Tel: +353 15242060 | Email: info@ors.ie

Structural Intent Report – Retaining Wall Solution

Templar Place SHD

Report Issued: 30th July 2021

Structural Intent Report – Retaining Wall Solution

Document Control Sheet

Client:	Rhonellen Developments Ltd
Document No:	201_321-ORS-XX-XX-CO-Z-7a-001

Revision	Status	Author:	Reviewed by:	Approved By:	Issue Date
P01	S2	AK	CG/MH	DMC	08/12/2020
P02	S2	AK	CG/MH	DMC	25/06/2021
P03	S2	AK	CG/MH	DMC	21/07/2021
P04	S2	AK	CG/MH	DMC	30/07/2021

Index

1 Introduction

ORS was engaged by Rhonellen Developments Ltd to provide civil and structural engineering services to support the proposed SHD planning application associated with the Templar Place SHD, Balbriggan, Co. Dublin. This report outlines the retaining wall solutions proposed for the development in areas where it is proposed to reduce levels to form courtyard and building levels lower than existing ground levels and near the site boundaries.

The proposed development comprises a Build to Rent (BTR), Strategic Housing Development (SHD) as follows:

Demolition of the existing buildings (former shopping centre and associated structures). Construction of 3 no. apartment blocks (Blocks A - C) ranging in height from 3 to 6 storeys (with Block B over 3 no. lower courtyard floors) providing a total of 101 units (19 no. studios, 41 no. 1-beds, 41 no. 2-beds). Provision of Resident Support Facilities/Resident Services and Amenities, 2 no. retail units, car parking (at ground floor), cycle parking, ESB substation/switch room, plant, bin stores, open space, landscaping, boundary treatments, all associated site works and services provision.

A general outline of the proposed development is provided in Figure 1.1 below.

Figure 1.1 – Proposed Architectural Site Layout

2 Site Location and Description

The site is located centrally within Balbriggan Town and is bound by Quay Street to the northwest and High Street to the East. There is an existing two storey retail building located on the north of the site fronting Quay Street, this was a former Tesco store but has been vacant for some time. There is a single storey building located to the southeast fronting High Street and this is trading as a bicycle store. Currently, vehicle access is provided off High Street to the site.

The total area of the site is circa 0.42 hectares. An approximate outline of the subject site is provided in 2.1 below.

Figure 2.1 – Site Location (Approximate area of the subject site in red)

3 Site Topography

A topographical survey was carried out on the site in August 2020. There is a significant change in levels across the site, the street level fronting the site at High Street is approximately 13.6mOD while at Quay Street it is approximately 4.2mOD. This results in a level change of approximately 9.4m across the site.

The design intent is such that the majority of the ground floor of Blocks A, B and C will be set at 4.7mOD and the ground floor carpark will also be set at approximately 4.7mOD. No residential apartment units are proposed at ground floor level, instead this level will contain shared amenity rooms, plant rooms, bin and bike stores. Block A will have 2 retail units at footpath level on Quay Street with finished floor levels of 4.0mOD and 4.55mOD.

Refer to the Traffic Layout drawing number 201_321-ORS-Z0-00-DR-C-700 for existing levels and proposed floor levels.

4 Retaining Wall Options

Various forms of retaining wall solution were considered on review of this scheme and taking account of the surrounding environment.

Given the proximity and depth of the excavations with respect to the site boundaries, an embedded retaining wall was selected as an appropriate solution where there is insufficient space to allow for excavation within the site boundary. This form of construction allows for the installation of the retaining wall structure from ground level, prior to the excavation progressing within the site and without the need for excavations immediately outside of the site. Taking this into account, available embedded solutions include –

- King post walls
- Sheet pile walls
- Continuous bored pile walls
- Secant pile walls
- Diaphragm walls

In terms of site-specific sensitivities which are considered in selecting the most appropriate embedded retaining wall, factors such as the site location within an urban environment and proximity of adjacent buildings are important. The presence of adjacent buildings requires a solution which will minimise future lateral movement of the walls either during construction or in the permanent development. Solutions such as king post walls and sheet pile walls are less favoured in these circumstances. In addition, to avoid excessive construction noise resulting from mechanically driving piles into place, steel sheet piles are again less favoured.

