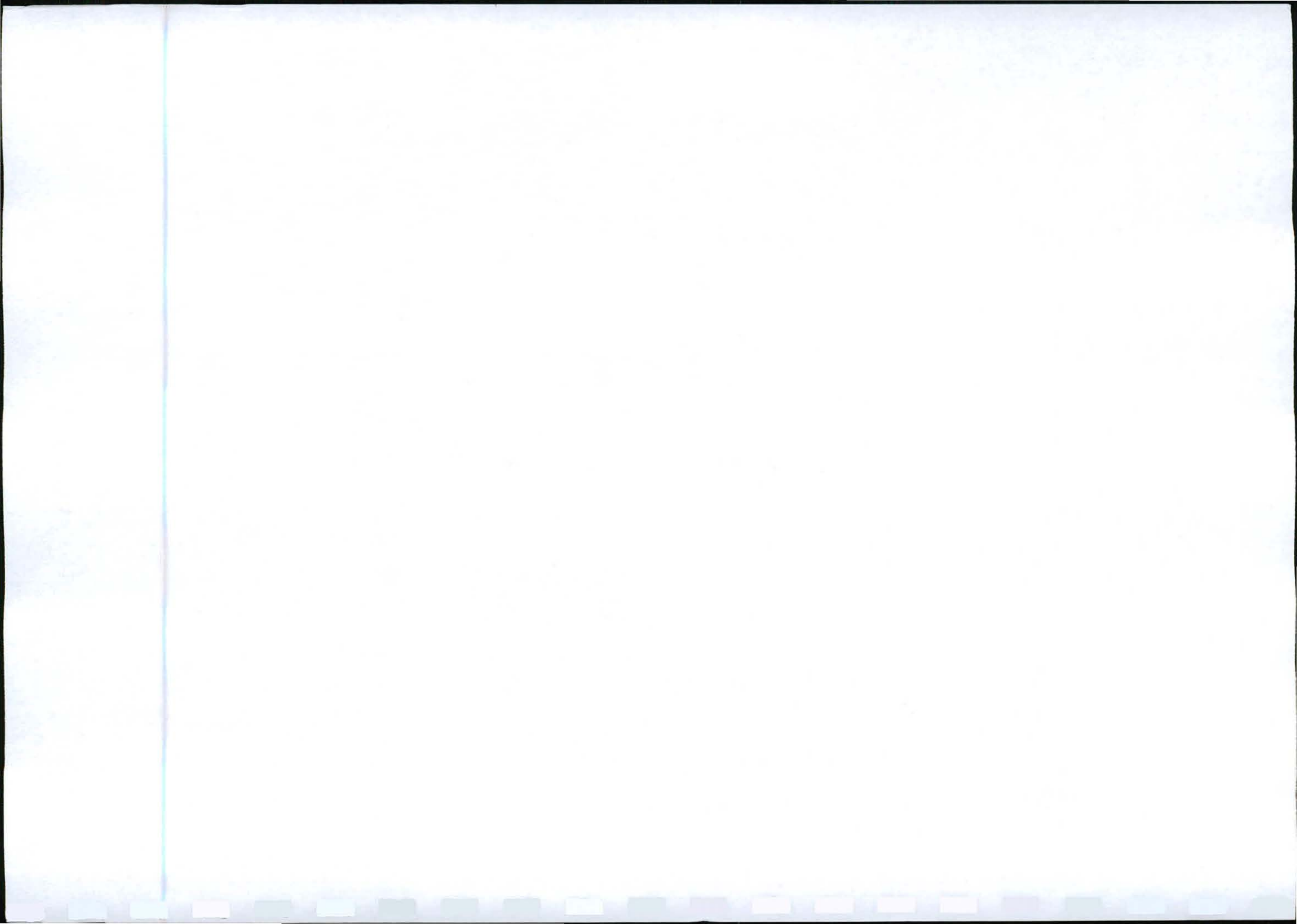


- 13.22 Von Breitbach, F. 1985. Southern Cape Tree Guide. Pamphlet 360. Department of Environmental Affairs and Forestry. Pretoria.
- 13.23 Weather Bureau (1988). Climate of South Africa - Climate statistics up to 1984 (WB40). Government Printer, Pretoria.
- 13.24 Weinert H. H. (1980). The Natural Road Construction Materials of Southern Africa. Academica, Cape Town.



APPENDIX 1:

**ENGCOBO ROAD
MAINTENANCE PROGRAMME:**

Photographs.

Application received in terms of the Mineral and Petroleum
Resources Development Act, 2002 (Act 28 of 2002)
EASTERN CAPE REGION

11 AUG 2009

Print Name S LYRWENGI

Signature [Signature]

DEPARTMENT OF MINERALS AND ENERGY

D2009/08/11/001
Ec 30/5/1/3/2/0366 MP

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PHOTO 1: Typical landscape in the high-lying northern part of the study area.

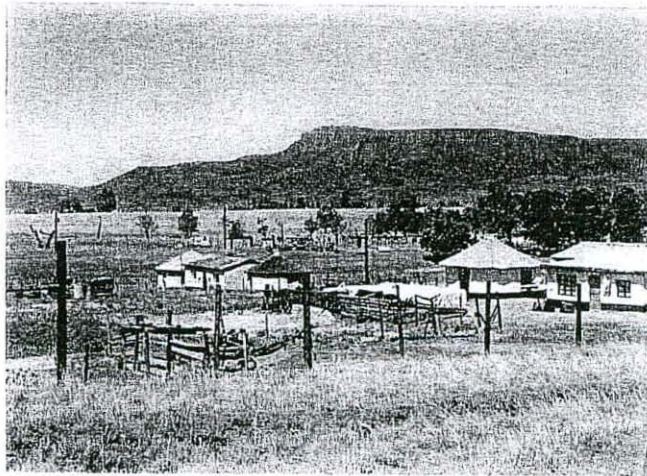


PHOTO 2: The All Saints Road Camp in the central-background.



PHOTO 3: Afromontane Forest in the northern part of the study area.



PHOTO 4: The road cuts through Afromontane Forest in remote areas.

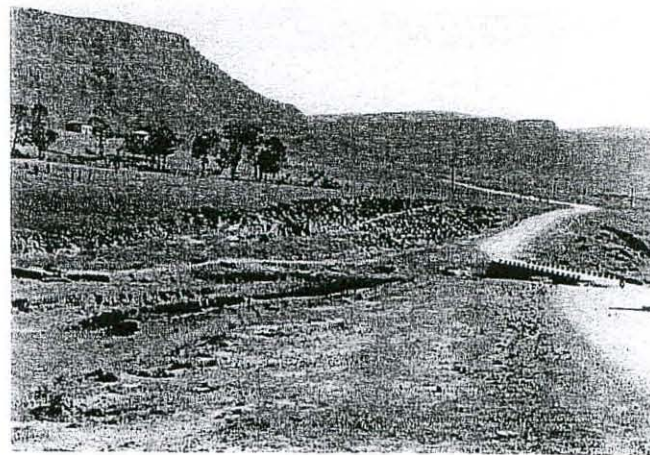
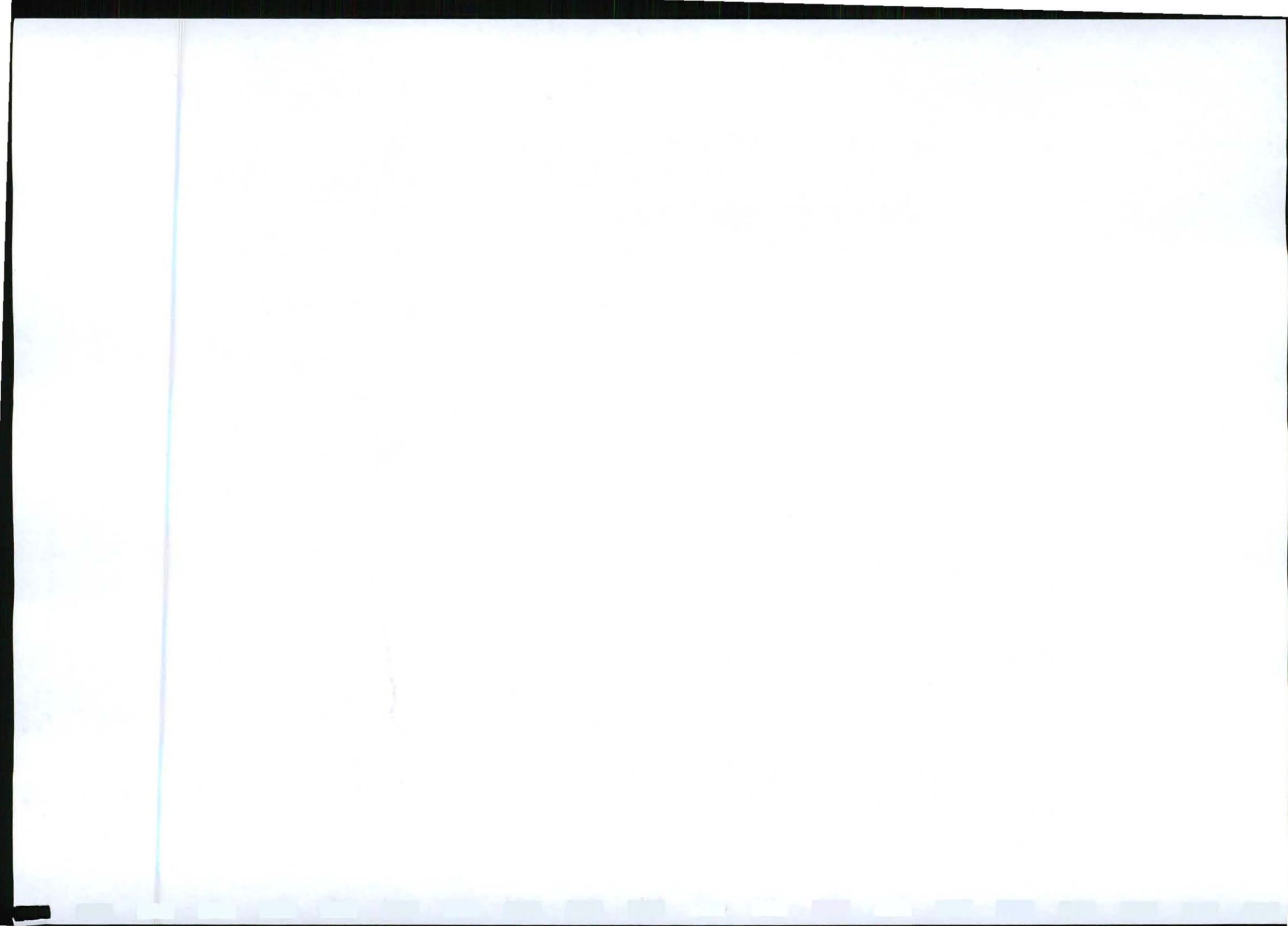


PHOTO 5: Erosion within drainage systems in the lower-lying areas.



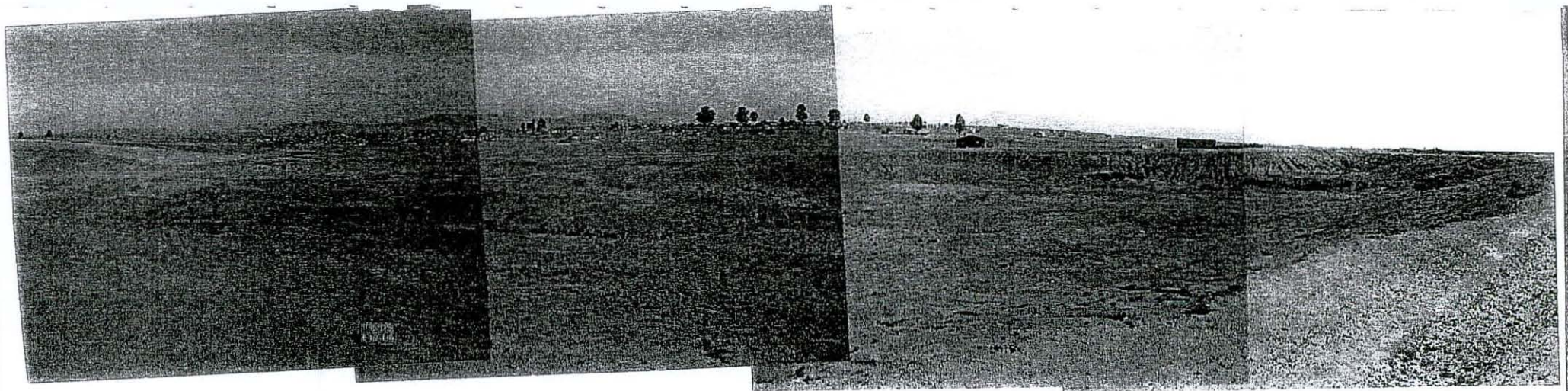


PHOTO 6: A north-westerly view of Borrow Pit 715/1 at Stake Value km 1,2 (LHS).

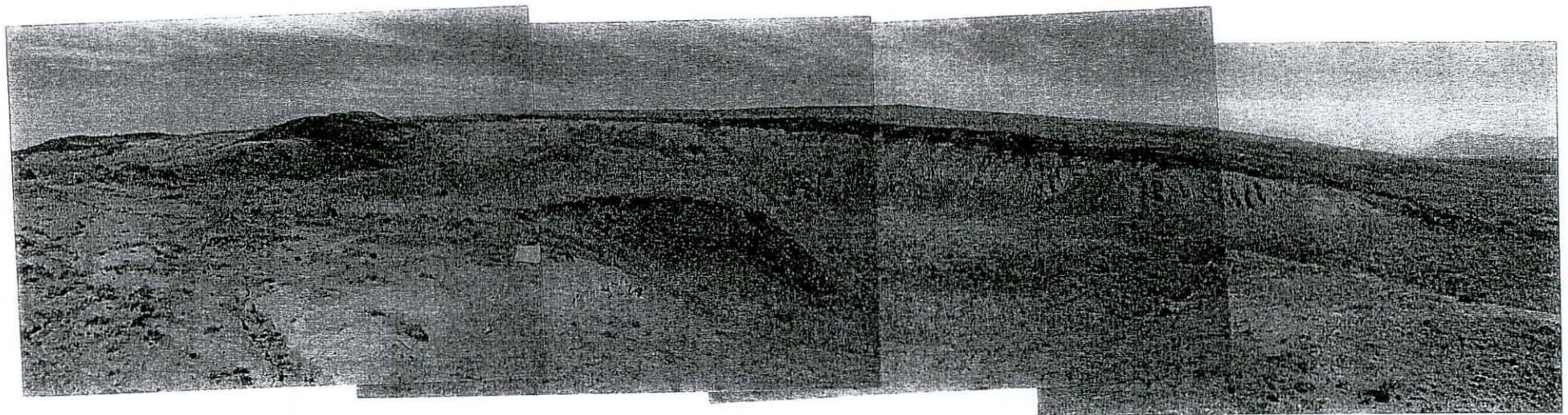


PHOTO 7: A north-westerly view of Borrow Pit 715/2 at Stake Value km 7,7 (RHS).



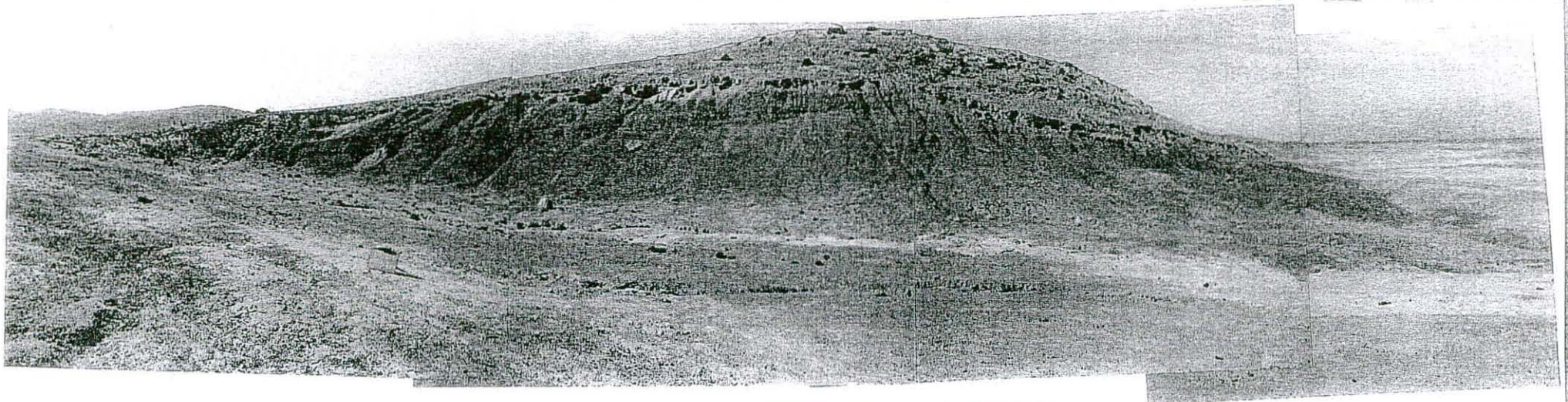


PHOTO 8: An easterly view of Borrow Pit 715/3 at Stake Value km 9,7 (RHS).



PHOTO 9: A view of the north-easterly part of Borrow Pit 715/3 at Stake Value km 9,7 (RHS), showing erosion scours in a rehabilitated slope.

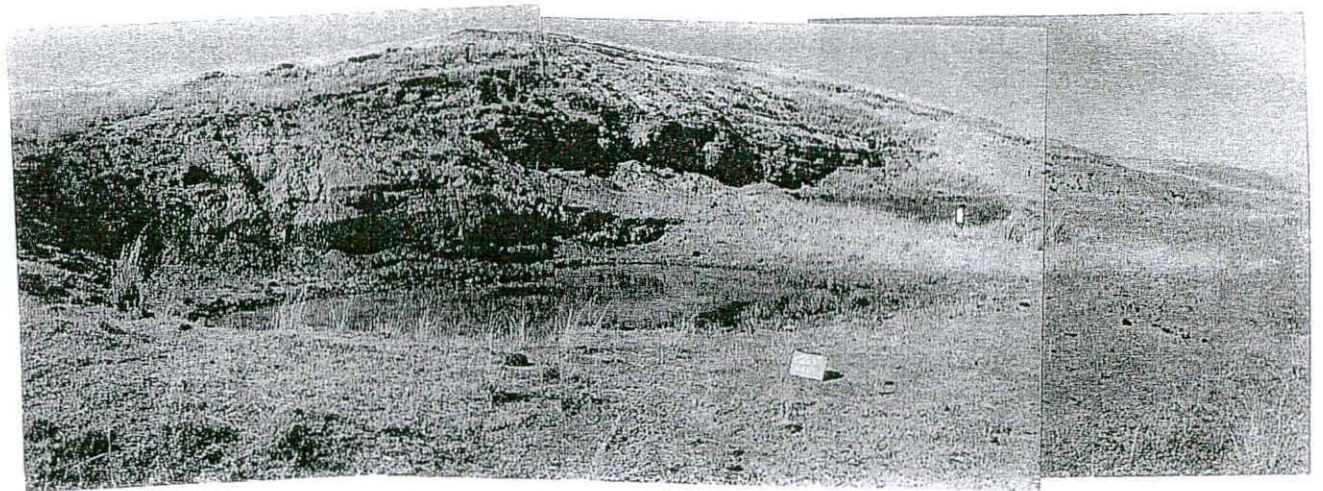


PHOTO 10: A south-easterly view of Borrow Pit 715/4 at Stake Value km 19,8 (RHS).



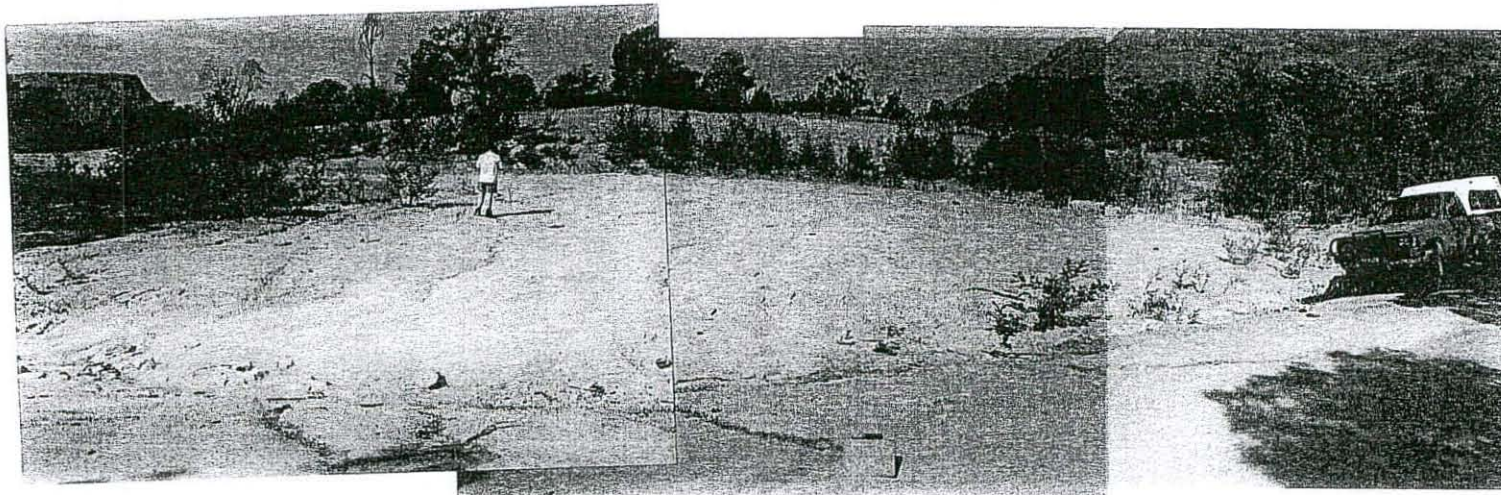


PHOTO 11: A westerly view of Borrow Pit 715/5 at Stake Value km 24,3 (LHS).

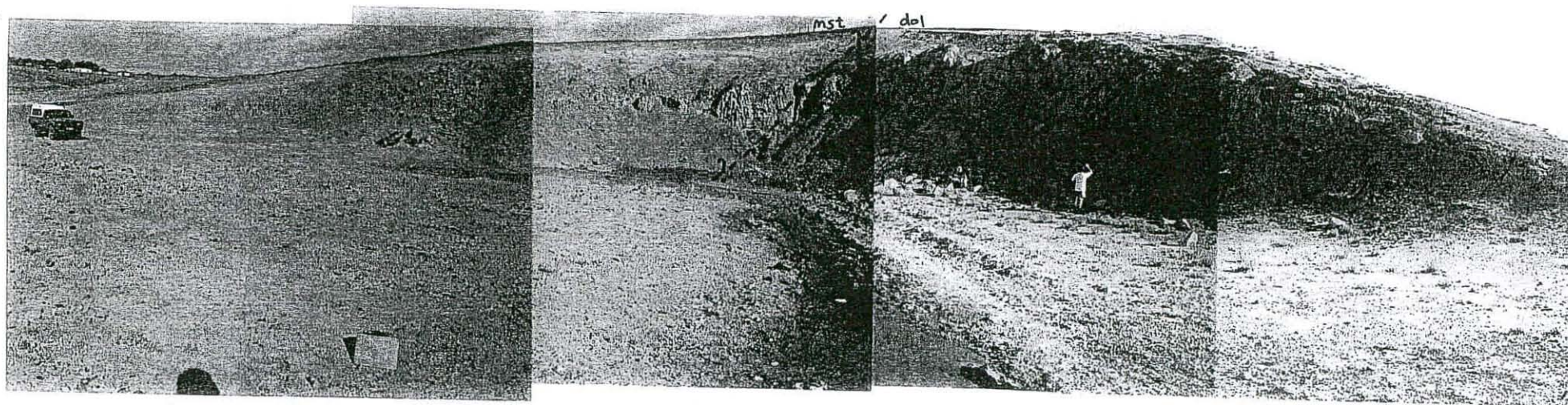
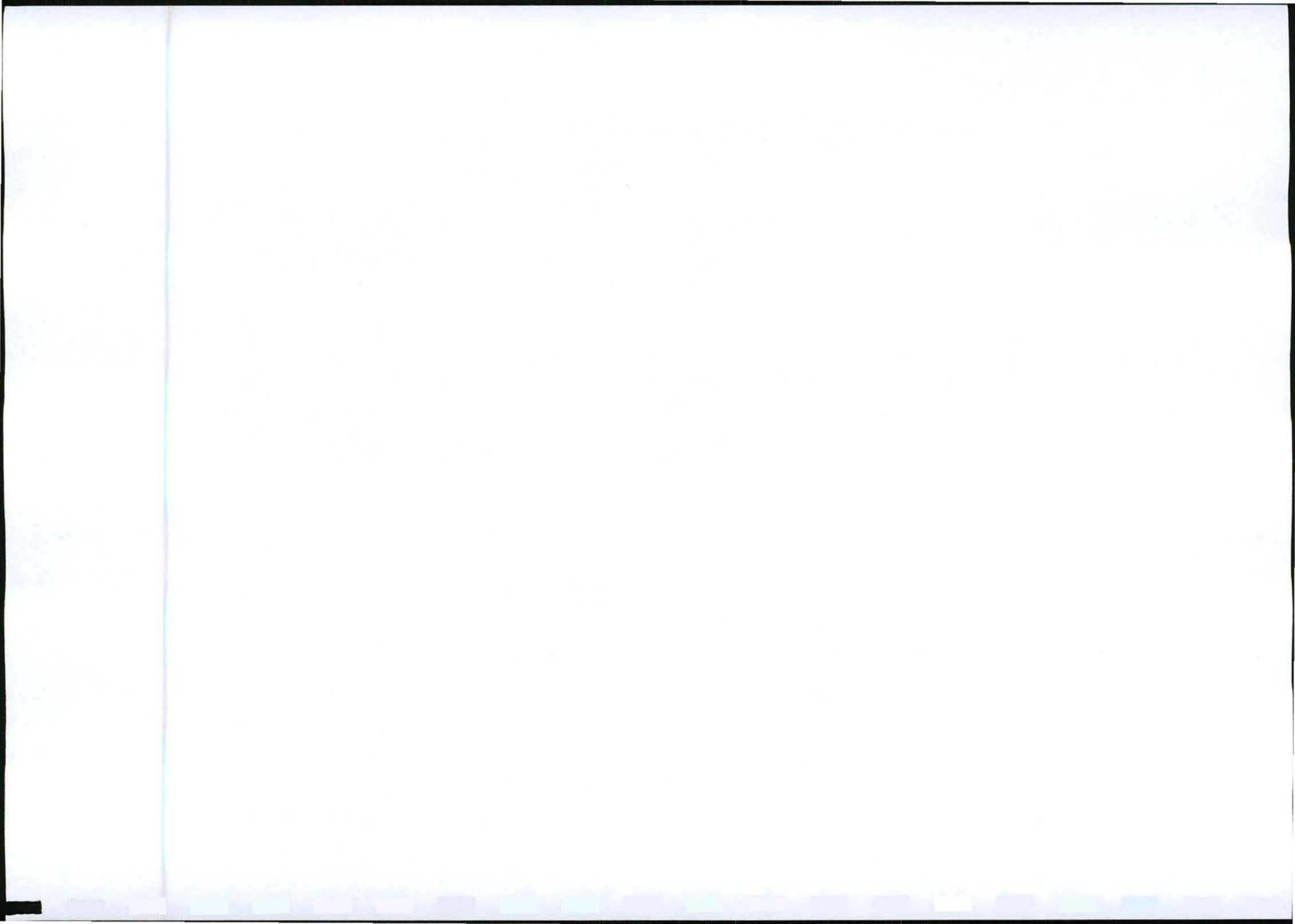


PHOTO 12: A north-easterly view of Borrow Pit 715/8 at Stake Value km 32,1 (RHS).



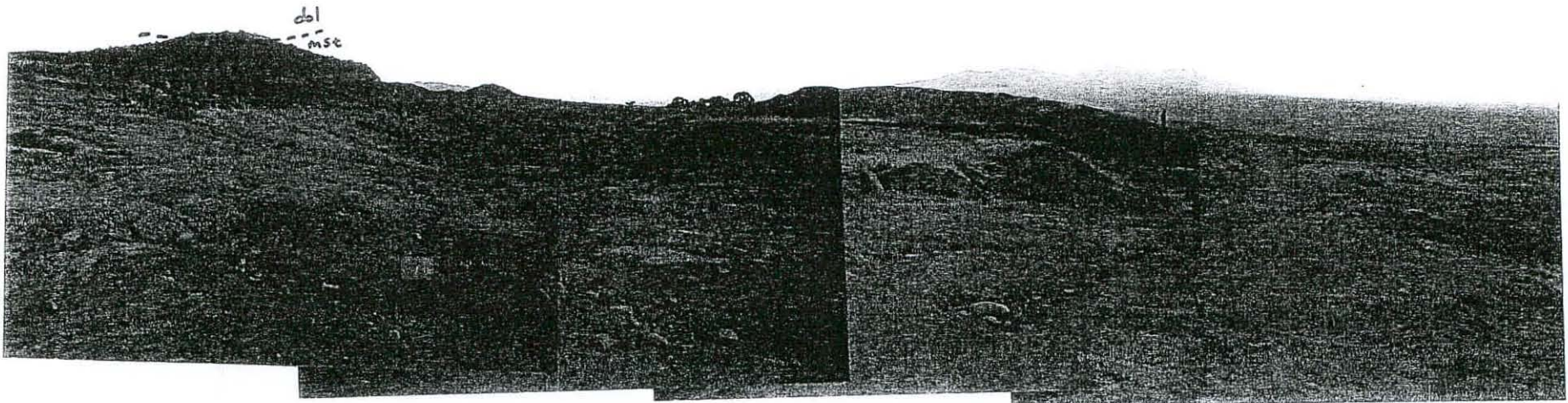


PHOTO 13: A south-easterly view of Borrow Pit 8034/2 at Stake Value km 5,6 (RHS).

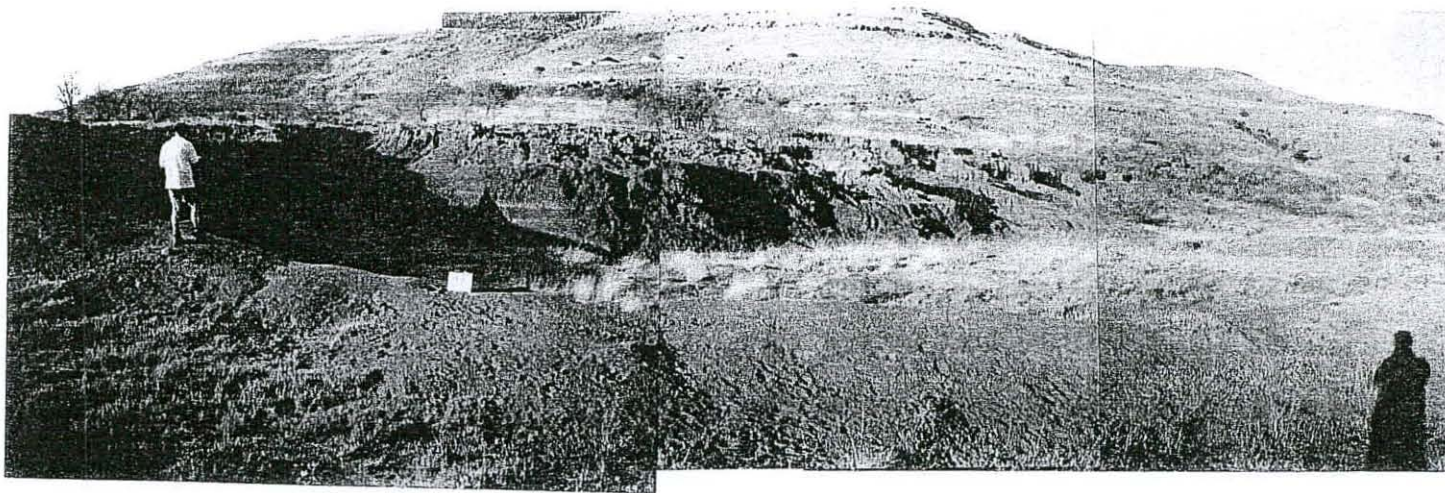
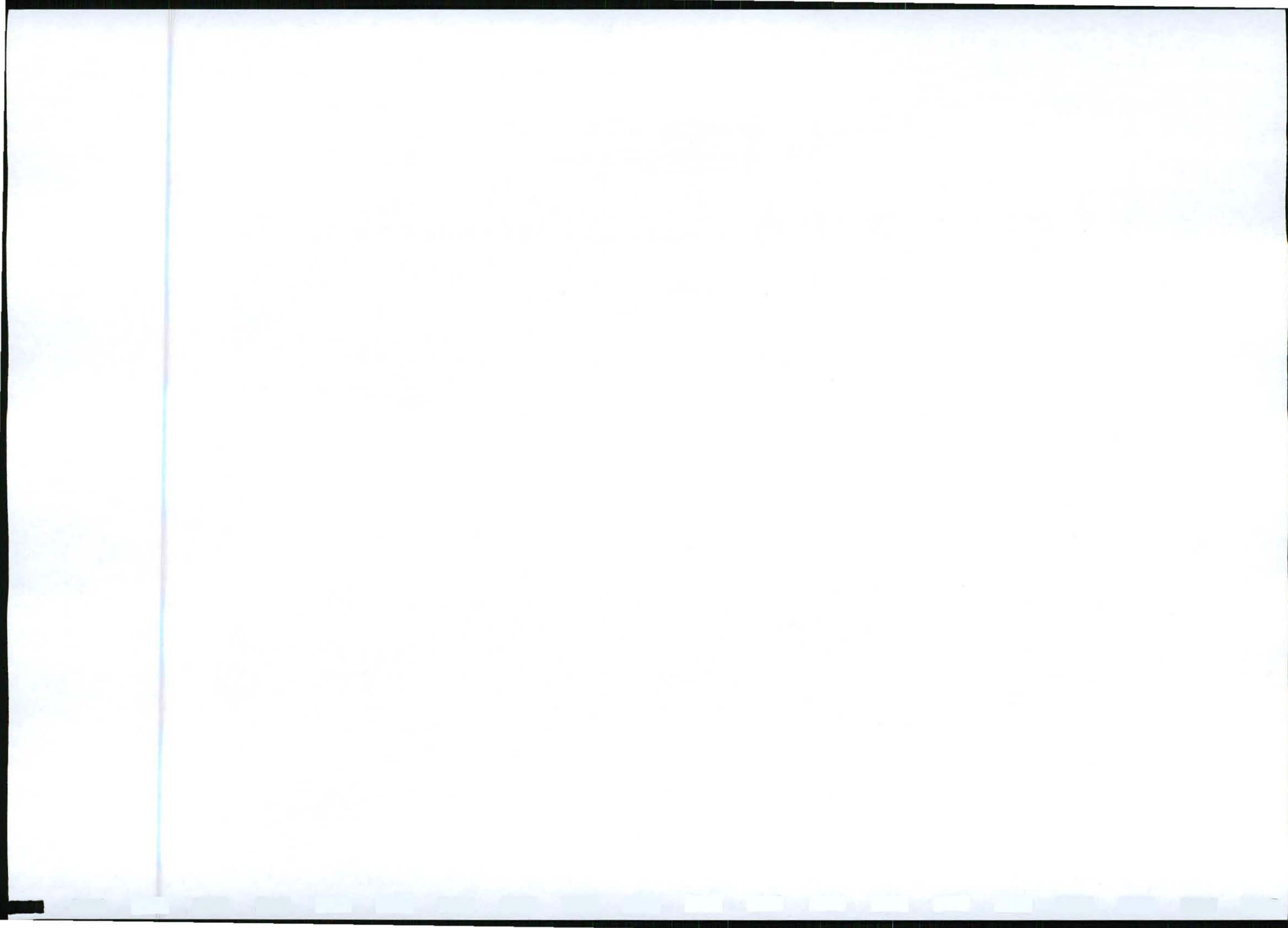


PHOTO 14: A south-easterly view of Borrow Pit 8034/3 at Stake Value km 11,0 (LHS).



