

A20.9

Geological Cross Sections

GEOLOGICAL LEGEND:



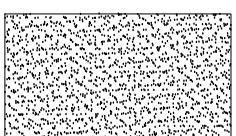
Made ground (QX)



Alluvial sand and gravels (QAGwd)
around the Ward River



Alluvial sand and gravels (QAGlr)
around the Liffey River



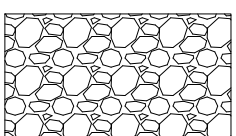
Fluvio-Glacial sands within
Glacial deposits



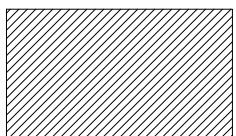
Brown Boulder Clay (QBR)



Black Boulder Clay (QBL)



Sands & gravels at the bottom
of the Glacial deposits



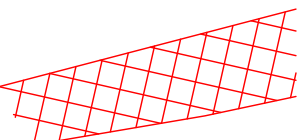
Upper weathered rock level



Phreatic level



Interpreted Bedding



Interpreted Faults



Argillaceous Bioclastic Limestone (CMUP)
Upper member of Malahide Formation



Biomicritic Limestone with thin shale interbedded (CMLO)
Lower member of Malahide Formation



Micritic Limestone (CWA)
Waulsortian Formation



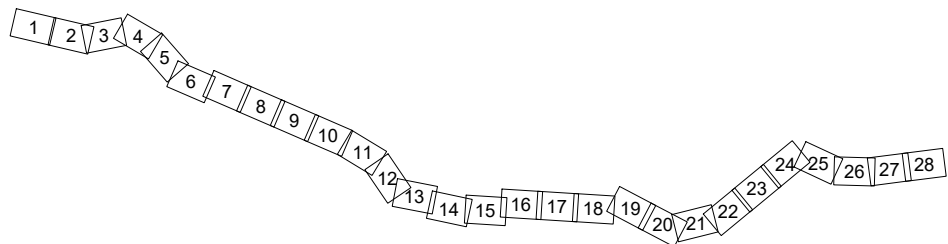
Calcareous Shale (CTO)
Tober Colleen Formation








Argillaceous Limestone (CLU)
Lucan Formation



Key Plan



| | | | | | | |
|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
| REV. | DATE | Description | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
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| | | | | | |
|---|--|---|--|---|----------------|
| Client | | Project | | Drawing Title | Drawing Status |
|   | |  | | Ground Investigation Geological Long Section – Phase 1 | S4 |
| Consultant | | Drawing N° | | | |
|   | | ML1-JAI-GEO-ROUT_XX-DR-Y-00013 | | | |
| Scales Original Size A1 | | | | | Sheet 0 of 28 |

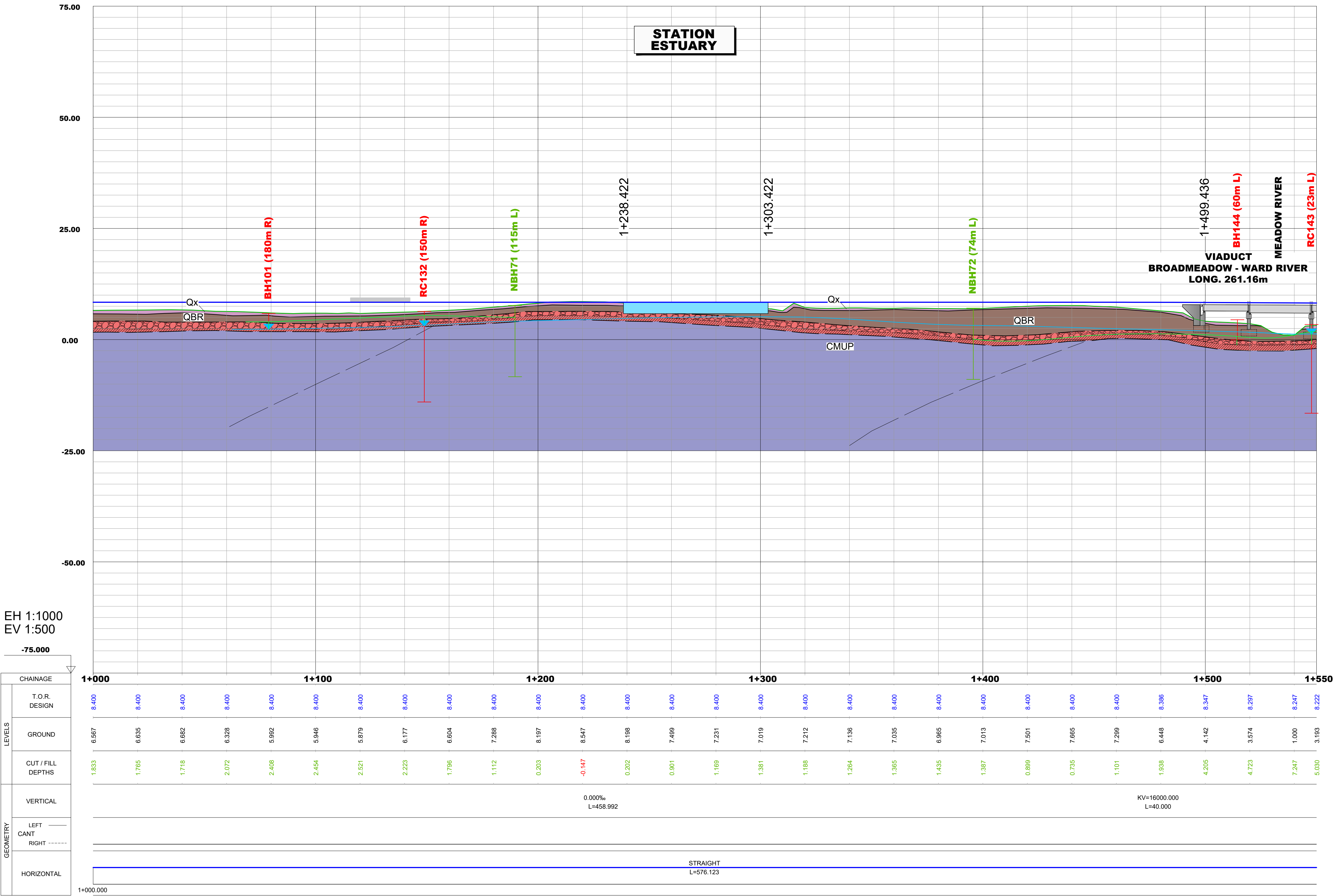
NOTES:

KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (‰)
D = Sagitta, difference between CV and TOR level (m)

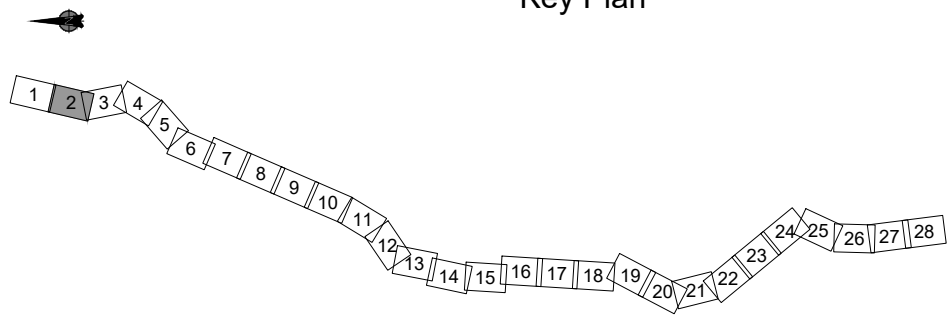
The distance from TOR to tunnel crown is 6.7 m

SYMBOLOLOGY:

Cut and cover section
TOR
Rail level (TOR)



Key Plan



| | | | | | | |
|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
| REV. | DATE | Description | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
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Client

TII **NTA**

Consultant

JACOBS **IDOM**

Project

METROLINK

Drawing Title

Ground Investigation
Geological Long Section – Phase 1

Drawing Status

S4

Drawing N°

ML1-JAI-GEO-ROUT_XX-DR-Y-00013

Scales Original Size A1 H: 1:1000 / V: 1:500

Sheet 1 of 27

NOTES:

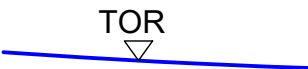
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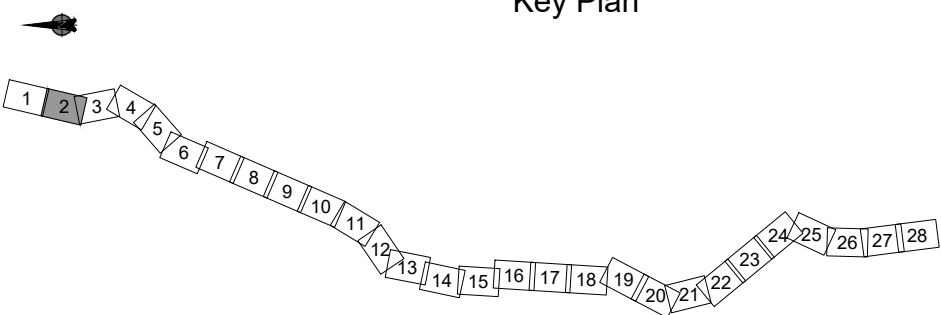
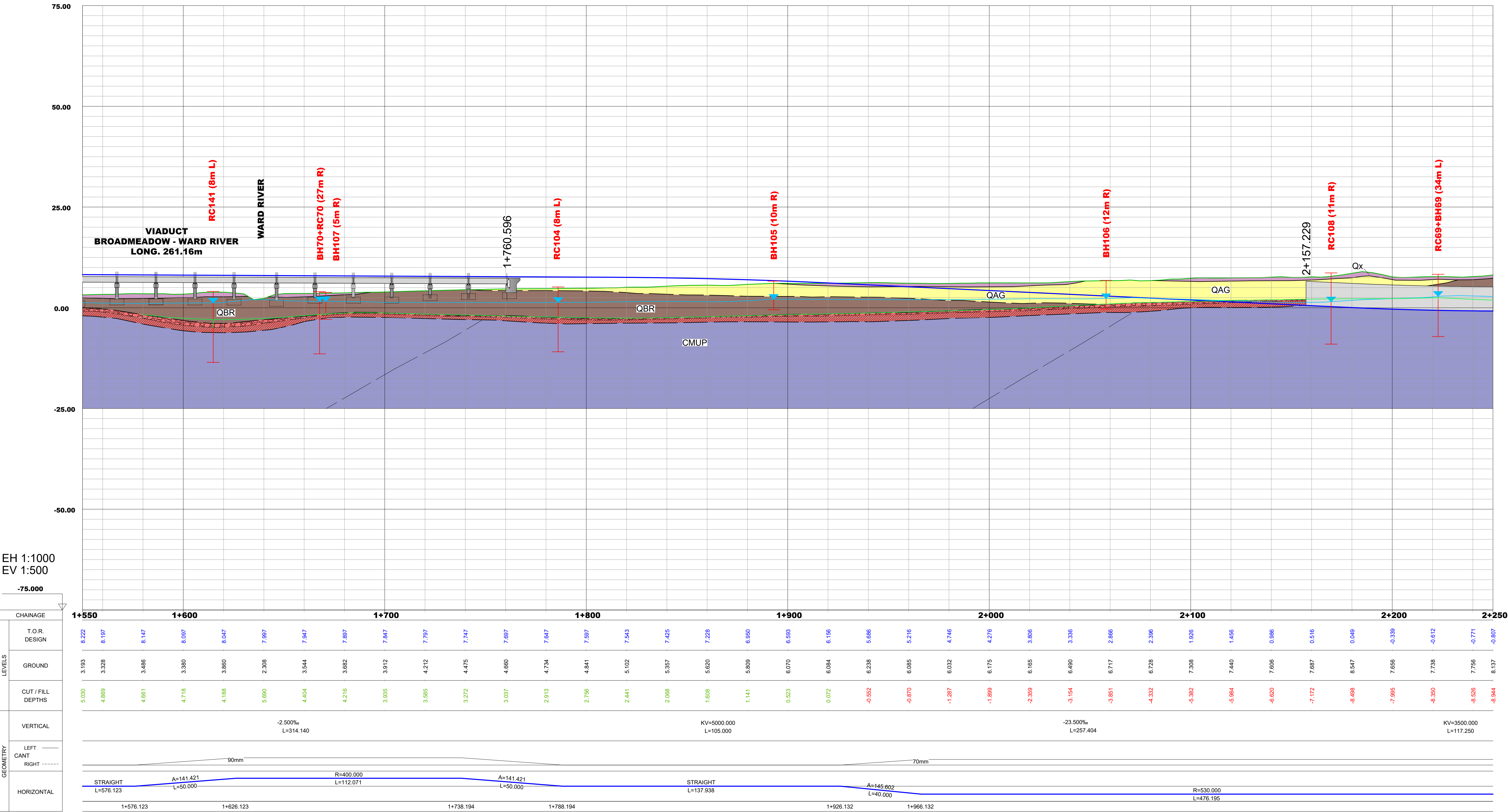
SYMBOLOLOGY:



Cut and cover section



Rail level (TOR)



Key Plan

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Client



Project



Consultant



| | | | |
|-------------------------|---|----------------|---------|
| Drawing Title | Ground Investigation Geological Long Section – Phase 1 | Drawing Status | S4 |
| Drawing N° | ML1-JAI-GEO-ROUT_XX-DR-Y-00013 | | |
| Scales Original Size A1 | H: 1:1000 / V: 1:500 | Sheet | 2 of 27 |

NOTES:

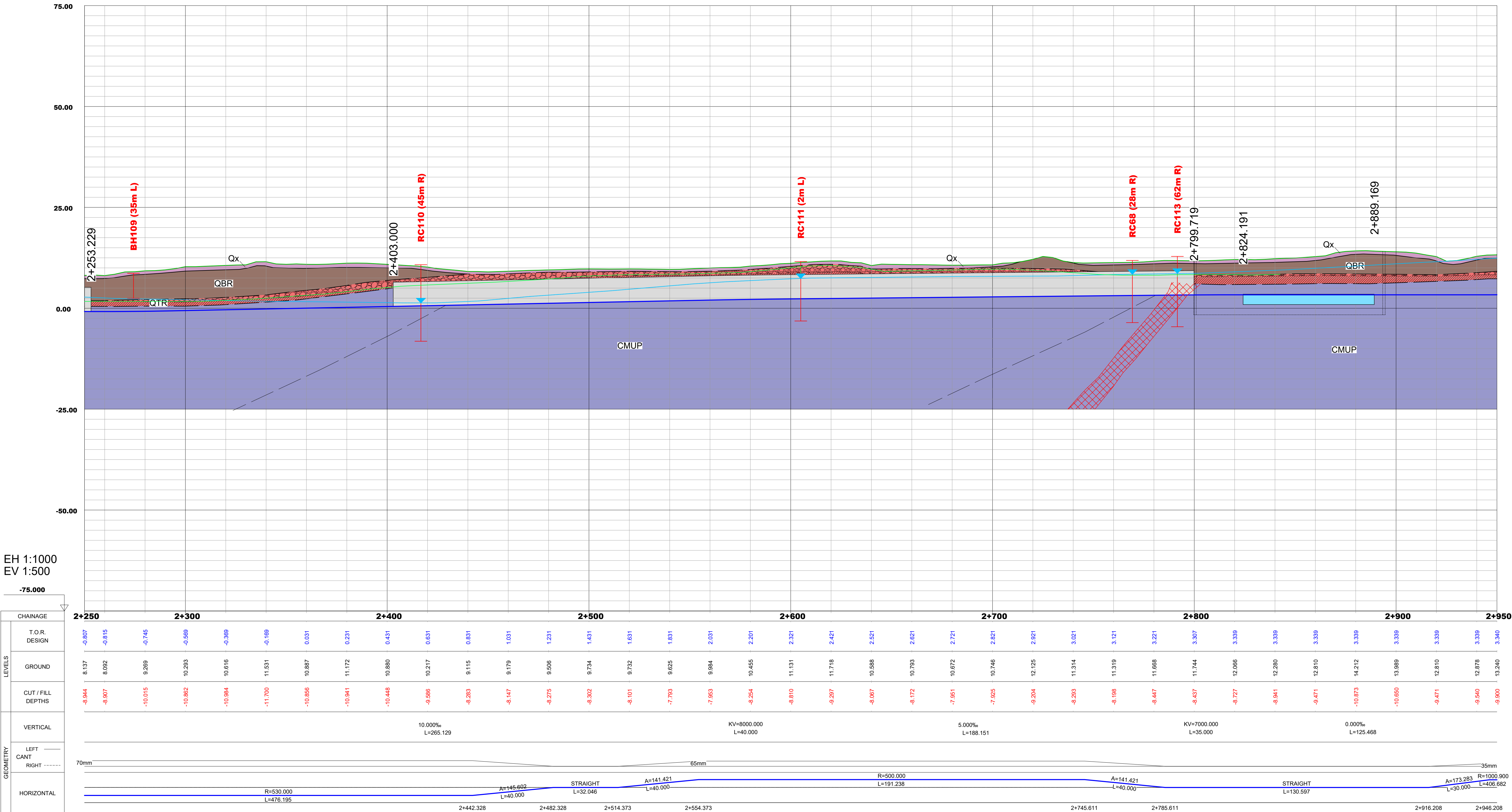
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D = Sagitta, difference between CV and TOR level (m)

The distance from TOR to tunnel crown is 6.7 m

SYMBOLLOGY:

Cut and cover section
TOR
Rail level (TOR)

STATION
SEATOWN



EH 1:1000
EV 1:500

-75.000

| CHAINAGE | 2+250 | | | | | | | | | | 2+300 | | | | | | | | | | 2+400 | | | | | | | | | | 2+500 | | | | | | | | | | 2+600 | | | | | | | | | | 2+700 | | | | | | | | | | 2+800 | | | | | | | | | | 2+900 | | | | | | | | | | 2+950 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 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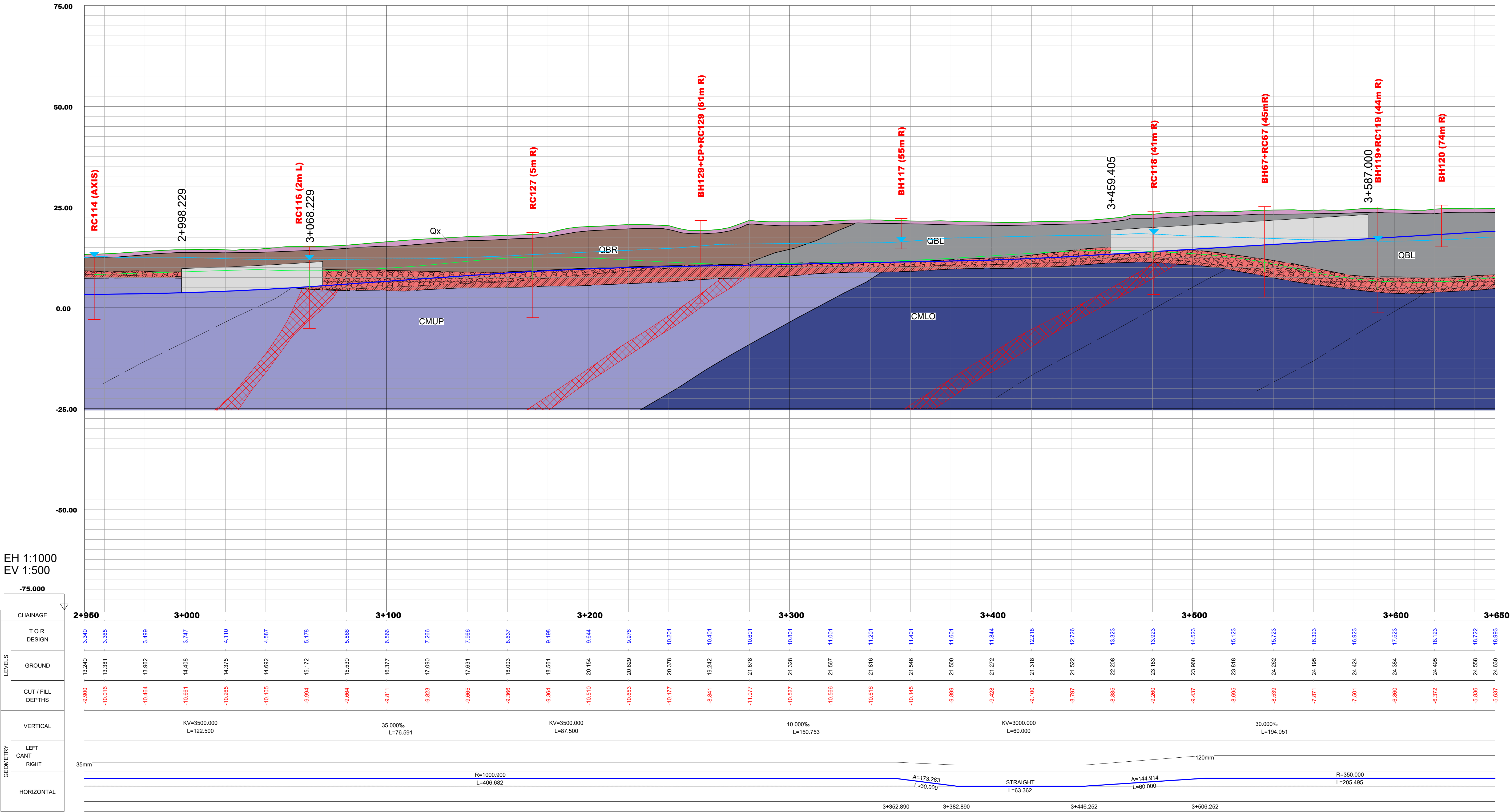
NOTES:

KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (%)
D = Sagitta, difference between CV and TOR level (m)

The distance from TOR to tunnel crown is 6.7 m

SYMBOLOLOGY:

Cut and cover section
TOR
Rail level (TOR)

