



SMEC Testing Services Pty Ltd

A.C.N. 101 164 792

CONSULTING GEOTECHNICAL ENGINEERS

Telephone: (02) 9756 2166 Facsimile: (02) 9756 1137

Email: smectesting@pacific.net.au

Unit 14,
1 Cowpasture Place
WETHERILL PARK
NSW 2164

P.O. Box 6989
WETHERILL PARK
NSW 2164

May 14, 2009

Project No. 17055/6336B

Report No. 09/0420

LWI/maa/ms

DeiCorp Pty Limited
Shop 5, 140-152 New Canterbury Road
PETERSHAM NSW 2049

Attention: Mr. Greg Colbran

**SUBJECT: POTENTIAL IMPACT ON PROPOSED BASEMENT EXCAVATION
NEW COMMERCIAL DEVELOPMENT
157 REDFERN STREET, REDFERN**

Dear Sir,

Introduction

Further to our various discussions this letter confirms our comments regarding the assessment of the potential affects of the proposed basement excavation on the adjacent railway property.

The new development is to be built on the eastern side along Gibbons Street. The works will include the excavation of four levels of basement car park that will be some 15 metres deep below the adjacent road level. The Redfern Station platforms for the Illawarra Line extend partly under the western side of Gibbons Street. It is particularly important to ensure that the proposed construction has no significant adverse affects on this railway infrastructure.

Background

SMEC Testing Services Pty Limited (STS) undertook a geotechnical investigation of the development site in March 2009 (referenced Project No. 17055/5911B, Report No. 09/0180). Three cored boreholes were drilled to depths varying from 20 metres to over 39 metres. The site is underlain by a thin veneer of fill over natural insitu residual clays to depths of 2.7 to 5.5 metres. Weathered shale was encountered below the clay, the strength increased with depth. In one deep borehole sandstone was found at a depth of 28.8 metres.

It is important to note that the following comments are based solely on a review of the Railway General Arrangement drawings for the ESR to Redfern Line at Redfern Station. These drawings appear to be preliminary concept drawings. They may not accurately depict the actual construction of the existing Illawarra Line platforms at Redfern Station. Once the work as executed drawings for the station become available it will be necessary to review the conclusions reached below.



It is important to note that the following comments are based solely on a review of the Railway General Arrangement drawings for the ESR to Redfern Line at Redfern Station. These drawings appear to be preliminary concept drawings. They may not accurately depict the actual construction of the existing Illawarra Line platforms at Redfern Station. Once the work as executed drawings for the station become available it will be necessary to review the conclusions reached below.

The attached sketch (Sketch 1) presents our present understanding of the location of the adjacent railway platform relative to the proposed basement excavation. The geotechnical conditions found during our recent investigation have been superimposed. The adjacent station was constructed using cut and cover techniques. Assuming that the external eastern wall was built as shown on the available railway drawings, then the likely excavation line would have been as shown on the sketch. This suggests that there may be a considerable width of filling between the eastern platform wall and the proposed basement. It appears that the western edge of the excavation will be between some 12.6 m and up to 16 m away from the eastern platform wall.

Potential Affects

One concern when excavating above or beside an underground railway is that the excavation will change the locked insitu stress conditions and thus cause distress in the railway tunnel/station. This is not the situation at Redfern as the original cut and cover construction relieved these stresses when the station was built. The backfill behind the station wall, and the shale under the proposed development site will now have negligible locked insitu stress, as compared to those often found in the sandstones below Sydney.

We consider that if the shoring for the proposed excavation is adequately designed and installed then there will be negligible affects on the station structure. It will be vital to ensure that this shoring is installed and stressed in such a way that the adjacent ground, under Gibbons Street, does not feel any change in stress. In this case the adjacent railway infrastructure will '*not know*' that the excavation has occurred.

The proposal is to use relatively stiff shoring supported by stressed rock anchors that are designed to ensure that there is negligible lateral movement or stress relief on the western side of the excavation. There will of course be some minor movement/changes in stress in the shale below the platform due to the excavation of a 15 metre deep basement. The potential affect of this will need to be assessed.

Proposed Further Investigation

The three most important investigations that need to be completed before any assessment of the potential affect on the railway infrastructure are:

- Confirming the actual layout of the Station Platform/Illawarra line relative to the proposed excavation.
- The actual subsurface conditions below Gibbons Street.
- Inspection of the adjacent railway infrastructure.



If work as executed drawings are not available it will be necessary to use survey techniques to map the actual platform location and the details of the structure inside the adjacent station. It may be difficult to ascertain the extent of the buried parts of the structure, such as footings and buttress walls, using survey. There is therefore some importance in obtaining the work as executed drawings.

In regards to the subsurface conditions below Gibbons Street we propose to drill a series of cored boreholes along two or three cross sections across Gibbons Street. They will extend down below the underside of the railway/proposed excavation. The work will need to be carried out at night. We do not consider that insitu stress measurement is warranted in the underlying shale. These stresses have already been relieved when the station was built and hence they will be negligible.

RailCorp sometimes require investigation type test pitting adjacent to their infrastructure to confirm the condition/location of the adjacent external walls. This is not practical for this project. Use of the work as executed drawings together with some confirmatory survey should be sufficient for this purpose.

The inspection of the adjacent station will be undertaken by both senior geotechnical engineers.

