153001

RESTRICTED FILE

A GUIDE TO RE-ACCESS OF THE DOLPHIN MINE

KING ISLAND

by

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ISG REFER REPORT 70-0676

153002

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1. INTRODUCTION

This report is a brief guide to the pre-existing conditions prior to the closure of the Dolphin Mine in 1990 and a recommended course of action with respect to precautions to be taken when dewatering, the stability of the ground and bulkheads and a recommended approach for early extraction of ore.

Prior to closure the Dolphin Mine generally mined ore utilising the Cut and Fill method of extraction. The Fill used was classified mill tailings which was deposited in 4 metre vertical layers, each layer was subsequently compacted, as machinery worked on it to extract the next "cut" of ore, prior to the deposition of the next 4 metre Fill layer. As a result the bulkheads, where used, were designed to withstand up to a maximum of 14 metres head of saturated tailings only. This proved satisfactory during the mine life with no major bulkhead failures recorded. Some of the bulkheads were built on a concrete "raft" base on the sandfill.

With the flooding of the mine there is a medium to high probability that the water/mobilised tail head on some of the bulkheads could cause failure if the dewatering process is not rigidly controlled.

Some of the bulkheads had waste rock plugs/barricades placed against them prior to flooding at the recommendation of Barrett & Fuller however it is unlikely such barricades would have any impact in the event of a bulkhead failure and their presence should not be viewed as an insurance.

The only safe way of dewatering the mine will be with a rigidly controlled and monitored program of water level reduction.

A series of 1:1000 plans accompanying this report defines:-

1. Areas of Poor Ground Conditions.
2. Bulkhead locations and maximum head of water.
3. Potential Water Traps.

2. PUMPING SYSTEM PRIOR TO CLOSURE IN NOVEMBER 1990

a. UNDERGROUND

Prior to closure water was pumped from the bottom of the mine to the water settling dams in seven stages comprising a Flygt pump at the bottom of the mine and six fixed pump stations pumping in relay. The pumps utilised in the fixed stations were generally two Warman 4/3 HH or Warman 3/2 CAH pumps with one operational and one standby pump. The pump system had a fully installed capacity of approximately 70 litres per second. Mine inflow was in the vicinity of 23 litres per second composed of 14 litres per second natural water and 9 litres per second mining related water.

The waste water was allowed to pass through a surface settling dam prior to re-use in the sandfilling process.

Water from outlying underground areas was either directed to the fixed pumps via six inch boreholes or pumped using small submersible Flygt pumps.

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a. Underground (Cont'd)

Water from hydraulic sandfilling was directed to the pumps via the installed drainage tower system within the sandfilled stopes or by pumping decanted water from the stope, the latter water was generally loaded with slimes.

b) SURFACE PUMPING SYSTEM

Because of the large catchment of the Open Cut it was necessary to have a high capacity, relatively clean water pump system, for the Open Cut.

Two permanent fixed pump stations each utilising two 8J18 Morris Pumps at each location were installed with a maximum capacity of 260 litres per second at each fixed pump station.

Water from the Open Pit Sump was fed to the lower fixed station utilising BS2151 Flygt Pumps. Generally only two Flygt pumps were required for normal duties however in heavy downpour conditions up to eight such flygt pumps could be run.

At the head used the Flygt pumps had an installed capacity of 35 litres per second for each unit.

No reliable statistics exist for average or annual pumping rates of clean (non-mine) water from the Open Cut although considerable scope exists for reduction of the inflow by simple surface water redirection at a low cost in relation to pumping.

3. MINE DEWATERING

Three major potential hazards directly associated with dewatering the mine could exist.

1. The effects of the removal of the hydrostatic load from old exposures, stope backs and in discontinuities.

2. Uneven dewatering of development and filled stopes could lead to high pressure heads on low strength bulkheads.

3. Water entrapped in vertical columns e.g. rises could be suddenly released as the differential head at the point of blockage overcomes the blocking resistance.

By applying controlled lowering of water levels and monitoring the drawdown occurring in the filled stopes (working to a maximum allowable vertical differential of 5 metres) no major bulkhead failure would be likely to follow.

Water in rises would have to be monitored in a similar manner to ensure no high head of water built-up as the rest of the mine was dewatered. Water might need to be separately pumped from such areas.

3. Mine Dewatering (Cont'd)

With controlled rates of drawdown the effects of the removal of the hydrostatic loading would be minimised however to assume that the removal of a hydrostatic load of 2.63 MPa, for example, at the L.Wedge 260 Stope would have no effect at all might be unwise. In general one would expect the loss of the load to allow many localised gravity controlled failures to take place whilst the regional impact might take the form of resettlement along major discontinuities.

4. POTENTIAL HAZARDOUS AREAS

a) STOPING AREAS

1. Lower Wedge

Between 1980-3 an attempt was made to Open Stope in the L.Wedge Orebody between -200 and -280 m R.L. All of the development on -200, -220, -240, -260 and -280 m R.L. was prepared for subsequent open stoping. In 1983 the W62 Open Stope collapsed and subsequently filled with caved material. As a result of the cave the area was generally destabilised and no further attempt was made to extract ore until 1986.

When mining was recommenced in 1986 using Post Pillar Cut and Fill with moderate success, some difficulties were experienced due to the destabilised ground and the presence of the previous development in advance of the Cut and Fill faces. The most severely affected region was the Lower Wedge -200 m R.L. which is also the only area not currently fully cablebolted, this area would need to be rehabilitated and cablebolted before extraction of the remaining ore between the -220m R.L. stope face and -200 m development could take place.