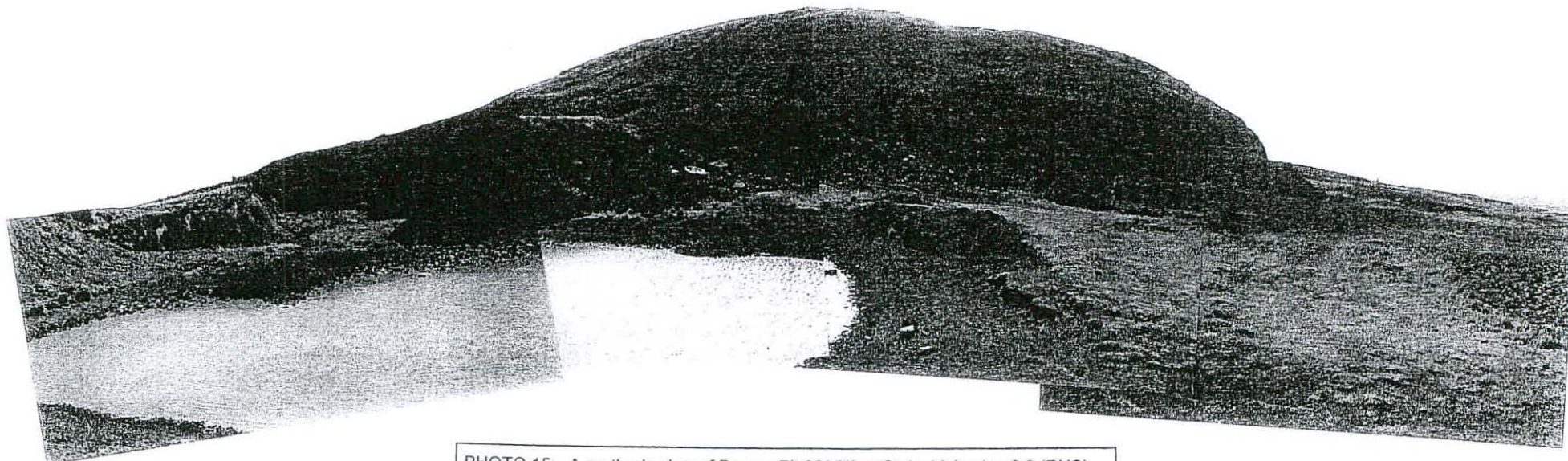


PHOTO 15: A northerly view of Borrow Pit 8035/0 at Stake Value km 0,0 (RHS).



PHOTO 16: A southerly view of Borrow Pit 8036/1 at Stake Value km 5,1 (RHS).

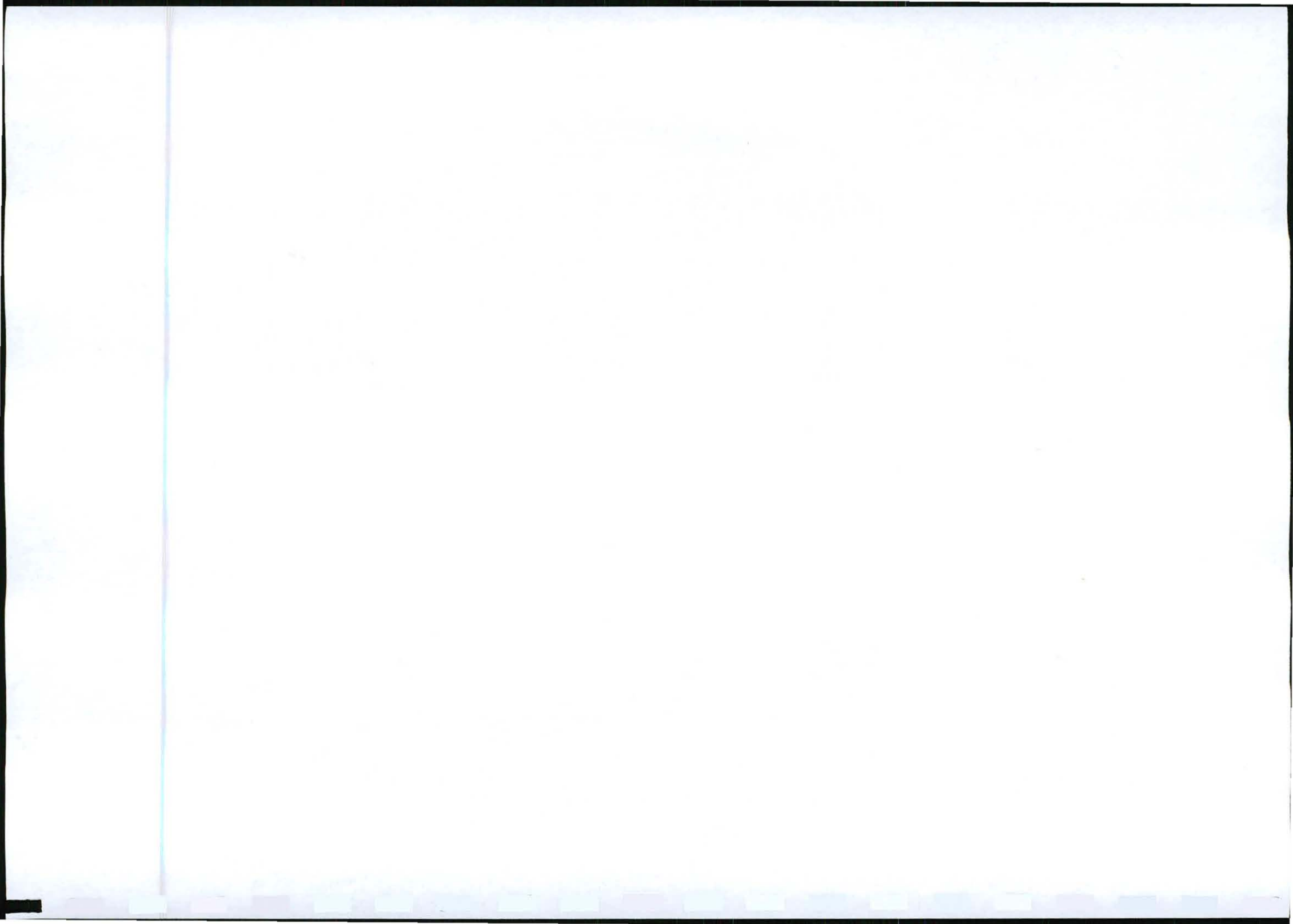




PHOTO 17: A north-westerly view of Borrow Pit 8036/3 at Stake Value km 13,1 (RHS).

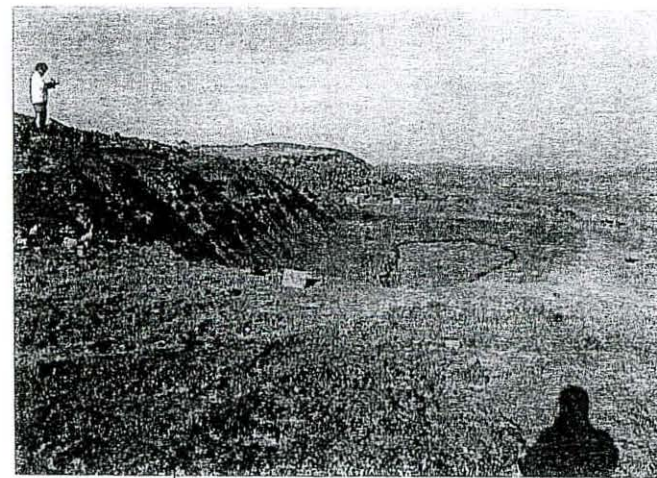


PHOTO 18: An south-westerly view of Borrow Pit 8036/5 at Stake Value km 18,9 (LHS).

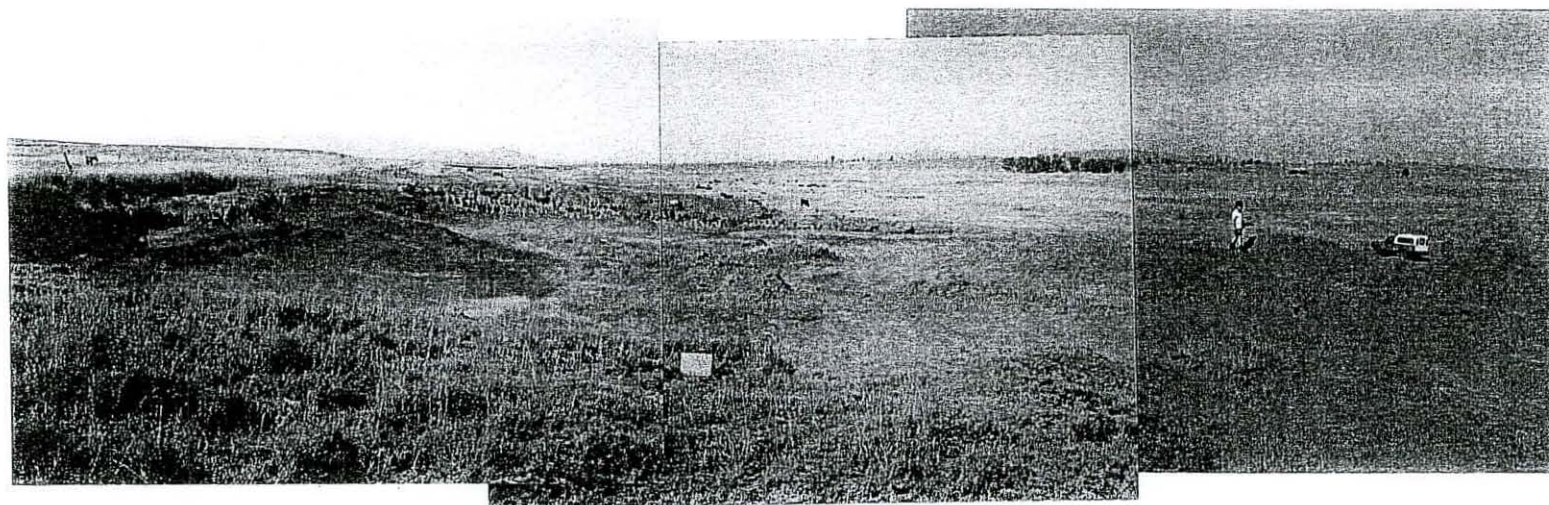


PHOTO 19: A south-easterly view of Borrow Pit 8225/1 at Stake Value km 7,4 (RHS).

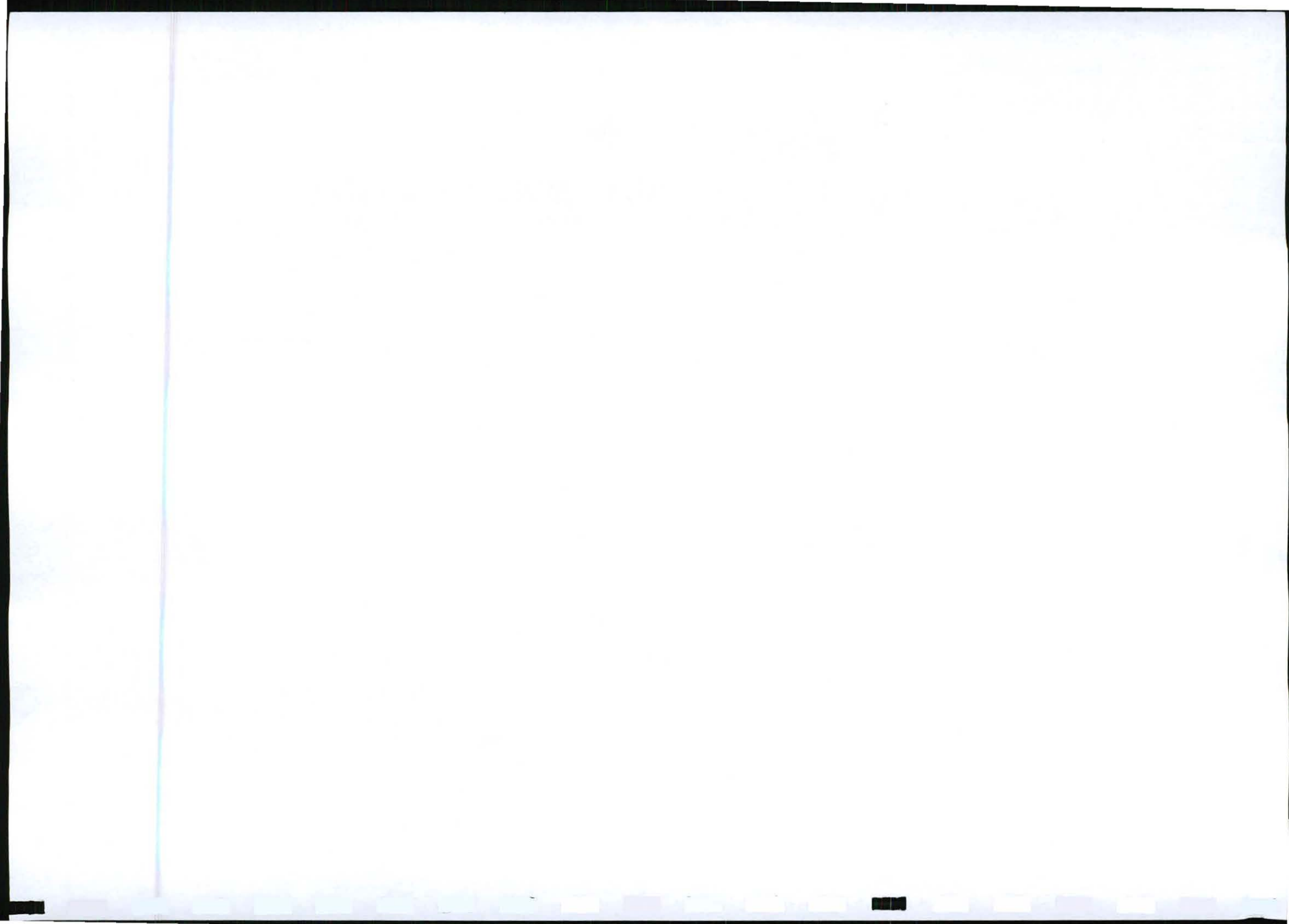




PHOTO 20: A north-easterly view of Borrow Pit 8225/2 at Stake Value km 13,3 (LHS).

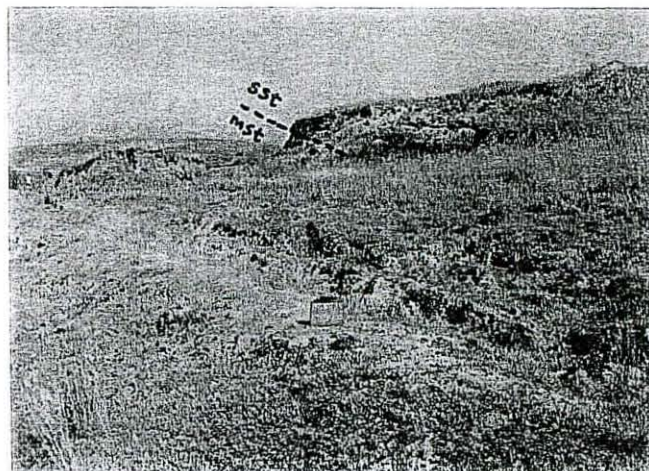


PHOTO 21: A south-westerly view of Borrow Pit 8225/3 at Stake Value km 13,5 (LHS).

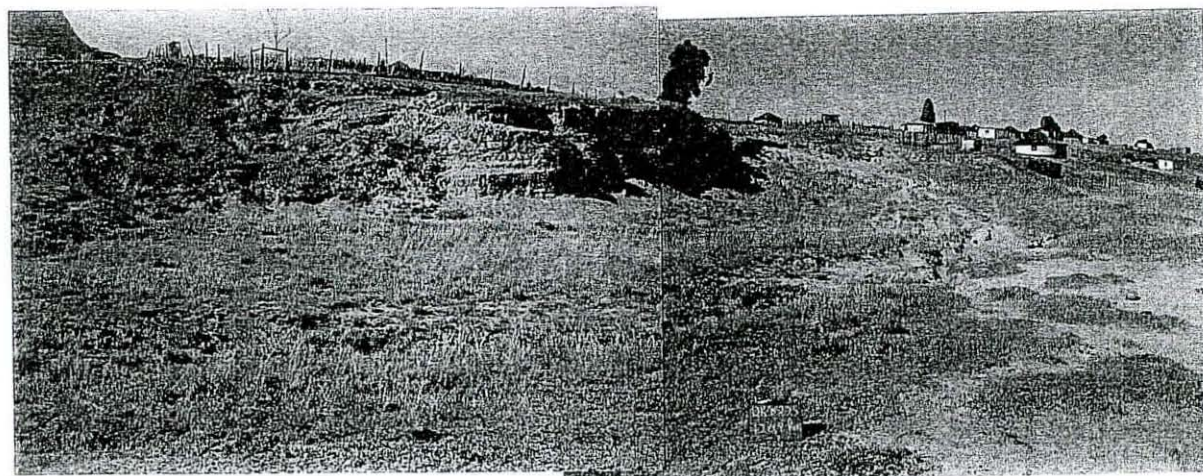
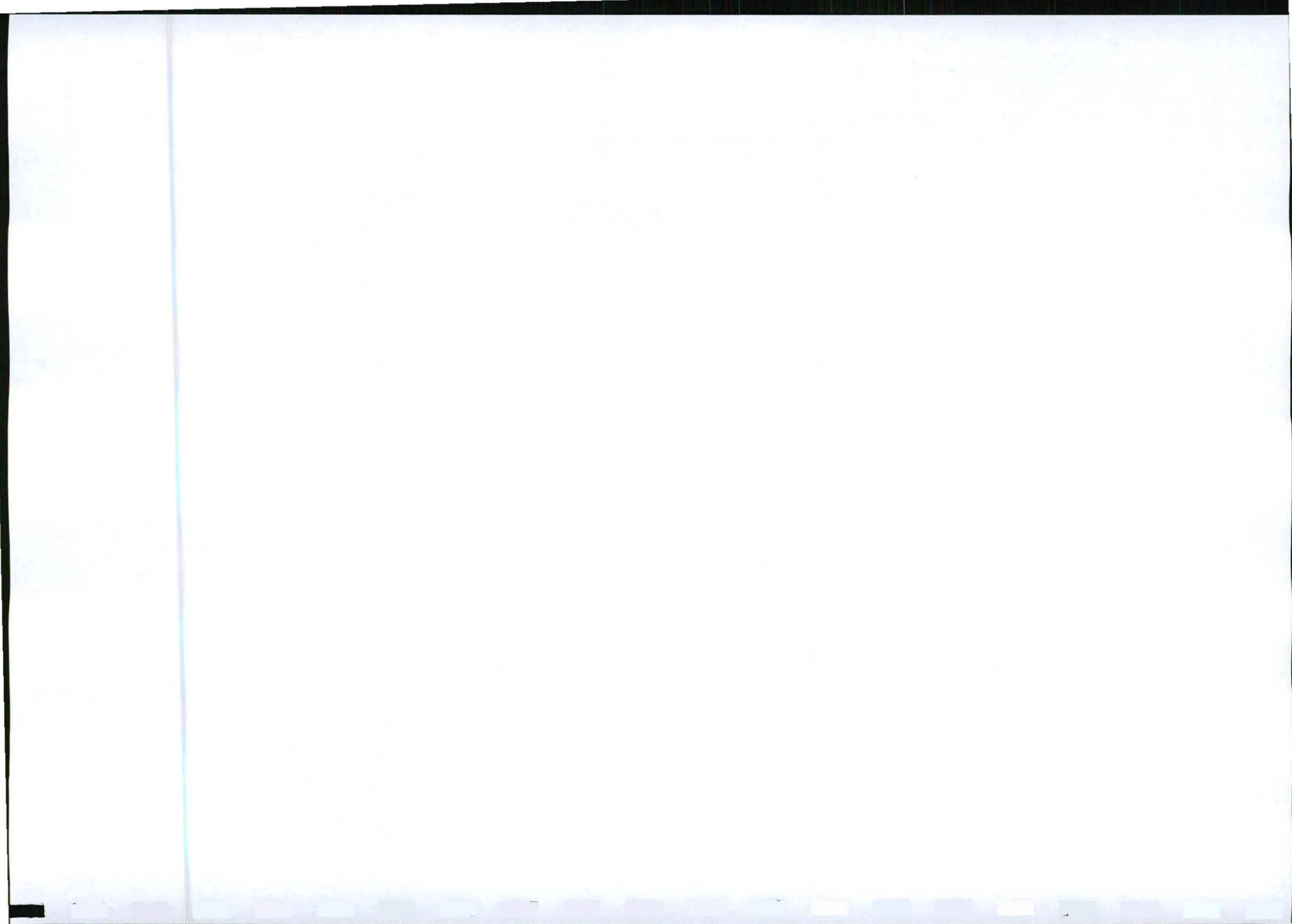


PHOTO 22: A south-easterly view of Borrow Pit 8225/4 at Stake Value km 20,8 (RHS).



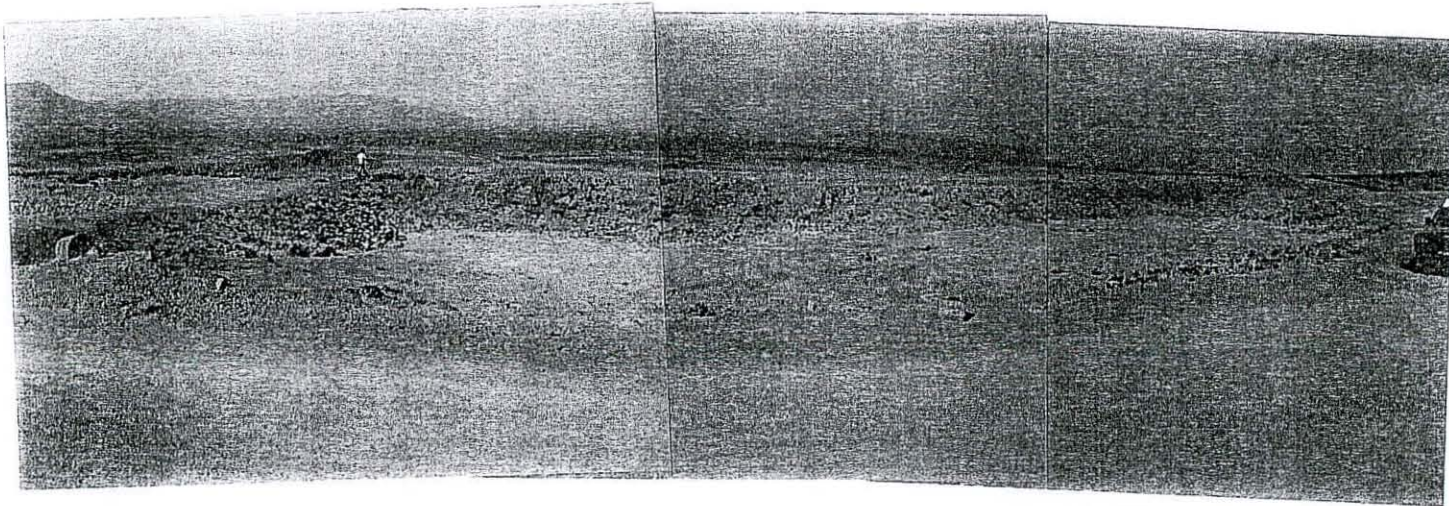


PHOTO 23: A north-easterly view of Borrow Pit 8224/1 at Stake Value km 3,2 (RHS).
Borrow Pit 8224/1 was encountered along the DR08226 roadway.



PHOTO 24: An easterly view of Borrow Pit 8227/1 at Stake Value km 1,5 (RHS).

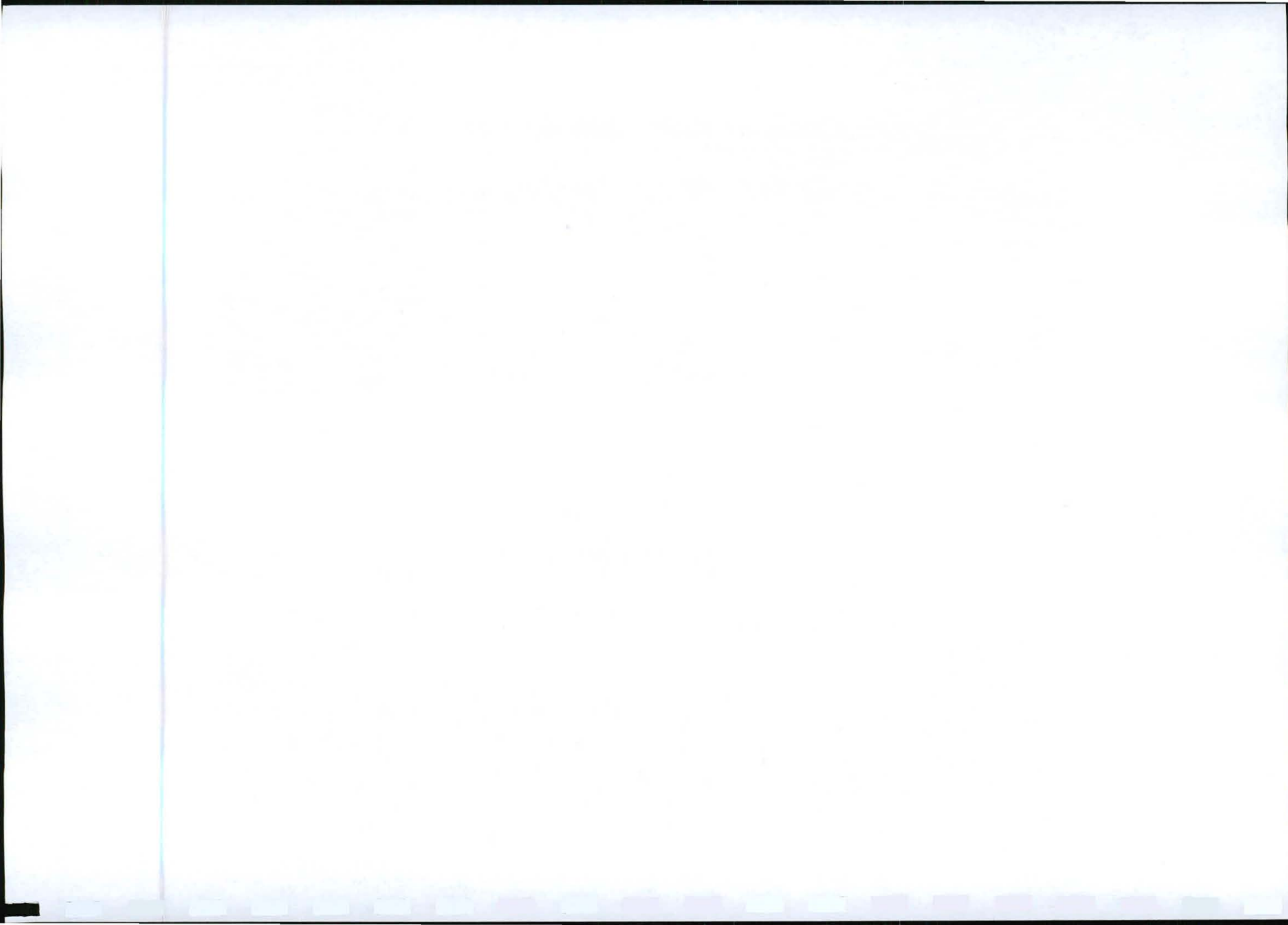


PHOTO 26: A northerly view of Borrow Pit 8229/2 at Stake Value km 1.3 (LHS).

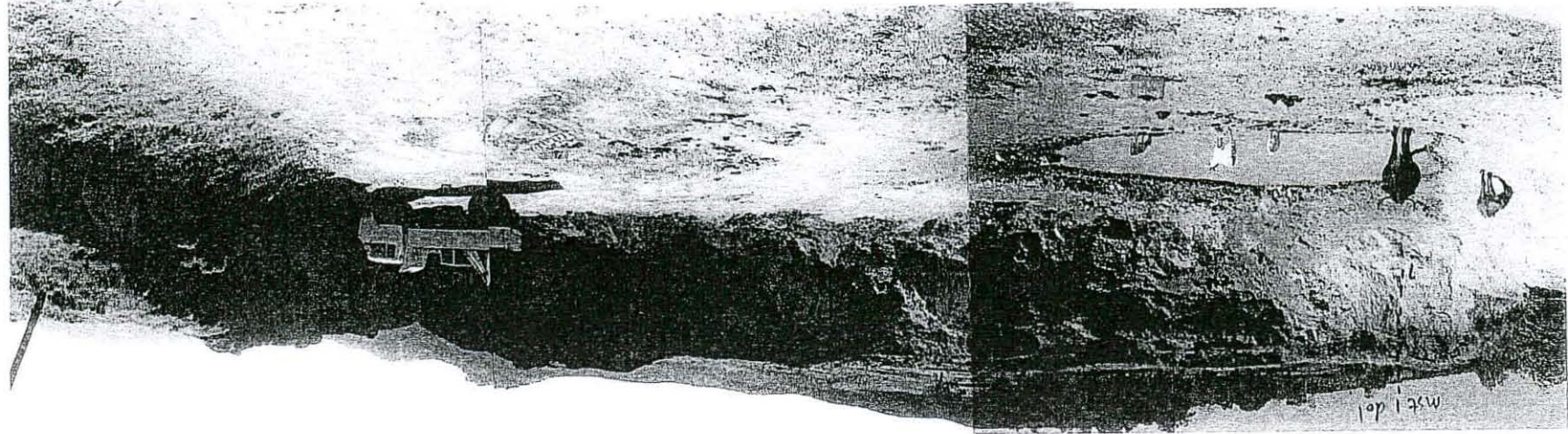
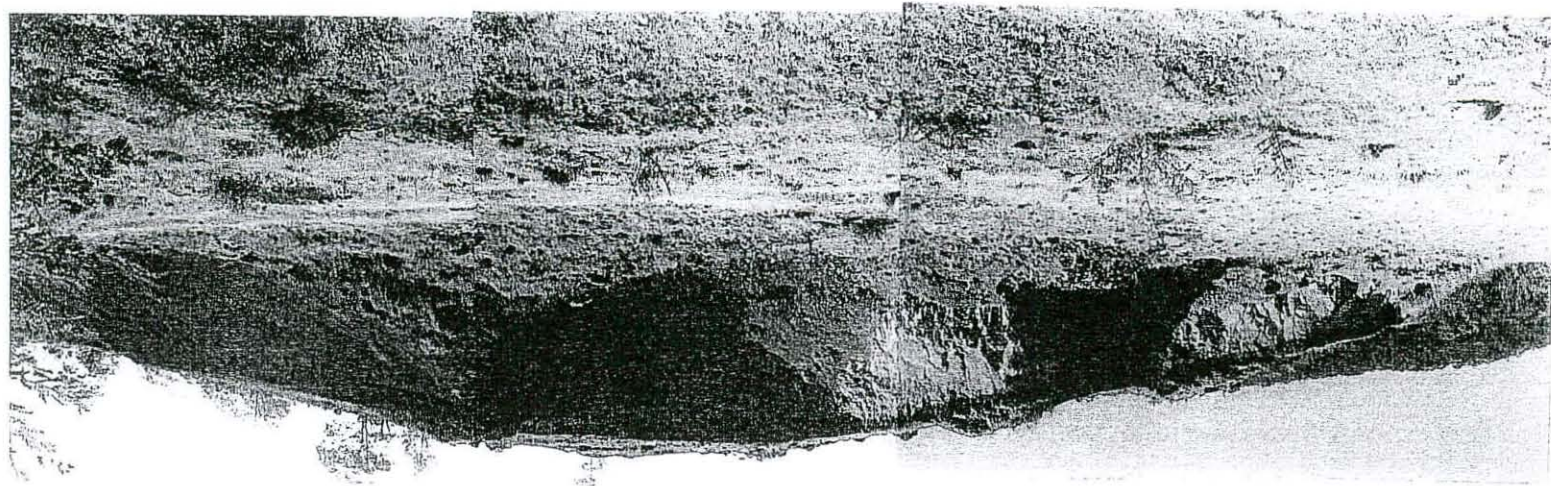
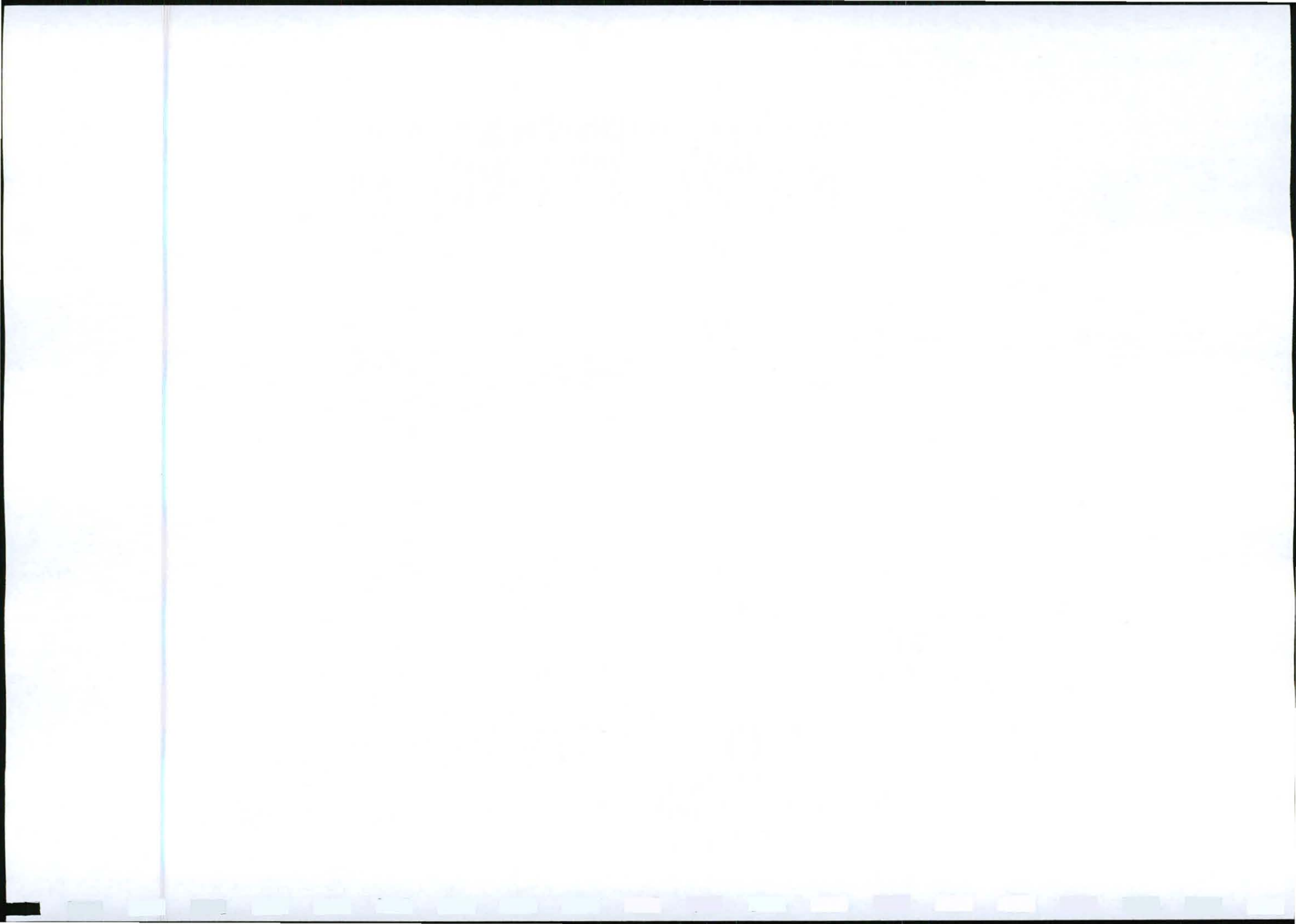


PHOTO 25: A south-westerly view of Borrow Pit 8229/1 at Stake Value km 1.1 (LHS).





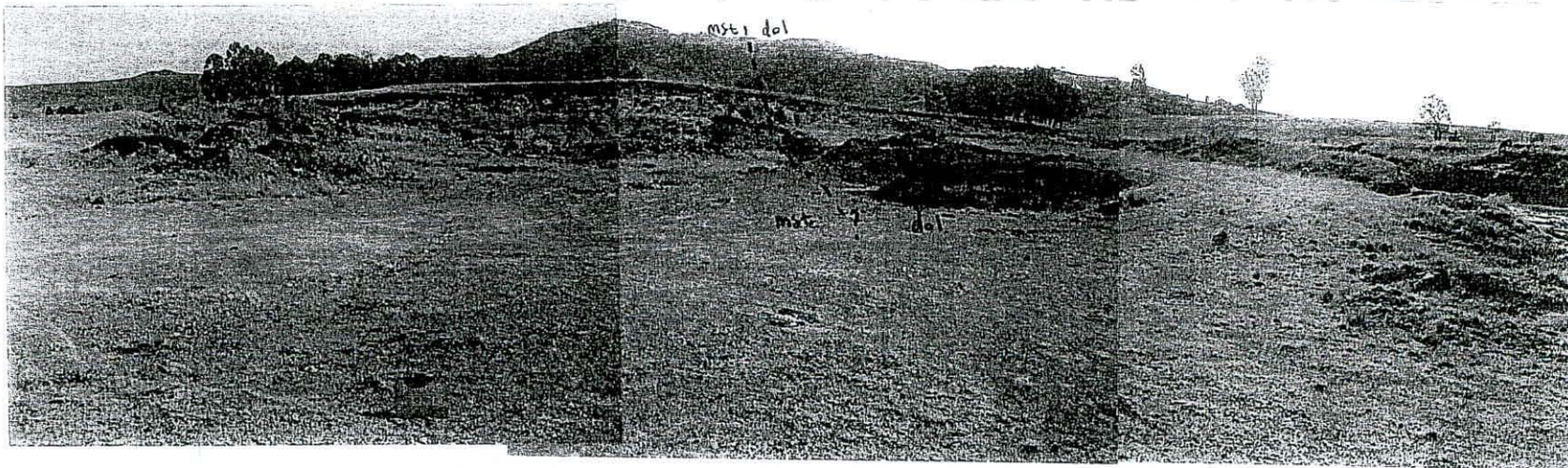


PHOTO 27: A north-westerly view of Borrow Pit 8229/3 at Stake Value km 3,6 (LHS).

