Submission No. 001c
(ANSTO Facilities)
SL Date: 25/02/2010

Inquiry: proposed construction of Centre for Accelerator Science and extension to facilities for the Australian Nuclear Science and Technology Organisation

Submission 1c: Opal Offices, Workshops and Laboratories Extension

Part 3 of 3. Parts 1 and 2 are:

- Submission 1a: Proposal for a new Centre for Accelerator Science
- Submission 1b: The Bragg Institute Offices and Laboratory Proposed Extension

Australian Government

Nuclear-based science benefiting all Australians

SUBMISSION TO THE PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

OPAL OFFICES, WORKSHOPS & LABORATORIES EXTENSION

FEBRUARY 2010

AUSTRALIAN NUCLEAR SCIENCE AND TECHNOLOGY ORGANISATION

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PREFACE

The Australian Nuclear Science and Technology Organisation (ANSTO) is Australia's national nuclear research and development organisation and the centre of Australian nuclear expertise. ANSTO is responsible for delivering specialised advice, scientific services and products to government, industry, academia and other research organisations. In particular, a central part of ANSTO's mission is to research, manufacture and advance the use of radiopharmaceuticals which will improve the health of Australians.

This proposal outlines the justification for the construction and fit out of additional OPAL offices, workshops and laboratories. These facilities are necessary for the ongoing efficient operation of the OPAL Reactor.

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1. IDENTIFICATION OF THE NEED

1.1. Historical Background

The OPAL Reactor is designed to meet Australia's current and future needs for a neutron source in a manner that meets all health, environmental and safety standards. Specifically, the OPAL Reactor fulfils the following purposes:

- Maintain Australia's nuclear technical expertise, in order to provide sound advice to Government in support of nuclear policy issues of strategic national interest and international obligations in this area.
- Maintain and enhance health care benefits provided to the community and ensure security of supply, through local production of the quantities and the known likely range of diagnostic and therapeutic radiopharmaceuticals needed to satisfy the requirements of Australia's medical professionals over the next 40 years.
- Provide a neutron beam research facility which will not only meet Australia's own scientific and industrial needs, but will also be a regional centre of excellence. Research undertaken using this facility will have broad application to investigations in a wide spectrum of scientific and industrial fields, including the life sciences and medicine, environmental science, chemistry, materials science and engineering science.
- Provide research and research training facilities and programs to enhance the educational opportunities available to Australia's scientists and engineers.
- Provide industrial radioisotopes and facilities for neutron activation analysis, irradiation of materials, and neutron radiography to service the needs of agriculture and industry, particularly in the electronics, environmental, resource and minerals processing industries.

Further information on the purpose and benefits of the OPAL Reactor was provided in the Environmental Impact Statement (PPK, 1998 and 1999), which formed part of the Application for a Facility Licence, Site Authorisation, the Preliminary Safety Analysis Report (PSAR, ANSTO, 2000), which formed part of the Application for a Facility Licence, Construction Authorisation and the Safety Analysis Report (SAR, ANSTO, 2004), which formed part of the Application for a Facility Licence, Operating Authorisation. As of December 2009, the OPAL Reactor has completed commissioning (ARPANSA commissioning hold point signed off on 11th November 2009) and is currently in the process of transitioning into normal operation and the full-scale production of radiopharmaceuticals, particularly molybdenum-99 for use in Technecium-99 generators.

1.2. The Need for the Work

The original Request for Tender covering the design, construction and commissioning of the OPAL Reactor included a requirement for the provision of appropriate offices and workshop facilities for Reactor Operations staff. Subsequently, during the course of the evaluation of the tenders received and the negotiations on the scope and content of the contract, the provision of offices, workshops and laboratories was limited to that required to accommodate staff required to operate the reactor. This reflected an ANSTO decision to maximise the use of the existing offices, workshops and laboratories on the Lucas Heights site.

Currently, Reactor Operations staff are distributed in a number of buildings across the Lucas Heights site as follows:

- Reactor Operations management and administrative support, the Operations Group (including the chemistry laboratory) and parts of the Utilisation Group are located in the OPAL Reactor building (Building 80).
- The Engineering and Maintenance Group is located in Hut 80 and the workshops in Buildings 42 and 43, although the I&C engineers and technicians within this group are located within the OPAL Reactor building (Building 80).
- The Nuclear Analysis Section is located in Building 40.
- The Technical Support Group (incorporating configuration management, training and IT support functions) is located in Buildings 40 and 72 and parts of Building 17.
- The Target and Canning Laboratory (part of the Utilisation Group) is located in Building 24.
- The Neutron Activation Group is located partially in the OPAL Reactor building (Building 80) and partially in Building 21.

Since that time, the ANSTO Asset Development Plan has determined that many of the buildings identified above are nearing the end of their useful life and have been scheduled for demolition. Experience gained during the commissioning and initial operation of the OPAL reactor has also shown that the current distributed arrangement is not conducive to the efficient operation of the OPAL reactor. In addition, our continuous improvement process has identified a need for additional facilities and accommodation to optimise our ability to produce radioisotopes (specifically molybdenum-99 for radiopharmaceuticals) and the irradiation of silicon for commercial customers.

