

14/06/2016

Refrigeration Scope of Works



The Co-operative Group
Acquisition

Southleigh Road, Emsworth
Hampshire
PO10 7TA

Produced by Joshua Silveira

Scope of works

- | | |
|--------------------------|------------------------------------|
| 1. Cold Rooms | 8. Electrical |
| 2. New chiller cold room | 9. Refrigeration Plant |
| 3. New freezer cold room | 10. CDM Compliance |
| 4. Air Conditioning | 11. Exclusions |
| 5. Alarm System | 12. Documentation |
| 6. Display Cases | 13. Required Information in Tender |
| 7. Condensate drainage | 14. Builders works |

This is an acquisition site in Hampshire formerly trading as a Spar to be extended to the rear. The store is located on the main road. Offload and crange will be an issue. The site will be cleared by the landlord prior to vacant possession.

The proposal is to convert to a Co-op convenience store in the time frame shown on the Main Contractor's programme of works.

All equipment should be ordered in good time to avoid any delays with procurement lead times.

The Main Contractor is to ensure a 100mm recess is provided for the Freezer coldroom with a 3mm tolerance well ahead of cold room delivery as shown on AB Group CR1 Sales and BOH dwg.

The Main Contractor will also provide a level base for external plant as shown on AB Group CR3 plant drawing ahead of plant delivery.

The appointed Refrigeration Contractor shall be responsible for arranging and managing the proposed delivery and installation of a dual temperature pack located internally, remote condenser and air conditioning equipment located externally along with the coldroom and cabinets.

New pipe work and associated electrics are to be installed on high level hangers to all HT fixtures, LT freezer cold room and AC equipment by Refrigeration Contractor.

A Snagging Report will be issued by AB Group ahead of Practical Completion to allow sufficient time to close out any defects picked up.

All works by all trades are to be defect free by Practical Completion.

Refrigeration Contractor to ensure Main Contractor's programme of works allows sufficient time to guarantee the site can be (HVACandR) defect free by Practical Completion.

Gravity drainage is a compulsory requirement, any pumps used need an exception notice approved by Co-op's Technical Performance & Design Manager.

Scope of Works

The Refrigeration Contractor will be responsible for the following

- Positioning of all plant
- All hangers, tray and bracketry for Refrigeration/ AC services
- All Refrigeration/AC pipe work and associated electrical services routed from the plant to the cooled fixtures as per AB Group CR2 dwg
- Fitting and services to Evaporators
- Fitting and electrical services to evaporator and condenser control panels
- Fitting and services to transducers
- Fitting cabinet & coldrooms condensate drains (gravity system)
- Fitting cabinet coldroom pumps (Co-op approval needed, please refer to section7.)
- Managing all Refrigeration/AC works on site
- Liaison with Cabinets & Cold Room Contractor
- Adherence to Co-op latest specification

The service route must follow the AB Group CR2 services drawing, any variances to the route are to be agreed with AB Group and Main Contractor before being carried out. Any costs associated to the variation must be then agreed by Co-op PM or Co-op appointed QS. Failure to adhere to this could result in additional works being unfunded.

A new shop services distribution board and associated sub main is to be supplied and installed by the Refrigeration Contractor for connection to the new plant, remote and integral cases and all associated refrigeration plant, AC and alarm equipment.

The proposed location of this distribution board is adjacent to the plant room door subject to space being available.

The Refrigeration Contractor shall ensure sufficient ways are available to provide supplies to all equipment detailed on AB Group proposed layout. The Refrigeration Contractor shall feed all associated refrigeration equipment from this distribution board including all remote cases, AC, plant, integrals, ice cream fridge, condensate pumps, hubs, RDM equipment etc.

1. Cold Rooms

- Remote chiller and freezer cold room to the warehouse area
- Installed by nominated cold room supplier

2. New chiller cold room

- LED lighting. PIR sensor controlled to include emergency light combined unit.
- Door switch
- Personnel entrapment alarm and emergency lighting
- Strip curtain [Seymour] fitted by cold room contractor, with order from Refrigeration Contractor
- Install new electrical supplies
- All holes must be sealed with hypafoam finished with white sealant, by Refrigeration Contractor

3. New freezer cold room

- LED lighting. PIR sensor controlled to include emergency light combined unit.
- Door switch
- Personnel entrapment alarm
- Strip curtain [Seymour] fitted by cold room contractor, with order from Refrigeration Contractor
- Install insulated condensate c/w 26w/m wrapped heater tape
- Install new electrical supplies
- Connect the PRV, floor heater etc
- All holes must be sealed with hypafoam finished with white sealant, by Refrigeration Contractor

4. Air Conditioning

- 2 off ceiling mounted cassettes supplied by Mitsubishi Electric to be installed in sales floor ceiling as reflected in CR1 and CR2 by the Refrigeration Contractor
- Positioning is to be co-ordinated with electrical contractor to save clashing with new LED lighting layout [which is awaited].
- The AC units are to set to 20c and programmed to switch off outside of the stores normal trading hours
- Ceiling cassettes are to be supported from the structure by AV mounts, similar to FIBET Stud Mount 2015VV18-35, M6. Selection to be made subject to the weight to be imposed in shear mode
- In addition 1 off wall mounted unit to be sited within the manager's office is to be fitted
- Local isolation required to both outdoor and indoor units

5. Alarm System

A new touch screen RDM Data Manager is to be supplied and installed to the latest software version and all required optimization enabled. In addition, a battery backup facility is to be provided.

All remote & integral display cabinets, plant, entrapment alarms and the cold rooms shall be connected on to the alarm and monitoring system.

Any condensate pumps will need to be connected to alarm system.

The Appointed Refrigeration Contractors design & selections must incorporate the new 'energy initiatives' required by the Co-operative Group refrigeration specification to include:

- LED lighting to the cold room
- Strip curtains
- Emergency lighting to the cold room
- Personnel trapped alarm
- Trim heater control via 'RDM Humidistat' to be incorporated on all FGD cases (including integrals when available)
- Suction pressure transducers to the remote cases
- TD probes to the remote condensers (where fitted)
- The appointed refrigeration contractor shall ensure that the new cases are supplied with the correct controls and alarm probes. The BWS cases and frozen food cases are also to be connected to the network).
- Trim heater control via 'RDM Humidistat' to be incorporated on all FGD cases.
- The Appointed Refrigeration Contractor shall ensure that the alarm system is connected to the store dial-out system. The connection, testing and witnessing shall be done in conjunction with the Initial Alarm Engineer and the Appointed Refrigeration Contractor's Project Manager. A dialout test certificate shall be signed by all three parties and a copy shall be inserted in the O&M manual. In addition, the panel is to be configured for remote access via the RDM website.

6. Display Cases

- The new sales floor remote cases are detailed on the latest proposed Coop drawing number: Emsworth – P1F2M0 and AB CR1 layout drawing
- The remote cases will be manufactured by EPTA
- The integral freezer cases will be supplied and fitted by Capital Cooling

7. Condensate drainage

Gravity drainage is a compulsory requirement, any pumps used need an exception notice approved by Co-op's Technical Performance & Design Manager.

If pumps are approved and used a connection will need to be made to the alarm system.

Please refer to condensate drainage specification following this scope.

8. Electrical

- A new shop services Distribution board and associated sub main is to be supplied and installed BOH for connection to the cooled fixtures and associated refrigeration, plant, AC and alarm equipment
- The Refrigeration Contractor shall ensure sufficient spare ways are available to provide supplies to all equipment detailed on proposed layout
- Separation between HV & LV cabling to be allowed for.
- Provide electrical supplies to all new remote and integral cases including ice cream
- Supplies to the new RDM equipment
- Supplies to the new plant, cold rooms and AC

9. Refrigeration Plant

- Supply and install a new R407a housed dual temperature pack, sited in BOH as shown on CR3 drawing
- The pack is to be protected with warehouse grade floor bumper, supplied and fitted by builder
- The pack is to be connected to the RDM data manager
- The condenser fan speed night and day must be set and checked, run speed voltages are stated on AB CR3 Plant legend, for example, if legend states day setpoint is 5.7v this equates to 57%, thus RDM should be set at 43 (10v or 100% would require RDM to be set at 0)

10. CDM Compliance

The Appointed Refrigeration Contractor must comply with the Construction (Design and Management) Regulations 2015. The Refrigeration Contractor will be required to provide all method statements and risk assessment to the Principal Contractor.

11. Exclusions

The Appointed Refrigeration Contractor must include for all works necessary to deliver a fully working refrigeration installation.

12. Documentation

Notwithstanding the documentation already described, the Refrigeration Contractor shall provide contract documentation in accordance with the Co-op Refrigeration Specification dated Sept 2011.

The refrigeration installation contractor must ensure that all aspects of the installation conform to the Co-op Refrigeration Specification.

13. Required Information in Tender

The following information is required to be returned to the Main Contractor and AB Group:

- Method statement detailing the proposed phasing/programme of works
- Completed Cost Schedules of Rates
- BWIC Note this must be provided
- Heat load calculation (heating requirement)

14. Builders works (not exhaustive)

- 100mm recess to Freezer coldroom as per AB Group CR2 dwg
- Provide all service holes as where required
- Maintenance lighting to the new plant area and a single SSO
- Gravity condensate facility to the remote cases and coldrooms
- Suitable non slip floor finish to the chiller coldroom
- Suitable mechanical and/or passive ventilation to the integral cold-room plant assume 3.4kw THR with an air change of 2000m³/hr air volume x 2 units
- Key clamp protection to the internal plant

HAZARD/RISK EVALUATION						
The Construction (Design and Management) Regulations 2015						
Designer's Risk Assessment				Project	Emsworth	
Evaluation by AB GROUP (INSTALLATION)				AB Job No	QR R1648	
Design Element: Refrigeration system Installation, Service & Maintenance				Issue Date	15/06/16	
Assessment by: Joshua Silveira				Revision	A	
Item	Hazard	Party Affected	Severity	How Likely	Score	Mitigation
Installation of new refrigeration plant future removal or decommissioning Works.	. Risk of trap or crush injury during lifting.	Refrigeration & M&E Contractor. General site operatives.	3	1	3	New Plant to be lifted by specialist Contractor. Loads and lifting method to be fully assessed prior to works. Area around Lift to be cordoned off & managed.
Installation of refrigeration services at high level. Future maintenance & repair or decommissioning of same.	Risk of fall from high level, also risk of injury from falling objects during installation, repair or decommissioning works. Risk of injury from live services.	Refrigeration Contractor & Service - Installation Contractors.	3	1	3	All installation and future service works to be undertaken using suitable access platforms. Operatives to be suitably qualified. Area below works to be cordoned off and managed during works to prevent unauthorised access. All services to be isolated prior to service, repair or removal works.
Installation or replacement of heavy or unmanageable items of plant.	Plant to be located in a designated plant area. Risk of injury from lifting or positioning of heavy or unmanageable items of equipment.	Refrigeration Contractor, general site operatives and store staff.	3	1	3	Compressors or other heavy items to be lifted using suitable equipment. Area around working area to be cordoned off during lifting operation.
Installation or Removal of Display Cabinets.	Risk of personal injury during handling and positioning of Cabinets.	Cabinet & Installation operatives.	2	1	2	Works to be undertaken by specialist contractor. Delivery and positioning to be coordinated by Main Contractor. Work areas to be cordoned off to prevent unauthorised access.
Insulated Coldstore installation, modification or removal.	Risk of personal injury during handling and positioning of coldroom panels. Collapse of partially built structure. Risk of store staff suffering from hypothermia if trapped.	Coldroom installation & general site operatives.	3	1	3	Works to be undertaken by specialist contractor. Delivery and positioning to be coordinated by Main Contractor. Work areas to be cordoned off to prevent unauthorised access. Internal door release and a personnel entrapment alarm to be fitted in all coldrooms. Emergency lighting required.
Refrigeration pipework pressure testing.	Risk of pipework or component rupture. Refrigerant leak, high pressure refrigerant and oil escaping from the pipes at high velocity.	Refrigeration Contractor and other site operatives.	3	1	3	Works to be undertaken by trained operatives. Services to be isolated prior to works .All works to be coordinated with Main Contractor or Store Management. Work areas to be cordoned off. Ensure all joints are brazed correctly. RDM alarm system to alarm on plant fail or low liquid level in receiver.
Welding and brazing during construction maintenance.	Fire, risk of injury from burns.	Refrigeration Contractor and Store Staff	3	1	3	Hot works to be undertaken by trained operatives. Works to be carried out in line with site safety requirements .Use of PPE and segregation of work areas mandatory.
Vandalism / Unauthorized access.	Risk of Severe injury or death.	General public or unauthorised persons.	3	1	3	Areas containing Plant or Hazardous materials to be fenced and secured to prevent unauthorised access. Permit to work system requiring task specific risk and method statements to be instigated.
Electrical wiring installation.	Risk of fall from high level, also risk of injury from falling objects during installation, repair or decommissioning works. Risk of injury from live services.	Electrical installation and other site operatives.	3	1	3	Circuit breakers and isolators for each individual case, AC and plant. Tidy all cables to prevent any loose ends.

Under Severity

- 1 Slightly Harmful
- 2 Harmful
- 3 Extremely Harmful

Under Likelihood

- 1 Very Rare
- 2 Infrequent
- 3 Frequent
- 4 Constant

The scores should be interpreted as follows:-

- 1 or 2 No Action Required.
- 3 to 4 Moderate - Look at ways of reducing the risk, but the cost and time used should also be considered.
- 5 to 7 Substantial - Work should not be commenced or continued until the risk is reduced, and considerable expense should be afforded to reduce risk.
- 9< Intolerable – All work should be prohibited unless unlimited resources are available to reduce the risk.

The Co-operative 610 Southleigh Road

Emsworth
Hampshire
PO10 7TA

Plant Noise Impact Assessment

On behalf of



Project Reference: 854215421 | Revision: 00 | Date: 15 June 2016

Document Information

Project Name : The Co-operative, Southleigh Road, Emsworth
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	Name	Qualifications	Initials	Date
Prepared by:	Adam Meakins	PgDip, AMIOA	AM	15 June 2016
Reviewed and approved by:	Teli Chinelis	BSc(Hons), PgDip, MIOA, CEng, MImechE	TC	15 June 2016
For and on behalf of Noise Solutions Ltd				

Revision	Date	Description	Prepared	Reviewed/ Approved

Noise Solutions Ltd (NSL) disclaims any responsibility to the Client and others in respect of any matters outside the scope of this report. This report has been prepared with reasonable skill, care and diligence within the terms of the Contract with the Client and generally in accordance with the appropriate ACE Agreement and taking account of the manpower, resources, investigations and testing devoted to it by agreement with the Client. This report is confidential to the Client and NSL (Noise Solutions Ltd) accepts no responsibility of whatsoever nature to third parties to whom this report or any part thereof is made known. Any such party relies upon the report at their own risk.

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Reg no. 3483481 Trading office Unit 6, LDL Business Centre, Station Road West, Ash Vale, GU12 5RT

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1.0 Introduction

- 1.1. Noise Solutions Ltd (NSL) has been commissioned by the AB Group to provide a plant noise impact assessment for the plant serving a proposed Co-operative store located at 610 Southleigh Road on Emsworth in Hampshire.
- 1.2. An environmental sound survey has been undertaken to establish the prevailing background sound levels at a location representative of the sound levels outside the nearest noise sensitive receptors to the site.
- 1.3. Cumulative plant noise emission levels for the proposed plant have been predicted at the most affected noise sensitive receptors and assessed using guidance in BS4142: 2014.

