

Electrical Services Overview Report

For

Site 9 Sydney Olympic Park – Electrical Services

This report, dated 1 April 2016 has been prepared by Haron Robson Pty Ltd for Ecove Group.

Please direct enquires regarding this document to Greg Reardon at this office quoting our document reference no:
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**SITE 9 - SYDNEY OLYMPIC PARK
ELECTRICAL SERVICES OVERVIEW REPORT
DATED: 1 APRIL 2016**

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1 INTRODUCTION

The development at Site 9 - Sydney Olympic Park is a new mixed use residential development for the redevelopment of the Sydney Olympic Park site on the corner of Olympic Boulevard & Sarah Durack Avenue.

Site 9 incorporates the following:

- 229 Residential Apartments
- 950m² of Retail Tenancies on the Ground Floor
- Five (5) Levels of above ground car park facilities
- 2,540m² of Commercial office space
- One (1) Landscaped Residential Level

Haron Robson Pty Ltd have been engaged as Electrical Engineering Consultants to advise on the electrical services and overall master planning of the site services for the apartments and associated spaces.

This overview document is a general statement of the aims and inclusions of the electrical services installation.

2 ELECTRICAL SERVICES

The electrical services component of this project comprises many electrical / electronic systems. The briefing stage of this project will involve the collection of detailed information about the areas and the equipment to be installed so that there can be appropriate detailed allowances for each space. There will be a need to further address the electrical requirements of the other active systems in the building such as air conditioning and hydraulic services during the detailed design process.

This detail design will address the functional requirements of the users of the building by locating power outlets for general use, and connections for installed electrical equipment. Also the design of the electrical reticulation system so that it has sufficient capacity to provide reliable and safe power to the development. All systems will be designed to exceed the requirements of the relevant Australian Standards.

3 OUTLINE OF PROVISIONS

3.1 General

Electrical services will be provided to comply with all relevant mandatory Australian Standards and the requirements of Statutory Authorities having jurisdiction in the matter including the National Construction Code 2015 Volume 1.

3.2 Electricity and Telecommunications Authorities

All relevant Electrical Distribution and Telecommunications Carrier authorities shall be consulted with respect to the provision of the required services to the development and the street reticulation to service the development.

All involved authorities will be notified of the details of the development in an orderly time to allow service arrangements and local network augmentation to be carried out without incurring delays in the development's construction schedule.

3.3 Stratum

A Strata Title will be established for the development which will consist of multiple Stratum types. The Stratum types are:

- Residential House Services (Communal areas such as Carpark, Residential Lobbies & External areas)
- Commercial House Services (Common areas such as Carpark & Commercial Lobbies)
- Residential Apartments
- Retail Tenancies
- Commercial Offices

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3.4 Electricity Supply

Electricity Supply to the development shall be via the establishment of two (2) new Kiosk type substations to be constructed at the nominated locations. An Application for Connection shall be submitted to Ausgrid to further develop a scope of works.

It is proposed that the High Voltage Cabling shall run within deep soil garden areas where possible, otherwise the High Voltage shall run within conduits under the public roadways / footpaths or cast in to the Concrete Slab to the approval of Ausgrid.

New Low Voltage Electrical Supplies (Service/Consumers Mains) from the Designated Kiosk Substations to the development shall be installed via In-ground/In-slab Heavy Duty UPVC Conduits to the Main Switchboards throughout the development. The installation of the Low Voltage Electrical Supply cables shall achieve a 2-Hour Fire Rated capacity to maintain Electrical Supply Provisions for the Emergency and Essential Services Equipment.

3.5 Public Domain Lighting

The Public Domain lighting across the site will be developed as an integrated and coherent system, which comprehensively addresses the lighting requirements in terms of effective functional, aesthetic and energy solutions. Our detailed solutions will:

- Provide an appropriate level of lighting for pedestrian areas to a category P4 level which for the footpaths means "Local Roads or streets used primarily for access to abutting properties" with "Mixed vehicle and pedestrian traffic" and "low pedestrian/cycle activity" and "Low risk of crime" and "No requirement to enhance prestige" as per Australian Standards for pedestrian lighting AS/NZS 1158.3.1:2005.
- Provide lighting to the entry of the Residential Tower and building perimeter

Generally our approach will be to use low wattage high efficiency light sources throughout the development. These light sources will be housed in fittings with good light control to minimise light spill to residents and generally directed downward avoid "cloud staining". The form / style of all light fittings will be matching throughout to unify the development to the site.

3.6 Telecommunications Provisions

As the development will cater for more than One-Hundred (100) Apartments/Living Units, the site must be serviced by a 'Fibre to the Home' solution. Therefore, the incoming Telecommunications Cable Entry Provisions will be provided for National Broadband Network Company (NBNCo) Fibre Optic Network Cabling to meet this requirement.

NBNCo Distribution Network (Distribution Equipment and Cabling) within the development will be supplied and installed by NBNCo Contractors. The "pit and pipe" plus cable pathways conduit and cable trays for the network cabling within the site will be supplied and installed as part of the Electrical Services Scope Of Works.

All work shall be carried out to comply with the Australian Communications and Media Authority's requirements and regulations. Spatial provisions shall be provided within the allocated telecommunications rooms/riser cupboards throughout the development to accommodate the NBNCo Active and Distribution Equipment.

4 BUILDING SERVICES

The Electrical Services installation within the development shall be designed and installed to comply with all relevant standards/statutory authority requirements, which have jurisdiction over the development. These include, but are not limited to:-

- National Construction Code (NCC)
- Australian Standard AS/NZS 3000 (Wiring Rules)
- Australian Standard AS/NZS 3008 (Electrical Installations – Selection Of Cables)
- Australian Standard AS/NZS 2293 (Emergency Escape Lighting and Exit Signs For Building)
- Australian Standard AS 1670 (Fire Detection, Warning, Control and Intercom Systems)
- Australian Communications and Media Authority (ACMA) Regulations
- Service and Installation Rules of New South Wales (SIRNSW)

Electrical Supplies to Emergency/Safety and Essential Equipment shall be 2 Hour Fire Rated and segregated, as required by the National Construction Code and Australian Standard AS/NZS 3000.

An Automatic Smoke Detection System shall be provided in the residential areas and in all other areas (Excluding the Car Park) in accordance with the National Construction Code and Australian Standards AS 1670.1.

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A Building Occupant Warning System shall be provided in the carpark areas including ancillary storage/plant areas in accordance with the National Construction Code and Australian Standards AS 1670.1 and AS 4428.

A Sound System & Intercom System for Emergency Purposes (EWIS) shall be provided in the common areas and residential apartments in the Tower in accordance with the National Construction Code and Australian Standards AS 1670.4 and AS 4428.

Emergency and Exit Lighting shall be provided throughout the non residential areas of the development, complying with the National Construction Code and Australian Standard AS 2293.

4.1 Regulations and Authorities

The whole of the work will be carried out strictly in accordance with:

- Australian Standard AS/NZS 1158 Road Lighting
- Australian Standard AS 1428.1 General Requirements for access - Buildings
- Australian Standard AS/NZS 1680 Interior Lighting
- Australian Standard AS/NZS 2293 Emergency Evacuation Lighting in Buildings
- Australian Standard AS/NZS 3000 Wiring Rules
- Australian Standard AS/NZS 3008 Electrical Installations - Selection of Cables
- Australian Standard AS/NZS 3012 Electrical Installations - Demolition and Construction Sites
- Australian Standard AS/NZS 3013 Electrical Installations - Wiring Systems for Specific Applications
- Australian Standard AS/NZS 3017 Electrical Installations - Testing and Inspection Guidelines
- Australian Standard AS/NZS 3080 for Commercial Premises Telecommunications Installations - Integrated Tele Cabling Systems
- Australian Standard AS/NZS 3100 Approval and Test Specification - General requirements for electrical equipment (Parent specification for essential safety requirements)
- Australian Standard AS/NZS 3131 Plugs and Socket Outlets for use in Installation Wiring Systems
- Australian Standard AS 3137 Approval and Test Specification - Luminaires
- Australian Standard AS/NZS 3760 In-service Safety Inspection and Testing of Electrical Equipment
- Australian Standard AS/NZS 3947 Low Voltage Switchgear and Control gear
- Australian Standard AS/NZS 4251.1 EMC - Generic Emission - Residential, Commercial, Light Industrial
- Australian Standard AS/NZS 4252.1 EMC - Generic Immunity - Residential, Commercial, Light Industrial
- Australian Standard AS 4282 Control of Obtrusive Effects of Outdoor Lighting
- Australian Standard AS/NZS 4778:2001 Electromagnetic Compatibility for Radio Communications Equipment
- Australian Standard AS/NZS 61000.3.2 Limits for harmonic current emissions (equipment input current less than or equal to 16A per phase)
- Australian Standard AS/NZS 61000.3.3 Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current less than or equal to 16A
- Australian Standard AS/NZS 61000.3.5 Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current greater than 16A
- BS EN 50081.2 EMC
- BS EN 50082.2 EMC
- Local Government Authority
- Department of Industrial Relations
- Sydney Water
- Insurance Council of Australia

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- New South Wales Fire Brigade
- Australian Communication Authority
- NBNCo Requirements
- Environmental Protection Agency
- SAA Lift Code
- National Construction Code 2012 Volume 1
- Electricity Distributor's Requirements
- Electricity Retailer's Requirements
- Occupational Health and Safety Act
- Disability and Discrimination Act
- WorkCover Authority Requirements
- Electricity Service and Installation Rules of New South Wales.
- Sydney Olympic Park Authority
- The Requirements of all other Authorities having jurisdiction over the work

4.2 Extent of Work

The following items will be arranged to be supplied and installed by the relevant Third Parties and Authorities:-

- High Voltage Network Mains to the New Kiosk Substations & the augmentation of the Existing High Voltage Network Mains
- Two (2) new Kiosk type substations
- Electricity Distribution Authority / Electricity Retailer Tariff Meters and Associated Equipment
- Incoming Lead-In NBNCo Telecommunications Cable
- NBNCo Active Distribution Equipment and Cabling

The following items will be arranged to be supplied and installed by the Engaged Electrical Contractor:-

- Service/Consumer Mains from the Point of Supply to the New Main Switchboards
- Two (2) New Main Switchboards including Protective and Control Devices as required
- Energy Monitoring Equipment in accordance with the National Construction Code - Section J8 requirements
- Electrical Submains to House Services Distribution Boards, Residential & Retail Meter Panels, Apartment Distribution Boards and other Building Services Control Panels
- House Services Distribution Boards
- Apartment Distribution Boards
- Residential, Commercial Tenancy & Retail Tenancy Meter Panels
- Electrical Final Sub-circuit Cabling and Circuit Protection
- General Power Services in accordance with National Construction Code - Section J6 and the nominated Basix requirements
- General Lighting Services in accordance with National Construction Code - Section J6 and the nominated Basix requirements
- Emergency Lighting and Illuminated Exit Sign Services in accordance with National Construction Code and Australian Standard AS 2293
- Pathways for NBNCo Backbone (Vertical) Cabling
- Pathways for NBNCo Distribution (Horizontal) Cabling
- Television Distribution System for Pay TV and Free-to-Air Television Services

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- Automatic Smoke Detection, BOWS and EWIS in accordance with National Construction Code and Australian Standard AS 1670 requirements
- Smoke Alarms within the residential Apartments in accordance with National Construction Code and Australian Standard AS 3786
- Security, Access Control & Intercom Systems Services
- Lightning & Surge Protection
- ESD Design Principles

These items are listed in further detail below.

