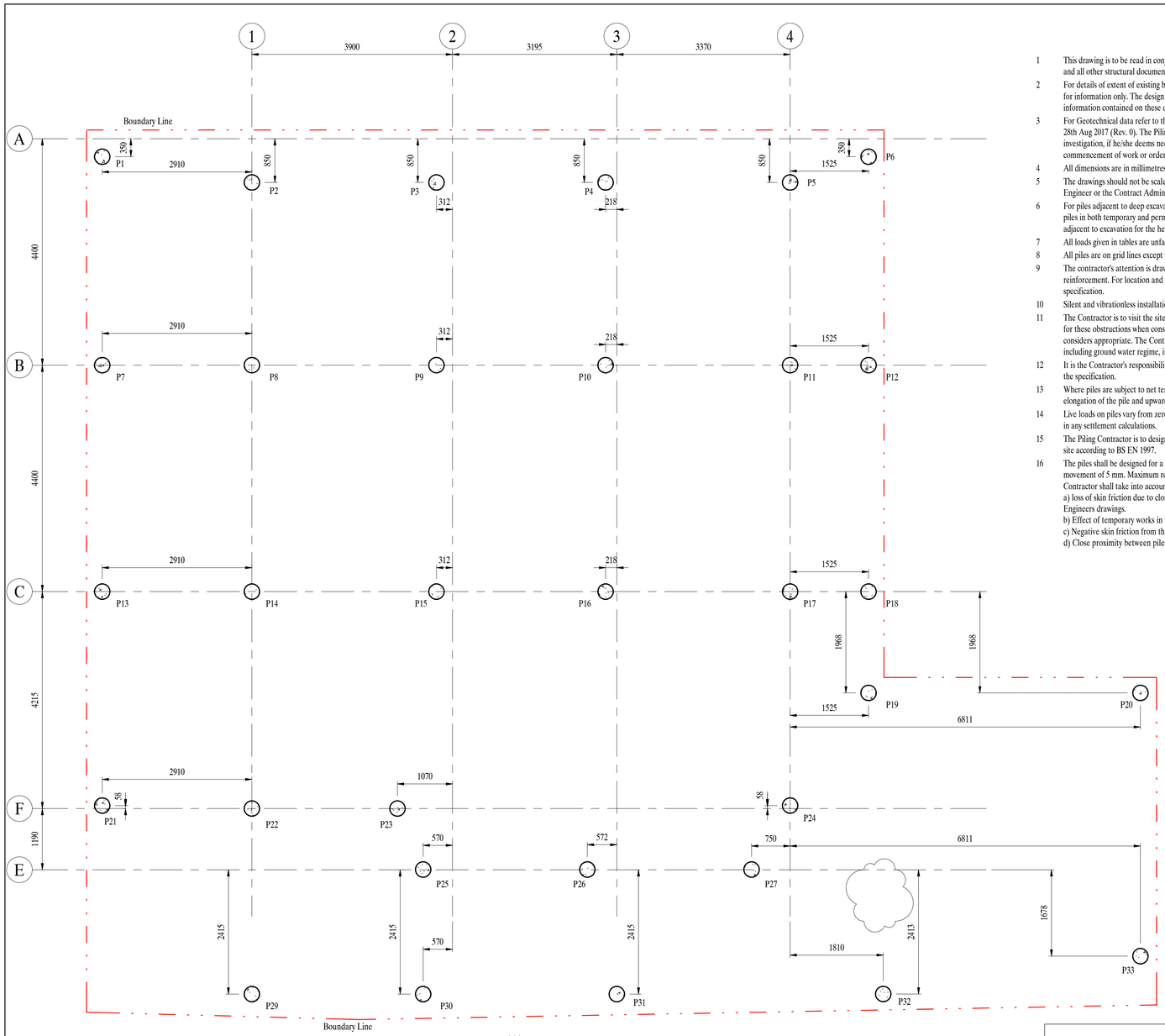


Piling Layout

(Scale 1 : 50)

