

17th January 2020

Our ref: GE18103/LL01v2.0/200117
Your ref: LU/354/19/DOC



Mrs A Gardner
Arun District Council
Arun Civic Centre
Maltravers Road
Littlehampton
BN17 5LF

Dear Mrs Gardner,

RE: Land South of Cornfield Close Littlehampton BN17 6LD- Approval of details reserved by condition imposed under ref LU/330/18/PL relating to Condition Nos 9 - periodic verification reports

We write on behalf of Thakeham Homes Limited further to your letter dated 17th December 2019 from Neil Crowther, Group Head of Planning, within which you stated that Arun District Council have decided to refuse the discharge of Condition Number 9 for the site which states:

Within 3 months of the start of the development, the Developer shall agree a timetable for submission of periodic verification reports to demonstrate the completion of works set out in the approved remediation strategy and the effectiveness of the remediation. The reports shall include a maintenance plan in respect of contamination, including a timetable of monitoring and shall be submitted to, and approved in writing, by the local planning authority. The report shall include results of sampling and monitoring carried out in accordance with the approved verification plan to demonstrate that the site remediation criteria have been met. The development shall proceed in accordance with approved details.

Reason: To ensure that the site does not pose any further risk to human health or the water environment by demonstrating that the requirements of the approved verification plan have been met and that remediation of the site is complete in accordance with Arun Local Plan policies QE SP1 and QE DM4.

The council have requested clarification of several points and this letter serves to address those queries raised as detailed in below:

- 1) Confirmation is required as to which, if any, of the suggested ground gas remedial options presented in Geo-Environmental - Updated RSVP (ref.: GE17106-RSVPv1.2-GE-NOV19, dated November 2019) will be used on site.**

Geo-Environmental have undertaken a review of the gas protection measure details proposed for the site. Thakeham Homes propose to install gas protection measures in line with Option 1 of the updated RSVP (Ref: GE17106-RSVPv1.2-GE-NOV19. Page 7 of the RSVP states:

In accordance with BS8485, the proposed residential development is considered to comprise a Type A buildings (residential) and thus, with a gassing regime of CS2, any gas protection measures installed within the proposed buildings are required to achieve a cumulative score of at least 3.5 (Table 4 BS8485:2015).

As such and in accordance with BS8485 and CIRIA C665 the following gas protection measures, or a combination of a selection of the following gas protection measures will be required to be installed within all buildings of the

Geo-Environmental Services Ltd

Environmental Consultants | Geotechnical Engineers | Site Investigations

Geo-Environmental Services Ltd incorporated in England number 3214980 VAT number 679544479



proposed development:

Reinforced concrete cast in situ floor slab (suspended, non-suspended or raft) with at least 1200g DPM and sufficient reinforcement to mitigate/control cracking and minimal services penetrations through (and sealed to) the slab. (BS8485 gives this a score of 1.0-1.5 depending on reinforcement and services penetration. The 1200g DPM is likely to have a score of zero);

Option 1 – Reinforced concrete floor slab

The floor construction will comprise a reinforced cast in-situ floor slab where service penetrations are reduced to a minimum and where possible are not brought through the floor slab. The floor slab will comprise sufficient reinforcement to mitigate/control cracking within the floor. This floor construction would achieve a score of **1.5** points.

In addition, a suitable gas resistant membrane meeting the criteria listed within BS8485 will also be installed within the floor. The membrane must be resistant to methane and carbon dioxide (and compliant with BS8485), suitably installed and independently validated. It should be noted that membranes made from recycled plastics are not acceptable as gas protection membranes and the installer must check to confirm that the membrane is not made from recycled plastics. Installation of a gas resistant membrane will give a score of **2** points.

Installation of a reinforced floor slab and suitable gas resistant membrane would achieve a cumulative score of **3.5** points and therefore complying with the requirements of BS8485 for a CS2 classification for Type A buildings.

- 2) Furthermore, exceedances of methane, carbon dioxide, oxygen, carbon monoxide, hydrogen sulphate and VOCs were previously identified, however only methane and carbon dioxide concentrations are discussed -this should be clarified.**

We have previously responded to this same query when by raised building control in relation to the initial RSVP report (ref. GE17106-RSVP-GE-NOV18, dated December 2018).

Table 1 contained within our Remediation Strategy Report (ref. GE17106-RSVPv1.2-GE-NOV19, dated 2019) details the recorded minimum and maximum concentrations of all gases monitored during the continuous gas monitoring period (Methane, Carbon dioxide, Oxygen, Carbon Monoxide, Hydrogen Sulphide and VOCs). The numbers in bold are the maximum monitored results for the 3 week duration of the continuous monitoring period, not identified exceedances. The recorded levels of Carbon Monoxide, Hydrogen Sulphide and VOC's on site do not exceed Occupational exposure limits (OELs), either short term or long term, or Environmental Assessment Levels (derived by the Environment Agency), therefore this is why they are not discussed further in the report as they are not considered to be a risk to the proposed building or users thereof.

We understand that it is proposed to utilise a Juta GP1 membrane as part of the development, GP1 is specifically designed and manufactured to perform as a Methane, Carbon Dioxide, Radon, Ground Gas, VOC, air & Moisture protection system, and therefore will provide a sufficient level of protection to the building and users from the elevated concentrations of gases (Methane and Carbon Dioxide) identified beneath the site.

