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Acoustic Consultancy Report

Noise Impact Assessment for Proposed Petrol Filling Station, Machinery and Tanker Deliveries

Asda Ferring – Proposed PFS

Client:	Asda Stores Ltd
Project:	Proposed Asda PFS Asda Store Littlehampton Road Ferring BN12 6PN
Our Ref:	11036
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1.0 EXECUTIVE SUMMARY

- 1.1 Acoustic Consultancy Partnership Ltd have been appointed to complete a noise impact assessment for the proposed Petrol Filling Station (PFS) located at the northern end of the Asda store site and adjacent to Littlehampton Road.
- 1.2 The assessment is based on the PFS trading 24 hours a day, 7 days a week.
- 1.3 The assessment and associated environmental noise monitoring focuses on the weekday evening, night time and early morning periods as these relate to the most noise sensitive times during the proposed PFS trading hours. An assessment is also included for the Sunday morning and evening periods as the existing noise climate on a Sunday morning and evening can be quieter when compared to the corresponding time on a weekday.
- 1.4 Detailed calculations have been undertaken of the predicted PFS activity, jet washes, vacuum and air/water units usage and the tanker delivery noise levels based on noise data previously obtained at other Asda PFS operations.
- 1.5 We have received a response from the Environmental Health Department at Arun District Council requesting our report to be modified to allow for the TRICS trip generation of Land Use 13B. We have been advised by Systra that the Land Use 13B does not apply to this site as the PFS only sells petrol. We have not, therefore, amended our figures although we have included the weekend 13A figures into our Sunday results where applicable, as advised by Systra.
- 1.6 The Environmental Health Department at Arun District Council also requested that we address the combined operation of the jet washes, vacuum units and the air/water units and we have provided results in this revised report.

Noise Impact Assessment and Conclusion – PFS Trading Activity

- 1.7 The change in $L_{Aeq,T}$ assessment due to PFS trading activity confirms a negligible or no change impact for the most noise sensitive periods considered. In overall terms, this means the predicted activity noise level is below the lowest existing ambient $L_{Aeq,T}$ noise climate.
- 1.8 During the night time period (23.00 to 07.00) the predicted L_{AFmax} noise level does not exceed the World Health Organisation 60 dB L_{AFmax} external night time criteria at the receptor positions. The predicted activity noise level is also significantly below the existing L_{AFmax} noise climate established during our night time noise monitoring.



- 1.9 We conclude PFS trading would be acceptable 24 hours a day, 7 days a week, in accordance with guidance contained in the latest noise policy documents.

Noise Impact Assessment and Conclusion – Jet Washes, Vac unit and Air/Water unit

- 1.10 The Environmental Health Department at Arun District Council also requested that we address the combined operation of the jet washes, vacuum units and the air/water units and we have provided results in this revised report.
- 1.11 It is noted that the rating levels of the machinery would have an adverse or significant adverse impact for some time periods at receptor positions RPA and RPB.
- 1.12 The dominant noise sources are the Jet Washes and the Vac Unit.
- 1.13 We would recommend the operation of the units should be restricted, where necessary, so that they do not cause an adverse or significant adverse impact at the nearest noise sensitive properties.
- 1.14 We recommend the operation of the Jet Washes, Vac unit and Air/Water unit are to be restricted to the daytime hours detailed below. With the restrictions in place, the operation of the machinery would result in a low impact in accordance with BS4142:2014.

Jet Washes	Monday to Saturday	07.00 to 20.00 hours
	Sundays	10.00 to 18.00 hours
Vac Unit	Monday to Saturday	07.00 to 21.00 hours
	Sundays	10.00 to 18.00 hours
Air/Water	Monday to Saturday	07.00 to 23.00 hours
	Sundays	07.00 to 22.00 hours

Noise Impact Assessment and Conclusion – PFS Tanker Activity

- 1.15 The tanker deliveries would have an adverse or significant adverse impact for some time periods at receptor positions RPA and RPB.



- 1.16 We would recommend the tanker delivery operation should be restricted so that it does not cause an adverse or significant adverse impact at the nearest noise sensitive properties.
- 1.17 We conclude that PFS tanker deliveries between 06.00 to 23.00 hours Monday to Saturday and 07.00 to 23.00 hours on Sundays would be acceptable in accordance with guidance contained in the latest applicable British Standard and noise policy documents.



2.0 Introduction

- 2.1 Acoustic Consultancy Partnership Ltd have been appointed to complete a noise impact assessment for the proposed Petrol Filling Station (PFS) located at the northern end of the Asda store site and adjacent to Littlehampton Road.
- 2.2 The assessment is based on the PFS trading 24 hours a day, 7 days a week.
- 2.3 The assessment and associated environmental noise monitoring focuses on the weekday evening, night time and early morning periods as these relate to the most noise sensitive times during the proposed PFS trading hours. An assessment is also included for the Sunday early morning and late evening periods as the existing noise climate on a Sunday morning and evening can be quieter when compared to the corresponding time on a weekday.
- 2.4 Detailed calculations have been undertaken of the predicted PFS activity, combined jet washes, vacuum and air/water units usage and the tanker delivery noise levels based on noise data previously obtained at other Asda PFS operations.
- 2.5 The assessment has been carried out with reference to British Standards and other guidance as considered appropriate.