All other stoping areas are well supported and, at the time of flooding, filled or in good condition.

b) MAIN DECLINE

Poor ground conditions exist at a number of places in the Main Decline most particularly at:-

I. Main Decline 240 Sub-station.
II. Between Q11 -235m R.L. and L. Wedge -240 m R.L.
III. -150m R.L.
IV. Above M18 pump station.
V. Above N13 cross-cut.

All of these areas will deteriorate and may well collapse on dewatering or before.

I would anticipate access could be satisfactorily restored as far as the -235m R.L. Q11 but that a by-pass to the Southern Swan area will be required to establish long term access to the lower mine.

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b) Main Decline (Cont'd)

A short term access in ore was commenced from the L.Wedge -240m R.L. to the L.Wedge -260m R.L. just prior to closure. This could be used as a temporary lower mine access provided the Main Decline can be re-established to the Lower Wedge -240m R.L.

The major causes of Decline set loss would be:-

I. Rotting of timbers.
II. Poor installation of original set lining.

5. RECOMMENDED AREAS FOR INITIAL EXTRACTION

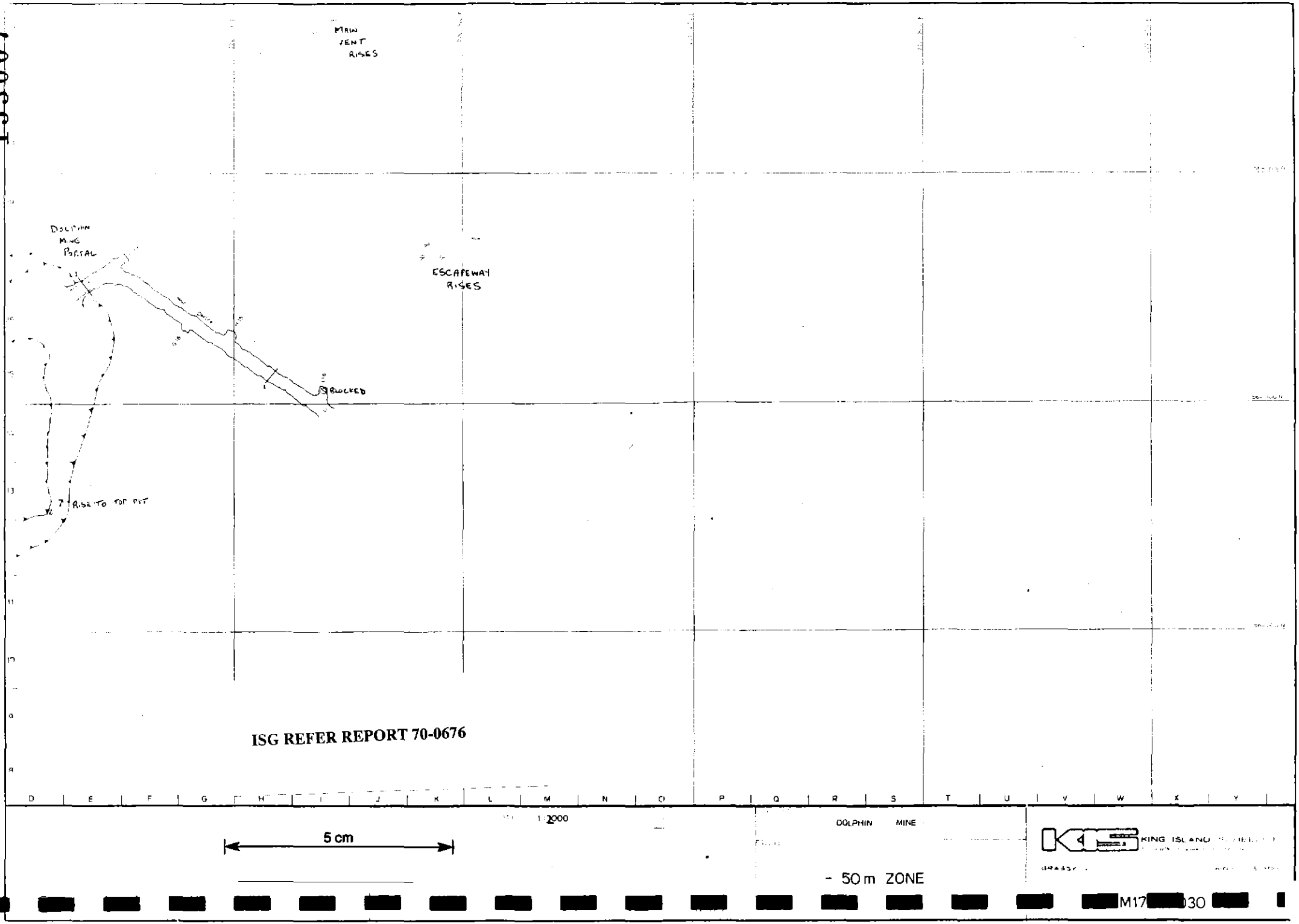
The first area of bulk ore at high grade to be exposed will be the Mid Wedge -150m R.L. Stope where normal mining could commence in high grade garnet hornfels immediately access has been re-established.

The next key area to be exposed would be the Mid Central/Mid Pit/Lower Pit Stope area which is also a high grade good ground quality mining area.

