



**NSW DEPARTMENT OF  
PRIMARY INDUSTRIES**

**SPECIFICATION  
FOR  
CONSTRUCTION OF A LABORATORY,  
AQUARIA SHED & DEMOLITION OF  
EXISTING LABORATORY  
AT  
PORT STEPHENS FISHERIES CENTRE  
Job No: BES200805**

**TENDERS CLOSE: 2.00pm on Friday, 12<sup>th</sup> December 2008**

**Specification Prepared By:**

**NSW Department of Primary Industries  
Building and Engineering Services  
161 Kite Street  
Locked Bag 21  
ORANGE NSW 2800**

Specifications for works to be done  
and the material to be used for the

**Construction of Laboratory,  
Aquaria Shed & Demolition of  
existing Laboratory**

at the

**Port Stephens Fisheries Centre**

**JOB No. BES200805**

Tenders are to be submitted on the enclosed Tender Form sealed in an envelope or  
faxed and forwarded to :

**ATTN: Derek Scott  
Port Stephens Fisheries Refurbishment BES200712  
NSW Department of Primary Industries  
161 Kite Street  
Orange NSW 2800**

**Fax: 6391 3472 (this fax machine is located within the Tender Box)**

On or before the closing date as indicated.

**Tenders close 2pm on Friday, 12<sup>th</sup> December 2008**

Contact :     Derek Scott  
                 Tel:        6391 3203  
                 Mob:        0427 913203  
                 Fax:        6391 3329

<b>1.00 PRELIMINARIES.....</b>	<b>4</b>
1.1 GENERAL CONDITIONS.....	4
1.2 SITE LOCATION.....	4
1.3 SCOPE OF WORK.....	4
1.4 VISIT SITE.....	4
1.5 DOCUMENTS.....	4
1.6 INTERPRETATION OF DRAWINGS.....	5
1.7 WORK AS EXECUTED DRAWINGS.....	5
1.8 METHOD OF DESCRIBING ITEMS AND SUBSTITUTIONS.....	5
1.9 GOODS AND SERVICES TAX.....	5
1.10 LUMP SUM CONTRACT.....	6
1.11 VARIATIONS.....	6
1.12 TRADES SCHEDULE.....	6
1.13 NOTICE AND FEES.....	6
1.14 INSURANCE.....	6
1.15 LONG SERVICE LEVY.....	6
1.16 FINANCIAL ASSESSMENT.....	6
1.17 LIQUIDATED DAMAGES.....	7
1.18 SPECIFICATION TERMS.....	7
1.19 NOTICE OF INSPECTION.....	7
1.20 PRIME COST ITEMS.....	7
1.21 TBS ITEMS.....	8
1.22 PERFORMANCE GUARANTEE.....	8
1.23 STANDARDS.....	8
1.24 CO-OPERATION.....	8
1.25 WORKMANSHIP AND MATERIAL.....	8
1.26 FOREMAN.....	8
1.27 RELOCATION OF EXISTING SERVICES.....	8
1.28 SAMPLES.....	9
1.29 HOURS OF OPERATION.....	9
1.30 CONTINUITY OF SERVICES.....	9
1.31 SITE MEETINGS.....	9
1.32 USE OF ROADS AND MAKING GOOD.....	9
1.33 JOB CLEANLINESS.....	9
1.34 CLEAN UP SITE.....	9
1.35 CERTIFICATE OF PRACTICAL COMPLETION.....	10
1.36 DEFECTS LIABILITY PERIOD.....	10
1.37 MAINTENANCE AFTER COMPLETION.....	10
1.38 OCCUPATIONAL HEALTH, SAFETY AND REHABILITATION.....	10
1.39 RELEVANT AUTHORITIES, SAFETY AND ACCESS.....	11
Part A - Site Safety Rules.....	11
Part B - Safe Work Method Statements.....	11
TENDER FORM (mandatory with tender).....	13
SCHEDULES (mandatory with tender).....	14
SCHEDULE OF MANDATORY ALTERNATIVE TENDERS.....	15
<b>2.00 DEMOLITION.....</b>	<b>16</b>
2.1 GENERALLY.....	16
2.2 DEMOLITION.....	16
2.3 MATERIALS AND COMPONENTS.....	17
2.4 EXISTING SERVICES.....	17
<b>3.00 GROUNDWORKS.....</b>	<b>18</b>
3.1 GENERALLY.....	18

3.2 FOOTING EXCAVATIONS .....	18
3.3 TERMITE PROTECTION .....	18
<b>4.00 CONCRETE.....</b>	<b>19</b>
4.1 GENERALLY .....	19
4.2 CONCRETE & REINFORCEMENT .....	19
4.3 FOOTINGS .....	19
4.4 FLOOR SLABS .....	19
4.5 PAVING SLABS .....	19
4.6 BUILDING IN, POURING & CURING.....	20
4.7 MISCELLANEOUS .....	20
<b>5.00 BRICKWORK.....</b>	<b>21</b>
5.1 GENERALLY .....	21
5.2 BRICKS .....	21
5.3 MORTAR.....	21
5.4 WALLS.....	21
5.5 DAMP-PROOF COURSES & FLASHINGS.....	22
5.6 LINTELS.....	22
<b>6.00 METALWORK.....</b>	<b>23</b>
6.1 GENERALLY .....	23
6.2 STRUCTURAL STEELWORK .....	23
6.3 PREFABRICATED SHED (Aquaira Shed) .....	23
6.4 ALUMINIUM WINDOWS & DOORS .....	24
6.5 PORTABLE FIRE EXTINGUISHERS .....	24
6.6 WINDOWS BLINDS & CURTAINS .....	24
6.7 METAL DOOR FRAMES .....	24
6.8 METAL WALL FRAMING .....	25
6.9 CEILING ACCESS.....	25
6.10 SOAP DISPENSERS .....	25
6.11 PAPER TOWEL DISPENSERS .....	25
6.12 ROOF TRUSSES .....	25
6.13 BUILDER'S COMPOUND FENCE.....	26
6.14 EXTERNAL BALUSTRADING/HANDRAIL .....	26
6.15 STAINLESS STEEL BENCH SUPPORT FRAMES.....	26
6.16 FREEZER ROOM SHELVING .....	26
6.17 STORE SHELVING .....	26
6.18 TANK BENCH .....	27
<b>7.00 WOODWORK.....</b>	<b>28</b>
7.1 GENERALLY .....	28
7.2 STUD WALL FRAMING.....	28
7.3 EAVES & VERGE LINING.....	28
7.4 INSULATION .....	28
7.5 ACOUSTIC INSULATION .....	28
7.6 DOORS.....	28
7.7 CUPBOARDS .....	29
7.8 DOOR HARDWARE / LOCKS .....	30
7.9 DOOR SECURITY .....	30
7.10 TRIMS.....	30
7.11 WHITE BOARD / NOTICE BOARDS .....	30
7.12 MISCELLANEOUS .....	30
7.13 COAT HOOKS .....	30
7.14 RELOCATED EQUIPMENT.....	30
<b>8.00 ROOFING.....</b>	<b>32</b>

8.1 GENERALLY .....	32
8.2 GUTTERING.....	32
8.3 DOWNPIPES.....	32
8.4 INSULATION .....	32
8.5 ROOF SHEETING .....	32
8.6 ROOF SAFETY MESH .....	33
8.7 FLASHINGS & CAPPINGS .....	33
8.8 FASCIA.....	33
8.9 ROOF ANCHORAGE & LADDER POINT .....	33
<b>9.00 FLOOR, WALL &amp; CEILING FINISHES .....</b>	<b>34</b>
9.1 SEAMLESS VINYL .....	34
9.2 TACTILE INDICATORS .....	34
9.3 SHEET LININGS.....	34
9.4 EPOXY FLOOR.....	35
<b>10.00 PAINTING .....</b>	<b>36</b>
10.1 GENERALLY .....	36
10.2 SCOPE .....	36
10.3 COLOUR SCHEDULE .....	36
10.4 SAMPLE PANELS .....	36
10.5 PREPARATION OF SURFACES .....	36
10.6 PAINT TYPES .....	37
10.7 EXCLUSIONS .....	37
<b>11.00 DOOR HARDWARE SCHEDULE .....</b>	<b>38 – 40</b>
<b>12.00 COMMUNICATIONS .....</b>	<b>41 – 46</b>
<b>13.00 ELECTRICAL .....</b>	<b>47 – 60</b>
<b>14.00 MECHANICAL.....</b>	<b>61 – 73</b>
<b>15.00 HYDRAULIC.....</b>	<b>74 – 86</b>
<b>16.00 SCHEDULE OF P.C. SUMS.....</b>	<b>87</b>
<b>ANNEXURE 1 – PART A - AS2124 .....</b>	<b>88 – 91</b>
<b>ANNEXURE 2 – PART B - AS2124 .....</b>	<b>92 – 98</b>

## **1.00 PRELIMINARIES**

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### **1.1 GENERAL CONDITIONS**

The General Conditions of the Contract are AS2124 -1992 and Annexures A and B are included in this specification and shall form part of the contract.

### **1.2 SITE LOCATION**

The site is Port Stephens Fisheries Centre, Taylors Beach Road, Taylors Beach.

### **1.3 SCOPE OF WORK**

The extent of the works included in this contract is shown on the drawings referred to in the specification and is summarised below:-

- Construction of a new Laboratory Building
- Construction of a new Aquaria prefabricated shed.
- Construction of a Chemical Storage Area.
- Demolition of existing Blue Laboratory (This must be done after completion of new Laboratory Building).

The work to be carried out under this contract includes the supply of all plant, labour and materials (not designated as PC items) required for completion.

### **1.4 VISIT SITE**

Tenderers shall visit the site to ascertain for themselves as to the exact nature and extent of work proposed under this contract. No claim arising out of neglect of this precaution shall be grounds for any variation.

To organise a site inspection contact:

Port Stephens Site Manager

Ian Powell

ph: 4916 3818

M: 0438 913541

### **1.5 DOCUMENTS**

The contract documents shall remain in the Department of Primary Industries custody during the execution of the contract.

Contract documents for this project are:

Specification:	<b>Pages 1 - 97</b>
Drawings:	A.01 Title Page & Locality Plan
	A.02 Stage 1 – External Works Site Plan
	A.03 Stage 2 – Demolition Plan
	A.04 Part Site Plan
	A.05 Laboratory Floor Plan & Elevations
	A.06 Reflected Ceiling Plan & Roof Access Platform Plan
	A.07 Laboratory Sections
	A.08 Laboratory Bench Details
	A.09 Laboratory Window & Door Schedules
	A.10 Laboratory Room Elevations
	A.11 Aquaria Shed Plan, Elevations & Details
	A.12 Chemical Storage Compound
	S.01 General Notes
	S.02 Footing Plan
	S.03 Floor Slab Plan
	S.04 Aquaria & Chemical Store Slab Plans
	S.05 Concrete Details 1

S.06	Concrete Details 2
S.07	Concrete Details 3
E.01	Legend, Notes & Schematics
E.02	Site Reticulation
E.03	Power, Data & Lighting Layout
E.04	Single Line Diagram, Schematic & Block Diagram
M.01	Legend, Schedule, Details, A/C & Ventilation Layout
M.02	A/C & Ventilation Layouts
H.01	Legend, Notes & Site Plan
H.02	Water & Sanitary Layouts

Each tender shall be supplied with one (1) set of Architectural drawing and Specification. The drawings will form part of the Contract together with this Specification and any subsequent drawings, details or other related specifications.

## **1.6 INTERPRETATION OF DRAWINGS**

Where any item of work is not wholly indicated on the plans, the Contractor shall, in the actual execution of the work, complete same to entirely correspond with work of a similar nature shown in detail elsewhere on the plans. All sections of the Specification shall be read in conjunction with one another and any provisions of clauses in any one section are to be taken as referring to all other sections, if such provision or clauses are in any way applicable.

Where the work involves alterations and additions to an existing building, actual site dimensions are to be taken in preference to those shown or indicated on the plans but the Contractor shall obtain the approval of the Superintendent before deviating from the plans.

In all cases figured dimensions and spot levels shall be taken in preference to scaled dimensions and contour levels respectively.

## **1.7 WORK AS EXECUTED DRAWINGS**

The contractor shall arrange with all sub-contractors, and provide an electronic copy on CD of the layout of all services installed during the works (work as executed drawings), their positions and depths etc and forward the same to the superintendent in AutoCAD 2002 format and also in hard copy. Failure to provide the layouts will delay the final payment.

## **1.8 METHOD OF DESCRIBING ITEMS AND SUBSTITUTIONS**

Where in this specification or on the drawings trade names, brands and/or catalogue numbers are referred to, sole preference to any material or equipment is not intended. The Contractor may substitute other material or equipment provided that the characteristics of type, quality, appearance, finish, method of construction and/or performance are not less than specified and provided also that the written approval of the Superintendent is first obtained.

Except to the extent that the approval, if any, of the Superintendent includes a contrary provision, the approval shall be deemed to include the conditions that:

- the variation will not directly or indirectly result in any increase in the cost to the Department
- the variation will not directly or indirectly cause any delay to the work and if it does, the Contractor will compensate the Department for any loss which the delay causes.

## **1.9 GOODS AND SERVICES TAX**

GST is payable in respect to any goods and services used in this contract and tenderers shall indicate total GST payable on the attached quotation form. All progress claims shall be in the form of a tax invoice.

### **1.10 LUMP SUM CONTRACT**

Tenders are to be submitted on a firm price basis. Any tender, which provides that the tender price shall be subject to adjustment in respect of any variation in the cost of labour, material or any other item, may be declared to be informal and excluded from consideration. Tenders must include the schedules request.

### **1.11 VARIATIONS**

Prices must be submitted by the Contractor in writing prior to commencement for any additional work he considers chargeable as a variation. No variations will be granted without the written authority of the Superintendent.

### **1.12 TRADES SCHEDULE**

The Tenderer shall furnish with his tender a completed copy of the Trades Schedule included in this specification detailing the break up of all sub trades. The schedule shall be only used as a means of assessing progress payments and for assessing the value of work which is additional to the Contract as ordered in writing by the Principal.

### **1.13 NOTICE AND FEES**

The Contractor shall give all notices, pay all fees, charges, levies and deposits and otherwise conform with the requirements of all properly constituted authorities.

### **1.14 INSURANCE**

The contractor shall be able to show current cover for the following prior to undertaking contract;

- All work and materials completed or delivered on the site shall be insured to their full value against loss or damage.
- Ensure that all workers are covered by a suitable Workers Compensation Policy effective in NSW which must be extended to cover the liability of the principal.
- Hold a suitable Public Liability policy of not less than \$10 million.

### **1.15 LONG SERVICE LEVY**

The Contractor is to furnish proof of payment of the due amount of Long Service Levy or a document from the Building and Construction Industry Long Service Payments Corporation giving exemption.

A retention, equivalent in value to the full amount of the Long Service Levy which may be due as assessed by the Superintendent, will be withheld from moneys due to the Contractor until the requirements of the Long Service Levy have been met.

### **1.16 FINANCIAL ASSESSMENT**

As part of the review of tenders submitted, a financial assessment will be carried out by a government contracted company on all projects that exceed \$50,000 (GST inclusive). The financial assessment will provide a rating on the contractor's financial capacity. NSW Department of Primary Industries has a confidentiality agreement that any financial information will not be disclosed to other parties. Tenders will be required to submit copies of balance sheets, profit & loss, cash flow statements and tax returns from the previous years.

The main criteria considered in financial assessment of tenders are:

- Net Worth (total assets, excluding any assets of company directors, less total liabilities less intangible assets);
- Current Ratio (ratio of current assets to current liabilities; and
- Working Capital (current assets less current liabilities).



If the contractor receives an unsatisfactory financial rating, NSW Department of Primary Industries may request a Performance Bond (bank guarantee) up to the value of 20% of the contract and will be released at Practical Completion. All costs associated with obtaining a Performance Bond will be incurred by the Contractor.

### **1.17 LIQUIDATED DAMAGES**

The Contractor shall accept sole responsibility for the completion of the entire project by the due date.

If the Contractor fails to reach practical Completion by the Date for Practical Completion, the Contractor shall be indebted to the Department for liquidated damages at the rate stated in Annexure A for every day after Date of Practical Completion to and including the Date of Practical Completion.

### **1.18 SPECIFICATION TERMS**

The terms: Arrange for supply, fix, provide and fix, thus referred to in this specification shall mean that it is the Contractor's full responsibility to fully pay for and completely install the items of work so referred to in these terms and allow for accordingly in his tender unless specifically excluded otherwise.

Where such phrases as: as may be directed, to approval or approved, etc are used in this specification shall mean to the approval or direction of the Superintendent.

### **1.19 NOTICE OF INSPECTION**

The Contractor or his representative shall inform the Superintendent (4) days before any of the following building stages are reached.

- Mesh inspection before pour concrete slab
- Internal framework & trusses
- Rough-in of hydraulic, electrical & mechanical services
- Brickwork
- Backfilling of services
- Erection of Coolroom panels
- Installation of Laboratory benches
- Practical completion of Laboratory & Aquaria Shed
- Demolition of Blue Laboratory

### **1.20 PRIME COST ITEMS**

Where in the specifications either lump sum or price per unit is named for the goods to be obtained by the Contractor, such sum or price shall be termed a "Prime Cost Sum".

The amount of each PC Item shall mean the sum paid by the Contractor to the merchant after deducting all trade or other discounts, excepting a discount (not exceeding 2.5% for prompt payment).

The Contractor must add for fixing and/or other work in connection with the goods stated in the specification and must add for freight and cartage, except where otherwise specified.

The Contractor shall purchase, take delivery of, adequately store and pay for all such articles as selected by the Superintendent and shall be responsible for, and make good, any loss or damage to the same or he shall replace with equal quality at his own expense.

The Superintendent reserves the right to purchase all or any of the PC Items and the pay for same direct, in which case the Contractor will not be allowed 2.5% discount on the net cost of each item. Where the right is exercised, the Contractor shall retain all other responsibilities.

The Contractor must obtain and submit to the Superintendent a receipt or receipts showing payment for all Prime Cost Items and until such receipts have been submitted, the final payment voucher in respect of this contract will not be certified by the Superintendent.

### **1.21 TBS ITEMS**

TBS Items means: to be supplied by the Department of Primary Industries free of cost to the Contractor and the Contractor should exclude the cost of same from his contract price. The Contractor is to take delivery, store and install all TBS Items.

The Contractor shall from the time of receipt of his letter of acceptance or signing of the contract, whichever is sooner, fully co-ordinate with sub-contractor and other persons employed in separate phases of these works. The Contractor is fully responsible to ensure the properly related execution of these works.

No extensions of time will be allowed for delays owing to the Contractor's negligence in placing and following up orders for material or his failure in arranging sub-contractor's etc. Performance delays on the part of sub-contractors and/or suppliers will not be allowed as reasons for extension of contract time and the Contractor shall arrange the term of his sub-contracts accordingly.

### **1.22 PERFORMANCE GUARANTEE**

By accepting the Contract, the Contractor will be deemed to have guaranteed the performance of the installation under normal working conditions for a period of twelve months from the date of handing over the works. Should the complete installation or any part thereof be defective or fail to fulfil the requirements of this specification, performance of the relevant equipment shall be corrected by the Contractor at his own expense. The Contractor shall be responsible for the replacement of any portion of the installation rejected and for all costs thereby incurred.

### **1.23 STANDARDS**

All materials, equipment, workmanship and fittings, etc shall comply with the relevant Australian Standard Specification, the Building Code of Australia, local requirements and Code of Practice (and in the absence of Australian Standards shall conform to the relevant British Standard Specification.) When Australian or British Standards are not available materials and workmanship shall conform to the Standard established by the Supervisor.

### **1.24 CO-OPERATION**

In addition to any specific items of work specified in the trade sections, each trade is to assist, arrange with, leave holes for, cut away for, do all chasing and drilling for and make good after every other trade.

### **1.25 WORKMANSHIP AND MATERIAL**

The whole of the work is to be faithfully executed in the most tradesman like and substantial manner. All materials are to be new and of the best quality and are to be approved before being used. Whenever possible and unless otherwise specified in respect of particular items, all materials are to be of New South Wales manufacture.

### **1.26 FOREMAN**

The Contractor shall nominate an English-speaking Foreman who shall be on site for the purposes of executing the works and controlling the quality of work performed. The companies' own labour, and/or any sub-contracts engaged by them. The Foreman is to be on site at all times work is being performed.

### **1.27 RELOCATION OF EXISTING SERVICES**

Where it is found necessary to remove, divert or cut into any existing drain, gas or water main, gas or water service pipe, stormwater drainage line, sewer, electrical conduit, telephone installation or other existing work or service beyond the control of the Principal, the Contractor shall give at least 7 days notice of his requirements to the Superintendent. Where necessary, the Principal will arrange with the appropriate Authority for the removal or deviation of such existing works. When required the Contractor shall lay bare and clear round the said mains, services, pipes, lines, sewers, conduits,

installations or other existing works when and as directed. The removal, diversion, or relaying shall be performed only by the Authorities respectively interested. Any excavation or other work performed by the Contractor to the order of the Superintendent in writing, related to the removal or diversion or relaying of existing services will be regarded as an extra to the Contract and payment will be arranged under the provisions of the General Conditions of Contract.

### **1.28 SAMPLES**

Samples as required by the Superintendent of materials and/or fittings shall be submitted 14 days before a decision is required.

### **1.29 HOURS OF OPERATION**

Building work shall only be carried out between the hours of 7.00am and 5.30pm on Monday to Friday inclusive. No work shall be carried out on weekends without prior arrangement.

In approving a variation to the working hours the Superintendent may attach conditions. Such conditions may include but are not limited to a prohibition of or restriction on the performance of work which requires supervision, in which case the Contractor will be required to meet the costs of the Superintendents supervisor.

### **1.30 CONTINUITY OF SERVICES**

The Contractor shall make himself aware of any existing services in the vicinity and shall program his contract so that services to the existing buildings are not interrupted during hours of operation. The Contractor shall notify the Superintendent immediately upon the discovery of services or obstructions not shown on the contract documents and await instructions.

Where an existing service is damaged by the Contractor for any reason whatever, the Contractor shall meet all costs for repairing the service.

### **1.31 SITE MEETINGS**

The contractor shall arrange for monthly site meetings when job progress warrants it, or at the Superintendents request to discuss, expedite and Co-ordinate the contract. The contractor shall arrange for the presence at any such meeting of representatives requested by the Superintendent.

### **1.32 USE OF ROADS AND MAKING GOOD**

The Contractor shall only use such entrances, exits and roads as will be pointed out by the Superintendent.

The Contractor shall be responsible for the making good any damage to fencing, piping, footways, roads and surfaces generally and any other work or servicing which may be disturbed or injured by cartage or other operations in carrying out this contract, and must leave the whole in as good a state of repair as they were when he commenced the works.

### **1.33 JOB CLEANLINESS**

The Contractor shall be responsible for cleaning up all works executed by him at least weekly and on completion to the satisfaction of the Supervisor.

### **1.34 CLEAN UP SITE**

Any debris left on the site must be removed as the work proceeds and not allowed to accumulate. On completion of the construction the site of the works shall be left in a clean and tidy condition to the satisfaction of the Superintendent.

Excess fill shall be spread or stockpiled as directed by the Superintendent. Temporary erosion control banks shall be removed, also as directed by the Superintendent. Borrow pits shall be filled with clean compacted earth or constructed so as to blend into the surrounding ground with batters less than 1:4.

### **1.35 CERTIFICATE OF PRACTICAL COMPLETION**

When in the opinion of the Supervisor, the Contract Works are practically completed, the Supervisor will issue a certificate hereinafter called "Certificate of Practical Completion" stating the date upon which the contract works were practically completed. This date shall be the date from which the guarantee, warranty and defects liability periods as defined shall operate.

A Certificate of Practical Completion will not be issued until:

1. All parts of the works are ready for occupation and/or use.
2. All services are tested and operating satisfactorily and approved by the appropriate Authorities.
3. All work included in the contract is performed, including such rectification as may be required by bringing the work to standards acceptable to the Supervisor.

### **1.36 DEFECTS LIABILITY PERIOD**

The Contractor shall be responsible for the rectification of all defects in the work due to faulty materials and/or workmanship for a period of (12) months, after all work is completed and handed over. The balance of the contract sum amounting to 2.5% will be retained for this period and will be paid when all defects requiring attention due to faulty materials and workmanship have been rectified to the satisfaction of the Supervisor.

Should the Contractor fail to commence to make good such defects as directed by the Supervisor within seven days of written notice to do so, the Supervisor will have the right to have all such defects rectified by others at risk and expense of the Contractor.

If any defect requiring attention under this clause is of such a nature as to endanger or prevent the operation of any service, the Contractor shall, on telephone advice from the Supervisor, arrange for such work to be carried out immediately.

If the Contractor is unable to arrange for such works to be carried out immediately, the Principal will have the right to have such defects rectified by others at the risk and expense of the Contractor.

