Forth Replacement Crossing

Employer's Delivery Team
Construction Vibration Monitoring Report

M9 Junction 1a Contract
(October 2012)

TRANSPORT SCOTLAND

An agency of The Scottish Government

FORTH REPLACEMENT CROSSING

FORTH REPLACEMENT CROSSING

EMPLOYER'S DELIVERY TEAM
CONSTRUCTION VIBRATION MONITORING REPORT

M9 JUNCTION 1A CONTRACT
(October 2012)

Revision Status

Revision	Date	Description	Author	Approved for Use
0	December 2012	Original	DGC/RML	AMM

FORTH REPLACEMENT CROSSING

EMPLOYER'S DELIVERY TEAM
CONSTRUCTION VIBRATION MONITORING REPORT

CONTENTS

1. INTRODUCTION

1.1 This report sets out the results of the construction vibration monitoring undertaken on the M9 Junction 1a Contract in October 2012 as part of the Forth Replacement Crossing project.

2. M9 J1A CONTRACT VIBRATION MONITORING

VIBRATION MONITORING LOCATIONS

2.1 Continuous vibration monitoring was carried out at fixed monitor locations in October 2012 as outlined in Table 2.1 below. The main construction activities carried out adjacent to the monitor locations are also listed.

Monitoring Location	Monitoring Period	Main Construction Activities
93/95 King Edwards Way (CNV02)	October 2012	• Pavement surfacing works
15-17 Buie Rigg (CNV07)	October 2012	• Earthworks & SUDS pond excavation • Pavement works on eastbound diverge slip • Pavement works on eastbound merge slip • Pavement works on M9 Mainline • Concrete pours at M901 Overbridge • Erection of Gantry 11 • Traffic management movement of Varioguard
8 Kirklands Park Grove (CNV16)	October 2012	• Safety Barrier works at M9 Spur • Pavement works on northbound M9 Spur • Concrete pours at Newmains Bridge • Traffic management on southbound M9 Spur

Table 2.1 Long Term Monitoring Locations – October

VIBRATION MONITORING RESULTS

2.2 The results of the M9 J1a Contract construction vibration monitoring are provided in chart format in Appendix A of this report.

2.3 The charts show the Vibration Dose Values (VDV) and Peak Particle Velocities (PPV) recorded at receptors. VDV levels are recorded in order to monitor the potential for disturbance to the occupants of buildings (as discussed in BS 6472) and PPV values are recorded in order to monitor the potential for damage to buildings (as discussed in BS 7385).

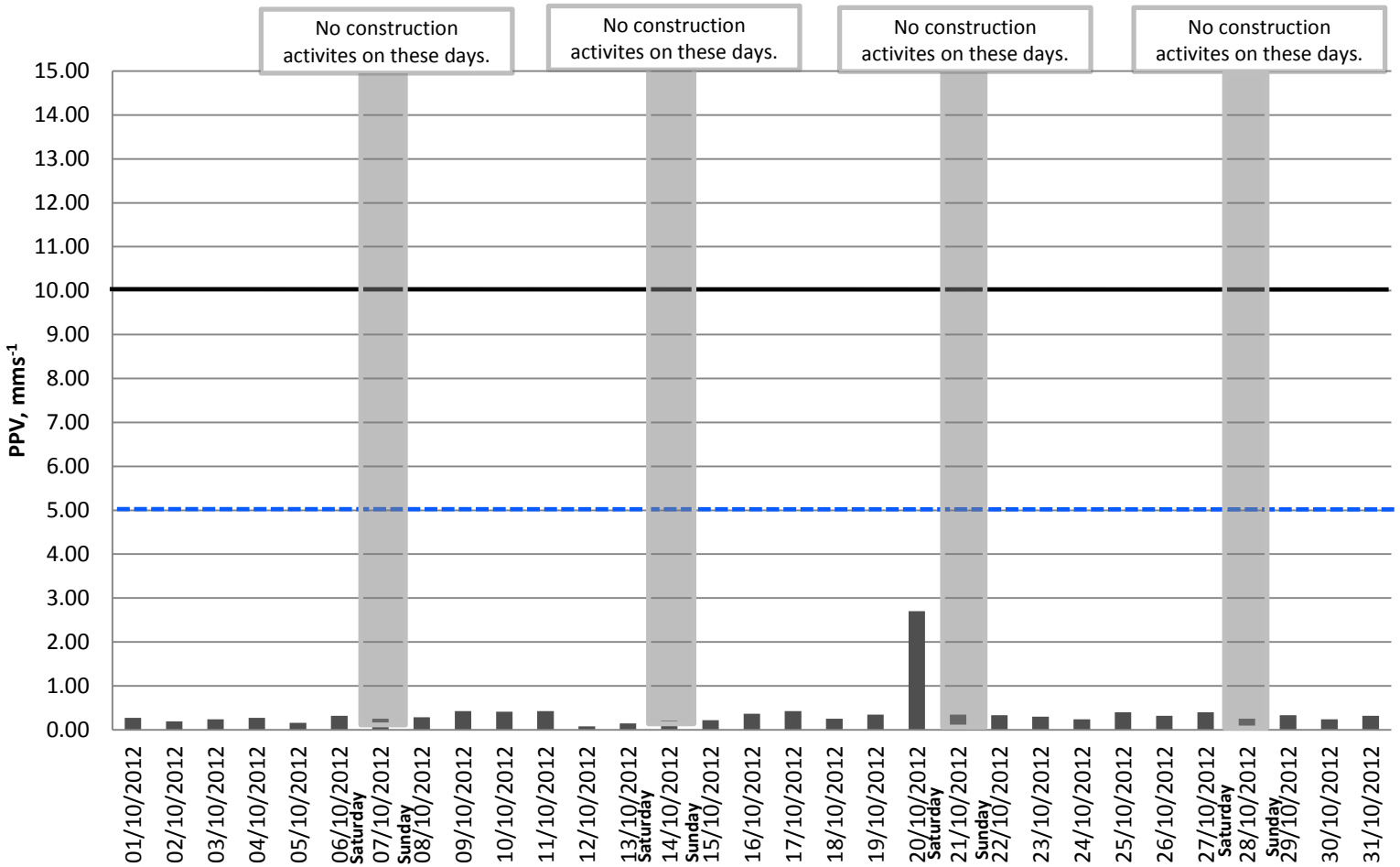
2.4 The charts indicate that all construction activities in the period were carried out in accordance with the vibration thresholds set out in the project Code of Construction Practice.

2.5 One exceedance of the VDV threshold level was recorded in October 2012. The exceedance was investigated and the Contractor found that no construction activates were being carried out in the area at the time of the exceedance. The exceedance is therefore not attributed to construction works.

2.6 No exceedances of the PPV threshold level were recorded in the month of October.

APPENDIX A - M9 J1A CONTRACT CONSTRUCTION VIBRATION CHARTS

Measured highest daytime Peak Particle Velocity (PPV), 93/95 King Edwards Way (CNV02) Measurement period 1st October 2012 to 31st October 2012



