Appendix 3 – Acid sulfate laboratory certificates.

RESULTS OF ACID SULPHATE SOIL ANALYSIS (Page 1 of 1)

Samples supplied by Gilbert & Sutherland on 15th November, 2000 - Lab. Job No. J6263

Analysis requested by Allison Sands - Your Job. No. GJ0090

Sample Site	Depth (m)	Texture	Extractable Sulphate Sulphur $\%S_{kcl}$	Oxidisable Sulphur %Sox (as $\%S_p - \%S_{kcl}$)	POSA Kg H_2SO_4/ Tonne soil	Reduced Inorganic Sulphur (% chromium reducible S) (%Scr)	TAA pH	Total Actual Acidity (TAA) mole / Kg	TPA pH	Total Potential Acidity (TPA) mole / Kg	Total Potential Acidity (TPA) Kg H_2SO_4/tonne	Neutralising Calculation Kg Lime/tonne DW (based on %Scr)	Neutralising Calculation Kg Lime/tonne DW (based on %Sox)	Neutralising Calculation Kg Lime/tonne DW (based on TPA)
BH1	1.0-1.2	fine	0.016	0.057	1.8	..	5.02	0.001	4.26	0.007	0.4	..	1.8	0.4
BH1	1.8-2.3	medium	0.160	0.321	10.0	1.388	4.62	0.008	2.45	0.220	10.8	42.5	10.0	10.8
BH1	2.5-3.0	fine	0.096	1.032	32.3	..	7.32	0.000	2.15	0.428	21.0	..	32.3	21.0
BH2	0.5-1.0	fine	0.002	0.009	0.3	0.013	6.16	0.000	5.85	0.000	0.0	0.4	0.3	0.0
BH2	1.1-1.4	fine	0.020	0.168	5.2	..	5.08	0.001	3.22	0.048	2.4	..	5.2	2.4
BH3	0.75-1.0	fine	0.003	0.018	0.6	..	4.52	0.004	4.72	0.002	0.1	..	0.6	0.1
BH3	2.15-2.7	medium	0.114	0.616	19.3	..	4.31	0.016	1.93	0.468	23.0	..	19.3	23.0
BH3	2.7-3.0	course	0.025	0.180	5.6	0.211	4.36	0.010	2.59	0.124	6.1	6.5	5.6	6.1
BH4	0.5-.075	fine	0.006	0.006	0.2	0.003	4.76	0.001	5.39	0.002	0.1	0.1	0.2	0.1
BH4	1.9-2.0	course	0.002	0.002	0.1	..	5.31	0.000	7.32	0.000	0.0	..	0.1	0.0
BH5	1.3-1.7	medium	0.008	0.011	0.4	..	4.29	0.012	5.42	0.002	0.1	..	0.4	0.1
BH5	2.2-2.7	course	0.030	0.214	6.7	0.257	4.74	0.004	2.31	0.108	5.3	7.9	6.7	5.3
BH5	2.7-3.0	course	0.045	0.256	8.0	..	4.35	0.006	2.44	0.144	7.1	..	8.0	7.1
BH6	0.0-0.5	medium	0.028	0.009	0.3	..	4.67	0.010	4.49	0.008	0.4	..	0.3	0.4
BH6	1.7-2.2	course	0.002	0.002	0.1	0.009	5.68	0.000	7.13	0.000	0.0	0.3	0.1	0.0
BH7	1.0-1.5	fine	0.012	0.009	0.3	0.009	4.21	0.018	4.48	0.004	0.2	0.3	0.3	0.2
BH7	1.5-1.7	course	0.002	0.005	0.2	..	4.63	0.001	6.27	0.000	0.0	..	0.2	0.0
BH7	2.2-2.6	medium	0.077	0.696	21.7	..	4.30	0.012	1.92	0.468	23.0	..	21.7	23.0
BH8	1.5-2.0	course	0.001	0.004	0.1	0.005	4.68	0.001	4.37	0.004	0.2	0.2	0.1	0.2
BH8	2.4-3.0	medium	0.087	0.612	19.1	..	4.27	0.020	2.03	0.456	22.4	..	19.1	22.4
BH9	1.0-1.6	fine	0.009	0.004	0.1	..	4.01	0.036	3.77	0.020	1.0	..	0.1	1.0
BH9	2.0-2.5	course	0.027	0.573	17.9	..	4.54	0.002	2.42	0.084	4.1	..	17.9	4.1
BH9	3.0-3.5	medium	0.143	0.781	24.4	1.121	4.12	0.016	1.87	0.656	32.2	34.3	24.4	32.2
BH10	0.75-1.5	fine	0.018	0.083	2.6	..	4.36	0.014	3.51	0.048	2.4	..	2.6	2.4
BH10	2.2-2.8	course	0.033	0.161	5.0	0.185	4.74	0.002	2.82	0.076	3.7	5.7	5.0	3.7
		Refer Note 11										Refer Note 6 & 7	Refer Note 6 & 7	Refer Note 6 & 7

