MACRAES MINING COMPANY LIMITED

NORTHERN GULLY EARTHWORKS

DETAILED ENGINEERING REPORT

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9219rep1

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1. STATEMENT OUTLINE

1.0 Introduction

This report provides a detailed engineering outline of the proposed earthworks to be carried out in Northern Gully. The Otago Regional Council have granted four Resource Consents (W4146-W4149) to cover the development of a waste rock stack in Northern Gully. Each consent contains a number of specific conditions to be met and this report provides relevant design and construction details required to meet those conditions. In addition, the Waitaki District Council requires a Producer Statement to support an application for a Building Consent in terms of the Building Act 1991.

The report describes the main structural elements of the proposed development in Northern Gully, their function and the criteria adopted for their design.

Reference should be made to the attached drawings:

NGRD 1 General Arrangement
NGRD 2 Initial Drainage Layout
NGRD 3 Silt Retention Pond Embankment Details
NGRD 4 Miscellaneous Drainage Details

1.2 Location

The Macraes Gold Mine is located near the village of Macraes Flat, approximately 60 kilometres north of Dunedin. The mine is within the catchment of Deepdell Creek a tributary of the Shag River. The main ore body is located on Round Hill, which lies between Maori Tommy Gully and Northern Gully, tributaries of Deepdell Creek.

Waste from the mine has been deposited in Maori Tommy Gully since the mine was opened in 1990, but additional space for the disposal of waste rock will be required by early in 1993. The site shown on drawing NGRD 1 has been examined in detail as described in Reference 1 which formed the basis for the application for resource consents. These consents have since been granted subject to certain conditions.

1.3 Project Outline

The development of the Northern Gully for the storage of waste rock involves the construction of:

* an embankment across the lower section of the gully to form a silt retention pond (Northern Gully Silt Pond)

* an open drain on the south side of the proposed waste rock stack in order to divert relatively clean stormwater and discharge it to the eastern most tributary gully.

* an open drain on the northern and eastern sides of the stack area to collect runoff from the stack and to discharge it to the proposed silt retention pond

* haul roads

* seepage collector pipelines for possible use in the future if a tailings retention embankment is constructed on the south side of the stack

* outlet drains, culverts, intake structures, all as described in this document or detailed on the drawings. A return water pump and pipeline will be required to transfer water which accumulates in the silt pond to the plant area. Details of this equipment have not been determined at this stage.

Areas disturbed during the process of this work will be rehabilitated as the work progresses.

1.4 Standards for the Design and Construction of the Works

1.4.1 Drainage

Stormwater runoff volumes, the size of pipes and the dimensions of open drains have been determined using **Building Industry Authority Approved Document E1: Surface Water**, as and where applicable.

1.4.2 Embankment

No Standards or Codes of Practice exist for earth or rockfill dams of the type to be used for this project. The form of the structure, the criteria for the sizing of the spillway and factors of safety for static and seismic stability analysis generally follow accepted practice as set down in publications produced by the International Committee on Large Dams (ICOLD).

1.4.3 Buildings

There are no buildings or walls constructed from unit building elements, associated with this project.

1.5 Topography

The catchment of Northern Gully comprises ridges and gently sloping terrain in which the creeks have become deeply entrenched. The main gully is aligned approximately west-east (in terms of the minesite grid) with five tributary creeks flowing due north.

On the south side of the catchment a broad ridge, at an elevation of 580m RL, divides Northern Gully from upper reaches of the Waikouaiti River catchment and Macraes Flat.

A similar ridge on the north side provides the divide between the

Northern Gully and Deepdell Creek catchments while one on the west side separates Northern Gully from Maori Tommy Gully.

Northern Gully narrows at the east end to a very steep sided, relatively narrow section for the last 500m before it enters Deepdell Creek

1.6 Geology

The geological characteristics of the gully are similar to those in Maori Tommy Gully (which is described in detail in Reference 2) with a thin layer (300-600mm) of loess and colluvium overlying semi-psammitic schist. The schistocity, which dips gently to the east (Mine Site Grid) is non-fissile and the fabric is generally tight and contains no visible weakness.

A 1m wide graphitic foliation shear was exposed during an earlier investigation for a tailings dam in the West Arm tributary gully suggesting that the development of the gullies is fault controlled.

Figure 1 shows the data related to the major discontinuities in the area of the silt pond embankment. This information, revealed by exposures in cuttings and by trenching in particular areas has been projected back to the 400m RL plane.

Structurally the area is bisected by a series of joints and by a fault in the north abutment. This fault dips at about 44 degrees towards 255 degrees (varying to 271 degrees) and may control the development of the adjacent tributary creek. The fault is 400mm wide and consists of fault breccia with minor amounts of gouge.

The joint patterns fall within three major sets as indicated by the polar diagrams attached as Appendix A and are similar in nature to those found in the same type of material elsewhere on the site.

The loess and colluvium is up to two metres deep in the bottom of the gullies, but generally 300 to 1000mm elsewhere.

1.6 Climate

The climate of Northern Gully is no different to that of the Macraes Mine described in detail in the original EIA document. The main element of the climate relevant to this project is the rainfall summarised in the attached table (see Appendix B).

1.7 References

The environmental impact of the proposed waste rock stack is described in **Environmental Assessment, Northern Gully Waste Rock Stack, August 1992**, produced by Macraes Mining Company Limited. More detailed information with regard to climate and engineering in particular is contained in the report of the original impact study **Macraes Gold Mine, Environmental Impact Assessment, 1988**

produced by Macraes Joint Venture

2 DESIGN CRITERIA

2.1 Engineering Characteristics of Waste Rock and Local Borrow Material

The materials found on the site, other than topsoil, are described as follows:

Type 1 Completely, highly or moderately weathered schist rock which after placement, conditioning and compaction , is capable of forming a strong, dense, low permeability fill

Type 2 Loess, colluvium, solifluction soils or combinations of these materials which, after blending with Type 1 material and following placement, conditioning and compaction, is capable of forming a strong, dense, low permeability fill.

Type 3 Slightly weathered or fresh schist rock which after placement and compaction constitutes a strong, dense fill.

Type 4 All mine waste and material from embankment foundation preparation and other works apart from that included in Types 1,2,3 or 5

Type 5 Reject material, derived mainly from excavation of drainage channels and swampy areas which, because of organic content or excessive moisture, renders it unsuitable for inclusion in structural fills.

Selected materials from the site will be incorporated in the structural fill zones described in the following:

Zone A The primary function of this zone is to limit seepage. It forms the upstream blanket and central core of the silt pond embankment and would provide the upstream structural zone of the possible tailings pond embankment on the south side of the rock stack. In all cases the material incorporated within this zone has sufficient strength to prevent the likelihood of instability, particularly during earthquakes.

Zone A will be constructed primarily from a blend of Type 1 & 2 materials obtained from local borrow areas. These materials will have to be conditioned and compacted to meet density, particle size and permeability requirements.

Zone B This zone forms the bulk of the structural fill portions of the silt pond embankment. Its main

function is to support the low permeability zone and to provide strength to prevent instability. The southern most section of the waste rock stack will also be formed to Zone B specification.

Type 1,2 & 3 materials may be used to form this zone subject to meeting density, permeability and maximum particle size requirements.

Zone C — The bulk of the waste rock stack will comprise Zone C. The full range of material types can be deposited in this zone although restrictions are placed on the disposal of Type 5. The maximum thickness of a layer and the minimum level of compactive effort are the only requirements specified for this zone.

Zone D — This Zone defines the chimney drain provided in the embankment to intercept seepage and to prevent the development of pore-water pressures in the downstream shoulder of the embankment. It also prevents the propagation of cracks which may result from settlement within the embankment or from movement induced by earthquake shaking.

Zone D will be formed using drainage aggregate (defined in the civil works specification) manufactured to meet particle size and durability requirements.

The geotechnical properties of the materials permitted to be used in the structural fill zones are set out in Table 1.

Table 1 Geotechnical Properties of Structural Fill Materials

Zone	Dry Density (t/m^3)	Water Content (%)	Permeability (m/s)	Effective Strength Parameters A	B
A	2.15	8.0	10^{-7}	1.28	1.0
B	2.05	2.0	10^{-6}	2.43	0.83
C	1.95	2.0	10^{-5}	1.29	0.91

The results of laboratory tests on local borrow material is attached as Appendix C. It is intended that Zone A would comprise a blend of 70% loess and 30% schist compacted to a dry density of 2.15 t/m^3 at a water content of 7-9%.

2.2 Stormwater

The runoff coefficients used in the design of the stormwater drainage system are as follows:

Table 2 Runoff Coefficients for Calculating Peak Flow

Catchment Characteristics	Coefficient - Return Period	
	< 10 years	> 10 years
Undisturbed, steep slopes	0.4	0.5
Disturbed,eg Rock Stacks	0.6	0.7
Sealed areas	0.8	0.9
Rehabilitated areas	0.45	0.55

Runoff coefficients for calculating storm runoff volumes are as follows:

Developed areas having a low permeability	1.0
Undisturbed catchment area, 100 yr RP rainfall	0.8
PMF inflows	1.0

3. MAIN STRUCTURAL COMPONENTS

3.1 Introduction

Planning for the development of the waste rock stack was required to take into account the possible construction of a tailings impoundment on the south side at some time in the future. The likely form of the dam required to form this impoundment is indicated on the drawings.

3.2 Drainage

The stormwater runoff from the site will be controlled by shallow open drains excavated into the surficial soils and the weathered schist rock. The location of the drains is shown on drawing NGRD 2. The main drains will have an overall longitudinal slope of the order of one percent and side slopes of 1 : 1.5 (V :H). Some short drains may be directed down the slope and will have longitudinal gradients as high as 1 : 2 (V : H). However the invert is expected to be in sound rock over the whole length of all drains and erosion of the channel is unlikely.

Two minor culverts will be required to carry surface drainage under the haul roads.

A 300 diam culvert will be constructed adjacent to the existing channel of the Northern Gully Creek to ensure positive drainage of the main gully west of the waste rock stack. However, experience in similar situations in Maori Tommy Gully, the main site for the disposal of waste rock and tailings, shows that the

coarse rock material in the bottom of the dump generally provides adequate drainage for stormwater run-off.

A 300 diam outlet pipe will be laid through the base of the silt pond embankment, so that stormwater can be released during large storms. A manual control valve will be installed immediately downstream of the outlet structure. This will be operated from the top of the embankment using a hand wheel connected by a long steel shaft to the spindle of the valve. The outlet end of the pipe will be located in the invert of the existing channel, which at this point is contained within a deep, narrow gully. The velocity of discharge from the pipe is expected to be as high as 10 m/s. This compares to a flow in the original channel, estimated to exceed 13 m/s during heavy rainfall.

A similar pipe will be laid to connect the two gullies blocked by the embankment. Drainage through this pipe will reduce the volume of dead storage in the gully on the south side, to a minimum.

Two pairs of 100 diam pipes will be laid to provide positive drainage from the tributary gullies on the south side of the rock dump area. These pipes may ultimately be used as chimney drain collectors if and when these tributaries are used to store tailings. Each pair of pipes will be laid on a continuously falling grade to a common outfall located immediately above the silt pond.

Another two 100 diam pipes will be laid from cut-off sumps H and I located in the lower sections of the southern tributary gullies. These sumps are intended to collect seepage from the possible future tailings impoundment. The pipes will be laid on a falling grade to the common outfall point above the silt pond.

3.3 Silt Pond Embankment and Associated Works

A soil and rockfill embankment will be constructed across Northern Gully in the position shown on drawing NGRD 3. The embankment will have a low permeability core and upstream blanket (Zone A) and rock shoulders (Zone B). A chimney drain will be constructed on the downstream side of the core and connected through a base collector and outlet to an outfall at the base of the downstream toe. The slope of the upstream shoulder will be 1:2 (V:H) while that of the downstream shoulder will be 1:1.4.

