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QUARTERLY REPORT

EL 16/85

PERIOD 29.2.86 - 30.5.86

**OPEN FILE**

Queensland Mines Limited  
For Pioneer Concrete (Tasmania) Pty Ltd

1. Exploration Completed

During the period, reporting of the test pitting programme at Tam O'Shanter and Bridwood was completed. A copy of the report is attached.

Further reconnaissance work was initiated on Saltwood Station, where silica gravel deposits similar to those at Bridwood were discovered. Test pitting of these deposits is planned for the next quarter.

2. Future Exploration

Next quarter will see the completion of the pitting programme on Saltwood Station, and a decision made as to where to mark out Mineral Leases.

3. Financial Statement for Period 29.3.86 to 30.5.86

Staff Salaries	\$2,010.63
Travel & Accommodation	115.20
Vehicle Rental	305.04
Publications	41.22
Pitting Contractors	480.00
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TOTAL*	\$2,952.09
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\*This does not include charges for geological supervision by our contractor; these will be included next quarter.

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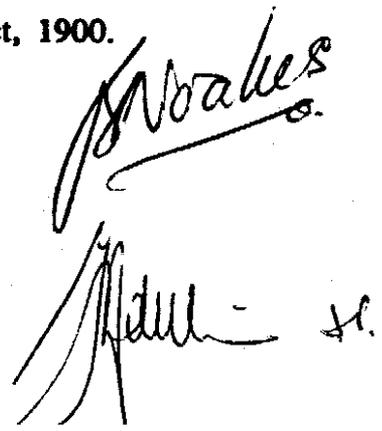
# STATUTORY DECLARATION

**I.** JOHN SEYMOUR NOAKES of QUEENSLAND MINES LIMITED  
50 MARGARET STREET, in the State of New South Wales  
SYDNEY

do solemnly and sincerely declare that the financial statement in the report entitled "Quarterly Report EL 16/85, Period 29.2.86 - 30.5.86" is correct at the time of writing, to the best of my knowledge.

And I make this solemn declaration conscientiously believing the same to be true and by virtue of the provisions of the Oaths Act, 1900.

Subscribed and declared at SYDNEY  
this ELEVENTH day of JULY  
one thousand nine hundred and EIGHTY-SIX  
before me GERRARD ALLE de VRIES  
J.P.



TEST PITTING FOR QUARTZ GRAVEL  
- BRIDWOOD STATION & WEYMOUTH

NORTH EAST TASMANIA

EXPLORATION LICENCE 16/85

PIONEER CONCRETE (TAS.) PTY. LTD.

by

R.G. Wright

CONSULTING GEOLOGIST

Distribution

J. Noakes - Queensland Mines

Tasmanian Department of Mines

Devonport

March, 1986.

Report No PSC: 1986/1

TEST PITTING FOR QUARTZ GRAVEL- BRIDWOOD STATION & WEYMOUTH

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## 1. INTRODUCTION

Exploration Licence 16/85 - Pipers River was granted to Pioneer Concrete (Tas.) Pty. Ltd. on 30th August, 1985.

The licence, of 225 sq. km., covers an area prospective for the occurrence of coarse quartz pebble gravels.

This report details the results from test pitting carried out at four sites on Bridwood Station, situated west of Bridport and work undertaken later at Weymouth.

## 2. PREVIOUS WORK

A rapid survey on the Pipers Brook-Scottsdale region was completed by the author between 16-23.4.85. Results from that survey are provided in Wright, 1985.

## 3. GEOLOGY

Four main types of gravel deposit were identified in the reconnaissance survey.

1. Recent, angular, vein-quartz lag gravels developed over weathered Mathinna siltstones.
2. Angular to sub-rounded Recent lag gravels developed over ?Pleistocene glacial pebbly grit sequences.
3. Poorly sorted, sub-rounded to sub-angular ?Pleistocene gravels draped liked blankets over low hills of Mathinna sediment - generally in areas close to the coast.

These poorly-sorted gravels contain very little sand or silt content and give high yields (upto 50%) of coarse +20mm sized quartz pebbles. They have an irregular distribution and shape and are possibly of glacial origin.

Recent test pitting on Bridwood Station has shown that they have developed as lag crusts above sporadically pebbly yellow-brown clays and clayey sands.

Mr. V. Threader of the Tasmanian Department of Mines has queried the suggested origin of these gravels and samples were taken for him during the pitting programme to check on their age.

4. Tertiary fluviatile and braided stream deposits occur east and west of the Little Pipers River. These limonite-stained, sub-rounded quartz gravels and silty sands reach thicknesses of 6-7m in pits operated by Brambles south of the George Town to Bridport Road.

Test pitting for Pioneer has been concentrated on the blanket gravel deposits because, while they are thin at between 1-2m, their high yield of vein quartz pebbles makes them attractive feed stock for the Electrona plant.

4. TEST PITTING PROGRAMME

A total of 63 pits were dug in four areas on Bridwood Station between 13-15-12.85. A further 44 pits were dug on the Weymouth gravel deposit on 21 and 22.2.86.

Test results are provided in Appendix I and location plans are attached as Figures 1-5 inclusive.

The pits were dug with a Mitsubishi MS180 excavator on hire from Mr. R. Gerke of Scottsdale.

The work showed that it is very difficult to judge from surface gravel exposures how thick or which type of gravel is being tested. Often coarse surface gravels are only 10-20cm thick veneers over yellow-brown clay. The presence of she-oak trees is usually a good indication of clay at shallow depth. Open eucalyptus forest is normally a better sign for a thicker gravel section.

The angularity of surface pebbles is not always a reflection of the underlying gravel. In some places angular surface gravels overly upto 2m of sub-rounded boulder gravel. The pebbles obviously break down into angular pieces at surface. Elsewhere drift sand with small 1cm pebbles sometimes masked 1-2m thick sections of good boulder gravel.

The cleanest gravel occurs on the crests of hills. Test pits on the flanks usually show iron and manganese oxide staining and cementing which comes closer to the surface as the flats are approached. Gravels on the hill crests are usually leached and free of iron oxides and clay, sometimes to depths of over 1 metre. Below this a clay matrix and iron-manganese oxides and secondary silica sometimes form harder zones. Usually this is still rip-able but possibly too contaminated for use as high grade silica ore.

Secondary silicification is a problem as it can sometimes cement the whole gravel profile. It is irregular in distribution and hard to predict how extensive it is without closed spaced pitting.

Outcrop of silicified gravel are present at the southern Bridwood deposit. River Hills North in the old E pit, the E end of the Gravel Pit deposit and on the W central side of the Weymouth deposit.

Gravel dug from pits in the River Hills North deposit also has the property of cementing up again after excavation. These gravels would need to be screened as soon as they are dug to be sure that large, clay-rich, re-cemented fragments did not report in the +20mm fraction.

5. BULK SAMPLE SCREENING RESULTS

A total of 24 bulk samples ranging in weight from 60-80kg were collected from various test pits. (Refer Table 1).

These were carefully weighed on a set of Avery Scales kindly provided by Mr. J. Beatty of General Jones Pty. Ltd.,

TABLE I

BULK SAMPLE SCREENING RESULTS - BRIDWOOD STATION AND WEYMOUTH AREAS

Location	Pit No.	Sample Depth metres	Max. Pebble Length cm.	Matrix	Total Sample Weight Kg	Weight of +20mm Fraction Kg	% Yield	
Bridwood Gravel Deposit	8	0-1.35	13	White silty to clayey sand	65.5	22.5	34	
	15	0-0.75	18	White clay	60.0	21.5	36	
	22	0-2.1	25	White clay - some limonite on pebbles	64.0	26.0	41	
	25*	0-1.5	25	White clayey sand - some limonite on pebbles	61.0	20.0	33	
	27	0-2.1	15	White sand	80.0	34.0	43	
	31	0-0.9	15	Grey-white sand	80.0	33.5	42	
							Depth Weighted Avge	39%
River Hills North Gravel Deposit	32	0-1.25	8	Grey-white sandy hard clay-sets after digging	78.0	13.0	17	
	33	0-1.35	10	White sand	59.0	9.5	16	
	35	0-1.2	5	Silty clay - sets hard again after digging	65.0	7.0	11	
	36*	0-1.2	15	Pale brown silty-clayey sand	49.5	26.0	53	
							Depth Weighted Avge	24%
River Hills South Gravel Deposit	41	1.35 - 2.25	8	Grey-brown sand	83.5	11.0	13	
	42	0-1.65	12	White sand	64.0	13.0	20	
	46*	0-1.0	10	Grey-brown, iron-stained sand	72.0	13.5	19	
	47	0-1.45	30	Pale grey-brown clayey sand	71.0	30.0	42	
							Depth Weighted Avge	25%
Gravel Pit Deposit	49	0-1.1	10	Grey-brown sand	63.5	18.0	28	
	52	0-1.4	20	White sand	81.5	21.5	26	
	53	0-1.05	10	White clay	66.5	16.0	24	
	56*	0-0.8	15	White sand	67.0	17.5	26	
	58	0-0.8	15	Pale brown silty-clayey sand	64.5	23.5	36	
							Depth Weighted Avge	28%
Weymouth Gravel Deposit	W19	0-1.5	5	White sand	70.0	19.0	27	
	W28	0-0.5	5	White sand	65.0	1.5	2	
	W31	0-1.0	5	White sand	67.0	6.5	10	
	W39	0-1.6	8	Grey-brown sand	77.0	5.5	7	
	W43	0-0.95	4	White sand	81.5	6.5	8	
							Depth Weighted Avge	13%

\* 10Kg samples sent to France for furnace tests (20.3.86).  
 2Kg splits sent to S.G.S. Laboratories, Sydney, for Assay (14.3.86).