Construction PPV Thresholds

Daily PPV threshold for intermittent construction

Daily PPV threshold for continuous construction

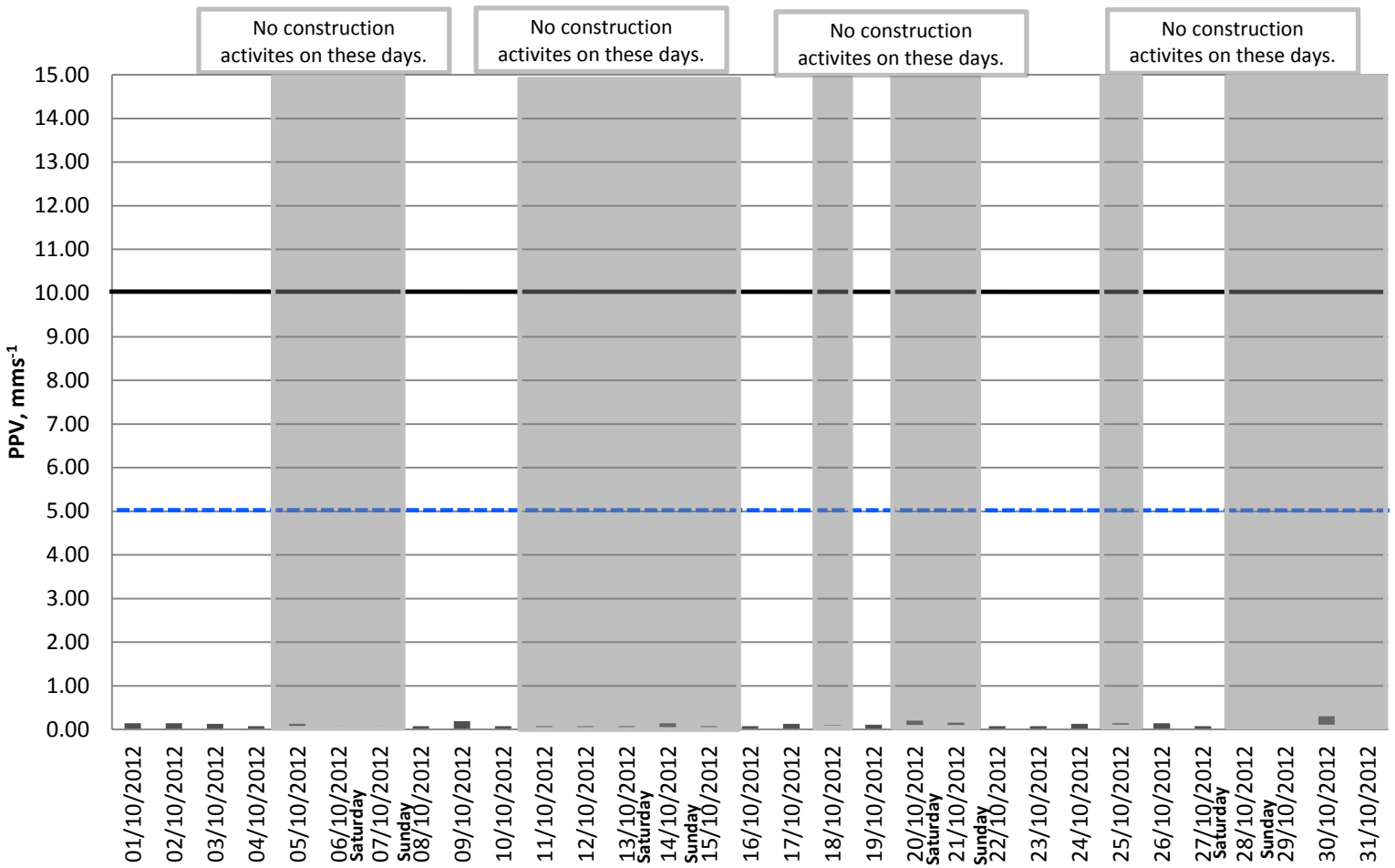
Measured VDV

Daily highest PPV (z-axis)

(n) = Investigation Report Number

Note: The horizontal axes often show high vibration levels caused by spurious 'localised' events which are not attributable to construction works, whilst the vertical axis appears much less affected. Therefore the results from only the vertical dataset are presented, as a more reliable indicator of the prevailing vibration climate at this location.

Measured highest night-time Peak Particle Velocity (PPV), 93/95 King Edwards Way (CNV02) Measurement period 1st October 2012 to 31st October 2012



Construction PPV Thresholds

Daily PPV threshold for intermittent construction

Daily PPV threshold for continuous construction

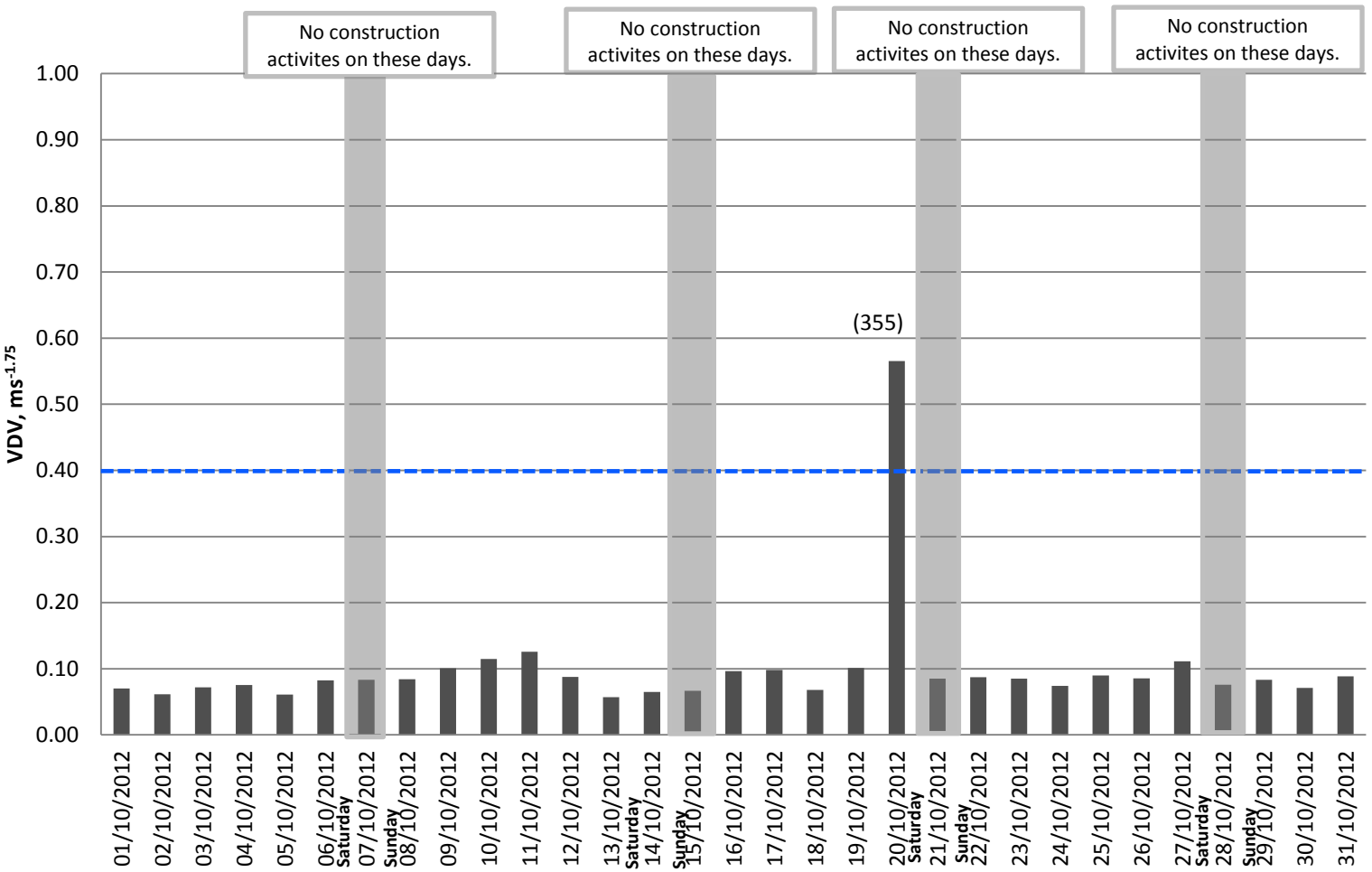
Measured VDV

Daily highest PPV (z-axis)

(n) = Investigation Report Number

Note: The horizontal axes often show high vibration levels caused by spurious 'localised' events which are not attributable to construction works, whilst the vertical axis appears much less affected. Therefore the results from only the vertical dataset are presented, as a more reliable indicator of the prevailing vibration climate at this location.

