FICHTNER
Consulting Engineers Limited

Portland ERF

Powerfuel Portland Ltd

Schedule 5 Response No 1

ENGINEERING – CONSULTING

Document approval

	Name	Signature	Position	Date
Prepared by:	James Sturman		Lead Consultant	26/11/2021
Checked by:	Stephen Othen		Technical Director	26/11/2021

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Contents

1. Response to Schedule 5 Request

1. **Please clarify the height of the proposed Portland ERF stack.**

   It is noted by the Applicant that the stack height stated in the Supporting Information and the CHP Assessment are not correct. It can be confirmed that this was a typographical error.

   The stack height of the Facility is 80 m as stated within the air quality assessments submitted with the application and as such this typographical error has no impact on the results of the air quality assessments and resulting predicted health or ecological impacts.

2. **With regard to the submitted air quality modelling of emissions from the proposed Portland ERF stack please quantify and comment on the modelling uncertainties, re-evaluating predictions (including the use of alternative-modelling software as appropriate) and re-interpret predicted impacts in accordance with our guidance at Environmental permitting: air dispersion modelling reports - GOV.UK (www.gov.uk)**

   Please see detailed response to this question, in Annex A - Modelling Uncertainty .

3. **Please provide the following information with regard to the operation of the proposed emergency standby diesel generator:**

   a) **a technical description of the operation of the activity (including estimated maximum annual operating hours and input thermal capacity) and a demonstration of how you will meet relevant Best Available Techniques (BAT). This should also include details of operating techniques and the infrastructure proposed to minimise the risk of pollution, including any details of secondary containment (e.g. bunds) used and how this meets any relevant standards.**

   The thermal capacity of the Emergency Diesel Generator (EDG) will be subject to detailed design and procurement of the engines by the technology provider. However, taking into consideration the parasitic load of the Facility (2.2 MWe), and a conservative electrical efficiency of 30%, the EDG will have a thermal capacity of approximately 7.3 MWth. Therefore, the EDG will not be subject to the Large Combustion Plant requirements of the IED but will be subject to the requirements of the Medium Combustion Plant Directive (MCPD) which applies to combustion plant with a thermal capacity of less than 50 MWth.

   The MCPD states:

   > *Member States should be able to exempt medium combustion plants used in cases of emergency and operated during limited time periods from compliance with the emission limit values set out in this Directive.*

   Furthermore, the TA Luft guidance for new and existing liquid fuelled engine(which is referenced by the EA in the explanation for this question) states:

   > *limits do not apply to emergency engines …*

   On this basis, it is understood that the emission limit values within the MCPD and the TA Luft guidance do not apply to the EDGs.

   The EDG will only operate in the following scenarios:

   - for testing and maintenance purposes – expected to be tested every two weeks for less than 30 minutes, so no more than 1 hour per month in total; and

- in the event of loss of grid connection to maintain operation of the abatement and control systems to enable a safe shutdown of the ERF – assumed to be typically no more than 4 hours for any one event.

  In this operating scenario, the EDG would need to operate at 100% load following the initial loss of grid connection. However, as the shutdown sequence progressed the abatement and control systems would be reduced in operation so that the EDG could operate at a reduced load prior to be switched-off until the grid connection could be reinstated to enable the Facility to commence the start-up sequence with power for start-up being provided by the grid connection, not the EDG.

Therefore, apart from maintenance and testing purposes, which will be much less than 50 hours per annum, the EDG will only operate as an emergency/safety system to enable safe shutdown of the Facility in the event of a loss of grid connection. Typically, an EDG will need to operate to provide capacity for safe shutdown of the Facility less than once per year – the history of electricity supply to Portland port suggests that it would be more like once every 3 years.

As explained within the EP application, the EDG will be fuelled by diesel. As this is a liquid fuel it will be required to be stored in a bunded tank with secondary containment facilities having a volume of 110% of the stored capacity. In addition, the environmental management systems and procedures which are adopted at the Facility will include emergency/spill response procedures to be implemented in the event of a spill of diesel or failure of the containment systems.

Finally, it can be confirmed that the EDG will have a vertical stack with no caps/cowls or impediments, and it will be designed to prevent persistent dark smoke when it is in operation.

