October 6th, 2015

Mr. Bernard Reid
Capital Planning Branch, Design & Construction Division
Direction de l'aménagement de la capitale, Division de Désign et construction
National Capital Commission
Ottawa (Ontario) K1P 1C7

Subject: **Technical report following the emission of the plans 60% - Geotechnical Comments Revision 1**
Leamy Creek Pedestrian Bridge
O/Ref. : 033-B-0012112-1-GE-R-0002-01

Mr. Bernard Reid,

You will find below our geotechnical comments about the overall stability of the site.

1. Introduction

The services Englobe Corp. were retained by the National Capital Commission for the realization of an additional geotechnical study and an environmental site assessment (ESA Phase 2) for the replacement of the Leamy Stream pedestrian bridge in Gatineau, Quebec. The results of these studies are presented in reports 033-B-0012112-1-GE-R-0001-00, issued July 8, 2015, and 033-B-0012112-2-HG-R-0001-00, issued July 21, 2015. This review should be read in conjunction with these reports to ensure good understanding of the contents of this document.

At time of the redaction of the ground investigation report, in the absence of any information relating to the proposed works, evaluation of stability was limited to historical research using aerial photographs and detailed visit site.

The impact and limitations of the report are set out in Appendix 1. These comments are important for a proper understanding of the information contained in the report and should be considered as an integral part of it.

2. Summary of the stratigraphy

The encountered stratigraphy in boreholes F-01-15 to F-06-15 and F-08-15 is presented in Table 1.

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Table 1: Summary of stratigraphic units encountered in boreholes

ABUTMENT	BOREHOLE #	ASPHALT/ TOPSOIL (m)	HETERO-GENEOUS FILL (m)	SANDY SILT TO SILT DEPOSIT (m)	CLAY DEPOSIT (m)	END OF BOREHOLE (m)
East	F-01-15	0.00 - 0.05	0.05 - 5.36*	N/E	N/E	5.36*
	F-06-15	0.00 - 0.05	0.05 - 2.44	N/E	2.44 - 13.41	13.41
West	F-02-15	0.00 - 0.05	0.05 - 3.66	3.66 - 6.10	N/E	6.10
	F-03-15	0.00 - 0.10	0.10 - 4.88	4.88 - 6.10	N/E	6.10
	F-04-15	0.00 - 0.10	0.10 - 4.26	4.26 - 6.10	N/E	6.10
	F-05-15	N/E	0.00 - 3.05	3.05 - 6.10	N/E	6.10
	F-08-15	N/E	0.00 - 2.44	2.44 - 5.61	5.61 - 13.71	13.71

**: End of drilling after obtaining a refusal on a block, footing of the abutment, dense soil or probable rock*

N/E : Non ecountered

3. Summary of scope of work

The scope of work is presented in the plans issued to 60%, dated August 21st, 2015, prepared by CIMA+, project no. G003546.

In summary, the existing bridge with a length of 55.97 m will be replaced by a new bridge with a length of 65.00 m. The headwall be replaced by a land-support structure composed of an imbricated concrete block wall and a reinforced embankment.

4. Study Methodology

a. Consulted documents

The following documents were consulted for the writing of this opinion:

- LVM inc. - Travaux de réhabilitation du pont pédestre du ruisseau Leamy, Gatineau, Québec. Projet 237-B-0001957-1-GE-R-0002-01, mars 2013;
- LVM, a division of Englobe Corp. - Leamy Creek Pedestrian Bridge – Complementary Geotechnical Study. O/Réf.: 033-B-0012112-1-GE-R-0001-00, July 2015;
- CIMA+ - Plan émis à 60%, Sentier des Voyageurs, Ruisseau Leamy, Reconstruction du pont pédestre. Projet G003546, août 2015

b. Geotechnical properties of materials

The reports from the borehole realized as part of the geotechnical study (O/Ref.: 033-B-0012112-1-GE-R-0001-00) were consulted.

Table 2 summarizes the geotechnical properties of the materials from these boreholes, as well as materials and structures to be built.

Table 2: Geotechnical properties of the materials for analysis

PROPERTIES	SYMBOL	SILTY SAND DEPOSIT	CLAY DEPOSIT	CONTROL FILL	RIP-RAP
Unit weight (kN/m³)	γ	18.0	16.5	21.0	22
Submerged unit weight (kN/m³)	γ	8.2	6.7	11.2	11.2
Short-term analysis (undrained)					
Effective angle of internal friction (°)	φ'	30	0	38	45
Total cohesion (kPa)	c	0	Accordig to C_u profile	0	0
Long-term analysis (drained)					
Effective angle of internal friction (°)	φ'	30	28	38	45
Effective cohesion (kPa)	c'	0	5	0	0

The concrete elements are considered "impenetrable" for analysis, with a unit weight of 25.0 kN/m^3 and 15.2 kN/m³ submerged unit weight.

c. Seismic event cases

Effective strength parameters for granular materials and strength parameters undrained shear to the clay deposit are used. A pseudo-static method was used to simulate the case of seismic events.

This method requires the determination of seismic parameters such as peak ground acceleration (PGA) and the seismic coefficient *k*.

The PGA value was determined from the *National Building Code – Canada 2010* (NBCC-2010). Thus, the PGA value to be considered for the Gatineau area was 0.32 g. This acceleration corresponds to a probability of exceedance of 2% in 50 years.

The seismic coefficient *k* selected for pseudo-static stability analysis is considered equal to 50% of the value of PGA (Kramer, SL, Geotechnical Earthquake Engineering, Prentice Hall, 1996). In case of seismic event, a minimum safety factor of 1.0 is required.

d. Other input parameters

- No surcharge is transmitted to the ground by the bridge being supported by piles;
- The water level is considered is 44 m;
- All heterogeneous fill material is excavated and replaced by a controlled fill;
- The geometry of the retaining wall is from the type section of a wall with a height greater than 1.2 m. For analytical purposes, the width of the reinforced embankment was set at 3 m. As indicated in the plan, this length is to be determined by the manufacturer. An ultimate strength of fabric is 5 kN/m and cohesion at the interface soil – fabric of 5 kPa was taken as hypothesis. The fabric spacing is set at 300 mm.

e. Sections and scenarios analyzed

Six (6) sections will be analyzed, including:

- Under the floor in the middle of both sides of the bridge;
- North shore and south shore of the floor on both sides.

The position of these cuts is shown on the plan 033-0012112-1-GE-D-0004-00 presented in Appendix 2.

For each of the six (6) sections, three (3) scenarios are analyzed:

- Short-term analysis;
- Long-term analysis;
- Pseudo-static analysis (seismic event).

f. Limitations of the model

The analysis model does not take into account certain factors such as:

- Disruption of clay deposit by the compaction and pile driving works;
- The effects of water level variations in the stream;
- Variations in the nature and compactness of the backfill in place;
- Contractor work method.

5. Results

The results of the stability analysis carried out are summarized in Table 5. The analyzed sections, the sliding surface associate and the minimum safety factor (SF) corresponding are graphically shown in Figures 1 to 24 presented in Appendix 3.

To ensure the stability of a slope, it is generally recommended that the safety factor is at least 1.5 for short and long term conditions and 1.0 in the pseudo-static analysis.

Table 3 shows the safety factors obtained. The analysis results in the form of section showing the critical slip surface are presented in Appendix 3.

Table 3: Geotechnical properties of the materials for analysis

ANALYZED SCENARIO		MINIMAL FACTOR OF SECURITY (FS)	
		CALCULATED FS	MINIMUM SEARCHED FS
Section 1	Short-term analysis	1.83	1.50
	Long-term analysis	1.70	1.50
	Pseudo-static analysis	1.19	1.00
Section 2	Short-term analysis	1.74	1.50
	Long-term analysis	1.60	1.50
	Pseudo-static analysis	1.21	1.00
Section 3	Short-term analysis	1.49	1.50
	Long-term analysis	1.49	1.50
	Pseudo-static analysis	0.99	1.00
Section 4	Short-term analysis	1.40	1.50
	Long-term analysis	1.40	1.50
	Pseudo-static analysis	0.93	1.00
Section 5	Short-term analysis	2.41	1.50
	Long-term analysis	1.52	1.50
	Pseudo-static analysis	1.57	1.00
Section 6	Short-term analysis	1.92	1.50
	Long-term analysis	1.39	1.50
	Pseudo-static analysis	1.38	1.00

6. Comments

Some safety factors particularly for long-term are below the minimum desired value of 1.50. It is the same for the pseudo-static analysis. In all cases, the critical rupture surface passes under the wall and passes through most of the fabrics.

To improve the overall stability, the following solutions are suggested:

- Increase the width of the embankment strengthened beyond the width of 3 m used as a hypothesis;
- Use of a fabric promoting better friction or achieved by a setting up system.

Additional analyzes were performed to verify the effect of the suggested solutions on the global stability. Sections 4 and 6 were used for testing the solutions. The changes made and the results are summarized in Tables 4 and 5. The typical wall section are shown in Figures 25 to 40 in Appendix 4.

Table 4: Results of stability analysis with suggested solutions - Section 4

ANALYZED SCENARIO	FS FROM TABLE 3	NEW FS	MINIMUM SEARCHED FS
Width of the reinforced embankment from 3 m to 5 m	---	---	---
Short-term analysis	1.40	1.40	1.50
Long-term analysis	1.40	1.40	1.50
Pseudo-static analysis	0.93	1.02	1.00
Cohesion at the interface soil - fabric from 5 kPa to 10 kPa ultimate tensile strength from 5 kN/m to 10 kN/m	---	---	---
Short-term analysis	1.40	1.49	1.50
Long-term analysis	1.40	1.49	1.50
Pseudo-static analysis	0.93	0.96	1.00

Table 5: Results of stability analysis with suggested solutions - Section 6

ANALYZED SCENARIO	FS FROM TABLE 3	NEW FS	MINIMUM SEARCHED FS
Width of the reinforced embankment from 3 m to 5 m	---	---	---
Short-term analysis	1.92	2.20	1.50
Long-term analysis	1.39	1.43	1.50
Pseudo-static analysis	1.38	1.48	1.00
Cohesion at the interface soil - fabric from 5 kPa to 10 kPa ultimate tensile strength from 5 kN/m to 10 kN/m	---	---	---
Short-term analysis	1.92	2.06	1.50
Long-term analysis	1.39	1.41	1.50
Pseudo-static analysis	1.38	1.48	1.00

7. Conclusion

The results of stability tests show that the overall stability of the site after the construction of retaining walls is satisfactory. Despite this conclusion, it is the responsibility of the manufacturer of works or

designer in charge of validating the results depending on the final design of the structures and working method.

The determination of an adequate width of the reinforced fill and tensile and pull-out strengths are fundamental for the design of safe retaining structures. It must be reminded that the calculations were made on the basis of assumptions regarding the exact geometry and strength parameters of fabrics. It will be required that these calculations are validated at the design phase by the manufacturer or the responsible designer.

8. Limitations

It is important to understand that this analysis focuses on the overall stability of the site on a geotechnical standpoint, **and does not constitute a design or a validation of the design in part or in totality of the works to build**. This report does not constitute a validation of the working method of the contractor. It is responsible for the safety of its excavations and design excavation stabilization works.

The analyses were performed based on the specified data in the previous sections. Results will not be valid in case of different design assumptions, especially those related to the design of structures and soil conditions.

We trust the enclosed to your satisfaction. If, however, additional information should be required, please communicate with the undersigned.

Yours very truly,

Tommy Lampron, Eng.
Discipline Manager - Geotechnical

Yaya Coulibaly, Eng., P.Eng.
Project Manager

TL/yc/mp

Attach. : Appendix 1 : Scope of the study ; Appendix 2 : Sections location plan ; Appendix 3 : Slope stability analyzes results ; Appendix 4 : Slope stability analyzes results with suggested solutions

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Appendix 1 Scope of the study

SCOPE OF THE GEOTECHNICAL STUDY

1.0 Characteristics of soil and rock

The soil and rock characteristics described in this report originate from geotechnical investigations conducted within a given period and correspond to the nature of the terrain only at the specific locations where these investigations were carried out.

Soil and rock formations have natural variations. The limits between the different formations presented in the sounding logs must therefore be considered as transitions between the formations rather than set boundaries. The precision of these limits depends on the type and number of soundings, the sounding methods used, as well as sampling frequency and methods.

The descriptions of the samples taken are based on recognized identification and classification methods used in geotechnics. They can call into play the judgement and interpretation of the personnel who carried out the examination of materials and can be presumed to be accurate and correct in keeping with current best practices in the field of geotechnics. Finally, if tests were carried out, the results of these tests apply solely to the samples tested, as described in this report.

The properties of the soil and rock can undergo significant modifications in the wake of construction activities such as excavation, blasting, pile driving or drainage activities, carried out on the site under study or an adjacent site. They can also be indirectly modified by the exposure of the soil or rock to freezing or weather stresses.

2.0 Groundwater

The groundwater conditions presented in this report apply only to the site under study. The accuracy and representation of these conditions must be interpreted based on the type of instrumentation used, as well as the period, duration, and number of observations carried out. These conditions can vary depending on precipitation, the seasons and, ultimately, the tides. They can also vary as a result of construction activities or the modification of physical elements on the site under study or in its vicinity. The problematic of ferrous ochre and its effects is not covered in this report.

3.0 Use of the report

The comments and recommendations contained in this report are intended primarily for the project's design team. The number of soundings required to identify all of the underground conditions that could impact construction costs, techniques, the choice of equipment and planning of operations could be greater than the number required for design purposes. All contractors bidding on or carrying out the work on the site under study must undertake their own interpretation of the results of the soundings and, if need be, carry out their own investigations to determine how site conditions could influence their operations or work methods.

Any modifications to the design, position and elevation of the works must be quickly communicated to Englobe, allowing the validity of the recommendations presented to be verified. Complementary site or laboratory work could ultimately be required.

4.0 Project tracking

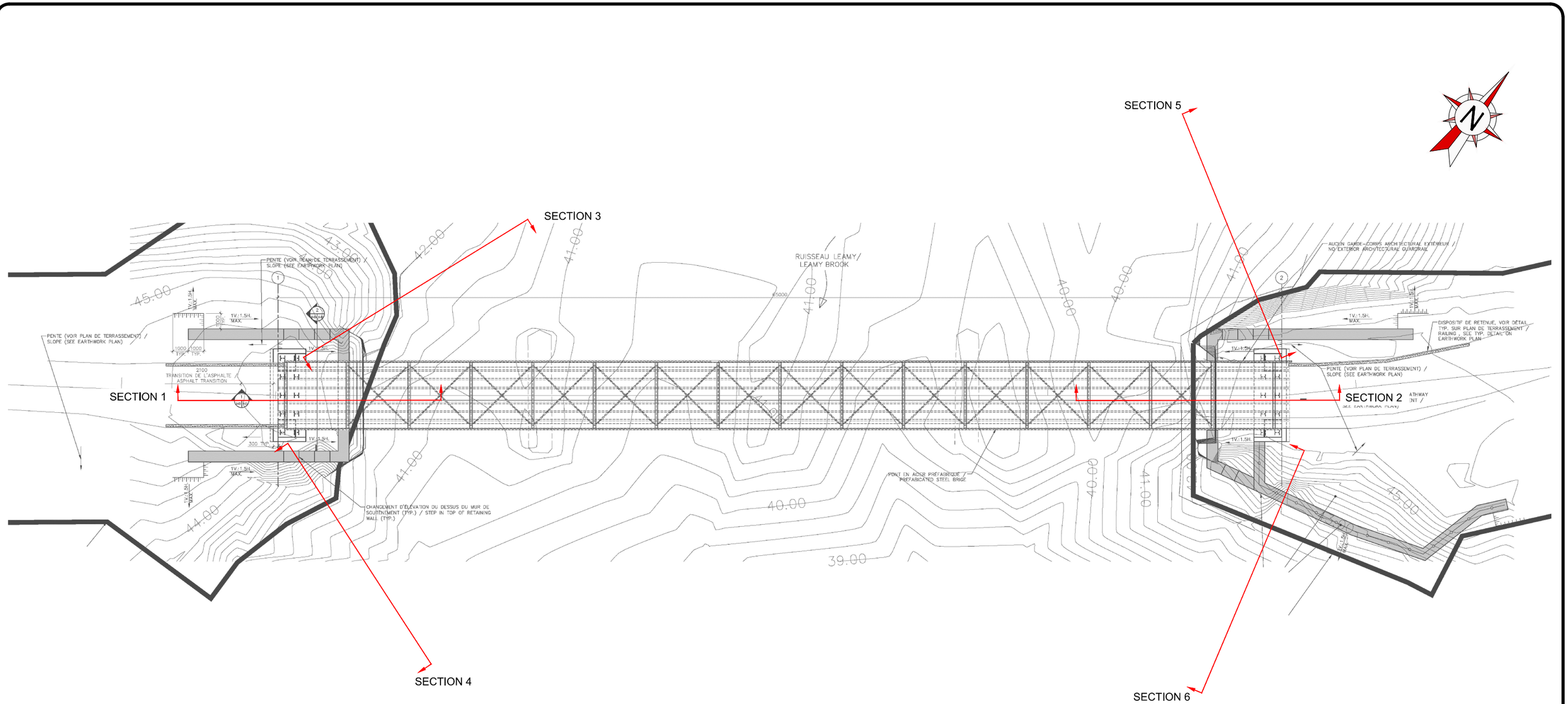
The interpretation of the on-site and laboratory results obtained, as well as the recommendations presented in this report, apply solely to the site under study and to the information available about the project at the time this report was drafted.

Information available concerning the site and groundwater conditions increases as construction work progresses. As site conditions were interpreted and correlated between sounding points, Englobe should be allowed to verify these conditions, during site visits conducted as work progresses, in order to confirm the information provided by the drillings soundings. If it is not possible for us to conduct these verifications, Englobe shall assume no responsibility for geotechnical interpretations by third parties concerning recommendations contained in this report, particularly if the design has been modified or if site conditions different from those described in this report are encountered. The identification of such changes requires experience and must be carried out by an experienced geotechnical engineer.

5.0 Environment

The information contained in this report does not cover the environmental aspects of the site conditions, as these aspects were not included in the study mandate.

Appendix 2 Sections location plan



GRAPHIC SCALE : 1 : 250

0 1 2 3 5 10 15 m

LEGEND :

SECTION

NOTES :

1. REFERENCES: CIMA, DATE April 24, 2015, DRAWING NO. B-03

This document must be used jointly with the recommendations formulated in the geotechnical study report

Projet

National Capital Commission
Pedestrian bridges Ruisseau Leamy

Sentier des Voyageurs , Gatineau, Québec

Titre

Sections location

Englobe Corp.
900, de la Carrière Blvd, suite 100
Gatineau (Québec) J8Y 6T5
Phone : 819.778.3143
Fax : 819.770.1373

Prepared **T. Lampron**	Discipline **Geotechnical**	Project Manager **Y. Coulibaly**
Drawn **R. Frenette**	Scale **1:250**	Extract from: Rev.:
Checked **T. Lampron**	Date **2015-12-04**	

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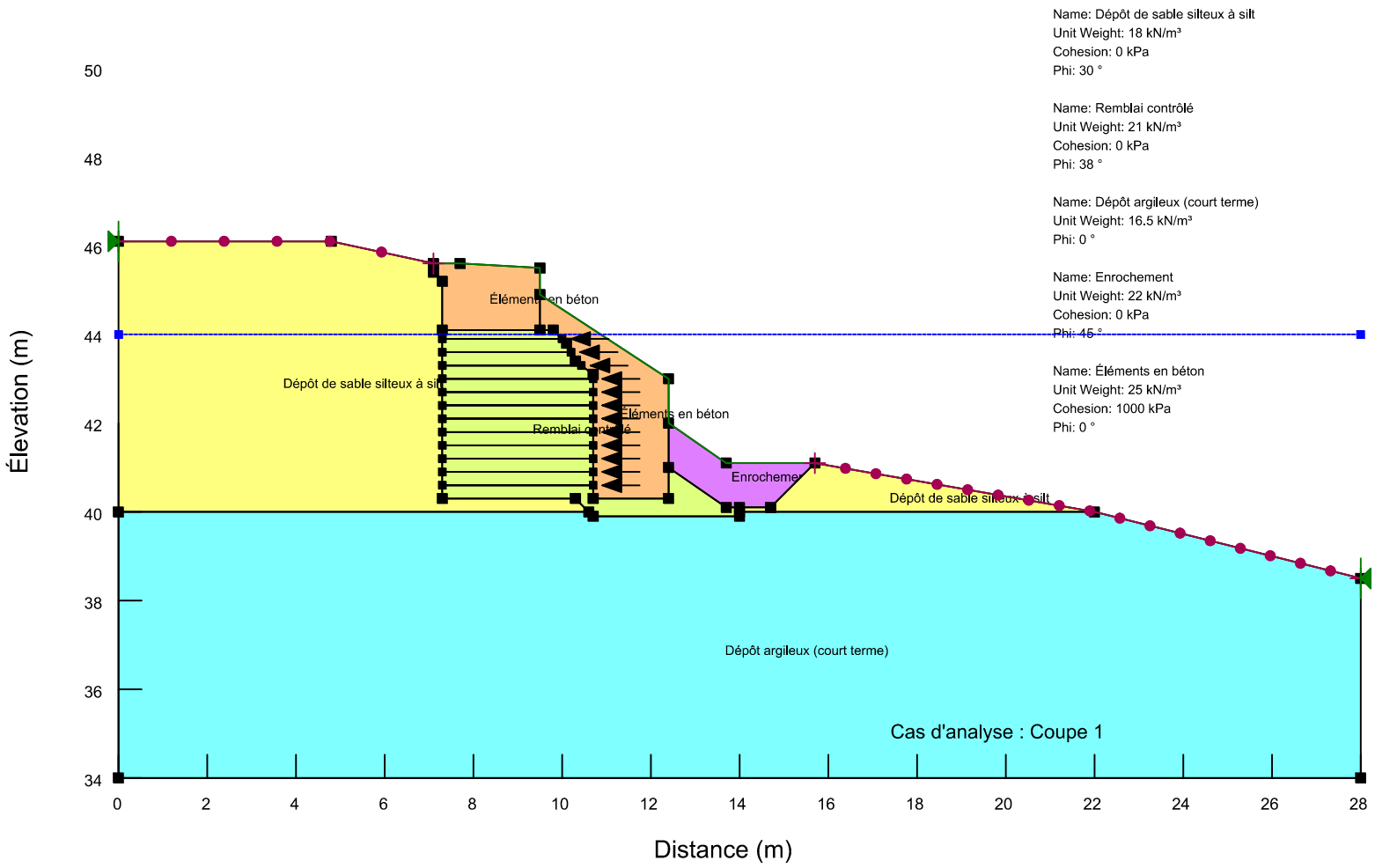
Appendix 3 Slope stability analyzes results

ANALYSE DE STABILITÉ

Figure 1



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Projet :	Pont pédestre du ruisseau Leamy Commentaires sur la stabilité du site	**N/Réf. :**	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 1, simple	**Date :**	2015-09-04
		C.S. :	