4.2.1 High Voltage Network Mains

The High Voltage Mains will be required to run to the New Kiosk Substations in the nominated locations of the development via underground ducts and/or ducts within the concrete slab.

(Please find attached layout sketches for further information)

A nominated Level 3 Accredited Service Provider will be engaged to carry out the electrical design works for the High Voltage Mains.

A nominated Level 1 Accredited Service Provider will be engaged to carry out the electrical installation works for the High Voltage Mains and Network augmentation.

4.2.2 Kiosk Substations

The development will require the supply and installation of Two (2) new 1000kVA Kiosk type substations in the nominated locations of the development.

Each 1000kVA Kiosk substation shall have a 400V Three (3) Phase, 4 Wire, 50 Hertz, Low Voltage Output capacity of approximately 1440 Amps per phase.

The anticipated Electrical Maximum Demand for the development is approximately 1,500kVA (2,100 Amps/Phase). This assessment of the electrical load is based upon the installation of Gas Cooktops, Electric Wall Ovens and Reverse Cycle Air Conditioning within each Apartment, along with a Central Gas Hot Water System.

A nominated Level 3 Accredited Service Provider shall be engaged to carry out this portion of the electrical design works for the new Kiosk substations.

A nominated Level 1 Accredited Service Provider shall be engaged to carry out the electrical installation works for the new Kiosk substations. The Main Contractor shall carry out the Kiosk substation site preparation and civil/structural works, in accordance with Ausgrid requirements and approved Level 3 ASP design drawings.

According to Ausgrid Network Standard NS141 Specification for Site Selection for Kiosk type substations - Aug 2005, Kiosk Substations must have access for Ausgrid personnel and vehicles, directly from a public street, for 24 hours per day, 7 days per week. A heavy truck with a vehicle-mounted crane is needed to install or remove the kiosk and equipment. Access routes, where required, must be suitable under all weather conditions and constructed to withstand the loading (Max 22,500kg). The access route should be a minimum of 4 metres wide, have a minimum of 4 metres headroom and be continuous from the property boundary to the kiosk site.

(Please find attached Ausgrid Kiosk Substation Details for further information)

4.2.3 Service/Consumer Mains

New Service/Consumer Mains shall be reticulated from each of the New Kiosk Substations to Two (2) New Main Switchboards. New Service/Consumer Mains shall be installed with a methodology for achieving a 2 Hour Fire Rated in accordance with the National Construction Code and Australian Standard AS/NZS 3000 for the sustained operation of the Emergency and Essential Services Equipment within the development.

The Engaged Electrical Contractor shall carry out the New Service/Consumer Mains installation works, in accordance with Ausgrid requirements, Service and Installation Rules of New South Wales (SIRNSW), National Construction Code (NCC) and Australian Standard AS/NZS 3000.

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Service/Consumer Mains Cables shall be calculated and sized in accordance with AS/NZS 3008.

4.2.4 Electrical Switch Rooms

It is proposed that an Electrical Switch room be provided on Level 2. House Distribution Boards, Unmetered Distribution Boards, Meter Panels and Lighting Control equipment (as required) shall be located within this Electrical Switch room.

(Please find attached layout sketches for further information)

4.2.5 Main Switchboards

The development will require the installation of Two (2) New Main Switchboards which will be located within the Main Switch Room 1 located on Level 2.

The New Main Switchboards will incorporate the following requirements:-

- Dead Front
- Free-Standing with Front Access (Rear where applicable)
- Ingress Protection Rating of IP42 (minimum)
- Form 3b Construction in accordance with Australian Standard AS/NZS 3000 (Wiring Rules) and AS/NZS 3439.1 (Low Voltage Switchgear and Control gear Assemblies) requirements
- Service Protection Device on the Incoming Electrical Supply within the Main Switchboard Assembles in accordance with Service and Installation Rules of New South Wales (SIRNSW).
- Surge Protection Devices
- Power Analysing & Monitoring Devices in accordance with National Construction Code – Section J8
- Sealed Compartments for Electrical Supply Authority Tariff Metering in accordance with the Service and Installation Rules of New South Wales (SIRNSW), Electrical Distribution Authority and Electricity Retailer requirements
- Non-Essential, Essential and Emergency /Safety Services Sections in accordance with National Construction Code and Australian Standard AS/NZS 3000 requirements
- Outgoing Circuit Breakers for House Distribution Boards, Meter Panels, Building Services Control Panels and Equipment.

Main Switchboard dimensions will vary and further investigation will be required to determine an approximate size.

4.2.6 Electricity Supply Authority Tariff Metering

The New Main Switchboards shall have sealable compartments for the installation of current transformers to facilitate the Tariff Metering of the House Services. The sealable compartments for current transformers shall be in accordance with the Service and Installation Rules of New South Wales (SIRNSW) and the relevant Electrical Distribution Authority's requirements. The House Services Tariff Metering equipment shall be installed within the Main Switch rooms provided.

4.2.7 Submain Cabling

Submain Cables will be reticulated from the New Main Switchboards via cable ladders, conduits, vertical risers and service cupboards to each Tariff Meter Panel, Distribution Board, Building Services Control Panel and Associated Equipment.

Submain Cabling shall be 2 Hour Fire Rated, where they are supplying nominated Emergency and Essential Services Equipment within the development.

Submain Cables shall be calculated and sized in accordance with AS/NZS 3008 with each submain to generally have 20% spare capacity over and above the designed final maximum demand for the normal usage of that section of installation being supplied by the respective submain cable.

4.2.8 House Distribution Boards

New House Services Distribution Boards shall be supplied and installed within the development for the distribution of electricity for General Lighting, Emergency Lighting and Illuminate Exit Sign Services, General Power Services & Building Services Equipment as required.

New House Services Distribution Boards shall be a Split Chassis Arrangement (Separate Light Chassis and Power Chassis) for compliance with National Construction Code - Section J8 requirements. New House Services Distribution Boards shall incorporate Main Isolating Switch, Miniature Circuit Breakers (MCBs) and Energy Monitoring Facilities.

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The House Distribution Boards will incorporate the following requirements:-

- Dead Front
- Free-Standing with Front Access
- Ingress Protection Rating of IP42 (minimum)
- Surge Protection Devices
- Main Switch/Circuit Breaker to isolate power
- Contactors for General Lighting & Emergency/Exit Lighting
- Emergency Lighting Test Switch
- Time Clocks
- Fuses
- Power Analysing & Monitoring Devices in accordance with National Construction Code – Section J8
- Outgoing Circuit Breakers complete with RCD Protection for final sub-circuits as required by AS/NZS 3000:2007.

4.2.9 Apartment Distribution Boards

Apartment Distribution Boards (Load centres) shall be supplied and installed within each Apartment for the distribution of Lighting and Power Services within the Apartment. New Apartment Distribution Boards shall be installed in a location as nominated by the Main Contractor.

New Apartment Distribution Boards shall be a White/Grey Polycarbonate DIN Rail Load Centre. Circuit Breakers shall be provided with RCD Protection in accordance with AS/NZS 3000:2007.

The Apartment Distribution Boards will incorporate the following requirements:-

- Surface Mount
- Ingress Protection Rating of IP42 (minimum)
- Surge Protection Devices
- Main Switch/Circuit Breaker to isolate power
- Outgoing Circuit Breakers complete with RCD Protection for final sub-circuits as required by AS/NZS 3000:2007.

4.2.10 Residential, Commercial Office & Retail Tenancy Meter Panels

Residential, Commercial Office and Retail Tenancy Metering Panels shall be supplied and installed within the Electrical Switch Rooms located on the Car Park Levels as described above (except the Residential Tower – where meters will be installed within the Electrical Riser Cupboards on each residential level). The Electricity Supply Authority shall supply and install their Tariff Meters and associated equipment on the nominated Meter Panels.

Combined Meter Panels will contain active links to allow for multiple supply authority tariff meters to be installed with meter combinations of 6, 9, 12 or 16 meters. Individual protection fuses for each meter and Single Phase Circuit Breakers or Switches will be also be provided as per the requirements of the Electricity Service and Installation Rules of New South Wales.

4.2.11 Final Sub-circuits

Generally, all cabling for general lighting and power sub-circuits will be run in Thermoplastic (PVC) Sheathed Cable concealed in the false ceilings, wall cavities or wiring installation accessories (i.e. conduits, ducting). Conduits will be provided where necessary for protection of cables installed within structural slabs and walls.

All final sub-circuits shall be installed utilizing Residual Current Circuit Breakers with Over-Current Protection (RCBOs) on all sub-circuits in accordance with Australian Standard AS/NZS 3000:2007, Clause 2.6 requirements.

4.2.12 General Power Services

The General Power Services installation will be provided in common areas for maintenance and servicing purposes (i.e. cleaning), and as nominated for ancillary equipment and building services equipment.

General Power Services within each Apartment shall be in accordance with the Principal's requirements & the nominated BASIX Requirements.

4.2.13 General Lighting Services

The General Lighting Services installation involves both Interiors and Exteriors and will be designed to co-ordinate and enhance the architecture, interiors and landscape, whilst providing lighting for the safe movement of occupants throughout the development. Also ESD principles shall be applied.

The General Lighting Services shall be designed in accordance with National Construction Code - Section J6, AS 1680 requirements and the nominated BASIX requirements.

Lighting within each Apartment shall be in accordance with the nominated BASIX requirements.

4.2.14 Emergency Lighting and Illuminated Exit Sign Services

Emergency Lighting and Illuminated Exit Signs shall be installed throughout the development to comply with the National Construction Code and Australian Standard AS 2293 (Emergency Escape Lighting & Exit Signs for Buildings) requirements.

Emergency Lighting Test Switches shall be supplied and installation in accordance with Australian Standard AS 2293 on all Distribution Boards supplying circuits with Emergency and Exit Sign Lighting incorporated.

4.2.15 Commercial Office Spaces

The Commercial Office Spaces shall be of a "Integrated" tenancy fit-out. This includes the supply and installation of a Distribution Board, Communications Network, General Power and General Lighting or as required by the Principal's Project Requirements & the nominated tenant's requirements.

4.2.16 Retail Tenancy Spaces

The Retail Tenancy Spaces shall be of a "Cold Shell" base building fit-out. This includes the supply and installation of a Distribution Board, Communications Hub, General Power and General Lighting or as required by the Principal's Project Requirements & the nominated BASIX requirements.

4.2.17 Fire Control Centre

The development shall incorporate a Fire Control Centre within the Basement in accordance with the National Construction Code requirements E1.8.

The Fire Control Centre shall be located within an easily accessible location for the attending New South Wales Fire and Rescue (NSWFR) personnel. The Fire Control Centre shall house the essential equipment for the Smoke Detection, BOWS, EWIS and Fire Fighting Equipment including the Main Fire Indicator Panel (FIP) and the EWIS Indicator Panel (IP)

Electrical Equipment installed within the Fire Control Centre shall be electrically supplied via a dedicated Emergency Services Distribution Board installed within the Fire Control Centre. The Emergency Services Distribution Board shall be supplied via a 2hr Fire Rated Sub-main source from the Emergency Electrical Supply section of the House Services Main Switchboard.

4.2.18 Automatic Smoke Detection & Alarm System

An Automatic Smoke Detection & Building Occupant Warning System and/or Sound System and Intercom System for Emergency Purposes (EWIS) shall be installed as required.

The systems shall be designed and installed in accordance with the National Construction Code, the Fire Engineered Report, New South Wales Fire and Rescue Requirements, Australian Standards AS 1670.1, AS 1670.4, AS 44283 and all relevant statutory authority regulations and requirements.