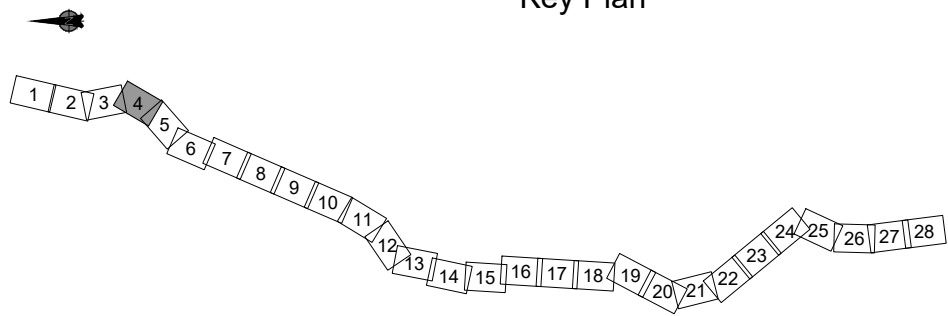


EH 1:1000
EV 1:500

-75.000

| CHAINAGE | 2+950 | 3+000 | 3+100 | 3+200 | 3+300 | 3+400 | 3+500 | 3+600 | 3+650 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| T.O.R. DESIGN | 3.340 | 3.365 | 3.499 | 3.747 | 4.110 | 4.587 | 5.178 | 5.866 | 6.566 | 7.266 | 7.966 | 8.637 | 9.198 | 9.644 | 9.976 | 10.201 | 10.401 | 10.601 | 10.801 | 11.001 | 11.201 | 11.401 | 11.601 | 11.844 | 12.218 | 12.726 | 13.323 | 13.923 | 14.523 | 15.123 | 15.723 | 16.323 | 16.923 | 17.523 | 18.123 | 18.722 | 19.303 | | | |
| GROUND | 13.240 | 13.381 | 13.982 | 14.408 | 14.375 | 14.692 | 15.172 | 15.530 | 16.377 | 17.090 | 17.631 | 18.003 | 18.561 | 20.154 | 20.629 | 20.378 | 19.242 | 21.678 | 21.328 | 21.567 | 21.816 | 21.546 | 21.500 | 21.601 | 21.272 | 21.318 | 21.622 | 22.208 | 23.183 | 23.960 | 23.818 | 24.262 | 24.195 | 24.424 | 24.384 | 24.495 | 24.558 | 24.630 | | |
| CUT / FILL DEPTHS | -9.900 | -10.016 | -10.464 | -10.661 | -10.265 | -10.105 | -9.994 | -9.664 | -9.611 | -9.823 | -9.665 | -9.366 | -9.364 | -10.510 | -10.653 | -10.177 | -8.841 | -11.077 | -10.527 | -10.566 | -10.616 | -10.145 | -9.689 | -9.428 | -9.100 | -8.797 | -8.885 | -9.260 | -9.437 | -8.665 | -8.539 | -7.871 | -7.501 | -6.860 | -6.372 | -5.636 | -5.637 | | | |
| VERTICAL | KV=3500.000 L=122.500 | | 35.000% L=76.591 | | KV=3500.000 L=87.500 | | 10.000% L=150.753 | | KV=3000.000 L=60.000 | | 30.000% L=194.051 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GEOMETRY | LEFT ——— | | CANT | | RIGHT - - - - - | | HORIZONTAL | | 35mm | | R=1000.900 L=406.682 | | A=173.283 L=30.000 | | STRAIGHT L=63.362 | | A=144.914 L=60.000 | | R=350.000 L=205.495 | | | | | | | | | | | | | | | | | | | | | |
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Key Plan



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|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
| REV. | DATE | Description | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
| © National Roads Authority (NRA) 2018. This drawing is confidential and the copyright in it is owned by NRA. This drawing must not be either loaned, copied or otherwise reproduced in whole or in part or used for any purpose without the prior permission of NRA, Transport Infrastructure Ireland (TII) is an operational name of the National Roads Authority. © Ordnance Survey Ireland and Government of Ireland. All O.S. data used for plans are printed under Ordnance Survey no. EN0045216. All elevations are in metres and relate to OSI Geoid Model (OSGM02) Mean Head as defined by existing Project Control. All Co-ordinates are in Irish Transverse Mercator Grid (ITM) as defined by OSI active GPS station Tallaght College (TLTG). | | | | | | |

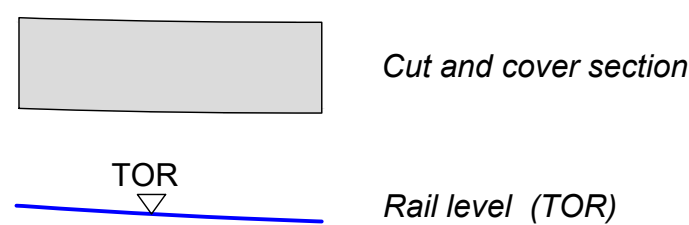
| | | | |
|--------------------------------------|--|---|----------------|
| Client | Project | Drawing Title | Drawing Status |
| Transport Infrastructure Ireland | Udarás Náisiúnta Iompair National Transport Authority | Ground Investigation Geological Long Section – Phase 1 | S4 |
| Consultant | Drawing N° | ML1-JAI-GEO-ROUT_XX-DR-Y-00013 | |
| IDOM | Scales Original Size A1 | Sheet 4 of 28 | |

NOTES:

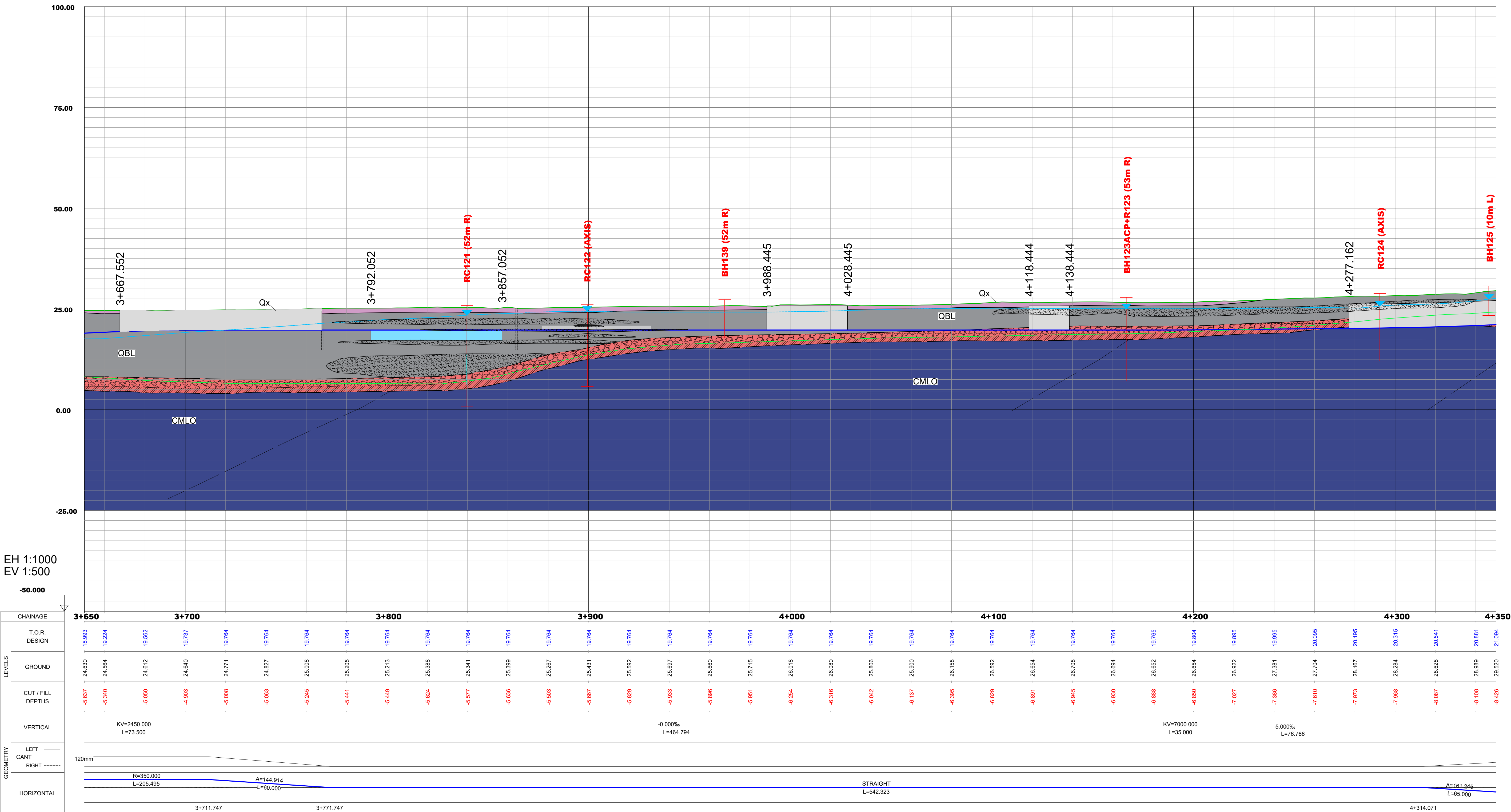
KV= Vertical curve radio (m)
CV= Vertex level (m)
W = Difference between the exit slope minus the entrance slope (%)
D = Sagitta, difference between CV and TOR level (m)

The distance from TOR to tunnel crown is 6.7 m

SYMBOLGY:



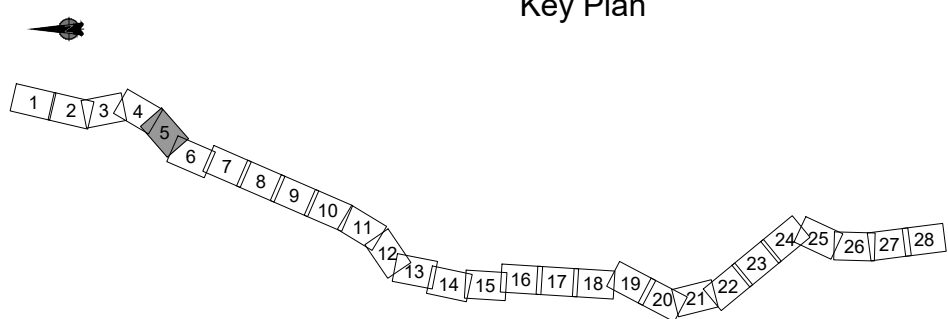
STATION
SWORDS CENTRAL



EH 1:1000
EV 1:500

-50.000

| CHAINAGE | | 3+650 | | 3+700 | | 3+800 | | 3+900 | | 4+000 | | 4+100 | | 4+200 | | 4+300 | | 4+350 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| LEVELS | T.O.R. DESIGN | 18.893 | 19.224 | 19.562 | 19.737 | 19.764 | 19.764 | 19.764 | 19.764 | 19.764 | 19.764 | 19.764 | 19.764 | 19.764 | 19.765 | 19.804 | 19.895 | 20.195 | 20.315 | 20.541 | 20.881 | 21.094 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | GROUND | 24.630 | 24.564 | 24.612 | 24.640 | 24.771 | 24.827 | 25.008 | 25.008 | 25.205 | 25.213 | 25.388 | 25.341 | 25.389 | 25.267 | 25.431 | 25.680 | 25.592 | 25.687 | 25.664 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 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25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 | 25.652 |



| REV. | DATE | DESCRIPTION | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
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| | | | | | | | |
|---|--|-------------------------|--|---|--|----------------|--|
| Client | | Project | | Drawing Title | | Drawing Status | |
| TII Transport Infrastructure Ireland | | METROLINK | | Ground Investigation Geological Long Section – Phase 1 | | S4 | |
| Consultant | | Drawing N° | | ML1-JAI-GEO-ROUT_XX-DR-Y-00013 | | Sheet 5 of 28 | |
| JACOBS IDOM | | Scales Original Size A1 | | | | | |

NOTES:

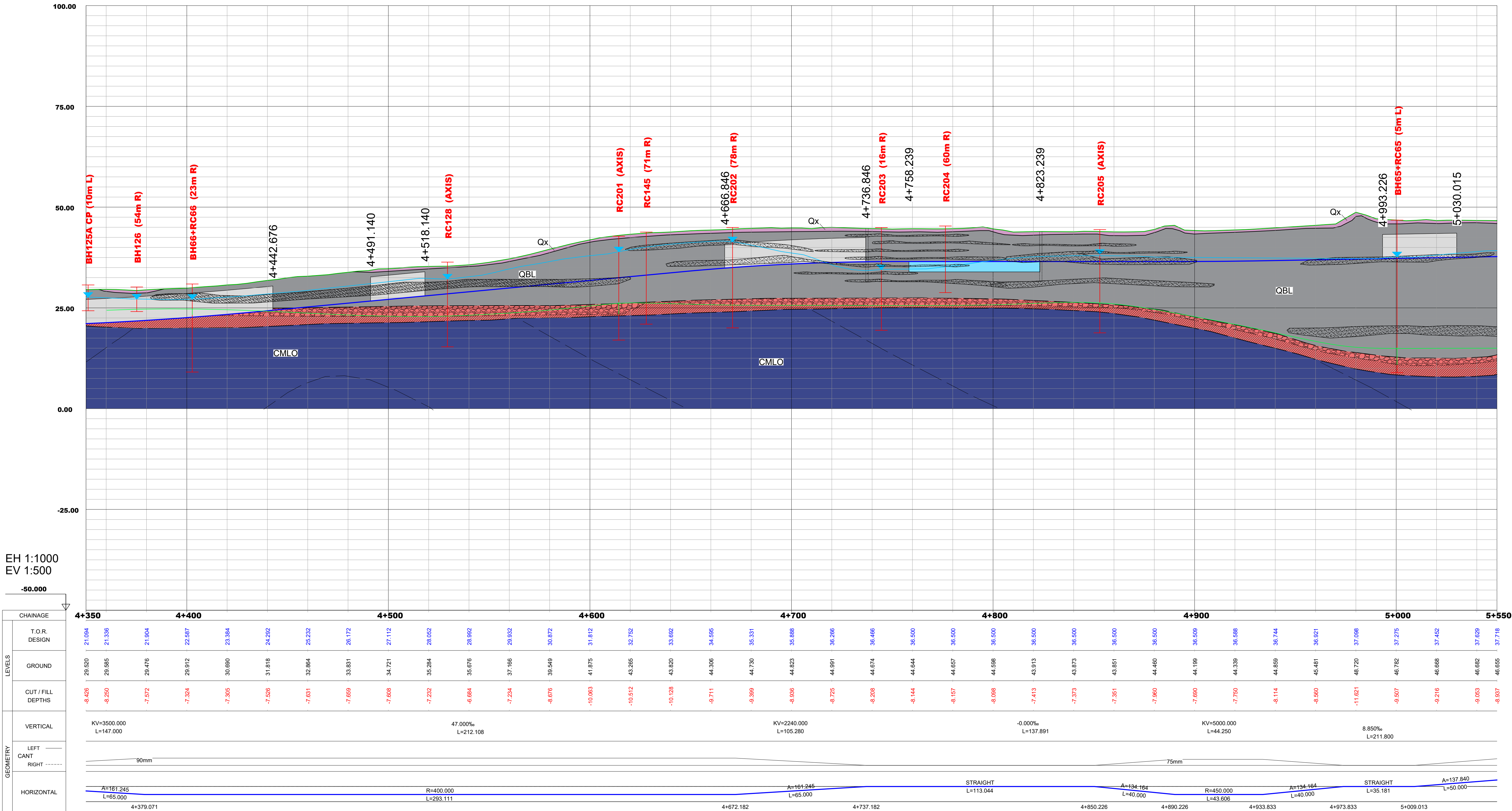
KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (%)
D = Sagitta, difference between CV and TOR level (m)

The distance from TOR to tunnel crown is 6.7 m

SYMBOLLOGY:

Cut and cover section
TOR
Rail level (TOR)

STATION
FOSTERSTOWN



EH 1:1000
EV 1:500

| | | -50.000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------|-------------------|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|----------------------|--------|--------|--------|--------|-----------|--------|--------|--------|--------|--------------------------|--------|--------|--------|--------|------------------------|--------|---------|--------|--------|-------------------------|--|--|--|--|-----------------------|--|--|--|--|-----------------------|--|--|--|--|-----------------------|--|--|--|--|-----------------------|--|--|--|--|-----------------------|--|--|--|--|----------------------|--|--|--|--|-----------------------|--|--|--|
| CHAINAGE | | 4+350 | | | | | 4+400 | | | | | 4+500 | | | | | 4+600 | | | | | 4+700 | | | | | 4+800 | | | | | 4+900 | | | | | 5+000 | | | | | 5+100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LEVELS | T.O.R. DESIGN | 21.094 | 21.336 | 21.904 | 22.597 | 23.384 | 24.292 | 25.232 | 26.172 | 27.112 | 28.052 | 28.992 | 29.932 | 30.872 | 31.812 | 32.752 | 33.692 | 34.595 | 35.331 | 35.898 | 36.266 | 36.466 | 36.500 | 36.500 | 36.500 | 36.500 | 36.500 | 36.509 | 36.588 | 36.744 | 36.921 | 37.098 | 37.275 | 37.452 | 37.629 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | GROUND | 29.520 | 29.585 | 29.476 | 29.912 | 30.680 | 31.818 | 32.864 | 33.831 | 34.721 | 35.284 | 35.676 | 37.166 | 38.549 | 41.875 | 43.265 | 43.820 | 44.306 | 44.730 | 44.823 | 44.991 | 44.674 | 44.644 | 44.657 | 44.598 | 43.919 | 43.873 | 43.851 | 44.460 | 44.199 | 44.339 | 44.859 | 45.481 | 48.720 | 46.762 | 46.688 | 46.682 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | CUT / FILL DEPTHS | -8.428 | -8.250 | -7.572 | -7.324 | -7.305 | -7.526 | -7.031 | -7.659 | -7.608 | -7.232 | -6.684 | -7.234 | -8.676 | -10.063 | -10.512 | -10.128 | -9.711 | -9.389 | -8.936 | -8.725 | -8.208 | -8.144 | -8.157 | -8.098 | -7.413 | -7.373 | -7.351 | -7.980 | -7.660 | -7.750 | -8.114 | -8.560 | -11.621 | -9.507 | -9.216 | -9.653 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GEOMETRY | VERTICAL | KV=3500.000 L=147.000 | | | | | | | | | | | | | | | 47.000% L=212.108 | | | | | | | | | | KV=2240.000 L=105.280 | | | | | -0.000% L=137.891 | | | | | KV=5000.000 L=44.250 | | | | | 8.850% L=211.800 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | LEFT CANT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | RIGHT CANT | 90mm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | HORIZONTAL | A=161.245 L=65.000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | R=400.000 L=293.111 | | | | | | | | | | A=161.245 L=65.000 | | | | | STRAIGHT L=113.044 | | | | | A=134.164 L=40.000 | | | | | R=450.000 L=43.606 | | | | | A=134.164 L=40.000 | | | | | STRAIGHT L=36.181 | | | | | A=137.840 L=50.000 | | | |
| | | 4+379.071 | | | | | | | | | | | | | | | 4+672.182 | | | | | 4+737.182 | | | | | | | | | | 4+850.226 | | | | | 4+890.226 | | | | | 4+933.833 | | | | | 4+973.833 | | | | | 5+009.013 | | | | | | | | | | | | | | | | | | | | | | | |

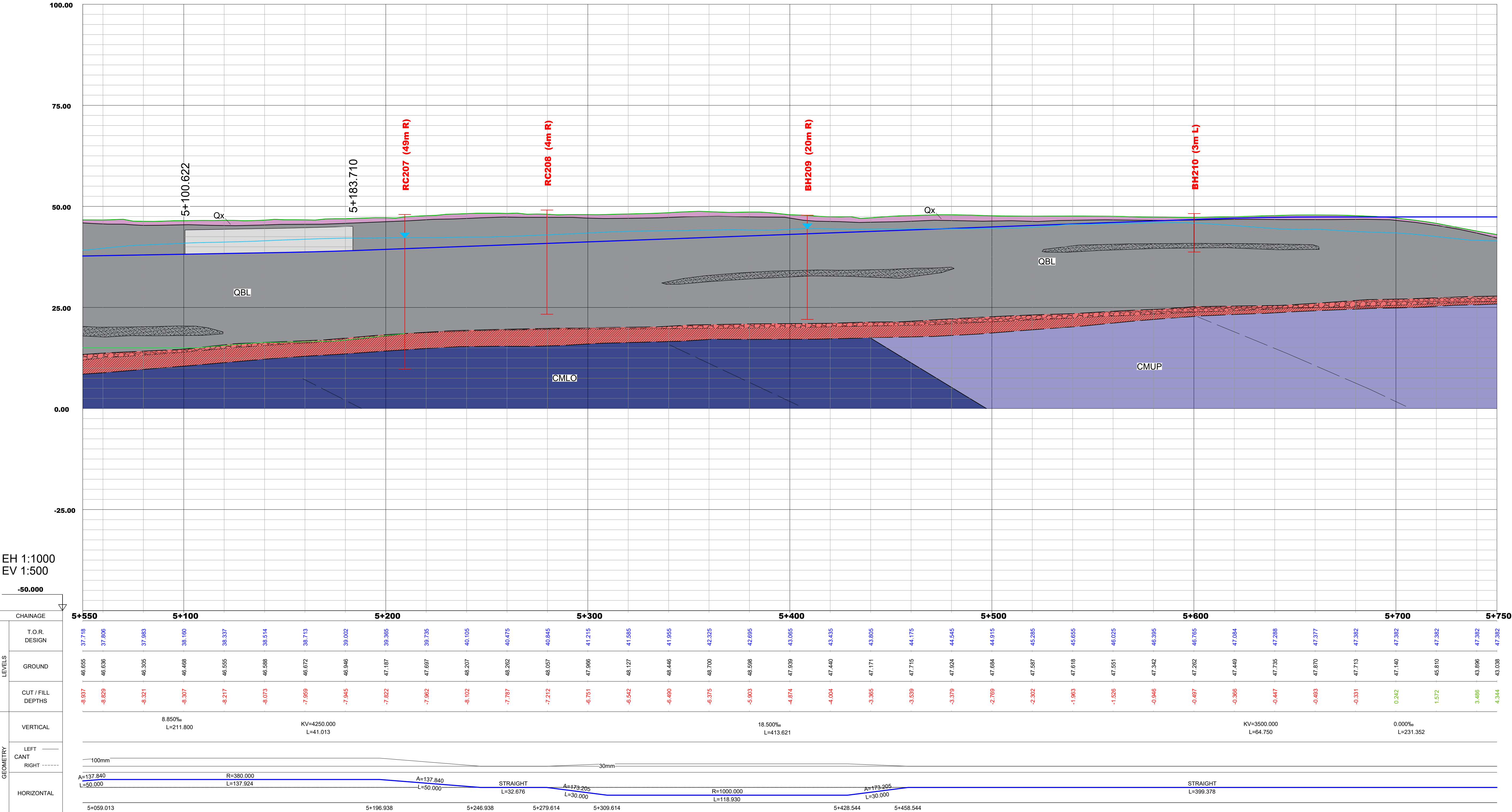
NOTES:

KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (%)
D = Sagitta, difference between CV and TOR level (m)

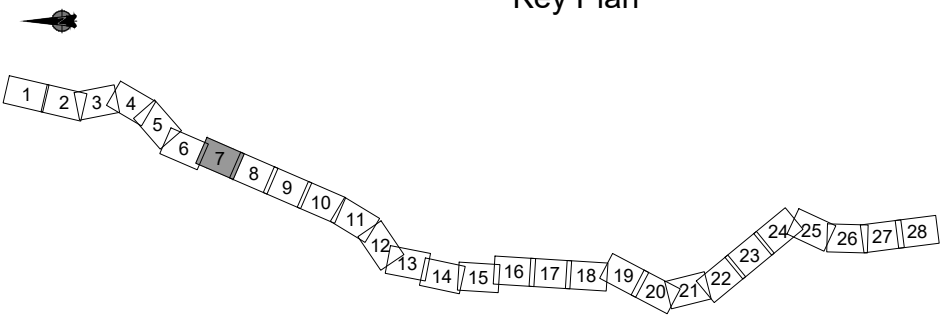
The distance from TOR to tunnel crown is 6.7 m

SYMBOLLOGY:

Cut and cover section
TOR
Rail level (TOR)



| CHAINAGE | | 5+550 | 5+100 | 5+200 | 5+300 | 5+400 | 5+500 | 5+600 | 5+700 | 5+750 |
|------------|-------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| LEVELS | T.O.R. DESIGN | 37.718 | 37.806 | 37.983 | 38.160 | 38.337 | 38.514 | 38.691 | 38.868 | 39.045 |
| | GROUND | 46.655 | 46.636 | 46.305 | 46.468 | 46.555 | 46.598 | 46.672 | 46.713 | 46.746 |
| | CUT / FILL DEPTHS | -8.937 | -8.929 | -8.321 | -8.307 | -8.217 | -8.073 | -7.959 | -7.945 | -7.897 |
| GEOMETRY | VERTICAL | 8.850% L=211.800 | | | | | | | | |
| | LEFT | KV=4250.000 L=41.013 | | | | | | | | |
| | CANT | 18.500% L=413.621 | | | | | | | | |
| HORIZONTAL | RIGHT | KV=3500.000 L=64.750 | | | | | | | | |
| | VERTICAL | 0.000% L=231.352 | | | | | | | | |
| | HORIZONTAL | 0.000% L=231.352 | | | | | | | | |



| REV. | DATE | DESCRIPTION | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
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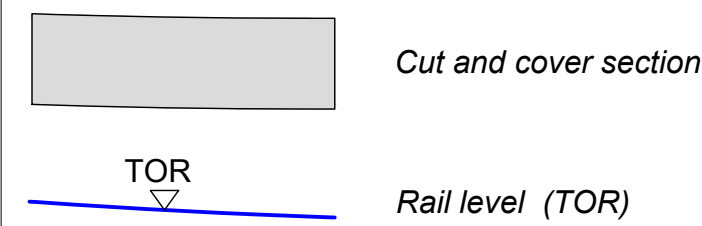
| | | | | | | | |
|---|--|-------------------------|--|---|--|----------------|--|
| Client | | Project | | Drawing Title | | Drawing Status | |
| TII Transport Infrastructure Ireland | | METROLINK | | Ground Investigation Geological Long Section – Phase 1 | | S4 | |
| Consultant | | Drawing N° | | ML1-JAI-GEO-ROUT_XX-DR-Y-00013 | | Sheet 7 of 28 | |
| JACOBS | | Scales Original Size A1 | | | | | |
| IDOM | | | | | | | |

NOTES:

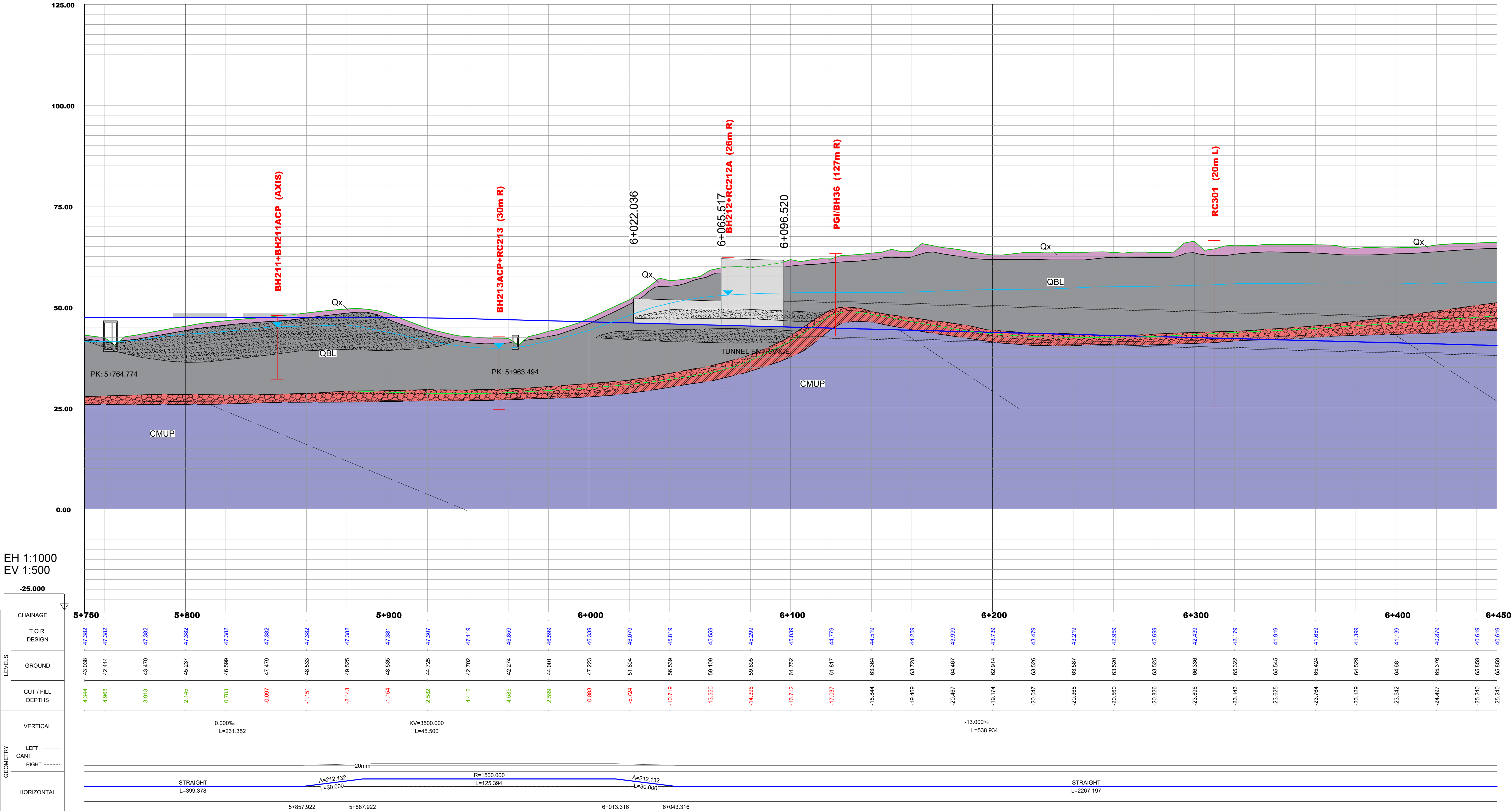
KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (%)
D = Sagitta, difference between CV and TOR level (m)

The distance from TOR to tunnel crown is 6.7 m

SYMBOLLOGY:



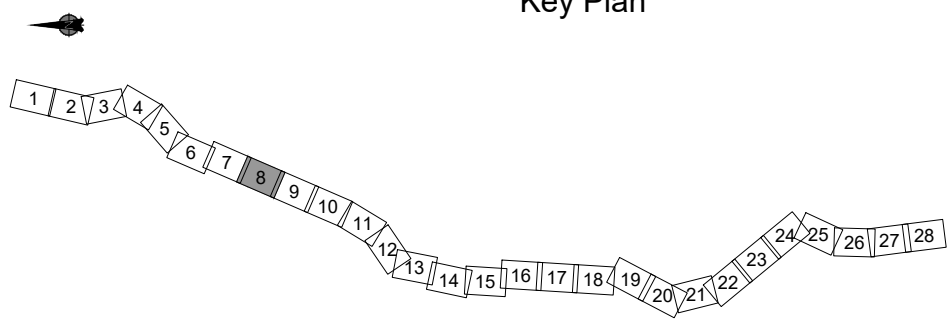
NORTH PORTAL



EH 1:1000
EV 1:500

-25.000

| CHAINAGE | | 5+750 | 5+800 | 5+900 | 6+000 | 6+100 | 6+200 | 6+300 | 6+400 | 6+450 |
|------------|-------------------|-----------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| LEVELS | T.O.R. DESIGN | 47.382 | 47.382 | 47.382 | 47.382 | 47.382 | 47.382 | 47.382 | 47.382 | 47.382 |
| | GROUND | 43.038 | 42.414 | 43.470 | 46.599 | 47.382 | 47.382 | 47.382 | 47.382 | 47.382 |
| GEOMETRY | CUT / FILL DEPTHS | 4.344 | 4.968 | 3.913 | 2.145 | 0.783 | -0.087 | -1.151 | -2.143 | -1.154 |
| | VERTICAL | 0.000% L=231.352 | | | | | | | | |
| HORIZONTAL | LEFT | STRAIGHT L=399.378 | | | | | | | | |
| | RIGHT | STRAIGHT L=399.378 | | | | | | | | |



Key Plan

| | | | | | | |
|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
| REV. | DATE | Description | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
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Client

Project

METROLINK

Consultant

| | | | |
|-------------------------|---|----------------|---------|
| Drawing Title | Ground Investigation Geological Long Section – Phase 1 | Drawing Status | S4 |
| Drawing N° | ML1-JAI-GEO-ROUT_XX-DR-Y-00013 | | |
| Scales Original Size A1 | | Sheet | 8 of 28 |

NOTES:

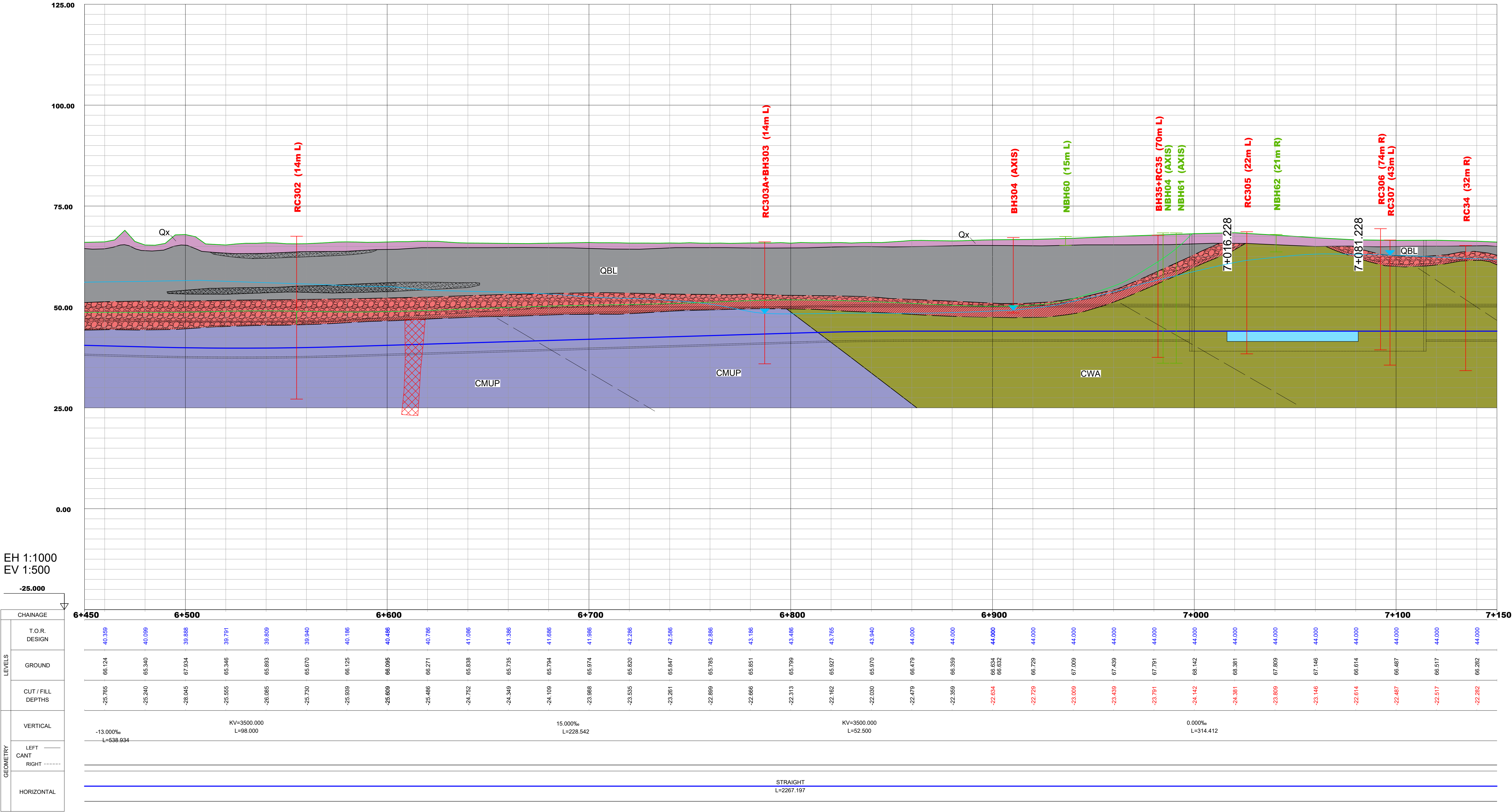
KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (‰)
D = Sagitta, difference between CV and TOR level (m)

The distance from TOR to tunnel crown is 6.7 m

SYMBOLOLOGY:

Cut and cover section
TOR
Rail level (TOR)

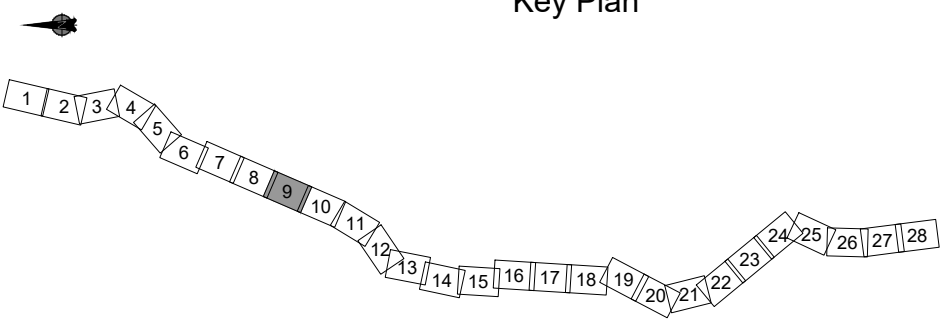
STATION
DUBLIN AIRPORT




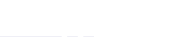



EH 1:1000
EV 1:500

-25.000

| CHAINAGE | | 6+450 | 6+500 | 6+600 | 6+700 | 6+800 | 6+900 | 7+000 | 7+100 | 7+150 |
|------------|-------------------|-------------------------|---------|----------------------|---------|-------------------------|---------|---------------------|---------|---------|
| LEVELS | T.O.R. DESIGN | 40.359 | 40.089 | 39.888 | 39.791 | 39.809 | 39.940 | 40.186 | 40.486 | 40.786 |
| | GROUND | 66.124 | 65.340 | 67.934 | 65.346 | 65.893 | 65.670 | 66.125 | 66.125 | 66.125 |
| GEOMETRY | CUT / FILL DEPTHS | -25.765 | -25.240 | -28.045 | -25.555 | -26.085 | -25.730 | -25.939 | -25.609 | -25.486 |
| | VERTICAL | KV=3500.000 L=98.000 | | 15.000‰ L=228.542 | | KV=3500.000 L=52.500 | | 0.000‰ L=314.412 | | |
| GEOMETRY | LEFT CANT | | | | | | | | | |
| | RIGHT | | | | | | | | | |
| HORIZONTAL | | STRAIGHT L=2267.197 | | | | | | | | |



| REV. | DATE | Description | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
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| | | | | | | |
|---|--|---|--|--|--|----------------------|
| Client <div></div> | | Project <div></div> | Drawing Title Ground Investigation Geological Long Section – Phase 1 | | | Drawing Status S4 |
| Consultant <div></div> | | | Drawing N° ML1-JAI-GEO-ROUT_XX-DR-Y-00013 | | | |
| | | | Scales Original Size A1 | | | Sheet 9 of 28 |

NOTES:

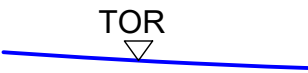
KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (%)
D = Sagitta, difference between CV and TOR level (m)

The distance from TOR to tunnel crown is 6.7 m

SYMBOLOLOGY:

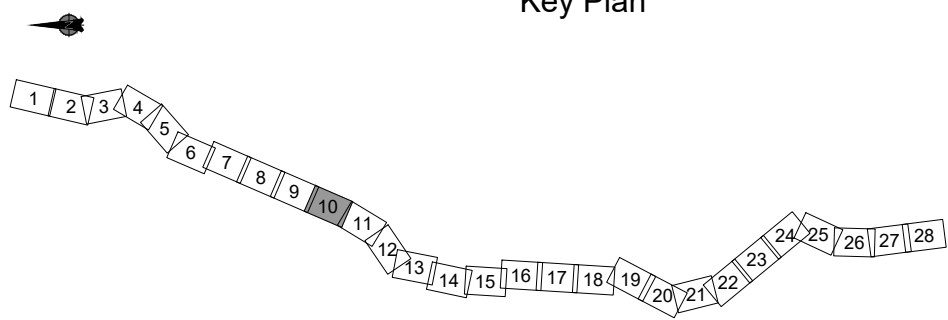
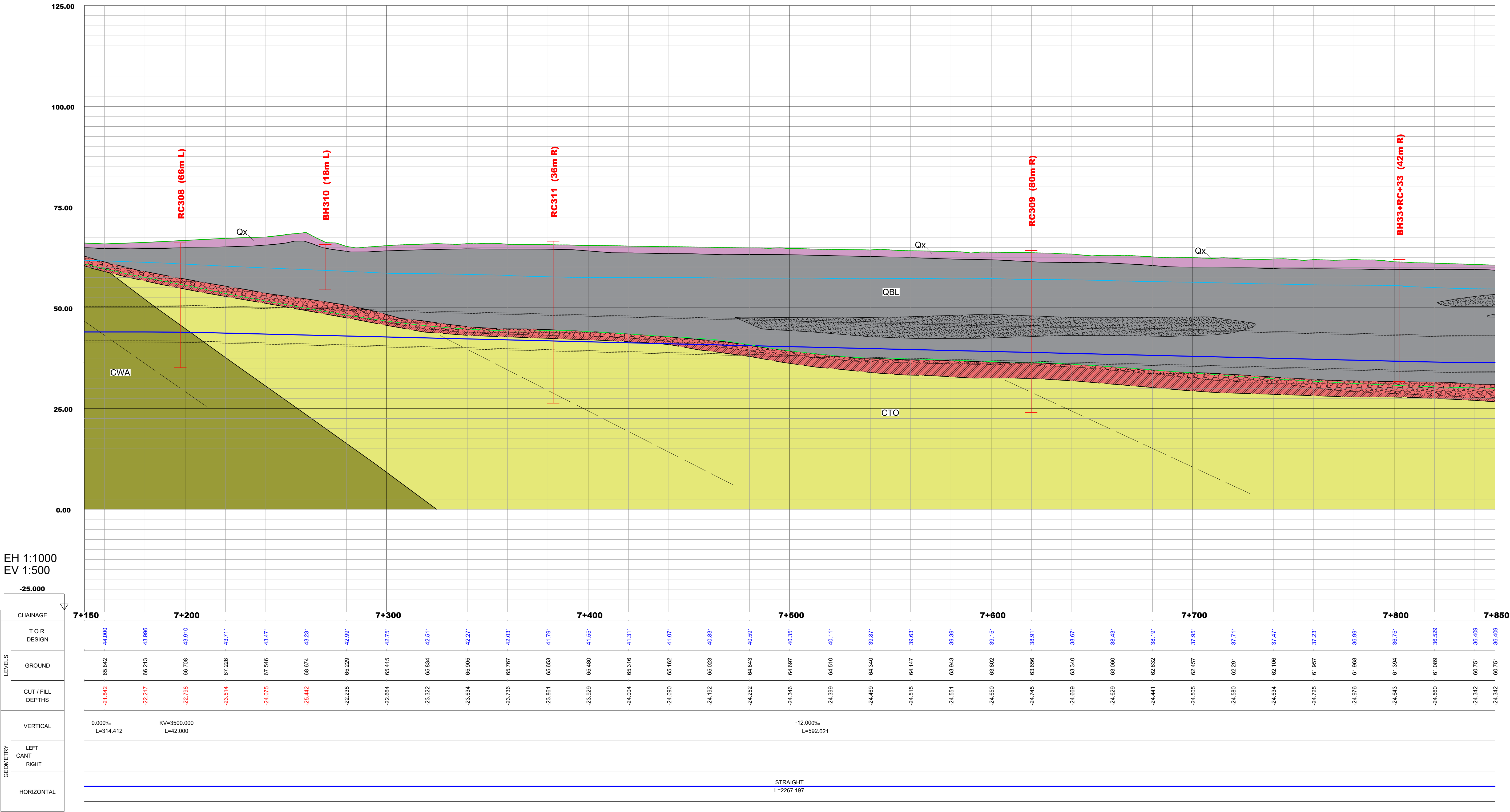