It is understood that Thakeham Homes Limited have previously provided a copy of the plans for the gas protection measure details to the Council, however please find updated plans enclosed within Appendix A. The gas protection measures are to be installed and verified by Keytech with additional independent validation then also undertaken by Geo-Environmental.

3) The submission does not address the information as required by condition 9.

Condition 9 requests a timetable for submission of periodic verification reports to demonstrate the completion of works set out in the approved remediation strategy and the effectiveness of the remediation. The reports shall include a maintenance plan in respect of contamination, including a timetable of monitoring and shall be submitted to, and approved in writing.

The Water Quality Monitoring Plan (WQMP) Table 6.1 presents the proposed groundwater monitoring plan for agreement. Section 8.0 of the WQMP details the validation works that will be undertaken, provides a tentative timescale for works and details that a phased validation is proposed with plots broken down into proposed CML dates. As such the first phase of Validation will comprise the groundwater monitoring works to be undertaken during the main phase of piling and intrusive groundworks on site.

Subsequent validation reports will be produced per phase in line with the RSVP and WQMP for the various elements required for each phase of plots ahead of the CML dates as detailed in Table 9.1 of the WQMP.

Closure

We trust we have interpreted your request correctly and provided sufficient information for your current requirement and to allow the discharge of Condition 9.

Should you have any queries please do not hesitate to contact us.

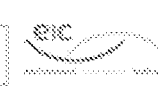
Yours sincerely

For and on Behalf of Geo-Environmental



Laura Legate CGeol, CSci, BSc (Hons), MSc, FGS
Regional Manager - West

Appendix A – Updated gas protection measure drawing details (Drawing refs: M637-60.25.01, M637-60.26.01, M637-60.50.03 & M637-60.50.04)

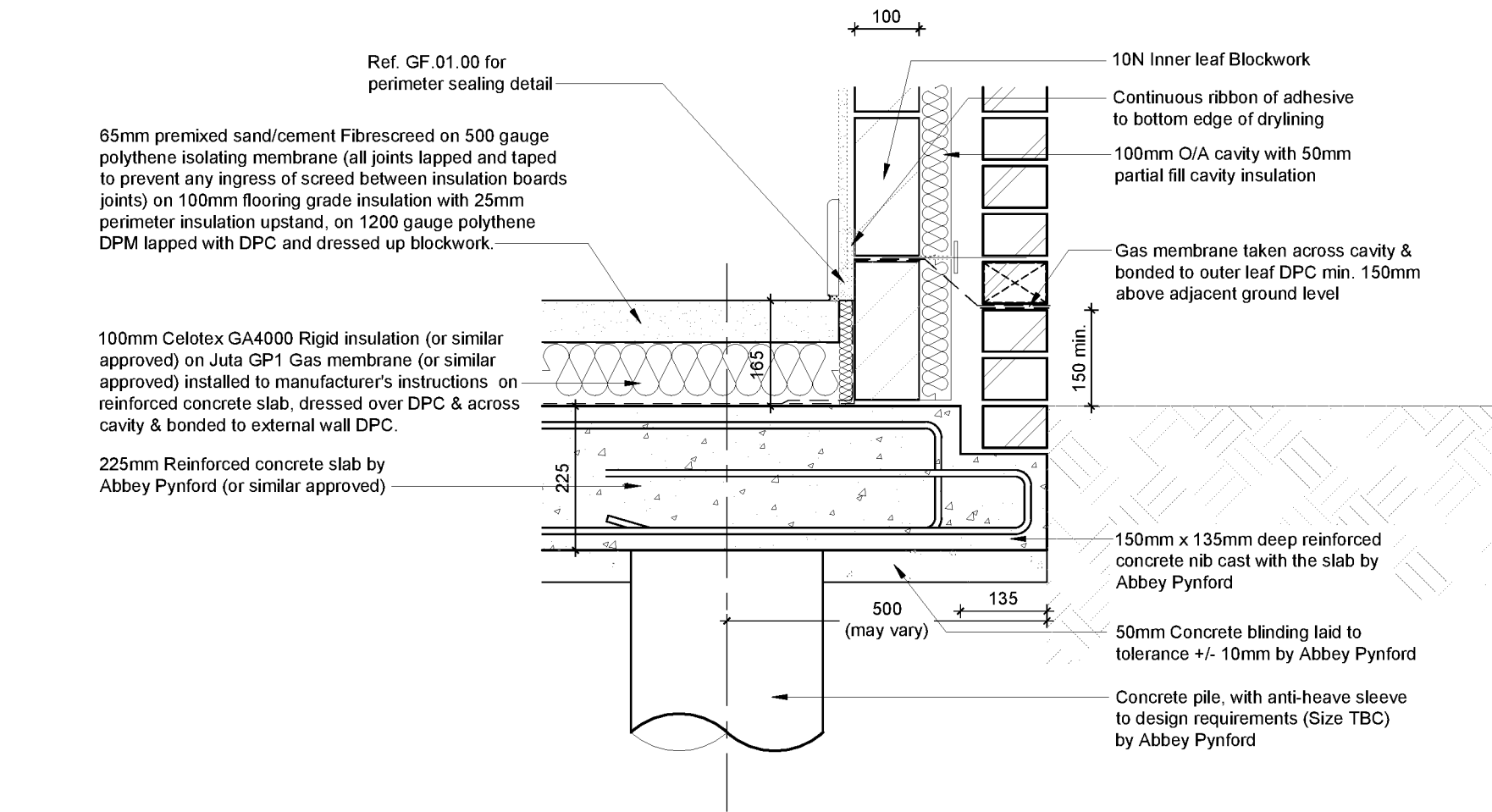




APPENDIX A

**Updated gas protection measure drawing details (Drawing refs:
M637-60.25.01, M637-60.26.01, M637-60.50.03 & M637-60.50.04)**