2.0 Details of development proposals

- 2.1. The existing premises are to be refurbished and extended with the air conditioning and refrigeration plant replaced with new items of plant. The existing plant is located at the rear, southern elevation, of the store. The proposed plant will be located inside a timber hit and miss enclosure to the rear of the extended store.
- 2.2. The proposed AC plant will only operate during store opening hours (07:00 hours to 23:00 hours), the proposed refrigeration plant will operate 24 hours but at a reduced setting outside of the store's opening hours.
- 2.3. [Appendix D](#) contains a table with the manufacturer published sound pressure levels for the proposed plant.

3.0 Nearest noise sensitive receptors

- 3.1. The area surrounding the site is mostly residential with some retail premises. The nearest noise sensitive properties will be the adjacent residences (Reference R1) located at 608 Southleigh Road and 612 Southleigh Road (Reference R2). [Appendix B](#) contains an aerial photograph showing the site and surrounding area.

4.0 Existing noise climate

- 4.1. An environmental noise survey was undertaken in order to establish the typical background sound levels at locations representative of the noise climate outside the façades of the nearest noise sensitive receptors to the proposed plant area during the quietest times at which the plant will operate.

- 4.2. The results of the environmental sound survey are summarised in Table 1 below. The full set of measurement results and details of the survey methodology are presented in [Appendix C](#).

Table 1 Summary of survey results

Measurement period	Range of recorded sound pressure levels (dB)			
	L _{Amax} (10mins)	L _{Aeq} (10mins)	L _{A10} (10mins)	L _{A90} (10mins)
Daytime (07.00 - 23.00 hours)	47-75	38-50	40-48	34-38
Night-time (23.00 - 07.00 hours)	38-61	28-33	31-36	24-26

5.0 Plant noise design criteria

National Planning Policy Framework

- 5.1. The *National Planning Policy Framework (NPPF)* was introduced in March 2012. The document sets out the Government's planning policies for England and how these are expected to be applied.
- 5.2. Paragraph 123 of the *NPPF* states that planning policies and decisions should aim to:
- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
 - *mitigate and reduce to a minimum other adverse impacts on quality of life arising from noise from new development, including through the use of conditions;*
 - *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established [subject to the provisions of the Environmental Protection Act 1990 and other relevant law]; and*
 - *identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*
- 5.3. Furthermore the *NPPF* gives weight to the requirements of the local authority as it states the following:

11. Planning law requires that applications for planning permission must be determined in accordance with the development plan unless material considerations indicate otherwise.

12. This National Planning Policy Framework does not change the statutory status of the development plan as the starting point for decision making. Proposed development that

accords with an up-to-date Local Plan should be approved, and proposed development that conflicts should be refused unless other material considerations indicate otherwise. It is highly desirable that local planning authorities should have an up-to-date plan in place.

13. The National Planning Policy Framework constitutes guidance for local planning authorities and decision-takers both in drawing up plans and as a material consideration in determining applications.

- 5.4. As the NPPF does not set out any objective noise level criteria, perhaps the guidance within BS4142:2014 could be used to establish suitable target levels for the purposes of the assessment.

Havant Borough Council

- 5.5. Planning Application APP/15//00489 covers the proposed alterations to the building Condition 5 of the Decision Notice states:

"The development hereby permitted shall not be commenced until details of all plant and equipment including the external air moving equipment and their acoustic specifications and hours of operation, have been submitted to and approved in writing by the Local Planning Authority. The development shall not be brought into use until the approved details have been fully implemented and the details shall be adhered to at all times, and the external air moving equipment shall not be operated outside the hours of operation approved under this condition."

- 5.6. Based on a review of comparable planning applications online, it is understood that Havant Borough Council typically requests that noise from fixed plant should not exceed a level 5dB below the otherwise prevailing background noise level when assessed in accordance with BS4142: 2014: *Method for rating industrial noise affecting mixed residential and industrial areas.*

BS4142:2014

- 5.7. BS4142: 2014 'Methods for rating and assessing industrial and commercial sound' is intended to be used to assess the likely effects of sound on people residing in nearby dwellings. The scope of BS4142: 2014 includes "sound from fixed plant installations which comprise mechanical and electrical plant and equipment". The standard has been referenced as appropriate for the assessment of noise from plant.
- 5.8. The procedure contained in BS4142: 2014 provides the likely effects of sound on people when comparing the specific noise levels from the source with representative background noise levels. Where the noise contains "a tone, impulse or other characteristic" then various corrections can be added to the specific (source) noise level to obtain the "rating level".

Specifically “Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.”

5.9. The likely effects of sound on people are assessed by subtracting the background noise level from the rating level. BS4142: 2014 states the following:

- *Typically, the greater this difference, the greater the magnitude of the impact.*
- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context;*
- *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*

5.10. BS4142: 2014 requires uncertainties in the assessment to be considered, and where the uncertainty is likely to affect the outcome of the assessment, steps should be taken to reduce the uncertainty.

5.11. Based on the typical requirements of Havant Borough Council it would be considered appropriate for noise from the plant, rated as per the methodology of BS4142: 2014 to be at level that is lower than 5dB below the representative L_{A90} background level.

5.12. Based on the above initial requirements, the cumulative noise rating level for the proposed plant at the nearest residential windows should not exceed the limits shown in the table below.

Table 2 Plant noise emissions limits at residences

Period	Cumulative plant noise rating level, dB(A)
Daytime (07.00 – 23.00 hours)	29
Night-time (23.00 – 07.00 hours)	19

6.0 Plant noise impact assessment

- 6.1. The cumulative plant noise level at the most affected noise sensitive receptors has been predicted. The assessment has considered the directivity of sound propagation, as well as screening and distance losses between the source and the receiver.
- 6.2. The predictions during the daytime period have been based on the proposed AC and refrigeration plant operating simultaneously at full capacity. The predictions during the night-time period have been based on the proposed refrigeration plant only, operating at a reduced capacity.
- 6.3. It should be noted that the proposed plant is not anticipated to exhibit any tonal or impulsive characteristics provided it is well maintained. All proposed external plant will be inverter driven and, therefore, will gently ramp up and down depending on the demands on the various systems. In order to be robust, however, a +3 dB feature correction has been applied to the noise level predictions as advised in BS4142: 2014.
- 6.4. Table 4, below, summarises the results of the assessment at the most affected residential properties to the south of the plant. All other nearby receptors benefit from increased distance/screening to the plant. The full set of calculations can be found in [Appendix E](#).

Table 4 Assessment of predicted noise levels at Receptor R1

Receptor	Period	Predicted rating level at receptor, L_{Aeq} (dB)	Design criterion (dB)	Difference (dB)
R1	Daytime (07.00 - 23.00 hours)	28	29	-1
	Night-time (23:00 – 07:00 hours)	13	19	-6
R2	Daytime (07.00 - 23.00 hours)	22	29	-7
	Night-time (23:00 – 07:00 hours)	11	19	-8

- 6.5. The assessment includes the noise reduction from acoustic enclosures around the AC units.

7.0 Summary

- 7.1. Noise Solutions Ltd has been commissioned by AB Group to undertake a plant noise emissions impact assessment for the new plant at the proposed Co-operative store located at Southleigh Road in Emsworth.

- 7.2. An environmental noise survey has been undertaken to establish the existing prevailing noise levels at a location representative of the noise climate outside the nearest noise sensitive receptors to the proposed site.
- 7.3. The cumulative plant noise emission levels for the proposed plant have been predicted at the most affected noise sensitive receptor locations and assessed using guidance from BS4142:2014 and the typical requirements from Havant Borough Council.
- 7.4. The results of the assessment demonstrate that cumulative plant noise emissions from the proposed external plant should be acceptable to the local planning authority and the plant noise emissions should not be viewed as a planning constraint.

Appendix A Acoustic Terminology

Parameter	Description
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ($L_{Aeq,T}$).
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1/s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is $20\mu\text{Pa}$. The threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.
dB(A), L_{Ax}	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
Fast Time Weighting	Setting on sound level meter, denoted by a subscript F, that determines the speed at which the instrument responds to changes in the amplitude of any measured signal. The fast time weighting can lead to higher values than the slow time weighting when rapidly changing signals are measured. The average time constant for the fast response setting is 0.125 (1/8) seconds.
Free-field	Sound pressure level measured outside, far away from reflecting surfaces (except the ground), usually taken to mean at least 3.5 metres
Façade	Sound pressure level measured at a distance of 1 metre in front of a large sound reflecting object such as a building façade.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level recorded during a noise event with a period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise. $L_{A10,18h}$ is the A-weighted arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06:00-24:00.
$L_{90,T}$	A noise level index. The noise level that is exceeded for 90% of the measurement time interval, T. It gives an indication of the lower levels of fluctuating noise. It is often used to describe the background noise level and can be considered to be the "average minimum" noise level and is a term used to describe the level to which non-specific noise falls during quiet spells, when there is lull in passing traffic for example.

Appendix B Aerial Photograph of Site showing areas of interest



Appendix C Environmental Sound Survey

Details of environmental sound surveys

- C.1 Measurements of the existing background noise level were undertaken between 19:44 hours on Thursday 23rd July and 10.44 hours on Friday 24th July 2015.
- C.2 The sound level meter was programmed to record the A-weighted L_{eq} , L_{90} , L_{10} and L_{max} noise indices for consecutive 15-minute sample periods for the duration of the survey.

Measurement position

- C.3 The sound level meter was positioned along Southleigh Road. The approximate location of the sound level meter is indicated in **Appendix B**.

Equipment

- C.4 Details of the equipment used during the survey are provided in the table below. The sound level meter was calibrated before and after the survey; no significant change (+/-0.2 dB) in the calibration level was noted.

Description	Model / serial no.	Calibration date	Calibration certificate no.
Class 1 Sound level meter	Svantek 977 / 36190	25/06/2014	Factory Calibrated
Condenser microphone	ACO Pacific 7052E / 57366		
Preamplifier	Svantek SV12L / 41504		
Calibrator	CEL 284/2 /3/01920312	09/06/2015	14755

Weather Conditions

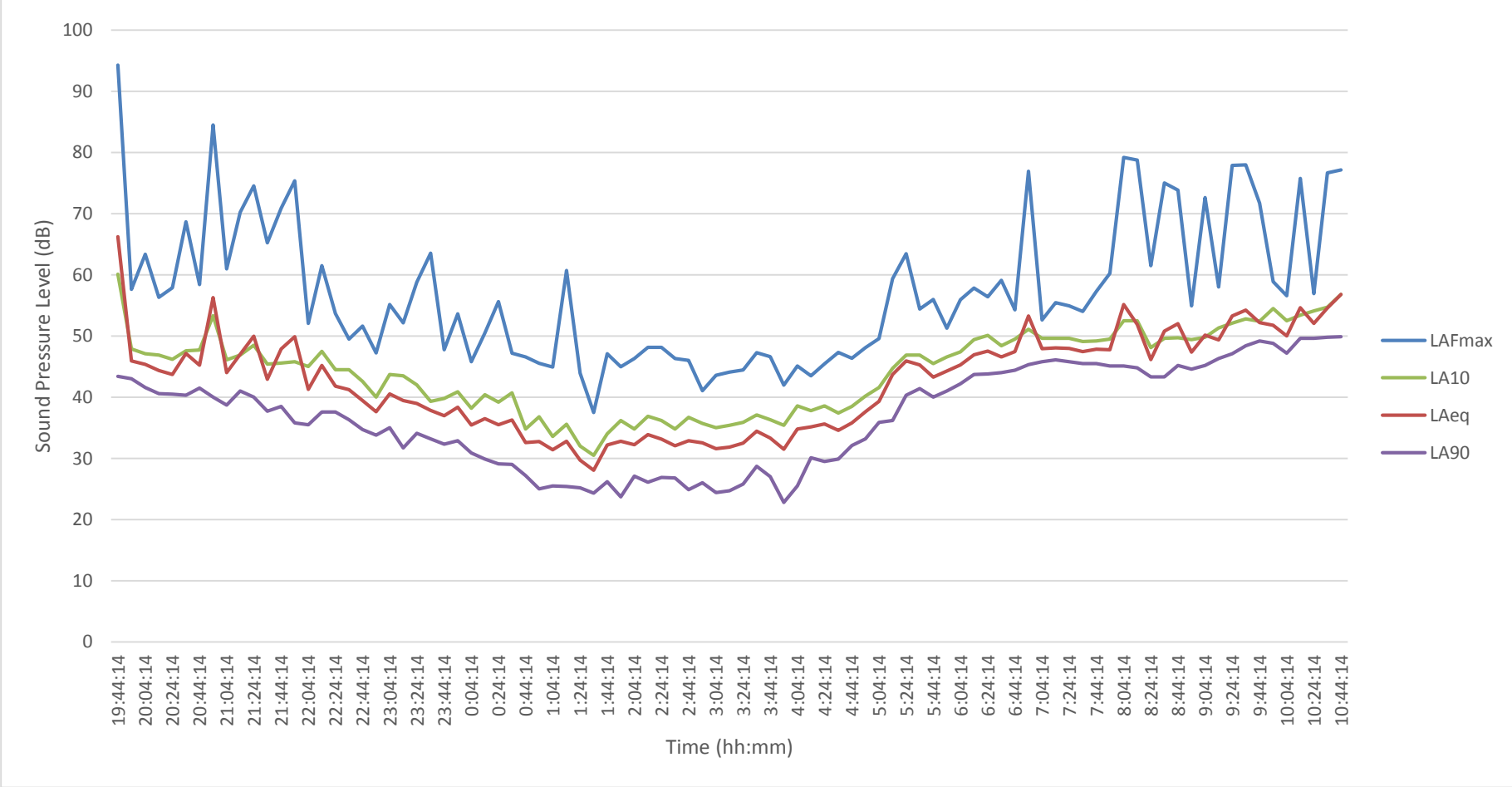
- C.5 Weather conditions were determined both at the start and on completion of the survey. It is considered that the meteorological conditions were appropriate for environmental noise measurements. The table below presents the weather conditions recorded on site at the beginning and end of the survey.

Weather Conditions																										
Measurement Location	Date/Time	Description	Beginning of Survey	End of Survey																						
As indicated on Appendix B	19:44 23/7/2015-10:44 24/7/2015	Temperature (°C)	16	14																						
Cloud Cover <table><tr><th>Symbol</th><th>Scale in oktas (eighths)</th></tr><tr><td></td><td>0 Sky completely clear</td></tr><tr><td></td><td>1</td></tr><tr><td></td><td>2</td></tr><tr><td></td><td>3</td></tr><tr><td></td><td>4 Sky half cloudy</td></tr><tr><td></td><td>5</td></tr><tr><td></td><td>6</td></tr><tr><td></td><td>7</td></tr><tr><td></td><td>8 Sky completely cloudy</td></tr><tr><td></td><td>(9) Sky obstructed from view</td></tr></table>		Symbol	Scale in oktas (eighths)		0 Sky completely clear		1		2		3		4 Sky half cloudy		5		6		7		8 Sky completely cloudy		(9) Sky obstructed from view	Precipitation:	Dry	Light rain
		Symbol	Scale in oktas (eighths)																							
			0 Sky completely clear																							
			1																							
			2																							
			3																							
			4 Sky half cloudy																							
			5																							
	6																									
	7																									
	8 Sky completely cloudy																									
	(9) Sky obstructed from view																									
Cloud cover (oktas - see guide)	3	1																								
Presence of fog/snow/ice	No	No																								
Presence of damp roads/wet ground	No	No																								
Wind Speed (m/s)	3	8																								
Wind Direction	South	East																								
Conditions that may cause temperature inversion (i.e. calm nights with no cloud)	No	No																								

Results

- 7.5. The results of the survey are considered to be representative of the background sound pressure levels at the façades of the nearest noise sensitive receptors to the proposed plant areas during the quietest times at which the plant will operate. The noise climate during the survey period was dominated by road traffic movements. The results of the survey are presented in a time history graph overleaf.

