



The Bacup Clay Company Limited

Tong Quarry, Bacup

Noise Management Plan

Document Ref: 213036/NMP

August 2021



AA Environmental Limited

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Report for:

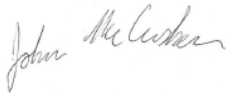
Bacup Clay Company Limited
Tong Farm,
Tong Lane
Bacup, Rossendale
Lancashire
OL13 9XA

**Tong Quarry
Tong Lane
Bacup, Rossendale
Lancashire
OL13 9XA**

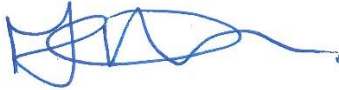
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213036/NMP

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Issue	Description of status

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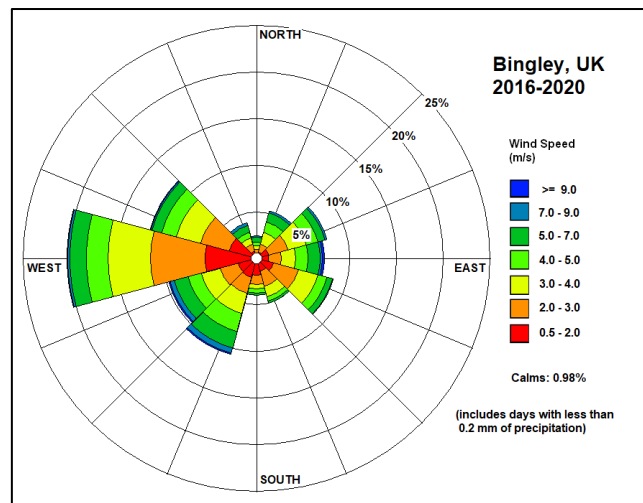
1.0 INTRODUCTION

Overview

- 1.1 This Noise Management Plan (NMP) has been produced as part of the Environmental Management Systems for the bespoke waste operations at Tong Quarry in Bacup, Lancashire OL13 9XA. The Operator is by The Bacup Clay Company (the Operator). The bespoke waste operation is a deposit for recovery scheme with a throughput of 200,000 tonnes per annum under Environmental Permit EPR/EB3307HK. The site location is shown in drawing 213036/D/001.
- 1.2 The operations on-site include on-site involve transport, deposition, and compaction of inert soils / aggregates. There is a Standard Rules 2010 No. 12 (EPR/DB3908FR) operating within the quarry. The location is shown in 213036/D/007. The noise risk associated with the Standard Rules Permit is not assessed within this application. This management plan is for the landfilling activity only.
- 1.3 The Operator has provided a noise management plan to outline management and control measures for the activities on site. A noise impact assessment for the restoration of the quarry is shown in Appendix A for information. This was approved by the local Authority in 2020.
- 1.4 The annual throughput is 200,000 tonnes per annum. The waste and site layout and site infrastructure plans for the operations is presented in drawing 213036/D/004 and 213036/D/007.
- 1.5 The site is located in Lancashire, circa 1 km east of Bacup, and is accessed via a private road off of Tong Lane to the west of the site. The site is bounded to the north by agricultural fields, to the east by residential dwellings and agricultural fields, to the west by residential, educational and agricultural land uses and to the south by agricultural fields and infilled areas of former Tong Quarry excavations. The surrounding ground levels are 361 m AOD in the north east, falling to 346 m AOD in the north west, 341 m AOD to the south west and 345 to the south east. The base of the quarry void will lie between 325 in the west and 335 m AOD in the east of the site.
- 1.6 Management and control measures will be in accordance with Noise and vibration management: environmental permits EA guidance (July 2021).
- 1.7 This report establishes the sensitive receptors surrounding the site, identifies any potential risks associated with the proposed activities and outlines required controls.

2.0 SENSITIVE RECEPTORS

- 2.1 The site and surrounding receptors are shown on drawing 213036/D/002. The nearest sensitive receptors to noise are the residential properties Dry Corner Farm, Hey Head Cottage and Bent House farm located circa 94 m south-east, 110 m south east and 150 m south west of the site respectively. Additionally, St. Marys RC Primary School is located 309 m west of the site. Nearby land uses are predominantly of agricultural and residential.
- 2.2 Meteorological wind data for 2016-2020, has been acquired from ADM Limited. The wind data has been taken from the Met Office Station in Bingley, which is approximately 24 km north east of the site and is considered to be representative of conditions at the site. The data shows that the prevailing wind direction is from the west quadrant, as shown below. The nearest residential property is upwind of the prevailing winds.



- 2.3 The background levels and impact assessment have been determined through a noise assessment. The assessment is provided in Appendix A. The site operations are assessed to unlikely impact surrounding sensitive receptors with slight adverse impact during final restoration landform works. The majority of the works are below the quarry rim. The main noise source is the power screen which is regulated under the Standard Rules Permit EPR/ DB3908FR.
- 2.4 The site and surrounding sensitive receptors are shown on drawing 213036/D/002. Table 1 below sets out the nearby sensitive receptors.

Table 1. Sensitive receptors

Receptor Type	Approximate distance from site
Residential	
Residential Dwelling along Access Road (Dry Corner Farm)	94 m east
Residential Dwelling off of Tong Lane (Hey Head Farm Cottage)	110 m south east
Residential Dwelling off of Tong Lane (Bent House Farm)	150 m south west
Residential Dwellings along Tong Lane	162 m south west 214 m south west 320 m west 354 m west
Residential Dwelling along Access Road (Tong Farm) (owned by Operator)	190 m west
Dwellings along Warcock Lane	285 m north west
Residential Dwelling along off of Hazel Grove (Pasture Bottom Farm)	300 m north
Residential Dwellings off Tong Lane (Slack Gate)	321 m west
Dwellings along Oakencloough Road	330 m north west
Residential Dwellings along Pennine Road	365 m west
Residential Dwelling along off of Hazel Grove (Lower Reaps Farm)	365 m north east
Dwellings along Hazel Grove	431 m north west
Industrial/Commercial	
Automotive Repair Units along Vale Street	665 m north west

Receptor Type	Approximate distance from site
Commercial/Industrial Units along A6066	804 m south
Commercial/Industrial Units along The Sidings	876 m south west
Commercial and Industrial Area along A671 and A681	930 m south west
Transport	
Access Road	Within site
Tong Lane	197 m south west 236 m south 348 m west
Pennine Road	362 m west
Warcock Lane	325 m north west
A671 (Rochdale Road) Public Highway	690 m south 766 m south west 861 m west
Agricultural	
Various	<5 m north <5 m south <5 m east <5 m west
Schools	
St. Marys RC Primary School	309 m west
Bacup Britannia Community Primary School	567 m south
Vale Street Nursery	792 m north west
Early Years & Childcare Centre	908 m west
Bacup Thorn Primary/Nursery School	1.05 km north west
Medical	
Irwell Medical Practice	917 m west
Priority Habitat	
Grassland (Good quality semi-improved grassland)	725 m south east
Blanket Bog	434 m east 612 m north east 788 m north east
Lowland Fens	263 m south east 386 m south east
Deciduous Woodland Habitat	464 m south west 634 m west 660 m north west 726 m south west 865 m west
Protected Species Site	
European Protected Species Site- Bats off Market Street	990 m west
Statutory Designated habitat/site (SSSIs, SACs, SPAs, Ramsar, NNRs, LNRs)*	
Lee Quarry SSSI	1778 m south west
Recreation	
Bacup Pennine BMX Track	363 m south west
Playing Fields	409 m west
Playing Field	469 m south west
Bacup Cricket Club	991 m north west
New Line Picnic Site	965 m south
Statutory Historic Buildings	
38 and 40 Oakencrough Road (Listed Building)	369 m north west
36-38, Todmorden Road	678 m north west
Lane Ends Farmhouse (Listed Building)	721 m south west
16, Rochdale Road (Listed Building)	879 m west
Britannia Mill (Listed Building)	839 m south
*SSSI = Sites of Special Scientific Interest; SAC = Special Area of Conservation; SPA = Special Protection Areas; NNR = National Nature Reserve; LNR = Local Nature Reserve	

2.5 Table 2 below sets out potential noise emitters in the surrounding area.

Table 2. Nearest other potential noise emitters

Name	Comments	Approximate distance from site boundary to centre of receptor
Road traffic (Pennine Road and Tong Lane)	Activities are likely to contribute to the background noise, particularly during peak traffic hours.	197 m south west 342 m west

Construction along Henrietta Street	Activities would cause moderate noise emissions during operation .	993 m west
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3.0 MANAGEMENT AND MITIGATION

- 3.1 The noise levels generated by site operations below the rim of the quarry are unlikely to exceed the background noise concentration by more than 10 dB and will remain within the upper limit of 55 dB LA_{eq}. Site operations involving topsoil and subsoil stripping / re-instatement will generally be within 55 dB LA_{eq}, but has the potential to exceed 55 dB LA_{eq} but will remain below 70 LA_{eq} during works nearest sensitive receptors. Following topsoil and subsoil stripping the material will be stockpiled 3 m high bund along the north and north western boundary of the site, breaking line to the receptors to the north and north west of the site.
- 3.2 The operations on-site involve transfer and tipping of suitable wastes; and the permanent deposit and compaction of inert soils / aggregates. Table 3.1 details the mobile plant list and combined sound level.

Table 3.1. Details of Plant					
Machinery / activity	Maximum number	Measured Sound Level (dB LA _{eq})	Manufacturer Details	Model	Comment
Mobile Plant					
Wheeled loader	1	82.1 dB	Doosan	DL420	Collective noise level taken during noise assessment.
Tracked Excavator	1		Komatsu	Pc210LC	
Bull dozer	1		CAT	Not provided	

- 3.3 The site is accessed via a 600 m long access road to the west of the site off of Tong Lane. Access to the working areas within the site will be via an internal haul route. The location of the access road and internal haul route is shown site infrastructure plan on drawing 213036/D/007.
- 3.4 The site will operate between the hours set out below in Table 3.2:

Table 3.2 Working Hours	
Days	Hours
Monday to Friday	07:30 – 17:00
Saturday	08:00 – 13:30
Sunday and Public Holidays	No vehicle movements or operation

- 3.5 Site design and management controls include:
1. Adherence to the working hours;
 2. Equipment will be fitted with effective silencers in accordance with manufacturers' recommendations and maintained in accordance with the manufacturers' specifications;
 3. Ensuring regular and effective maintenance of plant;
 4. Reducing drop heights to waste storage area and/or working plant;
 5. All machines in intermittent use shall be shut down in the intervening period between work and throttled down to a minimum;
 6. Induction briefing to all employees regarding the need to keep noise to a minimum and the health hazards associated with exposure to excessive noise. This will include training on the proper use and maintenance of plan and equipment, positioning of machinery to reduce noise emissions to surrounding receptors and site personnel, avoidance of unnecessary noise and the protection of persons against noise.
 7. Avoidance of unnecessary revving of engines;
 8. All engines and generators will wherever practical be operated with doors or cowls in the closed position;
 9. Design of internal haul routes, where possible, to have gentle gradients and curves;
 10. Haul routes will be maintained to be pothole free;

11. 3 m high topsoil and subsoil noise bund along north and north western edge of quarry edge to attenuate noise emissions to receptors to the north west of the site. This will be in place throughout the entirety of the works until the end of restoration works when the topsoil is placed back over the final restoration. The bund is shown on drawing 213036/D/007;
12. The majority of the works will be undertaken below existing surrounding ground level. During the last phase of the works within 1 m of ground level (the restoration phase), the bulldozer working hours will be 8:30-17:00 hours during week days and 9:00-13:30 hours on Saturday; and
13. Only plant conforming with relevant national or international standards, directives or recommendations on noise emissions will be used.

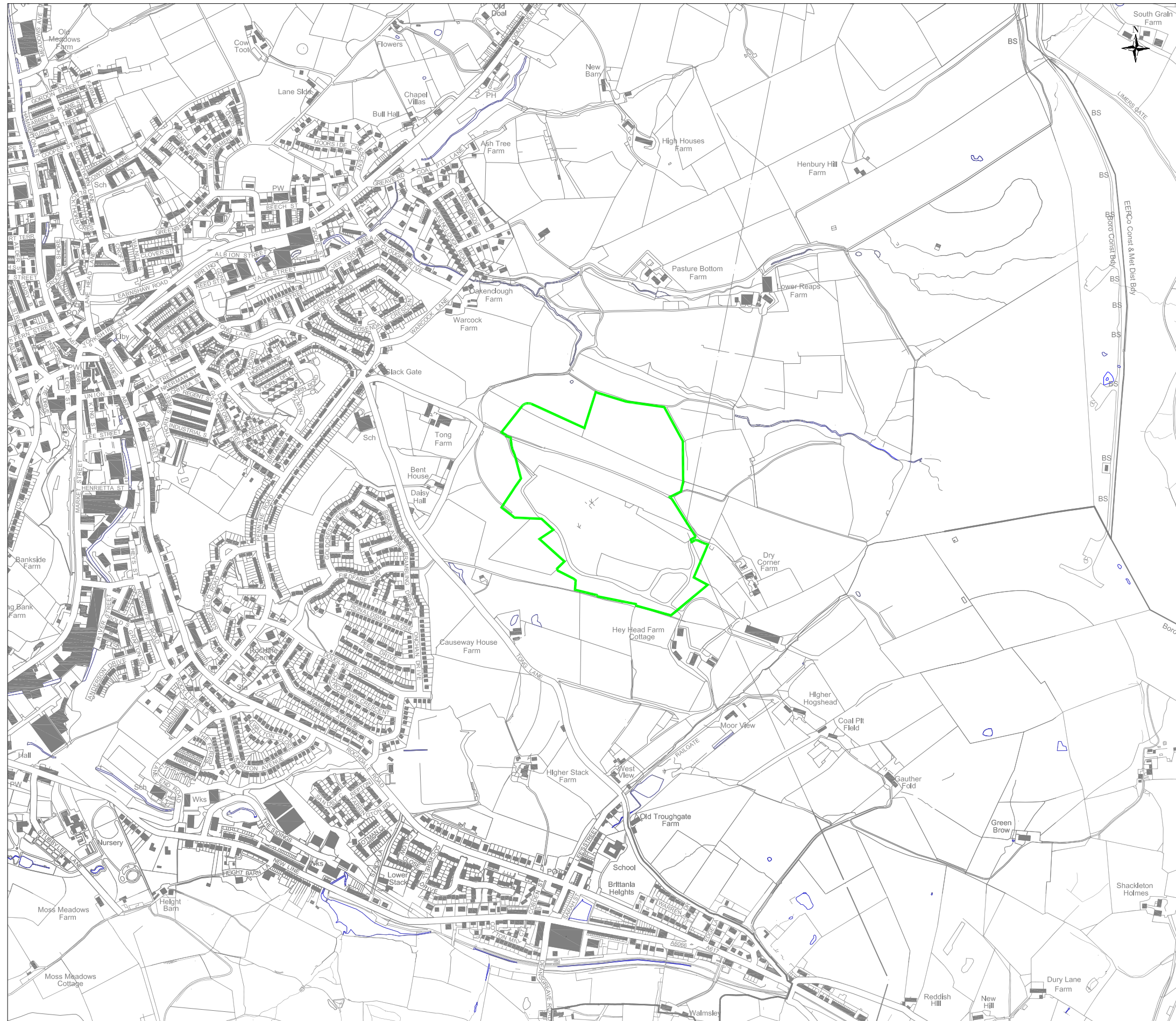
3.6 Site operational controls include:

- Anti-idling policy on the HGV's;
- HGV routing plan and one-by-one policy to ensure no build up of HGV's in each area; and
- All vehicles will obey the internal speed limit of 5 mph.


