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PROPOSED EXTENSION TO GLEN ABBEY, NATIONAL AMBULANCE SERVICE FOR THE HEALTH SERVICE EXECUTIVE (HSE), TALLAGHT, Co. DUBLIN

CIVIL / STRUCTURAL REPORT

PLANNING

Project Title:	Glen Abbey National Ambulance Service
Project No:	20-082
Client:	Health Service Executive
Issue Date:	07/04/2023
Stage:	Planning
Revision:	A

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1.0 INTRODUCTION

This report summarises the Civil and Structural submission of the Planning Application report compiled by Axo Architects for the proposed extension development at Glen Abbey, National Ambulance Service, Tallaght.

2.0 PLANNING RFI RESPONSES

Upon receipt of a Request for Further Information. CHH has revised their storm water system for Sustainable Drainage Systems in accordance with South Dublin County Council's Sustainable Drainage Explanatory Design & Evaluation Guide 2022. Refer to table of RFI Items below. These items are discussed in their relevant sections.

With regards to the Site Layout on our drawings 'IN2', (Mechanical & Electrical engineers), have had to alter their equipment locations in order to accommodate the proposed SUDS system outlined in the following report and attached CHH drawings.

RFI	Comment
4a	Refer to Section 6.0, 7.0 & 8.0
4b	Refer to Section 6.0 & 7.0 & CHH Drawings
4c	Refer to Section 6.0, 7.0 & 8.0
4d	Refer to Section 6.0 & 7.0 & CHH Drawings
4e	Refer to Section 8.0
5a	Refer to Section 6.0 & 7.0 & CHH Drawings
6a	Refer to Section 8.0
6b	Refer to Section 6.0, 7.0 & 8.0 & CHH Drawings

3.0 SITE APPRAISAL & GROUND CONDITIONS

The proposed Glen Abbey National Ambulance Service development is to be situated on a site bounded to the East by the R113 Belgard Road and by existing industrial and commercial units on all remaining sides. The site comprises an unused three storey office development with some previously unused green area. The site is directly accessed via the Belgard Road through a shared entrance with several neighbouring businesses. The site topography is exclusively flat and is clearly defined to the East and South by existing boundary walls.

The existing structure to be renovated and extended comprises precast concrete frames and infill panels and brickwork to the external envelope with a combination of loadbearing masonry walls and in-situ concrete slabs supporting the internal floors. The existing roof was identified as comprising shallow fabricated steel trusses supporting a metal deck roof with

undetermined insulation and finishes. It was noted that the primary structure of the building was in good repair with the exception of some minor weathering and spalling damage to the external precast frames.

Figure 1 - Google Maps view of site

CHH Consulting Engineers carried out site investigations prior to the initial design and established that the existing building is constructed on bearing strip and pad foundations. Trial pits were also excavated in the location of the proposed extension, and good bearing was confirmed at a depth of approximately 1.0m below ground level, with overlying topsoil and organic, dauby clay.

4.0 EXISTING STRUCTURE

The existing building comprises a three-storey office development, including a reception area to the ground floor and open-space meeting rooms to the top floor. Other spaces throughout the building include partitioned offices, Kitchenettes, clinic rooms, etc. A steel frame stair well protrudes from the Southern elevation and may have been added after the initial development was complete. The external structure comprises precast and in-situ concrete frames with infill precast panels to the Northern and Southern elevations, and brickwork between floors to the Eastern and Western gable walls. Some minor weathering and spalling damage had been identified to the external concrete frame. Some minor repair works were carried out prior to the detailed design of the proposed development.

The existing floors have all been noted as being suspended in-situ concrete, including the ground floor. The first and second floor structures were identified as RC Ribbed slabs, with solid sections over the hallways walls where load transfer occurs to the wall panels and subsequent floors. The roof structure was identified as being shallow fabricated steel trusses with a profiled metal deck roof. All load transfer appears to be transmitted through the external concrete frames and internal loadbearing masonry walls to the existing foundations.

Some load transfer beams were identified above the ground floor reception area where a landing is provided for the stairs. All internal imposed loads were assumed to be transferred to the foundations via the central corridor solid masonry walls. These walls align through all floors to ground level and foundations.