3.0 Site Layout and Nearest Noise Sensitive Receptors

- 3.1 The proposed PFS would be located at the northern end of the Asda store site and adjacent to the A259 Littlehampton Road which is a two lane dual carriageway with traffic lights controlling the junction into the Asda store and which would also serve the proposed PFS.
- 3.2 To the north of Littlehampton Road is a Garden Centre with car parking backing onto the Littlehampton Road. To the west of the Garden Centre is a detached two storey dwelling with a dormer window in the roof. The property is set back from Littlehampton Road and will not be the nearest residential to the proposed PFS site.
- 3.3 To the west of the proposed PFS is a large area of open farm land with residential beyond at some distance. To the south east of the proposed PFS is a bungalow with a 2.8m high solid perimeter fence. To the east is a new Taylor Wimpey housing development with two storey dwellings fairly close to the west boundary which is a solid 2.0m high timber fence. There is a narrow lane separating the residential boundary from the proposed PFS site.



- 3.4 The most affected noise sensitive properties, with line of sight to the PFS development, are the upper windows of the new two storey dwellings to the east of the PFS development. The existing timber boundary fence offers partial line of sight to the ground floor windows only.
- 3.5 The detached bungalow to the south east is nearer the PFS development but the height of the timber perimeter fence provides full line of sight protection to the windows of the bungalow.
- 3.6 A site plan is provided in Appendix B, indicating the PFS location and the location of the most affected noise sensitive properties.

4.0 Environmental Noise Monitoring

- 4.1 Environmental noise monitoring has been carried out to establish the existing noise climate. The measurements were completed at a location in the south-eastern corner of the PFS development nearest to the bungalow and the new dwellings.
- 4.2 The adopted position, indicated on the site plan in Appendix B is considered representative of the existing noise climate at both locations.
- 4.3 The relevant results from the environmental noise monitoring are summarised in the following sections and given in full in Appendix A.

5.0 Existing Asda Store Trading Hours

- 5.1 The trading hours of the existing Asda store are as follows.
- 06.00 to midnight Monday to Saturday.
 - 10.00 to 16.00 hours on Sundays.

6.0 Proposed PFS Trading Hours

- 6.1 This report considers PFS trading, machinery operation and tanker deliveries between the following times
- 24 hours a day, 7 days a week.



7.0 Noise Impact Assessment Details and Noise Data

- 7.1 We have based our assessment on typical measured noise levels for PFS activity, jet washes, vacuum unit and air/water unit operation, and tanker deliveries.
- 7.2 The noise data for the PFS activity includes the arrival and departure of vehicles within the PFS and associated noise events due to closing of doors, engine start up and fuel pump operation. This site will incorporate drive to pay and pay at pump operations. From recent measurements taken at PFS facilities, the activity time for the full operation, including the payment operation, is between 4 to 5 minutes, depending on the amount of fuel dispensed from the pump. Vehicle pass-by noise within the site has also been included.
- 7.3 The noise levels for the jet washes, vac unit and air/water unit have been based on noise data available within our library database for unit noise levels obtained from existing sites.
- 7.4 The noise data for the tanker operation includes the lorry arrival, filling operation and lorry departure. The filling operation usually takes between 30 minutes and 40 minutes to complete. There is negligible noise when tanks are filling as the tanker engine is turned off and filling operates under gravity feed with pipes connected from the tanker to the low level fill pipes. There is a low level of noise when the pipes are connected and disconnected but this is included in our measured noise levels and assessment. Tanker pass-by noise within the site has also been included.

8.0 Receptor Positions

- 8.1 We have selected the following receptor positions, which represents the nearest, most affected, dwellings.

Receptor Position RPA	The west façade of the new Taylor Wimpey housing to the east at a distance of 70m from the centre of the PFS canopy and with line of sight to the upper windows and partial line of sight to the ground floor windows.
Receptor Position RPB	The north- western façade of the bungalow to the south east at a distance of 60m from the centre of the PFS canopy and with no line of sight.



SECTION A – PFS TRADING ACTIVITY

9.0 Noise Assessment

- 9.1 We have based our assessment on the six pump, twelve filling points PFS having six Drive to Pay and six Pay at Pump fill points.
- 9.2 We have carried out a noise impact assessment for the receptor positions RPA and RPB based on the methodology and criteria contained in Appendix C.
- 9.3 The assessment and associated environmental noise monitoring focuses on the weekday evening, night time and early morning periods as these relate to the most noise sensitive times during the proposed PFS trading hours. An assessment is also included for the Sunday morning and evening periods as the existing noise climate on a Sunday can be quieter compared to the corresponding time on a weekday.

Change in LAeq,T Noise Level

- 9.4 From the assessment methodologies given in Appendix C, we believe the change in LAeq,T methodology to be the most appropriate for this activity. It has the advantage of comparing the activity noise level against the existing noise climate and includes the influence of existing noise sources in the vicinity of the site, including traffic on the surrounding road network. This methodology is widely adopted for this type of activity by acoustic consultants and Local Authorities throughout the UK and is considered a fair and robust assessment methodology for this type of activity.
- 9.5 We have calculated the activity noise level over a 1 hour period for day time (07.00 to 23.00 hrs) and a 15 minute period for night (23.00 to 07.00 hrs), in accordance with the latest guidance within recent British Standards.



- 9.6 Based on the established noise data and the distance of the various activities to the receptor positions, the combined activity noise levels per car is given below. This includes the arrival, fill and departure including the vehicle pass by on entry and exit.

RPA

25.0 dB $L_{Aeq}(1\text{ hour})$

31.1 dB $L_{Aeq}(15\text{min})$

51.9 dB L_{AFmax}

RPB

17.5 dB $L_{Aeq}(1\text{ hour})$

23.5 dB $L_{Aeq}(15\text{min})$

45.5 dB L_{AFmax}

- 9.7 The above noise levels need to be corrected for the total customer numbers for each period.
- 9.8 The maximum number of car movements, based on 100% capacity, could be 144 in a one hour period, during peak times (continuous customer change overs every 5minutes at all 12 fill points).
- 9.9 We have been provided with the customer trip information by transport consultants (Systra), for a six pump, twelve fill PFS based on TRICS 13A land use. The total hourly trips corresponding to our survey results are as follows.

