Specification and Tender

for

Lift Works: Modernisation of Two Passenger Lift

at

Multi-Storey Car Park
Mitchell Road
Eastleigh
SO50 5PB

for

Regeneration & Planning Policy Unit
Eastleigh Borough Council
Eastleigh House
Upper Market Street
Eastleigh
Hants
SO50 9YN

prepared by

ILECS Ltd
International Lift and Escalator Consultants
Tops'l House
High Street
Mistley
Manningtree
Essex CO11 1HB

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Form of Tender

Date: ……..

To:

Regeneration & Planning Policy Unit, Eastleigh Borough Council, Eastleigh House, Upper Market Street, Eastleigh, Hants, SO50 9YN [Purchaser]

Sirs,

Re: Lift Works on two hydraulic passenger lift at Mitchell Street Car Park Eastleigh.

I/We, the undersigned, hereby tender and offer to design, manufacture, deliver, install, test and complete the Works more particularly described and referred to in the general conditions and Special Conditions, Specification, schedules and drawings (if any) hereto annexed issued for this Tender and which under the terms is to be designed, manufactured, delivered, installed, tested and completed by the Contractor and to perform and observe the provisions and agreements on the part of the Contractor contained in or reasonably to be inferred from the Conditions, Specification, Schedules and drawings for the sum of £ [……..]

(amount in words) ……..... (exclusive of any applicable Value Added or Sales Tax properly chargeable on such sum) the details of which are given in the schedules of prices submitted within this Tender.

I/We further declare that I/We have visited and inspected the Site and have read and understood the tender documents.

I/We hereby undertake, in the event of your acceptance of this Tender and if required, to execute the Agreement within 45 Days from receipt of the Letter on Acceptance and if required to furnish a satisfactory Performance Bond in such amount as you may require not exceeding [10%] of the Contract Price and to obtain such insurance as is stipulated in the Conditions.

I/We undertake to do any extra work not covered by the above Schedule of prices which may be ordered by the Engineer and hereby agree that the value of such extra work shall be determined as provided for in the Contract.

I/We understand that you reserve to yourself the right to accept or refuse this Tender whether it be lower, the same or higher than any other tender, or for any other reason.

I/We agree that this Tender shall remain open for acceptance by you and will not be withdrawn by us for a period of 180 days from the closing date for submission of Tenders and the Contract price is fixed for the total period of the contract. Retention shall be 5% of the contract sum, which shall reduce to 2.5% of the contract sum on satisfactory completion of the snagging.

I/We hereby agree that the following schedules are attached and form part of this tender.

Schedules of prices

Schedule 1 – Per Lift Prices *(delete if only one lift included in tender)*

a)	Lift works as specified on the East Lift	£
b)	Lift works as specified on the West Lift	£
c)	Cost of Providing an Eastleigh Borough Council bond	£
d)	Parent company guarantee	£
	Total	**£**

Schedule 2 – Breakdown of Prices for Included Works

The Purchaser wishes to sequence the works with one lift being completed before the other lift can be taken out of service so an indication of costs is required to assist with budgeting and cash flow, so please show separate price for the following Works as included in the main offer price noted above: -

	Description	**Cost**	**Programme Days**
a)	Health and Safety Works East Lift	£	
b)	Health and Safety works West Lift	£	
c)	Main works East Lift	£	
d)	Main works West Lift	£	

Schedule 3 - Programme of Standard Included Works

Phase of Works	**Weeks**
Provision of drawings	
Delivery of materials to site from receipt of an order	
Removal of non-retained existing equipment	
Lift refurbishment Works (West Lift)	
Testing and commissioning (West Lift)	
Lift refurbishment Works (East Lift)	
Testing and commissioning (East Lift)	
Total programme from placement of order	

Schedule 4 – Cost of Optional Works

If the contractor considered any other works are essential for the reliability or safety of the users or those that work on the lifts they shall provide optional prices in the schedule of optional prices below, and advise their reasoning for the additional works.

	Description	**Price (per lift)**	**Days effect on Programme,**
a)	Cost reduction for surface mounted vandal resistance landing stations on, West Lift (Total)	-£	
b)	Cost reduction for surface mounted vandal resistant Position Indicator on, West Lift (total)	-£	
c)	Cost reduction for surface mounted vandal resistance landing stations on, East Lift (Total)	-£	
d)	Cost reduction for surface mounted vandal resistant Position Indicator on, East Lift (total)	-£	
e)	New vandal resistant landing door in patterned stainless steel .	£	
f)	Additional cost for providing vvvf hydraulic drive system, West Lift.	£	
g)	Additional cost for providing vvvf hydraulic drive system, East Lift.	£	
h)	Up grading car interior to grade 316 patterned stainless steel, West Lift	£	
i)	Up grading car interior to grade 316 patterned stainless steel, East Lift	£	

j)	Painting the lift wells and pits (total for two lifts)	£	
k)	Paint the machine rooms (total for two lifts)	£	
l)	Cost of removing existing lift and fitting new vandal resistant lift, West Lift	£	
m)	Cost of removing existing lift and fitting new vandal resistant lift, East Lift	£	
n)			
o)			
p)			
q)			
r)			
s)			

Schedule 5 – Labour Rates (Installation)
Where it is agreed that the Contractor can claim for additional works being completed during the Works the below labour rates will be applicable.

Normal Working	£	
Early / Late working (Before 7.00 am or after 6.00 pm (Monday to Friday)	£	
Saturday Working	£	
Sunday Working	£	
Bank Holiday working	£	

Schedule 6 – Labour Rates (Service)

Where it is agreed that the Contractor can claim for additional works completed during the 12 months Warranty Period the below labour rates will be applicable.

Normal Working	£	
Early / Late working (Before 7.00 am or after 6.00 pm (Monday to Friday)	£	
Saturday Working	£	
Sunday Working	£	
Bank Holiday working	£	

Schedule 7 – General Information

Schedule 7.1 Callout responses.

Response times to callouts			
During Normal Working Hours 08:00 to 17:00	Entrapment		Minutes
	Breakdown		Minutes
Out of Normal Working Hours	Entrapment		Minutes
Including weekends and Bank holidays	Breakdown		Minutes

Schedule 7.2 Training

Hand-winding/lowering Training	£	
Hand-winding/lowering Training Refresher Lessons	£	

The Contractor shall provide further detailed breakdown of his costs if required by the Lift Consultant.

The contractor shall detail below any recommended spare parts and delivery schedule for the said parts.

Inclusions

Cash flow Forecast included	Yes / No
Bar Chart Programme included	Yes / No

All correspondence relative to this Tender is to be addressed to us, the Tenderer at the following address:

……

……

……

……

The undersigned is empowered to sign this Tender on our behalf.

SIGNED for and on behalf of

[insert full legal title of Tenderer] …….

Status of Signatory

Address

Date:

CERTIFICATE OF NON-COLLUSION

The essence of selective tendering is that the Purchaser shall receive bone-fide competitive tenders from all firms tendering. In recognition of this principal, we certify that this is a bona fide tender, intended to be competitive, and that we have not fixed or adjusted the amount of the tender by or under or in accordance with any agreement or arrangement with any other person. We also certify that we have not done and we undertake that we will not do at any time before the returnable date for this tender any of the following acts:

Communicate to a person other than the person calling for this tender the amount or approximate amount of the proposed tender, except where the disclosure, in confidence, was necessary to obtain insurance premium quotations required for the preparation of the tender,

Enter into any agreement or arrangement with any other person that he shall refrain from tendering or as to the amount of any tender to be submitted.

Offer or pay or give or agree to pay or give any sum of money or valuable consideration directly or indirectly to any person for doing or having done or causing or having caused to be done in relation to any other tender or proposed tender for the said work any act or thing of the sort described above.

In this Certificate, the word “person” includes any persons and anybody or association, corporate or unincorporated; and “any agreement or arrangement” includes any such transaction, formal or informal and whether legally binding or not.

Signed …….. Position ……

For and on behalf of …… Date ……..

PRELIMINARIES

A.1. Introduction

The works described within the Tender Documentation, Contract, Specification and any associated drawings, schedules etc. relate to the refurbishment and modernisation of the two existing hydraulic passenger lift reference 'West Lift' and 'East Lift' as specified at the named site.

Where the singular is noted in the tender documents and more than one unit is covered by the specification the singular shall be taken to read as the plural.

A.2. Tender Instructions

Four copies of the tender submission shall be submitted at the date and time shown in the invitation to tender documentation, in the format agreed with the Engineer.

The tender submission shall be complete with the following information as a minimum.

1.0 Form of Tender
2.0 Tender Price Summary
3.0 Confirmation that the submission strictly complies with the tender specification and drawings.
4.0 Schedule of equipment, illustrative material, preferred suppliers and sub-contractors.
5.0 Confirmation that the construction programme will be achieved.
6.0 Confirmation that the Special Terms and Condition of Contact are acceptable.

A.3. Tender documentation

The following documentation forms the basis of the tender against which the Contractor is to base his tender.

Tender Documentation

Preliminaries (This section)
Section B – General Conditions, Materials and Installation procedures
Section C – Form of Contract
Section D – Lift specification
Section E – Equipment Schedules
Section F – Special condition of Contract and amendments to the standard MF1 form of Contract
Section G – Appendices'
Pre-construction Information
Relevant drawings provided with the tender documentation

In addition to the above noted Documentation, the Contractor shall base his tender on his survey of the lift machine room, lift well, lift pit and any existing lift equipment and / or the information provided in any tender drawings as noted in the tender documentation.

A.4. Directory

A.4.1 A registry of companies and contractors is listed in the Pre-Construction information.

A.5. Definitions

The "**Purchaser**" is to mean: -

Regeneration & Planning Policy Unit
Eastleigh Borough Council
Eastleigh House
Upper Market Street
Eastleigh
Hants, SO50 9YN

The "**Building Managing Agent**" is to mean: -

Regeneration & Planning Policy Unit
Eastleigh Borough Council
Eastleigh House
Upper Market Street
Eastleigh
Hants, SO50 9YN

The "**Engineer**" is to mean: -

ILECS Ltd.
International Lift and Escalator Consultants
Tops'l House
High Street
Mistley
Manningtree
Essex CO11 1HB

The "**Principal Designer**" is to mean: -

ILECS Ltd.
International Lift and Escalator Consultants
Tops'l House
High Street
Mistley
Manningtree
Essex CO11 1HB

The "**Lift Consultant**" is to mean: -

ILECS Ltd.
International Lift and Escalator Consultants
Tops'l House
High Street
Mistley
Manningtree
Essex CO11 1HB

The "**The Principal Contractor**" is to mean: -

The company or organisation appointed to act as the Principal Contractor under CDM 2015.

The "**Contractor**" is to mean: -

The Company appointed to carry out the work that is the subject of this Specification.

The "**Works**" is to mean: -

The subject of this tender and contract including the design, manufacture, supply of equipment and materials, their transport to site, unloading, distribution, storage, unpacking, assembly, allocation, installation, builders work, electrical installation, connection, setting to work, testing, together with the provision of all skilled and unskilled labour, the removal, safe compliant disposal from site at time to time of all surplus materials and rubbish caused by the Works and twelve months defects liability period from the date the works on the lift is complete as agreed by the Lift Consultant. Comprehensive maintenance including compliance with all statutory regulations from award until successful completion of contract and the 12 months' defects liability period.

The "**Site**" is to mean: -

Multi-Storey Car Park
Mitchell Road
Eastleigh, SO50 5PB

A.6. Construction Programme

For tendering purposes, the Contractor shall base their tender on the programme stated in the Pre-Construction Information or Construction Phase Plan, the actual programme will be subject to agreement on the placement of order.

A.7. Tender Return

The completed tender documentation shall be returned in a plain envelope using the labels provided in accordance with the covering letter issuing the tender.

All tenders must be received before the due date and time to be considered. The outside of the tender must not indicate the name of the company tendering in any way, form or format.

The Purchaser reserves the right to discard any tender that: - arrives late, is not completed correctly, is sent without the information called for being provided, fails to comply with the details noted above, ignores instructions in the tender documentation.

SECTION B. General Conditions of Contract and Procedures

In addition to the clauses noted below the documentation noted in section 'A' and the following documents will apply to the contract:

Special Conditions of Contract and Amendments to the standard form of Contract, as provided

B.1. Form of Contract

The Works set out in the Tender Documents and Specification is to form the basis of a Contract based on The Institution of Engineering and Technology / The Institution of Mechanical Engineers 'Model Form of General Conditions of Contract for the supply of electrical, electronic or mechanical plant – with erection, MF/1 (rev. 6) 2014 Edition with current amendments and Special Terms and Conditions included in the Tender Documentation (see Section F).

B.2. Programme

The Contractor shall include his Programme with his tender submission which shall take account of sequence of working on the lift and lift equipment.

When preparing his programme, the Contractor shall take account of the anticipated programme of works as noted in the Pre-Construction Information and indicate all key dates inclusive of: return of drawing comments, confirmation of finishes, issue of relevant Construction Phase plan information and comment return dates, etc.

B.3. Conflict between documentation

Should there be any conflict between the main contractual documentation and this document which relate to the contract details the MF/1 Form of Contract shall take precedence unless the clause is specifically amended in Section F of the Tender Documentation.

Should there be any conflict between the main contractual documentation, relevant British Standards and this specification relating to technical issues the most stringent requirement shall apply.

B.4. General

The subject of this specification includes for the lift Works as specified at the noted site.

The Works shall comprise the whole of the labour and unless otherwise indicated, all the materials necessary together with such tests, adjustments, commissioning and maintenance as prescribed in the schedules and as may otherwise be required to give an effective reliable installation in fulfilment of the Contract.

The 'complete installation' referred to shall include not only the major items of plant and equipment conveyed by these tender documents and specifications, but also all the incidental sundry components necessary for the satisfactory erection and operation of the installation, whether or not these sundry components are specified.

The words 'as indicated', 'where indicated', 'unless otherwise indicated', refer to items or requirements indicated elsewhere in the Tender Documents issued in connection with the Contract.

The Contractor shall supply all necessary fixings, inserts, bolts etc. and where specified, builder's works, electrical works and making good including redecoration to the entire satisfaction of the Lift Consultant.

Alternatives from the requirements of the specification may be considered, but only if they are fully detailed in a letter accompanying the Tender and the difference in price between the specified article and that offered is stated in the accompanying letter. Unless alternatives are fully detailed, the price given shall be deemed to include for all items required by this specification.

A Tender may not be considered if the Contractor has not provided all the information requested in the schedules or if this information does not meet the requirements of this specification. The Contractor shall provide with his Tender a full description of the materials. The Contractor shall be willing to substitute to equal or other agreed value different materials, if so required by the Lift Consultant.

If the Tender price includes for the delivery of factory-assembled components to site, this shall be clearly stated in a letter accompanying the Tender together with full details of the facilities required for their installation. The Contractor shall include in the Tender the cost of all such facilities unless otherwise indicated.

B.5. Regulations and Compliance

The equipment and complete installation shall comply with all relevant current: - European Directive, Acts, Regulations, other statutory instruments, British Standards, codes and health and safety practices as far as is reasonably practical, whether noted or not within the tender documentation. Attention is particularly directed to those noted in Section D.

All British Standards, Guidance Notes, Codes of Practice, Regulations and Statutes shall for the purpose of this specification be deemed as minimum legal requirements. Where higher standards are required, they shall be complied with.

All apparatus, where the normal operation is such that interruption of low frequency or direct electric currents occurs, shall be fitted with means for suppressing the radio and TV interference frequencies so caused. Where existing mains supply cables are to be retained and reused the Contractor shall determine their suitability for compliance and reuse for both rating and EMC purposes this shall be stated in the tender.

The equipment and methods to be used in determining the level of radio interference shall in all cases be those specified in the latest standards and BS CISPR 11-A3. Reference shall be made to CP 1006 for guidance on the provision and installation of equipment to meet the above standards.

A recommendation shall be taken as a requirement.

The Contractor shall be responsible for ensuring that all items of plant, machinery and systems comply and that all necessary manufacturers' instructions are where necessary fixed to the items of plant as well.

B.6. Construction (Design and Management) Regulations 2015

If required, the Contractor shall allow within his tender for taking on the role of the Principal Contractor for the lift works under the Construction (Design and Management) Regulations 2015 (CDM 2015) and as such will be expected to undertake the duties of the Principal Contractor.

Where the Contractor is the Principal Contractor he shall ensure that the 'Construction Phase Plan' is prepared and received by the Principal Designer and Purchaser before the Works under the Contract is commenced, and that any subsequent amendment to it by the Contractor is notified to the Purchaser, and Principal Designer and (where there is no Principal Designer) that the Principal Contractor carries out all duties of a Principal Contractor under CDM 2015.

Promptly upon request from the Principal Designer the contractor shall provide, and shall ensure that any sub-contractor, through the Contractor, provides, to the Principal Designer (or, if the Contractor is not the Principal Contractor, to the Principal Contractor) such information as the Principal Designer reasonably requires for the preparation of the health and safety file.

The Contractor has a duty to ensure compliance with all relevant parts of the CDM 2015 that apply to their works so far as is reasonably practical, whether or not the project is notifiable and whether or not the Lift Contactor is the Principal Contractor.

The Contractor shall allow in his tender for co-ordinating and supervising all work including that of any Sub-Contractor during the dismantling, overhauling, design, manufacture, installation and site construction works to achieve a reliable and efficient lift installation is completed by the agreed completion date.

The Contractor shall make full allowance for complying with the CDM 2015 and the requirements of the Principal Designer, including the provision of risk analysis documentation and method statements.

The Contractor shall ensure that health and safety measures are considered during not only the design phase, but during installation and throughout the life of the equipment inclusive of: - maintenance, cleaning, alteration, refurbishment, modernisation, dismantling, removal and future demolition and disposal of the lift and lift equipment.

B.7. Insurance

The Contractor shall indemnify the Employer against all expenses, liability, costs, claims or proceedings whatsoever in respect of personal injury or death of persons or loss or damage to property arising from the carrying out of the Works unless such claims result from the negligence of the Purchasers employees and as stated in the contractual documentation.

The Contractor shall maintain insurance against the above matters to a minimum of £10,000,000.00 or a value stated in the contract documentation whichever is the maximum and provide reasonable evidence of such insurance from time to time at the Purchasers or Engineers request.

B.8. Labour Plant and Materials

The Contractor is to provide all the labour, plant and materials necessary for the proper execution of the Works in the agreed period of time for completion of the Works. The Contractor shall to include in his Tender for any extra costs for importing labour including higher rates of wages, fares, subsistence and lodging facilities, any payments in connection with the operation of any bonus schemes and the cost of all non-productive overtime involved in executing and completing the works in the agreed time period for completion as no claims for additional cost on these grounds will be considered. The Contractor shall provide all welfare facilities, where alternative facilities are not available on site.

Only directly employed labour shall be used for the whole of this project including the testing of the lifts.

B.9. Value Added Tax

The Contractor is to show VAT as a separate item at the rate prevailing at the time of tender.

B.10. Overtime and Allowances

All overtime and other expenses are to be allowed in the Tender that may be necessary in order to comply with the agreed programme and the Contractor is to include all travelling allowances, the cost of importing labour, etc., and all other expenses that may also be involved in the execution of the Works.

The Contractor shall meet the cost of Purchaser's security staff during his requests for out of normal hours working?

B.11. Payment

The Interim Application for Payment / invoice shall be presented to the Engineer with the Purchaser being the 'Payee' for the percentage of the works completed and agreed by valuation.

The Engineer shall check the Interim Application for Payment / invoice and issue a "Certificate of Payment" provided he is satisfied the phase of Works are acceptable and complete. A 5% retention is applicable and it shall be deducted from the net figure, on each invoice, before VAT is added. No payment shall be made for materials, which are not on site.

B.11.1 Payment terms

Stage	Percentage Payments
On placement of order	(Zero) 0%
On issue of Drawings	(Zero) 0%
On commencement of work on site	50 %
Monthly progress payments during the installation phase based on works completed.	25 %
On satisfactory completion of witness tests.	10 %
On completion of all snagging items	10 %
On satisfactory completion of the performance test	5 %

B.11.2 Damages

Damages in respect of Clause 34.1 of the General Conditions herein referred to shall be applicable at the rate noted in Appendix 1 of the per lift Contract Value per week, or part thereof, in respect of each lift.

B.12. Taking-over by Sections

Where this specification covers more than one lift, either as single lifts, or as groups of two or more lifts, the Contractor shall make due allowance within his tender for completion of the lifts and placing them in service before proceeding to take the next lift out of service. Taking-over by Section is not permitted and a 'Taking-over Certificate' will only be issued on completion of the last lift on the order, unless agreed otherwise in writing before the order is placed on the Contractor,

in which case a 'Taking-over by Sections' Certificate will be issued by the Engineer. The 12 months' defects and warranty period will only commence on issue of the Taking-over Certificate as will the 12 months' free maintenance period. It will be deemed that the Contractor has made all due allowance for extended maintenance and warranty periods as necessary.

B.13. Variations

No variation, together with any variation already ordered shall involve a net increase or deduction from the Contract Price of more than fifteen percent (15%) thereof unless the contractor and the Purchaser consent thereto in writing.

B.14. Provision of Services

The Purchaser is prepared to allow the Contractor the use of any existing accessible water or electricity supply in machine room or common areas for use in carrying out the works on the lift and no charge will be made for the water or power used. The contractor is not allowed to use any gas supply available in the machine room or anywhere else in the building, without prior written authority from the Purchaser.

B.15. Order of Works

The Contractor shall include his programme with his tender submission taking account of the programme noted in the tender documentation.

The Contractor shall be responsible for providing and maintaining suitable protection to the lift equipment, lift car, car and landing entrances until practical completion of the project.

The Contractors tender price shall allow for the maintenance of the lift from award of contract as noted elsewhere in the tender documentation until completion of the 12 months' warranty period which shall start on completion of the last lift to be completed.

Where possible all components shall be assembled off site prior to the installation works commencing. The programme as stated in the schedules shall be considered to be the contract period and Contractor is to fix his price for the duration of the works.

Due to the nature of the works the successful Contractor is required to keep his contract period to an absolute minimum without reducing quality, safety or performance. The tenders will be analysed not only on price and equipment but also on programme.

B.16. Visit to Site

It is deemed that the Contractor has visited the Site and thoroughly acquainted himself with the nature of the Works and the conditions under which the Works will be executed. The Contractor shall satisfy himself as to the safe means of access and egress, the extent and nature of the work and of the site, the conditions affecting the supply of labour, site welfare facilities, storage and materials and any other matter which may affect his tender as no claim on the grounds of lack of knowledge in any respect will be considered.

B.17. Electricity Supply

The Contractor shall take account of the requirements set out elsewhere in the tender documentation and allow all costs associated with the relevant works and supply demands.

Temporary lighting and general-purpose power shall be provided by the Contractor from the supplies in the machine rooms.

B.18. Fees

The Contractor shall be responsible for defraying the cost of all statutory and other fees properly payable to Notified Bodies, Local Authorities and Public Utilities in connection with the Works. The Contractor shall be responsible for liaison with the Local Authority in all matters regarding planning permission and building regulations approvals, also the Health and Safety Executive regarding the lift design dealing with all aspects regarding the Local Authority requirements and undertaking the Works accordingly. All costs associated with such fees shall be included in the Contractors tender.

B.19. Guarantees

The materials and workmanship of all equipment supplied under the Contract shall be fully guaranteed for a period of 12 months from the certified Completion Date. Notwithstanding the Contract conditions, all equipment normally guaranteed for a time beyond the termination date of the Defects Liability Period for this Lift Contract shall be held to remain under guarantee for the maximum period.

When required, the Contractor shall provide an assignable warranty for the whole Works for a period of 12 years based on him carrying out the maintenance for this period.

B.20. Suppliers

Within two weeks of being appointed, the Contractor shall submit to the Lift Consultant a detailed list of supplier's names and addresses for items of materials and equipment he proposes to purchase for the execution of the works.

Suppliers shall admit the Lift Consultant to their premises during normal working hours for the purpose of inspecting and testing the materials and equipment offered. Where requested, copies of the Contractor's sub-orders to suppliers shall be sent to the Lift Consultant.

All materials and equipment shall be new unless agreed in writing with the Lift Consultant.

The Contractor shall ensure all materials are obtained and delivered to meet the agreed programme and before any lifts are taken out of service. The Contractor shall allow adequate time to obtain materials from alternative suppliers to meet the programme.