If in the performance or observance of the Contractor's obligations during the liability period hereunder, defects are discovered in the work, the Principal will reserve the right to extend the liability period to enable such defects to be made good by the Contractor and to allow the whole work after being made good to be proved satisfactory.

### **1.37 MAINTENANCE AFTER COMPLETION**

Refer to General Conditions of Contract-Defects liability.

### **1.38 OCCUPATIONAL HEALTH, SAFETY AND REHABILITATION**

#### **General**

All workers to hold a General Construction OHS Induction Green Card or equivalent as per WorkCover requirements.

All project personnel may be required to undergo a site safety induction-training program (1-hour Duration) in accordance with NSW Department of Primary Industries site safety policies (training by NSW Department of Primary Industries).

#### **Principal Contractor**

The main contractor will be appointed by NSW Department of Primary Industries as the principal contractor for the purpose of managing all OHS on site as required by clause 210 (Appointment of principal contractor) under the Occupational Health and Safety Act 2001.

### **1.39 RELEVANT AUTHORITIES, SAFETY AND ACCESS**

The Occupational Health and Safety Amendment Act 2001 and its Regulations will be the means by which safety matters are to be handled on this project, together with Site Safety Regulations included in this Specification.

The Contractor shall be responsible for complying with all applicable obligations, awards and Site Agreements with respect to safety on Site including :

the provision of all safety devices and equipment necessary and/or required by Statutory Regulations to prevent accidents, injuries and fires. These devices and equipment shall include but not be limited to adequate life protection equipment, illumination, railings on stairs and landings, traffic controls, machinery guards, walkways, ladders, scaffolds and gang planks;

advising the Superintendent immediately of any dangerous occurrences or practices on the Site;

providing, erecting and maintaining adequate barricades, hand rails, guards, fencing, flooring material, temporary roadways, footpaths, signs and lighting so that all means of access to and from the actual area where work under the Contract is being executed shall be made safe

provide all amenities as per the WorkCover code of practice - Amenities for construction work

#### **Part A - Site Safety Rules**

Prepare Site Safety Rules and ensure they are displayed on notice boards and other suitable locations on the Site and are provided to all personnel who may work on the Site or visit the Site. Include rules for

Induction and safety training - ensuring adequate training is provided to personnel working on the Site:

Ensuring safety helmets (to AS 1801), safety footwear and fluorescent vests are worn by all employees of Contractors, agents and visitors on the Site **at all times**;

Entry to, movement on, and exit from the Site - ensuring only authorised access to the Site and to areas or work, and ensuring the safe movement of persons, vehicles and equipment whilst on the Site;

Accident and emergency procedures - ensuring first aid facilities are clearly identified and all persons are made aware of accident and emergency procedures;

Protection of all workers and the public on or near the Site - ensuring the use of effective barricades, fencing and overhead protection;

Working at or above 1.8 metres in height - ensuring all such work is performed in accordance with the WorkCover Code of Practice for Safe Work on Roofs and relevant construction safety legislation, regulations, standards and codes;

Electrical work, installations and equipment - ensuring all such work and equipment complies with the WorkCover Code of Practice - Electrical Practices for Construction Work and construction and electrical safety legislation, regulations, standards and codes

#### **Part B - Safe Work Method Statements**

Prepare Safe Work Method Statements for all work activities with a significant risk (such as working at or above 1.8 metres in height, working with or near hazardous substances, working in confined spaces, working in deep excavations). include in Safe Work Method Statements;

- Description of the work;
- Name and qualifications of the person or persons who will supervise the work;
- Name and qualifications of the person or persons who will inspect and approve work areas, work methods, protective measures, plant, equipment and power tools;

- Potential risks associated with the work;
- Identification of health or safety related standards or codes applicable to the work and where these are kept;
- What training is given to persons involved with the work;
- All precautions to be taken to protect health and safety;
- All health and safety instructions to be given to employees involved with the work.

#### **Submission**

Supply Safe Work Method Statements to the Superintendent no later than 7 days before affected parts of the work under the Contract commence.

#### **Failure to comply**

If at any time the Contractor has not prepared and supplied to the Superintendent any safe work method statements, then notwithstanding Clause 3.17 of the General Conditions of Contract, the Principal shall not be required to make payments to the Contractor until the 7th day after the specified action has been carried out.

#### **Incident management**

Before commencing any work under the Contract, nominate the persons who will be available during and outside normal working hours, to prevent, prepare for, respond to and recover from incidents. Nominate procedures for contacting the person. Notify promptly any changes to such nominations and procedures.



**NSW DEPARTMENT OF  
PRIMARY INDUSTRIES**

**TENDER FORM (mandatory with tender)**

I/We .....

.....

Of .....

.....

ABN .....

hereby Tender to perform the construction of the Laboratory Building, Aquaria Shed, Chemical Storage Area & Blue Laboratory demolition in accordance with the following documents:

- Annexure 1 - General Conditions of Contract - Minor Works or Services
- Specification prepared by NSW Department of Primary Industries.
- Drawings:            Architectural:        A01-A12  
                             Structural:            S01 & S02  
                             Electrical:            E01-E04  
                             Mechanical: M01 & M02  
                             Hydraulic:            H01 & H02

<b>Lump Sum Tender</b>	<b>GST exclusive</b>	<b>GST Inclusive</b>
Laboratory Building including services		
Aquaria Shed including services		
Chemical Storage Compound		
Demolition of Blue Laboratory		

Construction Start Date: .....

Construction Time Frame: .....

Builders % profit & overhead (variations): .....

Contractor Signature: \_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_



**SCHEDULES (mandatory with tender)**

Insert the amount for each of the following items. This Schedule is for information only and does not form part of the Contract. Its purpose is to assist in making valuations of works carried out but the Superintendent is not bound to use it.

Description	Amount
Preliminaries	\$
Demolition	\$
Groundworks	\$
Concrete	\$
Brickwork	\$
Metalwork	\$
Woodwork	\$
Roofing	\$
Floor, Wall & Ceiling Finishes	\$
Glazing	\$
Hardware	\$
Painting	\$
Hydraulics	\$
Electrical	\$
Mechanical	\$
Communications	\$
PC Items	\$
(Other)	\$
GST	\$
<b>TOTAL:</b>	\$

Contractor Signature: \_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_





**SCHEDULE OF MANDATORY ALTERNATIVE TENDERS**  
(submit with Tender Form)

All amounts GST exclusive

Item	Description	Amount
MAT.01	<b>CONCRETE KERB</b> Provide a separate price not to remove the existing island concrete kerb, trees, street light and compacted roadbase.	\$
MAT.02	<b>SHARK WEIGHING POST</b> Provide a separate price not to install the steel Shark Weighing steel post and concrete footing to the Aquaria Shed.	\$
MAT.03	<b>DISABLED RAMP</b> Provide a separate price not to install the disabled concrete ramp including steel handrails, brickwork and footings.	\$
MAT.04	<b>AQUARIA SHED - AWNING</b> Provide a separate price not to install the Aquaria Shed roof awning and concrete slab.	\$
MAT.06	<b>AQUARIA SHED – TANK BENCHES</b> Provide a separate price not to install (3) steel tanks benches in the Aquaria Shed.	\$

Contractor Signature: \_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

## 2.00 DEMOLITION

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### 2.1 GENERALLY

Demolition of the existing Blue Laboratory is to be done in a careful and systematic manner to ensure minimum disturbance to surrounding areas, conform with AS 2601.

Follow the WorkCover Authority Code of Practice "Building Demolition by Earth Moving Equipment/Machinery".

Evidence of Compliance: Before commencing demolition, submit evidence that requirements of authorities relating to the work under the Contract have been ascertained.

Disconnect, seal off and if necessary, remove superseded electrical, plumbing, drainage and other services. Maintain temporary services as required.

All salvaged items are to remain the property of the NSW Department of Primary Industries.

### 2.2 DEMOLITION

**When the new Laboratory & Aquaria Shed has been completed and all major defects rectified by the building, NSW DPI staff will have 3 weeks to relocate all laboratory equipment into the new buildings before the Blue Laboratory will be demolished.**

Refer to Electrical specification and drawings for power & communications change over from existing Blue Laboratory to new Laboratory & Aquaria Shed.

Work under the contract is detailed on Drawing A.02 & A.03 and as listed below, including but not limited to the removal of the following:

#### Externally

Remove:

- Trees
- Concrete kerb & gutter
- Street lighting
- Blue Laboratory including concrete slab
- Formulin tank pit & pumps
- Rainwater tanks
- Saltwater tank
- Overhead tank
- Septic tank
- Flag pole
- Steel bollards
- Chemical storage containers

#### Salvage Items

- Street lighting
- Formulin Tank & pump
- Saltwater Tank
- Overhead Tank
- Flag pole
- Chemical storage containers
- Steel bollards

## Internally

### Salvage Items

- Office workstations, chairs, shelving & cupboards
- Filing cabinet
- Underbench chemical storage cupboard
- Fridge
- Freezer
- Sample storage cabinet
- Plywood benches
- Oven
- Communications cabinet

## **2.3     MATERIALS AND COMPONENTS**

### **Hazardous Materials:**

Give notice immediately any hazardous materials or conditions are found.

### **Demolished Materials:**

Except for materials to be salvaged or re-used, demolished materials are the property of the Contractor and must be removed from the site. Do not burn or bury demolished materials on the site.

Salvage: Recover materials to be salvaged or re-used without damage.

Re-use: Re-use only materials recovered from the demolitions in a sound and suitable condition.

Storage: Store in an approved location any materials to be re-used.

Removal: Cover materials in transit to prevent spillage.

## **2.4     EXISTING SERVICES**

Prior to commencing demolition, consult:

- the documents.
- Site Maintenance Staff

Regarding the location, possible capping off, and or redirection of existing services.

## **3.00 GROUNDWORKS**

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### **3.1 GENERALLY**

Ascertain nature of ground, allow for excavation in whatever material may be found. Rates for excavation of rocks exceeding 0.5 cub. m. if considered necessary, are to be quoted in tender.

Work to datum and levels indicated or required. In areas not affected by the works preserve all existing trees, including root structures.

Keep excavations free of water.

Excavations to be passed by the Superintendent and relevant authorities before proceeding. Test bearing values if necessary.

### **3.2 FOOTING EXCAVATIONS**

Excavations to be formed as required for strip footings and piers, square, accurate to shape and profile and free of loose earth.

If necessary, over-excavate to achieve solid bottoms and even bearing throughout. Bottoms to be level and stepped to suit contours of the site and brick courses.

If excavation exceeds required depth backfill with weak concrete or stabilized sand. Loose rock, bad ground, roots, etc. to be removed and similarly made good.

On completion of foundations backfill and compact to required levels.

### **3.3 TERMITE PROTECTION**

Termite protection will rely on the raised floor level and minimum use of timber in the building. Ensure all subfloor areas are cleared of timber offcuts, and builder's rubble etc.

Provide ant capping to piers conforming with AS 3660.1.

## **4.00 CONCRETE**

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### **4.1 GENERALLY**

All workmanship and materials shall comply with relevant codes AS3600 and AS3610.

All concrete work shall be accurately set out and supervised by a capable foreman experienced in reinforced concrete construction.

NSW DPI project manager shall be notified of the intention to pour in order that reinforcement is checked and the necessary preparations be approved.

The Builder shall arrange any testing should it be required by the Superintendent.

Concrete shall be liable for rejection if strength, compaction or surface requirements are not satisfactory.

### **4.2 CONCRETE & REINFORCEMENT**

Ready mixed concrete from an approved supplier shall be used. Delivery dockets are to be kept on the job.

Refer Drawings for performance specifications and details of reinforcement etc. Reinforcement stored clear of the ground, shall be free of loose mill scale, loose rust, oil, paint, grease, or dirt which may reduce bond to concrete.

Concrete Strength: 32MPa

### **4.3 FOOTINGS**

Refer Engineers Drawings.

Step levels in masonry courses as required, to suit ground levels, and to avoid conflict with drainage pipes etc.

### **4.4 FLOOR SLABS**

Refer Engineers Drawings.

Concrete floors shall be laid to the shapes, thickness, and dimensions shown, to be of structural strength indicated, and reinforced as per Drawings.

Suspended slabs are to be cast on Lysaght 'Bondek' steel formwork used in accordance with manufacturer's instructions. Formwork is to bear on brick walls and internal steel beams and columns. Build up levels as required and approved. Note cut outs for ductwork refer mechanical drawings and floor plan.

Adjust levels of slab so junctions between different floor finishes will be level. Finish surface as required for floor finishes, thresholds, falls, etc to wastes. Take particular care to comply with surface tolerances recommended by the Standards Association for the substrate beneath vinyl flooring. Refer "Seamless Vinyl" in floor, wall and ceiling finishes.

### **4.5 PAVING SLABS**

Construct external slabs including ramps and steps as detailed and/or required. Provide shear resistant joints, edge turn downs and reinforcement as detailed, and install, for the full depth of the slab, 10mm thick closed cell compressible joint filler between concrete and wall faces. Finish all external paving etc. with a broomed surface, evenly applied.

Finish steps with granolithic topping and an even coverage of non-slip silicon carbide granules or aluminium oxide at the rate of 1kg/m<sup>2</sup>.

#### **4.6     BUILDING IN, POURING & CURING**

Ensure total co-ordination and supervision. Check all trades have completed preliminary work correctly. Copper pipes to be continuously lagged, conduits properly jointed with risers sealed and protected. Lay conduits and pipes above bottom reinforcement and check precise locations of all service entry points and other items to be cast in. Take proper care of membranes and make good damage prior to pouring.

Ensure correct placement of reinforcement on approved non-corrodible chairs set on suitable spreaders.

Properly vibrate concrete where appropriate with mechanical vibrator, carefully worked around reinforcement into angles and corners, etc. Do not cause segregation by over vibrating.

Do not pour in wet weather. Do not stop pour unless absolutely necessary and then in vertical plane only. Trowel slabs as required to receive floor finishes noted. Unless otherwise noted, where concrete finish is shown, it shall be steel trowelled. Cure by covering with sealed waterproof building paper or moist sand for at least seven days.

#### **4.7     MISCELLANEOUS**

Provide miscellaneous concrete work as required by other trades, including but not limited to:

- Drainage pits and covers.
- Pad footings for posts, fencing, bollards etc.
- Footings for steps, etc.
- External paving
- Drainage pits Q2.01 & Q2.03

## **5.00 BRICKWORK**

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### **5.1 GENERALLY**

Co-operate with other trades, and protect adjoining work.

Materials, construction and detailing to conform with AS3700.

Maintain gauge throughout the job. Work to be carried up plumb, on level courses, securely bonded, with 10mm perpends full and accurately maintained. Dry pressed bricks shall be thoroughly saturated with water both in the stack and again just before laying.

Form door, window and other openings as indicated with jambs and reveals plumb and true. No portion of the work is to be taken more than one metre higher than the adjoining work and the ends of lengths are to be well raked back.

All 110mm work to be in stretcher bond.

All exposed brickwork is to be twice cleaned down using a diluted acid that is compatible with the selected bricks. Thoroughly hose down before and after each application. Verify proposed cleaning system with brick manufacturer prior to commencing.

### **5.2 BRICKS**

Externally, bricks shall be first quality extruded clay bricks laid as facework with struck, flush or brushed joints.

Bricks to be equal to Austral bricks Symmetry range 'Terracotta', submit samples for approval.

### **5.3 MORTAR**

Unless otherwise noted bricks shall be laid in cement-lime mortar consisting of one part cement, one part hydrated lime and six parts sand.

Allow to use off-white cement with 50% Forbes and 50% Lithgow bricklayers' sand, but obtain approval of sample before ordering.

Mortar additives are not to be used without approval.

### **5.4 WALLS**

Brick Veneer Walls shall be one thickness of 110 brickwork spaced 50mm from studwork and tied with approved frame ties spaced 600 horizontally and 450 vertically.

Lay flashings, form open perpends as weepholes, and fit vermin proofing. Build in brackets, frame straps, beams, bolts, hoop iron straps, electrical wall boxes etc. as required by other trades.

Form weepholes and ventilation slots set out in an orderly manner at approximately 900mm centres, using "Weepa" joint insertions available from BHP Reinforcing Products.

Lay "bricktor" woven galv. wire mesh joint reinforcement in every seventh course, lapped 300mm at joints, and laid continuously around corners.

Use timber batten or alternatively, hose down cavities under pressure at the completion of each days work to keep cavities clean of mortar droppings. At base of walls every fourth brick shall be omitted so mortar droppings can be removed. Only after inspection shall bricks be inserted.

Where straight joints are required they shall be 10mm wide, clear of mortar, and tied to existing work every fourth course with approved ties. Fill joint with approved closed cell compressible joint filler recessed 10mm, and finished with approved sealant.

## **5.5 DAMP-PROOF COURSES & FLASHINGS**

All DPC's and flashings are to cover the full wall thickness, lapped 200mm at joints, angles and intersections, stepped in courses, where necessary inclined across cavities and in single widths, all as detailed or required. Stepped flashings to be turned up where necessary to stop horizontal ingress of moisture.

Heavy grade polythene DPC similar to Polydampcourse by Dimet may only be used in concealed horizontal applications that do not cross a cavity.

Remaining applications to be 0.55mm thick bituminous coated aluminium similar to heavy grade 'Alcor' by Dimet, with exception of those above roof level where 0.7mm thick soft zinc by Century Storage Battery Co. Ltd., or similar approved is to be used.

Locate DPC's and flashings as shown or required; generally in external walls 2 courses above ground level, at slab level, in wet areas one course above slab level, at window sills.

## **5.6 LINTELS**

Flat Openings:

Provide mild steel flat or angle lintels over all brick openings, one lintel to each wall leaf, kept 6mm clear of heads of frames. External lintels must be galvanized; internal ones may be finished with approved metal primer.

Comply with the following:

<b><u>Maximum Span (mm)</u></b>	<b><u>Lintel Dimensions (mm)</u></b>	<b><u>Bearing Each End (mm)</u></b>
950	50 x 10	150
1050	75 x 10	150
1200	75 x 75 x 8	150



## 6.00 METALWORK

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### 6.1 GENERALLY

Provide and fix all metalwork required by any trade for satisfactory completion of the works. Submit samples for approval if required. Use only skilled tradesmen. Verify dimensions and tolerances. Protect all work before and after installation.

### 6.2 STRUCTURAL STEELWORK

#### Generally:

Supply, fabricate and erect galvanised steelwork in accordance with the details and relevant standards, and as required, complete with brackets and cleats, etc.

After preparation as detailed structural drawings, apply one coat of approved rust inhibitor and one coat of zinc phosphate prior to delivery, and additional coats of zinc phosphate to repair any damage after installation.

**Prepare 2 sets of shop drawings showing all components, dimensions, and tolerances, submitting for Engineering approval prior to fabrication. Consult Superintendent should clarifications be required. Approval will not relieve responsibility for accuracy.**

Deliver steelwork to site with protective finish later specified, handle carefully without causing damage or overstress. Store clear of ground, free of ponding.

#### Materials and Workmanship:

Unless otherwise specified all steel shall comply with AS 1204 or AS 1163.

Workmanship, tolerances and finish shall be equal to good general practice. Where work is exposed to view, special attention shall be given to the finish. Steel shall be free of loose rust, loose mill scale, dirt, oil and grease.

#### Protective Coatings:

Clean down and prime as follows:

- Internal Steelwork, power tool clean to AS 1627, Class 1, thence apply zinc phosphate primer to AS K211, Type 2 or 3, in two coats to 70 micrometres minimum dry film thickness.
- External Steelwork, abrasive blast to AS 1627, Class 2.5, thence apply primer to AS 2204 as required by paint section of this specification.

Make good damaged primer after erection.

#### Scope of Work:

Refer Engineer's Drawings.

Provide all steelwork necessary to complete the works including but not necessarily limited to:

- Steel columns & beams under floor to support suspended slab.
- Shark weighing post

Provide and fix all metalwork required by any trade for satisfactory completion of the works. Submit samples for approval if required. Use only skilled tradesmen. Verify dimensions and tolerances. Protect all work before and after installation.

### 6.3 PREFABRICATED SHED (Aquaira Shed)

Provide a proprietary prefabricated shed 12m x 6m with a 3.5m awning equal to Ranbuild. Shed will be complete with windows, doors and roller doors as indicated on the drawings. Roof and walls lined with colorbond 0.48 BMT. Aircell Glareshield roof and wall insulation. Safety mesh installed to the whole roof. NSW DPI to select colour.

Refer to engineers drawings for concrete slab.

## **6.4     ALUMINIUM WINDOWS & DOORS**

Aluminium window and door assemblies shall be equal 'Capral 400 series' and shall consist of suitable and structurally adequate extruded aluminium alloy frame and sash members, shop fabricated into complete assemblies including all necessary hardware, fixing lugs, flashing & glazing, etc. The assembly and installation into the building shall be weatherproof. Aluminium shall be finished with powder coating to selected standard colour from Dulux or equal range. NSW DPI to select colour.

Details of proposed sections and supplier are to be nominated on the tender form and samples are to be submitted for approval before commencing fabrication.

All glazing shall be in accordance with AS 1288. Glass to doors and windows shall be SOLAR GREY TINTED glass, unless otherwise required or specified. Refer Glazing.

Timber reveals may be moisture resistant medium density fibreboard, factory fitted where appropriate, and prepared ready for paint finish.

Fix all frames plumb, square and level with adequate packing, in accordance with AS 2048. Finish at posts and other junctions with colour-matching folded aluminium sheet as detailed or required. Fit matching inverted angle trims to frame surrounds both internally and externally to provide a properly sealed finish.

Fit approved mohair or polypropylene pile waterseals to all door and window openings, including meeting styles. Concealed inside the bottom rails of all external hinged doors, fit Raven RP74 brush weatherseals, together with Raven RP 28 clear anodised aluminium thresholds.

Sashes shall slide or hang in accordance with AS 2047 Clause 5.3.5. Spiral balances must be approved before installation. Locks, lifts, etc, must be approved before installation. Ensure mounting heights are within easy reach particularly where windows are adjacent cupboards.

All windows shall be lockable.

To all window openings fit hinged or sliding insect mesh screens having matching frames and approved black anodised aluminium mesh.

Hang aluminium doors on approved aluminium butt hinges and fit hardware as noted in the Hardware Schedule.

## **6.5     PORTABLE FIRE EXTINGUISHERS**

Provide portable fire extinguishers and fire blankets of the types, and to the locations as required by AS.2444. Contractor to certify compliance of installation upon completion of the works.

## **6.6     WINDOWS BLINDS & CURTAINS**

To all external windows (in plane of reveal) of Laboratory rooms provide and install hand operated aluminium louvre horizontal blinds equal to luxaflex, 25mm Venetian blinds. Install to manufacturers instructions.

Colour to be as selected by the superintendent.

Builder to provide superintendent with samples for approval prior to ordering.

## **6.7     METAL DOOR FRAMES**

INTERNAL FRAMES: Internal door frames are to be prefabricated mild steel of the size and profiles as detailed. Do not use welded hinges. Hinges are to be screw fixed to 6mm the. reinforcing plates welded within frame. Frames are to be minimum 1.6mm thick, primed, ready for paint finish.

Width of frames are to suit overall wall thicknesses.

## **6.8     METAL WALL FRAMING**

**Provide shop drawings of proposed metal wall framing and certification from a qualified structural engineer as being capable of resisting wind loads applied to the building. Refer to AS 1684 for bracing arrangements / requirements. Obtain approval of the design from the superintendent prior to commencing manufacture.**

Consult with wall framing manufacturer re: additional columns / stiffened studs at perimeter of large doors, framed openings etc.

Provide cold-formed GMS lintels, trussed lintels etc. as required to support roof / plant loads imposed upon internal and external walls.

**External & Internal** studwork to be equal to Lysaght superframe steel house framing system 90 x 38 x 1.2mm thick steel studwork (refer floor plan), at max. 600mm centres, factory designed and assembled, complete with two rows of noggings.

Provide noggings / additional furring channels / framing to sections of wall required to:

- support wall-mounted cupboards, shelves etc.
- be braced where they run parallel to trusses.

## **6.9     CEILING ACCESS**

Provide ceiling access hatch where shown on A.05. 600 x 600 equal to Rondo “panther” with feathered edge and cam lock. Finish: Powder coated surround and paint finish to match ceiling.

Construct access ways within the roof space, 600 mm wide x 22mm thick particleboard flooring is to be supported on metal roofing battens bridging between trusses.

Stiffen trusses locally to support these structures.

## **6.10    SOAP DISPENSERS**

Provide and install (2) Hygenex soap dispensers 2170163 complete with soap refills to handwash basins.

Provide additional noggings to the relevant walls.

## **6.11    PAPER TOWEL DISPENSERS**

Provide and install (2) Kimberly Clark 4959 paper towel dispensers complete with paper towel rolls to handwash basins.

## **6.12    ROOF TRUSSES**

Generally

**NOTE:**     **Roof structure to be designed to accommodate wind speeds as detailed in the Structural Engineer’s documents.**

Trim and block for incidental work as required.

Brace roof as required and to manufacturer’s detail.