All loose soil and weathered schist within the Zone A footprint of the embankment will be removed. All loose rock and steep slopes will also be excavated before any fill is placed. The area to be covered by Zone B fill will be stripped of all soil to expose competent rock.

A 300 diam outlet pipe will be installed in a trench excavated in the schist rock foundation. It will be concrete encased through the area to be covered by Zone A fill and surrounded with drainage aggregate over the rest of its length.

A spillway channel will be formed on the south (right) abutment to direct the overflow from the impoundment to an existing watercourse, clear of the downstream toe of the embankment. The crest of the overflow weir and the invert of the vee shaped channel will be excavated into fresh schist.

3.4 Waste Rock Stack

Waste rock will be placed in Northern Gully to cover the area and form the shape indicated on drawing NGRD 1. Soil will be stripped from the surface of the area to be covered and stockpiled for use in subsequent rehabilitation.

Rock will be placed in lifts not exceeding 15m high. The batter slopes will be trimmed to a maximum slope of 1:2 (V:H) and topsoiled prior to grassing. Five metre wide benches, formed at vertical intervals of 20m, will be shaped to divert and contain stormwater flowing off the batters. This water will be discharged directly into or piped to an existing watercourse.

4 DESIGN SUMMARY

A summary of the results of the design operation are as follows:

4.1 Diversion Drains

South Side

Catchment area	102Ha
Runoff coefficient	0.7
Time of concentration	45mins
Design storm flow (10yr RP)	5.4m^3/s
Gradient	1.0%
Maximum velocity (depth=1.3)	3.3m/s

North Side

Catchment area (undeveloped)	19Ha
Runoff coefficient	0.7
Time of concentration	27mins
Design storm flow (10 yr RP)	1.3m^3/s
Gradient	1.0%
Maximum velocity	2.0m/s

Rock Stack Benches

Catchment Area (600 x45)	2.7Ha
Runoff coefficient	0.6
Time of concentration	35mins
Design storm flow(10yr RP)	0.14m^3/s
Gradient	1.0%
Maximum velocity	0.4m/s

4.2 Culverts

Northern Gully (under rock stack)

Catchment area (undeveloped)	94Ha
Runoff coefficient	0.7
Time of concentration	37mins
Design storm flow(10yr RP)	5.5m^3/s
Gradient	5.6%
Pipe capacity(305 flowing full)	350 l/s

Note:
Water will pond on west side of stack and flow through rock. The estimated depth of ponding likely to occur during a 1 day 10 yr RP storm is 5m.

Pipe laid in trench and backfilled with compacted Zone A.

Effective vertical load	226Kn/m
Pipe class	2Z

(method described in Humes CPAA High Fill Embankments)

Collector Drains

Catchment area,West Arm (the east arm is smaller)	9Ha
Runoff coefficient	0.7
Time of concentration	30mins
Design storm flow	600 l/s
Gradient	1.75%
Pipe capacity(2x100 dia flowing full)	20 l/s

Note:
Most of the flow will occur through the rock stack and will follow the original creek alignment.

4.3 Silt Retention Pond

Pond capacity(at spillway crest level) 37,500m^3

Spillway Capacity:

Catchment area(undeveloped)	143Ha
(developed)	129Ha
Runoff coefficient	0.7
Time of concentration(undeveloped)	123mins
Design storm flow (100yr RP)	5.9m^3/s
Storage capacity(as per Resource Consent)	27,000m^3
Minimum freeboard	500mm
Head on overflow weir	500mm
Length of weir	10m
Capacity of spillway	6.0m^3/s

Spillway Channel Capacity:

Channel has 1:1.5 (V:H) side slopes and 350mm freeboard at design flow

Gradient	1%
Depth of flow (100yrRP)	1.15m
Capacity	6.1m^3/s
Maximum velocity	3.1m/s

4.4 Silt Pond Embankment

Crest:	Elevation	506mRL
	Width	5m
Side slopes:	Upstream	1:2.0(V:H)
	Downstream	1:1.4(V:H)

Type: zoned earth and rock fill with central core

Seismic design (peak ground accelerations)

Operating basis earthquake	0.15g
Maximum credible earthquake	0.34g

Factors of safety for stability(required minimum values)

Construction	1.3
Long term	1.5
Rapid drawdown	1.3
Seismic - operating basis	>1.0
- maximum credible*	N/A

* damage may occur but no water to be released.

Refer to Figure 2 for a summary of the stability analyses

Chimney drain flow:

(Water at maximum operating level and core saturated)

Estimated maximum flow	0.1 l/s
Collector drain design flow	1.0 l/s

With respect to the comments made by the technical reviewers (refer Agsearch letter dated 10 December 1992) regarding the design storm for the spillway and the form of the outlet pipe, the following modifications have been carried out:

Spillway

The reviewers indicated that the design rainfall should between a 100yr RP and a half PMP or between 0.3 PMP and 1000yr RP.

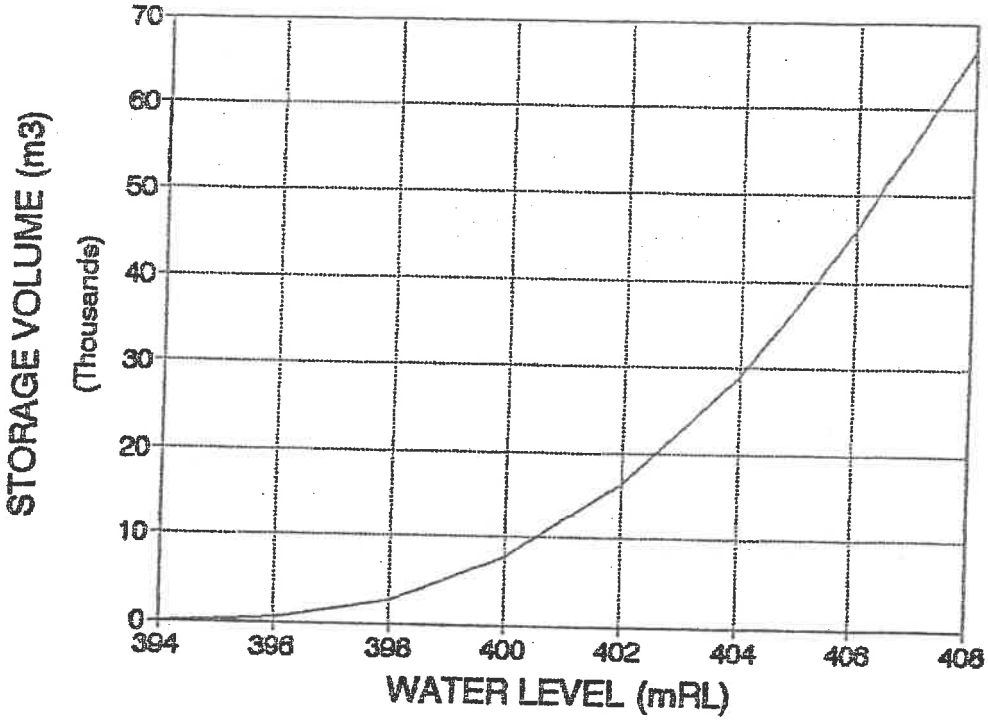
The spillway crest will pass a flow generated by a "half PMP" rainfall with 75 mm freeboard. The depth of flow in the channel under the same conditions will be 1.66m ie 0.33m freeboard. The 1000yr RP rainfall is less than the half PMP.

Outlet Pipe.

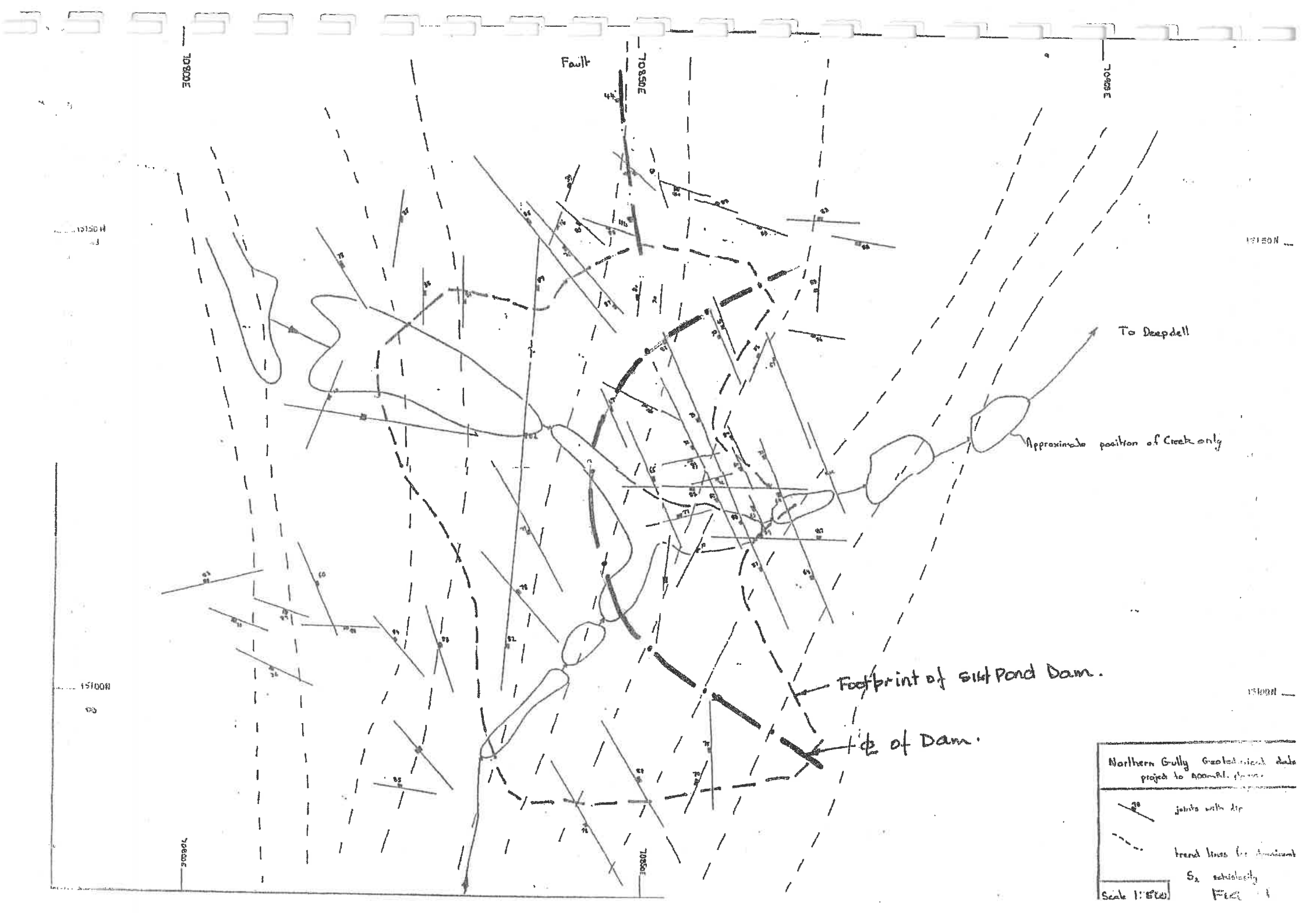
The trench and concrete encasing detail for the outlet pipe under

