



WILLIAM
HUNT
CONSULTING

Design Calculations

WHC reference: 20235

Job Information

Client	Optera Structural Solutions
Client Reference	9774
Report Date	15/10/2025
Address	11 Hollins Walk, Reading, Berkshire, RG30 2BU

Scope

To provide an internal screwpile raft underpinning solution to the single-storey garage at the risk address of 11 Hollins Walk, Reading, Berkshire, RG30 2BU. Garage is a single-storey single skin masonry structure of traditional construction.

Design

Consider applied line load from Garage :

Load Case 1

Element	Unfact. Dead Load kN/m Run			Unfact. Live Load kN/m Run			Total Unfactored Load kN/m Run	Total Factored Load kN/m Run
Flat Roof	2.85	x	1.10	2.85	x	1.00	5.99	8.95
Wall	2.50	x	3.57	N/A			8.93	12.50
Ground Floor (Conc)	0.20	x	24.00	1.80	x	1.50	7.50	11.04
Sf Wt of Footing & Beam	1.00	x	7.50	N/A			7.50	10.50

Total Service Load (kN/m) 29.91

Total Ultimate Load (kN/m) 42.98

Piles to be adopted to be a 60R Screwpile with a SWL of 44kN, ie. $29.91 \times 1.45 = 43.40\text{kN}$. Assumed pile depth to 4m, see attached data sheet.

Consider Needle Beam Design

$$b = 450\text{mm}; h = 300\text{mm}; d = 300 - 50 - 10 - 8 = 232\text{mm}; F_y = 500\text{N/mm}^2; F_{cu} = 35\text{N/mm}^2$$

$$\text{Pile Load} = 29.91 \times 1.45 = 43.37 \text{ kN}$$

$$\text{Max. Bending Moment} = PL = 62.33 \times 0.70 = 43.63 \text{ kNm}$$

$$K = \frac{43.63 \times 10^6}{450 \times 232^2 \times 35} = 0.051$$

$$Z = \sqrt{0.25 - \frac{0.051}{0.9}} + 0.50 = 0.940 \text{ d} = 218.08$$

$$A_{st} \text{ Required} = \frac{43.63 \times 10^6}{0.87 \times 500 \times 218.08} = 459.90 \text{ mm}^2$$

$$\text{Therefore provide 3No. H16's. Top \& Bottom, } A_{st} \text{ Provided} = 603 \text{ mm}^2$$

$$V = 43.37 \text{ kN} \quad v_d = \frac{43.37 \times 10^3}{450 \times 232} = 0.42 \text{ N/mm}^2$$

$$v_c = 0.79 \times 1^{1/4} \times 35/25^{1/3} \times (100 \times 603 / 450 \times 232)^{1/3} / 1.25 = 0.59 \text{ N/mm}^2$$

$$A_{sv} \text{ Req'd} = 450 \times (0.75 \times 232) \times 0.4 / 0.87 \times 500 = 72 \text{ mm}^2 / 174\text{mm}$$

$$\text{Therefore provide Minimum H10 Links @ 150mm Centres} = 182\text{mm}^2 / 174\text{mm}$$

Notes

1. Section size 450mm x 300mm
2. Main Steel 3No. H16's Top & Bottom
3. Links Min. H10 Links at 150mm centres
4. Concrete to be minimum C35 (35N/mm²)

Consider Slab Design

$$b = 1000\text{mm}; h = 200\text{mm}; d = 200 - 50 - 10 - 5 = 135\text{mm}; F_y = 500\text{N/mm}^2; F_{cu} = 35\text{N/mm}^2$$

$$\text{Max. Bending Moment} = WL^2/8 = \frac{11.04 \times 1.80^2}{8} = 4.47 \text{ kNm} \quad (\text{say } 15\text{kNm})$$

$$K = 15.00 \times 10^6 / 1000 \times 135^2 \times 35 = 0.007$$

$$Z = \sqrt{0.25 - \frac{0.007}{0.9}} + 0.50 = 0.940 \quad d = 126.90$$

$$\text{Ast Required} = 15.00 \times 10^6 / 0.87 \times 500 \times 126.90 = 272 \text{ mm}^2$$

Therefore provide A393 Mesh Top & Bottom, Ast Provided = 393mm²
Or, H10 loose bar @ 200mm centres in both directions

Notes

1. Reinforced Slab Depth 200mm
2. Reinforcement to be A393 Mesh T & B, or H10's @ 200mm ctrs in both directions
3. Concrete to be minimum C35 (35N/mm²)