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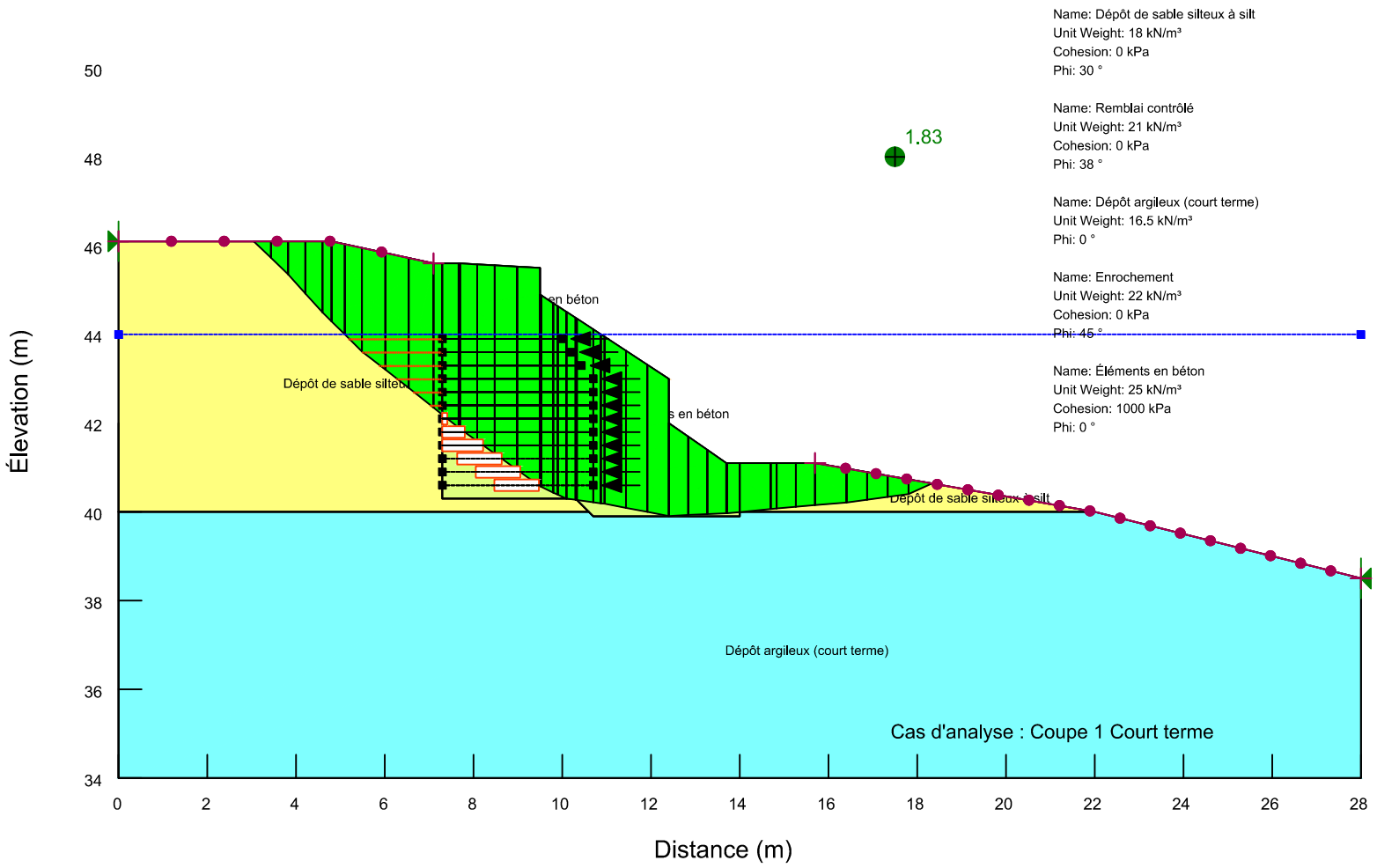
ANALYSE DE STABILITÉ

Figure 2



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		C.S. :	1,83

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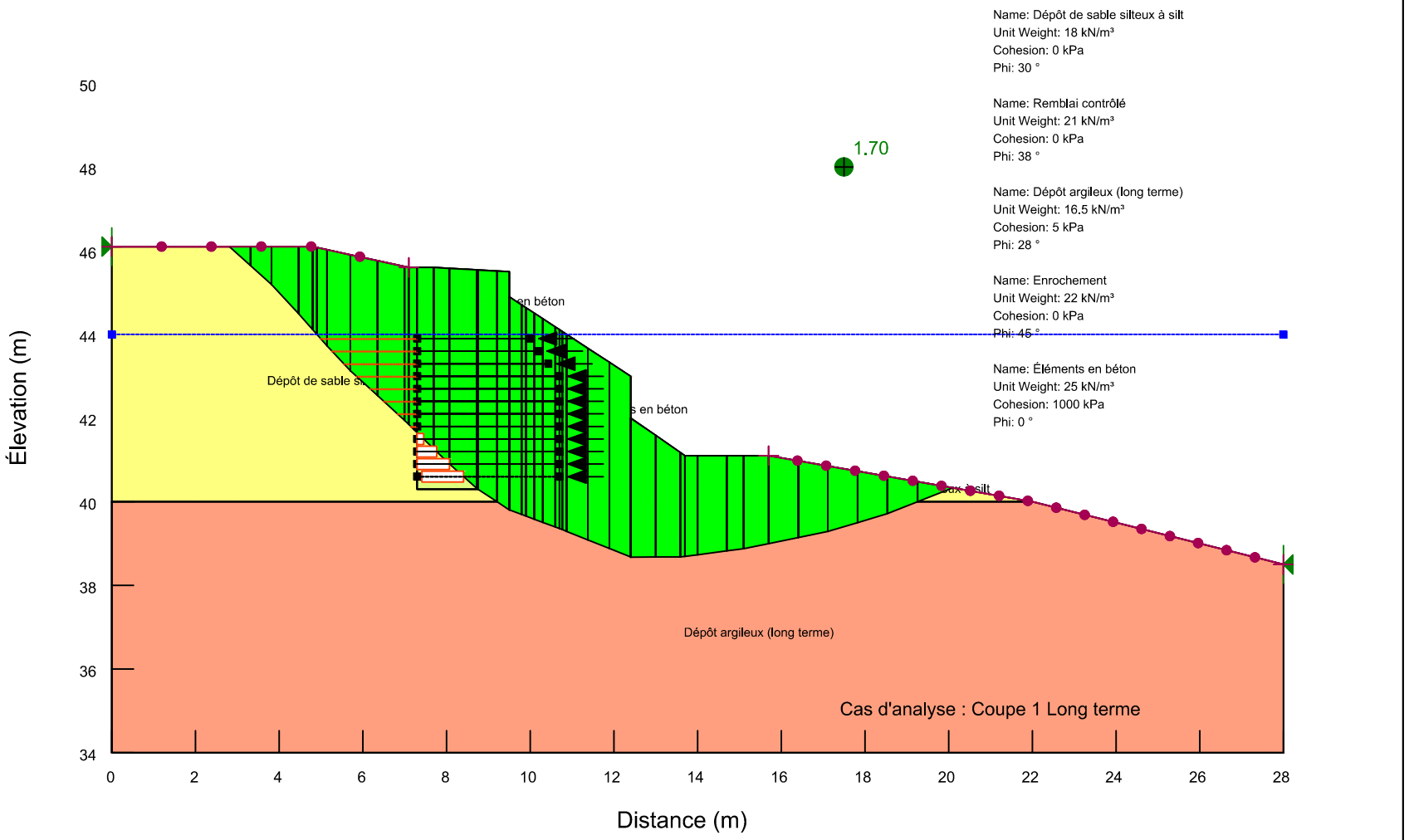
ANALYSE DE STABILITÉ

Figure 3



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Analyse :	Coupe 1, long terme	**Date :**	2015-09-04
		C.S. :	1,70

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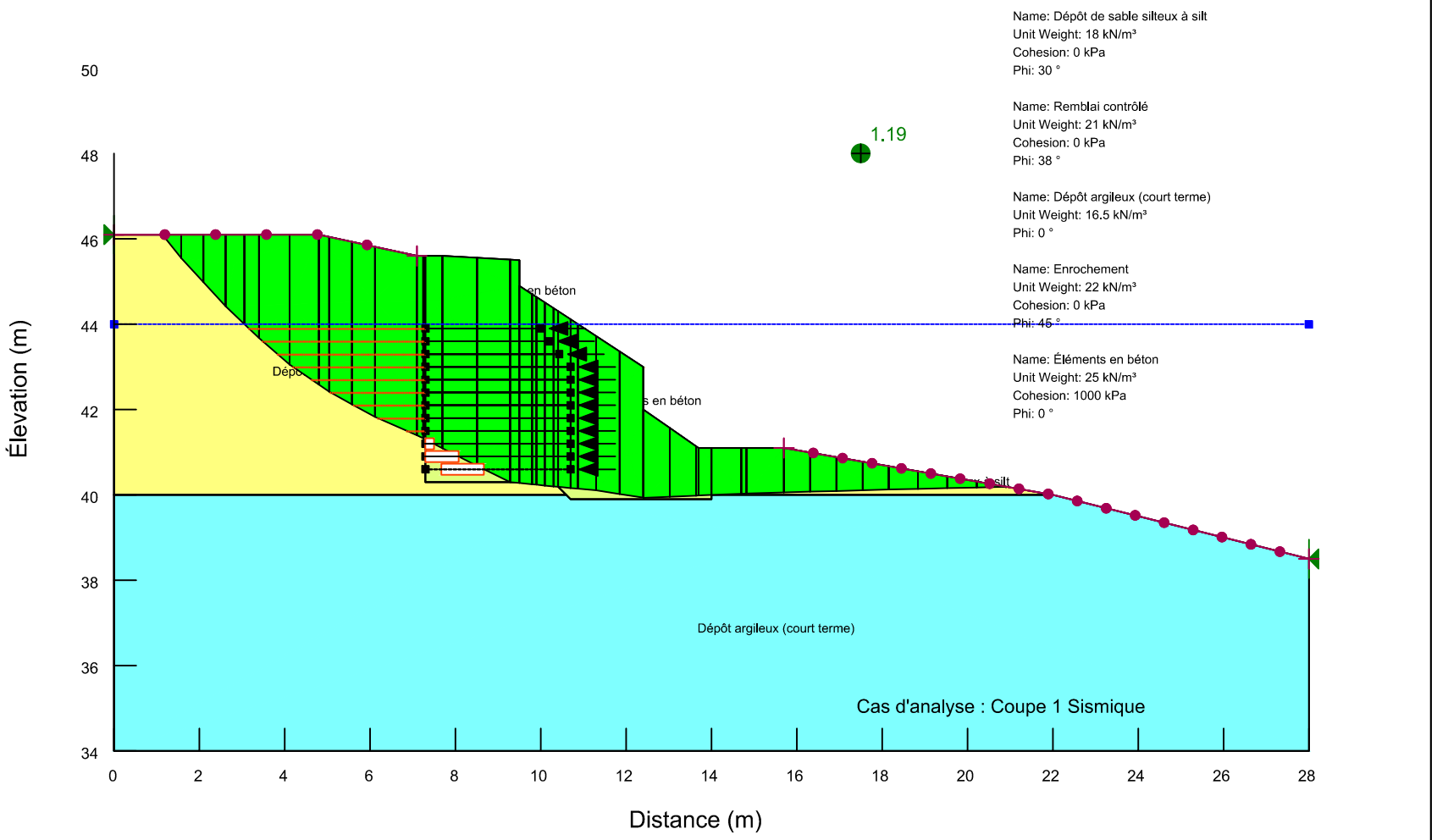
ANALYSE DE STABILITÉ

Figure 4



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		C.S. :	1,19

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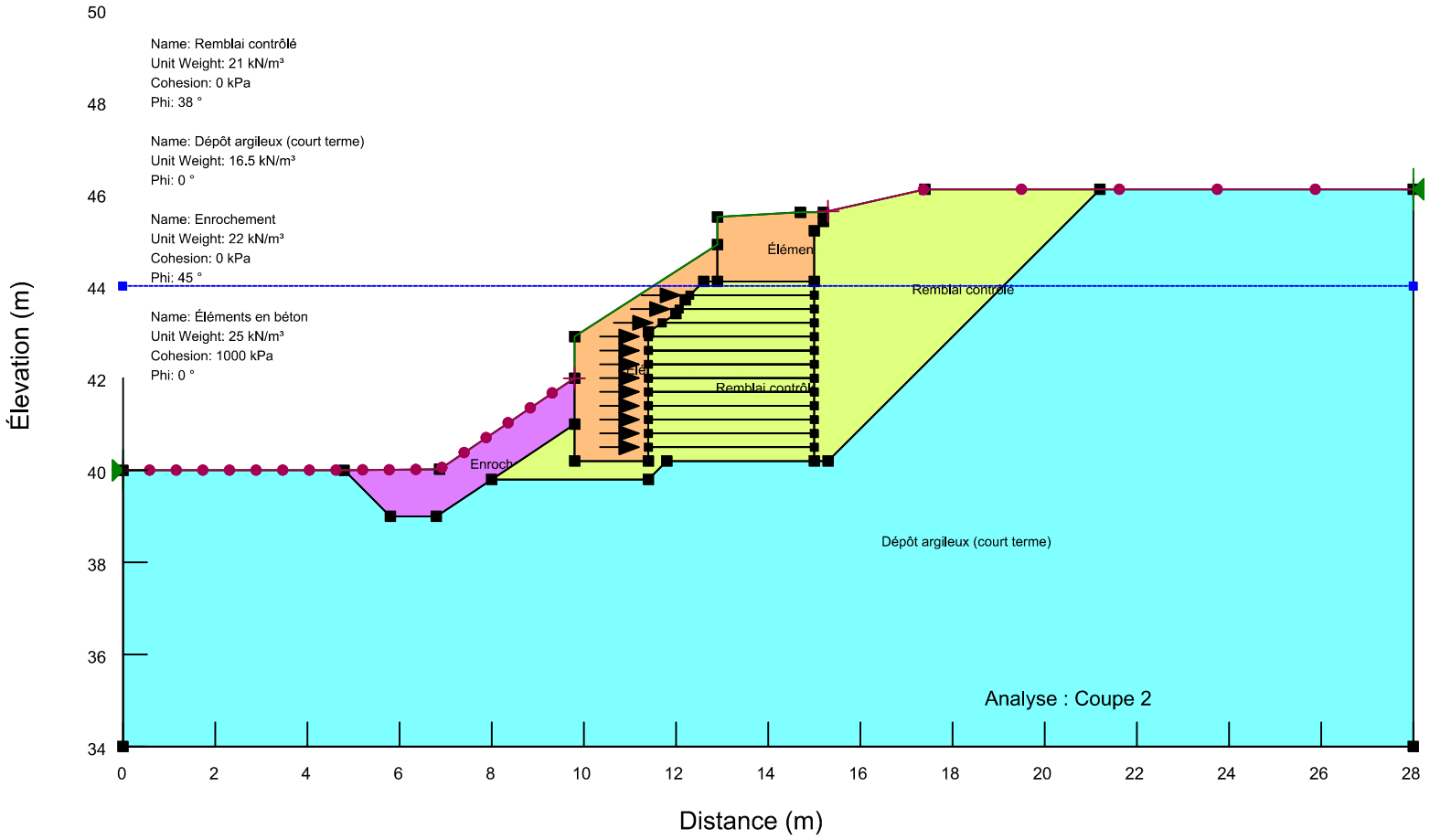
ANALYSE DE STABILITÉ

Figure 5



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		C.S. :	

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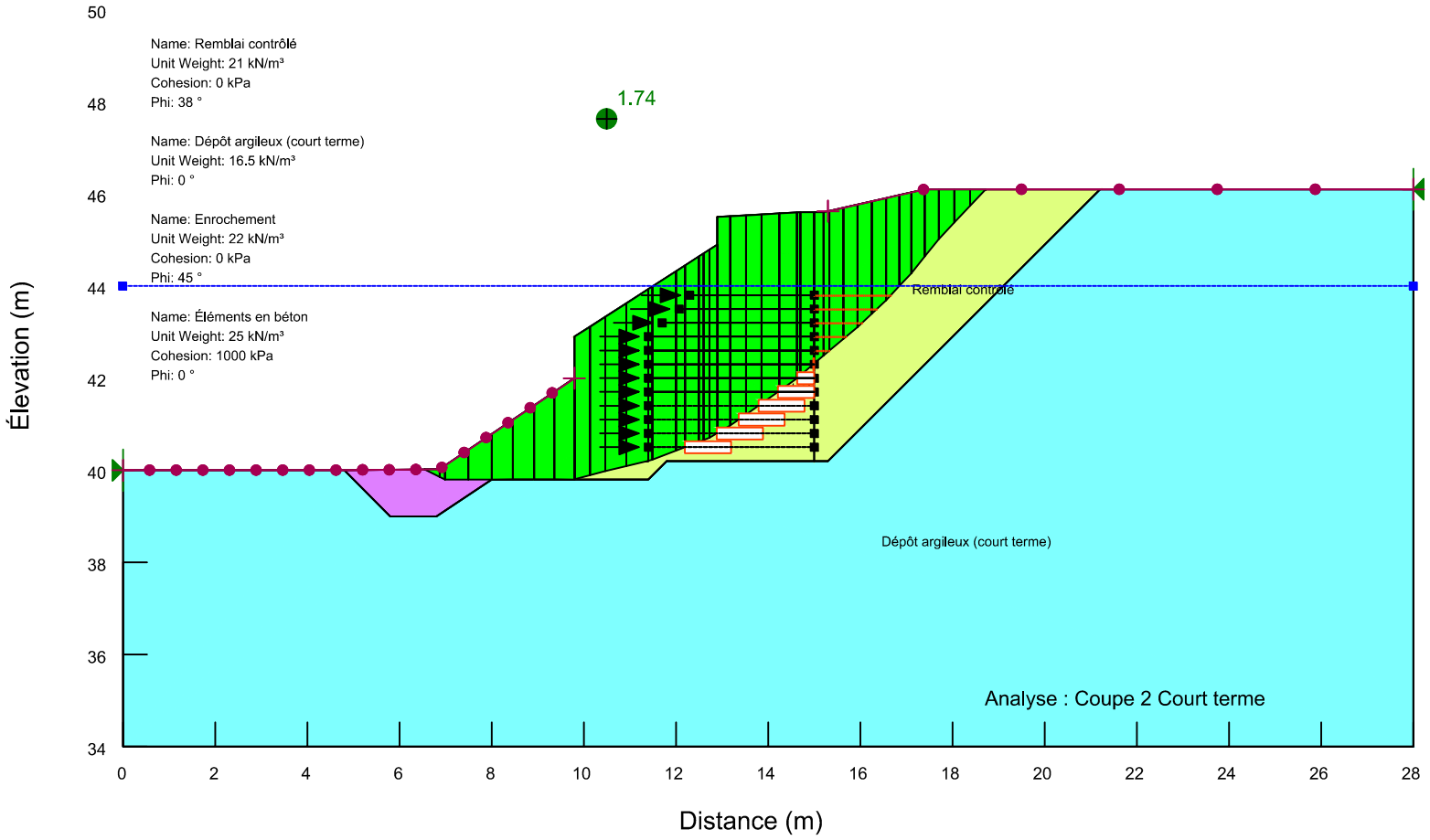
ANALYSE DE STABILITÉ

Figure 6



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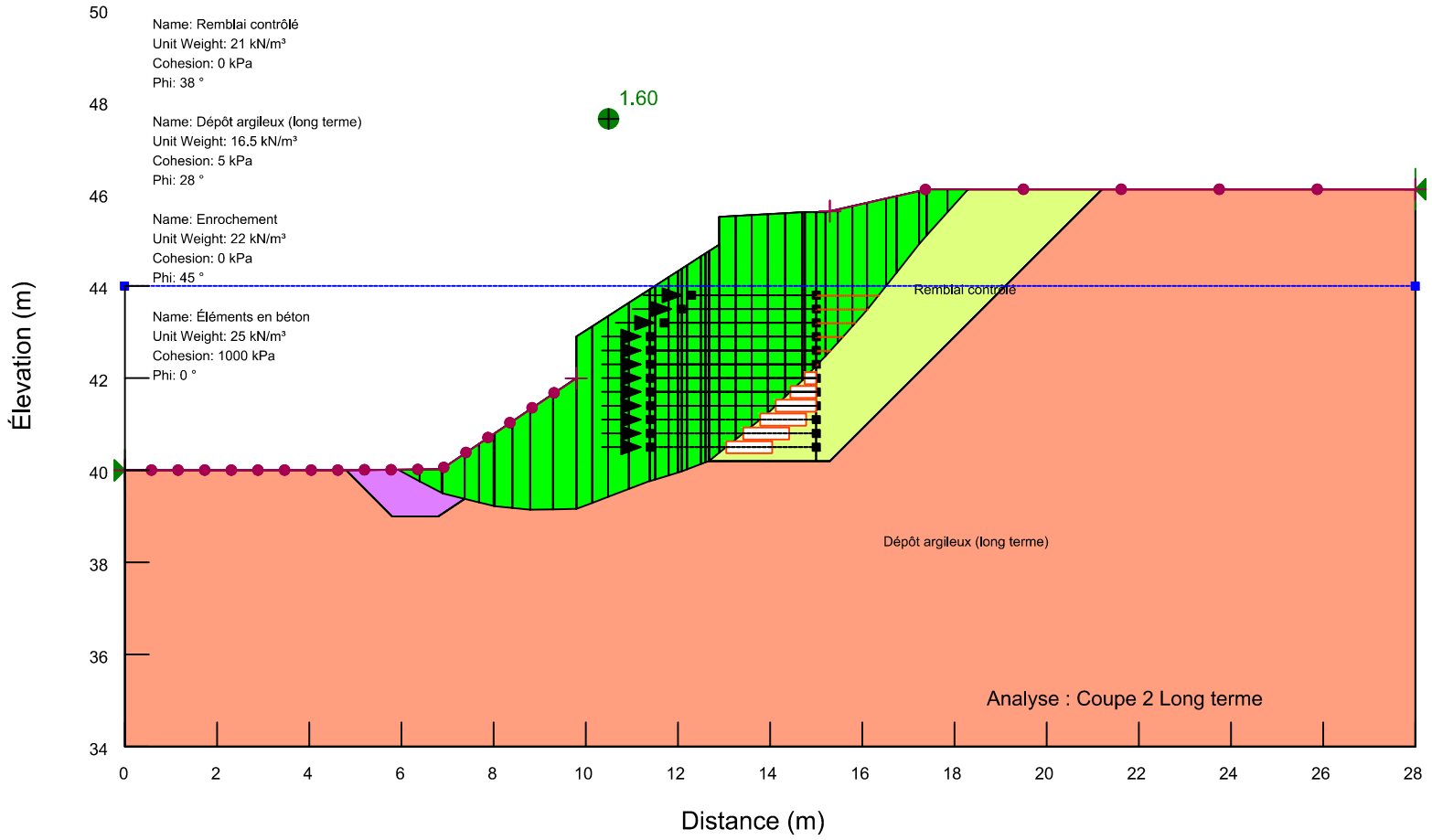
ANALYSE DE STABILITÉ

