



public works  
& infrastructure

Department:  
Public Works and Infrastructure  
**REPUBLIC OF SOUTH AFRICA**

DEPARTMENT OF PUBLIC WORKS AND INFRASTRUCTURE  
DURBAN REGIONAL OFFICE

**REFERENCE NUMBER – DBN24/03/02**

**BOOK 2**

**VOLUME 5 OF 5 MECHANICAL SPECIFICATIONS AND DRAWINGS**

**SERVICE DESCRIPTION: JUSTICE: BERGVILLE MAGISTRATE COURT: REPAIRS AND RENOVATIONS INCLUDING UPGRADE AND INSTALLATION OF BOREHOLE**

**SUBMITTED BY:**

Company Name : .....

CSD / CIDB registration number: ...../.....

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**CLOSING DATE: 18 APRIL 2024**

**TENDER BOX LOCATION: PHYSICAL ADDRESS: National Department of Public Works, 157 Monty Naicker, Durban, 4001**  
**TENDER BOX NUMBER: DBN24/03/02**

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## **MECHANICAL SPECIFICATIONS**

**BERGVILLE JUSTICE COMPLEX  
UPGRADE, REPAIRS & RENOVATION  
MECHANICAL WORKS**

**1. SCOPE OF WORKS**

These works consist of the supply, delivery, installation and commissioning of:

- 1.1. Split Air Conditioning Equipment
- 1.2. Ventilation Equipment
- 1.3. Fire Booster Pump
- 1.4. Fire Suppression System
- 1.5. Fire Protection Equipment
- 1.6. Recycled Water Pump

**2. PARTICULAR SPECIFICATION**

**2.1. Site**

The site for these works is Bergville, KwaZulu-Natal.

**2.2. Air Conditioning Equipment**

**2.2.1. General**

All equipment is to comply with the latest amendments of:

- a) SANS 1125: Room Air conditioners.
- b) SANS 10147: Refrigerating Systems, including plant associated with air conditioning systems.
- c) SANS 1283: Manufacture of Ducting.
- d) SANS 10173: Installation, Testing and Balancing of Ducting.
- e) SANS 1424: Air conditioning and Ventilation Filters.
- f) SANS 1287: Flexible Ducting.
- g) SANS 60335-2-40/ICE60335-2-40: Electrical Safety of Air conditioning.

Walls are to be chased for the controllers, conduits and wall boxes installed and the walls patched and made good.

Units are to be complete with drip trays which shall be mounted under the coils and properly pitched for positive drainage. They shall project under the entire length and width of the coil. PVC (blue) or other approved type drain tubing of not less than 25mm nominal bore with glued joints and supported at 1m intervals, shall be provided. Drip trays are to be easily accessible for cleaning and piped to drain.

Precautions shall be taken to prevent condensation on the outside of drip trays and piping.

The mean sound pressure levels generated by the units shall not exceed 40 dB(A) when measured at a distance of 2 metres from the units.

### **2.2.2. Split Units**

Inverter type midwall split units, with reverse cycle heating, are to be installed as shown on the drawings, each with its own hard-wired controller.

Split type units shall consist of a direct expansion fan coil unit and a separate externally located air cooled condensing unit.

Each indoor unit must be suitable for wall mounting or ceiling suspended, and shall be operated by a separate, flush mounted hard-wired controller installed in the room, adjacent to the light switch (unless otherwise indicated). Fan speed and temperature are to be adjustable and are to be controlled by this controller.

The condensing unit shall be wall mounted on sturdy, hot dipped galvanised brackets with galvanised rawl bolts in the position specified. Rubber waffle pads are to be used to eliminate vibration between mounting brackets and the unit.

### **2.2.3. Technical Specification**

Room air conditioners shall be completely self-contained and equipped with suitable filters, recirculation fan with a minimum of two speeds, adjustable or automatic directional air discharge vanes, direct expansion cooling coil, compressor, air cooled condenser, interconnecting refrigerant tubing, reverse cycle heating unless otherwise specified, thermostat, control panel and electric wiring.

All moving parts shall be resiliently mounted in a sturdy sheet steel casing.

All steel surfaces shall be thoroughly rust proofed in the factory and final coated with epoxy scratch-proof finish unless otherwise specified.

Condenser coils shall be constructed from copper or aluminium tubing and aluminium or copper fins as specified.

Electric terminals and connections shall be protected with mastic coating.

All units must have a drip tray and drain outlet. Slinger-ring type fans are not acceptable.

Console and window type units must have fresh air inlet vents with selector lever.

Filter elements shall be of robust construction and shall be easily removable. Filter material shall be constructed of washable synthetic fibre.

The following interlocks shall be provided:

- a) The compressor shall only run when the recirculation and condenser fans are running.
- b) Heater elements, when specified, shall only be on when the recirculation fan is running.
- c) Heater elements must be fitted with an overheat cut-out thermostat.
- d) Cooling and heating shall not run simultaneously.

Refrigerant is to be of CFC free type

Reverse cycle heating shall be provided when calling for heating, i.e. heater elements not accepted.

Air conditioners shall be unconditionally guaranteed for a minimum period of twelve (12) months from date of installation.

Air conditioners shall comply with the Occupational Health and Safety Act of 1993, as amended.

#### *2.2.3.1. Controls*

The air conditioning in each room is to have a single, independent, hard wired controller, flush mounted, installed next to the light switch.

#### *2.2.3.2. Split Units*

Split type units shall consist of a direct expansion fan coil unit and a separate externally located air cooled condensing unit.

The fan coil unit must be suitable for wall and floor mounting or ceiling suspended as specified and shall be operated by hard wired controls.

- a) The condensing unit shall be wall mounted on sturdy, hot dipped galvanized brackets with galvanized rawl bolts in the position specified.
- b) The condensing unit shall be made weatherproof.
- c) The interconnecting refrigerant piping and electric wiring shall be fitted in trunking and unobtrusively run between units and must be straight, vertical, horizontal or parallel to walls as applicable.
- d) Refrigerant piping shall be seamless, dehydrated, deoxidized, sealed, copper tubing.
- e) Holes made through the building wall shall be neatly finished, sealed and made good, and a horizontal PVC sleeve installed protruding not more than 5mm beyond the wall.
- f) The suction (and supply when reverse cycle heating is used) line piping is to be insulated with Armaflex type insulation and any exposed insulation is to be painted with UV resistant, flexible type outdoor paint. Any joints or bends are to be sealed with polyurethane foam.

#### *2.2.3.3. Installation of Air Conditioners*

Where specified the air conditioning units supplied shall be installed in the following manner:

Provision shall be made to remove condensate from inside the building via copper or PVC tubing which must be saddled against the outside wall at intervals of no greater than 750mm (minimum internal diameter of 20mm).

Cassette units are to be installed flush with the ceiling.

The interconnecting refrigerant piping and electric wiring shall be fitted in trunking and unobtrusively run between units and must be straight, vertical, horizontal or parallel to walls as applicable.

Refrigerant piping shall be seamless, dehydrated, deoxidised, sealed, copper tubing.

The suction (and supply when reverse cycle heating is used) line piping is to be insulated with Armaflex type insulation and any exposed insulation is to be painted with UV resistant, flexible type outdoor paint. Any joints or bends are to be sealed with polyurethane foam.

The equipment is to be supplied with a manufacturer's guarantee of 5 years on the motor/compressor.

#### **2.2.4. Supply/Extract Fans**

In-line axial fans, as per the drawings.

In line fans are to be complete with internal and external grilles and wall kits. The fans are to be fitted with a totally enclosed motor fitted with lubricated-for-life bearings and thermal cut-out overheat/overloading protection. Fan noise is not to exceed 40 dB (A) (measured at 2m). Fans are to operate permanently or controlled by a switch, as indicated on the drawings.

Supply air fans are to be installed with a filter box with a standard sized filter. The filter box is to be installed to allow replacement of the filter.

#### **2.2.5. Supply/Extract Air Ducting**

##### **2.2.5.1. Sheetmetal Ducting**

0.6mm galvanised steel sheetmetal ducting complete with MEZ flanges, in accordance with SANS 1283, installed in accordance with SANS 10173, is required.

##### **2.2.5.2. Flexible Ducting**

Flexible ducting may only be used at connections to disc valves. It is to be non-allergenic spiral wound and not to exceed 1.5 metre in length. Connections are to be clamped with purpose made stainless steel clamps.

All ducting is to comply with Technical Specification clause **Error! Reference source not found.**

#### **2.2.6. Fresh Air Supply**

Fresh air supply quantities for each room are indicated on the drawings.

#### **2.2.7. Weather Louvres**

Standard Trox type AWG weather resistant louvres, with natural anodised finish, or powder coated to the Architect's specified colour.

Louvres are to be complete with sub frames and secured on the wall, external to the relevant extract fan.

#### **2.2.8. Door Grilles**

300x300mm double-sided natural anodised aluminium door grilles, with frames drilled for countersunk fixing.

These are to be handed to the builder for installation by his carpenter.

#### **2.3. Fire Booster Pump**

Fire Pump – 30lit/s @ 400kPa

A complete fire booster set consisting of:

- 1 x electric duty pump
- 1 x electric jockey pump
- 2 x control panels (duty and jockey pump)
- Inlet and outlet manifolds, valves and base plate
- Recirculation test bypass line with flow meter
- Pressure gauges and switches
- 2 x pressure vessels

The pump set is to be supplied, complete, factory tested and ready for operation.

The Jockey Pump will service low demand leaks in the Firewater reticulation network.

When the water system pressure drops below a specific setpoint, an output signal is given to the Fire Detection System and the Primary Pump is started.

#### **2.4. Fire Suppression System**

An FM-200 automatically operated fire suppression system is required for the above room and must comply with the following:

- Not require an electrical power connection for activation.
- Be actuated by heat
- Mechanically actuated
- Self-contained
- 2 stage sounder beacons and warning lights
- To service the following volume room: 5.0m X 3.7m X 3.1m
- Equipment is to comply with the latest amendments of:
  - SANS 369-2: Fire protection measures, mechanical actuation, extinguishing systems
  - SANS 14520-1 Fire-extinguishing systems, gases, design, physical properties

#### **2.5. Fire Protection Equipment**

##### **2.5.1. Fire Hose Reels**

Fire hose reels are to be fitted with an isolating valve and union, in that order (so that the reel can be isolated and removed without having to isolate the mains) and comply with SANS 543.

##### **2.5.2. Hand Held Extinguishers**

Hand held fire extinguishers are to be comply with SANS 1739 and SANS 1522.

These are to be mounted on a full-length hardwood backing board on the walls, as shown in the drawings:

- a) DCP handheld extinguishers – are to comply with SANS 1522, SANS 1739 and SANS 10105.

##### **2.5.3. Signage**

200x200mm SABS approved photoluminescent signage a clear perspex sheet, with anodised aluminium supports, mounted on the wall, suspended from the ceiling, or mounted perpendicular to the wall, as agreed on site with the Engineer and Architect.

#### **2.6. Rainwater Harvesting Pump System**

A booster pump and hydrosphere combination system is to be installed to feed the building with water from the harvested rainwater.

The system is to incorporate a float switch which senses when the rainwater storage tank is empty and automatically switches off the booster pump and opens a solenoid valve on the municipal feed, which allows the toilets to be fed by municipal water.

The specifications are given below:

- Pump to supply 6.7 litre/sec at 400 kPa
- Hydrosphere to have a capacity 100 litre
- Pump must be supplied aligned and complete on their base frames.

## **2.7. General**

### **2.7.1. Air Conditioning: Qualifications of Tradesman**

All air conditioning works are to be done by an authorised person who is registered with the South African Qualification and Certification Committee for Gas (SAQCC Gas), under the relevant category.

Valid proof of registration with SAQCC Gas shall be provided at the onset of the works.

### **2.7.2. Air Conditioning: Certificate of Conformity**

In order to comply with the Pressure Equipment Regulations and Section 10 of the Occupational Health and Safety Act, a Certificate of Conformity (CoC) must be issued for the refrigeration works on the completion of the works.

Only an authorised person who is registered with the South African Qualification and Certification Committee for Gas (SAQCC Gas) may sign a CoC.

### **2.7.3. Electrical Connections**

All equipment is to be provided with suitable electrical connections to a nearby isolator, provided by others.

### **2.7.4. Approval of Equipment**

The contractor is to submit all technical information of the equipment to be installed for approval by the engineer prior to ordering/fabrication.

### **2.7.5. Shop Drawings**

The contractor is to prepare the following detailed drawings for approval by the engineer prior to fabrication/ordering:

- a) Electrical requirements
- b) Building works required
- c) Ducting layout

These drawings are to include measuring on site and detailing equipment offered.

### **2.7.6. Operation and Maintenance Manuals**

The contractor shall hand over, at the completion of the works, three (3) copies of the necessary operating and maintenance requirements for all plant and equipment supplied and installed by him. Each copy of the operating and maintenance manual shall be separately bound, in a plastic covered hard cover ring binder, indexed and contain the following data:

#### **2.7.6.1. As Built Drawings**

A complete set of full-size paper prints of the drawings of the entire installation reflecting as-built conditions, shall be included in each copy of the manual. The set shall include:

- a) Electrical wiring diagrams indicating all cables sizes, current ratings, fuses, control units, both internal and external to the machine.
- b) Mechanical drawings and schematics showing all equipment, connections to the equipment and service runs installed by the contractor, and isolating valves, etc.



- c) Exploded views of all equipment showing each component part adequately identified and numbered.
- d) Electronic copies of the drawings (on CD) are to be handed over at first delivery.

#### **2.7.6.2. Equipment Schedules**

A complete schedule of all plant and equipment forming part of the works shall be included in the manual. The schedule shall include, but shall not be restricted to, the following data:

- a) equipment type and model
- b) equipment identity number/serial number
- c) working load/pressure
- d) date of manufacture, testing installation and commissioning
- e) country of manufacture
- f) manufactures name and contact address

#### **2.7.6.3. Maintenance Requirements**

The manufacturer's recommendation with regard to the routine servicing and maintenance of all equipment shall be included in the manual. This data shall include the recommended service interval and the estimated hours required for each type of service, for each item of equipment, together with a list of agents/contractors authorized to carry out service/maintenance.

#### **2.7.6.4. Operating Instructions**

A complete description of all-operating procedures and safety measures shall be included in the manual. A basic "Fault Finding Guide" shall also be included.

#### **2.7.6.5. Staff Training Certificate**

A certificate indicating the staff training details must be included in the manual. This should detail the training curriculum, the date, the trainer's name, ID number, company and position, the trainees' names, ID numbers and positions.

#### **2.7.7. Testing and Commissioning**

All equipment is to be tested and commissioned in accordance with the manufacturers' requirements. After each component has been tested/commissioned, the system is to be commissioned in the presence of the Client's representative, the results recorded for inclusion in the O&M Manuals.

The testing should include:

- a) Balancing of airflow between diffusers, so as to obtain the airflow requirements as set out in the drawings.

#### **2.7.8. Guarantee Period**

All equipment is to be guaranteed for a period of 12 months after hand-over.

##### **2.7.8.1. Maintenance During the Guarantee Period**

The contractor is to allow for the maintenance of all equipment and installations included in this specification, for the full 12-month guarantee period. Notwithstanding the above, this is to include;

After 6 months, all equipment is to be serviced, all filters and oil replaced, and any repairs that may be required effected. A report, per service type, is to be submitted.

During the 12<sup>th</sup> month, all equipment is to be given a major service, which is to include the replacement of all consumables, belts, filters, oils and seals as well as any "touching-up" that may be required to hand the equipment over in "as-new" condition at Final Delivery.

#### **2.7.9. Spares on Site**

Running spares are to be left on site. These are to be replenished after use at the contractor's next visit. First and Final Delivery will only be taken with a full complement of spares neatly stored in the applicable plantrooms. The contractor is to provide any brackets/shelves etc. that may be required to properly store these; i.e. spares left on the floor is not acceptable. In addition, labels detailing the type of spare/model/part No. etc. and number off are required.

#### **2.7.10. Logbooks**

Each system is to have a logbook, kept in the plantroom/maintenance manager's office. These are to be A4 2-quire hardcover, feint and margin books per plantroom/equipment type. Where more than one type of equipment is in a plantroom, a book per service type shall be provided.

For groups of equipment (i.e.: fancoil air conditioning units, extraction fans, chilled water equipment, etc.) a single book, kept in the applicable office, will suffice.

These logbooks are to be completed by all staff at every visit/inspection/service or repair, and shall include:

- date
- running hours (if applicable)
- description of any work done/spares used
- any other relevant remarks
- the service man and company name (PRINTED)

#### **2.7.11. Plantroom Padlocks**

All mechanical plantrooms/equipment access doors etc. are to be provided with keyed alike 50mm brass padlocks (Viro HA1). A set of 5 keys, are to be handed over at First Delivery

#### **2.7.12. Site Dimensions**

Note that the dimensions shown on the drawings/listed in the bills of quantities are for tender purposes only, and that contractors are to verify all dimensions on site, and prepare fabrication drawings, for approval by the Engineer, prior to ordering/fabricating any equipment/components.

**FIRE DETECTION SYSTEM**

**GENERAL SPECIFICATION**

**1. DRAWINGS**

- (a) The outlet positions shown on drawings are approximate only as are the positions of light fittings. Actual positions are to be determined on site in liaison with the Head : Public Works prior to installation of the circuit wiring.
- (b) The drawings issued with this document are listed in the Table of Contents at the front of this document.

**2. CONTRACTOR'S WORK**

The Contractor shall supply and install all the distribution boards, conduit, wireways, cables, wiring, fittings and socket outlets as specified below and as per the Bill of Quantities.

- a) Be responsible for the planning of the electrical contractor's work.
- b) Attend site meetings.
- c) Oversee work being performed
- d) Commissioning
- e) Certificate of Compliance

**3. SAFETY**

It MUST be stressed that the above site IS occupied so workflows must be developed to minimize disruption and hazard to the occupants. Any trenches excavated will be properly barricaded and shall be re-filled within one week of excavation. i.e. cable sleeves and cables shall be installed as soon as the trench has been dug. If this is not the case the contractor will be instructed to fill in the excavations and re-excavate at a later stage at his own cost.

**4. STANDARD SPECIFICATIONS**

The entire installation shall be completed to the satisfaction of the Head : Public Works and shall be carried out in accordance with the standards listed in the Main Electrical Specification as well as SANS 10139

**5. SCOPE OF WORK**

The upgraded Buildings at Bergville Magistrates Court will require fire detection, including an aspirating system for the cells.

**FIRE DETECTION SYSTEM**  
**PARTICULAR SPECIFICATION**

This Particular Specification shall be read in conjunction with the Electrical Specification and the Schedule of Equipment offered to be found on T2\_16 and reference lists at the end of this specification are to be completed at the time of tender.

**1. SCOPE OF WORK**

The Fire Detection System must be installed by a Specialist Fire Detection contractor.

The Electrical Contractor shall install round outlet boxes at the positions indicated on the Drawing 2682-01-04, in the void or concrete ceiling slab or brickwork. Where there are ceiling voids, the Fire Detection Specialist shall install a dome lid and a 2m length of 20mm PVC flexible conduit from the Dome Lid to his Fire Sounders, etc.

**NOTE :** Fire Detection conduits Shall Be PVC 25mm (or larger if required) conduit unless otherwise indicated.

With respect to the Manual Call Points, the Electrical Contractor shall take delivery from the Fire Detection Specialist the required outlet boxes so that they may be FLUSH.

**2. FIRE DETECTION SYSTEM TECHNICAL SPECIFICATION**

**2.1 Fire Detection Control Panel** – a 4 loop analogue addressable panel, upgradeable to 8 loops only by the addition of the necessary expansion card, is required for the Main Admin Office of the Bergville Police Department. A LCD Repeater panel is to be installed in the Gatehouse Admin Office. This should comply with the following minimum requirements ;

- 230V input
- 24 hour battery backup (3 hours with sounders operating), battery charger, etc.
- 2 sounder outputs
- 1A, 30V DC relay outputs
- LCD display
- Up to 20 display zones.
- 24 Volt auxiliary output
- 2 programmable voltage free relays
- I/O programming capabilities with Boolean functions
- Up/download programming from a standard PC
- Fibre-optic interface unit to enable communication with other Panels.

