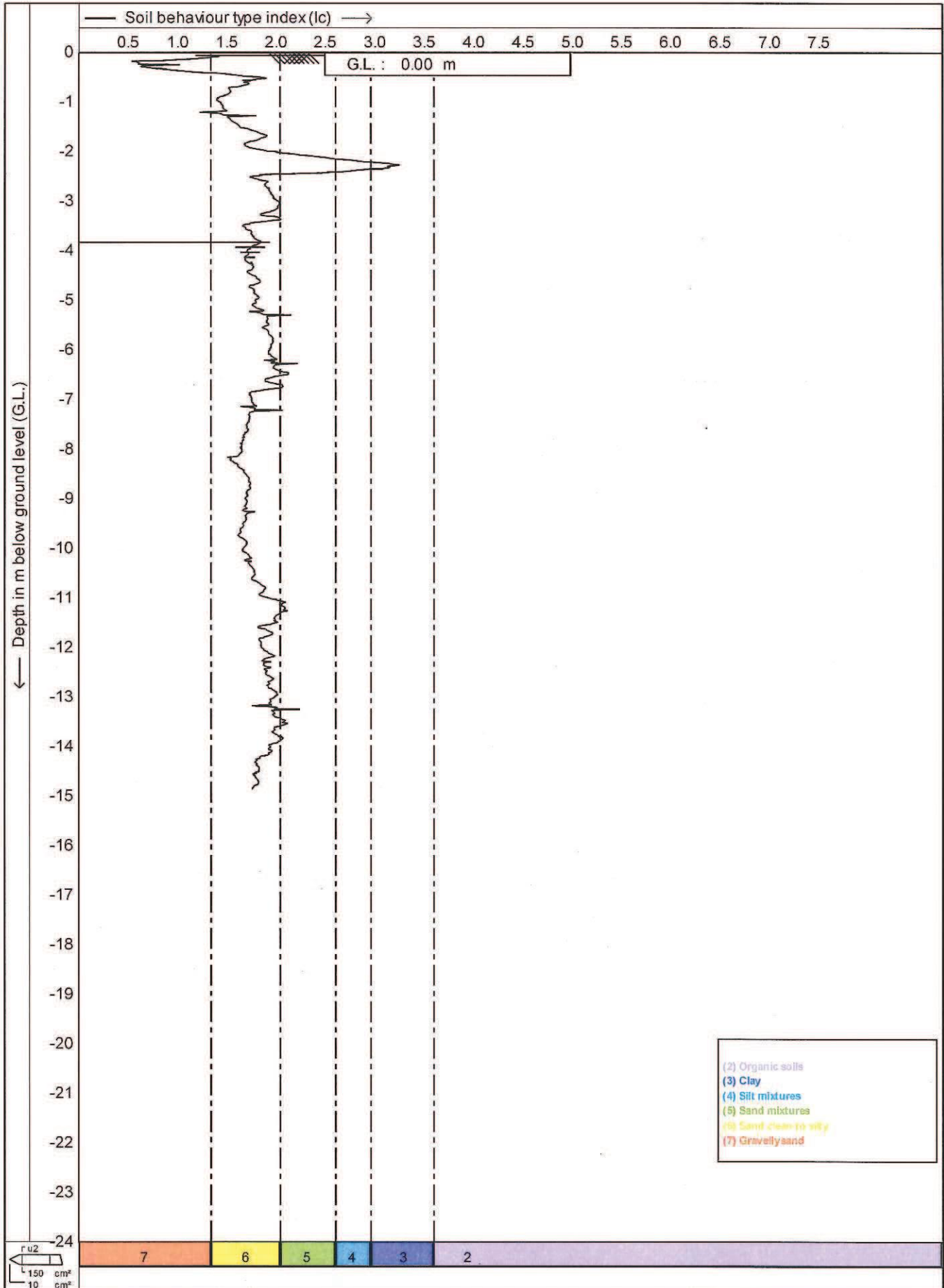


Test according A.S.T.M. Standard D 5778-07  
 Project : Putauaki Trust Site Investigations  
 Location : Kawerau

Date : 26-1-2012  
 Cone no. : C10CFIP.F57  
 Project no. : 02BBO1  
 CPT no. : 03



CPTask V1.31



Test according A.S.T.M. Standard D 5778-07

Project : **Putauaki Trust Site Investigations**

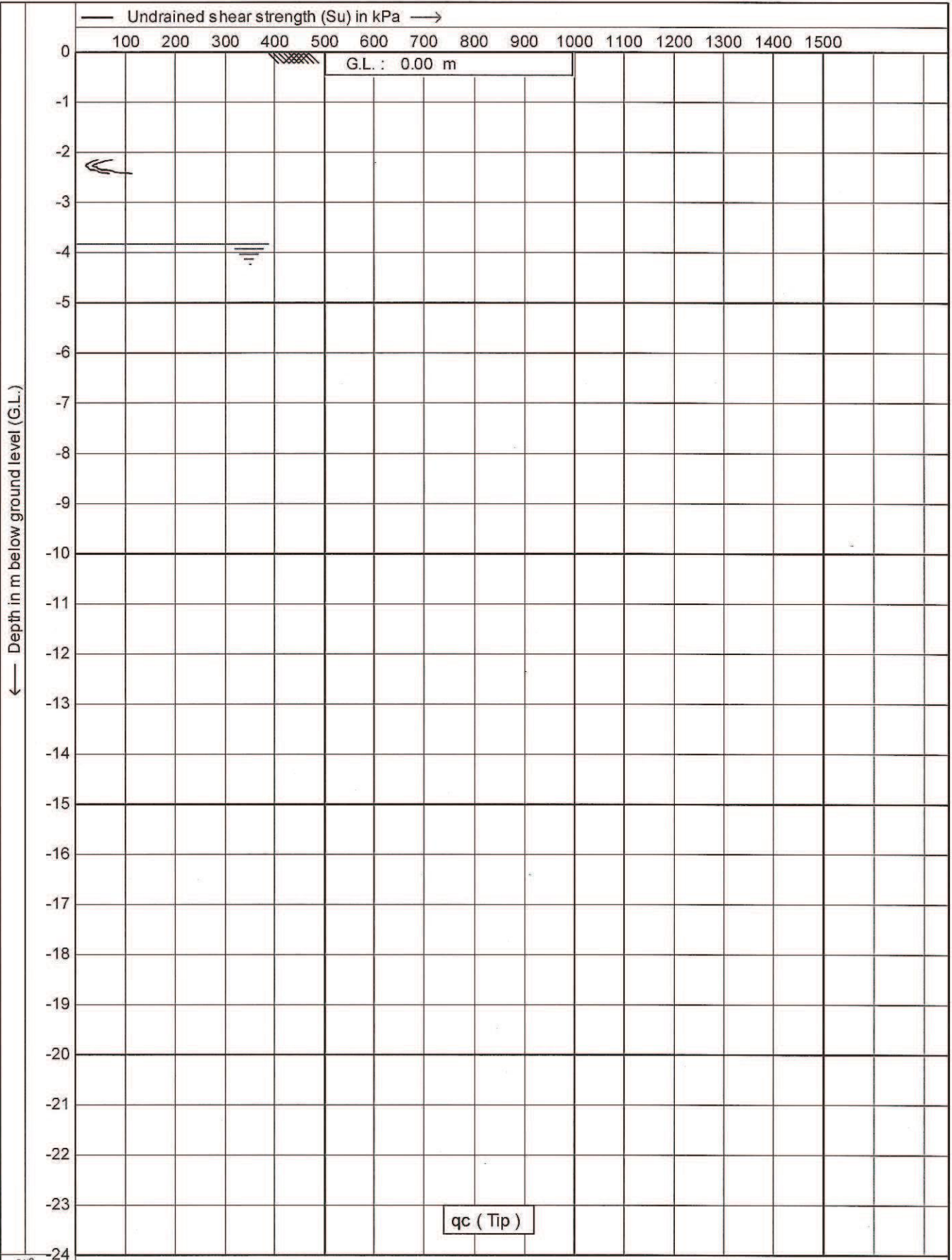
Location: **Kawerau**

Date : **26-1-2012**

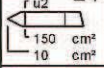
Cone no. : **C10CFIIP.F57**

Project no. : **02BBO1**

CPT no. : **03**      9/14



← Depth in m below ground level (G.L.)



CPTask-V1.31



Test according A.S.T.M. Standard D 5778-07

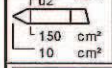
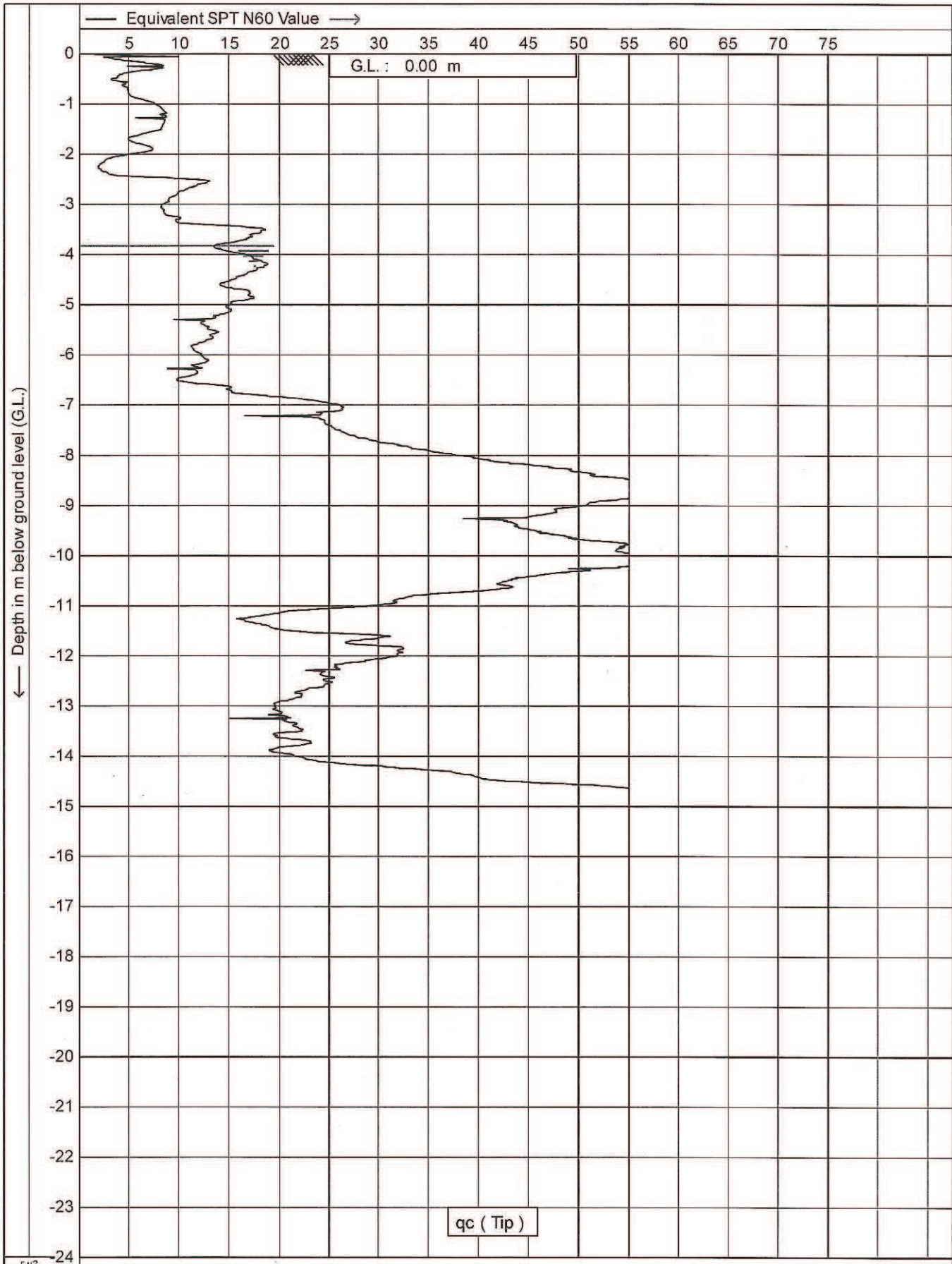
Project : Putauaki Trust Site Investigations

