



UNSW Design and Construction Specifications

PART 5

UNSW Lift Design Standards

September 2019

As a guide only, attention is drawn to changes that have been made in the following clauses since the last revision:

Revision	Date	Details
General Revision	September 2019	General Update to all sections
General Revision	August 2015	General Update to all sections
General Revision	November 2013	General Update to all sections

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1. Part 1 – Vertical transport overall requirements

1.1 Definitions

- 1.1.1 **‘Attendant’** means a person using the Hazardous Goods Operation mode in a Goods or Passenger Lift.
- 1.1.2 **‘Car Operating Panel (COP)’** means assembly of pushbuttons and indicators mounted on the inside panel, including but not limited to, car call, door open and close, alarm and mechanics control push buttons, car call, position, direction and information indication, as well as key operated switches to be used by authorised persons.
- 1.1.3 **‘Contractor’** means the installer of the equipment including its subcontractors, re-sellers and distributors.
- 1.1.4 **‘Breakdown’** means the equipment in normal service is unable to close its doors, travel to another floor and open its doors in response to a car or landing call. Where the equipment is operating in an abnormal, dangerous, or noisy condition. Where the equipment is stopped, and passengers are trapped requiring release. Where the equipment is observed stopped or is behaving in an erratic manner that prevents the lift from providing “normal” service.
- 1.1.5 **‘Defects Liability Period’** means the time between practical completion and final completion, where defects arising from the work are to be rectified by the contractor at the contractor's cost.
- 1.1.6 **‘Goods Lift’** means a lift primarily designed to carry goods and people, refer to Part 1, item 1.3.4.
- 1.1.7 **‘Hazardous Goods Operation (General HGO)’** means operation of a lift using a special key switch located on the landing and within the lift car.
- 1.1.8 **‘Independent Service’** means a car operational feature made effective by key switch, which provides for operation of a lift only by controls within the car.
- 1.1.9 **‘Inspection Authority’** means SafeWork NSW.
- 1.1.10 **‘Landing Operating Panel (LOP)’** means, push button that generates a landing call when pushed.
- 1.1.11 **‘Lift Monitoring’** means functions and operations identified in Part 2, items 2.4.1 and 2.4.2.
- 1.1.12 **‘Machine Room Less Lift (MRL)’** means a passenger or goods lift that does not require a separate machine room and where the machine and control panel is in the well.
- 1.1.13 **‘Passenger Lift’** means a lift primarily designed to carry people.
- 1.1.14 **‘Self-Rescue Device’** means a device installed in a lift which prevents passenger from being trapped inside a lift, if there is a loss of power.
- 1.1.15 **‘Stretcher Lift’** means a lift that can accommodate a raised stretcher with a patient lying on it horizontally by providing a clear space not less than 600mm wide x 2000mm long x 1400mm high above the floor level. (reference BCA section E3.2 Stretcher facility in lifts)
- 1.1.16 **‘UNSW’** means the University of New South Wales and its officers, agents and employees.
- 1.1.17 **‘UNSW Facilities Management’** means the UNSW, its officers, agents and employees of the UNSW Estate Management, Facilities Management team.
- 1.1.18 **‘UNSW Hazardous Goods Operation (HGO)’** means operation described in Part 2 item 2.5.
- 1.1.19 **‘UNSW Representative’** means a UNSW Facilities Management officer and the UNSW nominated lift consultant for receiving information about UNSW lifts and escalator.

1.2 Purpose

This document sets out the minimum requirements for vertical transport at UNSW, across these 4 sections;

- Part 1 – Vertical transport overall requirements
- Part 2 – Compliance, type and performance requirements
- Part 3 – Specification
- Part 4 – Drawings and Signage
- Part 5 - Lift Design Standard Check List

Adherence to the minimum UNSW lift design and installation requirements contained within this standard, will ensure that UNSW achieves maximum operational efficiency in the movement of people and goods within the UNSW built environment to meet the specific and unique UNSW needs and requirements.

1.3 Scope

The information detailing lift installations described in this standard is to be used as the minimum requirement for all new, replacement or refurbished lift and escalator installations, as well as major building upgrades on the UNSW University's campuses. No deviation from or substitutes for the requirements stated in this document will be accepted by UNSW.

Part 5 of this standard includes a checklist to be completed for all lift proposals.

1.3.1 Overview

All new, replaced or refurbished lifts must meet or exceed the following minimum basic requirements;

- (a) The lifts must be safe and comply with all relevant codes and standards.
- (b) The lifts must be easily maintained, with minimal problems, by multiple (other than the original manufacturer) lift maintenance contractors.
- (c) The lifts are to be as flexible and versatile in operation as possible.
- (d) The lifts must have a proven, local history of reliability and maintainability.
- (e) The lifts must meet minimum requirements of handling capacity and waiting time for passenger lifts and materials for goods lifts.
- (f) The lifts must meet the minimum requirements for use of persons with disabilities as defined by the Building Code of Australia (BCA).

1.3.2 Prequalification Requirements

A competent, well-established, lift contractor with at least ten (10) years local lift installation experience shall only install, replace or refurbish lifts.

The lifts must comply fully with all local rules, regulations, codes and practices as well as gain approval and certification from SafeWork NSW prior to the lift being placed into service.

All passenger lifts shall be, as a minimum, compliant for use by people with disabilities and in particular with the BCA. Full compliance to the lift code AS 1735.12 Lifts, escalators and moving walks – Facilities for persons with disabilities, is also required.

Consideration shall be given to lift power systems that are energy efficient and environmentally friendly. Any lift power system that can be proven to be more efficient or less power consuming and environmentally friendly shall have preference over a less efficient system.

Only non-proprietary lift equipment or lift equipment that has been available locally for at least 5 years in Australia and has a ready supply of spare parts to local lift companies, other than the original

manufacturer, may be used. Lift equipment shall mean any and all parts of the entire lift installation, in particular controllers, drives and its various component parts.

A detailed list of how many lifts of the same type and model and in particular with the same control system that have been installed over the past 5 years is required to be supplied by intended installers in order to be considered at the time of tender for any new, replaced or refurbished lifts. The list is to show the address of the lift installations and if the original manufacturer or installer is now maintaining the lift. Preference shall be given to well established lift systems that have a proven track record of reliability, ease of maintenance and availability of spare parts.

1.3.3 Lift Design - Minimum Requirements

Lifts identified in Part 2 item 2.1.3 of this document are not to be installed at UNSW.

Lift dispatch systems shall be;

- (a) single call button for two (2) floor installations or;
- (b) two (2) button directional collective for three (3) or more floor installations.
- (c) Preselection systems (Port, Compass, Hall Call Allocation, Destination Control, etc) shall not be used.

Service/dumbwaiter lifts must not be installed without prior approval of the UNSW Director, Facilities Management.

All passenger lifts must be fully compliant with the BCA and AS 1735.12 Lifts, escalators and moving walks – Facilities for persons with disabilities.

All passenger lifts must have a minimum clear lift car floor area of 1600 mm wide x 2000 mm deep, regardless of how short the rise may be. Larger lift car sizes are encouraged.

All lifts (i.e. any lift defined as passenger, goods/passenger or goods) that is expected to carry heavy loads must be able to carry the lift car rated load, both as a combination of 75 kg items or as 1 single item. The finishes of these lifts, signage and other requirements are set out in later parts of this standard.

The UNSW Hazardous Goods Operation feature must be provided in at least one lift in any building. All Goods lifts must have this installed.

No lifts are to share a common lift shaft, i.e. as a minimum lift shafts shall have a dividing screen installed from the pit floor to the underside of the top of the lift shaft between each lift car.