B.21. Design / Working Drawings

Unless otherwise indicated or directed by the Lift Consultant, the Contractor shall, before manufacture commences provide four sets of the following working drawings and details for comment.

- General Arrangement Drawings.
- Builder's Work Drawings.
- Construction / Manufacturing Drawings.
- Car Internal Drawings inclusive of car operating panel(s)
- Details of electrical work associated with the lift works.

The Lift Consultant will accept combination general arrangement and builder's work drawings if suitably clear and complete.

The Contractor shall provide the Lift Consultant with four sets of the final working drawings and details. All drawings shall be fully dimensioned in SI units.

Where it is agreed that drawings can be provided in an electronic format, they shall be formatted as PDF's, unless otherwise called for as formatted as AutoCAD.

At the end of the contract the contractor shall provide 4 sets of 'AS INSTALLED' drawing.

B.22. Samples

The Lift Consultant reserves the right to call upon the Contractor to submit samples of any or all materials for inspection. If samples are rejected by the Lift Consultant, further samples are to be submitted until approval is achieved. Particular attention will be paid to the car and landing finishes and samples of these will be required within three weeks to enable selection to be made.

B.23. Site Progress Records

The Contractor shall arrange for a full set of white prints of working drawings and site diary to be kept on the site showing the progress of all work in connection with this Contract. Such documents shall be kept up to date and shall be available for inspection at any time.

B.24. Accuracy / Setting Out

Arrange the setting out, erection, juxtaposition of all components and application of finishes (working within the practical limits of the design and the specification) to ensure that there is satisfactory fit at junctions and that the finished work has a well aligned, true and regular appearance.

Wherever satisfactory accuracy, fit and/or appearance of the work are likely to be critical or difficult to achieve, obtain approval of proposals or of the appearance of the relevant aspects of the partially finished works as early as possible.

Work that fails to meet the specified levels of accuracy must not be rectified without approval. The Contractor shall submit proposals for rectification and meet all costs arising, including effects on other work. Allowance shall be made for the possibility that approval will not be given, necessitating removal and replacement of the work.

B.25. Protection of Equipment

Electrical equipment or equipment with electrical component parts shall be delivered and stored with vapour-proof protection.

Equipment or component parts of equipment specifically designed to operate in normal room conditions, shall be delivered and stored with suitable weatherproof protection.

Where a piece of equipment or an appliance comprises more than one part, the pieces shall be separately packed and be clearly identified on the outside with the Manufacturer's name and component reference.

The Contractor shall ensure that his equipment is adequately painted prior to dispatch from the works. Any bright surfaces shall be adequately protected before transportation.

Particular care shall be taken to ensure that all factory applied finishes which are designed as visible finished surfaces, are adequately protected whilst stored.

After erection is completed the Contractor shall thoroughly clean exposed metal, paint this metal with at least one coat of primer paint and then all new metalwork shall be painted with at least two coats of oil-based paint to a colour to be agreed. The paint shall be non-toxic and not give off harmful fumes during its application or curing period that would affect the residents.

The Contractor is to include full details of the protection allowed in his tender to the lift car, car and landing entrances.

B.26. Provision of Documentation and Records

B.26.1 Construction Phase Plan

Where the Contractor is not required to take on the role of the Principal Contractor he shall provide information as necessary to the Principal Contractor and take note of the Construction Phase Plan when tendering.

Where the Contractor takes on the role as the Principal Contractor he shall take on the duties and responsibilities of a Principal Contractor as set out in CDM 2015 and produce the Construction Phase Plan, which shall take account of the requirements of CDM 2015 and information provided in the Pre-Construction Information. The Construction Phase Plan shall take the format noted in the Pre-Construction Information' and include all relevant information necessary to enable sub-contractors to provide tenders for the element of works that they will be expected to undertake.

Within two weeks of receiving the order the Principal Contractor shall provide copies of the Construction Phase Plan for perusal and comment by the Principal Designer. The format and number of copies shall be as called for in the Pre-Construction Information. The Principal Contractor shall allow for and take note of comments provided and incorporate any necessary changes into the Construction Phase Plan, before issuing it to contractor. The Principal Contractor shall also allow for the incorporation of any necessary changes that may be needed as the Works project progresses.

B.26.2 Final Documentation

Eight weeks before completion of each lift and before the lift is put into service; the Contractor shall supply preliminary copies in the agreed format of the Operation and Maintenance manual and the Health and Safety File for the Principal Designer and Lift Consultant comment and perusal.

The Lift Consultant will return one copy of the manual to the Contractor with any comments or observations, within three weeks of receipt. Upon receipt of return of the documents from the Lift Consultant the Contractor shall incorporate the necessary modifications and re-issue further copies for his perusal and comment. This shall continue until such time as the manuals are correct and in accordance with the Principal Designer and Lift Consultant requirements.

The Contractor shall note that the lift installation will not be deemed complete or handed over until the documentation is correctly completed.

The Contractor shall place a copy of the final agreed Operating and Maintenance manual in the lift machine room complete with a service log card.

Two final copies of the Operating and Maintenance manual and Health and Safety File shall be sent to the Lift Consultant, one for the Principal Designer and one for the Purchaser. An additional copy shall be provided on CD-ROM in Word or PDF format unless otherwise agreed in writing.

B.26.2.1 Operating and Maintenance Manuals

The Operating and Maintenance manuals shall be in the form of a purpose bound ring binder containing all necessary information to enable the safe and correct maintenance of the installed equipment.

The manuals shall include as a minimum the following:

- Index.
- General description of the systems.
- Operating instructions for all equipment and systems installed.
- Frequency and full details of routine maintenance requirements.
- Manufacturer's literature, including detailed drawings and electrical circuit details, printed operating and maintenance instructions, for all specific items of equipment and plant supplied under this specification.
- Schedules of all equipment and plant stating their duties and performance figures. Each item of equipment shall have a unique code number, cross-referenced with the Record Drawings. The Manufacturer's name, address and plant shall be listed in the manuals together with catalogue list numbers for replacement purposes.
- All record drawings and circuit diagrams shall be 'As Built' drawings and be included at the rear of the manual. All drawings larger than A4 shall be folded and accommodated in the binder so that they may be unfolded without being in any way detached from the rings. For all CAD drawings, DXF discs shall also be provided.
- Certificates relating to any tests and procedures noted in clause B.21.

B.26.2.2 Health and Safety File

The Contractor shall assist the Principal Designer or Principal Contractor with the preparation of the Health and Safety File by providing all necessary information as reasonably called for or requested by the Principal Designer or Principal Contractor in the format called for in the Pre-Construction Information and the Construction Phase Plan.

B.27. Testing and Commissioning

On completion of the Works and before final acceptance, the Contractor shall carry out witness tests in the presence of the Lift Consultant. These tests shall be undertaken on each lift irrespective of whether a conformity assessment certificate is to be provided or not.

The Contractor shall give 10 days' written notice to the Lift Consultant of the day for the witness test to be carried out. Should the witness test be aborted by the Contractor or that upon arrival by the Lift Consultant the lift is considered by him not to be completed and ready for witness testing then the Contractor shall reimburse the Lift Consultant. A new date shall be arranged, which shall not adversely affect the completion date of the Works.

The Contractor at his own expense shall supply all instruments, labour and materials required to carry out such tests as the Lift Consultant may direct and also those prescribed by the appropriate regulations and as set out elsewhere in this specification.

The Lift Consultant will be at liberty to use any instruments or apparatus he may wish to employ for the purpose of testing.

The tests are to be the satisfaction of the Lift Consultant. The Contractor at his own expense shall rectify, to the entire satisfaction of the Lift Consultant, any faults, omissions or defective work revealed by such tests.

Should the lift fail the witness tests, the Contractor shall reimburse all costs expended by the Lift Consultant or his representative in carrying out further tests. These costs shall be invoiced to the Contractor.

The tests shall cover all items detailed in the SAFed 'Guidelines on the Supplementary Tests of in-service lifts', BS5655 Part 10, BS8486 and the Lifting Operations and Lifting Equipment Regulations 1998 as appropriate for the type of lift and the works undertaken. Completed copies of test certificates shall be available for use by the Lift Consultant before the witness test commences. BS8486 shall be completed as far as is reasonably practicable on all lifts be they new or refurbished or modernised lifts.

The results of the witness tests shall be tabulated by the Contractor on a form similar to that set out in the appropriate documents e.g. BS8486, BS 5655 Part 10. The results of SAFed Supplementary Test shall be set out as the SAFed 'Guidelines on the Supplementary Tests of in-service lifts' Section A. Three typed copies shall be submitted to the Lift Consultant within seven days of completion. Test certificates and/or type test certificates shall be provided for all components which affect safety; e.g. ropes, eyebolts, buffers, safety gears, locks, etc.

Lift ride quality measurements shall be carried out in accordance with ISO 18738.

B.28. Completion

Unless otherwise agreed in writing the Works will not be considered to be complete until: The Works have successfully completed the witness tests and been commissioned subject to the completion of minor snagging items to the satisfaction of the Engineer or the Purchaser's appointed Agent and the Operating and Maintenance Manual and the Health and Safety File are accepted as being complete and finished in their final form.

SECTION C. Particular Specification

C.1. General

This specification relates to the refurbishment and modernisation of the two passenger lift as detailed at the noted sites in compliance with the Tender Documentation and Specification. The Works shall include all that is necessary to complete the project and other specified works.

All new and replacement equipment provide shall comply with the standard specification as shown in Section 'D.2' of this specification and all other relevant codes and standards.

Where equipment is noted as being retained, the Contractor shall, as a minimum allow for the works indicated in 'D.3' to be carried out. Should the contractor consider any of the equipment to be unusable or that it is more expedient or economical to replace or modify the equipment, he shall note this in his tender and offer a cost reduction.

Where plant or equipment is to be refurbished or modernised, as a minimum the works indicated is 'D.4' shall be carried out. Where the Contractor considers that it is more expedient or economical to replace the equipment, he shall note this in his tender and offer a cost reduction.

The Contractor shall quote a separate extra sum for annual fully comprehensive maintenance as a minimum for a period of 3 years. If an order is placed for the Maintenance Contract with the contractor the maintenance shall commence at the end of the defects liability period.

C.2. Lift Well

The lift and lift equipment is to be installed within the existing lift wells and machine rooms.

The Contractor is to ensure that the existing well structures including any nibs supporting the landing sills are sound and suitable for their purpose and the Contractor is to take this into account when submitting his tender.

The Contractor shall ensure that any new equipment is compatible and suitable for the installation and use within the existing structure, headroom and pit depth.

C.3. Technical Details

The following technical details indicate the lift details following completion of the Works.

C.3.1 Lift Reference – West Lift and East Lift

General	
Number of Lifts & type	2 Open front simplex hydraulic passenger lifts
Machine room location	Existing machine room adjacent to lift well at bottom level
Original Installer & serial number	Otis 78J1776X and 78J1777X (approximate year of installation 1970's)
Well Construction	Existing.
Electricity Supply	Existing 400 Volts 3ph 50 Hz
Emergency Supply	Not Provided.
Headroom	Existing to be confirmed by site measurement
Travel	Existing to be confirmed by site measurement
Pit Depth approximate	Existing to be confirmed by site measurement
Well Sizes approximate	Existing to be confirmed by site measurement
Load	(Exiting 8 Person, 600 kg) rate to suit revised car size.
Speed	As existing
Vandal resistance	Required
Floors Served Front	**West Lift** – 1st, 3rd, 5th, 7th, 9th and 11th floors, **East Lift** – 2nd, 4th, 6th, 8th, 10th and 12th floors.

Floors Served Rear	None
Stops and Openings	6 total stops, 6 total openings
Control System	Directional collective 3 car group control
Drive system	Indirect acting hydraulic with Star / Delta starting
Roping System	Indirect acting
Door Operation (Front):	New horizontal sliding power operated centre opening doors
Starts Per Hour.	Minimum 90 lift starts
Lift Car	
Clear Internal dimensions	Existing
Car Operating Panel Type	1 off flush fitting in sidewall, push buttons with tactile markings, one floor button for each floor back light with call accepted signals, door open and door close pushes, car preference service key switch, enunciator and induction loop. Lift number and load to be engraved at top of car operating panel. To be compliant with EN81-70.
Roof trap	Not Required
Car Position Indicator	Digital type in main COP'.
Lighting Switch	Key operated in lift car operating panel Three position switch ON, OFF and TEST.
Fan switch	Not required.
Other Indicator	'Lift returning to ground floor on fire alarm control' indicator in car or displayed in posit ind.
Ventilation	Visible high and low level natural ventilation with profile cut vents and backing plates.
Overload Indicator	Required.
Emergency Intercom System	Commercially available hands free alarm and emergency breakdown intercom system with autodial. Inductive loop and symbol are to be provided for persons with impaired hearing.
Car Doors	New power operated centre opening sliding doors.
Entrance Protection	New curtain of light type.
Advanced Door Opening	Not required
Landings	
Position Indicators (PI)	Required at all floors. Located to one side of the entrance above landing stations
Pre-announcing Direction indicators	Required at all floors. Combined with PI's
Landing Stations –	1 riser per lift vandal resistant
Landing Entrances	Existing
Architraves	Existing
Sills	Existing to be cleaned
Fireman's switch	Not Required.
Alarm indicator	Display in Landing position indicators latching signal with manual reset in controller.

C.4. Requirements for Additional Control Features

The control features as noted below shall be included into the control system.

Control Feature	Clause No	Required	Comments
Special Service	D.2.7.4.1	No	
Fireman's Control Feature	D.2.7.4.2	No	

Firefighting Control Feature	D.2.7.4.3	No	
Evacuation Control Feature	D.2.7.4.4	No	
Engineer's Access Control	D.2.7.4.5	Yes	
Split Service Feature	D.2.7.4.6	No	

C.5. Equipment schedule

The following tables indicate the action to be taken on key items of equipment e.g. retained, modernised / refurbished or replaced. The works called for shall be carried out as stated in the appropriate section.

Any new equipment shall comply with the relevant clause in section 'D.2' of this specification and relevant standards.

Where equipment is to be retained, refurbished or modernised; as a minimum the works as noted in the relevant section 'D.3 or 'D.4' of this specification shall be carried out to bring the lift into line with the latest standards as far as is reasonably practicable. If the Contractor considers it to be expedient or economically beneficial, components shall be replaced with new equipment in accordance with section 'D.2' of this specification and the latest standards. Where any part is found to be unusable for any reason it shall be replaced on a like for like basis or with a CE marked product. Where an exact replacement cannot be obtained or where a safety component is to be replaced it shall be replaced with a component in accordance with section 'D.2' and the latest standards and CE marked where applicable.

Equipment declared to be retained, refurbished or modernised is to be reused unless during the Contractors survey or installation it is found in an unsuitable condition or does not lend itself suitable for the installation as a whole or with the new equipment.

The Contractor shall check the existing equipment in particular the electrical equipment for signs of damage. Should any equipment prove to be defective the Contractor shall inform the Lift Consultant immediately. The Contractor shall ensure that all equipment is operational before setting the lifts to work.

It is deemed that the Contractor has included all costs associated with the retained equipment whether retained or not: -

The following table shall be read in conjunction with the technical details as set out in C.3, the finishes as indicated in C.6, the Health and Safety and EN81-80 items noted in C.7 and other relevant sections of the specification and documentation.

C.5.1 . Lift Reference – Lift 1

Main items of Equipment	Retain (D.03)	Refurbish / Modernise (D.04)	Replace with new (D.02)	Comments
Machine room access	Existing			
Electrical Mains Supply	Existing			
Mains Switch and distribution board	Existing			Subject to Health and Safety works
Hydraulic power unit	Existing			
Hand-winding/ lowering facilities			New	
Pulleys, sheaves & guarding		Refurbish		Ram head pulley
Controller and drive System			New	
Trunking and conduit			New	Galvanised
Wiring and travelling cables			New	Provide for CCTV cores in travelling cables terminate in machine room.
Over-speed governor & tension weight			New	
Protection against unintended car movement			New	
Car guides & brackets	Existing			Clean and degrease before painting.
Ram head assembly	Existing			
Well switchgear and position system			New	
Hydraulic Jacks assembly and rupture valve				
Hydraulic pipe work / hoses	Existing			Subject to SAFed and oil damage

Suspension ropes & terminations including anchor bolts nuts and split pins			New	Unless certificated proof of new being fitted in last 3 years
Car and fixed suspension rope anchorages	Existing			
Governor rope & terminations			New	
Buffers			New	
Dividing screens				N/A
Car Top Maintenance Control			New	
Car Frame & anchorage	Existing			
Car pulleys	Existing			
Platform	Existing			Modify if necessary
Car Enclosure	Existing			Modify to suit new door operator and subject to optional price for new
Safety gear	Existing			SAFed
Emergency car lighting			New	
Door Operator			New	Vandal resistant type
Entrance protection			New	Vandal resistant type
Car décor	See finishes			See finishes schedule
Car operating panel			New	Vandal resistant in side wall
Car guide shoes & Lubricator			New	
Intercom system			New	Emergency passenger alarm
Compensation system				N/A
Well Lighting		Modify		3-way switch and improve
Landing fixtures			New	To be EN81-70 compliant
Alarm Indicator panel			New	
Landing entrance equipment		Modify		
Landing doors panels	Existing			Option for new
Door components		Refurbish		Vandal resistant, locks, new rollers, pickups, kicking rollers, door bottom shoes, etc.
Architraves, slam posts	Existing			Subject to option for new
Outer Trims / Full Fronts	Existing			
Toe guards and Facia Plates	Existing			To comply with EN81
Notices and tools			New	

C.6. Lift Car and Landing Finishes

A design board and samples of all alternative car, door and landing finishes are to be provided for consideration and design agreement. The following detail indicates the preferred design for lift car and landing finishes. If the Contractor is unable to comply with any specifically noted details, these should be listed in the covering letter, with any proposed alternatives.

C.6.1 Lift Reference – L1

Lift Car	Refurbish with option price for new vandal resistant enclosure
Ceiling	New.
Lighting	New Flush mounted vandal resisting units, to achieve a minimum 200 lux at car floor
Sidewalls	Existing, with option for new, in patterned stainless steel, pattern and design to be agreed.
Rear wall	Existing with half height mirror finished stainless steel above dado rail. Option for new, in lower part in patterned stainless steel with mirror above, pattern and design to be agreed.
Front wall	New patterned st/st, pattern to be agreed

Skirting	New
Car Controls	1 off new COP in satin brushed stainless steel to be located in the sidewall in accordance with EN81-70.
Handrail	Vandal resistant circular section stainless steel handrail on one walls in accordance with EN81
Dado / Bump Rails	Behind handrail and between mirror and wall finish below. Vandal resistant
Cornice	None required.
Car Floor	New non slip industrial hardwearing flooring, vandal resistant type.
Car Doors	Existing to be cleaned. Option for new vandal resistant door in patterned stainless steel. Pattern to be agreed
Car sill	Existing
Sundries	None.
Notice	No smoking symbol.
Landings	
Landing Stations	Flush mounted in satin stainless steel with EN81-70 compliant pushes. Cost reduction to be offered for surface mounted landing stations in lieu of flush units.
Landing position indicators	Flush mounted units in satin stainless steel in compliance with EN81-70. Cost reduction to be offered for surface mounted landing stations in lieu of flush units.
Landing sills	Existing to be cleaned.
Landing doors	Existing to be cleaned. Option for new vandal resistant doors in patterned stainless steel, pattern to be agreed.
Architraves and slam post if applicable	Existing to be cleaned. Optional price for skinning is patterned stainless steel.
Alarm indicator panel	In LPI
Fireman's Switch	Not required

C.7. Health and Safety and EN81-80 Improvements

Areas of the installation(s) that do not comply with the Health and Safety at Work Act, EN81-80 and other relevant standards shall be modified to minimise risks. When undertaking works on the lift, the Contractor shall include for current standards to be applied "as far as reasonably practicable" such that the lift can be brought into line with the Health and Safety at Work Act 1974 and EN81-80 and other relevant standards.

Any additional observations regarding technical limitations or Health and Safety issues must be brought to the attention of the Lift Consultant at the time of tender. They must be clearly stated and a cost must be applied, as no additional cost will be considered.

C.7.1 Health and Safety Improvements – Goods Lift

C.7.1.1 Lift machine room (machinery space)

- Provide encapsulated and wall mounted circuit diagrams
- Install a floor specific hand winding indicator and buzzer.
- Update all machine room notices to be the pictorial type.
- Clearly and conspicuously mark and identify the equipment within the lift machine rooms.
- Provide temperature controls for machine room heaters where they are not already provided.
- Ensure at least one RCD type socket outlet is provided in both machine rooms
- Provide a bund wall either around tank or within machine room to prevent oil spillage running out of the machine room West lift only.

- Mark electrical equipment with its voltage
- Fire stop where hydraulic hoses and electrical wiring enters the lift well from the machine rooms
- Improve the machine room lighting to provide 200 lux at all the equipment.
- Provide engineers and passenger alarms / intercom system in accordance with EN81-1 & EN81-28 that provides 2-way communications between the lift machine room, car top, pit area and within the lift car.
- Provide relevant warning notices to EN81-1, EN81-80 and BS 7255.
- Provide emergency stop switch that is accessible from the hand-pump position and machine sheave.
- All SAFed examinations to be completed and copies provided in the machinery spaces.
- Copies of the Insurance Inspectors reports to be provided in the machinery spaces.
- Provide entrance barriers.
- Mark tripping hazards.

C.7.1.2 Lift Well and Pit

- Lift Well and Pit
- Upgrade the well lighting to incorporate fluorescent fittings and provide switched well lighting made available via 3-way switching from the lift machine room; pit and car top with emergency fittings to the car top and lift pit areas.
- Mark safe refuge area on the car top and in the pit.
- Install RCD type socket outlet in the pit.
- Install appropriate car top guard rails with mid rails and kickboards where there are voids greater than 300 mm square.
- Install oil catchment trays to the base of the guides.
- Paint the hydraulic ram head a statutory safety yellow
- Install pit depth notice.
- Guard the ram head pulleys.
- Fit automatic lubricators to the ram heads.
- Mark lifting beams “DO NOT USE FOR LIFTING. TEST BEFORE USE”.
- Provide a pit prop stowage bracket, complete with a safety switch to confirm the pit prop is stowed safely and correctly.
- Guard tension weight in pit and provide safety switch.
- Suitably guard moving / rotating parts in the lift well and pit in accordance with the machinery Directive.
- Check material on the backs of the doors and suitably label it if it contains asbestos.
- Provide engineers pit control unit

C.7.2 Maintenance issues

The following items should have been completed under the existing maintenance contract but may be outstanding or need reworking.

C.7.2.1 Lift Machine room

- Identify the cause of the damp in the machine room and rectify as necessary, if the marks on the walls and floors are due to oil clean them up.
- Remove damaged and redundant parts and non-lift materials from the machine room.

C.7.2.2 Lift Well and Pit

- Replace leaking ram seals.
- Clean down and lubricate the entrance equipment as necessary.
- Replace worn or damaged; door rollers, lanyards, locks, lock contacts, drive block rollers, etc. and adjust automatic door closers, kicking rollers etc.
- Clean corroded parts and repaint them.

C.7.2.3 Lift Car

- Adjust car and landing door equipment to improve the door operation and to stop the doors banging on closing.
- Correct problem with car lighting
- Ensure operational alarm sounders are provided.

C.8. Sequence of the Works

The work will be completed in sequence in a single phase. SAFed supplementary testing, as required shall be completed within two weeks of placement of order.

C.9. Builders Work and Electrical Installation

This section relates to the builders and electrical work forming part of the Works.

The Contractor shall make due allowances within his tender for the position and protection of the retained lift equipment, such that it is safe and suitably located to enable the scaffold to be erected in the lift well as necessary.

The Lift Consultant shall have the right to instruct the Contractor to remove from site all plant or equipment he considers to be faulty or dangerous.

Heating and Cooling shall also be the responsibility of the Contractor to meet the ambient temperatures outlined in BS 5655 / EN81 for machine room equipment. Consideration shall be given to solar heat gain to the lift machine etc. located within the lift well.

All Contractors staff shall note that the lift entrances open into office areas on some floors and under no circumstances will they be allowed entry into any areas other than the lift well, stairwell and machine room on any floor other than by special arrangement and with the agreement of the Purchasers representative. The Contractor shall work behind hoardings and closed doors.