Drawing to be read in conjunction with Construction Specification & Standard Details



M637_60.50.01

SUBSTRUCTURE KEY	
STRUCTURAL	
	Ventilated concrete slab floor construction on piled foundations designed & detailed by Abbey Pynford.
	Air Bricks to external cavity walls linked by telescopic connector
	Loadbearing wall over.
SERVICES	
	Incoming Gas main
	Incoming Water main
	Incoming Electric Main
	Incoming BT main BT FO Duct
	(SVP) - Stack & Vent Pipe / (FS) - Floor Socket / (ICD) - Condensate Drain
	(RWP) - Rainwater Pipe
	Water supply to lockable tap
	Universal Gas Meter Box
	Gas Meter (Internal)
	Electricity Meter (Internal)

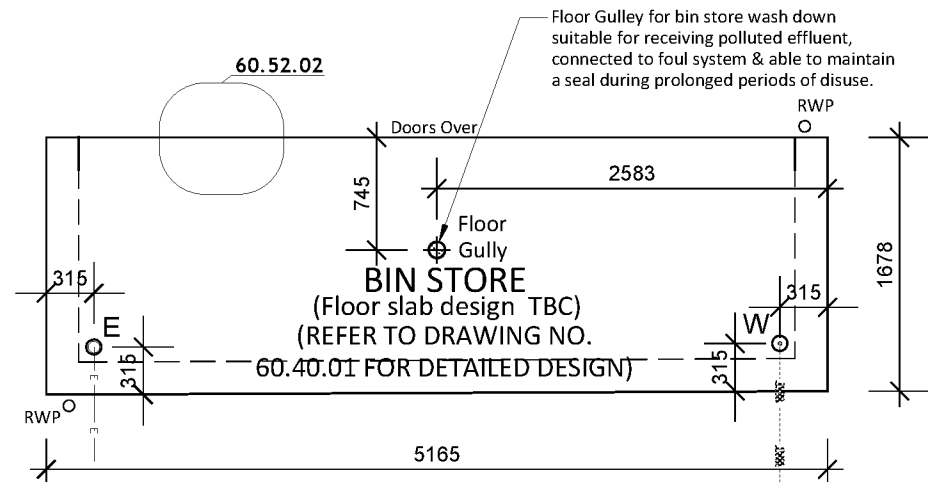
SUB-FLOOR NOTES
1. Diagonal Check dimensions are from external face of concrete nib.
2. Refer to Abbey Pynford drawings for Foundation Design/Details.

