

CIVIL AND STRUCTURAL ENGINEERING SERVICES

STAGE 3 REPORT

**AT
YSGOL GYMRAEG BRO MORGANNWG (YGBM),
COLCOT ROAD, BARRY,
CARDIFF**



INDEX

1.0	INTRODUCTION	1
2.0	EXISTING SITE	2
2.1	Ground Conditions	2
2.2	Site Inspection	2
3.0	PROPOSED STRUCTURES	6
3.1	New Build Extensions	6
3.2	Design and Load Criteria	8
3.3	Disproportional Collapse	9
3.4	Stability	10
3.5	Tolerance and Deflection	10
4.0	PROPOSED CIVIL AND STRUCTURAL WORKS.....	11
5.0	DRAINAGE AND FLOOD RISK	12
5.1	Existing Drainage	12
5.2	Proposed Surface Water Drainage	12
5.3	Proposed Foul Water Drainage	13
5.4	Flood Risk	14
6.0	DESIGN STANDARDS	17
7.0	CONTRACTOR/SUB-CONTRACTOR DESIGN (CDP).....	18

APPENDIX

- i) Stage 3 Civil Drawings***
- ii) Stage 3 Structural Drawings***
- iii) Civil and Structural Specifications***

Issue	Prepared by	Checked by	Date
First Issue	ZA	DB	18 th January 2019

1.0 INTRODUCTION

Shear Design Limited (SDL) have been appointed by ISG Plc to undertake a Civil and Structural Engineering Services at Ysgol Gymraeg Bro Morgannwg (YGBM), Colcot Road, Barry. The main client for the scheme is the Vale of Glamorgan (VoG).

This document provides an outline of the Civil and Structural Engineering at RIBA Stage 3.

The project concerns the redevelopment of the existing 1960's CLASP system buildings. As per plans provided by the Vale of Glamorgan, it has been determined that the school has undergone various changes throughout its lifetime. Taken over in 2000, 8 phases have elapsed, resulting in the final extension to dining in 2005.

The proposed redevelopment comprises of the new build extensions and refurbishments as follows:

- New Sports Hall
- New IT and Business Studies Block Extension
- Demolition of the existing changing block adjacent to the existing Sports Hall and replacement with a New Circulation Core Extension
- New Entrance Extension and Plantroom
- New Design and Technology Block Extension
- A new link bridge to the south west of the site connecting the existing 2003 development with the new ITB extension
- Further refurbishments including the removal of several blockwork walls throughout the existing structure and a new mezzanine floor within the atrium of the 2003 extension

It should be noted that the information in this report is subjected to refinement and further co-ordination between the client and the design consultant team during the subsequent design stages. A suitable cost contingency allowance should be made to allow for on-going design development and co-ordination, which is subjected to further detailed intrusive investigation of the existing buildings.

2.0 EXISTING SITE

2.1 Ground Conditions

The Geotechnical and Geoenvironmental Interpretative Report (GIR) for the site has been provided by AECOM.

We have extracted the following comments from the Geotechnical Interpretative Report:

“The results of the ground investigation broadly confirm the anticipated ground conditions from the published mapping. The ground model comprises Made Ground overlying Residual Soil grading into Weathered Porthkerry Member (Blue Lias Formation) over Unweathered Porthkerry Member (Blue Lias Formation).”

“It is considered that lightly loaded structures as currently proposed will be adequately supported on shallow foundations if founded in the Residual Soil (or weathered bedrock where encountered at shallow depth). The Made Ground is not considered a suitable founding material due to its high variability and would need to be replaced with adequate engineered fill if encountered at the proposed founding level.”

“Residual Soils was encountered throughout the site at depth between 0.30m and 0.60m. Residual Soils were typically encountered as stiff to very stiff clay with undrained shear strength of approximately 85kN/m². If founded in stiff to very stiff Residual Soil an allowable bearing capacity adopting shallow foundations of 150kPa is likely to be achievable with associated settlements limited to 25mm. This should be assessed in detail taking into consideration final foundation geometry and settlement criteria of the structure.”

“Due to the presence of variable and locally compressible Made Ground and the associated low bearing capacity and high settlement potential, suspended floor slabs if placed at ground surface are recommended. Suspended ground floor slabs are considered appropriate for the proposed building if slabs are placed within the Residual Soils given the medium to high volume change potential of the soils and potential influence of vegetation that may be removed during construction or remain and give rise to the potential for both short and long term seasonal ground movements respectively.”

2.2 Site Inspection

An initial site walkover has been undertaken on the 22nd August 2018. This is followed by a visual and limited measured survey on the 30th October 2018. The extent of the survey was limited to section exposed only. The measurements in the areas surveyed are assumed to be representative of the building as a whole. No detailed and intrusive survey of the structure was undertaken at that time.

Ysgol Gymraeg Bro Morgannwg School (YGBM) is was originally constructed in the 1960s and has been expanded with a number of later extensions in the 1990s and 2000s. The original building is primarily a single storey area for the maths and learning services framed structure, with a two-storey

area for the maths and learning services department. As shown in Figure 1 and Figure 2, the original building consists of a steel framed structure with steel trusses supporting metal decking at roof level and timber decking at first floor. The observed form of structure utilised for the building is classified as a prefabricated frame system, such as SCOLA (Second Consortium of Local Authorities) or CLASP (Consortium of Local Authorities Special Programme).



Figure 1. Roof Trusses Within Existing Building

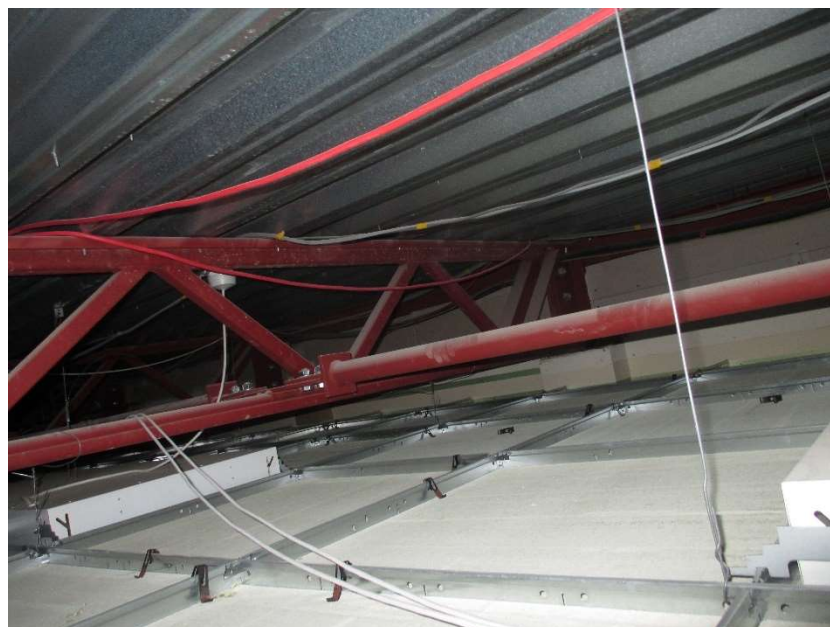


Figure 2. Steel Trusses Supporting Metal Deck



Figure 3. Typical External Façade of Existing Structure

The extension structures in the later phase are braced steel frame structures with precast concrete floors as shown in Figure 4 and Figure 5. The foundation of the extensions are on shallow pad and strip footings. The existing elevations comprise of a combination of non-load bearing masonry walls and curtain walling, which are fixed back to the steel frame. The internal partitions are typically constructed with blockwork and lightweight studwork.



Figure 4. Precast Concrete Floors



Existing IT &
Business
Studies Block

Figure 5. Existing Building

The lateral stability of the building is formed by diaphragm action from the precast floors and metal decking, which transfers the horizontal forces to the vertical masonry shear walls or vertical bracing encapsulated within the partition walls. No vertical braced bays were observed during the visual inspections of the building.

Once the works have been commenced, it is suggested that a further detailed structural surveys are to be completed and followed by a full intrusive structural investigation. Previously, works have been done in the existing building to control asbestos, however, an appropriate measure must be in place as the existing buildings are classified as CLASP/SCOLA building.

3.0 PROPOSED STRUCTURES

3.1 New Build Extensions

3.1.1 New Sports Hall

The proposed sports hall is located to the south west of the site and adjacent to the new IT Business Studies (ITB) extension. With reference to the Geotechnical and Geoenvironmental Interpretative report produced by AECOM, it is suggested that the steel superstructure will be supported on pad foundations with the maximum allowable bearing pressure of 100 kN/m². The proposed ground floor slab construction is 275mm thick cast insitu reinforced concrete slab spanning between strip foundations positions. The new sports halls and IT Business block extensions will have independent superstructure steelwork with combined spread pad foundations where the building adjoin.

The sports hall will have a 5 degree duo-pitch roof with parapets. It will be formed by primary steel rafters cranked at the apex. Due to the crank at the apex, the resultant horizontal thrust will be resisted by a tie bar at eaves level. Cold rolled Z-section purlins butt system and a lightweight roof deck are to be supported by the steel rafters. The overall lateral stability is upon the diagonal bracing in both directions at each corner of the building and plan bracing in the roof, which transfer the horizontal forces to the braced bays.

The proposed superstructure solution at this stage is annotated on the preliminary drawings within Appendix i – drawings numbers 18136-SDL-00-00-DR-S-00001 to 18136-SDL-00-XX-DR-S-00017.

3.1.2 New IT and Business Studies (ITB) Block Extension

The proposed new IT and Business (ITB) Studies block, which is an extensions to the previous Phase 6 extension in 2004 is located to the South West of the site. The three storey steelwork superstructure building will be supported on pad foundations with the maximum allowable bearing pressure of 100 kN/m², as suggested in the Geotechnical and Geoenvironmental Interpretative report. The base slab is to be suspended slab and to be built with beam and blocks construction.

The upper ground floor and first floor will be formed using composite metal deck Comflor 60 with 140mm thick reinforced concrete slab to span between the primary steelwork. A lightweight 15 degree duo-pitch roof will be supported on structural steelwork beams with cold rolled butt system Z-section purlins.

The overall lateral stability of the building that is supported by braced bays in both directions will be transferred to the pad foundations. Plan bracing in the roof will be required to transfer the horizontal forces to the braced bays. The composite floor slabs at the upper ground floor and first floor will provide diaphragm actions to transfer the horizontal forces. Note that the new building extension will be isolated from the existing ITB building to prevent surcharging or differential settlement issues.

The proposed superstructure solution at this stage is annotated on the preliminary drawings within Appendix i – drawings numbers 18136-SDL-00-00-DR-S-00005 to 18136-SDL-00-XX-DR-S-00017

3.1.3 New Circulation Core Extension

The proposed new circulation core extension is to be built on the existing site of changing block adjacent to the existing Sports Hall, which will be demolished. The superstructure consist of a steel frame with composite metal deck comflor 60 (140mm thick RC slab) to span between the primary steelwork, and to be supported on strip and pad foundations. Note that the new circulation core extension will be isolated to the existing buildings to prevent surcharging or differential settlement issues.

The proposed superstructure solution at this stage is annotated on the preliminary drawings within Appendix i – drawings numbers 18136-SDL-00-00-DR-S-00060 to 18136-SDL-00-XX-DR-S-00078

3.1.4 New Entrance Extension and Plantroom

The new proposed new entrance extension and plantroom is located to the South East of the site, replacing the existing Phase 4 extension in 2002. A single storey steelwork superstructure will be supported on pad foundations with the maximum allowable bearing pressure of 100 kN/m², as suggested in the Geotechnical and Geoenvironmental Interpretative report. The ground floor slab is to be suspended floor slab and to be built with beam and blocks construction.

A lightweight roof will be supported on cold rolled Z-section purlins and structural steel beams. The roof for the new entrance extension will be duo-pitch with 15 degree falls. The adjacent plantroom will have a flat roof with nominal fall to avoid ponding.

A lateral stability of the building is upon the braced bays in both directions, which will be transferred to the foundations. Plan bracing in the roof will transfer the horizontal forces to the braced bays.

The proposed superstructure solution at this stage is annotated on the preliminary drawings within Appendix i – drawings numbers 18136-SDL-00-GF-DR-S-00020 to 18136-SDL-00-XX-DR-S-00036

3.1.5 New Design and Technology Block Extension

The proposed new Design and Technology (D & T) extension block is located to the North East of the current site location. A single storey steelwork superstructure will be supported on pad foundations with the maximum allowable bearing pressure of 100 kN/m², as suggested in the Geotechnical and Geoenvironmental Interpretative report by AECOM. The base slab is to be suspended and to be built with beam and block construction.

A lightweight roof will be supported on cold rolled Z-section purlins and structural steel beams. The roof for the new D & T extension will be duo-pitch with 5 degree falls and parapet around the perimeter.

A lateral stability of the building is upon the braced bays in both directions, which will be transferred to the foundations. Plan bracing in the roof will transfer the horizontal forces to the braced bays. In order to avoid transfer loading to the existing foundations, the final row of columns are to be offset and the roof beams will be cantilevered towards the existing building.

The proposed superstructure solution at this stage is annotated on the preliminary drawings within Appendix i – drawings numbers 18136-SDL-00-GF-DR-S-00040 to 18136-SDL-00-XX-DR-S-00054

3.2 Design and Load Criteria

The structure elements to be designed in accordance with all relevant British Standards or Eurocodes and 3.4.2 Building Regulation Approved Documents.

3.2.1 Considered Loadings at Stage 3

3.2.1.1 Dead Loadings

The permanent loadings have been taken into account for the Stage 3 structural design elements are summarised in Table 1 below:

Description	Load
Suspended ceiling	0.20 kN/m ²
Mechanical and Electrical Services	0.30 kN/m ²
Insulated Roof Decking	0.25 kN/m ²
Z-section Roof Purlins	0.05 kN/m ²
Floor Coverings and Finishes	0.10 kN/m ²
Comflor 60 with 140mm slab	2.71 kN/m ²
75mm Screed	1.50 kN/m ²
Steelwork	As required

Table 1. Dead Loads Summary

3.2.1.2 Imposed Loadings

Table 2 shows summarises the imposed design loads which are pertinent to the design of Ysgol Gymraeg Bro Morgannwg scheme:

Description	Load
Classrooms	3.00 kN/m ²
Corridors/circulation areas	4.00 kN/m ²
Offices	4.00 kN/m ²
Hall/Sports Hall	5.00 kN/m ²
Plant Rooms	7.50 kN/m ²
Stairs	3.00 kN/m ²

Toilets	2.00 kN/m ²
Partitions – Lightweight	1.00 kN/m ²
Roof without general access	0.60 kN/m ²
Roof with access	1.50 kN/m ²
Roof – Snow Drift	In accordance with BS 6399 or Eurocode 1

Table 2. Live Loads Summary

3.2.1.3 Wind Load

The following parameters have been used for proposed/current wind loadings:

- Postcode: CF62 8YU
- Terrain: City Location
- Site ID: ST 106690

3.2.2 Design Working Life

3.2.2.1 New Build Elements

A minimum Design Working Life of 60 years is required for all structural elements. In accordance with Eurocode 0, the buildings are to be designed as Design Working Life Category 4. The Consequence Class for the structural design is CC2. Life to first maintenance shall be 25 years.

3.2.2.2 Existing Building

It is understood that the existing buildings require 25 years of design working life. Based on our inspections, it is estimated that the design working life to be circa 10 years. However, a routine inspections are recommend to be carried out on 5 years cycles.

3.3 Disproportional Collapse

The new build extensions are classified as the following:

- Class 2A for a single storey, and
- Class 2B – ‘High Consequence’ (*Educational Building greater than 1 storey but not exceeding 15 storeys*)

All columns are to be tied horizontally in two directions at floor and roof levels. Additional reinforcement are to be included in the floor slab design to ensure all floor are tied into the main superstructure.

3.4 Stability

In order for total stability to be achieved, all lateral-vertical forces need to be transferred to the foundations at the ground level. Lateral forces in the forms of wind and notional horizontal forces (no greater than 2.5% of the vertical loading) are distributed across the floor plates through the inherent diaphragm action provided by the reinforced concrete floor at each level.

The lateral forces will be transferred to various wall positions at braced bays in both directions. The transfer structure will be designed to withstand lateral forces through the provision of braced bays in wall positions, where openings are not provided and additional rotationally fixed (portalised) beam to column connections. Preliminary positions have been indicated on the intent drawings within the appendix of this report. Final locations are to be agreed with the design team.

3.5 Tolerance and Deflection

Deflections under imposed loading will be limited in accordance with general requirements of the relevance Eurocodes. Span/depth ratios which limit the allowable deflections are summarised as follows:

Deflection of structural RC slab and RC beam elements:

Description	Limit
Total deflection	Span/250
Post construction deflection limit (due to finishes, partitions and live loads)	Span/500 or 20mm

Table 3. Concrete Elements Deflection Summary

Deflection of structural steelwork elements:

Description	Limit
Total deflection	Span/250
Post construction deflection limit (due to finishes, partitions and live loads)	Span/360 or 20mm
Edge beams supporting cladding will be designed to a post construction deflection limit (due to finishes, partitions and live loads)	Span/750 or 15mm

Table 4. Steelwork Elements Deflection Summary

4.0 PROPOSED CIVIL AND STRUCTURAL WORKS

Refer to Appendix i for Stage 3 drawings for the proposed civil and structural drawings. These include the following:

- Proposed drainage and flood risk
- Proposed foundation details
- Proposed structural steelwork drawings

5.0 DRAINAGE AND FLOOD RISK

5.1 Existing Drainage

Surface Water

A complete survey of the existing school drainage is still underway at the time of this report however we have completed a review of the available school information as well as existing surface water drains.

The site drains to surface water outfall/s in the south west corner of the site.

Records indicate a 300mm surface water sewer that appears to serve the Barry Boys comprehensive school to the north of the site. The 300mm drain runs under the existing school and across the playing pitches before leaving the site in the south east.

There also appears to be a 150mm surface water sewer, installed to drain the car park and access road drainage at the east of the site. This drain passes via an attenuation system and along the southern boundary of the site, before again leaving the site in the south west corner of the site.

Within the site there are already pitch drainage and attenuation tank arrangements, we have record drawings of these system and surveys are underway to confirm the network for detailed design purposes.

Soakaway potential is also being further investigated during Stage 3/4

Foul water

The school foul drainage is a gravity system to a pumping station located on the boundary of the primary school and the secondary school. This pumping station lifts foul sewage beyond the site boundary however the precise route or outfall point is not known with certainty.

5.2 Proposed Surface Water Drainage

Refer to drawings Appendix ii for preliminary drainage proposals.

Detailed design is subject to additional, ongoing CCTV, Soakaway testing and landscape proposals however design principles are established.

This project is being delivered under new January 2019 Sustainable urban drainage Approval Body (SAB) regulations as dictated by Schedule 3 of the Flood and Water Management Act 2010.

It is proposed to ensure that all surface water run-off from previously undeveloped area is limited to green field run off rates. Proposed areas of hardstanding that were previously also hardstanding

will be considered brownfield run off and where possible 30% betterment over existing flows will be implemented.

The reuse the existing drainage network will be required in some areas.

It is also proposed to divert the exiting 300mm diameter surface water that runs from north to south around the proposed sports hall to avoid building over this asset.

Drainage Catchments

New Bus drop up and pick up loop – This requires drainage and appropriate pollution control. A bypass interceptor is proposed with a connection into a sub-surface attenuation tank before connection to a new SuDS conveyance and storage swale system at a controlled rate.

The 3G Rugby Pitch is to be designed in accordance with source control principles, and will contain a sub-surface drainage and storage system with flow control prior to discharge into to a new SuDS conveyance and storage swale system at green field rates.

Soakaway testing is underway in the area of the 3G pitch and if favourable a soak away solution will be developed in preference to a controlled discharge.

Drainage from new buildings and associated external areas (With the exception of the DT unit) will drain into a new SuDS compliant swale and ditch system. Flow rates will be limited to ensure at least 30% betterment on existing flows as this area is substantially area that were previously positively drainage hard standing.

The new DT unit is difficult to incorporate into the SuDS system and so a new attenuation tank is proposed under the adjacent external dining area. Flow from the new unit and the external dining area will be limited to ensure 30% betterment on existing flows.

The MUGA areas are proposed as macadam surfaced areas which will be positively drained by gullies and drainage channels. The drainage will outfall into the swale/pond system at an uncontrolled rate for storage within the surface water swale features.

New external car park enhancement south of the access loop. This gravel area is proposed to be surfaced by macadam and drained by gravity into the existing drain that runs along the southern boundary at green field rate or as close to it as possible.

There is an existing attenuation tank in this area (according to the historic drawings we have been provided.) This area is also envisaged as the site compound area and so a precise location of this tank will need to be ascertained.

5.3 Proposed Foul Water Drainage

It is proposed to utilise parts of the existing foul drawing within the site (subject to repairs) to convey the new foul water drainage from the development.

New foul drainage runs are proposed to serve the new blocks and a foul drain run will run from the proposed sports hall to the location of the foul pumping station.

Both the secondary school and the newer primary school are served by foul pumping stations. The primary school pumping station has been inspected and appears to be serviceable, the rising main from this pumping station discharges across the primary school play area and car park and into the pumping station

The existing secondary school currently has 1,133 pupils enrolled with a permitted capacity of 1,361 pupils and it is proposed to enrol 1,660 pupils, of which 250 are sixth form.

The existing staff numbers are a total of 91.

At a rate of 90 litres per person per day his increase in numbers represents a foul flow increase of circa 1.9l/s peak flow from 9.07 to 10.03l/s and an increase in volume from 130m³ to 160m³ per day.

In addition to this there is the existing base flow from the primary school which at circa 200 pupils represents a total proposed peak into the pumping station of 12.2 l/s and a volume of 175m³ per day.

The exact size of the existing secondary school pumping station is now know but based on Aecom records a wet well volume of about 17.5m³ can be considered unsatisfactory.

Based on existing school pupil and staff numbers of about 1300 this would convert to about 120m³ of waste and which is about 3.5 hours storage, and on proposed numbers only 2.5 hours storage before the system overflows.

It is proposed to build a new pumping station on site, likely adjacent to the existing pumping station. This new pumping station would be fitted with new pumps and a new rising main would be installed to connect to a suitable DCWW asset.

The existing pumping station pumps and wet well will remain in situ and be used as additional storage. The 17.5m³ provided along with 25m³ new storage in the proposed pumping station will provide 6 hours of storage in the event of a pump or power failure.

A new route been proposed to connect to a sewer in Colcot Road into the sewer in the current school access road, the formal consent of this is being sought from Welsh Water.

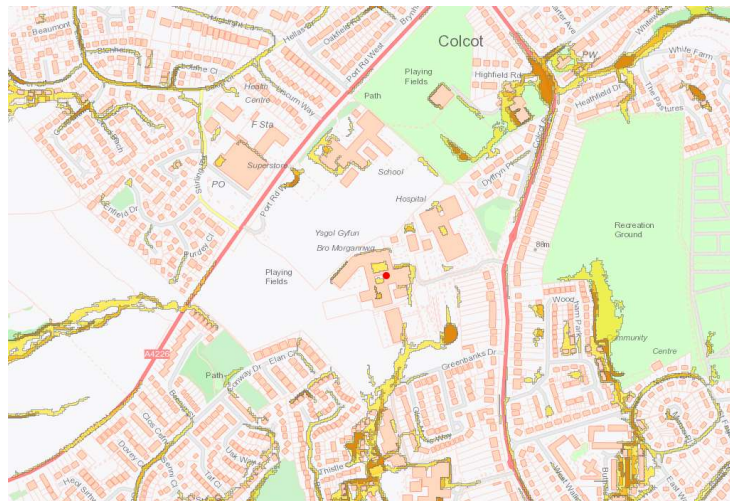
The existing school is serve by a foul drainage network that is in defective condition in some locations and ground water ingress to the foul pipes is likely. This surface water flow will compromise the available storage in the pumping station and so a schedule of remedial works to the existing drains will be developed to improve the existing system.

5.4 Flood Risk

As reported in the Aecom Stage 2 report the Development Advice Map (DAM) presented on the Natural Resources Wales (NRW) website, shows that the entire site is located in DAM Zone A, with the exception of a small area on the southern site boundary which is located within DAM Zone B.

Areas located in DAM Zone A are classified as being at little or no risk of fluvial or coastal/ tidal flooding. Areas located within DAM Zone B are classified as areas known to have been flooded in the past evidenced by sedimentary deposits. As the risk of flooding from rivers or seas is classified as low, the principal consideration of the FCA is surface water management and cross reference with the Natural Resources Wales (NRW) flood mapping identifies this area as overland surface water flow.

Surface water drainage proposals are identified above.



Flood risk from other sources has also been considered in the stage 2 report and work completed during stage 3 has not identified any change to this risk, which is summarised below.

Flood Source	Presence	Notes
Fluvial (River)	x	Low risk.
Tidal (Sea)	x	Low risk.
Canals	x	Not Present
Groundwater	x	Low risk.
Sewers	✓	No evidence of flooding – Low risk. Some on site difficulties with existing pumping station surcharging but this does not constitute a significant flood risk and improvements are planned as part of the work.
Reservoirs	x	Not Present
Pluvial (Rain)	✓	There is an area of flood risk near the south and south east of the site, which appears to correlate to a localised low point which attracts surface water flow. This is likely attributable to natural run off across the low areas of the site and is an existing condition that will be improved by the design proposals.
Development Drainage	✓	All new proposed hardstanding will be flow limited to greenfield rates, brownfield areas that are currently hardstanding and will be redeveloped will, where possible, be enhanced so as to offer 30% betterment on peak flows off site.

Table 5. Flood Risk Summary

6.0 DESIGN STANDARDS

The buildings are to be designed in accordance with the current relevant legal and regulatory requirements. The following Eurocodes along with the relevant National Annexes and none contradictory complementary information guides will be used for the design of the structural and civil engineering aspects of the new development:-

- BS EN 1990 Eurocode 0: Basis of Structural Design.
- BS EN 1991 Eurocode 1: Actions on structures – Part 1-1: General actions – Densities, selfweight and imposed loads.
- BS EN 1991 Eurocode 1: Actions on structures – Part 1-2: General actions – Actions on structures exposed to fire.
- BS EN 1991 Eurocode 1: Actions on structures – Part 1-3: General actions – Snow loads.
- BS EN 1991 Eurocode 1: Actions on structures – Part 1-4: General actions – Wind actions.
- BS EN 1991 Eurocode 1: Actions on structures – Part 1-5: General actions – Thermal actions.
- BS EN 1991 Eurocode 1: Actions on structures – Part 1-6: General actions – Actions during execution.
- BS EN 1991 Eurocode 1: Actions on structures – Part 1-7: General actions – Accidental actions.
- BS EN 1992 Eurocode 2: Design of concrete structures – Part 1-1: General – Common Rules for building and civil engineering structures.
- BS EN 1992 Eurocode 2: Design of concrete structures – Part 1-2: General – Structural fire design.
- BS EN 1992 Eurocode 2: Design of concrete structures – Part 3: Liquid retaining and containment structures.
- BS EN 1993 Eurocode 3: Design of steel structures – Part 1-1: General rules and rules for buildings.
- BS EN 1993 Eurocode 3: Design of steel structures – Part 1-10: General – Material toughness and through thickness assessment.
- BS EN 1997 Eurocode 7: Geotechnical design – Part 1: General rules.
- BS EN 1997 Eurocode 7: Geotechnical design – Part 2: Ground investigation and testing.
- BS EN 752-2017: Drain and sewer systems outside buildings. Sewer system management.
- The Building Regulations 2010: Approved Document H - Drainage and Waste Disposal.
- Latest Sewers for Adoption edition including addendums provided thereafter by the relevant Water Authority.
- BS EN 124-2015: Gully tops and manhole tops for vehicular and pedestrian areas.

This list is not exhaustive and other British Standards, Codes of Practice and Design Guides shall be referred to as appropriate.

7.0 CONTRACTOR/SUB-CONTRACTOR DESIGN (CDP)

The following is a list of CDP items with respect to the civil and structural aspects of the project for which contractor design is required:-

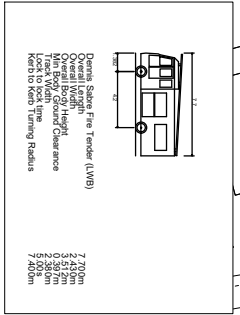
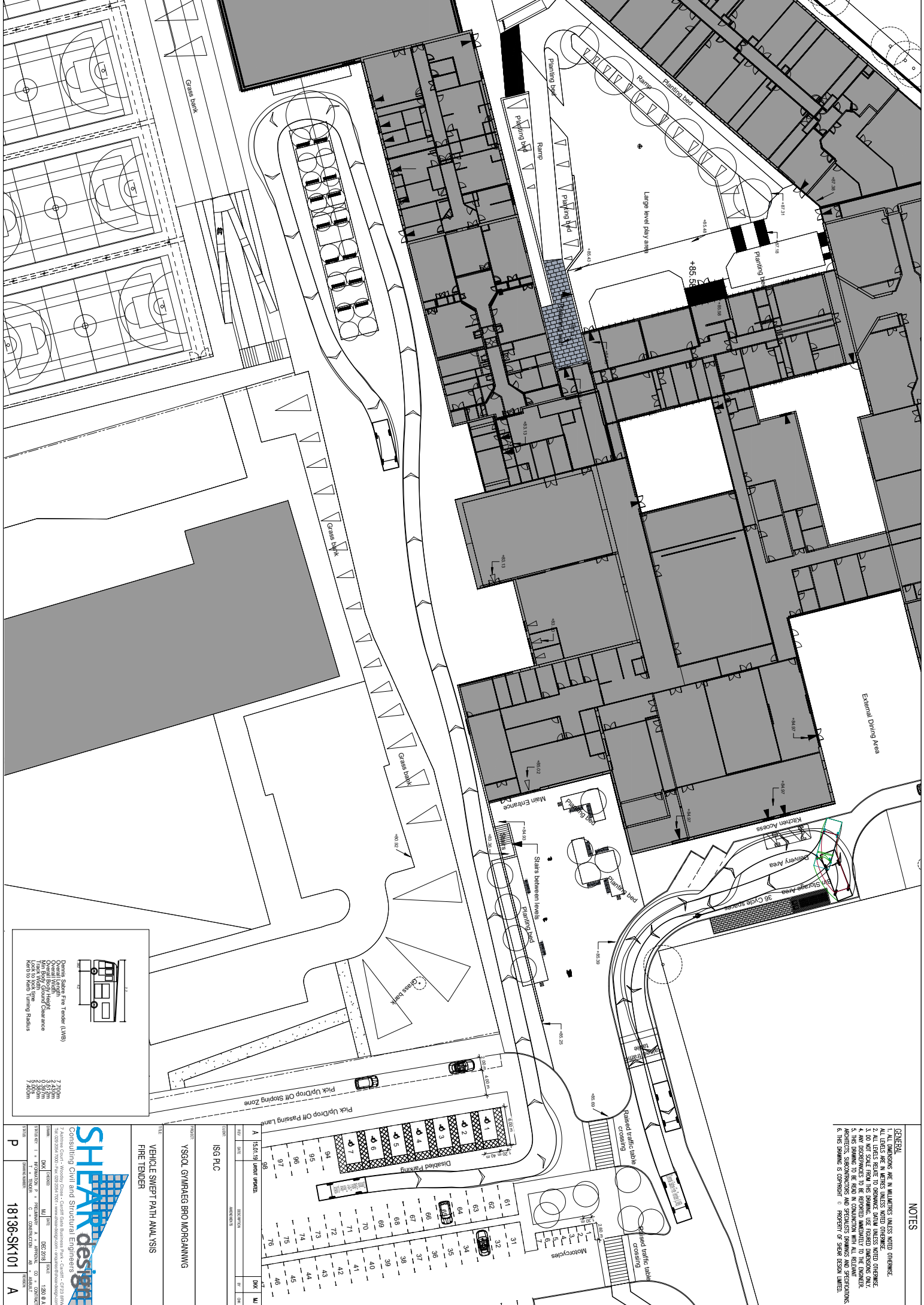
- Temporary works design and method statements.
- All steelwork to steelwork connections.
- Design of intumescent paint specification and thicknesses, boarded protection and cementitious spray thicknesses to steelwork (if required).
- Precast stair units and landings (if required).
- Architectural metalwork including stairs, balustrades, handrails, balconies, canopies etc.
- Secondary steelwork/general metalwork including all framing supports to the following elements including the connections onto the primary structure:-
 - i. Access ladders/walkways.
 - ii. Plant support steelwork/secondary platforms.
 - iii. Builders work/support to services.
 - iv. Lift equipment/guidrails.
 - v. Cleaning cradles.
 - vi. Lighting gantries.
 - vii. Non-loadbearing walls/partitions.
- Light Gauge Load Bearing Frame Design.
- Ceilings.
- False/floating floors.
- Acoustic ceilings/walls/curtains.
- Wind posts and masonry support/restraint steelwork.
- Cladding including all fixings and framework required to connect it to the primary Structure.
- Proprietary lintels.
- Corrosion protection system.
- Tower crane base if required.
- Attenuation tanks
- Sports pitches
- Foul water pumping station

APPENDIX

i) Stage 3 Civil Drawings

NOTES

- GENERAL**
1. Dimensions are in millimetres unless noted otherwise.
 2. ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
 3. DO NOT SCALE FROM THIS DRAWING. USE PROVIDED DIMENSIONS ONLY.
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SH E A R design
 Consulting Civil and Structural Engineers

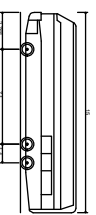
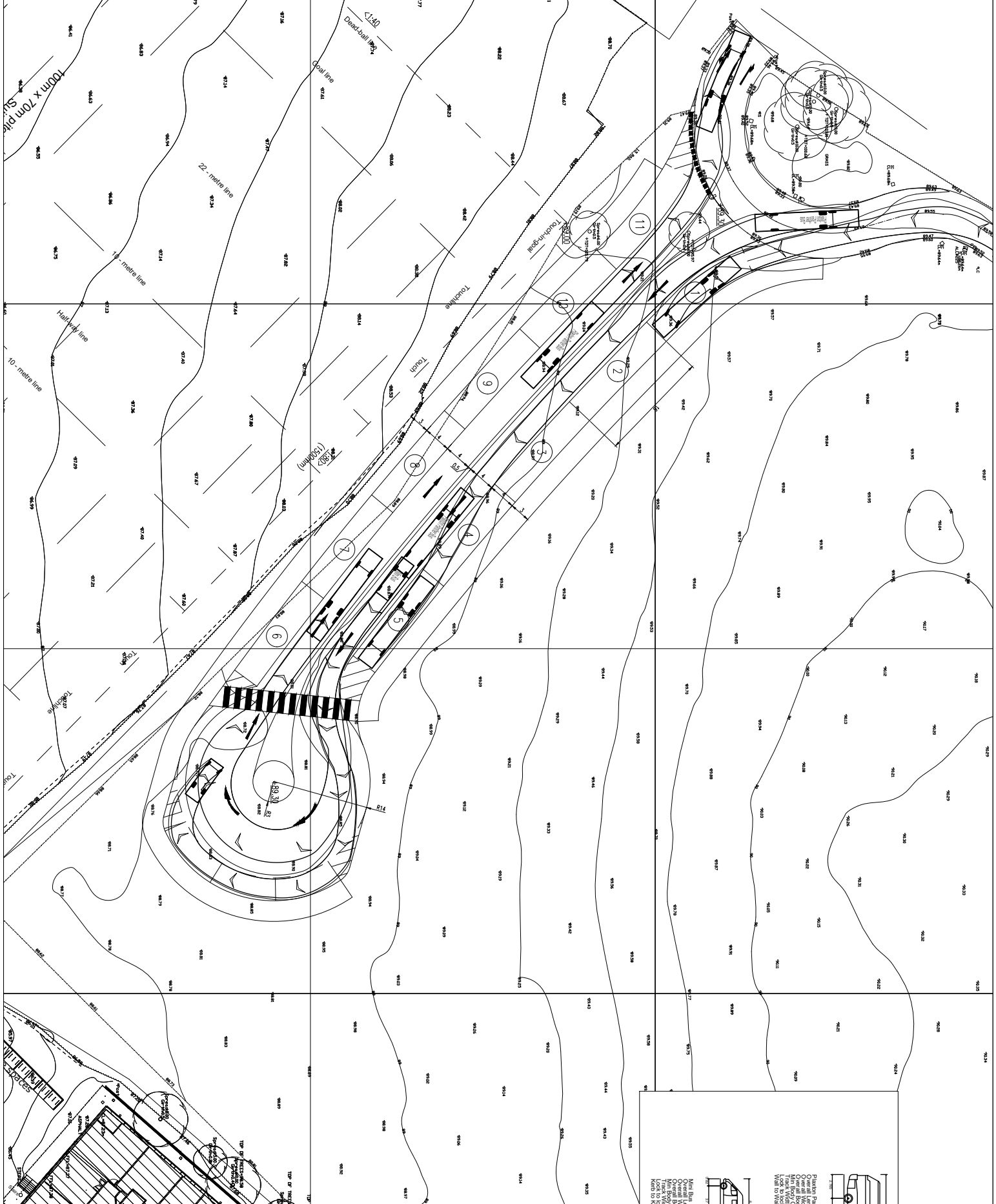
SHEAR DESIGN LIMITED
 100/102 WYNDHAM STREET, SYDNEY NSW 1510
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 WWW: WWW.SHEARDDESIGN.COM.AU

PROJECT NO.	18136-SK101
TITLE	VEHICLE SWEEP PATH ANALYSIS
DATE	12/08/14
DESIGNED BY	A. KENNEDY
CHECKED BY	A. KENNEDY
APPROVED BY	A. KENNEDY

18136-SK101
 A

NO.	REV.	DESCRIPTION	DATE	BY	CHK.
A	1	Issue for tender			

ISS: H.C.
 APPROVED: [Signature]
 PROJECT: YSSOL GYMNASIUM BRO MORGANNING
 TITLE: VEHICLE SWEEP PATH ANALYSIS



Private Passenger Bus

Overall Length	6.500m
Overall Width	2.400m
Overall Height	2.800m
Min. Body Ground Clearance	0.312m
Min. Body Ground Clearance	0.300m
Min. Body Ground Clearance	0.300m
Min. Body Ground Clearance	0.300m
Min. Body Ground Clearance	0.300m
Min. Body Ground Clearance	0.300m
Min. Body Ground Clearance	0.300m

Min. Body Ground Clearance
Overall Length
Overall Width
Overall Height
Min. Body Ground Clearance
Min. Body Ground Clearance
Min. Body Ground Clearance
Min. Body Ground Clearance
Min. Body Ground Clearance
Min. Body Ground Clearance

NOTES

- GENERAL
1. DIMENSIONS ARE IN METERS UNLESS NOTED OTHERWISE.
 2. ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
 3. DO NOT SCALE FROM THIS DRAWING. USE FIGURED DIMENSIONS ONLY.
 4. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, STRUCTURAL AND SERVICES DRAWINGS AND SPECIFICATIONS.
 5. THIS DRAWING IS COPYRIGHT © PROPERTY OF SHEAR DESIGN LIMITED.