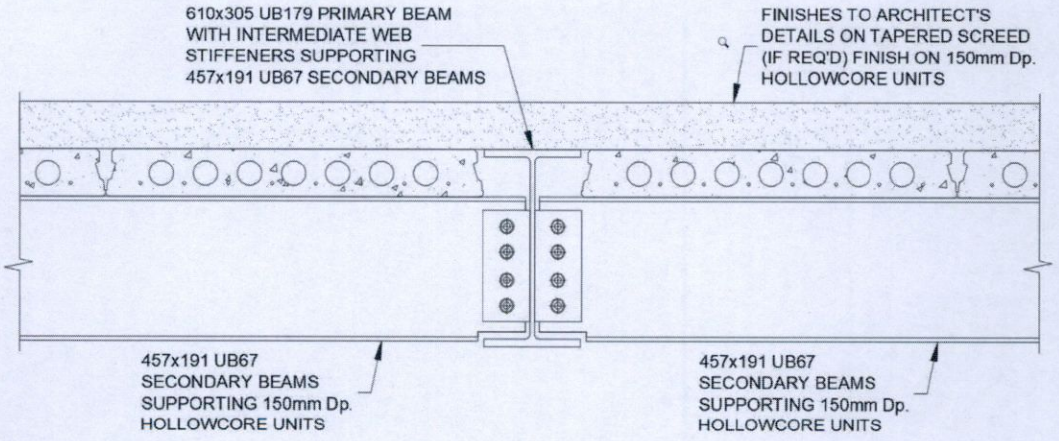
The structure is situated to the Northern end of an irregularly shaped site, with hardstand parking and green areas to the remaining grounds. The site is enclosed by the R113 Belgard Road to the East, with an existing wall and fence along the boundary of the site and the public road and footpaths. Similarly, a boundary wall and fence enclose the site to the Southern boundary.

5.0 PROPOSED STRUCTURE

The proposed works include the renovation and upgrading of the existing structure and the development of a two-bay ambulance garage with ancillary plant and storage rooms. Works also comprise some site developments, including new fencing, access gates, parking areas and a covered ambulance canopy area with adjacent power washing station.

It is anticipated that structural works to the existing building will be minimal. The proposed alterations to the existing layout will not affect the structure for the most part. Works may include slight modifications to existing doorways and the removal of some partition walls. The proposed external works to the existing building comprise the upgrading and improving of the thermal envelope, including the insulation and new cladding systems, however it is not anticipated that these works will unduly affect the underlying structure.

A new stairwell will be provided separate to the existing structure to the Northern elevation, with a minimalist link and access to the existing building. Additional works to facilitate the access to the existing building include new RC steps and access ramp.



TYPICAL SECTION THROUGH ROOF STRUCTURE

The new extension will comprise a combination of steel frames, masonry walls and precast units to the roof and intermediate areas. The steel frames will be required to provide an open plan, unobscured area for the two-bay ambulance garage. Some steel beams will also be provided to the plant room to form a mezzanine level. The roof structure has been designed as a precast concrete hollowcore unit roof to facilitate the installation of plant and/or solar panel systems on the roof of the new extension. All internal walls will comprise

215mm loadbearing solid masonry wall panels, and all external cavity walls will similarly comprise a 215mm inner leaf with a masonry external leaf with various finishes or cladding to the Architect's details.

The proposed ambulance canopy structure will be formed using a series of fabricated steel frames with trusses forming the main cantilevered roof. The frames will provide an unobstructed shelter to the ambulance parking area, with a sheltered, enclosed walkway providing access to the main building. The canopies will be constructed with a power washing station directly adjacent in order to provide washing and cleaning facilities for each vehicle.

Additional Civil and Structural site works will also include the construction of RC slab or plinth bases for M&E services and fuel storage, the allowance for new boundary walls and a new bespoke steel fence, a new rolling gate access with a bespoke steel design to match the fencing, new hardstand parking facilities and the installation of a new attenuation system and rainwater harvesting system.

6.0 SUSTAINABLE MEASURES

The use of green roof and other SUDS systems was reviewed by the design team. However, the proposed development is almost fully utilising the new roof space for PV panels and renewables. Furthermore, any additional weight for green roof systems cannot be added to the existing roof without significant strengthening works.

The runoff from a green roof / roof garden would be unsuitable for rainwater collection and harvesting. In this development, the rainwater harvesting has a very specific and appropriate purpose; washing the fleet of Ambulances to be berthed in the new covered parking area. It may be counterproductive to use a green roof in this instance. A green roof area would reduce the potential collection area for the rainwater harvesting tanks and the client would therefore become more reliant on the water mains for supplementing the practice of washing the Ambulances.

7.0 SURFACE WATER DRAINAGE

It is proposed that the surface water is collected from both the existing building and the new development using two distinct and separate systems.

The roof areas to both the existing building and the new structures are to be collected and drained to a rainwater harvesting storage system located at the South West area of the Site.

The hardstand ground level areas will be split up into 3 separate Zones.

Zone A = North front facing carpark and Extg and proposed roof)

Zone B = East facing carpark and access road.

