

## **Façade Access Equipment (excluding BMU) Performance Specification – North Tower**

**Martin Place Metro**

**Macquarie Bank**

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**Prepared for**

Lend Lease

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## 1. Technical Performance Specification

### 1.1 Performance Schedule and Specifications

This Specification is a Performance Specification. The Drawings and this Specification indicate the design intent and establish the required geometry of the visible components, and the minimum acceptable standard to which the facade access installations must be designed, tested, fabricated and installed. As performance-based documents, the Drawings and Specification do not provide full details of the proposed systems. It is the responsibility of the Sub-Contractor to inform itself of the full extent and detailing of the Works and make all necessary monetary and time allowances.

The Specification is divided into sections for convenience. All parts of the Specification are mandatory, including the Appendices.

This document is to be read in conjunction with the relevant project documentation. Refer to Section 2.3 of this Specification for a list of project specific documents. As a minimum refer also to the following:

- Trade specific scope of works and other relevant documents by Lend Lease and the project consultants.
- Architectural drawing package
- Architectural facade systems descriptions and materials finishes schedule
- Lend Lease requirements including the GMR's, CIDD's, Alerts and ROADS
- Façade Access Strategy Report
- Façade Performance Specification

Notwithstanding any checks and/or reviews by the consultants, the Sub-Contractor is fully responsible for the design, engineering, procurement, testing, fabrication, installation, commissioning and certification of the facade access systems, including all interfacing with the structure and other trades' work.

The main contract will take precedence if conflicts or ambiguity occur between this document, the documents listed above and main contract.

### 1.2 Compliance to Human Rights Requirements

The suppliers and factories are to comply with Lendlease requirements including compliance to the 'International Labour Organisations Fundamental Convention' and the 'United Nations Global Compact Principles'.

Human Rights violations (such as Child Labour) is not acceptable for any part of the procurement of these works.

Refer to Lendlease 'Supplier Interview Checklist' for requirements and information required to confirm compliance.

### 1.3 Description of the Project

The Project includes design and construction of the new Sydney Metro Martin Place Integrated Station Development, integrated with concourse, retail and Martin Place. The two OSD sites, (north 40 storeys and south 29 storeys) are planned for commercial office use which are to be integrated with the ground plane and below ground station to create a single precinct experience.

#### Project Vision

Macquarie's vision is aligned with the State's objective to create a transportation precinct that offers mixed use space with inter modal travel that seamlessly integrates into the civic centre of Sydney.

The vision will provide the framework for a global leading design for all facets of the built form, one in which high volume transportation systems sit alongside a convergent urban form incorporating commercial office space, modern retail outlets and urban defining civic space. This will reinforce Sydney's credentials as a global city in the 21st century.

A development of this scale, building on a major new transport initiative, comes about only once in a generation. As an integral part of the Martin Place Station precinct, the consolidated Macquarie proposal for the precinct provides a unique opportunity to restructure and revitalise a city block into the vital fabric of Sydney. It is a unique opportunity to create a world class, sustainable, integrated commercial office and retail experience built around the rich heritage of Martin Place and more specifically 50 Martin Place.



Figure 1 - Image of the Macquarie Proposed development issued in Stage 1 of the USP

The three key components of the precinct include:

#### North Tower

- Site bound by 50 Martin Place, Castlereagh Street, Elizabeth Street and Hunter Street and incorporate Macquarie owned 50 Martin Place within an integrated precinct
- Property Council of Australia (PCA) 'Premium Grade' commercial tower (refer project brief)
- The tower has a curved form with no set-backs to Elizabeth Street, Castlereagh Street and Hunter Street incorporating approx. 65,000sqm NLA (includes retail)
- The building is a ~40 storey side core reinforced concrete structure with a lift core on Castlereagh Street.
- Targeting 6 Star Green Star Office Design and As Built 2015 V1.1
- Targeting NABERS Energy: 5.5 Star, NABERS Water 3.5 Star:
- Macquarie as anchor tenant for the precinct will consolidate an estimated 8,000+ Sydney staff in a globally significant campus

#### South Tower

- Situated on the southern side of Martin Place between Castlereagh Street and Elizabeth Street. Site area: ~1,900sqm
- PCA 'Premium' grade commercial tower with 'Premium Grade' services (refer project brief)
- The building is ~29 storey rear core reinforced concrete structure comprising a podium and tower
- The typical podium level floors will offer a ~1,400sqm NLA and the typical tower floors ~1,200sqm NLA. The building is targeted to achieve 35,000sqm of NLA (includes retail)

- Targeting 6 Star Green Star Office Design and As Built 2015 V1.1
- Targeting NABERS Energy: 5.5 Star, NABERS Water: 3.5 Star.

### **Metro Station and Concourse**

A new metro station with 30,000+ passengers at AM peak hour (2026), and station access at Martin Place and Hunter Street (below the South Tower and North Tower respectively), interconnected by public concourses, civic spaces and pedestrian link(s).

The south station entry comprises of a two- level station hall, providing escalator and lift access to the platforms, ticket lines and station amenities. The south shaft incorporates a link to the existing Eastern Suburbs train station (at paid and unpaid locations); a potential future link to the MLC Centre (subject to further stakeholder engagement); retail tenancies and facilities, plant rooms (for Metro and OSD operations) and station offices.

The north station entry comprises of a single-level station hall, providing escalator and lift access to the platforms, ticket lines, station platform rooms, station amenities and an atrium connecting the platform level to the entrance level.

The north shaft incorporates station plant rooms (for Metro and OSD operations), retail tenancies and facilities, and station offices.

A pedestrian tunnel links the north and south station hall at level B3 (unpaid concourse level)

Targeting 6 Star Green Star Design & As Built (Sydney Metro Tool)



## 1.4 Extent of works

In general, the facade access systems are to comply with:

- The Occupational Health and Safety Act
- WorkCover NSW requirements
- AS 1418.13: Building Maintenance Units
- AS 2550.13: Cranes Safe Use, Building Maintenance Units
- Lend Lease requirements including the GMR's, CIDD's, Alerts and ROADS

Refer to the following descriptions of each system:

Note: Access systems equipment such as EWP, IRA equipment, Scaffolds etc. will be provided by the Building Manager (and/or Cleaning/Maintenance Contractor) on an as needs basis. This Specification is intended to identify permanent fixed equipment requirements as a scope of works for Lend Lease sub-contractors.