Cut and cover section



Rail level (TOR)

SOUTH PORTAL
EMERGENCY EXIT



| | | | | | | |
|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
| REV. | DATE | Description | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
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| | | | |
|-------------------------|---|----------------|----|
| Drawing Title | Ground Investigation Geological Long Section – Phase 1 | Drawing Status | S4 |
| Drawing N° | ML1-JAI-GEO-ROUT_XX-DR-Y-00013 | | |
| Scales Original Size A1 | | Sheet 10 of 28 | |

NOTES:

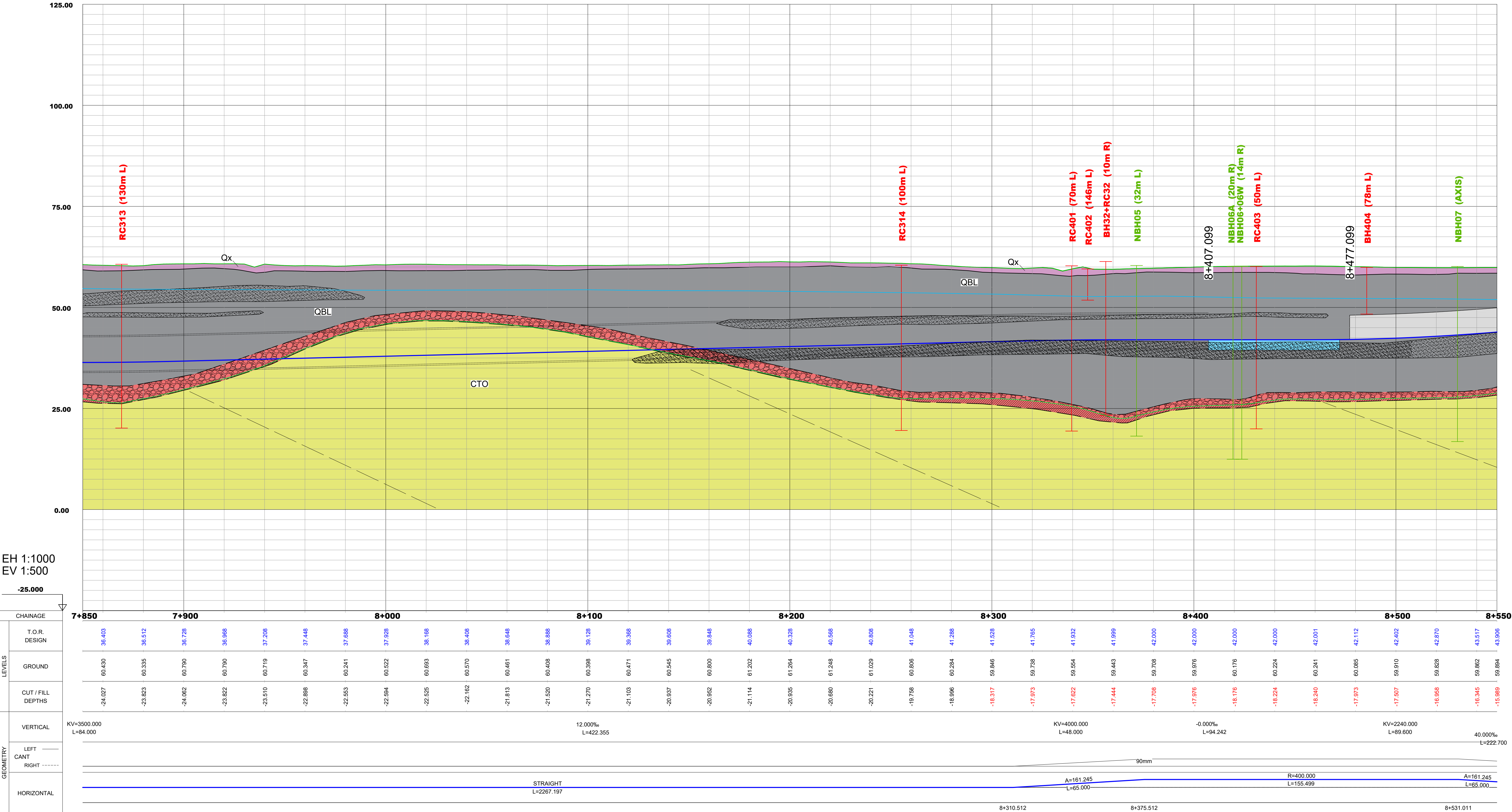
KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (%)
D = Sagitta, difference between CV and TOR level (m)

The distance from TOR to tunnel crown is 6.7 m

SYMBOLOLOGY:

Cut and cover section
TOR
Rail level (TOR)

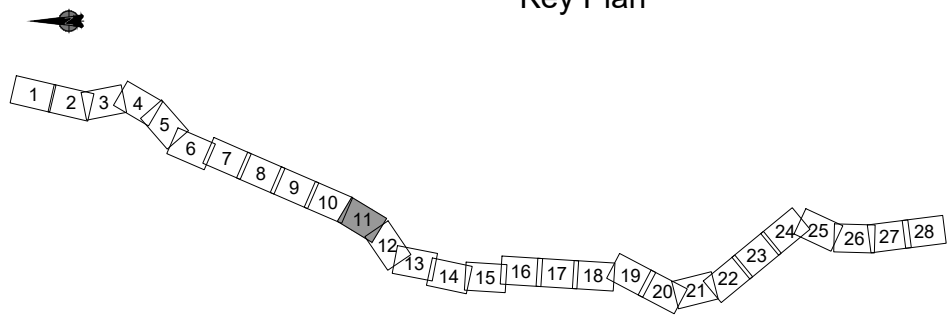
SOUTH PORTAL
SHAFT N°1



EH 1:1000
EV 1:500

-25.000

| CHAINAGE | | 7+850 | 7+900 | 8+000 | 8+100 | 8+200 | 8+300 | 8+400 | 8+500 | 8+550 |
|----------|-------------------|-------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| LEVELS | T.O.R. DESIGN | 36.403 | 36.512 | 36.728 | 36.988 | 37.208 | 37.448 | 37.688 | 37.928 | 38.188 |
| | GROUND | 60.430 | 60.335 | 60.790 | 60.790 | 60.719 | 60.347 | 60.448 | 60.241 | 60.241 |
| GEOMETRY | CUT / FILL DEPTHS | -24.027 | -23.823 | -24.082 | -23.822 | -23.510 | -22.898 | -22.553 | -22.553 | -22.553 |
| | VERTICAL | KV=3500.000 L=84.000 | | | | | | | | |
| GEOMETRY | LEFT | 12.000% | | | | | | | | |
| | CANT | L=422.355 | | | | | | | | |
| GEOMETRY | RIGHT | KV=4000.000 L=48.000 | | | | | | | | |
| | HORIZONTAL | -0.000% | | | | | | | | |
| GEOMETRY | LEFT | KV=2240.000 L=89.600 | | | | | | | | |
| | CANT | L=94.242 | | | | | | | | |
| GEOMETRY | RIGHT | 40.000% | | | | | | | | |
| | HORIZONTAL | L=222.700 | | | | | | | | |
| GEOMETRY | LEFT | 90mm | | | | | | | | |
| | CANT | A=161.245 L=65.000 | | | | | | | | |
| GEOMETRY | RIGHT | R=400.000 L=155.499 | | | | | | | | |
| | HORIZONTAL | A=161.245 L=65.000 | | | | | | | | |



| REV. | DATE | DESCRIPTION | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
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| | | | | | | | |
|--|--|-----------------------------|--|--|--|----------------------|--|
| Client TII Transport Infrastructure Ireland | | Project METROLINK | | Drawing Title Ground Investigation Geological Long Section – Phase 1 | | Drawing Status S4 | |
| Consultant JACOBS | | Consultant IDOM | | Drawing N° ML1-JAI-GEO-ROUT_XX-DR-Y-00013 | | Sheet 11 of 28 | |
| Scales Original Size A1 | | | | | | | |

NOTES:

KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (%)
D = Sagitta, difference between CV and TOR level (m)

The distance from TOR to tunnel crown is 6.7 m

SYMBOLLOGY:

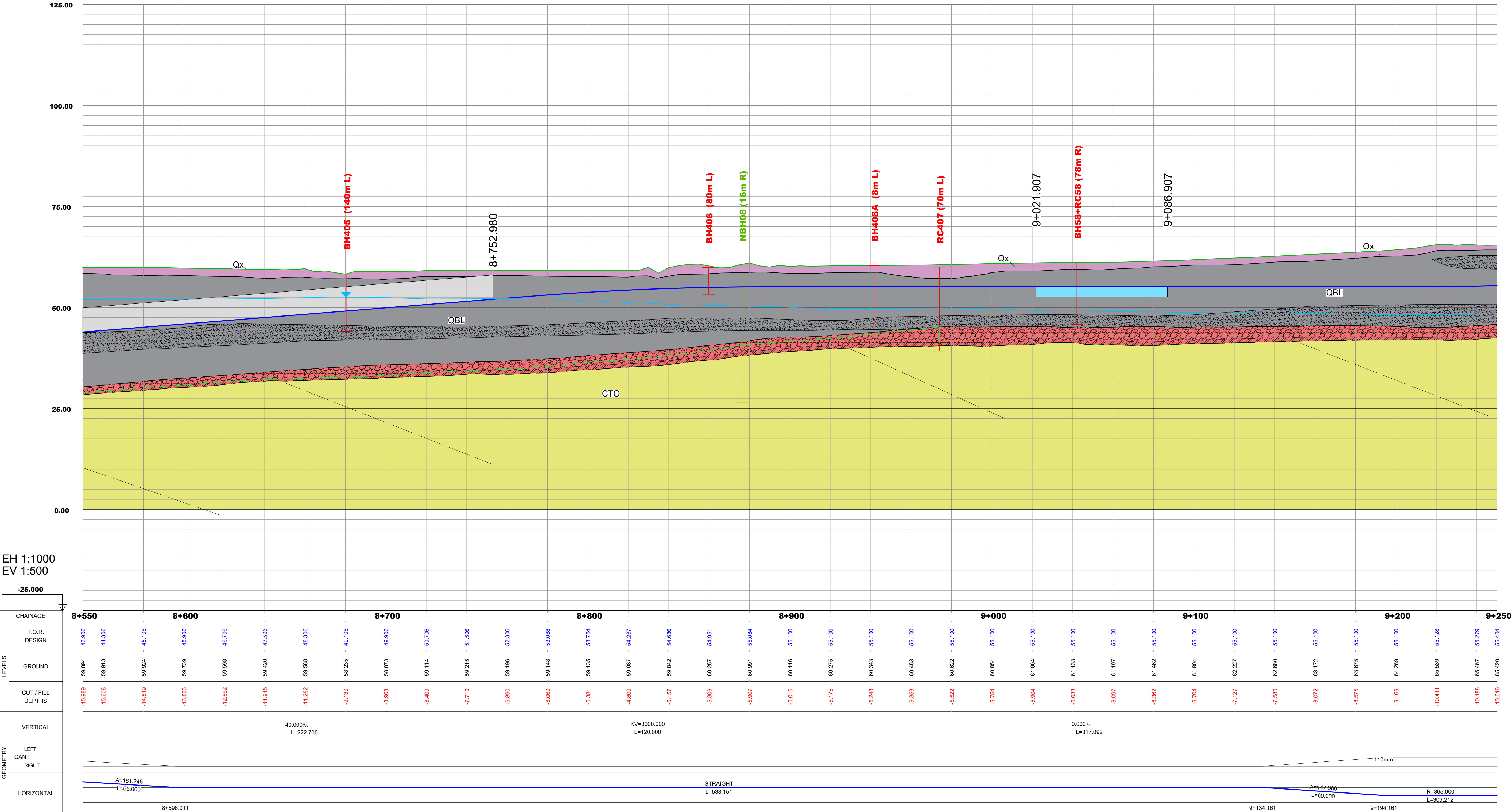


Cut and cover section

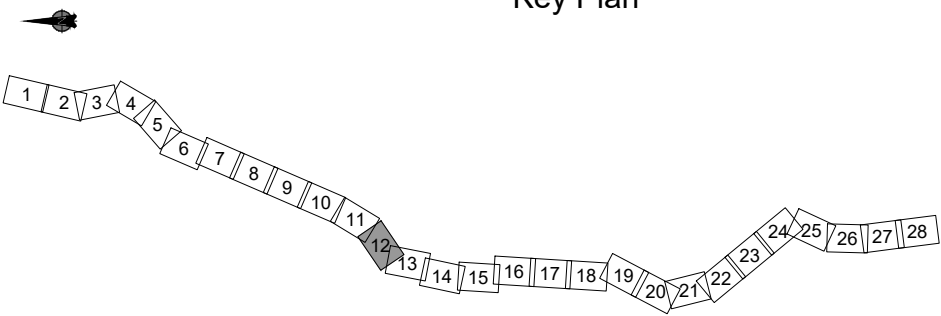


Rail level (TOR)

STATION
DARDISTOWN



Key Plan



| | | | | | | |
|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
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| | | | |
|--------------------------------------|---------------|---|----------------|
| Client | Project | Drawing Title | Drawing Status |
| Transport Infrastructure Ireland | METROLINK | Ground Investigation Geological Long Section – Phase 1 | S4 |
| Consultant | Drawing N° | ML1-JAI-GEO-ROUT_XX-DR-Y-00013 | |
| JACOBS | IDOM | Scales Original Size A1 | Sheet 12 of 28 |

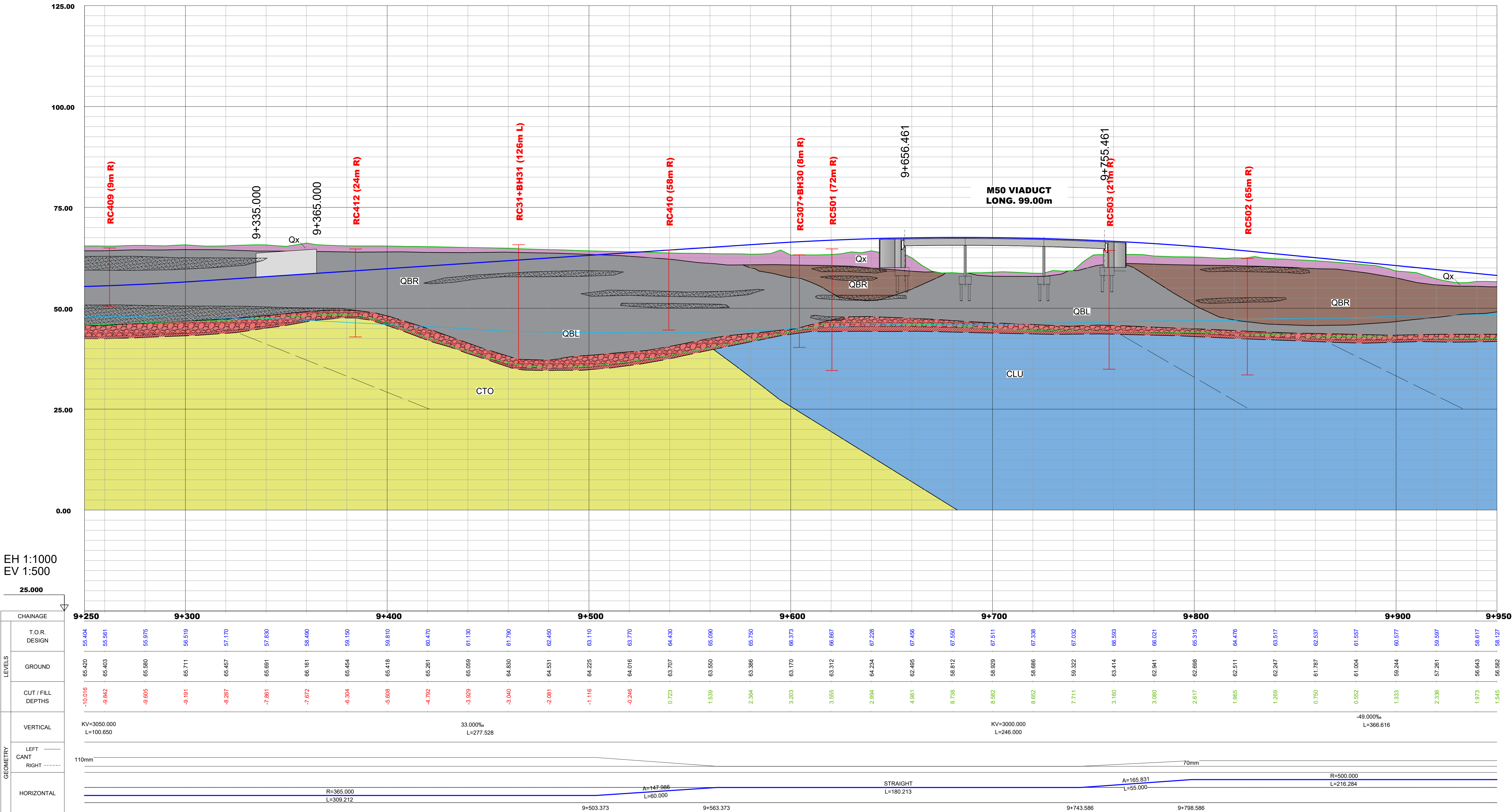
NOTES:

KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (%)
D = Sagitta, difference between CV and TOR level (m)

The distance from TOR to tunnel crown is 6.7 m

SYMBOLOLOGY:

Cut and cover section
TOR
Rail level (TOR)

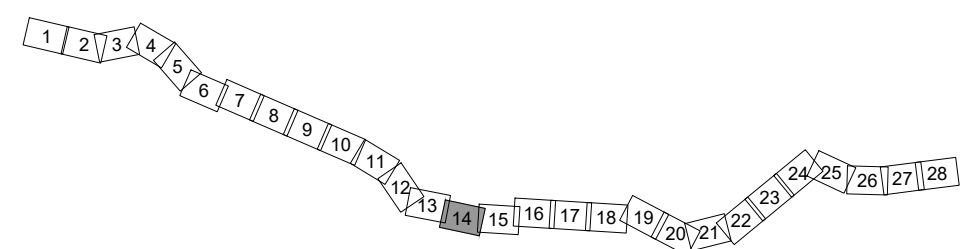
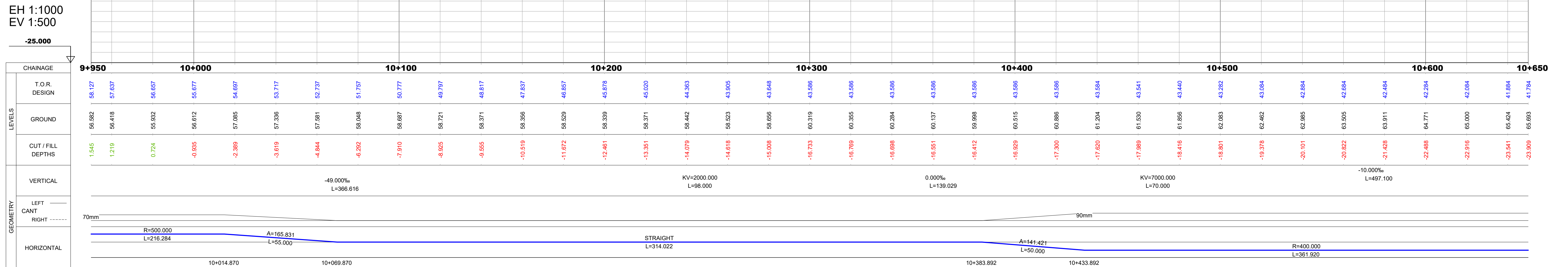


| | |
|-----|--|
| KV= | Vertical curve radio (m) |
| CV= | Vertex level (m) |
| W = | Difference between the exit slope minus the entrance slope (‰) |
| D = | Sagittta, difference between CV and TOR level (m) |

Cut and cover section

TOR

Rail level (TOR)



| | | | | | | |
|------|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
| REV. | DATE | Description | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |

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All elevations are in metres and relate to Geoid (GSD Mean) (DS0002) Mean High as defined by existing Project Control.

All coordinates are in Irish Grid (ITM) as defined by OSI active GPS station Tallaght College (TLIC).