Monday to Friday

06.00 to 07.00 47no per hour, allow 12no per 15min

07.00 to 08.00 67no per hour

Sunday

06.00 to 07.00 23no per hour, allow 6no per 15min

07.00 to 08.00 42no per hour



- 9.10 Where the survey hours are not covered by the Systra trip information for a 13A land use, we have adopted PFS traffic counts at other Asda sites. We have based our assessment on the following number of fill points in operation per hour or 15 minutes during the periods when the pre-development background noise levels will be lowest.

Monday to Friday

22.00 to 23.00	25% capacity	36 per hour
23.00 to 00.00	10% capacity	4 per 15min
00.00 to 06.00	10% capacity	4 per 15min

Sunday

22.00 to 23.00	10% capacity	14 per hour
23.00 to 00.00	10% capacity	4 per 15min

- 9.11 Based on our surveys at other PFS sites, the time taken for the full operation, including payment, is between 4 to 5 minutes, depending on the amount of fuel dispensed from the pump. The pump operation in isolation generally takes between 1-2 minutes, depending on the fill capacity. We have included a +3dB correction to the resultant noise levels.
- 9.12 For the existing noise climate we have taken the lowest $L_{Aeq(15min)}$ measurement from each 1 hour period. This ensures the lowest existing noise climate values are considered and provides a robust assessment.
- 9.13 The total predicted PFS trading activity noise levels are given below, together with the lowest existing $L_{Aeq(15min)}$ noise levels, the resultant increase and the corresponding impact.

Day	Period			Predicted Activity Noise Level, dB		Lowest Existing $L_{Aeq(15min)}$,dB	Increase in $L_{Aeq,T}$,dB	Impact
Weekday	06.00	to	07.00	42	$L_{Aeq(15min)}$	62	Nil	No change
	07.00	to	08.00	43	$L_{Aeq(1hr)}$	66	Nil	No change
	22.00	to	23.00	41	$L_{Aeq(1hr)}$	58	Nil	No change
	23.00	to	00.00	37	$L_{Aeq(15min)}$	53	0.1	Negligible
	00.00	to	06.00	37	$L_{Aeq(15min)}$	47	0.4	Negligible
Sunday	06.00	to	07.00	39	$L_{Aeq(15min)}$	55	0.1	Negligible
	07.00	to	08.00	41	$L_{Aeq(1hr)}$	58	0.1	Negligible
	22.00	to	23.00	37	$L_{Aeq(1hr)}$	57	Nil	No change
	23.00	to	00.00	37	$L_{Aeq(15min)}$	53	0.1	Negligible

Table 1 – RPA Change in $L_{Aeq,T}$ Noise Level and Corresponding Impact



Day	Period			Predicted Activity Noise Level, dB		Lowest Existing LAeq(15min),dB	Increase in LAeq,T,dB	Impact
Weekday	06.00	to	07.00	34	LAeq(15min)	62	Nil	No change
	07.00	to	08.00	36	LAeq(1hr)	66	Nil	No change
	22.00	to	23.00	33	LAeq(1hr)	58	Nil	No change
	23.00	to	00.00	30	LAeq(15min)	53	Nil	No change
	00.00	to	06.00	30	LAeq(15min)	47	0.1	Negligible
Sunday	06.00	to	07.00	31	LAeq(15min)	55	Nil	No change
	07.00	to	08.00	34	LAeq(1hr)	58	Nil	No change
	22.00	to	23.00	29	LAeq(1hr)	57	Nil	No change
	23.00	to	00.00	30	LAeq(15min)	53	Nil	No change

Table 2 – RPB Change in LAeq,T Noise Level and Corresponding Impact

- 9.14 The predicted increase in LAeq(T) noise levels at the receptor positions would be within the negligible or no change categories for all the PFS trading hours considered.

World Health Organisation

- 9.15 For any night time periods between 23.00 to 07.00 hours, it is also appropriate to consider the World Health Organisation (WHO) recommended LAFmax internal noise criteria for sleep disturbance. The criteria is 45 dB LAFmax inside / 60 dB LAFmax outside. Whilst this is a relatively common criteria adopted for this type of assessment, it is also important to consider the existing LAFmax noise climate as the guideline figures may already be regularly exceeded at some sites.
- 9.16 The highest predicted LAFmax activity noise level is confirmed below and compared to the guidance criteria.

Receptor Position	Period	Highest Predicted LAFmax (Outside Bedroom)	WHO LAFmax Criteria (Outside Bedroom)	Existing LAFmax Noise Climate
RPA	23.00 to 07.00	53	60	66-84
RPB	23.00 to 07.00	46	60	66-84

Table 3 –World Health Organisation LAFmax Assessment

- 9.17 The World Health Organisation 60 dB LAFmax night time criteria is not exceeded. Furthermore, the highest predicted LAFmax activity noise levels at the receptor positions are significantly below the existing LAFmax noise climate established during the night time noise monitoring.



