DESIGN REPORT Services Integration

MAJOR ALTERATIONS & ADDITIONS TO THE STEVENSON LIBRARY SSD 8922
Prepared for: THE SCOTS COLLEGE
29-53 Victoria Rd, Bellevue Hill, NSW 2023

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DESIGN REPORT: Service Integration

1. Introduction

This chapter outlines the objectives and general requirements of Service Integration in relation to the proposed works on the Stevenson Library at The Scots College. As the proposed works consist of major renovations to an existing structure, service integration predominately includes the use of existing infrastructure, supplemented with new and upgraded services where required.

2. Consultants

The Scots College has engaged a list of consultants in order to ensure optimal service integration:

UMEA	-	Electrical Engineering
JCL	-	Hydraulic Engineering
ACV	-	Mechanical Engineering

3. Electrical + Communication Services

The existing electrical services infrastructure supplying the College consists of an Ausgrid kiosk substation located on College property line of Victoria Road. The high voltage supply to the kiosk is via underground cables using the specifically installed underground conduits along Victoria Road. The substation in turn supplies the College's low voltage main switchboard located adjacent to the kiosk. Underground sub-main cables are reticulated to the individual buildings within the College grounds.

UMEA has consulted with Ausgrid, the electrical network authority for Bellevue Hill, who have advised that the existing Ausgrid substation does not have the capacity to connect the proposed Library. The proposed Library building will require an electrical supply in the order 600 Amperes to adequately provide for the installed services which far exceeds the available capacity of the existing substation.

The College is to install an upgraded substation, positioned in the immediate vicinity of the existing substation. The existing high voltage circuit supplying the existing substation should be capable of supporting the additional load imposed by the new substation.

The existing submains will be redirected into the shoring cavity of the Library. Cables will be extended to reach the proposed new switch room on the first floor level via the junction box. This is achieved through a cable tray positioned in the shoring cavity. Slab penetrations shall allow electrical feed to the EDB from the shoring cavity below.

Additionally, the College has committed to a high level of environmental performance for the new Stevenson Library Building. The College is considering the incorporation of modern and efficient renewable energy technologies within the design of the building. Proposals are being investigated into the installation of integrated photovoltaic roof tiles and glass panels. Proposals will also be investigated for the installation of super capacitor banks, charged using energy generated from solar powered photovoltaic panels.

The communications services consist of telephone + information technology for the transmission of voice and data. The Stevenson Library Building will be provided with a main data room where incoming services will be terminated.

The main service will originate from the existing College infrastructure. Currently, the College uses a VOIP system, which shall be extended into the Stevenson Library. The Library communications cabling will be reticulated internally using dedicated risers and ducts specifically set aside for this purpose. It is envisaged that the necessary works required to bring the Library up to contemporary standards and expectations will originate from the existing internal services. Access Control + Intruder Detective Systems [ACID] will be located next to the service riser on each level from the ground floor to the fifth floor – Refer Fig 5. Current College ACID system infrastructure shall be extended into the Stevenson Library which includes CCTV as well as a swipe card network. The potential for facial recognition technology is also being explored.