As a result, we have identified a need for:

- an extension to the OPAL reactor building to accommodate the currently distributed parts of Reactor Operations into a single location and provide additional facilities and accommodation to meet future operational requirements; and
- modifications to the existing accommodation and facilities within the OPAL Reactor building to complement the extension.

1.3. Project Objectives

The project objective is to construct an extension to the OPAL Reactor building and implement associated modifications to the OPAL Reactor building that will provide additional facilities and accommodation to meet the current and anticipated future needs of Reactor Operations. This is consistent with the ANSTO strategic plan, which identifies the safe and efficient operation of the OPAL reactor as the principal means by which ANSTO can achieve its aims and objectives.

1.4. Description of the Proposal

The proposal is to construct additional offices, laboratories and workshops for Reactor Operations. The project is estimated to cost less than $15 million and will be staged between the 2009-2010 and 2012-2013 financial years, with the following milestones:

- Detailed design completion date July 2010;
- Construction completed by December 2011;
- Staff relocation by February 2012.

1.5. Consultation

The matter is primarily a design and construction issue. The design of the extension will be in accordance with best practice for laboratories, workshops and offices. Given the low levels of radioactivity that will be present in the building, the construction project does not require the approval of the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). Any use of radioactive material in the extension will be subject to ARPANSA regulation via the relevant ANSTO source licence. The construction of the extension and the associated modification within the OPAL Reactor building also constitute a change to the OPAL Reactor and as such, will be subject to review and approval in accordance with the Reactor Operations change control process.

1.6. Environmental and Heritage Considerations

The proposed site is a vacant, flat, grassed site adjacent to Building 80 and within the ANSTO OPAL general area. In general, construction of the extension will result in short term, localised, small–scale impact to soils, air quality, flora and fauna, noise, visual and landscape. Management protocols will restrict any impact on surface runoff and erosion and mitigate any other environmental effects.

There will be no impacts on Aboriginal or non-Aboriginal cultural heritage as a result of the construction of the proposed extension. There are no heritage considerations for the project.

It is therefore concluded that the proposed works are unlikely to produce a significant environmental impact. Nevertheless, an assessment of the project under the *Environment Protection and Biodiversity Conservation Act 1999* will be undertaken.

2. TECHNICAL INFORMATION

2.1. Project Location

ANSTO is situated in the local government area of Sutherland Shire, approximately 30 kilometres south-west of Sydney's central business district. The site for the proposed OPAL additional offices, workshops and Laboratories is adjacent to Building 80 and within the 70 hectare ANSTO site at Lucas Heights.

2.2. Design Objectives and General Design Principles

Design will be to Australian Standards and the BCA (Building Code of Australia), thereby delivering a reliable and maintainable facility. ANSTO standards will also apply where practical.

The design of the extension will be in accordance with best practice for workshops, laboratories and office accommodation and consultation with external consultants for the achievement of a minimum 4.5 star ABGR/NABER rating.

2.3. Scope of Works

The extension is to be a purpose built, world class laboratory, workshop and office facility incorporating Engineering and Maintenance Facilities (including the Instrument and Control Group), Nuclear Analysis Group, IT Services Group, Technical Support Group, Target and Canning Group, Training Group, and additional facilities for the Utilisation Group . Preliminary planning has indicated an additional floor space requirement of approximately 2,388 sq metres for the facility extension and 283 sq metres of minor refurbishment. The associated modifications within the OPAL Reactor building will complement the new facilities with respect to the Instrumentation and Control Group and the Utilisation Group.

2.4. Responsibilities and Resources

ANSTO's Engineering and Technical Services (E&TS) Major Projects Deliveries Office (MPDO) will be responsible for the overall project management of the project, from the design development of the concept design through to final completion and commissioning. External consultants will be engaged to carry out the design development and detailed design. Procurement for the construction will involve tender action in accordance with the Commonwealth Procurement Guidelines.

Within ANSTO, the proposal will be developed with extensive consultation and support from the following:

- Reactor Operations;
- Engineering & Technical Services;
- Occupational Health, Safety & Environment Division;
- Capital Investment Committee;
- Executive;
- ANSTO Board;

- Campus Services.

2.5. Quality Assurance

ANSTO Engineering and Technical Services is certified as complying with Quality System Standard *AS/NZ ISO 9001:1994 'Quality Systems, Model for Quality Assurance in Design, Development, Production, Installation and Servicing'*.

The work will be carried out in accordance with the appropriate Business Management System Procedures and Instructions.

2.6. Project Time Schedule

Once the Committee has approved the proposal, consultants will be engaged for the detailed design phase.

The detailed design phase completion is due in July 2010 with the construction completion due in December 2011.

The completion of these additional facilities will allow Reactor Operations staff and facilities to be relocated from B43, B40, B24 and B17. This will allow these buildings (which are up to 40 years old) to be demolished as part of the 10 year Asset Development Plan.

2.7. Risk Assessment

The project is subject to the risk management processes of ANSTO. ANSTO has a risk management policy and framework consistent with the Australian Standard 4360:1999. This framework has been benchmarked favourably against Comcover better practice principles.