Co-operative 610 Stonleigh Road Emsworth
Sound pressure levels measured from 23rd July to 24th July 2015



Appendix D Plant information and manufacturer's sound pressure levels

Plant Item	Make/Model	Quantity	Sound pressure level (dBA)
Air Conditioning	Mitsubishi PUHZ ZRP140YKA2	2	52 @ 1m
Air Conditioning	Mitsubishi PUHZ ZRP35VKA	1	46 @ 1m
Refrigeration Condenser	Kelvion RF-NB102L3-091A-AV	1	27 @ 10m (day)
			13 @ 10m (night)

Plant noise emission impact predictions

Receptor R1 Daytime

Plant	Maximum plant noise level at source		DISTANCE		DIRECTIVITY	SCREENING	BS4142 FEATURE		RESULTANT AT RECEPTOR (dB)
	Lp (dBA)	Distance (m)	Distance (m)	Correction (dB)	Correction (dB)	Correction (dB)	Applicable (Y/N)	Correction (dB)	
Mitsubishi PUHZ ZRP140YKA2	52	1	9	-19	0	-20	y	3	16
Mitsubishi PUHZ ZRP140YKA2	52	1	11	-21	0	-20	y	3	14
Mitsubishi PUHZ ZRP35VKA	46	1	11	-21	0	-20	y	3	8
Kelvion RF-NB102L3-091A	27	10	8	2	0	-5	y	3	27
Total Daytime									28

Receptor R1 Night-time

Plant	Maximum plant noise level at source		DISTANCE		DIRECTIVITY	SCREENING	BS4142 FEATURE		RESULTANT AT RECEPTOR (dB)
	Lp (dBA)	Distance (m)	Distance (m)	Correction (dB)	Correction (dB)	Correction (dB)	Applicable (Y/N)	Correction (dB)	
Kelvion RF-NB102L3-091A	13	10	8	2	0	-5	y	3	13
Total Night-time									13

Plant	Maximum plant noise level at source		DISTANCE		DIRECTIVITY	SCREENING	BS4142 FEATURE		RESULTANT AT RECEPTOR (dB)
	Lp (dBA)	Distance (m)	Distance (m)	Correction (dB)	Correction (dB)	Correction (dB)	Applicable (Y/N)	Correction (dB)	
Mitsubishi PUHZ ZRP140YKA2	55	1	17	-25	0	-20	y	3	13
Mitsubishi PUHZ ZRP140YKA2	55	1	14	-23	0	-20	y	3	15
Mitsubishi PUHZ ZRP35VKA	46	1	14	-23	0	-20	y	3	6
Kelvion RF-NB102L3-091A	27	10	11	-1	0	-7	y	3	22
Total Daytime									22

Plant	Maximum plant noise level at source		DISTANCE		DIRECTIVITY	SCREENING	BS4142 FEATURE		RESULTANT AT RECEPTOR (dB)
	Lp (dBA)	Distance (m)	Distance (m)	Correction (dB)	Correction (dB)	Correction (dB)	Applicable (Y/N)	Correction (dB)	
Kelvion RF-NB102L3-091A	13	10	8	2	0	-7	y	3	11
Total Night-time									11



Company	AB Group	Quote No	PB16263
Ref.	Pack Quotation – Co-op, Southleigh Road, Emsworth	Date	9 th May 2016
Attention	Joshua Silveira	Our Fax No	01684 594839
From	Rob Empson	Tel No	01684 594839
Email address	robe@hubbardproducts.com	Pages	1 of 2

Joshua

Many thanks for your revised pack enquiry for R407A a Compressor pack dated 9th May 2016, all as per your e-mail, please see below for details and prices:-

HT Pack - External housed Scroll Compressor Pack (R407A)

Internal HT/LT Scroll Pack (R407A)

- HT - 1 x ZBD45-KCE-TFD Copeland Digital Scroll Compressor (Lead)
- 2 x ZB45-KCE-TFD Copeland Scroll Compressors
- Duty = 34.25kw @ -7°C SST (THR = 46.90kw)
- LT - 1 x ZFD13-KVE-EVI-TFD Copeland Scroll Compressor (Lead)
- Duty = 3.74kw @ -31°C SST (THR = 6.94kw)
- Total Pack THR = 53.84kw
- Dual Temperature pack – 2 x Suction Mains / 1 x Discharge Main
- LT Liquid Line Sub-Cooling – LT Liquid Lines need to be lagged
- RDM Control Panel for compressors and EC fans
- Siemens Logo back-up controller
- High pressure oil system c/w Electronic compressor oil level control
- Compressor Design Run Current = 33 Amps
- Compressor Full Load Current (FLC) = 48 Amps
- Note: Condenser not included

Standard Pack Housing

- Weatherproof / Attenuated housing
- Noise Level = 30dB(A) @ 10m (Free Field)
- Dimensions = 1472 long (Including air boxes) x 750 deep x 1946 high

Remote 40L Liquid Receiver Assy

- Twin PRV Assy
- Drier Assy, Valved Bypass & Sight Glass
- Low level Alarm

Normal Working Hours Hi-ab Delivery to Site

- Maximum Waiting on Site – 2 hours
- Longer Waiting times will be charged accordingly

Delivered Total

If you have any queries, please do not hesitate to contact myself.

Best Regards

Rob Empson
Hubbard Products Ltd

Cont.....

Mobile - **07766 166069**
Office - **01684 594839**
E-mail - **robe@hubbardproducts.com**

This quotation is subject to our terms of business. A copy of which is available on request

*You should ensure that adequate facilities are available to off-load goods on arrival.
All prices quoted are net and are supply only, unless stipulated and exclusive of VAT.
The quotation offered is valid for 30 days, our standard conditions of sale apply.
All Hubbard products come with 12 months parts only warranty, unless otherwise stated.
Check all calculations and selections for validity, final design responsibility lies with the contractor.*

Mr Joshua Silveira
AB Group
Bank Chambers,
2 Church Street
Reigate,
RH2 0AN

Dear Josh,

Ref: RF85421/HBID – The Co-operative, Emsworth

Further to our recent correspondence, we have the pleasure in confirming the following fee proposal for the supply and install of 3No attenuated enclosure to house 3No external A/C unit. The following is to be read in conjunction with our previous written correspondence, drawings, designs and e-mails. This design is subject to discussion, approval and modifications to suit site requirements.

This is a budget quotation subject to change pending a site visit

Description	Cost
Supply and installation of 1No A/C enclosure. Units to be enclosed are; 2No - Mitsubishi PUHZ-ZRP140YKA 1No - Mitsubishi PUHZ-ZRP35VKA Enclosures to contain suitable doors/access hatches for access and maintenance. We also include for suitable intake/discharge dividing plenums inside the enclosure. Site surveys / design meeting on site to resolve building limitations, project management, acoustic engineering, designs, drawing office costs admin & procurement cost, etc. Fixing trims, sealants mastic and sundries. Installation crew, including towers and equipment Delivery, packaging etc.	£8,000.00 + VAT
Total supply, deliver and install	£8,000.00 + VAT

General / Works to be carried out by others

- Obtain local authority and landlord's planning permission to install hardware proposed by ourselves (by others).
- We assume no asbestos is in the working areas indicated.
- Our tender is based on normal working hours of 8.00am-6.00pm Monday to Friday.

-
- Clear access to be available for the off-loading, distribution and installation of our equipment.
 - We assume storage will be provided on site for our materials.
 - All plant to be fitted with suitable anti-vibration mounts (by others).
 - All pipework routes to be checked with NSL.
 - Flat and level base to which we can fix to be provided by others.
 - Enclosures to be constructed prior to installation/piping up of A/C units.
 - A/C units to be positioned on a uni-strut feet (or similar) in order to raise the unit and allow for condensate drainage.
 - Enclosures may frost in extreme conditions. Trace heaters may need to be installed by others.

We hope the above is of assistance and await your further instructions.

Should you wish to discuss the above including design concept, please do not hesitate to contact us.

Yours sincerely,

Ashley Willis

F.A.O. Joshua Silveira
Company AB Refrigeration
Tel. 07495 059419
E-Mail joshua.silveira@abgroup.com
Your ref. Southleigh Road, Emsworth

From Jamie Rawe
E-Mail Jamie.Rawe@kelvion.com
Tel. +44 (0)1329 821205
Date 12/05/2016
Enq. No. 05032668R1

Thank you for your enquiry for Condensers (Searle Products). We have pleasure in submitting our offer for your consideration.

Model offered	Duty (kW)	Amb. (°C)	Cond. (°C)	TD (°K)	Mid or Dew	Coil Material	No.	Net Price Each £ (GBP)	Total Net Price £ (GBP)
RF-NB102L3H-091A-AMBG	54.9	35	43	8	Mid Point	CU/AMBG	1		
Option	Fan Mounted Isolators							Included	Included
Option	1 x REMOTE/NONE (EC-FCB) Fan Box (EC)							Included	Included
Option	1000mm One Piece Legs with supporting cross beams. (replaces standard 500mm legs)							Included	Included
Option	Additional Cost for AxiTop EC Fansets (EBM)							Included	Included
Option	Additional cost for Blygold Coated ALMG Fins (AMBG)							Included	Included

Comments: Note: HIAB Delivery (curbside drop only) is an additional £350 midweek during normal working hours. Out of hours, timed and weekend deliveries are additional costs, see below for details.

Availability – Currently **4** working weeks, Ex-works, from date of full and final written instructions.
Please check with our office before ordering.

The Optional Remote/None (EC-FCB) box: 0-10 volt signal from customer's controller/BMS with NO controls. Includes terminals for common motor fault. Circuit Breakers. Steel control box with rain shield mounted on the connection end. One main isolator for 3 phase and neutral. The signal from customer's BMS controller to main motor/s is 0-10 volts (DC). (Excludes 24v transformer & Anti-condensation heater). Please contact our office regarding motor communication connectivity/protocols.

Delivery DAP UK - UK Mainland delivery between the hours 9am - 5pm, Mon to Fri is included. For deliveries outside these hours, the following fixed charges will apply per vehicle:- Weekday out of hours £200, Timed Deliveries (+/- 1hr) +£100, Weekend deliveries £350. HIAB delivery (if offered above) is Curbside drop only.

Our offer is for manufacture & delivery (If included) only; off-loading, installation, testing & commissioning is not included unless otherwise stated. Delivery changes within 2 weeks or specification changes within 5 weeks of delivery may incur additional charges.

The above prices are those which would be quoted to a bona fide Refrigeration / Air-conditioning contractor having a current trading account with Kelvion Ltd.

The above offer is valid for : - **30 Days** & is subject to Kelvion Limited standard terms & conditions of sale, available upon request.

We trust you have sufficient information to enable you to proceed. If you require any further assistance please do not hesitate to contact me.

Best Regards

Jamie Rawe (Applications Engineer)

	SI	RF-NB102L3H-091A-AMBG	
		Day	Night
Total Heat of Rejection	kW	54.9	33.5
Ambient Temperature	°C	35	25
Condensing Temperature	°C	43	33
Actual TD	K	8	8
Dew or Mid Point		Mid Point	Mid Point
Refrigerant		R407A	R407A
Hot Gas Inlet Temperature	°C	78	68
Maximum Allowable Pressure	barg	32	32
Maximum Medium Temperature	°C	120	120
PED Category		1	1
Sound Pressure Level	dB(A)	27 @ 10 m	13 @ 10 m
Mean Sound Pressure Level	dB(A)	29 @ 10 m	15 @ 10 m
Sound Power Level	dB(A)	60	47
Sound Spectrum 125 Hz	dB	60	46
Sound Spectrum 250 Hz	dB	59	45
Sound Spectrum 500 Hz	dB	58	45
Sound Spectrum 1 kHz	dB	57	43
Sound Spectrum 2 kHz	dB	50	36
Sound Spectrum 4 kHz	dB	44	30
Sound Spectrum 8 kHz	dB	36	23
Tube/Fin Material		CU/AMBG	CU/AMBG
Surface Area	m2	263	263
Subcooling Section		No	No
Degrees of Subcooling	K		
Connections		Same End	Same End
Inlet Connection Size	OD	2-1/8"	2-1/8"
Outlet Connection Size	OD	1-3/8"	1-3/8"
Subcooling Connections			
Subcooling Inlet Connection	OD		
Subcooling Outlet Connection	OD		
Orientation		Horizontal	Horizontal
Air Discharge Direction		Vertical	Vertical
Refrigerant Charge	kg	14	14
Altitude	m	0	0
Air Volume	m3/s	5.9	3.3
Internal Volume	dm3	42	42
Input Power (Total)	kW	0.383	0.103
Energy Rating		A+	A+
Fan Speed	1/min	390 (840 max)	220 (840 max)
Approximate Control Voltage 0-10V	V	2.7	0.9
Electrical Supply		400-3-50/60	400-3-50/60
Rows of Fans		1	1
Fans per Row		2	2
Starting Current (per fan)	A	1 (4.9 max)	0.4 (4.9 max)
Full Load Current (per fan)	A	0.8 (3.5 max)	0.3 (3.5 max)
Overall Length	mm	3323	3323
Overall Width	mm	1578	1578
Overall Height inc 1m legs	mm	1973	1973
Dry Weight	kg	538	538
Software Release		3.8.4	



CO-OP Emsworth

Foster Coldstores Reference: CSQ37623
Date: 19 May 2016
Customer: AB Group
Delivery Zone: D

Foster Coldstores
Tel: 01553 817751
Project estimator: Laura Footer

Foster Coldstores Quotation:

Dear Josh (joshua.silveira@abgroup.com)

Many thanks for your valued enquiry; please see attached our quotation as per your request and below a pricing summary for your consideration.

Item No.	Identification	Description	Qty	Pricing Excl VAT
Freezer	Dual compartment CSQ37623-1A	Walk In Freezer 3977mm (w) x 2600mm (d) x 2300mm (h) AFFL	1	
Chiller		Walk In Chiller 3200mm (w) x 2600mm (d) x 2300mm (h) AFFL	1	
		NETT PRICE Excl VAT		

Validity

- Prices valid for six months from date of quotation.

Exclusions:

- All works to be completed in one continuous visit
- All works quoted within normal working hours
- Power supply to be provided by others
- Cable tray, ventilation, infill panelling, scaffolding / lifting equipment and anything else not specifically mentioned within the quotation

Terms & Conditions

- This quotation is subject to our standard terms and conditions a copy can be obtained by clicking [here](#).

Availability

- Generally available in a maximum of 5 weeks upon receipt of order. Shorter lead times may be available at time of order. Contact customer sales support for details.

If you need any further information or assistance, please do not hesitate to call.