Although the standing level of the water table is not known at this time, it can be assumed that this level is below the level of Quay Street in the north, which is the lowest of all site boundaries. Sites with proposed floors levels below surround ground levels which are below the water table level are inherently difficult to keep free of water and require robust solutions such as secant pile walls or

diaphraphm walls, with the later providing the best means of maintaining a dry excavation but also having the higher capital costs due to the increased amount of concrete and reinforcement associated with it. Another potential reason to select a diaphragm wall would be where the footprint of the site was tight in comparison to the dig depth and where internal propping was not suitable. In this site, there would be sufficient space to prop alternative forms of walls. As such, a diaphragm wall solution would appear to be excessive for this project. There will be sufficient space to prop the embedded walls in the temporary case without the need to anchor the walls beyond the site boundary.

Therefore, either a **contiguous bored pile wall** or a **secant pile wall** would appear to be the most appropriate solutions for the development. An example is provided below in Figure 2 of a typical secant pile wall with internal bracing to eliminate lateral displacement of the walls.

Figure 1 - Example of Secant Pile Wall (Ref Specialist Contractor, Bachy Soletanche)

It is proposed to construct this wall along boundaries adjacent to Block B and around parts of the podium area to the centre of the site. It is proposed to then construct a reinforced concrete liner wall immediately inside of this wall, with a waterproofing membrane also to be considered, based on the intended use of the space.

Bored pile diameters will vary subject to the height to be retained and the temporary works strategy for constructing the lower floor levels on the east of the site. However, based on advice from specialist piling contractors, it can be assumed that the minimum set-back between the outside face of piles and the nearest point on any adjacent building will be 500mm (including overhangs)

to allow a rig to safely operate in the area. This may also allow for sufficient setback from adjacent building foundations although foundations will need to be proven by investigation prior to finalising the set-out. Pile diameters of 900mm are reasonable for a triple height development below street level along High Street and 600mm diameter are reasonable for a double or single development below adjoining ground levels. The current design incorporates a 1.5m setback between all boundaries and the inside face of the below ground level walls.

In some areas, where space is available for forming batters, the site can be excavated initially, with reinforced concrete retaining walls constructed ahead of infilling between the retaining walls and the site boundary. Final construction methodologies and detailed design of piled foundations and temporary and permanent retaining structures will need to be developed following engagement of a specialist geotechnical engineer. Vibration monitoring techniques will need to be employed during construction to ensure that vibrations from piling are within acceptable limits considering neighbouring properties around the perimeter of the site.

APPENDIX A – DRAWINGS

A1

S2 - INFORMATION

Figured dimension only to be taken from this drawing.
All dimensions to be checked on site.
Consultants to be informed immediately of any discrepancies before work proceeds.

REV NO:	DATE:	REVISION NOTE:	DWN BY:	CKD BY:
P01	02/12/2020	ISSUED FOR INFORMATION	AK	MH
P02	21/07/2021	ISSUED FOR INFORMATION	SG	MH

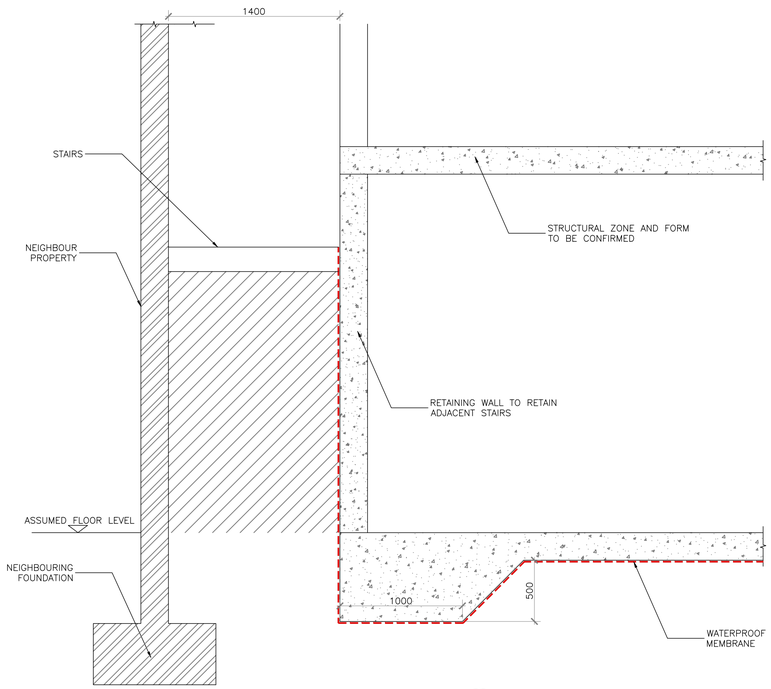
CLIENT:	RHONELLEN DEVELOPMENTS LTD.
PROJECT:	TEMPLAR PLACE SHD
TITLE:	STRUCTURAL DESIGN INTENT - RETAINING WALL SECTION LOCATIONS