IDOM

Geological Long Section – Phase 1

S4

| | |
|-------------------------|----------|
| Scales Original Size A1 | Sheet 14 |
|-------------------------|----------|

NOTES:

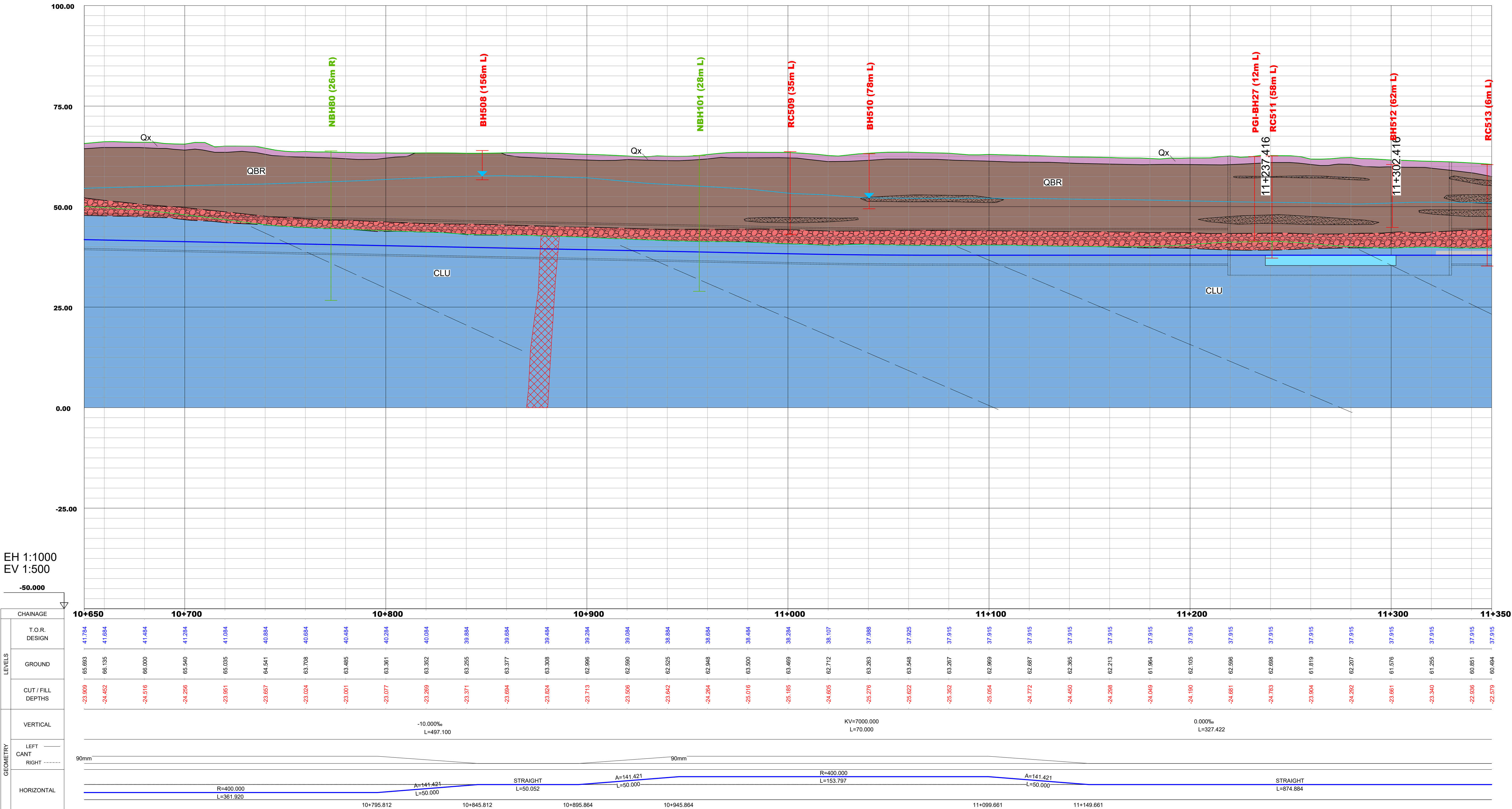
KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (%)
D = Sagitta, difference between CV and TOR level (m)

The distance from TOR to tunnel crown is 6.7 m

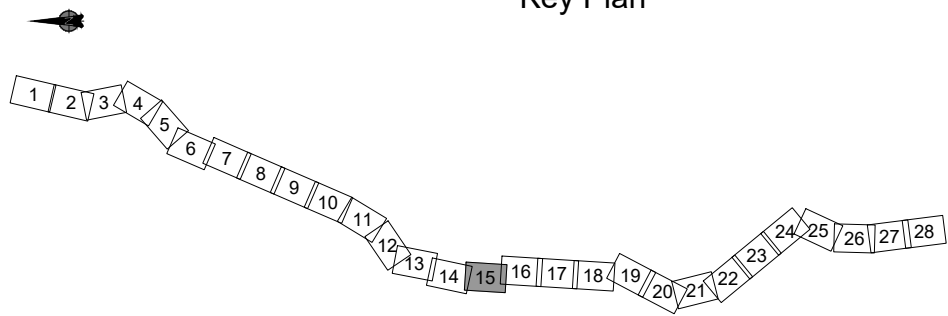
SYMBOLOLOGY:

Cut and cover section
TOR
Rail level (TOR)

STATION
BALLYMUN



Key Plan



| | | | | | | |
|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
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Client



Project



Consultant



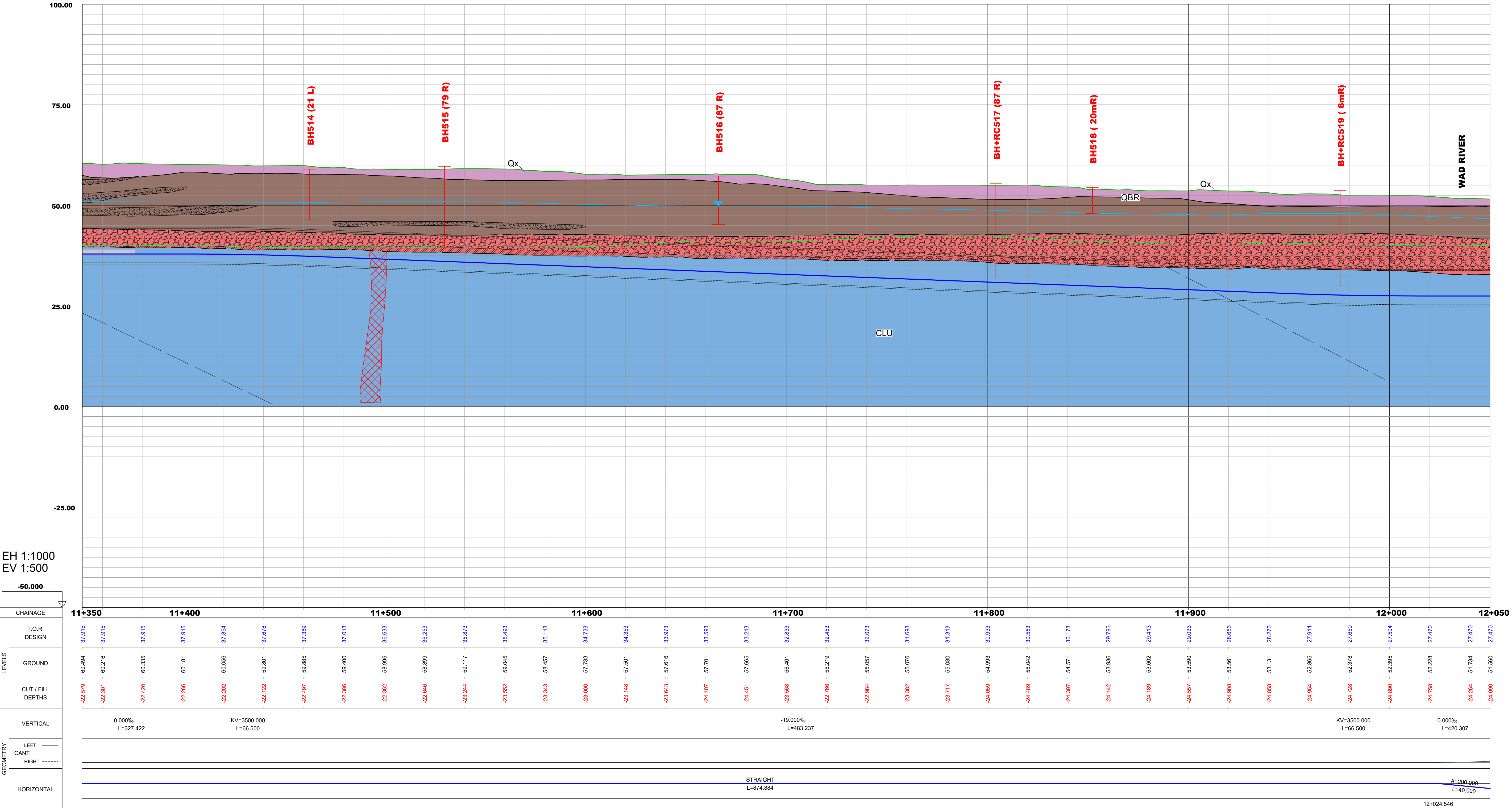
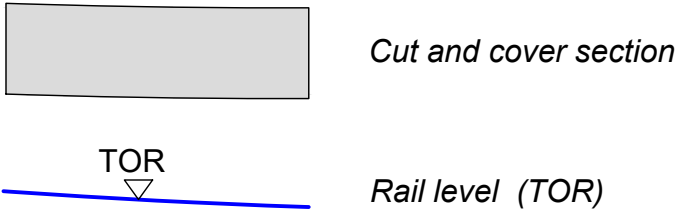
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|-------------------------|---|----------------|----|
| Drawing Title | Ground Investigation Geological Long Section – Phase 1 | Drawing Status | S4 |
| Drawing N° | ML1-JAI-GEO-ROUT_XX-DR-Y-00013 | | |
| Scales Original Size A1 | | Sheet 15 of 28 | |

NOTES:

KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (%)
D = Sagitta, difference between CV and TOR level (m)

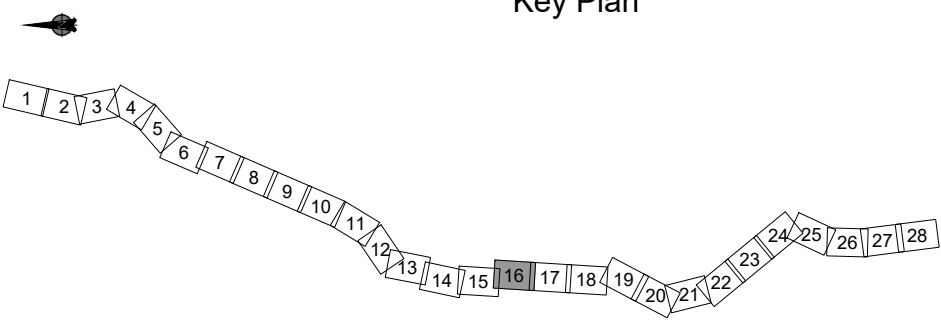
The distance from TOR to tunnel crown is 6.7 m

SYMBOLLOGY:








EH 1:1000
EV 1:500

| CHAINAGE | | 11+350 | 11+400 | 11+500 | 11+600 | 11+700 | 11+800 | 11+900 | 12+000 | 12+050 |
|------------|-------------------|-----------------------|---------|-------------------------|---------|-----------------------|---------|-------------------------|---------|---------------------|
| LEVELS | T.O.R. DESIGN | 37.915 | 37.915 | 37.915 | 37.915 | 37.915 | 37.915 | 37.915 | 37.915 | 37.915 |
| | GROUND | 60.494 | 60.216 | 60.335 | 60.181 | 60.056 | 59.854 | 59.801 | 59.885 | 59.400 |
| | CUT / FILL DEPTHS | -22.579 | -22.301 | -22.420 | -22.266 | -22.202 | -22.122 | -22.497 | -22.386 | -22.362 |
| GEOMETRY | VERTICAL | 0.000% L=327.422 | | KV=3500.000 L=66.500 | | -19.000% L=483.237 | | KV=3500.000 L=66.500 | | 0.000% L=420.307 |
| | LEFT CANT | | | | | | | | | |
| | RIGHT CANT | | | | | | | | | |
| | HORIZONTAL | STRAIGHT L=874.884 | | | | | | | | |
| | | A=200.000 L=40.000 | | | | | | | | |
| 12+024.546 | | | | | | | | | | |



| | | | | | | |
|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
| REV. | DATE | Description | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
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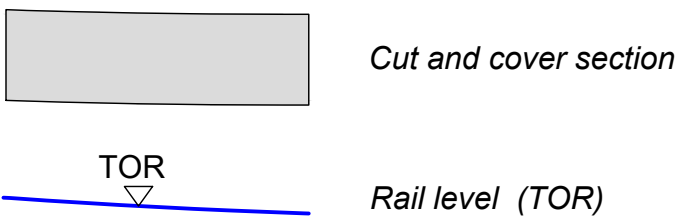
| | | | | | | | | | | | | | |
|---|--|--|--|---|--|--|----------------|--|--------------------------------|--|--|--|--|
| Client | | Project | | Drawing Title | | | Drawing Status | | | | | | |
| <div><div>TII</div><div>Transport Infrastructure Ireland</div></div> <div><div>NTA</div><div>Náisiúnta Náisiúnta National Transport Authority</div></div> | | <div><div>METROLINK</div></div> | | <div>Ground Investigation Geological Long Section – Phase 1</div> | | | <div>S4</div> | | | | | | |
| Consultant | | | | Drawing N° | | | | | ML1-JAI-GEO-ROUT_XX-DR-Y-00013 | | | | |
| <div><div>JACOBS</div></div> <div><div>IDOM</div></div> | | | | Scales Original Size A1 | | | | | Sheet 16 of 28 | | | | |

NOTES:

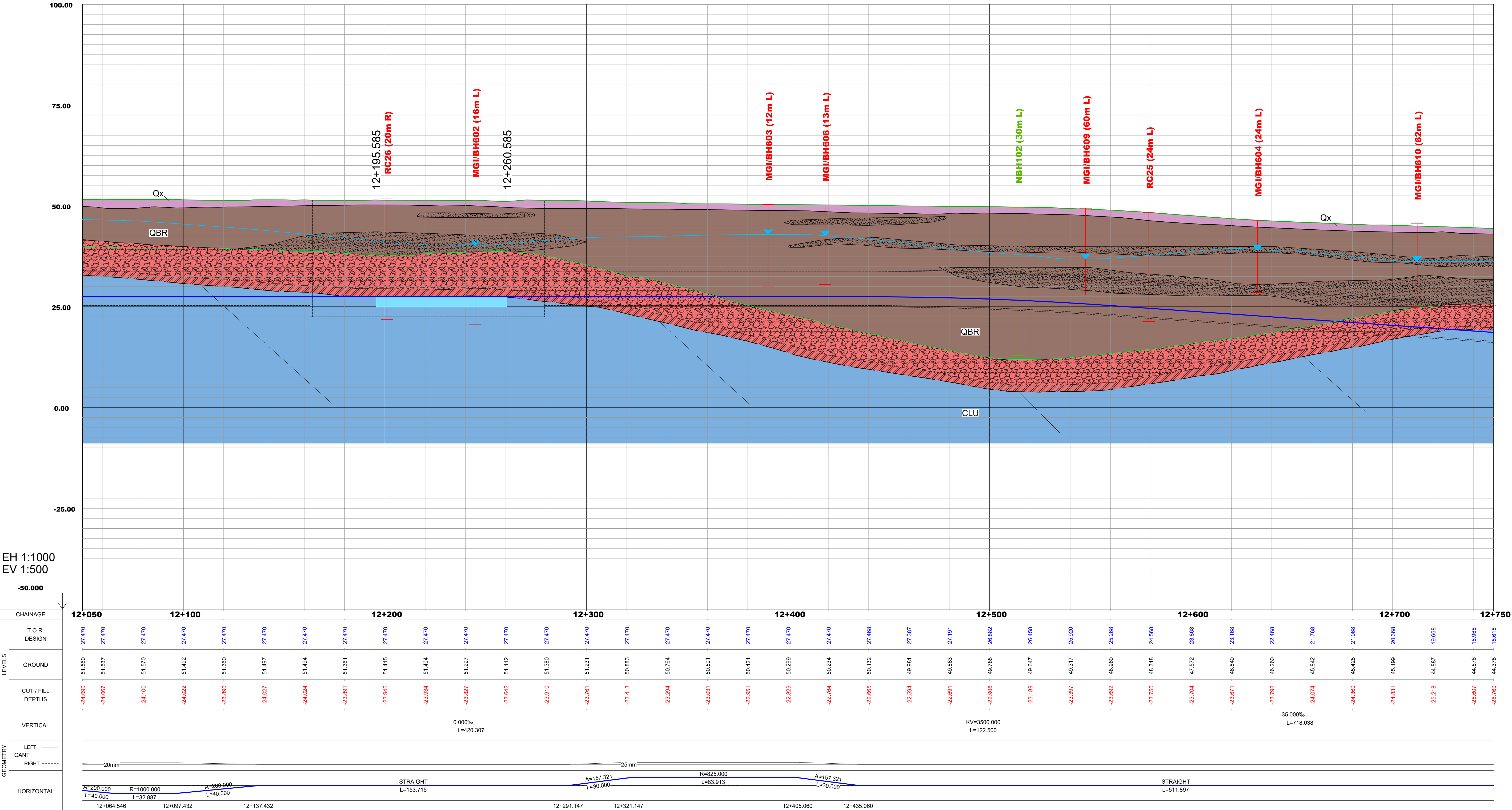
KV= Vertical curve radio (m)
CV= Vertex level (m)
W = Difference between the exit slope minus the entrance slope (%)
D = Sagitta, difference between CV and TOR level (m)

The distance from TOR to tunnel crown is 6.7 m

SYMBOLLOGY:



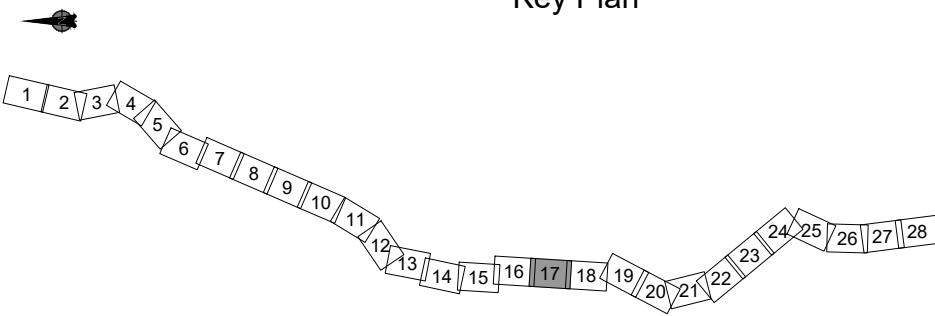
STATION
COLLINS AVENUE



EH 1:1000
EV 1:500

-50.000

| LEVELS | CHAINAGE | | | | | | | | | |
|------------|---|--------|-------------------|----------|------|------|-------|------------|--------|--------|
| | T.O.R. DESIGN | GROUND | CUT / FILL DEPTHS | VERTICAL | LEFT | CANT | RIGHT | HORIZONTAL | 12+050 | 12+100 |
| GEOMETRY | 0.000% L=420.307 | | | | | | | | | |
| | KV=3500.000 L=122.500 | | | | | | | | | |
| HORIZONTAL | 20mm | | | | | | | | | |
| | 25mm | | | | | | | | | |
| HORIZONTAL | STRAIGHT L=153.715 | | | | | | | | | |
| | 12+064.546 12+097.432 12+137.432 12+291.147 12+321.147 12+405.060 12+435.060 12+511.897 | | | | | | | | | |



| | | | | | | |
|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
| REV. | DATE | Description | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
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Client

Project

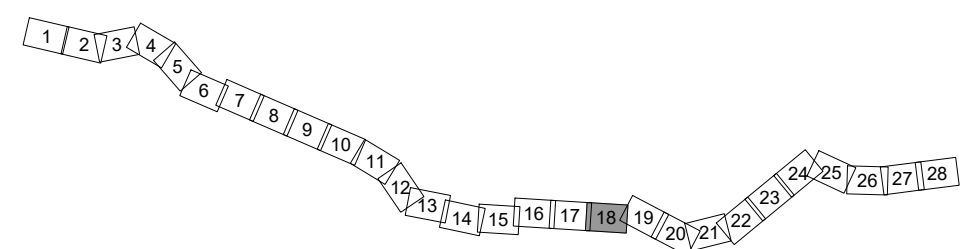
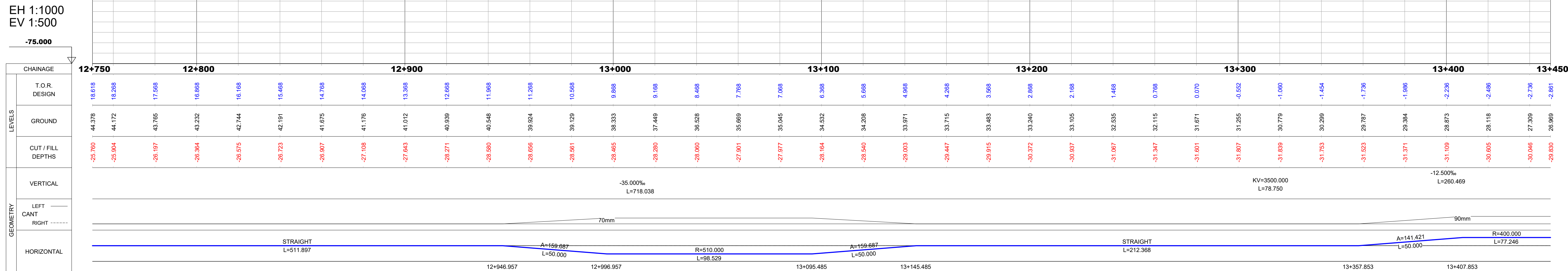
Consultant

| | | | |
|-------------------------|---|----------------|----------------|
| Drawing Title | Ground Investigation Geological Long Section – Phase 1 | Drawing Status | S4 |
| Drawing N° | ML1-JAI-GEO-ROUT_XX-DR-Y-00013 | | |
| Scales Original Size A1 | | | Sheet 17 of 28 |

| | |
|-----|--|
| KV= | Vertical curve radio (m) |
| CV= | Vertex level (m) |
| W= | Difference between the exit slope minus the entrance slope (‰) |
| D = | Saguitta, difference between CV and TOR level (m) |

The distance from TOR to tunnel crown is 6.7 m

Diagram illustrating a cut and cover section. The top surface is labeled "Cut and cover section". Below the cut, the rail level is indicated by a blue line and labeled "Rail level (TOR)". A triangle symbol is placed on the blue line, with "TOR" written above it.



| P03 | 11/12/20 | Final Preliminary Design | | DT | FP | | | JB | NC |
|---|----------|--------------------------|-------------|----------|------------|-------------|-------------|----|----|
| P02 | 03/04/20 | Preliminary Design | | DT | FP | | | JB | NC |
| P01 | 05/12/19 | Preliminary Design | | DT | FP | | | JB | NC |
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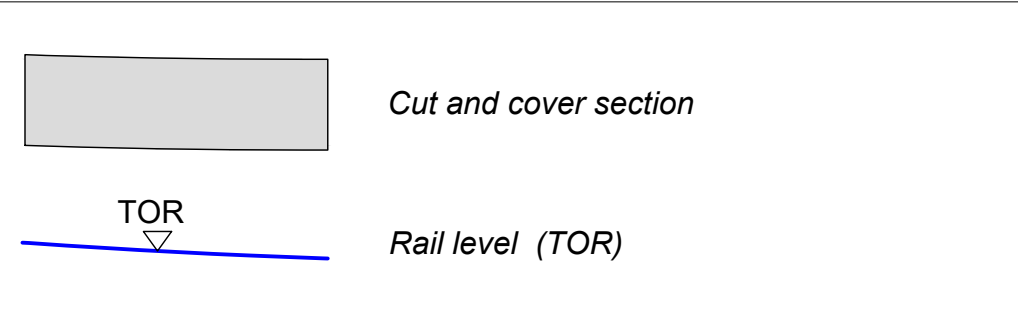
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|--|---|
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| <p>Consultant</p> <div data-bbox="1605 1911 1976 1932">  </div> | |

| | | | | | |
|-------------------------|--|---|--|----------------|--|
| Drawing Title | | Ground Investigation Geological Long Section – Phase 1 | | Drawing Status | |
| | | | | S4 | |
| Drawing N° | | ML1-JAI-GEO-ROUT_XX-DR-Y-00013 | | | |
| | | | | | |
| Scales Original Size A1 | | | | Sheet 18 of 28 | |

