



C305– Eastern Running Tunnels

Close Out Report for Stepney Green to Pudding Mill Lane NR/19

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This document has been reviewed by the following individual for coordination, compliance, integration and acceptance and is acceptable for transmission to the above stakeholder for the above stated purpose.

Sign: [Redacted] Role: [Redacted] Name: [Redacted] Date: 08/08/16

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Stakeholder Organisation	Job Title	Name	Signature	Date	Acceptance
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GEOCISA UK


C305-CLOUT-160429

**Close Out Report for Stepney Green to Pudding Mill Lane
NR/19**

C305 Crossrail Eastern Running Tunnels

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Learning Legacy Document

1. CLOSE OUT REPORT PURPOSE

The purpose of this close out report is to summarise the movements with the related C305 construction activities for Network Rail (NR/19) based on the C704 monitoring system and C305 manual monitoring system. This report incorporates the existing C704 decommissioning agreement for this asset ((C704 Instrumentation Decommissioning Agreement NR/19c – FSS1 Eleanor Street Shaft (C704-XRL-C-AAG-CR094_SH007-50001 and C704 instrumentation Partial Decommissioning Agreement Network Rail FSS1 Gas Factory Curve Viaduct- NR/19)), whereby the C704 monitoring system has been shown to be at an acceptably small settlement rate and suitable for decommissioning.

To provide a summary of the effects of C305 construction activities on the asset, the C305 manual verification readings have been reviewed alongside the C704 automatic monitoring system for completeness. This report has been produced to close out the requirement for C305 monitoring reviews in connection with this asset.

2. LOCATION OF THE WORKS

Interface NR/19 is located along Drive Z (Contract 305), between Crossrail reference chainage approximately 81490 NE and 82625 NE. The Eastbound tunnel is approximately 20-25m deep, aligned in a north-east direction, generally following the route of the existing Network Rail viaduct. At the Bow triangle area, which is formed by the surrounding three railway viaducts (FSS1, FSS1 extension and LUL Bow Road viaduct), the Eastbound tunnel meet Eleanor Street shaft before continuing eastward towards the Pudding Mill Lane Portal. The westbound tunnel is parallel to the eastbound, in close proximity, and interlinked with the eastbound tunnel at Mile End Park Shaft at the western extent of interface NR/19.

3. DOCUMENTATION SUMMARY

CROSSRAIL NUMBER	DOCUMENT NAME	REASON FOR ISSUE
C701-ITM-C-RGN-CRG03-50205	C701 Installation Report for NR/19	Installation report
C122-OVE-C2-RGN-CRG01-50069	Instrumentation & Monitoring Plan for LT&S Yorkshire Street Viaduct (NR/17) and LT&S Gas Factory Curve Viaduct (NR/19).	I&M Plan
C704-XRL-C-AAG-CR094_SH007-50001	C704 instrumentation Decommissioning Agreement NR/19c – FSS1 Eleanor Street Shaft	Decommissioning Agreement
C704-XRL-C-AAG-CR094-50001	C704 Instrumentation Partial Decommissioning Agreement Network Rail FSS1 Gas Factory Curve Viaduct- NR19	Decommissioning Agreement

4. SUMMARY OF INSTRUMENTATION

The total numbers of instruments covered in this report are:

- 1920 No. Prims fixed on the track. (See Appendix A).
- 815 No. Prisms installed on the viaduct structure. (See Appendix A).
- 2198 No. Track levelling marks (See Appendix B)

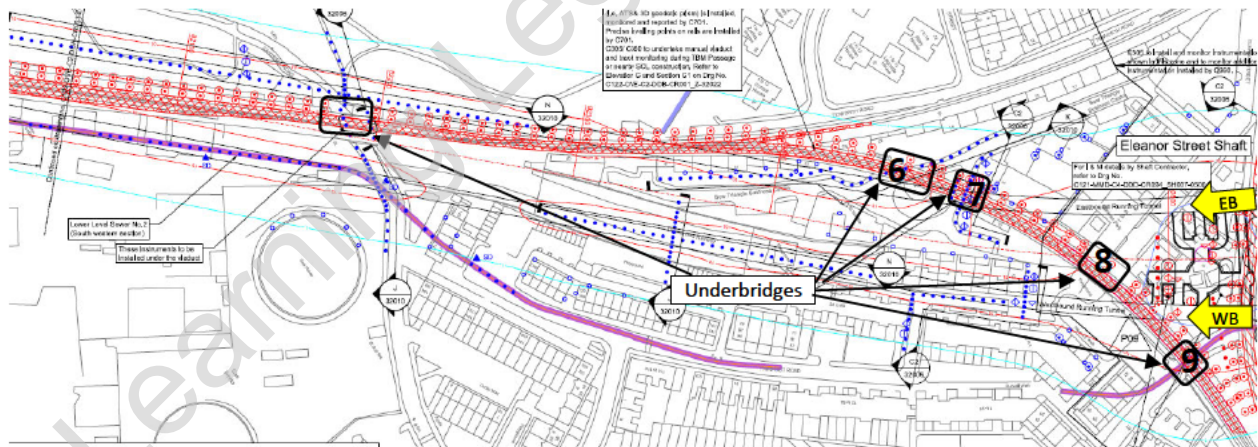
5. C305 CONSTRUCTION ACTIVITIES

Drive Z Running Tunnel Construction	Rings	Chainage	Date
Eastbound (EB) Tunnel Boring Machine (TBM) Passage	500 - 1200	81490 - 82625	24 October – 19 December 2013
Westbound (WB) Tunnel Boring Machine (TBM) Passage	510 - 1230	81490 - 82625	12 April – 15 May 2014

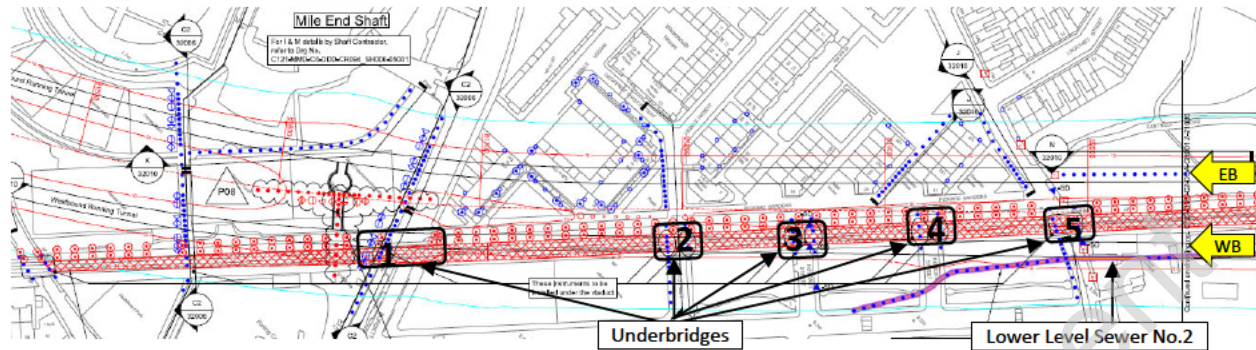
6. SUMMARY OF C704 DATA

The sketches below show the location plans and the underbridges numbered.

East (from Eleanor Street shaft)



West (toward Mile End Shaft)

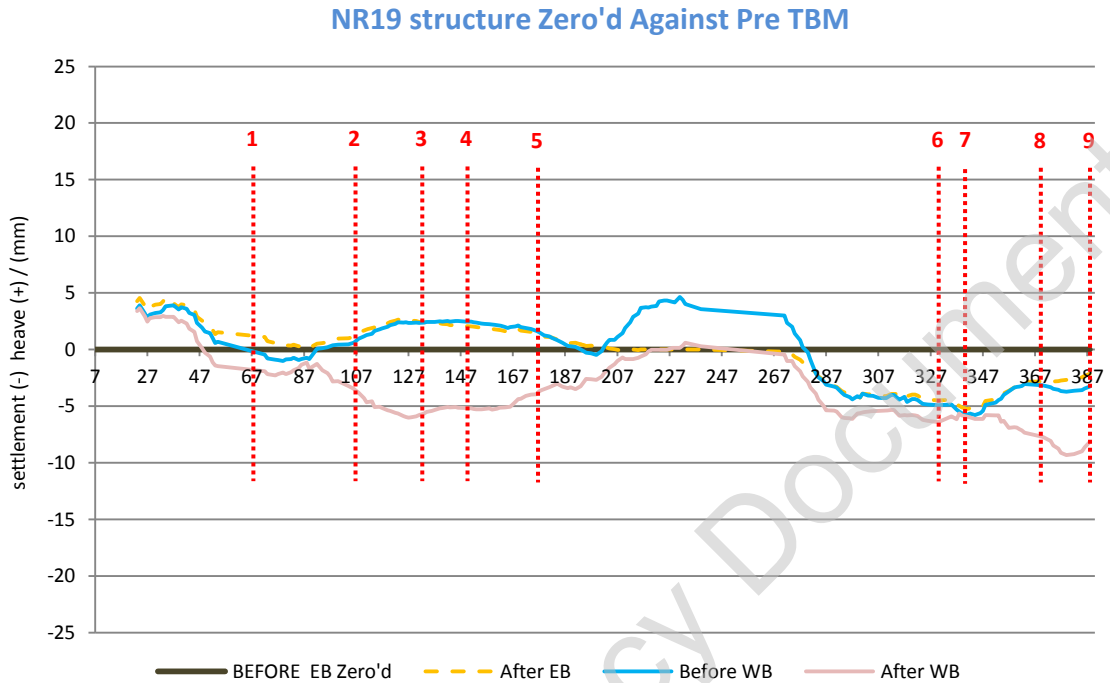


The table below shows the settlement during the C305 works and the maximum differential settlement between two adjacent supports during the TBM passage.

NR 19 STRUCTURE								
		BEFORE EB Zero'd	AFTER EB Zero'd against before EB	BEFORE WB Zero'd against before EB	AFTER WB Zero'd against before EB	Maximum differential settlement AFER EB TBM	Maximum differential settlement BEFORE WB TBM	Maximum differential settlement AFER WB TBM
1-BURDETT ROAD	C701-RP105471-CR102	0	3.8	2.5	-0.5	-3.6	-2.4	-4.6
	C701-RP107371-CR102	0	0.3	0.1	-5.0			
2-JOSEPH STREET UNDERBRIDGE	C701-RP210671-CR102	0	2.6	2.3	-3.9	0.0	0.1	-1.6
	C701-RP211171-CR102	0	2.7	2.4	-5.5			
3-HUDDART STREET	C701-RP212771-CR102	0	2.1	1.8	-6.1	0.1	0.9	1.2
	C701-RP213071-CR102	0	2.2	2.7	-4.9			
4-ROBERSON STREET	C701-RP214671-CR102	0	1.8	2.3	-5.7	0.2	0.1	0.5
	C701-RP215171-CR102	0	2.0	2.3	-5.2			
5-BOW COMMON LANE UNDERBRIDGE	C701-RP217071-CR102	0	0.5	0.6	-4.4	0.7	0.6	1.1
	C701-RP217471-CR102	0	1.2	1.2	-3.3			
6-BOW TRIANGLE BUSINESS CENTRE	C701-RP232671-CR102	0	-5.2	-5.8	-6.7	-0.1	-0.3	-0.4
	C701-RP233071-CR102	0	-5.3	-6.1	-7.1			
7-BOW TRIANGLE BUSINESS CENTRE	C701-RP233971-CR102	0	-6.2	-6.9	-7.9	2.3	3.1	1.1
	C701-RP234171-CR102	0	-3.9	-3.8	-6.9			
8-NAVENBY WALK	C701-RP236371-CR102	0	0.0	-1.6	-8.9	-3.0	-3.1	-2.1
	C701-RP237071-CR102	0	-3.0	-4.7	-11.0			
9-ROUNTON ROAD	C701-RP238671-CR102	0	-1.1	-1.4	-3.5	0.0	0.1	1.0
	C701-RP238871-CR102	0	-1.2	-1.3	-2.5			

As can observe, as per Specific Action Plan Z05- LT&S Gas Factory Curve Viaduct (NR/19) the values for differential settlement for Underbridges are under the green trigger level.

The graph below shows the rolling average trend line of the south façade and the location of the underbridges. All values are relative to the pre TBM data.



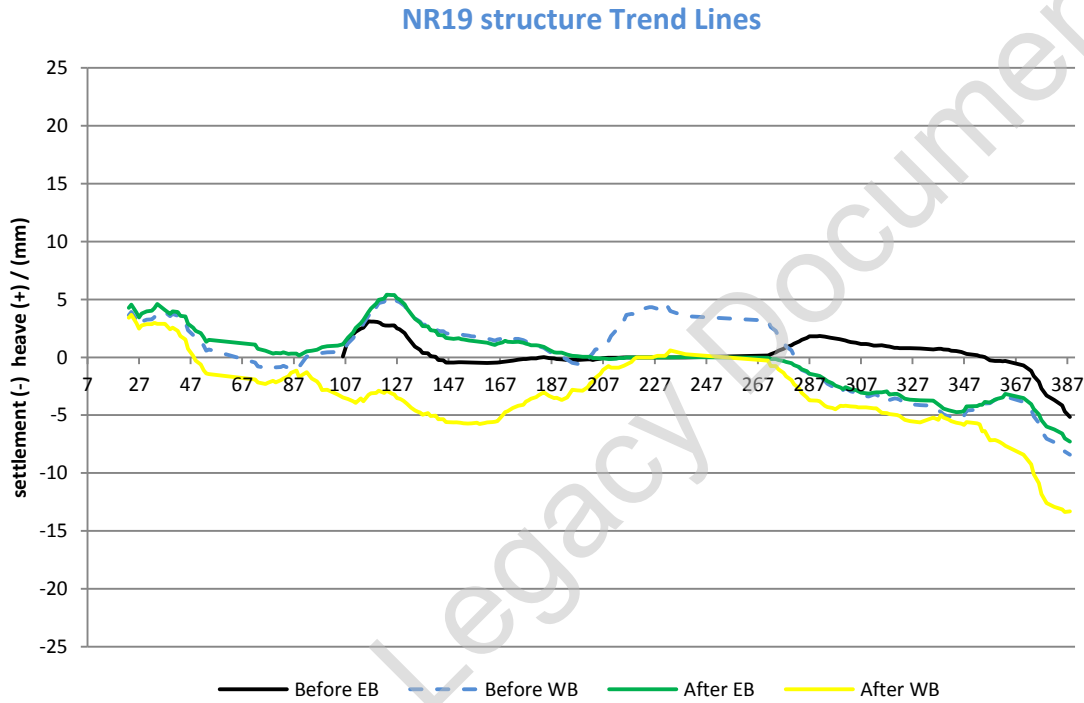
* rolling average trendline used. All values relative to the pre TBM data

LEGEND			
X AXIS	PRISM' NAME	X AXIS	PRISM' NAME
7	C701-RP100771-CR102	197	C701-RP219771-CR102
27	C701-RP102771-CR102	218	C701-RP221871-CR102
49	C701-RP104971-CR102	272	C701-RP227271-CR102
86	C701-RP208671-CR102	294	C701-RP229471-CR102
113	C701-RP211371-CR102	313	C701-RP231371-CR102
133	C701-RP213371-CR102	341	C701-RP234171-CR102
155	C701-RP215571-CR102	362	C701-RP236271-CR102
176	C701-RP217671-CR102	388	C701-RP238871-CR102

The settlement values after EB TBM passage stay between +5mm and -5mm. Values after WB TBM passage are within a range of 0mm and -9mm. As per Specific Action Plan Z05- LT&S Gas Factory Curve Viaduct (NR/19) the amber trigger value for Maximum differential settlement is ± 10 mm for Masonry Arches (taken between adjacent supports). All values are therefore within an acceptable range and do not breach amber trigger levels.

It is to be noted that the graph above shows a heave of 5 mm between points 207 – 270 after EB TBM transit and before WB TBM transit. This movement was not detected by the manual monitoring of the track levelling points, as reported at page 29 on; hence this anomaly might be due to a malfunction of the C704 ATSS system.

The graph below shows the rolling average of the south façade used for trend lines data combining the ground movement due to Eleanor Street Shaft works, Mile End Shaft works and TBM passage.

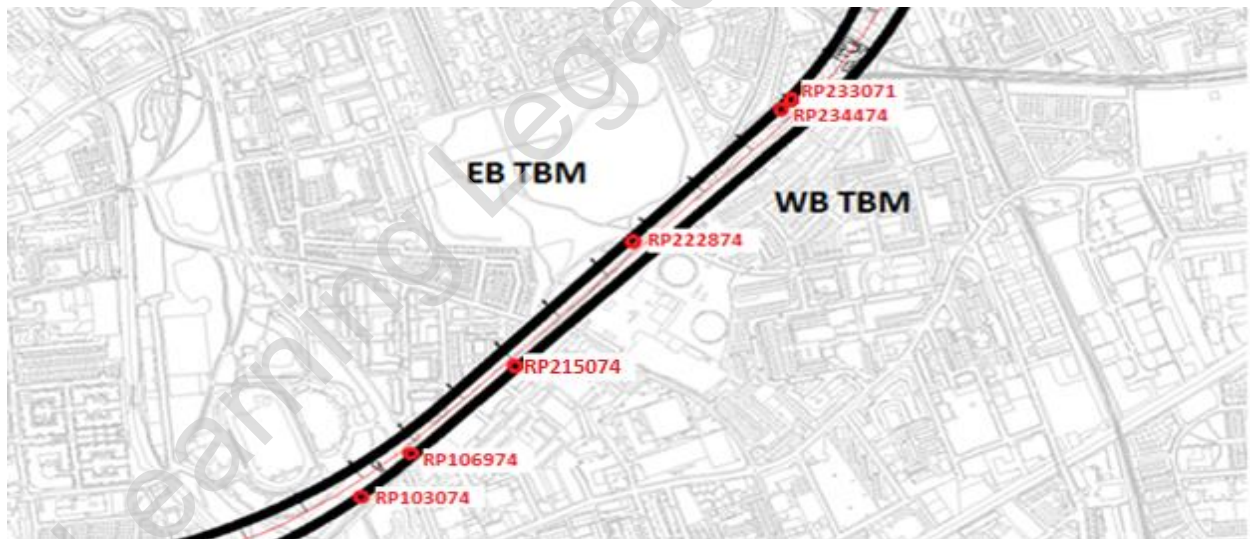
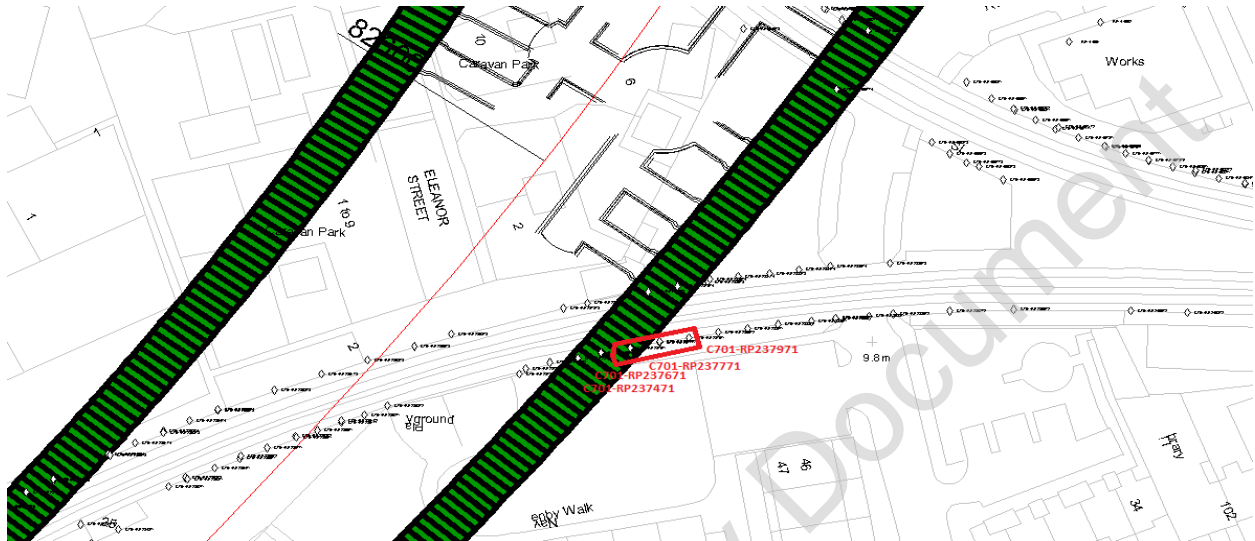


* rolling average used for trendlines. Data is combined settlement of Eleanor Street Shaft works and TBM

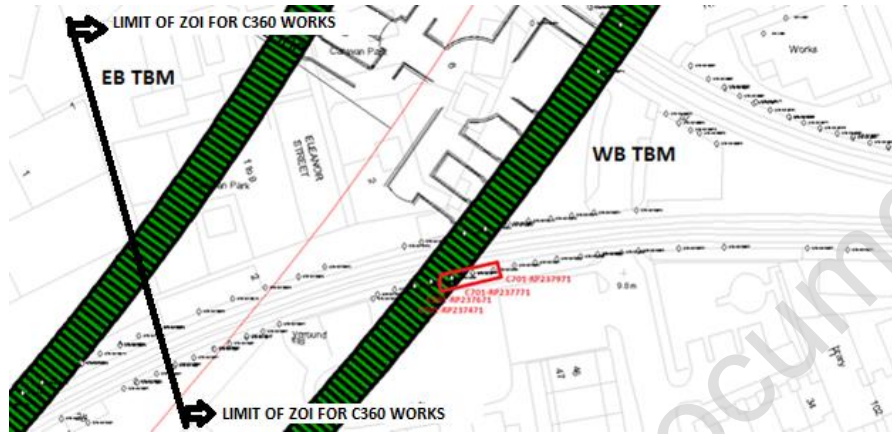
LEGEND			
X AXIS	PRISM' NAME	X AXIS	PRISM' NAME
7	C701-RP100771-CR102	197	C701-RP219771-CR102
27	C701-RP102771-CR102	218	C701-RP221871-CR102
49	C701-RP104971-CR102	272	C701-RP227271-CR102
86	C701-RP208671-CR102	294	C701-RP229471-CR102
113	C701-RP211371-CR102	313	C701-RP231371-CR102
133	C701-RP213371-CR102	341	C701-RP234171-CR102
155	C701-RP215571-CR102	362	C701-RP236271-CR102
176	C701-RP217671-CR102	388	C701-RP238871-CR102

In order to analyse the result from the monitoring system, some specific locations have been chosen.

The sketches below show the prisms included in these locations of the Network Rail Asset.



Tables below show the summary of the ground movements in these locations along the structure, in this section only movement due to the C305 TBMs is considered and movements due to C360 works will be covered in a separate C360 report. The CRL chainage for the limit of C360 works is 82526 (see sketch below).



Note: Some of these movements due to C360 works occurred during the interval between the passages of the two TBMs.

Activity	Movement (X)(mm) *			
	PRISMS			
	C701-RP237471	C701-RP237671	C701-RP237771	C701-RP237971
Eastbound (EB) Tunnel Boring machine(TBM) transits	0	0	0	0
Westbound (WB) Tunnel Boring Machine (TBM) transits	0	-1	-1	-2

Activity	Movement (Y)(mm) *			
	PRISMS			
	C701-RP237471	C701-RP237671	C701-RP237771	C701-RP237971
Eastbound (EB) Tunnel Boring machine(TBM) transits	-1	-1	-1	-1
Westbound (WB) Tunnel Boring Machine (TBM) transits	+1	3	3	4

Activity	Movement (Z)(mm) *			
	PRISMS			
	C701-RP237471	C701-RP237671	C701-RP237771	C701-RP237971
Eastbound (EB) Tunnel Boring machine(TBM) transits	0	0	0	0
Westbound (WB) Tunnel Boring Machine (TBM) transits	-5	-5	-5	-5

*Relative movements caused by C305 works, excluding movement due to C360 works.

Activity	Movement (X)(mm)					
	PRISMS AFFECTED FOR C305 WORKS					
	C701-RP103074	C701-RP106974 (underbridge)	C701-RP215074	C701-RP222874	C701-RP233071 (underbridge)	C701-RP234474
Eastbound (EB) Tunnel Boring machine(TBM) transits	3	-1	0	1	0	0
Westbound (WB) Tunnel Boring Machine (TBM) transits	-1	0	0	2	0	0
Total movement (X):	2	-1	0	3	0	0

Activity	Movement (Y)(mm)					
	PRISMS AFFECTED FOR C305 WORKS					
	C701-RP103074	C701-RP106974 (underbridge)	C701-215074	C701-RP222874	C701-RP233071 (underbridge)	C701-RP234474
Eastbound (EB) Tunnel Boring machine(TBM) transits	0.5	0	0	0	0	0
Westbound (WB) Tunnel Boring Machine (TBM) transits	2	0	0	-3	0	0
Total movement (Y):	2.5	0	0	-3	0	0

Activity	Movement (Z)(mm)					
	PRISMS AFFECTED FOR C305 WORKS					
	C701-RP103074	C701-RP106974 (underbridge)	C701-215074	C701-RP222874	C701-RP233071 (underbridge)	C701-RP234474
Eastbound (EB) Tunnel Boring machine(TBM) transits	1	-2	0	0	0	0
Westbound (WB) Tunnel Boring Machine (TBM) transits	-4	0	-5	-3	0	0
Total movement (Z):	-3	-2	-5	-3	0	0

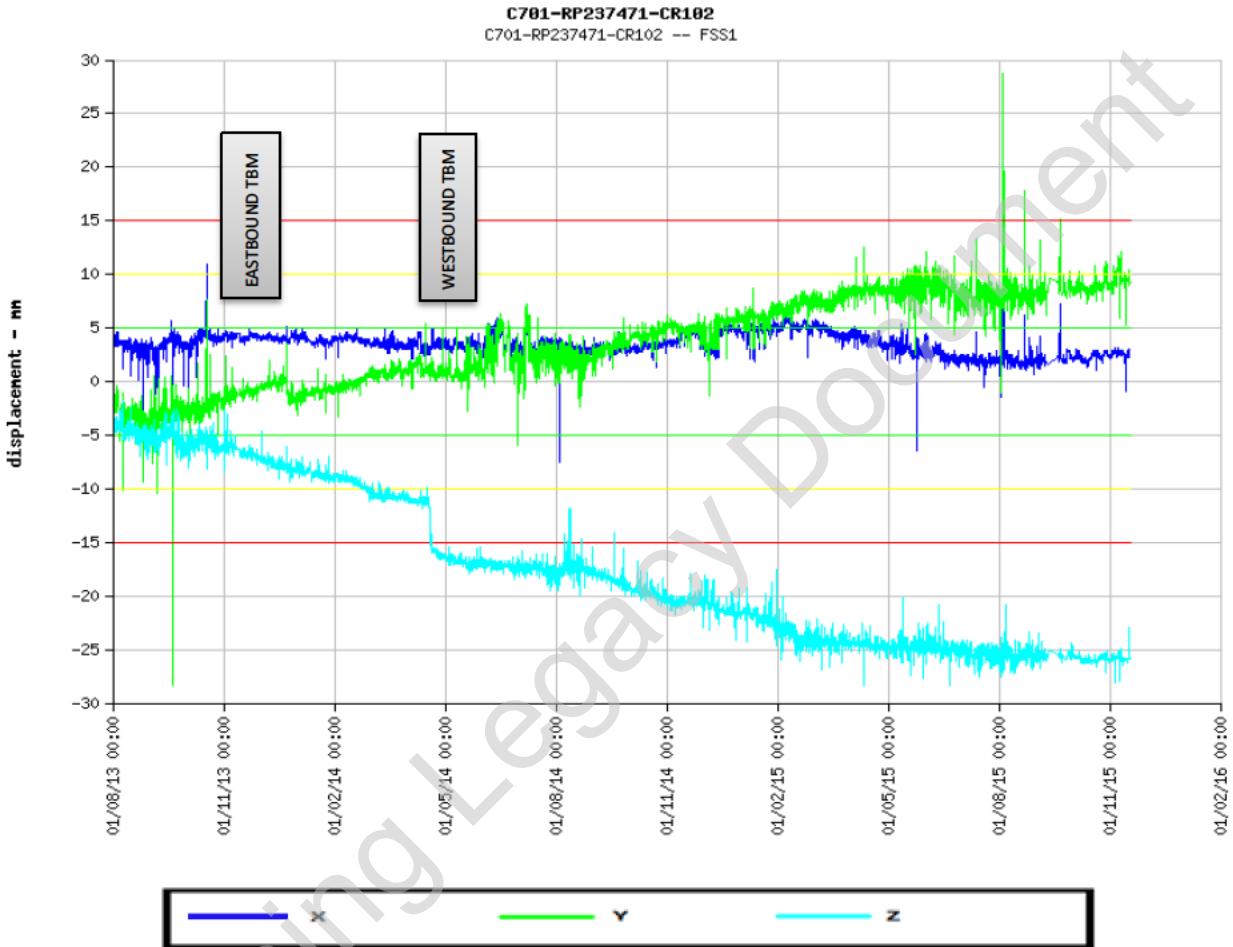
The graphs below show the automatic readings including the construction activities for each location of these prisms.

Monitoring frequencies and trigger values were specified in: Specific Action Plan Z005-LT&Gas Factory Curve Viaduct (NR19) (C305-DSJ-C-STP-CRG03-50040 Rev 1.0) which sets trigger values for vertical settlement for **Masonry Arches** at 25mm for green, 30mm for amber and 40mm for red; and for **underbridges** at 15mm for green, 20 mm for amber and 25mm for red and for the horizontal displacement values of ± 7 mm for green, ± 10 mm for amber and ± 15 mm for red.

Note: Trigger values shown in the graphs below from UCIMS system are not correct.

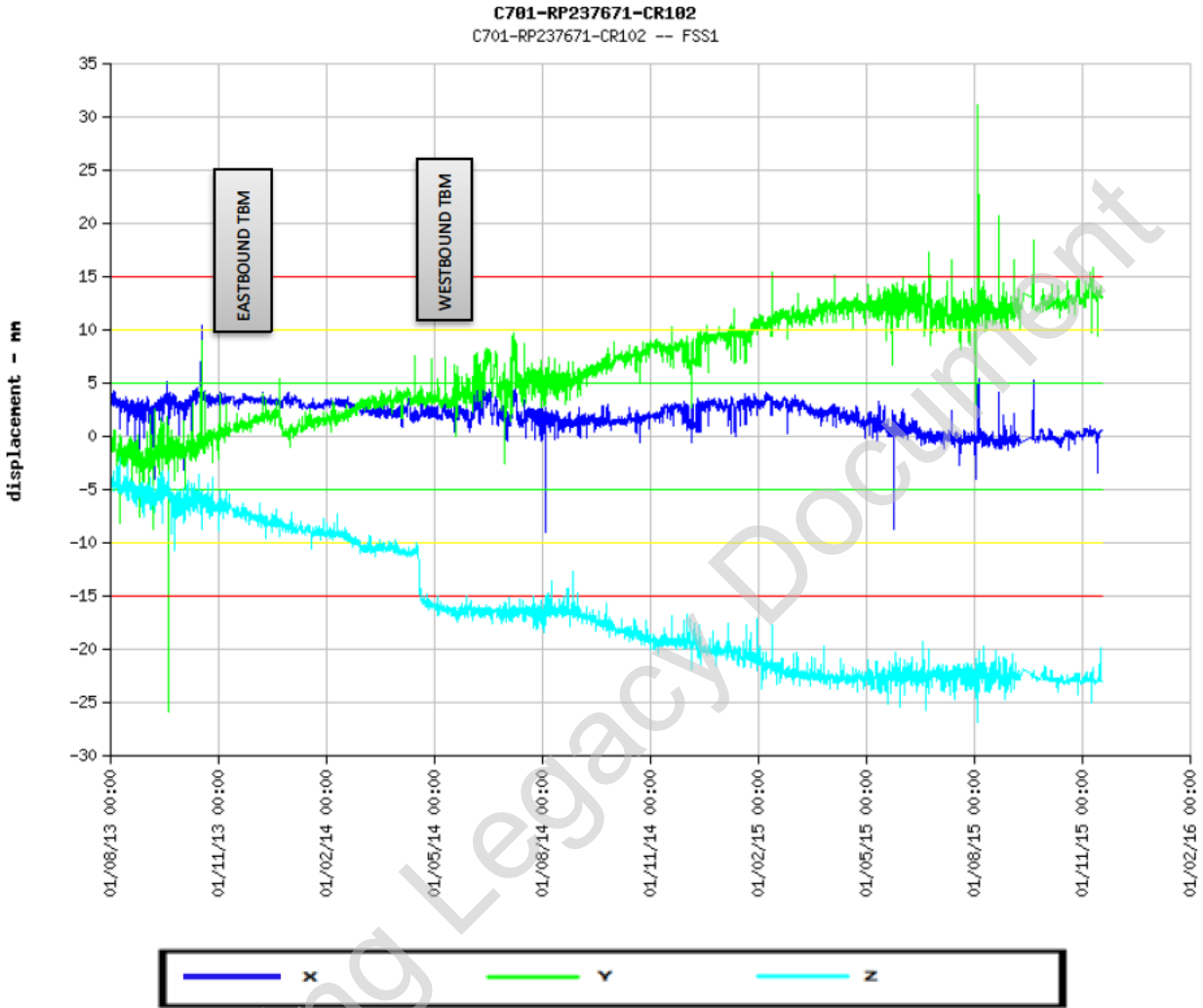
6.1. PRISMS AFFECTED BY C360 WORKS

C701-RP237471



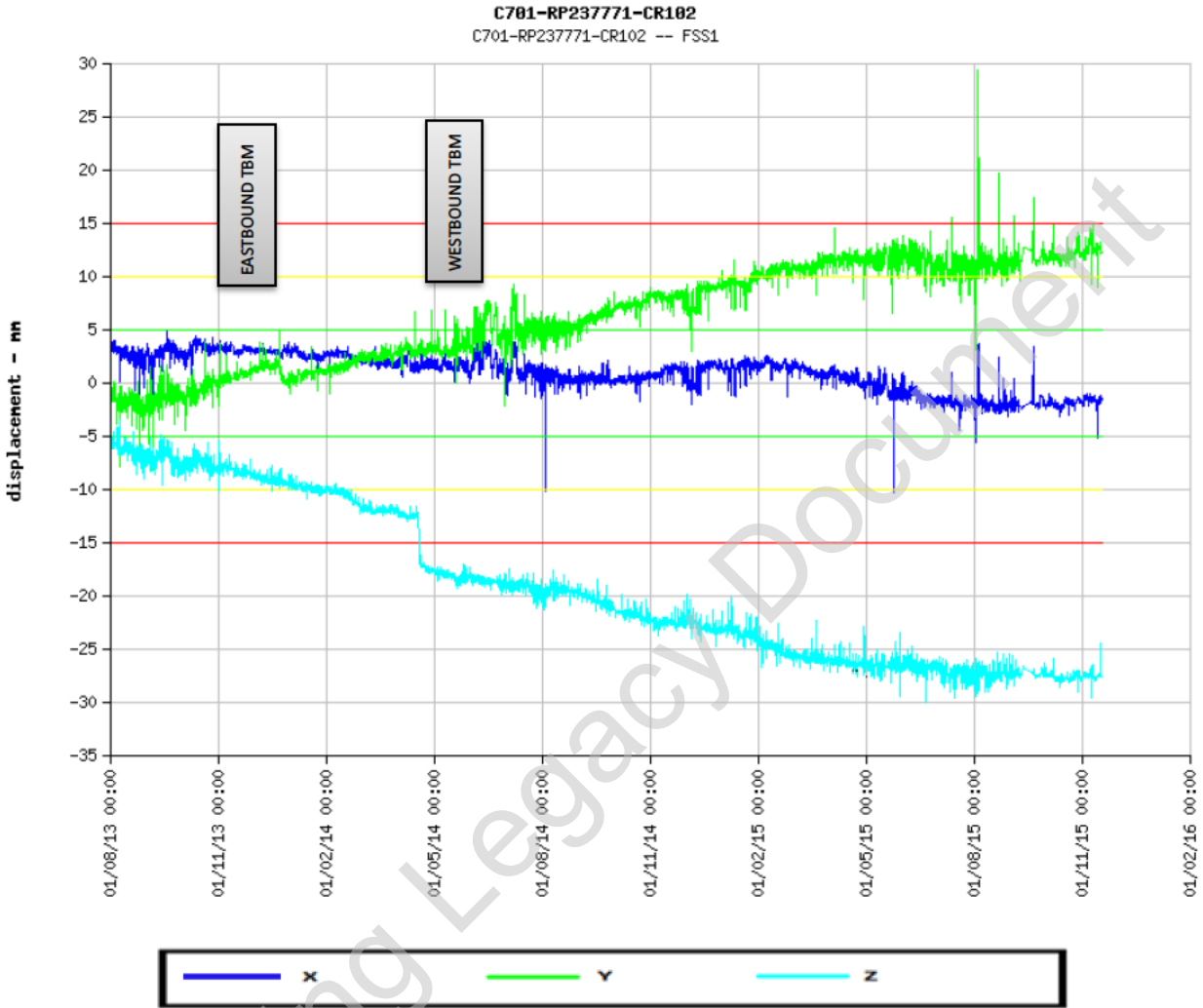
No trigger value has been breached at the time that the TBMs passed.

C701-RP237671



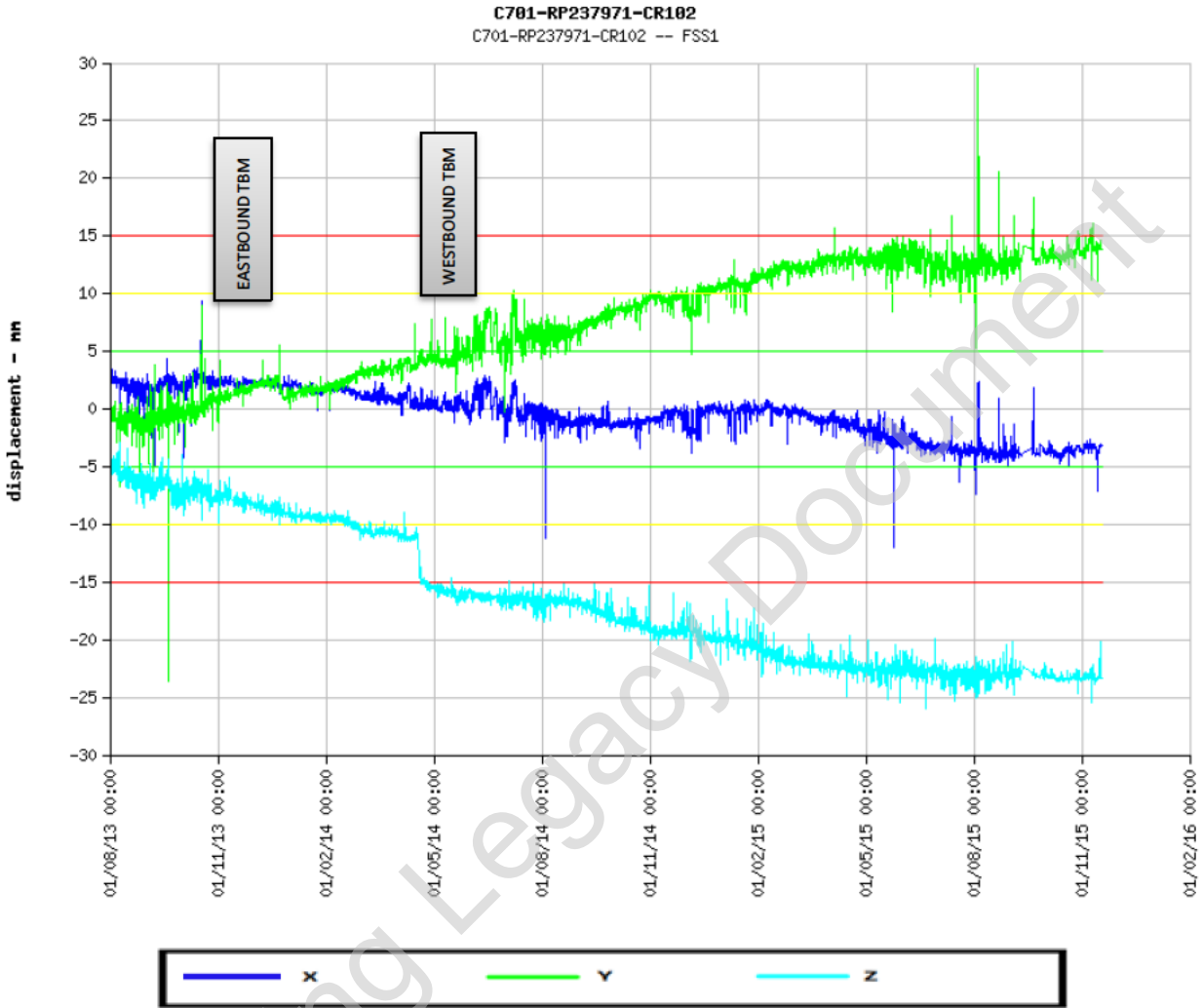
No trigger value has been breached at the time that the TBMs passed.

C701-RP237771



No trigger value has been breached at the time that the TBMs passed.

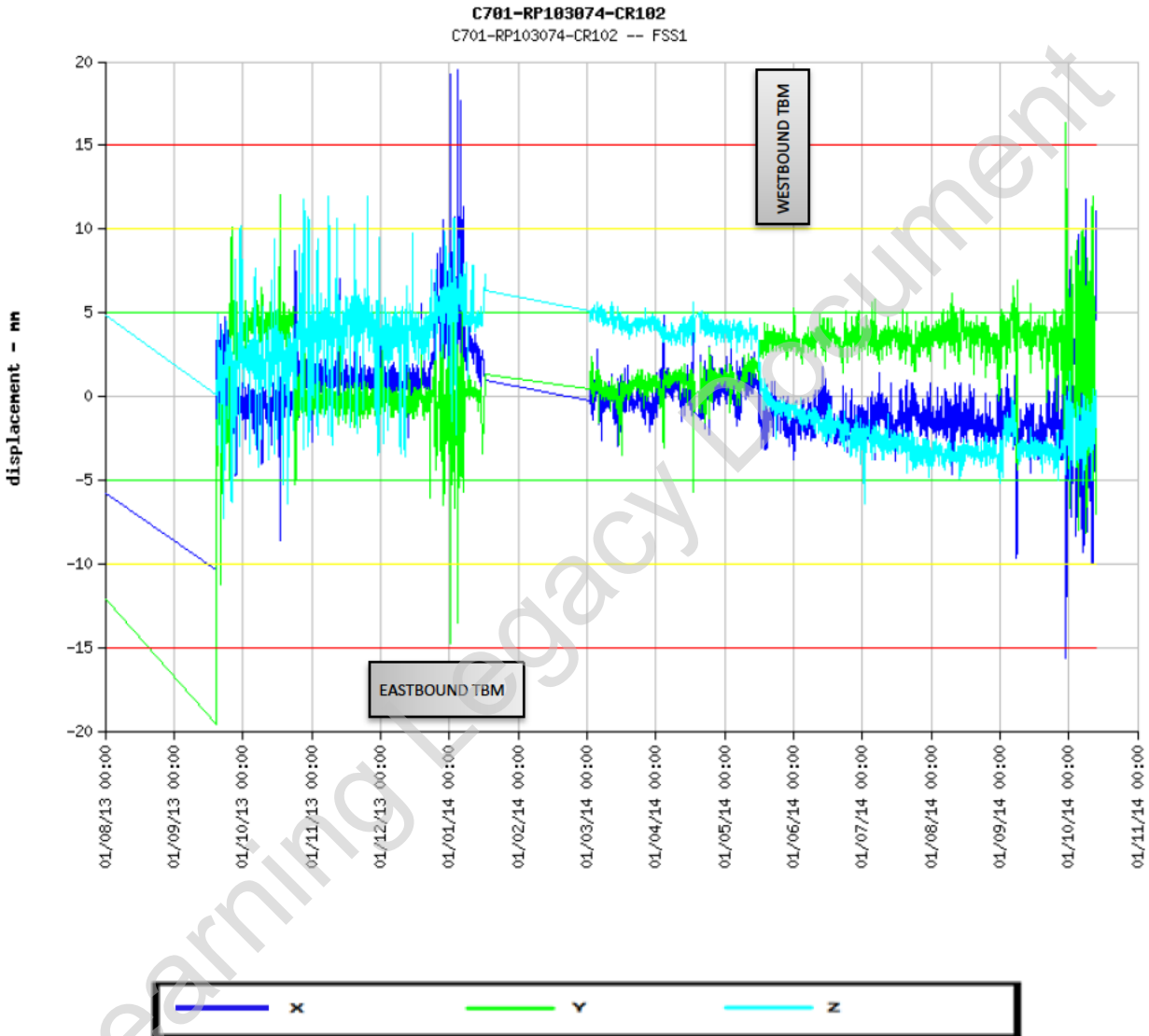
C701-RP237971



No trigger value has been breached at the time that the TBMs passed.

6.2. PRISMS AFFECTED BY THE C305 WORKS

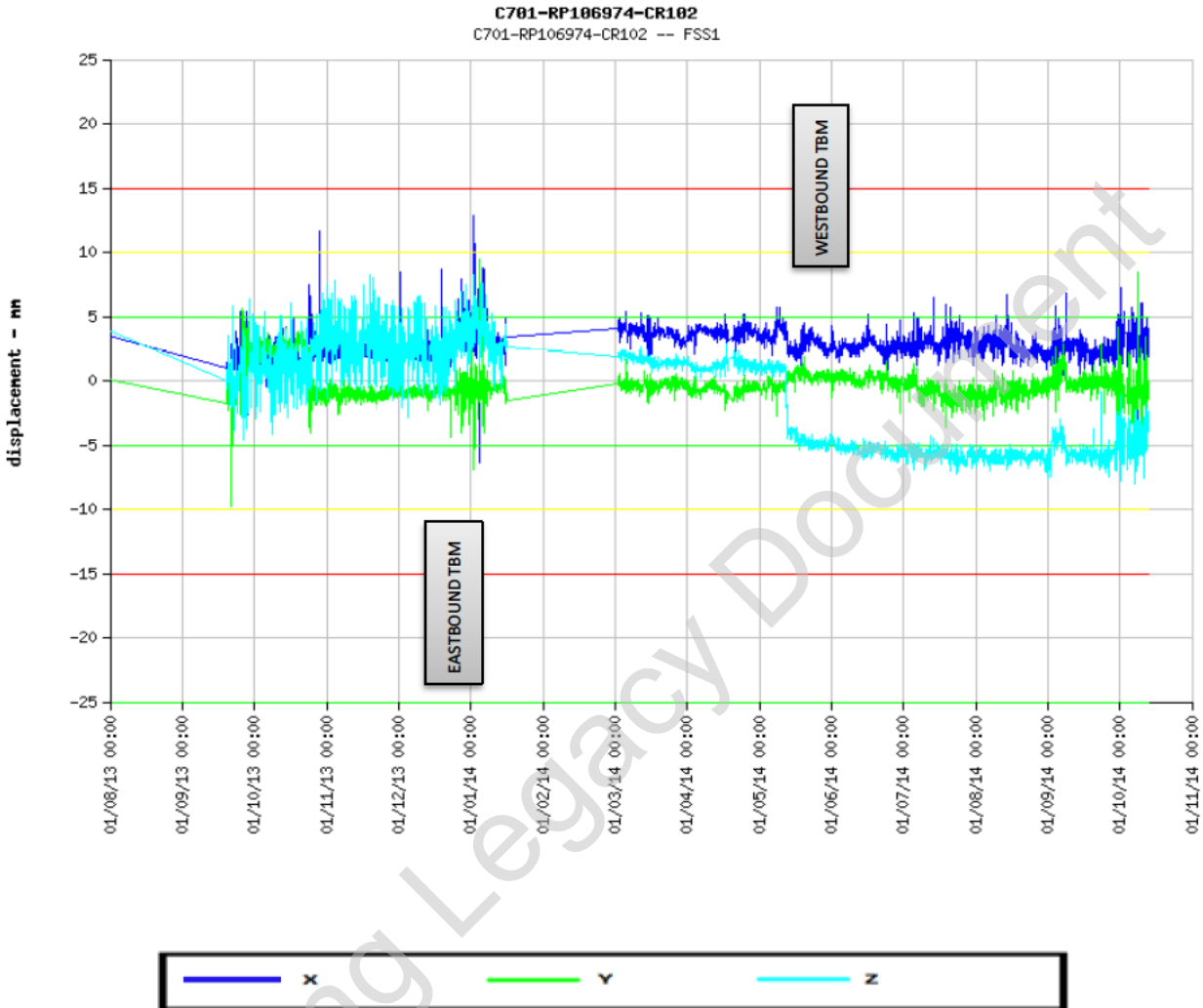
C701-RP103074 (HAVEN MEWS)



The horizontal displacements (X, Y) show some spiky readings exceeding the red trigger value (15mm).

It should be noted for the gaps in monitoring data displayed between January 2014 and March 2014 there is no specific explanation provided by C704.

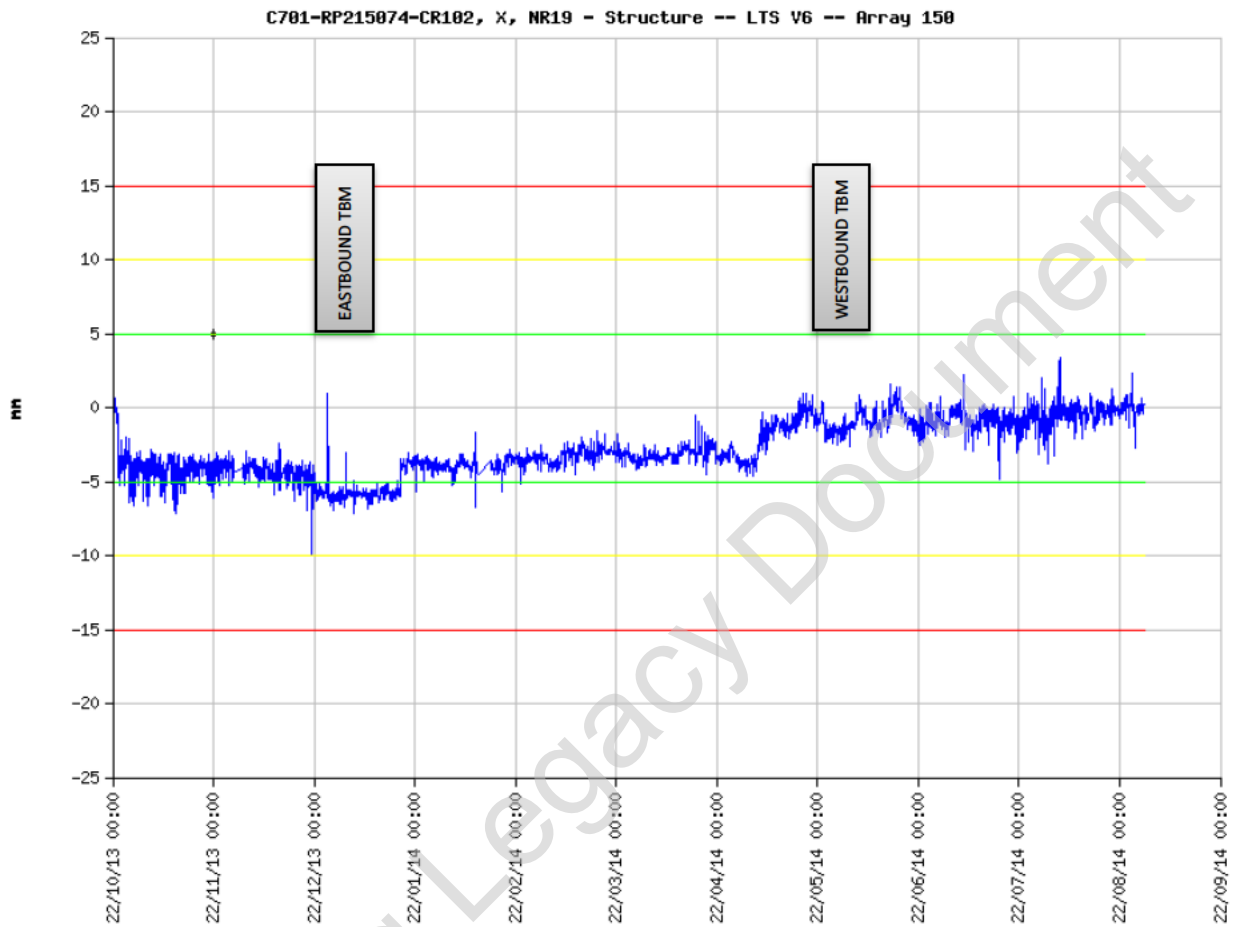
C701-RP106974 (BURDETT ROAD)



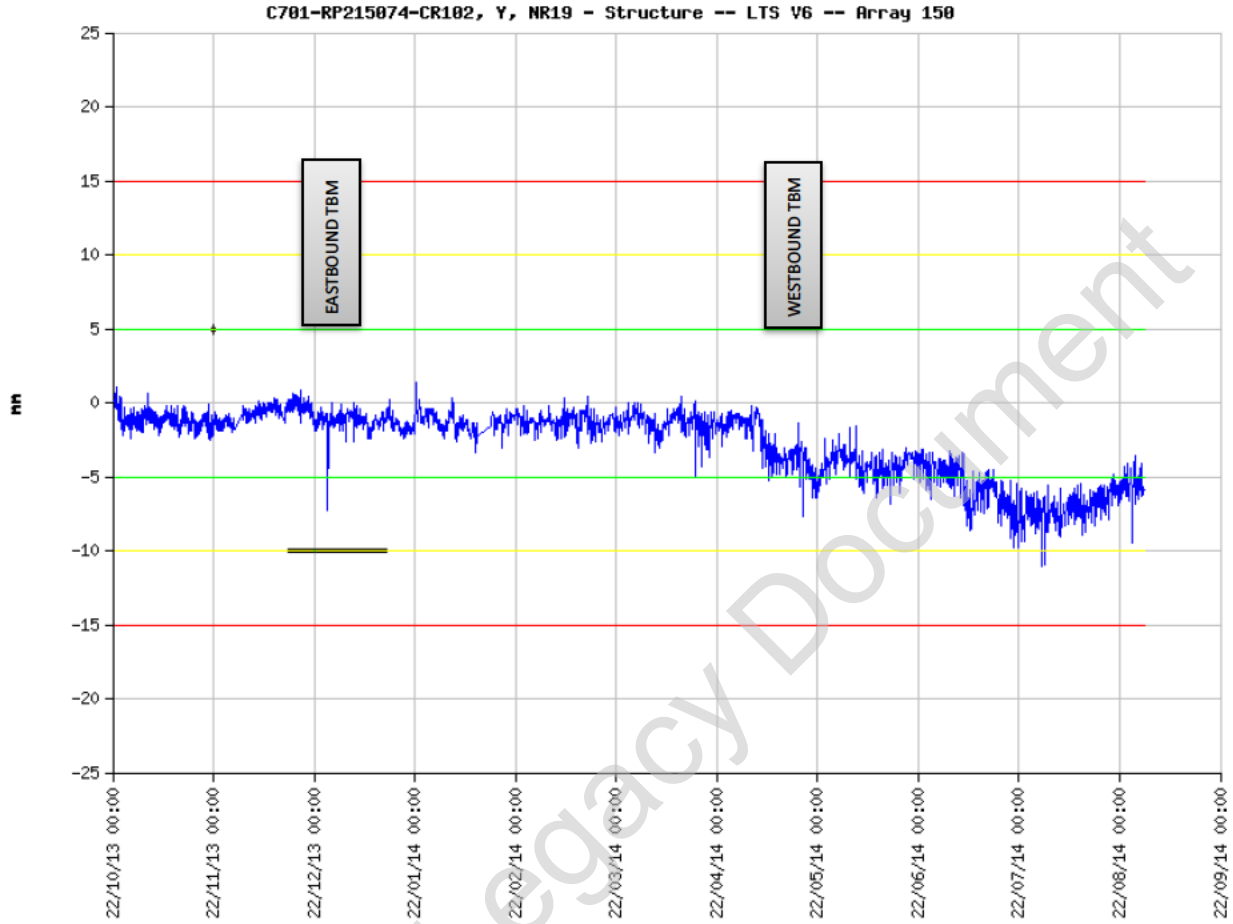
No trigger value was breached.

It should be noted for the gaps in monitoring data displayed between January 2014 and March 2014 there is no specific explanation provided by C704.

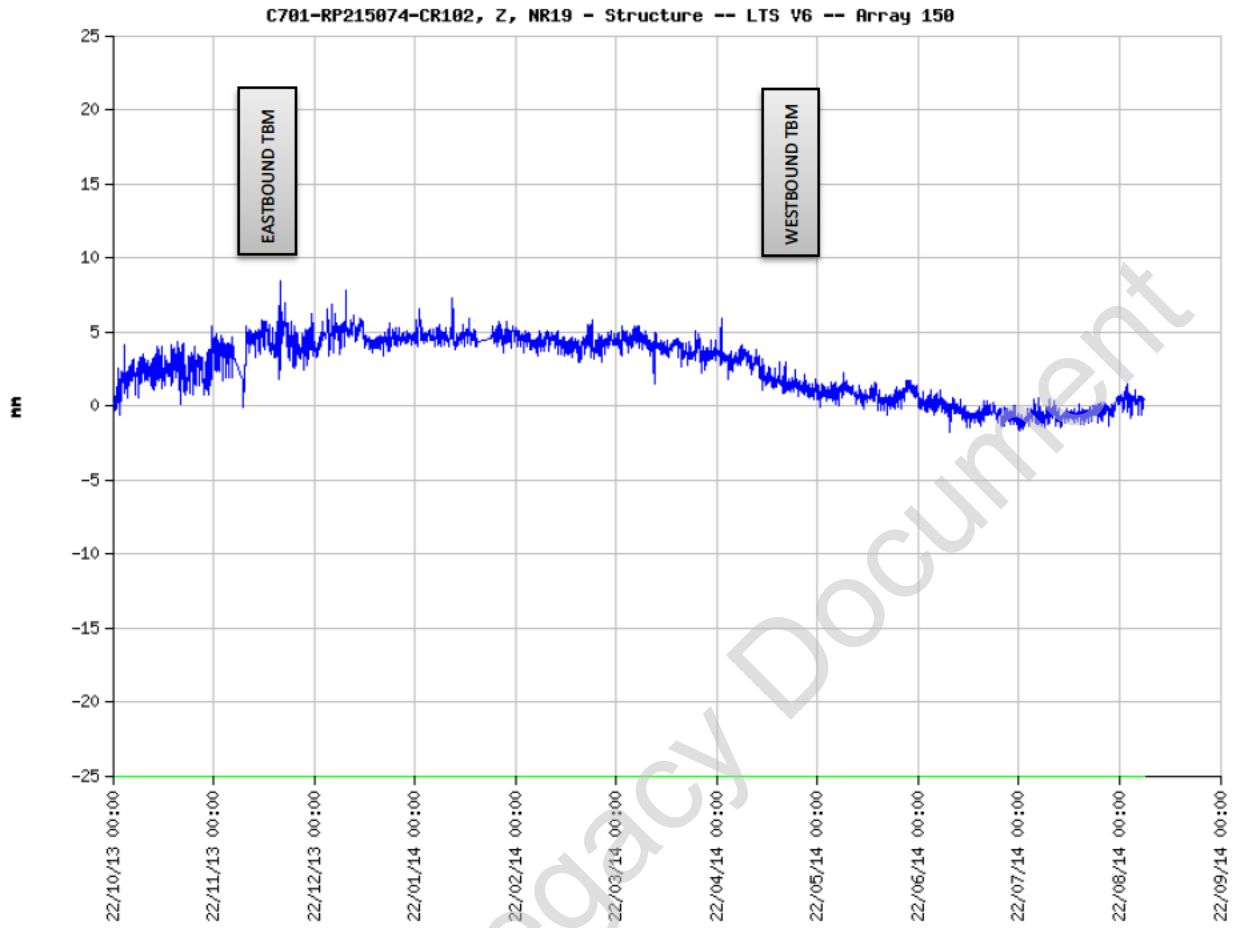
C701-RP215074 (PICKARD GARDENS / ROBESON STREET)



No trigger value has been breached at the time that the TBMs passed.

