Douglas Partners
Geotechnics • Environment • Groundwater

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Monteath & Powys Pty Ltd
PO Box 726
NEWCASTLE NSW 2300

Attention: Mr Stephen Barr

Email: s.barr@monteathpowys.com.au

Dear Sir

ADDITIONAL INFORMATION
DIRECTOR GENERAL'S REQUIREMENTS
PACIFIC NATIONAL TRAIN SUPPORT FACILITY
GRETA

1. INTRODUCTION

This report presents the results of additional assessment on the above site, following a request from the Director General's Department, as presented in the letter of 4 November 2009. The additional work was requested by Monteath & Powys Pty Ltd on behalf of Pacific National.

It is understood that the Director General's requirements have indicated the following issues which need to be addressed as part of the environmental assessment:

1. Impacts on groundwater and the management of this issue (if required);
2. The potential risks and impacts associated with mine subsidence;
3. Potential land contamination;
4. Natural soil constraints including the potential for methane gas and acid sulphate soils.

It is noted that an assessment of mine subsidence and a Stage 1 Preliminary Contamination Assessment have been carried out for the site. Refer to reports Ref 1, 2 and 3. This current report therefore provides additional information for Points 1 and 4 above.

2. BACKGROUND

The proposed development is a railway siding off the main northern line for the routine maintenance of Pacific National trains together with several structures for the maintenance facilities. Proposed facilities include the following:

- Locomotive and wagon maintenance facility;
- Locomotive wash plant;
- Wheel lathe;
- Fuel storage;
- Road vehicle service centre;
- Administration and amenities building.

Douglas Partners Pty Ltd (DP) has previously undertaken the following investigations at the site:

- "Geotechnical Assessment of Mine Subsidence Risk, Proposed Rail Facility, Greta", Project 39129, December 2004 (Ref 1);
- "Report on Geotechnical Investigation, Proposed Pacific National Depot, Mansfield Street Greta", Project 39129.01, October 2009 (Ref 2);
- "Report on Preliminary Contamination Assessment, Proposed Pacific National Depot, Lot 1, DP 1129191, 8 Mansfield Street, Greta", Project 39129.02, dated December 2009 (Ref 3).

Detailed discussion regarding investigation of mine workings, pothole subsidence, depth of cover and soil contamination are presented in the above reports. A brief summary is provided below:

- Mine workings are present beneath the site, with the depth of cover to workings ranging from about 10 m in the southern part of the site to about 200 m in the north-western corner of the site;
- There is an ongoing risk of pothole subsidence in the southern portion of the site (areas with less than about 30m cover);
- A coal seam outcrops in the southern part of the site;
- Several depressions, possibly 'shafts' or water cisterns are located on the site, generally close to the Main Northern Railway and are to be subject to additional geotechnical and archaeological investigation;
- Pothole subsidence occurred in the southern portion of the site in February 2009 and was subsequently backfilled by the Mine Subsidence Board (MSB);
- The MSB reported the surface expression of the pothole as about 30 m long, 15 m wide and up to about 10 m deep;
- The potential for soil contamination at the site is considered to be low, with only minor potential contamination sources observed.

3. GROUNDWATER

As part of the assessment of potential groundwater impacts and the management of potential groundwater issues at the site, the following scope was undertaken:

- Review of existing investigation data at the site (i.e. depth to groundwater encountered during subsurface investigation);
- Review of published data for the site and surrounding areas;
- Identification of potential groundwater issues and impacts expected during construction and during operation of the proposed facility.

Existing Investigation Data

Subsurface investigation undertaken by DP comprised the drilling of four boreholes as part of the geotechnical investigation (Ref 2). Subsurface conditions generally comprised clay soils to depths of between 0.1 m to 2.0 m below the ground surface, underlain by sandstone/siltstone and coal.

A summary of groundwater levels encountered in the four bores is presented in Table 1 below.