The Contractors shall at all-time be aware that this building will be in use and that members of the general public will be using the car park, lifts, lobby areas and stairwells. Therefore, care must be taken when carrying out works, etc. on this site. Dustsheets or other protective measure shall be used to protect flooring and, decorative finishes and floor finishes, from dust, oil and other deposits which may be present during the works. These protective measures must be properly and safely maintained until removed. Safe and free passage shall be afforded to the staff at all times.

The site shall at all times be kept in a clean and reasonable condition. At the end of each working day the site shall be left in a clean and tidy condition.

At the time the lift Works are carried out the Contractor will be the Principal Contractor on site and will be totally responsible for all their site attendances, builders' works and electrical works without exception. All protection to existing finishes will be the responsibility of the Contractor and this must be taken in to account, especially when unloading and distributing equipment.

Any additional observations regarding additional attendances or Health and Safety issues must be brought to the attention of the Lift Consultant at the time of tender. They must be clearly stated and a cost must be applied, as no additional cost will be considered after placement of order.

The Contractor will be responsible for making good the gap between the new lift entrances and the existing structural opening to provide at least 2-hour fire rating.

C.9.1 Schedule of Builders Works & Attendances

The Contractor shall allow for all cutting away and making good to the structure of the building to allow all cables/conduits fixtures and fitting to be installed. The Contractor shall allow for all hoardings protective screens and any other protection that for health and safety reasons may be needed during the works, including making good where the existing entrances have been removed and replaced with power operated sliding doors.

The lift machine room shall be painted internally with two coats of good quality paint, white for the walls and red for the floor.

The lift wells shall be painted internally with two coats of good quality paint, white for the walls and red for the pit floor.

All attendance's associated with the Works.

All cutting out and making good inclusive of periphery decoration and making good to surrounding areas of landing entrances after the Works has been completed.

The existing well structure shall be checked by the Contractor for security and suitability for continued use any defects are to be reported to the Engineer within 5 working days of acceptance of the order. Any ledges or recesses shall be ramped or protected.

C.9.2 Schedule of Electrical Works & Requirements

The Contractor's electrical installation shall begin from the lift supply termination outlet in the machine room, the position of which is to be agreed. The existing mains cables are to be reused; should this not be suitable either due to rating or EMC requirements the Contractor is to allow for replacing the cable with one of a suitable type. When noted in the Particular Specification alternative power supplies for the lift will be provided.

The electrical installation shall comply with the current edition of the BS 7671 Requirements for Electrical Installations. All cables other than travelling cables or metal sheathed cables shall be enclosed in galvanised metal conduit and/or trunking.

Within two weeks of receiving the order, the Contractor shall confirm that the existing mains supply and any auxiliary supply is suitable for their needs; they shall provide details of the mains and auxiliary power supply requirements to run the installed equipment and any auxiliary equipment associated with the lift. This shall include the type of mains and termination required and consumer unit details. The Contractor shall provide mains cables for the lift from the mains termination to the lift equipment, which shall be provided to meet the requirements of the installed equipment. The Contractor shall determine the suitability and load characteristics of the supply to the building and therefore the machine room and its suitability for any existing and new lift equipment and revised application. If required, the Contractor shall liaise with the appropriate electricity supply company to confirm acceptability. Where specified a lockable fused mains isolator is to be located near to point of access to the machine room (provide additional switches if existing mains supply cannot be readily and easily moved). The following shall be strictly adhered to in the execution of the works: -

a) The IEE Regulation,
b) Health and Safety at Work Act 1974.
c) Electricity at Work Act 1990.
d) Building Regulations.
e) Construction (Design and Management) Regulations 2015.
f) Management of Health and Safety Regulations.

The installations shall be tested by the Contractor in the presence of the Lift Consultant who shall witness all tests. The tests to be carried out shall be those described in the IEE Regulations, Section 6.

The Contractor shall provide typed test certificates. Hand-written certificates are not acceptable. The Certificates shall be issue upon completion of the works and before handover.

The Electrical Contractor shall agree times and dates with the Lift Consultant before disconnecting any electrical supplies, giving notice to the Lift Consultant in accordance with the Contract Conditions.

All new lighting and power installation within the lift well shall be undertaken by the Contractor. The Contractor shall supply and fit MCB's within the new distribution boards in the lift machine room.

The existing provisions shall be retained and upgraded as necessary to ensure their suitability for continued use, with new equipment being supplied as necessary to ensure the provisions are available in the machinery space(s).

- Switched fused isolators per lift located near to the point of entry into the machine room.
- Lift well lighting with emergency lighting.
- 13A RCD socket outlets in lift machine room, pits and on car tops.
- Lighting in machinery space provides 200 LUX at the lift equipment.
- Emergency lighting in machinery space.
- Ensure that distribution boards per lift are fitted with the following separate ways: -
- Switched lighting in lift machine room / machinery space.
- Lift car lighting switched from machine room / machinery space.
- Lift well lighting switched from machine room / machinery space, pit and car top.
- Tubular heating in lift machine room/ machinery space with thermostat control.
- 2 Spare ways.

SECTION D. Standard Specification

D.1. General

Where the singular is noted in the tender documents and more than one unit are covered by the specification the singular shall be taken to read as the plural.

The intention is to bring the lift into line with the latest standards and Health and Safety practices as far as is reasonably practical and provide suitable access and delivery equipment to suit the needs of the building.

The Contractor will be responsible for carrying out work in the machine room, lift well, lift pit and areas adjacent to the landing entrances, including the lift landing architraves and doors as indicated.

The Contractor is reminded that there may be no other contractors on site. The Works shall include all attendances, builders work and electrical work that are necessary to complete the project.

The Works undertaken must comply with all relevant Acts, standards and regulations and in particular, Health and Safety at Work Act 1974, good working practices and all other relevant standards and codes, whether noted or not below and in Section 'D.02' of this specification.

- BS EN 12385 - Wire Ropes for Lifts and Hoists.
- BS DC BS ISO 22199 – Electromagnetic compatibility Product family standard for lift, escalators and moving walkways
- BS 5655 - Code of Practice for Lifts.
- BS 7255 - Safe Working on Lifts.
- BS 7671 - Requirements for Electrical Installations.
- BS 7801 –Code of practice for safe working on escalators and moving walks
- BS 8300 - Code of Practice for Disabled Access.
- BS 8486 – Specification for means of determining compliance with BS EN 81.
- BS 8501 – Graphic symbols and signs. Public information symbols
- BS 9999 – Code of practice for fire safety in the design, management and use of buildings
- BS EN 81 - 2, 3, 11, 20, 21, 22, 28, 29, 31, 41, 43, 50, 58, 70, 71, 73 & 80 Lift Standards and Codes of Practice.
- BS EN 627 – Specification for data logging and monitoring of lifts, escalators and passenger conveyors
- BS EN 13015 – Maintenance for lifts and escalators. Rules for maintenance instructions
- BS EN 12015 – Electromagnetic compatibility. Product family standard for lifts, escalators and moving walks, Emissions
- BS EN 12016 – Electromagnetic compatibility. Product family standard for lifts, escalators and moving walks, Immunity.
- BS EN 50214 – Flat polyvinyl chloride sheathed flexible cables
- BS EN 13015 Maintenance of Lifts and Escalators.
- BS ISO 4190 – Lift (elevator) installation. Control devices, signals and additional fittings
- BS ISO 18738 Lift (elevators) Measurement of lift ride quality
- DD 265:2008 - Protocol for communications between a lift alarm system and an alarm receiving station
- Building Regulations including Part M Access for the Disabled.
- Construction (Design and Management) Regulations 2015.
- DC BS ISO 25745 Energy Performance of lifts and escalators
- Disabled Discrimination Act.
- Equality Act 2010
- EEC Lifts Directive.
- Electricity Council Engineering Recommendation G5/4.
- European Directive on EMC 89/336/EEC.
- Health and Safety at Work Act 1974.
- Management of Health and Safety at Work Regulations 1992.
- Provision of Work Equipment Regulations 1998.
- SAFed Guidelines on the supplementary tests of in-service lifts.
- The Lift Regulations 1997.
- The Lifting Operations and Lifting Equipment Regulations 1998.
- The Machinery Regulations 1992.

- Workplace (Health and Safety) Regulations 1992.

The Contractor is to formulate the fixed tender sum on the basis of the period shown in the Tender Documentation. Alternative working procedures can be adopted to minimise the onsite time subject to agreement. No work shall start until all of the materials are available on site, all assembly works that can be completed and all site works that can be carried out is completed and permission has been agreed with the Purchaser.

All ancillary works, which are detailed in this section and the tender documentation shall form part of this specification.

All retained steelwork which forms part of the overall lift installation and the structural elements of the lifts themselves, which are not finished surfaces, shall be de-greased, cleaned and wire brushed and treated with rust inhibiter. Painted surfaces shall be de-greased, cleaned and wire brushed then treated with rust inhibiting gloss paint of at least 2 coats.

D.1.1 Methods and Procedures

Where a building is occupied the Contractor's attention is drawn to the fact that the rights of free access for other building users must be respected at all times and such access shall not at any time be impeded. The Contractor's Construction Phase Plan, Method Statement and Risk Assessments shall detail the measures being taken to ensure the safe and free movement of persons is maintained throughout the building.

Where a site may be subjected to vandalism the Contractor shall take this into account when preparing his tender and allow for any measures they deem necessary to cover for such eventualities within their tender and make suitable allowances in their design and when selecting components and equipment.

The Contractor is to take all necessary safety precautions whilst inspecting, surveying, and undertaking work on an existing installation and work within safety barriers, which must be erected whilst working on the landings or accessing the lift. Free and safe access to the stairs and lift-landing lobbies shall be maintained at all times. The Contractor shall take into consideration the requirements of the Pre Construction Information, the nature of the Works, site workers and those visiting, residing in, working in or staff occupying the building.

The measures taken to ensure that the other workers, occupants and visitors maintain unrestricted access to and free movement around the building during the Works is to be incorporated within the Construction Phase Plan, Health and Safety Plan and method statement for the Works.

The Contractor shall take all reasonable steps to reduce noise, fumes, dust and dirt from his works. Before carrying out any particularly noisy or dusty operations the Purchaser or his authorised representative on site must be consulted. In all circumstances there shall be minimum disruption to any occupant's operations. All measures shall be taken to ensure co-operation and coordination with any occupant's activities especially during, wet trades, operations likely to cause noise or fumes and mixing of concrete / cement.

The working day shall be as noted in the Pre-Construction Information or Construction Phase Plan.

Noisy operations are only permitted as specified in the Pre-Construction Information or Construction Phase Plan.

The Contractors attention is drawn to the location of the lift well and the proximity of the accommodation, hence the noise guaranteed by the lift equipment shall be a fundamental consideration.

All necessary action shall be taken in designing and installing the equipment to reduce and/or eliminate vibration and transmission of air borne noise. The Contractor shall state the maximum noise level generated by his equipment measured 1 m from source 1.5 m above the finished floor level and the frequencies at which it occurs. Within the accommodation and circulation areas adjacent to the lift doors, the noise level shall not exceed NR38.

The Contractor shall at all times strictly observe the requirements of the Health and Safety at Work Act (1974) and shall comply with all relevant Statutory Regulations and Instruments. Under no circumstances are landing openings to be left open and/or unprotected at any time. Due to available space it may not be possible to erect full hoardings, therefore when necessary timber or metal covers shall be fitted over all the entrance apertures. The entrance cover at the main entrance level shall be lockable from the outside and opened from the inside without a key, at other floors they shall be removable from the inside the lift well.

The Contractor shall give an irrevocable commitment that all materials and labour required to complete the Works is available at least two weeks before any lift is taken out of service. The Contractor shall include with his tender, his method statement, a programme of activities both on and off site for evaluation prior to the placing of an order. Should

the Contractor receive an order for the Works he shall provide a detailed programme clearly stating the on and off site operations to be carried out on a daily basis, the programme must be agreed before any work commences.

Redundant materials shall be dismantled and removed from site by the Contractor. All such materials shall be deemed as scrap and due allowance for their scrap value shall be allowed for in the tender price. All materials shall be disposed of in compliance with relevant Act, Regulations, standards and local authority requirements.

The Contractor is to use directly employed labour for the whole of the project including project management and testing.

Upon completion of each phase of the contract and at the end of each day the Contractor shall clear away all rubbish and excess materials and leave the site in a clean and tidy condition.

Where temporary electrical supplies and lighting are provided by the Contractor, they shall be fed from the available supplies.

Where there are no storage facilities available on site, it will be the Contractors responsibility to provide any necessary storage for small items and tools. Large items shall be delivered to site as and when required by the Contractor. The Contractor shall take all necessary precautions and allow access where other services are located in the machine space/ machine room.

The Works shall comprise the whole of the labour and unless otherwise indicated, all the materials necessary to complete the works with such tests, adjustments, commissioning and maintenance as prescribed in the schedules and as may otherwise be required to give an effective reliable installation in fulfilment of the Contract.

The Contractor shall be responsible for protecting all finishes including floors, walls and ceilings. The Contractor shall be responsible for making good the existing wall and floor finishes in a good workman like manner, to the entire satisfaction of the Lift Consultant and Purchaser.

The Contractor shall at all times strictly observe the requirements of the Health and Safety at Work Act (1974) and shall comply with all relevant Statutory Regulations and Instruments including EC Directives in force or coming into force during the works programme.

Upon completion of the lift the Contractor shall finally clear away all rubbish and excess materials and leave the site in a clean and tidy condition.

D.1.2 Integrity of Existing Structure

The Contractor shall satisfy themselves that the structures are suitable for continued use and inform the Lift Consultant of any defects they consider require further investigation.

D.1.3 Quality of Materials and Workmanship

All materials shall be suitable for the application and be the best of their respective kinds including those not specifically described. The Contractor shall ensure that experienced, competent and qualified tradesmen are employed in carrying out the work.

D.1.4 Maintenance during Installation and after Commissioning

The Contractor shall include for carrying out fully comprehensive maintenance and repair from the date of the order through procurement, installation and from practical completion of the project to the successful completion of the defects liability period. The maintenance shall include all equipment, labour, and consumables, 12 calendar monthly visits for routine lubrication, adjustment and checking whether the equipment is retained or not.

Also to be included shall be a 24-hour callout service for all breakdowns. The Contractor shall provide a report after each breakdown and send it to the Purchaser stating the nature of the fault and the corrective action taken. Response time for callouts shall be stated within the tender within the 'Bills of Materials'.

The Contractor shall undertake Supplementary Tests in accordance with the Safety Assessment Federation (SAFed) 'Guidelines on the Supplementary Tests of in-service lifts', as requested by a competent person, over the contract and defects liability period.

D.2. New / Replacement Equipment

The following Design Intent Specification shall be read in conjunction with all other relevant sections of this specification and other tender documentation. Where new equipment is called for it shall be compatible with any new or existing equipment and comply with all current relevant standards and codes as well as the following:

D.2.1 Lift well and machine room.

New lift wells will be constructed in accordance with the Contractors requirements and EN81.

New and existing lift wells shall be painted with good quality paint to reduce the potential for dust etc. white for the walls of the lift well and machine room and red for the lift pit floor and machine room floor. Man clearance areas shall be clearly identifiable.

The lift well shall be imperforate or with holes not exceeding the size allowed by EN294 and to prevent contact with the equipment for at least 2.5 metres above the highest stepping point for a normal lift, this shall be increased to a minimum if 3.5 metres in any area subjected to vandalism. The lift well enclosure shall be able to with stand the forces imposed by the equipment and as given in EN81.

In common lift wells, rigid wire mesh screens shall be provided and fixed by the Contractor to effectively separate individual wells. The screens shall extend the full depth and height of the wells and shall be formed from heavy gauge wire mesh panels, suitably supported in rigid steel frames. Void screens shall be provided or alternative means of protection where large voids exist between the car roof and the lift well proper.

Where the lift well has large vertical spaces between openings electrically interlocked access doors shall be fitted at a maximum distance of 11 metres to enable emergency access and the ropes to be inspected. The access doors shall be fitted with warning signage and electrical safety interlock switches that are not affected by windage.

The headroom and lift pit shall provide clearances and over travels in accordance with EN81. If this is not possible due to the existing site restraints alternative safety devices shall be provided in conjunction with safe systems of work. All necessary notified body and district surveyor approvals shall be obtained by the Contractor.

Lift machine rooms shall be provided with a safe means of access with stairs or ladders in accordance with EN81. Enclosed lighting shall be provided with an illumination level of 200lux at floor level and at the equipment and working areas with emergency lighting to enable safe emergency release to be carried out.

Rope hole kerbs and noise baffles shall be fitted. An RCD socket outlet shall be provided in the machinery space. Where there are different levels greater than 500mm, steps, ladders and guardrails shall be provided. The floor surfaces shall be made smooth and be treated with non-slip materials. Where voids exist in the floor these shall be made smooth or covered with tread plate or similar and fixed in position. Lifting beams shall be tested and marked with safe working load. Wherever there is reduced headroom the lifting beams shall be fitted with head protection marked with yellow and black stripes.

Where a pulley room or sub floor is provided, rope hole kerbs and noise baffles shall be fitted. An enclosed light with an emergency light shall be provided, operated by a switch adjacent to the access door as part of the well lighting system. An RCD socket outlet shall be provided and an emergency stop switch shall be fitted adjacent to the access door with additional switches accessible from the working area if the stop near the door cannot be reached form any work area.

Where machine sheaves are within the well they shall have fire resisting screens fitted between the lift well and machine room.

D.2.1.1 Machine Room Access

New or existing machine room access door shall be fitted with a lock that can be locked from the outside using an FB4 key and opened from the inside without a key.

D.2.2 Electrical Installation

D.2.2.1 Electrical Installation

The electrical installation shall comply with the current edition of the IEE Regulations for the Electrical Equipment of Buildings. All cables other than travelling cables and those that are metal sheathed shall be enclosed in conduit and/or trunking.

The Contractor shall wire and install a 13-amp switch RCD socket outlet located on top of the lift car, in the pit and adjacent to the controller fed from 16A type B MCB's in the lift services distribution board.

Steel conduit shall be of heavy gauge, welded, mild steel tubing. All conduit and accessories shall be galvanised and comply with BS4568 Parts 1 and 2 (with amendments to date) and be manufactured by a member of the Conduit Manufacturers Association.

All junctions shall be made with fittings complying with BS4568 and BS50086. Space-bar type saddle supports complying with BS4569 Part 2 shall be used.

Flexible metallic conduit may be used only for motors or other equipment subject to vibration or on equipment that will need to be positioned during running adjustments. End adapters shall positively grip the flexible conduit and earth continuity conductor, which shall be visible. All flexible conduits shall be LSF-sheathed.

Steel trunking for ducts shall comply with BS4678 Part 1 for surface runs and Part 2 for under floor trunking. To avoid a multiplicity of conduits, trunking may be used in place of or in conjunction with steel conduit.

Cables run in conduit or trunking shall be 300V/500V LSF insulated with copper conductors complying with BS6004, or with BS6500 if properly terminated and adequately supported. Power and signal cables shall be segregated and routed to prevent interference from line pollution and noise. Multicore cables having more than 5 cores, but otherwise in accordance with BS6004 or BS6500, may be used for interconnection between controllers and other items.

Controller internal wiring shall not support combustion. It shall be colour coded and preferably in accordance with BS6231. In general, it shall be bunched and run in trays or purpose made slotted plastic cable trunking.

Positive fixings of cable ends shall be ensured by purpose made clamps or pinch type terminals, or by the use of crimped cable tags or other equally suitable termination devices. Each terminal shall have an efficient locking device. Connector strips with unlocked gripping screws and without centre stops shall not be used. Connections and devices of the plug in type shall be so designed and arranged that if their withdrawal does not require the use of a tool, it will be impossible to reinsert the plug correctly. Where cables are required to be shielded the correct type of terminations shall be used with 360-degree enclosure.

Travelling cables shall comply with EN50214. Where the rated speed of the lift is greater than 1.60 m/sec. only cables of circular cross section shall be used. Their construction shall include fillers of dry cotton or other suitable fibrous material and a textile braid covering over assembled cores (including the fillers). Additionally, rubber insulated cables shall have a covering of textile braid on each core insulation.

The travelling cables shall be supported at each end so that the cores are not under strain at the terminals. Where appropriate for the correct installation and operation of the cables, they shall have a strain bearing centre. They shall include at least 10% spare cores and the requisite number of protective conductor cores. The arrangement of the terminals at both ends shall be similar and individually marked terminals at both ends shall be similar and individually marked for identification and those for the normal car lighting and door motor supplies shall be shielded and clearly labelled.

Before fitting, circular travelling cables shall be hung down the lift well for at least 24 hours with their lower ends suitable weighted and free to rotate in order to eliminate any tendency to twist in service.

All cable is to be tested at the manufacturer's works and a test certificate with date of manufacture is to be attached by seal to each coil. No cable is to have been manufactured more than 3 months prior to delivery.

Where a fireman's lift or firefighting lift is called for the Contractor shall confirm that any existing changeover switchgear is suitable for his requirements within 5 days of receiving the order and all cables shall be of a low smoke and fume type.

Where new mains changeover switch gear is provided it will fulfil the requirements of BS 9999 and EN81-72 and be suitable for the lift drive. The Contractor shall advise his supply requirements within 10 days of receiving an order.

All conduit and trunking is to be mechanically and electrically continuous and all exposed metal used in connection with the lift installation, including the car, is to be efficiently earthed. Additional earth bonding in the form of heavy copper wire or tape is to be provided if necessary to obtain satisfactory earth continuity. Earthing conductors shall not be less than 2.5mm copper connected where necessary to substantial earth clips.

Where any trunking or conduit passes through a fire compartment or wall it shall be sealed according, both externally and internally to the degree of fire resistance of the element of the construction it passes through and any sealing which is

disturbed during installation shall be reinstated. Where lift guides are connected to the steels of a steel framed building the guides shall be suitably and adequately earthed.

D.2.2.2 Electromagnetic Compatibility and Radio and Television Suppression

Electrical equipment shall comply with ISO22199, ISO22200, EN12015 and EN12026 and other relevant standards.

Suitable suppressers shall be provided and installed by the Contractor as necessary for all equipment and circuitry to prevent interference with radio and television reception.

Interference suppression components shall not be connected into any circuit where their failure may cause unsafe connection. The Contractor shall include for the complete installation to be tested and provide written confirmation to the Lift Consultant that the installation complies with the relevant standards.

D.2.2.3 Electrical Mains Supply

New electricity supplies will be 400V +10% -6% with an allowance of 4% volt drop from the intake room to the termination point, 3 phase 50Hz + 1% terminating in a fused main isolating switch provided in the position required by the Contractor. The separate car light supply will be 240V line/neutral terminating in a 6-amp type B MCB within a dedicated lift services distribution board in the position required. All necessary wiring, conduit, trunking and fittings from this point shall be provided and installed by the Contractor. Harmonic distortion imposed on the supply shall not exceed that indicated in G5/4.

D.2.2.4 Mains Switch and Distribution Board

The Contractor shall ensure that the isolating switch for each lift is suitably marked with the lift designation number. It shall be possible to lock the mains switch in the OFF position. The switch shall be located near the point of access, where an existing switch is not located near to the point of access an additional switch shall be provided near the point of access by the Contractor. Where more than one access door is provided an additional mains switch shall be provided adjacent to the secondary point of access. Where a group of lifts have split, machine rooms additional isolators shall be provided in the remote location. Should the Contractor require different arrangements to the above this shall be stated in the tender.

D.2.2.5 Well Lighting

The Contractor shall supply and install energy saving fluorescent bulkhead light fittings with emergency lighting in the well to give 50 lux at one metre above the car and at pit floor level. Location of the initial fittings shall not exceed 0.5 metres from the highest and lowest points in the well. The span of the intermediate fittings shall not exceed 5 metre centres, and preferably be positioned 1500 mm above each landing entrance level. A fault or failure of the bottom light fitting shall not cause loss of the complete well lighting system; this includes failure due to the ingress of damp or water.

The lights shall be controlled by three-way switching inclusive of an intermediate switch. One switch located in the Machine room and the other 1100mm above the lowest floor served within easy reach of the landing when the landing door is open. The lights shall be fed by a circuit separate from the lift equipment. The intermediate switch will be fitted to the car top to allow operation of the well lighting from the car top control.

A permanent clearly legible notice shall be fixed immediately adjacent to the switches marked ‘WELL LIGHT SWITCH’ and clearly identifying the respective well.