10.0 PFS Trading - Conclusions

- 10.1 The change in $L_{Aeq,T}$ assessment due to PFS trading activity confirms a negligible or no change impact for the most noise sensitive periods considered. In overall terms, this means the predicted activity noise level is below the lowest existing ambient $L_{Aeq,T}$ noise climate.
- 10.2 During the night time period (23.00 to 07.00) the predicted L_{AFmax} noise levels do not exceed the World Health Organisation 60 dB L_{AFmax} external night time criteria at the receptor positions. The predicted activity noise level is also significantly below the existing L_{AFmax} noise climate established during our night time noise monitoring.
- 10.3 The requirements of the National Planning Policy Framework 2012 (NPPF), Noise Policy Statement for England 2010 (NPSE) and Planning Practice Guidance – Noise 2014 (PPG) should also be considered. These documents require Planning Authorities to support sustainable growth whilst firstly avoiding noise from giving rise to significant adverse impacts on health and quality of life as a result of the new development and secondly aiming to mitigate and minimise adverse impacts. PPG confirms that a noise impact below the Lowest Observed Adverse Effect Level (LOAEL) is acceptable with no specific mitigation measures required and describes this as *“noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic environment of the area but not such that there is a perceived change in the quality of life”*. We believe the negligible or no change impact indicated by this assessment falls below the LOAEL threshold and therefore achieves the first and second aims of these documents.
- 10.4 It is important to recognise that the proposed PFS is in a relatively busy area, with existing activity and vehicle movements on the A259 dual carriageway.
- 10.5 We conclude PFS trading would be acceptable 24 hours a day, 7 days a week, in accordance with guidance contained in the latest noise policy documents.



SECTION B – JET WASHES, VAC UNIT and AIR/WATER UNIT

11.0 Proposed Hours of Operation

- 11.1 The four items of machinery would be located together at the eastern side of the site. It is proposed the machinery would operate between 07.00-23.00 hours on all days of the week, subject to a satisfactory noise assessment.
- 11.2 A glass screen would be provided to three sides of the jet washes providing partial line of sight protection to the two receptor positions. There is no screening around the Vac unit or the Air/Water unit.

12.0 Machinery Operations

- 12.1 The noise levels for the machines have been recorded on other Asda sites.
- 12.2 The Jet Wash noise levels will be controlled by the water jet from the lance and the water impacting on the body of the car. The compressor also contributes to the overall noise level. We have noise data for the jet wash machines.
- 12.3 The Vac unit noise levels were stable throughout the tests.
- 12.4 The Air/Water unit noise levels were controlled by the tyre inflator.

13.0 Noise Assessment

- 13.1 For the existing noise climate we have taken the lowest $L_{Aeq(15min)}$ measurement from each 1 hour period (07.00-23.00).00). This ensures the lowest existing noise climate values are considered and provides a robust assessment.
- 13.2 The recorded noise levels for each of the two Jet Washes are within the range of 60-65 dBA at 10m with an operating time generally between 3 and 5 minutes. We have taken the average level of 63 dBA at 10m for each jet wash for our assessment.



- 13.3 The Vac unit noise levels were 65 dBA at 10m and an individual operating period of 2-3 minutes.
- 13.4 The Air/Water unit noise levels were 57dBA at 10m and an individual operating period of 1-2minutes.
- 13.5 The number of operations, for each piece of machinery, during the periods when the pre-development background noise levels will be lowest is difficult to establish on a site by site basis. We have assumed a 50% down time for each machine during any one hour or 15 minute reference time period. We believe this provides a robust assessment.
- 13.6 We have also included an acoustic penalty of 6dB for each machine to determine the machine rating noise levels.

Jet Washes (2no)

Day	Period			Predicted Unit Rating Noise Level,dB		Lowest Existing LA90T,dB	Excess	Impact
Monday to Saturday	07.00	to	08.00	56	LAeq(1hr)	62	Nil	Low
	22.00	to	23.00	56	LAeq(1hr)	47	+9	Significant
Sunday	07.00	to	08.00	56	LAeq(1hr)	49	+7	Adverse
	22.00	to	23.00	56	LAeq(1hr)	43	+13	Significant

Table 4 – RPA Excess above existing LA90T Noise Level and Corresponding Impact

Day	Period			Predicted Unit Rating Noise Level,dB		Lowest Existing LA90T,dB	Excess	Impact
Monday to Saturday	07.00	to	08.00	48	LAeq(1hr)	62	Nil	Low
	22.00	to	23.00	48	LAeq(1hr)	47	+1	Low
Sunday	07.00	to	08.00	48	LAeq(1hr)	49	Nil	Low
	22.00	to	23.00	48	LAeq(1hr)	43	+5	Adverse

Table 5 – RPB Excess above existing LA90T Noise Level and Corresponding Impact

- 13.7 At RPA the Jet wash rating noise levels would have low impact on weekdays between 07.00-08.00 hours and a significant adverse impact between 22.00-23.00 hours. On Sundays the Jet wash rating noise levels would have an adverse or significant adverse impact during both the monitored periods.



- 13.8 At RPB, the Jet wash rating noise levels would have low impact on weekdays between 07.00-23.00 hours. On Sundays the Jet wash rating noise levels would have low impact between 07.00-08.00 hours and an adverse impact between 22.00-23.00 hours.

Vac Unit

Day	Period			Predicted Unit Rating Noise Level,dB		Lowest Existing LA90T,dB	Excess	Impact
Monday to Saturday	07.00	to	08.00	55	LAeq(1hr)	62	Nil	Low
	22.00	to	23.00	55	LAeq(1hr)	47	+8	Adverse
Sunday	07.00	to	08.00	55	LAeq(1hr)	49	+6	Adverse
	22.00	to	23.00	55	LAeq(1hr)	43	+12	Significant

Table 6 – RPA Excess above existing LA90T Noise Level and Corresponding Impact

Day	Period			Predicted Unit Rating Noise Level,dB		Lowest Existing LA90T,dB	Excess	Impact
Monday to Saturday	07.00	to	08.00	48	LAeq(1hr)	62	Nil	Low
	22.00	to	23.00	48	LAeq(1hr)	47	+1	Low
Sunday	07.00	to	08.00	48	LAeq(1hr)	49	Nil	Low
	22.00	to	23.00	48	LAeq(1hr)	43	+5	Adverse