Table 1 – Groundwater (measured 18 August 2009)

Bore	Depth to Water (m)	Groundwater Level (AHD)
1	23.5	43.7
2	14.5	42.4
3	15.8	43.6
4	10.4	43.4

Investigations undertaken on nearby sites (ARTC and RTA) are understood to indicate similar groundwater depths as found during the DP investigation of the Pacific National site.

Published Data

An on-line search of registered groundwater wells was undertaken on the NSW Government Natural Resources Atlas, which provides information on the location and construction of registered groundwater wells and limited information on the subsurface profile encountered and water bearing zones. A summary of the relevant information is provided in Table 2 below.

Table 2 – Published Groundwater Data

Bore	Approximate Location	Authorised/Intended Use	Drilled Depth (m)	Subsurface Conditions	Water Bearing Zones
GW080479	900 m south-west of southern boundary	Domestic Stock	61	Clay over sandstone	53 m depth to 61 m depth
GW080478	1300 m south-west of southern boundary	Domestic Stock	61	No details	No details
GW020723	2000m south-west of southern boundary	Not known	54.9	Clay over sandstone	36.6 m depth
GW080977	1600m east-north-east of south-eastern corner of the site	Monitoring Bore	42	Shale, pyroclastics, tuff	No details
GW080976	1500m north-north-west of northern corner of the site	Monitoring Bore	36	Clay over Shale, pyroclastics, tuff	10 m to 10.1 m depth and 30 m to 30.1 m depth
GW061339	2800m north-east of the northern corner of the site	Domestic Stock	45.7	Clay over sandstone	3.6 m to 3.7 m depth, 10 m to 10.7 m depth and 32 m to 32.5 m depth

Groundwater within the abandoned coal mine is understood from investigations on the adjoining RTA site to be slightly acidic (pH 5.5), brackish (EC 6.4 mS/cm, Na 1600 mg/L) and included sulphate concentration of 2400 mg/L and TDS 5600 mg/L.

Proposed Site Use & Groundwater Effects

Based on the proposed site use, activities with the potential to affect groundwater quality via migration of contamination could include (but is not limited to) the following:

- Fuel storage and associated fuel leaks, spillage;
- Chemical storage;
- Wastewater systems/management (e.g. sumps, oil water separators etc);
- Solid and liquid waste handling/storage.

The site is a new facility and would be designed with sufficient safeguards to minimise the migration of contamination and potential impact to groundwater quality at the site. Current regulations require the implementation of strict environmental management standards and controls including. bunded chemical/fuel storage facilities, regular monitoring and leak detection systems, waste management procedures etc. The project would be designed to meet these requirements, which would minimise the potential of the project to impact on groundwater quality.

The groundwater data presented above (i.e. results of subsurface investigation and desktop study) suggests that regional groundwater is at considerable depth. In addition, the low permeability of the overlying strata will restrict migration of surface impacts to the underlying groundwater table.

The above activities are considered to have a low potential for impact on groundwater quality at the site. The management of potential groundwater quality issues should comprise standard environmental controls and management plans, as specified in the existing regulations.

The groundwater could also be impacted if mine rectification, such as grouting of mine workings, is undertaken at the site. The layout of the facility is planned such that all buildings would be located over mine workings with greater than 40 m cover. Mine rectification works will not be required for those structures. The access road and some rail tracks would be located over mine workings with less than 40m cover.

Where mine rectification works are undertaken at the site, for example on the access road, the injection of grout could cause displacement of groundwater and result in localised impact on the groundwater flow regime. Groundwater (mine waters) brought to the surface through grouting could be readily managed via re-use in the grouting process, re-injection into the mine or appropriate treatment and disposal. The mine water would not be suitable for discharge to the existing creek system.

In summary, the potential for impacts of the project on groundwater at the site are considered to be low. The project would be designed in accordance with the relevant requirements. Further, the environmental controls required by current regulations will allow early detection and clean-up of any spills/leaks, and therefore minimise the risk for adverse impact on groundwater quality. In addition, any groundwater displaced during mine rectification/grouting (if required) can be readily managed during construction as discussed above.