Provide min. 75w x 50h galvanised mild steel battens, sized and spaced at centres to suit roof sheeting and wind loads.

Roof Trusses:

Provide galvanised steel roof trusses at max 900mm spacing to whole of roof area, ensuring that dimensioned floor to ceiling height is maintained.

Use only trusses of approved manufacture and clearly branded with the following information:

1. Name of Manufacturer.
2. Pitch of roof.
3. Span of truss.

**Supply two sets of roof truss shop drawings certified by a qualified Structural Engineer to the Superintendent prior to installation.**

- Modify truss profiles as required to allow for location of plant units and passage of ductwork.
- Provide roof bracing if and as required to stabilise the structure in conjunction with the wall bracing.

Support trusses directly from the bottom chord, off external studwork or beams. Do not support trusses off internal walls unless actual design features allow for such support. Construct trusses to clear internal wall plates.

Provide and install girder, hip, jack and saddle trusses, etc. as required and strictly in accordance with the manufacturer's design and installation instructions. Provide necessary outriggers etc. at gable construction.

### **6.13 BUILDER'S COMPOUND FENCE**

Location:

Refer to drawings for extent of temporary fence and position of access gates.

General Description: 2100 mm high galvanized rail-less chain wire temporary security fence braced and strained taut, fixed to galvanized steel posts complete with gates where shown on drawings.

### **6.14 EXTERNAL BALUSTRADING/HANDRAIL**

Supply & install a handrail and balustrade system comprising:

- Top rail: CHS 48.3mm OD x 3.2mm thick pipe, grade 316 stainless steel
- Posts: CHS 48.3 OD x 3.2mm max 1500 cts, grade 316 stainless steel
- Balustrade: Stainless steel cabling and proprietary brackets. Ensure the horizontal cabling system complies with Table D2.16a and D2.16b of the BCA.

### **6.15 STAINLESS STEEL BENCH SUPPORT FRAMES**

Provide shop drawings to NSW DPI for approval prior to commencing fabrication. Construct benches to the dimensions as indicated on the drawings. Bench supports including legs and cross members to be fabricated from 32 x 32mm grade 316 stainless steel SHS tube. Stainless steel adjustable feet inserts shall be fitted to all legs. Weld all joints and grind flush to satin finish.

### **6.16 FREEZER ROOM SHELVING**

Provide zinc plated steel shelving with ABS plastic shelves to the Aquaria Shed Freezer Room. Shelving shall be 460mm deep x four tiers high installed along one side of the Freezer Room. Posts shall be 2m high.

### **6.17 STORE SHELVING**

Provide shelving to the Aquaria Shed Shark Area equal to Versatruss by Allrack Storage Systems ph: 1300 137 220. Shelving shall be 1800mm high x 450mm deep with adjustable 4 tier zinc plated off white powdercoat finish.

## **6.18 TANK BENCH**

Provide Tank Benches in Aquaria Shed as indicated on the drawings. Tank bench shall be fabricated from galvanised steel 50x50x2.5mm Gr 50 SHS, bolted together with M8 bolts to 6mm cleats and stainless steel gas struts.

Allow to fit the lights to the hinged lid for the electrician to wire.

Tanks supported on 20mm thick marine plywood.

NSW DPI to supply tanks.

Confirm all measures of tanks with NSW DPI before fabrication.

## **7.00 WOODWORK**

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### **7.1 GENERALLY**

All timber is to be the best procurable quality, thoroughly seasoned, free from defects, and to hold the full sizes specified with the usual saw cut allowance only. It is to be passed, examined for borers and white ants. Materials and workmanship to conform to AS 1684.

All timbers shall be dressed where exposed to view (except as otherwise specified) and properly prepared for painting, polishing and oiling, having all milling marks and other defects cleaned from surfaces. All joinery to be primed with clear primer as later specified, with special care at end grains and joints. Where possible all timbers shall be purchased immediately after signing the Contract and be stacked on site protected for seasoning.

Do all framing as required, all mortices, tenons and tongues. Where visible, all work to be neatly mitred or scribed. All joinery to be knocked together and left to dry before gluing. All necessary tonguing, grooving, rebating, framing, housing mitring etc., and all other work necessary and incidental, although not actually specified is to be allowed for and done by the Contractor.

All timbers are to be thoroughly seasoned. Internal timbers, doors, cupboards, etc., to be well sanded prior to finishes being applied.

### **7.2 STUD WALL FRAMING**

Refer Metalwork.

### **7.3 EAVES & VERGE LINING**

Provide 6.0mm thick fibre cement eaves and soffit linings to be fitted complete with PVC joining strips in accordance with manufacturer's instructions and to an approved setout. Fit ex 25 x 25 maple splayed mould at junction with walls. Nog rafters to provide additional fixing as required.

### **7.4 INSULATION**

Insulate all external stud and brick veneer walls with ACI sisalation 499 or similar approved breather type building paper, fixed to outer face of studs.

All exterior walls and infill framing to be insulated with R1.5 fibreglass insulation batts, set in the plane of the studs.

### **7.5 ACOUSTIC INSULATION**

Provided and install min. 50mm 10.8kg/m<sup>3</sup> Glasswool Partition batts to all internal walls, placed between studs, in conjunction with relevant linings, the Rw rating detailed.

### **7.6 DOORS**

Supply and hang solid core doors in accordance with the details and hardware schedule and AS 1908 and AS 1909 where applicable. Ensure careful handling and protection. Door sizes given must be verified on site before ordering. Supply and fix selected hardware; verify code numbers are correct before ordering. Refer Metalwork for aluminium doors.

NOTE: No wind or warping of door leafs will be accepted for the new doors provided.  
All door leafs to be min. 35mm thick.

## **7.7    CUPBOARDS**

### **Benchtops**

Material:	32mm high moisture resistant MDF supported on steel frame
Upstand:	16mm high moisture resistant MDF, 150mm high with 25mm coved radius
Laminate:	Laminex chemical resistant
Edge Finish:	Post form edge
Joint Sealing:	Fill joint with sealant matching finish and clamp with Proprietary mechanical connectors

### **Overhead Cupboards & Wall Storage**

Material:	HMR whiteboard
Thicknesses:	25mm bottom shelf 18mm adjustable shelves 25mm top of unit 12mm back
Adjustable Shelves:	Support on proprietary pins in holes bored at equal Centres vertically.
Glass Doors:	Clear float glass 6mm thick all edges polished
Glass Track:	Cowdroy ball bearing cabinet track TT20 aluminium head guide TT415 aluminium bottom track TT74 nylon balls

### **Underbench Drawers**

Material:	16mm thick HMR whiteboard
Adjustable Shelves:	Support on proprietary pins in holes bored at equal centres vertically
Drawers:	16mm HMR whiteboard sides and bottom with Hettich FR602 runners.
Doors:	16mm thick HMR whiteboard with 90° rolled edge profile.
Handles:	100mm satin chrome plate 'D' handle
Castor:	Lockable heavy duty nylon castors
Hinges:	concealed metal hinges
Lockable:	Lockwood 692 deadbolt pin tumbler cupboard lock, Each cupboard drawers and cupboard keyed alike.

## **7.8 DOOR HARDWARE / LOCKS**

Supply and fix door hardware as detailed in the Door / hardware schedule supplied by Lockwood Security Products.

Allow to take delivery and install.

Verify the Schedule is complete and correct before placing orders. Unless otherwise noted, all hardware is to be finished to match existing.

Mount door handles 1000mm above floor level unless otherwise directed.

Provide all stainless steel kickplates as scheduled.

## **7.9 DOOR SECURITY**

Allow a PC Sum of \$3,860.00 (GST exclusive) for Hunter Valley Security to supply and install (2) swipe card readers and door strikes to the external doors. The building contractor is to organise and pay for the installation with Hunter Valley Security.

## **7.10 TRIMS**

Provide medium density fibreboard architraves splay profile 67 X 18 (f) to windows.

Provide incidental trims, moulds etc. as and when required to complete the project to an appropriate standard.

## **7.11 WHITE BOARD / NOTICE BOARDS**

Provide and install (1) 1800 x 1200 white boards.

Final location to be confirmed by the superintendent.

## **7.12 MISCELLANEOUS**

### Flues:

Extend existing flues to fume cupboards in ceiling space to suit new roof layout, match existing in all respects.

Fume cupboard shall comply with AS 2124.8.

Ensure existing flashings are weather tight and exhaust system stands are relocated and made good when reinstalled.

### Ceiling Access:

Specified elsewhere – Metalwork 6.09

### Ceiling Support / miscellaneous framing:

Trim and frame ceiling structure at walls and elsewhere as required to provide adequate support for:

- ceiling sheeting.
- light fittings (ref. electrical documentation).
- internal stud walling running parallel with trusses.
- cooling plant & ductwork (ref. mechanical documentation).

## **7.13 COAT HOOKS**

Supply and install stain chrome coat hooks equal to Lockwood L45SC, fixed on timber maple board.

## **7.14 RELOCATED EQUIPMENT**

Where scheduled or shown on the drawings, the builder is to relocate existing equipment from the Blue Laboratory, including disconnection, relocation and installation to the new Building works.



**Schedule of Existing Equipment to be Relocated :**

<b>Equipment</b>	<b>No</b>	<b>Present Location</b>	<b>New Location</b>
Communication Cabinet	1	Blue Lab	Laboratory – General Lab
Fridge	1	Blue Lab	Laboratory - Workroom
Oven	1	Blue Lab	Laboratory - Workroom
Underbench Chemical Storage Cupboard	1	Blue Lab	Laboratory – Wet Lab
Chemical Storage Container (yellow)	1	Blue Lab – external	Chemical Storage Compound
Formulin Tank	1	Blue Lab – external	Chemical Storage Compound
Workstation & cupboards	1	Blue Lab	Laboratory - Workstation
Filing Cabinet	1	Blue Lab	Laboratory - Workstation

## **8.00 ROOFING**

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### **8.1 GENERALLY**

Roofing shall be installed by specialist tradesmen. Carry out all necessary operations including cutting, trimming, flashing and sealing to ensure weather-tight performance. Prior to fixing, store materials to keep them dry, clean and undamaged.

On completion remove all loose material from roofing, gutters, downpipes, etc., and replace any damaged sections. Check all flashings and leave the whole work sound and watertight.

**Note: NSW DPI will not accept any touch-up paint on colorbond sheeting, fascia or guttering.**

### **8.2 GUTTERING**

#### Eaves Gutters:

Fit 125 x 0.6mm thick colorbond steel eaves guttering complete with all necessary formations and accessories, lapped, riveted and silicon sealed with 'G.E. Silglaze' or similar approved in accordance with manufacturer's instructions. Set to minimum fall 1:450. Support guttering on 40 x 1.6mm pre-painted steel brackets together with similar 40 x 0.8mm overstraps both at 1200 cts. Provide spigot and domed galv. wire mesh leaf strainer to downpipes.

### **8.3 DOWNPIPES**

Where shown fit 100 x 75mm colorbond ms downpipes supported on 40 x 0.8mm approved zincalume 'stand off' type steel straps at max. 1800 cts. NSW DPI to select colour.

Terminate feet of downpipes at ground level

### **8.4 INSULATION**

Prior to fixing roof, lay fire resistant sarking membrane/ R1.5 glass fibre insulation equivalent to "Anticon", without creases, lapped at joints and turned down 40mm into gutter. Cut sisalation at ridge to allow ventilation beneath ridge capping.

All joints to be fully taped.

#### Ceiling Insulation:

Refer "Floor, Wall & Ceiling Finishes - Sheet Linings".

### **8.5 ROOF SHEETING**

#### Battens:

Fix steel roofing battens of size and spacing recommended by the truss and roofing manufacturer. Fix above sarking and double screw each connection.

Sheet roof with Lysaght 0.48mm BMT "custom orb" colorbond corrugated steel sheeting in single lengths fixed in accordance with the manufacturer's printed instructions.

Laps to be protected from S.W. weather. Particular care to be taken whilst handling sheets and trafficking on finished work.

Crimp corrugation valleys up at top of all sheets. Fixings to be located in an orderly manner, to a consistent torque to avoid unevenness.

Fasteners to be "Buildex" type 17 self drilling hexagon head No. 12 x 50mm screws, coloured to match roofing with neoprene washer, together with similar type-S, No. 8 x 12mm self tapping side lap fixings at mid-span.

Sweep roof and guttering clean at end of each day's work. Project sheeting 50mm into gutters.

Obtain approval on site for the location of all penetrations with before commencing relevant work.

## **8.6     ROOF SAFETY MESH**

Provide roof safety mesh 2mm dia x 300 x 150mm.

Fix mesh to metal purlins by drilling a hole in the top of the purlin and tie it off with at least four full turns around the wire.

The mesh must be lapped 150mm min or if the purlin spacing exceeds 1.5m mesh shall be lapped 300mm

NSW DPI will inspect the installation to comply with WorkCover Code of Practice.

## **8.7     FLASHINGS & CAPPINGS**

Form cappings and flashings generally from 0.8mm zincalume steel, lapped, rivetted and silicon sealed where necessary with 'G.E. Silglaze' or similar approved, in accordance with manufacturer's printed instructions, unless otherwise detailed.

Girth of ridge and hip cappings to be 400mm. Cap ends of ridge and hip cappings to match existing on site.

At vent penetrations, provide full sheet metal flashing from ridge line or seal with approved flexible neoprene gasket pre-coloured to match roofing and pop riveted and sealed to sheeting.

## **8.8     FASCIA**

Install proprietary pre-finished 0.48 BMT colorbond fascia system equal to Lysaght fascias including all necessary accessories. Colour to be selected by NSW DPI.

## **8.9     ROOF ANCHORAGE & LADDER POINT**

Supply and installation of a roof anchorage point and a ladder fixing point in accordance with the requirements of Work Cover to access the roof mounted equipment.

Confirm location of roof and ladder fixing points and the design of the proposed system with the building superintendent prior to commencing work.

The complete system must be designed and certified by a structural engineer that it is in full compliance with WorkCover requirements. Hand one copy of the anchor and installation certificate to the superintendent.

## **9.00 FLOOR, WALL & CEILING FINISHES**

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### **9.1 SEAMLESS VINYL**

Where scheduled, prepare substrate, provide and lay 2.0mm, low-maintenance seamless vinyl as required by NSW government contract, equal to "Accolade Plus" from Armstrong Nylex Pty. Ltd., in strict accordance with the manufacturers' instructions and AS 1884. Material to be 2.00mm thick, 2000mm wide, colour to be selected. Cold weld seams unless recommended otherwise by the manufacturer.

Provide heat weld / epoxy seal at junctions with fixtures, wastes, outlets etc.

NSW DPI to select colour.

### **9.2 TACTILE INDICATORS**

Where shown on the drawings supply and install tactile indicator tiles complying with AS1248.4.

Generally:	Tactile indicators shall be provided at both the top and bottom of the stairs and disabled access ramp.
Proprietary Item:	Granito Tactile tiles.
Size:	300 x 300 x 12mm thick
Type:	Hazard tiles (Dot Type).
Installation:	Refer to drawings for setout location.

### **9.3 SHEET LININGS**

#### Wall Insulation:

Provide "breather" sarking to outer face the full extent of the perimeter stud walling as specified in clause 7.04.

Before fixing linings to external walls provide and install approved R1.5 bulk fibreglass insulation between studs for full height of walls.

#### Ceiling Insulation:

Before fixing linings, supply and install approved R.3.5 fibreglass insulation to all ceiling areas. Fit immediately above ceiling, between ceiling joists and/or roof trusses.

#### Sound Insulation:

Refer clause 7.05.

#### Wet Areas:

Ensure all noggings for rails, soap dispensers, coat hooks, shelves, etc. and waterproof membranes are in place before fixing sheet linings.

#### Plasterboard:

Where scheduled fix recessed edge plasterboard with taped and set joints etc., all screw fixed in accordance with manufacturer's printed instructions to the Laboratory Building.

**Walls: 10mm thick Aquacheck to all walls.**

**Ceiling: 10mm thick plasterboard to all ceilings.**

Set external corners with P32 corner bead from Rondo Building Services Pty. Ltd. or approved equal.

Allow adequate time between the various applications of jointing cement. Joints that peak will be rejected.

Provide 90mm plasterboard cornice as scheduled, secured with cornice cement in accordance with manufacturer's recommendations.

Provide expansion joints to large areas of plasterboard and fibrocement, to avoid cracking / peaking of long sheeted areas. Fix to manufacturer's recommendations.

#### **9.4    EPOXY FLOOR**

Provide an epoxy floor finish equal to Dulux Berger, Jet Dry AquaTread Paving Paint to the Aquaria Shed freezer room as indicated on the drawings.

## **10.00 PAINTING**

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### **10.1 GENERALLY**

Use only the best prepared epoxy, acrylic, and enamel paints of approved manufacture.

All work to be carried out by qualified tradesmen in accordance with AS 2311

Deliver all paint to the works in new sealed and unopened tins or drums and in the colour selected. Carry out all preparation, rubbing down, stopping, filling, cleaning, sanding, etc. Prime coat all steelwork, other than that to be encased in concrete or otherwise treated, with anti-corrosive metallic primer before leaving the workshop.

Protect all finished paint work, and the work of other trades from paint splashes, etc., by the use of screens and drop sheets. Make good any areas so damaged.

### **10.2 SCOPE**

NEW INTERIOR: Paint all elements within the new works, unless specified otherwise.

NEW EXTERIOR: Paint all elements within the new works, unless specified otherwise.

EXISTING: Paint all elements affected by the new work.

Refer to Clause 16.06 for paint types & Cl. 10.07 for exclusions.

### **10.3 COLOUR SCHEDULE**

All colours to be in accordance with colour schedule to be provided by the Superintendent.

### **10.4 SAMPLE PANELS**

Provide in-situ samples of paint colours by completing panels of paintwork as follows:

Externally, an approved area of the building from top to bottom, approximately 1.8m wide, incorporating roofing, guttering, window, verandah posts, etc.

Internally, one area in several major rooms from top to bottom, approximately 1.8m wide, incorporating ceiling, cornices, wall, window, skirting, etc.

Modify colours as required.

### **10.5 PREPARATION OF SURFACES**

Comply with AS 2311.

1. Painted Dressed Woodwork:  
Sand, knot, stop, sand smooth and dust off. Use only plain putty for filling and stopping.  
Remove all arrisses and sand lightly between all coats.
2. Plasterboard:  
Allow to dry thoroughly before commencing any preparations. Make good any surface breaks with plaster based putty and allow to dry. Rub back, dust down, seal with heavy bodied sealer and apply specified coats.
3. Fibre Cement Based Products:  
Allow to dry thoroughly before commencing preparations. Remove nibs, splashes, loose sand and cement.

4. Steelwork  
Clean and touch up any damaged primer. (Refer to Structural engineer's drawings for structural steel preparation)
5. Zinc and Zinc-aluminium steel  
Wash down with mineral turps and clean water. Refer AS 2311.
6. Materials to be treated with special paint finishes  
Prepare surfaces in strict accordance with manufacturers printed instructions.

## 10.6 PAINT TYPES

Paint materials shall be as follows:

1	Plasterboard ceilings generally	Satin latex interior	Sealer & 2 coats
2	Fibre cement ceilings & eaves soffits	Low gloss latex	2 coats
3	Fibre cement walls & soffits	Satin solvent-borne interior	Sealer, undercoat & finishing coat
4	Doors & internal woodwork Internal & external ductwork	Gloss solvent-borne	Primer, undercoat & finishing coat
5	External galvanized steel	Gloss latex	Metal primer & 2 coats
6	All visible structural steel (excludes purlins & girts)	Full gloss solvent-borne	Metal primer, undercoat & 2 finishing coats

## 10.7 EXCLUSIONS

Paint all new surfaces except:

1. Pre-painted metal roofing and accessories.
2. Fair faced brickwork.
3. Pre-finished surfaces generally (e.g. Powder coating, Colorbond)

# Keeler Hardware

Architectural Ironmongers

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## Ironmongery Schedule Notes

### Project No WolJ00329

PRELIMINARY SCHEDULE ONLY NOT FOR CONSTRUCTION UNLESS APPROVED BY CLIENT

ALL FUNCTIONS & DOOR DETAILS T.B.C. PRIOR TO ORDERING

#### KEYING

KEY TO EXISTING SYSTEM - FINAL DETAILS TO BE CONFIRMED PRIOR TO ORDERING

ALLOW FOR CONSTRUCTION/LOAN CYLINDERS

#### ALUMINIUM DOOR HARDWARE FITTING NOTES

BUILDER TO ADVISE ALUMINIUM DOOR FABRICATOR OF THE FOLLOWING:

- 1) MINIMUM LOCK RAIL WIDTH REQUIRED FOR FITTING OF LOCKS SPECIFIED
- 2) MINIMUM TOP RAIL DEPTH REQUIREMENTS FOR FITTING OF DOOR CLOSERS IF SPECIFIED

#### GENERAL NOTES

DOOR SIGNS & DOOR GRILLS ARE NOT PART OF THIS SCHEDULE – CONFIRM REQUIREMENTS

PROVIDE DOOR SEALS TO FIRE/SMOKE DOORS AND DOORS NOMINATED BY CLIENT



# Keeler Hardware

Architectural Ironmongers

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ABN 74000775235  
Contact **WARWICK WILLIAMS**

## Ironmongery Schedule

WOLJ000329

Project number  
Revision  
Description

**Laboratory & Aquaria Shed**  
**Port Stephens Fisheries Centre**

Customer  
Project Contact  
Customer order  
Print date

7. November 2008

Page 1

Building	Level	Zone	Door	Location	Hand	
<b>A</b>	.	.	.	.	.	.
Bldg	Level	Zone	Door	Location	Hand	
<b>A</b>			<b>D01</b>	<b>INDOOR AQUARIA</b>	<b>RH%</b>	<b>SC/MC</b>
<b>10075BBSSS</b>			100x75x2.5 ball bearing hinge	<b>3</b>	<b>EACH</b>	
<b>2801-70SC</b>			brass round end exterior plate cylinder & lever	<b>1</b>	<b>EACH</b>	
<b>2905-70SC</b>			brass round end interior plain plate & lever	<b>1</b>	<b>EACH</b>	
<b>3572M-RSCNCYL</b>			mortice vestibule classroom (no locking inside) NO CYLINDER	<b>1</b>	<b>EACH</b>	
<b>7714SSS</b>			standard doorcloser adjustable back check, delayed action, parallel arm	<b>1</b>	<b>EACH</b>	
<b>KEYING</b>			KA-MK-GMK keying supplied by others [not included]	<b>1</b>	<b>EACH</b>	
Bldg	Level	Zone	Door	Location	Hand	
<b>A</b>			<b>D02</b>	<b>SHARK AREA</b>	<b>LH%</b>	<b>SC/MC</b>
<b>10075BBSSS</b>			100x75x2.5 ball bearing hinge	<b>3</b>	<b>EACH</b>	
<b>2801-70SC</b>			brass round end exterior plate cylinder & lever	<b>1</b>	<b>EACH</b>	
<b>2905-70SC</b>			brass round end interior plain plate & lever	<b>1</b>	<b>EACH</b>	
<b>3572M-LSCNCYL</b>			mortice vestibule classroom (no locking inside) NO CYLINDER	<b>1</b>	<b>EACH</b>	
<b>7714SSS</b>			standard doorcloser adjustable back check, delayed action, parallel arm	<b>1</b>	<b>EACH</b>	
<b>KEYING</b>			KA-MK-GMK keying supplied by others [not included]	<b>1</b>	<b>EACH</b>	
Bldg	Level	Zone	Door	Location	Hand	
<b>L</b>	.	.	.	.	.	.
Bldg	Level	Zone	Door	Location	Hand	
<b>L</b>			<b>D01</b>	<b>WET LABORATORY</b>	<b>1.5PR LH%</b>	<b>ALG</b>
<b>DN205MF</b>			ferrule to suit dn201	<b>1</b>	<b>EACH</b>	
<b>PH3605-FFSSS</b>			300mm single handle surface fixing	<b>1</b>	<b>EACH</b>	
<b>250SC</b>			door stop	<b>1</b>	<b>EACH</b>	
<b>102002-000</b>			12v pto standard elect strike	<b>1</b>	<b>EACH</b>	
<b>3582X-LSCNCYL</b>			23mm backset mortice STOREROOM lock no cylinder	<b>1</b>	<b>EACH</b>	
<b>5800SC</b>			brass round short backset exterior plate cylinder only	<b>1</b>	<b>EACH</b>	
<b>5905-70SC</b>			brass round short backset interior plain plate & lever	<b>1</b>	<b>EACH</b>	
<b>7714SRSSS</b>			slide rail doorcloser hold open, adjustable back check, delayed action	<b>1</b>	<b>EACH</b>	
<b>LC8810</b>			277mm cable transfer device - lead cover	<b>1</b>	<b>EACH</b>	
<b>A104-SAA</b>			130x39 heavy duty double fix aluminium hinge square knuckle FIXED PIN satin	<b>6</b>	<b>EACH</b>	
<b>202-300SC</b>			flush bolt to suit aluminium doors with 300mm rod	<b>2</b>	<b>EACH</b>	
<b>KEYING</b>			KA-MK-GMK keying supplied by others [not included]	<b>1</b>	<b>EACH</b>	
Bldg	Level	Zone	Door	Location	Hand	
<b>L</b>			<b>D02</b>	<b>WET/GENERAL LAB</b>	<b>1.5PR RH</b>	<b>SC</b>
<b>6GX3-4INCSKSTSS</b>			6g x 3/ 4 csk x/r self tappers stainless steel	<b>16</b>	<b>EACH</b>	
<b>KP390X200X1.2SFSS</b>			kick plate 390x200x1.2mm sss c/sunk screw fix	<b>1</b>	<b>EACH</b>	
<b>KP820X200X1.2SFSS</b>			kick plate 820x200x1.2mm sss c/sunk screw fix	<b>1</b>	<b>EACH</b>	
<b>1751SCP-02</b>			1751 barrel bolt 150mm with brass shoot SCP	<b>1</b>	<b>EACH</b>	
<b>1751SCP-03</b>			1751 barrel bolt 200mm with brass shoot SCP	<b>1</b>	<b>EACH</b>	
<b>1759ALY</b>			1759 top hat ferrule to suit 1751 10mm ALY	<b>1</b>	<b>EACH</b>	
<b>250SC</b>			door stop	<b>1</b>	<b>EACH</b>	
<b>10075BBSSS</b>			100x75x2.5 ball bearing hinge	<b>6</b>	<b>EACH</b>	
<b>2805-70SC</b>			brass round end exterior plain plate & lever	<b>1</b>	<b>EACH</b>	
<b>2905-70SC</b>			brass round end interior plain plate & lever	<b>1</b>	<b>EACH</b>	
<b>3570-4902SC</b>			mortice lock rebate kit	<b>1</b>	<b>EACH</b>	
<b>3574SC</b>			mortice passage latch (no locking function) NO CYLINDER	<b>1</b>	<b>EACH</b>	
<b>7714SSS</b>			standard doorcloser adjustable back check, delayed action, parallel arm	<b>1</b>	<b>EACH</b>	