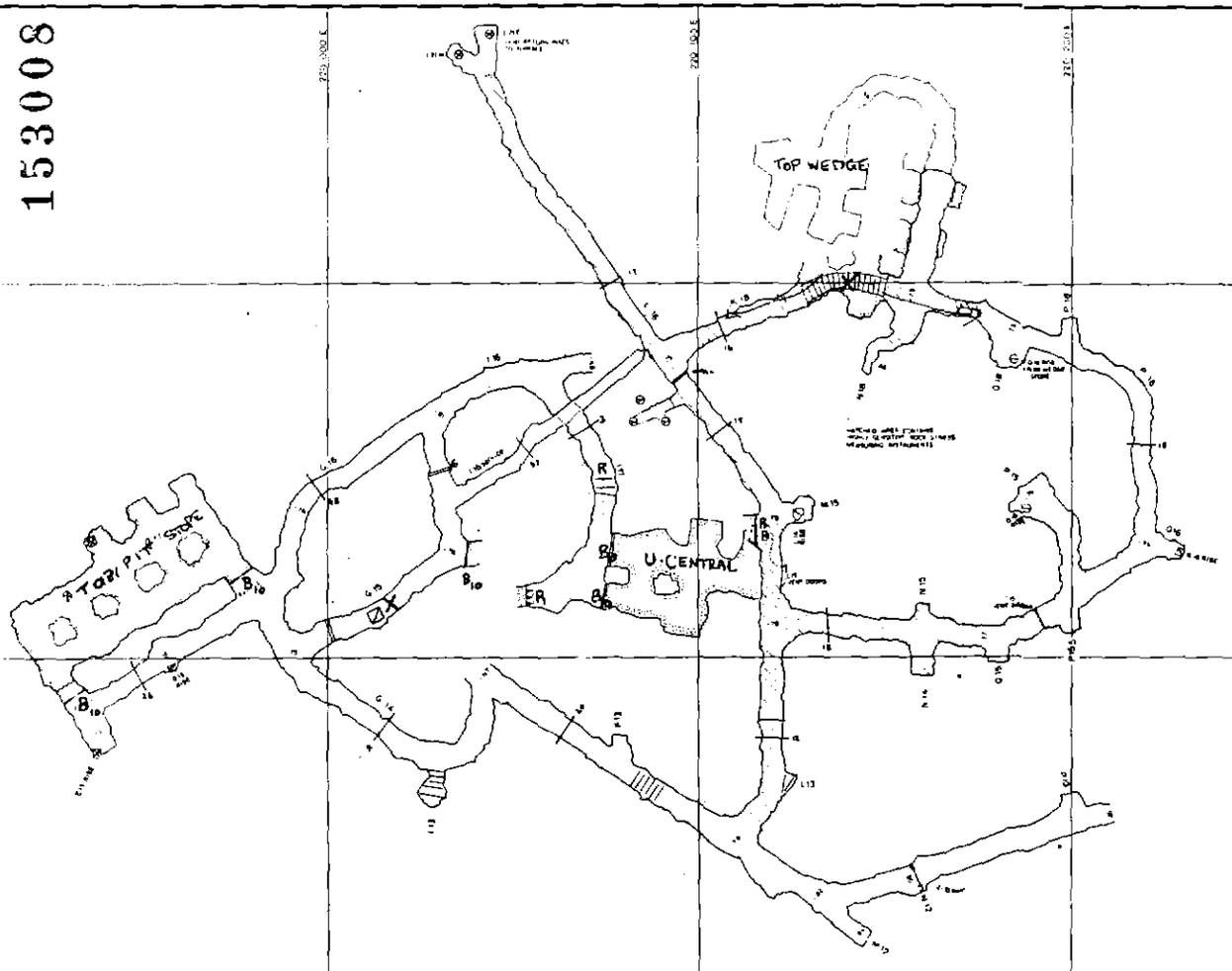
Some filling of the Lower-Mid Pit would be required prior to extraction however the Mid Central portion could be mined whilst this was in progress.

The two other major high grade production stopes are below the Decline collapse but could be accessed quickly through the L.Wedge 240-260 access ramp which could be mined within a month of dewatering the face.

153007


MAIN
VENT
RISES
DOLPHIN
MINE
PORTAL
ESCAPEWAY
RISES
BLOCKED
RISE TO TOP PIT
ISG REFER REPORT 70-0676
D E F G H I J K L M N O P Q R S T U V W X Y
1:2000
5 cm
DOLPHIN MINE
KING ISLAND
- 50 m ZONE
M17 030