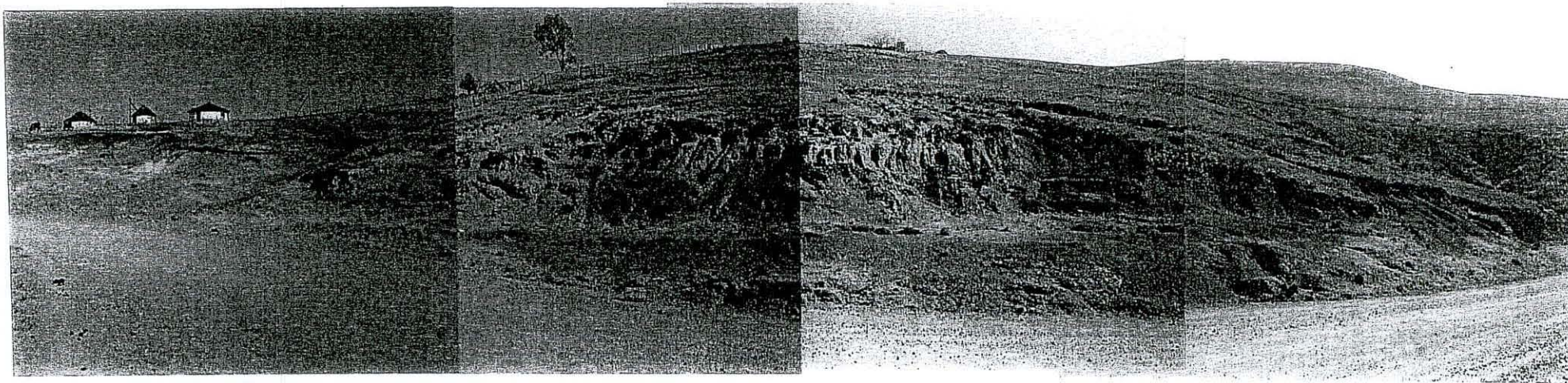
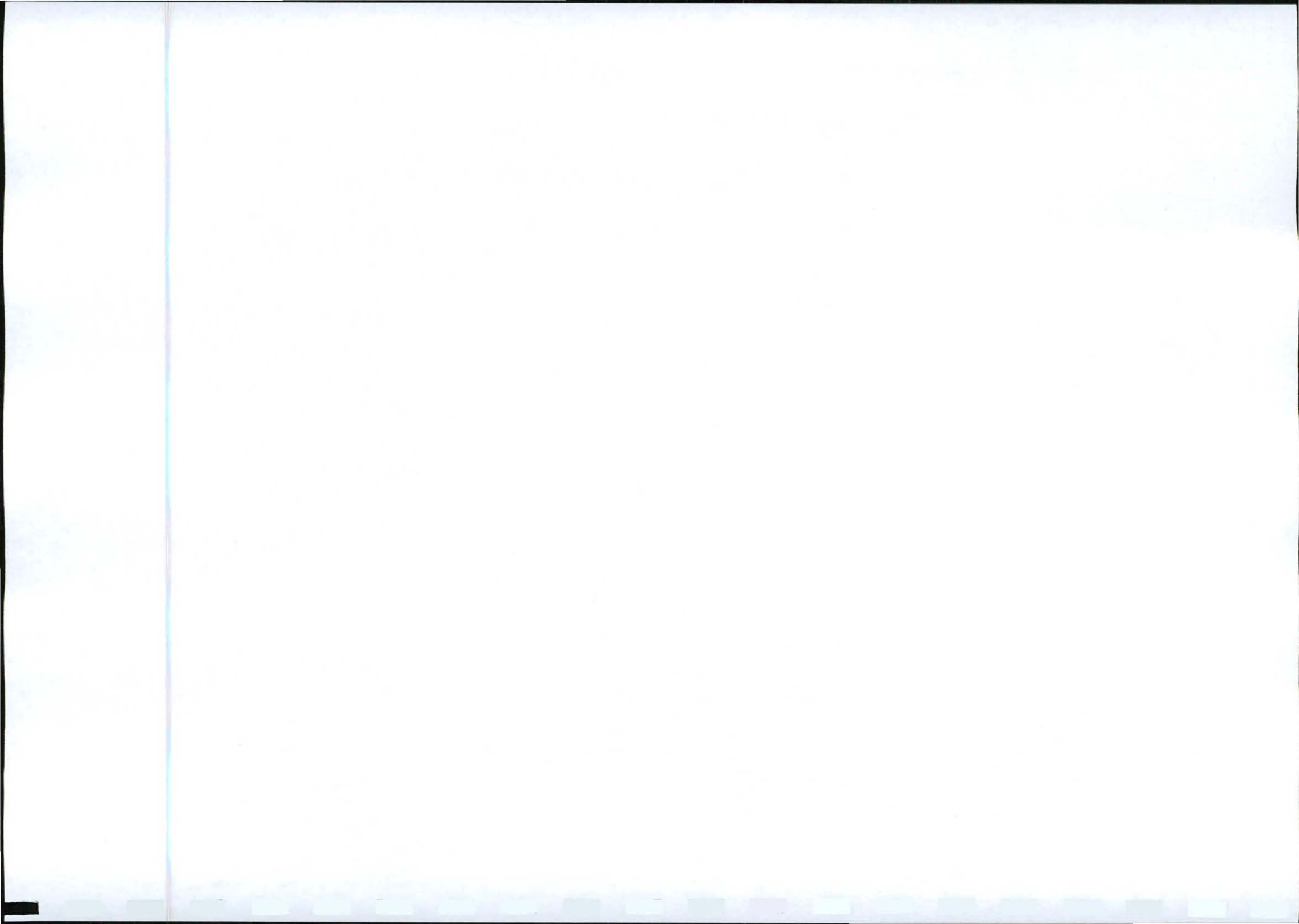


PHOTO 28: A north-westerly view of Borrow Pit 8229/4 at Stake Value km 4,5 (LHS).



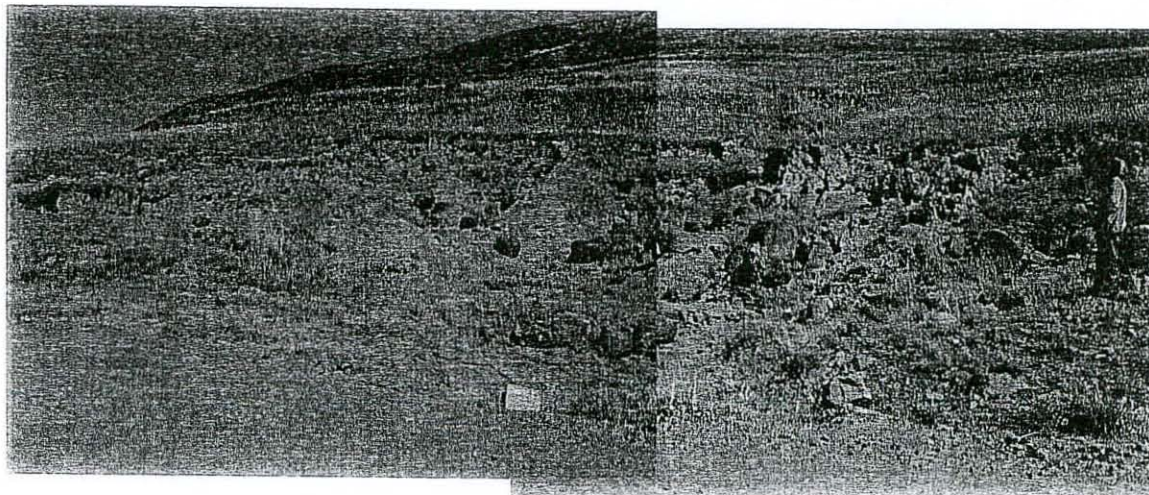


PHOTO 29: A westerly view of Borrow Pit 8229/5 at Stake Value km 5,5 (LHS).

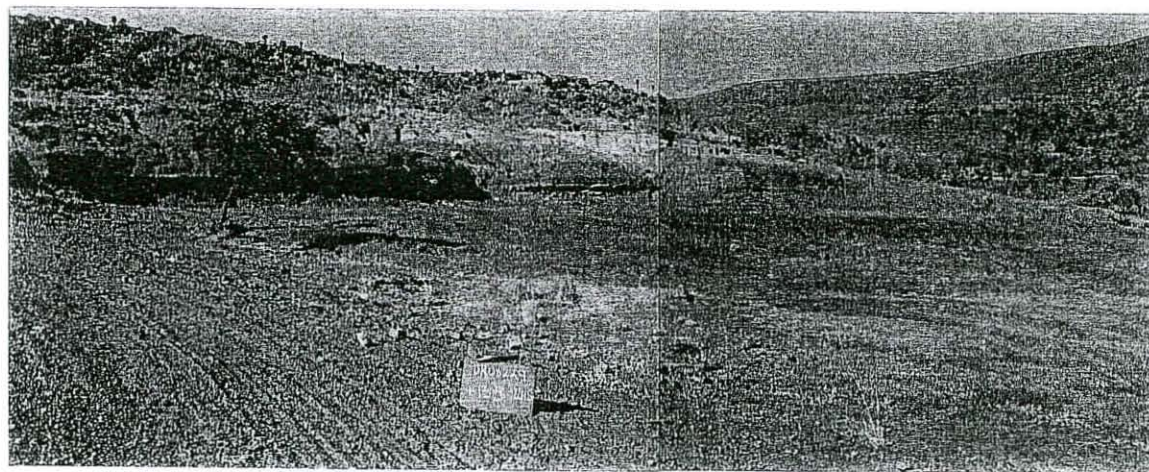


PHOTO 30: A south-westerly view of Borrow Pit 8229/7 at Stake Value km 13,8 (LHS).



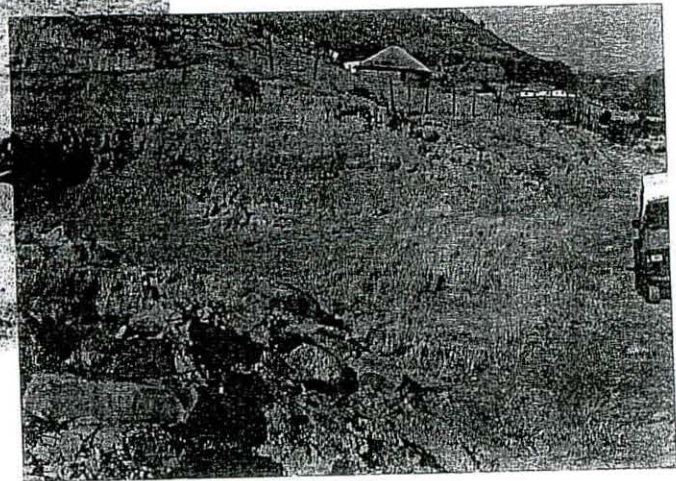
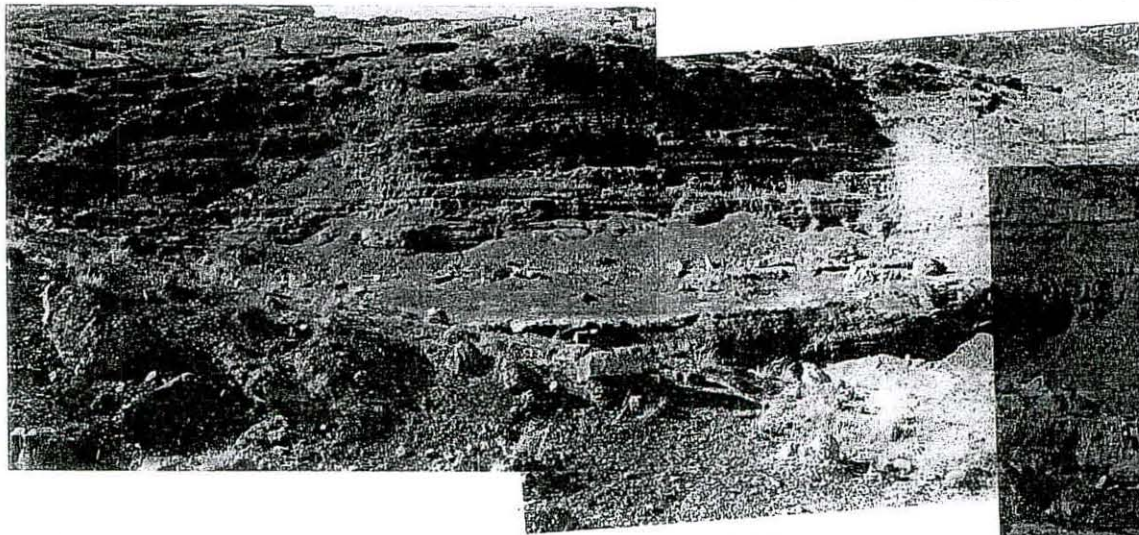


PHOTO 31: An easterly view of Borrow Pit 8229/8 at Stake Value km 17,5 (RHS).

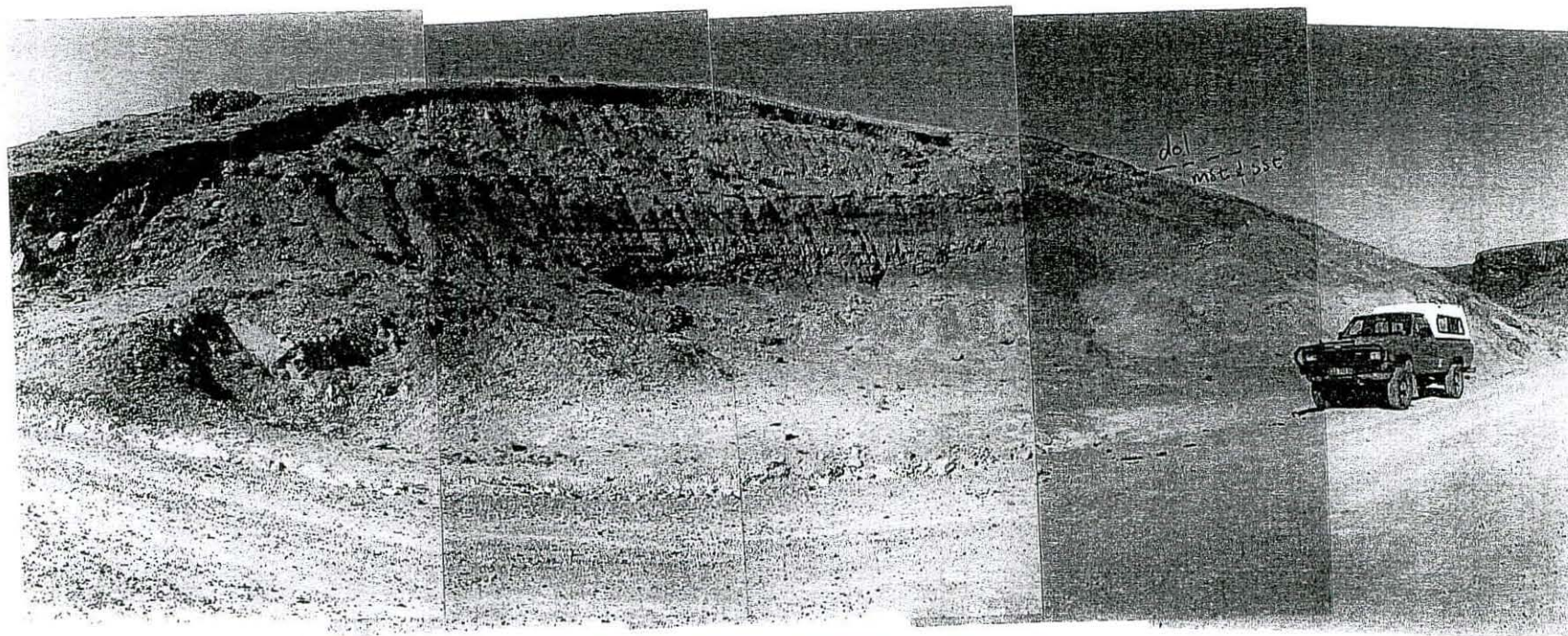
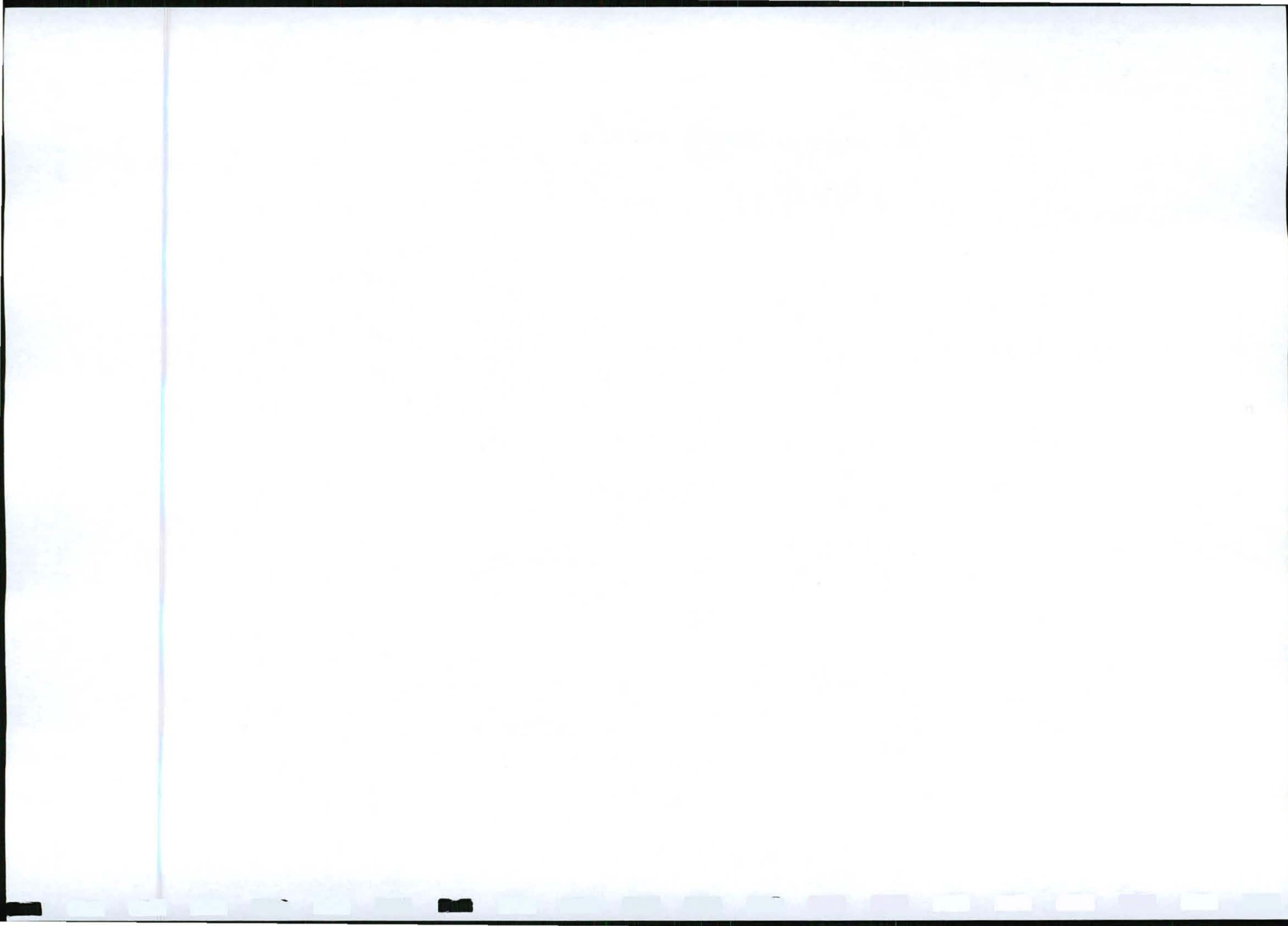


PHOTO 32: A south-easterly view of Borrow Pit 8229/10 at Stake Value km 22,6 (RHS)



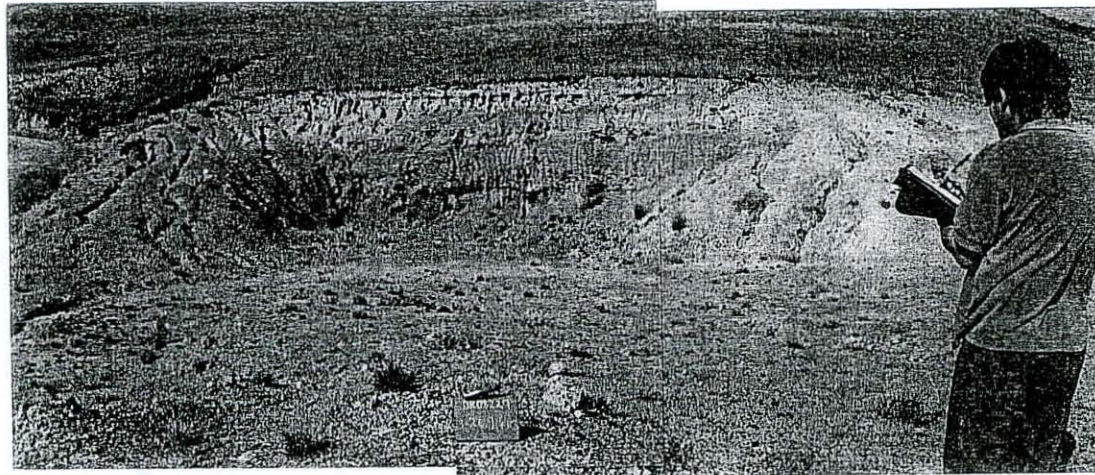


PHOTO 33: A south-easterly view of Borrow Pit 8229/11 at Stake Value km 24,9 (RHS)



PHOTO 34: A north-westerly view of Borrow Pit 8230/2 at Stake Value km 5,7 (LHS).



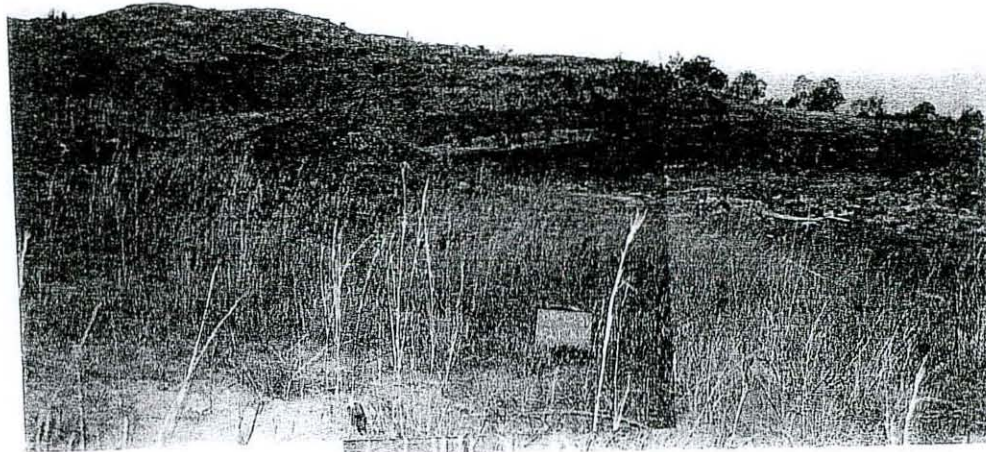


PHOTO 35: A north-easterly view of Borrow Pit 8231/1 at Stake Value km 2,1 (RHS).

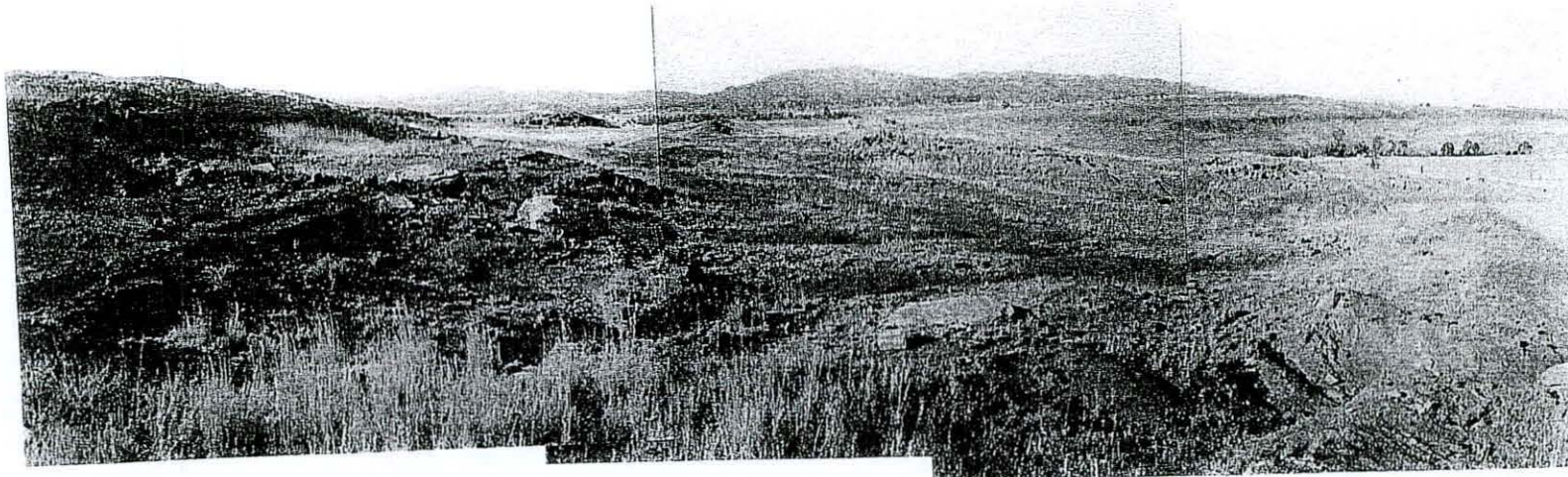
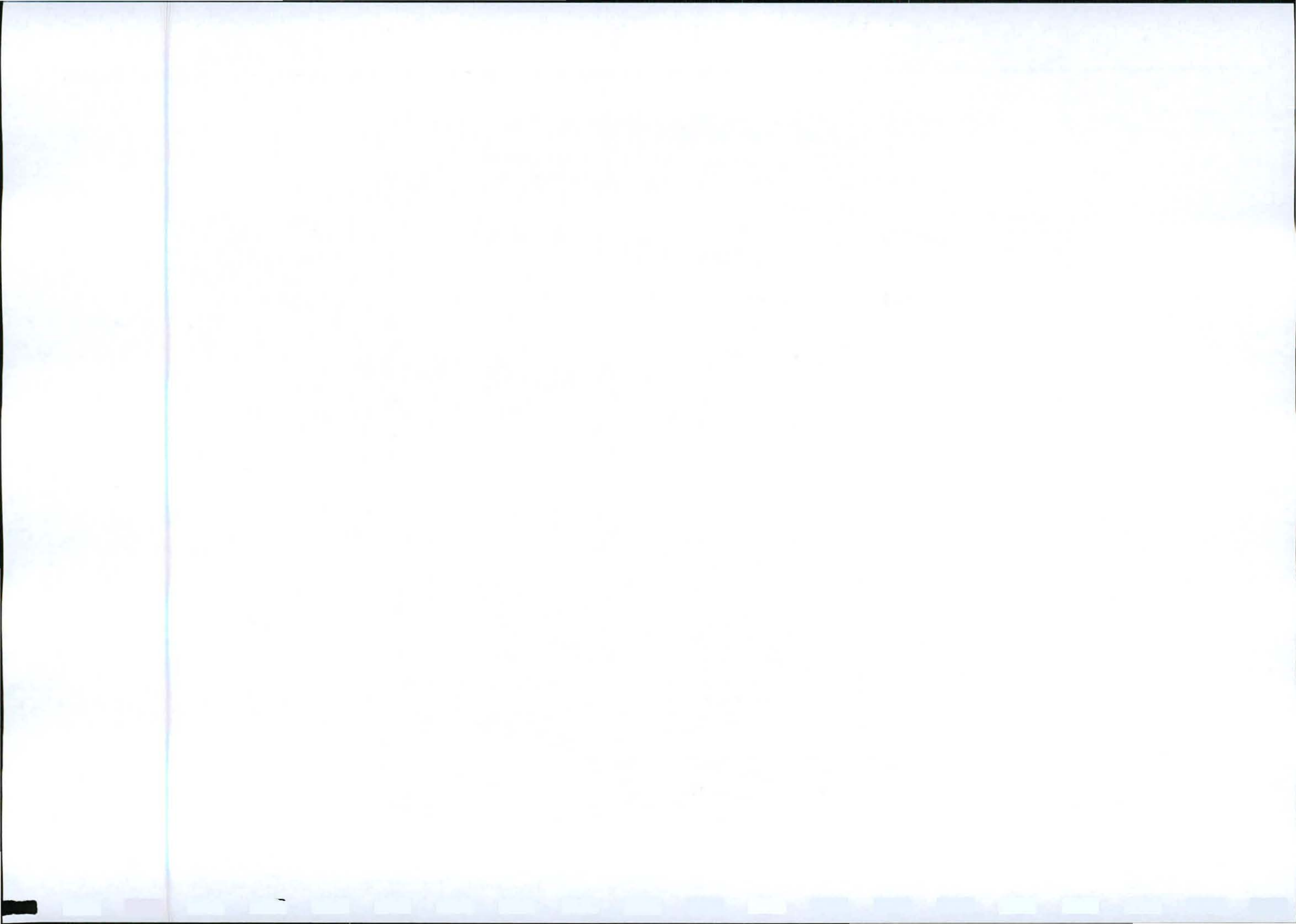


PHOTO 36: A north-easterly view of Borrow Pit 8232/1 at Stake Value km 0,9 (RHS).



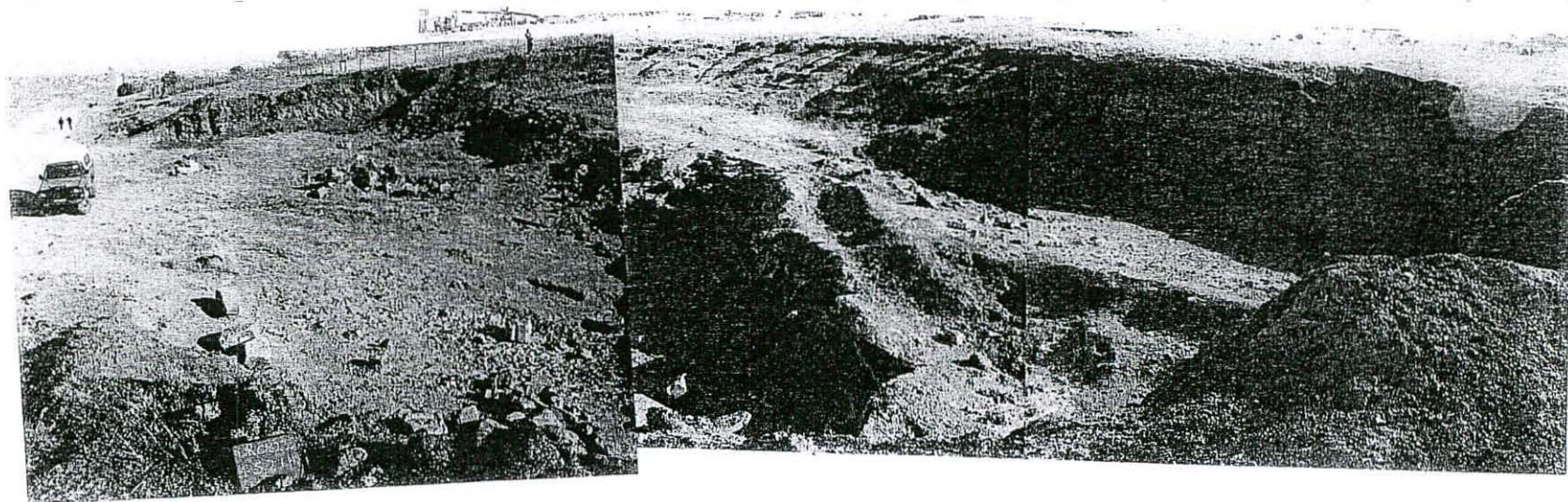


PHOTO 37: A south-westerly view of Borrow Pit 8232/2 at Stake Value km 5,2 (LHS).

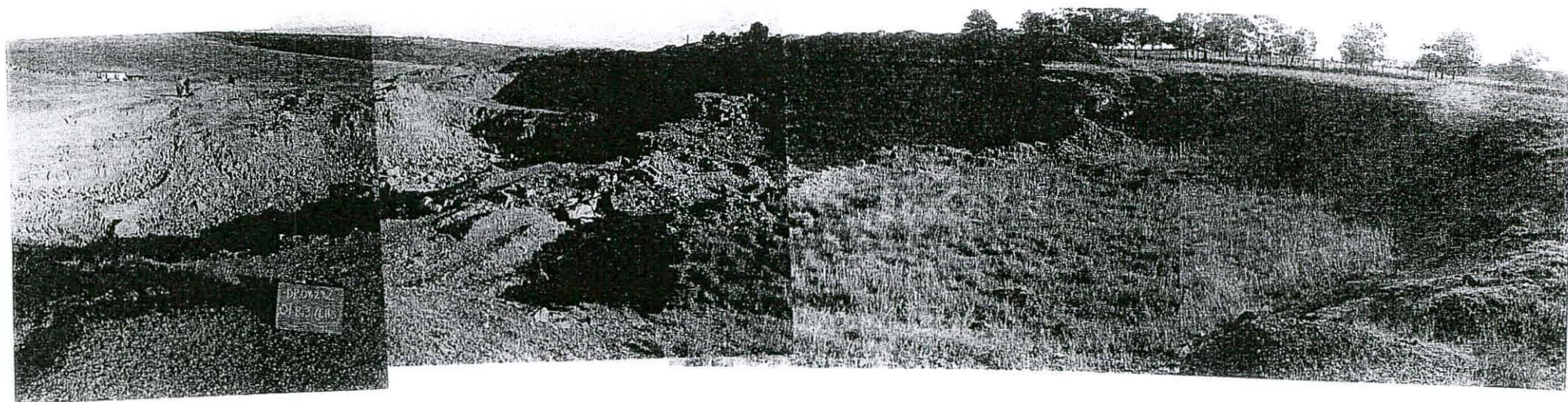


PHOTO 38: A south-easterly view of Borrow Pit 8232/3 at Stake Value km 8,3 (LHS).





PHOTO 39: A southerly view of Borrow Pit 8232/5 at Stake Value km 15,1 (LHS).