4.0 MONITORING AND RECORDS

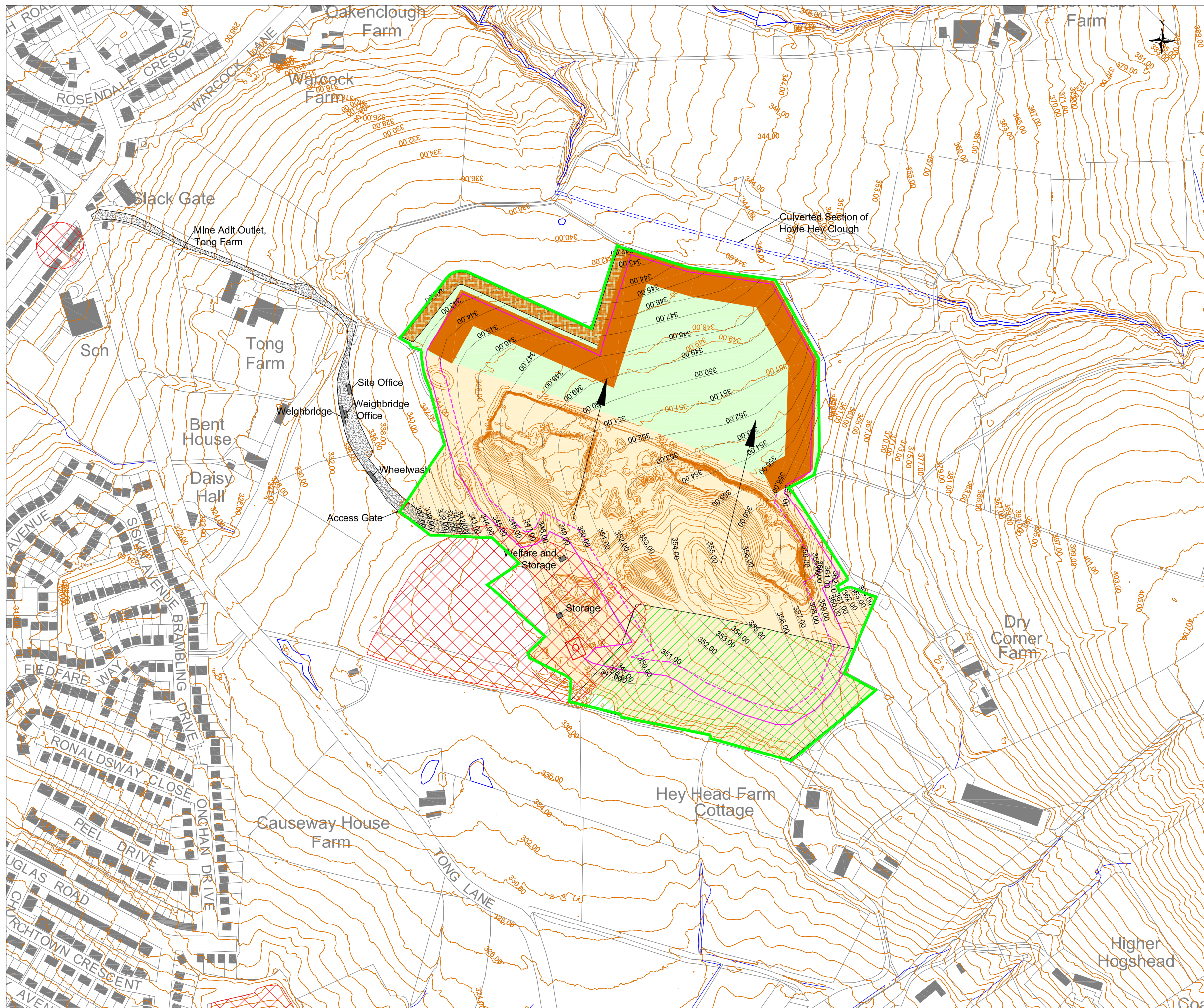
- 4.1 Given the assessment outcome, quantitative noise monitoring is not deemed necessary. An inspection of noise will be undertaken at the visual monitoring locations in drawing 213036/D/006.
- 4.2 The inspection of noise levels generated by the operation will be on a continuous basis by the site staff and it will be their responsibility to identify and control any excessive noise that occurs. If noise is identified internally or external complaints are raised, the complaints procedure and form will be implemented (attached in Appendix B). In the event of substantiated noise complaints, quantitative monitoring will be undertaken. Remedial actions under the procedure may include:
 - Temporary cessation of mineral extraction operations;
 - Temporary reduction of HGV movements to or from site;
 - Review / temporary cease crushing / screening operations; and
 - To note, these remedial actions are indicative and would only be raised if the procedure identified the emission source and it could be fully justified/substantiated.
- 4.3 A record of any complaints arising regarding noise emissions and the actions taken will be kept in the Site Diary.
- 4.4 In the event of sustained noise issues or substantiated complaints, this NMP will be reviewed and updated. The NMP will be issued to the Environment Agency for approval and operations will cease within 100 m of the impacted receptor(s).

DRAWINGS



Key:
—— Site Boundary

Rev.	Details	Drawn Chkd.	Date
Project 213036 Tong Quarry			
Title Site Location Plan			
		AA Environmental Ltd Units 4-8 Cholswell Court Shippon Abingdon Oxon OX13 6HX T: (01235) 536042 F: (01235) 523849 info@aae-ltd.co.uk www.aae-ltd.co.uk	
Scale 1:10,000@A3	Date July '21	Drg. No. 213036/D/001	Rev.
Drawn JM	Chkd. ML		



- Key:**
- Site Boundary
 - Existing Contours
 - Proposed Contours
 - Quarry Extension Area
 - Quarry Area
 - Restored Area
 - Historic Waste Deposit
 - Engineered Sidewall Geological Separation Layer
 - Proposed / Existing Top of Quarry Face
 - Proposed / Existing Base of Quarry Face
 - Sequence of Mineral Extraction and Restoration Works

- Note:**
1. Existing contours taken from Digital Terrain Model supplied by National LiDAR Program from 2019.
 2. Proposed Contours taken from Restoration Scheme by Minerals and Waste Planning (drawing reference 9865A/05, January 2020).

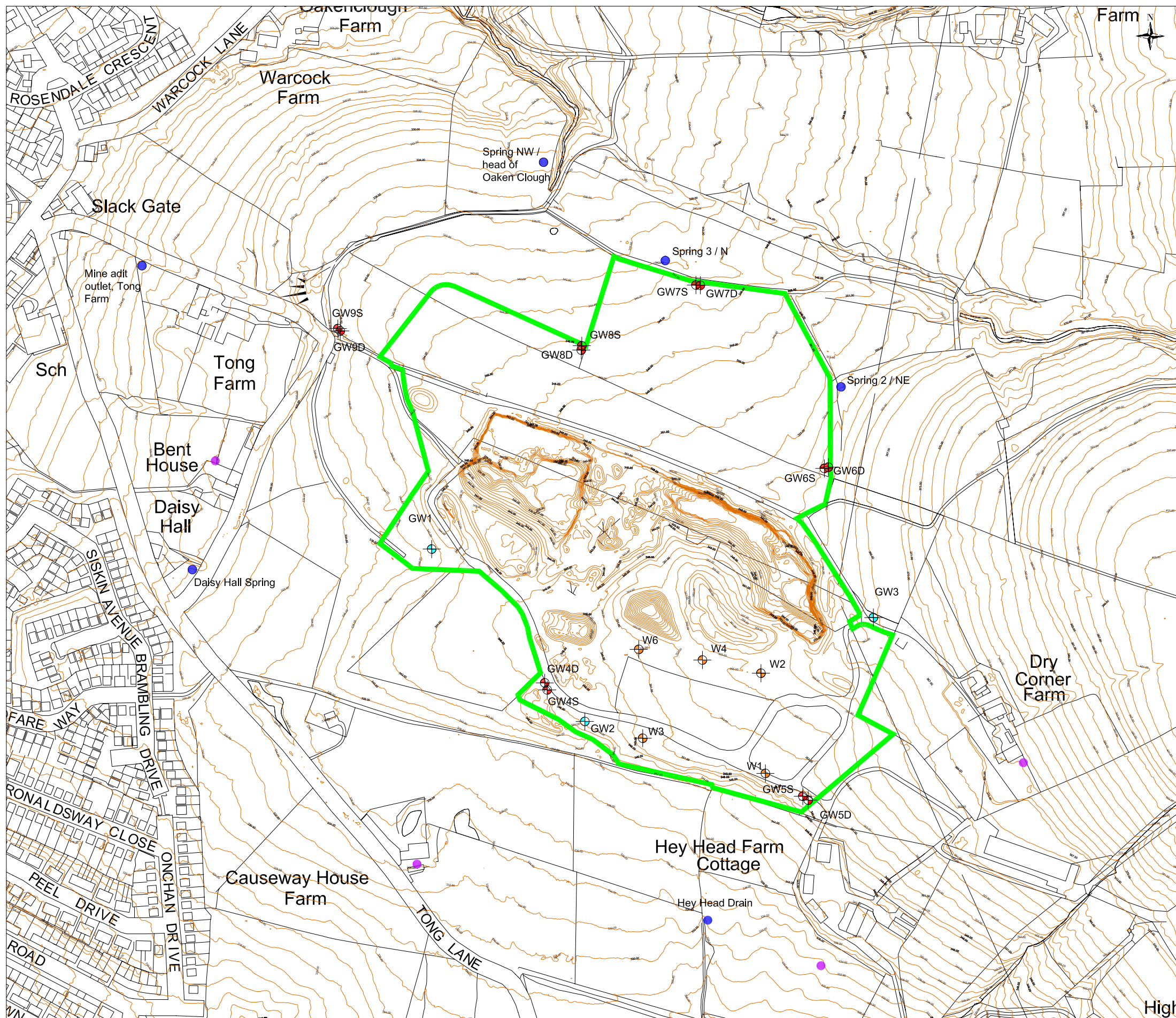
Rev.	Details	Drawn	Date
		Chkd.	

Project
213036
Tong Quarry

Title
Site Layout and Waste

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Scale	Date	July '21	Drg. No.	Rev.
1:4,000@A3	Drawn	Chkd.	213036/D/004	
	JM	ML		



- Key:**
- Site Boundary
 - Perimeter Borehole (2021)
 - Existing Perimeter Borehole
 - Existing In-waste Borehole
 - Noise Monitoring Points
 - Surface Water Monitoring Points
 - Existing Ground Level Contour (m AOD)

Notes:
 1. Existing ground levels were taken from the National LiDAR Survey Data undertaken in 2019.

Surface Water Monitoring Point Coordinates		
ID	X	Y
Oaken Clough	388025	422994
Spring 3 / N	388146	422897
Spring 2 / NE	388320	422772
Hey Head Drain	388187	422245
Daisy Hall Spring	387678	422591
Mine adit outlet	387628	422892

Rev.	Details	Drawn Chkd.	Date
Project 213036 Tong Quarry			
Title Monitoring Plan			
		AA Environmental Ltd Units 4-8 Cholswell Court Shippon Abingdon Oxon OX13 6HX T: (01235) 536042 F: (01235) 523849 info@aae-ltd.co.uk www.aae-ltd.co.uk	
Scale 1:4,000@A3	Date Sep '21	Drawn JM	Chkd. ML
Drg. No. 213036/D/006		Rev.	



- Key:**
- Site Boundary
 - Proposed Contours
 - Quarry Extension Area
 - Quarry Area
 - Restored Area
 - Proposed / Existing Top of Quarry Face
 - Proposed / Existing Base of Quarry Face
 - Side Wall Geological Separation Layer
 - Surface Water Drain
 - Surface Water Attenuation Pond
 - Surface Water Flow Direction
 - Surface Water Course
 - Quarantine Area
 - Soil Management Area
 - 3 m High Topsoil Bund
 - Impermeable Concrete Surfacing
 - Site Buildings / Infrastructure
 - Access Gate

Note:
 1. Proposed Contours taken from Restoration Scheme by Minerals and Waste Planning (drawing reference 9865A/05, January 2020).

Rev.	Details	Drawn Chkd.	Date
Project 213036 Tong Quarry			
Title Site Infrastructure and Drainage Plan			
		AA Environmental Ltd Units 4-8 Cholswell Court Shippon Abingdon Oxon OX13 6HX T: (01235) 536042 F: (01235) 523849 info@aae-ltd.co.uk www.aae-ltd.co.uk	
Scale 1:4,000@A3	Date Aug '21	Drawn JM	Chkd. ML
Drg. No. 213036/D/007		Rev.	

APPENDIX A
Noise Assessment (S. & D. Garritt, 3rd March 2020)

S. & D. Garritt Ltd.

Acoustic Design,
Testing & Consultancy

Vicarage Cottage, High Street, Wadworth, Doncaster DN11 9BG. Tel: 01302 854303 contact@sdgarritt.co.uk

NOISE IMPACT ASSESSMENT

at

**PROPOSED MINERAL EXTRACTION,
TONG QUARRY,
BACUP,
OL13 9XA**

Dates of measurements: 21st – 29th March 2019

Date of report revision: 3rd March 2020

Prepared for: MWP Planning

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1.0 **Summary and Conclusions**

- 1.1 It is proposed to extend current mineral extraction works at Tong Quarry, Bacup, OL13 9XA. The existing site is currently active and so measurements of proposed operations could be measured directly.

The quantitative guidance set by central government policy is that the sound level from the site as received at dwellings from 07.00 to 19.00 hours should not exceed the background level by more than 10 dBA. In some circumstances it may not be possible to meet this requirement without unreasonable burden of the mineral operator in which case the upper limit between 0700 to 1900 hours is 55 dB LA_{eq} (1-hour) at noise-sensitive properties.

- 1.2 Measurements of sound from the overall operation were taken at three different distance sets. The results were :

Machine	Sound Level
All sources except McCloskey screen, 25m McCloskey Trommel Screen, 10m	80.2 – 82.1 dB LA _{eq} 82.5 dB LA _{eq}
All sources, 40m – 75m to SW	73.5 – 74.0 dB LA _{eq}
Measurements at site rim, 40m – 70m to NW	75.7 dB LA _{eq}
Road lorry on haul road	Sound Power Level L _{wa} = 98 dBA

- 1.3 The predicted overall noise impact from all activities on site, including HGVs on the haul road is:

Dwelling Location	Average dB LA_{eq}	Background Level LA₉₀	Comparison v. Background
Farms to North	45	38 – 40	5 - 7 dB above
Hey Head & Farms SE	45	38 – 40	5 - 7 dB above
Saskin Ave & Farm SW	45	38 – 40	5 - 7 dB above
Tong Farm W	46	38 – 40	6 - 8 dB above
Warcock Lane NW	43	38 – 40	3 - 5 dB above

- 1.4 An additional haul / access road is proposed. Sound levels from lorry movements along the access road are predicted by the haul road equation given in BS 5228:

$$LA_{eq} = L_{WA} - 33 + 10 \log Q - 10 \log V - 10 \log d + 10 \log (a/180) \text{ dB}$$

The summary of predicted sound levels is:

	Farms to North	Hey Head SE	Farm SW & Saskin	Tong West	Warcock NW
LAeq	29.7	31.7	31.0	35.0	31.7

The predicted sound levels from HGV movements as received at all receptors are more than 10 dBA less than the predictions from quarry sources, so do not have a significant effect on the overall assessment. The predictions from wagons on the haul road is less than the existing background sound levels at all receptors.

- 1.5 The land form provides a barrier effect to all dwellings when machinery is working below the quarry rim. The remaining suggested mitigation is to ensure that the landform / earth bunds from soil stripping are used to entirely break line of sight from all parts of all machinery to all dwellings whenever practicable.
- 1.6 The conclusion is that it is likely that the target of not exceeding background by more than 10 dBA is likely to be met at all of the nearby dwellings for the vast majority of the time. The exception is when workings are at their closest to individual dwellings, where predictions are up to 12 - 13 dBA above background on a Saturday morning, but remain well within the upper limit of 55 dB LAeq at all times and all locations.
- 1.7 The predictions during initial soil stripping activities near the quarry rim generally be around the 55 dB LAeq limit unless close to individual dwellings, and well within the temporary 70 dB LAeq limit allowable for up to 8 weeks per year for exactly this type of activity.