Consulting Civil and Structural Engineers

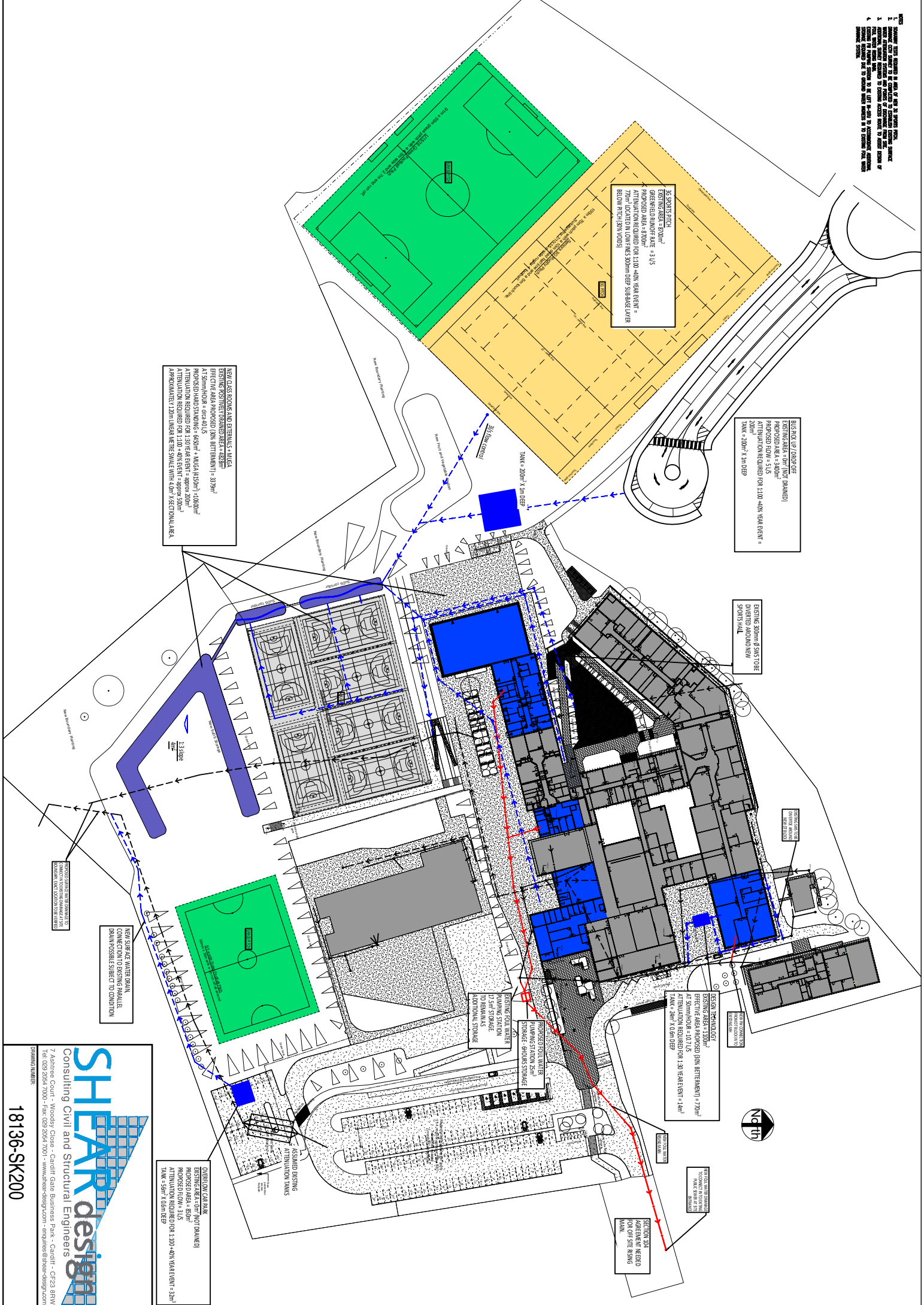
18136-SK102

PROJECT: VSSOL GYMNASIUM BROJ MORGANING

TITLE: VEHICLE SWEEP PATH ANALYSIS 15M BUS & MINI-BUS

DATE	15/08/24
DRAWN BY	AMR
CHECKED BY	AMR
APPROVED BY	AMR

1. EXISTING SITE LAYOUT IS SHOWN IN BLACK ON THIS PLAN.
2. NEW ATTENUATION TANKS AND CANALS OF EXISTING TANKS ARE SHOWN IN GREEN.
3. ALL NEW CANALS ARE TO BE LEFT OPEN TO ACCOMMODATE ATTENUATION OF FLOODING FROM THE TANKS.
4. EXISTING TANKS ARE TO BE LEFT OPEN TO ACCOMMODATE ATTENUATION OF FLOODING FROM THE TANKS.
5. EXISTING TANKS ARE TO BE LEFT OPEN TO ACCOMMODATE ATTENUATION OF FLOODING FROM THE TANKS.



EXISTING STITCH
 PROPOSED AREA = 3,415
 ATTENUATION REQUIRED FOR 1:100 +40% YEAR EVENT = 77mm LOCATED IN LOW FINE 300mm DEEP SUBBASE LAYER BELOW 75% (3% Voids)

EXISTING 300mm DIA STUB CORE
 PROPOSED FLOW = 51LS
 ATTENUATION REQUIRED FOR 1:100 +40% YEAR EVENT = 200mm
 TANK = 200m x 1m DEEP

NEW CLASSROOMS AND EXTERNALS - AREA
 EXISTING PROPOSED (2% BETTMENT) = 482mm²
 AT 30% PAVEMENT - OVER 20LS + 4M (2.45M) - 1400mm²
 ATTENUATION REQUIRED FOR 1:100 +40% YEAR EVENT = 200mm
 APPROXIMATELY 120m LINER WITH 40mm SECTIONAL AREA

EXISTING 300mm DIA STUB CORE
 PROPOSED FLOW = 51LS
 ATTENUATION REQUIRED FOR 1:100 +40% YEAR EVENT = 200mm
 TANK = 200m x 1m DEEP

DESIGN TECHNOLOGY
 EXISTING AREA = 100m²
 AT 30% PAVEMENT - OVER 20LS + 4M (2.45M) - 1400mm²
 ATTENUATION REQUIRED FOR 1:100 +40% YEAR EVENT = 140mm
 TANK = 140m x 1m DEEP

NEW SURFACE WATER BASIN
 CONNECTION TO EXISTING DRAIN SYSTEM SUBJECT TO CONVICTION

PROPOSED FILL WATER STORAGE - 900m³ STORAGE
 EXISTING FILL WATER STORAGE - 900m³ STORAGE
 PROPOSED FILL WATER STORAGE - 900m³ STORAGE

OPERATIONAL CAR PARK
 PROPOSED AREA = 85m²
 ATTENUATION REQUIRED FOR 1:100 +40% YEAR EVENT = 32mm
 TANK = 55m x 0.6m DEEP



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 7 Ashford Court - Woodside - Cardiff Gate Business Park - Cardiff - CF23 9BW
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 DRAWING NUMBER: 18136-SK200

APPENDIX

ii) Stage 3 Structural Drawings

Note: The full set of structural drawings can also be found on Conject.

GROUND FLOOR ARRANGEMENT

400mm SPAN OF 275mm THICK RC SLAB

NOTE:
FOR LOCATION AND SETTING OF ALL SERVICE ENTRIES REFER TO MAKE DRAWINGS FOR SETTING OUT.
SCAFFOLD SERVICE ENTRIES/STAYS ETC. MUST BE 100mm OR TO HAVE 100mm STEEL SCAFFOLD USING 150mm SPACING FROM PERIMETER OF ALL SERVICES.

FOUNDATION NOTES:

- REVEALED FOUNDATION LEVELS INCLUDING FREE INFLUENCE ZONES WILL BE CONTAINED.
- PILES - ALLOW FOR PROPOSED FOUNDING DEPTH TO BE MINIMUM 1m FROM EXISTING GROUND LEVEL AND MINIMUM 125mm FROM PROPOSED GROUND LEVEL FOR PILES, UNLESS OTHERWISE SPECIFIED.
- REINFORCED STRIPS - ALLOW FOR PROPOSED FOUNDING LEVEL TO BE MINIMUM 1m FROM EXISTING GROUND LEVEL AND MINIMUM 125mm FROM PROPOSED GROUND LEVEL FOR PILES, UNLESS OTHERWISE SPECIFIED.
- TO BE TO BE MINIMUM 75mm BELOW FIN AND MINIMUM EXISTING PROPOSED GROUND LEVEL.
- THE SITE SOIL INVESTIGATION UNDERTAKEN BY KEOON SOO ARCHITECTS GEOTECHNICAL AND GEOMECHANICAL INTERPRETING REPORT 06/27/14 NOVEMBER 2018
- ALL START SPOTS TO BE REVEALED AND REPAIRED WITH LEANING, IN DOORF LASK SHEAR DESIGN.
- ALL STRIP FOUNDATIONS TO BE 300mm DEEP DRAKE.
- ALL FOUNDATION FOUNDATION LEVELS MUST BE INSPECTED BY BUILDING CONTROL FOR SUBMITTAL PRIOR TO POURING FOUNDATIONS.

NOTE:
ALL BLOCKS BELOW DEPT TO HAVE A MINIMUM STRENGTH OF 7N/mm² AND HAVE MINIMUM DENSITY OF 1800 kg/m³ UNLESS OTHERWISE SPECIFIED OR BLOCKWORK LAMING REQUIRED.

NOTE:
ALL WALL SETTING OUT REFER TO ARCHITECTS DRAWINGS.

NOTE:
FOUNDATION EXAMINATIONS TO BE STIPPED FOR INDICATION OF FOUNDING LEVELS.

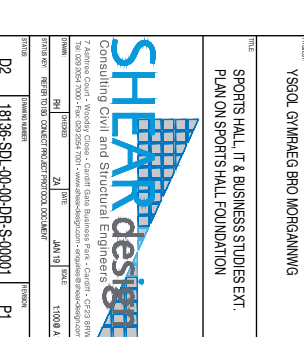
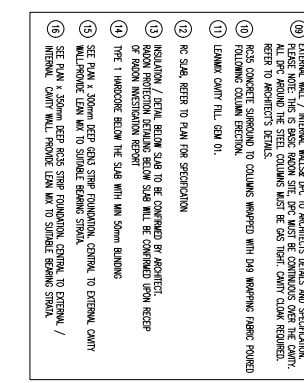
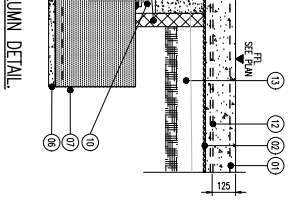
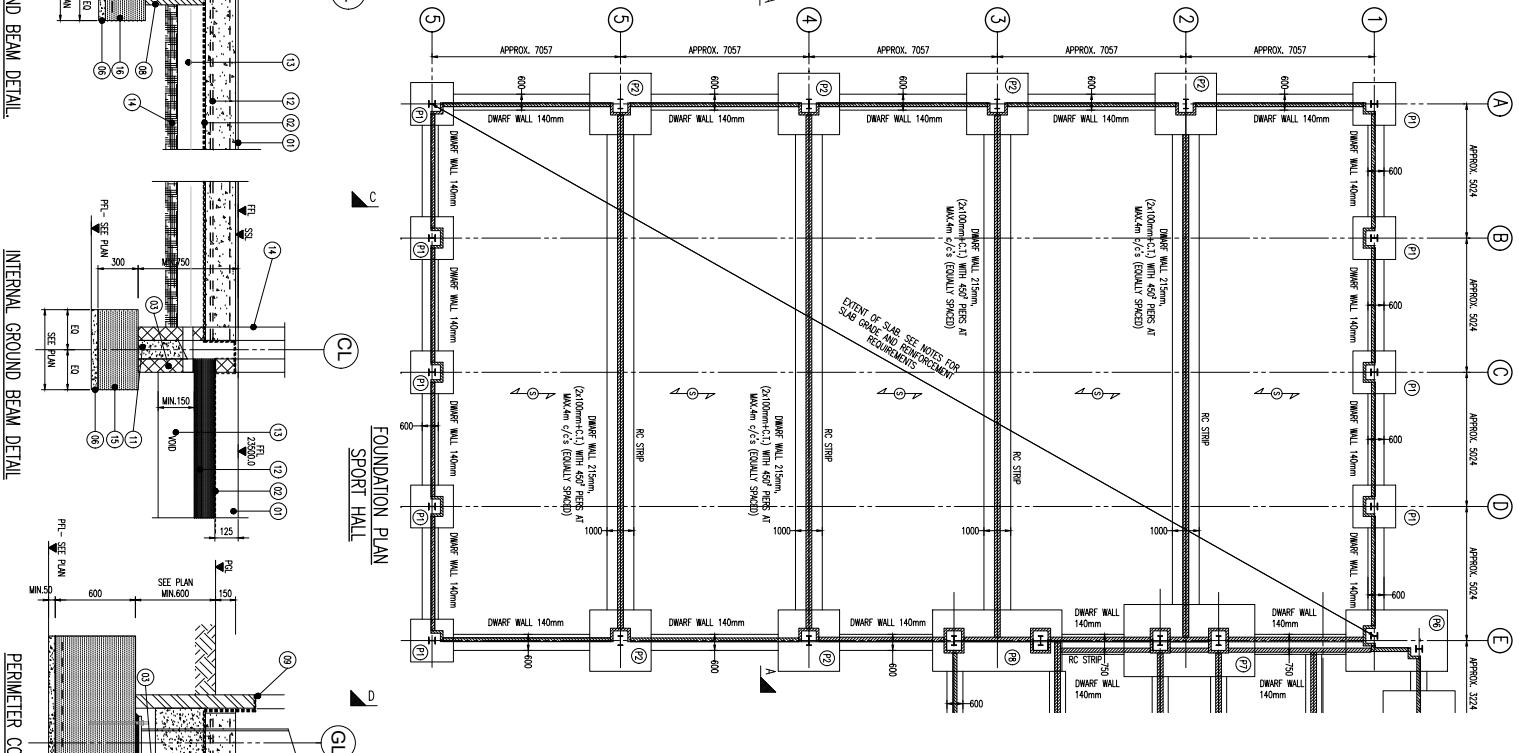
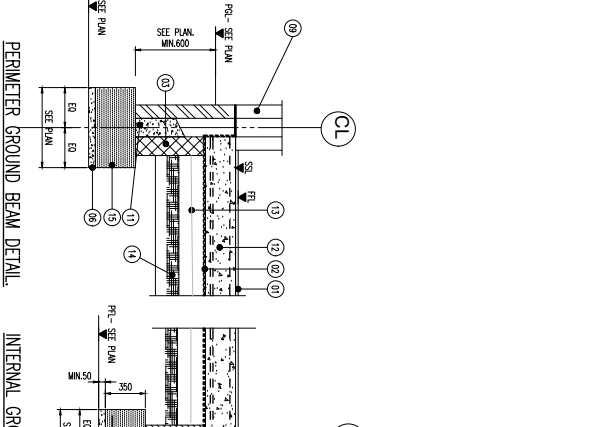
NOTE:
FINAL STATE OF SOIL INVESTIGATION REPORTS GROUND CONDITIONS TO HAVE GROUND BEARING PRESSURE OF 100kN/m².

NOTE:
ALL COLUMNS UNPROTECTED AT GROUND FLOOR CONTINUE THROUGH TO ROOF STRUCTURE LEVEL.

NOTE:
ALL STEELWORK TO BE GRADE SABS

NOTE:
CONCRETE CLASS - SEE SOIL INVESTIGATION REPORT

NOTE:
FOUNDING LEVELS REFER TO PLAN



KEY: RC PARS FOR SPORT HALL + IT & BUSINESS STUDIES

- (1) REVEALED 2000 X 2000 X 400 RC PAD
- (2) REVEALED 2000 X 2000 X 400 RC PAD
- (3) REVEALED 2000 X 2000 X 400 RC PAD
- (4) REVEALED 5000 X 2750 X 400 RC PAD
- (5) REVEALED 2700 X 5000 X 400 RC PAD
- (6) REVEALED 2800 X 3800 X 400 RC PAD
- (7) REVEALED 2700 X 4800 X 400 RC PAD
- (8) REVEALED 2800 X 4845 X 400 RC PAD
- (9) REVEALED 2800 X 4200 X 2800 RC PAD

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE FOUNDATION PLAN AND GEOTECHNICAL REPORT.
2. IT HAS BEEN ASSUMED ALL EXISTING FOUNDATIONS AND CONCRETE SLABS WILL BE LEFT IN PLACE.
3. ALL START SPOTS ARE TO BE REVEALED AND REPAIRED WITH LEANING CONCRETE.
4. ALL MATERIAL THAT IS TO BE REMOVED FROM THIS IS TO BE DISPOSED IN A APPROPRIATE LICENSED JARVEL CONCRETE WASTE WASHING STATION.
5. ALL FOUNDATION FOUNDATIONS ARE TO BE INSPECTED BY THE BUILDING CONTROL OFFICER PRIOR TO POURING OF CONCRETE.
6. ALLOWANCE TO BE MADE FOR ALL TEMPORARY AND PERMANENT EXISTING BUILDING FOUNDATIONS WHERE FOUNDATIONS ARE TO BE REMOVED OR REPAIRED. EXISTING FOUNDATIONS MUST ALLOW FOR LOCAL DEVIATIONS IN TRENCHES.

NOTES:

- (1) CONTRACTOR TO REMOVE ALL EXISTING TRENCHES, EXCEPT WHERE SHOWN OTHERWISE.
- (2) CONTRACTOR TO SUIT DEPTH OF FOUNDATION AND DESIGN CONDITIONS AS NECESSARY.
- (3) CONTRACTOR TO ALLOW FOR ANY NECESSARY TEMPORARY SUPPORT TO MAINTAIN DURING ITS TEMPORARY CONDITION.
- (4) ALL MATERIAL WASTING TO BE CARRIED OUT IN ACCORDANCE WITH RELEVANT CURRENT USE GUIDELINES.
- (5) REFER TO FOUNDATION FOUNDATIONS FOR FINISHED DETAILS, IF RECORDED LEANING TO BE TAKEN DOWN TO SUIT DRAINAGE LEVEL.

THIS DRAWING HAS BEEN PRODUCED IN ADVANCE OF ARCHITECTS DETAILS. FINAL DETAILS SUBJECT TO CHANGE

NOTES

- 1. THE DRAWING IS TO BE READ IN CONJUNCTION WITH THE FOUNDATION PLAN AND GEOTECHNICAL REPORT.
- 2. IT HAS BEEN ASSUMED ALL EXISTING FOUNDATIONS AND CONCRETE SLABS WILL BE LEFT IN PLACE.
- 3. ALL START SPOTS ARE TO BE REVEALED AND REPAIRED WITH LEANING CONCRETE.
- 4. ALL MATERIAL THAT IS TO BE REMOVED FROM THIS IS TO BE DISPOSED IN A APPROPRIATE LICENSED JARVEL CONCRETE WASTE WASHING STATION.
- 5. ALL FOUNDATION FOUNDATIONS ARE TO BE INSPECTED BY THE BUILDING CONTROL OFFICER PRIOR TO POURING OF CONCRETE.
- 6. ALLOWANCE TO BE MADE FOR ALL TEMPORARY AND PERMANENT EXISTING BUILDING FOUNDATIONS WHERE FOUNDATIONS ARE TO BE REMOVED OR REPAIRED. EXISTING FOUNDATIONS MUST ALLOW FOR LOCAL DEVIATIONS IN TRENCHES.

FOUNDATION NOTES

1. THE BASE SPECIFICATION FOR FOUNDATION WORKS SHALL BE AS FOLLOWS: BRUSH SANDWICH COLE OF PROTECT FOR FOUNDATIONS.
2. ALL LEVELS RELATE TO FINISHED DATUM UNLESS NOTED OTHERWISE.
3. DO NOT SCALE FROM THIS DRAWING. USE FINISHED DIMENSIONS ONLY.
4. THE DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, STRUCTURAL AND SERVICES DRAWINGS AND SPECIFICATIONS.
5. THE DRAWING IS COPYRIGHT © PROPERTY OF SHEAR WATER LIMITED.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDOUSNESS NORMALLY ASSOCIATED WITH THE FOLLOWING WORK DEFINED ON THIS DRAWING, NOTE THE FOLLOWING:

- ▲ REINFORCEMENT MATERIALS CONTAINED IN EXISTING CONSTRUCTION ASSUMED FROM RECORDED DRAWINGS TO BE VERIFIED ON SITE BY CONTRACTOR.
- ▲ LIMITED RECORD STRUCTURAL INFORMATION IS AVAILABLE FOR THE EXISTING EXISTING BUILDINGS. PRESENT ON SITE AND SHOULD BE REFERRED TO IN-ROOM DESIGN TEAM.
- ▲ WASTE/HAZARDOUS/CONTAMINATION/CONTAMINATION

BASIC RADON PROTECTION REQUIRED BASED ON S1 REF:10730/GNS/10 INEGRAL GEOTECHNIQUE DESK STUDY OF NEIGHBOURING DEVELOPMENT

FURTHER RADON INVESTIGATION REQUIRED

YSSOL GYMNASIUM BRO MORGANWANGS

SPORTS HALL, IT & BUSINESS STUDIES EXT. PLAN ON SPORTS HALL FOUNDATION

SHEAR design
Consulting Civil and Structural Engineers

18136-SDI-00-00-DR-S-00001

18136-SDI-00-00-DR-S-00001

GROUND FLOOR ARRANGEMENT

INDICATES POSITION OF WALL OF 140mm FROM & BELOW, 4.00m TO STRUCTURE DESIGN. FINISH AND SPECIFICATION TO BE GIVEN IN THE FOLLOWING SCHEDULES.

DEAD

- FINISHES = 120mm/12
- FRANKING = 120mm/12
- FLICK WORK PERIMETER = 150mm/12
- CONCRETE STAIRS = 4.00m/12
- OFFICES = 4.00m/12
- STORAGE ROOMS = 4.00m/12

IMPOSED

- CLASSROOMS = 3.00m/12
- CONCRETE STAIRS = 4.00m/12
- OFFICES = 4.00m/12
- STORAGE ROOMS = 4.00m/12

B & S SET WEIGHT = 10 SPECULAT DETAILS

NOTE:

FOR LOADING AND SETTING OF ALL SERVICE ENTRIES REFER TO MAKE DRAWING FOR SETTING OUT. SLOPED SERVICE ENTRIES/SPE'S ETC. SHALL BE FORMED OR TO HAVE TYPICAL STEEL SLOPED USING 1:10 IN SECTION/ON FACE/ INVERSE FLOOR & SLOATH.

FOUNDATION NOTES:

- DETAILED FOUNDATION DETAILS INCLUDING THE INFLUENCE ZONES WILL BE COMPILED.
- PAIS - ALLOW FOR PROPOSED FOUNDING LEVEL TO BE MINIMUM 1m FROM EXISTING GROUND LEVEL AND MINIMUM 1.50m FROM PROPOSED GROUND LEVEL FOR PAIS, UNLESS OTHERWISE SPECIFIED.
- REINFORCED STRIPS - ALLOW FOR PROPOSED FOUNDING LEVEL TO BE MINIMUM 1m FROM EXISTING GROUND LEVEL AND MINIMUM 1.50m FROM THE PROPOSED GROUND LEVEL, UNLESS OTHERWISE SPECIFIED.
- 1.02C TO BE MINIMUM 150mm BELOW FIN. AND MINIMUM 600mm PROPOSED GROUND LEVEL.
- 7.1 FOUNDATION LEVEL TO BE MINIMUM 100mm ABOVE FINISH LEVEL IN ACCORDANCE WITH RECOMMENDATIONS IN GEOTECHNICAL INTERPRETIVE REPORT 06/271314 NOVEMBER 2018.
- ALL SPT SPOTS TO BE RECORDED AND RECORDED WITH LEANING. IF A DOUBT FOR SPT DESIGN.
- ALL SPT FOUNDATIONS TO BE 300mm DEEP U/LD.
- ALL FOUNDATION EXPANSIONS MUST BE INSPECTED BY BALANCE CONTROL FOR SUFFICIENT PROX TO FINISH FOUNDATIONS.

NOTE:

- ALL BLOCKS BELOW PAV TO HAVE A MINIMUM STRENGTH OF $7N/mm^2$ AND HAVE MINIMUM DENSITY OF 1800 kg/m³ U/LD. SEE SPECIFICATION OF BLOCKWORK LAYING REQUIRED.

NOTE:

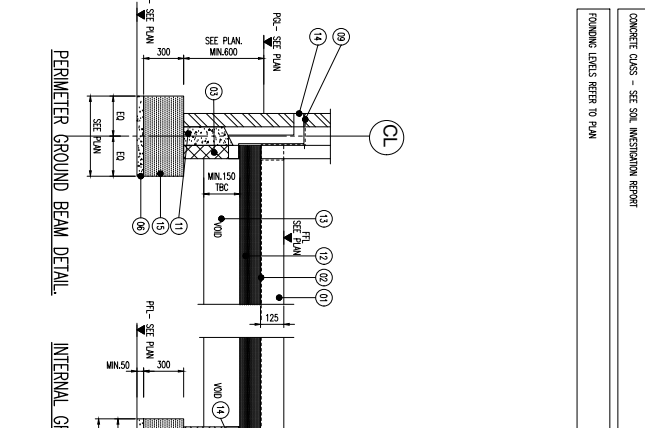
- FINISH WALL SETTING OUT REFER TO ARCHITECTS LAYOUTS.

FOUNDATION EXPANSIONS TO BE STIPPED PER INDICATION OF FOUNDING LEVELS.

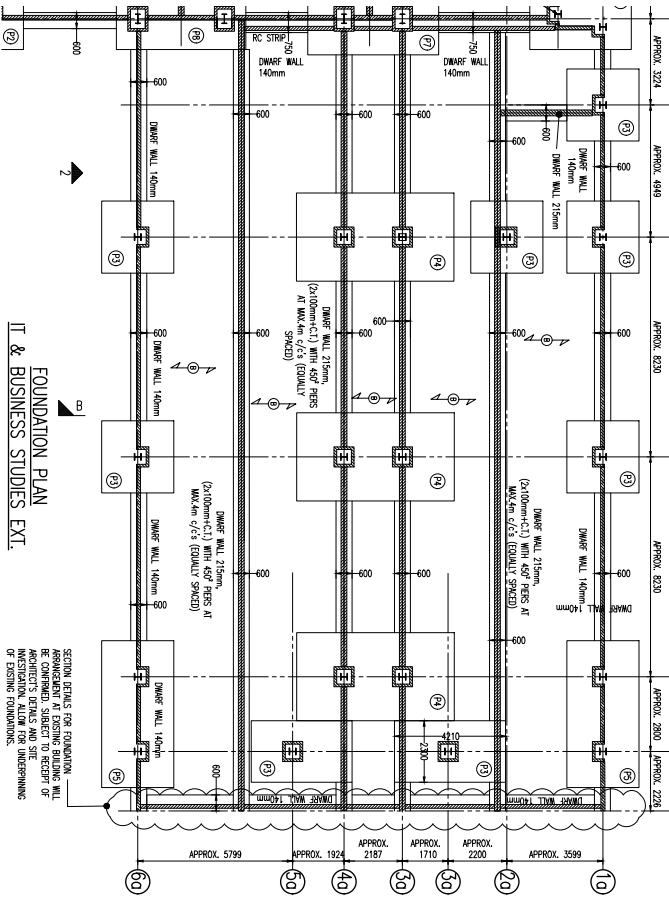
FINAL SIZE OF SOIL INVESTIGATION BERTHS GROUND CONDITIONS TO HAVE GROUND BEARING PRESSURE OF ALL STEELWORK TO BE CHECK SIZES

CONCRETE CLASS - SEE SOIL INVESTIGATION REPORT

FOUNDING LEVELS REFER TO PLAN



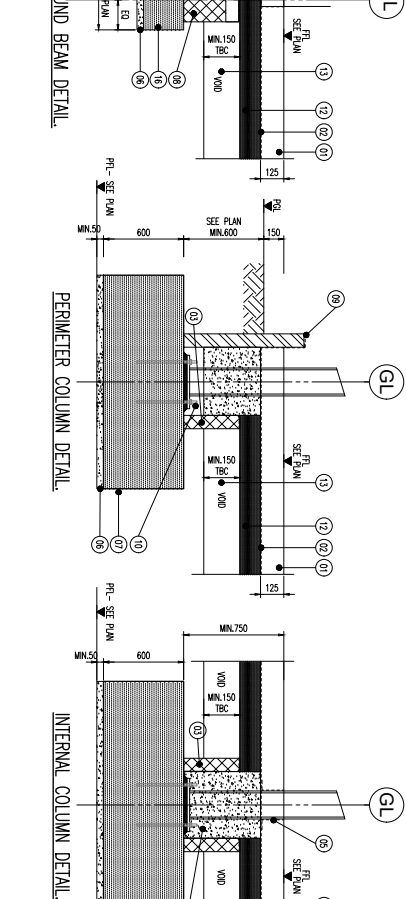
FOUNDATION PLAN



WHERE REQUIRED UNDERPINNING WORKS TO BE UNDERTAKEN USING DUE CARE AND ATTENTION BY CONTRACTOR IN ACCORDANCE WITH SPECIFICATION BELOW:

SPECIFICATION FOR SECTIONAL UNDERPINNING

- ALL EXPANSIONS UNDER THE EXISTING FOUNDATIONS ARE TO BE CARRIED OUT BY HAND. ALL OTHER EXPANSIONS ARE TO BE CARRIED OUT WITH EXTREME CARE BY HAND WHERE NECESSARY AND BY MEANS OF VIBRATING COMPACTOR SUCH AS PERFORMANCE.
- ALL TRENCH SPACINGS AND SPACING FOR HEALTH AND SAFETY REASONS TO MAINTAIN FULL STABILITY AND TO PREVENT DAMAGE TO THE EXISTING STRUCTURE, ARE THE RESPONSIBILITY OF THE CONTRACTOR AND ARE TO BE PROVIDED AS DIMENSIONS PROVIDED.
- SECTIONS OF UNDERPINNING ARE TO BE LIMITED TO A MAXIMUM LENGTH OF 11M (OR LESS IF NEEDED APPROPRIATE BY THE CONTRACTOR) AND SEQUENCED TO LEAVE A 500 GAP BETWEEN EACH UNDERPINNING SECTION. I.E. A MAXIMUM OF EVERY FOURTH UNDERPINNING SECTION IS TO BE WORKED ON AT ANY ONE TIME.
- THE UNDERPINE OF THE EXISTING FOUNDATION IS TO BE THOROUGHLY CLEANED OF ALL EXHRT.
- GRADE CUT 1.5 CONCRETE IS TO BE ROUGH TO WITHIN 50mm OF THE UNDERPINE OF THE EXISTING FOUNDATION, LEFT TO CURE FOR 48 HOURS AND THEN PROCEED WITH A SAND DRY MIXED LAY FULLY PAVED HOME TO PROVIDE A FULL BENCH SUPPORT BED.
- A MINIMUM OF 48 HOURS PRE-CURE CEMENT TIME IS TO BE ALLOWED BEFORE AN ADDITIONAL UNDERPINNING SECTION IS EXCAVATED.
- IF REQUIRED THE SIZES AND BACK OF THE EXCAVATION ARE TO BE SHEETED AND STRUTTED TO PREVENT THE COLLAPSE OF THE EXCAVATION TO EACH SECTION.
- CHARGES OR ROCKERS ARE TO BE LEFT IN THE VERTICAL STOP ENDS OF EACH SECTION TO BOND IN WITH THE CONCRETE OF THE ADJACENT SECTIONS.
- WORK IS TO PROCEED UNTIL THE ENTIRE FOUNDATION IS UNDERPINNED CONTINUOUSLY.



KEY: RC PADS FOR SPORT HALL + IT & BUSINESS STUDIES

- 01 DEPOSITED 2000 x 2000 x 600 RC P40
- 02 DEPOSITED 2200 x 2200 x 600 RC P40
- 03 DEPOSITED 2200 x 2200 x 600 RC P40
- 04 DEPOSITED 2200 x 2200 x 600 RC P40
- 05 DEPOSITED 2700 x 2700 x 600 RC P40
- 06 DEPOSITED 2700 x 2700 x 600 RC P40
- 07 DEPOSITED 2700 x 4900 x 600 RC P40
- 08 DEPOSITED 2900 x 4445 x 600 RC P40
- 09 DEPOSITED 2900 x 4200 x 2300 RC P40

PAID FOUNDATIONS REINFORCEMENT

ALLOW FOR 125 kg/m³ OF REINFORCEMENT

REINFORCED GROUND STRIPS

ALLOW FOR 220 kg/m³ OF REINFORCEMENT

THIS DRAWING HAS BEEN PRODUCED IN ADVANCE OF ARCHITECTS DETAILS. FINAL DETAILS SUBJECT TO CHANGE

NOTES

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH GEO-ENVIRONMENTAL AND GEOTECHNICAL REPORT
 - IT HAS BEEN ASSUMED ALL EXISTING FOUNDATIONS AND CONCRETE SLABS HAVE BEEN BROKEN UP
 - ALL SPT SPOTS ARE TO BE RECORDED AND RECORDED WITH LEANING CONCRETE
 - ALL INTERNAL DATE IS TO BE RECORDED FROM SITE AS TO FACILITY FOLLOWING WASTE ACCEPTANCE CRITERIA
 - ALL FOUNDATION FOUNDATIONS ARE TO BE INSPECTED BY THE RELATING CONTRACTOR OTHER FROM TO FINISHES OF CONCRETE
 - ALLOWANCE TO BE MADE FOR ALL TRENCHING AND EXCAVATION OF EXISTING BUILDING FOUNDATIONS WHERE FOUNDATION DESIGN REVISIONS ALSO ALLOW FOR CONSTRUCTION (AS NOTED)
- NOTES:**
- CONTRACTOR TO PROVIDE ALL NECESSARY TRENCHING AND EXCAVATION OF EXISTING BUILDING FOUNDATIONS TO BE COMPLETED SUBJECT TO RECEIPT OF INVESTIGATIVE ALLOW FOR UNDERPINNING OF EXISTING FOUNDATIONS.
 - CONTRACTOR TO SUPPLY ALL NECESSARY TRENCHING AND EXCAVATION OF EXISTING BUILDING FOUNDATIONS TO BE COMPLETED SUBJECT TO RECEIPT OF INVESTIGATIVE ALLOW FOR UNDERPINNING OF EXISTING FOUNDATIONS.
 - CONTRACTOR TO ALLOW FOR ANY NECESSARY TEMPORARY SUPPORT TO MAINTAIN STABILITY TO EXISTING FOUNDATIONS.
 - ALL MINIMUM HAVING TO BE CARRIED OUT IN ACCORDANCE WITH RELEVANT CONCRETE CODES.
 - CONTRACTOR TO PROVIDE ALL NECESSARY TRENCHING AND EXCAVATION OF EXISTING BUILDING FOUNDATIONS TO BE COMPLETED SUBJECT TO RECEIPT OF INVESTIGATIVE ALLOW FOR UNDERPINNING OF EXISTING FOUNDATIONS.
 - ALL BLOCKS BELOW PAV TO HAVE A MINIMUM STRENGTH OF $7N/mm^2$ AND A MINIMUM DENSITY OF 1800 kg/m³ U/LD. SEE SPECIFICATION OF BLOCKWORK LAYING REQUIRED.
 - THE BULKING DEPTH SHALL BE RECORDED AS PART OF THE DESIGNED FOUNDATION DEPTH AS NOTED ON THE DETAILS. RECORDED WITH LEANING CONCRETE.
 - ALL SPT SPOTS TO BE RECORDED AND RECORDED WITH LEANING CONCRETE.
 - ALL SPT FOUNDATIONS ARE TO BE SET OUT CENTRAL TO SUPPORTED WALL AND 1.0m OF FOUNDATION LEVEL TO BE AS NOTED ON THE DETAIL.
 - ALL BLOCKS BELOW PAV TO HAVE A MINIMUM STRENGTH OF $7N/mm^2$ AND A MINIMUM DENSITY OF 1800 kg/m³ U/LD. SEE SPECIFICATION OF BLOCKWORK LAYING REQUIRED.
 - THE BULKING DEPTH SHALL BE RECORDED AS PART OF THE DESIGNED FOUNDATION DEPTH AS NOTED ON THE DETAILS. RECORDED WITH LEANING CONCRETE.
 - ALL SPT SPOTS TO BE RECORDED AND RECORDED WITH LEANING CONCRETE.
 - ALL SPT FOUNDATIONS ARE TO BE SET OUT CENTRAL TO SUPPORTED WALL AND 1.0m OF FOUNDATION LEVEL TO BE AS NOTED ON THE DETAIL.
 - ALL BLOCKS BELOW PAV TO HAVE A MINIMUM STRENGTH OF $7N/mm^2$ AND A MINIMUM DENSITY OF 1800 kg/m³ U/LD. SEE SPECIFICATION OF BLOCKWORK LAYING REQUIRED.
 - THE BULKING DEPTH SHALL BE RECORDED AS PART OF THE DESIGNED FOUNDATION DEPTH AS NOTED ON THE DETAILS. RECORDED WITH LEANING CONCRETE.
 - ALL SPT SPOTS TO BE RECORDED AND RECORDED WITH LEANING CONCRETE.
 - ALL SPT FOUNDATIONS ARE TO BE SET OUT CENTRAL TO SUPPORTED WALL AND 1.0m OF FOUNDATION LEVEL TO BE AS NOTED ON THE DETAIL.