**2.2 Optical Smoke Detectors** – these shall be compatible with the Fire Detection Control Panel and should comply with the following minimum requirements. Each Ward Fire Detector needs to be vandal proof so a robust “grille” shall be installed over each detector to protect them ;

- Ceiling mounted
- Analogue addressable
- White LED indication (red when alarming)
- 17-28V dc operating voltage
- 0 -95% humidity, non condensing
- IP43 rated

- Standard base
- Remote test capabilities.
- Numeric addressing
- Full diagnostic self-testing

**2.3 Beacon Sounders**

- Wall or ceiling mounted, as Roshni
- Analogue Addressable
- 17-39V dc operating voltage
- 103 dB(A) sound output at 1 metre
- 990 Hz continuous tone
- 990 Hz On/off at 1 Hz Intermittent tone
- 990 Hz/650 Hz two tone capability

**2.4 Loop Sounder** - these shall be compatible with the Fire Detection Control Panel and should comply with the following minimum requirements ;

- Wall or ceiling mounted
- Analogue Addressable
- 17-39V dc operating voltage
- 100 dB(A) sound output at 1 metre
- 990 Hz continuous tone
- 990 Hz On/off at 1 Hz Intermittent tone
- 990 Hz/650 Hz two tone capability

**2.5 Isolator Bases** - these shall be compatible with the Fire Detection Control Panel and should comply with the following minimum requirements ;

- Ceiling mounted
- Analogue addressable
- White LED indication (red when indicating an operation)
- Capable of resetting itself once a fault is cleared.
- 17-28V dc operating voltage
- 0 -95% humidity, non condensing
- IP43 rated
- Standard base. Can provide a common base for a detection device

**2.6 Manual Call Points** - these shall be compatible with the Fire Detection Control Panel and should comply with the following minimum requirements ;

- Flush mount, high strength red plastic housing
- Analogue addressable
- LED alarm indicator
- Tamper proof break glass design with anti vandal flip up cover
- IP67 rated
- Ease of testing with self reset, with Test Key

**2.7 Aspirating Devices** – These are required for the Cells. They are not intended as early warning devices but as a remote air sampling solution so as to avoid the possibility of vandalism to detectors installed inside a cell.

They shall:

- Be mounted on the slab above the cell
- be analogue addressable
- capable of 2 channel operation for up to two (2) heads
- contain a cartridge air filter
- be IP50 rated

2.8 Cabling – fire retardant cabling, type PH30, 0.75mm<sup>2</sup> or 1mm<sup>2</sup> minimum, as required, should be used and shall be installed in a Class A configuration.

2.9 Good Working Order – the above installation shall be supplied, installed and commissioned, including all necessary sundry items, necessary to the leave the installation in a good working order.

### **3. Lightning and Surge Protection**

The equipment shall be properly protected against lightning hazards, power surges, mains-borne and other noise interference to prevent malfunctioning of the system.

### **4. MAINTENANCE AND GUARANTEE PERIOD**

The contractor shall Guarantee, and provide maintenance for, the complete installation including fittings, fixtures, materials and workmanship for a period of twelve (12) months from the date of first delivery of the installation. This shall be inclusive of the time and other costs (materials, travel, accommodation, etc.) required.

The contractor shall allow to visit the site at the start of the 12<sup>th</sup> month after First Delivery is taken to perform any required maintenance as well as any guarantee related work not already actioned.

### **5. OPERATING AND MAINTENANCE MANUALS, ETC.**

The Contractor shall supply three complete comprehensive sets (one original and 2 copies) of the necessary and operating and maintenance requirements for all [plant and equipment supplied and installed by him/her as part of the WORKS. Each copy of the operating and maintenance manual shall be separately bound in an acceptable manner, and shall contain the following data where applicable. These documents are to be handed to the Engineer for onward transmission to the Department of Health Head Office official :

- Scope of Work
- Operating Instructions
- Normal Operation
- Safety Measures
- Fault Finding Guide
- Equipment Information/Schedules – a complete schedule of all plant forming part of the Works shall be included in the manual. The schedule shall include, but shall not be restricted to, the following data :
  - i. Equipment type and model
  - ii. Equipment Identity number/ serial number.
  - iii. Date of manufacture, testing installation and commissioning.
  - iv. Country of manufacture.
  - v. Manufacturer's name and contact address.
  - vi. Any other information required by the Department.

- Schedule of Information
- List of Spares and Agents
- Design Data
- As Commissioned Data
- Maintenance Requirements – the manufacturer's recommendation with respect to the routine servicing and maintenance of all equipment shall be included in the manual. This data shall include the recommended service interval and the estimated hours required for each type of service, for each item of equipment, together with a list of agents/contractors authorized to carry out service/maintenance.
- KZNPA Service Schedules
- Manufacturer's Service Recommendations
- Manufacturer's Literature
- Equipment Brochures
- Proprietary Drawings, Exploded Views and Wiring Diagrams
- As-Built Drawings
- Electrical Drawings – a complete set of drawings of the entire installation shall be included in the manual, and which shall include :
  - i. Electrical Wiring Diagrams indicating all cable sizes, current ratings, fuses, control units, site cable reticulation and schematic wiring diagrams applicable to the Works.
  - ii. Mechanical drawings and schematics showing all equipment, connections to the equipment and service runs installed by the Contractor, etc.
  - iii. Exploded views of all equipment showing each component part adequately identified and numbered.
  - iv. Electronic copy of all drawings, preferably in .DWG (alternatively in .DXF) Format.
  - v. Laminated and framed copies of Operating Procedures, wiring diagrams, zone diagrams and plant schematics, as applicable, are to be fixed to the wall in a well illuminated and accessible area.
- System Layouts and Schematics
- Training Certificates

## 6. TRAINING

After installation of the system, and before first delivery, the hospital staff must be trained in the operation of Intercom system as well as the maintenance personnel who must be trained in the basic fault finding and malfunctioning of the system. Training Certificates must be signed by the staff that received the training.

**7. PROPRIETARY MATERIALS, SYSTEMS, ETC.**

Any reference in these schedules of prices or specifications to trade or brand names (and catalogue numbers, etc.) shall be deemed to be followed by the words "or other approved". Similarly, any wording equating to similar to, equal to, equivalent to, etc. when used in combination with a trade name or brand name (and catalogue numbers, etc.) shall be entirely replaced with the trade or brand names (or catalogue numbers, etc.) followed by the words "OR OTHER APPROVED". This will take precedence over any contradictory clause or note appearing anywhere in this document.

Where the term "or other approved" is used in connection with proprietary materials or articles it is to be understood that approval shall be at the sole discretion of the Head : Public Works.

Where brand and trade names are referred to in these documents they shall indicate the quality and type of material or fitting required and no substitution of materials so specified will be permitted unless the authority of the Head : Public Works has been obtained in writing **before tenders close**.

In all cases where the Contractor takes delivery of, handles, stores, uses, applies and/or fixes any proprietary product he shall do so in strict accordance with the manufacturer's instructions after consultation with the manufacturer or his authorized representative.

**8. DEFINITION OF APPROVED, ETC.**

The terms "approved" or "specified" where used in these documents shall mean approved or specified by the Head : Public Works.



**SCHEDULE OF INFORMATION FOR FIRE DETECTION SYSTEM**  
(To be completed by Tenderer)

A list of at least ten references shall be given where the tenderer has installed FIRE DETECTION systems in the past.

Tenderers must complete the following schedule of information and are to submit with their tender comprehensive literature on the equipment offered.

The list shall include the following points for each system:-

1. Manufacturer.....
2. Country of Manufacturer.....
3. Manufacturer's Type  
number.....
4. Company name and telephone  
number.....
5. Date when installed. (Also include the oldest working installation,  
in the list)  
.....
6. Number of repair calls to date  
.....
7. Nature of fault (s)  
.....
8. Maximum time before first repair call  
.....

**N.B.** Information given here shall be true: If it is discovered that any of the information given is false the tenderer may be disqualified.

**FIRE DETECTION SYSTEM**

**GENERAL SPECIFICATION**

**1. DRAWINGS**

- (a) The outlet positions shown on drawings are approximate only as are the positions of light fittings. Actual positions are to be determined on site in liaison with the Head : Public Works prior to installation of the circuit wiring.
- (b) The drawings issued with this document are listed in the Table of Contents at the front of this document.

**2. CONTRACTOR'S WORK**

The Contractor shall supply and install all the distribution boards, conduit, wireways, cables, wiring, fittings and socket outlets as specified below and as per the Bill of Quantities.

- a) Be responsible for the planning of the electrical contractor's work.
- b) Attend site meetings.
- c) Oversee work being performed
- d) Commissioning
- e) Certificate of Compliance

**3. SAFETY**

It MUST be stressed that the above site IS occupied so workflows must be developed to minimize disruption and hazard to the occupants. Any trenches excavated will be properly barricaded and shall be re-filled within one week of excavation. i.e. cable sleeves and cables shall be installed as soon as the trench has been dug. If this is not the case the contractor will be instructed to fill in the excavations and re-excavate at a later stage at his own cost.

**4. STANDARD SPECIFICATIONS**

The entire installation shall be completed to the satisfaction of the Head : Public Works and shall be carried out in accordance with the standards listed in the Main Electrical Specification as well as SANS 10139

**5. SCOPE OF WORK**

The upgraded Buildings at Bergville Magistrates Court will require fire detection, including an aspirating system for the cells.

## FIRE DETECTION SYSTEM

### PARTICULAR SPECIFICATION

This Particular Specification shall be read in conjunction with the Electrical Specification and the Schedule of Equipment offered to be found on T2\_16 and reference lists at the end of this specification are to be completed at the time of tender.

#### 1. SCOPE OF WORK

The Fire Detection System must be installed by a Specialist Fire Detection contractor.

The Electrical Contractor shall install round outlet boxes at the positions indicated on the Drawing 2682-01-04, in the void or concrete ceiling slab or brickwork. Where there are ceiling voids, the Fire Detection Specialist shall install a dome lid and a 2m length of 20mm PVC flexible conduit from the Dome Lid to his Fire Sounders, etc.

**NOTE :** Fire Detection conduits Shall Be PVC 25mm (or larger if required) conduit unless otherwise indicated.

With respect to the Manual Call Points, the Electrical Contractor shall take delivery from the Fire Detection Specialist the required outlet boxes so that they may be FLUSH.

#### 2. FIRE DETECTION SYSTEM TECHNICAL SPECIFICATION

2.1 **Fire Detection Control Panel** – a 4 loop analogue addressable panel, upgradeable to 8 loops only by the addition of the necessary expansion card, is required for the Main Admin Office of the Bergville Police Department. A LCD Repeater panel is to be installed in the Gatehouse Admin Office. This should comply with the following minimum requirements ;

- 230V input
- 24 hour battery backup (3 hours with sounders operating), battery charger, etc.
- 2 sounder outputs
- 1A, 30V DC relay outputs
- LCD display
- Up to 20 display zones.
- 24 Volt auxiliary output
- 2 programmable voltage free relays
- I/O programming capabilities with Boolean functions
- Up/download programming from a standard PC
- Fibre-optic interface unit to enable communication with other Panels.

2.2 **Optical Smoke Detectors** – these shall be compatible with the Fire Detection Control Panel and should comply with the following minimum requirements. Each Ward Fire Detector needs to be vandal proof so a robust “grille” shall be installed over each detector to protect them ;

- Ceiling mounted
- Analogue addressable
- White LED indication (red when alarming)
- 17-28V dc operating voltage
- 0 -95% humidity, non condensing
- IP43 rated

- Standard base
- Remote test capabilities.
- Numeric addressing
- Full diagnostic self-testing

**2.3 Beacon Sounders**

- Wall or ceiling mounted, as Roshni
- Analogue Addressable
- 17-39V dc operating voltage
- 103 dB(A) sound output at 1 metre
- 990 Hz continuous tone
- 990 Hz On/off at 1 Hz Intermittent tone
- 990 Hz/650 Hz two tone capability

**2.4 Loop Sounder** - these shall be compatible with the Fire Detection Control Panel and should comply with the following minimum requirements ;

- Wall or ceiling mounted
- Analogue Addressable
- 17-39V dc operating voltage
- 100 dB(A) sound output at 1 metre
- 990 Hz continuous tone
- 990 Hz On/off at 1 Hz Intermittent tone
- 990 Hz/650 Hz two tone capability

**2.5 Isolator Bases** - these shall be compatible with the Fire Detection Control Panel and should comply with the following minimum requirements ;

- Ceiling mounted
- Analogue addressable
- White LED indication (red when indicating an operation)
- Capable of resetting itself once a fault is cleared.
- 17-28V dc operating voltage
- 0 -95% humidity, non condensing
- IP43 rated
- Standard base. Can provide a common base for a detection device

**2.6 Manual Call Points** - these shall be compatible with the Fire Detection Control Panel and should comply with the following minimum requirements ;

- Flush mount, high strength red plastic housing
- Analogue addressable
- LED alarm indicator
- Tamper proof break glass design with anti vandal flip up cover
- IP67 rated
- Ease of testing with self reset, with Test Key

**2.7 Aspirating Devices** – These are required for the Cells. They are not intended as early warning devices but as a remote air sampling solution so as to avoid the possibility of vandalism to detectors installed inside a cell.

They shall:

- Be mounted on the slab above the cell
  - be analogue addressable
  - capable of 2 channel operation for up to two (2) heads
  - contain a cartridge air filter
  - be IP50 rated
- 2.8 Cabling – fire retardant cabling, type PH30, 0.75mm<sup>2</sup> or 1mm<sup>2</sup> minimum, as required, should be used and shall be installed in a Class A configuration.
- 2.9 Good Working Order – the above installation shall be supplied, installed and commissioned, including all necessary sundry items, necessary to the leave the installation in a good working order.

### **3. Lightning and Surge Protection**

The equipment shall be properly protected against lightning hazards, power surges, mains-borne and other noise interference to prevent malfunctioning of the system.

### **4. MAINTENANCE AND GUARANTEE PERIOD**

The contractor shall Guarantee, and provide maintenance for, the complete installation including fittings, fixtures, materials and workmanship for a period of twelve (12) months from the date of first delivery of the installation. This shall be inclusive of the time and other costs (materials, travel, accommodation, etc.) required.

The contractor shall allow to visit the site at the start of the 12<sup>th</sup> month after First Delivery is taken to perform any required maintenance as well as any guarantee related work not already actioned.

### **5. OPERATING AND MAINTENANCE MANUALS, ETC.**

The Contractor shall supply three complete comprehensive sets (one original and 2 copies) of the necessary and operating and maintenance requirements for all [plant and equipment supplied and installed by him/her as part of the WORKS. Each copy of the operating and maintenance manual shall be separately bound in an acceptable manner, and shall contain the following data where applicable. These documents are to be handed to the Engineer for onward transmission to the Department of Health Head Office official :

- Scope of Work
- Operating Instructions
- Normal Operation
- Safety Measures
- Fault Finding Guide
- Equipment Information/Schedules – a complete schedule of all plant forming part of the Works shall be included in the manual. The schedule shall include, but shall not be restricted to, the following data :
  - i. Equipment type and model
  - ii. Equipment Identity number/ serial number.
  - iii. Date of manufacture, testing installation and commissioning.
  - iv. Country of manufacture.
  - v. Manufacturer's name and contact address.
  - vi. Any other information required by the Department.

- Schedule of Information
- List of Spares and Agents
- Design Data
- As Commissioned Data
- Maintenance Requirements – the manufacturer’s recommendation with respect to the routine servicing and maintenance of all equipment shall be included in the manual. This data shall include the recommended service interval and the estimated hours required for each type of service, for each item of equipment, together with a list of agents/contractors authorized to carry out service/maintenance.
- KZNPA Service Schedules
- Manufacturer’s Service Recommendations
- Manufacturer’s Literature
- Equipment Brochures
- Proprietary Drawings, Exploded Views and Wiring Diagrams
- As-Built Drawings
- Electrical Drawings – a complete set of drawings of the entire installation shall be included in the manual, and which shall include :
  - i. Electrical Wiring Diagrams indicating all cable sizes, current ratings, fuses, control units, site cable reticulation and schematic wiring diagrams applicable to the Works.
  - ii. Mechanical drawings and schematics showing all equipment, connections to the equipment and service runs installed by the Contractor, etc.
  - iii. Exploded views of all equipment showing each component part adequately identified and numbered.
  - iv. Electronic copy of all drawings, preferably in .DWG (alternatively in .DXF) Format.
  - v. Laminated and framed copies of Operating Procedures, wiring diagrams, zone diagrams and plant schematics, as applicable, are to be fixed to the wall in a well illuminated and accessible area.
- System Layouts and Schematics
- Training Certificates

**6. TRAINING**

After installation of the system, and before first delivery, the hospital staff must be trained in the operation of Intercom system as well as the maintenance personnel who must be trained in the basic fault finding and malfunctioning of the system. Training Certificates must be signed by the staff that received the training.

**7. PROPRIETARY MATERIALS, SYSTEMS, ETC.**

Any reference in these schedules of prices or specifications to trade or brand names (and catalogue numbers, etc.) shall be deemed to be followed by the words "or other approved". Similarly, any wording equating to similar to, equal to, equivalent to, etc. when used in combination with a trade name or brand name (and catalogue numbers, etc.) shall be entirely replaced with the trade or brand names (or catalogue numbers, etc.) followed by the words "OR OTHER APPROVED". This will take precedence over any contradictory clause or note appearing anywhere in this document.

Where the term "or other approved" is used in connection with proprietary materials or articles it is to be understood that approval shall be at the sole discretion of the Head : Public Works.

Where brand and trade names are referred to in these documents they shall indicate the quality and type of material or fitting required and no substitution of materials so specified will be permitted unless the authority of the Head : Public Works has been obtained in writing **before tenders close**.

In all cases where the Contractor takes delivery of, handles, stores, uses, applies and/or fixes any proprietary product he shall do so in strict accordance with the manufacturer's instructions after consultation with the manufacturer or his authorized representative.

**8. DEFINITION OF APPROVED, ETC.**

The terms "approved" or "specified" where used in these documents shall mean approved or specified by the Head : Public Works.

**SCHEDULE OF INFORMATION FOR FIRE DETECTION SYSTEM**  
(To be completed by Tenderer)

A list of at least ten references shall be given where the tenderer has installed FIRE DETECTION systems in the past.

Tenderers must complete the following schedule of information and are to submit with their tender comprehensive literature on the equipment offered.

The list shall include the following points for each system:-

1. Manufacturer.....
2. Country of Manufacturer.....
3. Manufacturer's Type  
number.....
4. Company name and telephone  
number.....
5. Date when installed. (Also include the oldest working installation,  
in the list)  
.....
6. Number of repair calls to date  
.....
7. Nature of fault (s)  
.....
8. Maximum time before first repair call  
.....

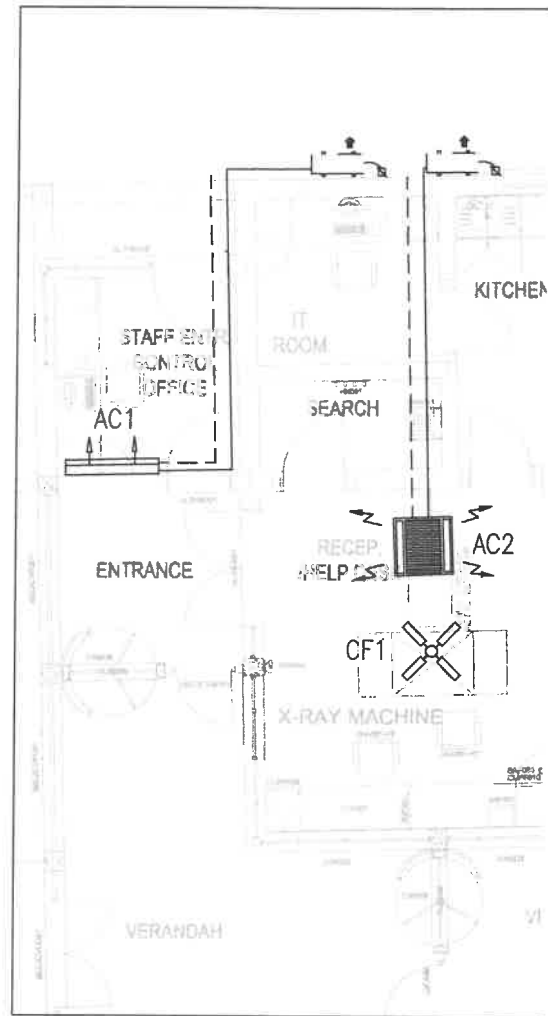
**N.B.** Information given here shall be true: If it is discovered that any of the information given is false the tenderer may be disqualified.