Measured daytime (07:00-23:00) Vibration Dose Values (VDV), 93/95 King Edwards Way (CNV02) Measurement period 1st October 2012 to 31st October 2012



Construction VDV Threshold

Daily daytime VDV threshold for residential dwellings

Measured VDV

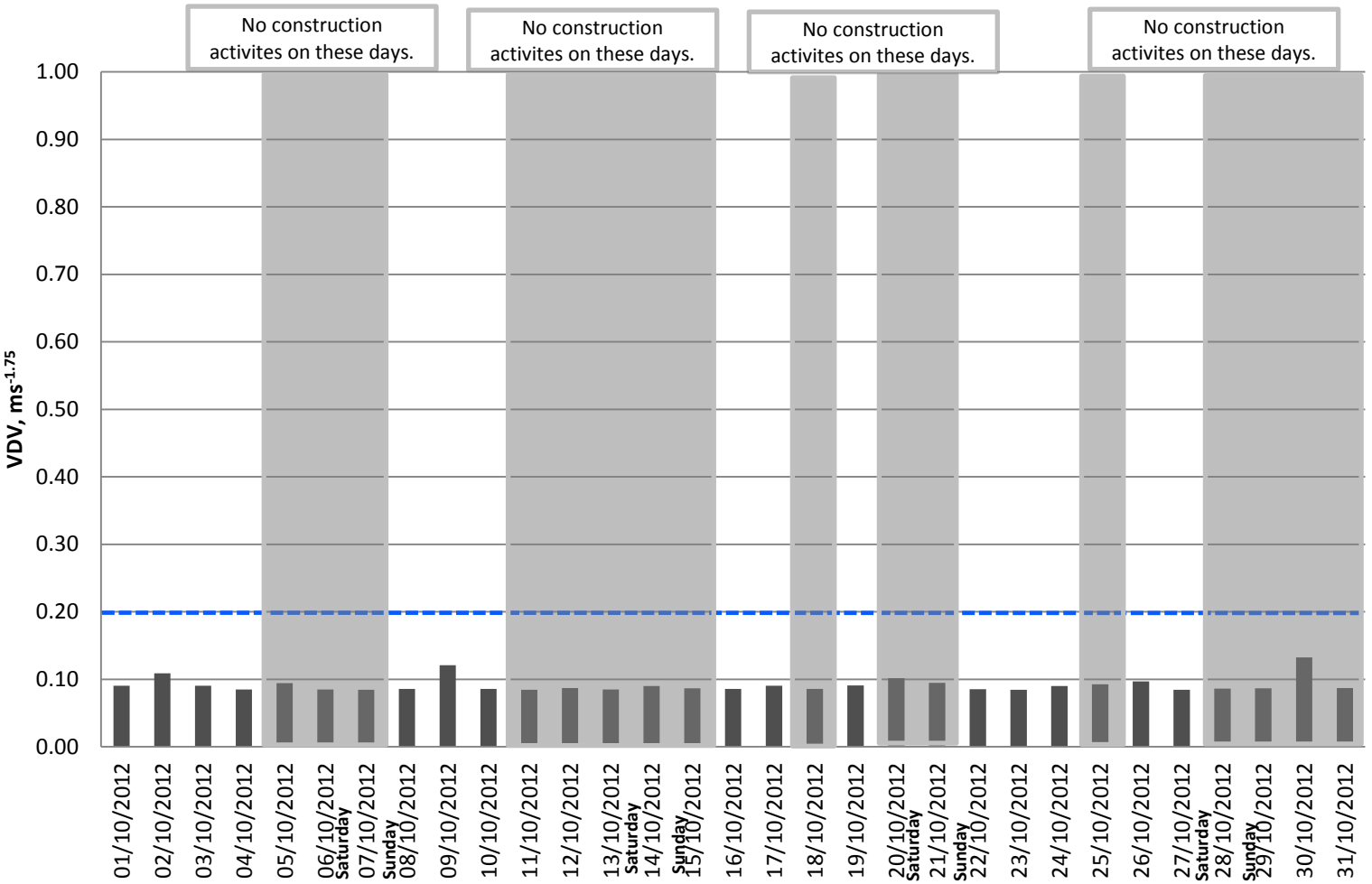
Daily daytime VDV (z-axis)

(n) = Investigation Report Number

Note: The horizontal axes often show high vibration levels caused by spurious 'localised' events which are not attributable to construction works, whilst the vertical axis appears much less affected. Therefore the results from only the vertical dataset are presented, as a more reliable indicator of the prevailing vibration climate at this location.

VDV threshold for Education establishments, offices and similar is 0.40ms$^{-1.75}$ and Commercial is 0.80ms$^{-1.75}$. Therefore it may be necessary to adjust the threshold displayed on the graph if buildings other than residential dwellings are being assessed.

Measured night time (23:00-07:00) Vibration Dose Values (VDV), 93/95 King Edwards Way (CNV02) Measurement period 1st October 2012 to 31st October 2012



Construction VDV Threshold

Daily night time VDV threshold for residential dwellings

Measured VDV

Daily night time VDV (z-axis)

(n) = Investigation Report Number

Note: The horizontal axes often show high vibration levels caused by spurious 'localised' events which are not attributable to construction works, whilst the vertical axis appears much less affected. Therefore the results from only the vertical dataset are presented, as a more reliable indicator of the prevailing vibration climate at this location.

A transfer function equivalent to doubling the night-time VDV measurements has been applied to obtain values representative of an upstairs, mid-floor receptor location. VDV threshold for Education establishments, offices and similar is 0.40ms$^{-1.75}$ and Commercial is 0.80ms$^{-1.75}$. Therefore it may be necessary to adjust the threshold displayed on the graph if buildings other than residential dwellings are being assessed.

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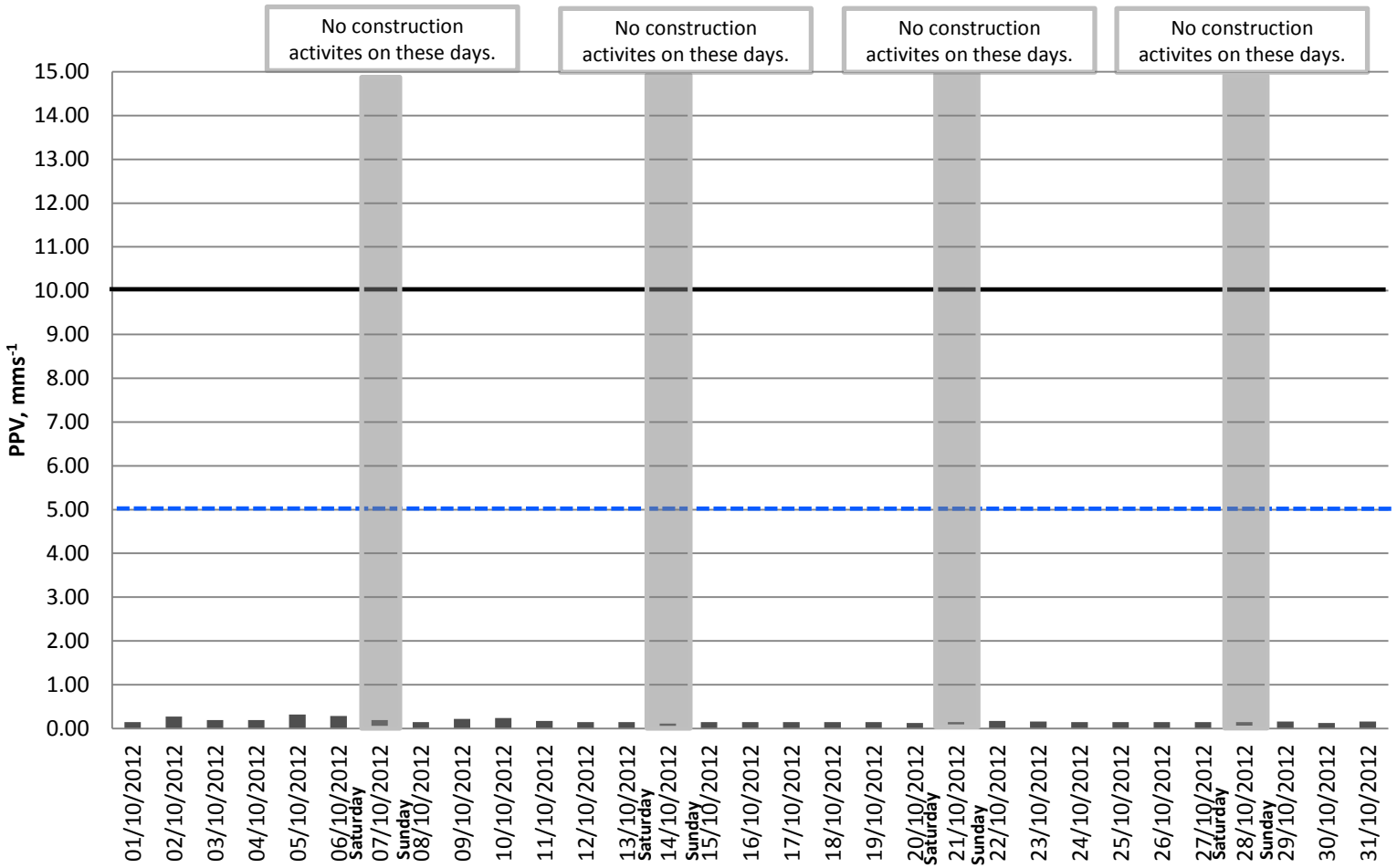