NOTE:

1 - All analysis is Dry Weight (DW) - samples dried and ground immediately upon arrival (unless supplied dried and ground)

2 - Samples analysed by **POCAS method** (ie Peroxide Oxidation - Combined Acidity and Sulphate - Method 21) and **'Chromium Reducible Sulphur' technique** (Scr - Method 22B)

3 - Methods from Stone, Y. Ahern CR, and Blunden B (1998). **Acid Sulphate Soil Manual 1998.** ASSMAC, Wollongbar, NSW.

4 - Total carbon and total sulphur determined using a LECO CNS 2000 analyser

5 - Bulk density was determined immediately on arrival to laboratory (insitu bulk density is preferred)

6 - Neutralising Requirement (based on NAGP, chromium reducible sulphur **or** total sulphur) = Kg H_2SO_4/tonne x bulk density

7 - The neutralising requirement does not include a safety margin for complete neutralisation (a factor of 1.5 is often recommended)

8 - Conductivity 1 dS/m = 1 mS/cm = 1000 μS/cm

9 - For Texture: coarse = sands to loamy sands; medium = sandy loams to light clays; fine = medium to heavy clays and silty clays

(Classification of potential acid sulphate material if: coarse Scr>0.03%S; medium Scr>0.06%S; fine Scr>0.1%S)

checked: .....

Environmental Analysis Laboratory

Appendix 4 – Surface water analysis laboratory certificates.

RESULTS OF WATER ANALYSIS (Page 1 of 1)

Samples supplied by Gilbert & Sutherland on the 30th October, 2000 - Lab. Job No. J6190

Analysis requested by Allison Sands

PARAMETER	METHODS REFERENCE	P.PINES OUTGOING 27/10/00	P.PINES PM 27/10/00
TOTAL SUSPENDED SOLIDS (mg/L)	APHA 2540-D	3.0	18.5
TOTAL PHOSPHORUS (mg/L P)	QuickChem 31-115-01-3-B	0.005	0.023
TOTAL NITROGEN (mg/L N)	QuickChem 31-107-04-1-B	0.243	0.389

NOTES:

1. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 μg/L (micrograms per litre)= 1000 ppb (part per billion)

checked: .....

Environmental Analysis Laboratory

RESULTS OF WATER ANALYSIS (Page 1 of 1)

Samples supplied by Gilbert & Sutherland on the 6th November, 2000 - Lab. Job No. J6230

Analysis requested by Allison Sands

PARAMETER	METHODS REFERENCE	P.PINES AM OUTGOING 3/11/00	P.PINES PM INCOMING 3/11/00
pH	APHA 4500-H^+	6.22	6.62
CONDUCTIVITY (EC) (dS/m)	APHA 2510-B	9.47	29.80
TOTAL DISSOLVED SOLIDS (mg/L)	by calculation using EC	6,440	20,264
TOTAL SUSPENDED SOLIDS (mg/L)	APHA 2540-D	8.5	40.0
TOTAL PHOSPHORUS (mg/L P)	QuickChem 31-115-01-3-B	0.002	0.007
TOTAL NITROGEN (mg/L N)	QuickChem 31-107-04-1-B	0.248	0.819

NOTES:

1. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 μg/L (micrograms per litre)= 1000 ppb (part per billion)

checked: .....