It is ANSTO policy that all major projects assess risks, identify risk owners and develop action plans to mitigate identified risks. Risks for this project are being assessed for their potential impact on budget, schedule and performance. Risks are discussed on a regular basis at relevant ANSTO management meetings, and the ANSTO Board Audit Committee has an oversight role on ANSTO risk management.

A risk register for the project will be developed.

2.8. Civil and Structural

The proposed development will be provided with an access road to the workshop unloading area. The building foundations will be designed for safe operation under seismic, dead, live, vibration, settlement and equipment loads over the life of the facility and are expected to be concrete column pads keyed into bedrock.

2.9. Electrical Services

The building's extension power supply will be provided from the existing local sub-station. This arrangement will cater for refurbishment as well as any future expansion. A main

switchboard will be installed in a new main switch room located in the ground floor level of the new building. A number of distribution boards will be located throughout the building to provide power to the various items of plant, process equipment and general power requirements. The power for the mechanical plant will be supplied from local switchboards located in the mechanical plant areas.

2.10. Communications

The existing telephone, EWIS and public address systems will be extended to cover the new areas as required.

An integrated voice / data cabling system will be provided to link each voice and data outlet in each building back to the communications closet in the building.

2.11. Mechanical Services

The entire building will be designed around the mechanical systems, workshop and laboratory processes, to ensure that the required internal design conditions can be achieved. Primary confinement areas will be kept at a negative pressure in order to provide the necessary containment. Certain laboratories will need to comply with clean laboratory design codes and regulations. This will be achieved by a building and mechanical services design that incorporates specialised pressure regimes between the different areas.

The air conditioning to the various areas of the building will be provided by separate mechanical plant, in order to ensure that no cross-contamination between different areas can occur. Chilled water air handling units will be used for the cooling requirements of the air conditioning system, while the heating function will be met by using electrical heating systems. The air conditioning systems, together with the necessary exhaust systems, will provide the required building pressurisation regimes.

A main plant mezzanine room will provide a large area for the extensive plant requirements, including mechanical plant for fume cupboard extraction.

2.12. Gases and Compressed Air Service

The proposed facility will require a liquid nitrogen source. Reticulation for nitrogen gas, vacuum and site-wide compressed air reticulation will be extended to the new extension and will be distributed to locations as required. Additional non-flammable laboratory gases will be reticulated from the existing adjoining gas enclosure.

2.13. Fire Detection, Fire Alarm and Security Systems

Fire detection and fire alarm systems will be installed and interconnected with the existing OPAL reactor and site wide system to ensure that the entire facility operates as a single unit. A hydrant and hose reel system will be installed throughout the new building. It will fully comply with all relevant codes.

There will be a building security system installed, with secure card access to control and monitor access to certain physical containment (PC2) laboratory areas.

2.14. Hydraulic Services

The main supply of cold water for the new extension will be derived from the extension of the site-wide water reticulation. Solar hot water heaters will generate locally within the new areas to cater for change rooms, showers and sinks. Provision for a number of safety showers has been made throughout the new facility.

The new building will also necessitate additional stormwater control systems for existing drainage catchments, with implementation of contouring, bunds, retention ponds and stormwater litter collection. The system will be integrated into the existing ANSTO bunded stormwater system.

2.15. Energy Conservation Measures

Consideration will be given to the incorporation of passive energy conservation measures into the building and landscape design, and active measures into the design of the mechanical, electrical and hydraulic services to reduce the usage of conventional fossil fuel energy. Measures to be considered will include:

- North facing windows screened to provide control;
- Shading to the east and west windows, to control solar heat gains;
- Thermal insulation, to reduce heating and cooling loads;
- Significant daylight incorporated into the design, to minimise the use of artificial lighting;
- A building management system to operate, control and monitor engineering services with an option to integrate this system with the existing OPAL reactor Building Control and Monitoring System (BCMS);
- Variable speed drives for all variable air volume handling plant and secondary chiller water and heating water pumps;
- Use of long life low energy light fittings; and
- Measures to reduce water consumption - water flow control tap ware, dual flush WC pan cisterns, programmable boiling water units, etc.

2.16. Technical References

The works will be undertaken in accordance with all relevant Australian Standards and with relevant regulations, including:

- Building Code of Australia;
- NSW Occupational Health and Safety Act and Regulations;
- Construction Safety Act and Regulations;
- NSW Workcover Administration Act and Regulations;
- ComCare Regulations;
- Australian Building Codes;