2.0 **Introduction**

It is proposed to extend current mineral extraction works at Tong Quarry, Bacup, OL13 9XA. The existing site is currently active and so measurements of proposed operations could be measured directly.

The application area lies to the immediate north of the existing quarry. Other than the initial soil strip, with soils placed into mounds around the edges to form bunds, all activity will take place below the quarry rim.

This noise impact assessment has been commissioned to quantify impact from proposed extension of site activities in compliance with the relevant parts of the National Planning Policy Framework. This revision has been prepared to include a new site layout drawing only.

2.1 **Noise Assessment Criteria**

The Department for Communities and Local Government published the document “Planning Practice Guidance” to the National Planning Policy Framework in March 2014. The section of the document which applies to minerals excavation and surface workings quantifies specific noise standards. These are summarised as:

- During daytime from 07.00 to 19.00 hours the sound level at noise-sensitive properties should not exceed the background level by more than 10 dBA.
- In some circumstances it may not be possible to meet this requirement without unreasonable burden of the mineral operator in which case the upper limit between 0700 to 1900 hours is 55 dB LA_{eq} (1-hour) at noise-sensitive properties.
- During the evening from 19.00 to 22.00 hours the 55 dB LA_{eq} (1-hour) limit applies even if the background level is greater than 45 dB LA₉₀.
- At night between 22.00 to 07.00 hours the sound level at noise-sensitive properties should not exceed 42 dB LA_{eq} (1-hour).
- Where the site noise is tonal in character it may be appropriate to set specific limits for this element of the noise.
- Peak or impulsive noise, which may include reversing beepers, may need specific limits and should not occur regularly at night.

- It is often necessary to raise the noise limits to allow temporary phases in a development. Examples include baffle mound construction, soil stripping, removal of spoil heaps and construction of new permanent landforms. A limit of 70 dB LA_{eq} (1-hour) is suggested for periods of up to 8 weeks per year.

3.0 **Proposed Site Operations**

Operations in the proposed quarry extension will consist of exactly the same activities that have taken place in the existing quarry:

- (a) prior to the main operations, topsoil and subsoil will be removed and stored as screening bunds around the site perimeter.
- (b) extraction of minerals using the tracked excavator and bucket loader for processing on site using screens.

Inert waste will be brought onto the premises for the purposes of backfill and for recycling suitable materials to form aggregate.

The proposed hours of operation are 07.30 - 18.00 weekdays and 08.00 - 13.30 on Saturdays.

3.1 **Sound Sources**

The sound sources proposed for use in the site extension and assessed in this report are:

- Komatsu pc210LC tracked excavator
- Cat tracked dozer.
- Doosan DL420 wheeled loader
- Case 1021G wheeled loader
- Hitachi tracked bucket
- McCloskey 516 trommel screen
- Powerscreen 400X tracked jaw crusher
- Powerscreen chieftain 2100X screen

The operations and sound sources will generally be located below the quarry rim. The sound emissions anticipated at the surface level of the quarry rim are mainly during the initial soil stripping and early extraction operations.

The elevation of the site is approximately 350m. The majority of nearby dwellings, situated to the north, west and south lie at a lower level. There is one dwelling to the north east and one dwelling to the east that lies at a higher ground level. The grid reference for the site is SD 88178 22786.

3.2 **Plant Sound Levels**

Plant sound levels were measured directly at the existing site during normal operations. Measurements were taken at three different distance sets from the overall operation and results calculated using each set of data for comparison. The various sources could not generally be measured individually due to contributions from other machinery.

The summary of source sound levels is shown below:

Machine	Sound Level
All sources except McCloskey screen, 25m <i>Three measurements, highest used in calculations</i>	80.2 – 82.1 dB LA _{eq}
McCloskey Trommel Screen, 10m	82.5 dB LA _{eq}
All sources, 40m – 75m to SW <i>Two measurements, highest used in calculations</i>	73.5 – 74.0 dB LA _{eq}
Measurements at site rim, 40m – 70m to NW	75.7 dB LA _{eq}
Road lorry on haul road	Sound Power Level L _{wa} = 98 dBA

When the different sets of measurements described above are normalised to the same distance from source, they agree with each other to within a margin of 2 dBA. Predictions are given for each data set and an arithmetic average of them is used in the main assessment.

It is assumed that all plant items will operate with 100% utilisation and there will be five lorry movements both in and out during the daytime assessment period of one hour. The assessment of all items of machinery having simultaneous 100% utilisation over one hour represents the reasonable worst case scenario.

4.0 **Sound Levels at Dwellings**

4.1 **Dwelling Positions**

The assessment of sound impact from proposed site activities is undertaken for the following closest dwellings:

- **Farms to the North** on unnamed roads. The dwellings are 300m – 490m from site operations (mid point 395m) and 470m the closest part of the new haul road. The elevations are 344m and 360m. The grid references are SD 88252 23175 and SD 88502 23135.
- **Hey Head Farm & Dry Corner Farm** to the southeast. The dwellings are 280m – 580m from site operations (mid point 430m) and 300m the closest part of the new haul road. The elevations are 344m and 360m. The grid reference is SD 88465 22443.
- **Farm to SW & Dwellings beyond on Siskin Ave.** The dwellings are at least 220m – 600m from site operations (mid point 410m) and 350m the closest part of the new haul road. The elevations are 335m or less. The grid reference of the closest property is SD 87809 22447.
- **Tong Farm / Bent Head Farm** to the west. The dwellings lie at 180m – 600m from site operations (mid point 390m). The dwelling is a minimum of 140m from the new haul road. The elevation is 327m. The grid reference is SD 87684 22857.
- **Dwellings on Warcock Lane** to the north west. The dwellings lie at 300m – 700m from site operations (mid point 500m) and 340m from the new haul road. The elevation of these dwellings is around 300m. The grid reference is SD 87751 23124.

4.2 **Sound Predictions**

Calculations of sound levels at the nearest dwellings caused by the plant items at site are given in the Appendices to this report. Bunds, the natural landform and quarry rim will be used to break line of sight from all parts of all machinery to all dwellings whenever practicable, apart from during initial soil stripping operations.

The predicted sound levels reaching dwellings are summarised in the table below for each of the three data sets.

Location	Meas @ 25m	Meas to SW	Meas at rim		Average
Farms North	44.7	45.2	46.4		45.4
Hey Head & Farms SE	44	44.4	45.6		44.7
Farm & Saskin Ave SW	42.7	43.1	44.3		43.4
Tong Farms W	43.6	44.0	45.0		44.2
Warcock NW	41.5	41.9	43.0		42.1

Predictions are given for workings at the mid point of the quarry. When operating at the closest points to dwellings, sound levels will be up to 5 dBA higher than the predictions given above (these elevated sound levels are considered in the noise impact assessment contained later in this report). When operating further away from the dwellings, predictions will be up to 5 dBA lower than the above figures.

During temporary phases when mobile plant items operate at the rim height of the quarry, all values are predicted at up to 10 dBA higher than those shown above.

5.0 **Background Sound Levels**

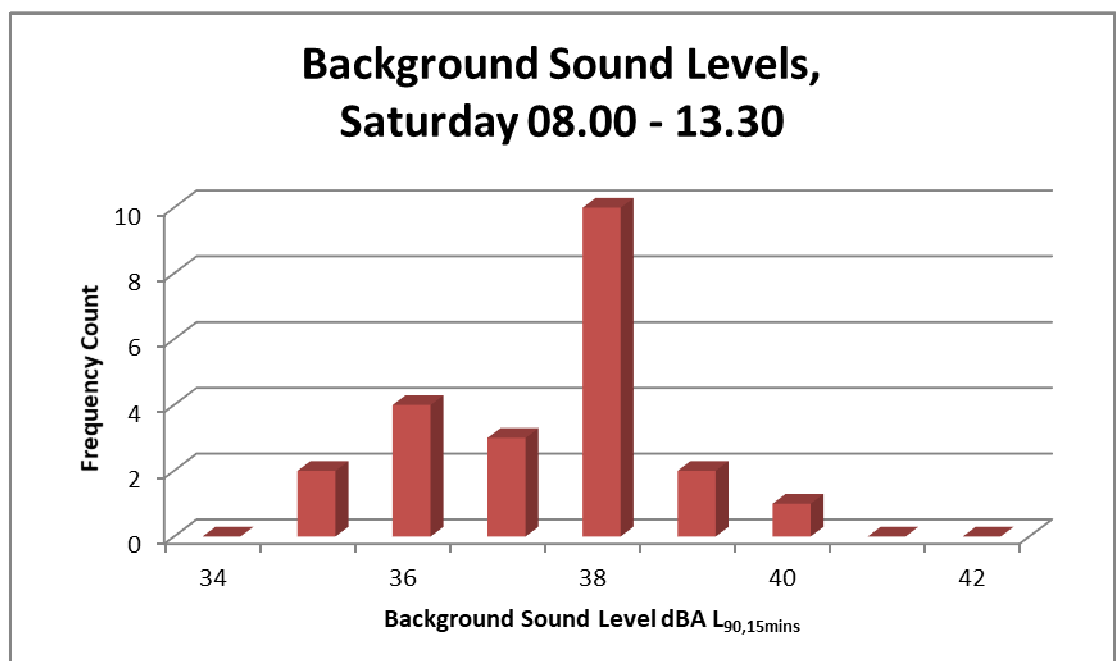
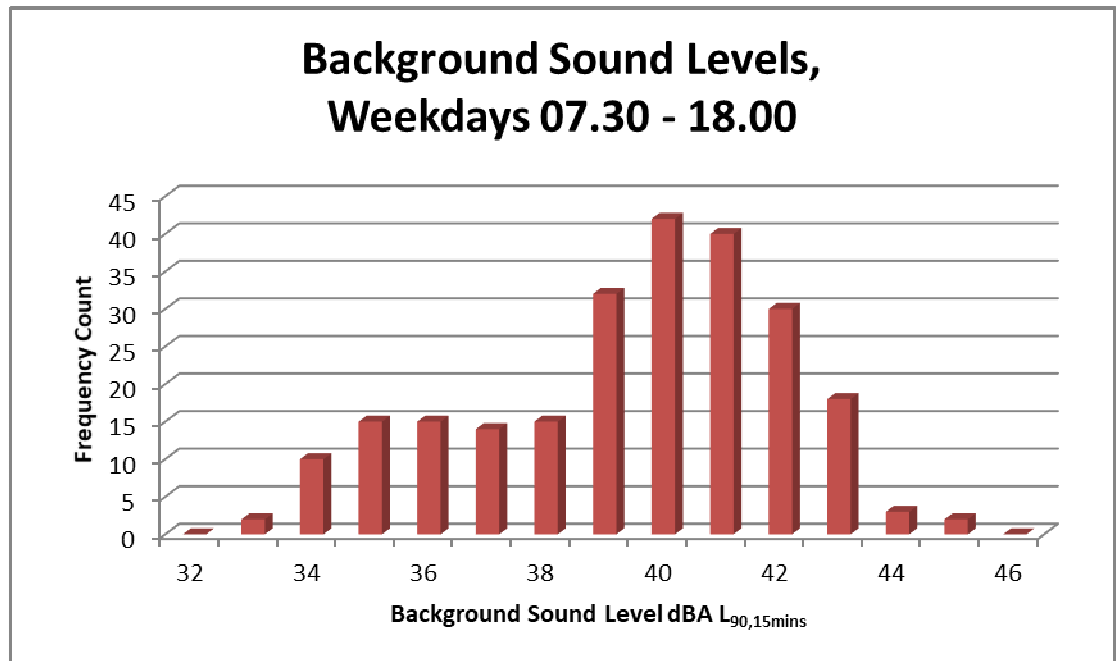
Existing background sound levels were measured in the private garden of the closest dwelling, Tong Farm, which is under the ownership of the applicant.

Sound levels were measured between 16.45 on 21st March 2019 to 13.00 on 29th March 2019.

The background survey included a Saturday morning when the quarry site will be operating. Analyses of the data at this site shows that Saturday levels are around 2 dBA lower than the rest of the week and so a separate assessment for Saturday levels has been undertaken.

The location is fairly rural, with low background sound levels. Full measurement data is included in the appendices of this report; a

graphical summary of measured background sound levels during proposed times of quarry operation is shown below.



The typical representative background sound level is identified from the above as being **40 dB LA₉₀** during weekdays and **38 dB LA₉₀** on a Saturday morning.

6.0 **Impact Assessment**

6.1 **Background Comparison - Normal Activities Including HGVs**

The requirements of the NPPF “Planning Practice Guidance” on sound limits from minerals excavation and surface workings are summarised in section 2.0 of this report. The chief requirement is that from 07.00 to 19.00 hours the sound level at noise-sensitive properties should not exceed the background level by more than 10 dBA unless this places unreasonable burden on the operator. In these instances a limit of up to 55 dBA can be applied, but exceedances above the 10 dBA comparison to background should be minimised where practicable.

Comparison between the background sound levels measured for this survey and the predicted sound levels from the proposed quarry operation show:

Dwelling Location	Average dB LA_{eq}	Background Level LA₉₀	Comparison v. Background
Farms to North	45	38 – 40	5 - 7 dB above
Hey Head & Farms SE	45	38 – 40	5 - 7 dB above
Saskin Ave & Farm SW	45	38 – 40	5 - 7 dB above
Tong Farm W	46	38 – 40	6 - 8 dB above
Warcock Lane NW	43	38 – 40	3 - 5 dB above

The comparisons to the lower background sound level is for Saturday morning working.

The predictions shown in the above table represent normal operations with all noise sources located below the quarry rim, but with full utilisation of all equipment. Movements from HGVs on the haul road is also included, separate details of HGV predictions are given in section 7 of this report

As mentioned earlier in this report, predictions are given for workings at the mid point of the quarry. When operating at the closest points to dwellings, sound levels will be up to 5 dBA higher than the predictions given above, and they will be lower by up to 5 dBA when working further away.

The conclusion is that it is likely that the target of not exceeding background by more than 10 dBA is likely to be met at all nearby dwellings at all times. The exception is when workings are at their

closest to the nearest individual dwellings in each direction, when predicted sound levels are up to 12 - 13 dBA above background on a Saturday morning, but remain within the upper limit of 55 dB LA_{eq} at all times and all locations.

6.2 **Background Comparison – Phases at Quarry Rim**

During soil stripping activities and initial minerals excavation at ground level of the quarry rim the sound levels reaching dwellings are predicted 10 dBA higher than the values shown in 6.1.

The predicted sound levels at dwellings during these phases would generally be around the 55 dB LA_{eq} limit unless close to individual dwellings, and well within the temporary 70 dB LA_{eq} limit allowable for up to 8 weeks per year for exactly this type of activity.

7.0 **HGVs on Haul Road**

An additional haul / access road is proposed to the east of the site. The exact utilisation of this is not known at this stage; an allowance of five movements in and five movements out of site per hour by HGV has been made, thought to represent the reasonable worst case scenario.

Sound levels from lorry movements along the access road are predicted by the haul road equation given in BS 5228:

$$LA_{eq} = L_{WA} - 33 + 10 \log Q - 10 \log V - 10 \log d + 10 \log (a/180) \text{ dB}$$

where V= average speed in km/h

Q = hourly vehicle rate

d = distance from haul road to receiver

a = the angle of view of the haul road from the dwelling.

The exact route of the new haul road has not been determined; an angle of view of 60 degrees is used for all dwellings, which represents the worst case given the relative locations. No shielding from land forms or bunds is assumed, though in practice an extra margin of tolerance may be provided by any screening effect that does occur. Calculation tables are shown overleaf:

	Farms to North	Hey Head SE	Farm SW & Saskin	Tong W	Warcock NW
LWA	98	98	98	98	98
Q (no. movements per hour)	10	10	10	10	10
V, kmh	24	24	24	24	24
d (distance)	470	300	350	140	300
a (angle of view)	60	60	60	60	60
Shielding	0	0	0	0	0
LAeq	29.7	31.7	31.0	35.0	31.7

The predicted sound levels from HGV movements as received at all receptors are more than 10 dBA less than the predictions from quarry sources, so do not have a significant effect on the overall assessment, but are included for completeness.