Type/Location	General Description of Access System	Materials minimum requirements (summary refer to section 4 for more information)
Level Roof BMU (Zone N1)	<ul style="list-style-type: none"> <li>○ Refer to separate BMU Specification</li> </ul>	
Level 28 BMU (Zone N2)	<ul style="list-style-type: none"> <li>○ Refer to separate BMU Specification</li> </ul>	
Roof access (to top of dome) (Top of Zone N1)	<p>Subject to finalisation of the BMU system and BMU door system, noting there may be a 'blind spot' beneath the BMU jib that the BMU cradle cannot access.</p> <ul style="list-style-type: none"> <li>○ Allow for IRA access through the top of the dome including rope anchors within the top of the dome, doors/hatches, and rope guides as required.</li> </ul>	<p><b>Steel frame members:</b></p> <ul style="list-style-type: none"> <li>○ Typically grades 300plus as per AS 4100 or other suitable grades as per AS4100</li> <li>○ Finish – per Section 4 of this Specification</li> </ul> <p><b>Extruded aluminium frame members:</b></p> <ul style="list-style-type: none"> <li>○ Typically grades 6063-T5 or T6 or other suitable grades as per AS1664</li> <li>○ Finish – to AAMA 2604</li> </ul> <p><b>Fixings:</b></p> <ul style="list-style-type: none"> <li>○ External and visible fixings to be grade 316 stainless steel, all others to be grade 304 stainless steel</li> </ul>

Type/Location	General Description of Access System	Materials minimum requirements (summary refer to section 4 for more information)
Level 10 Terraces Façade (office) (Zone N3)	<ul style="list-style-type: none"> <li>Provide monorail within the soffits at the north and south terrace. IRA access from monorail.</li> </ul>	<p><b>Steel frame members:</b></p> <ul style="list-style-type: none"> <li>Typically grades 300plus as per AS 4100 or other suitable grades as per AS4100</li> <li>Finish – per Section 4 of this Specification</li> </ul> <p><b>Extruded aluminium frame members:</b></p> <ul style="list-style-type: none"> <li>Typically grades 6063-T5 or T6 or other suitable grades as per AS1664</li> <li>Finish – to AAMA 2604</li> </ul> <p><b>Fixings:</b></p> <ul style="list-style-type: none"> <li>External and visible fixings to be grade 316 stainless steel, all others to be grade 304 stainless steel</li> </ul>
Ground floor facades (Zone N4)	<ul style="list-style-type: none"> <li>Provide monorail within the soffits for IRA access from monorail. Provide loop box within column or wall cladding finishes zones for access to monorail.</li> <li>Access awnings from ladders, install ladder hooks</li> </ul>	<p><b>Steel frame members:</b></p> <ul style="list-style-type: none"> <li>Typically grades 300plus as per AS 4100 or other suitable grades as per AS4100</li> <li>Finish – per Section 4 of this Specification</li> </ul> <p><b>Extruded aluminium frame members:</b></p> <ul style="list-style-type: none"> <li>Typically grades 6063-T5 or T6 or other suitable grades as per AS1664</li> <li>Finish – to AAMA 2604</li> </ul> <p><b>Fixings:</b></p> <ul style="list-style-type: none"> <li>External and visible fixings to be grade 316 stainless steel, all others to be grade 304 stainless steel</li> </ul>

Type/Location	General Description of Access System	Materials minimum requirements (summary refer to section 4 for more information)
Awnings and canopies (Zone N5)	<p>Restraint system to include tethering to safety lines, ladders and ladder hooks and through walkways on the awning.</p> <ul style="list-style-type: none"> <li>○ Provide monorail within the soffits for IRA access from monorail. Provide loop box within column or wall cladding finishes zones for access to monorail.</li> <li>○ Access awnings from ladders, install ladder hooks</li> </ul>	<p><b>Steel frame members:</b></p> <ul style="list-style-type: none"> <li>○ Typically grades 300plus as per AS 4100 or other suitable grades as per AS4100</li> <li>○ Finish – per Section 4 of this Specification</li> </ul> <p><b>Extruded aluminium frame members:</b></p> <ul style="list-style-type: none"> <li>○ Typically grades 6063-T5 or T6 or other suitable grades as per AS1664</li> <li>○ Finish – to AAMA 2605</li> </ul> <p><b>Fixings:</b></p> <ul style="list-style-type: none"> <li>○ External and visible fixings to be grade 316 stainless steel, all others to be grade 304 stainless steel</li> </ul>
Internal face of Southern high rise atrium (Zone N6)	<p>Provide restraint system to allow traversing of IRA professionals and including access to glazing and soffits in the case of cleaning and glass replacement</p> <p>Restraint system to include tethering to soffits through monorail system and through rope restraint to façade mullions, allow to support and walk on the steel structure.</p> <p>Access through or over balustrade required at each level at agreed locations for access to the steel beam levels.</p>	<p><b>Steel frame members:</b></p> <ul style="list-style-type: none"> <li>○ Typically grades 300plus as per AS 4100 or other suitable grades as per AS4100</li> <li>○ Finish – per Section 4 of this Specification</li> </ul> <p><b>Extruded aluminium frame members:</b></p> <ul style="list-style-type: none"> <li>○ Typically grades 6063-T5 or T6 or other suitable grades as per AS1664</li> <li>○ Finish – to AAMA 2604</li> </ul> <p><b>Fixings:</b></p> <ul style="list-style-type: none"> <li>○ External and visible fixings to be grade 316 stainless steel, all others to be grade 304 stainless steel</li> </ul>

Type/Location	General Description of Access System	Materials minimum requirements (summary refer to section 4 for more information)
Central Atriums to low rise and mid rise office (Zone N6)	<p>Provide restraint system to allow traversing of IRA professionals and including access to glazing and soffits in the case of cleaning and glass replacement (for balustrades)</p> <p>Restraint system to include tethering to soffits through monorail system.</p> <p>Access through or over balustrade required at each level at agreed locations for access to the monorail system</p>	<p><b>Steel frame members:</b></p> <ul style="list-style-type: none"> <li>Typically grades 300plus as per AS 4100 or other suitable grades as per AS4100</li> <li>Finish – per Section 4 of this Specification</li> </ul> <p><b>Extruded aluminium frame members:</b></p> <ul style="list-style-type: none"> <li>Typically grades 6063-T5 or T6 or other suitable grades as per AS1664</li> <li>Finish – to AAMA 2604</li> </ul> <p><b>Fixings:</b></p> <ul style="list-style-type: none"> <li>External and visible fixings to be grade 316 stainless steel, all others to be grade 304 stainless steel</li> </ul>
Link bridges and light well (Zone N7)	<p>Provide restraint system to allow traversing of IRA professionals and including access to glazing, roof, side walls in the case of cleaning and glass replacement</p> <p>Restraint system to include tethering to bridges through monorail system.</p> <p>Access doors to the top of the bridge roof required at level 11 and level 6 at agreed locations for access to the monorail system</p>	<p><b>Steel frame members:</b></p> <ul style="list-style-type: none"> <li>Typically grades 300plus as per AS 4100 or other suitable grades as per AS4100</li> <li>Finish – per Section 4 of this Specification</li> </ul> <p><b>Extruded aluminium frame members:</b></p> <ul style="list-style-type: none"> <li>Typically grades 6063-T5 or T6 or other suitable grades as per AS1664</li> <li>Finish – to AAMA 2604</li> </ul> <p><b>Fixings:</b></p> <ul style="list-style-type: none"> <li>External and visible fixings to be grade 316 stainless steel, all others to be grade 304 stainless steel</li> </ul>

Type/Location	General Description of Access System	Materials minimum requirements (summary refer to section 4 for more information)
Lift Shafts (internal face of glazing) (Zone N9)	Access from top of lift cars for cleaning to most areas. Allow monorails for IRA access to voids spaces not accessible from the top of the lift cars.	<b>Steel frame members:</b> <ul style="list-style-type: none"> <li>Typically grades 300plus as per AS 4100 or other suitable grades as per AS4100</li> <li>Finish – per Section 4 of this Specification</li> </ul> <b>Extruded aluminium frame members:</b> <ul style="list-style-type: none"> <li>Typically grades 6063-T5 or T6 or other suitable grades as per AS1664</li> <li>Finish – to AAMA 2604</li> </ul> <b>Fixings:</b> <ul style="list-style-type: none"> <li>External and visible fixings to be grade 316 stainless steel, all others to be grade 304 stainless steel</li> </ul>
<b>Note</b>	50 Martin Place façade access is to be as per existing methods, refer to 50 Martin lace building managers for details (including the 50MP north wall).	