Kind Regards,

Laura Footer
laura.footer@fostercoldstores.com
Foster Coldstores

Foster Coldstores

Plant 3, Rollesby Road
King's Lynn Norfolk PE30 4LS
Tel: 0843 216 8866 Fax: 0843 216 4708
Website: www.fostercoldstores.co.uk





CO-OP Emsworth

Foster Coldstores Reference: CSQ37623
Date: 19 May 2016
Customer: AB Group
Delivery Zone: D

Foster Coldstores
Tel: 01553 817751
Project estimator: Laura Footer

Dual compartment - CSQ37623-1A

Reference:	Overall	7177mm (w) x 2600mm (d) x 2300mm (h) AFFL
	Dimensions:	
Compartments:	Room 1:	Walk In Freezer 3977mm (w) x 2600mm (d) x 2300mm (h) AFFL
	Room 2:	Walk In Chiller 3200mm (w) x 2600mm (d) x 2300mm (h) AFFL
Insulation:	Room 1:	100mm polyurethane (PUR)
	Room 2:	75mm polyurethane (PUR)
Wall finish:	Rooms 1-2:	White PVC laminate internal/external
Ceiling finish:	Rooms 1-2:	White PVC laminate internal/Smooth galvanised external
Flooring:	Room 1:	Recessed: 100mm insulated floor c/w 1.5mm rigid galv finish
	Room 2:	Floorless application
Lighting:	Rooms 1-2:	No lights
Doors:	Room 1:	1 x hinged 900x1975mm c/w int & ext 1250Alu chequer plate 2mm kick plates, low voltage transformer & lockable handle
	Room 2:	1 x hinged 900x1975mm c/w int & ext 1250Alu chequer plate 2mm kick plates & lockable handle
Room accessories:	Room 1:	1 x pressure relief valve, 1 x Condensate pump, 1 x Coil, 3/8 for Condensate pump
Shelving:	Rooms 1-2:	4 tier nylon shelving as per attached layout
Refrigeration equipment:	Room 1:	1 x integral refrigeration system designed to maintain -18/-21°C in a maximum ambient of 32°C. 48dBA measured at 10m field condition.
Electrical requirements:	Room 1:	400/3/50 16A motor rated electrical supply
Wall protection:		Chequer plate 2mm to walls as indicated on drawing
Refrigeration installation:		Refrigeration installation by an approved Foster engineer. Refrigeration installation carried out in line with & exceeding the Carbon Trust's Good Practice Guide. Our installation also complies with BS EN 378:1:2008 & the British Refrigeration Association standards as set out in document "Part 5 – Commissioning".
Warranty:		12 months full parts & labour warranty guarantee.
Project management:		Dedicated project supervision included.

Nett price supplied, delivered and installed

REFRIGERATION/COMMISSIONING TO CHILLER, LIGHTING, PTA'S, PIR SENSOR & PLASTIC STRIP CURTAIN BY REFRIGERATION CONTRACTOR

Site Refrigeration Equipment

Monoblock System



Freezer 1
FTL024Z002
400/3/50 16A
4426w heat of rejection
1980m³/hr air volume
690x430x887mm
†48 dBA

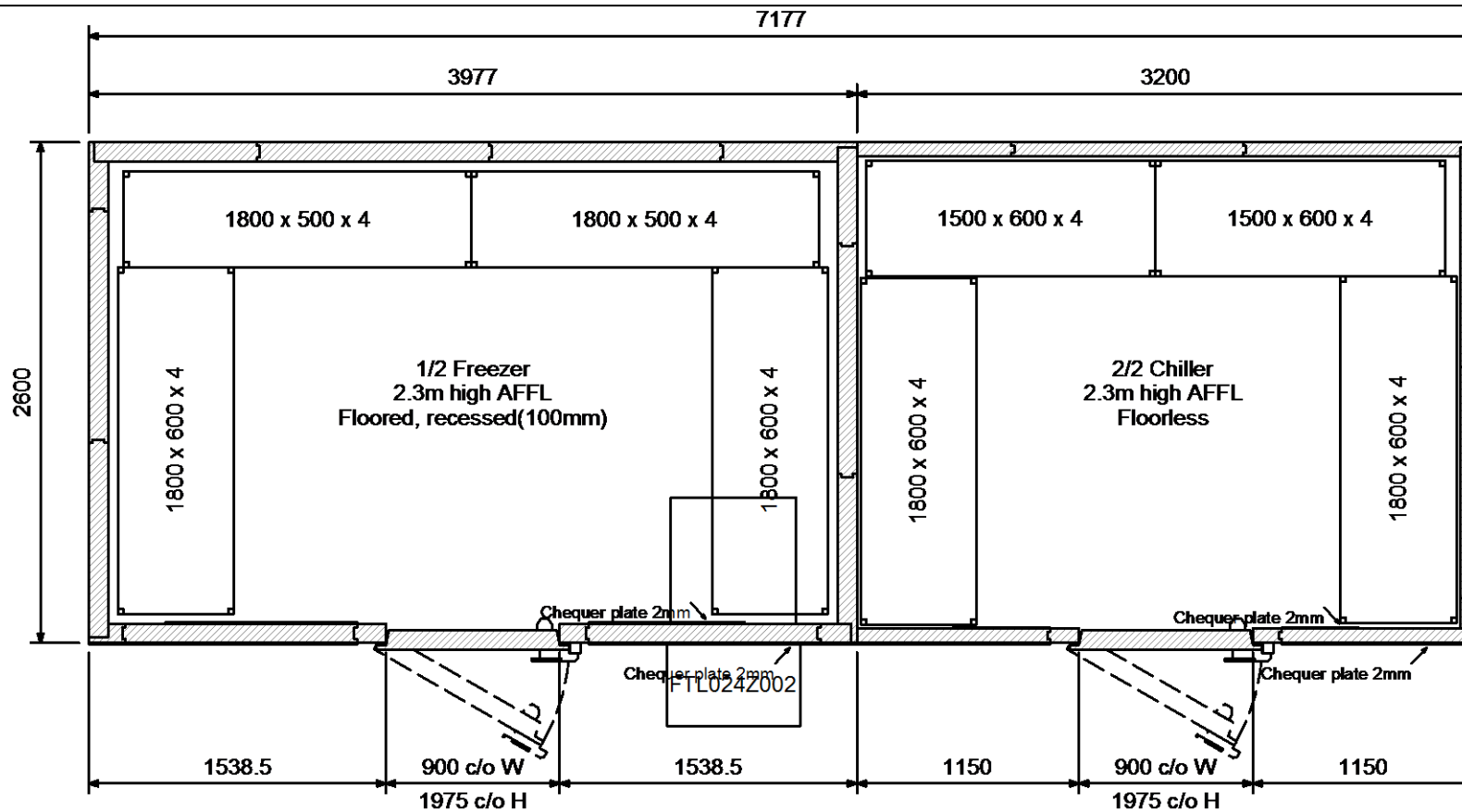
†dBA measured at 10m field condition, dimensions shown are WxDxH unless stated otherwise

Integral refrigeration requires mechanical ventilation to operate within its design parameters, it is the client's responsibility to provide this and Foster Coldstores cannot be held responsible for any mechanical failures with the unit due to inadequate ventilation. Requirements are stated within this quotation and should be considered as the minimum. NOTE: It is the client's responsibility to ensure that air flow around evaporator is not compromised by stored products. Foster Coldstores recommend that a minimum space of 300mm beyond the extremities of the evaporator is left completely clear of any obstruction to ensure sufficient air flow.

Foster Coldstores

Plant 3, Rollesby Road
King's Lynn Norfolk PE30 4LS
Tel: 0843 216 8866 Fax: 0843 216 4708
Website: www.fostercoldstores.co.uk





A Change of Dims	19/05/16	Laura Footer
Project created	27/08/15	Laura Footer
Rev Description	Date	By



Rollesby Road, King's Lynn, Norfolk, PE30 4LS
Tel 01553 817751

E-mail laura.footer@fostercoldstores.com

Drawn:	Scale:	Date:	Issued for comment/approval
L.F.	Not to scale	19/05/16	Issued for manufacture
			Issued as installed layout

Contract:
CO-OP Emsworth

Title
Dual compartment

Quote No.	Works Order No.	Drg. No.	Rev.
CSQ37623-1A			A



a BEIJER REF company

Air Creation.
15 Bruntcliffe Avenue
Leeds 27 Industrial Estate
Morley, Leeds
West Yorkshire
LS27 0LL

Pages: 2
To: Joshua Silveira
Company: A B Refrigeration
Contracting Ltd
Fax no: 01737 735250
Tel no: 01737 735250
Date: 07 Jun 2016
Project ref: Co-op Emsworth

From: Tyrone Dunnet
Tel (direct): 0208 575 8369
Tel (mobile): 07872 635 914
Fax no: 0208 566 6749
Email: dunnett@aircreation.co.uk
Prepared by: David Ball
Tel (direct): 0113 201 2812
Email: balld@aircreation.co.uk

Proposal no: Q0902-003535

Validity: 30 days from the above date

Please quote this reference number on all correspondence relating to this proposal

Proposal

Ref.	Qty	Model	Description	Unit Price	Nett Price
Bill of Materials					
Sales Floor					
	2	PUHZ-ZRP140YKA2	PUHZ-ZRP140YKA2 POWER POWER INVERTER INVERTER R410A 3PH R410A 3PH		
	2	PLA-ZRP140BAR1	PLA-ZRP140BAR1 HIGH COP CASSETTE		
	2	PLP-6BA GRILLE	PLP-6BA GRILLE		
	1	PAR-31MAA-J	PAR-31MAA-J REMOTE CONTROLLER		
Office					
	1	PUHZ-ZRP35VKAR1	PUHZ-ZRP35VKAR1 POWER INVERTER R410A		
	1	PKA-RP35HALR1	PKA-RP35HALR1 COMMON INDOOR R407C/R410A		

TOTAL NETT PRICE EXCLUDING VAT

Regards
Tyrone Dunnet

REMINDERS

- This quotation is given by Air Creation in good faith based upon information provided by you or your company.
- We have not undertaken a site survey to support this quotation. Whilst we endeavour to factor into our quotation any special site conditions or user requirements which you may have expressly identified to us previously in writing, this quotation is not a project system design and is not a confirmation of project volumetric



a BENER REF company

Page: 2
Proposal: Q0902-003535
Project: Co-op Emsworth
Date: 07 Jun 2016

analysis. We recommend that you assess final product selection and make the final system design based upon your own volumetric analysis and project knowledge, including any project requirements which might impact on that selection.

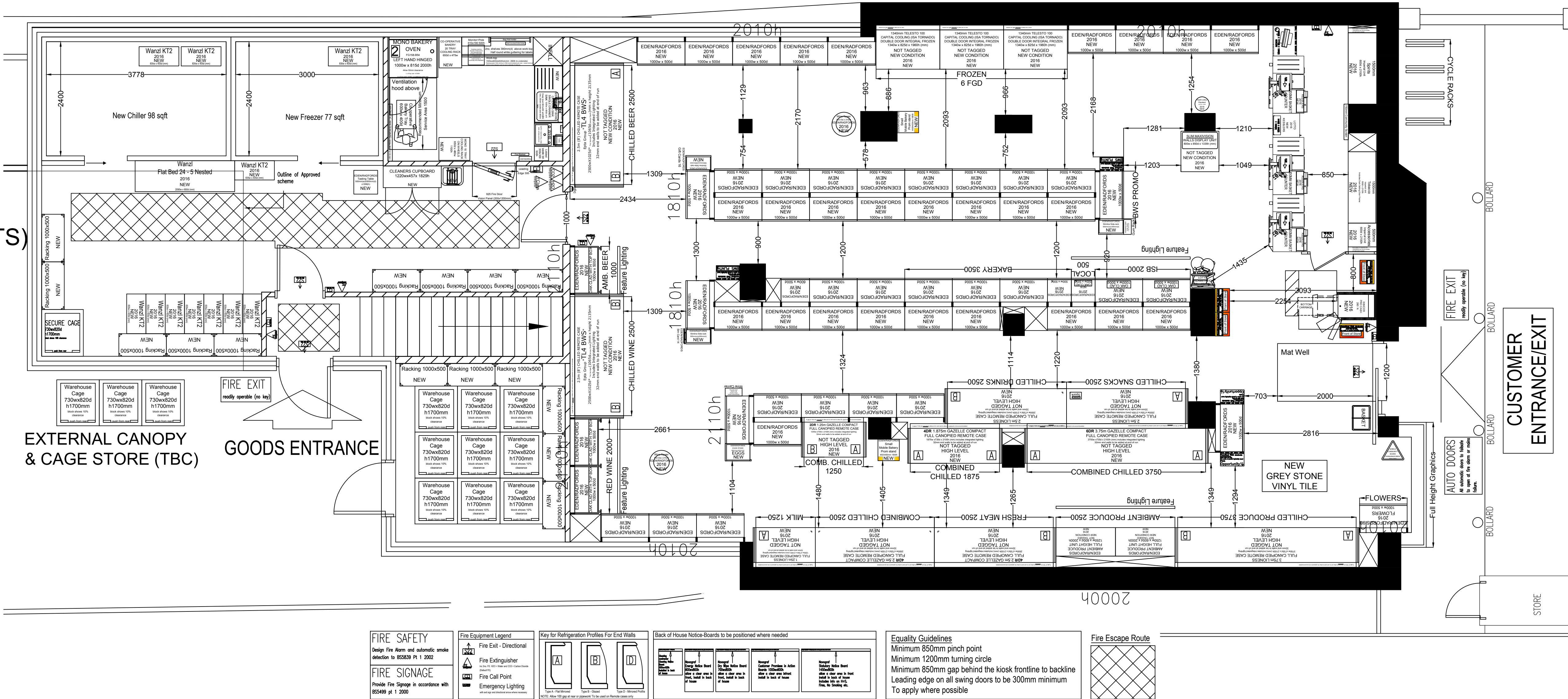
- Please check carefully any requirement for a Mitsubishi Electric product to integrate with any third party equipment. We are not responsible for integration capability of our products with any third party equipment unless we have expressly confirmed that this integration is approved in the current Mitsubishi Electric product specification or in a current technical bulletin.

-If this quote contains Heating Products. Purchasing and installing customers must pass the relevant Heating Training Course before an order can be placed. Call on 0161 866 6089 to book.