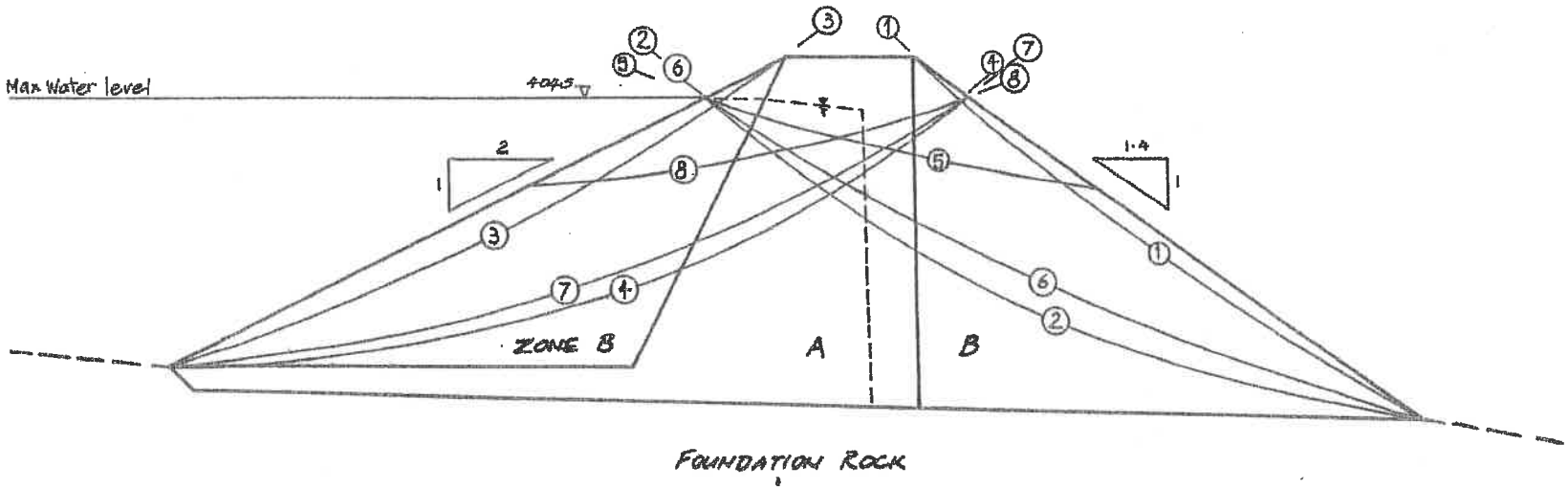
the embankment has been modified to provide a sloping trench side and sloping shoulders to the concrete surround. This should overcome the major concerns expressed by the reviewers.

NORTHERN GULLY SILT POND



EL	AREA	DELTA VOL	SUM VOL	SUM(Mm3
394	0		0	
396	535	535	535	0.00
398	1581	2116	2651	0.00
400	3514	5095	7746	0.01
402	5268	8782	16528	0.02
404	7264	12532	29060	0.03
406	9460	16724	45784	0.05
408	11809	21269	67053	0.07


7080E
7050E
7040E
Fault
To Deepdell
Approximate position of Creek only
Footprint of Silt Pond Dam.
℄ of Dam.
Northern Gully Geotechnical data
joints with dip
trend lines for
S_2 schistosity
Scale 1:
Feet



Engineering Geology Ltd

Dwg. No. Fig 2
Date .. DEC. 1972
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Scale .. 1:200

STABILITY ANALYSES

MATERIAL	PARAMETERS		
	c' (kPa)	ø' ( )	(kN/m)
FOUNDATION ROCK	100	40	24
ZONE A	0	38	21.1
ZONE B1			22.5

RESULTS OF STATIC STABILITY ANALYSES

CIRCLE NO	FACTOR OF SAFETY	
	STEADY STATE SEEPAGE	RAPID DRAWDOWN
1	1.76	
2	2.12	
3	2.54	1.49
4	2.86	1.88

RESULTS OF SEISMIC STABILTY ANALYSES

CIRCLE NO	SEISMIC COEFFICIENT		FACTOR OF SAFETY		DISPLACEMENT (mm)
	DBE	MCE	DBE	MCE	DURING MCE
DOWNSTREAM					
1	0.18	0.39	1.23	0.83	2-6
5	0.40	0.87	1.39	0.68	5-15
6	0.18	0.39	1.46	1.03	-
UPSTREAM					
3	0.20	0.44	1.26	0.66	5-12
7	0.20	0.44	1.45	0.86	1-3
8	0.40	0.87	1.20	0.52	25-75

APPENDIX A

TABLE

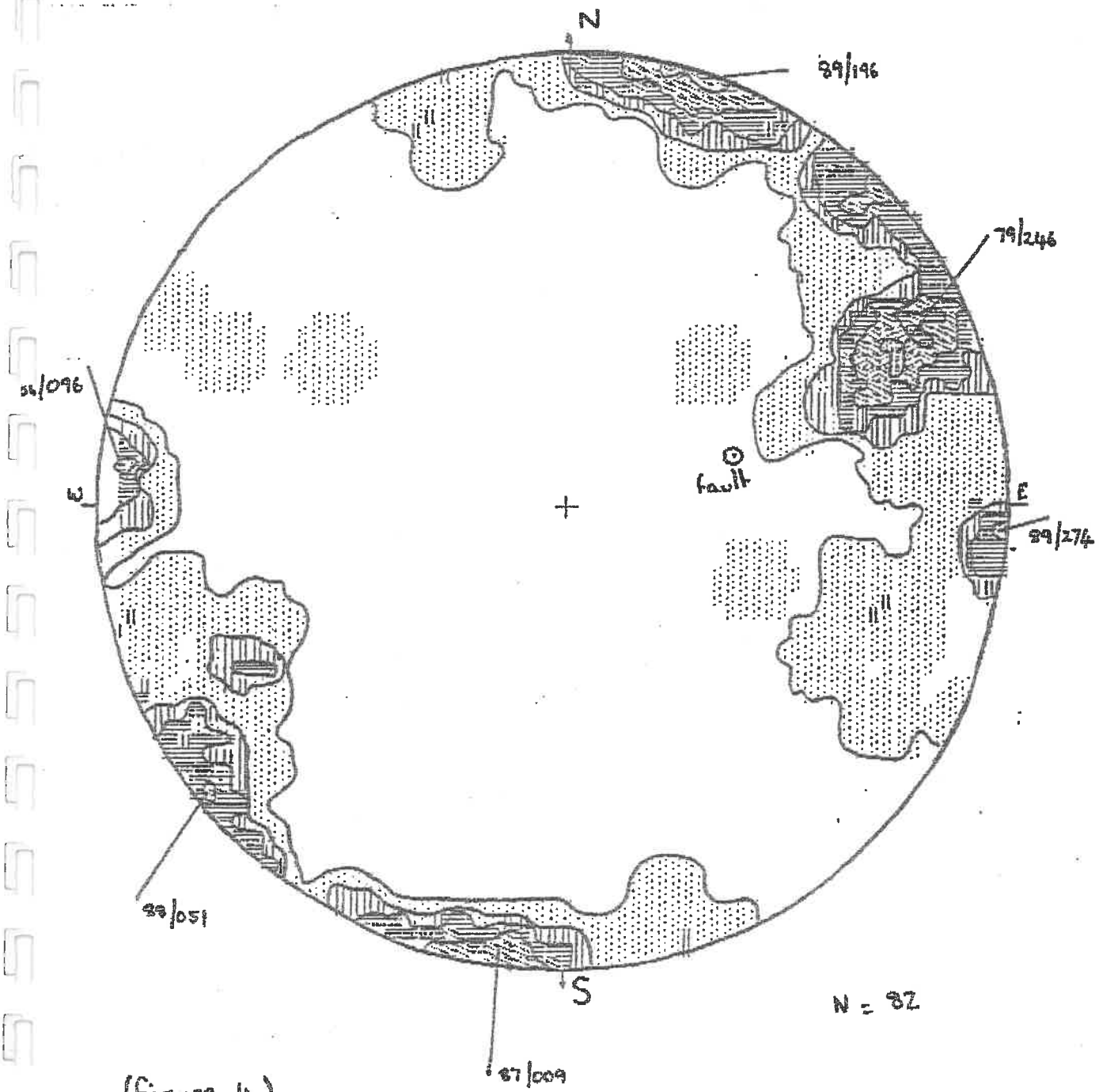
ESTIMATED RAINFALL DEPTH DURATION FREQUENCY FOR ROUND HILL

DURATION	RAINFALL (mm) FOR RETURN PERIOD							
	2 yrs	5 yrs	10 yrs	20 yrs	50 yrs	100 yrs	500 yrs	PMP
10 mins	6	8	9.5	11	13	14		42
15 mins	7.5	10	12	13.5	16	17.5		52
30 mins	11	14	17	19.5	23	25		76
45 mins	13.5	17.5	20.5	24	27.5	31		96
1 hr	15.5	20	23.5	27.5	32	35		112
2 hrs	21.5	27	32	37	43	47		164
3 hrs	26	33	38	44	50	56		206
6 hrs	37	45	53	60	70	77		302
12 hrs	49	60	70	80	92	100		443
1 day	64	80	94	105	120	135		650
	(38)	(65)	(82)	(99)	(121)	(138)	(175)	
2 days	80	100	120	135	155	170		954
	(49)	(88)	(114)	(139)	(171)	(195)	(250)	
3 days	88	105	130	145	170	185		1193
	(57)	(103)	(134)	(163)	(201)	(230)	(295)	

NOTE: Figures in () are derived by Gumbel analysis of Glendale Station rainfall; all other figures derived from regional analysis (Reference F4)

APPENDIX B

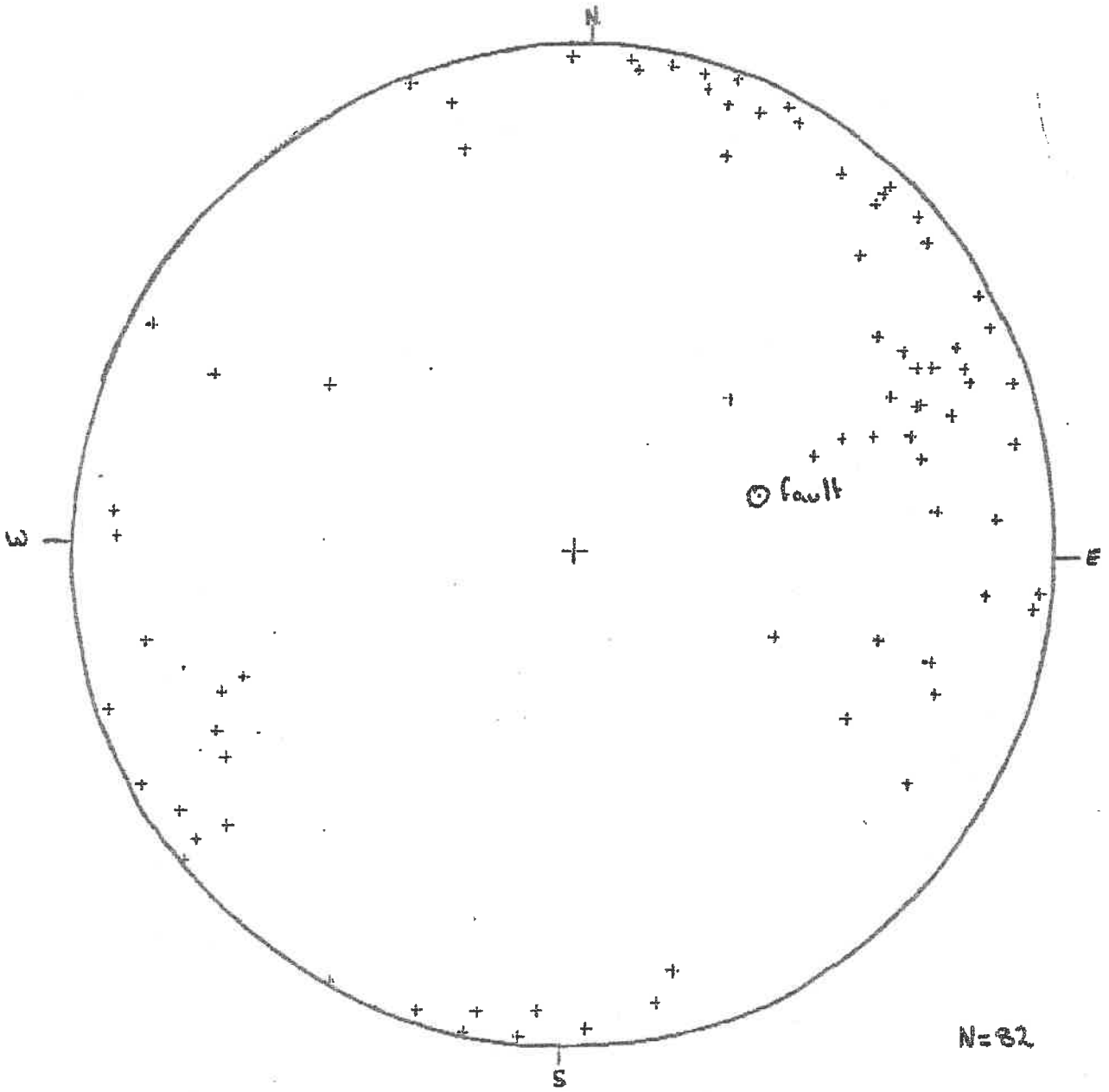
Contoured plot of poles to joint planes



(Figure 4)