READ IN CONJUNCTION WITH ENGINEERS DRAWINGS

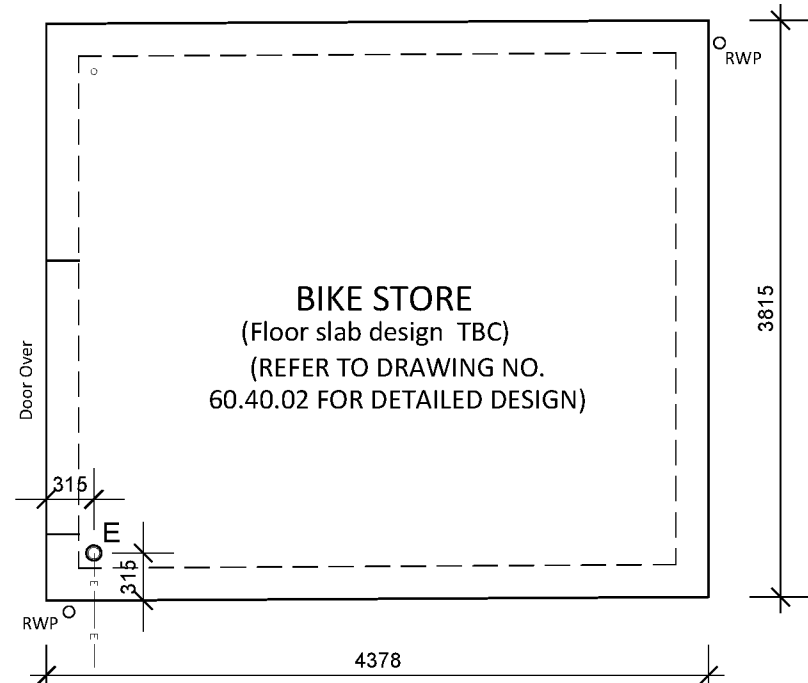
REFER TO CIVIL ENGINEERS DRAWINGS FOR FFL

WATER SUPPLIES TO BE INSULATED TO BYLAW 49

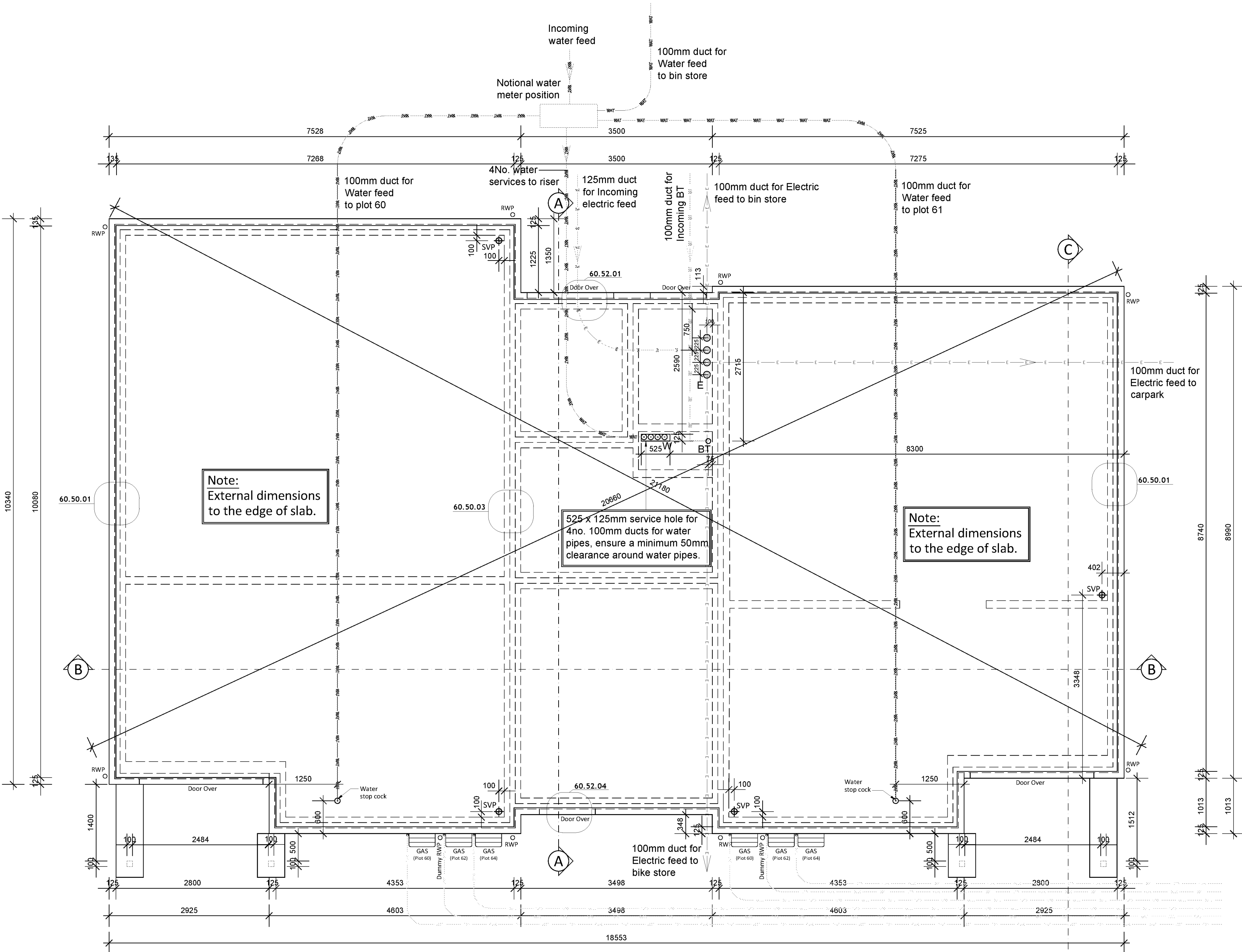
GAS METERS MIN. 225mm FROM ANY AIRBRICK



SUBSTRUCTURE LAYOUT
FLAT BLOCK A - BIN STORE



SUBSTRUCTURE LAYOUT
FLAT BLOCK A - BIKE STORE



SUBSTRUCTURE LAYOUT
FLAT BLOCK A
Plot 60

FLAT BLOCK A
Plot 61

Littlehampton - Plots 60 To 65 (Flat Block A) - Substructure Layout

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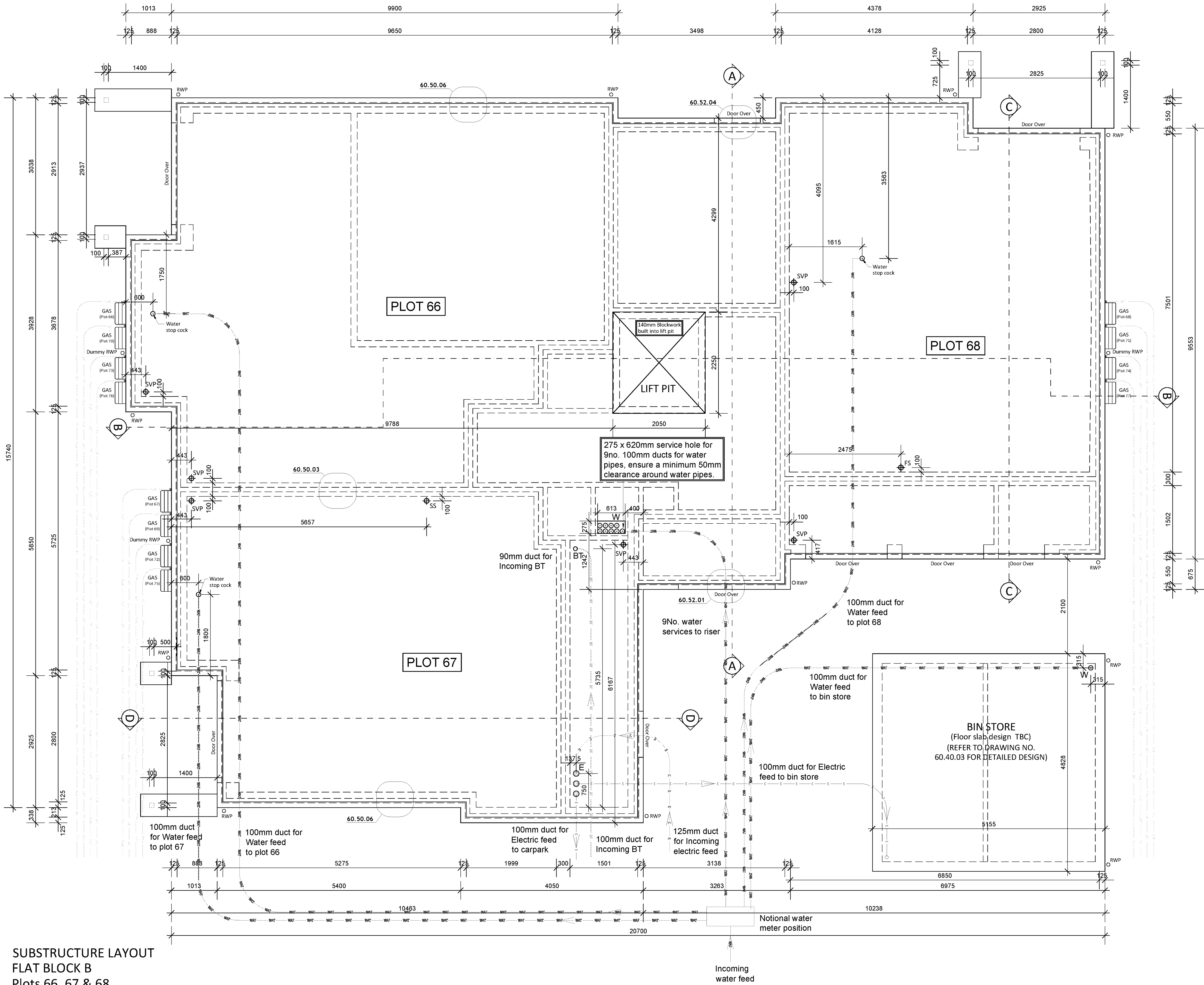
Any surveyed information incorporated within this drawing cannot be guaranteed as accurate unless confirmed by fixed dimension.

REV	DATE	DESCRIPTION	INITIAL	CHECKED
C04	10.01.20	INCOMING SERVICES AMENDED TO SUIT LATEST SERVICE INFORMATION.	AJH	CD
C03	19.12.19	WATER PIPES SPACED OUT & NOTE ADDED.	AJH	CD
C02	09.10.19	SUB FLOOR VOID & VENTS OMITTED.	AJH	CD
C01	12.06.19	ISSUED FOR CONSTRUCTION	AJH	CD
P04	15.03.19	SUBSTRUCTURE LEGEND UPDATED & TELESCOPIC VENTILATORS INDICATED.	AJH	CD
P03	28.02.19	LOAD BEARING WALLS ADJUSTED AS CLOUDDED.	AJH	CD
P02	20.12.18	SERVICE POSITIONS AMENDED.	AJH	CD
P01	07.12.18	PRELIMINARY ISSUE	AJH	CD

