RPS Newcastle

Bulahdelah Rezoning Project

Pacific Highway, Bulahdelah

Preliminary Site Contamination Assessment

Report No. RGS00022.1-AB

9 June 2010

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Great Lakes Council
c/o RPS Newcastle
PO Box 428
HAMILTON NSW 2303

Attention: Mr Rob Dwyer

Dear Rob

RE: Bulahdelah Rezoning Project

Preliminary Site Contamination Assessment

As requested, Regional Geotechnical Solutions Pty Ltd (RGS) has undertaken an assessment of site contamination at the site of the proposed residential rezoning at Lot 3 DP1120817, Pacific Highway, Bulahdelah. Proposed future development of the site involves a mixture of commercial, tourist, and residential development. The current zoning of the site allows the commercial and tourist development but rezoning is required for the residential components of the development. The purpose of the work described herein therefore was to undertake a preliminary assessment of the potential for the site to be impacted by contamination from past or current land use activities and assess the significance of such contamination on the proposed residential land usage.

The findings of this assessment indicate some minor isolated soil contamination associated with a shed near the southern boundary of the site, for which some localised further investigation and possible remediation may be required. No widespread contamination or high concentrations of contamination were encountered on the site and therefore the site is deemed suitable for residential development pending further investigation and possible minor, isolated cleanup of soils impacted by spilt fuels and oils near the southern boundary as outlined above.

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If you have any questions regarding this project, or require any additional consultations, please contact the undersigned.

For and on behalf of

Regional Geotechnical Solutions Pty Ltd

Steven Morton

Principal

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1 INTRODUCTION

Regional Geotechnical Solutions Pty Ltd (RGS) has undertaken an assessment of site contamination at the site of the proposed residential rezoning of a parcel of land identified as Lot 3 DP1120817, located on the eastern side of the Pacific Highway, Bulahdelah (See Figure 1).

The site is part of a larger parcel of land proposed for development involving a mixture of commercial, tourist, and residential development. The current zoning of the site allows the commercial and tourist development but rezoning is required for the residential components of the development. The purpose of the work described herein therefore was to undertake a preliminary assessment of the presence of contamination from past or current land use activities and assess the significance of such contamination on the proposed residential land usage.

The work was commissioned by RPS Newcastle Pty Ltd on behalf of Great Lakes Council.

2 SITE LOCATION AND LANDUSE

The site is located on the eastern side of the Pacific Highway, on the northern side of the township of Bulahdelah and is identified as Lot 3 DP1120817

The larger development site, formerly identified as Lot 1 DP120651 and Lot 5 DP863307, is shown on Figure 2. The site is predominantly vacant, with only by a single existing residence and some associated sheds to the south of the rezoning area, some areas of cleared land, a golf course to the northwest, and minor earthworks associated with borrowing fill materials for unsealed roadworks that were underway on the site at the time of the fieldwork.

The current assessment applies only to the sections of the site proposed for residential development, the extent of which, based on a concept plan provided by the client, is reproduced in Figures 2 and 3.

3 SITE HISTORY

3.1 History of land usage

A brief historical search of land titles (Appendix A), revealed no former land uses of concern. The site is largely undeveloped. In the vicinity of the site the dominant industrial landuses have been mining and forestry.

Alunite mining, associated with the Alum Mountain Volcanics, has a historic presence in the Bulahdelah area. All mining activity to date, including surface facilities and processing, is believed to have been located well to the south of the proposed residential development site. According to correspondence from NSW Department of Primary Industries some gold exploration drilling was undertaken in the vicinity of the site but revealed no anomalous gold. Although weakly anomalous arsenic, zinc, and copper were encountered, it is unlikely that these would become economic deposits in the future.

Forestry activities occur in the land to the north and east of the site and there is some evidence of former land clearing, since largely regrown, within the development area.

There was no visible evidence on site of forestry facilities or activities other than forest access roads.