- AS/NZ 2243 Safety in Laboratories - Parts 1 to 7;
- AS 2982 Laboratory Construction Code;
- AS 1386.1 Clean rooms and clean workstations Part 1 - Principles of clean space control;
- AS 1386.2 Clean rooms and clean workstations Part 2 - Laminar flow clean rooms;
- AS 1386.3 Clean rooms and clean workstations Part 3 - Non-laminar flow clean rooms - Class 350 and cleaner;
- AS 1386.4 Clean rooms and clean workstations Part 4 - Non-laminar flow clean rooms - Class 3500;
- AS 1386.6 Clean rooms and clean work stations Part 6 - Operation and inspection of clean rooms;
- AS 1668.1 The use of Mechanical Ventilation and Air Conditioning in Buildings Part 1 - Fire and Smoke Control;
- AS 1668.2 The Use of Mechanical Ventilation and Air Conditioning Part 2 - Mechanical Ventilation for Acceptable Indoor - Air Quality;
- AS 3000 Wiring Rules;
- AS 1055 Acoustics - Application to Specific Situation;
- AS 1324 Air Filters for Use in Air Conditioning and General Ventilation;
- AS 2430 Classification of Hazardous Areas;
- AS 4254 Ductwork For Air Handling Systems in Buildings;
- AS 4260 High efficiency particulate air (HEPA) filters - Classification, construction and performance;
- AS 4426 Thermal Insulation of Pipework, Ductwork and Equipment – Selection Installation and Finish;
- AS 1170 Minimum Design Loads on Structures;
- AS A185 Solvent-welding cement for use with Rigid PVC Pipes and Fittings;
- AS 1023 Low Voltage Switchgear and Control Gear;
- AS 1029 Low Voltage Contractor;
- AS 1055 Acoustics -Description and measurement of Environment Noise;
- AS 1074 Medium and Heavy Steel Tube;
- AS 1099 Tests for Electronic Equipment;
- AS l I00 Technical Drawings;
- AS 1 101 Graphical Symbols for General Engineering;
- AS 1102 Graphical Symbols for Electrotechnology;
- AS 1104 Informative Symbols for use on Electrical and Electronic Equipment;
- AS 1167 Allow Filler Rods for Brazing;

- AS 1172 Vitreous China Water Closet Pans;
- AS1192 Electroplated Coatings of Nickel and chromium;
- AS 1202 A.C. Motor Starters;
- AS 1210 Unfired pressure levels;
- AS 1218 Flushing cisterns;
- AS1221 Fire Hose Reels;
- AS 1260 Unplasticised PVC (UPVC) pipes and fittings for sewerage application;
- AS 1324 Air filters for use in air conditioning and general ventilation;
- AS 1342 Precast Reinforced Concrete Drainage Pipes;
- AS 1345 Rules for Identification of piping, conduits and ducts;
- AS 1371 Toilet Seats of Moulded Plastic;
- AS 1397 Steel sheet and strip - Hot dipped zinc coated or aluminium/zinc coated;
- AS 3415 Unplasticised PVC (UPVC) pipes and fittings for soil, waste and vent (SWV) applications;
- AS I432 Copper Tubes for Water, Gas and Sanitation;
- AS 1464 UPVC pipes and fittings for gas reticulation;
- AS 1470 Health and safety at work - Principles and practice;
- AS 1477 & ASK138 UPVC pressure pipes with solvent cement joints;
- AS 1530 Part 3: Tests for early fire hazard properties;
- AS 1571 Seamless copper tubes for use in refrigeration;
- AS 1572 Seamless copper and copper alloy tubes for General Engineering purposes;
- AS 1585 Capillary and Brazing Fittings for Copper and Copper Alloy;
- AS 1588 Filler Rods for Welding;
- AS 1589 Copper and Copper Based Alloy Fittings for use in Sanitary Plumbing installations;
- AS 1596 LP Gas Storage and Handling;
- AS 1628 Copper Alloy Gate Valves and Non Return Valves for use in Water Supply and Hot Water Supply;
- AS 1646 Rubber Joint Rings for Water Supply, Sewerage and Drainage Purposes;
- AS 1668 SAA Mechanical Ventilation and air conditioning code:

  Part 1 : Fire and smoke control;

  Part 2: Mechanical ventilation for acceptable indoor-air quality;
- AS 1670 Automatic fire detection and alarm systems;
- AS 1677 SAA Refrigeration Code;