# Keeler Hardware

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Contact **WARWICK WILLIAMS**

## Ironmongery Schedule

WOLJ000329

Project number  
Revision  
Description

**Laboratory & Aquaria Shed**  
**Port Stephens Fisheries Centre**

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**Page 2**

Bldg	Level	Zone	Door	Location	Hand	
L			<b>D03</b>	<b>GENERAL LAB</b>	1.5PR RH%	ALG
			<b>DN205MF</b>	ferrule to suit dn201	1	EACH
			<b>PH3605-FFSSS</b>	300mm single handle surface fixing	1	EACH
			<b>250SC</b>	door stop	1	EACH
			<b>102002-000</b>	12v pto standard elect strike	1	EACH
			<b>3582X-RSCNCYL</b>	23mm backset mortice STOREROOM lock no cylinder	1	EACH
			<b>5800SC</b>	brass round short backset exterior plate cylinder only	1	EACH
			<b>5905-70SC</b>	brass round short backset interior plain plate & lever	1	EACH
			<b>7714SRSSS</b>	slide rail doorcloser hold open, adjustable back check, delayed action	1	EACH
			<b>LC8810</b>	277mm cable transfer device - lead cover	1	EACH
			<b>A104-SAA</b>	130x39 heavy duty double fix aluminium hinge square knuckle FIXED PIN satin	6	EACH
			<b>202-300SC</b>	flush bolt to suit aluminium doors with 300mm rod	2	EACH
			<b>KEYING</b>	KA-MK-GMK keying supplied by others [not included]	1	EACH
Bldg	Level	Zone	Door	Location	Hand	
L			<b>D04</b>	<b>UNDER FLOOR SPACE</b>	RH	SC
			<b>HINGES BY OTHERS</b>	hinges supplied by others	1	EACH
			<b>PADBOLT</b>	padbolt by gate fabricator [not included]	1	EACH
			<b>PADLOCK</b>	padlock & keying supplied by others [not included]	1	EACH
Bldg	Level	Zone	Door	Location	Hand	
L			<b>D05</b>	<b>LAB CUPBOARD</b>	LH%	SC
			<b>NL450SSS</b>	Nightlatch with Snib - less Cylinder	1	EA
			<b>10075FPSSS</b>	100x75x2.5 fixed pin hinge	1	EACH
			<b>KEYING</b>	KA-MK-GMK keying supplied by others [not included]	1	EACH

## **12.00 COMMUNICATIONS**

---

### **12.1 DEFINITION OF TERMS**

"Krone" means Krone (Australia) Technique Pty Ltd

"Department of Primary Industries" or "DPI" shall mean the Department of Primary Industries, its agent or representative.

"Department of Primary Industries Superintendent" shall mean Department of Primary Industries' nominated representative appointed under the General Conditions who will exercise the liaison and control provisions as set out hereunder.

"ACA" shall mean Australian Communications Authority

"TO" shall mean Telecommunications Outlet

#### **Intent**

The work requested under this Scope of Works shall comprise the supply, installation, termination, and testing of a structured cabling system built to the proposed Category 5 enhanced standard for use as an integrated voice and data network.

This Scope of Works shall be read in conjunction with the attached RFQ or Tender documentation, General Specification and site plans showing the position of cable outlets and equipment cabinets, and the attached site specific details.

Where the contractor finds difficulty with the specifications, the contractor shall refer to the overarching contract.

#### **Ambiguity**

Where the Contractor finds an ambiguity or contradiction between this Scope of Works and any other site specific or general documentation, or between the site documentation and the actual site conditions, the Contractor shall advise The Project Manager who shall provide written clarification.

#### **Contractor Qualifications**

Attention is drawn to the relevant section of the General Specification (1.8 Approved Manufacturers System). The appropriately Krone endorsed Contractor shall install, test and commission the integrated cabling, including but not exclusive to wiring, cable runways, outlets, cabinets and enclosures. This work shall not be subcontracted to another party.

Krone endorsement certification to be supplied for verification and confirmation prior to commencement of cabling.

Where the contractor wishes to utilise existing conduiting in a campus environment, the contractor shall confirm ownership of said conduit with the appropriate authorities, and seek approval from the owner of the conduit for the laying of any new cabling, or replacement of old cabling.

Where trenching is necessary to lay new conduit, the contractor shall confirm with 'Dial before you Dig' before instigating said trenching.

DPI is obligated under the OHS Act 2000 and the OHS Regulation 2001 to ensure that any contractor or employee has undertaken a recognised form of OHS induction training for construction work. This is deemed to include cabling contractors.

A green card from an accredited workcover course is the preferred evidence of this training.

If alternative form of evidence is submitted, it will need to be assessed on an individual basis.

### **12.2 SCOPE OF WORKS - AQUARIA**

#### **External Works**

##### **Pit and Pipe Work**

2 x 50mm conduits between new building and old admin building pit as per diagram (one each for Fibre and Voice Cables). Cables may be run through existing building conduit infrastructure between PABX room and exit point in old admin building.

Existing conduit may be used if meets spec.

1 x 30 pair voice cable between BD and PABX CD (in existing building)

Pits to be included at changes of direction or at intervals of not more than 50 metres.

### **Internal Works**

Comms Cabinet – new Laboratory building

- 1 x 12 RU Cabinet located as per electrical drawings, with lockable door and orientated to permit easy access to both front and rear of cabinet.
- 1 x shelf
- 3 x 32 port Krone Highway RJ45 patch panel
- 4 x cable managers with horizontal and vertical keepers
- 1 x Fibre Optic breakout tray (12 fibre)
- 6 x termination of fibres (3 pair)
- 15 x green 1 metre Cat5e patch leads (supply only, in new building Comms rack)
- 15 x blue 1 metre Cat5e patch leads (supply only, in new building Comms rack)

Comms cabinet layout as per attached diagram 1.

New Laboratory Cabling

- 36 x Cat5e telecommunication outlets in triple (12 x 3) faceplate mountings located as per diagram.

New Laboratory Distributor – located near, but not in Comms rack - location to be confirmed with DPI

- 1 x Krone 11 way frame
- 30 pair Krone termination blocks
- 30 pair tie cable to existing building
- 30 pair tie cable to Comms cabinet

PABX Room – Old admin building

- Pull back and secure fibre from 'Blue Lab' in a secure location - if necessary.
- Re-run fibre to new lab, terminate and test 3 pair fibre on fibre panel in Comms rack.
- Supply and terminate 20 pair Krone blocks.
- Fibre tray from 'Blue Lab' may be recovered and re-located to new Lab if /when
- approved by DPI

### **External Works**

#### **Pit and Pipe Work**

2 x 50mm conduits between new building and old admin building pit as per diagram (one each for Fibre and Voice Cables). Cables may be run through existing building conduit infrastructure between PABX room and exit point in old admin building.  
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- 1 x Fibre Optic breakout tray (12 fibre)

- 6 x termination of fibres (3 pair)
- 15 x green 1 metre Cat5e patch leads (supply only, in new building Comms rack)
- 15 x blue 1 metre Cat5e patch leads (supply only, in new building Comms rack)

Comms cabinet layout as per attached diagram 1.

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- Re-run fibre to new lab, terminate and test 3 pair fibre on fibre panel in Comms rack.
- Supply and terminate 20 pair Krone blocks.
- Fibre tray from 'Blue Lab' may be recovered and re-located to new Lab if /when approved by DPI

### **12.3 SCOPE OF WORKS - AQUARIA**

#### **External Works**

##### **Pit and Pipe Work**

- 2 x 50mm conduits between Aquaria and old admin building pit as per diagram. (one each for Fibre and Voice Cables). Cables may be run through existing building conduit infrastructure between PABX room and exit point in old admin building.
- Existing conduit may be used if meets spec.
- 1 x 10 pair voice cable between BD and PABX CD (in existing building)

Pits to be included at changes of direction or at intervals of not more than 50 metres.

#### **Internal Works**

##### **Comms Cabinet – Aquaria building**

- 1 x 12 RU Cabinet located as per electrical drawings with lockable door and orientated to permit easy access to both front and rear of cabinet.
- 1 x shelf
- 2 x 32 port Krone Highway RJ45 patch panel
- 4 x cable managers with horizontal and vertical keepers
- 1 x Fibre Optic breakout tray (12 fibre)
- 4 x termination of fibres (2 pair). Existing equipment may be re-used if it meets spec.
- 5 x green 1 metre Cat5e patch leads (supply only, in new building Comms rack)
- 5 x blue 1 metre Cat5e patch leads (supply only, in new building Comms rack)

Comms cabinet layout as per attached diagram 2.

#### **Aquaria Cabling**

- 6 x Cat5e telecommunication outlets in triple (2 x 3) faceplate mountings located as per diagram.

Aquaria Distributor – located near, but not in Comms rack - location to be confirmed with DPI.

- 1 x Krone 11 way frame
- 20 pair Krone termination blocks

- 10 pair tie cable to existing building
- 10 pair tie cable to Comms cabinet

#### **12.4 PABX ROOM – OLD ADMIN BUILDING**

Pull back and secure fibre from existing rack/building to secure location - if necessary. Re-run fibre to Aquaria building, terminate and test 2 pair fibre on fibre panel in Comms rack. Supply and terminate 10 pair Krone blocks. Fibre tray from existing rack in Aquaria may be recovered and re-used in new rack.

##### **Removal of old cabling**

All obsolete data cabling and outlets shall be removed from floor, ceiling or wall cavities where new cabling is proposed.

##### **Application assurance and Warrantee**

Tenderer shall provide a 15 years industry standards compliance warranty for Class D Channel performance, backed by KRONE's 15 year warranty from the date of successful completion of testing and commissioning of the Structured Cabling System.

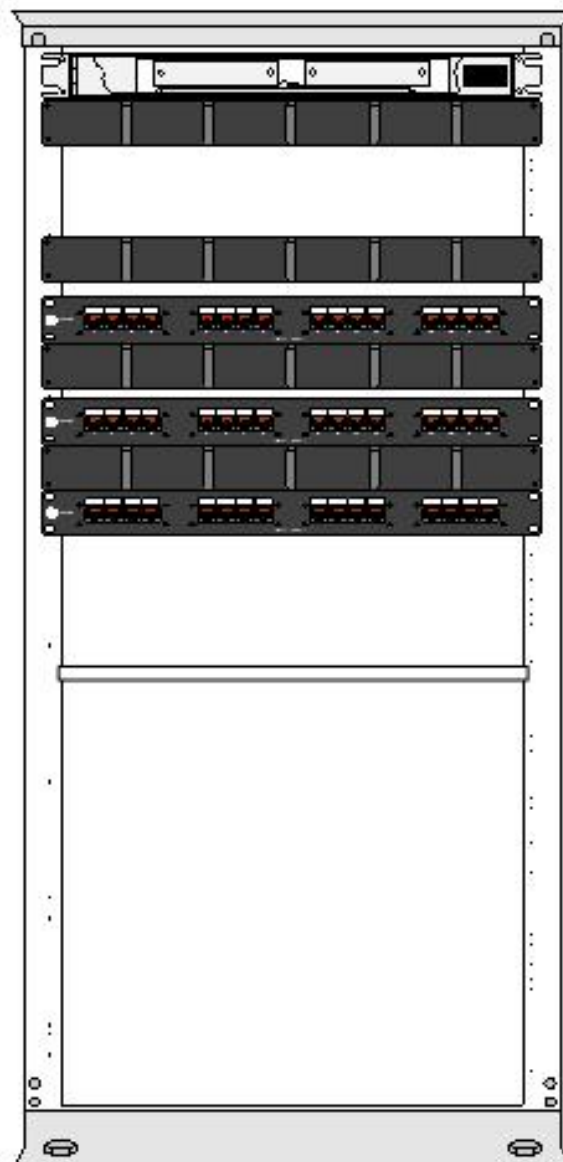
The 15 year application assurance shall cover the failure of the offered cabling system to operate the applications that the system was initially designed to support i.e.; those identified in the current (at the time of tendering) versions of the Cabling Performance Specifications (that is the AS/NZS 3080:2003, ISO 11801 or TIA/EIA 568-B.2).



***Pt Stevens - DPI  
New Laborotary  
Communications Cabinet Layout***

***Diagram 1***

12 RU Cabinet



Fibre Optic Breakout Tray  
*cable management*

2 RU vacant for equipment

Voice Tie Cable

Telecommunications Outlets

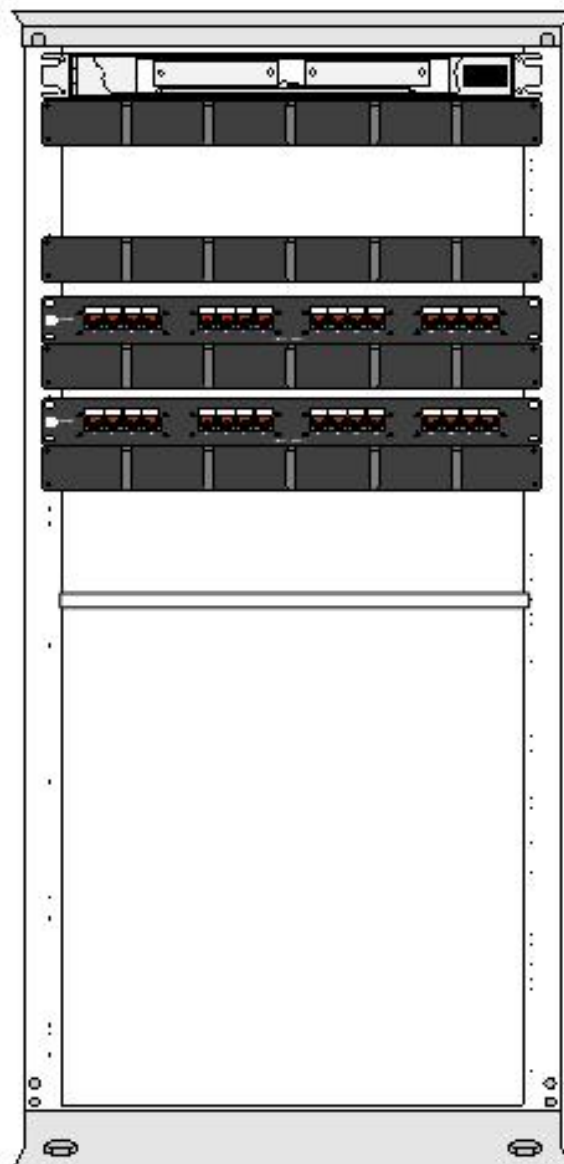
Telecommunications Outlets

shelf

***Pt Stevens - DPI  
Aquaria  
Communications Cabinet Layout***

***Diagram 2***

12 RU Cabinet



Fibre Optic Breakout Tray  
*cable management*

2 RU vacant for equipment

Voice Tie Cable

Telecommunications Outlets

shelf



## 13 GENERAL ELECTRICAL REQUIREMENTS

### 13.1 GENERAL

Prior to any work on site the contractor shall co-ordinate all services isolation with NSW Department of Primary Industries engineering.

#### Scope of Work

This electrical sub-contract consists of, but is not necessarily limited to the supply, installation and commissioning of the following:

- Provision of New Distribution Board (DB-M, DB-Q1 and DB-Q2)
- Provision of sub-mains cabling and conduits.
- Provision of internal lighting.
- Provision of power to outlets, equipment, appliances as detailed.
- Provision of power to isolators for mechanical services to air conditioning units.
- Provision of lighting control cabling and equipment as detailed.
- Provision of all communication racks, equipment and cabling necessary to provide a complete workable system.
- Replacement of DB-M required sequence:
  - o Install new sub-mains
  - o Complete all new electrical fit out works in both New Laboratory and Aquaria buildings.
  - o When new works construction is complete replace existing DB-M with new IP56 switchboard – change over to be done over weekend period, seek prior approval from NSW Department of Primary Industries management for all shut down work.
  - o Reconnect existing DB-M to new DB-M board and retain existing electrical services.
  - o Connect new additional sub-mains for New Laboratory and Aquaria buildings.
  - o Remove all existing electrical services connections in Blue Laboratory ready for demolition.
  - o Existing Blue Laboratory will then be demolished and concrete slab directly under DB-M will be retained for DB-M mounting base.
  - o Provide spare conduits for future services as documented.

All of the above as per the contract drawings.

- All electrical services in wet areas to be IP.56 rated or equivalent as shown on drawings.
- Testing and commissioning of installation.
- Maintenance and warranty service during the warranty period.

All electrical accessories are to maintain double insulation with their mounting method. For example, architrave switches in aluminium door frames must have a rubber boot fitted over the terminals; isolating switches must have the supplied caps fitted over the mounting screws.

All underground cables to be installed in conduit with marking tape.

All metallic pipes entering the building are to be bonded to the main Earth conductor.

The building will be designated with a unique identifier by NSW Department of Primary Industries and this identifier is to be used for Distribution Board identification.

All rooms in a building are to be numbered and the number used for the electrical legend. (Rm C8).

The installation should provide flexibility and ability to accommodate changes and expansion of facilities over the life of the building.

Items of equipment of a common type are to be from the same manufacturer.

Pay all fees lawfully imposed by relevant Electricity Supply or Telecommunications Authorities in provision of supply and services.

Provide a “declaration of conformity” that equipment installed as part of this contract complies with the Australian Communications Authority Electromagnetic Compatibility Framework requirements that applied from 1<sup>st</sup> January, 1999.

The specified works is shown on the following drawings and forms part of the works:-

- E-01 LEGEND, NOTES & SCHEMATICS
- E-02 SITE – RETICULATION
- E-03 LABORATORY & AQUARIA FLOOR – POWER, DATA & LIGHTING LAYOUT
- E-04 SINGLE LINE DIAGRAM, SCHEMATIC & BLOCK DIAGRAM

#### **Standard**

Building Code of Australia  
AS 3000, AS2430, AS2381  
NSW Service and Installation Rules  
Australian Communications Authority  
Any other authority having jurisdiction over this installation.

#### **Operating environment**

Provide an electrical system and elements which are suitable for the ambient service conditions and operating environment with components and equipment suitable for the system application.

#### **Electromagnetic compatibility**

Electrical and electronic apparatus: To AS/NZS 4251.1 and AS/NZS 4252.1.

**All equipment shall be Clipsal range.**

### **13.2 EXISTING SERVICES**

The Contractor shall be responsible for the complete removal of all existing electrical services not required under these works as indicated on drawings.

#### **Re-Use of Existing and Redundant Cabling**

The Contractor may re-use existing power and lighting cabling if economical to do so. Any re-used circuits shall comply with AS/NZS 3000:2007.

#### **Demolition Work**

Where electrical services exist in walls to be demolished, the Contractor shall ensure the circuit is disconnected and made safe for the demolition works to proceed.  
The Contractor shall re-route all services cabling that is required for the correct operation of services elsewhere internal or external to refurbished areas and runs through a wall or structure that is to be demolished as part of the specified works.

#### **Power Cabling**

The Contractor is responsible for the complete removal of all redundant power and lighting cabling. Cables shall be removed from the redundant equipment back to the switchboard where possible. Cables rendered in a wall that cannot be removed shall be cut at the wall and the remaining cable removed up to the switchboard.

#### **Investigation and work plan**

Work plan: Submit the work plan before demolition or stripping work. Include the following information:

- Locations and details of necessary service deviations and terminations.

#### **Demolished materials**

Ownership: Ownership of demolished materials is described in the **Demolished materials classes table**.

#### **Demolished materials classes**

Ownership and implementation: Comply with the **Demolished materials classes table**.

##### **Demolished materials classes table**

Class	Requirement	Ownership
-------	-------------	-----------

Laboratory Building & Aquaria Shed, Port Stephens Fisheries Centre – BES200805

Recovered items for re-use in the works	Recover without damage items identified in the <b>Recovered items for re-use in the works schedule</b>	Principal/proprietor
Demolished material for recycling off site	Demolish and deliver for recycling material identified in the <b>Demolished material for recycling off-site schedule</b>	Contractor
Demolished for removal	Remove from the site demolished materials identified in the <b>Demolish for removal schedule</b> . Do not burn or bury on site Transit: Prevent spillage of demolishing materials in transit	Contractor

### 13.3 INSPECTION

#### Notice

Give sufficient notice so that inspection may be made at the following stages:

- Trench excavation before installing cables.
- Underground and concealed conduits before concealment.
- Concealed cabling prior to covering.
- Switchboard terminations, prior to installing escutcheon plates.
- Required tests.

### 13.4 INSTALLATION TESTING AND COMMISSIONING

Provide manuals for all systems showing all technical details of the system, maintenance, operational procedures and as-installed drawings.

Provide 12 months maintenance for the following:

Emergency and Exit Lighting: To AS 2293.2

Fire Detection and Alarms: To AS 1851.8

Maintain an on site record of maintenance visits.

#### Test certificates

Provide copies of test certificates for all tests.

Number of copies of test certificates: > 2

#### Balancing of load

Balance the load at practical completion.

### 13.5 CONTRACTOR'S SUBMISSIONS

#### Product data

Submit manufacturer's published product data, including

- technical specifications;
- recommendations for installation.

#### Shop drawings

Submit shop drawings showing system schematics, interface to existing system, dimensions of equipment, location, circuit identification and labelling details for the following:

- switchboards
- structured cabling system

#### Work-as-executed drawings

Prior to practical completion submit work-as-executed drawings showing the "as installed" location of electrical cables, services and equipment including the depth of underground cables, in relation to permanent site features and other underground services.

#### Operating and maintenance manuals

4 copies.

### 13.6 CONSTRUCTION GENERALLY

#### System integration

Interconnect the elements so that the system performs its required functions.

#### Wiring

Conceal wiring runs, except within plant room. Where cable ladders are to be used.

Concealed wiring: Easily rewirable, without damage to finishes or materials.

#### Building penetrations

Proprietary system: > To approval

Limitations: Unless prior approval has been given do not penetrate:

- Structural members including external walls, fire walls, floor slabs and beams; or
- Membrane elements including damp-proof courses, waterproofing membranes and roof coverings.

Membranes: Where approval is given to penetrate membranes, provide a waterproof seal between the element and the penetrating pipe, conduit or cable.

Fire rated elements: Seal the penetration using a system conforming to AS 4072.1.

Non fire rated elements: Seal penetrations around conduits and sleeves with a weak sand:cement mix or other approved material. Seal the space between cables within sleeves with a pliable waterproof compound. If the building element is acoustic rated, maintain the rating by packing the penetration with a suitable insulation.

Concrete building elements: Obtain approval for the location of sleeves or core holes.

**Labelling**

General: Provide labels to operable control devices and indicators.

Wiring: Identify the origin of wiring by means of legible indelible marking.

**13.7 FINAL LOCATION & UNIFORMITY**

The locations shown on drawings for all equipment, fittings and accessories are approximate only. Final locations shall be determined on site to comply with site requirements, relevant Standards and Codes of Practice and to suit architectural layouts.

The tenderer/contractor shall allow for movement of up to 3m prior to installation without extra cost.