Piling Notes

1. This drawing is to be read in conjunction with all Pringuer-James Consulting Engineers (PJCE) specifications and all other structural documentation.
2. For details of extent of existing buildings refer to Architect's drawings of the existing building. These are issued for information only. The design team do not take any responsibility for the accuracy or completeness of the information contained on these drawings.
3. For Geotechnical data refer to the Site Investigation Report by Soil Consultants Ltd. Ref. 10120/MR/CB dated 28th Aug 2017 (Rev. 0). The Piling Contractor must make all necessary inquires, including a full site investigation, if he/she deems necessary, concerning the nature and location of soils and strata prior to the commencement of work or ordering of materials.
4. All dimensions are in millimetres and levels in metres O.D. unless noted otherwise.
5. The drawings should not be scaled. Any discrepancies in dimensions are to be referred to the Structural Engineer or the Contract Administrator.
6. For piles adjacent to deep excavation (i.e. manholes) particular attention should be given to the design of the piles in both temporary and permanent conditions. e.g. no shaft friction capacity should be taken for piles adjacent to excavation for the height of the excavation.
7. All loads given in tables are unfactored and in kN.
8. All piles are on grid lines except where noted.
9. The contractor's attention is drawn to the requirement for connection of lightning protection earthing to pile reinforcement. For location and details of lightning protection, refer to services engineer's drawings and specification.
10. Silent and vibrationless installation techniques are to be used for all piles. No driven piles allowed.
11. The Contractor is to visit the site and must note all visible obstructions to his work. The Contractor must allow for these obstructions when considering the piling equipment and must allow for any protection works he considers appropriate. The Contractor is required to take full account of prevailing ground conditions on site including ground water regime, in the design of piles.
12. It is the Contractor's responsibility to ensure that the setting out of the piles complies with the requirements of the specification.
13. Where piles are subject to net tensile forces the Piling Contractor shall in his design limit the sum of the elongation of the pile and upward deflection of the pile to a maximum of 5mm.
14. Live loads on piles vary from zero to the maximum stated at each location and this should be taken into account in any settlement calculations.
15. The Piling Contractor is to design and detail the piling works based upon the geotechnical data relating to the site according to BS EN 1997.
16. The piles shall be designed for a maximum absolute settlement of 10 mm and a maximum absolute vertical movement of 5 mm. Maximum relative settlement for any other dimensions will be taken pro-rata. The piling Contractor shall take into account all factors that may effect pile/soil interaction and pile capacity -
    a) loss of skin friction due to close proximity of excavation for drain runs and chambers, etc. - refer to Services Engineers drawings.
    b) Effect of temporary works in the ground adjacent to piles. refer to the contractor for details.
    c) Negative skin friction from the insitu soil strata and backfill material.
    d) Close proximity between piles and piles in groups.