153008



ISG REFER REPORT 70-0676

5 cm

SCALE 1:1000

B_{10} = BULKHEAD (x = HEAD)
R - ROCK BARRICADE
X - POOR GROUND CONDITIONS

DOLPHIN MINE

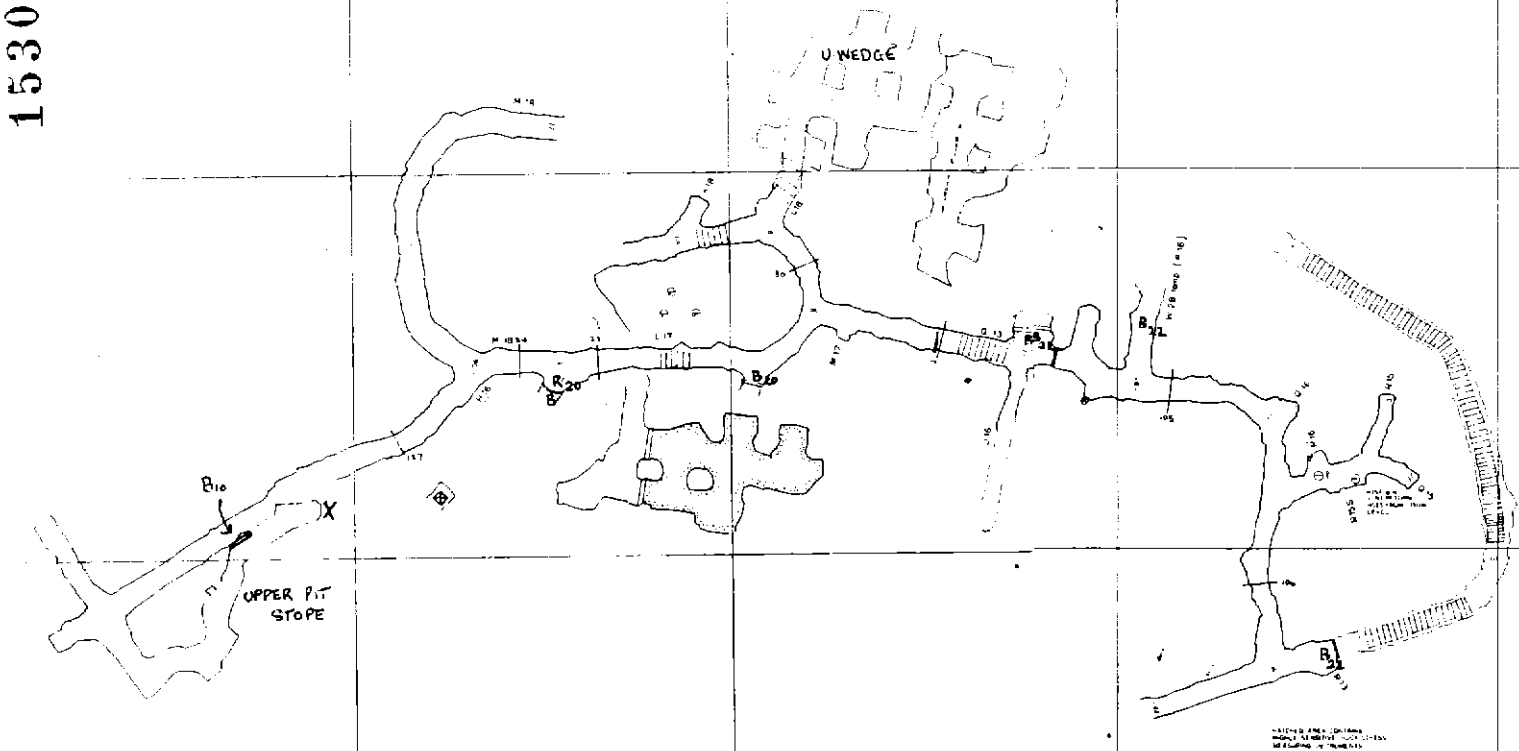
- 75 m ZONE

KING ISLAND

GRASSY

04DM17 - 2031

153009



ISG REFER REPORT 70-0676

D E F G H I J K L M N O P Q R S T U V W X Y

5 cm

SCALE 1:2000

X - POOR GROUND CONDITIONS

R - ROCK BARRICADE

B_{10} BULKHEAD

DOLPHIN MINE

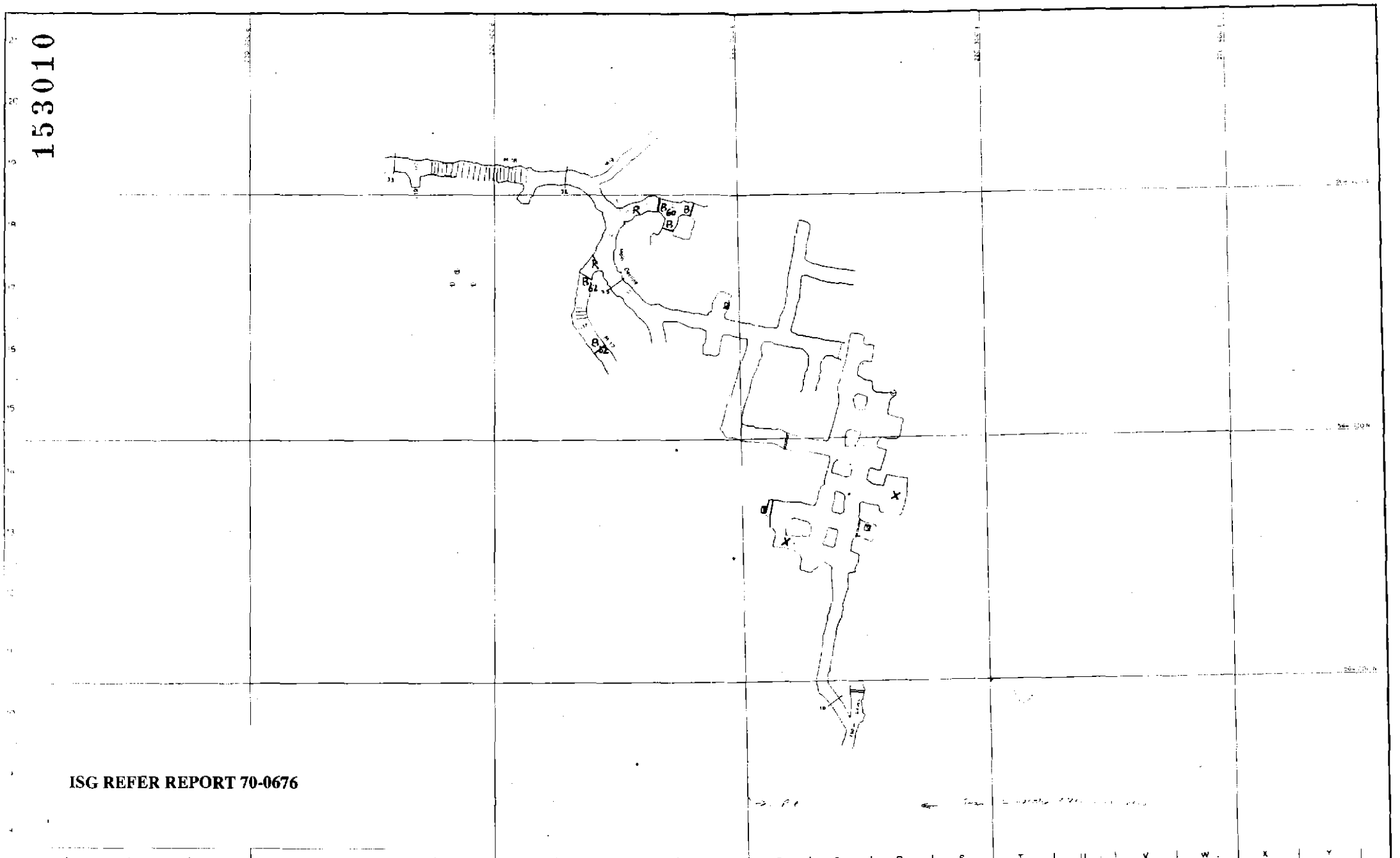