Environmental Analysis Laboratory

RESULTS OF WATER ANALYSIS (Page 1 of 1)

Samples supplied by Gilbert & Sutherland on the 14th November, 2000 - Lab. Job No. J6258

Analysis requested by Allison Sands - Your Project GJ0093

PARAMETER	METHODS REFERENCE	WOLLONGBAR INCOMING 13/11/00	WOLLONGBAR OUTGOING 13/11/00
pH	APHA 4500-H^+	7.38	7.31
CONDUCTIVITY (EC) (dS/m)	APHA 2510-B	0.14	0.10
TOTAL DISSOLVED SOLIDS (mg/L)	by calculation using EC	97	71
TOTAL SUSPENDED SOLIDS (mg/L)	APHA 2540-D	6	7
TOTAL PHOSPHORUS (mg/L P)	QuickChem 31-115-01-3-B	0.083	0.059
TOTAL NITROGEN (mg/L N)	QuickChem 31-107-04-1-B	0.963	0.656

NOTES:

1. Samples analysed for metals were acidified to <2pH with nitric acid prior to filtration and analysis (total available metals)
2. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 μg/L (micrograms per litre)= 1000 ppb (part per billion)
3. For conductivity - 1 dS/m = 1 mS/cm = 1000 μS/cm

checked: .....

Environmental Analysis Laboratory

RESULTS OF WATER ANALYSIS (Page 1 of 1)

Samples supplied by Gilbert & Sutherland on the 13th November, 2000 - Lab. Job No. J6252

Analysis requested by Allison Sands - Your Project GJ0090

PARAMETER	METHODS REFERENCE	P.PINES AM OUTGOING 10/11/00	P.PINES PM OUTGOING 10/11/00
pH	APHA 4500-H^+	6.82	6.90
CONDUCTIVITY (EC) (dS/m)	APHA 2510-B	11.80	10.02
TOTAL DISSOLVED SOLIDS (mg/L)	by calculation using EC	8024	6814
TOTAL SUSPENDED SOLIDS (mg/L)	APHA 2540-D	20	17
TOTAL PHOSPHORUS (mg/L P)	QuickChem 31-115-01-3-B	<0.001	0.018
TOTAL NITROGEN (mg/L N)	QuickChem 31-107-04-1-B	0.424	0.336

NOTES:

1. 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 μg/L (micrograms per litre)= 1000 ppb (part per billion)
2. For conductivity - 1 dS/m = 1 mS/cm = 1000 μS/cm

checked: .....

Environmental Analysis Laboratory

Appendix 5 – Protocol for investigating and reporting fish kills

PROTOCOL FOR INVESTIGATING AND REPORTING FISH KILLS

All fish kills are potentially significant and should be investigated thoroughly and as soon as possible

Information on fish kills is available at www.fisheries.nsw.gov.au

Notification

When a report of a fish kill is received all information is to be recorded on the ***Fish Kill Notification & Investigation Report [Part A].*** Officers of NSW Fisheries who receive this information are to notify the nearest EPA office and vice versa. Local offices of DLWC and council are also be notified. Completed Part A forms should be faxed to the relevant Regional Office of NSW Fisheries and EPA for information. Each agency will be responsible for information exchange within their respective departments.

Initial assessment

The officer receiving notification of the fish kill will decide whether a field investigation is warranted. This decision will be made following discussions with other staff (e.g. NSW Fisheries or EPA biologists) on the basis of: size of kill, sensitivity of waterway, potential cause, species affected, potential public interest, etc. If a field investigation is warranted, and NSW Fisheries or EPA officers are not available, the department with primary responsibility for the investigation (see below) will arrange an inspection by the local council or another government department, whichever is most appropriate.

Field investigation

Generally, NSW Fisheries officers will investigate fish kills in non-metropolitan areas while EPA officers will investigate fish kills in Sydney, Newcastle and Wollongong metropolitan areas. In some cases a joint inspection may be appropriate. Regardless of the location, EPA Officers will be responsible for detailed investigation of kills which appear to be related to hazardous chemical incidents or discharges from commercial or industrial premises. Investigating officers will inspect the site and complete the ***Notification & Investigation Report [Part B].*** If officers of a Council or a department other than EPA or NSW Fisheries investigate a fish kill, the investigating officer should discuss the fish kill with NSW Fisheries regional Conservation Managers at the earliest opportunity. Completed ***Part B*** forms should be faxed to **both** the relevant NSW Fisheries office and EPA office.