Scottsdale. The bulk samples were then individually run through a screening plant owned by Mr. N. Gerke of Scottsdale. The +20mm fraction was collected and re-bagged and weighed again.

Table I shows the results from the screening tests together with brief comments on matrix material and maximum pebble size. The overall average yield for the four deposits on Bridwood Station is 30%, as weighted by depth of the gravel profiles.

Some pits, as shown by the yields of 40-50%. exposed very large quartz boulders. Pit 53 at Gravel Pit uncovered several boulders upto 50cm long. Yield figures from these areas could well be higher than indicated from the sampling.

Test pitting at Weymouth was disappointing - a large area of surface gravel to the east of the northern-most pits proved to be only thin veneers.

Testing elsewhere showed that previous quarry operations had removed nearly all the thicker sections of coarse gravel. Yields elsewhere were generally less than 10%.

Some relict patches could probably be located with further pitting but are not likely to contain large reserves of coarse pebbles.

One 10kg sample from each of the four deposits on Bridwood Station were sent to France in late March for furnace tests. These tests will check on the suitability of the Bridwood gravels for silica production.

## 6. RESERVE ESTIMATES

### 6.1 BRIDWOOD GRAVEL DEPOSIT

These deposits occur about 7km due W of Bridwood homestead. Test pitting has shown that four separate deposits occur on a rough NS trend. The two northern deposits A and B have been quarried in the past and only limited tonnages could be recovered from these areas. The two other deposits, C and D have not been worked before.

The thickest sections of each deposit occurs on the western side of each low hill.

An estimate of reserves present in this area is as follows:

#### 1. Old pit areas A & B

Four test pits in Area A show that no relict reserves are available.

The six pits dug into Area B which intersected gravel give an average relict thickness of 0.5m.

Volume =  $360 \times 90 \times 0.5$   
 = 16,200 cubic metres.

Tonnage = 29,000 tonnes (assumed density of 1.8)

Reserves of +20mm pebbles (Yield 35%) = 10,000 tonnes.

2. Area C

One pit dug here on the W end of a low ridge uncovered 0.9m of coarse gravel.

Volume =  $70 \times 70 \times 0.9$   
 = 4,400 cubic metres.

Tonnage = 8,000 tonnes (S.G. of 1.8).

Reserves of +20mm pebbles (Yield 40%) = 3,000 tonnes.

3. Area D

Nine out of ten pits dug into this area intersected gravel ranging from 0.2 upto 2.1m thickness. Average thickness for the area is 0.9m.

Volume =  $300 \times 150 \times 0.9$   
 = 40,500 cubic metres.

Tonnage = 73,000 tonnes (S.G. of 1.8).

Reserves of +20mm pebbles (Yield 40%) = 29,000 tonnes.

Total probable reserve of +20mm quartz pebbles in Areas B, C & D

= 42,000 tonnes.

6.2 RIVER HILLS NORTH GRAVEL DEPOSIT

Four out of the six pits dug at this site intersected gravel. Average thickness is 1.25m.

Volume =  $200 \times 50 \times 1.25 + 150 \times 50 \times 1.25$   
 = 22,000 cubic metres.

Relict Volume (50% quarried) = 11,000 cubic metres.

Tonnage = 19,800 tonnes.

Reserves of +20mm pebbles (Yield 24%) = 5,000 tonnes.

6.3 RIVER HILLS SOUTH GRAVEL DEPOSIT

Only four out of the eleven pits dug in this area uncovered thick gravel sections. Average thickness

from these four pits was 1.25m.

$$\begin{aligned} \text{Volume} &= 400 \times 120 \times 1.25 \\ &= 60,000 \text{ cubic metres.} \end{aligned}$$

Relict Volume (40% quarried) = 36,000 cubic metres.

Tonnage = 65,000 tonnes.

Reserves of +20mm pebbles (Yield 25%) = 16,000 tonnes.

#### 6.4 GRAVEL PIT DEPOSIT

Eight of the fifteen pits dug in this area exposed gravel from 0.4 upto 1.4m thick. Average thickness is 0.9m.

$$\begin{aligned} \text{Volume} &= 330 \times 100 \times 0.9 \\ &= 29,700 \text{ cubic metres.} \end{aligned}$$

Relict Volume (25% quarried) = 22,000 cubic metres.

Tonnage = 40,000 tonnes.

Reserves of +20mm pebbles (Yield 28%) = 11,000 tonnes.

Estimated probable reserves of +20mm pebbles available on Bridwood Station are:

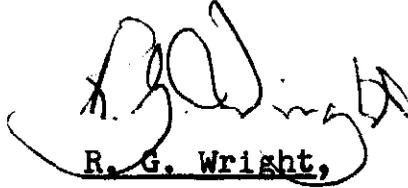
	<u>Tonnes</u>
Bridwood Deposit	42,000
River Hills North	5,000
River Hills South	16,000
Gravel Pit	11,000
	<hr/>
TOTAL	74,000 tonnes
	<hr/> <hr/>

#### 7. CONCLUSIONS AND RECOMMENDATIONS

Test pitting at four localities on Bridwood Station has located a probable total reserve of 74,000 tonnes of +20mm quartz pebbles. All the testing was done adjacent to previously worked gravel pits. Further deposits could well exist on the NW scrub-covered portion of this property. Traversing through this area is recommended after detailed study of aerial photographs. The survey should also be extended further west into the adjacent Saltwood property.

A brief visit to various small gravel pits with the owner, Mr. J. McCarthy of Karoola, showed that potential exists here for similar coarse gravels.

Test pitting at Weymouth was disappointing and no further work is needed in this area.



R. G. Wright,

Consulting Geologist.

REFERENCES

Wright, R.G., 1985      Quartz Gravel Survey - N.E. Tasmania.  
Unpub. Queensland Mines Ltd. Report,  
May, 1985.

APPENDIX I

Test Pit Results - Bridwood Station  
& Weymouth Areas.

TEST PIT RESULTS - BRIDWOOD STATION & WEYMOUTH AREAS

(All measurements in metres)

1. BRIDWOOD GRAVEL DEPOSITPIT 1

- 0 - 0.1 Black sandy loam.  
0.1 - 0.5 White to grey sandy quartz pebble gravel.  
0.5 - 1.0 Stiff pale yellow brown - dark brown clay.

PIT 2

- 0 - 0.3 Black loamy soil.  
0.3 - 1.0 White to grey fine sand.  
1.0 - 1.8 Grey to yellow-brown clay.

PIT 3

- 0 - 1.3 White to grey fine sand.  
1.3 - 1.6 Dark red to chocolate brown ferruginized sands - very compact and hard to dig with the excavator.

PIT 4

- 0 - 1.2 White surface sands.  
1.2 - 2.3 Brownish black iron-stained sands.  
2.3 - 2.9 Grey-white, clayey sands - iron stained as above.

PIT 5

- 0 - 1.4 White fine sand.  
1.4 - 2.3 Pale yellow slightly iron-stained sand.  
2.3 - 3.0 White clayey sands with water inflow at 3.0m depth.

PIT 6

- 0 - 0.3 Black loamy soil.  
0.3 - 0.5 Quartz pebble gravel layer.  
0.5 - 0.8 Sandy, iron-stained clay with occasional quartz pebble.  
0.8 - 1.6 Pale grey to yellow brown stiff clay with occasional quartz pebble.

PIT 7

- 0 - 0.1 Black loamy soil.
- 0.1 - 1.5 Pale grey to yellow-brown stiff clay.

PIT 8

- 0 - 0.7 Quartz pebble lag gravel set in clay-rich matrix from 0.3m depth. Yellow-brown iron oxide staining occurs between 0.6-0.7m depth.
- 0.7 - 1.35 Sub-rounded to angular coarse quartz pebbles (50% + 20mm) in a pale grey, stiff, gritty clay.
- 1.35 - 1.7 Grey-white to pale yellow-brown clay. Sample 8 of this clay collected at 1.35-1.45m for V. Threader, Tas. Mines Department. Bulk sample of gravel from 0 - 1.35 collected for screening tests.