Table 7 – RPB Excess above existing LA90T Noise Level and Corresponding Impact

- 13.9 At RPA the Vac unit rating noise levels on weekdays would have low impact between 07.00-08.00 hours and an adverse impact between 22.00-23.00 hours. On Sundays the Vac unit rating noise levels would have an adverse impact between 07.00-08.00 hours and a significant adverse impact between 22.00-23.00 hours.
- 13.10 At RPB, the Vac unit rating noise levels would have low impact on weekdays between 07.00-23.00 hours. On Sundays the Vac unit rating noise levels would have low impact between 07.00-08.00 hours and an adverse impact between 22.00-23.00 hours



Air/Water Unit

Day	Period			Predicted Unit Rating Noise Level,dB		Lowest Existing LA90T,dB	Excess	Impact
Monday to Saturday	07.00	to	08.00	47	LAeq(1hr)	62	Nil	Low
	22.00	to	23.00	47	LAeq(1hr)	47	Nil	Low
Sunday	07.00	to	08.00	47	LAeq(1hr)	49	Nil	Low
	22.00	to	23.00	47	LAeq(1hr)	43	+4	Adverse

Table 8 – RPA Excess above existing LA90T Noise Level and Corresponding Impact

Day	Period			Predicted Unit Rating Noise Level,dB		Lowest Existing LA90T,dB	Excess	Impact
Monday to Saturday	07.00	to	08.00	40	LAeq(1hr)	62	Nil	Low
	22.00	to	23.00	40	LAeq(1hr)	47	Nil	Low
Sunday	07.00	to	08.00	40	LAeq(1hr)	49	Nil	Low
	22.00	to	23.00	40	LAeq(1hr)	43	Nil	Low

Table 9 – RPB Excess above existing LA90T Noise Level and Corresponding Impact

- 13.11 At RPA, the Air/Water unit rating noise levels would have low impact on weekdays between 07.00-23.00 hours and on Sundays between 07.00-08.00 hours. On Sundays the Air/Water unit rating noise levels would have an adverse impact between 22.00-23.00 hours.
- 13.12 At RPB, the Air/Water unit rating noise levels would have low impact on weekdays and Sundays between 07.00-23.00 hours.
- 13.13 The Environmental Health Department at Arun District Council have requested that we address the combined operation of the jet washes, vacuum units and the air/water units and we have provided results in this revised report. This will indicate the worst case operations with all four machines working simultaneously during all periods.



The cumulative machinery noise levels are as follows:

Machinery	Machinery Rating Noise Levels, dBA			
	Monday to Saturday		Sunday	
	07.00-08.00	22.00-23.00	07.00-08.00	22.00-23.00
Jet Washes	56	56	56	56
Vacuum Unit	55	55	55	55
Air/Water Unit	47	47	47	47
Cumulative	59	59	59	59
Lowest Existing LA90T,dB	62	47	49	43
Excess	Nil	+12	+10	+16

Table 10 – RPA Cumulative Noise Levels and Excess above rating criteria

Machinery	Machinery Rating Noise Levels, dBA			
	Monday to Saturday		Sunday	
	07.00-08.00	22.00-23.00	07.00-08.00	22.00-23.00
Jet Washes	48	48	48	48
Vacuum Unit	48	48	48	48
Air/Water Unit	40	40	40	40
Cumulative	51	51	51	51
Lowest Existing LA90T,dB	62	47	49	43
Excess	Nil	+4	+2	+8

Table 11 – RPB Cumulative Noise Levels and Excess above rating criteria

14.0 Mitigation Measures

- 14.1 It is noted that the rating levels of the machinery would have an adverse or significant adverse impact for some time periods at receptor positions RPA and RPB.
- 14.2 The dominant noise sources are the Jet Washes and the Vacuum Unit.
- 14.3 We would recommend the operation of the units should be restricted, where necessary, so that they do not cause an adverse or significant adverse impact at the nearest noise sensitive properties.



15.0 Machinery Conclusions

- 15.1 We recommend the operation of the Jet Washes, Vacuum unit and Air/Water unit are to be restricted to the daytime hours detailed below. With the restrictions in place, the operation of the machinery would result in a low impact in accordance with BS4142:2014.

Jet Washes	Monday to Saturday	07.00 to 20.00 hours
	Sundays	10.00 to 18.00 hours
Vac Unit	Monday to Saturday	07.00 to 20.00 hours
	Sundays	10.00 to 18.00 hours
Air/Water	Monday to Saturday	07.00 to 23.00 hours
	Sundays	07.00 to 22.00 hours



SECTION B – PFS TANKER DELIVERIES

16.0 Proposed Hours of Operation

- 16.1 For the purposes of this assessment we considered the impact of tanker deliveries 24hrs a day, 7 days a week. Where the assessment does not support deliveries at certain times, restricted hours of operation will be recommended.

17.0 Tanker Deliveries Noise Criteria

- 17.1 We have carried out a noise impact assessment for the receptor positions based on the methodology detailed in BS4142:2014 and the resultant noise levels at the receptor positions will be compared to the lowest measured background $L_{A90(15min)}$.