The Automatic Smoke Detection & Alarm System, Emergency Warning and Intercommunication System (EWIS) shall be integrated into other Smoke Detection and Fire Control measures for the development, including Australian Standard AS 1668 for Mechanical Ventilation Systems and Hydraulic Fire Suppression Equipment (i.e. Fire Hydrants, Fire Hose Reels, and Fire Sprinklers).

A Mimic Panel shall be provided within the Lobby of the Residential Tower, linked back to the Main Fire Indicator Panel within the Fire Control Centre.

Smoke Alarms shall be installed within each Apartment in accordance with Australian Standard AS 3786 requirements.

4.2.19 Telecommunication Rooms

It is proposed that a Telecommunication Room within the Level 2 area to allow for NBNco Distribution Equipment which will be provided by NBNco, Security/Access/Intercom Racks will also be located within this room.

(Please find attached layout sketches for further information)

4.2.20 Telecommunications Fibre Optic Lead-In Cabling

The Engaged Electrical Contractor shall provide the Building Entry/Lead-In Cabling Conduits and accessories from the site boundary to the nominated Telecommunications Room. All works shall be in accordance with NBNco Network Standards and requirements.

NBNCo shall provide all the Fibre Optic cabling and equipment to development as necessary to deliver Fibre Optic connectivity to each individual Apartment / Unit within the development in accordance with the NBNco Network Standards, Australian Standards, Australian Communication and Media Authority requirements.

An application to NBNco will be required to undertake these works and to further establish a detailed scope of works for the entire development.

4.2.21 Telecommunications Fibre Optic Distribution Equipment

Spatial Provisions shall be provided within the allocated Telecommunications Room within the development for the installation of all necessary NBNCo Distribution Equipment.

A Premises Distribution Hub (PDH) shall be provided by NBNco. The Engaged Electrical Contractor shall provide all necessary installation accessories (conduits, cable ladders, ducts etc) to ensure the NBNco Installing Contractor can install the required cabling and equipment.

4.2.22 Telecommunications Fibre Optic Vertical (Backbone/Trunk) Cabling

Spatial Provisions shall be provided for the installation of Fibre Distribution Terminals (FDT within the Telecommunications Room. The Engaged Electrical Contractor shall provide all necessary installation accessories (conduits, cable ladders, ducts etc) to ensure the NBNco Installing Contractor can install the required cabling and equipment on each level as required.

Spatial Provisions shall be provided for the installation of Fibre Distribution Terminals (FDT within the Telecommunications Cupboard/Risers on each apartment floor level. The Engaged Electrical Contractor shall provide all necessary installation accessories (conduits, cable ladders, ducts etc) to ensure the NBNco Installing Contractor can install the required cabling and equipment on each level as required.

4.2.23 Telecommunications Apartment Provisions

The Engaged Electrical Contractor shall provide a Communications Hub to provide connectivity between the Apartment Telecommunications Outlets and the NBNco Network. The connectivity of the Television System for the Apartment will also be within the Communications Hub.

The "Communications Hub" shall comprise a flush mounted communications panel complete with:

- One (1) double GPO (10 Amp switched socket outlets)
- Ethernet Data switcher
- Outgoing Data Cabling patch panels
- Multi-switch for TV Distribution (Splitter)
- Power supply unit (By NBNco)
- Network Termination Device (By NBNco)
- Fibre Wall Outlet (By NBNco)

Communications Hub Enclosure and associated equipment shall be installed to the Manufacturer's specifications.

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The Engaged Electrical Contractor shall provide RJ45 Telecommunications Outlets within the Apartment. Locations and quantities shall be in accordance with the Principal's requirements.

The Engaged Electrical Contractor shall provide a Cat.6 (Copper) Cabling to the Telecommunication Outlets within the Apartments. Cabling shall be installed within concealed conduits, ceiling spaces and wall cavities.

The cabling shall be installed in accordance with AS/ACIF S009, Australian Standards AS 3080 and AS 3085 and any other statutory authorities' requirements.

4.2.24 Essential & Emergency House Services Communications Distribution Network

The Engaged Electrical Contractor shall provide a Cat.6 (Copper) Cabling between each Emergency and Essential Services Equipment and/or Panel to individual NBNCofibre Network Termination Devices (NTD) located in the Main Telecommunications Room on Level 3 to provide telecommunications connectivity for the Emergency and Essential Services Equipment.

4.2.25 Television Distribution System

The Engaged Electrical Contractor shall provide a combined free-to-air / pay-TV television distribution system throughout the development which includes Head-End Equipment, Amplifiers, Multi-taps, Splitters, and Television Outlets and associated cabling. The system shall all be installed in accordance with all relevant Australian Standards and Foxtel Installation requirements.

Engaged Electrical Contractor shall provide all necessary Television Signal Distribution Equipment to ensure broadcast signal is conveyed throughout the development.

4.2.26 Gas & Hot Metering

The Engaged Contractor shall provide Electrical provisions for Gas and Hot Water Metering in accordance with Jemena Document (FR.RS.002673 – Meter Data Logger Installation Instructions).

4.2.27 Security, Access Control and Intercom Systems

An Intruder Security System will be provided for the monitoring of the communal areas, common areas and fire isolated stairway exits.

An Access Control and Intercom System will be provided for the external entry points to provided access for residents and visitors to the development.

Resident and Visitor Carparking Facilities shall be incorporated into the Access Control and Intercom System to control vehicle access to the facilities, by the means of Roller Shutters and Boom Gates, Induction Loops and Air (Radio Frequency) Keys.

A Secure Telephone Point (Mode 3) will be provided within each Apartment to facilitate Third Party Security System Providers to install their services and monitor within the Apartment in the future, by the resident.

The Lift Card Key Controls shall be incorporated within the Security/Access & Intercom System to provide control so that lift travel can only be authorised by the approved occupants of the building.

4.2.28 Lightning and Surge Protection

A lightning protection system shall be installed to comply with AS 1768.

The system shall be installed comprising an air termination roof conductors connected to earth electrodes by down conductors. Other Premises components shall be bonded to the system, these include:

- Electrical earth - Main Switchboard MEN
- Communications earth - MDF earth
- Incoming water pipes
- Incoming gas pipes
- Curtain wall - facade metalwork
- Steel reinforcement and structure

**SITE 9 - SYDNEY OLYMPIC PARK
ELECTRICAL SERVICES OVERVIEW REPORT
DATED: 1 APRIL 2016**

- External metal handrails.

All bond connections shall use the appropriate bimetallic connection to eliminate any corrosion caused by contact between dissimilar metals.

Down conductors shall be installed in conduits cast into the concrete columns indicated on the drawings.

Surge protection shall be provided for the Main Switchboards and Distribution Boards as detailed earlier in this report.

4.2.29 ESD - Design Principles

The aim of our detailed design solutions will be to minimise the greenhouse gas emissions associated with building materials (embedded energy) and building operations as well as to minimise running and maintenance costs.

All design solutions shall be in accordance with the minimum requirements of the Building Code of Australia – Section J and BASIX Requirements.

5 ANNEXURES

- **Electrical Preliminary Reticulation Plans (Total of 19 Pages)**
- **Kiosk Substation Details**
- **Kiosk Substation Earthing Requirements**

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Notes - Construction General (BASIX)

Glazing
Doors / windows:
 - Aluminium framed **single clear** glazing to internal windows that open to wintergardens
 U-Value: 6.6 (equal to or lower than)
 SHGC: 0.69 (+ or - 10%)
 - Aluminium framed **double clear** glazing to curtain walls & glazing to balcony edge.
 U-Value: 4.4 (equal to or lower than)
 SHGC: 0.5 (+ or - 10%)

Given values are NFRC, total window values

Roof / ceiling insulation
Roof:
 Concrete roof - No insulation
 Default Colour modelled

Ceiling:
 Plasterboard ceiling - R3.0 bulk insulation to selected units (34.01 and 34.07) with balconies above.
 Plasterboard ceiling - R2.0 bulk insulation to all units to top floor, balconies above & slot areas above to all other units.

Note: It has been assumed at DA stage that the area of all ceiling penetrations is less than 0.5% of the total ceiling area. If down lights are proposed at a later stage, BCA loss of insulation calculations will be required.

Wall / floor insulation
External Wall:
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 No colour nominated

Internal walls within units:
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Inter-tenancy walls / corridor:
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75mm hebel power panel plasterboard lined with R1.5 acoustic insulation to all other units.

Floors:
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 Concrete - no insulation required between units

Floor coverings:
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 All 3 & 4 bed apartments tiled throughout

Central hot water system
 Central gas-fired boiler with R1.0 (-38mm) insulation to ringmain and supply risers.

Reticulated alternative water

HARON ROBSON
 lightmatters wattmatters avmatters
 1 April 2016

Revision	Date	Description	Initial	Checked
A	01.03.16	Development Application	JS	CP



Site 9, Sydney Olympic Park
 3 Olympic Boulevard

General Arrangement Plan
 Ground

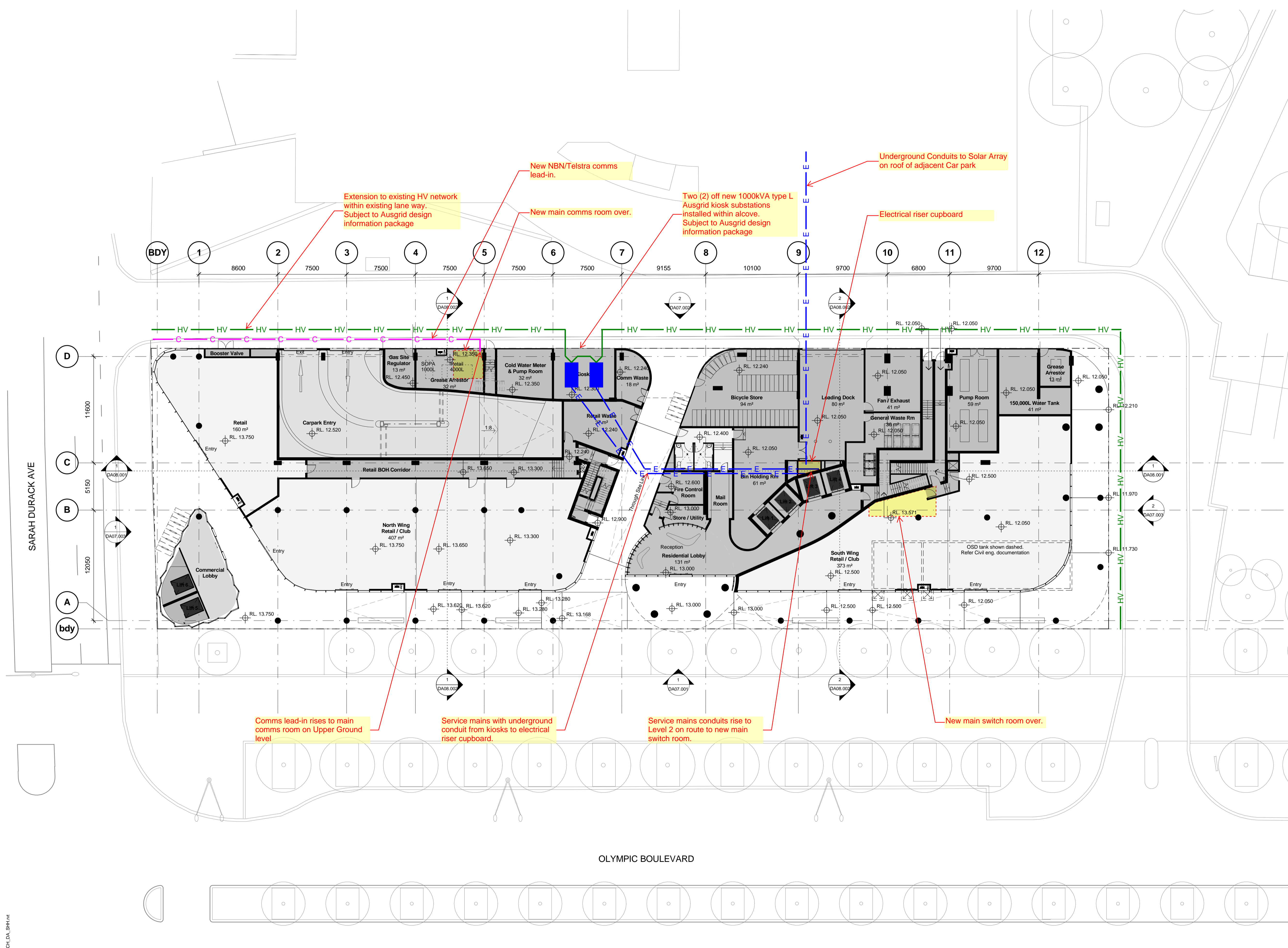
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Scale	1 : 200 @ A1
Drawn	JS Checked CP
Project No.	S11890
Plot Date	1/04/2016 2:06:04 PM
Plot File	