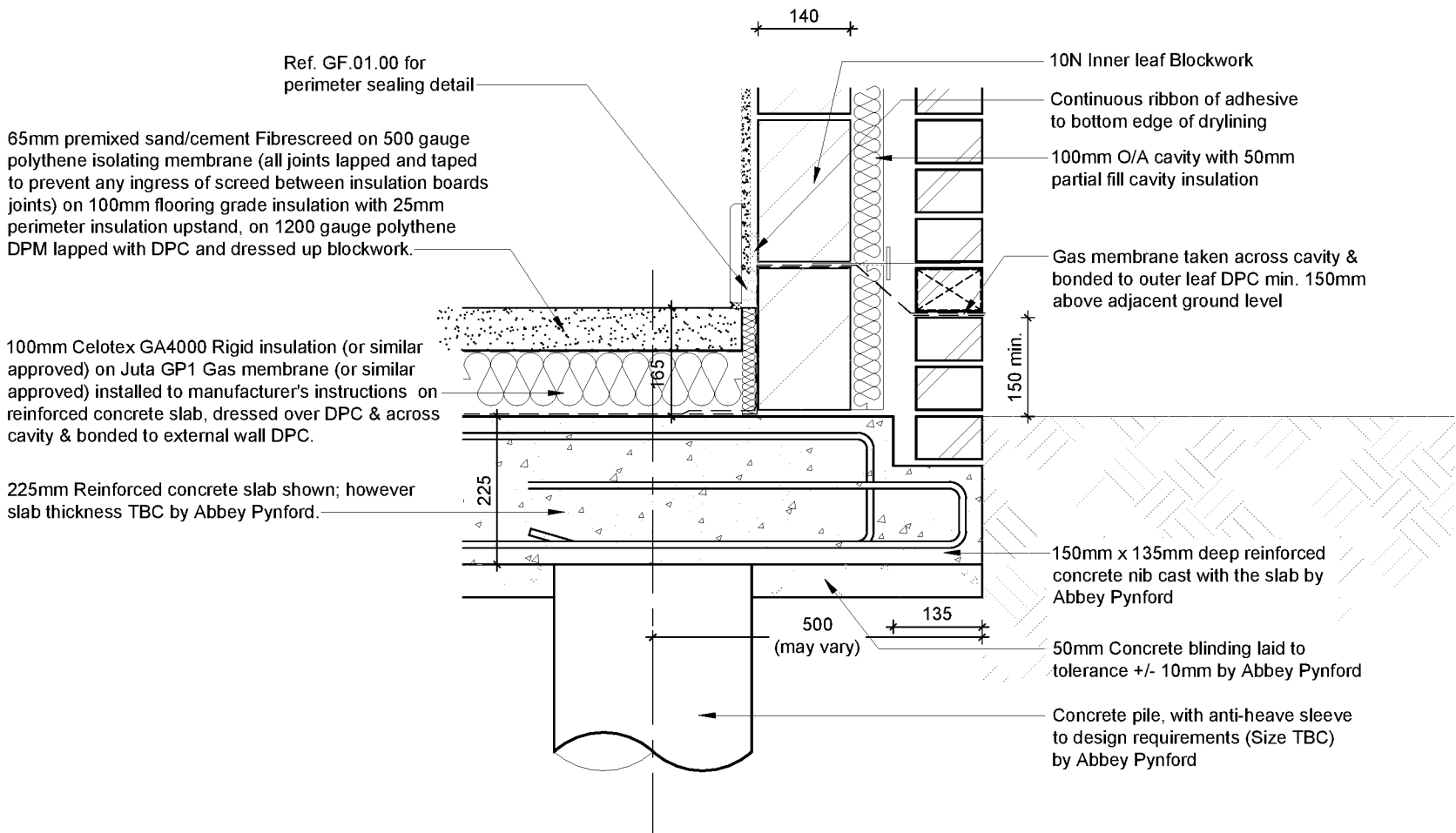
CONSTRUCTION

HP architecture	
CLIENT	THAKEHAM CLIENT
PROJECT	CORNFIELD CLOSE, LITTLEHAMPTON
TITLE	PLOTS 60 TO 65 - FLAT BLOCK A SUBSTRUCTURE PLAN
SCALE	1:50 @ A1
DATE	05/12/18
PROJECT NO.	18.335
DRAWN	AJH
CHECKED	CD
M634_60.25.01 C04	

Drawing to be read in conjunction with Construction Specification & Standard Details



SUBSTRUCTURE LAYOUT
FLAT BLOCK B
Plots 66, 67 & 68



M637_60.50.06

SUBSTRUCTURE KEY	
STRUCTURAL	
	Ventilated concrete slab floor construction on piled foundations designed & detailed by Abbey Pynford.
	Air Bricks to external cavity walls linked by telescopic connector
	Loadbearing wall over.
SERVICES	
	Incoming Gas main
	Incoming Water main
	Incoming Electric Main
	Incoming BT main BT FO Duct
	{SVP} - Slack & Vent Pipe / {FS} - Floor Socket / {CD} - Condensate Drain
	{RWP} - Rainwater Pipe
	Water supply to lockable tap
	Universal Gas Meter Box
	Gas Meter (Internal)
	Electricity Meter (Internal)

SUB-FLOOR NOTES
1. Diagonal Check dimensions are from external face of concrete nib.
2. Refer to Abbey Pynford drawings for Foundation Design/Details.