60R Screw Piles - Product Page

Specification	Definition	60R
Wall Thickness	Thickness of the screw pile tube wall	6.35mm
Torque Limited	The ability of the pile to transmit torque is always the limiting factor. This is therefore the ultimate practical pile install torque capacity. For handheld installation the torque is limited to 4kNm.	4kNm
Empirical torque factor Kt Kt m ⁻¹	This is the 'Empirical Torque Factor' expressed in metric units when torque is measured in kNm and force in kN. Its value decreases as pile diameter and helix plate thickness increases. This is due to a combination of skin friction and the energy needed to displace the soil.	30m ⁻¹

Installation Equipment

The 60R Anchors can be installed using the hand held 400H or the excavator mounted 500X.

The 400H compact size allows it to fit through doorways therefore is very useful on sites with limited access. It is driven from a hydraulic powerpack. The 500X fits excavators from 2-7 tonne.

Both machines offer torque read outs, allowing the pile capacity to be calculated instantly.



	400H (Handheld)	500X (Excavator)
Ultimate pile capacity (un-factored) @ 5kNm torque		150kN
Ultimate pile capacity (un-factored) @ 4kNm torque	120kN	
Safe working load (2.5 FOS) @ 5kNm torque		60kN
Safe working load (2.5 FOS) @ 4kNm torque	48kN	

- **Un-factored load** - A maximum load that the pile will take before deflection exceeds standard limits
- **Factor Of Safety (FOS)** - The ratio between unfactored and working load
- **Safe Working Load (SWL)** - The actual load the pile is taking when the building is in place

Tube Specification	BS EN-10297 E355 HFS
Helix Specification	BS EN-10025 S275
Fasteners Specification	METRIC M16 GR8.8

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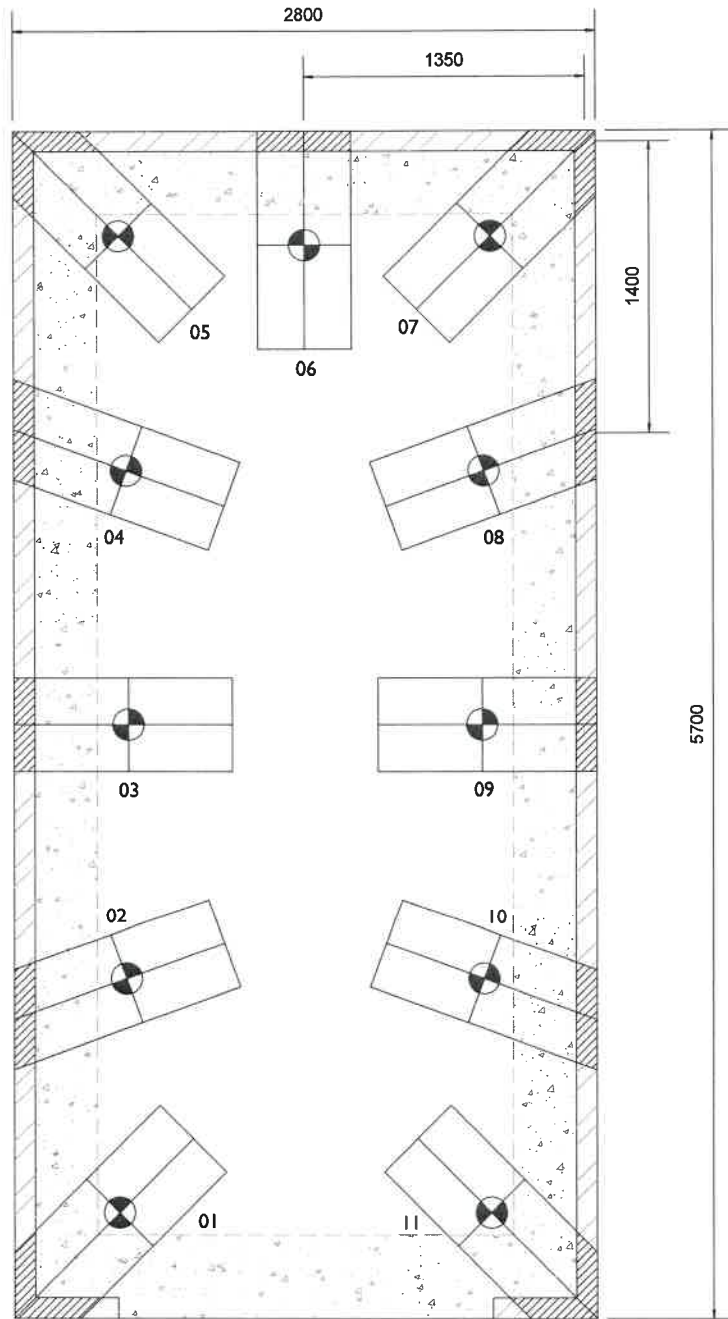
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In common with other manufacturers we reserve the right to modify or change specification without prior notice and without commitments to change units in the field. E&OE A011.4a