Taking all of the above into consideration, the proposed design and operation of the EDG is considered to represent BAT.

b) **an air quality assessment which considers the impact of operating the proposed emergency standby diesel generator (using dispersion modelling as appropriate) on sensitive human and ecological receptors respectively.**

   Please see separate response, in Annex B - Air quality assessment of EDGs.

4. **Please review the originally submitted permit application documents and provide updated and/or supplementary information (as appropriate) to ensure that any information submitted to the local planning authority (LPA) in response to their letter requesting additional information dated 30/04/2021, ref. WP/20/00692/DCC, where that information is also relevant to the environmental permit application, is submitted in support of the permit application.**

   You must ensure that your response clearly indicates the information which you consider relevant for the permit application, thereby distinguishing if from information submitted to the LPA which is outside of the Environment Agency's environmental permitting remit.

   The Regulation 25 Request, dated 30 April 2021, is provided in Annex C.1.

   The response to the Regulation 25 Request included a full suite of documentation, some of which is not relevant to the scope of the Environmental Permitting regime. The covering letter to the Regulation 25 Request is provided in Annex 0. From review of the Regulation 25 Request and the covering letter to the response to the Regulation 25 Request, the information which is relevant to the Environmental Permitting regime has been extracted and is provided in Annex C.3.

Annexes

A Modelling Uncertainty (Q2)

FICHTNER

Consulting Engineers Limited

Portland Energy Recovery Facility

Powerfuel Portland Ltd

Annex A to Schedule 5 request – Modelling Uncertainty

ENGINEERING CONSULTING

Document approval

	Name	Signature	Position	Date
Prepared by:	Rosalind Flavell	RFlavell	Senior Environmental Consultant	26/11/2021
Checked by:	Stephen Othen	[illegible]	Technical Director	26/11/2021

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0	15/11/2021	Draft for client review	RSF	SMO
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Contents

1 Introduction

1.1 Background

Powerfuel Portland Ltd (the Client) submitted an application for an Environmental Permit (EP) to the Environment Agency (EA) (reference: EPR/AP3304SZ/A001). The detailed dispersion modelling methodology was set out in Technical Appendix D.2 Process Emissions Modelling (Fichtner document reference: S2953-0030-0005RSF rev 2 dated 25/08/2020), referred to within this report as the Dispersion Modelling Assessment (DMA).

As part of the determination, the EA has issued a request for more information under Schedule 5 of the Environmental Permitting (England and Wales) Regulations 2016. This report has been produced to provide the technical information needed to answer these questions.

1.2 Objectives

This report has the following objectives:

1. To provide clarification to the EA on the approach used.
2. To conduct a sensitivity analysis and to comment on the modelling uncertainty to answer question 2 of the Schedule 5 request for information.

2 Clarifications

2.1 Stack emissions data

Table 7 of the DMA includes 2 typographical errors with the stack diameter and flue gas velocity. The modelling was based on a stack diameter of 1.85 m and a resultant flue gas velocity of 20 m/s and all of the results presented in the DMA were based on this modelling.

Table 8 of the DMA also includes 2 typographical errors with the emission rate for ammonia and hydrogen fluoride incorrect. However, these were not carried through into the analysis.

The corrected Tables 7 and 8 are provided below. The changes are provided in red text.

Table 7 Corrected : Stack source data

Item	Unit	Value
Stack Data		
Height	m	80
Internal diameter	m	1.85
Location	m, m	369607, 74248
Flue Gas Conditions		
Temperature	°C	140
Exit moisture content	% v/v	14.90%
	kg/kg	0.105
Exit oxygen content	% v/v dry	8.11%
Reference oxygen content	% v/v dry	11.0%
Volume at reference conditions (dry, ref O_2)	Nm^3/s	39.07
Volume at actual conditions	Am^3/s	53.81
Flue gas exit velocity	m/s	20.0