# **MECHANICAL DRAWINGS**

## HVAC NOTES

1. AC UNITS ARE TO BE INVERTER TYPE WITH REVERSE CYCLE HEATING.
2. THE UNITS SHALL BE DAIKIN, LG, MITSUBISHI, SUMSUNG OR EQUIVALENT TYPE.
3. ALLOWANCE MUST BE MADE FOR SUITABLE GALVANIZED STEEL MOUNTING BRACKETS FOR THE CONDENSER UNITS WHETHER FLOOR SLAB MOUNTED OR WALL MOUNTED. THE FRAMES SHALL BE SUITABLE TO ALLOW FOR EASY ACCESS TO THE UNIT FOR MAINTENANCE PURPOSES.
4. APPROXIMATE PIPE ROUTES ARE SHOWN ON THE DRAWINGS. WHERE PIPING PENETRATES WALLS AND SLABS ETC. ADEQUATE SLEEVES SHALL BE PROVIDED UNDER THIS CONTRACT.
5. ALL SURFACED MOUNTED PIPING SHALL BE INSTALLED IN SUITABLY SIZED P2000 OR P8000 GALVANIZED "UNISTRUT", COMPLETE WITH REMOVABLE COVER PLATE, SECURELY FIXED TO WALLS. ALL EXPOSED TRUNKING SHALL BE PAINTED. THE COLOUR SHALL BE FINALIZED AT A LATER DATE.
6. ALL PIPING AND CABLING ABOVE CEILINGS SHALL BE INSTALLED ON FACTORY MANUFACTURED GALVANISED STEEL CABLE TRAY, HUNG FROM THE ROOF TRUSSES OR SLAB.
7. ALL REFRIGERANT, LIQUID AND SUCTION, SHALL BE SEPARATELY INSULATED WITH 15 mm THICK ARMAFLEX INSULATION.
8. ELECTRICAL CONTRACTOR SHALL PROVIDE SINGLE PHASE WEATHER PROOF ISOLATORS IN THE PROXIMITY OF AC OUTDOOR UNITS. THE HVAC CONTRACTOR SHALL BE RESPONSIBLE FOR THE WIRING BETWEEN THE ISOLATORS AND THE AC UNITS.
9. ALL AC UNITS SHALL BE CONTROLLED BY A HARD WIRED CONTROLLER, INSTALLED FLUSH MOUNTED ADJACENT TO THE ROOM LIGHT SWITCH CONDUIT TO BE PROVIDED BY THE ELECTRICAL ENGINEER.



GATE HOUSE

SCALE: 1/20

## EQUIPMENT LIST - AC





ROOM	UNIT NUMBER	QTY	DESCRIPTION	TOTAL COOLING
ADMIN OFFICE	AC1	1	NEW MIDWALL SPLIT AC UNIT INVERTER TYPE	3.2 kW
RECEPTION	AC2	1	NEW CASSETTE SPLIT AC UNIT INVERTER TYPE COMPLETE WITH CONDENSATE DRAIN PUMP.	5.2 kW
MAGISTRATE OFFICE	AC3	1	EXISTING MIDWALL SPLIT AC UNIT TO BE SERVICED AND REPAIRED IF NECESSARY.	-
FAMILY COURT OFFICE	AC4	1	EXISTING MIDWALL SPLIT AC UNIT TO BE SERVICED AND REPAIRED IF NECESSARY.	-
PUBLIC COURT OFFICE	AC5	1	EXISTING MIDWALL SPLIT AC UNIT TO BE SERVICED AND REPAIRED IF NECESSARY.	-



## SIGNAGE NOTES

1. ALL PHOTOLUMINESCENT FIRE AND DIRECTIONAL SIGNAGE MUST COMPLY WITH SABS 1186 - 1 & 5 PHOTOLUMINESCENT AND TO BE INSTALLED IN ACCORDANCE WITH SABS 0400 - 1990.
2. ALL PHOTOLUMINESCENT FIRE AND DIRECTIONAL SIGNS ARE TO HAVE A MATT FINISH TO THE FACE OF THE SIGNS AND ARE TO BE FRAMED WITH MITRED CORNERS AND CONCEALED ELBOW JOINTS. FRAME TO BE MANUFACTURED FROM ALUMINIUM
3. ALL WALL-MOUNTED FIRE AND DIRECTIONAL SIGNAGE TO BE CONCEALED SCREWED TO BRICKWORK. NO DOUBLE-SIDED TAPE
4. ALL SUSPENDED FIRE AND DIRECTIONAL SIGNAGE TO BE HUNG ON STAINLESS STEEL WIRE
5. SIGNAGE IN OFFICE AREAS TO BE 150MM HIGH
6. SIGNAGE EXTERNAL TO BUILDING TO BE ABS IN NON - PHOTOLUMINESCENT
7. SIGNAGE TO EXTERNAL HYDRANTS TO BE POLE MOUNTED AND AT 2000MM HIGH
8. ALL SIGNS TO BE 290X290 SINGLE PICTOGRAM SIZE COMBINATIONS IN BASEMENTS

### LEGEND

- |   |        |                       |
|---|--------|-----------------------|
| FHR   |        |                       |
|  | 30m    | FIRE HOSE REEL        |
| FE  |        |                       |
|  | 4.5kg  | DCP FIRE EXTINGUISHER |
| FH  |        |                       |
|  | FIRE   | HYDRANT               |
|  | ESCAPE | ROUTE                 |

## SIGNAGE LEGEND



E1



F4



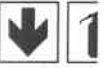
E2 = 12 off



F5



E3



F13



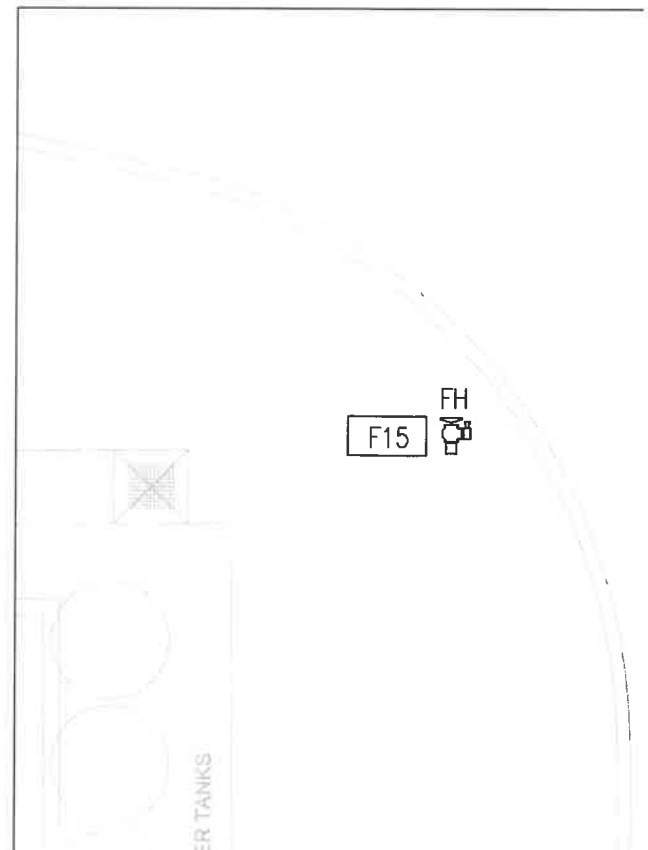
E6

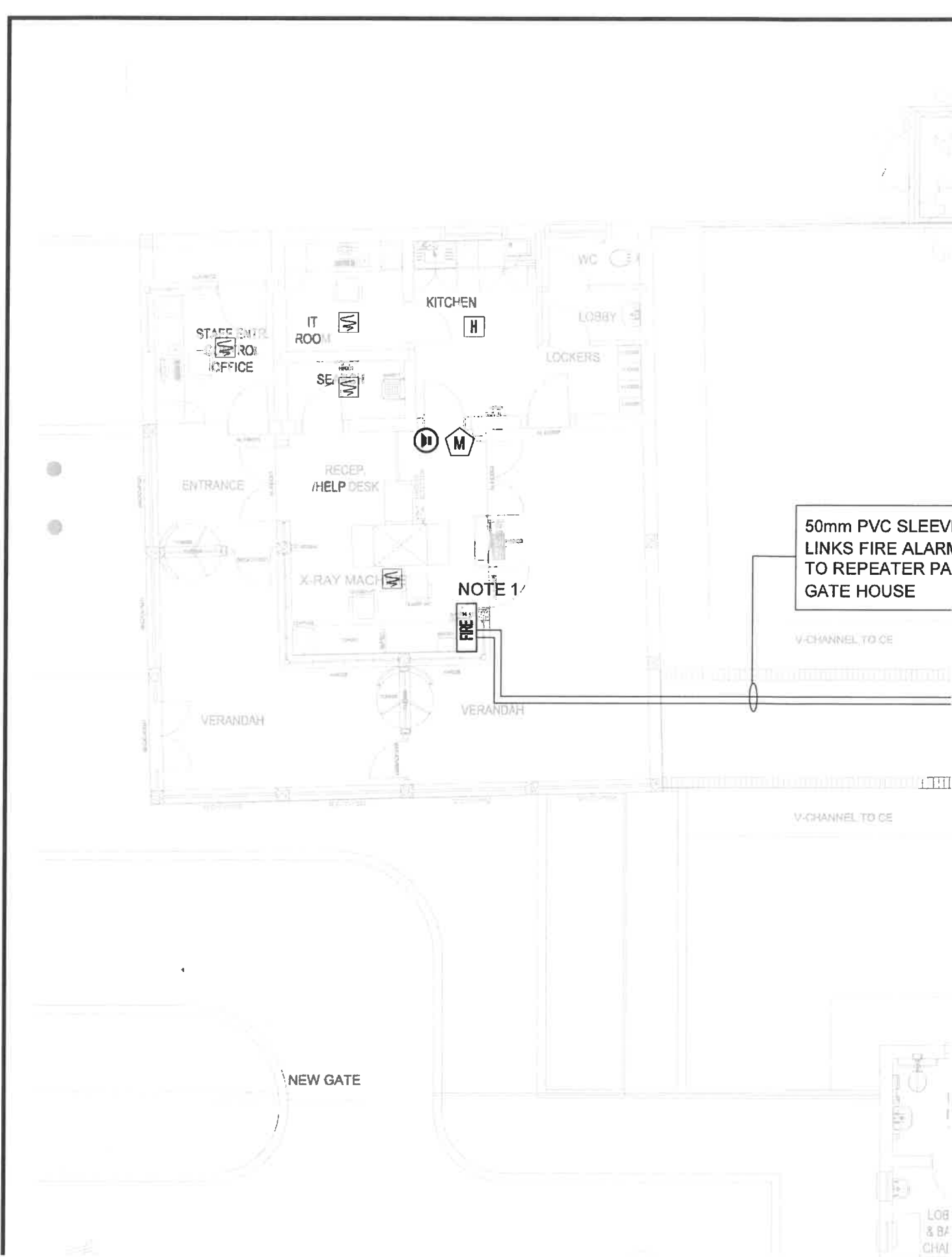


F15



ILLUMINATED  
E7





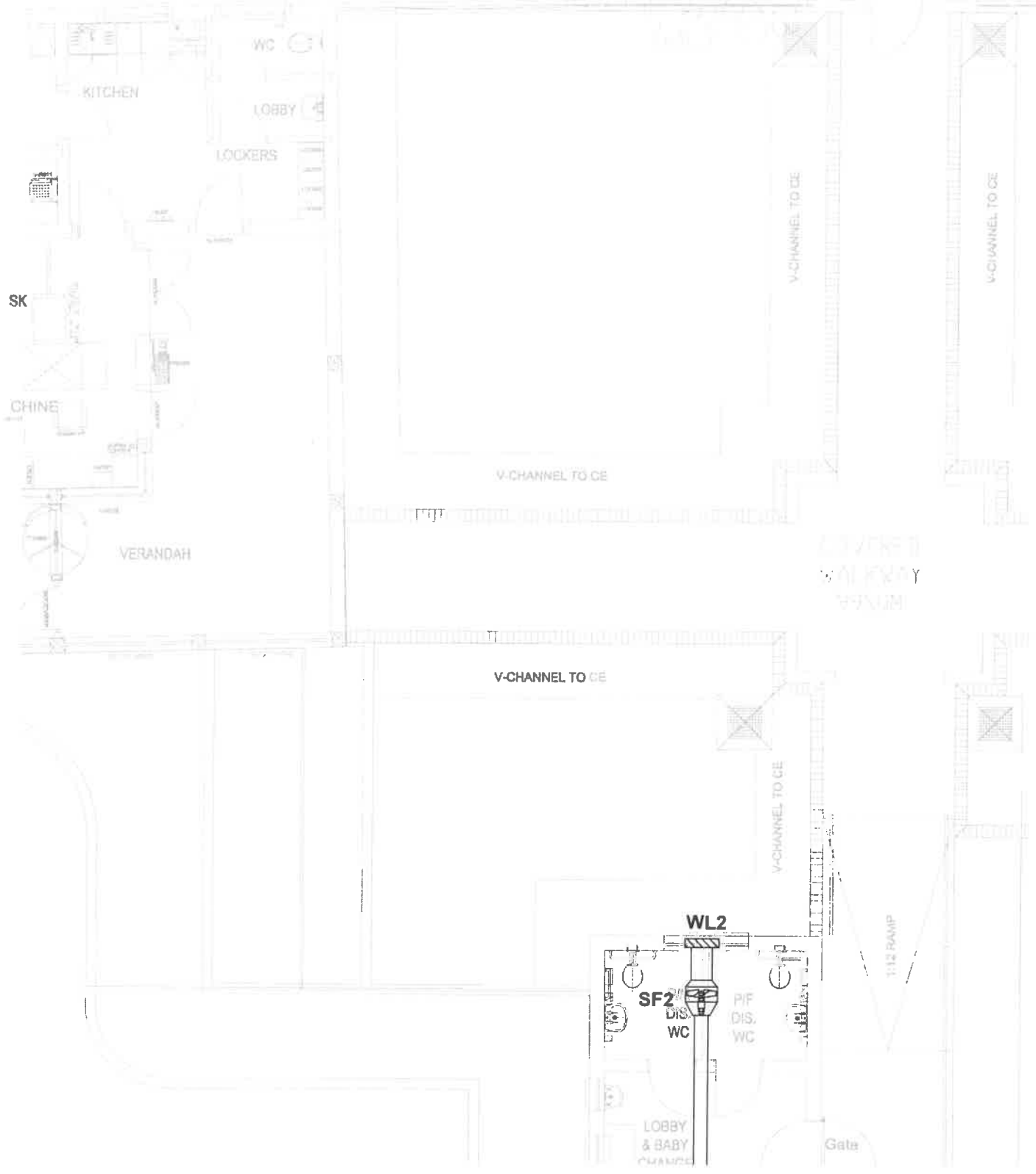
50mm PVC SLEEVE  
LINKS FIRE ALARM  
TO REPEATER PANEL  
IN GATE HOUSE

V-CORNER TO CEILING

V-CORNER TO CEILING

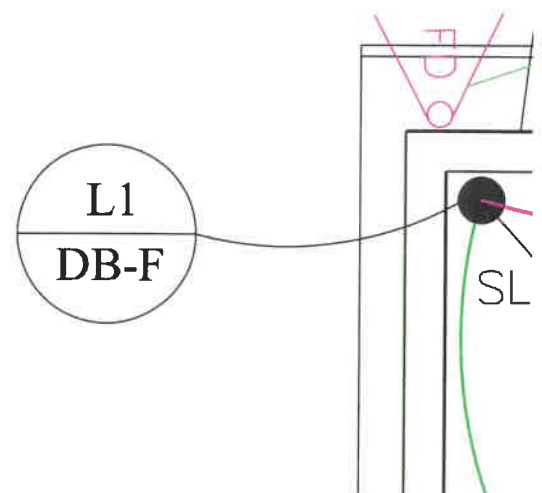
NEW GATE

LOB & BATH

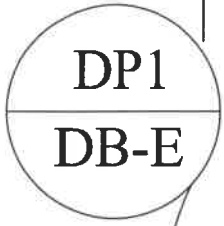


LOBBY  
AREA  
AREA

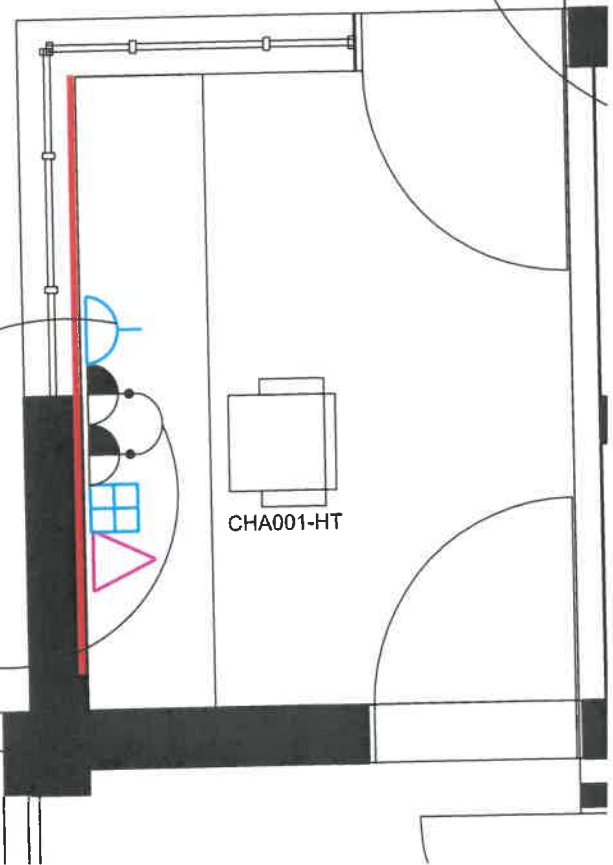
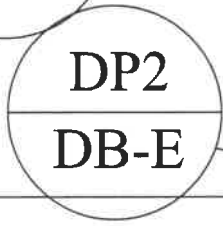
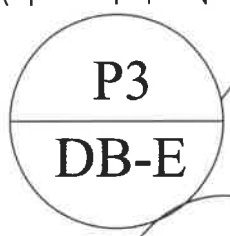
ELECTRICAL LEGEND:	
SYMBOL	DESCRIPTION
	DISTRIBUTION BOARD
	Type D: 2 x 23W LED 1500mm Surface mounted IP65 Vapor proof with Polycarbonate UV stabilized base and diffuser with 305 Stainless steel clips. Wired ECG complete with 4m 3 Core Cabtyre.
	Type FD: 1 x 40W LED Floodlight, IP65, CCT 4000k, Die-cast Aluminium Housing, Wired ECG complete 4m 3 Core Cabtyre. 90lm/Watt, Driver Lifetime 30000hrs
	20A LIGHT SWITCH - SINGLE LEVER
	DOUBLE SOCKET OUTLET POINT