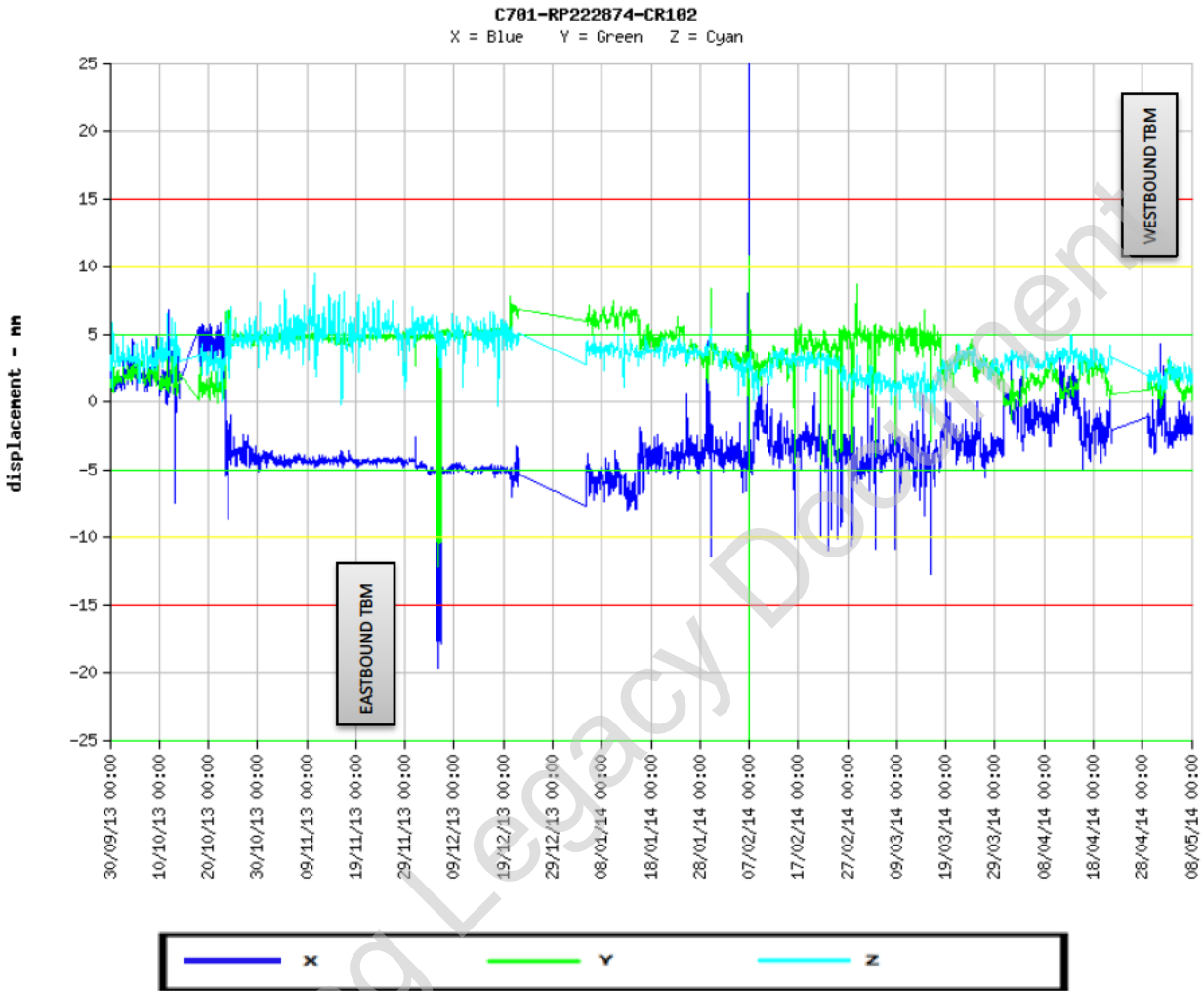


No trigger value has been breached at the time that the TBMs passed.



The horizontal displacements (X, Y) show some spiky readings exceeding the red trigger value (15mm).

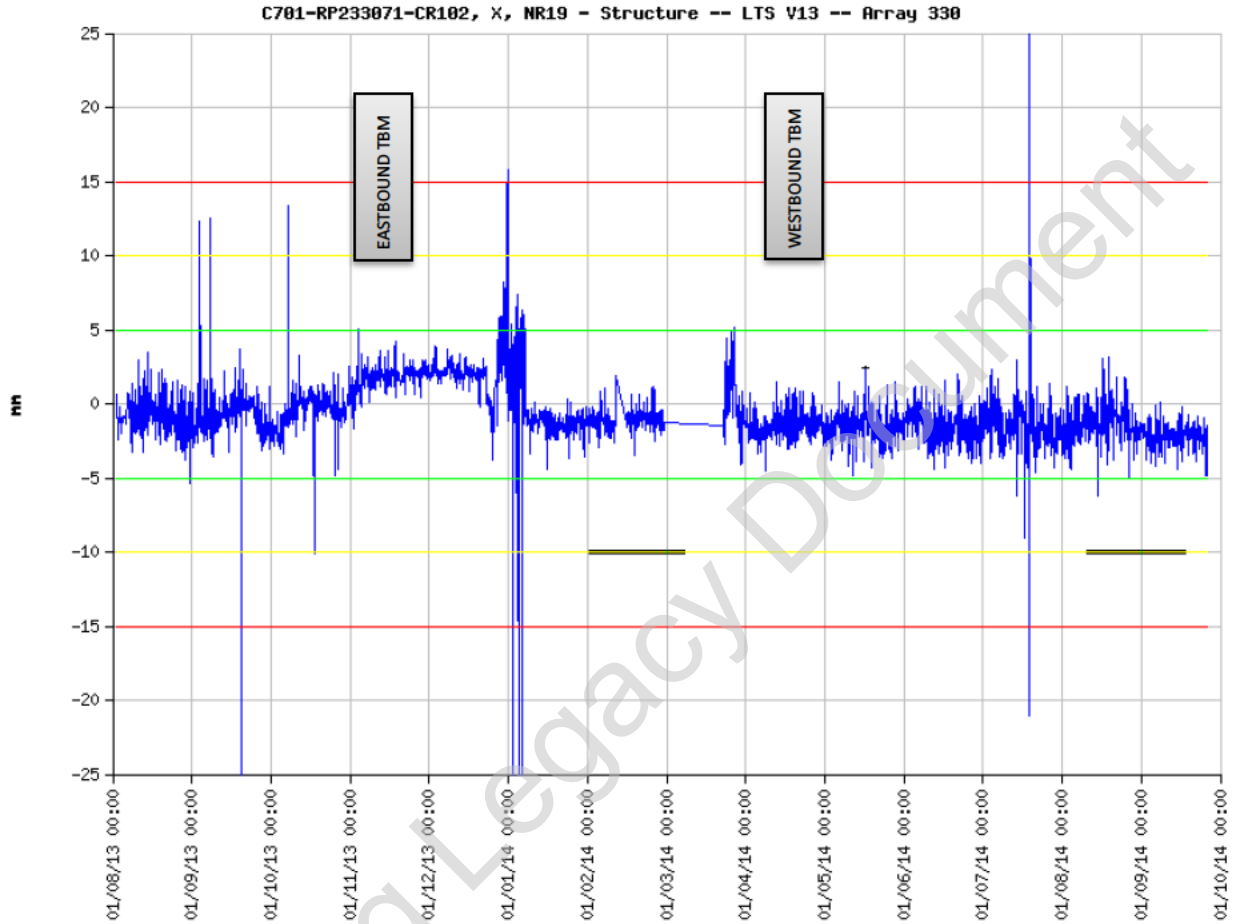
C701-RP222874 (CANTRELL ROAD)



The horizontal displacement (X) shows some spiky readings exceeding the amber trigger values (10mm).

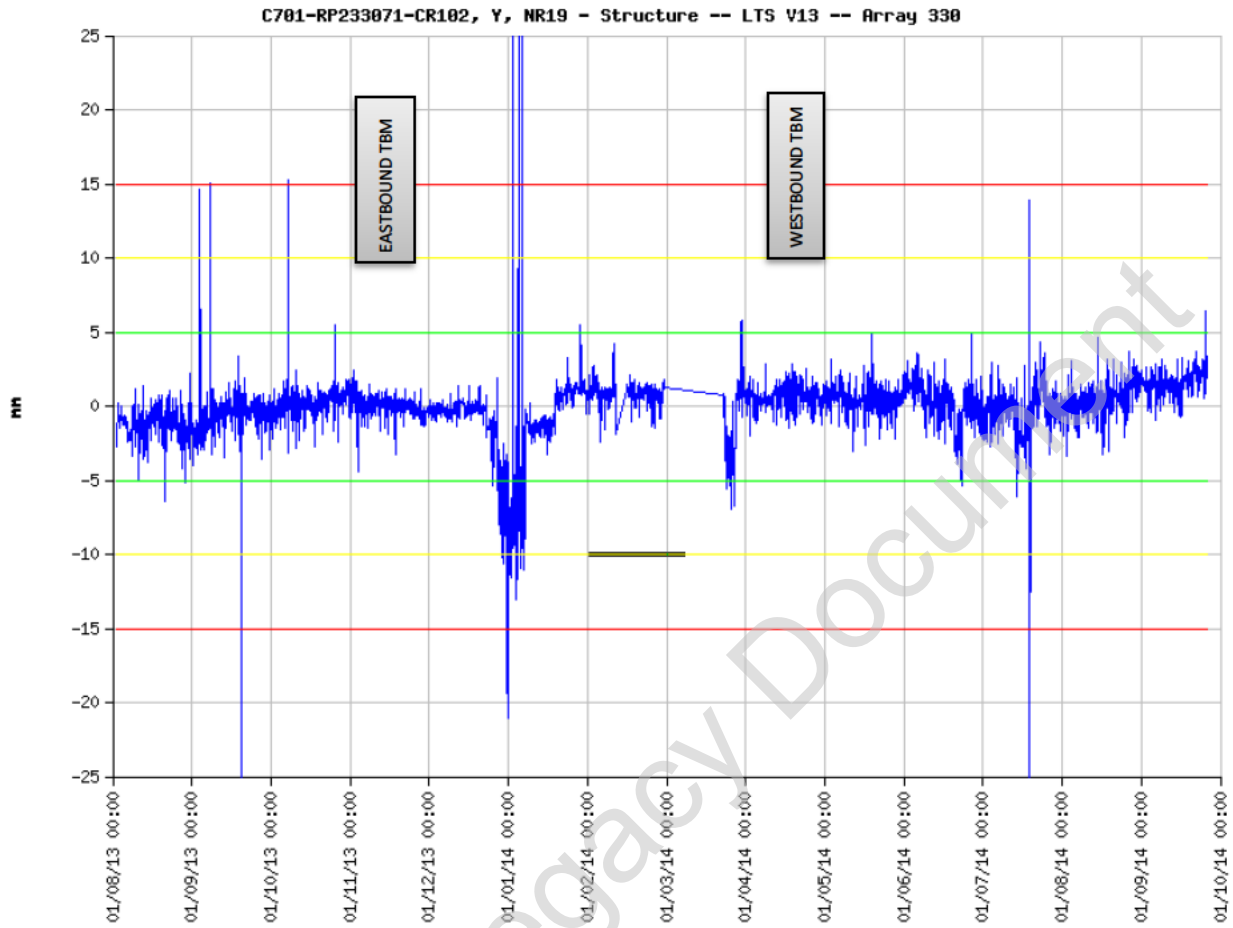
It should be noted for the gaps in monitoring data displayed in December 2013 there is no specific explanation provided by C704.

C701-RP233071 (BOW TRIANGLE BUSINESS CENTRE)



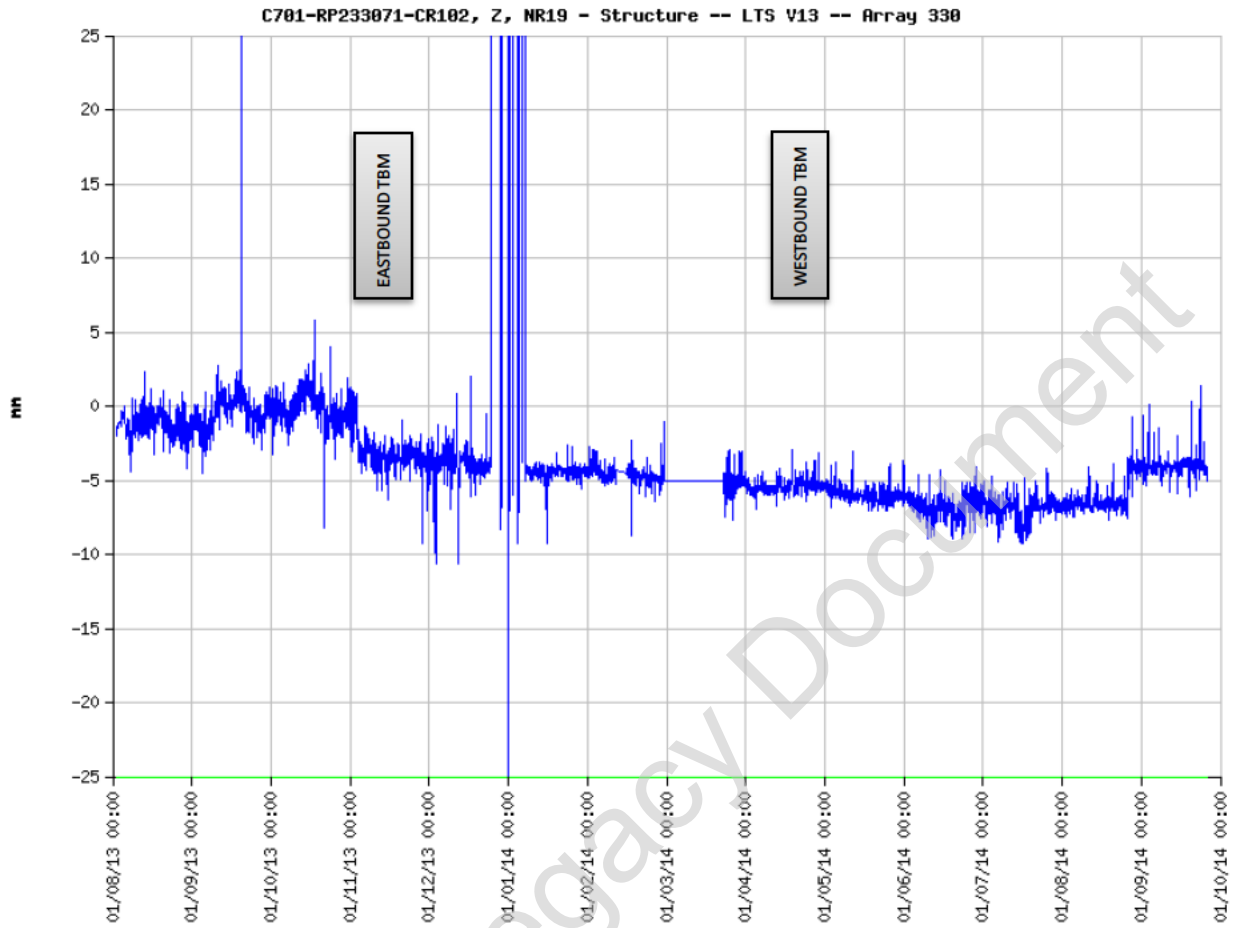
The horizontal displacement (X) shows some spiky readings exceeding the amber trigger values (10mm).

It should be noted for the gaps in monitoring data displayed in March 2014 there is no specific explanation provided by C704.



The horizontal displacement (Y) shows some spiky readings exceeding the amber trigger values (10mm).

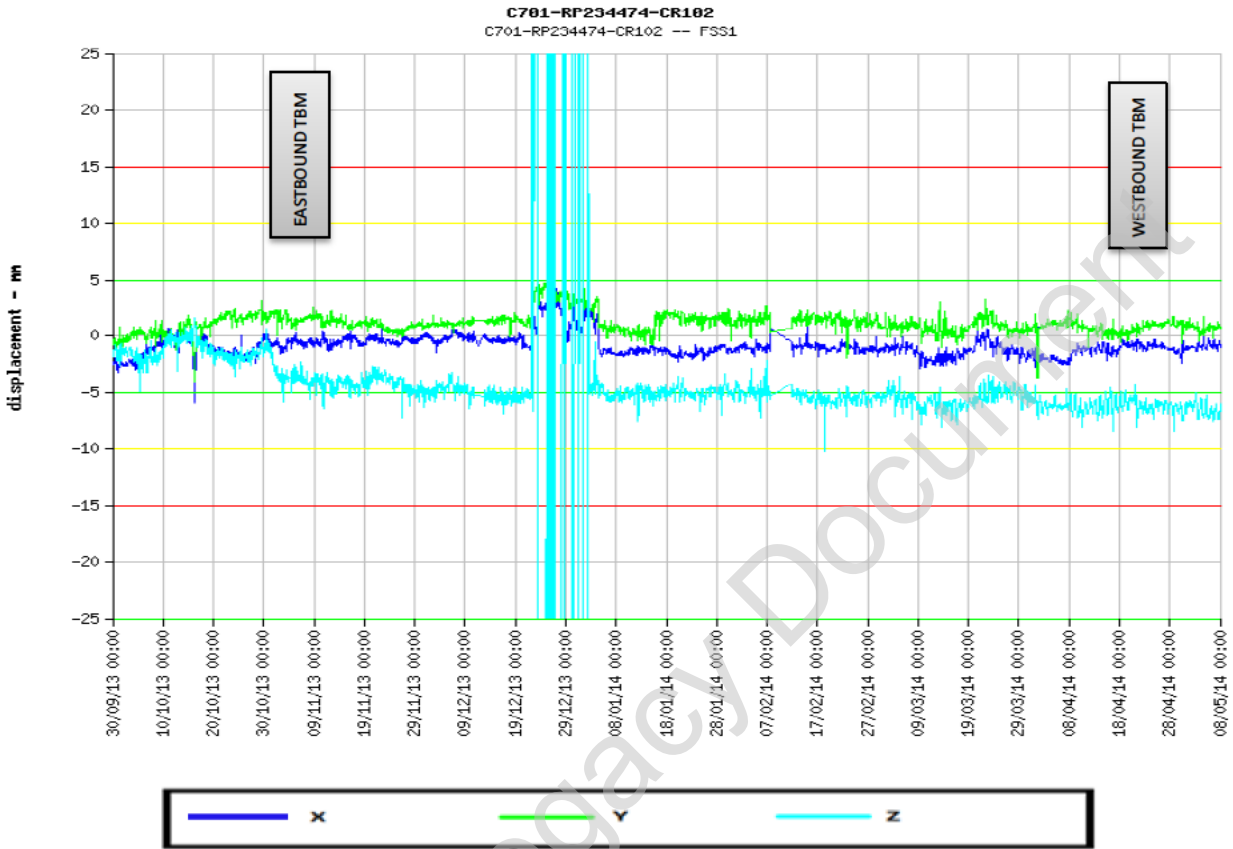
It should be noted for the gaps in monitoring data displayed in March 2014 there is no specific explanation provided by C704.



The vertical displacement (Z) shows some spiky readings exceeding the amber trigger values (10mm).

It should be noted for the gaps in monitoring data displayed in March 2014 there is no specific explanation provided by C704.

C701-RP234474 (BOW TRIANGLE BUSINESS CENTRE / TIDWORTH ROAD)



No trigger value was breached (settlement movement shows some spiky readings across December 2013 and January 2014).

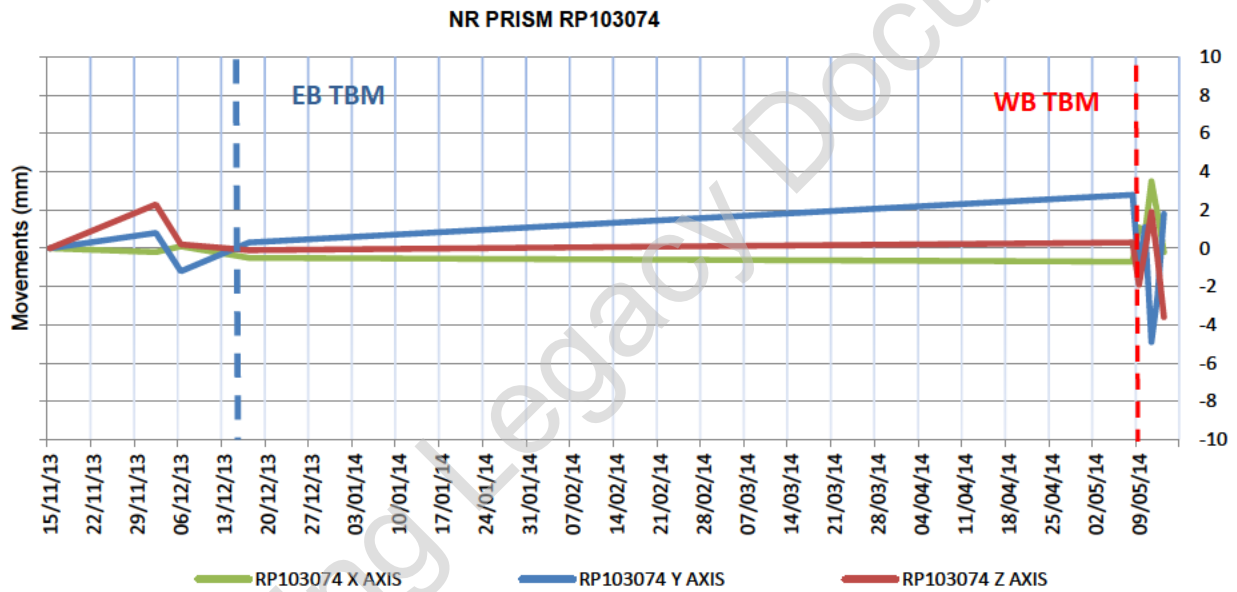
7. C305 MANUAL VERIFICATION READINGS

During the passage of the TBMs, manual readings were taken by C305 to verify the data provided from the C704 system was accurate and reliable.

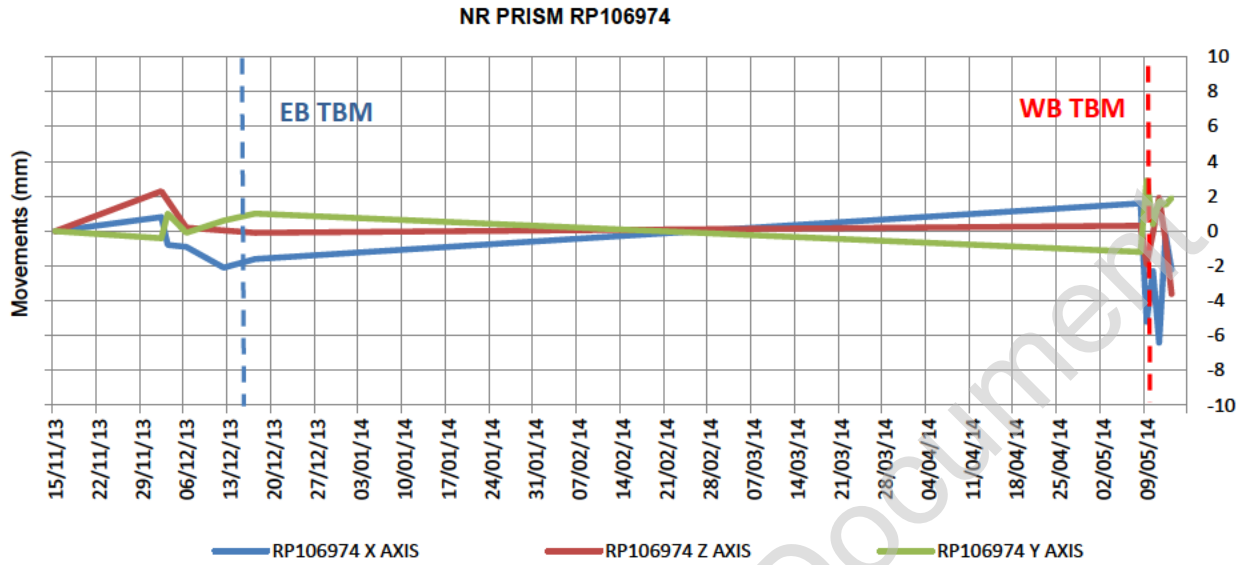
AUTOMATIC PRISMS MANUAL VERIFICATION

Graphs below show the manual readings of the same prisms chosen alongside the structure.

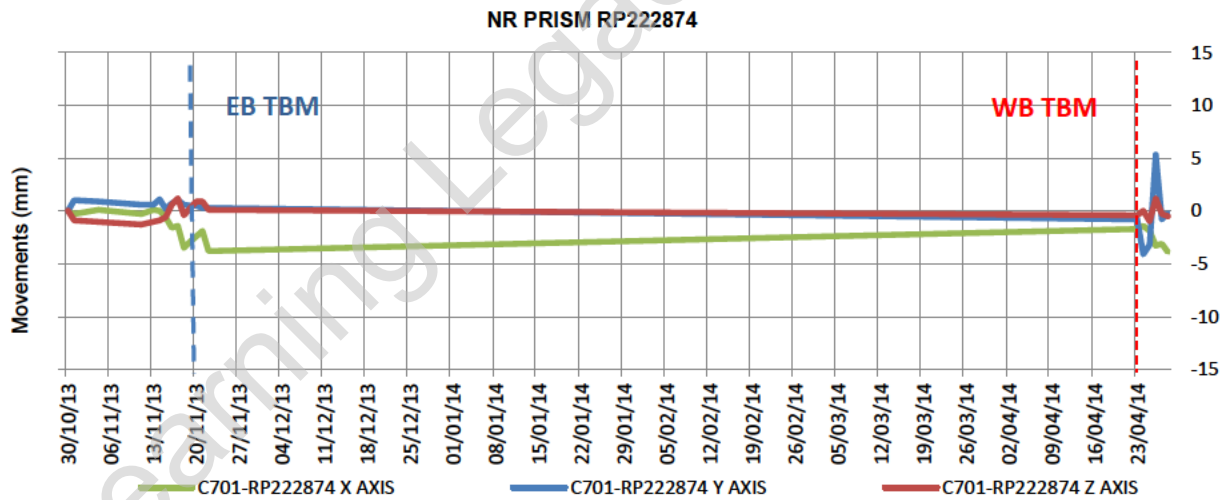
C305 MANUAL READINGS (RP103074)



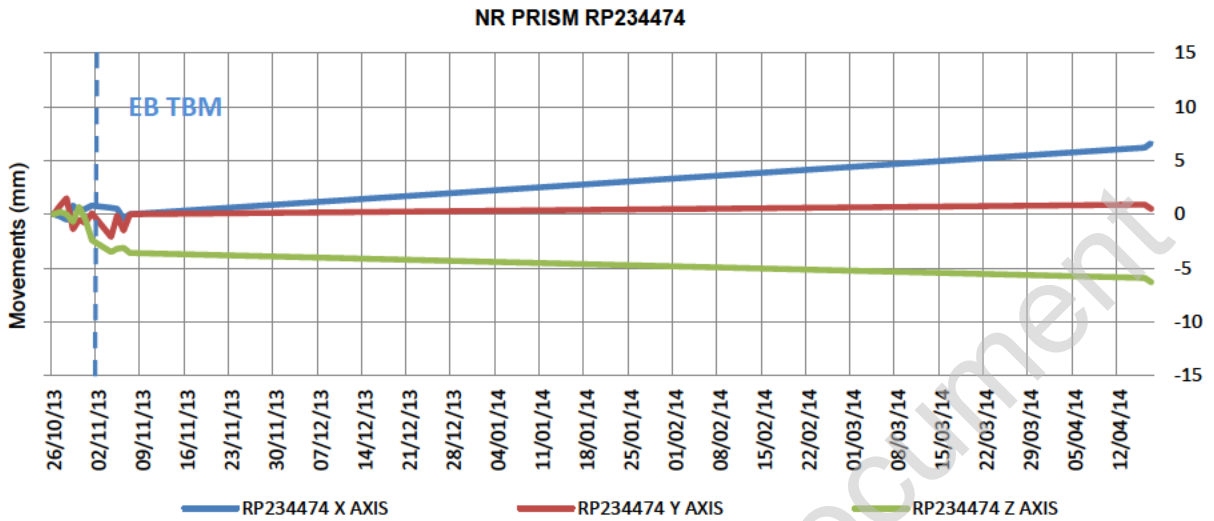
C305 MANUAL READINGS (RP106974)



C305 MANUAL READINGS (RP222874)

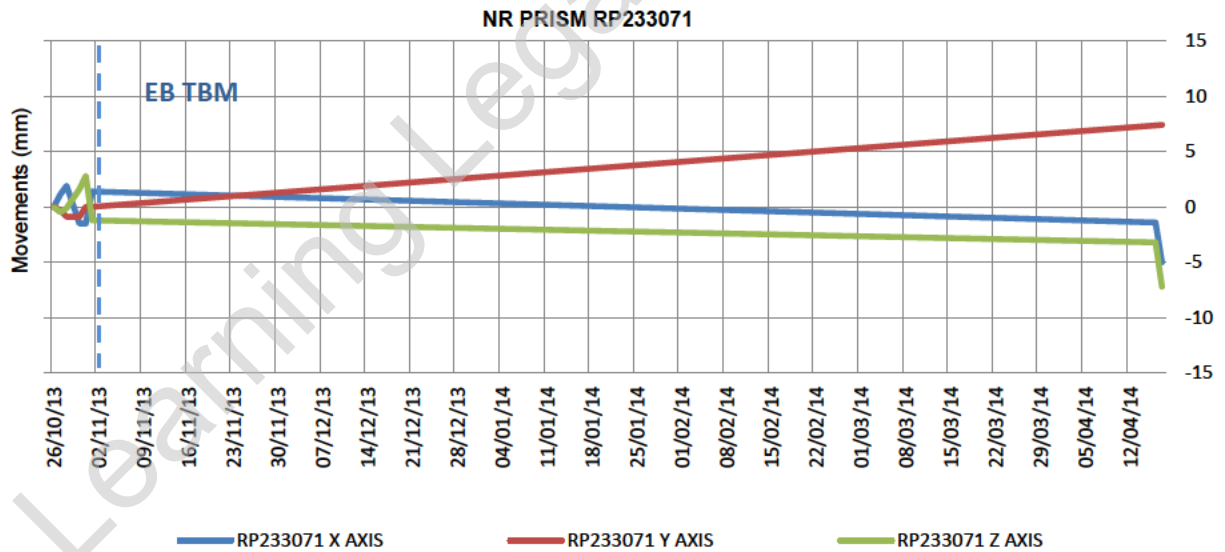


C305 MANUAL READINGS (RP234474)



Note: The prism chosen is out of the WB TBM zone of influence.

C305 MANUAL READINGS (RP233071)



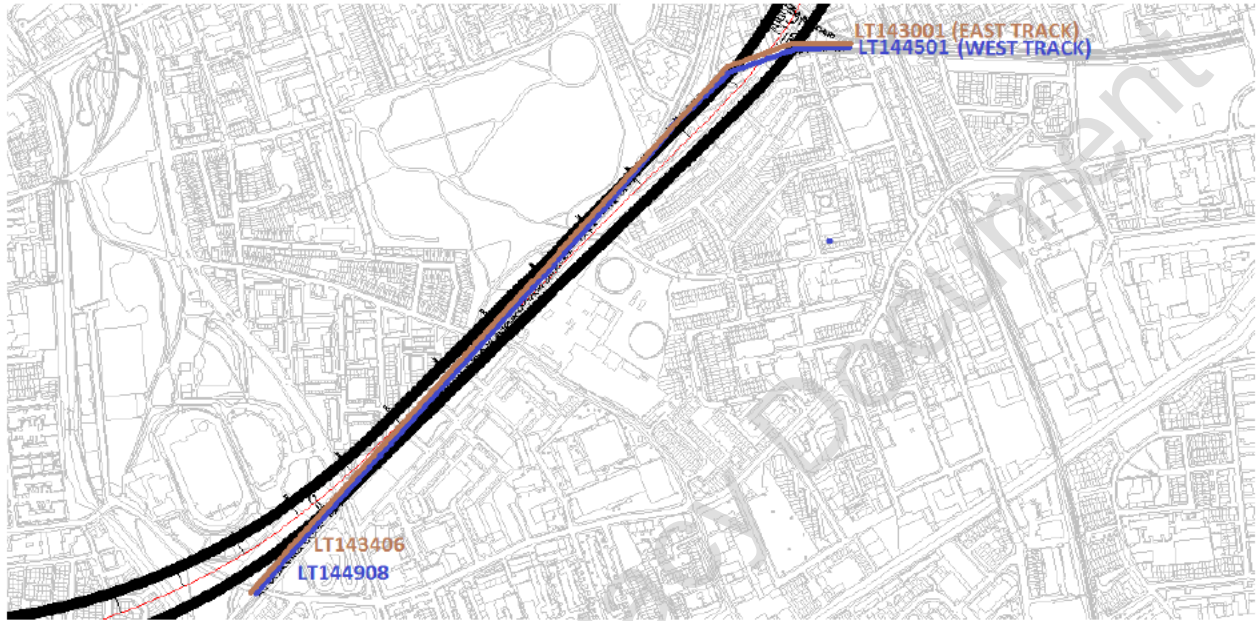
Note: The prism chosen is out of the WB TBM zone of influence.

As can be observed, the results of automatic and manual readings show similar values.

TRACK LEVELLING TBM

The sketch below shows the location of the track levelling at Network Rail (NR) tracks.

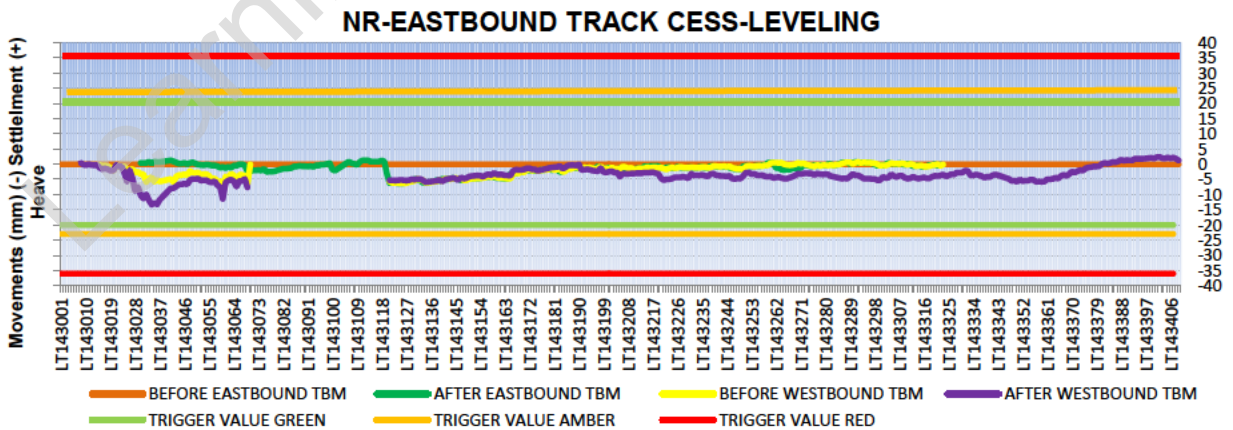
TRACK LEVELLING NETWORK RAIL (CESS-NR)



TRACK LEVELLING

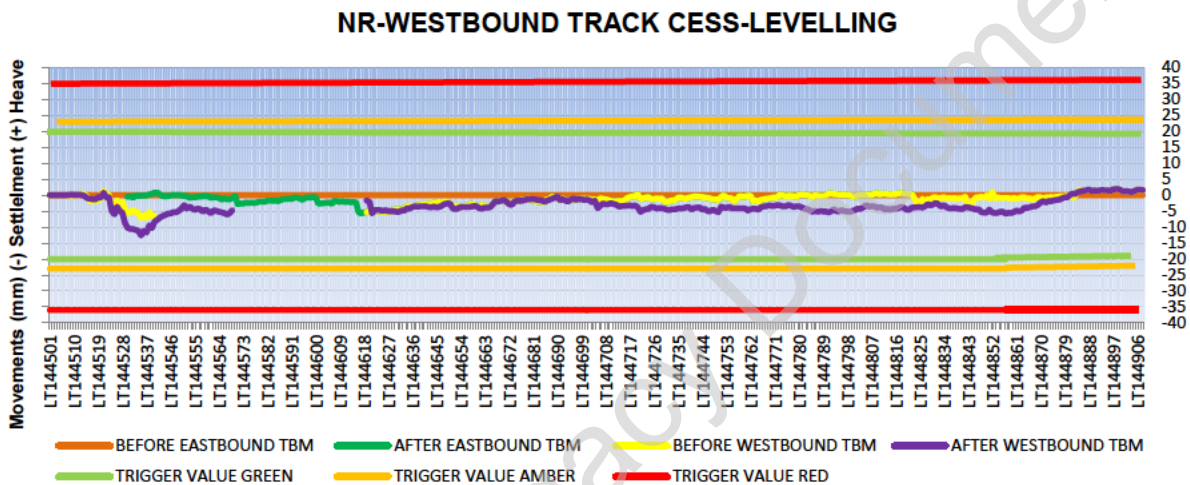
It is to be noted the LT arrays are parallel to the Drive Z tunnel alignment.

SETTLEMENT



The graph above shows a maximum settlement of 5.5mm after the eastbound TMB passage and a maximum settlement following the westbound TBM passage of approximately 13mm. In total, the maximum settlement recorded was approximately 13mm.

Note: there is a gap of data recorded between LT143070 to LT143120 levelling marks after westbound TBM passage because these levelling marks are out of the WB TBM zone of influence.

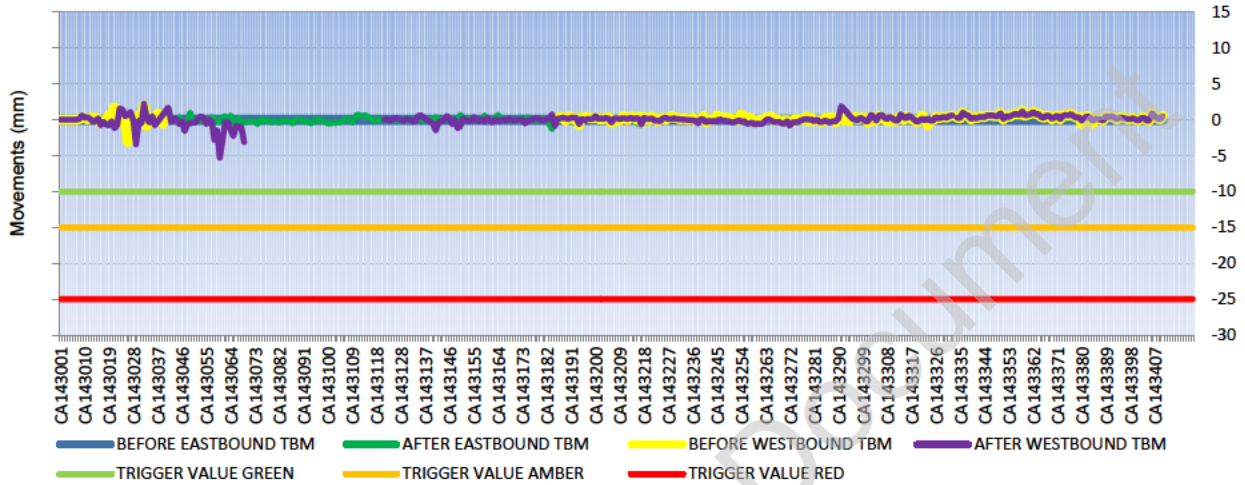


The graph above shows a maximum settlement of approximately 5.5mm after the eastbound TMB passage, and a maximum settlement following the westbound TBM passage of approximately 13mm. In total, the maximum settlement recorded was approximately 13mm.

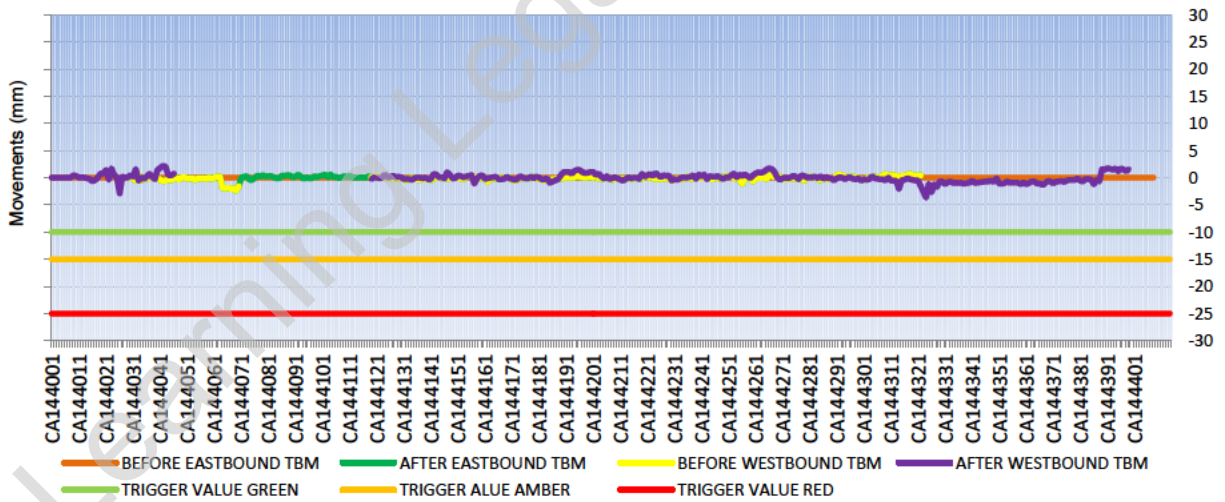
Note: there is a gap of data recorded between LT144570 to LT144620 levelling marks after westbound TBM passage because they are out of the WB TBM zone of influence.

CHANGE IN CANT

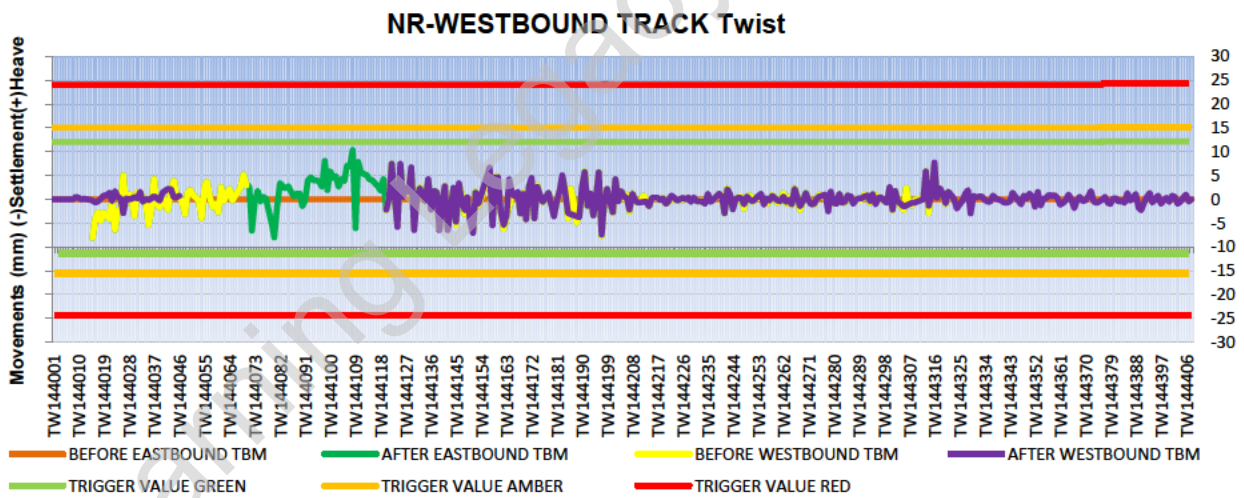
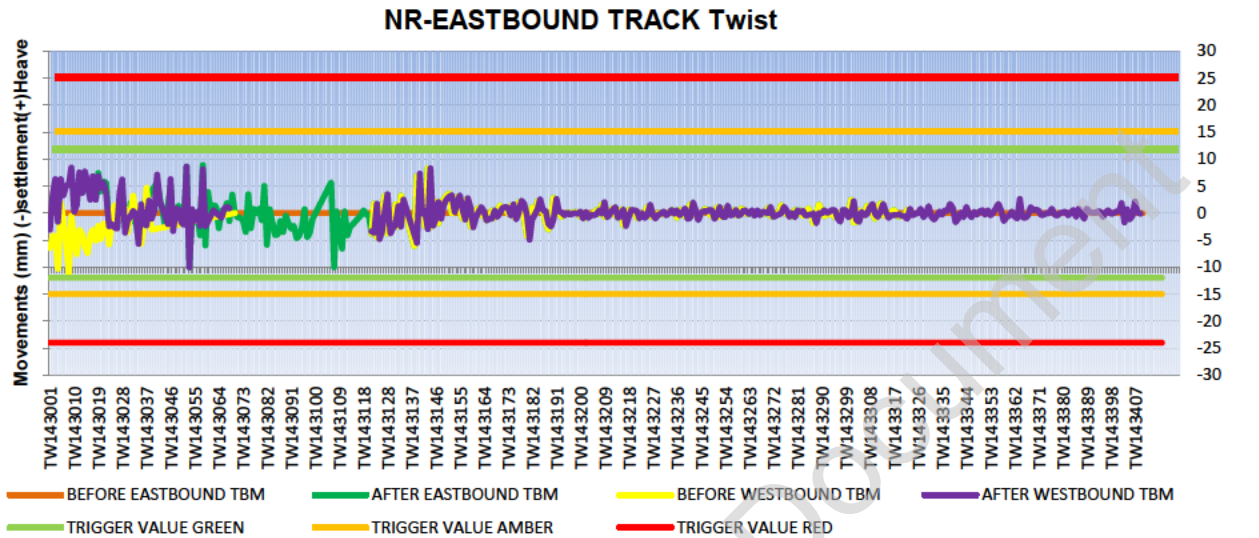
NR-EASTBOUND TRACK CHANGE IN CANT



NR-WESTBOUND TRACK CHANGE IN CANT



TWIST



No significant changes of twist and change in cant have been registered.

Trigger values shown on the graphs are as per C305-DSJ-C-STP-CRG03-50040 Rev 1.0 - Specific Action Plan 2005 - LT&S Gas Factory Curve Viaduct (NR19). As can be seen all movements were within the specified trigger values.

8. SUMMARY

This review of both the C305 manual verification data and the C704 automatic system data concludes that the impact of the C305 works was within the predictions as per the trigger values specified in the C122 I&M Plan (C122-OVE-C2-RGN-CRG01-50069). The assessment concluded in these documents: "C704 Instrumentation Decommissioning Agreement NR/19c-FSS1 Eleanor Street Shaft C704-XLR-C-AAG-CR094_SH007-50001" and "C704 Instrumentation Decommissioning Agreement Network Rail FSS1 Gas Factory Curve Viaduct- NR19 C704-XLR-C-AAG-CR094-50001" (appendix A) states the long term ground movement have reached an acceptably small rate, and proposes to decommission the automatic system and that manual monitoring should cease.

Learning Legacy Document

Learning Legacy Document

APPENDIX A: DECOMMISSIONING AGREEMENTS



Crossrail Delivery – Contract C704

C704 Instrumentation Partial Decommissioning Agreement Network Rail FSS1 Gas Factory Curve Viaduct – NR19

Document Number: C704-XRL-C-AAG-CR094-50001

Document History:

Revision	Date:	Prepared by:	Checked by:	Approved by:	Reason for Issue
1.0	07-10-2014	J Drinkwater	Javier Gonzalez Marti	M Groves	First Issue for Network Rail Acceptance
Formal Acceptance by Chief Engineer Group (CEG)				Accepted by:	
				Mike Black	

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Document Template: CRL1-XRL-Z3-ZFM-CR001_Z-50001

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1

1 Definitions

Asset	Specific Network Rail interface covered by this document (NR/19).
ELR FSS1	Engineers Line Reference; Fenchurch Street to Shoeburyness
CRL	Crossrail.
C122	CRL Contract that assessed excavation-induced ground movements and acts as Designer of C701/C704 I&M systems. C122 advises on residual risk to the Asset associated with long term movements/deformations, based on current trends.
C305	Main tunnelling Contractor (Dragados Sisk Joint Venture)
C360	Main Shaft construction Contractor (Costain Skanska Joint Venture)
TBM	Tunnel Boring Machine
C701	CRL Contract responsible for the installation/maintenance of the automatic I&M system on NR/19
UCIMS	Underground Construction Information Management System
C704	CRL Contract responsible for the maintenance/decommissioning of C701 manual/automatic I&M system in NR/19.
I&M	Instrumentation & Monitoring.
NR	Network Rail.
ZOI	Zone of Influence
Predicted zone of influence of Crossrail works	Area located within the predicted 1mm greenfield ground surface settlement contour associated with Crossrail works.
Relevant parties	Parties requested to formally agree decommissioning of the automatic I&M system presented in this document: <ul style="list-style-type: none">- <i>Network Rail (NR)</i>;- <i>CRL Chief Engineers Group (CEG)</i>.
RTS	Robotic Total Station
BRE stud	British Research Establishment stud

2 Purpose

Following detailed assessment of the impact of CRL works on the individual Assets by C122 and as part of CRL's resulting risk management strategy, a comprehensive Instrumentation & Monitoring (I&M) system has been installed by C701 on the Network Rail FSS1 Gas Factory Curve Viaduct (NR19). The objective of the monitoring regime has been that of automatically (and manually) monitoring the effects of the movements caused by Crossrail works (TBM passage and Construction of Eleanor Street and Mile End Shafts and associated adits) beneath the Asset.

The C701 I&M automatic system has been installed in advance of CRL construction activities to record necessary background monitoring data. Currently C704 provide monitoring data from the system to UCIMS.

This document aims to provide a basis on which all relevant parties can agree on C704 ceasing automated monitoring from that part of the Asset that can now be demonstrated to be stable with no further settlement anticipated.

3 Scope

The extent of the Asset considered stable is from St Pauls Way (Approximately 2m 12ch) to the travellers caravan Park (Approximately 2m 60ch) - See Appendix E.

The latest and last CRL work that affected the Asset was the C305 Westbound TBM drive that passed the 1mm ZOI contour on approximately 16-05-2014 at St Pauls Way.

The remainder of the ELR FSS1 installation from the Caravan Park (approximately 2m 60ch) to Campbell Road (Approximately 2m 74ch) will remain in order to monitor the asset during the remainder of the Eleanor Street shaft works. The stopping of automated monitoring in this area will be covered by a future submission when it becomes appropriate.

Given its purpose, the document has been intentionally drafted by C704 as a high level reference summary to be used by decision makers and not as a detailed technical report. Comments have been provided on the quality and the reliability of the data collected, but any engineering considerations with regards to the impact induced by Crossrail works on the Asset and to the residual risk (associated with long term movements/deformations) to the Asset will be provided by Crossrail in a close-out report.

The scope of the installation is defined by the Instrumentation & Monitoring Plan for LT&S Yorkshire Street Viaduct (NR/17) and LT&S Gas Factory Curve Viaduct (NR/19) C122-OVE-C2-RGN-CRG01-50069 and by I&M drawing C122-OVE-C2-DDA-CR001_Z-31135, C122-OVE-C2-DDA-CR001_Z-31136 and C122-OVE-C2-DDB-CR001_Z-32018 (see Appendix A).

4 The Asset: Network Rail FSS1 Gas Factory Curve Viaduct – (NR19)

The following sections comprise a brief description of the Network Rail FSS1 tracks known as Gas Factory Curve Viaduct and present the Crossrail works that have affected this asset.

It should be noted that the original C122 report considered the combined effect of the TBM and shaft construction, however due to construction programming the Mile end shaft was constructed prior to the TBM passage and C122 carried out a further assessment that established an automated system was not required for the Mile End shaft construction.

**C704 Instrumentation and Monitoring – Partial Decommissioning Agreement
Network Rail FSS1 Gas Factory Curve Viaduct - NR19
C704-XRL-C-AAG-CR094-50001 Rev 1.0**

C122 have further clarified the ZOI for the remainder of the on-going Eleanor Street Shaft construction and this report does not propose any changes to the automated monitoring for this area, checks have been undertaken to ensure the continued monitoring system in this area will be unaffected by the de-commissioning proposed in this document.

Further details are included in:

C122 Assessment of Ground Movement Effects on Network Rail LT&S Gas Factory Curve Viaduct (London Tilbury & Southend Line) (NR19), C122-OVE-C2-RGN-CRG01-50038

C122 Assessment Of Ground Movement Effects On Network Rail LT & S Gas Factory Curve Viaduct (London Tilbury & Southend Line) Due To The Construction Of Mile End Shaft (C360 Works) And Review Of Monitoring Requirements, C122-OVE-C2-RGN-CRG01-50089

LWW-C704-RFI-000056 (See Appendix D)

4.1 Asset Description

Interface NR/19 is located along Drive Z (Contract 305), between Crossrail reference chainages approximately 81+490 NE and 82+625 NE. The eastbound tunnel is proposed at approximately 20-25 m deep, aligned in a north-east direction generally, following the route of the existing Network Rail viaduct. At the Bow triangle area, which is formed by the surrounding three railway viaducts (FSS1, FSS1 extension and LUL Bow Road viaduct), the tunnel meets Eleanor Street shaft before continuing eastward towards the Pudding Mill Lane Portal. The westbound tunnel is proposed in parallel to the eastbound, in close proximity, and interlinked with the eastbound tunnel at Mile End Park Shaft at the western extent of Interface NR/19.

The viaduct within the NR/19 interface is approximately 1200m in length and carries two tracks of the overhead electrified rail track system between St. Paul's Way (FSS1 A410) and Arch A9 near Rounton Road (FSS1/1 A9). The tracks are supported on a mixture of timber and concrete sleepers with ballast bed formation.

A trackside inspection took place in May 2011. All structures were generally found to be in good condition (See Reference Document C122-OVE-C2-RGN-CRG01-50038).

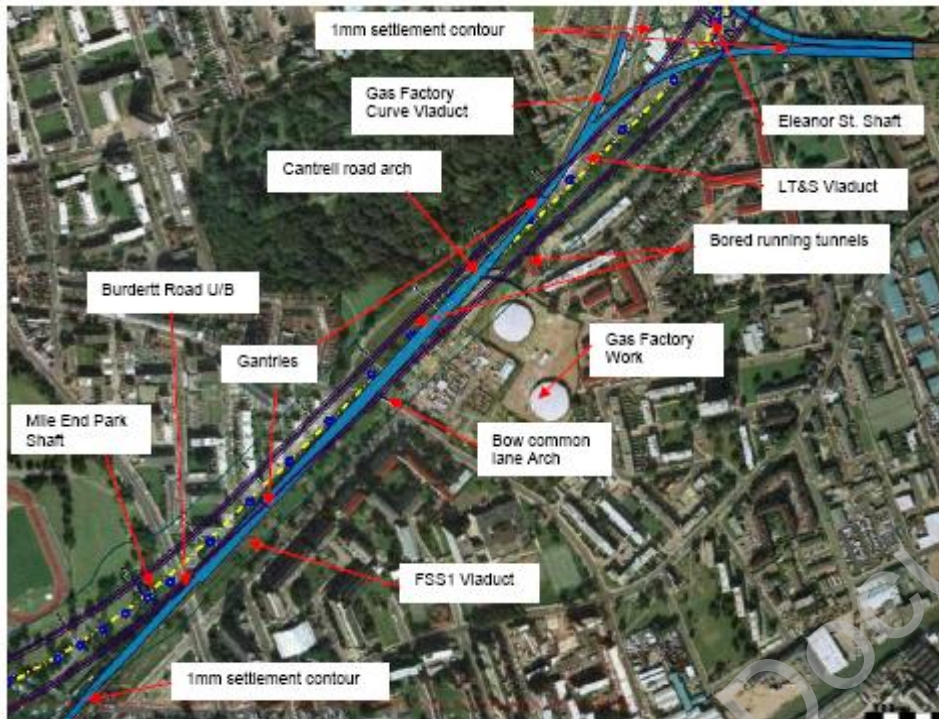


Figure 1: Location plan for interface between Crossrail running tunnels and Network Rail FSS1 Gas Factory Curve Viaduct – NR19

4.2 Crossrail Works affecting the Asset

The CRL works include twin running tunnels, Eleanor Street shaft, and Mile End shaft. The running tunnel is proposed to be constructed with crown level approximately 20-25m below ground level and consists of:

- Tunnel of 6.2m internal diameter, 7.18m excavated diameter (6.8m lined outer diameter);
- Tunnel lining comprising gasketted pre-cast steel fibre reinforced concrete (SFRC) segments. The lining is formed with tapered and parallel rings with 5no ordinary segments, 2no counter-key segments and 1no key segment to form a ring
- Lining thickness is 300mm with a segment length of 1600mm
- SGI cast iron segments are adopted to form the openings at cross passage's and adits' connections.

Mile End Park and Eleanor Street Shaft, are located at CRL reference chainages 81+630 NE and 82+616 NE respectively.

Mile End Park shaft is a 10m internal diameter, 29.0m deep circular shaft that includes construction of two intervention adits that connect to the running tunnels. The intervention adit openings are at tunnel axis level, however C122 assessment has determined manual monitoring only is required here due to minimal predicted settlement (See Reference Document C122-OVE-C2-RGN-CRG01-50089).

Eleanor Street shaft, located within the Bow Triangle centre, is an intervention and ventilation shaft. The shaft comprises two intervention and six ventilation adits that connect the running tunnels. The intervention and ventilation adit openings are at tunnel axis level and positioned to

coincide with the evacuation walkway. The shaft is approximately 36m deep with a 16m internal diameter shaft.

5 Predicted impact of CRL Works on the Asset

The methodology used to assess the predicted impact of Crossrail works on the Network Rail FSS1 Gas Factory Curve Viaduct (NR19) and a summary of the results of this assessment are presented in C122 Assessment of Ground Movement Effects on Network Rail LT&S Gas Factory Curve Viaduct (London Tilbury & Southend Line) (NR19) C122-OVE-C2-RGN-CRG01-50038 and C122 Assessment Of Ground Movement Effects On Network Rail LT & S Gas Factory Curve Viaduct (London Tilbury & Southend Line) Due To The Construction Of Mile End Shaft (C360 Works) And Review Of Monitoring Requirements, C122-OVE-C2-RGN-CRG01-50089.

6 I&M Systems in NR/19

6.1 C704 systems

The automatic (and manual) I&M system to be installed on the asset under consideration was specified on drawing C122-OVE-C2-DDA-CR001_Z-31135, C122-OVE-C2-DDA-CR001_Z-31136 and C122-OVE-C2-DDB-CR001_Z-32018.

