

GEOCRES No. 40I14-129DIST. 31 REGION _____

W.P. No. _____

CONT. No. _____

W. O. No. 97-11004

STR. SITE No. _____

HWY. No. 3LOCATION Slope Failure 1.3km E of
Wellington Rd.No of PAGES -

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT. _____REMARKS: _____

From: Ron Meertens
To: ArthurG, BeechP, BentleKe
Date: 9/2/98 2:04pm
Subject: Hwy at St. Thomas bypass slope repair

The following is a resend of this mornings E-mail that disappeared when the power went off this morning.

Yesterdays review of the project to address the organic material identified by the District staff and water in the guide rail post holes has produced the following conclusions.

Continue with the current method. When the identified organic material is encountered during the benching operation for the placing of the slope widening (recall the organic material found in the upper 2 m portion of the existing fill) remove the organic material by widening the excavation for the 2 metre wide benching platform (as currently indicated in the contract typical) until removed. Continue with the benching so that the excavation for the benching removes the outer 1/2 to 1/3 of the existing granular shoulder through to a depth of 500 mm below the edge of pavement. This last operation remove the clay capped shoulder (like old core construction), the contaminated shoulder granular and will provide positive drainage of the subgrade. Replace the the existing shoulder granulars and in this case provide granular sealing in accordance with OPSD 210.07. If it is possible under this contract it is strongly advised to extend the stripping of the outer portion of the shoulder from the rounding out to the end of subgrade for the length of the steel beam guiderail at this location.

Please note the following details: Remove all of the organic excavated material and contaminated shoulder material from the site to avoid remixing it with the newly placed earth and granulars. Please notify me or the Geotech section when the benching is being done in the upper limits of the slope so we may confirm for you the adequate removal for you.

CC: GilbertN, MagniE, MTOHO1.TORHO2.Vasavith, ZohorskN



MEMORANDUM

Engineering Materials Office

Room 233, Central Building, Downsview
Tel. (416) 235-3732 Fax. (416) 235-5240

To: Eric Magni, P. Eng.
Head, Geotechnical Section
Southwestern Region, London

Date: April 21, 1998

From: Pavements and Foundations Section
Room 223, Central Building

Re: Slope Failure 1.3 km East of Wellington Road, St. Thomas
W. P - 178 - 97 - 00, Highway 3, District 31, London

The cross-sections of the area show that the slope instability extends from Sta. 11 + 235 to Sta. 11 + 270. In addition, the existing slope in this area is steeper than 2 horizontal to 1 vertical. A review of the Typical Grading Section (refer to Cont. 79 - 20, Sheet 21) reveals that lime treated material was used from El. 226.0 to El. 228.4. There is a possibility for this layer to redirect any water retained in the median ditch toward the slope. The vegetation on the slope also suggests that there be water seepage through the slope. The following options are suggested to stabilize the slope.

Option 1: Flatter Slope

It is suggested to flatten the slope by increasing the base width and providing 2.5 meter wide berm at El. 227.0. This option requires acquisition of property and extension of the culvert to fit the flatter slope. Details of the recommended slope are shown on the drawings attached to this memorandum. The extent of the property involved to carry out this option is only about three to four meters wide.

Option 2: Gabion Wall

A gabion wall may be placed as shown on the drawings to form a slope of 2 horizontal to 1 vertical and the berm at El. 227. The type of retaining wall or any other arrangement in the culvert area (Sta. 11 + 243) should be decided by the Structural Section, Southwestern Region.

The restoration work may be carried out by subexcavating the soil in the unstable area (i.e., Sta. 11 + 235 to Sta. 11 + 270) and replacing preferably with granular material. Subexcavation should extend below the failure surface and the benching for the restoration work shall be

carried out according to OPSD 208.01 or as shown on the typical section attached to this memorandum. The excavation and placement of backfill may be carried out as follows:

- a) Close the east bound lane for traffic during construction.
- b) Subexcavate all the loose fill and any spongy or soft area observed.
- c) Ensure excavation extends below the failure surface.
- d) Benching shall be according to OPSD 208.01 or as shown on the typical section
- e) If Option 2 is implemented, places the gabion and filter cloth as shown on the drawings.
- f) Place the fill in layers and compact.