The predictions from wagons on the new haul road is less than the existing background sound levels at all receptors.

8.0 **Overall Sound Assessment**

Compliance with the normal requirements of the National Planning Policy Framework is predicted using three different measurement data sets of machinery used at the site.

Bunds, the natural landform and quarry rim will be used to break line of sight from all parts of all machinery to all dwellings whenever practicable, apart from during initial soil stripping operations.

APPENDIX 1

BACKGROUND SOUND LEVEL MEASUREMENTS

Date	Time	LAeq	LAFmax	LAFmin	LAF10%	LAF90%	LAF1%
[YYYY-MM-DD]	[hh:mm:ss]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
21/03/2019	16:45:00	41.8	53.2	35.8	44.4	38.1	48.9
21/03/2019	17:00:00	44.4	60.6	35.9	45.8	38.7	55
21/03/2019	17:15:00	43.4	57.6	36.1	45.7	39.3	50.2
21/03/2019	17:30:00	44.5	59.1	35	48.4	38.2	53.4
21/03/2019	17:45:00	47.7	69.4	35.1	47.2	38.1	61.1
21/03/2019	18:00:00	50.3	61	35.7	55.2	38.8	59.6
21/03/2019	18:15:00	58.7	81.1	35.8	48.8	38.1	72.3
21/03/2019	18:30:00	45.4	64	36.4	49	39.1	53.7
21/03/2019	18:45:00	43.3	57.2	35.6	46.2	38.5	52
21/03/2019	19:00:00	42	59.9	34.7	44.1	36.8	51
21/03/2019	19:15:00	44.7	63.5	35.4	46	38	54.5
21/03/2019	19:30:00	41.9	64.1	29.9	43.2	34.1	54.2
21/03/2019	19:45:00	38.3	51.7	28.6	41.6	31.2	47.6
21/03/2019	20:00:00	36.4	57.8	28.4	37.4	30	47.5
21/03/2019	20:15:00	35.9	53.1	26.7	37.5	29.5	46.8
21/03/2019	20:30:00	36.3	58.7	25.6	34.4	27.1	48.9
21/03/2019	20:45:00	37	53.9	25.2	39	26.7	49.2
21/03/2019	21:00:00	36	61.1	25.9	37.4	28	43.7
21/03/2019	21:15:00	36.7	49.6	28.8	39.7	31.2	45.1
21/03/2019	21:30:00	35.6	51.2	29.8	37.9	31.8	43.3
21/03/2019	21:45:00	36	53.9	29.3	37.9	31.6	44.8
21/03/2019	22:00:00	33.8	45.4	28	35.4	31.3	38.7
21/03/2019	22:15:00	33.7	54.7	27.8	34.6	29.7	42.3
21/03/2019	22:30:00	32.6	51.4	27.3	34.4	29.5	38.7
21/03/2019	22:45:00	32.8	49.1	25.6	35	28.9	39.8
21/03/2019	23:00:00	32.1	48.3	26.2	34.1	28.5	38.8
21/03/2019	23:15:00	32.9	52	25.2	35.2	27.9	41.3
21/03/2019	23:30:00	32	46.8	25.5	34	28.3	39
21/03/2019	23:45:00	31.6	52.6	25.3	32.9	27.1	40.2
22/03/2019	00:00:00	31.9	47.1	25.1	34.1	27.7	38.3
22/03/2019	00:15:00	30.5	51.2	24.8	32	26.8	36.9
22/03/2019	00:30:00	29.9	54	24.6	31.2	26.2	37.4
22/03/2019	00:45:00	29.1	41.2	24.4	31	26.6	34
22/03/2019	01:00:00	28.5	39.8	23.8	30.7	25.6	35.1

22/03/2019	01:15:00	27.1	46.7	23.6	28	25.2	31.5
22/03/2019	01:30:00	32.3	48.3	24.2	33.8	25.5	44.3
22/03/2019	01:45:00	27.9	49.6	23.8	29.6	25.2	34.1
22/03/2019	02:00:00	30.5	52.2	23.4	32.5	25.2	38.6
22/03/2019	02:15:00	28.8	49.6	24.2	30.7	25.3	36.7
22/03/2019	02:30:00	27.9	43.6	23.3	30.2	24.5	34.8
22/03/2019	02:45:00	27.4	50.5	23.1	28.9	24.2	34.7
22/03/2019	03:00:00	30.4	48.3	23.7	33.5	24.8	39.3
22/03/2019	03:15:00	30.4	57	24.3	32.5	25.7	39.1
22/03/2019	03:30:00	35.7	52.6	24.5	37.8	26.6	47.6
22/03/2019	03:45:00	32.1	46.5	25	34.9	26.6	40
22/03/2019	04:00:00	38.1	57.7	25.6	40.7	28.9	48.4
22/03/2019	04:15:00	38.1	56	26.9	39.1	29	50.7
22/03/2019	04:30:00	35.5	52.2	27.2	37.6	29.6	45.6
22/03/2019	04:45:00	34.8	57.4	27.8	37.6	29.5	43.4
22/03/2019	05:00:00	34.8	49	28.3	37.2	30.8	41.7
22/03/2019	05:15:00	37.1	51.6	29.6	39.5	33.1	43.8
22/03/2019	05:30:00	41.1	56.8	33	43.7	35.6	50.8
22/03/2019	05:45:00	38.5	52.2	33.8	40.2	35.8	43.5
22/03/2019	06:00:00	51.2	69.9	33.4	53.7	36.1	63.6
22/03/2019	06:15:00	40.1	54.2	34.9	41.9	37.2	46.3
22/03/2019	06:30:00	48.2	67.2	36.5	46.8	39.4	62
22/03/2019	06:45:00	45	63.6	38.3	46.9	40.3	54.7
22/03/2019	07:00:00	51.4	71.3	39.7	47.3	41.7	66.8
22/03/2019	07:15:00	52.2	70.6	39.5	49	41.2	66.7
22/03/2019	07:30:00	50.4	67.1	39.5	47.5	41.3	63.9
22/03/2019	07:45:00	44.1	66	39.6	45.4	41.4	50.5
22/03/2019	08:00:00	43.5	62.1	38.2	45.3	40.6	48.7
22/03/2019	08:15:00	51.6	71.4	39.5	46.9	41.3	67.2
22/03/2019	08:30:00	46	66.9	39.4	46.7	41.4	54.2
22/03/2019	08:45:00	46.5	66.3	39.7	47.8	42	56.1
22/03/2019	09:00:00	44.9	59.6	39.3	46.8	41.8	50.8
22/03/2019	09:15:00	45.6	63.9	40	47.7	42	52.4
22/03/2019	09:30:00	45.7	62.2	39.9	48.2	42.2	51.6
22/03/2019	09:45:00	44.9	59.3	38.1	47.2	41	51.2
22/03/2019	10:00:00	57.4	75.9	38.9	51.5	41.7	72.2
22/03/2019	10:15:00	45	58.7	38.3	47.4	40.8	51.5
22/03/2019	10:30:00	44.7	62.3	38.4	46.2	40.3	51.8
22/03/2019	10:45:00	47.4	71.3	39.1	48.8	41.9	57.9
22/03/2019	11:00:00	59	77.9	40.6	61	43.4	70.8
22/03/2019	11:15:00	48.7	63.8	40.3	52.7	42.9	55.9
22/03/2019	11:30:00	46.1	63.6	38.7	48.9	41.5	53.7

22/03/2019	11:45:00	50.7	68.7	40.1	53.7	43.4	59.1
22/03/2019	12:00:00	49.1	70.8	39	47.7	41.3	59
22/03/2019	12:15:00	46.7	65.8	39.6	48.4	42.3	54.6
22/03/2019	12:30:00	48.6	69.9	40	49.7	43	57.4
22/03/2019	12:45:00	49.1	72.7	40.7	51.2	43.4	57
22/03/2019	13:00:00	45.6	65.2	39.3	47.3	41.3	54.2
22/03/2019	13:15:00	47.4	65.4	39.8	49.9	42.7	55.5
22/03/2019	13:30:00	46.9	67.1	39.7	49.1	42.5	55.5
22/03/2019	13:45:00	44.6	59.7	39.5	46.4	41.5	50.1
22/03/2019	14:00:00	47.6	65.1	40.1	50.1	42.7	56
22/03/2019	14:15:00	48.3	65	40.9	50.6	43	57.2
22/03/2019	14:30:00	49.4	62.5	42.1	51.9	44.9	57.1
22/03/2019	14:45:00	44.3	57.4	40.1	45.9	41.9	49.8
22/03/2019	15:00:00	45.2	59.8	39	47.6	41.3	52.6
22/03/2019	15:15:00	45.1	57.5	39.2	47.4	41.9	51.1
22/03/2019	15:30:00	44.4	59.4	39.4	45.9	41.6	51.6
22/03/2019	15:45:00	58.2	78.6	40.8	55.6	43	70.4
22/03/2019	16:00:00	45.5	63.4	39.9	47.4	42.4	52
22/03/2019	16:15:00	47.1	70.4	39	46.3	41.4	52.9
22/03/2019	16:30:00	46.8	67.1	39.8	48.8	41.8	55.4
22/03/2019	16:45:00	47.2	67	40.8	49.5	42.7	55
22/03/2019	17:00:00	45.4	62.4	39.6	47.1	42	53.1
22/03/2019	17:15:00	46.1	66.7	40.7	47.7	42.6	53.8
22/03/2019	17:30:00	44.4	62.8	39.6	45.6	42.1	49.2
22/03/2019	17:45:00	45.1	62.4	40.2	46.8	42.1	52.6
22/03/2019	18:00:00	45.4	65.7	39.9	47.6	41.8	52.6
22/03/2019	18:15:00	46.7	66.9	39.3	48.6	41	55.9
22/03/2019	18:30:00	46.4	68.7	38.8	45.6	41	55.2
22/03/2019	18:45:00	44	61.9	38.5	45.9	40.9	50
22/03/2019	19:00:00	44.9	60.2	39.5	46.7	41.7	52
22/03/2019	19:15:00	46.2	60.5	39.7	48.8	41.9	53.8
22/03/2019	19:30:00	45.6	67.8	39.1	47.1	41.3	53.8
22/03/2019	19:45:00	42.8	56	37.4	44.8	39.9	48.7
22/03/2019	20:00:00	43.1	58.4	37.5	44.9	39.4	50.6
22/03/2019	20:15:00	42.4	60.3	36.8	44.4	38.8	49.8
22/03/2019	20:30:00	40.8	58.5	35.5	42.5	37.9	46.1
22/03/2019	20:45:00	41.4	58.7	34.9	43.2	37.4	48.7
22/03/2019	21:00:00	41.6	59.5	35.3	43.8	37.7	48.9
22/03/2019	21:15:00	42.1	57.6	34.9	44.4	38.1	49.4
22/03/2019	21:30:00	40.5	58.8	34.7	42.3	37.1	47.2
22/03/2019	21:45:00	40.6	60.2	34.1	43	36.2	47.7
22/03/2019	22:00:00	40.8	61.8	34.6	42.3	37.2	47

22/03/2019	22:15:00	41.1	59.8	34.2	43.1	36.6	49.2
22/03/2019	22:30:00	40.2	58.9	34.1	42.4	36.1	47.1
22/03/2019	22:45:00	38	50.9	31.7	40.3	33.9	45.1
22/03/2019	23:00:00	39.4	54.9	32.3	41.7	35.1	46.4
22/03/2019	23:15:00	38.8	56.2	31.7	40.6	34.4	47.5
22/03/2019	23:30:00	38.6	50.9	33	41.2	34.8	45.6
22/03/2019	23:45:00	37.5	51.2	30.9	40.2	32.9	43.6
23/03/2019	00:00:00	35.9	53.3	29.9	37.8	32.3	43
23/03/2019	00:15:00	35.9	49.2	30.7	37.9	32.4	42.7
23/03/2019	00:30:00	35.1	45.6	30.3	36.8	31.9	42
23/03/2019	00:45:00	35.4	49.8	29.1	38.1	31.2	42.5
23/03/2019	01:00:00	33.4	45.4	28	35.8	29.9	39.3
23/03/2019	01:15:00	33.3	45.1	28.2	35.5	29.9	40.2
23/03/2019	01:30:00	34.3	51.6	28.2	36.6	30.1	42.2
23/03/2019	01:45:00	34.1	52.1	28.9	36.2	30.9	39.2
23/03/2019	02:00:00	33.3	49.5	28.2	35.4	29.7	40.6
23/03/2019	02:15:00	32.6	48.7	27.9	34.3	29.6	39.2
23/03/2019	02:30:00	32.5	47.6	27.8	34.5	29.2	38.9
23/03/2019	02:45:00	32.2	47	27	34.3	28.8	38.1
23/03/2019	03:00:00	39.9	58.6	26.4	40.8	27.7	53.2
23/03/2019	03:15:00	32.7	50	26	32.8	27.4	44.9
23/03/2019	03:30:00	30.2	44.1	26.2	32.3	27.4	37
23/03/2019	03:45:00	30.6	50.4	26.2	32.2	27.7	37.3
23/03/2019	04:00:00	32.2	46	26.8	34.6	28	40.7
23/03/2019	04:15:00	33.6	52.5	26	35.1	27.7	45.2
23/03/2019	04:30:00	38.3	59.9	26.2	42	29.2	47.9
23/03/2019	04:45:00	33.3	45.9	25.9	36.4	28.5	40.5
23/03/2019	05:00:00	35.5	52.9	28.3	37.6	30.8	42.6
23/03/2019	05:15:00	40.2	53.6	30.3	43.5	34.3	48.5
23/03/2019	05:30:00	41.1	56	31.5	44.9	34	50
23/03/2019	05:45:00	50.1	64	31.1	54.6	35.4	61.2
23/03/2019	06:00:00	42.2	66.4	31	44.4	33.5	52.8
23/03/2019	06:15:00	38.2	50.9	31.7	40.8	34.3	44.1
23/03/2019	06:30:00	40.7	63.9	34	42.3	36.4	46
23/03/2019	06:45:00	41.4	55	32.8	44	37.1	49.3
23/03/2019	07:00:00	42.7	69.9	34.2	45.7	36.5	50.6
23/03/2019	07:15:00	40.2	52.8	33.4	42.7	36.1	47.4
23/03/2019	07:30:00	44.2	77.6	33.9	44.3	36.8	51.7
23/03/2019	07:45:00	40.6	53.4	32.7	43.4	35.2	48.1
23/03/2019	08:00:00	39.9	53	33.1	42.6	35.6	46.3
23/03/2019	08:15:00	40.3	53.5	32.5	43.2	35.5	47.8
23/03/2019	08:30:00	40.8	54.1	32	43.6	35.4	47.8