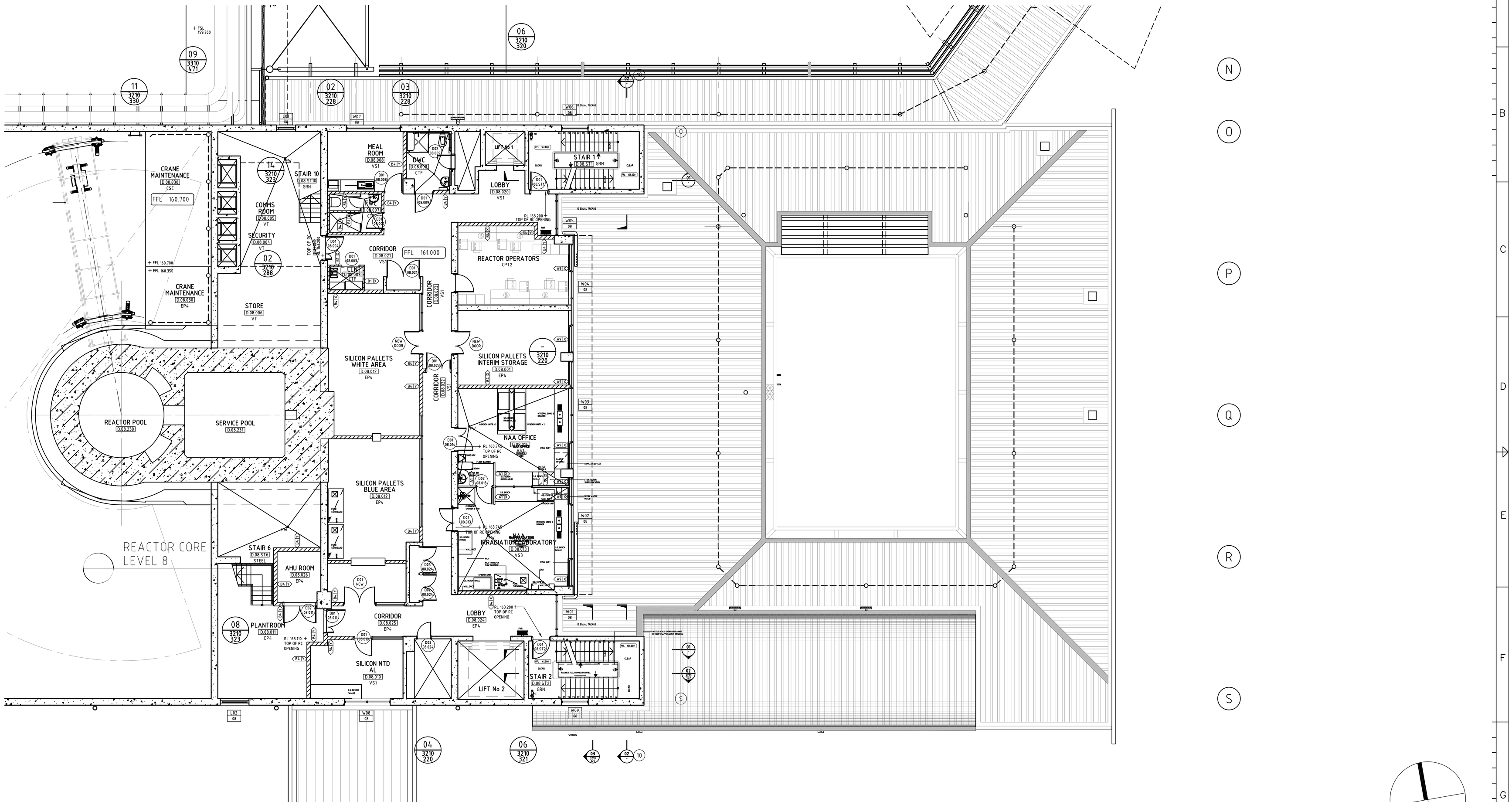
- AS 1730 Wash Basins;
- AS 1756 Household Sinks;
- AS 1768 Lightning Protection;
- AS 2005 Low Voltage Fuses;
- AS 2032 Code of Practice for Installation of UPVC Pipe Systems;
- AS 2052 Metallic Conduits and fittings;
- AS 2053 Non-Metallic Conduits and Finings;
- AS 2067 Switchgear Assemblies and ancillary equipment;
- AS 2129 Flanges for pipes, valves, and fittings;
- AS 2129 Flanges for Pipes, Valves and Fittings;
- AS 2201 Intruder Alarm Systems (parts 1,2 and 3);
- AS 2279 Disturbances in Mains Supply Networks;
- AS 2373 Control cables for electricity supply systems;
- AS 2417 1980 Parts 1,2 and 3 - The International Acceptance Test Codes;
- AS 2419 Fire hydrants;
- AS 2441 Installation of Fire Hose Reels;
- AS 2528 Bolts, stud bolts and nuts for flanges;
- AS 2546 Printed Circuit Boards;
- AS 2566 Plastic pipe laying design;
- AS 2613 Safety Devices for Gas Cylinders;
- AS 2638 Cast Iron sluice valves for water works purposes;
- AS 2758 Aggregates and rocks for engineering purposes - Part 1 Concrete Aggregates;
- AS 3000 SAA Wiring Rules,
- AS 3008 Electrical Installations - Selection of cables,
- AS 3080 Integrated Telecommunications cabling systems for commercial buildings,
- AS 3084 Telecommunications pathways and spaces for commercial buildings,
- AS 3086 integrated Telecommunications cabling systems for small office/home office Premises;
- AS 3013 Electrical Installations - Wiring systems for specific applications;
- AS 3147 Approval and test specification - Electric cables;
- AS 3500 National Plumbing and Drainage Code - Suite of standards I to 4;
- AS 3600 Concrete structures;
- AS 3610 Formwork for concrete;

- AS 3700 SAA Masonry Code;
- AS 3901 Quality Assurance Standards;
- AS 3905.2 Quality Systems Guidelines;
- AS 4041 Pressure Piping;
- AS 4100 Steel structures;
- AS 4254 Ductwork for air-handling systems in buildings;
- AS 4600 Cold-formed steel structures;
- SMACNA Low pressure duct construction standards;
- AS CA33 Code of practice for concrete pipe laying design;
- AG 601-1787 - Installation Code for Gas Burning Appliances and Equipment;
- AS HB3 Drawing Standards;
- AS HB-27 Hand Book for Field Testing of Balanced Cable Installations;
- SAA/SNZ MP77 - A Definition of Year 2000 Conformity Requirements;
- Local supply authority regulation;
- AUST ROADS Design Codes
- Water Services Association of Australia - Sewage and Water Codes;
- Others if subsequently identified.