NEW GATE



LANDSCAPING





NEW WATER CONNECTION POINT

NEW 2.9 HIGH CLEARVU FENCE

12 NEW COVERED STP PARKING BAYS

STAFF SECURE ENTRANCE / PRISONER ESCORT ENTRANCE

NEW GATE

LANDSCAPING

EX. SEWER LINE

NEW SEWER CONNECTION POINT

PUBLIC ENTRANCE

NEW 2.9 HIGH

NEW 2.9 HIGH CLEARVU FENCE

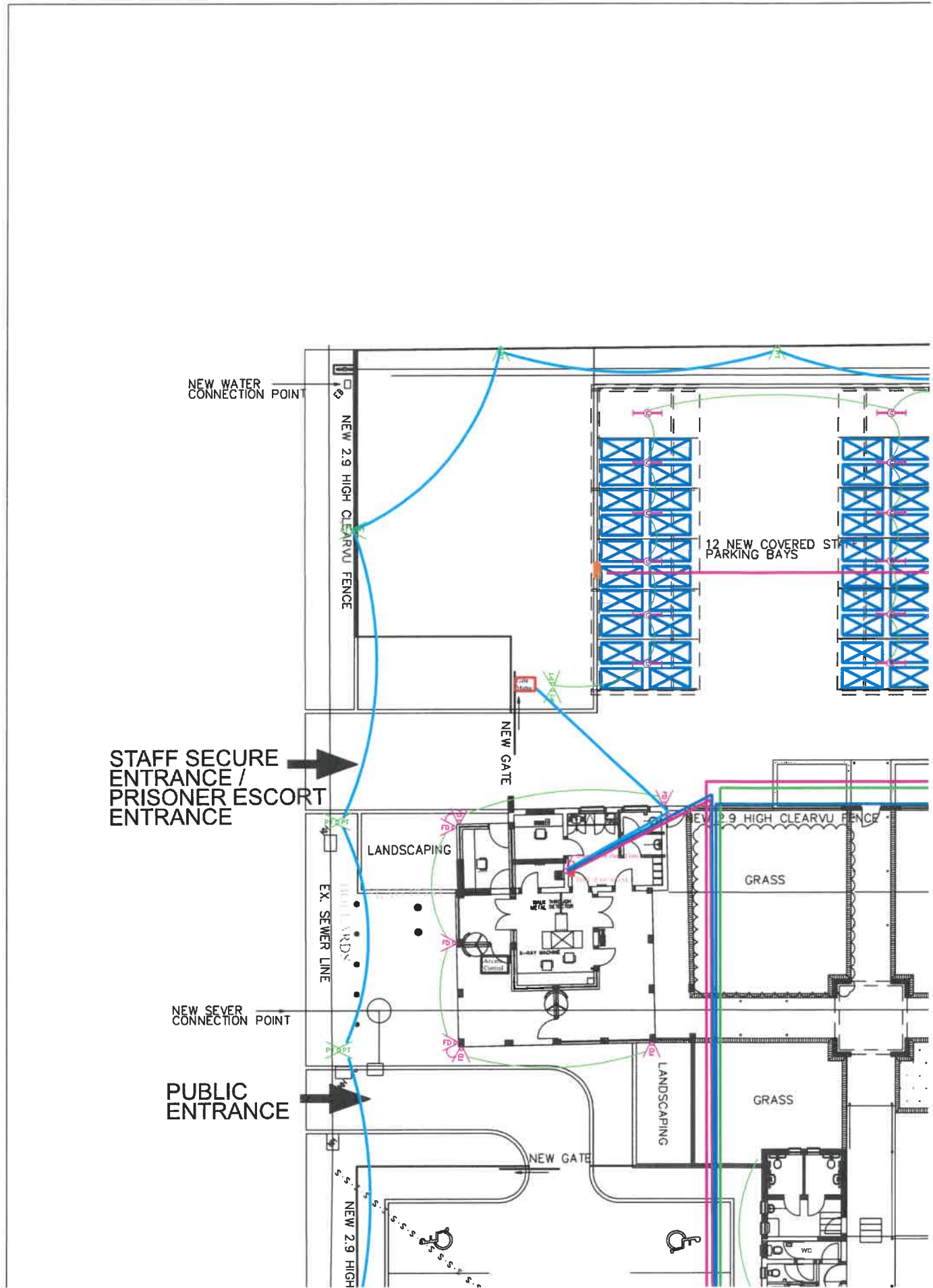
GRASS

LANDSCAPING

GRASS

NEW GATE

WC



NEW WATER CONNECTION POINT

NEW 2.9 HIGH CLEARVU FENCE

12 NEW COVERED STAFF PARKING BAYS

1 x 60mm Dia PVC Sleeve

SLOW BEND

STAFF SECURE ENTRANCE / PRISONER ESCORT ENTRANCE

NEW GATE

GALVANISED 20mm SLEEVE UP TO ROOF LEVEL

LANDSCAPING

GRASS

NEW 2.9 HIGH CLEARVU FENCE

EX. SEWER LINE

NEW SEWER CONNECTION POINT

PUBLIC ENTRANCE

LANDSCAPING

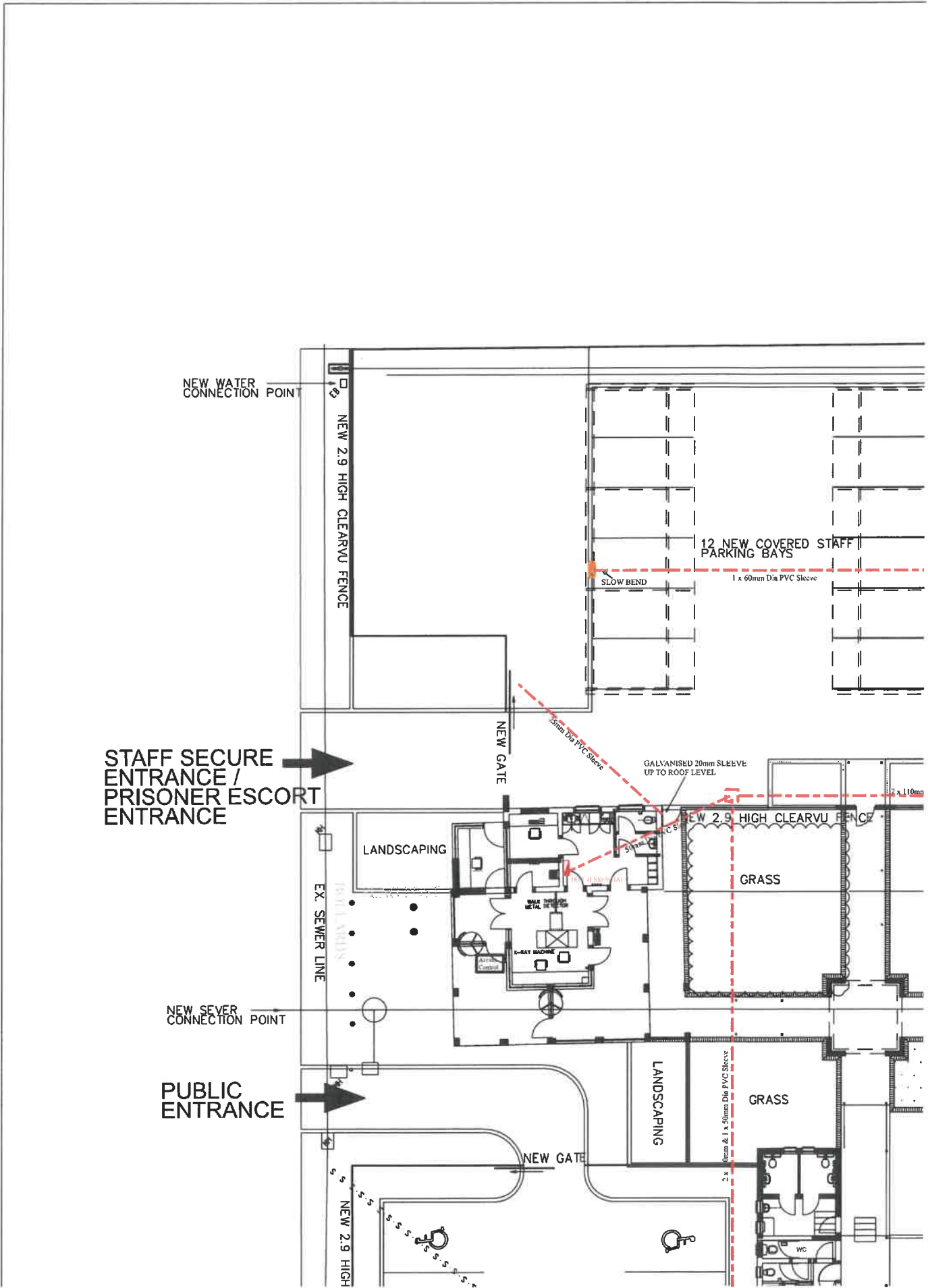
GRASS

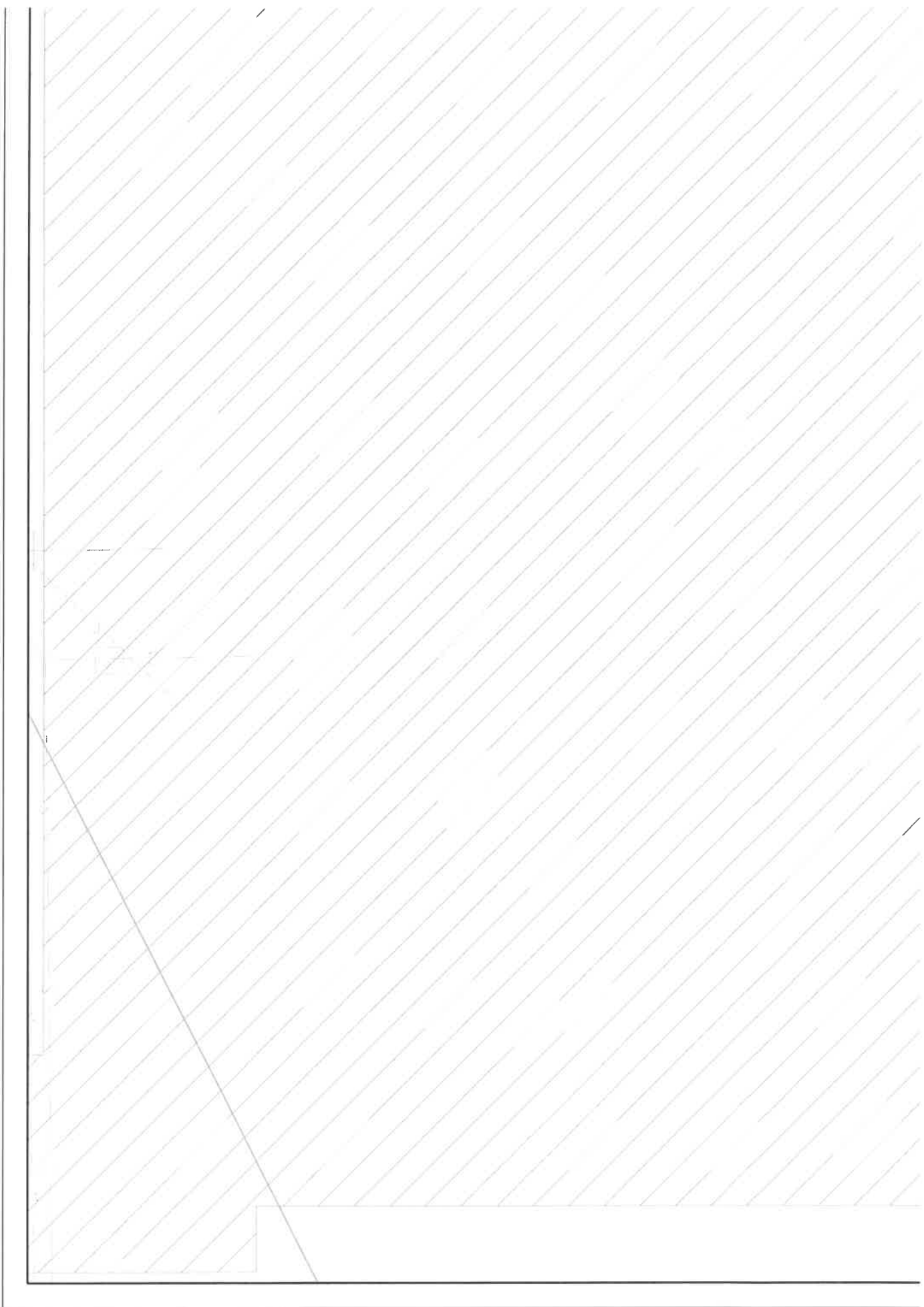
NEW GATE

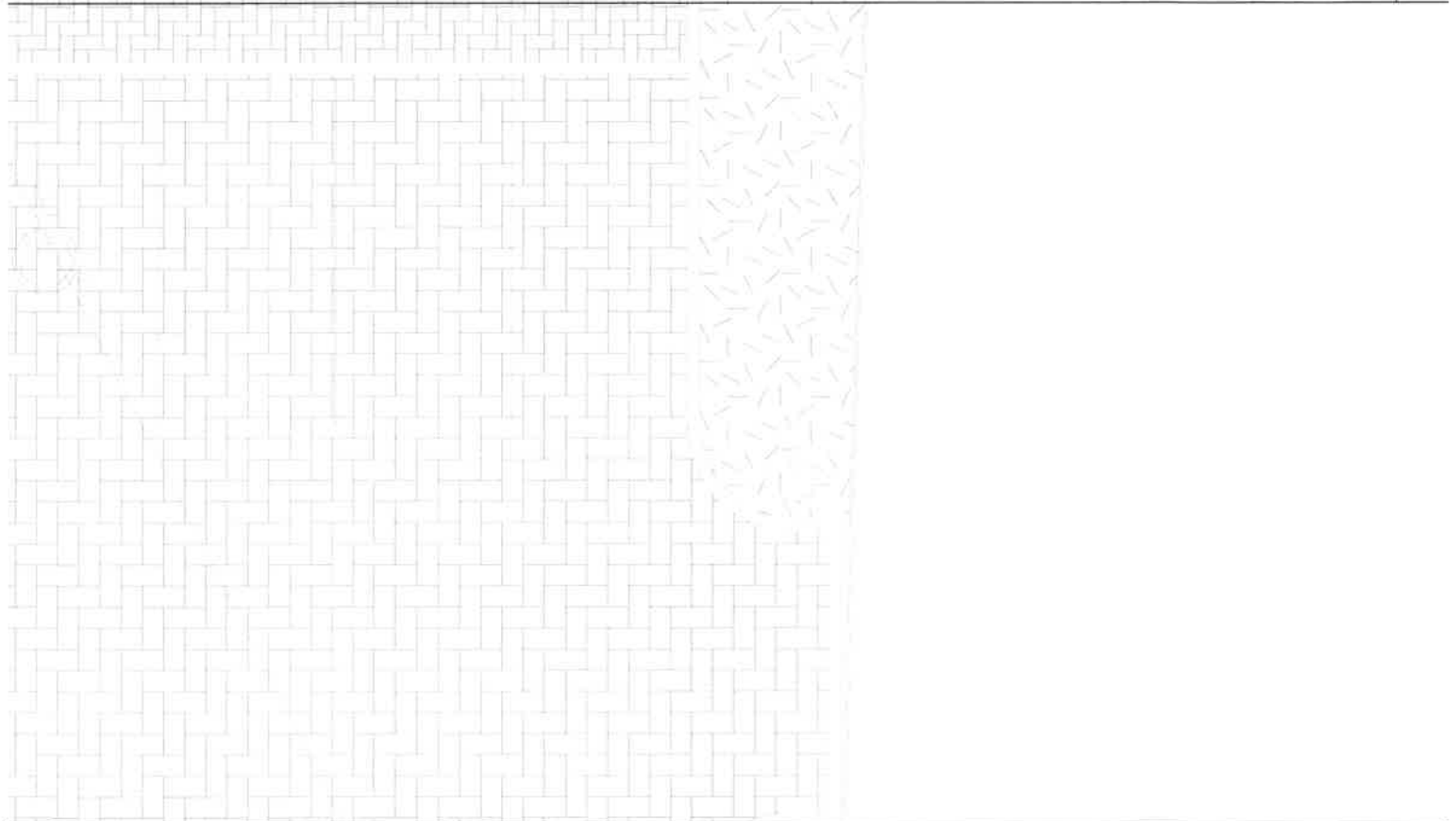
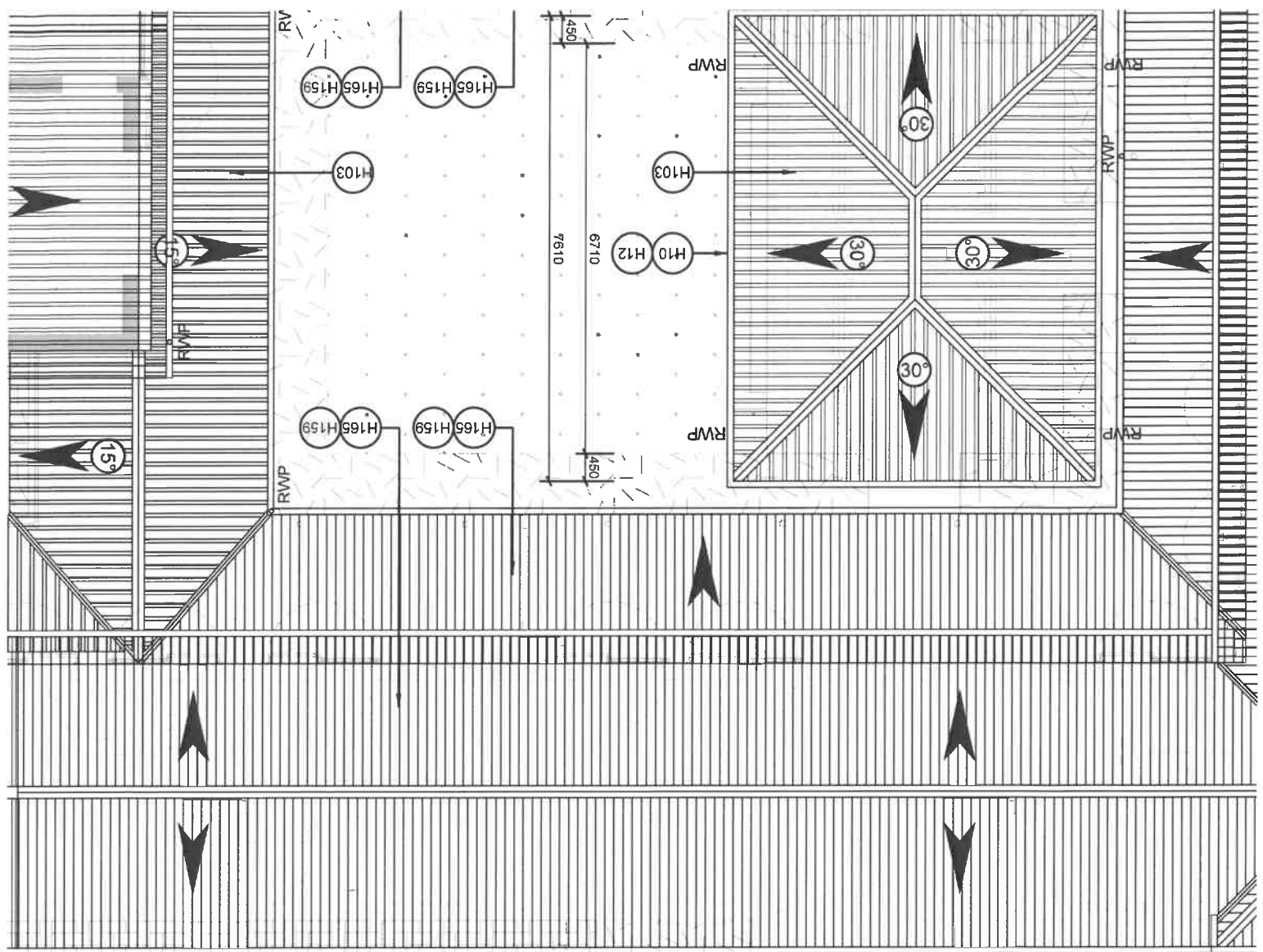
NEW 2.9 HIGH