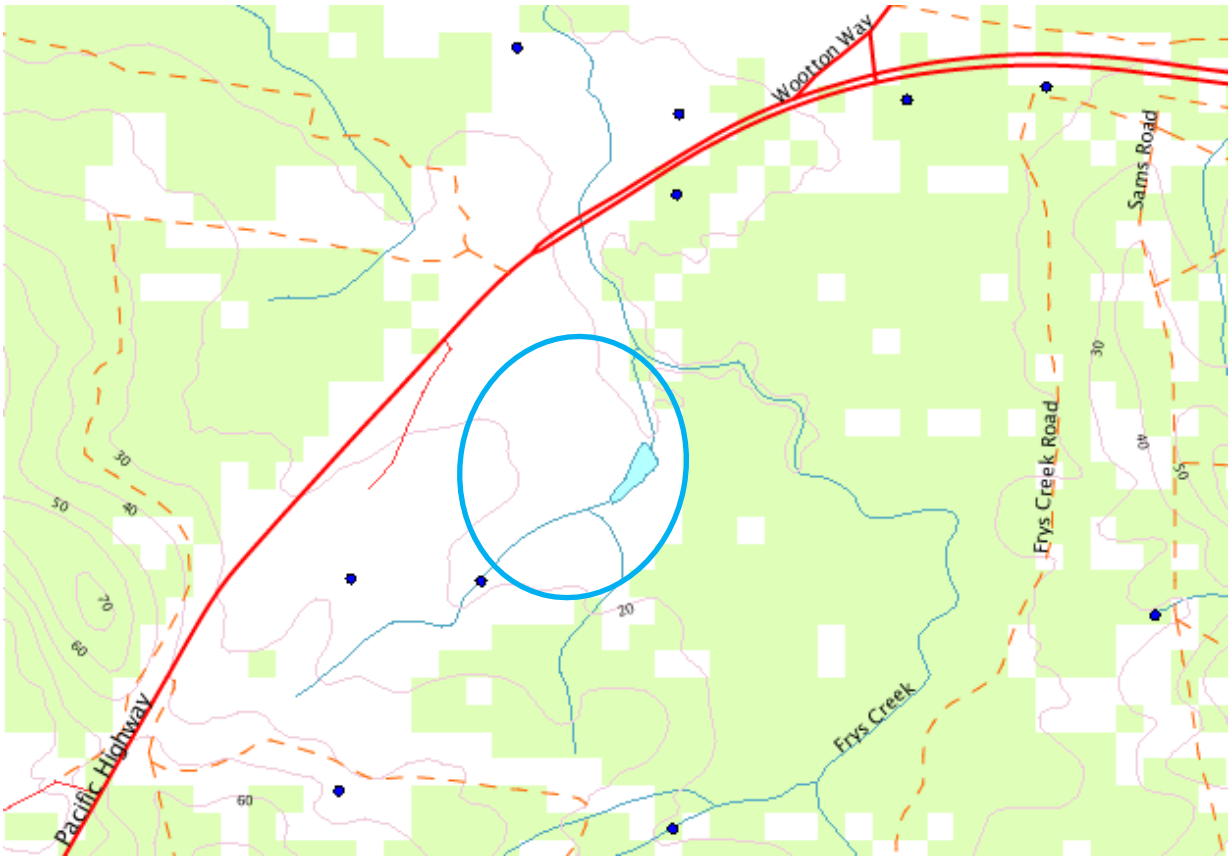
On the basis of the above, no specific areas of environmental concern were identified within the study area on the basis of historic industrial land use.

3.2 NSW EPA Notices

A review of the NSW EPA website database on 22 May 2010 revealed that no notices had been issued for the site or its previous Lot and DP numbers under the *Environmentally Hazardous Chemicals Act (1985)* or the *Contaminated Land Management Act (1997)*.

3.3 Groundwater Usage

A search of the NSW DWE groundwater bore records database indicated numerous groundwater bores in the vicinity of the site. There are no bores within the proposed residential development area. Two bores are located to the south of the site and would be expected to be up-gradient of the site. Bores to the north are beyond Frys Creek and therefore not expected to receive groundwater from the subject site.



Locations of registered water bores (dark blue dots) relative to approximate location of proposed development site (Blue circle)

4 SITE OBSERVATIONS

The site is situated on the northern footslopes of the Alum Mountain ridge and has an overall moderate to gentle slope towards the north and northwest. The area proposed for residential development is predominantly vegetated by open bushland, with some areas of re-growth timber having been cleared in the past. The northwestern margins of the area have been cleared, possibly for extension of the adjacent golf course, but were undeveloped and vegetated by long grass at the time of this assessment.

Drainage appears to occur by minor infiltration, but predominantly by surface runoff into a series of ephemeral drainage courses that flow generally toward the north. There were some man-made unlined surface drains visible at the time of the site visit, associated with access tracks.

The site is bounded to the northwest by a golf course, which is downslope of the development site. The land to the northwest and west is occupied by bushland. To the south the land is predominantly bushland, but an area disturbed by shallow quarrying for bulk rock for access road construction was observed. Also on the southern boundary of the proposed residential area is an existing residence and some associated sheds.