18.0 Noise Assessment

- 18.1 The noise data for the tanker operation includes the lorry arrival, filling operation and lorry departure. The filling operation usually takes between 30 minutes and 40 minutes to complete. There is negligible noise when tanks are filling as the tanker engine is turned off and filling operates under gravity feed with pipes connected from the tanker to the low level fill pipes. There is a low level of noise when the pipes are connected and disconnected but this is included in our measured noise levels and assessment. Tanker pass-by noise within the site has also been included.
- 18.2 We have carried out a noise impact assessment for the most affected dwellings, based on BS4142:2014 methodology. The scope of this standard has been increased from previous versions and now includes “sound from the loading and unloading of goods and materials at industrial and/or commercial premises”.
- 18.3 We consider BS4142:2014 is applicable to PFS tanker deliveries.
- 18.4 As specified in BS4142:2014, during the day (07.00 to 23.00 hrs) the activity rating sound level is to be established over a 1 hour reference time period and to be compared to the typical existing background sound level. At night the activity rating sound level is to be established over a 15 minute reference time period and to be compared to the typical existing background sound level.



- 18.5 From the activity sound levels given in Appendix C, we have calculated the worst case activity rating level over a 1hour period or 15minute period, taking all stages of the arrival, departure and tank filling into account.
- 18.6 In accordance with BS4142:2014, a +3dB acoustic feature correction has been applied for “other sound characteristics” during the tanker arrival, departure and pass-by. A +6dB acoustic feature correction has been applied for “impulsivity” during the tanker connecting and disconnecting the refuelling pipes.
- 18.7 The calculated delivery activity rating level, typical background sound level and resulting excess is given below.

Day	Period			Predicted Unit Rating Noise Level,dB		Lowest Existing LA90T,dB	Excess	Impact
Monday to Saturday	06.00	to	07.00	44	LAeq(15mins)	55	Nil	Low
	07.00	to	08.00	39	LAeq(1hr)	62	Nil	Low
	22.00	to	23.00	39	LAeq(1hr)	47	Nil	Low
	23.00	to	00.00	44	LAeq(15mins)	39	+5	Adverse
	02.00	to	03.00	44	LAeq(15mins)	30	+14	Significant
Sunday	06.00	to	07.00	44	LAeq(15mins)	43	+1	Low
	07.00	to	08.00	39	LAeq(1hr)	49	Nil	Low
	22.00	to	23.00	39	LAeq(1hr)	43	Nil	Low
	23.00	to	00.00	44	LAeq(15mins)	36	+8	Significant

Table 12 – RPA Excess above existing LA90T Noise Level and Corresponding Impact

Day	Period			Predicted Unit Rating Noise Level,dB		Lowest Existing LA90T,dB	Excess	Impact
Monday to Saturday	06.00	to	07.00	47	LAeq(15mins)	55	Nil	Low
	07.00	to	08.00	42	LAeq(1hr)	62	Nil	Low
	22.00	to	23.00	42	LAeq(1hr)	47	Nil	Low
	23.00	to	00.00	47	LAeq(15mins)	39	+8	Significant
	02.00	to	03.00	47	LAeq(15mins)	30	+17	Significant
Sunday	06.00	to	07.00	47	LAeq(15mins)	43	+4	Adverse
	07.00	to	08.00	42	LAeq(1hr)	49	Nil	Low
	22.00	to	23.00	42	LAeq(1hr)	43	Nil	Low
	23.00	to	00.00	47	LAeq(15mins)	36	+11	Significant

Table 13 – RPB Excess above existing LA90T Noise Level and Corresponding Impact



- 18.8 At RPA the tanker delivery rating noise levels would have an adverse or significant adverse impact on weekdays and Sundays between 23.00-06.00 hours.
- 18.9 At RPB the tanker delivery rating noise levels would have an adverse or significant adverse impact on weekdays between 23.00-06.00 hours and on Sundays between 23.00-07.00 hours.

World Health Organisation

- 18.10 For any night time periods between 23.00 to 07.00 hours, it is also appropriate to consider the World Health Organisation (WHO) recommended L_{AFmax} internal noise criteria for sleep disturbance. The criteria is 45 dB L_{AFmax} inside / 60 dB L_{AFmax} outside. Whilst this is a relatively common criteria adopted for this type of assessment, it is also important to consider the existing L_{AFmax} noise climate as the guideline figures may already be regularly exceeded at some sites.
- 18.11 The highest predicted L_{AFmax} activity noise level is confirmed below and compared to the guidance criteria.

Receptor Position	Period	Highest Predicted L_{AFmax} (Outside Bedroom)	WHO L_{AFmax} Criteria (Outside Bedroom)	Existing L_{AFmax} Noise Climate
RPA	23.00 to 07.00	58	60	66-84
RPB	23.00 to 07.00	61	60	66-84

Table 14 –World Health Organisation L_{AFmax} Assessment

- 18.12 The World Health Organisation 60 dB L_{AFmax} night time criteria is marginally exceeded at receptor RPB but the highest predicted L_{AFmax} activity noise level at the receptor position is below the existing L_{AFmax} noise climate range established during the night time noise monitoring.
- 18.13 BS4142:2014 also requires context to be taken into account. It should be noted that the PFS site is adjacent to the A259 Littlehampton Road which is a two- lane dual carriageway with traffic lights controlling the junction into the Asda store and proposed PFS. Also, the tanker deliveries would be infrequent, with typically less than 1 per day.



19.0 PFS Tanker Deliveries - Conclusions

- 19.1 We would recommend the tanker delivery operation should be restricted so that it does not cause an adverse or significant adverse impact at the nearest noise sensitive properties.
- 19.2 We conclude that PFS tanker deliveries between 06.00 to 23.00 hours Monday to Saturday and 07.00 to 23.00 hours on Sundays would be acceptable in accordance with guidance contained in the latest applicable British Standard and noise policy documents.



APPENDIX A

Environmental Noise Monitoring

A1.0 Environmental Noise Monitoring

Late evening, night and early morning environmental noise monitoring was carried out on Monday 4th December and Tuesday 5th December 2017. Early morning and late evening environmental noise monitoring was also carried out on Sunday 3rd December 2017.