2 x 60mm & 1 x 50mm Dia PVC Sleeve

WC





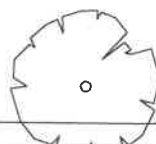
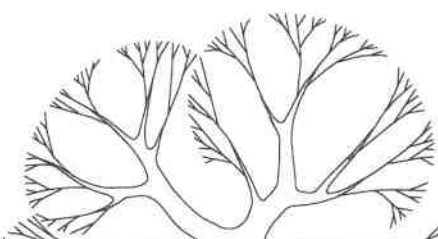


PERIMETER MILD STEEL PALLISADE FENCE

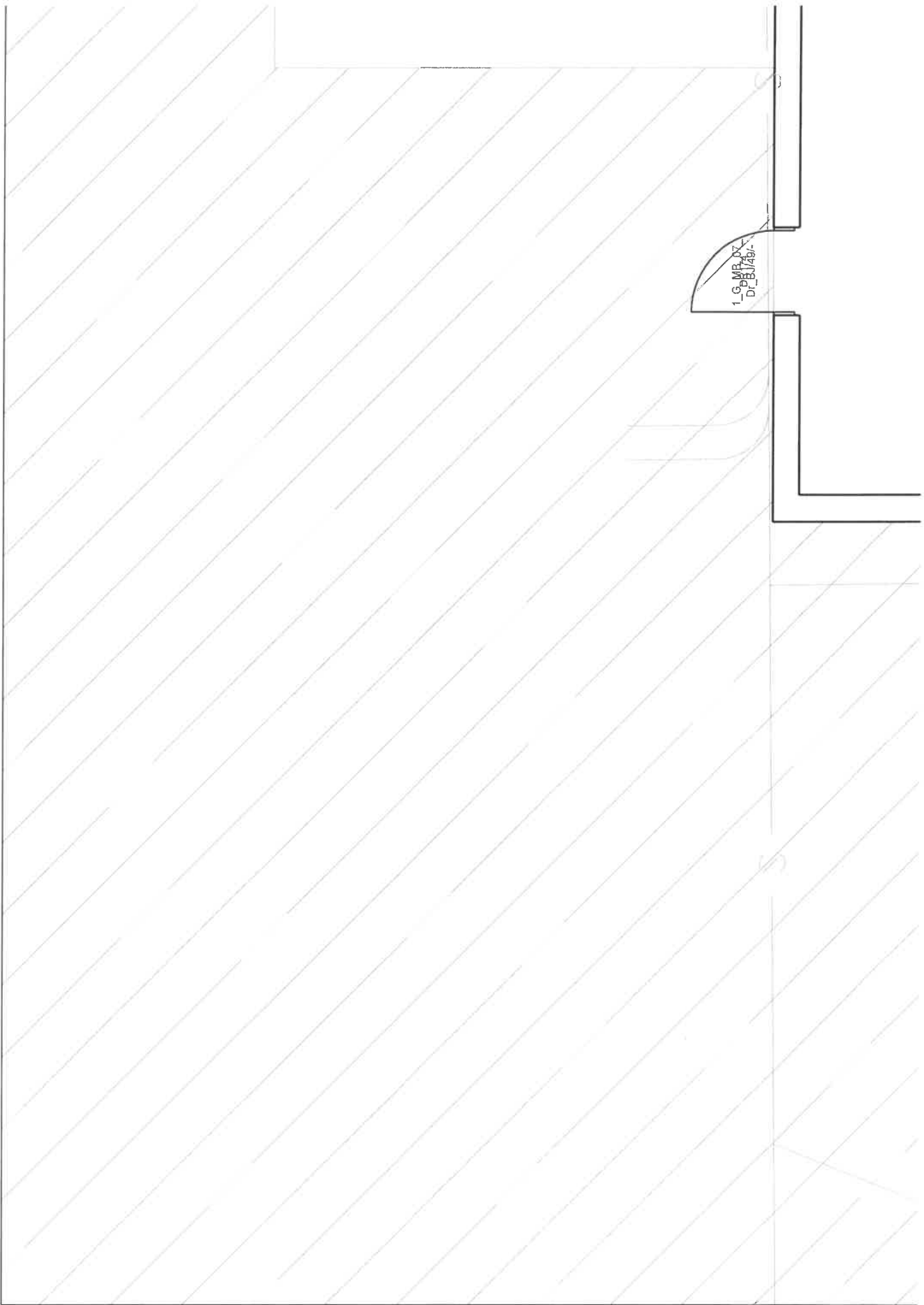
14065

SITE BOUNDARY

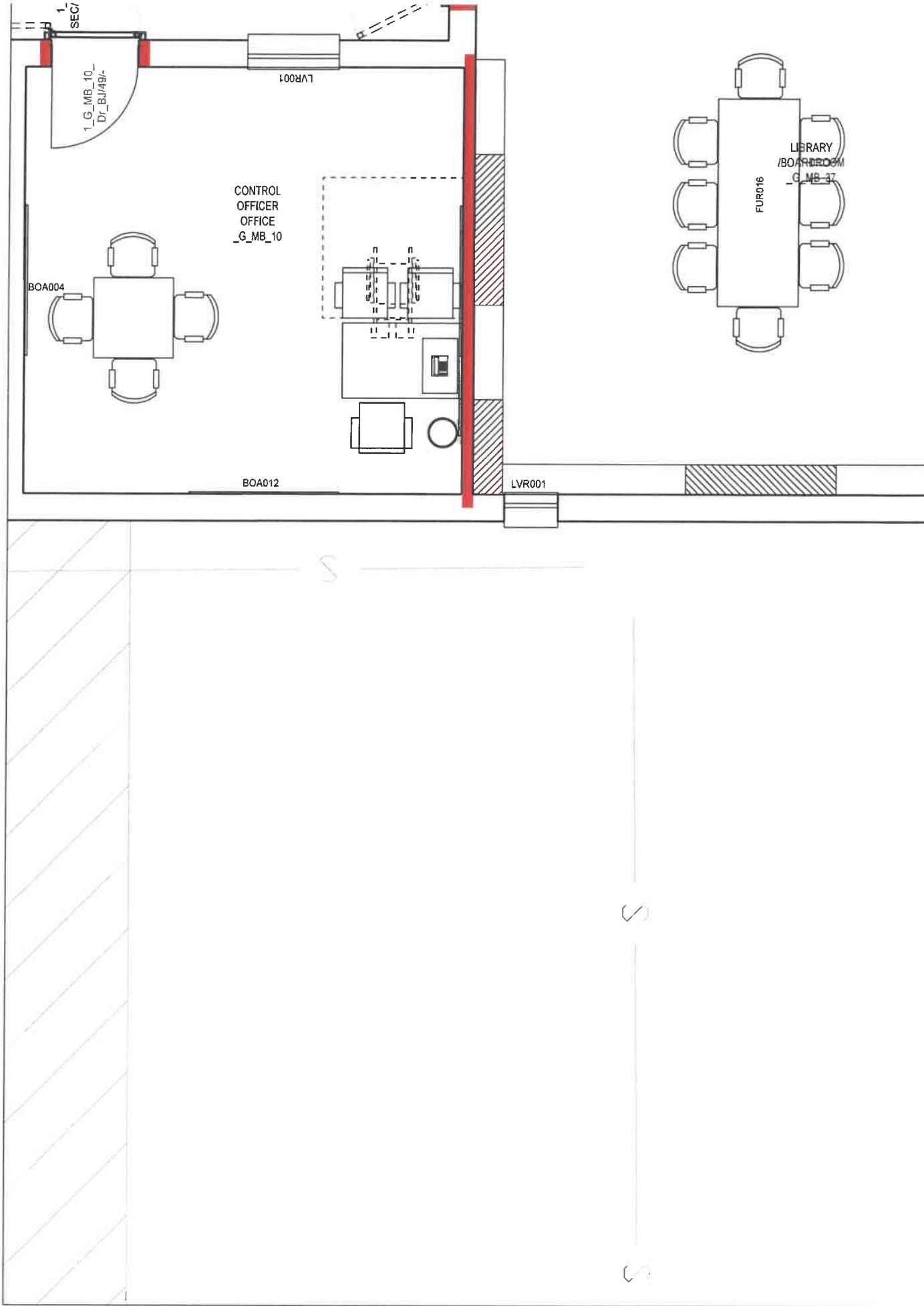
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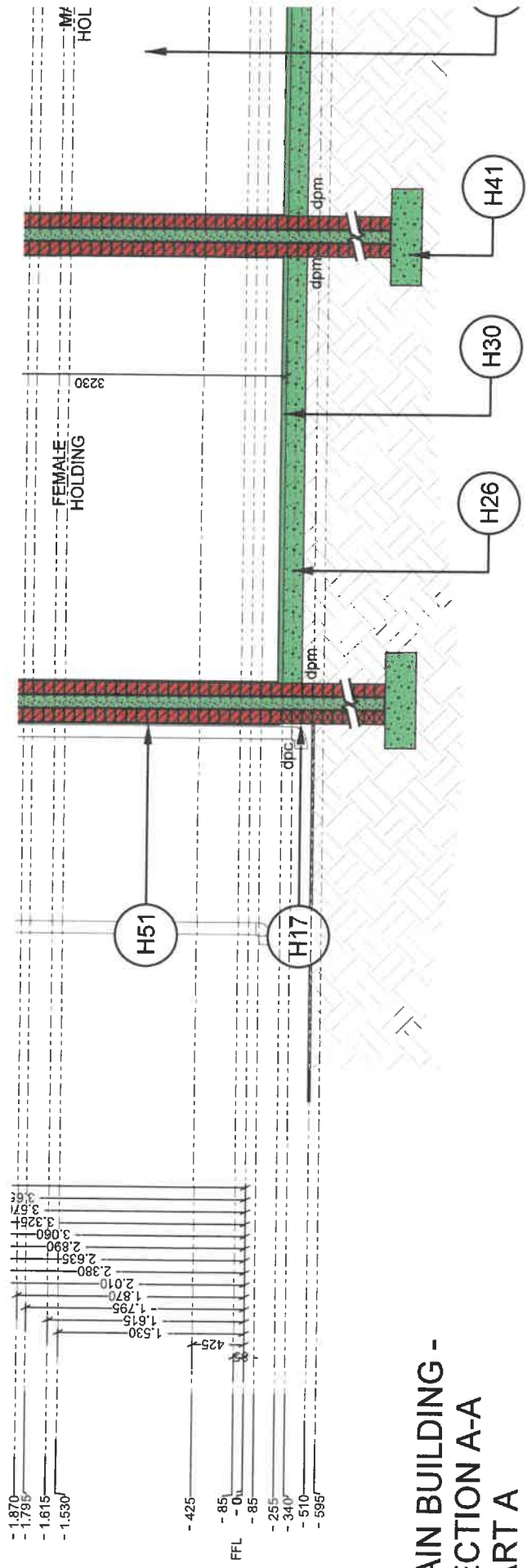




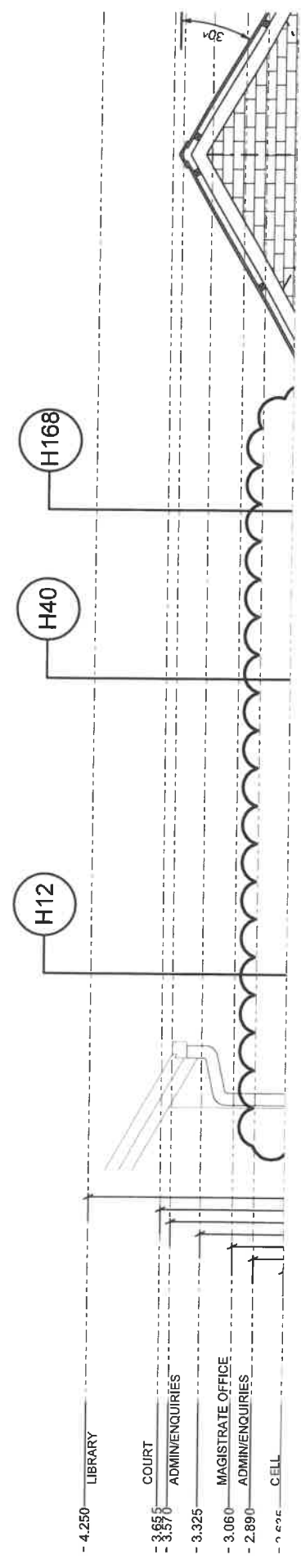
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DT\_BU/49/



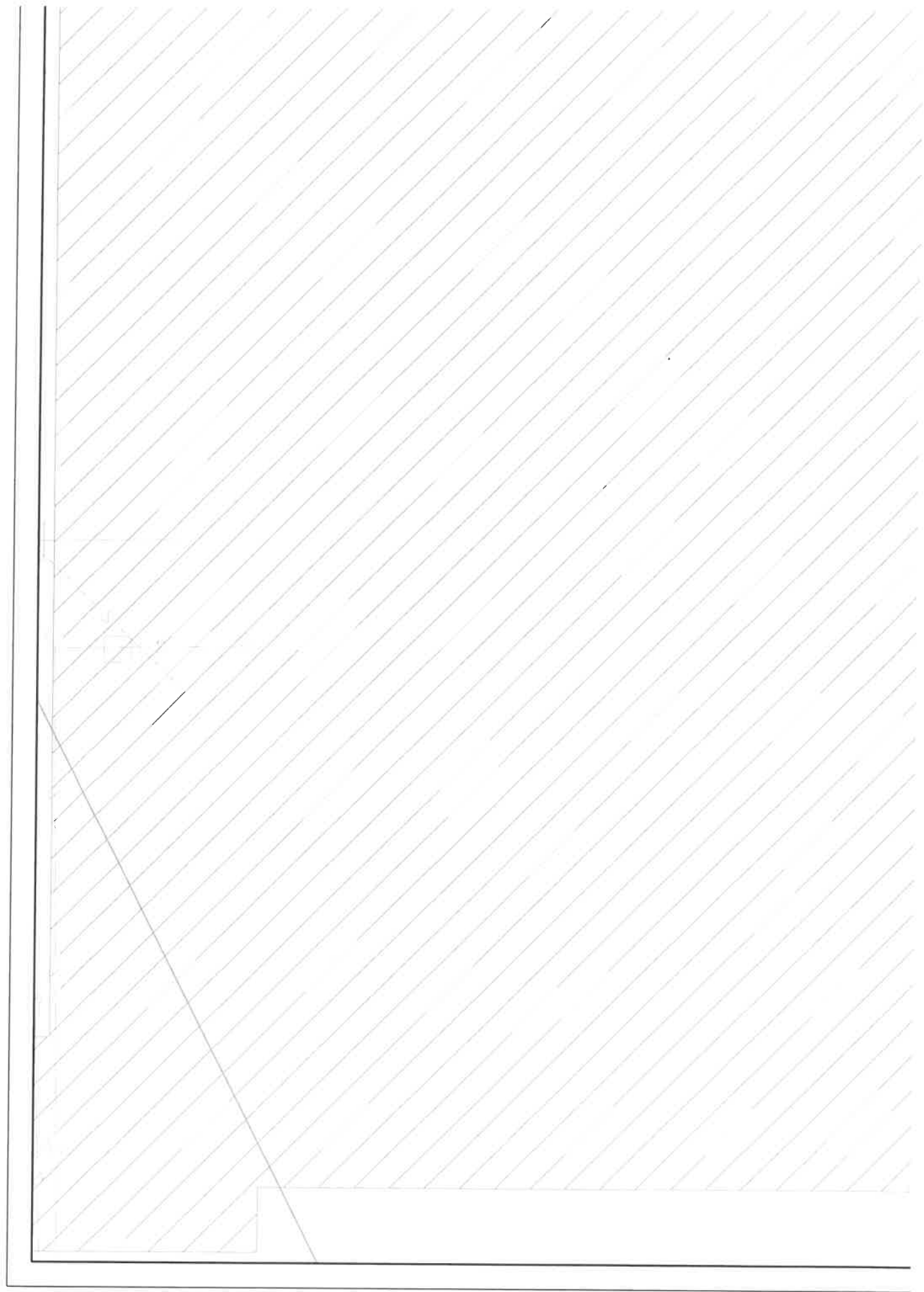


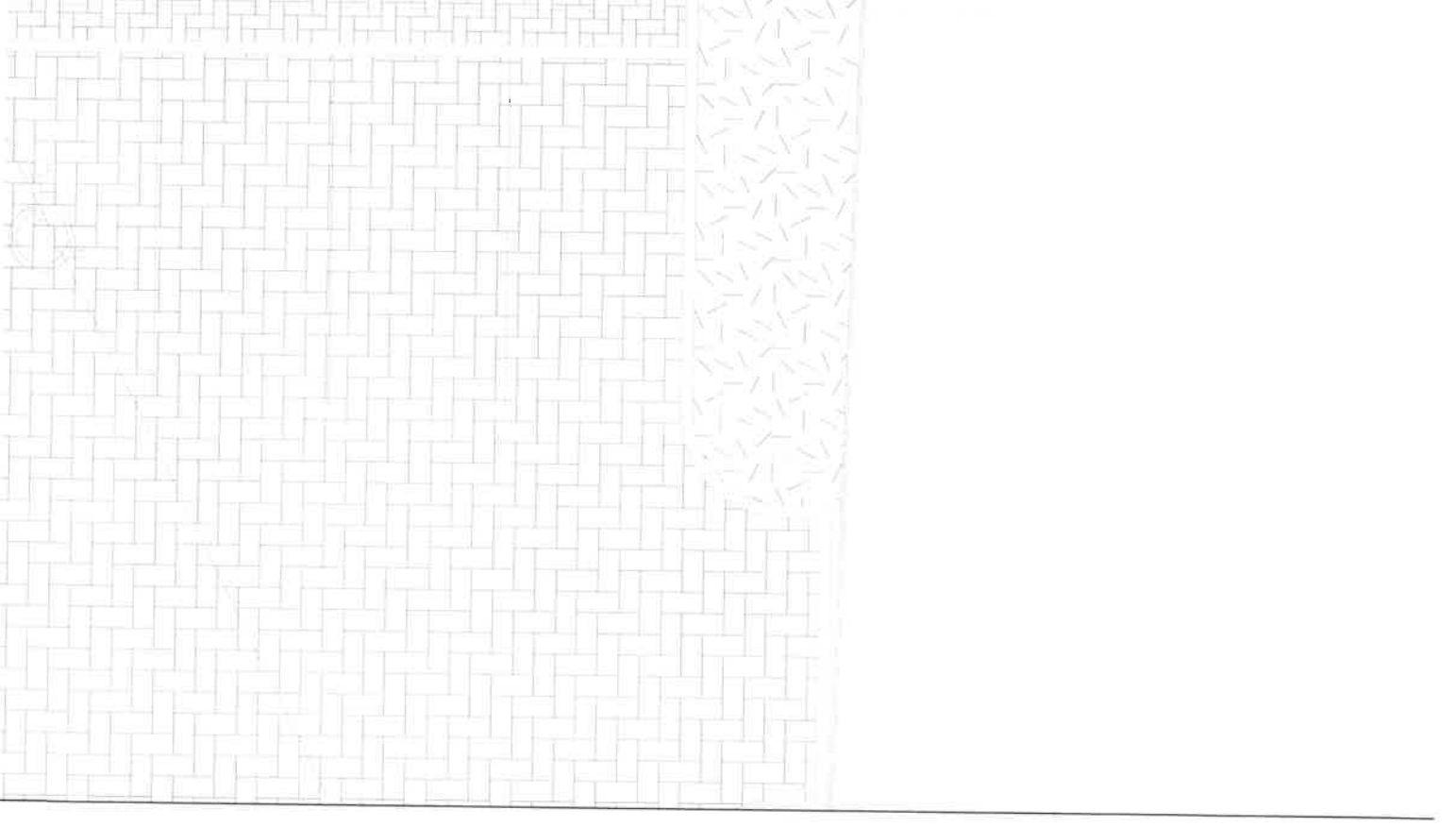
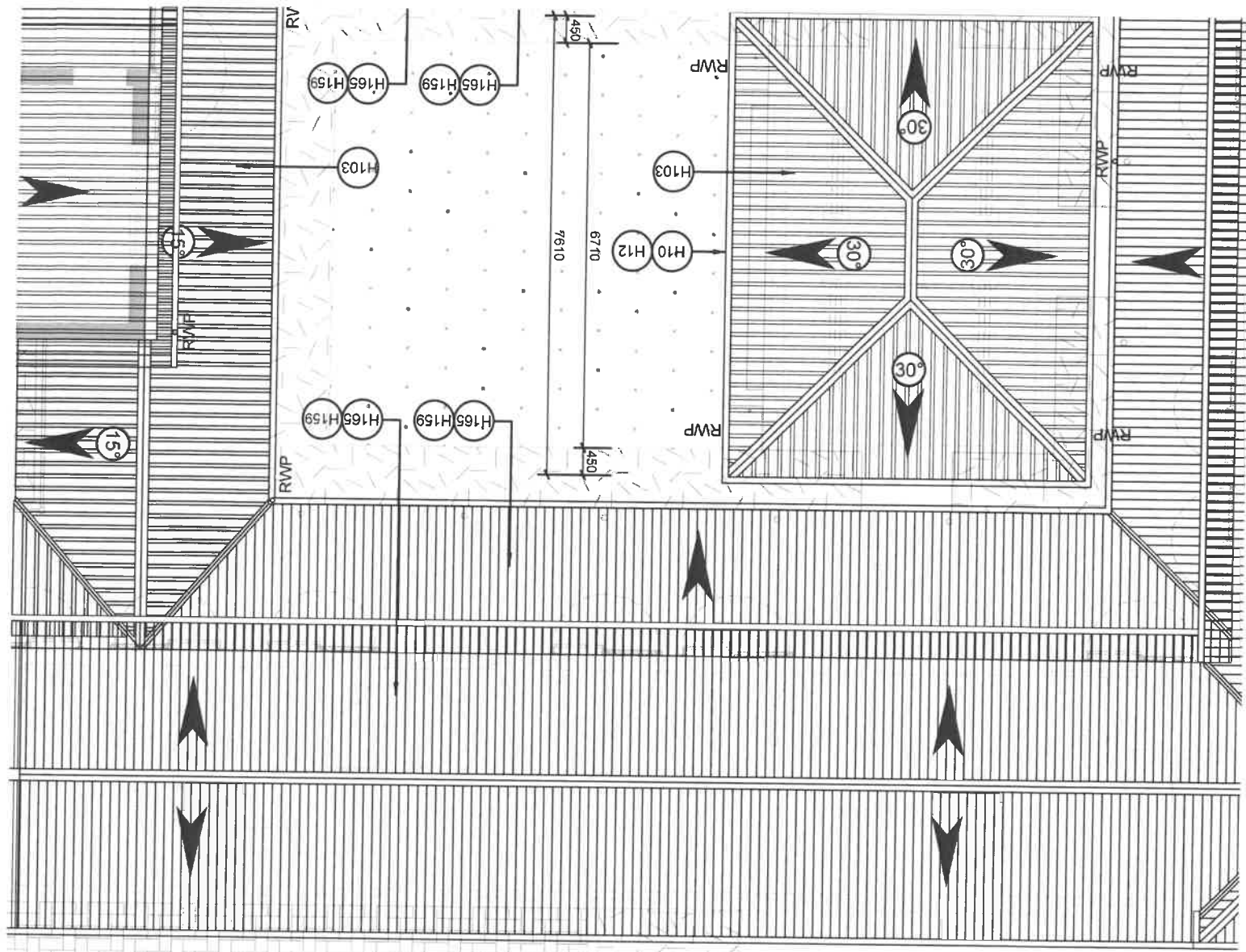