23/03/2019	08:45:00	39.4	57.3	31.7	41.9	35.2	46.3
23/03/2019	09:00:00	42	55.7	33.6	45.2	36.8	49.1
23/03/2019	09:15:00	51.2	65	35.8	55	39.4	59.6
23/03/2019	09:30:00	51.2	65.6	36.2	55.4	40	60.8
23/03/2019	09:45:00	60	81	36.2	57.8	39.2	74.9
23/03/2019	10:00:00	53.4	73.1	35.5	52.8	37.8	68.3
23/03/2019	10:15:00	42	60.1	35.7	43.6	38.3	49.5
23/03/2019	10:30:00	44.8	61.1	34.4	47.8	38	52.9
23/03/2019	10:45:00	59.7	81.2	34.3	56.7	38.2	73.2
23/03/2019	11:00:00	46.5	65.3	34.4	46.1	38	59.6
23/03/2019	11:15:00	42.2	65.9	34	43.9	37.6	47.9
23/03/2019	11:30:00	40.9	54.9	34.4	43.2	37.4	46.7
23/03/2019	11:45:00	39.7	60.8	33.5	41.6	36.2	46
23/03/2019	12:00:00	43.3	61.2	34.8	45.3	37.8	53.4
23/03/2019	12:15:00	41.7	61.3	34.5	43.9	38	47.2
23/03/2019	12:30:00	41.1	56.7	34	43.7	36.4	47.8
23/03/2019	12:45:00	40.5	54.3	33.7	42.4	37	46.9
23/03/2019	13:00:00	42.2	54.4	35.4	44.3	38.2	50.4
23/03/2019	13:15:00	42.6	60.5	34.8	44.3	37.5	52.2
23/03/2019	13:30:00	40.1	52.3	34.7	42.3	37.1	45.5
23/03/2019	13:45:00	40.6	51.1	33.8	42.5	37.5	46.4
23/03/2019	14:00:00	41.1	55.7	33.7	43	37.6	48.2
23/03/2019	14:15:00	42	55.6	36.1	44.3	38.6	48.2
23/03/2019	14:30:00	43	60.3	36.1	45.2	38.5	50.4
23/03/2019	14:45:00	42.6	64.7	34.5	42.6	37.5	51.3
23/03/2019	15:00:00	46.9	67.4	34.6	46.9	38.5	59.2
23/03/2019	15:15:00	48.5	71.4	36.7	49.1	39.3	58.1
23/03/2019	15:30:00	49.2	67.6	34.8	50.3	38.1	61.6
23/03/2019	15:45:00	46.4	69.2	35.7	45.3	38.4	57.6
23/03/2019	16:00:00	44.9	67.9	34.7	44.3	37.2	49.6
23/03/2019	16:15:00	41.3	55	34.6	43.3	37.5	49.3
23/03/2019	16:30:00	51	71.8	34.5	45.1	37.4	66.5
23/03/2019	16:45:00	51.8	73.5	35.7	44.2	37.9	66.3
23/03/2019	17:00:00	58.7	80.3	35	44.9	38.2	73.9
23/03/2019	17:15:00	52.2	75.9	35.1	41.3	36.9	68.9
23/03/2019	17:30:00	41.1	57.1	34.3	42.8	37.6	47.8
23/03/2019	17:45:00	40.4	55.2	33.6	42.1	37.4	46
23/03/2019	18:00:00	41	55.5	34.9	43.3	37.6	47
23/03/2019	18:15:00	41	58.5	33.2	42.3	36	51.3
23/03/2019	18:30:00	40.6	55.6	32.8	42.9	35.5	50.2
23/03/2019	18:45:00	40.9	55.9	32.1	43.8	35.7	49.2
23/03/2019	19:00:00	40.7	59.8	33	42.3	36	48.6

23/03/2019	19:15:00	38.5	51.2	31.9	40.7	34.8	45.5
23/03/2019	19:30:00	37.4	57.6	31.5	39.1	33.7	44.7
23/03/2019	19:45:00	37.1	56.3	30.7	38.9	33.4	44.2
23/03/2019	20:00:00	37.5	55	32.3	39.1	34.9	42.4
23/03/2019	20:15:00	37.9	55.1	31	39.8	34.6	43
23/03/2019	20:30:00	37.4	60.4	30.1	38	32.2	45
23/03/2019	20:45:00	33.1	45.2	25.7	35.4	29.3	39
23/03/2019	21:00:00	36.3	49.7	28.2	37.7	30.9	46.7
23/03/2019	21:15:00	37.2	51	29.8	39.7	32.9	44.5
23/03/2019	21:30:00	34.1	47.5	27.3	36.5	30.1	39.1
23/03/2019	21:45:00	32.5	48.1	26.6	34.5	29.1	38
23/03/2019	22:00:00	34	48.8	28	35.9	29.9	42.2
23/03/2019	22:15:00	33.2	48.3	26.9	35.5	29.1	38.8
23/03/2019	22:30:00	31.2	47.7	25.5	33.2	27.8	37.5
23/03/2019	22:45:00	31.3	42.6	25.7	33.3	27.7	37.9
23/03/2019	23:00:00	32.8	41.3	26.8	34.9	29.9	37.7
23/03/2019	23:15:00	31.7	43.4	26.5	33.9	28.2	37.2
23/03/2019	23:30:00	29	48.2	24.2	31	25.6	34.8
23/03/2019	23:45:00	29.7	45.5	24.4	31.7	26.1	37.7
24/03/2019	00:00:00	33.9	51.2	26.6	36.6	28.8	40.6
24/03/2019	00:15:00	34.5	52.4	26.6	37.5	28.4	40.4
24/03/2019	00:30:00	33.8	44.5	26.5	36.4	29.3	39.7
24/03/2019	00:45:00	31.1	51.3	25.3	33.4	26.8	37.3
24/03/2019	01:00:00	31.4	45.5	25.3	33.9	27.2	37.8
24/03/2019	01:15:00	34.9	52.7	26.8	37	29.7	44.3
24/03/2019	01:30:00	32.5	45	26	35.1	27.4	40.1
24/03/2019	01:45:00	30	43.1	25.1	32	26.9	34.8
24/03/2019	02:00:00	30.2	46.9	25	32.7	26.4	37.6
24/03/2019	02:15:00	31.6	54.8	26	33.3	27.4	39.9
24/03/2019	02:30:00	31.7	52.9	26.3	33.6	27.7	38.9
24/03/2019	02:45:00	34.3	52.7	25.3	36.3	27.9	44.1
24/03/2019	03:00:00	31.9	49.4	24.3	34.2	26.4	41.6
24/03/2019	03:15:00	32.2	45.2	24.9	35.2	26.8	40
24/03/2019	03:30:00	34.1	57.5	26.3	36.8	28.4	42.1
24/03/2019	03:45:00	32.5	44	26.8	35.4	28.2	39.6
24/03/2019	04:00:00	31.2	43.2	26.8	33.4	28.2	37
24/03/2019	04:15:00	30.8	42.6	27	33.2	28.1	36.5
24/03/2019	04:30:00	33	44.3	26.3	35.4	28	41
24/03/2019	04:45:00	32.5	43.1	26	35.1	28.5	38.3
24/03/2019	05:00:00	35.2	47.8	28.8	37.9	30.9	42.2
24/03/2019	05:15:00	41.1	54.8	30.6	45.3	33.6	50
24/03/2019	05:30:00	42.7	59.2	30.9	47.3	33.7	51.6

24/03/2019	05:45:00	38.9	53.6	31.2	41.6	33.9	47.8
24/03/2019	06:00:00	36.2	63	30.7	37.8	32.8	41.3
24/03/2019	06:15:00	35.8	50.1	30	38.4	32	42.6
24/03/2019	06:30:00	39.3	54.8	30.6	42.2	33.2	49.2
24/03/2019	06:45:00	41.2	58.4	31.8	44.6	35.6	49.1
24/03/2019	07:00:00	42	63	33.5	44.5	36	50.5
24/03/2019	07:15:00	41.2	62.8	33.7	43.2	36.1	48.8
24/03/2019	07:30:00	39.9	65.4	31.8	41.5	34.9	46.3
24/03/2019	07:45:00	40.6	57.8	32.6	43.6	35.1	49.5
24/03/2019	08:00:00	39.3	52.4	32.8	41.9	35	46.1
24/03/2019	08:15:00	42.5	60.9	34.1	44.8	37.1	51.8
24/03/2019	08:30:00	42	60.4	34.7	44	37	51
24/03/2019	08:45:00	45.2	63	35.3	48	38.2	54.8
24/03/2019	09:00:00	45.4	66.2	36.5	47.8	39.2	55.4
24/03/2019	09:15:00	47.2	63.4	38.1	50.1	40.5	57.4
24/03/2019	09:30:00	48.1	64	39.5	50.8	42	57.6
24/03/2019	09:45:00	49.3	65.6	38.5	52.3	41.9	58.9
24/03/2019	10:00:00	48.5	65.4	38.5	51.3	42.2	57.7
24/03/2019	10:15:00	52.1	69.3	38.4	55.9	42.2	61
24/03/2019	10:30:00	47.6	65.7	39.3	50.1	42.1	57.1
24/03/2019	10:45:00	48.8	67.3	40.4	51.3	43.1	58
24/03/2019	11:00:00	48.5	64.4	41.4	51.1	43.3	57.9
24/03/2019	11:15:00	59.4	82.9	39.4	53	43	72.2
24/03/2019	11:30:00	48.6	64.2	40.9	51.3	43.2	57.7
24/03/2019	11:45:00	48.6	69.1	40.5	51	42.7	58.3
24/03/2019	12:00:00	47.6	64.1	40	50.1	42.4	55.9
24/03/2019	12:15:00	46.5	65	39.6	49	41.9	54.9
24/03/2019	12:30:00	47.4	66.3	38.8	50	41.6	56
24/03/2019	12:45:00	48.1	64	39.6	50.8	42.6	56.7
24/03/2019	13:00:00	48.6	65	39.9	50.9	43	58.2
24/03/2019	13:15:00	49.8	71	39.8	51.9	43	59.6
24/03/2019	13:30:00	47.6	64.1	39.5	50.3	42	56.8
24/03/2019	13:45:00	49.1	65.7	40.7	51.6	43.1	58.5
24/03/2019	14:00:00	51.9	67.3	42.8	54.8	45.7	61.1
24/03/2019	14:15:00	51.1	67.2	42.6	53.9	44.9	60.4
24/03/2019	14:30:00	48.4	68.9	40	50.1	42.3	57.5
24/03/2019	14:45:00	48.2	64.6	40.3	50.8	43.2	57.2
24/03/2019	15:00:00	49.7	67.8	40.9	52.5	43.9	58.3
24/03/2019	15:15:00	49.8	65.9	40.5	52.5	43.8	59
24/03/2019	15:30:00	49	66.9	40.9	51.5	43.2	58.8
24/03/2019	15:45:00	48.8	64.5	41.1	51.4	43.1	58.6
24/03/2019	16:00:00	48.6	64.7	40.5	51.6	42.8	57.8

24/03/2019	16:15:00	50.4	70.7	39.9	53.1	42.9	60.3
24/03/2019	16:30:00	46.8	63.6	40.5	49	42.5	55.6
24/03/2019	16:45:00	51.3	69.3	41.6	54.2	44.6	60.5
24/03/2019	17:00:00	51.1	69.8	41.4	54.1	45	59.9
24/03/2019	17:15:00	48.9	67.7	40.3	51.6	42.9	58.2
24/03/2019	17:30:00	45	64.6	38.7	47.5	40.5	53.5
24/03/2019	17:45:00	45.8	67.1	38.5	47.5	40.9	54.8
24/03/2019	18:00:00	46.4	61.9	38.1	49.3	40.9	54.9
24/03/2019	18:15:00	43.3	62.8	37.4	45.1	39.8	50.5
24/03/2019	18:30:00	45.9	62.4	38.4	48.4	40.6	54.4
24/03/2019	18:45:00	49.7	67.9	40.1	52.5	42.6	58.7
24/03/2019	19:00:00	48	64.2	40.7	50.4	43.3	56.6
24/03/2019	19:15:00	45.3	61.7	37.8	47.5	40.7	53.9
24/03/2019	19:30:00	43.3	60	38.2	45	40.2	50.1
24/03/2019	19:45:00	47.9	71.1	37.1	49	40	58.2
24/03/2019	20:00:00	44.9	60.5	36.5	47.5	39.5	53.1
24/03/2019	20:15:00	43	61.3	35.2	44.6	38.5	51.7
24/03/2019	20:30:00	43.5	59.3	35.9	46	39.2	50.8
24/03/2019	20:45:00	45.2	63.2	36.8	47.9	39.4	53.7
24/03/2019	21:00:00	47.7	64.9	38.2	50.5	41.2	57.1
24/03/2019	21:15:00	49.5	67.8	38.3	52.4	42.2	59
24/03/2019	21:30:00	52.7	72.4	42.2	55.3	45.8	62.4
24/03/2019	21:45:00	50.4	67.8	41.4	52.8	44.3	59.4
24/03/2019	22:00:00	49.9	67.7	37.2	52.6	41	59.7
24/03/2019	22:15:00	41.4	60.6	34.3	43.7	36.8	49.1
24/03/2019	22:30:00	45	65.3	35.7	47.5	39.6	53.6
24/03/2019	22:45:00	48	65.9	39.1	50.6	42	57
24/03/2019	23:00:00	48.3	63.7	37.4	51.4	41.2	57.8
24/03/2019	23:15:00	47.7	65.7	39	50.4	42.4	55.9
24/03/2019	23:30:00	50.9	68.7	40.6	53.5	44.1	60.5
24/03/2019	23:45:00	45.6	63.2	36	48.4	39.8	54
25/03/2019	00:00:00	44.7	62.3	35.8	47.6	39.1	52.6
25/03/2019	00:15:00	48.9	65.9	38.6	51.4	42.3	59
25/03/2019	00:30:00	50.1	71.4	39.7	52.7	42.8	59.6
25/03/2019	00:45:00	47.4	64.1	38.6	50.2	41.4	55.8
25/03/2019	01:00:00	44.5	63	33.2	47.2	36.7	54.3
25/03/2019	01:15:00	39.9	60	30.9	42.6	34	48.9
25/03/2019	01:30:00	38	57.7	31	40.2	33.1	46.7
25/03/2019	01:45:00	37.4	57.3	30.2	39.7	32.8	45.3
25/03/2019	02:00:00	35.7	57	29.8	37.6	31.5	42.8
25/03/2019	02:15:00	32.3	50.7	26.6	34.3	28.8	39.7
25/03/2019	02:30:00	31	50.6	25.8	31.9	27.2	39.9

25/03/2019	02:45:00	30.1	46.2	25.9	31.6	27.7	37
25/03/2019	03:00:00	29.1	43.8	25.5	30.7	26.5	36.9
25/03/2019	03:15:00	28	42.6	25.4	29.1	26.3	32.9
25/03/2019	03:30:00	30	44.7	25.3	31.9	26.4	38.4
25/03/2019	03:45:00	30	40.7	25.9	32.2	27.2	35.4
25/03/2019	04:00:00	32	45.8	25.9	34.5	27.8	39.4
25/03/2019	04:15:00	32.2	45.3	26.4	34.6	28.3	39.7
25/03/2019	04:30:00	31.7	46.9	27.2	33.8	28.5	38.6
25/03/2019	04:45:00	32.8	41	27.1	35.4	28.9	38.1
25/03/2019	05:00:00	38.3	53.3	29.3	40.8	32.3	47.7
25/03/2019	05:15:00	42	57.6	33.3	45.5	36.6	50.2
25/03/2019	05:30:00	40.9	56.6	33.4	43.2	36.1	49.2
25/03/2019	05:45:00	41.9	57.2	34	44.9	36.5	50.1
25/03/2019	06:00:00	43.9	57.5	35.3	46.8	39.1	50.8
25/03/2019	06:15:00	41.3	53.2	35.5	43.4	37.7	48
25/03/2019	06:30:00	44.6	61.7	37.8	46.9	40.9	51.3
25/03/2019	06:45:00	45.1	61.2	37.6	47.1	41.4	51.9
25/03/2019	07:00:00	45.3	57.8	39.3	46.9	42	53.6
25/03/2019	07:15:00	44.1	53.5	39.2	46	41.4	48.4
25/03/2019	07:30:00	42.7	58.4	37.2	45.1	39.2	49.6
25/03/2019	07:45:00	42.5	53	37.2	44.7	39.2	47.7
25/03/2019	08:00:00	43.5	55.5	36.2	45.6	39.5	50.7
25/03/2019	08:15:00	42.5	54.2	37.2	44.7	39.1	49.1
25/03/2019	08:30:00	43.6	61	37.8	45.1	40.1	51.6
25/03/2019	08:45:00	45.3	70.8	37.5	46.8	39.9	52.9
25/03/2019	09:00:00	44.4	56.9	35.6	47	39.5	52.6
25/03/2019	09:15:00	45.3	67	36.6	46.5	39.3	51.8
25/03/2019	09:30:00	44.9	65.5	33.7	47	37.2	54.5
25/03/2019	09:45:00	47.6	68.1	34.1	46.6	36.8	60.7
25/03/2019	10:00:00	53.3	64.4	35.3	56	40.2	60.7
25/03/2019	10:15:00	45.4	60.1	35.6	48	39.9	53.2
25/03/2019	10:30:00	48.6	62	33.7	52.7	37.7	55.8
25/03/2019	10:45:00	43.6	60	35.7	45.9	39.5	50.8
25/03/2019	11:00:00	44.5	60	33.2	47.5	38.1	53
25/03/2019	11:15:00	42	56.9	32.7	45.8	35.2	51.6
25/03/2019	11:30:00	41.1	56.3	31.2	44.1	34.2	49.4
25/03/2019	11:45:00	42.6	52.7	34.6	43.8	40.2	48.4
25/03/2019	12:00:00	38.1	54.3	30.1	40.5	32.9	47.3
25/03/2019	12:15:00	36.5	48.4	30.6	38.5	33.3	42.4
25/03/2019	12:30:00	39.7	54.2	32.8	42.1	35.7	46.6
25/03/2019	12:45:00	44.8	68.5	33.5	44.8	36.8	52.8
25/03/2019	13:00:00	49.5	66.3	33.4	48.8	35.9	62.8