**13.8 RETICULATION AND PROTECTION**

Provide RCD protection as shown on the drawings. Standards to AS 3190 and AS 3175. RCDs are to be an approved type combined overload and circuit breaker having a rated tripping current of 30 mA and complying with AS 3190.

Reduced size neutral conductors in any wiring system is not permitted.

Maintain separation between telecommunications and power cabling in accordance with AS 3084.

Provide surge protection on all power and communications cables entering the building.

Outlets to have in-built plug-in insert type labelling for circuit identification and colour coded as to function.

**14 SWITCHBOARDS**

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**14.1 GENERAL****General**

Switchboard to be IP56 Merlin Gerin or approved equal and capable of housing all lighting control equipment. Submit shop drawings of proposed boards for approval to John Lean prior to ordering.

**Interpretation**

Throughout this section the term "switchboards" refers to low voltage switchgear and control gear assemblies.

All distribution boards to be metal construction using DIN rail circuit breakers and incorporating a centre mounted Main Switch. A minimum 25% spare pole capacity required on the board when the project is finished.

Incoming mains must be insulated on the main switch terminals -this allows work to be performed on the board later without any exposed live terminals.

All electrical equipment shall be labelled with Distribution Board identification and circuit breaker number e.g. C 1-CB36. In addition, the Distribution Board legend shall cross reference the circuits supplied by each circuit breaker.

Generally, circuits should not be labelled with PI, LI etc. (causes confusion when selecting the correct circuit breaker to isolate).

Hand written identification/ labels will not be acceptable.

All switch board labelling must comply with 4.21 and 4.22 of NSW Service and Installation Rules

Soft copy of the switch board legend is required in Microsoft format.

**Approved manufacturers**

The switchboard shall be provided by an approved switchboard manufacturer.

**14.2 DESIGN****Standard**

To AS 3439.3 or AS 3439.1, as required.

**Circuit protection**

Provide circuit protection by means of automatic circuit breakers and reuse of provided circuit breakers where possible.

**Conductors**

Busbars: Provide busbar circuits within the switchboard, extending from the termination of the incoming functional unit to the line side of protective equipment for outgoing functional units.

Cable interconnections: Do not use to link adjacent circuit breakers where proprietary multi pole busbar assemblies are readily available.

**Fault levels**

The values given are prospective symmetrical r.m.s. values of the short-circuit current at the switchboard input terminals. Provide conductors and equipment suitable for a rated prospective short-circuit withstand current.

**Degrees of protection**

To AS 1939.

Minimum degrees:

- General: IP41.

**Spare facilities**

Provide minimum 25% spare pole capacity.

**Switchboard schedule**

As per drawings

**14.3 CUSTOM-BUILT SWITCHBOARDS****Definition**

Switchboards purpose-built to the requirements of the contract documents.

**14.4 CONDUCTORS FOR CUSTOM-BUILT SWITCHBOARDS****Busbars**

Materials: Hard drawn, high conductivity electrolyte tough pitch copper.

Phase sequence: For main busbars and connections to switching devices, red, white and blue from left to right and from top to bottom, when viewed from the front of the switchboard.

Current carrying capacity: Provide busbars of current rating required or, if not stated, based on the frame size of all outgoing functional units and the load diversity factors given in AS 3439.1.

Busbar links: Provide removable links for current transformers.

Jointing: Make busbar joints with high tensile steel bolts, washers and nuts, locked in position with lock nuts or locking tabs. Do not use tapped holes and studs for jointing current carrying sections.

Busbar insulation: Active and neutral busbars: Select from the following:

- Polyethylene: Minimum 0.4 mm thick with dielectric strength in accordance with AS 3000 of 2 kV r.m.s. for 1 minute. Apply by a fluidised bed process in which the material is directly cured onto the bars.
- Fully encapsulated busbars or close fitting busbar insulation mouldings: Not less than 1 mm thick.
- Heat shrink material: Use only on rounded edge busbars.

### **Wiring**

Cable type: Provide PVC insulated copper cables to AS 3147 and rated to AS 3008.1.

Control and indication circuits: Provide conductors of not less than 1 mm<sup>2</sup> with 32/0.2 stranding sized to suit the current carrying capacity of the particular circuit.

### **Terminations**

Motor control centres: For connections up to and including 16 mm<sup>2</sup> provide DIN rail mounted, spring loaded, tunnel type terminal blocks. For connections to circuits above 16 mm<sup>2</sup> provide stud type terminals not less than 5 mm diameter sized to continuously carry the load. Fit insulated sleeve ferrules to flexible cables terminated in tunnel terminals.

Identification: Identify each cable at both ends with neat ring type ferrules.

## **14.5 SWITCHGEAR FOR CUSTOM-BUILT SWITCHBOARDS**

### **Moulded case and miniature circuit breakers**

Standards:

- To AS 3858 for fault capacities of 10 kA or more.
- To AS 3111 for miniature overcurrent circuit breakers up to 125 A current rating and less than 10 kA fault capacity.

Type: Automatic trip.

Adjustable current settings: Make provision for sealing of the trip current adjustment control, to prevent tampering, if adjustable with the covers in position. Where the adjustment control is concealed behind the cover or escutcheon, no sealing facility is required. Provide a label mounted on or adjacent to the circuit breaker indicating the rated current and trip current setting.

Trip setting: Set all adjustable short circuit trip settings to the "low" position.

Trip units: Connect circuit breakers with interchangeable trip units so that the trip units are not "live" when the circuit breaker contacts are open.

Clip tray chassis: For miniature overcurrent circuit breakers provide clip tray assemblies, capable of accepting the installation of single, double, or triple circuit breakers, and related busbars. Provide moulded clip-on pole fillers for all unused portions of the chassis.

**Switch-isolator and fuse-switch units**

Standards: To AS 3947.3 and AS 3133

Utilisation category: For circuits comprising essentially motor or other highly inductive loads, not less than AC-23. For other circuits, not less than AC-22.

Locking: Provide a facility to lock the unit in the OFF position.

Fuse-switch units: Ensure fuse links are isolated when the switch contacts are open.

**Fuses**

Provide fuses which discriminate with other protective equipment.

Let-through energy and peak current cut-off: Suitable for the protected equipment.

Standard: To AS 2005 Parts 10, 20, 21.1, 21.2, and 29.

Type: Use enclosed, high rupturing capacity (HRC) type, except that unenclosed fuses may be used as fault current limiters.

Unenclosed fuses: Provide barriers to prevent inadvertent electrical contact between phases by a foreign metallic straight object, on both sides of each fuse link. Where necessary for safe removal and insertion of the fuse carrier, provide extraction handles.

**Residual current devices**

Standard: To AS 3190.

Tripping:

- Maximum tripping time: Type II, to AS 3190 and AS 3000.

**14.6 CONTROLGEAR FOR CUSTOM-BUILT SWITCHBOARDS****Contactors**

Standard: To AS 3947.4.1 for a.c. contactors.

Type: Block type, air break.

Rated duty: Intermittent; 1 or 3 operating cycles per hour.

Minimum size: 16 A for single phase at 240 V a.c.

Mechanical durability:  $10 \times 10^6$  no-load operating cycles.

Utilization category: Not less than AC-3.

Contacts life: 1 million operations at utilization category AC-3.

Short circuit protection: Type "1".

Auxiliary contacts: Provide auxiliary contacts with minimum one normally open and one normally closed separate contact with rating of 4 A at 240 V a.c.

**Alternating current motor starters**

Standard: To AS 3947.4.1.

Selection: Provide DOL motor starters except where limitations on starting currents preclude their use.

Rated values: Not less than:



- Rated operational current: The full load current of the load controlled.
- Rated duty: Intermittent; 1, 3 or 12 operating cycles per hour.
- Mechanical durability:  $0.3 \times 10^6$  no-load operating cycles.
- Utilization category: AC-3.

### Motor protection

Single phase motor protection: If required by AS 3000 and if mounted in the switchboard, provide a manual reset overload device.

Three phase motor protection: Provide thermal overload protection relays for each motor.

Thermal overload protection relays:

- Standards: To AS 3947.5.1.
- Construction: For three phase operation, provide triple pole relays with differential trip bar operation for single phase protection, and with ambient temperature compensation.

In addition provide the following:

One set of normally open and normally closed auxiliary contacts with minimum operational current of 4 A at 240 V a.c.

Thermal overload connections directly to the contactor using proprietary links.

Manual reset.

## 14.7 SURGE DIVERTERS

Provide surge protection as shown on drawings.

Protection is to be installed within the switchboard. Provide an identifying label for the protection devices and locate on cover of switchboard in front of sections where devices are located.

Provide label on front cover with explanation of LED status indication and procedure to be followed when the LED indicates protection is no longer effective. Mount these devices such that the status indicators are readily visible without the need to remove any cover panels.

### Type

- Connection type: parallel
- Voltage: 120-275VAC & 120-300VDC
- Current rating: 32A
- Cut off frequency (-3dB at full load): <1KHz
- Attenuation (at full load): >60dB @ 1MHz
- Clamping Voltage (A-N)/(N-E): 470Vrms/650Vrms
- Response time: <5nS
- Maximum surge current (8/20nS): 50KA
- Peak let-through voltage (10KA A-N): 800V
- Energy absorption (8/20uS A-N)/8/20uS N-E): 550J/400J
- LED Status indication; and
- DIN rail mounting

## 14.8 LABELS

### Marking

For each switchboard, include labels for switchboard designation, functional units, control switches, circuit designations and ratings, fuses, warning notices, switchboard manufacturer's name and source of electrical supply for other than main switchboards. Identify separate sections of enclosures.

### Fixing

Screw fix or rivet each label adjacent to the relevant item of equipment.

**Material**

Two colour laminated plastic, or photo anodised rigid aluminium.

**14.9 CIRCUIT SCHEDULE****General**

Provide a schedule holder and typed circuit schedule and install adjacent to the switchboard.

**15 WIRING AND ACCESSORIES**

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**15.1 CONTRACTOR'S SUBMISSIONS****Power cable ratings**

If cable sizes are not given, submit calculations of current ratings and voltage drop, to AS 3008.1.

**Columns and footings**

Submit shop drawings of lighting/power columns and structural drawings of their footings.

**15.2 WIRING SYSTEM INSTALLATION****General**

Lighting system to general spaces shall be reticulated using normal practice of cable tray or ladder, and catenary systems within concealed ceiling spaces with corrugated conduit to luminaires. Where there are no concealed ceiling spaces, reticulation shall be by exposed cable tray or ladder in accordance with Australian Standards. Maintain IP56 level where possible to all installations in wet areas.

Power cabling shall be as far as possible run on tray or ladder systems or conduit to final outlet locations. Maintain IP56 level where possible to all installations in wet areas.

**Lighting Control Cabling****General**

Supply and install a new lighting control system as indicated on the drawings.

**Straight-through joints**

Unless unavoidable due to length or difficult installation conditions, run cables for their entire route length without intermediate straight-through joints.

Details of joints: > To be submitted for approval

**Cable joints**

Locate joints in accessible locations.

**Cable support system**

A cable support system shall:

- be provided to support all runs of three or more cables. It shall comprise:
  - Cable Tray; and/or
  - Cable Ladder tray; and/or
  - Cable Ladder

- be fitted with the manufacturer's standard bends, risers, curves, reducers and fishplates.
- be fixed to approved hot dipped galvanised steel brackets and hangers.
- fixed such that there is an air space of 50mm minimum to the structure to which it is secured.
- be supported such that the maximum deflection between adjacent supports does not exceed 10mm when fully loaded.
- be installed parallel or at right angles to the building structure and planning grids.
- be sized so that it is loaded to not more than 80% of its capacity (width) including spaces between cables for derating purposes.

Cable tray shall be:-

- be perforated hot dip galvanised sheet steel with a rolled return edge with 40% (minimum) of its surface area open for air circulation.

Cable ladder shall be:-

- hot dipped galvanised, steel ladder.
- Only be used for cables which are self supporting between rungs.

Cable laddertray shall be:-

- hot dipped galvanised steel.

Keep tray and support cuts to a minimum and where they are necessary protect with two layers of galvanised paint.

### 15.3 POWER CABLE SELECTION

#### Cable

Use multi-stranded copper cable, or MIMS.

Minimum size: 1.5 mm<sup>2</sup> for lighting circuits and 2.5 mm<sup>2</sup> for power circuits.

MIMS cables: 1 kV/1 kV class bare cable.

PVC insulated cables: Use XLPE insulated for submain and PVC insulated for final subcircuits.

All power circuits to be individually protected by circuit breakers supplied or RCD/MCB units.

Generally, GPO's to be identified with a label.

### 15.4 CONDUITS

#### Installation

If exposed to view, install conduits in parallel runs with right angle changes of direction.

#### Inspection fittings

Use accessible type.

#### Non-metallic conduits and fittings

To AS/NZS 2053, as appropriate.

Corrugated conduit: In slabs, use high compression corrugated conduit and restrain at regular intervals to achieve a nominally straight run.

## 15.5 TRUNKING

### Standard

General: To AS/NZS 4296.

### Accessories

Provide purpose-made accessories and covers to match the trunking system. Use screw fixed covers. Alternatively, use clip-on covers which are removable only with the use of tools.

## 15.6 POWER OUTLETS

- a) The building should allow for wiring access, cable and conduit supports in the form of cable trays. The cable trays are to be sized to carry the fit out cabling and not cause cable capacity derating.
- b) Outlets to be in general of the Clipsal IP-56 type.
- c) All power outlets to be labelled with CB and DB identification.

## 15.7 EARTHING

Provide a complete earthing system for the installation, in accordance with AS3000. Provide one main earthing point at the Main Switchboard and run a separate earthing conductor to new earth stake.

## 16 LUMINAIRES

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### 16.1 GENERAL

#### STANDARDS

##### Standards

Luminaires: To AS 3137.

#### INTERPRETATIONS

##### Definitions

Proprietary luminaires: Luminaires available as a catalogue item.

Custom-built luminaires: Luminaires manufactured to order.

##### Lighting Circuits

Generally all internal fluorescent lighting to be T5 type with low glare louvres.

All lighting to be HPF where a choice is available. Load of lighting points on each circuit not to exceed 80% of circuit protection.

Generally, rooms infrequently occupied to have lights controlled by PIR detector and control switch wired in series.

All light switches to be labelled.

### 16.2 LUMINAIRES

#### General

Compliance with AS 1680 "Code of Practice for interior lighting and Visual Environment".

Supply luminaires complete with lamps and required accessories. All luminaires are to comply with Supply Authority requirements for audio frequency rejection equipment for shunt capacitor installations.

**Thermal characteristics**

To AS 3137 Category A.

**Power factor correction**

Provide correction which achieves a power factor of not less than 0.85 lagging after 2 hours of continuous operation.

Standard: To AS 2644.

**Control Gear**

Unless otherwise indicated provide high power factor low loss type control gear in all fluorescent and discharge luminaires.

Install luminaires with blocking inductors where these are required by the local electricity distributor.

**Electronic fluorescent lamp ballasts**

Standards: To AS 3963 and AS 3134.

Refer to requirements for automatic dimming controls.

Power factor: > 0.9.

Current total harmonic distortion: < 15%.

Number of ballasts: Provide separate ballasts for each lamp.

**Reactive fluorescent lamp ballasts**

Standard: To AS 2643.

Connections: Provide quick-connect terminals or wiring, suitable for the operating temperature close to the ballast.

Number of ballasts: Provide separate electronic ballasts for each lamp.

**Fluorescent Lamp Starters**

In all fluorescent luminaires provide fully electronic lamp starters with the following features:

- Cathode pre-heat time between one and three seconds and single pulse or multipulsing "soft: starting to provide extended fluorescent lamp life up to at least 20,000 hours
- Automatic adjustment to ballast wattage.
- Disconnection of failed tubes after four to five seconds.
- Comply with requirements of IEC 926/927.
- Starters from the Thorn "Fluoro-Pulse" or Arlen Electronics "Pulsestarter" ranges selected for the particular lamp type and wattage are examples which comply with the above requirements.

**Lamps**

Generally fluorescent lamps, including compact fluorescent type, are to have a correlated colour temperature of 4000°K and a minimum colour rendering index of 80 Ra.

Generally linear fluorescent lamps are to be T5 triphosphor lamps with minimum output at 100 hours of 89 lumen/watt and less than 10% depreciation in output after 12,000 hours of operation.

**Installation**

Mount luminaires on proprietary supports, brackets and hangers. Submit proposed mounting arrangements for approval. Provide screws, trims, noggings, roses and packing material, as required. All installation methods to be submitted and approved by the Builder's representative.

Noggings: Minimum size 75 x 50 mm.

Position luminaires to provide an even level of illumination throughout the room, and as follows:

Where one luminaire is required position it centrally within the room.

Position rows of luminaires so that the distance from the wall is half the distance between rows.

Fit packing pieces to level luminaires and prevent distortion of luminaire bodies. Use packing strips to align end to end luminaires.

Fixing: Use two fixings at each end of fluorescent luminaires. A single fixing at each end in conjunction with 1.6 mm backing plates may be used for narrow luminaires. Securely fix luminaires to structural members of ceilings or walls as follows:

Fixing to timber: Steel woodscrew No. 10 x 25 zinc-plated round head.

Fixing to concrete: Expanding bolts M5 x 40.

Fixing to hollow blocks: M5 galvanised round head screws with spring loaded butterfly toggles.

Washers: Use zinc-plated washers 3 x screw diameter under all screw heads.

### **Recessed luminaires**

Connect recessed troffer fluorescent luminaires to a plug socket outlet.

## **16.3 EXTERNAL AND EMERGENCY LIGHTING**

All luminaires and attachments to be suitable for outdoor use and shall be vandal resistant. Lighting in accordance with AS 1158.

The luminaires selected are to minimise spill lighting to adjoining properties/residences, with no luminaires aimed towards the sky.

Lighting is to be controlled by photoelectric cell and time switch.

### **Emergency Lighting**

Emergency and EXIT lights to be installed only to the minimum requirements of BCA and AS2293.1.

EXIT lights to be twin 8W tube, (sustained type) having Nicad batteries with dual rate battery chargers incorporated. (Legrand Slideconnect "Premium" range).

Emergency lights (non-maintained) generally to be 10W halogen with Nicad batteries and dual rate battery chargers incorporated. (Legrand "Optica" range).

Emergency lights to be wired to same circuit as adjacent general lighting. Test station to be provided in switchboard for emergency and EXIT light testing.

## **16.4 QUALITY**

### **INSPECTION**

#### **Notice**

Give notice so that inspection of custom-built luminaires may be made when the first batch of each type is ready for delivery to site.

### **SAMPLES**

#### **Prototypes**

Submit prototypes of each type of custom-built luminaire.

## 14 GENERAL MECHANICAL REQUIREMENTS

### 14.1 GENERAL

#### Cross references

Refer to the following sections:

GENERAL REQUIREMENTS.

#### Standards

To AS 3666.

To AS 1668 Part 1

To AS 1668 Part 2

To AS 1682 - Fire Dampers

To AS 3000

To Building Code of Australia

#### General description of the work

The work of this section comprises the manufacture, supply, coordination, installation, testing, commissioning, certification, warranty and maintenance for 12 months of the mechanical services systems.

The various systems shall comprise:

- Two split ducted systems(FCU1&2) serving work and lab areas complete with controllers, external sensors and after hours override switch(c/w green run on indicator light) located on wall as per drawings. Provide an Auto/Off switch as detailed on drawing.
- Allow a PC sum of \$25,000 (GST Exclusive) for the supply and installation of a fume cupboard including electrical connection.
- Allow a PC sum of \$10,000 (GST exclusive) for the supply and installation of a bench mounted extraction system including electrical connection.
- Provision of drainage for condensers to gully. Co-ordinate with Hydraulic contractor for all drainage requirements.
- Provision of four roof ventilators for Aquaria building.
- Freezer Unit complete with master control switch and temperature indication external to the freezer room.
- Electrical and controls work from local isolators to mechanical plant
- Provision of drainage to in wall tundish and safety trays to eaves.
- The Fisheries Centre is located within metres of Taylor's beach. As such all systems and components provided shall be either Marine Grade 316SS or treated with the highest quality corrosion protection available.

Systems shall be complete with all necessary ancillary equipment, piping, ductwork, electrical switchgear, wiring and controls to form complete operational systems.

This specification shall be read in conjunction with the following drawings:

M-01 MECHANICAL SERVICES LEGEND, NOTES, SCHEDULE, DETAILS, AIR CONDITIONING & VENTILATION LAYOUT

M-02 MECHANICAL SERVICES SCHEDULES, AIR CONDITIONING & VENTILATION LAYOUTS & SECTIONS

#### INSPECTION OF SITE AND INFORMATION:

Prior to submitting a tender the Contractor shall view all relevant documents and allow to co-ordinate the mechanical services. Any works subsequently required for the proper installation and functioning of the equipment shall be carried out at the Contractor's cost.

**Noise and vibration**

Use equipment that operates within the required noise and vibration limits. Prevent the transmission of vibration from rotating or reciprocating equipment to other building elements using static and dynamic balancing, and anti-vibration mounting supports and hangers.

The amount of movement and restraining devices shall comply with AS 2121 "The Design of Earthquake Resistant Buildings".

**Schedule of maximum noise levels in occupied spaces**

Area	Noise rating (NR)
OFFICE SPACE	35
KITCHEN	45
LOBBIES & CORRIDORS	40

**14.2 INSPECTION****Notice**

Give sufficient notice (minimum 2 days) so that the superintendent may attend tests and so that inspection may be made of concealed services prior to covering.

In cases where no such notice is given the test shall be redone in the presence of the superintendent at no cost.

**14.3 CONTRACTOR'S SUBMISSIONS****Product data**

Submit manufacturer's published product data for the plant and equipment including certified drawings;

performance and rating tables; and  
recommendations for installation.

**Shop drawings**

Submit drawings and other documents illustrating the fabrication, installation, operation, maintenance and adjustment of mechanical services and equipment.

Drawings shall include:

All penetrations, including dimensions

Ductwork and pipework layouts, including details of construction supports, anchoring, sheet metal sizes and duct lengths, duct radii, transition lengths etc.

Reflected ceiling layouts showing all air outlets, grilles, access panels etc.

Automatic control schematics including details of control equipment.

Electrical schematics and switchboards drawings

Drawings are to be drawn to current Australian Standards and are to be on the same size drawing sheets as the tender documents. Drawings are to be drawn to suitable scale with a minimum scale of 1:50 being used for plant layouts. Shop drawings are to be provided in electronic format compatible with the current version of 'AUTOCAD'.

**Tests records**

For each required test and system balance, submit a report or certificate in a form suitable for inclusion in the maintenance manual.

**Maintenance manual**

Prior to practical completion, submit three copies of operating and maintenance instructions for the equipment installed.

Contents:

Description of the system.

Plant operating instructions.

Schedule of technical data for items of plant installed, together with supplier's name.



Product data.

Outline of maintenance procedures and problem rectification techniques.

Copies of air and water balancing test reports.

Control and wiring diagrams, in fadeproof format.

Work as executed drawings

**Work-as-executed drawings**

Submit four (4) copies of drawings showing the "as installed" location of mechanical services and equipment.

#### **14.4 INSTALLATION**

##### **Building penetrations**

Limitations: Unless approval has been given do not penetrate

structural members including external walls, fire walls, floor slabs and beams; or

membrane elements including damp-proof courses or waterproofing membranes.

Membranes: Where approval is given to penetrate membranes, provide a waterproof seal between the membrane and the pipe.

Sleeves: Where a pipe passes through building elements provide purpose-made metal or plastic sleeves formed from pipe sections. Prime paint ferrous surfaces. If the building element is acoustic rated, maintain the rating by packing the annular space with suitable insulation.

Fire-rated elements: Seal the penetration using a system conforming to AS 4072.1.

Concrete building elements: Obtain approval for the location of sleeves or core holes.

#### **14.5 PAINTING**

##### **General**

Paint new services and equipment where exposed to view, including in plantrooms. Use colours approved by the Superintendent.

Packaged air conditioning units: Provide the manufacturer's standard finish.

Roof mounted fans: Factory finish in colour to match roof colour unless another colour nominated

##### **Method**

Minimum coverage: One priming coat, one intermediate coat and one finishing coat of gloss enamel.

Do not spray paint. Etch prime galvanised steel, including duct, prior to painting.

#### **14.6 IDENTIFICATION**

##### **General**

Identify all items of equipment, piping and electrical wiring using permanent labelling.

##### **Pipework**

Identify throughout its length (including in concealed spaces) to AS 1345.

##### **Equipment labels**

Use engraved laminated plastic type, positively fixed to the equipment.

#### **14.7 COMMISSIONING**

##### **General**

After the works are completed, carry out a complete series of commissioning and acceptance tests for all plant, equipment and systems installed.

Certified, calibrated measuring equipment shall be used for all tests.

##### **Tests**

Air Systems balancing: Balance air distribution and water circulating systems to within +10%, -0% of the required quantities.

After the system has been balanced all balancing damper position shall be securely fixed and marked.

Measure and record the following information for each system: -

Fan static pressure

Fan RPM

Fan motor RPM

Motor current

### **Fire mode operation**

General: Test all systems required to operate in fire mode.