PIT 9

- 0 - 0.3 Sandy grey loam.
- 0.3 - 0.45 Pebbly grey sand.
- 0.45 - 1.5 Yellow-brown sandy clay which grades down into grey-white sparsely pebbled clay.

PIT 10

- 0 - 0.1 Blank loamy soil.
- 0.1 - 0.7 Grey-white fine sand.
- 0.7 - 1.0 Red-brown to black, very ferruginous, sandy clay pebble layer.
- 1.0 - 1.05 Yellow-brown grading down into grey-white sporadically pebbly clay as seen in pit 9.

PIT 11

- 0 - 1.2 Pale yellow clay with a 5cm thick crust of white quartz lag pebbles. Most of the gravel crust has been removed in the past.

PIT 12

- 0 - 0.1 Black loam with white quartz pebbles.
- 0.1 - 0.85 Pale grey-white clay with an occasional white quartz pebble.

PIT 13

- 0 - 0.2 Clayey gravel in old scraped area.

0.2 - 1.0 Pale grey-white clay with occasional white quartz pebble.

PIT 14

0 - 0.2 Black loamy soil.

0.2 - 0.6 White clayey sand.

0.6 - 2.1 Grey to pale yellow stiff clay.

PIT 15

0 - 0.75 Coarse quartz pebble lag gravel (60% + 20mm). Sample 15 from base of clayey gravel collected at 0.74-0.75m depth for V. Threader, Tas. Mines Department.

0.75 - 1.3 Stiff white clay.  
Bulk sample of gravel from 0 - 0.75m depth collected for screening tests.

PIT 16

0 - 0.2 Black loam with large white quartz pebbles.

0.2 - 1.5 Stiff pale brown clay.

PIT 17

0 - 0.3 White quartz pebble gravel set in stiff yellow to pale cream coloured clay. (Surface gravel removed).

0.3 - 1.0 Pale brown to pale cream clay with several pebbly grit layers.

PIT 18

0 - 0.3 Black surface loam with large white quartz pebbles and boulders.

0.3 - 1.5 Pale yellow brown stiff clay - ? weathered Mathinna siltstone.

PIT 19

0 - 0.2 Black loam with white quartz pebbles.

0.2 - 0.7 Pale yellow clay.

PIT 20

0 - 0.6 Pale grey fine sand with a few sparse quartz pebbles at surface.

0.6 - 1.5 Pale yellow brown stiff clay.

PIT 21

- 0 - 0.2 White quartz pebble lag gravel in black-brown sandy loam.
- 0.2 - 1.7 Pale grey - yellow, well jointed clay.

PIT 22

- 0 - 0.2 Black loamy sands with white quartz pebbles.
- 0.2 - 2.1 Coarse, white quartz pebbles and boulder gravel (50% +20mm) set in pale grey to yellow orange mottled clay. Pebbles upto 30cm long. Sample 22A collected from 2.0 - 2.1m for Mines Department.
- 2.1 - 2.8 Pale white to pale yellow stiff clay. Sample 22B collected from 2.3 - 2.4m depth.

The top 0.8m of the gravel is loose and unconsolidated - below this the gravel is bonded with clay.  
Bulk sample from 0 -2.1m depth was collected for screening tests.

PIT 23

- 0 - 0.2 Black loamy soil with white quartz pebbles and boulders.
- 0.2 - 0.5 Gritty pebble and boulder gravels - loose and unconsolidated.
- 0.5 - 1.7 Pale yellow to pale orange stiff clay.

PIT 24

- 0 - 0.2 Black loamy soil with white quartz pebbles upto 10cm long.
- 0.2 - 0.4 Grey, unconsolidated pebbly sand.
- 0.4 - 1.25 Pale red-brown and pale yellow-white clay.

PIT 25

- 0 - 1.5 Boulder and pebble gravel - 0.1m thick on SE side of the pit but thickens to 1.5m on NW side. Loose and unconsolidated to 0.6m depth - below this cemented with yellow and pale red clay. Yield of +20mm pebbles estimated to be about 50% with pebbles upto 30cm long.
- 1.5 - 1.8 Pale yellow to white weathered Mathinna Siltstone-shale.  
Bulk sample of gravel from 0 - 1.5m depth collected for screening tests.

PIT 26

- 0 - 0.2 Black loamy soil with white quartz pebbles

upto 5cm long.

0.2 - 0.5 Loose grey pebble and boulder gravel - colluvial material downhill from gravels on crest of hill.

0.5 - 1.0 Stiff pale grey to yellow brown clay.

PIT 27

0 - 0.3 Black pebbly loam.

0.3 - 0.8 Loose, sandy pebble-boulder gravel.

0.8 - 2.1 Coarse boulder gravel (50-60% +20mm) set in a pale cream - pale grey clay. Minor yellow brown iron oxide spotting.

2.1 - 2.6 Pale cream to pale yellow stiff clay.  
Bulk sample from 0 - 2.1m depth collected for screening tests.

PIT 28

0 - 0.4 Black loamy soil.

0.4 - 0.7 Grey-brown sand with an occasional pebble.

0.7 - 1.0 Yellow brown to grey stiff clay.

PIT 29

0 - 0.2 Black loamy soil.

0.2 - 0.6 Quartz pebble gravel, unconsolidated to 0.4m depth.

0.6 - 1.5 Pale cream to pale yellow and grey stiff clay.

PIT 30

0 - 0.2 Black loamy soil with white quartz gravel.

0.2 - 0.4 Grey sandy, unconsolidated pebble layer.

0.4 - 1.45 Pale yellow-brown to pale grey clay.

PIT 31

0 - 0.3 Black loam with an occasional white quartz pebble.

0.3 - 0.9 Coarse boulder gravel, loose and free of clay with boulders of quartz upto 20cm long.

0.9 - 1.3 Pale yellow to cream - grey sands clay.  
Bulk sample from 0 - 0.9m depth collected for screening tests.

2. RIVER HILLS NORTH GRAVEL DEPOSITPIT 32

- 0 - 0.2 Black loamy soil with white quartz pebbles.
- 0.2 - 1.25 Grey pebbly gravel in a loose sandy matrix. Becomes harder, ?silicified at depth.
- 1.25 - 1.5 Pale cream, hard, sandy clays and grits - cemented with orange iron oxides.  
Bulk sample from 0 - 1.25m depth collected for screening tests.

PIT 33

- 0 - 0.2 Black loam with white quartz pebbles.
- 0.2 - 1.35 Coarse boulder gravel with pebbles upto 10cm long in a loose sandy matrix to 1.1m depth. Becomes harder, silicified and cemented with iron and manganese oxides towards 1.35m.  
Bulk sample from 0 - 1.35m depth taken for screening tests.

PIT 34

- 0 - 0.2 Black loam.
- 0.2 - 0.6 Grey brown fine sand.
- 0.6 - 1.05 Pale yellow brown clay - weathered Mathinna shale.

PIT 35

- 0 - 0.2 Black loam with white quartz pebbles upto 4-5cm long.
- 0.2 - 1.2 Pebble and boulder gravel in a grey gritty matrix. (30% +20mm). Pebbles upto 15cm long. Gravels become more indurated and silicified from about 0.6m depth.
- 1.2 - 1.35 Hard red-brown to brown iron-oxide cemented gravels as above.  
Bulk sample for 0 - 1.2m depth taken for screening tests.

PIT 36

- 0 - 0.25 Black loam with large white quartz pebbles and boulders.
- 0.25 - 1.2 Coarse boulder gravel with pebbles upto 15cm long in a grey sandy clay matrix.
- 1.2 - 1.4 Pale brown to cream soft clay.  
Bulk sample from 0-1.2m depth taken for screening tests.

PIT 37

- 0 - 0.1 Black loam with occasional white quartz pebble.  
 0.1 - 0.5 Yellow brown clay.

3. RIVER HILLS SOUTH GRAVEL DEPOSITPIT 38

- 0 - 0.2 Loam with white quartz pebbles.  
 0.2 - 1.2 Yellow brown and grey clay.

PIT 39

- 0 - 0.2 Black loam with white quartz pebbles upto 5-8cm long.  
 0.2 - 0.7 Yellow clay.

PIT 40

- 0 - 0.2 Black loam.  
 0.2 - 0.7 Pebbly grits and sands. Pebbles upto 5cm long.  
 0.7 - 0.95 Grey and pale yellow stiff clay.

