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ENGINEERING DESIGN GROUP

Road Traffic Noise Assessment

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1 INTRODUCTION

1.1 Background

1.1.1 Whitecleave Quarry is located on the Eastern side of the A38 within Buckfastleigh. Site access is from the B3380 (Plymouth Road) going under the A38. Sam Gilpin Demolition Ltd (SGDL) who are currently operating this site are planning to expand their works to allow recycling of waste materials.

1.1.2 The expansion of works will include a Materials Recycling Facility (MRF) for construction and demolition waste as well as a recycling facility for Incinerator Bottom Ash (IBA) from the proposed Energy from Waste (EfW) plant in Plymouth.

1.1.3 The current use of this site allows for vehicle access by non HGV and HGV traffic as well as HGV usage within the compound for stockpiling materials.

1.1.4 The proposal will allow for an increase in both the non HGV (visitors and workers) and HGV traffic levels accessing the site from the B3380.

1.1.5 This report is to verify the operational road traffic noise impact assessment section of part 13: Noise and Vibration within the Environmental Statement (May 2011) produced by URS Scott Wilson Ltd (URS) for MVV Environment Devonport Limited (MVV).

2 LEGISLATIVE GUIDANCE

2.1 Design Manual for Roads and Bridges, Volume 11 Section 3

2.1.1 Design manual for Roads and Bridges (DMRB) was introduced to provide a comprehensive manual system that includes all current standards, advice notes and other published documents relating to the design, assessment and operation of public highways. The manual consists of a series of volumes covering all the requirements for quality assurance procedures.

2.1.2 DMRB Volume 11, Section 3 covers the techniques necessary within the Environmental Assessment volume.

2.1.3 Part 7 Noise and Vibration (HD 213/11-Revision 1) provides guidance for undertaking noise and vibration assessments of impacts from road projects.

2.1.4 Noise level calculations procedures follow those set out in the Technical Memorandum Calculation of Road Traffic Noise (CRTN) (Ref 1)

2.2 Calculation of Road Traffic Noise 1988

2.2.1 The Government's standard methodology for the prediction of traffic noise is given in the Department of Transport memorandum entitled "Calculation of Road Traffic Noise" (CRTN). The current version was first published in 1988 and describes the procedures for calculating noise from road traffic.

2.2.2 The CRTN therefore forms the basis of the methodology used for the calculations used in this Report.

3 METHODOLOGY FOR ASSESSING IMPACTS

3.1 General

3.1.1 The DMRB allows for 2 levels of assessment depending upon thresholds met or expected to be met during a brief scoping assessment of the project.

3.1.2 The threshold criteria used for traffic assessment during the day is a permanent change in magnitude of 1dB $L_{A10,18h}$ in the short-term (i.e. on opening) or a 3dB $L_{A10,18h}$ change in the long term (typically 15 years after project opening). Planned operation times of the MRF and IBA will run until 19:00 Monday to Friday with commuting trips possibly running up till 19:30 so it is accepted to only use the day time assessments. Any future changes to the activity times will come under an amended proposal and will be looked at that time.

3.1.3 A simple assessment is performed if it is unlikely that the threshold values will be reached at any sensitive receptor or if it is not foreseeable at the early stages if the threshold value will be met. If the threshold values are met within either the scoping look at the project or during the simple assessment phase then a detailed assessment is necessary.

3.1.4 At the initial investigation of the impacts it is expected that due to only a small increase in overall traffic conditions (even though there is a large increase in HGV levels) that it is unlikely that the threshold values for this assessment will be met therefore the simple assessment process will be followed. As stated in 3.1.3 above if the threshold values are reached during the simple assessment then a more detailed assessment will be undertaken.

3.2 Traffic Flows

3.2.1 Base traffic data has been taken from the Transport Statement Report July 2011 produced by URS. This information was gathered by both manual classified counts and automatic traffic counts.

3.2.2 The transport statement sets the year 2016 as the year that the MRF will be running at peak levels therefore 2016 has been used as the short-term date rather than the year of opening to allow for maximum site traffic.