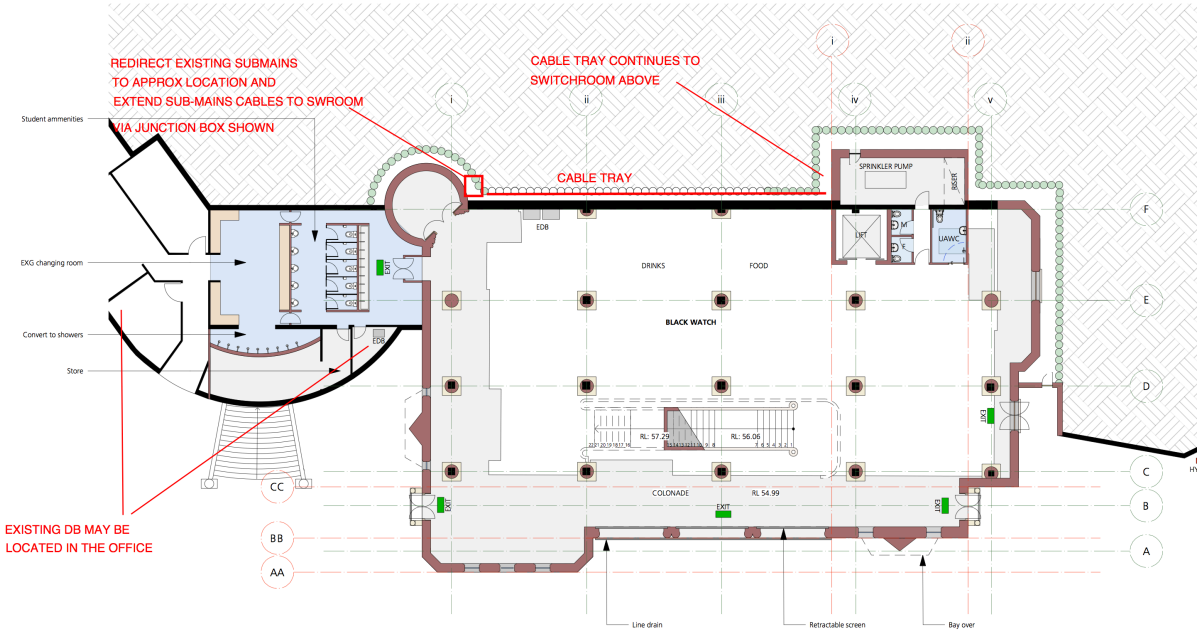

Fig 1: UMEA Elec Services Spatial Concept [Ground Floor] dated 12 Feb 2018

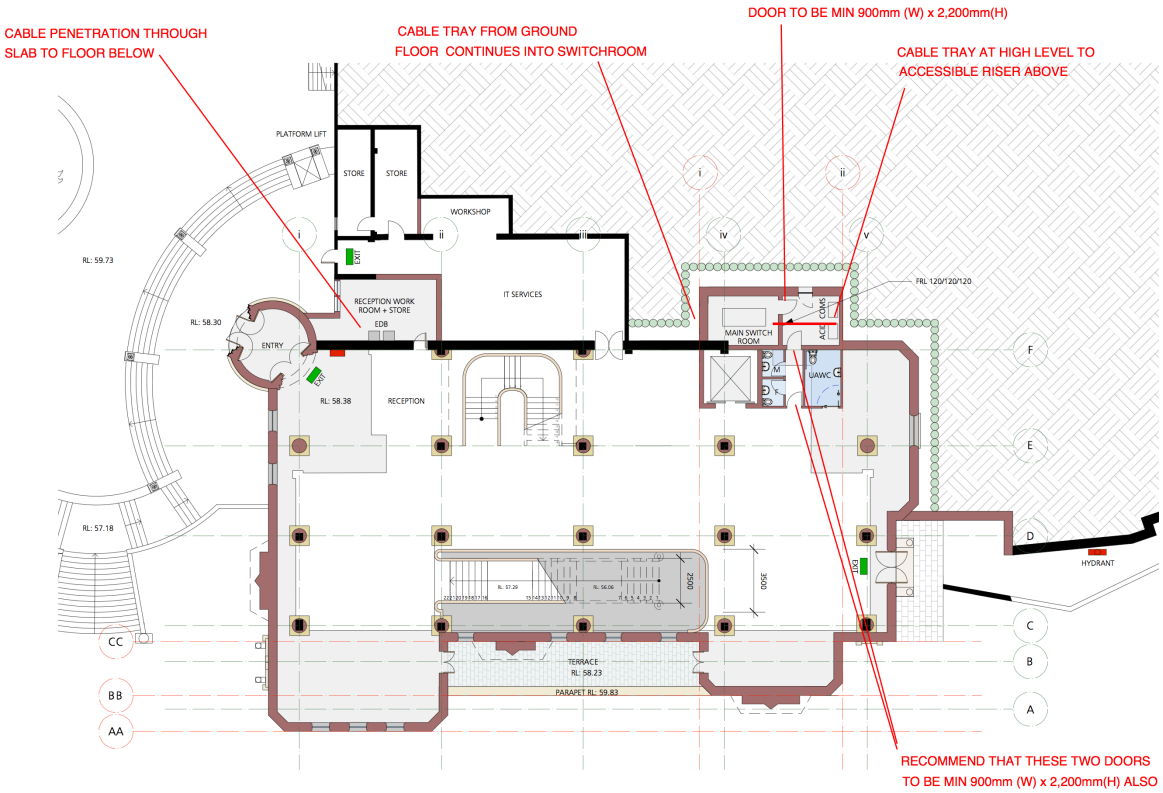

Fig 2: UMEA Elec Services Spatial Concept [First Floor] dated 12 Feb 2018

4. Hydraulic Services

4.1 STORMWATER MANAGEMENT PLAN:

The existing Library Building is provided with 6 x 200mm dia downpipes that collect storm runoff from the Library Roof catchment and part of Dining Hall roof catchment. The new Library roof catchment shall be design checked for developed storm runoff based on the compliant storm 1:100 year storm event, and connected to the existing site stormwater management system. Surcharge flows shall be collected into the existing OSD basin. As post development flows are equal to the existing Library building zone flows, there is no requirement for additional OSD capacity. Stormwater shall discharge to the East of the ovals via the existing stormwater discharge pit – refer Fig 3