Construction PPV Thresholds

Daily PPV threshold for intermittent construction

Daily PPV threshold for continuous construction

Measured VDV

Daily highest PPV (z-axis)

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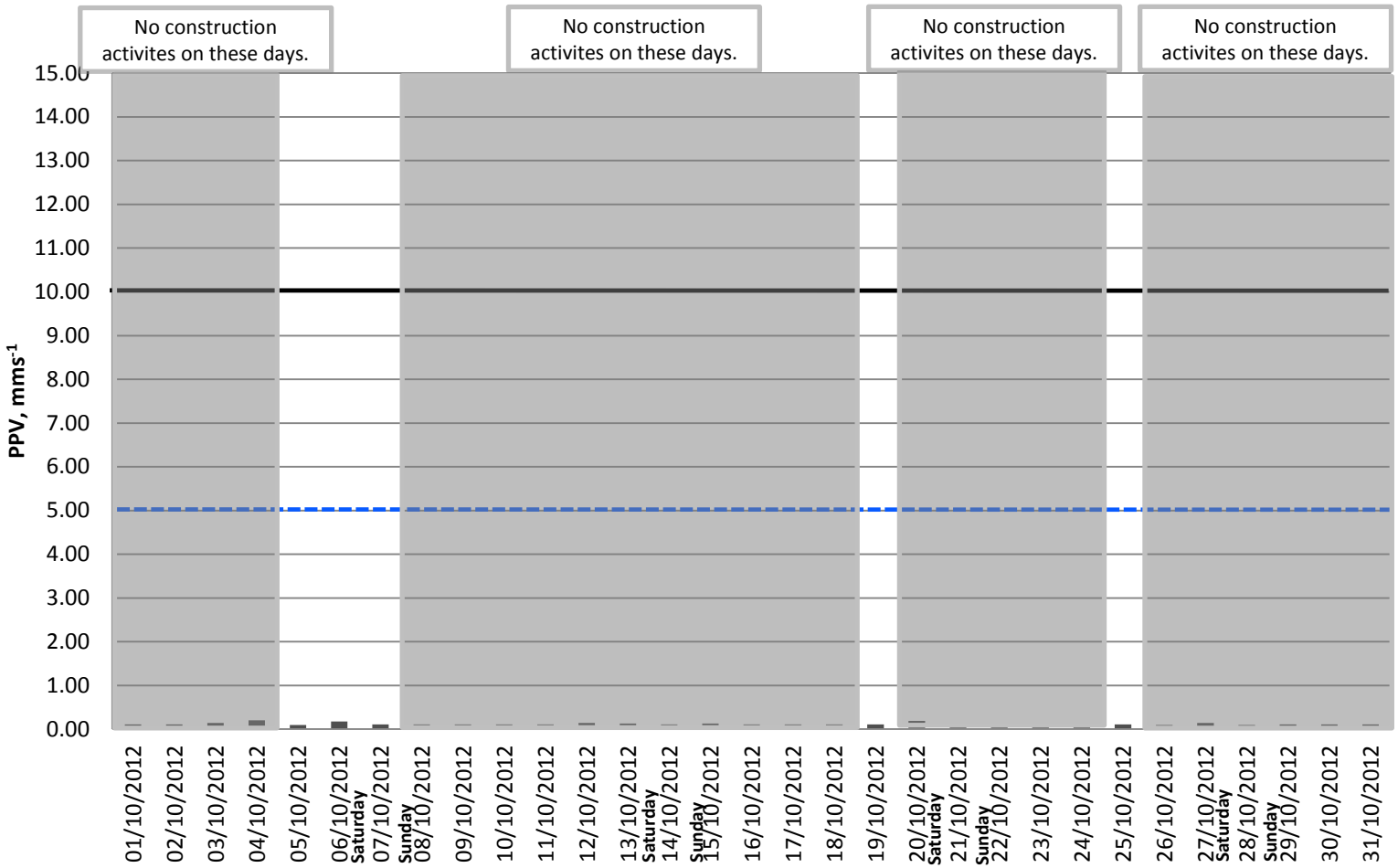

Construction PPV Thresholds

Daily PPV threshold for intermittent construction

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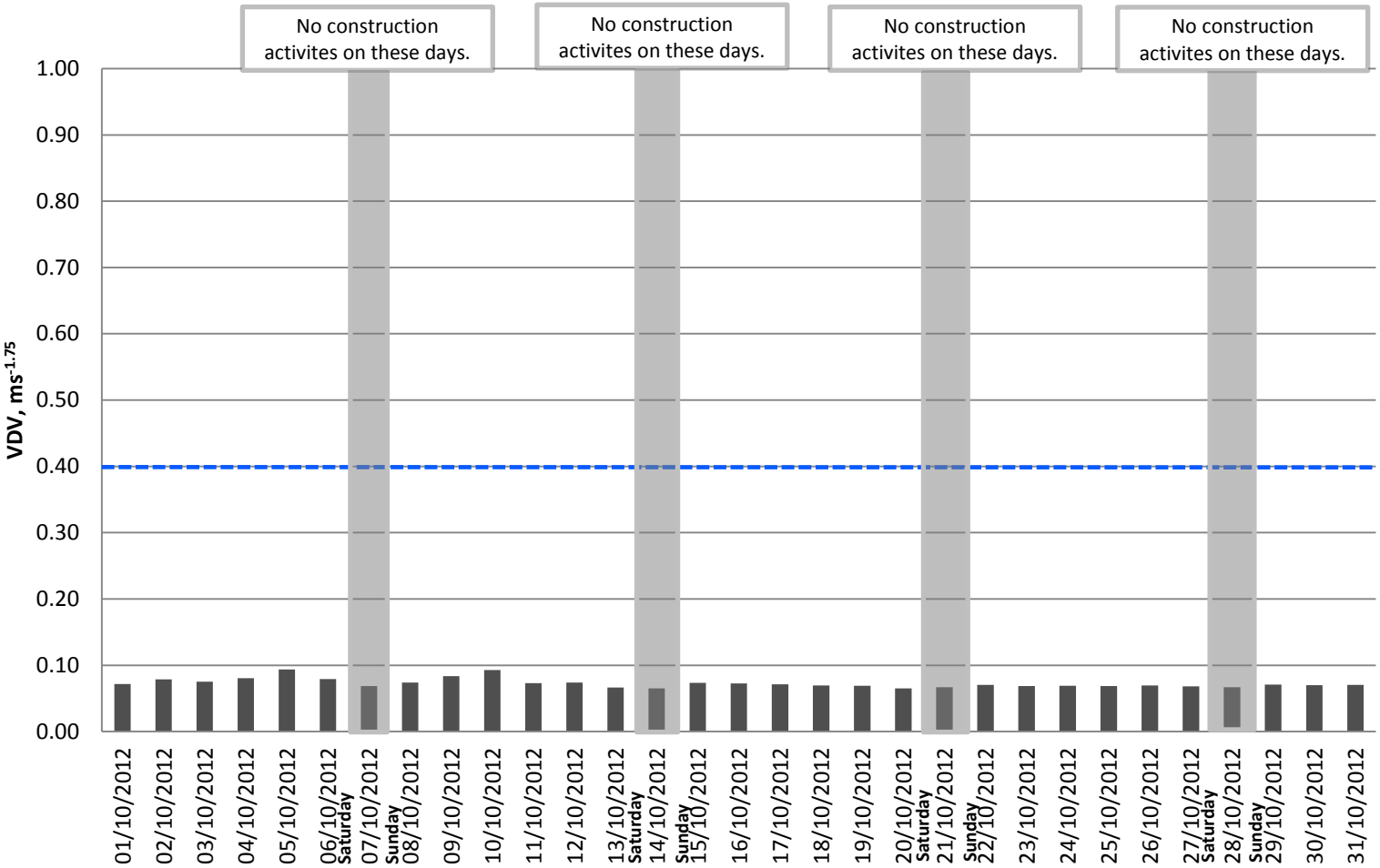