All lifts must be installed in a fully enclosed shaft. Glass lift shafts are discouraged.

All lift pits must have a dry sump.

All lift shafts are to be adequately ventilated.

All lifts are to have a Self-Rescue Device unless the lifts are connected to the building emergency power supply.

1.3.4 Goods Lifts

A Goods Lift is a lift designed for frequent usage moving heavy materials as well as passenger traffic.

Lift car finishes must be robust and comply with the later requirements of this standard.

All Goods Lifts must be able to carry **a single item** of goods or materials equal to the rated load of the lift car. Lift car flooring, car and landing sills, lift car guides, lift guide rails, brakes, sheave loading, point loading, etc must be designed to allow for the loading, unloading and carrying of these single, heavy loads. Depending on the specific circumstances of weight and load, the lift car may also need

to allow the load to be placed in the lift car by powered lifting equipment which may or may not need to also travel in the lift car.

Each building that contains one (1) or more lifts, must have at least one (1) Goods Lift.

All Goods Lifts must contain a UNSW Hazardous Goods Operation feature.

1.3.5 **Assessment, Commissioning & Training**

The UNSW Facilities Management team (Facilities Management) is to be involved in all new lift tender assessments. All documentation is to be made available to Facilities Management at least one (1) week prior to notice of the assessment date.

Facilities Management is to be involved in the commissioning of all new lift installations. At least two (2) weeks prior notice is to be given to Facilities Management of any commissioning of new lifts.

At least two (2) weeks prior to commissioning any new lifts, Facilities Management is to be provided with at least one (1) copy of the Operational and Maintenance Manuals for the particular lift.

On completion of the installation a complete set of as-installed documentation is to be provided to Facilities Management. A Safe to Operate Certificate must be provided by the lift installer prior to the lift being placed into service.

Correctly completed SafeWork plant registration forms must be provided to Facilities Management within one (1) week of practical completion.

A training session or sessions is to be provided for Facilities Management and the lift users, after the testing and commissioning is successfully completed. This training session/s is to be at no additional cost to UNSW.

The training session/s is to include, as a minimum;

- (a) the operation of the lift and its controls,
- (b) keys and locks,
- (c) cleaning of all finishes,
- (d) operation in an emergency (such as fire or power failure),
- (e) hanging/cleaning/storage of protective curtains, etc.
- (f) The lift contractor is to allow for at least two (2) sessions of two (2) hours each.

1.3.6 **Maintenance**

UNSW has many lifts under maintenance and requires all new lifts to be as compatible and easily integrated with the existing lifts and lift maintenance contract. To that end consideration must be given, and documentation must be provided, before accepting any new lift system that clearly identifies it as being easily and effectively maintained by the existing lift maintenance contractor.

All lift proposals must clearly state if the proposed lift equipment complies with the following Independent or Supported Maintainability requirements.

1.3.7 **Independent Maintainability**

All new lift equipment must be able to be fully and effectively repaired, serviced and maintained, in accordance with the requirements and recommendations of each designer, supplier, manufacturer and installer of the lift equipment (including as set out in the Operation and Maintenance Manuals required under the contract), by any qualified and competent lift maintenance contractor without the need to rely on or use devices, spare parts or intellectual property of a proprietary nature such as, but not limited to, tools, instruments, pass words, software, keys and cards, even if only required on very infrequent occasions.

Without limiting the foregoing, the lift equipment will be deemed to not be compliant with this requirement if it is reasonably necessary for UNSW or its lift maintenance contractor to, at any time during the life of the lift equipment, to pay and/or to enter into contractual arrangements with, a designer, supplier, manufacturer or installer of the lift equipment, for access to, or for the use of, anything or any intellectual property in order to effectively repair, service or maintain the lift equipment.

1.3.8 Supported Maintainability

UNSW will consider new lift equipment, which is not compliant with the independent maintainability requirement in Independent Maintainability Part 1, item 1.3.7 if;

- (a) all devices, spare parts and intellectual property required for independent maintainability will be provided to or made available to UNSW as part of the requirements for practical completion; and
- (b) no additional amount will be payable at any time to the Contractor or any third party for UNSW or its Contractors to receive or to have access to the relevant devices, spare parts or intellectual property. All Operation and Maintenance manuals are to include instructions on how to use or apply these tools, instruments, passwords, keys, cards, spare parts and intellectual property, etc.

1.3.9 Integration with Existing Maintenance Procedures

The following procedures shall be included into any new lift construction specification to assist the integration of any new lifts into the existing lift maintenance program.

- (a) Facilities Management is to be involved in all new lift tender assessments. All documentation must be made available to the Facilities Management with at least one (1) week prior notice of the assessment date.
- (b) Facilities Management is to be involved in the commissioning of all new lift installations. At least two (2) weeks prior notice is to be given to Facilities Management of any commissioning of new lifts.
- (c) At least one (1) week prior to commissioning of any new lifts, Facilities Management is to be provided with at least one (1) copy of the Operational and Maintenance Manuals for the lift.
- (d) The Defects Liability Period for new and refurbished lifts will be at least twelve (12) months in duration. The maintenance must comply with the procedures for recording and reporting of the existing lifts that are in place for UNSW at the time of tender. It is the Contractor's responsibility to ensure that the procedures being applied are current and the latest available.

1.3.10 Reporting, Logging of Visits and Inspections

The following documentation is required to be provided to UNSW Facilities Management during any new, replacement or refurbished lift and escalator installations:

- (a) The Contractor shall provide the UNSW Representative with an approved Breakdown Calls Log, which must be kept on site in a designated location, and the Contractor must enter in the Breakdown Calls Log a record of each visit made in response to a Breakdown.
- (b) Breakdown Calls Log entries must be made at the time that the visits, service calls or repairs are made.
- (c) The Contractor must present the Breakdown Calls Log to the UNSW Representative for review at regular intervals of not more than one (1) month.
- (d) The Contractor must record the following details in the Breakdown Calls Log:
 - i. Time of arrival;
 - ii. Time of departure;
 - iii. Details of repairs or replacements carried out;
 - iv. Details of all call out attendances and nature of fault rectified;
 - v. Details of all tests and adjustments carried out;
 - vi. Lift personnel names.

- (e) The Contractor shall on the first day of each month forward to the UNSW Representative a detailed list of all maintenance visits, Breakdowns, or stoppages and rectification effected. The Breakdown report must be in an acceptable format, which will enable the UNSW Representative to assess the number of Breakdowns per lift per month.

1.3.11 Lift Monitoring

Every Passenger and Goods lift must have basic alarms and faults monitored by the UNSW BMS and, in larger buildings, a local standalone monitoring system such as Otis EMS or Schindler Lobby Vision as per later Item 2.4.1 and 2.4.2.

1.3.12 Maintenance Schedule

In addition to the logging of visits all routine maintenance items as scheduled are to be signed and dated by the lift technician carrying out the work and issued to the UNSW Representative.

1.3.13 Construction Inspections

The Contractor shall at least eight (8) weeks prior to the completion of the Defects Liability Period of any lift or escalator upgraded, replaced or newly installed, inspect the entire lift equipment in presence of the UNSW Representative to ascertain the condition in which the equipment is being maintained.

The responsibility for arranging such inspections shall rest with the Contractor. The Contractor must give a minimum of two (2) weeks' notice to the UNSW Representative of such any inspection.

Final completion at the end of the Defects Liability Period will not be granted without this inspection being satisfactorily completed and all defects rectified.

