

Preliminary Piling Platform Design – SR30

Alternative based on Reinforced Platform

152-156 Kentish Town Road
London
NW1 9QB



Date: 17/05/2021
Prepared by: Nigel Brooks, R&E Geotechnical Consultants Ltd
Design Ref: RE2437 des 020
NFS Ref: 200809
Revision: 0

Design Input

Platform for CFA rig SR30; (representing most onerous of SR30, SR20, S60 & SF50)

PPL marginally below original ground level.

GEA Desk Study & Ground Investigation report ref J15359 dated June 2016.

Sub-grade options up to 1m below original ground Topsoil to be removed

- A Cohesive Made Ground; no strength description just 2 SPTs BH1 N of 1 at 1.2m and 13 at 2m
No Atterberg limit tests in Made Ground.
Whilst a SPT of 2 maybe considered to represent an Su of 20kPa the testing here is insufficient in itself and any strength needs to be confirmed.
Provisional Assigned Su 27kPa; **extensive plate testing required to confirm design.**
- B Granular Made Ground not noted, but possibly present.
Allow Assigned phi 30; minimum for granular material; *SI report gives phi of 27 but that is for cohesive material.*
- C Naturally reworked London Clay; described as soft to firm
Assigned Su 27kPa; **plate testing required to confirm design.**

Consider cohesive sub-grade Su 27kPa and granular subgrade phi 30

SR30 Piling Rig:

BRE Load Case 1: q1k = 189kPa, L1 = 2.54m, W1 = 0.6m

BRE Load Case 2: q2k = 269kPa, L2 = 1.46m, W2 = 0.6m

Alternative to BRE470, Based on Load Spreading through Reinforced Platform, with enhanced factors of safety.

Design Output

Subject to plate loading tests confirming design strength.

Where the platform is on Soft Clay or better, or granular Made Ground, the following is required.

*450mm thick platform of compacted crushed concrete or similar
with one layer of **Tensar TX170 or equivalent** at base.
Geotextile TX170 for well graded 100mm maximum particle size.*

Crushed Concrete to conform to 6f5 but maximum 100mm; platform material must not have excessive fines.

Piling Platform to be compacted in approximately 150mm thick layers using a Bomag BW120AD-4 or similar.

The design is based on the assumed subgrade listed above; any unrepresentative softer patches (see below) must be dug out and backfilled with suitable compacted material; voids must be adequately filled.

***With very little strength data available in top 3m; extensive plate loading testing is required to establish strength / confirm design strength.
A total of 8 No Plate load tests required to confirm design strength in cohesive materials, particularly cohesive made ground. Two tests to be near location of BH1.
600mm diameter plate load tests to be carried out on cohesive sub-grade before constructing the platform.
Plates need to hold a pressure of 185kPa to confirm design strength on Clay.***

Suggested loading sequence that includes the following pressures, 50kPa, 75kPa, 100kPa, 120kPa, 135kPa, 160kPa and 185kPa, unloading to zero. Each pressure should be held for 5 minutes. Tests should be carried out predominantly on cohesive Made Ground.



All tests need to hold 185kPa; if tests fail to hold 185kPa a redesign will be required which will need at least two layers of Triax 170.

Refer to BRE document BR470 "Working Platforms for Tracked Plant; good practice guide to the design, installation, maintenance and repair of ground-supported working platforms"
Section 4 Installation & Section 5 Operation, maintenance and repair.

Piling Platform Design & Calculations

Alternative Based on Reinforced Platform



152-156 Kentish Town Road, NW1				R&E Geotechnical Consultants Ltd	
TITLE Preliminary Platform Design - As Reinforcement Platform SR30				Design Cover Sheet	
Reference No. RE2489 des 020	Revision No. 0	Date of Previous Design (if revision)		Page 1 of 4	
Activity	initials	signature		Date	
Design By	NJB			14/5/21	
Verified By	MRF			16/5/21	

Design Input

Platform for CFA rig SR30; (representing most onerous of SR30, SR20, S60 & SF50)
PPL marginally below original ground level.

GEA Desk Study & Ground Investigation report ref J15359 dated June 2016

Topsoil to be removed

Sub-grade options up to 1m below original ground

A Cohesive Made Ground; no strength description just 2 SPTs BH1 N of 1 at 1.2m and 13 at 2m
 No Atterberg limit tests in Made Ground.
 Whilst a SPT of 2 maybe considered to represent an Su of 20kPa the testing here is insufficient in itself and any strength needs to be confirmed
 Provisional Assigned Su 27kPa; extensive **plate testing required to confirm design**

B Granular Made Ground not noted, but possibly present
 Allow Assigned phi 30; minimum for granular material; SI report gives phi of 27 but that is for cohesive material.