Standards: To AS/NZS 1668.1 and AS 1668.3.

Related systems: Test air handling systems for correct operation in conjunction with fire protection and other related systems.

Reset: Verify that all systems return to normal operating mode after fire mode operation.

Fire and smoke dampers: Commission to AS 1682.2. Test that fire and/or smoke dampers close fully with fans operating.

Timing: Complete testing before practical completion.

Test that fire and/or smoke dampers close fully with fans operating.

### **Controls**

Perform electrical continuity and insulation resistance tests and check phase rotation and direction of rotation of motors.

Each plant shall be made to pass through its full cycle under complete automatic control. All safety and alarm circuits shall be checked and recorded.

Acceptance tests: On completion of the installation, commission the plant and carry out tests to demonstrate that the systems and components meet the performance requirements. Tests are to be carried out in the presence of the superintendent. Where tests are required to be repeated the cost of the superintendents time will be deducted from the contract sum. Leave the plant ready for operation.

### **Reports**

Provide reports of all test and commissioning procedures in Operating and Maintenance Manuals.

## **14.8 OPERATIONAL MAINTENANCE**

Maintenance period

Servicing: Service the installation, including attention to emergency calls, for the duration of the defects liability period, in accordance with the maintenance manual and AIRAH HVAC&R Maintenance Schedules.

Completion: At the end of the maintenance period, carry out a final check of the installation before handing over the installation and submitting the service log.

MAXIMUM INTERVAL BETWEEN SERVICE VISITS: 1 MONTH FOR FIRST 3 MONTHS THEN 3 QUARTLEY VISITS.

Service log

During the maintenance period maintain a service log, which is to be kept on site, showing details of all routine and breakdown maintenance calls. All maintenance sheets are to be sign by a representative of the client.

NOTE: FAILURE TO MAINTAIN AN APPROPRIATE SERVICE LOG WILL RESULT IN THE COST OF 12 MONTHS SERVICE BEING DEDUCTED FROM THE CONTRACT PRICE.

## **14.9 CERTIFICATION**

Provide all certificates associated with the mechanical services as required by the Principal Certifying Authority.

The Certificates shall be provided to the Principal Certifying Authority prior to practical completion.

Where a certificate is required to be provided by a Registered Certifying Authority the contractor shall arrange this and bear all costs associated with it.

## MECHANICAL EQUIPMENT

### 14.10 GENERAL

All equipment shall be new and in good condition. Equipment not in new condition will be rejected. Equipment shall be the current model and spare parts shall be readily available. Test data shall be available for all equipment from a "NATA" approved laboratory.

Equipment shall be installed in accordance with manufacturer recommendations with adequate space for air circulation and access for maintenance.

Equipment shall be as nominated on the drawings. Alternatives are subject to written approval by the superintendent.

All equipment shall comply with AS/NZ3823.2-2005

### 14.11 FANS

#### General

Fan types shall be as nominated on the drawings.

Use fans which have quiet operation and maximum static efficiency and which deliver the required air quantity against the resistance of the system as installed.

Balancing: Statically and dynamically balance rotating parts after assembly at the manufacturer's works.

Installation: Isolate fans from rigid ductwork with flexible connections and from the building structure with resilient mounts.

#### Roof mounted centrifugal fan units

Provide weatherproof construction with components manufactured from Marine Grade 316 stainless steel, fibreglass, polypropylene, or UV-stabilised plastic.

Housing: House the fan in a compact base fitted with a weathering skirt and removable weather proof and bird proof cowl.

Profile roof fans shall be provided with a metal base that has the same profile as the roof to eliminate the need for under flashing.

Fans with a metal base material shall be provided to be chemical compatible with the existing roof metal/surface.

### 14.12 SPLIT AIR CONDITIONING SYSTEMS - DUCTED

#### General

Provide air-cooled split ducted reverse cycle air conditioning units.

Air conditioning units shall be by a proprietary manufacturer. The units shall be reverse cycle unless nominated otherwise. The air conditioning systems shall have a cabinet constructed of 1.2-mm mild steel galvanised sheet, formed and reinforced to provide a rigid assembly. The outdoor cabinet shall be protected by a polyester powder coat finish, painted inside and out, applied after cutting and punching. Formed panels shall be removable to provide easy access to all internal components. Access panel shall have foam rubber gasket seals and lifting handles.

Fan-coil units: Comprising the main heating/cooling coil, centrifugal supply air fan and associated refrigerant controls all within an insulated housing.

The supply air fan shall be a forward curve centrifugal fan capable of delivering the required air quantity against the external static pressure of the system. A heavy-duty permanently lubricated motor vibration isolated from the frame of the unit shall drive the fan. The fan shall be designed to operate with a noise level of less than NR 30. Provision shall be made for easy alteration of fan speed on site.

Condensing units: Comprising compressor, condenser coil (treated with high level proprietary corrosion protection) and fans, together with all required operating and safety controls enclosed in a weather-proof enclosure.

Coils shall be of seamless copper tube construction mechanically expanded into aluminium fins, with all joints brazed. A marine grade aluminium condensate drain tray shall be provided under the cooling coil.

The units shall be supplied with a Liquid Line drier in the condenser section and moisture indicating sight glass.

The hermetically sealed compressors shall be fitted with crankcase heaters and shall be isolated from the unit by spring mounts.

The controls shall include high and low pressure cut outs, electronic compressor protection relay, and time temperature defrost controls safety circuit fitted with lock out delay. Controls shall be 24 V. Overload relays shall be installed for each 3 phase motor circuit. Power cable for 3 phase motors shall be run in conduit. Defrost shall be by reverse cycle operation or hot gas defrost method with the supply fan stopping during the defrost cycle.

The fan for the outdoor coil shall be a single blade axial flow type direct coupled to the motor. Air conditioning units in excess of 29Kw cooling capacity shall have two refrigeration circuits. Condenser coils shall be treated with a corrosion resistant treatment. The treatment shall provide a finish which is resistant to diluted Acids, Alkalis, solvents and inorganic salts and which does not affect the heat transfer rate

### **Operating conditions**

Select equipment to operate within an ambient temperature range of -5oC to 45oC, without excessive head pressure, unstable operation or icing.

### **Installation**

Above ceiling: Support units on anti-vibration mounts suspended from the building structure above. If fixing to steelwork, bolt to webs only. Do not fix to flanges without approval.

Floor mounting: Raise above floor level on a galvanised steel frame or mount on a concrete plinth 100 mm high. Provide anti-vibration mounts under the units.

Connections: Install refrigeration piping and electrical wiring neatly.

### **Condensate drains**

Provide a safety tray under the indoor unit.

Provide an "Accent Air Ezy Clean P-Trap" for each fan coil unit.

Drip tray: If reverse cycle outdoor units do not have a drain connection, install drip tray below the unit for drain connection.

## **14.13 AIR FILTERS**

Filters shall be as nominated on the drawing.

Install filters to allow easy access for removal and replacement. Provide proprietary hinges and latches on access panels. Install filters to prevent air bypassing the filter.

A "Dwyer" Magnehelic differential pressure gauge graduated 0 to 250 Pa shall be installed across each filter bank. Clean and dirty resistance of each filter shall be clearly marked on the scale.

One new set of all filters shall be provided as part of this Specification and shall be located where nominated prior to the issue of the Final Certificate.

## **DUCTWORK**

### **14.14 GENERAL**

#### **Dimensions**

Duct dimensions shown on the drawings are clear internal sizes of the air passages, the first dimension given being of the side shown in that view. If ducts are internally insulated, increase dimensions accordingly.

### **14.15 MATERIALS**

Zinc-coated steel sheet

To AS 1397/G2 Z275.

### **14.16 RIGID DUCTWORK**

#### **Standard**

To AS 4254

#### **Fabrication**

Fabricate ductwork and fittings from galvanised steel sheet, machine bent and free from waves and buckles. Remove burrs and sharp edges and ensure that there are no protrusions into the airways.

Seams: Do not use snap lock seams. Provide a rivet fastening at regular intervals for standing seams and slides to stop spreading of the seam.

Flanged joints: Provide soft jointing material between flanges.

#### **Circular ductwork**

Construct from spiral wound galvanised steel sheet ducts with helical lock seam joints.

Circumferential joints: Use standard male couplings of the same material as the connecting duct, secured with a minimum of three rivets. Coat each end of the coupling with sealer before insertion.

Fittings: Form all bends, tees, take-offs, closures etc. from the same material as the parent duct and construct with continuously welded joints.

#### **Supports**

Provide supports at regular intervals to fix the ductwork in position and prevent noticeable sag. Use steel angles, rods and galvanised straps, suitable for fixing to the building structure. Where possible locate supports on or adjacent to cross joints in the ductwork. Provide hangers and fixings of hot-dip galvanised steel where exposed to the weather.

### **14.17 CIRCULAR FLEXIBLE DUCTWORK**

#### **Standard**

To AS 1668.1 clause 2.2.

Building Code of Australia Section J

#### **Fabrication**

Fabricate from a helix of zinc coated spring steel wire fully encapsulated with tough, flexible perforated sheathing.

Insulation: Minimum R1.0 Rating.

Sheathing: Reinforced aluminium foil laminate or similarly durable material.

Take-offs: At rigid ducts provide a take-off spigot of standard circular or equivalent oval shape with a butterfly type volume control damper.

#### **Installation**

Install without restriction to airflow using 20 mm wide straps at regular intervals to prevent sagging.

Connections: Make connections to rigid fittings with draw bands and duct tape.

### **14.18 FLEXIBLE CONNECTIONS**

#### **General**

At connections to equipment containing rotating machinery, provide a clear break of 100 mm and an airtight flexible connection long enough to provide slack under static conditions. Provide covers over flexible connections located externally.

#### **Material**

Use heavy duty, waterproof, fire retardant material to AS 1668.1.

### **14.19 DAMPERS**

#### **General**

Provide full adjustability of the air distribution system at junctions and branch take-offs in the duct system and at registers and grilles. Ensure splitters and dampers are readily accessible for adjustment after installation and that final settings are prominently marked.

#### **Volume Control**

##### **General**

General: Provide dampers that are free of rattles, fluttering or slack movement, and capable of adjustment over the necessary range without excessive self-generated noise or the need for special tools.

Face dimensions: Duct size.

Connections: Mating angle flanged cross joints.

#### **Damper adjustment**

Provide for adjusting the damper and locking it in position. Locate in an accessible position. Label the open and closed positions clearly and permanently.

#### **Motorised**

**Construction**

Comply with Volume control dampers, and the following:

- Side seals: Aluminium or stainless steel.
- Blade tip seals: Neoprene or silicone rubber.

Leakage: 25 L/s.m<sup>2</sup> at 1.5 kPa pressure differential.

**Installation**

Maintenance access: Locate dampers and damper motors in accessible positions, for blade and motor maintenance and blade seal replacement.

Mounting: Sufficiently rigid to prevent flexing or distortion of the frame or ductwork during operation.

Operation: If 2 sets of dampers are connected to a single motor, provide linkages that allow either damper to be adjusted without affecting the other.

**Non-Return****Construction**

Comply with Volume control dampers, counterweight the assembly so that it

- offers minimum resistance to air flow; and
- closes by gravity.

**Fire And Smoke****General**

Provide free cross section area at least 85% of the face area.

**Links**

Fire dampers: Frangible bulb or fusible links.

Smoke dampers: Motorised opening with spring return and fusible link activated by local heat.

Installation: Mount for easy access for maintenance.

Ensure fire and smoke dampers include

- Breakaway connection to duct
- Fireseal packing
- Flanges to AS1682
- Is located fully within wall

**Access panels**

Provide for maintenance of dampers and replacement of links.

Construction: To AS 1682.1, having a free cross-section area not less than 85% of the face area.

Installation: To AS 1682.2 and AS 1668.1.

**14.20 ACCESS PANELS****General**

Builder will provide access panels where required and where shown on architectural drawings.

Mechanical contractor to submit workshop drawings for approval indicating all access panel locations.

Manholes: 450 x 600 mm. -

Handholes: 200 x 300 mm.

Type: Double panel, deep formed, galvanised steel construction, insulated as for the duct, complete with wedge type sash latches and soft sealing gaskets.

**14.21 AIR OUTLETS AND GRILLES****General**

Manufacture: Provide outlets, grilles and louvres which are commercially proven and in current volume production and, if possible, from the one manufacturer. All outlets, grilles and louvres are to be installed with all fixings hidden.

Noise levels: Use outlets and grilles that meet noise level requirements for occupied spaces.

Material and finish: Aluminium construction finished in thermoset powder coating to AS 3715, to required colour. Paint dampers them matt black.

Ductwork behind grilles: Where visible, paint matt black.

#### **Louvre ceiling diffusers**

Provide diffusers with the following features:

- 4-way blow configuration, unless nominated differently on the drawings.
- Cores easily removable and replaceable.
- An opposed blade damper in the neck of each diffuser for equalising air flow.
- On top of each diffuser connected to flexible ductwork, an independently supported sheet metal plenum box of dimensions sufficient to ensure uniform air flow.

#### **Return air and exhaust grilles**

Ceiling mounted: 12 x 12mm egg-crate type with removable core and flanged surround. Fit exhaust grilles with adjustable opposed blade damper.

Wall mounted: Horizontal louvre blade type with flanged surround, blades at 19 mm centres and fitted with adjustable opposed blade damper.

## **MECHANICAL INSULATION**

### **14.22 GENERAL**

#### **Early fire hazard properties**

To AS 1668.1.

### **14.23 PIPEWORK INSULATION**

#### **Refrigerant piping**

Insulate refrigerant lines using either flame resistant polystyrene to AS 1366.3 or elastomeric sponge. Provide a vapour barrier on cold lines. Provide folded zinc-coated steel sheet cover sections or other approved sheathing over insulation located externally.

Maximum thermal conductivity: 0.038 W/m.K at 20°C.

#### **Condensate piping**

Insulate internal condensate piping with 25 mm thick preformed mineral wool with aluminium foil laminate facing or elastomeric sponge.

Maximum thermal conductivity: 0.036 W/m.K at 20°C.

### **14.24 DUCTWORK INSULATION**

Insulation shall be installed in accordance with the requirements of the Building Code of Australia based on the zone of the development and location of the ductwork.

#### **External insulation**

For ducts to be externally insulated install a minimum thickness as shown on the drawings mineral wool flexible duct insulation with aluminium foil laminate facing. Maximum thermal conductivity: 0.036 W/m.K at 20°C.

Fixing: Fix insulation to the ducts using 12 mm wide polypropylene strapping at 600 mm centres or using weld pins and disc clips spaced at 380 mm maximum centres. Maintain the vapour barrier at the joints and pins.

#### **Internal insulation**

For ducts to be internally insulated install a minimum thickness as shown on the drawings fibreglass semi-rigid duct liner, 28 kg/m<sup>3</sup> density, with perforated aluminium foil laminate facing.

Rectangular ducts: Restrain the insulation inside rectangular ducts using weld pins and disc clips, and corner angles, cover strips and end channels.

Circular ducts: Provide an internal duct liner of minimum 0.6 mm thick perforated zinc/iron-coated steel sheet.

Joints: Cover all joints in the insulation with cover strips of foil facing.

## **MECHANICAL PIPEWORK**

### **14.25 TESTS**

#### **Refrigeration systems**

Pressure tests: If refrigeration lines are fabricated on site, pressure test with dry nitrogen to AS 1677. Hold the test pressure for 24 hours without loss after due allowance for changes in ambient temperature.

Dehydration: Dehydrate the system, before charging with refrigerant gas, to 400  $\mu\text{m Hg}$  (53 Pa absolute) and maintain for 24 hours with a maximum rise in vacuum of 50  $\mu\text{m Hg}$ .

Charging: On completion of dehydration, charge the system with refrigerant and test for leaks with an electronic gas detector.

#### **Pipework generally**

Pressure test all pipework before concealing, insulating or connecting to equipment to not less than 1 MPa hydrostatic for water systems.

Tests: Hold all test pressures for at least 24 hours without evidence of leakage. Where air test pressures are given, test all joints with soapy water concurrent with the air pressure test.

### **14.26 PIPEWORK**

#### **General**

Installation: To AS 4041. Install piping with regard to the requirements of control, operation, maintenance and safety.

Layout: Install piping in straight lines and with uniform grades without visible sags. Provide bends and fittings so that systems are sufficiently flexible to permit movement and allow removal of piping and fittings for maintenance.

Supports: Provide supports at regular intervals to secure the piping to adjacent surfaces, prevent visible sagging and eliminate vibration.

#### **Joints**

Keep joints to a minimum. Provide permanent welded or brazed joints.

#### **Piping - water systems**

Tubes: Copper to AS 1432, Type B.

Capillary fittings: To AS 3688.

Compression fittings: To AS 3688, flared type.

Bends: Long radius type.

Permanent joints: Make silver brazed slip joints using either a capillary fitting or by expanding one tube over the other forming a parallel socket.

Provide flanged demountable joints at connections to plant and valves and where required for maintenance, except for pipe sizes 50 mm and under where screwed unions may be used.

Demountable joints: Use either brass unions or bronze flanges.

#### **Piping - refrigeration**

Tubes: Copper to AS 1571.

Type: Seamless hard drawn copper, refrigeration grade. Soft annealed type may be used for tubes of nominal size up to 22 mm.

Wall thickness: To AS 1432 Type B for tubes below 50 mm. For 50 mm and above use 1.6 mm wall thickness.

Design and installation: To AS 1677 and AS 4041, and in accordance with the recommendations of the manufacturer of the refrigeration equipment.

## **ASSOCIATED ELECTRICAL WORK AND AUTOMATIC CONTROLS**

### **14.27 RULES AND REGULATIONS**

The work shall be carried out strictly in accordance with the current S.A.A. Wiring Rules and the special requirements of the Local Supply Authorities.

### **14.28 EQUIPMENT AND UNIFORMITY**

All items of equipment shall be first grade as regards design and manufacture and shall be completely satisfactory for operation control, safety and maintenance under all conditions of service.

### **14.29 MOTOR STARTERS AND MOTOR PROTECTION**

All motor starters shall be of approved make and type with adjustable thermal overloads, fitted with reset, provided on all three (3) active conductors.



Auxiliary contacts and time delay relays of approved type shall be fitted where necessary.

#### **14.30 ISOLATING SWITCHES**

Isolating switches shall be of the weatherproof iron clad or Wilco weatherproof Hi-impact type with semi rotary action and disconnection on all three phases. Isolating switches shall be installed adjacent to every motor and suitably labelled.

#### **14.31 WIRING**

All wiring shall be in T.P.I. cables of 0.6/1 k grade.

Provide the following systems:

Cast concrete slabs: Unsheathed cable in heavy duty UPVC conduit.

Accessible spaces: Thermoplastic insulated and sheathed cables.

Concealed spaces: Unsheathed cable in UPVC conduit.

Plant rooms: Unsheathed cable in heavy duty UPVC conduit.

Plastered or rendered surfaces: Cable in UPVC conduit.

Stud walls without bulk insulation: Thermoplastic insulated and sheathed cables.

Stud walls with bulk insulation: Cable in UPVC conduit.

The joining of conductors shall not be permitted except in fixed terminals.

All cables shall be multi-stranded. Cables shall be sized so that voltage drops are within regulations and so that the minimum cables sizes are as follows.

Power Circuits 7/0.67

Control Circuits 7/0.50

Earth Wires 7/0.85

All conductors shall be copper with V75 insulation.

Cables shall be suitably de-rated when grouped.

#### **14.32 CONDUIT**

General conduit and fittings shall be rigid thermoplastic class B. The minimum conduit size - 20 mm. Conduits subject to mechanical damage shall be galvanised metal.

Where unavoidably exposed to view, as approved, it shall be run parallel to building members, walls, doors, etc.

Conduit for Room Thermostats, where located on columns, shall be run within the respective column and shall terminate at 1400 above finished floor level.

All conduits shall be supported either by saddles fixed by screws or approved type clamps or clips. When fixed to brick or concrete, the screws shall be in properly lugged holes. Holes shall be plugged with lead or other approved materials but wood lugs shall not be used. Fixing by means of explosive gun or other similar device is not permissible.

The ends of all lengths of conduit shall be reamed free of burrs, rags, etc. and all open ends of conduit shall be bushed.

Permanent connections to all motors and appliances shall be made using flexible thermoplastic conduit of 1 metre maximum length.

Generally all fittings shall be of the inspection type and easily accessible.

Where fittings are embedded in concrete or render, or are otherwise inaccessible, bends shall be used in lieu of inspection elbows.

#### **14.33 MECHANICAL SERVICES CONTROL PANELS**

The cubicles shall be constructed as follows:

General: Min. 1.6mm thick Zinc coated sheeted steel, coating class Z200

Outdoors assemblies: Coating class Z450

All joints shall be neatly welded and finished flush by grinding and/or machining. No joints shall be located on a corner. Bare edges shall be lipped.

Framework shall be folded on structural sections.

All doors and panels shall have rounded corners, machine formed.

Doors shall be hinged by approved lift off concealed type hinges with an open swing of not less than 100o with T-bar type door handles.

All handles, hinges, bolts, nuts, washers on the front of the cubicle shall be chrome plated. Captive 25 mm diameter knurled locking screws fitted with felt and metal washers shall be fitted to all removable panels, escutcheon plates, etc.

Approved neoprene gaskets cemented into the door shall seal doors.

All busbars and connections shall comply with Australian Standards 1136.

All connections in current carrying parts shall be made by means of locking plates, bolts, nuts and flat and spring washers. All screws, nuts, bolts and washers for electrical connections shall be electro-zinc plated.

All busbars shall be fully insulated in phase colours.

The complete cubicle shall be designed to withstand a fault level condition of 10,000 amps for a period of 5 cycles at the Main Mechanical Services Switchboard.

An approved switchboard manufacturer company shall manufacture the cubicle.

The top section on the cubicle shall have the various "auto-off-man" switches, indicator lights and control switches all flush mounted.

The lower section shall house the C.B.'s starters, relays, automatic control unit, indication circuits and all other equipment required for the plant operation and safety.

Indicating lights shall be of the circular type suitable for panel mounting with minimum 25 mm glass lens.

Lamps shall be full voltage 24 V type SES with lamp replacement made without the removal of the lamp holder.

Control relays and timers to have a minimum contact rating of 6 amps inductive. Pneumatic timers are not acceptable.

All thermal overload relays to be triple pole time limit thermal overload relays of an approved type to adequately protect the motor against overload or single phase operation and to have sufficient time lag in operation to withstand the relatively high currents which may be incurred during the starting period. The relay is to incorporate differential current phase failure protection.

All equipment mounted on cubicle doors shall be flush mounted and all live terminals of the equipment shall be covered to prevent accidental contact.

The metal casing of the switchgear and supporting framework to be efficiently earthed. All doors with equipment mounted to be adequately earthed with flexible metal braid.

Terminal blocks shall be provided in each cubicle for the termination of the incoming field wiring and inter panel cubicle wiring. Each wire is to be terminated with lugs to suit the particular terminal block used. All switchboard cables to be fully identified with "Z" type ferrules.

Adequate space shall be provided to ensure suitable ventilation of panel wiring.

Cable entry to the cubicles shall be by removable gland plate. Drilling of holes etc. shall be carried out with the plate removed from the cubicle.

#### **14.34 LABELLING**

White-black-white "Traffolyte" labels having 5 mm upper case letters shall be fitted to the outside of each item of equipment for identification. Similarly route, conductor number and size shall identify all cables, other than those in final sub circuits.

All cables shall be labelled each end by an approved indelible system which shall correspond with terminal and lug numbers, and all numbers shall be shown in the appropriate wiring diagrams.

#### **14.35 CIRCUIT PROTECTION**

All circuits shall be protected by suitably rated moulded case air circuit breakers complying with AS3111.

#### **14.36 AUTOMATIC CONTROLS**

The Contractor shall study the method of control outlined hereafter and as indicated on the drawings and shall be satisfied that the controls can perform the function specified within the limits of the design conditions.

Any departure from the principles of the method of control specified hereafter and indicated on the drawings, must be fully described and justified at the time of tendering. The responsibility for the correct operation of the automatic controls and for obtaining the specified guarantee conditions lies with the Contractor.

**General**

Controls shall be simple electric/electronic suitable for automatic operation of the respective systems and requiring a minimum of wiring.

The control system shall be supplied and commissioned by an approved supplier and shall be installed in accordance with the manufacturer's instructions and recommendations.

**Control Equipment**

Control equipment shall be recognised specialist manufacture arranged to provide the functions basically in accordance with the drawings.

**Time Switch**

Time switch shall have quartz action, 7 day operation and 12 hour rechargeable battery back-up. It shall provide the number of contacts shown or be supplied with auxiliary relays.

Timers shall be adjustable around the 2 hour range and shall make on energisation and break after the preset period. Each 'make' shall restart the timer. They shall be solid state type equal to HPM and shall have a green run on indicator light.