Monitoring frequencies and trigger values were specified in *Design Consultant Framework Contract C122 – Bored Tunnels: Instrumentation & Monitoring Plan* for LT&S Yorkshire Street Viaduct (NR/17) and LT&S Gas Factory Curve Viaduct (NR/19) C122-OVE-C2-RGN-CRG01-50069

The installation of this system on NR/19 has been carried out by C701 (See Appendix B for as-installed drawings)

As described in detail in C701-ITM-C-RGN-CRG03-50205 (C701 Installation Report for NR/19), and the system comprises the following:

- Track monitoring at 3.0m centres by means of geodetic prisms fixed to the foot of the rail and read by RTS.
- Viaduct Structure monitoring by means of Geodetic prisms fixed to the arch crown, high/low spring points and abutments these are read by RTS
- BRE studs have been installed in some areas where obstructions and difficulties meant structural prisms could not be installed/read.

Further details are included in WPP Non-track (C701-ITM-O1-GMS-CRG03-50005), WPP C701-ITM-O1-GMS-CRG03-50002 and C701-ITM-C-RGN-CRG03-50205 (Installation Report)

6.2 Systems installed by others

Additional manual monitoring has been installed by the main Contractors C305 and C360 the detail of which is shown on drawings C122-OVE-C2-DDA-CR001_Z-31035, C122-OVE-C2-DDA-CR001_Z-31036 and C122-OVE-C2-DDB-CR001_Z-3202 for C305 and C121-MMD-C4-DDD-CR094_SH006-05001 for C360.

Decommissioning of these systems does not fall under C704 umbrella. Necessary actions will be taken by C704 in order to avoid any accidental damage to these systems while decommissioning systems installed by C701 (see Section 6.1).

7 Monitoring Results vs. CRL Construction Works

Design Consultant Framework Contract C122 – Instrumentation & Monitoring Plan for LT&S Yorkshire Street Viaduct (NR/17) and LT&S Gas Factory Curve Viaduct (NR/19) C122-OVE-C2-RGN-CRG01-50069 presents trigger values for the following purposes:

- Asset protection;
- Construction control;
- Track Geometry and Track Clearance.

The present document has been intentionally drafted by C704 as a high level reference summary to be used by decision makers and not as a detailed technical report. It is not the purpose of this document to analyse in detail the construction monitoring results for all monitored parameters, compare these results with associated trigger values and provide engineering considerations on residual risk to the Asset. A brief summary of current trends for NR/19 is included in Appendix C.

The CRL works that have affected the Asset are dated:

- May 2014 (Westbound TBM drive);
- December 2013 (Eastbound TBM drive).

The construction monitoring data recorded by the automatic systems (Geodetic prisms and RTS) indicate a clear correlation with these two tunnel drives (see graphs in Appendix C).

The settlement trough associated with the individual TBM drives and the long term settlement effect are easily identifiable in the data recorded by the automatic system, and is also reflected in the C305 manual data (See Appendix C).

The maximum settlement recorded by the automatic system following the first TBM drive is approximately -6 mm for the Eastbound, and -10 mm for the Westbound tunnel drive. The cumulative vertical displacement due to the combination of both TBM drives is approximately -8 mm for the Eastbound and -12 mm for the Westbound tunnel. The post-TBM data shows long time settlement trends for a 50 day period, after which the area tends to stabilise. The latest readings are just showing network noise due to daily thermic variations, and different weather conditions, all within the specified monitoring accuracy.

Following the plots provided in Appendix C, it can be seen that track and structural monitoring is reacting in the same way and at the same time to ground movements, in most cases, as well providing similar settlement ranges. This same comparison against the C305 road monitoring though the manual monitoring done by the C305 Principal Contractor proves to be true as well. A quick comparison of the data provided in array 030 shows that the main settlement in the manual data happens with the first TBM passage around the 19/12/2013, and the second one on the 12/05/2014, reaching a final maximum settlement of -5mm (depending on the location of the point read), quite comparable to the -6 mm achieved by C704's automatic monitoring. Similar extrapolations can be made on the other arrays achieving similar results.

This proves that both, manual and automatic monitoring, are complementary, and providing similar values (inside of their own accuracy and repeatability), and that manual monitoring is a valid option to reassure the asset owner that ground and structures are within the expected long term settlement.

The data recorded from the automatic system during both construction and closeout monitoring regimes are considered reliable and non-construction related variations are within the expected repeatability for this kind of system. The data collected reflect the effect of the movements

induced by the two TBM drives on the Asset and they are consistent with the manual monitoring results obtained by C305.

8 Assessment of Closeout Trends

Following the Westbound TBM drive (May 2014); the automated monitoring regime has been recording data at the same frequency as during TBM passage.

C122 Instrumentation and Monitoring, Combined I & M, Monitoring Frequency, C300, C305 C122-OVE-C2-DDJ-CR001_Z-30002 stipulates that 3 months post TBM passage the monitoring regime should be quarterly until settlement is less than 2mm per annum.

As highlighted in Section 7 and Appendix C the manual monitoring of road studs does reflect the same degree of movement as that of the automated track and structure monitoring.

Current closeout trends highlight a general stabilization with very limited residual (post-construction) movement over the last 2-3 months.

Based on this, it is proposed to decommission the automatic I&M system currently installed in NR/19 over the defined area as described in Section 3 and Appendix E, with manual monitoring of the road studs continuing on a quarterly basis until a further agreement is reached with NR that this can be stopped. CRL have commenced the manual monitoring of the road studs in order to provide continuity of readings (See Appendix F).

9 Reference Documents

C122-OVE-C2-RGN-CRG01-50069 - Instrumentation & Monitoring Plan for LT&S Yorkshire Street Viaduct (NR/17) and LT&S Gas Factory Curve Viaduct (NR/19)

C122-OVE-C2-DDA-CR001_Z-31135 - I&M drawing

C122-OVE-C2-DDA-CR001_Z-31136 - I&M drawing

C122-OVE-C2-DDB-CR001_Z-32018 - I&M drawing

C122-OVE-C2-RGN-CRG01-50038 - C122 Assessment of Ground Movement Effects on Network Rail LT&S Gas Factory Curve Viaduct (London Tilbury & Southend Line) (NR19)

C122-OVE-C2-RGN-CRG01-50089 - C122 Assessment Of Ground Movement Effects On Network Rail LT & S Gas Factory Curve Viaduct (London Tilbury & Southend Line) Due To The Construction Of Mile End Shaft (C360 Works) And Review Of Monitoring Requirements

LWW-C704-RFI-000056 – C122 RFI response regarding Eleanor Street Shaft ZOI

C122-OVE-C2-RGN-CRG01-50069 - Monitoring frequencies and trigger values were specified in Design Consultant Framework Contract C122 – Bored Tunnels: Instrumentation & Monitoring Plan for LT&S Yorkshire Street Viaduct (NR/17) and LT&S Gas Factory Curve Viaduct (NR/19)

C701-ITM-C-RGN-CRG03-50205 - C701 Installation Report for NR/19

C701-ITM-O1-GMS-CRG03-50005 – Work Package Plan for Installation – Non track

C701-ITM-O1-GMS-CRG03-50002 – Work Package Plan for Installation

C122-OVE-C2-DDA-CR001_Z-31035 – I&M Drawing for C305

C122-OVE-C2-DDA-CR001_Z-31036 – I&M Drawing for C305

C122-OVE-C2-DDB-CR001_Z-3202 – I&M Drawing for C305

**C704 Instrumentation and Monitoring – Partial Decommissioning Agreement
Network Rail FSS1 Gas Factory Curve Viaduct - NR19
C704-XRL-C-AAG-CR094-50001 Rev 1.0**

C121-MMD-C4-DDD-CR094_SH006-05001 – I&M Drawing for C360

C122-OVE-C2-DDJ-CR001_Z-30002 - C122 Instrumentation and Monitoring, Combined I & M, Monitoring Frequency, C300, C305

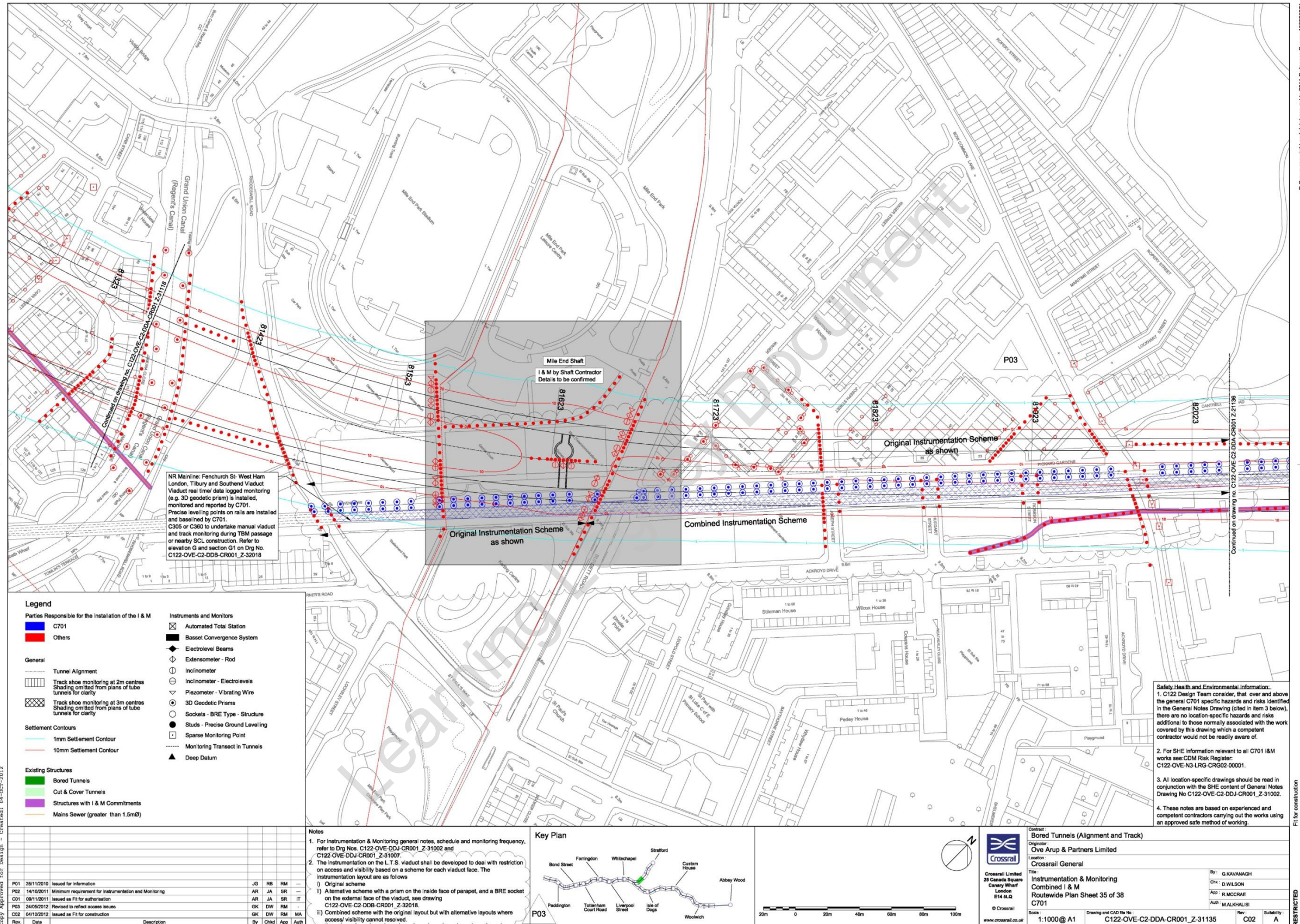
C122-OVE-C4-RGN-CRG01-50060 Technical note on the Assessment of Ground Movement Effects on Network Rail LT&S Gas Factory Curve Viaduct (FSS1) due to the combined effects of settlement due to Dewatering and C360 Construction works

C122-OVE-C2-ASM-CR094_WS109-50001 Assessment of Ground Movement Effects on Network Rail LT&S Gas Factory Curve Viaduct (London Tilbury & Southend Line) due to the construction of Eleanor Street Shaft and Temporary Shaft (C360 works)

10 Appendices

APPENDIX A - I&M Drawings

Learning Legacy Document



Legend

Parties Responsible for the installation of the I & M

- C701
- Others

General

- Tunnel Alignment
- Track shoe monitoring at 2m centres
- Track shoe monitoring at 3m centres
- Settlement Contours
- Existing Structures

Instruments and Monitors

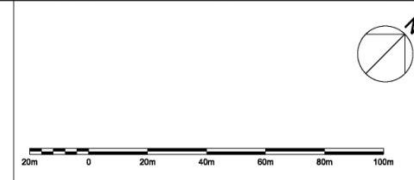
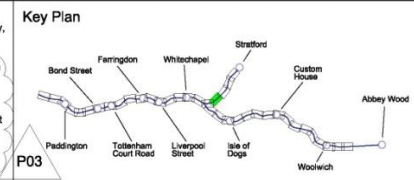
- Automated Total Station
- Basel Convergence System
- Extensometer - Rod
- Inclinometer
- Inclinometer - Electrolevelis
- Piezometer - Vibrating Wire
- 3D Geodetic Prisms
- Sockets - BRE Type - Structure
- Studs - Precise Ground Levelling
- Sparse Monitoring Point
- Monitoring Transact in Tunnels
- Deep Datum

NR Manline: Fenchurch St- West Ham London, Tibury and Southend Viaduct Viaduct real time data logged monitoring (e.g. 3D geodetic prism) is installed, monitored and reported by C701. Precise levelling points on rails are installed and beamed by C701 C365 or C360 to undertake manual viaduct and track monitoring during TBM passage or nearby SCL construction. Refer to elevation G and section G1 on Drg No. C122-OVE-C2-DOB-CR001_Z-32018

Rev	Date	Description	By	Chkd	App	Auth
P01	25/11/2010	Issued for information	JG	RB	RM	---
P02	14/10/2011	Minimum requirement for instrumentation and Monitoring	AR	JA	SR	---
C01	06/11/2011	Issued as FI for authorisation	AR	JA	SR	IT
P03	24/05/2012	Revised to reflect access issues	GK	DW	RM	---
C02	04/10/2012	Issued as FI for construction	GK	DW	RM	MA

Notes

- For Instrumentation & Monitoring general notes, schedule and monitoring frequency, refer to Drg Nos. C122-OVE-DDJ-CR001_Z-31002 and C122-OVE-DDJ-CR001_Z-31007.
- The instrumentation on the L.T.S. viaduct shall be developed to deal with restriction on access and visibility based on a scheme for each viaduct face. The instrumentation layout are as follows:
 - Original scheme
 - Alternative scheme with a prism on the inside face of parapet, and a BRE socket on the external face of the viaduct, see drawing C122-OVE-C2-DOB-CR001_Z-32018.
 - Combined scheme with the original layout but with alternative layouts where access/visibility cannot be resolved.



Contract
Bored Tunnels (Alignment and Track)

Client
Ove Arup & Partners Limited

Location
Crossrail General

Title
Instrumentation & Monitoring
Combined I & M
Route-wide Plan Sheet 35 of 38
C701

Scale
1:1000@A1

Drawing and CAD file No.
C122-OVE-C2-DDA-CR001_Z-31135

Rev
C02

Subsity
A

Author
G. KAVANAGH
D. WILSON
R. MACRAE
M. ALKHALISI

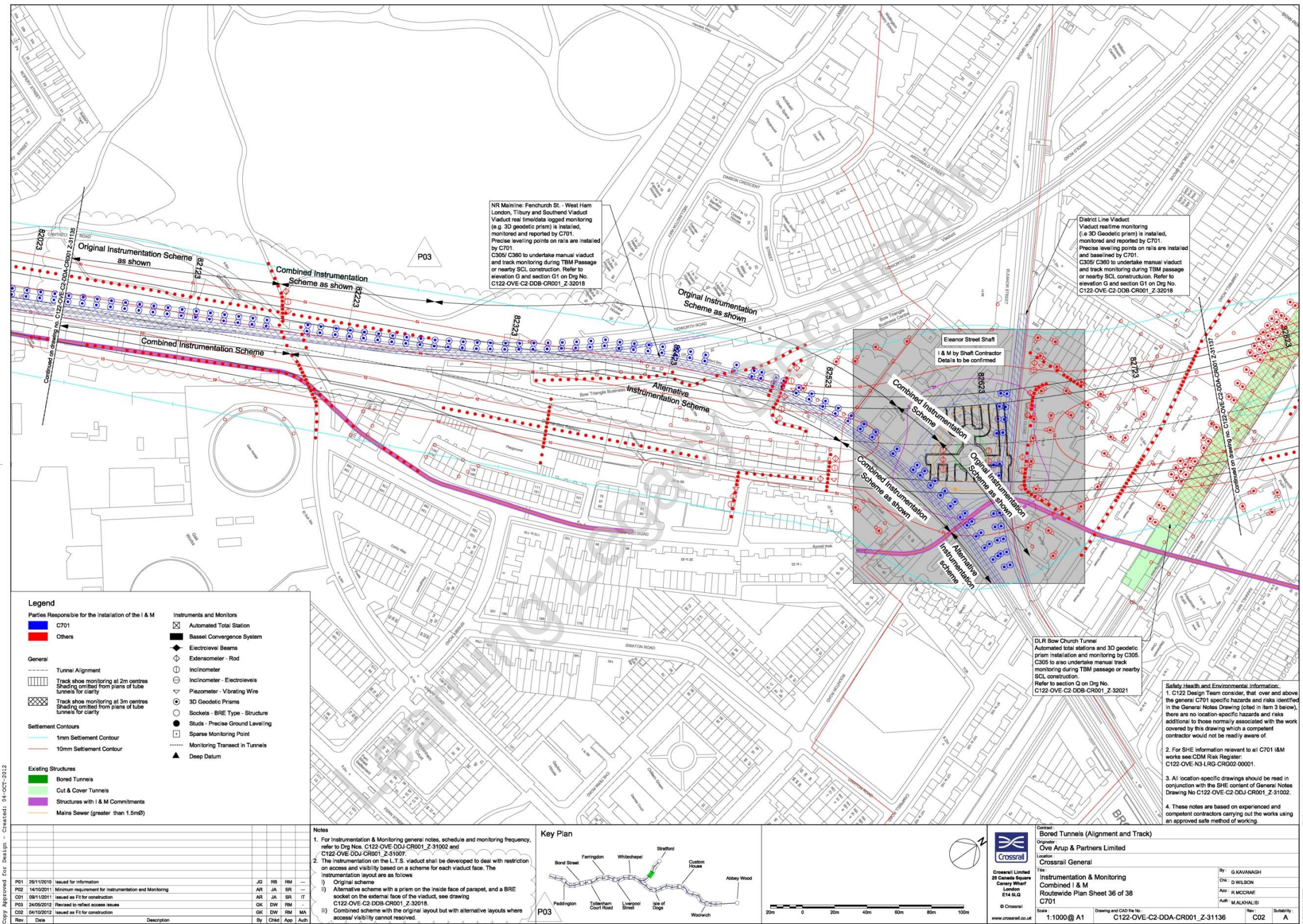
Safety, Health and Environmental Information

- C122 Design Team consider that over and above the general C701 specific hazards and risks identified in the General Notes Drawing (cited in item 3 below), there are no location-specific hazards and risks additional to those normally associated with the work covered by this drawing with a competent contractor would not be readily aware of.
- For SHE information relevant to all C701 I&M works see CDM Risk Register: C122-OVE-N3-LRG-CR002-00001.
- All location-specific drawings should be read in conjunction with the SHE content of General Notes Drawing No C122-OVE-C2-DDJ-CR001_Z-31002.
- These notes are based on experienced and competent contractors carrying out the works using an approved safe method of working.

Copy Approved For Design - Created: 04-07-2012

Fit for construction

RESTRICTED



Legend

Parties Responsible for the Installation of the I & M

- C701
- Others

General

- Tunnel Alignment
- Track shoe monitoring at 2m centres
- Track shoe monitoring at 3m centres
- Settlement Contours
- Existing Structures

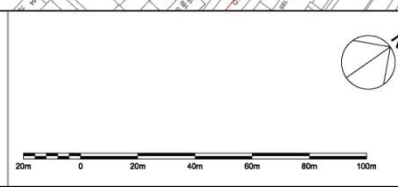
Instruments and Monitors

- Automated Total Station
- Basecell Convergence System
- Electrolevel Beams
- Extensometer - Rod
- Inclinometer
- Inclinometer - Electrolevels
- Piezometer - Vibrating Wire
- 3D Geodetic Prisms
- Sockets - BRE Type - Structure
- Studs - Precise Ground Levelling
- Sparse Monitoring Point
- Monitoring Transact in Tunnels
- Deep Datum

Rev	Date	Description	By	Chkd	App	Auth
P01	25/11/2010	Issued for information	JG	RB	RM	
P02	14/10/2011	Minimum requirement for instrumentation and monitoring	AR	JA	SR	
C01	08/11/2011	Issued as Fit for construction	AR	JA	SR	IT
P03	24/05/2012	Revised to reflect access issues	CK	DW	RM	
C02	04/10/2012	Issued as Fit for construction	GK	DW	RM	MA

Notes

- For Instrumentation & Monitoring general notes, schedule and monitoring frequency, refer to Drg Nos. C122-OVE-DDJ-CR001_Z-31002 and C122-OVE-DDJ-CR001_Z-31007.
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 - Combined scheme with the original layout but with alternative layouts where access/visibility cannot be resolved.



Contract
 Bored Tunnels (Alignment and Track)

Original
 Ove Arup & Partners Limited

Location
 Crossrail General

Title
 Instrumentation & Monitoring
 Combined I & M
 Routeway Plan Sheet 36 of 38
 C701

Scale
 1:1000@ A1

Drawing and CAD File No.
 C122-OVE-C2-DDA-CR001_Z-31136

Rev
 C02

Subsidiary
 A

By
 G. KAVANAGH

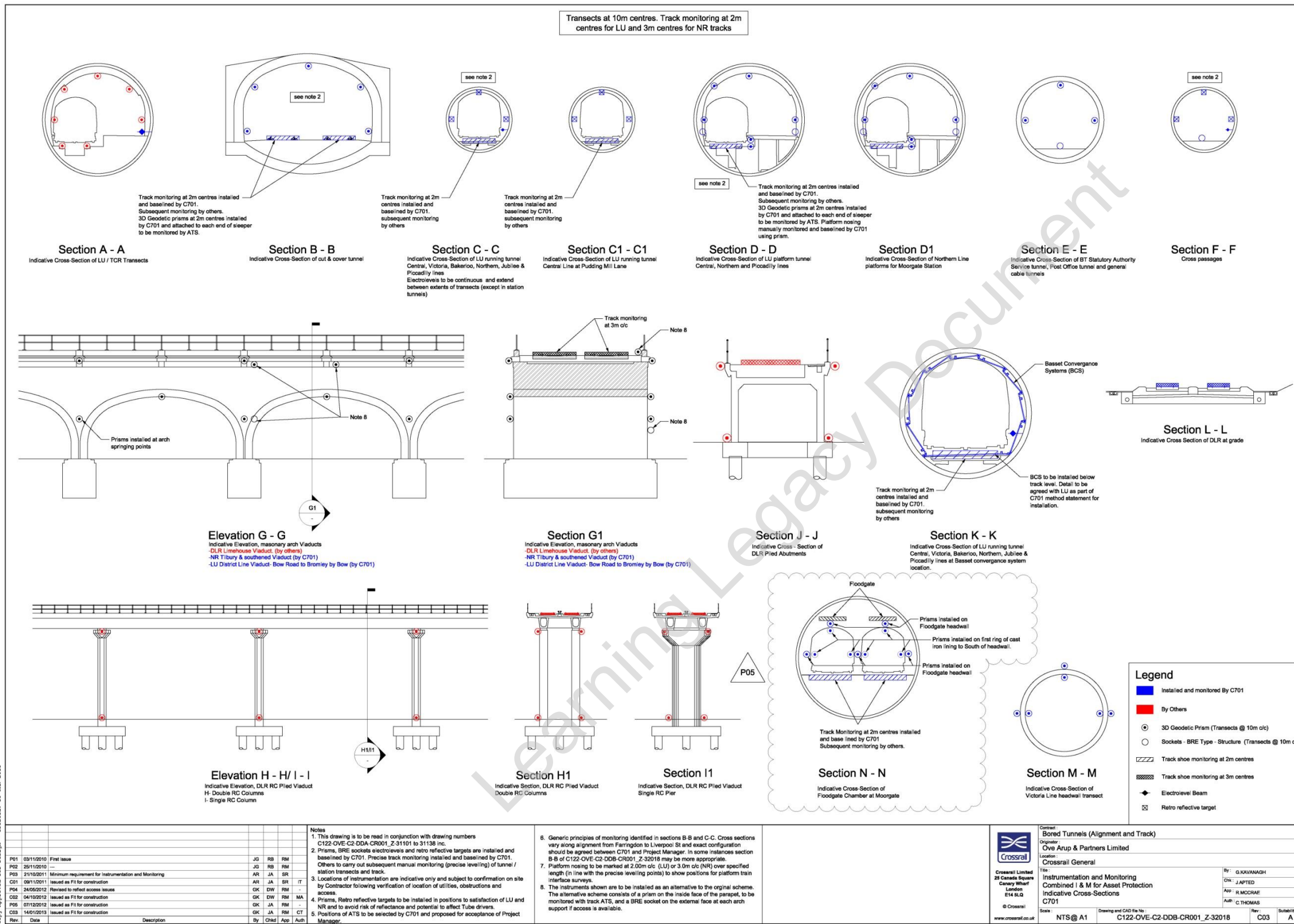
Chk
 D. WILSON

App
 R. MCCRAE

Aut
 M. ALKHALISI

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Fit for construction

Notes

- This drawing is to be read in conjunction with drawing numbers C122-OVE-C2-DDA-CR001_Z-31101 to 31130 inc.
- Prisms, BRE socket electrolevels and retro reflective targets are installed and baselined by C701. Precise track monitoring installed and baselined by C701. Others to carry out subsequent manual monitoring (precise levelling) of tunnel / station transects and track.
- Locations of instrumentation are indicative only and subject to confirmation on site by Contractor following verification of location of utilities, obstructions and access.
- Prisms, Retro reflective targets to be installed in positions to satisfaction of LU and NR and to avoid risk of reflectance and potential to affect Tube drivers.
- Positions of ATS to be selected by C701 and proposed for acceptance of Project Manager.

6. Generic principles of monitoring identified in sections B-B and C-C. Cross sections vary along alignment from Farnington to Liverpool St and exact configuration should be agreed between C701 and Project Manager. In some instances section B-B of C122-OVE-C2-DOB-CR001_Z-32018 may be more appropriate.

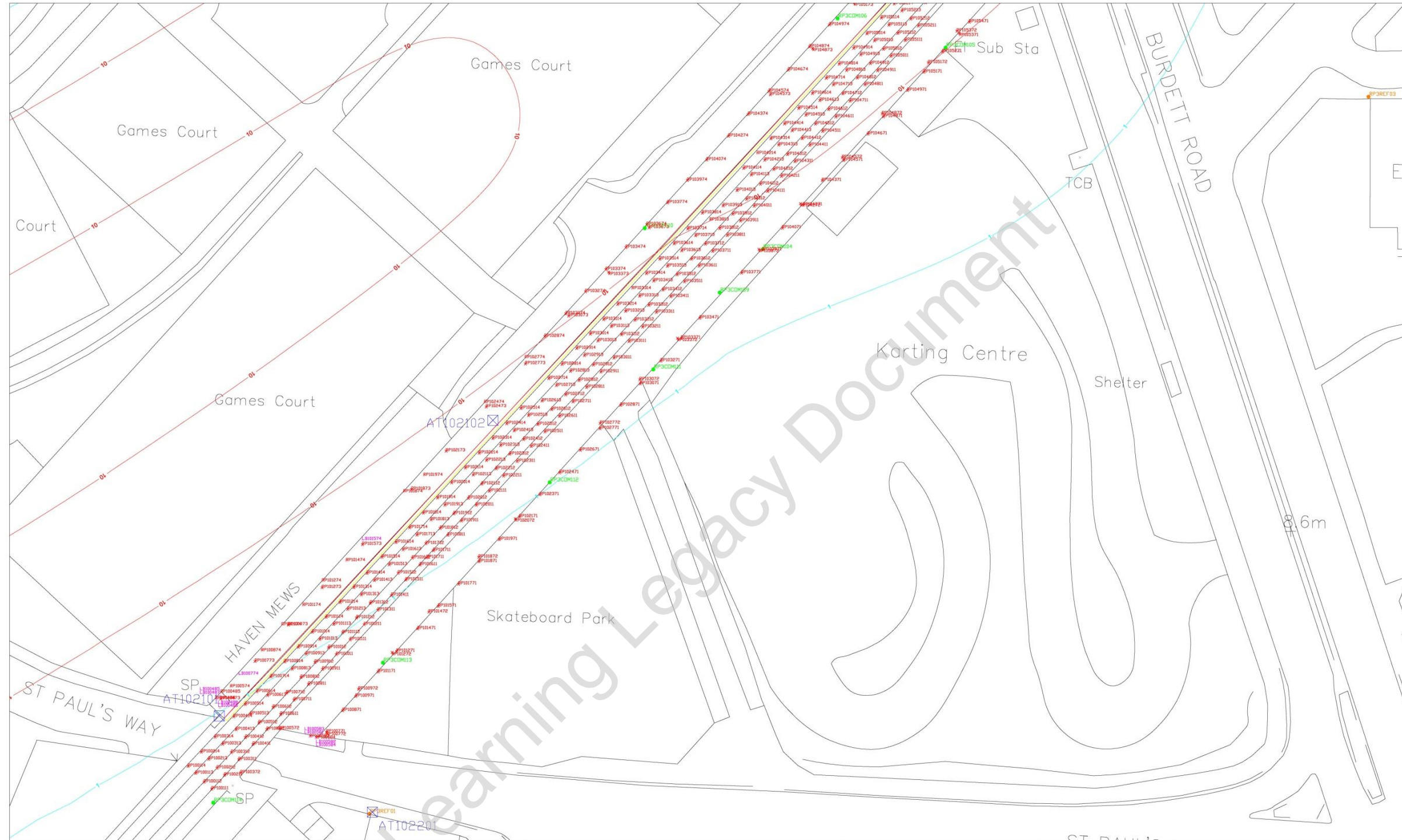
7. Platform nosing to be marked at 2.00m c/c (LU) or 3.0m c/c (NR) over specified length (in line with the precise levelling points) to show positions for platform train interface surveys.

8. The instruments shown are to be installed as an alternative to the original scheme. The alternative scheme consists of a prism on the inside face of the parapet, to be monitored with track ATS, and a BRE socket on the external face at each arch support if access is available.

<p>Crossrail Limited 28 Canada Square Canary Wharf London E14 3LQ</p> <p>© Crossrail www.crossrail.co.uk</p>	Contract: Bored Tunnels (Alignment and Track) Originator: Ove Arup & Partners Limited Location: Crossrail General	By: G.KAVANAGH Dn: J.APTED App: R.MOCHRAE Auth: C.THOMAS
	Title: Instrumentation and Monitoring Combined I & M for Asset Protection Indicative Cross-Sections C701	Rev: C03 Sub: A
	Scale: NTS@ A1	Drawing and CAD file No: C122-OVE-C2-DOB-CR001_Z-32018
	Date: 15-JUN-2013	

APPENDIX B - As-Installed Drawings

Learning Legacy Document



Notes

- 1 - Track Prisms installed at 3m centres
- 2 - Prisms attached to running rail via non-intrusive 'Flat-Bottom' Rail clips
- 3 - All positions of the Crossrail Horizontal Grid & Crossrail Vertical Datum

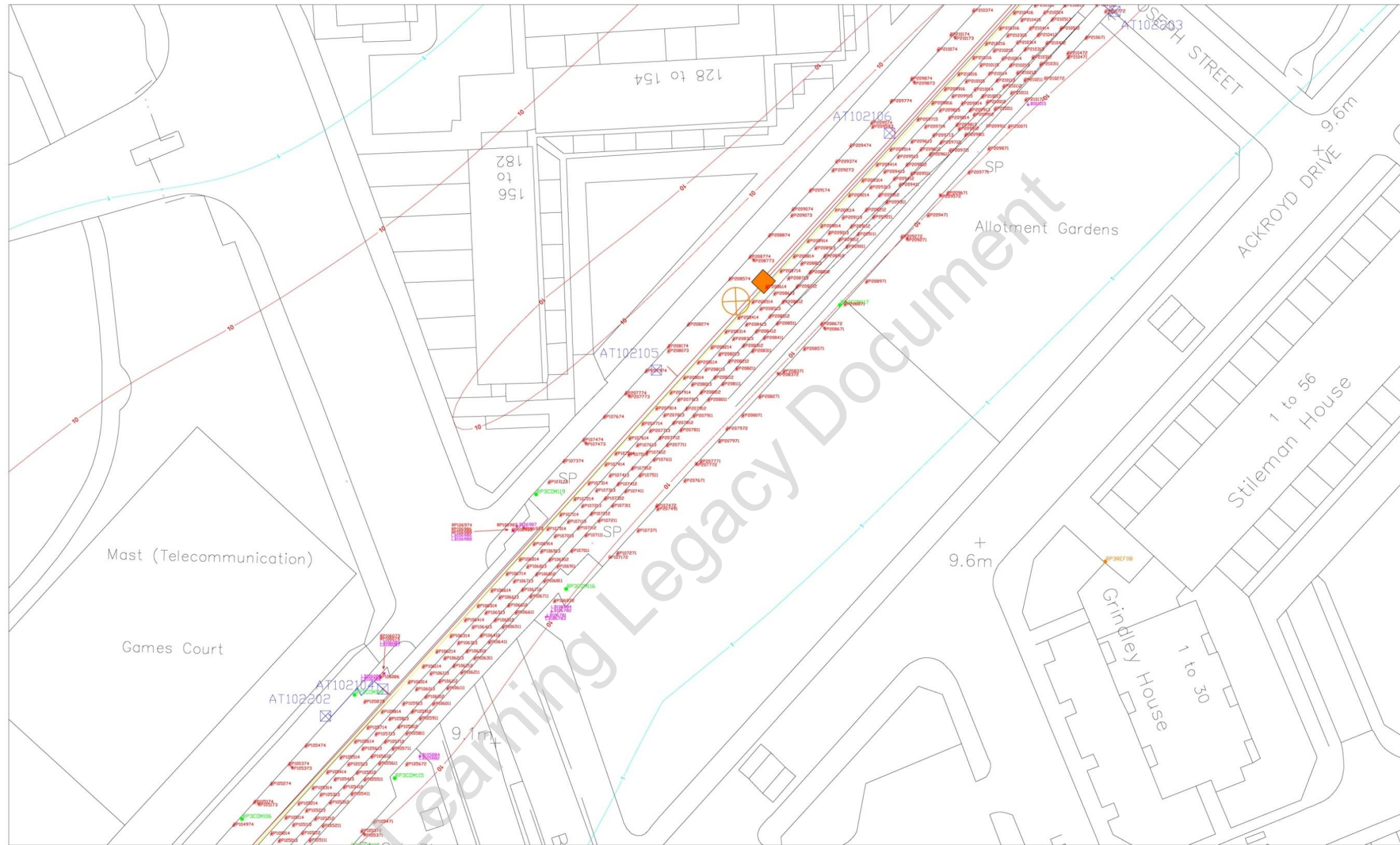
Legend

	3D geodetic prism		Common point prism
	Reference prism		
	BRE levelling socket		
	RTS		
	1mm/10mm Settlement Contour		
	Itmsoil installed power enclosure		
	Power supply point		
	Itmsoil installed Power cable		
	Itmsoil installed Comms cable		

Location Plan

itmsoil		itmsoil UCKFIELD EAST, SUSSEX TN22 10L ENGLAND Tel: +44(0)1825 765044 Fax: +44(0)1825 761740	
Drawn	CK	Title	C701 - NWR FSS1 Viaduct As Built Drawing
Checked	CC	Paper	
Date	26/11/13	Drawing No.	C701-ITM-FSS1-ASB-001
Rev	03	Sheet	01
Scale	1:250	Job Number	228-024

C701-ITM-C-RGN-CRG03-50205) Rev 03



Notes

- 1 - Track Prisms installed at 3m centres
- 2 - Prisms attached to running rail via non-intrusive 'Flat-Bottom' Rail clips
- 3 - All positions of the Crossrail Horizontal Grid & Crossrail Vertical Datum

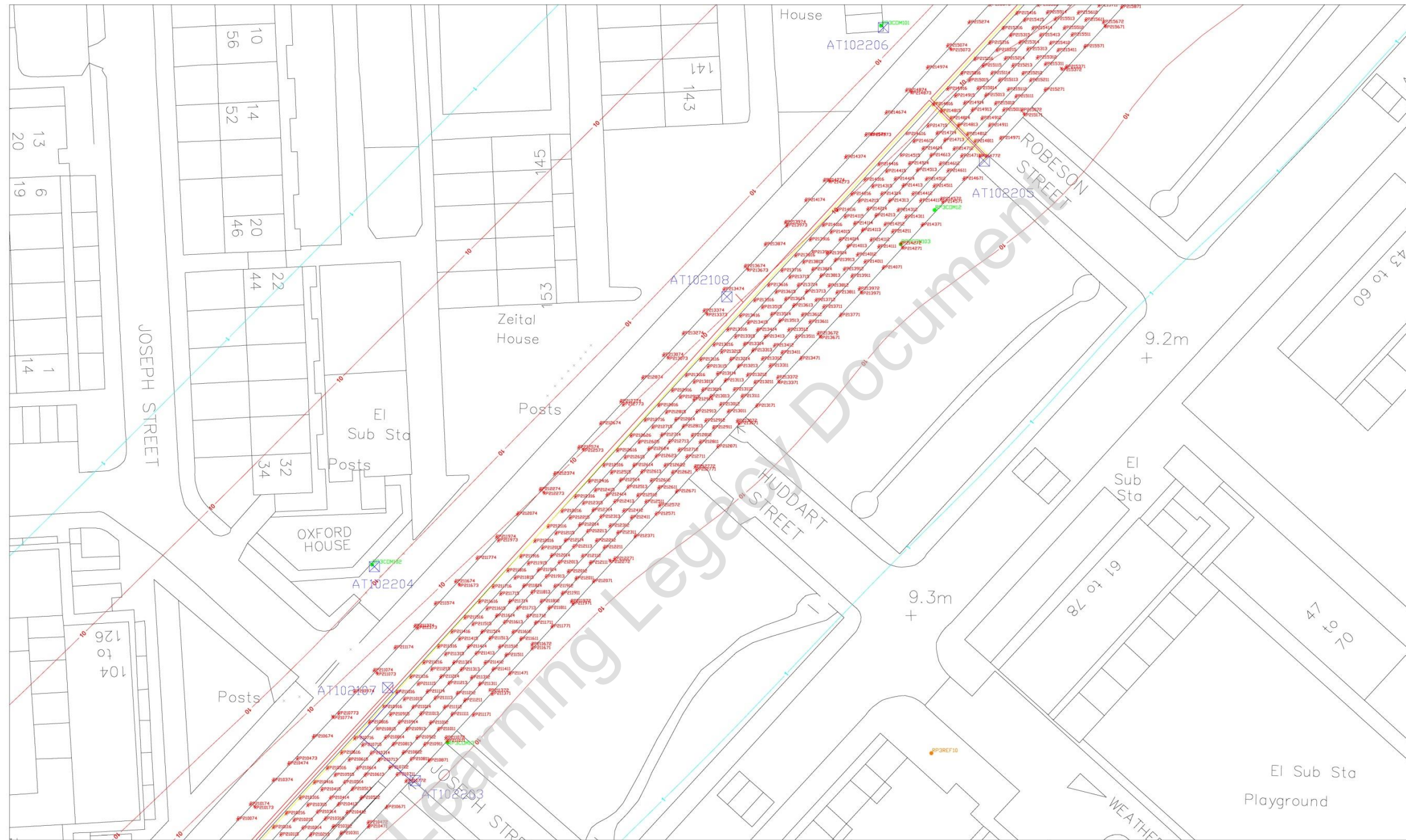
Legend

✕	3D geodetic prism	●	Common point prism
○	Reference prism	●	Common point prism
○	BRE levelling socket		
⊠	RTS		
~	1mm/10mm Settlement Contour		
⊠	Itmsoil installed power enclosure		
○	Power supply point		
—	Itmsoil installed Power cable		
—	Itmsoil installed Comms cable		

Location Plan

itmsoil		itmsoil UCKFIELD EAST SUSSEX TN22 1QL ENGLAND Tel: +44(0)1825 765044 Fax: +44(0)1825 761740	
Drawn	CK	Title	C701 - NWR FSS1 Viaduct As Built Drawing
Checked	CC	Paper	Drawing No. C701-ITM-FSS1-ASB-001
Date	26/11/13	Sheet	02
Rev	03	Job Number	228-024
Scale	1:250		

C701-ITM-C-RGN-CRG03-50205) Rev 03



Notes

- 1 - Track Prisms installed at 3m centres
- 2 - Prisms attached to running rail via non-intrusive 'Flat-Bottom' Rail clips
- 3 - All positions of the Crossrail Horizontal Grid & Crossrail Vertical Datum

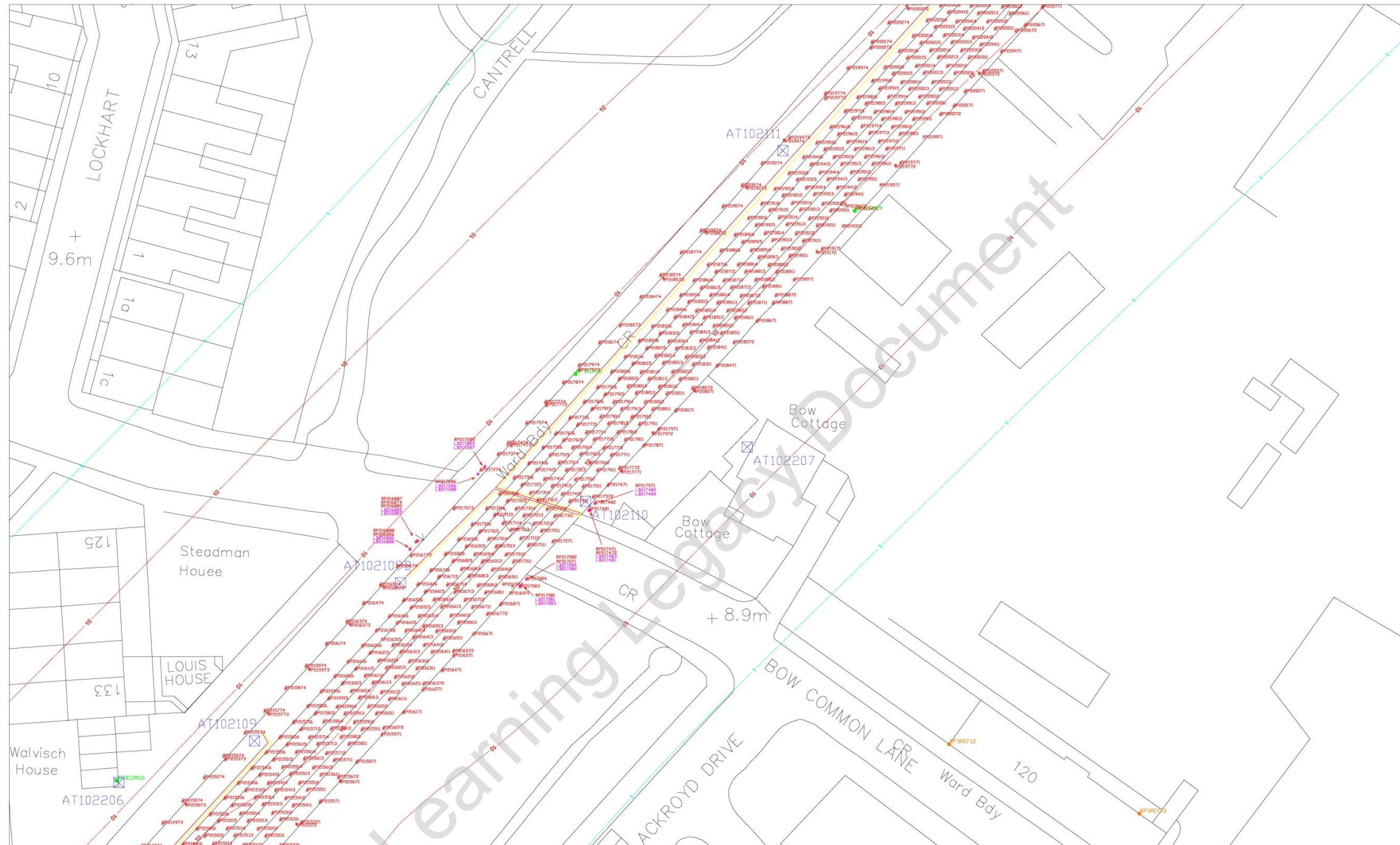
Legend

	3D geodetic prism		Common point prism
	Reference prism		
	BRE levelling socket		
	RTS		
	1mm/10mm Settlement Contour		
	Itmsoil installed power enclosure		
	Power supply point		
	Itmsoil installed Power cable		
	Itmsoil installed Comms cable		

Location Plan

itmsoil		<small>itmsoil UCKFIELD EAST SUSSEX TN22 1QL ENGLAND Tel: +44(0)1825 765044 Fax: +44(0)1825 761740</small>	
Drawn	CK	Title	C701 - NWR FSS1 Viaduct As Built Drawing
Checked	CC	Paper	
Date	26/11/13	Drawing No.	C701-ITM-FSS1-ASB-001
Rev	03	Sheet	03
Scale	1:250	Job Number	228-024

C701-ITM-C-RGN-CRG03-50205) Rev 03



Notes

- 1 - Track Prisms installed at 3m centres
- 2 - Prisms attached to running rail via non-intrusive 'Flat-Bottom' Rail clips
- 3 - All positions of the Crossrail Horizontal Grid & Crossrail Vertical Datum

C701-ITM-C-RGN-CRG03-50205) Rev 03

Legend	
✕	3D geodetic prism
●	Reference prism
●	Common point prism
⊗	BRE levelling socket
⊗	RTS
—	1mm/10mm Settlement Contour
⊠	Itmsoil installed power enclosure
⊠	Power supply point
—	Itmsoil installed Power cable
—	Itmsoil installed Comms cable

Location Plan

itmsoil		itmsoil UCKFIELD EAST SUSSEX TN22 1QL ENGLAND Tel: +44(0)1825 785044 Fax: +44(0)1825 781740	
Drawn	CK	Title	C701 - NWR FSS1 Viaduct As Built Drawing
Checked	CC	Paper	Drawing No. C701-ITM-FSS1-ASB-001
Date	26/11/13	Rev	03
Scale	1:250	Job Number	228-024
			Sheet 04



Notes

- 1 - Track Prisms installed at 3m centres
- 2 - Prisms attached to running rail via non-intrusive 'Flat-Bottom' Rail clips
- 3 - All positions of the Crossrail Horizontal Grid & Crossrail Vertical Datum

Legend

✕	3D geodetic prism	●	Common point prism
○	Reference prism	●	Common point prism
○	BRE levelling socket		
⊠	RTS		
⊞	1mm/10mm Settlement Contour		
⊞	Itmsoil installed power enclosure		
⊞	Power supply point		
—	Itmsoil installed Power cable		
—	Itmsoil installed Comms cable		

Location Plan

itmsoil		UCKFIELD EAST SUSSEX TN22 1QL ENGLAND Tel: +44(0)1825 765044 Fax: +44(0)1825 761740	
Drawn	CK	Title	C701 - NWR FSS1 Viaduct As Built Drawing
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Date	26/11/13	Sheet	05
Rev	03	Job Number	228-024
Scale	1:250		

C701-ITM-C-RGN-CRG03-50205) Rev 03



Notes

- 1 - Track Prisms installed at 3m centres
- 2 - Prisms attached to running rail via non-intrusive 'Flat-Bottom' Rail clips
- 3 - All positions of the Crossrail Horizontal Grid & Crossrail Vertical Datum

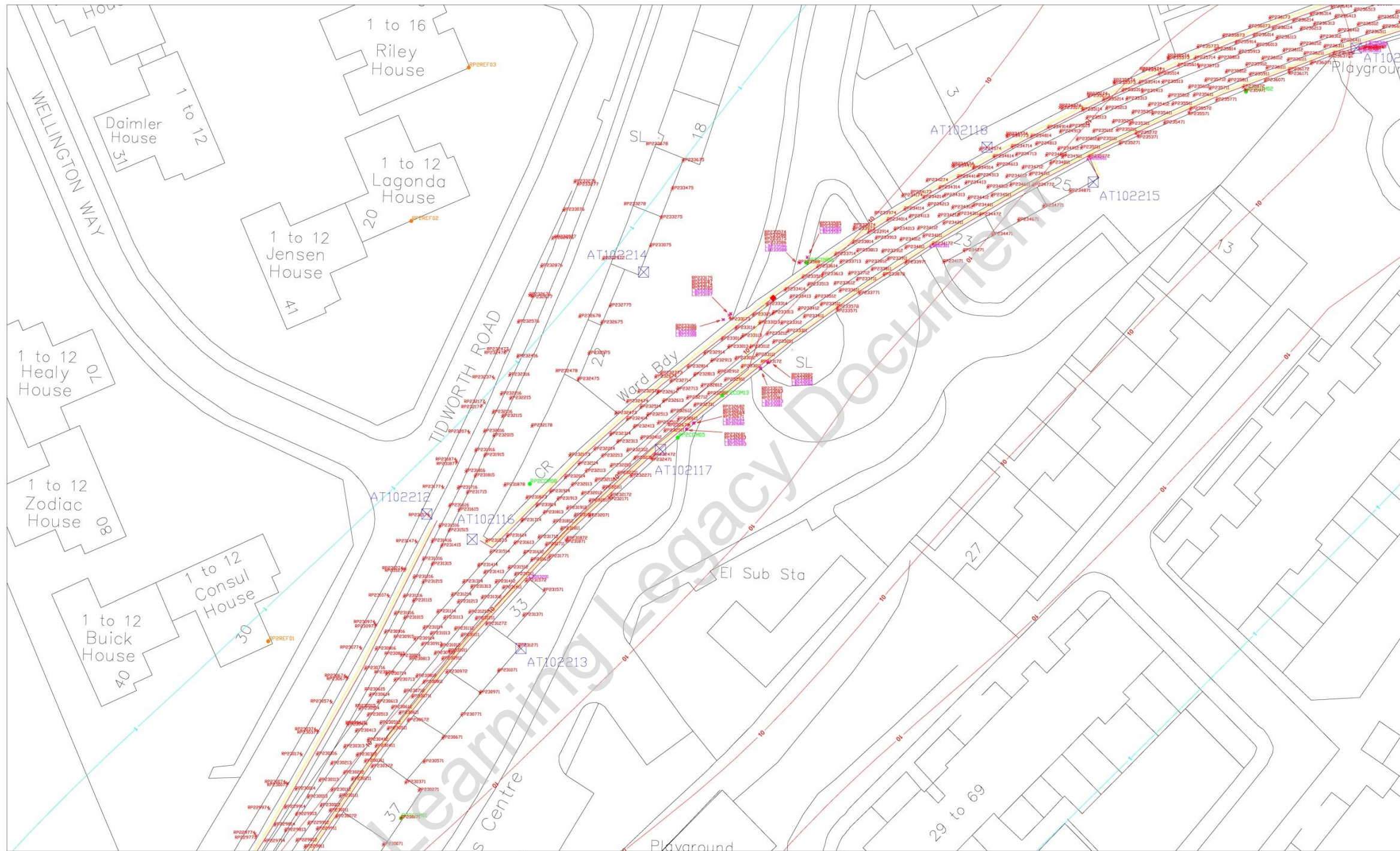
Legend

✕	3D geodetic prism	●	Common point prism
○	Reference prism		
○	BRE levelling socket		
⊠	RTS		
—	1mm/10mm Settlement Contour		
■	Itmsoil installed power enclosure		
●	Power supply point		
—	Itmsoil installed Power cable		
—	Itmsoil installed Comms cable		

Location Plan

itmsoil		itmsoil UCKFIELD EAST SUSSEX TN22 1QL ENGLAND Tel: +44(0)1825 765044 Fax: +44(0)1825 761740	
Drawn	CK	Title	C701 - NWR FSS1 Viaduct As Built Drawing
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Date	26/11/13	Drawing No.	C701-ITM-FSS1-ASB-001
Rev	03	Sheet	06
Scale	1:250	Job Number	228-024

C701-ITM-C-RGN-CRG03-50205) Rev 03



Notes

- 1 - Track Prisms installed at 3m centres
- 2 - Prisms attached to running rail via non-intrusive 'Flat-Bottom' Rail clips
- 3 - All positions of the Crossrail Horizontal Grid & Crossrail Vertical Datum

Legend

- × 3D geodetic prism
- Reference prism
- BRE levelling socket
- ⊠ RTS
- 1mm/10mm Settlement Contour
- Itmsoil installed power enclosure
- ⊕ Power supply point
- Itmsoil installed Power cable
- Itmsoil installed Comms cable
- Common point prism

Location Plan

itmsoil		itmsoil	
UCKFIELD EAST SUSSEX TN22 1QL ENGLAND Tel: +44(0)1825 765044 Fax: +44(0)1825 761740			
Drawn CK	Title	C701 - NWR FSS1 Viaduct As Built Drawing	
Checked CC	Paper	Drawing No.	Sheet
Date 26/11/13		C701-ITM-FSS1-ASB-001	07
Rev 03	Job Number	228-024	
Scale 1:250			

C701-ITM-C-RGN-CRG03-50205) Rev 03



Notes

- 1 - Track Prisms installed at 3m centres
- 2 - Prisms attached to running rail via non-intrusive 'Flat-Bottom' Rail clips
- 3 - All positions of the Crossrail Horizontal Grid & Crossrail Vertical Datum

Legend

✕	3D geodetic prism	●	Common point prism
○	Reference prism	●	Common point prism
○	BRE levelling socket		
⊗	RTS		
—	1mm/10mm Settlement Contour		
⊠	Itmsoil installed power enclosure		
⊙	Power supply point		
—	Itmsoil installed Power cable		
—	Itmsoil installed Comms cable		

Location Plan

itmsoil		UCKFIELD EAST SUSSEX TN22 1QL ENGLAND Tel: +44(0)1825 765044 Fax: +44(0)1825 761740	
Drawn	CK	Title	C701 - NWR FSS1 Viaduct As Built Drawing
Checked	CC	Paper	
Date	26/11/13	Drawing No.	C701-ITM-FSS1-ASB-001
Rev	03	Sheet	08
Scale	1:250	Job Number	228-024

C701-ITM-C-RGN-CRG03-50205) Rev 03

APPENDIX C - Summary of monitoring results for NR/19

Location of Automated and Manual Data Arrays

C701 Automated Data

C305 Manual Data

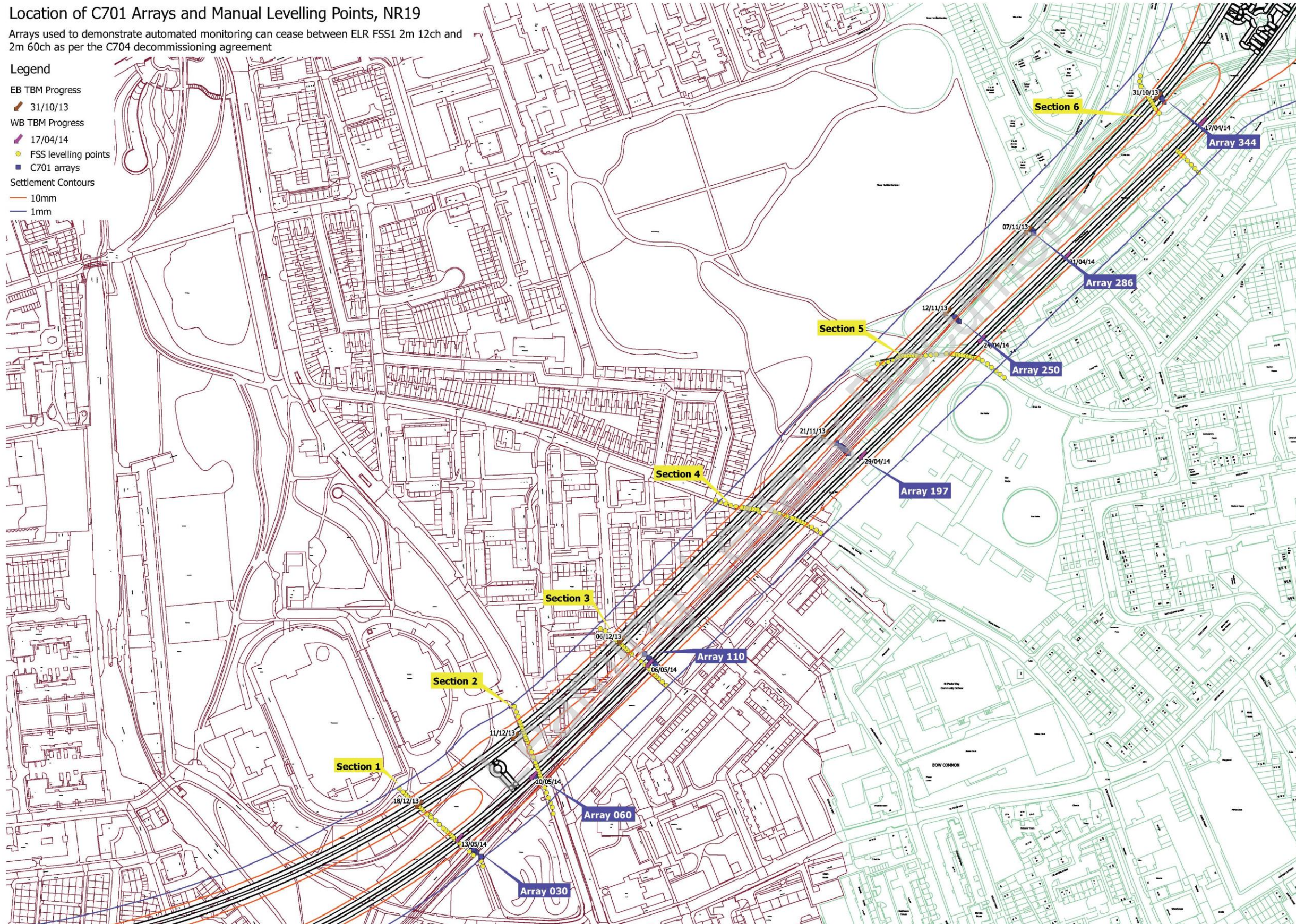
Learning Legacy Document

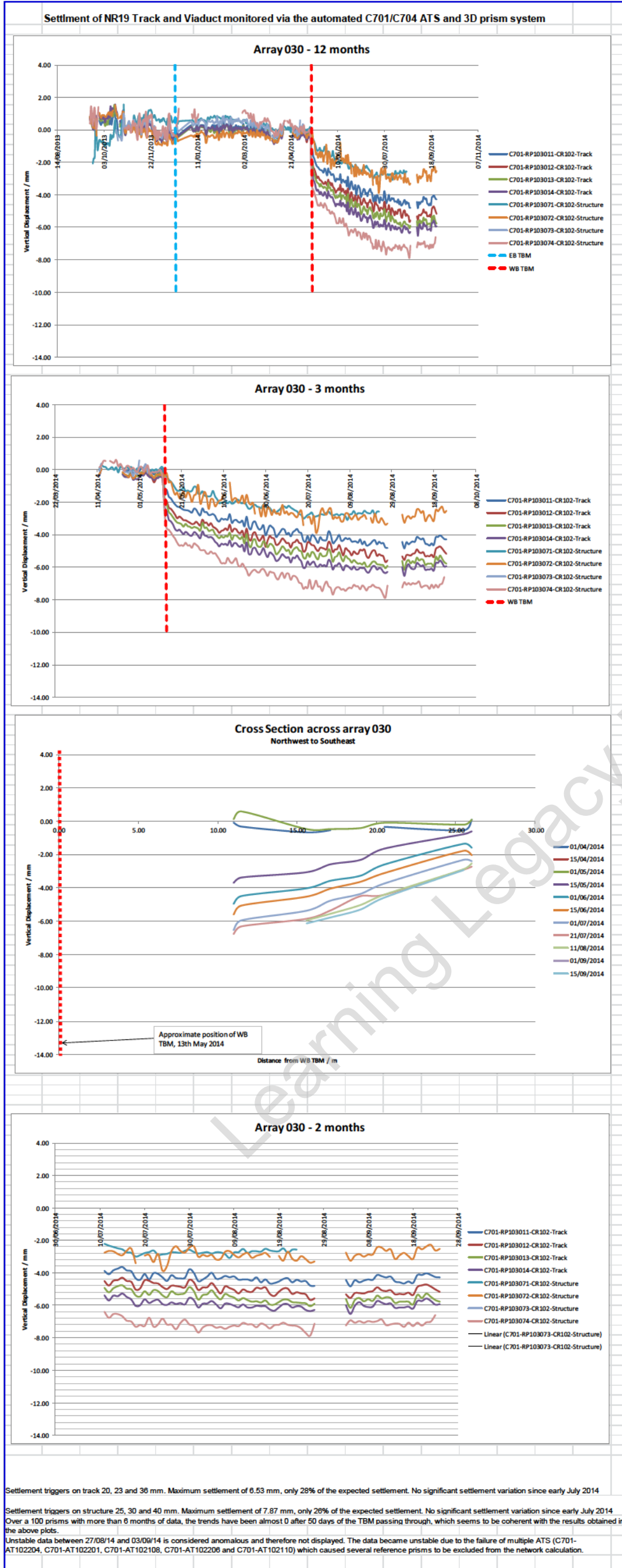
Location of C701 Arrays and Manual Levelling Points, NR19