-100m ZONE

KCGS MINE ISLAND

GRASSY

04DM17 - 2032

153010



ISG REFER REPORT 70-0676

D E F G H I J K L M N O P Q R S T U V W X Y

5 cm

SCALE 1:2000

R- ROCK BARRICADE
B- BULKHEAD
X- POOR GROUND CONDITIONS

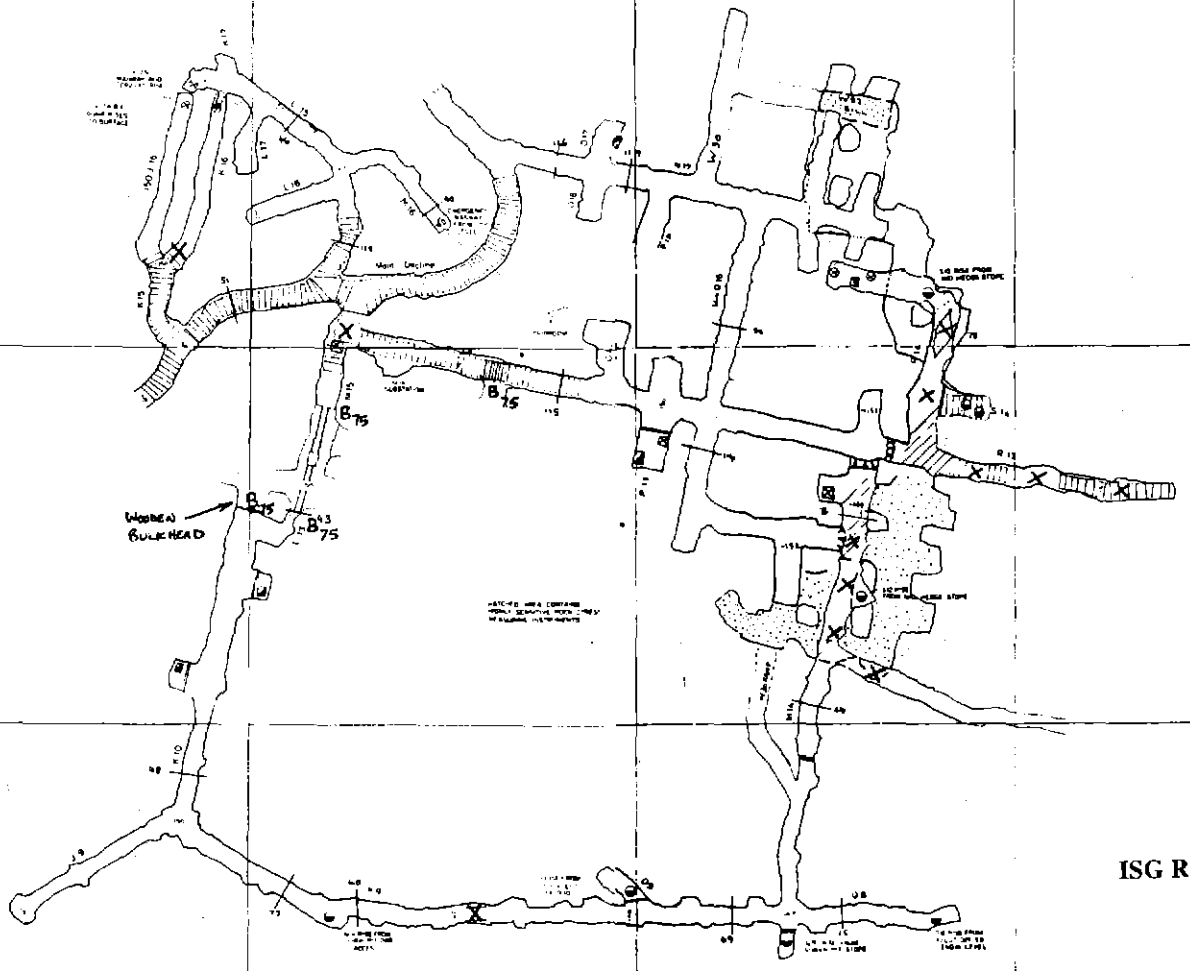
DOLPHIN MINE

- 125 m ZONE

KING ISLAND

04DM17 - 2033

153011



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5 cm

SCALE 1:2000

R- ROCK BARRICADE
B- BULKHEAD
X- POOR GROUND CONDITION