ATTACHMENT 1 – ARCHITECTURAL PRELIMINARY CONCEPT PLANS

- A1E 124590 – B80 Proposed Ground Floor Plans
- A1E 124591 – B80 Proposed Level 8 Floor Plans
- A1E 124592 – B80 Proposed Level 0 Floor Plans
- A1E 124593 – B80 Proposed Elevations and Sections

DRAWING No.	LOC.	TITLE	REQD



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04	AMENDED PLAN AS PER GJ MARK UP	AS	RM		090430		
03	AMENDED PLAN AS PER ANSTO MARK UP	AS	RM		090318		
02	DRAWING AMMENDED	AS	RM		081002		
01	INITIAL SKETCH FOR REVIEW AND APPROVAL	AS	RM		081002		

DIMENSIONAL	YES ☐ NO ☐
INSPECTION REQD.	YES ☐ NO ☐
TESTING & INSPECTION REQUIREMENTS	

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PMB 1, MENAI NSW 2234 AUSTRALIA

TOLERANCES ON DIMENSIONS	SCALE 1:100@A1
	DRAWING REFERENCE
UNLESS NOTED OTHERWISE	JOB. No 1606

B80 OPAL PROPOSED EXTENSION LEVEL 08

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DRG. CKD	R.Maxwell	081016	RM
DESIGNED.	A.Sunderland	081008	AS
DESIGN CKD.	R.Maxwell	081008	RM
APPROVED			

Sheet No.

DRG.No. A1E 125591

REV 04

CAD

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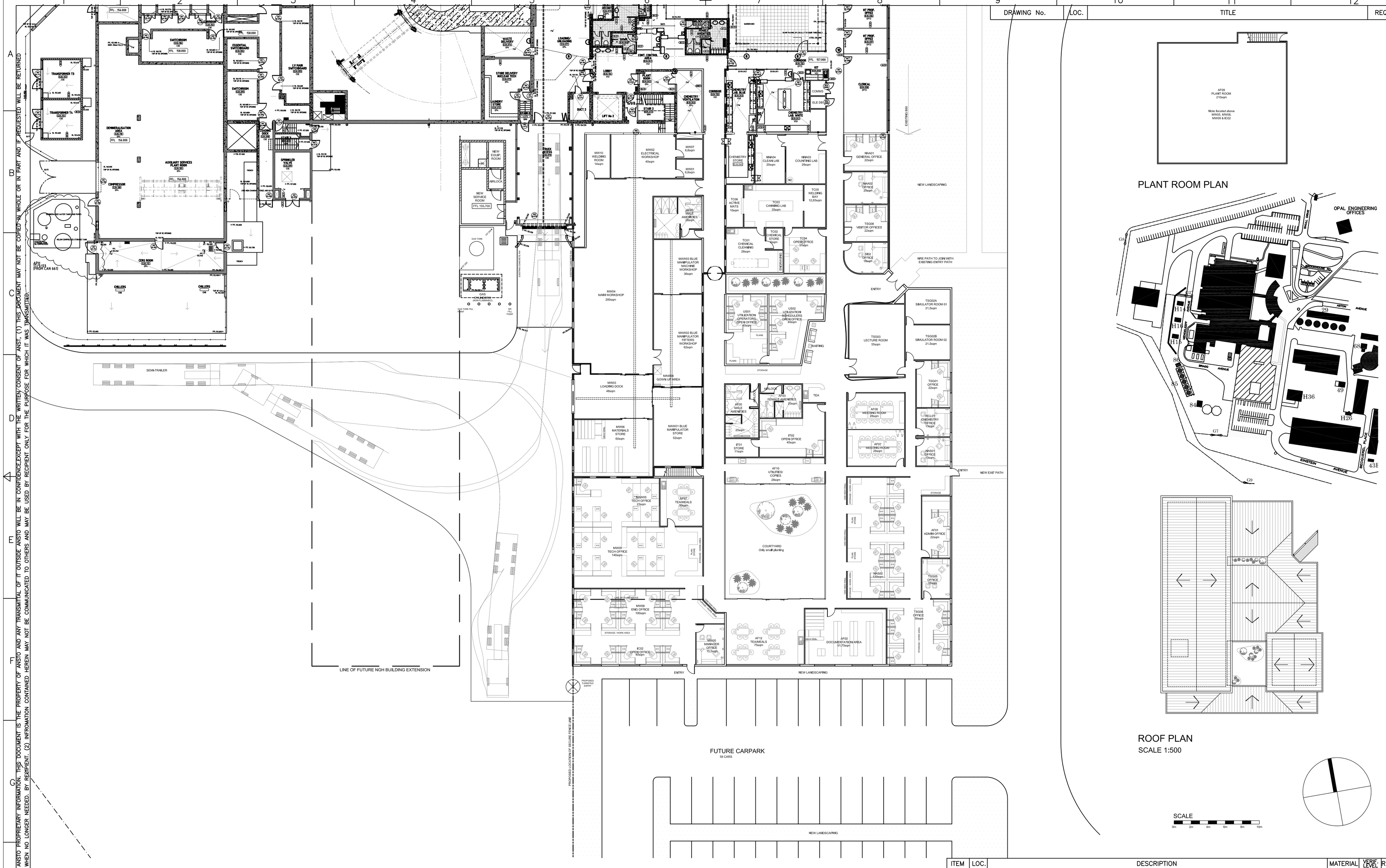