C Naturally reworked London Clay; described as soft to firm
 Assigned Su 27kPa; plate testing required to confirm design

Consider cohesive sub-grade Su 27kPa granular sub-grade phi 30

SR30 Piling Rig:
 BRE Load Case 1: q1k = 189kPa, L1 = 2.54m, W1 = 0.6m
 BRE Load Case 2: q2k = 269kPa, L2 = 1.46m, W2 = 0.6m

Design Output

Alternative to BRE470, Based on Load Spreading through Reinforced Platform

Where the platform is on Soft Clay or better, granular Made Ground; the following is required

*450mm thick platform of compacted crushed concrete or similar
 with single layer of **Tensar TX170 or equivalent** at base.
Geotextile TX170 for well graded 100mm maximum particle size.*

Crushed Concrete to conform to 6f5 but maximum 100mm
 Piling Platform to be compacted in approximately 150mm thick layers using a Bomag BW120AD-4 of similar

The design is based on the assumed subgrade listed above; any unrepresentative softer patches must be dug out and backfilled with suitable compacted material; voids must be adequately filled.

***With very little strength data available in top 3m; extensive plate loading tests required to establish strength
 A total of 8 No Plate load tests required to confirm design strength in cohesive materials, two tests near BH1***

***600mm diameter plate load tests to be carried out on cohesive sub-grade before constructing the platform.
 Plates would need to hold a pressure of 185kPa to confirm design strength on cohesive material***
 Recommended sequence; 50kPa, 75kPa, 100kPa, 120kPa, 135kPa, 160kPa and 185kPa

*Refer to BRE document BR470 "Working Platforms for Tracked Plant; good practice guide to the design,
 installation, maintenance and repair of ground-supported working platforms"*
Section 4 Installation & Section 5 Operation, maintenance and repair.

Revision	By	Date	Ver	Date	Description

PROJECT:	152-156 Kentish Town Road NW1				R&E Geotechnical Consultants Ltd		
TITLE or DESCRIPTION: Preliminary Platform Design - As Reinforcement Platform SR30	Orig	Date	Verif	Date	Ref. No	Sheet No	
	njb	14/5/21	mrf	'16/5/21	RE2489	Rev	0

Alternative approach based on load spread due to particle interlock in association with geotextile

**Allow for 40 degree spread through 450mm thick platform with base layer of geotextile
Area increases and pressure decreases as set out below**

SUB GRADE: Soft to Firm Clay

1 Subgrade properties

C_{uk}	=	27 kPa
γ_f	=	1
C_{ud}	=	27 kPa
N_c	=	$2 + \pi$
	=	5.14

Platform properties

Material Spec.	=	*
ϕ_{pk}	=	45^0
γ_{pk}	=	21 kN/m ³
γ_f	=	1
ϕ_{pd}	=	45^0
γ_{pd}	=	21 kN/m ³
$N_{\gamma p}$	=	257.0
$K_p \tan \delta$	=	9.9

2 Piling Rig

Rig Type	=	SR30
W_d	=	1.35 m
L_n	=	2.91 m
s_{cN}	=	1.09
$s_{\gamma N}$	=	0.86
s_{pN}	=	1.46

Loaded area increased by 0.45m x tan 40 x 2

L_e	=	1.83 m
s_{cE}	=	1.15
$s_{\gamma E}$	=	0.78
s_{pE}	=	1.74

Track Pressures:

q_{Nk}	=	73.3 kPa	} reduced pressure due to load spread
q_{Ek}	=	95 kPa	

3 Check adequacy of 450mm platform as described above

R_d	=	$c_{ud} * N_c * s_{cN}$	
	=	152 kPa	
q_{Nd}	=	$2.0 q_{Nk}$	= 147 $q_{Nd} < R_d$
q_{Ed}	=	$1.5 q_{Ek}$	= 143 $q_{Ed} < R_d$

450mm Reinforced Platform is Sufficient

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	njb	14/5/21	mrf	'16/5/21	RE2489	Rev	0
							3 of 4

Alternative approach based on load spread due to particle interlock in association with geotextile

**Allow for 40 degree spread through 450mm thick platform with base layer of geotextile
Area increases and pressure decreases as set out below**

1 Subgrade properties

Granular MG

ϕ_{sk}	=	30°
γ_{sk}	=	17 kN/m ³
γ_f	=	1.0
ϕ_{sd}	=	30°
γ_{sd}	=	17 kN/m ³
$N_{\gamma s}$	=	21.0

Platform properties

ϕ_{pk}	=	45°
γ_{pk}	=	21 kN/m ³
γ_f	=	1.0
ϕ_{pd}	=	45°
γ_{pd}	=	21 kN/m ³
$N_{\gamma p}$	=	257.0
$K_p \tan \delta$	=	9.9

Material Spec.