DOLPHIN MINE

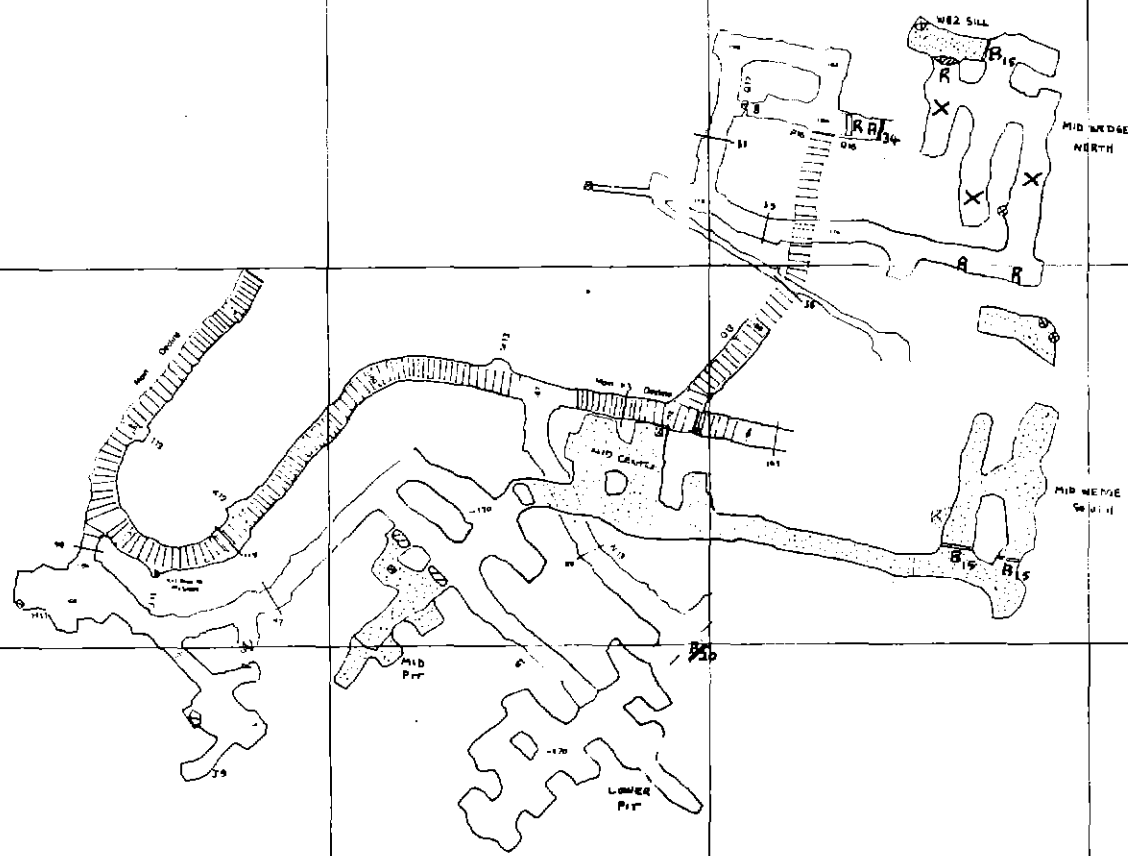
- 150m ZONE

KING ISLAND

GRASSY

04DM17 - 2034

153012



B- BULKHEAD

R- ROCK BARRICADE

X - POOR GROUND CONDITIONS.

5 cm

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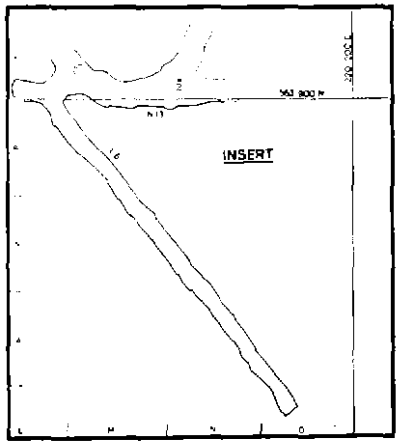
DOLPHIN MINE

1:2000

-175 m ZONE

04DM17 - 2035

153013



THIS AREA WILL REMAIN FULL OF WATER

5 cm

PIT DAG OPEN STOPE

RISE MAY HOLD WATER

LOWER PIT (FILLED)