NB Figures are dip and dip directions

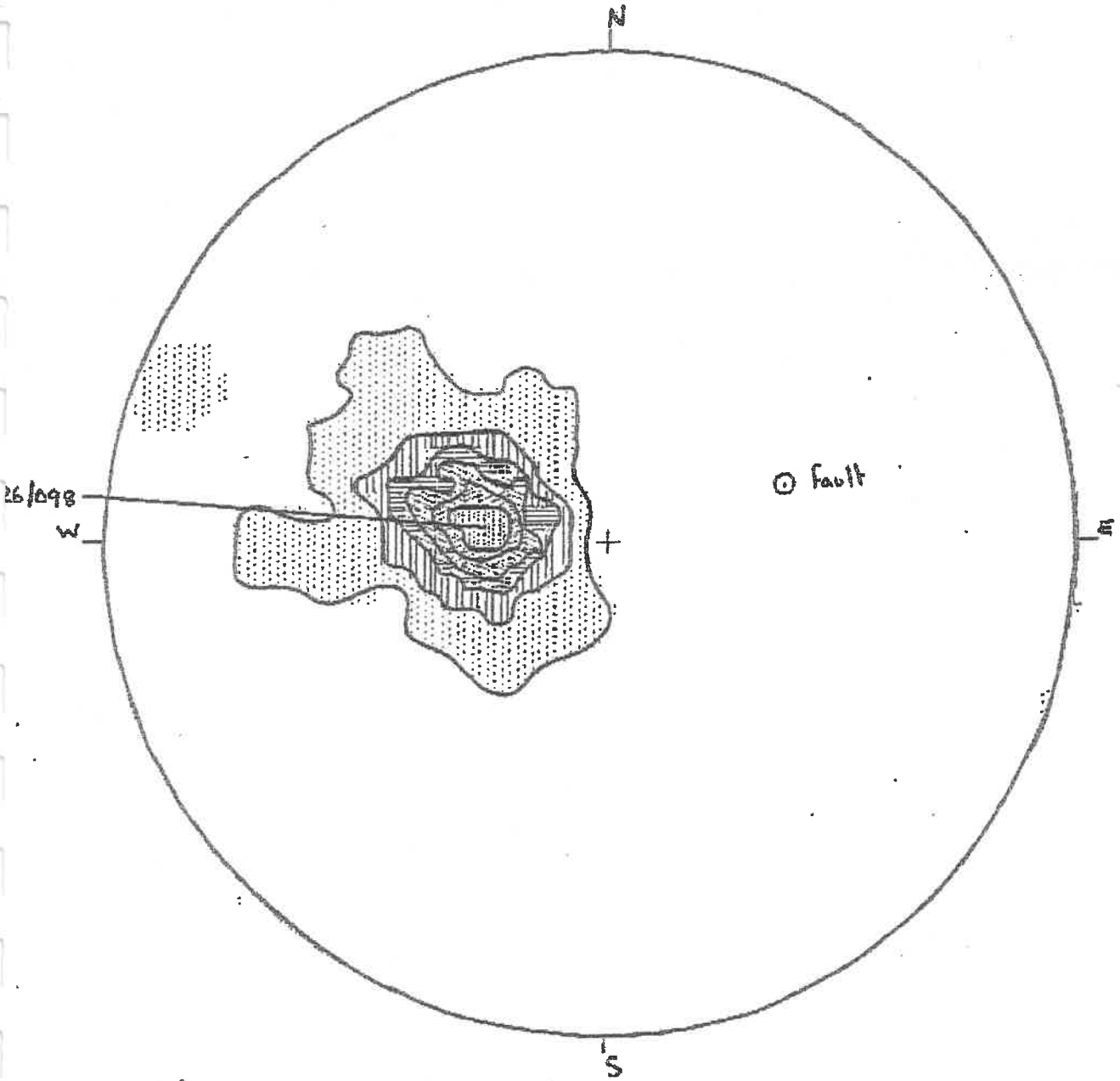
Poles to joint planes



(Figure 3)

NB* Figures used are dip and dip directions

Contoured plot of S_2 planes

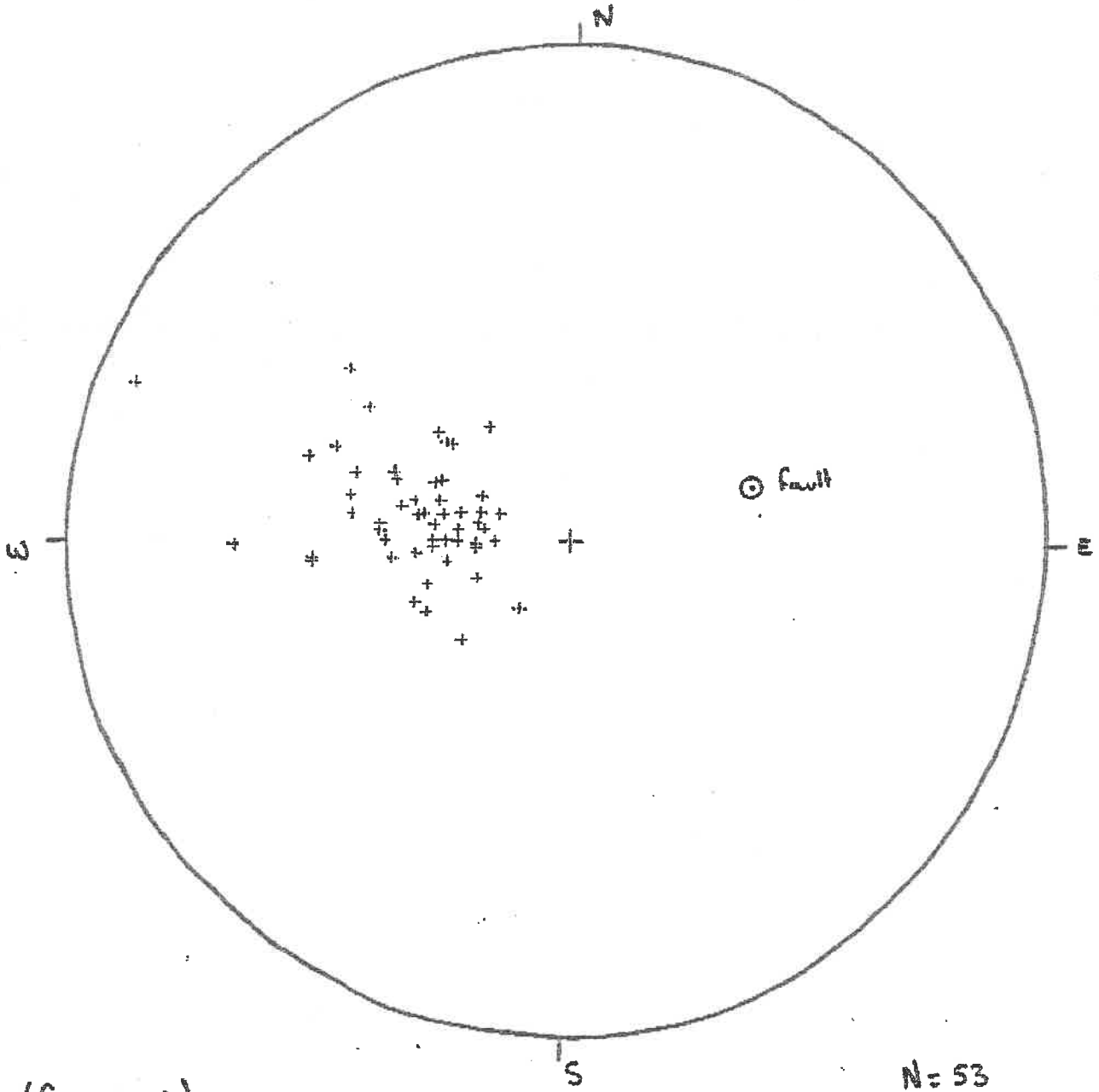


(Figure 2)

N= 53

NB* Figures used are dip and dip directions

Poles to S_2



(Figure 1)

N = 53

NB* Figures used are dip and dip directions

APPENDIX C

OTAGO REGIONAL COUNCIL

OUR REFERENCE

W4146

9 November 1992

Macraes Mining Company Ltd,
C/o Simpson Grierson Butler White,
Private Bag,
Wellesley St PO,
Auckland.

Attention: R A Fisher

Dear Sirs,

Resource Management Act 1991

I wish to advise that the Council has given its decision on your application for a resource consent.

The decision is -

I. That the Macraes Mining Company Ltd, P.O.Box 84, Palmerston, Otago (address for service of documents: Simpson Grierson Butler White, Private Bag, Wellesley St PO, Auckland, Attn R A Fisher) be granted the following resource consents:

W4146 A land use consent and discharge permit for the placement of 8,000,000 cubic metres of waste rock onto land and onto the bed of the tributary of Deepdell Creek in Northern Gully for a term expiring on 1 August 2004, for the purpose of disposal of waste rock from the Macraes gold mine.

Legal description of land: Pt Section 14, Block IX, Highlay Survey District. Map reference at and about NZMS260 I42:095364.

Conditions

1. Appropriate silt control measures shall be in place prior to the exercise of this consent.

W4147 A water permit to divert, dam, take and use water and land use consent for construction of dam on stream bed, for a term expiring on 1 August 2004, for the purpose of diverting and containing stormwater the containment and use of stormwater from the vicinity of the northern waste rock stack.

Legal description of land: Pt Section 14, Block IX, Highlay Survey District. Map reference at and about NZMS260 I42:095364.

Conditions

1. The grantee shall ensure that the area of disturbance within the catchment shall be kept to a minimum.

2. The grantee shall ensure that the area is rehabilitated as soon as practicable to the satisfaction of the Council.

3. The grantee shall ensure all practicable steps are taken to prevent contamination of stormwater by suspended solids during the construction of the diversion drains and the dam. Where construction works create disturbance in a catchment of 1 hectare or greater, the grantee shall provide temporary silt retention ponds.

4. Diversion channels and associated works shall be designed to contain the runoff arising from a storm event having a return period of 1 in 10 years.

5. The dam and associated facilities shall be designed so as to contain the runoff arising from storms having a return period of no less than 1 in 2 years without discharge.