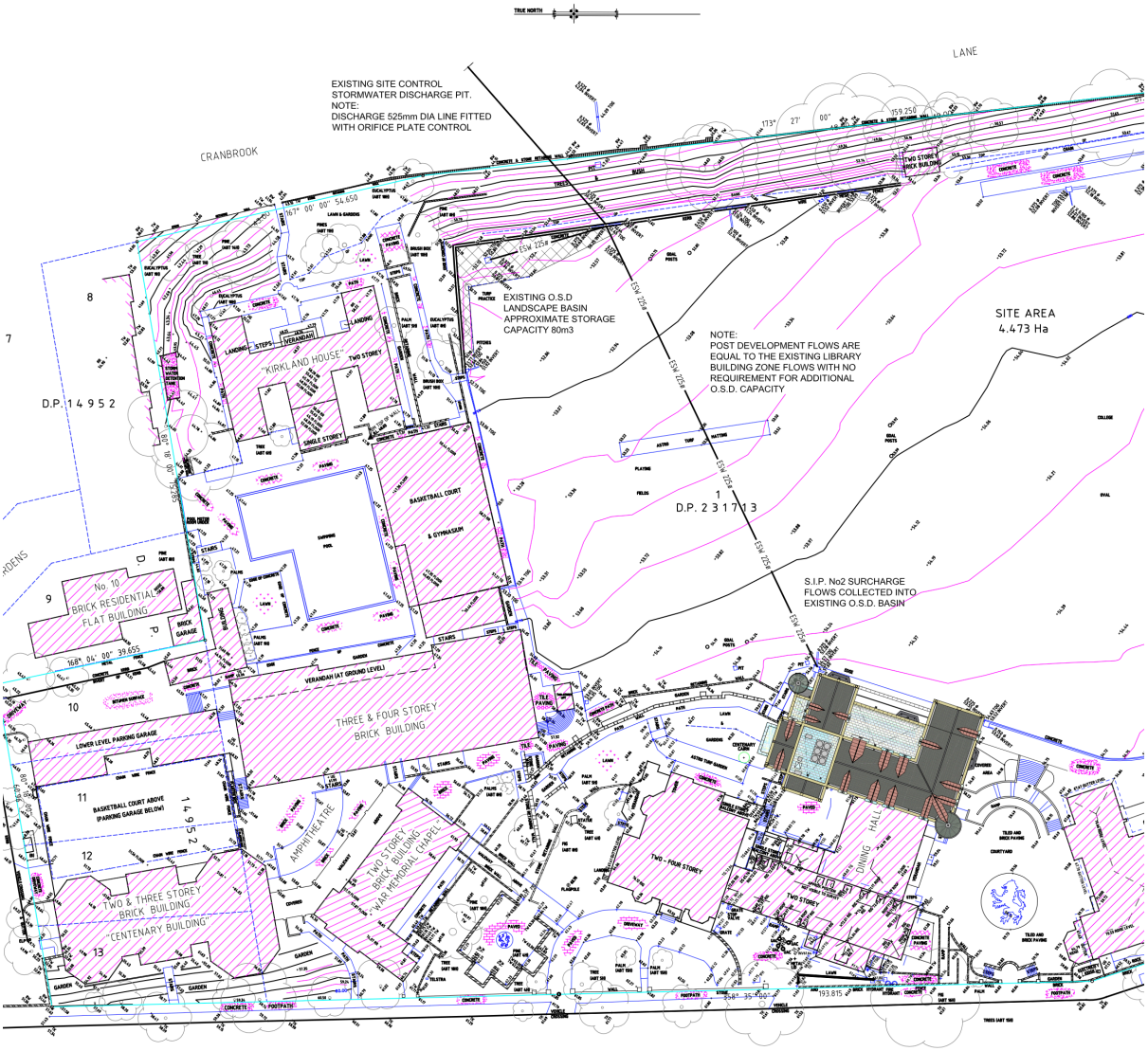

Fig 3: JCL Stormwater Discharge Diagram dated 14 March 2018

Currently, there is an existing SW line, nominally 225mm dia, installed in the shoring cavity at the Northern end of the existing Library. This SW line extends West, collecting storm runoff from Aspinal House / Annex zone. This existing SW drainage system is to be maintained during new building works and re-connected to the new drains that are interconnected to the existing Library SW drainage system – Refer Fig 4