Table 8 Corrected : Stack emissions data

Pollutant	Conc. (mg/Nm^3)		Release rate (g/s)	
	Daily or periodic	Half-hourly	Daily or periodic	Half-hourly
Oxides of nitrogen (as NO_2)	120	400	4.689	15.630
Sulphur dioxide	30	200	1.172	7.815
Carbon monoxide	50	150(1)	1.954	5.861
Fine particulate matter (PM)(2)	5	30	0.195	1.172
Hydrogen chloride	6	60	0.234	2.344
Volatile organic compounds (as TOC)	10	20	0.391	0.781
Hydrogen fluoride	1	4	0.039	0.156
Ammonia (3)	8	-	0.313	-

Pollutant	Conc. (mg/Nm³)		Release rate (g/s)	
	Daily or periodic	Half-hourly	Daily or periodic	Half-hourly
Cadmium and thallium	0.02	-	0.781 mg/s	-
Mercury	0.02	0.035	0.781 mg/s	1.368 mg/s
Other metals(4)	0.3	-	11.722 mg/s	-
Benzo(a)pyrene (PaHs)(5)	0.105 µg/Nm³	-	4.103 µg/s	-
Dioxins and furans	0.06 ng/Nm³	-	2.344 ng/s	-
PCBs(6)	5.0 µg/Nm³	-	4.103 µg/s	-

Notes:

All emissions are expressed at reference conditions of dry gas, 11% oxygen, 273.15K.

(1) Averaging period for carbon monoxide is 95% of all 10-minute averages in any 24-hour period.

(2) As a worst-case it has been assumed that the entire PM emissions consist of either PM_{10} or $PM_{2.5}$ for comparison with the relevant AQALs.

(3) A more stringent limit for ammonia is being applied for 8 mg/Nm^3

(4) Other metals consist of antimony (Sb), arsenic (As), lead (Pb), chromium (Cr), cobalt (Co), copper (Cu), manganese (Mn), nickel (Ni) and vanadium (V).

(5) The highest recorded emission concentration of B[a]P from the Environment Agency's public register was 0.105 ug/m³, or 0.000105 mg/m³ (dry, 11% oxygen, 273K). In lieu of any specific limit, this has been assumed to be the emission concentration for the Facility.

(6) The Waste Incineration BREF provides a range of values for PCB emissions to air from European municipal waste incineration plants. This states that the annual average total PCBs is less than 0.005 mg/Nm³ (dry, 11% oxygen, 273K). In lieu of any specific limit, this has been assumed to be the emission concentration for the Facility.

2.2 Ecological receptors

The impact at ecological receptors was calculated by post processing the gridded output to determine the maximum impact at any grid point contained within the ecological site. Figure 3 contained in Appendix A shows the points used for each UK and European designated ecological sites. Figure 4 contained in Appendix A shows the points used for the local wildlife sites.

A separate excel file has been provided which includes the co-ordinates for each of the grid points used for the ecological sites, in order to facilitate the AQMUA audit.

2.3 Metals analysis

As part of the EP Application and as set out in the DMA, the impact of metals was carried out using the methodology set out in the EA document "Guidance on assessing group 3 metal stack emissions from incinerators"[1].

1. The first stage was to take the worst-case screening approach assuming each metal is released at 100% of the group ELV. In this case, this was the proposed emission limit value (ELV) of 0.3 mg/Nm^3.
2. The second stage was to assume that the Portland ERF would have emissions no greater than the maximum monitored concentration as set out in Table A1 of the EA guidance.

Table 18 and Table 19 of the DMA presented the emissions concentration of each metal as a percentage of the ELV. This was the maximum measured concentration set out in the EA guidance, expressed as a percentage of the proposed ELV of 0.3 mg/Nm^3 rather than as a percentage of the Industrial Emissions Directive (IED) ELV presented in the EA guidance.

The following table provides a summary of the maximum measured concentration, and then shows this as a percentage of the IED group 3 ELV (as presented in the EA guidance) and as a percentage of the proposed ELV of 0.3 mg/Nm^3 (as presented in the DMA).