4. METHANE

Methane Exposure Pathways

The presence of methane is common in coal seams and underground coal mine workings, with methane a by-product of the coal-forming process.

The presence of methane within former underground workings at the Greta site cannot be discounted. Possible exposure pathways of methane to the surface include the following:

- Mine subsidence potholing, which is the result of the collapse of shallow workings (approximately 20 m cover or less), potentially creating a pathway for methane to the surface;
- Open shafts/drifts etc into the mine workings;
- Boreholes drilled into the mine workings from the surface. It is noted, however, that boreholes are generally backfilled to minimise a connection with the workings and the surface (Bores 1 – 4, drilled by DP on the Pacific National site were grouted up on completion of drilling and sampling);
- Potential excavation of shallow workings as part of remediation works (i.e. excavation and backfilling of workings);
- Displacement of mine water and methane during mine grouting works.

Table 3 below presents potential methane exposure paths that could be encountered either during investigation, construction, or future site use, along with a qualitative exposure risk (low, medium and high) and associated comments.

Table 3 – Qualitative Methane Exposure Risk

Exposure Pathway	**Likelihood of Exposure**	**Comments**
Mine Subsidence Potholing	Medium	Potholing occurred at the site in Feb 2009
Uncapped Shafts/Drifts etc	Low/Medium	Possible 'shafts' have been identified at the site, however the status of these is to be confirmed
Drilled Boreholes	Low	Temporary exposure route, normally backfilled following drilling
Excavation into Shallow Workings	Medium/High	Possible exposure during remediation of shallow workings
Methane/Groundwater Displacement (Grouting)	Low/Medium	Possible exposure during remediation of shallow workings

It is noted that additional geotechnical investigation is in progress for the assessment of potholing, along with the assessment of possible 'shafts' at the site and the assessment of potential mine rectification options.

Methane Monitoring

Surface gas monitoring (including methane) was undertaken at selected locations within the site on 14 January 2010. The locations were selected based on their potential exposure pathway risk (i.e. possible shafts, areas of former investigation, areas of former mine subsidence). The approximate monitoring locations are indicated on the attached site plan. The results are presented in Table 4 below.

Table 4 – Surface Gas Monitoring Results

Location	Easting	Northing	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppm)	H_2S (ppm)	Comments
G1	348272	6382310	0	0	20.1	0	0	Filled area in southern portion of the site (adjacent to access track)
G2	348395	6382533	0	0	19.9	0	0	Location of subsided filling in southern portion
G3	348386	6382547	0	0	19.9	0	0	Location of subsided filling in southern portion
G4	348381	6382685	0	0	19.9	0	0	Former test pit location (by others)
G5	348348	3682781	0	0-2.1	19.5	0	0	Borehole 211 (by others)
G6	348323	6382801	0	0	20	0	0	Possible 'shaft'/subsidence hole
G7	348249	6382964	0	0	20	0	0	Possible 'shaft'/subsidence hole (Shaft 6018)
G8	348211	6383040	0	0	20.1	0	0	Possible 'shaft'/subsidence hole
G9	348217	6383026	0	0	20.1	0	0	Possible 'shaft'/subsidence hole 15 m south of Shaft 6018
G10	347873	6383439	0	0	20.2	0	0	Possible 'shaft'/subsidence hole (Shaft 6011 – rock lined)
G11	347853	6383454	0	0	20.1	0	0	Possible Adit/Trough adjacent to Shaft 6011

The results of the surface gas monitoring indicate that there was no detectable methane gas at the location of the above surface features during the assessment.

Legislation

The NSW Government controls legislation and regulations that impact abandoned mines, such as the *Coal Mine Health and Safety Act 2002* and the *Coal Mine Health and Safety Regulation 2006*. The Department of Primary Industry should be consulted as part of the development process regarding management of potential methane issues during and following development of the site.