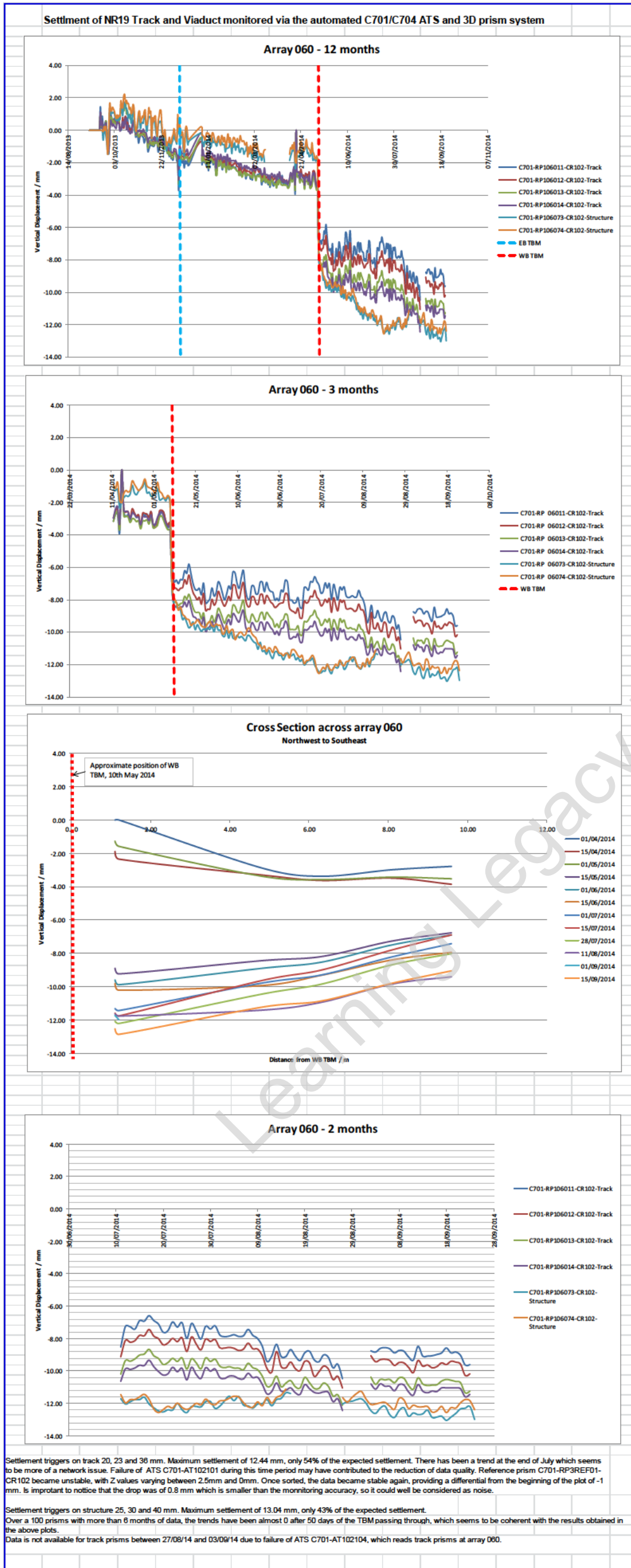
Arrays used to demonstrate automated monitoring can cease between ELR FSS1 2m 12ch and 2m 60ch as per the C704 decommissioning agreement

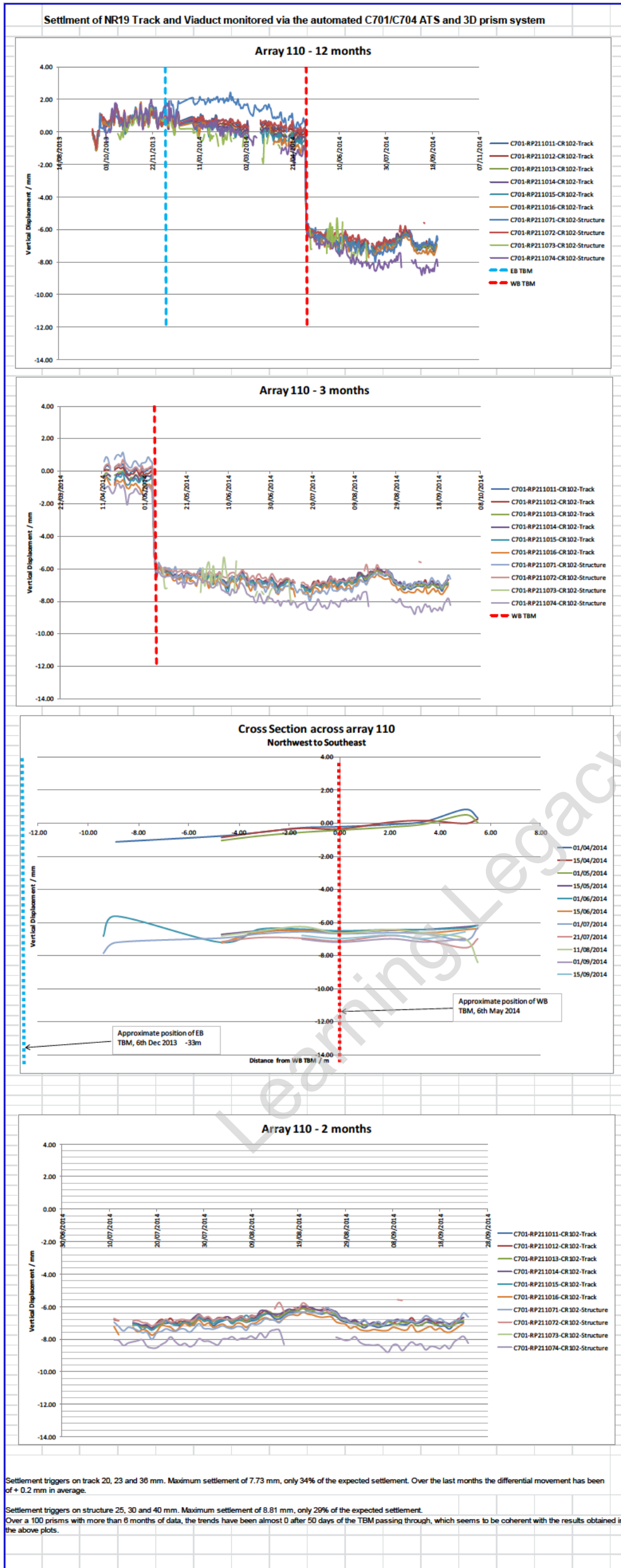
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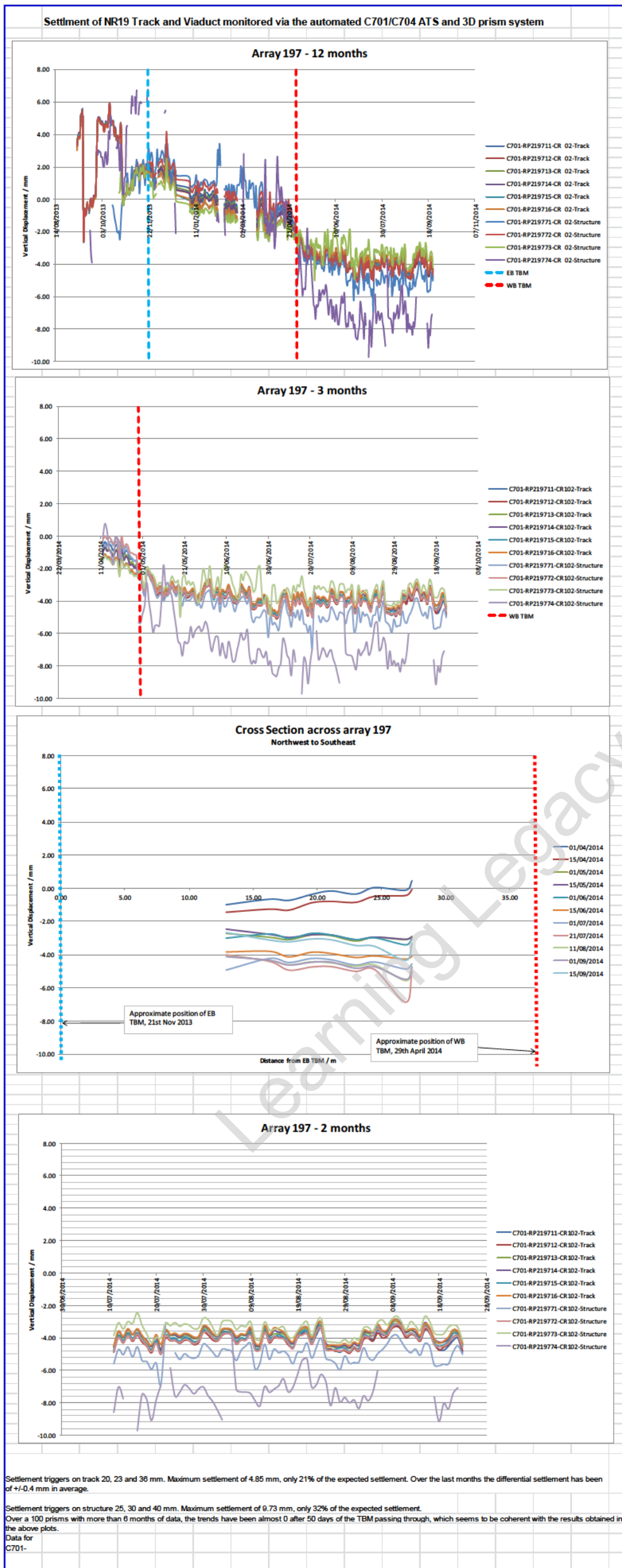
- EB TBM Progress 31/10/13
- WB TBM Progress 17/04/14
- FSS levelling points
- C701 arrays
- Settlement Contours 10mm
- 1mm

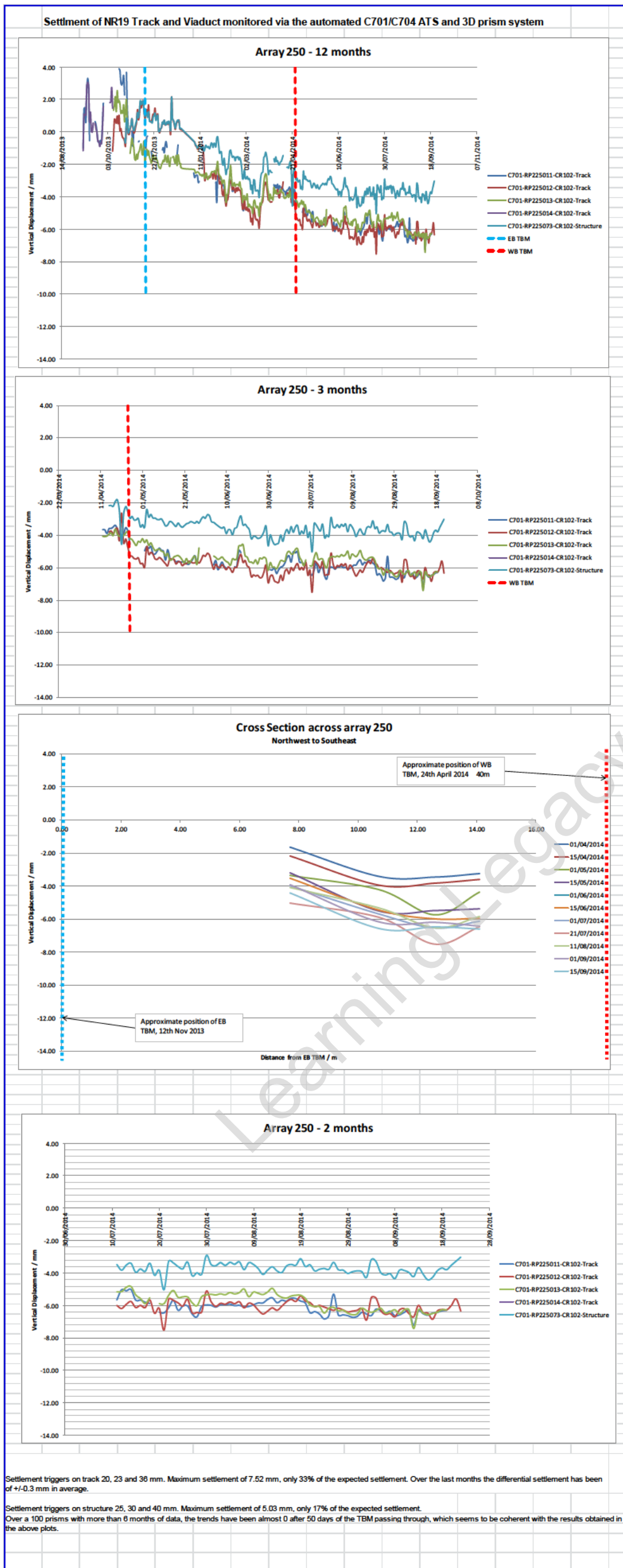


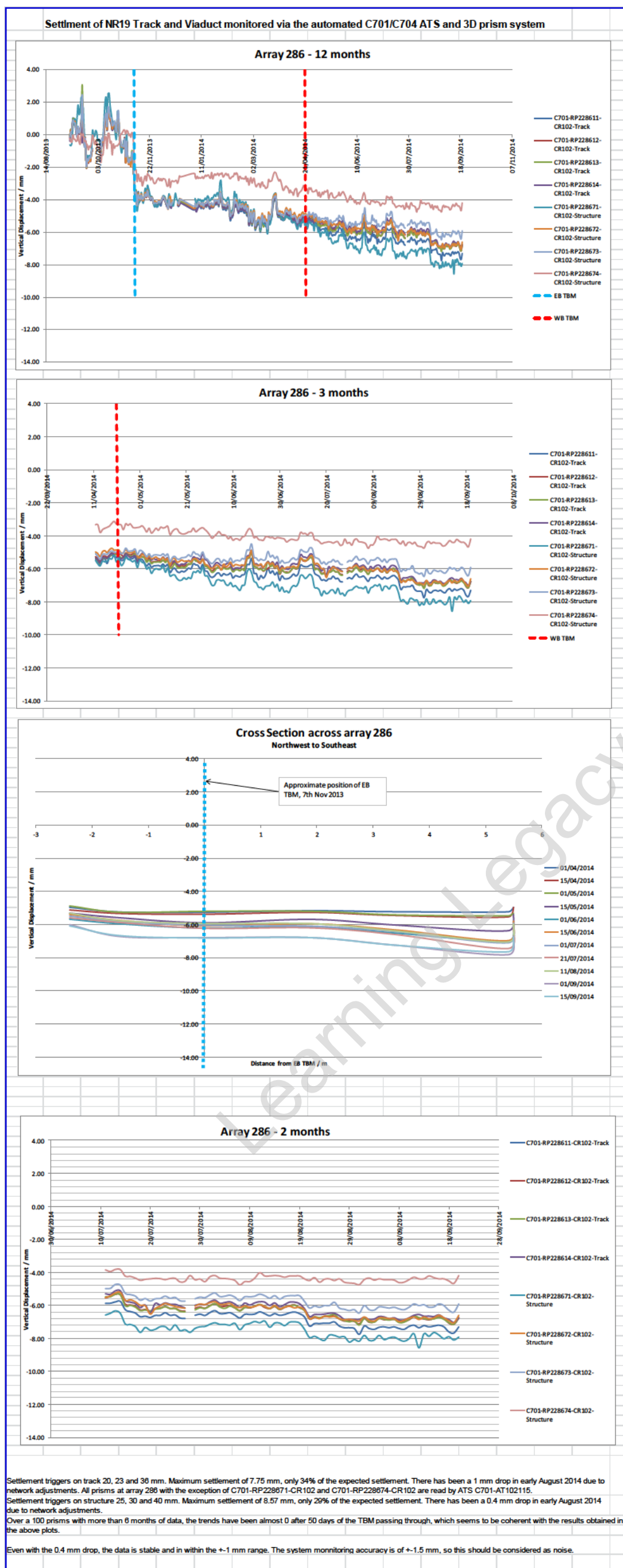


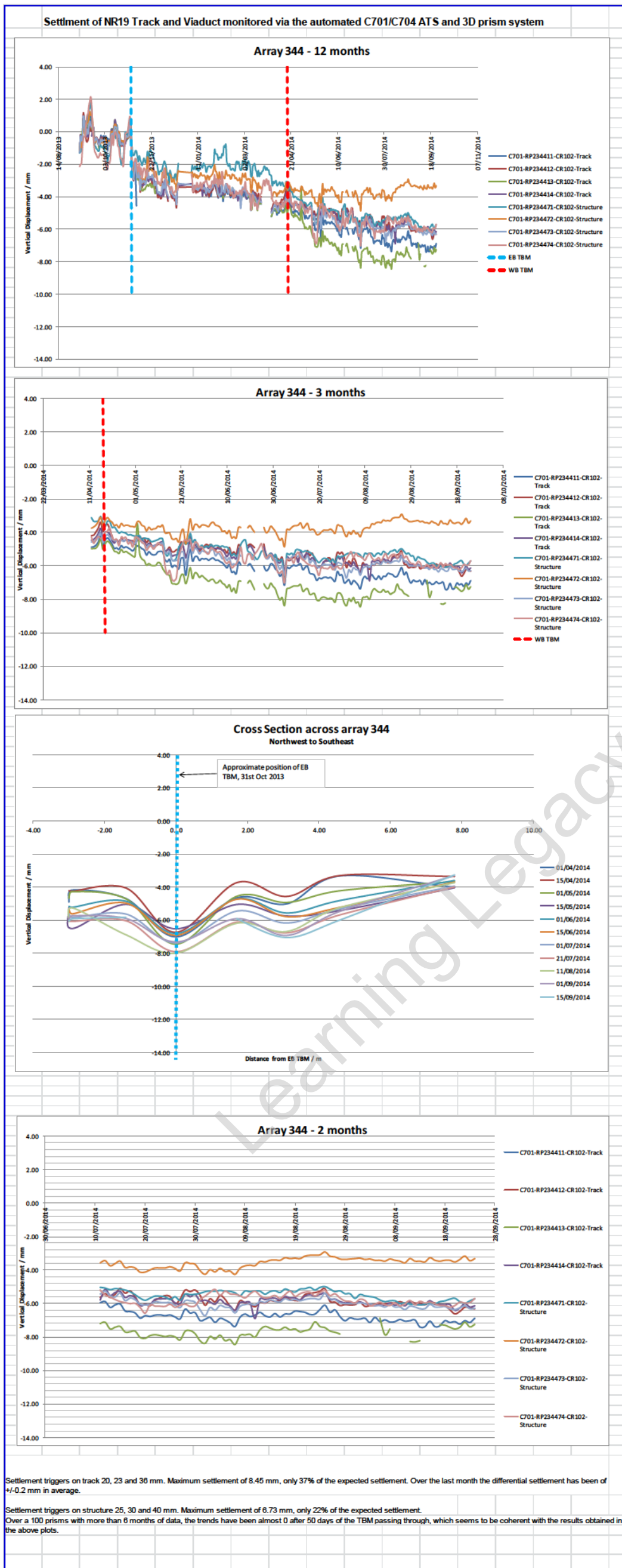




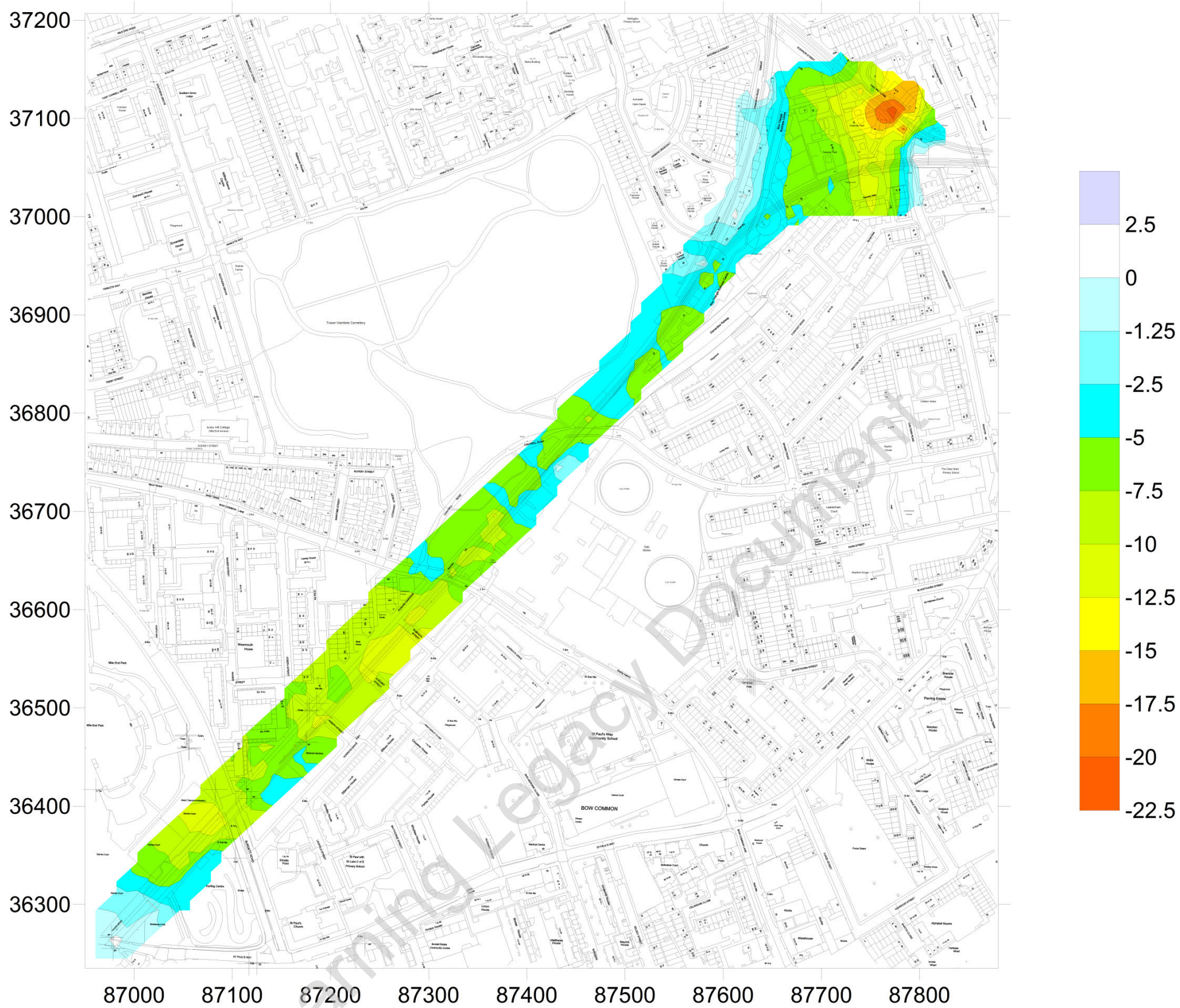




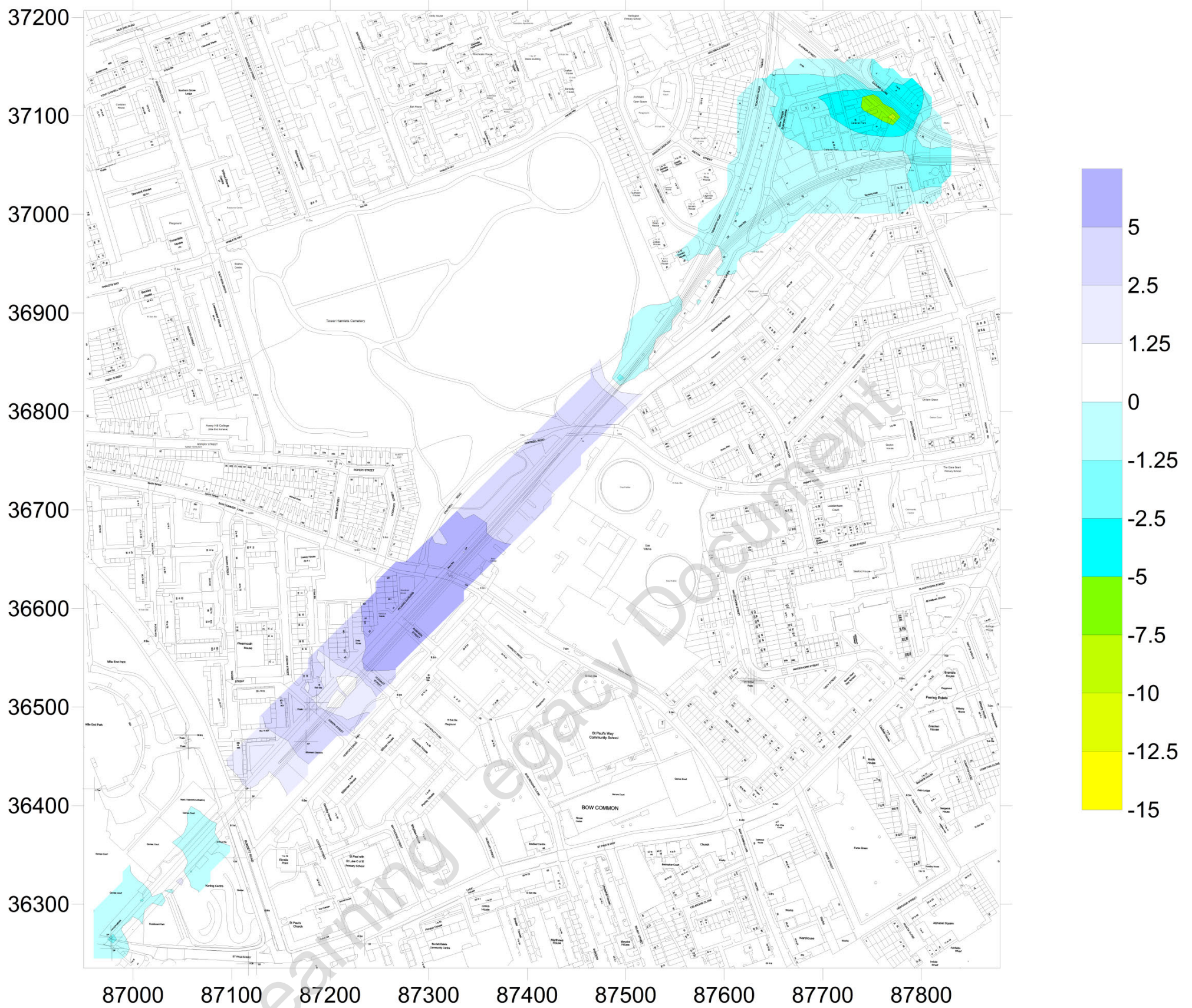




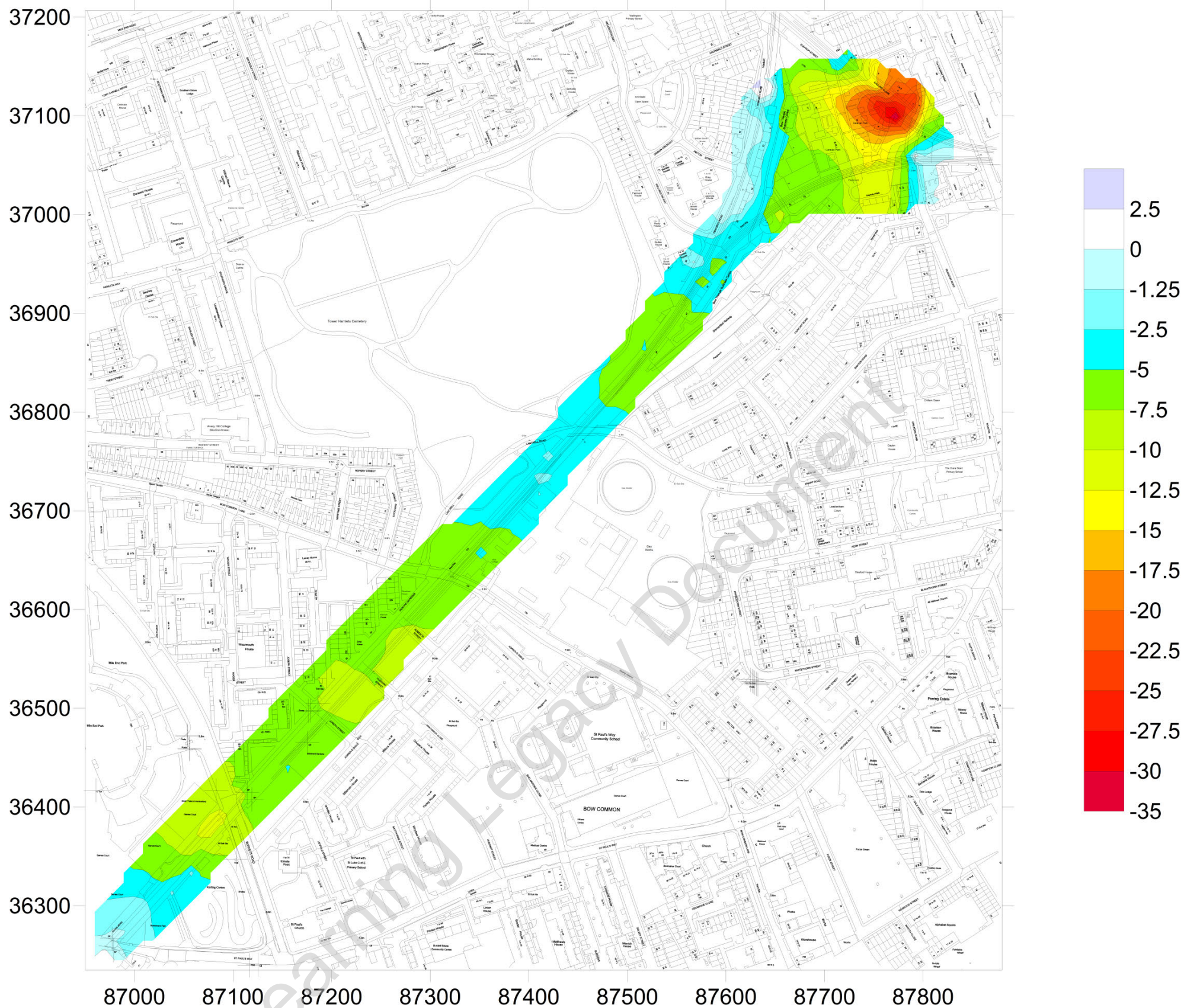
Delta Z - October 2013 to August 2014



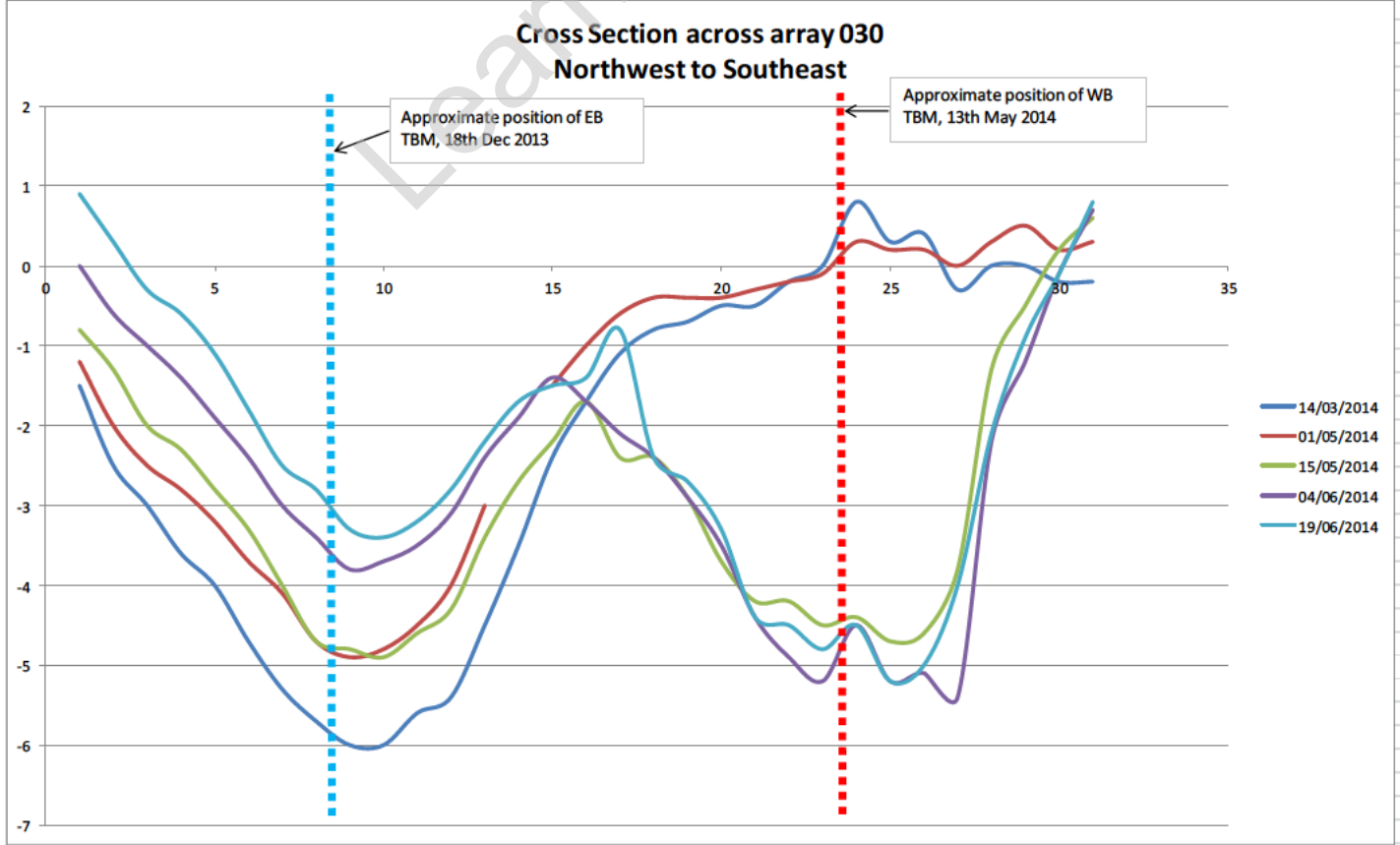
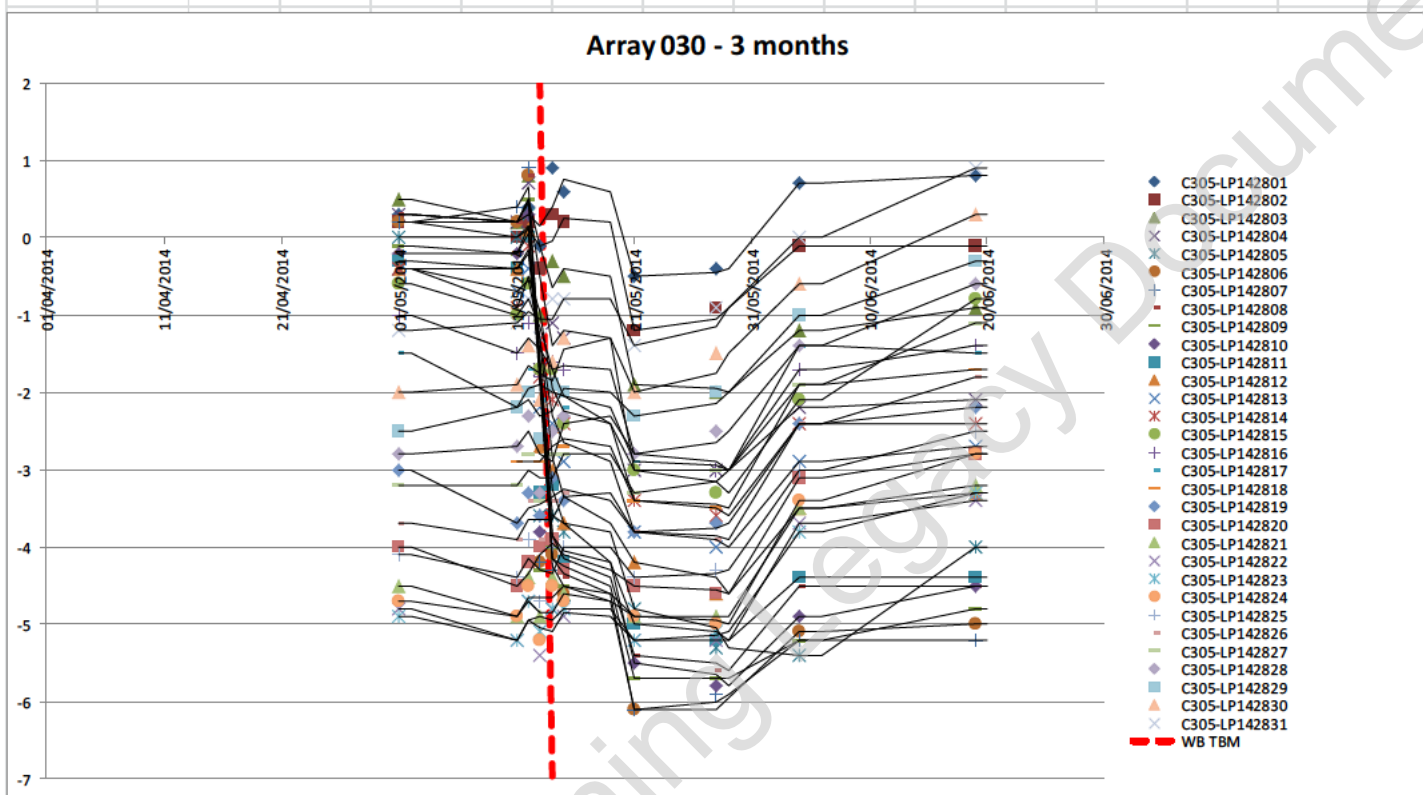
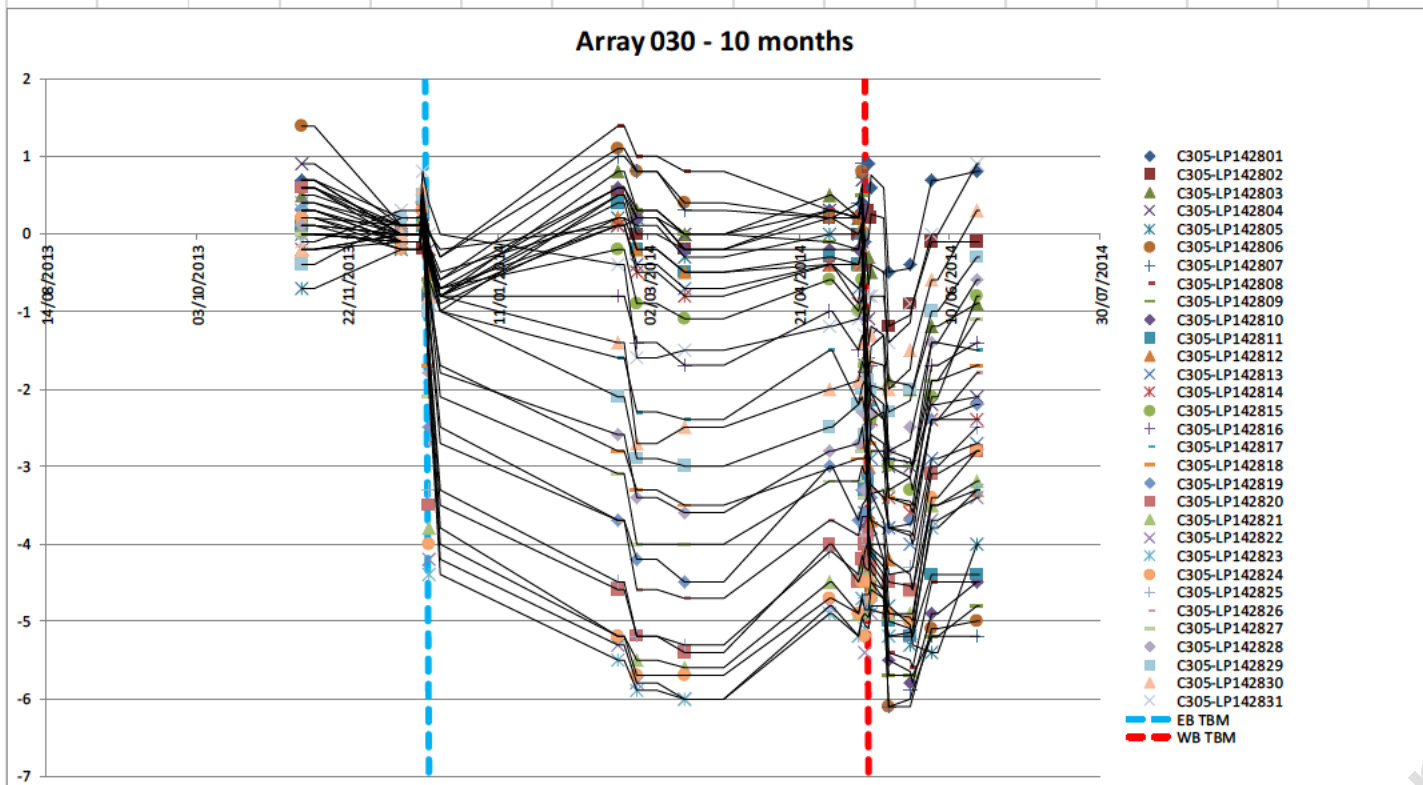
Median - 01/10/13



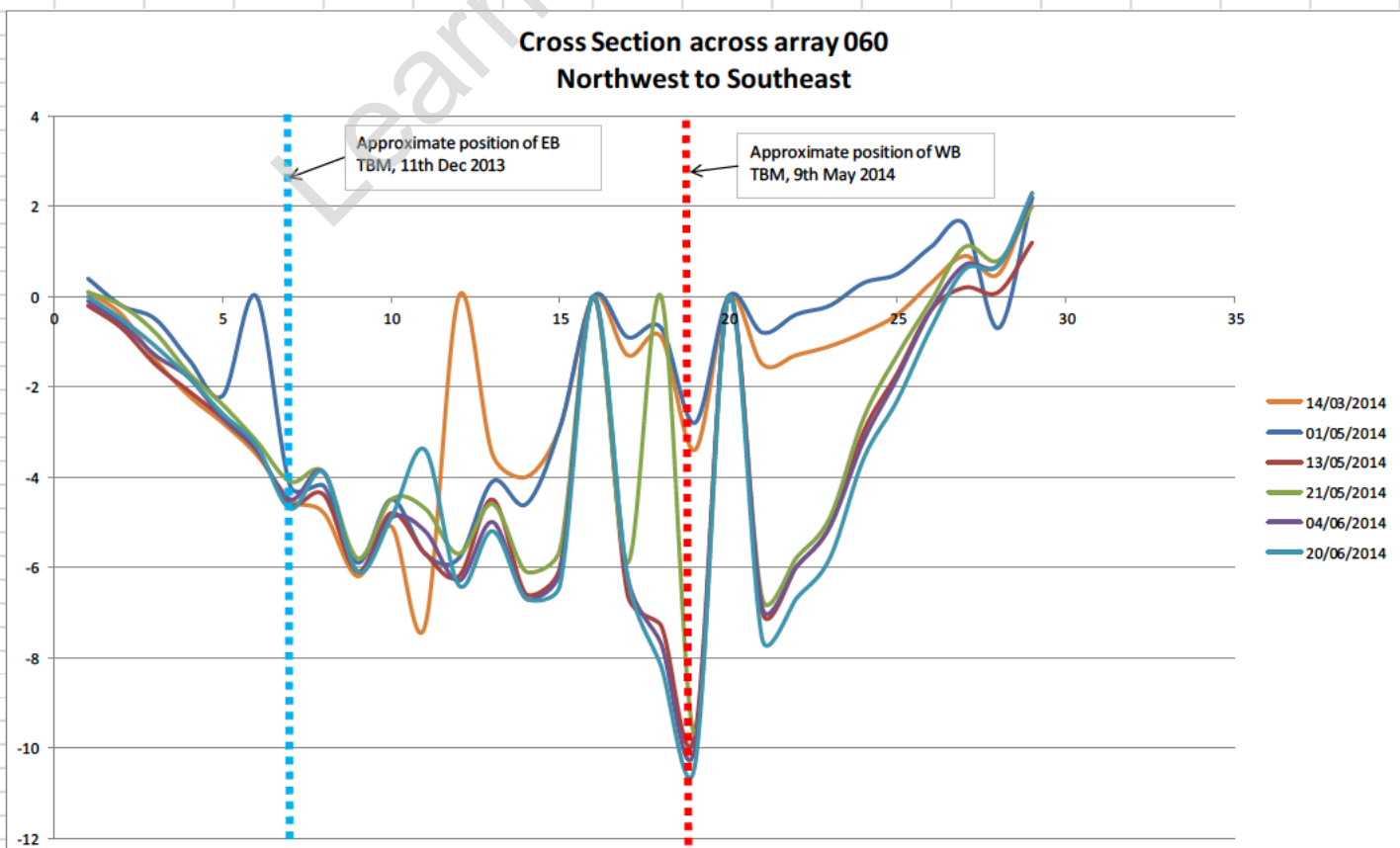
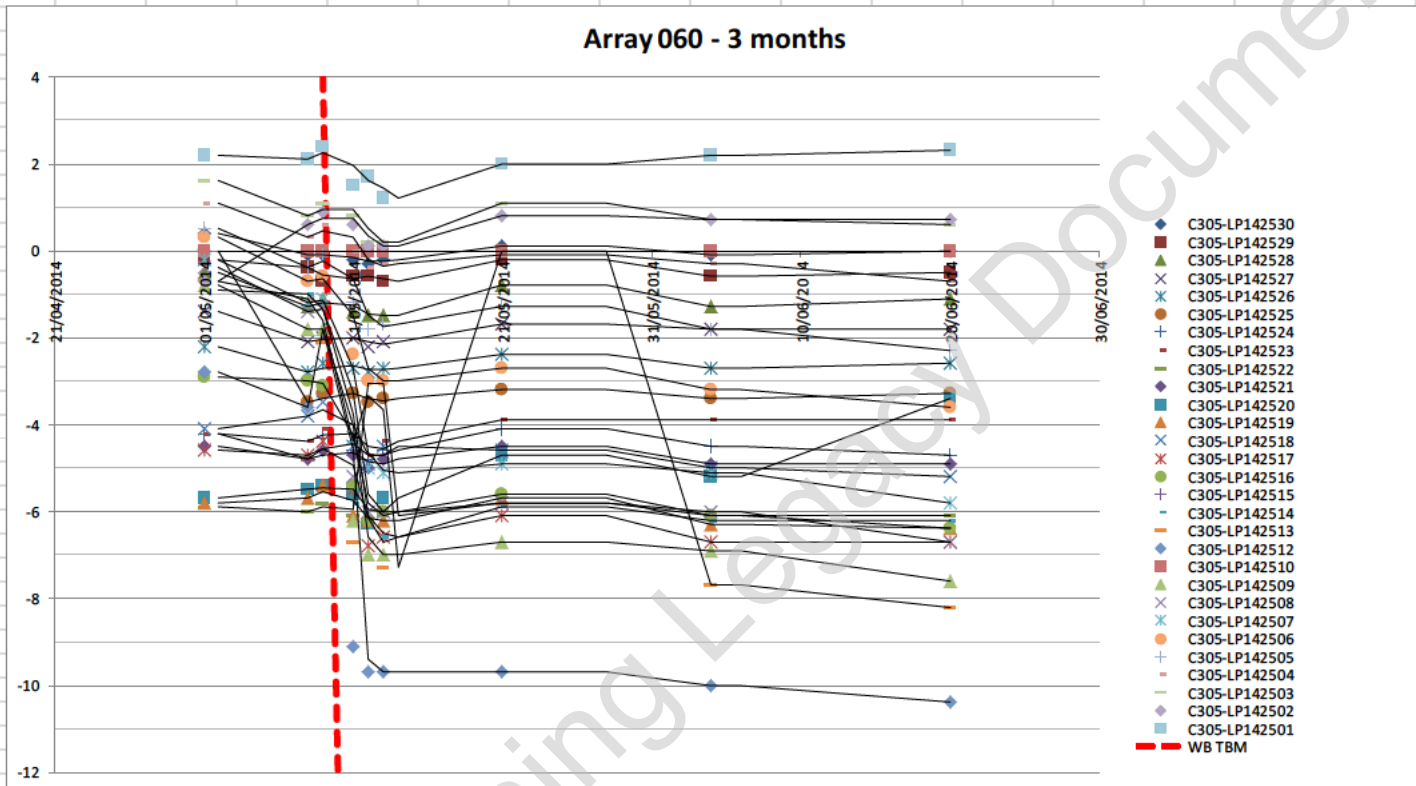
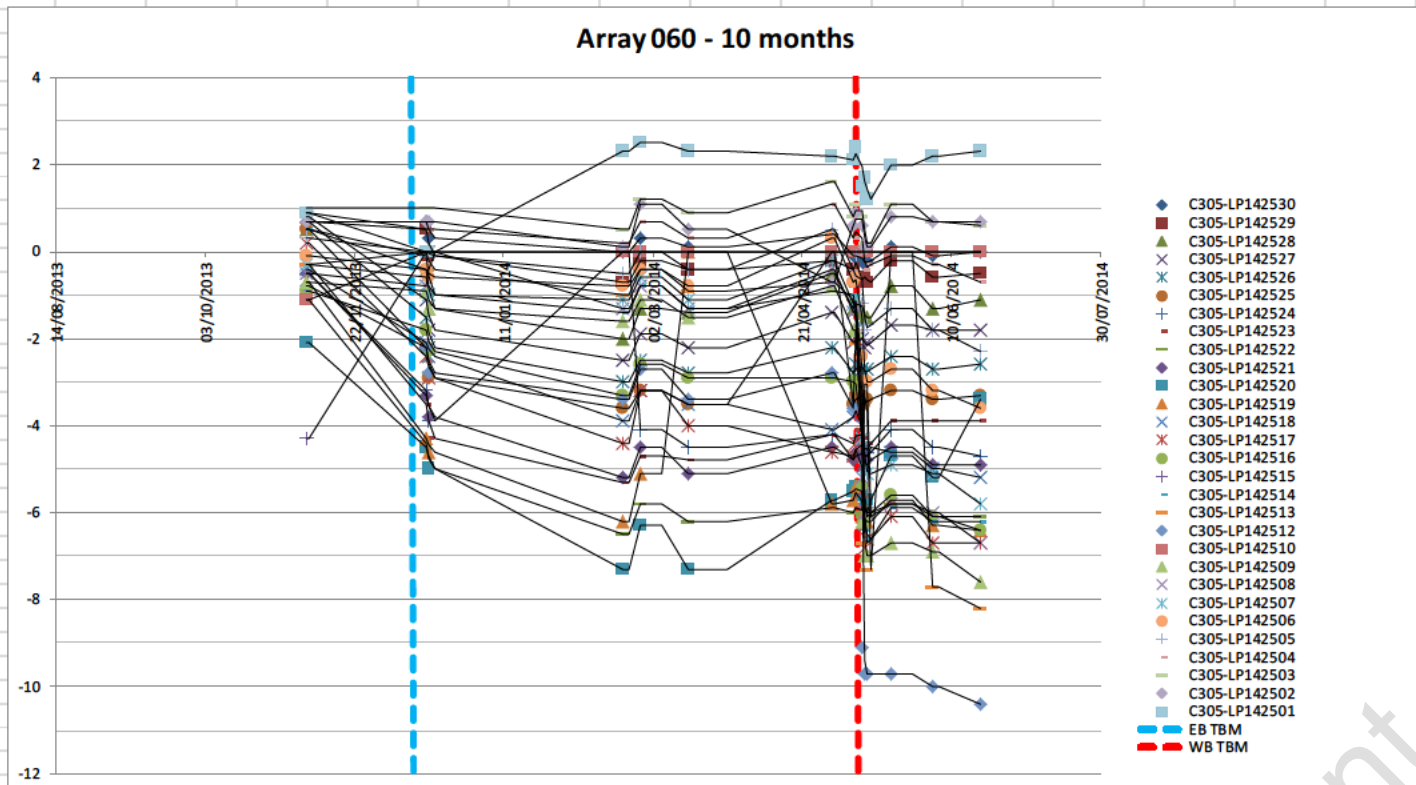
Median - 01/09/14



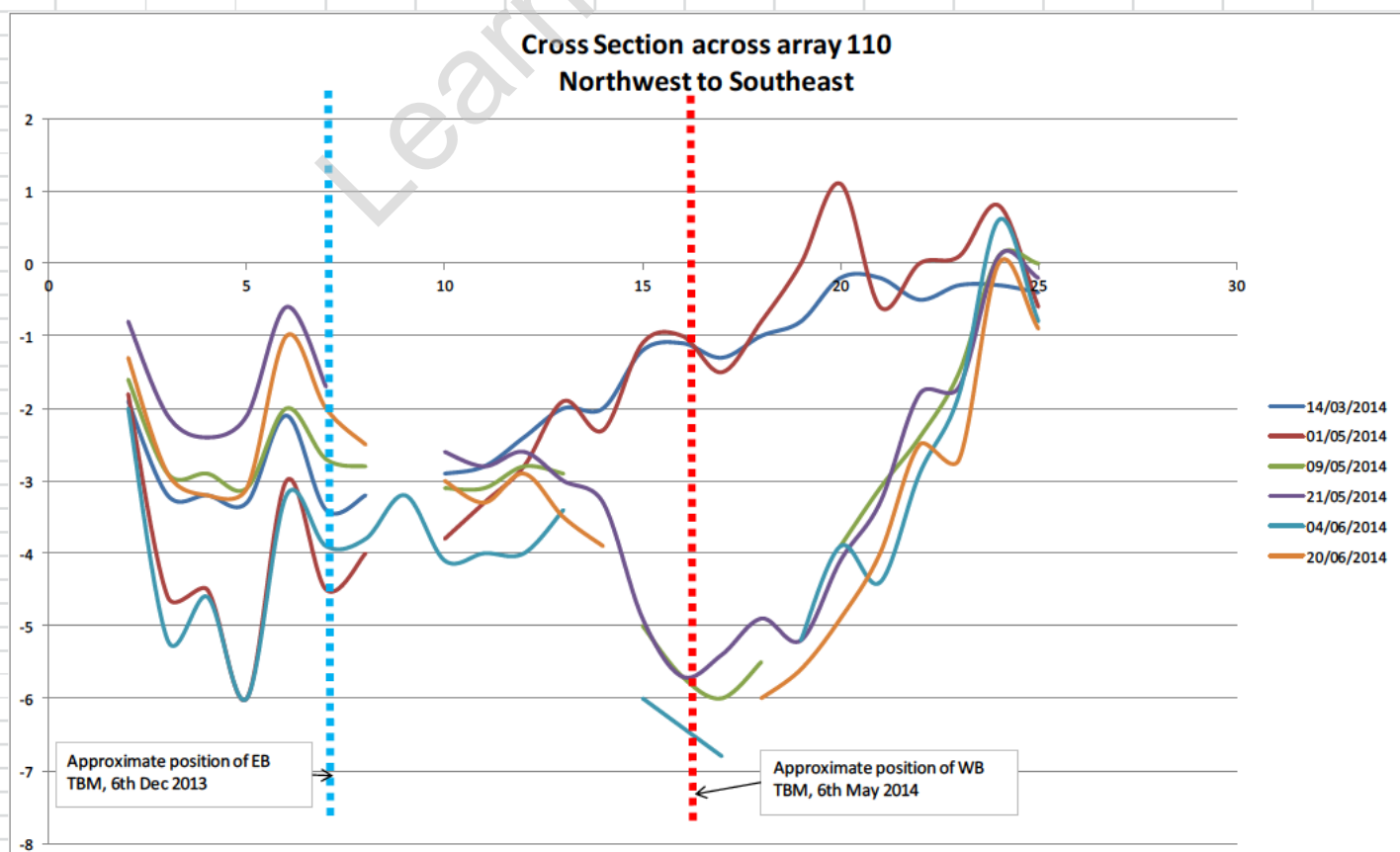
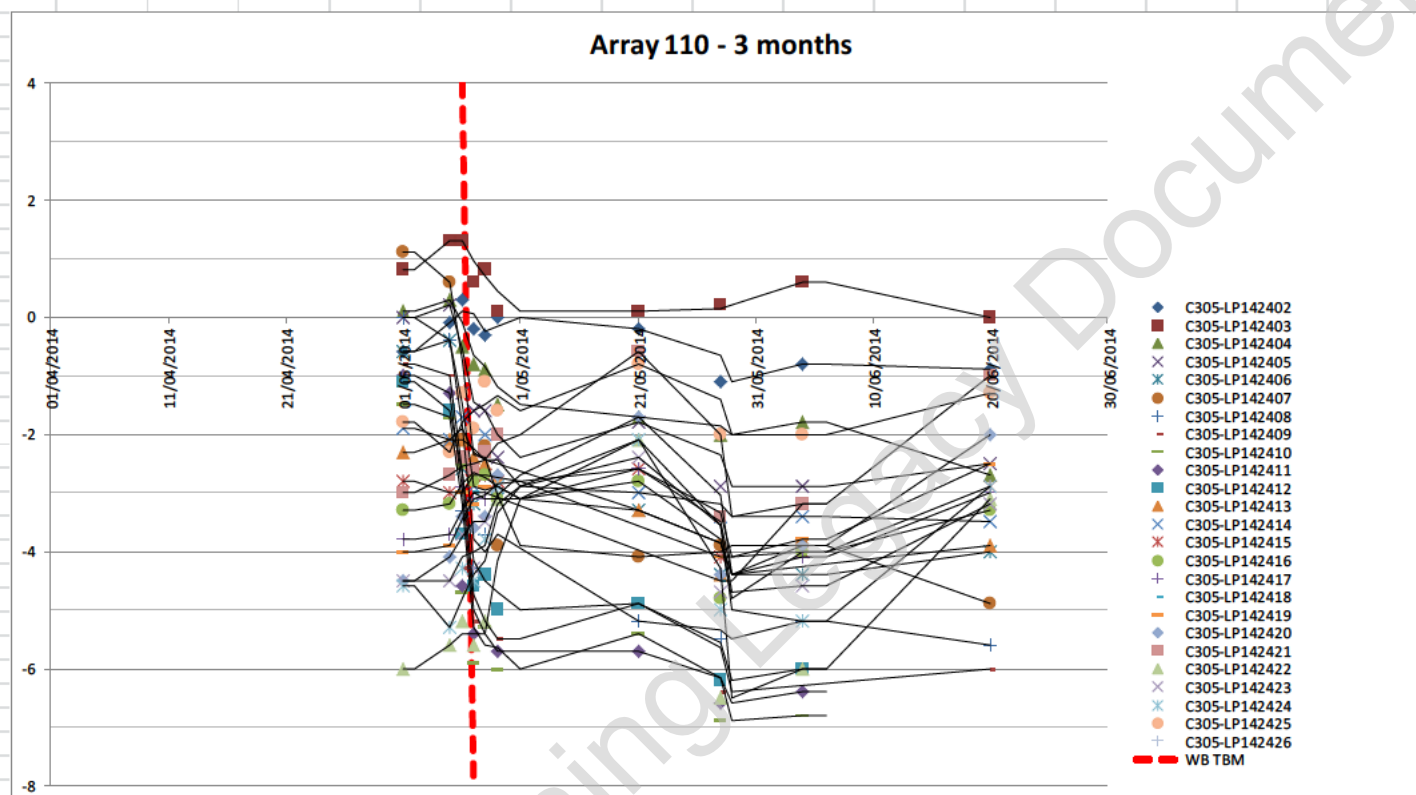
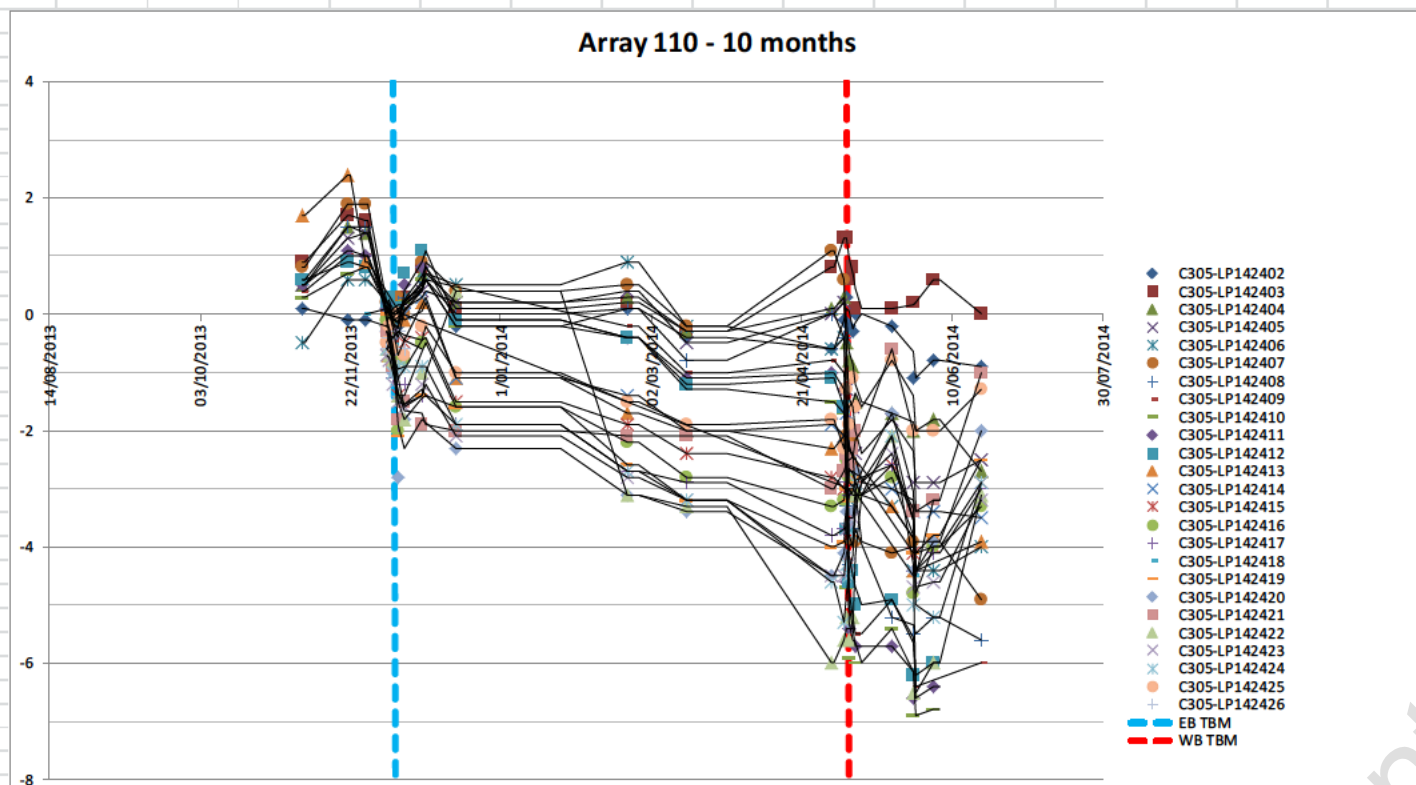
Settlement of NR19 Track and Viaduct monitored manually via C305 precise levelling points