GENERAL:

- ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE
- DO NOT SCALE FROM THIS DRAWING. USE PROVIDED DIMENSIONS ONLY.
- THE DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, STRUCTURAL AND SERVICES DRAWINGS AND SPECIFICATIONS.
- THE DRAWING IS COPYRIGHT © PROPERTY OF SHEAR DESIGN LIMITED.

FOUNDATION NOTES:

- THE BASE SPECIFICATION FOR FOUNDATION WORKS SHALL BE AS BOLD BROWN SHADING CODE OF PRACTICE FOR THE RELEVANT GROUND INVESTIGATION REPORT.
- FOR DETAILS OF GROUND CONDITIONS REFER TO THE RELEVANT GROUND INVESTIGATION REPORT.
- THE DESIGN IS TO BE PROVIDED UNLESS A FOUNDATION DESIGN SPECIFICATION IS PROVIDED FROM THE ARCHITECT.
- ALL SPT FOUNDATIONS ARE TO BE SET OUT CENTRAL TO SUPPORTED WALL AND 1.0m OF FOUNDATION LEVEL TO BE AS NOTED ON THE DETAIL.
- ALL BLOCKS BELOW PAV TO HAVE A MINIMUM STRENGTH OF $7N/mm^2$ AND A MINIMUM DENSITY OF 1800 kg/m³ U/LD. SEE SPECIFICATION OF BLOCKWORK LAYING REQUIRED.
- THE BULKING DEPTH SHALL BE RECORDED AS PART OF THE DESIGNED FOUNDATION DEPTH AS NOTED ON THE DETAILS. RECORDED WITH LEANING CONCRETE.
- ALL SPT SPOTS TO BE RECORDED AND RECORDED WITH LEANING CONCRETE.
- ALL SPT FOUNDATIONS ARE TO BE SET OUT CENTRAL TO SUPPORTED WALL AND 1.0m OF FOUNDATION LEVEL TO BE AS NOTED ON THE DETAIL.
- ALL BLOCKS BELOW PAV TO HAVE A MINIMUM STRENGTH OF $7N/mm^2$ AND A MINIMUM DENSITY OF 1800 kg/m³ U/LD. SEE SPECIFICATION OF BLOCKWORK LAYING REQUIRED.
- THE BULKING DEPTH SHALL BE RECORDED AS PART OF THE DESIGNED FOUNDATION DEPTH AS NOTED ON THE DETAILS. RECORDED WITH LEANING CONCRETE.
- ALL SPT SPOTS TO BE RECORDED AND RECORDED WITH LEANING CONCRETE.
- ALL SPT FOUNDATIONS ARE TO BE SET OUT CENTRAL TO SUPPORTED WALL AND 1.0m OF FOUNDATION LEVEL TO BE AS NOTED ON THE DETAIL.

BASIC RADON PROTECTION REQUIRED BASED ON S.I REF:10/30/GNS/10 INTEGRAL GEOTECHNIQUE DESK STUDY OF NEIGHBOURING DEVELOPMENT

FURTHER RADON INVESTIGATION REQUIRED

YSSOL CIVILS BRO MOFGANNINGS

SPORTS HALL, IT & BUSINESS STUDIES EXT PLAN ON IT & BUSINESS EXPI FOUNDATION

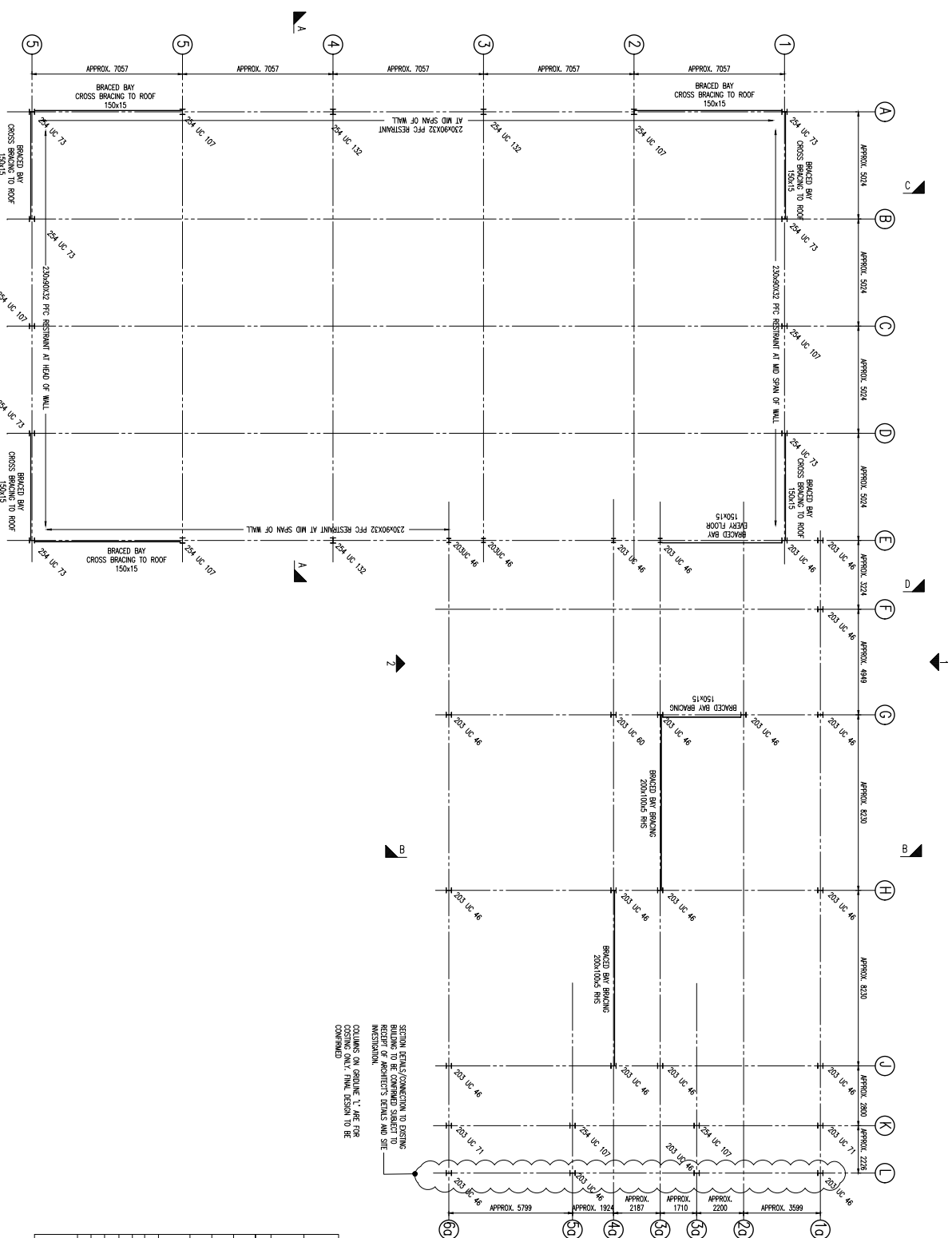
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P1

THIS DRAWING HAS BEEN PRODUCED IN ADVANCE OF ARCHITECTS DETAILS. FINAL DETAILS SUBJECT TO CHANGE

LOWER GROUND FLOOR COLUMN PLAN



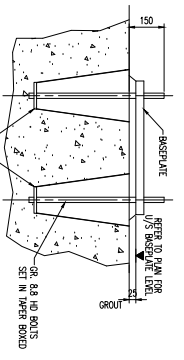
SECTION DETAILS/CONNECTION TO EXISTING RECEPTOR OF ARCHITECT'S DETAILS AND SITE INVESTIGATION.
 COLUMNS ON GRIDLINE 11, ARE TO BE CONSIDERED ONLY. FINAL DESIGN TO BE COMBINED

SETTING OUT
 FINAL SETTING OUT IS SUBJECT TO FINAL THE ARCHITECTS AND M AND C CONSULTANTS. ALL WORKING AND GRID SETTING OUT IN ACCORDANCE WITH THE ARCHITECTS DRAWINGS

STEELCASES
 ALL STEELCASES TO BE DESIGNED BY OTHERS. SHIPMENTS BACK TO STEEL BEAMS. ALL SHIPMENTS TO BE PROVIDED BY THEM AND BACK TO PRIMARY STEEL WORK.

TOP OF CONCRETE
 REFER TO FOUNDATION PLAN FOR ALL TOP OF CONCRETE LEVELS. BASELAYER DESIGN TO BE CHECKED OUT BY STEEL BRACING.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING:
CONSIDERATION
▲ POSSIBLE ASBESTOS MATERIALS CONTAINED IN EXISTING
▲ RISK OF INHALATION FROM ASBESTOS EXPOSURE TO BE AVOIDED
▲ LIMITED RECORD STRUCTURAL INFORMATION IS AVAILABLE FOR THE ADJACENT EXISTING BUILDINGS.
▲ EXISTING UNDERGROUND SERVICES ROUTES MAY BE PRESENT ON SITE AND SHOULD BE IDENTIFIED TO THE MAIN DESIGN TEAM.
MAINTENANCE/OPERATION/REPAIRS
DECOMMISSIONING/DEMOLITION
REFER TO THE DESIGN RISK REGISTER FOR FURTHER DETAILS. IT IS ASSUMED THAT ALL THE WORKS ON THIS DRAWING WILL BE COMPLETED IN ACCORDANCE WITH THE DESIGN AND CHECKED OUT A COMPREHENSIVE RISK ASSESSMENT.



NOTES

- GENERAL:
 1. ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
 2. ALL LEVELS RELATE TO OSNDAWM DATUM UNLESS NOTED OTHERWISE.
 3. DO NOT SCALE FROM THIS DRAWING. USE DIMENSIONS ONLY.
 4. THE DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, STRUCTURAL AND SERVICES DRAWINGS AND SPECIFICATIONS.
 5. THIS DRAWING IS COPYRIGHT © PROPERTY OF SHEAR WATSON LIMITED.
- STEEL NOTES:
 1. THE STEELWORK FOR STRUCTURAL STEELWORK SHALL BE SUPPLIED BY THE STEELWORK CONTRACTOR. DESIGN STRUCTURAL USE OF STEELWORK IN BUILDING AND THE NATIONAL STEELWORK SPECIFICATION PRODUCED BY THE BSA.
 2. WORK TO ANY MODIFICATION OF THE STEELWORK CONTRACTOR SHALL PRODUCE THE RESPONSIBILITY OF THE STEELWORK CONTRACTOR.
 3. STRUCTURAL STEELWORK TO BE GRADE S275 MR.
 4. THE MINIMUM SPECIFICATION FOR BOLTS SHALL BE A8 AND ZINC PAIRED.
 5. HEAVY DUTY BOLTS AND WASHER PLATES ARE TO BE SPECIFIED BY THE ENGINEER.
 6. ALL WELDS TO BE OF THE COMPATIBLE FILLER METAL AND ALL BRAMS/COLUMNS SHALL BE LOCATED SUBSTANTIALLY ON ONE LINE UNLESS OTHERWISE STATED.
 7. ALL PLATE DIMENSIONS ARE SHOWN TO CENTRES OF BOLTS/COLUMNS UNLESS OTHERWISE STATED.
 8. ALL LEVELS INDICATED MUST BE TO THE TOP OF BEAMS/COLUMNS UNLESS OTHERWISE STATED.
 9. FOR DETAILS OF RIGID PROTECTION TO STEELWORK REFER TO ARCHITECTS DRAWINGS.
 10. DESIGN OF ALL TEMPORARY WORKS, SHORING AND BRACING SHALL BE THE RESPONSIBILITY OF THE STEELWORK CONTRACTOR.
 11. THE CONTRACTOR SHALL NOT FORM ANY JOISTS THROUGH STEEL MEMBERS OTHER THAN THOSE FOR CONNECTIONS WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER.
 12. ALL COLD FORMED SHAPES/STEELING SHALL BE TO BE SPECIFIED WITHIN THE DRAWING.
 13. ALL STEELWORK SHALL BE TO BE CONNECTED TO EXISTING STEELWORK IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATION AND RECOMMENDATIONS. WHERE DISPAR STEELS ARE TO BE CONNECTED A SHARPLE GALVANIC ANODE SHALL BE PROVIDED.
 14. ALL CORNER JOISTS TO BE SPECIFIED BY THE STEELWORK CONTRACTOR.
 15. ALL STEELWORK REQUIRING TIGHTER WALLS, BRACES, ETC. ARE TO BE SPECIFIED WITH 12mm ϕ BOLTS ϕ 60mm CENTERS SPACED (GIVEN FROM ONE).
 16. ALL WALL RESTRAINING MEMBERS AND WINDOW FRAMEWORKS TO HAVE CONTINUOUS REINFORCING BARS THROUGH THE WALLS.
 17. UNLESS OTHERWISE NOTED IN THE PROJECT SPECIFICATION, PROTECTION TREATMENT OF STEELWORK SHALL BE IN ACCORDANCE WITH BRITISH STEEL SPECIFICATION FOR STRUCTURAL STEELWORK (BS5950).
 18. A SYSTEM OF CORROSION PROTECTION FOR STEELWORK AND A FIRST WASH SHALL BE PROVIDED FOR ALL STEELWORK.
 19. ALL STEELWORK TO BE CASTED ON FORMWORK. UNLESS OTHERWISE STATED, ALL STEELWORK TO BE CASTED ON FORMWORK. UNLESS OTHERWISE STATED, ALL STEELWORK TO BE CASTED ON FORMWORK. UNLESS OTHERWISE STATED, ALL STEELWORK TO BE CASTED ON FORMWORK.
 20. ALL STEELWORK TO BE CASTED ON FORMWORK. UNLESS OTHERWISE STATED, ALL STEELWORK TO BE CASTED ON FORMWORK.
 21. WHERE THE STEELWORK SUBORDINATE BEARS IT TO USE STEEL MEMBERS OF A HIGHER SPECIFICATION THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SO AS TO MAINTAIN CONNECTIONS OR OTHERWISE THEN ANY OTHER COST INCURRED WILL BE AT THE OWNERS RISK.

PROJECT: YSSOL GYMAREG BROU MORGANNWG	
TITLE: SPORTS HALL, IT & BUSINESS STUDIES EXT. LOWER GROUND FLOOR - COLUMN PLAN	
CLIENT: ISS Pfc	ARCHITECTS: SHEAR WATSON
DATE: 26 JAN 19	SCALE: 1:1000 A4
DRAWN BY: REB TO BE CHECKED/REVISOR/PROJECT COORDINATOR	DATE: 26 JAN 19
PROJECT NUMBER: D2	PROJECT CODE: 18136-SDL-00-LG-DR-S-00010
DESIGNER: SHEAR WATSON	PROJECT: P1



- GENERAL**
1. ALL DIMENSIONS ARE IN METERS UNLESS NOTED OTHERWISE.
 2. ALL LEVELS REFER TO FINISHED FLOOR FINISH UNLESS NOTED OTHERWISE.
 3. DO NOT SCALE FROM THIS DRAWING. USE FINISHED DIMENSIONS ONLY.
 4. THE DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL SPECIFICATIONS AND STRUCTURAL DRAWINGS AND SPECIFICATIONS.
 5. THIS DRAWING IS COPYRIGHT © PROPERTY OF SHEAR DESIGN LIMITED.
- STEEL NOTES**
1. THE STEEL SPECIFICATION FOR STRUCTURAL STEEL SHALL BE SHEAR DESIGN LIMITED STEELWORK SPECIFICATION 65590. STRUCTURAL USE OF STEELWORK IN BUILDING AND THE NATIONAL STEELWORK SPECIFICATION SHALL BE USED FOR ALL OTHER STEELWORK.
 2. CALCULATIONS AND A FULL SET OF FINISHED DIMENSIONS SHALL PROVIDE THE NATIONAL STEELWORK FOR REITS SHALL BE OF 8.8 AND ZING PANDA.
 3. THE NATIONAL STEELWORK FOR REITS SHALL BE OF 8.8 AND ZING PANDA.
 4. ALL DIMENSIONS SHALL BE TO FACE UNLESS NOTED OTHERWISE.
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 21. ALL DIMENSIONS SHALL BE TO FACE UNLESS NOTED OTHERWISE.
 22. ALL DIMENSIONS SHALL BE TO FACE UNLESS NOTED OTHERWISE.

- SETTING OUT**
- FINAL SETTING OUT IS SUBJECT TO FINAL DETAILED DESIGN AND ARCHITECTS' DRAWINGS.
- ALL SETTING OUT SHALL BE IN ACCORDANCE WITH THE ARCHITECTS' DRAWINGS.
- STARCASTS**
- ALL STARCASTS TO BE DESIGNED BY OTHERS SUPPLEMENTED BACK TO BE PROVIDED BY THEM FIXED BACK TO PRIMARY STEEL WORK.
- SECONDARY STEEL**
- ALL SECONDARY STEELWORK FOR NEW CLADDING SYSTEM TO BE DESIGNED BY SUB CONTRACTOR.
- VERTICAL BRACING**
- ALL VERTICAL BRACING, DESIGNED BY BRACED BAY TO BE 200x200x13 UB 25. ALL VERTICAL BRACING TO BE 200x200x13 UB 25. ALL VERTICAL BRACING TO BE 200x200x13 UB 25.
- KEY**
- 10 (ES&O), 14mm THICK SLAB
- RISERS**
- ALL RISER CONDITIONS SUBJECT TO COORDINATION WITH ARCHITECT AND STRUCTURAL CONSULTANT PRIOR TO FINAL SETTING OUT AND WORK COMMENCEMENT TO ALLOW FOR ALL FINISHES, STEEL REQUIRED TO COMPLY WITH RELEVANT DESIGN CONDITIONS.
- SITE RAILS - SPORTS HALL**
- ALL CLADDING RAILS TO BE LATEST STEREO RAILS FOR 7.5m SPAN C/C AND MAXIMUM SPACING 65 FOLLOU U/A.0. ALL CLADDING RAILS TO BE LATEST STEREO RAILS FOR 7.5m SPAN C/C AND MAXIMUM SPACING 65 FOLLOU U/A.0. ALL CLADDING RAILS TO BE LATEST STEREO RAILS FOR 7.5m SPAN C/C AND MAXIMUM SPACING 65 FOLLOU U/A.0.
- MASONRY RESTRAINT TIES**
- ALL MASONRY RESTRAINT TIES TO BE INSTALLED STRICTLY IN ACCORDANCE WITH RELEVANT DESIGN CONDITIONS AND DETAIL INCLUDING ALL DETAILS, FINISHES, TIES AND WALLS AND SHEETS.
- ROOF PERIMERS - SPORTS HALL**
- ALL ROOF PERIMERS TO BE INSTALLED STRICTLY IN ACCORDANCE WITH RELEVANT DESIGN CONDITIONS AND DETAIL INCLUDING ALL DETAILS, FINISHES, TIES AND WALLS AND SHEETS.
- ROOF PERIMERS - IT & BUSINESS STUDIES**
- ALL ROOF PERIMERS TO BE INSTALLED STRICTLY IN ACCORDANCE WITH RELEVANT DESIGN CONDITIONS AND DETAIL INCLUDING ALL DETAILS, FINISHES, TIES AND WALLS AND SHEETS.
- EXTERNAL CLADDING**
- THIS DRAWING HAS BEEN PRODUCED WITHOUT THE BENEFIT OF CLADDING DETAILS. CLADDING SUB-CONTRACTOR IS TO ALLOW FOR ALL CLADDING DETAILS TO BE PROVIDED BY THEM FIXED BACK TO THE STEELWORK INDICATED.
- INDICATES POSITIONS OF 152 UC 23 RAFTER ROIS**
- * OF MAIN TOP OF MAIN COLUMNS
- △ INDICATES POSITIONS OF 152 UC 23 EAVES STRIPS

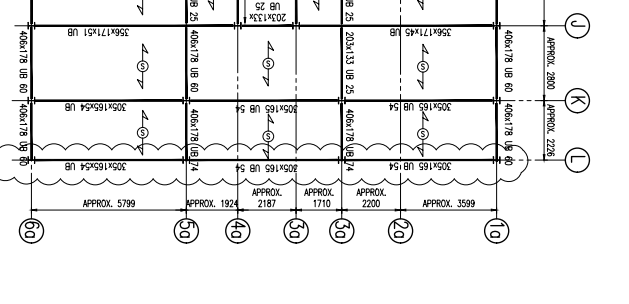
- INTERNAL CLADDING**
- THIS DRAWING HAS BEEN PRODUCED WITHOUT THE BENEFIT OF CLADDING DETAILS. CLADDING SUB-CONTRACTOR IS TO ALLOW FOR ALL CLADDING DETAILS TO BE PROVIDED BY THEM FIXED BACK TO THE STEELWORK INDICATED.
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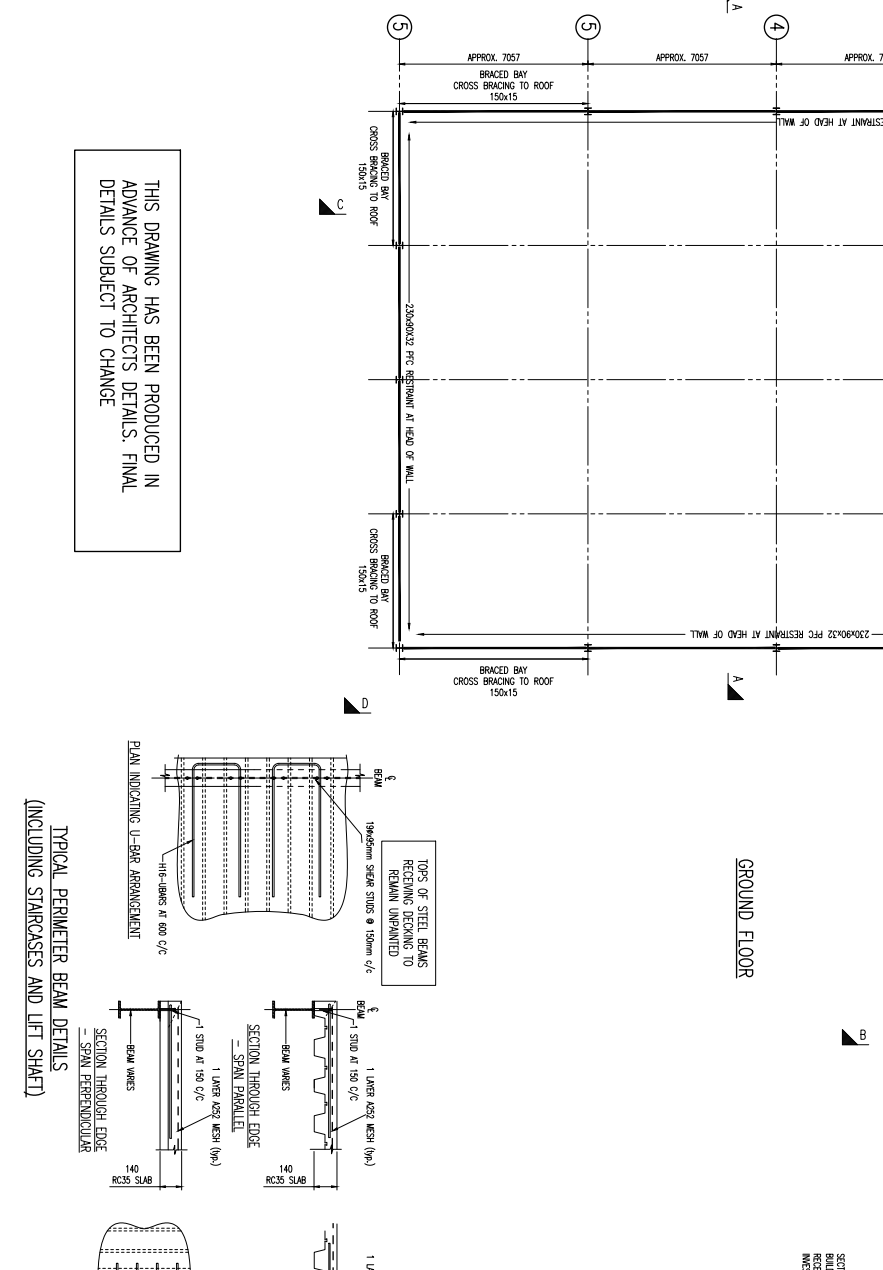
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- △ INDICATES POSITIONS OF 152 UC 23 EAVES STRIPS



GROUND FLOOR



THIS DRAWING HAS BEEN PRODUCED IN ADVANCE OF ARCHITECT'S DETAILS. FINAL DETAILS SUBJECT TO CHANGE

TYPICAL PERIMETER BEAM DETAILS (INCLUDING STARCASTS AND LIFT SHAFT)

INTERNAL BEAM DETAILS

<p>GENERAL</p> <p>ALL DIMENSIONS ARE IN METERS UNLESS NOTED OTHERWISE.</p> <p>ALL LEVELS REFER TO FINISHED FLOOR FINISH UNLESS NOTED OTHERWISE.</p> <p>DO NOT SCALE FROM THIS DRAWING. USE FINISHED DIMENSIONS ONLY.</p> <p>THE DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL SPECIFICATIONS AND STRUCTURAL DRAWINGS AND SPECIFICATIONS.</p> <p>THIS DRAWING IS COPYRIGHT © PROPERTY OF SHEAR DESIGN LIMITED.</p>	<p>SETTING OUT</p> <p>FINAL SETTING OUT IS SUBJECT TO FINAL DETAILED DESIGN AND ARCHITECTS' DRAWINGS.</p> <p>ALL SETTING OUT SHALL BE IN ACCORDANCE WITH THE ARCHITECTS' DRAWINGS.</p>	<p>STARCASTS</p> <p>ALL STARCASTS TO BE DESIGNED BY OTHERS SUPPLEMENTED BACK TO BE PROVIDED BY THEM FIXED BACK TO PRIMARY STEEL WORK.</p>	<p>SECONDARY STEEL</p> <p>ALL SECONDARY STEELWORK FOR NEW CLADDING SYSTEM TO BE DESIGNED BY SUB CONTRACTOR.</p>	<p>VERTICAL BRACING</p> <p>ALL VERTICAL BRACING, DESIGNED BY BRACED BAY TO BE 200x200x13 UB 25. ALL VERTICAL BRACING TO BE 200x200x13 UB 25. ALL VERTICAL BRACING TO BE 200x200x13 UB 25.</p>	<p>KEY</p> <p>○ 10 (ES&O), 14mm THICK SLAB</p>	<p>RISERS</p> <p>ALL RISER CONDITIONS SUBJECT TO COORDINATION WITH ARCHITECT AND STRUCTURAL CONSULTANT PRIOR TO FINAL SETTING OUT AND WORK COMMENCEMENT TO ALLOW FOR ALL FINISHES, STEEL REQUIRED TO COMPLY WITH RELEVANT DESIGN CONDITIONS.</p>	<p>SITE RAILS - SPORTS HALL</p> <p>ALL CLADDING RAILS TO BE LATEST STEREO RAILS FOR 7.5m SPAN C/C AND MAXIMUM SPACING 65 FOLLOU U/A.0. ALL CLADDING RAILS TO BE LATEST STEREO RAILS FOR 7.5m SPAN C/C AND MAXIMUM SPACING 65 FOLLOU U/A.0.</p>	<p>MASONRY RESTRAINT TIES</p> <p>ALL MASONRY RESTRAINT TIES TO BE INSTALLED STRICTLY IN ACCORDANCE WITH RELEVANT DESIGN CONDITIONS AND DETAIL INCLUDING ALL DETAILS, FINISHES, TIES AND WALLS AND SHEETS.</p>	<p>ROOF PERIMERS - SPORTS HALL</p> <p>ALL ROOF PERIMERS TO BE INSTALLED STRICTLY IN ACCORDANCE WITH RELEVANT DESIGN CONDITIONS AND DETAIL INCLUDING ALL DETAILS, FINISHES, TIES AND WALLS AND SHEETS.</p>	<p>ROOF PERIMERS - IT & BUSINESS STUDIES</p> <p>ALL ROOF PERIMERS TO BE INSTALLED STRICTLY IN ACCORDANCE WITH RELEVANT DESIGN CONDITIONS AND DETAIL INCLUDING ALL DETAILS, FINISHES, TIES AND WALLS AND SHEETS.</p>	<p>EXTERNAL CLADDING</p> <p>THIS DRAWING HAS BEEN PRODUCED WITHOUT THE BENEFIT OF CLADDING DETAILS. CLADDING SUB-CONTRACTOR IS TO ALLOW FOR ALL CLADDING DETAILS TO BE PROVIDED BY THEM FIXED BACK TO THE STEELWORK INDICATED.</p>	<p>INDICATES POSITIONS OF 152 UC 23 RAFTER ROIS</p> <p>* OF MAIN TOP OF MAIN COLUMNS</p> <p>△ INDICATES POSITIONS OF 152 UC 23 EAVES STRIPS</p>	<p>INTERNAL CLADDING</p> <p>THIS DRAWING HAS BEEN PRODUCED WITHOUT THE BENEFIT OF CLADDING DETAILS. CLADDING SUB-CONTRACTOR IS TO ALLOW FOR ALL CLADDING DETAILS TO BE PROVIDED BY THEM FIXED BACK TO THE STEELWORK INDICATED.</p>	<p>INDICATES POSITIONS OF 152 UC 23 RAFTER ROIS</p> <p>* OF MAIN TOP OF MAIN COLUMNS</p> <p>△ INDICATES POSITIONS OF 152 UC 23 EAVES STRIPS</p>	<p>INTERNAL CLADDING</p> <p>THIS DRAWING HAS BEEN PRODUCED WITHOUT THE BENEFIT OF CLADDING DETAILS. CLADDING SUB-CONTRACTOR IS TO ALLOW FOR ALL CLADDING DETAILS TO BE PROVIDED BY THEM FIXED BACK TO THE STEELWORK INDICATED.</p>	<p>INDICATES POSITIONS OF 152 UC 23 RAFTER ROIS</p> <p>* OF MAIN TOP OF MAIN COLUMNS</p> <p>△ INDICATES POSITIONS OF 152 UC 23 EAVES STRIPS</p>	<p>INTERNAL CLADDING</p> <p>THIS DRAWING HAS BEEN PRODUCED WITHOUT THE BENEFIT OF CLADDING DETAILS. CLADDING SUB-CONTRACTOR IS TO ALLOW FOR ALL CLADDING DETAILS TO BE PROVIDED BY THEM FIXED BACK TO THE STEELWORK INDICATED.</p>	<p>INDICATES POSITIONS OF 152 UC 23 RAFTER ROIS</p> <p>* OF MAIN TOP OF MAIN COLUMNS</p> <p>△ INDICATES POSITIONS OF 152 UC 23 EAVES STRIPS</p>
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YSSOL CIVIL&ELEC BRO MORGANWING

SPORTS HALL, IT & BUSINESS STUDIES EXT.

PLAN ON GROUND FLOOR STEEL WORK

SHEAR design

Consulting Civil and Structural Engineers

1836-SDL-00-GF-DR-S-00011

GROUND FLOOR ARRANGEMENT

INDICATES POSITION OF SPAN OF 150mm BEAM & BLOCK. FLOOR TO SPECULATED DESIGN DETAILS AND SPECIFICATION TO SUPPORT THE FOLLOWING LOADS:

LOADS

- IMPOSED = 1.8kN/m²
- FINISHES = 0.5kN/m²
- BLOCK WORK PARTITION = 1.0kN/m²
- 8 & 9 SELF WEIGHT = TO SPECULATED DETAILS

UNPOSED - CARBONDS/STAINS = 4.0kN/m²

OTHERS = 4.0kN/m²

STORAGE ROOMS = 4.5kN/m²

NOTE: FOR CLAYTON AND SETTING OF ALL SERVICE GANGES REFER TO THE DRAWINGS FOR SETTING OUT. SETTING SERVICE FOUNDATIONS TO BE TO THE FINISH OF THE 150mm STABLE GRADED FINISH TOP OF THE STRUCTURAL FLOOR TO THE FLOOR & BEAM.

FOUNDATIONAL NOTES:

- DETAILED FOUNDATION DETAILS INCLUDING THE FOUNDATION ZONES WILL BE COMPILED.
- GROUND BEAMS - ALLOW FOR DEPRESSION FORMING DUE TO BE MINIMUM 15mm FROM EXISTING GROUND LEVEL AND MINIMUM 150mm FROM PROPOSED GROUND LEVEL, WHICHEVER IS GREATER.
- PROPOSED STOPS - ALLOW FOR DEPRESSION FORMING DUE TO BE MINIMUM 15mm FROM EXISTING GROUND LEVEL AND MINIMUM 150mm FROM THE PROPOSED GROUND LEVEL, WHICHEVER IS GREATER.
- 1.0 TO BE REMOVED FROM BELOW FIN AND MINIMUM 150mm FROM PROPOSED GROUND LEVEL. THE SETTING OUT SHALL BE TO BE TO THE FINISH OF THE 150mm STABLE GRADED FINISH TOP OF THE STRUCTURAL FLOOR TO THE FLOOR & BEAM. REFER TO THE FOUNDATIONAL INTERPRETATION REPORT 02/13/14 NOVEMBER 2018.
- ALL SFT SPOTS TO BE REMOVED AND REPLACED WITH LEANMA, IF IN DOUBT ASK SHEAR DESIGN.
- ALL STOP FOUNDATIONS TO BE 300mm DEEP U/LA.
- ALL FOUNDATION REMOVAL LEVELS MUST BE INSPECTED BY BUILDING CONTROL FOR SUFFICIENCY PRIOR TO FORMING FOUNDATIONS.

NOTE:

ALL BLOCKS BELOW DEPT TO HAVE A MINIMUM STRENGTH OF 7N/mm² AND HAVE MINIMUM DENSITY OF 1800 kg/m³ U/LA. SITE SUPERVISION OF BLOCKING DURING REQUIRED.

NOTE:

FOR ALL WALL SETTING OUT REFER TO ARCHITECTS PLANS.

NOTE:

FOUNDATIONAL EXPANSIONS TO BE STOPPED FOR TRANSITION OF FOUNDING LEVELS.

NOTE:

FINAL USE OF SOIL INVESTIGATION REPORTS GROUND CONDITIONS TO HAVE GROUND BEARING PRESSURE OF 100kN/m².

ALL COLUMNS, ANCHORS AT GROUND FLOOR CONTINUE THROUGH TO ROOF STRUCTURE LEVEL.

ALL STEELWORK TO BE GRADE SS35.