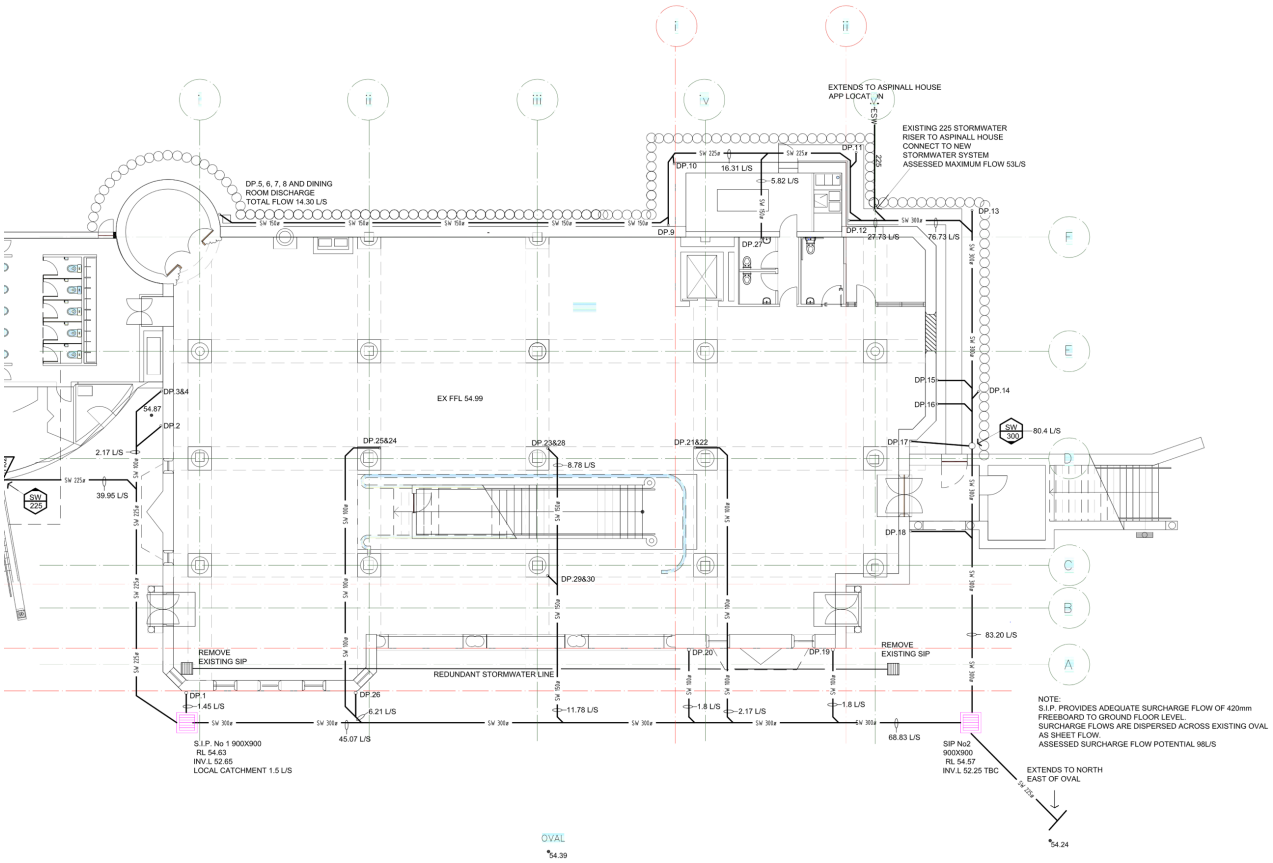

Fig 4: JCL Existing Aspinal House Stormwater System Diagram dated 14 March 2018

4.2 SANITARY PLUMBING / DRAINAGE:

Currently, the existing Library building amenities and Blackwatch Café are connected to the existing Northern site sewer system. Building fixtures located on the ground floor are connected to the system with in ground sanitary drainage and upper floors are connected with sanitary plumbing stacks.

The revised ground floor café layout and amenities will require modification of the existing in ground system to connect the new fixture layout and revised upper levels stack systems. The renovated change rooms are to connect to the existing middle school sewer system. The amenities within the Library building are to connect to the existing Northern sewer line via a new sewer line connection.