#### 1.4.1 General Scope of Work

The general scope of work for the façade access systems includes the following:

- Providing access to all areas of façade for both light and heavy maintenance (such as cleaning and seals replacement, glass replacement and cladding replacement)
- Refer to the Architectural drawings and design intent details for the extent and components of each facade type.
- Coordination with all façade detailing
- Submissions of samples, mock-ups and the like for this project as per the relevant sections of this Specification.
- Provision 'Building Information Models' (BIM) as per agreed scope with Lend Lease.
- Servicing and spare parts as required by the client. Requirement for a full maintenance warranty is set up with 24 hour call out access and spare parts as required.
- Safety in Design assessment and reporting
- Testing, commissioning and certification of all access systems and methods.
- Maintenance Manuals
- Training as required

#### 1.4.2 Secondary Steelwork

Include for all required secondary steelwork, including all sub-framing, stiffening and brackets (including cast in elements) necessary for the erection of façade access systems.

It is the sub-contractors responsibility to design, supply and install all necessary secondary steelwork to support the façade access systems. The proposed designs are to be approved by the design team.

### 1.4.3 **Interfaces**

Co-ordinate the design and installation with:

Building Structure	<i>Co-ordinate with structural tolerances for reinforced concrete structural elements, and structural steel.  Coordinate reaction loads to structure</i>
Façade Contractors	<i>Interfaces with all adjoining façade and claddings designed and installed by other façade Contractors.</i>
Mechanical Services	<i>Interface with services ductwork , plant room layouts and enclosures, louvers, etc.</i>
Water supply and outlet locations	<i>Coordinate with hydraulic engineers and designers for requirements</i>
ESD	<i>Co-ordinate materials with ESD requirements</i>
Internal Fitout	<i>Interface with ceiling, sill, internal linings, partitions and floor finishes (as required).</i>
Electrical Services	<i>Coordinate electrical requirements including:</i> <ul style="list-style-type: none"> <li>○ Power supply</li> <li>○ Communications</li> <li>○ Earthing and lightning protection</li> <li>○ Emergency power requirements</li> <li>○ Temporary power requirements (such as back up power for emergency events)</li> </ul>
Waterproofing Membranes:	<i>Plinths and perimeter hobs including compatibility of sealants with membranes by others.</i>
Fire services	<i>Interface with wall drenchers include coordination with commissioning and testing of fire sprinklers and pipes.</i>

### 1.4.4 **Contractor's Responsibilities**

It is the Sub-Contractor's responsibility to provide labour, materials, equipment and related items and to design, engineer, test, fabricate, transport to site, install, and provide warranty for complete façade access systems in accordance with specified parameters, and with the design intent of the contract drawings and this performance Specification.

The Sub-Contractor's Works shall include but not necessarily be limited to the following:

- Submission to and compliance with all Authority Requirements.
- Supply of samples and mock-ups.
- Prototyping and testing of access systems.
- Preparation of detailed shop drawings and computations for production of the access systems.
- Submission of documents and samples in accordance with this Specification and construction programs.
- Design and operation of an agreed quality assurance program and the maintenance of all records.
- Preparation of as-built drawings.
- Preparation of Façade Maintenance Manual in accordance with this specification.
- Design for building maintenance in accordance with the requirements of the maintenance system and OH&S regulations.
- Provide training to all relevant users of the BMU and access equipment
- Provide certification as per this Specification.

1.4.5 **Design and Supply only Items**

The following items are to be designed, fabricated and finished by the Sub-Contractor and then supplied to main contractor for incorporation into the Works by others.

**Cast in fixing elements:**

The Sub-Contractor is responsible for co-ordinating any cast-in details with the structure, providing detailed set-out drawings (plans), and verifying the position of the fixings once the main contractor has placed them prior to the pouring of concrete.

These are to comply with SA TS101:2015.

1.4.6 **Warranties**

The warranty shall comply with the requirements of that noted in the Contract.

## 2. Standards, Codes and Referenced documents

Design, engineering, fabrication and installation of the façade access systems shall comply with the following Codes, Standards and Guidelines as a minimum:

### 2.1 General Notes

- All work and labour practices under this Works Contract shall be in strict accordance with all applicable building codes, regulations, by laws and laws, Lend Lease ROAD, CiDD, Alerts and GMR documentation.
- The Standards, Codes and Legislation referenced below and elsewhere in this Specification shall be the current editions.
- No substitutions to these Standards and Codes shall be permitted without the written acceptance of the Consultant. Refer to commentaries for all Standards and Codes where they exist for further information and clarification.
- It is the Sub-Contractor's responsibility to ensure that the Project Manager and its consultants are satisfied with the Codes adopted by the Sub-Contractor for the Works.
- Wherever there are conflicts between different Local Authority Regulations, Codes and/or Standards, the more stringent shall apply and the Sub-Contractor shall in such circumstances notify the client accordingly.

### 2.2 Local Legislation

Building Code of Australia

### 2.3 Project Specific Documentation

*Structural Design report – by Arup*

*Materials and finishes schedule – by JPW*

*Wind Tunnel Test report – by CPP*

*Façade Access Strategy Report – by Surface Design*

*Façade Performance Specification – by Surface Design*

*Lend Lease requirements set out in GMR, CiDD, ROADS and Scope of Work*

### 2.4 Relevant Standards

#### 2.4.1 General

Unless otherwise specified or is specifically supplied by the client, the applicable issue of a standard is the issue current at the date one week before the closing date for tenders, or where no issue is current at that date, the most recent issue.

The following abbreviations are used in this Specification:

AS	Australian Standard
AS/NZS	Australian/New Zealand Standard
BS	British Standard
BS/EN	British/European Standard
ASTM	American Society for Testing and Materials
AAMA	American Architectural Manufacturers Association

#### 2.4.2 Access systems

Workcover - Guidelines For Building Façade Access Systems (or equivalent)



Access from fixed or portable structures:

AS 1657 Fixed platforms, walkways, stairways and ladders - Design, construction and installation.

AS/NZS 4576 Guidelines for scaffolding.

AS/NZS 1892 Portable ladders.

Personnel Lifting Equipment

AS 2550.10 Cranes-safe use, Part 10: Evaluating work platforms.

Industrial Rope Access

AS/NZS 4488.1 Industrial rope access system, Part 1: Specifications.

AS/NZS 4488.2 Industrial rope access systems, Part 2: Selection, use and maintenance.

Industrial Rope Access Association IRAA - Industry Code on Industrial rope access technique - September 2000.

Fall Arrest System

AS/NZS 1891.1 Industrial fall-arrest systems and devices, Part 1: Safety belts and harnesses.

AS/NZS 1891.2 Industrial fall-arrest systems and devices, Part 2: Horizontal lifeline and rail systems.

AS/NZS 1891.3 Industrial fall-arrest systems and devices, Part 3 Fall-arrest devices.

AS/NZS 1891.4 Industrial fall-arrest systems and devices, Part 4: Selection, use and maintenance.