Table 1: Metals Assumptions

Pollutant	Maximum Measured Concentration (mg/Nm^3)	Percentage of the IED Group 3 ELV	Percentage of the Proposed ELV
Antimony	0.0115	2.3%	3.8%
Arsenic	0.0250	5.0%	8.3%
Total chromium	0.0920	18.4%	30.7%
Chromium VI	1.3×10^{-4}	0.026%	0.043%
Cobalt	0.0056	1.1%	1.9%
Copper	0.0290	5.8%	9.7%
Lead	0.0503	10.1%	16.8%
Manganese	0.0600	12.0%	20.0%
Nickel	0.2200	44.0%	73.3%
Vanadium	0.0060	1.2%	2.0%
Notes: IED Group 3 ELV is 0.5 mg/Nm^3 Proposed ELV as set out in the EP application is 0.3 mg/Nm^3			

As shown, the maximum as a percentage of the proposed ELV matches the data set out in Table 18 and Table 19 of the DMA. This demonstrates that the DMA was based on the assumption that emissions from the Portland ERF would be no greater than the maximum monitored concentration as set out in Table A1 of the EA guidance.

[1] EA, Guidance on assessing group 3 metal stack emissions from incinerators, version 4

2.4 Updated AQALs

Since the DMA was submitted to the EA there have been some updates to the Environmental Assessment Levels (EALs) (referred to as Air Quality Assessment Levels (AQALs) in the DMA). The following AQALs are different to those used in the DMA:

- Annual mean AQAL for $PM_{2.5}$ reducing from 25 µg/m^3 as used in the DMA to 20 µg/m^3
- AQAL for benzene changing from 195 µg/m^3 as an hourly mean to 30 µg/m^3 as a daily mean.
- Annual mean AQAL for arsenic increasing from 3 ng/m^3 as used in the DMA to 6 ng/m^3
- Annual mean AQAL for chromium VI increasing from 0.2 ng/m^3 as used in the DMA to 0.25 ng/m^3.

As shown, the arsenic and chromium VI AQALs are larger than that used in the DMA. Therefore, the impact as a percentage of the AQAL for these pollutants will be lower and so we have not reconsidered these. However, the AQAL for $PM_{2.5}$ is lower and the AQAL for benzene has changed the averaging period used. The following table sets out the impact of the Portland ERF with reference to these two updated AQALs. These results have been factored from the data presented in Table 12 of the DMA and therefore represent the point of maximum impact based on operation at the daily ELVs. The analysis has used the maximum predicted impact using 5-years of weather data and conservatively assumes that:

- The ERF continually operates at the daily ELVs;
- The entire dust emissions consist of only the $PM_{2.5}$ fraction; and
- The entire TOC emissions consist of only benzene.

Table 2: Updated AQALs Analysis

Pollutant	Averaging period	Units	AQAL	Max PC	Max PC as % of AQAL
$PM_{2.5}$	Annual mean	µg/m^3	20	0.05	0.23%
VOCs (as benzene)	Maximum daily mean	µg/m^3	30	1.29	4.29%

As shown, the change to the AQALs does not alter the conclusions of the DMA with relation to these pollutants that the impact can be screened out as "insignificant" as the process contribution is less than 1% of the long term or less than 10% of the short term AQAL.

3 Validation of ADMS Model

3.1 Introduction

Dispersion modelling of process emission from the Portland ERF was carried out using ADMS (version 5.2) produced by Cambridge Environmental Research Consultants (CERC). The detailed methodology was set out in the DMA which was submitted with the EP application.

In this section, we have described the model and explained why we consider that it is appropriate for modelling impacts of the proposed ERF.

3.2 Model description

ADMS is a new generation dispersion model which characterises the atmospheric boundary layer in terms of the atmospheric stability and the boundary layer height. In addition, the model uses a skewed Gaussian distribution for dispersion under convective conditions, to take into account the skewed nature of turbulence. The model also includes modules to take account of the effect of buildings and complex terrain.

Within ADMS, the FLOWSTAR module is used to generate a new flow and turbulence field based on the terrain. This simulates the changes to the movement of air in the horizontal and vertical direction as a result of the terrain features in that the air flow is simulated flowing above and around raised ground. This modified flow field is then used by the model to adjust the plume height and plume spread parameters calculated by the flat terrain model. The ADMS model can also handle cases of strongly stable flow using a separate plume impingement model.

The technical specification document for the complex terrain module[2] explains that *"terrain should have no more than moderate slopes (up to 1:3) although the model is useful even when this criterion is not met (say up to 1:2)"*.