The existing cold water and fire hose reel supply is to be reused and reconfigured to within the shoring cavity. The existing hydrant line shall be re-routed into the shoring cavity. The hydrant riser will be fed by the existing hydrant valve along Victoria Rd, which shall be upgraded as necessary. A replacement service riser shall contain sanitary plumbing stack, cold water / fire hose reel + fire hydrant services – Refer Fig 5. The sprinkler pump room shall be located on the ground floor.

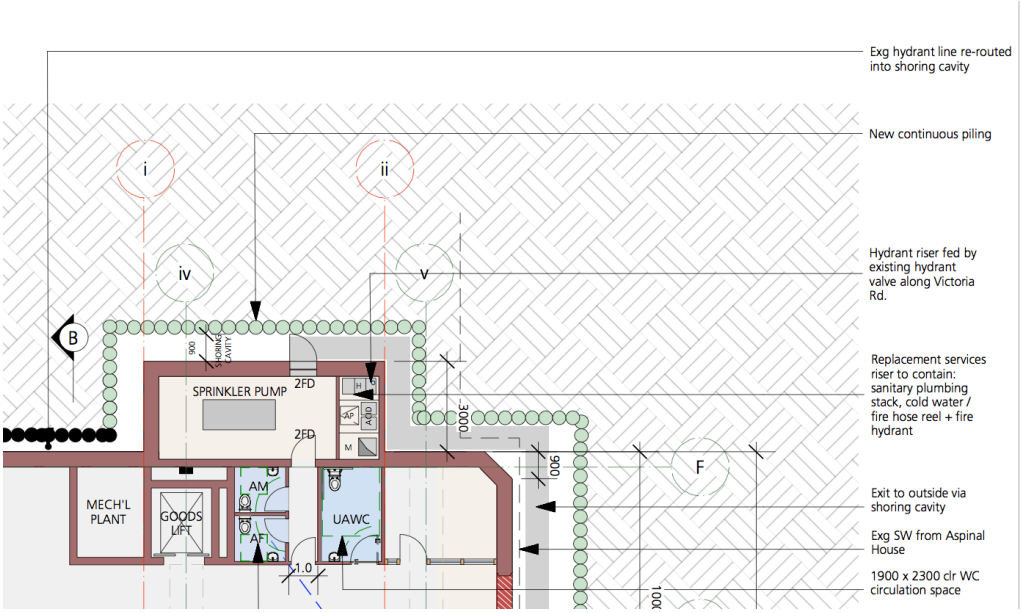

Fig 5: Hydraulic Riser System Diagram

The existing overland flow path from the courtyard catchment zone and part of Victoria Rd extends across the courtyard to the oval. This overland flow across the courtyard is to be maintained within new works and confirmed as adequate for controlling sheet surface flows preventing inundation of building areas. The final overland flow path shall be compliant with design standards for control of the 1:100 year storm event. Refer Fig 6.