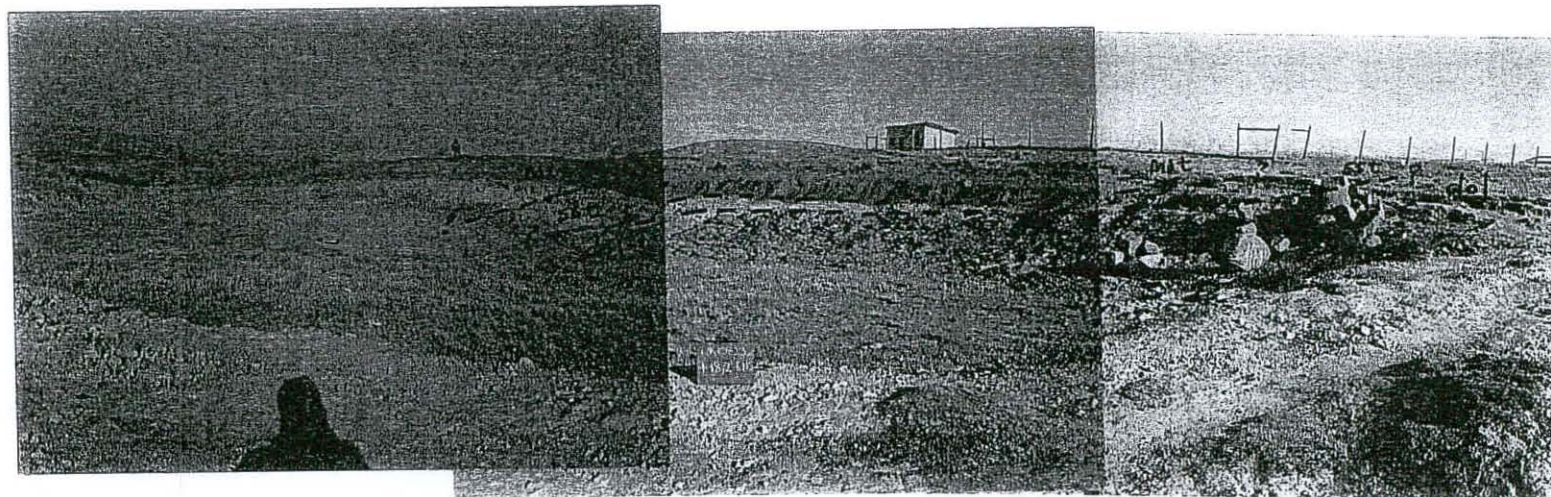
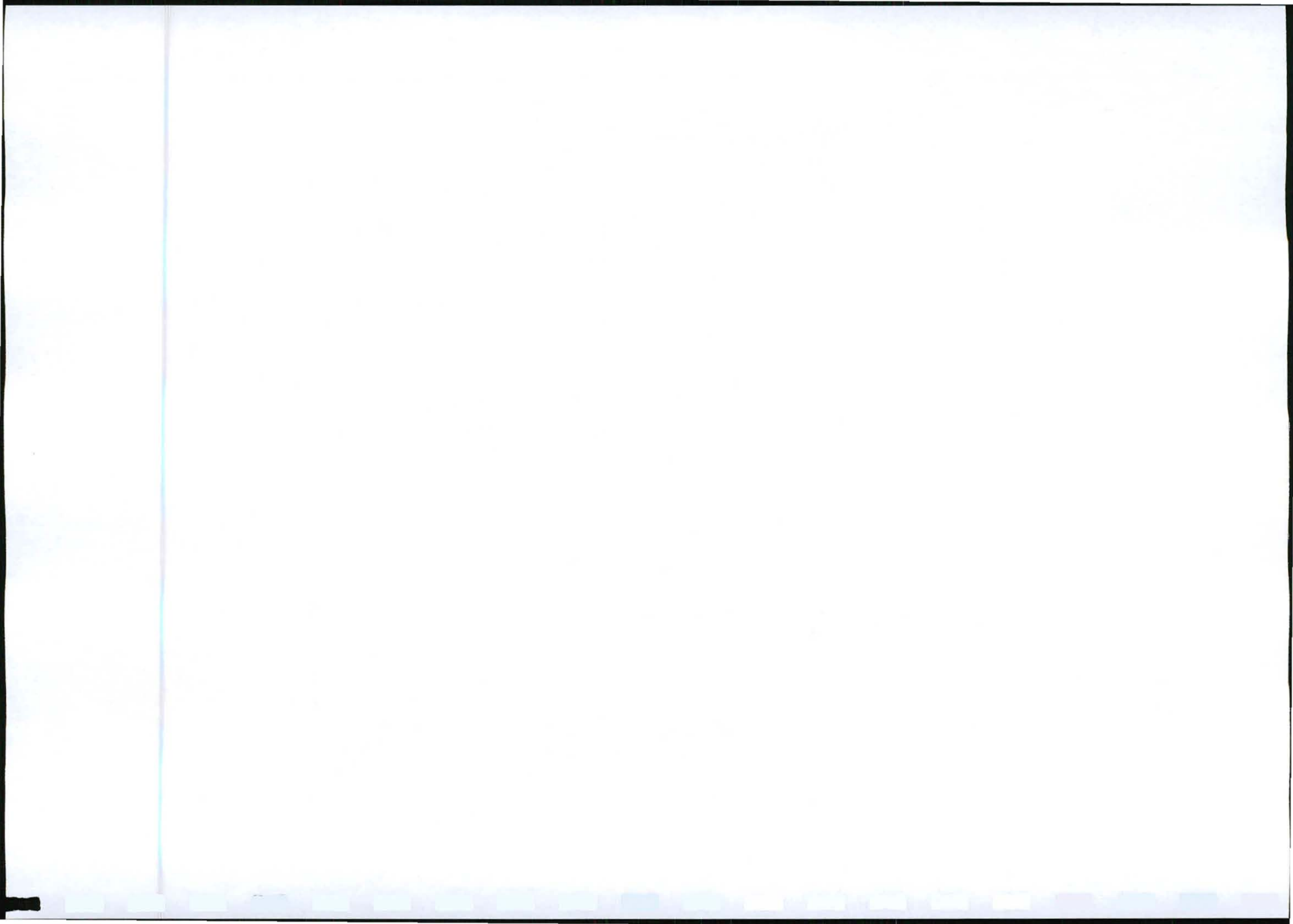


PHOTO 40: A south-easterly view of Borrow Pit 8232/7 at Stake Value km 18,2 (LHS).



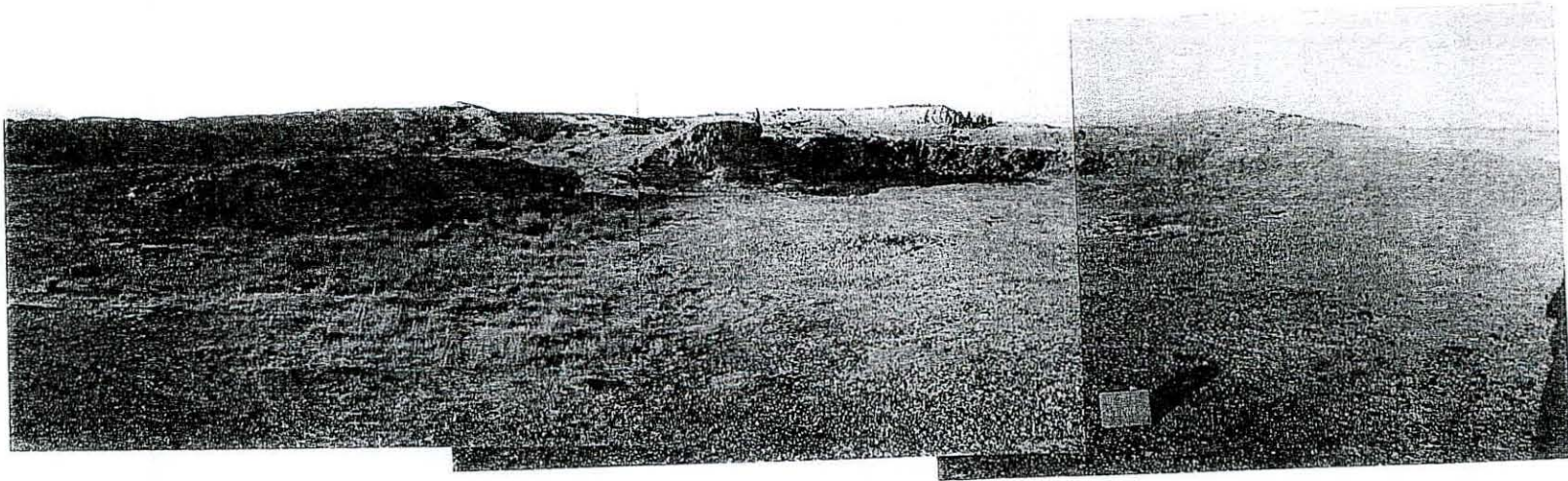


PHOTO 41: A northerly view of Borrow Pit 8232/8 at Stake Value km 20,8 (RHS).

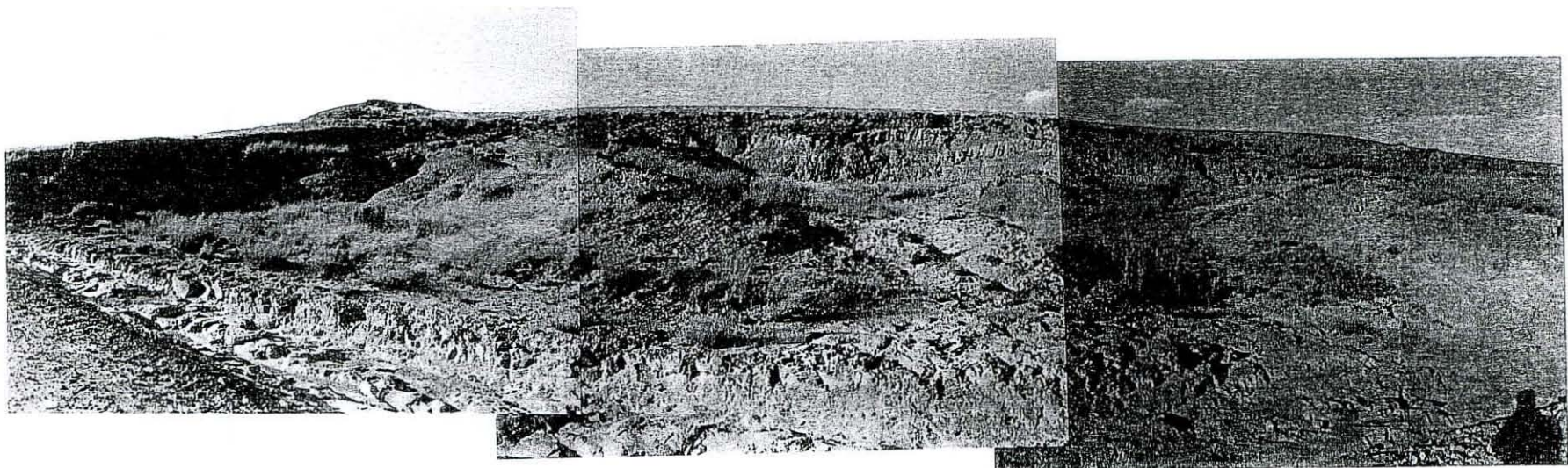
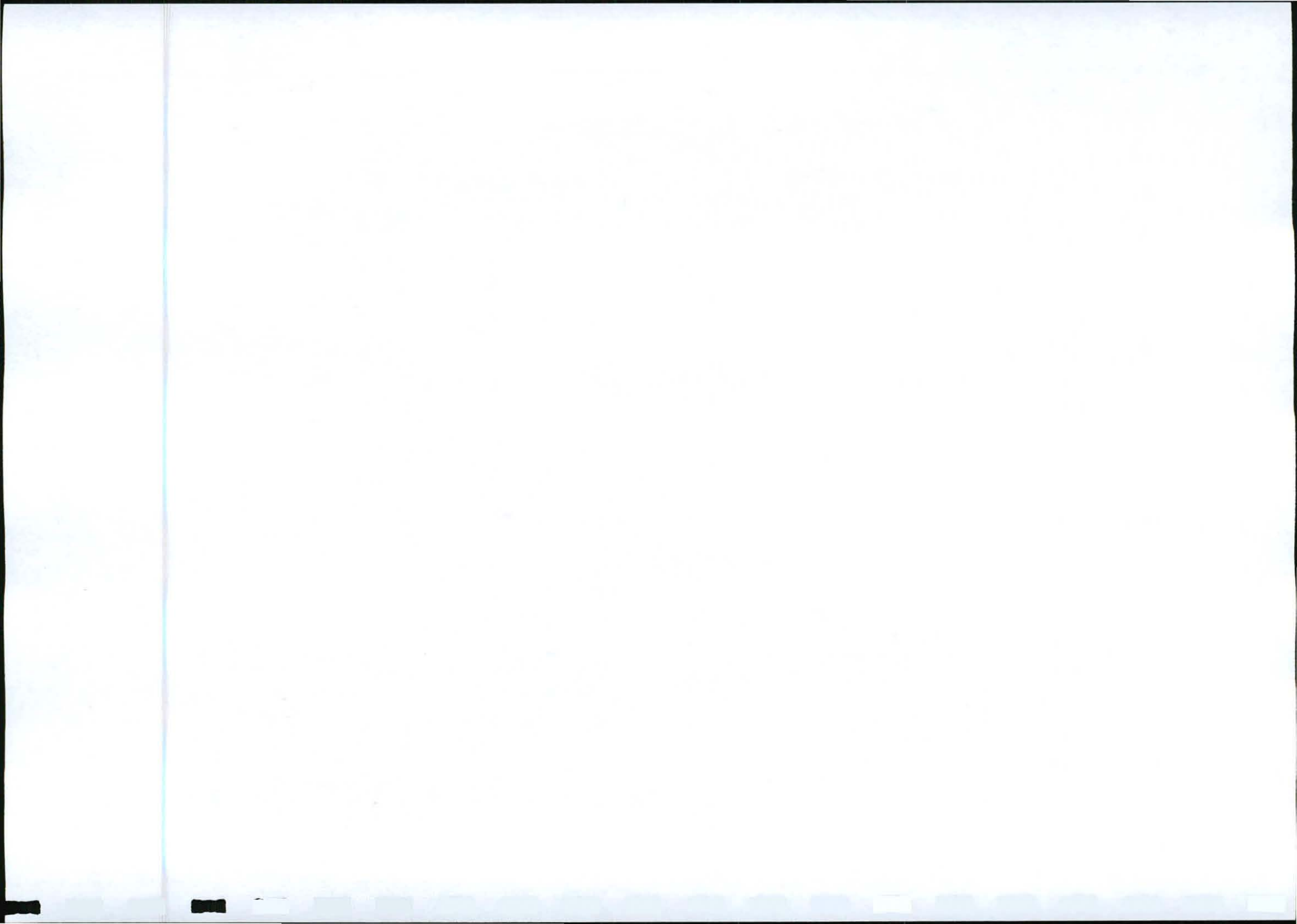


PHOTO 42: A north-easterly view of Borrow Pit 8232/9 at Stake Value km 23,8 (RHS).



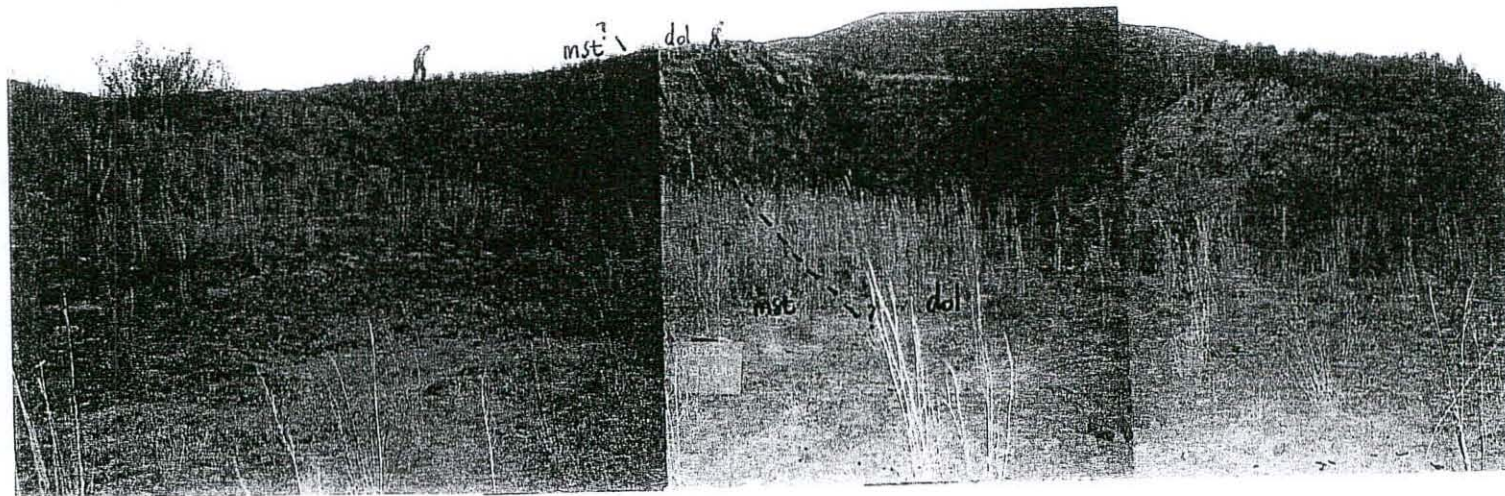


PHOTO 43: A westerly view of Borrow Pit 8232/11 at Stake Value km 32,3 (LHS).

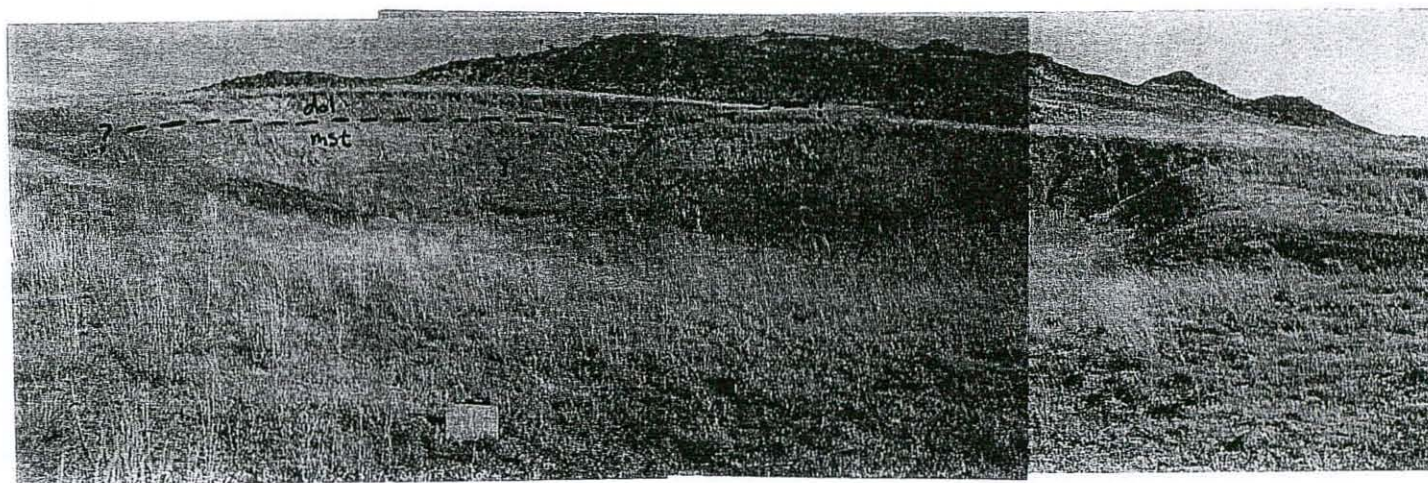
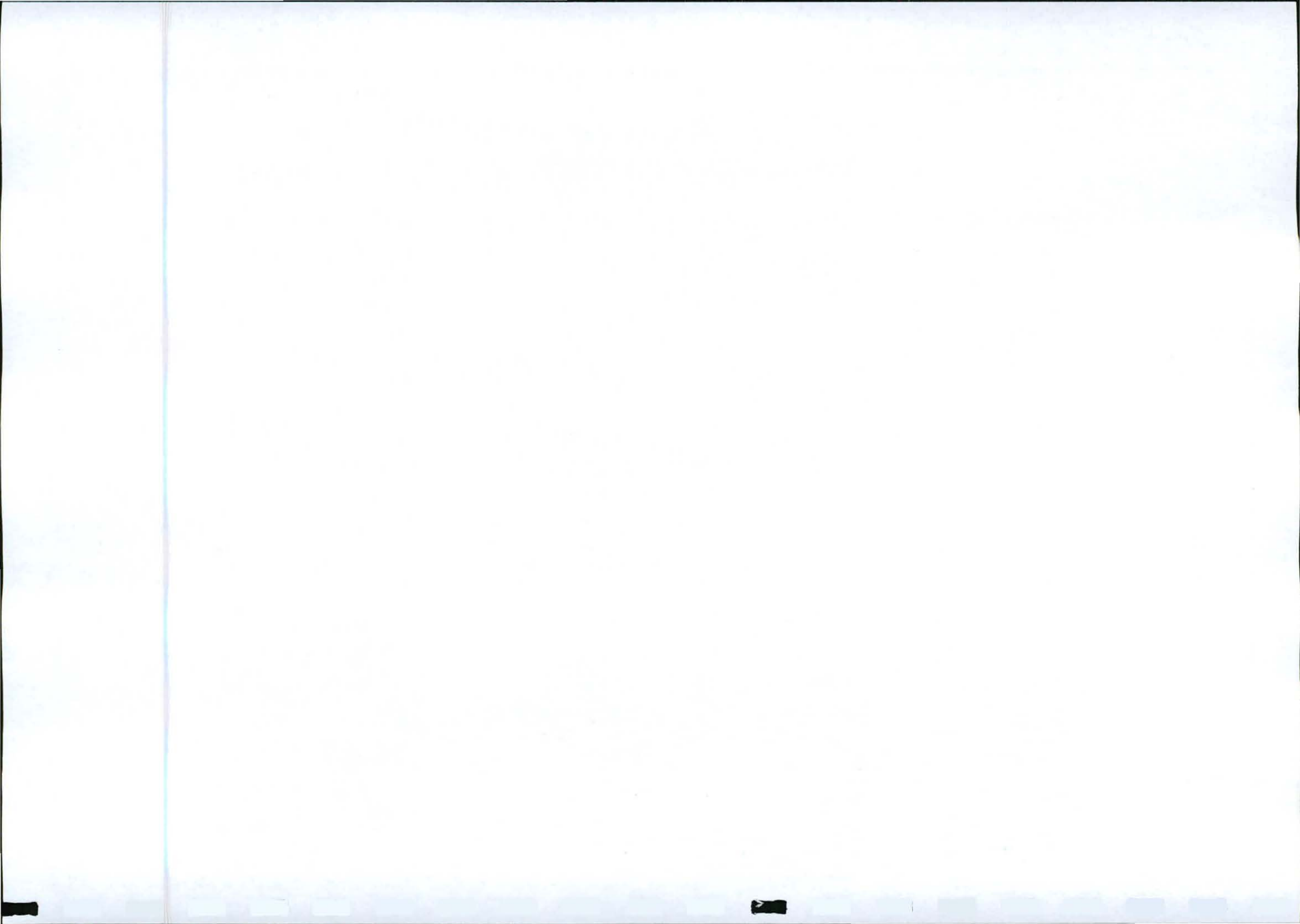


PHOTO 44: A southerly view of Borrow Pit 8234/1 at Stake Value km 3,4 (LHS).



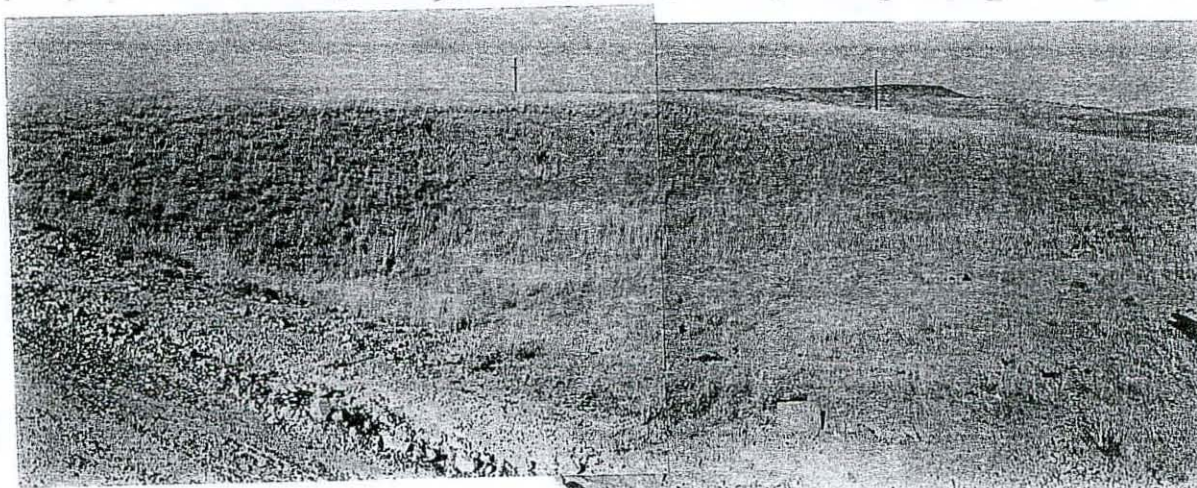
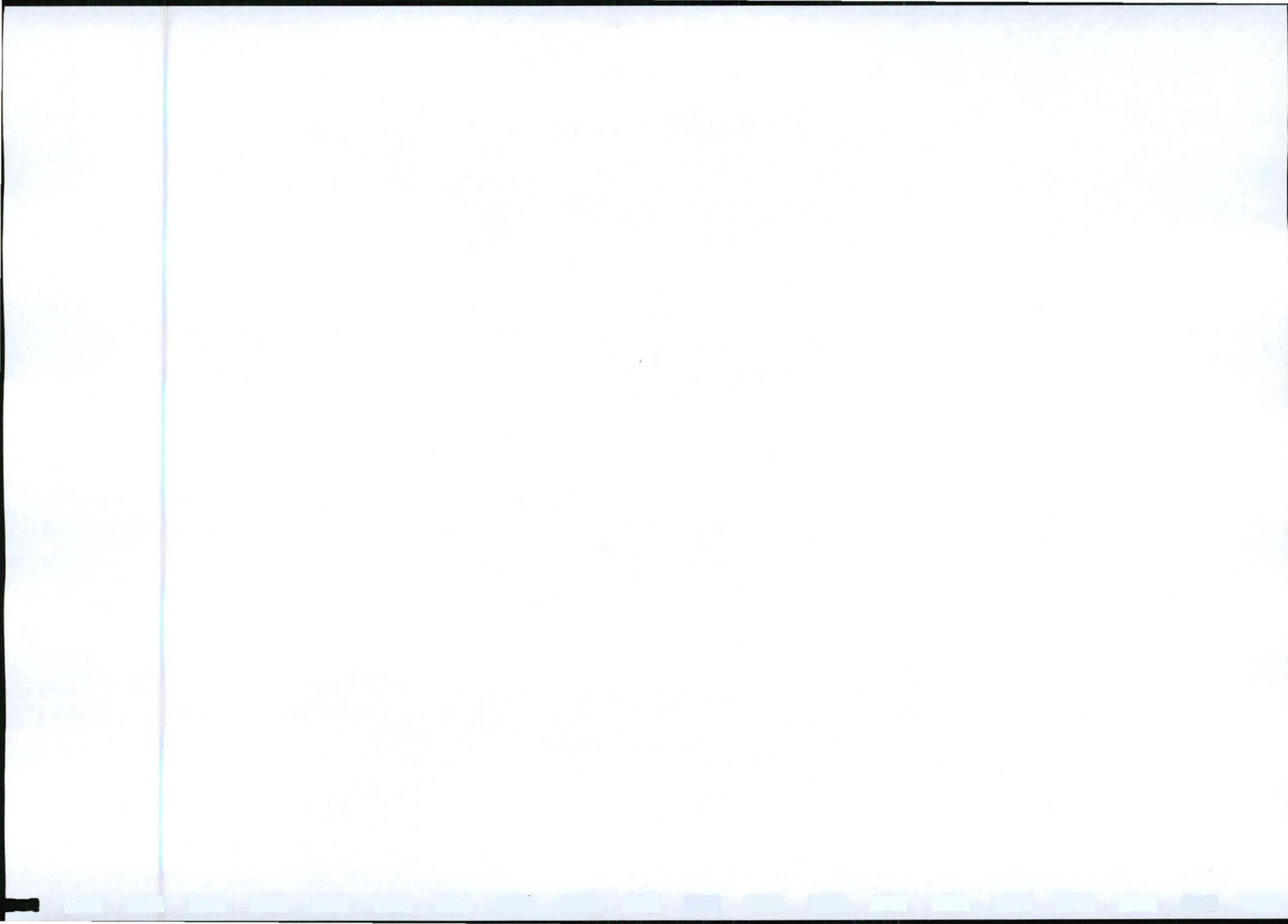


PHOTO 45: A south-easterly view of Borrow Pit 8234/2 at Stake Value km 6,5 (LHS).



PHOTO 46: A south-easterly view of Borrow Pit 8258/1 at Stake Value km 1,0 (RHS).



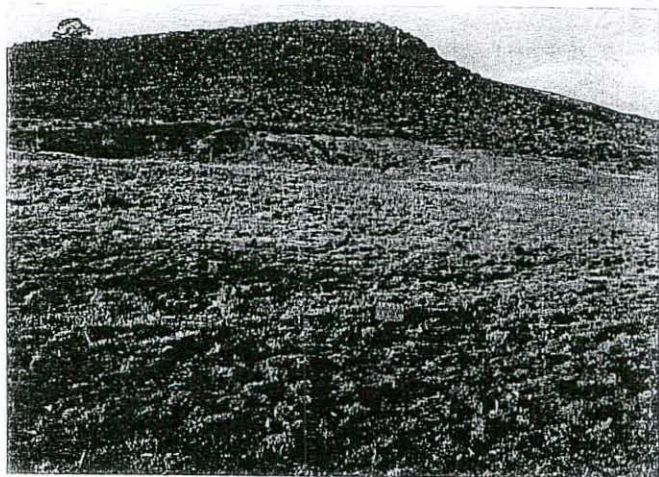


PHOTO 47: A southerly view of Borrow Pit 8259/1 at Stake Value km 2,6 (LHS).

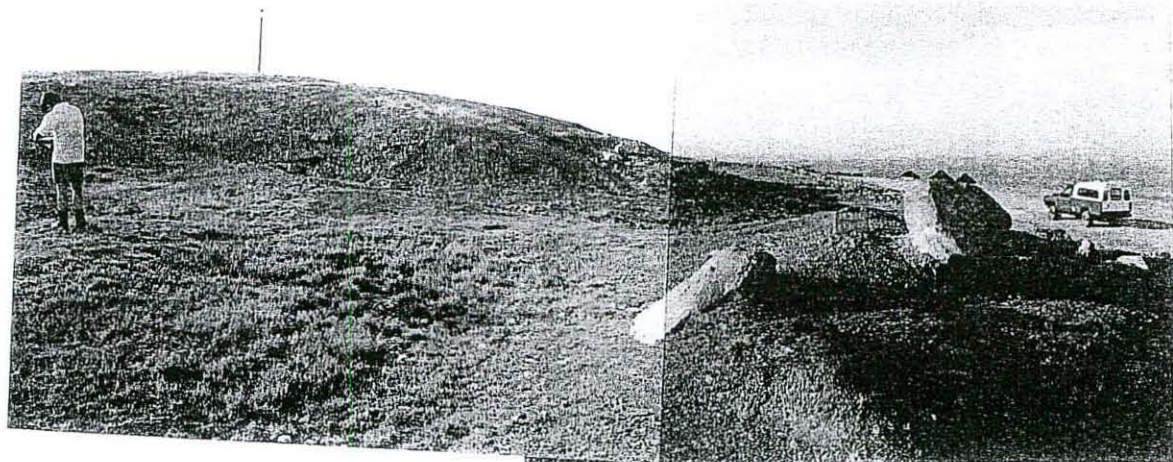


PHOTO 48: A south-easterly view of Borrow Pit 8260/1 at Stake Value km 2,6 (LHS).

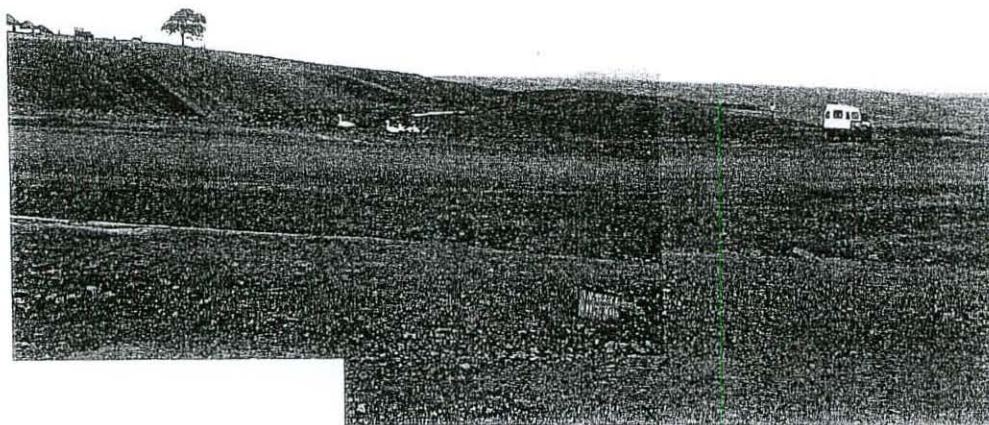
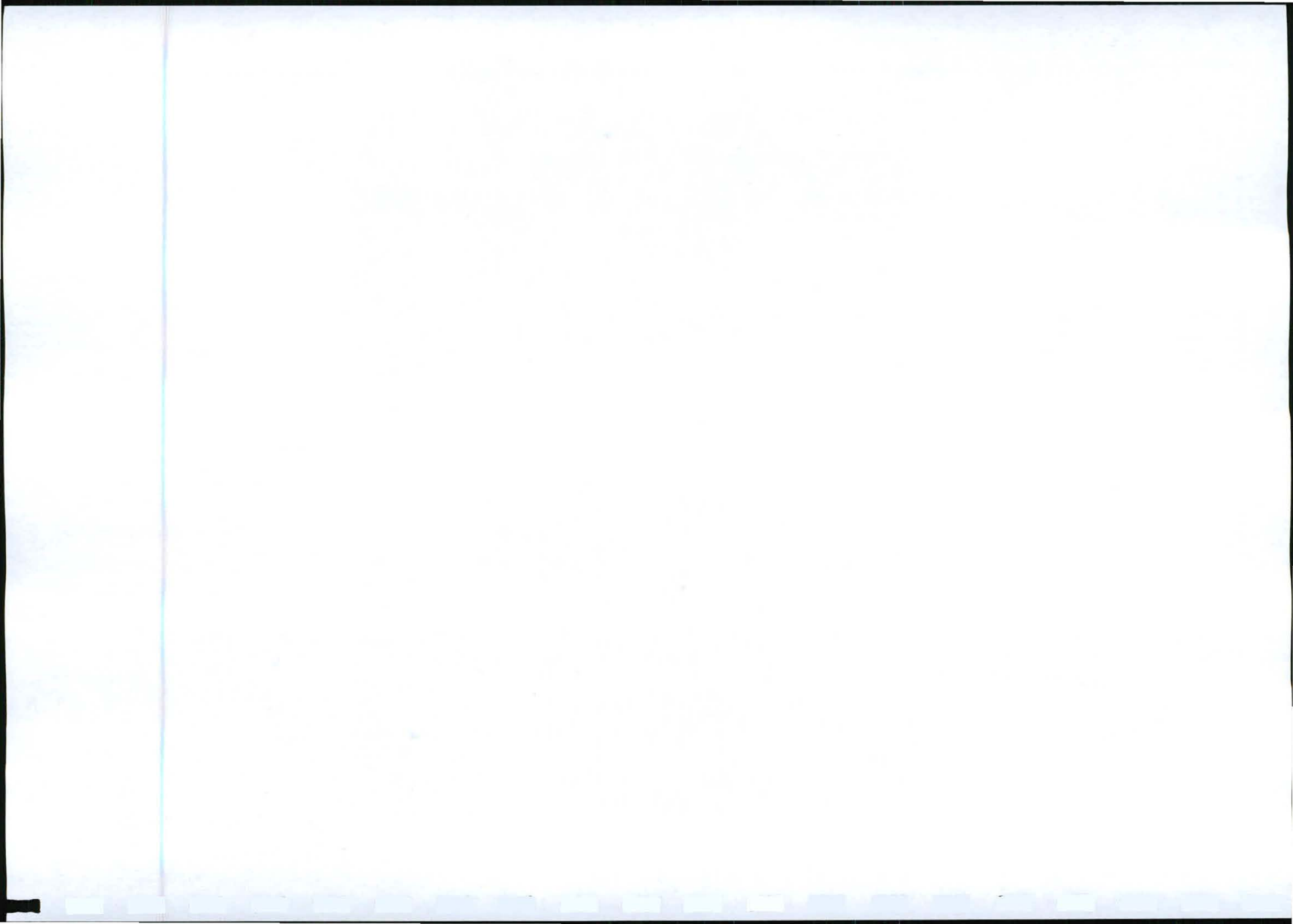


PHOTO 49: A north-easterly view of Borrow Pit 8266/3 at Stake Value km 11,3 (RHS).



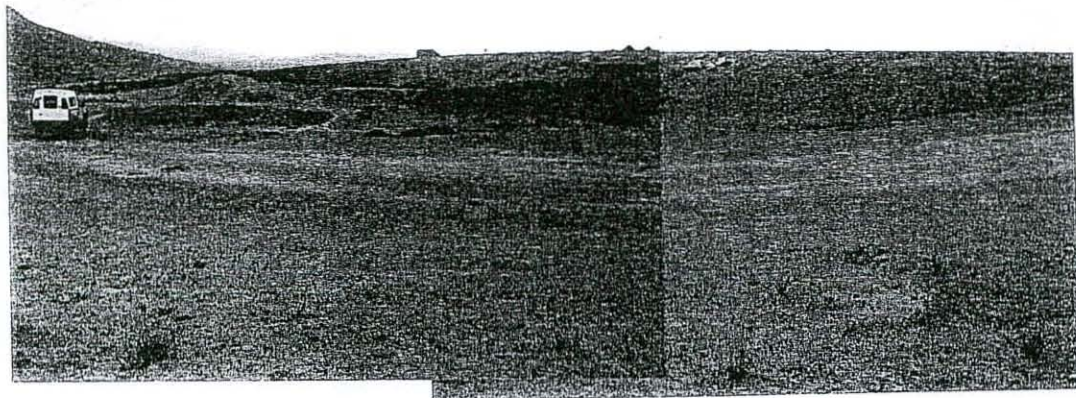


PHOTO 50: An easterly view of Borrow Pit 8266/6 at Stake Value km 14,3 (LHS).