L. WEDGE 200 (V. POOR GROUND)

B - BULKHEAD

R - ROCK BARRICADE

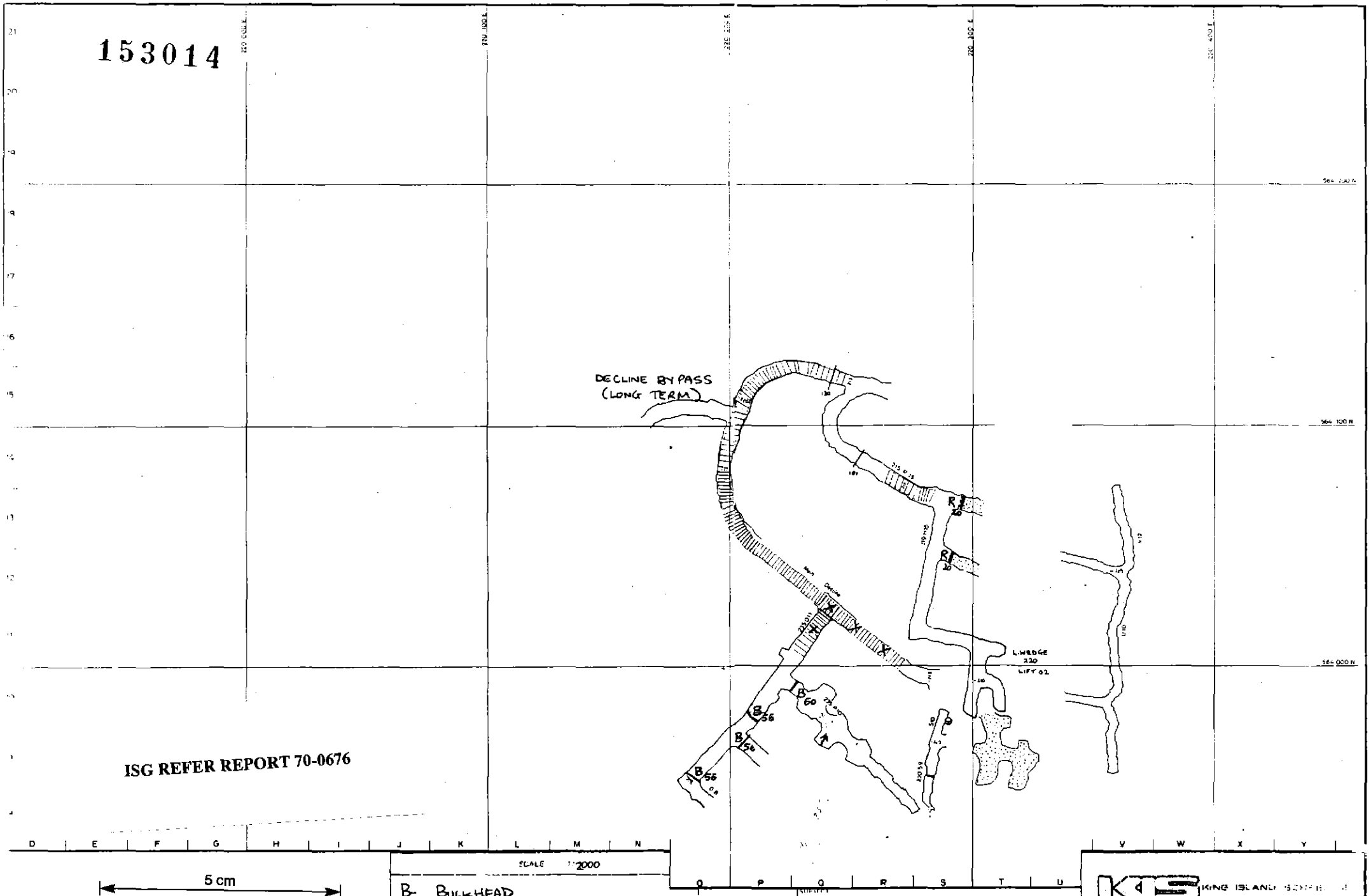
X - POOR GROUND CONDITIONS

1 : 2000

KING ISLAND SCH

ISG REFER REPORT 70-0676

153014



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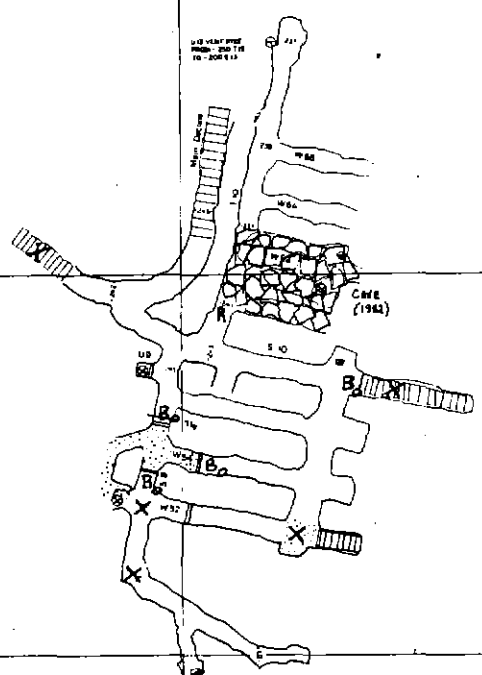
04PM17 2037