Drawing no. **DA02.001** Revision **A**

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Legend - General	
BG	Bulky Goods
	Storage Cage

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Given values are NFRC, total window values

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 Default Colour modelled

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 No colour nominated

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Floors:
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Reticulated alternative water

HARON ROBSON
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 1 April 2016

Revision	Date	Description	Initial	Checked
A	01.03.16	Development Application	JS	CP

Client: Ecove

Site 9, Sydney Olympic Park
 3 Olympic Boulevard

General Arrangement Plan
 Level 02

Status	Development Application		
Scale	1 : 200	@	A1
Drawn	Author	Checked	Checker
Project No.	S11890		
Plot Date	1/04/2016 3:48:18 PM		
Plot File			

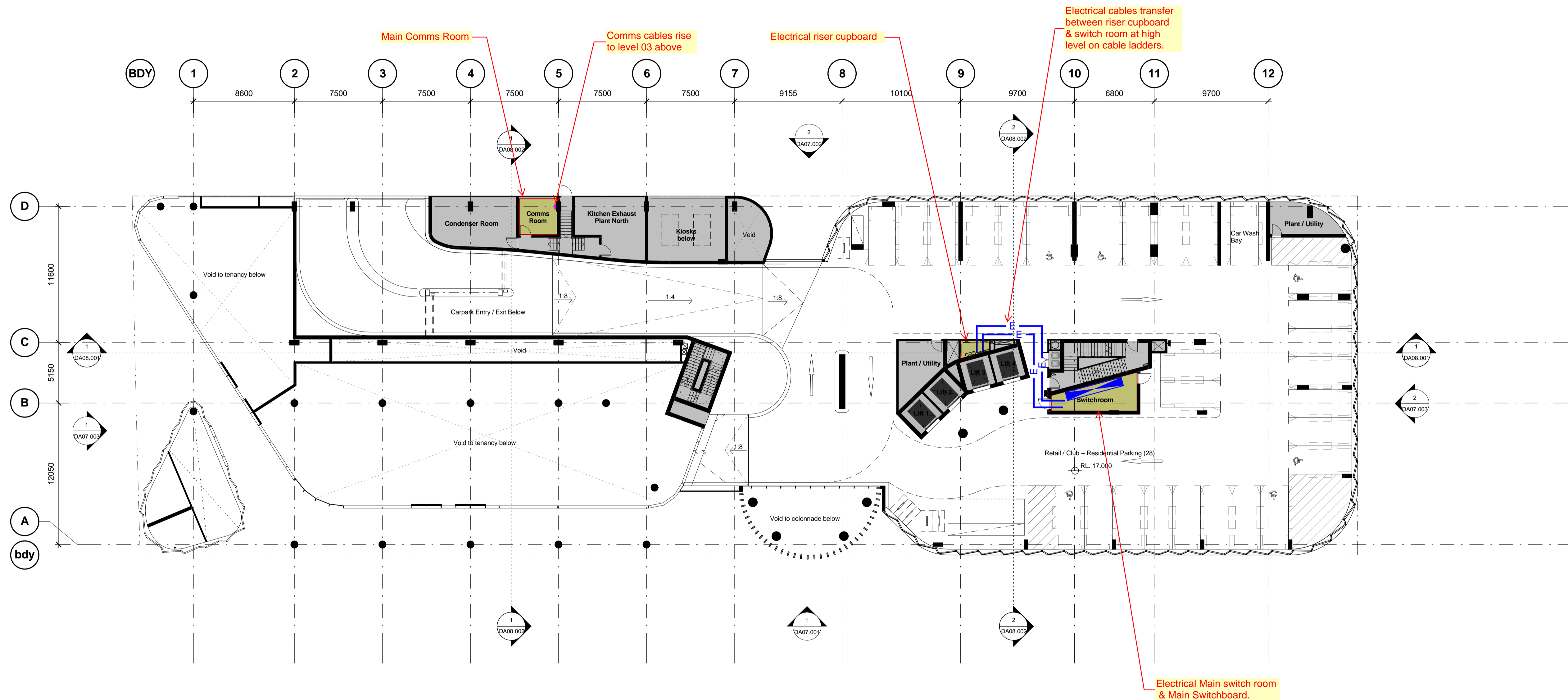
Drawing no.	Revision
DA02.002	A

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BATESSMART



Legend - General
 BG Bulky Goods
 Storage Cage

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 U-Value: 4.4 (equal to or lower than)
 SHGC: 0.5 (+ or - 10%)

Given values are NFRC, total window values

Roof / ceiling insulation

Roof:
 Concrete roof - No insulation

Default Colour modelled

Ceiling:
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Wall / floor insulation

External Wall:
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 No colour nominated

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 Central gas-fired boiler with R1.0 (~38mm) insulation to ringmain and supply risers.

Reticulated alternative water

HARON ROBSON
 lightmatters wattmatters avmatters
 1 April 2016

Revision	Date	Description	Initial	Checked
A	01.03.16	Development Application	JS	CP

Client: Ecove

Site 9, Sydney Olympic Park
 3 Olympic Boulevard

General Arrangement Plan
 Level 03

Status	Development Application		
Scale	1 : 200	@	A1
Drawn	Author	Checked	Checker
Project No.	S11890		
Plot Date	1/04/2016 1:02:09 PM		
Plot File			

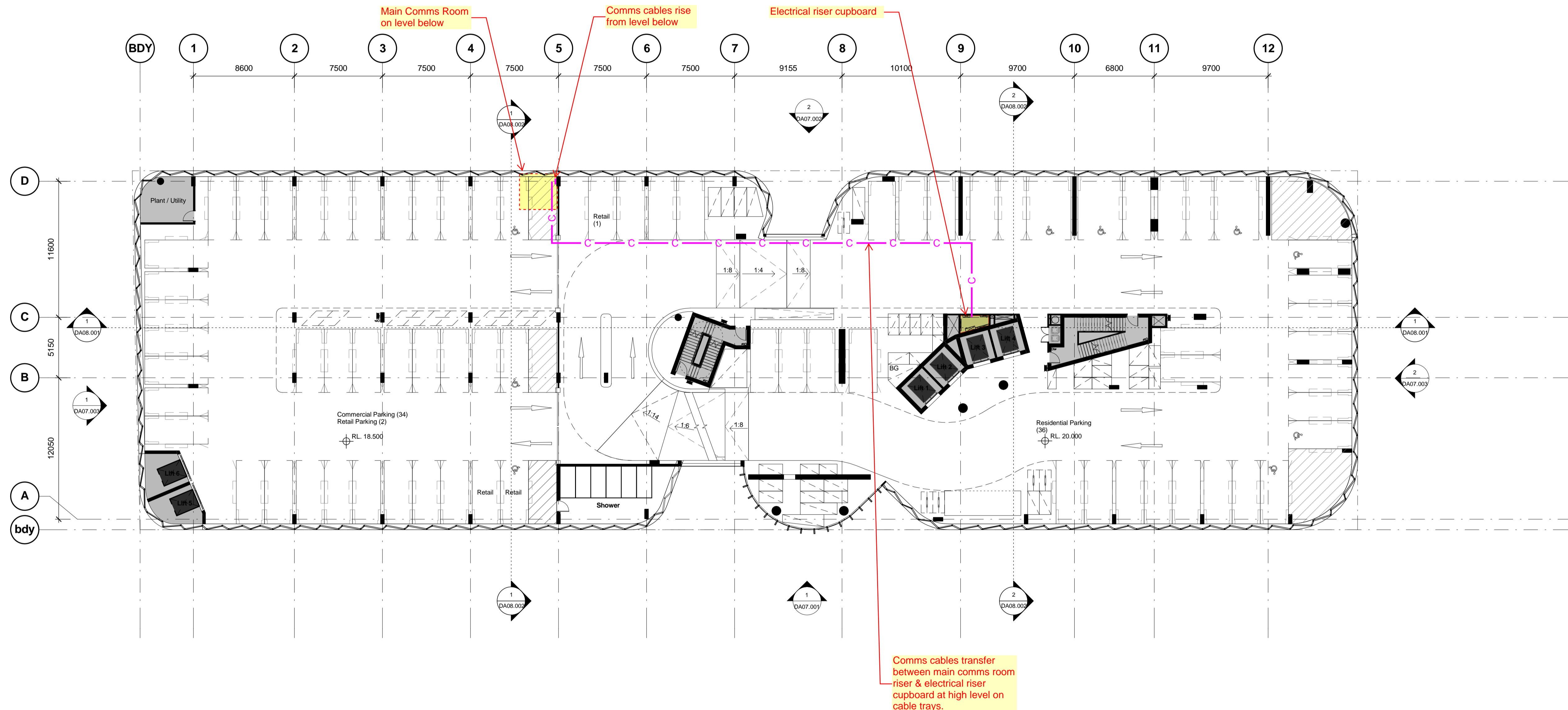
Drawing no.	Revision
DA02.003	A

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BATESSMART



Legend - General
 BG Bulky Goods
 Storage Cage

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 U-Value: 4.4 (equal to or lower than)
 SHGC: 0.5 (+ or - 10%)

Given values are NFRC, total window values

Roof / ceiling insulation

Roof:
 Concrete roof - No insulation

Default Colour modelled

Ceiling:
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Reticulated alternative water

HARON ROBSON
 lightmatters wattmatters avmatters
 1 April 2016

Revision	Date	Description	Initial	Checked
A	01.03.16	Development Application	JS	CP



Site 9, Sydney Olympic Park
 3 Olympic Boulevard

General Arrangement Plan
 Level 04



Status	Development Application		
Scale	1 : 200	@	A1
Drawn	Author	Checked	Checker
Project No.	S11890		
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Plot File			