2 Piling Rig = SR30

Wd	=	1.35 m
Ln	=	2.91 m
Le	=	1.83 m
q _{nk}	=	73.3 kPa
q _{ek}	=	95 kPa

Loaded area increased by 0.45m x tan 40 x 2

} reduced pressure due to load spread

$s_{\gamma n}$	=	0.86	s_{pn}	=	1.46
$s_{\gamma e}$	=	0.78	s_{pe}	=	1.738

3 Check adequacy of 450mm platform as described above

$$R_{ds} = 0.5 * \gamma_s * W_d * N_{\gamma s} * s_{\gamma} = 188 \text{ kPa}$$

q _{nd}	=	2.0 * q _{nk}	=	147 kPa	q_{nd} < R_{ds}
q _{ed}	=	1.5 * q _{ek}	=	143 kPa	q_{ed} < R_{ds}

450mm Reinforced Platform is Sufficient

Working Platform Certificate (FPS/WPC/4d)

Project Name	152-156 Kentish Town Road
Work area covered by this certificate	Area covered by GEA Desk Study & Ground Investigation report ref J15359 dated June 2016 subject to proposed Plate Load Tests

(A sketch or marked up pile layout drawing may be attached to this certificate. Include haul roads and gridlines.)

Part 1 – WORKING PLATFORM DESIGN (INCLUDING RAMPS AND ACCESS ROUTES)

Equipment to be used on site.	Soilmec SF55 Soilmec SR30s Soilmec SF50 Soilmec SR30 evo Soilmec SR20
Maximum plant loading	BRE Load Case 1 BRE Load Case 2 qlk = 189kPa, L1 = 2.54m qlk = 269kPa, L1 = 1.46m W2 = 0.6m W2 = 0.6m

(Note: BR470 'Working Platforms for Tracked Plant: Good practice guide to the design, installation, maintenance and repair of ground-supported platforms' is available from IHS BRE Press – Tel 01344 328 038)

Designer Name	Nigel Brooks	Tel No.
Designer Organisation	R&E Geotechnical Consultants Ltd	
Specification of testing required to verify the design	8 number Plate Load Tests required; 600mm diameter to 185kPa on cohesive sub-grade to confirm design strength. recommended stages, 50kPa, 75kPa, 100Pa, 120kPa, 135kPa, 160kPa & 185kPa.	

Part 2 – VERIFICATION BY PRINCIPAL CONTRACTOR

The working platform detailed above has been designed, installed to the design and, if specified, tested to safely support the equipment detailed in Part 1 above. The limits of the platform have been clearly identified on site as necessary.

The working platform will be **REGULARLY INSPECTED, MAINTAINED, MODIFIED, REPAIRED, and REINSTATED** to the as-designed condition after any excavation or damage, throughout the period when the equipment is on the site. A completed copy of this certificate signed by an authorised person from the Principal Contractor shall be given to each user of the working platform prior to commencement of any works on site.

Name & Position		Date
Organisation		Signature

The HSE has worked closely with the FPS to develop this initiative and supports the principle of reducing accidents by the certification of properly designed, prepared and maintained working platforms

Project: 152-156 Kentish Town Road		Project No: RE2489		Status: Contract		Date: 17-May-21								
Structure: Piling Platform - SR30		Assessors: NJB		Assessment: Detailed		Review Date:								
Structure Ref:		Approved:		Signed by m/c:		Date:								
Ref	Risk event and causes	Likely consequences if risk arises	Severity			L	R	T	All Options Considered to Mitigate Risk	SC/UC	Residual Risk / Consequence with Option in Place	Further Action and Responsibility	By Whom	By When
			D	S	C									
	Design													
1	Ground Profile varies from design profile; very limited strength test data	Inadequate design and potential rig instability	4	4	4	3	12	O						
			4	4	4	2	8	O	Design to be based on relatively cautious sub-grade strengths. Current design preliminary.	SC	Still potential for less favourable conditions as inforamtion on site strengths is limited	8 No Plate load tests to be carried out to confirm design strengths on cohesive sub-grade in particular the cohesive Made Ground.	Contractor	Before construction platform
			4	4	4	1	4	Y	8 No Plate load tests to be carried out to confirm design strengths on cohesive sub-grade in particular the cohesive Made Ground.	SC				