The relevant results from the environmental noise monitoring are given in section A5.0 later in this report.

The monitoring position were located at the eastern boundary of the proposed site adjacent to the two receptor positions and confirmed on the site plan in Appendix B.

The position was as follows:

Monitoring position MP1	On the eastern edge of the existing gravel area adjacent to the boundaries of the new dwellings and the existing bungalow.
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A2.0 Monitoring Equipment

The noise monitoring equipment for all surveys comprised of a Svantek 957 type 1 real time analyser, serial number 21434. Weatherproof microphone protection was used.

The meter calibration for all surveys was verified before and after the measurement using a Svantek SV31 acoustic calibrator, serial number 24687. Any deviation was within an acceptable tolerance.

The meter and calibrator have current calibration certificates available upon request.

A3.0 Environmental Noise Survey Weather Conditions

The weather during the weekday surveys was dry with partial cloud cover and still conditions. The temperature was 4°C in the morning, 8°C in the evening and 4°C at night.



The weather during the Sunday morning survey was dry with partial cloud cover and a wind speed of 0.2m/sec. The temperature was 6°C. In the evening the weather was dry and overcast with a wind speed of 0.4m/sec. The temperature was 6°C

The weather was acceptable for noise monitoring during all periods.

A4.0 Noise Measurement Parameters

The survey established the prevailing L_{AFmax} , $L_{Aeq,T}$, L_{A10} and L_{A90} noise levels, measured using F time weighting, with a 15 minute reference time period.

A5.0 Monitoring Results and Observations

We believe the recorded environmental noise measurements are representative of the existing noise climate applicable to the facades of the nearest noise sensitive properties.

The traffic activity, including buses and HGV's along the A259 Littlehampton Road was light at the start of the weekday early morning period increasing to practically continuous activity by 07.00 hours. Buses were in and out of the store car park about every 15 minutes. During the weekday late evening period traffic activity, including buses and lorries moderate at the start of the period becoming light at the end. During the night there was just the odd cars along the A259 and there were three HGV movements during the one hour monitoring period.

On the Sunday early morning traffic along the A259 was light at first becoming steady by the end of the morning survey. It was noted that twenty one cars came into the store during the two hour period. During the late evening period the main road traffic was light to moderate with a few cars in and out of the store car park.

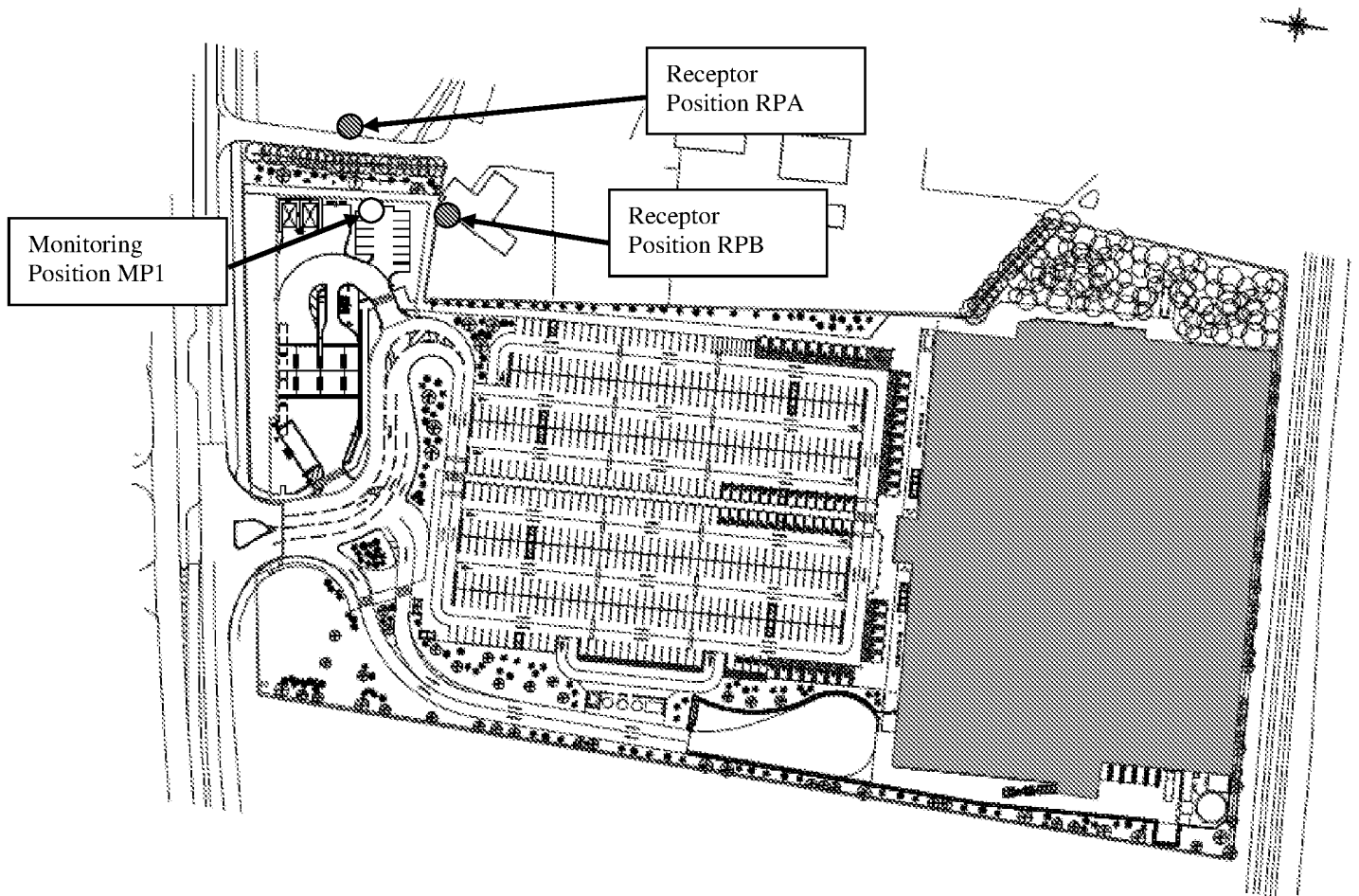


The environmental monitoring results are given below.