Piling Notes

17. In the permanent design case the concrete piles shall be designed to resist the following vertical and horizontal loads which can be combined appropriately to produce the most onerous loading combination.
    a)Vertical loads - the most onerous upwards and downwards vertical loads shall be determined by appropriately combining the vertical loads in the pile load table.
    b) Moments due to eccentric vertical loading of piles. - Piles shall be designed to resist moments due to pile / column eccentricity - determined from the worst case combination of :-
    i) Design eccentricity of walls ± 75mm relative to the specified location of the piles.
    ii) Eccentricity due to the most adverse combination of construction tolerances. of both piles and the supported structure.
18. The Contractor is required to submit and obtain approval to his/her design for the piles from Local Building Control Officer. The Contractor is also required to submit and obtain approval to his/her design for the piles as required from the party wall surveyours acting for the neighbouring owners. Contractor to make allowance for coordination with any temporary works required as part of the design and detail package, including liaising with any statutory authority.
19. The contractor shall determine the piling platform levels and advise the structural engineer accordingly. The Contractor shall provide any necessary temporary steelwork for the support of piling equipment whilst installing the sheet piles. The Contractor is also responsible for the design and detail of the piling mat required for the type of piling rig proposed.
20. The contractor is responsible for all trimming, cutting, recesses and drilling into piles and ensuring that piles are not damaged in the process.
21. See Contract Administrator's drawings for the setting out of the building grid lines. Wherever the dimensions differ from those shown on the 'GA' drawings, the dimensions given by the 'GA' shall take precedence.
22. All fire protection to all piles shall be in accordance with Architects specification and to satisfy the life satisfy requirements of the Building Regulations (if any).
23. The Piling Contractor is required to provide a full and detailed method statement in respect of the piling installation. The method statement is to be submitted to the Engineer for comment. The responsibility for the design and installation of piles is to remain fully with the Piling Contractor. The successful Piling Contrator will be required to submit all calculations and drawings to the Engineer for his consideration prior to the commencement of works. The Piling Contractor must state in his quotation the length of pile upon which his price is based. The Piling Contractor should stat the extra costs associated with an increase in the pile lengths due to site conditions and the credit allowed for pile length reduction. All work throughout the course of the contract is to be inspected by the Local Authority to ensure compliance with contract drawings, Building Regulations and good building practice.
24. The accurate positioning of the piles is the responsibility of the Piling Contractor, and maximum tolerance of 75mm is permitted. The piles shall not deviate from the vertical by more than one degree angle. If these tolerances are exceeded and, in the opinion of the Engineer, this is detrimental to the structural adequacy of the works, the Piling Contractor will be liable for any remedial work required.
25. The Piling Contractor is to calculate a suitable piling platform level based on final pile cut off levels. The Piling Contractor is to provide details of piling platform level and to take due account of pile head cut down in his tender pricing.
26. The Piling Contractor shall guarantee that each pile will sustain without appreciable deformations or undue progressive settlement, the full loads as derived from the Engineers drawings. Any defects or damage to the works or supported structure resulting from any inadequacy of the Piling Contractor's design, materials or workmanship are to be made good at the Piling Contractor's expense and to the satisfaction of the Engineer.
27. Indicative bearing pile diameter for this scheme to be 300mm diameter unless noted otherwise.
28. Pile lengths are to assessed by the piling contractor.
29. Full intrusive Site Investigation report data to be used to determine geotechnical parameters for use in Pile Design.
30. Minimum pile spacing generally 3 x pile diameter (i.e. 900 centres)
31. Static load testing not required, unless specified by Building Control.
32. Integrity testing - After the piles have been trimmed and prior to any additional concrete being placed, ALL foundation piles will be sonically tested for integrity by an independant testing authority. Any proven pile defects will be repaired to the Structural Engineer's satisfaction and counter-charge to the Piling Contractor. Testing to be included in the contract tender price.
33. Piles to be formed / concreted to required cut off levels with granular backfill up to piling mat level.
34. Working platform to be generally set at approximate existing ground level. Piling mat to be designed by main Contractor in accordance with Federation of Piling Specialists guidance on the design of piling mats. Piling mat design to be undertaken to BRE report "Working platforms for tracked plant" by the Main Contractor's suitably qualified Temporary Works Engineer.
35. The Contractor to take suitable precautions when piling in vicinity of existing structures. Method statements for manoeuvring of piling rig/other plant and detailed proposals for ensuring ground-borne vibration levels are kept to within acceptable levels to be provided prior to commencing works.
36. Piles are to be installed to achieve the specified SWL's in accordance with the 'Specification for Piling and Embedded Retaining Walls' as published by the Institute of Civil Engineers.
37. All RC piles to be installed utilising a vibration free method.
38. Casings (if required) shall be installed through unstable fill to natural stable strata using vibration less methods.
39. In addition to the loads shown allow for a horizontal force at the head of pile of a value equal to as specified in load tables.
40. Concrete to be minimum of grade C28/35 as per BS 8500 and BRE special digest 1 corresponding to a design sulphite class DS-4 and an class of AC-4, with the ground water being mobile.
41. The concrete shall be properly graded and compacted to give the required strength without excess water. Inclusions of soil and other extraneous matter causing wasting must be avoided and any piles affected with be condemned.
42. At all stages of the work every precaution shall be taken to prevent the formation of voids in the concrete caused by faulty consolidation. Particular attention shall be paid during withdrawal of any temorary liner.
43. A sufficient head of concrete shall be maintained to prevent an inflow of soil or water during the extraction of any temporary liner.
44. a) Minimum reinforcement to concrete piles should not be less than :-
    Minimum number of longitudinal bars - 5 no.
    Minimum diameter of longitudinal bars - H16
    Minimum diameter of links/helix - 10mm
    The minimum pitch centres of pile reinforcement shall not be less than 200mm centres to allow the placing of slab, pilecap or capping beam reinforcement through pile reinforcement. the minimum length of reinforcement cage shall not be less than 6 metres from the top of the pile.
    b) The length of the reinforcement cage shall be determined by the piling Contractor to adequately reinforce the pile to the length required to resist the forces applied.
    c) Tensile resistance of the pile concrete shall be ignored. where piles are subject to net uplift forces reinforcement cage to be full length of the pile.
    d) Where piles are subject to net tensile forces the piling contractor shall in his design limit the sum of the elongation of the pile and upward deflection of the pile to a maximum of 5 mm.
45. In the temporary construction stage case the concrete piles shall be designed to resist the following vertical and horizontal loads which can be combined appropriately to produce the most onerous loading combinations.
    a) Vertical loads worst case combination of :-
    i) Vertical loads given in note 17.
    ii) Additional loads due to temporary works, construction method and sequence for sub and super structure and any site temporary loading. Refer to the contractor for details.
    b) Moments due to eccentric vertical loadings of piles.
    i) Loading as given in note 17.
    ii) Additional loads due to temporary works, construction method and sequence for sub and super structure and any site temporary loading. Refer to the contractor.
    iv) Embankment wall loads to adjacent property.
    v) Deflections due to horizontal forces shall be limited to 20mm at ground level / 10mm adjacent to buildings.
46. The pile reinforcement projecting from piles into the ground beam above should be designed to resist the forces and moments from wall above the pile. The pile reinforcement shall extend a lap length anchorage length into the ground beams. The projecting pile reinforcement length shall take due account of the depth of the ground beam. For larger dia. pile reinforcement, cranked bars and mechanical reinforcement couplers may be required to provide the anchorage to the pile reinforcement. Where cranked bars and mechanical couplers are required, these shall be the responsibility of the contractor to design and install. The minimum pile reinforcement projecting into ground beams shall not be less than 650mm or 45 x diameter.