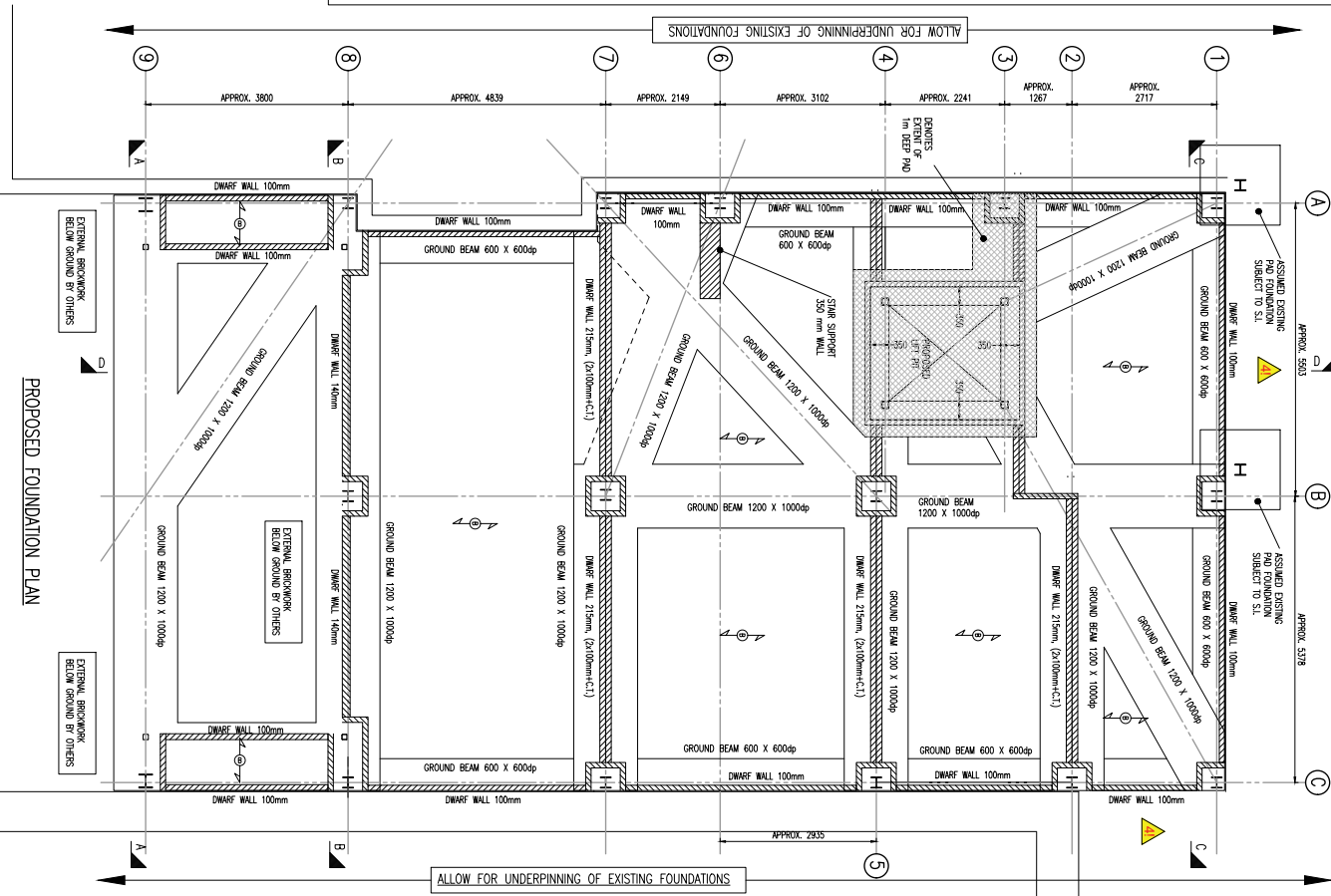
CONCRETE CLASS - SET SOIL INVESTIGATION REPORT

ENGINE / NEW FOUNDATION - ALLOW FOR 20mm COMPRESSIBLE JOINT / GAP BETWEEN FOUNDATIONS

NOTE - LEFT PIT CONSTRUCTION

SOILING GRADE VECS CONCRETE WALLS BASE 250mm TO BE REINFORCED WITH 450g MESH EACH FACE OF WALLS AND 800 @ 100 & 800 / SPACERS WITH 110/250 @ 100/150'S

ALLOW FOR UNDERPINNING OF EXISTING FOUNDATIONS



PROPOSED FOUNDATION PLAN

SEE DRAWING 18136-061 FOR FOUNDATION DETAILS AND UNDERPINNING NOTES

THIS DRAWING HAS BEEN PRODUCED IN ADVANCE OF ARCHITECTS DETAILS AND SITE EXPLORATORY WORKS OF EXISTING FOUNDATION / STRUCTURES FINAL DETAILS / ARRANGEMENT SUBJECT TO CHANGE

NOTES:

1. THIS DRAWING IS TO BE READ IN CONNECTION WITH GEO-ENVIRONMENTAL REPORT
2. IF ANY BEEN ASSIGNED ALL EXISTING FOUNDATIONS AND CONCRETE SLABS HAVE BEEN BROKEN UP WITH LEANMA CONCRETE.
3. ALL SFT SPOTS ARE TO BE REMOVED AND REPLACED WITH LEANMA CONCRETE.
4. ALL MATERIAL THAT IS TO BE REMOVED FROM SITE IS TO FACILITY FOLLOWING WASTE ACCEPTANCE CRITERIA TESTING.
5. ALL FOUNDATION REMOVALS ARE TO BE INSPECTED BY THE BUILDING CONTROL OFFICER PRIOR TO POURING OF CONCRETE.
6. ALLOWANCE TO BE MADE FOR ALL TEMPORARY AND PERMANENT SOCCERET SHUTTINGS TO FOUNDATIONS IN FOUNDATIONS TO BE TAKEN DOWN TO LEVEL OF EXISTING BASEMENT FOUNDATIONS. ALSO ALLOW FOR LOCAL DEFORMATIONS IN RETENERS.

NOTES:

CONTRACTOR TO PROVIDE ALL NECESSARY TRENCHES AND FOUNDATIONS TO BE TAKEN DOWN TO LEVEL OF EXISTING BASEMENT FOUNDATIONS. ALSO ALLOW FOR LOCAL DEFORMATIONS IN RETENERS.

GROUND BEAM REINFORCEMENT

ALLOW FOR 250mm/ft

NOTE - LEFT PIT CONSTRUCTION

ALLOW FOR BEARING GRADE VECS CONCRETE WALLS AND 250mm THICK REINFORCED WITH 450g MESH EACH FACE OF WALLS AND 800 @ 100 & 800 / SPACERS / CORNERS ALLOW FOR BARR RELATING TO STEEL POSTS WATERPROOF CONCRETE TO BE BY DRAWING PRESENTED

NOTES

1. THE SOIL SPECIFICATION FOR FOUNDATION WORKS SHALL BE AS BOLD BROWN SHADING COLE OF PROTECT FOR FOUNDATIONS.
2. ALL LEVELS RELATE TO GROUNDING DATUM UNLESS NOTED OTHERWISE.
3. DO NOT SCALE FROM THIS DRAWING. USE PROVIDED DIMENSIONS ONLY.
4. THE DRAWING IS TO BE READ IN CONNECTION WITH ALL RELEVANT ARCHITECTS, STRUCTURAL AND SERVICES DRAWINGS AND SPECIFICATIONS.
5. THIS DRAWING IS COPYRIGHT © PROPERTY OF SHEAR DESIGN LIMITED.

FOUNDATION NOTES

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5. THIS DRAWING IS COPYRIGHT © PROPERTY OF SHEAR DESIGN LIMITED.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

CONSTRUCTION	IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE WORKS, THE FOLLOWING:
CONSTRUCTION	POSSIBLE EXISTING MATERIALS CONTAINED IN EXISTING FOUNDATIONS.
FOUNDATIONS	CONSTRUCTION ASSIGNED FROM RECORD DRAWINGS TO BE VERIFIED ON SITE BY CONTRACTOR.
FOUNDATIONS	RISK OF UNDERMINING BUILDING FOUNDATIONS - TEMPORARY WORKS TO BE.
FOUNDATIONS	TEMPORARY WORKS TO BE.
FOUNDATIONS	ALLOW FOR BEARING GRADE VECS CONCRETE TO BE BY DRAWING PRESENTED
FOUNDATIONS	CONCRETE WALLS TO BE 250mm THICK REINFORCED WITH 450g MESH EACH FACE OF WALLS AND 800 @ 100 & 800 / SPACERS / CORNERS ALLOW FOR BARR RELATING TO STEEL POSTS WATERPROOF CONCRETE TO BE BY DRAWING PRESENTED
FOUNDATIONS	CONCRETE WALLS TO BE 250mm THICK REINFORCED WITH 450g MESH EACH FACE OF WALLS AND 800 @ 100 & 800 / SPACERS / CORNERS ALLOW FOR BARR RELATING TO STEEL POSTS WATERPROOF CONCRETE TO BE BY DRAWING PRESENTED
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BASIC RADON PROTECTION

REQUIRED BASED ON S.I. REF:10/30/GNS/10 INTEGRAL GEOTECHNIQUE DESK STUDY OF NEIGHBOURING DEVELOPMENT FURTHER RADON INVESTIGATION REQUIRED

ISS9 P16

YSSOL GYMRAEG BRO MORGANNING

CIRCULATION CORE EXTENSION PLAN ON FOUNDATION



GENERAL
 1. ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
 2. ALL LEVELS RELATE TO BOUNDARY DATUM UNLESS NOTED OTHERWISE.
 3. DO NOT SCALE FROM THIS DRAWING. USE DIMENSIONS ONLY.
 4. THE DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, STRUCTURAL AND SERVICES DRAWINGS AND SPECIFICATIONS.
 5. THIS DRAWING IS COPYRIGHT © PROPERTY OF SHEAR DESIGN LIMITED.

FOUNDATION NOTES

1. THE BASE SPECIFICATION FOR FOUNDATION WORKS SHALL BE AS BOLD BROWN SHADING CODE OF PRACTICE FOR FOUNDATIONS.
2. ALL FOUNDATIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE RELEVANT FOUNDATION REPORT.
3. THE EXISTING SHALL BE IMMEDIATELY WEDGED IF ANY VARIATIONS TO THE REPORTED FOUNDATION CONDITIONS.
4. ANY VARIATIONS TO THE REPORTED FOUNDATION CONDITIONS SHALL BE IMMEDIATELY REPORTED TO THE ARCHITECTS.
5. ALL FOUNDATIONS, OLD FOUNDATIONS, EXISTING SERVICES ETC SHALL BE REMOVED FOR THE EXIST OF THE FOUNDATION WORKS AND BACKFILLED TO THE APPROVAL OF THE ARCHITECTS (BANKS).
6. ALL SERVICES FOUNDATIONS ARE TO BE SET OUT CORRECTLY TO SUPPORTED WALL AND (REFER TO ARCHITECTS DRAWINGS).
7. TOP OF FOUNDATION LEVEL TO BE AS NOTED ON THE DRAWING.
8. ALL CONCRETE TO BE CURED ONE.
9. ALL FOUNDATIONS TO 4-600mm MINIMUM STRENGTH OF 7/10/14 AND A MINIMUM CURING PERIOD OF 900 HOURS.
10. ALL FOUNDATIONS TO 4-600mm MINIMUM STRENGTH OF 7/10/14 AND A MINIMUM CURING PERIOD OF 900 HOURS.
11. THE EXISTING PERIMETER SHALL BE EXCAVATED AS PART OF THE DESIGNED FOUNDATION WORKS.
12. EXCAVATION SITE SUPPORT AND PROTECT OF FOUNDATION WORK SHALL BE CONSIDERED UPON THE BASIS OF THE FOUNDATION INVESTIGATION REPORT AND AN OVERLAP TRAPAL INVESTIGATION.
13. FOUNDATION WORKS SHALL BE SET OUT CORRECTLY TO BE USED AND Laid STRICTLY IN ACCORDANCE WITH THE ARCHITECTS INSTRUCTIONS AND LAYED TO PER WHERE APPLICABLE AND.
14. ALL CONSTRUCTION TO BE CARRIED OUT IN ACCORDANCE WITH THE BSI STANDARD BS 5800.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE USAGES/PROCESSES NORMALLY ASSOCIATED WITH THE TYPES OF WORK SHOWN ON THIS DRAWING, THE FOLLOWING:

- CONSTRUCTION
- POSSIBLE CHEMISTS MATERIALS CONTAINED IN EXISTING BUILDING:
- CONSTRUCTION ASSUMED FROM RECORD DRAWINGS TO BE VERIFIED ON SITE BY CONTRACTOR.
- RYM OF UNDERPINNING BUILDING FOUNDATIONS - EXISTING WALLS TO BE EXCAVATED AND CONCRETE TO CONTAIN VERTICAL CRACKS.
- MAINTENANCE/DEMOLITION/DECONTAMINATION
- DECOMMISSIONING/DEMOLITION

REFER TO THE DESIGN AND REGISTER FOR FURTHER DETAILS. IT IS ASSUMED THAT ALL THE WORKS ON THIS DRAWING WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WHO HAS OBTAINED A COMPETENT RISK ASSESSMENT.

BASIC RADON PROTECTION
 REQUIRED BASED ON S1
 REF:10730/GNS/10 INTEGRAL
 GEOTECHNIQUE DESK STUDY OF
 NEIGHBOURING DEVELOPMENT
**FURTHER RADON INVESTIGATION
 REQUIRED**

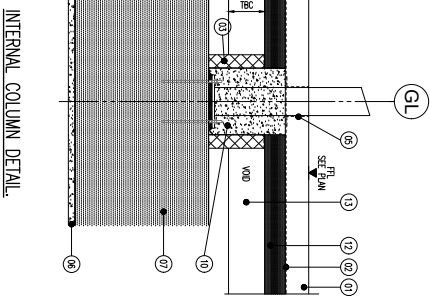
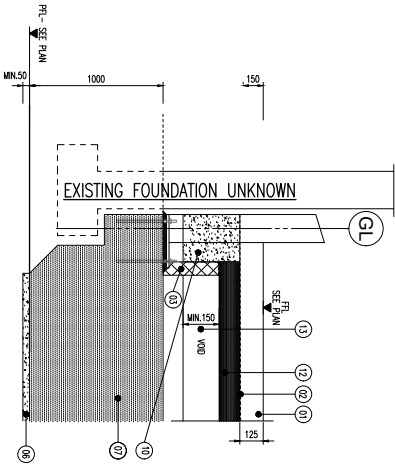
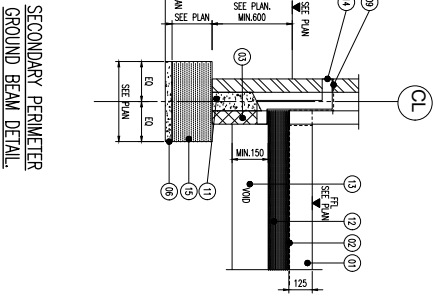
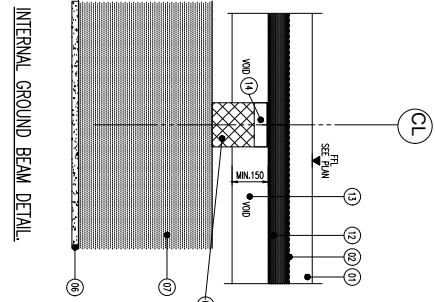
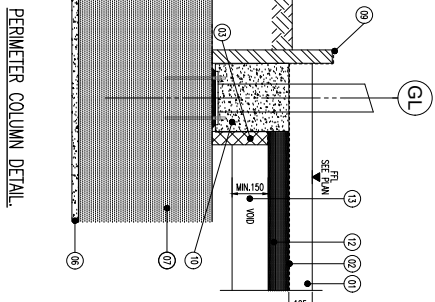
DATE	DESCRIPTION	BY	CHK
15/01/16	ISSUE FOR PERMITS		

YS90L GYMNASIUM BRO MORGANWINGS
 CONSULTATION CORE EXTENSION
 FOUNDATION DETAILS



DATE	DESCRIPTION	BY	CHK
18/03/16	ISSUE FOR PERMITS		

- NOTES**
1. FINISHES REFER TO ARCHITECTS DETAILS AND SPECIFICATION FOR UP/VANILINATION REQUIREMENTS.
 2. 500 GUMS WORKING PLAN.
 3. 7/10/14 TOP OF THE SUPPORT WALL SUPPORTING BEAM & BLOCK REFER TO ARCHITECTS DETAILS.
 4. APPROVED TANKING SYSTEM TO ARCHITECTS/SPECIALIST MANUFACTURERS DETAILS.
 5. DRAIN ROOFING TO COLUMNS PENETRATING GROUND SHALL BE AS PER ARCHITECTS DETAILS.
 6. ALL REINFORCED FOUNDATIONS TO RECEIVE A MIN 50mm BANDING OR LEAN MIX WHEN DOWN TO SUPPORT BEARING STRATA.
 7. 1000mm DEEP REINFORCED RIGID CONCRETE GROUND BEAM.
 8. 7/10/14 SYSTEM SHALL BE SET OUT CORRECTLY TO SUPPORTED WALL AND (REFER TO ARCHITECTS DRAWINGS).
 9. ALL CONCRETE TO BE CURED ONE.
 10. ALL FOUNDATIONS TO 4-600mm MINIMUM STRENGTH OF 7/10/14 AND A MINIMUM CURING PERIOD OF 900 HOURS.
 11. THE EXISTING PERIMETER SHALL BE EXCAVATED AS PART OF THE DESIGNED FOUNDATION WORKS.
 12. EXCAVATION SITE SUPPORT AND PROTECT OF FOUNDATION WORK SHALL BE CONSIDERED UPON THE BASIS OF THE FOUNDATION INVESTIGATION REPORT AND AN OVERLAP TRAPAL INVESTIGATION.
 13. FOUNDATION WORKS SHALL BE SET OUT CORRECTLY TO BE USED AND Laid STRICTLY IN ACCORDANCE WITH THE ARCHITECTS INSTRUCTIONS AND LAYED TO PER WHERE APPLICABLE AND.
 14. ALL CONSTRUCTION TO BE CARRIED OUT IN ACCORDANCE WITH THE BSI STANDARD BS 5800.



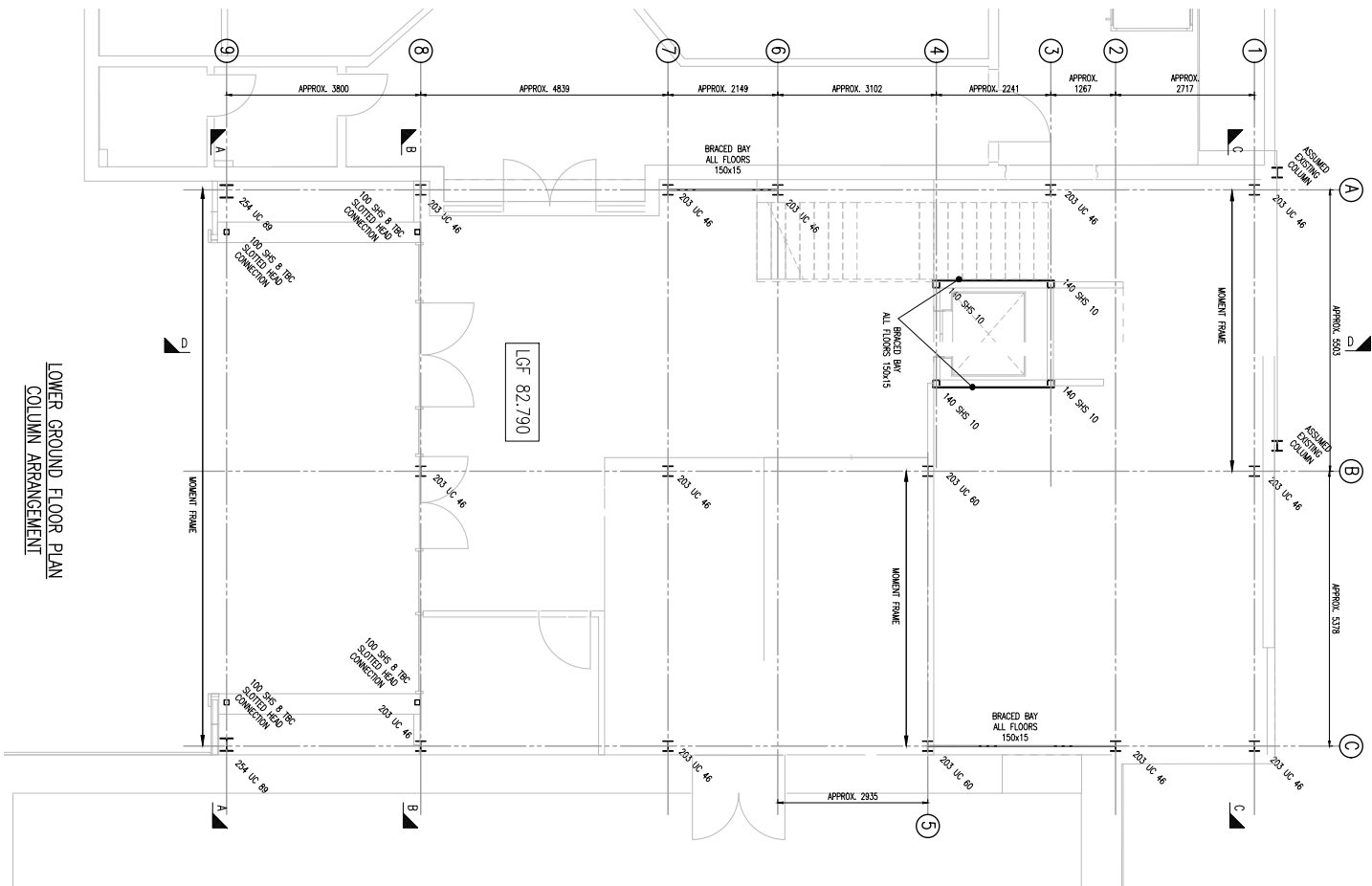
THIS DRAWING HAS BEEN PRODUCED IN ADVANCE OF ARCHITECTS DETAILS AND SITE EXPLORATORY WORKS OF EXISTING FOUNDATION / STRUCTURES FINAL DETAILS / ARRANGEMENT SUBJECT TO CHANGE

WHERE REQUIRED UNDERPINNING WORKS TO BE UNDERTAKEN USING DUE CARE AND ATTENTION BY CONTRACTOR IN ACCORDANCE WITH SPECIFICATION BELOW:

- SPECIFICATION FOR SECTIONAL UNDERPINNING**
1. ALL EXCAVATIONS UNDER THE EXISTING FOUNDATIONS ARE TO BE CARRIED OUT BY HAND. ALL OTHER EXCAVATIONS ARE TO BE CARRIED OUT WITH EXTREME CARE BY HAND WHERE NECESSARY AND BY MECHANICAL MEANS ONLY AS PER SPECIFICATION.
 2. ALL UNDERPINNING SUPPORTS AND STIRRING, FOR HEALTH AND SAFETY REASONS TO MAINTAIN FULL STABILITY AND TO PREVENT DAMAGE TO THE EXISTING STRUCTURE, ARE THE RESPONSIBILITY OF THE CONTRACTOR AND ARE TO BE PROVIDED AS EXCAVATIONS PROCEED.
 3. SECTIONS OF UNDERPINNING ARE TO BE LIMITED TO A MAXIMUM LENGTH OF 1M (OR LESS IF DEEMED APPROPRIATE BY THE CONTRACTOR) AND SPACED TO LEAVE A 2m GAP BETWEEN EACH UNDERPINNING SECTION. I.E. A MAXIMUM OF FOUR FOURTH UNDERPINNING SECTIONS IS TO BE WORKED ON AT ANY ONE TIME.
 4. THE UNDERSIDE OF THE EXISTING FOUNDATION IS TO BE THOROUGHLY CLEANED OF ALL DIRT.
 5. CONCRETE IS TO BE PLACED TO WITHIN 50mm OF THE UNDERSIDE OF THE EXISTING FOUNDATION. LEFT TO CURE FOR 48 HOURS AND THEN PLACED WITH A SAND BAY WORKER MAY FULLY BROWED HOME TO PROVIDE A FULL EVEN SUPPORT BED.
 6. A MINIMUM OF 48 HOURS PRE-PACK CURING TIME IS TO BE ALLOWED BEFORE AN ADDITIONAL UNDERPINNING SECTION IS EXCAVATED.
 7. IF REQUIRED THE SIDES AND BACK OF THE EXCAVATION ARE TO BE SHIELDED TO PREVENT THE COLLAPSE OF THE COLLAPSE OF THE EXCAVATION.
 8. THE CONCRETE IS TO BE PLACED AS QUICKLY AS POSSIBLE (PREFERABLY WITHIN FOUR HOURS AND CENTRALLY ON THE SAME DAY, IN BAY SEQUENTIAL) AFTER THE COMPLETION OF THE EXCAVATION TO EACH SECTION.
 9. CHANGES OR PROTECTS ARE TO BE LEFT IN THE VERTICAL STOP ENDS OF EACH SECTION TO REMAIN WITH THE CONCRETE OF THE ADJACENT SECTIONS.
 10. WORK IS TO PROCEED UNTIL THE ENTIRE FOUNDATION IS UNDERPINNED CONTINUOUSLY.

THIS DRAWING HAS BEEN PRODUCED IN ADVANCE OF ARCHITECTS DETAILS. FINAL DETAILS SUBJECT TO CHANGE

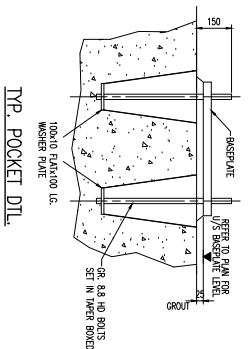
**LOWER GROUND FLOOR PLAN
COLUMN ARRANGEMENT**



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ACCORD TO THE HAZARD/RISK REGISTER ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NONE OF THE FOLLOWING IS APPLICABLE:

- POSSIBLE ASBESTOS MATERIALS CONTAINED IN EXISTING BUILDING.
- CONSTRUCTION ASSUMED FROM RECORD DRAWINGS TO BE CARRIED OUT BY A COMPETENT CONTRACTOR WHO HAS CHANGED OUT A COMPREHENSIVE RISK ASSESSMENT.



SETTING OUT

FINAL SETTING OUT IS SUBJECT TO FINAL ARCHITECTS DESIGN AND COORDINATION WITH THE ARCHITECTS AND A CONSULTANT. ALL LEVELS SHOWN TO BE IN ACCORDANCE WITH THE ARCHITECTS DRAWINGS.

TOP OF CONCRETE

REFER TO FOUNDATION PLAN FOR ALL TOP OF CONCRETE LEVELS. BASECAST DESIGN TO BE CARRIED OUT BY STEEL FABRICATOR.

COLUMNS BELOW GROUND

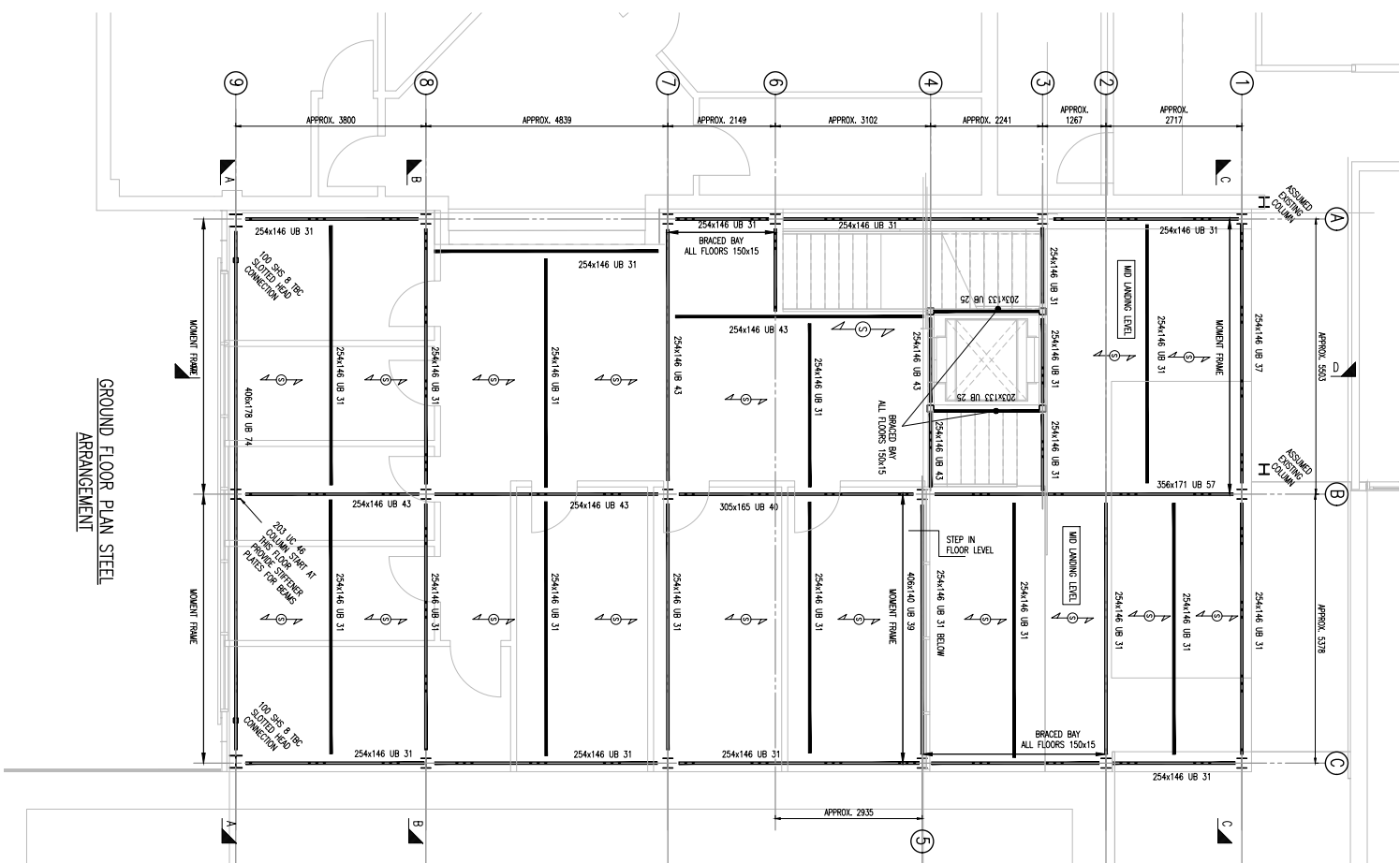
ALLOW FOR 1.2M LENGTH OF COLUMNS BELOW RTL -180

- GENERAL**
- 1. DIMENSIONS ARE IN MILLIMETERS UNLESS STATED OTHERWISE.
 - 2. ALL LEVELS ARE IN METRES UNLESS STATED OTHERWISE.
 - 3. DO NOT SCALE FROM THIS DRAWING. USE PROVIDED DIMENSIONS ONLY.
 - 4. THE DRAWING IS TO BE USED IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, STRUCTURAL AND SERVICES DRAWINGS AND SPECIFICATIONS.
 - 5. THE DRAWING IS COPYRIGHT © PROPERTY OF SHEAR DESIGN LIMITED.
- STEEL NOTES**
- 1. ALL STEELWORK FOR STRUCTURAL STEELWORK SHALL BE S355 JO STEEL.
 - 2. DESIGNER TO PROVIDE CONNECTIONS BETWEEN STEELWORK UNLESS OTHERWISE SPECIFIED BY THE BSA.
 - 3. STRUCTURAL STEELWORK TO BE GALVALUMED FOR PROTECTION.
 - 4. THE MINIMUM SPECIFICATION FOR BOLTS SHALL BE M8 AND ZINC PLATED.
 - 5. HEADING DOWN BOLTS AND WASHER PLATES ARE TO BE SPHERICAL.
 - 6. ALL WELDS TO BE OF 100% PENETRATION FULL WELDS UNLESS OTHERWISE STATED.
 - 7. ALL FLAM DIMENSIONS ARE SHOWN TO CENTRELINE OF BEAMS/COLUMNS.
 - 8. ALL LEVELS INDICATED MUST BE TO THE TOP OF BEAM/COLUMNS.
 - 9. FOR DETAILS OF ROOF PROTECTION TO STEELWORK REFER TO ARCHITECTS DRAWINGS.
 - 10. DESIGN OF ALL TEMPORARY WORK, SHORING AND BRACING SHALL BE THE RESPONSIBILITY OF THE STEELWORK CONTRACTOR.
 - 11. THE CONTRACTOR SHALL NOT FORM ANY HOLES THROUGH STEEL MEMBERS OTHER THAN THOSE FOR CONNECTIONS WITHOUT THE WRITTEN APPROVAL OF THE DESIGNER.
 - 12. ALL GAPPED BOLTS/STAYS SHALL BE TO BE SPHERICAL WITH 6mm CLEARANCE BETWEEN BOLTS/STAYS AND CONNECTIVE PLATE.
 - 13. WHERE DISPAR STEELS ARE TO BE CONNECTED A STRIKE BOLTING MATERIAL SHALL BE INCORPORATED.
 - 14. ALL COLLAR WELDS TO BE SPHERICAL BY THE STEELWORK CONTRACTOR.
 - 15. ALL STEELWORK REQUIRING TIGER WELLS/BOLTS, BOLTERS ETC. ARE TO BE PREPARED WITH 7mm ϕ HOLES ϕ 60mm CENTERS SPACED (GIVEN FITCH ON Dwg).
 - 16. ALL WALL RESTRAINING MEMBERS AND WINDOW FRAMEWORKS TO HAVE COMPOSITE EFFECT.
 - 17. UNLESS OTHERWISE NOTED IN THE PROJECT SPECIFICATION, PROTECTION TREATMENT OF STEELWORK SHALL BE IN ACCORDANCE WITH BRITISH STEEL SYSTEM A HIGH SPECIFICATION (IE OF S355 STEELS AND A FIRST WASH SYSTEM). ALL STEELWORK TO BE CORROSION PROTECTED WITH THE EXTERNAL COAT SYSTEMS TO BE GIVEN TWO COATS OF E.P.M. LIQUID SPERMATOCYD ON ALL SURFACES THAT ARE TO BE EXPOSED OR ENCASED BY THE MAIN CONTRACTOR.
 - 18. ALL STEELWORK TO BE CHECKED CORNER RADIUS, ROUNDED IN CONCRETE BELOW SLAB LEVEL OR HIGHLIGHT OR HIGHLIGHT HIGHLIGHTED WITHIN THE CONCRETE.
 - 19. ALL EXISTING STEELWORK TO BE HOT DIPPED GALVANIZED TO BS 729 (1971) WITH A MINIMUM OF 160 GRAMS PER SQUARE METRE.
 - 20. SPOILED FRAMES ARE COMPATIBLE WITH ANY INSULANT, ANCHORAGE OR F.W.M. CONTAINS WHICH MAY BE APPLIED BY THE MAIN CONTRACTOR.
 - 21. WHERE THE STEELWORK SUBORDINATE BEARS IT TO USE STEEL MEMBERS OF A HIGHER SPECIFICATION THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SO AS TO MAINTAIN CONNECTIONS OR OTHERWISE THEN ANY EXHAUST COST PROPOSED WILL BE IN THEIR OWN CONSIDERATION.