Location: Kawerau

Date	: 26-1-2012
Cone no.	: C10CFIIP.F57
Project no.	: 02BBO1
CPT no.	: 03

10/14





CPTask V1.31



Test according A.S.T.M. Standard D 5778-07

Project : Putauaki Trust Site Investigations

Location: Kawerau

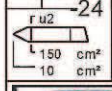
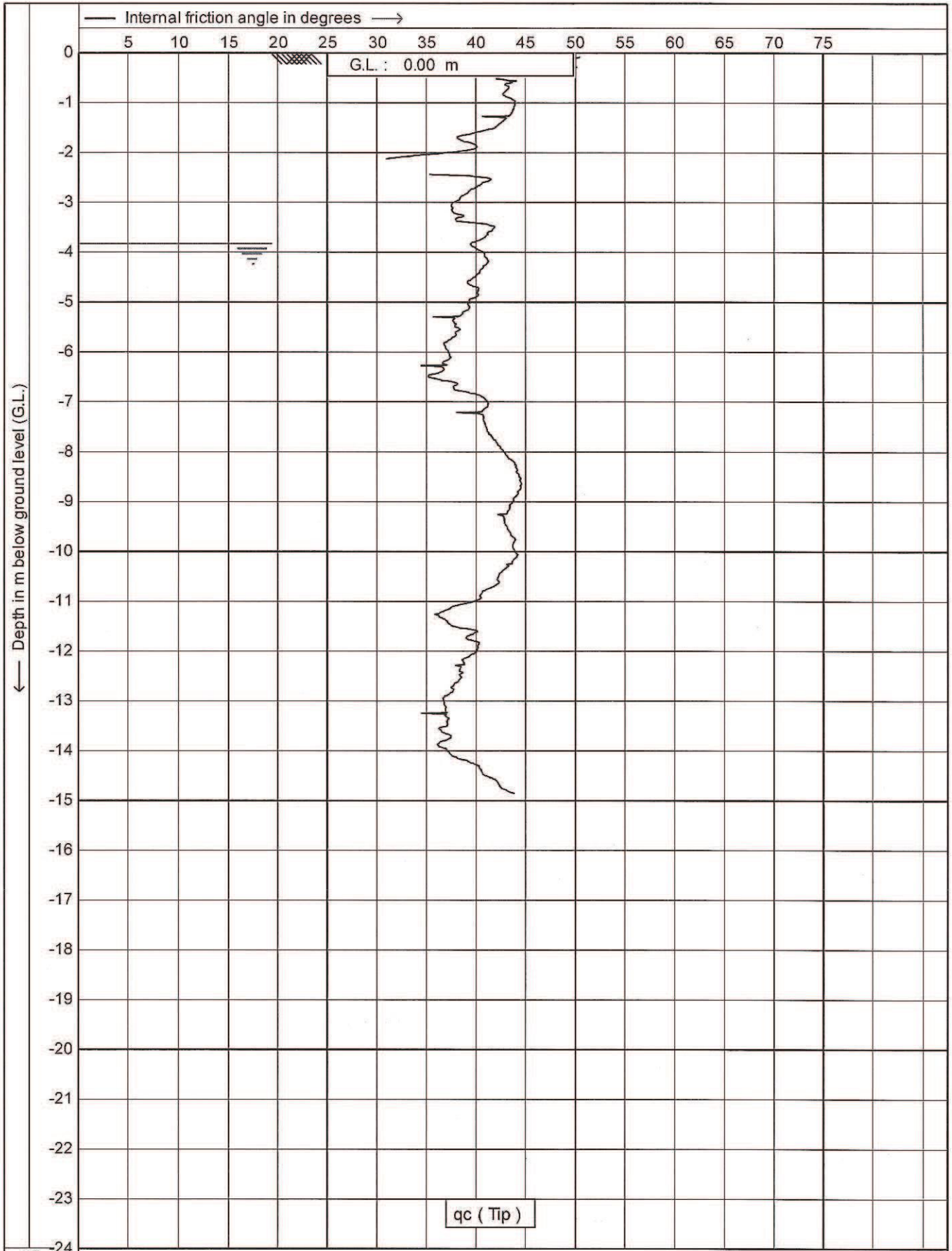
Date : 26-1-2012

Cone no. : C10CFIP.F57

Project no. : 02BBO1

CPT no. : 03

12/14



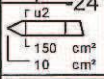
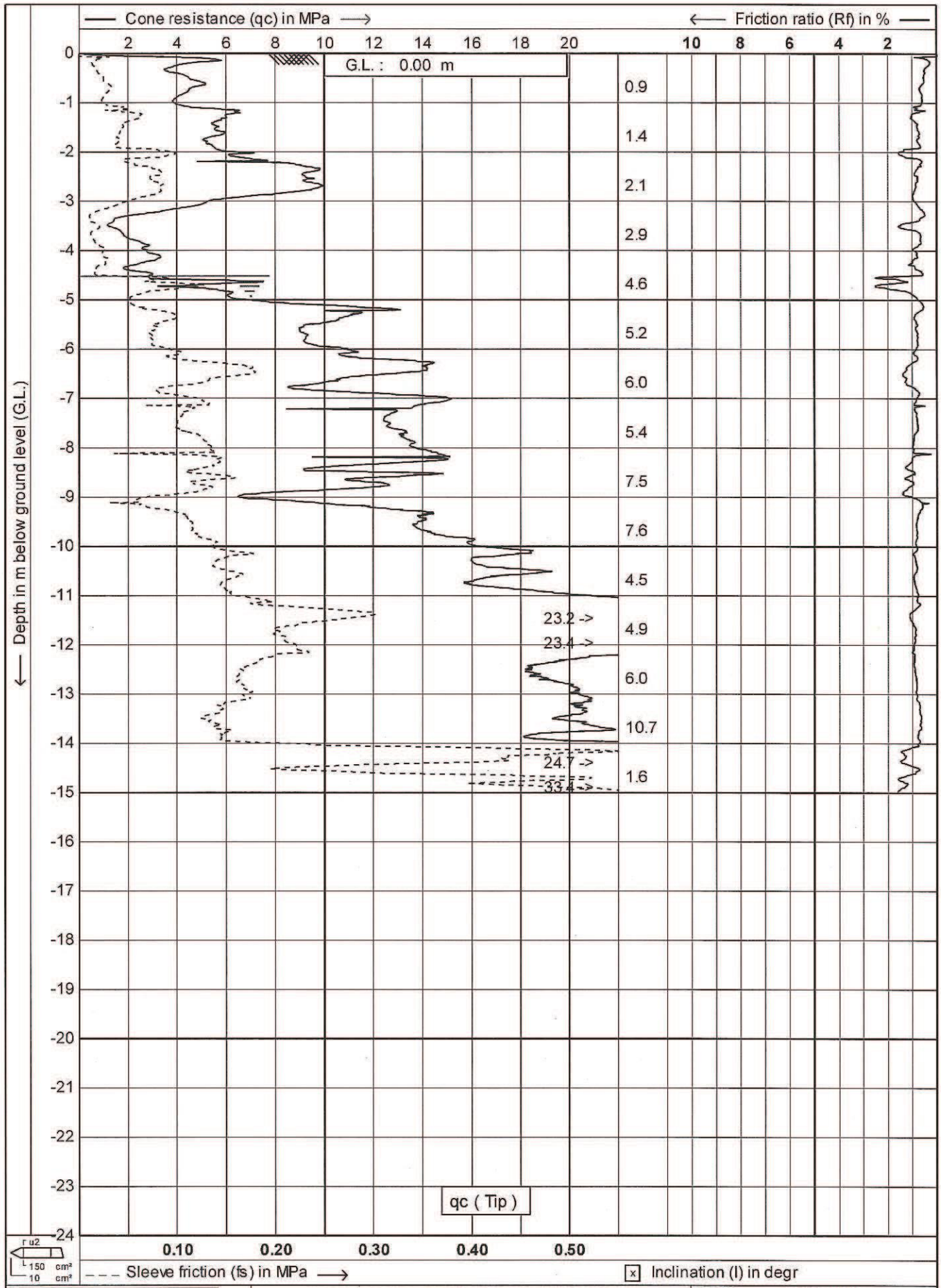
CPTask V1.31



Test according A.S.T.M. Standard D 5778-07  
 Project : Putauaki Trust Site Investigations  
 Location: Kawerau

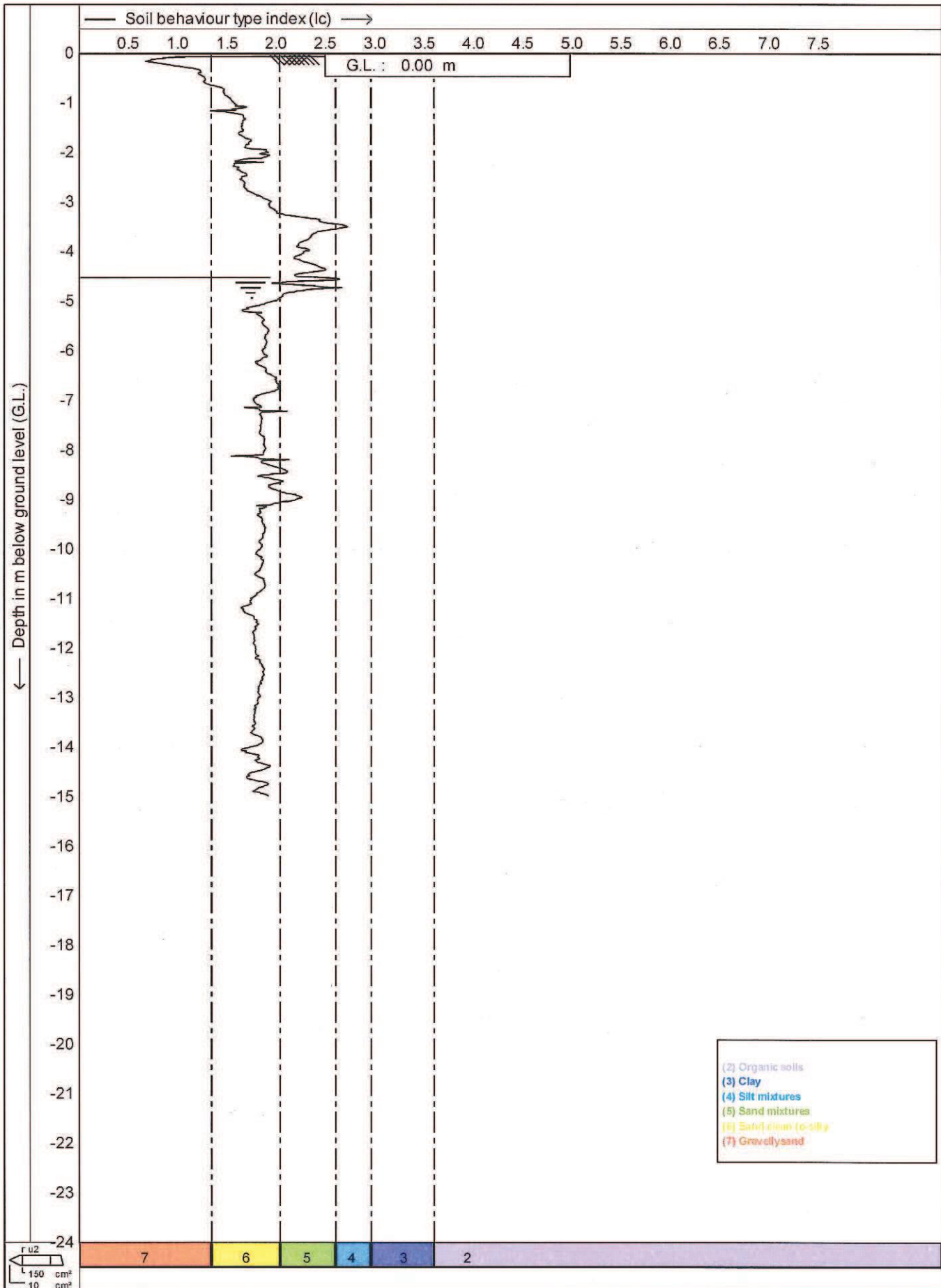
Date : 26-1-2012  
 Cone no. : C10CFIP.F57  
 Project no. : 02BBO1  
 CPT no. : 03



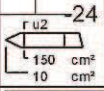


Test according A.S.T.M. Standard D 5778-07  
 Project : Putauaki Trust Site Investigations  
 Location: Kawerau

Date : 26-1-2012  
 Cone no. : C10CFIP.F57  
 Project no. : 02BBO1  
 CPT no. : 04



- (2) Organic soils
- (3) Clay
- (4) Silt mixtures
- (5) Sand mixtures
- (6) Sand clean to silty
- (7) Gravely sand



CPTask V1.31

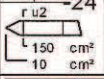
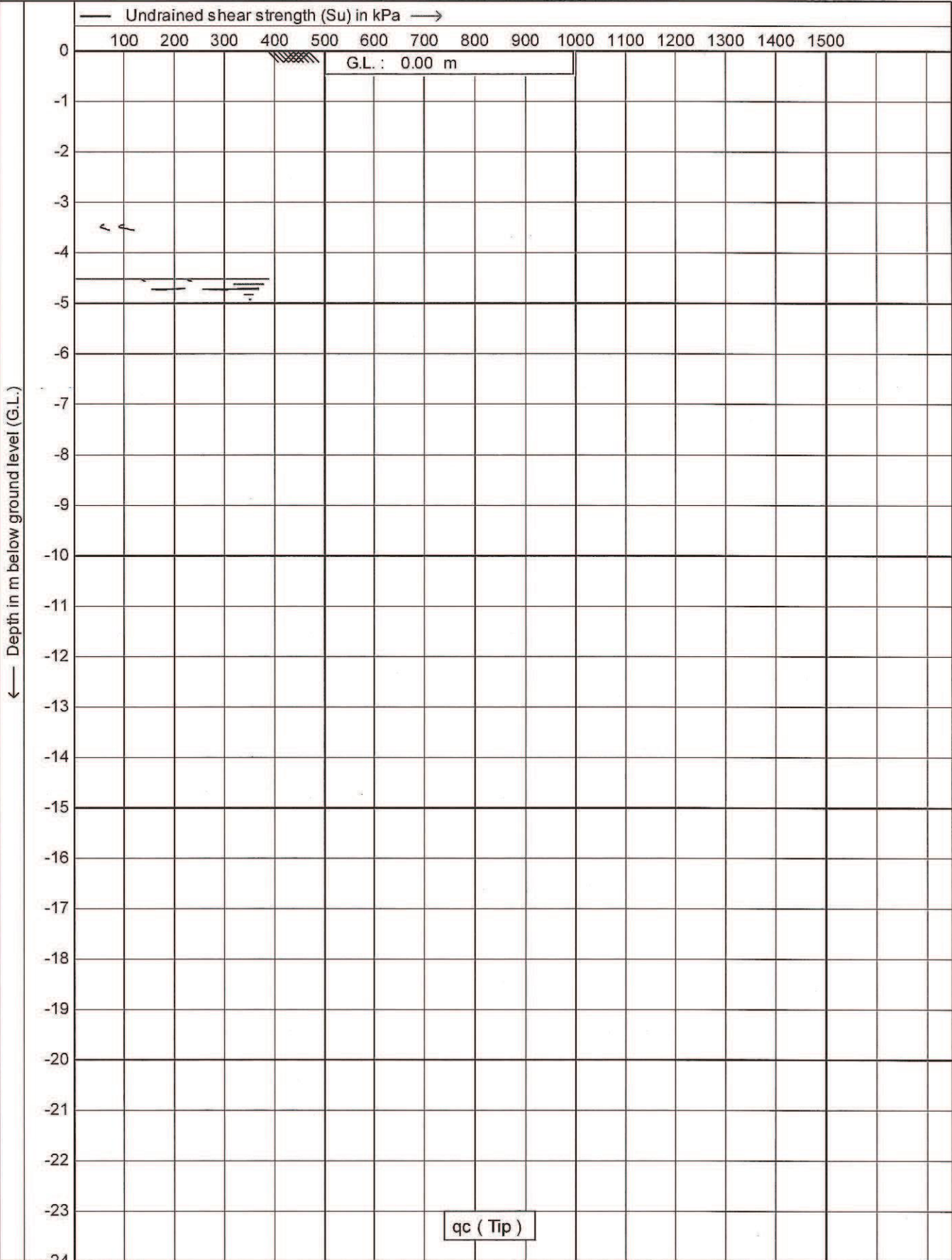