PIT 41

- 0 - 0.2 Loam.  
 0.2 - 0.95 Grey sand - old dump material.  
 0.95 - 1.35 Ferruginous pebbly grit layer.  
 1.35 - 2.25 Clean white quartz gravel (40% +20mm) with pebbles upto 15cm long. Very clean and with little clay - water inflow from the base at 2.25m.  
 2.25 - 2.5 Hard grey sand - indurated with secondary silica? Bulk sample taken from 1.35-2.25m depth for screening tests.

PIT 42

- 0 - 0.6 Coarse quartz pebble and boulder gravel. (Top ?0.5m previously removed).  
 0.6 - 1.0 Coarse gravel as above heavily stained and cemented with iron and manganese oxides.  
 1.0 - 1.25 Yellow brown to pale cream gritty clay layer.  
 1.25 - 1.65 Quartz pebble gravel (50-60% + 20mm) in a pale grey clay matrix.  
 1.65 - 1.75 Pale cream pebbly clay. Bulk sample taken from 0 - 1.65m depth for screening tests.

PIT 43

- 0 - 0.1 Grey loamy sand.
- 0.1 - 0.7 Grey-white fine sand.
- 0.7 - 1.6 Coarse quartz boulder and pebble gravel strongly cemented with iron and manganese oxides. Too hard for the excavator to dig any deeper.

PIT 44

- 0 - 0.1 Black loam with white quartz pebbles.
- 0.1 - 1.0 Pale yellow to red brown clay.

PIT 45

- 0 - 0.15 Black loam with white quartz pebble upto 5-8 cm long.
- 0.15 - 0.45 Loose quartz pebble gravel in a sandy matrix.
- 0.45 - 0.9 Pale yellow white clay with an unusual green ?jarosite tinge.

PIT 46

- 0 - 0.2 Grey loamy sand.
- 0.2 - 0.65 White to grey fine sand.
- 0.65 - 1.0 Grey pebble and boulder gravel in loose clean sandy matrix. Yield about 30% of +20mm pebbles some of which are upto 8cm long.
- 1.0 - 1.35 Yellow brown to brown ferruginous silty sands and clays.
- 1.35 - 1.7 Yellow brown to pale cream stiff clay.  
Bulk sample of gravel from 0 - 1.0m taken for screening tests.

PIT 47

- 0 - 0.4 Coarse boulder gravel upto 10cm long in relatively loose grey clay matrix. About ?0.5m of gravel has already been scraped off this site.
- 0.4 - 0.65 Dark brown, hard ferruginized pebble gravel of 2-3cm diameter.
- 0.65 - 0.9 Pale yellow to white gravelly clay to clayey gravel. Sample 47 collected for Mines Dept.
- 0.9 - 1.45 Variably ferruginized and ?silica cemented quartz pebble gravel of 2-3cm diameter.  
Bulk sample of gravel from 0 - 1.45m depth taken for screening tests.

PIT 48

- 0 - 0.2 Grey loamy sand.
- 0.2 - 0.3 Gritty grey sand with patches of 1cm pebbles.
- 0.3 - 0.9 Grey to pale yellow stiff clay.

4. GRAVEL PIT DEPOSITPIT 49

- 0 - 0.2 Grey loamy sand.
- 0.2 - 1.1 Loose, coarse pebble and boulder gravel in grey sandy matrix. (30-40% +20mm). Pebbles upto 10cm long.
- 1.1 - 2.1 Yellow brown to cream clay heavily stained with brown to black manganese oxides from 1.1 to 1.55m depth.  
Bulk sample taken from 0 - 1.1m depth for screening tests.

PIT 50

- 0 - 0.15 Grey loamy soil.
- 0.15 - 1.1 White fine sand.
- 1.1 - 1.5 Coarse, poorly sorted boulder gravel with greenish cherty pebbles upto 20cm long. At depth this gravel is hard and heavily cemented with secondary silica.

PIT 51

- 0 - 0.2 Grey loamy sand.
- 0.2 - 1.6 White fine sand.
- 1.6 - 1.9 Coarse pebble gravel in a hard limonite cement. Pebbles upto 10cm long.

PIT 52

- 0 - 0.3 Black loamy soil.
- 0.3 - 1.4 Coarse quartz pebble and boulder gravel in a loose, clean sandy matrix. (40% +20mm).
- 1.4 - 1.5 Brown, ferruginized and silicified sandstone with scattered pebbles. Very hard - excavator could not penetrate.  
Bulk sample from 0-1.4m depth collected for screening tests.

PIT 53

- 0 - 0.25 Black loamy soil with white quartz pebbles.

0.25 - 1.05 Coarse boulder gravel with little sand matrix (40-50% + 20mm). Some boulders of quartz are upto 50cm long.

1.05 - 1.5 Pale brown to cream soft to hard, variably silicified, ferruginous sandstone.  
Bulk sample from 0 - 1.05 collected for screening tests.

PIT 54

0 - 0.2 Grey loamy sand.

0.2 - 0.7 Coarse gravel with pebbles upto 10cm long (30% + 20mm) in a grey sandy matrix. The eastern end of the pit shows the gravel deepening to 1.2m depth but below about 0.7m depth it is moderately stained with yellow brown limonite.

0.7 - 1.4 Yellow brown to pale cream stiff clay - heavily stained below the contact for 20 - 30cm with iron oxides.

PIT 55

0 - 0.2 Grey loamy sand.

0.2 - 0.45 Grey white fine sand.

0.45 - 0.9 Yellow brown and grey stiff clay.

PIT 56

0 - 0.25 Grey loamy sand with abundant white quartz pebble float at surface.

0.25 - 0.8 Coarse, loose quartz boulder gravel with pebbles upto 12cm long.

0.8 - 1.1 Indurated, silicified pebbly grits and sands.  
Bulk sample collected from 0 - 0.8m depth for screening tests.

PIT 57

0 - 0.3 Black to grey loamy sand.

0.3 - 0.6 Grey, loose, pebbly sands and gravels (20 - 30% + 20mm) with pebbles upto 10cm long.

0.6 - 1.1 Dark brown to yellow brown strongly ferruginized clay grades into yellow - brown and pale grey clay at about 0.8m depth.

PIT 58

0 - 0.6 Coarse white quartz boulder gravel (50 - 60% + 20mm) in a loose grey sandy matrix. Pebbles upto 20cm long. Surface 70.5m previously removed.

025

0.6 - 0.8 Coarse gravel on an uneven clay bottom. Cemented with yellow brown limonite-stained sandy clay. Sample 58A collected between 0.7 - 0.8m depth for Mines Department.

0.8 - 1.9 Pale cream to pale yellow-brown sandy clay containing sporadic clumps of subrounded-angular pebbles upto 20cm long. Sample 58B collected at 1.9m depth. Bulk sample from 0-0.8m depth collected for screening tests.

PIT 59

0 - 0.4 Loose quartz gravel with pebbles upto 10cm long.

0.4 - 0.95 Brown to pale brown and black manganese oxide-stained silty clays grading down into yellow-brown and pale cream clay from about 0.8m depth.

PIT 60

0 - 0.25 Black loam with quartz pebble float upto 30cm long.

0.25 - 1.0 Pale cream to pale yellow stiff clay.

PIT 61

0 - 0.3 Black sandy loam.

0.3 - 0.8 Grey white gritty sand with small pebbles upto 1cm diameter at base.

0.8 - 0.9 Strongly ferruginized, hard, quartz pebble gravel with pebbles upto 7cm long. Too hard for excavator to dig.

PIT 62

0 - 0.3 Black-grey loamy sand.

0.3 - 1.6 Grey white fine sand.

1.6 - 1.8 Ferruginous hard sandstone with occasional white quartz pebble. Hard to dig - water inflow at 1.6m depth.

PIT 63

0 - 0.3 Grey loamy sand.

0.3 - 2.0 Grey white fine sand.

2.0 - 2.1 Dark to pale brown strongly ferruginized pebble and boulder gravel with pebbles upto 10cm long. Too hard to dig with the excavator.

5. WEYMOUTH GRAVEL DEPOSITPIT W1

- 0 - 0.2 Grey loamy sand with white quartz pebbles (10% +20mm).
- 0.2 - 1.2 Soft, pale yellow weathered Mathinna shales.

PIT W2

- 0 - 0.4 White sand
- 0.4 - 0.8 Pale yellow, weathered Mathinna shales.

PIT W3

- 0 - 0.7 Grey loamy sand.
- 0.7 - 1.7 Heavily ferruginized sand - iron oxide cementing decreases towards base of pit.

PIT W4

- 0 - 0.75 White to grey loamy sand.
- 0.75 - 1.0 Strongly ferruginized black to dark brown sand - difficult to dig with the excavator.

PIT W5

- 0 - 0.7 Grey white loamy sand.
- 0.7 - 0.9 Dark brown, heavily ferruginized sand grading downwards into pale yellow clayey sand.

PIT W6

- 0 - 0.6 Grey-white sand.
- 0.6 - 1.0 Heavily ferruginized sand with occasional 2-3cm pebble between 0.6-0.9m depth. Below this grades into yellow-white to pale brown variably ferruginous sand.