2. Part 2 – Compliance, type and performance requirements

2.1 Standards

All new lift and escalator installations, replacements and modernisations must comply with this UNSW Lift Design Standard as well as these Australian Standards and Codes:

- (a) AS 1735.1 - Lift Code - Lifts, escalators and moving walks - General requirements
- (b) EN81-20 - Safety rules for the construction and installation of lifts - Lifts for the transport of persons and goods - Part 20: Passenger and Goods Passenger Lifts
- (c) AS 1735.11 - Lift Code- Lifts, escalators and moving walks (known as the SAA Lift Code) - Fire-rated landing doors
- (d) AS 1735.12 - Lifts, escalators and moving walks – Facilities for Persons with Disabilities.
- (e) AS 3000 - Wiring Rules
- (f) Building Code of Australia (BCA)
- (g) SafeWork NSW requirements
- (h) Any other local regulation or requirements.

2.1.2 Minimum Lift Services

All buildings that are not completely flat (i.e. that have no steps or stairs) must have a lift for the vertical movement of furniture, goods and persons with disabilities.

Where the height of a building exceeds 10.5 metres or there are more than three (3) floors served, consideration should be given to more than one (1) lift being installed.

2.1.3 Minimum Requirements for Persons with Disabilities

All new lift and escalator installations, replacements and modernisations at any of UNSW campuses shall comply with at least the;

- (a) Building Code of Australia requirement for Facilities for People with Disabilities Clause E3.6 and Tables E3.6 a and b, and;
- (b) AS1735.12 Lifts, escalators and moving walks – Facilities for Persons with Disabilities.

The following lifts shall not be used for the access of people or any form of goods and or materials transport, regardless of ability, disabilities or limited mobility;

- (a) Stairway Lifts.
- (b) Lifts for persons with limited mobility - manually powered.
- (c) Lifts for persons with limited mobility - restricted or unrestricted use - low rise platforms.
- (d) Lifts for persons with limited mobility - restricted or unrestricted use – non - automatically controller lifts.
- (e) Lifts for persons with limited mobility - restricted or unrestricted use - automatically controlled.

Any form of platform lift, enclosed in a shaft or not, will not be accepted for passenger use, regardless of ability or disability of the passenger. Passenger goods hoist (e.g. man and material hoists) are also not acceptable.

Any form of platform lift, enclosed in a shaft or not, will not be accepted for use to carry any goods or materials.

All lifts as a minimum must provide full and compliant access for people with disabilities, i.e. full compliance to the BCA and Part 12 of AS 1735 Lifts, escalators and moving walks – Facilities for persons with disabilities.

2.2 Performance Requirements

2.2.1 Administrative and Office Buildings

If a Passenger Lift, as distinct from a Goods Lift or Facilities for Disabled Persons lift, is deemed necessary under the design concept it shall be designed to meet the following design criteria;

- (a) Interval - the maximum up peak departure interval from the main lowest floor landing for administrative and office building lifts with no more than 60% passenger loading.

1 to 4 floors served	45 seconds
5 to 8 floors served	35 seconds
8 and higher floors served	30 seconds

- (b) Handling Capacity - Minimum five (5) minute handling capacity expressed as a percentage of building population above the main lowest floor landing for administrative and office buildings:

1 to 4 floors served	10%
5 to 8 floors served	12.5%
8 and higher floors served	15%

2.2.2 Tutorial Rooms, Classrooms & Lecture Theatres,

Lift installations in a building or parts of a building of this type require an accurate theoretical traffic analysis. A detailed study is to be carried out and a comprehensive written report is to be provided by an appropriate independent consultant or at least three (3) separate studies supplied by three (3) potential tendering lift companies.

The basic requirement for classrooms up to four (4) floors served shall have a waiting interval as a maximum of 45 seconds with a handling capacity of a minimum of 15% up to a maximum of 50%.

For classrooms in buildings over five (5) floors special consideration will be required for the correct lift system and layout for the particular application. The use of escalators at least in part, shall be seriously considered.

2.2.3 Performance Criteria for Passenger Lifts

The following performance criteria shall apply to all Passenger Lifts;

- (a) Door Times - Speeds (+ or - 5%)

Open Doors	2.0 seconds
Close Doors	2.5 seconds

Door time measurement shall be made manually by stopwatch and shall be measured from start of door movement to completion of the opening or closing function, as the case may be.

- (b) Door Times - Dwells (maximum)

Car Call	3.0 seconds
Lobby Call	3.0 seconds

- (c) Floor Levelling Accuracy

- i. 5 mm +/- (maximum in either direction and with varying loads)

- (d) Noise

- i. Ambient inside the lift car no greater than 55dba

- ii. Door operation or other lift noise no greater than 60dba

2.2.4 Performance Criteria for Goods Lifts

The class of loading shall generally comply with EN81.20 Clause 5.4.2.2.1, however the lift must be able to be loaded, carry and unload its rated load up to and including a single item of equipment, goods, plant, etc. equal to the lift's rated load. Depending on specific Goods Lift requirements, the rated load may also have to include handling devices.

The lift shall comply with the following conditions, either;

- (a) The weight of handling devices is included in the rated load; or
- (b) The weight of handling devices shall be considered separately from the rated load under the following conditions:
 - i. handling devices are used only for loading and unloading of the car and are not intended to be transported with the load;
 - ii. for traction lifts the design of the car, the car sling, the car safety gear, the guide rails, the machine brake, the traction and the unintended car movement protection means shall be based on the total load of rated load plus weight of handling devices.

Compliant signage is also required to be provided as per EN81.20 Clause 5.4.2.2.1 Figure 14.

Minimum size of car must be 1600 mm wide x 2000 mm deep, clear between lift wall finishes but excluding handrails and bump rails.

Minimum height of the car must be a minimum of 3000 mm. An extended ceiling boot maybe considered in special circumstances.

Independent Service door control shall have a special key switch to allow the lift to "Park" at a landing while goods are being loaded or unloaded. The key switch shall not trap the key in the "Park" or "On" position.

Door width shall be a minimum of 1400 mm, with a door height of a minimum of 2100 mm and maximum of 2400 mm. Larger opening may be required for special purpose lifts.

UNSW required finishes are described on Part 4 of this standard.

2.3 Type of Lift Drive & Escalators

2.3.1 Lift Type

The type of lift shall be based on the following;

- (a) Lifts with overhead machine rooms are preferred by the UNSW. The use of MRL (Machine Room Less) lifts in any application will require the prior approval of UNSW.
- (b) All drives are to be high efficiency Variable Voltage Variable Frequency.
- (c) Regenerative drives are not mandatory but, if proven beneficial and appropriate for an installation, it will be encouraged.
- (d) The lifts shall also have a self-contained emergency Self-Rescue Device operation feature to allow the lift to travel to the nearest floor and release passengers in the event of loss of power. If the building has an emergency power generator, a lift self-contained operation feature must not be provided.
- (e) Hydraulic lifts are not acceptable.

2.3.2 Escalator Type

The type of escalator is to be based on the following;

- (a) Variable speed drives must be provided to allow the escalator to reduce speed when passenger traffic is light and come to a standstill when there is a pause in passenger traffic. The escalator is to restart automatically on the approach of passengers.