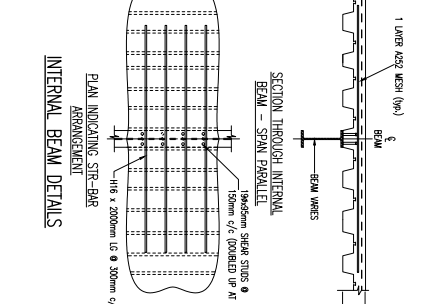
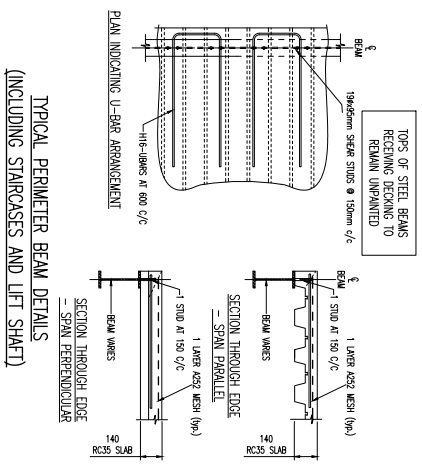
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DATE:	22	SCALE:	AS SHOWN
REVISED:	26	DATE:	JAN 19
REVISION:		SCALE:	1:50 @ A4
PROJECT:	REFER TO ALL CONSTRUCTION/FOUNDATION DRAWINGS		
DRAWN:	D2	INTERVIEWER:	
CHECKED:		DESIGNER:	P1



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	
<ul style="list-style-type: none"> IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING: CONSTRUCTION POSSIBLE ASBESTOS MATERIALS CONTAINED IN EXISTING BUILDINGS CONSTRUCTION ASSIGNED FROM RECORD DRAWINGS TO BE MADE AT THE DISCRETION OF THE CONTRACTOR EXISTING WALLS TO BE REMOVED MAY CONTRIBUTE TO BUILDING STABILITY AS BRICK SHOWN WALLS OR ANY COMMON VERTICAL BREAKS WALLS/CLADDING/CLIMBERS/OVERHANGS DECOMMISSIONING/DEMOLITION 	<p>REFER TO THE DESIGN RISK REGISTER FOR FURTHER DETAILS. IT IS ASSUMED THAT ALL THE WORKS ON THIS DRAWING WILL BE PERFORMED BY A COMPETENT PERSON AS ASSIGNED.</p>



SETTING OUT	
<ul style="list-style-type: none"> FINAL SETTING OUT IS SUBJECT TO FINAL DETAILED DESIGN AND REVISIONS TO THIS DRAWING. ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE. DO NOT SCALE FROM THE DRAWING. USE PROVIDED DIMENSIONS ONLY. THE BEARING TO BE READ AS CONTAINED WITH ALL RELATIVE BEARINGS, SUBORDINATIONS AND SUCCESSIONS DRAWINGS AND SPECIFICATIONS. THIS DRAWING IS COPYRIGHT © PROPERTY OF SHEAR WOOD LIMITED. 	<p>STAIRCASES</p> <p>ALL STAIRCASES TO BE RESIGNED BY OTHERS SUPPORTED BACK TO STEEL BEAMS. ANY ADDITIONAL STEELWORK NOT INDICATED IS TO BE PROVIDED BY THEM FROM BACK TO PRIMARY STEEL.</p> <p>SECONDARY STEEL</p> <p>ALL SECONDARY STEELWORK FOR NEW CLADDING SYSTEM TO BE DESIGNED BY SUB CONTRACTOR.</p> <p>VERTICAL BRACING</p> <p>ALL VERTICAL BRACING PROVIDED BY 'BRACED BAY' TO BE 200x100x10 SHS. ALL VERTICAL BRACING PROVIDED BY 'BRACED BAY' TO BE 200x100x10 SHS. ALL VERTICAL BRACING PROVIDED BY 'BRACED BAY' TO BE 200x100x10 SHS. ALL VERTICAL BRACING PROVIDED BY 'BRACED BAY' TO BE 200x100x10 SHS.</p>

KEY
 DENOTES SPAN OF COMPOSITE DECK: Composite
 80 TO 100 (ESSO), 140mm THICK SLAG

RISERS
 ALL RISER FACEWORK SUBJECT TO CONSTRUCTION WITH ASBESTOS HAZARD ASSESSMENT. CONTRACTOR TO RISE FROM TOOTH TO FACE. SETTING OUT AND TYPICAL CONSTRUCTORS TO ALLOW FOR ALL TRIMMING STEEL REQUIRED TO FORM PROPOSED RISE/FALL/OPENING LOCATIONS.

SIDE RAISLS - CIRCULATION AREA
 ALL CHANGING RAISLS TO BE WELDED STEADY RAISLS FOR 5.0m SPAN. C/C AND MAXIMUM SPACING AS FOLLOW UNLESS OTHERWISE SPECIFIED:
 • RAISLS TO BE AT MAX. 2.0m
 • IN C/C WITH 2 ROWS OF STOPS TO ALL BEAMS
 • HORIZONTAL CLADDING - RAISLS TO BE AT MAX 1.5m C/C WITH 2 ROWS OF STOPS TO ALL BEAMS UNLESS OTHERWISE SPECIFIED.

MASONRY RESISTANT JIES
 RAISLS TO BE INSTALLED STRICTLY IN ACCORDANCE WITH ALL CLADDING MANUFACTURER'S DESIGN AND DETAIL INCLUDING ALL CLEAN FINISHES, ATTACHES THE WINGS AND HIGGS AND SHES'S

ROOF FURLINS - NEW CIRCULATION AREA
 ALL ROOF FURLINS TO BE WELDED 202 X 14 BUTT JOINT SYSTEM WITH MAX 1500 C/C MAX C/W WITH ALL BELOW FURLINS, UNLESS OTHERWISE SPECIFIED AS FOLLOWS:
 • ALLOW 2 ROW OF STOPS TO ALL BEAMS
 • ALLOW 2 ROW OF STOPS TO ALL BEAMS UNLESS OTHERWISE SPECIFIED AS FOLLOWS.

EXTERNAL CLADDING
 THE DRAWING HAS BEEN PRODUCED UNDER THE ASSUMPTION THAT ALL CLADDING DETAILS, CLADDING SUB-COMPARATORS IS TO ALLOW FOR ALL SECONDARY COULD FORMED MEMBERS FINISH THEIR SYSTEM BACK TO THE STEELWORK INDICATED.

*** INDICATES POSITIONS OF 100mm DIA STAIRS & PASSEY POSTS GET WITH 100mm DIA STAIRS**

GENERAL	NOTES
1. ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.	1. THE DESIGNATION FOR STEELWORK SHALL BE SHEAR WOOD LIMITED STEELWORK. DESIGN STEELWORK USE OF STEELWORK IN BUILDING AND THE NATIONAL STEELWORK SPECIFICATION PRODUCED BY THE BSA.
2. DO NOT SCALE FROM THE DRAWING. USE PROVIDED DIMENSIONS ONLY.	2. CALCULATIONS AND A FULL SET OF DETAIL DRAWINGS FOR APPROVAL.
3. THE BEARING TO BE READ AS CONTAINED WITH ALL RELATIVE BEARINGS, SUBORDINATIONS AND SUCCESSIONS DRAWINGS AND SPECIFICATIONS.	3. THE NATIONAL STEELWORK SPECIFICATION FOR APPROVAL.
4. THIS DRAWING IS COPYRIGHT © PROPERTY OF SHEAR WOOD LIMITED.	4. THE NATIONAL STEELWORK SPECIFICATION FOR APPROVAL.
5. ALL BEAMS TO BE 254x146 UB 31 UNLESS OTHERWISE SPECIFIED.	5. THE NATIONAL STEELWORK SPECIFICATION FOR APPROVAL.
6. ALL BEAMS TO BE 254x146 UB 31 UNLESS OTHERWISE SPECIFIED.	6. THE NATIONAL STEELWORK SPECIFICATION FOR APPROVAL.
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9. THE DETAILS OF THE PROTECTION IN STEELWORK REFER TO HAZARDS INFORMATION.	9. THE DETAILS OF THE PROTECTION IN STEELWORK REFER TO HAZARDS INFORMATION.
10. DESIGN OF ALL TEMPORARY WORKS, PROPPING AND BRACING SHALL BE THE RESPONSIBILITY OF THE STEELWORK CONTRACTOR.	10. DESIGN OF ALL TEMPORARY WORKS, PROPPING AND BRACING SHALL BE THE RESPONSIBILITY OF THE STEELWORK CONTRACTOR.
11. THE CONTRACTOR SHALL NOT FORM ANY WALLS THROUGH STEEL MEMBERS OTHER THAN THOSE FOR CONNECTIONS INDICATED BY THE DRAWING PERIOD OF CONSTRUCTION.	11. THE CONTRACTOR SHALL NOT FORM ANY WALLS THROUGH STEEL MEMBERS OTHER THAN THOSE FOR CONNECTIONS INDICATED BY THE DRAWING PERIOD OF CONSTRUCTION.
12. ALL CUTS FORMED DURING CONSTRUCTION SHALL BE TO BE PROVIDED WITH ALL WELDSING, THE WELDSING, SHES, SHES ETC. STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION AND RECOMMENDATIONS, WHERE DESIGNS STATES ARE TO BE CONNECTED A SIMILAR DESIGNING WITH SHES SHALL BE RECOMMENDED.	12. ALL CUTS FORMED DURING CONSTRUCTION SHALL BE TO BE PROVIDED WITH ALL WELDSING, THE WELDSING, SHES, SHES ETC. STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION AND RECOMMENDATIONS, WHERE DESIGNS STATES ARE TO BE CONNECTED A SIMILAR DESIGNING WITH SHES SHALL BE RECOMMENDED.
13. ALL STEELWORK SHALL BE TO BE PROVIDED BY THE STEELWORK SUBCONTRACTOR.	13. ALL STEELWORK SHALL BE TO BE PROVIDED BY THE STEELWORK SUBCONTRACTOR.
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17. UNLESS OTHERWISE STATED IN THE PROJECT SPECIFICATION, PROVISION OF STEELWORK SHALL BE THE RESPONSIBILITY OF THE STEELWORK CONTRACTOR.	17. UNLESS OTHERWISE STATED IN THE PROJECT SPECIFICATION, PROVISION OF STEELWORK SHALL BE THE RESPONSIBILITY OF THE STEELWORK CONTRACTOR.
18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROVISION OF ALL MATERIALS AND LABOUR FOR THE CONSTRUCTION OF THE STEELWORK.	18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROVISION OF ALL MATERIALS AND LABOUR FOR THE CONSTRUCTION OF THE STEELWORK.
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YSSOL CIVILWARES BRO MORGANWING

CIRCUALATION CORE EXTENSION
 PLAN ON GROUND FLOOR STEEL WORK

ISS: P1c

21/08/23

23/08/23

25/08/23

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THIS DRAWING HAS BEEN PRODUCED IN ADVANCE OF ARCHITECTS DETAILS. FINAL DETAILS SUBJECT TO CHANGE

Shearwood
 Consulting Civil and Structural Engineers

18136-SD1-00-GL-DR-S-00071

P1

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPE OF WORK DETAIL ON THIS DRAWING, NOTE THE FOLLOWING:
CONSTRUCTION
● POSSIBLE ASBESTOS MATERIALS CONTAINED IN EXISTING BUILDING.
▲ FURTHER ASSESSMENT FROM RESPECTIVE STRUCTURAL ENGINEERS TO BE COMPLETED ON SITE BY CONTRACTOR.
▲ RISK OF UNDERMINING BUILDING FOUNDATIONS - TEMPORARY WORKS TO BE.
▲ EXISTING WALLS TO BE RETAINED MAY CONTRIBUTE TO BUILDING STABILITY AS BRICK SHED WALLS OR MAY MAINTAIN EXISTING STRUCTURE.
DECOMMISSIONING/DEMOLITION
REFER TO THE DESIGN RISK REGISTER FOR FURTHER DETAILS. IT IS ASSUMED THAT ALL THE WORKS ON THIS DRAWING WILL BE CARRIED OUT BY A COMPETENT RISK ASSESSMENT.

SETTING OUT

FLOOR SETTING OUT IS SUBJECT TO FINAL DETAILED DESIGN AND ALL WORKS TO BE SET OUT IN ACCORDANCE WITH THE ARCHITECT'S DRAWINGS.

STARCASTS

ALL STARCASTS TO BE INSTALLED BY OTHER SUPPORTED BACK TO STEEL BEAMS. ANY ADDITIONAL STEELWORK NOT KNOWN TO BE PROVIDED BY THEM MUST BE PROVIDED BY THE CONTRACTOR.

SECONDARY STEEL

ALL SECONDARY STEELWORK FOR NEW CLADDING SYSTEM TO BE DESIGNED BY SUB CONTRACTOR.

VERTICAL BRACING

ALL VERTICAL BRACING PROVIDED BY SUPPORTED PLY TO BE 200mm DIA, 200 x 15 FLAT PLATE CROSS BRACING GAUGE 275.

KEY

INDICATES SPINE OF COMPOSITE DECK. Centreline

RISERS

ALL RISERS INCLUDING THOSE SUBJECT TO CONSTRUCTION WITH ASBESTOS AND LAKE CONSULTANTS PRIOR TO FINAL SETTING OUT AND TOTAL CONTRIBUTORS TO ALLOW FOR ALL FINISHING STEEL REQUIRED TO MATCH EXISTING RISERS/OVERHANG CONDITIONS.

SIDE RAILES - CIRCULATION AREA

ALL CHANGING RAILS TO BE WETTEST STAIRED RAILS FOR 50mm SPAUL, C/C AND MAXIMUM SPACING AS FOLLOWS: 2.0m IN C/C WITH 2 ROWS OF SHCS TO ALL BAYS

- HORIZONTAL CLADDING - RAILS TO BE AT MAX 1.5m C/C WITH 2 ROWS OF S&C ROLES TO ALL BAYS (MAX)

MASONRY RESISTANT JETTES

ALLOW MASONRY RESISTANT JETTES AT 500mm C/C HORIZONTAL ALONG FULL WALL LENGTH FROM TO 1/5 OF ALLOW PROPERLY WETTED TIE STEELWORK AT 225mm C/C WHERE WALLS ARE TO BE ENDED ON EXISTING WALLS.

ROOF FURLINS - NEW CIRCULATION AREA

ALL ROOF FURLINS TO BE WETTEST 202 x 14 BUTT FULL SYSTEM AT MAX 1500 C/C MAX C/W WITH ALL BEARING JOINTS, WETTED RESISTANT SPECIFICATIONS

- ALLOW 2 ROWS OF S&C ROLES AND BAYS STRIPS FOR ALL BAYS

EXTERNAL CLADDING

THIS DRAWING HAS BEEN PRODUCED UNDER THE DIRECTION OF CLADDING DETAILING ENGINEER. CLADDING SIDE-COMPARATOR IS TO ALLOW FOR ALL SECONDARY COULD FORMED MEMBERS FINISH THEIR SYSTEM BACK TO THE STEELWORK INDICATED.

INDICATES POSITIONING OF 100mm DIA & FRAMING POSTS SET 100mm FROM FACE OF STEELWORK

LINTELS

ALL INTERNAL AND EXTERNAL LINTELS TO BE DESIGNED AND DETAIL BY STRUCTURIST

LIFTS

LIFTS BEAM AND LIFT OVERSIL REQUIREMENTS TO BE PROVIDED FOLLOWING RELEVANT STANDARDS FROM LIFT SUPPLIER

THERMAL BREAKS

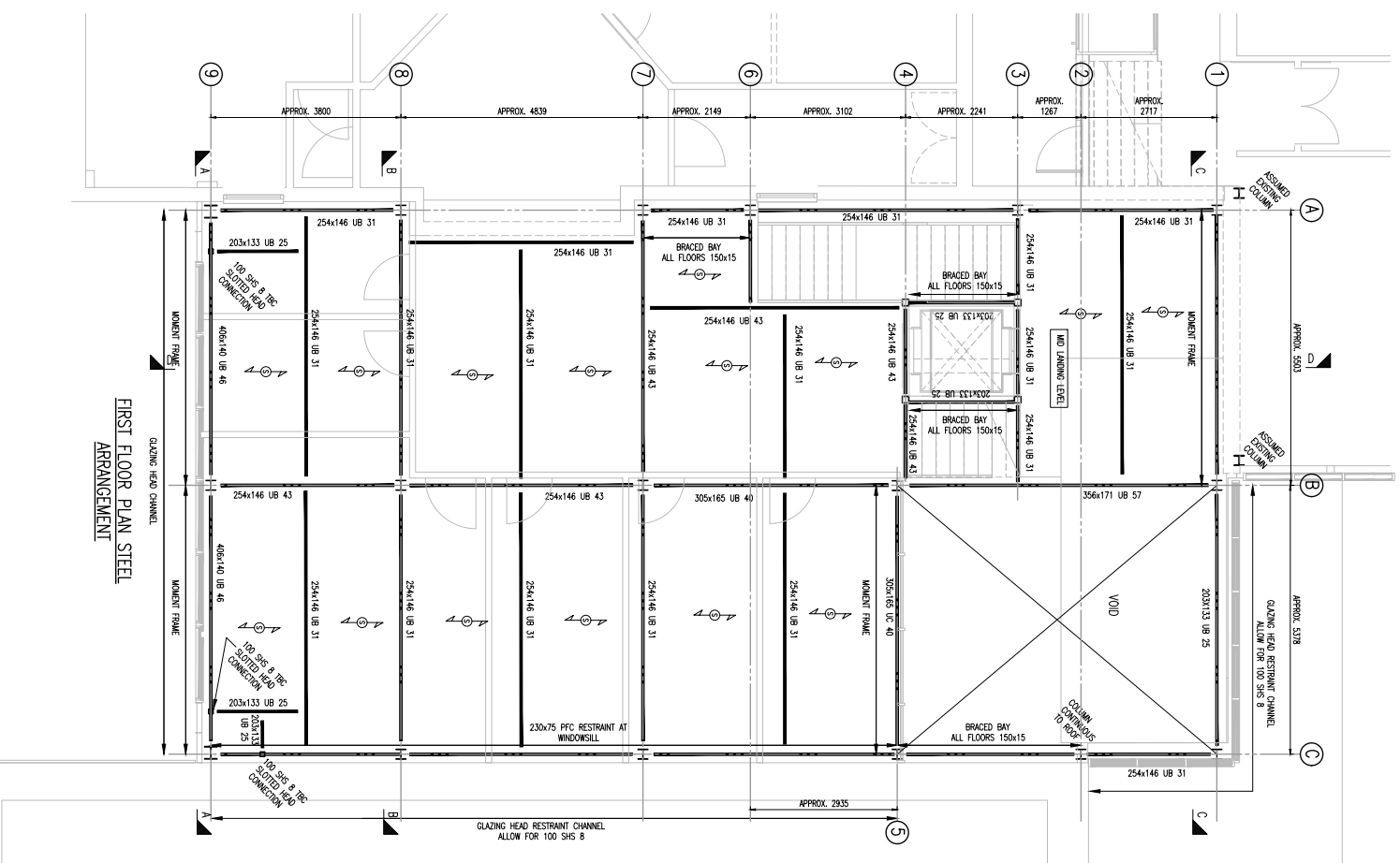
ALL CONNECTION BETWEEN EXTERNAL AND INTERNAL STEEL TO BE MADE USING THERMAL BREAKING SYSTEMS TO BE PROVIDED BY CONTRACTOR TO DETAIL TO DETAILED DRAWING AND CONNECTION BOLT REQUIREMENT

WINDOWS - TRIMMING

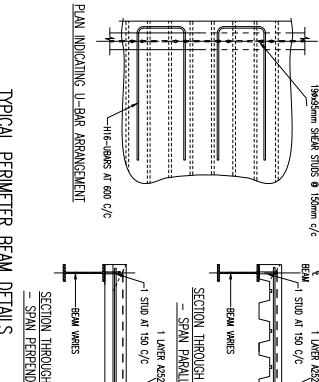
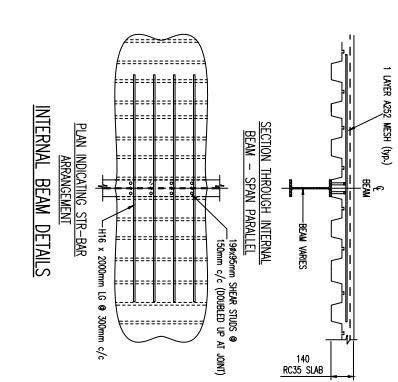
ALL WINDOWS TO BE TRIMMED WITH HOT ROLLED SECTIONS SEE DRAWINGS AND PLAN FOR DETAIL

NOTES

1. ALL LETTERS ARE IN CAPITALS UNLESS NOTED OTHERWISE
 2. ALL LETTERS RELATE TO DIMENSIONS UNLESS NOTED OTHERWISE
 3. DO NOT SCALE FROM THIS DRAWING, USE PROVIDED DIMENSIONS ONLY
 4. ALL DIMENSIONS ARE TO FACE UNLESS NOTED OTHERWISE
 5. THE DRAWING TO BE MADE BY CONTRACTOR WITH ALL RELEVANT ARCHITECTS, STRUCTURAL ENGINEERS AND SERVICES DRAWINGS AND SPECIFICATIONS
 6. THE DRAWING IS CONTRACTOR'S PROPERTY OF STEEL DESIGN LIMITED.
- STEEL NOTES**
1. THE BAY SPACING FOR STRUCTURAL STEELWORK SHALL BE 5000mm UNLESS OTHERWISE SPECIFIED
 2. THE BAY SPACING FOR STRUCTURAL STEELWORK SHALL BE 5000mm UNLESS OTHERWISE SPECIFIED
 3. ALL SECONDARY STEELWORK FOR NEW CLADDING SYSTEM TO BE DESIGNED BY SUB CONTRACTOR
 4. THE NUMBER SPECIFICATION FOR BEAMS SHALL BE OF 8.8 AND 200mm DIA
 5. ALL BEAMS TO BE FROM CONTINUOUS FLAT ROLLED IPEA, S&C
 6. ALL WALLS TO BE FROM CONTINUOUS FLAT ROLLED IPEA, S&C
 7. ALL FLAT DIMENSIONS ARE SHOWN TO CENTERS OF BEAMS/COLUMNS
 8. ALL LINTELS INDICATED THIS WAY ARE TO THE TOPS OF BEAMS/COLUMNS
 9. FOR DETAILS OF THE PROTECTION IN STEELWORK REFER TO ARCHITECTS DRAWINGS
 10. DESIGN OF ALL TEMPORARY WORKS, PROPPING AND BRACING SHALL BE THE RESPONSIBILITY OF THE STEELWORK CONTRACTOR
 11. THE CONTRACTOR SHALL NOT FORM ANY WALLS THROUGH STEEL MEMBERS
 12. ALL CUTS THROUGH PILING/STEERING RAILS ARE TO BE PROVIDED WITH ALL NECESSARY TIE WELDS, STAYS, S&C ROLES ETC. STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATION AND RECOMMENDATIONS
 13. WHERE DESIGNATED STEEL ARE TO BE CONNECTED TO SIMILAR EXISTING STEEL SHALL BE RECORDED
 14. SUBCONTRACTOR
 15. ALL STEELWORK INCLUDING UNDER WELDS, BEAMS ETC. ARE TO BE PROVIDED WITH 2mm x 4mm x 60mm x 60mm COVERS
 16. ALL STEELWORK INCLUDING UNDER WELDS, BEAMS ETC. ARE TO BE PROVIDED WITH 2mm x 4mm x 60mm x 60mm COVERS
 17. ALL STEELWORK INCLUDING UNDER WELDS, BEAMS ETC. ARE TO BE PROVIDED WITH 2mm x 4mm x 60mm x 60mm COVERS
 18. ALL STEELWORK TO BE ENDED OTHER THAN CONCRETE BENCH SHALL BE ENDED BY FULLY WELDED END CONNECTIONS TO BE PROVIDED BY THE CONTRACTOR
 19. ALL STEELWORK TO BE ENDED OTHER THAN CONCRETE BENCH SHALL BE ENDED BY FULLY WELDED END CONNECTIONS TO BE PROVIDED BY THE CONTRACTOR
 20. ALL STEELWORK TO BE ENDED OTHER THAN CONCRETE BENCH SHALL BE ENDED BY FULLY WELDED END CONNECTIONS TO BE PROVIDED BY THE CONTRACTOR
 21. WHERE THE STEELWORK SUBCONTRACTOR DEPENDS UPON THE MEMBER OF A HIGHER SPECIFICATION THAN THOSE SHOWN ON THE DRAWING, THE CONTRACTOR SHALL PROVIDE THE HIGHER SPECIFICATION MEMBER AT HIS OWN RISK AND WITHOUT LIABILITY
 22. ALL STEELWORK TO BE ENDED OTHER THAN CONCRETE BENCH SHALL BE ENDED BY FULLY WELDED END CONNECTIONS TO BE PROVIDED BY THE CONTRACTOR



FIRST FLOOR PLAN STEEL ARRANGEMENT

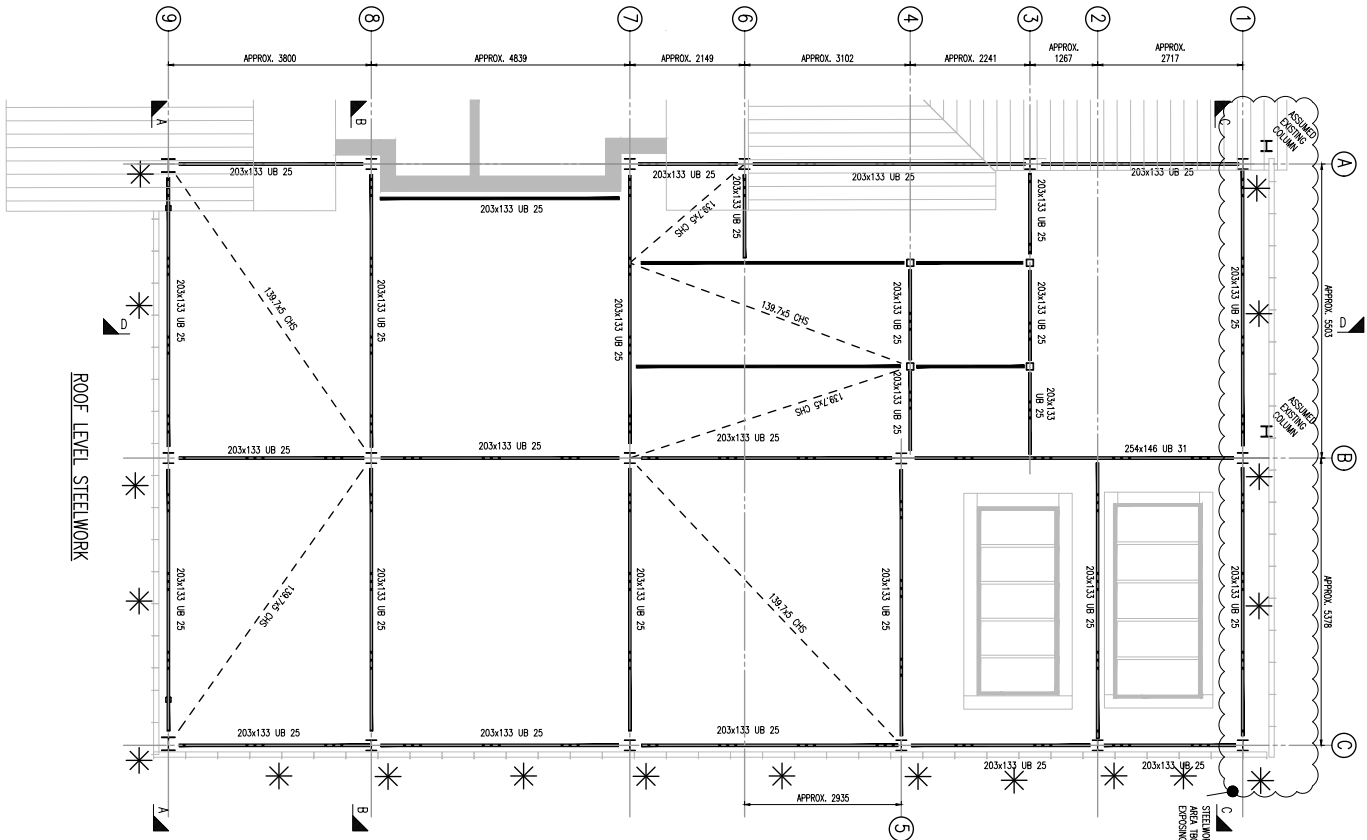


THIS DRAWING HAS BEEN PRODUCED IN ADVANCE OF ARCHITECTS DETAILS. FINAL DETAILS SUBJECT TO CHANGE

CLIENT	YSCOL (THAMES BRO MORGANNING)
PROJECT	CHCULATON CORE EXTENSION PLAN ON FIRST FLOOR STEELWORK
DATE	22 JAN 19
DRAWN BY	DL
CHECKED BY	DL
SCALE	1:50 A 4
REVISED TO	REFER TO THE CONTRACT DRAWINGS FOR ALL CONTRACTORS
NO.	D2
ISSUE	18136-SOI-00-01-DR-S-00072
STATUS	P1

SHAR design
Consulting Civil and Structural Engineers

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SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
<ul style="list-style-type: none"> POSSIBLE ASBESTOS MATERIALS CONTAINED IN EXISTING BUILDINGS. POSSIBLE ASBESTOS EXPOSURE FROM ROOF BRACING TO RISK OF UNDERMINING BUILDING FOUNDATIONS - TEMPORARY WORKS ETC. EXISTING WALLS TO BE REMOVED MAY CONTRIBUTE TO BUILDING STABILITY AS BRICK STEEN WALLS OR ANY CONCRETE STRUCTURAL ELEMENTS. MAINTENANCE/DEMOLITION/OPERATION
<p>REFER TO THE DESIGN RISK REGISTER FOR FURTHER DETAILS. IT IS ASSUMED THAT ALL RISKS ON THIS DRAWING WILL BE IDENTIFIED AND MITIGATED BY THE CONTRACTOR. CHECKED OUT A COMPREHENSIVE RISK ASSESSMENT.</p>

SETTING OUT
<p>FINAL SETTING OUT IS SUBJECT TO FINAL DETAIL DESIGN AND SHALL BE PROVIDED BY THE CONTRACTOR. ALL WORK AND SETTING OUT IN ACCORDANCE WITH THE ARCHITECTS DRAWINGS.</p>
STAIRCASES
<p>ALL STAIRCASES TO BE ASSIGNED TO OTHER SUPPORTED BACK TO STEEL BEAMS. ANY ADDITIONAL STEELWORK NOT INDICATED IS TO BE PROVIDED BY THE CONTRACTOR.</p>
SECONDARY STEEL
<p>ALL SECONDARY STEELWORK FOR NEW CLADDING SYSTEM TO BE DESIGNED BY SUB CONTRACTOR.</p>
VERTICAL BRACING
<p>ALL VERTICAL BRACING EXCEPT FOR STAGED BAY TO BE 200x200x200x12 FLAT PLATE CROSS BRACING, GRADE 275.</p>
KEY
<p>DESIGNER SIGN OF COMPOSITE DECK COMPANY </p>

GENERAL
<ol style="list-style-type: none"> 1. ALL LAYOUTS ARE IN METRES UNLESS NOTED OTHERWISE. 2. ALL LEVELS RELATE TO FINISHED FLOOR LEVEL UNLESS NOTED OTHERWISE. 3. DO NOT SCALE FROM THIS DRAWING. USE DIMENSIONS ONLY. 4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL AUTHORITY. 5. THE DRAWING IS COPYRIGHT © PROPERTY OF SHEAR WATSON LIMITED.
STEEL NOTES
<ol style="list-style-type: none"> 1. THE BASE SPECIFICATION FOR STRUCTURAL STEEL SHALL BE SHEAR RESISTANT STEELWORK (S275) STRUCTURAL STEELWORK (S275) AS PER THE STEELWORK SPECIFICATION (BS5950). 2. ALL LEVELS RELATE TO FINISHED FLOOR LEVEL UNLESS NOTED OTHERWISE. 3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. 4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL AUTHORITY. 5. THE DRAWING IS COPYRIGHT © PROPERTY OF SHEAR WATSON LIMITED.

RISERS
<p>ALL RISER CONNECTIONS SUBJECT TO SPECIFICATION WITH ASSIGNED NUMBER. ALL RISERS SHALL BE PROVIDED WITH 100% COVER TO ALLOW FOR ALL TRAPPING STEEL REQUIRED TO FORM PROPOSED RISER/OPENING LOCATIONS.</p>
SIDE RAILS - CIRCULATION AREA
<ul style="list-style-type: none"> • ALL CLADDING RAILS TO BE WELDED STEEL RAILS FOR 5mm SPAN, C/C AND WINDING SPACING AS FOLLOWS UNLESS OTHERWISE STATED. • VERTICAL CLADDING - RAILS TO BE AT MAX. 2.0m C/C WITH 2 ROWS OF SIDS TO ALL BAYS. • HORIZONTAL CLADDING - RAILS TO BE AT MAX. 1.5m C/C WITH 2 ROWS OF SIDS RAILS TO ALL BAYS UNLESS OTHERWISE STATED.
MASONRY RESTRAINT TIES
<p>RESTRAINT TIES TO BE PROVIDED AT 450mm VERT. SPACING. ALL CLADDING SHALL BE TIED TO THE MASONRY WITH RESTRAINT TIES. TIES TO BE 12mm DIA. STEEL BARS WITH 150mm DIA. CONCRETE ENDS.</p>

ROOF PURLINS - NEW CIRCULATION AREA
<p>ALL ROOF PURLINS TO BE WELDED 200 x 14 ROLL ROLL SYSTEM. ALL PURLINS TO BE WELDED TO THE MAIN BEAMS. ALL PURLINS TO BE WELDED TO THE MAIN BEAMS. ALL PURLINS TO BE WELDED TO THE MAIN BEAMS.</p>
EXTERNAL CLADDING
<p>THE FINISHING HAS BEEN PROVIDED UNLESS THE FINISH OF CLADDING DETAILS. CLADDING SUB-CONTRACTOR IS TO ALLOW FOR ALL SECONDARY COLD FORMED MEMBERS FROM THEIR SYSTEM BACK TO THE STEELWORK INDICATED.</p>
INDICATES POSITIONING OF 100 SIDS & PARALLEL RISERS
LET MAIN UP OF MAIN COLUMNS

LUFTS
<p>ALL INTERNAL AND EXTERNAL LUFTS TO BE DESIGNED AND DETAIL BY SPECIALIST.</p>
THERMAL BREAKS
<p>ALL CONNECTION BETWEEN EXTERNAL AND INTERNAL STEEL TO HAVE THERMAL BREAKS TO PREVENT BRIDGE OF HEAT. APPROVED ARCHITECTS / ENGINEERS DRAWINGS FROM LUFT SUPPLIERS.</p>
WINDOWS, TRIMMING
<p>ALL WINDOWS TO BE FINISHED WITH SET BACK SECTIONS. SEE ELEVATIONS AND PLAN FOR DETAIL.</p>

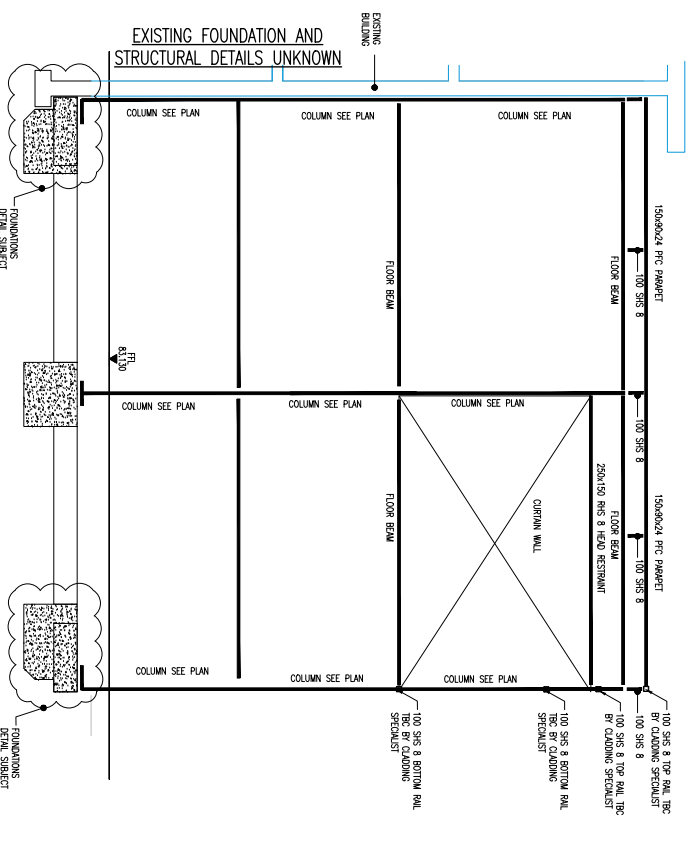
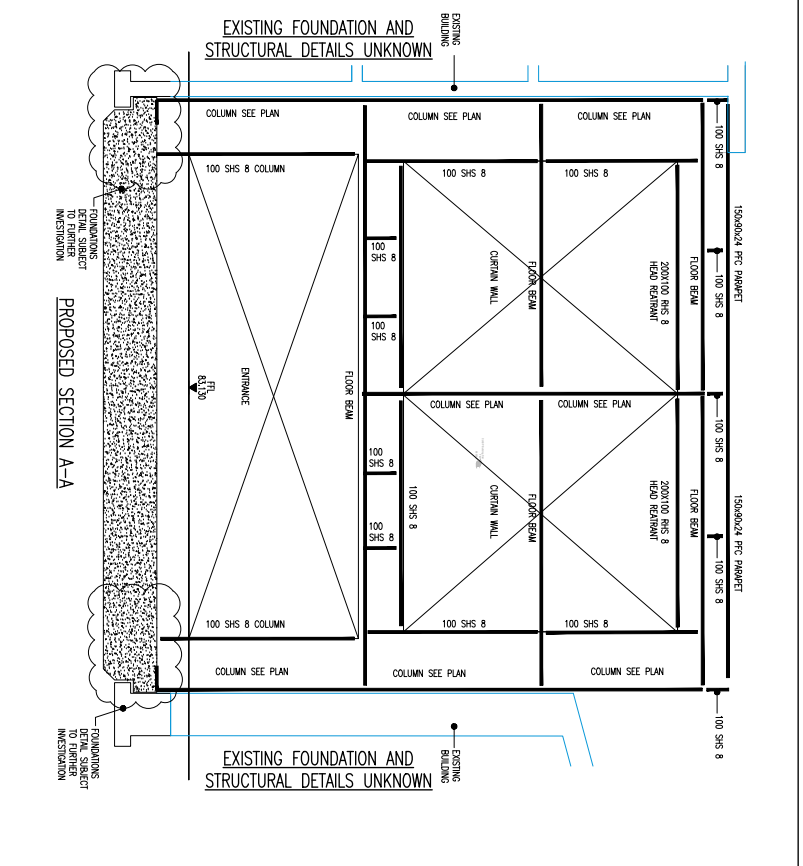
CLIENT	ISSG Plc
PROJECT	VS90QL GYMAREG BRO MORGANNWMS
TITLE	CIRCULATION CORE EXTENSION PLAN ON ROOF STEELWORK
DATE	21/01/19
SCALE	1:50 & A4
DESIGNER	18136-SDL-00-RL-DRS-00073
ISSUED BY	P1