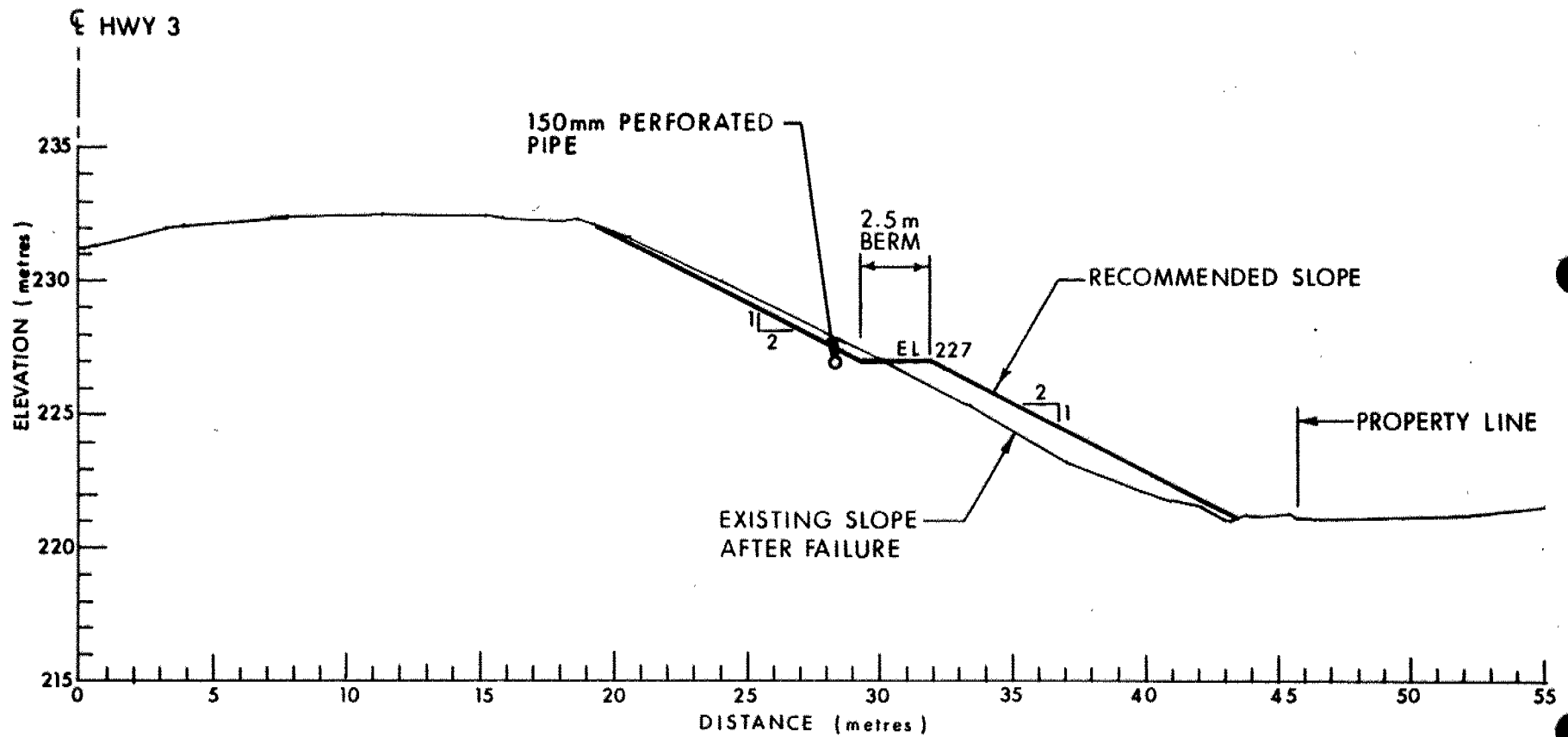
As indicated before, there may be water seepage through the fill. To prevent any retention of water in the drainage ditch along the median, this ditch should be graded properly to provide a positive drainage. In addition, any seepage through the fill should be intercepted by placing a 150- mm diameter perforated pipe. This pipe shall be placed at the interface of lime treated material (i.e., around El. 227) and the dry fill. The perforated pipe should be wrapped in geotextile and covered with clear stone and Granular 'A' and directed to provide a positive drainage.

To ensure the integrity and the future performance of the embankment, pertinent MTO Specifications and Standards should be used. If you have any question or clarification, please contact this office.

c.c: R. Meertens
A. Ho



M. Vasavithasan, P. Eng.
Foundation Engineer
For
Tae C. Kim, P.Eng.
Sr. Foundation Engineer



SECTION AT STA 11+230

NOTES:

- 1) SUBEXCAVATE ALL THE LOOSE FILL AND ANY SPONGY OR SOFT AREAS.
- 2) ENSURE EXCAVATION EXTENDS BELOW FAILURE SURFACE.
- 3) BENCHING SHALL BE IN ACCORDANCE WITH OPSD - 208.01.
- 4) PERTINENT MTO SPECIFICATIONS AND STANDARDS SHOULD BE USED.

OPTION 1

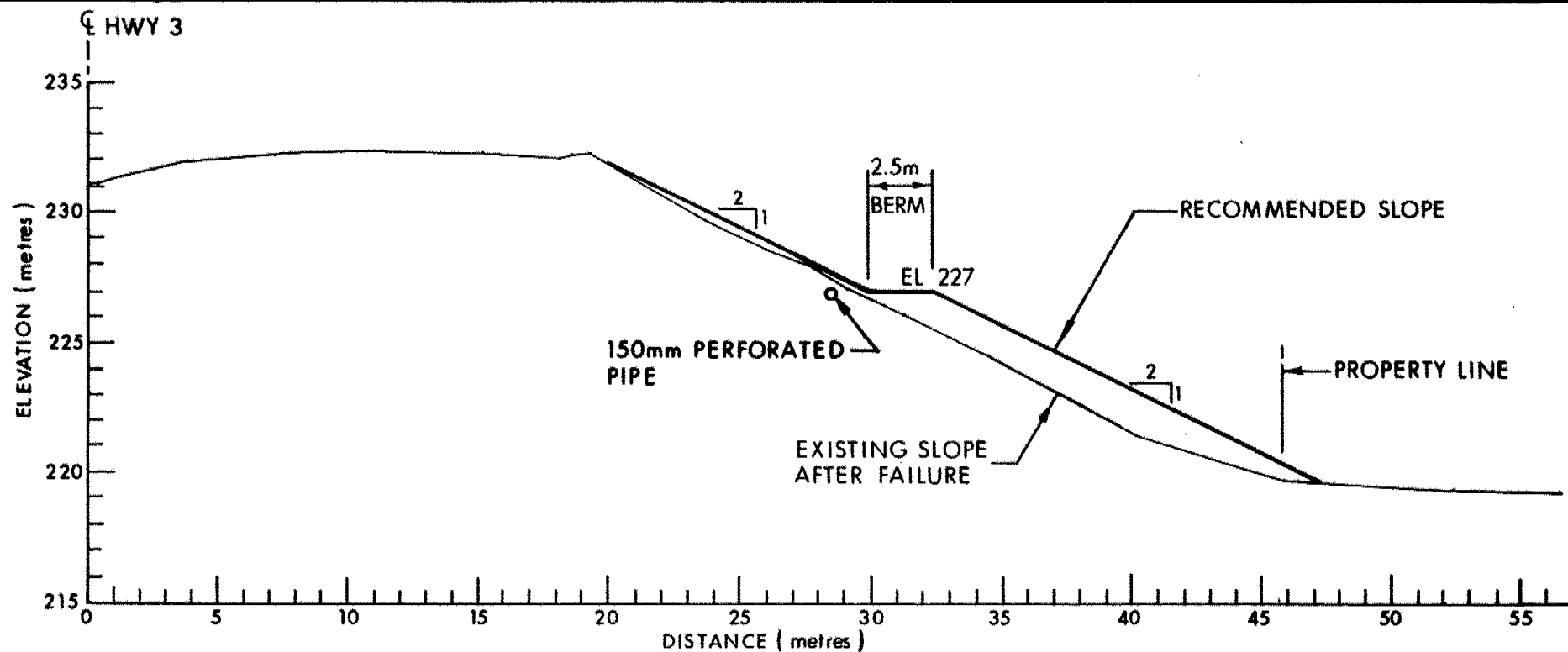
RECOMMENDED SLOPE FOR RESTORATION

HWY 3

DIST 31

GEOCREs No 40114 -129

WP 178 - 97 - 00



NOTES:

- 1) SUBEXCAVATE ALL THE LOOSE FILL AND ANY SPONGY OR SOFT AREAS.
- 2) ENSURE EXCAVATION EXTENDS BELOW FAILURE SURFACE.
- 3) BENCHING SHALL BE IN ACCORDANCE WITH OPSD - 208.01.
- 4) PERTINENT MTO SPECIFICATIONS AND STANDARDS SHOULD BE USED.