Figure 7



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Analyse :	Coupe 2, long terme	**Date :**	2015-09-04
		C.S. :	1,60

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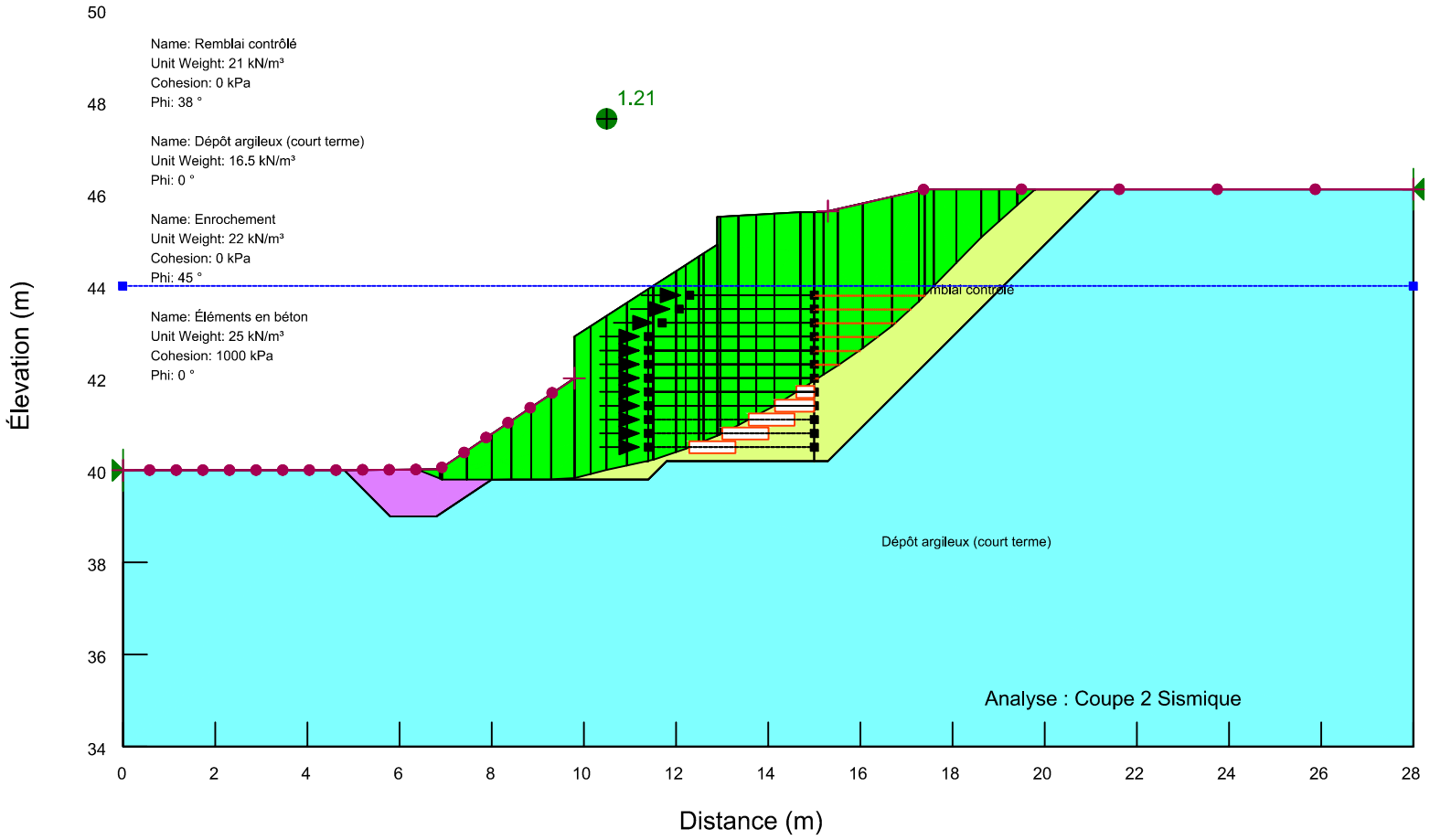
ANALYSE DE STABILITÉ

Figure 8



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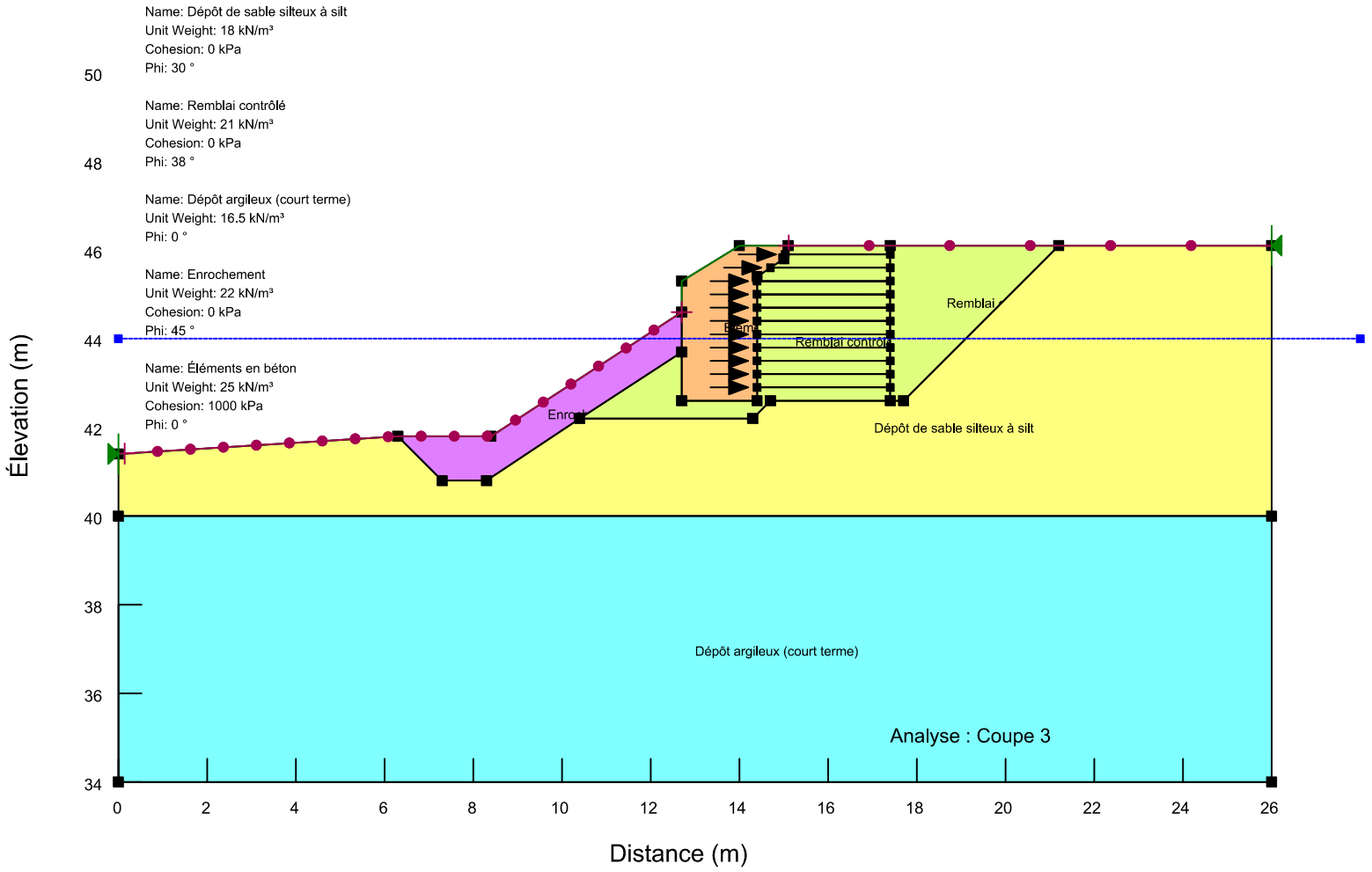
		C.S. :	1,21

ANALYSE DE STABILITÉ

Figure 9



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Analyse :	Coupe 3, simple	**Date :**	2015-09-04
		C.S. :	

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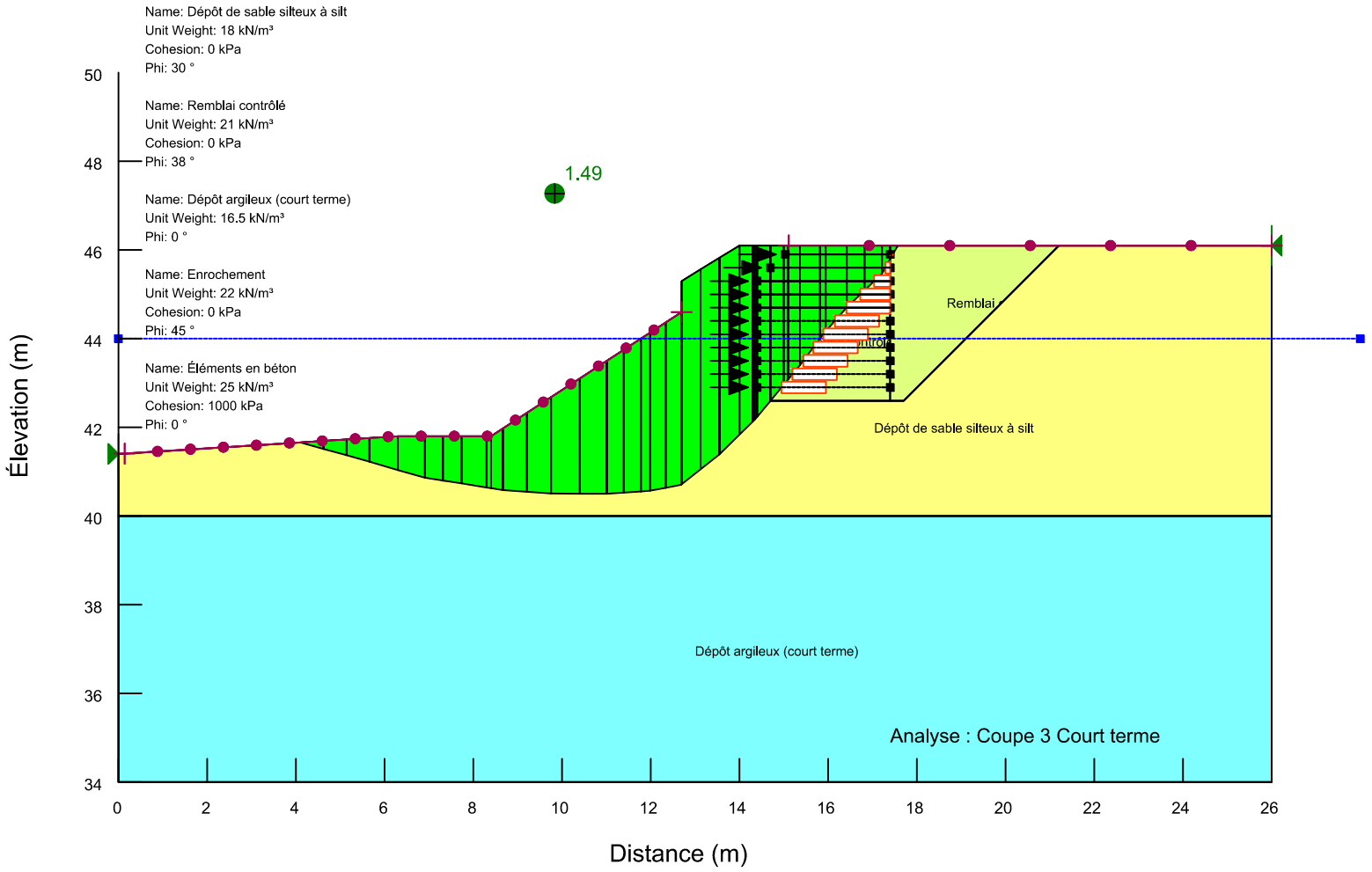
ANALYSE DE STABILITÉ

Figure 10



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		Préparé par :	T. Lampron
Analyse :	Coupe 3, court terme	**Date :**	2015-09-04
		C.S. :	1,49

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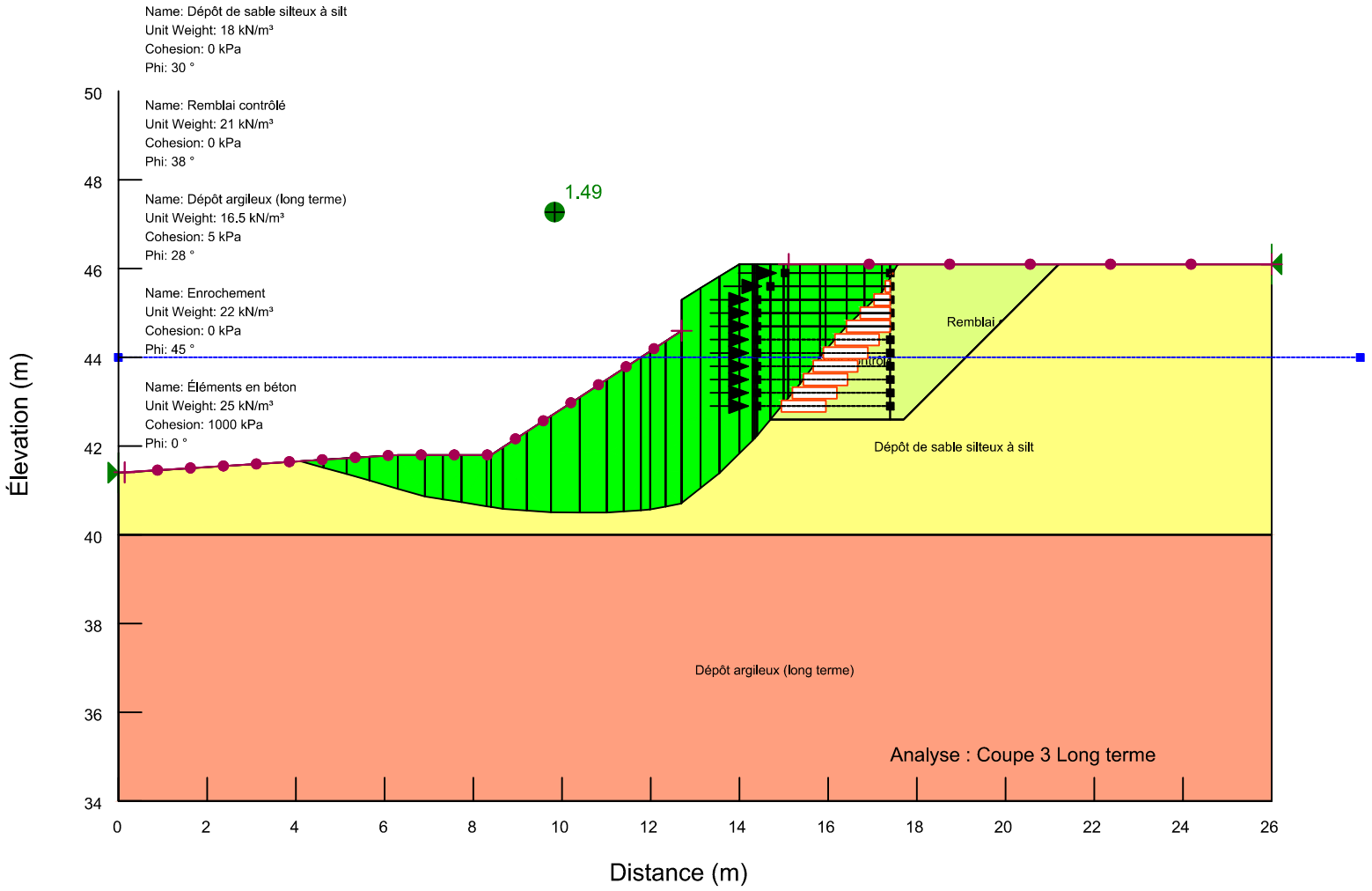
ANALYSE DE STABILITÉ

Figure 11



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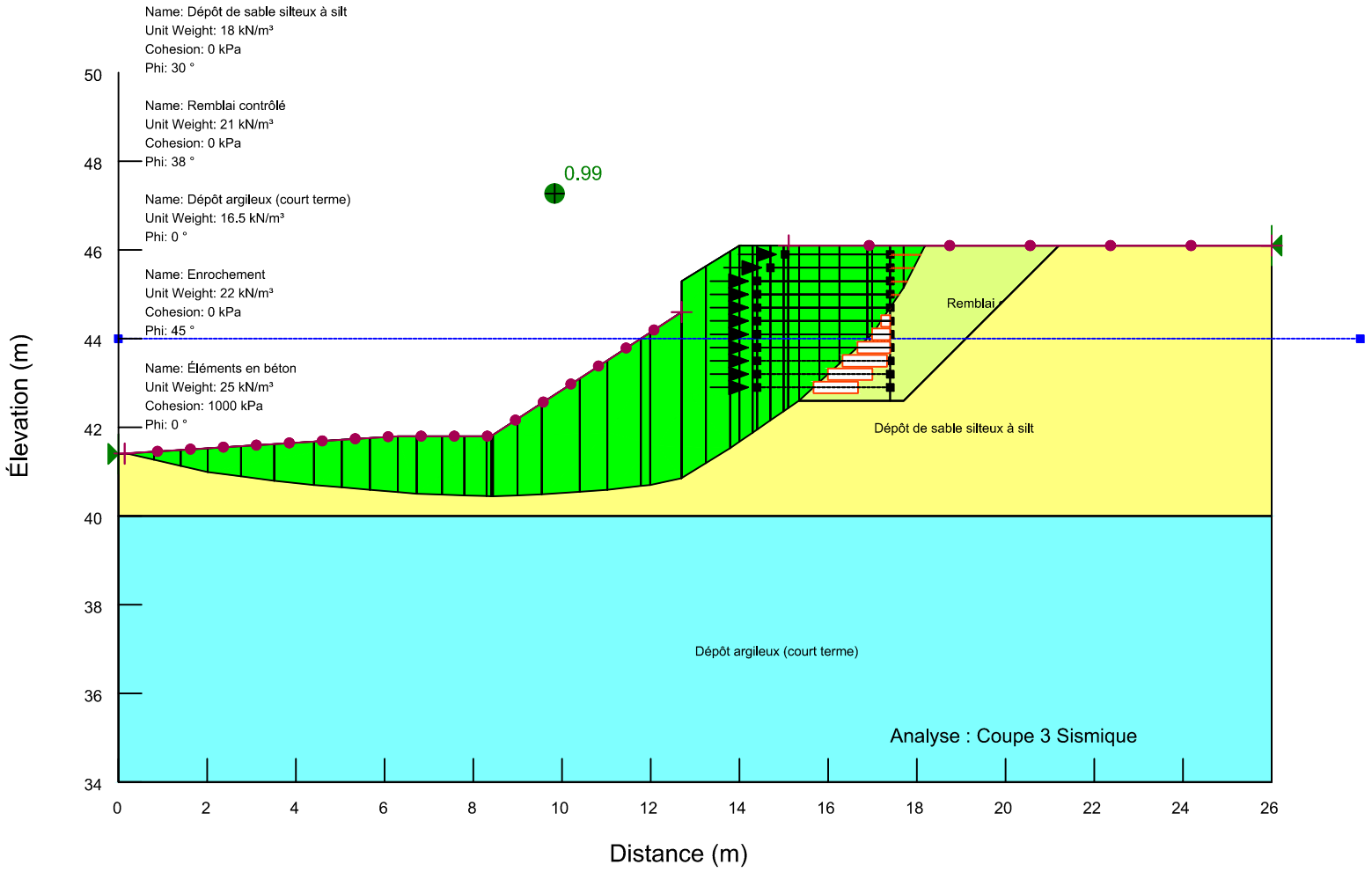
Analyse :	Coupe 3, long terme	**Date :**	2015-09-04
		C.S. :	1,49

ANALYSE DE STABILITÉ

Figure 12



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		Préparé par :	T. Lampron
Analyse :	Coupe 3, sismique	**Date :**	2015-09-04
		C.S. :	0,99

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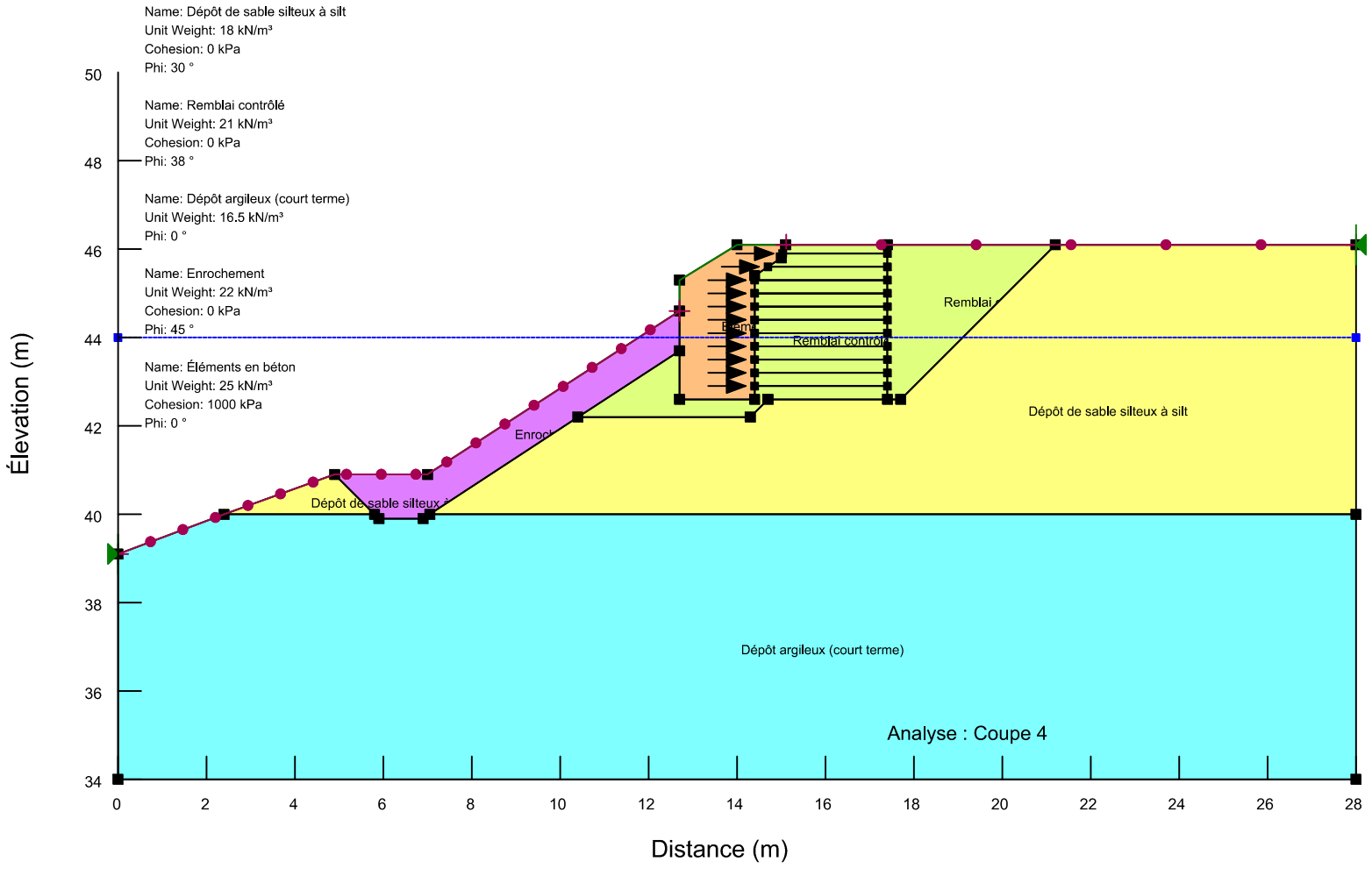
ANALYSE DE STABILITÉ