In addition to the above where a lift is a fireman’s lift or a firefighting lift the well lighting shall be in accordance with BS 9999 and BS EN81-72.

D.2.3 Sheaves and Pulleys

The pitch diameter of the sheave shall not be less than 40 times the nominal diameter of the hoist ropes. The traction sheave shall be secured to the drive spider by means of flanged /spigot joint and fitted bolts or to the drive shaft by at least two fitted keys located at 90o to each other.

All sheaves shall be flanged both sides and necessary provision made to avoid:

- the suspension ropes leaving the sheave
- the introduction of objects between the ropes and grooves.
- persons coming into contact with the sheave or pulley.

- devices used to meet the above requirements shall be so constructed that they do not hinder inspection or maintenance.

Diverter sheave and pulleys if provided shall comply with the requirements of the traction sheave and should be mounted to supporting steels or rafts. All diverter sheave mounting supports including the drilling and fixing of it shall be provided by the Contractor. The Contractor shall give full consideration the fixed height in the machine room and well and the accessibility of the equipment for maintenance.

D.2.4 Hand-Lowering Facility

The hand-winding or hand pumping arrangement shall comply with EN81

A hand-lowering valve and a hand pump shall be provided or in cases where the time taken to hand-lower or hand pump the lift car to the next floor would be excessive a battery operated backup system shall be fitted.

A visual and audible device, having a loud arresting tone, shall be installed in the controller. This device shall indicate the car position and operate a sounder and indicator when the car reaches a floor level in the hand-winding mode. The hand-winding audible device shall be energised by a trickle charge battery pack having a 3-hour operating capacity.

The Contractor shall provide and fix permanent notices in prominent positions close to the hand-winding position. The notices shall clearly state that hand-winding must only be carried out by authorised personnel and set out precise instructions for carrying out the hand-winding procedure.

D.2.5 Machine, Pulley and Well Guarding

Effective protection shall be provided by removable guards to all rotating parts, in accordance with EN81 and the Workplace Regulations 1992. Traction sheaves, hand-winding wheels, brake drums, governors, tension pulleys and similar smooth rotating parts shall also be painted yellow. All electrical equipment shall be protected to at least IP2X rating.

D.2.6 Controller and drive system

D.2.6.1 Drive Control – Variable speed AC or DC

The drive shall be essentially an AC or DC motor specifically designed for lift services. The control system shall be of a solid state drive module - closed loop - of a variable voltage/variable frequency type. Alternatively, the drive shall be a variable speed DC system driven from a regenerative solid state converter.

For lift speeds of 0.75 m/s or greater the control system shall ensure smooth ‘S’ Curve transition from start to acceleration and from acceleration to full speed, from full speed to deceleration and them to stop with minimum flight times without appreciable noise regardless of the floor to floor heights. All necessary chokes and filters shall be provided to ensure a high quality system is provided without noise. For lift speeds of less than 0.63 m/s or less the transitions between fast and levelling speeds and also final stopping shall be accomplished smoothly and without appreciable noise for varying loads up to and including the maximum rated duty for both directions in the hauling and overhauling modes. The limits of stopping and floor levelling accuracy shall be +/-10mm maximum and normally better than +/- 3mm. It shall be possible to adjust the jerk, acceleration and deceleration within defined limits which must be stated in the tender.

Solid state units incorporated in the drive control module shall be amply rated and suitable for arduous lift duty.

The tenderer shall state in his tender, the floor levelling accuracy that can be achieved and the maximum heat dissipation for the equipment.

D.2.6.2 Control System – Simplex and Group Control

Other than for two floor simple push button control the control shall be a microcomputer processor based system to perform all of the functions of safe lift motion and door control. The system shall perform car operational and group supervisory control, of proven reliability incorporating detector heads and vanes or magnetic tape transducers in the well. The Contractor shall submit full details of the system proposed with his tender.

Each main function, namely traffic demand calculations, permanent car position control, car motion control and door operating control, to be individually supervised by a set of processors. The system is to be co-ordinated to ensure an immediate response to any change in traffic conditions, which may occur.

Microcomputer systems shall be designed to accept reprograms with the minimum system down time. The transmission of all information between cars and controller cabinets shall be carried out serially.

Access to all components should be from the front only; if access is required to the rear of components for maintenance or adjustment then it shall not be necessary to dismantle parts of the controller for this purpose.

Suitable devices shall be included to prevent the lift equipment interfering with the building system and electromagnetically compatibility shall be assured. The equipment must comply in all respects with the Electricity Association Engineering Recommendation G5/4 for permitted harmonic currents, published by The Electricity Association and the EMC European Directive. This condition shall apply to the single sub-main feeder cable, with lifts in their most onerous condition.

Materials used in the construction of the control equipment shall not support combustion. All components shall be rated at the maximum temperature present within the cabinet and the manufacturers shall take account of the effect of heat generated by resistors, relay and contactor coils, lamps, and other components and adjacent equipment in the machine room. Where solid state components require more stringent environmental conditions than those specified in EN81 to ensure correct and stable lift operation, the Contractor shall include for providing the necessary equipment to achieve the correct conditions. Full details of this equipment shall be submitted with the tender.

All insulating materials and metal components shall be suitably finished to prevent deterioration under an arduous working environment. Plastics, elastomers, resin bonded laminates, base metals and alloys shall be of best quality selected from the appropriate British Standards as applicable. Conductor insulation and mouldings used within the control cabinet shall be flame retardant and track resistant. Low toxic hazard plastics are to be used for insulating materials.

All plug-in connectors shall be polarised so that it is impossible to reverse connections. Alternatively, a special tool shall be required to assemble and dismantle the plug-in connectors.

All power cables and terminations shall be effectively segregated from control cables and terminals. Where the voltage of a terminal exceeds 24 volts the voltage shall be marked on the terminal.

The preferred voltage used for control circuits and safety circuits is 24 volts or less, but it shall not exceed 100 volts, which shall be obtained via a double wound transformer incorporating efficient smoothing circuits. The positive line shall be protected by an instantaneous overload circuit breaker. The negative pole shall be earthed at the rectifier through a removable link. The removable link is for test purposes and no switch, fuse or device shall be placed in that position or circuit. Removal of the link shall prevent operation of the lift.

The brake solenoid and any retiring cam shall operate on direct current.

The return side of all relay circuits shall be effectively earthed. All relays, contactors and interlocks, whether in safety or sequential circuits, shall fail to safety.

The design of all circuits and interlocks must comply with the requirements of EN81. The system shall be arranged that if the landing lock circuit is by passed the doors are prevented from closing until the by-pass is removed.

The controller shall incorporate manual reset adjustable time-lagged overload protection and any necessary protection against overheating of motors, including the door operator motors. Electronic timing devices are preferred to mechanical or oil damped timing devices. Where the detection of overheating of the motor windings is by temperature sensing devices, e.g. thermistors embedded in the windings, a device on the controller shall cut off the supply to the windings in all live conductors until the temperature lowers so they automatically re-set. The occurrence shall be recorded in the controller. The controller shall also be fitted with an over temperature sensor to shut the lift down should the operating range of the equipment be exceeded.

In addition to protection against overload, the controllers shall incorporate devices to protect against phase failure and phase reversal. The operation of any of these devices shall disconnect the electrical supply to the controller and drive or pump motor. Separate independent starting contactors shall be fitted. Full details of the devices proposed shall be submitted with the tender.

The combined characteristics of the fuses and overload protection shall be sufficient to prevent damage to switch gear, including protective, instrumentation and solid state components.

A test facility shall be incorporated within the control cabinet. When switched to test mode it shall not override the top of car test control. It shall be clearly labelled as a test facility.

Each component mounted on and inside the cabinet and all terminals shall be clearly identified by permanent labels with codes or abbreviations exactly matching those used on the wiring diagrams and a nomenclature shall be provided.

An insulating rubber mat extending the full width of the cabinet by 1m deep shall be provided in front of each controller and where necessary at the rear. The mat shall be of the correct thickness and comply with the relevant British Standards.

Any new controller and drive system shall be compatible with any new or existing equipment it is being used with, whether it is a new or existing and designed to suit the speed as stated or existing speeds. If the gear / motor is found to be unusable due to deterioration, the controller should be designed to meet the full replacement drive system.

On group control systems optimised response to landing calls shall be achieved by computing the relative system response of each car to each call. The computation of each RSR time to a call shall be based on but not limited to such relevant factors as distance, service to previously assigned calls, car load, direction, door and motion status and coincidence of car and landing calls. The car with the least RSR shall have the call assigned to it. RSR computations for each landing call shall be repeated several times per second and the landing call assignment shall be changed if a more suitable car is found.

A car without registered car calls arriving at a floor where both up and down landing calls are registered shall initially respond to the landing call in the direction that the car was travelling.

When the cars are stationary at a landing the call push buttons on that landing shall also serve as an open door push button. Open door push buttons shall also be provided inside the lift cars. If for any reason, the doors are prevented from closing and the car is unable to respond to a call the call shall be transferred to another car.

Car call priority shall be incorporated in control system to ensure that the passengers entering the car have a period of 3 seconds (adjustable) after the doors have closed before the car can respond to a landing call.

At no time shall it be possible for the car to move unless all landing doors are closed and locked, the car doors closed and all doors closed proving contacts made.

D.2.6.3 Standard Control Features

All control systems shall provide as a minimum the following features and facilities

Anti-Nuisance Feature – An anti-nuisance feature shall be provided to prevent operation due to repeated interference with the door sensing devices or the operation of all the car pushes within a given but adjustable time period. Details of the Contractors proposals shall be submitted with the tender.

Car Preference / Independent Service – A car preference key switch shall be provided to enable the car to be controlled exclusively from the car operating panel.

When the car preference service is selected the lift car shall not respond to any landing calls and a message shall be displayed on the position indicators indicating that the lift is on car preference service. Five keys shall be provided for each car preference switch.

If the lift is part of a group of lifts the lift shall be detached from the group control operation and operate only to calls made from within the lift.

Up Peak Facility – When incoming traffic at the main entrance lobby increases as indicated by a car leaving the lobby filled to a predetermined adjustable level of its capacity within a predetermined adjustable time period, a car assigned to an upper floor shall be called to the lobby and the controls system shall instigate an UP PEAK demand feature. Cars shall be automatically dispatched from the lobby responding to car calls when they become loaded to more than a predetermined adjustable level of the capacity or if not loaded to capacity on an adjustable time interval. Once all the car calls have been answered the car shall return to the main entrance level for reassigning.

When all calls have been cleared on the system one car will automatically home to the ground floor and park with the doors closed. The cars shall continue to operate in this manner until the lobby traffic has been reduced to a predetermined level.

Initial initiation setting for the loading capacity shall be set at 70% of full load with automatic dispatch taking place when the car is loaded to 80% of its full load,

Down Peak – When a car leaves an upper floor loaded to 80% of its capacity or down calls above the lobby increase to a predetermined level assignment of a car to the lobby shall cease and the car after discharging its passengers shall be

dispatched upwards. The cars shall continue to operate in this manner until the down traffic has reduced to a predetermined interval.

When all calls have been cleared on the system and the load in two consecutive cars reduces to below 50% of their capacity one car will automatically home to the ground floor and park with the doors closed.

Auto By-pass – The lift controls system shall include a feature that prevents a lift car being allocated calls and stopping in response to landing calls when the lift car is loaded beyond a predetermined percentage of its rated contract load. This percentage shall be adjustable on site to suit the site conditions and to assist with traffic handling. Any call not allocated to a car that is prevented from answering a landing call due to its load condition shall be allocated to the first available car moving in the direction of the call or to a free car.

Lift Overload – A car overload device shall be incorporated which shall prevent the doors closing and the lift moving when the load in the car reaches 110% of its rated capacity. In addition, a buzzer shall sound and a car overload sign shall be illuminated in the car operating panel.

Alarm Indicator – Where there is more than one lift in a building or there is a group of two or more lifts, provision shall be made to indicate from which lift the alarm has been raised. An indicator panel shall be provided and located in an agreed potion. A reset key switch shall be provided to cancel the indicator when action is taken to free any trapped passengers. The illumination of the alarm indicator shall be via a 3-hour battery backup system. 6 copies of the key shall be provided

Stopping Levelling and Re-levelling – The drive/control system shall incorporate self-levelling and re-levelling systems that shall bring the car level to any landing within a tolerance of +/-3mm regardless of the direction of travel. The automatic self-levelling system shall correct for over travel, under travel and rope stretch.

The levelling tolerance shall be maintained in either direction irrespective of the load condition. Re-levelling of the lift car shall be instigated such that the lift car does not reach a distance of more than 6 mm above or below the level of the landing sill.

Fire Alarm Recall – A facility shall be provided within the control system for interconnection with the fire alarm system and returning the lift to the main exit floor on operation of the fire alarm system even when the lift is not to be connected to an existing fire alarm system. This is so that it can be made operational at a later date if required. The system shall be suitable for either a single fire alarm floor or two fire alarm floors, such that if the fire alarm is from the normal fire service exit floor the lift shall return to an alternative floor, the alternative floor is to be agreed. The Contractor shall liaise with others as necessary to test, commission and demonstrate the system.

The feature shall be in compliance with EN81-73. The Contractor shall include for terminating the wiring in a terminal box located in a suitable position if the feature cannot be connected at the time the lift is commissioned.

Down Collective – When called for the lift shall be arranged to operate as down collective, only answer landing call in the down direction in the order they are approached as the lift travel down the lift well. Calls that are missed shall be answered as soon as a car becomes available.

Fault Logging – Included within the controller shall be a fault event logging system with retrieval capability. This system shall be easy to operate and shall store information on at least 100 past events. Full details shall be supplied with the tender. The faults shall be easy to retrieve and understand and be complete with the time and date of occurrence.

The recorded fault shall include as a minimum the following:

- out of service,
- lift fails to start,
- doors fail to open,
- doors fail to close
- tipped landing lock,
- drive fault,
- safety edge failure,

Limited Management System – Where a Limited Management system is required it shall as a minimum be capable of transferring the details noted in D.2.7.3. Fault Logging via an agreed linkage system to either a local or remote BMS as called for. The control system shall be capable of storing and transmitting the information as necessary to a Building Management System (BMS).

D.2.6.4 Additional Control Features

The control system shall be arranged to provide the following control features when called for:

D.2.6.4.1 Special Facilities

Provision shall be made that enables the Managing Agent to set the control system to operate as the following options during the life of the lift without incurring additional cost:

When all calls have been cleared the car will remain at the floor, at which it last stopped, unless the control system has instigated and UP or DOWN peak feature.

When all calls have been cleared the car will automatically home to the parking floor

It shall be possible to set parking with door open or closed as selected.

It shall be possible to set the parking floor as any of the served floors.

D.2.6.4.2 Fireman's Control Feature

A facility shall be provided within the controls system to enable the lift to respond to operation of the Fireman's Switch. When the fireman's switch is activated the lift shall in all respects function as if it had been switched on to Firefighting Control in accordance with EN 81-72 and BS 9999. All car and landing calls shall be cancelled and the lift shall proceed to the fire access floor and park with its door open. If travelling towards the fire service floor it shall continue without stopping to answer any calls and stop at the fire access floor. If the lift is travelling away from the fire access floor it shall stop and change direction and proceed to the fire access floor without opening its door on reaching the fire access floor it shall park with its door open.

The lift shall respond to calls made from the car in accordance with BS 9999. The lift doors responding to constant pressure on the door open and door close buttons in accordance with BS 9999.

D.2.6.4.3 Firefighting Control Feature

A facility shall be provided within the controls system to enable the lift to respond to operation of the Firefighting Switch. When the firefighting switch is activated the lift shall in all respects function in accordance with EN 81-72 and BS 9999. All car and landing calls shall be cancelled and the lift shall proceed to the fire access floor and park with its door open. If travelling towards the fire service floor it shall continue without stopping to answer any calls and stop at the fire access floor. If the lift is travelling away from the fire access floor it shall stop and change direction and proceed to the fire access floor without opening its door on reaching the fire access floor it shall park with its door open.

The lift shall respond to calls made from the car in accordance with BS 9999. The lift doors responding to constant pressure on the door open and door close buttons in accordance with BS 9999.

D.2.6.4.4 Evacuation Control Feature

When called for a facility shall be provided within the controls system to enable the lift to respond to operation of the Evacuation control switch. When the Evacuation control switch is activated the lift shall in all respects in accordance with BS 9999. All car and landing calls shall be cancelled and the lift shall proceed to the fire access floor and park with its door open. If travelling towards the fire service floor it shall continue without stopping to answer any calls and stop at the fire access floor. If the lift is travelling away from the fire access floor it shall stop and change direction and proceed to the fire access floor without opening its door on reaching the fire access floor it shall park with its door open.

The lift shall respond to calls made from the car in accordance with BS 9999. The lift doors respond in accordance with BS 9999.

D.2.6.4.5 Engineer's Access Control

A facility shall be built in to the lift control system to enable the engineer to cause the lift car to park at a safe and convenient level to gain access to the top of the lift car. If the engineer fails to open the landing doors and turn the lift on to maintenance control within an adjustable time period (2 to 5 minutes) the lift shall return to normal service provided it is safe to do so. With the lift at the same floor as the switch (to enable the lift car to be checked that it is empty) the operation of the switch shall isolate car and landing calls and automatically send the lift car and park it at a height that enable safe access to be gained to the car top. When moving on engineer's access control all safety devised shall remain operative and the car and landing doors must be closed and locked. Operation of the Engineers Access Control shall not override any maintenance control devices. Where the lift is of an MRL type the switch is to be located in the controller

adjacent to the lift entrance. Where the lift is of a conventional arrangement with a machine room or where the lift controller is not adjacent to the lift entrance, the switch shall be located in the architrave or in a location to be agreed with the Lift Consultant. The switch shall be clearly labelled Engineers access control inside any panel.

D.2.6.4.6 Split Service Feature

Where there is more than one lift in a group of lifts it shall be possible to split lifts from the main grouping as necessary. With a four (4) car group, it shall be possible to split the lifts into one group of two lifts and two single lifts, or for the lifts to work as two groups of two lifts, the lifts serving different floors. The ability to split the grouping of lifts shall be provided via three position switches on the lift controllers. A label shall be provided with the switch to indicate its function.

D.2.6.5 Controller

The control system shall be housed in an enclosed, preferably wall mounted, or floor mounted, IP43 cabinets of neat appearance, fabricated from materials to the architect's choice not less than 1.00 mm thick. Hinged doors with lockable handles shall be fitted to the front of the cabinet. When in their open position all components shall be easily accessible for maintenance and replacement.

Each controller cabinet containing memory equipment shall be properly shielded from line pollution and incorporate positive ventilation and air filtration. The cabinet shall be constructed in accordance with BS EN 60439 Part 1.

Where the controller is an MRL type and forms part of the lift entrance, the controller cabinet shall be fire rated to at least the same rating as the lift entrances and any gaps between the inside of the controller and the lift well shall be fire stopped. 5 sets of keys for the controller shall be provided with one set being left on the car top in secure place adjacent to the car top control unit. Task lighting providing at least 200 lux and emergency lighting shall be provided inside the lift controller.

D.2.6.6 Limit Switches

The final limit switches and any well mounted terminal stopping switches shall be operated directly by the car with a fixed ramp or similar positive device. The only exception to this is when the lift is of an indirect acting type, when the limit switch can be operated by the movement of the ram head assembly.

The switches shall be securely fixed and in such a manner that normal horizontal movement or 'float' of the car shall not affect their operation.

The operation and function of the switches shall be in accordance with EN81, and not reliant on a spring for correct operation.

The upward travel of the car at the top terminal shall be limited by means of an 'up' inspection / maintenance limit switch which will be activated when maintenance control is switched to the TEST position. In this position the constant pressure of the RUN and UP buttons shall enable the car to travel up sufficiently to facilitate inspection of the equipment from the roof of the car. The limit switch shall ensure that the car will stop at a level which will enable safe escape and prevent a person 1800mm high standing on the roof of the car from being in any danger of making accidental contact with any overhead equipment or well structure should pressure on RUN and UP buttons be maintained.

D.2.6.7 Car Position System

The car position system shall be capable of determining the lift position at all times and ensuring the car stops and levels and re-levels into floor within the noted tolerances of the floor level.

D.2.7 Hydraulic System

The hydraulic system shall comply with the requirements of BS EN81-2 and EN982 where applicable and be manufactured by Bucher Hydraulic or similar quality product and be of the VF valve type with a variable frequency controlled digital drive system with accumulation. The Contractor shall state in his tender the best levelling tolerance that can be maintained with the drive systems proposed. The system shall be fitted with over pressure and low pressure switches. An anti-creep timer shall be fitted in the controllers.

D.2.7.1 Power Unit

The hydraulic tank unit shall be sealed to prevent oil leakage and designed and selected to provide adequate oil capacity to provide sufficient safety margins for the lift travel involved. The pump and pump motor shall be mounted on one robust bed plate or within the power unit assembly if it is suitably rigid. The motor, pump and bearing(s) shall be so mounted and assembled that proper alignment of these parts is maintained under all normal operating conditions. The power unit shall be rated such and shall operate with the minimum of noise and vibration with isolators on the machine room floor.

An oil filter shall be fitted in the pump inlet. Where necessary, stopcocks shall be provided to enable the filter to be cleaned or changed without significant loss of oil.

The pump motor shall be of a type and it shall run with the minimum of noise and vibration.

The power unit shall run without appreciable noise or hum. It shall be specifically designed for heavy-duty service, capable of frequent reversals and smoothly driving varying loads up to the maximum specified duty. The drive unit shall be capable of a minimum 45 motor starts per hour.

The drive motor shall be specially designed and constructed for lift operation. It shall be suitable for a 400V, 3 phase, 50 hertz supply and shall have a speed not exceeding 3000 rpm.

The motor manufacturers test certificates shall be submitted to the Lift Consultant for approval before the machine is delivered to site. Compliance with this clause does not relieve the Contractor from the responsibility of installing equipment, which will meet the commissioning tests and normal operating requirements of the installation.

The hydraulic system shall be complete with a pressure gauge, hand pump, hand lowering valve and maximum and minimum oil level indicators.

Oil tank heater complete with adjustable temperature control shall be provided. Where necessary to achieve the required number of motor starts per hour temperature controlled oil coolers shall be provided.

A clearly engraved permanent data plate shall be fixed to the motor stating the manufacturers name, the type/frame size and full relevant technical data.

Where the pump motor power is 30 kW or more a separate re-levelling motor shall be provided.

D.2.7.2 Hydraulic Jack

Cylinder/s shall be so mounted such that they are only subjected to axial loads. All necessary supports and mountings of the cylinders shall be provided by the Contractor.

A rupture valve shall be installed at the take off point on the cylinder, where more than one cylinder is provided a balancing pipe between the rupture valves shall be fitted to equalise the pressures.

Where the platform is connected direct to the cylinder, suitable mountings shall be used that withstand the type of loading. A device shall be incorporated which will initiate the closing of the lowering valve in the event of the car being prevented from descending. Where an indirect acting system is utilised an overspend governor and safety-gear shall be provided. In some circumstances, it may be permitted to provide a safety gear operated by a slack rope system complete with an electrical interlock in place of the over-speed governor, however this must be agreed in writing by the Lift Consultant before the order is placed. Where truck loading is to be used, clamping devices or pawl arms shall be fitted to prevent the lift sinking during loaded.

Whenever indirect acting systems are utilised they shall be of a type that requires steel wire suspension ropes designed for the purpose, the pitch diameter of the ram head pulley or any other pulley in the system shall not be less than 40 times the nominal diameter of the hoist ropes. Ram head pulleys shall be suitably mounted to, and secured, to the ram and the assembly suitably guided either by separate ram head guides or by the car guides.

All ram head pulleys shall be provided complete with all necessary mounting supports including the drilling and fixing. The Contractor shall give full consideration to the height of the lift well. Clearances in accordance with EN81-2 should be allowed when sitting the lift equipment, especially for maintenance around the pulleys / sheaves.

All pulleys shall be flanged both sides and necessary provision made to avoid:

- the suspension ropes leaving the pulley / sheave
- the introduction of objects between the ropes and grooves.
- persons coming into contact with the sheave.

- The devices used to meet the above requirements shall be so constructed that they do not hinder inspection or maintenance.