OPTION 1

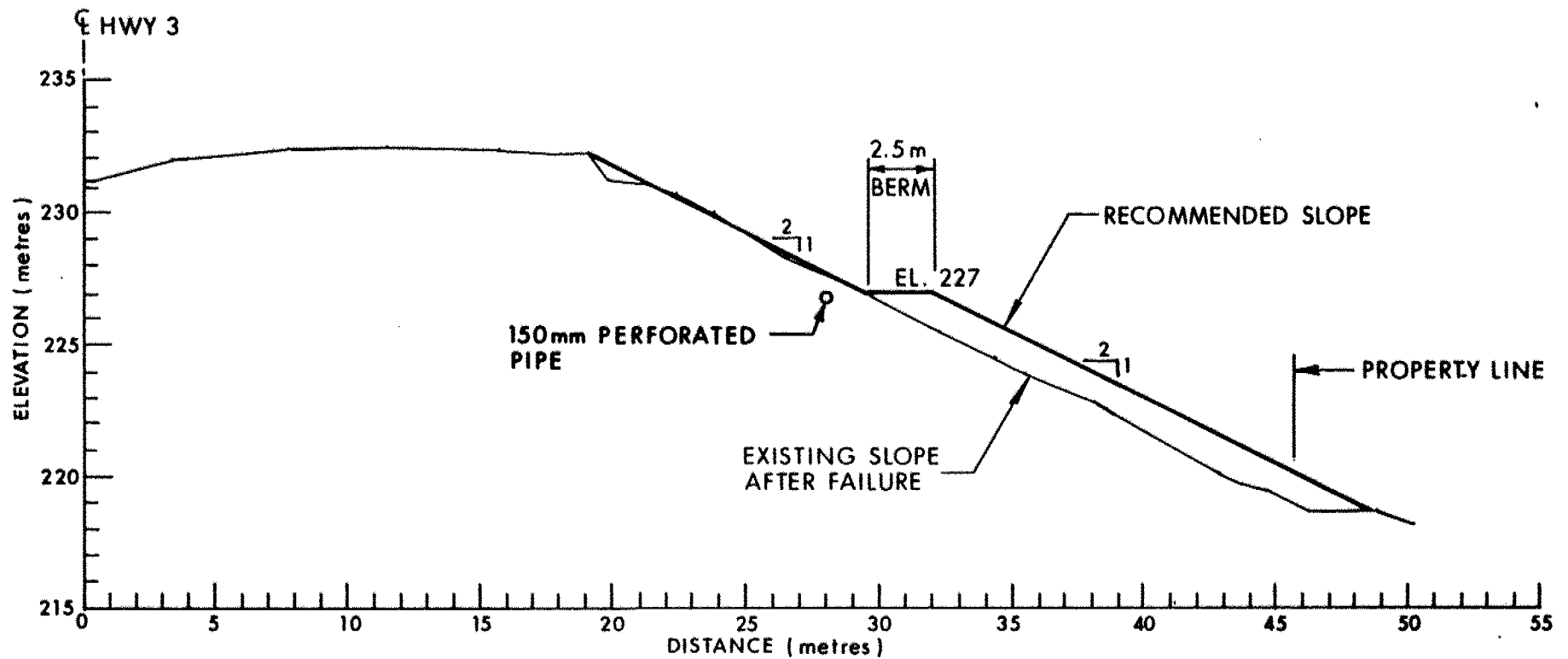
RECOMMENDED SLOPE FOR RESTORATION

HWY 3

DIST 31

GEOCREs No 40114 - 129

WP 178 - 97 - 00



SECTION AT STA 11+250

NOTES:

- 1) SUBEXCAVATE ALL THE LOOSE FILL AND ANY SPONGY OR SOFT AREAS.
- 2) ENSURE EXCAVATION EXTENDS BELOW FAILURE SURFACE.
- 3) BENCHING SHALL BE IN ACCORDANCE WITH OPSD - 208.01.
- 4) PERTINENT MTO SPECIFICATIONS AND STANDARDS SHOULD BE USED.