READ IN CONJUNCTION WITH ENGINEERS DRAWINGS

REFER TO CIVIL ENGINEERS DRAWINGS FOR FFL

WATER SUPPLIES TO BE INSULATED TO BYLAW 49

GAS METERS MIN. 225mm FROM ANY AIRBRICK

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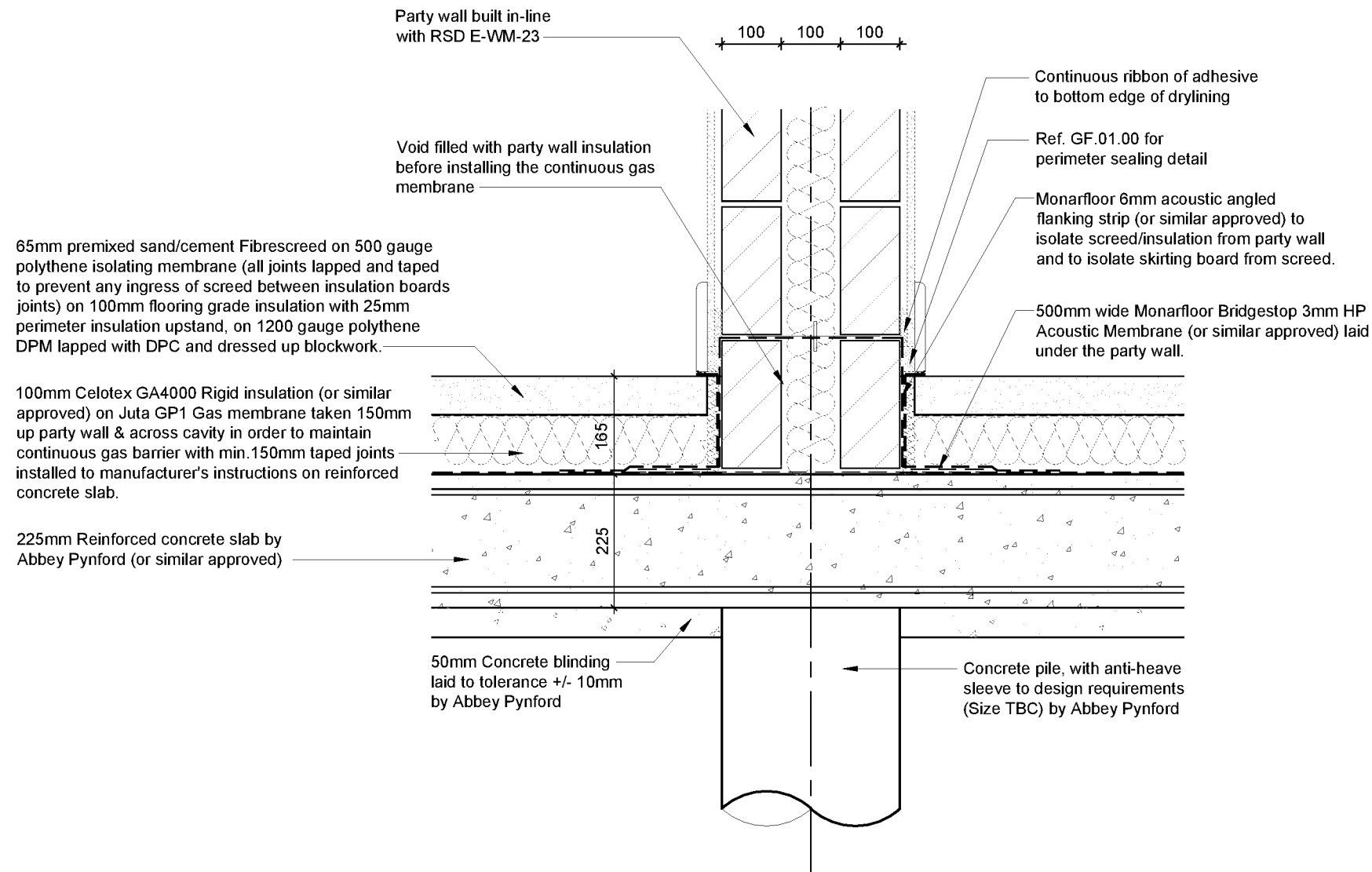
Littlehampton - Plots 66 To 77 (Flat Block B) - Substructure Layout

CD4	10.01.20	INCOMING SERVICES AMENDED TO SUIT LATEST SERVICE INFORMATION.	AJH	CD
CD3	19.12.19	WATER PIPES SPACED OUT & NOTE ADDED.	AJH	CD
CD2	09.10.19	SUB FLOOR VOID & VENTS OMITTED.	AJH	CD
CD1	12.06.19	ISSUED FOR CONSTRUCTION	AJH	CD
P06	28.03.19	SVP POSITIONS ADJUSTED SLIGHTLY, WATER SUPPLY & AIRBRICK NOTES ADDED TO LAYOUT, ELECTRIC FEED ADDED FOR CARPARK & NOTE ADDED TO BINSTORE.	AJH	CD
P05	18.03.19	SUBSTRUCTURE LEGEND UPDATED, TELESCOPIC VENTILATORS INDICATED, EXTERNAL WALLS MOVED OUT AS CLOUDED.	AJH	CD
P04	28.02.19	PORCH RWP ADDED, SOME 140MM WALLS REMOVED INTERNALLY	AJH	CD
P03	22.01.19	DRAINAGE POSITIONS AMENDED AS CLOUDED.	AJH	CD
P02	20.12.18	SERVICE POSITIONS AMENDED.	AJH	CD
P01	07.12.18	PRELIMINARY ISSUE	AJH	CD
REV	DATE	DESCRIPTION	INITIAL	CHECKED

CONSTRUCTION

HP architecture		enquiries@architecture.co.uk	
CLIENT		THAKEHAM CLIENT	
PROJECT		CORNFIELD CLOSE, LITTLEHAMPTON	
TITLE		PLOTS 66 TO 77 - FLAT BLOCK B SUBSTRUCTURE PLAN	
SCALE	DATE	PROJECT NO.	
1:50 @ A1	05/12/18	18.335	
DRAWN	CHECKED	M637_60.26.01 C04	
AJH	CD		

Drawing to be read in conjunction with Construction Specification & Standard Details



PARTY WALL/G.F. SLAB SUBSTRUCTURE DETAIL - MASONRY APARTMENTS

(GROUND WORKS TO BE IN STRICT ACCORDANCE WITH ENGINEERS DETAILS & INFORMATION)

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Party Wall/G.F. Slab Substructure Detail