Test according A.S.T.M. Standard D 5778-07

Project : Putauaki Trust Site Investigations

Location: Kawerau

Date	: 26-1-2012
Cone no.	: C10CFIP.F57
Project no.:	<b>02BBO1</b>
CPT no.	: <b>04</b>
	9/14



CPTank V1.31



Test according A.S.T.M. Standard D 5778-07

Project : **Putauaki Trust Site Investigations**

Location: **Kawerau**

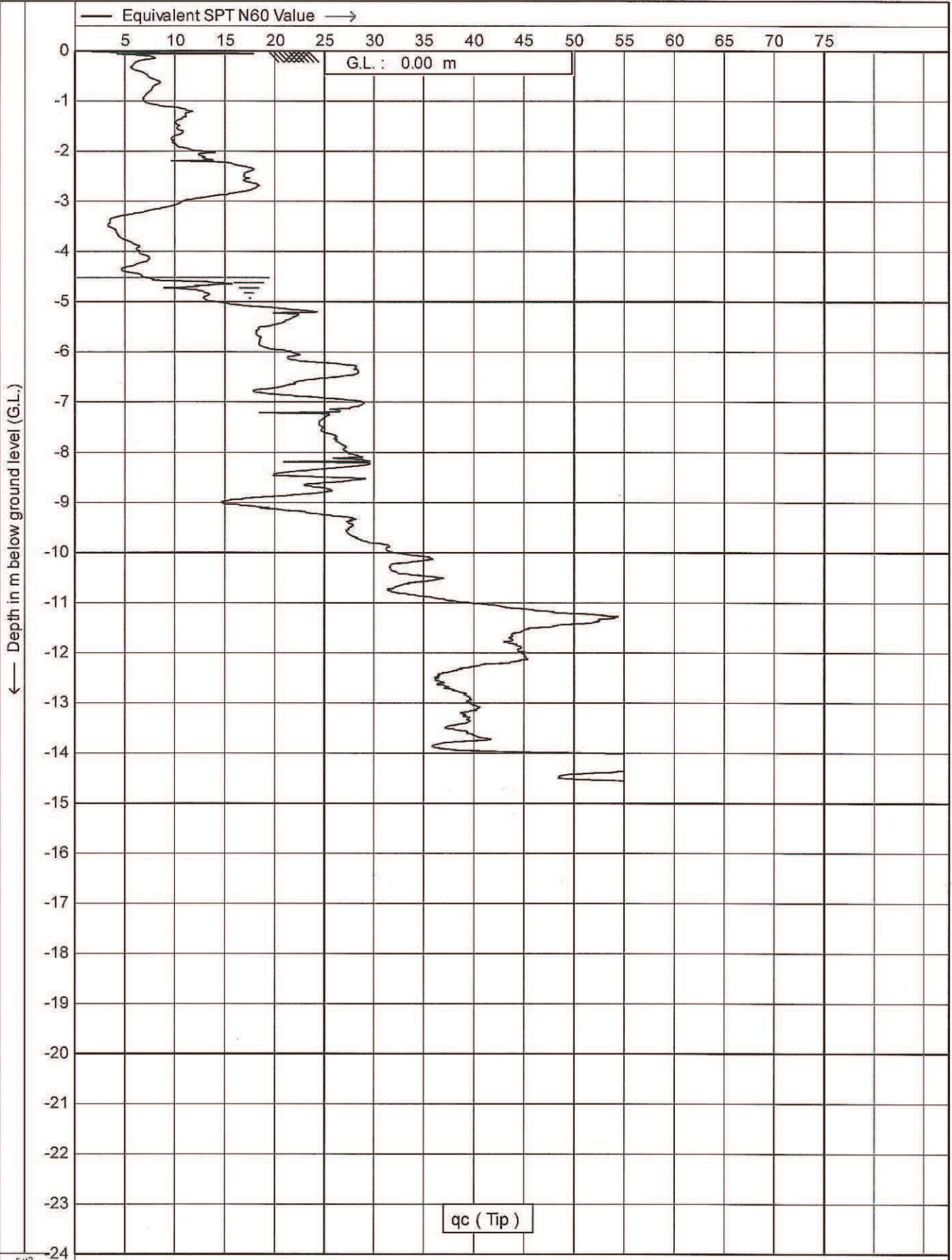
Date : **26-1-2012**

Cone no. : **C10CFIP.F57**

Project no. : **02BBO1**

CPT no. : **04** | 10/14





CPTask V1.31

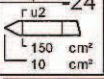
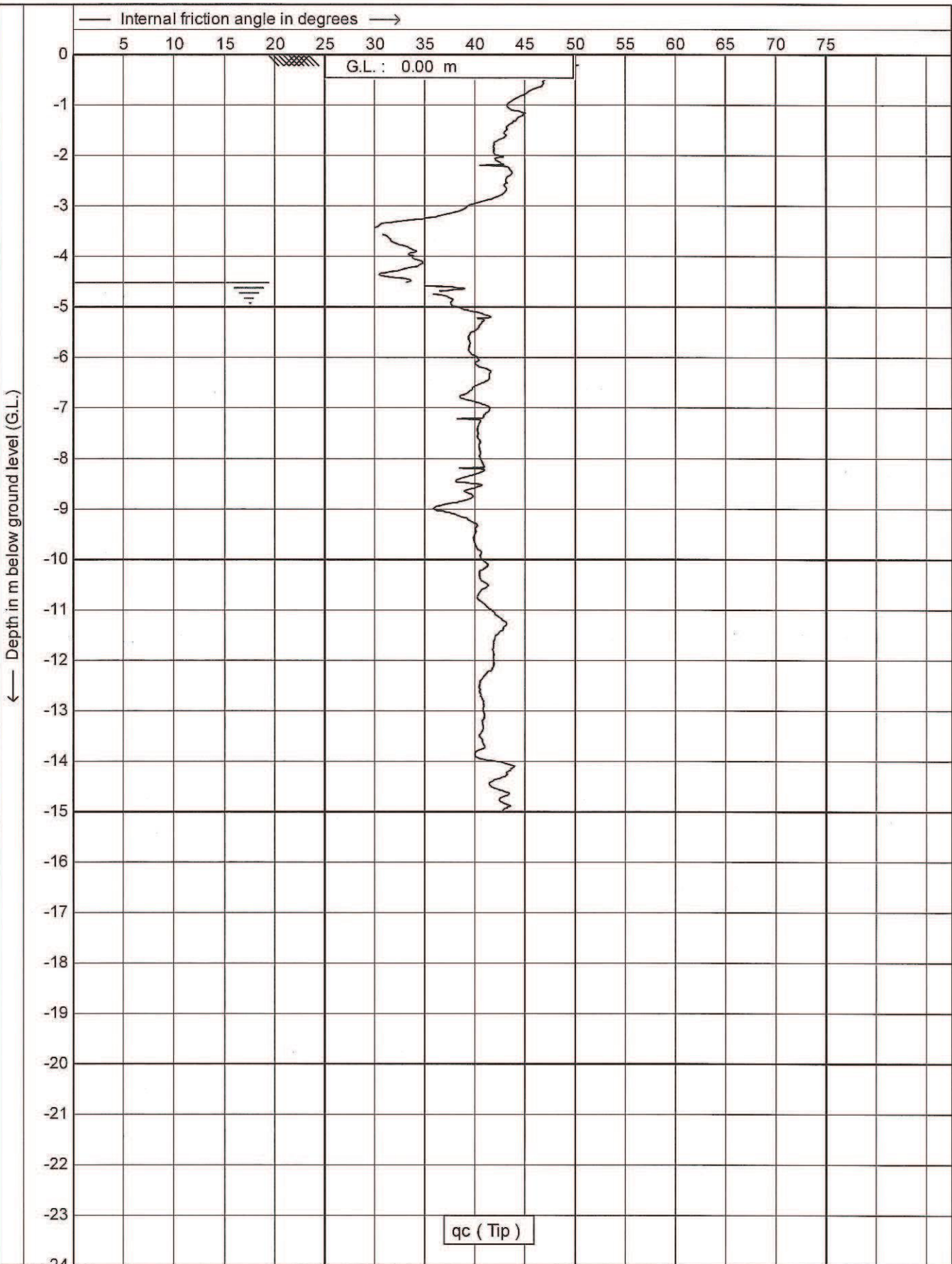


Test according A.S.T.M. Standard D 5778-07

Project : **Putauaki Trust Site Investigations**

Location: **Kawerau**

Date	: 26-1-2012
Cone no.	: C10CFIP.F57
Project no.:	<b>02BBO1</b>
CPT no.	: <b>04</b>
	12/14



CPTask V1.31



Test according A.S.T.M. Standard D 5778-07

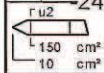
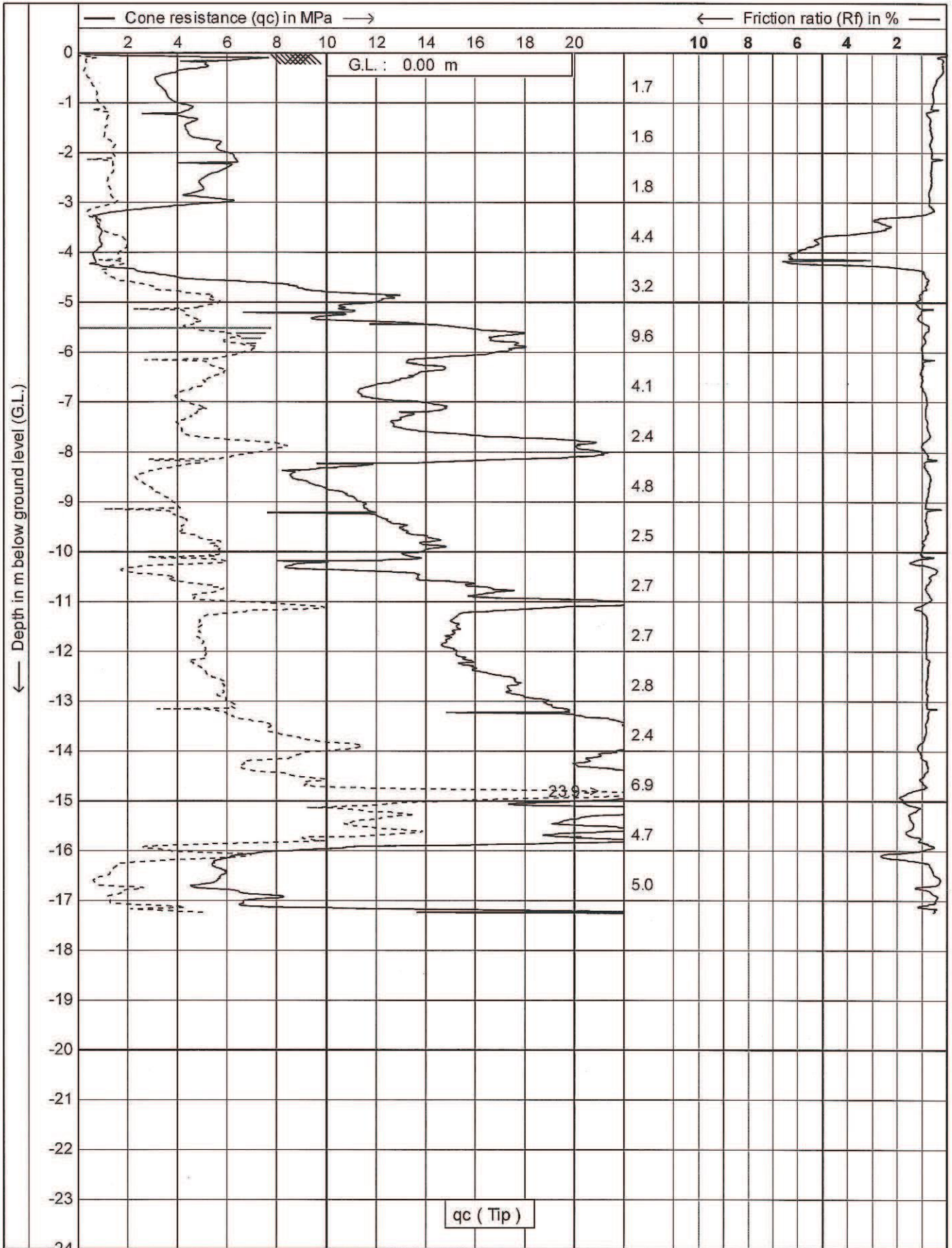
Project : **Putauaki Trust Site Investigations**

Location: **Kawerau**

Date	: 26-1-2012
Cone no.	: C10CFIP.F57
Project no.	: <b>02BBO1</b>
CPT no.	: <b>04</b>