OPTION 1

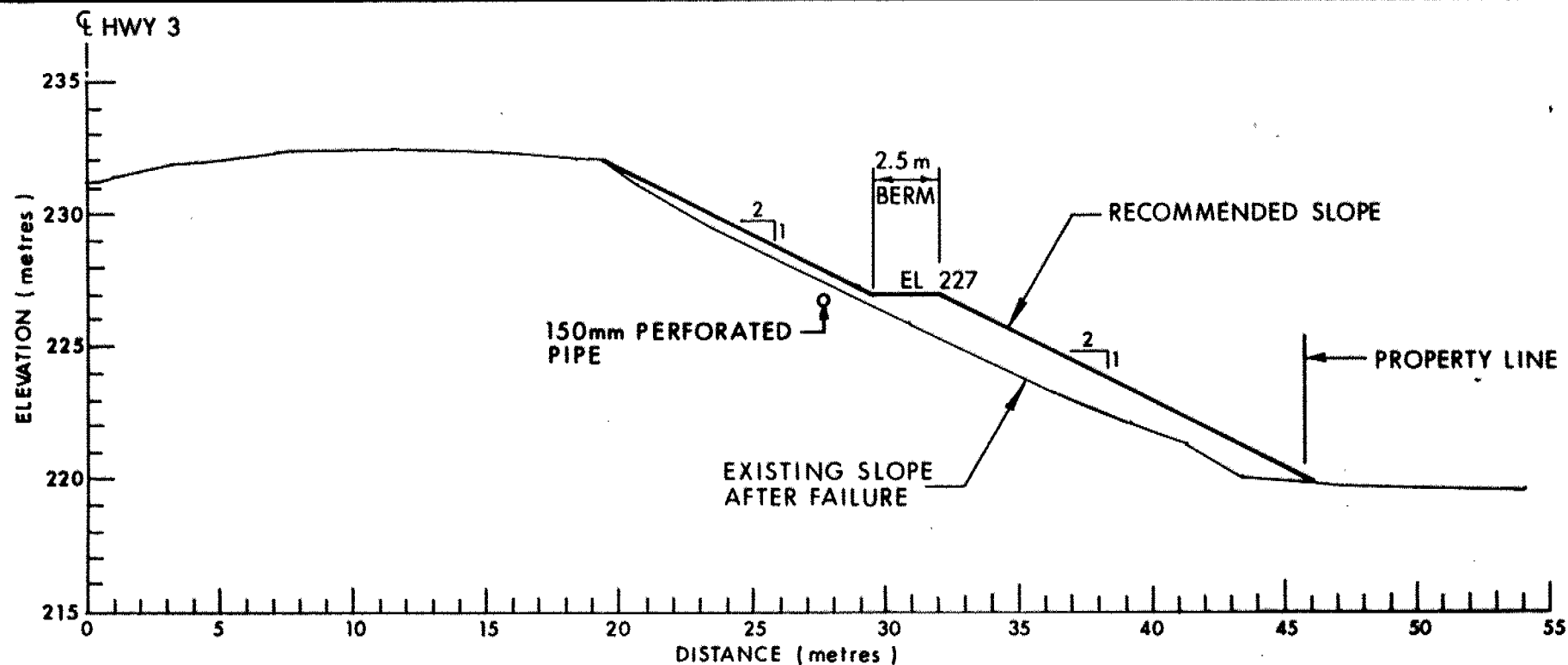
RECOMMENDED SLOPE FOR RESTORATION

HWY 3

DIST 31

GEOCRETS No 40114-129

WP 178 - 97 - 00



SECTION AT STA 11+260

NOTES:

- 1) SUBEXCAVATE ALL THE LOOSE FILL AND ANY SPONGY OR SOFT AREAS.
- 2) ENSURE EXCAVATION EXTENDS BELOW FAILURE SURFACE.
- 3) BENCHING SHALL BE IN ACCORDANCE WITH OPSD - 208.01.
- 4) PERTINENT MTO SPECIFICATIONS AND STANDARDS SHOULD BE USED.

OPTION 1

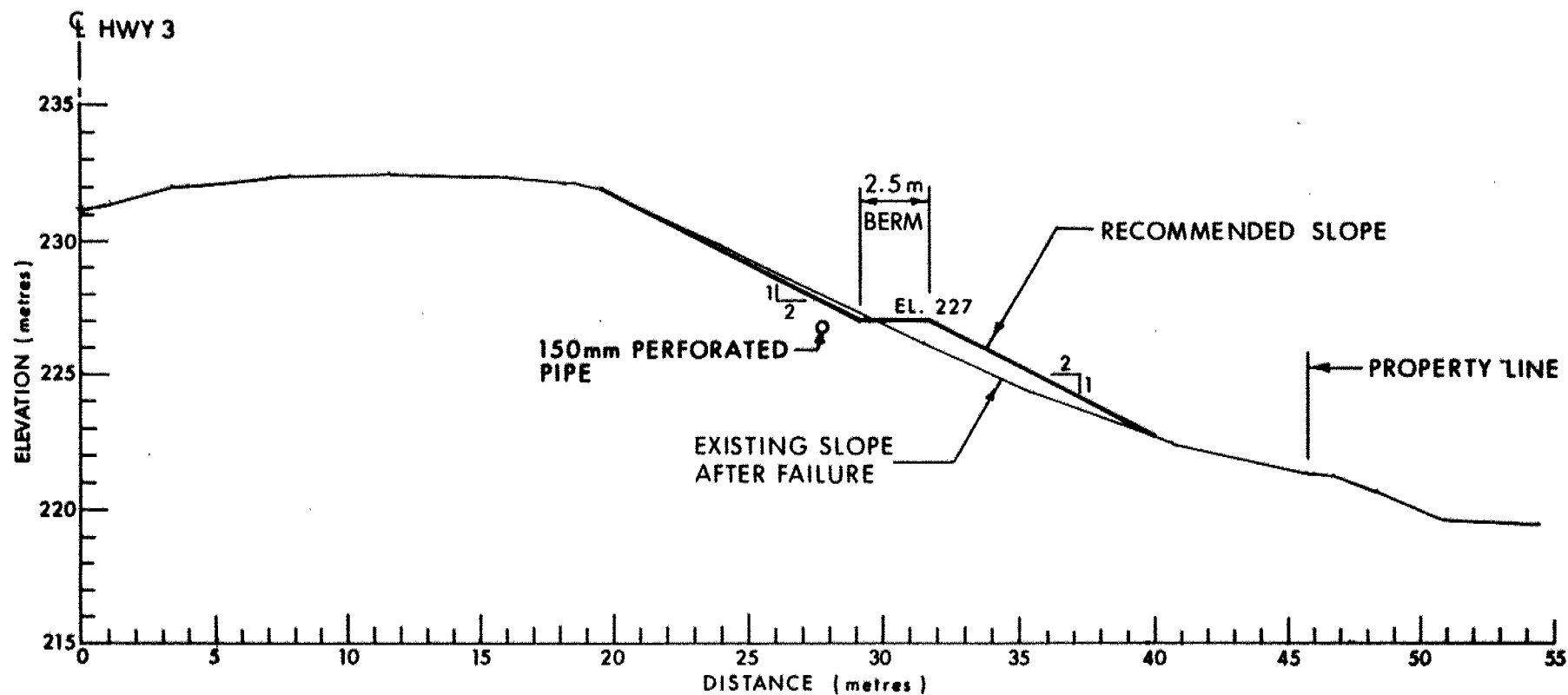
RECOMMENDED SLOPE FOR RESTORATION

HWY 3

DIST 31

GEOCRE No 40I14 - 129

WP 178 - 97 - 00



SECTION AT STA 11+280

NOTES:

- 1) SUBEXCAVATE ALL THE LOOSE FILL AND ANY SPONGY OR SOFT AREAS.
- 2) ENSURE EXCAVATION EXTENDS BELOW FAILURE SURFACE.
- 3) BENCHING SHALL BE IN ACCORDANCE WITH OPSD - 208.01.
- 4) PERTINENT MTO SPECIFICATIONS AND STANDARDS SHOULD BE USED.