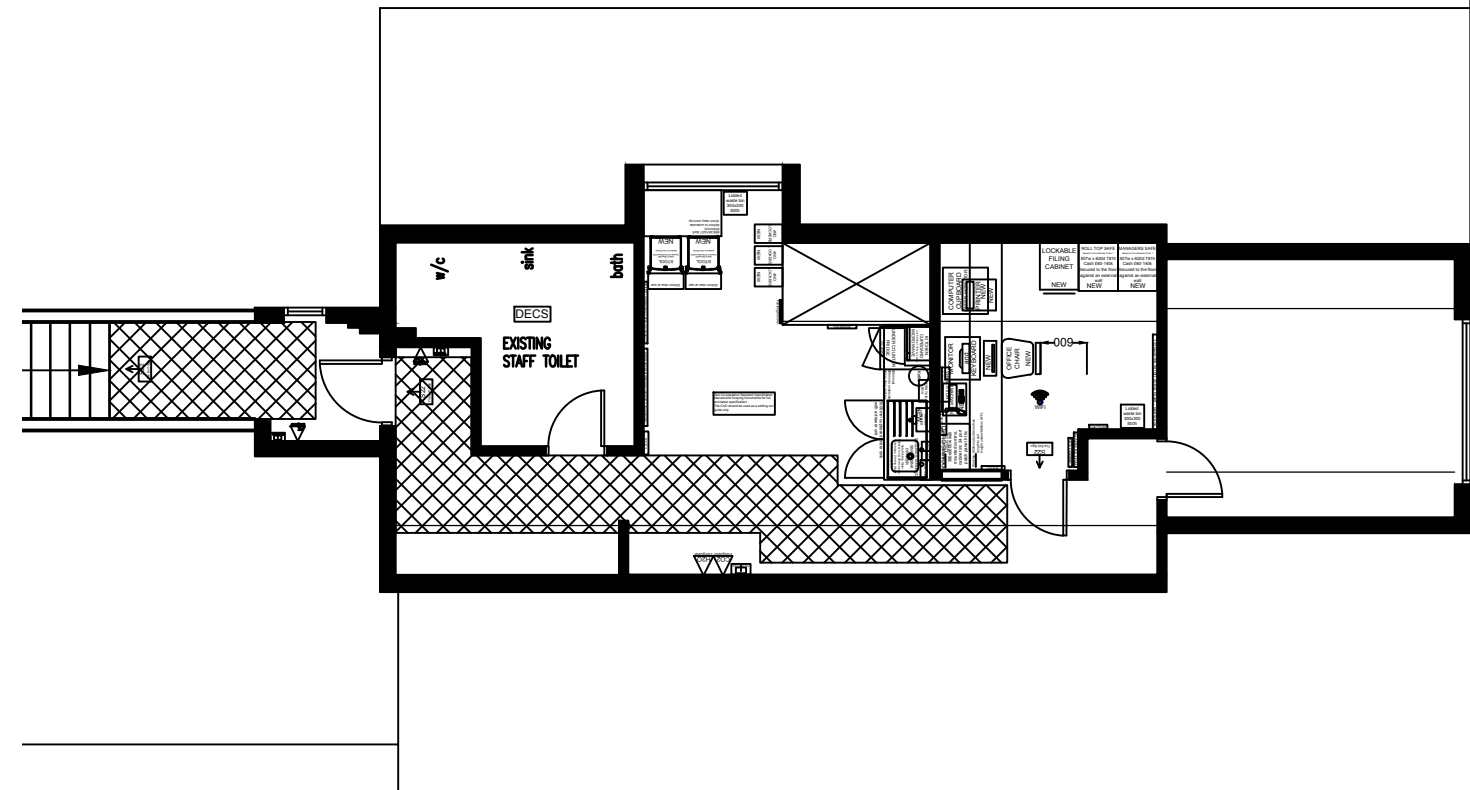
-All quotations containing CAHV, CRHV and/or Cascade Systems must be accompanied by a Mitsubishi Electric technical proposal. Please contact your Account Manager if you have not received one.

Product Sales and Technical literature can now be found at www.library.mitsubishielectric.co.uk

ORDNANCE SURVEY MAP (NTS)

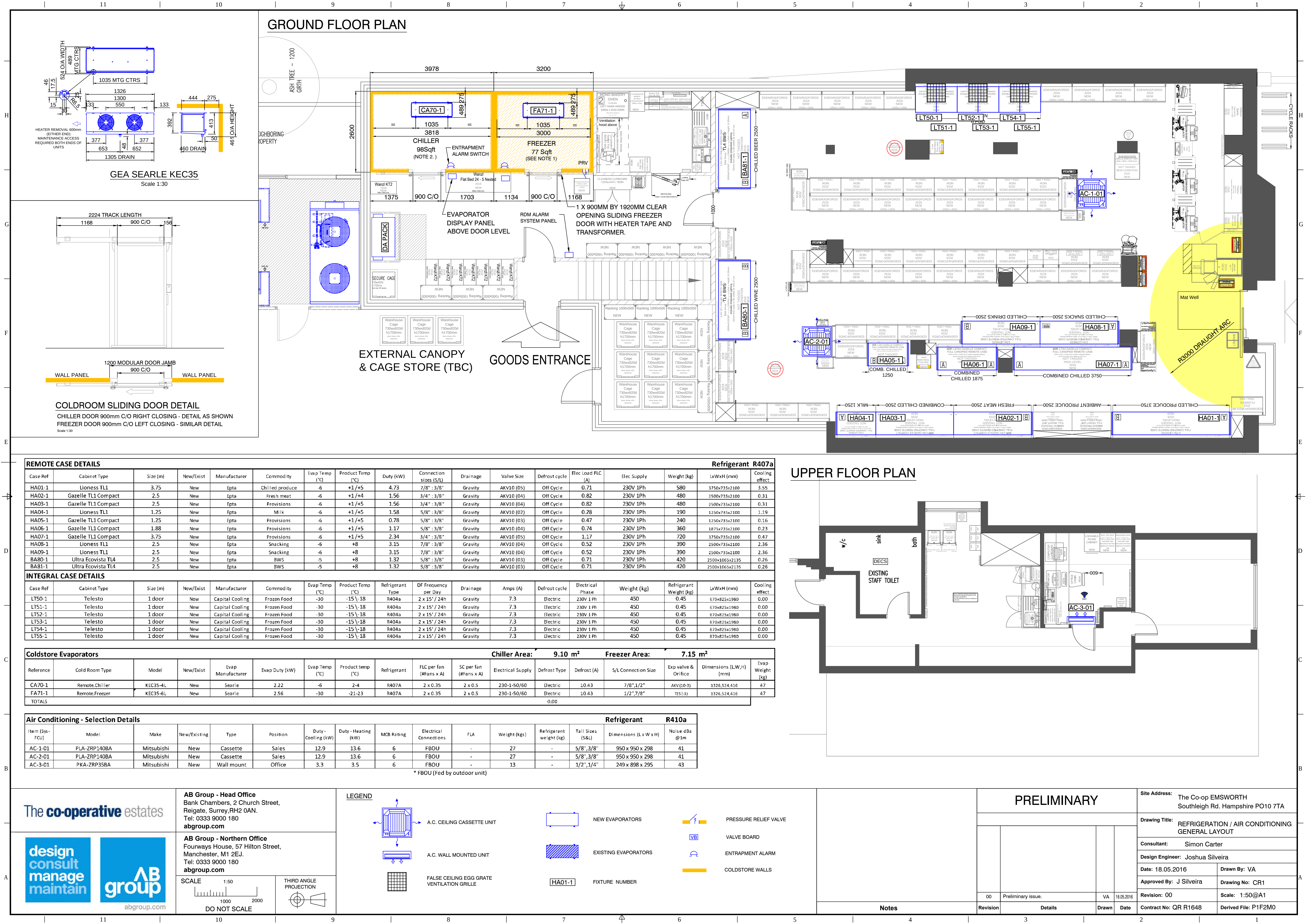


ELEVATIONS 1:200

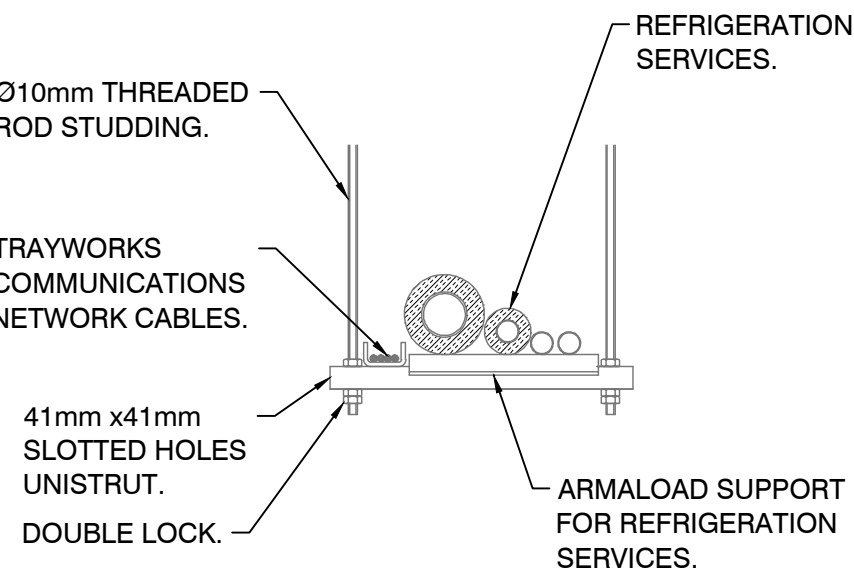
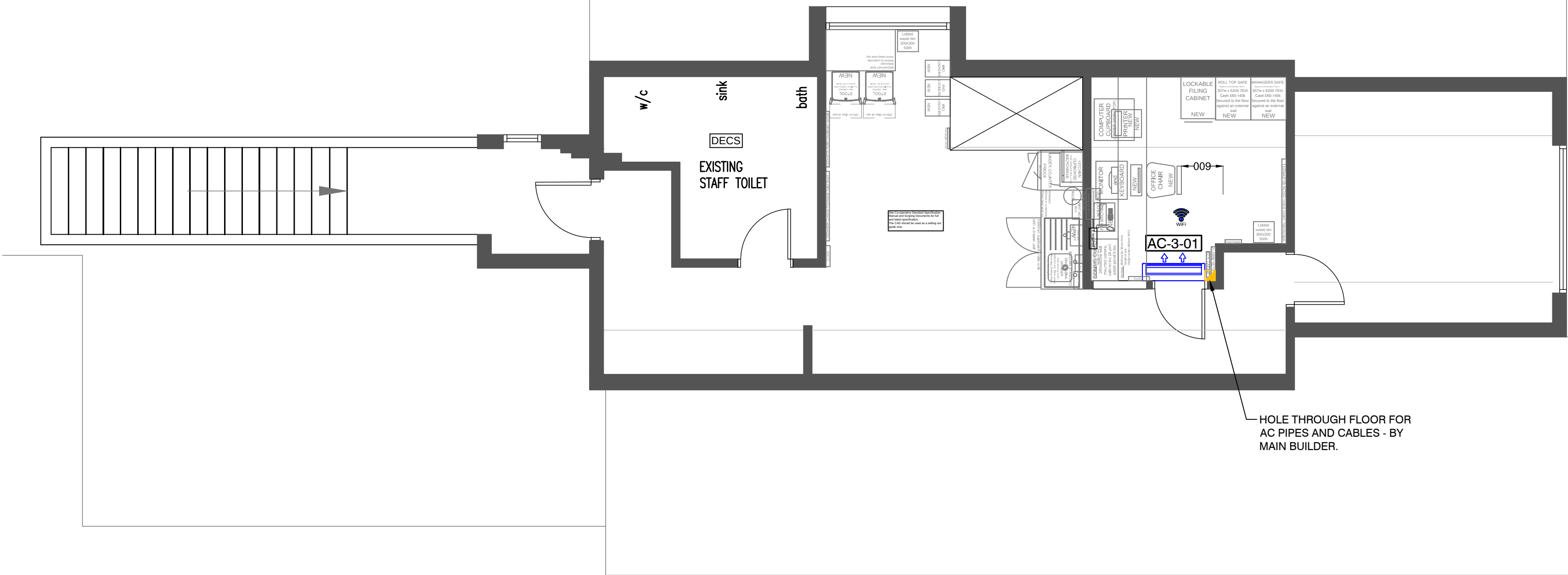


BACK OF HOUSE - 1:100

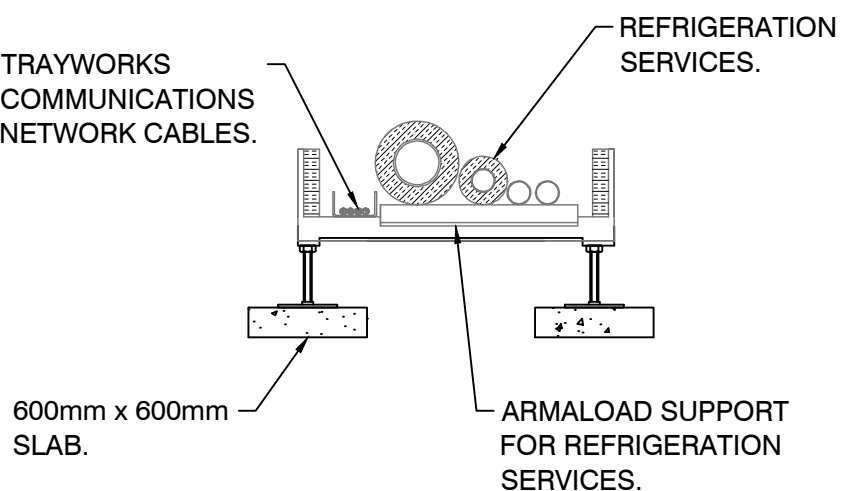
Description of Amends						AWAITING SURVEY	
05.02.16 - Emsworth - P1F1M0/BW Initial design, as per S2S requirements						EMSWORTH Southleigh Road Emsworth Hampshire PO10 7TA	
06.04.16 - Emsworth - P1F2M0/AT Scheme validation amends						Store Phone No: Phone No.	
						Format: EDC\ATD Hub Number: TBC	
						Drawing Information	
						Back Of House Information	
						Brief Description Of Works:	
						Proposed Fixture Layout	
						Latest system drawing	
						Job Originated By:	
						Acquisition Programme 2016	
						Meetings	
						Drawing No: EMSWORTH-P1	
						Drawing Status: Second Review CAD	
						The Co-operative Group	
						1 Angel Square, Manchester, M16 6UG	
						A1	



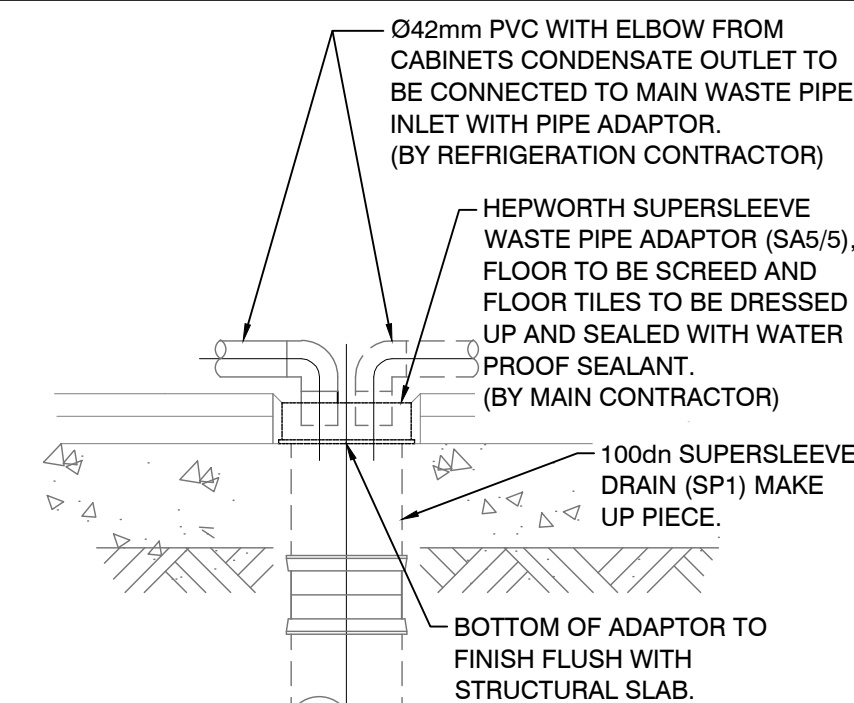
UPPER FLOOR PLAN



DETAIL A
TYPICAL HANGER ARRANGEMENTS AT 1.5M ON CENTRES.