D.2.7.3 Hydraulic Jacks in Bore Holes

Where a hydraulic jack is to be placed in a bore hole; the bore hole shall be of sufficient size to accommodate the Jack assembly and to give sufficient space between the outside of jack assembly and the inside of the bore hole to enable easy inspection of the bore hole and Jack assembly. The bore hole shall be constructed to be water tight and to prevent the ingress or seepage of damp or water into the bore hole.

D.2.7.4 Hydraulic Pipe work and Hoses

Rigid steel pipes shall be used between the tank and the cylinder(s) complying with the requirements of BS: 778. All welded joints shall comply with the requirements of BS: 2633.

Short lengths of hydraulic rubber hose shall be used for final connection to the tank unit and Jack(s) / cylinder(s). Pipes shall be installed so as to avoid twisting sharp bends and chafing with protection provided at all rubbing points. Pipes and joints shall be installed to allow inspection to be carried out over their entire length.

Hydraulic piping and rubber hoses shall be effectively isolated from the building structure to minimise the transmission of vibration.

D.2.8 Safety-gear and Over-speed System

D.2.8.1 Safety-gears

Safety-gears shall have been type tested in accordance with Appendix F3 of EN81 and shall bear the type approval mark. The safety-gear shall be compatible with the over-speed governor where applicable.

When bi-directional safety-gears are fitted to provide ascending over-speed protection in addition to providing descending / free fall protection they shall be fitted to the car slings below the platforms and shall comply in all respects with EN81. Where a counterweight safety-gear is required it shall be fitted to the underside of the counterweight frame.

The safety-gear the safety-gear shall be operated by suitable over-speed governors in the well, motor or pulley room. The safety-gear shall be released by moving the car in the opposite direction to that of its operation, in the up direction for decent and down for ascending operation, by means of the hand-winding devices. The safety gear shall be tested on site in accordance with the requirements of the appropriate standards and this document.

D.2.8.2 Over-speed Governor and Tension Weight

An over-speed governor, operating ropes, pit tension sheaves and frames shall be provided. The operation of the governor and tripping speed settings shall comply with the requirements of EN81. Governors shall be type tested in accordance with Appendix F4 of EN81 and shall bear the type approval mark.

The governor data plate shall show the rated speed and both the mechanical and electrical contact tripping speeds and the normal contract speed, with all speeds indicated in m/s.

Means shall be provided to enable the governor's operation to be tested with the car travelling at contact speed. A convenient means for manual release of the governor jaws shall be provided.

The tension weight frame in the pit shall be fitted with a positively acting switches with contacts connected in the control circuit potential line.

Governor and tension frame shall be protected by adequate guards in compliance with EN81. All sheaves shall be painted yellow.

D.2.9 Protection against unintended car movement

A devise to prevent the unintended movement of the lift shall be provided; the device shall be capable of stopping the lift car moving in either direction. The device shall be automatically activated to prevent the lift car moving more than 1 m above or below any floor level at which the lift has stopped.

D.2.10 Guidance System

All car and ram guides shall be steel rigid tee section with smooth machined rubbing surfaces. The ends of each length of guide shall have machined tongue and grooved joints to ensure accurate alignment. The guides shall be bolted together by steel fish plates complying with EN81 and ISO 7465. Car guide deflection shall not exceed 5 mm at any point inclusive of any deflection of any support steelwork and the fabric of the lift well. Where the lift speed exceeds 1.25 m/s the deflection shall be reduce to a maximum of 3 mm inclusive of any deflection of any support steelwork and the fabric of the building.

All necessary rail clips, brackets, sole plates and buffer supports shall be provided and fixed by the Contractor. Drilling of all steelwork, concrete and brickwork required to secure the guides and lift equipment to the building structure shall be carried out by the Contractor. The Contractor shall supply inserts in good time where they are to be built into the new well where provided.

The Contractor shall accurately plumb within 1.5mm and bone the car, counterweight guides and ensure that all joints are smoothly lapped. All guide clips must be examined and checked to ensure each clip is correctly fitted and secure. Any shims shall be of steel. The thickness of any shimming/packing to obtain proper alignment of the guides shall not exceed 25mm.

The guides, joints and attachments shall be sufficient strength to withstand the forces imposed on them due to the operation of the safety gear when stopping a fully laden car. The method of supporting the guides shall limit their deflection to 3mm maximum under all conditions so as not to affect normal operation of the lift.

The guides shall rest on steel bases combined with buffer mountings and any necessary oil drip trays.

The guides shall be drilled with M10 holes, 300mm from the bottom, to facilitate main earth bonding. The Contractor shall liaise with other Contractors to provide a route into the lift pit for bonding cables.

Where the counterweight is guided by steel wire ropes four ropes shall be provided or the ropes shall be fitted with rigid guides.

D.2.10.1 Guidance Shoes

Four adjustable heavy pattern sliding guide shoes fitted with renewable linings of low friction durable material shall be fitted to each car and counterweight frame. Where lift speeds exceed 1.0m/sec the guide shoes shall be spring loaded and self-aligning. Any necessary lubrication shall be applied by automatic means. Roller guide shoes uses on rucksack slings shall have hard tires and so designed as to minimise the potential for flat spotting them when the lift is idle for any extended period,

All guide shoes shall be of a design suitable for the loads imposed on them and roller guide shoes shall be designed such that that will not readily flat spot in use and will not cause vibration.

D.2.11 Suspension System

Suspension ropes shall not be less than 10mm in diameter. A minimum of 4 ropes independent of each other shall be provided.

The suspension ropes shall comply with the requirements of BS329 and shall be preformed. The rope construction shall be either 6 x 19 (12/6+6F/1) FC Langs lay, or 8 x 19 (9/9/1) FC Ordinary lay. Suspension ropes shall be made of wire having a tensile strength of 140kgf/mm or be dual tensile.

A data plate shall be fixed to the car sling crosshead near to the suspension rope anchorage in a conspicuous position, giving the following data:

- The maximum static load on the ropes in kilograms.
- The rated load and speed of the lift in kilograms and metre per second.
- The length in metres and details of the rope construction.
- Car weight

The ropes shall be attached to the car and counterweight frames, or dead-end hitches in the case of 2:1 roping arrangements, by means of Bulldog grips, thimbles and eyebolts or equal alternative method complying with EN81.

Rope termination shall be arranged so that the whole of the rope anchorages and terminations can be carried safely from a single inspection point.

Anchorage plates, fixings and associated supporting steelwork shall be supplied and fixed by the Contractor.

Multi reeved roping systems (2:1 , 3:1, 4:1 etc.) will be permitted, but the travel permitted will be limited in accordance with the following formula.

$$\text{Maximum Travel (m)} = \frac{0.3 \times \text{Smallest Sheave Diameter}}{\text{Rope Ration}}$$

Where:

Sheave diameter is in (mm)
Roping ration is 2 for 2:1, 3 for 3:1 and 4 for 4:1 etc.

Automatic devices shall be provided for equalising the tension of the suspension ropes and in addition provision shall be made to enable each rope to be adjusted independently in service.

A locking device or anti-twist rope shall be fitted to the eyebolts after the ropes have been attached to the anchorage plates.

Ropes shall be delivered to site on the manufacturers reel and remain thereon, properly protected, until fitted to the lift.

Before ropes are delivered to site, the Contractor shall submit a "Certificate of Test and Examination" to the Lift Consultant for approval. The Certificate shall be in the form required for ropes used within the jurisdiction of the United Kingdom Statutory Regulations.

Other means of supporting the lift car will be considered, but only if full details are provided with the tender.

The fleet angle of the ropes between fixed sheaves or pulleys shall not exceed 0.4 degrees and shall be no more than 1.0 degrees where the centres are variable.

D.2.12 Rope Sheaves and Pulleys

Sheaves shall be manufactured from high grade cast iron. The diameter of each sheave shall not be less than 40 times the hoist rope diameter. The sheave shall be of a quality of material and sufficient dimensions to allow re-grooving. All the pulleys and sheaves shall be fitted with anti-jump bars and guards to prevent contact

2 : 1 reeving sheaves shall have amply proportioned, low friction bearings preferably of the sealed for life lubricated design.

- The sheaves and pulleys shall have the necessary provisions to avoid:
- The suspension ropes leaving the grooves under slack rope conditions.
- The introduction of objects between the ropes and grooves.
- All sheaves shall be effectively guarded to avoid accidental bodily contact.
- The devices used to meet the above requirements shall be so constructed that they do not hinder inspection or maintenance of the sheaves or bearings.
- Governor rope and terminations
- Buffers
- Counterweight screen and dividing screen
- Car top control

D.2.13 Car, Car Frame and Platform

D.2.13.1 Car Sling

The car sling shall consist of a steel frame and platform fabricated from rolled steel angle and channel sections, suitably braced and stiffened, incorporating the safety gear below the platforms.

The platform shall be effectively isolated from the frame by means of oil retardant isolation rubber pads of suitable resistance and density.

The car sling shall be of a strength and rigidity to withstand forces resulting from the operation of the safety gear, or buffer impact in accordance with EN81.

Data plates shall be fitted to the crossheads clearly engraved with the static car mass, the size, construction and length of the suspension ropes and car weights.

D.2.13.2 Car Roof

The car roof shall be rigidly constructed and be able to support the weight of two persons and resist a vertical force of 2000N at any position without permanent deformation. All components mounted on the car roof shall be located in one position to enable a safe means of access to the roof to be achieved.

D.2.13.3 Car Roof and Maintenance Control System

A maintenance mechanics control station shall be fitted on the car roof within 1 metre of the landing sill complying with the requirements of EN81 and BS7255. Its location and design shall prevent it from being damaged or operated accidentally.

In addition to the facilities or controls stated in EN81 the facilities provided shall be in accordance with BS 7255 and the following shall be provided: -

- Permanent light fittings, with low energy fluorescent lamps and emergency light suitably protected and separately switched.
- 13 amp RCD sockets complying with the requirements of BS1363 which shall be fed from the car light supplies.
- Intermediate switches for well lighting.
- A permanent notice reading "TOOLS AND HAND LAMPS TO BE CERTIFIED DOUBLE INSULATED TYPE, MAXIMUM 1000 WATTS" shall be fixed adjacent to the 13-amp socket outlets.
- Where a reduced headroom situation exists clearly worded warning notices shall be mechanically fixed adjacent to the control stations.
- Normal and emergency breakdown intercom connected to machine room and lift pit.
- There shall be sufficient space to accommodate a rectangular block not less than 500 mm x 600 mm x 1200mm resting on one of its faces. This are shall be clearly marked on the car top.

Where there is more than one car entrance a stop switch shall be fitted within 1 m of each entrance and a clearly marked door test switch shall be provided for each car entrance.

All buttons and operating devices to be permanently marked in accordance with EN81 and BS 7255.

D.2.14 Car Enclosure, Decor and Lighting including Emergency Lighting

D.2.14.1 Lift Car Enclosure

The construction of the car enclosure shall satisfy the requirements of EN81.

Special attention shall be given to the elimination of vibration and transmission of noise to the car enclosure. High density oil resistant pads shall be fitted as required between the enclosure and the supporting sling. The external surfaces of the enclosure shall be fire retardant and treated with anti-drumming compound or pads as necessary.

The car ventilation shall comprise visible apertures of adequate size located along the side and rear walls below the ceiling level and above the skirting. Masking plates shall be mechanically fixed externally to the apertures and be so positioned to prevent small objects from being pushed through the apertures.

A fan shall be fitted in the lift car roof powered from a maintained battery system to achieve 4 air changes per hour minimum. It shall be linked to a thermostat, located in the lift car above the suspended ceiling. The thermostat shall be adjustable and suitable for use in lift cars. A warning notice shall be fitted stating the unit is fed from an independent power supply. It shall be possible to remove the key in either the ON or OFF position.

The car interior lighting shall be provided as detailed elsewhere in this specification. The interior car lighting shall provide an illumination value of at least 100 lux at floor level or the same as the landings or brighter so that there is no significant change between the levels at all floors and the threshold of the lift. The car lighting shall comply with EN81-70 and not cause glare, shadow or pools of light. The car light shall be fed from a separate supply to that of the lift drive system. Unless otherwise indicated the car light switch located in the car operating panel shall be a three-way switch engraved ON, OFF and TEST in the test position only the emergency light shall be operational, in the OFF position no lighting shall be operational and in the ON position the normal and emergency lighting shall be operational. Key trapped in TEST position

A car operating panel shall be located in the lift car in accordance with BS EN81-70, with side opening doors on the closed jamb sidewall and on the right hand side when viewed from the landing with centre opening doors.

The car enclosure and fittings shall have sufficient mechanical strength to resist forces applied during normal operation, the impact on its buffers and the application of the safety gear. The car roof and roof trap if fitted shall withstand the weight of two men. All glass shall be safety/ laminated glass in accordance with the Workplace Regulations and a certificate shall be provided in the maintenance manuals.

Where a roof trap is fitted on fireman's lift or a fire fighting lift it shall be electrically interlocked with the safety circuit to prevent operation should the trap be opened. It shall be possible to open the trap from the roof. When the roof trap is open it shall not project beyond the line of the lift car roof.

Where there are excessive gaps around the lift car fixed or demountable guardrails shall be provided on the car roof. Where there is reduced headroom a notice shall be fitted stating reduced headroom and the safe working area painted on the car roof in accordance with BS7255.

The exterior of any enclosure shall be covered with a fire retardant material if the design incorporates non fire retardant material.

D.2.14.2 Emergency Car Lighting

A maintained emergency lighting system shall be provided that will energise automatically upon failure of the supply to the normal interior car light in full compliance with EN81 and BS: 5266 system type M3.

The emergency lighting unit shall be a self-contained pack mounted on the car roof and shall incorporate nickel cadmium batteries, charger and control circuit. The unit shall be supplied from the live side of the car light switch, and shall illuminate one of the general purpose luminaries (over the operating pushbuttons).

The batteries shall have sufficient capacity to maintain emergency lighting for a period of 3 hours. The illumination of the emergency lighting shall be such that horizontal luminance of at least 10 lux is provided over the alarm button in addition to some general illumination in the car.

The emergency lighting unit battery shall be automatically recharged upon restoration of the normal mains supply. After being discharged the battery shall within a 14-hour period be capable of again meeting the requirements of the Design Intent Specification. At the end of its discharge period the battery shall provide not less than 85% of its normal voltage at 15o C with the normal load connected.

D.2.14.3 Emergency Alarm and Intercom System

The Contractor shall provide and install an emergency alarm capable of being heard within the accommodation and reassurance alarms fitted on the car top.

The emergency alarm system shall be powered by a self-contained power supply unit incorporating nickel cadmium batteries, charger and control circuit. The unit shall be supplied from the live side of the car light switch.

The Contractor shall supply and install a normal and emergency intercom system comprising a microphone/speaker unit mounted in the car, car top, pit and machine room and connected to an external telephone line. The microphone/speaker unit shall be mounted in the car operating panel at a suitable height and shall be activated by pressing the emergency alarm button. When activated the system shall provide high quality two-way voice communication with adjustable sound volume and a telephone activated indicator shall be provided. The unit will be capable of being pre-programmed with at least three emergency numbers, which will be dialled automatically until answered. The unit must be capable of differentiating between a line being answered personally and an answer phone service. The alarm / intercom system shall be fully compliant with EN81-28 and EN81-70 and be complete with an induction loop system etc.

A permanent, engraved clear and concise instruction notice shall be incorporated in the unit faceplate.

Where there are two or more lifts in a group or there are more than two lifts in a building the alarm system shall be arranged to operate an alarm indicator panel on the main floor landing and at a remote location.

The Protocol used between the alarm device and the service provided shall be in accordance with DD 265.

D.2.14.4 Entrance Protection

Non contract type sensitive devices shall be provided across the full lift entrance. The device shall be of a type that detects wire trolleys or ribbon type leads.

D.2.15 Buffers

Energy accumulation or energy dissipation type buffers complying with EN81 as appropriate shall be installed beneath the car and counterweight in the pit.

Energy accumulation type buffers shall be of the helical spring type and have a constant spring rate.

Energy dissipation oil buffers shall be used for rated speeds above 1m/sec. They shall have been tested in accordance with Appendix F5 of EN81 and bear the type approval mark.

Oil buffers shall comply with the following:

- be so constructed as to contain any oil (hydraulic fluid) displaced during operation.
- be permanently and legibly marked to indicate the type and quantity of oil to be used within the buffer.
- be fitted with a positive action electrical switch which shall shut off the lift when the car or counterweight begins to compress the buffers. These switches are to remain open circuit until the buffers are fully extended.

Steel buffer striking plates of ample proportions shall be fitted to the car sling and counterweight frame to ensure that buffer impact loads are evenly distributed.

The Contractor shall supply and fit all necessary steelwork, mounting plates including steel stools, columns or stands to secure and support the buffers at the appropriate height above the pit floor.

With the car on the fully compressed buffers there must be adequate clearance and man clearance between the lowest part of the car and pit.

Buffers for fireman's or firefighting lift shall be in accordance with BS 9999, EN81-1, EN81-2 and EN81-72.

D.2.16 Fireman's lifts

Were a fireman's lift or a lift with fireman's service is called for, the well and equipment within the well shall be in accordance with BS 9999 and BS EN81-72 as far as is reasonably practical within the confines of the existing building. Where it is agreed that the landing entrances are not being changed and protected to prevent ingress of water into the lift well the Contractor shall advise the precautions being taken, or it will be assumed that special measures are being taken to protect the equipment against the ingress of water, moisture and condensation.

Electrical equipment in the well shall be positioned at least 1 m from the front of the lift well and protected as appropriate for the application. Where it is not possible to locate electrical equipment more than 1 m from the front of the lift well or more than 1 m above the pit floor the Contractor shall take precautions to prevent the ingress of water and moisture into the equipment and electrical switches and wiring. The Contractor is to agree measures with the Lift Consultant before starting work.

A fireman's switch shall be suitably positioned in an agreed position at the main fire access level in the lobby of the fireman's lift. The switch shall incorporate an intercom for communication between the fireman's access point, the lift car and the lift machine room and the fire communication point within a building where one is provided. Where an auxiliary supply is provided the switch shall also provide indication of the status of the lift supply, green for normal supply and red for auxiliary supply with suitably engravings. The cover of the unit shall be engraved 'Fireman Switch'. The switch and the operation of the lift on fireman's service shall be as that for a firefighting lift in accordance with EN81-72 and BS 9999. However, the lift is not to be designated or recorded as a firefighting lift.

Where existing mains and auxiliary supplies are provided and a new changeover switch is fitted. The changeover from the normal mains supply to auxiliary supply shall be in accordance with BS 9999 and BSEN81-72.

A suitable means of escape and rescue from the lift car shall be provided; arrangements are to be agreed with the Engineer.

A fire alarm sounder and indicator shall be provided on the car top and integrated into the operation of the maintenance control on the car top.

All landing fixtures and fittings shall be to at least IPX3.

D.2.17 Firefighting lifts

Were a firefighting lift is called for the well and equipment within the well shall be in accordance with BS 9999 and BS EN81-72 as shall the operation of the lift and lift equipment.

The means of escape and rescue from the lift car shall be agreed with the Engineer.

Electrical equipment in the well shall be positioned at least 1 m from the front of the lift well and protected as appropriate for the application. Where it is not possible to locate electrical equipment more than 1 m from the front of the lift well the Contractor shall take precautions to prevent the ingress of water and moisture affecting the operation of the lift. Contractor to agree measures with the Lift Consultant.

A firefighting switch in compliance with BS EN81-72 and BS 9999 shall be suitably positioned in an agreed position in the lobby of the firefighting lift at the main fire access level. The switch shall incorporate an intercom for communication between the main firefighting lobby, the lift car and the lift machine room and the fire communication point within a building. The switch shall also provide indication of the status of the lift supply, green for normal supply and red for auxiliary supply with suitably engraved markings. The cover of the unit shall be engraved with the pictogram in accordance with BS EN81-72 annex F. The operation of the lift and lift equipment shall be in full compliance with BS EN81-72 and BS 9999.

D.2.18 Car and Landing Entrances

D.2.18.1 Operation

Lift car and landing doors shall be operated smoothly by a high speed electric door operator which shall drive open or close the car and landing doors simultaneously. The type of operator shall enable minimum flight times to be achieved with fast door opening and slow closing speeds. The door operator and associated controls shall be of the highest quality being the premier type currently available from the Contractor's range.

The door dwell times, opening and closing speeds shall be fully adjustable.

The drive motor and speed reduction unit shall be mounted on the car headers with dampers to prevent noise transmission or vibration to the lift car and be capable of driving the car and landing doors through a solid metal linkage system. The door drive motor unit and linkage system must be designed for intensive and arduous duty. The connecting ramp or coupler between the car and landing doors shall be of robust metal construction and can only be engaged when stopping at a landing.

In normal service it shall only be possible for the car doors to operate in the levelling zone of the landing at which the car is stopping or has stopped. During lift travel the doors shall be locked if the distance between the car and landing sill exceeds 150mm. The distance between the car and landing door panels shall not exceed 120mm over the width of their operation. Advanced door opening shall be provided to minimise the flight times except where the elderly or children would use the lifts. When advanced opening is fitted the doors are to be open the maximum to prevent persons leaving the lift as stated in EN294 when the lift arrives at floor level.

The kinetic energy values and forces imposed by the closing doors as defined in EN81 for horizontally sliding doors must be considered as absolute maximum values, as the lift may be used by children, the elderly or the less able.

An extra low voltage, non-contact, multi-beam detection device shall be provided and so located to give full protection along the leading edge of the car door panel and for the full height and width of the door opening.

The device shall detect any type of obstruction in the path of the doors when closing. It shall provide a minimum protection zone of 50mm in front of the leading edge of each panel and the extent of this zone shall be adjustable. Upon detecting an obstruction, the doors will stop before striking the obstruction and reverse to the fully open position. Pressure operated door reversal devices, mechanical type retractable shoes or safety edges are not acceptable. The detection device shall not be susceptible to dust or sunlight.

An alternative method of providing effective door protection may be offered for consideration provided full details are supplied with the tender submission.

Upon arrival of the car at the selected landing the car and landing doors will automatically open and remain open for a predetermined period of time. The door dwell time shall be readily adjustable by authorised personnel. Registration of a call inside the car shall override the door dwell time and cause the doors to close subject to the detection and door monitoring devices.

'Door open' and 'door close' buttons shall be provided in the car operating panel. These buttons shall only be operative whilst the car is stationary at a floor. Momentary pressure of the 'door open' button shall cause the car and landing doors to open only if they are coupled together. Momentary pressure of the 'door open' button whilst the doors are closing shall stop them and reverse their direction to the fully open position. Operation of the 'door close' button shall reduce the door dwell time to 0.5 seconds.

Landing locks shall be in accordance with EN81-1, EN81-2 and have clear dustproof covers which enable the locks to be visually inspected. Multi-door panels shall be fitted with slave locks and / or mechanically interlocked. It shall be possible to open the landing doors in an emergency with the aid of triangular release key unless otherwise specified to suit the environment i.e. vandal resistant. The landing locks shall not be accessible from any position.

Where shutter gates are fitted on the car and the landing doors are hinged the distance shall not exceed 150mm. Where power operated doors are provided on the car and there are swing doors on the landings the car doors shall only operate when the landing doors are closed and the landing doors shall not be unlocked until the car doors are fully open.

The lighting level on the landings shall enable persons to see they are stepping into the lift car.

D.2.18.2 Car and Landing Doors

The car and landing door panels shall consist of horizontally sliding metal panels in accordance with the types set out in the Particular Specification.

The panels shall be of rigid hollow metal construction formed from 1.5mm minimum thickness steel as stated in the Particular Specification.

The landing doors shall be constructed to be rigid and withstand the forces given in EN81 unless otherwise specified to suit the environment. The landing door panels shall be adequately guided at the top by suitable rollers of sufficient diameter to ensure smooth operation and to withstand the pressures exerted on the doors from repeatedly meeting obstructions. At the bottom shoes shall be provided which fully engage the landing thresh hold so they cannot be forced out. Emergency guidance shall be provided to guide the doors should the running surfaces wear out. Gravity or spring closers shall be fitted to automatically close the doors. The landing entrance assembly shall be fire rated as stated in the Particular Specification. Where vision panels are fitted these shall be between 60mm and 150mm wide at least 1000mm above the floor, a minimum of 6mm thick laminated glass, a minimum glazed area of 0.015 metres sq. with a minimum of 0.01 metres sq. per vision panel otherwise a car indicator shall be fitted.