- (b) Step chains shall have a minimum service life of at least 100,000 hours.
- (c) All step chain rollers are to have roller or ball bearings, not bushes.
- (d) The use of nylon or other “soft” materials shall not be used for major items such as drive and handrail sprockets
- (e) Automatic lubricators, if provided, shall have enough capacity to provide lubrication at appropriate levels for periods of at least 1 (one) month without topping up.
- (f) All handrail returns (newels) are to have roller guides not sliders.
- (g) Balustrades are to be made of substantial materials other than glass unless otherwise approved by the UNSW.
- (h) There shall be at least 3 level steps at the entry and exit of each escalator.
- (i) The speed of any escalator shall be limited to no more than 0.5 mps
- (j) NT (thermoplastic elastomers with steel cables and slider fabric) handrails shall be used instead of traditional rubber.

2.4 Lift Monitoring

2.4.1 Building Management System (BMS) Interface

All lifts and escalators are to have certain functions monitored by a campus Building Management System (BMS). The BMS shall be located in one particular place on campus. It will be run on BACnet, which is a communication protocol for building automation and control networks.

The following functions and operations shall be monitored by the BMS;

- (a) Lift/escalator fail to start
- (b) Lift on Fire Service
- (c) Alarm button pressed (escalator stop button pressed)
- (d) Lift on Independent Service
- (e) Lift/escalator on maintenance
- (f) Lift on Hazardous Goods Operation and 60-minute alarm

The interface between the lifts and the BMS shall be by a suitable BACnet gateway and implemented as follows;

- (a) The lift microprocessor shall be directly linked at a high-level interface or gateway to indicate status and fault information to be monitored at real time continuously via the BMS, or;
- (b) Inputs from the lifts to indicate status and fault information to the BMS will be by voltage free relay contacts rated at 240Vac 1A resistive load.

The BMS trade shall supply and install all cable and conduit between terminal strips and interface box provided by the lift contractor adjacent to each lift machine room (or top landing lobby for MRL Lifts) and the BMS for the transfer of signals between the systems. The lift contractor shall also provide assistance in testing and all other requirements necessary for the commissioning and correct operation and monitoring of the required functions between the lifts and the BMS.

2.4.2 Local Lift Monitoring

Every Passenger and Goods lift are to have basic alarms and faults monitored by the UNSW BMS as per the previous clause. In buildings that contain four (4) or more lifts additional features are to be monitored with a dedicated Local Monitoring System (LMS).

Each of the lifts connected to an LMS must show, in graphic format, the following features as a minimum;

- (a) Lift fail to start

- (b) Lift on Fire Service
- (c) Alarm button pressed
- (d) Lift on UNSW Hazardous Goods Operation
- (e) Lift on Independent Service
- (f) Position of each lift
- (g) Direction of travel
- (h) Landing and car buttons pressed
- (i) Doors open or closed

The above shall be shown on one (1) screen. Some information can be scrolled through if the amount of detail is too much for the one screen. The screen shall be at least 17 inch and full colour.

The screen shall also have provision for a keyboard to be attached and to connect to a UNSW printer.

The monitoring system shall have basic performance recording of interval, time to answer any or all landing calls, average waiting times, number of buttons pressed, out of service time, etc.

Connection into the UNSW intranet and general connection via the internet is also desirable.

2.4.3 Closed Circuit Television (CCTV) Cameras

The lift contractor shall supply and install all cable and conduit between terminal strips and interface box provided by the lift contractor adjacent to each lift machine room (or top landing lobby for MRL Lifts) to allow for the installation of CCTV cameras by others. Wiring is to include both shielded twisted pairs of cables as well as CAT 6 and to any other specific building requirements

2.4.4 Access Control

The lift contractor shall supply and install all cable and conduit between terminal strips and interface box provided by the lift contractor adjacent to each lift machine room (or top landing lobby for MRL Lifts) to allow for the installation of access control to be installed by others. Wiring is to include both shielded twisted pairs of cables as well as CAT 6 and to any other specific building requirements

2.5 Hazardous Goods Operation

2.5.1 Lift types to be fitted with Hazardous Goods Operation (HGO)

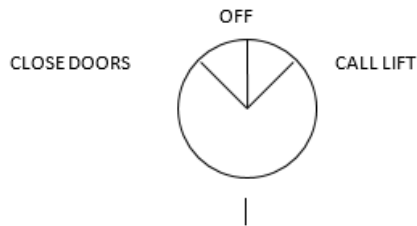
The HGO assists building users to safely move hazardous goods within the building as well as moving bulky items within the lift whilst having complete control of the lift from the landing operation panel.

The HGO must be installed to at least one (1) lift serving all floors in each building.

HGO must have the hardware installed and method of operation exactly as described in this specification at items 2.5.2 to 2.5.5.

2.5.2 HGO Landing Panels (LOP)

All landing panels will be provided with a three (3) position key operated switch labelled "HAZARDOUS GOODS OPERATION" with the positions labelled as follows;



The lock will be spring return to the “OFF” position from both other positions.

2.5.3 HGO Car Operating Panels (COP)

In addition to normal switches, there will be a two-position switch labelled “HAZARDOUS GOODS OPERATION”. The two positions will be labelled “OFF” and “ON” and the key can be withdrawn in either position.

The key switches in both the Car Operating Panel and the landing will be of the quick-change Bi-Lock type, with the plugs cut to the UNSW HGO Lift Bi-Lock cut.

2.5.4 HGO Method of Operation

- (a) When the **HGO** key switch is in the “**OFF**” position the designated lift will operate normally and where applicable as part of a lift group.
- (b) The Attendant turns the key switch in the LOP clockwise from the “**OFF**” to the “**CALL LIFT**” position.
- (c) An in-car announcement is made: “*Please exit at the next stop, this lift is required for special service*”. Note, this audio announcement will repeat approximately every 10 seconds until the lift arrives at the “calling” floor.
- (d) An illuminated flashing sign in the lift COP will illuminate “**Special service operation**”.
- (e) Hall position indication will retain lift position indication but will also show the lift is on “**Special Services**”. A scrolling message is acceptable.
- (f) Hall call response is inhibited.
- (g) The lift will travel to answer the next registered lift car call in its direction of travel, the doors will open, all other lift car calls will be cancelled, and new lift car calls will not be accepted. All passengers are expected to leave the lift car. The doors will close and the lift travel directly to answer the **HGO** key switch. If the lift is idle it will immediately travel directly in answer to the **HGO** key switch.
- (h) The lift will travel (non-stop) to the “**calling**” floor (at which the **HGO** switch is selected).
- (i) Open its doors.
- (j) The lift will remain at that floor with the doors open.
- (k) The Attendant will remove the key switch from the landing LOP key switch in the “**OFF**” position.
- (l) The lift will remain “captive” in the **HGO** mode of operation for 60 seconds. **If the process does not proceed to the next stage, the lift will return to normal service.**
- (m) The **HGO COP** key switch is turned to the “**ON**” position.
- (n) The key is removed in the “**ON**” position.
- (o) The goods are loaded.
- (p) The key is inserted into the landing LOP key switch and turned counter-clockwise to the “**CLOSE DOORS**” position. The doors close and the key returns to the central “**OFF**” position and withdrawn.
- (q) The Attendant travels via another lift or stairs, to the “**destination**” floor.

- (r) The Attendant then turns the **HGO** key switch in the LOP to the “**CALL LIFT**” position at the “**destination**” floor.
- (s) The lift travels to the “**destination**” floor.
- (t) The doors open.
- (u) The goods are removed.
- (v) The key is removed from the “**destination**” landing LOP key switch.
- (w) The **COP HGO** key switch is returned to the “**OFF**” position.
- (x) The key is removed.
- (y) The lift returns to normal service with doorway scanners fully operational when the lift doors start to close. All indication returns to normal.