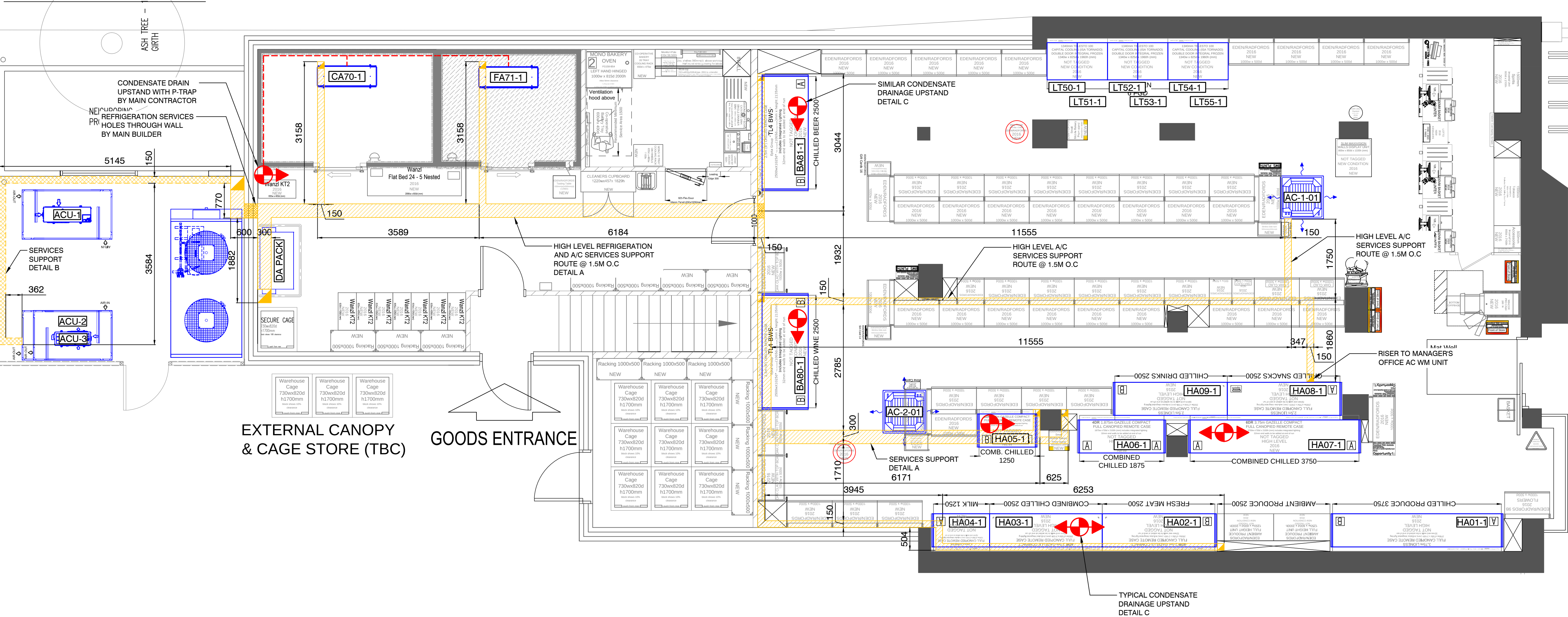


DETAIL B
TYPICAL SERVICES SUPPORT ARRANGEMENTS ON ROOF AND SLAB AT 1.5M ON CENTRES.



DETAIL C
TYPICAL DRAINAGE UPSTAND WITH Ø100mm ADAPTOR.

GROUND FLOOR PLAN



The co-operative estates

design consult manage maintain

AB group

AB Group - Head Office
Bank Chambers, 2 Church Street,
Reigate, Surrey RH2 0AN.
Tel: 0333 9000 180
abgroup.com

AB Group - Northern Office
Fourways House, 57 Hilton Street,
Manchester, M1 2EJ.
Tel: 0333 9000 180
abgroup.com

SCALE 1:50
DO NOT SCALE

THIRD ANGLE PROJECTION

LEGEND

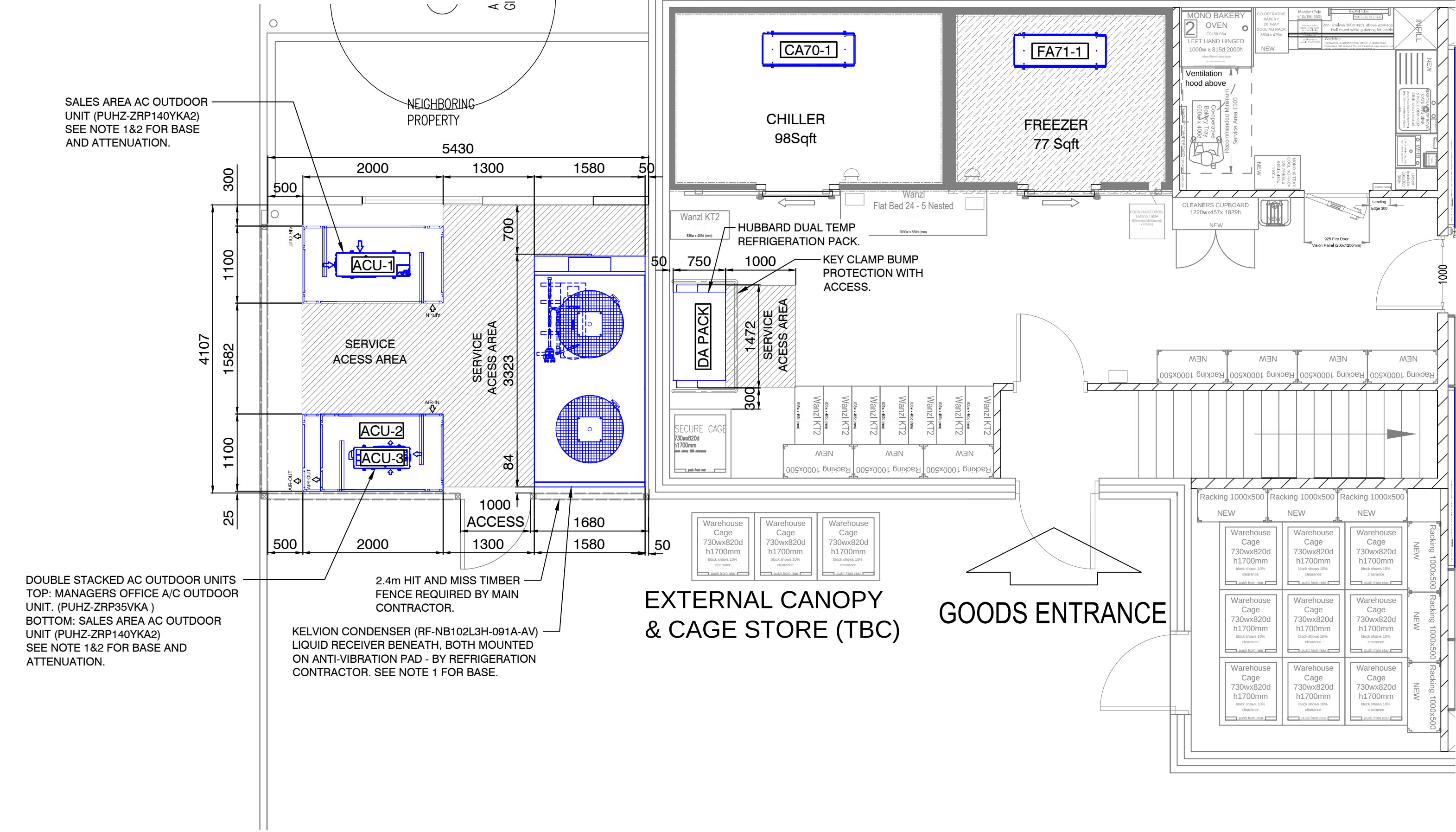
- REFRIGERATION PIPE AND CABLES ROUTE
- AIR CONDITIONING PIPE AND CABLES ROUTE
- REFRIGERATION PIPEWORK RISER
- CONDENSATE - DRAINAGE W/ ELBOW (50mm)
- CONDENSATE - DRAINAGE W/TEE (100mm)
- CONDENSATE - DRAINAGE (EXISTING)
- CONDENSATE DRAIN PUMP & TRAY
- A.C. CEILING CASSETTE UNIT
- A.C. WALL MOUNTED UNIT
- HA01-1
- FALSE CEILING EGG CRATE VENTILATION GRILLE REQUIRED

Notes			
00	Preliminary issue.	VA	18.05.2016
Revision	Details	Drawn	Date

PRELIMINARY			
00	Preliminary issue.	VA	18.05.2016
Revision	Details	Drawn	Date

Site Address: The Co-op EMSWORTH Southleigh Rd. Hampshire PO10 7TA	
Drawing Title: REFRIGERATION / AIR CONDITIONING CONDENSATE DRAINAGE & SERVICES	
Consultant: Simon Carter	
Design Engineer: Joshua Silveira	
Date: 18.05.2016	Drawn By: VA
Approved By: J Silveira	Drawing No: CR2
Revision: 00	Scale: 1:50@A1
Contract No: QR R1648	Derived File: P1F2M0