Safe Work Australia – Code of practice: Managing the risk of falls at workplace

Building Maintenance Units

AS 1418.13: Building Maintenance Units

AS 2550.13: Cranes Safe Use, Building Maintenance Units

#### 2.4.3 Design and structures

AS/NZS 1170.1	Structural Design Actions – Permanent, imposed and other actions
AS/NZS 1170.2	Structural design action – Wind actions
AS/NZS 1170.4	Earthquake loads and commentary
AS 3600 and Supplement	Concrete structures
AS 4100 and Supplement	Steel Structures
AS/NZS 4600 and Supplement	Cold-formed steel structures
AS 3700 and Supplement	Masonry structures
AS/NZS 1664 and Commentaries	Aluminium structures – Part 1: Limit State Design Part 2: Allowable Stress Design
AS/NZS 4673	Cold-formed stainless steel structures
AS 1288	Glass in buildings – Selection and installation
AS1428.1	Design for access and mobility – General requirements for access – new building work
AS1657	Fixed platforms, walkways, stairways and ladders – design construction and installation
BS EN 14024	Metal profiles with thermal barrier – Mechanical Performance – Requirements, proof and tests for assessment
SA TS101:2015	Design of post installed and cast-in fastenings for use in concrete

#### 2.4.4 Aluminium

##### Materials and products

AS/NZS 1734	Aluminium and aluminium alloys – flat sheet, coiled sheet and plate
AS/NZS 1865	Aluminium and aluminium alloys – Drawn wire, rod, bar and strip
AS/NZS 1866	Aluminium and aluminium alloys – extruded rod, bar, solid and hollow shapes
AS/NZS 1867	Aluminium and aluminium alloys – drawn tubes
AS 1874	Aluminium and aluminium alloys – Ingot and castings
AS 2848.1	Aluminium and aluminium alloys – Compositions and designations – Wrought Products

##### Surface coatings and finishes

AS 1231	Aluminium and aluminium alloys – Anodic oxidation coatings
AS 3715	Metal finishing- Thermoset powder coating for architectural application of aluminium and aluminium alloys
AAMA 2605	Superior Performing Organic Coatings on Aluminium Extrusions and Panels

##### Welding

AS/NZS 1665	Welding of aluminium structures
AS/NZS ISO 18273	Welding consumables – Wire electrodes, wires and rods for welding of aluminium and aluminium alloys – Classification

#### 2.4.5 Structural steels and components

##### Materials and products

AS 1163	Structural steel hollow sections
AS/NZS 3679.1	Structural steel – Hot-rolled bars and sections
AS/NZS 3679.2	Structural steel – Welded I sections
AS/NZS 3678	Structural steel – Hot-rolled plates, floorplates and slabs
AS/NZS 1594	Hot-rolled steel flat products
AS/NZS 1595	Cold-rolled, unalloyed, steel sheet and strip
AS 1397	Steel sheet and strip – Hot-dipped zinc-coated or aluminium/zinc coated
AS 2551	Steel sheet and strip – Cold rolled, electrolytic zinc coated

##### Welding

AS/NZS 1554.1	Structural steel welding – Welding of steel structures
AS/NZS 1554.2	Structural steel welding – Stud welding (steel studs to steel)
AS/NZS 1554.5	Structural steel welding – Welding of steel structures subject to high levels of fatigue loading
AS/NZS 1554.7	Structural steel welding – Welding of sheet steel structures
AS/NZS 4855	Welding consumables – Covered electrodes for manual metal arc welding of non-alloy and fine grain steels –

	Classification
AS 1858.1	Electrodes and fluxes for submerged arc welding – carbon steels and carbon-manganese steels
AS/NZS 1167.2	Welding and Brazing – Filler metals – Filler metal for welding
AS/NZS 2717.1	Welding – Electrodes – Gas metal arc – Ferritic steel electrodes
AS 4882	Shielding gases for welding
AS 1796	Certification of welders and welding supervisors
AS/NZS 2980	Qualification of welders for fusion welding of steels

#### Bolts and fasteners

AS 1110	ISO metric hexagon bolts and screws – Product grade A and B – Part 1 – Bolts; Part 2 – Screws
AS 1111	ISO metric hexagon bolts – Product grade C – Part 1 – Bolts; Part 2 – Screws
AS/NZS 1559	Hot-dip galvanized steel bolts with associated nuts and washers for tower construction
AS 1112	ISO metric hexagon nuts (4 parts)
AS 3566	Self-drilling screws for the building and construction industries (2 parts)

#### Corrosion protection and coatings

AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS 2312	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings
AS/NZS 3750	Paints for steel structures (several parts)
AS 1627	Metal finishing – Preparation and pre-treatment of surfaces (several parts)
AS 3894	Site testing of protective coatings (several parts)

### 2.4.6 Stainless steels and components

#### Materials and products

BS EN 10088-1	Stainless Steels. List of Stainless Steels
BS EN 10088-2	Stainless Steels. Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes
BS EN 10088-3	Stainless Steels. Technical delivery conditions for semi-finished products, bars, rods, wire, sections and bright products of corrosion resisting steels for general purposes
BS EN 10088-4 (05/30126202 DC)	Stainless Steels. Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for construction purposes
BS EN 10088-5 (05/30126205 DC)	Stainless Steels. Technical delivery conditions for bars, rods, wire, sections and bright products of corrosion resisting steels
BS EN ISO 3506	Mechanical properties of corrosion-resistance stainless steel fasteners. Part 1: Bolts, screws and studs; Part 2: Nuts; Part 3: Set screws and similar fasteners not under tensile stress; Part 4: Tapping screws

#### Welding of stainless steels

AS/NZS 1554.6	Structural steel welding – Welding stainless steels for structural purposes
AS/NZS ISO 14343	Welding consumables – Wire electrodes, wires and rods for arc welding of stainless and heat resisting steels – Classification
Passivation	
ASTM A380	Standard practice for cleaning, Descaling and passivation of stainless steel parts, equipment, and Systems
ASTM A967	Standard specification for chemical passivation treatments for stainless steel parts
ASTM B912	Standard specification for passivation of stainless steels using electropolishing

#### 2.4.7 Corrosion resistant castings

ASTM A518	Standard specification for corrosion-resistant high silicon iron castings
ASTM A743	Standard specification for castings, iron-chromium, iron-chromium-nickel, corrosion resistant, for general application
ASTM A744	Standard specification for castings, iron-chromium-nickel, corrosion resistant, for severe services
ASTM A890	Standard specification for castings, iron-chromium-nickel-molybdenum corrosion resistant, duplex (austenitic/ferritic) for general application
AS 2074	Cast steels
BS EN 10283	Corrosion resistant steel castings

## 2.5 Fire Protection

AS 1530	Methods for fire tests on building materials
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## 2.6 Lightning Protection

AS/NZS 1768 – 2007	Lightning Protection
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## 2.7 Quality Management

ISO 9000 – 2000	Quality management systems – fundamentals and vocabulary
ISO 9001 – 2000	Quality management systems – requirements

## 2.8 Building Maintenance

OHS Regulations	NSW Work Health and Safety Regulation 2011 NSW Work Health and Safety Act 2011
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### 3. Performance requirements

Design of the façade access systems are to be in accordance with the following performance parameters.