2.5.5 Important HGO Operational Notes

The HGO mode of operation will not initiate if;

- (a) The Hall Fire Service or Car Fire Service is operated. (HFS & CFS)
- (b) The lift is in Inspection mode. (INS)
- (c) The lift is on Independent Service. (INDS)
- (d) When the HGO mode is activated

Engaging the Hall Fire Service (HFS) mode will return the lift to a designated floor for unloading.

If the Hall Fire Service (HFS) mode is selected while the lift is on Hazardous Goods Operation (HGO), there will be an announcement in the lift car, advising the Attendant to abandon the use of the lift and exit the lift before the doors close and the lift returns to the designated floor.

Note. The UNSW BACnet will be programmed to raise an alarm if the lift is in Hazardous Goods Operation (HGO) for more than 60 minutes.

3. Part 3 – Specification

3.1 Lift Shafts (& Lift Machine Room where provided)

3.1.1 Lift Shaft requirements

- (a) All lift pits must have a 300 mm x 300 mm x 300 mm dry sump with a chequer plate steel cover. The sump must be placed so as to not interfere with the lift equipment or personnel. The pit floor shall slightly slope to the sump and floor waste.
- (b) All lift shafts must be effectively ventilated in compliance with EN81.20 as a minimum.
- (c) No lifts are to share a common lift shaft, i.e. as a minimum lift shafts shall have a dividing screen installed from the pit floor to the underside of the top of the lift shaft between each lift car.
- (d) All lifts must be installed in an enclosed shaft. Glass lift shafts are discouraged.
- (e) Position of any MRL controller, e.g. E&I panel, MAP, etc, is to be on the top landing floor of the lift next to the top floor landing door.
- (f) Landing call buttons and indication is to be installed “flush” mounted on the lift lobby wall. Surface mounting is not acceptable. Mounting on/in door frames is not acceptable.
- (g) Lift shaft lights must be provided in compliance with EN81.20 as a minimum.
- (h) Lift pits are to be painted light grey on completion.
- (i) Clear and permanent instruction must be mounted in the lift pit next to any pit control stations showing how to use the controls and how to reset the lift on completion.
- (j) Lift machine rooms (where used) shall be painted “ceiling white” on the walls and light grey on the floor.
- (k) Lift machine rooms (where used) must be air conditioned.
- (l) Lift car light switched must be 3 position, “OFF, ON & TEST” if the lift has a machine room.
- (m) All switches and circuit breakers in controllers and switch panels shall have their purpose clearly labelled (i.e. an abbreviated designation such as CB1 or ED1.1 will not be accepted), e.g. light switch, main switch, power door operator circuit breaker, power RCD, etc.
- (n) To ensure compliance with Work Health and Safety Regulation 2017, Chapter 5, Part 5.3, Division 4, Clause 273, the SafeWork plant registration number must be permanently marked on the item of plant by the Contractor as soon as the plant registration number is known.
- (o) The door of the controller shall have appropriate signage warning of a potential electrical hazard. Typical signage can be found at PART 4 Drawing, Item 4.3.
- (p) All lift shaft combination brackets, supports, angles, stands, etc that have slotted holes must be tack welded, pinned or otherwise secured in position to ensure their position will be retained. Washers and or gluing agents (e.g. lock tight) are not acceptable.
- (q) Holes and penetrations in the lift shaft must be filled with grout. Expensing foam or “tin” plate is not acceptable.
- (r) Lift car compensation must be either steel wire rope or heavily encapsulated chain, e.g. whisper flex.
- (s) All compensation chains or ropes must have connected to the lift safety circuit to stop the lift as soon as possible if the compensation rope or chain comes into contact with the pit floor or fails.
- (t) All lifts must have a Fire Service feature and Independent Service mode.
- (u) All goods lifts must have the UNSW Hazardous Goods Operation feature.

3.2 Lift Cars

3.2.1 Lift Car Requirements

- (a) Emergency lighting on the lift car top is required as per EN81.20.
- (b) All emergency lifts (as defined by the BCA) must have provision for a Warden Intercom Point (WIP) as per AS1670.4-2015 Clause 5.4. The point shall be in a metal box behind a hinged stainless-steel locked door. The door shall be clearly engraved with W.I.P in large RED letters. The lock shall be keyed the same as the fire service key switch.
- (c) All lifts must have lift car visual and audio (voice, not just a sound) position indication fully operational regardless of how many floors are served.
- (d) Lift car position indication must remain displayed in the lift car when the lift is on either normal or any special services, i.e. fire service, Independent service, UNSW Hazardous Goods Operation, etc.
- (e) All controls are to have vandal resistant controls and communication systems.
- (f) Any lift car emergency phone system must be a commercially available system e.g. emFone (proprietary systems such as the Otis REM system will not be accepted) that shall be directly connected to the UNSW Security Office phone system for 24-hour monitoring. Each lift will require a separate telephone line and be allocated a unique phone number.
- (g) Full details of the UNSW phone system must be obtained, and compatibility confirmed by the lift contractor before installation so that the lift car emergency phone system will work correctly when installed.
- (h) All lift car emergency phones must have an NBN compatible lift car emergency phone, i.e. at least of the 3G dual SIM type.
- (i) All lifts are to be numbered consecutively as per the UNSW lift numbering system. The lift number must be engraved clearly on each of the lift COPs.
- (j) A UNSW Landing Asset tag, shown in Part 4, item 4.4, must be fixed to the top right-side inside landing door frame at each level.
- (k) All lift cars must have a roof trap door compliant with EN 81-20 Clause 5.4.6 Emergency trap doors and emergency doors.
- (l) If access to the lift car roof trap door is via a sliding or removable ceiling panel, the panel must be secured from above via small "shot-bolts".
- (m) All lifts must have provision for CCTV and access control (i.e. CAT 6 and shielded twisted pair wiring between the lift car and a point near and above the top floor landing door).
- (n) All lift hoisting machines located in a lift machine room must have a mechanical means to move the lift car to a landing if power is lost to the lift. The mechanical means must comply with EN81-20 Clause 5.9.2.3.1, Paragraph a)
- (o) All lifts shall have a self-contained fully automatic Self-Rescue Device feature that, as a minimum, shall run the lift to the nearest floor and allow passengers to exit the lift car if electrical mains power fails, unless the lifts are connected to emergency power diesel power supply. The lift doors are to close after the passengers have exited the lift car and remain closed until normal power is resumed. The door open button shall remain fully operative and effective during this time.
- (p) All signage in the lift car and on the landings (i.e. fire warning signs) must be engraved, no stick-on labels will be accepted.
- (q) All Lifts must have an Independent Service feature, with a special key switch to allow the lift to "Park" at a landing while goods are being loaded or unloaded. The key switch shall not trap the key in the "Park" or "On" position.
- (r) The lifts are to have provision for protective blankets in all lift cars to protect their finishes. Each UNSW building to have minimum of one (1) set of lift protective blankets. Therefore, if there is only one lift in the building it must have a set of blankets supplied with lift.