Where glass doors are specified they shall be of laminated glass with or without a flush stainless steel frame. The protective devices detailed in EN81 shall be fitted either Teflon inlayed polish, opaque glass to 1100mm or finger detectors. Advance door opening shall not be fitted where the lift is to be used by the public and the size of the entrance shall allow sufficient time for children to remove their hands before the doors open.

In their open position the doors shall provide clear openings in accordance with the dimensions specified in the Particular Specification.

Each panel shall be top suspended and run in accurately formed tracks on hanger assemblies incorporating polyurethane rollers fitted with low friction life lubricated bearings. Adjustable up thrust or 'kicking' rollers shall be fabricated as a common assembly, which in turn shall be rigidly fixed to supporting steelwork attached to the well structure or car frame as applicable. All necessary supporting steelwork and fixings shall be provided by the Contractor.

Each panel shall be accurately guided in a bottom track by means of two sliding shoes. The shoes shall be easily replaceable from the well side of the doors without the need to remove the door panels. Each guide block unit shall incorporate a robust safety flange extending downwards into the bottom track such that, in the event of the collapse or breaking adrift of the normal rubbing surfaces of the guide block, the safety flange will prevent the bottom of the door panel from being forced into the lift well. The landing doors shall be fitted with self-closing devices to automatically re-close the doors.

The drive panels shall be fitted with electro-mechanical interlock devices and the slave panels shall be mechanically connected in accordance with EN81.

The leading edge of each landing door panels shall incorporate a reinforced sight guards so as to effectively mask any gaps between the hoist way face of the landing doors and the door sills. The sight guards shall extend the full height of the entrance.

In an area where the lift is likely to be subject to vandalism the doors shall be designed to suit the environment and in accordance with EN81-71. The type of emergency door release is to be agreed with the lift consultant.

D.2.18.3 Landing Door Locks

Each set of landing doors shall be fitted with electro-mechanical locks incorporating interlock functions and compatible with the door operators. The design of the locks shall comply with the requirements of EN81, be vandal resistant with Perspex covers.

Locks shall have been type tested in accordance with Appendix F1 of EN81 and shall bear the type approval mark.

It shall be impossible to open the landing doors unless the cars are stationary at the particular landings. It shall further be impossible for the lifts to move or be kept in motion unless all landing doors are properly mechanically locked and all electrical interlocks and proving contacts are made.

The only exception to the above is:

- When a lift car is re-levelling at floor level and within the re-levelling zone which shall not exceed 20mm,
- When the lift car is approaching a floor at levelling speed in response to a call for that floor and is within the landing-levelling zone. This zone must not exceed 0.35m above or below the door level.

The Contractor shall state the maximum landing door gaps that the door locks will tolerate. This shall be on the basis of what will be demonstrated during the acceptance tests by use of rectangular obstruction standing 100mm high on the sill (on the go/no-go principle).

The locks shall be provided with emergency release devices which will enable only authorised person to open the landing doors from the landing side by means of a specially shaped key of the triangular type detailed in EN81. The emergency release mechanisms shall be of robust design suitable for rough usage with the apertures fitted with a 3mm wide escutcheon rings on the visible faces of the door panels or alternatively in the headers. Where vandal resistance is required the mechanisms shall be fitted in the architrave headers and the key inserted through an aperture offset from the triangular release to prevent operation by common objects.

D.2.19 Door Sills Toe-guards and Face Plates

The car and landing door sills shall be heavy section extruded aluminium suitable for rough usage. The length of the sills shall be such that they extend beyond the ends of the door panels with the doors in the fully open position.

Heavy section rolled steel angle struts or equivalent shall be bolted between the landing sills and door tracks to provide a rigid door support frame.

The horizontal running clearance between cars and landing door sills shall not exceed 30mm.

On the car a toe guard having a minimum depth of 750mm and extending at least 100mm beyond the full width of the opening shall be fitted below the threshold in accordance with EN81. The toe guard shall be formed from sheet steel of not less than 1.6mm and shall be rigidly braced back to the car platform steelwork. Where the lift pit is reduced a collapsible toe guard may be fitted.

A toe guard or fascia on the landing extending at least 100mm beyond the full width of the clear opening and formed from 1.6mm sheet steel shall be fixed below each landing sill. Fascia plates shall present a flush surface to the lift well continuously between the sill and the door header at the floor below. A toe guard conforming to the requirements of EN81 shall be provided in the pit below the lowest sill.

D.2.20 Car and Landing Stations Including Indicators

The design of the car operating panel shall be agreed with the Lift consultant, but it will typically be hinged and locked by at least two flush mounted Yale type locks or flush mounted with either secret or invisible fixings. The travelling cables shall be either directly connected to the relative item of equipment or be terminated in a terminal box which shall be in an easily accessible position on the car top or housed behind the car operating panel and readily accessible when the panel is opened. All buttons shall be of the self-illuminating type incorporating tactile markings in relief, including the alarm push.

D.2.20.1 The Car Operating Panel

Car operating panels shall incorporate the following: -

- Manufactures name and serial number
- The rated load in kg and persons
- A call button corresponding to each floor served with half illumination.
- Main floor button to be green and proud of COP.
- Car preference key switch (key only to be removable in the Normal position).
- Door open button
- Door close button
- Alarm button
- Telephone activated indicators,
- Flush mounted speaker / microphone grille
- Car position and direction indicators
- Overload warning indicator
- An induction loop with the appropriate symbol for the emergency passenger alarm
- All car and call buttons to have blue backlit halo lights

To facilitate use by disabled persons the car-operating panel shall be mounted in the sidewall of the lift car such as the centreline of the nearest button to the front of the lift car is at least 400 mm from the front wall, the highest button in the lift car station shall be placed no higher than 1.1 metres above the car floor level and an audible enunciator warning of floor arrival shall be provided. The illuminating alarm button and door control buttons shall be located such that their centre line is 900mm above the floor level on the lift car. Full details of the maximum wording and possible wordings shall be provided.

Each button shall be tactile marked in relief with Braille markings corresponding to the floors served. The same designations shall be used for the car position indicator. All other symbols shall conform to EN81-70 and BS8300. All buttons shall have background illumination by means of blue backlit halo illumination with full illumination for car acceptance. Car floor buttons shall remain illuminated when pressed and will revert to reduced illumination when the car arrives at the selected floor.

The wording of the overload indicator shall only be discernible when illuminated.

A blue digital LCD indicator shall be located in the car station having clear and legible characters not less than 50mm high complying with EN81-70. The alpha - numerical characters shall correspond to those engraved on the car operating buttons and the enunciators.

A permanent load plate measuring at least 150mm wide x 100mm high legibly engraved with characters not less than 30mm high showing the contract load capacity in persons and kilograms shall be fitted in a conspicuous position on the car operating panel. The engraving shall be black infilled.

Unless specified otherwise car position indicators shall be positioned such that their centre line is not more than 1,600 and not more than 1,800 mm above the car floor level.

Where a fireman's or firefighting lift is called for the push buttons and indicators shall be in accordance with BS 9999 and BS EN81-72.

D.2.21 Landing Furniture

The landing call pushes shall be located between 900 and 1100mm, have background illumination and incorporate self-illumination to indicate call acceptance and audible signals on each and every operation. The buttons shall remain illuminated when pressed and will only be revert to reduced illumination by a car arriving at the floor in response to the appropriate directional call.

Blue digital LCD position indicators shall be located at all floors with digital direction arrows incorporating pre-arrival sounders located at positions to suit disabled complying with EN81-70. All faceplates fitted to signals and operating boxes shall be flush mounted and finished as stated in the particular Design Intent Specification. Where specified multi-function TFT screen indicators shall be provided in the lift car stations and on the landings at the levels specified to provide additional information including time, temperature, financial and news information. Provision shall be incorporated to give information about the tenants or functions on each floor level and building management information.

Landing position indicators and direction arrows shall be positioned in accordance with the lift consultant's requirements and be position such that their centreline is not less than 1,800mm and not more than 2,500mm above the finished floor level unless agreed otherwise in writing.

The arrival of a lift at a floor shall be accompanied by an audible signal, one sound for up and two sounds for down.

D.2.22 Painting

All steelwork shall be thoroughly cleaned of all scale and rust removed prepared, primed and painted two coats of good quality oil paint in the factory before delivery to site. Parts not accessible after installation shall be given two coats of paint in the factory.

On completion of erection and prior to commissioning a final coat of paint shall be applied giving a gloss finish.

Where paint finishes are specified for car or door decorative finishes, the paint shall be spray applied to give a smooth and blemish free finish to colour and grade specified by the Lift Consultant. Samples of colours and grades so selected must be submitted and approved before the work is executed.

The specification and materials used are to be to the approval of the Lift Consultant.

D.2.23 Notices and Tools

A purpose made rack shall be provided and fixed by the Contractor in the Machine room to provide storage for the lock release key and any other tools and keys necessary for emergency use or safe release of trapped passengers. Barriers complying with PM26 shall be provided by the Contractor for working on the landings and where applicable the control panel.

Clear and detailed instructions regarding the moving of the lift in an emergency, shall be durably mounted and fixed in a readily accessible position in the Machine room. A danger notice complying with the requirements of EN81 shall be supplied and fixed by the Contractor to the outside of the machine room door or attached to the door lock keys. The Contractor shall also supply and fix durably mounted "Treatment of Electric Shock" notices in the machine room complying with Statutory Requirements. Where more than one lift is installed in the same well lift number labels shall be fixed to the main switches, machines, generators, controllers etc. All notices shall be supplied and fixed before the acceptance tests commence.

Encapsulated non-fading straight line wiring diagrams shall be mounted in a readily accessible location in each machine room. Full details of operational sequences of the control equipment related to and incorporating the same nomenclature and symbols used in the line diagram shall be supplied in booklet or other suitable form by the Contractor for retention in the machine room.

LG1s and Type Test Certificates shall also be properly displayed in the machine room.

D.2.24 Quality of equipment

All equipment provided as part of the contract shall have been commercially available for at least two years and the Contractor shall be able to demonstrate its reliability for at least the same period. Equipment that does not fulfil the above criteria may be considered if its suitability for the application can be demonstrated to the satisfaction of the Lift Consultant.

The doors shall be smooth in their operation and of a robust design suitable for the application and it shall be possible to adjust their speed in order to maximise their performance and the performance of the lift as necessary.

Vibration and noise measurements shall be made in accordance with BS ISO 18738 on two consecutive up and down journeys.

D.2.24.1 Ride Quality

Accelerations levels shall be measured as root mean square (RMS) values using a time constant of 0.125 s (fast), and the maximum values recorded in each 1/3 rd-octave band from 1-80 Hz inclusive over each complete cycle. The following limits shall apply.

Horizontal Vibration – Frequency range 1-80 Hz inclusive: maximum (RMS) acceleration and deceleration shall not exceed O.08 m/s^2 and applied to any time during a complete cycle, in any $^1/_3$ rd-octave band in the frequency range specified.

Vertical Vibration – At maximum speed: maximum (RMS) acceleration level in any $^1/_3$ rd-octave band should not exceed 0.08 m/s^2 in the frequency range 1-80 Hz.

During acceleration / deceleration and start / stop periods: the maximum (RMS) acceleration level in any $^1/_3$ rd-octave band should not exceed 0.1 m/s^2 in the frequency range 1-80 Hz.

The acceleration and deceleration of a lift shall be set between O.3 m/s^2 and 1.2 m/s^2 depending on the lift speed as agreed with the Lift Consultant to maximise the lift performance.

The Jerk shall be as set between 0.3 m/s^3 and 2.2 m/s^3 depending on the lift speed as agreed with the Lift Consultant.

D.2.24.2 Noise

Noise levels shall be measured with a precision grade sound level meter set to 'fast' response and shall not exceed the values noted below unless otherwise agreed in writing by the Lift Consultant.

- The noise level within the lift car shall not exceed 50 dBA.
- The noise level generated by the lift doors shall not exceed 60 dBA.
- The noise level generated by the lift with the landing doors closed shall not exceed 45 dBA on any lift lobby.

D.3. Retained Equipment

Where plant and equipment is noted to be retained it shall be retained unless during the Contractors survey or installation it is found not to be in a suitable condition or does not lend itself suitable for the installation as a whole and the new equipment. Any new plant or equipment shall be provided in accordance with the relevant parts of D.2 of this specification.

Where Equipment is to be retained it shall be retained unless it is incompatible with any new equipment, it does not lend itself to modification to be compatible with the new or modified equipment where retained equipment or it is economically prudent to provide new equipment in its place.

The Contractor shall check the existing equipment in particular the electrical equipment for signs of damage. Should any equipment prove to be defective the Contractor shall inform the Lift Consultant immediately. The Contractor shall ensure that all equipment is operational before setting the lift to work. The Contractor shall advise in his tender any retained equipment that is considered to be obsolete or not suitable for continued use for at least the next 5 years.

The exterior of any retained car enclosure shall be covered with a flame retardant material if the material is not already of such a type.

It is deemed that the Contractor has included all costs associated with the retained equipment whether retained or not.

All retained plant and equipment shall be thoroughly inspected at the start of the works, as required by a SAFed supplementary tests. They shall be checked for wear, correct operation and alignment. A report on the condition of the components shall be issued to the Lift Consultant within 5 working days of starting work on site. Failure to provide a written report within 5 days will be taken to mean that the Contractor is providing a minimum of 5 year guarantee on the retained equipment.

All retained equipment shall be cleaned and painted and recharged with oil or grease as appropriate. Idle rope systems on traction lifts shall be replaced with over-speed devices on accordance with D.2 unless otherwise agreed in writing by the Lift Consultant. Guide sections shall be of 'Tee' section and worn or damaged sections replaced as necessary unless otherwise agreed in writing by the Lift Consultant. Landing lock not activated by gravity shall be replaced or modified to ensure that failure of the actuating devise does not cause unlocking of the door or gate.

Where an existing bore hole is to be retained and reused it shall be checked to ensure that it is of sufficient size to accommodate the Jack assembly and to give sufficient space between the outside of jack assembly and the inside of the bore hole to enable easy inspection of the bore hole and Jack assembly. The bore hole shall be checked to ensure that it is water tight and in good condition. Any filling (i.e. sand) shall be removed to ensure an air gap remains between the jack and the bore hole.

D.4. Refurbishment and Modernisation of Equipment

Where plant and equipment is noted to be refurbished or modernised it shall be retained unless during the Contractors survey or installation it is found not to be in a suitable condition or does not lend itself suitable for the installation as a whole and with the new equipment. Any new plant or equipment shall be provided in accordance with the relevant parts of D.2 of this specification. The Contractor shall advise details of all the new equipment included.

The following Design Intent Specification shall be read in conjunction with all other relevant sections of this specification and the other tender documentation. Where Equipment is to be refurbished or modernised it shall be retained unless it is incompatible with any new equipment or it does not lend itself to modification to be compatible with the new or modified equipment.

Where equipment is to be refurbished or modernised it shall comply with the following:

The Contractor shall check the existing equipment in particular the electrical equipment for signs of damage. Should any equipment prove to be defective the Contractor shall inform the Lift Consultant immediately. The Contractor shall ensure that all equipment is operational before setting the lifts to work. The Contractor shall advise in his tender any retained equipment that is considered to be obsolete or not suitable for continued use for at least the next 5 years. It is deemed that the Contractor has included all costs associated with the refurbishment or modernisation of the existing equipment whether retained or not: -

All plant and equipment to be refurbished or modernised shall be thoroughly inspected at the start of the works, as required by SAFed supplementary tests. They shall be checked for wear, correct operation and aligned. A report on the condition of the above components shall be issued to the Lift Consultant within 5 working days of starting work on site. Failure to provide a written report within 5 days will be taken to mean that the Contractor is providing a 5 year guarantee on the retained equipment.

Where equipment is as being modified or refurbished, as a minimum the following works shall be carried out on the equipment to be retained and refurbished or modernised.

D.4.1 Lift Well and Machine Room.

Existing machine rooms and lift wells shall be checked for structural strength and condition any defects to be brought to the attention of the Lift Consultant.

The existing lift well and machine room shall be painted to seal against dust etc. White for the walls and red for the floor of the machine room and pit. Any pulley rooms shall also be painted as noted.

D.4.1.1 Machine Room Access

Where an existing machine room access doors opens inwards it shall be changed to open outwards. Where the existing lock cannot be opened from the inside without a key or where the key is not a FB4 type key the lock shall be changed so that they can be open from the outside with the key and opened from inside without a key unless agreed otherwise in writing by the Lift Consultant.

D.4.1.2 Lift Pit

An emergency light unit and an RCD socket outlet shall be installed in the pit if they are not already provided failure of the emergency lighting unit or RCD Socket outlet due to short circuit, damp or water ingress shall not cause the loss on any other circuit or supply.

Where any electrical safety switches or electrical circuit in the pit may become damp or wet particularly any that are fundamental to the operation of the lift shall be of a type that will not be affected by, submersion in water, damp or humidity.

A safe means of accessing the lift pit shall be provided in accordance with section ‘D.2’ and EN81 where there is no existing means or the existing provisions are not in compliance with the aforementioned requirements or the latest standards.

Where an existing pit access door is provided the Contractor shall ensure that it open outwards and has an electrical safety interlock fitted if one is not already fitted.

D.4.2 Electrical Installation

D.4.2.1 Electrical Installation

Where the existing is being retained it shall be checked for correct operation and damage, any new wiring shall be in accordance with D.2 and the IEE regulations.

Existing trunking and conduits shall be cleaned and the wiring checked for wear and damage. Any damaged or defective wiring shall be replaced. The Contractor shall provide assurances that the retained existing control equipment is maintainable for at least the next 5 years. Any missing lids and any damaged trunking and conduit shall be replaced.

Earth continuity of the trunking and conduit shall be checked, and any missing, damaged, defective or unsuitable parts shall be replaced.

D.4.2.2 Electromagnetic Compatibility, Radio and Television Suppression

Where the existing installation is being retained it shall be checked for compliance with relevant standards.

D.4.2.3 Electrical Mains Supply

The Contractor shall check and confirm the suitability and compliance of any retained supply and wiring for the new lift installation. Where he considers the wiring to be unsuitable he shall include for costs associated with replacing it. If the mains are not suitable, he shall indicate such in his tender, failure to advise the unsuitability of the supply will be taken as the Contractor having included all necessary costs associated with making it suitable and compliant if it is not acceptable.

D.4.2.4 Mains Switch and Distribution Board

Where the existing provisions are being retained that shall be upgraded as necessary to ensure their suitability for continued use, with new equipment being supplied as necessary to ensure the provision of the following.

- Switched fused lockable isolators per lift.
- Lift well lighting with emergency lighting.
- 13A RCD socket outlets in lift Machine room, pits and on car tops.
- Lighting in machinery space provides 200 LUX.
- Emergency lighting in machinery space.
- D.04.02 Mains Switches and Distribution Boards
- Ensure that distribution boards per lift are fitted with the following separate ways: -
- Switched lighting in lift machine room / machinery space.
- Lift car lighting switched from machine room / machinery space.
- Lift well lighting switched from machine room / machinery space, pit and car top.
- Tubular heating in lift machine room/ machinery space with thermostat control.
- 2 Spare ways.

D.4.2.5 Well Lighting

Any retained well lighting shall be checked and made to operate via three-way switching where this is not already the case, with switches being located in the machine room (controller of an MRL), on the car tops and in the pit. Well lighting shall be arranged on a per lift basis in accordance with Section D.2. Failure of the bottom fitting due to short circuit, damp or water ingress shall not cause failure of the well lighting system.

Where the lift is or is to be a fireman's or firefighting lift the additional requirements of BS 9999 and EN81-72 shall be incorporated into the system.

D.4.3 Hydraulic System

Where parts of the existing hydraulic system are being retained that shall be checked in accordance with SAFed supplementary inspections and a report of their condition provided to the lift consultant within 5 working days of placement of order.

Valve blocks shall be checked and any damaged, defective or depredated parts replaced.

Jacks shall be checked for correct alignment and plumb and their bearings and seals replaced as necessary.

Valve blocks shall be checked and any damaged, defective or depredated parts replaced.

New equipment or replacement parts shall comply with the requirements of BS EN81-2, EN982 and Section D.2 of this specification where applicable and be manufactured by Bucher Hydraulic or similar quality product and be of the type compatible with the power system specified. Accumulators shall be replaced with new units as appropriate for the application. The Contractor shall state in his tender the best levelling tolerance that can be maintained with the drive

systems proposed. The system shall be fitted with over pressure and low pressure switches. An anti-creep timer shall be fitted in the controllers.

D.4.3.1 Power Unit

The hydraulic system, motor, pump, valve block, hoses and pipe work shall be thoroughly inspected at the start of the works, as required by SAFed supplementary tests. They shall be checked for wear, correct operation. A report (including any obsolescence) on the condition of the system and components shall be issued to the Lift Consultant within 5 working days of starting work on site.

All grime shall be removed from the outer casings which shall be de-greased, wire brushed cleaned and painted with two coats of good quality paint. All fixings shall be inspected for soundness and tightened as required. The isolation shall be renewed if fitted.

Existing oil shall be removed and the system flushed out and cleaned and all bearings and seals checked for wear. The bearings shall be checked for wear and replaced if necessary.

The lift company is required to give assurances as to the condition of the motor, pump valve block etc. which shall accompany the tender documents. If the part of the unit or the complete unit is found to be unusable due to deterioration an optional cost for replacement parts or a new unit along with the design details.

The Contractor shall ensure and confirm that the existing unit is suitable for continued use with the drive control system being supplied. Any changes due to the incompatibility of equipment shall be at the Contractor's expense.

The existing drive system shall be cleaned and the wiring and components checked for correct operation, wear and damage. Any damaged or defective wiring or damaged, defective or worn components shall be replaced. The Contractor shall provide assurances that the existing drive equipment is maintainable for at least the next 5 years.

The pump and pump motor mounting shall be checked and replaced if necessary. The motor, pump and bearing(s) shall be so mounted and assembled that proper alignment of these parts is maintained under all normal operating conditions. The power unit shall be rated such and shall operate with the minimum of noise and vibration with isolators on the machine room floor.

An oil filter shall be cleaned or replace. Where not already provided a stopcock shall be provided to enable the filter to be cleaned or changed without significant loss of oil.

The Contractor shall confirm that after refurbishment the hydraulic power unit will be capable of at least the minimum number of starts per hour specified in the schedules.

Compliance with this clause does not relieve the Contractor from the responsibility of installing equipment, which will meet the commissioning tests and normal operating requirements of the installation.

The hydraulic system shall be complete with a pressure gauge, hand pump, hand lowering valve and maximum and minimum oil level indicators.

Oil tank heater complete with adjustable temperature control shall be provided. Where necessary to achieve the required number of motor starts per hour temperature controlled oil coolers shall be provided.

A clearly engraved permanent data plate shall be fixed to the motor stating the manufacturers name, the type/frame size and full relevant technical data.

Where the pump motor power is 30 kW or more a separate re-levelling motor shall be provided.

D.4.3.2 Hydraulic Jack

Jacks and pipe rupture valves shall be thoroughly inspected at the start of the works, as required by SAFed supplementary tests. They shall be checked for wear, correct operation. A report (including any obsolescence) on the condition of the system and components shall be issued to the Lift Consultant within 5 working days of starting work on site.

Jacks shall be so checked for alignment and to ensure that they are mounted such that they are only subjected to axial loads. All necessary adjustments, supports and mountings of the cylinders shall be provided by the Contractor.

Where the platform is connected direct to the cylinder, the mountings shall be checked for suitability for continued use with any existing or revised arrangement and that they will withstand the type of loading applied. Any existing device which will initiate the closing of the lowering valve in the event of the car being prevented from descending shall be

checked and replace if found to be defective, where such a device is not already fitted one shall be installed. Where an indirect acting system utilises an idle rope system it shall be replaced with an overspend governor compatible with any retained or new safety-gear, if an existing over-speed governor system is being retained it shall be inspected as called for in SAFed supplementary tests. In some circumstances, it may be permitted to provide a safety gear operated by a slack rope system complete with an electrical interlock in place of the over-speed governor, however this must be agreed in writing by the Lift Consultant before the order is placed. Where truck loading is to be used, clamping devices or pawl arms shall be fitted to prevent the lift sinking during loaded if they are not already provided, any existing systems shall be checked for correct operation and any worn or defective components replaced.