Preliminary monitoring indicated the general absence of methane, however, the presence of methane within former underground workings at the Greta site cannot be discounted. Further monitoring during site investigations and construction is recommended. This would comprise monitoring of methane levels at the surface and within excavations/bore holes that intercept mine workings, during site investigations and construction. Monitoring should be conducted by suitably qualified and experienced personnel. If elevated methane levels are detected during further monitoring, standard mitigation measures such as cap and contain (i.e. physical barrier to control migration) or controlled extraction could be conducted if further management of methane is required. This would be done in consultation with the Department of Primary Industry. Such measures are common for development over sites containing potential impacts from methane gas.

5. ACID SULPHATE SOILS

Coastal, low-lying alluvial soils, generally lying below RL 5 (but occasionally to elevations up to about RL 10 AHD) can contain pyrite or other sulphides. In such situations where the sulphides are kept out of contact with air, they are relatively stable and generally in 'equilibrium' with the local environment. If sulphides come into contact with air, they have the potential to oxidise and form sulphuric acid. Soils which have appreciable pyrite or other sulphides which have not yet reacted significantly with air are referred to as Potential Acid Sulphate Soils (PASS). Pyritic soils which have begun to generate acid are referred to as Actual Acid Sulphate Soils (AASS).

The site elevation is generally 50 to 70 m AHD. Site soils are therefore not considered to be acid sulphate soils. This is reinforced by the site geology which generally comprises sandstone, conglomerate, siltstone and coal of the Greta Coal Measures and Branxton Formation. This geology is not associated with acid sulphate soils.

Reference to the Acid Sulphate Soil Risk Map (Second Edition) for Greta, prepared by the Department of Land & Water Conservation, also indicates that there is no known occurrence of acid sulphate soil materials at the site.

The potential of the project to impact on acid sulphate soils is therefore unlikely. As such, mitigation measures are not required for management of acid sulphate soils.

6. LIMITATIONS OF THIS REPORT

DP has prepared this report for this project at Mansfield Street, Greta with reference to DP's proposal dated 19 November 2009 and acceptance received from Pacific National dated 29 December 2009. The work was carried out under DP Conditions of Engagement. This report is provided for the exclusive use of the Pacific National for the specific project and purpose as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party.

The results provided in the report are considered to be indicative of the observed conditions on the site only at the time the work was carried out. DP's advice may be based on observations, measurements, tests or derived interpretations. The accuracy of the advice provided by DP in this report is limited by unobserved features, conditions beyond the site boundaries or by variations with time.

DP cannot be held responsible for interpretations or conclusions from review by others of this report, which are not otherwise supported by an expressed statement, interpretation, outcome or conclusion stated in this report. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

We trust the above information satisfies your current requirements. Please contact the undersigned if you have any questions.

Yours faithfully
DOUGLAS PARTNERS PTY LTD

Reviewed by:

Patrick Heads
Associate

John Harvey
Principal

Greg Hawkins
Senior Associate

Attachments
Notes Relating to This Report
Drawing 1 – Surface Gas Monitoring Locations

NOTES RELATING TO THIS REPORT

Introduction

These notes have been provided to amplify the geotechnical report in regard to classification methods, specialist field procedures and certain matters relating to the Discussion and Comments section. Not all, of course, are necessarily relevant to all reports.

Geotechnical reports are based on information gained from limited subsurface test boring and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726, Geotechnical Site Investigations Code. In general, descriptions cover the following properties - strength or density, colour, structure, soil or rock type and inclusions.

Soil types are described according to the predominating particle size, qualified by the grading of other particles present (eg. sandy clay) on the following bases:

Soil Classification	Particle Size
Clay	less than 0.002 mm
Silt	0.002 to 0.06 mm
Sand	0.06 to 2.00 mm
Gravel	2.00 to 60.00 mm

Cohesive soils are classified on the basis of strength either by laboratory testing or engineering examination. The strength terms are defined as follows.