Collection and analysis of samples

On-site water quality measurements may help elucidate the cause of the kill. However, detailed laboratory testing will be required to detect most contaminants and diseases, and this will require sampling of water and/or fish. Sampling of water is to be carried out according to EPA guidelines (see **Water Sampling Protocols - A Training Manual for NSW Fisheries in the Collection of Water Samples for Fish Kill Investigations** prepared by Science Management and Support Branch). Sampling of fish should be discussed with NSW Fisheries Pathologist or Conservation Managers or EPA laboratory staff. Without such guidance, and as an interim measure, eight, freshly dead, individuals of each species affected should be placed in separate plastic bags on ice. In general, subsequent preservation in formalin (for disease testing) or freezing (for contaminant testing) will be required until analysis can be undertaken.

Reporting of laboratory analysis

The officer responsible for organising transportation and analysis of water and fish samples will be responsible for reporting results of the analysis to all organisations previously involved with the fish kill.

Media contact

Fish kills can generate significant media interest. Prior to any response to the media, a common view should be established between EPA and NSW Fisheries officers. At that time an agreed co-ordinator for media contact will be established.

Database

All completed **Notification and Investigation Report** forms and results of analyses are to be forwarded to NSW Fisheries Shoalhaven/Nowra office for inclusion on the state-wide fish kill database. Information from the database is available on request.

FISH KILL Notification & Investigation Report

Part A - Notification

NAME OF WATERBODY: .....

CATCHMENT (e.g. Murray River, Sydney Harbour, Tuggerah Lakes): .....

PRECISE LOCATION WITHIN WATERBODY: .....

HABITAT DESCRIPTION: (circle as appropriate): (A) Freshwater, estuarine, marine (B) stream, river, anabranch, lake, billabong, swamp, drain, channel, impoundment, bay, lagoon, farm dam, beach, open ocean, other: .....

REPORTED BY (Name, address, phone): .....

TIME/DATE REPORTED..... TIME/DATE KILL FIRST OBSERVED.....

WEATHER CONDITIONS PRIOR TO OBSERVATION OF KILL: .....

.....

TIDAL STATE/WATER LEVEL AT TIME OF KILL (if applicable): .....

NUMBERS OF FISH AFFECTED (circle): less than 10, 10 to 100, 100's, 1000's, 10,000's, 100,000's, millions

CONDITION OF FISH (circle): dying, freshly dead, few hours old, few days old, decomposed

SIZE OF FISH (circle): all similar size, wide range of size classes (specify size/size range in cm) .....

SPECIES OF FISH AFFECTED (circle): one species only, few species, many different species, (please list if known): .....

.....

LOCATION OF FISH (circle): floating in water, on bottom, along waters edge, onshore

EXTENT OF KILL (area (ha) or length (m) of habitat affected): .....

GENERAL OBSERVATIONS OF REPORTING PERSON : .....

.....

.....

OTHER FORMS OF WILDLIFE AFFECTED ? (specify): .....

WHAT IS THE SUSPECTED CAUSE? .....

OTHER INDIVIDUALS & AUTHORITIES NOTIFIED :

INDIVIDUAL	DEPARTMENT	LOCATION	COMMENTS

REPORTED TO : .....POSITION: .....LOCATION.....

ORGANISATION : .....DATE: .....PHONE.....

REMINDER. Send copies of Parts A and B to NSW Fisheries, Office of Conservation, PO Box 456 NOWRA 2541 (fax (02)4423 2007).

FISH KILL Notification & Investigation Report

Part B - Investigation

TIME/DATE KILL INVESTIGATED:.....

HABITAT DESCRIPTION: (circle as appropriate): (A) Freshwater, estuarine, marine (B) stream, river, anabranch, lake, billabong, swamp, drain, channel, impoundment, bay, lagoon, farm dam, beach, open ocean, other.....

ADJACENT LAND USES (specify): .....