PARTIAL GROUND FLOOR PLAN

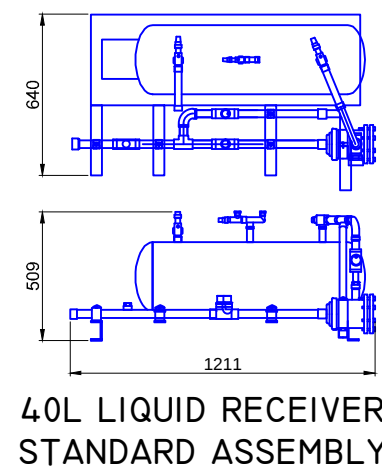
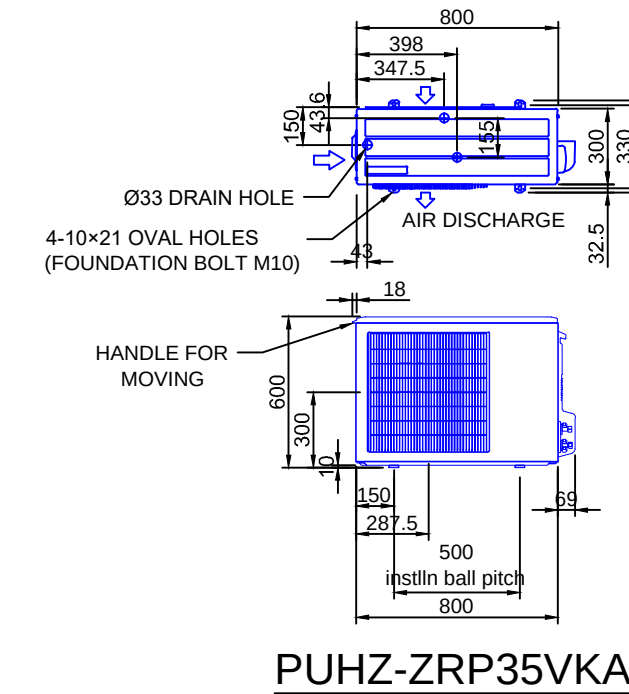
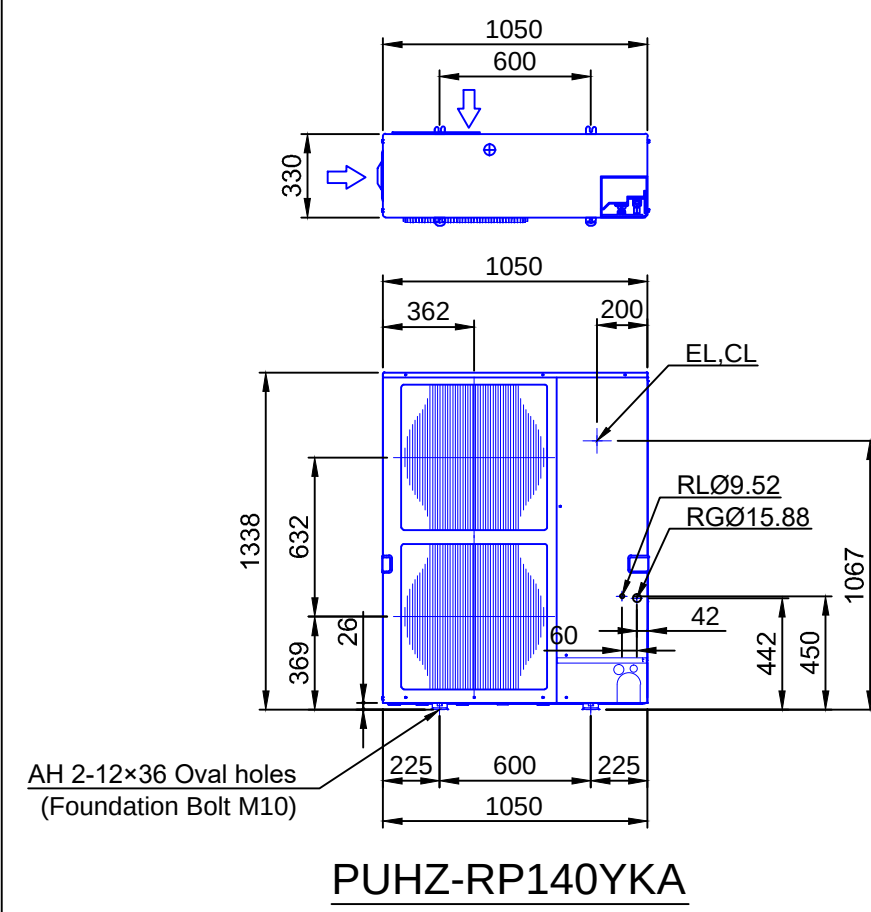
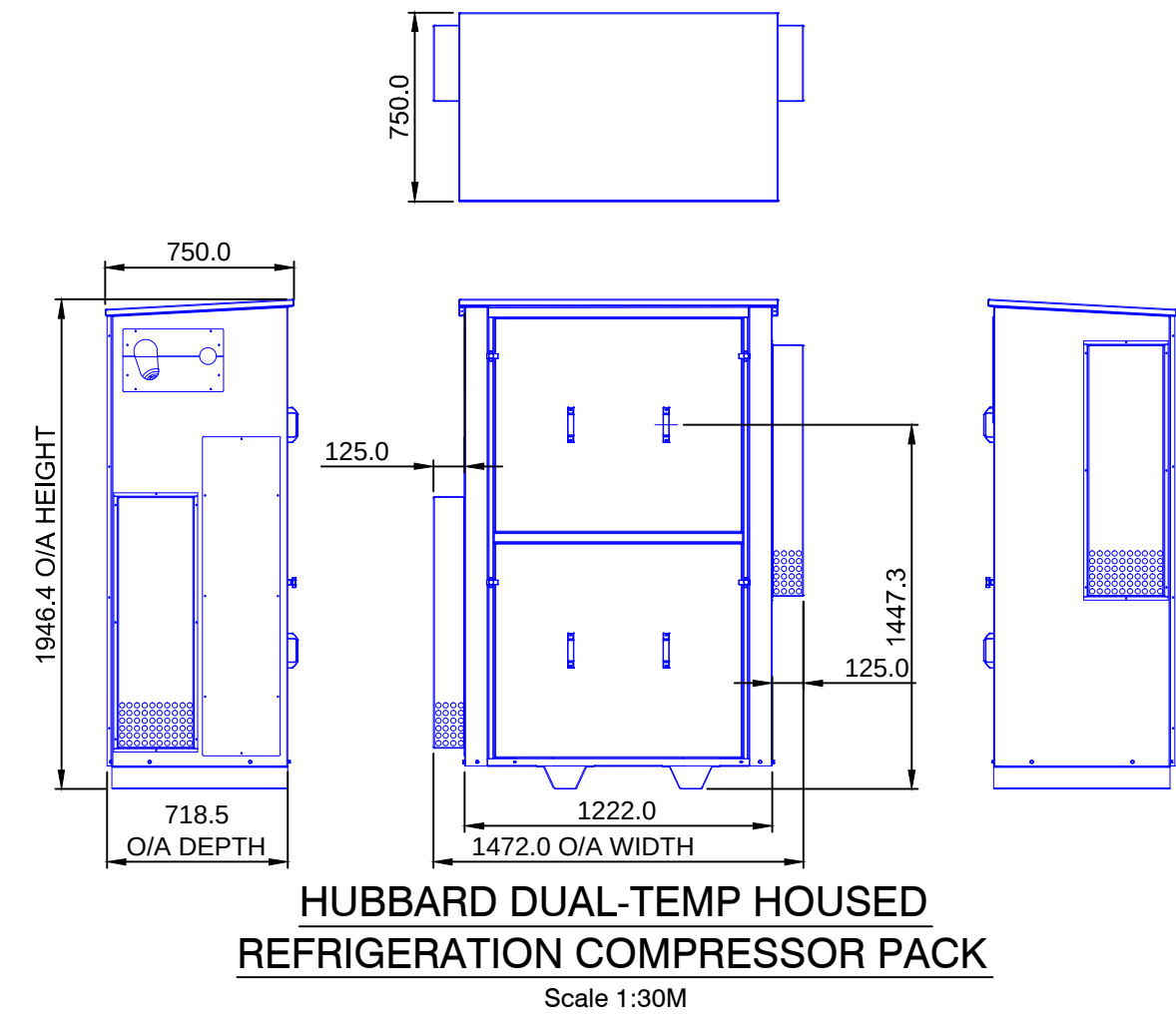
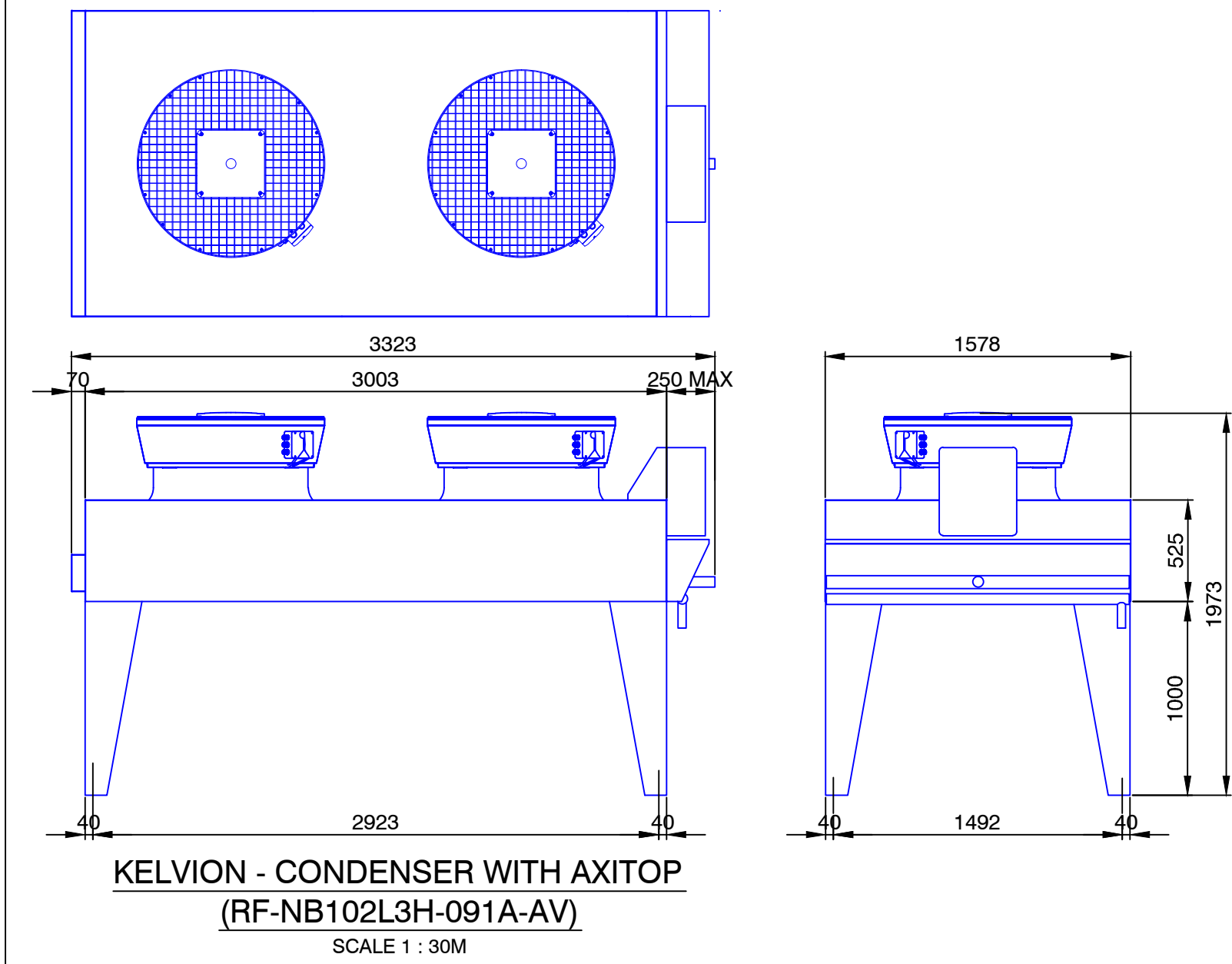


Hubbard		MODEL		REFRIGERATION PACK SELECTION					PACK DETAILS					R407a	
Reference	Model	Manufacturer	New/Exist	SST (°C)	Evap Capacity (kW)	THR (kW)	Design current (A/ph)	Full load Current (A/ph)	Electrical Connection	Length (mm)	Width (mm)	Height (mm)	Weight (kg)	Max dBA Rating @10m	
HA1	ZBD45KCE-TFD	Copeland	New	-7	11.55	15.55	8.83	12.30	415v/3ph/50hz	1472	750	1946	575	30	
HA1	ZB45KCE-TFD	Copeland	New	-7	11.55	15.65	9.30	13.10							
HA1	ZB45KCE-TFD	Copeland	New	-7	11.55	15.65	9.30	13.10							
LOW TEMPERATURE COMPRESSOR SELECTION															
LA1	ZFD13KVE-TFD EVI	Copeland	New	-31	3.74	6.92	5.67	9.00							
LT TOTALS					3.74	6.92	5.67	9.00							
PACK TOTALS					38.39	53.77	33.10	47.50							

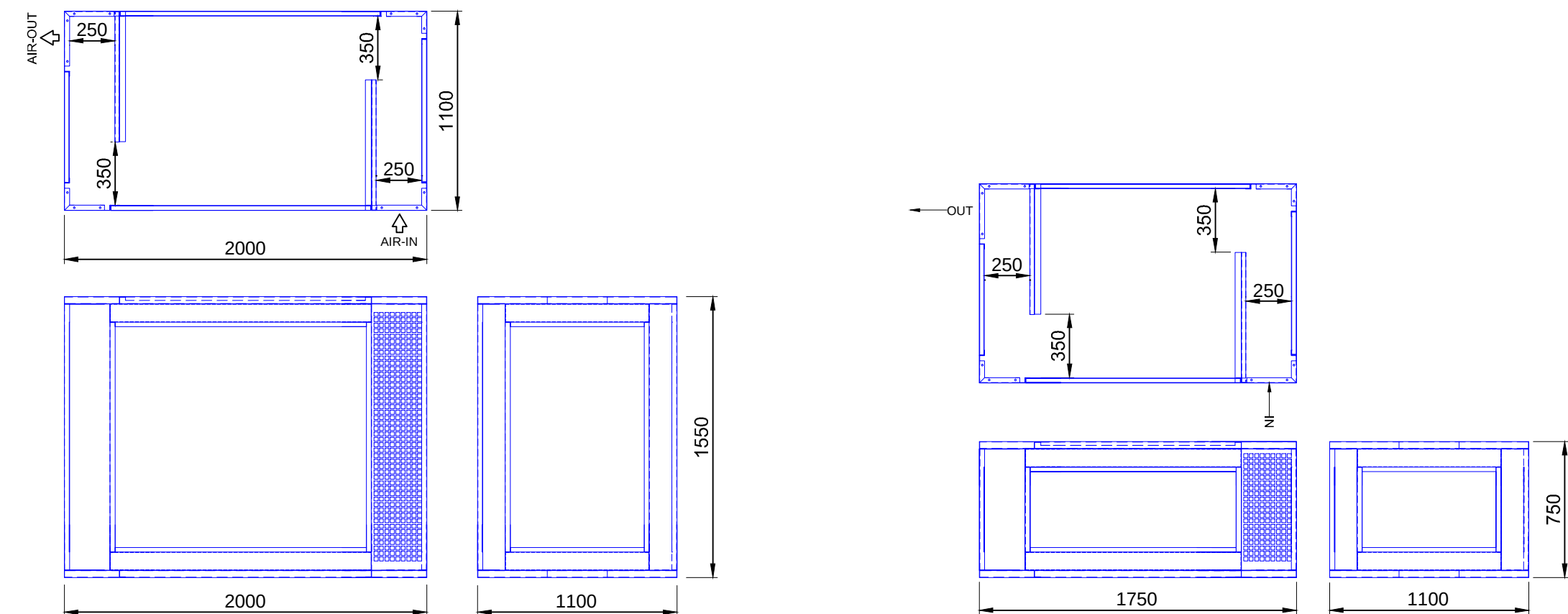
CONDENSER SELECTION														Refrigerant		R407a
Model	Manufacturer	New / Existing	Condensing / Ambient Temperature (°C)	TD (K)	THR (kW)	Current @ Design (per fan) (A)	Full Load Current (per fan) (A)	Supply Voltage & Phase	Run speed signal voltage (0-10V) (Day / Night)	Condenser Inlet & Outlet Sizes (In / Out)	Refrigerant (kg)	Weight (kg)	Dimensions (LxWxH) (mm)	d8(A) @ 10m Day Time	d8(A) @ 10m Night time	
RF-NB102L3H-091A-AV	Kelvion	New	43/35	8	54.09	1 (4.9max)	0.8 (3.5 max)	400-3-50/60	2.7/0.9	2-1/8" & 1-3/8"	14	538	3323x1578x1973	27	13	

Receiver Detail				
Reference	Manufacturer	Orientation	Size (Ltr)	Connections sizes Inlet / Outlet
RA	Hubbard	Horizontal	40	1-1/8

Air Conditioning - Selection Details														Refrigerant		R410a
Item (Sys-FCU)	Model	Make	New/Existing	Type	Position	Duty - Cooling (kW)	Duty - Heating (kW)	MCB Rating	Electrical Connections	FLA	Weight (kgs)	Refrigerant weight (kg)	Tail Sizes (S&L)	Dimensions (LxW x H)	Noise dBa @1m	
ACU-1	PUHZ-ZRP140YKA2	Mitsubishi	New	Outdoor unit	Plant	-	-	16	380-415v, 50Hz	8.09	131	5	5/8", 3/8"	1050 x 330 x 1338	52	
ACU-2	PUHZ-ZRP140YKA2	Mitsubishi	New	Outdoor unit	Plant	-	-	16	380-415v, 50Hz	8.09	131	5	5/8", 3/8"	1050 x 330 x 1338	52	
ACU-3	PUHZ-ZRP35VKA	Mitsubishi	New	Outdoor unit	Plant	-	-	16	220-240v, 50Hz	4.17	43	0	1/2", 1/4"	809 x 300 x 630	46	



MITSUBISHI AC OUTDOOR UNITS



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SCALE 1:50M

DO NOT SCALE

THIRD ANGLE PROJECTION

LEGEND	
HA01-1	FIXTURE NUMBER

Notes				PRELIMINARY				Site Address: The Co-op EMSWORTH Southleigh Rd. Hampshire PO10 7TA	
				Drawing Title: REFRIGERATION / AIR CONDITIONING PLANT LAYOUT				Drawing Title: REFRIGERATION / AIR CONDITIONING PLANT LAYOUT	
1. SMOOTH AND LEVEL BASE CONCRETE PLINTH REQUIRED FOR REFRIGERATION PLANT AND AC OUTDOOR UNITS - TO BE PROVIDED BY THE BUILDER. 2. ALL AC OUTDOOR UNITS TO BE WITHIN INDIVIDUAL NSL ACOUSTIC ENCLOSURE.				Consultant: Simon Carter				Consultant: Simon Carter	
				Design Engineer: Joshua Silveira				Design Engineer: Joshua Silveira	
				Date: 18.05.2016				Date: 18.05.2016	
				Drawn By: VA				Drawn By: VA	
				Approved By: S Carter				Approved By: S Carter	
				Revision: 00				Revision: 00	
				Scale: 1:50@A1				Scale: 1:50@A1	
				Contract No: QR R1648				Contract No: QR R1648	
				Derived File: P1F2M0				Derived File: P1F2M0	

HFC Pipe Gauge Thickness			
Suction		Liquid / Liquid Return / Discharge	
Pipe Diameter	Gauge	Pipe Diameter	Gauge
3 1/8"	16 SWG	3 1/8"	12 SWG
2 5/8"	16 SWG	2 5/8"	12 SWG
2 1/8"	18 SWG	2 1/8"	14 SWG
1 5/8"	18 SWG	1 5/8"	16 SWG
1 3/8"	18 SWG	1 3/8"	18 SWG
1 1/8"	18 SWG	1 1/8"	18 SWG
7/8"	18 SWG	7/8"	18 SWG
3/4"	19 SWG	3/4"	19 SWG
5/8"	20 SWG	5/8"	20 SWG
1/2"	20 SWG	1/2"	20 SWG
3/8"	20 SWG	3/8"	22 SWG

Pipe Totals		
Pipe Diameter	SWG	Length (m)
1/2"	20	73.5
3/4"	19	15.5
7/8"	18	8.0

R407a REFRIGERANT

NOTE

ALL CASE PIPE TAILS = 7/8" x 1/2"