Figure 13

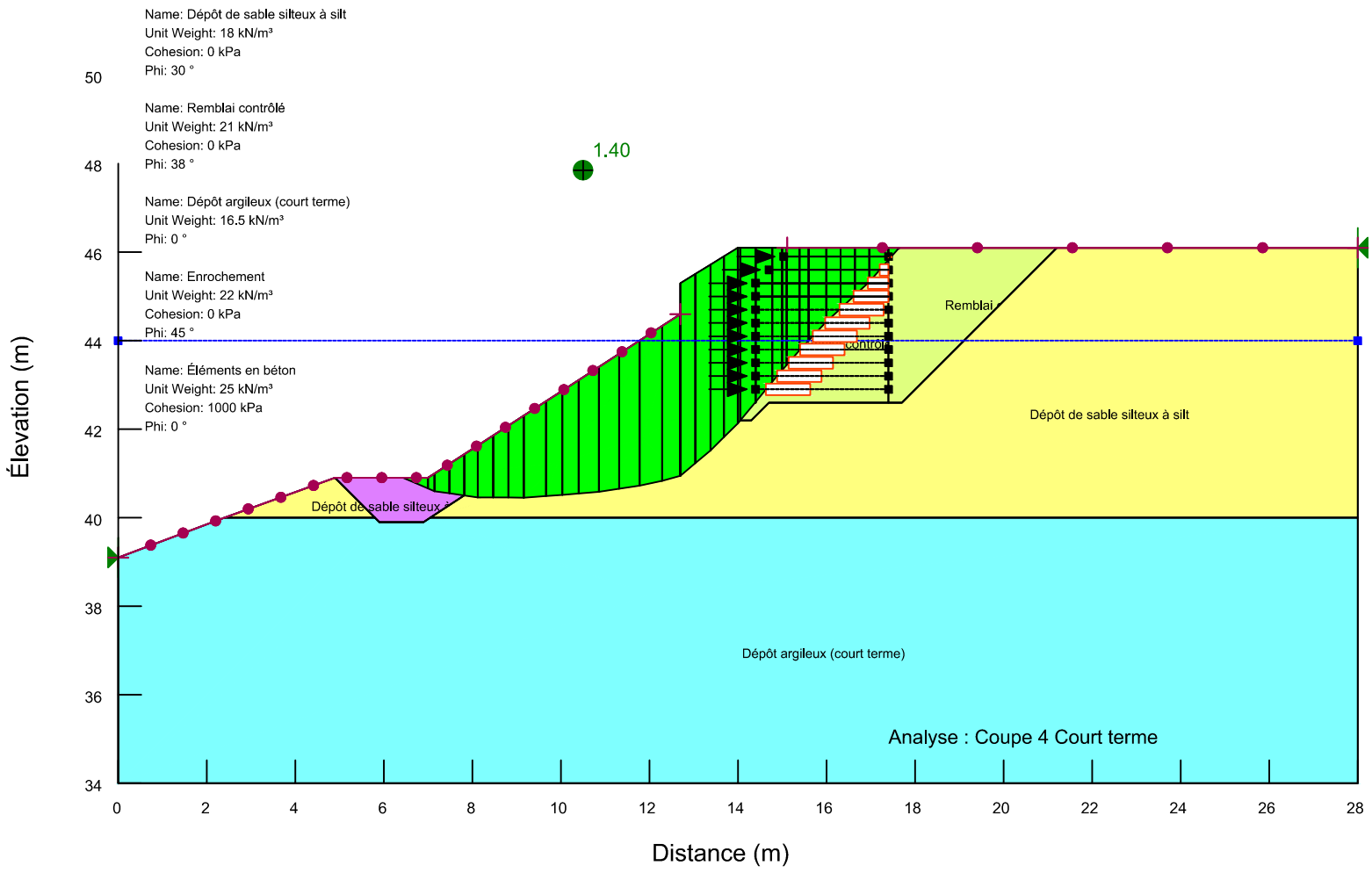


Client :	Commission de la Capitale Nationale	**Échelle :**	1: 150
Projet :	Pont pédestre du ruisseau Leamy - Commentaires sur la stabilité du site	**N/Réf. :**	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 4, simple	**Date :**	2015-09-04
		C.S. :	

Englobe

ANALYSE DE STABILITÉ

Figure 14

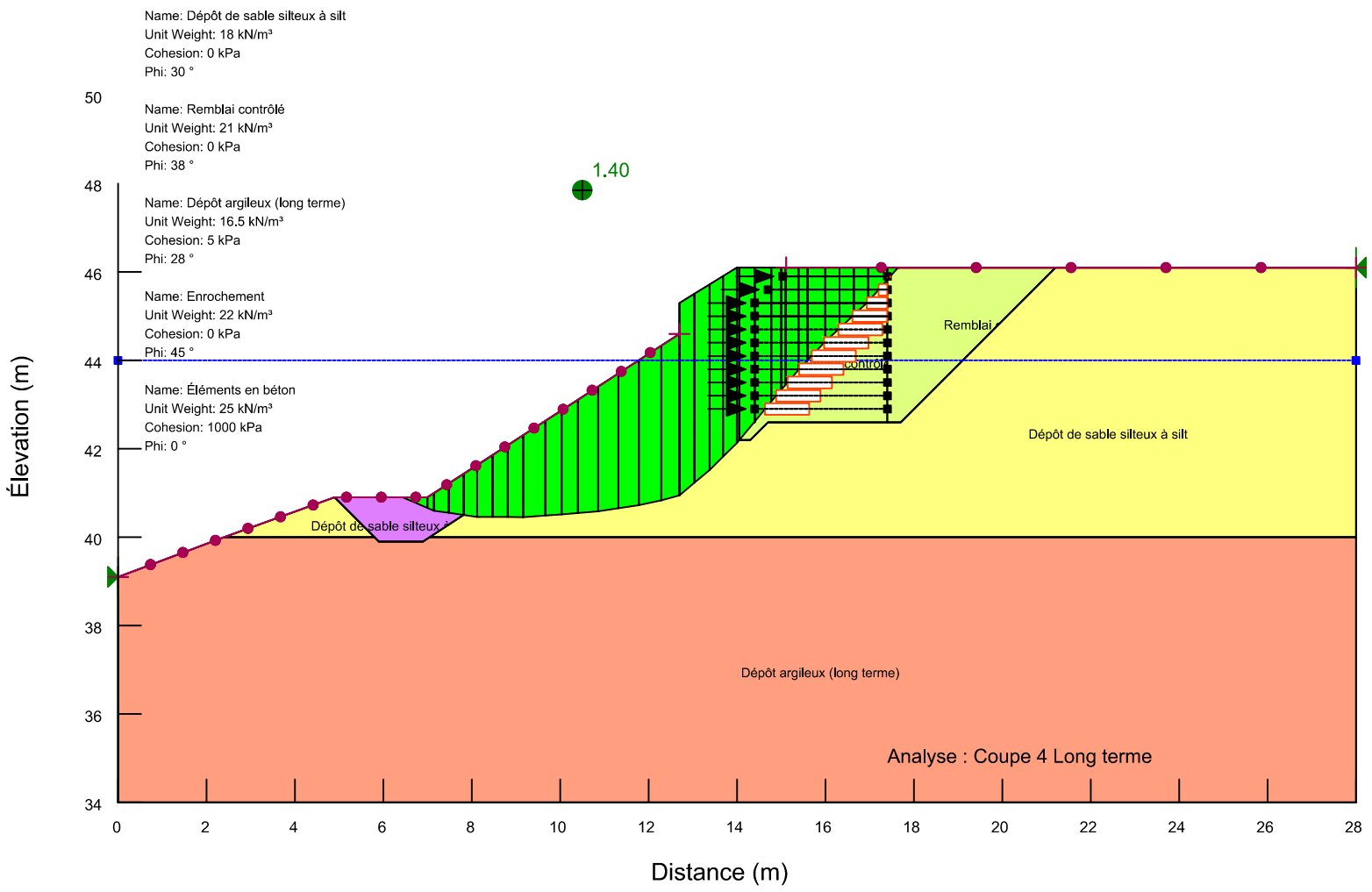


Client :	Commission de la Capitale Nationale	**Échelle :**	1: 150
Projet :	Pont pédestre du ruisseau Leamy - Commentaires sur la stabilité du site	**N/Réf. :**	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 4, court terme	**Date :**	2015-09-04
		C.S. :	1,40

Englobe

ANALYSE DE STABILITÉ

Figure 15

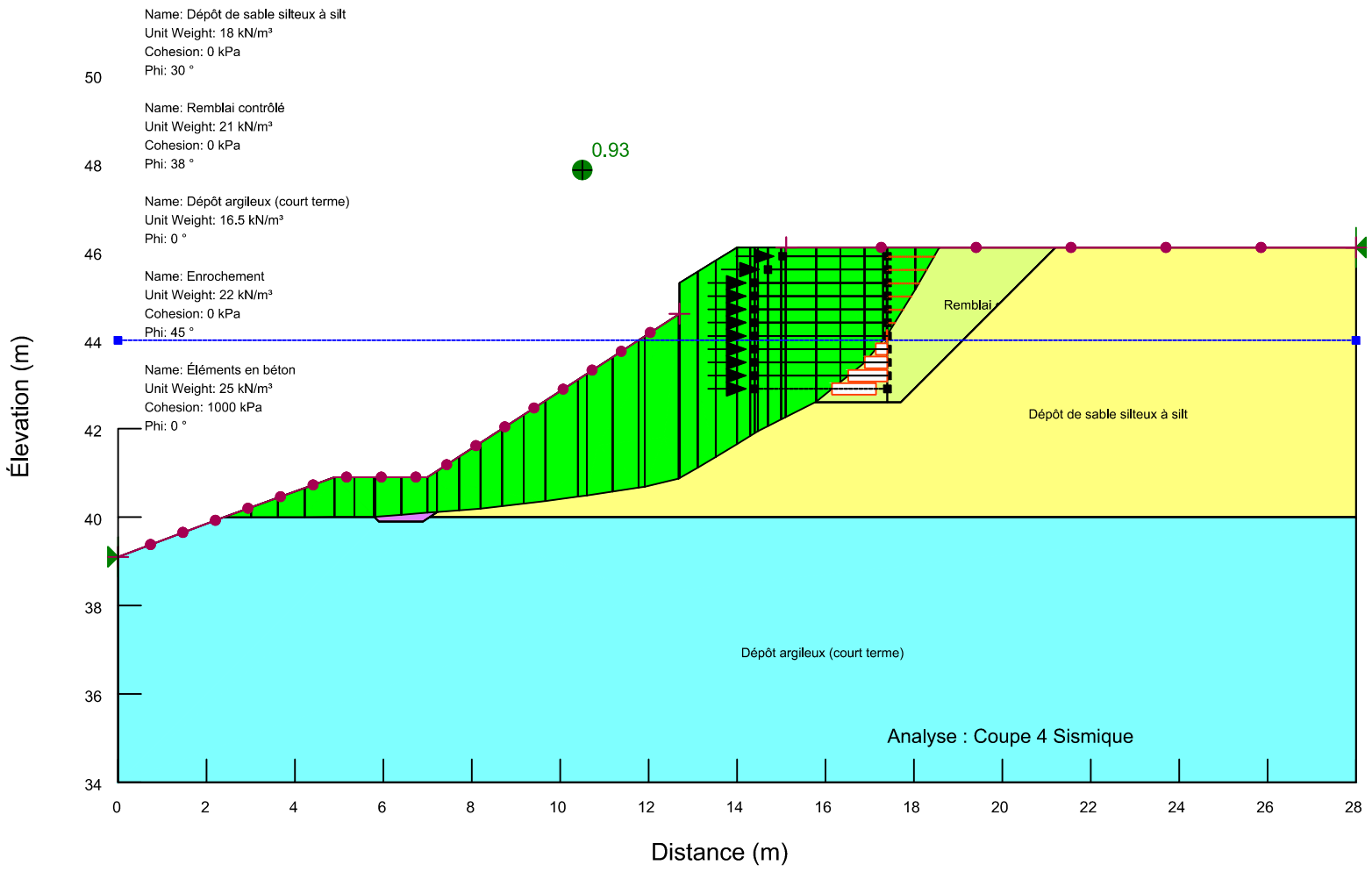


Client :	Commission de la Capitale Nationale	**Échelle :**	1: 150
Projet :	Pont pédestre du ruisseau Leamy - Commentaires sur la stabilité du site	**N/Réf. :**	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 4, long terme	**Date :**	2015-09-04
		C.S. :	1,40

Englobe

ANALYSE DE STABILITÉ

Figure 16

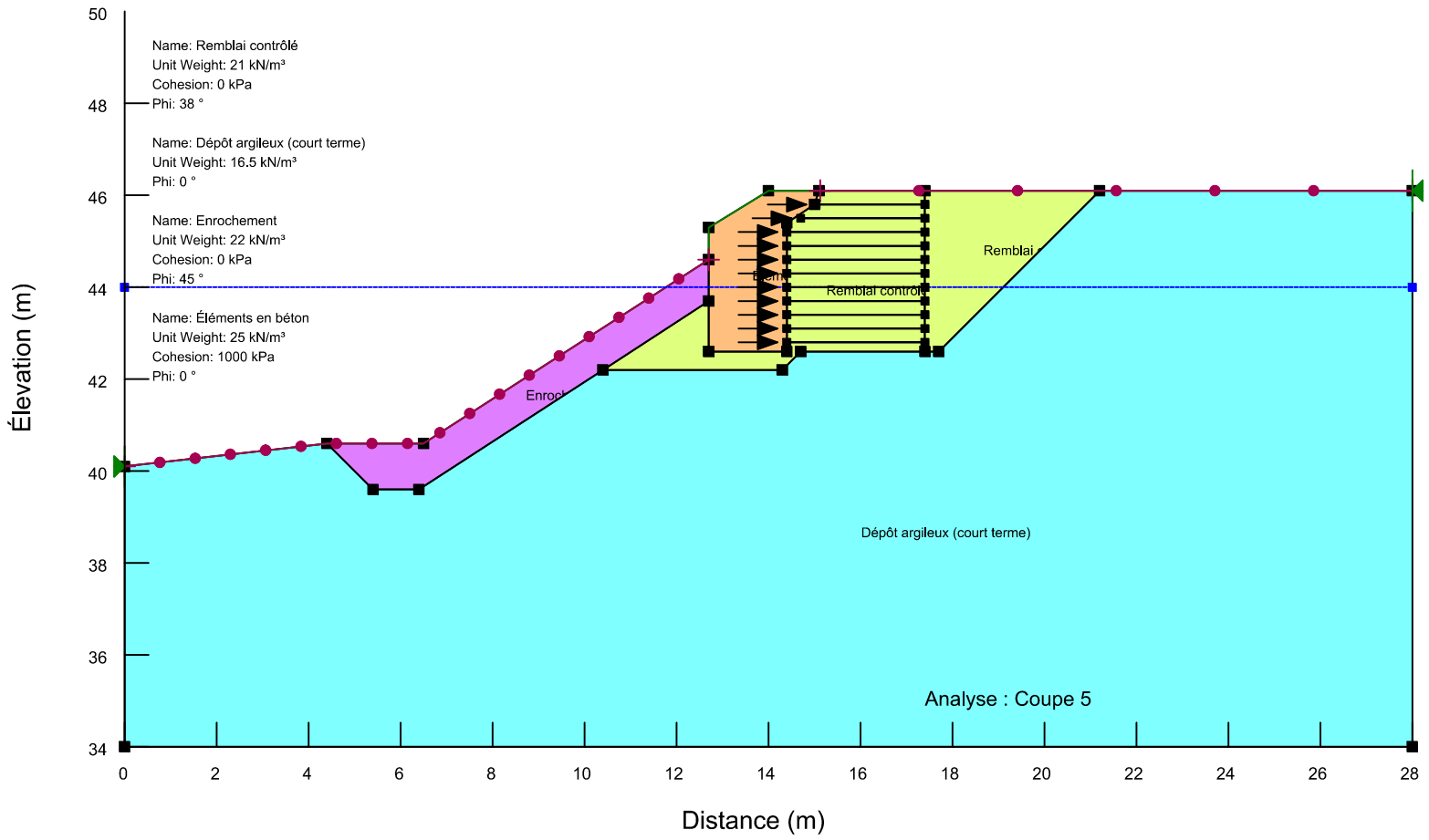


Client :	Commission de la Capitale Nationale	**Échelle :**	1: 150
Projet :	Pont pédestre du ruisseau Leamy - Commentaires sur la stabilité du site	**N/Réf. :**	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 4, sismique	**Date :**	2015-09-04
		C.S. :	0,93

Englobe

ANALYSE DE STABILITÉ

Figure 17

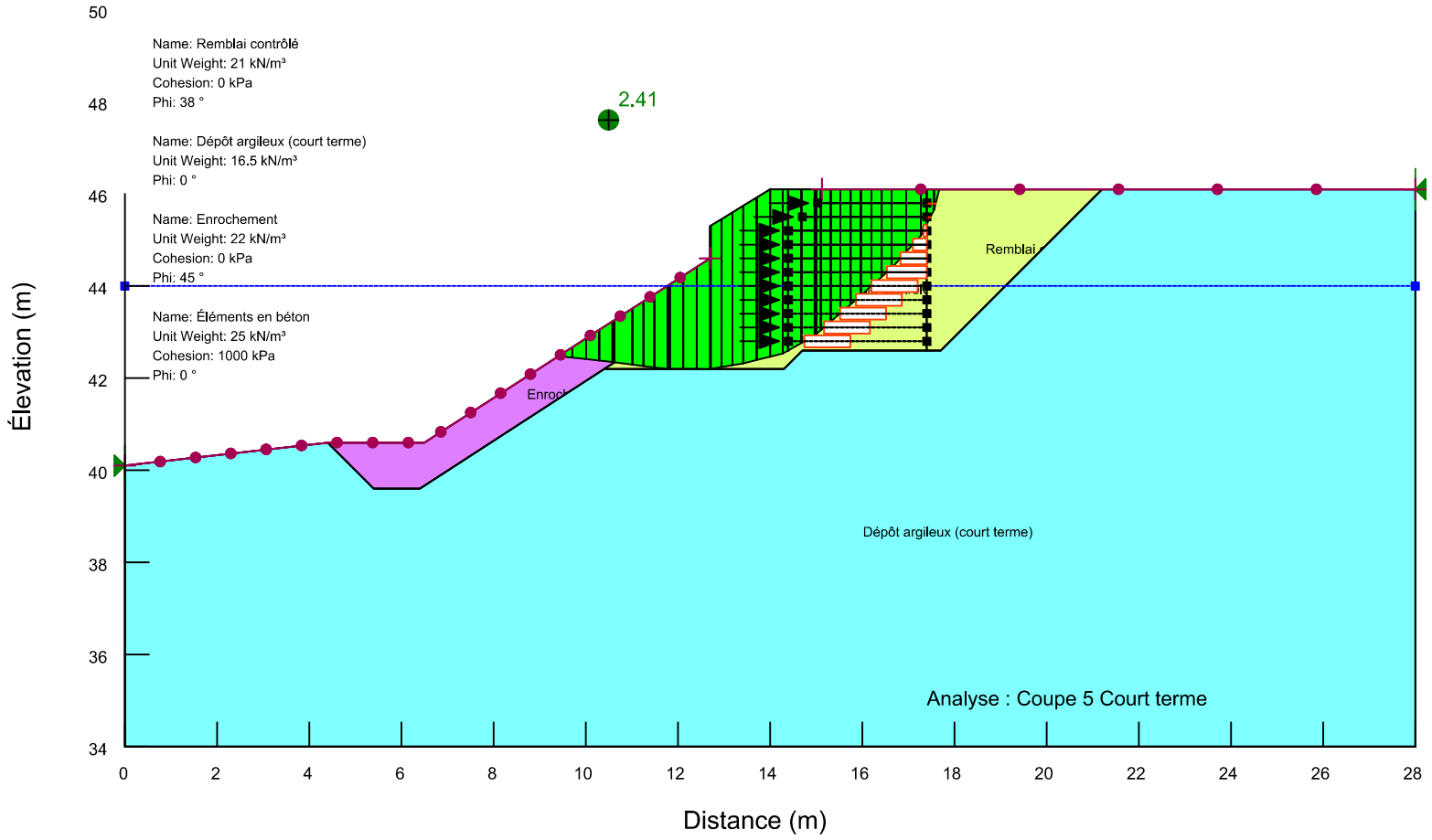


Client :	Commission de la Capitale Nationale	**Échelle :**	1: 150
Projet :	Pont pédestre du ruisseau Leamy - Commentaires sur la stabilité du site	**N/Réf. :**	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 5, simple	**Date :**	2015-09-04
		C.S. :	