	
Localised excavation for extraction of access track materials within proposed residential development area	*Machinery shed near southern boundary of development area.*

In an access track near the centre of the site, a polyethylene pipe was noted daylighting from the ground upslope of the track and discharging onto the edge of the track. The extent, source, and use of the pipe were not able to be determined from site observations

	*Polyethylene pipe of unknown origin or use, discharging onto edge of track.*

5 AREAS OF ENVIRONMENTAL CONCERN

The site is largely undeveloped and no obvious contaminating activities or areas of notable environmental concern were identified during the assessment. Where there was deemed to be some potential for contamination based on site activities or site observations, samples were obtained as outlined in Table 1.

Table 1. Areas of Environmental Concern and samples obtained

AREA OF CONCERN	SAMPLE & NUMBER
Area of recent quarrying activity – possibility of spilt or leaking fuels or oils from machinery	Sample No. 1 obtained from sediments at low point of quarry
Outlet of pipe of unknown origin and use	Sample 2 obtained from outlet
Machinery shed near southern boundary – possible leakage, spillage or dumping of fuels and oils. Use of pesticide sprays	Sample 3 obtained from base of open drain below shed, on southern boundary of property
Shed/garage associated with house. Possible leakage or spillage of fuels or spraying of pesticides	Sample 4 obtained from southern site boundary, downslope of shed
Golf course – spraying of pesticides and herbicides	Samples 5, 6 and 7 obtained from western area adjacent to golf course.
Access road – spills or leaks of fuels and oils, possible spraying of herbicides on track.	Sample 8 obtained from edge of track

On the basis of site usage and the potential modes of contamination identified, the following broad suite of chemical analytes was adopted for the assessment:

- Total Recoverable Hydrocarbons (TRH) – from the leakage of fuels and oils;
- Polycyclic Aromatic Hydrocarbons (PAH) – from oils, greases, tar or bitumen products;
- Benzene, Toluene, Ethyl-Benzene, Xylene (BTEX) – From fuels, solvents, paint stripper;
- Heavy Metals - Copper, lead, zinc, cadmium, chromium, nickel, arsenic, mercury from a range of common industrial contaminant sources;
- Organochlorine and organophorphorus pesticides (OCP & OPP) – from spraying of pesticide and weedicide.

6 GUIDELINES AND ASSESSMENT CRITERIA

To assess the results of the laboratory testing, the following industry accepted soil investigation guidelines were referred to:

- NSW DEC (2006), Guidelines for the NSW Site Auditor Scheme;
- NSW EPA (1994), Guidelines for Assessing Service Station Sites.

The NSW DEC (2006) *Guidelines for the NSW Site Auditor Scheme* present health based investigation levels for different land uses including industrial/commercial, residential, and recreational. The guidelines reference the National Environmental Health Forum (NEHF) investigation levels to derive guideline levels for protection of human health for these different land uses.

As the site is proposed for residential development the guidelines for residential land use were adopted for this investigation.

NSW DEC (2006) does not provide levels for volatile petroleum hydrocarbon compounds (TRH and BTEX). The *Guidelines for Assessing Service Station Sites* (NSW EPA, 1994) provide threshold levels for sensitive land use for petroleum hydrocarbon compounds. The NSW DECCW has advised that these guidelines should also be used for less sensitive land uses.

Based on the above discussion of industry accepted guidelines, the guidelines presented in Table 2 were adopted for this assessment.

Table 2. Adopted Soil Investigation Criteria (mg/kg)

Analyte	Adopted Soil Investigation Criteria	Analyte	Adopted Soil Investigation Criteria
Benzene	1	Copper	1,000
Toluene	1.4	Lead	300

Analyte	Adopted Soil Investigation Criteria	Analyte	Adopted Soil Investigation Criteria
Ethyl-benzene	3.1	Zinc	7,000
Xylene	14	Cadmium	20
TRH $C_6 – C_9$	65	Chromium (III)	12%
TRH $C_{10} – C_{35}$	1000	Arsenic	100
Total PAH	20	Nickel	600
Benzo-a-pyrene	1	Mercury	10
Aldrin + Dieldrin	10	DDT + DDD + DDE	200
Chlordane	50	Heptachlor	10

7 RESULTS OF FIELD INVESTIGATIONS

Samples were obtained from each of the areas of environmental concern identified in Table 1. Samples were placed in laboratory supplied and pre-treated glass sampling jars and were placed on ice on site and maintained on ice during transit to the laboratory.

During the sampling no visible or olfactory evidence of contamination was encountered at any of the sample locations.