PIT W7

- 0 - 0.8 Grey white sand.
- 0.8 - 1.2 Grey white sandy clay stained with iron oxide between 0.8 - 0.9m depth.

PIT W8

- 0 - 0.75 Grey white loamy sand.
- 0.75 - 1.95 Dark brown ferruginized sandy clay which grades down into pale yellow to pale grey sandy clay from about 1.65m depth.

PIT W9

- 0 - 0.7 Grey white sand.
- 0.7 - 3.5 Variably ferruginized sandy clay which grades into green ?glaucanitic clay with rare quartz pebbles upto 5cm diameter from about 2m depth.

PIT W10

- 0 - 0.2 Grey-white loamy gravel.
- 0.2 - 0.7 Gravelly sand with white quartz pebbles (5% + 20mm).
- 0.7 - 1.5 Grey and yellow-brown clay.

PIT W11

- 0 - 1.3 Black loamy soil over dark brown and yellow sandy clay.
- 1.3 - 1.5 White quartz pebble layer with water.
- 1.5 - 2.2 Yellow and cream clay.

PIT W12

- 0 - 0.2 Loose, white quartz pebble gravel (20% +20mm).
- 0.2 - 0.6 Yellow brown stiff clay.

PIT W13

- 0 - 0.1 Pebbly sand (1% + 20mm).
- 0.1 - 0.4 Yellow brown clay.

PIT W14

- 0 - 0.2 Loose white quartz gravel (30-40% +20mm).
- 0.2 - 0.5 Pale yellow-brown clay.

PIT W15

- 0 - 0.1 Black sandy loam.
- 0.1 - 0.3 Loose, white quartz pebble gravel. (10% +20mm).
- 0.3 - 0.5 Yellow-brown clay.

PIT W16

- 0 - 0.3 Loamy, sandy gravel with angular fragments (10-15% +20mm).
- 0.3 - 0.6 Pale yellow clay.

PIT W17

- 0 - 0.3 Grey loamy sand with white quartz fragments (5% + 20mm).
- 0.3 - 0.5 Pale yellow white to grey very weathered Mathinna siltstones and shales.

PIT W18

- 0 - 0.3 Grey loamy, sandy gravel.
- 0.3 - 0.90 Yellow white weathered Mathinna siltstones.

PIT W19

- 0 - 1.5 White, mostly unconsolidated quartz pebble gravel. (30% + 20mm). Between 0.9-1.1m depth gravel is partly silicified but still rip-able.
- 1.5 - 1.9 Yellow stiff clay.  
Bulk sample from 0-1.5m depth collected for screening tests.

PIT W20

- 0 - 0.1 Surface loam sands and gravel.
- 0.1 - 0.3 Loose white gravel (20% + 20mm).
- 0.3 - 0.6 Stiff yellow brown clay with manganese oxide along joints.

PIT W21

- 0 - 0.2 Grey loamy sand with occasional quartz pebble.
- 0.2 - 0.5 Loose white quartz pebble gravel (15% +20mm).
- 0.5 - 0.8 Pale yellow-brown and cream mottled clay.

PIT W22

- 0 - 0.2 Black to grey swampy loamy sand and fine silt.
- 0.2 - 0.4 Loose quartz pebble gravel (5-10% +20mm).
- 0.4 - 0.6 Yellow-brown stiff clay.

PIT W23

- 0 - 0.1 Grey sandy loam with occasional quartz pebble.
- 0.1 - 0.4 Loose, white quartz fragmental gravel (10% + 20mm).
- 0.4 - 0.5 Yellow brown clay.

PIT W24

- 0 - 0.1 Grey sand with white quartz pebbles.
- 0.1 - 0.4 White, poorly consolidated quartz pebble gravel (20% + 20mm).
- 0.4 - 0.7 Ferruginous and slightly silicified gravel as above. Very hard to dig.
- 0.7 - 0.9 Pale grey to yellow-brown weathered Mathinna siltstones.

PIT W25

- 0 - 0.1 Dark grey loamy sand.
- 0.1 - 0.8 Pale grey silty sand which grades into pale yellow-brown to cream, weathered, sandy-siltstone at 0.35m depth.

PIT W26

- 0 - 0.1 Grey loamy sand with white quartz pebbles.
- 0.1 - 0.4 Grey-white loose quartz pebble gravel (20% + 20mm).
- 0.4 - 0.65 Stiff yellow brown to red brown clay.

PIT W27

- 0 - 0.4 White quartz pebble gravel in loose sandy matrix (20% + 20mm).
- 0.4 - 0.65 Pale grey to yellow brown fine clayey sand.

PIT W28

- 0 - 0.5 Sample of gravel cut from the face of an old pit. Gravel crust formed on surface - much sandier further into the fresh gravel (10-15% + 20mm).  
Bulk sample taken for screening tests.

PIT W29

- 0 - 0.4 Loose, sandy loam with white quartz pebbles (1-2% + 20mm).
- 0.4 - 0.6 Dark brown to yellow brown stiff clay.

PIT W30

- 0 - 0.1 Pebbly loamy sand (5% + 20mm).
- 0.1 - 0.4 Pale brown and cream, very weathered siltstone.

PIT W31

- 0 - 1.0 Coarse quartz pebble gravel in a loose sandy matrix (10-15% + 20mm).
- 1.0 - 1.3 Cream to pale brown clay.  
Bulk sample of gravel from 0 - 1.0m depth taken for screening tests.

PIT W32

- 0 - 0.2 Loose grey quartz pebble gravel (10% + 20mm) - top ?0.3m previously removed.
- 0.2 - 0.5 Yellow brown and white clay.

PIT W33

- 0 - 0.3 Grey loamy sand with white quartz pebbles (10% + 20mm).
- 0.3 - 0.7 Yellow brown clayey sand with sparse quartz pebbles.

PIT W34

- 0 - 0.2 Grey loamy sand.
- 0.2 - 0.6 Quartz pebble gravel (5% + 20mm).
- 0.6 - 0.8 Highly ferruginous yellow-brown to red brown hard cemented gravel and gritty sands. (5% + 20mm).

PIT 35

- 0 - 0.1 Grey swampy loam.
- 0.1 - 0.9 Grey silty clay grading down into yellow brown and grey clay.

PIT W36

- 0 - 0.2 Grey loamy sand.
- 0.2 - 0.35 Loose, white quartz pebble gravel (5% + 20mm).
- 0.35 - 0.65 Red-brown to dark brown ferruginous gritty clay.

PIT W37

- 0 - 0.2 Grey surface loam.
- 0.2 - 0.5 Grey-white fine sandy silt.
- 0.5 - 0.8 Red-brown and white clay.

PIT W38

- 0 - 0.2 Grey loamy sand with white quartz pebbles (5% + 20mm).
- 0.2 - 0.45 White loose gravel with little sand matrix (5-10% + 20mm). Pebbles generally about 10mm diameter.
- 0.45 - 0.95 Pale red brown clay with thin quartz pebble layers.

PIT W39

- 0 - 0.2 Loose white quartz pebble gravel in a grey sandy matrix.
- 0.2 - 0.6 Black to grey fine sand.
- 0.6 - 1.6 Loose coarse gravel in sand matrix (10 - 15% + 20mm).
- 1.6 - 1.8 Gravel as above in stiff pale brown clay - hard to dig.  
Bulk sample of gravel from 0 - 1.6m depth collected for screening tests.

PIT W40

- 0 - 0.2 Black to dark brown silty loam - swamp deposit.
- 0.2 - 0.6 Red brown to grey sandy clay.
- 0.6 - 1.7 Grey, odiferous sandy clay with a pebbly layer between 1.15-1.25m.

PIT W41

- 0 - 0.1 Grey loamy soil.
- 0.1 - 0.8 Yellow brown clay with 1cm ferruginous nodules.

PIT W42

- 0 - 0.5 Dark brown to grey loamy and swampy sand.
- 0.5 - 1.2 Loose grey quartz pebble gravel (10-15% +20mm pebbles).
- 1.2 - 1.3 Red brown to dark brown very ferruginized hard gravel - as above - but cemented with iron oxides.

PIT W43

- 0 - 0.2 Grey loamy and sandy gravel.
- 0.2 - 0.95 Coarse quartz pebble gravel with a trace of sand (15-20% + 20mm).

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0.95 - 1.15 Dark brown to red brown weathered Mathinna  
sandy siltstone.  
Bulk sample from 0 - 0.95m depth taken for  
screening tests.

PIT W44

0 - 0.2 Dark brown pebbly loamy soil.

0.2 - 0.65 Loose quartz pebble gravel (10-15% + 20mm).

0.65 - 0.9 Gravel as above but strongly cemented with  
iron oxides.