14/14





0.10 0.20 0.30 0.40 0.50

--- Sleeve friction (fs) in MPa —>

Inclination (I) in degr



Test according A.S.T.M. Standard D 5778-07

Project : Putauaki Trust Site Investigations

Location: Kawerau

Date : 26-1-2012

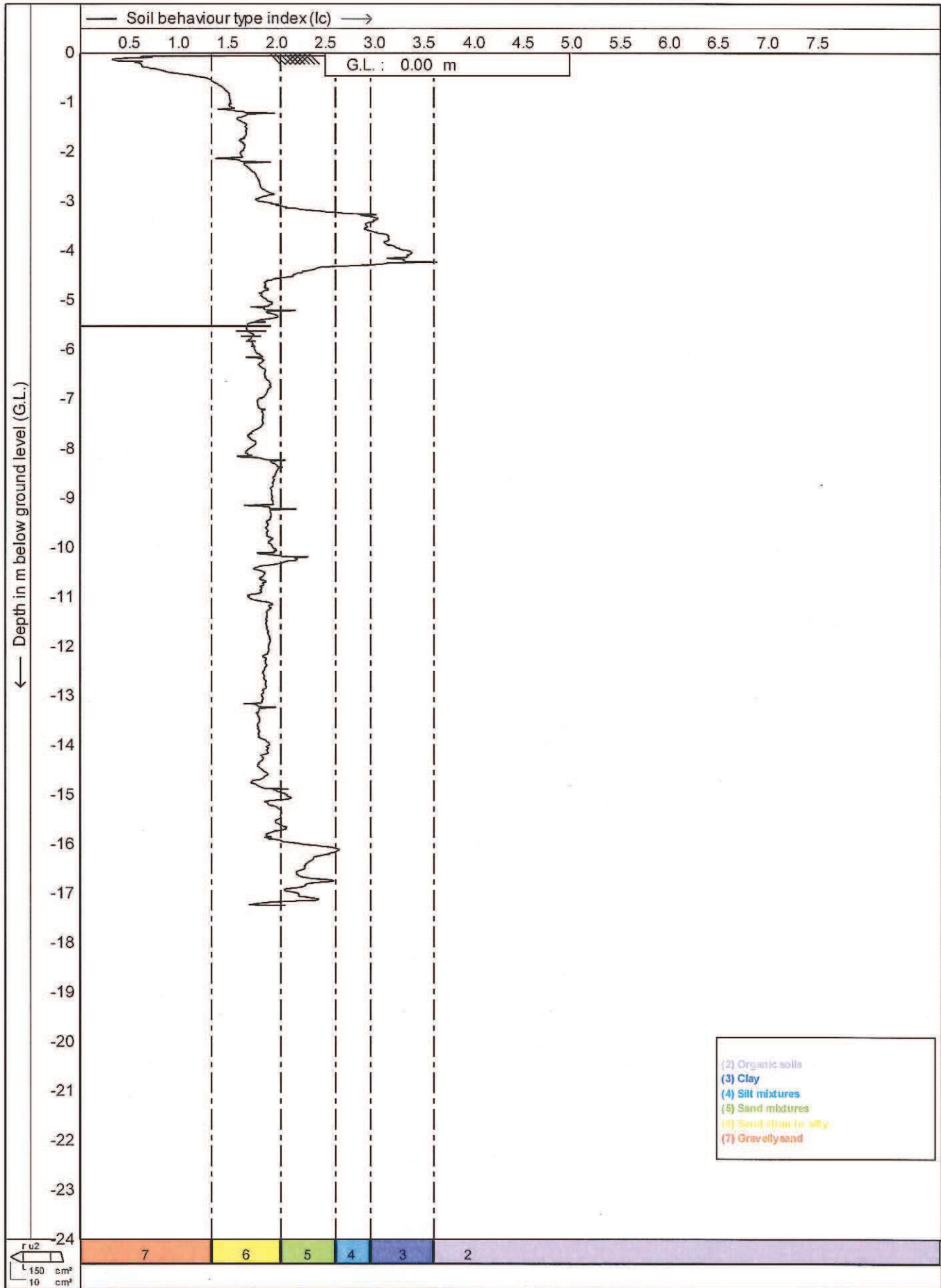
Cone no. : C10CFIP.F57

Project no. : 02BBO1

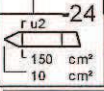
CPT no. : 05

1/14





(2) Organic soils  
 (3) Clay  
 (4) Silt mixtures  
 (5) Sand mixtures  
 (6) Sand silty to clay  
 (7) Gravelly sand



CPTask V1.31



Test according A.S.T.M. Standard D 5778-07

Project : **Putauaki Trust Site Investigations**

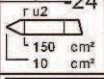
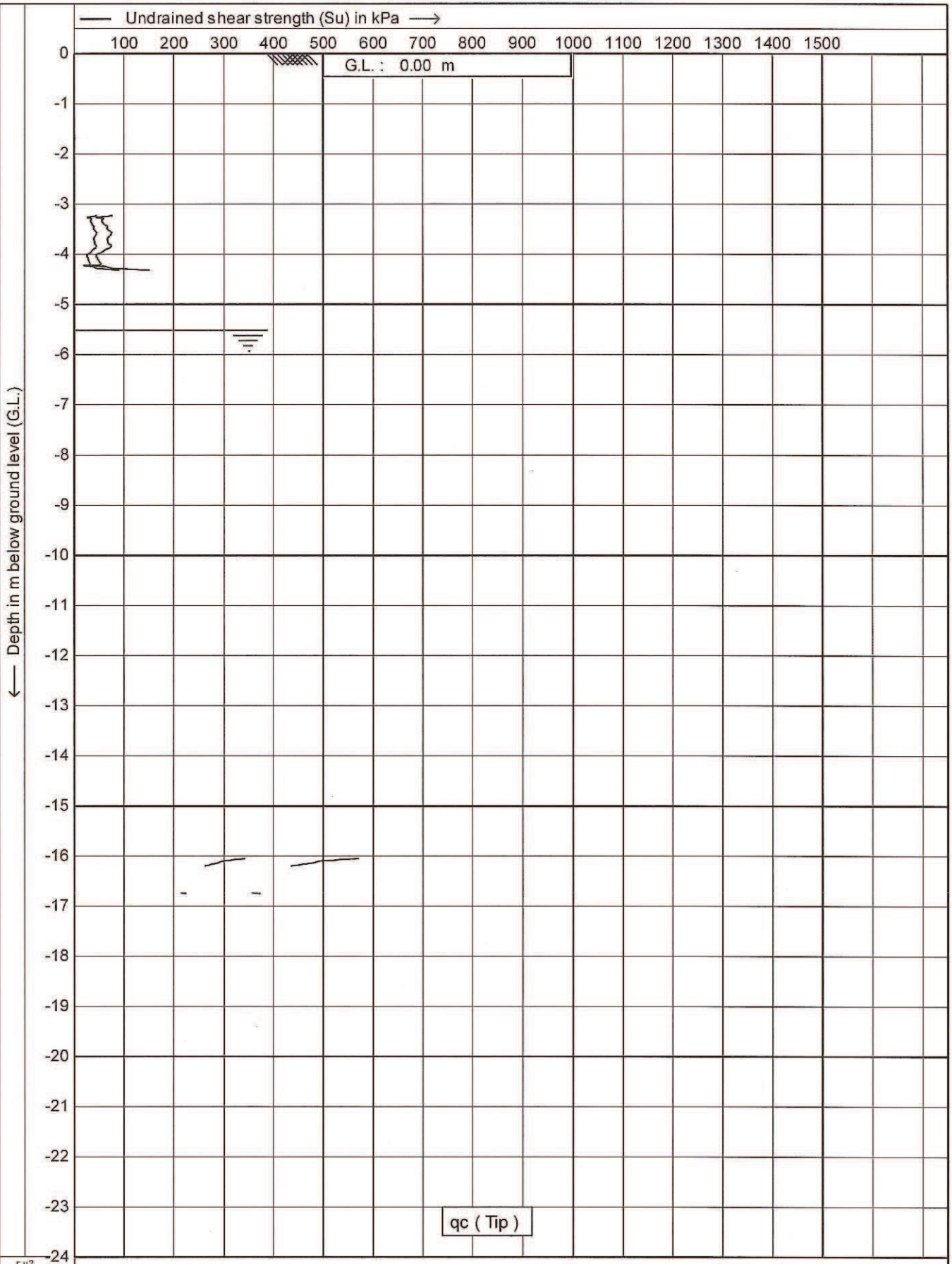
Location: **Kawerau**

Date : **26-1-2012**

Cone no. : **C10CFIP.F57**

Project no. : **02BBO1**

CPT no. : **05**      9/14



Test according A.S.T.M. Standard D 5778-07

Project : Putauaki Trust Site Investigations

Location: Kawerau

Date : 26-1-2012

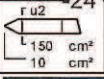
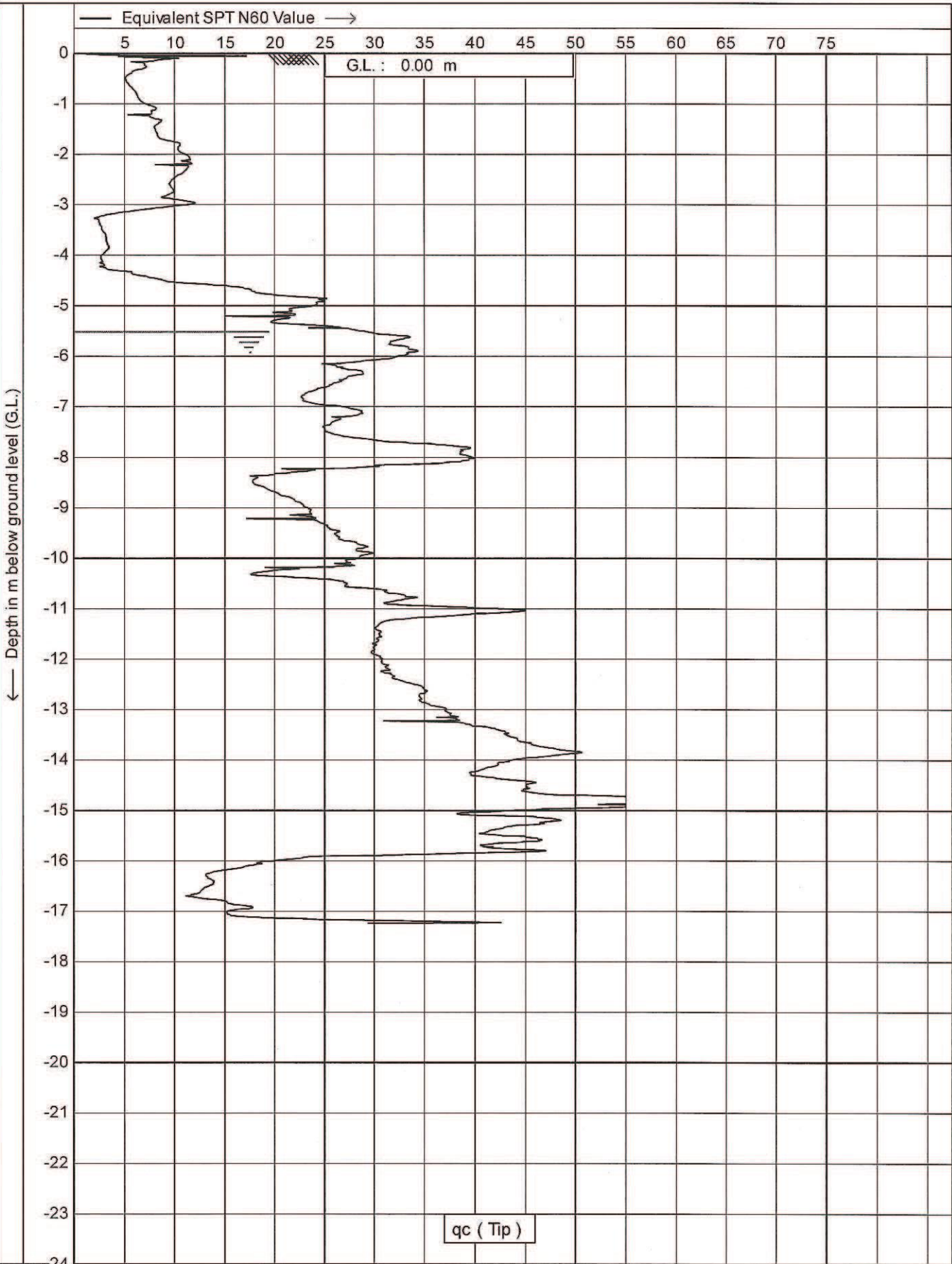
Cone no. : C10CFIP.F57