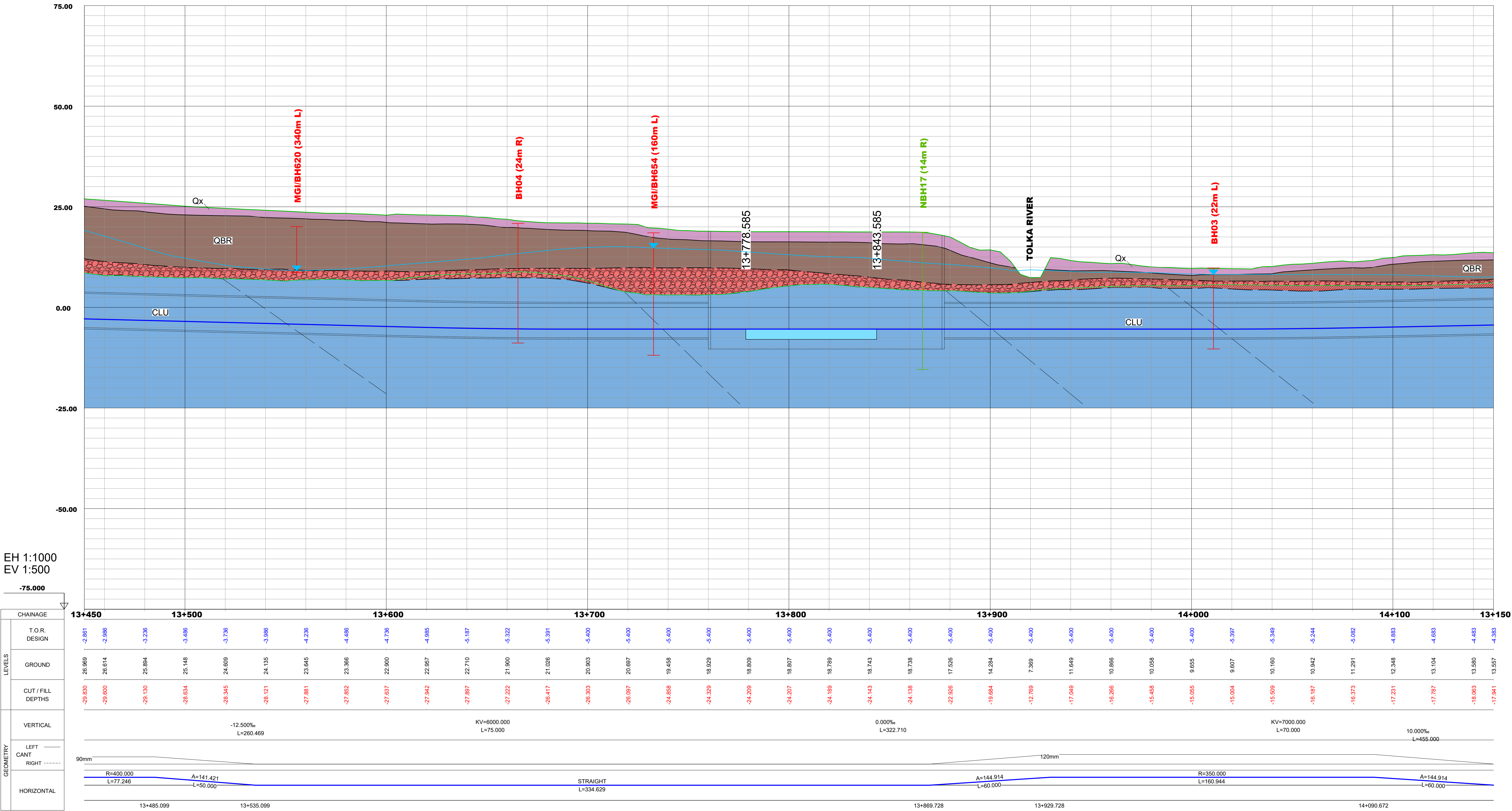
NOTES:

KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (‰)
D = Saguitta, difference between CV and TOR level (m)

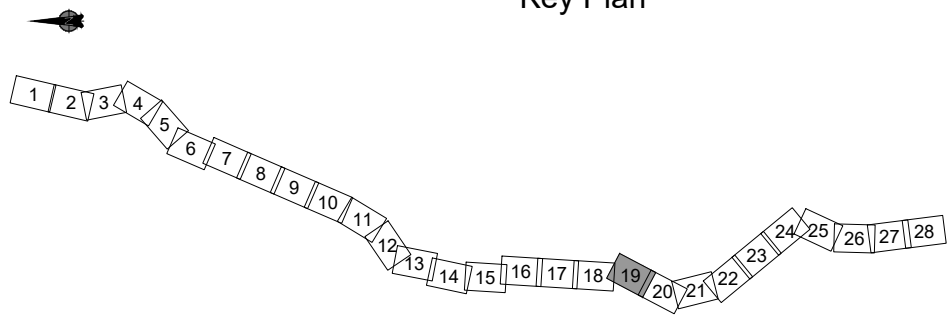
SYMBOLLOGY:



STATION
GRIFFITH PARK



Key Plan



| | | | | | | |
|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
| REV. | DATE | Description | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
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Client

Project



Consultant

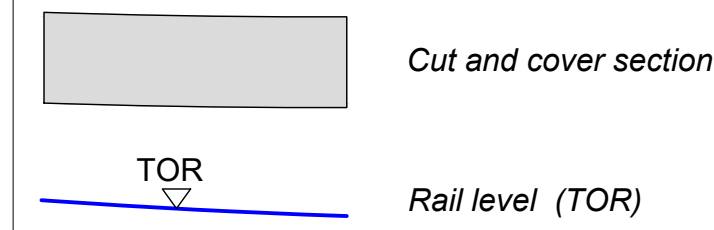
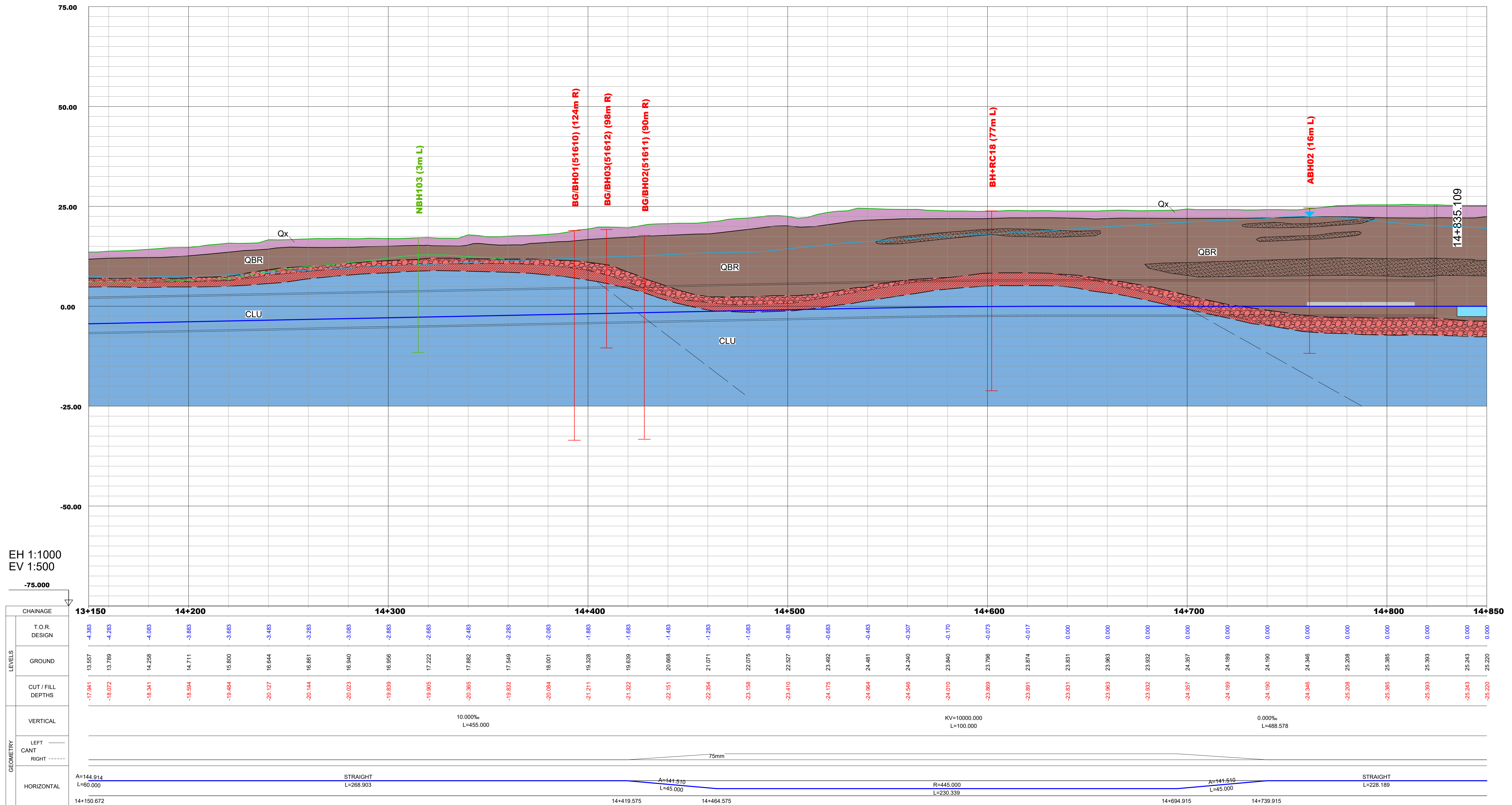
| | | | |
|-------------------------|---|----------------|----|
| Drawing Title | Ground Investigation Geological Long Section – Phase 1 | Drawing Status | S4 |
| Drawing N° | ML1-JAI-GEO-ROUT_XX-DR-Y-00013 | | |
| Scales Original Size A1 | | Sheet 19 of 28 | |

NOTES:

KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (%)
D = Sagitta, difference between CV and TOR level (m)

The distance from TOR to tunnel crown is 6.7 m

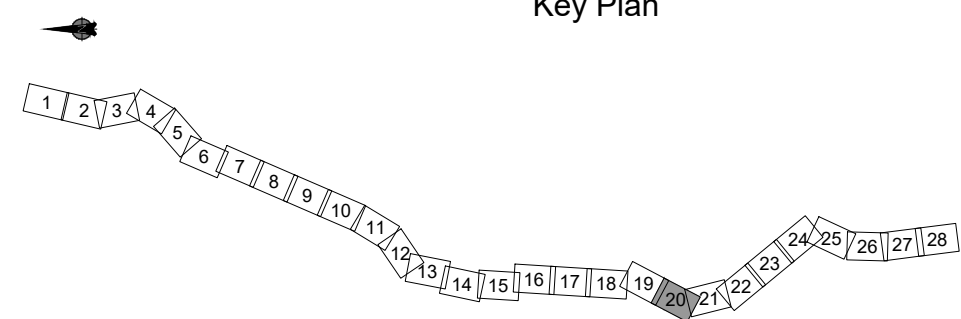
SYMBOLLOGY:

STATION
GLASNEVIN

EH 1:1000
EV 1:500

| CHAINAGE | | 13+150 | 14+200 | 14+300 | 14+400 | 14+500 | 14+600 | 14+700 | 14+800 | 14+850 |
|----------|-------------------|-----------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| LEVELS | T.O.R. DESIGN | -4.383 | -4.283 | -4.083 | -3.883 | -3.683 | -3.483 | -3.283 | -3.083 | -2.883 |
| | GROUND | 13.557 | 13.789 | 14.258 | 14.711 | 15.800 | 16.644 | 16.861 | 16.940 | 16.966 |
| GEOMETRY | CUT / FILL DEPTHS | -17.941 | -18.072 | -18.341 | -18.594 | -19.484 | -20.127 | -20.144 | -20.023 | -19.639 |
| | VERTICAL | | | | | | | | | |
| | LEFT | | | | | | | | | |
| | CANT | | | | | | | | | |
| | RIGHT | | | | | | | | | |
| | HORIZONTAL | A=144.914 L=60.000 | | | | | | | | |
| | STRAIGHT | | | | | | | | | |
| | L=268.903 | | | | | | | | | |
| | A=141.510 | | | | | | | | | |
| | L=45.000 | | | | | | | | | |
| | R=445.000 | | | | | | | | | |
| | L=230.339 | | | | | | | | | |
| | A=141.510 | | | | | | | | | |
| | L=45.000 | | | | | | | | | |
| | STRAIGHT | | | | | | | | | |
| | L=228.189 | | | | | | | | | |
| | KV=10000.000 | | | | | | | | | |
| | L=100.000 | | | | | | | | | |
| | 0.000% | | | | | | | | | |
| | L=488.578 | | | | | | | | | |
| | 75mm | | | | | | | | | |
| | | | | | | | | | | |
| | 14+150.672 | | | | | | | | | |
| | 14+150.672 | | | | | | | | | |
| | 14+419.575 | | | | | | | | | |
| | 14+464.575 | | | | | | | | | |
| | 14+694.915 | | | | | | | | | |
| | 14+739.915 | | | | | | | | | |

Key Plan



| REV. | DATE | DESCRIPTION | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
| REV. | DATE | DESCRIPTION | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
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Client



Project

METROLINK

Drawing Title

Ground Investigation
Geological Long Section - Phase 1

Drawing Status

S4

Consultant



Drawing N°

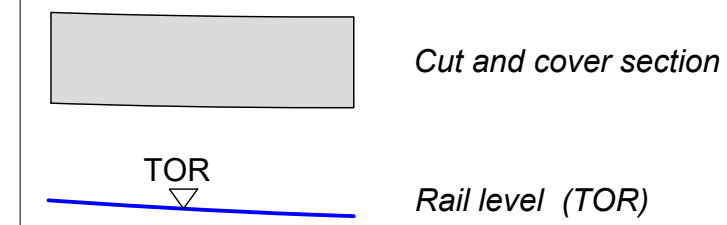
ML1-JAI-GEO-ROUT_XX-DR-Y-00013

Scales Original Size A1

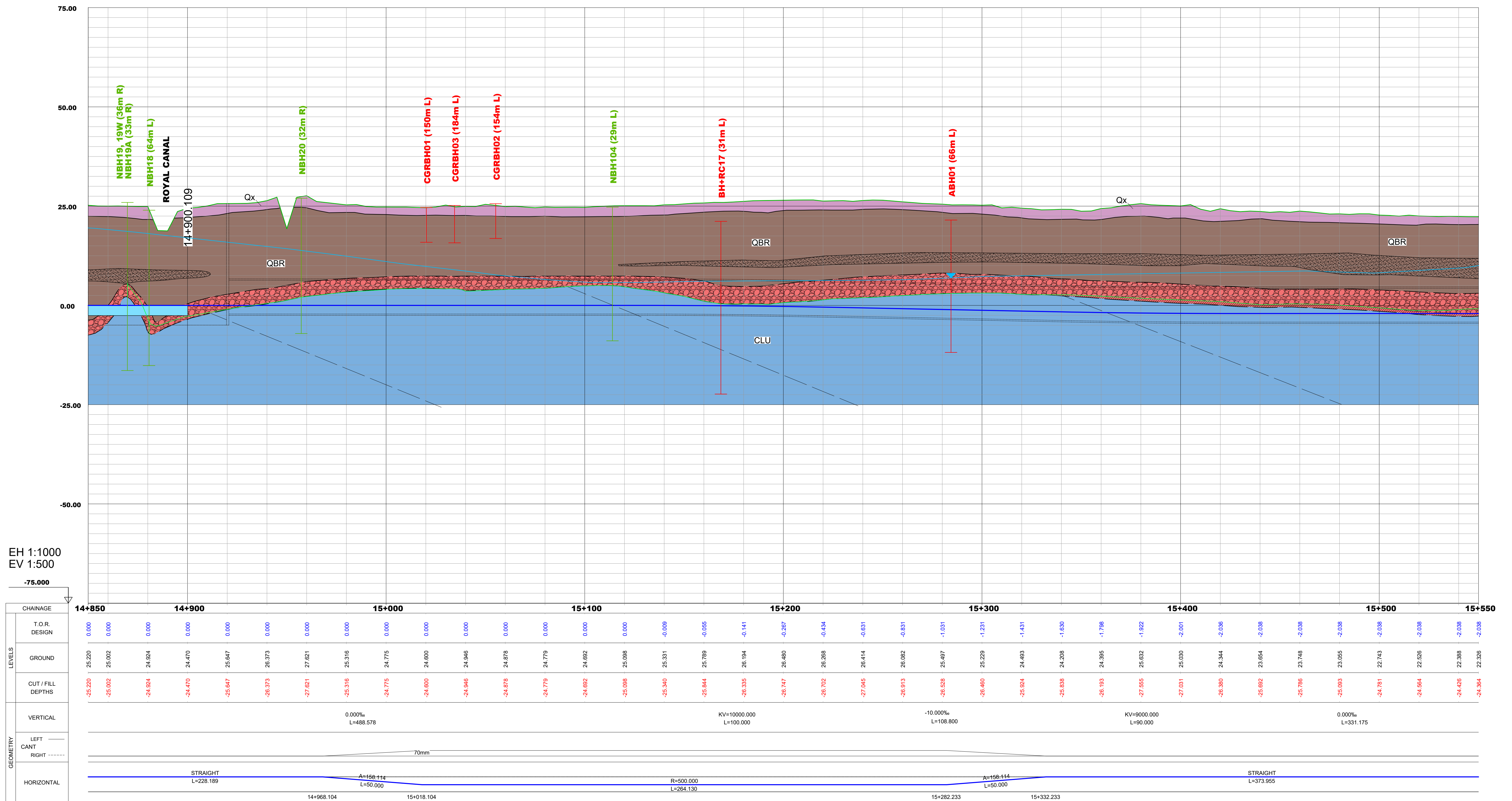
Sheet 20 of 28

| | |
|-----|--|
| KV= | Vertical curve radio (m) |
| CV= | Vertex level (m) |
| W = | Difference between the exit slope minus the entrance slope (‰) |
| D = | Saguitta, difference between CV and TOR level (m) |

SYMBOLOLOGY:



STATION GLASNEVIN



| | | | | | | |
|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
| REV. | DATE | DESCRIPTION | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
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JACOBS™ **IDOM**

METROLINK

Ground Investigation
Geological Long Section – Phase 1

ML1-JAI-GEO-ROUT_XX-DR-Y-00013

Sheet 21 of 28

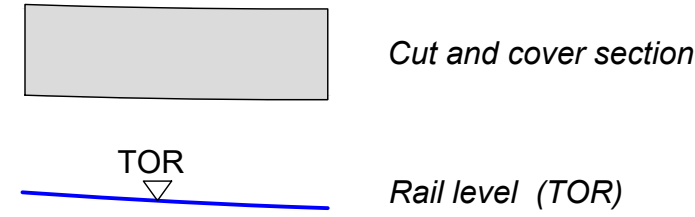
4

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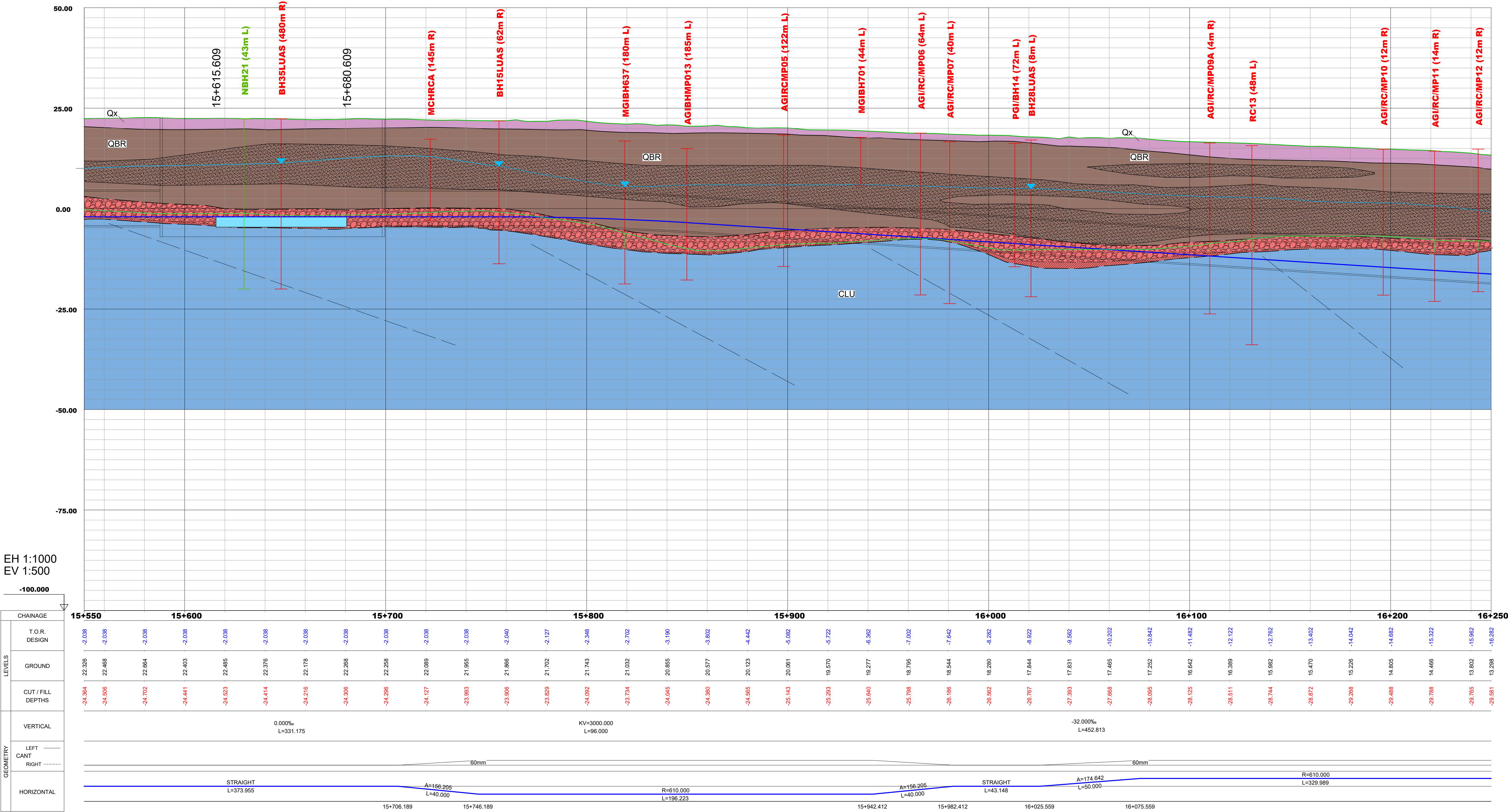
KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (%)
D = Sagitta, difference between CV and TOR level (m)