Whenever indirect acting systems are retained they shall be of a type that requires steel wire suspension ropes designed for the purpose, the pitch diameter of the ram head pulley or any other pulley in the system shall not be less than 40 times the nominal diameter of the hoist ropes. Ram head pulleys shall be checked as required by SAFed Supplementary tests and their mountings checked for suitability for continued use. Ram head guide shoes shall be replaced unless otherwise agreed in writing by the Lift Consultant.

Clearances in accordance with EN81-2 should be allowed when sitting the lift equipment, especially for maintenance around the pulleys / sheaves.

All pulleys shall be arranged to avoid:

- the suspension ropes leaving the pulley / sheave
- the introduction of objects between the ropes and grooves.
- persons coming into contact with the sheave.
- The devices used to meet the above requirements shall be so constructed that they do not hinder inspection or maintenance.

D.4.3.3 Hydraulic Pipe work and Hoses

Existing hoses and pipe work shall be checked and any defective or worn parts replaced.

Existing pipe supports are to be checked and replaced if found to be defective in any way. Hydraulic piping and rubber hoses shall be effectively isolated from the building structure to minimise the transmission of vibration.

D.4.4 Sheaves, Pulleys and Anchorages

Sheaves and pulleys shall be thoroughly inspected at the start of the works, as required by SAFed supplementary tests. They shall be checked for wear, correct operation and the sheaves are to be checked for plumb with the existing guides. A report on the condition of the above components shall be issued to the Lift Consultant within 5 working days of starting work on site.

All grime shall be removed from the outer casings of existing pulleys, over-wheel steelwork and rope anchorages. They shall be degreased, cleaned and wire brushed before being repainted with good quality paint. Before being returned to service they shall be recharged with oil or grease as appropriate. All fixings shall be inspected for soundness and tightened as required. All bearings and seals shall be checked for wear and replaced if necessary.

D.4.5 Hand-winding / lowering facility

The hand-winding or hand pumping arrangement shall comply with EN81. A spoke-less smooth rimmed hand-winding wheel shall be provided if not already available. The hand wheel shall be painted yellow and shall be clearly and permanently marked UP and DOWN with arrows corresponding to the direction of lift travel. When the wheel is fixed to the hoist unit it shall be guarded to prevent persons coming into contact in accordance with the Workplace Regulations 1992.

Where there is no hand-pump or hand-lowering valve on the existing hydraulic system suitable facilities shall be provided in accordance with section D.2

Where the force required to hand-wind the lift exceeds 400N emergency electrical control shall be provided. For hydraulic lifts a battery operated backup system shall be fitted.

A visual and audible device, having a loud arresting tone, shall be installed in the controller. This device shall sound when the car reaches a floor level in the hand-winding mode. The hand-winding audible device shall be energised by a trickle

charge battery pack having a 3-hour operating capacity. Indication of the car position shall also be provided in the vicinity of the hand-winding signals during hand-winding.

The Contractor shall provide and fix permanent notices in prominent positions close to the hand-winding position. The notices shall clearly state that hand-winding must only be carried out by authorised personnel and set out precise instructions for carrying out the hand-winding procedure.

D.4.6 Machines, Pulleys and Well Guarding

The Contractor shall ensure that all guarding is suitable and adequate for it purpose. Where moving parts are not guarded or inadequately guarded new guards shall be fitted in accordance with D.2 and the Workplace Regulations, this includes the provisions of masks, toe guards and facia plates etc. as necessary and appropriate.

D.4.6.1 Counterweight Screen, Pit Screens and Shaft Dividing screens

All retained screens shall be cleaned, degreased and painted as appropriate for their purpose. There fixings shall be checked and tightened or new fixing provided if that are found to be insecure. Where existing screens are not in compliance with D.2 and the latest standards the Contractor shall include for its replacement.

D.4.7 Controller and drive system

If the Contractor considers that the control system or drive is not suitable for retention due to degradation obsolescence or other reasons he shall state this in his tender and provide a report (including any obsolescence) on the condition of the control and control equipment clearly stating his reasons for his views.

D.4.7.1 Drive system

There an existing drive unit is being retained it shall be checked for correct operation and signs of degradation, deterioration and damaged. Any damaged or defective wiring or degradation or worn components shall be replaced. The Contractor shall provide assurances that the existing drive equipment is maintainable for at least the next 5 years.

A report (including any obsolescence) on the condition of the drive and drive components shall be issued to the Lift Consultant within 5 working days of starting work on site.

D.4.7.2 Control System – Simplex and Group control

Where the existing controller and control system are being retained they shall be cleaned and the wiring and components shall be checked and inspected for wear, degradation, damage, correct operation and suitability for continued use over the next five years. Any damaged or defective wiring or damaged, defective or worn components shall be replaced. The Contractor shall prove the correct operation of the lift system and control features as required by the Lift Consultant. As part of their tender the Contractor shall provide assurances that the existing control equipment is maintainable for at least the next 5 years.

The existing control system shall be overhauled and modified as necessary to comply with EN81-70.

The existing wiring shall be reused as far as is reasonably practical as shall the travelling flexes, where the Contractor considered them to be unsuitable for continued use they shall include for replacing them.

If the Contractor considered the hoist unit to be unsuitable due to deterioration, he should include for modifications to the controller to suit the full replacement drive system.

Over current and short circuit protection devices shall be checked and new equipment fitted if it is found to be defective.

D.4.7.3 Controller

The controller shall be cleaned and checked for suitability for continued use and the earth continuity checked. Where the locks are damaged that shall be replaced. 6 new controller keys shall be provided for new or existing locks.

D.4.7.4 Limit Switches and Car Position System

Limit switches and their contacts shall be checked for wear and correct operation and replaced if considered unsuitable for continued use. Where over-travel or maintenance limits are not provided, new limits shall be fitted.

Unless the car position system has been replaced within the last 12 months a new car position system shall be provided.

D.4.8 Hydraulic system

Where parts of the existing hydraulic system are being retained that shall be checked in accordance with SAFed supplementary inspections and a report of their condition provided to the lift consultant within 5 working days of placement of order.

Jacks shall be checked for correct alignment and plumb and their bearings and seals replaced as necessary.

Valve blocks shall be checked and any damaged, defective or depredated parts replaced.

D.4.9 Safety-gear and Over-speed System

Retained safety-gears and their jaws and the over-speed system shall be inspected at the start of the works, as required by a SAFed Thorough Examination and Supplementary Test as indicated in Section '4' of the Guidelines on the supplementary testing of in-service lifts. They shall be cleaned and checked for wear, correct operation and soundness of fixing. A report on the condition of the above components shall be issued to the Lift Consultant within 5 working days of starting work on site.

All grime shall be removed from the outer casings which shall be de-greased, wire brushed cleaned and painted with two coats of good quality paint. All fixings shall be inspected for soundness and tightened as required.

They shall be checked for wear, correct operation and the sheaves are to be checked for plumb with the existing car pickup and tension weight.

D.4.9.1 Safety-gears

Retained safety-gears and their jaws shall be thoroughly inspected at the start of the works, cleaned and checked for wear, correct operation and soundness of fixing to car frames. New electrical safety cut out switches, as required by EN81 shall be fitted and the inertia springs shall be replaced.

Safety-gears and their fixings shall be de–greased, wire brushed cleaned and painted with two coats of good quality paint. All fixings shall be tightened and checked for overall soundness.

The safety-gears shall be replaced if any defect is found during the inspection or at final testing stage. Safety-gears are to be operated by compatible over-speed governors and tension weights. Where new safety-gears are provided, ascending over-speed protection shall also be provided if it is not provided by some other means.

Optional costs shall be provided in the tender for the provision of ascending over-speed protection.

Where an existing safety-gear is retained on a traction lift that is operated by an existing idle ropes or slack rope system it shall be replaced or modified to incorporate an over-speed system in compliance with EN81-1 and section D.2 of this specification.

Safety-gears operated by idle rope or slack rope system on hydraulic lifts shall be replaced or modified to incorporate an over-speed system in compliance with EN81-2 and section D.2 of this specification unless a pipe rupture valve is attached directly to the hydraulic cylinder(s).

D.4.9.2 Over-speed Governors and Tension Weights

All switches, springs, bearings and seals etc. shall be checked for wear and replaced as necessary and the speed setting checked and reset if necessary.

The Contractor shall provide an optional cost in case they are found to be unusable due to deterioration, along with the design details.

The Contractor shall give assurances of the condition of the existing over-speed governor and tension weight is suitable for continued use with the safety-gear being used. Any changes due to the equipment not being compatible will at the Contractor's expense.

D.4.9.3 Ascending over-speed protection

Where an existing means of ascending over-speed protection is being retained it shall be checked for correct operation in accordance with SAFed Supplementary tests and a report provided to the Lift Consultant. They shall be cleaned, re-greased or oiled as appropriate and painted as necessary before being returned to service.

D.4.10 Unintended Movement Protection

Any devise to prevent the unintended movement of the lift shall be checked for correct operation and suitability for continued use and a report provided to the Lift Consultant within 5 working days of placement of an order.

D.4.11 Guidance system

D.4.11.1 Car and Counterweight Guides

The car and counterweight guides shall be checked and adjusted for correct alignment, deflection and distance between guides. They shall be cleaned, de-greased and their backs painted. All fishplates, bolts and shims shall be inspected for tightness and tightened as required.

At the base of each guide a firmly fitted but removable steel fabricated oil drip tray shall be supplied and positioned, where one is not already provided.

The Contractor shall confirm that the guides are suitable for continued use with the any revision to loads and lift arrangement. If he considered them unsuitable any costs associated with replacing them should be included in the tender price otherwise it will be assumed that he is giving assurances as to their condition and suitability for continued use.

D.4.11.2 Car and Counterweight Guide Brackets

All grime shall be removed from the guide brackets and fixings, which shall be inspected, checked for soundness and tightened as necessary, cleaned and painted with two coats of good quality paint.

The lift company shall give assurances as to the condition of the guide brackets which should accompany the tender documents. If they are found to be unusable due to deterioration the cost for their replacement as deemed necessary shall be included in the tender, along with the design details. Any changes due to the equipment not being compatible will be at the Contractor's expense.

D.4.11.3 Guide Shoes

Where existing car and counterweight guide shoes are being retained that shall be checked for alignment with the safety-gear and for their suitability for continued use, any liners shall be replaced, their fixings checked and all grime removed, they shall be cleaned, wire brushed, and painted with two coats of good quality paint.

The Contractor shall check the existing car and counterweight guide shoes for their suitability for the application and continued use, giving assurances as to this effect. If the guide shoes are found to be defective or unsuitable for continued use the Contractor shall include for replacement shoes. All sliding guide shoes shall be provided with suitable guide lubricators as appropriate for the speed and application. Roller guide shoes that are flat spotted or showing signs of degradation shall be replaced.

D.4.12 Suspension system

D.4.12.1 Mains Suspension and Governor Ropes, Rope Terminations

The main suspension ropes, governor ropes and fixings shall be checked and the Lift Consultant informed if they are defective and not suitable for continued use for the next 5 years. If they are found to be unusable due to deterioration costs shall be included in the tender for replacing them. The Safety factor of the existing system shall be checked and it is found to be less that that called for in EN81-1 or EN81-2 they shall be replaced with suitable alternatives.

The rope terminations and anchorages shall be cleaned and checked, with suitable means of rope tension equalization being provided where suitable means is not already provided. If the Contractor considers that rope tension equalisation cannot be fitted at either the lift car or counterweight he shall state, the reason in the tender. Means shall be provided to ensure that the ropes cannot untwist in use. Anchorages and terminations shall be arranged to enable easy and safe access and inspection and be in compliance with section 'D.2'.

D.4.12.2 Rope Sheaves and Pulleys

Where sheaves or pulleys are noted as being retained they shall be retained unless found to be damaged or unsuitable for continued use for the revised installation.

They shall be thoroughly inspected at the start of the works, as required by SAFed supplementary tests. They shall be checked for wear, correct operation and for plumb with the existing car pickup and tension weight. A report on their condition shall be issued to the Lift Consultant within 5 working days of starting work on site.

They shall be degreased, cleaned wire brushed and painted with two coats of good quality yellow paint. New bearings and seals shall be fitted before they are returned to service.

D.4.13 Car, Car Frame and Platform

D.4.13.1 Lift Car, Car Frame and Platform

The lift cars and platforms shall be thoroughly inspected for damage; any damage being reported to the Lift Consultant. After cleaning, any rust is to be removed and treated; all painted surfaces shall be repainted with two coats of good quality paint and all unpainted surfaces to be treated with a corrosion preventative treatment. Any timber floor or sub-floor shall be replaced and the underside of the platform shall be fireproofed as necessary. The underside of any timber shall be covered with a protective steel sheet. The car frames and their fixings, including the platforms shall be de–greased, wire brushed cleaned and painted with two coats of good quality paint. All fixings shall be tightened and checked for overall soundness.

When a new door operator is called for, the lift car and platform shall be altered to suit it.

Where ascending over-speed protection is being provided by the provision of a bi-directional safety-gear the car frame and safety-gear pickup shall be modified to suit the new equipment.

Where any part of the flooring is timber it shall be checked for rot and deterioration and replaced if necessary.

Where load weighing is not already provided a suitable means shall be incorporated into the design of the lift system. As a minimum the load weighing system shall be capable of measuring 110% contract load and at least one other loads setting that can be adjusted to suit traffic demands etc. (e.g. adjustable between 50% and 100% load), the preliminary setting shall be for 80% which shall trigger auto bypass of landing calls.

Where a fireman's or firefighting lift is called for any electrical equipment shall be located at least 1m from the front of the lift car or it shall be suitably protected. Where any timber is retained the Contractor shall fire protect it. All materials used shall be in compliance with EN81-72 and BS 9999 and be fire treated or fire proofed or protected as necessary and of a kind that do not give off harmful fumes.

D.4.13.2 Car Roof

A flat free standing area of at least 0.12 m2 shall be provided on the car roof the smallest dimension of which shall be 0.25 m. Where there are voids greater than 300 mm x 300 mm around the car roof an appropriate safe means of reducing the void shall be provided or balustrades in accordance with EN81-1 or EN81-2 shall be provided.

Where the safe refuge is not indicated it shall be clearly defined and marked.

D.4.13.3 Car Roof Maintenance Control System

The operation of any retained maintenance control unit shall be proved to be in compliance with BS7255 or it shall be replaced by the Contractor. Car top lighting and emergency lighting shall be provided where they are not already provided, as shall an RCD socket outlet. Where there are two or more car entrances, emergency stop switches shall be positioned within 1m on the entrance in an easily accessible position. The main maintenance control unit shall be safely accessible from the landing entrance and be no more than 1m from the landing entrance.

D.4.14 Car Enclosure, Decor and Lighting including Emergency Lighting

D.4.14.1 Lift Car Enclosure

The existing car enclosure shall be modified as necessary to suit any new equipment and to meet the requirements as set out in the Schedule of Finishes, EN81-28, EN81-70 and EN81-80. Ventilation in accordance with BS EN81-1 clause 8.16. shall be incorporated where top and bottom ventilation is not already provided.

Where EN81-70 compliance is to be incorporated the enclosure shall be modified to incorporate new car operating panels in compliance with EN81-1, EN81-2, EN81-28 and EN81-70. The car operating panels are to be positioned such that the alarm button is located 900 mm above the finished floor level of the car. The push buttons and key switches shall be

positioned such that they are between 900 and 1100 mm above the car floor level, no key switches or push buttons shall be higher than 1200 mm above the car floor level.

New car-operating panels shall be fitted with EN81-70 compliant fixtures and fittings.

The front wall of the lift cars shall be cleaned to the satisfaction of the Lift Consultant, or replaced, or re-skinned in accordance with the Schedule of Finishes.

Handrails in accordance with EN81-70 shall be provided as called for in the schedule of finishes where they are not already provided.

Lift car interior lighting with emergency lighting shall be overhauled to provide illumination in accordance with section D.2 of this specification and EN81-1 and EN81-70, changing of lighting fittings shall be from inside the lift cars when new light fittings are provided. In areas where the lift is likely to be subjected to vandalism the light fitting shall be designed and selected with the environment in mind. In such areas it may be acceptable to provide light fittings that are changed from the top of the lift car, details to be agreed with the Lift Consultant.

Any timber making up the exterior of the lift car shall be protected by a fire retardant costing.

D.4.14.2 Car Décor

The lift car décor shall be modified as necessary to accommodate any changes to accommodate new or amendments to codes and standards as well as any design and equipment changes. The finishes shall be as noted in the schedule of finishes with any retained finishes being clean down and modify as necessary.

Where new lighting is to be installed it shall be of a low energy type and provision shall be made for turning the lighting off after an adjustable time period of inactivity. Any new lighting shall be complete with emergency lighting in compliance with section D.2 of this specification and any other relevant standard.

D.4.14.3 Emergency Car Lighting.

The operation of any existing emergency lighting system shall be checked and assurances given of its suitability for continued use for at least 5 years. If the Contractor considers it to be unsuitable for retention, he shall include for a new replacement system. The system shall be in compliance with EN81-1 and EN81-2.

D.4.14.4 Emergency Alarm and Emergency Passenger Alarm System

Where an existing alarm system and/or a passenger emergency intercom is being retained it shall be retained unless the Contractor considered it unsuitable for continued use, or it is incompatible with his 24-hour monitoring system. The Contractor shall include all cost associated with its replacement in accordance with D.2. if the Contractor considers a replacement is essential.

Where an existing hands free intercom in compliance with EN81-28 is fitted the telephone number shall be changed and an induction loop fitted if one is not already provided in accordance with EN81-28, EN81-70 and BS8300. The intercom shall be integrated with an engineer's alarm and intercom system where one is not already provided. Otherwise a hands free intercom shall be fitted and connected to a 24-Hour emergency voice link with induction loop in accordance with EN81-28, EN81-70, BS8300 and section D.2 and be inclusive of all wiring to and terminations in the machine room.

The operation and suitability of any existing alarm sounder shall be confirmed by the Contractor or it shall be deemed that he has included for new equipment.

D.4.14.5 Entrance Protection

The Contractor shall inspect the existing electronic door detectors and confirm their suitability for continued use and give written assurances to this effect. Door protection system shall be of a type that does not relay on contact between the user and the leading edge of the closing door panels in accordance with EN81-70, 5.2.3 and 5.2.4.

A new non-contact type entrance protection system shall be provided in accordance with D.2. if the Contractor considered the existing to be unsuitable or defective.

D.4.15 Car and Counterweight Buffers

Buffers shall be thoroughly inspected at the start of the works, as required by SAFed supplementary tests. They shall be checked for wear, correct operation and any switches shall be checked and replaced if necessary. A report on the condition of the buffers shall be issued to the Lift Consultant within 5 working days of starting work on site.

Existing buffers shall be checked and secured in position where the existing fixings are inadequate. If they are found to be unsuitable for retention the Lift Consultant shall be informed, any replacement buffers shall be of a type not affected by damp or humidity and they shall be mounted on stools as necessary.

All grime shall be removed from the surface/outer casings which shall be de-greased, wire brushed cleaned and painted with two coats of good quality paint. All fixings shall be inspected for soundness and tightened as required.

The lift company shall ensure, confirm and give assurances as to the condition of the buffers and their suitability for continued use and compatibility with all other lift equipment and the lift speed, which should accompany the tender documents. If they are found to be unusable due to deterioration or they are not compatible with other equipment a cost for replacing them shall be included in the tender. Any changes due to the equipment not being compatible will at the Contractor's expense.

Where existing buffers of an energy accumulation type are fitted they shall be secured to the pit.

Where the existing buffers are of an energy dissipation type they shall be fitted with an electrical interlock system to indicate that they are in the returned position and suitable for reuse. Where electrical safety contacts are already fitted they shall be checked and replaced as necessary.

D.4.16 Ram Head Assembly

Ram head assemblies shall be cleaned, de-greased, wire brushed and painted with two coats of good quality yellow paint. All fixings, key plates etc. shall be inspected and checked for soundness and tightened as required.

D.4.17 Car and Landing Doors - Operation

D.4.17.1 Door Operators, Car Entrance Equipment and Doors.

Where the existing operator is noted as being modified the Contractor shall provide assurances in writing that the existing door operators are suitable for continued use for at least the next five years, any additional work they consider necessary to the operators to be included and advised to the Lift Consultant.

Existing door operators are to be refurbished and any retained gear units, brakes, clutches, motors, solenoid units, or drive vain's shall be inspected and replacements fitted as necessary. The retained equipment is to be thoroughly cleaned down to remove all grime etc. Any damage shall be reported to the Lift Consultant before clean down commences.

Painted surfaces shall be repainted with two coats of good quality paint; unpainted surfaces shall be treated to prevent corrosion. The existing car and landing doors shall be refurbished/ or replaced with new running gear, rollers, bottom door guide shoes, toe guards, sight guards, main rollers, kicking rollers locks etc. as necessary.

Where an existing design incorporated astragals and the design is retained they shall be replaced. Where possible the design of the door and entrance shall be amended to eliminate the astragals providing this does not infringe the existing fire certification of the landing doors.

Existing locks that are not gravity activated are to be replaced or modified to ensure the lock engages if any spring or other actuating device fails.

An optional price is to be provided for replacement of the existing car entrance equipment with modern VF drive entrance equipment that is to operate in conjunction with the existing car and landing doors, toe-guards and sills. In areas subject to vandalism the design shall be suitable for the environment they will be installed in.

D.4.17.2 Car and Landing Door – Panels

Where the existing doors are noted as being retained that shall be retained unless during the Contractor's inspection they are found to be defective. They shall have their front faces cleaned as called for in the schedules of finishes. The backs of the existing door panels are to be cleaned and painted.

The front faces of the doors shall be cleaned, re-linished/ re-skinned / painted or replaced as called for in the Schedule of finishes. The backs of the existing door panels are to be cleaned and painted.

D.4.17.3 Landing Door Locks

Where the existing locks are noted as being retained they shall be retained unless during the Contractor's inspection they are found to be defective or they are not gravity activated. Defective locks shall be replaced with new type tested and CE

marked locks where exact like for like replacements are not available. They shall be checked and their contacts renewed. Locks that are not gravity activated are to be replaced or modified to ensure the lock engages if any spring or other actuating device fails.

Consideration shall be given to the effects of any change on any fire certification of the entrances.

D.4.17.4 Door Sills, Toe-guards and face plates

Existing sills, toe guards and face plates shall be checked for wear, security and suitability for continued use, before being cleaned and repainted as appropriate.

The existing car sills shall be inspected and thoroughly cleaned down or replaced as necessary.

D.4.17.5 Landing Entrances and Fronts

If the existing doors and entrance fronts are found to be damaged the damage the Contractor shall include allowances for their replacement and report their condition to the Lift Consultant in his tender.

Landing entrances shall be fitted with emergency unlocking devices as noted in EN81-1 and EN81-2 where the existing system is non-compliant. The fire rating of the new lift entrances shall be as a minimum equal to that of the existing entrances.

The existing landing entrances are to be cleaned and the door panels and architraves are to be re-linished, re-skinned or cleaned and painted, as noted in the Schedule of Finishes. The landing entrances shall be refurbished with new astragals, top tracks, new locks, slave locks, running gear, rollers, bottom door guide shoes, toe guards or fascia's, sight guards, main rollers, kicking rollers and pick-up gear as appropriate. The backs of the door panels are to be cleaned and painted; the appropriate floor designation shall be clearly marked on the back of the doors.

Where not already provided emergency release devices in accordance with EN81-1 shall be provided in the Landing doors. In areas likely to be subjected to vandalism and appropriate type shall be agreed with the lift consultant.

The existing landing entrances may be certified fire resisting. This is to be established before submitting the tender and all costs are to be included. Where the existing landing entrances are fire rated care shall be taken not to invalidate the original fire certification.

The self-closuring of the landing doors shall be checked and remedial action taken where their operation is not in accordance with EN81-1 and EN81-2, with new parts being fitted and necessary.

Existing multi panelled landing doors shall be fitted with mechanical interlocks where they are not already fitted. Laze door contacts shall be fitted if not already provided wherever there is a possibility of a door panel not closing due to a failure of the linkage system.

D.4.18 Car and Landing Stations Including Indicators

D.4.18.1 The car operating panel faceplates shall incorporate the following: -

Any retained car operating panel shall be inspected and cleaned and checked for compatibility with any new equipment, any unsuitable or defective equipment shall be replaced with equipment in accordance with Section D.2 of this specification. All the pushes inspected and replaced as necessary to. All illumination devised in pushes shall be replaced with LED type illumination. Position indicators shall be checked for compatibility with any new equipment and any defective units replaced. Any new fittings shall be in compliance with En81-70.