3.3 Passenger Lifts – Lift car finishes

Lift car finishes shall be as detailed below (also see PART 4 Drawings);

- (a) 6WL Rimex Metals Australia P/L stainless steel patterned wall lining (not finished) on 6mm minimum backing to side walls and lower half of rear wall. All panel joints and edges are to be faced 3 mm natural anodised aluminium strips. Note that the lift car must have an outer shell, backing timber or equivalent of at least 6 mm and then the car finishes applied to the timber. Lift car finishes must not be the metal lift car shell or attached directly to the shell.
- (b) Stainless steel bump rails shall be installed on both sides and rear wall, just above the lift car floor. The stainless-steel bump rail shall be a flat plate approximately 150 mm wide x 6 mm thick securely mounted to the lift car wall. See drawing for details.
- (c) Aluminium framed half height laminated silver mirror to rear of lift positioned from 200mm above handrail to 200 mm below the ceiling level.
- (d) Fixed “white” coloured ventilated lift car ceiling with access panel (to the roof trap door) secured with shot bolts (or similar) on the top side of the ceiling to prevent the panel being opened from within the lift car.
- (e) 38mm dia. continuous s/steel handrail securely attached to side and rear wall, refer drawings.
- (f) Provide lift car LED down lights in at least all four corners. Lift car lighting levels must comply with EN81-20 Clause 5.4.10.
- (g) The lift car emergency lighting must provide electrical lighting ensuring a light intensity of at least 100 lux on the control devices and at 1 m above the floor at any point not less than 100 mm from any wall. The lift car emergency lighting must remain operative for a minimum of 2 hours after the mains supply is lost.
- (h) Car door and car front, finished stainless steel.
- (i) Floor covering vinyl tiles - Polyflor “Atlantic Slate” 7154 305mm X 610mm or Kardeen Art Select Canberra LM06.
- (j) Car and landing buttons must be commercially available “third party supplier” items (e.g. Dewhurst) fully AS1735.12 compliant with White/Blue Illumination. Generic lift company manufactured items will not be accepted regardless of purported quality.
- (k) Car and landing indication must be commercially available “third party supplier” items (e.g. DesignCom etc) fully AS1735.12 compliant with White/Blue floor illumination. Generic lift company manufactured items will not be accepted regardless of purported quality.
- (l) Landing door frames to be supplied and installed to the full depth of wall structure.
- (m) Landing door closers are to be weighted type. The weight/guide is not to be attached to a door panel but rather to the door frame or shaft wall.
- (n) Hall lanterns, indicators and call buttons are to be installed on the front wall of the lift lobby and in line with the structure to ensure high visibility from every point of the lift lobby. Face plates are to be finished stainless steel of at least 2mm thick, secured with vandal resistant screws.
- (o) All passenger lifts are to have features as required for their particular application.
- (p) The car platform shall be floored with not less than 3 mm thick steel welded to a structural steel frame and provided with steel supporting bearers beneath. Alternatively, the platform shall be of approved well-seasoned timber or waterproof marine ply, adequately supported and fitted in a structural steel frame. The underside completely covered with 0.9 mm thick galvanized sheet iron. The upper side of the platform shall be level and made suitable for the fixing of the floor covering.
- (q) Indicative drawings of car interiors are attached at Section 4.

3.4 Goods Lifts and Passenger Goods Lifts – Lift car finishes

- (a) Goods lifts shall have similar appearance to passenger lifts.
- (b) These lifts are expected to carry potentially very heavy loads. They must be able to carry the rated lift carload as one (1) single item.
- (c) As a minimum goods lifts/passenger goods lifts must comply with EN81-20 Clause 5.4.2.2 Goods passenger lifts, particularly Clause 5.4.2.2.1 Point 5) Signage on landings. The landing signage is also to be replicated (permanently engraved onto an aluminium or stainless-steel plate) on the rear wall of the lift car.
- (d) Goods lifts are to have appropriate finishes for the intended use, as a minimum they must be highly durable, impact resistant and easily cleaned.
- (e) All goods lifts are to be sized and have features as required for their particular application including Hazardous Goods Operation.
- (f) Specialist goods lifts for chemicals, animals, biologicals etc may require special finishes that must be co-ordinated with the Project Manager and End User.
- (g) Two bump rails (refer to Part 4 Drawings) shall be installed on both sides and rear wall of the lift car and shall be stainless steel flat plate approximately 150 mm wide x 6 mm thick securely mounted to the lift car wall.
- (h) See Part 4 Drawings for details and possible omission of the lift car mirrors.
- (i) Fixed “white” coloured ventilated lift car ceiling with access panel (to the roof trap door) secured with shot bolts (or similar) on the top side of the ceiling to prevent the panel being opened from within the lift car.
- (j) 38mm dia. continuous s/steel handrail securely attached to side and rear wall, refer drawing.
- (k) Provide lift car LED down lights in at least all four corners. Lift car lighting levels must comply with EN81-20 Clause 5.4.10.
- (l) The lift car emergency lighting must provide electrical lighting ensuring a light intensity of at least 100 lux on the control devices and at 1 m above the floor at any point not less than 100 mm from any wall. The lift car emergency lighting must remain operative for a minimum of 2 hours after the mains supply is lost.
- (m) Car door and car front, finished stainless steel.
- (n) Floor covering of aluminium chequer plate. Approval from UNSW FM required for installation of Polyflor vinyl tiles – Atlantic Slate 7154 (305mm x 610mm) or Kardeen Art Select Canberra LM06.
- (o) The car platform shall be floored with not less than 6 mm thick steel welded to a structural steel frame and provided with steel supporting bearers beneath. Alternatively, the platform shall be of approved well-seasoned timber or waterproof marine ply, adequately supported and fitted in a structural steel frame. The underside completely covered with 0.9 mm thick galvanized sheet iron. The upper side of the platform shall be level and made suitable for the fixing of the floor covering.
- (p) Car and landing buttons must be commercially available “third party supplier” items (e.g. Dewhurst) fully AS1735.12 compliant with White/Blue Illumination. Generic lift company manufactured items will not be accepted regardless of quality.
- (q) Car and landing indication must be commercially available “third party supplier” items (e.g. DesignCom etc) fully AS1735.12 compliant with White/Blue floor illumination. Generic lift company manufactured items will not be accepted regardless of quality.
- (r) Landing door frames to be supplied and installed to the full depth of wall structure.
- (s) Landing doors, car doors and power door operators must be heavy duty, design to be durable. Standard passenger lift items are not acceptable.
- (t) Landing door closers are to be weighted type. The weight/guide is not to be attached to a door panel but rather to the door frame or shaft wall.
- (u) Landing door and car sill are to be solid (not hollow) steel or stainless steel.