The distance from TOR to tunnel crown is 6.7 m

SYMBOLOLOGY:



STATION
MATER



EH 1:1000
EV 1:500

-100.000

| | | | | | | | | | | |
|----------|-------------------|---------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| GEOMETRY | CHAINAGE | 15+550 | 15+600 | 15+700 | 15+800 | 15+900 | 16+000 | 16+100 | 16+200 | 16+250 |
| | T.O.R. DESIGN | -2.038 | -2.038 | -2.038 | -2.038 | -2.038 | -2.038 | -2.038 | -2.038 | -2.038 |
| | GROUND | 22.326 | 22.468 | 22.664 | 22.403 | 22.485 | 22.376 | 22.178 | 22.268 | 22.258 |
| | CUT / FILL DEPTHS | -24.364 | -24.506 | -24.702 | -24.441 | -24.523 | -24.414 | -24.216 | -24.306 | -24.286 |
| GEOMETRY | VERTICAL | 0.000% L=331.175 | | | | | | | | |
| | LEFT | 60mm | | | | | | | | |
| | CANT | 60mm | | | | | | | | |
| | RIGHT | 60mm | | | | | | | | |
| GEOMETRY | HORIZONTAL | STRAIGHT L=373.955 | | | | | | | | |
| | | A=156.205 L=40.000 | | | | | | | | |
| | | R=610.000 L=196.223 | | | | | | | | |
| | | A=156.205 L=40.000 | | | | | | | | |

| | | | | | | |
|------|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
| REV. | DATE | Description | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |

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Client

Project

METROLINK

Drawing Title

Ground Investigation
Geological Long Section – Phase 1

Drawing Status

S4

Consultant

JACOBS IDOM

Drawing N°

ML1-JAI-GEO-ROUT_XX-DR-Y-00013

Scales Original Size A1

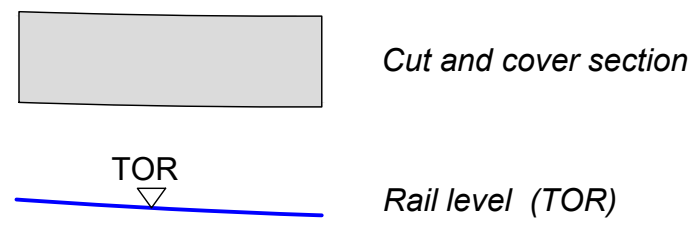
Sheet 22 of 28

NOTES:

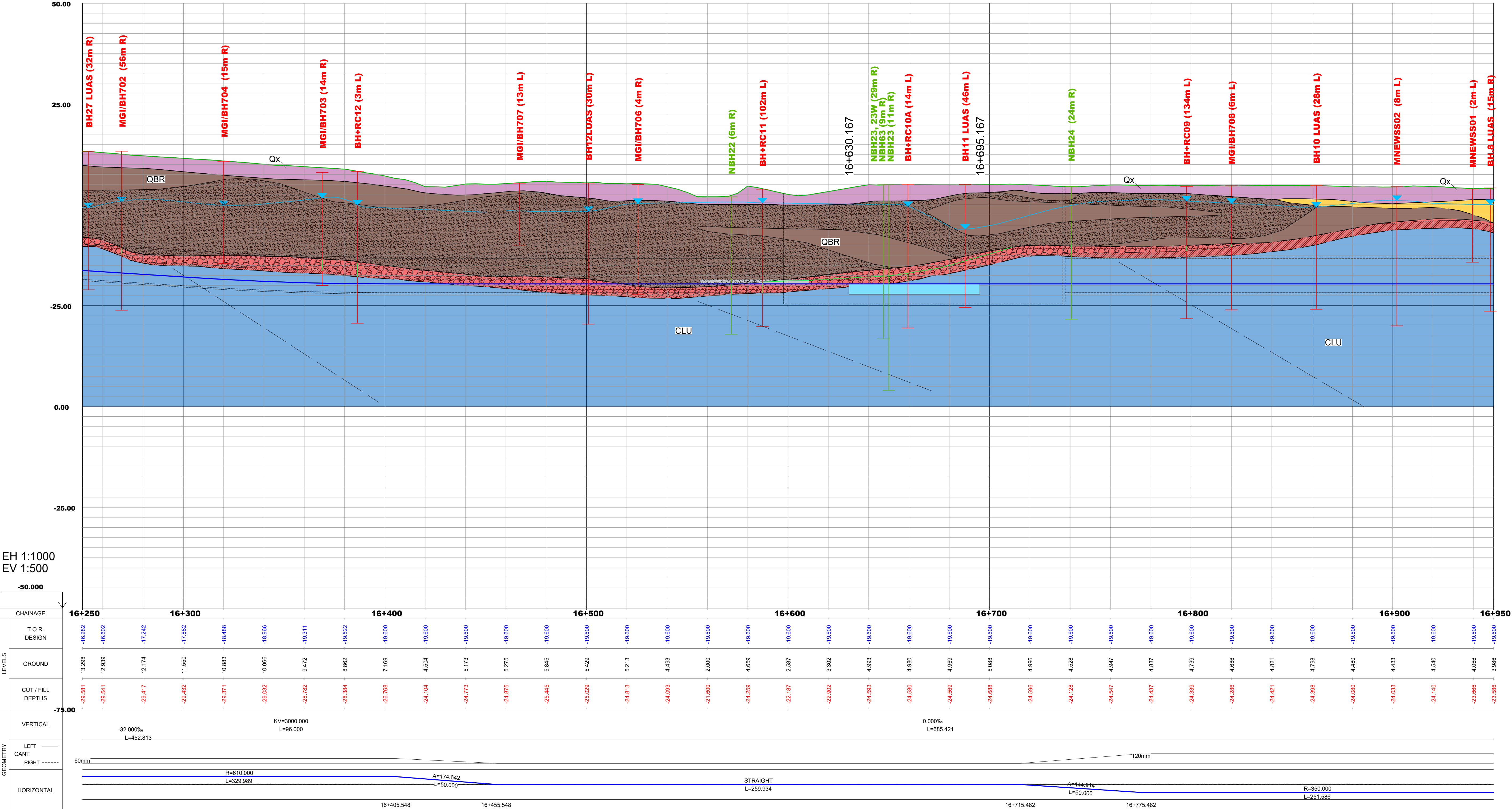
KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (‰)
D = Sagitta, difference between CV and TOR level (m)

The distance from TOR to tunnel crown is 6.7 m

SYMBOLLOGY:

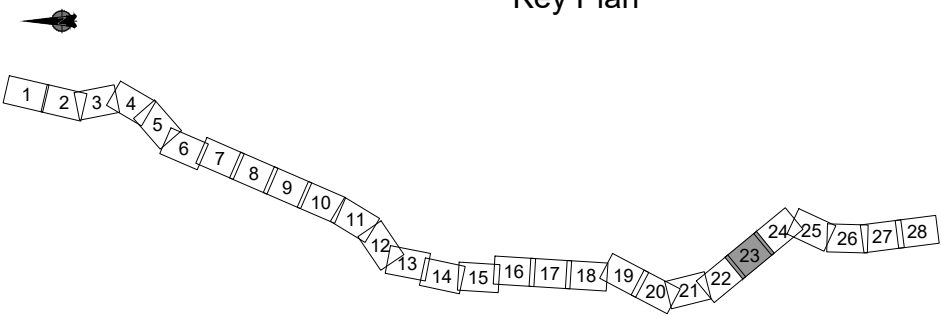


STATION
O'CONNELL STREET



EH 1:1000
EV 1:500

| CHAINAGE | | 16+250 | 16+300 | 16+400 | 16+500 | 16+600 | 16+700 | 16+800 | 16+900 | 16+950 |
|-------------------|---------------|------------------------|---------|-------------------------|---------|-----------------------|---------|-----------------------|---------|------------------------|
| LEVELS | T.O.R. DESIGN | -16.282 | -16.602 | -17.242 | -18.488 | -18.966 | -19.311 | -19.522 | -19.600 | -19.600 |
| | GROUND | 13.298 | 12.939 | 12.174 | 11.550 | 10.883 | 10.066 | 9.472 | 8.862 | 8.862 |
| CUT / FILL DEPTHS | LEFT | -29.581 | -29.541 | -29.417 | -29.432 | -29.371 | -29.032 | -28.762 | -28.384 | -28.384 |
| | RIGHT | -29.541 | -29.541 | -29.417 | -29.432 | -29.371 | -29.032 | -28.762 | -28.384 | -28.384 |
| GEOMETRY | VERTICAL | -32.000‰ L=452.813 | | KV=3000.000 L=96.000 | | 0.000‰ L=685.421 | | | | |
| | HORIZONTAL | R=610.000 L=329.989 | | A=174.642 L=50.000 | | STRAIGHT L=259.934 | | A=144.914 L=60.000 | | R=350.000 L=251.586 |



| REV. | DATE | DESCRIPTION | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
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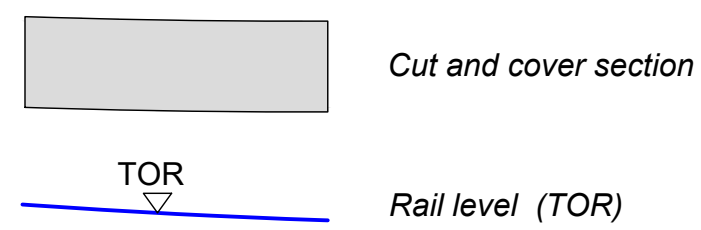
| | | | | | | | |
|---|--|--|--|--|--|----------------------|--|
| Client TII NTA | | Project METROLINK | | Drawing Title Ground Investigation Geological Long Section – Phase 1 | | Drawing Status S4 | |
| Consultant JACOBS IDOM | | Drawing N° ML1-JAI-GEO-ROUT_XX-DR-Y-00013 | | Scales Original Size A1 | | Sheet 23 of 28 | |

NOTES:

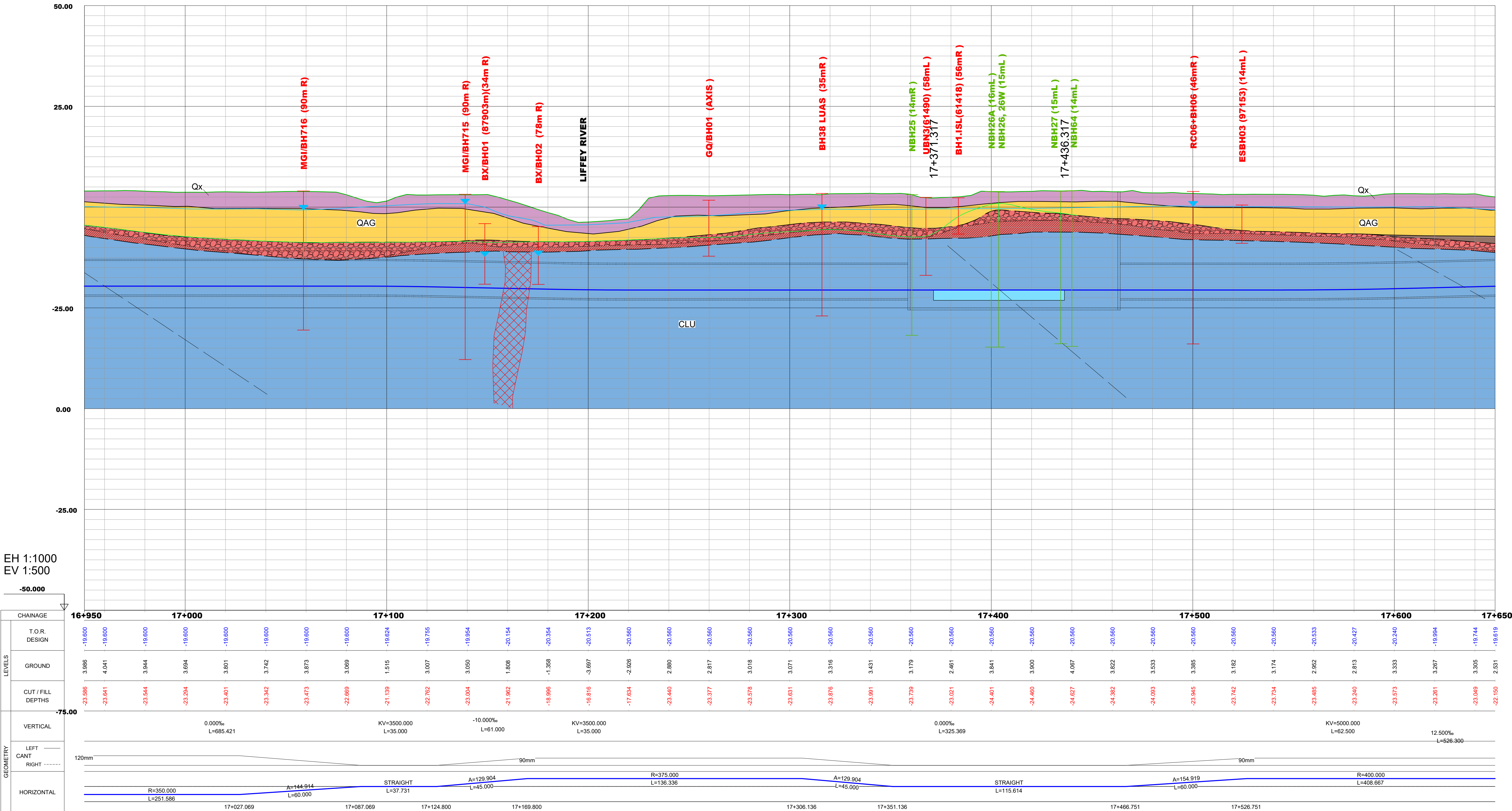
KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (%)
D = Sagitta, difference between CV and TOR level (m)

The distance from TOR to tunnel crown is 6.7 m

SYMBOLLOGY:

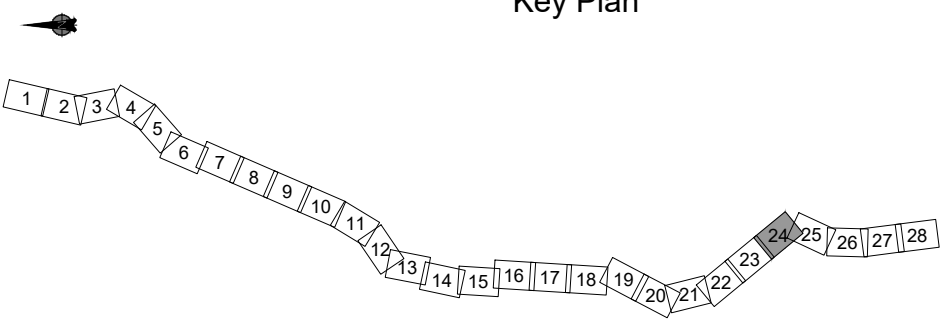


STATION
TARA



EH 1:1000
EV 1:500

| CHAINAGE | | 16+950 | | 17+000 | | 17+100 | | 17+200 | | 17+300 | | 17+400 | | 17+500 | | 17+600 | | 17+650 | | |
|------------|-------------------|-------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| LEVELS | T.O.R. DESIGN | -19.600 | -19.600 | -19.600 | -19.600 | -19.600 | -19.624 | -19.755 | -19.954 | -20.354 | -20.560 | -20.560 | -20.560 | -20.560 | -20.560 | -20.560 | -20.560 | -20.533 | -19.744 | -19.619 |
| | GROUND | 3.986 | 4.041 | 3.944 | 3.694 | 3.801 | 3.873 | 3.007 | 3.050 | -1.359 | -2.628 | 3.018 | 3.071 | 3.316 | 2.461 | 3.841 | 3.900 | 2.952 | 3.267 | 3.305 |
| | CUT / FILL DEPTHS | -23.586 | -23.641 | -23.544 | -23.294 | -23.401 | -23.473 | -22.752 | -23.004 | -18.996 | -17.634 | -23.578 | -23.631 | -23.876 | -23.991 | -23.729 | -24.401 | -24.480 | -23.485 | -23.049 |
| GEOMETRY | VERTICAL | -75.00 | | | | | | | | | | | | | | | | | | |
| | LEFT | 0.000% L=685.421 | | | | | | | | | | | | | | | | | | |
| | CANT | KV=3500.000 L=35.000 | | | | | | | | | | | | | | | | | | |
| | RIGHT | -10.000% L=61.000 | | | | | | | | | | | | | | | | | | |
| HORIZONTAL | VERTICAL | KV=3500.000 L=35.000 | | | | | | | | | | | | | | | | | | |
| | LEFT | 0.000% L=325.369 | | | | | | | | | | | | | | | | | | |
| | CANT | KV=5000.000 L=62.500 | | | | | | | | | | | | | | | | | | |
| HORIZONTAL | RIGHT | 12.500% L=626.300 | | | | | | | | | | | | | | | | | | |
| | VERTICAL | 120mm | | | | | | | | | | | | | | | | | | |
| | CANT | 90mm | | | | | | | | | | | | | | | | | | |
| HORIZONTAL | RIGHT | 90mm | | | | | | | | | | | | | | | | | | |
| | VERTICAL | R=350.000 L=251.586 | | | | | | | | | | | | | | | | | | |
| | CANT | A=144.914 L=60.000 | | | | | | | | | | | | | | | | | | |
| HORIZONTAL | RIGHT | STRAIGHT L=37.731 | | | | | | | | | | | | | | | | | | |
| | VERTICAL | A=129.904 L=45.000 | | | | | | | | | | | | | | | | | | |
| | CANT | R=375.000 L=136.336 | | | | | | | | | | | | | | | | | | |
| HORIZONTAL | RIGHT | A=129.904 L=45.000 | | | | | | | | | | | | | | | | | | |
| | VERTICAL | STRAIGHT L=115.614 | | | | | | | | | | | | | | | | | | |
| | CANT | A=154.919 L=60.000 | | | | | | | | | | | | | | | | | | |
| HORIZONTAL | RIGHT | R=400.000 L=408.667 | | | | | | | | | | | | | | | | | | |
| | VERTICAL | 17+027.069 | | | | | | | | | | | | | | | | | | |
| | CANT | 17+087.069 | | | | | | | | | | | | | | | | | | |
| HORIZONTAL | RIGHT | 17+124.800 | | | | | | | | | | | | | | | | | | |
| | VERTICAL | 17+169.800 | | | | | | | | | | | | | | | | | | |
| | CANT | 17+306.136 | | | | | | | | | | | | | | | | | | |
| HORIZONTAL | RIGHT | 17+351.136 | | | | | | | | | | | | | | | | | | |
| | VERTICAL | 17+466.751 | | | | | | | | | | | | | | | | | | |
| | CANT | 17+526.751 | | | | | | | | | | | | | | | | | | |
| HORIZONTAL | RIGHT | 17+526.751 | | | | | | | | | | | | | | | | | | |
| | VERTICAL | 17+526.751 | | | | | | | | | | | | | | | | | | |
| | CANT | 17+526.751 | | | | | | | | | | | | | | | | | | |



