Contractor

FCBC
Queensferry
Crossing

DRAGADOS | AMERICAN BRIDGE INTERNATIONAL
HOCHTIEF | MORRISON CONSTRUCTION

Project

FORTH REPLACEMENT CROSSING

Document title

AIR QUALITY MONITORING REPORT NOVEMBER 2017

00	06/12/2017	First revision	SWR	TSW	TSW
Rev	**Rev. Date**	**Purpose of revision**	**Made**	**Checked**	**Reviewed**

Document status

FOR REVIEW

Made by Steven Westwater	Checked By: Tom Shaw
Initials: SWR	Initials: TSW

Document number **REP-00349**	Rev 00

Distribution

Name	Email Address	Copy Sent (Y/N)

Contents

1. INTRODUCTION

1.1. Air quality monitoring is being undertaken by FCBC during the construction of the Forth Replacement Crossing and the associated road network. This report details the air quality monitoring that is currently being undertaken across the site and presents the monitoring results for November 2017.

1.2. Air quality monitoring during this period has been undertaken in accordance with the Code of Construction Practice (CoCP) and the Dust and Air Quality Management Plan (DAQMP) contained within the Environmental Management Plan (EMP).

1.3. The Queensferry Crossing opened to traffic at the end of August 2017 Therefore, the monitoring regime was reduced and a number of monitors removed.

2. MONITORING EQUIPMENT AND LOCATIONS

2.1. Air quality is being monitored on site using both automatic light scatter dust meters and Frisbee gauge dust deposition monitoring. Four Frisbee gauges are currently set up at sensitive locations across the site to measure dust deposition rates (Figure 1). Three automatic light scatter meters are installed at sensitive locations near the south abutment of the Queensferry Crossing to measure real time particulate matter (PM_{10}) concentrations and the Total Suspended Particle (TSP) concentrations (Figure 2). These meters are calibrated annually. Table 1 lists the air quality monitoring equipment present at each monitoring location, including the date it was installed.

2.2. Light scatter type monitoring equipment have been selected as a site monitoring tool to create a live network which assesses the levels of fugitive particulate matter, principally airborne dust. These monitors require less space, maintenance and power than other real time monitors such as a Tapered Element Oscillating Microbalance (TEOM) which is used and designed to measure particulate levels to exceedingly high standards, including measuring long-term compliance to statutory limits. Light scatter meters are more practicable to deploy. However, the meters do generally record levels higher than those measured by the TEOM. The meters can also be affected by atmospheric moisture content which further increases reported levels. Accordingly, any elevations of statutory limits should be treated as precautionary exceedances. The monitors are reliable for on-site monitoring and the establishment of action thresholds to ensure unforeseen activities generating significant dust are identified and suitably controlled. Light scatter meters are becoming the construction and waste industries norm for particulate dust monitoring.

2.3. In association with air quality monitoring across the site, temperature and relative humidity are also continually measured by the light scatter meters at Inchgarvie Lodge and Clufflat Brae.

2.4. Frequent environmental site inspections are also undertaken by members of the FCBC Environmental Department. These inspections include a dust check to assess the following:

- dust levels on site;
- suppression/dampening down; and
- transportation of materials.

Figure 1: Example of an Installed Frisbee Gauge Meter

Figure 2: Example of an installed Automatic Light Scatter Dust Meter

Table 1: Air Quality Monitoring Locations

Ref:	Monitoring Location	Monitoring Equipment	Installation Date	Construction Activities in November
M10	Inchgarvie Lodge	Frisbee	22/08/11	• South abutment works • Internal Bridge Works
		Automatic light scatter meter	17/10/11	
M11	Linn Mill	Frisbee	22/08/11	• South abutment works • Internal Bridge Works
		Automatic light scatter meter	06/12/11	
M12	Clufflat	Frisbee	29/08/11	• South abutment works • Internal Bridge Works
M13	Clufflat Brae	Frisbee	21/09/11	
		Automatic light scatter meter	24/10/11	
M18	Newton	TEOM	23/05/12	• None

3. AIR QUALITY MONITORING RESULTS

3.1. Automatic Light Scatter Dust Meter Monitoring Results

3.1.1. Light scatter meter results for November 2017 have been presented in a monthly chart; this can be found in Appendix A. Results for the month are generally low and all are well below the action level. PM_{10} levels follow a similar pattern throughout the month.