Classification	Undrained Shear Strength kPa
Very soft	less than 12
Soft	12—25
Firm	25—50
Stiff	50—100
Very stiff	100—200
Hard	Greater than 200

Non-cohesive soils are classified on the basis of relative density, generally from the results of standard penetration tests (SPT) or Dutch cone penetrometer tests (CPT) as below:

Relative Density	SPT “N” Value (blows/300 mm)	CPT Cone Value (q_c — MPa)
Very loose	less than 5	less than 2
Loose	5—10	2—5
Medium dense	10—30	5—15
Dense	30—50	15—25
Very dense	greater than 50	greater than 25

Rock types are classified by their geological names. Where relevant, further information regarding rock classification is given on the following sheet.

Sampling

Sampling is carried out during drilling to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing with a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Details of the type and method of sampling are given in the report.

Drilling Methods.

The following is a brief summary of drilling methods currently adopted by the Company and some comments on their use and application.

Test Pits — these are excavated with a backhoe or a tracked excavator, allowing close examination of the in-situ soils if it is safe to descent into the pit. The depth of penetration is limited to about 3 m for a backhoe and up to 6 m for an excavator. A potential disadvantage is the disturbance caused by the excavation.

Large Diameter Auger (eg. Pengo) — the hole is advanced by a rotating plate or short spiral auger, generally 300 mm or larger in diameter. The cuttings are returned to the surface at intervals (generally of not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube sampling.

Continuous Sample Drilling — the hole is advanced by pushing a 100 mm diameter socket into the ground and withdrawing it at intervals to extrude the sample. This is the most reliable method of drilling in soils, since moisture content is unchanged and soil structure, strength, etc. is only marginally affected.

Continuous Spiral Flight Augers — the hole is advanced using 90—115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are very disturbed and may be contaminated. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively lower reliability, due to remoulding, contamination or softening of samples by ground water.

Non-core Rotary Drilling — the hole is advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from 'feel' and rate of penetration.

Rotary Mud Drilling — similar to rotary drilling, but using drilling mud as a circulating fluid. The mud tends to mask the cuttings and reliable identification is again only possible from separate intact sampling (eg. from SPT).

Continuous Core Drilling — a continuous core sample is obtained using a diamond-tipped core barrel, usually 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in very weak rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation.

Standard Penetration Tests

Standard penetration tests (abbreviated as SPT) are used mainly in non-cohesive soils, but occasionally also in cohesive soils as a means of determining density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, "Methods of Testing Soils for Engineering Purposes" — Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of say 4, 6 and 7

  as 4, 6, 7
  N = 13

- In the case where the test is discontinued short of full penetration, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm

  as 15, 30/40 mm.

The results of the tests can be related empirically to the engineering properties of the soil.

Occasionally, the test method is used to obtain samples in 50 mm diameter thin walled sample tubes in clays. In such circumstances, the test results are shown on the borelogs in brackets.

Cone Penetrometer Testing and Interpretation

Cone penetrometer testing (sometimes referred to as Dutch cone — abbreviated as CPT) described in this report has been carried out using an electrical friction cone penetrometer. The test is described in Australian Standard 1289, Test 6.4.1.

In the tests, a 35 mm diameter rod with a cone-tipped end is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig which is fitted with an hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the friction resistance on a separate 130 mm long sleeve, immediately behind the cone. Transducers in the tip of the assembly are connected by electrical wires passing through the centre of the push rods to an amplifier and recorder unit mounted on the control truck.

As penetration occurs (at a rate of approximately 20 mm per second) the information is plotted on a computer screen and at the end of the test is stored on the computer for later plotting of the results.

The information provided on the plotted results comprises: —

- Cone resistance — the actual end bearing force divided by the cross sectional area of the cone — expressed in MPa.
- Sleeve friction — the frictional force on the sleeve divided by the surface area — expressed in kPa.
- Friction ratio — the ratio of sleeve friction to cone resistance, expressed in percent.

There are two scales available for measurement of cone resistance. The lower scale (0—5 MPa) is used in very soft soils where increased sensitivity is required and is shown in the graphs as a dotted line. The main scale (0—50 MPa) is less sensitive and is shown as a full line.