OPTION 1

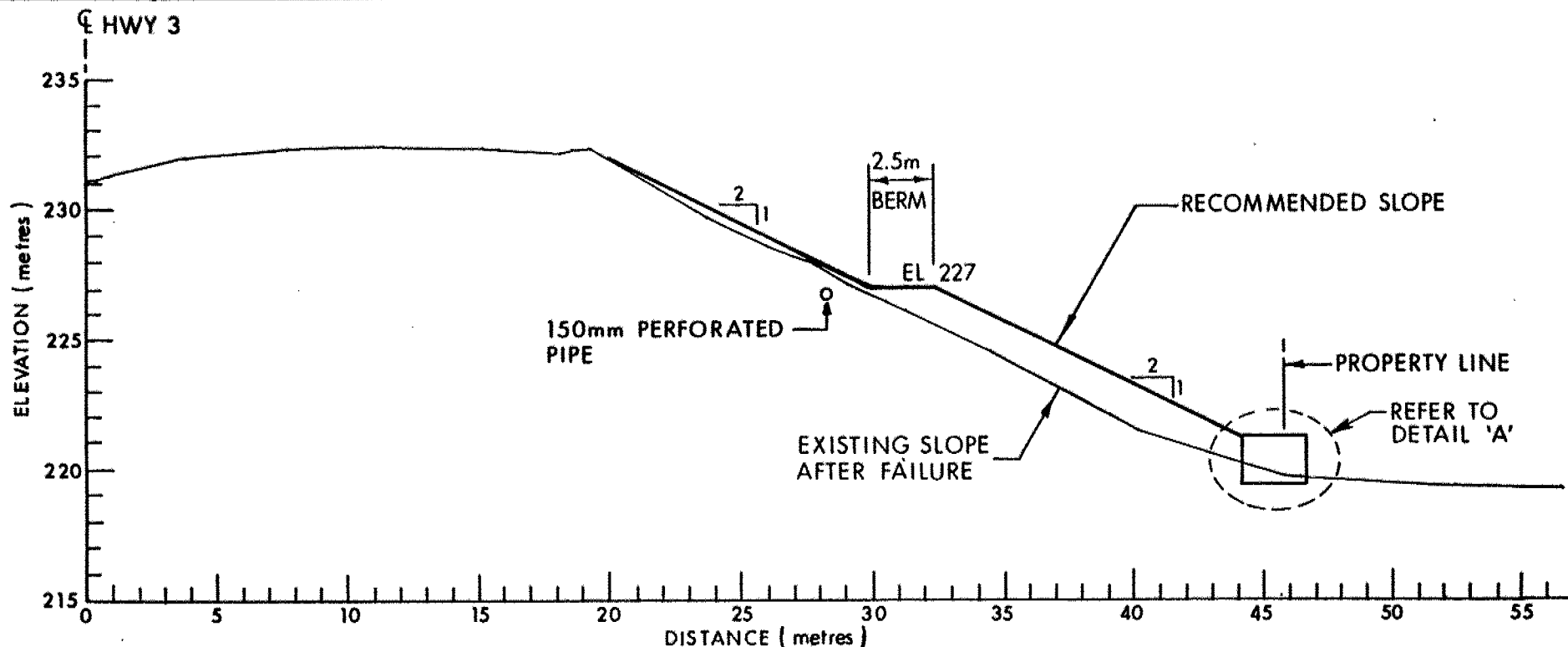
RECOMMENDED SLOPE FOR RESTORATION

HWY 3

DIST 31

GEOCRES No 40I14-129

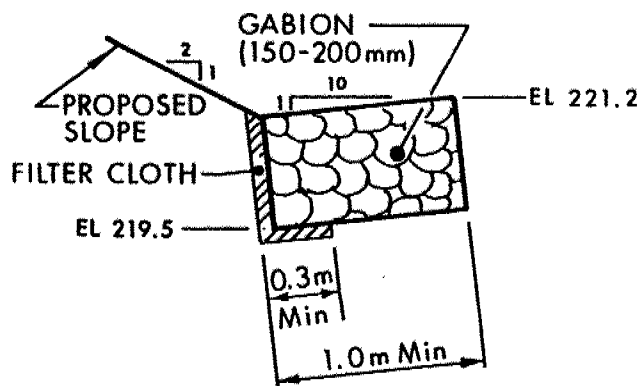
WP 178 - 97 - 00



SECTION AT STA 11+240

NOTES:

- 1) SUBEXCAVATE ALL THE LOOSE FILL AND ANY SPONGY OR SOFT AREAS.
- 2) ENSURE EXCAVATION EXTENDS BELOW FAILURE SURFACE.
- 3) PLACE THE FILTER CLOTH AND GABION TO REQUIRED HEIGHT.
- 4) BENCHING SHALL BE IN ACCORDANCE WITH OPSD -208.01.
- 5) PERTINENT MTO SPECIFICATIONS AND STANDARDS SHOULD BE USED.