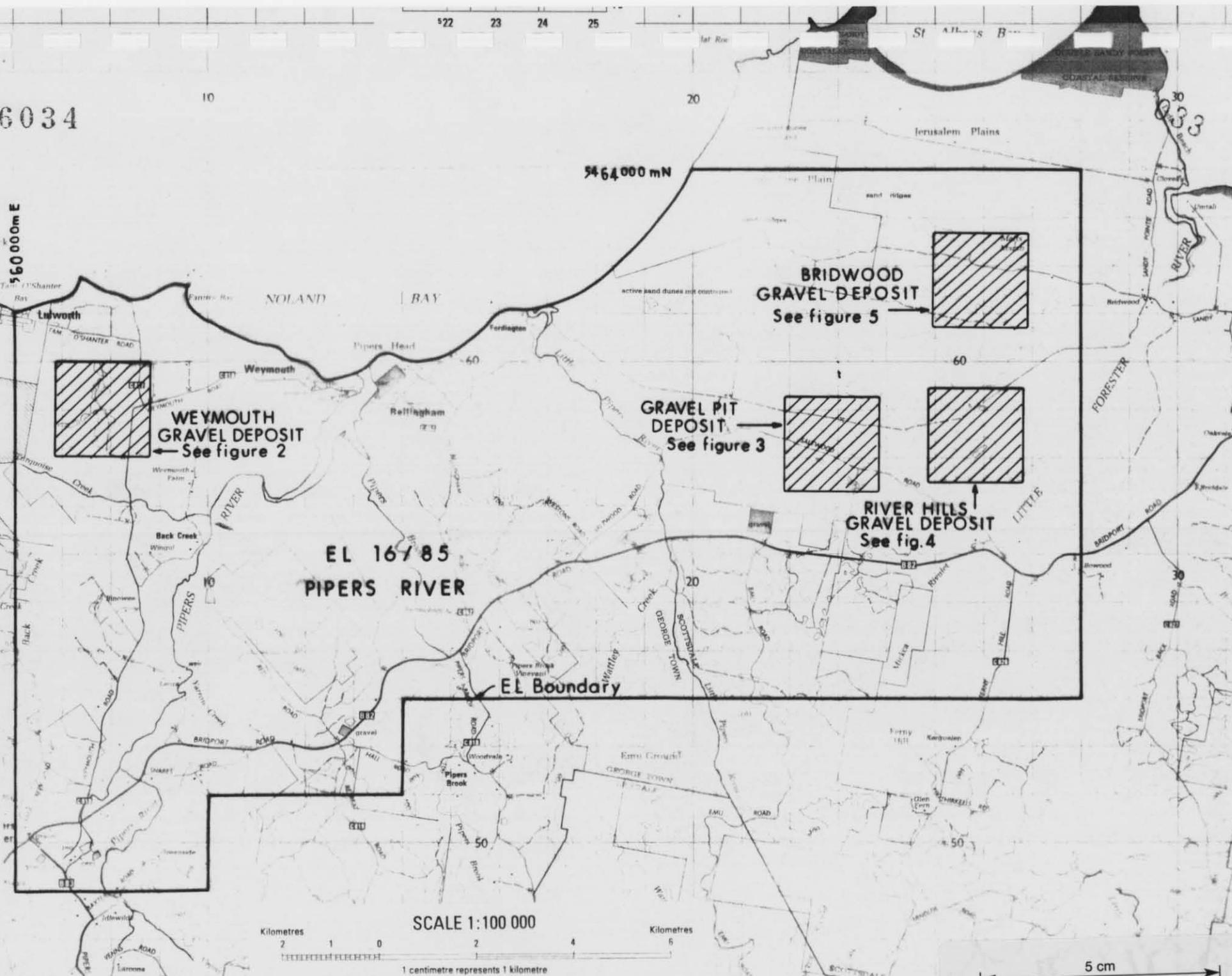
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**WEYMOUTH  
GRAVEL DEPOSIT**  
See figure 2

**BRIDWOOD  
GRAVEL DEPOSIT**  
See figure 5

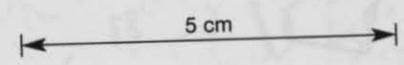
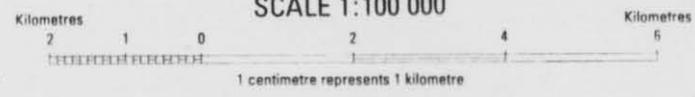
**GRAVEL PIT  
DEPOSIT**  
See figure 3