Proposed Assessment

After the above investigation work has been completed a detailed geotechnical model of the situation will be compiled. Preliminary design of the shoring will be carried out and then an assessment made of the potential affects, if any, of the excavation on the railway infrastructure. At this time we envisage that it will be necessary to undertake a 2D finite element analysis of one or two representative cross sections. We do not consider that a far more complicated 3D analysis is warranted. The finite element analysis will provide sufficient information to assess any potential adverse affect on the adjacent station structure. A detailed geotechnical report will be prepared for submission to RailCorp. We also envisage meeting with RailCorp at various stages during the investigation/assessment process to discuss the available results and their ramifications.

Monitoring During Construction

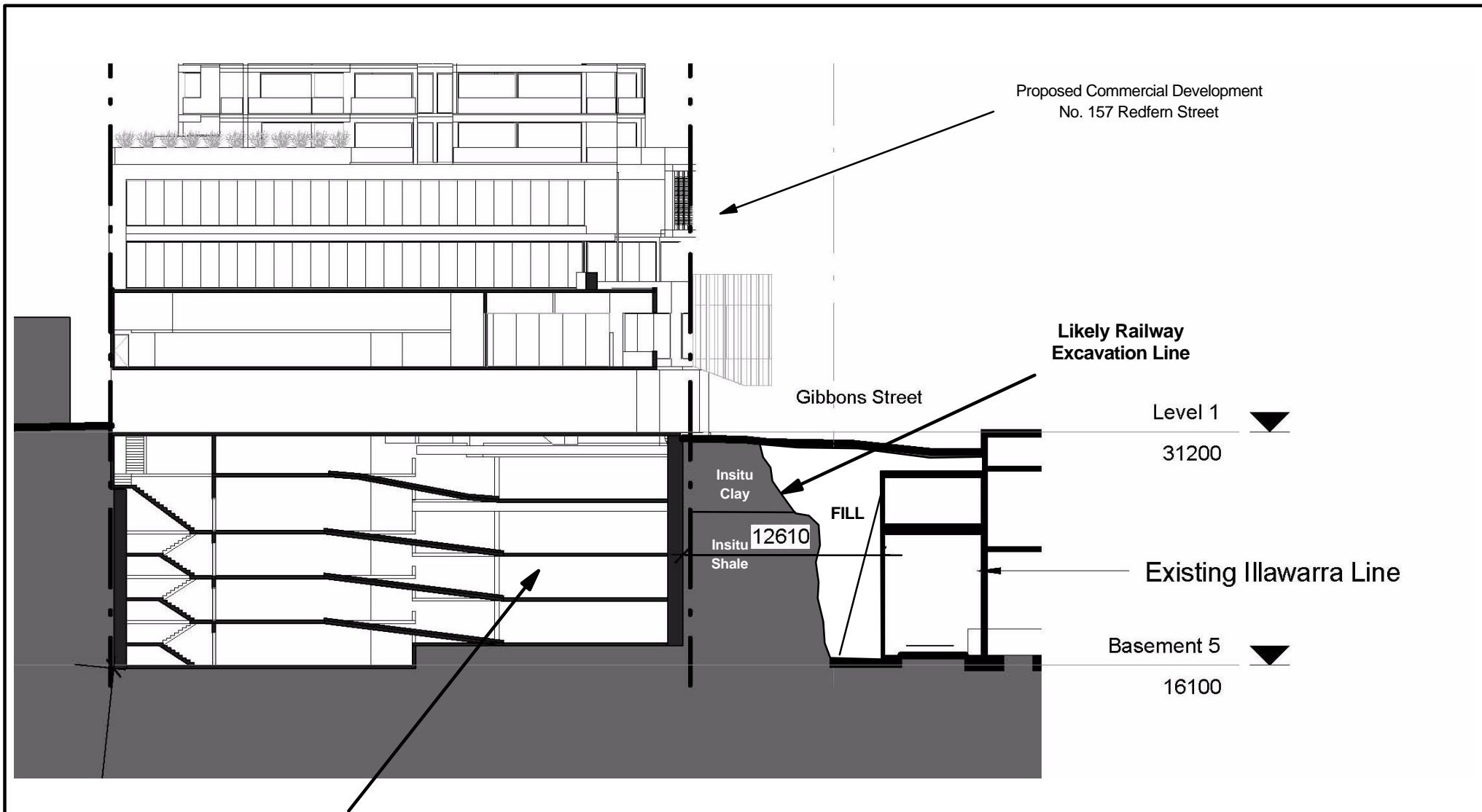
After completion of the assessment report and agreement by RailCorp a detailed monitoring program will be prepared. As part of this program pre-construction dilapidation surveys will be made of the adjacent railway infrastructure. The monitoring program will be agreed with RailCorp before it is adopted.

We trust this meets with your requirements. Should you have any questions, please contact us.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'L. Ihnativ', is written over a faint, circular stamp or watermark.

Laurie Ihnativ, BE, MEngSc, MBA
Manager, SMC Testing Services Pty Limited



Proposed Commercial Development
No. 157 Redfern Street

Likely Railway
Excavation Line

Gibbons Street

Level 1 ▼

31200

Insitu
Clay

FILL

Insitu
Shale 12610

Existing Illawarra Line

Basement 5 ▼

16100

Proposed
Basement
Excavation

NOT TO SCALE

SMEC Testing Services Pty. Limited	
Possible Subsurface Conditions Adjacent to Redfern Railway Station Proposed Development 157 Redfern St., Redfern	May 2009
Sketch 1	