Fig 6: JCL Overflow System Diagram dated 14 March 2018

5. Mechanical Services

The current mechanical ventilation system of the Stevenson Library consists of a series of highly inefficient power pack air conditioning units and split system air conditioning units. The new library will be provided with a high efficiency chilled water air conditioning system, integrated with the provision for natural ventilation and provide night venting. The incorporation of natural ventilation in to the project is to ensure acceptable internal conditions are provided with an environmentally friendly solution at reduced energy and running costs. The ventilation will be provided by openable external windows on the open East façade and on the Western side at high level above the main access stairs. This will provide cross ventilation through the building – Refer Fig 7

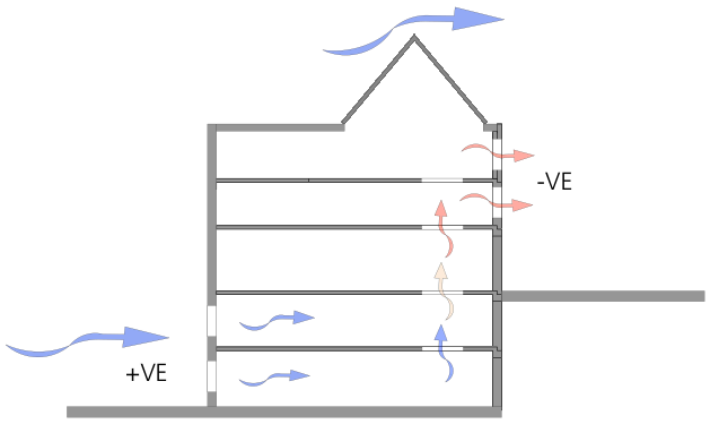

Fig 7: ACV Cross Ventilation Diagram

To ensure an efficient air conditioning system and to avoid inappropriate heating / cooling, the natural ventilation system will be interlocked via the Building Management System (BMS) to ensure the AC systems are turned off during periods of natural ventilation. The windows and doors will incorporate proximity switches which will, via the BMS, shut off the appropriate heating / cooling valves and stop the supply air fans from operating. In addition, control limits for room internal temperatures will be installed in the BMS to limit the natural ventilation should room temperatures become too hot or cold. As an additional safe guard to ensure satisfactory internal conditions are maintained for occupancy, carbon dioxide detection will be monitored via the BMS to over-ride the natural ventilation and utilize the mechanical air conditioning system – Refer Fig 8

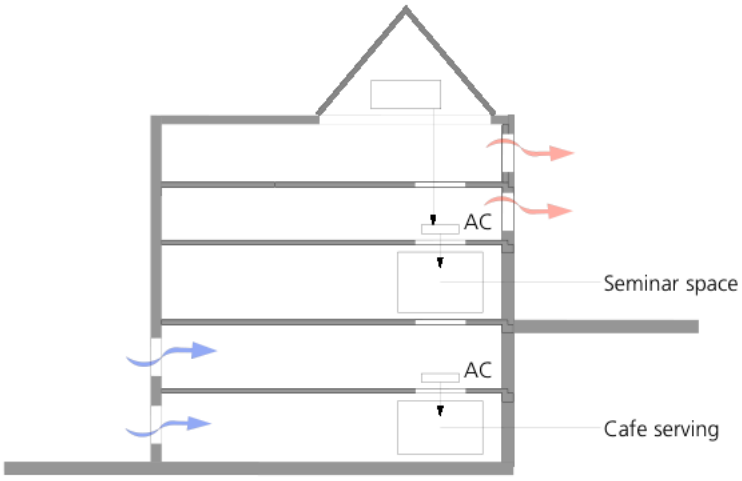

Fig 8: ACV Building Management System Diagram

It is recognized that there will be special seminar and teaching rooms that cannot be adequately served by natural ventilation and they will continue to be treated during occupied times with the mechanical air conditioning system. During periods of high or low external temperatures or during periods of unsuitable climate conditions the natural ventilation system will be closed and the main building air conditioning system will take over.