DETAIL 'A'
NTS

OPTION 2

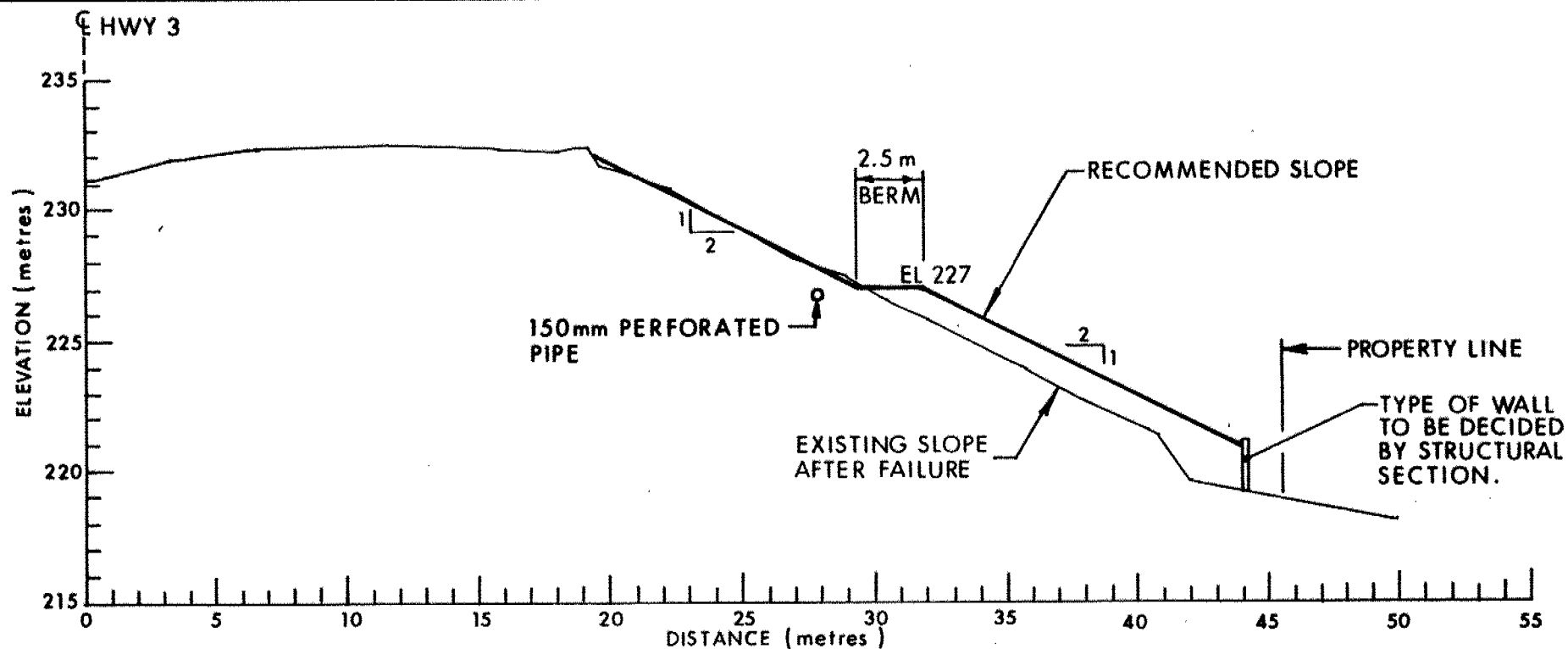
RECOMMENDED SLOPE FOR RESTORATION

HWY 3

DIST 31

GEOCRES No 40114-129

WP 178 - 97 - 00



SECTION AT STA 11+243.57

NOTES:

- 1) SUBEXCAVATE ALL THE LOOSE FILL AND ANY SPONGY OR SOFT AREAS.
- 2) ENSURE EXCAVATION EXTENDS BELOW FAILURE SURFACE.
- 3) BENCHING SHALL BE IN ACCORDANCE WITH OPSD - 208.01.
- 4) PERTINENT MTO SPECIFICATIONS AND STANDARDS SHOULD BE USED.

