

W2596/1-A RJK:TC
16th May 2005

P W Rygate and West Pty Ltd
PO Box 107
ULLADULLA NSW 2537

Attention: Mr Graham Beasley

Dear Sir

**Re: Proposed Residential Development Lot 41 DP1056665 and Lot 4
DP771597 Narrawallee: Phase 1 Preliminary Contamination
Assessment**

1.0 INTRODUCTION

At the request of Graham Beasley of P W Rygate and West Pty Ltd, Network Geotechnics Pty Ltd has carried out a Phase 1 Preliminary Contamination Assessment for an area of proposed residential development at Narrawallee on the NSW South Coast, east of Milton.

The site is titled as Part Lot 41 in DP1056665 and Lot 4 in DP771597 at Narrawallee. The site occupies an area of about 20 hectares, being about 700m long north-south and about 175m to 335m wide east-west. The land is currently vacant and adjoins existing residential development to the east which fronts Leo Drive and existing residential development and Public Reserve to the south which is mainly accessed from Seaspray Street.

Proposed development on Lots 41 and 4 comprises 192 residential lots of typically 700m² to 900m² but ranging from about 600m² to 1100m². The lots are to be accessed via a new road network totalling about 3km length. Proposed development is to be staged in seven releases of 19 to 35 lots.

A locality plan and a layout of the proposed development is shown on the attached Drawing No W2596/1-1.

2.0 SITE CONDITIONS

2.1 Surface

The area of proposed residential development occupies a broad ridge that descends from about RL30m to RL15m AHD from south to north. The west facing side slopes are relatively uniform and range from about 7° to 9° in the south-west to typically 4° to 6° along the majority of the ridge. The east facing side slopes are slightly undulose and include two noticeable descending spurs and a broad drainage depression opening to the east. These slopes actually face from south-west to north-east and range from about 5° to 10°.

The ridge crest within the southern portion of the site has been subject to previous gravel extraction, probably for local road construction purposes: this

previous landuse is discussed further in Section 3.0. Elsewhere on the site, there are a series of gravel surfaced access roads and tracks that typically follow the ridge crest and side spurs and the east flowing drainage depression.

Surface soils comprise mainly Silty SAND and Clayey SAND. Vegetation over most of the site comprises mature eucalypt forest with thin to moderate mainly native undergrowth.

The site visit was undertaken at a time of light rainfall. No evidence of significant overland flow and runoff was observed at the time. However, some water had ponded within local depressions in the area of previous gravel extraction to the south. One low lying inundated area is the size of a small farm dam.

2.1 Subsurface

Geological maps indicate the site to be underlain by the Shoalhaven Group Conjola Formation which generally comprises interbedded siltstone, silty sandstone, sandstone and conglomerate. Our experience of this geology in the Mollymook/Narrawallee area is that the profile is generally deeply weathered. Some weathered sandstone/conglomerate structure was locally evident in the base of the former gravel extraction area to the south. No other evidence/exposure of the underlying geology was observed on the site at the time of our visit.

3.0 INVESTIGATIONS

The assessment for this site has been carried out in accordance with NSW EPA requirements for preliminary site investigations. Specifically, work has included review of land titles records, review of aerial photographs dating back to 1967, perusal of several local history publications, brief discussions with flora and fauna consultants for the project and a brief site visit by our Principal Geotechnical Engineer. Findings on the above matters are presented in Sections 3.1 to 3.5.

3.1 Land Titles

Land titles records obtained from the Dept of Lands indicate that:

- Lot 41 in DP1056665 (northern most lot) and Lot 4 in DP771597 (southern most lot) at Narrawallee form a portion of a Crown Grant of 268 and 298 acres to W.S McLeary on 14/7/1840.
- From about 1875 to 1969, Lot 41 was owned by generations of the Garrard family, who appear to have been farmers.
- Since 1969, Lot 41 has been owned by James Milton Mison, who also appears to be or have been a farmer.
- From about 1875 to 1953, Lot 4 was owned and/or tenanted by members of the Cork, Garrard and Warden families. No specific mention of occupation is given, although the Garrard family were noted as farmers on titles for the adjoining lot.
- From 1953 to 1963, Lot 4 was owned by Margaret Gertrude Warden.
- From 1963 to 1965 Lot 4 was owned by Peter James Young and Margaret Anne Young, farmers.