Englobe

ANALYSE DE STABILITÉ

Figure 18

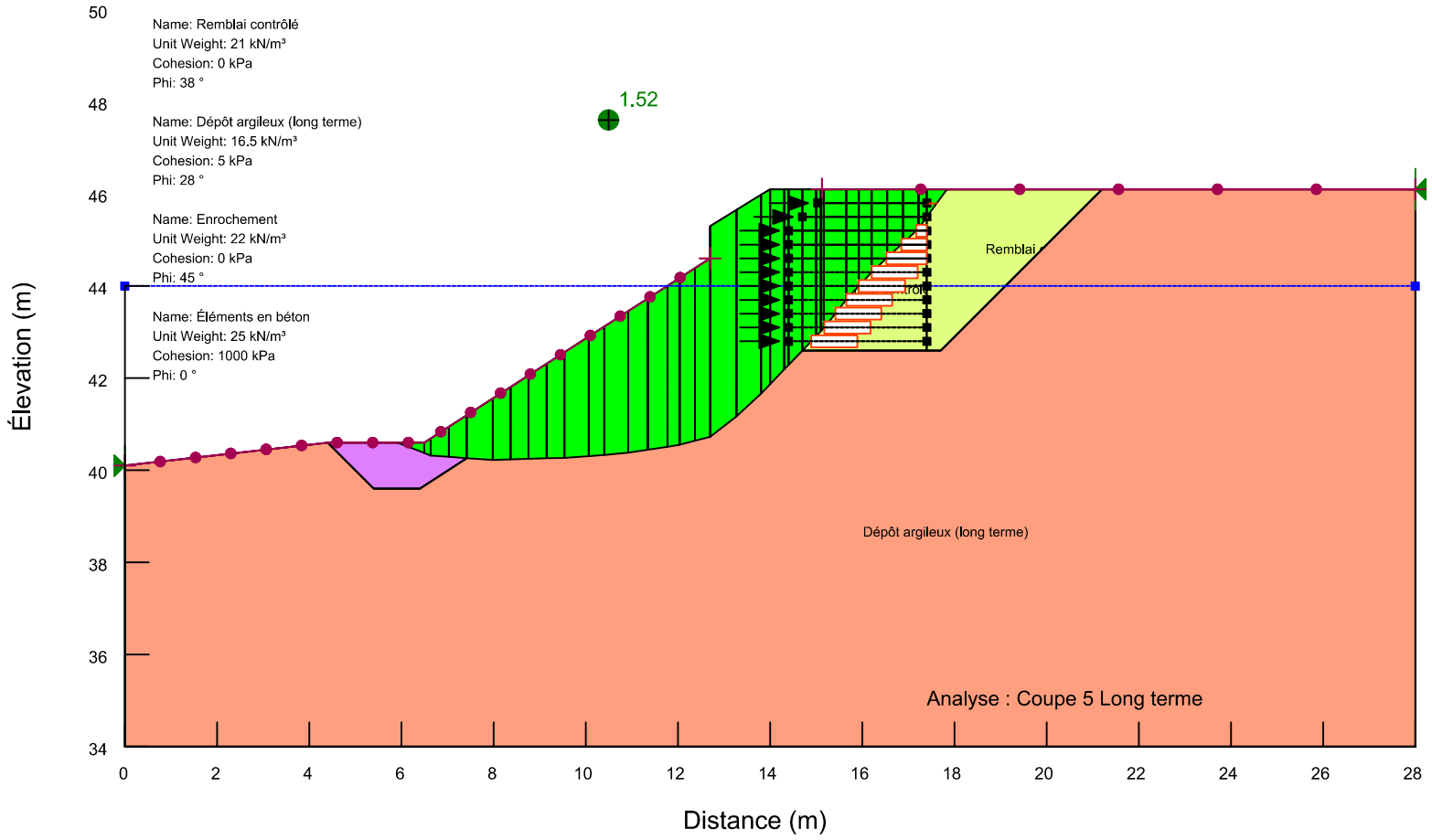


Client :	Commission de la Capitale Nationale	**Échelle :**	1: 150
Projet :	Pont pédestre du ruisseau Leamy - Commentaires sur la stabilité du site	**N/Réf. :**	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 5, court terme	**Date :**	2015-09-04
		C.S. :	2,41

Englobe

ANALYSE DE STABILITÉ

Figure 19

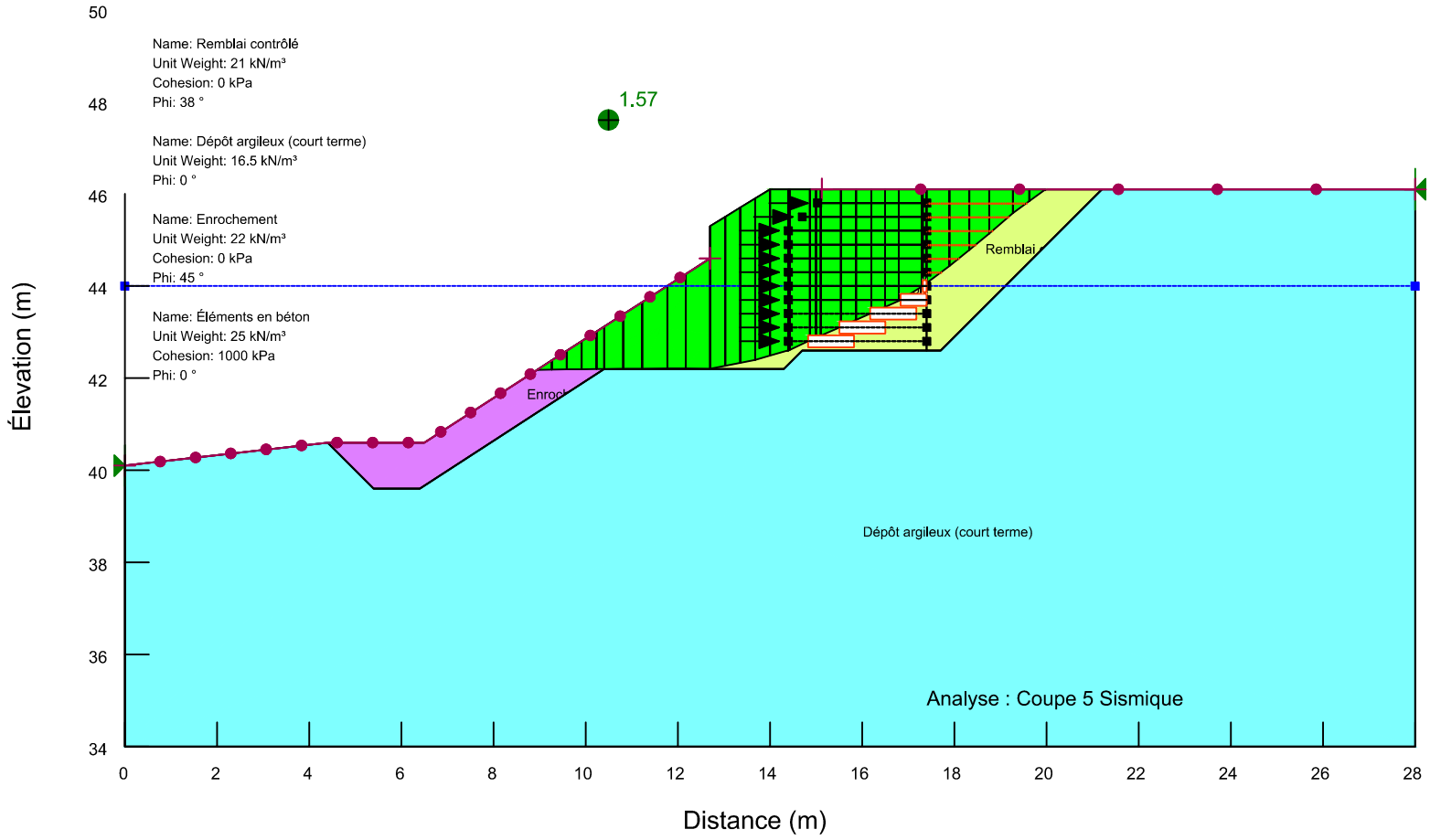


Client :	Commission de la Capitale Nationale	**Échelle :**	1: 150
Projet :	Pont pédestre du ruisseau Leamy - Commentaires sur la stabilité du site	**N/Réf. :**	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 5, long terme	**Date :**	2015-09-04
		C.S. :	1,52

Englobe

ANALYSE DE STABILITÉ

Figure 20

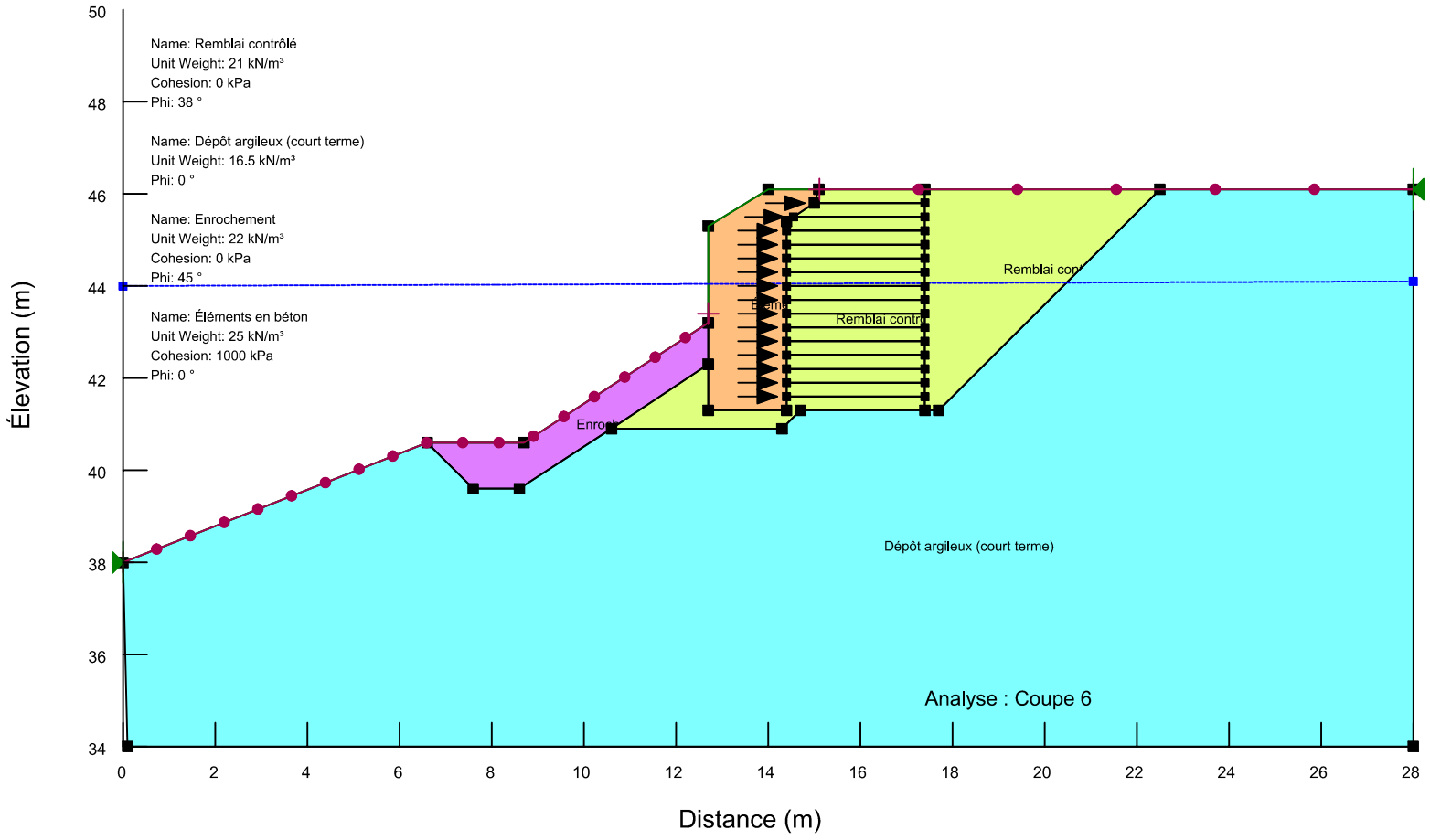


Client :	Commission de la Capitale Nationale	**Échelle :**	1: 150
Projet :	Pont pédestre du ruisseau Leamy - Commentaires sur la stabilité du site	**N/Réf. :**	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 5, sismique	**Date :**	2015-09-04
		C.S. :	1,57

Englobe

ANALYSE DE STABILITÉ

Figure 21

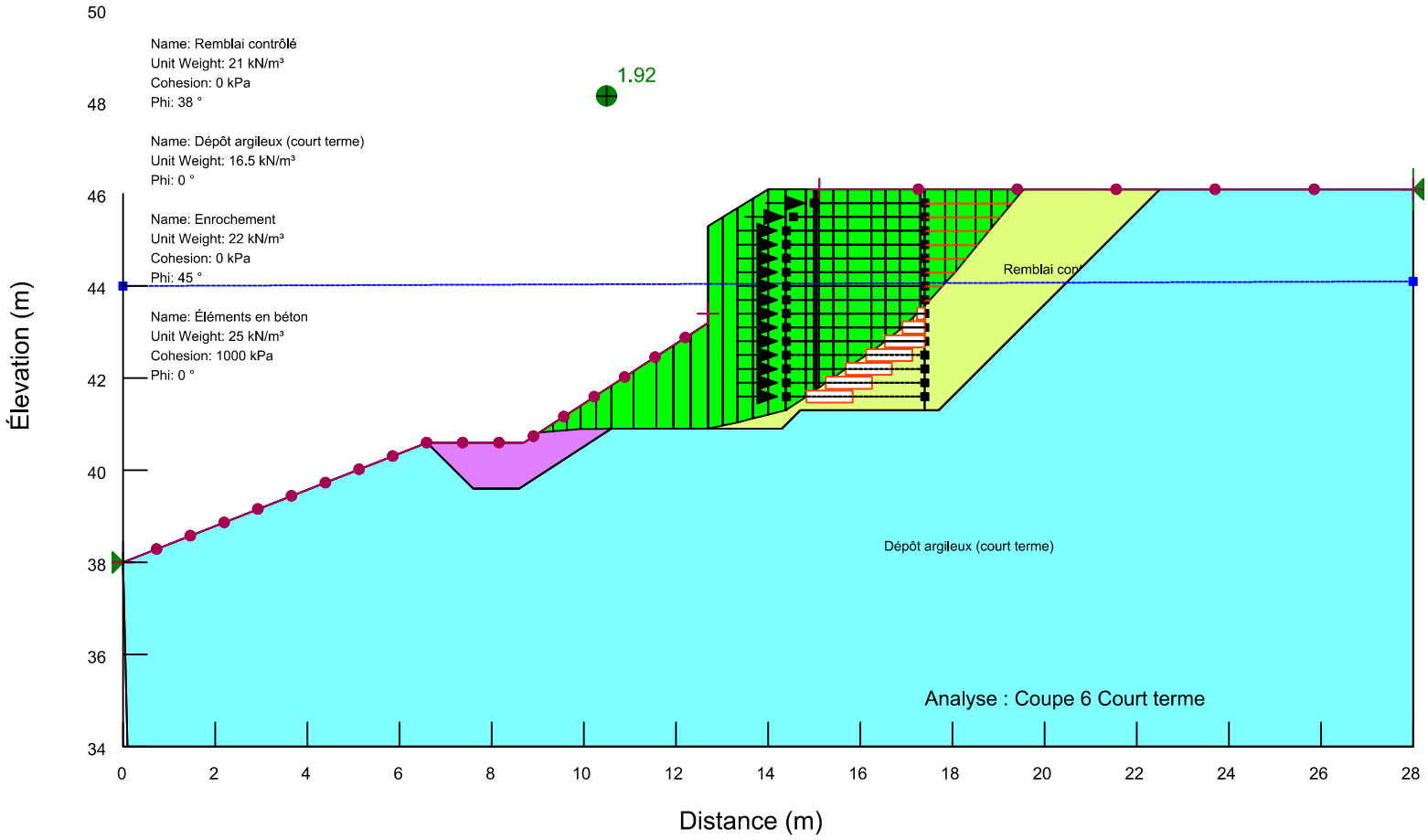


Client :	Commission de la Capitale Nationale	**Échelle :**	1: 150
Projet :	Pont pédestre du ruisseau Leamy - Commentaires sur la stabilité du site	**N/Réf. :**	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 6, simple	**Date :**	2015-09-04
		C.S. :	

Englobe

ANALYSE DE STABILITÉ

Figure 22

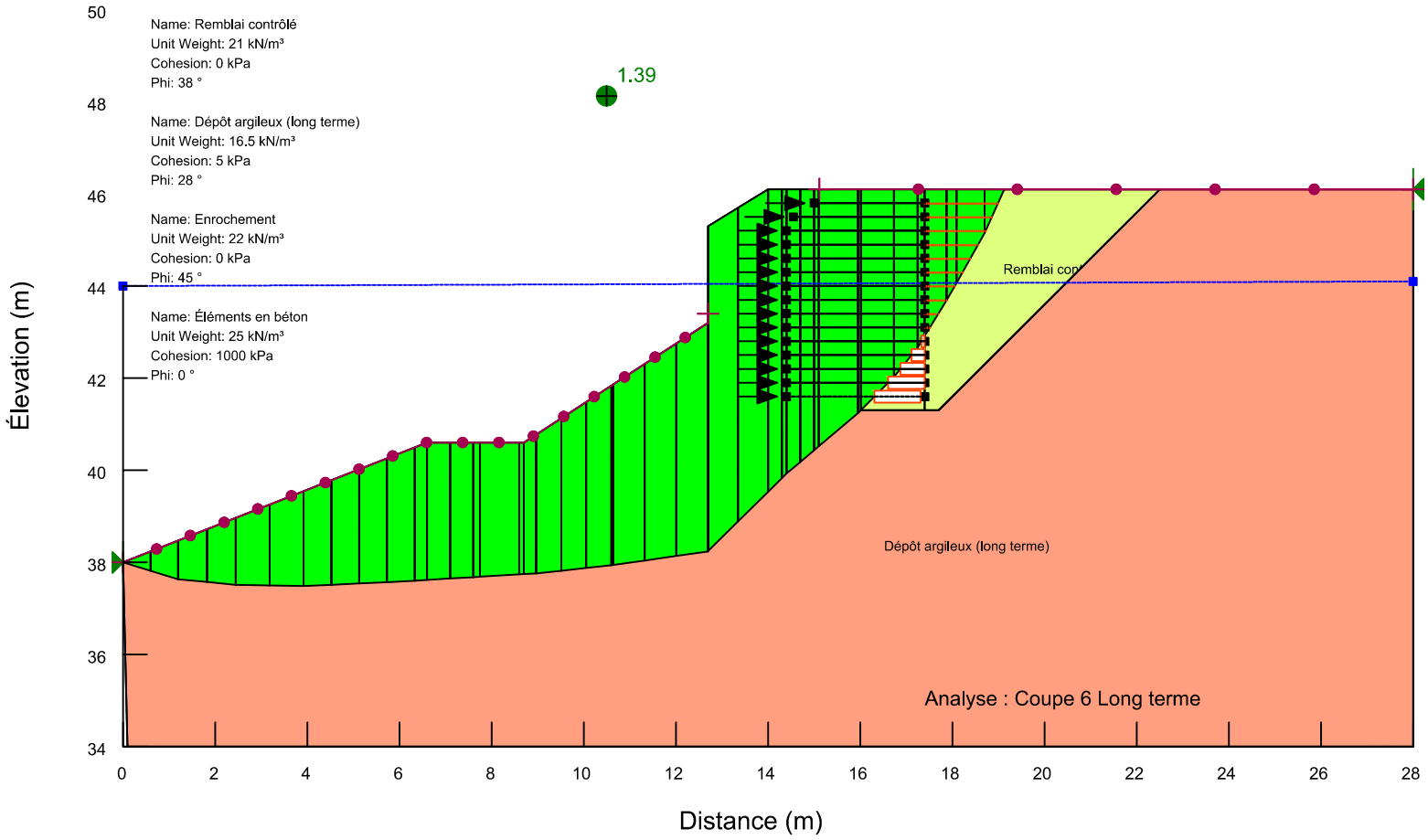


Client :	Commission de la Capitale Nationale	**Échelle :**	1: 150
Projet :	Pont pédestre du ruisseau Leamy - Commentaires sur la stabilité du site	**N/Réf. :**	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 6, court terme	**Date :**	2015-09-04
		C.S. :	1,92

Englobe

ANALYSE DE STABILITÉ

Figure 23

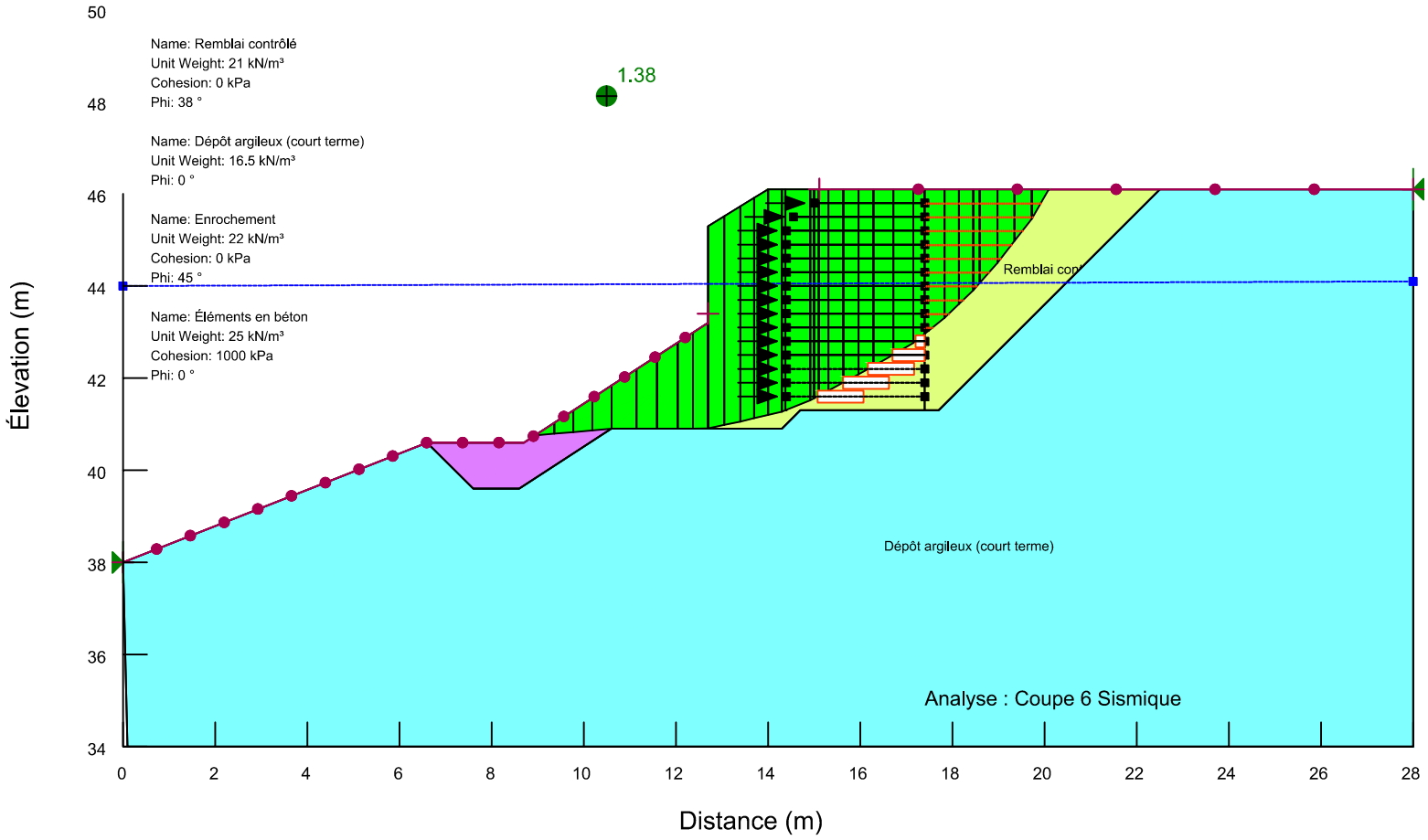


Client :	Commission de la Capitale Nationale	**Échelle :**	1: 150
Projet :	Pont pédestre du ruisseau Leamy - Commentaires sur la stabilité du site	**N/Réf. :**	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 6, long terme	**Date :**	2015-09-04
		C.S. :	1,39