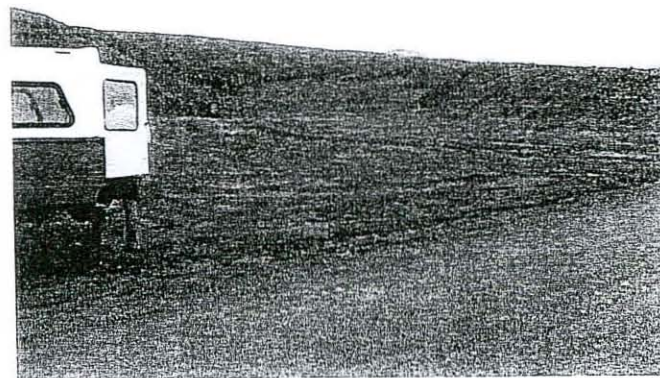


PHOTO 51: An easterly view of Borrow Pit 8266/5 at Stake Value km 18,5 (LHS).

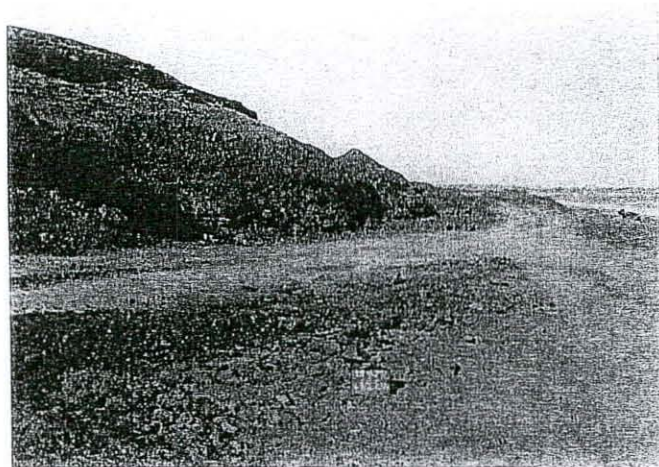


PHOTO 52: A south-easterly view of Borrow Pit 8270/2 at Stake Value km 3,3 (LHS).

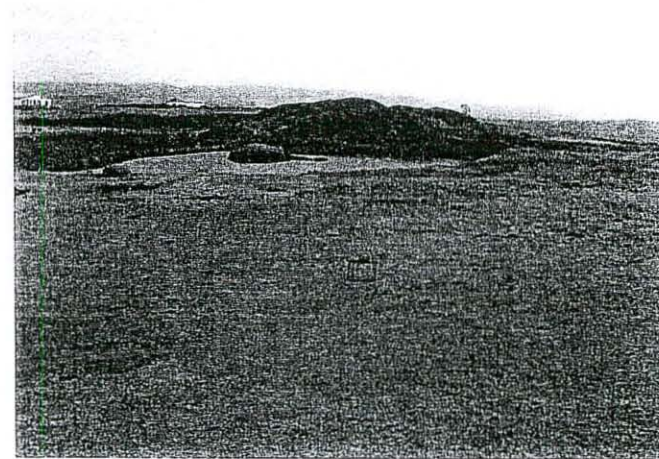
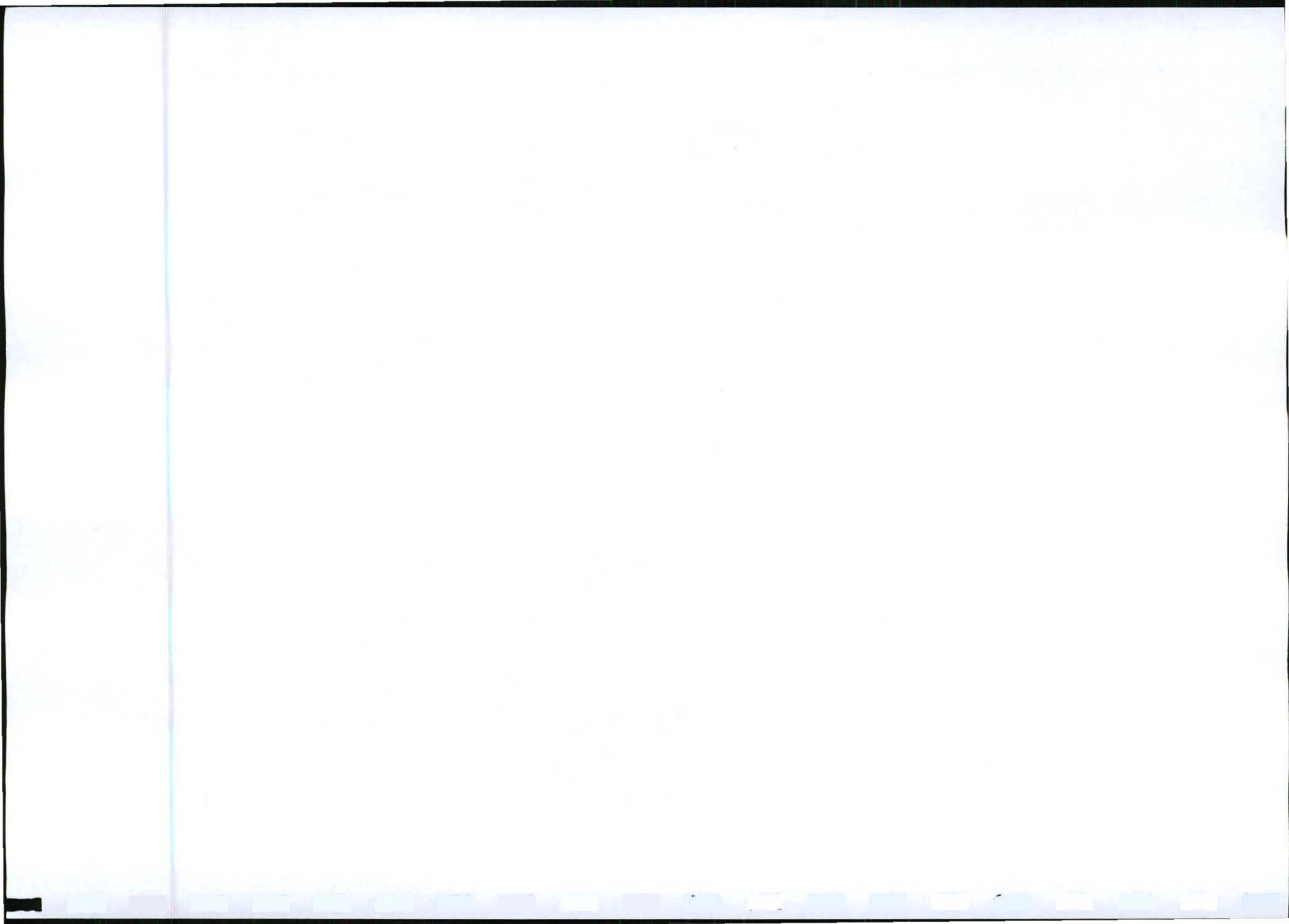


PHOTO 53: A westerly view of Borrow Pit 8270/4 at Stake Value km 9,8 (RHS).



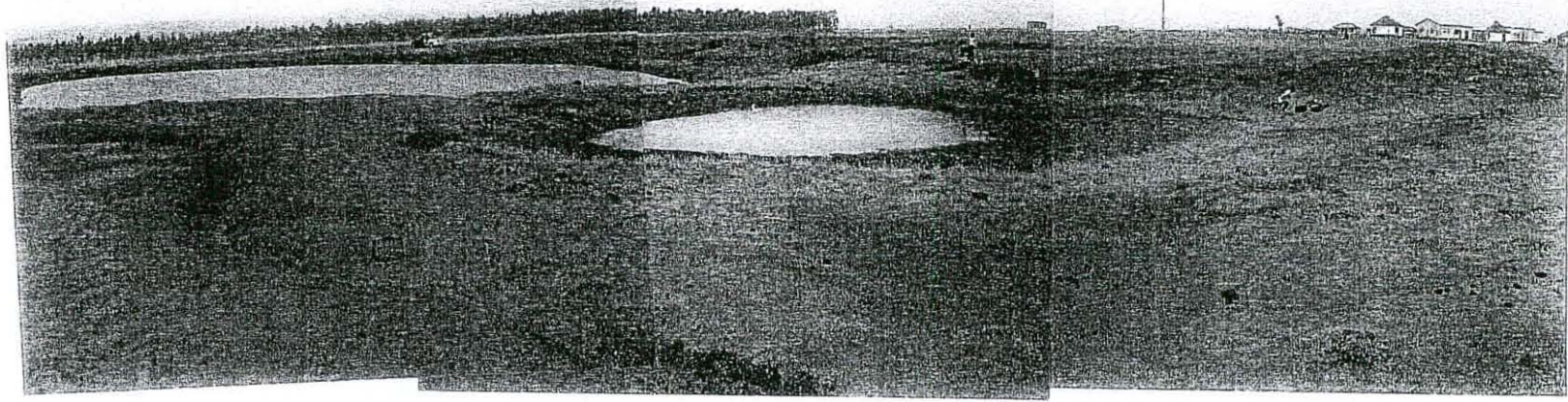


PHOTO 54: A south-westerly view of Borrow Pit 8270/5 at Stake Value km 12,2 (RHS).

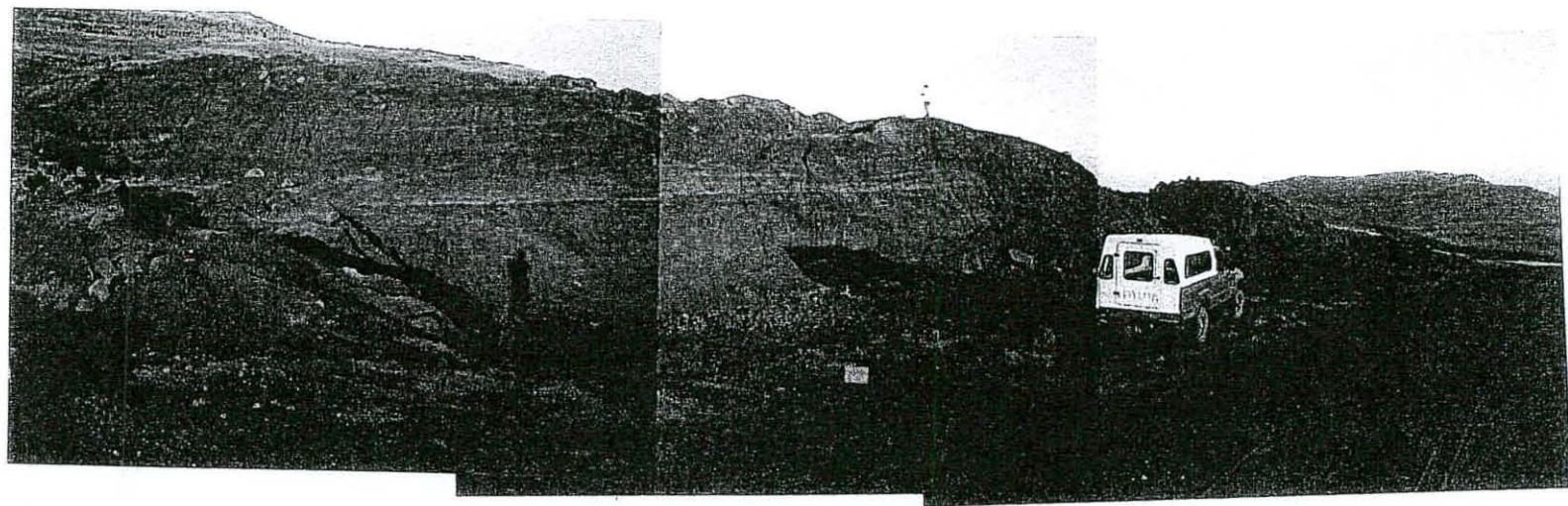


PHOTO 55: A northerly view of Borrow Pit 8272/1 at Stake Value km 5,0 (LHS).

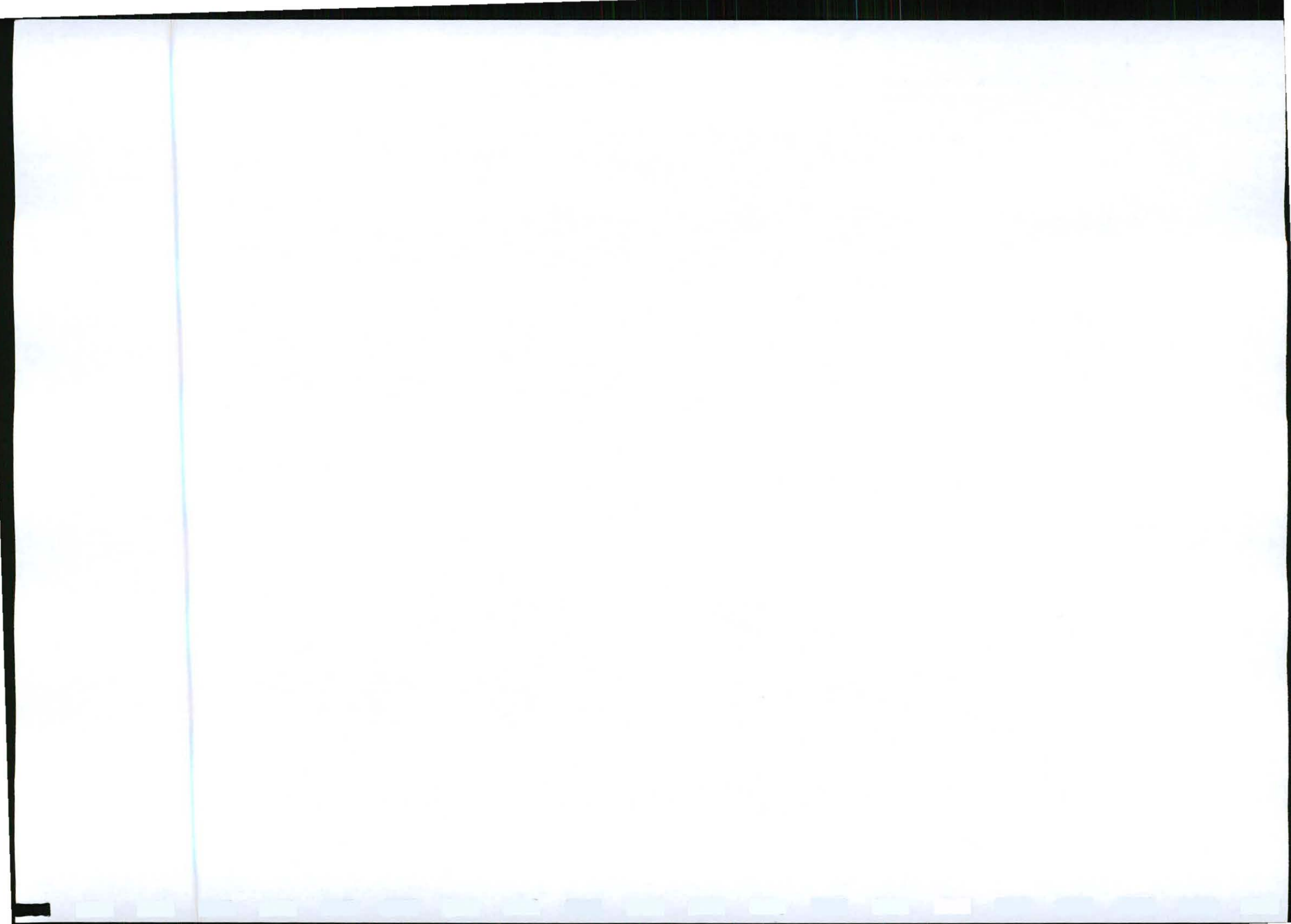




PHOTO 58: A south-easterly view of Borrow Pit 8273/3 at Stake Value km 10,8 (RHS).

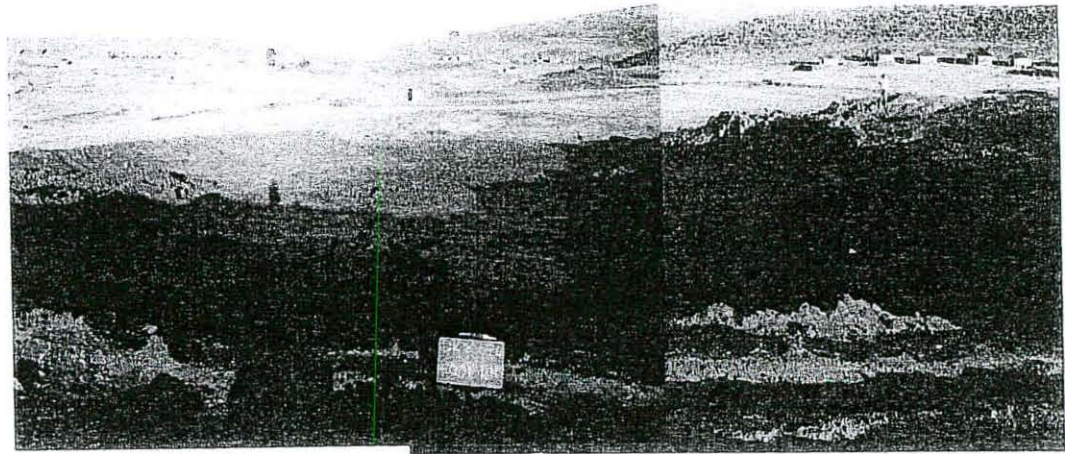


PHOTO 59: A south-easterly view of Borrow Pit 8274/1 at Stake Value km 2,9 (LHS).

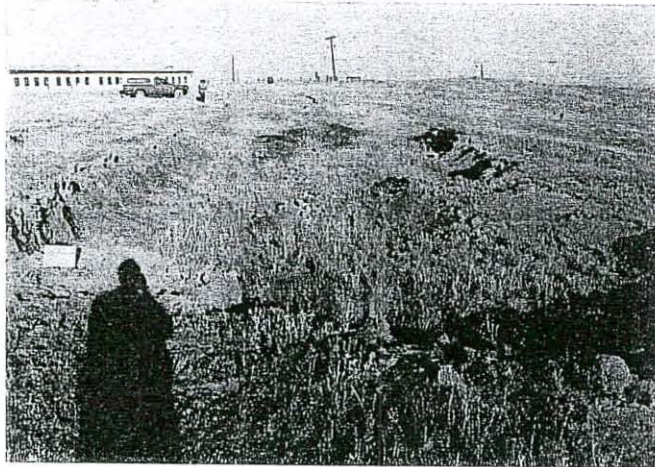


PHOTO 60: An easterly view of Borrow Pit 8504/1 at Stake Value km 6,8 (RHS).

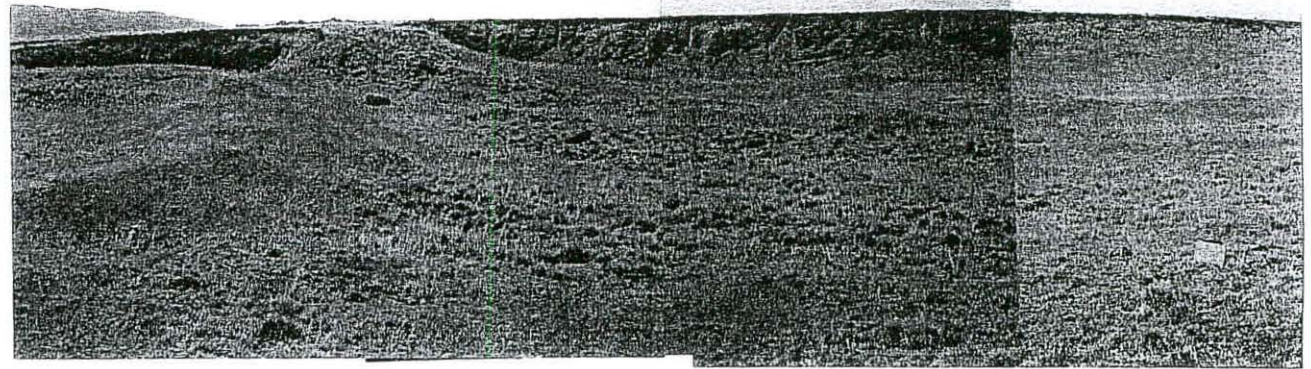
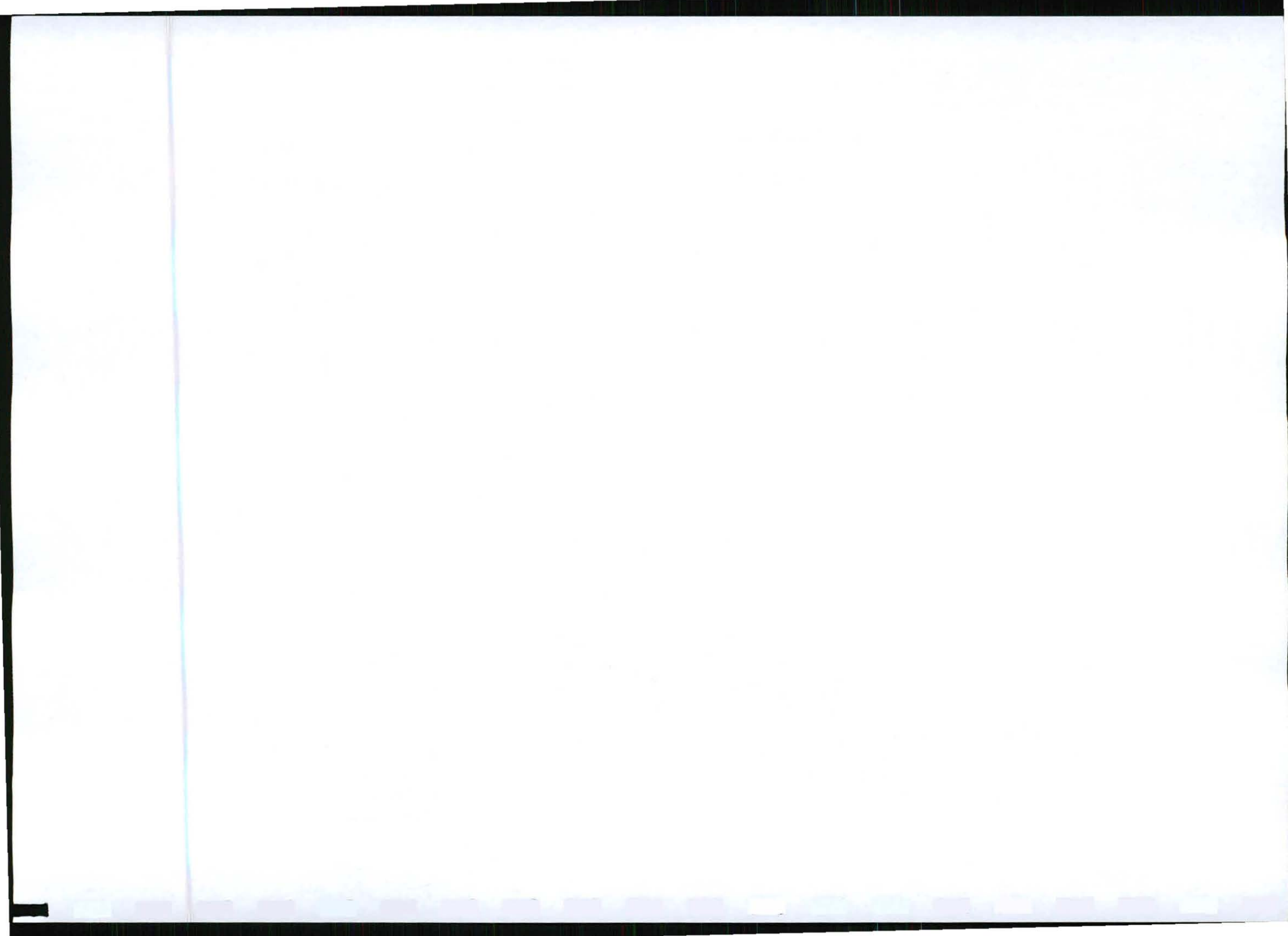


PHOTO 61: A south-easterly view of Borrow Pit 8444/1 at Stake Value km 4,4 (LHS).



APPENDIX 2:

ENGCOBO ROAD

MAINTENANCE PROGRAMME:

Figures.

Application received in terms of the Mineral and Petroleum
Resources Development Act, 2002 (Act 28 of 2002)
EASTERN CAPE REGION

11 AUG 2009

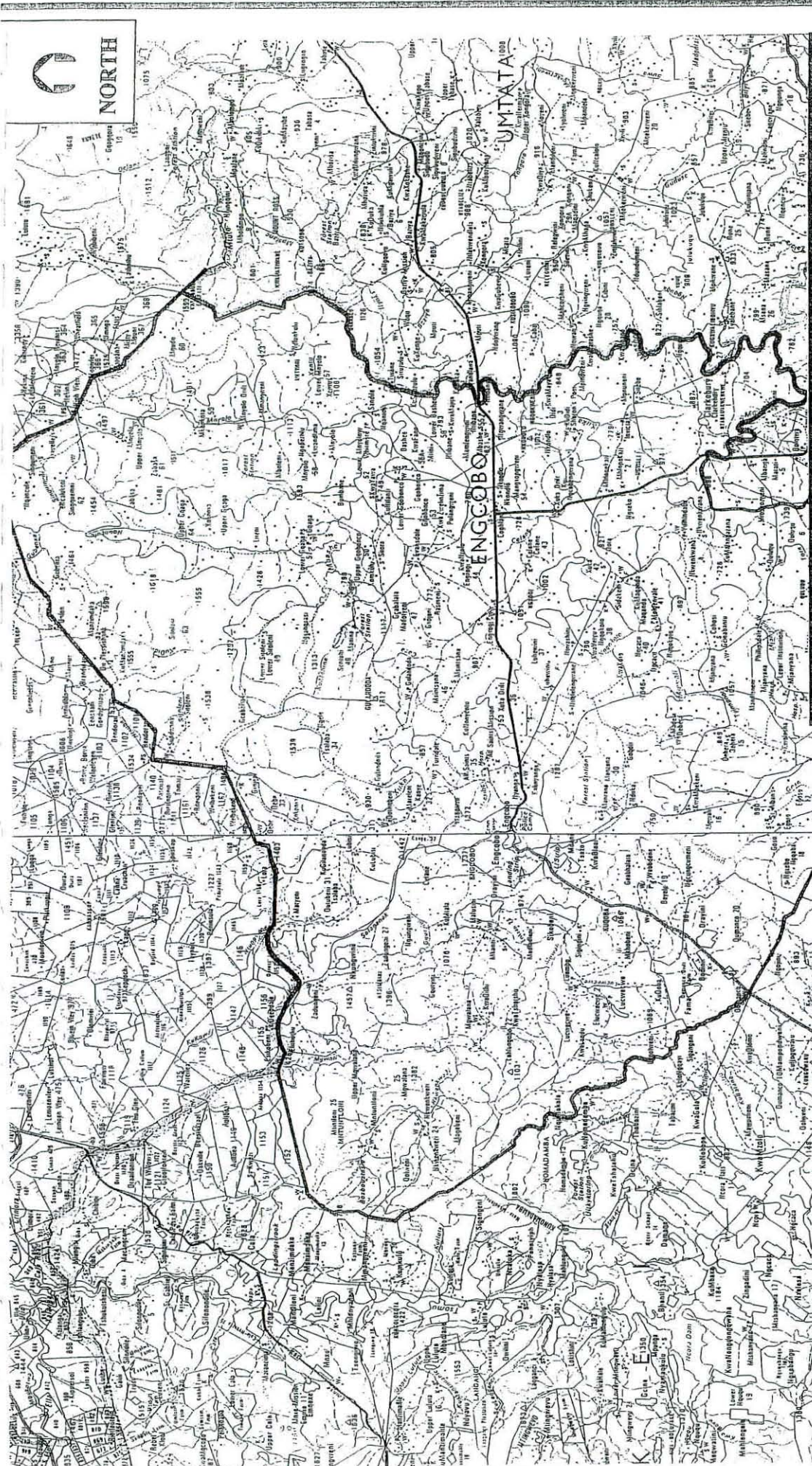
Print Name SLURWENGI

Signature *[Signature]*

DEPARTMENT OF MINERALS AND ENERGY

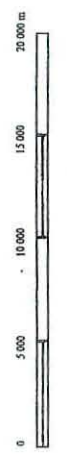
D12009/08/11/001
e.c. 30/5/13/2/0366 MP





**FIGURE 1: ENGCOBO ROAD MAINTENANCE PROGRAMME :
General Locality Map.**

SCALE: 1:250 000
SOURCE: 3126 QUEENSTOWN, 3128



UMTATA

LEGEND:

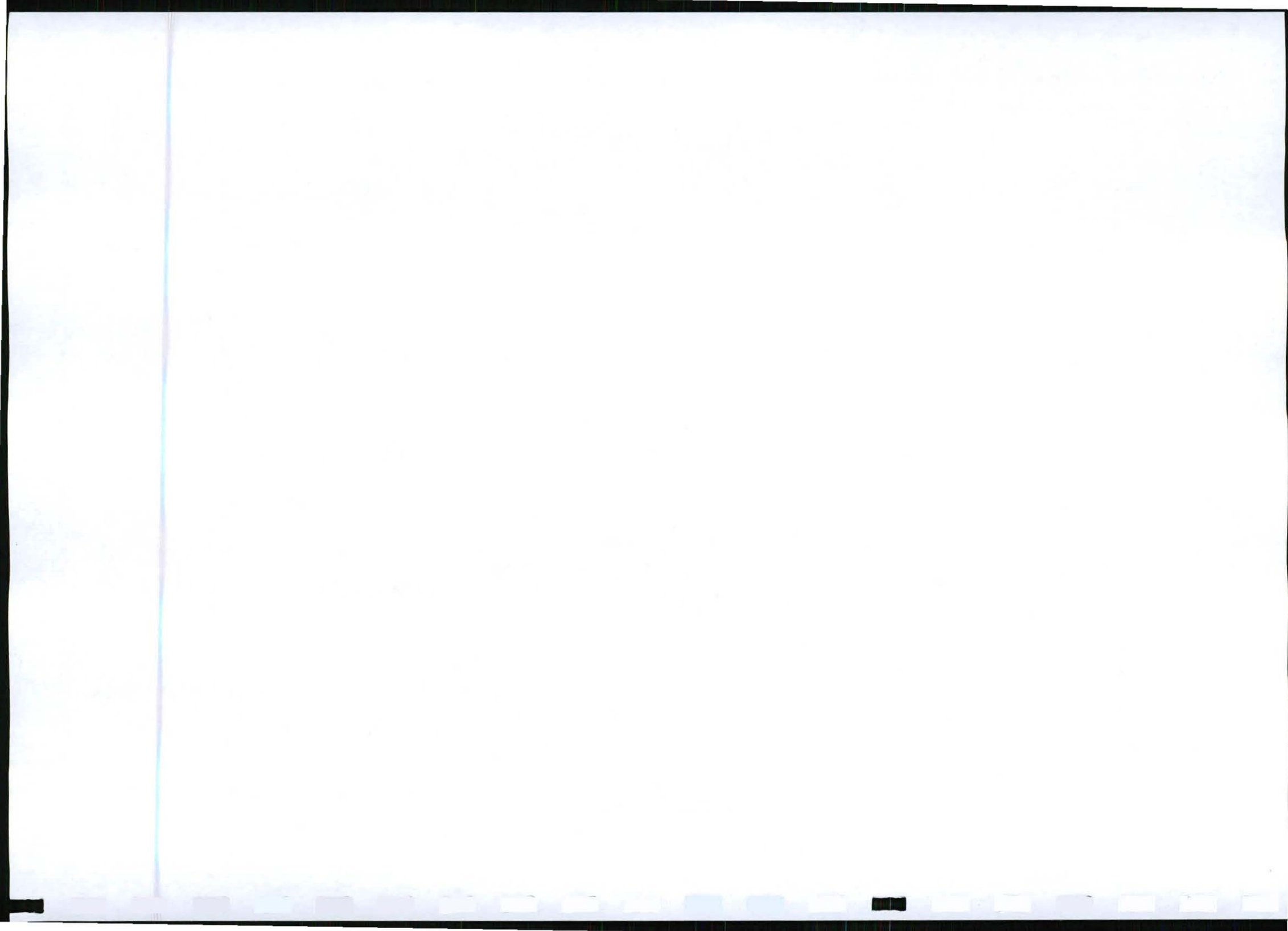
Approximate Chris Hani Region Boundary

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CK 96 6444023

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PORT ELIZABETH
6000



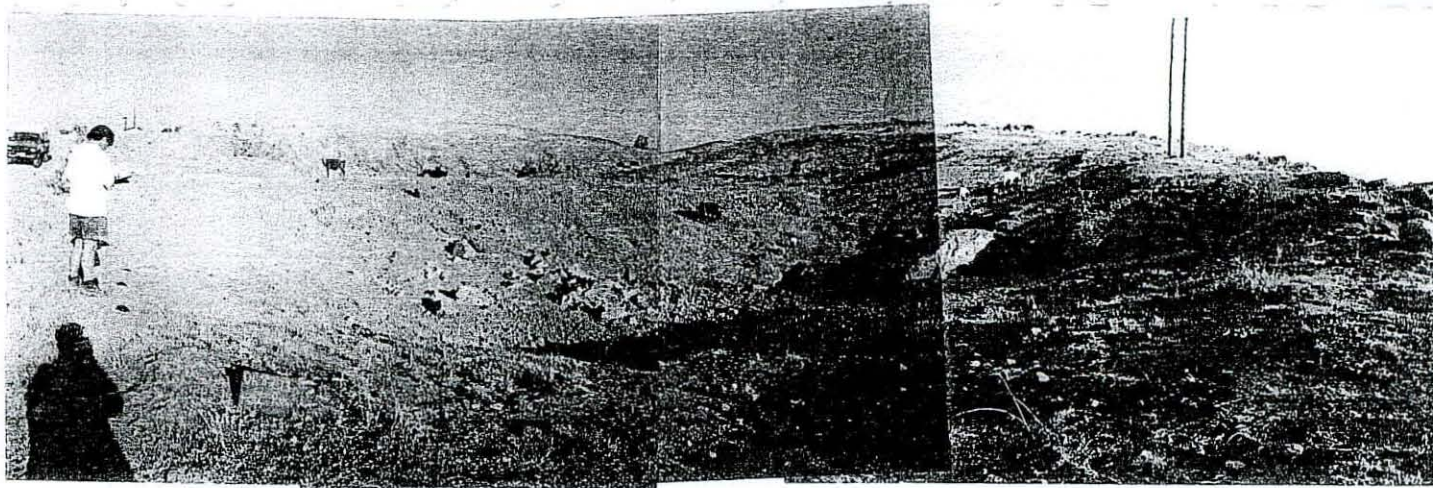


PHOTO 56: A south-easterly view of Borrow Pit 8273/1 at Stake Value km 0,4 (RHS).

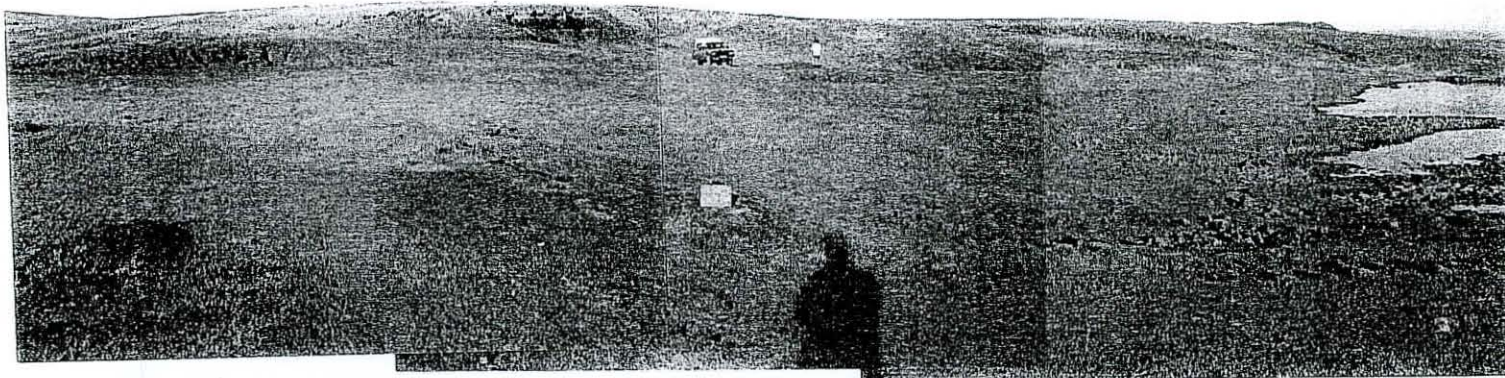


PHOTO 57: An easterly view of Borrow Pit 8273/2 at Stake Value km 6,3 (RHS).