OPTION 2

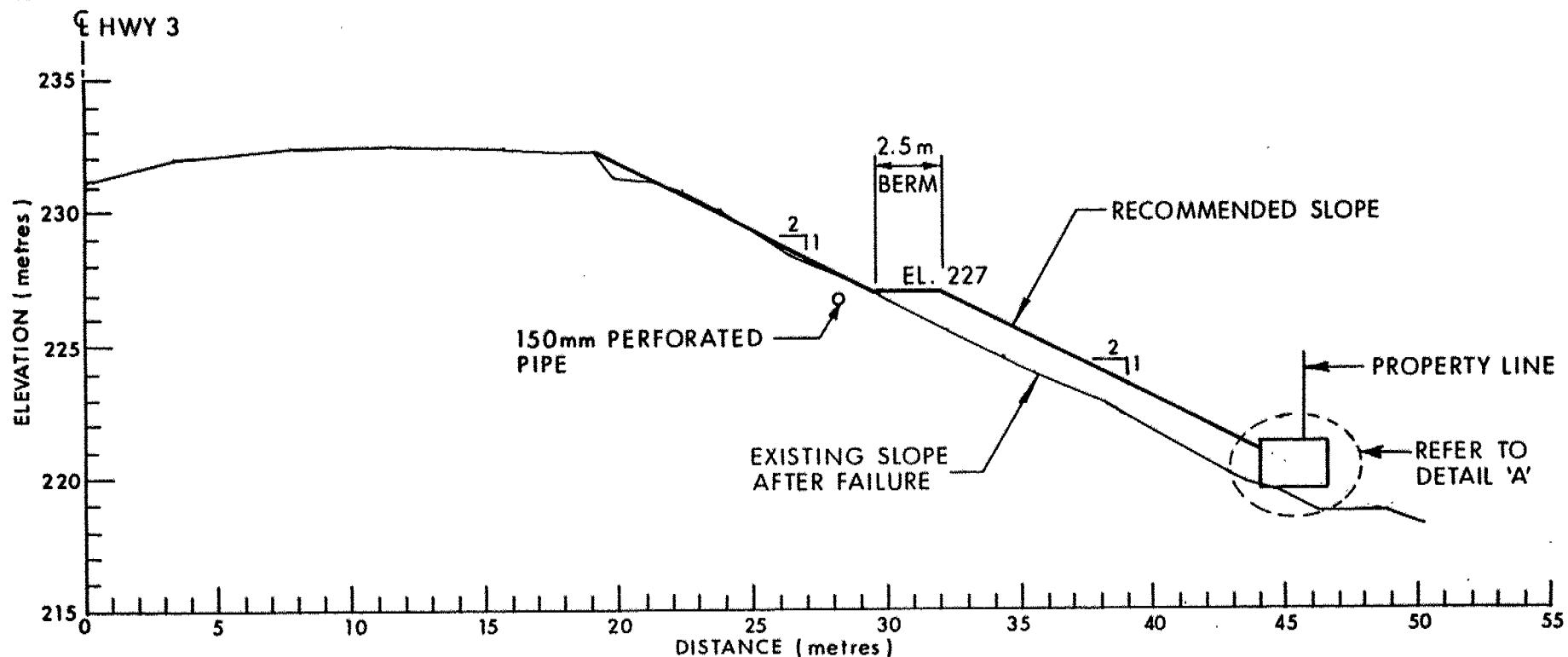
RECOMMENDED SLOPE FOR RESTORATION

HWY 3

DIST 31

GEOCRETS No 40114-129

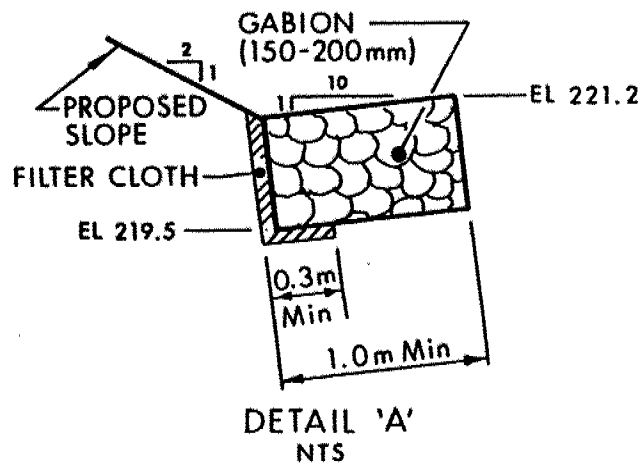
WP 178 - 97 - 00



SECTION AT STA 11+250

NOTES:

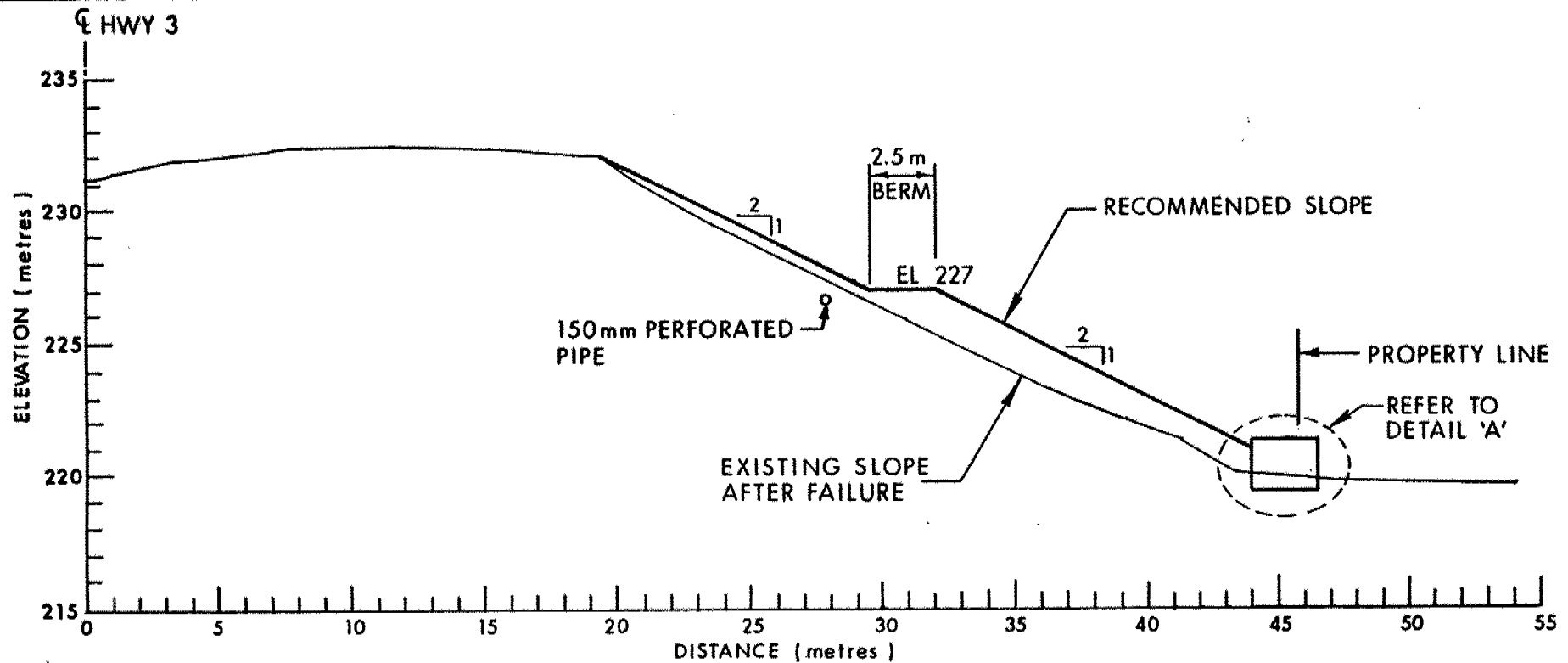
- 1) SUBEXCAVATE ALL THE LOOSE FILL AND ANY SPONGY OR SOFT AREAS.
- 2) ENSURE EXCAVATION EXTENDS BELOW FAILURE SURFACE.
- 3) PLACE THE FILTER CLOTH AND GABION TO REQUIRED HEIGHT.
- 4) BENCHING SHALL BE IN ACCORDANCE WITH OPSD - 208.01.
- 5) PERTINENT MTO SPECIFICATIONS AND STANDARDS SHOULD BE USED.