DRAWN:	CHECKED:	APPROVED:	JOB NO:	REV:
AK	MH	CG	201_321	P02
DATE: 02/12/2020	SCALE: 1:200		DRAWING NO: 201_321-ORS-ZO-00-DR-S-500	

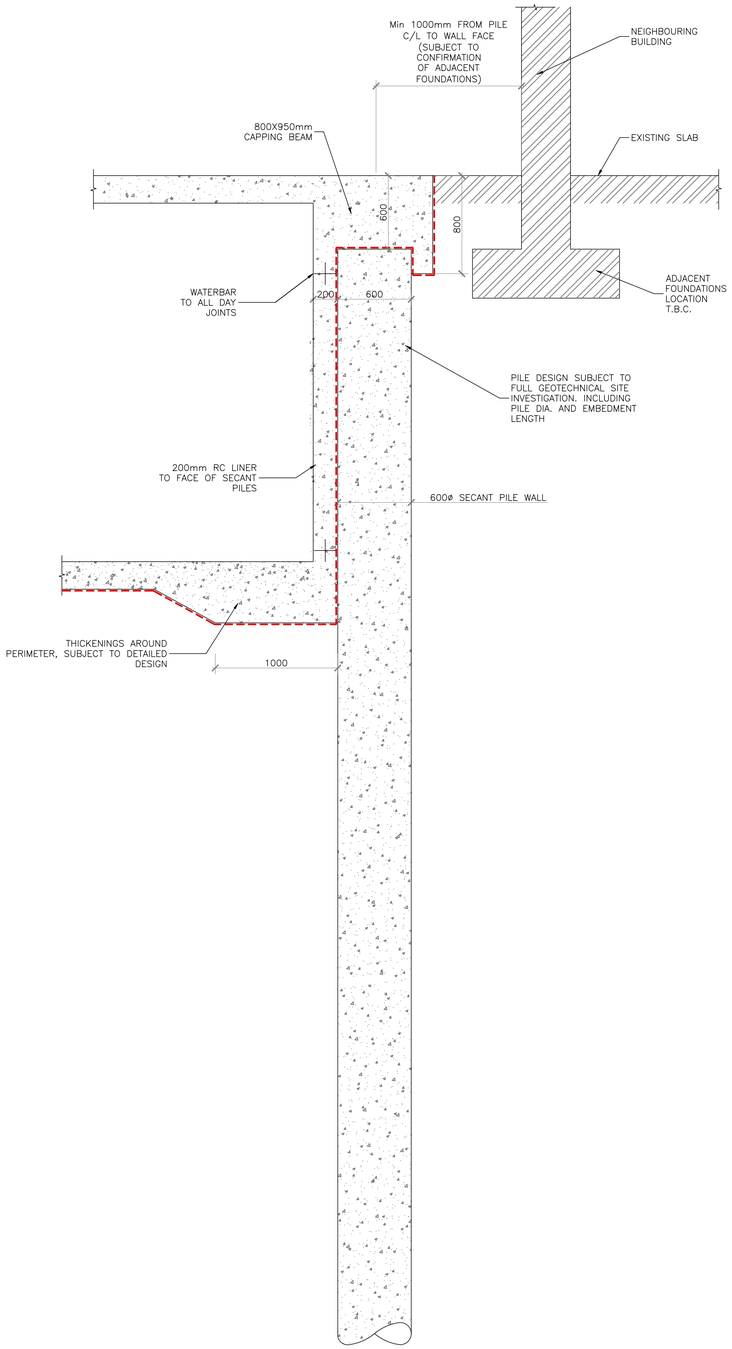
ORS

Dublin | London | Mullingar
T: +353 1 5242060 | W: www.ors.ie | E: info@ors.ie
ISO 9001:2008 QUALITY ASSURED COMPANY