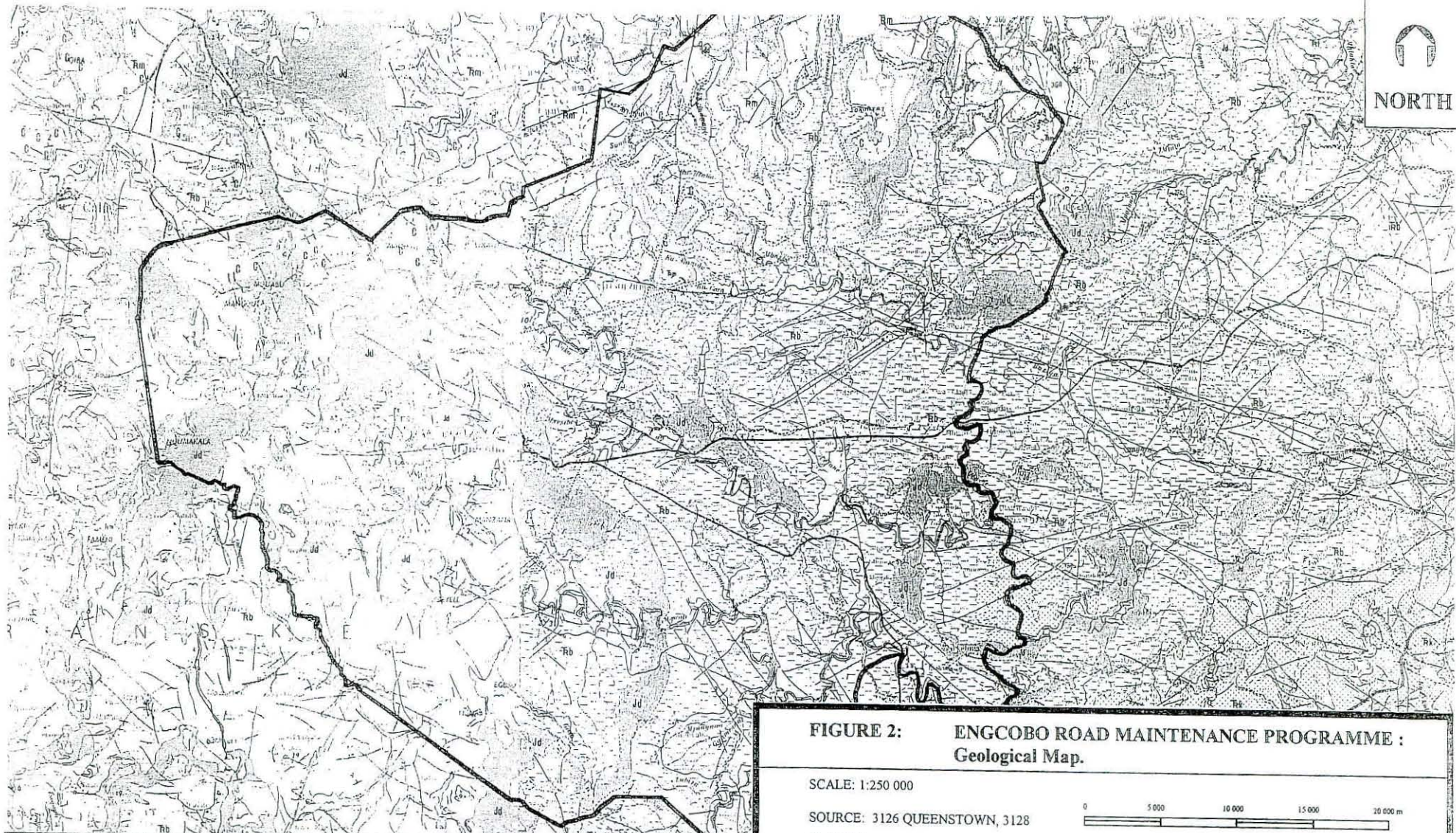
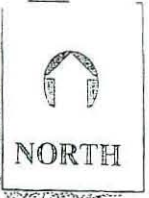
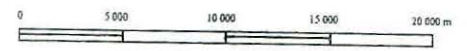


FIGURE 2: ENGCOBO ROAD MAINTENANCE PROGRAMME : Geological Map.

SCALE: 1:250 000

SOURCE: 3126 QUEENSTOWN, 3128 UMTATA



LEGEND:

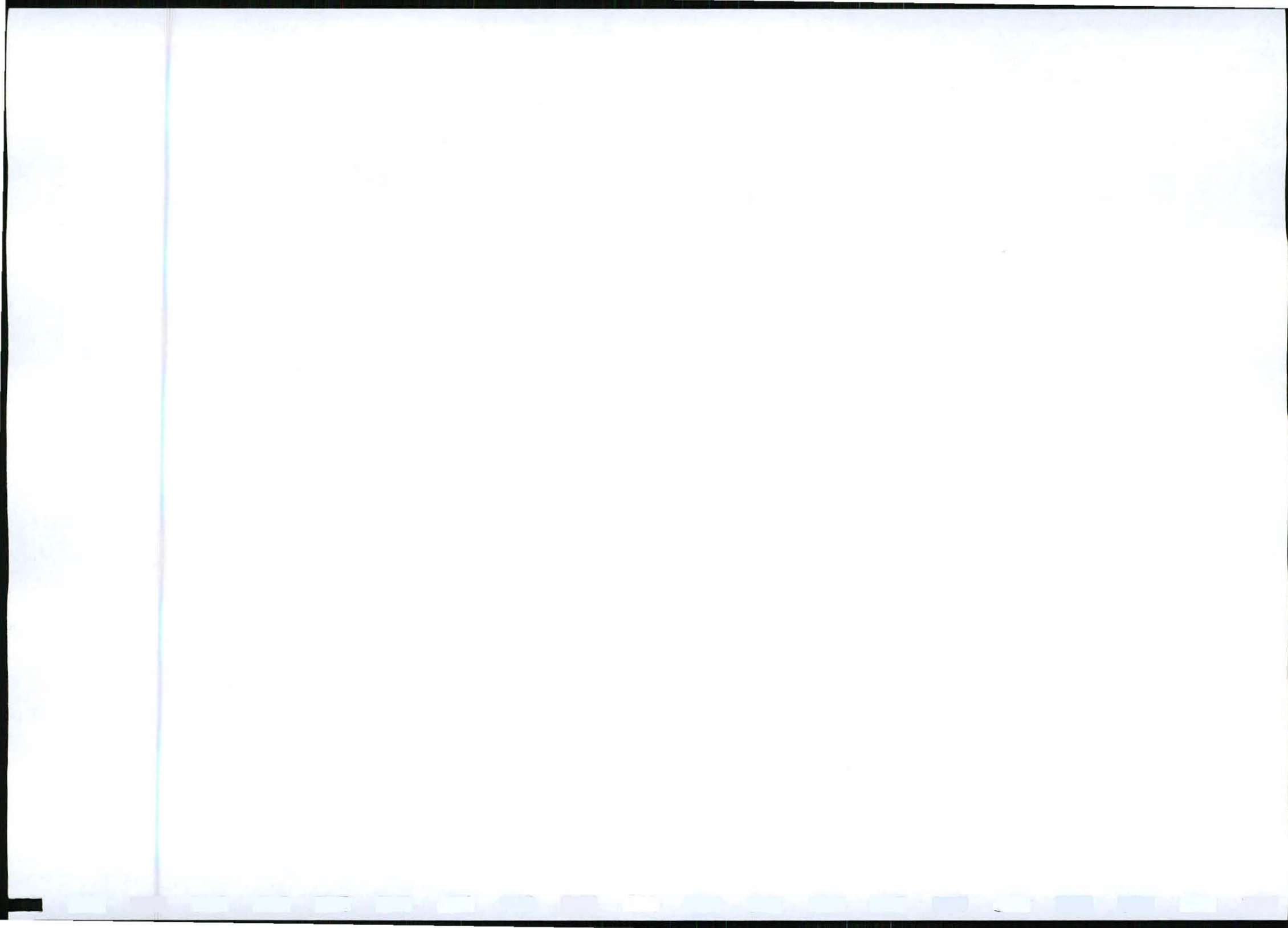
	<u>Rock Type</u>	<u>Formation</u>	<u>Subgroup</u>	<u>Group</u>	<u>Supergroup</u>
Jd	Dolerite	UNDIFFERENTIATED			
TRk	Sandstone, mudstone	Katberg	Traka	Beaufort	Karoo
TRb	Mudstone, sandstone	Burgersdorp	Traka	Beaufort	Karoo
TRm	Mudstone, shale, sandstone	Molteno	-	-	Karoo
		Approximate Chris Hani Region Boundary			

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Road MR00715
Borrow Pit 715/1
Stake Value km 1,2 (LHS)
Residual Mudstone

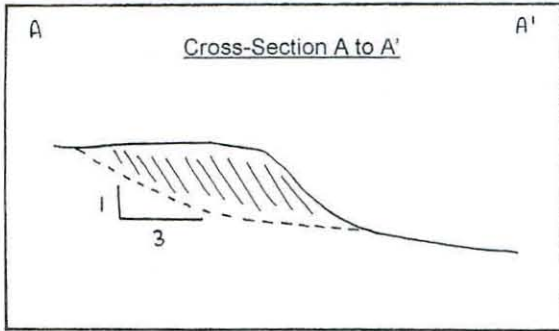
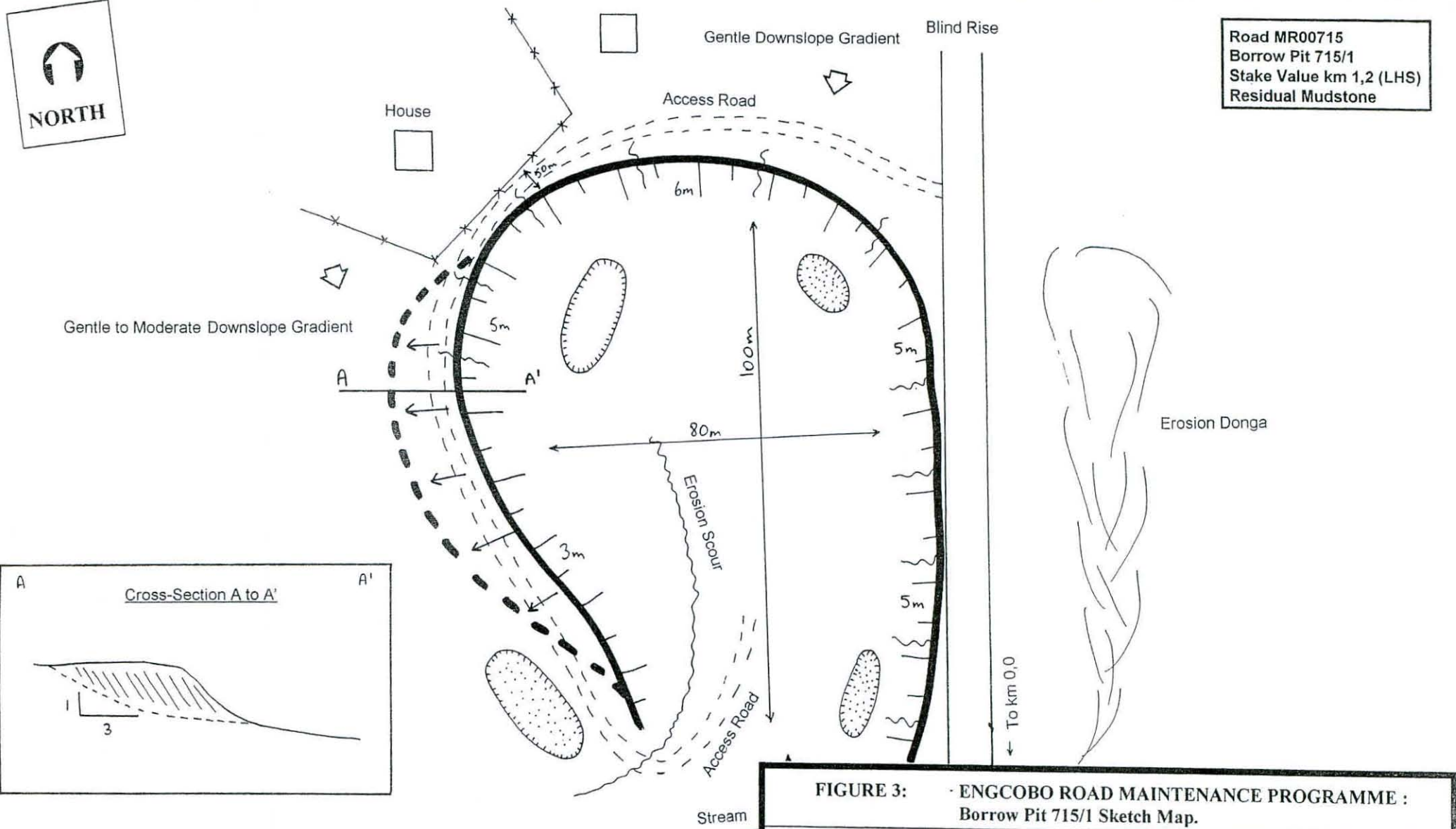


FIGURE 3: - ENGCOBO ROAD MAINTENANCE PROGRAMME : Borrow Pit 715/1 Sketch Map.

NOT TO SCALE SOURCE: Bopite Engineering Geologists CC

LEGEND:

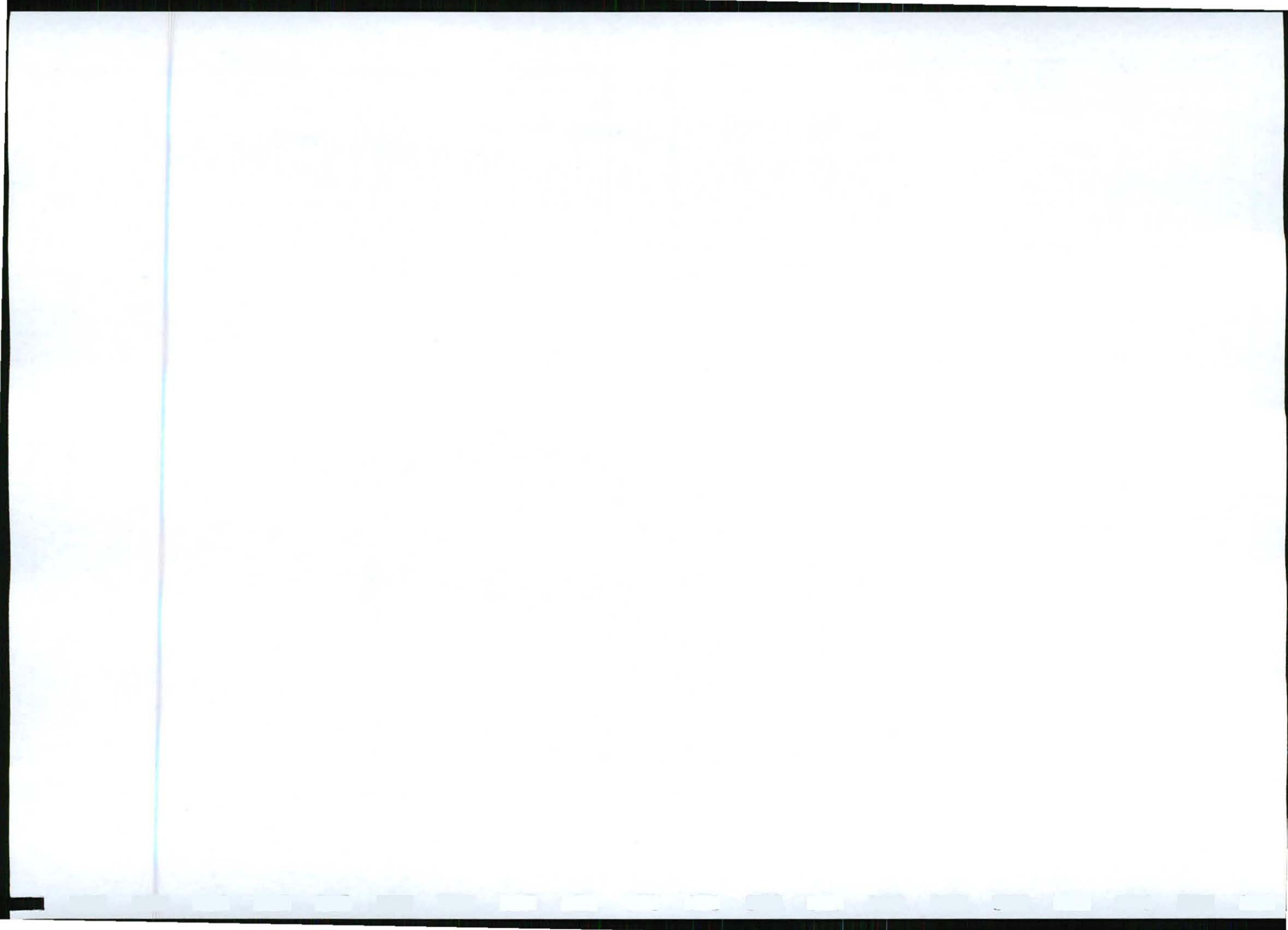
	Existing Soil Stockpile		Existing Gravel Stockpile
	Proposed New Quarrying Direction		Fence
	Downslope Gradient		Erosion Scour
	Existing Borrow Pit Boundary		Proposed New Excavation Boundary

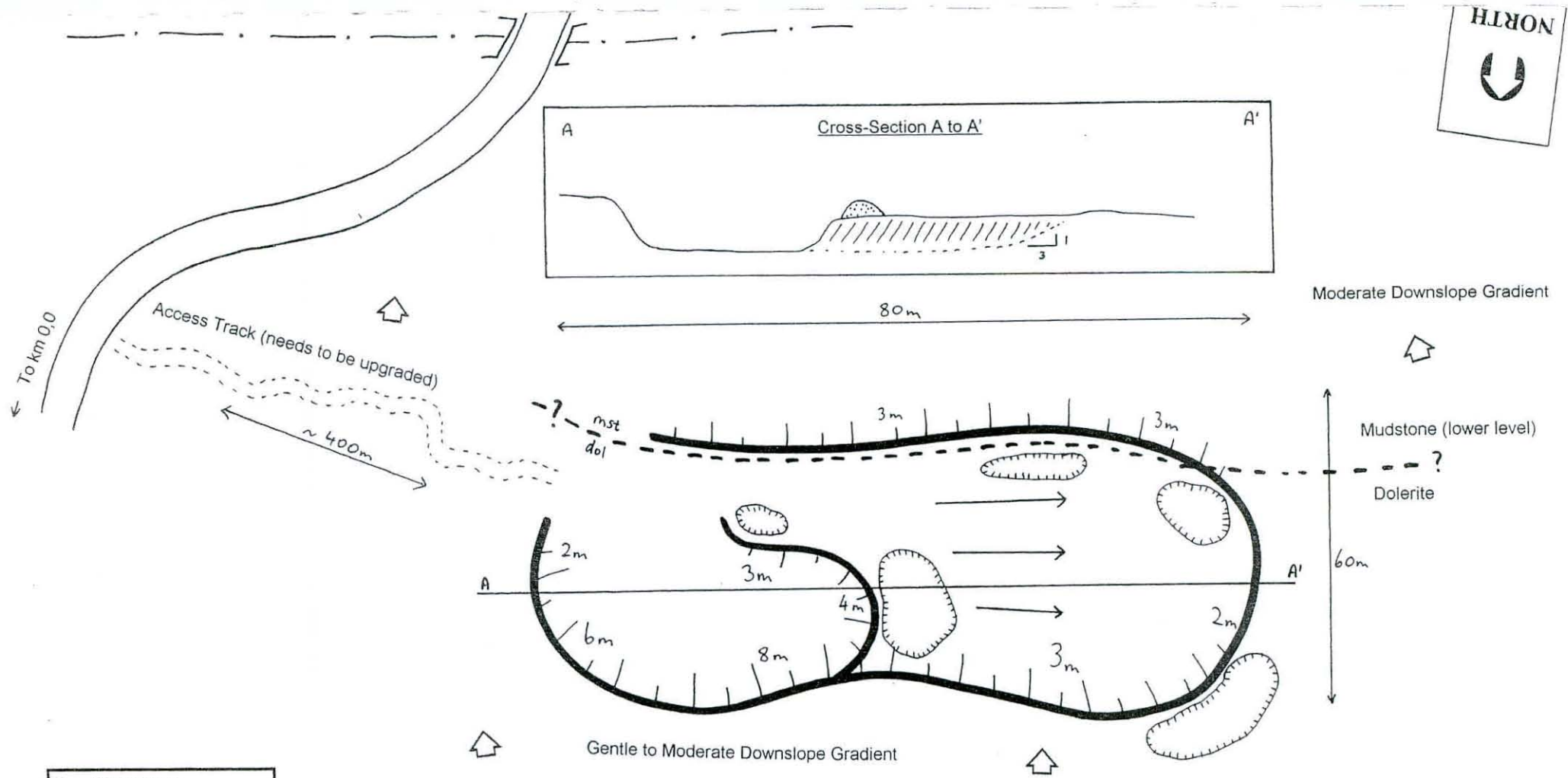
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Road MR00715
 Borrow Pit 715/2
 Stake Value km 7,7 (RHS)
 Dolerite and Sandstone

FIGURE 4: ENCOBO ROAD MAINTENANCE PROGRAMME : Borrow Pit 715/2 Sketch Map.

NOT TO SCALE SOURCE: Bopite Engineering Geologists CC

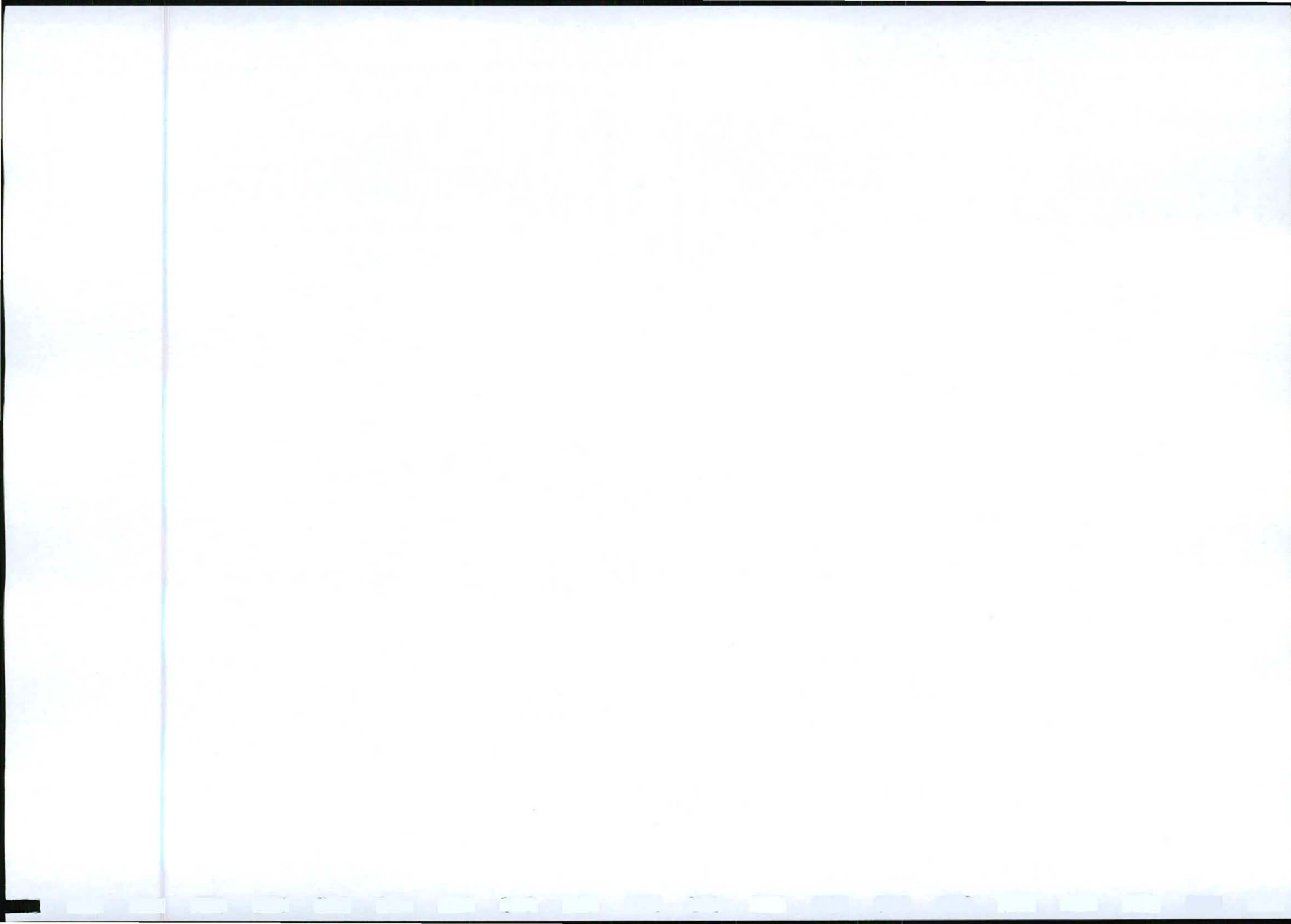
- LEGEND:**
- Existing Stockpile
 - Proposed New Quarrying Direction
 - River Channel
 - Existing Borrow Pit Boundary
 - Downslope Gradient
 - Quarry Terrace Level
 - Access Track
 - Proposed New Excavation Boundary

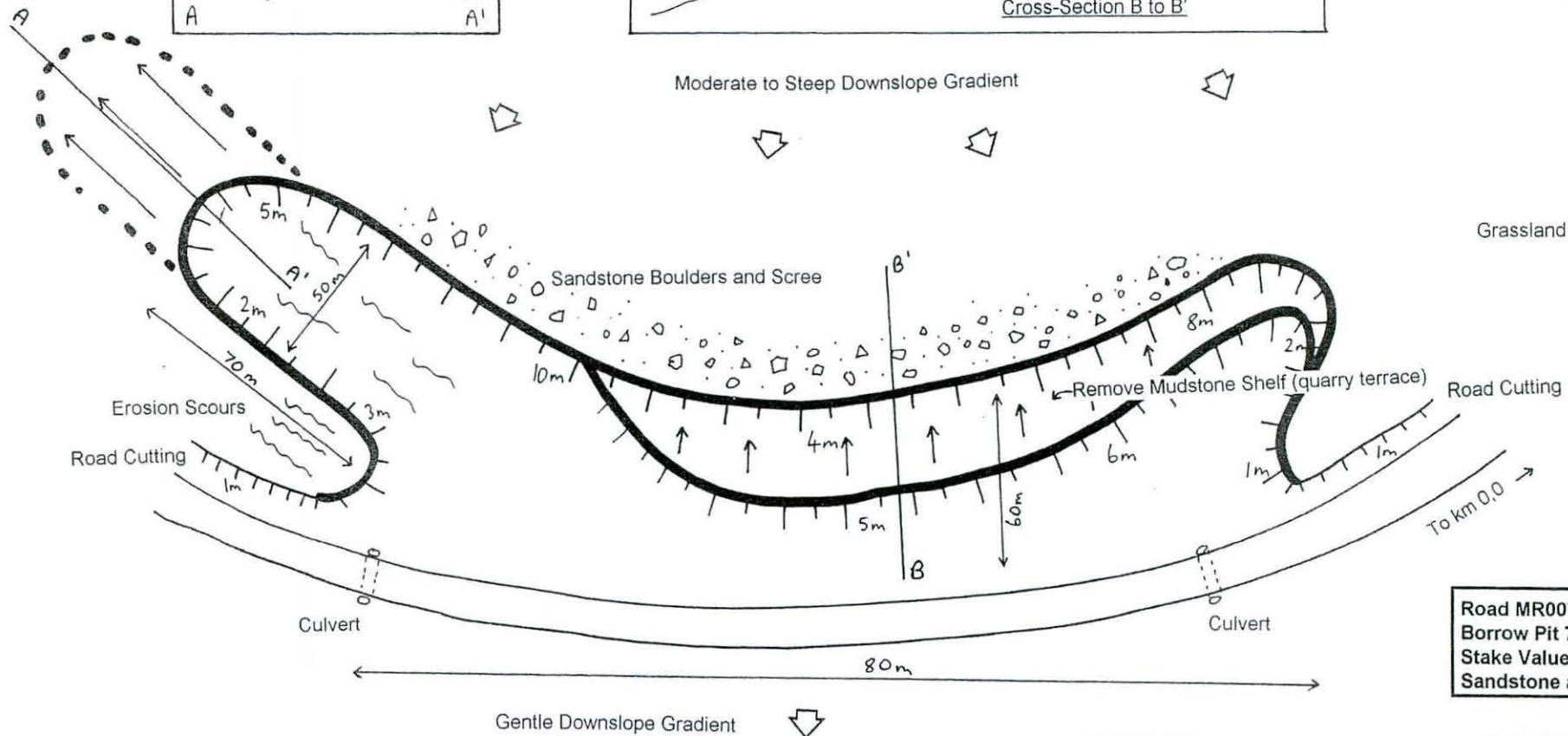
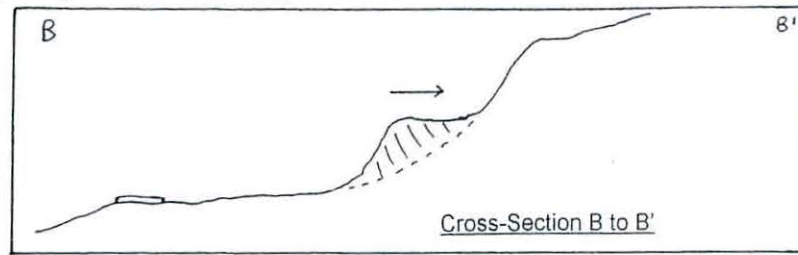
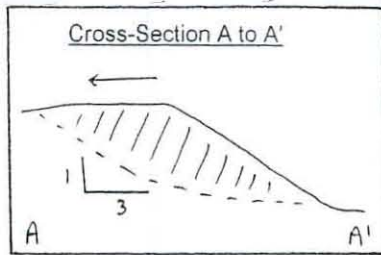
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Road MR00715
Borrow Pit 715/3
Stake Value km 9,7 (RHS)
Sandstone and Mudstone

FIGURE 5: ENCOBO ROAD MAINTENANCE PROGRAMME : Borrow Pit 715/3 Sketch Map.

NOT TO SCALE SOURCE: Bopite Engineering Geologists CC

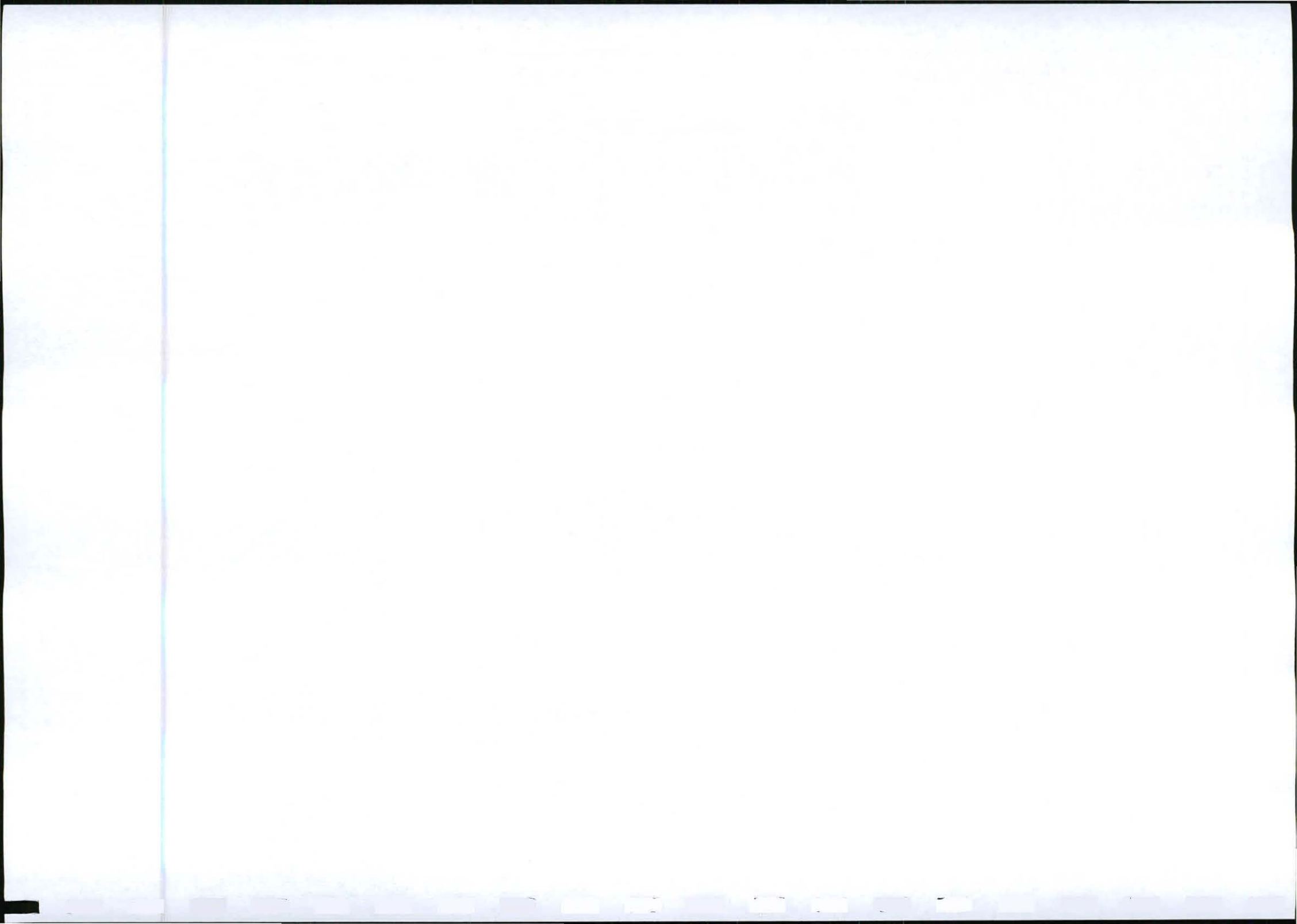
LEGEND:	
	Erosion Scours
	Proposed New Quarrying Direction
	Scree
	Existing Borrow Pit Boundary
	Proposed New Excavation Boundary
	Downslope Gradient
	Existing Borrow Pit Sidewall
	Quarry Terrace Level

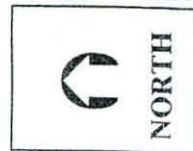
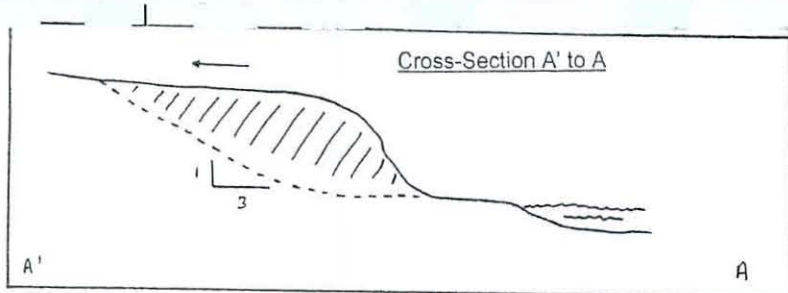
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Moderate Downslope Gradient

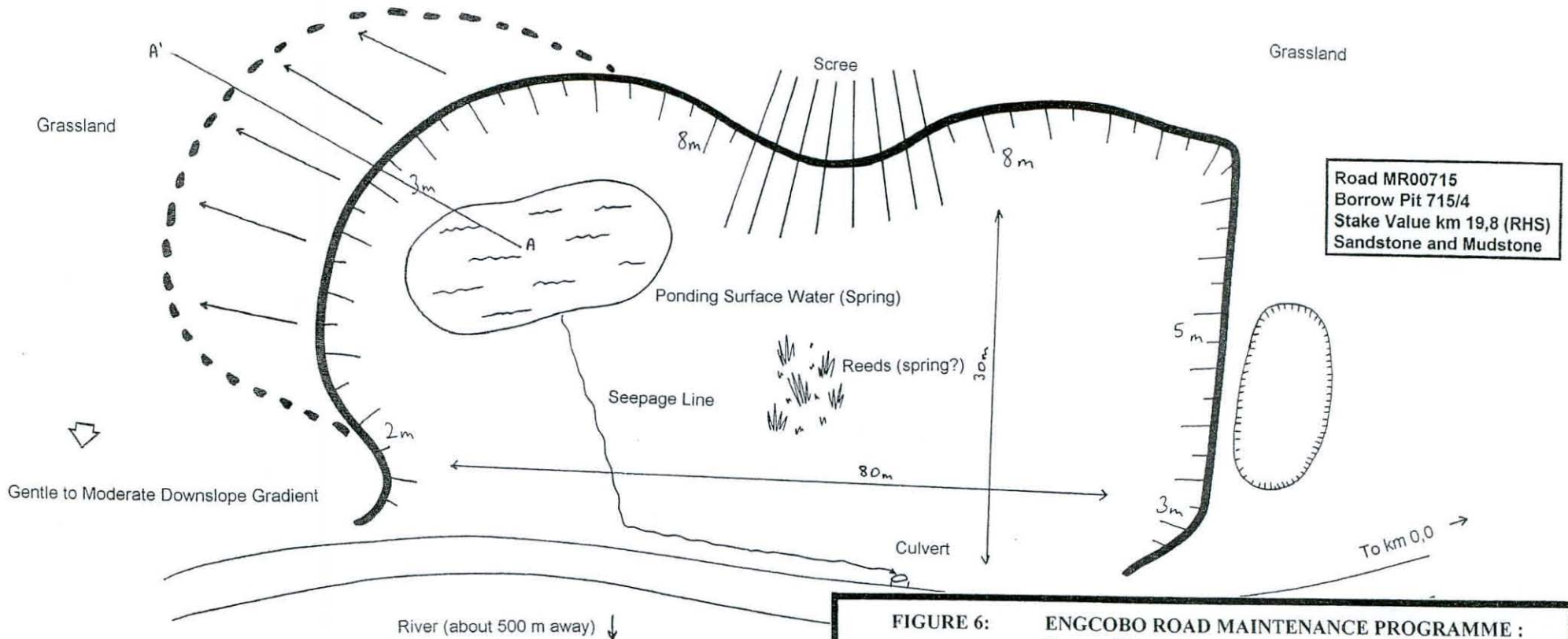
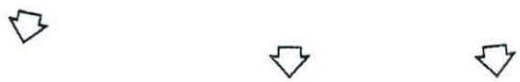


FIGURE 6: ENGOBO ROAD MAINTENANCE PROGRAMME : Borrow Pit 715/4 Sketch Map.