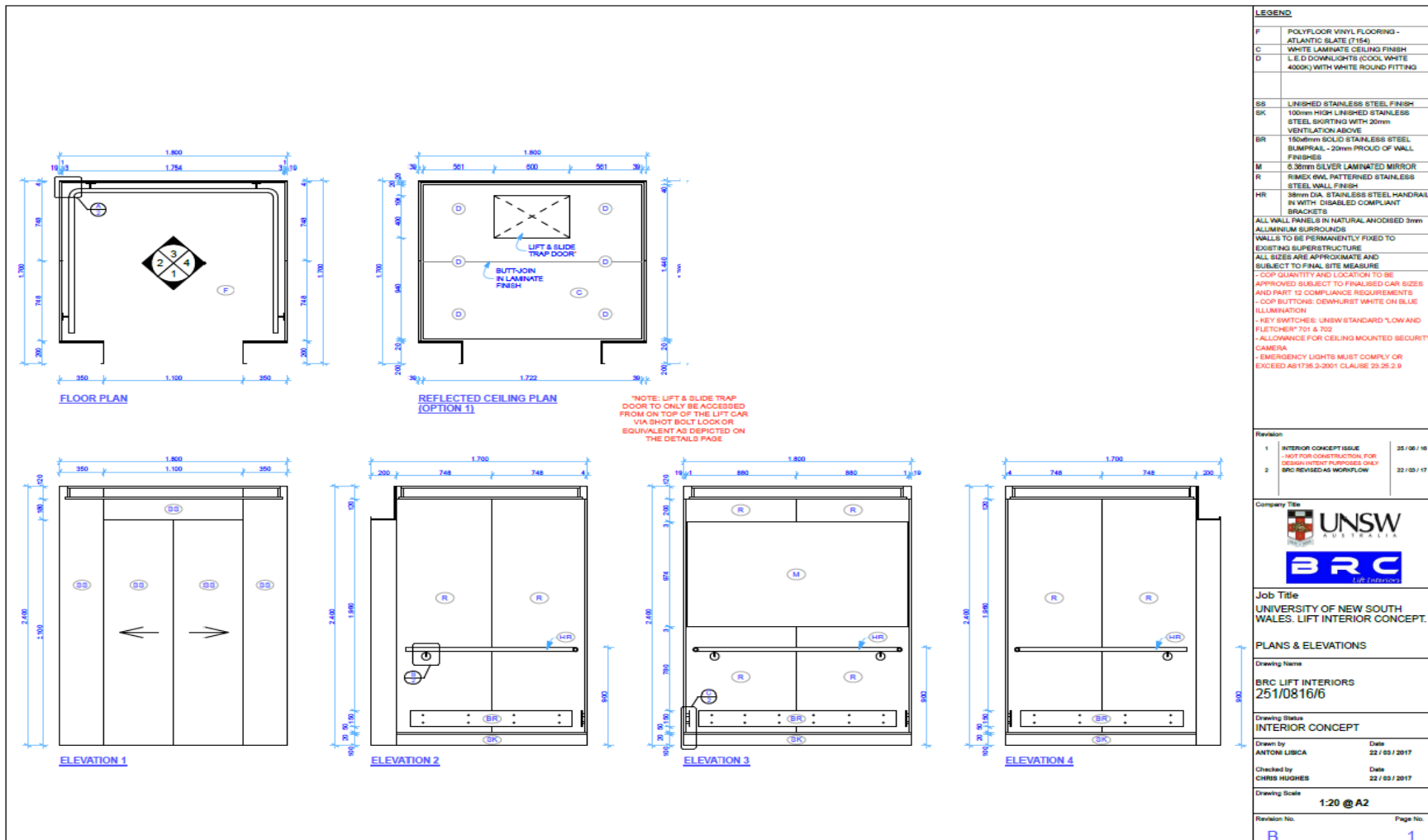
- (v) Lift car ventilation must be at least equivalent to EN81.20 Clause 5.4.9 however the effective areas of ventilation apertures are to be at least 5% instead of just 1% with vents of equal proportions at a lower level near the lift car floor and at a high level near the ceiling.
- (w) Typical drawings of car interiors are attached at PART 4.

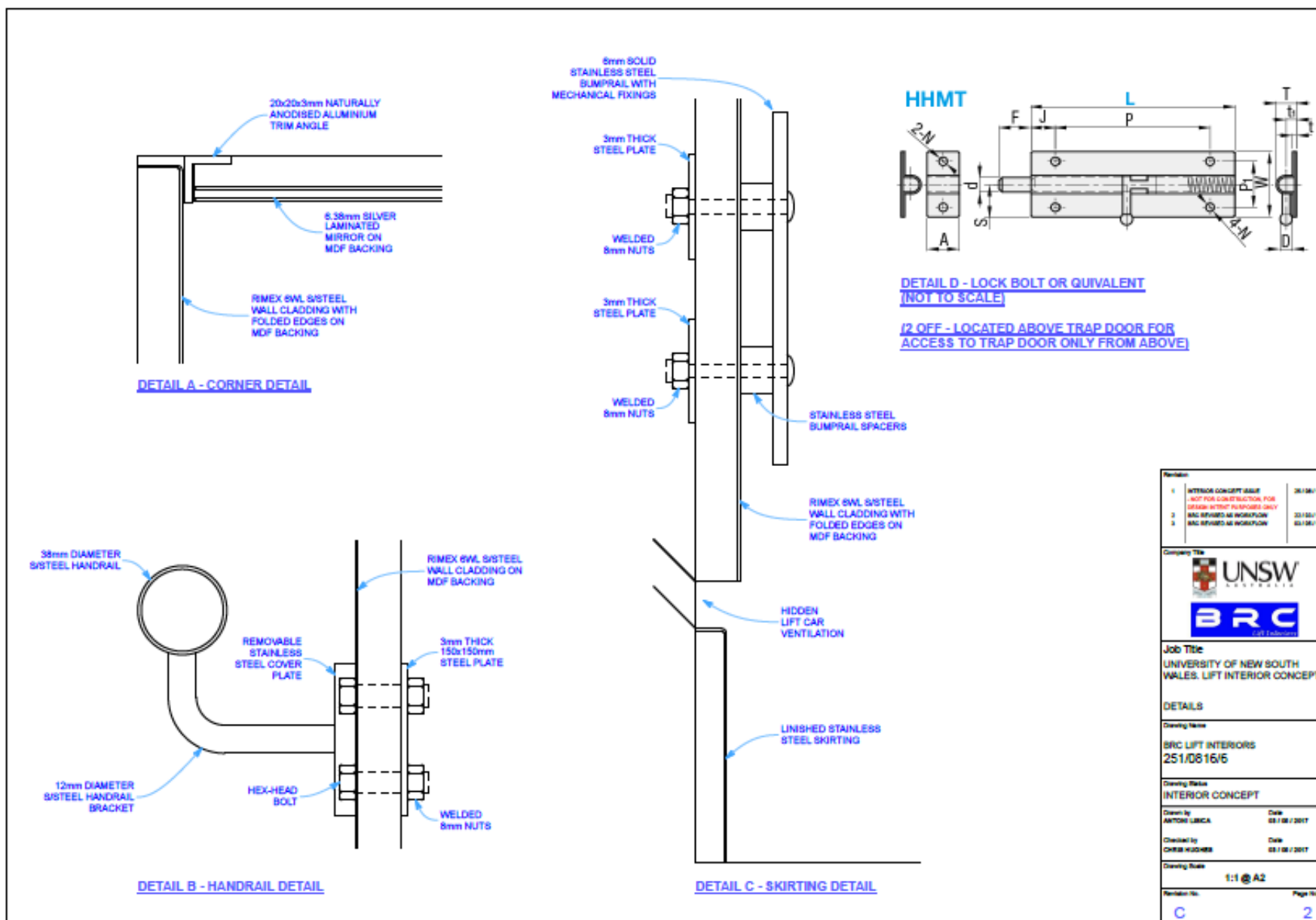
3.5 Keyed Operation

- (a) Fire service keying is to be: **“Low & Fletcher - Type 701.”**
- (b) All other maintenance and service functions (i.e. fan, light, maintenance cabinet, etc) are to be keyed to be: **“Low & Fletcher – Type 702”**.
- (c) Lift machine room doors and MRL controller cabinets are to be keyed to quick-change Bi-Lock type, with the plugs cut to the **UNSW Lift Bi-Lock cut**.
- (d) Hazardous Goods feature keying to be quick change Bi-Lock type, with the plugs cut to the **UNSW HGO Lift Bi-Lock cut**.