25/03/2019	13:15:00	41.8	57.4	31.2	45.3	34.6	50.4
25/03/2019	13:30:00	43.1	60.1	32.8	45.8	35.6	54
25/03/2019	13:45:00	41.4	57.3	31.9	44	35.4	50.9
25/03/2019	14:00:00	47.5	72.9	31.9	51.9	34.8	58.9
25/03/2019	14:15:00	42	60.1	33.8	44	37.3	51.1
25/03/2019	14:30:00	48.6	67.1	34.6	51.9	38	60.1
25/03/2019	14:45:00	44.2	56.9	35.7	46.8	39	51.7
25/03/2019	15:00:00	47.3	68.5	38.2	49.6	41.2	55.4
25/03/2019	15:15:00	46.6	65.1	39.1	49.5	41.2	55.4
25/03/2019	15:30:00	43.9	56.7	36.3	46.5	39.8	51.1
25/03/2019	15:45:00	42.6	55.3	37.2	44.5	39.7	48.4
25/03/2019	16:00:00	45.4	61.8	37.2	46.1	39.6	56.6
25/03/2019	16:15:00	46	64.5	34.5	46.6	38.2	58.7
25/03/2019	16:30:00	43.3	58.2	36.6	45.7	39	51.5
25/03/2019	16:45:00	51.1	69.4	35.7	47.6	38.9	65.9
25/03/2019	17:00:00	41.8	52.6	37.4	43.4	39.3	47
25/03/2019	17:15:00	47.8	62.5	37.1	53.2	39.5	56.4
25/03/2019	17:30:00	49.8	69.7	37.3	52.8	39.7	62.5
25/03/2019	17:45:00	42.8	62.3	37.9	44	40.1	47.3
25/03/2019	18:00:00	49	71.5	37.3	46.8	39.5	63.5
25/03/2019	18:15:00	45.2	69	37.9	46	39.9	55.2
25/03/2019	18:30:00	47.7	69.3	37.7	43.8	39.6	62.1
25/03/2019	18:45:00	44.2	65.5	37.4	46.2	39.5	52.7
25/03/2019	19:00:00	43.8	54.9	37.4	46.4	39.9	51.4
25/03/2019	19:15:00	41.8	52.7	35.4	43.9	38.4	47.9
25/03/2019	19:30:00	38.6	53.4	34.2	40.3	36.1	43.3
25/03/2019	19:45:00	38.2	54.4	32.6	39.6	34.2	47.3
25/03/2019	20:00:00	38.5	50.4	33.7	40	35.8	43.7
25/03/2019	20:15:00	37.4	52.2	32.4	38.9	34.5	41.7
25/03/2019	20:30:00	38.3	47.6	33.5	40.3	35.3	42.6
25/03/2019	20:45:00	38.5	53.6	31.5	40.8	33.4	45.4
25/03/2019	21:00:00	38.1	56.2	30.1	38.5	32.2	48.9
25/03/2019	21:15:00	37.1	52.8	29.8	39.5	32.2	44.7
25/03/2019	21:30:00	37.2	49	30.7	39.4	32.7	46.4
25/03/2019	21:45:00	36	50.7	30.1	37.3	32.2	46
25/03/2019	22:00:00	35.5	47.4	30.3	38	31.9	41
25/03/2019	22:15:00	34.8	48.1	28.1	36.4	30.8	43.9
25/03/2019	22:30:00	33.1	49.1	27.4	35	29.6	39.1
25/03/2019	22:45:00	30.6	50.3	24.5	32.6	26.8	36.7
25/03/2019	23:00:00	34.1	53.3	25.2	37.2	27	44
25/03/2019	23:15:00	33.2	50.8	25.3	36.1	27.6	41.9
25/03/2019	23:30:00	35.9	54.7	23.8	40.7	25.4	46.4

25/03/2019	23:45:00	36.6	56.7	23.4	36.7	25.2	49.6
26/03/2019	00:00:00	28.7	39	23.7	31.7	24.9	35.4
26/03/2019	00:15:00	29.3	57.1	23.6	30.6	24.9	34.4
26/03/2019	00:30:00	33.5	56.5	24.3	36.1	26	43.9
26/03/2019	00:45:00	28.1	45.2	23.8	30.6	24.8	34.5
26/03/2019	01:00:00	32.8	51.3	23.4	32.5	24.6	45.2
26/03/2019	01:15:00	35.7	54.6	23.8	38.6	26	46.7
26/03/2019	01:30:00	29	44.8	23.6	32	24.6	37.5
26/03/2019	01:45:00	28.2	42.6	22.3	30.9	23.6	36.7
26/03/2019	02:00:00	25.5	42.9	21.5	26	22.7	34.2
26/03/2019	02:15:00	27.3	49.3	21.5	28.1	22.6	36.7
26/03/2019	02:30:00	25.9	45.4	21.7	26.8	22.5	35.7
26/03/2019	02:45:00	26.4	46	22.4	27.8	23.2	35.1
26/03/2019	03:00:00	29.7	49.1	23.4	32.3	24.6	38.1
26/03/2019	03:15:00	27	43.1	22.9	28.4	24	34.4
26/03/2019	03:30:00	28.6	42.5	24.1	30.5	25.7	35.4
26/03/2019	03:45:00	29	44.2	23.7	31.2	25.1	36.8
26/03/2019	04:00:00	41.1	63.4	24.1	34.7	25.8	55.3
26/03/2019	04:15:00	31.2	46	25.3	33.8	27.4	38.7
26/03/2019	04:30:00	32	49.4	25.9	34.3	27.7	39.6
26/03/2019	04:45:00	32.7	44.8	25.8	35	28.5	39.1
26/03/2019	05:00:00	36	51.6	28.4	38.4	30.7	45
26/03/2019	05:15:00	43.1	55.8	31.5	47.6	34.5	51.9
26/03/2019	05:30:00	41	55.4	31.5	44.3	34.8	50.5
26/03/2019	05:45:00	38	48.9	32.4	40.1	34.9	43.2
26/03/2019	06:00:00	39.9	54.5	34.5	41.8	36.7	46.7
26/03/2019	06:15:00	40.7	52.7	34	43	37.1	48
26/03/2019	06:30:00	43.5	59.9	37.3	45.7	39.1	52.8
26/03/2019	06:45:00	43.2	55.7	37.7	45.4	39.7	49.6
26/03/2019	07:00:00	43.3	58.8	38.2	45.4	40.2	49.9
26/03/2019	07:15:00	44.6	56.2	38.2	47	40.7	51.9
26/03/2019	07:30:00	45.1	62	38.7	47.3	41.9	51.4
26/03/2019	07:45:00	44.9	62.6	40.3	46.6	42.1	51.3
26/03/2019	08:00:00	45.4	56	40.1	47.7	42.4	51.1
26/03/2019	08:15:00	45.5	58.5	40	47.5	42.6	50.7
26/03/2019	08:30:00	46.1	66.4	40	48.8	42.2	52.1
26/03/2019	08:45:00	46.8	58.8	40.7	49.5	42.9	53.6
26/03/2019	09:00:00	45.8	59	40.1	48.4	42.3	52.3
26/03/2019	09:15:00	44.8	58.6	38.9	47.4	40.8	51.3
26/03/2019	09:30:00	47.2	64.6	39.2	49.8	41.8	56.6
26/03/2019	09:45:00	48.3	62.5	37.4	52.1	40.1	55.2
26/03/2019	10:00:00	52	76.8	40.2	52.9	43.5	55.6

26/03/2019	10:15:00	46.3	61.5	40.3	48.3	42.4	54
26/03/2019	10:30:00	49.1	66	40.6	51.5	42.8	58.4
26/03/2019	10:45:00	48	62.5	39.4	50.7	42.7	55.3
26/03/2019	11:00:00	48.3	64.5	40.2	50.7	43.5	56.1
26/03/2019	11:15:00	57.9	76	40.1	53.5	43	72
26/03/2019	11:30:00	56.5	77.4	37.4	48.4	40.6	71.8
26/03/2019	11:45:00	50.2	76.4	38	47.9	41.1	54.6
26/03/2019	12:00:00	47.3	61.9	40.2	50.2	42.5	55.3
26/03/2019	12:15:00	45.6	59.7	39.1	47.9	41.6	53.2
26/03/2019	12:30:00	45.7	60.8	39.1	48.1	41.4	53.4
26/03/2019	12:45:00	48.1	62.5	40.2	50.5	43.8	55.1
26/03/2019	13:00:00	46.3	64.7	37.9	49.3	40.6	53.7
26/03/2019	13:15:00	43	57.8	37.9	44.9	39.8	50.2
26/03/2019	13:30:00	45.9	63	38.7	48.7	40.9	53.9
26/03/2019	13:45:00	47.4	64.3	37.7	50.9	39.9	56.1
26/03/2019	14:00:00	47.7	68.1	38.5	49.5	41.9	57
26/03/2019	14:15:00	48.3	65.8	39.9	49.7	41.7	59.6
26/03/2019	14:30:00	44.8	61	38.1	47	40.5	53.3
26/03/2019	14:45:00	46.2	69	37.4	47.2	39.8	54.1
26/03/2019	15:00:00	45.2	60.9	38.2	47	40.6	54.3
26/03/2019	15:15:00	46.3	67.6	39.5	48.6	41.5	54.6
26/03/2019	15:30:00	44.5	59.1	38.2	46.4	40.6	52.5
26/03/2019	15:45:00	44.5	61.2	38.4	46.5	40.7	51.8
26/03/2019	16:00:00	43.1	59.5	37.7	45	40	48.6
26/03/2019	16:15:00	44.2	63	37.9	45.7	40.6	52.6
26/03/2019	16:30:00	43.7	60.3	37.4	45.3	40.2	51.1
26/03/2019	16:45:00	44.2	64.1	36.9	45.8	40.2	52
26/03/2019	17:00:00	53.7	85.1	39	50.1	41.5	61.8
26/03/2019	17:15:00	49.9	70	39.1	47.4	41.2	63.2
26/03/2019	17:30:00	43.6	59.7	38.7	45.3	40.9	49.3
26/03/2019	17:45:00	43.7	59.6	38.7	45.4	40.9	50.1
26/03/2019	18:00:00	47.3	68	38.7	46.3	40.8	59.1
26/03/2019	18:15:00	47	68.2	37.8	45	40.1	59.3
26/03/2019	18:30:00	43.7	61.8	37.8	45.5	39.8	50.5
26/03/2019	18:45:00	41.3	57.2	35.9	43.2	38.3	47.5
26/03/2019	19:00:00	41.4	52.6	34.1	44.3	36.7	48.9
26/03/2019	19:15:00	40.9	54.5	35.5	43.1	37.8	46.9
26/03/2019	19:30:00	41.7	63.7	34.4	41.9	36.4	51.8
26/03/2019	19:45:00	39.1	48.6	34.1	41	36.2	43.9
26/03/2019	20:00:00	38	50.6	31.5	40.2	34.1	44.6
26/03/2019	20:15:00	37	52.9	30.8	38.7	33.3	45.1
26/03/2019	20:30:00	36.1	50	31.2	38	33.4	41

26/03/2019	20:45:00	36.5	45.7	30.4	38.7	33.3	42.6
26/03/2019	21:00:00	40.1	54.5	31.5	43.5	34	49.2
26/03/2019	21:15:00	35.8	46.2	30.2	38.1	32.5	41.3
26/03/2019	21:30:00	36.6	48.8	29.6	39.1	32.7	43.1
26/03/2019	21:45:00	36	53.4	28.3	37.9	30.4	46
26/03/2019	22:00:00	33.8	52.8	28.1	35.7	30	39.8
26/03/2019	22:15:00	34	48	27.9	36.1	30	40.7
26/03/2019	22:30:00	32.7	45.4	27	34.8	29.1	39.3
26/03/2019	22:45:00	30.8	41.7	25.4	33.3	27.2	36.7
26/03/2019	23:00:00	31.7	51.9	24.4	33.3	26.1	42.1
26/03/2019	23:15:00	29.9	46.2	24.4	32	26.3	36.3
26/03/2019	23:30:00	28.2	50.3	22.8	30	24.6	36.2
26/03/2019	23:45:00	29.3	49.4	23.6	31.1	24.8	37.4
27/03/2019	00:00:00	28.3	49.3	23.3	30	24.8	35.1
27/03/2019	00:15:00	27.6	41.5	22.7	30.2	24.1	35.3
27/03/2019	00:30:00	27.9	41.8	22.5	30.2	23.6	36
27/03/2019	00:45:00	31.2	56	22.3	30.4	23.5	40
27/03/2019	01:00:00	25.8	40.4	22.7	27	23.7	32
27/03/2019	01:15:00	25.1	40.5	22.5	26	23.2	30.9
27/03/2019	01:30:00	26.8	41	22.6	29.2	23.5	34.4
27/03/2019	01:45:00	27.2	43.6	23.1	29.1	24.1	35
27/03/2019	02:00:00	28.7	46.9	22.4	29.7	23.6	39
27/03/2019	02:15:00	26.5	51.5	22.3	27.7	23.5	32.4
27/03/2019	02:30:00	25.8	44.8	22.6	27.1	23.7	31.5
27/03/2019	02:45:00	28.5	42.2	22.7	31.2	24	36.9
27/03/2019	03:00:00	27.1	42.9	22.5	28.8	23.8	35.4
27/03/2019	03:15:00	29.2	46.8	22.6	32.1	23.6	39.3
27/03/2019	03:30:00	28.1	44.3	22.9	30.4	24.3	36.7
27/03/2019	03:45:00	28.6	47.4	23.1	30.9	24.7	36.5
27/03/2019	04:00:00	30.4	41.7	23.7	33.4	25.7	37.8
27/03/2019	04:15:00	31.6	50.8	24.5	33.2	26.3	39.9
27/03/2019	04:30:00	31	44.3	25.3	33.4	27.1	37.9
27/03/2019	04:45:00	31.2	43.8	25.8	33.6	27.8	37.2
27/03/2019	05:00:00	35.4	50.8	27	38	30.5	43.2
27/03/2019	05:15:00	41.8	58.7	31.7	45.4	35	50.9
27/03/2019	05:30:00	42.2	56.1	30.8	46.3	34.7	51
27/03/2019	05:45:00	38	53.5	32.8	39.9	34.7	44.7
27/03/2019	06:00:00	39.8	60.3	33.9	41.9	36.1	45.7
27/03/2019	06:15:00	39.4	53.6	33	41.9	35.7	45.6
27/03/2019	06:30:00	41.3	56	35.4	42.8	37.9	48.3
27/03/2019	06:45:00	42.1	53.7	37	44.2	38.8	49.2
27/03/2019	07:00:00	43.8	57.4	38	46.5	39.9	50.2