3.2.3 Section 6 (Trip Distribution) of the Transport Statement splits the proposed site vehicles between the usable junctions leaving and entering the A38, these splits were designed according to the origins and destinations of the vehicles. Due to a similarity in travel time for the south bound vehicles from the Exeter, 2 options have been calculated. The routes are named Lower Dean Route and Dart Bridge Route, naming the junctions that the vehicles will primarily use.

3.2.4 Base traffic data has been increased using a growth factor of 1.066 as set out in the URS Transport Statement to allow for growth of the base traffic up to 2016. These traffic flows have then been converted into 18 hour traffic flow levels to bring them in line with the DMRB calculation guidelines.

3.2.5 The DMRB assigns the future design year as 15 years after the base year, therefore 2031 (15 after the peak usage in 2016) has been taken as the long term design date.

3.2.6 The updated Environmental statement by URS allocates a growth factor of 1.2433 to the strategic road network and a growth of 1.1980 on the local road networks. This factor is used to convert the 2016 flows to the expected flow levels in 2031.

3.2.7 For the long term design date there will be no extra increase in the expected traffic levels using the site as the site levels will already be the maximum levels in 2016.

3.2.8 Long term design has also included 2 different allocations of traffic flow due to the usage of the proposed junctions from the A38.

3.3 Average Usage Scenario

3.3.1 Using the information laid out in the Transport Assessment by URS (July 2011) for the daily usage of the site (approx 43 two way HGV trips a day and 20 two way commuter trips a day) which has been taken as a constant (average) output rate throughout the year.

3.3.2 The average usage rates have been combined with the measured flow rates and amended for the methods mentioned in section 3.2.

3.4 Worst Case Scenario

3.4.1 The URS Transport Statement (Section 5.5.7, updated from the July 2011 version) describes a peak worst case condition occurring if output from the IBA facility is stockpiled for a time period and then a maximum output of 30,000 tonnes is achieved over a 3 week period (This is based on existing sites producing similar operation levels when working with large construction projects).

3.4.2 The output levels will provide approximately 90 loads more a day coming from the IBA Facility, bringing the level of roughly 10.4 laden trips a day up to 100 laden trips a day (200 two way vehicle movements).

3.4.3 It is predicted that the output will most likely leave the site and head towards the Exeter direction due to there already being available aggregates in Cornwall that can supply the sites to the south and west of Buckfastleigh. Therefore for the calculation process the traffic figures have only been added to the routes either coming or going to Exeter.

3.4.4 The DMRB process as mentioned in 3.2 above has been followed to provide a worst case scenario. This scenario is purely to be used as a peak condition event and will not be a good representation of the regular site usage.

4 NOISE CALCULATION RESULTS – AVERAGE USAGE SCENARIO

4.1 Short-Term Change on Local Road Network

5.1.1 A summary of the road Noise levels calculated using the CRTN process for the short-term differences is provided in Table 1.

	$L_{AF10, 18h}$ dB				
Road Link	Base Noise Levels	Lower Dean Route		Dart Bridge Route	
		BNL	Difference	BNL	Difference
B3380 Plymouth Rd between A38 underbridge & Strode Rd	62.0	62.8	+0.8	62.6	+0.6
B3380 Strode Rd between Plymouth Rd & site access	63.6	64.2	+0.6	64.0	+0.4
B3380 Strode Rd north of site access	63.8	64.0	+0.2	64.2	+0.4

Table 1: Short-term Road Noise levels (B3380)

5.1.2 The values shown in Table 1 are all slightly lower than those provided for the Operational Traffic Noise Assessment provided by URS, this is mostly due to the slightly different figures used when using either 18 hour or 1 hour flow and the factors involved.

5.1.3 The differences between pre and post-scheme base noise levels (BNL) are all less than 1 dB $L_{A10,18h}$ and correspond closely with the values of change given in the Environmental Statement.

4.2 Short-term change on Strategic Road Network

4.2.1 The road noise levels for the short-term period have been calculated for the A38 and are contained in Table 2 below.