OPTION 2

RECOMMENDED SLOPE FOR RESTORATION

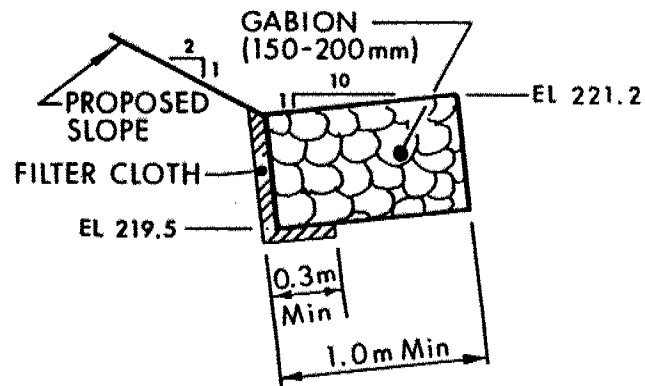
HWY 3 DIST 31
 GEOCRETS No 40I14-129 WP 178-97-00



SECTION AT STA 11+260

NOTES:

- 1) SUBEXCAVATE ALL THE LOOSE FILL AND ANY SPONGY OR SOFT AREAS.
- 2) ENSURE EXCAVATION EXTENDS BELOW FAILURE SURFACE.
- 3) PLACE THE FILTER CLOTH AND GABION TO REQUIRED HEIGHT.
- 4) BENCHING SHALL BE IN ACCORDANCE WITH OPSD - 208.01.
- 5) PERTINENT MTO SPECIFICATIONS AND STANDARDS SHOULD BE USED.



DETAIL 'A'
NTS

OPTION 2

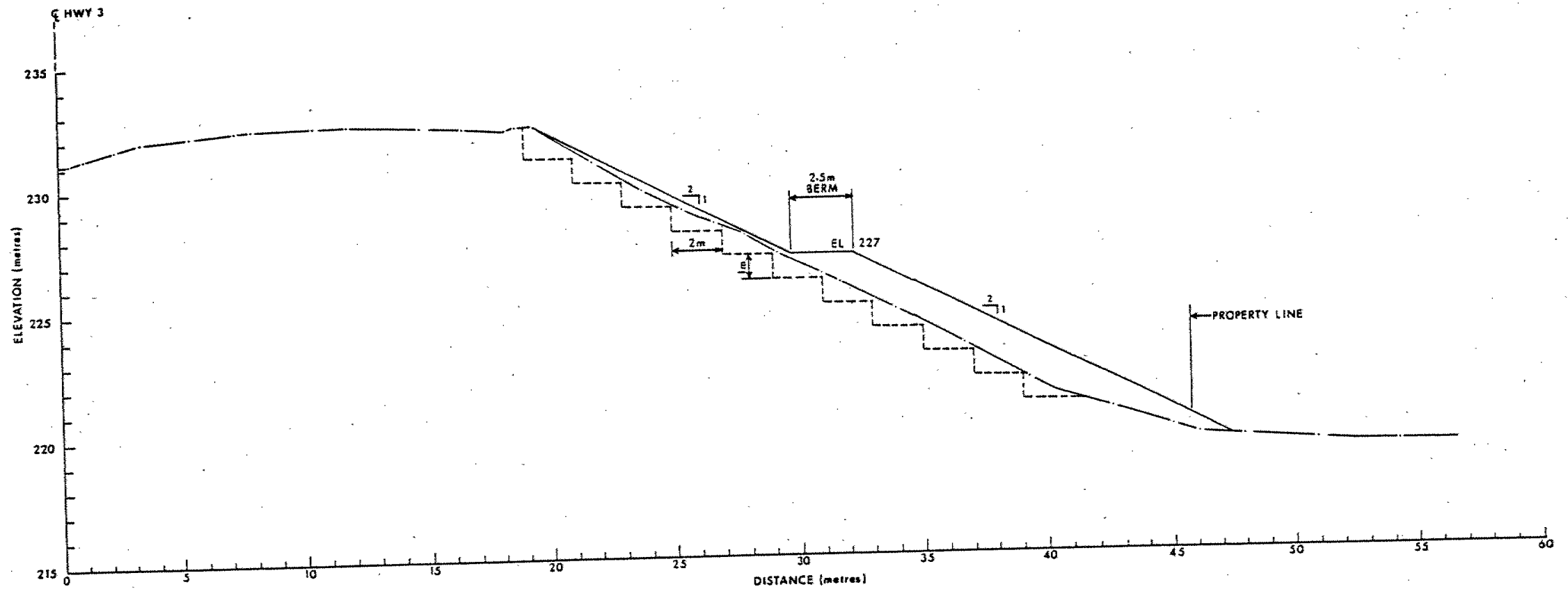
RECOMMENDED SLOPE FOR RESTORATION

HWY 3

DIST 31

GEOCRE No 40I14-129

WP 178 - 97 - 00



TYPICAL SECTION

BENCHING FOR RESTORATION
OF SLOPE

HWY 3
Geocres No 40114-129
WP 178-97-00

DIST 31



MEMORANDUM

Engineering Materials Office

Room 233, Central Building, Downsview
Tel. (416) 235-3732 Fax. (416) 235-5240

To: Eric Magni, P. Eng.
Head, Geotechnical Section
Southwestern Region, London

Date: November 25, 1997

From: Pavements and Foundations Section
Room 223, Central Building

Re: Slope Failure 1.3 km East of Wellington Road, St. Thomas
Highway 3, District 31, London

The above noted site was inspected on November 20, 1997 with Nick. Gilbert, Soils Engineer and Ron Meertens, Engineering Services Officer. Both of them briefed me about the construction history of the site.

Based on the information gathered, this stretch of the road was constructed in 1975. The embankment at this location is very steep (steeper than 2H:1V) and approximately 10 meters high. Steepness of the slope suggests that the embankment be constructed of clayey material.

Indications at the site are that the toe area of the embankment has been moving at a slow rate. Movement had taken place to an extent where the top of the slopes has become very steep and unstable. Following options are suggested to stabilize the slope.

Option 1: Flatter Slope

It is suggested to flatten the slope by increasing the base width and providing a berm at the mid height. This option requires acquisition of property and extension of the culvert to fit the flatter slope.

Option 2: Toe Wall

If Option 1 is costly or difficult to implement, a toe wall may be constructed to form a slope of 2 horizontal to 1 vertical. To design this wall, two to three shallow boreholes may have to be advanced to obtain the subsoil information.

Ron agreed to provide the cross-sections of the area of concern. Detail recommendations for both options will be provided when the cross-sections become available. Structural section should be consulted for their comments about the extension of the culvert and head wall in Option 2.

The area affected should be barricaded from vehicles until the embankment is repaired. If you have any questions or clarification, please contact this office.

c.c: N. Gilbert
R. Meertens
A. Ho



M. Vasavithasan, P. Eng.
Foundation Engineer
For
Tae C. Kim, P.Eng.
Sr. Foundation Engineer