Item	Performance requirement	Performance requirement	Notes
1	<b>Design life</b>	All elements are to be designed for: 50 years for structural integrity (Framing, brackets and fixings). 20 years for systems, seals and finishes (life to first major maintenance)	
2	<b>Loads</b>		
	General requirements	Design to comply with AS1170	
	Dead Loads	Design to AS1170.1	
	Imposed loads (including fall arrest loads)	Design to AS1170.1 All horizontal and vertical facade projections are to be able to withstand impact loads without dislodgment. Expressed elements are to withstand maintenance point load of 1.1kN in any direction. Fall arrest fixings, and cladding elements in contact with rope access lines are to withstand fall arrest loads if required	
	Wind Loads	Design to AS1170.2  Per CPP wind engineers.	Contractor to nominate safety procedure and operating conditions for the BMU system
	Earthquake loads	Design to AS1170.4	Anticipated movements to be confirmed by structural engineer
3	<b>Thermal Movement</b>	System to accommodate: Ambient Temperature Range -10°C to 50°C Surface Temperature Range -10°C to 110°C	
4	<b>Light and Heat Transfer</b>	NA	
5	<b>Condensation</b>	NA	
6	<b>Fixing to Structure</b>	Design fixings to resist all loads both individually and in combination.	

Item	Performance requirement	Performance requirement	Notes
7	<b>Displacement Limits</b>	Serviceability deflection limits (unless stated otherwise): Aluminium Framing - Span/250 Aluminium Panels - Span/90 In-plane Member Deflections – Span/1000, or 2mm, whichever is less, unless agreed otherwise. Maximum Displacement (Framing) – 25mm at any point. For ultimate limit state loads no non-linear (permanent) distortion is acceptable.	
8	<b>Tolerances</b>		
	Building structure tolerances	<i>Indicative Tolerances:</i> Concrete slab edge (on plan) +/- 25mm Concrete slab Level - +/- 10mm Steel edge beam (on plan) +/- 10mm Steel edge beam Level +/- 10mm <i>Cast In Inserts:</i> +/- 10mm from slab edge +/- 3mm from concrete surface +/- 25mm off grid position	Existing slab and structure to be surveyed and measured on site before any work is commenced.  Refer to Arup for details.
	Fabrication tolerances	Framing members – cut to +/-1mm The contractor will be required to submit a detailed list of fabrication tolerances from all of their suppliers including the glass supplier/manufacturer.	
	Installation tolerances	Rails and fixing points +/- 3mm (in plan and height) relative to adjacent panel. The contractor will be required to submit a detailed list of installation tolerances from all of their installers.	
9	<b>Building structure movements and deflections</b>	Refer to Arup Building Movements and Tolerances Report	
10	<b>Fixings to Structure</b>	Design to resist all loads individually and in most severe load combinations. All fixings are to accommodate the worst combination of structure tolerances, as identified by the builder.	
	Cast-in Inserts	Use only proprietary inserts and design to manufacturer's published data. If non-proprietary inserts are to be used the contractor will be required to provide test data and/or complete adequate site testing on the cast-ins. Design and install in accordance with SA TS101:2015.	Attachment to base building structure to be assessed. Design, fabricate, install and test in accordance with AEFAC and ETAG requirements.

Item	Performance requirement	Performance requirement	Notes
	Masonry Anchors	Use only proprietary inserts and design to manufacturer's published data. Design and install in accordance with SA TS101:2015.	If non-proprietary fixings are to be used load testing is required.
11	<b>Air Infiltration</b>	NA	
12	<b>Weatherproofing</b>	All access system fixings to structure are to be sealed in order to prevent water penetration to the building. Garage doors to be designed and installed by façade contractor, BMU contractor to coordinate requirements.	
13	<b>Maintenance &amp; Replacement Capacity</b>	Identify maintenance requirements in terms of routine (e.g. cleaning) and component repair / replacement. Identify components which must be replaced during the life of the installed systems.	Maintenance and replacement strategy is to be provided by the specialist contractor in the Operations Manual. This is to include maintenance cycles for all elements.
	Glass replacement	Each glass panel is to be capable of replacement in isolation without damage to adjacent elements, and without removing adjacent unitised panels. External features such as sunshades, fins and / or cladding that may have to be removed for glass replacement must be specified.	
14	<b>Acoustic Performance</b>	Design of all façade access systems so as to minimise any risk of structural born noise.	
15	<b>Lightning Protection</b>	Electrical continuity is required between individual sections of facade, in accordance with AS/NZS 1768 and AS 1882. Provide test data to verify electrical continuity of the proposed system.	Refer to Electrical Engineering Consultant for specific requirements
16	<b>Structural Silicone</b>	NA	
17	<b>Regulations</b>	Comply with all Government and Statutory Authority Regulations.	
18	<b>Concealed Fixings</b>	NA	
19	<b>Fixing of beads, trims and features</b>	Ensure that each significant elements on access equipment (trim or feature) is attached to the structure by mechanical means to agreed method and centres.	

Item	Performance requirement	Performance requirement	Notes
20	<b>Isolation of Materials</b>	<p>Separate different metals with a non-conductive material to eliminate galvanic action.</p> <p>Separation is not required for series 300 stainless steel screws/bolts in aluminium members and zinc (galvanised) and painted aluminium.</p> <p>EPDM (or similar) gaskets.</p>	
21	<b>Fire / Smoke Separation</b>	NA	
22	<b>Exterior lighting</b>	The façade access system is to be coordinated with the exterior lighting requirements	
23	<b>Safety in Design</b>	<p>The Façade Access Systems are to be coordinated with any safety in design items required.</p> <p>This includes compliance to all relevant standards as listed in this Specification and the BCA.</p> <p>This includes:</p> <ul style="list-style-type: none"> <li>- restrain to the façade through stainless steel 316 grade lanyard pins compliant to the standards, load transfer to be tested, designed and certified by the façade contractor and the façade access system contractor</li> <li>- Landing surfaces for rescue or emergency situations to be designed and coordinated with the project design team.</li> <li>- Protection of all finishes during access to be allowed for by cleaning contractor</li> </ul>	



## 4. Minimum requirements

### 4.1 Materials: General

This section defines the minimum requirements for the project in terms of materials, submissions and workmanship. The Works shall either meet or exceed these requirements.

Where a specific product is nominated, use that product or an approved equivalent. Approval of an equivalent is subject to the discretion of The Head Contractor and the consultant team. Provide manufacturer's technical data to verify equivalence.

All materials used shall be new and fit for purpose for which they are to be used.

### 4.2 Design Quality

For all exposed and visible elements (including rails, brackets, hooks, eyelets etc) allow to:

- coordinate set out
- provide samples or prototype for all brackets , sections and fixings
- provide high quality architectural finish (that is stainless steel, anodised or powder coated aluminium, in selected colours approved by the architect)

Corners in all rails to curved radius, to be coordinated with the architect.

### 4.3 Materials: Expected Life

The Subcontractor shall supply documented information outlining the expected service life of all materials used in the Works. This information shall be obtained from product/material manufacturers. This information shall be submitted in accordance with the submission schedule, and be included in the Façade Maintenance Manual.

As a minimum, this information shall include:

1. The economic life of the product/material on the project (this is not a warranty),
2. Requisite maintenance procedures which must be followed in order to achieve the economic life of the product/material,
3. An assurance from the manufacturer that the product is suitable and fit for purpose
4. Relevant product data including names of supplier and manufacturer.

### 4.4 Aluminium

#### 4.4.1 General

If the Sub-Contractor chooses an alloy other than those listed below and not listed in a recognised code (BS8118 or AS1664), then a certificate of properties shall be obtained from the billet maker. The data shall include all mechanical properties required for design, including the yield in compression. This data shall be used in the relevant calculations.