**MAIN BUILDING -  
SECTION A-A  
PART A**  
SCALE 1:50'



**LIBRARY  
COURT  
ADMINISTRATIVE OFFICES  
MAGISTRATE OFFICE  
ADMINISTRATIVE OFFICES  
CELL**



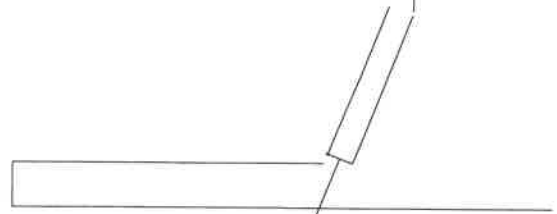
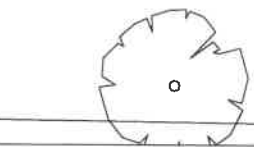
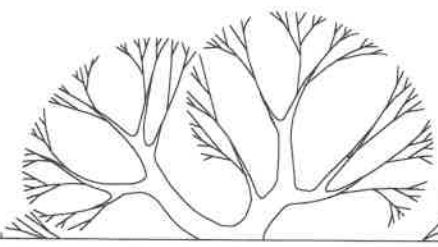
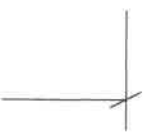


PERIMETER MILD STEEL PALLISADE FENCE

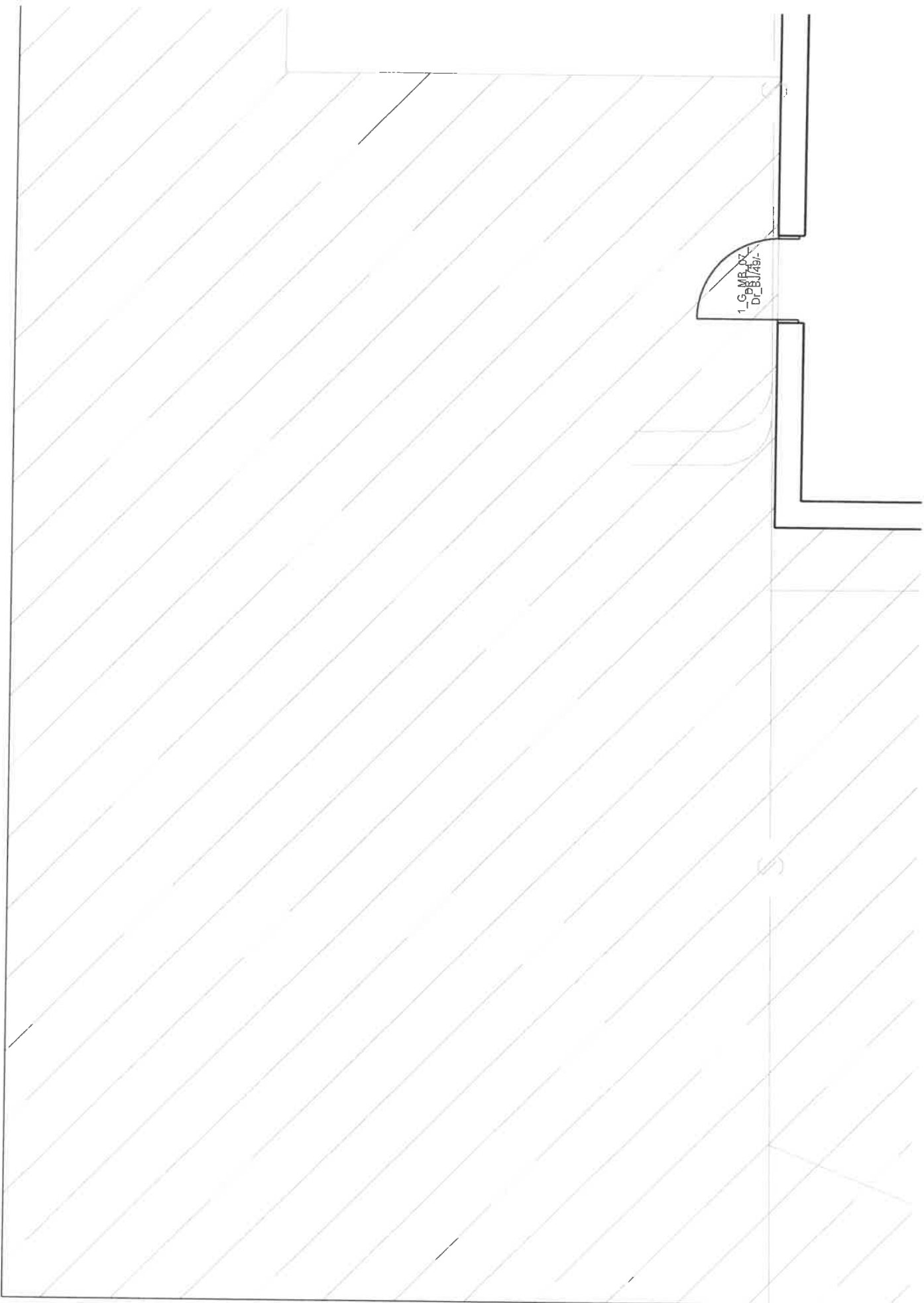
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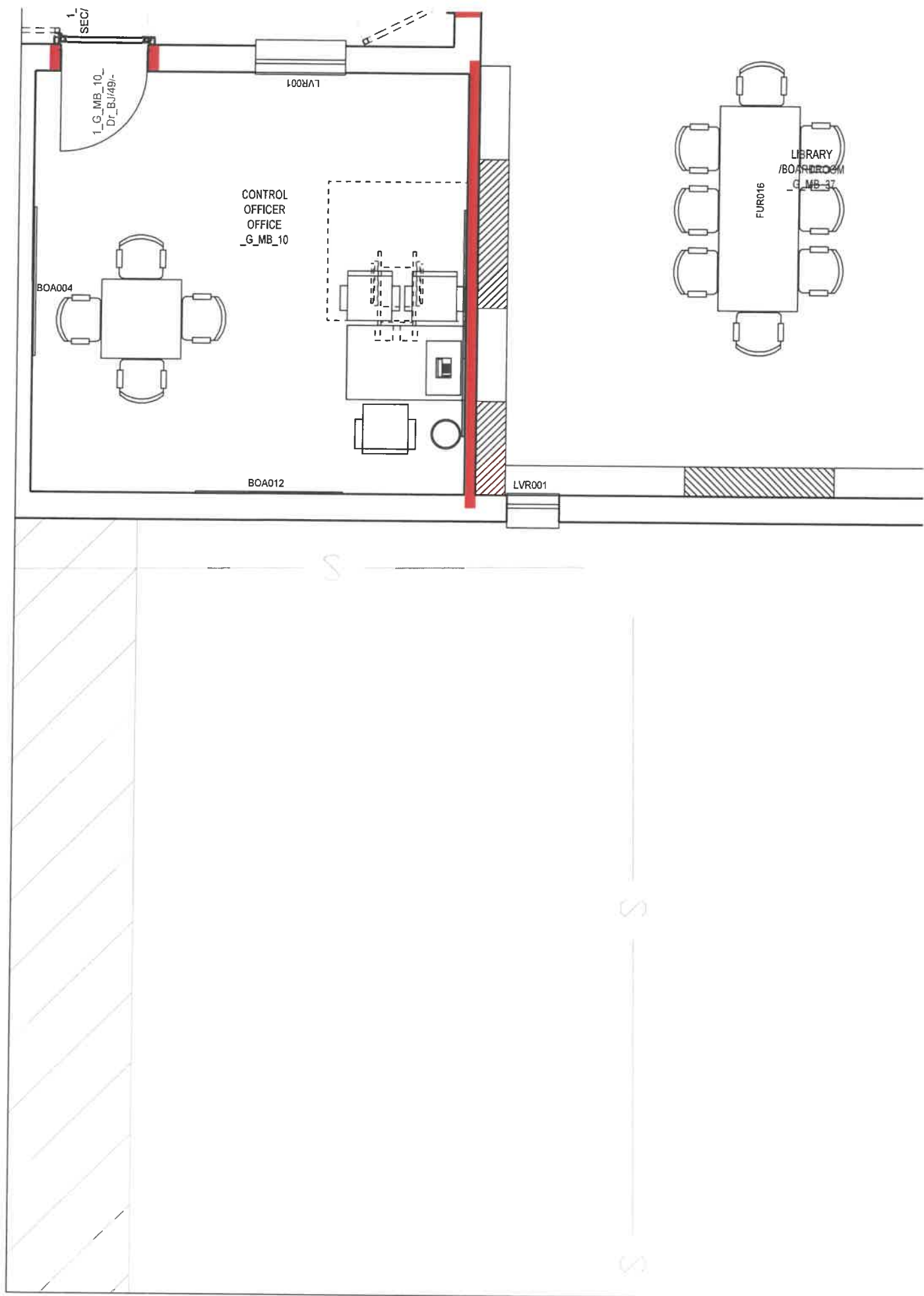
SITE BOUNDARY

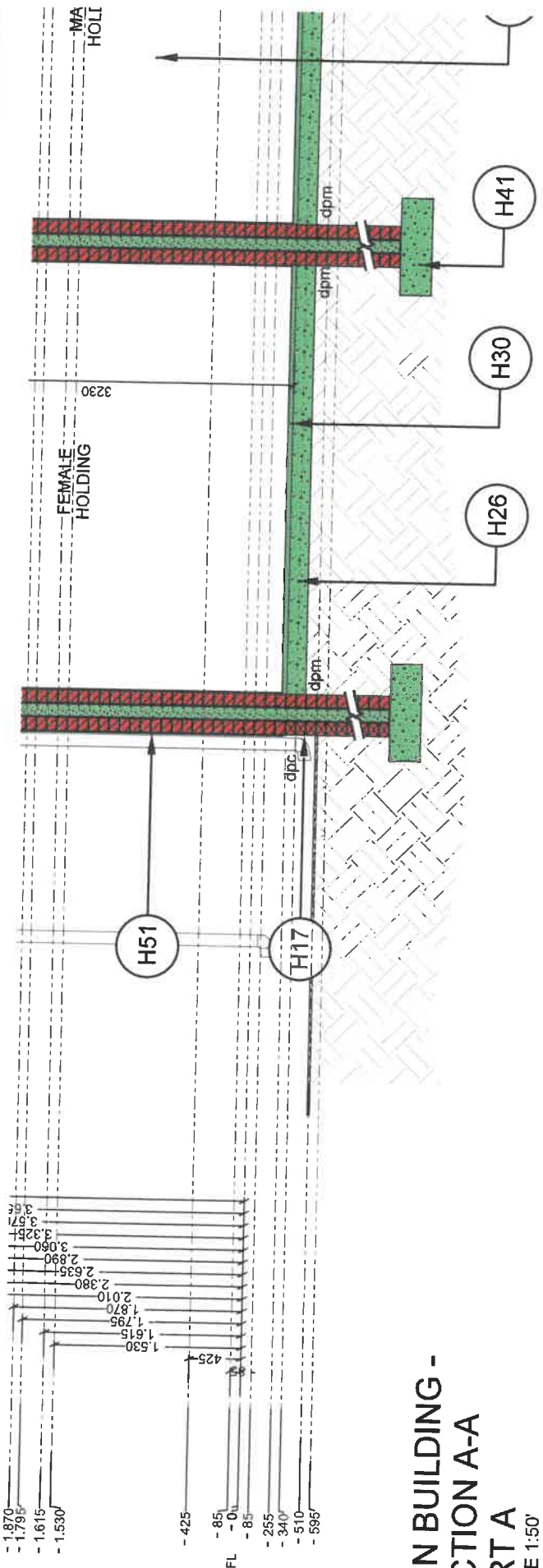
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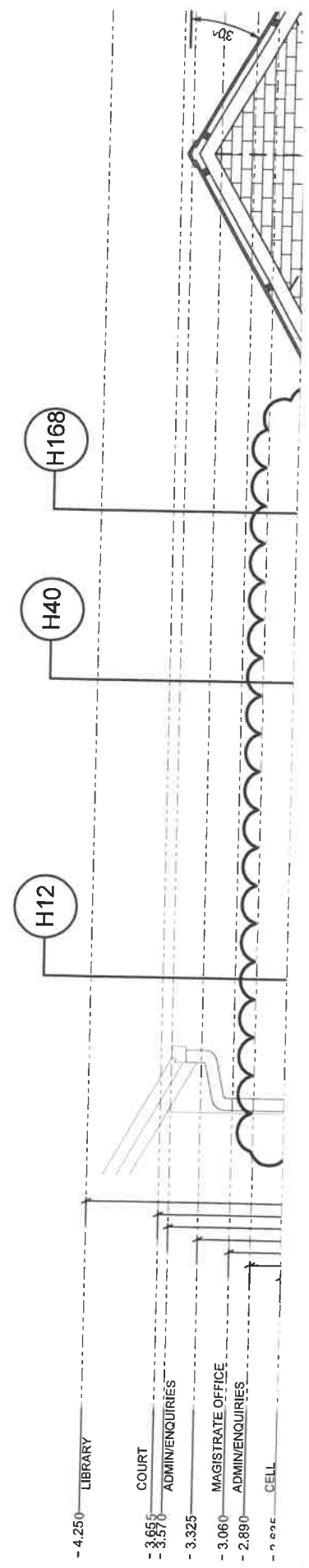