Construction VDV Threshold

Daily daytime VDV threshold for residential dwellings

Measured VDV

Daily daytime VDV (z-axis)

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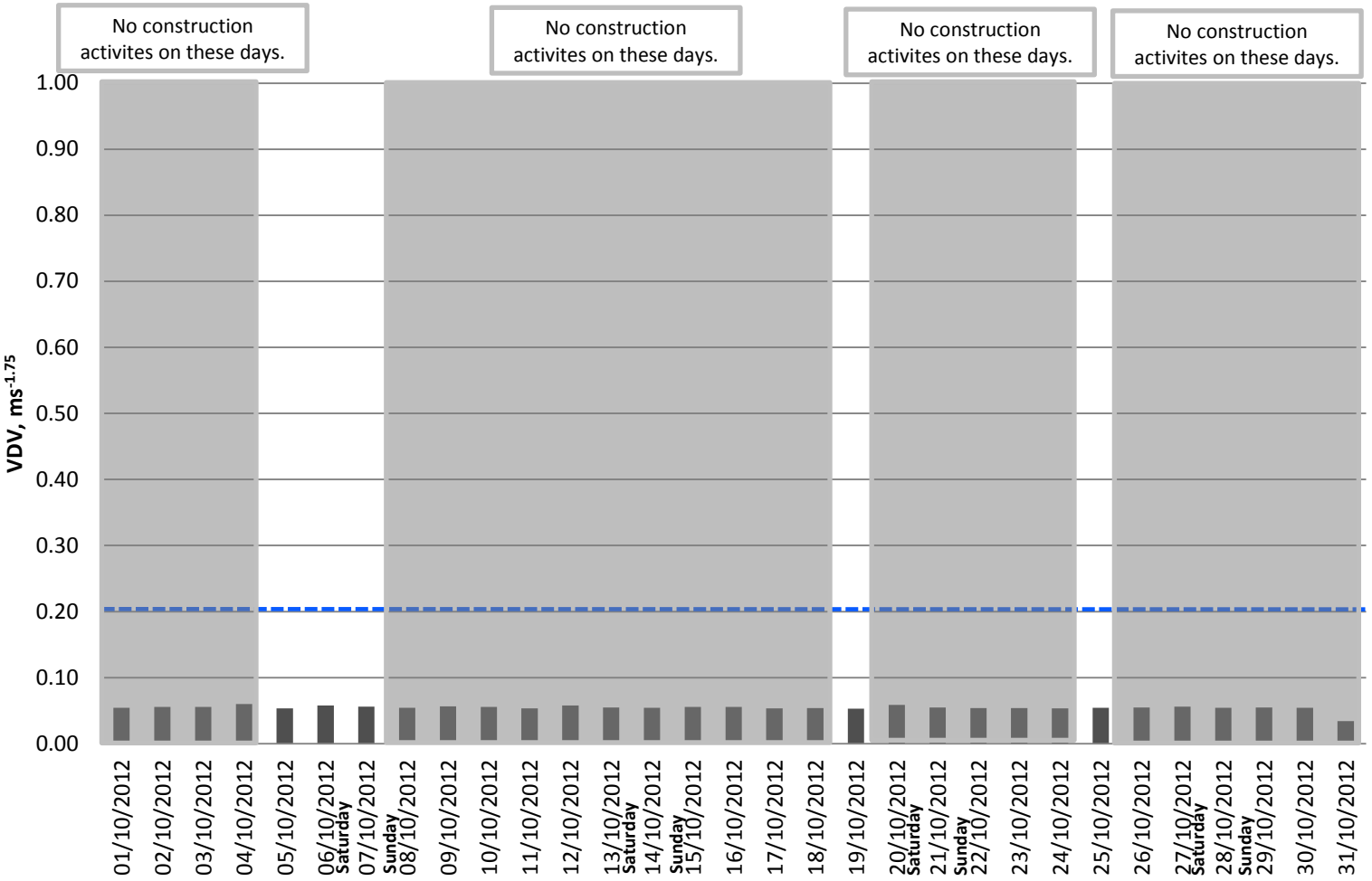

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Daily night time VDV threshold for residential dwellings

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Daily night time VDV (z-axis)

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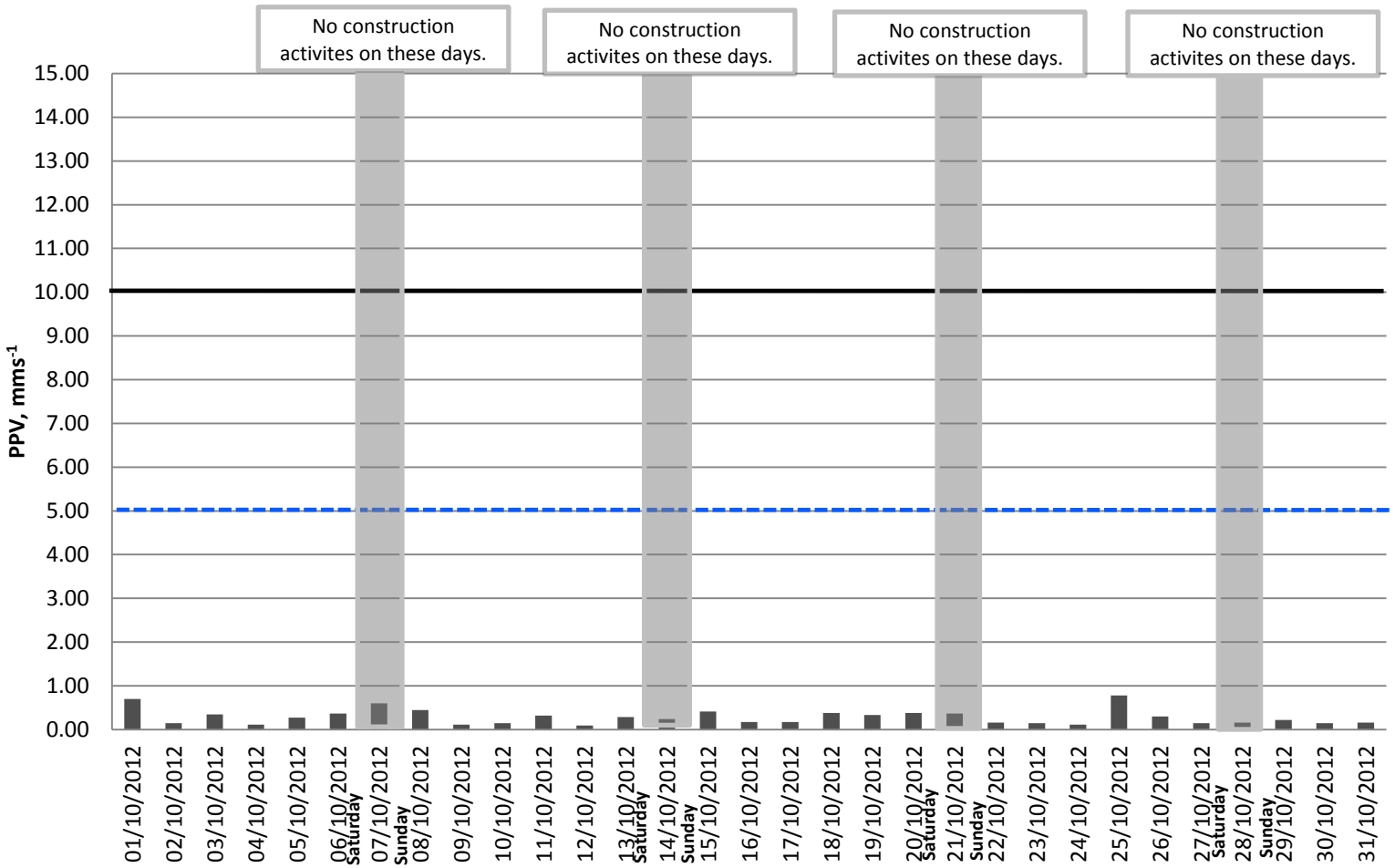
Measured highest daytime Peak Particle Velocity (PPV), 8 Kirklands Park Grove (CNV16) Measurement period 1st October 2012 to 31st October 2012