The ratios of the sleeve friction to cone resistance will vary with the type of soil encountered, with higher relative friction in clays than in sands. Friction ratios of 1%—2% are commonly encountered in sands and very soft clays rising to 4%—10% in stiff clays.

In sands, the relationship between cone resistance and SPT value is commonly in the range:—

$$q_c \text{ (MPa)} = (0.4 \text{ to } 0.6) \text{ N (blows per 300 mm)}$$

In clays, the relationship between undrained shear strength and cone resistance is commonly in the range:—

$$q_c = (12 \text{ to } 18)\, c_u$$

Interpretation of CPT values can also be made to allow estimation of modulus or compressibility values to allow calculation of foundation settlements.

Inferred stratification as shown on the attached reports is assessed from the cone and friction traces and from experience and information from nearby boreholes, etc. This information is presented for general guidance, but must be regarded as being to some extent interpretive. The test method provides a continuous profile of engineering properties, and where precise information on soil classification is required, direct drilling and sampling may be preferable.

Hand Penetrometers

Hand penetrometer tests are carried out by driving a rod into the ground with a falling weight hammer and measuring the blows for successive 150 mm increments of penetration. Normally, there is a depth limitation of 1.2 m but this may be extended in certain conditions by the use of extension rods.

Two relatively similar tests are used.

- Perth sand penetrometer — a 16 mm diameter flat-ended rod is driven with a 9 kg hammer, dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands (originating in Perth) and is mainly used in granular soils and filling.
- Cone penetrometer (sometimes known as the Scala Penetrometer) — a 16 mm rod with a 20 mm diameter cone end is driven with a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). The test was developed initially for pavement subgrade investigations, and published correlations of the test results with California bearing ratio have been published by various Road Authorities.

Laboratory Testing

Laboratory testing is carried out in accordance with Australian Standard 1289 "Methods of Testing Soil for Engineering Purposes". Details of the test procedure used are given on the individual report forms.

Bore Logs

The bore logs presented herein are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable, or possible to justify on economic grounds. In any case, the boreholes represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes, the frequency of sampling and the possibility of other than 'straight line' variations between the boreholes.

Ground Water

Where ground water levels are measured in boreholes, there are several potential problems;

- In low permeability soils, ground water although present, may enter the hole slowly or perhaps not at all during the time it is left open.
- A localised perched water table may lead to an erroneous indication of the true water table.
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report.
- The use of water or mud as a drilling fluid will mask any ground water inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water observations are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Engineering Reports

Engineering reports are prepared by qualified personnel and are based on the information obtained and on current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal (eg. a three storey building), the information and interpretation may not be relevant if the design proposal is changed (eg. to a twenty storey building). If this happens, the Company will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface condition, discussion of geotechnical aspects and recommendations or suggestions for design and construction. However, the Company cannot always anticipate or assume responsibility for:

- unexpected variations in ground conditions — the potential for this will depend partly on bore spacing and sampling frequency
- changes in policy or interpretation of policy by statutory authorities
- the actions of contractors responding to commercial pressures.

If these occur, the Company will be pleased to assist with investigation or advice to resolve the matter.

