

Hard / Hard Secant Wall

Marks & Spencer Development

FENCHURCH STREET, LONDON, UK



Foundation work for a level basement in central London

Introduction

For its prestigious city of London, store developer Marks & Spencer required that two existing concrete basement slabs be left in place, while new foundations for the eight storey, four basement level structure be formed beneath them.

Design

Piling operations were completed through an existing 7m basement. The 450mm thick structural slabs could not be removed until the new 221m long hard/hard secant piled retaining wall had been constructed, 100mm inside the existing perimeter wall. The slabs had been designed to act as horizontal props to an original retaining wall. To demolish these before construction of the new wall would have caused instability to adjacent roads and structures.

To facilitate this construction method, 1.5m wide access slots were cut through both slabs directly above the line of the proposed secant wall. A further number of square holes were cut across the site to allow load supporting piles with plunged columns to be formed.



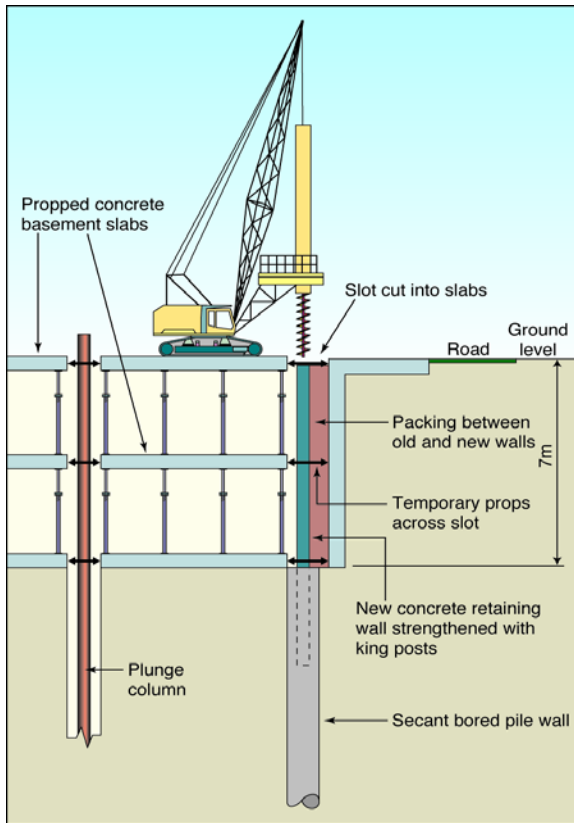
The Construction Site with rigs in place

CLIENT:	Marks & Spencer Ltd
MAIN CONTRACTOR:	hbg Construction Ltd
CONSULTING ENGINEER:	Ove Arup & Partners
DURATION OF WORKS:	13 Weeks

WORKS QUANTITIES

Secant Piling	221 linm of 1180mm dia at 1050mm centres, 31m depth
Bearing Piles	33, 1200mm dia to 16m (Plunged Columns) 11 900mm dia under reamed





Schematic of Construction Sequence



Rigs On Site

Hard / Hard Secant Piled Wall

The hard / hard secant piled wall, consisted of 304 piles, 1180mm diameter at 1950mm spacing up to 31m long. The secant piling formed the lower part of the wall, with a new insitu concrete retaining wall up to 1m thick built over the top. A steel beam was cast into every third pile designed to extend 7m above the pile cut off level into the existing basement. Short flat jack props were placed horizontally in the narrow gap between the beams and the existing wall, to aid the eventual demolition of the old wall.

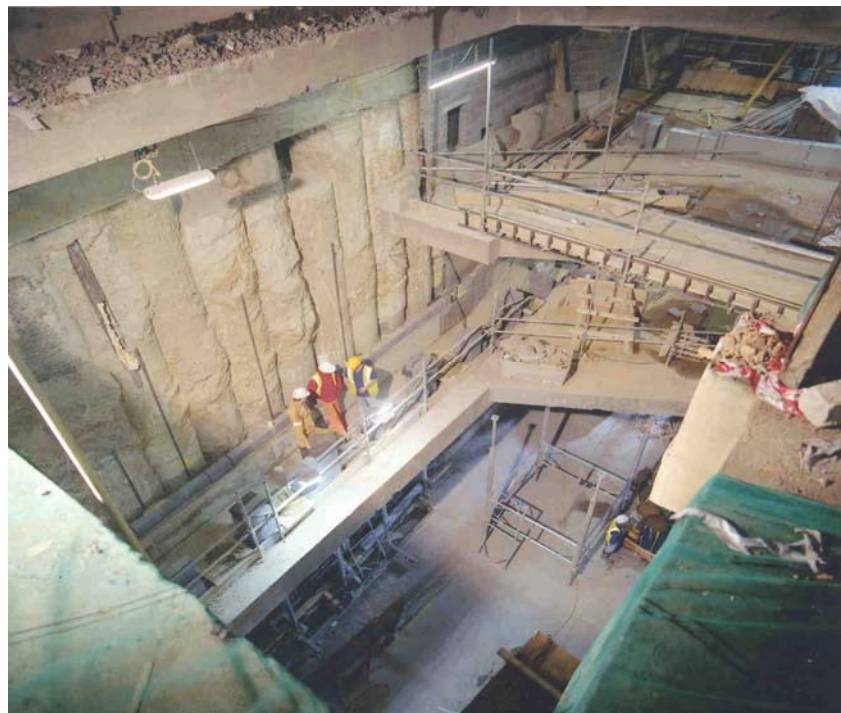
During the development of the site, six existing piles from the previous structure to occupy the site were incorporated into the wall. Watertightness was ensured between these and the new piles by injection grouting.

Thirty three load bearing piles were constructed across the site incorporating plunged columns 23m in length, placed within 1200mm diameter bored piles, 16m deep. The columns were designed to extend above existing ground level, to

allow a top down construction method to be utilised for the super structure.

In addition to these a further 11, 900mm diameter piles were constructed extended to form a 3m diameter under ream at the base in order to carry enhanced loads.

On completion of excavation, Bachy Soletanche's patented penetrometer system was utilised to gain an indication of the insitu strengths of the base material.



Completed Hard / Hard Secant Piled Wall