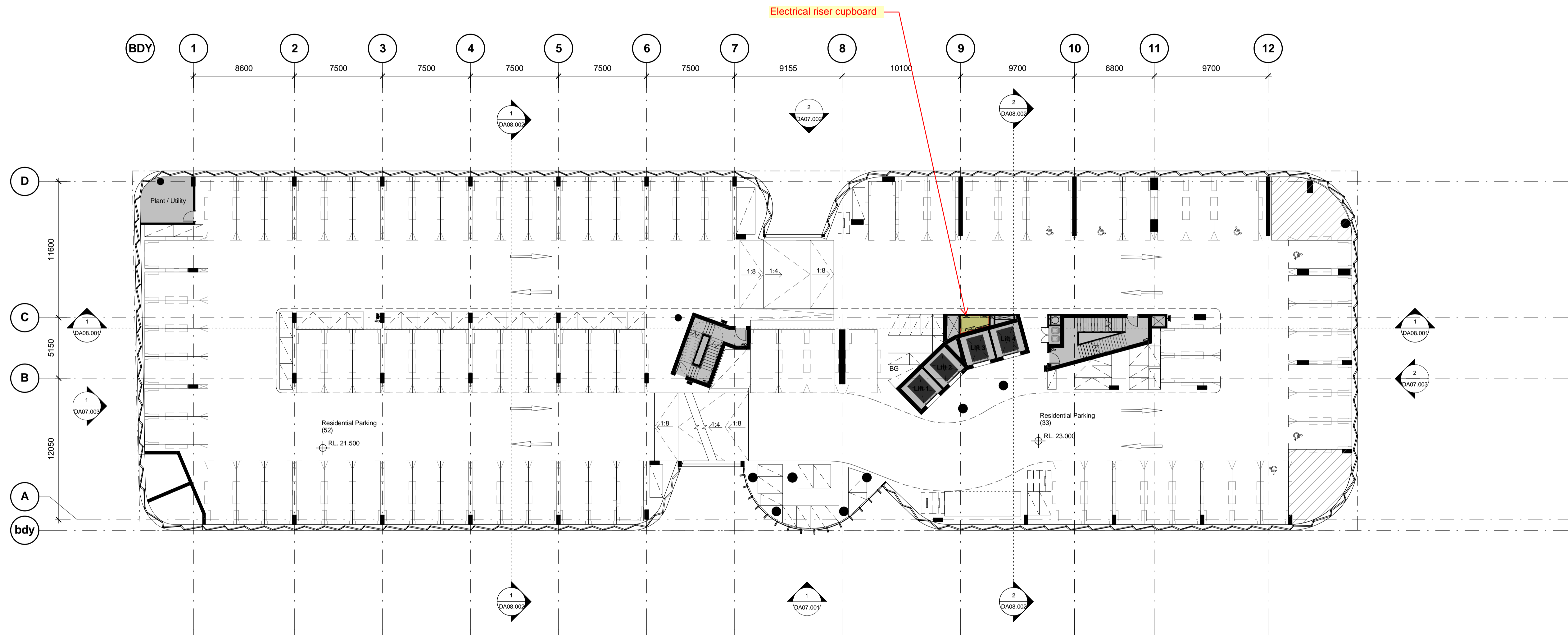
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DA02.004	A

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BATESSMART



Legend - General	
BG	Bulky Goods
	Storage Cage

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Given values are NFRC, total window values

Roof / ceiling insulation

Roof:
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Default Colour modelled

Ceiling:
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Central hot water system
 Central gas-fired boiler with R1.0 (~38mm) insulation to ringmain and supply risers.

Reticulated alternative water

HARON ROBSON
 lightmatters wattmatters avmatters
 1 April 2016

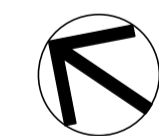
Revision	Date	Description	Initial	Checked
A	01.03.16	Development Application	JS	CP

Client: Ecove



Site 9, Sydney Olympic Park
 3 Olympic Boulevard

General Arrangement Plan
 Level 05



Status	Development Application		
Scale	1 : 200	@	A1
Drawn	Author	Checked	Checker
Project No.	S11890		
Plot Date	1/04/2016 3:48:59 PM		
Plot File			

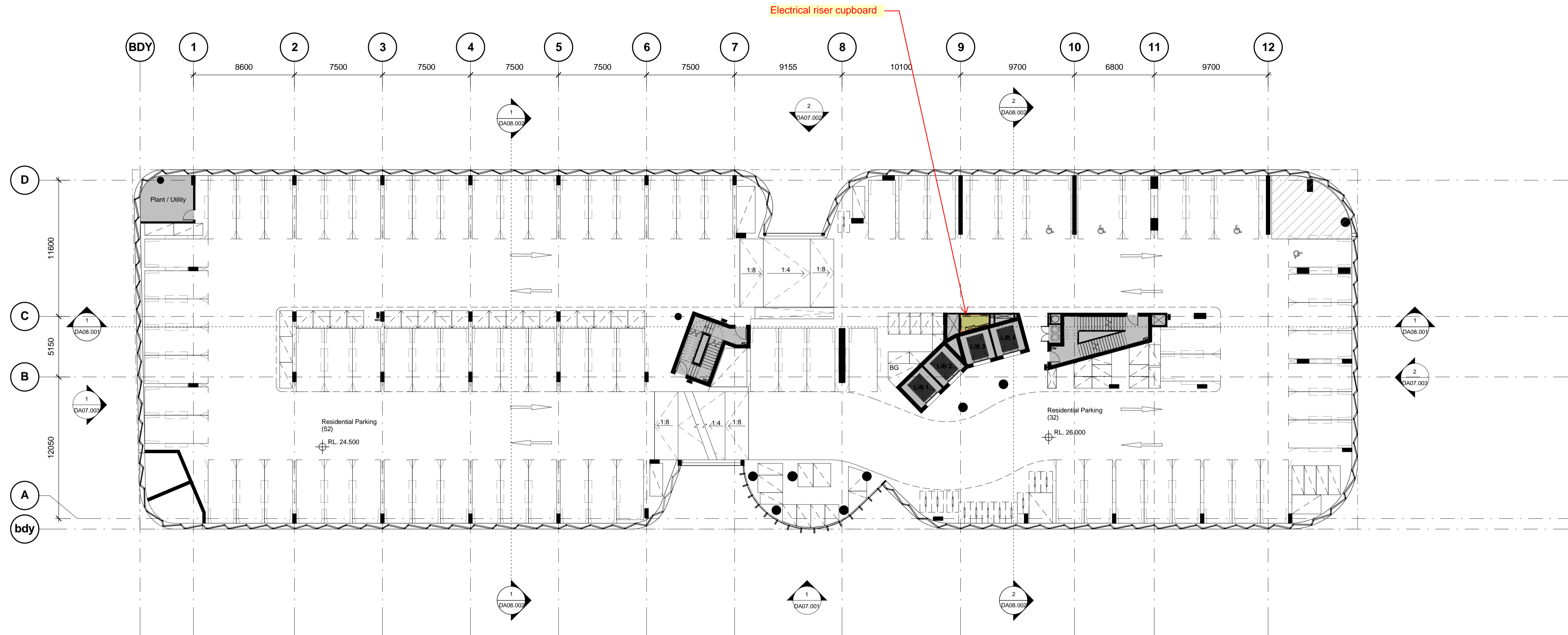
Drawing no.	Revision
DA02.005	A

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Legend - General	
BG	Bulky Goods
	Storage Cage

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Default Colour modelled

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Reticulated alternative water

HARON ROBSON
 lightmatters wattmatters avmatters
 1 April 2016

Revision	Date	Description	Initial	Checked
A	01.03.16	Development Application	JS	CP

Client: Ecove

Site 9, Sydney Olympic Park
 3 Olympic Boulevard

General Arrangement Plan
 Level 06

Status	Development Application		
Scale	1 : 200	@	A1
Drawn	Author	Checked	Checker
Project No.	S11890		
Plot Date	1/04/2016 3:49:12 PM		
Plot File			

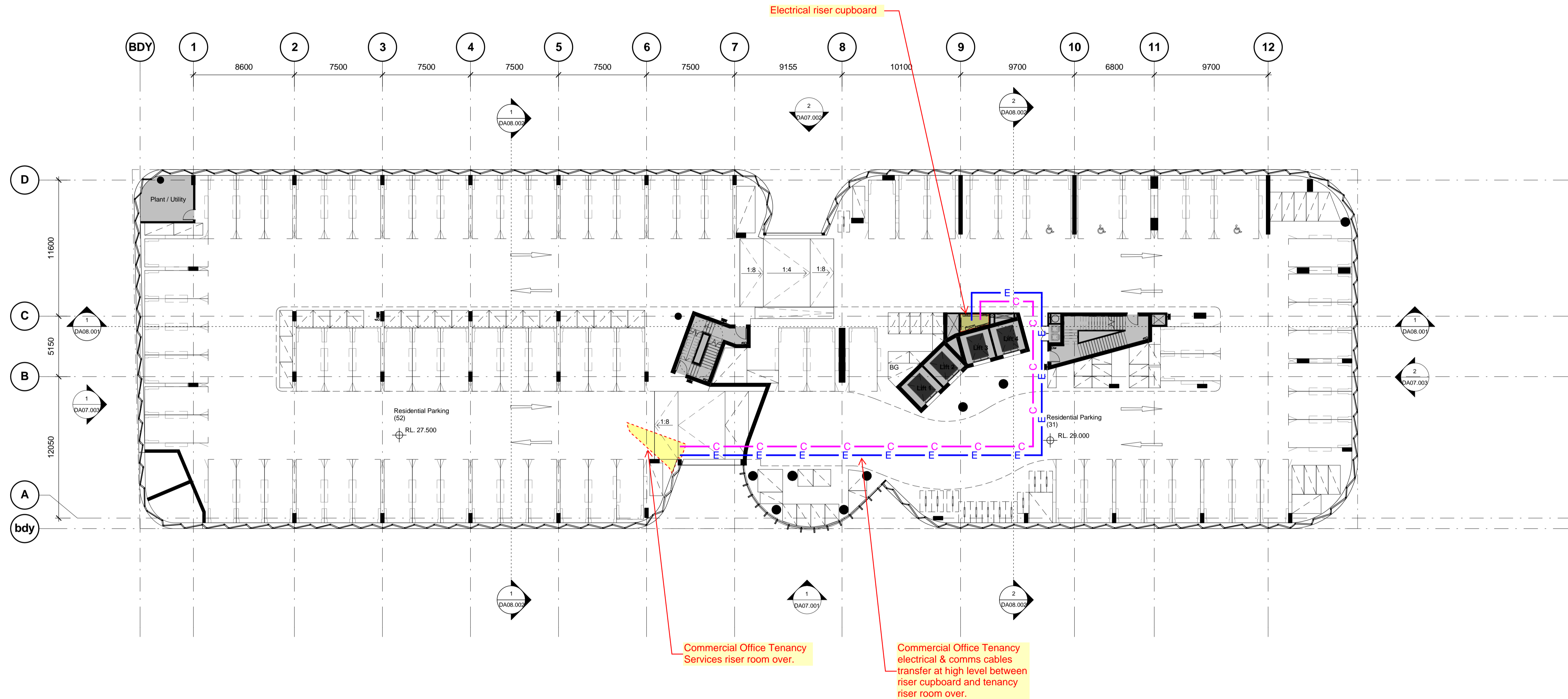
Drawing no.	Revision
DA02.006	A

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BATESSMART



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Default Colour modelled

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Reticulated alternative water

HARON ROBSON
 lightmatters wattmatters avmatters
 1 April 2016

Revision	Date	Description	Initial	Checked
A	01.03.16	Development Application	JS	CP

Client: Ecove


Site 9, Sydney Olympic Park
 3 Olympic Boulevard

General Arrangement Plan
 Level 07

Status	Development Application		
Scale	1 : 200	@	A1
Drawn	Author	Checked	Checker
Project No.	S11890		
Plot Date	1/04/2016 3:49:32 PM		
Plot File			