Site Anomalies

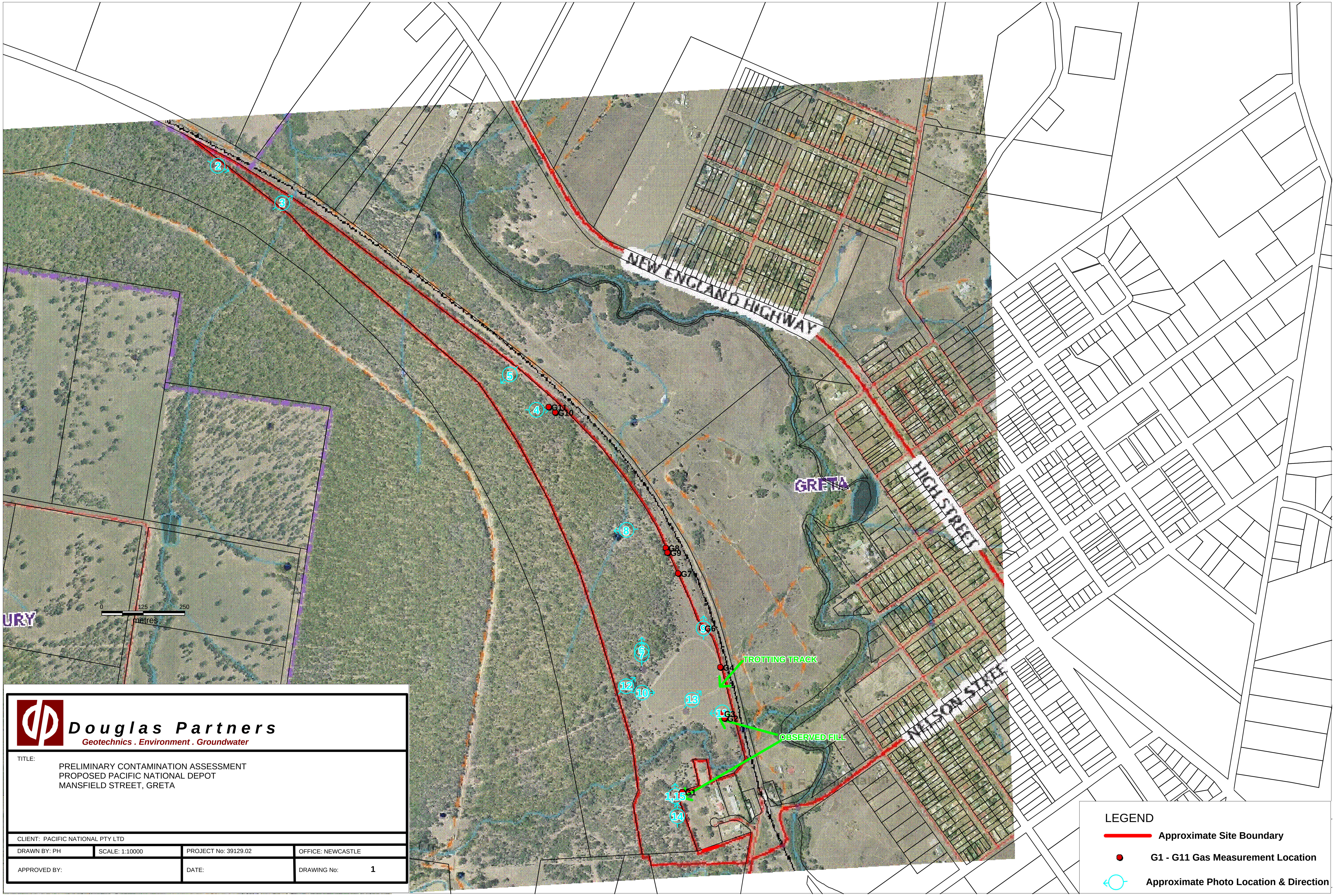
In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, the Company requests that it immediately be notified. Most problems are much more readily resolved when conditions are exposed than at some later stage, well after the event.

Reproduction of Information for Contractual Purposes

Attention is drawn to the document "Guidelines for the Provision of Geotechnical Information in Tender Documents", published by the Institution of Engineers, Australia. Where information obtained from this investigation is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. The Company would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The Company will always be pleased to provide engineering inspection services for geotechnical aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.



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Geotechnics . Environment . Groundwater

TITLE: PRELIMINARY CONTAMINATION ASSESSMENT
PROPOSED PACIFIC NATIONAL DEPOT
MANSFIELD STREET, GRETA

CLIENT: PACIFIC NATIONAL PTY LTD			
DRAWN BY: PH	SCALE: 1:10000	PROJECT No: 39129.02	OFFICE: NEWCASTLE
APPROVED BY:		DATE:	DRAWING No: 1