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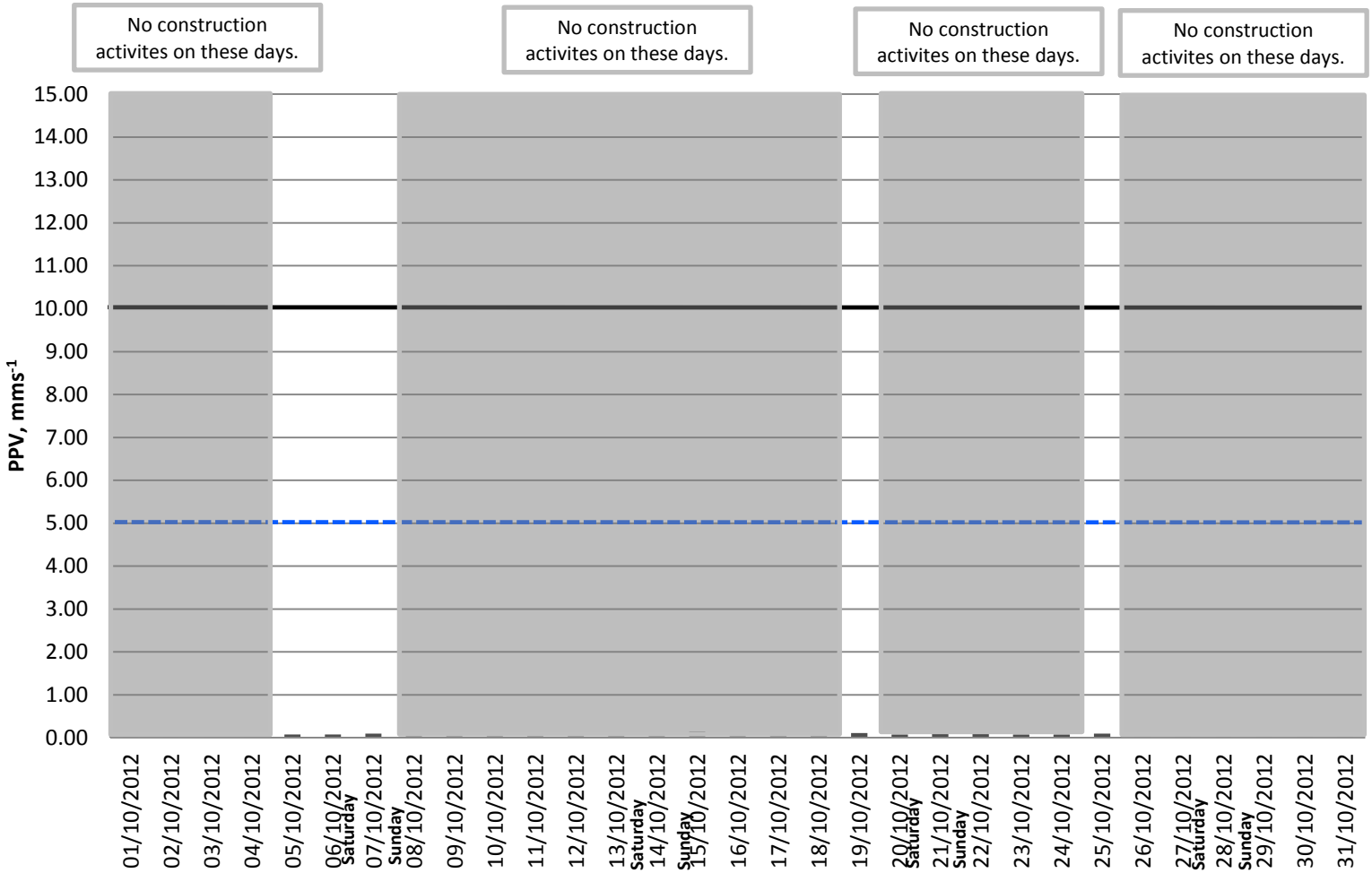

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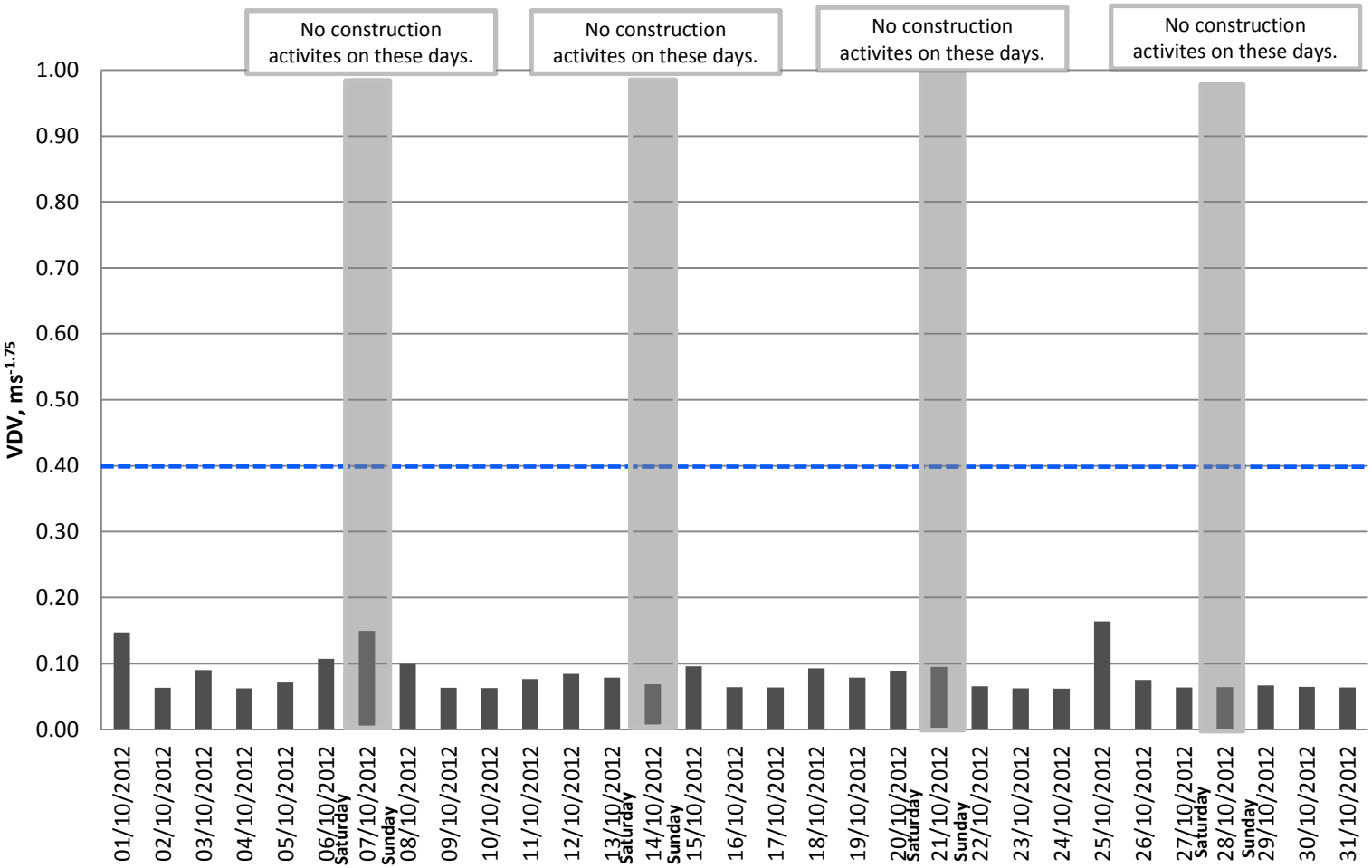