**RIVER HILLS  
GRAVEL DEPOSIT**  
See fig. 4

**EL 16/85  
PIPERS RIVER**

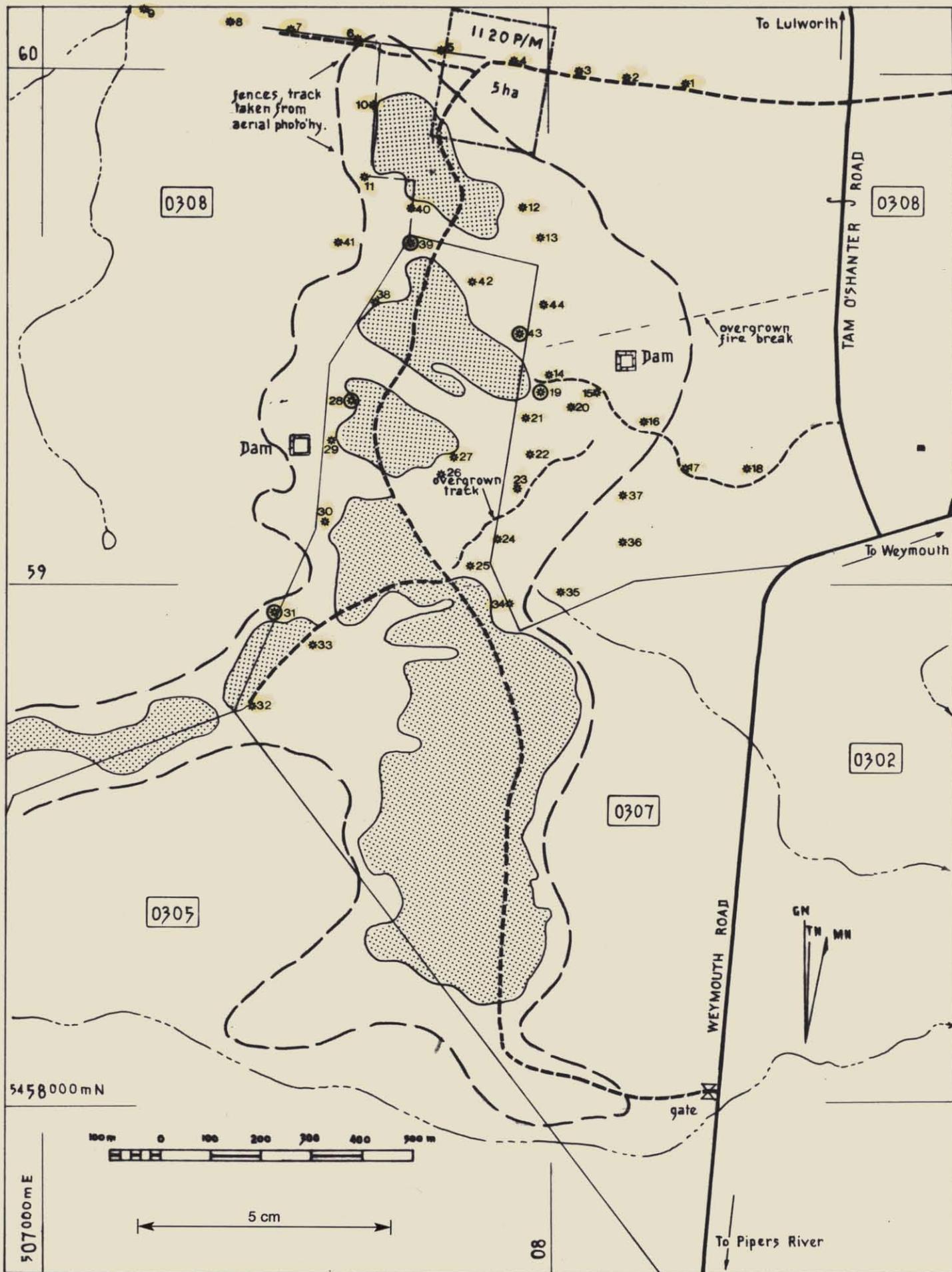
**EL Boundary**

**SCALE 1:100 000**



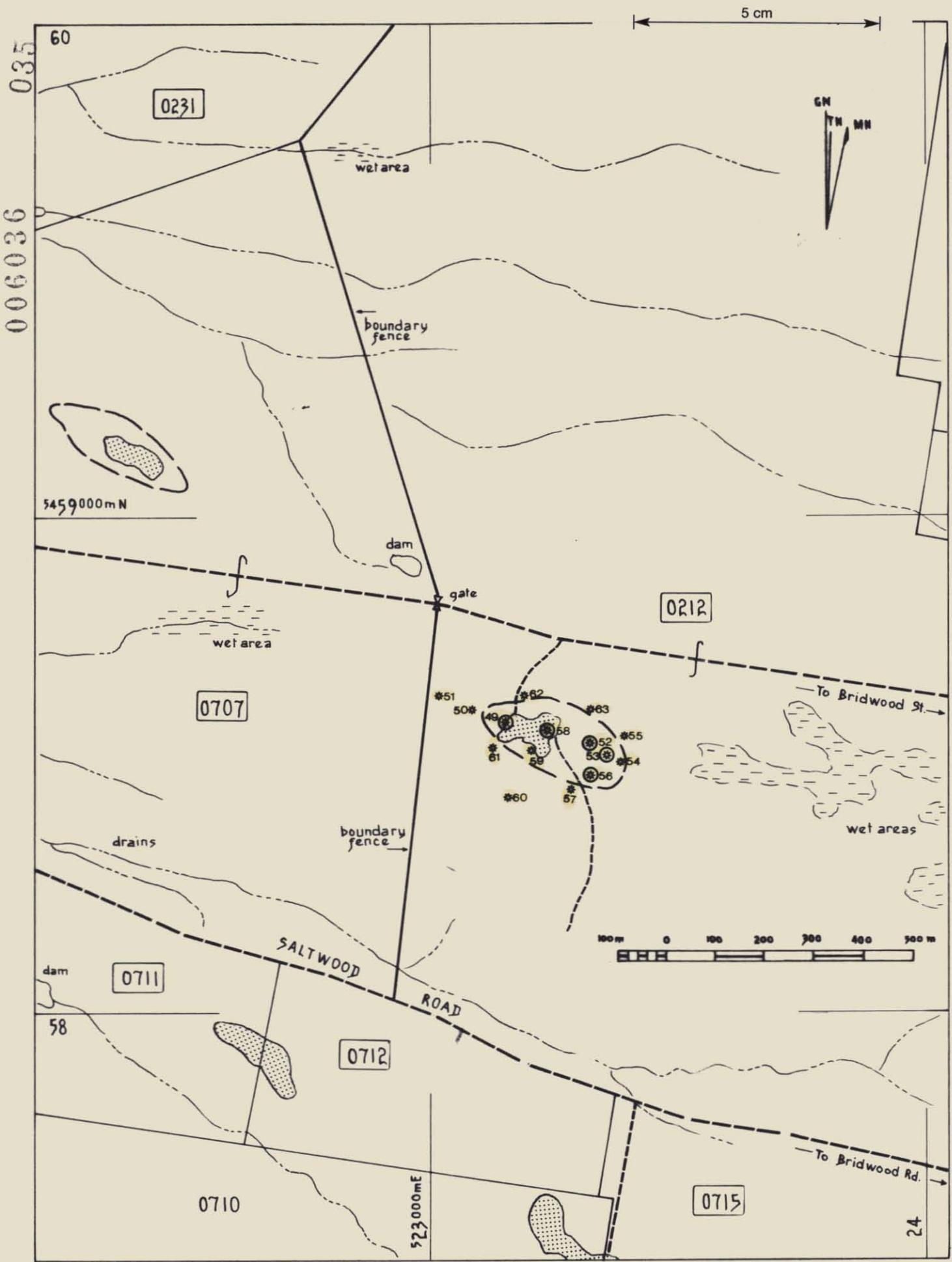
**EL 16/85 - PIPERS RIVER  
LOCATION MAP  
TEST PITS**  
Scale: 1:100 000 **FIGURE 1**

034  
006035



- Inferred boundary of Quartz pebbles gravel
- Current gravel pits
- \* Test Pits
- ⊛ Bulk Samples
- Property boundary
- Land parcel bdy.
- 0307 Land parcel No.

EL. 16/85 - PIPERS RIVER  
WEYMOUTH GRAVEL DEPOSIT  
TEST PITS  
Scale 1:10,000 FIGURE 2

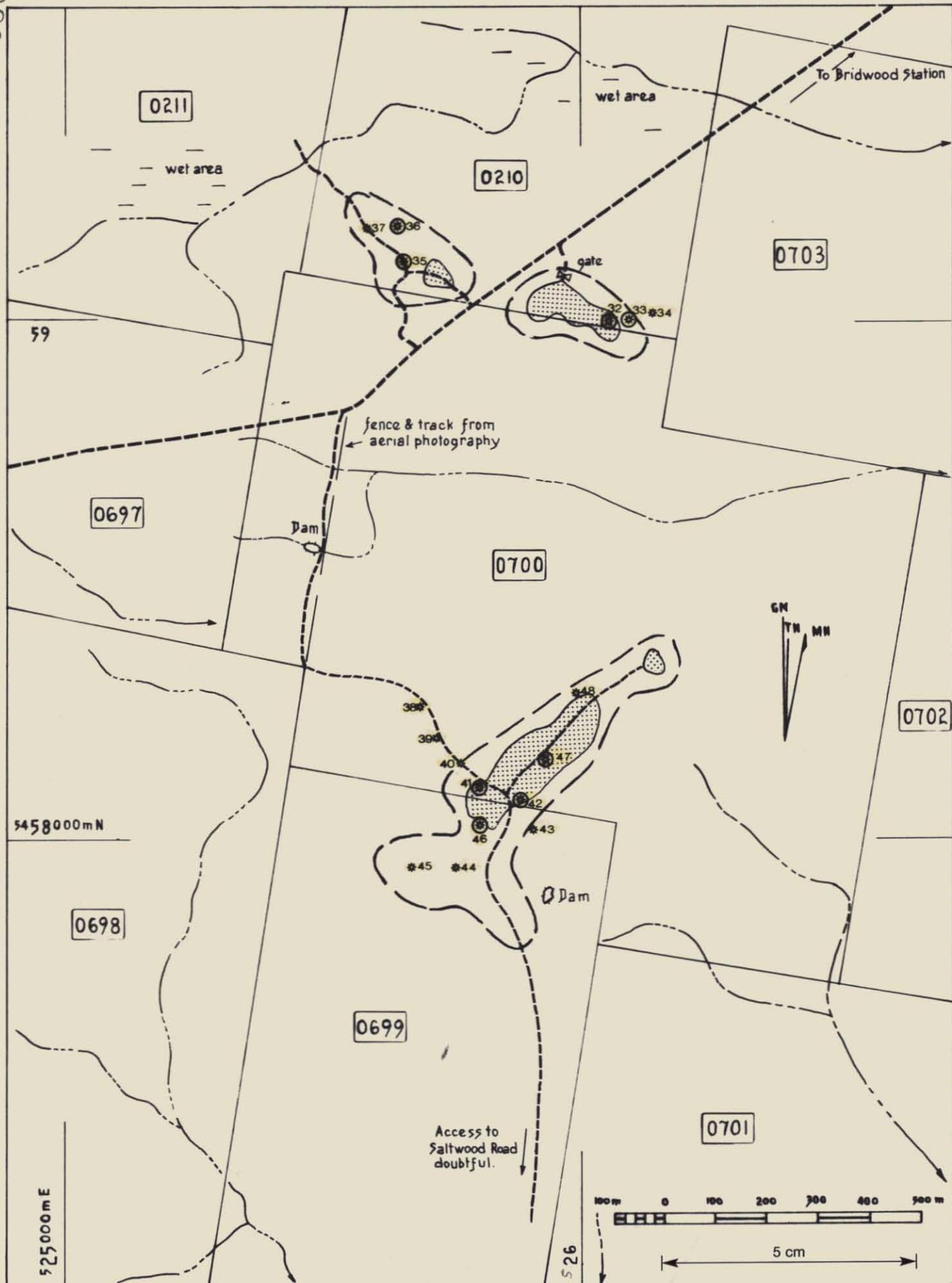


- Inferred boundary of Quartz pebble gravel
- Current gravel pits
- Test Pits
- Bulk Samples
- Property boundary
- Land parcel bdy.
- Land parcel No.