Englobe

ANALYSE DE STABILITÉ

Figure 24



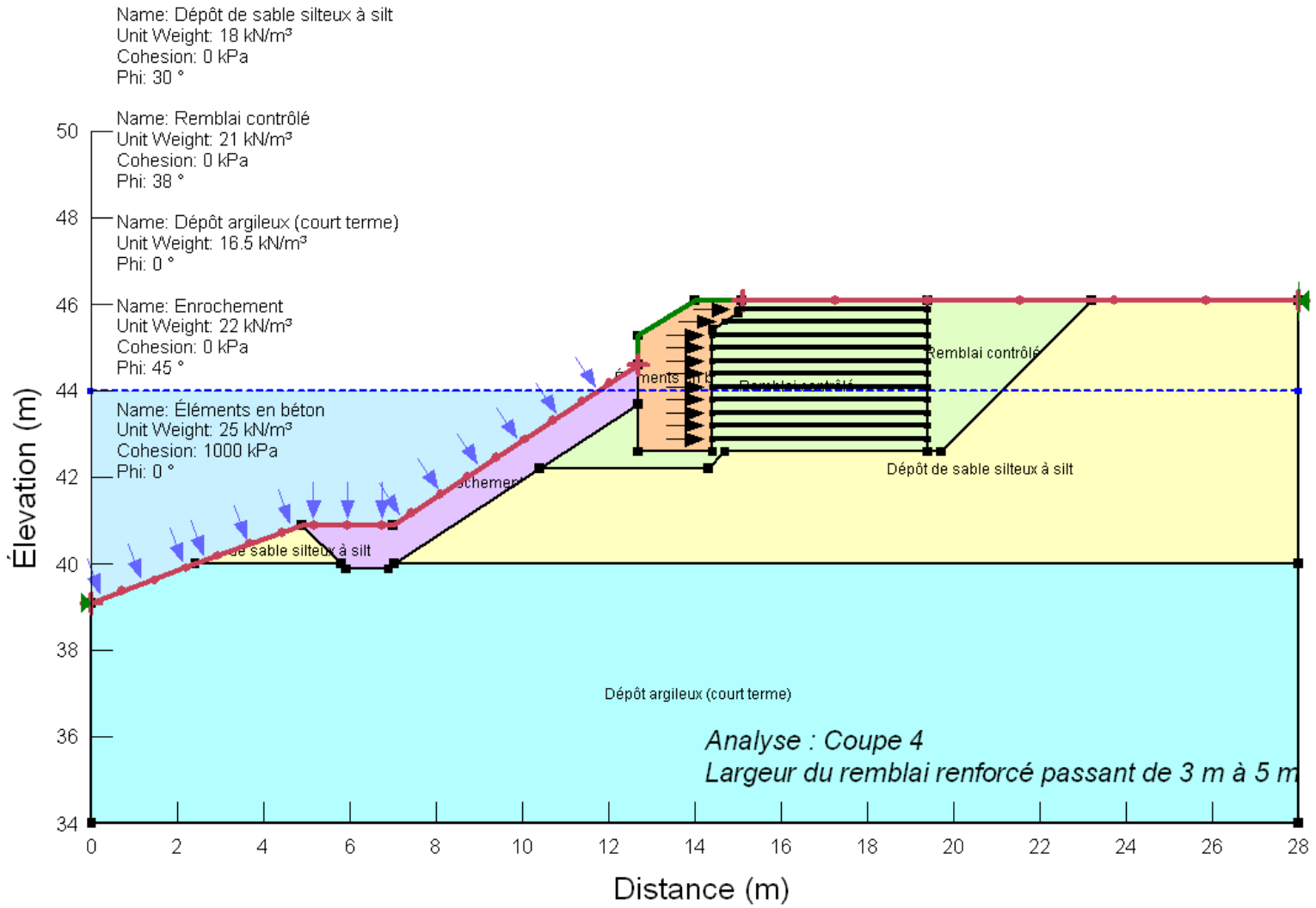
Client :	Commission de la Capitale Nationale	**Échelle :**	1: 150
Projet :	Pont pédestre du ruisseau Leamy - Commentaires sur la stabilité du site	**N/Réf. :**	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 6, sismique	**Date :**	2015-09-04
		C.S. :	1,38

Appendix 4 Slope stability analyzes results with suggested solutions

Englobe

ANALYSE DE STABILITÉ

Figure 25

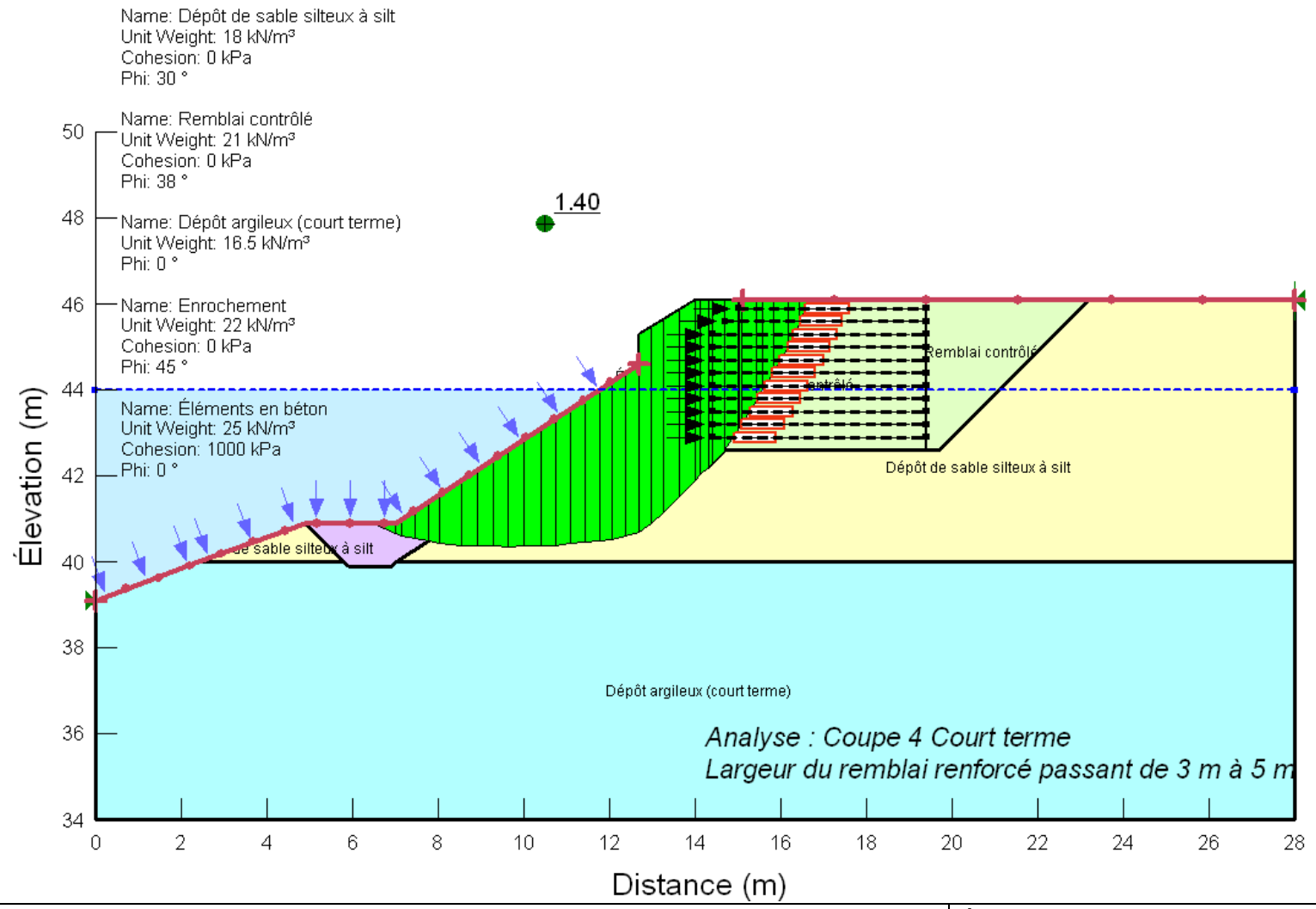


Client :	Commission de la Capitale Nationale	**Échelle** :	Aucune
Projet :	Pont pédestre du ruisseau Leamy – Commentaires sur la stabilité globale du site	**N/Réf.** :	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 4 – Largeur du remblai renforcé passant de 3 m à 5 m	**Date** :	2015-10-06
		C.S. :	

Englobe

ANALYSE DE STABILITÉ

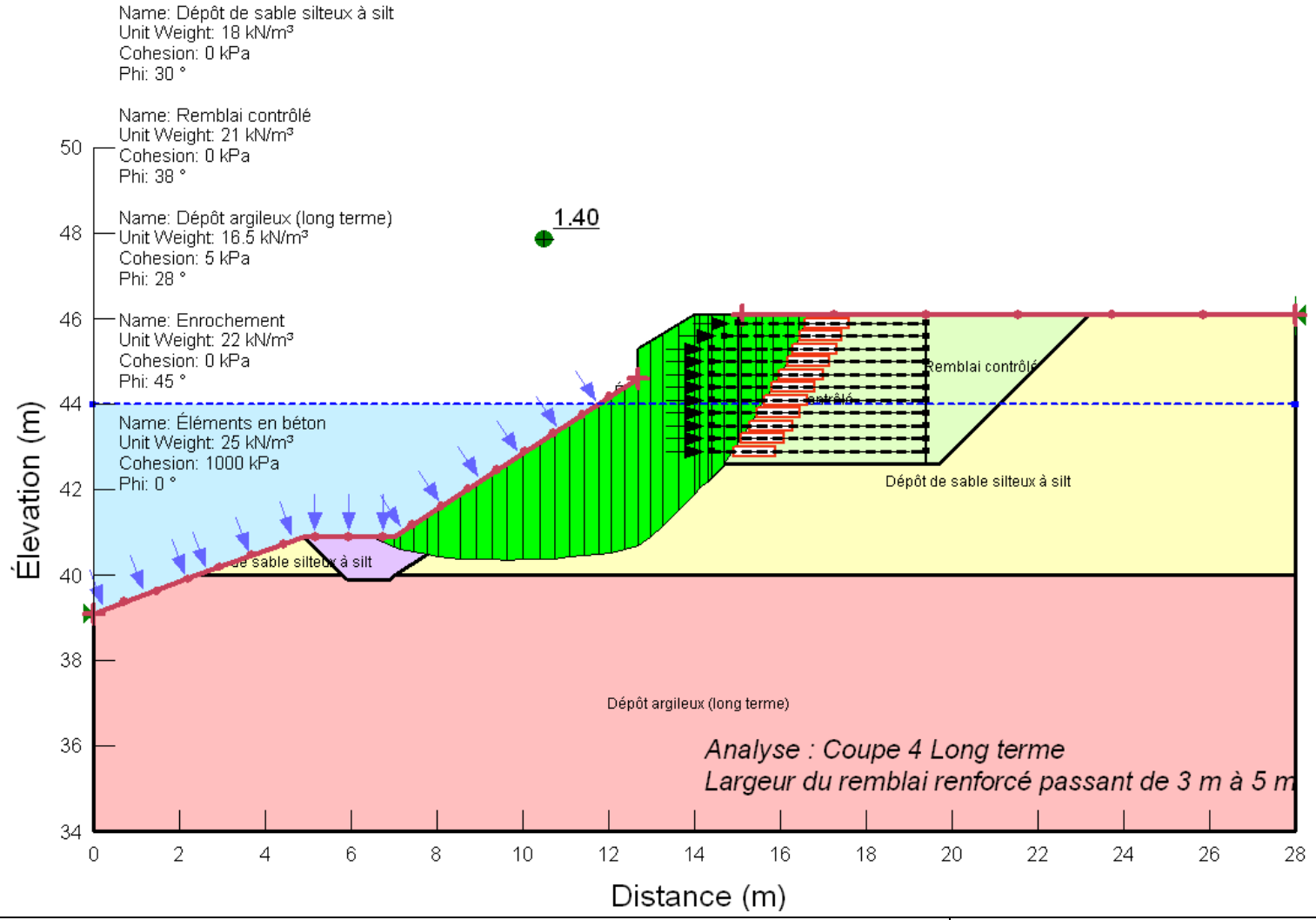
Figure 26



Client :	Commission de la Capitale Nationale	**Échelle** :	Aucune
Projet :	Pont pédestre du ruisseau Leamy – Commentaires sur la stabilité globale du site	**N/Réf.** :	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 4 – Largeur du remblai renforcé passant de 3 m à 5 m – Analyse à court terme	**Date** :	2015-10-06
		C.S. :	1,40

ANALYSE DE STABILITÉ

Figure 27

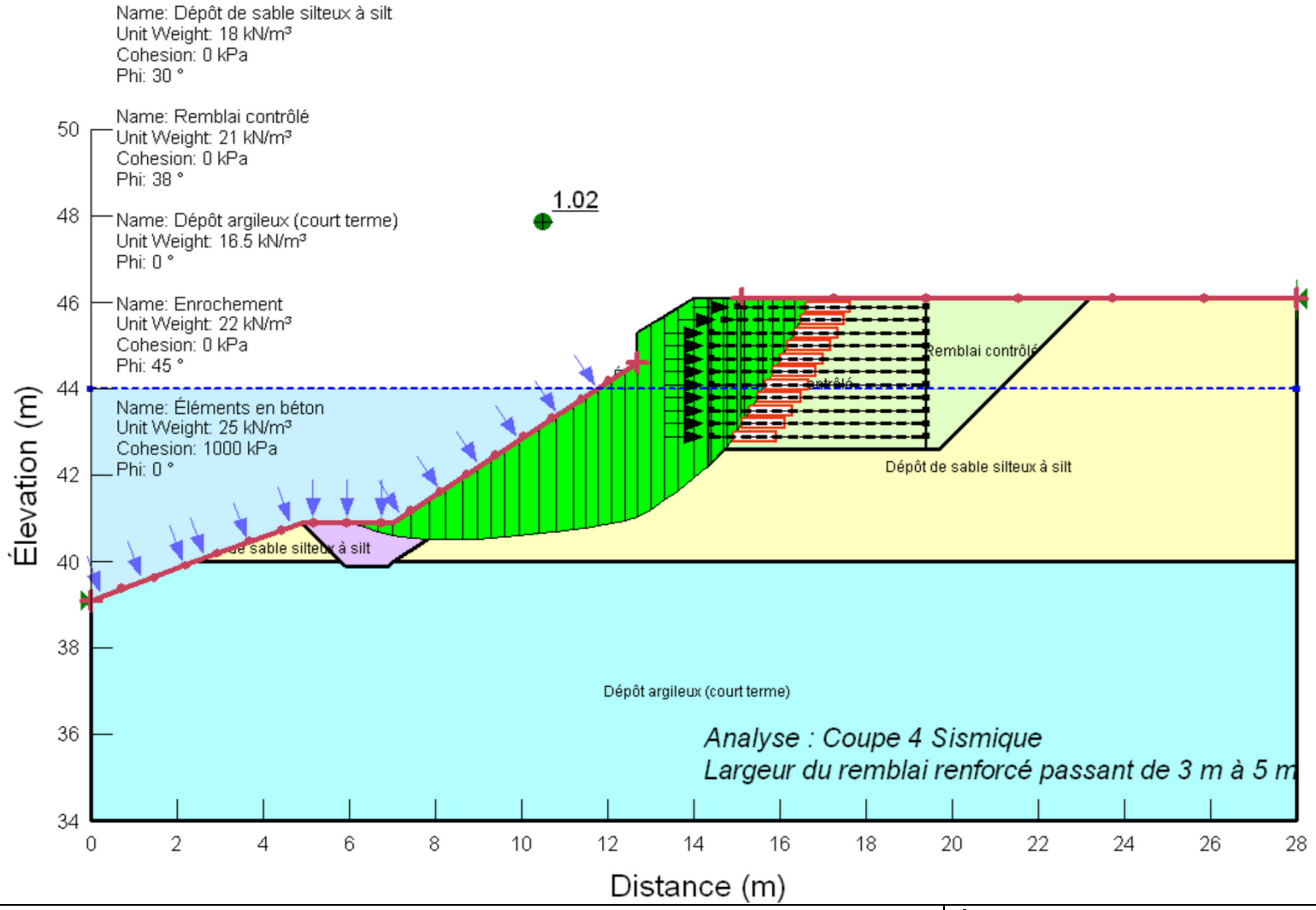


Client :	Commission de la Capitale Nationale	**Échelle** :	Aucune
Projet :	Pont pédestre du ruisseau Leamy – Commentaires sur la stabilité globale du site	**N/Réf.** :	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 4 – Largeur du remblai renforcé passant de 3 m à 5 m – Analyse à long terme	**Date** :	2015-10-06
		C.S. :	1,40

Englobe

ANALYSE DE STABILITÉ

Figure 28

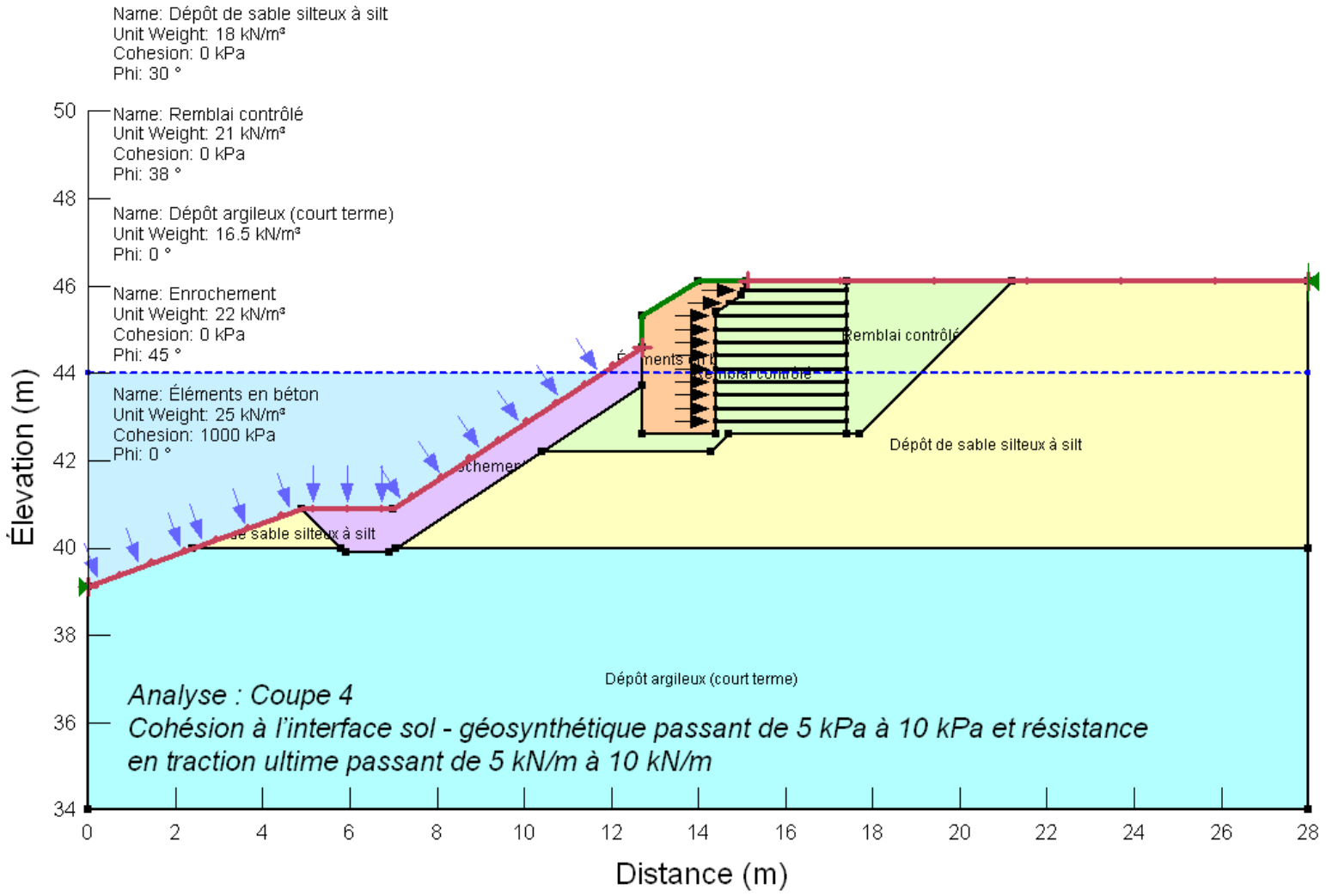


Client :	Commission de la Capitale Nationale	**Échelle** :	Aucune
Projet :	Pont pédestre du ruisseau Leamy – Commentaires sur la stabilité globale du site	**N/Réf.** :	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 4 – Largeur du remblai renforcé passant de 3 m à 5 m – Analyse pseudo-statique	**Date** :	2015-10-06
		C.S. :	1,02