Project no. : 02BBO1

CPT no. : 05

10/14

CPTank V1.31



GPTask V1.31



Test according A.S.T.M. Standard D 5778-07

Project : Putauaki Trust Site Investigations

Location : Kawerau

Date : 26-1-2012

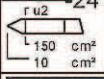
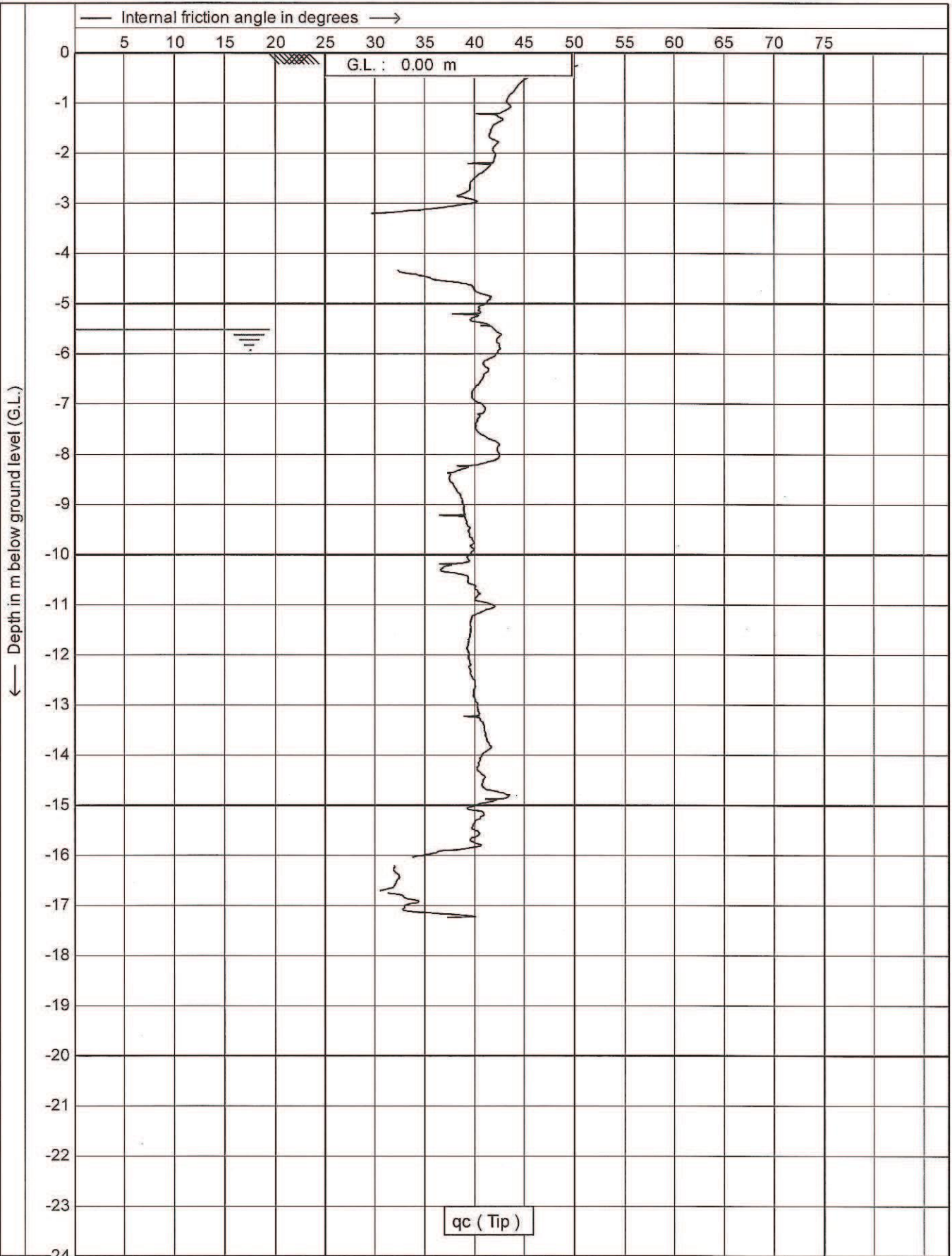
Cone no. : C10CFIP.F57

Project no. : 02BBO1

CPT no. : 05

12/14





Test according A.S.T.M. Standard D 5778-07

Project : Putauaki Trust Site Investigations

Location: Kawerau

Date : 26-1-2012

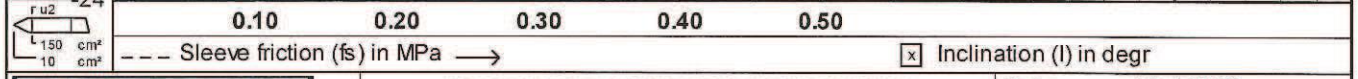
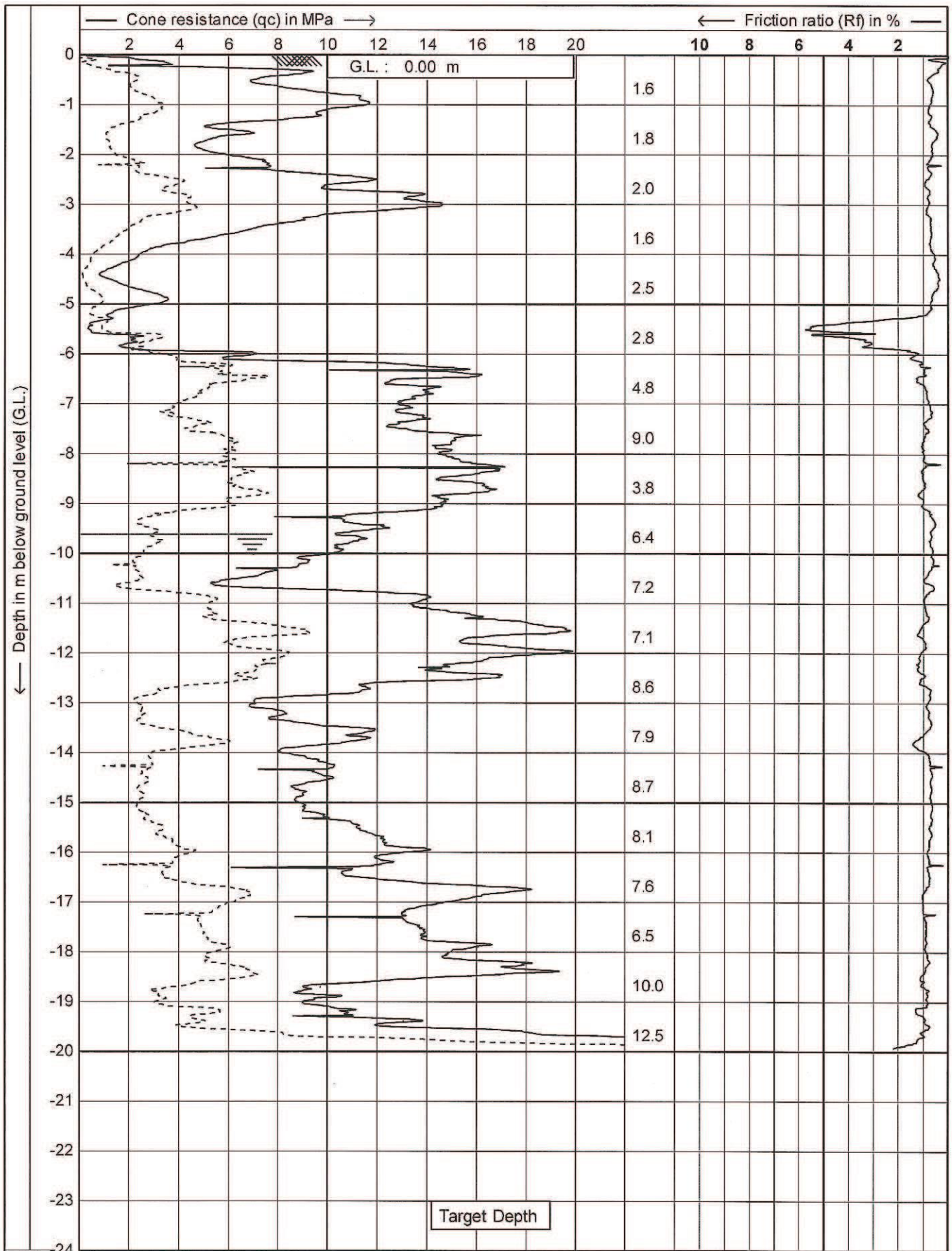
Cone no. : C10CFIIP.F57