AF09
PLANT ROOM
210sqm

Notec llocated above
MW05, MW06,
MW09 & IC02

PLANT ROOM PLAN

ROOF PLAN

SCALE 1:500

SCALE
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ITEM	LOC.	DESCRIPTION	MATERIAL	VERIF. LEVEL	REQD

REVISION						
11	ADDED SHOWERS AND LANDSCAPING AS PER GJ MARKUP	AS	RM		090505
10	AMENDED AS PER GJ MARKUP	AS	RM		090424
09	AMENDED AS PER GJ MARKUP	AS	RM		090420
08	AMENDED PLANS TO MATCH RDS	AS	RM		090417
07	AMENDED PLANS AS PER ANSTO INSTRUCTION	AS	RM		090416
06	AMENDED PLAN AS PER ANSTO MARK UP	AS	RM		090330
ISSUE	DESCRIPTION	DRN	CKD	APPD	DATE

DIMENSIONAL	YES ☐ NO ☐
INSPECTION REQD.	YES ☐ NO ☐
TESTING & INSPECTION REQUIREMENTS	

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TOLERANCES ON DIMENSIONS	SCALE 1:200@A1
	DRAWING REFERENCE
UNLESS NOTED OTHERWISE	JOB. No 1606

B80 OPAL PROPOSED EXTENSION GROUND FLOOR PLAN

DRAWN TO AS 1100 | DIMENSIONS IN MILLIMETRES | DO NOT SCALE

	NAME	DATE	SIGN
DRAWN	A.Sunderland	081003	AS
DRG. CKD	R.Maxwell	081003	RM
DESIGNED.	A.Sunderland	080917	AS
DESIGN CKD.	R.Maxwell	080917	RM
APPROVED			

Sheet No.

DRG.No. A1E 125590

REV 11

CAD

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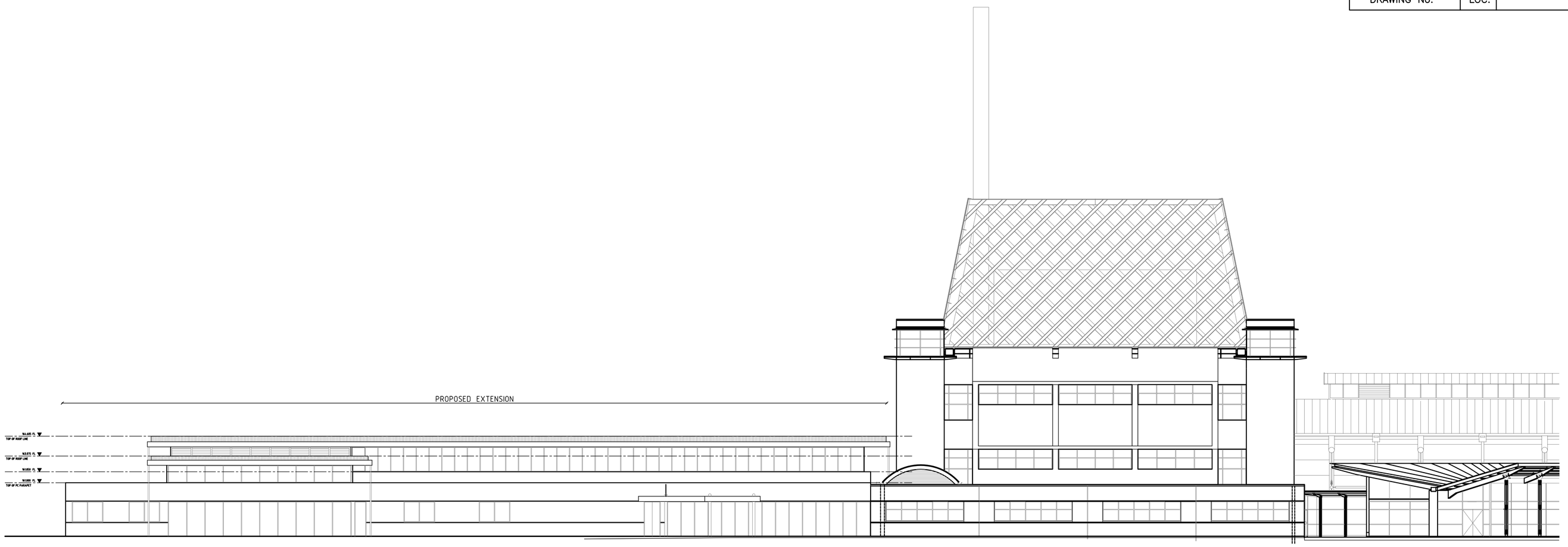
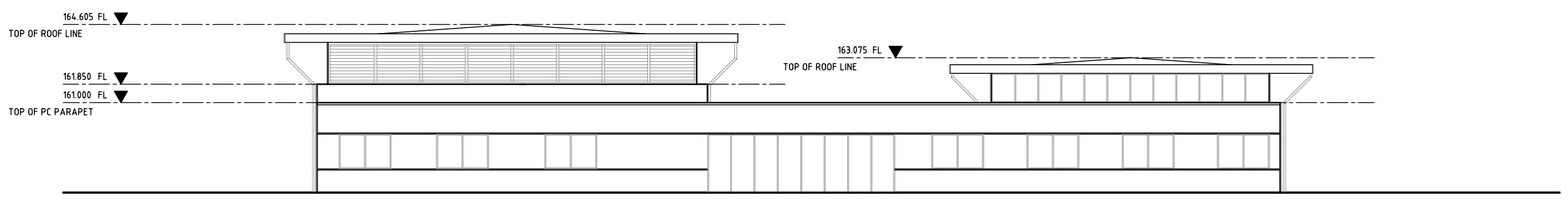