Englobe

ANALYSE DE STABILITÉ

Figure 29

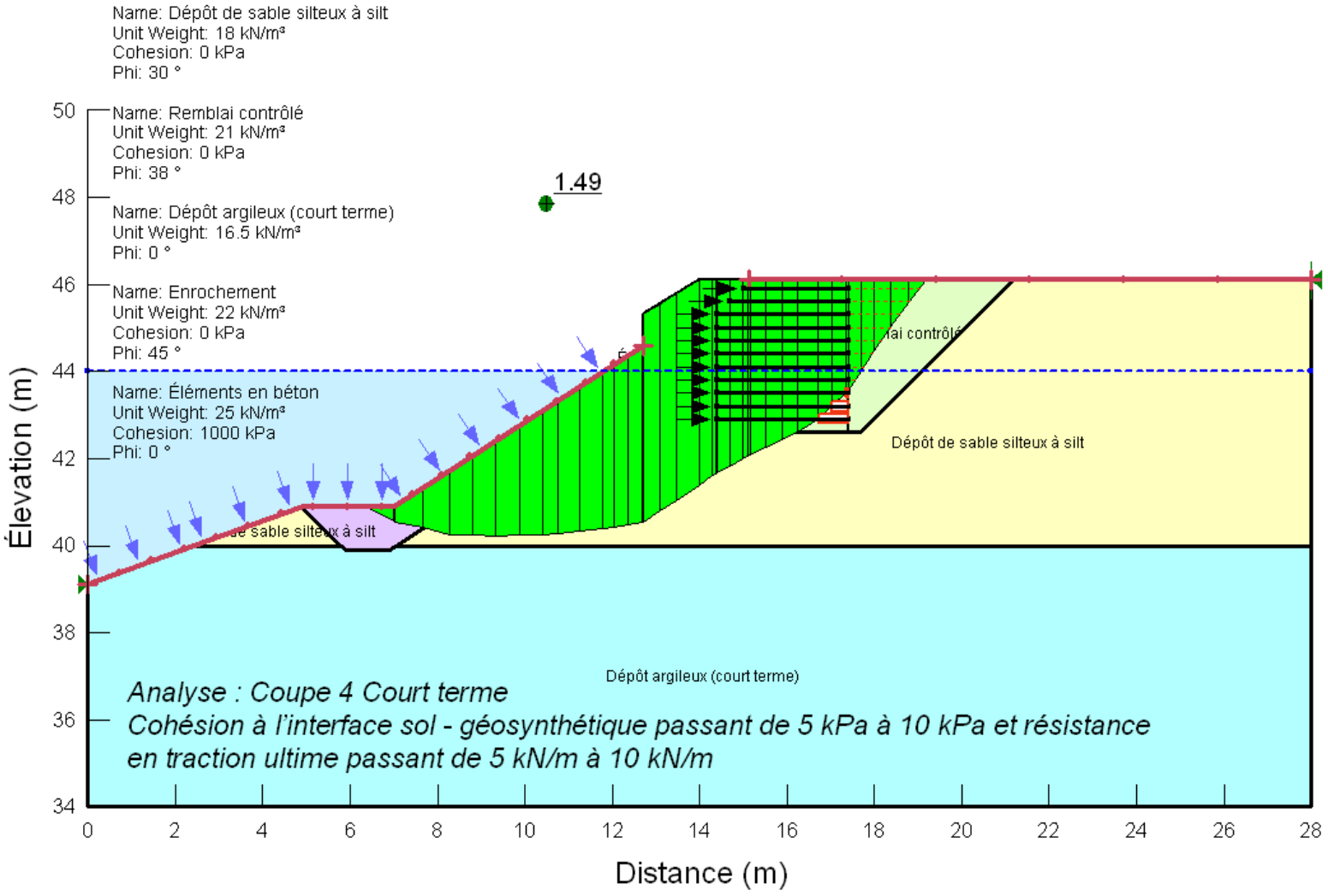


Client :	Commission de la Capitale Nationale	**Échelle** :	Aucune
Projet :	Pont pédestre du ruisseau Leamy – Commentaires sur la stabilité globale du site	**N/Réf.** :	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 4 – Cohésion à l'interface sol – géosynthétique passant de 5 kPa à 10 kPa et résistance en traction ultime passant de 5 kN/m à 10 kN/m	**Date** :	2015-10-06
		C.S. :	

Englobe

ANALYSE DE STABILITÉ

Figure 30

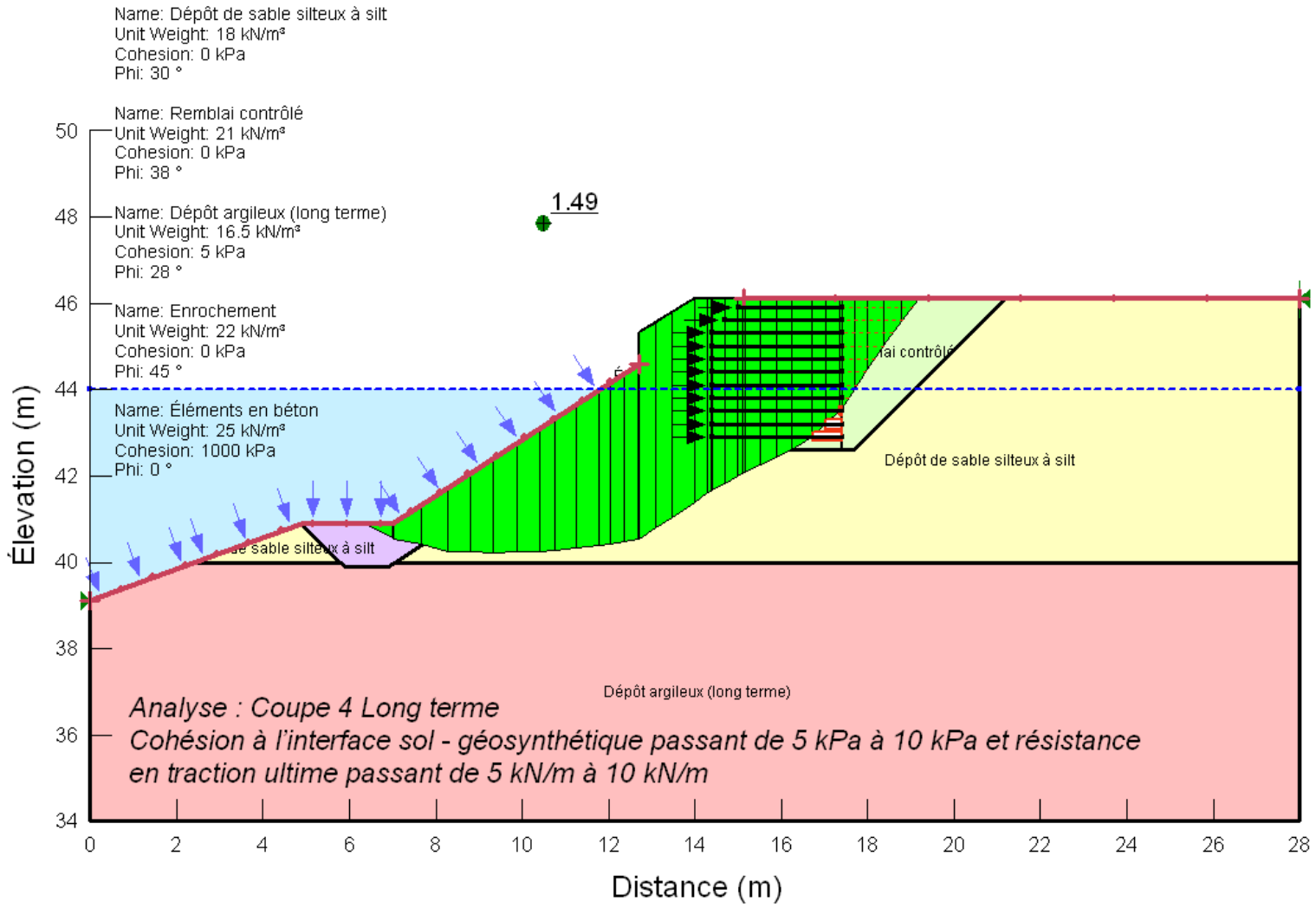


Client :	Commission de la Capitale Nationale	**Échelle** :	Aucune
Projet :	Pont pédestre du ruisseau Leamy – Commentaires sur la stabilité globale du site	**N/Réf.** :	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 4 – Cohésion à l'interface sol – géosynthétique passant de 5 kPa à 10 kPa et résistance en traction ultime passant de 5 kN/m à 10 kN/m – Analyse à court terme	**Date** :	2015-10-06
		C.S. :	1,49

Englobe

ANALYSE DE STABILITÉ

Figure 31

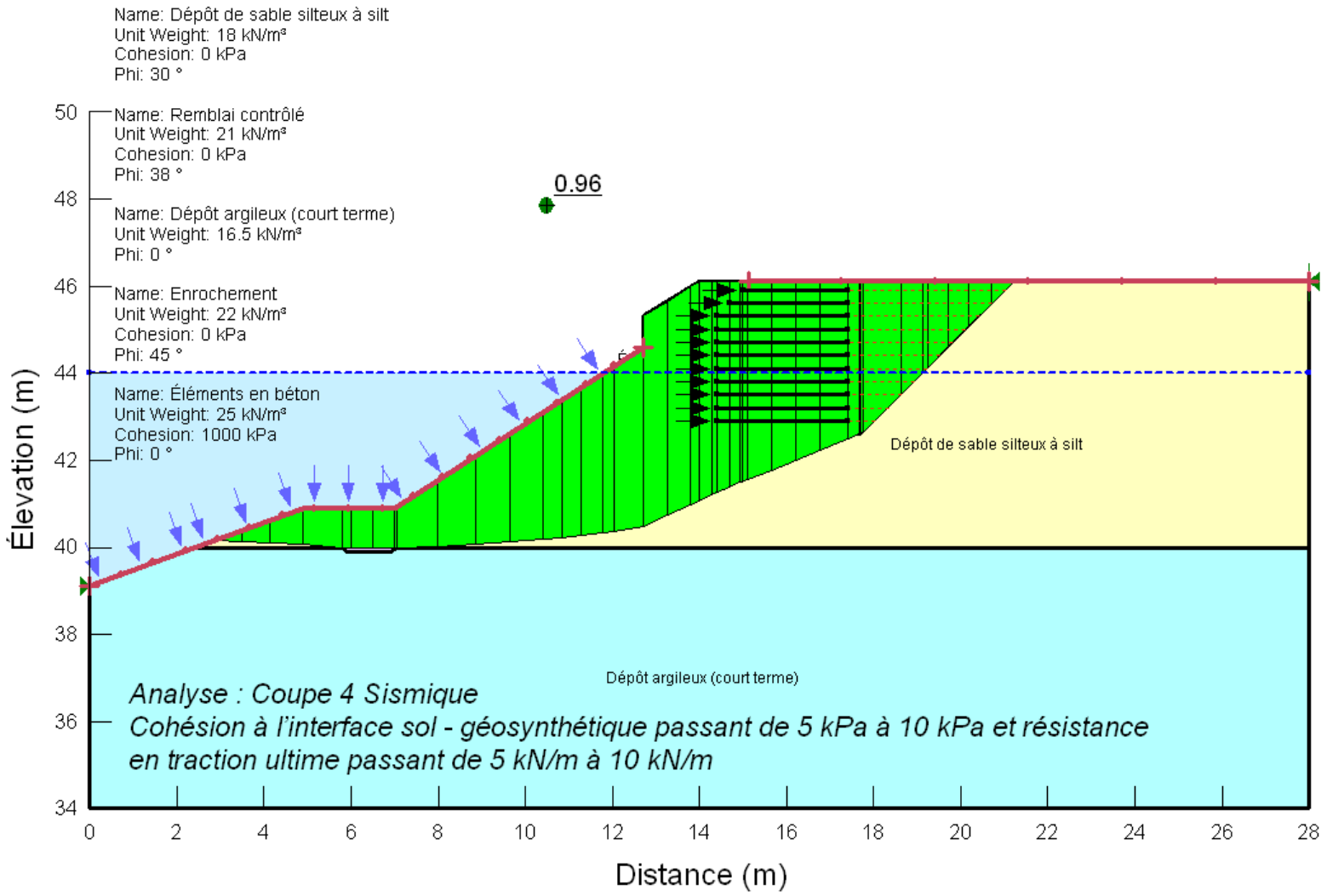


Client :	Commission de la Capitale Nationale	**Échelle** :	Aucune
Projet :	Pont pédestre du ruisseau Leamy – Commentaires sur la stabilité globale du site	**N/Réf.** :	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 4 – Cohésion à l'interface sol – géosynthétique passant de 5 kPa à 10 kPa et résistance en traction ultime passant de 5 kN/m à 10 kN/m – Analyse à long terme	**Date** :	2015-10-06
		C.S. :	1,49

Englobe

ANALYSE DE STABILITÉ

Figure 32

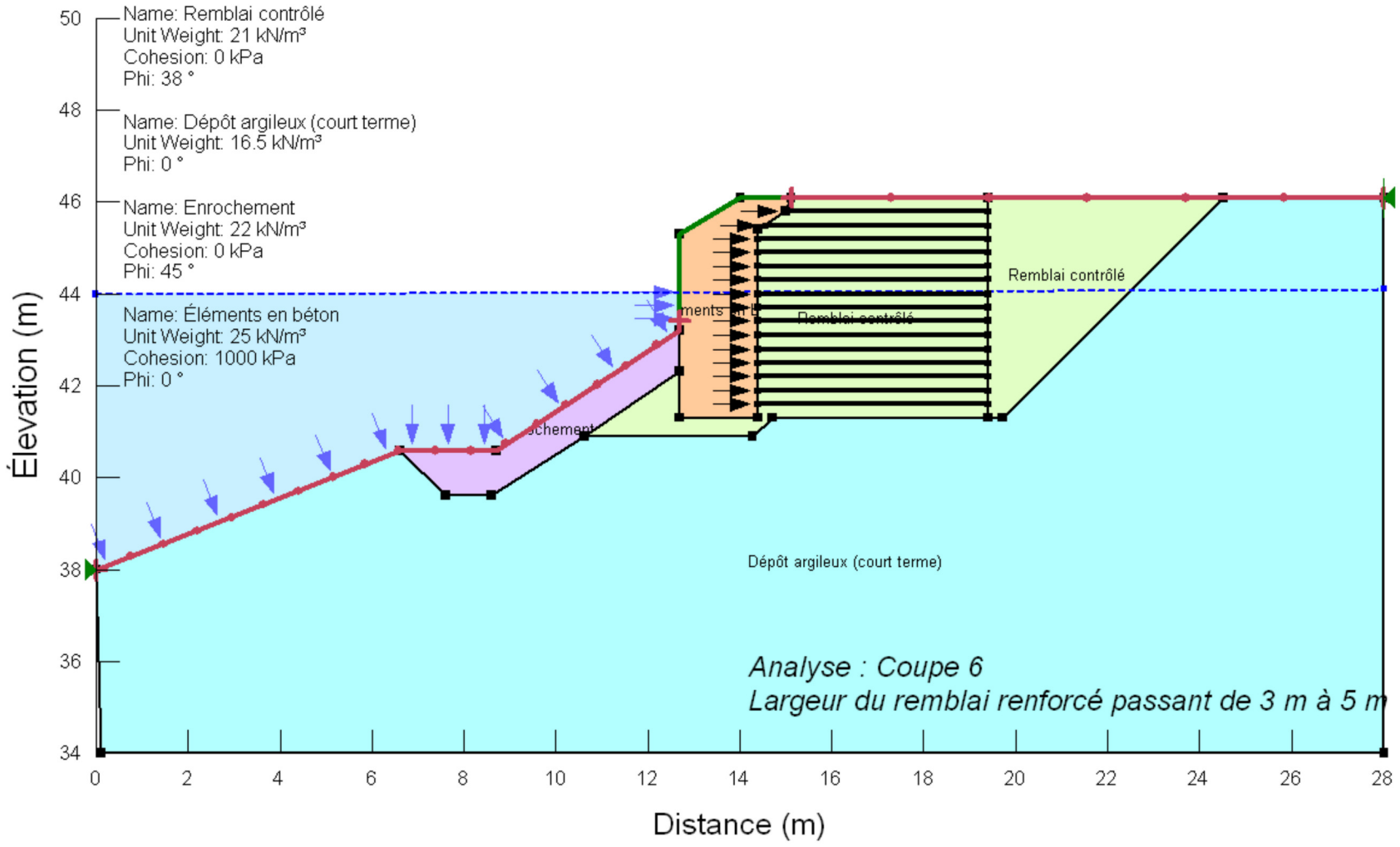


Client :	Commission de la Capitale Nationale	**Échelle** :	Aucune
Projet :	Pont pédestre du ruisseau Leamy – Commentaires sur la stabilité globale du site	**N/Réf.** :	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 4 – Cohésion à l'interface sol – géosynthétique passant de 5 kPa à 10 kPa et résistance en traction ultime passant de 5 kN/m à 10 kN/m – Analyse pseudo-statique	**Date** :	2015-10-06
		C.S. :	0,96

Englobe

ANALYSE DE STABILITÉ

Figure 33

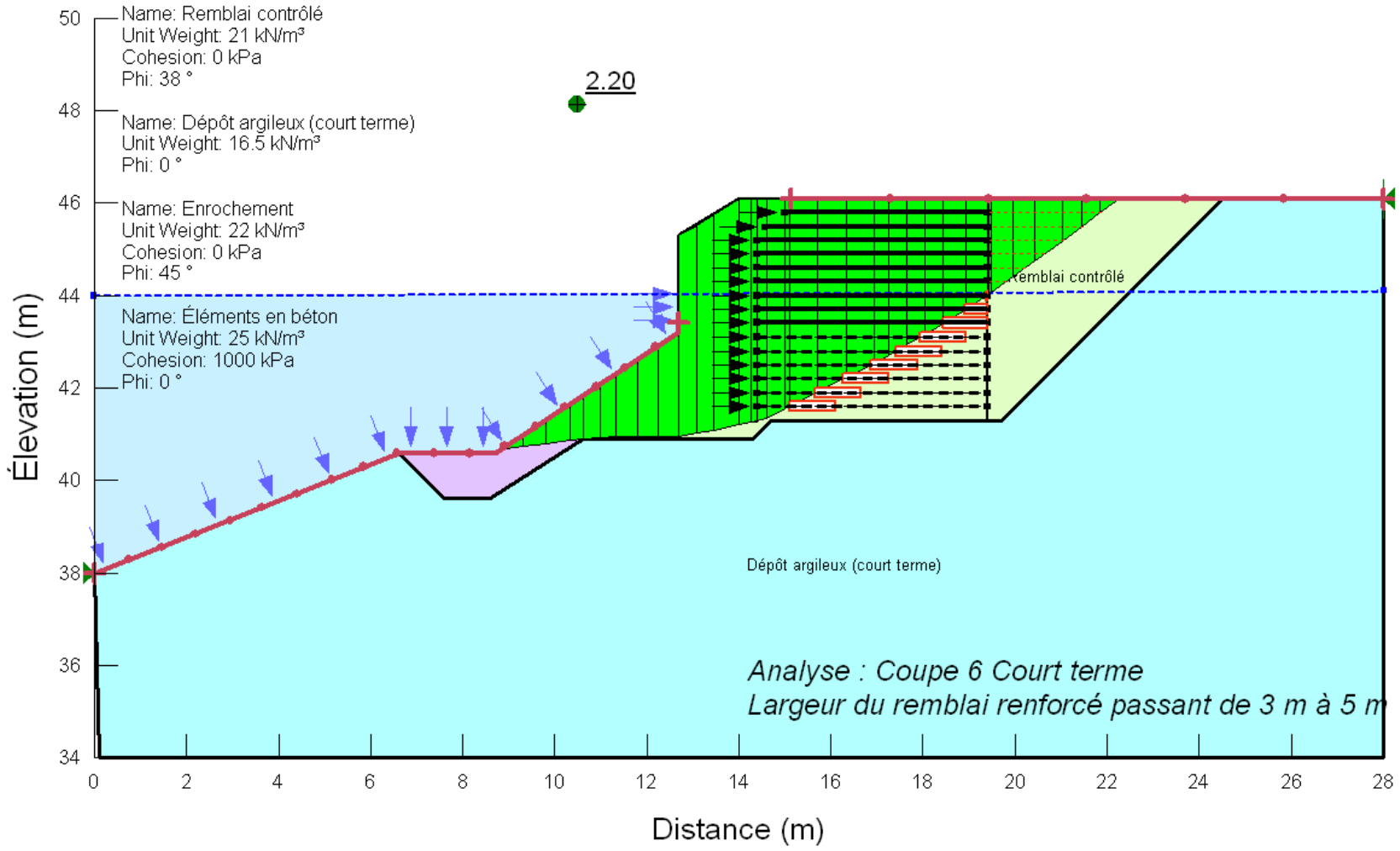


Client :	Commission de la Capitale Nationale	**Échelle** :	Aucune
Projet :	Pont pédestre du ruisseau Leamy – Commentaires sur la stabilité globale du site	**N/Réf.** :	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 6 – Largeur du remblai renforcé passant de 3 m à 5 m	**Date** :	2015-10-06
		C.S. :	

Englobe

ANALYSE DE STABILITÉ

Figure 34

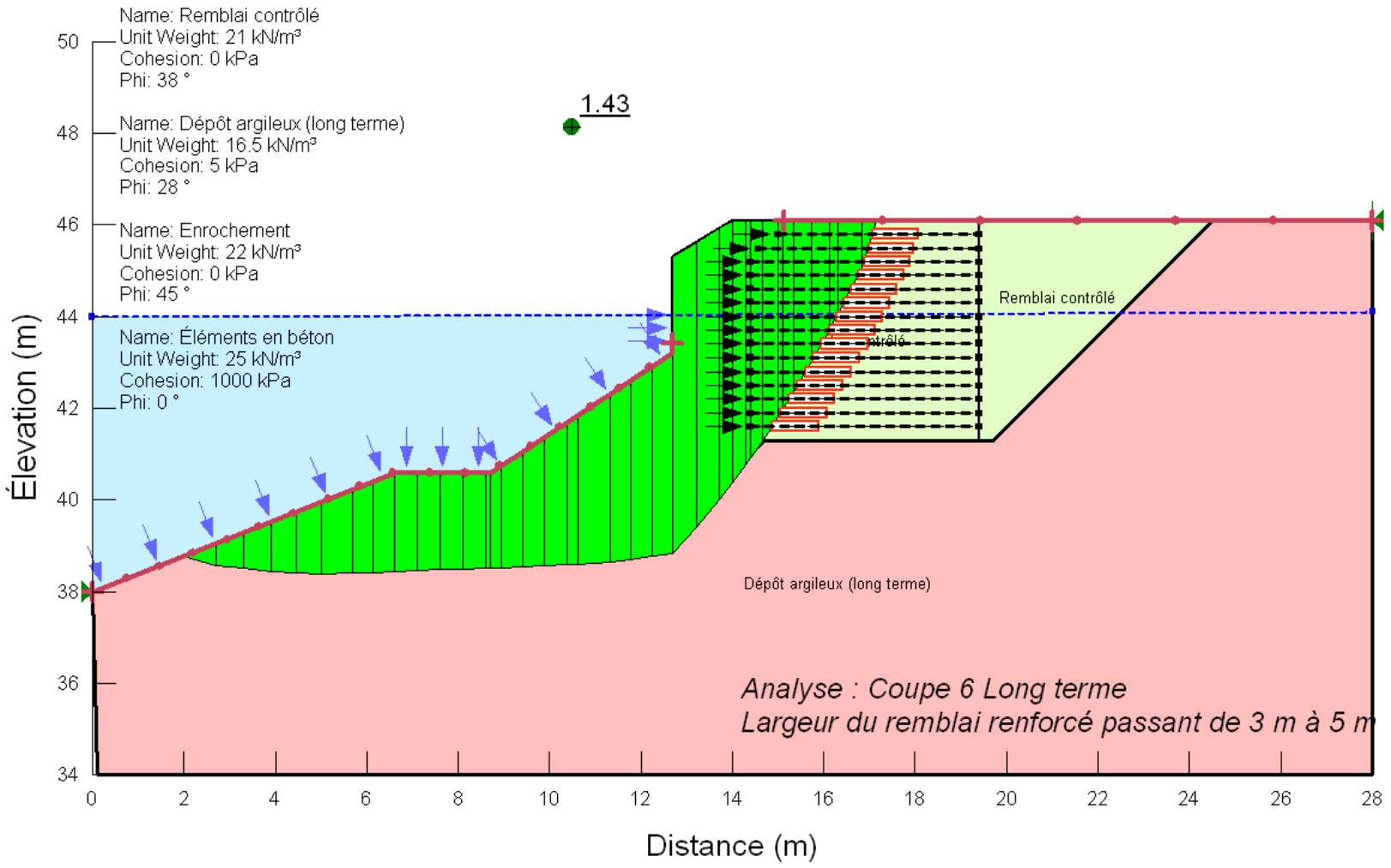


Client :	Commission de la Capitale Nationale	**Échelle** :	Aucune
Projet :	Pont pédestre du ruisseau Leamy – Commentaires sur la stabilité globale du site	**N/Réf.** :	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 6 – Largeur du remblai renforcé passant de 3 m à 5 m – Analyse à court terme	**Date** :	2015-10-06
		C.S. :	2,20