3.1.2. The PM_{10} results have also been compared to the daily mean results obtained from the TEOM air quality monitoring stations located in Newton, Rosyth, and Broxburn, and from the TEOM FDMS station located at Queensferry Road and St Leonards, Edinburgh (an urban background site). The TEOM at Newton was installed by West Lothian

Council, facilitated by FCBC, during January 2012. The comparison between the light scatter and TEOM results demonstrates that both sets of results generally follow the same pattern throughout the month.

3.2. Total Suspended Particles

3.2.1. The TSP results for November 2017 have been presented in a monthly chart; this can be found in Appendix B. The TSP levels at monitoring locations during November were found to be low and all results were within the threshold level. All locations across the site were found to follow a similar pattern to that observed for PM_{10} levels, as described in 3.1.1.

3.3. Frisbee Dust Deposition Results

3.3.1. The Frisbee dust deposition results for November 2017 have been presented in a chart and can be found in Appendix C. Two collections were made in November; these occurred on the 8th and 22nd November 2017.

3.3.2. The site action level for the dust deposition rate has been set at 250 $mg/m^2/day$. Exceedances of this level are treated as a potential incident and a review of the works in the vicinity of the site is instigated. A lower site review level has been set at 140 $mg/m^2/day$. Where concentrations exceed the lower review threshold the site works are reviewed to ensure good practice is implemented; it is essentially a warning that additional controls may be required.

3.3.3. During November there were no exceedances of either the site review or action levels.

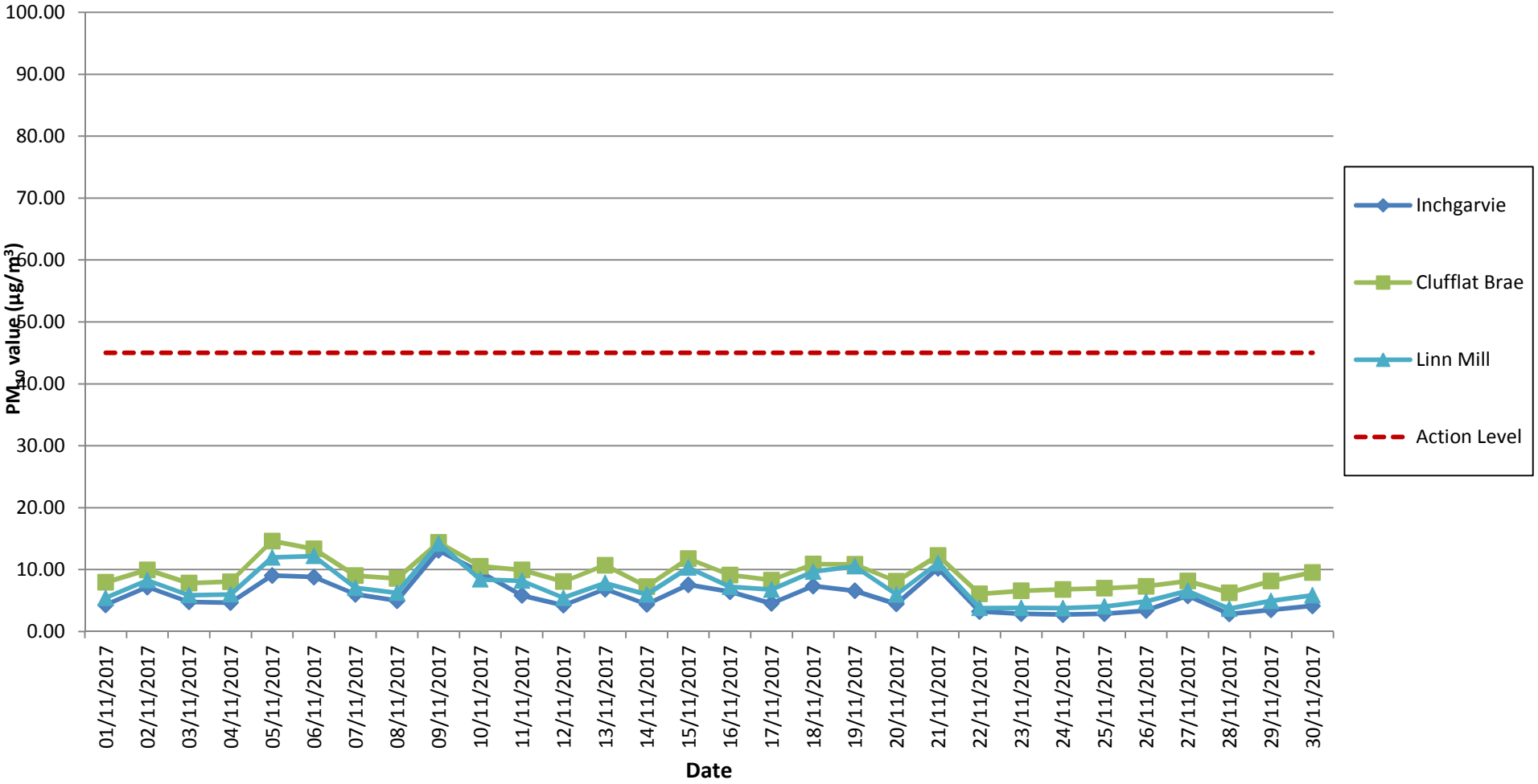
3.4. Daily Dust Log and Environmental Inspections