NOT TO SCALE

SOURCE: Bopite Engineering Geologists CC

LEGEND:

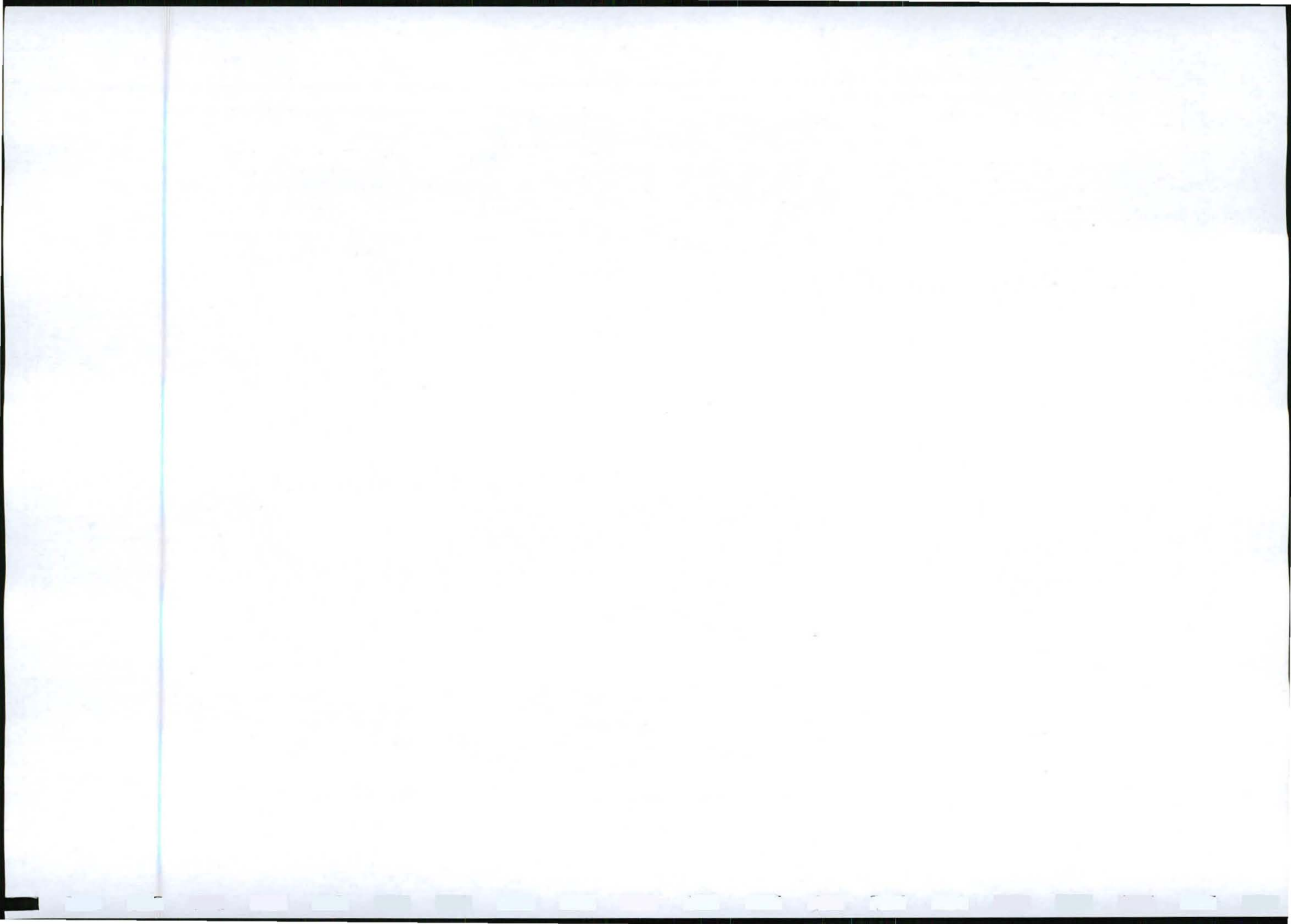
- Ponding Surface Water (Spring)
- Proposed New Quarrying Direction
- Existing Stockpile
- Existing Borrow Pit Boundary
- Downslope Gradient
- Existing Borrow Pit Sidewall
- Scree
- Proposed New Excavation Boundary

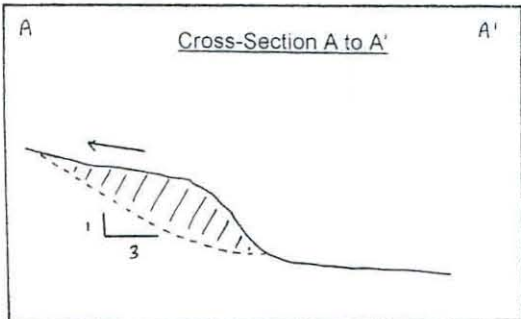
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Road MR00715
Borrow Pit 715/5
Stake Value km 24,3 (LHS)
Residual Sandstone

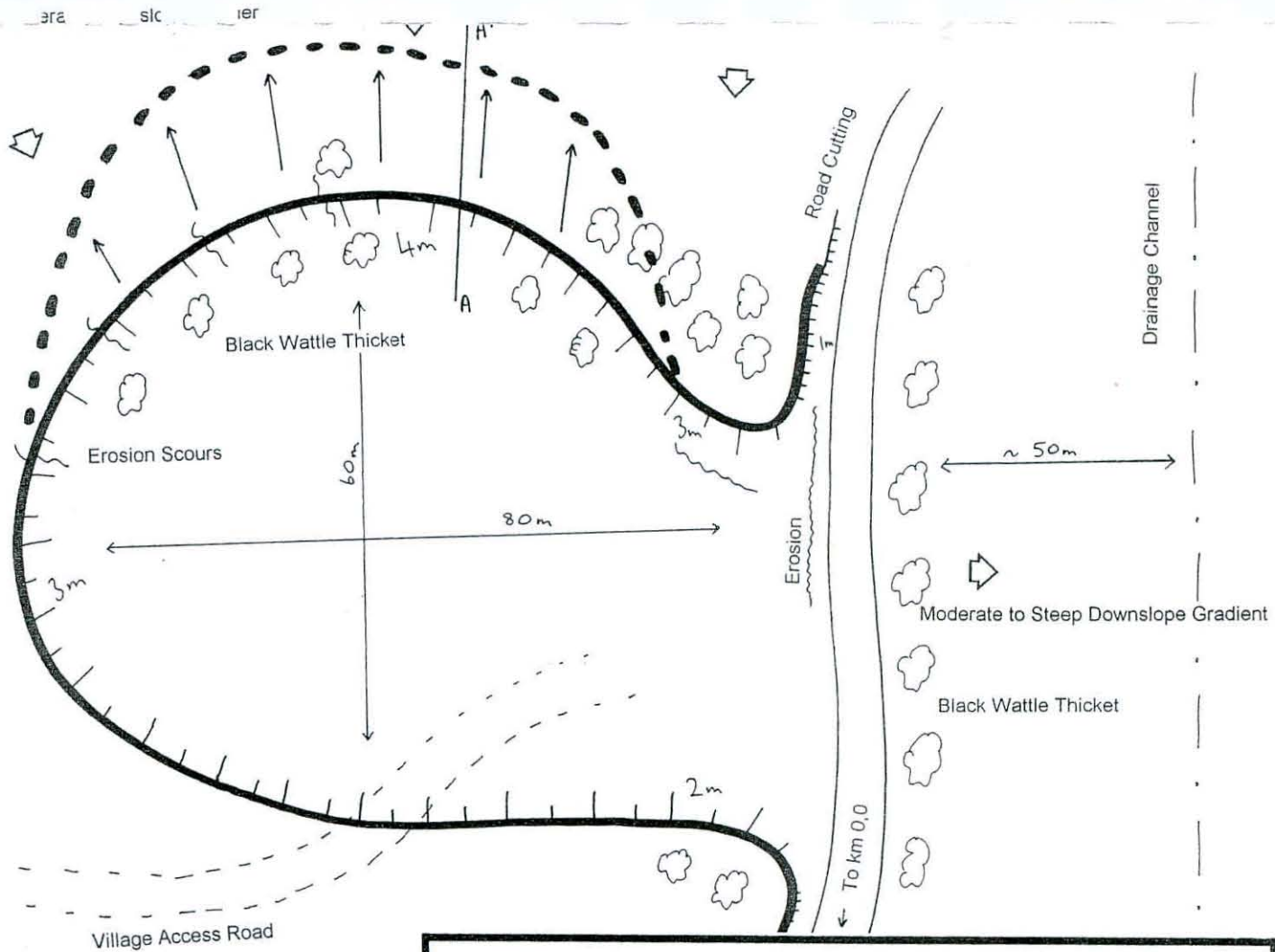


FIGURE 7: ENGCOCO ROAD MAINTENANCE PROGRAMME : Borrow Pit 715/5 Sketch Map.

NOT TO SCALE

SOURCE: Bopite Engineering Geologists CC

LEGEND:

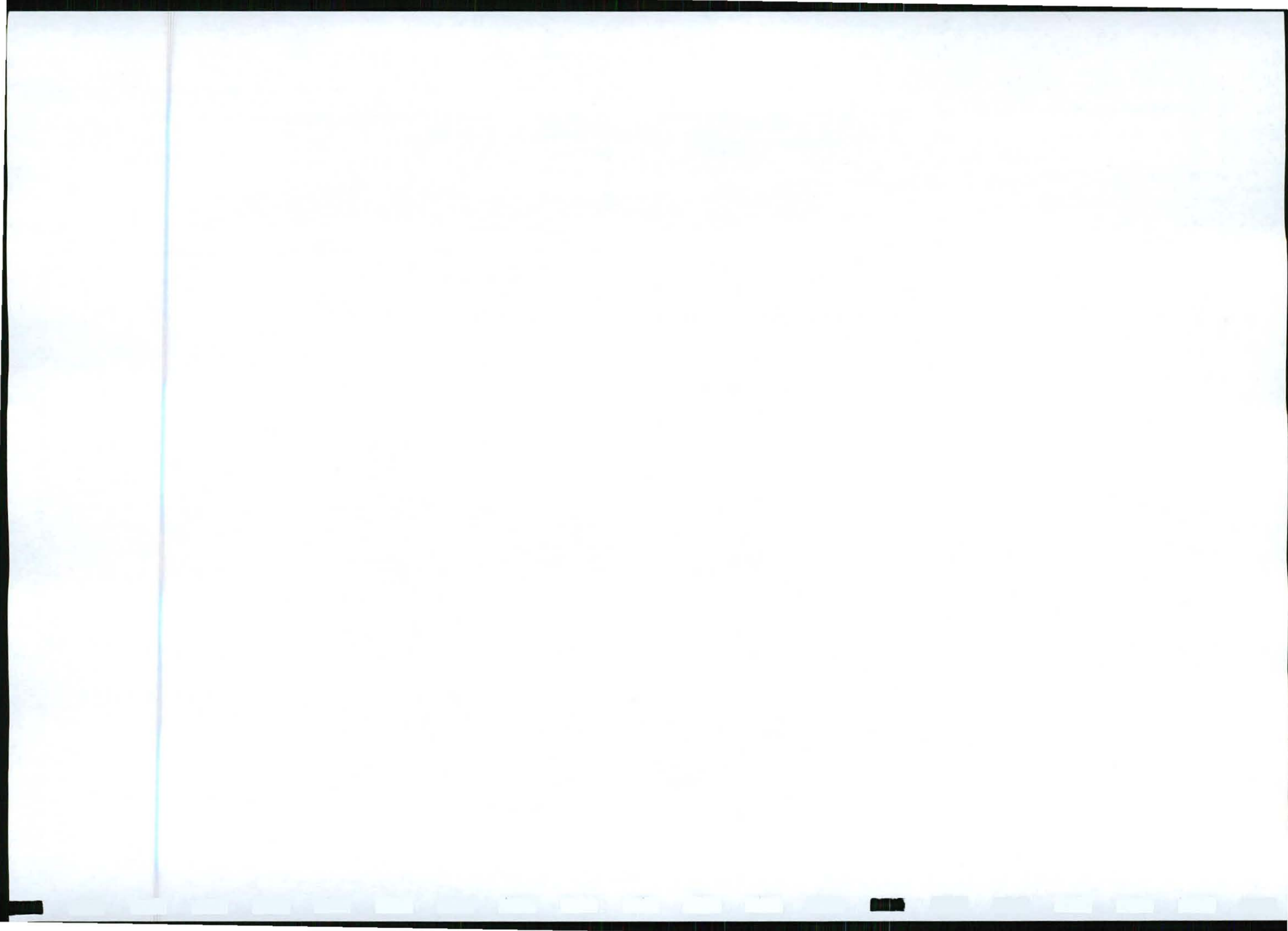
- | | | | |
|--|----------------------------------|--|----------------------------------|
| | Black Wattle Thicket | | Downslope Gradient |
| | Proposed New Quarrying Direction | | Existing Borrow Pit Sidewall |
| | Village Access Road | | Erosion Scour |
| | Existing Borrow Pit Boundary | | Proposed New Excavation Boundary |

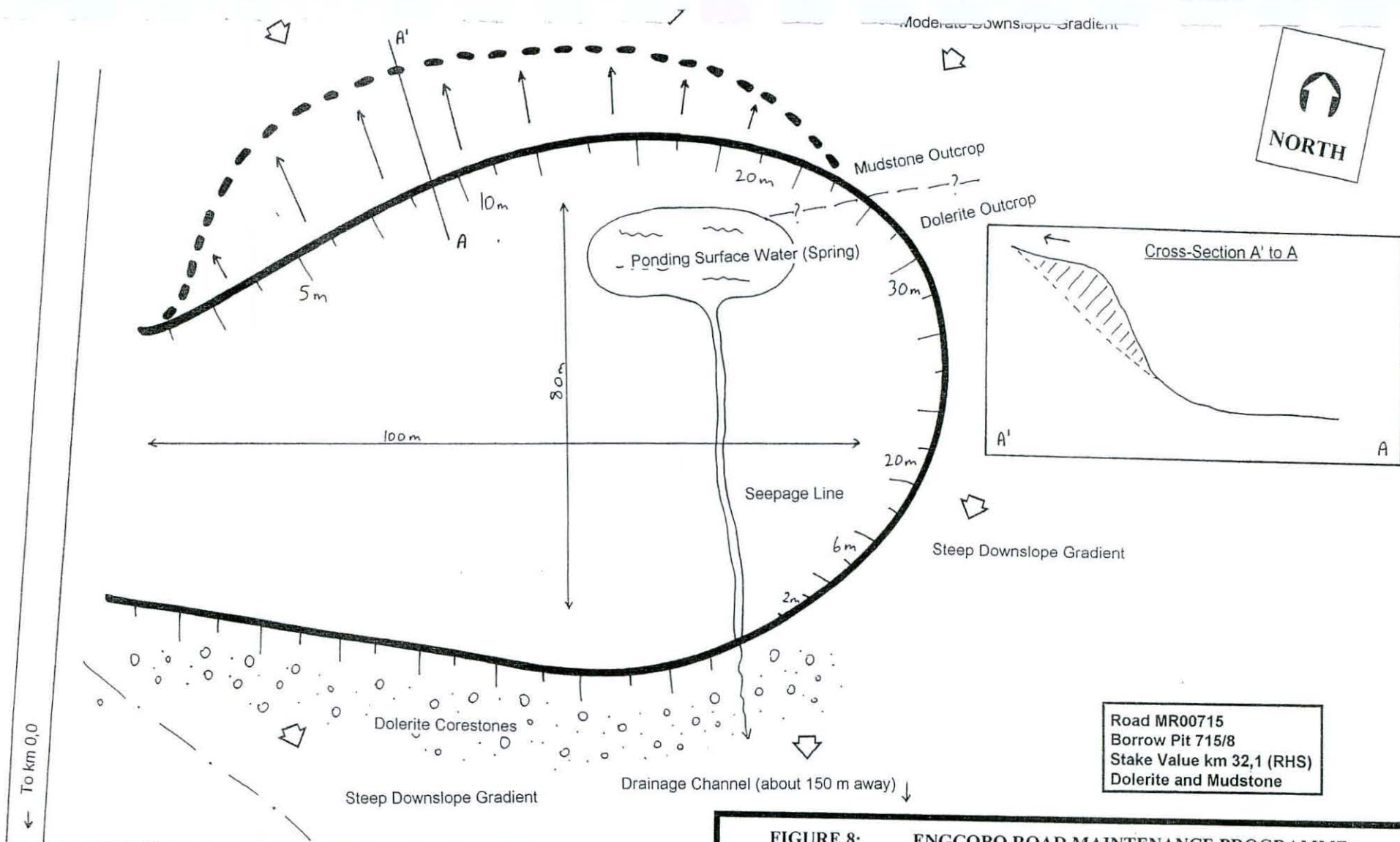
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Road MR00715
 Borrow Pit 715/8
 Stake Value km 32,1 (RHS)
 Dolerite and Mudstone

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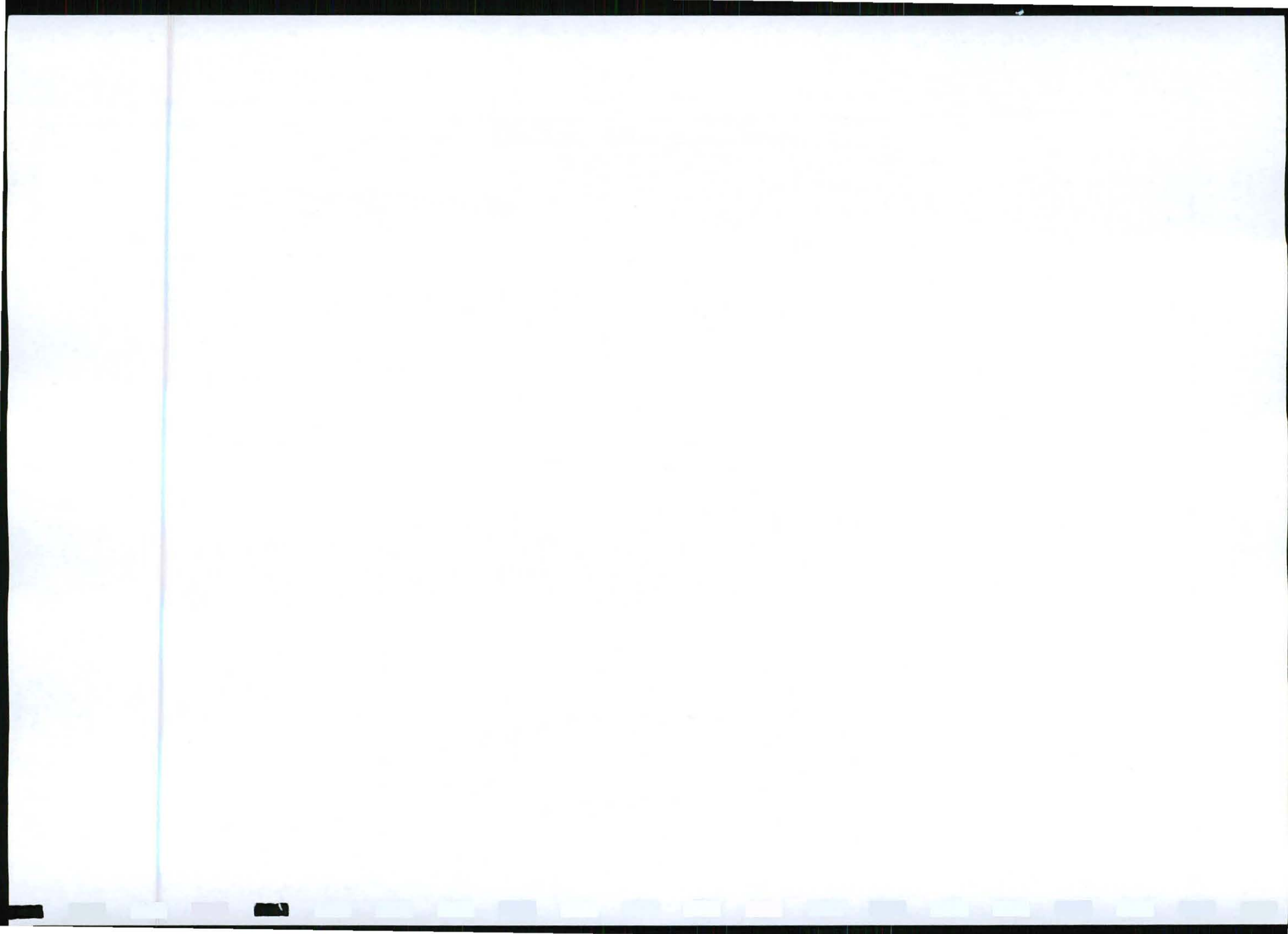
CK 96 6444023

FIGURE 8: ENGCOBO ROAD MAINTENANCE PROGRAMME : Borrow Pit 715/8 Sketch Map.

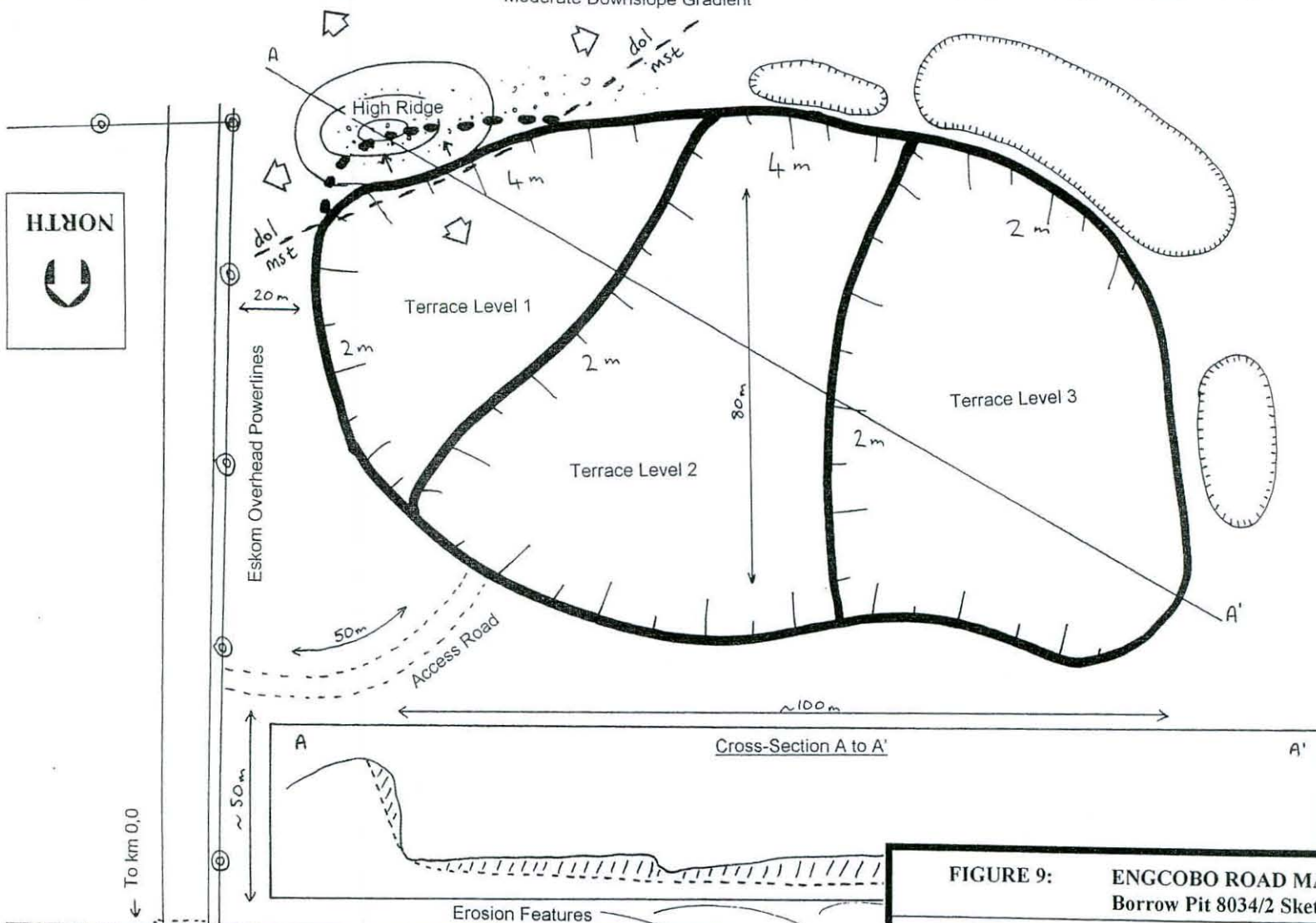
NOT TO SCALE SOURCE: Bopite Engineering Geologists CC

LEGEND:

	Proposed New Quarrying Direction		Existing Borrow Pit Sidewall
	Existing Stockpile		Downslope Gradient
	Existing Borrow Pit Boundary		Proposed New Excavation Boundary



Moderate Downslope Gradient



Road DR08034
Borrow Pit 8034/2
Stake Value km 5,6 (RHS)
Residual Mudstone



FIGURE 9: ENCOBO ROAD MAINTENANCE PROGRAMME : Borrow Pit 8034/2 Sketch Map.

NOT TO SCALE

SOURCE: Bopite Engineering Geologists CC

LEGEND:

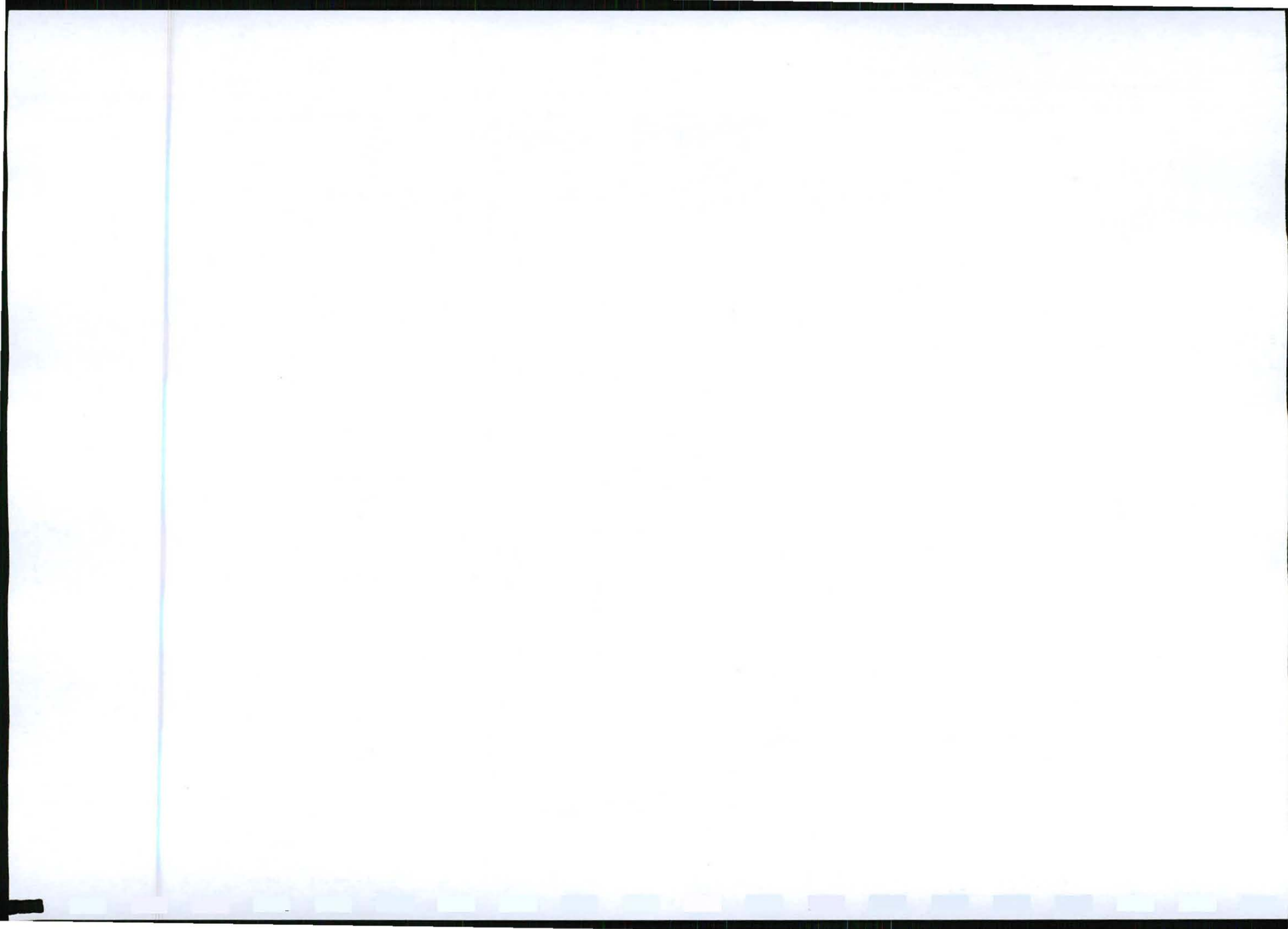
- Existing Stockpile
- Proposed New Quarrying Direction
- Quarry Terrace Level
- Existing Borrow Pit Boundary
- Downslope Gradient
- Existing Borrow Pit Sidewall
- Access Road
- Proposed New Excavation Boundary

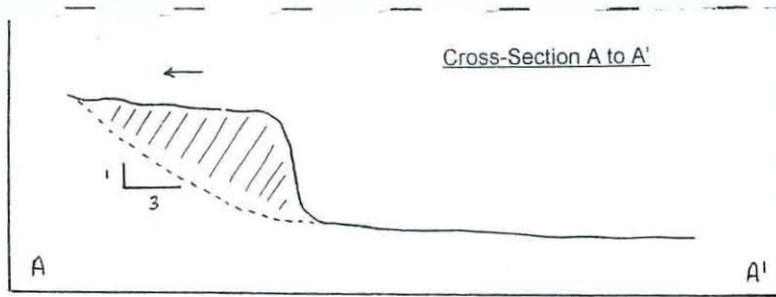
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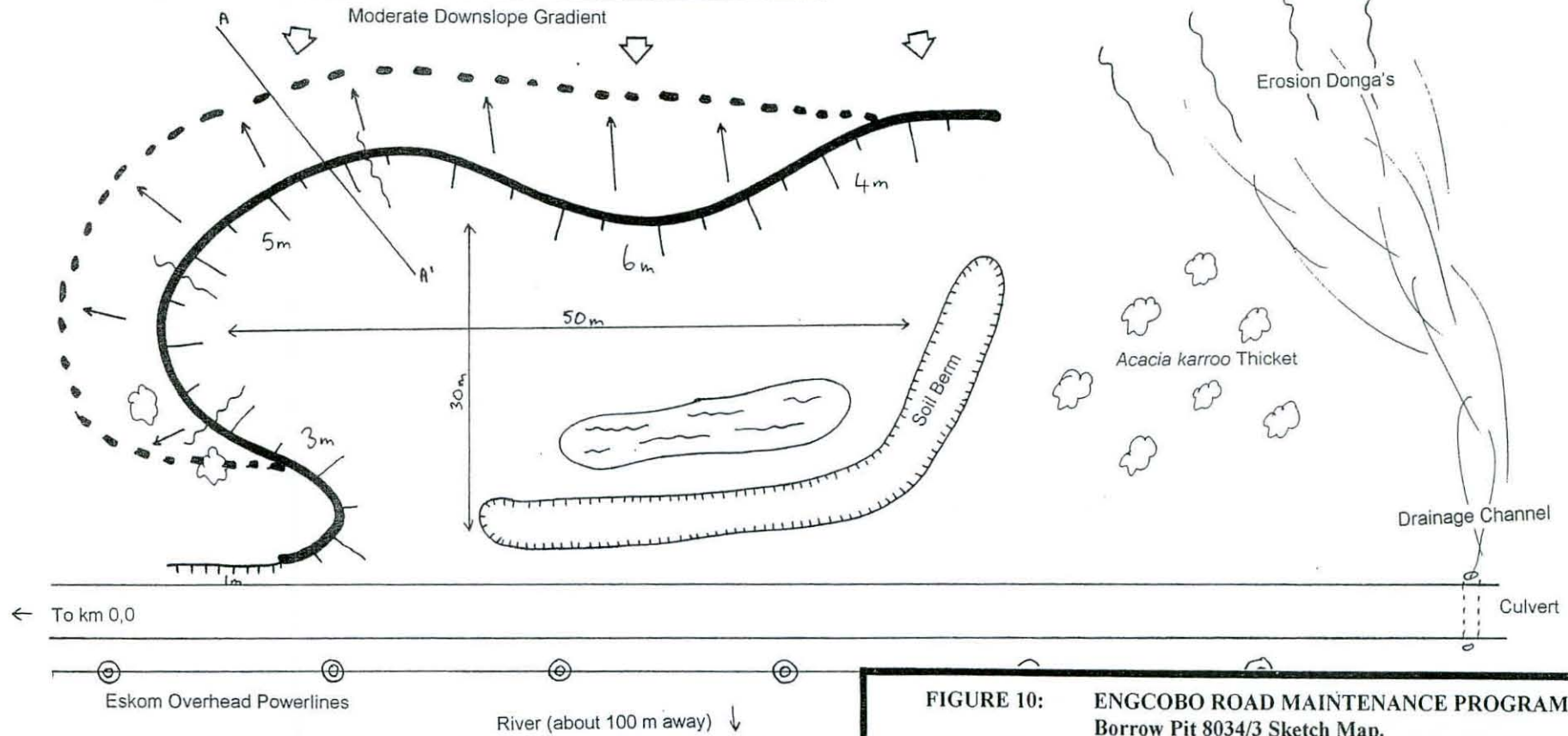
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CK 96 6444023





Road DR08034
Borrow Pit 8034/3
Stake Value km 11,0 (LHS)
Mudstone & Sandstone









**FIGURE 10: ENCOBO ROAD MAINTENANCE PROGRAMME :
Borrow Pit 8034/3 Sketch Map.**

NOT TO SCALE

SOURCE: Bopite Engineering Geologists CC

LEGEND:

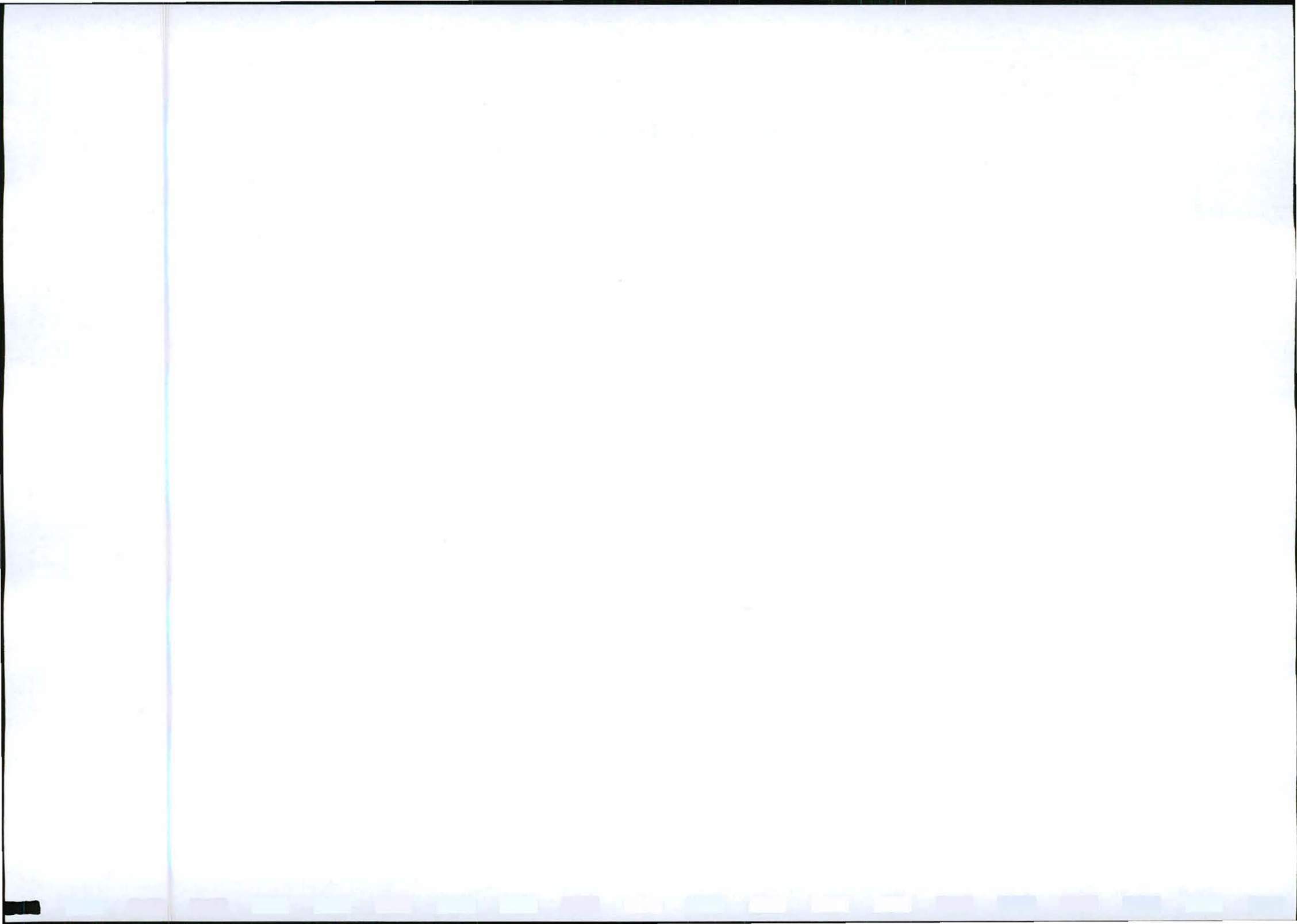
-  Downslope Gradient
-  Proposed New Quarrying Direction
-  Existing Borrow Pit Boundary
-  Existing Borrow Pit Sidewall
-  Dry Pan
-  Proposed New Excavation Boundary

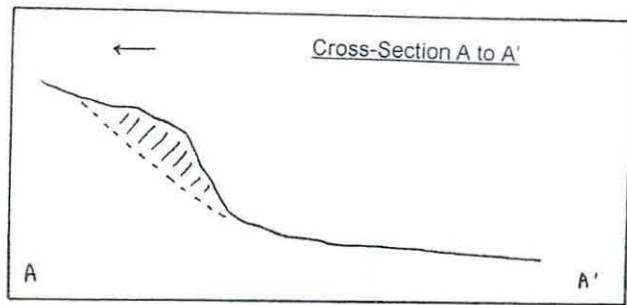
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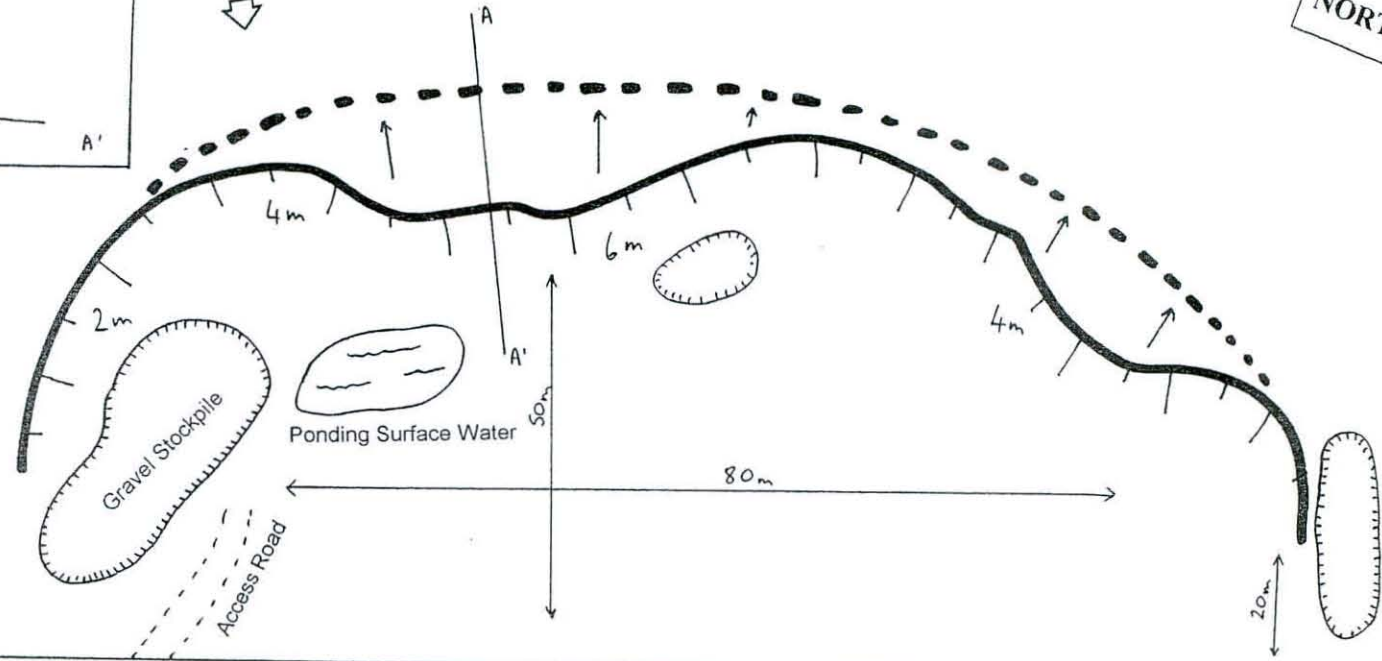




Steep Downslope Gradient



Road DR08035
Borrow Pit 8035/0
Stake Value km 0,0 (RHS)
Residual Mudstone



Gentle Downslope Gradient







To km 0,0 →

**FIGURE 11: ENGCOBO ROAD MAINTENANCE PROGRAMME :
Borrow Pit 8035/0 Sketch Map.**

NOT TO SCALE

SOURCE: Bopite Engineering Geologists CC

LEGEND:

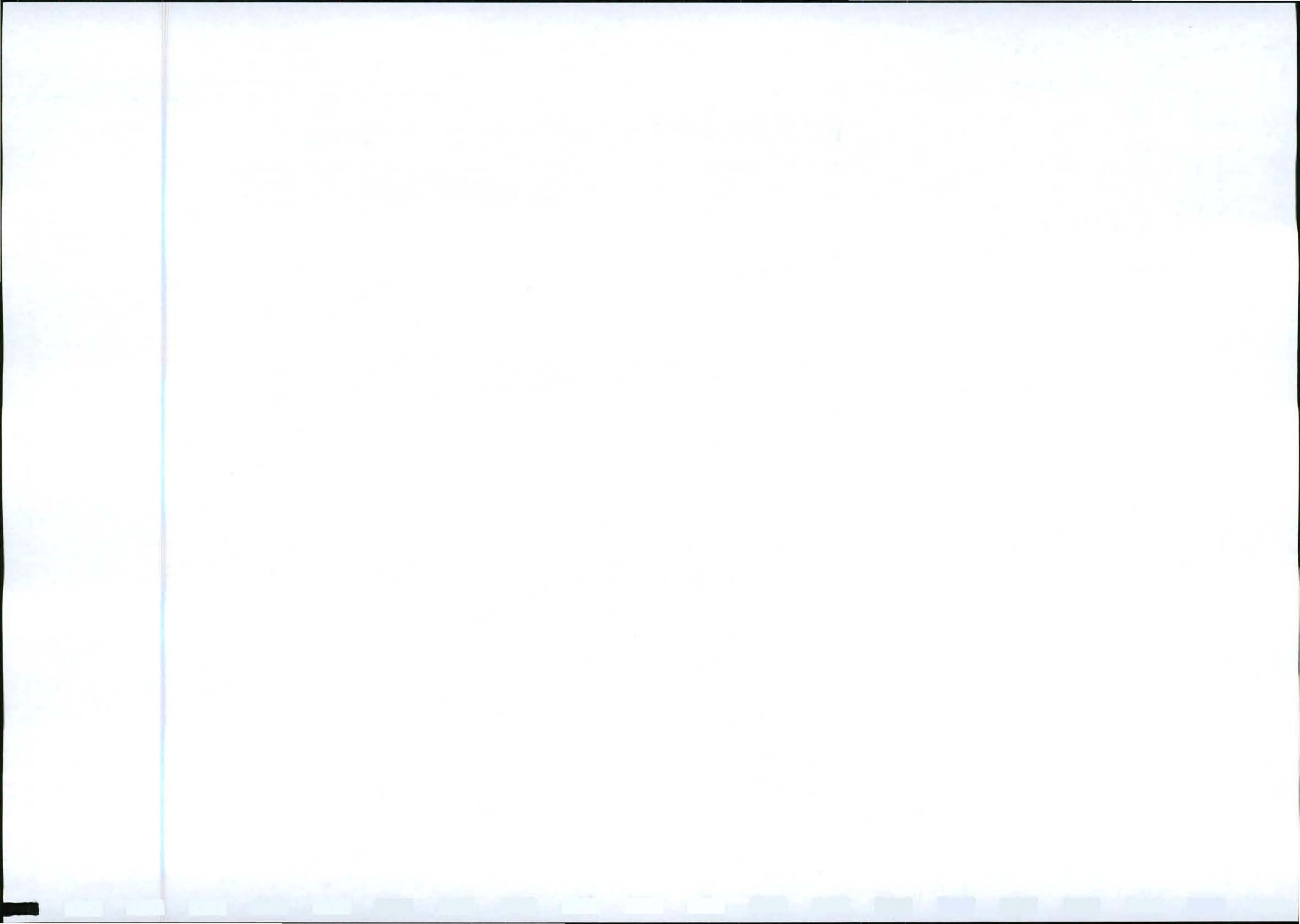
- | | | | |
|---|----------------------------------|---|----------------------------------|
|  | Existing Stockpile |  | Downslope Gradient |
|  | Proposed New Quarrying Direction |  | Existing Borrow Pit Sidewall |
|  | Existing Borrow Pit Boundary |  | Proposed New Excavation Boundary |

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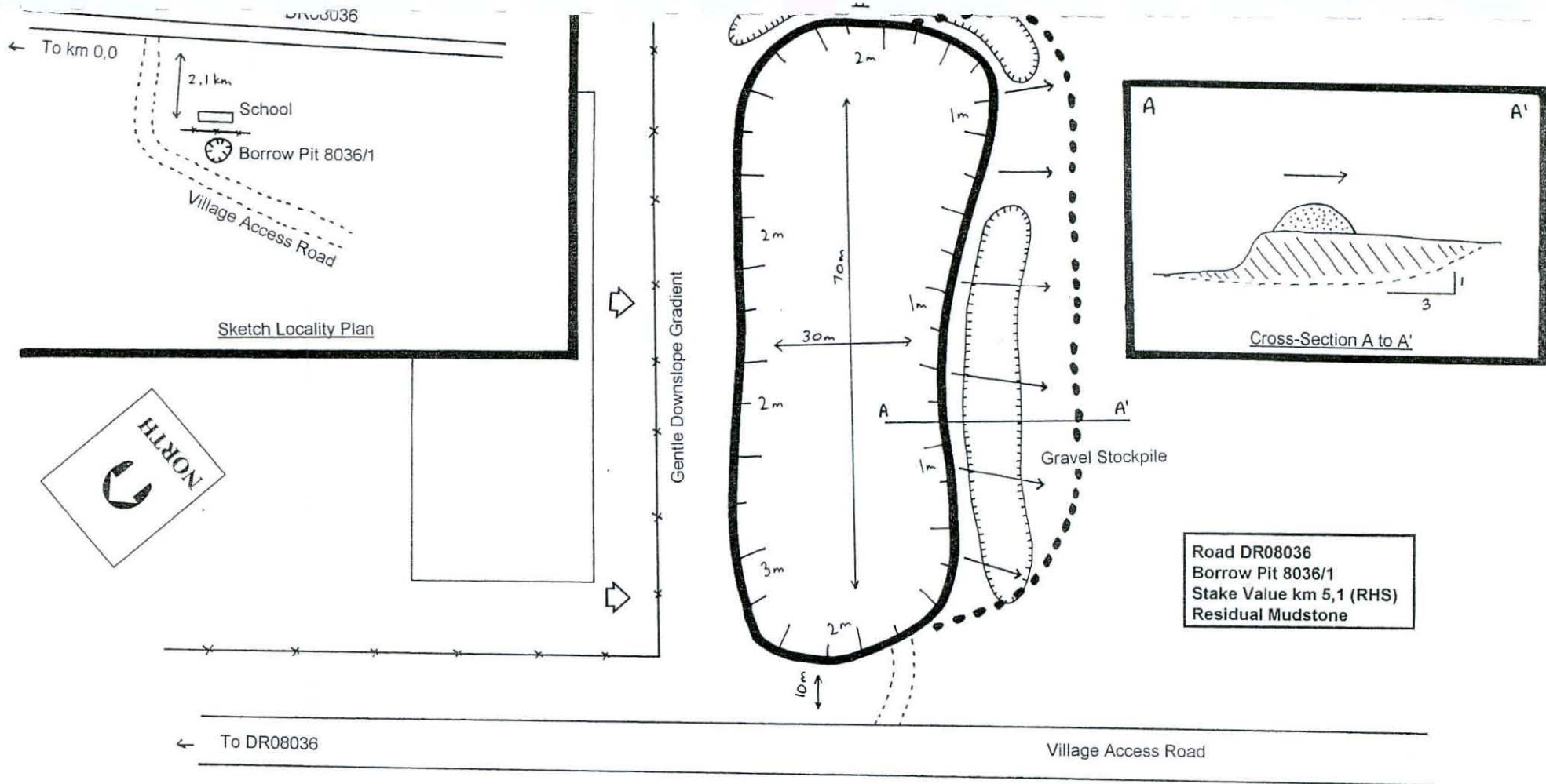










FIGURE 12: ENCOBO ROAD MAINTENANCE PROGRAMME : Borrow Pit 8036/1 Sketch Map.

NOT TO SCALE

SOURCE: Bopite Engineering Geologists CC

LEGEND:

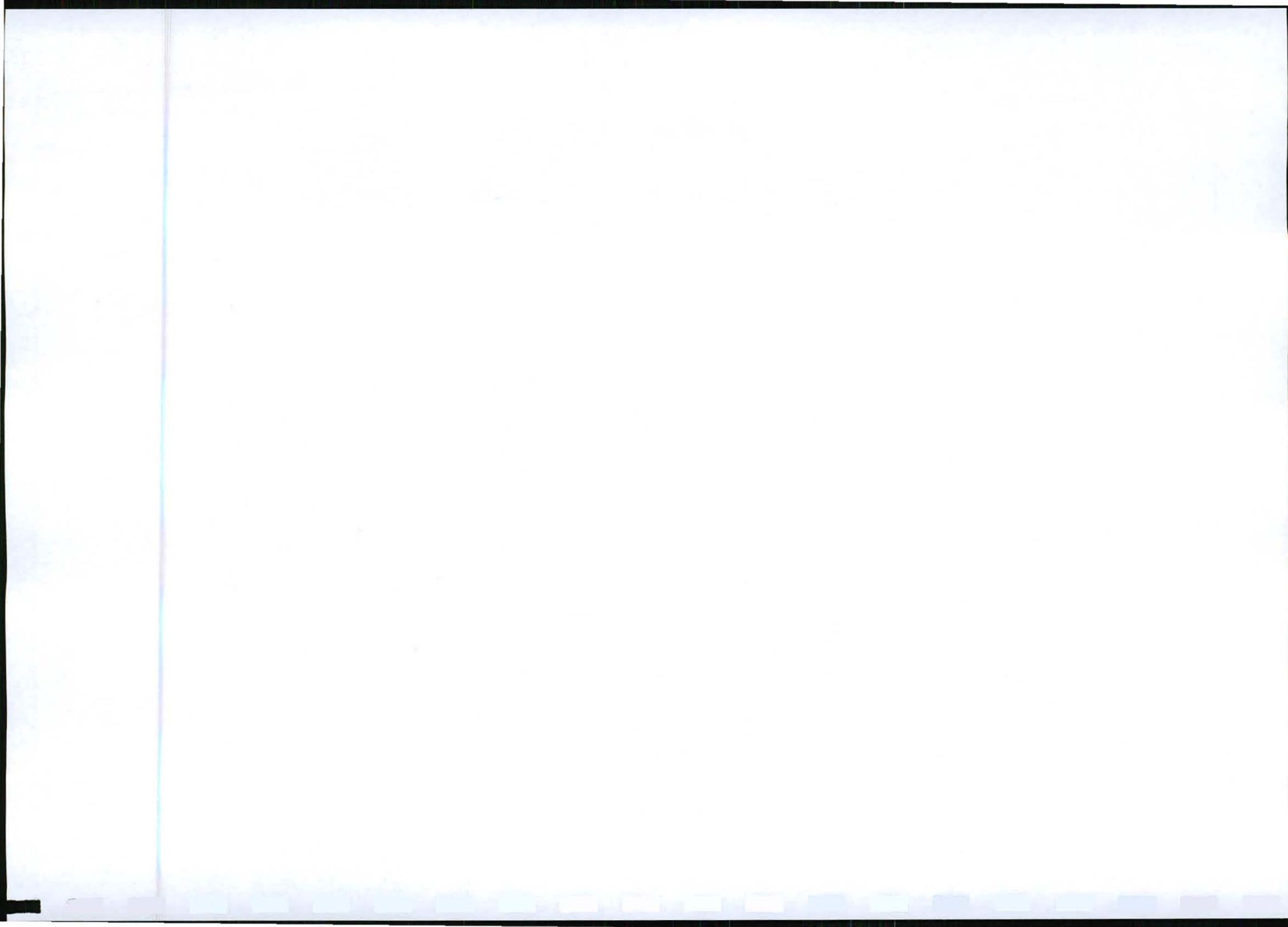
- | | | | |
|---|----------------------------------|---|----------------------------------|
|  | Gravel Stockpile |  | Downslope Gradient |
|  | Proposed New Quarrying Direction |  | Existing Borrow Pit Sidewall |
|  | Fence |  | Access Road |
|  | Existing Borrow Pit Boundary |  | Proposed New Excavation Boundary |

BOPITE ENGINEERING GEOLOGISTS CC

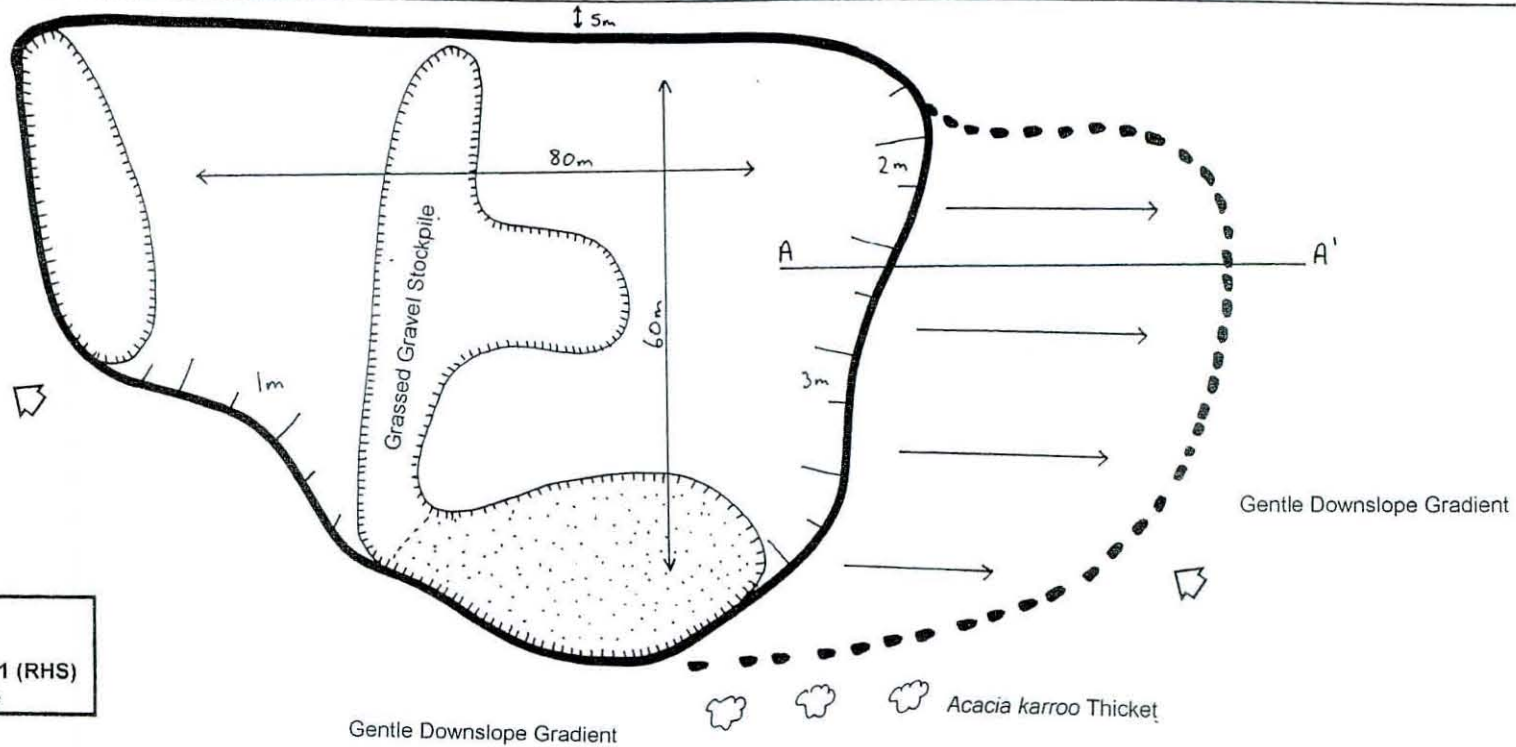
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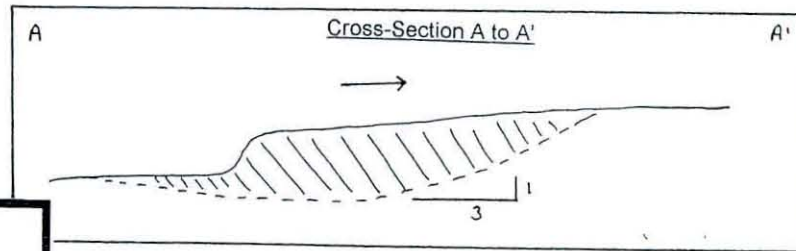
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← To km 0,0



Road DR08036
 Borrow Pit 8036/3
 Stake Value km 13,1 (RHS)
 Residual Mudstone



**FIGURE 13: ENCOBO ROAD MAINTENANCE PROGRAMME :
 Borrow Pit 8036/3 Sketch Map.**

NOT TO SCALE

SOURCE: Bopite Engineering Geologists CC

LEGEND:

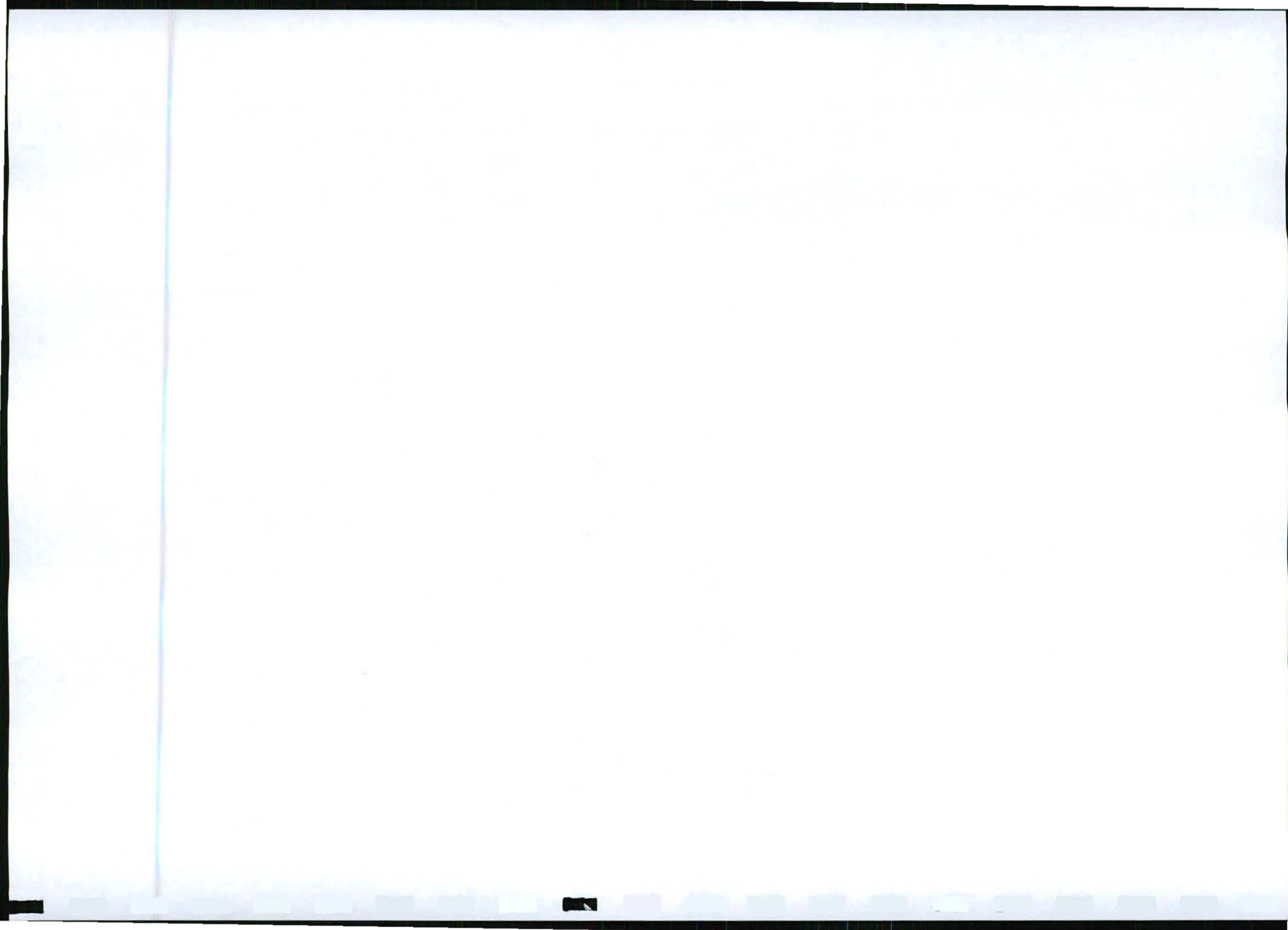
- | | | | |
|--|----------------------------------|--|----------------------------------|
| | Downslope Gradient | | <i>Acacia karroo</i> Thicket |
| | Proposed New Quarrying Direction | | Existing Borrow Pit Sidewall |
| | Existing Borrow Pit Boundary | | Proposed New Excavation Boundary |

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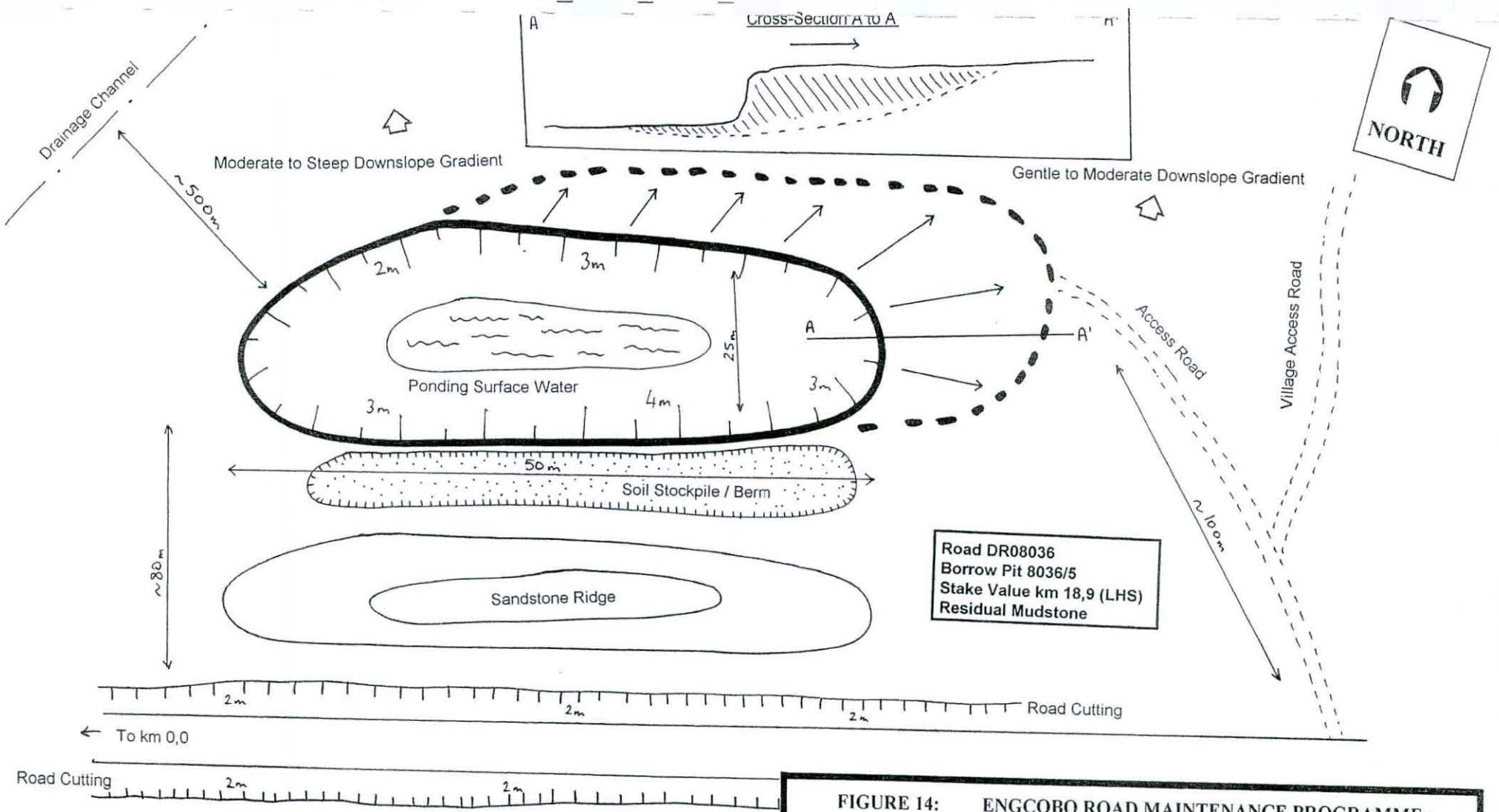


FIGURE 14: ENGCOBO ROAD MAINTENANCE PROGRAMME : Borrow Pit 8036/5 Sketch Map.

NOT TO SCALE SOURCE: Bopite Engineering Geologists CC

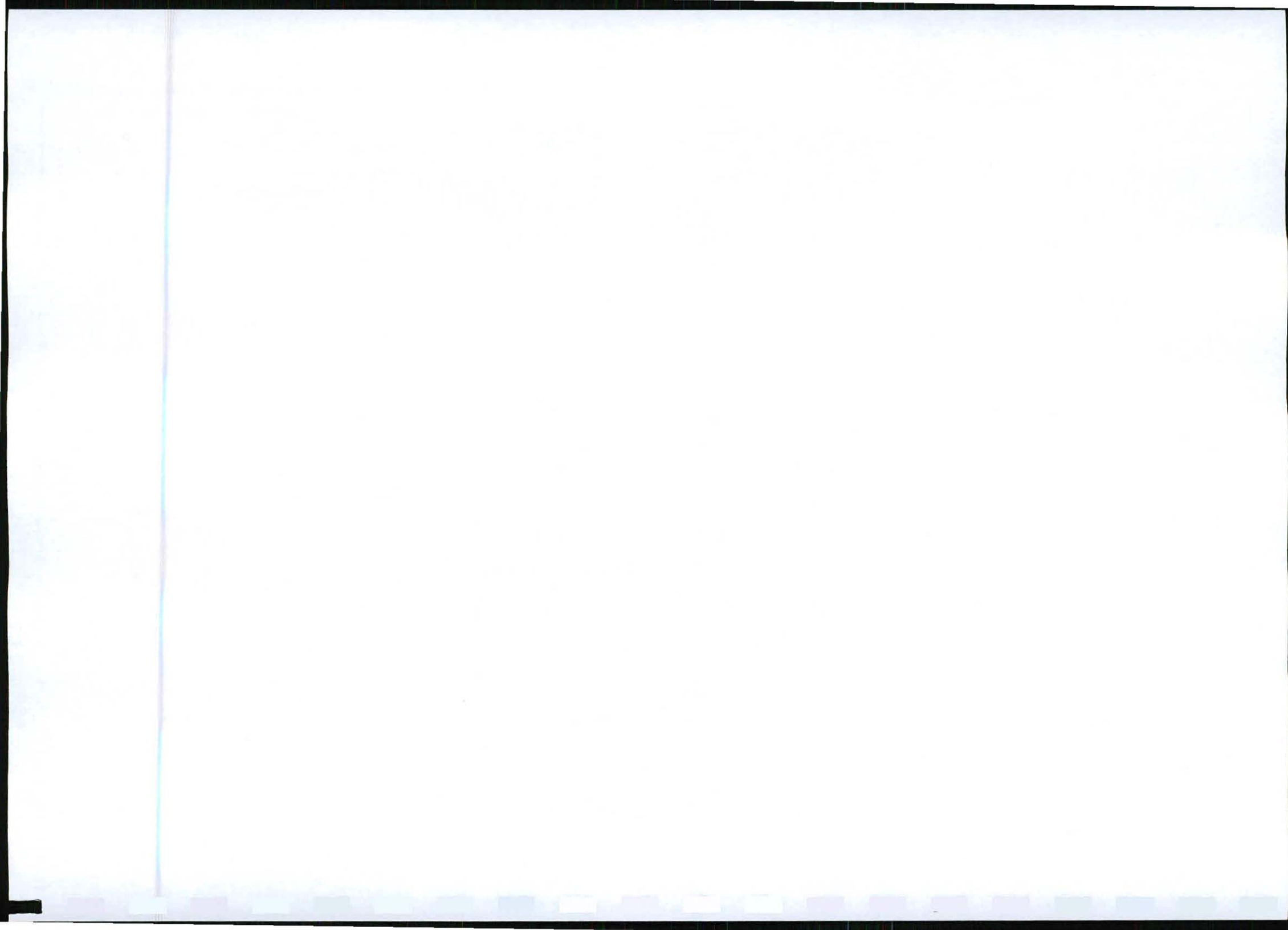
- LEGEND:**
- Sandstone Ridge
 - Proposed New Quarrying Direction
 - Soil Stockpile
 - Existing Borrow Pit Boundary
 - Downslope Gradient
 - Existing Borrow Pit Sidewall
 - Access Road
 - Proposed New Excavation Boundary

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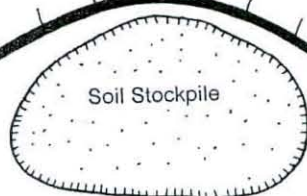
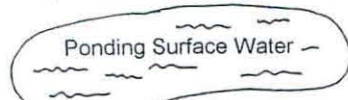
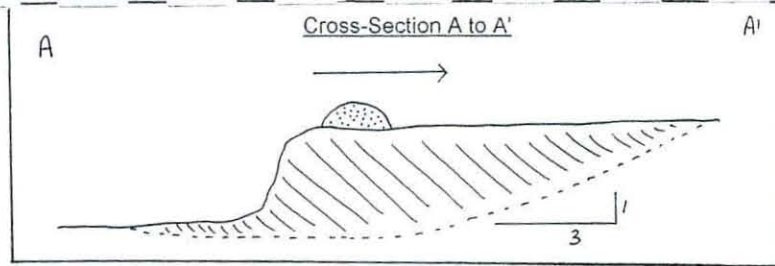
Gentle to Moderate Downslope Gradient

Ploughed Lands

Old Fence Remnant

Grassland

Grassland



Drainage Channel

Culvert

Road DR08225
Borrow Pit 8225/1
Stake Value km 7,4 (RHS)
Residual Mudstone

To km 0,0 →

FIGURE 15: ENGCOBO ROAD MAINTENANCE PROGRAMME : Borrow Pit 8225/1 Sketch Map.

NOT TO SCALE

SOURCE: Bopite Engineering Geologists CC

LEGEND:



Gravel Stockpile



Proposed New Quarrying Direction



Fence



Existing Borrow Pit Boundary



Downslope Gradient



Existing Borrow Pit Sidewall



Drainage Channel



Proposed New Excavation Boundary

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