- Since 1965, Lot 4 has been owned by Tim William and Genelle Irene Gregory.

In summary, lands title records show that both Lot 41 and Lot 4 have been owned by several generations of farmers with apparently strong familial ties to 1953 (Lot 4) and 1969 (Lot 41). Current owners have held the land for about 35 to 40 years.

3.2 Aerial Photographs

Aerial photographs dated 1967, 1979, 1987 and 2001 were obtained from Land and Property Information NSW. The following observations have been made from the photographs:

- 2001 Lot 41 (northern most lot) is thickly vegetated with established eucalypt forest. Lot 4 (southern most lot) is also thickly vegetated with eucalypt forest, but there is an obvious clearing on the ridge crest at the southern end and intermittent views of a track along the north trending ridge line. Possibly some small stockpiles or trucks or structures evident in the clearing. The clearing is interpreted as a former gravel extraction for probable local road construction. Existing residential subdivisions to the south and east.
- 1987 Lot 41 has essentially the same features as in 2001, with a possible north trending track to the west. However, the clearing to the south (for gravel extraction) is bigger (indicating subsequent regrowth vegetation) and the ridge line track is prominent and leads off-site towards Leo Drive. There is a large clearing south from Lot 4, possibly evidence of previous gravel extraction and/or excavation/preparation for pending adjoining subdivision construction.
- 1979 Lot 41 is essentially undisturbed eucalypt bushland, with a possible north trending track along the western side. Various ridge line and spur tracks are evident on Lot 4 and a small clearing is evident on the ridge line at the southern boundary of Lot 4 (probably formed for early gravel extraction). The clearing well to the south of Lot 4 and noted in 1987 is evident but smaller.
- 1967 Within the northern Lot 41, ridge line eucalypt vegetation appears much thinner than in subsequent photographs, possibly being regrowth from an earlier bushfire or from possible much earlier gravel or other (silica?) extraction. Some tracks only are evident within eucalypt vegetation on the southern Lot 4. The cleared area well south of Lot 4 (noted in 1979, 1987 photographs) appears quite large (indicating significant subsequent vegetation regrowth). This clearing could be associated with gravel or other (silica?) extraction.

In summary, Lots 41 and 4 have remained largely undeveloped since about 1967. Former gravel extraction (most likely for local road construction) on the ridge line at the southern end of Lot 4 appears to have commenced during the 1970's, possibly peaked during the late 1980's to early 1990's and to have since been subject to perimeter bushland regrowth. No specific evidence was observed in the photographs of former gravel or other (silica ?) extraction on Lots 41 and 4.



3.3 Local History

Two publications of local history were perused subsequent to the site visit. These were 1988 and 1989 publications by local resident Alex McAndrews, titled "The Narrawallee Story" and "Memoirs of Mollymook." Our Principal Engineer was aware of a history of silica mining in the Narrawallee/Mollymook area in the period between the two World Wars.

It appears that the main silica mining activities and infrastructure were located as follows:

- Mining at the ridge line close to Matron Porter Drive well to the south of the southern Lot 4.
- Mining at the Red Head Point, near the current 9 hole Mollymook Beach Golf Course.
- Mining well to the north of Narrawallee Lagoon.
- A railway haul track across Narrawallee Inlet and along the coast to Bannister Head at Mollymook.
- All silica mining activities ceased prior to or during World War II.

In summary, it appears unlikely that either Lots 41 or 4 were subject to mining or related operations associated with silica extraction which occurred locally in the region between the two World Wars. In view of this and our recent site inspection, the clearings and tracks observed mainly on Lot 4 in the aerial photographs dated 2001, 1987 and 1979 are assessed to be associated with previous gravel extraction (for local road construction), not with much earlier silica mining.

3.4 Other Project Consultants

Based on discussions with Conacher Travers Pty Ltd it is understood that field staff used for flora and fauna and related studies did not encounter unusual man made features, objects or effects associated with former landuses at Lots 41 and 4.