27/03/2019	07:15:00	42.7	51.7	37.8	44.5	40.3	48
27/03/2019	07:30:00	42.5	58.1	37.4	44.1	39.4	49.9
27/03/2019	07:45:00	43.7	61.4	38.1	46.1	40.4	49.9
27/03/2019	08:00:00	43.7	53.4	38	45.8	40.6	48.9
27/03/2019	08:15:00	44	56.5	38.1	46.5	40.2	51.6
27/03/2019	08:30:00	43.3	61.3	37.3	45.1	39.4	51.2
27/03/2019	08:45:00	43.3	58.2	38.8	44.9	40.7	48.6
27/03/2019	09:00:00	44.5	59.4	37.6	46.4	40.8	52.6
27/03/2019	09:15:00	45.2	64.4	37.1	46.7	39.9	55.1
27/03/2019	09:30:00	44.5	62.6	36.5	46.7	39.8	52.9
27/03/2019	09:45:00	42.3	56.2	36.4	44.3	38.7	49.1
27/03/2019	10:00:00	44.5	61.7	36.7	47.2	39	52.3
27/03/2019	10:15:00	45.6	62.7	36.6	48.2	40.1	53.6
27/03/2019	10:30:00	44.8	63.1	37.6	47.5	39.9	51.6
27/03/2019	10:45:00	45.8	58.5	37.8	48.4	40.9	52.4
27/03/2019	11:00:00	44.8	60.8	37.1	46.7	40.4	52.8
27/03/2019	11:15:00	45.9	65.9	37.3	47.5	40.2	54.8
27/03/2019	11:30:00	44.7	61.4	37.9	47.3	40.2	52.8
27/03/2019	11:45:00	44.4	62.2	36.6	46.9	39.2	52.4
27/03/2019	12:00:00	44.7	61.4	37.6	46.7	40.6	53.2
27/03/2019	12:15:00	44.2	60.1	37.1	46.6	39.7	52.1
27/03/2019	12:30:00	44.9	59.4	38.1	47.2	41	51.9
27/03/2019	12:45:00	45.1	59.7	38.6	47.3	41.4	52
27/03/2019	13:00:00	46.4	62.6	37.1	48.8	40.5	56.1
27/03/2019	13:15:00	42.9	57.2	36.4	45	39.4	49.5
27/03/2019	13:30:00	43.8	66.2	37	44.7	39.3	50.5
27/03/2019	13:45:00	50.8	69.8	37.4	50.8	40.4	64.6
27/03/2019	14:00:00	49.1	66.1	37.6	51.1	41.4	61
27/03/2019	14:15:00	45.9	61.7	38.3	48.3	40.8	54.9
27/03/2019	14:30:00	46.2	65.8	38	47.1	40.3	56.7
27/03/2019	14:45:00	43.8	59.7	36.9	45.9	40.1	52.1
27/03/2019	15:00:00	43.7	54.3	37.3	45.9	40.4	49.8
27/03/2019	15:15:00	45.8	67.6	37.7	45.3	40.3	54
27/03/2019	15:30:00	44	60.3	37.3	45.2	39.4	53.4
27/03/2019	15:45:00	42.9	58	36.5	45	39.4	48.9
27/03/2019	16:00:00	42.2	55.9	36.2	44.3	38.5	50.1
27/03/2019	16:15:00	44.4	66	36.8	45.7	39.5	51.7
27/03/2019	16:30:00	43.2	62	37.5	44.2	39.8	50.4
27/03/2019	16:45:00	42.6	62.5	36.1	43.8	39	50.6
27/03/2019	17:00:00	50.2	70.2	37.9	51.7	40.6	62.3
27/03/2019	17:15:00	59.1	77.6	37.9	60.2	41.3	72.9
27/03/2019	17:30:00	70.4	77	40	72.5	45.3	74.4

27/03/2019	17:45:00	67.2	70.8	37.7	68.4	41.7	69.3
27/03/2019	18:00:00	47.1	67.4	36	45.5	39.1	60.4
27/03/2019	18:15:00	47.9	69.9	36.4	45	39.6	61.3
27/03/2019	18:30:00	48.5	69.2	37.4	46.6	40.4	62
27/03/2019	18:45:00	44	59.8	36.9	46.4	40	50.8
27/03/2019	19:00:00	43.8	54.5	37	46.1	40.3	50.1
27/03/2019	19:15:00	40.6	56.3	32.4	44.1	34.6	48.4
27/03/2019	19:30:00	40.5	61.5	33.9	42.5	36.5	46.8
27/03/2019	19:45:00	38.1	52	33.1	39.7	35.2	42.2
27/03/2019	20:00:00	38.7	57.2	31.4	40.7	32.8	48.7
27/03/2019	20:15:00	37.9	55.2	32.6	38.5	34.8	47.3
27/03/2019	20:30:00	39.8	54.8	32.7	40.7	35	50.8
27/03/2019	20:45:00	40.7	55.3	34.1	42.6	37.2	47.1
27/03/2019	21:00:00	41	54.8	33.7	42	36.1	52.2
27/03/2019	21:15:00	40.6	54.4	34.4	42.5	37.1	47
27/03/2019	21:30:00	39.2	52.3	31.4	41.2	34.3	49.1
27/03/2019	21:45:00	35.9	47.2	28.3	38.3	30.4	44
27/03/2019	22:00:00	36.1	45.9	28.2	38.6	31.3	42.2
27/03/2019	22:15:00	35.6	49.4	29.7	38.1	32	40.4
27/03/2019	22:30:00	34.3	48.8	26.6	36.7	29.8	40.5
27/03/2019	22:45:00	35.9	51	28.3	38.6	31.2	42.2
27/03/2019	23:00:00	36.4	53.4	28.5	38.6	31.4	43.1
27/03/2019	23:15:00	34.1	43.1	28	36.4	30.7	40
27/03/2019	23:30:00	34.2	47.4	27	36.4	29.6	41
27/03/2019	23:45:00	31.2	51.4	25	33.1	26.8	38.8
28/03/2019	00:00:00	32.3	48	25	34.9	27.9	38.4
28/03/2019	00:15:00	30.6	56.2	24.6	32.6	26.3	37.7
28/03/2019	00:30:00	30.6	47.3	24.3	34.4	25.6	38.3
28/03/2019	00:45:00	31.4	53.6	24.5	33.5	25.8	40.2
28/03/2019	01:00:00	30	47.1	25	32.5	26.1	36.9
28/03/2019	01:15:00	31.3	50.6	23.3	33.6	24.5	42.8
28/03/2019	01:30:00	28.1	46.1	23.4	29.7	25.3	33.8
28/03/2019	01:45:00	30.9	61	23.6	31.4	24.5	36.1
28/03/2019	02:00:00	26.5	43.9	22.5	27.6	23.7	34.5
28/03/2019	02:15:00	28.6	55.8	23.6	28.9	24.8	36.4
28/03/2019	02:30:00	26.5	47.2	23.2	27.3	24.1	32.1
28/03/2019	02:45:00	26.2	42.1	23	26	23.7	34.8
28/03/2019	03:00:00	26.8	46.1	23	28.8	24	32.4
28/03/2019	03:15:00	26.6	39.7	23.5	27.9	24.6	33.7
28/03/2019	03:30:00	26.8	45.1	23.3	28.4	24.3	34.5
28/03/2019	03:45:00	34.7	51.7	24.9	35.2	26	47.4
28/03/2019	04:00:00	30.4	42.9	25	33	26.3	38.5

28/03/2019	04:15:00	31.3	47.9	25.1	33.5	26.3	41
28/03/2019	04:30:00	30.2	43.2	24.9	32.6	26.2	37.6
28/03/2019	04:45:00	31.1	44.3	25.5	33.1	28.1	36.1
28/03/2019	05:00:00	41.1	55.3	28.2	45.1	32.5	51
28/03/2019	05:15:00	41.7	53.7	30.6	45.9	33.5	50.1
28/03/2019	05:30:00	39.1	54.6	31.1	41.1	34.2	47.8
28/03/2019	05:45:00	41	56.5	33.4	43.6	36.6	48.5
28/03/2019	06:00:00	41.9	52.3	34.6	44.3	37.8	49
28/03/2019	06:15:00	42.1	56	34.8	45	37	50.5
28/03/2019	06:30:00	42.4	58.1	36.3	44.2	39.2	49.8
28/03/2019	06:45:00	44.6	61.4	37.8	47	39.6	54.4
28/03/2019	07:00:00	42.2	56.1	36.7	44.2	39.1	48.1
28/03/2019	07:15:00	41.6	50.8	36	43.7	38.5	48
28/03/2019	07:30:00	40.4	52.2	35.3	42.8	37	47.6
28/03/2019	07:45:00	42.2	54.5	33.7	45.8	36.3	49.9
28/03/2019	08:00:00	39.3	64	34.2	40.9	35.9	45.1
28/03/2019	08:15:00	41	62.1	32.4	44.1	34.3	50.5
28/03/2019	08:30:00	40.2	60.1	32.8	42.6	34.6	50
28/03/2019	08:45:00	40.6	60	33.5	41.3	34.8	51.2
28/03/2019	09:00:00	37.4	54	32.3	39.5	34.4	43.7
28/03/2019	09:15:00	41.3	63	32	42.4	33.7	52.7
28/03/2019	09:30:00	42.5	57.1	32.7	46.2	35.5	52.3
28/03/2019	09:45:00	40.1	59	32.3	43	34.2	48.8
28/03/2019	10:00:00	38.8	57.7	31.7	40.7	33.7	48
28/03/2019	10:15:00	57.8	79.5	33.5	51.5	35.6	71.5
28/03/2019	10:30:00	40.4	58.5	32.6	42.6	34.9	50.1
28/03/2019	10:45:00	40.5	59.7	33.6	43.2	35.8	48.1
28/03/2019	11:00:00	40.6	55	33.4	43.6	36	48.5
28/03/2019	11:15:00	39.6	58.9	33.2	42.1	35.2	47.2
28/03/2019	11:30:00	43.2	63.5	33.3	44.6	35.7	54.1
28/03/2019	11:45:00	37.7	48.6	32.2	40	34.3	44.2
28/03/2019	12:00:00	39.9	60.6	32.1	42	34.4	49.3
28/03/2019	12:15:00	40	55.6	32.8	42.5	35	47.9
28/03/2019	12:30:00	41.4	56.9	34.1	44.5	36.5	49.6
28/03/2019	12:45:00	43.3	60.9	35.6	45	38.5	52.6
28/03/2019	13:00:00	47.1	68.8	33.2	43	35.8	62.9
28/03/2019	13:15:00	42.1	63.7	32.6	43.1	35.1	52
28/03/2019	13:30:00	40.6	56.1	32.7	43.1	35.9	49.2
28/03/2019	13:45:00	41.9	62.2	34.4	44.2	37	49.1
28/03/2019	14:00:00	42.3	60.8	34.9	44.1	38.1	50.6
28/03/2019	14:15:00	45.5	66.3	35.3	47.8	38	56.2
28/03/2019	14:30:00	43	58.2	35.2	45.5	38.5	49.8

28/03/2019	14:45:00	45.2	61.4	36.2	47.9	38.5	54.5
28/03/2019	15:00:00	44.5	68.4	34.6	43.4	36.9	55.5
28/03/2019	15:15:00	42.1	58.1	35	44.2	38.8	48.1
28/03/2019	15:30:00	40.9	55.1	34.6	42.9	37.6	47.4
28/03/2019	15:45:00	45.6	73.6	35.8	45.9	38.2	57.8
28/03/2019	16:00:00	40.6	53	35.1	42.4	37.4	47.1
28/03/2019	16:15:00	41.5	58.6	35	43.1	37.7	49.7
28/03/2019	16:30:00	43.6	61.5	36.8	46.2	38.7	51.6
28/03/2019	16:45:00	43.6	65	36.3	45.1	38.9	52.7
28/03/2019	17:00:00	44	66.4	36.9	44.8	39.4	51.2
28/03/2019	17:15:00	43.1	61.4	36	44.5	39	51.5
28/03/2019	17:30:00	50.8	68.2	37.6	55.6	39.6	57
28/03/2019	17:45:00	41.7	53.5	36.9	43.3	39.2	47.5
28/03/2019	18:00:00	42.3	57.6	37.7	43.9	39.6	47.9
28/03/2019	18:15:00	42.3	57.5	37.8	43.6	40.2	47.3
28/03/2019	18:30:00	47.8	68.1	37.4	45.9	39.6	61.2
28/03/2019	18:45:00	41.6	54.4	37.5	43.2	39.2	46.1
28/03/2019	19:00:00	41.7	57.6	35.2	43.1	38	49.9
28/03/2019	19:15:00	40.8	61.5	33.1	43.1	35.5	49
28/03/2019	19:30:00	38.2	55.8	33.1	39.8	34.8	45.1
28/03/2019	19:45:00	38.5	59.1	32.9	40.3	34.6	46.8
28/03/2019	20:00:00	37.4	44.8	31.4	39.3	34.5	41.5
28/03/2019	20:15:00	40	54.8	34.5	42	36.8	46.4
28/03/2019	20:30:00	40.2	50.7	34.9	42	37.6	44.8
28/03/2019	20:45:00	40.2	48.7	33.7	42.5	37.2	44.9
28/03/2019	21:00:00	38.8	46.8	33.3	40.5	36.2	43.8
28/03/2019	21:15:00	43.3	61	35.7	42.9	37.8	55.7
28/03/2019	21:30:00	40.6	62.6	35.1	41.9	38	43.8
28/03/2019	21:45:00	38.3	55.1	31.5	40.4	34.4	43.7
28/03/2019	22:00:00	38.2	51	31.6	39.9	35.3	42.9
28/03/2019	22:15:00	38	45.9	31.8	40.2	34.4	42.5
28/03/2019	22:30:00	39.9	58.7	29.1	42.2	35	47.4
28/03/2019	22:45:00	37.3	49.3	28.9	39.6	33.1	42.7
28/03/2019	23:00:00	35.7	47	28.8	38	31.9	40.6
28/03/2019	23:15:00	34.3	45.6	28	36.9	30.1	39.5
28/03/2019	23:30:00	34.2	44.7	27	36.5	30.2	39.2
28/03/2019	23:45:00	36	49.5	28	38.7	30.7	43.4
29/03/2019	00:00:00	34.9	47.6	28	37.4	30.6	40.7
29/03/2019	00:15:00	36	54.2	27.8	39.1	29.8	43.4
29/03/2019	00:30:00	32.1	44.9	25.5	35	26.8	40.4
29/03/2019	00:45:00	31.7	52.6	24.8	34	26.5	39.3
29/03/2019	01:00:00	30	52.8	23.5	32.7	25.5	37