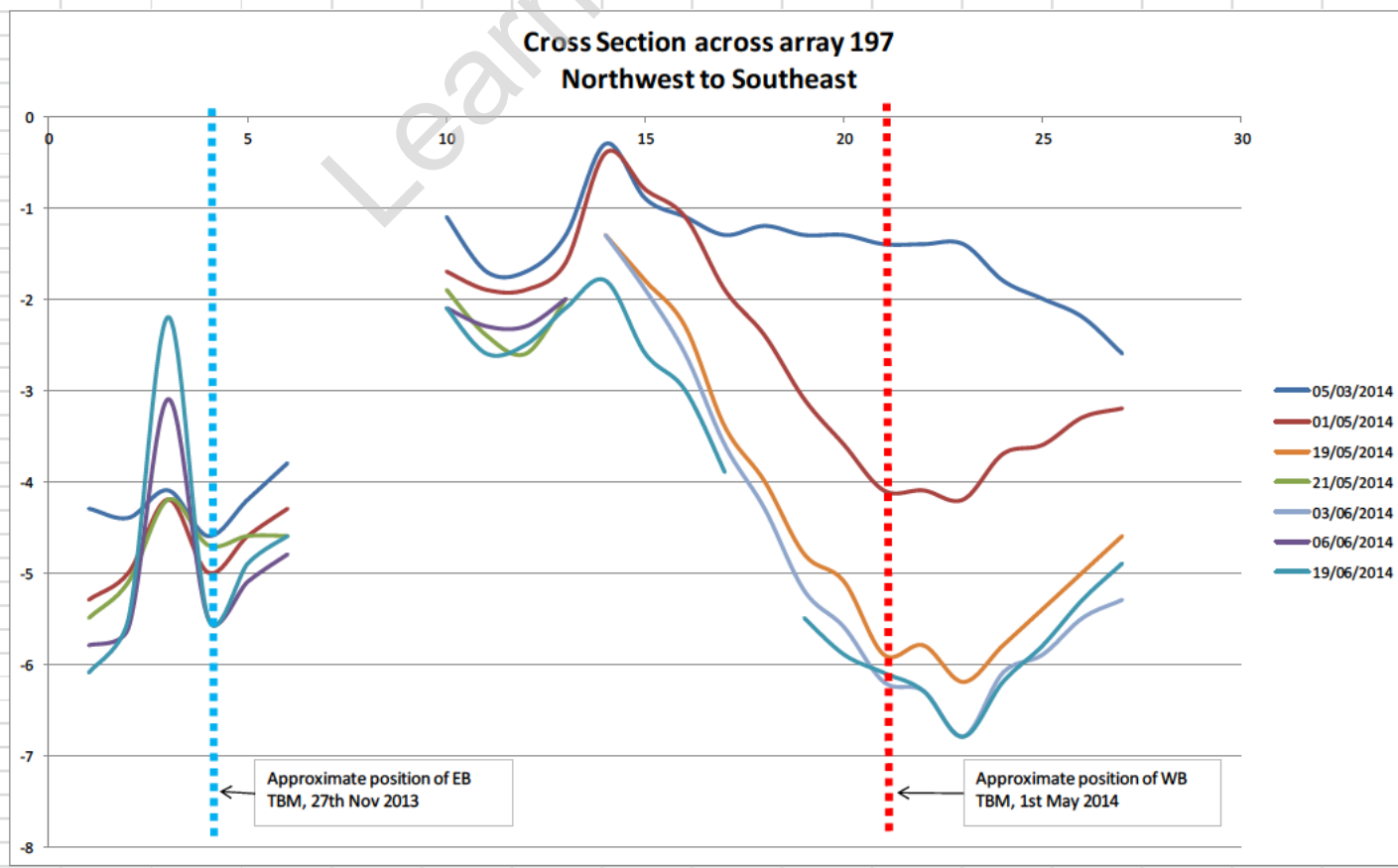
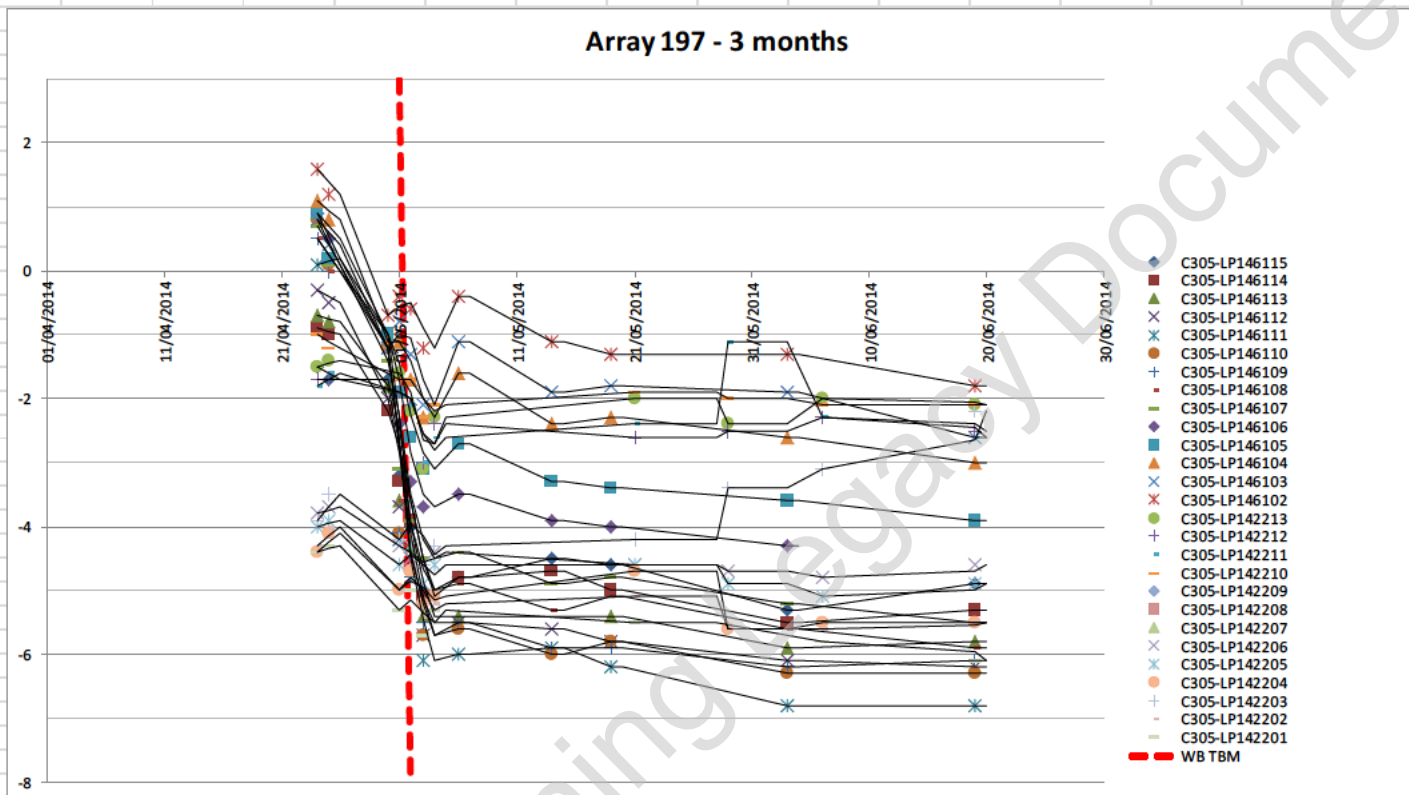
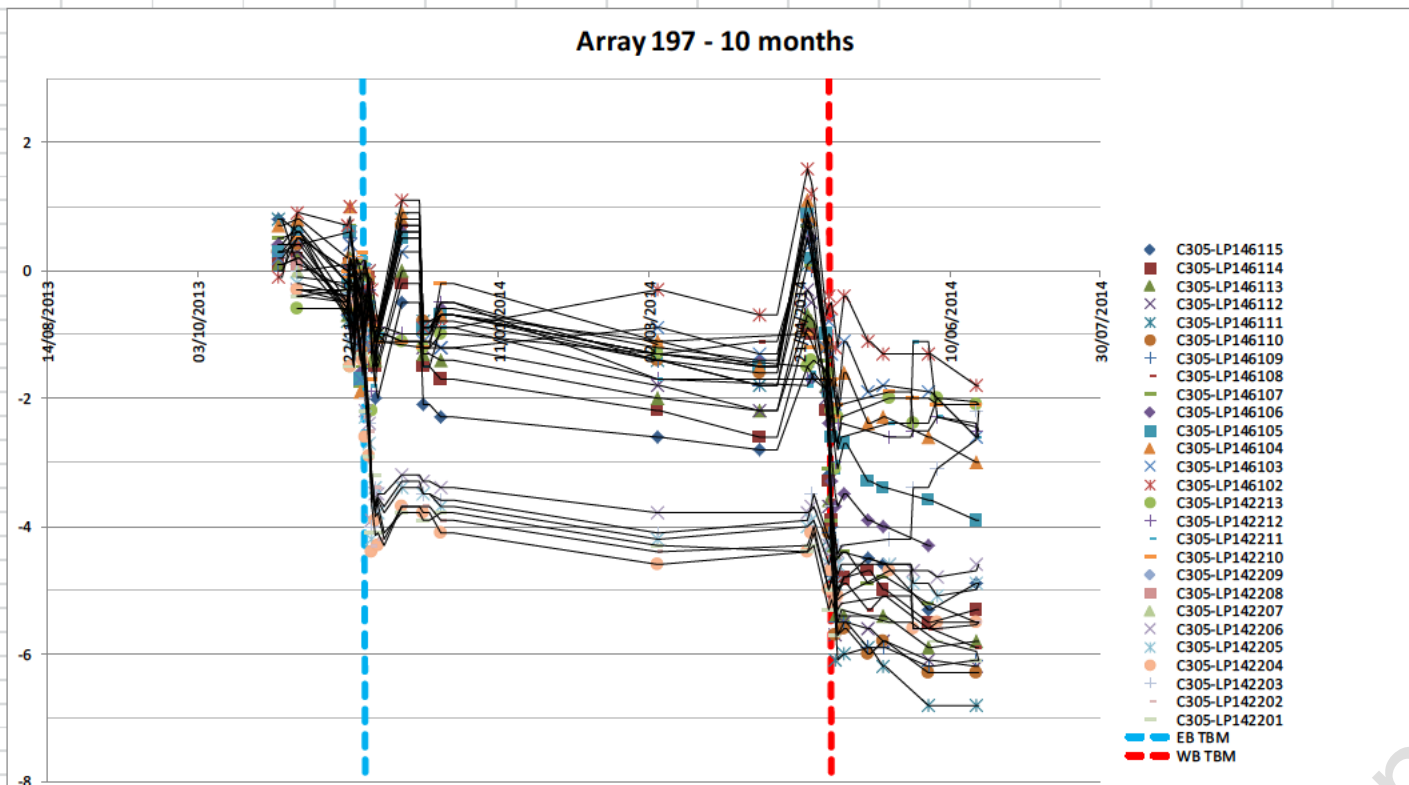
Settlement of NR19 Track and Viaduct monitored manually via C305 precise levelling points



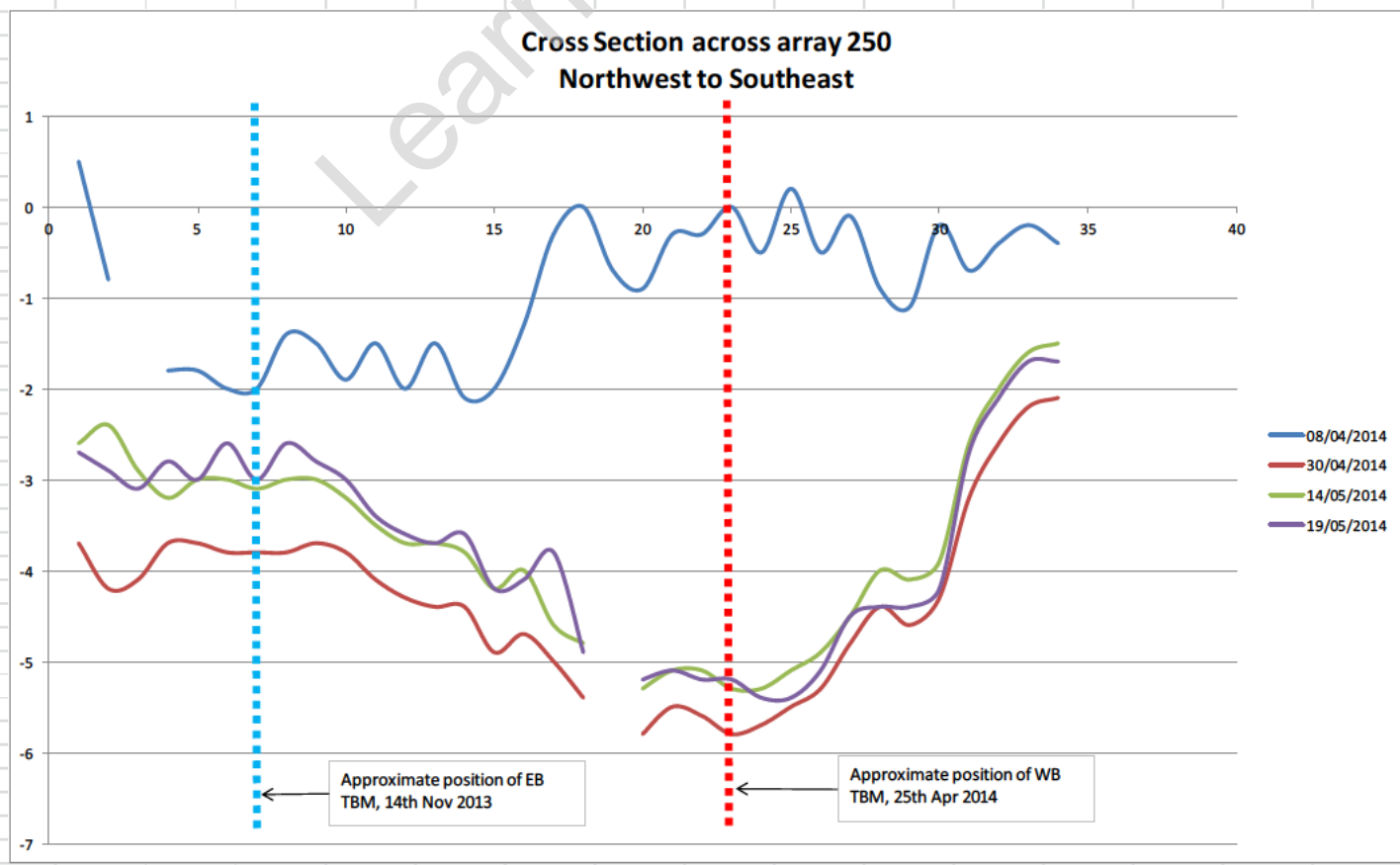
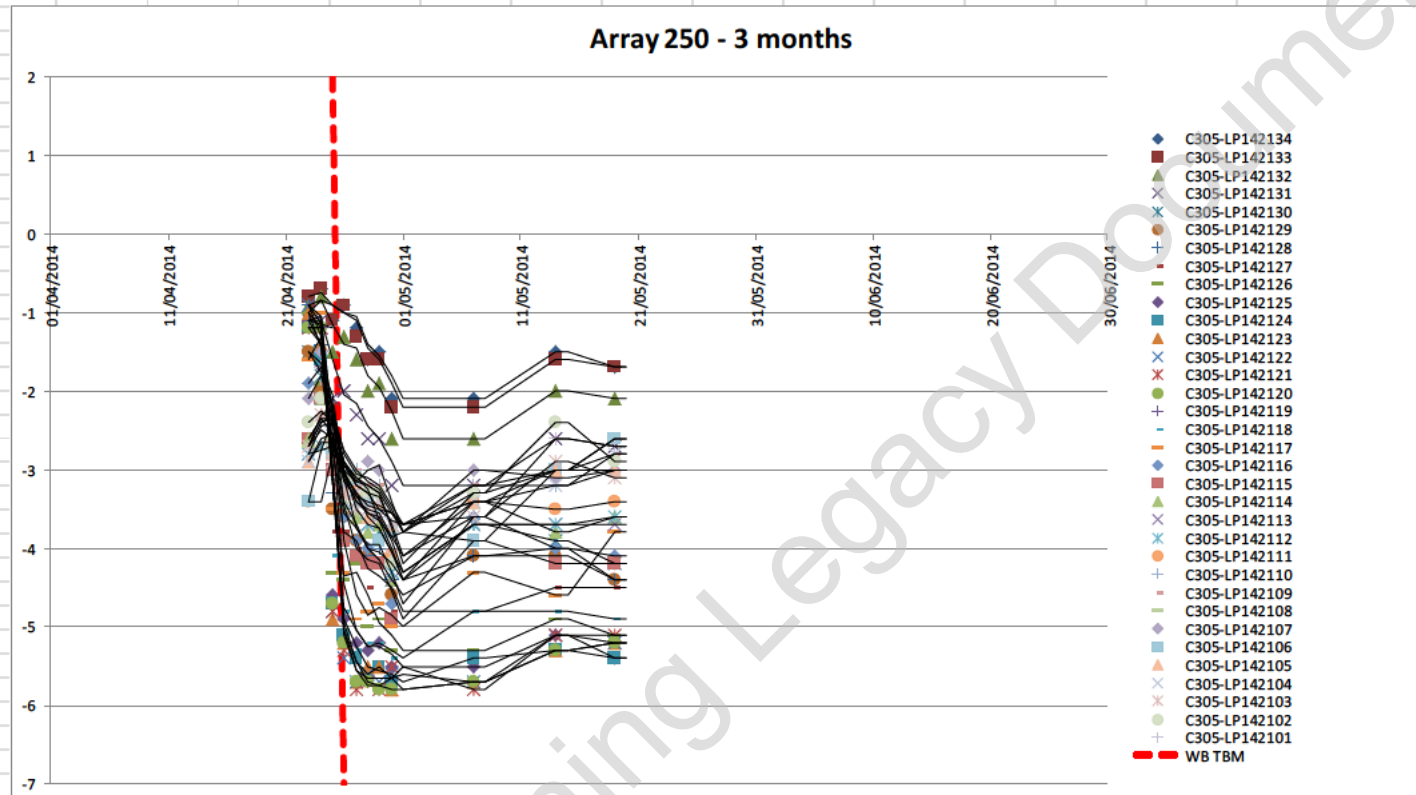
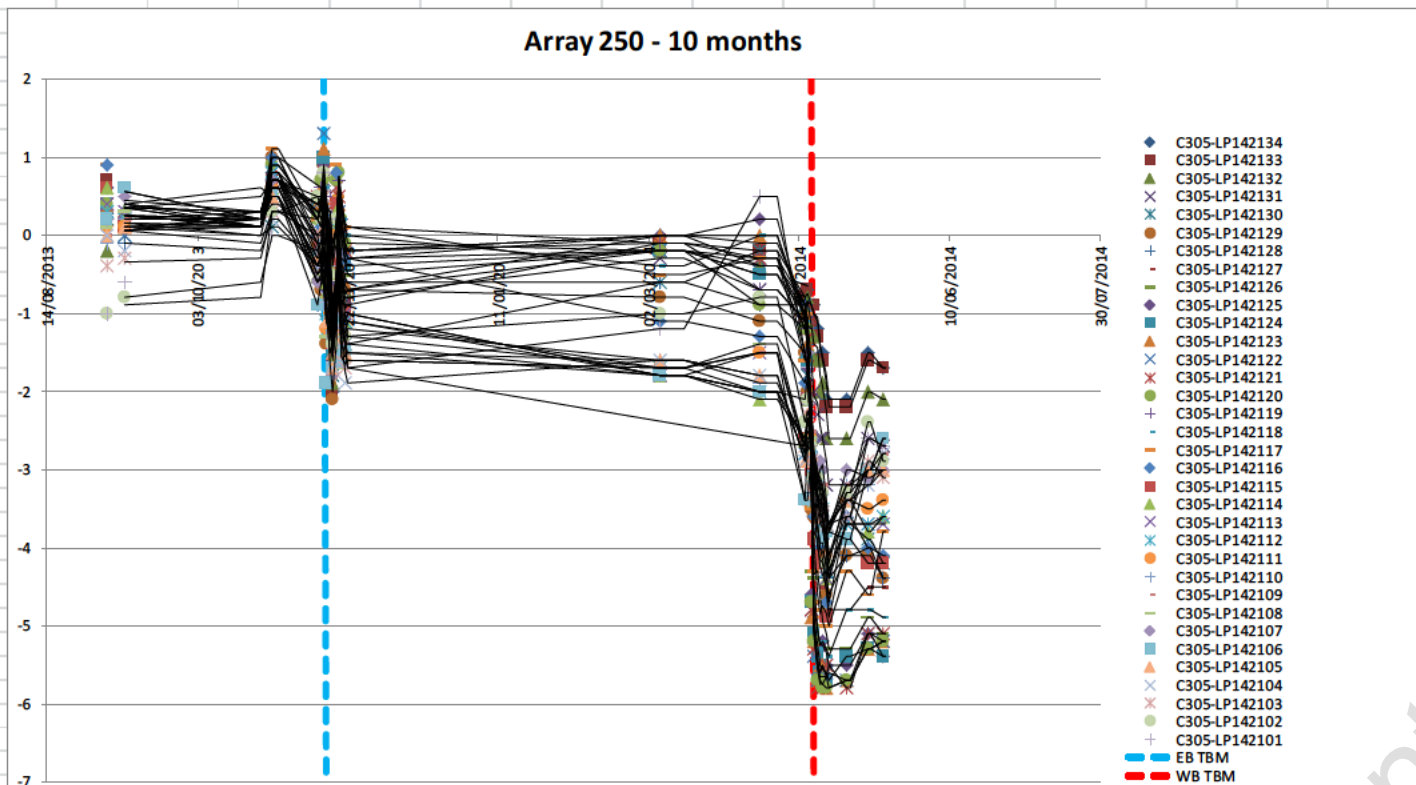
Settlement of NR19 Track and Viaduct monitored manually via C305 precise levelling points



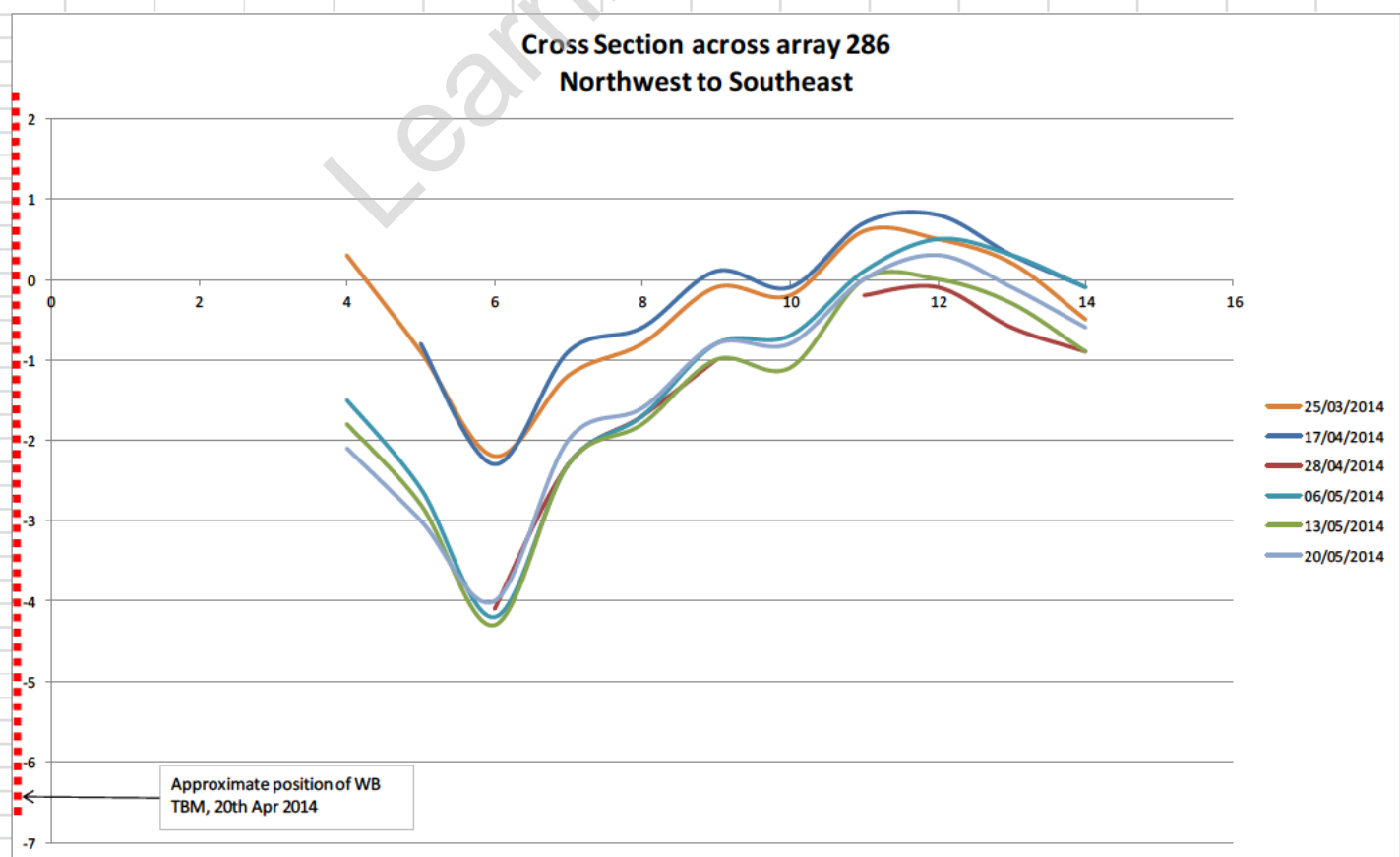
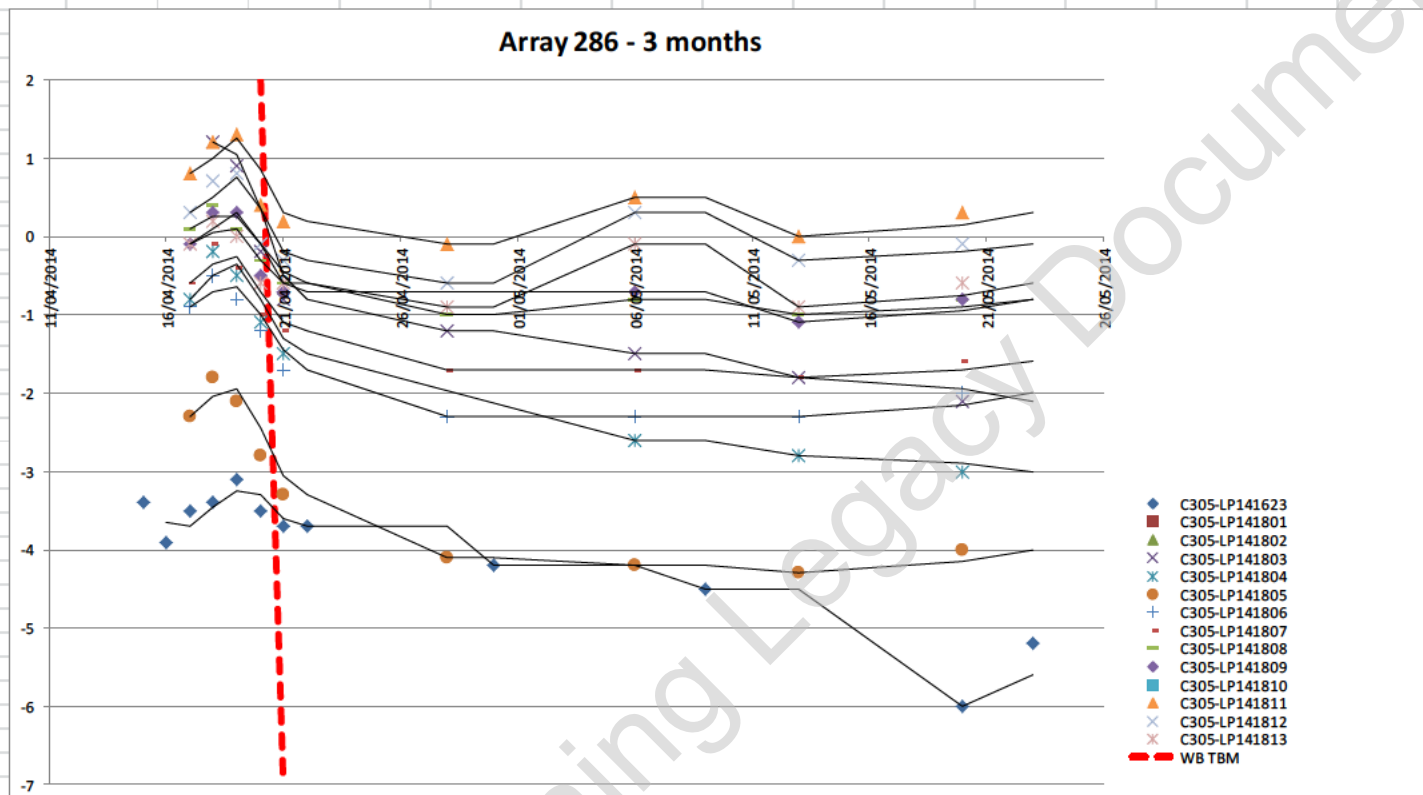
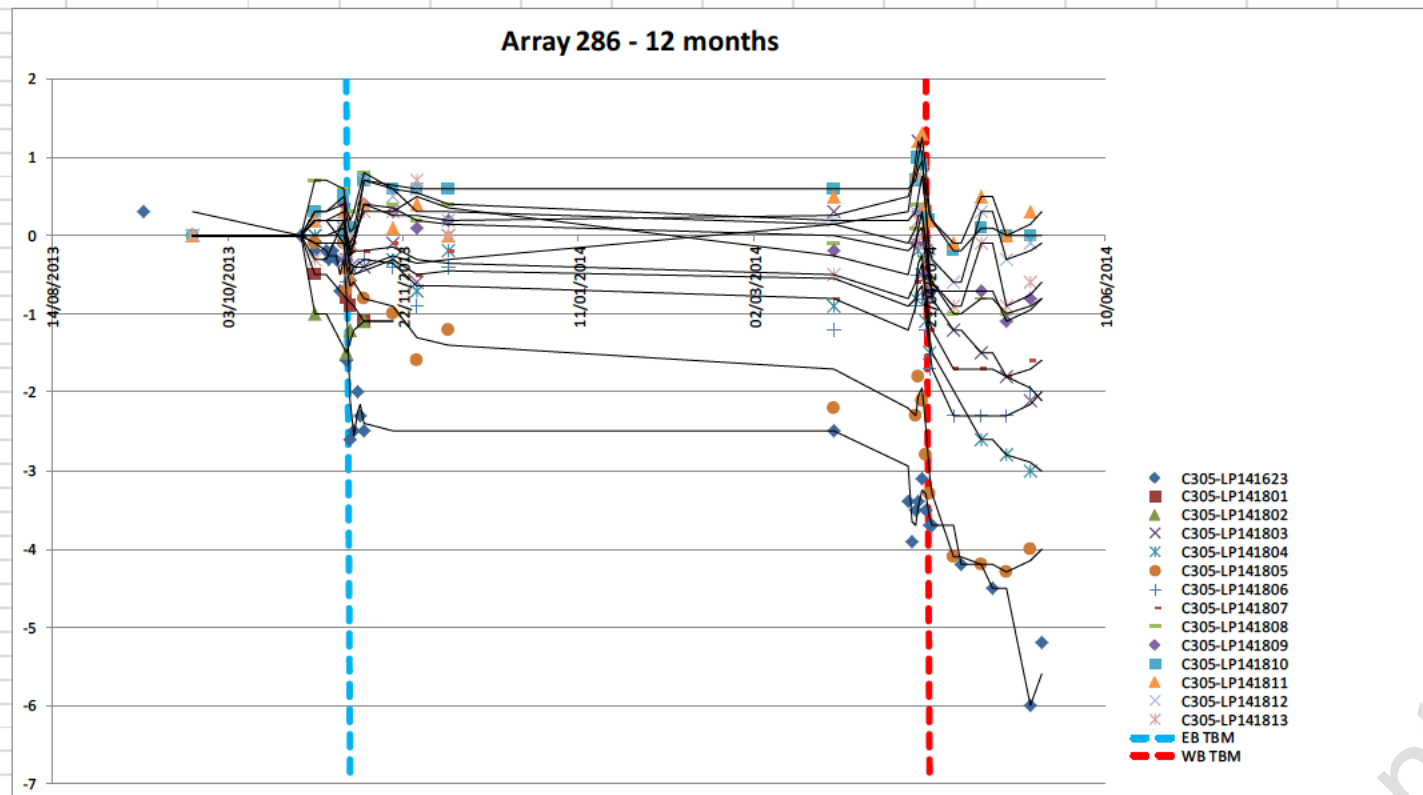
Settlement of NR19 Track and Viaduct monitored manually via C305 precise levelling points



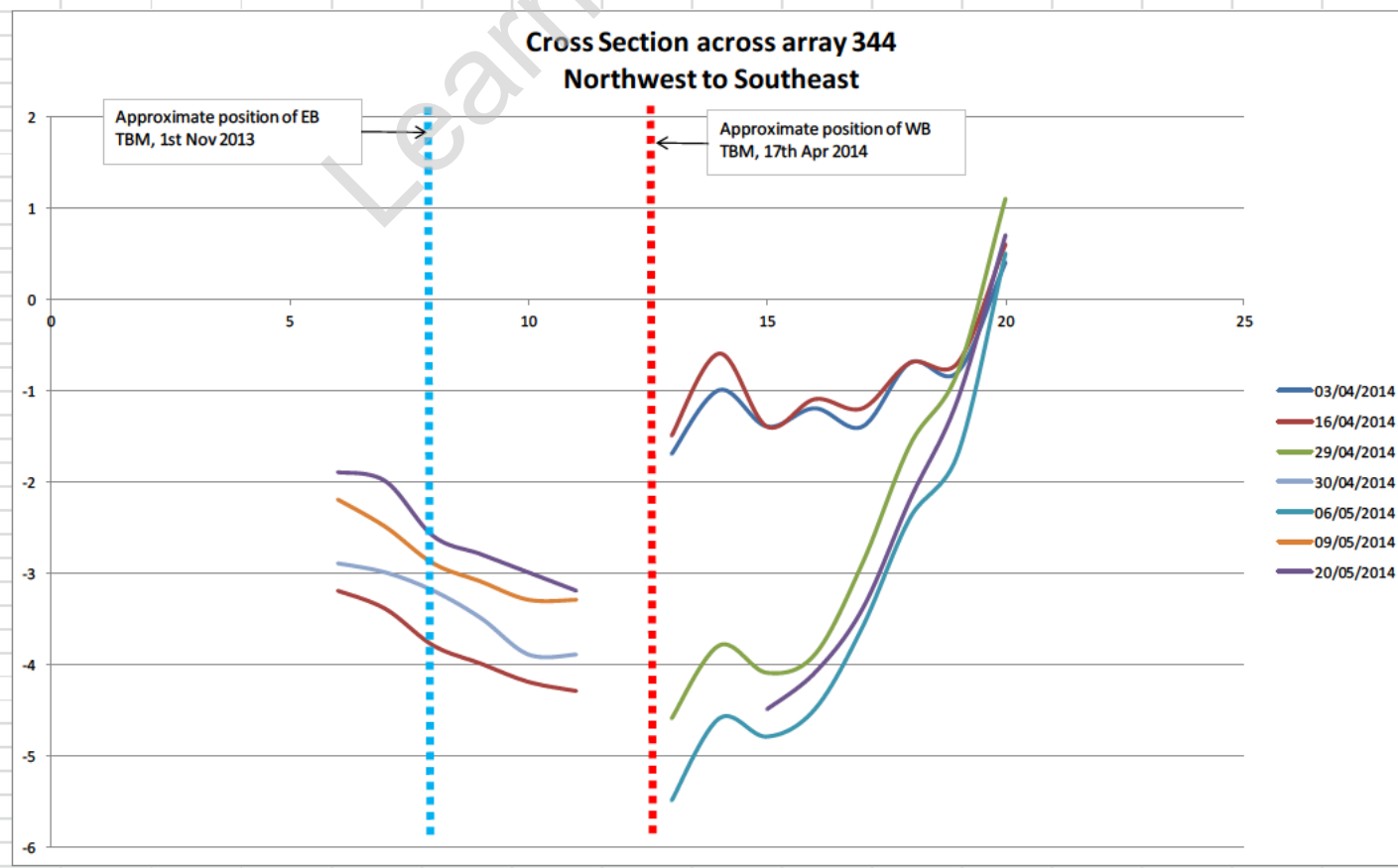
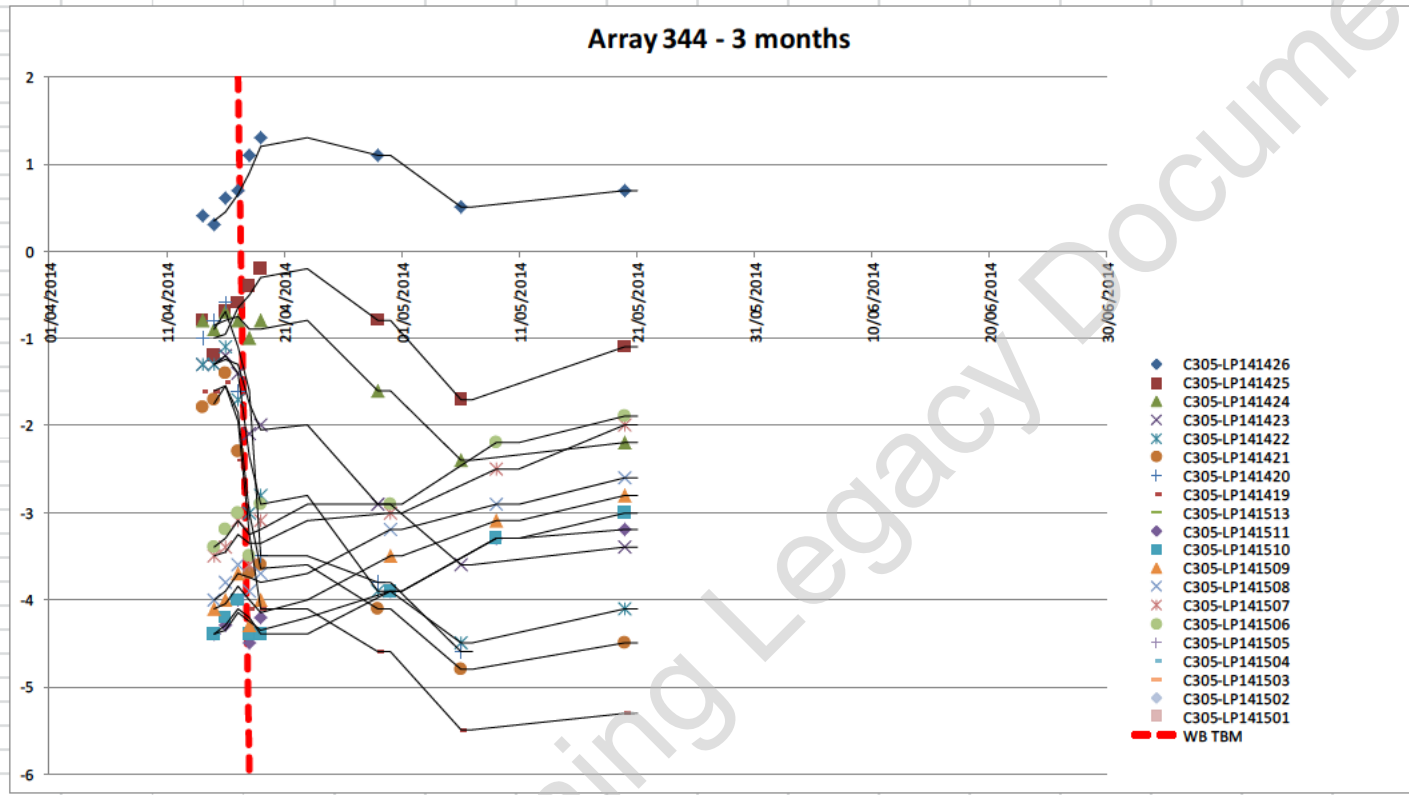
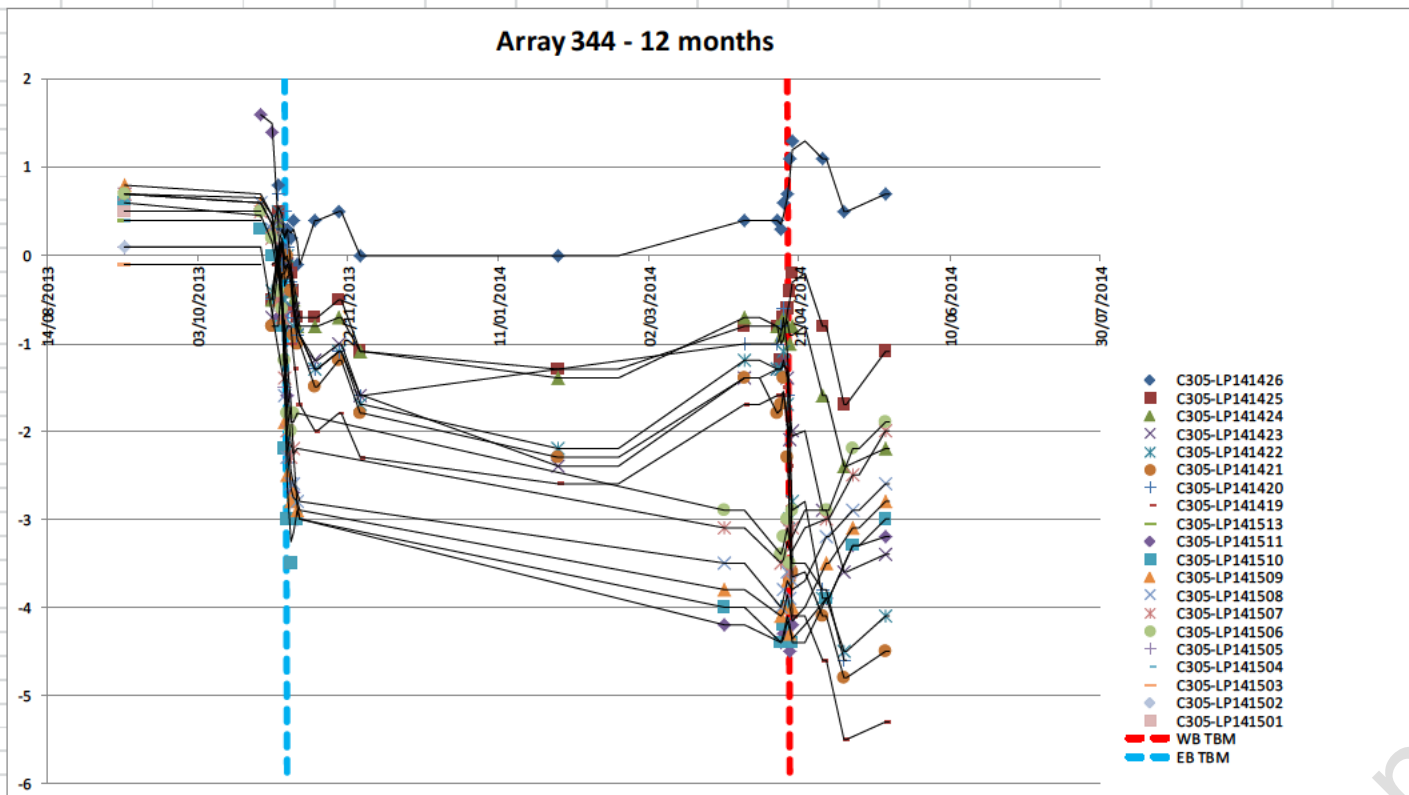
Settlement of NR19 Track and Viaduct monitored manually via C305 precise levelling points



Settlement of NR19 Track and Viaduct monitored manually via C305 precise levelling points



Settlement of NR19 Track and Viaduct monitored manually via C305 precise levelling points



APPENDIX D - LWW-C704-RFI-000056

Learning Legacy Document

**C704 Instrumentation and Monitoring – Partial Decommissioning Agreement
 Network Rail FSS1 Gas Factory Curve Viaduct- NR19
 C704-XRL-C-AAG-CR094-50001 Rev 1.0**

Project Technical Request - Crossrail RFI - C704-RFI-000056			
Demographic Details			
PTR Type	RFI - Request for Information		
Project - Area	ZAW - Asset Wide (All Locations) (Projectwide)		
Contract	C704 - Instrumentation and Monitoring Works		
Discipline	Surveying - Instrumentation and Monitoring		
Subject	RFI - Eleanor Street Shaft - C704 automated monitoring required for on-going Zone of Influence		
PTR Number	C704-RFI-000056		
Initiator	JANE DRINKWATER	Current Status	Complete
Location	CRG03 - Central Sections General	Date Initiated	29/08/2014
Location Description		Required Close Out Date	12/09/2014
Sub Location	-	Actual Close Out Date	01/09/2014
PTR Details			
RFI Details	Drawing C122-OVE-C2-DDA-CR001_Z-31136 details the C701/C704 automated monitoring required for the combined TBM and Eleanor Street Shaft Zone of Influence. C122 Report C122-OVE-C2-ASM-CR094_WS109-50001 makes an assessment of the predicted Zone of Influence for the Eleanor Street Shaft and associated temporary works independantly of the passage of the TBM. The attached pdf identifies the 1mm contour limit of the Zone of Influence for the remainder of the Eleanor Street Shaft work.		
Proposed Answer	It as agreed the attached pdf identifies the 1mm contour limit of the Zone of Influence for the remainder of the Eleanor Street Shaft work.		
Alternative Reference Number			
Can Answer RFI Directly?	No		
Reason for Cancellation			
FCD Required?	No		
FCD Actionee			
RFI Routing Option	Engineering - go to Engineering Routing		

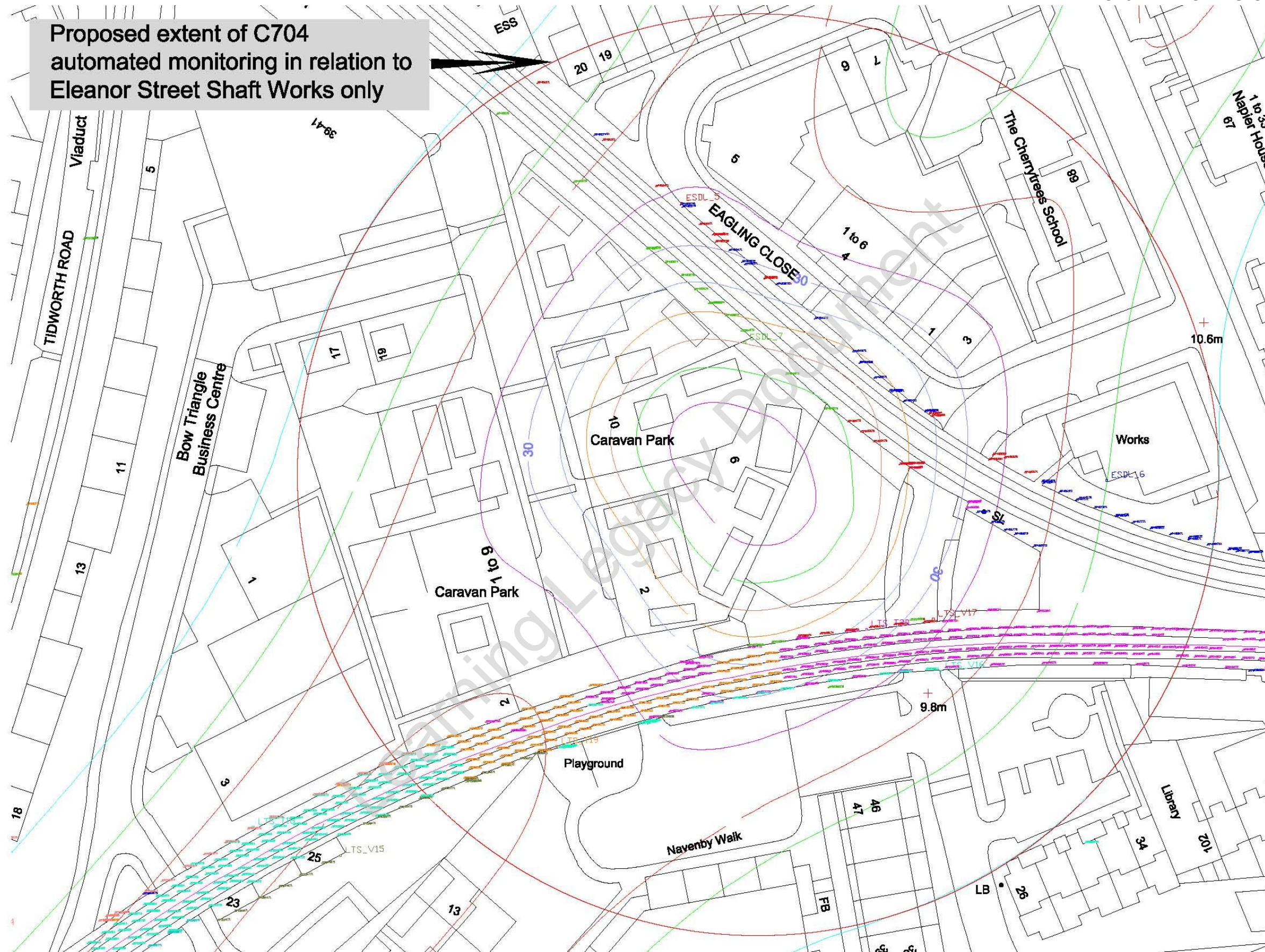
**C704 Instrumentation and Monitoring – Partial Decommissioning Agreement
 Network Rail FSS1 Gas Factory Curve Viaduct - NR19
 C704-XRL-C-AAG-CR094-50001 Rev 1.0**

Reference Document Number	Reference Document Revision	Revision Document Title	
None			
Actual Answer	The designer (C122) can confirm that the attached plan ('FSS1-ESS proposed 1mm contour 29-08-2014') correctly shows the 1mm surface settlement contour related to the Eleanor Street Shaft and Adit works.		
Enhanced Answer			
Potential Cause	Clarification		
Crossrail RFI Reviewer	JANE DRINKWATER	Crossrail Engineering Manager	PAUL READINGS
RFI Eng Answer Responder	ROGER LINDSAY	RFI Constr Answer Responder	
RFI Answer Approver	PAUL READINGS	RFI Close Out Reviewer	JANE DRINKWATER
Attachments			
Attachment Name			
FSS1-ESS proposed 1mm contour 29-08-2014.pdf			
Related Contract Communications			
Communication Number	Title		
History			
Stage	Date	Name	Notes
CLOSE OUT REVIEW	01/09/2014 2:09 PM	Jane Drinkwater	
ENGINEERING APPROVAL	01/09/2014 1:49 PM	Paul Readings	
ENGINEERING RESPONSE	01/09/2014 1:26 PM	Roger Lindsay	
ENGINEERING ROUTING	01/09/2014 9:42 AM	Paul Readings	
REVIEW	29/08/2014 2:58 PM	Jane Drinkwater	Paul, please can this be routed to Roger Lindsay/Brian Murphy for review, thanks Jane
INITIATE	29/08/2014 2:52 PM	Jane Drinkwater	

This is not a Project Manager's Instruction

Learning Legacy Document

Proposed extent of C704
automated monitoring in relation to
Eleanor Street Shaft Works only