18136-SDL-00-RL-DRS-00073 P1

NOTES

- GENERAL**
1. FOUNDATIONS ARE IN MATTERS UNLESS NOTED OTHERWISE.
 2. ALL LEVELS RELATE TO FINISH FLOOR LEVEL UNLESS NOTED OTHERWISE.
 3. DO NOT SCALE FROM THIS DRAWING. USE DIMENSIONS ONLY.
 4. THE DRAWING TO BE MADE BY CONTRACTOR SHALL PROVIDE ALL DIMENSIONS AND A FULL SET OF DIMENSIONS FOR APPROVAL.
 5. THE DRAWING IS NOT TO BE USED FOR CONSTRUCTION WITHOUT THE WRITTEN APPROVAL OF THE ARCHITECT.
 6. THIS DRAWING IS COPYRIGHT © PROPERTY OF SHEAR DESIGN LIMITED.
- STEEL NOTES**
1. THE BASE SPECIFICATION FOR STRUCTURAL STEELWORK SHALL BE SHEAR RESISTANT STEELWORK DESIGNATION, DESIGN SPECIFICATION, USE OF STEELWORK IN BUILDING AND THE NATIONAL STEELWORK SPECIFICATION PRODUCED BY THE BRICK WORKERS AND BUILDERS ASSOCIATION.
 2. ALL DIMENSIONS SHALL BE TO FACE UNLESS SPECIFICALLY NOTED OTHERWISE.
 3. STRUCTURAL STEELWORK TO BE GRADE S275 OR S355 UNLESS OTHERWISE SPECIFIED.
 4. THE MINIMUM SPECIFICATION FOR BOLTS SHALL BE OF 8.8 AND 10.9 RATED UNLESS OTHERWISE SPECIFIED.
 5. ALL WELDS TO BE FULL PENETRATION BUT NOT TO BE SPALLS BY THE STEELWORK CONTRACTOR UNLESS OTHERWISE SPECIFIED.
 6. ALL WELDS TO BE FULL PENETRATION BUT NOT TO BE SPALLS BY THE STEELWORK CONTRACTOR UNLESS OTHERWISE SPECIFIED.
 7. ALL PLATE DIMENSIONS ARE SHOWN TO CENTRES UNLESS OTHERWISE SPECIFIED.
 8. ALL LEVELS INDICATED SHALL BE TO THE TOPS OF BEAMS/COLUMNS UNLESS OTHERWISE SPECIFIED.
 9. THE DETAILS OF THE PROTECTION TO STEELWORK REFER TO ARCHITECTS DRAWINGS.
 10. DESIGN OF ALL TEMPORARY WORKS, PROFORMING AND BRACING SHALL BE THE RESPONSIBILITY OF THE STEELWORK CONTRACTOR.
 11. THE CONTRACTOR SHALL NOT FORM ANY HOLES THROUGH STEEL MEMBERS WITHOUT THE WRITTEN APPROVAL OF THE ARCHITECT.
 12. ALL COLD FORMED PILING/SYSTEMS/BOLTS ARE TO BE PROVIDED WITH ALL NECESSARY WELDS, STAYS, SPS BOLTS ETC. STRICTLY IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATION AND RECOMMENDATIONS.
 13. WHERE DESIGN STAYS ARE TO BE CONNECTED TO A STRUCTURE OR OTHER MEMBER THEY SHALL BE RECORDED.
 14. ALL STEELWORK RECEIVING TRAFFIC LOADS SHALL BE PROVIDED WITH SUBDIAPHRAGMS.
 15. ALL STEELWORK RECEIVING TRAFFIC LOADS, EXCEPTS ETC. ARE TO BE PROVIDED WITH 12mm x 70x70 x 500mm CHANNELS.
 16. ALL STEELWORK SHALL BE PROVIDED WITH 12mm x 70x70 x 500mm CHANNELS TO RECEIVE TRAFFIC LOADS UNLESS OTHERWISE SPECIFIED.
 17. UNLESS OTHERWISE NOTED IN THE PROJECT SPECIFICATION, PROTECTION TO STEELWORK SHALL BE IN ACCORDANCE WITH BRITISH STANDARDS (BS 595) PART 1 AND PART 2 UNLESS OTHERWISE SPECIFIED.
 18. ALL STEELWORK TO BE EXPOSED (OTHER THAN CONCRETE EXPOSED TO WEATHER) SHALL BE GRAD 220 OR EQUIVALENT UNLESS OTHERWISE SPECIFIED.
 19. ALL EXTERNAL STEELWORK TO BE NOT PROTECT COLOURED TO BS 729 (971) WITH A MINIMUM OF 140 MICROMETRES.
 20. THE STEELWORK CONTRACTOR IS TO ENSURE THAT ANY SHIP OR SITE APPLIED PRIMERS ARE COMPATIBLE WITH ANY FINISHING, PAINTWORK OR PLATE COATINGS WHICH MAY BE APPLIED BY THE MAIN CONTRACTOR.
 21. WHERE THE STEELWORK SUBCONTRACTOR DEPENDS ON THE USE OF MEMBERS OF A LOWER SPECIFICATION THAN THOSE SHOWN ON THE DRAWING, THE CONTRACTOR SHALL PROVIDE EVIDENCE THAT THE LOWER SPECIFICATION MEMBERS WILL BE AT LEAST OF EQUAL STRENGTH AND STIFFNESS TO THE MEMBERS SPECIFIED AND WILL BE AT THEIR OWN RISK OF CONFORMANCE.



THIS DRAWING HAS BEEN PRODUCED IN ADVANCE OF ARCHITECTS DETAILS. FINAL DETAILS SUBJECT TO CHANGE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	
IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING:	
CONSIDERATION	POSSIBLE HAZARDOUS MATERIALS CONTAINED IN EXISTING FOUNDATION MATERIALS.
PRECAUTIONS	WORKERS SHALL BE ADVISED THAT EXISTING FOUNDATIONS MAY CONTAIN ASBESTOS.
CONTROL MEASURES	WORKERS SHALL BE ADVISED THAT EXISTING FOUNDATIONS MAY CONTAIN ASBESTOS.
REMARKS	EXISTING WALLS TO BE REMOVED MAY CONTRIBUTE TO CONTAMINATION OF THE SITE.
DATE	15/08/2024
BY	YSSQL
FOR	YSSQL CIVIL AND STRUCTURAL ENGINEERS

PROJECT: YSSQL CIVIL AND STRUCTURAL ENGINEERS

DATE: 15/08/2024

BY: YSSQL

FOR: YSSQL CIVIL AND STRUCTURAL ENGINEERS

REVISIONS:

NO.	DATE	DESCRIPTION	BY	CHK
1	15/08/2024	ISSUED FOR PERMIT	YSSQL	YSSQL

CLIENT: ISS9 P16

PROJECT: YSSQL CIVIL AND STRUCTURAL ENGINEERS

TITLE: CIRCULATION CORE EXTENSION SECTIONS

DESIGNER: SHEAR DESIGN

PROJECT NO: YSSQL CIVIL AND STRUCTURAL ENGINEERS

DATE: 15/08/2024

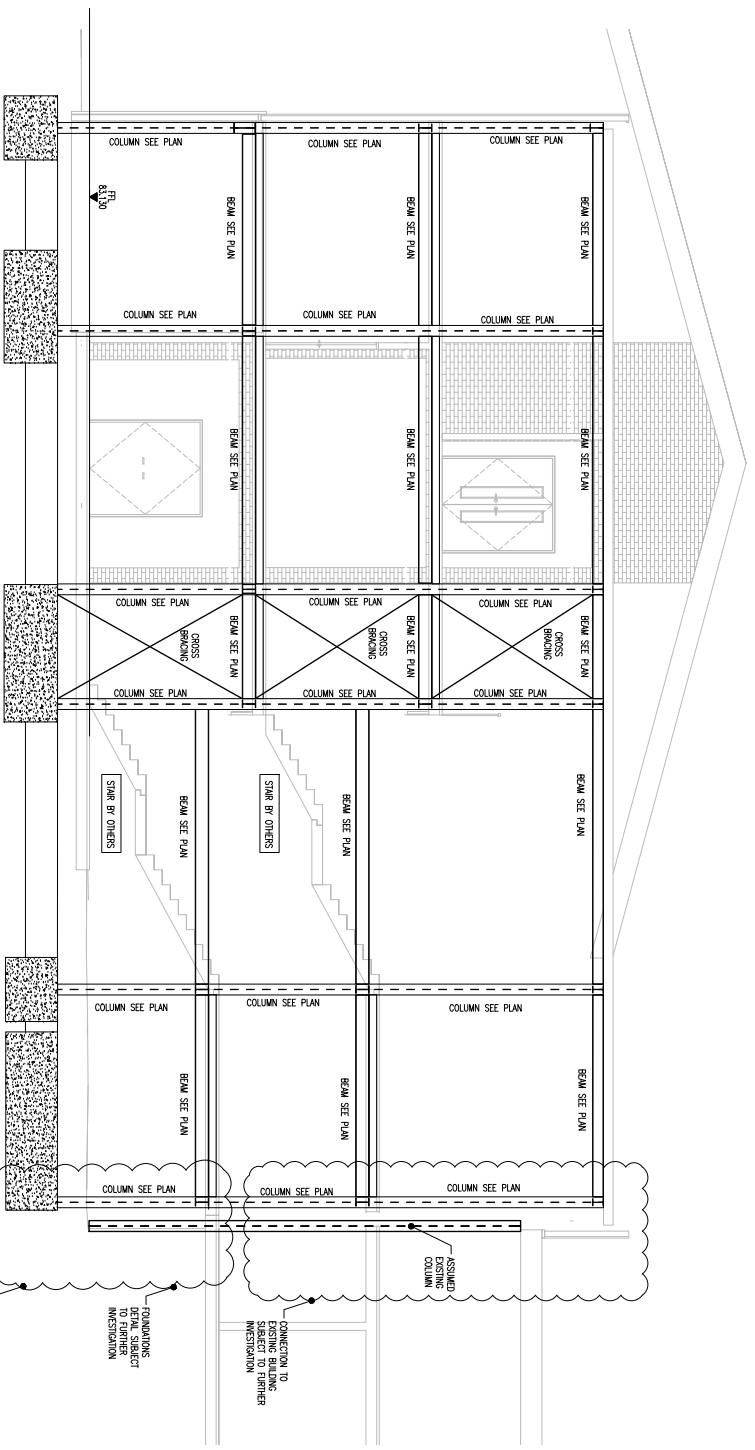
PROJECT NO: YSSQL CIVIL AND STRUCTURAL ENGINEERS

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PROJECT NO: YSSQL CIVIL AND STRUCTURAL ENGINEERS

PROJECT NO: YSSQL CIVIL AND STRUCTURAL ENGINEERS



PROPOSED SECTION- D-D

THIS DRAWING HAS BEEN PRODUCED IN ADVANCE OF ARCHITECTS DETAILS. FINAL DETAILS SUBJECT TO CHANGE

NOTES

- GENERAL**
1. DIMENSIONS ARE IN METERS UNLESS NOTED OTHERWISE.
 2. ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
 3. DO NOT SCALE FROM THIS DRAWING. USE DIMENSIONS ONLY.
 4. THE DRAWING TO BE READ IN CONJUNCTION WITH ALL RELATED ARCHITECTS, STRUCTURAL AND SERVICES DRAWINGS AND SPECIFICATIONS.
 5. THIS DRAWING IS COPYRIGHT © PROPERTY OF SHEAR WATSON LIMITED.
- STEEL NOTES**
1. THE BASE SPECIFICATION FOR STRUCTURAL STEELWORK SHALL BE SHEAR RESISTANT STEELWORK PERFORMED TO THE NATIONAL STEELWORK SPECIFICATION PRODUCED BY THE BSI.
 2. ALL DIMENSIONS FOR CONNECTIONS SHALL BE TO THE CENTERLINE UNLESS OTHERWISE SPECIFIED.
 3. STRUCTURAL STEELWORK TO BE GRADE S275 UNLESS OTHERWISE SPECIFIED.
 4. THE MINIMUM SPECIFICATION FOR BOLTS SHALL BE OF 8.8 AND ZINC PLATED UNLESS OTHERWISE SPECIFIED.
 5. STEELWORK CONNECTIONS SHALL BE TO THE SPECIFICATION OF THE STEELWORK CONTRACTOR UNLESS OTHERWISE SPECIFIED.
 6. ALL WELDS TO BE FROM CONTINUOUS FILLET WELDS UNLESS OTHERWISE SPECIFIED.
 7. ALL PLATE DIMENSIONS ARE SHOWN TO CENTERLINES OF BEAMS/COLUMNS UNLESS OTHERWISE SPECIFIED.
 8. ALL LEVELS INDICATED THEREIN ARE TO THE TOPS OF BEAMS/COLUMNS UNLESS OTHERWISE SPECIFIED.
 9. FOR DETAILS OF THE PROTECTION TO STEELWORK REFER TO ARCHITECTS DRAWINGS.
 10. DESIGN OF ALL TEMPORARY WORKS, PROPPING AND BRACING SHALL BE THE RESPONSIBILITY OF THE STEELWORK CONTRACTOR.
 11. THE CONTRACTOR SHALL NOT FORM ANY HOLES THROUGH STEEL MEMBERS UNLESS OTHERWISE SPECIFIED.
 12. ALL CUTS FOR THE CONNECTIONS SHALL BE TO THE CENTERLINE UNLESS OTHERWISE SPECIFIED.
 13. ALL CUTS FOR THE CONNECTIONS SHALL BE TO THE CENTERLINE UNLESS OTHERWISE SPECIFIED.
 14. WHERE DIMENSIONS ARE TO BE CONNECTED TO A STRUCTURAL MEMBER, DIMENSIONS SHALL BE TO THE CENTERLINE UNLESS OTHERWISE SPECIFIED.
 15. ALL STEELWORK RECEIVING TENSION SHALL BE TO THE CENTERLINE UNLESS OTHERWISE SPECIFIED.
 16. ALL STEELWORK RECEIVING TENSION SHALL BE TO THE CENTERLINE UNLESS OTHERWISE SPECIFIED.
 17. UNLESS OTHERWISE NOTED IN THE PROJECT SPECIFICATION, PROTECTION OF STEELWORK SHALL BE IN ACCORDANCE WITH BRITISH STANDARDS INSTITUTION (BSI) SPECIFICATION FOR THE PROTECTION OF STEELWORK FROM CORROSION BY ENVIRONMENTAL AGENTS (BS 5951) AND A 150μm MINIMUM THICKNESS OF 25 YEARS IS TO BE ASSURED.
 18. ALL STEELWORK TO BE ENCASED (OTHER BARS, ENCASED IN CONCRETE BEAM SLAB LEVEL OR WHOLLY OR PARTIALLY ENCASED WITHIN THE EXTERNAL CONCRETE WALLS) TO BE GIVEN TWO COATS OF RAL 1000 ASPHALT COMPOUND ON ALL SIZES THAT ARE TO BE ENCASED OR OTHERWISE SPECIFIED BY THE ARCHITECT.
 19. ALL EXTERNAL STEELWORK TO BE HOT DIPPED GALVANIZED TO BS 729 (90%) WITH A MINIMUM OF 140 MICRONS.
 20. THE STEELWORK CONTRACTOR IS TO ENSURE THAT ANY SHIP OR SITE APPLIED PRIMERS ARE COMPATIBLE WITH ANY FINISHING, PAINTS OR OTHER PLATE COATINGS WHICH MAY BE APPLIED BY THE MAIN CONTRACTOR.
 21. WHERE THE STEELWORK SUBCONTRACTOR DEPENDS UPON THE MAIN CONTRACTOR FOR THE SUPPLY OF MATERIALS, THE STEELWORK CONTRACTOR SHALL BE RESPONSIBLE FOR THE DELIVERY OF MATERIALS TO THE STEELWORK CONTRACTOR'S WORKS UNLESS OTHERWISE SPECIFIED BY THE ARCHITECT.
 22. THE STEELWORK CONTRACTOR SHALL BE RESPONSIBLE FOR THE DELIVERY OF MATERIALS TO THE STEELWORK CONTRACTOR'S WORKS UNLESS OTHERWISE SPECIFIED BY THE ARCHITECT.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ACCORDANCE WITH THE HAZARDOUS INGREDIENTS REGULATIONS (HIR) THE HAZARDOUS INGREDIENTS LISTED IN THIS DRAWING ARE AS FOLLOWS:

- ▲ POSSIBLE ASBESTOS MATERIALS CONTAINED IN EXISTING BUILDINGS.
- ▲ CONSTRUCTION ASSUMED FROM RECORD DRAWINGS TO BE CARRIED OUT BY THE CONTRACTOR.
- ▲ RISK OF COLLAPSE OF EXISTING BUILDINGS FOUNDATIONS - EXISTING WALLS TO BE REINFORCED AND COMPARTMENTED TO PREVENT COLLAPSE.
- ▲ BUILDING STABILITY AS CHECK SHEAR WALLS ON WAY TO BE MAINTAINED/REINFORCED/REMOVED.

RECOMMENDATIONS/REVISIONS

NO.	DATE	DESCRIPTION	BY	CHECKED
1	15/11/2024	ISSUE FOR PERMIT	AS	AS

PROJECT: YS90L CIVILIARES BROU MORGANINGA

TITLE: CIRCULATION CORE EXTENSION SECTIONS

CLIENT: SHEAR WATSON LIMITED

DATE: 24/11/2024

SCALE: 1:50 & A4

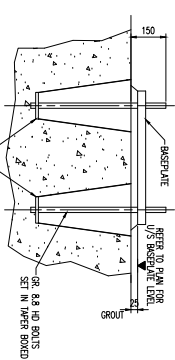
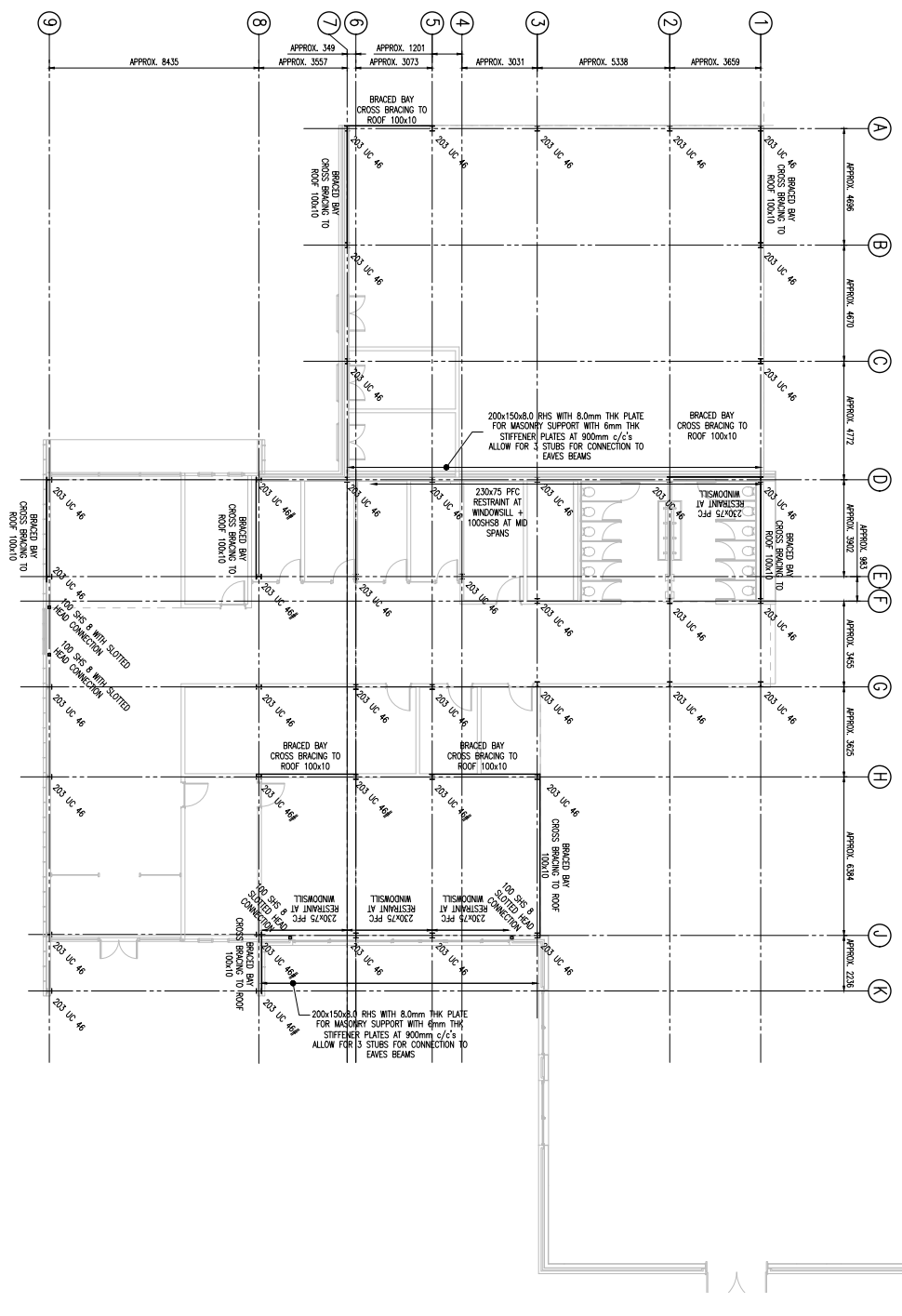
DRAWN BY: AS

CHECKED BY: AS

PROJECT NO: 18136-SDL-00-XX-DR-S-00076

FIGURE NO: P1





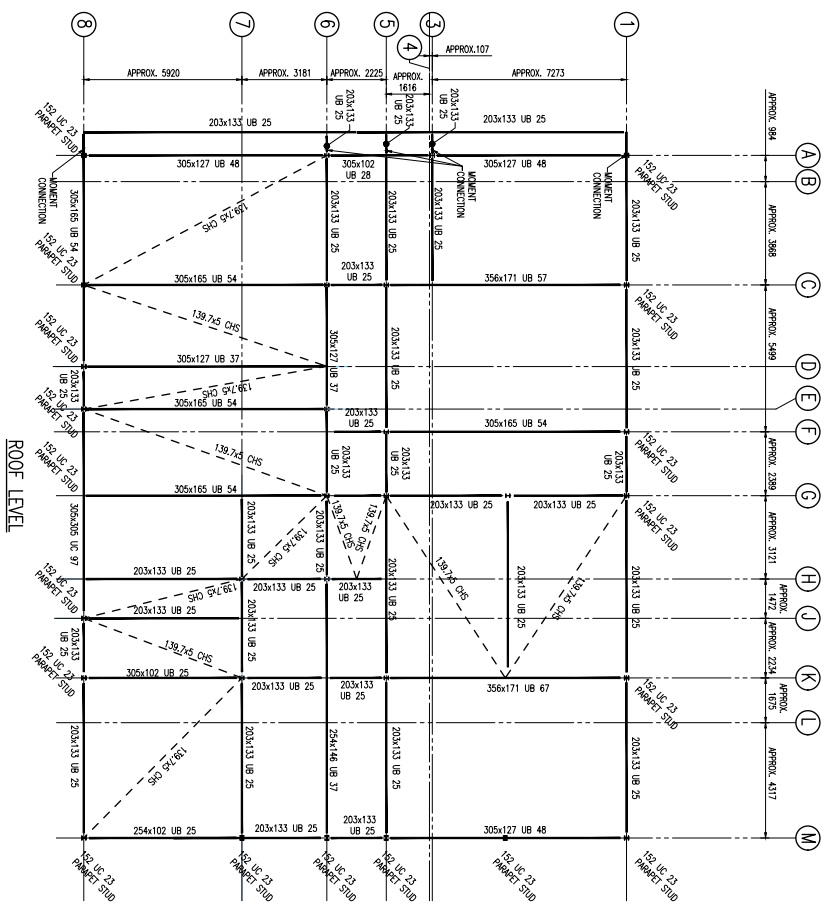
- SETTING OUT**
- FINAL SETTING OUT IS SUBJECT TO FINAL DESIGN AND COORDINATION WITH THE ARCHITECTS AND ALL CONSULTANTS. ALL DIMENSIONS SHALL BE TO FACE UNLESS OTHERWISE SPECIFIED. SETTING OUT SHALL BE ACCORDANCE WITH THE ARCHITECTS DRAWINGS.
- STARCOUSES**
- ALL STARCOUSES TO BE DESIGNED BY OTHERS. STARCOUSES SHALL BE SET IN CONCRETE. ANY ADDITIONAL STEELWORK NOT INDICATED IS TO BE PROVIDED BY THE ARCHITECTS. PROVIDER STEEL WORK.
- TOP OF CONCRETE**
- REFER TO FOUNDATION DRAWINGS FOR ALL TOP OF CONCRETE LEVELS. BASEMENT DESIGN TO BE CARRIED OUT BY STEEL FABRICATOR.

- NOTES**
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
 2. ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
 3. DO NOT SCALE FROM THIS DRAWING. USE PROVIDED DIMENSIONS ONLY.
 4. THE DRAWING IS TO BE USED FOR INFORMATION ONLY. ALL DIMENSIONS SHALL BE TO FACE UNLESS OTHERWISE SPECIFIED.
 5. THE ARCHITECTS DRAWINGS AND SPECIFICATIONS SHALL TAKE PRECEDENCE OVER THIS DRAWING.
 6. THIS DRAWING IS COPYRIGHT © PROPERTY OF SHEAR DESIGN LIMITED.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAIL ON THIS DRAWING, NOTE THE FOLLOWING:
<ul style="list-style-type: none"> ▲ POSSIBLE ASBESTOS MATERIALS CONTAINED IN EXISTING CONSTRUCTION ▲ CONSULTING ASSESSOR ASSIGNED FROM RECORD DRAWINGS TO BE VERIFIED ON SITE BY CONTRACTOR ▲ RISK OF UNDERMINING BUILDING FOUNDATIONS - EMPLOYER WORKS THE
MAINTENANCE/CLIMBING/OPERATION
REGULATIONS/NOTIFICATION
REFER TO THE DESIGN RISK REGISTER FOR FURTHER DETAILS. ALL DESIGN RISK REGISTERED IN THIS DRAWING SHALL BE CARRIED OUT BY THE CONTRACTOR. A COMPREHENSIVE RISK ASSESSMENT SHALL BE CARRIED OUT BY THE CONTRACTOR.

THIS DRAWING HAS BEEN PRODUCED IN ADVANCE OF ARCHITECTS DETAILS AND SITE EXPLORATORY WORKS OF EXISTING FOUNDATION / STRUCTURES FINAL DETAILS / ARRANGEMENT SUBJECT TO CHANGE

<p>Consulting Civil and Structural Engineers</p> <p>100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000 </p>	<p>1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.</p> <p>2. ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.</p> <p>3. DO NOT SCALE FROM THIS DRAWING. USE PROVIDED DIMENSIONS ONLY.</p> <p>4. THE DRAWING IS TO BE USED FOR INFORMATION ONLY. ALL DIMENSIONS SHALL BE TO FACE UNLESS OTHERWISE SPECIFIED.</p> <p>5. THE ARCHITECTS DRAWINGS AND SPECIFICATIONS SHALL TAKE PRECEDENCE OVER THIS DRAWING.</p> <p>6. THIS DRAWING IS COPYRIGHT © PROPERTY OF SHEAR DESIGN LIMITED.</p>
	<p>1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.</p> <p>2. ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.</p> <p>3. DO NOT SCALE FROM THIS DRAWING. USE PROVIDED DIMENSIONS ONLY.</p> <p>4. THE DRAWING IS TO BE USED FOR INFORMATION ONLY. ALL DIMENSIONS SHALL BE TO FACE UNLESS OTHERWISE SPECIFIED.</p> <p>5. THE ARCHITECTS DRAWINGS AND SPECIFICATIONS SHALL TAKE PRECEDENCE OVER THIS DRAWING.</p> <p>6. THIS DRAWING IS COPYRIGHT © PROPERTY OF SHEAR DESIGN LIMITED.</p>



THIS DRAWING HAS BEEN PRODUCED IN ADVANCE OF ARCHITECTS DETAILS AND SITE EXPLORATORY WORKS OF EXISTING FOUNDATION / STRUCTURES FINAL DETAILS / ARRANGEMENT SUBJECT TO CHANGE

- SETTING OUT**
FINAL SETTING OUT IS SUBJECT TO FINAL DETAIL DESIGN AND SHALL BE VERIFIED BY THE CONTRACTOR. ALL MASONRY AND BRICK SETTING OUT IN ACCORDANCE WITH THE ARCHITECTS DRAWINGS.
- VERTICAL BRACING**
ALL VERTICAL BRACING, IDENTIFIED BY BRACKETED BAY TO BE 2ND, DIAGONAL 150 X 151 FLAT PATE CROSS BRACING, GRADE Z75.
- RISERS / ROOF OPENINGS**
ALL RISER LOCATIONS SUBJECT TO COORDINATION WITH ARCHITECT AND USE CONSULTANT PRIOR TO FINAL SETTING OUT AND TOUL CONTRACTORS TO ALLOW FOR ALL TRIMMING STEEL REQUIRED TO FINAL PROPOSED RISER/OPENING LOCATIONS.
- MASONRY RESTRAINT TIES**
ALLOW ANCHOR HEAD RESTRAINT TIES AT 900 C/C HORIZONTALLY ALONG FULL WALL LENGTH FIXED TO U/S OF NEW STEEL BEAMS/PRESSURES.
• TIES TO BE SPACED AT 200 VERT C/C WHERE WALLS BE NEW VERTICAL CLIMBERS.
- ROOF FINISHES**
DESIGN AND TECHNOLOGY BLOCK
ALL ROOF FINISHES TO BE DESIGN FOR 2.18 STEEP RAIN FALL RATE.
NEW STEEL BEAMS/PRESSURES TO BE SUPPLIED TO ACCORDANCE WITH METEC DESIGNER SPECIFICATIONS.
• ALLOW 1 ROW OF 500 RIPS AND DIMS STRIPS FOR ALL SIPS.
- EXTERNAL CLADDING**
THIS DRAWING HAS BEEN PRODUCED WITHOUT THE BENEFIT OF CLADDING DETAILS. CLADDING SUB-CONTRACTOR IS TO ALLOW FOR DETAIL TO THE STEELWORK REQUIRED.
- LINTELS**
ALL INTERNAL AND EXTERNAL LINTELS TO BE DESIGNED AND DETAIL BY SPECIALIST.
- THERMAL BREAKS**
ALL CONCRETE DETACHED EXTERNAL AND INTERNAL STEEL TO HAVE THERMAL BREAKS PLATES FABRIC OR SIMILAR APPROVED ARCHITECT / FABRICATOR TO DETERMINE PLATE THK. AND CONNECTION DETAIL REQUIREMENT.
- WINDOWS TRIMMING**
ALL WINDOWS TO BE TRIMMED WITH HOT ROLLED SECTIONS SEE PLAN FOR SIZES.

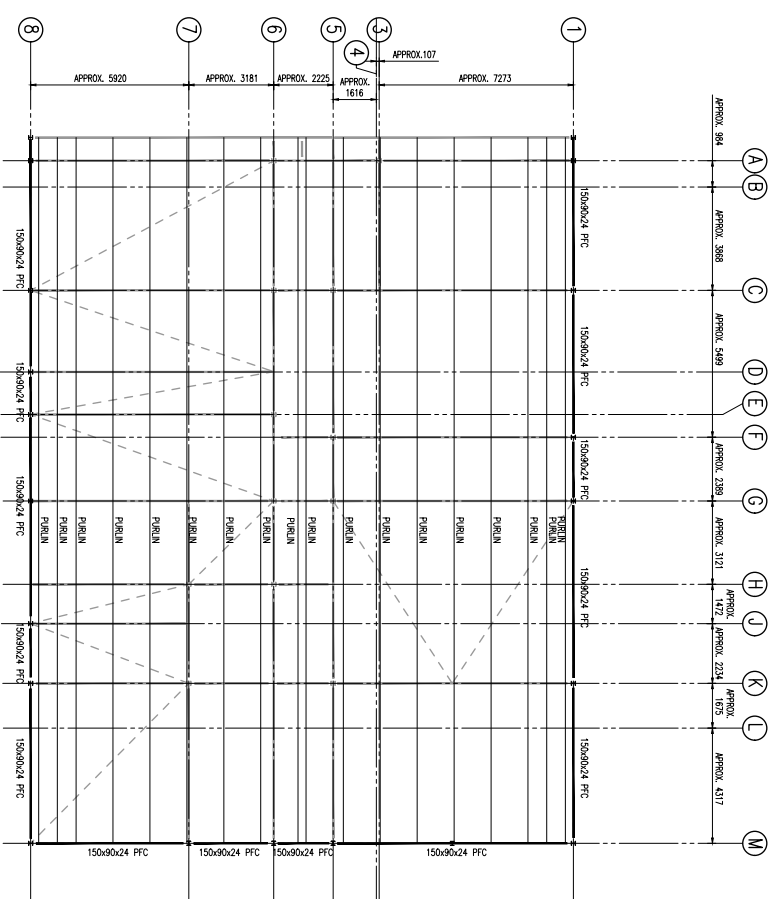
- GENERAL**
1. THE BASE SPECIFICATION FOR STRUCTURAL STEELWORK SHALL BE SHEAR DESIGN USE STEELWORK SPECIFICATION, DESIGN, STRUCTURAL USE OF STEELWORK IN BUILDING AND THE NATIONAL STEELWORK SPECIFICATION PRODUCED BY THE BSA.
 2. ALL LINTELS SHALL BE TO DRAWING DIMENSIONS UNLESS NOTED OTHERWISE.
 3. DO NOT SCALE FROM THIS DRAWING. USE DIMENSIONS ONLY.
 4. THE DRAWING TO BE READ IN CONJUNCTION WITH ALL REVISIONS, REVISIONS, SUBORDINATES AND SPECIALIST DRAWINGS AND SPECIFICATIONS.
 5. THIS DRAWING IS COPYRIGHT © PROPERTY OF SHEAR DESIGN LIMITED.
- STEEL NOTES**
1. THE BASE SPECIFICATION FOR STRUCTURAL STEELWORK SHALL BE SHEAR DESIGN USE STEELWORK SPECIFICATION, DESIGN, STRUCTURAL USE OF STEELWORK IN BUILDING AND THE NATIONAL STEELWORK SPECIFICATION PRODUCED BY THE BSA.
 2. ALL LINTELS SHALL BE TO DRAWING DIMENSIONS UNLESS NOTED OTHERWISE.
 3. DO NOT SCALE FROM THIS DRAWING. USE DIMENSIONS ONLY.
 4. THE DRAWING TO BE READ IN CONJUNCTION WITH ALL REVISIONS, REVISIONS, SUBORDINATES AND SPECIALIST DRAWINGS AND SPECIFICATIONS.
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SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAIL ON THIS DRAWING, NOTE THE FOLLOWING:
CONSTRUCTION	POSSIBLE AGGRESSORS MATERIALS CONTAINED IN EXISTING ROOF BUILD-UP.
ROOF BUILD-UP	CONSTRUCTION ASSUMED FROM RECORD DRAWINGS TO BE IDENTIFIED ON SITE BY CONTRACTOR. CONTRACTOR TO BE ADVISED BY ARCHITECT/ENGINEER/PROJECT MANAGER FOR THE ADVISORY ENGINEER BALDWIN.
WARNING/CLEANING/DECONTAMINATION	
COMMISSIONING/OPERATION	

REFER TO THE DESIGN RISK REGISTER FOR FURTHER DETAILS. ALL DESIGN AND TECHNOLOGY BLOCKS TO BE CHECKED AND APPROVED BY A COMPETENT CONTRACTOR WHO HAS CARRIED OUT A COMPREHENSIVE RISK ASSESSMENT.

Consulting Civil and Structural Engineers

18136 SLDL-00-RL-DR-S-00051



PARAPET LEVEL

SETTING OUT
FINAL SETTING OUT IS SUBJECT TO FINAL DETAIL DESIGN AND ALL WORKERS AND GIRD SETTING OUT IN ACCORDANCE WITH THE ARCHITECT'S DRAWINGS

VERTICAL BRACING
ALL VERTICAL BRACING, IDENTIFIED BY BRACKETED BAY TO BE 2ND, DIMENSIONAL 150 X 151 FLAT PLATE CROSS BRACING, GRADE Z/NS.