3.4.1. A summary of the daily dust log for November can be found in Appendix D.

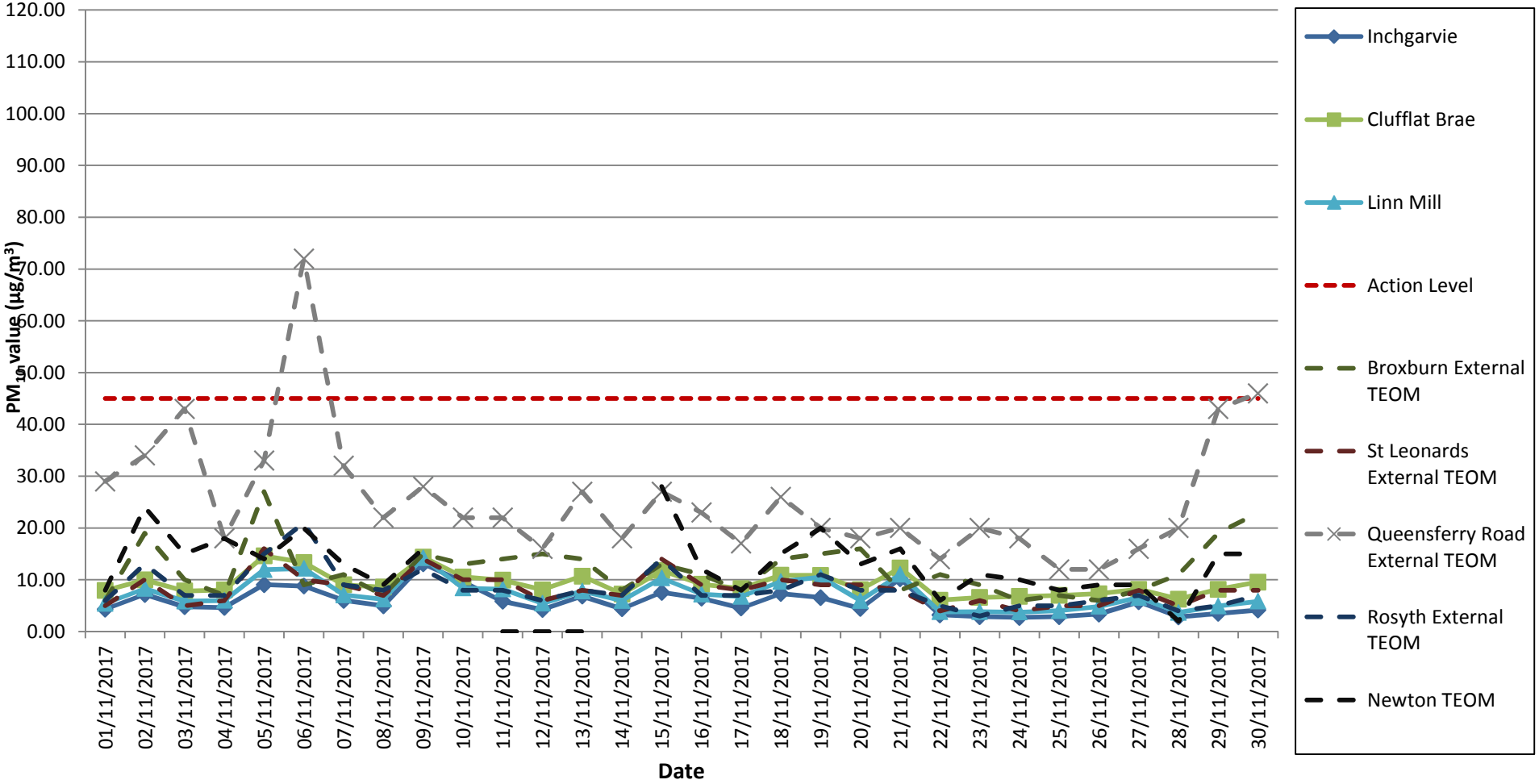
3.4.2. During this period, full environmental inspections were also undertaken across the site and covered areas where works were being carried out.