3.5 Site Visit

The recent site visit included a walk-over inspection of the central and southern portion of the site as viewed from existing unsealed tracks and from within and adjoining the area of previous (ridge line) gravel extraction close to the southern boundary of Lot 4. The following observations were made:

- Regrowth vegetation has substantially encroached the former extraction areas. Cuts, scarps and fill mounds of 0.5 to 2m+ height generally define the main extraction area which appears to be about 1 hectare. The fill mounds appear to be site sourced.
- The existing adjoining subdivision to the south is at a higher level. Some fill from that subdivision encroaches the former gravel extraction area. Minor localised mainly garden refuse has been discarded on the perimeter of the land.
- Several small stockpiles of imported fill each equivalent to a small (2-3 tonne) truck load were observed.
- Minor discarded rubbish (tin, plastic, one car body) was observed in mainly perimeter regrowth areas.



- No obvious evidence of substantial backfilling of former extraction areas was observed.
- Land in some localised areas adjoining the ridge line track that extends northward from the former extraction area appears to have been surficially disturbed and subject to subsequent vegetation regrowth.
- Elsewhere as observed from tracks and the perimeter areas of the lots, no dumpings of building rubble, commercial waste or debris were observed.

4.0 DISCUSSION

This study has included review of land titles records, historical aerial photographs, perusal of several publications on local history, brief discussion with other consultants on the project and a brief walk-over site inspection by our Principal Geotechnical Engineer.

Based on the above, it is considered that there has been previous gravel extraction (for local road construction) locally on the ridge line towards the southern end of Lot 4. The affected area is probably about 1 hectare. Elsewhere on the site, the only other associated features include a series of ridge line and spur access tracks and some adjoining areas of locally surficial disturbance.

The former gravel extraction appears to have been relatively shallow, possibly in the range of 0.5m to 3m, depending on the original landform. One low lying area the size of a small farm dam is currently inundated. There appears to be relatively minor encroachment of existing fill onto the site from the adjoining subdivision to the south and very minor localised domestic rubbish/debris/garden waste within perimeter areas adjoining the former gravel extraction area.

No evidence of building rubble containing fibro or similar contaminants and no evidence of commercial or industrial waste dumpings were observed.

The site is largely vegetated with established eucalypt forest and native undergrowth. Regrowth vegetation is obvious around the perimeter of the former gravel extraction area and adjoining some existing unsealed tracks.

Land titles records indicate a relatively tight, familial ownership until the 1950's to 1960's and that current owners have had title to the land for about 35 to 40 years.

Based on published accounts of local history, the site is considered unlikely to be associated with silica extraction or infrastructure which occurred in the area between the two World Wars.

Based on aerial photographs, the only obvious landuse in the past nearly forty years appears to have been localised gravel extraction, probably for local road construction. This local landuse probably occurred from the mid 1970's until the late 1980's to early 1990's. Substantial perimeter vegetation regrowth has occurred since then.

Existing adjoining residential development to the east and south occurred mainly since the late 1970's.

Notwithstanding the above, localised contaminants of concern could include:



- Former fuel or other chemical storage areas associated with the previous gravel extraction operations located on or near the ridge line near the southern boundary of Lot 4.
- Backfill of former extraction areas using imported fill.
- Dumping of rubble (which could include fibro/asbestos) or other commercial/industrial waste.

5.0 CONCLUSIONS

Based on the studies outlined in Section 1.0 to 3.0 above and discussed in Section 4.0 above, Lot 41 in DP1056665 and Lot 4 in DP771597 are considered suitable for proposed residential development with respect to contamination issues.

Whilst there has been localised gravel extraction (for local road construction) on the ridge crest in the southern portion of Lot 4, no evidence of associated contamination or other previous landuse has been discovered that would preclude development of the site for residential use. Furthermore, there appears to be no pressing reason to undertake a more detailed contamination investigation of the site prior to subdivision construction.

Notwithstanding the above, minor localised issues could be uncovered during subdivision construction, such as localised rubbish or waste dumping, buried rubbish or waste or localised questionable imported fill. The above issues or similar can be handled appropriately and effectively during subdivision construction project by working closely with the geotechnical consultant.