153015

ISG REFER REPORT 70-0676



5 cm

SCALE 1:1000

B- BULKHEAD
B- ROCK BARRICADE
X- POOR GROUND

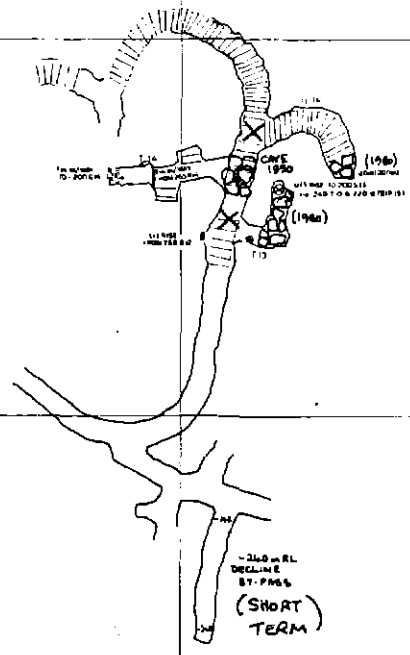
DOLPHIN MINE

-240 m ZONE

KING ISLAND SCHEELITE

KING ISLAND

153016



ISG REFER REPORT 70-0676

5 cm

B- BULKHEAD
R- ROCK BARRICADE
X - POOR GROUND

DOLPHIN MINE

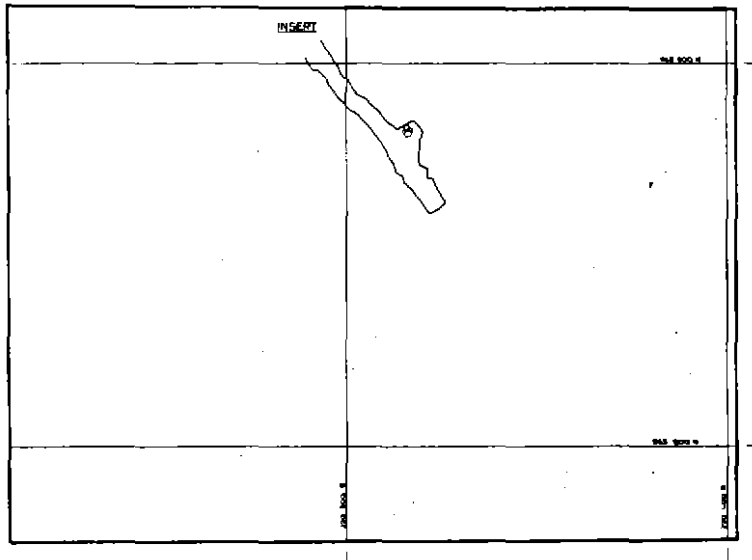
- 250 m ZONE

KIS KING ISLAND SCHEELITE

GRASSY KING ISLAND

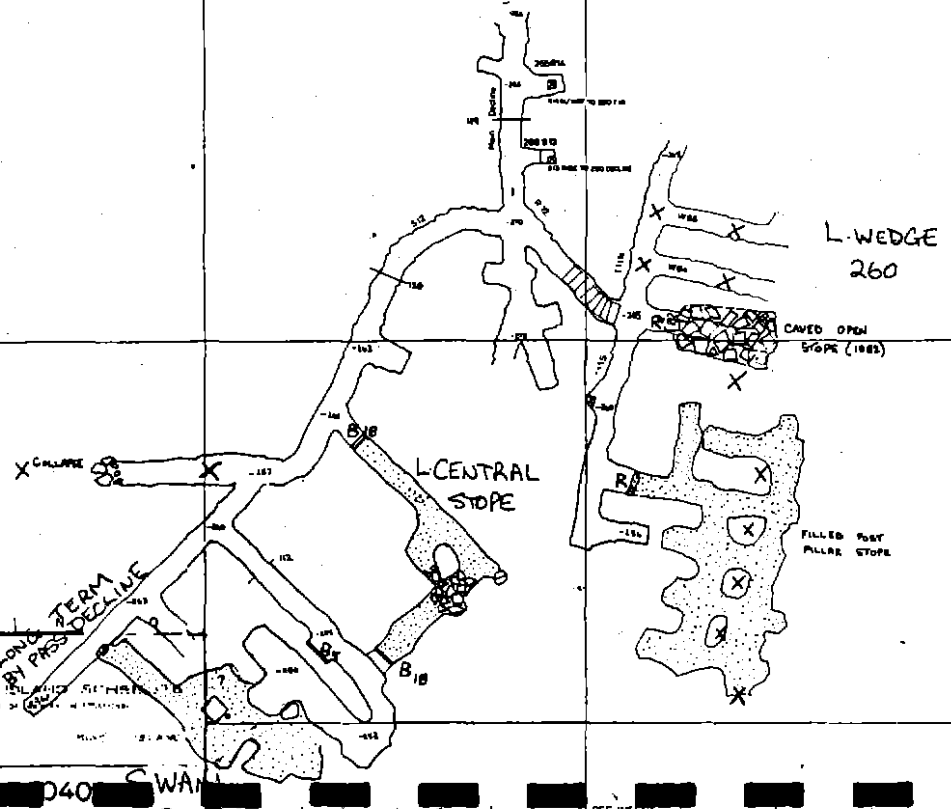
04DM17 - 2039

153017



ISG REFER REPORT 70-0676

5 cm



SCALE 1:2000

B- BULKHEAD

R- ROCK BARRICADE

X- POOR GROUND CONDITIONS

DOLPHIN MINE

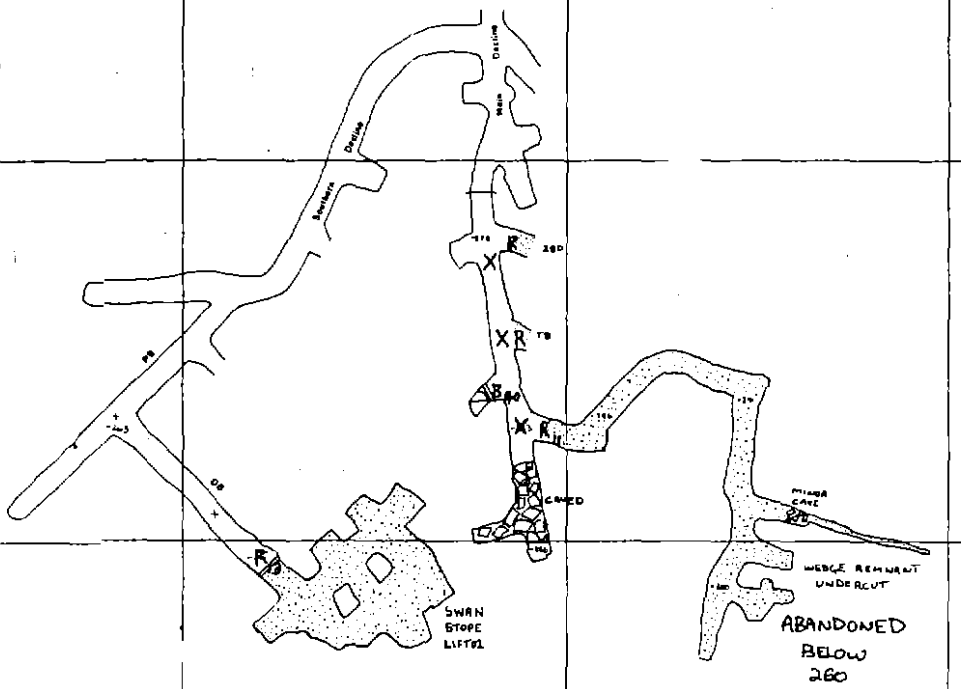
-275m ZONE

KING ISLAND SCHEELITE

[redacted]117 [redacted]040 SWAN

SEE INSERT

153018



ISG REFER REPORT 70-0676

5 cm

SCALE 1:2000 B- BULKHEAD R- ROCK BARRICADE X- POOR GROUND CONDITIONS	LOCATION DOLPHIN MINE SUBJECT -280m ZONE	KGS KING ISLAND GRASSY 04 DM 17 - 2041