6. The level of the crest of the dam shall not exceed RL 406m, and the location shall be generally in accordance with the map attached to this consent.

7. The dam shall be provided with a spillway designed for a 100 year return frequency flood.

8. The dam shall provide for a minimum live storage capacity of 27,000 cubic metres.

9. The grantee shall design, construct and manage the facilities in accordance with best engineering practice. The dam design and construction shall be reviewed and approved by a suitably qualified engineer to the satisfaction of the Council.

10. This consent shall be exercised in conjunction with consents 4148 and 4149, and in conformity with a management plan prepared by the grantee to the satisfaction of the Council. The plan shall be submitted to the Council for approval no later than three months following the granting of this consent. The plan shall be reviewed at least annually or at such lesser frequency as the Council may approve. The management plan shall:

    (1) Present projections and intentions for mining operations in relation to the future exercise of this consent.

    (2) Describe the sequencing of works and procedures to be adopted during the construction and the maintenance and management of the facilities.

    (3) Describe measures to be taken so that the objectives and conditions of this consent will be met at all times, and that adverse effects on the environment are minimised.

    (4) Describe precautionary measures that prevent unauthorised discharges or other adverse effects on the environment, and present a contingency plan that will describe how such events will be managed so as to prevent, minimise and redress any adverse effects on the environment.

    The objective to be met at all stages of the plan is the long term stability of the structure and to maintain the water quality and uses of Deepdell Creek.

11. All measuring, recording, sampling and testing methods employed for the purposes of any of the conditions of this consent shall be such as are acceptable to the Council.

12. Material removed from the impoundment shall be deposited within the site boundaries in a manner and at a location to the approval of the Council.

13. Prior to the expiry or surrender of this consent, the grantee shall update the management plan to the satisfaction of the Council, and shall make provision for its implementation,

and shall seek appropriate resource consents for any ongoing activity that requires such consents under the Resource Management Act 1991.

14. Pursuant to Section 128 of the Resource Management Act 1991, the Council may review the conditions of this consent for any of the purposes stated in that section.

15. Any function ascribed to the Council in any condition of this consent may be performed by an appropriately authorised officer of the Council.

W4148 A water permit to divert tributaries of Deepdell Creek for a term expiring on 1 August 2004, for the purpose of diverting runoff within the Northern Gully Catchment to minimise silt and contamination control requirements in areas disturbed by mining activities.

Legal description of land: Pt Section 14, Block IX, Highlay Survey District. Map reference at and about NZMS260 I42:095364.

Conditions

1. The grantee shall ensure that the area of disturbance within the catchment shall be kept to a minimum.

2. Diversion channels and associated works shall be designed to contain the runoff arising from a storm event having a return period of 1 in 10 years.

3. The grantee shall design, construct and manage the facilities in accordance with best engineering practice.

4. This consent shall be exercised in conjunction with consents 4147 and 4149, and in conformity with a management plan prepared by the grantee to the satisfaction of the Council. The plan shall be submitted to the Council for approval no later than three months following the granting of this consent. The plan shall be reviewed at least annually or at such lesser frequency as the Council may approve. The management plan shall:

   (1) Present projections and intentions for mining operations in relation to the future exercise of this consent.

   (2) Describe the sequencing of works and procedures to be adopted during the construction and the maintenance and management of the facilities.

   (3) Describe measures to be taken so that the objectives and conditions of this consent will be met at all times, and that adverse effects on the environment are minimised.

   (4) Describe precautionary measures that prevent unauthorised discharges or other adverse effects on the environment, and present a contingency plan that will describe how such events will be managed so as to prevent, minimise and redress any adverse effects on the environment.

   The objective to be met at all stages of the plan is the long term stability of the structure and to maintain the water quality and uses of Deepdell Creek.

5. All measuring, recording, sampling and testing methods employed for the purposes of any of the conditions of this consent shall be such as are acceptable to the Council.

6. Prior to the expiry or surrender of this consent, the grantee shall update the management plan to the satisfaction of the Council, and shall make provision for its implementation, and shall seek appropriate resource consents for any ongoing activity that requires such consents under the Resource Management Act 1991.

7. Pursuant to Section 128 of the Resource Management Act 1991, the Council may review the conditions of this consent for any of the purposes stated in that section.

8. Any function ascribed to the Council in any condition of this consent may be performed by an appropriately authorised officer of the Council.

W4149 A discharge permit to discharge 8 cubic metres per second of stormwater into Northern Gully for a term expiring on 1 August 2004, for the purpose of discharging stormwater runoff and intercepted groundwater from the Northern Gully silt pond.

Legal description of land: Pt Section 14, Block IX, Highlay Survey District. Map reference at and about NZMS260 I42:097365.

Conditions

1. The likelihood, frequency and duration of discharge shall be minimised as far as is practicable.

2. The grantee may manually discharge silt pond contents provided that the following conditions are met:

   (a) The maximum rate of discharge does not exceed 0.7 $m^3.s^{-1}$.

   (b) The water flow in Deepdell Creek exceeds 3 $m^3.s^{-1}$.

   (c) The water level in the pond is at or above 402.5 m.

3. The operation of the manual discharge system shall be at under the direct control of the mine manager.

4. The grantee shall install a remote read-out and recording device at the mine site connected to the automatic gauging station at Deepdell Creek, for the purposes of monitoring stream flow, to the satisfaction of the Council.

5. The grantee shall install a staff gauge in the silt pond for the purpose of monitoring the reduced level of the water in the pond, to the satisfaction of the Council.

6. The grantee shall collect a representative sample during each discharge event and analyse it for:

   (i) non-filterable residue
   (ii) turbidity
   (iii) pH
   (iv) conductivity.

7. The grantee shall estimate and record the following during each discharge event

   (i) discharge flow rate
   (ii) pond water level
   (iii) duration of discharge
   (iv) total discharge volume.

8. The grantee shall, at the time when samples are taken pursuant to condition 6, take samples of Deepdell Creek at Golden Point Road, and of Highlay Creek and analyse them for:

   (i) non-filterable residue
   (ii) turbidity

(iii) pH
(iv) conductivity

As far as is practicable, sampling will coincide with the time of greatest likely impact of the discharge.

9. No chemicals or additives shall be used in the Northern Gully catchment unless the Council is satisfied that the nature and quantity of chemicals and additives are such that there will not be an adverse effect on the environment. Such approval must be in writing and may be conditional.

10. All measuring, recording, sampling and testing methods employed for the purposes of any of the conditions of this consent shall be such as are acceptable to the Council.

11. All monitoring data shall be made available to the Council on request.

12. This consent shall be exercised in conjunction with consents 4147 and 4148, and in conformity with a management plan prepared by the grantee to the satisfaction of the Council. The plan shall be submitted to the Council for approval no later than three months following the granting of this consent. The plan shall be reviewed at least annually or at such lesser frequency as the Council may approve. The management plan shall:

    (1) Present projections and intentions for mining operations in relation to the future exercise of this consent.

    (2) Describe the sequencing of works and procedures to be adopted during the construction and the maintenance and management of the facilities.

    (3) Describe measures to be taken so that the objectives and conditions of this consent will be met at all times, and that adverse effects on the environment are minimised.

    (4) Describe precautionary measures that prevent unauthorised discharges or other adverse effects on the environment, and present a contingency plan that will describe how such events will be managed so as to prevent, minimise and redress any adverse effects on the environment.

    The objective to be met at all stages of the plan is the long term stability of the structure and to maintain the water quality and uses of Deepdell Creek.

13. Prior to the expiry or surrender of this consent, the grantee shall update the management plan to the satisfaction of the Council, and shall make provision for its implementation, and shall seek appropriate resource consents for any ongoing activity that requires such consents under the Resource Management Act 1991.

14. Pursuant to Section 128 of the Resource Management Act 1991, the Council may review the conditions of this consent for any of the purposes stated in that section.

15. Any function ascribed to the Council in any condition of this consent may be performed by an appropriately authorised officer of the Council.

II. That the Councils costs and expenses in processing these applications be recovered from the applicant.

This decision is subject to a statutory right of appeal to the Planning Tribunal, which must be lodged with the Tribunal and served on the Council within 15 working days of receipt of this letter. With respect to costs Section 357(3) provides for right of objection to the Council. In the absence of any appeal or objection, a formal consent permit(s) will be issued following the expiry of this period, together with an invoice for the Council's costs

This letter is a formal notification of the Council's decision under the above Act.

Yours faithfully,

R.W. Scott
Director Corporate Services

aaj pe.wr

Waitaki District Council
10 Eden Street, Oamaru · Private Bag 50058 · Phone (03) 434 8080 · Fax (03) 434 8442

FILE REF 12/136

ENQUIRIES TO Mr Harwood/Miss Binmore

24 November 1992

Simpson Grierson Butler White
Private Bag
Wellesley Street
Post Office
AUCKLAND

Attention: R A Fisher

RE: APPLICATION FOR RESOURCE CONSENT: MACRAES MINING COMPANY LTD

This application sought land use consent to establish a waste rock stack over an area of approximately 50 hectares over approximately two years, the rehabilitation of the area to permit pastoral farming as appropriate and subject to establishing re-establishment of vegetative cover on part section 14 Block IX, Highlay survey district being part of MPA 41-064 (SD 23739) Part CT 12C/562.

There were no submissions received.

A joint hearing with the Otago Regional Council was not considered necessary because discussions were held with the applicant company and set of conditions agreed to.

The application was considered by Council at a hearing on 10 November 1992. The proposal was considered as a non-complying activity under the Resource Management Act 1991.

Pursuant to Sections 104, 105 and 108 of the Resource Management Act 1991 the Waitaki District Council grants it's consent to establish a waste rock stack over an area of approximately 50 hectares over approximately two years, the rehabilitation of area to permit pastoral farming as appropriate and subject to establishing re-establishment of vegetative cover on Part section 14 Block IX, Highlay survey district being part of MPA 41-064 (SD 23739) Part CT12C/562 subject to the following conditions:-

All equipment and machinery shall be regularly maintained to ensure noise levels as low as reasonably attainable but at no time shall they exceed the levels permitted in this licence.

Road Construction

During the construction of roading for the project:

The noise levels shall be measured in accordance with the requirements of New Zealand Standard, NZS 6901:1991 Measurement of Sound and assessed in accordance with New Zealand Standard, NZS 6802P The Measurement and Assessment of Noise from Construction, Maintenance and Demolition Work.

The noise levels shall comply with the recommended upper limits for levels of construction work noise received in residential areas listed in NZS 6803P.

The noise shall be measured with a sound level meter complying at least with the International Standard IEC 651 - Sound Level Metre Type 1.

All equipment and machinery shall be regularly maintained to ensure noise levels as low as reasonably attainable but at no time shall they exceed the levels permitted in this consent.

4. Dust

Dust nuisance during waste rock stack formation, and ancillary activities, shall be minimised by the use of mobile and fixed plant including water carts and irrigation sprays and also by minimising the areas stripped of topsoil at any one time. Furthermore, condition 7(e) of the existing mining license (C32/3047) relating to background monioring of dust levels shally apply.

5. Buildings

That any buildings or site works construction will require consent under the Buildings Act 1991.

6. Work Programme

The evnisaged work programme for the Waste Rock Stack will be submitted as part of the annual work programme submitted as part of license C32/3047.

Please note that pursuant to Section 120 of the Resource Management Act 1991, you may, within 15 working days of receiving notification of this decision, appeal to the Planning Tribunal against the whole or any part of the Council's decision.

Your attention is drawn to Section 116 of the Resource Management Act 1991 which provides that any resource consent, which has been granted shall, unless stated otherwise, commence either, when the time for lodging appeals expires and no appeals have been lodged, or when the Planning Tribunal determines the appeals or all appeals are withdrawn.