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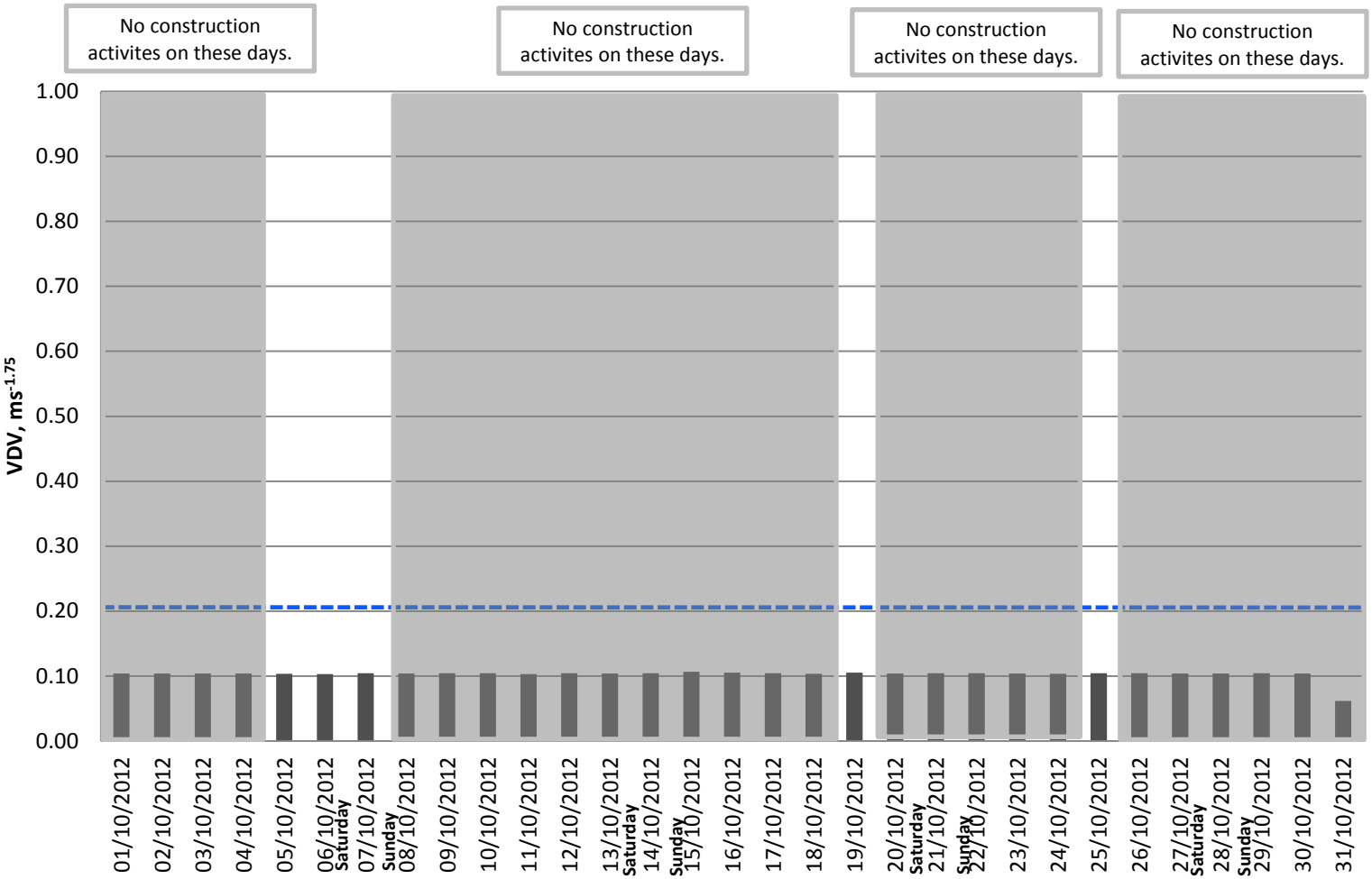

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SRB Civil Engineering Limited ROADBRIDGE SISK	Project Title: **FORTH REPLACEMENT CROSSING** **M9 Junction 1A**		**Project Number:** **208**
	Contractor: **SRB**	Date: **22-10-12**	**NER. 169**
QUALITY MANAGEMENT SYSTEM	**VIBRATION EXCEEDENCE REPORT**		

Summary of Finding(s): October 20th – CNV02

Exceedences 355: Maximum VDV: 0.57 at 17.30 on Saturday

An analysis was carried out using the following data:

- Recorded Vibration Logs
- Vibration type
- Site Diaries / Weather Data
- Inspections by Senior Engineer (Roland Tarrant)

Findings:

Analysis of the site diary shows that no works were carried out in this area at this time by SRB.

Therefore it is considered unlikely that noise from the construction activities caused the exceedence.

Corrective Action Required:

Maintain current monitoring and surveillance levels.