The mechanical plant room will be found on the ground floor – Refer Fig 5. The mechanical riser will be found on all levels adjacent to the other service risers. Mechanical plant, including the cold water chillers, shall be located on the roof – Refer Fig 9. Acoustic levels shall also be mitigated via a number of noise attenuation techniques. These include specifying mechanical plant with low acoustic output. Furthermore, such plant shall be enclosed within sound insulating material and positioned so that they are out of site / acoustic lines.

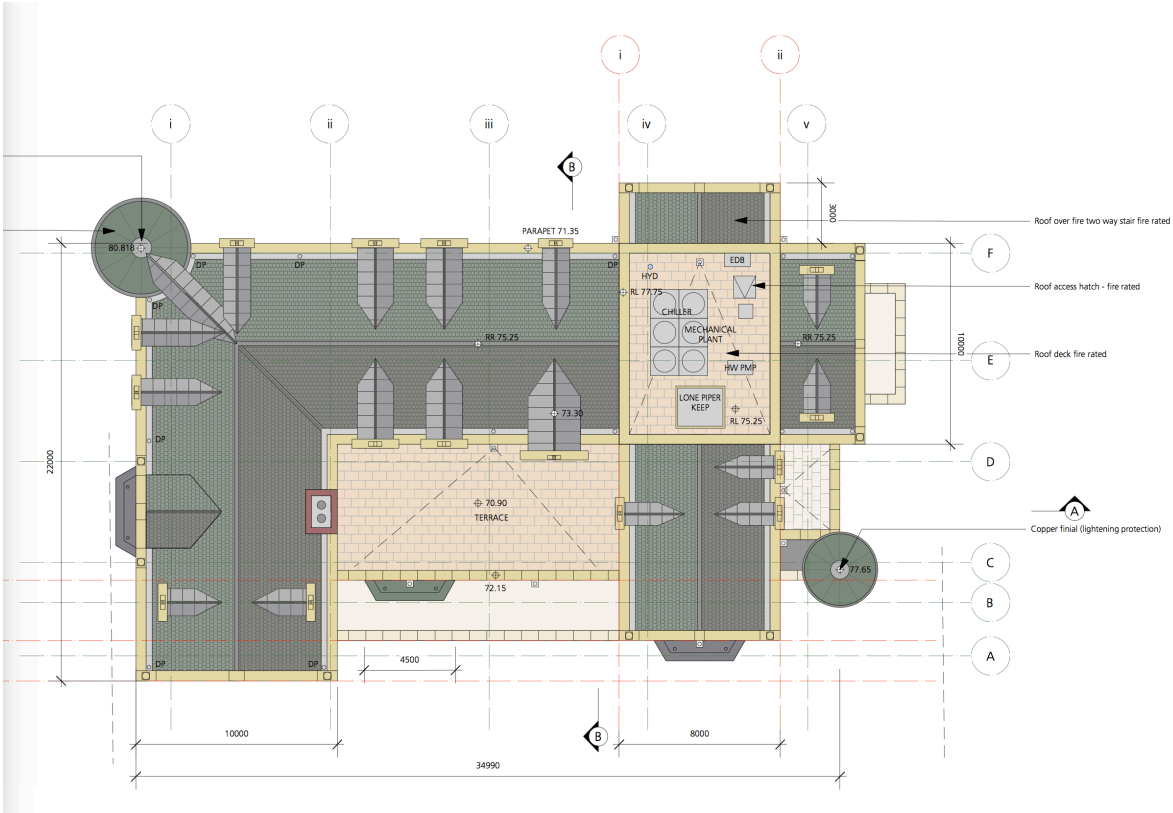

Fig 9: Mechanical Plant