Note - Dimensions to be confirmed on site



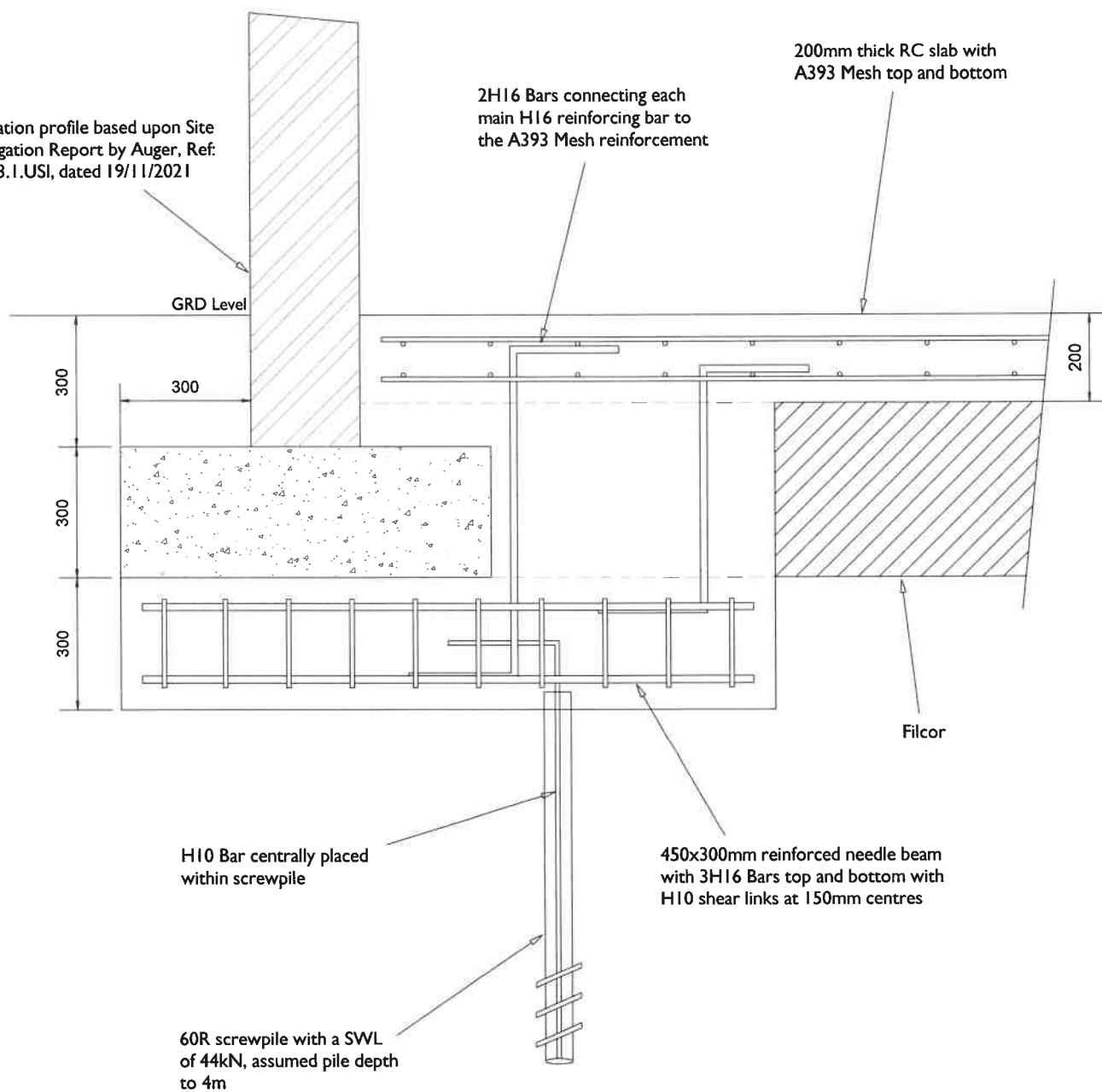
Front Elevation



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Foundation profile based upon Site Investigation Report by Auger, Ref: I29603.1.USI, dated 19/11/2021



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Contact us

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