Project no. : 02BBO1

CPT no. : 05

14/14

CPTask V1.3f



Test according A.S.T.M. Standard D 5778-07

Project : Putauaki Trust Site Investigations

Location : Kawerau

Date : 26-1-2012

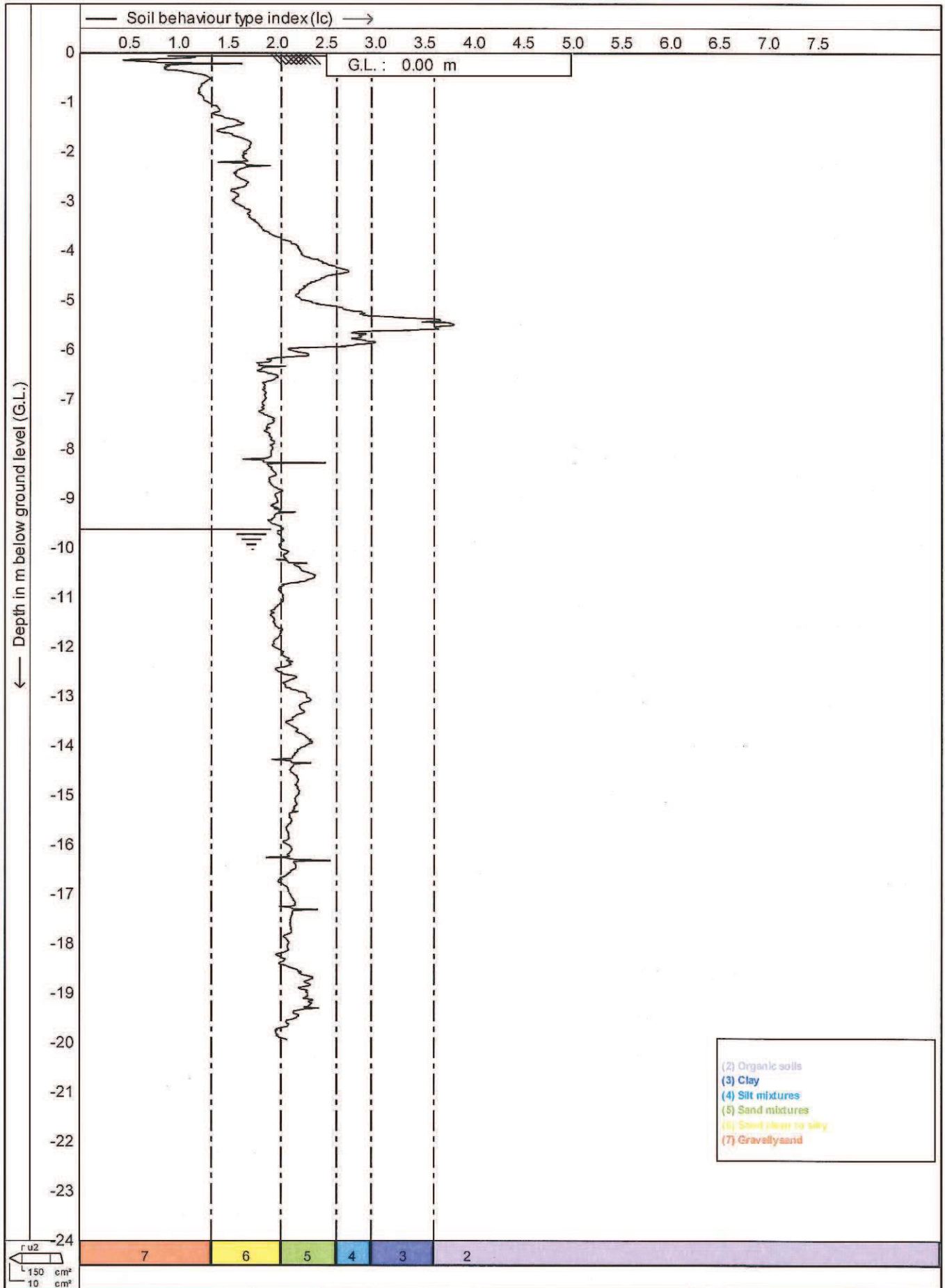
Cone no. : C10CRIP.F57

Project no. : 02BBO1

CPT no. : 06

1/14





CPTask V1.31



Test according A.S.T.M. Standard D 5778-07

Project : Putauaki Trust Site Investigations

Location: Kawerau

Date : 26-1-2012

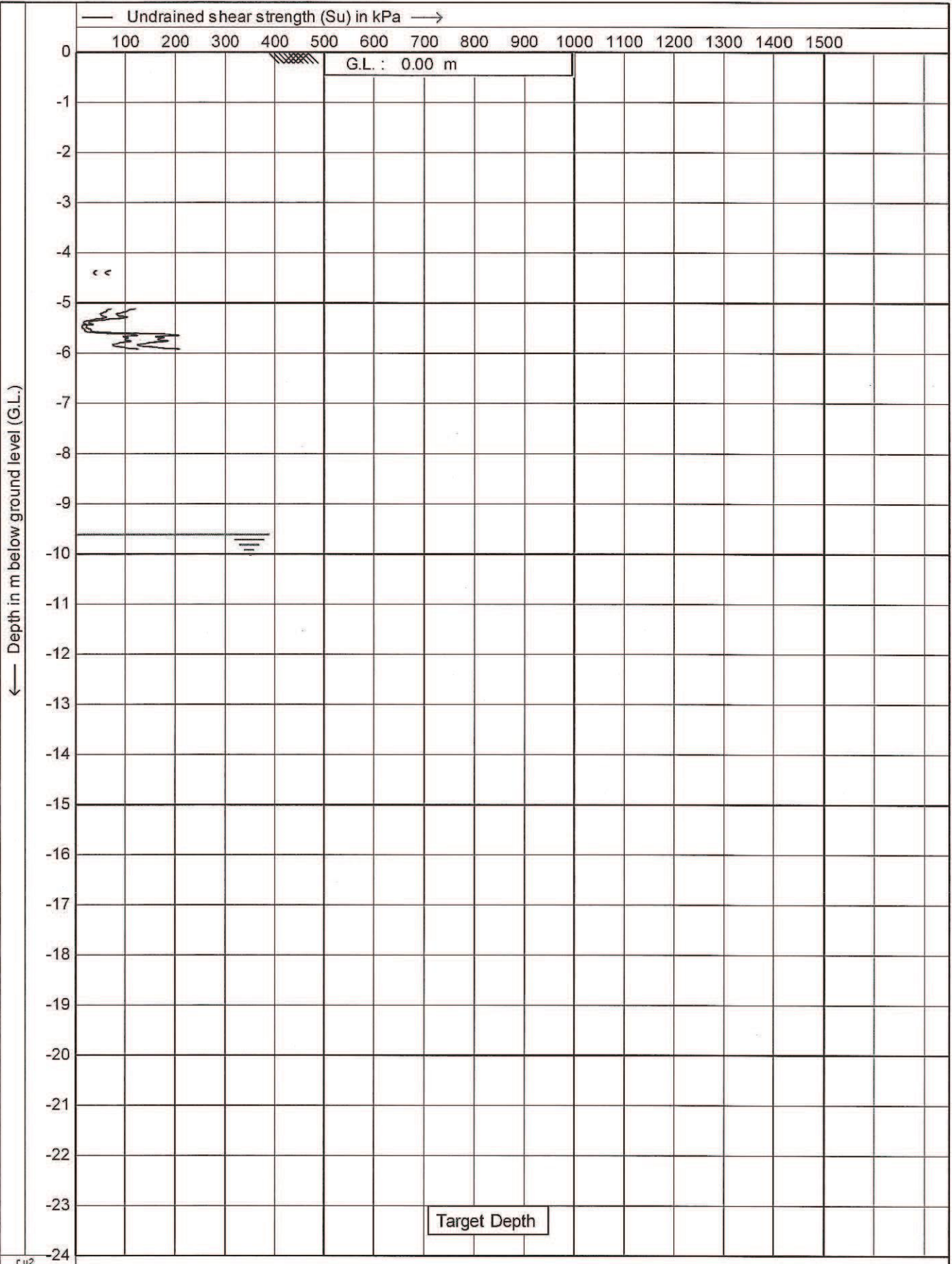
Cone no. : C10CFIIP.F57

Project no. : 02BBO1

CPT no. : 06

9/14

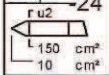
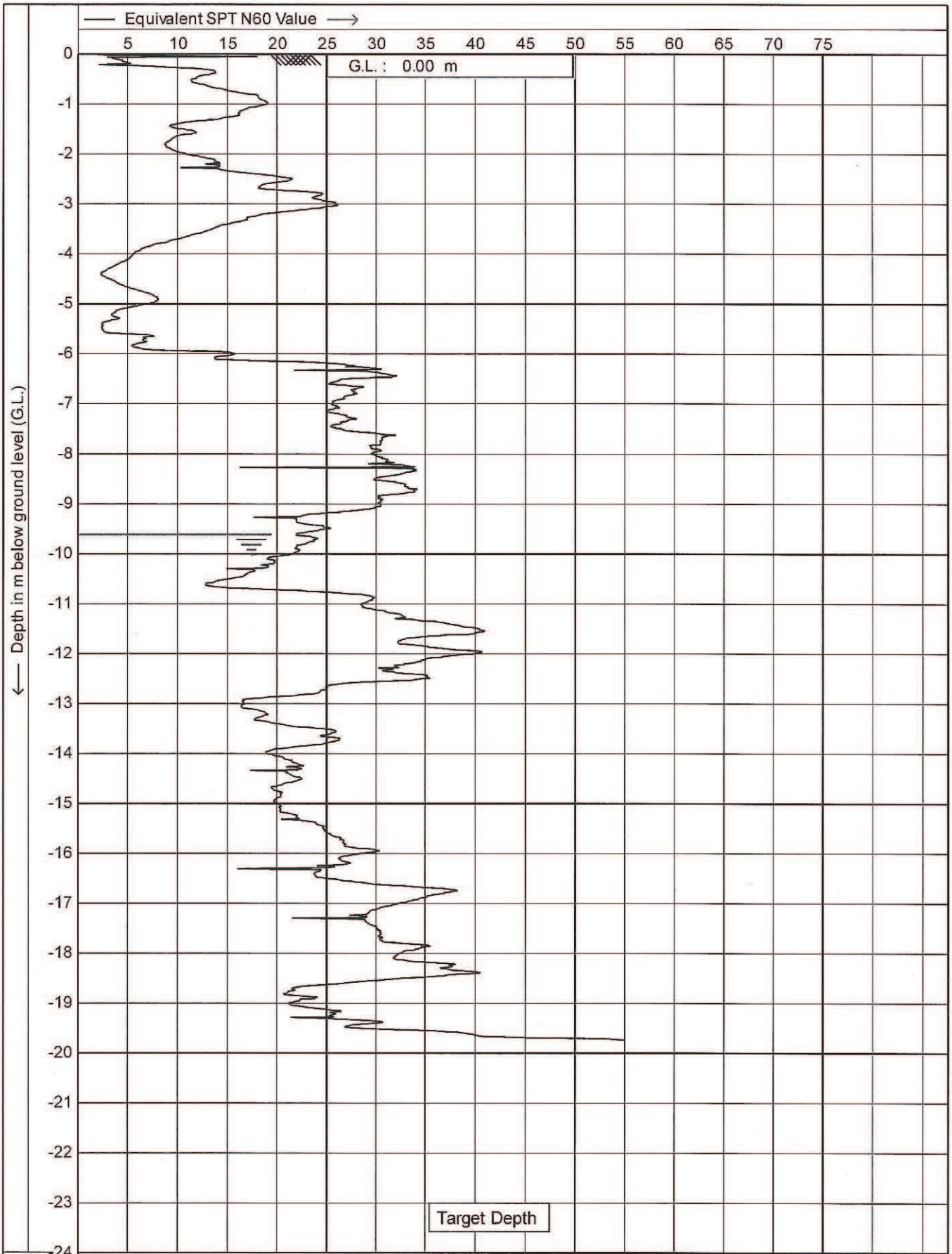




Test according A.S.T.M. Standard D 5778-07  
 Project : **Putauaki Trust Site Investigations**  
 Location: **Kawerau**

Date : **26-1-2012**  
 Cone no. : **C10CFIP.F57**  
 Project no. : **02BBO1**  
 CPT no. : **06** | **10/14**

CPTest V1.31



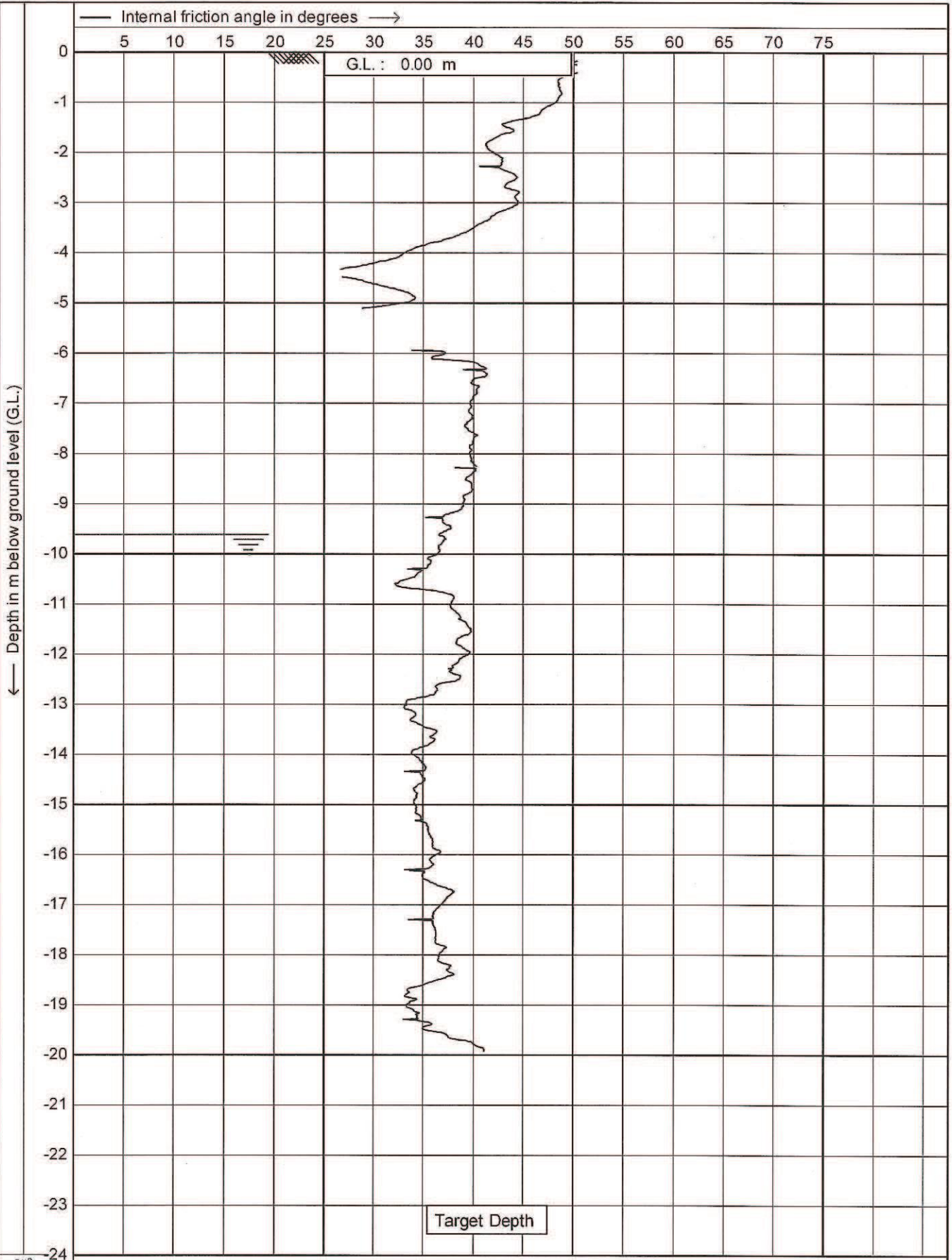
CPTask V1.31



Test according A.S.T.M. Standard D 5778-07  
 Project : Putauaki Trust Site Investigations  
 Location: Kawerau

Date : 26-1-2012  
 Cone no. : C10CFIIP.F57  
 Project no. : 02BBO1  
 CPT no. : 06





CPTask V1.31



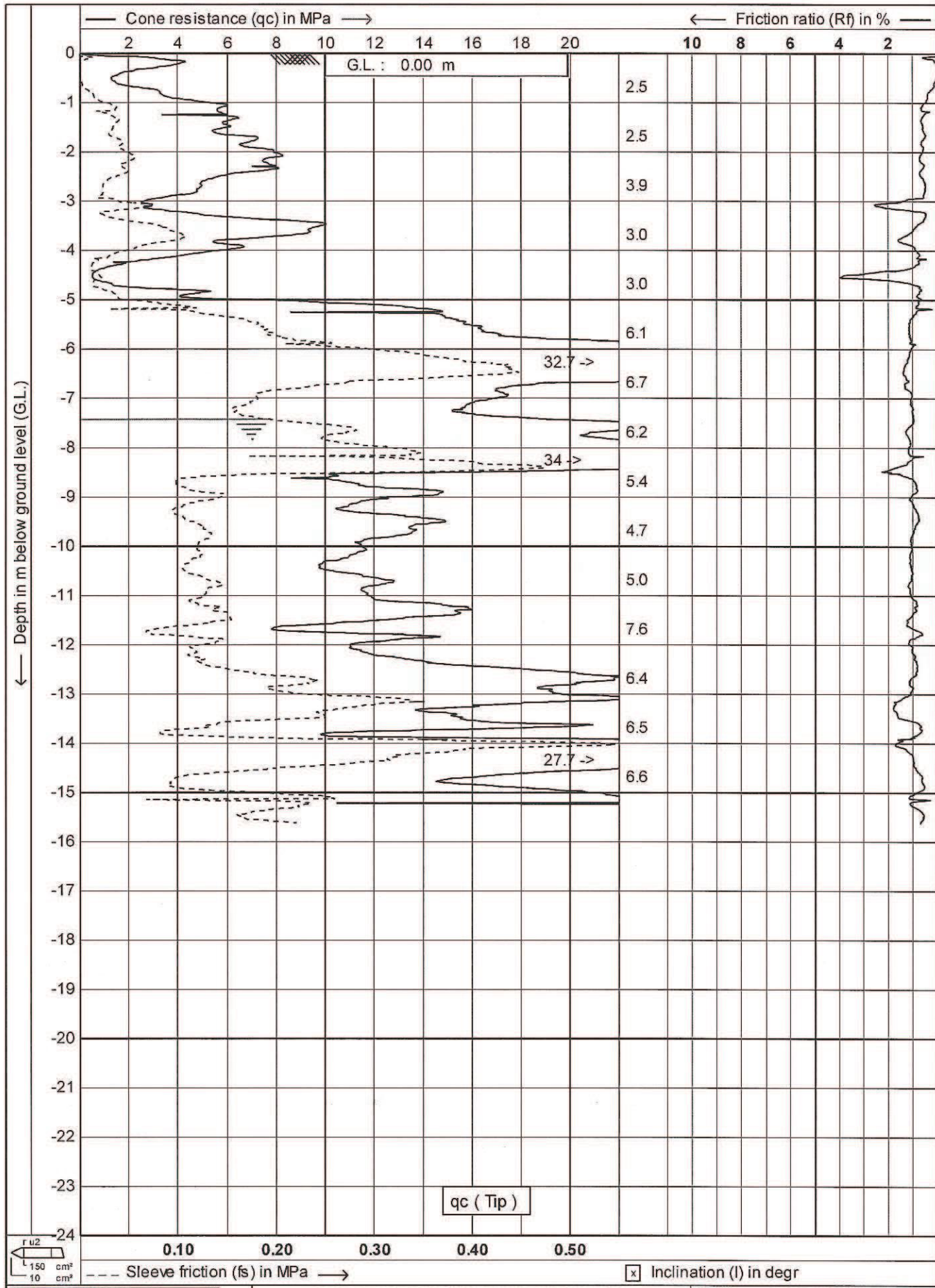
Test according A.S.T.M. Standard D 5778-07

Project : **Putauaki Trust Site Investigations**

Location: **Kawerau**

Date	: 26-1-2012
Cone no.	: C10CRIP.F57
Project no.	: <b>02BBO1</b>
CPT no.	: <b>06</b>
	<b>14/14</b>