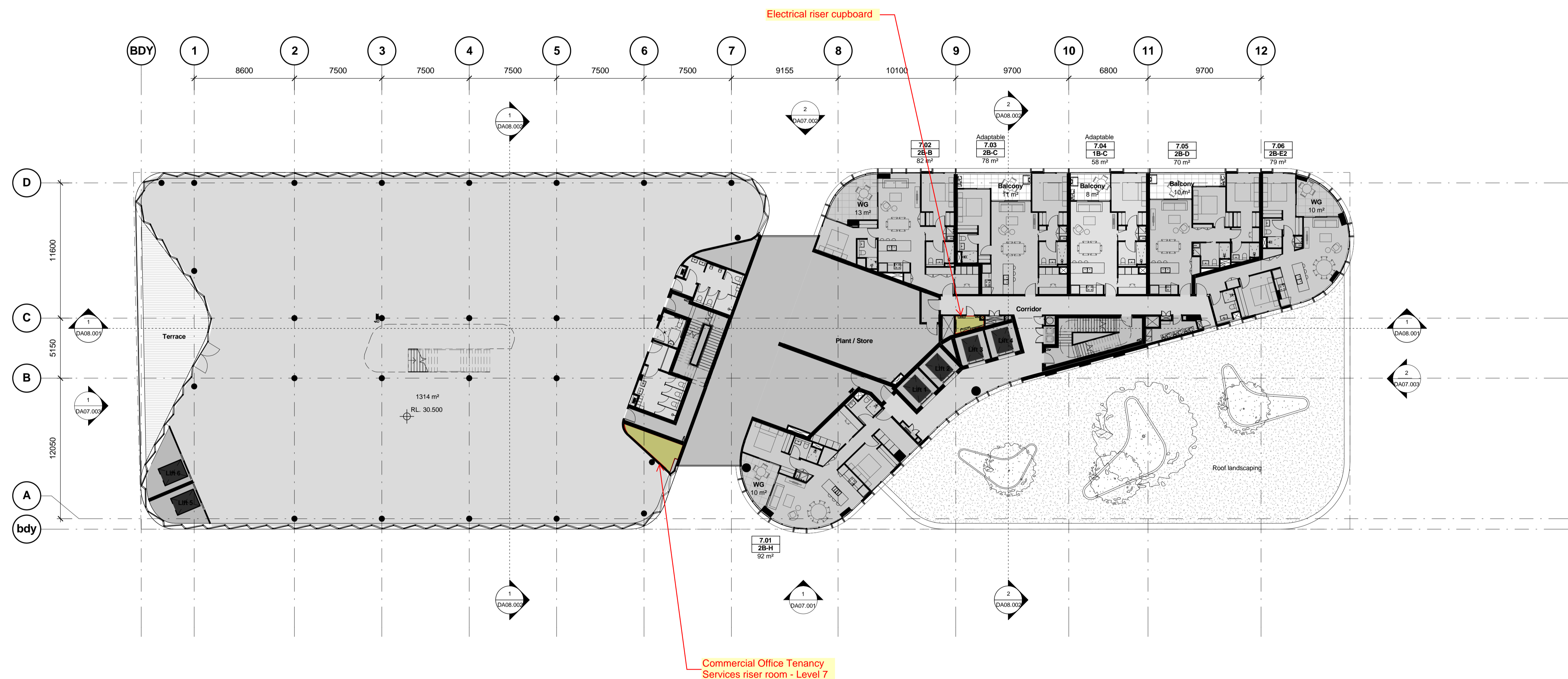
Drawing no. **DA02.007** Revision **A**

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 Concrete - no insulation required between units

Floor coverings:
 1 & 2 bed apartments - tiles to wet areas, carpet to bedrooms and living areas as per plans
 All 3 & 4 bed apartments tiled throughout


Central hot water system
 Central gas-fired boiler with R1.0 (~38mm) insulation to ringmain and supply risers.

Reticulated alternative water

HARON ROBSON
 lightmatters wattmatters avmatters
 1 April 2016

Revision	Date	Description	Initial	Checked
A	01.03.16	Development Application	JS	CP

Client: Ecove



Site 9, Sydney Olympic Park
 3 Olympic Boulevard

General Arrangement Plan
 Level 08



Status	Development Application		
Scale	1 : 200	@	A1
Drawn	Author	Checked	Checker
Project No.	S11890		
Plot Date	1/04/2016 1:04:11 PM		
Plot File			

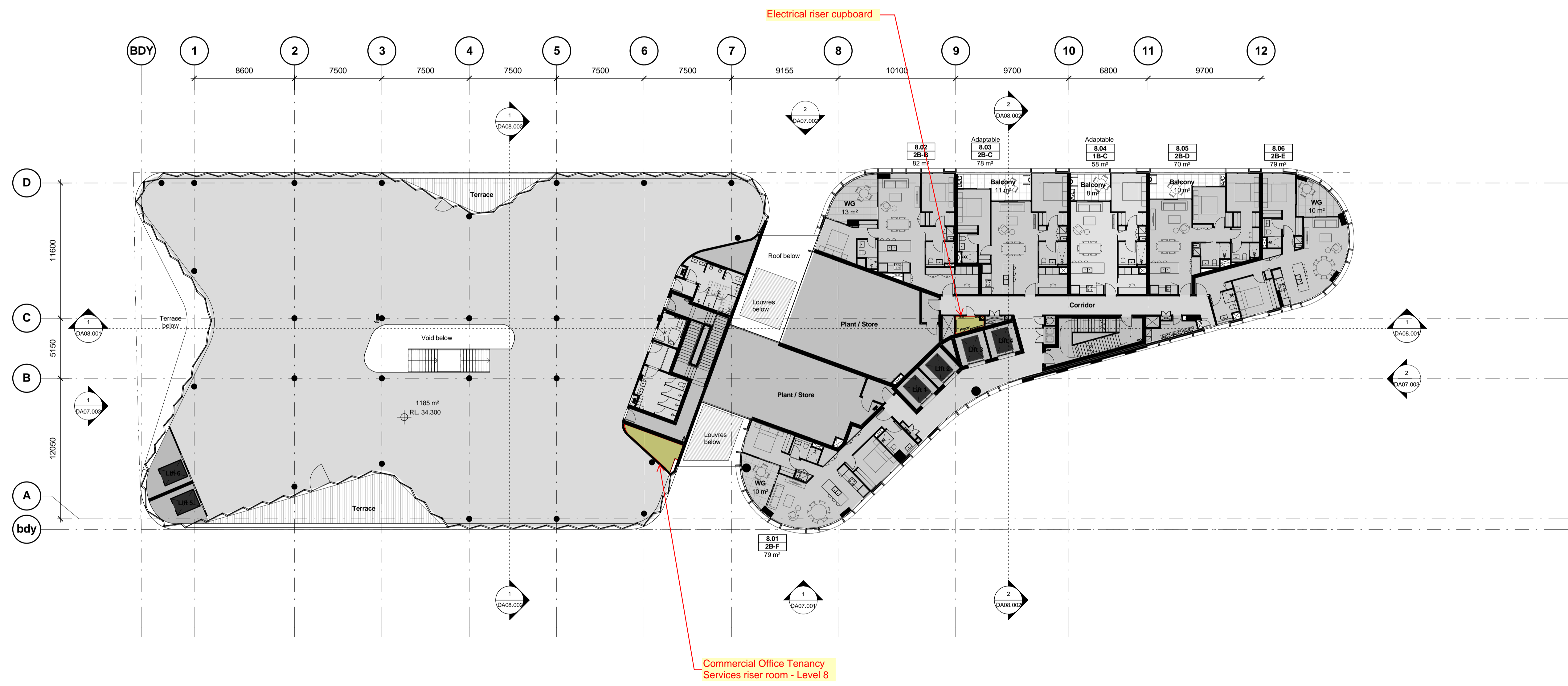
Drawing no.	Revision
DA02.008	A

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Electrical riser cupboard

Commercial Office Tenancy
 Services riser room - Level 8

Check all dimensions and site conditions prior to commencement of any work, the purchase or ordering of any materials, fittings, plant, services or equipment and the preparation of shop drawings and or the fabrication of any components.

Do not scale drawings - refer to figured dimensions only. Any discrepancies shall immediately be referred to the architect for clarification.

All drawings may not be reproduced or distributed without prior permission from the architect.

Notes - Construction General (BASIX)

Glazing
Doors / windows:
 - Aluminium framed **single clear** glazing to internal windows that open to wintergardens
 U-Value: 6.6 (equal to or lower than)
 SHGC: 0.69 (+ or - 10%)

- Aluminium framed **double clear** glazing to curtain walls & glazing to balcony edge.
 U-Value: 4.4 (equal to or lower than)
 SHGC: 0.5 (+ or - 10%)

Given values are NFRC, total window values

Roof / ceiling insulation

Roof:
 Concrete roof - No insulation

Default Colour modelled

Ceiling:
 Plasterboard ceiling - R3.0 bulk insulation to selected units (34.01 and 34.07) with balconies above.

Plasterboard ceiling - R2.0 bulk insulation to all units to top floor, balconies above & slot areas above to all other units.

Note: It has been assumed at DA stage that the area of all ceiling penetrations is less than 0.5% of the total ceiling area. If down lights are proposed at a later stage, BCA loss of insulation calculations will be required.

Wall / floor insulation

External Wall:
 Lightweight cladding to all external walls with R1.5 bulk insulation
 No colour nominated

Internal walls within units:
 Plasterboard on studs - no insulation

Inter-tenancy walls / corridor:
 75mm hebel power panel plasterboard lined with R2.0 acoustic insulation to **selected units only (7.01 and 8.01)**

75mm hebel power panel plasterboard lined with R1.5 acoustic insulation to all other units.

Floors:
 Concrete - R2.1 insulation to all units in level 7 with car park below
 Concrete - no insulation required between units

Floor coverings:
 1 & 2 bed apartments - tiles to wet areas, carpet to bedrooms and living areas as per plans
 All 3 & 4 bed apartments tiled throughout

Central hot water system
 Central gas-fired boiler with R1.0 (~38mm) insulation to ringmain and supply risers.