Key Plan

| REV. | DATE | DESCRIPTION | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
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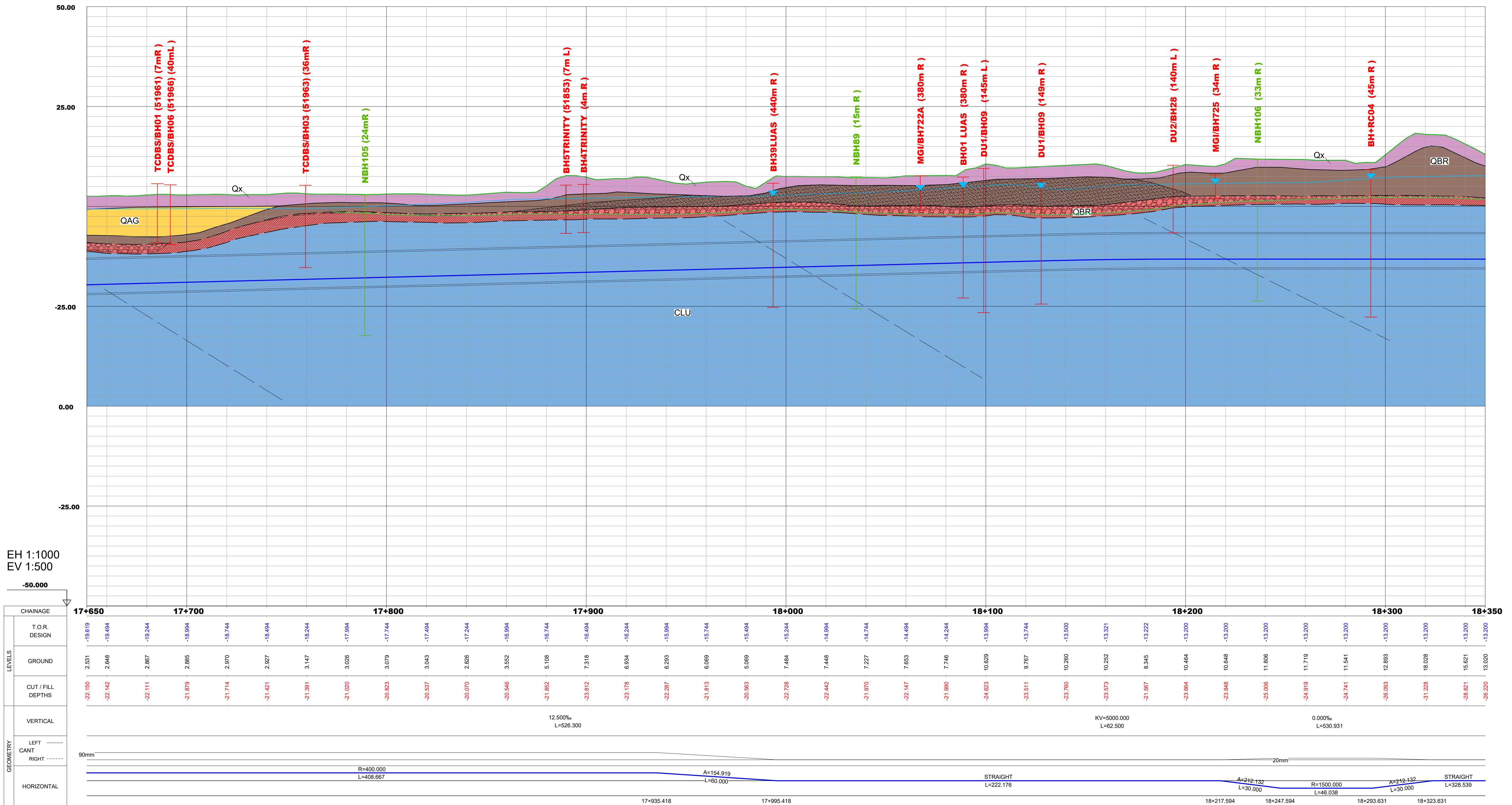
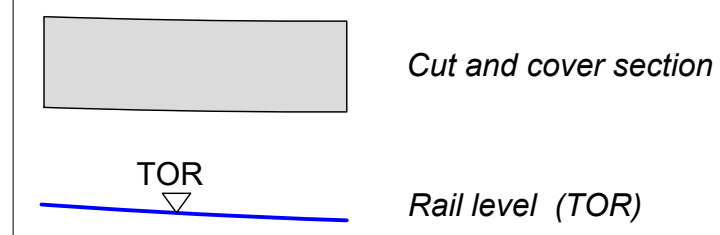
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|---|--|--|--|--|--|----------------------|--|
| Client TII NTA | | Project METROLINK | | Drawing Title Ground Investigation Geological Long Section – Phase 1 | | Drawing Status S4 | |
| Consultant JACOBS IDOM | | Drawing N° ML1-JAI-GEO-ROUT_XX-DR-Y-00013 | | Scales Original Size A1 | | Sheet 24 of 28 | |

NOTES:

KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (%)
D = Sagitta, difference between CV and TOR level (m)

The distance from TOR to tunnel crown is 6.7 m

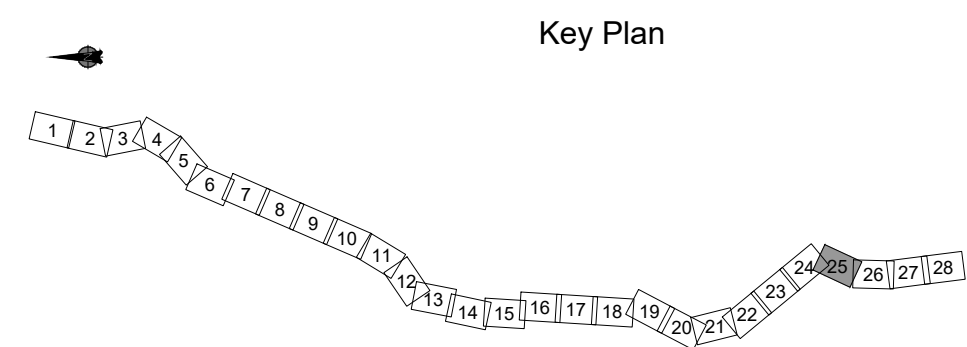
SYMBOLLOGY:



EH 1:1000
EV 1:500

-50.000

| CHAINAGE | | 17+650 | 17+700 | 17+800 | 17+900 | 18+000 | 18+100 | 18+200 | 18+300 | 18+350 |
|----------|-------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| LEVELS | T.O.R. DESIGN | -19.619 | -19.494 | -19.244 | -18.994 | -18.744 | -18.494 | -18.244 | -17.994 | -17.744 |
| | GROUND | 2.531 | 2.648 | 2.867 | 2.885 | 2.970 | 2.927 | 3.147 | 3.026 | 3.079 |
| GEOMETRY | CUT / FILL DEPTHS | -22.150 | -22.142 | -22.111 | -21.879 | -21.714 | -21.421 | -21.391 | -21.020 | -20.823 |
| | VERTICAL | | | | | | | | | |
| | LEFT | | | | | | | | | |
| | CANT | | | | | | | | | |
| | RIGHT | | | | | | | | | |
| | HORIZONTAL | | | | | | | | | |



| REV. | DATE | Description | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
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Client

TII **NTA**

Udarás Náisiúnta Iompair
National Transport Authority

Project

METROLINK

Drawing Title

Ground Investigation
Geological Long Section - Phase 1

Drawing Status

S4

Consultant

JACOBS **IDOM**

Drawing N°

ML1-JAI-GEO-ROUT_XX-DR-Y-00013

Scales Original Size A1

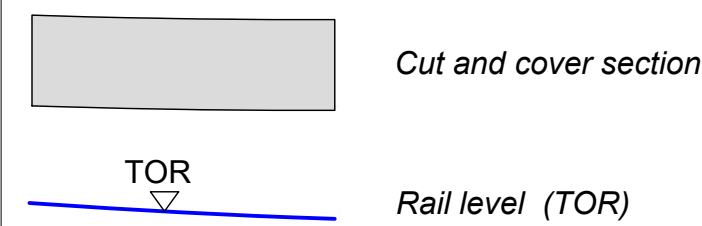
Sheet 25 of 28

NOTES:

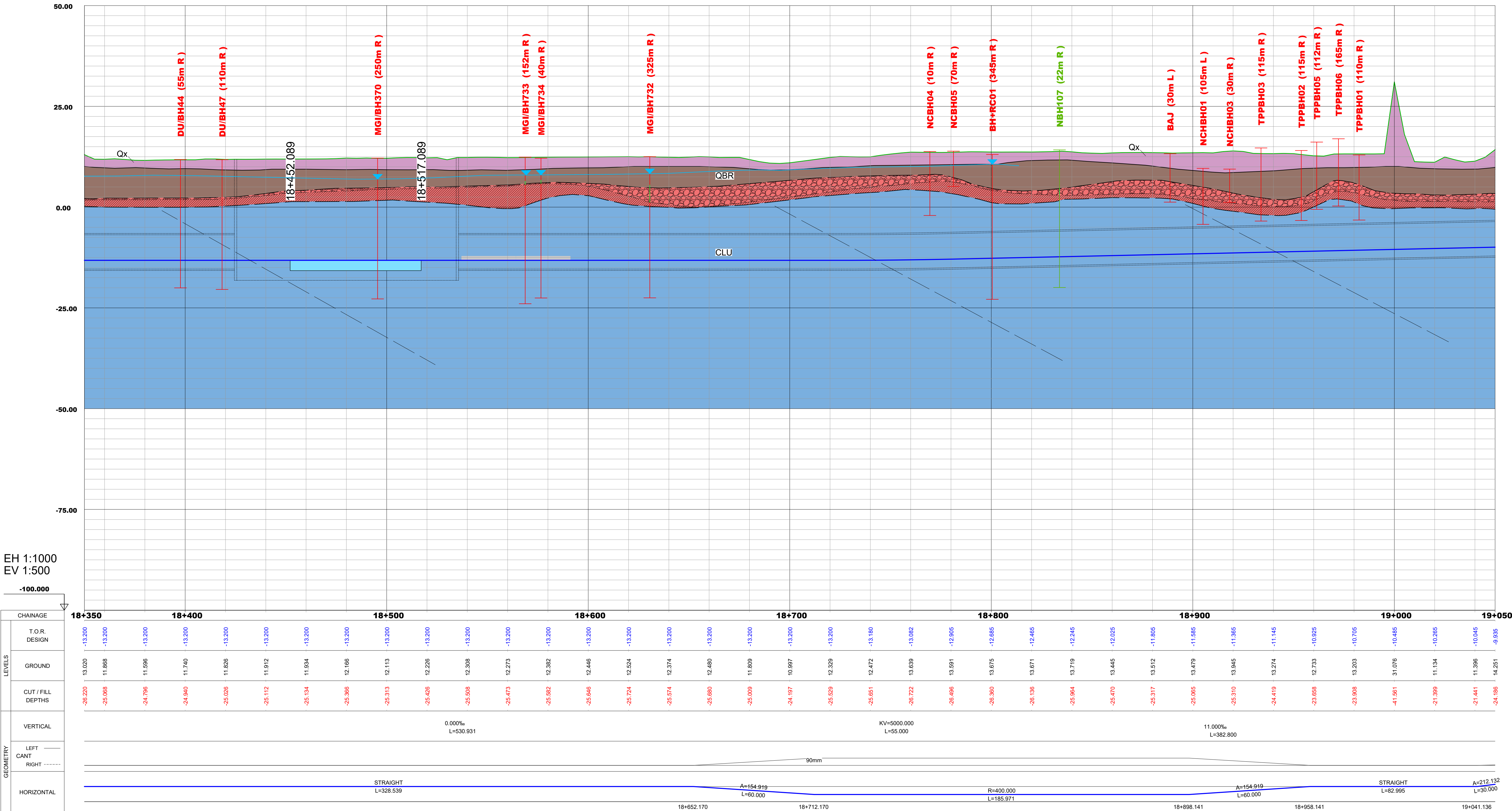
KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (%)
D = Sagitta, difference between CV and TOR level (m)

The distance from TOR to tunnel crown is 6.7 m

SYMBOLOLOGY:



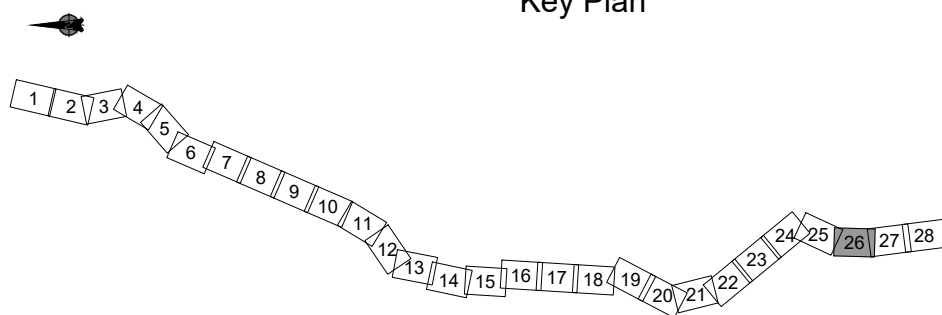
STATION
ST. STEPHENS GREEN



EH 1:1000
EV 1:500

-100.000

| CHAINAGE | | 18+350 | 18+400 | 18+500 | 18+600 | 18+700 | 18+800 | 18+900 | 19+000 | 19+050 |
|----------|-------------------|-----------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| LEVELS | T.O.R. DESIGN | -13.200 | -13.200 | -13.200 | -13.200 | -13.200 | -13.200 | -13.200 | -13.200 | -13.200 |
| | GROUND | 13.020 | 11.868 | 11.596 | 11.740 | 11.826 | 11.912 | 11.934 | 12.166 | 12.113 |
| GEOMETRY | CUT / FILL DEPTHS | -26.220 | -25.068 | -24.796 | -24.940 | -25.026 | -25.112 | -25.134 | -25.366 | -25.313 |
| | VERTICAL | 0.000% L=530.931 | | | | | | | | |
| GEOMETRY | LEFT CANT | 90mm | | | | | | | | |
| | RIGHT | 90mm | | | | | | | | |
| GEOMETRY | HORIZONTAL | STRAIGHT L=328.539 | | | | | | | | |
| | HORIZONTAL | STRAIGHT L=328.539 | | | | | | | | |



| REV. | DATE | DESCRIPTION | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
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Client
TII **NTA**
Udarás Náisiúnta Iompair
National Transport Authority

Project
METROLINK

Consultant
JACOBS **IDOM**

| Drawing Title | Drawing Status |
|---|----------------|
| Ground Investigation Geological Long Section – Phase 1 | S4 |
| Drawing N° | Sheet 26 of 28 |
| ML1-JAI-GEO-ROUT_XX-DR-Y-00013 | |
| Scales Original Size A1 | |

NOTES:

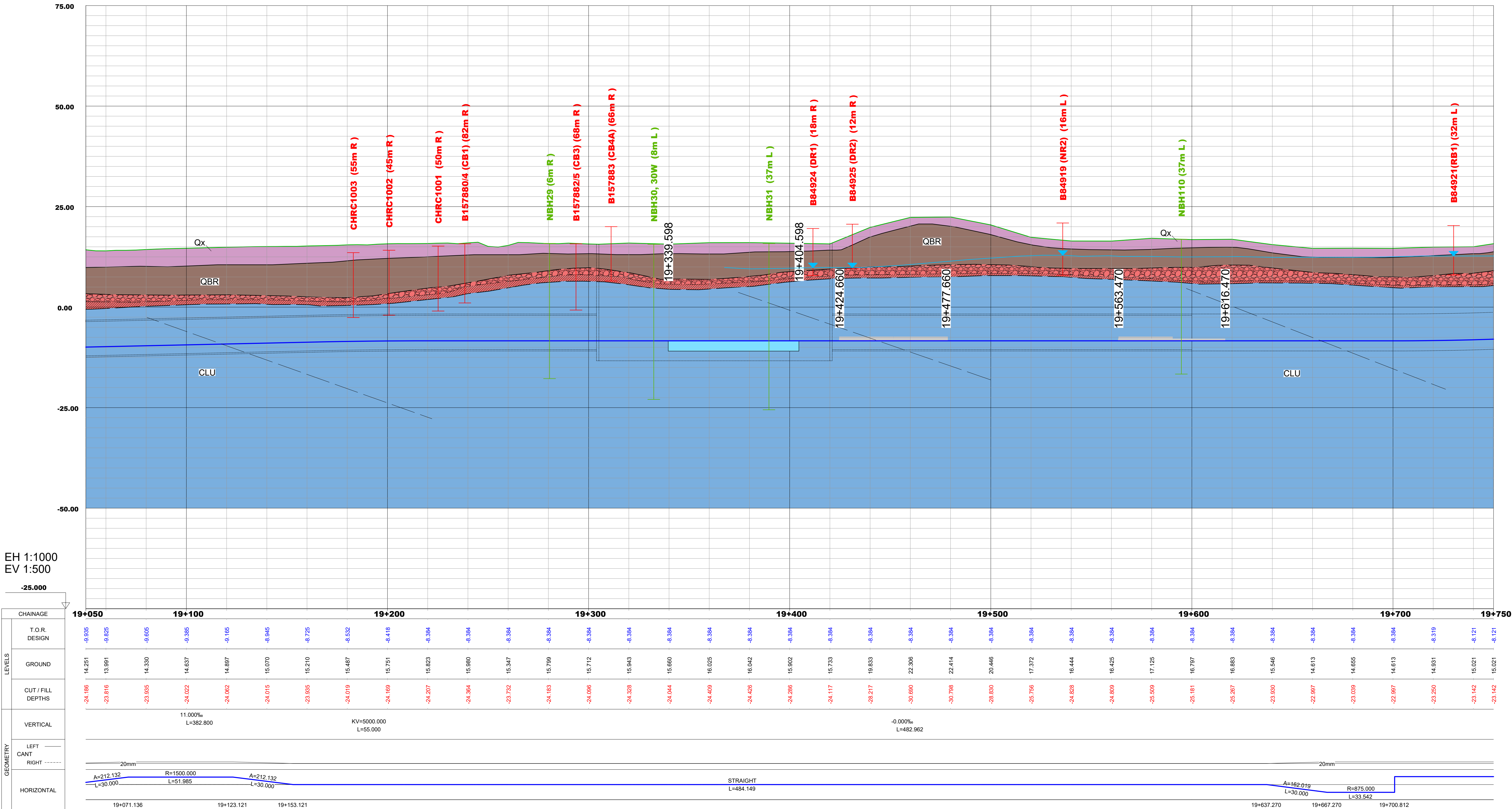
KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (%)
D = Sagitta, difference between CV and TOR level (m)

The distance from TOR to tunnel crown is 6.7 m

SYMBOLLOGY:

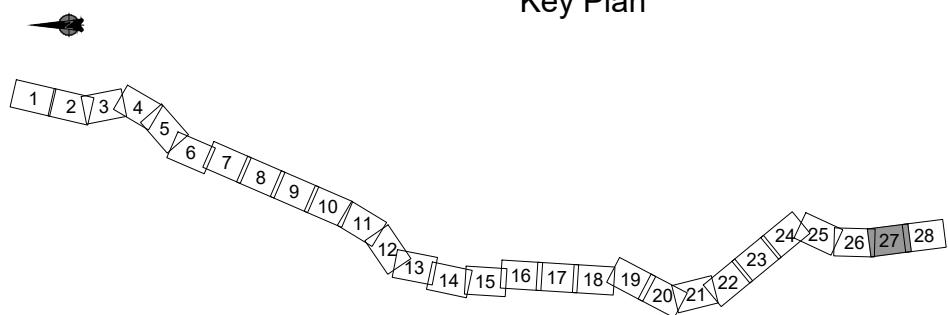
Cut and cover section
TOR
Rail level (TOR)

STATION
CHARLEMONT



EH 1:1000
EV 1:500

| CHAINAGE | | 19+050 | 19+100 | 19+200 | 19+300 | 19+400 | 19+500 | 19+600 | 19+700 | 19+750 |
|-------------------|---------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| LEVELS | T.O.R. DESIGN | -9.935 | -9.825 | -9.605 | -9.385 | -9.165 | -8.945 | -8.725 | -8.505 | -8.285 |
| | GROUND | 14.251 | 13.991 | 14.330 | 14.637 | 14.887 | 15.070 | 15.210 | 15.487 | 15.751 |
| CUT / FILL DEPTHS | CUT | -24.186 | -23.816 | -23.935 | -24.022 | -24.062 | -24.015 | -23.935 | -24.019 | -24.169 |
| | FILL | -23.816 | -23.935 | -24.022 | -24.062 | -24.015 | -23.935 | -24.019 | -24.169 | -24.328 |
| VERTICAL | LEFT | 11.000% | 11.000% | 11.000% | 11.000% | 11.000% | 11.000% | 11.000% | 11.000% | 11.000% |
| | RIGHT | 11.000% | 11.000% | 11.000% | 11.000% | 11.000% | 11.000% | 11.000% | 11.000% | 11.000% |
| HORIZONTAL | LEFT | 19+071.136 | 19+123.121 | 19+153.121 | 19+213.121 | 19+283.121 | 19+353.121 | 19+423.121 | 19+493.121 | 19+563.121 |
| | RIGHT | 19+071.136 | 19+123.121 | 19+153.121 | 19+213.121 | 19+283.121 | 19+353.121 | 19+423.121 | 19+493.121 | 19+563.121 |



| REV. | DATE | DESCRIPTION | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
|--|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
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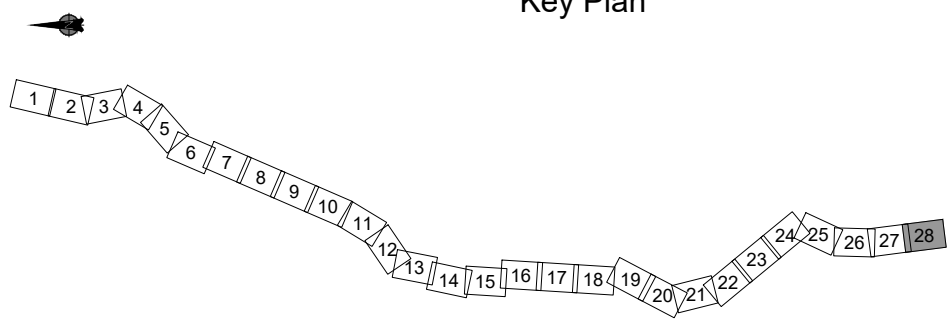
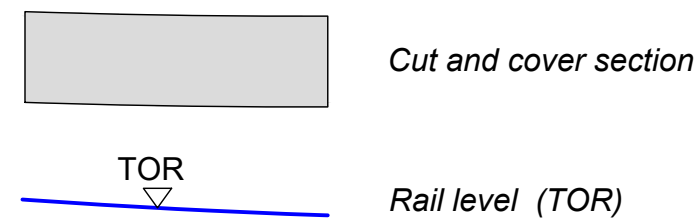
| | | | | | | | |
|--|--|--|--|--|--|----------------------|--|
| Client TII Transport Infrastructure Ireland | | Project METROLINK | | Drawing Title Ground Investigation Geological Long Section - Phase 1 | | Drawing Status S4 | |
| Consultant JACOBS | | Drawing N° ML1-JAI-GEO-ROUT_XX-DR-Y-00013 | | Scales Original Size A1 | | Sheet 27 of 28 | |

NOTES:

KV= Vertical curve radio (m)
CV= Vertex level (m)
W= Difference between the exit slope minus the entrance slope (%)
D = Saguitta, difference between CV and TOR level (m)

The distance from TOR to tunnel crown is 6.7 m

SYMBOLLOGY:



| | | | | | | |
|---|----------|--------------------------|----------|------------|-------------|-------------|
| P03 | 11/12/20 | Final Preliminary Design | DT | FP | JB | NC |
| P02 | 03/04/20 | Preliminary Design | DT | FP | JB | NC |
| P01 | 05/12/19 | Preliminary Design | DT | FP | JB | NC |
| REV. | DATE | Description | DRAWN BY | CHECKED BY | REVIEWED BY | APPROVED BY |
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Client

Project

Drawing Title

Ground Investigation
Geological Long Section – Phase 1

Drawing Status

S4

Consultant

Drawing N°

ML1-JAI-GEO-ROUT_XX-DR-Y-00013

Scales Original Size A1

Sheet 28 of 28