Test according A.S.T.M. Standard D 5778-07

Project : Putauaki Trust Site Investigations

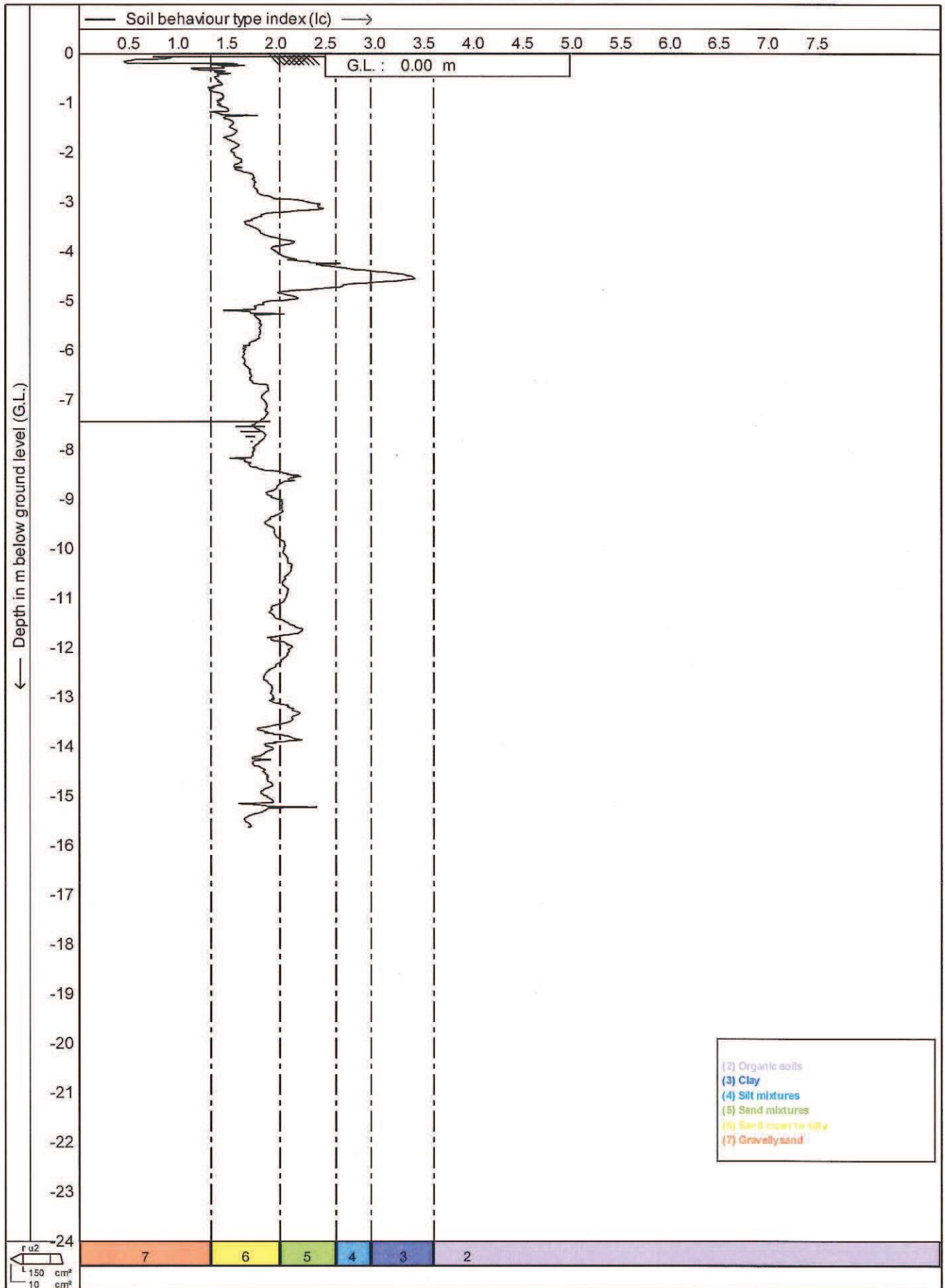
Location: Kawerau

Date : 26-1-2012

Cone no. : C10CFIP.F57

Project no.: 02BBO1

CPT no. : 07



CPTask V1.3Y



Test according A.S.T.M. Standard D 5778-07

Project : Putauaki Trust Site Investigations

Location: Kawerau

Date : 26-1-2012

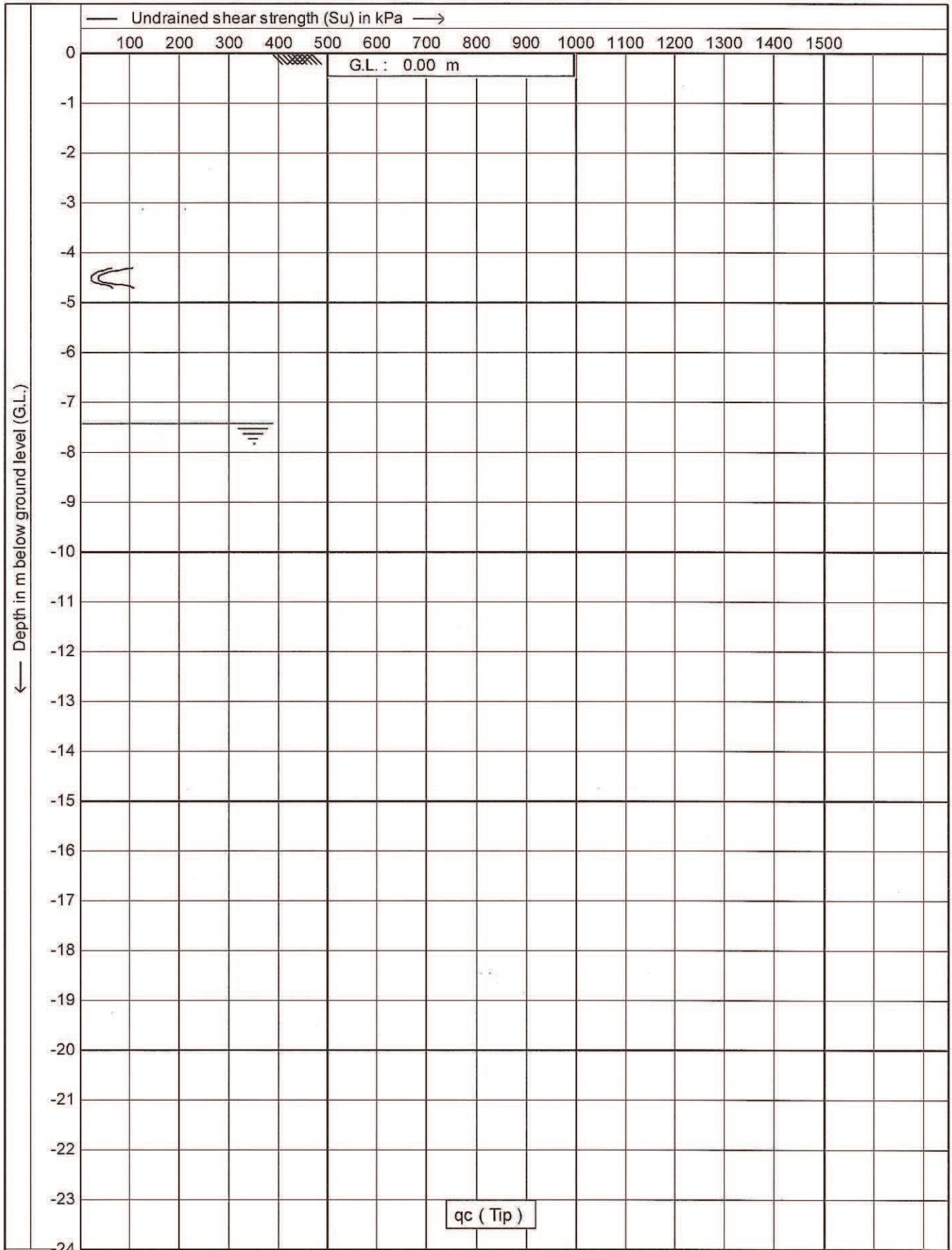
Cone no. : C10CFIP.F57

Project no. : 02BBO1

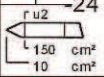
CPT no. : 07

9/14





← Depth in m below ground level (G.L.)



Test according A.S.T.M. Standard D 5778-07

Project : **Putauaki Trust Site Investigations**

Location: **Kawerau**

Date : **26-1-2012**

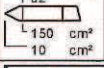
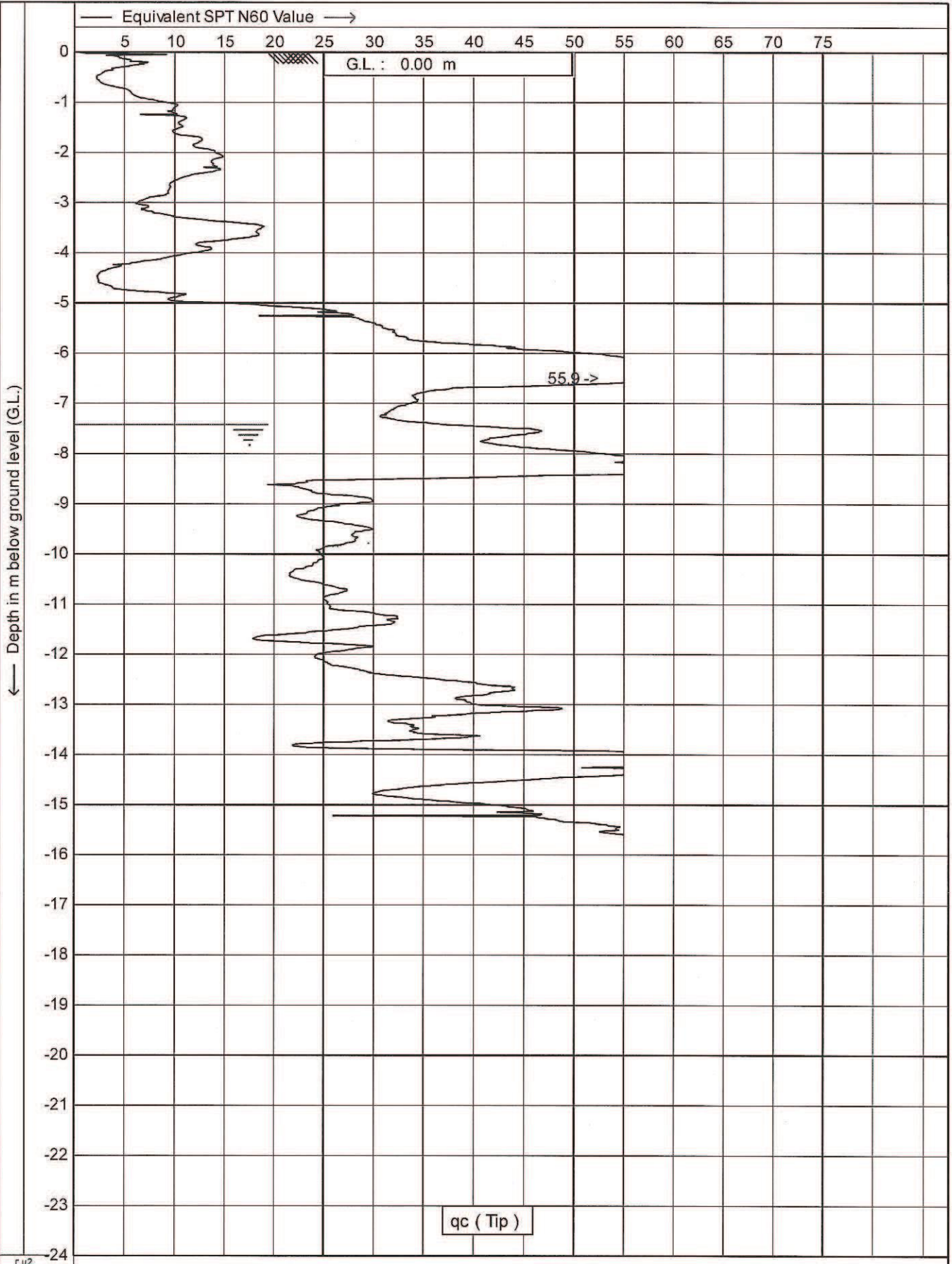
Cone no. : **C10CFIP.F57**

Project no. : **02BBO1**

CPT no. : **07** | 10/14

CPTest V1.31





Test according A.S.T.M. Standard D 5778-07

Project : Putauaki Trust Site Investigations

Location : Kawerau

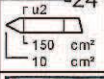
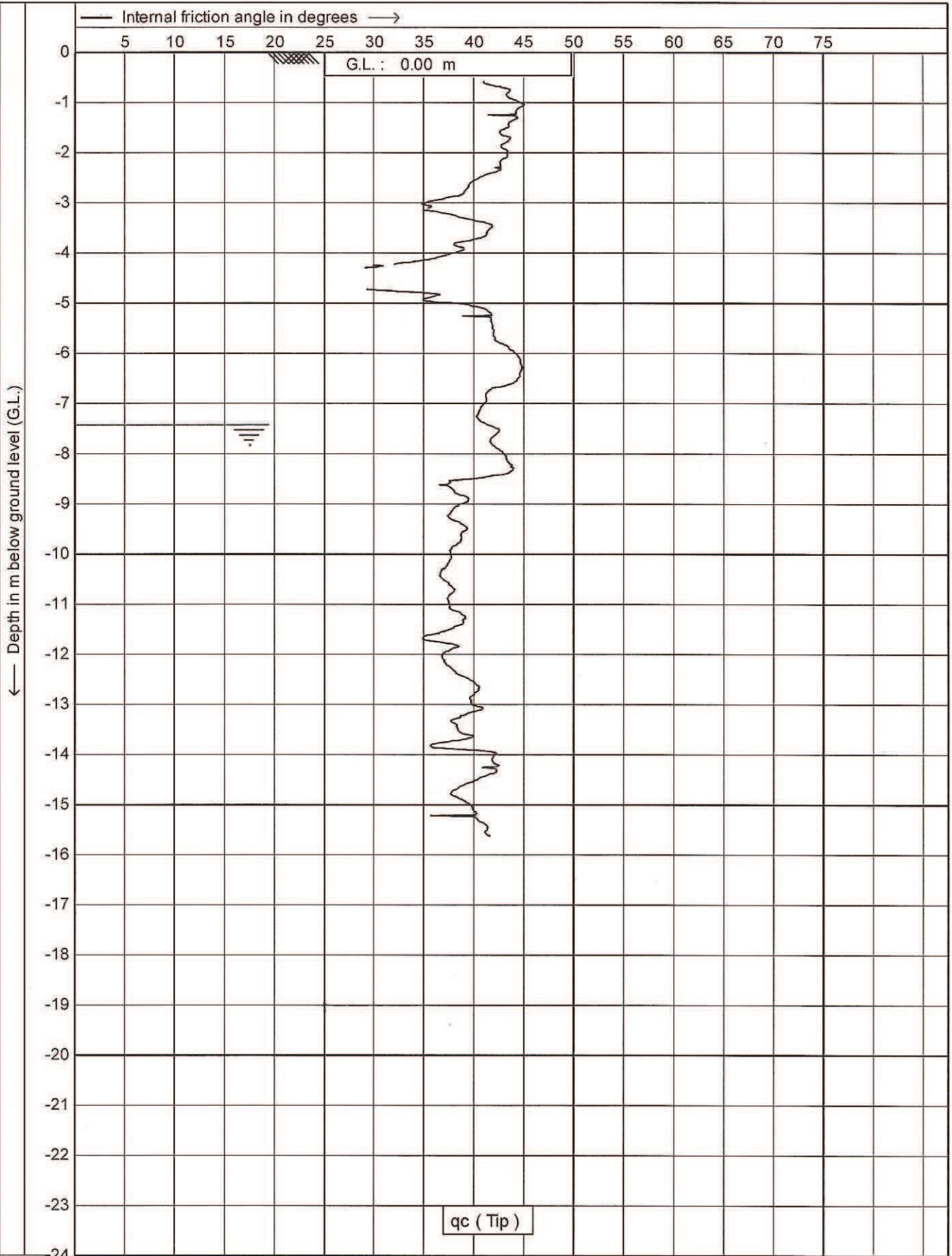
Date : 26-1-2012