Reticulated alternative water

HARON ROBSON
 lightmatters wattmatters avmatters
 1 April 2016

Revision	Date	Description	Initial	Checked
A	01.03.16	Development Application	JS	CP

Client: Ecove



Site 9, Sydney Olympic Park
 3 Olympic Boulevard

General Arrangement Plan
 Level 09

Status	Development Application		
Scale	1 : 200	@	A1
Drawn	Author	Checked	Checker
Project No.	S11890		
Plot Date	3/3/2016 7:57:26 PM		
Plot File			

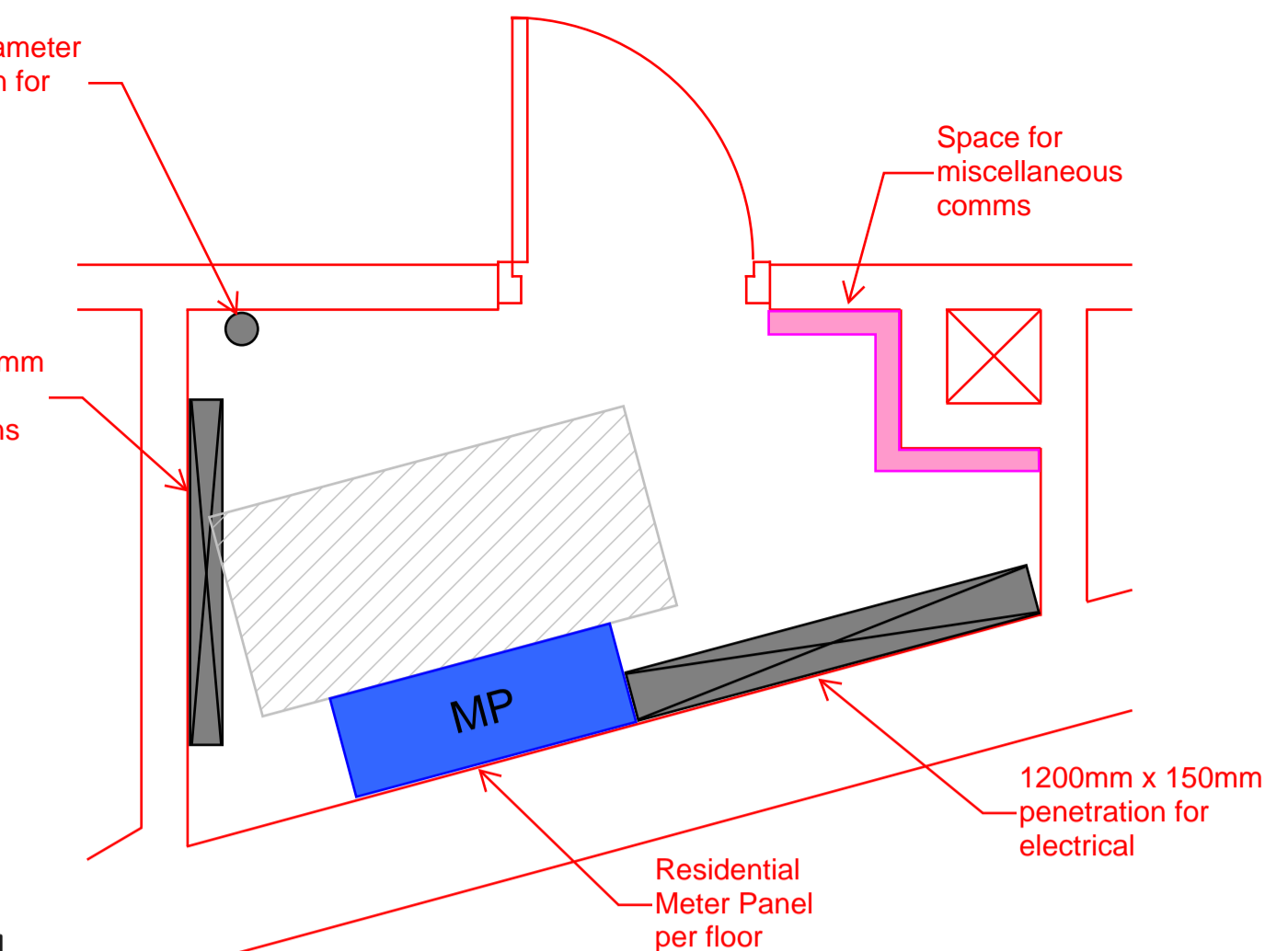
Drawing no.	Revision
DA02.009	A

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Electrical/Comms Room - Layout 1
For Levels 7, 13, 18, 22, 27, 31, 36 & 38

Wall / floor insulation
External Wall:
 Lightweight cladding to all external walls with R1.5 bulk insulation
 No colour nominated
Internal walls within units:
 Plasterboard on studs - no insulation
Inter-tenancy walls / corridor:
 75mm hebel power panel plasterboard lined with R2.0 acoustic insulation to selected units only (7.01 and 8.01)
 75mm hebel power panel plasterboard lined with R1.5 acoustic insulation to all other units.
Floors:
 Concrete - R2.1 insulation to all units in level 7 with car park below
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Central hot water system
 Central gas-fired boiler with R1.0 (~38mm) insulation to ringmain and supply risers.

HARON ROBSON
 lightmatters wattmatters avmatters
 1 April 2016

Revision	01.03.16	Development Application	JS	CP
Date		Description	Initial	Checked
Client: Ecove				

Site 9, Sydney Olympic Park
3 Olympic Boulevard

General Arrangement Plan
Level 10, 12, 14

Status	Development Application			
Scale	1 : 100	@	A1	
Drawn	Author	Checked	Checker	
Project No.	S11890			
Plot Date	7/03/2016 2:50:34 PM			
Plot File				