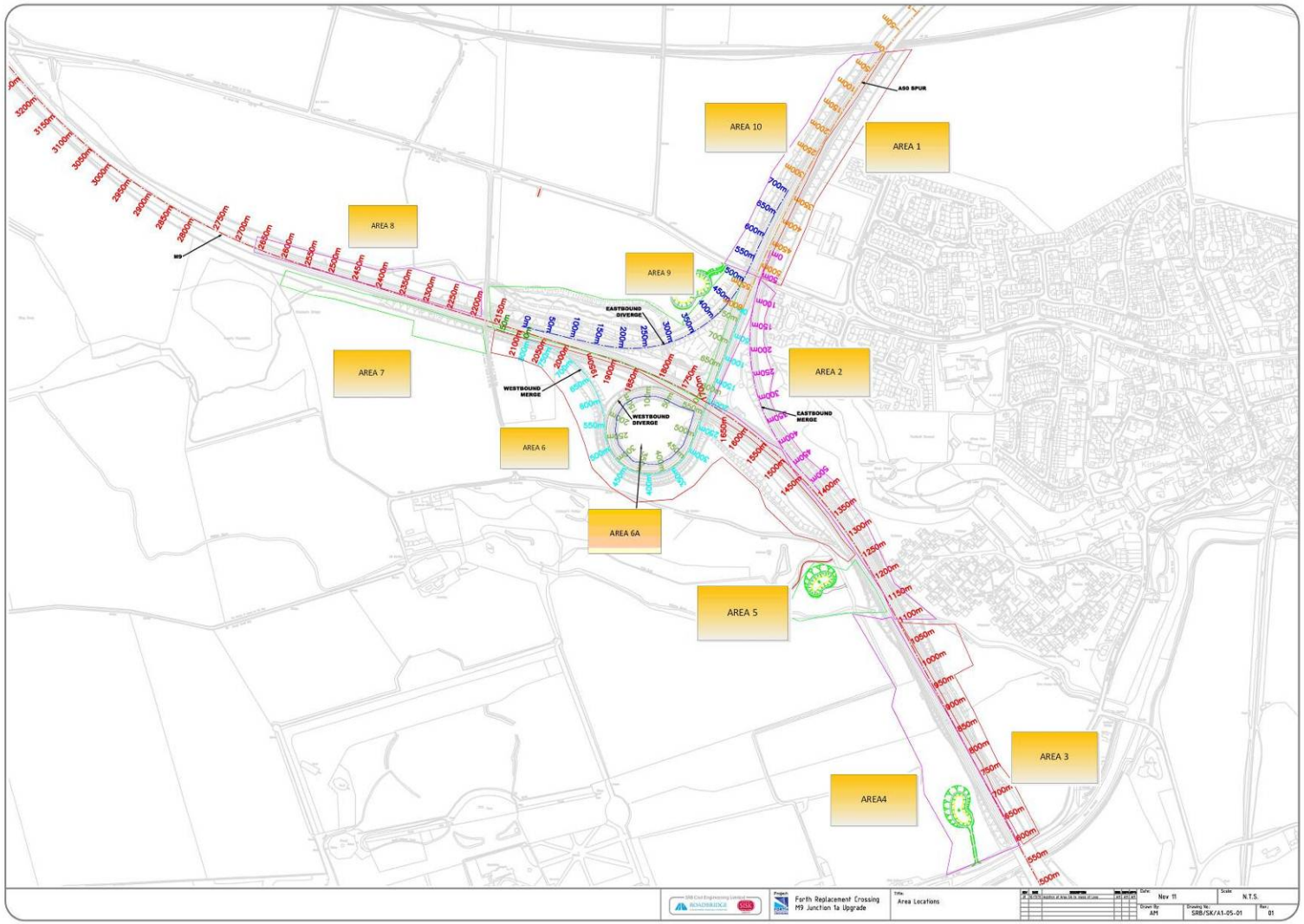
Signature ……Roland Tarrant…….. Date ……22-10-12……

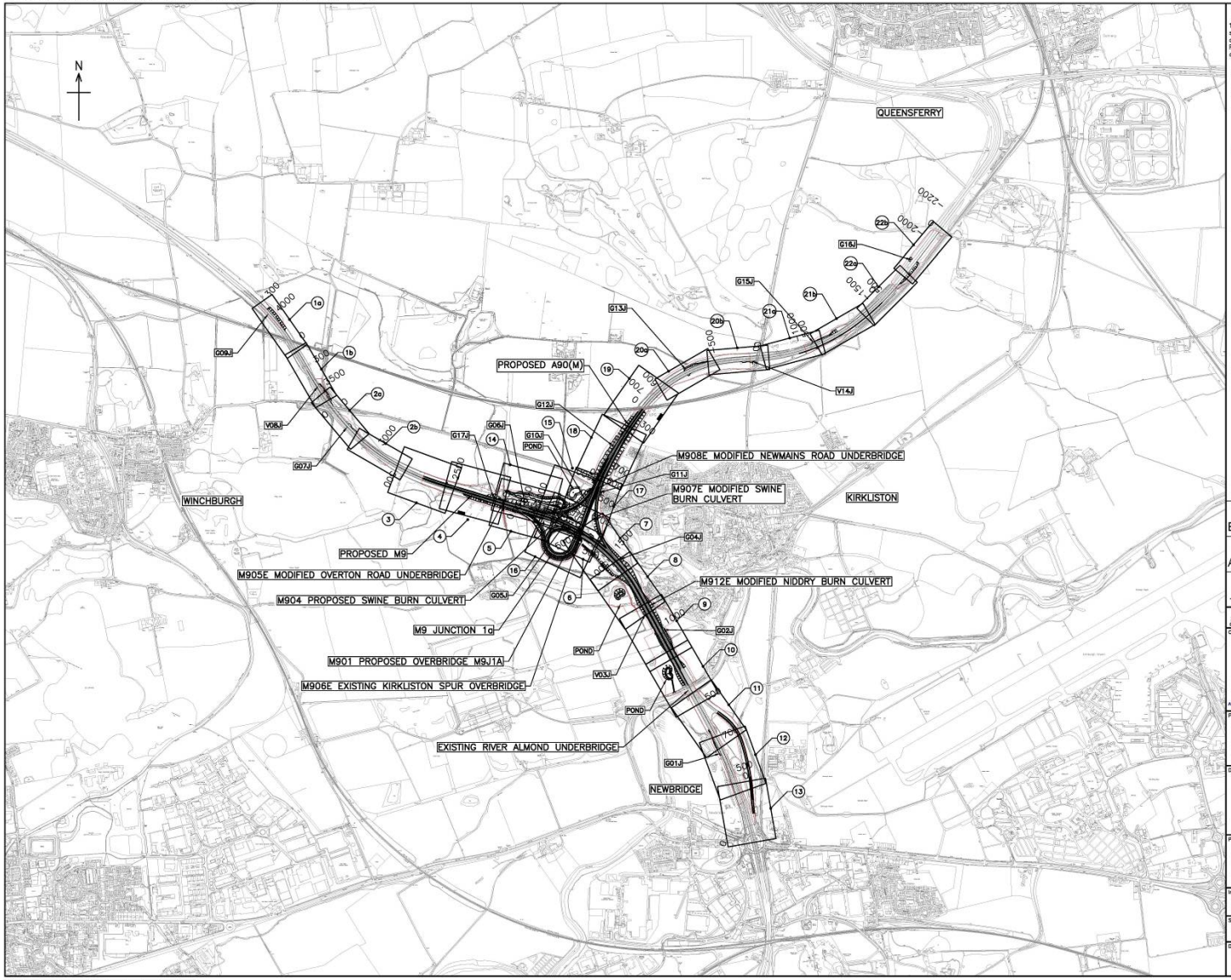
NER Closed

Works have been inspected and completed as described above.

Signature ……Seamus O'Brien……Date ……22-10-12…

Project Manager ~~/ Assist Project Manager~~


AREA 10
AREA 1
AREA 8
AREA 9
AREA 7
AREA 2
AREA 6
AREA 6A
AREA 5
AREA 3
AREA4
A90 SPUR
M9
EASTBOUND DIVERGE
WESTBOUND MERGE
WESTBOUND DIVERGE
EASTBOUND MERGE
Project
Forth Replacement Crossing
M9 Junction 1a Upgrade
Title
Area Locations
Date
Nov 11
Scale
N.T.S.
Drawn By
AM
Drawing No.
SRB/SK/A1-05-01
Rev.
01



10 0 10 20 50 100mm NATURAL SCALE

NOTES

1. This drawing should be read in relation to subject of the Title. Other information shown on drawing is to be considered indicative only. Reference should be made to appropriate drawing series for other information.

KEY

(1) Sheet Number

Lands Made Available

Rev.	Drawn	Checked	Approved	Date	Description
B	SC	MRD	AMB	01.11.11	ISSUED FOR CONSTRUCTION
A	SC	MRD	AMB	16.08.11	PRELIMINARY For TS Review
I	SC	MRD	MRD	27.07.11	PRELIMINARY For CAT III check

Client: TRANSPORT SCOTLAND, An agency of The Scottish Government

Project: FORTH REPLACEMENT CROSSING M9 JUNCTION 1A

Drawing Title: SCHEME LAYOUT PLAN

Participant: ROADBRIDGE, SISK, Gifford, WSP

Independent Checker: WSP

Scale (at A1)	Date	Drawn
1:10000	JUL.2011	SC

Drg. no. 17867/H/000/001 Rev. B

ORIGINAL DRAWING SIZE A1 x 594