#### 4.4.2 Extruded members

- Alloy 6063-T5 or T6 (typical extrusions) or similar.
- Alloy 6061-T6 (brackets).
- Minimum wall thickness 2.5mm for structural elements.
- Minimum wall thickness 1.2mm for non structural components, unless agreed otherwise.

#### 4.4.3 Aluminium Finishes:

Refer to Architectural Finishes Schedule for specific finish references. Typically, the following applies:

- Extrusions –in accordance with AAMA 2604
- Colour: Refer Architectural Finishes Schedule and design intent drawings for finishes and locations.
- Concealed elements – Powdercoated or anodised any colour.

#### 4.5 Structural Steel (general)

- Minimum requirement, Grade 250 mild steel.
- Finish being a compatible, durable paint finish to minimum 15 year warranty paint system.
- Paint colour to any exposed structural steelwork to match selected samples, to be approved by the Architect.
- All elements are to be pre-drilled, cut and welded prior to coating.

##### 4.5.1 Structural Steel – Paint Finish; External (open sections only)

- Surface preparation Sa 2<sup>1/2</sup> (AS/NZS 1627.9)
- 2-pack epoxy zinc primer (AS/NZS 3750.9) – DFT 75µm
- High build epoxy – high solid 2-pack epoxy (AS/NZS 3750.14) - DFT 200 µm
- High build modified 2-component polyurethane (AS/NZS 3750.6) – DTF 80 µm

##### 4.5.2 Structural Steel – Paint Finish; External (open and/or hollow sections)

- All external visible structural steel hollow sections to be hot dip galvanised and painted.
- Surface treatment suitable for high quality architectural paint coating for visible steelwork. Degrease, wash and dry, then sweep blast galvanised surface with a non-metallic abrasive to impart a suitable surface roughness before priming. Prepare surface in accordance with AS/NZS 4680.
- Where steel is to be painted, surface preparation is to be to abrasive blast class 2.5 to AS1627. Pressure wash and leave overnight to ensure no more than 70 mg/m<sup>2</sup> of chlorides.
- Where steel is to be visible, suitably prepare members to remove all surface defects and manufacturing markings, to the satisfaction of the architect.
- Painting system for steel to comply with AS/NZS 2312:1994, table 7.6 “*Painting systems for galvanised coatings – long term protection*”. Paint system must be capable of being re-coated in-situ to facilitate future maintenance and to allow touching up of construction damage.
- Paint colour: As per architectural finishes schedule (including metallic finishes if required). To match selected samples, to be approved by the Architect.

##### 4.5.3 Structural Steel – Paint Finish; Internal (including concealed steel stiffeners in frames)

- All internal visible steelwork to be coated with suitable metal primer and powder coat finished; colour to Architect’s requirements.
- Where steel is to be visible, suitably prepare members to remove all surface defects and manufacturing markings, to the satisfaction of the architect.
- Grind all welds and finish to a smooth even surface prior to painting.
- Prepare all steel surfaces in accordance with AS 2311 prior to painting.

#### 4.6 Secondary Cold Formed Structural Steel

- Minimum requirement, Grade 250 mild steel.
- Finish being a compatible, durable finish to minimum 10 year warranty system.
- Minimum coating to be equivalent to Z275

#### 4.7 Stainless steel

##### 4.7.1 General

- Stainless steel shall conform to the requirements published in the American Iron and Steel Institute Steel Products Manual and the following classifications:

- All stainless steel sections, sheets, strips and fasteners shall comply with BS1449 Part 2 and AISI 316.

#### 4.7.2 Stainless Steel elements

- Unless otherwise specified series 316L stainless steel shall be used. Prior approval required by Architect and Façade Consultant for use of alternate grades.
- If the stainless steel is contaminated during fabrication by iron and other non-ferrous metals, clean and ensure the surface has adequate passivity. Test the surface passivity to ensure all free iron has been removed.
- During all fabrication procedures, protect the stainless steel finish with a protective film.
- Comply with AWS for recommended practices for welding. Unless otherwise specified, welds to visible areas of stainless steel to be ground smooth to achieve a seamless surface. Heat tints shall be removed using fine abrasives, pickling paste, wire brushing or similar to achieve continuity with the specified finish. Areas difficult to access shall be manually finished if necessary.
- Do not allow the steel surface to be scratched during fabrication. Scratches which cannot be removed will be cause for rejection.
- See section 5.2.5 for more information

### 4.8 Fixings

#### 4.8.1 Cast-In Anchors

- To comply with SA TS 101:2015
- Façade fixings to new structure; use cast-in anchors equal to Halfen or approved fabricated cast-in plate.
- Cast-ins shall be minimum galvanised steel.
- Site welds to façade brackets shall be de-slugged and minimum 2 coat cold galvanised after welding.

#### 4.8.2 Fixings, Screws, Rivets and Washers

- Screws: stainless steel grade 304 or 316 where visible.
- Nuts, bolts & washers: stainless steel grade 304 or 316 where visible.
- Pop rivets (if required): aluminium grade 5052 or stainless steel (300 series) with aluminium or stainless steel mandrels.
- Masonry anchors (expanding or chemical): Stainless steel grade 316; Masonry anchors installed inboard of the airseal may be galvanised or plated steel. Only recognised brands such as Fischer, Hilti, Ramset and Powers may be used.
- Ensure all fixings are concealed. Exposed fixings are unacceptable unless approved in writing by the Architect. Acceptable exposed fixings shall be stainless steel grade 316 pig nose or recessed hex head and finished flush.
- All fixings shall be vibration proof under dead loads, live loads, wind loads and thermal movements.

### 4.9 Other Materials

#### 4.9.1 Isolation Materials

- Inert material, compatible with materials with which it is in contact
- Non-conductive
- Non-compressible
- Water resistant
- UV resistant

## 5. Fabrication and transportation

### 5.1 General

Fabricate and assemble the Works in strict accordance with approved Shop Drawings and with the requirements of this section.

Do not modify or adapt the agreed drawings and method statements without written approval.  
Record all changes on the master set of shop drawings.

### 5.2 Workmanship

#### 5.2.1 Assembly

- Undertake assembly of components under factory controlled conditions.
- Remove all swarf and burrs from edges of cut and drilled metal before assembly of components.
- Where metal components are fixed together, Ensure proper cleaning procedures are followed in the preparation of surfaces for sealing.
- Ensure all drain holes are clear of sealant and laitance and drain freely.
- Adequately reinforce and accurately cut, fit and seal all junctions to leave only sealed hairline joints.
- Form joints accurately without lipping or offsets in visible surfaces unless designed otherwise. Joints shall be rigidly secured to prevent all but designed movement, unless indicated otherwise.
- Use jigs and computer controlled fabrication tools wherever appropriate to achieve accuracy. Carry out grinding, cutting, shaping and finishing operations using tools and techniques which will prevent contamination or damage of adjacent components with particles or substances which could stain or corrode them.

#### 5.2.2 Aluminium Framing

- Machine-cut all aluminium extrusions
- Factory drill or punch all holes, slots, etc in aluminium extrusions

#### 5.2.3 Structural Steel

- Prepare all visible structural steel within facade package to receive a high quality architectural paint finish. Ensure all manufacturing marks and the like are ground back to a smooth finish where exposed to view.
- Ensure all structural steel is prefabricated complete with all holes, welds, vents and the like prior to finishing.