Road Link	$L_{AF10, 18h}$ dB				
	Base Noise Levels	Lower Dean Route		Dart Bridge Route	
		BNL	Difference	BNL	Difference
A38 South of Lower Dean junction	80.4	80.4	+0.0	80.4	+0.0
A38 Between Lower Dean and Dart Bridge junctions	80.4	80.4	+0.0	80.4	+0.0
A38 North of Dart Bridge junctions	80.4	80.4	+0.0	80.4	+0.0

Table 2: Short-term Road Noise levels (A38)

4.2.2 Due to the currently high levels of vehicle movements along the A38, there is only a very small overall increase in the traffic levels (roughly 0.2%) when allowing for the site vehicles. This small increase in traffic levels reflects on the noise levels by showing a 0 dB $L_{A10,18h}$ increase.

4.3 Long-term change on Local Road Network

4.3.1 The long term changes in noise levels on the B3380 have been calculated using the updated traffic information provided in the Environmental Statement; these levels are shown in table 3.

4.3.2 Base levels for the road are for the 2016 baseline year date and compared to the 2031 future design year with assigned site traffic.

Road Link	$L_{AF10, 18h}$ dB				
	Base Levels	Lower Dean Route		Dart Bridge Route	
		BNL	Difference	BNL	Difference
B3380 Plymouth Rd between A38 underbridge & Strode Rd	62.0	63.5	+1.5	63.3	+1.3
B3380 Strode Rd between Plymouth Rd & site access	63.6	64.9	+1.3	64.7	+1.1
B3380 Strode Rd north of site access	63.8	64.8	+1.0	64.9	+1.1

Table 3: Long-term Road Noise Levels (B3380)

4.3.3 The noise levels shown show an increase of approximately 1dB $L_{A10,18h}$. These levels of increase are still lower than the long term threshold level of 3 dB $L_{A10,18h}$ so there is no necessity to perform a 'detailed' level assessment.

4.4 Long-term change on Strategic Road Network

4.4.1 Long term changes in noise levels on the A38 are shown in table 4 below:

Road Link	$L_{AF10, 18h}$ dB				
	Base Levels	Lower Dean Route		Dart Bridge Route	
		BNL	Difference	BNL	Difference
A38 South of Lower Dean Junction	80.4	81.4	+1.0	81.4	+1.0
A38 Between Lower Dean and Dart Bridge Junctions	80.4	81.4	+1.0	81.4	+1.0
A38 North of Dart Bridge Junction	80.4	81.4	+1.0	81.4	+1.0

Table 4: Long-term Road Noise Levels (A38)

4.4.2 Table 4 shows the expected 1dB $L_{A10,18h}$ increase from the base level to the future conditions due to the expected 25% (approximate) increase in traffic flow levels.

4.5 Summary of Results – Average Usage Scenario

4.5.1 The DMRB sets out the classification of any impacts for both the short term and long term conditions, these classifications are shown in tables 5 (short term) and 6 (long term) below.

Noise change, $L_{A10,18h}$	Magnitude of Impact
0	No Change
0.1 – 0.9	Negligible
1 - 2.9	Minor
3 - 4.9	Moderate
5+	Major

Table 5: Classification of Magnitude of Noise Impacts in the Short Term

Noise change, $L_{A10,18h}$	Magnitude of Impact
0	No Change
0.1 – 2.9	Negligible
3 - 4.9	Minor
5 - 9.9	Moderate
10+	Major

Table 6: Classification of Magnitude of Noise Impacts in the Long Term

4.5.2 The short term magnitude of noise impacts for both the B3380 and the A38 will be 'Negligible' due to the less than 1dB $L_{A10, 18h}$ increase in road traffic noise.

4.5.3 The long term magnitude of noise impacts for the both the B3380 and the A38 will be 'Negligible' due to the less than 3dB $L_{A10,\ 18h}$ increase in road traffic noise.

5 NOISE CALCULATION RESULTS – WORST CASE SCENARIO.

5.1 Short-Term Change on Local Road Network

5.1.1 Worst case traffic noise levels expected in the short term on the B3380 are shown in table 7 below:

Road Link	$L_{AF10,\ 18h}$ dB				
	Base Noise Levels	Lower Dean Route		Dart Bridge Route	
		BNL	Difference	BNL	Difference
B3380 Plymouth Rd between A38 underbridge & Strode Rd	62.0	63.8	+1.8	62.6	+0.6
B3380 Strode Rd between Plymouth Rd & site access	63.6	64.9	+1.3	64.0	+0.4
B3380 Strode Rd north of site access	63.8	64.7	+0.9	65.5	+1.7

Table 7: Short-term Road Noise levels (B3380)

5.1.2 The values shown in table 7 show the noise level differences increasing by up to 1.8dB $L_{A10,\ 18h.}$ These levels are enough to pass the threshold value of 1dB $L_{A10,\ 18h}$ causing a detailed assessment to become the necessary, the additional comparison table (Do-minimum baseline year compared to Do-minimum future year) is shown in section 5.5.