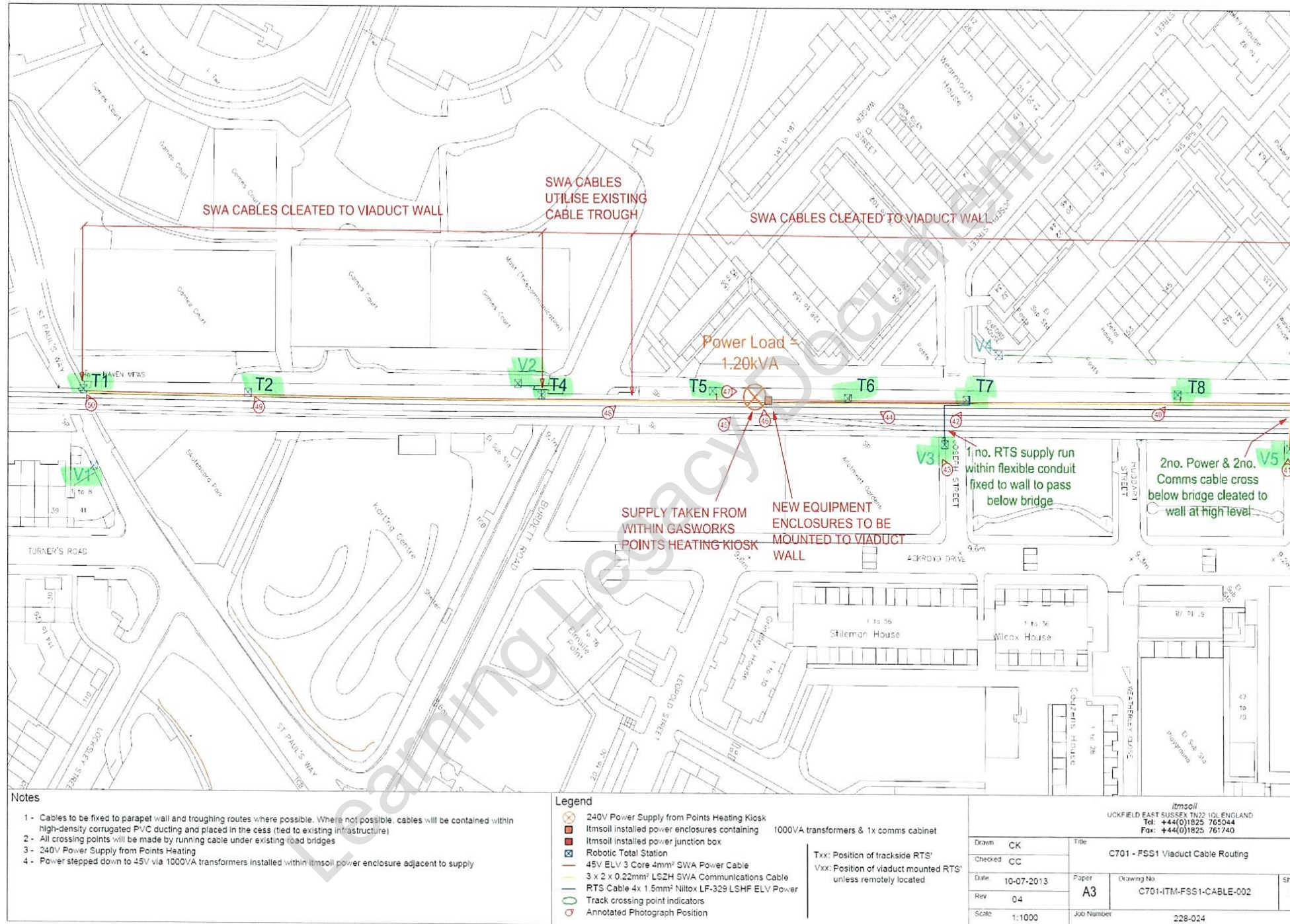


APPENDIX E - Detail of proposed area for De-commissioning

Learning Legacy Document

SEPTEMBER 2014

Appendix B



C701-ITM-E-ACT-CRG03-50003 Rev.3.0

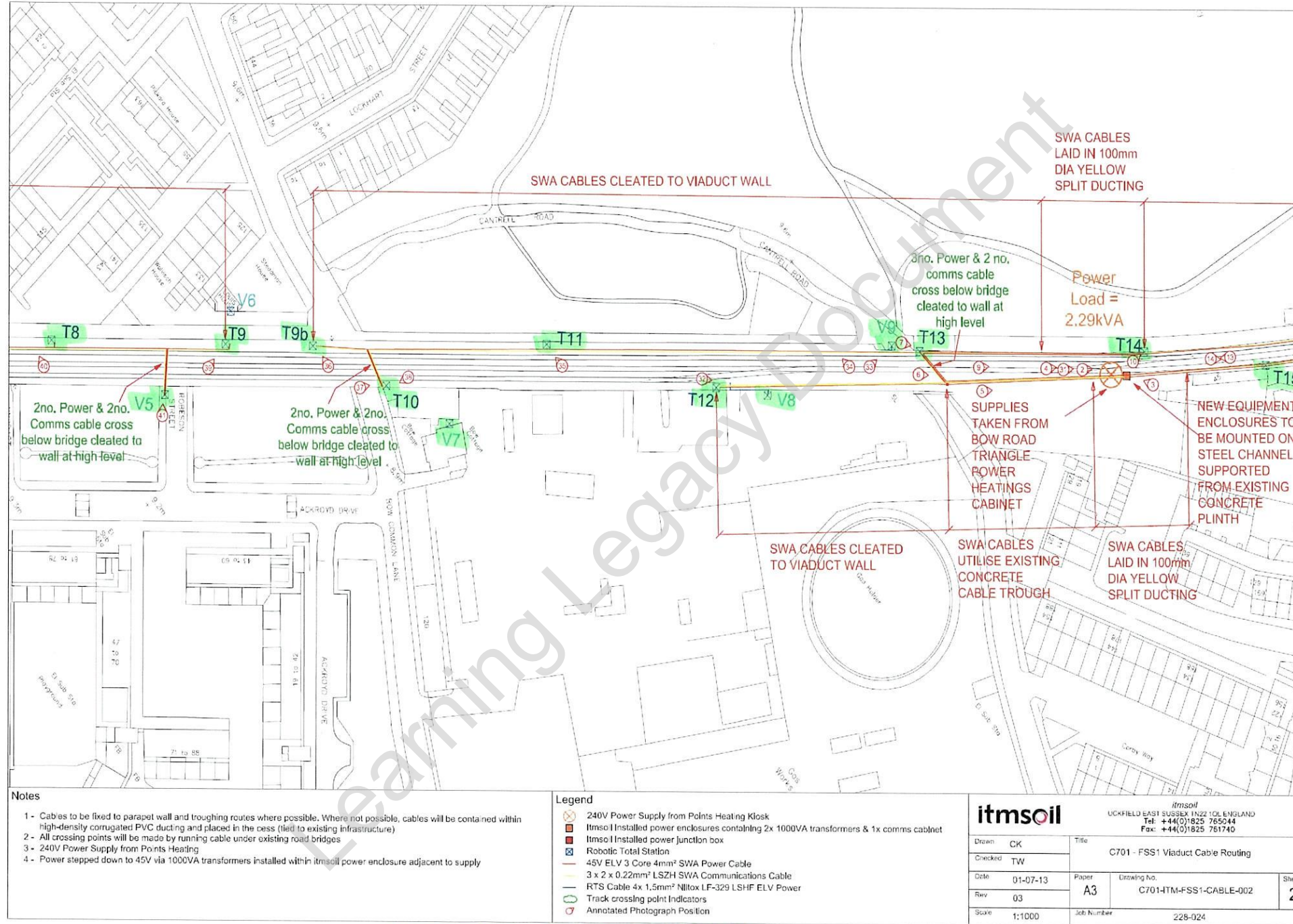
RTS TO DE-COMMISSION
 RTS TO REMAIN FOR C360 WORKS

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SEPTEMBER 2014



Appendix B



C701-ITM-E-ACT-CRG03-50003 Rev.3.0

RTS TO DE-COMMISSION

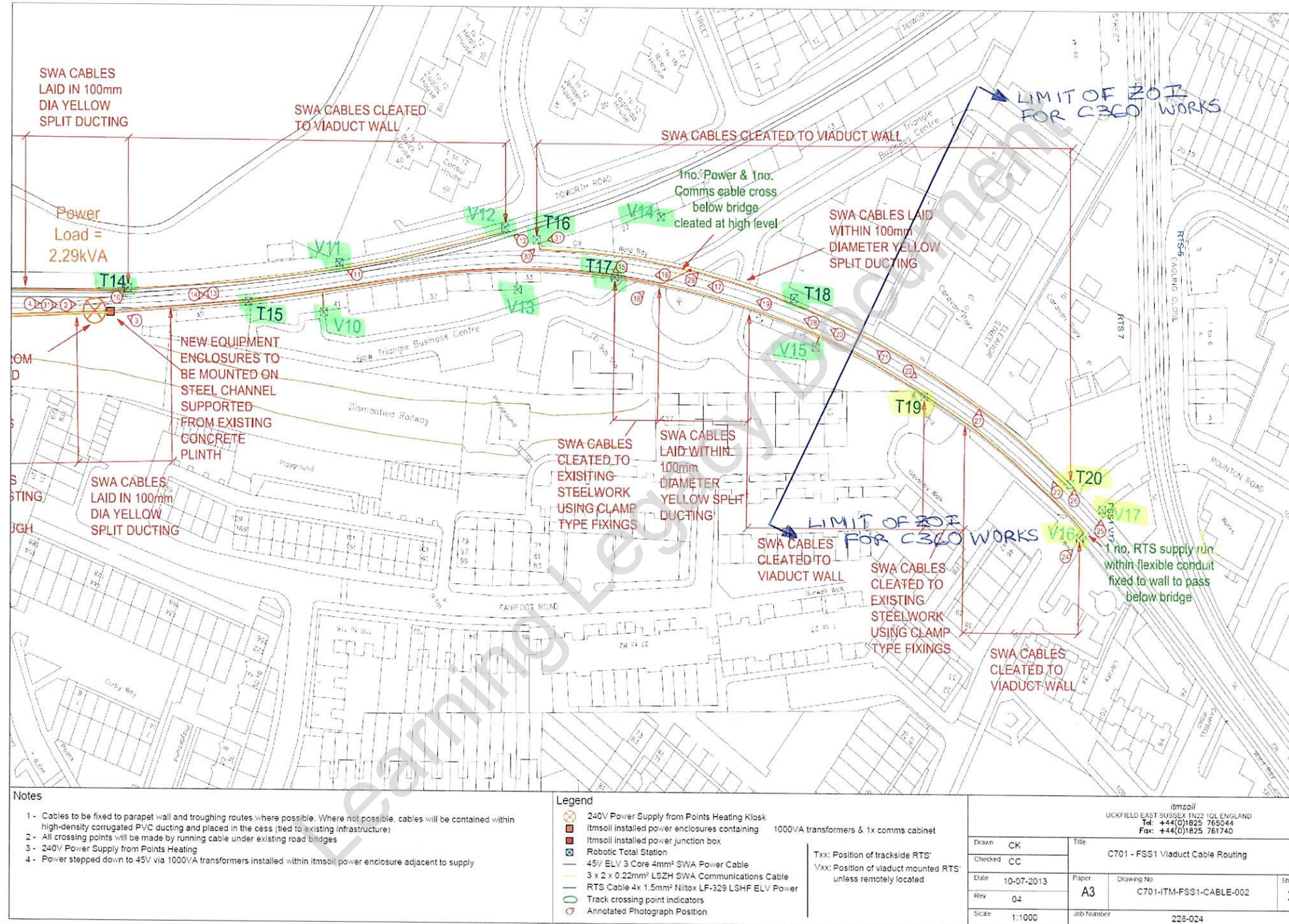
RTS TO REMAIN FOR C360 WORKS

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SEPTEMBER 2014



Appendix B



C701-ITM-E-ACT-CRG03-50003 Rev.3.0

RTS TO DE-COMMISSION
 RTS TO REMAIN FOR C360 WORKS

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APPENDIX F – CRL Manual Monitoring of Road Studs

Learning Legacy Document

**C704 Instrumentation and Monitoring – Partial Decommissioning Agreement
Network Rail FSS1 Gas Factory Curve Viaduct- NR19
C704-XRL-C-AAG-CR094-50001 Rev 1.0**

Mile End Levelling - Section 1 - Adjacent to Mile End Park Stadium				Mile End Levelling - Section 2 - Burdett Road				Mile End Levelling - Section 3 - Joseph Street			
Point	Crossrail Level 03/09/14	Crossrail Level 06/10/14	Difference 06/10/14 - 03/09/14	Point	Crossrail Level 03/09/14	Crossrail Level 06/10/14	Difference 06/10/14 - 03/09/14	Point	Crossrail Level 03/09/14	Crossrail Level 06/10/14	Difference 06/10/14 - 03/09/14
LP142801	109.283	109.282	-0.001	LP142501	109.146	109.146	-0.001	LP142401	LP not available	LP not available	NA
LP142802	109.325	109.324	-0.001	LP142502	108.965	108.964	-0.001	LP142402	109.6213	109.6210	0.000
LP142803	109.361	109.360	-0.001	LP142503	109.096	109.096	-0.001	LP142403	109.5796	109.5794	0.000
LP142804	109.332	109.331	-0.001	LP142504	109.081	109.080	-0.001	LP142404	109.6397	109.6394	0.000
LP142805	109.239	109.237	-0.002	LP142505	109.047	109.046	-0.001	LP142405	109.6421	109.6415	-0.001
LP142806	109.200	109.199	-0.001	LP142506	109.027	109.026	-0.001	LP142406	109.6442	109.6439	0.000
LP142807	109.135	109.134	-0.002	LP142507	109.027	109.026	-0.001	LP142407	109.6779	109.6773	-0.001
LP142808	109.109	109.107	-0.002	LP142508	109.030	109.029	-0.001	LP142408	109.6411	109.6406	0.000
LP142809	109.109	109.107	-0.002	LP142509	109.035	109.034	-0.001	LP142409	109.6392	109.6386	-0.001
LP142810	109.114	109.112	-0.002	LP142510	LP not available	LP not available	NA	LP142410	109.6453	109.6448	-0.001
LP142811	109.130	109.128	-0.002	LP142511	LP not available	LP not available	NA	LP142411	LP not available	LP not available	NA
LP142812	109.144	109.143	-0.002	LP142512	108.835	108.834	-0.001	LP142412	109.6758	109.6755	0.000
LP142813	109.159	109.157	-0.002	LP142513	108.827	108.826	-0.001	LP142413	109.7891	109.7890	0.000
LP142814	109.171	109.169	-0.002	LP142514	109.013	109.012	-0.001	LP142414	109.7915	109.7913	0.000
LP142815	109.183	109.181	-0.002	LP142515	108.966	108.965	-0.001	LP142415	109.7742	109.7739	0.000
LP142816	109.213	109.212	-0.002	LP142516	109.027	109.026	-0.001	LP142416	109.7587	109.7583	0.000
LP142817	109.242	109.241	-0.002	LP142517	109.016	109.015	-0.001	LP142417	109.7345	109.7343	0.000
LP142818	109.250	109.248	-0.002	LP142518	109.085	109.084	-0.001	LP142418	109.7209	109.7207	0.000
LP142725	109.286	109.284	-0.002	LP142519	109.138	109.137	-0.001	LP142419	109.7156	109.7154	0.000
LP142819	109.352	109.351	-0.002	LP142520	109.157	109.156	-0.001	LP142420	109.6943	109.6943	0.000
LP142820	109.352	109.350	-0.002	LP142521	109.129	109.128	-0.001	LP142421	109.6723	109.6721	0.000
LP142821	109.349	109.347	-0.002	LP142522	109.168	109.167	-0.001	LP142422	109.6581	109.6580	0.000
LP142822	109.343	109.341	-0.002	LP142523	109.201	109.201	-0.001	LP142423	109.5842	109.5844	0.000
LP142823	109.343	109.341	-0.002	LP142524	109.298	109.298	-0.001	LP142424	109.7089	109.7088	0.000
LP142824	109.344	109.342	-0.002	LP142525	109.254	109.253	-0.001	LP142425	109.7794	109.7795	0.000
LP142825	109.352	109.351	-0.001	LP142526	109.275	109.275	-0.001				
LP142826	109.342	109.341	-0.001	LP142527	109.263	109.262	-0.001				
LP142827	109.325	109.324	-0.001	LP142528	109.404	109.404	0.000				
LP142828	109.325	109.324	-0.001	LP142529	109.442	109.442	0.000				
LP142829	109.342	109.341	-0.001	LP142530	109.479	109.479	0.000				
LP142830	109.399	109.398	-0.001								
LP142831	109.535	109.534	-0.001								
Mile End Levelling - Section 4 - Bow Common Lane				Mile End Levelling - Section 5 - Knapp Road				Mile End Levelling - Section 6 - Fairfoot Road			
Point	Crossrail Level 03/09/14	Crossrail Level 06/10/14	Difference 06/10/14 - 03/09/14	Point	Crossrail Level 03/09/14	Crossrail Level 06/10/14	Difference 06/10/14 - 03/09/14	Point	Crossrail Level 03/09/14	Crossrail Level 06/10/14	Difference 06/10/14 - 03/09/14
LP142201	109.159	109.159	0.000	LP142101	109.477	109.477	0.000	LP141419	109.112	109.111	-0.001
LP142202	109.220	109.220	0.000	LP142102	109.424	109.423	-0.001	LP141420	109.059	109.058	-0.001
LP142203	109.257	109.257	-0.001	LP142103	109.353	109.352	-0.001	LP141421	109.141	LP not accessible	NA
LP142204	109.267	109.267	0.000	LP142104	109.403	109.403	0.000	LP141422	109.088	109.087	-0.001
LP142205	109.292	109.292	0.000	LP142105	109.428	109.428	0.000	LP141423	109.092	109.092	-0.001
LP142206	109.310	109.310	0.000	LP142106	109.445	109.445	0.000	LP141424	109.122	109.122	-0.001
LP142207	LP not available	LP not available	NA	LP142107	109.444	109.444	0.000	LP141425	109.151	109.151	0.000
LP142208	LP not available	LP not available	NA	LP142108	109.422	109.422	0.000	LP141426	109.148	109.147	-0.001
LP142209	109.378	109.378	0.000	LP142109	109.396	109.396	0.000				
LP142210	109.414	109.415	0.001	LP142110	109.352	109.351	-0.001				
LP142211	109.469	109.470	0.001	LP142111	109.272	109.272	0.000				
LP142212	109.470	109.471	0.001	LP142112	109.427	109.427	0.000				
LP142213	109.445	LP not accessible	NA	LP142113	109.438	109.438	0.000				
LP146102	108.641	108.641	0.000	LP142114	109.446	109.446	0.000				
LP146103	108.668	108.667	-0.001	LP142115	109.454	109.454	0.000				
LP146104	108.771	108.770	-0.001	LP142116	109.491	109.491	0.000				
LP146105	108.823	108.823	0.000	LP142117	LP not available	LP not available	NA				
LP146106	108.849	108.849	0.000	LP142118	109.612	109.612	0.000				
LP146107	108.883	108.883	0.000	LP142119	109.637	109.637	0.000				
LP146108	108.914	108.914	0.000	LP142120	109.646	109.646	0.000				
LP146109	108.951	108.951	0.000	LP142121	109.655	109.655	0.000				
LP146110	108.991	108.991	0.000	LP142122	109.657	109.657	0.000				
LP146111	109.026	109.026	0.000	LP142123	109.665	109.665	0.000				
LP146112	109.071	109.071	0.000	LP142124	109.673	109.673	0.000				
LP146113	109.094	109.094	0.000	LP142125	109.671	109.671	0.000				
LP146114	109.142	109.141	-0.001	LP142126	109.681	109.681	0.000				
LP146115	109.154	109.154	0.000	LP142127	109.686	109.685	-0.001				
				LP142128	109.708	109.707	-0.001				
				LP142129	109.732	109.731	-0.001				
				LP142130	109.796	109.795	-0.001				
				LP142131	109.856	109.855	-0.001				
				LP142132	109.883	109.883	0.000				
				LP142133	109.922	109.921	-0.001				
				LP142134	109.918	109.918	0.000				

Referred to Crossrail Bench Marks CRBM1051 & CRBM1052



Crossrail Delivery – Contract C704

C704 Instrumentation Decommissioning Agreement

NR/19c - FSS1 Eleanor Street Shaft

Document Number: C704-XRL-C-AAG-CR094_SH007-50001

Document History:

Revision	Date:	Prepared by:	Checked by:	Approved by:	Reason for Issue
1.0	15-09-2015	J Gonzalez Marti	J Brzeski J Drinkwater	M Groves	First Issue
2.0	21-09-2015	J Gonzalez Marti	J Drinkwater	M Groves	C122 comments
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Formal Acceptance by Chief Engineer Group (CEG)				Accepted by:	
				Mike Black	<i>M. Black</i>

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1 Definitions

Asset	Specific Network Rail interface covered by this document (NR/19c).
ELR FSS1	Engineers Line Reference; Fenchurch Street to Shoeburyness
CRL	Crossrail.
C122	CRL Contract that assessed excavation-induced ground movements and acts as Designer of C701/C704 I&M systems.
C305	Main tunnelling Contractor (Dragados Sisk Joint Venture)
C360	Main Eleanor Street shaft and associated adits (Costain Skanska Joint Venture)
TBM	Tunnel Boring Machine
C701	CRL Contract responsible for the installation/maintenance of the automatic I&M system on NR/19c
UCIMS	Underground Construction Information Management System
C704	CRL Contract responsible for the maintenance/decommissioning of C701 manual/automatic I&M system in NR/19c.
I&M	Instrumentation & Monitoring.
NR	Network Rail.
ZOI	Zone of Influence
Predicted zone of influence of Crossrail works	Area located within the predicted 1mm greenfield ground surface settlement contour associated with Crossrail works.
Relevant parties	Parties requested to formally agree decommissioning of the automatic I&M system presented in this document: <ul style="list-style-type: none">- <i>Network Rail (NR)</i>;- <i>CRL Chief Engineers Group (CEG)</i>.
RTS	Robotic Total Station
BRE stud	British Research Establishment stud

2 Purpose

Following detailed assessment of the impact of CRL works on the individual Assets by C122 and as part of CRL's resulting risk management strategy, a comprehensive Instrumentation & Monitoring (I&M) system has been installed by C701 on the Network Rail FSS1 Gas Factory Curve Viaduct (NR/19), including the FSS Eleanor Street Shaft area (NR/19c). The objective of the monitoring regime has been that of automatically (and manually) monitoring the effects of the movements caused by Crossrail works (TBM passage and Construction of Eleanor Street Shaft and associated adits) beneath the Asset.

The C701 I&M automatic system was installed after the start of ESS excavation. Baseline values were applied to the data on 23/10/2013 based on manual monitoring data, which started recording before the start of CRL construction activities. Currently C704 provide monitoring data from the system to UCIMS.

This document aims to provide a basis on which all relevant parties can agree on C704 ceasing automated monitoring from that part of the Asset that can now be demonstrated to be stable with no further settlement anticipated. This is the second document produced in this regards, the first being a Partial Decommissioning Agreement (C704-XRL-C-AAG-CR094-50001) for the Network Rail FSS1 Gas Factory Curve Viaduct (NR/19), provided on October 2014.

3 Scope

This document covers the remaining automated monitoring system installed on the FSS 1, Gas Factory Curve viaduct located in the zone of influence of Crossrail works at the Eleanor Street Shaft. This NR interface is referred to as NR/19c – FSS1 Eleanor Street Shaft. The scope of the installation is defined by I&M drawings C122-OVE-C2-DDA-CR001_Z-31136 and C122-OVE-C2-DDB-CR001_Z-32018 and is shown on the sensor location plan (Appendix A).

It should be noted that the majority of the NR/19 monitoring system was switched off following acceptance of the Partial Decommissioning Agreement, C704-XRL-C-AAG-CR094-50001. This was then supplemented by the agreement to remove trackside monitoring in the area around Eleanor Street Shaft in January 2015.

4 The Asset: Network Rail FSS1 Gas Factory Curve Viaduct – (NR/19)

The following sections comprise a brief description of the Network Rail FSS1 Gas Factory Curve Viaduct and present the Crossrail works that have affected this asset.

Further details are included in:

C122-OVE-C4-RGN-CRG01-50060 Technical note on the Assessment of Ground Movement Effects on Network Rail LT&S Gas Factory Curve Viaduct (FSS1) due to the combined effects of settlement due to Dewatering and C360 Construction works

C122-OVE-C2-ASM-CR094_WS109-50001 Assessment of Ground Movement Effects on Network Rail LT&S Gas Factory Curve Viaduct (London Tilbury & Southend Line) due to the construction of Eleanor Street Shaft and Temporary Shaft (C360 works)

4.1 Asset Description

The FSS1 Gas Factory Curve viaduct is a brick built viaduct carrying two lines of electrified ballasted track. The eastbound tunnel is proposed at approximately 20-25 m deep, aligned in a north-east direction generally, following the route of the existing Network Rail viaduct. At the

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area of Bow Triangle, which is formed by the surrounding three railway viaducts (FSS1, ELR GFB extension and LUL Bow Road viaduct).

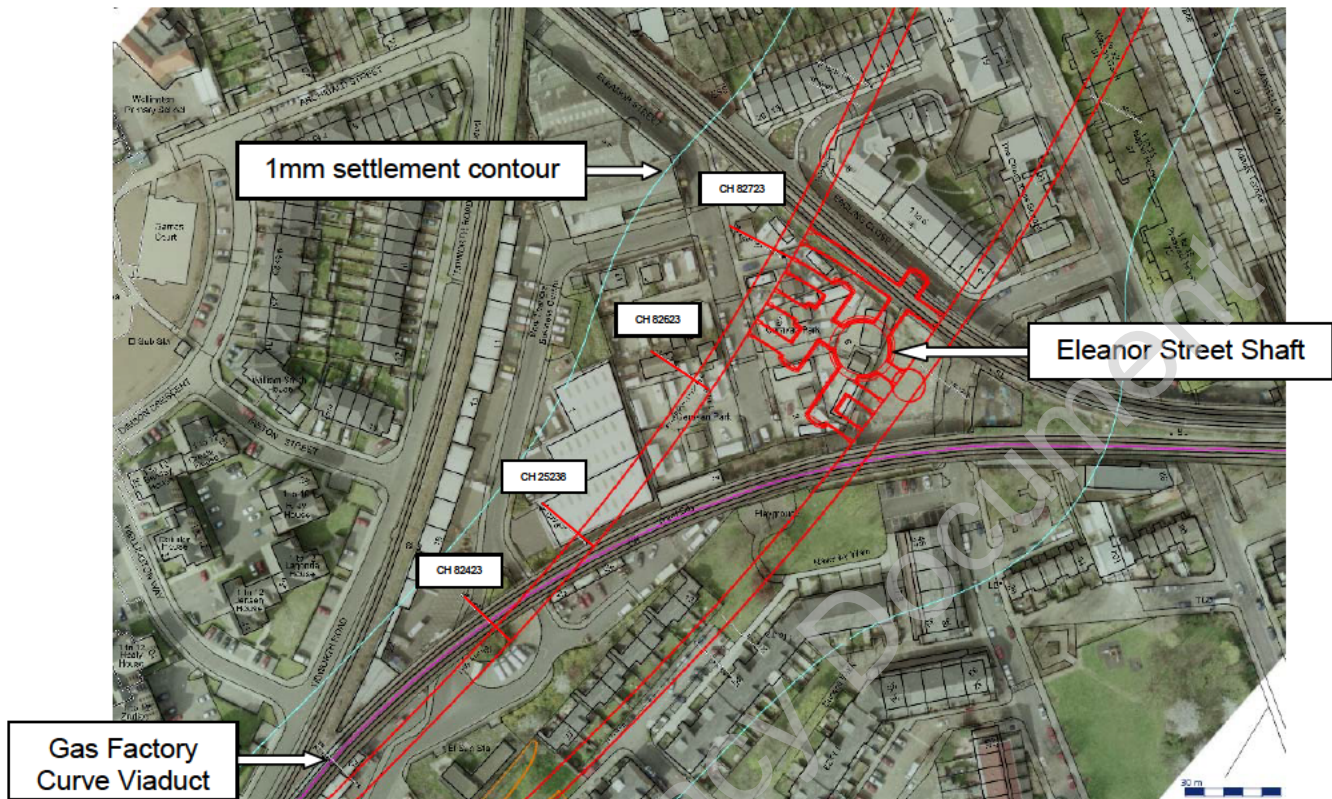


Figure 1: Location plan for interface between Crossrail running tunnels and Network Rail FSS1 Gas Factory Curve Viaduct – NR/19c

4.2 Crossrail Works affecting the Asset

Interface NR/19c is located between Crossrail reference chainages 82525 and 82625. The construction of Crossrail running tunnels (part of the C305 Western Running Tunnel Contract, Drive Z, from Pudding Mill lane and Stepney Green Shaft) and the construction of the Eleanor Street Shaft and adits were identified by C122 as the construction works with the potential of affecting the Asset. The Crossrail eastbound (EB) and westbound (WB) running tunnels pass below the NR/19 viaduct at a depth of approximately 20-25mbgl.

The CRL tunnel meets Eleanor Street shaft in the north before continuing eastward towards Pudding Mill Lane. The Westbound tunnel runs in parallel to the eastbound intersecting Eleanor Street shaft to the South.

5 C701/C704 I&M Systems in NR/19c

The automatic (and manual) I&M system was installed on the asset under consideration as specified on drawings C122-OVE-C2-DDA-CR001_Z-31136 and C122-OVE-C2-DDB-CR001_Z-32018.

Monitoring frequencies and trigger values were specified in *Design Consultant Framework Contract C122 – Bored Tunnels: Instrumentation & Monitoring Plan for LT&S Yorkshire Street Viaduct (NR/17) and LT&S Gas Factory Curve Viaduct (NR/19) C122-OVE-C2-RGN-CRG01-50069.*

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The installation of this system on NR/19c has been carried out by C701 and maintained by C704. The remaining instrumentation subject to this decommissioning agreement can be summarised as:

- 7 No. Prisms installed on Bridge Abutments
- 10 No. Prisms installed on the South Side of the viaduct
- 7 No. Prisms Installed on the North side of the viaduct
- 2 No. Automatic Total Stations with associated cabling and data loggers.
- 13 No. BRE sockets on the North side of the viaduct
- 9 No. BRE sockets on the South side of the viaduct

Offsets were applied to the automated data to match manual monitoring values, as manual monitoring commenced prior to the start of CRL works.

Further details are included in WPP Non-track (C701-ITM-O1-GMS-CRG03-50005), WPP C701-ITM-O1-GMS-CRG03-50002 and C701-ITM-C-RGN-CRG03-50205 (Installation Report). Locations of remaining instrumentation are given in Appendix B of this agreement.

6 Monitoring Results vs. CRL Construction Works

The present document has been intentionally drafted by C704 as a high level reference summary to be used by decision makers and not as a detailed technical report. It is not the purpose of this document to analyse in detail the construction monitoring results for all monitored parameters, compare these results with associated trigger values and provide engineering considerations with regards to the impact induced by Crossrail works on the Asset will be provided by the Main Contractor in separate documents.

The CRL works that have affected the Asset are dated:

- Construction of temporary shaft: July 2013 to September 2013
- Construction of main shaft: July 2014 to November 2014
- Construction of SCL tunnels: September 2013 to April 2014, November 2014 to April 2015
- Drive Z Eastbound TBM Passage: October/November 2013
- Drive Z Westbound TBM Passage: April 2014
- Dewatering associated with the Eleanor Street Shaft: July 2013 to October 2015
- Piling associated with ESS headhouse: August 2015 to September 2015

The construction monitoring settlement data recorded by the automatic system indicate a clear correlation with the East and Westbound TBM drives and Eleanor Street construction works (see graphs in Appendix C). The impact of the excavation of the Eleanor Street shaft and adits can also be observed. The piling works finished on September 25th 2015, and the dewatering was switched off on October the 12^h 2015.

In the FSS1 Partial Decommissioning agreement (C704-XRL-C-AAG-CR094-50001 Rev 1.0) it was already demonstrated that both, manual and automatic monitoring, are complementary and providing similar values (inside of their own accuracy and repeatability). Following this it was agreed by C360, C122 and C704 that trackside monitoring was no longer required in the NR/19c area, as per the signature of the CEG (Chief Engineering Group), of this document. NR will provide his approval once there is a no-comment DRN of this document submitted. The plots provided in Appendix C of the FSS1 Partial Decommissioning agreement (C704-XRL-C-AAG-CR094-50001) clearly demonstrate that track and structural monitoring has reacted in the

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same way and at the same time to ground movements, in most cases, as well providing similar homogeneous settlement plots.

The data recorded from the automatic system during both construction and closeout monitoring regimes are considered reliable and non-construction related variations are within the expected repeatability for this kind of system. The data collected reflect the effect of the movements induced by the two TBM drives on the Asset and they are consistent with the manual monitoring results obtained by C305.

7 Assessment of Closeout Trends

Excavation of the Eleanor Street Shaft and adits was completed by C360 in April 2015. Dewatering is the last CRL related works with the potential to affect the asset, this is due to continue into October 2015. The post-dewatering monitoring will start at this point and the total time period of monitoring required is dependent on recovery speed.

Very limited movement has been recorded since the completion of excavation in April 2015. There has been very limited movement since February 2015, approx. 0mm to 1mm. As highlighted in Section 6, almost no movement has been recorded since 26th April 2015. Current closeout trends suggest a general stabilisation across the monitored area with very limited residual (post-construction) variations that are within the accuracy of the monitoring system. Some additional minor movement may be expected due to recovery following switch off of dewatering.

Trends since 26/04/2015 are lower than the 2mm/year criterion defined by C122 as the trigger for decommissioning (see graphs in Appendix C).

Taking the above into consideration it is recommended that the automated monitoring of NR/19c provided by C704 will cease in early October 2015. Beyond this it is proposed that manual monitoring of the prisms installed on the viaduct be carried out at weekly intervals until one month after the dewatering has been switched off followed by 2 monthly surveys to demonstrate stable conditions. The locations of the viaduct prisms are given in Appendix B.

Should measurement of longer term movements still be required, the manual monitoring can continue at quarterly intervals. In addition, INSAR Satellite technology along the route can be used to provide further assessment of the long term settlement. At the moment CRL is processing the data every three months, using two or more images per month (a total of 6 or more images every three months period). The INSAR data will be presented to the CRL C360 team & C122, and they will present it to the Asset Owner in the form of “hitmaps” (or contour plots). It should also be noted that the C360 contractor will be undertaking longer term monitoring of this asset to monitor the effects of the dewatering.

8 Reference Documents

C122-OVE-C2-RGN-CRG01-50069 - Instrumentation & Monitoring Plan for LT&S Yorkshire Street Viaduct (NR/17) and LT&S Gas Factory Curve Viaduct (NR/19)

C122-OVE-C2-DDA-CR001_Z-31136 - I&M drawing

C122-OVE-C2-DDB-CR001_Z-32018 - I&M drawing

C122-OVE-C2-RGN-CRG01-50038 - C122 Assessment of Ground Movement Effects on Network Rail LT&S Gas Factory Curve Viaduct (London Tilbury & Southend Line) (NR19)

LWW-C704-RFI-000056 – C122 RFI response regarding Eleanor Street Shaft ZOI

C701-ITM-C-RGN-CRG03-50205 - C701 Installation Report for NR/19

C701-ITM-O1-GMS-CRG03-50005 – Work Package Plan for Installation – Non track

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NR/19c FSS1 Eleanor Street Shaft
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C701-ITM-O1-GMS-CRG03-50002 – Work Package Plan for Installation

C122-OVE-C2-DDA-CR001_Z-31036 – I&M Drawing for C305

C122-OVE-C2-DDB-CR001_Z-32022 – I&M Drawing for C305

C122-OVE-C2-DDJ-CR001_Z-30002 - C122 Instrumentation and Monitoring, Combined I & M, Monitoring Frequency, C300, C305

C122-OVE-C4-RGN-CRG01-50060 Technical note on the Assessment of Ground Movement Effects on Network Rail LT&S Gas Factory Curve Viaduct (FSS1) due to the combined effects of settlement due to Dewatering and C360 Construction works

C122-OVE-C2-ASM-CR094_WS109-50001 Assessment of Ground Movement Effects on Network Rail LT&S Gas Factory Curve Viaduct (London Tilbury & Southend Line) due to the construction of Eleanor Street Shaft and Temporary Shaft (C360 works)

C704-XRL-C-AAG-CR094-50001 – C701 Partial Decommissioning Agreement for NR/19

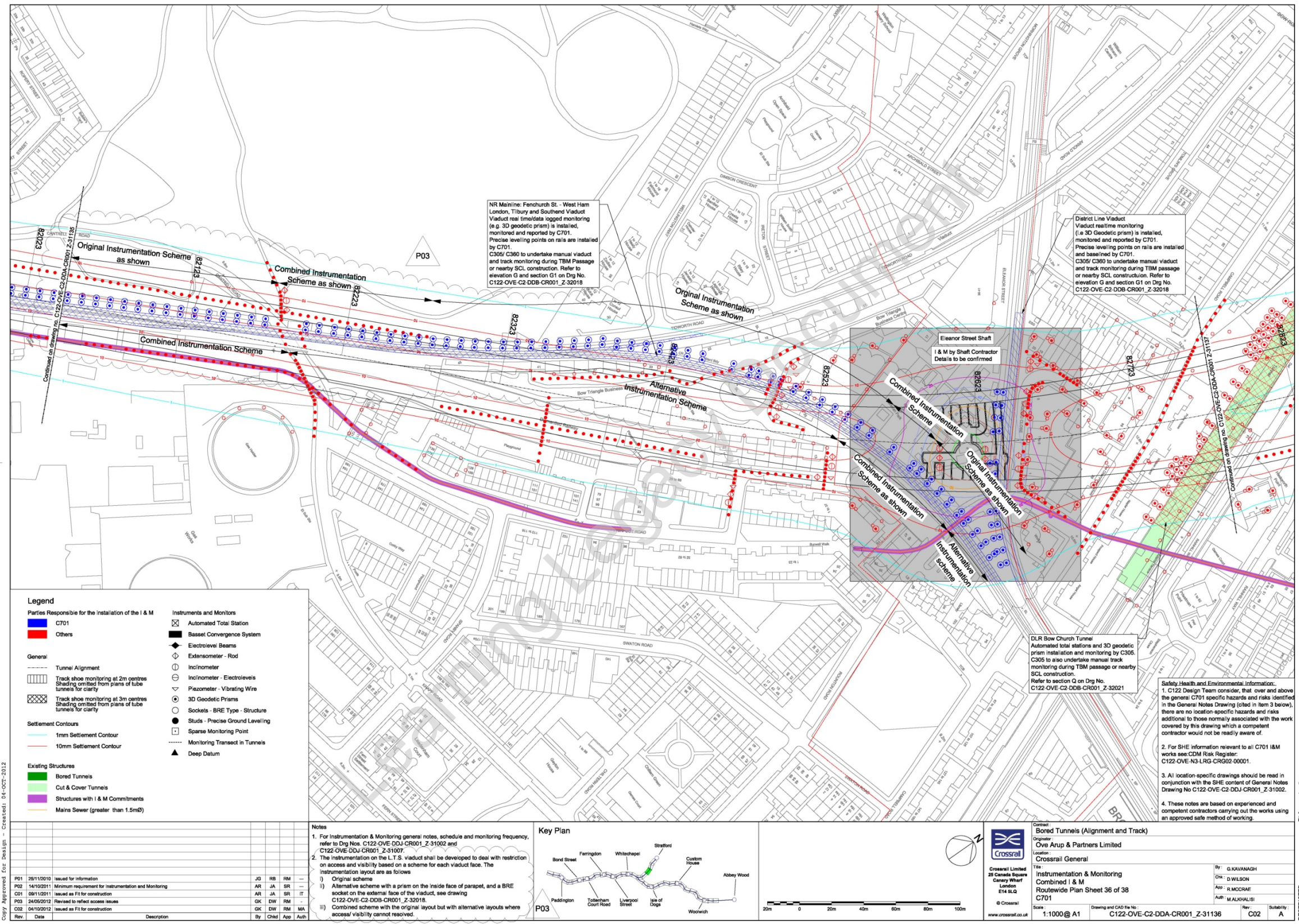
C122-OVE-C2-DDA-CR001_Z-31044 – I&M Drawing for C360

C122-OVE-C2-DDA-CR001_Z-31751 – I&M Drawing for C360

9 Appendices

APPENDIX A - I&M Drawings

Learning Legacy Document



Legend

Parties Responsible for the installation of the I & M

- C701
- Others

General

- Tunnel Alignment
- Track shoe monitoring at 2m centres
- Track shoe monitoring at 3m centres
- Settlement Contours
- Existing Structures

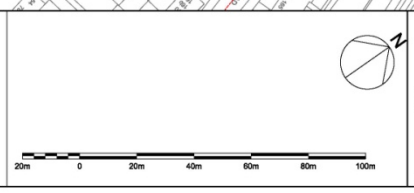
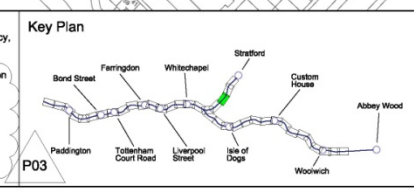
Instruments and Monitors

- Automated Total Station
- Bessel Convergence System
- Electrolevel Beams
- Extensometer - Rod
- Inclinometer
- Inclinometer - Electrolevels
- Piezometer - Vibrating Wire
- 3D Geodetic Prisms
- Sockets - BRE Type - Structure
- Studs - Precise Ground Levelling
- Sparse Monitoring Point
- Monitoring Transact in Tunnels
- Deep Datum

Rev	Date	Description	By	Chkd	App	Auth
P01	25/11/2010	Issued for information	JG	RB	RM	---
P02	14/10/2011	Minimum requirement for Instrumentation and Monitoring	AR	JA	SR	---
CD1	08/11/2011	Issued as Fit for construction	AR	JA	SR	IT
P03	24/05/2012	Revised to reflect access issues	OK	DW	RM	---
CD2	04/10/2012	Issued as Fit for construction	OK	DW	RM	MA

Notes

- For Instrumentation & Monitoring general notes, schedule and monitoring frequency, refer to Drg Nos. C122-OVE-DDJ-CR001_Z-31002 and C122-OVE-DDJ-CR001_Z-31007.
- The instrumentation on the L.T.S. viaduct shall be developed to deal with restriction on access and visibility based on a scheme for each viaduct face. The instrumentation layout are as follows:
 - Original scheme
 - Alternative scheme with a prism on the inside face of parapet, and a BRE socket on the external face of the viaduct, see drawing C122-OVE-C2-DDB-CR001_Z-32016.
 - Combined scheme with the original layout but with alternative layouts where access/visibility cannot be resolved.



Contract
Bored Tunnels (Alignment and Track)

Originator
Ove Arup & Partners Limited

Location
Crossrail General

Title
Instrumentation & Monitoring
Combined I & M
Routeview Plan Sheet 36 of 38
C701

Scale
1:1000 @ A1

Drawing and CAD File No.
C122-OVE-C2-DDA-CR001_Z-31136

Rev
C02

Subsidiary
A

By
G. KAVANAGH

Chk
D. WILSON

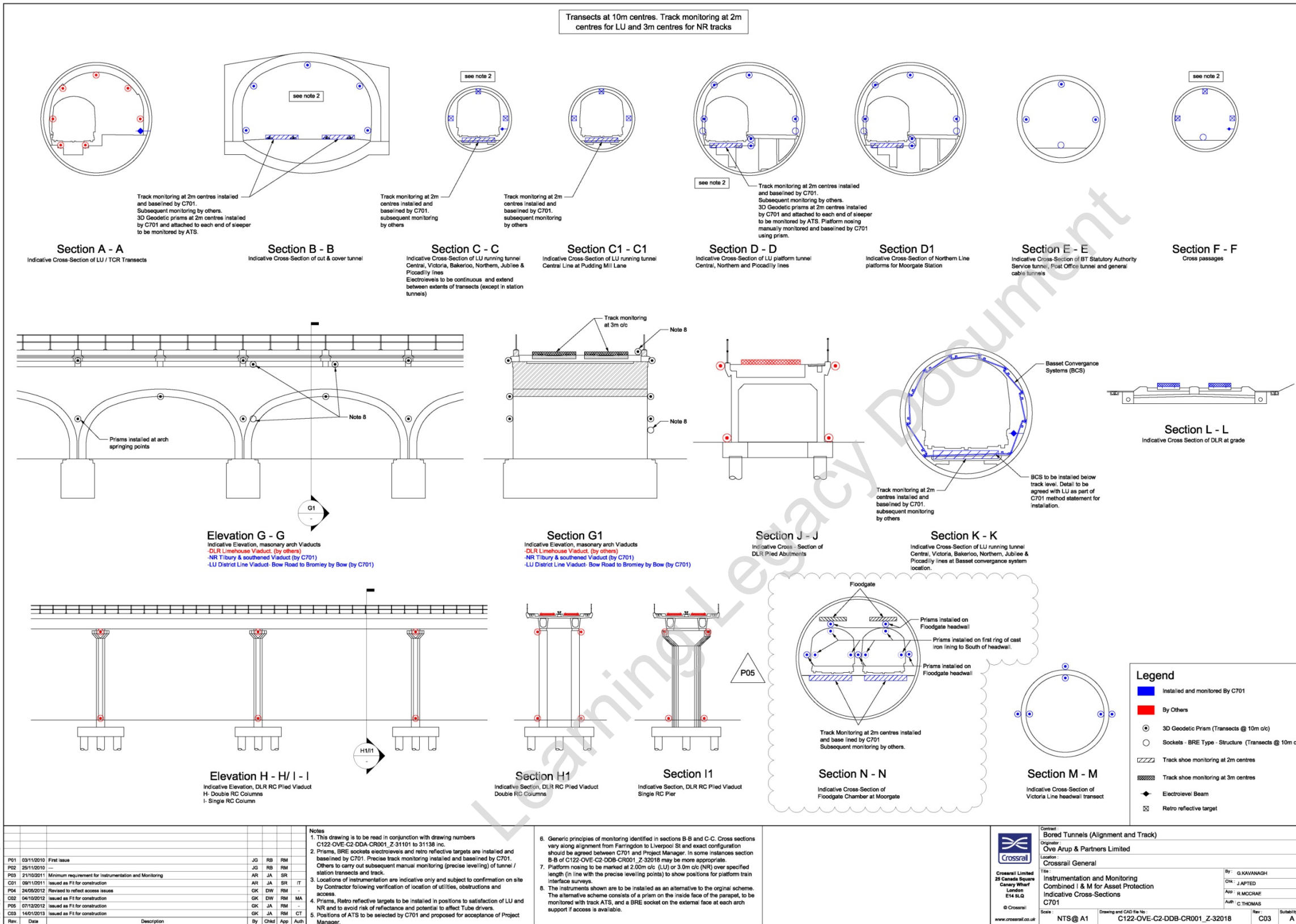
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Aut
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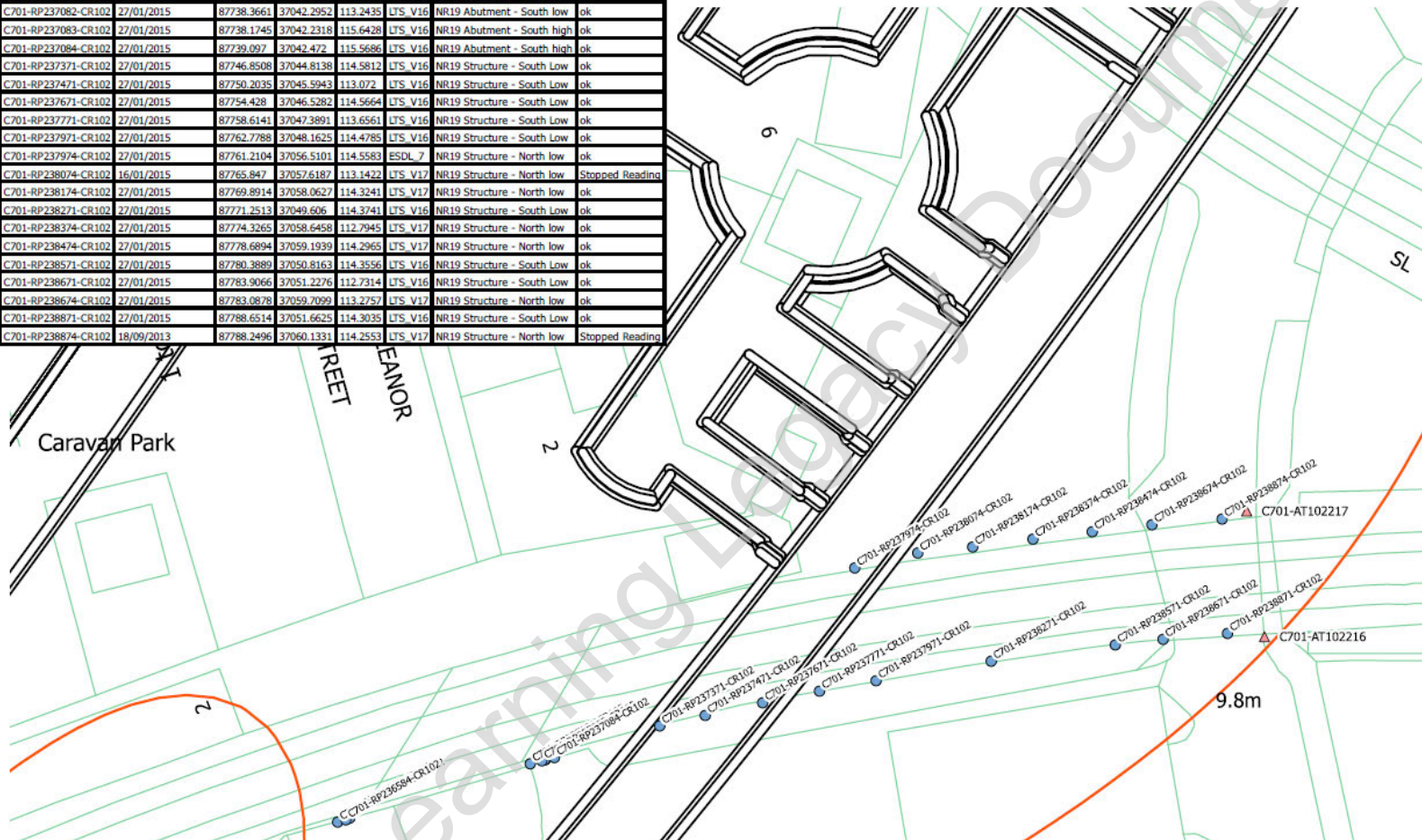


APPENDIX B – NR/19c Instrumentation Locations

**C704 Instrumentation and Monitoring – Decommissioning Agreement
NR/19c FSS1 Eleanor Street Shaft
C704-XRL-C-AAG-CR094_SH007-50001 Rev. 3.0**

ID	Date of last reading	X	Y	Z	RTS	Location	Status
C701-RP236581-CR102	27/01/2015	87723.1404	37037.6949	113.1518	LTS V16	NR19 Abutment - South low	ok
C701-RP236582-CR102	27/01/2015	87724.0264	37037.9862	113.086	LTS V16	NR19 Abutment - South low	ok
C701-RP236584-CR102	27/01/2015	87723.7429	37037.8600	115.6466	LTS V16	NR19 Abutment - South high	ok
C701-RP237071-CR102	27/01/2015	87738.4252	37042.3134	114.313	LTS V16	NR19 Structure - South Low	ok
C701-RP237081-CR102	27/01/2015	87737.3204	37042.0103	113.3205	LTS V16	NR19 Abutment - South low	ok
C701-RP237082-CR102	27/01/2015	87738.3661	37042.2952	113.2435	LTS V16	NR19 Abutment - South low	ok
C701-RP237083-CR102	27/01/2015	87738.1745	37042.2318	115.6428	LTS V16	NR19 Abutment - South high	ok
C701-RP237084-CR102	27/01/2015	87739.097	37042.472	115.5686	LTS V16	NR19 Abutment - South high	ok
C701-RP237371-CR102	27/01/2015	87746.8508	37044.8138	114.5812	LTS V16	NR19 Structure - South Low	ok
C701-RP237471-CR102	27/01/2015	87750.2035	37045.5943	113.072	LTS V16	NR19 Structure - South Low	ok
C701-RP237671-CR102	27/01/2015	87754.428	37046.5282	114.5664	LTS V16	NR19 Structure - South Low	ok
C701-RP237771-CR102	27/01/2015	87758.6141	37047.3891	113.6561	LTS V16	NR19 Structure - South Low	ok
C701-RP237971-CR102	27/01/2015	87762.7788	37048.1625	114.4785	LTS V16	NR19 Structure - South Low	ok
C701-RP237974-CR102	27/01/2015	87761.2104	37056.5101	114.5583	ESDL Z	NR19 Structure - North low	ok
C701-RP238074-CR102	16/01/2015	87765.847	37057.6187	113.1422	LTS V17	NR19 Structure - North low	Stopped Reading
C701-RP238174-CR102	27/01/2015	87769.8914	37058.0627	114.3241	LTS V17	NR19 Structure - North low	ok
C701-RP238271-CR102	27/01/2015	87771.2513	37049.606	114.3741	LTS V16	NR19 Structure - South Low	ok
C701-RP238374-CR102	27/01/2015	87774.3265	37058.6458	112.7945	LTS V17	NR19 Structure - North low	ok
C701-RP238474-CR102	27/01/2015	87778.6894	37059.1939	114.2965	LTS V17	NR19 Structure - North low	ok
C701-RP238571-CR102	27/01/2015	87780.3889	37050.8163	114.3556	LTS V16	NR19 Structure - South Low	ok
C701-RP238671-CR102	27/01/2015	87783.9066	37051.2276	112.7314	LTS V16	NR19 Structure - South Low	ok
C701-RP238674-CR102	27/01/2015	87783.0878	37059.7099	113.2757	LTS V17	NR19 Structure - North low	ok
C701-RP238871-CR102	27/01/2015	87788.6514	37051.6625	114.3035	LTS V16	NR19 Structure - South Low	ok
C701-RP238874-CR102	18/09/2013	87788.2496	37060.1331	114.2553	LTS V17	NR19 Structure - North low	Stopped Reading

**Remaining C704 Automated Monitoring on NR/19 Viaduct
2nd Februaury 2015**

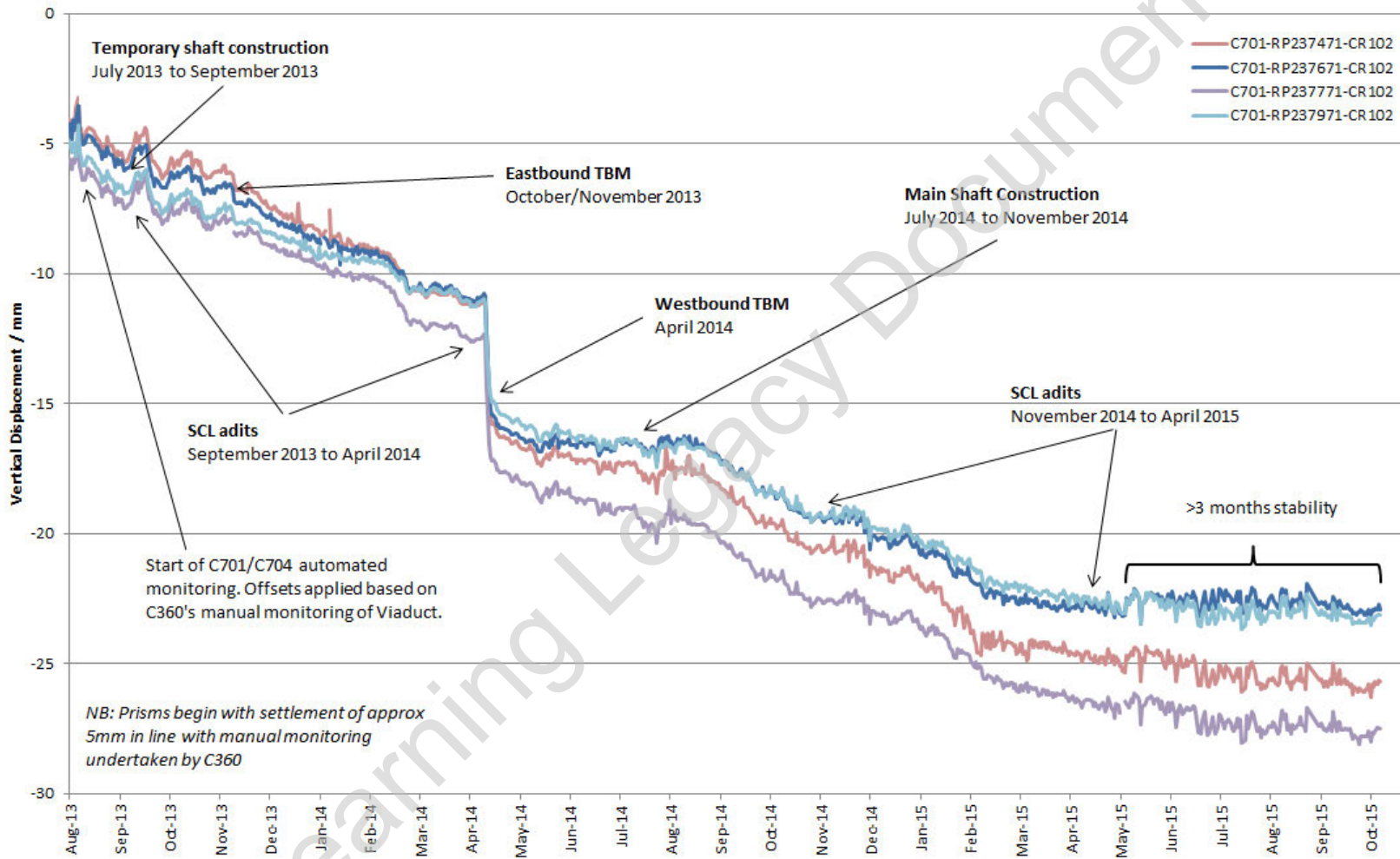


APPENDIX C - Summary of monitoring results for NR/19

1. Typical time plot for South viaduct
2. Time plots for North and South Elevations (May to July)
3. Contour Plot, Change in level September – October 2015
4. Contour Plot, Change in level August – October 2015
5. Contour Plot, Change in level July – October 2015
6. Contour Plot, Change in level June – October 2015
7. Contour Plot, Change in level April – October 2015

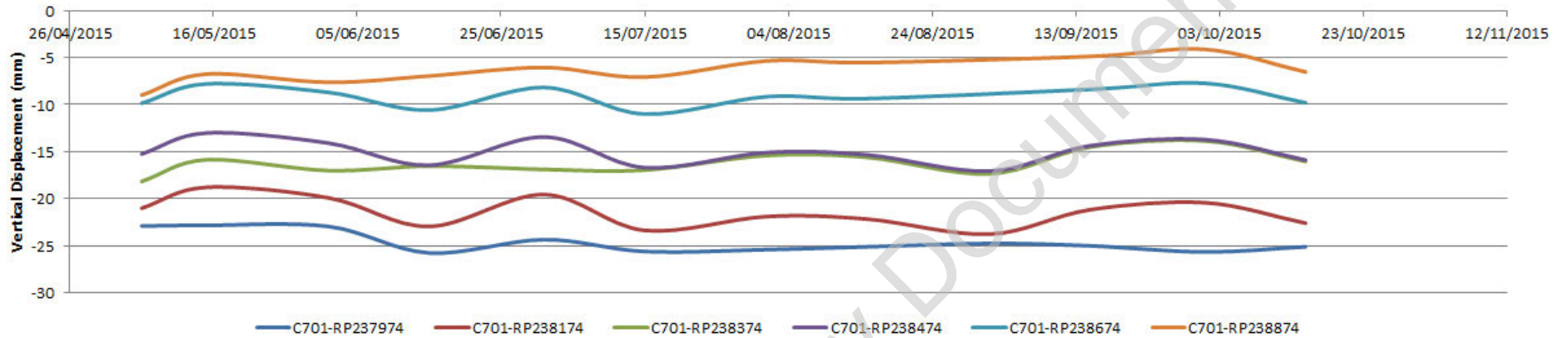
**C704 Instrumentation and Monitoring – Decommissioning Agreement
NR/19c FSS1 Eleanor Street Shaft
C704-XRL-C-AAG-CR094_SH007-50001 Rev. 3.0**

Vertical Displacement - NR/19 South Viaduct

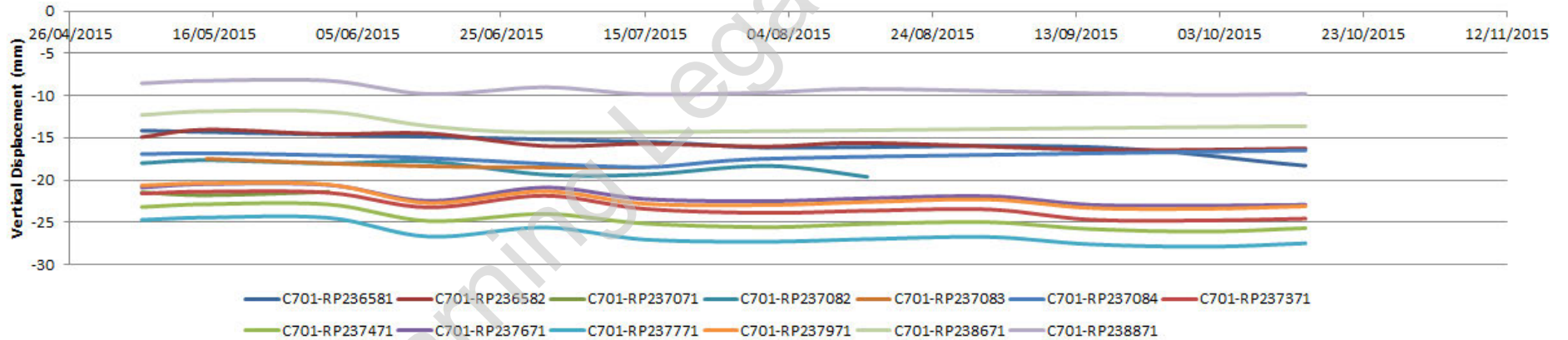


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 C704-XRL-C-AAG-CR094_SH007-50001 Rev. 3.0**

NR/19c - Eleanor Street Shaft Northern Elevation



NR/19c - Eleanor Street Shaft Southern Elevation



Differential Movement Z (mm) from 15/09/2015 to 15/10/2015



Differential Movement Z (mm) from 15/08/2015 to 15/10/2015



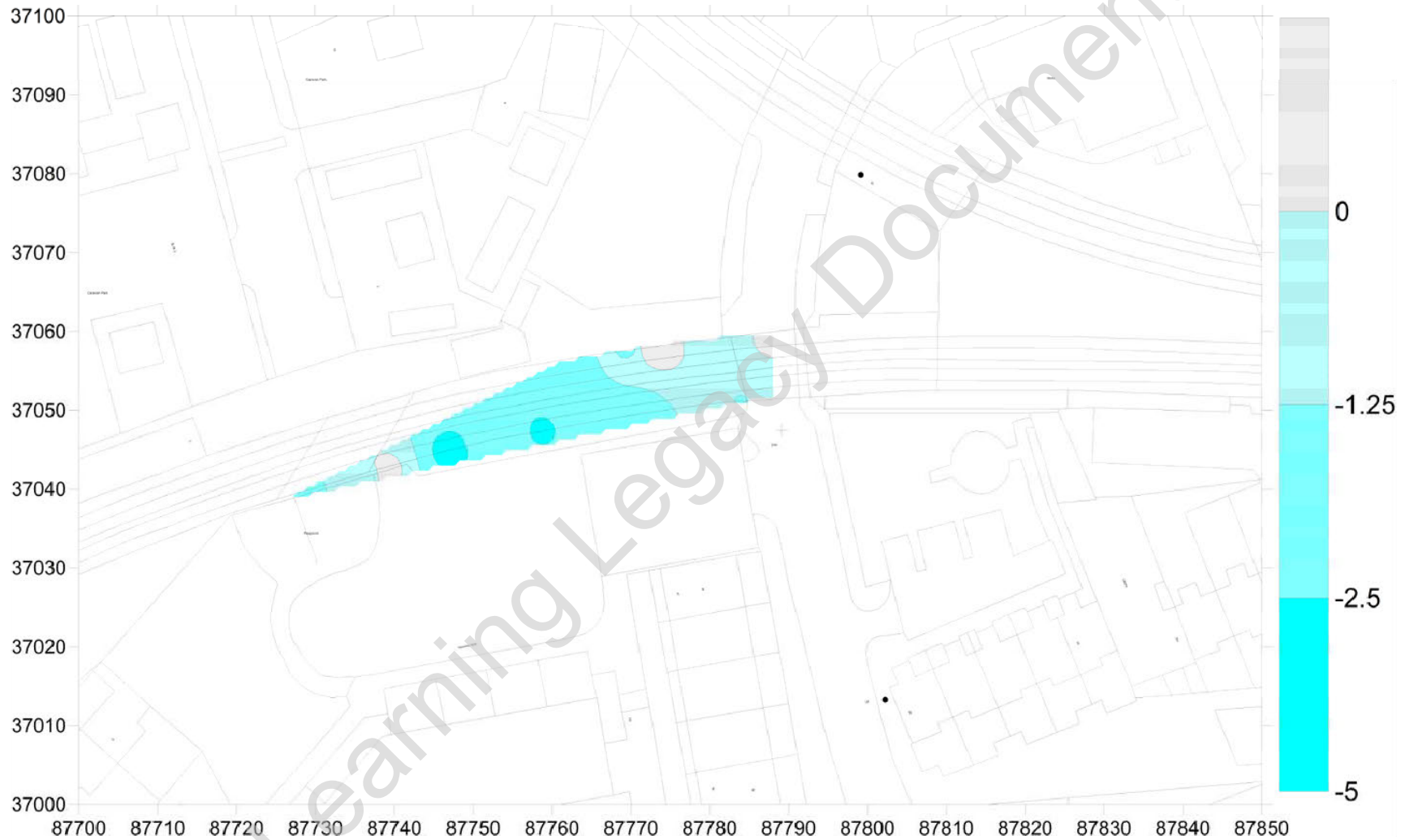
Differential Movement Z (mm) from 15/07/2015 to 15/10/2015



Differential Movement Z (mm) from 15/06/2015 to 15/10/2015



Differential Movement Z (mm) from 15/04/2015 to 15/10/2015



Learning Legacy Document

APPENDIX B: LEVELLING MARKS

CONTENTS

1. LEVELLING MARKS LOCATED ON THE FOUR RAILS 3
 1.1. COORDINATES.....3

Learning Legacy Document

1. LEVELLING MARKS LOCATED ON THE FOUR RAILS.

This document includes the coordinates for all the levelling marks located on the four rails.