APPENDIX A: LIGHT SCATTER METER RESULTS

Air Quality Monitoring
Particulate Matter (PM10) Results for all Monitoring Locations
November 2017

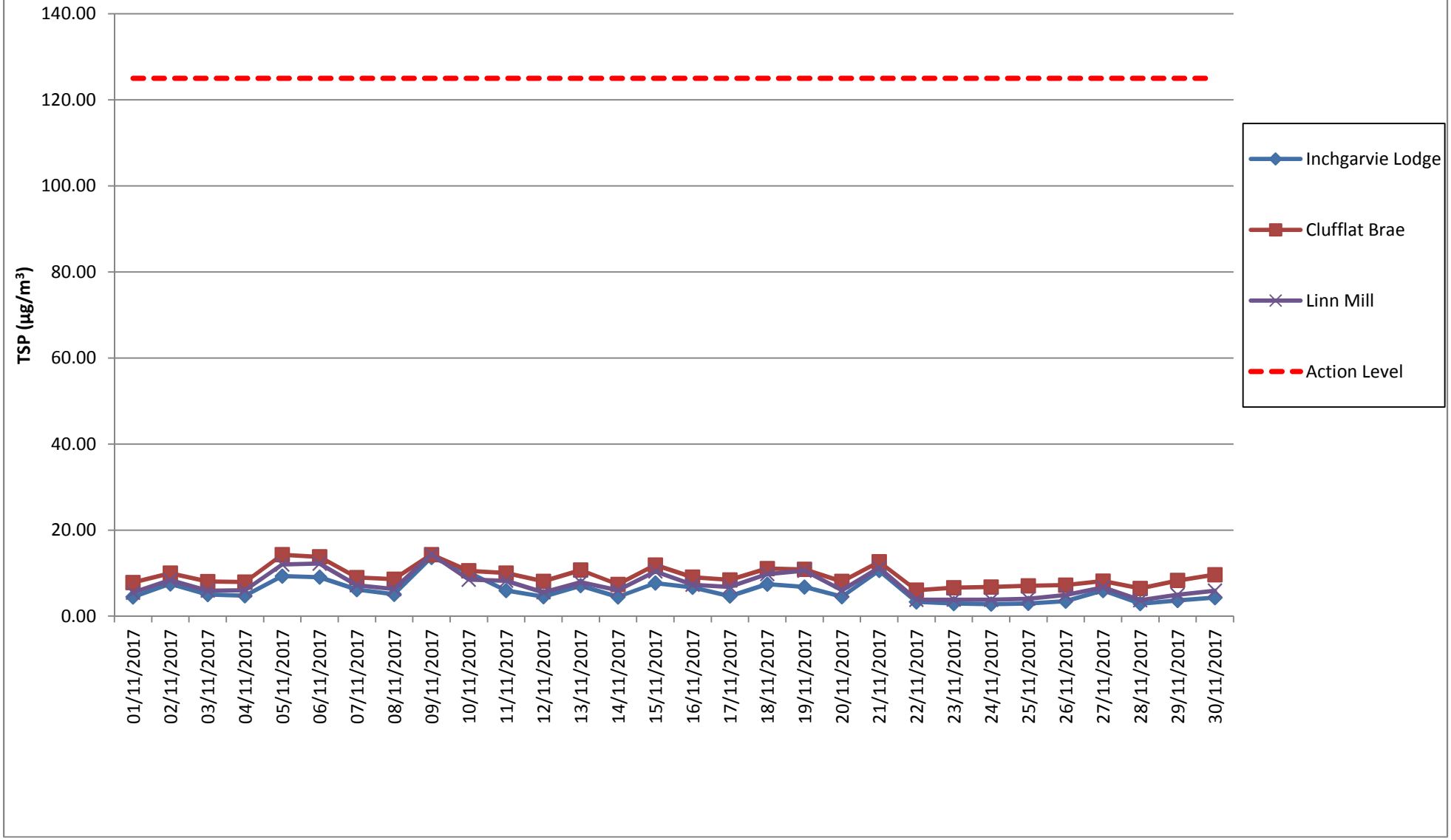


Air Quality Monitoring: Particulate Matter (PM10) Results for all Monitoring Locations, inlcuding TEOM data
November 2017