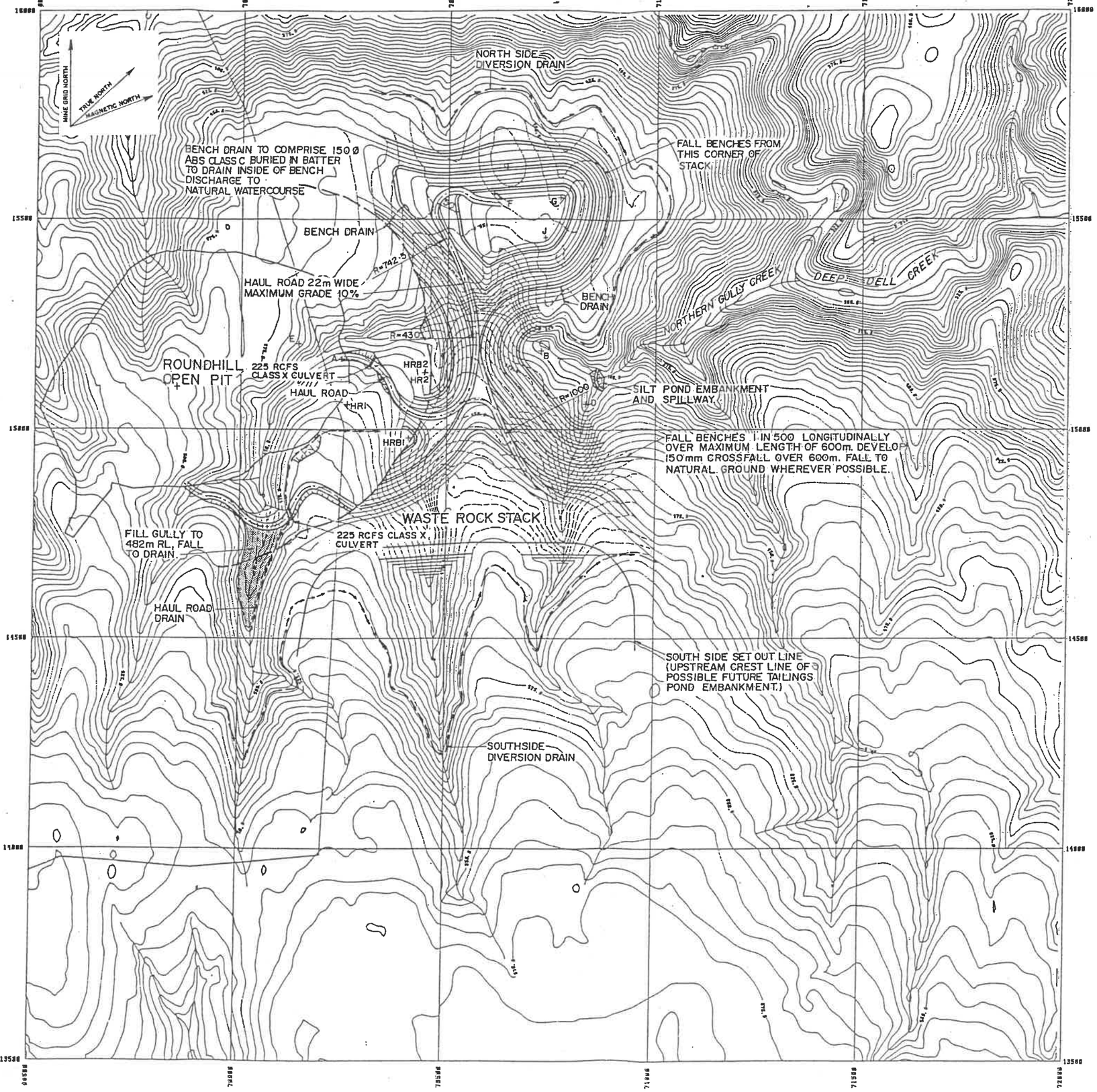
Your attention is also drawn to Section 125 of the Resource Management Act 1991 which provides that a resource consent that is not given effect to shall lapse on the expiry of 2 years after the commencement of the consent or such shorter or longer period provided for in the consent; unless the Council agrees to a longer period upon an application made up to 3 months after the expiry date.

Yours faithfully
D T R Harwood
PLANNING OFFICER

H A Binmore

Per: H E Binmore
ASSISTANT PLANNING OFFICER

c.c. Davie, Lovell-Smith & Partners Attention: K McCracken
Valuation NZ PO Box 215, Dunedin
Otago Regional Council, Private Bag Dunedin
Director Regulatory Services
Manager Technical Services
Environmental Health Officer
Senior Rates Clerk
Building Inspector
Technical Officer of Roading
Waihemo Community Board, c/- R Mabon Waitaki District Council
H A Muldrew, Postal Delivery Centre, Hampden
Property File: 26381/006/00



No.	DETAILS	DATE

REVISIONS

APPROVED FOR ISSUE

Woodward-Clyde

CLIENT

MACRAES MINING COMPANY LIMITED

PROJECT

MACRAES FLAT GOLD PROJECT

TITLE

NORTHERN GULLY WASTE ROCK STACK

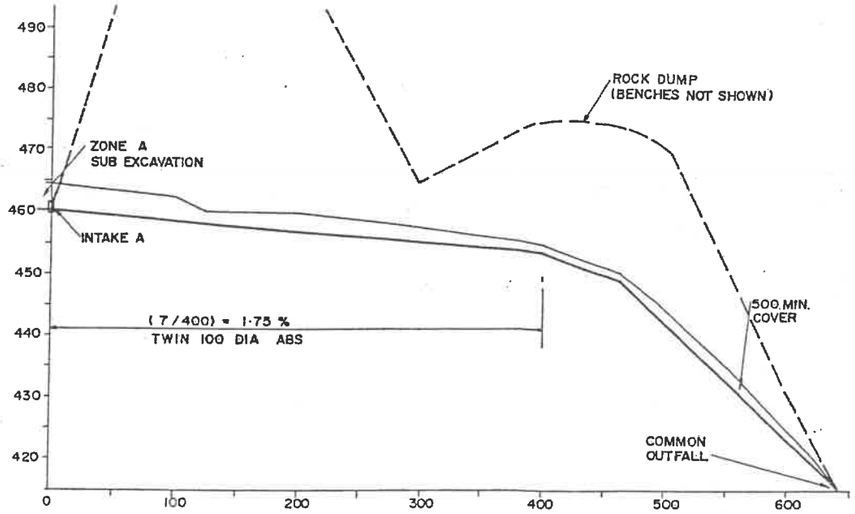
GENERAL ARRANGEMENT

ORIGINAL SCALE

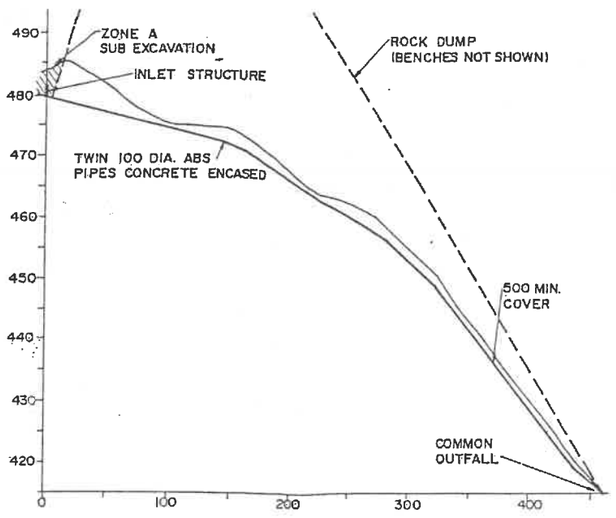
1:5000

DATE	PROJECT No.	SHEET No.
NOV. 1992	221.91	NGRD

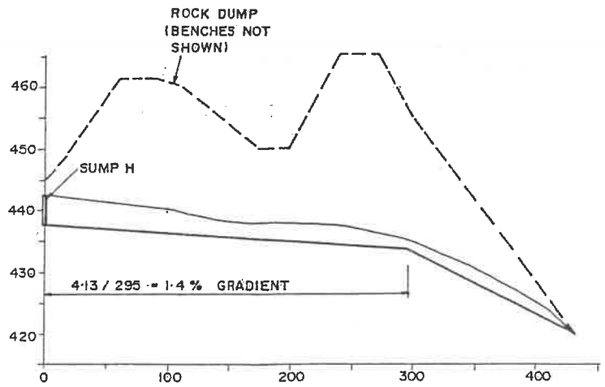
REVISION



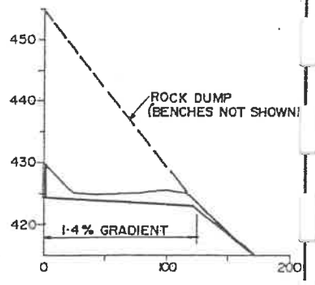
WEST ARM COLLECTOR DRAIN
1:2500 H
1:500 V



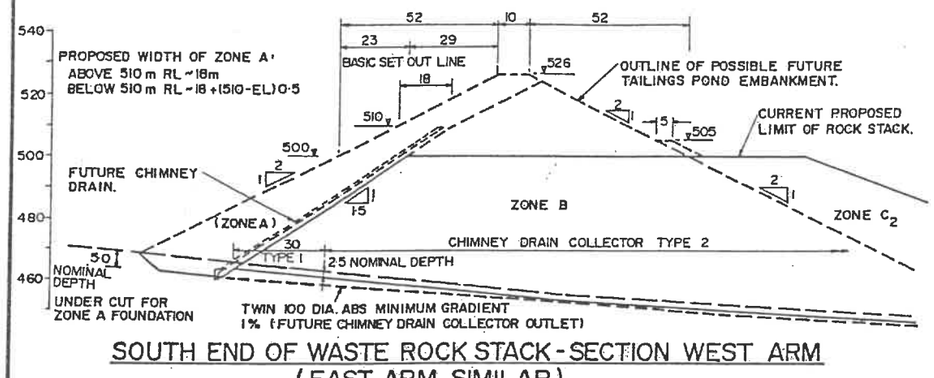
EAST ARM COLLECTOR DRAIN
1:2500 H
1:500 V