PHYSICAL EVIDENCE OF POLLUTION (OR ALGAL BLOOMS) OBSERVED: .....

ON-SITE WATER SAMPLING RESULTS WATER SAMPLES COLLECTED: Yes ☐ No ☐

Sample no.	1	2	3	4	5	6
Name of sampling site						
pH						
Temp. (°C)						
Dissolved Oxygen						
Others (specify)						

Attach map/diagram showing total area of fish kill and sample sites. Colour photographs would also assist analysis and identification.

CONDITION OF FISH (circle as appropriate): dying, freshly dead, few hours old, few days old, decomposed

FISH AFFECTED			
SPECIES -(Full name)	LENGTH RANGE (cm)	NUMBERS	SAMPLES COLLECTE
			yes/no
			yes/no
			yes/no
			yes/no
			yes/no

OTHER COMMENTS: (eg behaviour/appearance of fish)

SUSPECTED CAUSE OF FISH KILL: .....

.....

WATER SAMPLES DESPATCHED TO:.....TO BE TESTED FOR: .....

FISH SAMPLES DESPATCHED TO:.....TO BE TESTED FOR: .....

INVESTIGATED BY: .....POSITION: .....

ORGANISATION: .....DATE: .....

RECOMMENDATION(S) FOR FUTURE ACTION: .....

REMINDER. Send copies of Parts A and B to NSW Fisheries, Office of Conservation - PO Box 456, Nowra 2541 (fax 02 4423 2007).

Contacts

NSW Fisheries

24 hour service **1800 043 536**

District Offices

Albury	02 6042 4228
Ballina	02 6686 2018
Batemans Bay	02 4472 4032
Bathurst	02 6331 1428
Broken Hill	08 8087 6483
Buronga	03 5023 5204
Coffs Harbour	02 6651 9522
Cooma	02 6452 3996
Deniliquin	03 5881 6036
Eden	02 6496 1377
Inverell	02 6722 1129
Maclean	02 6645 2147
Narooma	02 4476 2072
Narrandera	02 6959 1488
Nelson Bay	02 4982 1311
Newcastle	02 4927 6548
Nowra	02 4423 2200
Port Macquarie	02 6583 1102
Swansea	02 4971 1201
Sydney Metropolitan (Wollstonecraft)	02 9439 3148
Sydney South (Sans Souci)	02 9529 6021
Sydney West (Brooklyn)	02 9985 7256
Tamworth	02 6765 4591
Taree	02 6552 6799
The Entrance	02 4332 2147
Tumut	02 6226 2199
Tuncurry	02 6554 6078
Tweed Heads	07 5523 1822
Wellington	02 6845 4438
Wollongong	02 4295 1809
Yass	02 6226 3867

Office of Conservation Regional Offices

North (Ballina)	02 6686 2018
North West (Inverell)	02 6722 1129
Central (Port Stephens)	02 4916 3931
South (Nowra)	02 4423 2080
West (Narrandera)	02 6959 9028
West (Albury)	02 6042 4208
Sydney Area	02 9492 9401

Regional Offices (for reports)

Northern	Fax:	02 6645 1326
Western	Fax:	02 6021 5829
Southern	Fax:	02 4472 7542

Environment Protection Authority

Pollution Line 24 hr service 13 15 55

Regional Offices

Albury		02 6041 4963
Armidale		02 6773 7000
Bathurst		02 6332 1838
Dubbo		02 6884 9745
Gosford		02 4323 9875
Grafton		02 6640 2500
Griffith		02 6964 1880
Newcastle		02 4926 9986
Queanbeyan		02 6299 3330
Sydney		02 9995 6810
	or	02 9995 6802
Wollongong		02 4226 8424

Specialist Advice

Water Science	02 9995 5539
Ecotoxicology	02 9514 4050
Marine & Estuarine Studies	02 9795 5331
Laboratories	02 9995 5033

Advice on pathology testing, disease and sampling procedures:

Dick Callinan,
NSW Fisheries - 02 6626 1261
02 6626 1264

Advice on chemical residue testing:

Chemical Residue Laboratory
NSW Agriculture
Wollongbar 02 6621 2632