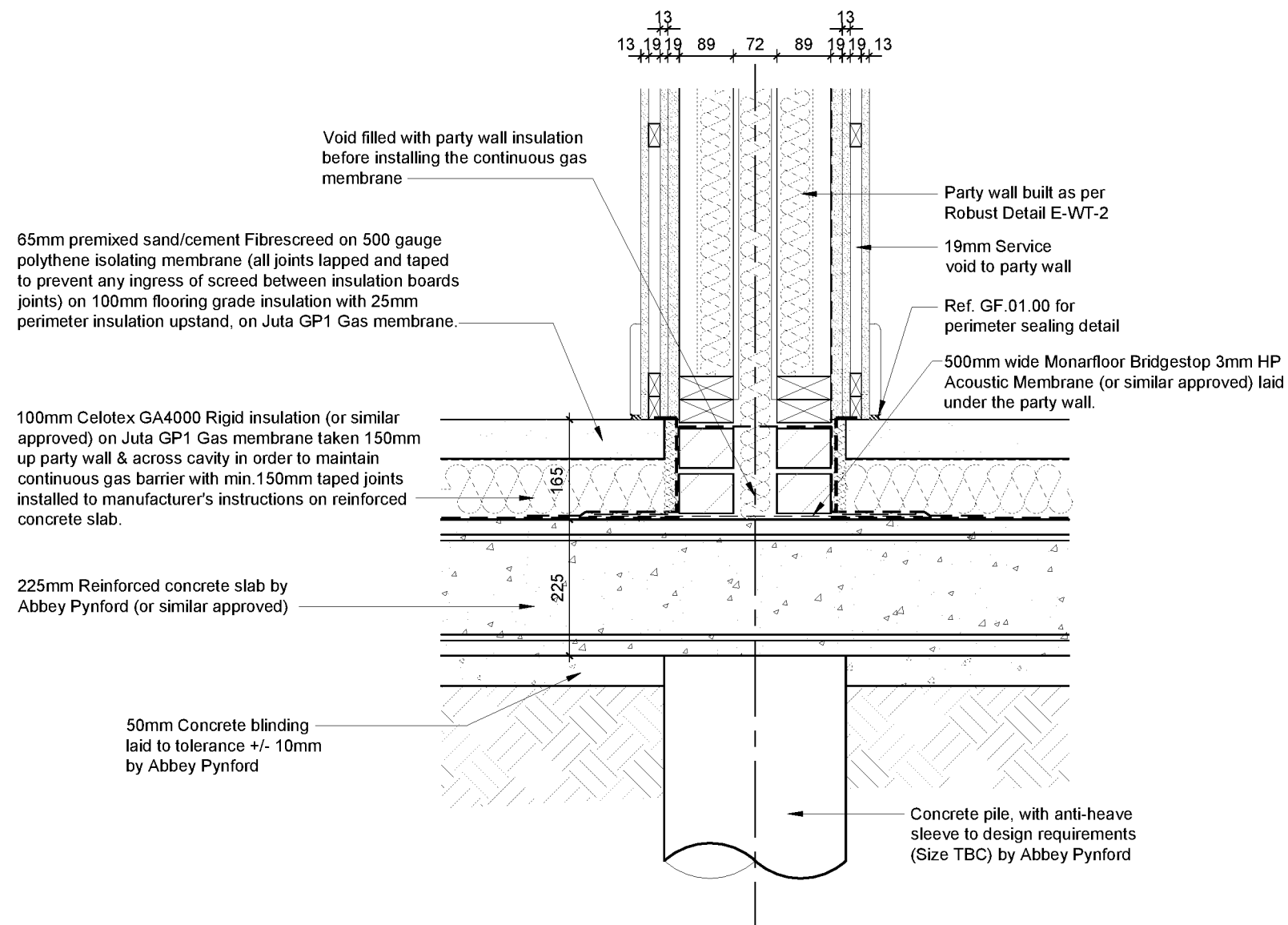
Littlehampton - (Masonry Apartments)

C03	19.12.19	DETAIL UPDATED TO SUIT GAS MEMBRANE COMMENTS.	A/H	C
C02	09.10.19	SUB FLOOR VOID & VENTS COMMITTED & DPCS UPDATED.	A/H	C
C01	12.06.19	ISSUED FOR CONSTRUCTION	A/H	C
P02	07.03.19	225mm AIR VOID AND TELESCOPIC VENTS INTRODUCED.	A/H	C
P01	07.12.18	FIRST ISSUE	A/H	C
REV	DATE	DESCRIPTION	INITIAL	CHECK

		enquiries@architecture.co.uk 01344 752 271	
CLIENT TAKEHAM CLIENT			
PROJECT CORNFIELD CLOSE, LITTLEHAMPTON			
TITLE PARTY WALL/G.F. SLAB SUBSTRUCTURE MASONRY APARTMENTS			
SCALE	DATE	PROJECT NO.	
1:10 @ A3	07/12/18	18.335	
DRAWN	CHECKED	M637_60.50.03 C03	
AJH	CD		

CONSTRUCTION

Drawing to be read in conjunction with Construction Specification & Standard Details



PARTY WALL/G.F. SLAB SUBSTRUCTURE DETAIL - TIMBER FRAME HOUSES

(GROUND WORKS TO BE IN STRICT ACCORDANCE WITH ENGINEERS DETAILS & INFORMATION)

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Party Wall/G.F. Slab Substructure Detail

Littlehampton - (Timber Frame Houses)

C03	19.12.19	DETAIL UPDATED TO SUIT GAS MEMBRANE COMMENTS.	A/H	C
C02	09.10.19	SUB FLOOR VOID & VENTS OMITTED, PARTY WALL DETAIL AMENDED.	A/H	C
C01	12.06.19	ISSUED FOR CONSTRUCTION	A/H	C
P02	07.03.19	225mm AIR VOID AND TELESCOPIC VENTS INTRODUCED.	A/H	C
P01	07.12.18	FIRST ISSUE	A/H	C
REV	DATE	DESCRIPTION	INITIAL	CHECK

CONSTRUCTION

		enquires@architecture.co.uk 01344 752 271	
CLIENT THAKEHAM CLIENT			
PROJECT CORNFIELD CLOSE, LITTLEHAMPTON			
TITLE PARTY WALL/G.F. SLAB SUBSTRUCTURE TIMBER FRAME HOUSES			
SCALE 1:10 @ A3	DATE 07/12/18	PROJECT NO. 18.335	
DRAWN AJH	CHECKED CD	M637_60.50.04 C03	