8 LABORATORY TESTING

Samples were transported under chain-of-custody conditions to ALS Laboratory Group, a NATA accredited specialist chemical testing laboratory, to be tested for the broad suite of common contaminants outlined in Section 5.

The results of the laboratory analyses are presented in Appendix A.

9 QUALITY CONTROL

Samples were obtained using industry accepted protocols for sample treatment, preservation, and equipment decontamination. Duplicate samples were submitted to the laboratory for analysis. Comparison of the results of testing on primary and duplicate samples is presented in Table 3.

Table 3. Comparison of Primary and Duplicate Samples (mg/kg)

Analyte	BH1 and BH9	
	Primary	Duplicate
TRH: C_6-C_9	<LOR	<LOR
TRH: C_{10}-C_{36}	<LOR	<LOR
PAH	<LOR	<LOR
Benzo - pyrene	<LOR	<LOR
OC Pesticides	<LOR	<LOR
OP Pesticides	<LOR	<LOR
Copper	<5	<5
Lead	16	14
Zinc	7	7
Cadmium	<1	<1
Chromium	2	<2
Nickel	<2	<2
Mercury	<0.1	<0.1

Note: LOR = Limit of reporting

The results show good correlation between testing on primary and duplicate samples.

In addition to the field QC procedures, the laboratory conducted internal quality control testing including surrogates, blanks, and laboratory duplicate samples. The results are presented with the laboratory test results in Appendix B.

All laboratory quality control data is within acceptable limits for the tests carried out. Therefore on the basis of the results of the field and laboratory quality control procedures and testing the data is considered to reasonably represent the concentrations of contaminants in the soils at the sample locations at the time of sampling and the results can be adopted for this assessment.

10 RESULTS

Laboratory test results are presented in Appendix A. An appraisal of the laboratory test results is provided below:

- Comparison of the limits of laboratory detection against the adopted soil assessment criteria presented in Table 2 of this report indicates that the detection limits for all laboratory analyses are well below the adopted soil investigation criteria. Therefore test results indicating concentrations of below the quantifiable limits can be reasonably assumed to indicate that the contaminant is either not present at that sample location, or is present at trace concentrations well below the adopted soil investigation criteria;
- Results of BTEX analysis in all samples revealed concentrations below the laboratory detection limits and therefore well below the adopted assessment criteria for all BTEX compounds analysed;
- Results of TRH C_6-C_9 analysis in all samples revealed concentrations below the laboratory detection limits and therefore well below the adopted assessment criteria for all TRH C_6-C_9 compounds analysed;
- Results of TRH C_{10}-C_{36} analysis in sample 4, on the southern site boundary downslope of the shed associated with the existing residence, revealed concentrations of 2480mg/kg, which exceeds the guideline value of 1000mg/kg. The highest concentrations were in the longer chain hydrocarbon compounds, indicating the source of the contamination to be heavy oils, such as motor oil, or grease;
- Results of TRH C_{10}-C_{36} analysis in all other samples revealed concentrations below the laboratory detection limits and therefore well below the adopted assessment criteria for all TRH C_{10}-C_{36} compounds analysed;
- Results of Organochlorine and organophosphorus pesticide analysis in all samples revealed concentrations below the laboratory detection limits and therefore well below the adopted assessment criteria for all pesticide compounds analysed;
- All heavy metals concentrations were at typical background levels in the samples analysed, and therefore well below the adopted soil investigation guideline values.

11 ASSESSMENT AND CONCLUSIONS REGARDING SITE CONTAMINATION

On the basis of the above, the only exceedance of the adopted guideline values was the concentration of long chain hydrocarbons in Sample 4 on the southern site boundary. This was directly downslope of a nearby shed and is likely to be a result of isolated spillage or leakage of oil.

Prior to residential development, it is recommended that some additional sampling be conducted around this area to delineate the extent of the affected soil. Once delineated, the soil should be removed to an appropriate off-site facility.

The remainder of the samples revealed no contamination at levels of concern for residential development. Based on the results of this assessment the site is considered suitable for residential development with regard to site contamination.

12 LIMITATIONS

The findings of this assessment are the result of sampling and analysis at specific locations using methodologies adopted in accordance with accepted industry practices and standards. It is considered that the results represent a reasonable interpretation of the conditions at the site in relation to contamination resulting from past site activities. Under no circumstances, however, can it be considered that these findings represent the actual state of the site at all points.

Should conditions that differ from those described in this report be encountered during future site usage, further advice should be sought.

For and on behalf of

Regional Geotechnical Solutions Pty Ltd

Steven Morton

Principal

Figures

Appendix A
Land Titles Information

Appendix B
Laboratory Test Results