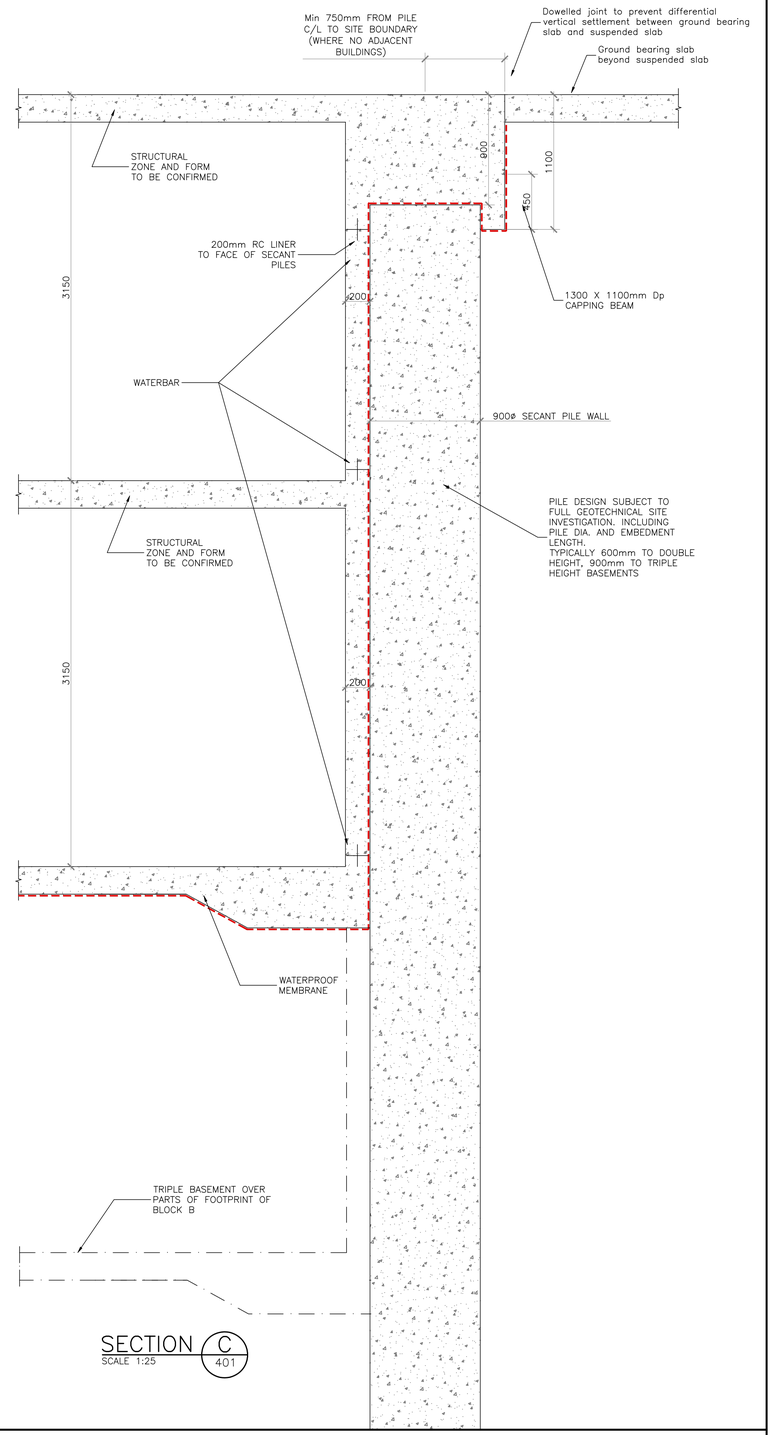
A1



SECTION A
SCALE 1:25
401



SECTION B
SCALE 1:25
401



SECTION C
SCALE 1:25
401

S2 - INFORMATION

REV NO:	DATE:	REVISION NOTE:	DWN BY:	CKD BY:
P01	02/12/2020	ISSUED FOR INFORMATION	AK	MH
P02	21/07/2021	ISSUED FOR INFORMATION	SG	MH

CLIENT:	RHONELLEN DEVELOPMENTS LTD.
PROJECT:	TEMPLAR PLACE SHD
TITLE:	STRUCTURAL DESIGN INTENT - RETAINING WALL SECTIONS

DRAWN:	CHECKED:	APPROVED:	JOB NO:	REV:
AK	MH	CG	201_321	P02
DATE: 02/12/2020	SCALE: 1:25		DRAWING NO: 201_321-ORS-ZO-ZZ-DR-S-501	

ORS
Dublin | London | Mullingar
T: +353 1 5242060 | W: www.ors.ie | E: info@ors.ie
ISO 9001:2008 QUALITY ASSURED COMPANY