#### 5.2.4 Stainless Steel

- Ensure all fabrication in accordance with ASDA recommendation.
- Stainless steel sheet for external architectural application shall meet the requirements of type 316L (ASTM A167) or stainless steel grade with pitting resistance equivalent number (PRE = %Cr + 3.3 x % Mo + 16 x %N) of not less than 25. Ferritic stainless steel such as 445M2 grade is considered acceptable for external applications. Stainless steel sheets shall meet all the requirements of relevant current standards (ASTM or BS EN) and additional requirements given in this Specification.
- The external surface of stainless steel sheets shall be mechanically polished with non-directional finish to 2P as per EN 10088/2 with surface roughness of not more than 0.5 microns".
- Avoid cross contamination with ferrous metals
- Ensure all oils and chemicals used during the manufacturing process are adequately removed and cleaned prior to being installed in factory fabricated panels and arriving on site.

#### 5.2.5 **Vibration-proof fixings**

Ensure all fixings are vibration proof under dead loads, live loads, wind loads and thermal movements, either by use of locking nuts, washers or the application of an approved locking fluid.

#### 5.2.6 **Tolerances**

Achieve compliance with maximum allowable fabrication tolerances nominated in this specification.

#### 5.2.7 **Markings**

- Clearly mark fabricated assemblies to identify lifting points, panel types, assembly or installation sequence, location and orientation.
- Mark with removable material, which can be completely removed without affecting appearance of the marked area. Alternatively, mark in areas which will be concealed when the installation is complete.
- Include warning signage and safety tags as required

#### 5.2.8 **Protection**

- Store fabricated assemblies in a manner that will prevent overload, distress or permanent deformation of the overall assembly or individual components.
- Store and transport fabricated assemblies in a manner that will prevent ingress of moisture into the panel cavities.
- Protect the Works to prevent damage and staining during transportation, storage and erection until Final Completion under the Head Construction Contract is granted. Ensure temporary protective measures will not affect the appearance of the finishes when the protection is removed.
- The Sub-Contractor is to submit protective measures for approval prior to transportation and installation.
- Notify Client and discuss protective measures with the design team if open top containers are used to transport materials.
- Package fabricated assemblies so as to prevent finish damage, overload, distress or permanent deformation of overall assembly or individual components either during transportation or hoisting/lifting operations.
- All materials that are transported from overseas are to be inspected and approved at off-site location (in Sydney) prior to delivery to site.
- Acceptable standard of panel fabrication and transportation is to be agreed between all parties through testing and benchmark process.

#### 5.2.9 **Material Deliveries**

Check all materials provided by other suppliers for compliance with the project requirements. In particular, check for:

- Source, type, quality, grade, finishes and colour
- Correct accessories and fixings
- Correct sizes
- Correct quantities (to ensure shortages do not delay the works)
- Correct coating thickness
- Shelf life (i.e. that they are not out of date)
- Record all checks, confirming satisfactory supply or corrective actions.

## 6. Installation

### 6.1 General

Carry out installation in accordance with approved Shop Drawings by personnel experienced in the handling and site installation of the Works.

Do not cut, drill, modify or otherwise alter any work or the agreed details without obtaining written approval. All such alteration work shall be carried out in accordance with the requirements of the Contract Documents and agreed submissions. All changes must be recorded on master documents held by the Subcontractor for inclusion on the 'as-built' drawings.

Employ only competent and experienced installers to carry out the installation. Provide and maintain records to demonstrate their employees' experience and related training.

### 6.2 Fixings

- Install fixings in accordance with the manufacturer's recommendations and procedures.
- Do not cut reinforcement to concrete/masonry when installing fixings.
- Make good the integrity of the steel corrosion protection system where post drilled or site fixings are used for connections to the external steel work.

### 6.3 Site Welding

- For site welding of fixing brackets or other structural steel, all welding shall be carried out in full accordance with BS EN 288. Welding shall be supervised by an appropriately qualified tradesperson.
- Protect all finishes from weld spatter, including glass and paint finish. Replace all glass panels damaged by weld spatter.

### 6.4 Protection

Protection of the works will be supplied, installed, maintained and removed by the subcontractor to the requirements of the Head Contractor. Protection will remain in place until the commencement of the final clean and will be removed to facilitate trade and final clean.

### 6.5 Cleaning

The subcontractor shall trade clean their works as per the clients scope of work requirements. This may include progressive clean and handover as agreed between the client and sub-contractor.

Clean all internal and external surfaces of aluminium framing and painted steel etc.

Undertake a trade clean of the Works, and any surfaces affected by the Works, at a time agreed with the Head Contractor. The trade clean shall remove all:

- Protection tapes, films, covers and the like, together with any residual adhesives left by the protection materials.
- Incidental construction dust, laitance, rubble and the like, to a level where the performance and appearance of the installation is not compromised, and any residual material will not etch the surface coatings/finishes and can be easily removed during the final clean.
- Visible installation stickers and temporary product markings and QA markings.
- Conduct a trial trade clean at the commencement of cleaning operations, and seek approval that the level of cleaning is suitable.

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### 6.6 Rejections and Defect Rectification

Any work determined by the Head Contractor and Consultants as being defective (either during the course of the Works or during the Defects Liability Period) shall be rectified by the Subcontractor to

the satisfaction of the Head Contractor and Consultants. The cost of such rectification shall be borne by the Subcontractor.

If directed, open up complete work for inspection. The time and cost of the opening up, inspection and closing up will be born by the contractor.

Where the inspection identifies that the works have been undertaken in a manner which is different from the approved method statements, then all costs associated with the inspection and subsequent rectification works will be born by the Subcontractor.

**6.6.1 Agreed Methods**

Rectification methods for finished products will be trialled and submitted for approval prior to the commencement of work. Where rectification methods are rejected, replacement of the component and/or assembly will be required.

**6.6.2 Allocation of Costs**

Defects, which are clearly due to the actions of the Subcontractor and/or his agents, shall be rectified at the Subcontractors cost.

Defects, which are clearly due to other trades, shall be rectified at the agreed variation rates.

Damage, repair/replacement and cleanup costs due to weatherproofing failure of completed work will be at the Subcontractors cost.

**6.7 Delivery, Handling and Storage**

Co-ordinate the delivery, handling and storage of panels and components so as to ensure they reach their final position in a clean, undamaged condition.

## 7. Verifications

### 7.1 Submissions

#### 7.1.1 Schedule

- Make submissions in accordance with the Submission Schedule in Appendix.
- Confirm schedule of submissions in accordance with the Submission Schedule within two weeks of Contract award.

#### 7.1.2 Contract Samples

- Submit samples of each significant component complete with the proposed colour, texture and finish for acceptance by the Architect, The Head Contractor and the consultant team.
- Cladding samples shall be minimum 300 x 300mm
- Finish samples shall be minimum 300 x 300mm for each finish type.
- Samples of bolts, fixings and anchors; submit one unit of each type.
- Samples of hardware and ironmongery; submit one unit of each type.
- Samples of restraint pin; submit one unit of each type.

#### 7.1.3 Shop Drawings and system design drawings

Provide initial system design drawings for review and agreement prior to preparation of shop drawings. The system drawing should include all typical details.

For the shop drawing submission as a minimum provide plans, elevations, detail elevations and full size (1:1) detail drawings for each component, condition and connection. Include allowance for 3D assembly drawings.