5.1.3 The use of the Lower Dean Route gives a greater overall increase in noise levels on the roads due to the increased HGV using the B3380 to the south of the site access. The increased levels are lower in the Dart Bridge option due to the HGV site vehicles being divided more evenly between the southern and northern sections of the B3380.

5.2 Short-term change on Strategic Road Network

5.2.1 Worst case traffic noise levels expected in the short term on the A38 are shown in table 8 below:

Road Link	$L_{AF10,\ 18h}$ dB				
	Base Noise Levels	Lower Dean Route		Dart Bridge Route	
		BNL	Difference	BNL	Difference
A38 South of Lower Dean junction	80.4	80.5	+0.1	80.5	+0.1
A38 Between Lower Dean and Dart Bridge junctions	80.4	80.5	+0.1	80.4	+0.0
A38 North of Dart Bridge junctions	80.4	80.5	+0.1	80.5	+0.1

Table 8: Short-term Road Noise levels (A38)

5.2.2 The levels shown follow a similar pattern to those in table 2 where the baseline noise levels for the A38 are already high in comparison to the small impact the additional site traffic will have on the levels.

5.2.3 In comparison to the levels in Table 2 there is a slight (+0.1dB) increase in the noise levels.

5.3 Long-term change on Local Road Network

5.3.1 Worst case traffic noise levels expected in the long term on the B3380 are shown in table 9 below:

Road Link	$L_{AF10, 18h}$ dB				
	Base Levels	Lower Dean Route		Dart Bridge Route	
		BNL	Difference	BNL	Difference
B3380 Plymouth Rd between A38 underbridge & Strode Rd	62.0	64.3	+2.3	63.3	+1.3
B3380 Strode Rd between Plymouth Rd & site access	63.6	65.5	+1.9	64.7	+1.1
B3380 Strode Rd north of site access	63.8	65.4	+1.6	66.0	+2.2

Table 9: Long-term Road Noise Levels (B3380)

5.3.2 Similar to the Short term changes (section 5.1) The Lower Dean Route shows a greater impact when compared to the Dart Bridge Route.

5.3.3 The increased difference between the base levels and the future levels when compared to the values shown in table 7 are due to the increased background noise levels of the increased traffic levels. The actual effect of the site traffic of the future traffic flow levels would show a lessened impact if directly compared.

5.4 Long-term change on Strategic Road Network

5.4.1 Worst case traffic noise levels expected in the long term on the A38 are shown in table 10 below:

Road Link	$L_{AF10, 18h}$ dB				
	Base Levels	Lower Dean Route		Dart Bridge Route	
		BNL	Difference	BNL	Difference
A38 South of Lower Dean Junction	80.4	81.4	+1.0	81.4	+1.0
A38 Between Lower Dean and Dart Bridge Junctions	80.4	81.4	+1.0	81.4	+1.0
A38 North of Dart Bridge Junction	80.4	81.5	+1.1	81.5	+1.1

Table 10: Long-term Road Noise Levels (A38)

5.4.2 Table 10 shows the increase in noise levels due to the expected 25% (approximate) increase in traffic flows. The additional site traffic is only expected to affect the northern part of the A38 from the Dart Bridge Junction where there is a 0. 1dB $L_{A10, 18h}$ increase.

5.5 Do-Minimum comparison on Local Road Network

5.5.1 Table 11 below shows the comparison of the Do-Minimum scenarios between the baseline year (2016) and the future year (2031). These comparisons use the flows expected in the worst case peak condition as described in section 3.3.