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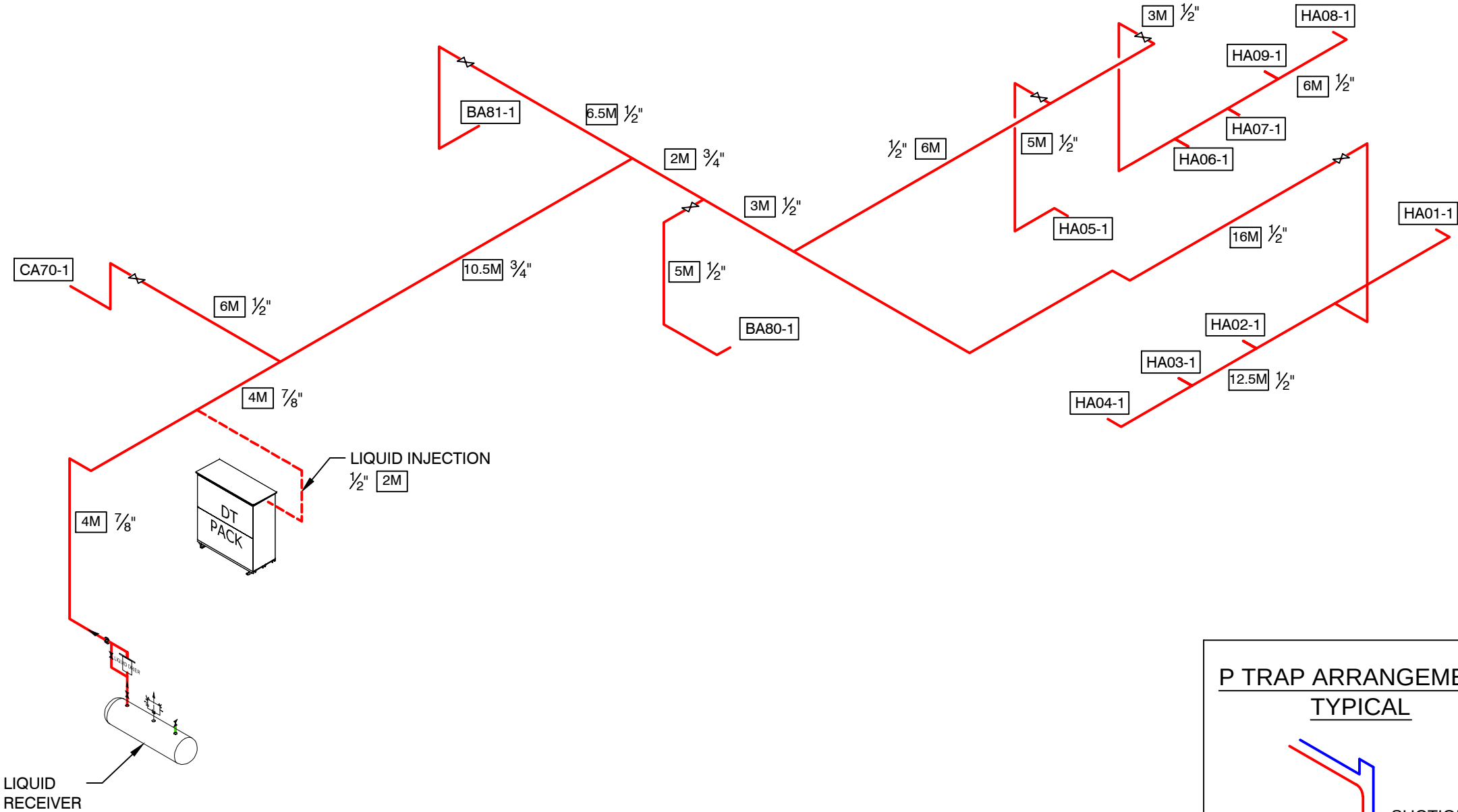


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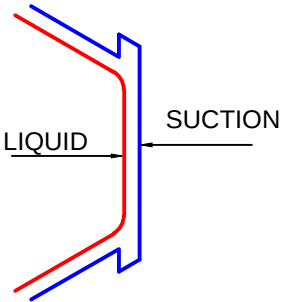
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LEGEND

- SUCTION/LIQUID PIPE LINES
- SUCTION LINE
- LIQUID LINE
- DISCHARGE LINE
- BLOW-OFF LINE
- LIQUID INJECTION
- PT PRESSURE TRANSDUCER
- SHUT OFF VALVE
- BALL VALVE
- EPR
- SOLENOID VALVE
- HA01-1 FIXTURE No.
- 1 1/8" x 1/2" PIPE SIZES
- 8M PIPE LENGTHS



P TRAP ARRANGEMENT TYPICAL



PRELIMINARY

Site Address:		The Co-op EMSWORTH Southleigh Rd. Hampshire PO10 7TA	
Drawing Title:		ISOMETRIC - HT LIQUID REFRIGERATION SCHEMATIC	
Consultant:		Simon Carter	
Design Engineer: Joshua Silveira			
Date: 18.05.2016		Drawn By: VA	
Approved By: J Silveira		Drawing No: CR4-HT LIQ	
Revision: 00		Scale: NTS@A3	
Contract No: QR R1648		Derived File: P1F2M0	

HFC Pipe Gauge Thickness			
Suction		Liquid / Liquid Return / Discharge	
Pipe Diameter	Gauge	Pipe Diameter	Gauge
3 1/8"	16 SWG	3 1/8"	12 SWG
2 5/8"	16 SWG	2 5/8"	12 SWG
2 1/8"	18 SWG	2 1/8"	14 SWG
1 5/8"	18 SWG	1 5/8"	16 SWG
1 3/8"	18 SWG	1 3/8"	18 SWG
1 1/8"	18 SWG	1 1/8"	18 SWG
7/8"	18 SWG	7/8"	18 SWG
3/4"	19 SWG	3/4"	19 SWG
5/8"	20 SWG	5/8"	20 SWG
1/2"	20 SWG	1/2"	20 SWG
3/8"	20 SWG	3/8"	22 SWG

Pipe Totals		
Pipe Diameter	SWG	Length (m)
1/2"	20	10.5
5/8"	20	14.5
3/4"	18	5.0
7/8"	18	5.5
1 1/8"	18	18.0
1 3/8"	18	39.5
1 5/8"	18	19.5

Insulation	
Pipe Diameter	IT 19mm
1/2"	5.0
5/8"	14.5
3/4"	5.0
7/8"	5.5
1 1/8"	14.0
1 3/8"	39.5
1 5/8"	19.5

R407a REFRIGERANT

NOTE

ALL CASE PIPE TAILS = 7/8" x 1/2"

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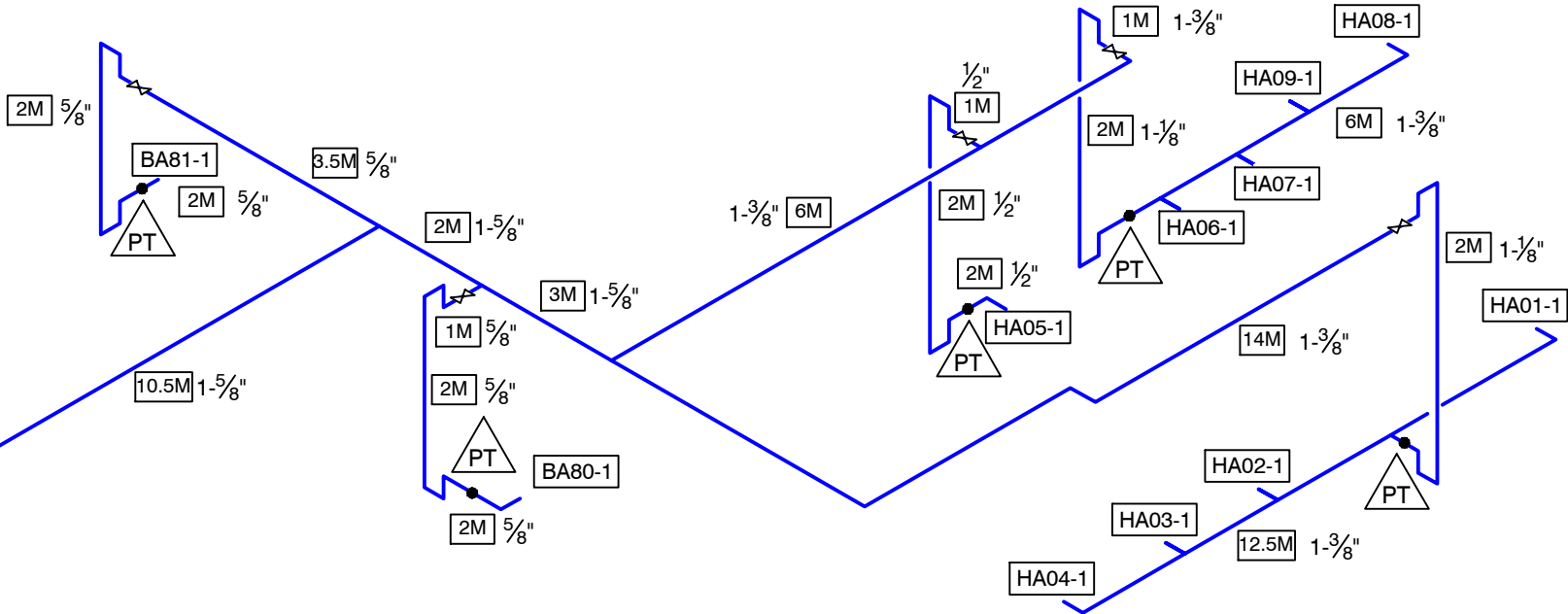
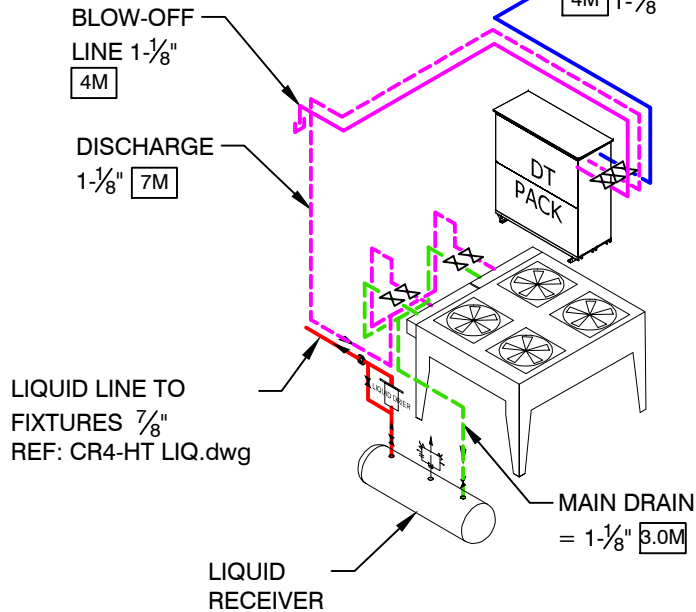
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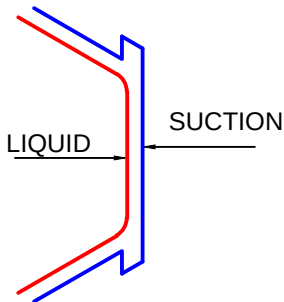
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LEGEND

- SUCTION/LIQUID PIPE LINES
- SUCTION LINE
- LIQUID LINE
- DISCHARGE LINE
- BLOW-OFF LINE
- MAIN LIQUID DRAIN
- PT PRESSURE TRANSDUCER
- SHUT OFF VALVE
- BALL VALVE
- EPR
- SOLENOID VALVE
- HA01-1 FIXTURE No.
- 1 1/8" x 1/2" PIPE SIZES
- 8M PIPE LENGTHS



P TRAP ARRANGEMENT TYPICAL



PRELIMINARY

Site Address: The Co-op EMSWORTH
Southleigh Rd. Hampshire PO10 7TA

Drawing Title: ISOMETRIC - HT SUCTION
REFRIGERATION SCHEMATIC

Consultant: Simon Carter

Design Engineer: Joshua Silveira

Date: 18.05.2016 Drawn By: VA

Approved By: J Silveira Drawing No: CR4-HT SUC

Revision: 00 Scale: NTS@A3

Contract No: QR R1648 Derived File: P1F2M0

HFC Pipe Gauge Thickness

Suction		Liquid / Liquid Return / Discharge	
Pipe Diameter	Gauge	Pipe Diameter	Gauge
3 1/8"	16 SWG	3 1/8"	12 SWG
2 5/8"	16 SWG	2 5/8"	12 SWG
2 1/8"	18 SWG	2 1/8"	14 SWG
1 5/8"	18 SWG	1 5/8"	16 SWG
1 3/8"	18 SWG	1 3/8"	18 SWG
1 1/8"	18 SWG	1 1/8"	18 SWG
7/8"	18 SWG	7/8"	18 SWG
3/4"	19 SWG	3/4"	19 SWG
5/8"	20 SWG	5/8"	20 SWG
1/2"	20 SWG	1/2"	20 SWG
3/8"	20 SWG	3/8"	22 SWG

Pipe Totals		
Pipe Diameter	SWG	Length (m)
1/2	20	14.5
7/8	18	14.5

Insulation	
Pipe Diameter	IT 19mm
1/2	14.5
7/8	14.5

R407a REFRIGERANT

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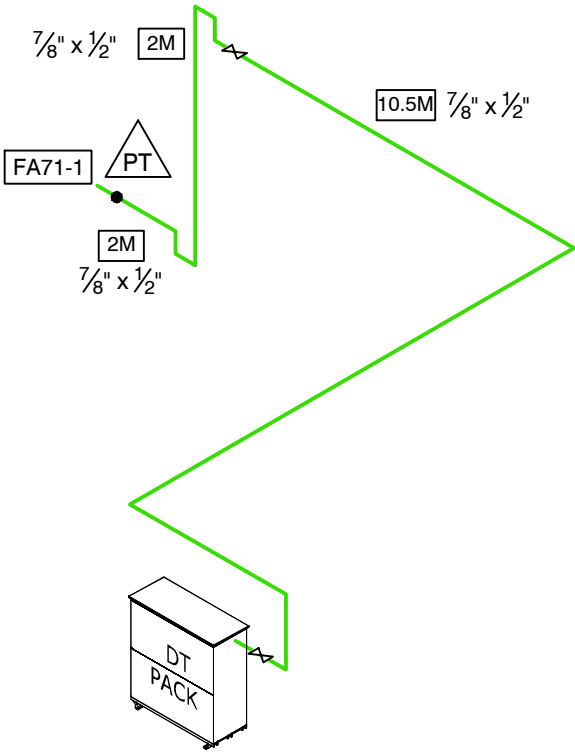
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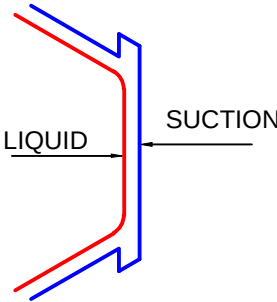
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LEGEND

- SUCTION/LIQUID PIPE LINES
- SUCTION LINE
- LIQUID LINE
- DISCHARGE LINE
- LIQUID INJECTION
- PRESSURE TRANSDUCER
- SHUT OFF VALVE
- BALL VALVE
- EPR
- SOLENOID VALVE
- HA01-1
- FIXTURE No.
- 1 1/8" x 1/2"
- PIPE SIZES
- 8M
- PIPE LENGTHS



P TRAP ARRANGEMENT
TYPICAL



PRELIMINARY

Site Address: The Co-op EMSWORTH
Southleigh Rd. Hampshire PO10 7TA

Drawing Title: ISOMETRIC - LT
REFRIGERATION SCHEMATIC

Consultant: Simon Carter

Design Engineer: Joshua Silveira

Date: 18.05.2016 Drawn By: VA

Approved By: J Silveira Drawing No: CR4-LT

Revision: 00 Scale: NTS@A3

Contract No: QR R1648 Derived File: P1F2M0