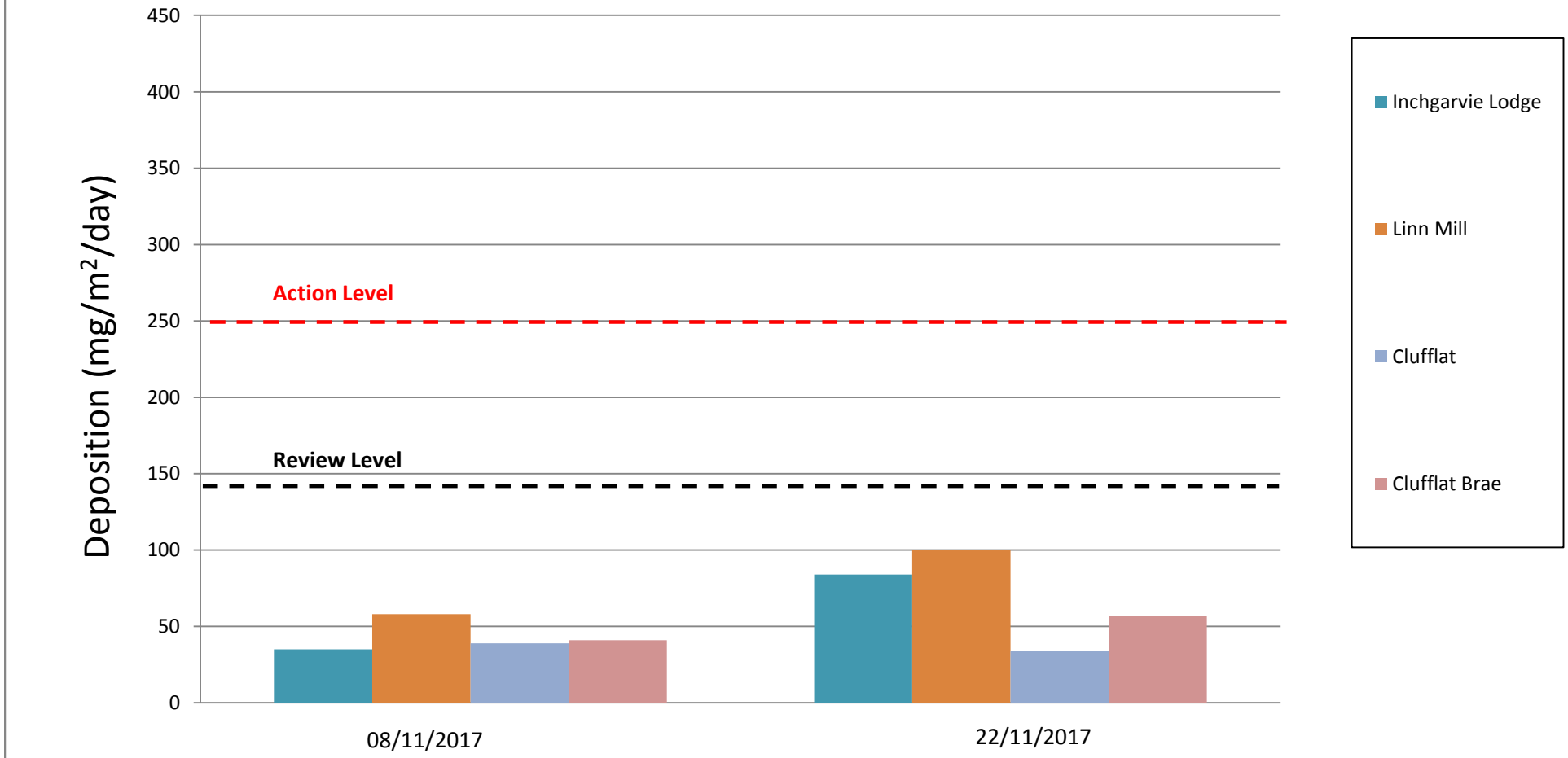
APPENDIX B: TOTAL SUSPENDED PARTICLES

Total Suspended Particles (TSP) Results
November 2017



APPENDIX C: FRISBEE GAUGE RESULTS

Frisbee Dust Deposition Results: November 2017



APPENDIX D: DAILY DUST LOG

Daily Dust Log - North - November 2017

DATE	LOCATION	WIND	WIND DIRECTION	GROUND SURFACE	VISIBLE DUST	DUST DUE TO WORKS (if applicable)	CAUSES OF DUST (if applicable)	COMMENTS AND ACTIONS
01/11/2017	N	LIGHT	E	DRY	N			
02/11/2017	N	LIGHT	SE	DRY	N			
03/11/2017	N	LIGHT	E	DRY	N			
04/11/2017								
05/11/2017								
06/11/2017	N	LIGHT	E	DRY	N			
07/11/2017	N	LIGHT	SE	DRY	N			
08/11/2017	N	LIGHT	E	DAMP	N			
09/11/2017	N	LIGHT	SE	DRY	N			
10/11/2017	N	LIGHT	S	DRY	N			
11/11/2017								
12/11/2017								
13/11/2017	N	LIGHT	E	DRY	N			
14/11/2017	N	LIGHT	S	DRY	N			
15/11/2017	N	LIGHT	SE	DRY	N			
16/11/2017	N	LIGHT	SE	DAMP	N			
17/11/2017	N	LIGHT	SE	DRY	N			
18/11/2017								
19/11/2017								
20/11/2017	N	LIGHT	S	WET	N			
21/11/2017	N	LIGHT	SE	WET	N			
22/11/2017	N	LIGHT	S	WET	N			
23/11/2017	N	LIGHT	SE	DAMP	N			
24/11/2017	N	LIGHT	E	DRY	N			
25/11/2017								
26/11/2017								