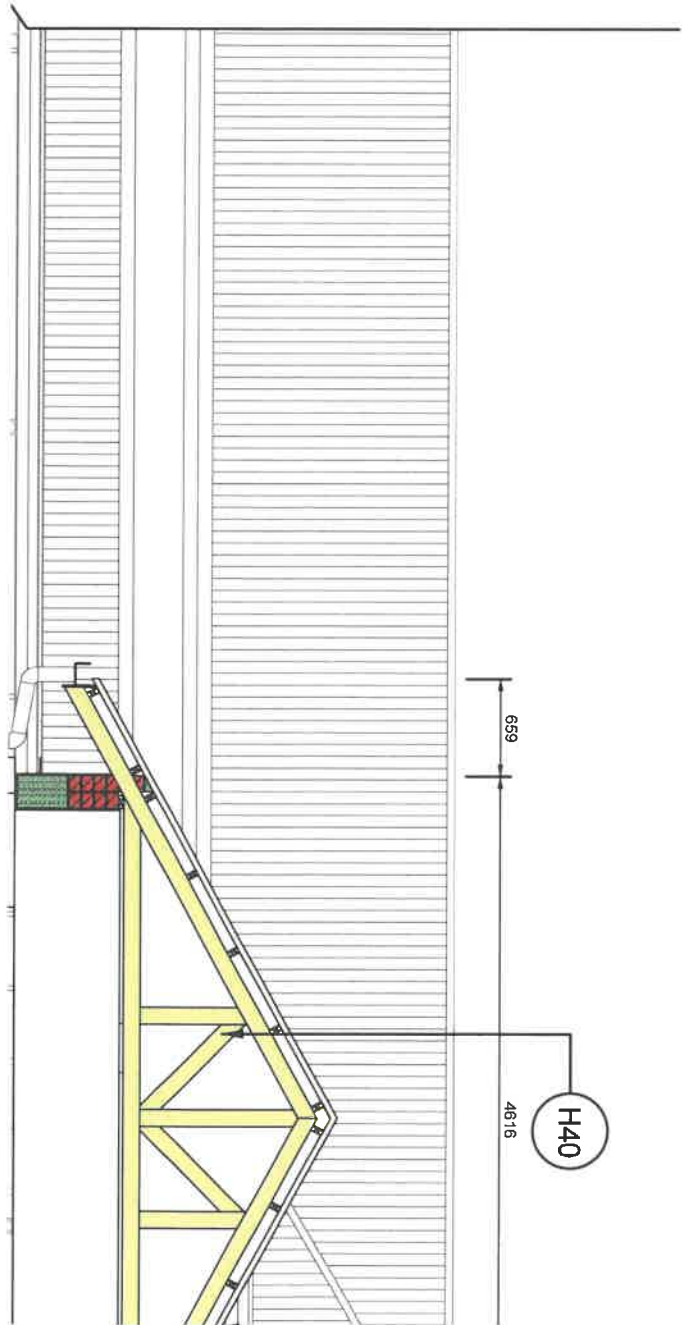


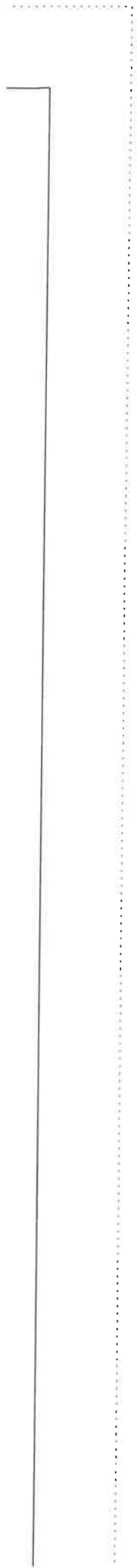


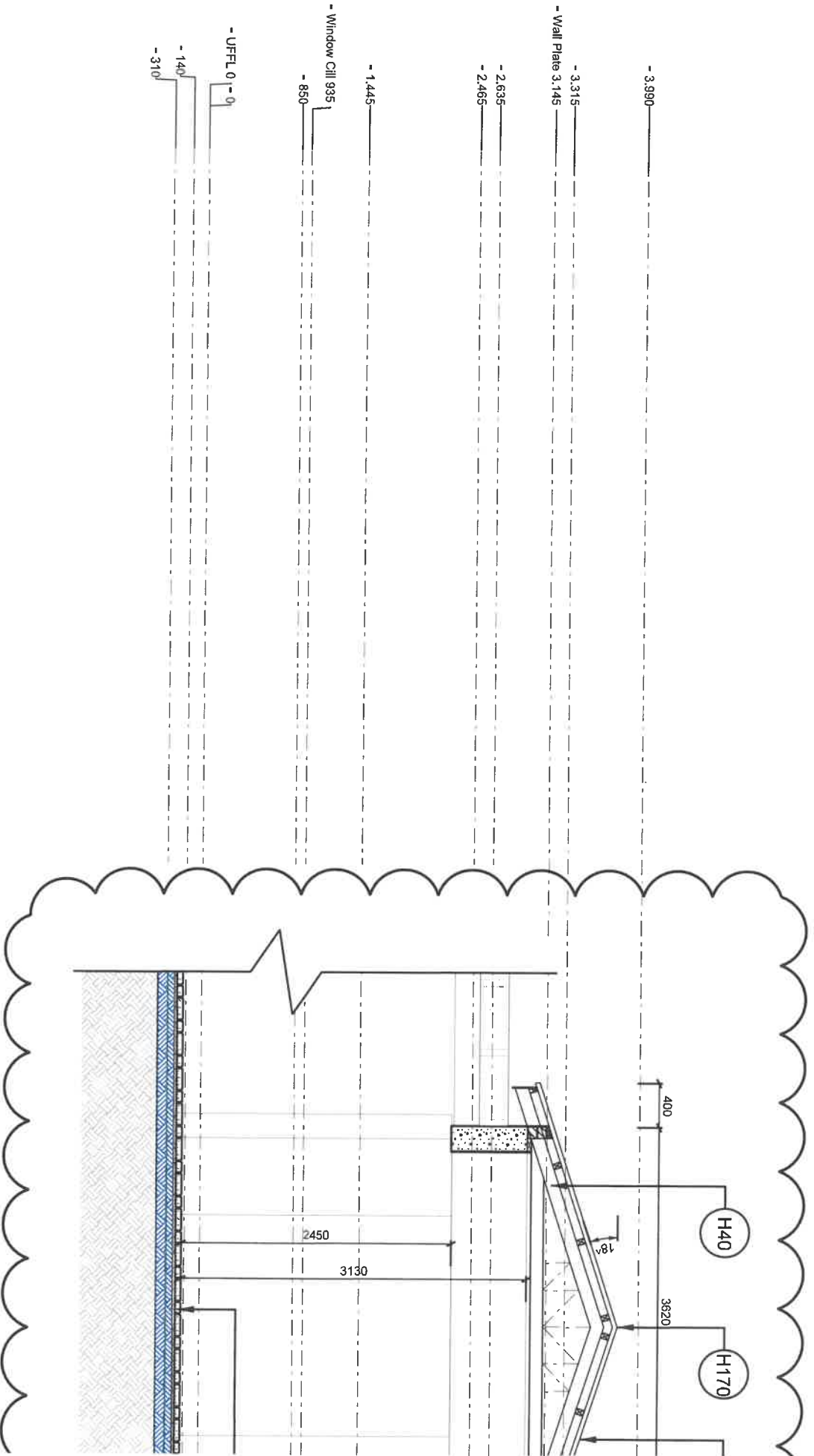
**MAIN BUILDING -  
SECTION A-A  
PART A**  
'SCALE 1:50'









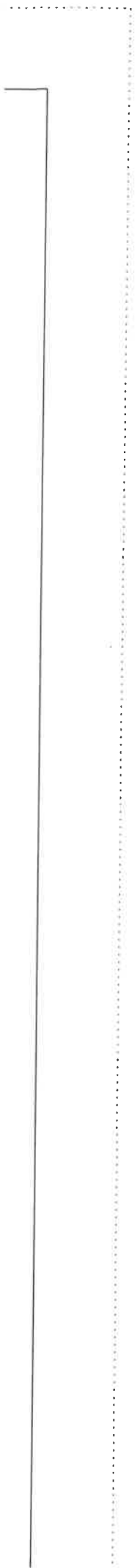


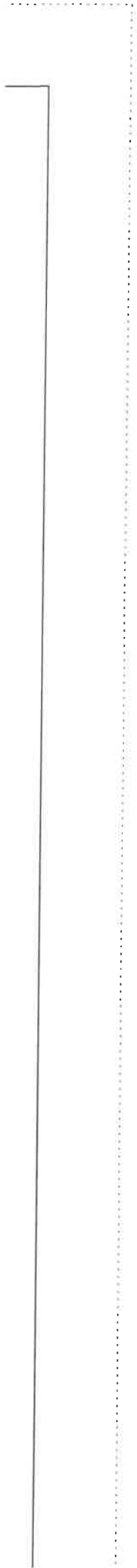
**WALKWAY SECTION A**

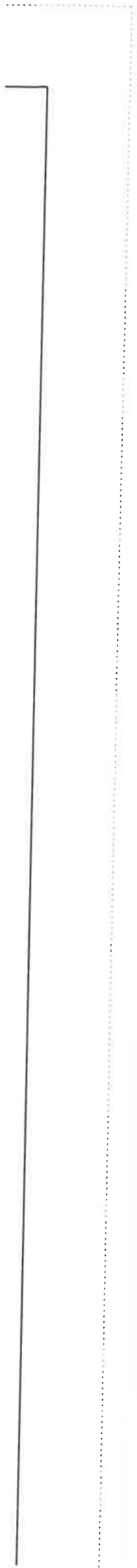
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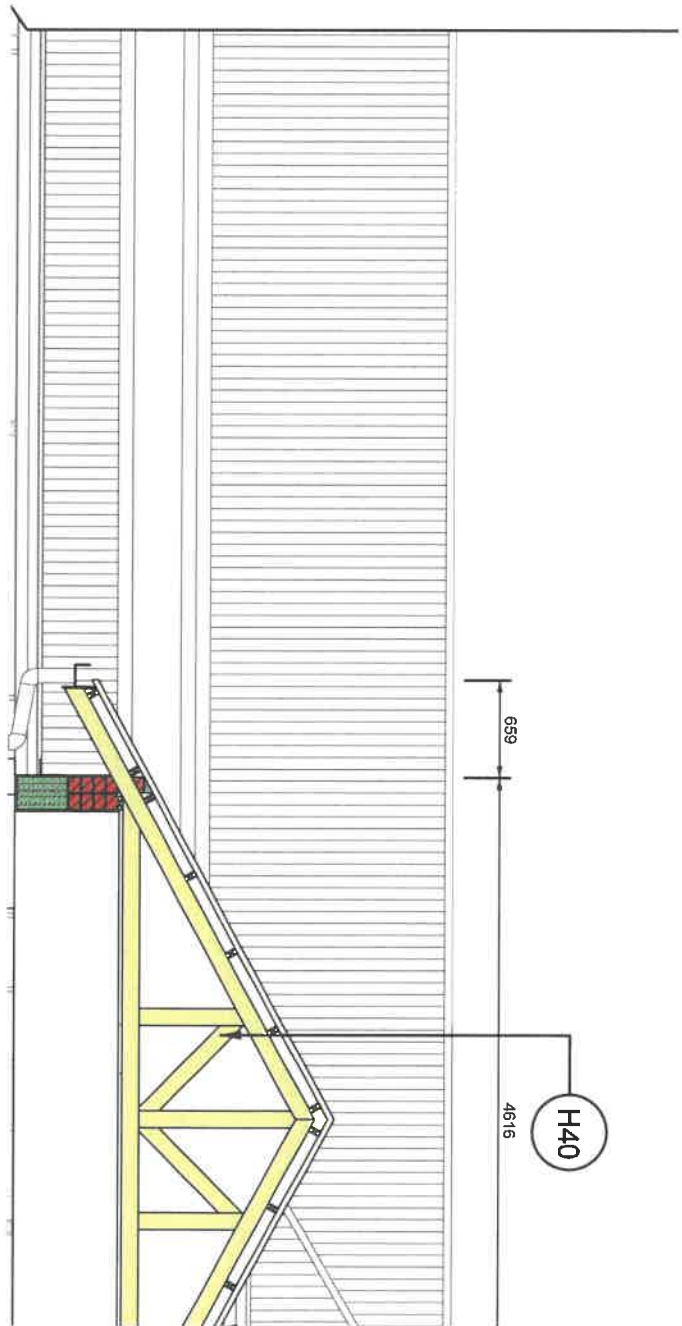






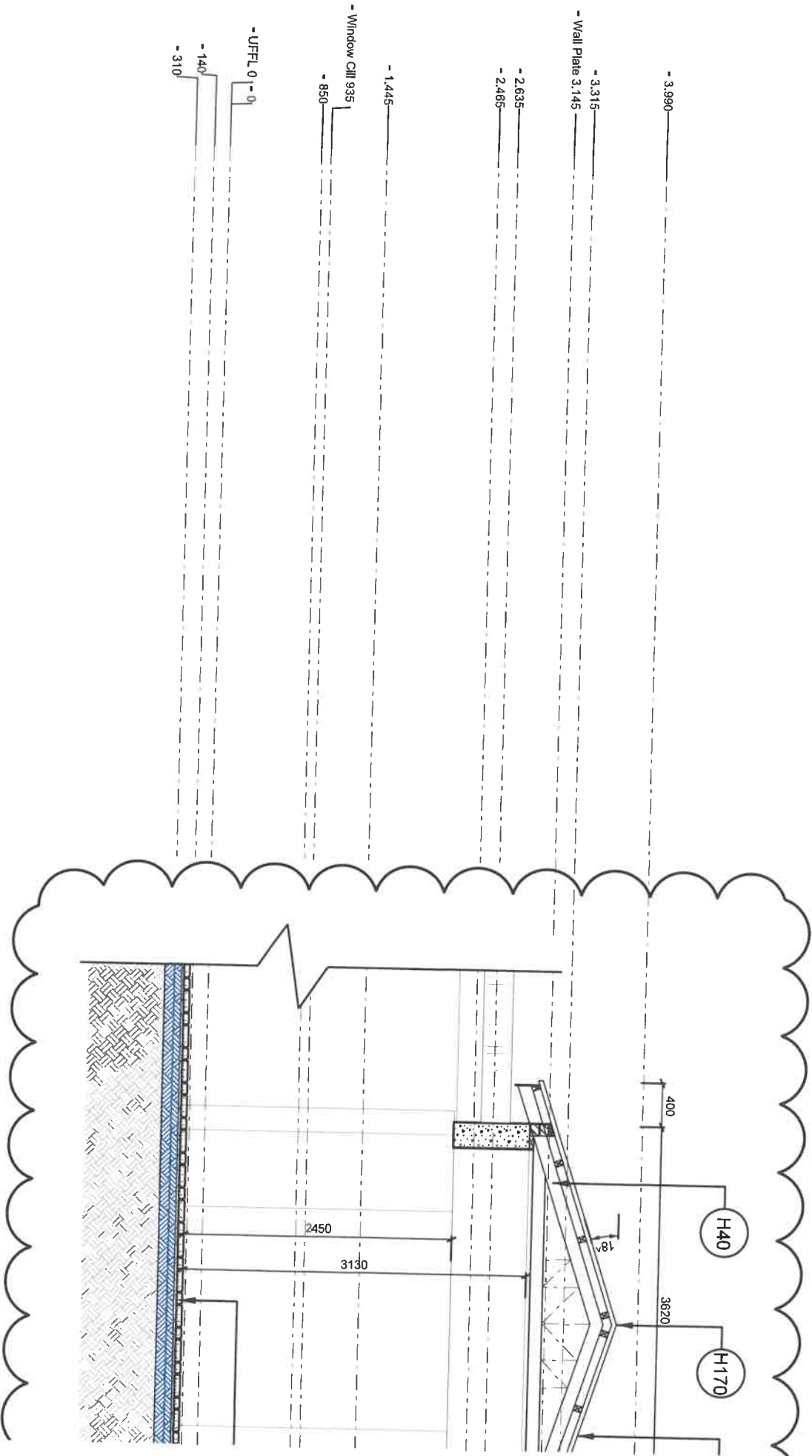




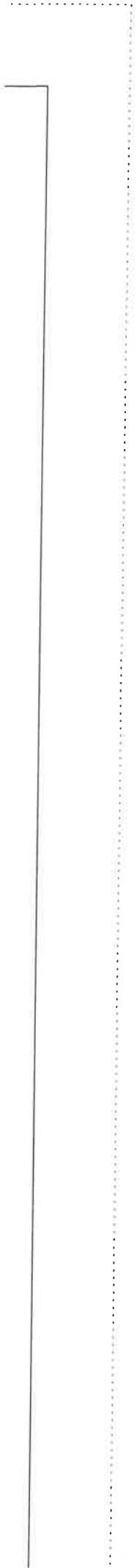


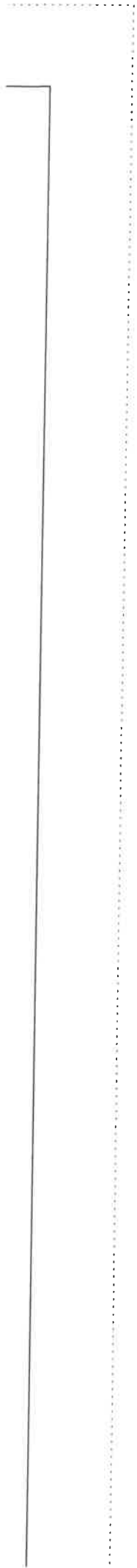


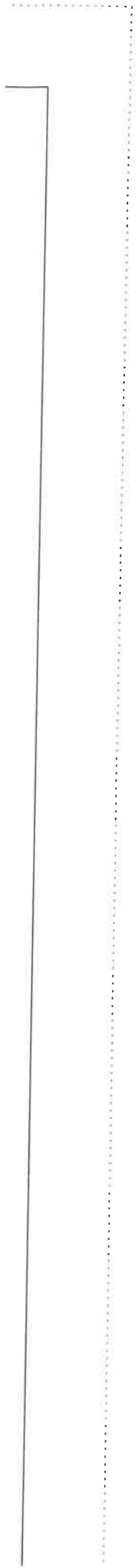
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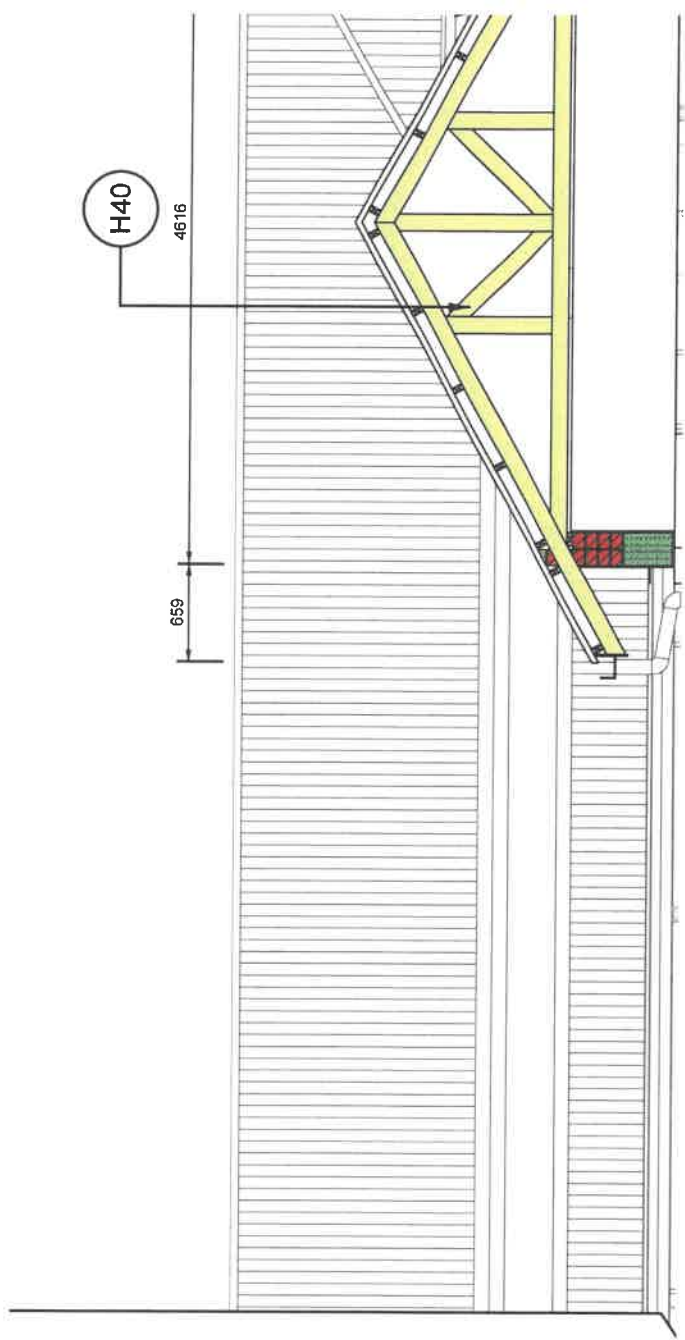