Englobe

ANALYSE DE STABILITÉ

Figure 35

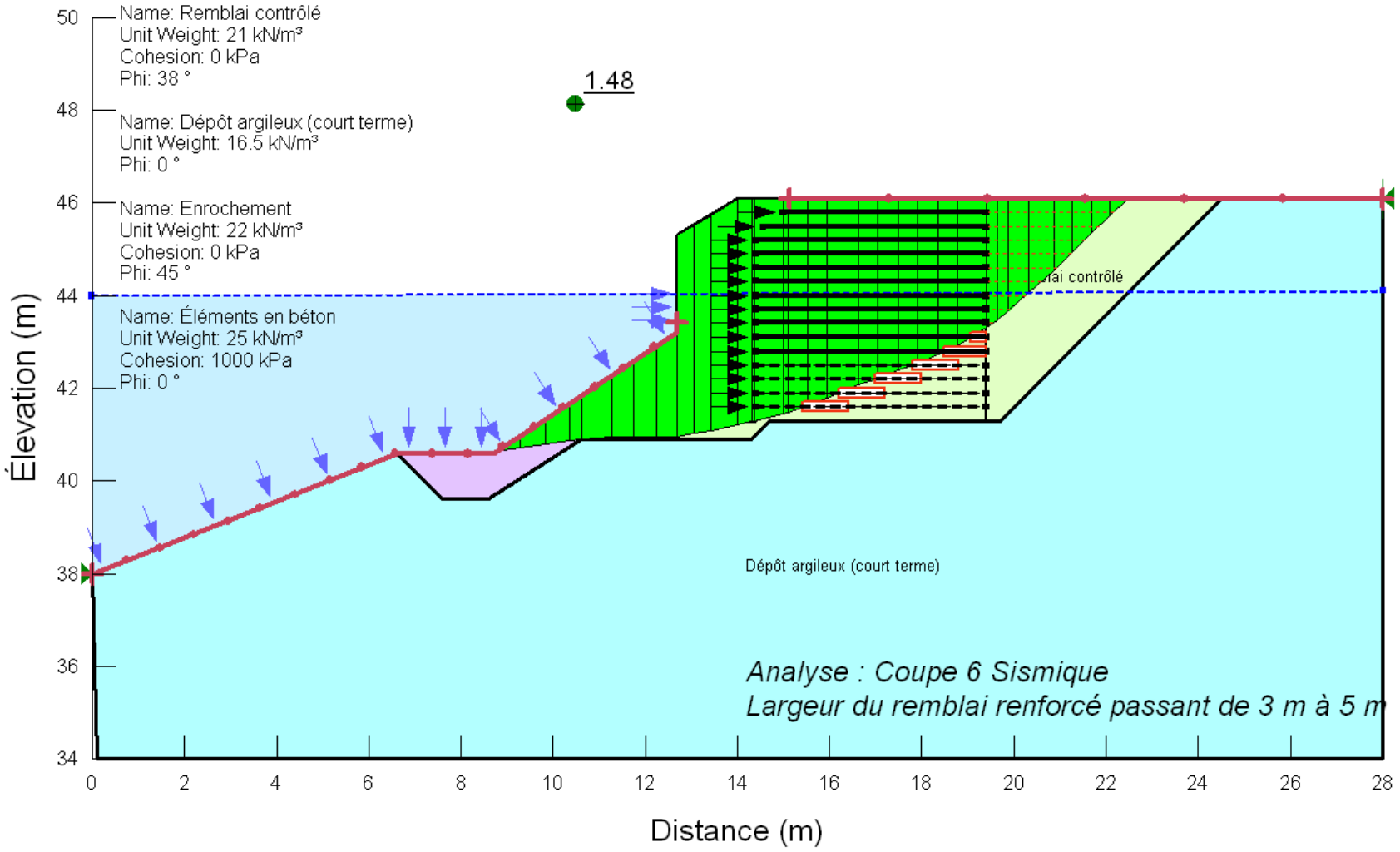


Client :	Commission de la Capitale Nationale	**Échelle** :	Aucune
Projet :	Pont pédestre du ruisseau Leamy – Commentaires sur la stabilité globale du site	**N/Réf.** :	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 6 – Largeur du remblai renforcé passant de 3 m à 5 m – Analyse à long terme	**Date** :	2015-10-06
		C.S. :	1,43

Englobe

ANALYSE DE STABILITÉ

Figure 36

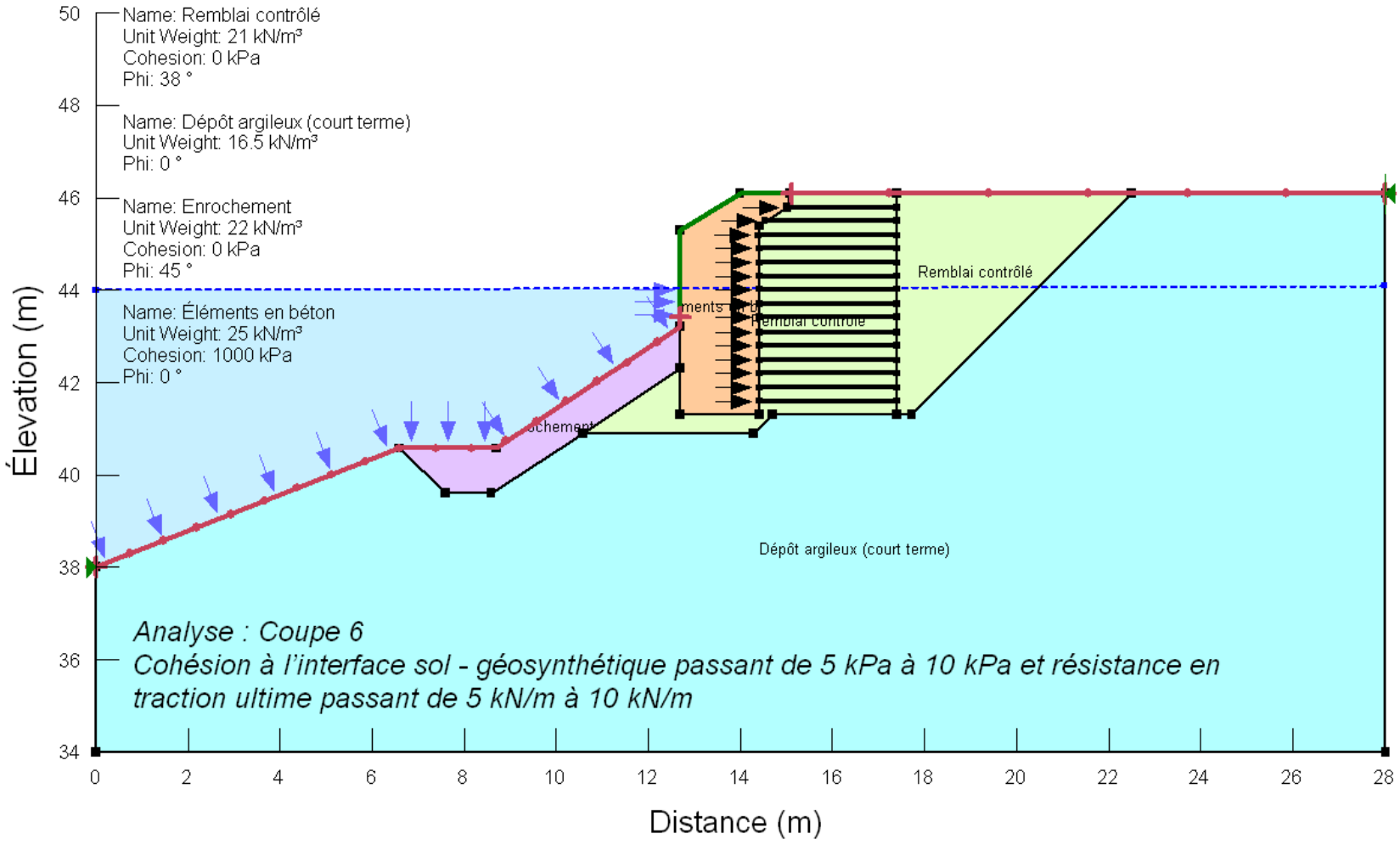


Client :	Commission de la Capitale Nationale	**Échelle** :	Aucune
Projet :	Pont pédestre du ruisseau Leamy – Commentaires sur la stabilité globale du site	**N/Réf.** :	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 6 – Largeur du remblai renforcé passant de 3 m à 5 m – Analyse pseudo-statique	**Date** :	2015-10-06
		C.S. :	1,48

Englobe

ANALYSE DE STABILITÉ

Figure 37

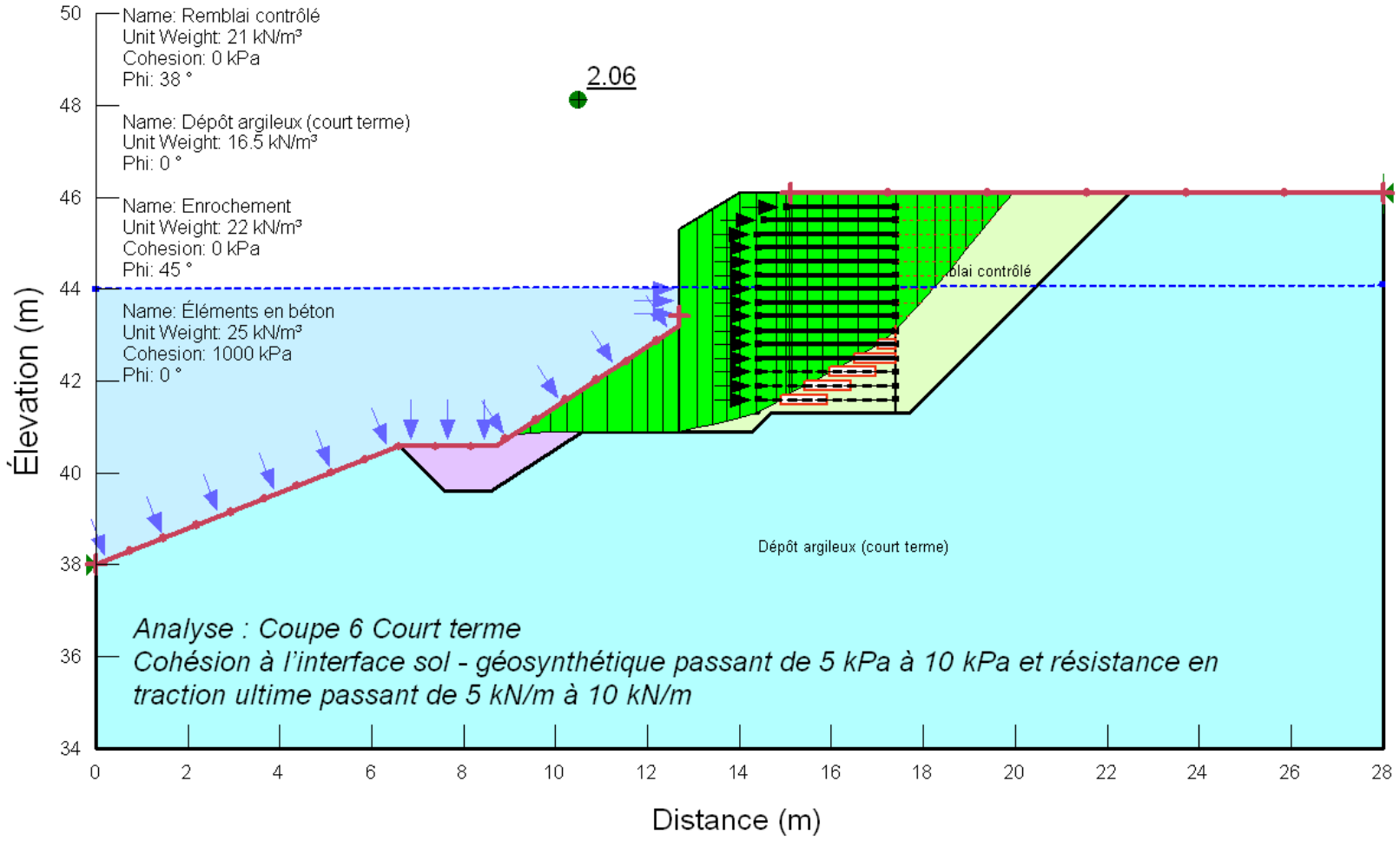


Client :	Commission de la Capitale Nationale	**Échelle** :	Aucune
Projet :	Pont pédestre du ruisseau Leamy – Commentaires sur la stabilité globale du site	**N/Réf.** :	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 6 – Cohésion à l'interface sol – géosynthétique passant de 5 kPa à 10 kPa et résistance en traction ultime passant de 5 kN/m à 10 kN/m	**Date** :	2015-10-06
		C.S. :	

Englobe

ANALYSE DE STABILITÉ

Figure 37

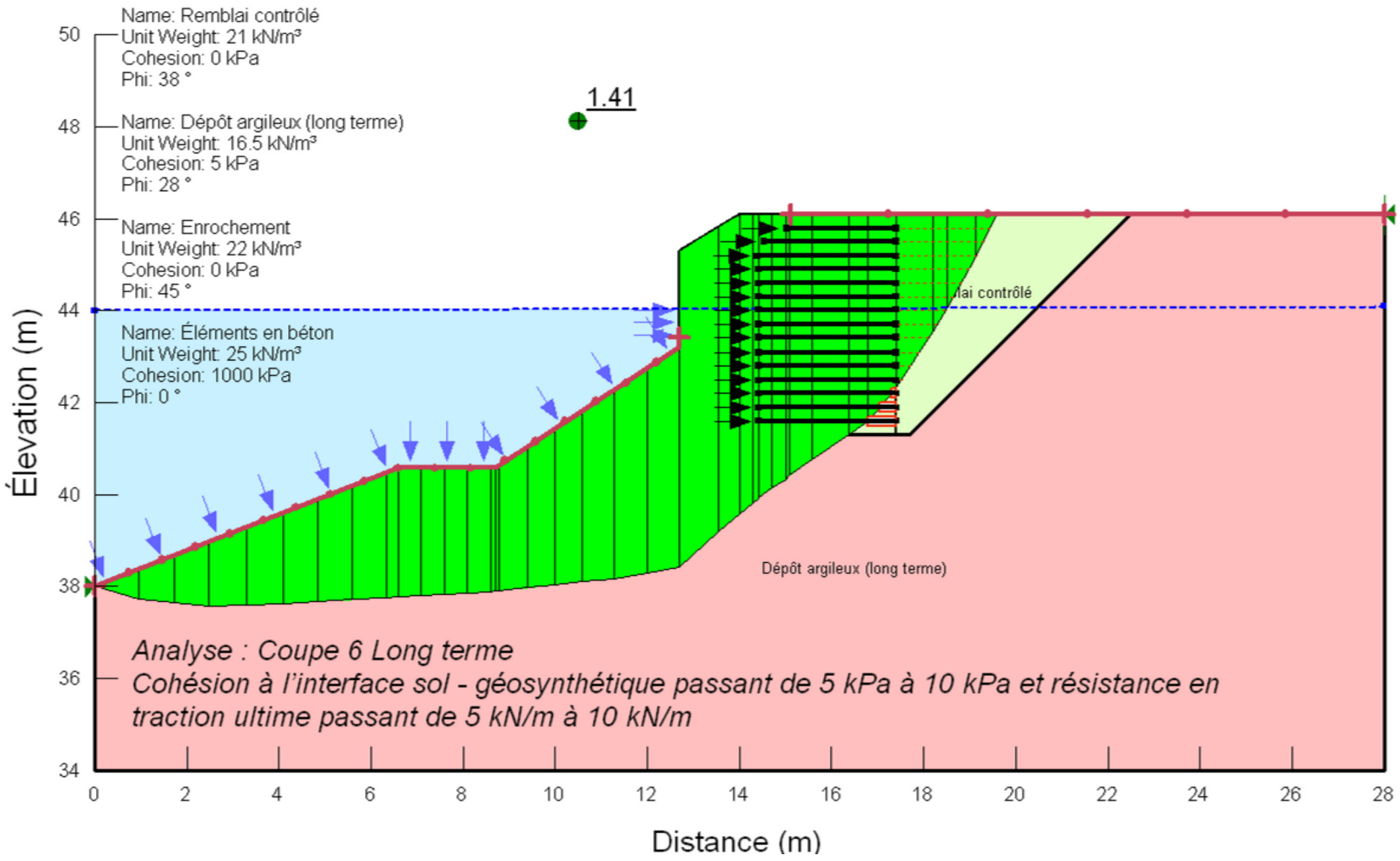


Client : Commission de la Capitale Nationale	**Échelle** : Aucune
Projet : Pont pédestre du ruisseau Leamy – Commentaires sur la stabilité globale du site	**N/Réf.** : B-0012112-1
	Préparé par : T. Lampron
Analyse : Coupe 6 – Cohésion à l'interface sol – géosynthétique passant de 5 kPa à 10 kPa et résistance en traction ultime passant de 5 kN/m à 10 kN/m – Analyse à court terme	**Date** : 2015-10-06
	C.S. : 2,06

Englobe

ANALYSE DE STABILITÉ

Figure 39

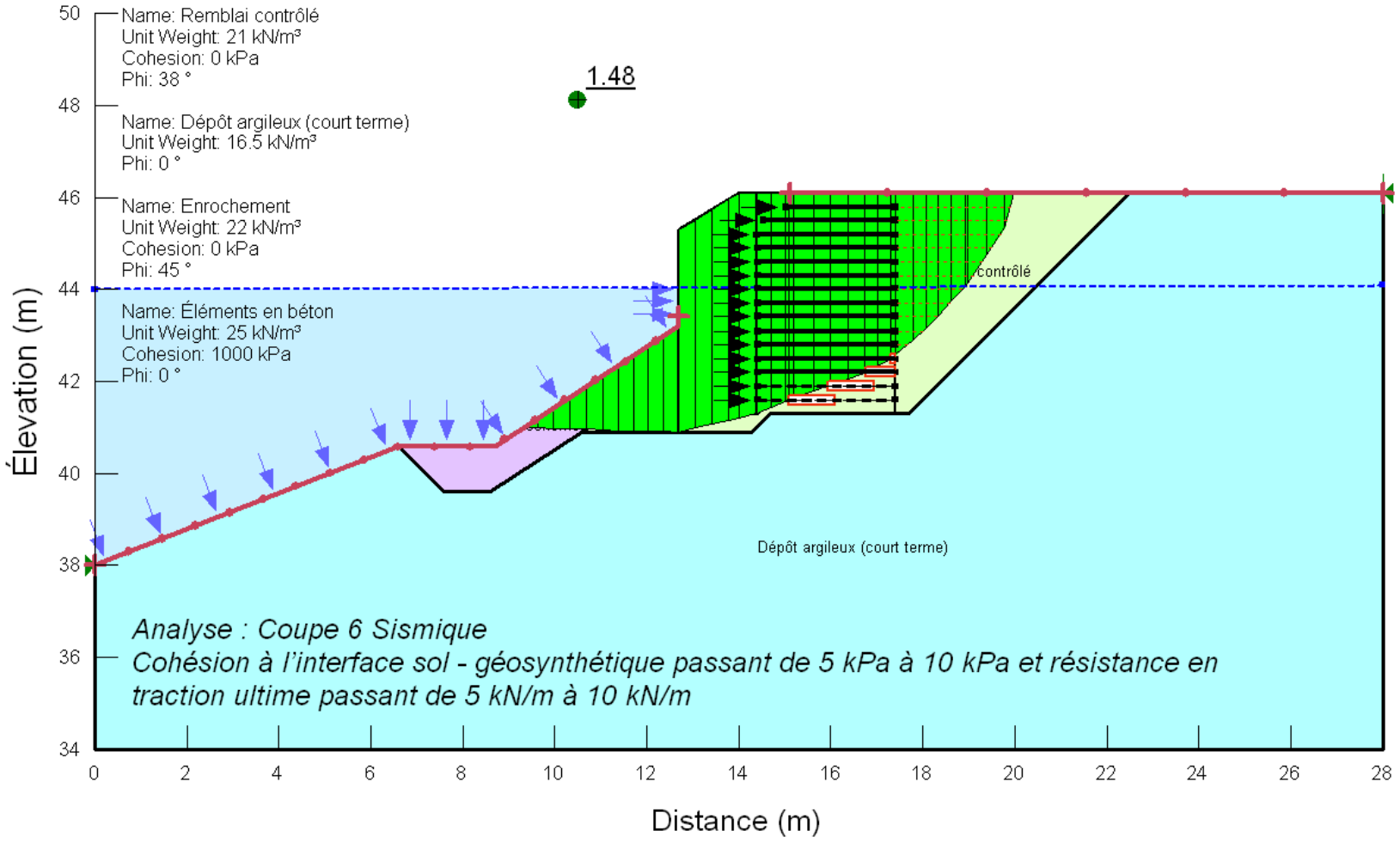


Client :	Commission de la Capitale Nationale	**Échelle** :	Aucune
Projet :	Pont pédestre du ruisseau Leamy – Commentaires sur la stabilité globale du site	**N/Réf.** :	B-0012112-1
		Préparé par :	T. Lampron
Analyse :	Coupe 6 – Cohésion à l'interface sol – géosynthétique passant de 5 kPa à 10 kPa et résistance en traction ultime passant de 5 kN/m à 10 kN/m – Analyse à long terme	**Date** :	2015-10-06
		C.S. :	1,41

Englobe

ANALYSE DE STABILITÉ

Figure 40



Client : Commission de la Capitale Nationale	**Échelle** : Aucune
Projet : Pont pédestre du ruisseau Leamy – Commentaires sur la stabilité globale du site	**N/Réf.** : B-0012112-1
	Préparé par : T. Lampron
Analyse : Coupe 6 – Cohésion à l'interface sol – géosynthétique passant de 5 kPa à 10 kPa et résistance en traction ultime passant de 5 kN/m à 10 kN/m – Analyse pseudo-statique	**Date** : 2015-10-06
	C.S. : 1,48