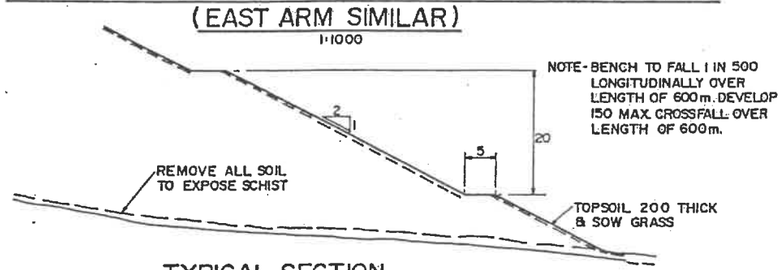
SUMP H OUTFALL PIPE
1:2500 H
1:500 V



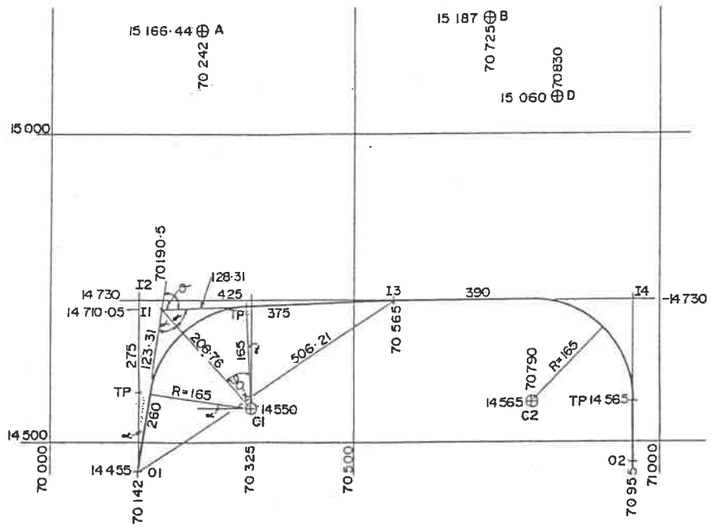
SUMP I OUTFALL PIPE
1:2500 H
1:500 V



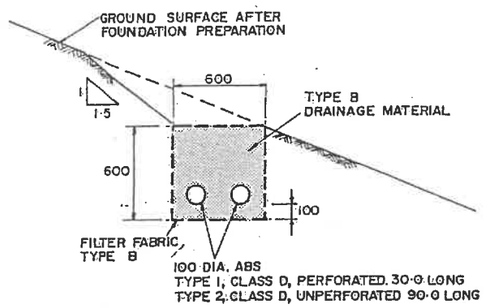
SOUTH END OF WASTE ROCK STACK - SECTION WEST ARM (EAST ARM SIMILAR)
1:1000



TYPICAL SECTION
1:500

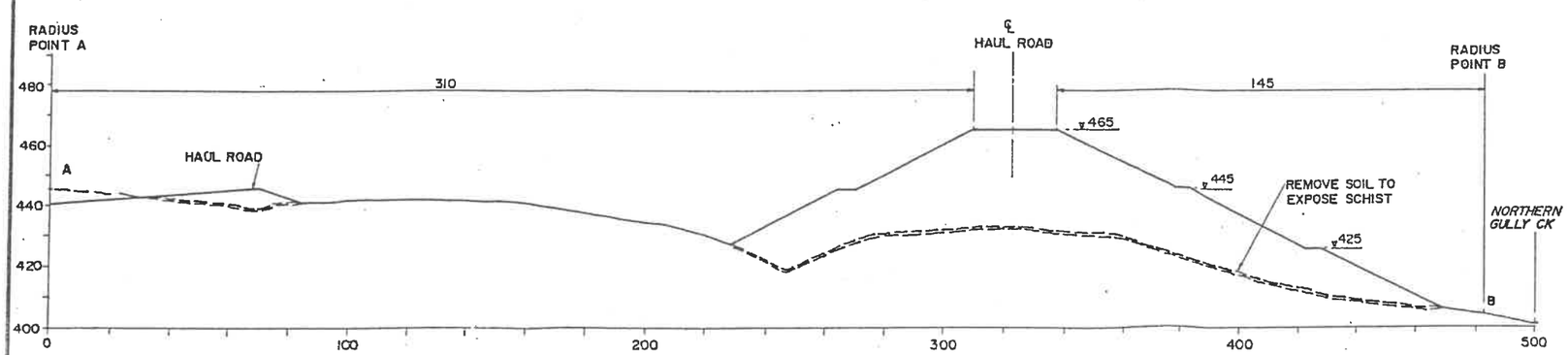


SOUTH END SET OUT DETAILS
1:5000

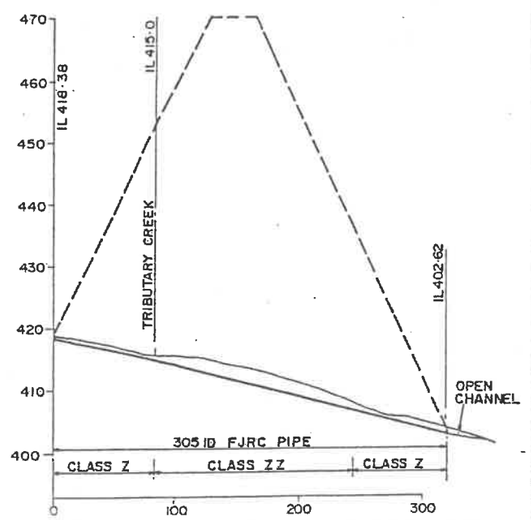


NOTE - CHIMNEY DRAIN COLLECTOR GRADIENT 1 IN 100

CHIMNEY DRAIN COLLECTOR DETAIL
1:20



SECTION A-B
1:100



NORTHERN GULLY CULVERT LONGITUDINAL SECTION
1:500 H 1:500 V

No.	DETAILS	DATE
	REVISIONS	

APPROVED FOR ISSUE

Woodward-Clyde

CLIENT
MACRAES MINING COMPANY LIMITED

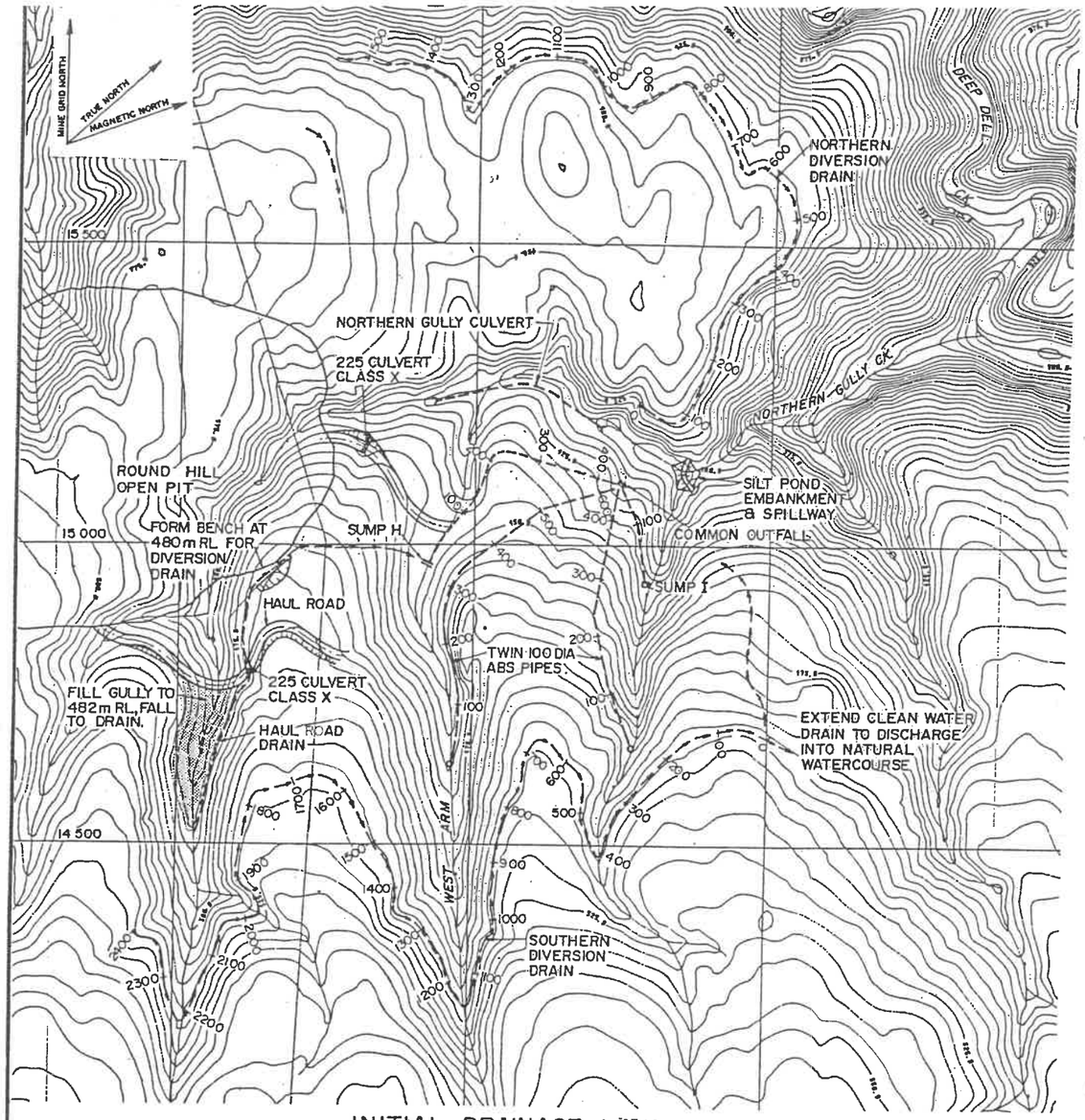
PROJECT
MACRAES FLAT GOLD PROJECT

TITLE
NORTHERN GULLY WASTE ROCK STACK
MISCELLANOUS DRAINAGE DETAILS

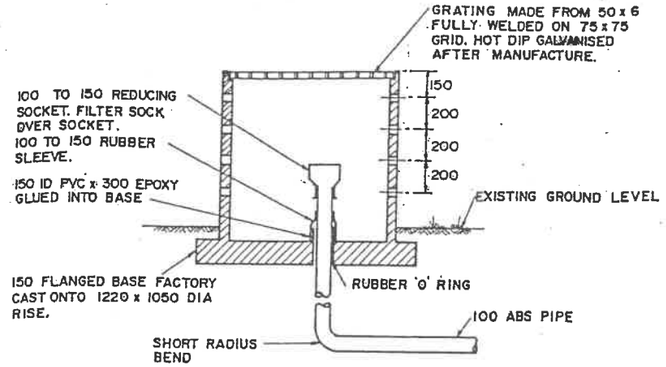
ORIGINAL SCALE
AS SHOWN

DATE	PROJECT No.	SHEET No.
NOV. 1992	221.91	NGRD 4

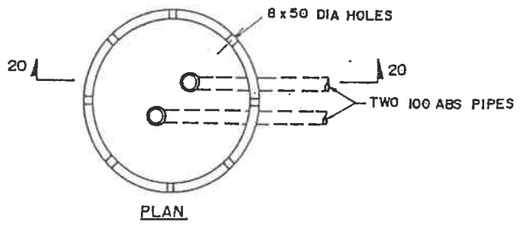
REVISION



INITIAL DRAINAGE LAYOUT
1:5000

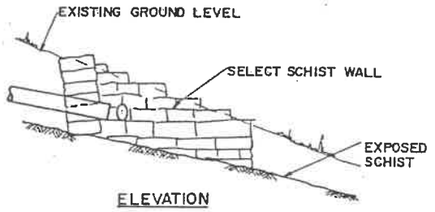


SECTION 20-20

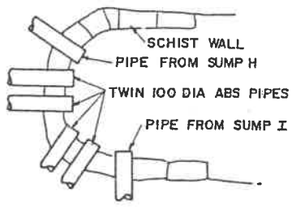


PLAN

SOUTHSIDE INLET STRUCTURE - (2 OFF)
1:20

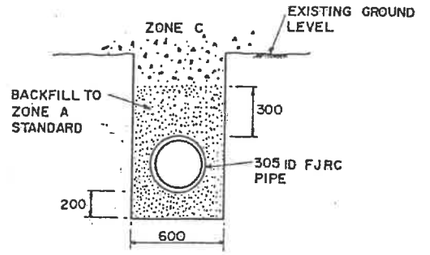


ELEVATION



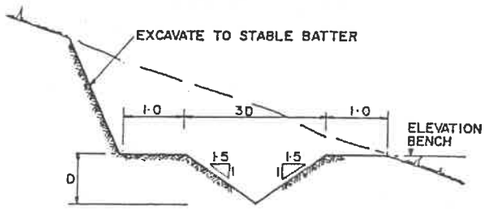
PLAN

COMMON OUTFALL
1:250



NOTE PIPE AND ZONE A BACKFILL MUST BE CONTAINED ENTIRELY WITHIN A TRENCH EXCAVATED IN ORIGINAL GROUND.