1.1. COORDINATES

SENSOR TYPE	SENSOR ID	SENSOR LOCATION-GPS READING(m)		
		Easting X	Northing Y	Elevation Z (mATD)
Levelling mark	LT143001	87848.33435	37058.1832	100.39040
Levelling mark	LT143002	87845.56989	37058.29191	100.41790
Levelling mark	LT143003	87841.98939	37058.42866	100.44490
Levelling mark	LT143004	87839.43359	37058.52488	100.45550
Levelling mark	LT143005	87836.71376	37058.61837	100.48740
Levelling mark	LT143006	87833.49777	37058.72619	100.51540
Levelling mark	LT143007	87831.49643	37058.78538	100.53290
Levelling mark	LT143008	87829.00795	37058.85703	100.55600
Levelling mark	LT143009	87825.6794	37058.93017	100.58710
Levelling mark	LT143010	87822.53600	37059.03000	100.61440
Levelling mark	LT143011	87819.33935	37059.19049	100.63810
Levelling mark	LT143012	87816.59554	37059.21028	100.67070
Levelling mark	LT143013	87813.32159	37059.21726	100.70050
Levelling mark	LT143014	87810.7321	37059.20703	100.72440
Levelling mark	LT143015	87807.51987	37059.16707	100.75550
Levelling mark	LT143016	87804.37442	37059.10718	100.78200
Levelling mark	LT143017	87801.68395	37059.03656	100.80030
Levelling mark	LT143018	87798.42683	37058.91082	100.83110
Levelling mark	LT143019	87795.86086	37058.79701	100.85370
Levelling mark	LT143020	87792.67834	37058.62246	100.87790
Levelling mark	LT143021	87789.4514	37058.41017	100.90480
Levelling mark	LT143022	87786.45505	37058.17398	100.92740
Levelling mark	LT143023	87783.5945	37057.9192	100.94630
Levelling mark	LT143024	87780.51967	37057.61107	100.97960
Levelling mark	LT143025	87777.45929	37057.27134	101.00680
Levelling mark	LT143026	87774.19351	37056.87068	101.02530
Levelling mark	LT143027	87771.51047	37056.51297	101.05360
Levelling mark	LT143028	87768.84136	37056.13186	101.07430
Levelling mark	LT143029	87765.61053	37055.62849	101.09010
Levelling mark	LT143030	87762.56516	37055.11773	101.12560
Levelling mark	LT143031	87759.94669	37054.49694	101.14450
Levelling mark	LT143032	87756.81547	37053.90854	101.16440
Levelling mark	LT143033	87753.60767	37053.25666	101.19600
Levelling mark	LT143034	87751.33113	37052.77288	101.21190

Close out report for Stepney Green to Pudding Mill Lane NR/19
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Levelling mark	LT143035	87747.88472	37052.1703	101.23110
Levelling mark	LT143036	87745.37611	37051.58133	101.25220
Levelling mark	LT143037	87742.22375	37050.81101	101.26750
Levelling mark	LT143038	87739.18675	37049.87464	101.34880
Levelling mark	LT143039	87736.67736	37049.20297	101.36770
Levelling mark	LT143040	87733.63312	37048.31748	101.38070
Levelling mark	LT143041	87730.55687	37047.47603	101.29380
Levelling mark	LT143042	87727.89733	37046.66305	101.29390
Levelling mark	LT143043	87724.72384	37045.67288	101.28560
Levelling mark	LT143044	87722.14712	37044.84625	101.28060
Levelling mark	LT143045	87719.21289	37043.86906	101.27450
Levelling mark	LT143046	87716.13813	37042.80587	101.26350
Levelling mark	LT143047	87713.56756	37041.88681	101.25160
Levelling mark	LT143048	87710.5713	37040.78294	101.24540
Levelling mark	LT143049	87707.7818	37039.72653	101.23390
Levelling mark	LT143050	87705.14019	37038.70023	101.22270
Levelling mark	LT143051	87702.15273	37037.66868	101.21110
Levelling mark	LT143052	87699.14885	37036.43053	101.19490
Levelling mark	LT143053	87696.7162	37035.39463	101.18090
Levelling mark	LT143054	87693.82649	37034.13561	101.17650
Levelling mark	LT143055	87691.01213	37032.8756	101.16180
Levelling mark	LT143056	87688.54132	37031.7434	101.15050
Levelling mark	LT143057	87685.70078	37030.40679	101.13360
Levelling mark	LT143058	87682.66575	37028.94008	101.12420
Levelling mark	LT143059	87680.19800	37027.68300	101.11340
Levelling mark	LT143060	87677.59159	37026.39308	101.10740
Levelling mark	LT143061	87675.09463	37025.09768	101.08950
Levelling mark	LT143062	87672.26327	37023.59192	101.07770
Levelling mark	LT143063	87669.60397	37022.14496	101.06670
Levelling mark	LT143064	87666.58437	37020.46592	101.04910
Levelling mark	LT143065	87664.36258	37019.19433	101.04410
Levelling mark	LT143066	87661.69327	37017.63622	101.02850
Levelling mark	LT143067	87659.33213	37016.22747	101.01460
Levelling mark	LT143068	87656.5599	37014.53665	101.00000
Levelling mark	LT143069	87654.04132	37012.96613	100.98790
Levelling mark	LT143070	87651.24315	37011.18025	100.96380
Levelling mark	LT143071	87649.00011	37009.71211	100.95500
Levelling mark	LT143072	87646.38952	37007.97285	100.94170
Levelling mark	LT143073	87643.75795	37006.18006	100.92730
Levelling mark	LT143074	87641.60456	37004.67774	100.91790
Levelling mark	LT143075	87639.01913	37002.84139	100.90070
Levelling mark	LT143076	87636.36548	37000.7156	100.88160
Levelling mark	LT143077	87634.31815	36999.18688	100.88030
Levelling mark	LT143078	87631.77504	36997.2552	100.87040
Levelling mark	LT143079	87629.7448	36995.67633	100.86160
Levelling mark	LT143080	87627.19066	36993.6524	100.84990

Close out report for Stepney Green to Pudding Mill Lane NR/19
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Levelling mark	LT143081	87624.74161	36991.65852	100.84070
Levelling mark	LT143082	87622.25967	36989.59503	100.82470
Levelling mark	LT143083	87620.27929	36987.92074	100.82170
Levelling mark	LT143084	87617.85600	36985.81400	100.80910
Levelling mark	LT143085	87615.85969	36984.07797	100.80030
Levelling mark	LT143086	87613.40837	36981.87756	100.78730
Levelling mark	LT143087	87611.06882	36979.68464	100.77450
Levelling mark	LT143088	87608.75591	36977.57137	100.75760
Levelling mark	LT143089	87606.78752	36975.68218	100.75650
Levelling mark	LT143090	87604.60771	36973.56597	100.74760
Levelling mark	LT143091	87602.58539	36971.55876	100.73840
Levelling mark	LT143092	87600.40894	36969.35654	100.72950
Levelling mark	LT143093	87598.24534	36967.11862	100.72100
Levelling mark	LT143094	87595.80748	36964.77331	100.70070
Levelling mark	LT143095	87594.02528	36962.83631	100.69640
Levelling mark	LT143096	87591.85116	36960.44577	100.68530
Levelling mark	LT143097	87590.15258	36958.54581	100.67430
Levelling mark	LT143098	87588.03822	36956.12513	100.66050
Levelling mark	LT143099	87586.02825	36953.78205	100.64540
Levelling mark	LT143100	87584.67066	36952.17782	100.63090
Levelling mark	LT143101	87582.15900	36949.06200	100.62460
Levelling mark	LT143102	87580.53143	36947.07755	100.60890
Levelling mark	LT143103	87578.02300	36943.86000	100.58340
Levelling mark	LT143104	87576.5984	36942.03282	100.58280
Levelling mark	LT143105	87574.86889	36939.74124	100.57350
Levelling mark	LT143106	87573.05100	36937.48300	100.55700
Levelling mark	LT143107	87571.35100	36935.30300	100.53300
Levelling mark	LT143108	87569.35400	36932.74100	100.52890
Levelling mark	LT143109	87567.26743	36930.40652	100.51550
Levelling mark	LT143110	87565.68954	36927.75657	100.50360
Levelling mark	LT143111	87564.15827	36925.20516	100.49600
Levelling mark	LT143112	87562.44700	36922.35400	100.47840
Levelling mark	LT143113	87560.87400	36919.73200	100.46270
Levelling mark	LT143114	87559.36600	36917.22100	100.44220
Levelling mark	LT143115	87557.73500	36914.69800	100.44000
Levelling mark	LT143116	87556.07500	36912.19600	100.44000
Levelling mark	LT143117	87554.41056	36909.69679	100.38500
Levelling mark	LT143118	87552.76791	36907.2137	100.37800
Levelling mark	LT143119	87551.05216	36904.62849	100.36350
Levelling mark	LT143120	87549.46878	36902.25401	100.35330
Levelling mark	LT143121	87547.88835	36899.89326	100.34760
Levelling mark	LT143122	87545.95583	36897.02306	100.33790
Levelling mark	LT143123	87544.3729	36894.69219	100.32680
Levelling mark	LT143124	87542.7405	36892.30392	100.32070
Levelling mark	LT143125	87540.85242	36889.57662	100.31760
Levelling mark	LT143126	87539.21508	36887.23346	100.31250

Close out report for Stepney Green to Pudding Mill Lane NR/19
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Levelling mark	LT143127	87537.58241	36884.91989	100.30180
Levelling mark	LT143128	87535.85755	36882.50862	100.29220
Levelling mark	LT143129	87534.17275	36880.17581	100.29400
Levelling mark	LT143130	87532.23441	36877.51799	100.29060
Levelling mark	LT143131	87530.50525	36875.17068	100.28330
Levelling mark	LT143132	87528.77516	36872.84491	100.27770
Levelling mark	LT143133	87527.05023	36870.56679	100.27980
Levelling mark	LT143134	87524.95871	36867.81065	100.28190
Levelling mark	LT143135	87523.54800	36865.93800	100.28000
Levelling mark	LT143136	87521.49400	36863.35100	100.28000
Levelling mark	LT143137	87519.35800	36860.74900	100.28000
Levelling mark	LT143138	87517.78800	36858.83600	100.28160
Levelling mark	LT143139	87515.80368	36856.41882	100.28040
Levelling mark	LT143140	87513.90112	36854.08319	100.27420
Levelling mark	LT143141	87512.04425	36851.81259	100.28410
Levelling mark	LT143142	87510.19837	36849.5904	100.29160
Levelling mark	LT143143	87508.31000	36847.28900	100.29180
Levelling mark	LT143144	87505.89324	36844.49284	100.28910
Levelling mark	LT143145	87504.69015	36843.09674	100.29310
Levelling mark	LT143146	87502.20605	36840.24381	100.30100
Levelling mark	LT143147	87500.3814	36838.1634	100.29670
Levelling mark	LT143148	87498.3078	36835.80529	100.29500
Levelling mark	LT143149	87496.48117	36833.74753	100.29060
Levelling mark	LT143150	87494.38000	36831.38900	100.28020
Levelling mark	LT143151	87492.48741	36829.28959	100.26640
Levelling mark	LT143152	87490.44911	36827.01803	100.25900
Levelling mark	LT143153	87488.37909	36824.7264	100.25130
Levelling mark	LT143154	87486.40887	36822.54482	100.23960
Levelling mark	LT143155	87484.38600	36820.30000	100.22450
Levelling mark	LT143156	87482.57003	36818.31646	100.22120
Levelling mark	LT143157	87480.52900	36816.02000	100.22180
Levelling mark	LT143158	87478.51200	36813.78200	100.21850
Levelling mark	LT143159	87476.44400	36811.59100	100.21150
Levelling mark	LT143160	87474.42100	36809.35900	100.21320
Levelling mark	LT143161	87472.39800	36807.12700	100.21830
Levelling mark	LT143162	87470.67000	36805.22000	100.21890
Levelling mark	LT143163	87468.45863	36802.78594	100.21860
Levelling mark	LT143164	87466.36900	36800.47600	100.21570
Levelling mark	LT143165	87464.35500	36798.25400	100.21670
Levelling mark	LT143166	87462.41994	36796.11929	100.21800
Levelling mark	LT143167	87460.3292	36793.81279	100.21920
Levelling mark	LT143168	87458.47667	36791.77067	100.22070
Levelling mark	LT143169	87456.40616	36789.48275	100.22460
Levelling mark	LT143170	87454.2768	36787.13626	100.22820
Levelling mark	LT143171	87452.35100	36785.01100	100.23290
Levelling mark	LT143172	87450.21938	36782.65624	100.23730

Close out report for Stepney Green to Pudding Mill Lane NR/19
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Levelling mark	LT143173	87448.41921	36780.67377	100.24120
Levelling mark	LT143174	87446.20137	36778.22339	100.24690
Levelling mark	LT143175	87444.21284	36776.02459	100.25120
Levelling mark	LT143176	87442.25223	36773.86337	100.25320
Levelling mark	LT143177	87440.24145	36771.6473	100.25770
Levelling mark	LT143178	87438.28103	36769.48063	100.26470
Levelling mark	LT143179	87436.15922	36767.13715	100.26870
Levelling mark	LT143180	87434.17332	36764.94564	100.27000
Levelling mark	LT143181	87432.24506	36762.8155	100.27010
Levelling mark	LT143182	87430.17513	36760.53278	100.26700
Levelling mark	LT143183	87428.23868	36758.3991	100.26710
Levelling mark	LT143184	87426.20767	36756.15688	100.26910
Levelling mark	LT143185	87424.08928	36753.82031	100.27120
Levelling mark	LT143186	87422.16444	36751.70072	100.27120
Levelling mark	LT143187	87420.03300	36749.35100	100.27580
Levelling mark	LT143188	87420.73022	36744.92003	100.27940
Levelling mark	LT143189	87418.60588	36742.56006	100.28150
Levelling mark	LT143190	87416.68972	36740.453	100.28460
Levelling mark	LT143191	87414.97976	36738.40404	100.28920
Levelling mark	LT143192	87412.5838	36735.91915	100.29260
Levelling mark	LT143193	87410.56528	36733.69374	100.29670
Levelling mark	LT143194	87408.37205	36731.27208	100.29710
Levelling mark	LT143195	87406.47787	36729.17703	100.30100
Levelling mark	LT143196	87404.42000	36726.89300	100.30430
Levelling mark	LT143197	87402.52693	36724.81483	100.30220
Levelling mark	LT143198	87400.42551	36722.49324	100.30510
Levelling mark	LT143199	87398.49000	36720.36300	100.30590
Levelling mark	LT143200	87396.47727	36718.14667	100.30540
Levelling mark	LT143201	87394.45697	36715.91708	100.30580
Levelling mark	LT143202	87392.45918	36713.71717	100.30580
Levelling mark	LT143203	87390.26563	36711.30653	100.30540
Levelling mark	LT143204	87388.16054	36709.21932	100.30510
Levelling mark	LT143205	87386.0743	36706.92854	100.30630
Levelling mark	LT143206	87384.25956	36704.92931	100.30620
Levelling mark	LT143207	87382.2606	36702.72753	100.30830
Levelling mark	LT143208	87380.18941	36700.45182	100.30890
Levelling mark	LT143209	87378.03651	36698.07344	100.31100
Levelling mark	LT143210	87376.10962	36695.95622	100.31500
Levelling mark	LT143211	87374.12698	36693.76876	100.31760
Levelling mark	LT143212	87372.23789	36691.69047	100.32120
Levelling mark	LT143213	87370.15563	36689.3946	100.32380
Levelling mark	LT143214	87368.16209	36687.19461	100.32770
Levelling mark	LT143215	87366.10188	36684.9212	100.33070
Levelling mark	LT143216	87364.11336	36682.73149	100.33490
Levelling mark	LT143217	87362.07079	36680.47445	100.33670
Levelling mark	LT143218	87360.16636	36678.37451	100.33840

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Levelling mark	LT143219	87358.09639	36676.09255	100.34340
Levelling mark	LT143220	87356.06819	36673.6226	100.34640
Levelling mark	LT143221	87354.03800	36671.49600	100.35070
Levelling mark	LT143222	87352.06861	36669.21096	100.35460
Levelling mark	LT143223	87350.13741	36667.07704	100.35750
Levelling mark	LT143224	87348.06655	36664.79269	100.36220
Levelling mark	LT143225	87346.19403	36662.7284	100.36550
Levelling mark	LT143226	87344.00951	36660.31543	100.36800
Levelling mark	LT143227	87342.11762	36658.22798	100.37170
Levelling mark	LT143228	87339.97913	36655.86858	100.37600
Levelling mark	LT143229	87338.08445	36653.78196	100.37800
Levelling mark	LT143230	87336.01932	36651.50248	100.38100
Levelling mark	LT143231	87334.08475	36649.36132	100.38400
Levelling mark	LT143232	87331.99854	36647.0641	100.38740
Levelling mark	LT143233	87329.99956	36644.85668	100.39030
Levelling mark	LT143234	87327.9974	36642.64389	100.39300
Levelling mark	LT143235	87325.86576	36640.28991	100.39470
Levelling mark	LT143236	87323.82683	36638.27482	100.39750
Levelling mark	LT143237	87321.7355	36635.96293	100.40030
Levelling mark	LT143238	87319.81338	36633.84783	100.40210
Levelling mark	LT143239	87317.72805	36631.54461	100.40410
Levelling mark	LT143240	87315.70232	36629.30622	100.40630
Levelling mark	LT143241	87313.75947	36627.16075	100.40980
Levelling mark	LT143242	87311.70426	36624.8881	100.41090
Levelling mark	LT143243	87309.72735	36622.70628	100.41290
Levelling mark	LT143244	87307.56503	36620.32031	100.41210
Levelling mark	LT143245	87305.62885	36618.18287	100.41850
Levelling mark	LT143246	87303.72599	36616.08104	100.42200
Levelling mark	LT143247	87301.67277	36613.81517	100.42340
Levelling mark	LT143248	87299.69056	36611.62072	100.42660
Levelling mark	LT143249	87297.67223	36609.39499	100.42760
Levelling mark	LT143250	87295.59385	36607.09829	100.42910
Levelling mark	LT143251	87293.64913	36604.95167	100.43060
Levelling mark	LT143252	87291.57128	36602.65966	100.43180
Levelling mark	LT143253	87289.63642	36600.52433	100.43340
Levelling mark	LT143254	87287.63263	36598.30968	100.43580
Levelling mark	LT143255	87285.53571	36595.99665	100.43740
Levelling mark	LT143256	87283.61877	36593.88162	100.43910
Levelling mark	LT143257	87281.49574	36591.53298	100.44250
Levelling mark	LT143258	87279.53195	36589.36206	100.44350
Levelling mark	LT143259	87277.51945	36587.14567	100.44660
Levelling mark	LT143260	87275.54955	36584.97258	100.45090
Levelling mark	LT143261	87273.53405	36582.74775	100.45260
Levelling mark	LT143262	87271.54452	36580.54783	100.45650
Levelling mark	LT143263	87269.5083	36578.30217	100.46010
Levelling mark	LT143264	87267.51992	36576.10949	100.46210

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Levelling mark	LT143265	87265.45600	36573.83100	100.46630
Levelling mark	LT143266	87263.46000	36571.62900	100.46810
Levelling mark	LT143267	87261.43043	36569.39149	100.46970
Levelling mark	LT143268	87259.51666	36567.27674	100.47400
Levelling mark	LT143269	87257.38602	36564.93248	100.47840
Levelling mark	LT143270	87255.5316	36562.88377	100.48090
Levelling mark	LT143271	87253.40251	36560.53291	100.48190
Levelling mark	LT143272	87251.2967	36558.20845	100.48440
Levelling mark	LT143273	87249.44956	36556.16469	100.48960
Levelling mark	LT143274	87247.4041	36553.91125	100.49320
Levelling mark	LT143275	87245.34329	36551.6365	100.49670
Levelling mark	LT143276	87243.44791	36549.54106	100.49740
Levelling mark	LT143277	87241.44392	36547.33262	100.50120
Levelling mark	LT143278	87239.50787	36545.19473	100.50670
Levelling mark	LT143279	87237.35448	36542.82234	100.50790
Levelling mark	LT143280	87235.38000	36540.64300	100.51360
Levelling mark	LT143281	87233.41237	36538.46449	100.51700
Levelling mark	LT143282	87231.34535	36536.18251	100.51940
Levelling mark	LT143283	87227.31692	36531.73568	100.52250
Levelling mark	LT143284	87225.34323	36529.5568	100.52550
Levelling mark	LT143285	87223.407	36527.41677	100.52700
Levelling mark	LT143286	87221.36099	36525.16036	100.52910
Levelling mark	LT143287	87219.38858	36522.98754	100.53050
Levelling mark	LT143288	87217.31438	36520.69767	100.53470
Levelling mark	LT143289	87215.27767	36518.44924	100.53680
Levelling mark	LT143290	87213.35344	36516.32188	100.53720
Levelling mark	LT143291	87211.2334	36513.98311	100.53990
Levelling mark	LT143292	87209.18642	36511.71991	100.54360
Levelling mark	LT143293	87207.27282	36509.60534	100.54660
Levelling mark	LT143294	87205.1387	36507.25419	100.54860
Levelling mark	LT143295	87203.16915	36505.08031	100.55090
Levelling mark	LT143296	87201.03261	36502.72383	100.55280
Levelling mark	LT143297	87199.15894	36500.65399	100.55260
Levelling mark	LT143298	87197.17605	36498.47057	100.55320
Levelling mark	LT143299	87195.10717	36496.19026	100.55290
Levelling mark	LT143300	87193.09029	36493.95176	100.55140
Levelling mark	LT143301	87191.08395	36491.73622	100.55190
Levelling mark	LT143302	87188.99369	36489.42088	100.54720
Levelling mark	LT143303	87186.99316	36487.21007	100.55100
Levelling mark	LT143304	87185.08700	36485.10100	100.55670
Levelling mark	LT143305	87183.03924	36482.83581	100.55620
Levelling mark	LT143306	87181.1473	36480.74957	100.55400
Levelling mark	LT143307	87179.02265	36478.40203	100.55920
Levelling mark	LT143308	87177.02759	36476.1974	100.55840
Levelling mark	LT143309	87174.93834	36473.8963	100.55710
Levelling mark	LT143310	87173.06397	36471.83005	100.55850

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Levelling mark	LT143311	87171.20341	36469.77743	100.56110
Levelling mark	LT143312	87167.69557	36468.48287	100.56280
Levelling mark	LT143313	87164.63600	36467.29300	100.56120
Levelling mark	LT143314	87162.6282	36465.14933	100.56240
Levelling mark	LT143315	87160.71500	36462.97700	100.56370
Levelling mark	LT143316	87158.57400	36460.61900	100.56320
Levelling mark	LT143317	87156.55174	36458.44087	100.56140
Levelling mark	LT143318	87154.24300	36455.85000	100.56000
Levelling mark	LT143319	87152.46666	36453.93471	100.56050
Levelling mark	LT143320	87150.50753	36451.77231	100.55900
Levelling mark	LT143321	87148.47261	36449.52873	100.55680
Levelling mark	LT143322	87146.52445	36447.38404	100.55680
Levelling mark	LT143323	87144.4316	36445.07145	100.55540
Levelling mark	LT143324	87142.42648	36442.86274	100.55210
Levelling mark	LT143325	87140.3553	36440.57485	100.55010
Levelling mark	LT143326	87138.47074	36438.50257	100.55050
Levelling mark	LT143327	87136.40461	36436.22375	100.55280
Levelling mark	LT143328	87134.42156	36434.03493	100.55320
Levelling mark	LT143329	87132.38533	36431.79352	100.55280
Levelling mark	LT143330	87130.40638	36429.61128	100.55300
Levelling mark	LT143331	87128.32191	36427.30921	100.55370
Levelling mark	LT143332	87126.27506	36425.05548	100.55340
Levelling mark	LT143333	87124.27600	36422.83800	100.55320
Levelling mark	LT143334	87122.27000	36420.62700	100.55320
Levelling mark	LT143335	87120.26400	36418.41600	100.55220
Levelling mark	LT143336	87118.25700	36416.20400	100.55270
Levelling mark	LT143337	87116.25100	36413.99300	100.55160
Levelling mark	LT143338	87114.24494	36411.78215	100.54940
Levelling mark	LT143339	87112.35731	36409.70209	100.54910
Levelling mark	LT143340	87110.35408	36407.49535	100.55300
Levelling mark	LT143341	87108.30599	36405.23647	100.55090
Levelling mark	LT143342	87106.39854	36403.1323	100.54900
Levelling mark	LT143343	87104.18406	36400.68942	100.55070
Levelling mark	LT143344	87102.15117	36398.45085	100.55010
Levelling mark	LT143345	87100.28765	36396.39567	100.54880
Levelling mark	LT143346	87098.17565	36394.06845	100.54900
Levelling mark	LT143347	87096.10043	36391.78242	100.54670
Levelling mark	LT143348	87094.11918	36389.60153	100.54550
Levelling mark	LT143349	87092.03543	36387.30853	100.54330
Levelling mark	LT143350	87090.08500	36385.16200	100.54260
Levelling mark	LT143351	87088.09377	36382.96713	100.54120
Levelling mark	LT143352	87086.06200	36380.73500	100.54150
Levelling mark	LT143353	87084.15615	36378.63442	100.54360
Levelling mark	LT143354	87082.05712	36376.32657	100.54300
Levelling mark	LT143355	87080.08785	36374.16469	100.54450
Levelling mark	LT143356	87077.9815	36371.85479	100.54480

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Levelling mark	LT143357	87075.89567	36369.57437	100.54310
Levelling mark	LT143358	87073.84100	36367.32700	100.54610
Levelling mark	LT143359	87071.83300	36365.13100	100.54490
Levelling mark	LT143360	87069.82500	36362.93500	100.54500
Levelling mark	LT143361	87067.8163	36360.73929	100.54810
Levelling mark	LT143362	87065.91100	36358.65600	100.54760
Levelling mark	LT143363	87063.88141	36356.44402	100.54960
Levelling mark	LT143364	87061.86642	36354.25097	100.55020
Levelling mark	LT143365	87059.79071	36351.99282	100.54710
Levelling mark	LT143366	87057.7882	36349.82045	100.54950
Levelling mark	LT143367	87055.80300	36347.60300	100.55400
Levelling mark	LT143368	87053.78822	36345.46903	100.54810
Levelling mark	LT143369	87051.73600	36343.24400	100.54880
Levelling mark	LT143370	87049.62300	36340.96500	100.55080
Levelling mark	LT143371	87047.71779	36338.90963	100.54600
Levelling mark	LT143372	87045.57349	36336.59172	100.54900
Levelling mark	LT143373	87043.5687	36334.42927	100.55260
Levelling mark	LT143374	87041.46613	36332.15925	100.54840
Levelling mark	LT143375	87039.49511	36330.0398	100.55040
Levelling mark	LT143376	87037.41000	36327.79100	100.55140
Levelling mark	LT143377	87035.27569	36325.50745	100.55010
Levelling mark	LT143378	87033.21229	36323.29112	100.54990
Levelling mark	LT143379	87031.252	36321.18813	100.55080
Levelling mark	LT143380	87029.26064	36319.05223	100.54760
Levelling mark	LT143381	87027.10221	36316.73926	100.54750
Levelling mark	LT143382	87025.15881	36314.66068	100.54810
Levelling mark	LT143383	87023.03100	36312.37800	100.54610
Levelling mark	LT143384	87021.06681	36310.28127	100.54480
Levelling mark	LT143385	87018.97021	36308.04328	100.54530
Levelling mark	LT143386	87016.93984	36305.87335	100.54330
Levelling mark	LT143387	87014.92081	36303.71838	100.54360
Levelling mark	LT143388	87012.89317	36301.54899	100.54270
Levelling mark	LT143389	87010.86854	36299.38951	100.54270
Levelling mark	LT143390	87008.79769	36297.17711	100.54480
Levelling mark	LT143391	87006.71289	36294.94836	100.54470
Levelling mark	LT143392	87004.69468	36292.79582	100.54540
Levelling mark	LT143393	87002.6823	36290.64009	100.54610
Levelling mark	LT143394	87000.64732	36288.46525	100.54620
Levelling mark	LT143395	86998.44048	36286.10625	100.54740
Levelling mark	LT143396	86996.49937	36284.02312	100.54910
Levelling mark	LT143397	86994.47800	36281.90000	100.54980
Levelling mark	LT143398	86992.43384	36279.66746	100.55040
Levelling mark	LT143399	86990.40145	36277.48486	100.55420
Levelling mark	LT143400	86988.3527	36275.28481	100.55330
Levelling mark	LT143401	86986.35028	36273.13379	100.55480
Levelling mark	LT143402	86984.30049	36270.92964	100.55980

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Levelling mark	LT143403	86982.26867	36268.74953	100.56430
Levelling mark	LT143404	86980.09200	36266.40200	100.56630
Levelling mark	LT143405	86978.05200	36264.20200	100.56970
Levelling mark	LT143406	86976.10997	36262.10757	100.57410
Levelling mark	LT143407	86974.0781	36259.91085	100.57850
Levelling mark	LT143408	86972.14622	36257.82454	100.58200
Levelling mark	LT143501	87848.19100	37056.83700	100.39180
Levelling mark	LT143502	87845.27761	37056.95352	100.41620
Levelling mark	LT143503	87841.83056	37056.9365	100.44680
Levelling mark	LT143504	87839.29200	37057.19300	100.46370
Levelling mark	LT143505	87836.57400	37057.30100	100.49400
Levelling mark	LT143506	87833.52500	37057.42300	100.52830
Levelling mark	LT143507	87831.52300	37057.50300	100.54910
Levelling mark	LT143508	87829.03400	37057.60200	100.57720
Levelling mark	LT143509	87825.70393	37057.73521	100.61360
Levelling mark	LT143510	87822.52976	37057.85303	100.64900
Levelling mark	LT143511	87819.41884	37057.83556	100.67330
Levelling mark	LT143512	87816.67941	37057.85916	100.70720
Levelling mark	LT143513	87813.42211	37057.86444	100.74440
Levelling mark	LT143514	87810.85305	37057.85564	100.77230
Levelling mark	LT143515	87807.62606	37057.81813	100.81100
Levelling mark	LT143516	87804.42216	37057.75341	100.84200
Levelling mark	LT143517	87801.69022	37057.72448	100.86340
Levelling mark	LT143518	87798.66036	37057.56467	100.90030
Levelling mark	LT143519	87795.92459	37057.49652	100.92550
Levelling mark	LT143520	87792.85625	37057.27876	100.95710
Levelling mark	LT143521	87789.56769	37057.06234	100.98800
Levelling mark	LT143522	87786.57800	37056.75300	101.01640
Levelling mark	LT143523	87783.66336	37056.61888	101.04100
Levelling mark	LT143524	87780.83494	37056.27161	101.07150
Levelling mark	LT143525	87777.61178	37055.93468	101.09590
Levelling mark	LT143526	87774.26708	37055.57546	101.11250
Levelling mark	LT143527	87771.58600	37055.17900	101.13810
Levelling mark	LT143528	87768.99586	37054.8402	101.16120
Levelling mark	LT143529	87765.86024	37054.3329	101.18070
Levelling mark	LT143530	87762.66331	37053.80452	101.21460
Levelling mark	LT143531	87760.15467	37053.0119	101.23240
Levelling mark	LT143532	87757.00585	37052.41592	101.25430
Levelling mark	LT143533	87753.84855	37051.77426	101.28470
Levelling mark	LT143534	87751.31902	37051.23855	101.29870
Levelling mark	LT143535	87748.08963	37050.86017	101.31370
Levelling mark	LT143536	87745.18617	37050.1829	101.33500
Levelling mark	LT143537	87742.52505	37049.53098	101.26740
Levelling mark	LT143538	87739.57598	37048.78081	101.28740
Levelling mark	LT143539	87737.01300	37047.90400	101.29820
Levelling mark	LT143540	87733.97700	37046.98700	101.37940

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Levelling mark	LT143541	87730.92500	37046.05000	101.37660
Levelling mark	LT143542	87728.27000	37045.22200	101.38210
Levelling mark	LT143543	87725.09988	37044.21757	101.37580
Levelling mark	LT143544	87722.58368	37043.40872	101.37130
Levelling mark	LT143545	87719.74198	37042.46008	101.36300
Levelling mark	LT143546	87716.63477	37041.38789	101.34990
Levelling mark	LT143547	87714.67113	37040.68828	101.34270
Levelling mark	LT143548	87711.13132	37039.39064	101.33480
Levelling mark	LT143549	87708.26507	37038.30831	101.32440
Levelling mark	LT143550	87705.66245	37037.29246	101.31370
Levelling mark	LT143551	87702.62600	37036.39400	101.30030
Levelling mark	LT143552	87699.68987	37035.2284	101.28240
Levelling mark	LT143553	87697.17000	37034.17200	101.27710
Levelling mark	LT143554	87694.38631	37032.94326	101.26290
Levelling mark	LT143555	87691.40123	37031.61064	101.24890
Levelling mark	LT143556	87689.10168	37030.51326	101.23540
Levelling mark	LT143557	87686.25700	37029.18300	101.21870
Levelling mark	LT143558	87683.27563	37027.77287	101.20490
Levelling mark	LT143559	87680.80376	37026.54204	101.20250
Levelling mark	LT143560	87678.23700	37025.23900	101.19080
Levelling mark	LT143561	87675.74000	37023.94500	101.17720
Levelling mark	LT143562	87672.90469	37022.44535	101.16570
Levelling mark	LT143563	87670.16652	37020.94972	101.15520
Levelling mark	LT143564	87667.34102	37019.3774	101.13910
Levelling mark	LT143565	87665.49791	37018.33081	101.13040
Levelling mark	LT143566	87662.39608	37016.51799	101.11540
Levelling mark	LT143567	87660.07231	37015.15361	101.10210
Levelling mark	LT143568	87657.29454	37013.44706	101.08870
Levelling mark	LT143569	87654.76500	37011.87100	101.07540
Levelling mark	LT143570	87652.33798	37010.33825	101.05470
Levelling mark	LT143571	87649.60618	37008.50037	101.04600
Levelling mark	LT143572	87647.14400	37006.83900	101.03190
Levelling mark	LT143573	87644.50702	37005.05482	101.01660
Levelling mark	LT143574	87642.40528	37003.58658	101.00550
Levelling mark	LT143575	87639.94500	37001.58000	100.98550
Levelling mark	LT143576	87637.24178	36999.49806	100.96970
Levelling mark	LT143577	87635.27833	36998.03055	100.96550
Levelling mark	LT143578	87632.74353	36996.10091	100.95660
Levelling mark	LT143579	87630.69804	36994.51466	100.94740
Levelling mark	LT143580	87628.18265	36992.52233	100.93670
Levelling mark	LT143581	87625.71209	36990.51405	100.92620
Levelling mark	LT143582	87623.10300	36988.39300	100.91500
Levelling mark	LT143583	87621.14418	36986.68697	100.90640
Levelling mark	LT143584	87618.81792	36984.67546	100.89320
Levelling mark	LT143585	87616.86347	36982.95889	100.88360
Levelling mark	LT143586	87614.41865	36980.76599	100.86690

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Levelling mark	LT143587	87612.17775	36978.71254	100.84980
Levelling mark	LT143588	87609.81509	36976.50641	100.83190
Levelling mark	LT143589	87607.77365	36974.54953	100.82730
Levelling mark	LT143590	87605.65889	36972.4919	100.81800
Levelling mark	LT143591	87603.63742	36970.48768	100.80670
Levelling mark	LT143592	87601.52600	36968.29600	100.79510
Levelling mark	LT143592	87599.33678	36966.08168	100.78400
Levelling mark	LT143593	87596.95700	36963.68100	100.75890
Levelling mark	LT143594	87594.93284	36961.82658	100.75080
Levelling mark	LT143595	87593.00775	36959.71253	100.73710
Levelling mark	LT143596	87591.07067	36957.54472	100.72650
Levelling mark	LT143597	87589.04667	36955.23103	100.70830
Levelling mark	LT143598	87587.08505	36952.9411	100.68930
Levelling mark	LT143599	87585.78552	36951.39634	100.67350
Levelling mark	LT143600	87583.32900	36948.24200	100.62440
Levelling mark	LT143601	87581.7609	36946.20615	100.61090
Levelling mark	LT143602	87579.27289	36943.0324	100.58540
Levelling mark	LT143603	87577.82836	36941.1426	100.60620
Levelling mark	LT143604	87576.08044	36938.83184	100.59180
Levelling mark	LT143605	87574.39078	36936.55081	100.58060
Levelling mark	LT143606	87572.71916	36934.35062	100.56260
Levelling mark	LT143607	87570.7449	36931.67461	100.54840
Levelling mark	LT143608	87569.05047	36929.2527	100.53480
Levelling mark	LT143609	87567.30009	36926.71298	100.52020
Levelling mark	LT143610	87565.68600	36924.10200	100.50650
Levelling mark	LT143611	87563.86300	36921.33200	100.48890
Levelling mark	LT143612	87562.22700	36918.84400	100.46920
Levelling mark	LT143613	87560.61800	36916.40000	100.44610
Levelling mark	LT143614	87558.96700	36913.89000	100.44500
Levelling mark	LT143615	87557.27700	36911.32200	100.43000
Levelling mark	LT143616	87555.67095	36908.88117	100.38280
Levelling mark	LT143617	87554.00196	36906.34466	100.37520
Levelling mark	LT143618	87552.33393	36903.82534	100.36130
Levelling mark	LT143619	87550.69374	36901.36462	100.35060
Levelling mark	LT143620	87549.1566	36899.0678	100.34630
Levelling mark	LT143621	87547.17342	36896.11799	100.33330
Levelling mark	LT143622	87545.62198	36893.82923	100.31830
Levelling mark	LT143623	87544.00328	36891.46882	100.31410
Levelling mark	LT143624	87542.0634	36888.66519	100.30640
Levelling mark	LT143625	87540.45615	36886.36086	100.29770
Levelling mark	LT143626	87538.78078	36883.98212	100.28740
Levelling mark	LT143627	87537.10251	36881.63576	100.28120
Levelling mark	LT143628	87535.36600	36879.19800	100.27940
Levelling mark	LT143629	87533.46300	36876.51200	100.27310
Levelling mark	LT143630	87531.78000	36874.12600	100.26360
Levelling mark	LT143631	87530.11100	36871.75000	100.25910

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Levelling mark	LT143632	87528.47000	36869.40400	100.25910
Levelling mark	LT143633	87526.33500	36866.68300	100.26440
Levelling mark	LT143634	87524.83800	36864.88100	100.26000
Levelling mark	LT143635	87522.72900	36862.34000	100.26440
Levelling mark	LT143636	87520.59100	36859.76500	100.26000
Levelling mark	LT143592	87518.99100	36857.83800	100.26510
Levelling mark	LT143637	87516.96300	36855.39500	100.25810
Levelling mark	LT143638	87515.09793	36853.1493	100.25840
Levelling mark	LT143639	87513.20593	36850.84803	100.26910
Levelling mark	LT143640	87511.30288	36848.55614	100.27740
Levelling mark	LT143641	87509.42144	36846.31265	100.27500
Levelling mark	LT143642	87507.13387	36843.63581	100.28080
Levelling mark	LT143643	87505.642	36842.0665	100.28230
Levelling mark	LT143644	87503.46695	36839.38596	100.28800
Levelling mark	LT143645	87501.53849	36837.17937	100.28600
Levelling mark	LT143646	87499.49297	36834.87073	100.28210
Levelling mark	LT143647	87497.58394	36832.72313	100.27960
Levelling mark	LT143648	87495.53334	36830.42359	100.27280
Levelling mark	LT143649	87493.60209	36828.26201	100.25980
Levelling mark	LT143650	87491.58075	36826.01987	100.25570
Levelling mark	LT143651	87489.55791	36823.77766	100.24810
Levelling mark	LT143652	87487.51612	36821.51344	100.23890
Levelling mark	LT143653	87485.51271	36819.30225	100.22670
Levelling mark	LT143654	87483.68615	36817.28275	100.22370
Levelling mark	LT143655	87481.61335	36815.00232	100.22340
Levelling mark	LT143656	87479.59500	36812.77600	100.22240
Levelling mark	LT143657	87477.56100	36810.55400	100.21690
Levelling mark	LT143658	87475.53700	36808.32200	100.21550
Levelling mark	LT143659	87473.50288	36806.08934	100.21950
Levelling mark	LT143660	87471.78400	36804.18500	100.22080
Levelling mark	LT143661	87469.56907	36801.75344	100.22130
Levelling mark	LT143662	87467.53799	36799.50399	100.21860
Levelling mark	LT143663	87465.49627	36797.25133	100.21830
Levelling mark	LT143664	87463.50926	36795.06324	100.21840
Levelling mark	LT143665	87461.52194	36792.87156	100.21890
Levelling mark	LT143666	87459.58325	36790.732	100.22070
Levelling mark	LT143667	87457.4668	36788.39493	100.22380
Levelling mark	LT143668	87455.43511	36786.1537	100.22760
Levelling mark	LT143669	87453.44869	36783.9666	100.23330
Levelling mark	LT143670	87451.42156	36781.72804	100.23880
Levelling mark	LT143671	87449.54487	36779.65818	100.24320
Levelling mark	LT143672	87447.38443	36777.26912	100.24880
Levelling mark	LT143673	87445.38363	36775.06254	100.25480
Levelling mark	LT143674	87443.33763	36772.8033	100.25560
Levelling mark	LT143675	87441.35918	36770.6202	100.26040
Levelling mark	LT143676	87439.36814	36768.42049	100.26960

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Levelling mark	LT143677	87437.3363	36766.17907	100.27520
Levelling mark	LT143678	87435.32511	36763.95808	100.27590
Levelling mark	LT143679	87433.33626	36761.76047	100.27130
Levelling mark	LT143680	87431.2862	36759.50197	100.26700
Levelling mark	LT143681	87429.33721	36757.35025	100.26760
Levelling mark	LT143682	87427.28771	36755.09104	100.26860
Levelling mark	LT143683	87425.18952	36752.77876	100.27430
Levelling mark	LT143684	87423.27087	36750.65926	100.27490
Levelling mark	LT143685	87421.17385	36748.34786	100.28000
Levelling mark	LT143686	87421.25589	36744.43941	100.28150
Levelling mark	LT143687	87419.3382	36741.9698	100.28100
Levelling mark	LT143688	87417.83624	36739.47254	100.28320
Levelling mark	LT143689	87416.05184	36737.51549	100.29030
Levelling mark	LT143690	87413.62665	36734.61187	100.29400
Levelling mark	LT143691	87412.05393	36732.39009	100.29730
Levelling mark	LT143692	87409.45039	36730.21413	100.29800
Levelling mark	LT143693	87407.62679	36728.19711	100.30180
Levelling mark	LT143694	87405.50477	36725.85397	100.30500
Levelling mark	LT143695	87403.66363	36723.82583	100.30280
Levelling mark	LT143696	87401.54134	36721.47999	100.30570
Levelling mark	LT143697	87399.64102	36719.38048	100.30680
Levelling mark	LT143698	87397.64424	36717.17966	100.30620
Levelling mark	LT143699	87395.55146	36714.87897	100.30570
Levelling mark	LT143700	87393.59248	36712.71944	100.30580
Levelling mark	LT143701	87391.3786	36710.27989	100.30470
Levelling mark	LT143702	87389.23403	36708.15281	100.30390
Levelling mark	LT143703	87387.17444	36705.89316	100.30410
Levelling mark	LT143704	87385.38263	36703.91813	100.30440
Levelling mark	LT143705	87383.38855	36701.72329	100.30700
Levelling mark	LT143706	87381.32331	36699.45432	100.30740
Levelling mark	LT143707	87379.18733	36697.10074	100.31160
Levelling mark	LT143708	87377.24537	36694.96308	100.31480
Levelling mark	LT143709	87375.23232	36692.73942	100.31710
Levelling mark	LT143710	87373.38704	36690.70308	100.32140
Levelling mark	LT143711	87371.25397	36688.35627	100.32490
Levelling mark	LT143712	87369.28199	36686.17626	100.32800
Levelling mark	LT143713	87367.25219	36683.94155	100.33060
Levelling mark	LT143714	87365.28171	36681.76832	100.33460
Levelling mark	LT143715	87363.23801	36679.51468	100.33500
Levelling mark	LT143716	87361.29714	36677.37473	100.33580
Levelling mark	LT143717	87359.21923	36675.07826	100.34140
Levelling mark	LT143718	87357.16768	36672.58714	100.34510
Levelling mark	LT143719	87355.25582	36670.48009	100.34950
Levelling mark	LT143720	87353.16715	36668.1768	100.35240
Levelling mark	LT143721	87351.18597	36665.98479	100.35520
Levelling mark	LT143722	87349.19163	36663.78404	100.35940

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Levelling mark	LT143723	87347.24689	36661.64377	100.36240
Levelling mark	LT143724	87345.12458	36659.2997	100.36630
Levelling mark	LT143725	87343.24413	36657.22246	100.36970
Levelling mark	LT143726	87341.10513	36654.8641	100.37310
Levelling mark	LT143727	87339.27258	36652.84461	100.37470
Levelling mark	LT143728	87337.11918	36650.46646	100.37750
Levelling mark	LT143729	87335.22534	36648.37319	100.38070
Levelling mark	LT143730	87333.11478	36646.04512	100.38380
Levelling mark	LT143731	87331.16128	36643.88898	100.38660
Levelling mark	LT143732	87329.07444	36641.58382	100.38940
Levelling mark	LT143733	87326.98664	36639.27807	100.39170
Levelling mark	LT143734	87324.9013	36637.20849	100.39460
Levelling mark	LT143735	87322.86329	36634.96702	100.39660
Levelling mark	LT143736	87320.9648	36632.87103	100.39910
Levelling mark	LT143737	87318.80731	36630.48062	100.40190
Levelling mark	LT143738	87316.79802	36628.26928	100.40260
Levelling mark	LT143739	87314.8635	36626.12873	100.40550
Levelling mark	LT143740	87312.78802	36623.84174	100.40840
Levelling mark	LT143741	87310.84612	36621.69077	100.41080
Levelling mark	LT143742	87308.23955	36618.82124	100.40910
Levelling mark	LT143743	87306.80406	36617.23043	100.41550
Levelling mark	LT143744	87304.84756	36615.07024	100.41880
Levelling mark	LT143745	87302.78207	36612.78786	100.42060
Levelling mark	LT143746	87300.81796	36610.62212	100.42470
Levelling mark	LT143747	87298.84147	36608.43557	100.42580
Levelling mark	LT143748	87296.72628	36606.10197	100.42650
Levelling mark	LT143749	87294.77763	36603.94796	100.42770
Levelling mark	LT143750	87292.72681	36601.69008	100.43010
Levelling mark	LT143751	87290.80096	36599.56015	100.43090
Levelling mark	LT143752	87288.7852	36597.33329	100.43260
Levelling mark	LT143753	87286.65900	36594.99300	100.43530
Levelling mark	LT143754	87284.77103	36592.9055	100.43660
Levelling mark	LT143755	87282.5858	36590.48862	100.43980
Levelling mark	LT143756	87280.64323	36588.3446	100.44110
Levelling mark	LT143757	87278.63491	36586.12818	100.44390
Levelling mark	LT143758	87276.68334	36583.97599	100.44790
Levelling mark	LT143759	87274.67125	36581.75532	100.45030
Levelling mark	LT143760	87272.65643	36579.52883	100.45490
Levelling mark	LT143761	87270.64704	36577.30942	100.45850
Levelling mark	LT143762	87268.67191	36575.13194	100.46080
Levelling mark	LT143763	87266.59378	36572.84171	100.46440
Levelling mark	LT143764	87264.55000	36570.58500	100.46670
Levelling mark	LT143765	87262.62042	36568.45477	100.46790
Levelling mark	LT143766	87260.65874	36566.29916	100.47230
Levelling mark	LT143767	87258.52692	36563.9407	100.47680
Levelling mark	LT143768	87256.67804	36561.89687	100.47920

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Levelling mark	LT143769	87254.58538	36559.58498	100.48080
Levelling mark	LT143770	87252.46906	36557.25347	100.48300
Levelling mark	LT143771	87250.61097	36555.20279	100.48740
Levelling mark	LT143772	87248.57544	36552.95637	100.49040
Levelling mark	LT143773	87246.46337	36550.62952	100.49410
Levelling mark	LT143774	87244.65339	36548.62369	100.49610
Levelling mark	LT143775	87242.55501	36546.30967	100.50040
Levelling mark	LT143776	87240.64775	36544.20839	100.50510
Levelling mark	LT143777	87238.5143	36541.85444	100.50630
Levelling mark	LT143778	87236.49928	36539.63053	100.51100
Levelling mark	LT143779	87234.52713	36537.45658	100.51510
Levelling mark	LT143780	87232.49175	36535.20125	100.51730
Levelling mark	LT143781	87228.44100	36530.72600	100.52080
Levelling mark	LT143782	87226.45362	36528.53603	100.52350
Levelling mark	LT143783	87224.48200	36526.37000	100.52500
Levelling mark	LT143784	87222.46100	36524.13600	100.52790
Levelling mark	LT143785	87220.54541	36522.0187	100.52940
Levelling mark	LT143786	87218.51396	36519.77351	100.53170
Levelling mark	LT143787	87216.40667	36517.44474	100.53420
Levelling mark	LT143788	87214.50962	36515.34949	100.53620
Levelling mark	LT143789	87212.42513	36513.04758	100.53900
Levelling mark	LT143790	87210.31993	36510.72289	100.54230
Levelling mark	LT143791	87208.42763	36508.63875	100.54520
Levelling mark	LT143792	87206.29887	36506.28663	100.54740
Levelling mark	LT143793	87204.29481	36504.07235	100.55000
Levelling mark	LT143794	87202.14049	36501.69851	100.55080
Levelling mark	LT143795	87200.33216	36499.70573	100.54940
Levelling mark	LT143796	87198.31856	36497.48886	100.55040
Levelling mark	LT143797	87196.23925	36495.18489	100.55040
Levelling mark	LT143798	87194.2059	36492.93818	100.54810
Levelling mark	LT143799	87192.20968	36490.72544	100.54920
Levelling mark	LT143800	87190.12837	36488.42443	100.54640
Levelling mark	LT143801	87188.13464	36486.22603	100.54840
Levelling mark	LT143802	87186.2592	36484.1434	100.55320
Levelling mark	LT143803	87184.21124	36481.87819	100.55300
Levelling mark	LT143804	87182.2979	36479.76566	100.54990
Levelling mark	LT143805	87180.17226	36477.42183	100.55480
Levelling mark	LT143806	87178.17474	36475.21728	100.55530
Levelling mark	LT143807	87176.05908	36472.88653	100.55550
Levelling mark	LT143808	87174.26009	36470.9055	100.55640
Levelling mark	LT143809	87172.31405	36468.75628	100.55830
Levelling mark	LT143810	87168.88756	36467.21903	100.56120
Levelling mark	LT143811	87165.72837	36466.31384	100.56090
Levelling mark	LT143812	87163.71373	36464.09118	100.56210
Levelling mark	LT143813	87161.79500	36461.98700	100.56290
Levelling mark	LT143814	87159.66281	36459.62134	100.56180

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Levelling mark	LT143815	87157.69000	36457.45200	100.56020
Levelling mark	LT143816	87155.36100	36454.87800	100.55900
Levelling mark	LT143817	87153.60898	36452.94242	100.55940
Levelling mark	LT143818	87151.6111	36450.73482	100.55780
Levelling mark	LT143819	87149.56995	36448.48332	100.55490
Levelling mark	LT143820	87147.63223	36446.34306	100.55350
Levelling mark	LT143821	87145.59707	36444.09956	100.55320
Levelling mark	LT143822	87143.5671	36441.86006	100.54920
Levelling mark	LT143823	87141.47921	36439.55998	100.54710
Levelling mark	LT143824	87139.57816	36437.465	100.54800
Levelling mark	LT143825	87137.59000	36435.26800	100.55090
Levelling mark	LT143826	87135.52009	36432.989	100.55060
Levelling mark	LT143827	87133.54239	36430.81093	100.55020
Levelling mark	LT143828	87131.51954	36428.58206	100.55160
Levelling mark	LT143829	87129.46156	36426.30834	100.55180
Levelling mark	LT143830	87127.39785	36424.03248	100.55040
Levelling mark	LT143831	87125.39800	36421.81500	100.54910
Levelling mark	LT143832	87123.39200	36419.60500	100.54930
Levelling mark	LT143833	87121.38500	36417.39400	100.54880
Levelling mark	LT143834	87119.37900	36415.18300	100.54960
Levelling mark	LT143835	87117.37200	36412.97200	100.54880
Levelling mark	LT143836	87115.36579	36410.76087	100.54780
Levelling mark	LT143837	87113.48245	36408.74656	100.54860
Levelling mark	LT143838	87111.4381	36406.43369	100.55070
Levelling mark	LT143839	87109.40794	36404.19581	100.54770
Levelling mark	LT143840	87107.46764	36402.05396	100.54590
Levelling mark	LT143841	87105.33389	36399.69885	100.54680
Levelling mark	LT143842	87103.31126	36397.47028	100.54760
Levelling mark	LT143843	87101.39236	36395.35665	100.54610
Levelling mark	LT143844	87099.28505	36393.03275	100.54550
Levelling mark	LT143845	87097.26758	36390.81653	100.54330
Levelling mark	LT143846	87095.24146	36388.58132	100.54180
Levelling mark	LT143847	87093.13696	36386.28816	100.54030
Levelling mark	LT143848	87091.22786	36384.164	100.53930
Levelling mark	LT143849	87089.2129	36381.94674	100.53800
Levelling mark	LT143850	87087.20941	36379.74297	100.53870
Levelling mark	LT143851	87085.27273	36377.6077	100.54060
Levelling mark	LT143852	87083.17975	36375.30687	100.54020
Levelling mark	LT143853	87081.18986	36373.12289	100.54260
Levelling mark	LT143854	87079.11428	36370.8487	100.54450
Levelling mark	LT143855	87077.01959	36368.54969	100.54350
Levelling mark	LT143856	87074.94700	36366.27500	100.54440
Levelling mark	LT143857	87072.94300	36364.07500	100.54250
Levelling mark	LT143858	87070.93800	36361.87500	100.54220
Levelling mark	LT143859	87068.93400	36359.67600	100.54590
Levelling mark	LT143860	87067.03300	36357.58900	100.54450