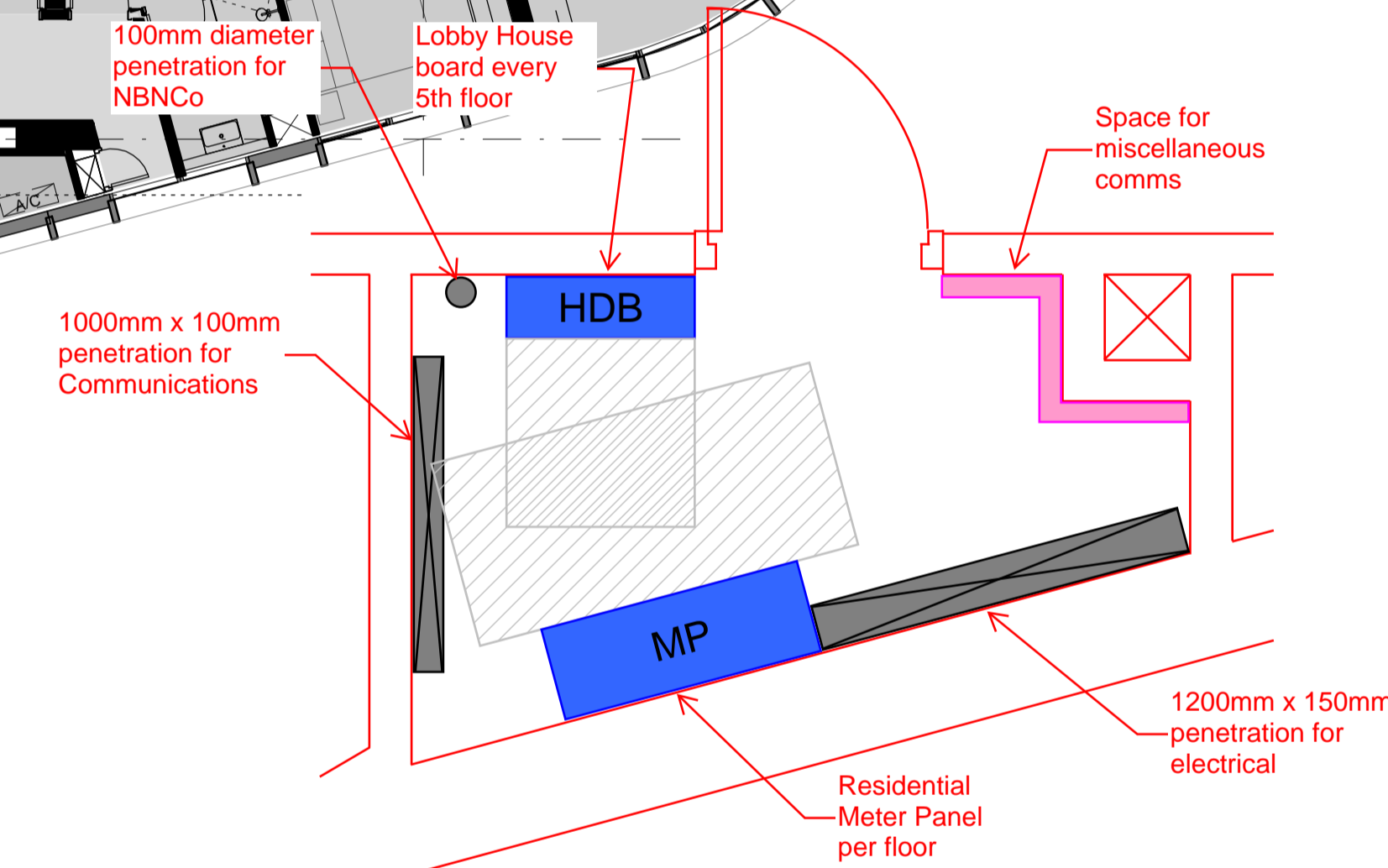
Drawing no. **DA02.010** Revision **A**

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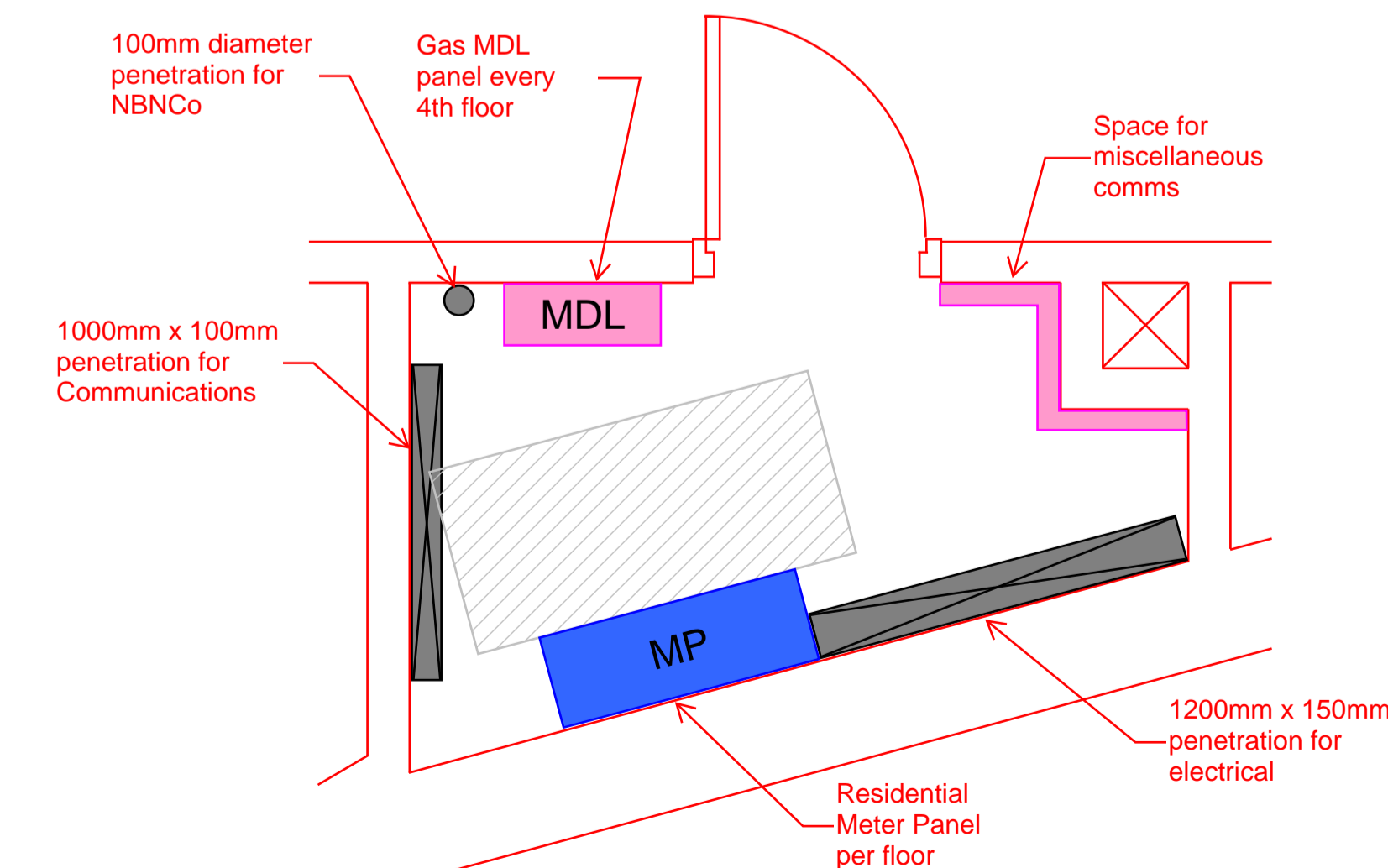
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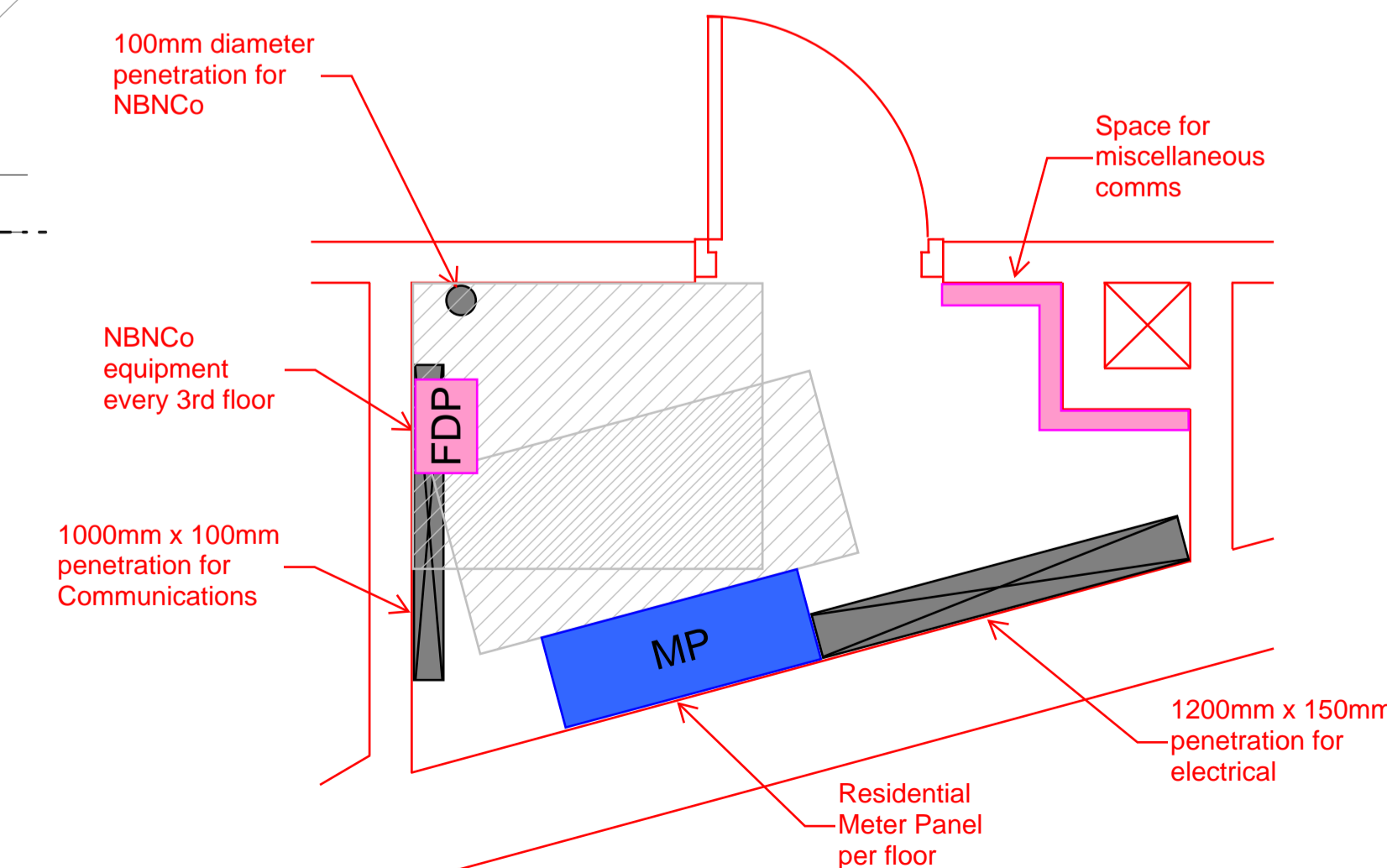
BATESSMART



Electrical/Comms Room - Layout 2
For Levels 10, 15, 19, 24, 30 & 34



Electrical/Comms Room - Layout 4
For Levels 9, 12, 16, 21, 25, 28, 33 & 37



Electrical/Comms Room - Layout 3
For Levels 8, 11, 14, 17, 20, 23, 26, 29, 32 & 35

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Notes - Construction General (BASIX)

Glazing
Doors / windows:
 - Aluminium framed **single clear** glazing to internal windows that open to wintergardens
 U-Value: 6.6 (equal to or lower than)
 SHGC: 0.69 (+ or - 10%)

- Aluminium framed **double clear** glazing to curtain walls & glazing to balcony edge.
 U-Value: 4.4 (equal to or lower than)
 SHGC: 0.5 (+ or - 10%)

Given values are NFRC, total window values

Roof / ceiling insulation
Roof:
 Concrete roof - No insulation
 Default Colour modelled

Ceiling:
 Plasterboard ceiling - R3.0 bulk insulation to selected units (34.01 and 34.07) with balconies above.
 Plasterboard ceiling - R2.0 bulk insulation to all units to top floor, balconies above & slot areas above to all other units.

Note: It has been assumed at DA stage that the area of all ceiling penetrations is less than 0.5% of the total ceiling area. If down lights are proposed at a later stage, BCA loss of insulation calculations will be required.

Wall / floor insulation
External Wall:
 Lightweight cladding to all external walls with R1.5 bulk insulation
 No colour nominated

Internal walls within units:
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Inter-tenancy walls / corridor:
 75mm hebel power panel plasterboard lined with R2.0 acoustic insulation to **selected units only (7.01 and 8.01)**
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 Concrete - no insulation required between units

Floor coverings:
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Central hot water system
 Central gas-fired boiler with R1.0 (~38mm) insulation to ringmain and supply risers.

HARON ROBSON
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 1 April 2016

A 01.03.16 Development Application JS CP
 Revision Date Description Initial Checked
 Client: Ecove



Site 9, Sydney Olympic Park
 3 Olympic Boulevard

General Arrangement Plan
 Level 11, 13

Status	Development Application
Scale	1 : 100 @ A1
Drawn	Author Checked Checker
Project No.	S11890
Plot Date	7/3/2016 2:50:49 PM
Plot File	

Drawing no. **DA02.011** Revision **A**

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Electrical riser cupboard.
 Refer to typical layout
 arrangements on drawing
 DA02.010.

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Default Colour modelled

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Wall / floor insulation

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Central hot water system
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HARON ROBSON
 lightmatters wattmatters avmatters
 1 April 2016

Revision	Date	Description	Initial	Checked
A	01.03.16	Development Application	JS	CP

Client: Ecove


Site 9, Sydney Olympic Park
 3 Olympic Boulevard
 General Arrangement Plan
 Level 15, 17, 19

Status	Development Application
Scale	1 : 100 @ A1
Drawn	Author Checked Checker
Project No.	S11890
Plot Date	7/3/2016 2:51:05 PM
Plot File	

Drawing no.	Revision
DA02.015	A

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Revision	Date	Description	Initial	Checked
A	01.03.16	Development Application	JS	CP

Client: Ecove



Site 9, Sydney Olympic Park
3 Olympic Boulevard

General Arrangement Plan
Level 16, 18

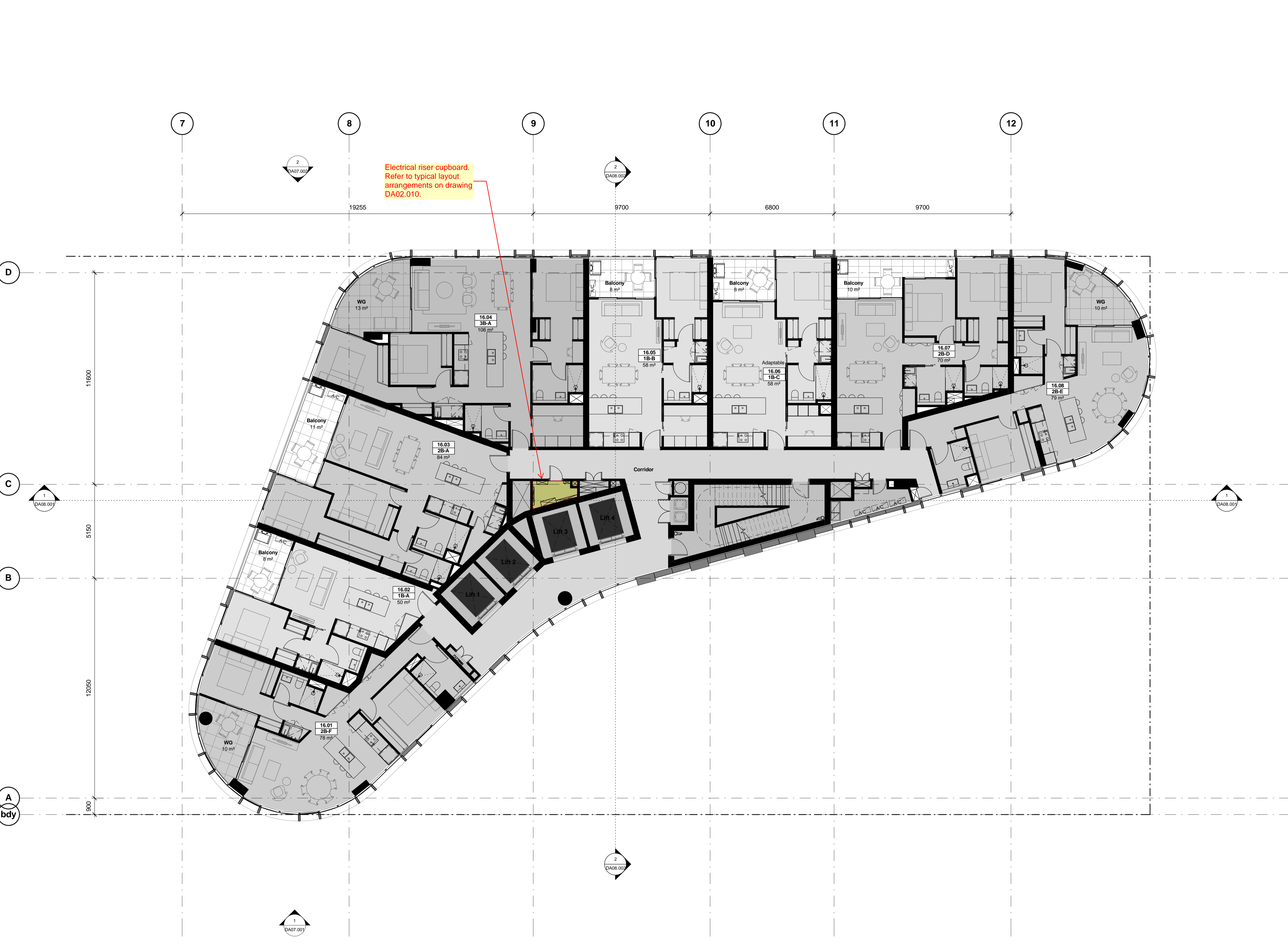
Status	Development Application
Scale	1 : 100 @ A1
Drawn	Author Checked Checker
Project No.	S11890
Plot Date	7/03/2016 2:51:28 PM
Plot File	

Drawing no.	Revision
DA02.016	A

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Electrical riser cupboard.
 Refer to typical layout
 arrangements on drawing
 DA02.010.