CULVERT BEDDING DETAIL
1:20



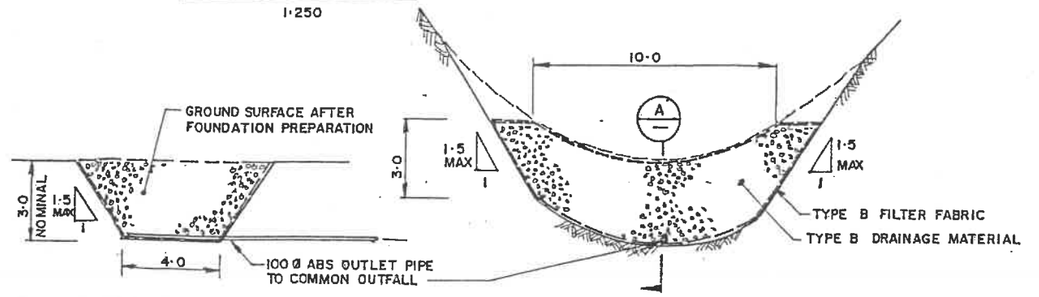
DIVERSION DRAIN
1:50

NOTE - NORTHERN DIVERSION DRAIN
D = 650 mm GRADIENT = 1·0 %

SOUTHERN DIVERSION DRAIN D VARIES.

DISTANCE	ELEVATION OF BENCH	DEPTH D (m)
0	501	1·30
200	503	1·25
400	505	1·20
600	507	1·15
800	509	1·10
1000	511	1·05
1200	513	1·00
1400	515	0·95
1600	517	0·90
1800	519	0·85
2000	521	0·80
2200	523	0·75
2400	525	0·70

HAUL ROAD DRAIN D = 300mm
GRADIENT = 1·0 %



A CROSS-SECTION SUMP H & I
1:125

ELEVATION SUMPS H & I
1:125

No.	DETAILS	DATE
REVISIONS		

APPROVED FOR ISSUE

Woodward-Clyde

CLIENT
MACRAES MINING COMPANY LIMITED

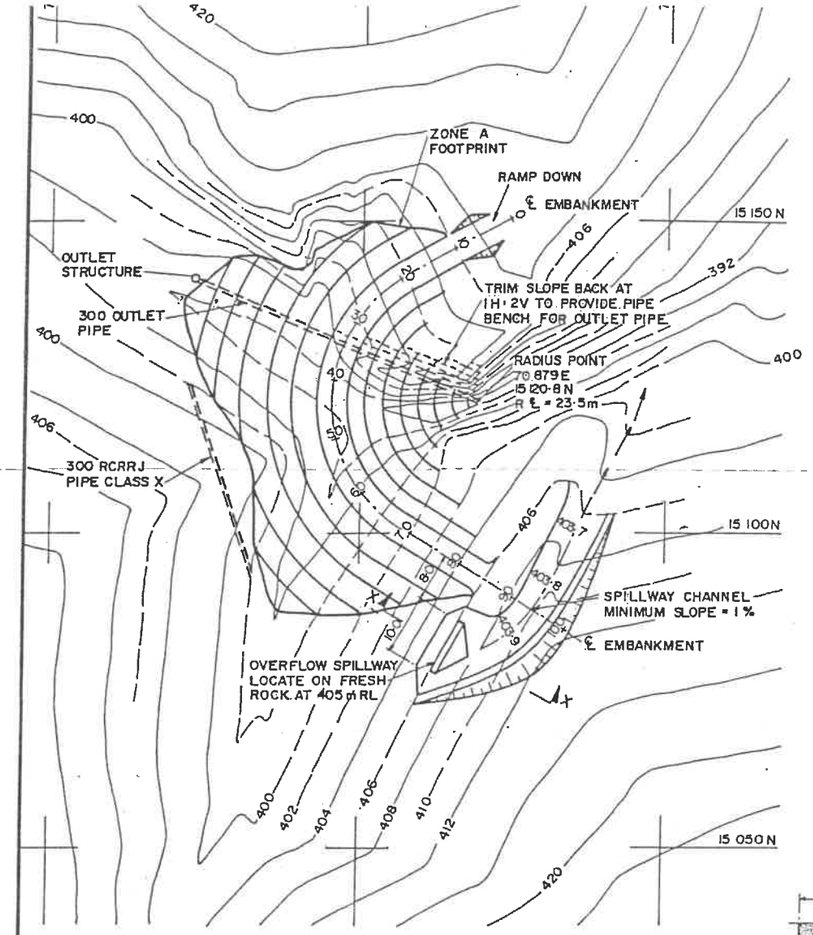
PROJECT
MACRAES FLAT GOLD PROJECT

TITLE
NORTHERN GULLY WASTE ROCK STACK
INITIAL DRAINAGE LAYOUT

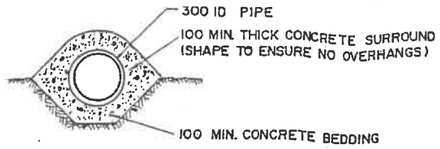
ORIGINAL SCALE AS SHOWN

DATE	PROJECT No.	SHEET No.
NOV. 1992	221.91	NGRD 2

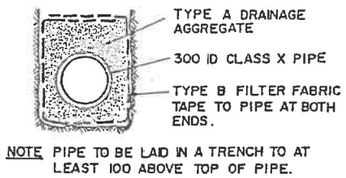
REVISION -



SILT RETENTION POND EMBANKMENT
1:500

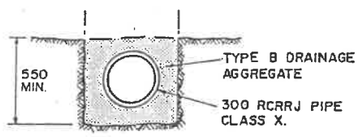


SECTION 1-1
1:20

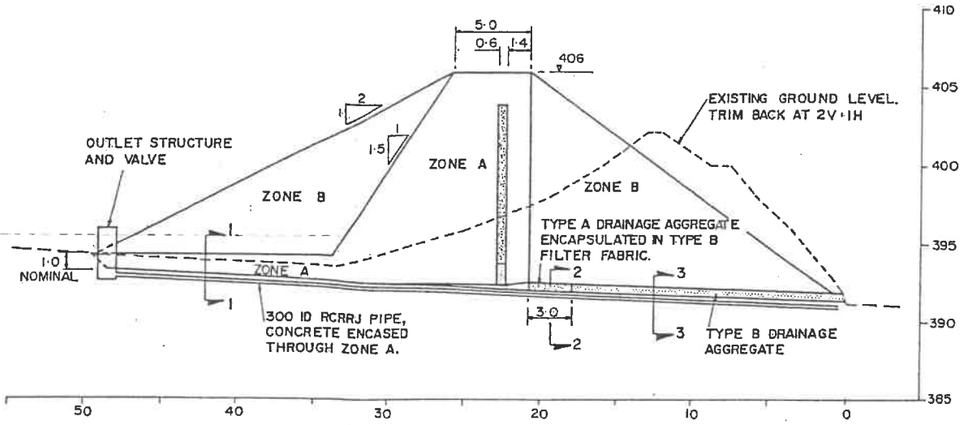


NOTE PIPE TO BE LAID IN A TRENCH TO AT LEAST 100 ABOVE TOP OF PIPE.

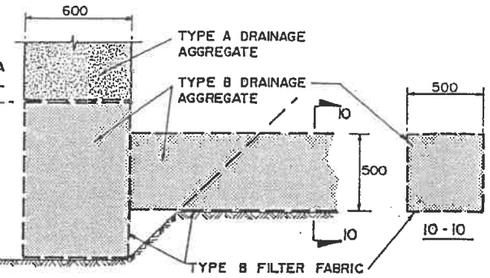
SECTION 2-2
1:20



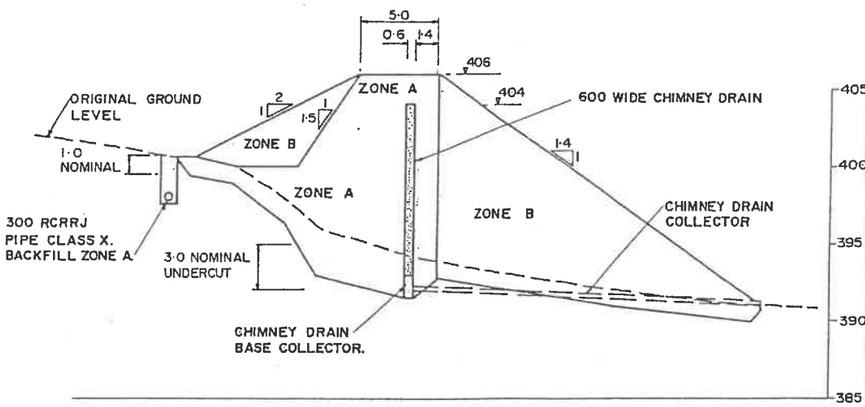
SECTION 3-3
1:20



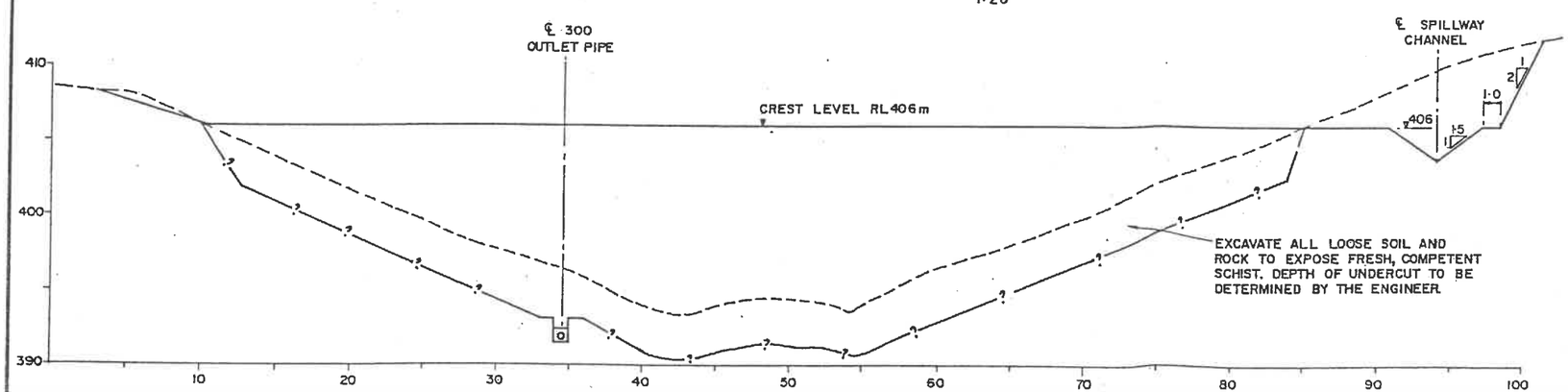
SECTION ON ℄ OUTLET PIPE (TYPICAL)
1:200



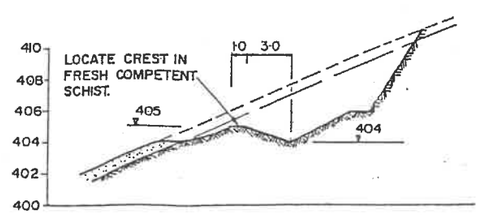
CHIMNEY DRAIN BASE COLLECTOR
1:20



SECTION 50
1:200



LONGITUDINAL SECTION ON ℄ EMBANKMENT
1:200



OVERFLOW SPILLWAY - SECTION X-X
1:200

DECIDED ON SITE BY THE ENGINEER.

No.	DETAILS	DATE
	REVISIONS	

APPROVED FOR ISSUE

Woodward-Clyde

CLIENT
MACRAES MINING COMPANY LIMITED

PROJECT
MACRAES FLAT GOLD PROJECT

TITLE
NORTHERN GULLY WASTE ROCK STACK
SILT RETENTION POND EMBANKMENT DETAILS

ORIGINAL SCALE
AS SHOWN

DATE	PROJECT No.	SHEET No.
NOV. 1992	221.91	NGRD 3

REVISION