27/11/2017	N	LIGHT	SE	DAMP	N			
28/11/2017	N	LIGHT	S	DRY	N			
29/11/2017	N	LIGHT	SW	DRY	N			
30/11/2017	N	LIGHT	S	DAMP	N			

Daily Dust Log - South - November 2017

DATE	LOCATION	WIND	WIND DIRECTION	GROUND SURFACE	VISIBLE DUST	DUST DUE TO WORKS (if applicable)	CAUSES OF DUST (if applicable)	COMMENTS AND ACTIONS
01/11/2017	S	LIGHT	E	DRY	N			
02/11/2017	S	LIGHT	SE	DRY	N			
03/11/2017	S	LIGHT	E	DRY	N			
04/11/2017								
05/11/2017								
06/11/2017	S	LIGHT	E	DRY	N			
07/11/2017	S	LIGHT	SE	DRY	N			
08/11/2017	S	LIGHT	E	DAMP	N			
09/11/2017	S	LIGHT	SE	DRY	N			
10/11/2017	S	LIGHT	S	DRY	N			
11/11/2017								
12/11/2017								
13/11/2017	S	LIGHT	E	DRY	N			
14/11/2017	S	LIGHT	S	DRY	N			
15/11/2017	S	LIGHT	SE	DRY	N			
16/11/2017	S	LIGHT	SE	DAMP	N			
17/11/2017	S	LIGHT	SE	DRY	N			
18/11/2017								
19/11/2017								
20/11/2017	S	LIGHT	S	WET	N			
21/11/2017	S	LIGHT	SE	WET	N			
22/11/2017	S	LIGHT	S	WET	N			
23/11/2017	S	LIGHT	SE	DAMP	N			
24/11/2017	S	LIGHT	E	DRY	N			
25/11/2017								
26/11/2017								
27/11/2017	S	LIGHT	SE	DAMP	N			
28/11/2017	S	LIGHT	S	DRY	N			
29/11/2017	S	LIGHT	SW	DRY	N			
30/11/2017	S	LIGHT	S	DAMP	N			