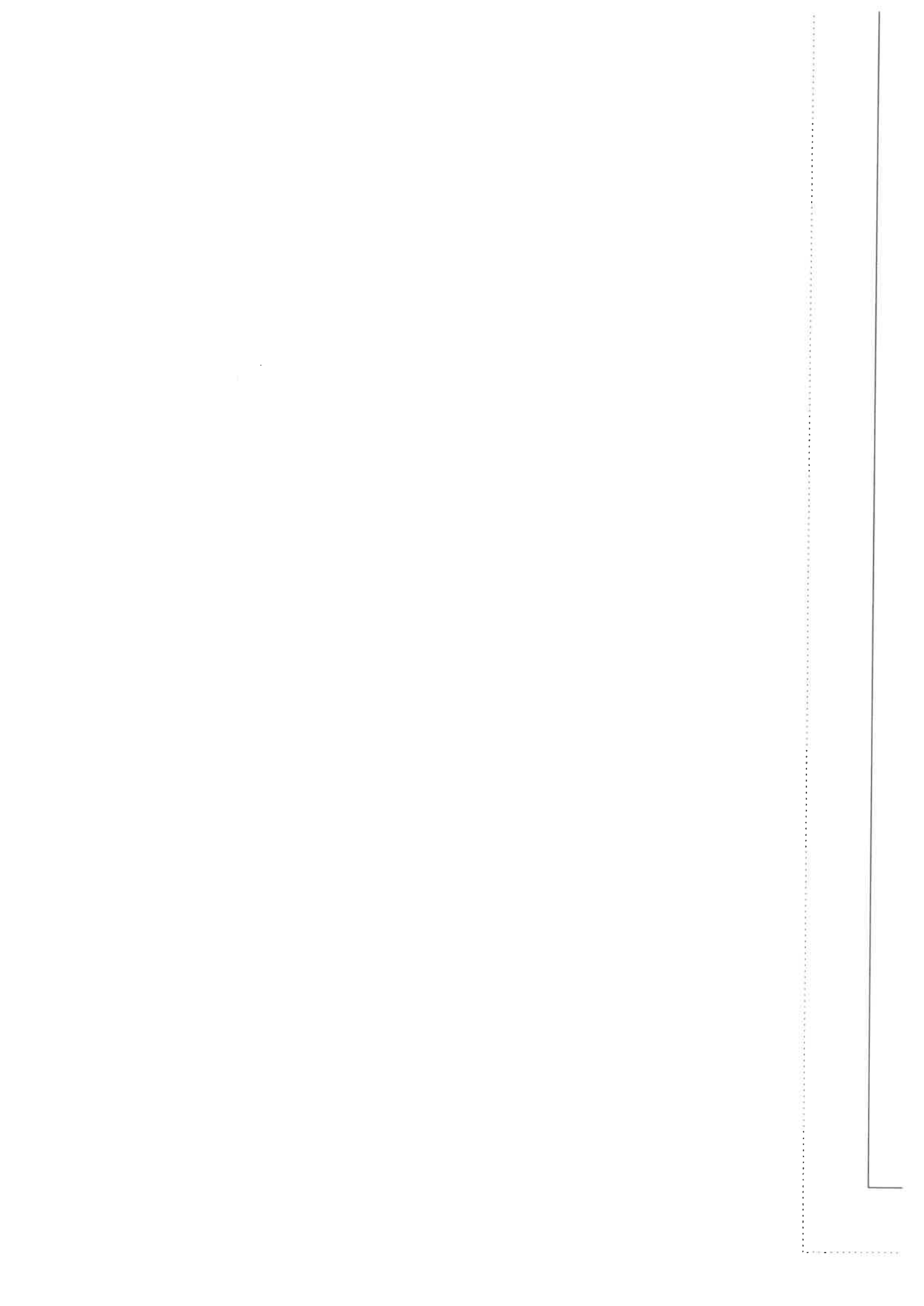


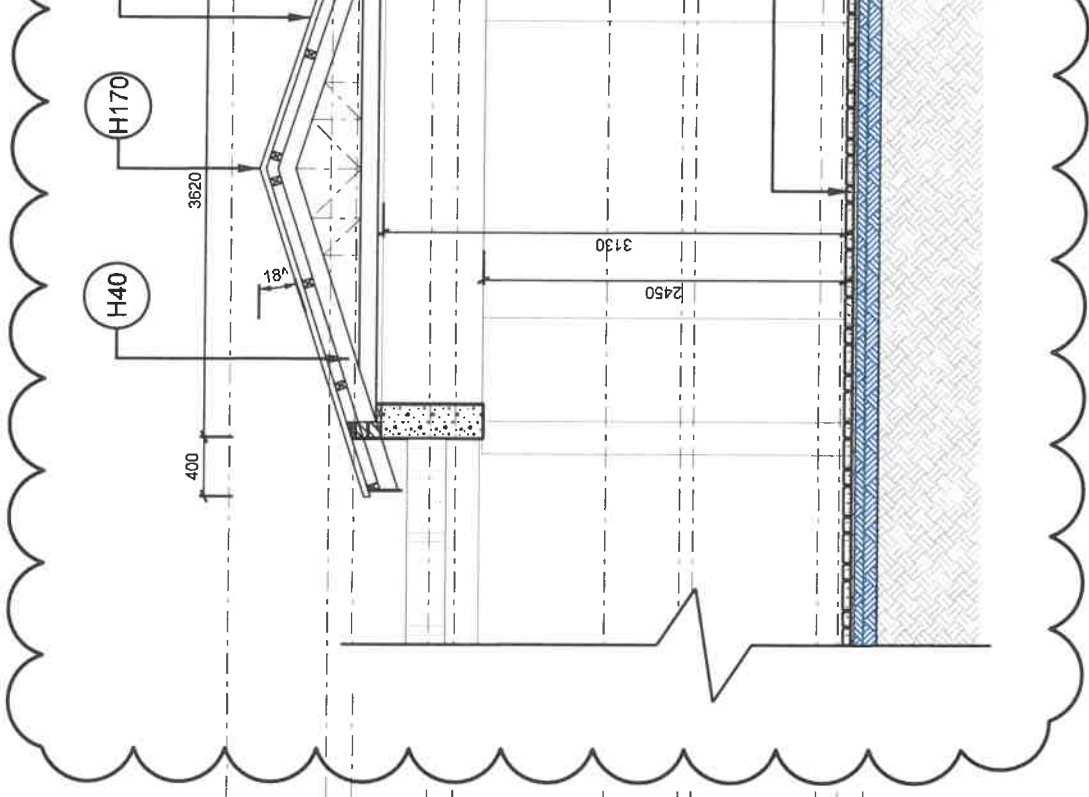








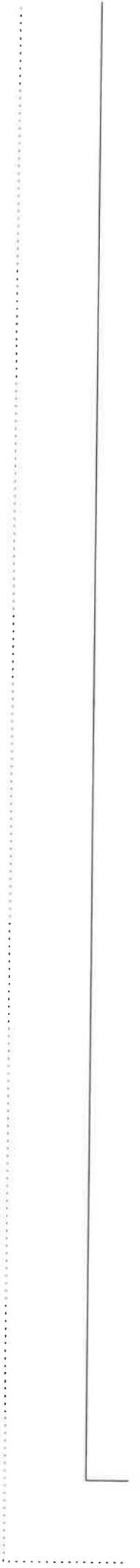


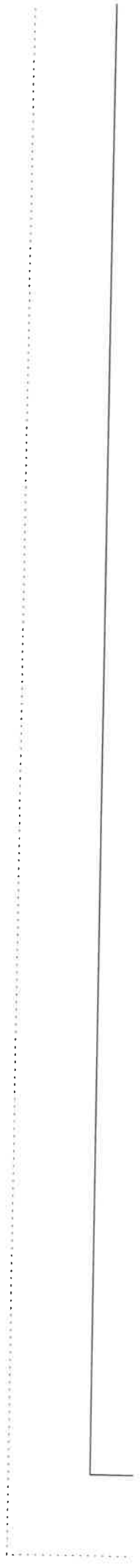


- 3.990
- 3.315
- Wall Plate 3.145
- 2.635
- 2.465
- 1.445
- Window Cill 935
- 850
- UFFL 0 | - 0
- 140
- 310

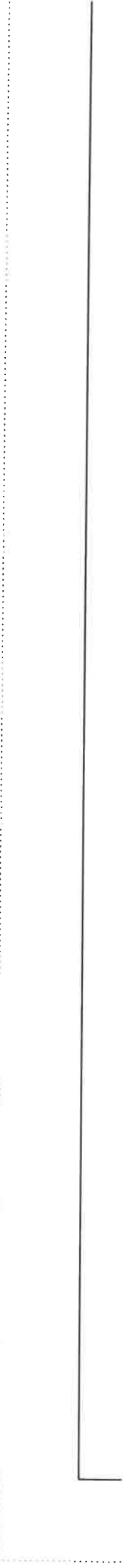
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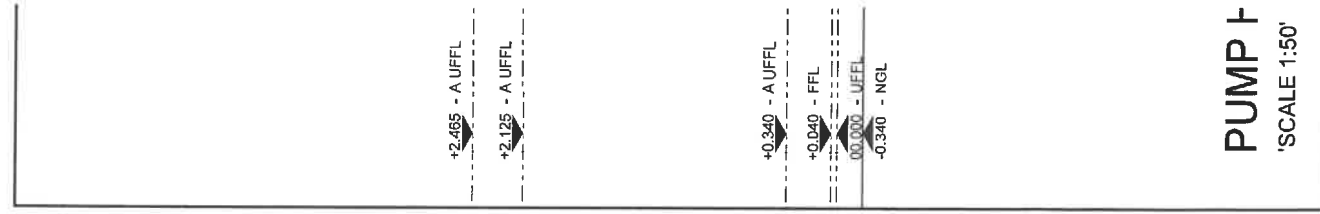
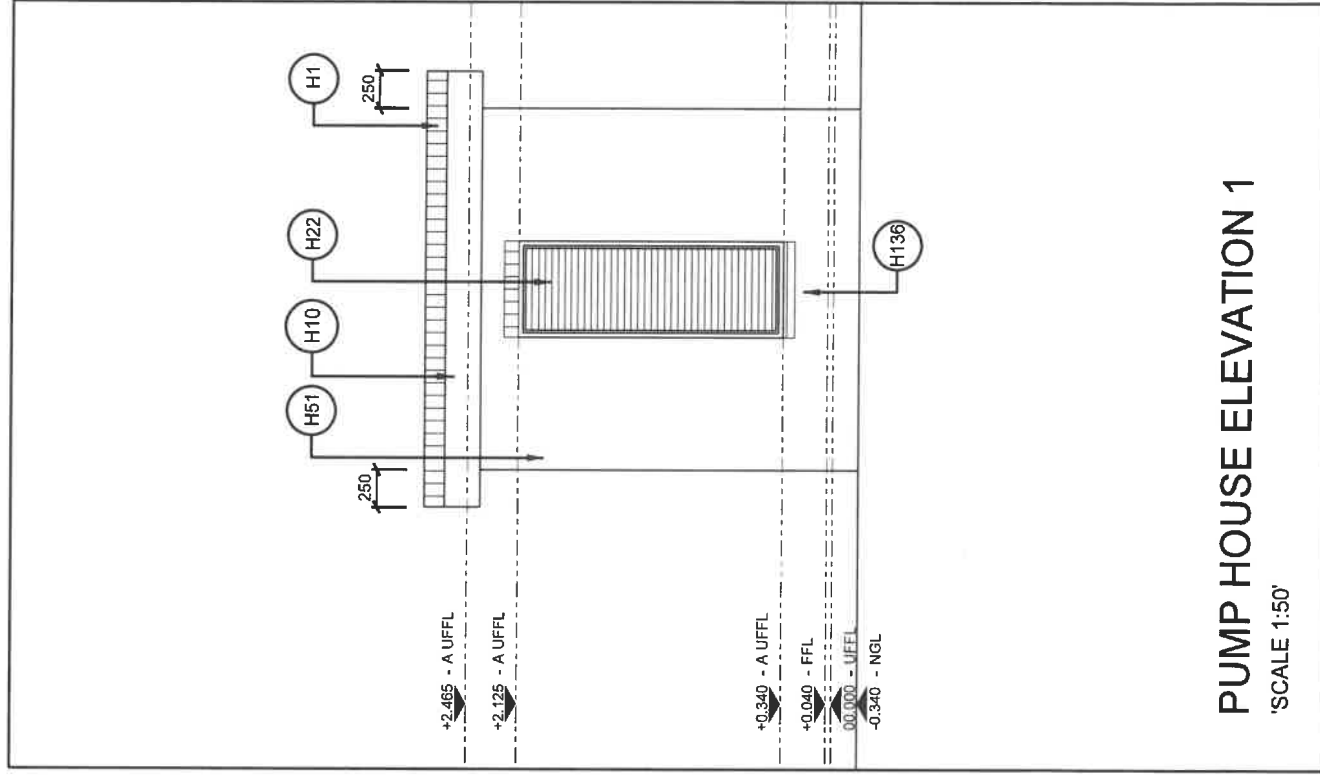
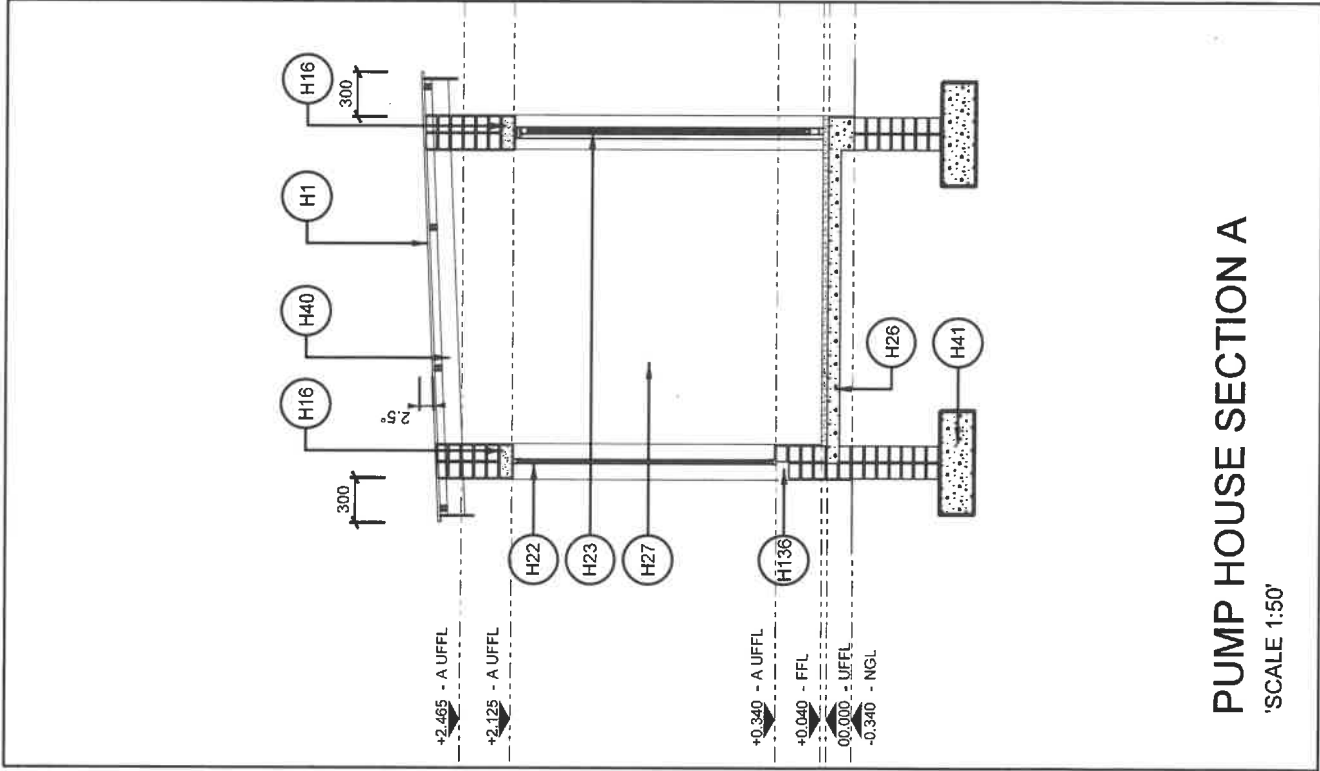


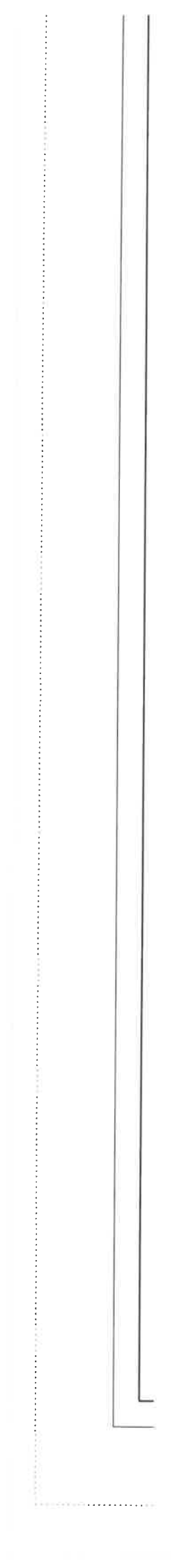


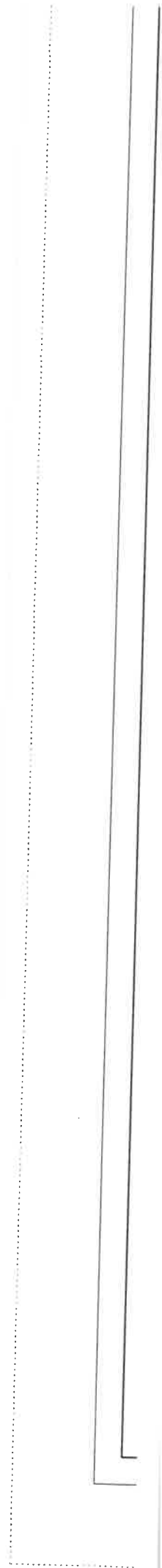


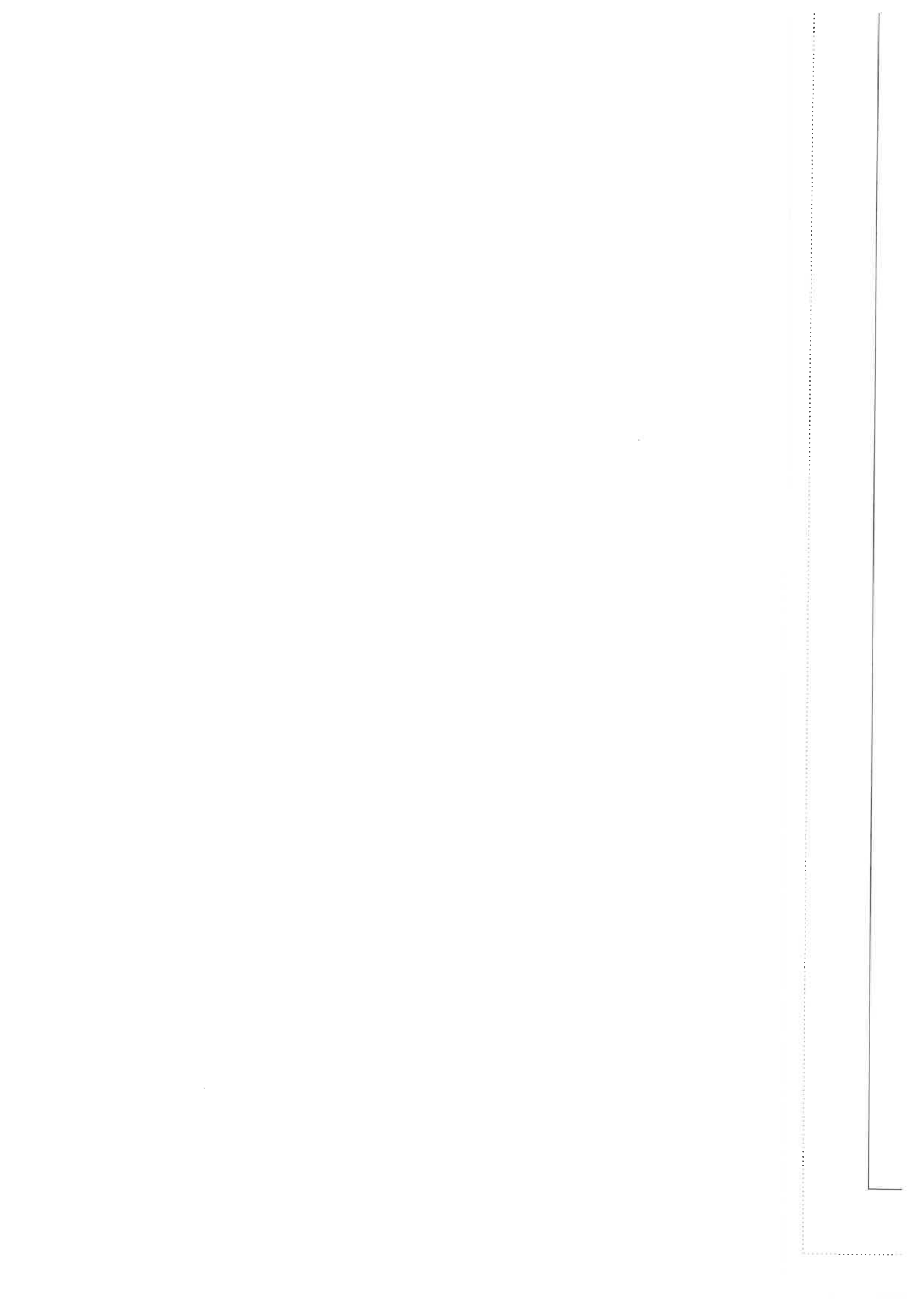












Other che

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