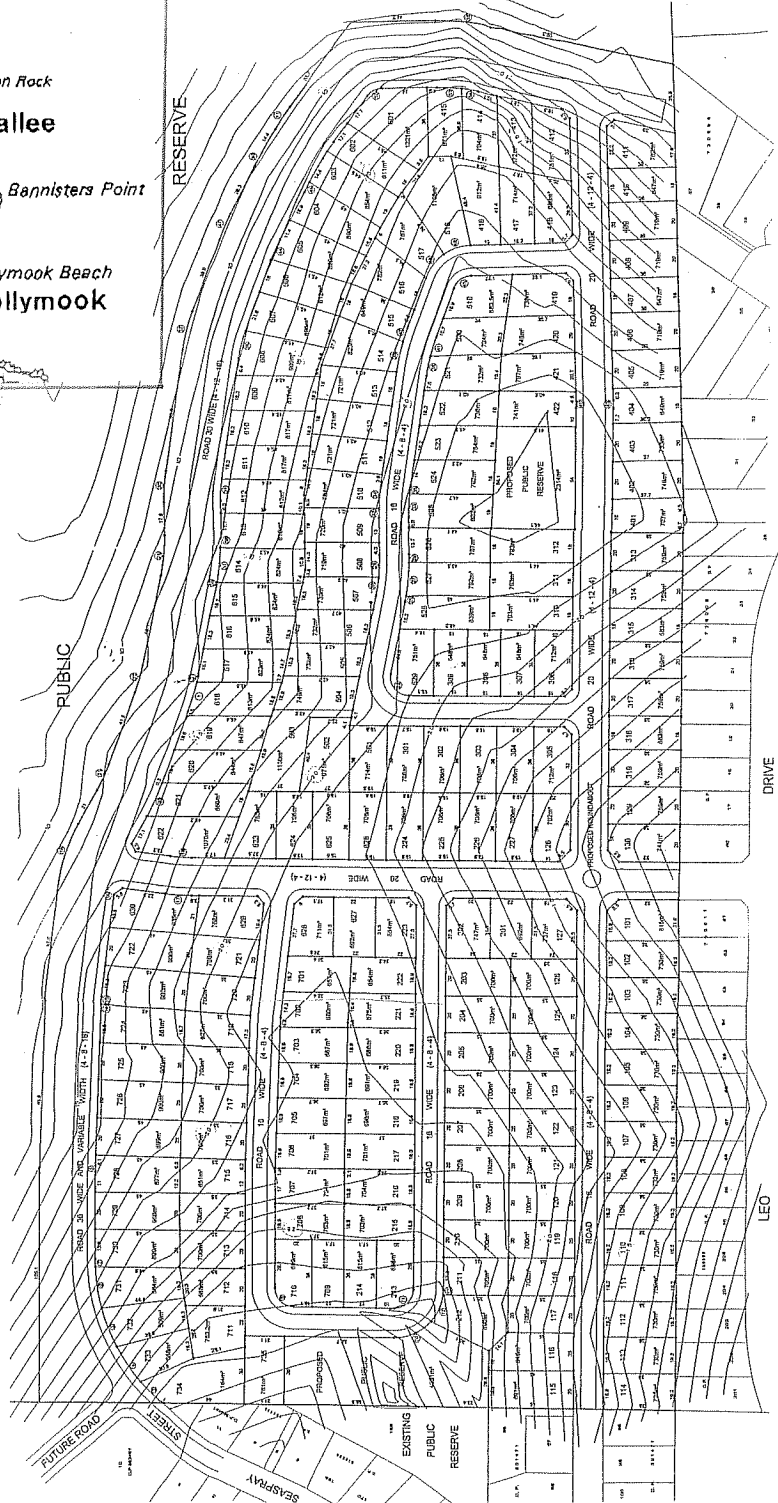
This preliminary report should be read in conjunction with the attached General Notes and we trust that it is suitable for your present needs. Please contact the undersigned if you have any queries.

For and on behalf of
Network Geotechnics Pty Ltd


R J King (BE) Civil
Principal Geotechnical Engineer

Encl: General Notes
Drawing No W2596/1-1 Site Plan





DRAWING:
W2596/1-1

SITE PLAN