**Electronic Temperature Sensors**

Electronic temperature sensors shall be contained in a small neat wall panel with plastic cover

**Electronic Controllers**

Electronic controllers shall be low voltage units providing a variable voltage control signal in the range of 0 to 10 volts in response to the specified input sensor. Controllers automatically cycle to the no-load condition upon loss of power before the system is reactivated. Temperature adjustment shall be at the controller with clearly visible dials.

**Air Conditioning**

Power is to be provided to a point adjacent to the condensing unit by the electrical trade. Provide isolating switch and final connection to condensing unit. Provide power and control wiring to fan coil unit. Provide zone control for the air conditioning units as indicated on drawings with a programmable controller with a digital display. The controller is to be slimline and neat in appearance.

**Exhaust fans**

Power is to be provided to an isolator adjacent to the exhaust fan by the electrical trade.

## 15.0 HYDRAULIC

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### 15.1 GENERAL

#### Precedence

Requirements of individual technical worksections of the specification override conflicting requirements in this worksection.

#### REFERENCE DOCUMENTS

##### Current editions

Use referenced documents which are editions, with amendments, current 3 months before the closing date for tenders, except where other editions or amendments are required by statutory authorities.

##### Contractual relationships

Responsibilities and duties of the principal, contractor and contract administrator are not altered by requirements in referenced documents.

##### General standards

Plumbing and drainage: To AS/NZS 3500.2.2.

Water supply: To AS/NZS 3500.1.2.

#### INTERPRETATION

##### General

Unless the context otherwise requires, the following definitions apply:

- Supply: "Supply", "furnish" and similar expressions mean "supply only".
- Provide: "Provide" and similar expressions mean "supply and install".
- Approved: "Approved", "reviewed", "directed", "rejected", "endorsed" and similar expressions mean "approved (reviewed, directed, rejected, endorsed) in writing by the contract administrator".
- Give notice: "Give notice", "submit", "advise", "inform" and similar expressions mean "give notice (submit, advise, inform) in writing to the contract administrator".
- Obtain: "Obtain", "seek" and similar expressions mean "obtain (seek) in writing from the contract administrator".
- Proprietary: "Proprietary" mean identifiable by naming manufacturer, supplier, installer, trade name, brand name, catalogue or reference number.
- Samples: Includes samples, prototypes and sample panels.

##### Technical

Zinc-coated steel: Includes zinc-coated steel, zinc/iron alloy-coated steel, and aluminium/zinc-coated steel.

Pipe: Includes pipe and tube.

##### Tests

Except where otherwise defined in referenced documents, the following definitions apply:

- Pre-completion tests: Tests carried out before completion tests.
  - Type tests: Tests carried out on an item identical with a production item, before delivery to the site.
  - Production tests: Tests carried out on the purchased equipment, before delivery to the site.
  - Site tests: Tests carried out on site.
- Completion tests: Acceptance tests and final tests.
  - Acceptance tests: Tests carried out on completed installations or systems and, except for final tests, before the date for practical completion, to demonstrate that the installation or system, including components, controls and equipment, operates correctly, safely and efficiently, and meets performance and other requirements.
  - Final tests: Acceptance tests carried out before completion of the maintenance period.

##### Maintenance period

Co-extensive with the defects liability period.

#### CONTRACT DOCUMENTS

##### General

Diagrammatic layouts: Layouts of service lines, plant and equipment shown on the drawings are diagrammatic only, except where figured dimensions are provided or calculable. Before commencing work, obtain measurements and other necessary information.

Levels: Spot levels take precedence over contour lines and ground profile lines.

## 15.2 QUALITY INSPECTION

All inspections shall be to the relevant authorities requirements.

### Notice

Witness points: If notice of inspection is to be given in respect of parts of the works, advise if and when those parts are to be concealed.

Hold points: If notice of inspection is to be given in respect of parts of the works, do not conceal those parts without approval.

Minimum notice for inspections to be made: 4 hours for on-site inspectors, otherwise 2 working days.

Concealed services: Give notice so that inspection may be made of services to be concealed.

## 15.3 MATERIALS AND COMPONENTS GENERAL

### Proprietary items

Implication: Identification of a proprietary item does not necessarily imply exclusive preference for the item so identified, but indicates the necessary properties of the item.

Alternatives: If alternatives are proposed, submit proposed alternatives and include samples, available technical information, reasons for proposed substitutions and cost. If necessary, provide an English translation. State if provision of proposed alternatives will necessitate alteration to other parts of the works and advise consequent costs.

### Manufacturers' or suppliers' recommendations

General: Select, if no selection is given, and transport, deliver, store, handle, protect, finish, adjust, prepare for use, and provide manufactured items in accordance with the current written recommendations and instructions of the manufacturer or supplier.

Instructions: Submit the recommendations and instructions, and advise of conflicts with other requirements.

Project modifications: Advise of activities that supplement, or are contrary to, manufacturer's or suppliers' written recommendations and instructions.

Product certification: If products must comply with product certification schemes, provide them in accordance with the certification requirements.

### Sealed containers

If materials or products are supplied by the manufacturer in closed or sealed containers or packages, bring the materials or products to point of use in the original containers or packages.

### Consistency

For the whole quantity of each material or product use the same manufacturer or source and provide consistent type, size, quality and appearance.

## 15.4 EXECUTION INSTALLATION

### General

General: Install equipment and services plumb, fix securely and organise reticulated services neatly. Allow for movement in both structure and services.

Arrangement: Arrange services so that services running together are parallel with each other and with adjacent building elements. Under suspended ground floors, keep services at least 150 mm clear above ground surface, additional to insulation, and ensure access is not impeded.

Lifting: Provide permanent fixtures attached to the equipment, for lifting heavy items of equipment, as recommended by the manufacturer.

## SERVICES CONNECTIONS

### Statutory authorities' requirements

If the authorities elect to perform or supply part of the works, make the necessary arrangements. Install equipment supplied, but not installed, by the authorities.

### Fees

If fees are required by the authority to carry out the necessary work, pay all fees required.

### Connections

Connect to statutory authorities' services or service points. Excavate to locate and expose connection points. On completion reinstate the surfaces and facilities which have been disturbed.

**SYSTEM INTEGRATION****General**

Interconnect system elements so that the installations perform their designated functions.

**BUILDING PENETRATIONS****Piping sleeves**

General: Provide metal or UPVC sleeves formed from pipe sections, for piping penetrations through building elements.

Sleeve diameter (for non fire-rated building elements): Sufficient to provide an annular space around the pipe or pipe insulation of at least 12 mm.

Minimum sleeve thickness:

- Metal: 1 mm.
- UPVC: 3 mm.

Sleeve terminations:

- If cover plates are fitted: Flush with the finished building surface.
- In floors draining to floor wastes: 50 mm above finished floor.
- In fire-rated and acoustic-rated building elements: 50 mm beyond finished building surface.
- Elsewhere: 5 mm beyond finished building surface.

Finish: Prime paint ferrous surfaces.

**Pipe sleeves**

Provide UPVC sleeves formed from pipe sections, for penetrations through ground floor slabs and beams and external walls.

**Fire rated building elements**

Seal penetrations with a system conforming to AS 4072.1.

**Non-fire rated building elements**

Seal penetrations around conduits and sleeves. Seal around pipes within sleeves. If the building element is acoustic rated, maintain the rating.

**Limitations**

General: Do not penetrate or fix to the following without approval:

- Structural building elements including external walls, fire walls, floor slabs and beams.
- Membrane elements including damp-proof courses, waterproofing membranes and roof coverings.

Membranes: If approval is given to penetrate membranes, provide a waterproof seal between the membrane and the penetrating component.

**FIXING****General**

If equipment and services are not suitable for fixing to non-structural building elements, fix directly to structure and trim around holes or penetrations in non-structural elements.

**UNDERGROUND METAL PIPING****Corrosion protection**

General: Provide corrosion protection for:

- underground ferrous piping; and
- underground non-ferrous metal piping in corrosive areas.

Protection methods: Select from the following:

- Impermeable flexible plastic coating.
- Sealed polyethylene sleeve.
- Continuous wrapping using proprietary petroleum taping material.
- Cathodic protection: Sacrificial anodes or impressed current. Incorporate a facility for periodic testing.

Standard: Comply with the recommendations of AS 2832.1.

**FINISHES****Piping**

General: Finish exposed piping, including fittings and supports, as follows:

In internal locations: Chrome plate copper piping to AS 1192 service condition 2, bright.

Externally paint to architects requirements and colour.

In concealed but necessary spaces (including cupboards and non-habitable enclosed spaces): Leave unpainted.

Valves: Finish valves to match connected piping.

**PIPING****Cleaning**

General: Before installation, remove loose scale, burrs, fins and obstructions.

Protection: During construction, prevent the entry of foreign matter into the piping system by temporarily sealing the open ends of pipes and valves with purpose-made covers of pressed steel or rigid plastic.

**Installation**

General: Install piping in straight lines at uniform grades with no sags. Arrange to prevent air locks. Provide sufficient unions, flanges and isolating valves to allow removal of piping and fittings for maintenance or replacement of plant.

Arrangement: Arrange and support piping so that it remains free from vibrations whilst permitting necessary movements. Minimise the number of joints.

Spacing: Provide at least 25 mm clear between pipes and between pipes and building elements, additional to insulation.

Dissimilar metals: Join dissimilar metals with fittings of electrolytically compatible material.

**Accessibility**

Provide access and clearance at fittings which require maintenance or servicing, including control valves and joints intended to permit pipe removal. Arrange piping so that it does not interfere with the removal or servicing of associated equipment or valves or block access or ventilation openings.

**Embedded piping**

Expansion and contraction: Sheath or sleeve metal piping chased into masonry or encased in concrete so that expansion or contraction can take place without damage to the pipe or to the material or surface finish of the surrounding element.

**Cover plates**

If piping emerges from exposed building surfaces, provide cover plates of non-ferrous metal, finished to match the pipe, or of stainless steel, close fitting and firmly fixed in place.

**Cover plate sizes table**

Nominal pipe size, DN	Cover plate diameter
< 20	65 mm
20, 50<	100 mm
<50	50 mm larger than pipe

**Support system**

General: Provide proprietary support systems equal to unistrut of galvanized or zinc-coated steel construction.

Vertical pipes: Provide anchors and guides to maintain long pipes in position, and supports to balance the mass of the pipe and its contents. Horizontal pipes to be secured with rubber straps to unistrut. All pipework to maintain a minimum fall of 1 in 60 as per drawings.

**VIBRATION SUPPRESSION****General**

Minimise the transmission of vibration and noise from rotating or reciprocating equipment to other building elements.

**MARKING****General**

General: Mark equipment, piping and valves, to provide a ready means of identification.

Piping, conduits and ducts: To AS 1345, as applicable.

**Labels**

Type: Select from the following:

- For indoor applications only, engraved two-colour laminated plastic.
- Engraved and black filled lettering on stainless steel or brass, minimum thickness 1 mm.
- Cast metal.

Label edges: If labels exceed 1.5 mm thickness, radius or bevel the edges.

**Minimum lettering heights**

Equipment nameplates: 40 mm.

Valve and pump identification: 20 mm.

Warning notices: 7 mm.

Automatic controls and electrical equipment: 5 mm.

Other: 3 mm.

#### **Location**

General: Locate labels so that they are easily seen and are either attached to, below or next to the item being marked.

Exposed locations: Provide durable materials.

#### **Fixing**

General: Mechanical fixing to roof trusses with unistrut or equivalent. Pipework to be mounted with rubber straps to allow easy removal for cleaning. Do not penetrate vapour barriers.

Valves and pumps: Screw fix to body or attach by key ring to valve handwheels.

#### **Contents**

General: Match terminology of record drawings.

Valves and pumps: Correlate pumps to starters and valves.

#### **Piping**

Identify throughout its length, including in concealed spaces.

### **15.5 COMPLETION**

#### **GENERAL**

##### **Contractor's submissions**

Within 2 weeks after practical completion, submit 3 copies of designated documents.

##### **Warranties**

General: Name the principal as warrantee. Register with manufacturers as necessary. Retain copies delivered with components and equipment.

Commencement: Commence warranty periods at practical completion or at acceptance of installation, if acceptance is not concurrent with practical completion.

Approval of installer: If installation is not by manufacturer, and product warranty is conditional on the manufacturer's approval of the installer, submit the manufacturer's written approval of the installing firm.

#### **RECORD DRAWINGS**

##### **General**

Submit record drawings. Show the "as installed" locations of building elements, plant and equipment. Show off-the-grid dimensions where applicable.

##### **Services**

Show dimensions, types and location of equipment and piping in relation to permanent site features and other underground services. Include relationship to building structure and other services, and changes made during commissioning and the maintenance period. Include diagrammatic drawings of each system showing piping and principal items of equipment.

##### **Format**

Use the same borders and title block as the contract drawings.

#### **OPERATION AND MAINTENANCE MANUALS**

##### **General**

General: Submit operation and maintenance manuals for installations.

Authors and compilers: Personnel experienced in the maintenance and operation of equipment and systems installed, and with editorial ability.

Subdivision: By installation or system, depending on project size.

Referenced documents: If referenced documents or technical worksection s require that manuals be submitted, include corresponding material in the operation and maintenance manuals.

##### **Format**

A4 size loose leaf, in commercial quality, 4 ring binders with hard covers, each indexed, divided and titled. Include the following features:

- Pagination: Number pages consecutively.
- Cover: Identify each binder with typed or printed title "*OPERATION AND MAINTENANCE MANUAL*", to spine. Identify title of project, volume number, volume subject matter, and date of issue.
- Ring size: 50 mm maximum, with compressor bars.
- Text: Manufacturers' printed data, including associated diagrams, or typewritten, single-sided on bond paper, in clear concise English.



- Dividers: Durable divider for each separate element, with typed description of system and major equipment components. Clearly print short titles under laminated plastic tabs.
- Drawings: Fold drawings to A4 size and accommodate them in the binders so that they may be unfolded without being detached from the rings. Provide with reinforced punched binder tabs.

### **Contents - services**

Include the following in addition to *Contents – general*:

- Installation description: General description of the installation.
- Systems descriptions: Technical description of the systems installed, written to ensure that the principal's staff fully understand the scope and facilities provided. Identify function, normal operating characteristics, and limiting conditions.
- Systems performance: Technical description of the mode of operation of the systems installed.
- Equipment descriptions:
- Operation procedures:
  - Supplements to product data to illustrate relations of component parts, include typed text as necessary
  - Manufacturers' technical literature for equipment installed, assembled specifically for the project, excluding irrelevant matter. Mark each product data sheet to clearly identify specific products and component parts used in the installation, and data applicable to the installation.
  - Safe starting up, running-in, operating and shutting down procedures for systems installed. Include logical step-by-step sequence of instructions for each procedure.
  - Control sequences and flow diagrams for systems installed.
  - Legend for colour-coded services.
  - Schedules of fixed and variable equipment settings established during commissioning and maintenance.
  - Procedures for seasonal changeovers.
- Maintenance procedures:
  - Schedule of normal consumable items, local sources of supply, and expected replacement intervals up to a running time of 40,000 hours. Include lubricant and lubrication schedules for equipment.
  - Instructions for use of tools and testing equipment.
  - Emergency procedures, including telephone numbers for emergency services, and procedures for fault finding.
- Certificates:
  - Copies of test certificates for the installation and equipment used in the installation.
  - Test reports.
- Drawings:
  - Charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

### **Timing and quantity**

Final copies: Submit 3 sets of final volumes within 2 weeks after practical completion. Incorporate feedback from review and from training of principal's staff, including preparation and insertion of additional data.

## **COMMISSIONING**

### **Reports**

Submit reports indicating observations and results of tests and compliance or non-compliance with requirements.

### **Notice**

Give sufficient notice for inspection to be made of the commissioning of the installation.

## **COMPLETION TESTS**

### **General**

Carry out acceptance tests and final tests.

Internal: To AS 2107

External: To AS 1055.1

### **Hydraulic site tests**

Preparation for pressure testing: Securely anchor pipes and fittings in position to prevent movement during tests. Leave pipe joints exposed to enable observation during tests. Disconnect equipment which is not designed to carry the test pressure.

**Functional checks**

Residual current devices: Verify earth leakage tripping times and currents.

**MAINTENANCE****General**

General: During the maintenance period, carry out periodic inspections and maintenance work as recommended by manufacturers of supplied equipment, and promptly rectify faults.

Emergencies: Attend emergency calls promptly.

**Site control**

Report to the principal's designated representative on arriving at and before leaving the site.

**Maintenance records**

General: Submit, in binders which match the manuals, loose leaf log book pages designed for recording completion activities including operational and maintenance procedures, materials used, test results, comments for future maintenance actions and notes covering the condition of the installation. Include completed log book pages recording the operational and maintenance activities performed up to the time of practical completion.

Number of pages: The greater of 100 pages or enough pages for the maintenance period and a further 12 months.

Certificates: Include test and approval certificates.

Service visits: Record comments on the functioning of the systems, work carried out, items requiring corrective action, adjustments made and name of service operator. Obtain the signature of the principal's designated representative.

Referenced documents: If referenced documents or technical worksection s require that log books or records be submitted, include this material in the maintenance records.

Certification: On satisfactory completion of the installation, submit certificates stating that each installation is operating correctly.

**TREATED WATER, SALTWATER, BORE WATER AND COMPRESSED AIR****15.6 GENERAL  
CROSS REFERENCES****General**

Refer to the *General requirements* worksection.

**STANDARDS****Water supply**

General: To AS/NZS 3500.1.2.

**15.7 QUALITY  
INSPECTION****Witness points**

Give sufficient notice so that inspection may be made at the following stages:

- Excavated surfaces.
- Concealed or underground services.

**Labelling**

All outlets to have traffolyte labels clearing identifying type of supply.

**15.8 MATERIALS AND COMPONENTS  
AUTHORISED PRODUCTS****Standard**

To SAA MP52, unless otherwise required by the statutory authority.

**PRESSURE CONTROL VALVES****Type**

Provide reduction valves, pressure limiting valves, or ratio valves, which produce the necessary reduction in pressure.

**LINE STRAINERS****Description**

Type: Low resistance, Y-form bronze bodied type, with screen of dezincification resistant brass, corrosion-resistant stainless steel, or monel.

Screen perforations: 0.8 mm maximum.

#### REDUCED PRESSURE ZONE DEVICE (RPZD)

50 diameter equal to Tyco model to be installed on processed cold water line in location shown and be 300 mm above ground level.

#### 15.9 EXECUTION RETICULATION

##### Cold water system, potable and non potable

Provide the cold water supply system, installed from the connection point shown on drawing to the draw-off points or connections to other services.

##### Cold water piping system schedule

Pipeline location	Material	Nominal size and class	Jointing method
All	UPVC	As drawings	Solvent Cement
Oxygen	Type B Copper	As drawings	Silver Brazed

#### FITTINGS AND ACCESSORIES

##### General

Provide the fittings necessary for the proper functioning of the water supply system, including taps, valves, backflow prevention devices, pressure and temperature control devices, strainers, gauges and automatic controls and alarms.

##### Tap and valve heads

Vandalproof heads: Provide vandalproof or anti-tampering devices for the designated types.

Metal heads and handles: Provide brass fittings or suitably bush to prevent electrolysis and growth.

##### Tap positions

Locate hot/warm tap to the left of, or above, the cold tap.

##### Valve spindles

If practicable, install in a vertical position.

##### Isolating valves schedule

Location	Function	Description
As drawings in each room	Isolation	PVC ball valve with thread connection

#### 15.10 COMPLETION GENERAL

##### Charging

On completion of installation, commissioning, testing and disinfection, fill the system with water, turn on control and isolating valves and the energy supply and leave the water supply system in full operational condition.

## WASTEWATER

#### 15.11 GENERAL CROSS REFERENCES

##### General

Refer to the *General requirements* worksection.

##### STANDARD

##### Sanitary plumbing and sanitary drainage

General: To AS/NZS 3500.2.2.

Local authority requirements:

##### LABORATORY SINK DRAINAGE

All drainage to be in HDPE pipework.

##### COLLECTION PIT

1,000 litre pre cast concrete collection pit equal to BCP SPW 12 modified to suit requirements.

**PUMP**

Submersible pump equal to Hunter Pump model capable of discharging 0.5 litres per second at 250 kPa complete with control panel, float switches and high level alarm.

**AQUAIRA OVERFLOW TANK**

1,000 litre pre cast pit equal to BCP 900 x 900 stormwater pit with gastic gas tight lids.

**PUMP**

Submersible pump capable of discharging 0.5 litres per second at 250 kPa complete with control panel, float switches and high level alarm.

**15.12 QUALITY INSPECTION****Witness points**

Give sufficient notice so that inspection may be made at the following stages if required by regulative authority:

- Excavated surfaces.
- Concealed or underground services.

**SUBMISSIONS****As installed drawings**

Submit drawings and schedules showing the layout and details of the as installed system, including

- location, type, grade and finish of piping, fittings and pipe supports; and
- location, type and other relevant details of sanitary ware.

**15.13 MATERIALS AND COMPONENTS****AUTHORISED PRODUCTS****Standard**

To SAA MP52, unless otherwise required by the statutory authority.

**SANITARY FIXTURES****General**

Provide the accessories necessary for correct installation.

**Sanitary fixtures schedule**

Location	Fixture	Description
Refer to sanitary fixture schedule and tapware section		

**15.14 EXECUTION SANITARY PLUMBING****Vent pipes**

Staying to roof: If fixings for stays penetrate the roof covering, seal the penetrations and make watertight.

Terminations: Provide vent cowls of the same material as the vent pipe.

**Sanitary plumbing piping schedule**

Location	Pipe material	Nominal size	Grade or class	Jointing method
All	UPVC	As drawing		Solvent cement

**Pipe support schedule**

Location	Type	Maximum spacing (mm)	Fixing method
All locations	Wall/floor	1000	Abbey/Unistrut

**SANITARY DRAINAGE****Sanitary drainage piping schedule**

Location	Pipe material	Jointing method	Bedding material
All locations	UPVC	Solvent cement	Granular

**15.15 EXECUTION DRAINS****General**

General: Provide stormwater drains to kerb inlet pit as per drawings.

Tolerances: Comply with the **Pipeline tolerances table**. These tolerances are conditional on falls to outlets being maintained and no part of a pipeline being at less than the designated gradient.

#### Pipeline tolerances table

	Permissible angular deviation from alignment	Permissible displacement from alignment
Horizontal	1 in 300	15 mm
Vertical	1 in 500	5 mm

#### Pipeline schedule

Location	Pipe material and nominal size	Class	Jointing	Bedding
All	UPVC as per drawings		Solvent Cement	Sand

#### Identification

Lay a detectable strip or plastic tape in the trench after pipelaying, testing and initial backfilling.

#### Pipe underlay

General: Bed piping on a continuous underlay of bedding material, at least 75 mm thick after compaction. Grade the underlay evenly to the gradient of the pipeline.

Chases: If necessary, form chases to prevent projections such as sockets and flanges from bearing on the trench bottom or underlay.

#### Pipe surrounds

General: Place the material in the pipe surround in layers  $\leq 200$  mm loose thickness, and compact without damaging or displacing the piping.

#### Anchor blocks

If necessary, provide anchor blocks which restrain lateral and axial movement of the pipelines at junctions and changes of grade or direction.

#### Encasement

General: If necessary, encase the pipeline in concrete at least 150 mm above and below the pipe, and 150 mm each side or the width of the trench, whichever is the greater.

Concrete: Grade N20 to AS 1379.

## PITS

#### Finish to exposed surfaces

General: Provide a smooth, seamless finish, using steel trowelled render or concrete cast in steel forms.

Corners: Cove or splay internal corners.

#### Metal access covers and grates

Standard: To AS 3996.

Cover levels: Top of cover or grate, including frame:

- In paved areas: Flush with the paving surface.
- In landscaped areas: 25 mm above finished surface.
- Gratings taking surface water runoff: Locate to receive runoff without ponding.

#### Pit schedule

Pit type	Size (mm)	Cover type	Remarks
All	600 x 600	Light duty grated	

Pit type	Size (mm)	Cover type	Remarks

## SANITARY FIXTURES AND TAPWARE

### 15.16 GENERALLY

Supply, install and commission all sanitary fixtures, fittings and tapware connected to the hydraulic services

Allow to take deliver, store as necessary and install. Provide all fixings, necessary cutting, securing of brackets to walls, levelling and connection to various services required for satisfactory operation.

Fix and support fixtures strictly to the manufacturers recommendations.

All exposed brackets shall be white enamelled.

All exposed connections shall be chrome plated unless specified.

Supply and install the following or equivalent fixtures, fittings and tapware.

Accessories shall include but not be limited to those scheduled below for specific locations or fixtures.