RISERS / ROOF OPENINGS
ALL RISER LOCATIONS SUBJECT TO COORDINATION WITH ARCHITECT AND USE CONSULTANT PRIOR TO FINAL SETTING OUT AND TOTAL CONTRACTORS TO ALLOW FOR ALL TRIMMING STEEL REQUIRED TO FORM PREPARED RISER/DAMPING LOCATIONS

MASONRY RESTRAINT TIES
ALLOW ANCHOR HEAD RESTRAINT TIES AT 900 C/C HORIZONTALLY ALONG FULL WALL LENGTH FIXED TO 1/8" OR NEW STEEL BEAMS/PRESSERS
TIES TO BE SPACED AT 2002 VERT C/C WHERE WALLS ARE INTO NEW VERTICAL COLUMNS.

ROOF RAJINS
DESIGN AND TECHNOLOGY BLOCK
ALL ROOF RAJINS TO BE RESIST 202.7, 18 STEEL RAJ INSTEAD OF 18. RAJINS TO BE WELDED TO ALL STEEL BEAMS/PRESSERS, STUDS, STUDS, STUDS ETC. IN ACCORDANCE WITH WETCO DESIGN AND SPECIFICATIONS
ALLOW 1 ROW OF SMC ROOFS AND DAMS STUDS FOR ALL RAJINS

EXTERNAL CLADDING
THIS DRAWING HAS BEEN PRODUCED WITHOUT THE BENEFIT OF CLADDING DETAILS. CLADDING SUB-CONTRACTOR IS TO ALLOW FOR ALL SUBCONTRACTOR TO FORM MEMBERS FROM THEIR SYSTEM PER TO THE STEELWORK DRAWINGS.

LINTELS
ALL INTERNAL AND EXTERNAL LINTELS TO BE DESIGNED AND DETAILLED BY CONTRACTOR

THERMAL BREAKS
ALL CONNECTIONS BETWEEN EXTERNAL AND INTERNAL STEEL TO HAVE THERMAL BREAKS PLATES FABRICATED BY SPECIAL APPROVED ARCHITECT / FABRICATOR TO DETAIL SPECIFIC PATE THK, AND CONNECTION DETAIL REQUIREMENT

WINDOWS TRIMMING
ALL WINDOWS TO BE TRIMMED WITH HOT ROLLED SECTIONS SEE PLAN FOR SIZES

THIS DRAWING HAS BEEN PRODUCED IN ADVANCE OF ARCHITECTS DETAILS AND SITE EXPLORATORY WORKS OF EXISTING FOUNDATION / STRUCTURES FINAL DETAILS / ARRANGEMENT SUBJECT TO CHANGE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION	IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING: CONSIDERATION POSSIBLE AGGRESSIVE MATERIALS CONTAINED IN EXISTING ROOF BUILDINGS CONTRACTOR TO ASSESS RISK FROM REPAIRS TO EXISTING STRUCTURAL MEMBERS TO BE CARRIED OUT ON SITE BY CONTRACTOR LIMITED RECORD STRUCTURAL INFORMATION IS AVAILABLE FOR THE ADJACENT EXISTING BUILDINGS. MAINTENANCE/CLEANING/PREPARATION
DECOMMISSIONING/DEMOLITION	REFER TO THE DESIGN RISK REGISTER FOR FURTHER DETAILS IF IS ASSUMED THAT ALL THE WORKS ON THIS DRAWING WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WHO HAS CARRIED OUT A COMPREHENSIVE RISK ASSESSMENT.

NOTES

- GENERAL
1. THE BASE SPECIFICATION FOR STRUCTURAL STEELWORK SHALL BE SHEAR DESIGN USE STEELWORK SPECIFICATION, B5500. STRUCTURAL USE OF STEELWORK IN BUILDING AND THE NATIONAL STEELWORK SPECIFICATION
 2. ALL LEVELS RELATE TO DRAWING DATA UNLESS NOTED OTHERWISE.
 3. DO NOT SCALE FROM THIS DRAWING. USE DIMENSIONS ONLY.
 4. THE DRAWING TO BE READ IN CONJUNCTION WITH ALL REVISIONS, ARCHITECT'S SUBCONTRACTORS AND SPECIMENS DRAWINGS AND SPECIFICATIONS.
 5. THIS DRAWING IS COPYRIGHT © PROPERTY OF SHEAR DESIGN LIMITED.
- STEEL NOTES
1. THE BASE SPECIFICATION FOR STRUCTURAL STEELWORK SHALL BE SHEAR DESIGN USE STEELWORK SPECIFICATION, B5500. STRUCTURAL USE OF STEELWORK IN BUILDING AND THE NATIONAL STEELWORK SPECIFICATION
 2. ALL LEVELS RELATE TO DRAWING DATA UNLESS NOTED OTHERWISE.
 3. DO NOT SCALE FROM THIS DRAWING. USE DIMENSIONS ONLY.
 4. THE DRAWING TO BE READ IN CONJUNCTION WITH ALL REVISIONS, ARCHITECT'S SUBCONTRACTORS AND SPECIMENS DRAWINGS AND SPECIFICATIONS.
 5. THIS DRAWING IS COPYRIGHT © PROPERTY OF SHEAR DESIGN LIMITED.

SH&AR design
Consulting Civil and Structural Engineers

UNIT: Y500 CIVIL&ECS BRO MOORGANWGS
PROJECT: DESIGN AND TECHNOLOGY BLOCK
PLAN ON ROOF PARAPET STEELWORK

DATE	REV	REVISIONS	BY	CHK
18/38/5DU-00-PL-DR-S-00052				

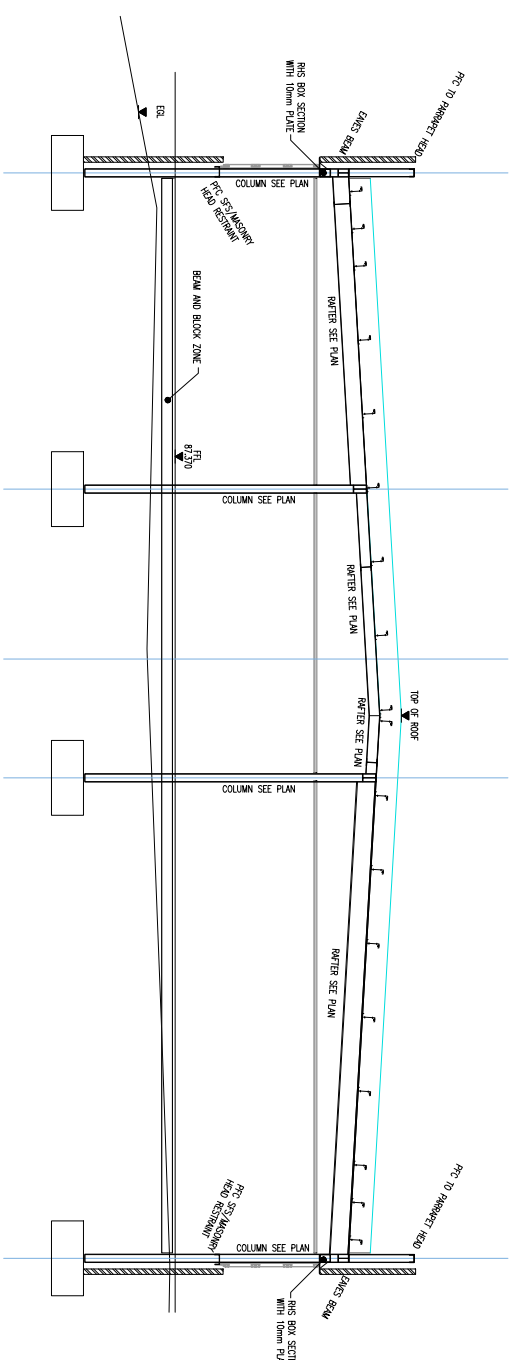
D2

NOTES

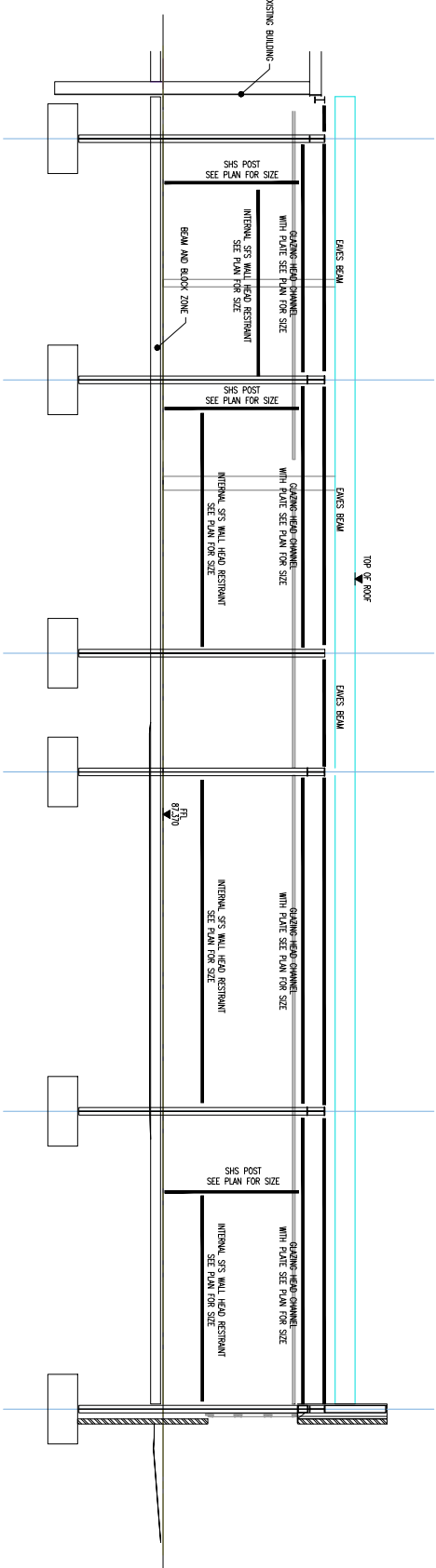
- GENERAL**
1. DIMENSIONS ARE IN METERS UNLESS NOTED OTHERWISE.
 2. ALL LEVELS ARE TO FINISH UNLESS NOTED OTHERWISE.
 3. DO NOT SCALE FROM THIS DRAWING; USE DIMENSIONS ONLY.
 4. THE DRAWING TO BE READ IN CONJUNCTION WITH ALL RELATED ARCHITECTS, STRUCTURALS AND SERVICES DRAWINGS AND SPECIFICATIONS.
 5. THIS DRAWING IS COPYRIGHT © PROPERTY OF SHEAR DESIGN LIMITED.

STEEL NOTES

1. THE BASE SPECIFICATION FOR STRUCTURAL STEELWORK SHALL BE SHEAR RESISTANT UNLESS OTHERWISE SPECIFIED.
2. THE STEELWORK SPECIFICATION, DESIGN, STRUCTURAL USE OF STEELWORK IN BUILDING AND THE NATIONAL STEELWORK SPECIFICATION SHALL BE USED UNLESS OTHERWISE SPECIFIED.
3. STRUCTURAL STEELWORK TO BE GRADE S235 UNLESS OTHERWISE SPECIFIED.
4. THE NATIONAL SPECIFICATION FOR BOLTS SHALL BE BS 44 AND ZINC PLATED.
5. STEELWORK CONNECTIONS SHALL BE TO BE SPECIFIED BY THE ARCHITECT.
6. ALL WELDS TO BE FROM CONTINUOUS FILET WELDS UNLESS OTHERWISE SPECIFIED.
7. ALL PLAN DIMENSIONS ARE SHOWN TO CENTERS UNLESS OTHERWISE SPECIFIED.
8. ALL LEVELS INDICATED THEREIN ARE TO THE TOPS OF BEAMS/COLUMNS UNLESS OTHERWISE SPECIFIED.
9. FOR DETAILS OF FIRE PROTECTION TO STEELWORK REFER TO ARCHITECTS DRAWINGS.
10. DESIGN OF ALL TEMPORARY WORKS, PROPPING AND BRACING SHALL BE THE RESPONSIBILITY OF THE STEELWORK CONTRACTOR.
11. THE CONTRACTOR SHALL NOT FORM ANY HOLES THROUGH STEEL MEMBERS UNLESS SPECIFICALLY AUTHORIZED BY THE ARCHITECT.
12. ALL CUTS FORMED FOR CONNECTIONS SHALL BE TO BE PROVIDED WITH ALL APPROPRIATE WELDS, STIFFENERS, SHEAR BOLTS ETC. STRICTLY IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATION AND RECOMMENDATIONS.
13. WHERE DESIGNATED STEEL ARE TO BE CONNECTED TO SIMILAR DESIGNING MEMBERS, THE CONNECTION SHALL BE TO BE SPECIFIED BY THE ARCHITECT.
14. ALL STEELWORK SHALL BE TO BE PROVIDED BY THE STEELWORK CONTRACTOR.
15. ALL STEELWORK RECEIVING TRUSS WALLS, BEAMS ETC. ARE TO BE PROVIDED WITH 12mm x 400mm x 400mm CHANNELS.
16. ALL STEELWORK SHALL BE TO BE PROVIDED WITH 12mm x 400mm x 400mm CHANNELS.
17. UNLESS OTHERWISE NOTED IN THE PROJECT SPECIFICATION, PROTECTION OF CORROSION OF STRUCTURAL STEELWORK SHALL BE IN ACCORDANCE WITH BRITISH STEEL'S RECOMMENDATIONS FOR THE PROTECTION OF STRUCTURAL STEELWORK FROM CORROSION.
18. ALL STEELWORK TO BE EXPOSED (OTHER BARRIERS, ENCASED IN CONCRETE OR PAINTED) SHALL BE TO BE PROVIDED WITH TWO COATS OF RAL 7002 ASPHALT EMULSION (OR EQUIVALENT) WITH A DRY FILM THICKNESS OF 25 MICROMETERS TO BE APPLIED.
19. ALL EXTERNAL STEELWORK TO BE NOT EXPOSED (UNLESS OTHERWISE SPECIFIED) SHALL BE TO BE PROVIDED WITH TWO COATS OF RAL 7002 ASPHALT EMULSION (OR EQUIVALENT) WITH A DRY FILM THICKNESS OF 25 MICROMETERS TO BE APPLIED.
20. THE STEELWORK CONTRACTOR IS TO ENSURE THAT ANY SHIP OR SITE APPLIED PRIMERS ARE COMPATIBLE WITH ANY FINISHING, PAINTS OR OR OTHER MATERIALS WHICH MAY BE APPLIED BY THE MAIN CONTRACTOR.
21. MEMBERS OF A MEMBER SPECIFICATION SHALL BE SHOWN ON THE DRAWING WITH THE MEMBER SPECIFICATION AND THE MEMBER SPECIFICATION SHALL BE TO BE PROVIDED BY THE ARCHITECT.
22. ANY OTHER COSTS INCURRED WILL BE AT THEIR OWN CONSEQUENCE.



PROPOSED SECTIONS



PROPOSED SECTIONS

19. ALL EXTERNAL STEELWORK TO BE NOT EXPOSED (UNLESS OTHERWISE SPECIFIED) SHALL BE TO BE PROVIDED WITH TWO COATS OF RAL 7002 ASPHALT EMULSION (OR EQUIVALENT) WITH A DRY FILM THICKNESS OF 25 MICROMETERS TO BE APPLIED.
20. THE STEELWORK CONTRACTOR IS TO ENSURE THAT ANY SHIP OR SITE APPLIED PRIMERS ARE COMPATIBLE WITH ANY FINISHING, PAINTS OR OR OTHER MATERIALS WHICH MAY BE APPLIED BY THE MAIN CONTRACTOR.
21. MEMBERS OF A MEMBER SPECIFICATION SHALL BE SHOWN ON THE DRAWING WITH THE MEMBER SPECIFICATION AND THE MEMBER SPECIFICATION SHALL BE TO BE PROVIDED BY THE ARCHITECT.
22. ANY OTHER COSTS INCURRED WILL BE AT THEIR OWN CONSEQUENCE.

NO.	DATE	REVISIONS	BY	CHK
01		ISSUED FOR PERMIT		

PROJECT: YSGL GWYBREG BRO MORGANNWG
 TITLE: DESIGN AND TECHNOLOGY EXTENSION STEELWORK SECTIONS

SHEAR design
 Consulting Civil and Structural Engineers
 20, LAMARCA ROAD, LONDON, E16 1JH
 TEL: 020 8500 2000 FAX: 020 8500 2001
 EMAIL: SALES@SHEARDESIGN.CO.UK
 SHEARDESIGN.CO.UK

DATE: 20 JAN 19
 SCALE: 1:50 A4
 DRAWING NO: YSGL-DR-001-DR-001-001
 SHEET NO: 01 OF 01

DESIGNER: D2
 CHECKER: P1

APPENDIX

iii) Civil and Structural Specifications

GENERAL SPECIFICATION FOR CIVIL ENGINEERING WORKS

1.0 INTRODUCTION

- 1.1 This specification has been prepared to cover the general civil engineering works and is to be read in conjunction with Shear Design's drawings.
- 1.2 This specification must also be read in conjunction with the relevant British Standards/European Codes of Practice, Part H of the Current Building Regulations, The Specification for Highway Works and the Design Manual for Roads and Bridges.
- 1.3 Where specialist manufacturers and their systems are noted on the drawings the Contractor must refer to the relevant specification and installation guides and gain the necessary technical advice and inspections defined by said product.
- 1.4 Any element of the design that is affected by the Contractor's chosen phasing for construction must be notified to Shear Design to ensure that it will not be adverse to the design or compromise the specified materials.
- 1.5 Any change to specified materials/components shown on Shear Design's drawings are to be approved by Shear Design in advance. Such proposals should also have written confirmation from the supplier that the alternative meets the same standard as the previously specified product.
- 1.6 The Contractor is responsible for assessing the temporary works required to achieve the finished article. The Contractor must also consider the phasing of their works and its affects on temporary works. All temporary works are the design responsibility of the Contractor.
- 1.7 This specification covers the following General Civil Engineering Work for:
 - Drainage
 - Public Highway Works
 - External Works
 - Retaining Walls

2.0 DRAINAGE

- 2.1 All drainage works are to be carried out in accordance with Shear Design's drawings and the requirements of BS EN 752 and Part H of the Building regulations.
- 2.2 Where specific Tennant specifications exist, conflicts with standards or Shear Design drawings should be confirmed with Shear Design.
- 2.3 All adoptable drainage works are to be carried out in accordance with the latest Sewers for Adoption edition including addendums provided thereafter by the relevant Water Authority.
- 2.4 Shear Design is only responsible for gaining the technical approval of the relevant adoptable works under a Section 185 Agreement (for diversions) or a Section 104 Agreement (for adoptions). Thereafter it is the Contractor's responsibility to arrange all necessary inspections and CCTV surveys and complete the works to the adopting authority's standards. The Contractor should make due allowance in their program for the procedures/inspections

to be completed and dependent on the agreed contract between the Client and the Contractor, complete the necessary application with the required payments/bonds.

- 2.5** All connections to adoptable sewers are to be made by a Water Authority approved Contractor under a Section 106 Agreement. It is the Contractor's responsibility to make the Section 106 application and get the list of approved connection Contractors. The Contractor must be aware that the Section 106 application may affect the type of connection to be made and as such may affect timescale for the connection. The contractor should be aware that there may be costs associated with the connection applications and water authority supervision fees.
- 2.6** All drainage works within the Public Highway are to be carried out by a licensed Contractor and cannot commence until approval of the relevant Highway Authority had been gained. Such works will be subject to all necessary notices e.g., RASWA, approved traffic management schemes and agreed programs etc.
- 2.7** All relevant inspecting bodies must be informed by the Contractor with sufficient notice for their attendance. Any deviation from the works shown on Shear Design's drawings at the direction of the relevant inspecting body should be verified with Shear Design by the Contractor.
- 2.8** The Contractor shall provide Shear Design with a survey to confirm the point of connection for the drainage, its type (i.e. surface water, foul or combined) diameter, pipe material and invert levels prior to commencement on site.
- 2.9** The Contractor shall locate all services along the route of the proposed drainage by CAT or trial pitting as necessary and inform Shear Design of their findings prior to the start of the works on site.
- 2.10** The Contractor is responsible for assisting in the coordination of the proposed service routes with the proposed drainage to prevent clashes.
- 2.11** The Contractor is to review all Site Investigation, Environmental, Archaeological and Ecological data and ensure compliance with their recommendations with regard to working practice and acceptable materials.
- 2.12** The Contractor is to refer to the Architect's and Mechanical Engineer's drawings for the setting out and type of sanitary drainage point. Should the Mechanical Engineer be part of the Contractor's direct appointments, provision must be made for a Soil and Vent Pipe at the head of each drainage run. Shear Design is not responsible for the above ground sanitary pipe work design.
- 2.13** The Client or Contractors Mechanical Engineer will be responsible for defining the number and location of all Soil and Vent Pipes that penetrate through the roof and not Shear Design.
- 2.14** The Contractor is to refer to all relevant Architects' drawings for the location of all Rain Water Pipes and their diameter.
- 2.15** All external Rain Water Pipes are to connect via a trapped rodable gully pot when connected to a Combined Sewer (directly or indirectly). Rain Water Pipes connected to a separate surface water system can be connected directly at 90° bend at ground level with provision of an online rodding plot.
- 2.16** Any suppliers of specialist rain water systems, such as syphonic drainage, are to provide the discharge rates and specialist details at the point of connection.

- 2.17** All Soil and Vent Pipe/Stub Stack connections are to have a 90° bend with GEN 3 concrete base and surround beneath the ground floor slab. The invert level of this bend is to be set 450mm below the finished floor level. Where the stack extends beyond four storeys in height, the bend must be set 750mm below the finished floor level. The minimum bend radius is to be 200mm to the centreline of the pipe.
- 2.18** All pipe work beneath the building with ground bearing slabs/rafts is to have class Z pipe bedding in accordance with Part H of the Building Regulations.
- 2.19** All pipe penetrations through internal/external walls are to have a minimum 50mm clearance through the hole formed by the precast concrete lintol above. The subsequent void is to be filled with a compressible sealer and rigid formers placed either side of the penetration. 600mm rocker pipes are to be connected 150mm – off the wall face, either side of the wall.
- 2.20** All pipe materials up to 225mm in diameter passing beneath ground bearing foundations are to have trench fill concrete grade GEN 1 taken down either side of the pipe with a 150mm clearance all round. The pipe penetration is to be sand packed with a permanent shutter over to allow formation of the trench fill. Pipe diameters greater than 300mm diameter will be specifically detailed by Shear Design.
- 2.21** All pipe materials are to be in accordance with Table 7 of the Building Regulations, Part H1 and installed by accredited contractors for the relevant material. The Contractor must confirm with the supplier that the materials proposed meet the structural requirements for the location/depth that they are to be used.
- Note: Where drainage is to be adopted by the Water Authority or Highway Authority, their material standards must apply.
- 2.22** The Contractor must refer to the relevant Site Investigation Report to verify whether certain pipe materials cannot be used due to aggressive ground conditions etc. and advise the supplier accordingly.
- 2.23** All new drain runs are to be air tested in accordance with Section 2.60 of the Building Regulations, Part H1 or to the adopting authority standards. Drain runs are also to be CCTV surveyed by an accredited operator with DVD and report supplied prior to practical completion of the works. Where these works are to be adopted, the Contractor must use Water or Highway Authority approved operators for the CCTV survey.
- 2.24** All existing drainage runs to be diverted are to be CCTV surveyed prior to start on site to establish any possible branch connections affected by the diversion.
- 2.25** All abandoned drainage less than 1.5m depth in open ground are to be grubbed up and the trench back filled with Type 1 granular fill material, compacted in 150mm layers up to formation of surfacing to be applied.
- 2.26** Abandoned drainage at depths greater than 1.5m or beneath buildings, are to be concrete plugged with a minimum 1m length of GEN 3 concrete and the remaining pipe fully grouted. All branch connections must also be concrete plugged prior to grouting.

2.27 All manhole dimensions and construction are to satisfy the requirements of the Building Regulations, Part H1, Tables 12 and 14. Any deviation from these is to be approved by Building Control prior to their use. All adoptable drainage manholes are to comply with Sewers for Adoption 6th edition and associated addendums of the relevant Water Authority.

2.28 All manhole covers are to comply with European Standards EN124 and provided under the following basis.

GRADE	USAGE
D400	All adoptable drainage, in public/private highways, car parks, service yards or anywhere, subject to HGV loadings.
B125	Private driveways not subject to heavy duty traffic. Landscape areas subject to maintenance traffic.
A15	Landscape areas not subject to maintenance traffic.

2.29 All internal manholes are to have double sealed bolted covers, recessed to accept finishes and set at finished floor levels. Manhole cover locations are to be coordinated to prevent any clash with future partitions/fit-out equipment.

2.30 All internal floor gullies are to be trapped and rodable with adjustable grating to match proposed finish floor levels.

2.31 All attenuated drainage systems are to utilise a Hydro-Brake Vortex Flow Control by Hydro International or similar device that provides the same discharge characteristics. This item is critical as the Micro drainage design software utilises the Hydro-Brake and any lesser discharge device will affect the design storage volumes.

2.32 All attenuation tanks formed by specialist plastic systems such as Stormcell or Stormbloc, are to be vetted and approved by the supplier as satisfactory for purpose and loading. Where necessary the supplier is to certify their satisfaction with the proposed work.

2.33 The Contractor must take into consideration sequences and working zones in proximity to storage tanks to minimise adverse loading from either construction traffic or storage of materials. Should there be a potential cross-over then the contractor must get verification from the supplier that the temporary loadings are satisfactory or provide a suitable approved method of protecting the constructed storage tank.

2.34 Any porous paving systems are to be installed in accordance with the specialist supplier's details and installation guidelines. The Contractor must consider construction sequences to prevent siltation of the porous sub-grade during the construction phase. If necessary, a Macadam base course as a protective layer should be provided.

3.0 Public Highway Works

- 3.1** All Public Highway construction should be constructed in full accordance with the local authority specifications and the specification for Highway Works, Design Manual for Roads and Bridges, British and European Standards.
- 3.2** All works in a Public Highway must be carried out by a licensed and Local Authority approved contractor. No works are to commence until all necessary notices have been served and the Local Authority has approved the traffic management scheme. This may also apply to scaffolding on public footpaths.
- 3.3** All highway works that are to be carried out under a Section 278 Agreement will be subject to three specific requirements.
- a) Technically Approved Design – to be produced by Shear Design to include Safety Audits as necessary (by others), Street Lighting Design (by others but shown on Shear Design's drawings)
 - b) Completed Section 278 Legal Agreement – to be completed by the Client or Contractor and to include necessary bonds etc.
 - c) Approved Traffic Management Plan – to be produced and agreed by the Contractor with the Local Authority.
- 3.4** The Contractor must take due allowance within their construction programme for the completion of the processes noted in item 3.3 above and give consideration to any related planning conditions.
- 3.5** The Contractor must verify with the Client the schedule of payments in relation to Safety Audits, Local Authority street lighting designs and Traffic Regulation Orders. To assist in this process, the following is an indication of the approximate timescales associated with each aspect.
- a) Traffic Regulation Orders – this is to ensure legal enforcement in a change of the road's usage i.e. a change to a one-way system, parking restrictions etc. This process is subject to Public Consultation and may take between 3 - 6 months.
 - b) Street Lighting Design – this is generally provided by the Local Authority and should be done during the technical approval process and can take approximately 4 weeks to procure.
 - c) Safety Audits – this is required to review the drawings prior to the Local Authority's technical approval. This process might require a site visit and safety review of the report findings to be agreed with the Local Authority and any amendments to be made to the drawings thereafter. This process will take approximately 4 weeks from instruction to the Auditors (2 weeks for the Stage 2 Safety Audit Report and 2 weeks for the Safety Review). A Stage 3 Safety Audit is to be undertaken upon completion of the works.
- 3.6** The Contractor shall be responsible for placing the orders for all necessary service diversions and new connections. These designs may be subject to fees from the statutory undertakers. The Contractor will need to verify the lead in times for each utility and advise the client of any likely adverse effects in relation to procurement timescales for both diversions and/or new supplies. All diversions and new supply cables, pipes, ducting etc. must be in place prior to Practical Completion of the Section 278 Works.
- 3.7** Any off-site trenching works beyond the extent of surfacing covered under the Section 278 Works must be fully reinstated to the Local Authority Highway standard details and approvals.
- 3.8** The interface between existing and proposed surfacing works must be 'feathered' in as per Local Authorities standard details and specifications.

- 3.9** All street lighting to be installed/decommissioned by a Local Authority approved Contractor and coordinated with the local electrical utility to ensure compliance with their specifications for the supply and termination of any old cabling.
- 3.10** All signage and road markings are to be in accordance with the Department of Transport specifications and regulations. These must be installed by a Local Authority approved contractor. Where old road markings are to be replaced by new, they must be fully removed - 'burnt off', not just painted over.
- 3.11** All Section 278 Works will be subject to inspection by the Local Authority during construction and may be subject to minor adjustment to their comments/snagging, within reasonable demands. Should the Contractor feel that certain comments extend beyond the technically approved drawings, they should inform the Client and Shear Design, and if necessary arrange a site meeting with the Local Authority to discuss.
- 3.12** Some new access points onto a Public Highway may not require a Section 278 Agreement and may be completed under either a Section 38 Agreement or a Road Opening Notice/License. The Contractor will be responsible for making the application for these works and should liaise directly with the Local Authority regarding timescales etc. Should the entrance be formed under part of a longer Section 38 Agreement (adapting of new internal roads), then the works will be subject to technical approval as a whole entity and the timescales for this process will have to be considered.
- 3.13** All Section 38 Works for new road adoptions are to be carried out in accordance with the technically approved drawings produced by Shear Design and the Local Authority's standard details, specifications and site inspections.
- 3.14** As per item 3.6 the cabling, ducting and piping for all new service supplies must be provided before completion of any surfacing to the Section 38 works.
- 3.15** The completion of any Section 278 and/or Section 38 works will be subject to inspection by the Local Authority prior to issue of a Practical Completion Certificate. Thereafter a 12 month maintenance period will be served. At the end of the 12 month maintenance period the Contractor must arrange the final inspection with the Local Authority. Any snagging works associated with workmanship raised by the Local Authority must be addressed by the Contractor and re-inspected by the Local Authority. The Contractor must notify the Client and Shear Design of any inspections and subsequent sign off by the Local Authority.
- 4.0 EXTERNAL WORKS**
- 4.1** All external works are to be constructed in accordance with material specifications and tolerances defined in Specification for Highway Works and relevant British/European Standards and Approved Codes of Practice.
- 4.2** The minimum construction depth for all vehicular trafficked areas is to be 450mm subject to the frost susceptibility of the strata. This construction depth is also subject to CBR values. Should there be no CBR test(s) provided within the geotechnical report, the contractor will be required to provide insitu CBR tests at formation prior to start.
- 4.3** CBR tests will define the provision of any capping layer and its necessary depth. These depths are as defined on Shear Design's drawings and are a minimum. Use of specialist geotextile reinforcement can be used to reduce the capping material depths but this must be at the direction of the specialist manufacturers' design and specification.
- 4.4** Should a specialist geotextile be used it must be installed as per the manufacturer's standards including all necessary laps etc. Where subsequent excavations penetrate the geotextile for trenching etc. the Contractor must ensure that the geotextile is clearly cut and replaced including laps to either side of the cuts.

- 4.5** The Contractor must review all relevant Architects' drawings for colours and types of all paving, kerbing and specific surface finishes.
- 4.6** The Contractor must refer to all relevant Architects' drawings for setting out of buildings, kerb lines to footpaths/parking areas and white (yellow for disabled bays) lining.
- 4.7** The Contractor must refer to all relevant Mechanical and Electrical drawings for locations of all service routes and entry points to buildings plus any external mains for watering points/external lighting etc.
- 4.8** The Contractor must peg out the legal boundary defined on the Architect's setting out drawing and advise accordingly of any possible issues with encroachment by third parties. The Contractor must also review the scheme proposals in relation to kerbing, fencing, barriers, lighting etc. that may encroach on third party land.
- 4.9** Where noted on Shear Design's drawings the Contractor will provide additional survey levels to boundaries to allow correct tie in of design levels. These levels are to be provided prior to start on site of the main works.
- 4.10** The Contractor must review all Ecological reports prior to start of any vegetative strip on site to assess any potential time constraints to their start on site. Should an area of dense vegetation be stripped then additional levels are to be provided by the Contractor to Shear Design.
- 4.11** Prior to start on site, the Contractor must review all services data and clearly define the routes of any known services crossing the site. These services are to be located by use of CAT and hand dug trial pits, and then surveyed for location, diameter and depth. These works must be co-ordinated with the relevant undertaker and be to their approvals. The findings of the survey are to be issued to Shear Design prior to start on site. Where loading restrictions are defined by the services, they are to remain pegged out during the works.
- 4.12** The Contractor shall be responsible for placing the orders for all necessary service diversions and new connections. These designs may be subject to fees from the statutory undertakers. The Contractor will need to verify the lead in times for each utility and advise the client of any likely adverse effects in relation to procurement timescales for both diversions and/or new supplies.
- 4.13** The Contractor will be responsible for completing all excavations and back filling to all service routes plus provision of all specialist bases for meters/governors/sub stations etc. in accordance with the utilities' standards, specifications and inspections.
- 4.14** The Contractor shall provide the surfacing to the levels and defined on Shear Design's drawings and in accordance with tolerances defined in the Specification for Highway Works.
- 4.15** The maximum step to the face of the road kerb type HB2 is 150mm down to a minimum of 100mm. Where falls across the kerb face exceed 1 in 80 to a low spot, the Contractor shall provide kerb channels between gullies. Where the gradient exceeds 1 in 125 an alternative method of drainage should be used such as a proprietary drainage channel system.
- 4.16** Use of dropped kerbs at pedestrian crossing points shall not have an upstand greater than 6mm.
- 4.17** All transitions between different kerb types must be done using proprietary kerb transitions where possible.
- 4.18** Where tactile pavements are used at pedestrian crossing points, they are to be aligned to match the crossing route.
- 4.19** All general footpaths adjacent to landscaped areas are to be laid to falls towards the landscaping with flush edging kerbs to allow draining of the pathway.

- 4.20** All vehicle barrier systems are to be installed in accordance with the specialist manufacturer's design.
- 4.21.1** The Contractor is to co-ordinate all signage/CCTV/barrier/fencing/gate bases with proposed drainage, services and kerbing details.
- 5.0 RETAINING WALLS**
- 5.1** All retaining walls are to be in accordance with Shear Design's drawings.
- 5.2** Where a specialist wall system has been shown, the Contractor shall provide Shear Design with details of the manufacturer, type and typical construction details of their preferred wall system. During detailed design stage, Shear Design will co-ordinate proposed levels etc., however the Contractor's chosen walling supplier will be responsible for providing all calculations, general arrangements, foundation designs, specifications and method statements. As a specialist design, they will also be required to provide the necessary levels of professional indemnity insurance.
- 5.3** Where a wall is defined as a highway retaining structure, an Approval in Principle (AIP) will be required. The Contractor will need to make allowance in their program for this approval procedure. Should the AIP be required for a specialist walling system defined by the Local Authority then the specialist wall designer will be required to provide the specification and calculations to the approval of the relevant Local Authority. Note: this approval may also apply to any retaining walls greater than 1.5m in height dependant on the Local Authority's requirements.
- 5.4** The Contractor is responsible for reviewing all proposed retaining structures in relation to their construction sequences and provision of the relevant temporary works. The Contractor will be responsible for the design of all temporary works associated with the installation of their walls.

SPECIFICATION FOR STRUCTURAL STEEL

1.0 GENERAL

- 1.1 This specification covers the general requirements for the supply, fabrication, delivery, welding, bolting and erection of structural steelwork.

All steelwork is to be in accordance with the British Standards quoted in this specification or later versions if applicable and in accordance with the latest edition of the National Structural Steelwork Specification (NSSS) published by the British Construction Association Limited.

Specific clauses in this specification are to be read in conjunction with similar clauses in the NSSS.

The Steelwork Contractor (SC) shall be responsible for obtaining the necessary quantities of steelwork and for deliveries and erection of same in order to meet the required programme.

CE marking of structural steelwork must be in accordance with BS EN 1090-1 and the technical requirements of EXC 2 of EXC 2 of BS EN 1090-2.

- 1.2 The SC is to provide rates for tonnage of steelwork when providing steelwork tender prices to allow for possible alterations/additions to steelwork.

1.3 Responsibility for Design

1.3.1 Permanent Works

The structural members have been designed by the Engineer in accordance with the requirements of BS 5950 to withstand the forces and loads experienced by the structure in position after erection.

The connections between the main structural elements including base plate fixing shall be designed in accordance with the requirements of BS 5950 to withstand the end forces, moments, loads, etc., as detailed on the Engineer's drawings or calculation sheets. The connections are to be designed by the Sub-Contractor and shall be submitted to the Engineers for comment. The SC shall also design and detail all baseplate and holding down bolts. The fabricator will need, where required, to provide a warranty for this design element.

The SC shall satisfy himself at all times of the following:

- a) All connections between structural elements must comply with the requirements of BS 5950 and of the structural action of the elements in question and of the building as a whole.
- b) Any local stiffenings, ties, struts, etc., are provided in keeping with BS 5950 and the design action of the structural elements in question and of the building as a whole.