- Do not commence fabrication until shop drawings have been reviewed and endorsed by The Head Contractor, the Architect and the consultant team.
- Review of shop drawings by The Head Contractor and the consultants shall not relieve the Subcontractor of any responsibilities under this Specification.
- Submit print copies of each drawing together with one electronic copy in .pdf format for review in sufficient time to allow for the review / comment / re-submission process to occur prior to fabrication. Allow a minimum of 10 working days for review by all parties from receipt of drawings.
- At the completion of the project, or as directed by The Head Contractor, provide the final set of As-Built drawings. These shall be a set of approved details, modified to reflect details changed to suit site conditions, different from those approved originally. These shall include changed details in the event of a failed performance prototype test.

#### 7.1.4 Calculations

- Submit detailed calculations for the facade access system and coordinate all reaction loads with the façade contractor and structural engineers as required.
- Calculations to be prepared by a certified practising engineer with experience in the design of glass and curtain wall access systems.
- Submit calculations concurrently with shop drawings and as agreed between sub-contractor, and design team.
- Calculations shall include a summary page indicating key results, assumptions and references.
- Review by The Head Contractor and its consultant team of calculations will in no way relieve the Subcontractor of its responsibilities under this Specification.
- Structural engineering certification shall be provided by the Subcontractor's professional engineer confirming the design complies with the Specification and all relevant Standards and Codes, local by-laws etc.
- Submit calculations in conjunction with shop drawings whenever possible. Allow 10 working days from date of receipt for review of calculations by the Consultants.



#### 7.1.5 Maintenance Manuals

- Prior to Technical Completion, provide four copies of facade maintenance manuals for the project, or as required by Lend Lease.
- Training of operator to be coordinated and provided by sub-contractor for all relevant elements/systems
- Maintenance manuals shall include as a minimum:
  - Schedule of all materials used to include material data, suppliers, and supplier contact details.
  - Cleaning and maintenance requirements (including pre-dated QC sheets to be completed with each maintenance procedure, adequate for 25 years of façade life) for all surfaces / materials.
  - Glass replacement strategy for all glass
  - Method for warranties for materials and workmanship including those for components from other manufacturers. Provide original copies of all warranties for materials and workmanship.
  - A3 size copies of all as-built drawings for the project
  - CD-Rom copies in PDF format of all as-built shop drawings for the project
  - Methods for repair / repainting of all painted elements
  - Suggested inspection regime.

### 7.2 Visual Prototypes

TBC

### 7.3 Testing

#### 7.3.1 Access Systems

- Proof load tests of all connections as required by Australian Standards

#### 7.3.2 Masonry Anchors

- Tests of masonry anchors shall be carried out by a tester approved The Head Contractor and its Consultants. A representative of the manufacturer of the masonry anchors may carry out the tests, if they regularly carry out this work.
- Load test 1 in every 100-typical masonry anchor to 1.2 times the design load. Test at least 1 of each type of non-typical anchor to a minimum of 1% of the type. Provide a graph of load versus deflection for all tests.
- Ensure that the method of load application is representative of the loading in service. The test procedure, including a diagram of the test equipment layout shall be submitted to The Head Contractor for approval prior to testing.
- At a test loading value of 1.2 times the design load for the anchor, deflection shall not exceed 1mm, or lesser value agreed with the masonry anchor manufacturer.
- Failures of any of these tests shall be reported immediately to The Head Contractor. The Head Contractor shall then determine the extent of re-testing required by the Subcontractor, which the Subcontractor shall carry out and bear all associated costs.
- Make all test reports available to The Head Contractor and its consultants on request. Include a full copy of all QC records in the maintenance manual.

#### 7.3.3 Finishes

##### Powdercoat and PVF2 Paint Finishes and Anodising of Aluminium

- Test powdercoating quality and thickness to the requirements of AS 3715.
- Test PVF2 quality and thickness to the requirements of AAMA 2605.
- Test anodised coating and thickness to AS 1231.

- Make all test reports available to The Head Contractor and its consultants for review. Include a full copy of all QC records in the maintenance manual.

#### 7.3.4 Weld Testing / Inspection

- Inspect and test welding of site and factory fabricated structural steel, including site welding of curtain wall brackets in accordance with BS EN 288.
- Make all test reports available to The Head Contractor and its consultants on request. Include a full copy of all QC records in the maintenance manual.

### 7.4 Quality Assurance

- Implement a quality assurance system in compliance with AS/NZS ISO 9001.
- Provide a professionally prepared project specific quality plan divided into separate sections for factory and site works. Present quality plan to The Head Contractor for review and comment prior to commencement of the Works.
- Implement a site inspection / verification procedure which ensures that all elements of the installation are installed in full accordance with the design.
- As a minimum, the QA manual shall include the following:
  - A method statement for each procedure involved in the implementation of the Works, including responsibilities for each procedure.
  - A pro-forma for each procedure.
  - Hold points in each procedure when QC checks/tests are carried out.
  - Pass/fail requirements for each check/test cross-referenced to a Specified, Code, Standard or local government requirement.
  - Non-conformance procedures for each test/check including quarantine and rectification procedures.

## **Appendix A**

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### **Deliverables & Samples Schedule**

## Appendix A – Deliverables and sample schedule

General Note: The following timings are maximum timeframes. The over-riding control in terms of submissions shall be the Head Contractor construction programme.

Sub-contractor deliverable	Expected delivery
Programme for design, prototyping & procurement	Within 2 weeks of Contract award
Programme for site works	Within 4 weeks of Contract award
Work Method Statements	Within 4 weeks of Contract award
Test programme, including nomination of test laboratory for approval	Within 4 weeks of Contract award Indicative programme for prototype test. Within 10 weeks of visual prototype approval.
Design drawings including detailed test schedule	4 weeks prior to procurement of prototype materials
Position and magnitude of reaction loads to primary structure	Within 2 weeks of Contract award
Contractor's drawing schedule	Within 2 weeks of Contract award
Contractor's drawings; Typical Details	Within 2 weeks of Contract award
Contractor's drawings; Concrete Inserts	4 weeks from Contract award date, or as advised by the Head Contractor
Contractor's drawings; full set	Progressively, in sufficient time to allow review / resubmission process
Calculations	Submit with shop drawings
Materials certification	Ongoing; 3 weeks prior to use of the material in Production and/or on the Site.
Draft Quality Assurance Manual	Within 4 weeks of Contract award
ITP for manufacturing	Within 4 weeks of Contract award
ITP for installation	6 weeks prior to commencement of installation of the Works
As Built drawings	4 weeks prior to completion of installation of the Works
Operations and Maintenance Manual	4 weeks prior to completion of installation of the Works
Deeds of Warranty	4 weeks prior to completion of installation of the Works
Engineering Certification	4 weeks prior to completion of installation of the Works

Samples	Expected delivery
Aluminium extrusions; 300mm lengths with applied finish	6 weeks prior to commencement of fabrication
Material data sheets (including for all materials and finishes)	8 weeks prior to ordering
Material samples (including for all materials and finishes)	8 weeks prior to commencement of production

## Appendix B

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### Design intent details

## Appendix B –Design intent details

Refer to relevant project design documentation including:

- JPW and Grimshaw architectural documentation (drawings and finishes schedule)
- Surface Design Façade Performance Specifications and Design Intent drawings
- Surface Design North Tower Façade Access Strategy Report
- Wind Tunnel test report by CPP
- Structural Engineering documentation (Arup) including drawings and specifications and Movement and tolerances report
- Arup mechanical services documentation