D.4.18.2 Landing Stations and Position Indicators

The existing fixtures and fitting shall be relocated in accordance with EN81-70 and the existing preparations are to be made good. New landing push stations and indicator are to be provided as detailed in the schedule of finishes. Where there are no existing fittings or the fittings are not suitable, compliant or compatible with the retained or new equipment they shall be replaced with new fittings. All fixtures and fitting are to be provided in compliance with EN81-70, BS8300 and part 3 of the DDA regulations. Allowances being made for all cutting away, making good and periphery decoration.

Where the lift operates as full collective the landing push plates are to be flush type with single pushes at terminal floors and two pushes at intermediate floors. Flush fitting landing position indicators are to be provided at each floor

Where the lift operates as down collective or non-selective collective the landing push plates are to be flush type with single pushes at all floors. Flush fitting landing position indicators are to be provided at each floor.

Finishes around the landing fittings and entrances are to be made good up to 1 m form the entrance and fixtures and fittings.

D.4.18.3 Fireman's / Firefighting switches

Where an existing firefighting switch is provided it shall be upgraded as necessary to comply with the latest standards as far as is reasonable practical. The operation of the switch and intercom shall be checked and any damaged or defective parts replaces. If the Contractor considers any items of equipment to be unsuitable for continued use for at least the next 5 years, he shall include a price for replacing them and note this in the tender.

Where an existing fireman's switch is being retained it shall be checked for damage and overhauled with new electrical contacts being fitted.

The Contractor shall confirm that the switch is suitable for continued use and compatible with the control system or a new switch shall be provided. The Contractor shall allow all cost necessary for its replacement if he considers it necessary and indicate in his tender the reason.

D.4.18.4 Other Landing Fixtures and Fittings.

All landing fittings are to be of a flush type and the design is to be agreed with the lift consultant.

Where more than one lift shares a lobby an alarm indicator per lift shall be provided at the main entrance level which shall illuminate to indicate the lift in which the alarm has been activated. Cancellation of the alarm indicator shall be via a key operated switch in the paned.

D.4.19 Notices and tools

Where existing notices are being retained that shall be inspected and retained unless during the inspection they are found to be missing, out of date or unsuitable for continued use. Notices shall be replaced with notices as stated in D.2.

SECTION E. Technical and Equipment Schedules

E.1. Technical Information

The Contractor shall submit sufficient illustrative material and data to components and assemblies that will clearly portray the equipment covered by his tender. The following schedule shall be completed and drawings and/or illustrated leaflets submitted where indicated. The Contractor shall indicate where components have been designed or modified to suit this project.

E.2. Equipment Schedules Refurbishment Lifts West and East Lifts

Item	Component and Information / Detail				
1.	**ELECTRICITY SUPPLY**				
	Mains switch	Type Rating		A	
	Auxiliary consumer unit for supplies to local lighting and power circuits	Type Rating		A	
	Total current demand from the declared supply for each lift when raising the contract load.	Starting Running		A A	
2.	**LIFT POWER UNIT**				
	Tank				
	Maker:				
	Manufacturer Type or Serial No:				
	Capacity				
	Drawing reference or illustration				
	Pump				
	Maker:				
	Type reference or serial No.:				
	Flow rate l/min				
	Pressure floor loss				
	Maximum working pressure				
	Drawing reference or illustration				
	Lift Motor				
	Maker:				
	Type reference or serial No.:				
	Rated output power Kw		Speed ratio: rpm		
	Rated Current Amp,	Full load running		Starting	
	Drawing reference or illustration of Motor:				
3.	**SUSPENSION ROPES**				
	Manufacturer:				
	Quantity:		Diameter: mm		
	Construction:		Lay:		
	Tensile strength: Grade				
	Maximum breaking load:			kN	
	Type of rope tension equalising device:				
	Type of connection to car and cwt				
4.	**OVERSPEED GOVERNOR**				
	Lift Car Governor				
	Maker:				
	Type reference or serial No.:				

	Number of type test certificate:								
	Contract speed: m/s								
	Tripping speed: m/s	Electrical			Mechanical				
	Rope diameter: mm			Rope connection					
	Construction:				Lay:				
	Tensile strength: Grade								
	Maximum breaking load: kN								
	Type of tensioning device & switch								
	Drawings or illustration of governor								
5.	**Jack**								
	Maker:								
	Type reference or serial No.:								
	Diameter:		mm	Wall thickness:		mm			
	Maximum working pressure								
	Length:								
	Drawings or illustration								
6.	**Valve Block**								
	Maker:								
	Type reference or serial No.:								
	Maximum working pressure								
	Working pressure								
	Drawings or illustration								
7.	**Pipe Rupture Valve**								
	Maker:								
	Type reference or serial No.:								
	Number of type test certificate:								
	Rated flow rate l/min								
	Maximum Flow rate l/min								
	Drawings or illustration of governor								
8.	**CAR FRAME**								
	Make:								
	Type and construction (Monocoque?)								
	Rope Hitch - Type								
	Platform / enclosure	Isolated			non isolated				
	Platform Load weighing Device								
	Enclosure type and manufacture								
	Car Safety Gear								
	Maker:								
	Type:								
	Maximum	Load Rating Kg			Speed rating m/s				
	Capable of arresting upward motion			Yes / No					
9.	**GUIDE RAILS / FIXINGS**								
	Car Guide Rails	Type		Location	Side/Rear/Right /Left				
	Method of fixing & type								
	Cwt Guide Rail	Type		Location	Side/Rear/ Right/Left				
	Method of fixing & type								

10.	**WIRING / TRAVELLING CABLES**						
	Wiring						
	Wiring system			Cable Type			
	Connections						
	Trunking			Conduit			
	Travelling Cables						
	Maker:			Type:			
	Construction:						
11.	**LIFT WELL POSITIONING SYSTEM**						
	Manufacturer:			Type			
	Location:		Levelling accuracy: (All Loads) mm				
12.	**WELL SWITCHES**						
	Manufacturer:			Type			
	Illustration or reference						
	Conduit connection:						
13.	**CONTROLLER**						
	Manufacturer:			Reference/serial:			
	Type:						
	Wiring connections			Motor overloads			
	Emergency Lowering buzzer						
	Temperature tolerance						
	Illustration / Drawing / Reference						
	Drive						
	Maker:						
	Type reference or serial No.:						
	Rated output power at full load / speed						
14.	**LIFT CAR**						
	Platform						
	Construction						
	Front wall/door returns finish & construction						
	Rear wall finish and construction						
	Side walls finish and construction						
	Roof finish and construction						
	Lift Car Operating Panel						
	Manufacturer:						
	Finish:						
	Location:						
	Button type, maker & reference						
	Alarm button type, maker & reference						
	Car Position Indicator type, maker & reference						
	Key switches, type, maker & reference						
	Ceiling and Lighting						
	Ceiling type						
	Ceiling pattern						
	Number and type of light fittings						
	Emergency Lighting Type						

	Output	Watts		Battery duration hours			
	Battery recharging time hours						
	Emergency Intercom System						
	Manufacturer		Type:				
	Telephone line requirements						
	Illustration / Drawing / Reference						
15.	**CAR DOORS**						
	Manufacturer:						
	Type:						
	Configuration:		Surface finish				
	Illustration / Drawing / Reference						
16.	**DOOR OPERATOR**						
	Manufacturer:						
	Type:						
	Nominal (sec):	Opening time:		Closing time:			
	Operator protective closing device						
17.	**DOOR DETECTOR (Door Safety Edge)**						
	Manufacturer						
	Type						
	Field covered						
	Illustration / Drawing / Reference						
18.	**DOOR CAM or VANE**						
	Type: (Fixed/Retiring/Retiring cam)						
	Maker:						
	Type:						
	Illustration / Drawing / Reference:						
19.	**CAR TOP INSPECTION UNIT**						
	Manufacturer:		Type:				
	Light with rechargeable supply included		Yes / No				
	Illustration / Drawing / Reference						
20.	**LANDING DOORS**						
	Manufacturer:						
	Type:						
	Configuration:		Surface finish				
	Fire rating (hours):		Type of automatic closers				
	Illustration / Drawing / Reference						
21.	**LANDING DOOR LOCKS**						
	Manufacturer:						
	Type:						
	Method of locking un-driven panel						
	Illustration / Drawing / Reference						
22.	**LANDING FIXTURES**						
	Landing Position Indicator(s)						
	Manufacturer						
	Type						
	Location(s) floor(s)						

	Faceplate design and finish		
	Landing Arrival & Directional Indicators		
	Manufacturer		
	Type		
	Location(s) floor(s)		
	Faceplate design and finish		
	Landing Buttons		
	Manufacturer		
	Type		
	Location(s) floor(s)		
	Faceplate design and finish		
	Fire Control Switch		
	Manufacturer		
	Type	Location	
	Faceplate design and finish		
	Landing Intercom Unit(s)		
	Manufacturer		
	Type		
	Location(s) floor(s)		
	Faceplate design and finish		
	Local Alarm		
	Manufacturer		
	Type		
	Power supply type and duration		
	Location		
	Faceplate design and finish		
23.	**LIFT PIT EQUIPMENT**		
	Car Buffer(s)		
	Manufacturer		
	Type & Number	Load capacity kg	
	Illustration / Drawing / Reference		
	Access Ladder		
	Pit stop switch type & number		
	Electrical socket with RCD		
	Intercom system		
24	**PERFORMANCE**		
	Rated number of starts per hour		
	Levelling Guarantee (mm) ±		
	Group call calculation methods		
	The maximum noise level generated by the equipment measured 1 metre from source and 1.5 m above the FFL and the frequency / frequencies at which this the noise occurs.		
	a) From the power unit		

	b) During door operation		
	c) Lift running 1 m from lift entrances with doors closed		
	d) Lift running in the lift car.		
	Service intervals		
	The maximum vibration generated by the equipment and the frequency / frequencies at which it occurs.		
	a) From the power unit		
	b) During door operation		
	c) Lift running 1 m from lift entrances with doors closed		
	d) Lift running in the lift car.		
	Any other technical information in support of your tender.		

SECTION F. Special Conditions of Contract and Amendments to the standard MF1 form of Contract.

For the purpose of this contract the following amendments and supplementary clauses shall be made to the Model form of General Conditions of Contract MF1 (rev 6) as recommended by The Institution of Engineering and Technology and The institute of Mechanical Engineers Engineer's 2014 Edition.

F.1. Definitions and interpretations

F.1.1 Licence to use software

Add new clause 5.8

5.8 Where special tools are required to set up the equipment or special software is used within the control system or any other type of equipment the Contractor shall provide the Purchaser with a license to use any special tools and software required for the running or setting up of the plant or any item of equipment provided as part of the contract.

F.2. Changes in Cost

F.2.1 Labour materials and transport

Clause 6.2 shall be excluded from the contract.

F.3. Notices

F.3.1 Attendance at meeting

Add new clause 10.4

10.4 The Contractor shall attend meeting as called for by the Engineer. These meetings shall include a pre-start meeting which shall take place approximately 2 weeks prior to starting on site. Regular meetings at 2 weekly intervals during the installation phase of the works or as deemed necessary by the Engineer and a progress meeting 2 weeks before the end of the contract for each phase of the works.

F.4. Purchaser's general Obligations

F.4.1 Wayleaves, consents etc.

Replace clause 11.2 with the following:

11.2 The Contractor shall, within the time stated in the Programme or, if not so stated, before the time specified for delivery of any Plant to the Site, obtain all consents, wayleaves and approvals in connection with the regulations and bylaws of any local or other authority which shall be applicable to the Works on the Site.

F.4.2 Import permits Licences and duties

Replace Clause 11.3 with the following:

11.3 The Contractor shall obtain all import permits, permits or licences required for any part of the Plant or Works within the time stated in the Programme or, if not so stated, in reasonable time having regard to the time for delivery of the Plant and the Time for Completion. The Contractor shall include all costs necessary for customs and import duties arising upon the importation of plant into the country in which the plant is to be erected. In the event that the Contractor shall fail to obtain such import permits or licences then the additional Cost incorrect by the contractor in consequence thereof shall be absorbed by the Contractor.

F.4.3 Foundations, etc.

Replace Clause 11.4 with the following:

11.4 The Buildings, Structures, lift wells, machine rooms, foundations, approaches and work, equipment or materials are existing and the Contractor shall ensure their suitability for continued use prior to submitting their tender. Any costs associated with making the foresaid safe and suitable for the efficient transportation, reception, installation and maintenance of the works and replacement equipment shall be included in the tender and written notification of the necessary works shall be given to the Engineer as part of the tender.

F.4.4 Purchaser's lifting equipment

Replace clause 11.5 with the following

11.5 The 'Contractor' shall include for safe working and testing and maintenance of any existing, or new lifting equipment used for the completion of the works.

F.5. Assistance with laws and regulations

Replace clause 12.1 with the following:

12.1 Where the works are to be erected outside the Contractor's country the Contractor shall ascertain the nature and extent of and to comply with the law, regulations, orders or bylaws of any local or national authority having the force of law in the country where the Works are to be installed or which may effect the Contract in the performance of his obligation under Contract.

F.6. Contractors obligations

F.6.1 Operating and maintenance instructions

Add the following paragraph to clause 15.6.

15.6 Where the lift is placed in service and the Purchaser is deemed to have beneficial use of the lift and lift equipment the Contract will not be deemed to be complete until all the snagging items are completed, all drawings are provided, the information for the CDM Health and Safety File is provided and the Operating and Maintenance Manuals are complete and accepted, and the Taking-over-Certificate is issue. As such the Liquidated and Ascertained Damages will continue to be applied until the aforementioned details and information is supplied and agreed as being complete.

F.6.2 Hours of work

Replace clause 19.1 with the following

19.1 Unless otherwise provided in the Contract the Purchaser shall give the Contractor facilities for carrying out the Works on the site continuously during the normal working hours, which shall be taken as 8.00 am to 5.00 pm Monday to Friday, unless otherwise specified in the contract or deemed otherwise for safe working in accordance with the Construction (Design and Management) Regulations 2015. The Contractor may, after consultation with the Engineer, arrange to have work done at other times if it shall be practicable in the circumstances for work to be so done. The extra Cost of the works so done shall be at the Contractors expense and no added costs will be accepted by the Purchaser. The Engineer may, after consultation with the contractor, direct that work shall be done at other times if it is practical in the circumstances for work to be so done. The extra cost of the works done shall be added to the contract Price, unless such work has, by the default of the contractor, becomes necessary to ensure the completion of the Works within the Time for Completion.

F.6.3 No night or rest day working

Replace clause 19.2 with the following.

19.2 No work shall be carried out on site during the night or on locally recognised days of rest without the consent of the Engineer or the Engineer's Representative unless the work is unavoidable or necessary for the protection of life or property or for safety of the Works, or for compliance with the Construction (Design and Management) Regulations 2015, in which case the Contractor shall immediately advise the Engineer, or the Engineer's Representative. The Engineer to the Engineer's Representative shall not withhold such consent if the work at night or rest days is considered by the Contractor to be necessary to meet the Time for Completion.

F.6.4 Extraordinary traffic or delivery

Replace clause 21.1 with the following:

21.1 The contractor shall use every reasonable means to prevent damage to any highway, bridge, walkway or floor on the route to, or through, the Site by any traffic or delivery of the Contractor or any of his Sub-contractors.

F.6.5 Special Loads

Replace clause 21.2 with the following:

21.2 Should the contractor consider that the moving of one or more loads of Plant or Contractor's Equipment is likely to damage any highway, bridge, walkway or floor they shall arrange for it to be broken down into smaller pieces that can be transported safely, unless specially protected or strengthening is carried out, then the Contractor shall before moving the load notify the Engineer. The Contractor shall in the notice state the weight and other particulars of the load to be moved and his proposal for protecting or strengthening the highway, bridge, walkway, or floor.

Unless within fourteen days of receipt of such notification the Engineer by notice directs that such protection or strengthening is unnecessary, then the Contractor shall carry out his proposals with any modifications of his proposal that the Engineer may require.

The Contractor shall include for all costs associated with the protection and strengthening works necessary within his tender. No additional costs for such works will be considered or accepted by the Engineer.

F.6.6 Extraordinary traffic claims

Replace 21.3 with the following:

21.3 If the Contractor shall receive any claim in respect of damage or injury to highways, bridges, walkways or flooring arising out of the execution of the works, he shall immediately report the claim to the Engineer.

If the Engineer decides that any part of such claim results from the negligence of the Contractor or from the Contractor's failure to perform his obligation under sub-clause 21.1 (Extraordinary traffic or delivery) and 21.2 (Special loads) then the Engineers shall certify the amount of such claims which shall be deducted from the Contract Price. The Contractor shall indemnify the Purchaser in respect of the claim and in respect of all proceedings, damages, Costs, charges and expenses in relation thereto.

F.6.7 Protection

Insert new Clause 21.5

21.5 The Contractor shall include all necessary special protection, strengthening and materials equipment and costs associated with protecting the access route, finishes and flooring etc. within their tender. The Contractor shall indemnify the Purchaser in respect of the claim and in respect of all proceedings, damages, Costs, charges and expenses in relation thereto.

F.7. Variations

F.7.1 Means of Variation

Replace clause 27.1 with the following:

27.1 In the Conditions the term 'variation' means any alteration of the Works whether by way of addition, modification, omission or agreed change to the programme.

F.7.2 Engineers power to vary

Replace paragraph 4 of clause 27.2 with the following:

27.2 No such variation shall, together with any variations already ordered; involve a net addition to or deduction from the Contract Price of more than that stated in Section B (B.13.) of the tender documents unless the Contractor and the Purchaser consent to the variation in writing.

F.7.3 Valuation of variations

Include the following Paragraph to clause 27.3

27.3 Where a variation is included and it has not been quoted and the quotation accepted by the Purchaser, the Contractor shall provide time sheets, material costs to validate the costs, if the necessary information is not provided to substantiate the costs to the Purchaser the Purchaser need not pay for the variation.

F.8. Taking over

F.8.1 Taking-over by sections

29.1 Taking over by sections, as with a group of lifts when one lift is commissioned and placed in service before the next lift is taken out of service or more than one lift is included within the Contract will not be accepted unless specifically included in Section B (B.12.) of the tender documentation or otherwise agreed in writing before placement of the order. When taking over by sections is accepted a 'Taking-over Certificate' will be issued on the lift being placed in service, however final payment will only be made on completion of all snagging items, which include the issue of Operating and Maintenance Manuals and the provision of all relevant information for the CDM Health and Safety File to the Principal Designer or Main Contractor where there is no Principal Designer.

F.9. Defects liability

F.9.1 Making Good Defects

Add new clause 36.2 (c)

36.2(c) Any failure of the design or equipment that can be considered as a failure to provide a design in compliance with the requirements of the Construction (Design and Management) Regulations 2015.

F.9.2 Performance test

Add new clause 36.11

36.11 As part of the 12 months' defects liability period the lift contactor shall carryout a Performance Test. The Performance Test shall be carried out 3 months after completion of the lift and snagging items. Any fault or failure due to component or equipment failure during this period shall be considered as a failure of Performance Test. The three-month period shall be taken from the date of the last failure of the equipment. Where a failure has occurred the Engineer reserve the right to call for further Performance Test which shall take place three months from the last failure. Any costs associated with completing a repeat Performance Test, including any expenses shall be claimable against the Contractor.

F.9.3 Completion of defects

Include additional clause 36.12

36.12 Failure to complete the defect within 28 days of notification of the defects shall delay the commencement of 'Defects Liability Period' and 'Warranty Period', which shall only commence on completion of all defects to the satisfaction of the Engineer.

Where the Contractor notifies the Engineer that the defects have been cleared and on attending site it is found that the defects are not all cleared to the satisfaction of the Engineer and a repeat visit will be necessary, the Engineer will be at liberty to charge the Contractor all costs associated with the additional visit.

F.9.4 Maintenance of the plant

Include additional clause 36.13

36.13 As part of the 'Defects Liability Period' the contractor shall provide 'Fully Comprehensive Maintenances Cover' for the entire period of the 'Defects Liability Period' covering all the equipment on the lift whether new or existing. All callouts shall be included 24 hours a day and be responded to within 2 hours of the call

being placed. All relevant costs for the provision of the Fully Comprehensive Maintenance as detailed in the Specification shall be included in the tender.

F.10. Vesting of plant, and contractor's equipment

F.10.1 Marking of plant

Add new clause 37.3

37.3 Clause 37.2 shall also apply to any plant or item of equipment, removed from site, or to be removed from site to enable works to be carried out on it.

F.11. Certificates and payment

F.11.1 Certificate for Payment

Add new clause 39.14

39.14 Where the Engineer considers that an application or invoice has been overstated, or it is not in strict accordance with the payment terms, he shall have the right to withhold and / or delay the issue of a Certificate for Payment until such time as a revised invoice is received or in the opinion of the Engineer the works have reached a stage were the payment can be cleared. In such cases the Contractor shall not be able to claim any additional costs against the Engineer or the Purchaser.

F.12. Payment

Replace clause 40.3 with the following:

a) The Purchaser must pay the contractor by the relevant Final Date:

   a. Where no Purchaser Notice has been issued, the Notified sum: or

   b. Where the Purchaser Notice has been issued, the amount specified for payment in the notice.

b) The Contractor shall be paid by the Purchaser direct on agreement of the Application for Payment / invoice that shall be presented to the Engineer with the Purchaser being the 'Payee' for the percentage of the works completed and agreed by valuation by the Engineer based on the Payment Terms and the issue of a Pass for Payment Certificate by the Engineer.

c) Failure by the Contractor to present the Application for Payment / invoice to the Engineer correctly and in accordance with the Terms of Payment may result in late or non-payment of the application until the appropriate payment stage is complete or the works have reached the appropriate level of completion for the valuation. Neither the Purchaser nor the Engineer can be held responsible for late payment of Applications for Payment / invoices in such circumstances.

d) Payments will generally be on a per lift basis and made within 60 days of receipt of an invoice.

F.13. Claims

F.13.1 Notification of claims

Include the additional clause 41.1 (c).

41.1 (c) The Contractor shall notify the Engineer and Purchaser immediately of any 'claims'. Where the claim is accepted the cost can be equal to the costs of labour, materials, delivery etc. plus an allowance for profit as indicated in 41.2.

F.13.2 Allowance for profit on claims

Include new paragraph into clause 41.2

Where a claim is made, the Contractor is permitted to include an allowance for profit on the total substantiated costs of the claim. The allowance for profit must be shown separately and it must not exceed the percent of the total substantiated costs noted in the Appendix.

F.14. Non Collusion

To ensure that competitive tenders are returned the contractor shall not fixe or adjusted the amount of the tender by or under or in accordance with any agreement or arrangement with any other person, anybody or association, corporate or unincorporated; and "any agreement or arrangement" includes any such transaction, formal or informal and whether legally binding or not.

The Contractor shall complete the certificate of NON COLLUSION contained within the Form of Tender.

SECTION G. Appendices'

G.1. Appendix 1

General Conditions

Prime cost items	SUB-CLAUSE 5.5	
	Percentage to be added	15 %
Delay in Completion	SUB-CLAUSE 34.1	
	Percentage of Contract Value to be paid or deducted for each week or part week of delay	2.0 %
	Maximum percentage of Contract Value which payments or deductions shall not exceed	10 %
	Where taking over by sections is agreed (i.e. each Section of Work where more than one section has been defined for the purpose of taking-over) the percentage noted above shall be applicable to the per lift values applicable to the lift completed.	
Prolonged delay	SUB-CLAUSE 34.2	
	Maximum loss recoverable by the Purchaser	10% of the Contract sum
Allowance for profit on claims	SUB-CLAUSE 41.2	
	Percentage to be added	Maximum of 6%
Limitation on contractor's liability	SUB-CLAUSE 44.3	
	Limit of liability	Contract price to be determined
Person to appoint adjudicator of arbitrator ('the Nominator')	SUB-CLAUSE 52.1(b) AND 52.2.(a) The President of the Institution of Mechanical Engineers or The President of the Institution of Engineering and Technology	
Rules governing adjudication	SUB-CLAUSE 52.1(c)	
	In accordance with rules chosen and determined by the adjudicator at the outset of the adjudication	