WEST ELEVATION



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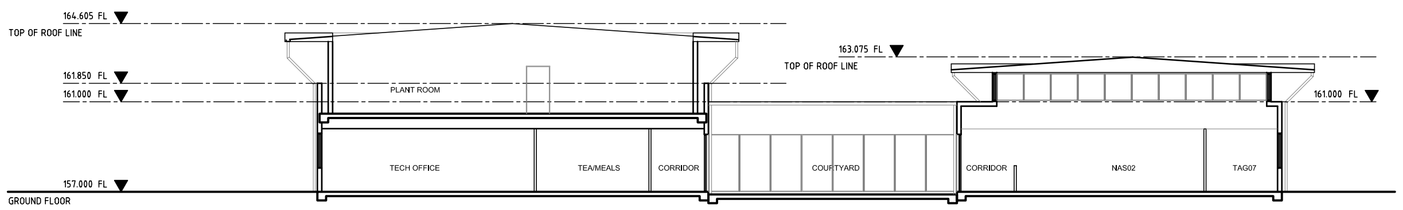
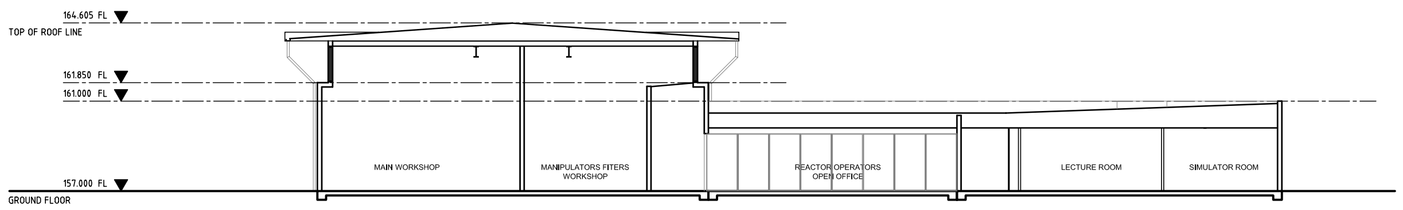


SECTION THRU COURTYARD



SECTION THRU WORKSHOPS

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ITEM	LOC.	DESCRIPTION	MATERIAL	VERIF. LEVEL	REQD

DIMENSIONAL	YES ☐ NO ☐
INSPECTION REQD.	YES ☐ NO ☐
TESTING & INSPECTION REQUIREMENTS	

REVISION	ISSUE	DESCRIPTION	DRN	CKD	APPD	DATE
	03	AMENDED ELEVATION	AS	RM		090330
	02	ADDED SECTIONS	AS	RM		081105
	01	INITIAL SKETCH FOR REVIEW AND APPROVAL	AS	RM		081013

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TOLERANCES ON DIMENSIONS
UNLESS NOTED OTHERWISE

SCALE 1:200@A1
DRAWING REFERENCE
JOB. No 1606

B80 OPAL PROPOSED EXTENSION ELEVATIONS / SECTIONS

DRAWN TO AS 1100 | DIMENSIONS IN MILLIMETRES | DO NOT SCALE

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DRG. CKD	R.Maxwell	081016	RM
DESIGNED.	A.Sunderland	081008	AS
DESIGN CKD.	R.Maxwell	081008	RM
APPROVED			

DRG.No. A1E 125593

Sheet No.

REV 03

CAD

DIMENSIONAL	YES ☐ NO ☐
INSPECTION REQD.	YES ☐ NO ☐
TESTING & INSPECTION REQUIREMENTS	

REVISION

ISSUE	DESCRIPTION	DRN	CKD	APPD	DATE
01	INITIAL SKETCH FOR REVIEW AND APPROVAL	AS	RM		081009

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TOLERANCES ON DIMENSIONS UNLESS NOTED OTHERWISE

SCALE	1:100@A1
DRAWING REFERENCE	
JOB. No	1606

B80 OPAL PROPOSED EXTENSION LEVEL 00 RENOVATION

ITEM	LOC.	DESCRIPTION	MATERIAL	VERIF. LEVEL	REQD

DRAWN TO AS 1100 — DIMENSIONS IN MILLIMETRES — DO NOT SCALE

	NAME	DATE	SIGN
DRAWN	A.Sunderland	081016	AS
DRG. CKD	R.Maxwell	081016	RM
DESIGNED.	A.Sunderland	081008	AS
DESIGN CKD.	R.Maxwell	081008	RM
APPROVED			

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