Zone C = South Power washing area and access pavement.

Zone A:

The storm water from Zone A will be drained via standard gully traps and passed through a Petrol interceptor before draining into the proposed rainwater harvesting system. This main storm line will also pick all roof rain water pipes.

Zone B:

The storm water from Zone B will drain over its surface and directed into a proposed Bio-Retention Garden in accordance with SDCC *Sustainable Drainage Explanatory Design & Evaluation Guide.*

Zone C:

The storm water from Zone C including the waste water from the power washing station will be directed through a petrol interceptor before draining to the recycling system of the power washing station where recycling of the used power station water will occur before being reused.

An overflow will be placed on the Rainwater Harvesting System. This overflow will be drained to the Bio-Retention garden.

The rainwater harvesting storage will include a backup mains feed where dry weather spells are expected.

The Bio-Retention garden is to be constructed in accordance with SDCC *Sustainable Drainage Explanatory Design & Evaluation Guide.* Where saturation of the garden may occur in heavy rainfall situation a flow control device has been specified to restrict outflow to 2l/s from the garden to thereby alleviate pressure on the public storm system. Refer to Section 9.0 Bio-Retention Garden Calculations

8.0 BIO-RETENTION GARDEN CALCULATIONS

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SURFACE WATER DRAINAGE: PRE- DEVELOPMENT

Project Title	Glen Abbey Complex, Belgard Road, Tallaght			**Calculation Basis:** BRE Digest 365 "Soakaway Design"; Flood Studies Report (I.H.Report No.124), **Rainfall Data:** Met Eireann rainfall data & Met Eireann "Technical Note 40 - Extreme Rainfalls in Ireland" **Design Basis:** M5-2Day (5Yr.return period, 2day duration) rainfall.
Client	HSE			
Project No.	20.082			
Made By:	**CF**	**Checked by:**	**PH**	

SITE AREAS (CONTRIBUTING)

(sq.m.)	Site Area	Imp.Factor	Eff. Area	Comment
Car Park, Roads & Conc Footpaths	822.00	0.90	739.80	
Roofed Areas	310.00	0.95	294.50	
Grassed Areas	2126.00	0.35	744.10	
Bricked Pavements & Roads	0.00	0.85	0.00	
Industrial	0.00	0.90	0.00	
Pasture	0.00	0.62	0.00	
Total	3258.00		1,778.40	

SITE OUTFLOWS

Site Outflow: Restricted to undeveloped 'Greenfield' runoff condition, design Runoff Rate (QT) (I.H. Report No.124)

Yearly Rainfall SAAR Including Climate Change = SAAR x 20% **120%**

Rainfall Data		Outflow Rate		
SAAR(yearly rainfall)(m	938	EFFECTIVE AREA (Ha)		0.18
M5-2Day rainfall (mm)	55	SAAR(mm)		938
M5-60min rainfall as p.c. of M5-2Day rainfall (%)	30	SOIL		0.40
		QBAR(l/s)		1.59
M5-60min rainfall (mr	17	QBAR(m3/min)		0.10
		QBAR(l/s/ha)		**8.91**

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- BIO-RETNTION GARDEN STORAGE CAPACITY-

Project Title	Glen Abbey Complex, Belgard Road, Tallaght		
Client	HSE		
Project No.	20.082		
Made By:	CF	**Checked by:**	PH

Calculation Basis: BRE Digest 365 "Soakaway Design"; Flood Studies Report (I.H.Report No.124),
Rainfall Data: Met Eireann rainfall data & Met Eireann "Technical Note 40 -Extreme Rainfalls in Ireland"
Design Basis: M5-2Day (5Yr.return period, 2day duration) rainfall.
Bio-Rentention Garden: Sustainable Drainage Explanatory Design & Evaluation Guide 2022 *(South Dublin County Council)*

SITE AREAS (CONTRIBUTING)

(sq.m.)	Site Area	Imp.Factor	Eff. Area	Comment
Car Park, Roads & Conc Footpaths	1303.00	0.90	1,172.70	
Roofed Areas	1210.00	0.95	1,149.50	
Grassed Areas	745.00	0.35	260.75	
Bricked Pavements & Roads	0.00	0.85	0.00	
Industrial	0.00	0.90	0.00	
Pasture	0.00	0.62	0.00	
Total	3258.00		2,582.95	

SITE OUTFLOWS

Site Outflow: Restricted to undeveloped 'Greenfield' runoff condition, modified for 100year return period design Runoff Rate (QT) (I.H. Report No.124)