Legend:

P?

Assumed 300mm dia. CFA piles.
To be confirmed by Contractor.

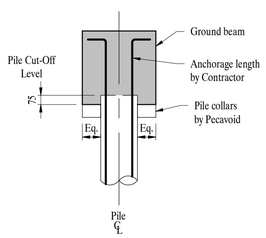
Piling Schedule

Mark	Tension (kN)	Compression (kN) Permanent	Compression (kN) Variable	Horizontal (in all directions)	Cut-off level
P1		100	30	10	34.264
P2		395	85	10	34.652
P3		395	85	10	34.652
P4		395	85	10	34.652
P5		395	85	10	34.652
P6		100	30	10	34.652
P7		150	45	10	34.264
P8		395	85	10	34.264
P9		525	115	10	34.652
P10		525	115	10	34.652
P11		395	85	10	34.652
P12		150	45	10	34.652
P13		150	45	10	34.114
P14		395	85	10	34.114
P15		525	115	10	34.652
P16		525	115	10	34.652

Note: All loads are unfactored

Piling Schedule

Mark	Tension (kN)	Compression (kN) Permanent	Compression (kN) Variable	Horizontal (in all directions)	Cut-off level
P17		395	85	10	34.652
P18		150	45	10	34.652
P19		100	30	10	34.652
P20		150	45	10	34.652
P21		150	45	10	34.114
P22		395	85	10	34.114
P23		395	85	10	34.652
P24		395	85	10	34.652
P25		395	85	10	34.114
P26		395	85	10	34.652
P27		395	85	10	34.652
P29		150	45	10	34.114
P30		150	45	10	34.114
P31		150	45	10	34.114
P32		100	30	10	34.652
P33		150	45	10	34.652



Indicative Section Showing Pile Cut-Off Level

(Scale 1 : 25)

General
For General Notes Drawing refer to PJCE drawing L2216-S-15-001.

All Structural Engineering drawings are to be read with the specification and with all relevant Architects drawings and specifications.

Do not scale from any Structural Engineers drawing. All dimensions are in millimetres and levels in metres.

All waterproofing (DPM & DPC) works to Architects details.

All fire protection works to Architects details unless specifically noted otherwise.

Abbreviations:-

SSL - Structural slab level	FFL - Finished floor level
C\S - Column Stops	C/C - Column Capped
UNO - Unless Noted Otherwise	OSA - Or SimilarApproved

The Contractor is responsible for the design, installation and maintenance of all necessary temporary works to ensure the strength and stability of the building throughout the course of the works. Drawings and calculations detailing all temporary works shall be submitted to the Engineer for comment prior to commencement of the works.

Rev	Date	Drn	Chk	Amendment
02	01.05.18	DA	TF	Pile P29 Removed
01	19.04.18	NC	TF	Revisions Clouded
-	06.04.18	NC	TF	Issued for Information

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PILING LAYOUT

Status : **INFORMATION**

Scales : As indicated @ A1		Date :
Drawn : NC	Engineer : TF	Checked : SPJ
Drawing No. L2216-S-20-009		Revision : 02