MP1

Date	Time			Measured Sound Pressure Level, dB			
				L _A F _{max}	L _A eq,T	L _A 10,T	L _A 90,T
Monday 4 th December 2017	06.00	to	06.15	83.8	62.2	64.1	55.3
	06.15	to	06.30	79.1	62.1	64.7	57.0
	06.30	to	06.45	72.2	63.9	66.5	59.4
	06.45	to	07.00	73.2	65.6	67.8	62.3
	07.00	to	07.15	72.9	65.9	68.1	62.4
	07.15	to	07.30	75.5	66.6	68.6	63.9
	07.30	to	07.45	70.6	65.9	67.7	63.1
	07.45	to	08.00	71.3	66.2	68.1	63.6
	22.00	to	22.15	74.7	59.5	63.1	50.6
	22.15	to	22.30	70.2	59.2	62.5	51.6
	22.30	to	22.45	68.2	58.1	61.6	48.7
	22.45	to	23.00	66.6	57.5	61.3	47.2
	23.00	to	23.15	68.6	57.0	60.9	46.9
	23.15	to	23.30	70.6	56.3	60.4	43.8
	23.30	to	23.45	71.1	55.9	59.9	41.1
	23.45	to	00.00	68.6	52.5	56.9	39.3
Tuesday 5 th December 2017	02.00	to	02.15	68.7	51.3	54.8	32.4
	02.15	to	02.30	68.6	49.4	52.6	33.6
	02.30	to	02.45	70.7	50.2	53.5	29.7
	02.45	to	03.00	65.6	47.4	50.9	31.2
Sunday 3 rd December 2017	06.00	to	06.15	67.4	55.0	59.4	43.2
	06.15	to	06.30	73.0	55.7	60.0	45.3
	06.30	to	06.45	69.9	57.4	61.5	45.0
	06.45	to	07.00	80.3	59.0	60.8	45.2
	07.00	to	07.15	70.0	58.1	61.8	48.7
	07.15	to	07.30	69.8	59.6	63.3	49.7
	07.30	to	07.45	71.5	60.6	64.2	50.6
	07.45	to	08.00	73.0	61.2	64.4	53.1
	22.00	to	22.15	69.5	58.8	62.5	47.4
	22.15	to	22.30	67.6	57.7	62.0	45.9
	22.30	to	22.45	68.6	57.4	61.7	43.1
	22.45	to	23.00	68.6	57.2	61.2	44.3
	23.00	to	23.15	70.0	56.0	59.7	42.5
	23.15	to	23.30	71.1	55.8	59.8	41.8
	23.30	to	23.45	71.8	56.2	60.3	39.9
	23.45	to	00.00	65.8	53.3	58.0	36.4

APPENDIX B Site Plan





Appendix C

Noise Impact Assessment Methodology

We give below a summary of the various British Standards and other published documents that provide guidance on noise impact assessment methodology and noise criteria for this type of activity.

BS 4142:2014 Methods for Rating and Assessing Industrial and Commercial Sound

This British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature, which includes

- a) Sound from industrial and manufacturing processes
- b) Sound from fixed installations which comprise mechanical and electrical plant and equipment
- c) Sound from the loading and unloading of goods and materials at industrial and/or commercial premises
- d) Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes

The methods described in the British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

The Standard confirms that certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where appropriate, a rating penalty should be established based on a subjective assessment of its characteristics at the receptor position. This method is appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed.

National Planning Policy Framework (NPPF)

The NPPF was published on 27th March 2012 and replaces the existing planning framework – which consisted of Planning Policy Guidance and Statements (PPGs and PPS).

The NPPF reflects previous planning guidance, and promotes sustainable economic development. As such the NPPF states that *“planning should operate to encourage and not act as an impediment to sustainable growth. Therefore significant weight should be placed on the need to support economic growth through the planning system”*.



Whilst not providing any specific guidance on assessment methodology, this document confirms in section 123 that planning policies and decisions should aim to *“avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development.”* Furthermore they should aim to *“mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions”*.

The aims of section 123 are to be read in conjunction with the Explanatory Note to the Noise Policy Statement for England (Department for the Environment, Food and Rural Affairs). Again, this document does not provide any specific guidance on assessment methodology.



Appendix D

Glossary of Terminology

$L_{Aeq,T}$

The $L_{Aeq,T}$ is defined as the equivalent continuous sound pressure level, over the reference time period “T”. It can be considered as an average of the total sound energy, or the steady continuous level that has the same total energy as a fluctuating sound source.

$L_{A90,T}$

The $L_{A90,T}$ is a statistical parameter, defined as the sound pressure level exceeded for 90% of the measurement time period “T”. It is used by BS4142:1997 to characterise the “background noise Level” and can be considered in simple terms as the noise level in the quieter spells eg between passing traffic.

$L_{A10,T}$

The $L_{A10,T}$ is a statistical parameter, defined as the sound pressure level exceeded for 10% of the measurement time period “T”. It is commonly used to measure road traffic noise. In simple terms, it is a measurement of the noisier spells eg when traffic is passing.

L_{AFmax}

The L_{AFmax} is the maximum measured sound pressure level in a given measurement period.