Yearly Rainfall SAAR Including Climate Change = SAAR x 20% 120%

Rainfall Data		Outflow Rate		
SAAR (mm)	938	EFFECTIVE AREA(Ha)	0.26	Outflow Limited to # l/s/ha
M5-2Day rainfall (mm)	55	SAAR(mm)	938	
M5-60m in rainfall as p.c. of M5-2Day rainfall (%)	30	SOIL	0.40	
		QBAR(l/s)	2.21	2.00
M5-60m in rainfall (mm)	17	QBAR(m3/min)	0.13	0.12
		QBAR(l/s/ha)	8.56	

QBAR Differnce to Pre-Devlopment)
-0.36 l/s/ha

SITE INFLOWS

Site Inflow: M5-2Day (5Yr.return period, 2day duration) rainfall modified for a 100year return period and rainfall ratio "r".

Duration	p.c.M5-2Day	M5-2Day	M5-G100	R100 Rainfall	Effective Area	Inflow(I)	Outflow(O)	Limited Outflow	Storage	Limited Storage
min	(r%)	D(mm)	100yr Factor	D(mm)	(sq.m.)	(cu.m)	(cu.m)	(cu.m)	(I-O)(cu.m)	(I-O)(cu.m)
1	3.30	1.82	**1.74**	3.16	2,583	8.2	0.13	0.12	8.02	8.04
2	5.70	3.14	**1.80**	5.64	2,583	14.6	0.27	0.24	14.31	14.34
5	10.30	5.67	**1.86**	10.54	2,583	27.2	0.66	0.60	26.55	26.62
10	14.80	8.14	**1.90**	15.47	2,583	39.9	1.33	1.20	38.62	38.75
15	17.70	9.74	**1.97**	19.18	2,583	49.5	1.99	1.80	47.55	47.74
30	23.30	12.82	**1.97**	25.25	2,583	65.2	3.98	3.60	61.23	61.61
60	30.00	16.50	**1.97**	32.51	2,583	84.0	7.96	7.20	76.00	76.76
120	38.00	20.90	**1.93**	40.34	2,583	104.2	15.91	14.40	88.28	89.79
240	48.00	26.40	**1.89**	49.90	2,583	128.9	31.82	28.80	97.06	100.08
360	55.00	30.25	**1.85**	55.96	2,583	144.5	47.73	43.20	96.81	101.35
720	68.00	37.40	**1.79**	66.95	2,583	172.9	95.47	86.40	77.45	86.52
1440	85.00	46.75	**1.73**	80.88	2,583	208.9	190.93	172.80	17.97	36.10
2880	106.00	58.30	**1.67**	97.36	2,583	251.5	381.87	345.60	0.00	0.00
							Max. Storage Capacity (cu.m.) =		97.06	101.35

BIO-RETENTION GARDEN CAPACITY

Bio-Rentention Garden: Sustainable Drainage Explanatory Design & Evaluation Guide 2022 *(South Dublin County Council)*

Indicative Attenuation storage (m3 of storage per m2 of SuDS structure) =	0.3		Rain Gardens
Max. Storage Capacity (cu.m.) of SUDS Structure =	101.35	(cu.m)	Attenuation Tank
Bio-Rention Garden Size	**338**	**sq.m**	

10.0 FOUL DRAINAGE

The proposed development requires minimal intervention with respect to foul water collection. The function of the new development is primarily that of a garage, and as such no new WCs, sinks or similar foul water-generating facilities are to be provided. The renovation and refurbishment works to the existing building include the use of the existing WC facilities without increasing the number or demand of outlets.

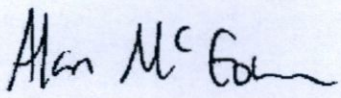
Minor works will be carried out to the existing foul network to the Northern elevation of the exiting building in the vicinity of the new stairwell and entrance. These works are required to facilitate the construction of the stairwell and require some re-direction of drainage runs and the relaying of some lines from the existing building to facilitate the construction of the new access ramp and steps. All foul water will be gravity-fed to the existing manholes and public network as per pre-development arrangements.

10.0 WATER MAINS

Similarly, minimal works are required to the watermain to facilitate the new development. The existing building will re-use existing connections and it is not anticipated that the new development will alter or increase the water demand in any way, as it is of identical use.

A new connection has been detailed to the rainwater harvesting system, however this is only to be used as a backup feed to the rainwater harvesting system where the storage supply of the harvesting system cannot meet the demand of the WC facilities in the existing building in periods of low rainfall. It is anticipated that for the majority of the year, the rainwater harvesting system will meet the non-potable water needs and alleviate the demand on the network.

Signed



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On behalf of

CHH Consulting Engineers