29/03/2019	01:15:00	30.1	49.3	23.7	32.4	26.2	36.7
29/03/2019	01:30:00	29.9	44.5	24	32.9	25.4	37.6
29/03/2019	01:45:00	29.7	45.7	23	33.2	24.3	37.8
29/03/2019	02:00:00	30.2	45.3	23.4	33	25.2	38.9
29/03/2019	02:15:00	27.9	48.1	23	29.9	23.8	36.3
29/03/2019	02:30:00	29.2	54.5	22.4	30.8	23.8	36.5
29/03/2019	02:45:00	29.8	60.6	22.4	28.3	23.4	36
29/03/2019	03:00:00	29.7	56	23.1	31.7	24.3	36.3
29/03/2019	03:15:00	28.8	51.4	23	31.2	24.4	35.8
29/03/2019	03:30:00	30.5	49.7	23.4	32.6	24.6	41.3
29/03/2019	03:45:00	28.2	40.5	23.1	31.3	24.1	35.6
29/03/2019	04:00:00	30.6	52.1	22.5	33	24.3	39.4
29/03/2019	04:15:00	26.7	47.6	21.8	28.2	22.7	36.9
29/03/2019	04:30:00	26.5	41.1	21.7	28.5	23.3	32.7
29/03/2019	04:45:00	29.8	40.1	23.6	32.4	25.8	36.2
29/03/2019	05:00:00	36.5	54.8	26	38.8	29.6	46.7
29/03/2019	05:15:00	48.9	66.6	27.2	45.2	29.5	62.5
29/03/2019	05:30:00	49.7	68	27.5	49.2	31.5	62.9
29/03/2019	05:45:00	36.6	53	30.2	38.5	31.8	46.6
29/03/2019	06:00:00	40.9	60	30	44.5	33.4	50.8
29/03/2019	06:15:00	42.7	60.9	32.1	45.7	35.1	52.7
29/03/2019	06:30:00	41	55.3	35.4	43.6	36.8	48.6
29/03/2019	06:45:00	41.9	56.6	35.7	44.6	37.3	49.8
29/03/2019	07:00:00	51.8	70.1	35.9	54.2	38.6	64.3
29/03/2019	07:15:00	47.5	67	35.4	45.8	37.8	62.4
29/03/2019	07:30:00	47.6	68.3	36	47.8	38.7	61.8
29/03/2019	07:45:00	41.2	54	35.2	43.6	37.5	47.8
29/03/2019	08:00:00	39.2	51.2	34.4	41.5	36.4	45.4
29/03/2019	08:15:00	40.9	63	34.5	43.1	37	48
29/03/2019	08:30:00	40.7	51.7	33.8	43.6	36.5	48
29/03/2019	08:45:00	40.4	58.8	32.4	43.2	34.6	49.8
29/03/2019	09:00:00	39.7	60.1	32.1	43.4	34.1	46.4
29/03/2019	09:15:00	39	52.9	31.6	42	33.6	47.9
29/03/2019	09:30:00	40.3	53.3	32.5	43.4	35.1	48.4
29/03/2019	09:45:00	39.8	58.9	32.5	42.1	34.9	48.2
29/03/2019	10:00:00	38	48.9	33.4	40.2	35.1	43.3
29/03/2019	10:15:00	40.9	57.2	32.5	43.4	34.6	50.2
29/03/2019	10:30:00	42.3	59.4	38.7	43.5	39.8	49.5
29/03/2019	10:45:00	42.3	55.8	39	43.6	40.6	46.6
29/03/2019	11:00:00	42.5	56.6	37.1	43.9	40.1	48.3
29/03/2019	11:15:00	42.3	57.7	34.1	45.1	36.6	50.3
29/03/2019	11:30:00	43.6	69.5	34.1	42.9	36	49.7

29/03/2019	11:45:00	42	59.8	33.9	43.5	35.9	52.5
29/03/2019	12:00:00	42.3	62.2	34.8	43.7	36.6	51.8
29/03/2019	12:15:00	39.5	50	34.4	41.4	36.6	45.8
29/03/2019	12:30:00	42	60.6	35.3	44	37.8	49.9
29/03/2019	12:45:00	46.8	66.1	35.9	48.3	37.9	58.9
29/03/2019	13:00:00	40.7	47.8	37.5	42.3	38.6	44.8

APPENDIX 2

EQUIPMENT AND QUALIFICATIONS

S & D Garritt Ltd are members of the Association of Noise Consultants (ANC). All work related to this report was undertaken by David Garritt.

David Garritt has been a full member of the Institute of Acoustics since 2005 and holds an honours degree in Electronic and Computer Systems Engineering. David teaches acoustics at post graduate level on a part time basis. David sits on the ANC Communications and PR Committee.

The equipment used during the site visits is shown in the table below. The sound level meter was calibrated before and after use; no drift was apparent.

Equipment Description	Type number	Manufacturer	Date of expiration of Calibration	Calibration Certificate Number
Sound Level Meter	2260 s/n 2409281	Bruel & Kjaer	02.10.2020	264205
Preamplifier	ZC 0026	Bruel & Kjaer	02.10.2020	264205
Microphone	4189 s/n 2395266	Bruel & Kjaer	25.09.2020	122565
Sound Level Meter	XL2 TA s/n A2A-10019-EO	NTi Audio	30.08.2020	263215
Microphone	MK 224 s/n 210762A	Cirrus Research	29.08.2020	121665
Calibrator	4231 s/n 2402706	Bruel & Kjaer	03.09.2019	263632

APPENDIX 3

UNCERTAINTY

Any uncertainties in calculations and/or methodology and how they have been minimised are considered in this section.

Sound data on machinery has been based on measurements taken of the same machinery at the existing premises using three separate methods / distances. The results agree with each other within a small margin of tolerance. Where any assumptions have been made, they have been stated and chosen to represent the reasonable worst case scenario.

The procedures used for the calculation of specific sound levels at the nearest noise-sensitive receptors are based on basic, fundamental principles of acoustics. Sound decay with distance from the sources has been calculated using the principles and methods recommended in BS 5228. The sound transmission paths are relatively simple, the site being open soft land but with a land profile that should provide attenuation to quarry sound as received at most dwellings when workings are below the quarry rim. The addition and subtraction of sound levels was done logarithmically on an energy basis, which is the correct method for decibel calculations. It is anticipated that this method would be considered by other suitably qualified acousticians to be relevant, correct and appropriate for this survey and is a method examined by the Institute of Acoustics on their post graduate diploma course.

The changes in elevation at the site means that the attenuation caused by the barrier effect of the land is likely to be greater (ie. better) than the predictions made in this report.

All sound level measurements were taken with a calibrated type 1 sound level meter, which represents the most accurate type of SLM available. Sound levels were measured to the nearest 0.1 dB, time periods were measured and recorded to the nearest second. No rounding was done in any calculations, the only rounding being done on final results, in compliance with BS 4142 : 2014. The sound level meter was calibrated before and after each survey period and no drift was apparent.

It is concluded that the uncertainty in this survey has been minimised as far as possible and is believed to be below the level at which it would have an impact on the assessment conclusions contained in this report.

APPENDIX 4 – SITE LOCATION PLAN INCLUDING DWELLINGS





APPENDIX 5 - SOUND LEVEL CALCULATIONS

A. Mobile Plant Items excluding HGVs

The typical sound levels from the plant items as given in BS 5288, measured at site and summarised in this report were quoted at various distances to provide extra datapoints.

Distance Decay

The additional distance decay to dwellings is given by the following equation from BS 5228 and BS EN ISO 9613-2 for propagation over soft ground where the ground surface between the source and receiver is covered by grass, bushes or other vegetation and the source levels are measured at 10m:

$$\text{decay} = 25 \log (\text{distance} / 10\text{m}) - 2 \text{ dB}$$

Shielding Attenuations

BS 5228 contains the following guidance: ‘ In the absence of spectral data, as a working approximation, if there is a barrier or other topographic feature between the source and the receiving position, assume an approximate attenuation of 5 dB when the top of the plant is just visible to the receiver over the noise barrier, and of 10 dB when the noise screen completely hides the sources from the receiver. High topographical features and specifically designed and positioned noise barriers could provide greater attenuation.’

A 10 dB reduction has been assumed for all barrier effects in line with this guidance, though this is likely to be conservative.

Calculations assume 100% utilisation for all items of machinery. Sound level predictions are undertaken for workings at the midpoint of the site. When operations are closer to the dwellings, levels may be up to 4 dBA higher, and this is included in the assessment contained in the main report.

Farms to North

Description	LAeq	Mins used in 1 hr	Time Correction	Barrier Effect	Meas. distance	Receptor distance	Decay	Specific Level at receptor
All sources minus McCloskey Trommel meas 1	80.2	60	0	10	25	395	28.0	42.2
All sources minus McCloskey Trommel meas 2	82.1	60	0	10	25	395	28.0	44.1
All sources minus McCloskey Trommel meas 3	81.9	60	0	10	25	395	28.0	43.9
McCloskey 516 Trommel Screen	82.5	60	0	10	10	395	37.9	34.6
All sources, 40m - 75m south west meas 1	74	60	0	10	57.5	395	18.9	45.1
All sources, 40m - 75m south west meas 2	73.5	60	0	10	57.5	395	18.9	44.6
Measurement at site rim (40 - 70m closest sources)	75.7	60	0	10	55	395	19.4	46.3

Hey Head & Farms to SE

Description	LAeq	Mins used in 1 hr	Time Correction	Barrier Effect	Meas. distance	Receptor distance	Decay	Specific Level at receptor
All sources minus McCloskey Trommel meas 1	80.2	60	0	10	25	430	28.9	41.3
All sources minus McCloskey Trommel meas 2	82.1	60	0	10	25	430	28.9	43.2
All sources minus McCloskey Trommel meas 3	81.9	60	0	10	25	430	28.9	43
McCloskey 516 Trommel Screen	82.5	60	0	10	10	430	38.8	33.7
All sources, 40m - 75m south west meas 1	74	60	0	10	57.5	430	19.8	44.2
All sources, 40m - 75m south west meas 2	73.5	60	0	10	57.5	430	19.8	43.7

Measurement at site rim (40 - 70m closest sources)	75.7	60	0	10	55	430	20.3	45.4
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Farms to Southwest & Saskin Avenue

Description	LAeq	Mins used in 1 hr	Time Correction	Barrier Effect	Meas. distance	Receptor distance	Decay	Specific Level at receptor
All sources minus McCloskey Trommel meas 1	80.2	60	0	10	25	430	28.9	41.3
All sources minus McCloskey Trommel meas 2	82.1	60	0	10	25	430	28.9	43.2
All sources minus McCloskey Trommel meas 3	81.9	60	0	10	25	430	28.9	43
McCloskey 516 Trommel Screen	82.5	60	0	10	10	430	38.8	33.7
All sources, 40m - 75m south west meas 1	74	60	0	10	57.5	430	19.8	44.2
All sources, 40m - 75m south west meas 2	73.5	60	0	10	57.5	430	19.8	43.7
Measurement at site rim (40 - 70m closest sources)	75.7	60	0	10	55	430	20.3	45.4

Tong Farm to West

Description	LAeq	Mins used in 1 hr	Time Correction	Barrier Effect	Meas. distance	Receptor distance	Decay	Specific Level at receptor
All sources minus McCloskey Trommel meas 1	80.2	60	0	10	25	390	27.8	42.4
All sources minus McCloskey Trommel meas 2	82.1	60	0	10	25	390	27.8	44.3
All sources minus McCloskey Trommel meas 3	81.9	60	0	10	25	390	27.8	44.1
McCloskey 516 Trommel Screen	82.5	60	0	10	10	390	37.8	34.7
All sources, 40m - 75m south west meas 1	74	60	0	10	57.5	390	18.8	45.2
All sources, 40m - 75m south west meas 2	73.5	60	0	10	57.5	390	18.8	44.7
Measurement at site rim (40 - 70m closest sources)	75.7	60	0	10	55	390	19.3	46.4

Warcock Lane to Northwest

Description	LAeq	Mins used in 1 hr	Time Correction	Barrier Effect	Meas. distance	Receptor distance	Decay	Specific Level at receptor
All sources minus McCloskey Trommel meas 1	80.2	60	0	10	25	500	30.5	39.7
All sources minus McCloskey Trommel meas 2	82.1	60	0	10	25	500	30.5	41.6
All sources minus McCloskey Trommel meas 3	81.9	60	0	10	25	500	30.5	41.4
McCloskey 516 Trommel Screen	82.5	60	0	10	10	500	40.5	32
All sources, 40m - 75m south west meas 1	74	60	0	10	57.5	500	21.5	42.5
All sources, 40m - 75m south west meas 2	73.5	60	0	10	57.5	500	21.5	42
Measurement at site rim (40 - 70m closest sources)	75.7	60	0	10	55	500	22.0	43.7

B. Lorries on Access Road

The sound from lorry movements along the access road is predicted by the haul road equation given in BS 5228:

$$LA_{eq} = L_{WA} - 33 + 10 \log Q - 10 \log V - 10 \log d + 10 \log (a/180) \text{ dB}$$

An average speed (V) of 15 mph (24 kph) is assumed on the access road. Total movements of HGVs is taken as 5 in and 5 out per hour, ie an hourly vehicle rate (Q) of 10. The angle of view of the haul road from the dwellings is a and has been taken as a worst case 60 degrees. The typical sound power level (L_{WA}) of a road-going lorry is taken from BS 5228 as 98 dBA.

Substituting the values of L_{WA} , Q, V, d and a in the equation gives predictions of:

	Farms to North	Hey Head SE	Farm SW & Saskin	Tong Farm W	Warcock NW
LWA	98	98	98	98	98
Q (no. movements per hour)	10	10	10	10	10
V, kmh	24	24	24	24	24
d (distance)	470	300	350	140	300
a (angle of view)	60	60	60	60	60
Shielding	0	0	0	0	0
LAeq	29.7	31.7	31.0	35.0	31.7

The above values are dB LA_{eq} (1-hour). No shielding attenuation is assumed to any dwellings. In reality, there will be shielding to some dwellings, which will reduce the above figures further below background. The sound level predictions from wagons on the haul road do not make a significant difference to the overall noise impact of the site.

APPENDIX B
Complaints Procedure/Form

Complaints Procedure

INTRODUCTION

This Complaints Procedure outlines how the Operator will respond in the event of a complaint. A complaint may arise relating to the site permitted activities involving a nuisance (dust, noise, odour, pests). This procedure contains information on how any complaint will be investigated and any actions taken as a result of the complaint.

KEY CONTACTS

The key contacts will be shown on the site notice board at the site entrance. Alternatively, any complaints can be made at the site to any site operative and/or the Site Manager. The contacts are shown below.

Contact	Role	Contact Number
On site Site Manager	Responsible for operation at the site under the Environmental Permit and their staff at the site	TBC
Supervisor / Engineer	Responsible for implementing and inspection of controls at the site under the Environmental Permit and their staff at the site	TBC

PROCEDURE

1. Any complaints made will be immediately logged by the Site Manager and/or Site Operative. In the event a complaint is made to a Site Operative, the Site Operative will refer the complaint to the Site Manager. If able to do so, the complainant details will be taken on initial contact either by phone or in person.
2. The Site Manager (or nominated operative) will discuss any concerns with the complainant directly within 1 working day of the complaint being made; and request contact details to notify the complainant of any updates/corrective measures. The complain will be logged using the Complaint Form (attached) and given a unique reference number.
3. The Site Manager will review the site activities and ensure control measures are in accordance with the Site's Management Systems.
4. The Site Manager will investigate the location of concern raised in relation to the site i.e. at a local receptor location and/or public highway to inspect the impact on the receptor.
5. The Site Manager will notify the complainant of any updates to the control measures / site operations. Control measures may be corrective and/or preventative and include additional control measures and/or increase the frequency of an existing control measure. Alternatively, the design of the site operations may change to decrease nuisance to that receptor.
6. In the event the same issue persists, the Site Manager will further review site operations and control measures. This may require a temporary cessation of certain operations whilst additional measure is implemented. The works will not recommence until further control measures have been incorporated and a review of effectiveness has been agreed / witnessed by the Site Manager. The complainant will be kept abreast of further measures.

The target close out of any complaint is within 1 week of point 1 however this is dependent on the complaint, effectiveness of control and any third-party testing required to quantify complaint and/or control.

Complaints Procedure

RECORDS

On site Records

A copy of this procedure is kept on site and briefed to all site operatives upon site induction. Any identified complaints, incidents or accidents, as well as corrective measures, are recorded in the Complaint Form. Copies of the complaint forms are kept on site.

Review

This procedure is reviewed on a yearly basis or post-incident to ensure it remains up-to-date with the site operations.

Complaint Form

Complaint Form Reference No.	
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Date of Complaint	
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Details of Complainant			
Name			
Address			
Contact Number		Email Address	
Nature of Complaint			
Reported To		Date of Incident (if different to date of complaint)	
Corrective Measure Taken			
Follow up Communication with Complainant			
Preventative Measure Taken (if any)			
Sign off		Close out Date	