	$L_{AF10, 18h}$ dB		
Road Link	Baseline Year 2016	Future Year 2031	Difference
B3380 Plymouth Rd between A38 underbridge & Strode Rd	62.0	62.8	+0.8
B3380 Strode Rd between Plymouth Rd & site access	63.6	64.4	+0.8
B3380 Strode Rd north of site access	63.8	64.6	+0.8

Table 11: Do-Minimum base year noise levels compared to Do-Minimum future year

5.5.2 The Do-Minimum comparisons show that there is expected to be a 0.8dB $L_{A10, 18h}$ increase in noise levels due to the increase in traffic flows without the additional site vehicles.

5.6 Summary of Results – Worst Case Scenario

5.6.1 The DMRB classification tables shown in section 4.5 (tables 5 and 6) have been used to assign the expected magnitude of impact for the worst case conditions from section 5.

5.6.2 For the short term noise impacts of the B3380 the classification will depend upon the choice of route chosen. For the Lower Dean Route, the road to the south of the site access is expected to have ‘Minor’ impact with the road north of the site access expected to have a ‘Negligible’ impact. For the Dart Bridge Route the reverse is expected, with the road to the south of the site having a ‘Negligible’ impact and the road to the north of the site having a ‘Minor’ impact.

5.6.3 For the long term noise impacts of the B3380 both routes provide a ‘Negligible’ impact due to the less than 3dB $L_{A10, 18h}$ increase in noise levels.

5.6.4 It should be noted that using the results in table 11, it can be seen that the forecast growth increases in traffic on the B3380 will be providing almost a

1dB $L_{A10, 18h}$ increase in the base noise levels (without site traffic) between 2016 and 2031. If this value is removed from the increases shown in table 9, the maximum expected noise level including site traffic will only be 1.5dB $L_{A10, 18h}$ greater than the noise level expected without the site traffic.

5.6.5 Both the short and long term noise impacts for the A38 are expected to be classified as 'Negligible' due to the small change the site traffic will have to the already high levels of road noise.

6 SUMMARY & CONCLUSIONS

6.1 Average usage Scenario

6.1.1 Due to no changes to the highway alignment any received noise levels at the nearby properties directly correlate to the increases in base road noise. Therefore the road noise would need to increase by at least 1dB $L_{A10, 18h}$ to have any perceptible effect on the noise levels at the properties.

6.1.2 Following the results in section 4, the average usage of the site is expected to have a 'Negligible' impact on the noise levels of both the 2016 and the 2031 design dates for the A38 and the B3380.

6.1.3 If the difference in noise levels due to the forecast growth of the background traffic flows in 2031 are removed from the noise levels in Table 3 the overall increase in noise levels due to site traffic will be reduced to less than 1dB $L_{A10, 18h}$.

6.1.4 The only increase in noise levels on the A38 is due to the 25% (approximate) increase in background traffic levels. Will no perceived effect result from the additional site vehicles.

6.1.5 Following the DMRB statement that any increase in road traffic noise levels of less than 1 dB $L_{A10, 18h}$ is not perceptible, it is permissible to say that for the average use of the site there will be no perceptible increase in the overall road traffic noise levels.

6.2 Worst Case Scenario

6.2.1 The B3380 in the base year provides the worst expected magnitude of impact from the addition of site traffic; these levels are still within the 'Minor' impact classification though. When comparing the 2 optional routes for the site traffic there is only a small overall difference of +0.4dB $L_{A10, 18h}$ (Lower Dean having the larger values of increase) between them.

6.2.2 The magnitude of impact on the B3380 in the future year is classified as 'Negligible'. The increase in noise levels is almost equally made up of site traffic and the growth in base traffic flow.

6.2.3 The A38 shows at maximum a 0.1dB $L_{A10, 18h}$ increase when the site vehicles are added to the future traffic flows, this level of increase not be perceptible in comparison to the base noise levels.

6.2.4 As the worst case scenario is unlikely to be a regular occurrence due to the level of output needed in a short space of time, the greatest impact being a 'Minor' classification would be an acceptable level of increase in the road noise levels.

7 References

Design Manual for Roads and Bridges.
Volume 11 Environmental Assessment - Section 3 Environmental Assessment Techniques. Part 7 (HD 213/11 – Revision 1, November 2011) Noise and Vibration.

1. Department of Transport and Welsh Office (1988). Calculation of Road Traffic Noise. HMSO, London