4. Part 4 – Drawings and Signage

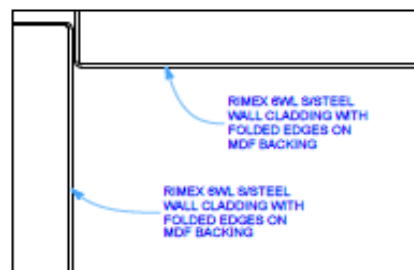
4.1 Passenger Lift - Interiors



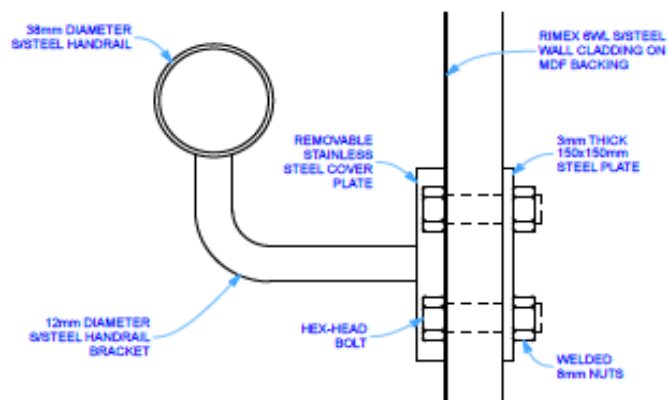


4.2 Goods Lift - Interiors

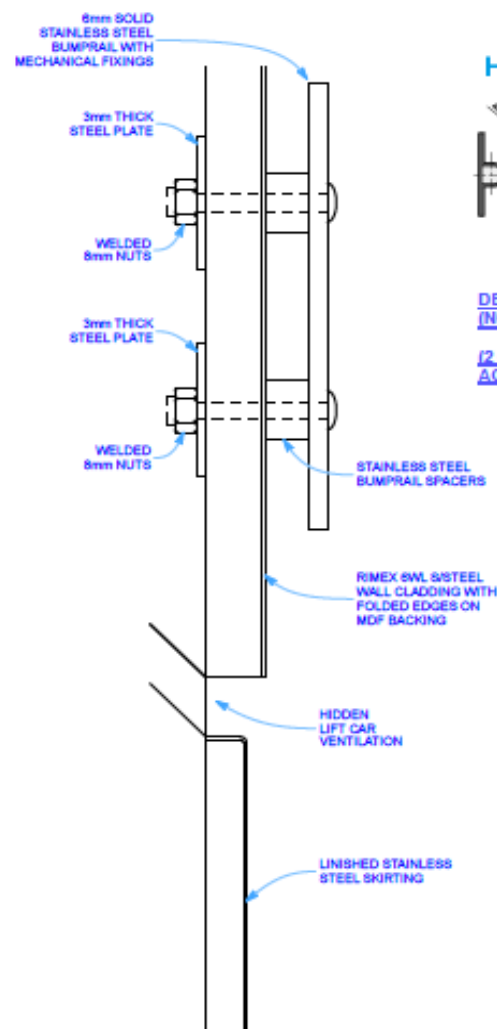




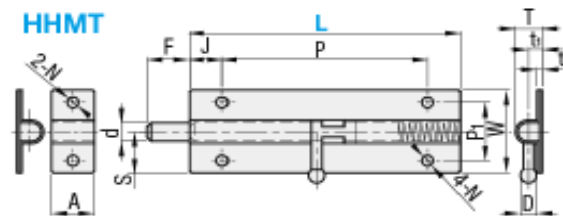
DETAIL A - CORNER DETAIL



DETAIL B - HANDRAIL DETAIL



DETAIL C - SKIRTING DETAIL



DETAIL D - LOCK BOLT OR EQUIVALENT
(NOT TO SCALE)

(2 OFF - LOCATED ABOVE TRAP DOOR FOR
ACCESS TO TRAP DOOR ONLY FROM ABOVE)

Revision	INTERIOR CONCEPT ISSUE - NOT FOR CONSTRUCTION, FOR DESIGN INTENT PURPOSES ONLY	22/06/17
Company Logo	 	
Job Title	UNIVERSITY OF NEW SOUTH WALES, GOODS LIFT INTERIOR CONCEPT	
Details		
Drawing Name	BRC LIFT INTERIORS 221/0517/7	
Drawing Status	INTERIOR CONCEPT	
Drawn by	ANTHONY LIMCA	Date 22/06/2017
Checked by	CHRIS HUGHES	Date 22/06/2017
Drawing Scale	1:1 @ A2	
Revision No.	A	Page No. 2

4.3 Controller door signage

4.3.1 Signage specifications

- (a) Premium grade self-adhesive vinyl
- (b) Size – H90mm x W125mm
- (c) Installation – stick on adhesive
- (d) Location of signage – lift controller door – middle 60cm from top of controller door

4.3.2 Typical signage



4.4 Landing Asset Signage

4.4.1 Sign Specifications

- (a) Sign Panel – 1.6mm black anodised aluminium panels
- (b) Graphics – Laser engraved text
- (c) Graphics – Laser engraved text
- (d) Size – H80mm x W60mm x D1.6mm
- (e) Installation – Supply only with double sided tape to rear
- (f) Location of signage – must be fixed to the top right-side inside landing door frame at each level.

4.4.2 Typical signage



5. Part 5 – LIFT DESIGN STANDARD CHECK LIST

#	Requirement	Yes	No**	N/A	Person Responsible	Comments**
5.1 Part 1 – Vertical Transport overall requirements						
1	Have the prequalification requirements at 1.3.2 been met?					
2	Has the lift design minimum requirements at 1.3.3 been met?					
3	Does the Goods Lift meet the requirements of 1.3.4?					
4	Can the Goods Lift carry the lift car rated load?					
5	Does the lift proposal comply with Independent and Supported maintainability requirements of 1.3.6 to 1.3.8?					
6	Is the proposed plant design registered with SafeWork NSW?					
7	Has the Integration of maintenance at 1.3.9 and reporting and inspection at 1.3.10 and 1.3.11 requirements been met?					
8	Construction Inspections requirements at 1.3.12 have been allowed for?					
5.2 Part 2 – Compliance, type and performance requirements						
9	Have the standards and minimum lift services been met? (2.1, 2.1.2 and 2.1.3)					
10	Does the proposed lift design meet the minimum requirements for persons with disabilities 2.1.3?					
11	Have the performance requirements of 2.2 been met? <i>Please provide details.</i>					
12	Does the Goods Lift meet the performance criteria of 2.2.4?					
13	Have the requirements of lift drive and escalator at 2.3 been met?					
14	Has lift monitoring BMS 2.4.1 and local monitoring 2.4.2 been included?					
15	Is there provision for CCTV 2.4.3 and access control 2.4.4 included?					
16	Has Hazardous Goods Operation described at 2.5 been included?					
17	Does the lift proposal meet all the requirements of the UNSW Hazardous Goods Operation requirement detailed in section 2.5?					

5.3 Part 3 – Specification requirements						
18	Are the lift shaft requirements at 3.1 met?					
19	Does the lift proposal comply with lift car requirements of 3.2?					
20	Has the Passenger lift car finishes requirement at 3.3 been achieved?					
21	Has the Goods/Passenger lift car finishes requirement at 3.4 been achieved?					
22	Does the lift proposal comply with the keyed operation requirements of 3.5?					
5.4 Part 4 – Drawings and Signage						
23	The typical Passenger Lift Interior drawings have been viewed and is included?					
24	The typical Goods Lift Interior drawings have been viewed and is included?					
25	The Controller door signage has been viewed and included?					
26	The Landing Asset Tag signage has been viewed and included?					
27	An allowance has been made to install signage as required in Part 4, Drawings and Signage Part 4, Item 4.3 Controller door signage and item 4.4 Landing Asset Tag signage.					
28	An allowance has been made to fix the plant registration number to the lift motor as per Part 3, Item 3.1, 3.1.1 (n)?					

**** If any of the responses are no – comments must be provided about the deviation**