**EL. 16/85 - PIPERS RIVER  
GRAVEL PIT DEPOSIT  
TEST PITS**

Scale 1:10,000 **FIGURE 3**

036  
006037

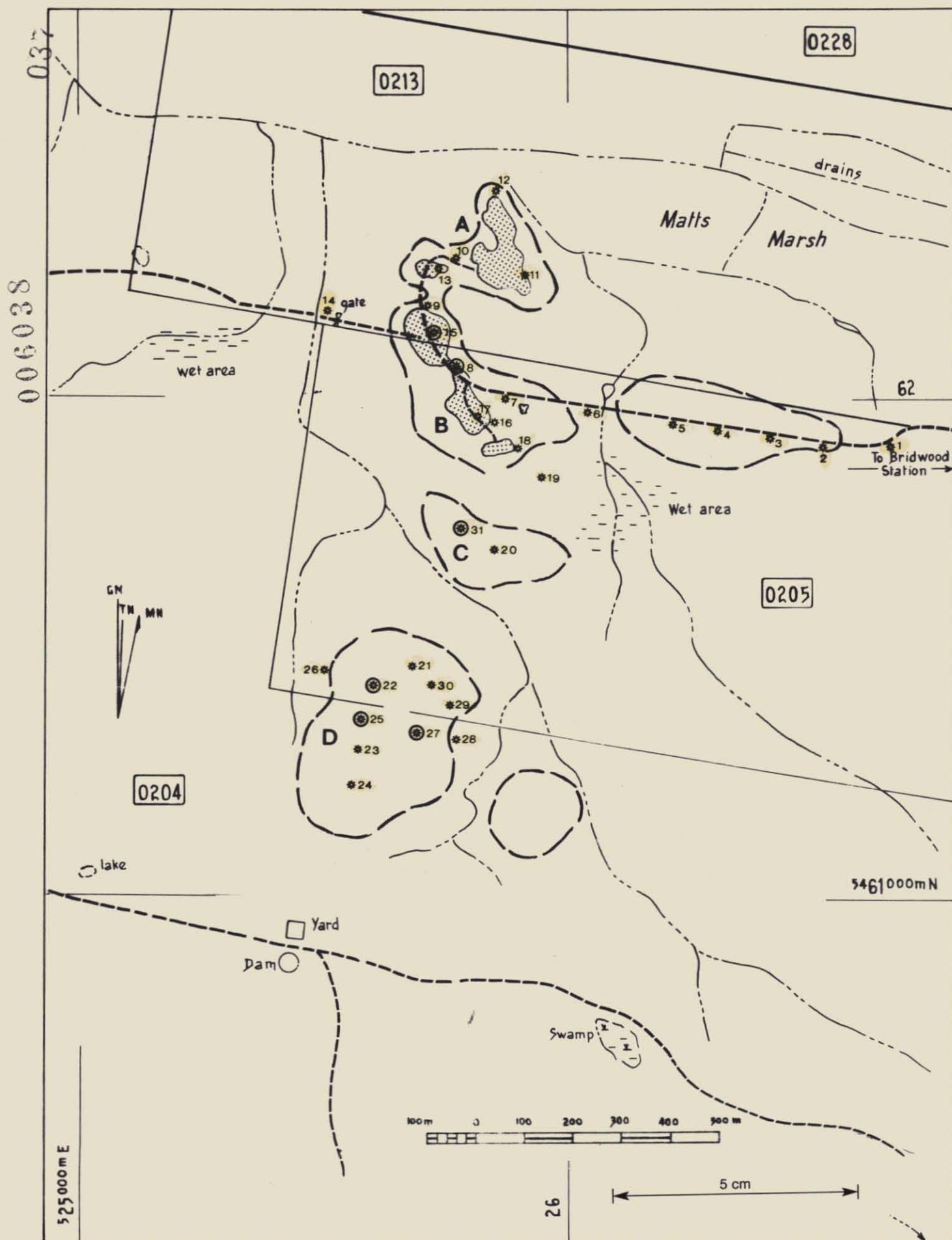


- Inferred boundary of Quartz pebble gravel
- Current gravel pits
- \* Test Pits
- Bulk Samples

- Property boundary
- Land parcel bdy.
- Land parcel No.

EL. 16/85 - PIPERS RIVER  
RIVER HILLS DEPOSIT  
TEST PITS

Scale 1:10,000 **FIGURE 4**



- Inferred boundary of Quartz pebble gravel
- Current gravel pits
- Test Pits
- Bulk Samples
- Property boundary
- Land parcel bdy.
- Land parcel No.

EL. 16/85 - PIPERS RIVER  
 BRIDWOOD DEPOSIT  
 TEST PITS

Scale 1:10,000 **FIGURE 5**

APPENDIX II

ANALYTICAL REPORT  
- SGS AUSTRALIA PTY LTD

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**SGS Australia Pty. Ltd.**

NEW SOUTH WALES  
74 McEvoy St., Alexandria, Sydney, N.S.W. 2016  
Telephone 699 7625 Telex: SGSSYD AA22395

WESTERN AUSTRALIA  
80 Railway Parade, Queens Park  
Telephone 458 1421 Telex: SGSPTH AA92624

QUEENSLAND MINES LIMITED  
Suite 2 / 8th Floor  
50 Margaret Street  
SYDNEY NSW 2000

Attention: Mr J.S. NOAKES

Our ref ..... LA 4629  
Your ref ..... JSN/rm  
Date received ..... 7/4/86  
Date completed ..... 24/4/86  
Issued at ..... SYDNEY

May 1, 1986

ANALYSIS OF SAMPLES SUPPLIED

**ANALYTICAL REPORT**

		SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	CaO	MgO	Na <sub>2</sub> O	K <sub>2</sub> O	P <sub>2</sub> O <sub>5</sub>	MnO	Cr <sub>2</sub> O <sub>3</sub>	LOI
1		%	%	%	%	%	%	%	%	%	%	%	%
2													
3	25	99.3	0.20	0.11	0.004	0.003	0.005	0.006	0.019	< 0.001	///	///	0.33
4													
5	36	99.6	0.044	0.027	0.033	0.002	0.002	0.005	0.008	< 0.001	///	///	0.30
6													
7	46	99.8	0.022	0.010	0.036	0.002	0.002	0.004	0.003	< 0.001	///	///	0.15
8													
9	56	99.5	0.24	0.007	0.013	0.006	0.001	0.009	0.014	< 0.001	///	///	0.22
10													
11													
12													
13													
14													
15													
16													
17													
18	METHOD:		AAS	AAS	AAS	AAS	AAS	AAS	AAS	Color- metric	AAS	AAS	Gravi- metri
19			SiO <sub>2</sub> by difference										
20			Samples washed, hand crushed (AGATE) LOI - 100°C										

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# SGS Australia Pty. Ltd.

NEW SOUTH WALES  
74 McEvoy St., Alexandria, Sydney, N.S.W. 2015  
Telephone 899 7625 Telex: SGSSYD AA22395

WESTERN AUSTRALIA  
80 Railway Parade, Queens Park  
Telephone 458 1421 Telex: SGSPTH AA92624

LA 4655

Our ref .....

Your ref .....

Date received 15.04.86

Date completed 22.05.86

Issued at SYDNEY

006041

QUEENSLAND MINES LIMITED  
FCA House 8th Floor  
50 Margaret Street  
SYDNEY / NSW 2000

Attention: Mr John S. NOAKES  
Chief Geologist

May 26, 1986

ANALYSIS OF SAMPLES SUPPLIED

## ANALYTICAL REPORT

Sample Ref.	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	CaO	MgO	Na <sub>2</sub> O	K <sub>2</sub> O	TiO <sub>2</sub>	LOI	
1	%	%	%	%	%	%	%	%	%	
2	8	99.5	0.14	0.051	0.002	0.004	0.006	0.009	0.042	0.26
3	15	99.1	0.37	0.073	0.005	0.010	0.008	0.024	0.033	0.36
4	22	99.0	0.42	0.082	0.002	0.007	0.008	0.015	0.045	0.38
5	27	99.1	0.36	0.067	0.001	0.006	0.008	0.024	0.010	0.42
6	31	99.8	0.008	0.004	0.001	0.001	0.004	0.002	0.003	0.17
7	32	99.6	0.060	0.036	0.004	0.004	0.004	0.009	0.073	0.20
8	33	99.8	0.017	0.013	0.001	0.002	0.004	0.003	0.042	0.14
9	35	99.3	0.13	0.078	0.002	0.003	0.004	0.005	0.092	0.37
10	41	99.8	0.013	0.013	0.001	0.002	0.003	0.002	0.055	0.13
11	42	99.7	0.020	0.015	0.001	0.002	0.003	0.003	0.033	0.17
12	47	99.6	0.11	0.032	0.001	0.004	0.004	0.016	0.074	0.20
13	49	99.6	0.11	0.010	0.006	0.002	0.005	0.004	0.039	0.20
14	52	99.7	0.083	0.005	0.003	0.002	0.005	0.009	0.055	0.17
15	53	99.4	0.24	0.026	0.005	0.007	0.009	0.026	0.11	0.13
16	58	99.6	0.11	0.019	0.004	0.004	0.004	0.010	0.036	0.23
17										
18	Method:		AAS	AAS	AAS	AAS	AAS	AAS	Color- imetric	Grav- imetric
19										
20										

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