#### FITTINGS AND ACCESSORIES

#### SAFETY SHOWER & EYE WASH

Location: All

Type: Enware free standing stainless steel hand operated shower and eye wash

Code: Enware EC 060

#### WALL BASIN

Location: General Lab Q1.04 Workroom Q1.01

Type: Caroma

Code: Concorde 500 3TH

Tapware: Enware Sensor tap

Code: ENM 3011

#### SINK

Location: Wet Lab

Type: Stainless steel fabricated

Code: Refer metalwork section

Tapware: Enware

Code: LC 107

#### LAB SINKS

Location: Wet lab, general lab, workroom

Type: Britex

Code: LB 4 400 x 400 x 290 mm deep

Tapware: Enware

Code: LC 107

#### STAINLESS STEEL SINK

Location: Shark area

Type: Stainless steel fabricated

Code: Refer to metal workers section

Tapware: Enware

Code: LC 130

#### THERMOSTATIC MIXING VALVE

Location: Laboratory

Type: Enware Aquablend 1000 in recessed stainless steel box

Code: ATM 710R

**OXYGEN OUTLETS**

Location: Tank area  
 Type: Enware 2 way outlet  
 Code: LC 143 WN

**STAINLESS STEEL FLOOR GRATE**

Location: Aquaria shed  
 Type: ACO KS100 channel with heelguard stainless steel grate

**STAINLESS STEEL FLOOR SUMP**

Location: Shark area  
 Type: Stainless metal craft  
 Model: AT-1-HST

**FUME CUPBOARD**

Tapware: Enware  
 Code: LC 130

**EXTINGUISHERS AND BLANKETS****15.17 GENERAL****15.18 CROSS REFERENCES****15.19 GENERAL**

Refer to the *General requirements* worksection.

**15.20 COMPONENTS****15.21 AUTHORISED PRODUCTS****GENERAL**

Provide equipment listed in the SSL Register of Accredited Products - Fire Protection Equipment.

**15.22 EXTINGUISHERS****Standards**

General: Provide portable fire extinguishers and location signs as follows:

- General requirements: AS/NZS 1841.1.
- Water: AS/NZS 1841.2.
- Wet chemical: AS/NZS 1841.3.
- Foam: AS/NZS 1841.4.
- Powder: AS/NZS 1841.5.
- Carbon dioxide: AS/NZS 1841.6.
- Non-rechargeable: To AS/NZS 1841.8.

Selection and location: To AS 2444.

**Fire extinguishers schedule**

Designation	FE1
Location	As per AS 2444
Unit type	3.5 kg CO2 for electrical. Dry powder all others
Classification and rating	3.5kg for laboratory
Nozzle type	Brass

Final locations and types to be in accordance with Australian Standard and to the Architects approval. Certification to be provided by contractor. Alternative locations and types can be suggested to that scheduled but must be approved prior to installation.

**BLANKETS****Fire blankets**

General: To AS/NZS 3504.  
 StandardsMark: Required.  
 Selection and location: To AS 2444.

Fire blankets schedule		
Location	Number	Size
Laboratory		1200 x 1200

**COMPLETION  
MAINTENANCE****Fire extinguishers**

Standard: To AS 1851.1.

**Fire blankets**

Standard: To AS 1851.1.



## **16.00 SCHEDULE OF PROVISION ALLOWANCES**

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<b>CLAUSE</b>	<b>ITEM</b>	<b>ALLOWANCE (GST exclusive)</b>
7.9	Door security access system	\$3,860.00
13.1	Fume cupboard	\$25,000.00
13.1	Bench extraction	\$10,000.00

**ANNEXURE 1 - PART A**  
**AS2124 – 1992 ANNEXURE TO GENERAL CONDITIONS OF CONTRACT**

## **PART A**

### **ANNEXURE TO THE AUSTRALIAN STANDARD**

#### **AS 2124-1992- GENERAL CONDITIONS OF CONTRACT**

This Annexure shall be issued as part of the tender documents and is to be attached to the General Conditions of Contract and shall be read as part of the Contract

The law applicable is that of the State or Territory of: (Clause 1)	NSW
Payments under the Contract shall be at: (Clause 1)	Orange, NSW
The Principal: (Clause 2)	NSW DPI
The Address of the Principal:	161 Kite Street Orange
The Superintendent: (Clause 2)	Chris Weale
The Address of the Superintendent: Orange	161 Kite Street
Superintendent's Representative:	Derek Scott
Superintendent's Representative's Address:	161 Kite Street Orange
Limits of accuracy applying to the quantities for which the Principal accepted a rate or rates: (Clause 3.3 (b))	Not applicable
Bill of Quantities - the alternative applying: (Clause 4.1)	Not applicable
The time for lodgement of the priced copy of the Bill of Quantities: (Clause 4.2)	Not applicable
Contractor shall provided security in the amount of (Clause 5.2)	Not applicable
Principal shall provide security in the amount of: (Clause 5.2)	Nil
The period of notice required of a party's intention to have recourse to retention moneys and/or to convert security: (Clause 5.5)	7 days
The percentage to which the entitlement to security and retention moneys is reduced: (Clause 5.7)	50%
Interest on retention monies and security - the alternative applying: (Clause 5.9)	Alternative 2
The number of copies to be supplied by the Principal: (Clause 8.3)	One copy

The number of copies to be supplied by the Contractor: (Clause 8.4)	One copy
The time within which the Superintendent must give a direction as to the suitability and return the Contractor's copies: (Clause 8.4)	5 days
Work which cannot be subcontracted without approval: (Clause 9.2)	Nil
The percentage for profit and attendance: (Clause 11(b))	Not applicable
The amount or percentage for profit and attendance: (Clause 11 (c))	Not applicable
Insurance of the Works - the alternative applying: (Clause 18)	Alternative 1
The assessment for insurance purposes of the costs of demolition and removal of debris: (Clause 18 (ii))	Not applicable
The Assessment for insurance purposes of consultants' fees: (Clause 18 (iii))	Not applicable
The value of material to be supplied by the Principal: (Clause 18 (iv))	Nil
The additional amount or percentage: (Clause 18(v))	Nil
Public Liability Insurance - the alternative applying: (Clause 19)	Alternative 1
The amount of Public Liability Insurance shall be not less than: (Clause 19)	\$10,000,000
The time for giving possession of the Site: (Clause 27.1)	1 day after signing contract
The Date for Practical Completion: (Clause 35.2)	To be determined
Liquidated damages per day: (Clause 35.6)	\$200.00
Limit of Liquidated Damages: (Clause 35.7)      No Limit	
Bonus per day for early Practical Completion (Clause 35.8)	Not applicable
Limit of Bonus: (Clause 35.8)	Not applicable
Extra costs for delay or disruption: (Clause 36)	Nil
The Defects Liability Period: (Clause 37)	52 weeks
The charges for overheads, profit, etc, for Daywork: (Clause 41(f))	Not applicable
Times for payment claims: (Clause 42.1)	Payments in accordance with Security of Payment Act 1999.
Unfixed Plant and Materials for which payment claims may be made notwithstanding that they are not incorporated in the Works: (Clause 42.1 (ii))	Nil

#### Retention Monies on (Clause 42.3)

a)	Work incorporated in the Works and any work or items for which a different amount of retention is not provided	10% of the value until 5% of the contract sum is held.
b)	Items on site but not yet incorporated in the Works	Not applicable
c)	Items off site but in Australia	Not applicable
d)	Items not in Australia	Not applicable
e)	Disbursements incurred by the Contractor for customs duties, freight, marine insurance, primage, landing and transport in respect of the work under the contractor.	Not applicable
	Unfixed plant or materials - the alternative applying: (Clause 42.4)	Alternative 3
	The rate of interest on overdue payments: (Clause 42.9)	10%
	The delay in giving possession of the Site which shall be a substantial breach: (Clause 44.7)	One month
	The alternative required in proceeding with dispute resolution: (Clause 47.2)	Alternative 2
	The person to nominate as arbitrator: (Clause 47.3)	The Chairperson of the Institute of Arbitrators, Australia, NSW Chapter
	Location of arbitration: (Clause 47.3)	New South Wales

**ANNEXURE 2 - PART B**  
**AS.2124 - 1992 ANNEXURE TO GENERAL CONDITIONS OF CONTRACT**

AS 2124- 1992

**Part B: Annexure to the Australian Standard General  
Conditions of Contract**

**Summary of Removed, Amended and Additional Terms and Conditions of Contract**

<b>Clause 2 Interpretation</b>	<b>amended by inclusion of the definitions:</b> * Business day * Contract price
<b>Remove clause 40.5</b>	<b>replace with new clause 40.5 - Valuation</b>
<b>Remove heading 42</b>	<b>replace with heading 42 Payment</b>
<b>Remove clause 42.1</b>	<b>replace with new clause 42.1 Progress Claims  and Payment Periods</b>
<b>Remove clause 42.2</b>	<b>replace with new clause 42.2 Amount of  Progress Payments</b>
<b>Additional clause new clause  Remove clause 42.4</b>	<b>42.2A Payment Schedule</b>
<b>Additional clause</b>	<b>42.7A Statement of Outstanding Claims</b>
<b>Remove clause 42.8</b>	<b>replace with new clause 42.8 Final Schedule</b>
<b>Remove clause 43</b>	<b>replace with new clause 43 Payment of  Workers, Subcontractors and Suppliers</b>
<b>Additional clause</b>	<b>43A Contractor's compliance with the Building  and Construction Industry Security of  Payment Act 1999</b>
<b>Remove heading 46</b>	<b>replace with new heading 46 Notification of  Claims and Disputes</b>
<b>Remove clause 46.1</b>	<b>replace with new clause 46.1 Notification of  Claims for Extra</b>
<b>Remove clause 46.2</b>	<b>replace with new clause 46.2 Ex-contractual  Claims</b>
<b>Additional clause</b>	<b>46.3 Submission of claims to the  Superintendent's Representative</b>
<b>Additional clause</b>	<b>46.4 Submission of Claims to the  Superintendent in clause A5.2 -  Annexure Part A</b>
<b>Additional clause new clause</b>	<b>46.4 Submission of Disputes to the  Superintendent in clause A5.1 -Annexure Part  A</b>
<b>Remove heading</b>	<b>47 and clause 47.1; 47.2; 47.3; 47.4</b>

**Additional clauses with conditions amended in compliance with requirements of NSW Government Industrial Relations Management Guidelines**

<b>New clause</b>	<b>49 Industrial Relations Management Performance Reviews</b>
<b>New Clause</b>	<b>49.1 Contractor Performance Reports</b>
<b>New Clause</b>	<b>49.2 Exchange of information between NSW Government agencies</b>

**NSW Department of Primary Industries - Australian Standard AS 2124-1992  
Amended Conditions of Contract**

**Conditions amended in compliance with requirements of *Building and Construction Industry Security of Payment Act 1999***

**Additional Definitions**

“Business Day” means any day other than:

a Saturday, Sunday or public holiday, or

27, 28, 29, 30 or 31 December.

“Contract Price” at any particular date means the Contract Sum [excluding any provisional sums] increased or decreased by:

if the Principal and the Contractor agree in writing on a specific amount to be added to or deducted from the Contract Price, the agreed amount; or

if by a final decision under **Clause 47**, it is decided that a specific amount is to be added to or deducted from the Contract Price, the amount decided.

**40.5 Valuation (replacement clause)**

Where the Contract provides that a valuation shall be made under **Clause 40.5**, the Principal or the Contractor may claim an entitlement to an adjustment of the Contract Price. The adjustment will be the amount agreed between the Principal and the Contractor. If they cannot agree, the arbitrator appointed under clause 46 shall decide the amount on the following basis:

if the Contract prescribes specific rates or prices to be applied in determining the value, those rates or prices shall be used;

if **Clause 40.2(a)** does not apply, the rates or prices in a Priced Bill of Quantities or Schedule of Rates shall be used to the extent that it is reasonable to use them;

to the extent that neither **Clause 40.2(a)** or **40.2(b)** apply, reasonable rates or prices, as valued for Daywork under **Clause 41**, shall be used;

in determining the deduction to be made for work which is taken out of the Contract, the deduction shall include a reasonable amount for profit and overheads;

if **Clause 11(b)** applied, the percentage referred to in **Clause 11(b)** shall be used for valuing the Contractor's profit and attendance;

daywork shall be valued in accordance with Clause 41.

**42 Payment (replaces heading “Certificates and Payments”)**

**42.1 Progress Claims and Payment Periods (replacement clause)**

The Contractor's only entitlement to payment for carrying out work under the Contract is the Contract Price.

Prior to becoming entitled to the Contract Price, the Contractor can make Progress Claims. In aggregate, progress claims shall not exceed the Contract Price.

Payment periods for progress payments are the periods specified in the Annexure or, if not specified, then monthly. At the end of each of these payment periods, the Contractor shall lodge with the Superintendent a payment claim marked "Progress Claim" and setting out the progress payment to which the Contractor claims to be entitled and how the amount has been calculated. The Progress Claim must be accompanied by such information as the Superintendent may reasonably require.

At the expiration of each payment period, the Contractor shall make a Progress Claim. If the Contractor fails to make a Progress Claim, the Principal may nevertheless make a progress payment.

#### **42.2 Amount of Progress Payments (replacement clause)**

If the amount of a progress payment or the method of valuing a progress payment is not specified in the Annexure, the progress payment shall be an instalment of the Contract Price which reflects the value of the work carried out by the Contractor in performance of the Contract to the end of the payment period to which the Progress Claim relates less:

amounts already paid by the Principal on account of the Contract Price;  
an amount on account of liquidated damages, if any, calculated in accordance with **Clause 35.6** up to and including the date of the Superintendent's payment schedule in respect of the Progress Claim;  
amounts equivalent to any liability of the Contractor to the Principal, whether liquidated or not, and whether the liability arises under the Contract or otherwise;  
amounts which the Principal is entitled to deduct or withhold under any provision of the Contract.

Where work is defective or omitted, the estimated cost of rectifying the defect or omission shall be taken into account.

In valuing work, regard shall not be had to the value of variations which value has not been included in the Contract Price.

If the Contractor claims payment for plant or materials intended for incorporation in the works but not yet incorporated, the Principal shall not be obliged to make payment for the plant or materials unless the Contractor provides security additional to and in one of the forms provided by Clause 5.3 in an amount equal to the payment claimed for the plant or materials.

The only plant or materials to be included in the valuation are those that have become (or on payment) will become the property of the Principal. If requested by the Superintendent, the Contractor shall provide evidence of ownership.

The Principal shall not be obliged to pay for an item to be imported into Australia if the Contractor has not given the Principal a clean on board bill of lading for the item drawn or endorsed to the order of the Principal and a Customs invoice for the item.

With the exception of items to be imported into Australia and items listed in the Annexure, the Principal shall not be obliged to pay for unfixed plant and materials which plant or materials are not on the Site.

#### **42.2A Payment Schedule (replacement clause)**

Within 10 Business Days after receipt of a Progress Claim or the Final Payment Claim, the Superintendent on behalf of the Principal will provide to the Contractor a payment schedule identifying the Progress Claim to which it relates and stating the payment, if any, which the Principal intends to make. If the payment is to be less than the amount claimed by the Contractor, the payment schedule will indicate why the scheduled amount is less and the reasons for withholding payment (if any payment is being withheld).

[Warning: Even though the payment schedule states that the Principal will be making a particular payment, an order under the Contractors Debts Act 1997 NSW or other legislation could prevent the Principal from making the payment. Under section 127 of the Industrial Relations Act 1996 NSW, the Principal could be relieved of the obligation to pay the Contractor if the Contractor fails to pay the Contractor's employees engaged in carrying out work under the Contract (see **Clause 43**).]



### **Time for Payment (replacement clause)**

The time for making a payment is the date which is the latter of:

28 days after the Superintendent receives the payment claim; or  
if the Contract provides that before the Contractor is entitled to payment or payment of or exceeding a particular amount, a test must be passed, insurance must be effected, evidence (or a statutory declaration) must be provided or some other requirement must be fulfilled, 7 days after the requirement is fulfilled.

Payments of moneys shall not be evidence of the value of work or an admission of liability or that work has been executed satisfactorily but shall be payment on account only.

**42.3 as per AS 2124-1992**

**42.5 as per AS 2124-1992**

**42.6 as per AS 2124 -1992**

**42.7 as per AS 2124 -1992**

### **42.7A Statement of Outstanding Claims (additional clause)**

With the Final Payment Claim the Contractor shall lodge with the Superintendent a Statement of Outstanding Claims. The Statement of Outstanding Claims must identify all claims for extension of time, adjustment of the Contract Price and ex-contractual claims which the Contractor still maintains.

Any claim whatsoever by the Contractor against the Principal under, arising out of or connected with the Contract which has been made or could have been made and which is not included in the Statement of Outstanding Claims shall be deemed to have been abandoned by the Contractor and is barred. This time bar is in addition to and not in substitution for any other time bar.

The Statement of Outstanding Claims is not a claim. All claims must be made separately and at the times provided in the respective clauses dealing with claims. After lodging the Statement of Outstanding Claims the Contractor shall not make any further claim whatsoever against the Principal.

Notwithstanding the preceding paragraph, if subsequent to the lodgement by the Contractor of the Final Payment Claim, a final determination is made under **Clause 46** increasing the Contract Price, the Contractor can lodge an amended Final Payment Claim to take into account the amount of the increase. The amended claim must be lodged with the Superintendent within 28 days after the final determination is made. If it is not lodged within that time, it is barred.

### **42.8 Final Schedule (replacement clause)**

Within 14 days after receipt of the Contractor's Final Payment Claim and Statement of Outstanding Claims or, where the Contractor fails to lodge such claims, the expiration of the period specified in Clause 42.7 of the lodgement of the Final Payment Claim by the Contractor, the Superintendent shall issue to the Contractor and to the Principal a Final Payment Schedule.

The Final Payment Schedule will state the amount of the payment (if any) the respondent intends to make. If the payment is to be less than the amount claimed by the Contractor, the Schedule will indicate why the scheduled amount is less and the reasons for withholding payment (if any payment is being withheld).

Within 14 days after the issue of a Final Payment Schedule which certifies a balance owing by the Principal to the Contractor, the Principal shall release to the Contractor any security then held by the Principal.

**42.9 as per AS 2124-1992**

**42.10 as per AS 2124-1992**

**42.11 as per AS 2124-1992**

### **43 Payment of Workers, Subcontractors and Suppliers (replacement clause)**

Before the Contractor is entitled to payment of a payment claim, the Contractor must give the Superintendent a statutory declaration, made out not earlier than the date of the progress claim or final payment claim, by the Contractor, or where the Contractor is a corporation, by a representative of the Contractor who is in a position to know the facts attested to, in the form of Schedule 2. (Note **Clause 42.5** with respect to the time for payment.)

If any moneys are shown as unpaid in the statutory declaration, then before the Contractor is entitled to payment, the Contractor must give the Superintendent a further statutory declaration in the same form but showing that there are no moneys unpaid. This paragraph does not apply to payment of so much of a payment claim as exceeds the sum of the amounts shown as unpaid in the statutory declaration.

At the request of the Contractor and out of moneys payable to the Contractor, the Principal may on behalf of the Contractor make payments directly to a worker, subcontractor or supplier.

If a worker, subcontractor or supplier obtains a court order in respect of the moneys payable to them in respect of their employment on materials supplied for or work performed under the Contract, as the case may be, and produces to the Principal the court order and a statutory declaration that it remains unpaid, the Principal may pay the amount of the order and costs included in the order to the worker, subcontractor or supplier, and the amount paid shall be a debt due from the Contractor to the Principal.

In the event of the Principal receiving notice of the making of a sequestration order or winding up order or order of receivership in respect of the Contractor, the Principal shall not make any payment to a worker, subcontractor or supplier without the concurrence of the Trustee or Official Receiver as the case may be of the Estate of the Contractor.

### **43A Contractor's compliance with the Building and Construction Industry Security of Payment Act 1999 (additional clause)**

Where the Contractor engages any subcontractors, the Contractor must include clauses in the subcontract which comply with the requirements under the Building and Construction Industry Security of Payment Act 1999. The Contractor must show the Superintendent a copy of the terms and conditions of any subcontract if requested to do so by the Superintendent.

### **46 Notification of Claims and Disputes (replacement clause 46 & 47)**

#### **46.1 Notification of Claims for Extra.**

If the Contractor wishes to claim an entitlement to an adjustment of the Contract Price, the Contractor must complete a Notice of Claim for Adjustment of the Contract Price in the following form. Not later than 28 days after the first day upon which the Contractor could reasonably have been aware of the event, circumstance, direction, act or omission which gave rise to the alleged entitlement the Contractor must lodge the notice with the Superintendent. The Contractor must not lodge the notice until the event is complete or the amount of the adjustment claimed can be ascertained. If the Contractor fails to lodge the notice within time, the Contractor will not be entitled to an adjustment of the Contract Price on account of the event, circumstance, direction, act or omission.

The Contractor's only entitlement to payment for carrying out work under the Contract is the Contract Price. [See **Clause 2** for definition and **Clause 42.1**].

#### **Notice of Claim for Adjustment of Contract Price**

Name of Contractor:

Contract Number:

Project:

The Contractor gives notice of the following claim for adjustment of the Contract Price:

The event, circumstance, direction or omission, is:

The date of event, circumstance, direction or omission is:

The provision of the Contract or other basis of the claim is:

The amount or likely amount of the adjustment claimed is:

Signed for the Contractor by:

Date:

#### **46.2 Ex-contractual Claims**

An ex-contractual claim is any claim whatsoever by the Contractor against the Principal other than a claim under **Clause 35.5** for an extension of time, a claim under clause 40 for the Contract Price or a Progress Claim on account of the Contract Price or a claim under clause 46.1 for adjustment of the Contract Price. Without limitation, an ex-contractual claim includes a claim for damages [whether in contract, tort or under statute], restitution, injunction, declaration or any other remedy whatsoever.

If the Contractor wishes to make an ex-contractual claim, the Contractor must complete a Notice of Ex-contractual Claim in the following form. Not later than 28 days after the first day upon which the Contractor could reasonably have been aware of the breach of contract, event, circumstance, direction, act or omission which gave rise to the alleged entitlement the Contractor must lodge the notice with the Superintendent. The Contractor must not delay giving the notice until the event is complete or the amount of the adjustment claimed can be ascertained. If the Contractor fails to lodge the notice within time, the Principal shall not be liable in respect of the ex-contractual claim and the claim shall be barred.

##### **Notice of Ex-Contractual Claim**

Name of Contractor:

Contract Number:

Project:

The Contractor gives notice of the following claim:

1. The breach of contract, event, circumstance, direction or omission which gives rise to the claim is:

2. The date of the breach, event, circumstance, direction or omission is:

3. The provision of the Contract which has been breached or other basis of the claim is:

4. The amount or likely amount of the claim is:

Signed for the Contractor by:

Date:...../...../.....

#### **46.3 Submission of claims to the Superintendent**

Claims under clauses 46.1 and 46.2 shall be considered in the first instance by the Superintendent on behalf of the Principal.

The Superintendent may accept or reject the claim in part or in full.

If within 28 days after first receipt of a claim the Superintendent has not made a decision on the claim, the claim shall be deemed to have been rejected on that 28th day.

#### **46.4 Submission of Claims to the Superintendent in clause A5.2 – Annexure Part A**

In conducting the review, that Superintendent may, on behalf of the Principal, affirm, reverse or vary the decision of the Superintendent's Representative.

If within 28 days after a request to review the decision of the Superintendent's Representative, the Superintendent has not made a decision on the claim, the claim shall be deemed to have been rejected on that 28th day.

#### **46.5 Submission of Disputes to the Superintendent in clause A5.1 – Annexure Part A**

In the formal notice of dispute, the Contractor shall request a decision of the Superintendent under Clause 46.4 and set out in writing details of the Contractor's claim and reasons why the Principal is liable. On receipt of the formal notice of dispute, the Superintendent will request the Principal to provide reasons in writing for rejecting the claim. Within 28 days after a request to review the decision the Superintendent has not made a decision on the claim, the claim shall be deemed to have been rejected on that 28th day.

Conditions amended in compliance with requirements of NSW Government Industrial Relations Management Guidelines

### **49 Industrial Relations Management Performance Reviews (new clause)**

#### **Contractor Performance Reports**

The Superintendent will review the industrial relations management performance of the Contractor from time to time during the life of this contract.

The Contractor will be expected to provide all reasonable assistance to the Superintendent during the review process, including attending the review if requested, and promptly implementing corrective action. The Contractor will be provided with an opportunity to comment on the review. The review results will be linked to and included with other matters in the Contractor Performance Reports for the project.

#### **Exchange of information between NSW Government agencies**

The Contractor authorises the Principal to make information concerning the contractor available to other NSW government agencies. Such information may include, but is not limited to, any information provided by the contractor to the Principal and any information relating to the contractor's performance under the contract.

The Contractor acknowledges that information about the Contractor from any source, including substantiated reports of unsatisfactory performance, may be taken into account by NSW government agencies considering whether to offer the Contractor future opportunities for NSW government work.

The Contractor acknowledges and agrees that the communication of such information to any NSW government agency is a communication falling within section 22 of the Defamation Act 1974 (NSW).

The Contractor releases and indemnifies the Principal and the State of New South Wales from and against any claim in respect of any matter arising out of such communications. Without limitation of the above, the Contractor releases the Principal and the State of New South Wales from any claim it may otherwise have for any loss to the Contractor arising out of the Contractor's performance under the contract by the Principal, the communication of information relating to such assessment to any NSW government agency, or the use of such information by the recipient.