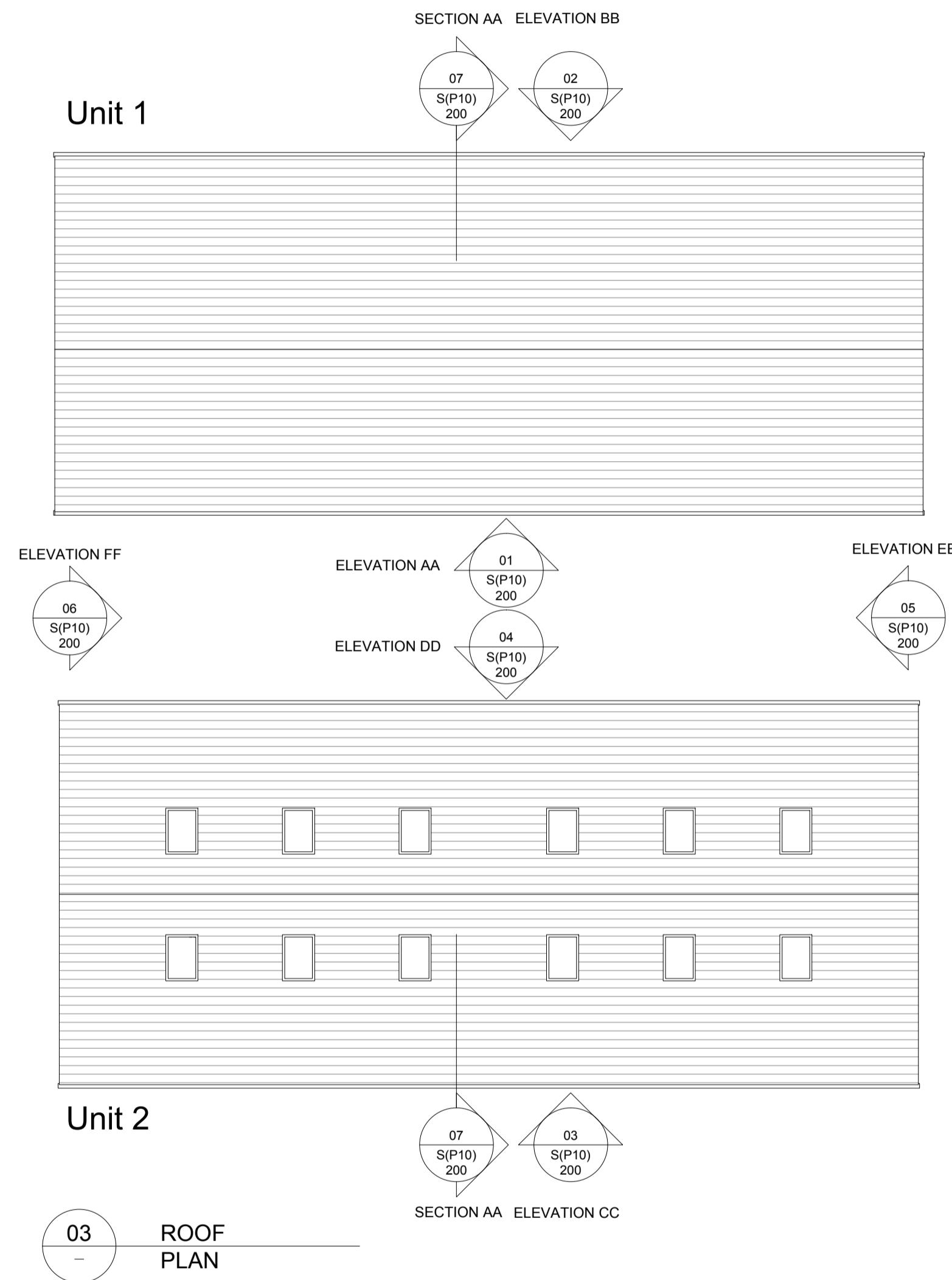
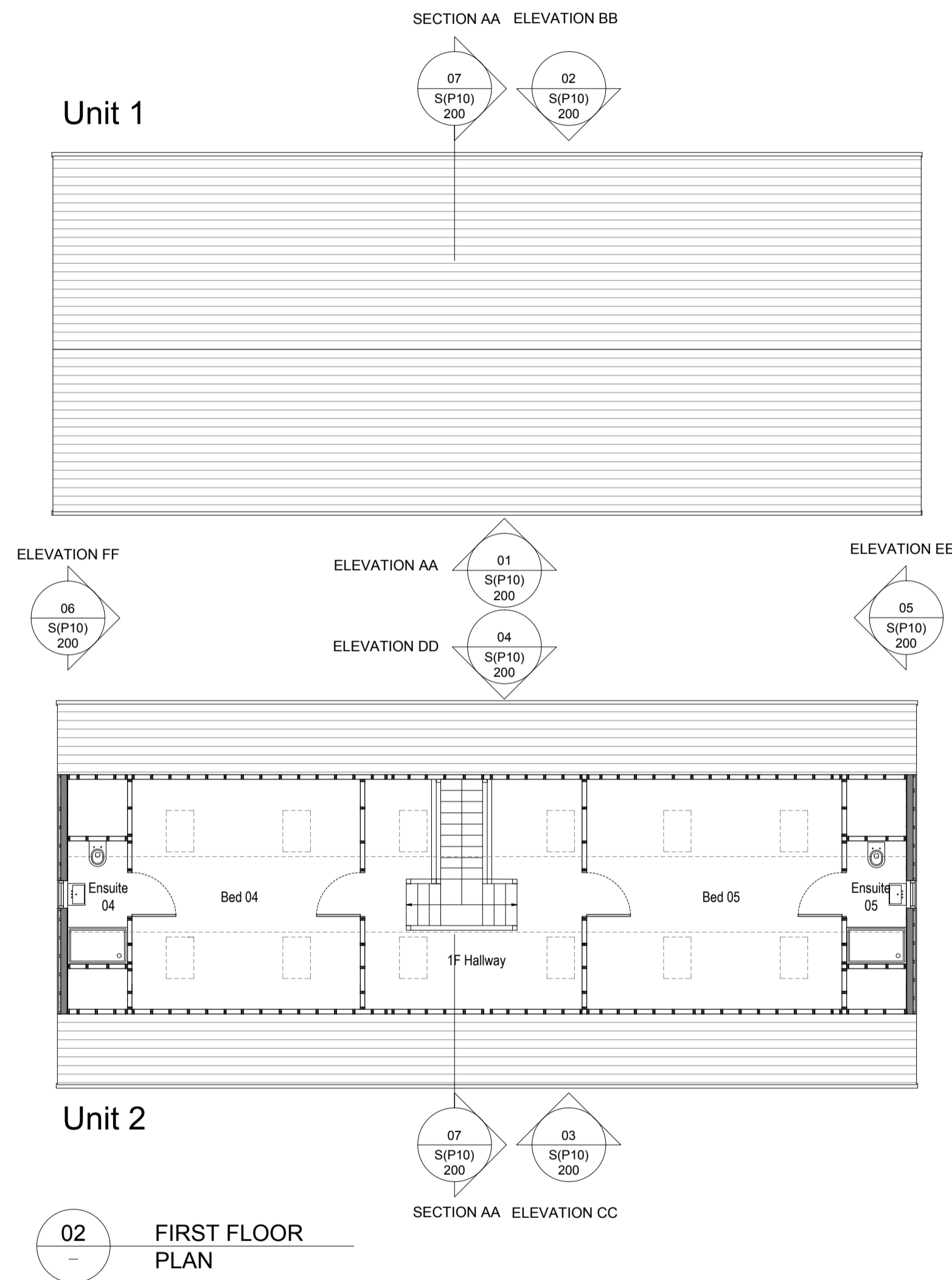
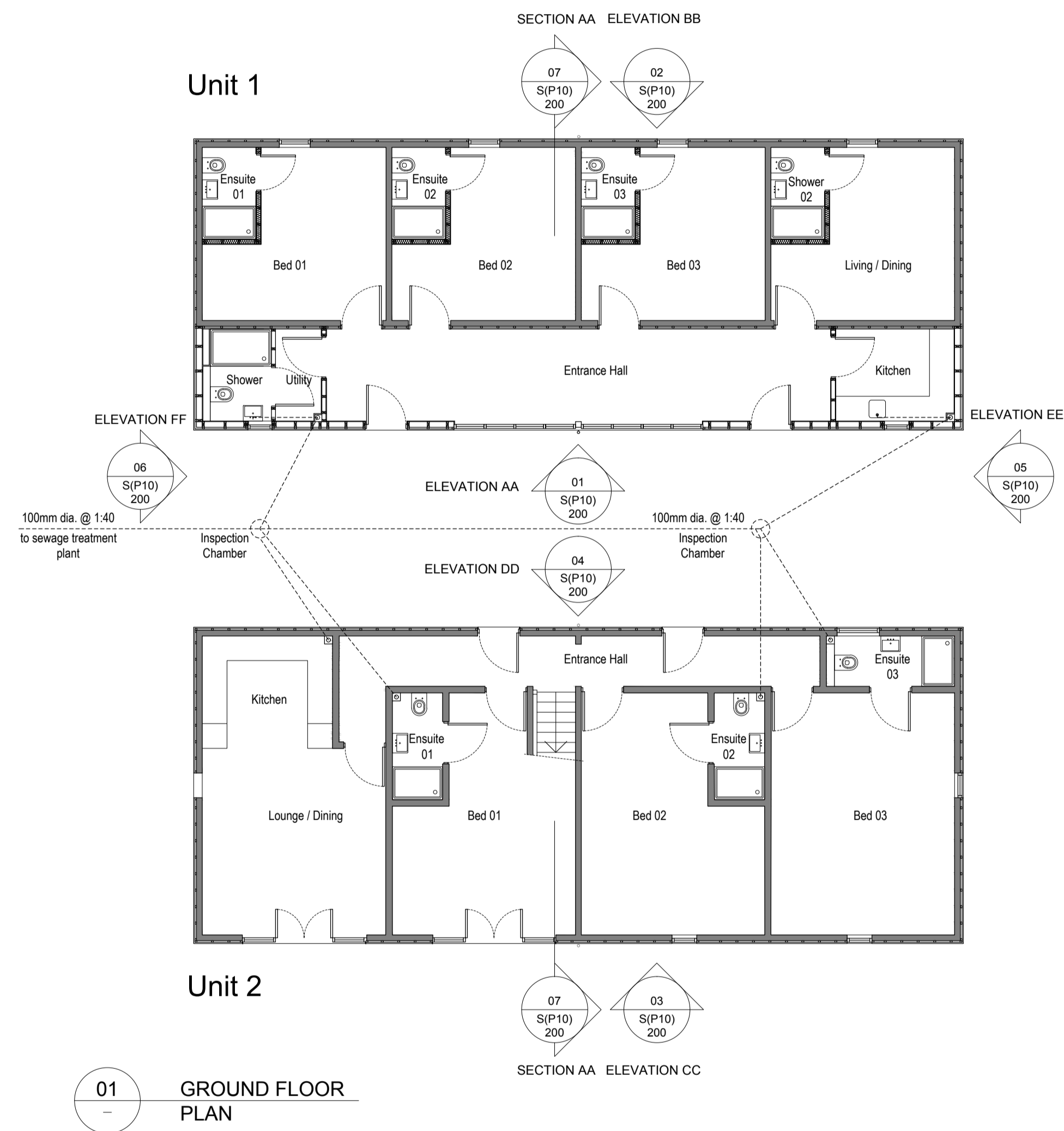
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01 GROUND FLOOR PLAN

02 FIRST FLOOR PLAN

03 ROOF PLAN

|        |                |           |           |
|--------|----------------|-----------|-----------|
| REV: - | DATE: 11.10.22 | DRAWN: CD | CHECK: CD |
|--------|----------------|-----------|-----------|

# CHIRAG DESAI ARCHITECTS

|  |                                   |
|--|-----------------------------------|
| CLIENT:<br>Quail Property<br>Charles Quail | PROJECT:<br>Rectory Farm<br>Barns |
|--|-----------------------------------|

|                      |                       |
|----------------------|-----------------------|
| Proposed Floor Plans | SCALE<br>1:100<br>@A3 |
|----------------------|-----------------------|

|                            |          |
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| DRG No.<br>1025_S(P10)_100 | REV<br>- |
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