Cone no. : C10CFIP.F57

Project no. : 02BBO1

CPT no. : 07

12/14



Test according A.S.T.M. Standard D 5778-07

Project : Putauaki Trust Site Investigations

Location: Kawerau

Date : 26-1-2012

Cone no. : C10CFIP.F57

Project no. : 02BBO1

CPT no. : 07

14/14

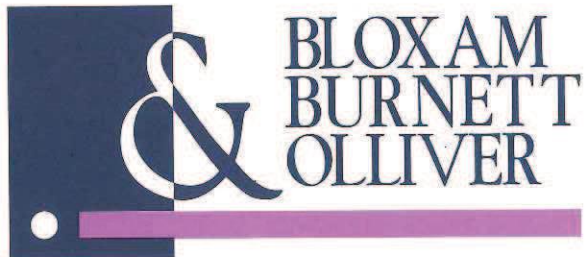
CPTask V1.31

---

**KAWERAU INDUSTRIAL PLAN CHANGE**

**ENGINEERING SERVICES REPORT**

---



140230

**ENGINEERS • PLANNERS • SURVEYORS**



**KAWERAU INDUSTRIAL PLAN CHANGE  
ENGINEERING SERVICES REPORT**

**140230**

**KAWERAU INDUSTRIAL PLAN CHANGE**

**ENGINEERING SERVICES REPORT**

Bloxam Burnett & Olliver Ltd  
Level 5, 18 London St  
PO Box 9041  
HAMILTON

Phone: (07) 838 0144  
Fax: (07) 839 0431  
email: [bhayes@bbo.co.nz](mailto:bhayes@bbo.co.nz)

**JOB NO: 140230**



## Contents

1.1	Introduction.....	1
1.2	Development Staging.....	1
1.3	Existing Infrastructure.....	1
1.4	Water Supply.....	1
1.5	Waste Water Disposal.....	2
1.6	Stormwater Management.....	2
1.7	Conclusions.....	3

Figure 1: Site Plan

Quality Record	Name	Company	Date
Prepared by:	Brad Hayes	Bloxam Burnett & Olliver Ltd	27 February 2012
Reviewed by:	Bernie Milne	Bloxam Burnett & Olliver Ltd	27 February 2012
Authorised by:	Chris Dawson	Bloxam Burnett & Olliver Ltd	27 February 2012

K:\140110 Kawerau Industrial Plan Change\Infrastructure Assessment\Kawerau Industrial Plan Change  
\_Engineering Services Report 270212

## **1.1 Introduction**

This report describes the issues associated with providing water supply, wastewater disposal and stormwater disposal infrastructure for land subject to a plan change and re-zoning to Industrial.

The proposed industrial land has an area of approximately 113 hectares and is located to the north east of the Kawerau township. The land fronts Tamarangi Drive (SH34) north of McKee Road (refer Areas A and B on attached Figure 1) and is owned by the Putauaki Trust.

## **1.2 Development Staging**

Agreement with NZTA has been reached which will enable construction of:

- a tee intersection with right turn bay south of the rail underpass on SH34 to gain access to Area A; and
- a roundabout north of the underpass approximately mid-way along the frontage of Area B.

At this stage, it is not known which area will be developed first. Hence, flexibility needs to be maintained with regard to the access point and with regard to the numbers and sizes of lots and staging within each area.

## **1.3 Existing Infrastructure**

Existing infrastructure within the site which needs to be considered in planning for transportation and three waters servicing includes:

- The Superskid site, including its wastewater ponds and railway sidings;
- Transpower high voltage overhead cables which run across A & B from northeast to southwest;
- High pressure gas mains across both areas A & B;
- Steam reinjection bores and associated geothermal power generation infrastructure operated by Mighty River Power.

Three waters servicing networks are able to accommodate this existing infrastructure without any adverse impacts upon it.

## **1.4 Water Supply**

Discussions with the Kawerau District Council (KDC) Operations and Services Manager have provided the following information:

- A 150mm diameter extension of its supply from Fletcher Ave along SH34 to the proposed tee intersection on the frontage of Area A could provide the development with the same standard of supply as the rest of Kawerau;



- Existing demand in Kawerau exceeds water supply source capacity during summer peak periods, however this can be managed provided that no wet industries are established in the new industrial zone;
- A small diameter trickle supply to the site from the KDC supply could be used if a relatively small first stage of development were proposed.

Based on these discussions we are of the view that there are no constraints to development as far as water supply is concerned, provided that wet industries are not envisaged. After extending the KDC reticulation to the site boundary, the site internal reticulation can be incrementally extended as development proceeds.

## **1.5 Waste Water Disposal**

Discussions with the KDC Operations and Services Manager have provided the following information:

- KDC can accept macerated sewage from the development pumped via. a pipeline along SH34 to the top end of the KDC reticulation at Fletcher Ave;
- The treatment plant does not require upgrading;
- KDC are prepared to consider alternatives to conventional gravity sewerage reticulation.

Based on these discussions we are of the view that there are no constraints to development as far as waste water disposal is concerned.

Within industrial subdivisions on large areas of flat land, conventional gravity sewers can be very deep and therefore expensive, while flows can be relatively low. Conventional gravity sewers can sometimes have the advantage that tenants can simply “connect and forget”, but sometimes this is still not the case near the shallow top end of a sewer line if the sanitary facilities for a building are a long way from the sewer. In addition, gravity sewer networks must be carefully planned from the outset, and the resulting design may not be able to accommodate a significant amendment to the development plan, such as a change in the road network.

Alternatives to gravity sewer reticulation such as vacuum and pressure sewers are therefore of considerable interest because they are less likely to constrain development staging and may be more cost effective. Due to the nature and scale of the development, on site disposal is not recommended.

## **1.6 Stormwater Management**

The KDC Operations and Services Manager advises that the soils within Kawerau Borough typically have a relatively impermeable near surface crust, but have high soakage rates beneath. A Geotechnical Site Suitability report prepared by Bloxam, Burnett & Olliver Ltd (February 2012) confirms that the site soils are suitable for the disposal of stormwater to ground soakage.

Under the present pastoral land use, there are no known overland flow paths entering or leaving the site, as all rainfall either soaks into the ground immediately, or ponds for a short time in the numerous depressions. For the developed site, it should be possible to achieve runoff rates which are no greater than existing and therefore do not cause any adverse effects on neighbouring land. This could be achieved through a combination of the following measures:

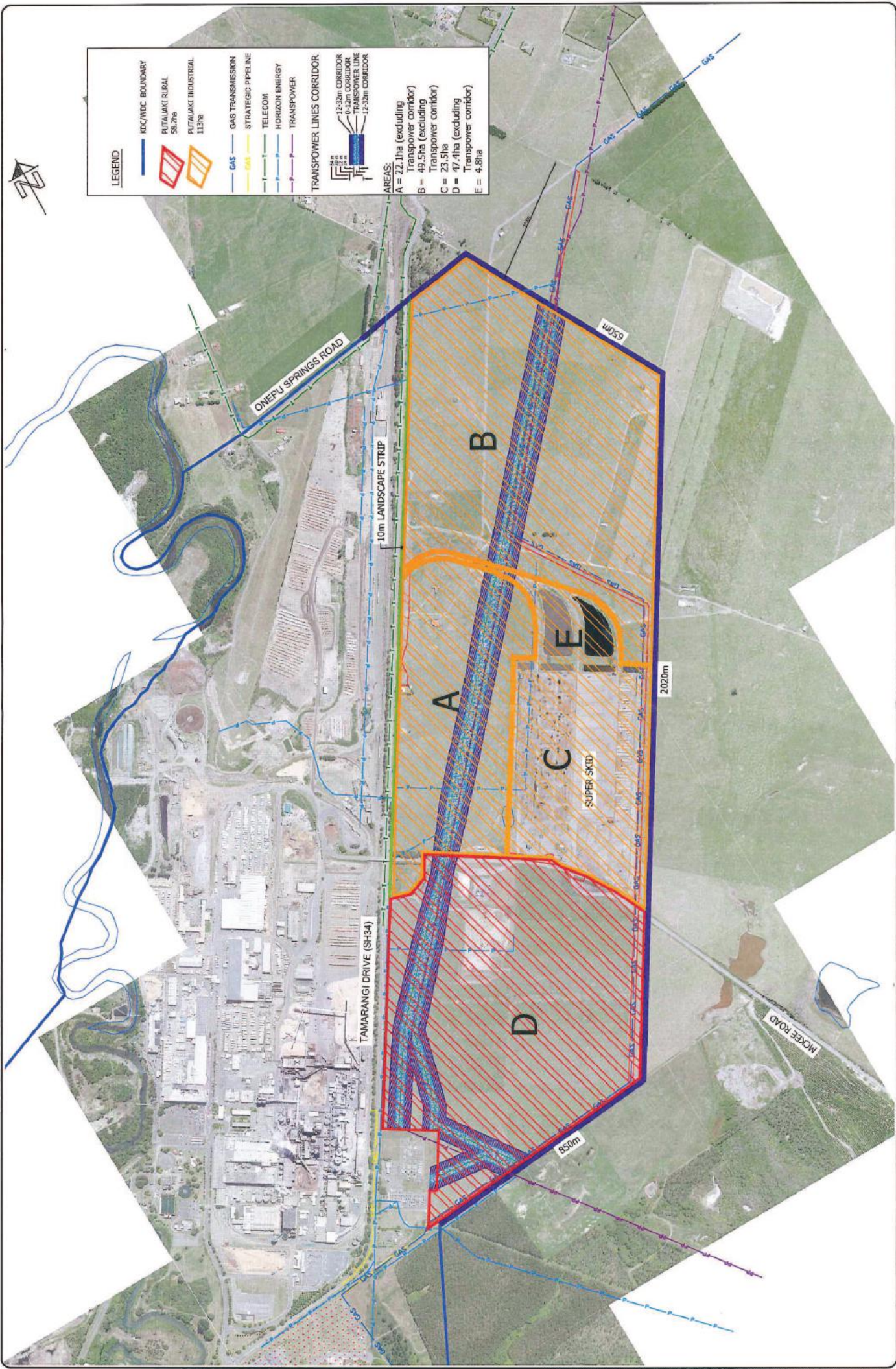
- Below ground soakage disposal devices for roads, buildings, and paved areas;
- Landscaped areas to store excess runoff prior to soakage disposal;
- Contouring of lots and roads to ensure any excess runoff from extreme events is contained within the site boundaries (for disposal by soakage once the flood peak has passed).

## **1.7 Conclusions**

Practicable solutions to the provision of water supply, wastewater disposal and stormwater disposal infrastructure are available for the proposed industrial land.

**Figure 1: Site Plan**





**LEGEND**

- KDC/WDC BOUNDARY
- PUTAUAKI RURAL 58.2%a
- PUTAUAKI INDUSTRIAL 113%b
- GAS TRANSMISSION
- STRATEGIC PIPELINE
- TELECOM
- HORIZON ENERGY
- TRANSPOWER
- TRANSPOWER LINES CORRIDOR
- 12-33m CORRIDOR
- 0-12m CORRIDOR
- 12-33m CORRIDOR

**AREAS:**

- A = 22.1ha (excluding Transpower corridor)
- B = 49.5ha (excluding Transpower corridor)
- C = 23.5ha
- D = 47.4ha (excluding Transpower corridor)
- E = 4.8ha

drawing file <b>SITE PLAN</b>	project <b>KAWERAU INDUSTRIAL PLAN CHANGE</b>	 client KAWERAU DISTRICT COUNCIL	 BRYAN BURNETT & OLLIVER LAND & SURVEY ENGINEERS Level 5, 18 Lonsdale Street, Auckland Phone: 64-7-328 0144, Fax: 64-7-328 9431 Email: consultants@bbo.co.nz	growing status <b>PRELIMINARY</b> THEC:\K140110_P_02.dwg scale:	checked approved scale <b>A1 = 1:5000</b>	design drawn date <b>02.10.2011</b>	by ch 05-12-11 08:35 AM	sheet/revision sheet 1 of 1	growing number <b>140110/P/02</b>	region <b>A</b>
				© copyright						