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Levelling mark	LT143861	87065.01100	36355.36900	100.54550
Levelling mark	LT143862	87062.9295	36353.27129	100.54830
Levelling mark	LT143863	87060.93900	36350.90000	100.54430
Levelling mark	LT143864	87058.94900	36348.71600	100.54610
Levelling mark	LT143865	87056.94500	36346.51700	100.55000
Levelling mark	LT143866	87054.88700	36344.41900	100.54480
Levelling mark	LT143867	87052.84400	36342.21400	100.54630
Levelling mark	LT143868	87050.7668	36339.97102	100.54920
Levelling mark	LT143869	87048.84600	36337.89800	100.54430
Levelling mark	LT143870	87046.72728	36335.60677	100.54730
Levelling mark	LT143871	87044.68105	36333.3959	100.55080
Levelling mark	LT143872	87042.58027	36331.13371	100.54650
Levelling mark	LT143873	87040.568	36328.96836	100.54870
Levelling mark	LT143874	87038.49486	36326.73973	100.55020
Levelling mark	LT143875	87036.42509	36324.51532	100.54840
Levelling mark	LT143876	87034.3348	36322.26925	100.54780
Levelling mark	LT143877	87032.37901	36320.1727	100.54820
Levelling mark	LT143878	87030.37500	36317.97600	100.54540
Levelling mark	LT143879	87028.34148	36315.74675	100.54590
Levelling mark	LT143880	87026.26142	36313.62601	100.54590
Levelling mark	LT143881	87024.16025	36311.37096	100.54360
Levelling mark	LT143882	87022.16424	36309.23477	100.54310
Levelling mark	LT143883	87020.08200	36307.01300	100.54290
Levelling mark	LT143884	87018.03600	36304.82800	100.54170
Levelling mark	LT143885	87015.99754	36302.65277	100.54170
Levelling mark	LT143886	87014.04169	36300.53775	100.54030
Levelling mark	LT143887	87011.98500	36298.37000	100.54100
Levelling mark	LT143888	87009.88867	36296.12182	100.54340
Levelling mark	LT143889	87007.84677	36293.94394	100.54320
Levelling mark	LT143890	87005.7799	36291.73259	100.54370
Levelling mark	LT143891	87003.74921	36289.56232	100.54490
Levelling mark	LT143892	87001.69487	36287.36213	100.54530
Levelling mark	LT143893	86999.53093	36285.05182	100.54570
Levelling mark	LT143894	86997.58576	36282.96796	100.54740
Levelling mark	LT143895	86995.60721	36280.84452	100.54860
Levelling mark	LT143896	86993.55125	36278.64006	100.54910
Levelling mark	LT143897	86991.50439	36276.44412	100.55270
Levelling mark	LT143898	86989.49027	36274.28051	100.55200
Levelling mark	LT143899	86987.43837	36272.08336	100.55410
Levelling mark	LT143900	86985.30800	36269.80000	100.56100
Levelling mark	LT143901	86983.31500	36267.65000	100.56340
Levelling mark	LT143902	86981.23600	36265.40700	100.56610
Levelling mark	LT143903	86979.197	36263.20737	100.56930
Levelling mark	LT143904	86977.22573	36261.08049	100.57280
Levelling mark	LT143905	86975.19404	36258.88782	100.57900
Levelling mark	LT143906	86973.26602	36256.80025	100.58250

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Levelling mark	LT143907	87848.20300	37055.01800	100.44360
Levelling mark	LT143908	87845.26623	37055.12028	100.46640
Levelling mark	LT144001	87841.94600	37055.23600	100.49060
Levelling mark	LT144002	87839.33697	37055.37655	100.51210
Levelling mark	LT144003	87836.71400	37055.41900	100.52980
Levelling mark	LT144004	87833.43073	37055.53369	100.56130
Levelling mark	LT144005	87830.86900	37055.62300	100.58590
Levelling mark	LT144006	87828.38103	37055.65388	100.60480
Levelling mark	LT144007	87825.65415	37055.70665	100.61990
Levelling mark	LT144008	87822.44909	37055.75652	100.65310
Levelling mark	LT144009	87819.3466	37055.78562	100.67840
Levelling mark	LT144010	87816.65447	37055.79565	100.69480
Levelling mark	LT144011	87813.45526	37055.78466	100.72630
Levelling mark	LT144012	87810.79784	37055.76019	100.74850
Levelling mark	LT144013	87807.55271	37055.70529	100.77490
Levelling mark	LT144014	87804.43937	37055.62244	100.79750
Levelling mark	LT144015	87801.71682	37055.53143	100.81950
Levelling mark	LT144016	87798.60248	37055.40383	100.83870
Levelling mark	LT144017	87795.9062	37055.26231	100.86300
Levelling mark	LT144018	87792.76983	37055.07038	100.88930
Levelling mark	LT144019	87789.63524	37054.84225	100.91070
Levelling mark	LT144020	87786.88435	37054.61485	100.93010
Levelling mark	LT144021	87783.81803	37054.32732	100.95380
Levelling mark	LT144022	87781.0221	37054.04527	100.97080
Levelling mark	LT144023	87777.96866	37053.69824	100.99150
Levelling mark	LT144024	87774.81036	37053.29956	101.00930
Levelling mark	LT144025	87772.09253	37052.92926	101.03760
Levelling mark	LT144026	87769.02725	37052.48311	101.05850
Levelling mark	LT144027	87766.36757	37052.05874	101.08100
Levelling mark	LT144028	87763.22313	37051.5297	101.10450
Levelling mark	LT144029	87760.61274	37050.90742	101.11930
Levelling mark	LT144030	87757.44806	37050.30262	101.14360
Levelling mark	LT144031	87754.37226	37049.68344	101.17060
Levelling mark	LT144032	87751.75733	37049.12438	101.18700
Levelling mark	LT144033	87748.6727	37048.43917	101.20660
Levelling mark	LT144034	87746.04709	37047.82755	101.21630
Levelling mark	LT144035	87743.06035	37047.10638	101.22880
Levelling mark	LT144036	87740.52033	37046.45886	101.24980
Levelling mark	LT144037	87737.39172	37045.63448	101.26320
Levelling mark	LT144038	87734.21553	37044.75202	101.25930
Levelling mark	LT144039	87731.73432	37044.03572	101.25800
Levelling mark	LT144040	87728.6712	37043.11828	101.25340
Levelling mark	LT144041	87726.09482	37042.3254	101.24420
Levelling mark	LT144042	87723.04371	37041.34444	101.24300
Levelling mark	LT144043	87720.2507	37040.41479	101.23750
Levelling mark	LT144044	87717.60114	37039.50507	101.22980

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Levelling mark	LT144045	87714.67982	37038.47178	101.22030
Levelling mark	LT144046	87712.14618	37037.54952	101.21190
Levelling mark	LT144047	87709.04673	37036.39222	101.19410
Levelling mark	LT144048	87706.67351	37035.47209	101.19280
Levelling mark	LT144049	87703.69884	37034.45964	101.18510
Levelling mark	LT144050	87700.67608	37033.22368	101.17720
Levelling mark	LT144051	87698.29871	37032.22562	101.17090
Levelling mark	LT144052	87695.32864	37030.94331	101.16330
Levelling mark	LT144053	87692.39526	37029.65241	101.14800
Levelling mark	LT144054	87689.99389	37028.55761	101.14820
Levelling mark	LT144055	87687.12572	37027.21802	101.14100
Levelling mark	LT144056	87684.25829	37025.8511	101.13340
Levelling mark	LT144057	87681.83011	37024.65697	101.12540
Levelling mark	LT144058	87679.10769	37023.2854	101.11790
Levelling mark	LT144059	87677.33952	37022.38696	101.10500
Levelling mark	LT144060	87673.89166	37020.55933	101.09630
Levelling mark	LT144061	87671.50871	37019.26736	101.08910
Levelling mark	LT144062	87668.73856	37017.72792	101.07920
Levelling mark	LT144063	87665.9339	37016.12895	101.06780
Levelling mark	LT144064	87663.5755	37014.75802	101.06120
Levelling mark	LT144065	87661.55558	37013.56493	101.04680
Levelling mark	LT144066	87658.53714	37011.72147	101.03770
Levelling mark	LT144067	87655.95384	37010.10775	101.02460
Levelling mark	LT144068	87653.30132	37008.41022	101.00940
Levelling mark	LT144069	87650.94765	37006.86986	100.99680
Levelling mark	LT144070	87648.42213	37005.18278	100.98480
Levelling mark	LT144071	87646.28341	37003.73298	100.96100
Levelling mark	LT144072	87643.49965	37001.78949	100.94260
Levelling mark	LT144073	87641.03329	37000.03401	100.92840
Levelling mark	LT144074	87638.48475	36997.98366	100.90940
Levelling mark	LT144075	87636.36231	36996.40333	100.89640
Levelling mark	LT144076	87633.87282	36994.51417	100.88310
Levelling mark	LT144077	87631.74559	36992.87791	100.86330
Levelling mark	LT144078	87629.26038	36990.90981	100.85300
Levelling mark	LT144079	87626.78807	36988.91084	100.83820
Levelling mark	LT144080	87624.66312	36987.15271	100.82430
Levelling mark	LT144081	87622.34644	36985.1933	100.80870
Levelling mark	LT144082	87620.39213	36983.50901	100.79600
Levelling mark	LT144083	87617.91662	36981.33453	100.77380
Levelling mark	LT144084	87615.88137	36979.50485	100.76600
Levelling mark	LT144085	87613.4702	36977.29137	100.75620
Levelling mark	LT144086	87611.2496	36975.20098	100.74210
Levelling mark	LT144087	87609.24402	36973.28017	100.73020
Levelling mark	LT144088	87607.06076	36971.14461	100.71870
Levelling mark	LT144089	87605.10072	36969.18508	100.70240
Levelling mark	LT144090	87602.87396	36966.91344	100.68700

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Levelling mark	LT144091	87600.7665	36964.70966	100.67520
Levelling mark	LT144092	87598.48026	36962.49626	100.65760
Levelling mark	LT144093	87596.59631	36960.43573	100.64310
Levelling mark	LT144094	87594.57356	36958.17212	100.62760
Levelling mark	LT144095	87592.71362	36956.06234	100.60710
Levelling mark	LT144096	87590.6304	36953.64526	100.59120
Levelling mark	LT144097	87588.57714	36951.19216	100.58180
Levelling mark	LT144098	87587.66278	36950.08543	100.57530
Levelling mark	LT144099	87584.95885	36946.75346	100.55500
Levelling mark	LT144100	87583.22213	36944.56312	100.54370
Levelling mark	LT144101	87581.39900	36942.25500	100.52730
Levelling mark	LT144102	87579.68809	36939.98551	100.51460
Levelling mark	LT144103	87577.83729	36937.52996	100.50920
Levelling mark	LT144104	87576.22252	36935.35262	100.49770
Levelling mark	LT144105	87574.32359	36932.74989	100.49020
Levelling mark	LT144106	87572.5246	36930.2434	100.48130
Levelling mark	LT144107	87570.92667	36928.00693	100.46590
Levelling mark	LT144108	87569.11345	36925.42461	100.46080
Levelling mark	LT144109	87567.37525	36922.92155	100.45450
Levelling mark	LT144110	87565.47952	36920.16514	100.44570
Levelling mark	LT144111	87563.85053	36917.77861	100.43900
Levelling mark	LT144112	87562.24100	36915.33500	100.42970
Levelling mark	LT144113	87560.70919	36912.78193	100.42130
Levelling mark	LT144114	87558.88500	36910.15300	100.41210
Levelling mark	LT144115	87557.22143	36907.58352	100.40620
Levelling mark	LT144116	87555.35939	36904.87147	100.39040
Levelling mark	LT144117	87553.91722	36902.71095	100.38220
Levelling mark	LT144120	87552.09474	36899.99761	100.38060
Levelling mark	LT144121	87550.64608	36897.85069	100.37010
Levelling mark	LT144122	87548.7882	36895.09931	100.35550
Levelling mark	LT144123	87546.95758	36892.41371	100.35470
Levelling mark	LT144124	87545.48268	36890.26374	100.34610
Levelling mark	LT144125	87543.6584	36887.62637	100.32990
Levelling mark	LT144126	87541.99316	36885.23963	100.32720
Levelling mark	LT144127	87540.48046	36883.09469	100.32120
Levelling mark	LT144128	87538.56709	36880.41141	100.31350
Levelling mark	LT144129	87536.67371	36877.77858	100.30030
Levelling mark	LT144130	87535.1735	36875.6412	100.29180
Levelling mark	LT144131	87533.5355	36873.48179	100.29390
Levelling mark	LT144132	87531.65969	36870.96531	100.29300
Levelling mark	LT144133	87529.69907	36868.36212	100.29190
Levelling mark	LT144134	87527.64000	36865.61400	100.28740
Levelling mark	LT144135	87526.23400	36863.73800	100.28150
Levelling mark	LT144136	87524.24300	36861.09900	100.28240
Levelling mark	LT144137	87522.09309	36858.56621	100.28190
Levelling mark	LT144138	87520.50657	36856.58013	100.28200

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Levelling mark	LT144139	87518.35681	36854.16415	100.29200
Levelling mark	LT144140	87516.46284	36851.84826	100.28420
Levelling mark	LT144141	87514.67668	36849.67808	100.28710
Levelling mark	LT144142	87512.65512	36847.25335	100.29420
Levelling mark	LT144143	87510.82535	36845.08575	100.30390
Levelling mark	LT144144	87508.56849	36842.42896	100.31890
Levelling mark	LT144145	87507.14259	36840.76276	100.32730
Levelling mark	LT144146	87504.67769	36838.28048	100.32950
Levelling mark	LT144147	87503.00297	36835.96482	100.32870
Levelling mark	LT144148	87500.92433	36833.60809	100.32590
Levelling mark	LT144149	87499.01394	36831.44941	100.32790
Levelling mark	LT144150	87497.0448	36829.23284	100.32530
Levelling mark	LT144151	87495.048	36826.99672	100.31400
Levelling mark	LT144152	87493.03500	36824.73700	100.29840
Levelling mark	LT144153	87491.08600	36822.54800	100.29770
Levelling mark	LT144154	87489.00500	36820.24600	100.28670
Levelling mark	LT144155	87486.97000	36818.01200	100.27000
Levelling mark	LT144156	87485.10700	36815.96700	100.24000
Levelling mark	LT144157	87483.03400	36813.69300	100.24990
Levelling mark	LT144158	87481.00500	36811.46600	100.24620
Levelling mark	LT144159	87478.96500	36809.24900	100.24640
Levelling mark	LT144160	87476.93800	36807.02100	100.24620
Levelling mark	LT144161	87474.91000	36804.79200	100.24850
Levelling mark	LT144162	87473.17900	36802.88900	100.23670
Levelling mark	LT144163	87470.96977	36800.4528	100.23000
Levelling mark	LT144164	87468.99881	36798.28977	100.22280
Levelling mark	LT144165	87466.91522	36796.00406	100.22170
Levelling mark	LT144166	87465.06008	36793.9631	100.21990
Levelling mark	LT144167	87463.057	36791.76311	100.21630
Levelling mark	LT144168	87460.91533	36789.41633	100.21520
Levelling mark	LT144169	87458.86898	36787.16765	100.21460
Levelling mark	LT144170	87456.78023	36784.8796	100.21610
Levelling mark	LT144171	87454.79681	36782.68347	100.20590
Levelling mark	LT144172	87452.87308	36780.56657	100.19600
Levelling mark	LT144173	87450.87121	36778.36533	100.20550
Levelling mark	LT144174	87448.76536	36776.05057	100.21990
Levelling mark	LT144175	87446.76000	36773.84800	100.22700
Levelling mark	LT144176	87444.71100	36771.59100	100.23050
Levelling mark	LT144177	87442.84800	36769.53900	100.23610
Levelling mark	LT144178	87440.85412	36767.34188	100.24620
Levelling mark	LT144179	87438.54648	36764.79949	100.25710
Levelling mark	LT144180	87436.66421	36762.72572	100.26710
Levelling mark	LT144181	87434.63683	36760.48824	100.28180
Levelling mark	LT144182	87432.69415	36758.34695	100.28730
Levelling mark	LT144183	87431.04600	36756.53600	100.30040
Levelling mark	LT144184	87428.66900	36753.91800	100.32310

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Levelling mark	LT144185	87426.58300	36751.61900	100.34180
Levelling mark	LT144186	87424.66029	36749.49423	100.35500
Levelling mark	LT144187	87422.52778	36747.14467	100.37190
Levelling mark	LT144188	87422.37600	36743.41700	100.38490
Levelling mark	LT144189	87420.45599	36740.95023	100.39840
Levelling mark	LT144190	87418.69908	36738.69342	100.41160
Levelling mark	LT144191	87417.08583	36736.60978	100.41830
Levelling mark	LT144192	87414.93383	36733.4447	100.43180
Levelling mark	LT144193	87413.33891	36731.51493	100.43760
Levelling mark	LT144194	87411.01982	36728.77	100.43590
Levelling mark	LT144195	87409.3332	36726.60184	100.43560
Levelling mark	LT144196	87406.23077	36725.08595	100.43930
Levelling mark	LT144197	87404.52883	36722.94484	100.44190
Levelling mark	LT144198	87402.64571	36720.60809	100.43530
Levelling mark	LT144199	87401.04874	36718.20858	100.43040
Levelling mark	LT144200	87398.94800	36715.74100	100.43070
Levelling mark	LT144201	87396.93000	36713.57500	100.43050
Levelling mark	LT144202	87394.98900	36711.49200	100.43130
Levelling mark	LT144203	87392.7615	36709.1007	100.43170
Levelling mark	LT144204	87390.59441	36706.94024	100.42940
Levelling mark	LT144205	87388.54200	36704.57100	100.42860
Levelling mark	LT144206	87386.77300	36702.67300	100.42760
Levelling mark	LT144207	87384.69615	36700.44329	100.42820
Levelling mark	LT144208	87382.56078	36698.08402	100.42460
Levelling mark	LT144209	87380.65876	36695.97762	100.42300
Levelling mark	LT144210	87378.65054	36693.756	100.42440
Levelling mark	LT144211	87376.67337	36691.5783	100.42380
Levelling mark	LT144212	87374.75676	36689.45905	100.42380
Levelling mark	LT144213	87372.74433	36687.23118	100.42510
Levelling mark	LT144214	87370.67600	36684.94600	100.42780
Levelling mark	LT144215	87368.6709	36682.73186	100.43020
Levelling mark	LT144216	87366.58200	36680.42500	100.43250
Levelling mark	LT144217	87364.57922	36678.23039	100.43560
Levelling mark	LT144218	87362.62238	36676.07389	100.43840
Levelling mark	LT144219	87360.58906	36673.82708	100.44140
Levelling mark	LT144220	87358.66505	36671.46567	100.44450
Levelling mark	LT144221	87356.71456	36669.3081	100.44740
Levelling mark	LT144222	87354.59261	36666.96484	100.44960
Levelling mark	LT144223	87352.64216	36664.81274	100.45430
Levelling mark	LT144224	87350.62437	36662.58839	100.45780
Levelling mark	LT144225	87348.68271	36660.43911	100.46070
Levelling mark	LT144226	87346.55138	36658.08213	100.46310
Levelling mark	LT144227	87344.57612	36655.89884	100.46600
Levelling mark	LT144228	87342.62597	36653.74765	100.46720
Levelling mark	LT144229	87340.57585	36651.48301	100.47020
Levelling mark	LT144230	87338.62361	36649.32371	100.47270

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Levelling mark	LT144231	87336.59895	36647.08336	100.47600
Levelling mark	LT144232	87334.53443	36644.79613	100.47680
Levelling mark	LT144233	87332.55033	36642.60629	100.47880
Levelling mark	LT144234	87330.40824	36640.2415	100.48150
Levelling mark	LT144235	87328.45995	36638.09396	100.48290
Levelling mark	LT144236	87326.27202	36635.92964	100.48530
Levelling mark	LT144237	87324.32322	36633.77315	100.48720
Levelling mark	LT144238	87322.39809	36631.65228	100.48980
Levelling mark	LT144239	87320.25618	36629.28559	100.49210
Levelling mark	LT144240	87318.26226	36627.07543	100.49590
Levelling mark	LT144241	87316.18497	36624.78782	100.49970
Levelling mark	LT144242	87314.27515	36622.6832	100.49980
Levelling mark	LT144243	87312.20659	36620.40144	100.50300
Levelling mark	LT144244	87310.13617	36618.11696	100.50280
Levelling mark	LT144245	87308.31547	36616.10405	100.50730
Levelling mark	LT144246	87306.16777	36613.73236	100.51000
Levelling mark	LT144247	87304.09132	36611.44444	100.51250
Levelling mark	LT144248	87302.07377	36609.2179	100.51610
Levelling mark	LT144249	87300.1974	36607.1402	100.51830
Levelling mark	LT144250	87298.13134	36604.86216	100.52080
Levelling mark	LT144251	87296.18374	36602.71452	100.52170
Levelling mark	LT144252	87294.03369	36600.33612	100.52420
Levelling mark	LT144253	87292.14943	36598.26171	100.52500
Levelling mark	LT144254	87290.11092	36596.01157	100.52780
Levelling mark	LT144255	87288.09961	36593.78757	100.53170
Levelling mark	LT144256	87286.17425	36591.65661	100.53310
Levelling mark	LT144257	87284.07831	36589.33825	100.53590
Levelling mark	LT144258	87281.96100	36587.00500	100.53880
Levelling mark	LT144259	87280.10300	36584.95800	100.54100
Levelling mark	LT144260	87278.10787	36582.7585	100.54260
Levelling mark	LT144261	87275.99615	36580.42655	100.54380
Levelling mark	LT144262	87274.02581	36578.25389	100.54630
Levelling mark	LT144263	87272.01521	36576.03524	100.54940
Levelling mark	LT144264	87270.02200	36573.83500	100.55080
Levelling mark	LT144265	87268.00700	36571.61300	100.55290
Levelling mark	LT144266	87265.90200	36569.28900	100.55560
Levelling mark	LT144267	87263.97188	36567.14465	100.56010
Levelling mark	LT144268	87261.91655	36564.87419	100.56180
Levelling mark	LT144269	87259.89400	36562.66000	100.56400
Levelling mark	LT144270	87258.01123	36560.5696	100.56610
Levelling mark	LT144271	87255.81222	36558.14376	100.56740
Levelling mark	LT144272	87253.88468	36556.02023	100.57240
Levelling mark	LT144273	87251.91022	36553.84192	100.57420
Levelling mark	LT144274	87249.91243	36551.6386	100.57530
Levelling mark	LT144275	87247.81834	36549.3274	100.57910
Levelling mark	LT144276	87246.0774	36547.40818	100.58230

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Levelling mark	LT144277	87243.89838	36545.00373	100.58490
Levelling mark	LT144278	87241.9657	36542.87741	100.58710
Levelling mark	LT144279	87239.90900	36540.66100	100.58920
Levelling mark	LT144280	87237.80555	36538.29486	100.59130
Levelling mark	LT144281	87235.8491	36536.13816	100.59510
Levelling mark	LT144282	87233.90255	36533.987	100.59650
Levelling mark	LT144283	87229.8481	36529.49949	100.59960
Levelling mark	LT144284	87227.88976	36527.3341	100.60160
Levelling mark	LT144285	87225.83238	36525.056	100.60320
Levelling mark	LT144286	87223.8402	36522.85052	100.60490
Levelling mark	LT144287	87221.86094	36520.66123	100.60510
Levelling mark	LT144288	87219.81227	36518.39065	100.60590
Levelling mark	LT144289	87217.7569	36516.12194	100.60520
Levelling mark	LT144290	87215.79239	36513.95906	100.60550
Levelling mark	LT144291	87213.78937	36511.74959	100.60760
Levelling mark	LT144292	87211.80921	36509.56434	100.60910
Levelling mark	LT144293	87209.69376	36507.23467	100.60960
Levelling mark	LT144294	87207.72372	36505.0596	100.61040
Levelling mark	LT144295	87205.62996	36502.74186	100.61210
Levelling mark	LT144296	87203.63705	36500.53817	100.61170
Levelling mark	LT144297	87201.54758	36498.22267	100.60960
Levelling mark	LT144298	87199.68034	36496.16167	100.61010
Levelling mark	LT144299	87197.63675	36493.89768	100.61010
Levelling mark	LT144300	87195.68223	36491.736	100.60940
Levelling mark	LT144301	87193.66342	36489.50569	100.61160
Levelling mark	LT144302	87191.68546	36487.3162	100.61640
Levelling mark	LT144303	87189.43000	36484.95000	100.61900
Levelling mark	LT144304	87187.52100	36482.89600	100.62010
Levelling mark	LT144305	87185.47158	36480.68985	100.61950
Levelling mark	LT144306	87183.43647	36478.62303	100.62060
Levelling mark	LT144307	87181.17239	36476.35323	100.62430
Levelling mark	LT144308	87179.16373	36474.38949	100.62690
Levelling mark	LT144309	87176.74222	36472.07861	100.62740
Levelling mark	LT144310	87174.81671	36470.2493	100.63290
Levelling mark	LT144311	87172.64128	36468.18916	100.63140
Levelling mark	LT144312	87169.97917	36466.17847	100.62880
Levelling mark	LT144313	87167.02309	36465.15292	100.62610
Levelling mark	LT144314	87164.98397	36462.90875	100.62380
Levelling mark	LT144315	87163.07800	36460.81100	100.61380
Levelling mark	LT144316	87160.96147	36458.46594	100.61860
Levelling mark	LT144317	87159.01271	36456.3075	100.62270
Levelling mark	LT144318	87156.83291	36453.89757	100.61910
Levelling mark	LT144319	87155.08003	36451.96228	100.61880
Levelling mark	LT144320	87152.92805	36449.58223	100.61770
Levelling mark	LT144321	87150.79229	36447.23098	100.62090
Levelling mark	LT144322	87148.88117	36445.13999	100.61870

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Levelling mark	LT144323	87146.83285	36442.88192	100.62080
Levelling mark	LT144324	87144.89598	36440.74911	100.62250
Levelling mark	LT144325	87142.90426	36438.55021	100.62460
Levelling mark	LT144326	87141.01159	36436.45428	100.61600
Levelling mark	LT144327	87138.94285	36434.17733	100.61370
Levelling mark	LT144328	87136.8156	36431.82966	100.61820
Levelling mark	LT144329	87134.84837	36429.66002	100.61770
Levelling mark	LT144330	87132.67611	36427.26668	100.61700
Levelling mark	LT144331	87130.79145	36425.18983	100.61570
Levelling mark	LT144332	87128.79252	36422.98498	100.61650
Levelling mark	LT144333	87126.86900	36420.88700	100.61980
Levelling mark	LT144334	87124.86400	36418.67400	100.62230
Levelling mark	LT144335	87122.86000	36416.46200	100.62240
Levelling mark	LT144336	87120.85500	36414.24900	100.62300
Levelling mark	LT144337	87118.85000	36412.03700	100.61940
Levelling mark	LT144338	87116.84495	36409.82451	100.61890
Levelling mark	LT144339	87114.75900	36407.52100	100.61710
Levelling mark	LT144340	87112.65193	36405.19425	100.61700
Levelling mark	LT144341	87110.73037	36403.07341	100.61550
Levelling mark	LT144342	87108.66027	36400.79257	100.61350
Levelling mark	LT144343	87106.62403	36398.54483	100.61250
Levelling mark	LT144344	87104.65848	36396.3794	100.61570
Levelling mark	LT144345	87102.60787	36394.11548	100.61570
Levelling mark	LT144346	87100.53195	36391.83259	100.61280
Levelling mark	LT144347	87098.59089	36389.68614	100.61450
Levelling mark	LT144348	87096.53289	36387.41775	100.61320
Levelling mark	LT144349	87094.49257	36385.16375	100.61290
Levelling mark	LT144350	87092.52437	36382.99821	100.61360
Levelling mark	LT144351	87090.53142	36380.79533	100.61160
Levelling mark	LT144352	87088.55832	36378.6175	100.61070
Levelling mark	LT144353	87086.5974	36376.4549	100.61300
Levelling mark	LT144354	87084.44814	36374.08974	100.61780
Levelling mark	LT144355	87082.56000	36371.97100	100.61790
Levelling mark	LT144356	87080.50519	36369.74202	100.61940
Levelling mark	LT144357	87078.33200	36367.35300	100.61930
Levelling mark	LT144358	87076.23500	36365.04900	100.62270
Levelling mark	LT144359	87074.23300	36362.84800	100.62260
Levelling mark	LT144360	87072.23000	36360.64600	100.62310
Levelling mark	LT144361	87070.46343	36358.7049	100.62570
Levelling mark	LT144362	87068.3475	36356.38869	100.62510
Levelling mark	LT144363	87066.26128	36354.10093	100.62500
Levelling mark	LT144364	87064.3171	36351.97112	100.62590
Levelling mark	LT144365	87062.36718	36349.83986	100.62430
Levelling mark	LT144366	87060.22478	36347.50001	100.62210
Levelling mark	LT144367	87058.21378	36345.30699	100.62060
Levelling mark	LT144368	87056.2292	36343.14561	100.61700

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Levelling mark	LT144369	87054.20833	36340.94626	100.61620
Levelling mark	LT144370	87052.18218	36338.74876	100.61660
Levelling mark	LT144371	87050.25936	36336.65932	100.61190
Levelling mark	LT144372	87048.14157	36334.36592	100.60970
Levelling mark	LT144373	87046.09938	36332.15753	100.61200
Levelling mark	LT144374	87043.99265	36329.88058	100.60830
Levelling mark	LT144375	87041.93261	36327.6509	100.60550
Levelling mark	LT144376	87039.84426	36325.39768	100.60360
Levelling mark	LT144377	87037.80654	36323.20902	100.60040
Levelling mark	LT144378	87035.81161	36321.06489	100.60130
Levelling mark	LT144379	87033.60300	36318.70100	100.60220
Levelling mark	LT144380	87031.68913	36316.64899	100.60000
Levelling mark	LT144381	87029.58185	36314.39215	100.60000
Levelling mark	LT144382	87027.61787	36312.29284	100.59900
Levelling mark	LT144383	87025.57642	36310.1154	100.59730
Levelling mark	LT144384	87023.5143	36307.92052	100.60050
Levelling mark	LT144385	87021.44544	36305.72342	100.60070
Levelling mark	LT144386	87019.41203	36303.561	100.59970
Levelling mark	LT144387	87017.39894	36301.42124	100.60120
Levelling mark	LT144388	87015.31259	36299.20291	100.60270
Levelling mark	LT144389	87013.34281	36297.11218	100.60120
Levelling mark	LT144390	87011.2015	36294.83641	100.60310
Levelling mark	LT144391	87009.18902	36292.69458	100.60490
Levelling mark	LT144392	87007.08549	36290.45509	100.60430
Levelling mark	LT144393	87005.09904	36288.34303	100.60620
Levelling mark	LT144394	87003.02134	36286.12675	100.60640
Levelling mark	LT144395	87000.89900	36283.88600	100.60640
Levelling mark	LT144396	86998.91759	36281.75135	100.60860
Levelling mark	LT144397	86996.89654	36279.59482	100.60980
Levelling mark	LT144398	86994.86212	36277.41766	100.60760
Levelling mark	LT144399	86992.79248	36275.20951	100.60740
Levelling mark	LT144400	86990.79718	36273.06869	100.60830
Levelling mark	LT144401	86988.73029	36270.85328	100.60910
Levelling mark	LT144402	86986.61368	36268.57656	100.60950
Levelling mark	LT144403	86984.63245	36266.44708	100.60850
Levelling mark	LT144404	86982.55333	36264.20226	100.60760
Levelling mark	LT144405	86980.56907	36262.06546	100.60890
Levelling mark	LT144406	86978.50864	36259.83965	100.60910
Levelling mark	LT144407	86976.40297	36257.56197	100.60930
Levelling mark	LT144408	86974.50011	36255.50593	100.60950
Levelling mark	LT144501	87848.14565	37053.49482	100.45040
Levelling mark	LT144502	87845.20952	37053.61167	100.47970
Levelling mark	LT144503	87841.8897	37053.73275	100.50810
Levelling mark	LT144504	87839.24589	37053.82793	100.53390
Levelling mark	LT144505	87836.65689	37053.91268	100.56190
Levelling mark	LT144506	87833.45217	37054.0175	100.59150

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Levelling mark	LT144507	87830.89400	37054.10600	100.61750
Levelling mark	LT144508	87828.40382	37054.29871	100.64230
Levelling mark	LT144509	87825.58394	37054.35611	100.66850
Levelling mark	LT144510	87822.49808	37054.40392	100.70220
Levelling mark	LT144511	87819.41200	37054.41300	100.73280
Levelling mark	LT144512	87816.71876	37054.44142	100.75670
Levelling mark	LT144513	87813.55063	37054.43145	100.79130
Levelling mark	LT144514	87810.7852	37054.46243	100.81740
Levelling mark	LT144515	87807.55301	37054.40267	100.85020
Levelling mark	LT144516	87804.49631	37054.32854	100.88090
Levelling mark	LT144517	87801.77858	37054.17797	100.90680
Levelling mark	LT144518	87798.64559	37054.05255	100.92870
Levelling mark	LT144519	87796.10841	37053.92031	100.95760
Levelling mark	LT144520	87792.83108	37053.72218	100.98670
Levelling mark	LT144521	87789.74338	37053.54807	101.01140
Levelling mark	LT144522	87786.95504	37053.26539	101.03490
Levelling mark	LT144523	87783.96185	37053.03242	101.05900
Levelling mark	LT144524	87781.139	37052.69692	101.08240
Levelling mark	LT144525	87778.13297	37052.41068	101.10570
Levelling mark	LT144526	87774.96634	37052.01413	101.12510
Levelling mark	LT144527	87772.23843	37051.6441	101.14840
Levelling mark	LT144528	87769.19275	37051.14031	101.17020
Levelling mark	LT144529	87766.53554	37050.72416	101.19170
Levelling mark	LT144530	87763.46266	37050.20393	101.21440
Levelling mark	LT144531	87760.85771	37049.42139	101.23260
Levelling mark	LT144532	87757.74588	37048.83027	101.25610
Levelling mark	LT144533	87754.66207	37048.21196	101.28140
Levelling mark	LT144534	87752.10468	37047.67003	101.29820
Levelling mark	LT144535	87749.04000	37046.90300	101.31760
Levelling mark	LT144536	87745.90821	37046.25468	101.33290
Levelling mark	LT144537	87743.45969	37045.61802	101.34720
Levelling mark	LT144538	87740.86016	37044.99796	101.36410
Levelling mark	LT144539	87737.75762	37044.18104	101.37810
Levelling mark	LT144540	87734.69518	37043.33099	101.37640
Levelling mark	LT144541	87732.2382	37042.62116	101.37500
Levelling mark	LT144542	87729.15556	37041.69982	101.37120
Levelling mark	LT144543	87726.77417	37040.97145	101.36430
Levelling mark	LT144544	87724.29029	37040.17202	101.36080
Levelling mark	LT144545	87720.6419	37038.96264	101.35160
Levelling mark	LT144546	87718.1414	37038.10839	101.34240
Levelling mark	LT144547	87715.20145	37037.06718	101.33240
Levelling mark	LT144548	87712.76985	37036.18203	101.32490
Levelling mark	LT144549	87709.66423	37035.01914	101.30970
Levelling mark	LT144550	87707.18851	37034.06172	101.30700
Levelling mark	LT144551	87704.09703	37033.16676	101.29770
Levelling mark	LT144552	87701.32333	37032.03154	101.28890

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Levelling mark	LT144553	87698.97612	37031.04363	101.28230
Levelling mark	LT144554	87695.84351	37029.75573	101.27530
Levelling mark	LT144555	87692.9066	37028.40327	101.26370
Levelling mark	LT144556	87689.59099	37026.88994	101.25890
Levelling mark	LT144557	87687.70154	37026.00593	101.25030
Levelling mark	LT144558	87684.94469	37024.68389	101.24260
Levelling mark	LT144559	87682.44213	37023.45772	101.23590
Levelling mark	LT144560	87679.67832	37022.12344	101.22960
Levelling mark	LT144561	87677.92537	37021.22426	101.21920
Levelling mark	LT144562	87674.94096	37019.60478	101.20780
Levelling mark	LT144563	87672.06313	37018.03479	101.20100
Levelling mark	LT144564	87669.32907	37016.51578	101.19000
Levelling mark	LT144565	87666.66305	37015.05573	101.17650
Levelling mark	LT144566	87664.5052	37013.79924	101.17010
Levelling mark	LT144567	87662.28091	37012.48396	101.16100
Levelling mark	LT144568	87659.31241	37010.62529	101.15840
Levelling mark	LT144569	87656.68036	37008.96892	101.14310
Levelling mark	LT144570	87654.08928	37007.30977	101.12180
Levelling mark	LT144571	87651.75481	37005.78772	101.10650
Levelling mark	LT144572	87649.56733	37004.3283	101.09160
Levelling mark	LT144573	87647.06647	37002.69317	101.07430
Levelling mark	LT144574	87644.28905	37000.70076	101.05730
Levelling mark	LT144575	87641.8179	36998.93542	101.04130
Levelling mark	LT144576	87639.40126	36996.80334	101.02240
Levelling mark	LT144577	87637.30055	36995.2403	101.00850
Levelling mark	LT144578	87634.8073	36993.3414	100.99530
Levelling mark	LT144579	87632.66992	36991.69448	100.97770
Levelling mark	LT144580	87630.21983	36989.75703	100.97240
Levelling mark	LT144581	87627.73684	36987.74601	100.96550
Levelling mark	LT144582	87625.73996	36986.09982	100.95310
Levelling mark	LT144583	87623.33063	36984.06158	100.93430
Levelling mark	LT144584	87621.3602	36982.36384	100.91910
Levelling mark	LT144585	87618.89300	36980.18000	100.89470
Levelling mark	LT144586	87616.93262	36978.3822	100.88370
Levelling mark	LT144587	87614.54126	36976.18948	100.87250
Levelling mark	LT144588	87612.33623	36974.11731	100.85760
Levelling mark	LT144589	87610.36063	36972.22182	100.84460
Levelling mark	LT144590	87607.87311	36970.23476	100.83220
Levelling mark	LT144591	87605.97897	36968.41274	100.81730
Levelling mark	LT144592	87603.69243	36966.15313	100.80180
Levelling mark	LT144593	87601.81881	36963.63565	100.78650
Levelling mark	LT144594	87599.42678	36961.53321	100.76470
Levelling mark	LT144595	87597.66239	36959.6045	100.74600
Levelling mark	LT144596	87595.60500	36957.28900	100.72670
Levelling mark	LT144597	87593.71100	36955.28500	100.70250
Levelling mark	LT144598	87591.55300	36952.92600	100.68360

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Levelling mark	LT144599	87589.71994	36950.45335	100.66640
Levelling mark	LT144600	87588.76814	36949.30464	100.65780
Levelling mark	LT144601	87586.00049	36945.89467	100.63150
Levelling mark	LT144602	87584.33448	36943.79151	100.61550
Levelling mark	LT144603	87582.48917	36941.42439	100.59470
Levelling mark	LT144604	87580.7604	36939.1682	100.57890
Levelling mark	LT144605	87578.99137	36936.62363	100.56970
Levelling mark	LT144606	87577.41873	36934.44344	100.55430
Levelling mark	LT144607	87575.51471	36931.82993	100.54010
Levelling mark	LT144608	87573.74748	36929.37113	100.52410
Levelling mark	LT144609	87572.24769	36927.26637	100.49820
Levelling mark	LT144610	87570.37323	36924.59459	100.49920
Levelling mark	LT144611	87568.58307	36922.01179	100.48480
Levelling mark	LT144612	87566.69788	36919.27029	100.47070
Levelling mark	LT144613	87565.11744	36916.94716	100.45860
Levelling mark	LT144614	87563.60200	36914.44100	100.44430
Levelling mark	LT144615	87561.92800	36911.94600	100.43160
Levelling mark	LT144616	87560.12000	36909.25400	100.41880
Levelling mark	LT144617	87558.44505	36906.76331	100.40950
Levelling mark	LT144618	87556.60039	36904.01136	100.39090
Levelling mark	LT144619	87555.16103	36901.85725	100.38080
Levelling mark	LT144620	87553.34081	36899.14739	100.37510
Levelling mark	LT144621	87551.89358	36897.00048	100.36640
Levelling mark	LT144622	87550.06503	36894.2901	100.35150
Levelling mark	LT144623	87548.21475	36891.57834	100.34340
Levelling mark	LT144624	87546.75532	36889.44999	100.33420
Levelling mark	LT144625	87544.90777	36886.77514	100.32320
Levelling mark	LT144626	87543.19375	36884.31785	100.31350
Levelling mark	LT144627	87541.68886	36882.18406	100.30710
Levelling mark	LT144628	87539.74397	36879.46245	100.29670
Levelling mark	LT144629	87537.88431	36876.8642	100.28240
Levelling mark	LT144630	87536.36428	36874.77092	100.26730
Levelling mark	LT144631	87534.78444	36872.62501	100.27560
Levelling mark	LT144632	87532.8393	36870.01242	100.27460
Levelling mark	LT144633	87530.8878	36867.42248	100.27080
Levelling mark	LT144634	87528.86300	36864.61200	100.26580
Levelling mark	LT144635	87527.35673	36862.81731	100.26020
Levelling mark	LT144636	87525.35500	36860.18800	100.25680
Levelling mark	LT144637	87523.27592	36857.62247	100.25830
Levelling mark	LT144638	87521.67047	36855.61449	100.25680
Levelling mark	LT144639	87519.51300	36853.14300	100.26550
Levelling mark	LT144640	87517.59568	36850.8307	100.26380
Levelling mark	LT144641	87515.89745	36848.76261	100.26750
Levelling mark	LT144642	87513.80054	36846.25361	100.27190
Levelling mark	LT144643	87511.96619	36844.07711	100.28710
Levelling mark	LT144644	87509.76666	36841.50507	100.30440

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Levelling mark	LT144645	87508.24894	36839.75254	100.31090
Levelling mark	LT144646	87506.0364	36837.16483	100.31800
Levelling mark	LT144647	87504.03396	36835.02607	100.31420
Levelling mark	LT144648	87502.13506	36832.69864	100.31070
Levelling mark	LT144649	87500.13887	36830.43132	100.31540
Levelling mark	LT144650	87498.17019	36828.216	100.31310
Levelling mark	LT144651	87496.21437	36826.03063	100.30630
Levelling mark	LT144652	87493.91200	36823.96400	100.29730
Levelling mark	LT144653	87492.05000	36821.77200	100.29530
Levelling mark	LT144654	87490.00288	36819.36246	100.28550
Levelling mark	LT144655	87488.04600	36817.05900	100.27000
Levelling mark	LT144656	87486.22000	36814.93600	100.26500
Levelling mark	LT144657	87484.14500	36812.66100	100.25340
Levelling mark	LT144658	87482.11500	36810.43500	100.24470
Levelling mark	LT144659	87480.08400	36808.20900	100.24950
Levelling mark	LT144660	87478.05400	36805.98300	100.24420
Levelling mark	LT144661	87476.02400	36803.75700	100.24170
Levelling mark	LT144662	87474.28482	36801.85074	100.23330
Levelling mark	LT144663	87472.06882	36799.42125	100.23200
Levelling mark	LT144664	87470.0608	36797.22145	100.22810
Levelling mark	LT144665	87468.04131	36795.00095	100.22280
Levelling mark	LT144666	87466.18902	36792.96539	100.21970
Levelling mark	LT144667	87464.18107	36790.76305	100.21560
Levelling mark	LT144668	87462.07091	36788.43842	100.21300
Levelling mark	LT144669	87460.04665	36786.21572	100.21540
Levelling mark	LT144670	87457.93722	36783.8978	100.21550
Levelling mark	LT144671	87455.89496	36781.6487	100.20990
Levelling mark	LT144672	87453.85254	36779.40378	100.19730
Levelling mark	LT144673	87451.9196	36777.27812	100.20290
Levelling mark	LT144674	87449.87443	36775.02378	100.22090
Levelling mark	LT144675	87447.87100	36772.82000	100.22510
Levelling mark	LT144676	87445.82200	36770.56400	100.22790
Levelling mark	LT144677	87443.91300	36768.46200	100.23420
Levelling mark	LT144678	87441.91839	36766.26588	100.24390
Levelling mark	LT144679	87439.68000	36763.80100	100.25310
Levelling mark	LT144680	87437.7987	36761.72672	100.26440
Levelling mark	LT144681	87435.76700	36759.49300	100.28240
Levelling mark	LT144682	87433.82328	36757.35218	100.28850
Levelling mark	LT144683	87432.3066	36755.40369	100.30010
Levelling mark	LT144684	87429.97581	36752.74481	100.31780
Levelling mark	LT144685	87427.97198	36750.37201	100.33470
Levelling mark	LT144686	87425.77959	36748.48947	100.35160
Levelling mark	LT144687	87424.05787	36745.81356	100.36640
Levelling mark	LT144688	87424.16300	36741.37800	100.37970
Levelling mark	LT144689	87422.08700	36739.08900	100.39850
Levelling mark	LT144690	87420.18800	36736.99500	100.41480

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Levelling mark	LT144691	87418.43900	36735.06600	100.41920
Levelling mark	LT144692	87415.93300	36732.30400	100.42690
Levelling mark	LT144693	87414.2622	36730.46149	100.43410
Levelling mark	LT144694	87411.94083	36727.90212	100.43160
Levelling mark	LT144695	87410.11500	36725.89600	100.43420
Levelling mark	LT144696	87407.94725	36723.51432	100.43760
Levelling mark	LT144697	87406.10493	36721.51036	100.43460
Levelling mark	LT144698	87404.09292	36719.31202	100.43580
Levelling mark	LT144699	87402.17699	36717.21518	100.43170
Levelling mark	LT144700	87399.94912	36714.7669	100.42990
Levelling mark	LT144701	87397.97163	36712.58783	100.43010
Levelling mark	LT144702	87396.09101	36710.52247	100.43360
Levelling mark	LT144703	87393.87236	36708.08549	100.43040
Levelling mark	LT144704	87391.70439	36705.91339	100.42820
Levelling mark	LT144705	87389.58723	36703.57283	100.42530
Levelling mark	LT144706	87387.8749	36701.68374	100.42420
Levelling mark	LT144707	87385.81243	36699.424	100.42400
Levelling mark	LT144712	87383.68572	36697.07226	100.42320
Levelling mark	LT144713	87381.82565	36695.01092	100.42020
Levelling mark	LT144714	87379.76476	36692.72725	100.42160
Levelling mark	LT144715	87377.82400	36690.58900	100.42190
Levelling mark	LT144716	87375.8454	36688.4029	100.42210
Levelling mark	LT144717	87373.84608	36686.19105	100.42260
Levelling mark	LT144718	87371.80526	36683.93613	100.42540
Levelling mark	LT144719	87369.80452	36681.72844	100.42900
Levelling mark	LT144720	87367.68102	36679.39825	100.43120
Levelling mark	LT144721	87365.69688	36677.21166	100.43390
Levelling mark	LT144722	87363.69192	36674.99614	100.43640
Levelling mark	LT144723	87361.69665	36672.79694	100.43980
Levelling mark	LT144724	87359.76901	36670.4406	100.44190
Levelling mark	LT144725	87357.84602	36668.31899	100.44630
Levelling mark	LT144726	87355.71800	36665.96300	100.44870
Levelling mark	LT144727	87353.72879	36663.76179	100.45230
Levelling mark	LT144728	87351.71428	36661.5416	100.45590
Levelling mark	LT144729	87349.79354	36659.42624	100.45850
Levelling mark	LT144730	87347.58767	36656.98369	100.46130
Levelling mark	LT144731	87345.65858	36654.8532	100.46430
Levelling mark	LT144732	87343.75462	36652.74861	100.46510
Levelling mark	LT144733	87341.67893	36650.45502	100.46790
Levelling mark	LT144734	87339.73088	36648.30202	100.47090
Levelling mark	LT144735	87337.66742	36646.01737	100.47400
Levelling mark	LT144736	87335.63218	36643.7697	100.47490
Levelling mark	LT144737	87333.64132	36641.56686	100.47750
Levelling mark	LT144738	87331.51358	36639.21899	100.48040
Levelling mark	LT144739	87329.55937	36637.062	100.48250
Levelling mark	LT144740	87327.39029	36634.9069	100.48380

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Levelling mark	LT144741	87325.42777	36632.73757	100.48620
Levelling mark	LT144742	87323.54258	36630.65487	100.48870
Levelling mark	LT144743	87321.36767	36628.25696	100.49020
Levelling mark	LT144744	87319.29406	36625.97017	100.49350
Levelling mark	LT144745	87317.27684	36623.74378	100.49600
Levelling mark	LT144746	87315.3601	36621.63465	100.49940
Levelling mark	LT144747	87313.31945	36619.38226	100.50010
Levelling mark	LT144748	87311.23286	36617.08367	100.49990
Levelling mark	LT144749	87309.43775	36615.09823	100.50590
Levelling mark	LT144750	87307.24811	36612.67953	100.50870
Levelling mark	LT144751	87305.21705	36610.44106	100.51080
Levelling mark	LT144752	87303.21694	36608.23108	100.51410
Levelling mark	LT144753	87301.32335	36606.13552	100.51770
Levelling mark	LT144754	87299.24132	36603.84562	100.51980
Levelling mark	LT144755	87297.3149	36601.7154	100.51970
Levelling mark	LT144756	87295.16986	36599.34369	100.52260
Levelling mark	LT144757	87293.23584	36597.21439	100.52360
Levelling mark	LT144758	87291.24796	36595.01695	100.52630
Levelling mark	LT144759	87289.18592	36592.7358	100.52970
Levelling mark	LT144760	87287.34214	36590.69763	100.53180
Levelling mark	LT144761	87285.19102	36588.32404	100.53470
Levelling mark	LT144762	87283.04796	36585.95094	100.53760
Levelling mark	LT144763	87281.25974	36583.97867	100.53940
Levelling mark	LT144764	87279.20238	36581.72035	100.54120
Levelling mark	LT144765	87277.08085	36579.37754	100.54220
Levelling mark	LT144766	87275.12298	36577.21721	100.54470
Levelling mark	LT144767	87273.13203	36575.02039	100.54700
Levelling mark	LT144768	87271.11068	36572.78874	100.54910
Levelling mark	LT144769	87269.14903	36570.62	100.55110
Levelling mark	LT144770	87266.99554	36568.24178	100.55450
Levelling mark	LT144771	87265.06893	36566.10899	100.55460
Levelling mark	LT144772	87263.04504	36563.8758	100.55790
Levelling mark	LT144773	87261.03048	36561.65387	100.56210
Levelling mark	LT144774	87259.1321	36559.56004	100.56470
Levelling mark	LT144775	87256.94151	36557.14289	100.56510
Levelling mark	LT144776	87255.00859	36555.01562	100.56990
Levelling mark	LT144777	87253.00806	36552.80797	100.57270
Levelling mark	LT144778	87251.01641	36550.60957	100.57490
Levelling mark	LT144779	87248.92545	36548.29949	100.57830
Levelling mark	LT144780	87247.18354	36546.37778	100.58060
Levelling mark	LT144781	87244.97595	36543.94796	100.58300
Levelling mark	LT144782	87243.1081	36541.88834	100.58460
Levelling mark	LT144783	87241.08777	36539.66395	100.58840
Levelling mark	LT144784	87238.93464	36537.29342	100.58910
Levelling mark	LT144785	87236.98417	36535.13919	100.59390
Levelling mark	LT144786	87235.03363	36532.98683	100.59630

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Levelling mark	LT144787	87230.95325	36528.46872	100.59820
Levelling mark	LT144788	87229.05568	36526.37064	100.60080
Levelling mark	LT144789	87226.97514	36524.06999	100.60330
Levelling mark	LT144790	87224.96134	36521.83994	100.60380
Levelling mark	LT144791	87223.00046	36519.67122	100.60390
Levelling mark	LT144792	87220.96149	36517.41558	100.60530
Levelling mark	LT144793	87218.85400	36515.09200	100.60500
Levelling mark	LT144794	87216.88432	36512.92178	100.60510
Levelling mark	LT144795	87214.93207	36510.76393	100.60740
Levelling mark	LT144796	87212.95655	36508.58698	100.60790
Levelling mark	LT144797	87210.81605	36506.22346	100.60800
Levelling mark	LT144798	87208.66373	36503.84454	100.60930
Levelling mark	LT144799	87206.76737	36501.7465	100.61020
Levelling mark	LT144800	87204.80469	36499.57629	100.61060
Levelling mark	LT144801	87202.63799	36497.17827	100.60810
Levelling mark	LT144802	87200.79159	36495.13897	100.60850
Levelling mark	LT144803	87198.81149	36492.94427	100.60880
Levelling mark	LT144804	87196.7961	36490.71715	100.60870
Levelling mark	LT144805	87194.81661	36488.53095	100.60890
Levelling mark	LT144806	87192.77794	36486.28393	100.61550
Levelling mark	LT144807	87190.55300	36483.99500	100.61660
Levelling mark	LT144808	87188.63200	36481.95100	100.61800
Levelling mark	LT144809	87186.57000	36479.75600	100.61860
Levelling mark	LT144810	87184.58608	36477.64512	100.62170
Levelling mark	LT144811	87182.26061	36475.31011	100.62320
Levelling mark	LT144812	87180.28648	36473.39148	100.62680
Levelling mark	LT144813	87177.89838	36471.10435	100.62810
Levelling mark	LT144814	87175.98100	36469.26800	100.63450
Levelling mark	LT144815	87173.57315	36467.31479	100.64030
Levelling mark	LT144816	87171.29700	36465.00500	100.64330
Levelling mark	LT144817	87168.02300	36464.25700	100.64070
Levelling mark	LT144818	87165.65626	36461.59742	100.63260
Levelling mark	LT144819	87163.96943	36459.99416	100.62550
Levelling mark	LT144820	87162.05491	36457.42889	100.62780
Levelling mark	LT144821	87160.0909	36455.25969	100.62420
Levelling mark	LT144822	87157.92100	36452.90400	100.62000
Levelling mark	LT144823	87156.18522	36450.9535	100.61760
Levelling mark	LT144824	87154.03400	36448.58200	100.61570
Levelling mark	LT144825	87151.85500	36446.17900	100.61990
Levelling mark	LT144826	87149.97100	36444.10200	100.61610
Levelling mark	LT144827	87147.94500	36441.86800	100.61720
Levelling mark	LT144828	87145.99796	36439.72075	100.61880
Levelling mark	LT144829	87144.09169	36437.61413	100.62270
Levelling mark	LT144830	87142.37988	36435.7133	100.61620
Levelling mark	LT144831	87140.0354	36433.12974	100.61590
Levelling mark	LT144832	87137.99727	36430.88022	100.61780

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Levelling mark	LT144833	87135.9167	36428.58933	100.61590
Levelling mark	LT144834	87133.77332	36426.23098	100.61720
Levelling mark	LT144835	87131.88493	36424.14354	100.61520
Levelling mark	LT144836	87129.88784	36421.95313	100.61610
Levelling mark	LT144837	87127.97500	36419.84400	100.61860
Levelling mark	LT144838	87125.96900	36417.63300	100.62040
Levelling mark	LT144839	87123.96400	36415.42100	100.62090
Levelling mark	LT144840	87121.95900	36413.20900	100.62190
Levelling mark	LT144841	87119.95300	36410.99700	100.61900
Levelling mark	LT144842	87117.94775	36408.78511	100.61760
Levelling mark	LT144843	87115.87634	36406.50547	100.61580
Levelling mark	LT144844	87113.79548	36404.20628	100.61570
Levelling mark	LT144845	87111.87626	36402.08859	100.61440
Levelling mark	LT144846	87109.85261	36399.8558	100.61270
Levelling mark	LT144847	87107.72058	36397.50898	100.61290
Levelling mark	LT144848	87105.80653	36395.39961	100.61620
Levelling mark	LT144849	87103.78667	36393.17111	100.61540
Levelling mark	LT144850	87101.64375	36390.80931	100.61420
Levelling mark	LT144851	87099.75958	36388.7332	100.61390
Levelling mark	LT144852	87097.6907	36386.44468	100.61390
Levelling mark	LT144853	87095.61673	36384.15264	100.61260
Levelling mark	LT144854	87093.67904	36382.02261	100.61340
Levelling mark	LT144855	87091.68426	36379.82062	100.60950
Levelling mark	LT144856	87089.67977	36377.60635	100.60900
Levelling mark	LT144857	87087.71300	36375.43900	100.61290
Levelling mark	LT144858	87085.57623	36373.08435	100.61610
Levelling mark	LT144859	87083.67164	36370.98505	100.61730
Levelling mark	LT144860	87081.66300	36368.77300	100.61880
Levelling mark	LT144861	87079.42983	36366.31432	100.61850
Levelling mark	LT144862	87077.33200	36364.00500	100.62090
Levelling mark	LT144863	87075.33200	36361.80200	100.62020
Levelling mark	LT144864	87073.33100	36359.59900	100.62010
Levelling mark	LT144865	87071.56600	36357.65600	100.62200
Levelling mark	LT144866	87069.41904	36355.31829	100.62300
Levelling mark	LT144867	87067.3162	36353.01078	100.62350
Levelling mark	LT144868	87065.38693	36350.90079	100.62430
Levelling mark	LT144869	87063.49681	36348.83696	100.62170
Levelling mark	LT144870	87061.31099	36346.44964	100.61990
Levelling mark	LT144871	87059.32513	36344.28451	100.62020
Levelling mark	LT144872	87057.31658	36342.0967	100.61730
Levelling mark	LT144873	87055.31656	36339.91644	100.61560
Levelling mark	LT144874	87053.31979	36337.75114	100.61600
Levelling mark	LT144875	87051.37055	36335.63304	100.61160
Levelling mark	LT144876	87049.23384	36333.31947	100.60960
Levelling mark	LT144877	87047.22298	36331.1445	100.60980
Levelling mark	LT144878	87045.09088	36328.83722	100.60660

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Levelling mark	LT144879	87043.07394	36326.6569	100.60440
Levelling mark	LT144880	87040.94799	36324.36232	100.60330
Levelling mark	LT144881	87038.92535	36322.19663	100.59990
Levelling mark	LT144882	87036.94604	36320.07282	100.60020
Levelling mark	LT144883	87034.71984	36317.678	100.60190
Levelling mark	LT144884	87032.80411	36315.62767	100.60070
Levelling mark	LT144885	87030.69413	36313.36801	100.60020
Levelling mark	LT144886	87028.70412	36311.24496	100.59950
Levelling mark	LT144887	87026.70033	36309.10473	100.59850
Levelling mark	LT144888	87024.58037	36306.85021	100.60140
Levelling mark	LT144889	87022.56757	36304.70995	100.60240
Levelling mark	LT144890	87020.48232	36302.49419	100.60030
Levelling mark	LT144891	87018.50376	36300.38625	100.60290
Levelling mark	LT144892	87016.40285	36298.15593	100.60350
Levelling mark	LT144893	87014.46914	36296.10383	100.60120
Levelling mark	LT144894	87012.29685	36293.79317	100.60260
Levelling mark	LT144895	87010.32778	36291.69739	100.60690
Levelling mark	LT144896	87008.19988	36289.43194	100.60670
Levelling mark	LT144897	87006.22587	36287.3319	100.60830
Levelling mark	LT144898	87004.15138	36285.12302	100.60730
Levelling mark	LT144899	87002.03163	36282.86303	100.60780
Levelling mark	LT144900	87000.03493	36280.73379	100.61050
Levelling mark	LT144901	86998.02062	36278.58894	100.61040
Levelling mark	LT144902	86995.95472	36276.38044	100.60940
Levelling mark	LT144903	86993.92202	36274.20394	100.60980
Levelling mark	LT144904	86991.91633	36272.05312	100.61000
Levelling mark	LT144905	86989.85012	36269.83479	100.61180
Levelling mark	LT144906	86987.71531	36267.54411	100.61130
Levelling mark	LT144907	86985.74781	36265.42902	100.61020
Levelling mark	LT144908	86983.72374	36263.24506	100.61030