1.3.2 During Erection and Fabrication of the Works

The SC shall be responsible for the design and provision of steelwork necessitated by his proposed methods of fabrication and erection of the steelwork, and shall provide temporary bracing to ensure stability of the structure at all stages during erection. Where bracing is provided it should not be removed without prior approval of the Engineer in writing.

Notwithstanding the SC's responsibilities for the method of erection of the steelwork, the SC shall submit with his tender details of the following:-

- a) The method proposed for the erection of the structural steelwork.
- b) The plant to be used in the erection of the steelwork.
- c) Temporary works required to enable the assembly of the framework to proceed.

The appointed SC shall submit to the Engineer his calculations for any temporary works.

1.4 British Standards

All materials and workmanship shall comply in all respects with the latest editions of all relevant British Standards and Codes of Practice, except as may be otherwise specified herein.

1.5 Supervisor of the Structural Steelwork

The structural steelwork works shall be supervised throughout by qualified representatives of the SC, who can be shown to have had a thorough experience of the management, fabrication and erection of steel structures.

2.0 DRAWINGS

2.1 Alterations

The SC shall not substitute any other sections from those shown on the Engineer's drawings without the prior approval of the Engineer in writing.

2.2 Engineer's Drawings

The steelwork drawings issued by the Engineer shall be read in conjunction with all other relevant drawings issued in connection with the works as a whole. The SC shall bring any conflict of information to the notice of the Engineer without delay and prior to fabrication.

2.3 Variations

Variations will only be ordered and issued by the Contract Administrator (CA) and the SC shall obtain such a written order prior to acting upon any variation instructions that may be given to him by any other parties.

2.4 Shop Drawings

2.4.1 The SC shall provide all shop drawings and shall submit copies to the Engineer in duplicate for examination not less than three weeks in advance of the start of fabrication of the particular and adjacent structural elements.

2.4.2 Should corrections be necessary, additional copies shall be submitted.

2.4.3 No steelwork shall be fabricated until the SC receives confirmation that the shop drawings are acceptable to the Engineer.

2.4.4 All separate portions of the work shall be distinctly marked on the drawings, etc., to indicate the exact location in which the work has to be fixed.

2.4.5 Notwithstanding any comments by the Engineer on the shop drawings, the SC shall remain responsible of the accuracy of his work which must be in accordance with the Engineers drawings.

2.4.6 After comments of the shop drawings by the Engineer the SC shall not alter the length, shape of fabrication of the steelwork in any way unless otherwise authorised in writing to do so by the Engineer.

2.5 Information to be Complete

The SC's drawings shall give complete information necessary for the fabrication of the component parts of the structure, including the location, type, size and extent of bolts and welds. They shall clearly distinguish between different grades of bolts and types of welds.

2.6 Responsibility for Error in Details

The Engineer's comments shall not in any way relieve the SC of responsibility for any errors subsequently discovered.

2.7 Erection Marks

The separate pieces of the steelwork shall be clearly marked to correspond with the markings indicated on the shop drawings and care shall be taken to ensure that the markings do not affect the efficiency of the protective coatings. Permanent forms of identification shall not be used on exposed steelwork.

3.0 **MATERIALS AND FIXINGS**

3.1 Grade of Steelwork

Structural steel shall be of the grades shown on the Contract Drawings or stated in the Bills of Quantities and shall comply with the requirements of the appropriate British Standard.

Hot rolled sections to be either Grade S275 or S355 and comply with the requirements of BS EN 10 025:2004.

3.2 Other Materials

Other materials used in association with the steelwork shall comply with the appropriate British Standard.

3.3 Differing Metals in Contact

Where differing metals are in contact with each other in bolted connections the SC is responsible to provide suitable isolation washers. These are to be identified on the fabrication drawings.

3.4 Costs of Tests

The SC shall be deemed to have included in his rates and prices appropriate allowance for the cost of supplying copies of material lists and orders and for the carrying out of tests and supplying Test Certificates to the Engineer.

3.5 Bolts and Nuts

All bolts shall be a minimum grade of 8.8 and the bolt assemblies in accordance with BS 5950 Part 2, Clauses 4.3 and 4.4. and in accordance with BS 4190.

3.6 Inspection by Engineer

All materials, sections and fixings may be subject to inspection and witnessed testing at the manufacturer's works by the Engineer or Inspectors appointed by the Engineer. Inspection as aforesaid, will be carried out, as far as possible, at the manufacturer's works but the Engineer may at his discretion defer inspection of any parts until after delivery to the site. All material inspected and approved by the Engineer will be marked for the purpose of identification and the corresponding advice notes and test certificates shall be marked correspondingly by the Engineer.

The SC and his suppliers shall afford the requisite facilities at all reasonable times and at all places for inspection and testing to be carried out by the Engineer or the appointed Inspectors.

Inspection and acceptance of material, sections and fixings etc., by the Engineer shall not in any way relieve the SC of any of his own responsibilities for ensuring that the materials, parts and fixings are sound and of required quality. Rejected material or workmanship shall be remedied or replaced by the SC without extra cost and without effect upon the Contract time of completion, all to the satisfaction of the Engineer.

4.0 DETAILS OF CONSTRUCTION

4.1 General

These shall comply with the requirements of the current BS 5950. Any deviations which the SC may consider desirable should be specifically drawn to the Engineer's notice in writing, and approval received prior to submission of drawings for approval.

Single bolt connections shall not be permitted unless the Engineer's written approval is obtained.

Bolt holes shall be drilled not burned.

When length of weld required at a connection is less than the length of edge of bracket etc., the edge shall be sealed with a sealing weld unless otherwise approved by the Engineer.

Connections containing more than one type of fastening shall not be used in the works.

4.2 Universal Plates or Flats

Where two or more universal plates or flats of the same nominal width are used in tiers the edges shall be machined straight and flush excepting only in cases when the approval of the Engineer has been obtained to omit these operations and provided that in such cases all edges shall be clean and true, square and flush.

4.3 Design of Welds

The design of welded joints and connections shall comply with BS 1011-1:2009 and BS 1011-2:2001 as appropriate except as may be otherwise specified or shown on the Engineer's working drawings.

If the two or more of the general types of welds (butt, fillet, plug, slot etc) are combined in a single joint the effective capacity of each type shall be separately computed with reference to the axis of the group in order to determine the allowable capacity of the combination.

4.4 Connections Generally

As much of the work of fabrication of the steelwork, as is reasonably practicable shall be completed in the workshops.

Unless noted otherwise, the steelwork sub-contractor is to design all connections to the loads provided.

End connections to beams shall be capable of providing torsional restraint to the beams. In connections subject to impact or vibration or reversal of stress or where slip under load would adversely affect the efficiency of the structure, the type of bolt to be used shall be approved by the Engineer.

4.5 Weld Terms and Symbols

On all working drawings, welding procedure sheets, etc., terms and symbols relating to the welding shall be in accordance with the relevant British Standard.

5.0 WORKMANSHIP

5.1 General

Workmanship shall be in accordance with the best recognised practice and shall take account of the cambers, tight fittings of joints etc., necessary to minimise deflections and/or movements when the buildings have been completed. Where close tolerance and turned bolts are specified these shall be used strictly in accordance with the appropriate British Standard Specification.

Bolts connecting members together shall have no threads within the bearing areas of the members and shall be fitted with the necessary washers to ensure proper tightening.

5.2 Fabrication of Steelwork

5.2.1 Accuracy and Allowances in Manufacture

Tolerances shall be as the NSSF.

The SC shall take care, especially in the manufacture of welded steelwork to ensure that flanges are accurately at right angles to webs and that completed parts and members are accurate both in section and in elevation so as to ensure correct alignment in completed units and when assembled and/or erected.

Drifting shall not be used to correct bad alignment. Burning equipment shall not be used for the rectification of misaligned holes in members without the permission of the Engineer in each specific case.

5.2.2 Welding

5.2.2.1 General

Welding of structural steelwork shall be by an electric arc process. The procedure to be followed, plant and equipment to be used and the testing and inspection to be applied shall all be to the satisfaction of the Engineer and shall conform generally with the relevant British Standard and with further requirements contained in the Specification.

5.2.2.2 Welding Current

The strength of the current shall be within the range recommended by the manufacturers of the particular electrode being used and shall be towards the upper limit of the range rather than the lower.

5.2.2.3 Shop Welding

Shop welding shall be carried out under the specified conditions of temperatures etc., and under continuous supervision. Machine welding will be allowed where approved machines are in use correctly controlled by qualified operators.

5.2.2.4 Welding Procedure

Welding procedure shall be such that induced stresses and distortion is reduced to the minimum practicable and local distortion is rendered negligible in the final structure.

Butt welds in flange plates and/or web plates shall be completed before the flanges and web are welded together.

All welds shall be finished full and made with the correct number of runs, the welds being kept free from slag and other inclusions, all adhering slag being carefully removed from the exposed faces immediately after each run.

5.2.2.5 Weld Joint Preparations

The fusion faces shall be carefully aligned and the correct gap and alignment maintained during the welding operations. In the preparation of the fusion faces shearing shall be limited to metal thicknesses not greater than 8mm. All fusion faces shall be prepared by machining, machine flame cutting or other means acceptable to the Engineer. Faces shall be kept clean and protected.

5.2.2.6 Butt Welded Joints

All main butt welds shall have complete penetration and, except on tubes where it is impracticable, shall be welded for both sides, the back of the first run being suitably gouged, out. All end to end butt welds shall be fitted with backing rings.

The ends of the welds shall have full throat thickness. This shall be obtained on all main welds by use of extension pieces adequately secured on either side of the main plates. Additional metal remaining after the removal of the extension pieces shall be removed by the Engineer and the ends and surfaces of the welds shall be smooth finished.

5.2.2.7 Intermittent Welds

Intermittent welds shall not be used unless approved by the Engineer.

5.2.2.8 Examination of Welds

5.2.2.8.1 General

An approved testing authority may be contracted to carry out examination of the welding, welding procedures and standard of workmanship both at the works of the Steelwork SC and on the proposed site. The SC will be required to permit representatives of the above firm reasonable access during fabrication to carry out these checks and where such checks indicate that welding procedures are not satisfactory the SC will be responsible for carrying out, and the cost of, all necessary remedial works to the satisfaction of the Engineer.

5.2.2.8.2 Non-Destructive Examination

The SC shall have radiographic, ultrasonic or other technical tests approved by the Engineer carried out on butt and fillet welded joints and/or on the test specimens referred to elsewhere whenever required by the Engineer. Butt welds that will be subjected to tension and 10% of those subjected to compression and selected by the Engineer in primary members of frameworks shall be so tested. Should there be any defective welds in the 10% of main compression members, then the SC may be required to test all main compression members at his own expense.

Where welds do not meet a standard to the satisfaction of the Engineer, the defective portion with the Engineer's permission may be removed and then re-welded and submitted for approval.

The results of all such tests shall be submitted to the Engineer for his inspection and the SC shall also prepare etched sections of welds for examination when required by the Engineer.

5.2.2.8.3 Payment for Tests and Examinations

The SC shall allow in his rates and prices for the steelwork for the cost of testing of his operators, for the provision of all additional labour, material and apparatus and for the preparation and testing of the test specimens, all as detailed in the foregoing clauses. He shall also allow in his rates the full cost of providing facilities for examination and testing under the above clause. Payment to cover the net cost of carrying out the examination and tests shall be made to the SC when the results prove to be satisfactory. If unsatisfactory results leading to the rejection or alteration of work are obtained, the entire costs of such examinations and tests of making good of defect to the works shall be borne by the SC.

5.2.3 Sealing and Cleaning inside Hollow Members

The insides of all box section members shall be cleaned before assembly and shall be entirely sealed by welding. All open ends shall be covered by suitable caps to exclude the possibility of ingress of moisture or other deleterious matter. Vent-holes shall be provided in members to be galvanised.

5.2.4 Supervision by Steelwork Contractor

The SC shall be responsible for ensuring that all materials and workmanship comply with this Specification and he shall provide all the supervision necessary to fulfil this requirement.

For welded work the SC shall appoint one or more supervisors to be responsible for seeing that all welding plant and equipment is maintained in proper working order and that all welding is carried out in accordance with this Specification.

The SC shall provide approved means of identification by means of an identification mark to enable all welds to be traced to the welding operators responsible for the work.

5.3 Erection of Steelwork and Associated Work on Site

5.3.1 General Plant, Labour and Materials

The SC shall provide and shall be responsible for providing all materials, labour, temporary works, plant, equipment, supervision and all other items necessary for the proper and safe execution and completion of the works on site all as specified in the Contract Documents and the Engineer's drawings, except when otherwise stated therein. Non-metallic slings shall be used wherever possible.

The SC shall be responsible for the suitability and capacity of all plant and equipment used in the work on site.

5.3.2 Site Supervision

The requirements of foregoing clauses shall apply also to supervision by the SC of the work on site.

The supervision as aforesaid shall be under the charge of competent personnel nominated for the purpose by the SC and working full time on the site during the progress of the site work.

The steelwork shall be erected and fixed in accordance with the agreed programme under the direct supervision of component and fully experienced staff.

5.3.3 Storing and Handling

All steelwork shall be so stacked, handled and erected on site that the members and units are not subjected to excessive stresses or are otherwise damaged in any way. Acceptance or rejection of any damaged section shall be at the discretion of the Engineer. Storing and handling shall be carried out in a manner to minimise damage to protective coatings.

5.3.4 Security during Assembly and Erection

The SC shall pay due regard to the stability and safety of the structure temporary work and plant during all stages of the work assembly and erection.

Temporary bracing and/or strutting shall be provided whenever necessary to resist all erection stresses, wind and suction, sway, temporary excessive loads during construction and all other erection conditions.

Particular attention and care will be taken by the SC to ensure that no stress concentrations shall occur by improper construction procedure.

Final welding or other fixing of permanent connections shall not be done until proper alignment of the portion of the framework has been obtained. The SC shall take particular care to ensure and shall be responsible for ensuring that temporary bolts, jigs or other fixings and/or supports are adequate to provide safety for all erection conditions and are left in until after the final joints have been made and passed.

5.3.5 Setting Out

The SC shall be responsible for the positioning and levelling of all steelwork, the plumbing of stanchions and posts and the accurate placing of every part of the works in accordance with the Engineer's working drawings and to the satisfaction of the Engineer.

5.3.6 Final Positioning of Steelwork

Where connections are to be site-welded, temporary connection shall be used for positioning the steelwork prior to welding. Before welding is carried out, as much of the steelwork as will be rigidly fixed thereby shall be finally positioned, plumbed and levelled, allowances being made for contractions due cooling of the welds.

Welding of members into continuous bays shall preferably be carried out in either direction from the middle of each section of the structure towards the expansion joints.

5.3.7 Inspection

All parts of the works done on the site will be subject to inspection by and shall be completed to satisfaction of the Engineer. The SC shall afford all facilities and assistance for inspection as aforesaid during the progress of the site works and until the completion of contract.

Materials or workmanship or parts rejected on inspection as aforesaid shall be remedied or replaced by the SC without extra charge and without affecting the time for completion of the contract.

The SC shall wherever possible give to the Engineer at least twenty four hours notice of when materials or parts will be ready for inspection.

Inspection as aforesaid and approval by the Engineer or his Representative shall not absolve the SC from being responsible for any error or fault that may be discovered subsequently and for the final accuracy of the works.

5.3.8 Deliveries to Site

Deliveries of steelwork to the site shall be planned in accordance with the programme for erection.

6.0 TOLERANCES

Workmanship – Accuracy of fabrication and accuracy of erected steelwork to be in accordance with the National Structural Steelwork specification.

7.0 PROTECTION AND PAINTING OF STEELWORK

7.1 Internal Steelwork

- a) All hot rolled steel except that which shall be subsequently encased in concrete, shall be blast cleaned to second quality finish in accordance with BS 7079. The steel shall be left free from all grease and dirt.

Coating System: Apply spray coat/s of high build epoxy (75 microns), fully compliant to E.P.A. to provide a 25 years maintenance free period in accordance with paint manufacturers recommendations.

Top flanges of steelwork sections supporting metal decking with shear studs are not to be painted.

- b) After erection the steelwork shall be inspected and any damage shall be made good by mechanically removing any rust and touching up with the appropriate brushable quality post-fabrication primer to a thickness to not less than 75 microns.
- c) Cold rolled steel sections shall be galvanised in accordance with the requirements of BS EN 10143.

7.2 Exposed Steelwork

All exposed steelwork to be hot dipped galvanised to BS EN ISO 1461 (140 microns) fully compliant to E.P.A. (1996) to provide a 25 years maintenance free period, etch primed and painted as in 7.1 above.

This includes for steelwork members supporting or framing outer masonry leafs of cavity walls.

Bolts, nuts and washers shall be hot dip spun galvanised to BS EN ISO 1461.

Permanent forms of identification shall not be used on exposed steelwork.

- 7.2.1 All painting of steelwork to be compatible with finishing top coat (where required) as specified by architect (e.g. colour and system).

7.3 Exposure to Damp Conditions

Any steelwork with cavities or subject to possible damp conditions where it is not galvanised apply two coats of an approved high build bituminous coating to the steel.

7.4 Steelwork to be Concrete Cased

All steelwork shall be thoroughly cleaned by scraper or wire brushed to remove loose rust and mill scale before delivery to site. Grease and oil to be removed with a suitable degreasing agent.

8.0 **PROTECTION TO STEELWORK BELOW GROUND FLOOR SLAB LEVEL**

On completion of erection of structural steelwork, all steelwork, bolt, etc., below finished surface level shall be encased in concrete of minimum strength of 35N/mm² reinforced with D49 mesh fabric or as otherwise detailed on the Contract drawings.

9.0 **FOUNDATIONS TO STEELWORK**

9.1 Holding Down Bolts etc

The holding down bolts, nuts, washers, anchor plates, yokes, bolt sleeves and other similar fixings for the steelwork shall be supplied assembled by them SC and cast in place in the concrete foundations constructed and prepared as foundations to the steelwork by the main contractor.

All bolt connections shall be rigidly suspended in the foundations in such a manner that they will not be disturbed or damaged during concreting.

The bolt assemblies shall be accurately set in position by means of templates supplied by the SC.

The SC shall check the positions and levels of all the aforesaid bolt assemblies before they are concreted in and again before steelwork erection is commenced.

Steelwork shall be erected in a manner such as to avoid damage to the cast in bolt assemblies.

After concreting in position, the exposed parts of the holding down bolts and fixings shall be thoroughly cleaned, greased and provided with temporary protection ready to receive the structural steelwork. Also the tops of the bases shall be cleaned off and the bolt nuts checked and tightened again where necessary all to the satisfaction of the Engineer.

9.2 Grouting to Baseplate and Holding Down Bolts

After erection of the structural steelwork the holding down bolts and bolt and base plates shall be grouted using:

A proprietary non-shrink high-strength grout to the engineer's approval. Minimum compressive strength to be 60N/sq. mm at 28 days.

All grouts to be used strictly in accordance with manufacturer's recommendations.

9.3 Positioning of Steelwork

The SC shall be entirely responsible for ensuring the final accuracy of the positions and levels of the steelwork on completion.

10.0 **FINAL CONSTRUCTION DRAWINGS**

On completion of the works the SC shall provide to the Engineer three sets of his updated workshop drawings for record purposes.

SPECIFICATION FOR MATERIALS AND WORKMANSHIP **FOR REINFORCED CONCRETE WORK**

1. GENERAL

All materials, workmanship and tests (where required) shall comply with the appropriate current British Standard, the Building Regulations and be in accordance with the drawings and this specification all to the satisfaction of the Engineer.

The contractor shall provide a programme and a schedule of information requirements before commencing on site. Should the Contractor wish to vary his programme and consequently his schedule of information requirements then reasonable notice shall be given to the Engineer

All materials shall be stored so as to be adequately protected and kept free from contamination from all sources.

2. CEMENTS

Ordinary Portland Cement shall comply with British Standard BS EN 197 (latest revision including amendments), and sulphate resisting cement shall comply with British Standard BS 4027.

All cement shall be obtained from an approved source. Certificates of manufacturer's tests on the cement are to be forwarded to the Engineer and cement is not to be used before it has been accepted by the Engineer. Appropriate methods to minimise the risk of Alkali Silica reaction shall be taken as described in other parts of this specification.

The contractor shall store cement in a manner approved by the Engineer and such approved arrangements shall be maintained for the duration of the contract.

3. AGGREGATES

The fine and coarse aggregates shall comply with the requirements of British Standard BS EN 12620 (latest revision including amendments). The grading of fine aggregates shall be limited to Grading Zones 1-3 unless otherwise specified. The shell content of the fine aggregate included as calcium carbonate as determined by the method in BS EN 933-7 (latest revision including amendments) shall not exceed 30%. Coarse aggregates shall be clean and free from shell, sand, clay, quarry refuse, dust and other impurities. Grading of coarse aggregates shall be within the limits of Table 1 of BS EN 12620 (latest revision including amendments), unless otherwise specified and their flakiness index shall not exceed 35%.

Aggregates shall not contain harmful impurities such as iron pyrites, coal, mica shale or similar laminated materials. Aggregates shall not contain flaky or elongated particles and rock or gravel likely to suffer from the action of frost shall not be used. Aggregates shall be obtained from one approved source capable of maintaining adequate supplies of consistently graded material throughout the contract. Aggregates for exposed concrete shall be free from all impurities likely to cause discolouration and shall be of consistent colour throughout the work.

The physical properties of the aggregates are to be such that the drying shrinkage of the concrete manufactured from them and tested in accordance with BS 1881 shall not exceed:

- i. 0.04% for all exposed concrete work and superstructure.
- ii. 0.08% for foundations and other works not liable to rapid drying.

Aggregates from marine or estuarine sources shall be used only with the prior approval of the Architect. In the event of approval being given, the chloride content of the fine and coarse aggregates shall be such that the total chloride ion content does not exceed 0.32% by mass of cement in the mix.

The Contractor should also note the special clauses referring to Alkali Silica reaction given in other parts of this specification.

4. WATER

Water used for mixing and curing shall be clean and free from harmful matter, shall be obtained from the mains and shall comply with the requirements of BS EN 1008 (latest revision including amendments).

5. ADMIXTURES

The use of admixtures shall not be permitted without the express approval of the Architect.

6. POLYTHENE

Under all slabs a 1200 gauge polythene membrane shall be provided, with 150mm laps or as specified by the Architect. The product used will carry an appropriate British Board of Agreement (BBA) Certificate.

7. DE-BONDING COMPOUND

An approved proprietary de-bonding compound shall be used as shown on the drawings. It shall consist of 66% of 200 per bitumen blended hot and 14% light creosote oil and when cold brought to the consistency of paint by the addition of 20% solvent naphtha or other approved compound which shall not retard or in any other way affect the setting of the concrete. The average bond stress on 7 day pull out tests shall not exceed 0.14 N/mm².

8. REINFORCEMENT

Mild steel bars shall comply with British Standard BS 4449 (latest revision including amendments).

High Tensile steel bars shall be Grade B500 deformed bars complying with BS 4449 (latest revision including amendments).

Steel fabric reinforcement shall comply with BS 4483 (latest revision including amendments).

Reinforcement shall be obtained from a fabricator operating a quality assurance system approved by the UK Certification Authority for Reinforcing Steels or another approved scheme. The Contractor shall supply the Engineer with a certificate stating the source of the reinforcement, the process of manufacture and a test sheet giving the results of mechanical tests. If required, results of chemical analyses shall also be supplied.

All reinforcement incorporated into the works shall be free from mill scale. Any deleterious material and any loose rust shall be removed before use.

9. SPACES AND CHAIRS

Spacers at maximum centres of 1m shall be used to maintain the cover to all steel and shall be dense cement mortar unless other materials are approved by the Engineer.

In ribbed slabs the position of reinforcing bars in the ribs shall be maintained by the use of purpose made spaces occupying the full width of the rib.

Top steel reinforcement in slabs shall be positively supported in position with steel chairs at no more than 1m centres in each direction.

The Contractor shall allow in his reinforcement rates for the provision of all necessary chairs and spacers.

10. BENDING OF REINFORCEMENT

All bars shall be bent cold to the true form, as shown on the drawings and bending schedules, by the gradual uniform application of force. Heating will not be allowed.

Unless described otherwise, bending dimensions shall conform to BS 8666 (latest revision including amendments).

The Engineer shall supply to the Contractor all Bar Bending Schedules who shall check them and satisfy himself as to their accuracy before ordering or placing any reinforcement.

High Tensile reinforcement in position, irrespective of whether or not it is partly embedded in hardened concrete, shall not be bent without the Architects permission.

No allowance will be made in the Bending Schedules for tying wire and rolling margins, and cutting and bending tolerances. All areas of mesh shall be taken off the contract drawings as required.

The Contractor shall be responsible for providing on site such skilled bar benders, bending machines, etc., as are necessary to ensure that minor variations to reinforcement can be made when necessary without incurring avoidable delays and expense.

11. FIXING OF REINFORCEMENT

All bars shall be maintained in the proper position, as shown on the drawings and temporarily fixed as necessary by means of 16 S.W.G. annealed steel wire, to prevent displacement before and during the process of concreting. All stirrups and links shall be tight to the bars which they embrace. All ends of binding wire must be bent back well clear of the formwork. Successive layers of reinforcement in beams and slabs shall be supported by means of steel spacer bars and stools.

The cover of concrete to the reinforcement shall be as described on the drawings and shall be maintained by means of distance pieces of cement mortar or other approved materials. Pieces of steel, blocks of wood etc, shall not be used against formwork for this purpose.

The spacers and supports shall be so arranged that the following tolerances of concrete cover will not be exceeded:

-0 +5mm

All bars left exposed for future work shall be suitably protected against exposure and corrosion, to the approval of the Architect.

Fabric reinforcement shall be supported in a manner similar to normal reinforcement.

No welding of reinforcement will be permitted unless the Architects prior permission is obtained and the requirements of the Architect and the regulations of the Local Authority shall be strictly complied with.

The fixing of all reinforcement shall be checked by the main Contractor's supervisor. Adequate notice shall be given to the Architect before pouring concrete.

During concreting a competent steel fixer shall be in attendance to adjust and correct the positions of any reinforcement which may be displaced.

12. LAPS OF FABRIC REINFORCEMENT

Unless otherwise indicated, steel fabric shall be lapped at least 300mm at the ends and sides of the mesh. Where congestion of fabric is likely to occur laps shall be of the overhang lap type. In slabs with top and bottom fabric reinforcement, laps in the two layers shall be staggered.

13. FORMWORK

a) General

All formwork shall be of sufficient strength, rigidity and tightness as required to support and maintain the concrete in its correct position and to withstand the worst combination of self weight reinforcement weight wet concrete weight, concrete pressure, construction and wind loads, together with all incidental dynamic effects caused by placing, vibrating and compacting the concrete. All joints shall be flush and close enough to prevent leakage of grout. Foam sealing strips shall be used as necessary to ensure joint tightness.

Formwork shall be set with an upward camber as follows:

Beams and slabs over 4.5m span:	1:600
All cantilevers:	1:300

Vertical struts to formwork to all upper beams, floor etc., shall be placed directly over those to the storey immediately below, and the lowest vertical strut shall bear on work of sufficient strength to carry the load, or on plates of sufficient size to distribute the load satisfactorily to the ground.

b) Preparation of Formwork

Before each use the formwork shall be carefully examined and any that has been damaged or defaced shall be discarded and shall be replaced with new material.

An approved release agent shall be used and shall not come into contact with reinforcement and shall not be allowed to collect in the bottom of the formwork.

Immediately prior to placing concrete the inside of the formwork shall be thoroughly cleaned out.

c) Striking of Formwork

Formwork shall be dismantled and removed from the cast concrete without sock, disturbance or damage. Unless the Contractor produces evidence to show that the concrete is of sufficient strength to permit earlier striking e.g. by reference to CIRIA reports, the minimum striking times shall be as follows:

Minimum period before striking formwork (concrete made with Ordinary or sulphate resisting Portland cement)			
Type of formwork	Minimum period before striking		
	Surface temperature of concrete		
	16°C and above	7°C	(any temperature between 0°C and 25°C)
Vertical formwork to columns, walls and large beams	12h	18h	$300/(t+10)$ h
Soffit formwork to slabs	4 days	6 days	$100/(t+10)$ days
Soffit formwork to beams and props to slabs	10 days	15 days	$250/(t+10)$ days
Props to beams	14 days	21 days	$360/(t+10)$ days

The above times shall be increased by half a day for each day on which the concrete is between 20°C and 7°C and one day for each day on which the concrete temperature is below 2°C.

14. FORMWORK FINISHES - FORMED SURFACES

a) Buried Concrete

No additional requirements

b) Exposed Concrete

Properly designed forms should be used with a hard smooth surface and all joints filled. The concrete surfaces should be smooth with true, clean arrases. Immediately after striking shutters all surface blemishes shall be filled with fresh specially prepared cement and fine aggregate paste. Every effort should be made to match the colour of the concrete. After the concrete has been properly cured, the faces should be rubbed down where necessary, to produce a smooth and even surface.

15. FORMWORK FINISHES - UNFORMED SURFACE FINISHES

a) Concrete to be screeded.

The concrete shall be uniformly levelled and tamped to produce a plain, textured surface.

b) Concrete which will not be covered with a screed.

The concrete shall be uniformly levelled and tamped to produce a plain, textured surface. When the moisture film has disappeared and the concrete has hardened sufficiently to prevent laitance from being worked to the surface, the surface shall be steel trowelled under firm pressure to produce a dense, smooth uniform surface free from trowel marks.

16. STRUCTURAL CONCRETE

a) All concrete to conform to the requirements of BS8500 and BS EN 206-1 (latest edition) and all normative references including resistance to alkali silica reaction, sulphate resistance, chlorine content etc

b) All details of the materials, proportions and preliminary test results shall be submitted to the Engineer for his approval prior to the use of the mix. A satisfactory method of control of water content must be employed.

c) The Contractor must himself carry out the control requirements of Clause 6.4 of BS 8110 and submit his results to the Engineer is requested.

d) Concrete Work

i) Lean Mix/Concrete Blinding
Designate mix Gen-1

ii) Pad Foundation/Strip Foundations
Designate mix RC35 or C28/35 – sulphate class AC4-s

iii) Power Floated Slab
Designate mix RC35 or C28/35

17. SITE TESTING OF CONCRETE

- a) The ready-mixed supplier must himself carry out all the control requirements of Clause 6.4 of BS 8110 and submit his results to the Architect if requested. In addition, the Contractor is himself to take at least three number 150mm test cubes each day concrete is poured until ten sets of cubes have been made. There after three number cubes are to be made each week or every 50 m³ of concrete poured, which ever is the more frequent.
- b) Test cubes shall be made, cured, stored, transported and tested in accordance with Parts 3 and 115-120 of BS 1881. One cube from each set shall be tested at 7 days and one at 28 days. The tests shall be carried out in an approved laboratory and test report supplied to the Architect.
- c) Either a slump test or a compacting factor test shall be carried out each time test cubes are made or on any batch of concrete that the Architect shall so direct.

18. BATCHING

- a) Concrete shall be mixed in machines of adequate capacity and of a design approved by the Architect. Each mixing machine shall be washed thoroughly as often as is necessary to prevent the adhesion of partly set concrete. Mixing shall continue for a least two minutes until the concrete is uniform in consistency.
- b) Under special conditions the Architect may sanction hand mixing in which case a specially prescribed concrete mix shall be made on clean level watertight platform of sufficient area. The cement and fine aggregate shall be spread in thin layers and mixed dry until a uniform colour is attained. The coarse aggregate shall then be added and the mixture turned over until the concrete is of uniform consistency.

19. PLACING OF CONCRETE

Concrete shall be carried in purpose made agitators operating continuously or in truck mixers with continuously rotating drums. Concrete shall be placed in the works with no segregation and with the required workability. The concrete shall be compacted and in its final position within 2 hours of the introduction of cement to the aggregate. Furthermore any concrete which had developed an initial set before being placed shall be rejected.

Concrete when deposited shall have a temperature of not less that 5°C and not more than 30°C. Fresh concrete shall not be placed against insitu concrete that has been in position for more than 30 minutes unless a construction joint is formed.

Concrete shall be compacted suing mechanical vibrators in such a manner as to produce a dense homogenous mass with a good surface finish. Care shall be taken that the vibrators are not allowed to come into contact with, or displace, any reinforcement, timber inserts, shutter ties, fixings etc., embedded in the concrete. A sufficient number of vibrators in a serviceable condition shall be on site to ensure that spare equipment is always available in a breakdown.

20. BLINDING

Reinforced concrete shall not be placed directly onto or against an earth surface. These surfaces shall be blinded with a layer of 'Gen 1' mix concrete. Unless detailed otherwise blinding shall be a minimum thickness of 50mm placed to a true surface.

Blinding shall be placed in such a way and at such times as to ensure that the exposed surface of the ground does not deteriorate after excavation through exposure to weather, traffic or other reasons.

21. CONSTRUCTION JOINTS

Concrete shall be deposited continuously between pre-determined joints, either as shown on the drawings, or in the case of construction or day to day joints the positions of which have already been agreed with the Architect.

Construction joints are to be generally formed, with the approval of the Engineer, within the middle third of the span of the beams and slabs.

The joints shall be prepared so that the full cross section of the work is lightly roughened and is entirely clean and free from scum, loose particles and foreign matter, immediately prior to the recommencement of concreting.

Immediately prior to depositing new concrete, the surface shall be wetted. Care shall be taken to ensure that the water used for wetting is not allowed to collect in the formwork. Particular attention must be given to see that the concrete is thoroughly compacted around the joint and at the bottom of each lift.

Movement joints shall be formed in the positions and to the detail shown on the drawings.

Unless stated on the drawings, kickers for all columns shall be not less than 75 mm high. Kickers for wall shall be not less than 150 mm high. The formwork for all kickers must be centred and rigidly fixed in position prior to placing concrete. All kickers shall be cast monolithically with the slab.

Where brick/block walls abut vertical concrete faces, dovetail stainless steel slots of approved manufacture shall be cast in the concrete to receive adjustable bonding ties. Alternatively, either 37 x 1.5mm stainless steel ties, 'Brickforce', 'Bricktor', 'Expamet' or other approved stainless steel fabric reinforcement, not less than 22 gauge, 600mm long shall be cast into the concrete for building into the horizontal joints of walling and partitions at not more than 300mm centres to suit the courses.

All concrete surfaces which are honeycombed or defective shall have the defective concrete cut out to a depth of at least 25mm or until solid concrete is reached, with all edges being cut perpendicular to the surface. The area should then be thoroughly dampened with water and then thoroughly primed, together with any exposed reinforcement, by brushing in a grout obtained by mixing equal volumes of cement and styrene butadiene rubber latex all as per manufacturer's instructions. Mortar, consisting of cement, zone 2 sharp sand, SBR latex and water in proportions recommended by the manufacturer, should be applied whilst the priming grout is still wet. The patch should be well consolidated with a wood float in layers of maximum 25mm thickness.

22. CURING OF CONCRETE

Immediately after compaction and for a minimum of 7 days, concrete shall be protected against harmful weather effects including rain, rapid temperature changes, frost and from drying out. The method of curing shall prevent loss of moisture from the concrete.

The manner in which the Contractor proposes to carry this out shall be described for the different concrete elements and shall be approved by the Engineer before work commences on site.

Notwithstanding any approval given by the Engineer, he may, if he considers particular method of curing to unsuitable, order him to vary the method to ensure satisfactory curing of the concrete.

23. COLD WEATHER WORKING

When concrete is placed at air temperatures below 2°C, the following requirements shall be met:-

- i) The aggregates and water used in the mix shall be free from snow, and frost.
- ii) The surface temperature of the concrete at the time of placing shall be at least 5°C and shall not exceed 30°C.
- iii) The surface temperature of the concrete shall be maintained at not less than 5°C until the concrete reaches a strength of 5N/mm² as determined by tests on cubes that have been cured under identical conditions to the structural concrete, in a manner approved by the Engineer.
- iv) Before placing concrete, the formwork, reinforcement, pre-stressing steel and any surface with which the fresh concrete will be in contact shall be free from snow, ice and frost.
- v) Cement shall not be allowed to come into contact with water at a temperature greater than 60°C.

24. HOT WEATHER WORKING

During hot weather the Contractor shall ensure that the constituent materials of the concrete are sufficiently cool to prevent the concrete from stiffening in the interval between its discharge from the mixer and compaction in its final position.

Cement shall not be allowed to come into contact with water at a temperature greater than 60°C. The temperature of the concrete when deposited shall not exceed 30°C, nor should fresh concrete come into contact with hot dry surfaces. Where necessary all surfaces should be shaded from direct sunlight.

25. TOLERANCES

The standard of acceptances for tolerances shall be taken from the relevant Codes of Practice.

26 REINFORCEMENT WEIGHTS

Reinforcement weights below are estimates, based on comparison with similar elements fully detailed element from similar projects.

Element	Reinforcement Weight
Pad foundation	125 kg/m ³
Strip foundation	200 kg/m ³
Ground beam	200 kg/m ³
Supported suspended ground floor slab	225 kg/m ³

The above quantities should be read in conjunction with the project drawings.