Figure 5 contained in Appendix A shows the Ordinance Survey Terrain 50 data and identifies the areas where terrain slopes are greater than 1:3 in orange, and greater than 1:2 in red. As shown the majority of the area the terrain slopes are less than 1:3. The hill to the west of the Portland ERF the slope is just over 1:3 but within the 1:2. This shows that there are only small areas where the terrain slopes are outside of the range of 1:2.

CERC note that during very low wind stable conditions in hilly terrain, horizontal gradients in density can cause katabatic (downslope) winds, which may influence the background flow in deep valleys[3]. These effects are not specifically accounted for in ADMS. However, the local area does not include valleys and as such this limitation of the model is not relevant to this project.

The technical note produced by CERC specifically sets out why CERC consider that the use of ADMS is entirely appropriate as the model has been designed for these types of locations[4].

3.3 Model validation

CERC validates its models against available measured data obtained from real world situations, field campaigns and wind tunnel experiments. The validation studies are published on the CERC

[2] CERC, P14/01S/17 Complex Terrain Module, March 2020

[3] CERC, Note 110 Temperature Inversions in ADMS, 20 April 2017

[4] CERC, Technical Note: Portland Energy Recovery Facility, attached as Appendix B.

website[5]. Table 3 provides a summary of each of the validation studies presented on the CERC website and Fichtner's interpretation as to whether they are representative of the conditions across the Portland ERF study area.

Table 3: Model Validation Studies

Study	Description	Similar to Portland ERF study area?
Baldwin Power Plant	Plant in a rural area on a flat river plain, with terrain rising to the east up to a height of 115 m above the river plain. Buoyant source. Stack height ~180 m. Building height ~44% of height of stack. SO_2 monitored at 10 points. Characterised as "complex terrain below the stack height".	No. Terrain below stack height unlike the Portland ERF study area.
Martins Creek	Rural area along a river with terrain to the south-east and north-west rising above the height of the stacks. Buoyant source, 8 stacks of varying heights from ~65 m to ~183 m. Building height ~50% of height of stack. SO_2 monitored at 7 points. Characterised as "complex terrain rising above the stack height".	No. Terrain above the stack height like the Portland ERF study area but terrain rising to the south-east and north-west. The closest stacks to the terrain MC12, MC3 and MC4 are ~183m with the terrain only rising to ~200m. So not much difference between the terrain height and stack for the main emission sources.
Clifty Creek Power Plant	Plant located within the creek with cliffs rising about 115 m above the river immediately to the north of the plant. Buoyant source, 3 stacks each with a height of ~210 m. No buildings included in model. SO_2 monitored at 6 points. Characterised as "complex terrain below the stack height".	No. Terrain below stack height unlike the Portland ERF study area.
Hogback Ridge Tracer Experiments	Small hill, with a maximum elevation of 104 m above the minimum elevation in the area. Tracer gases released from a tower at two heights (50 m and 70 m) and another point at 20 m under stable conditions. No buildings included in model. Tracer gas released and 74 monitoring sites located on the terrain adjacent to the release.	No. Limited amount of data for model validation purposes and only considers stable conditions.

1[5] https://www.cerc.co.uk/environmental-software/model-validation.html

Study	Description	Similar to Portland ERF study area?
	Characterised as "complex terrain rising above the stack height".	
Lovett Power Plant	Plant located on a river with terrain increasing from river level to 270 m. Plant has a single 145 m stack, buoyant source. No buildings included in model. SO_2 monitored at 12 sites. Characterised as "complex terrain rising above the stack height".	Considered to be representative (see further discussion below)
Tracy Power Plant	Plant located in a valley surrounded by complex terrain with peaks rising to around 950 m above the power plant. Plant with a single 90 m stack, buoyant source. No buildings included in model. SF6 monitored at 110 receptors around the site. Height of receptors were 0.5 m above ground, but also 3 elevated receptors were positioned at heights of 43, 105 and 145m on a tower.	No. Significantly more complex terrain.
Westvaco Corporation	Plant located close to very complex terrain within a meandering part of a river valley. Buoyant source released at a height of 190 m. No buildings included in model. SO_2 monitored at 11 sites. Characterised as "complex terrain rising above the stack height".	No. Plant located in meandering river valley, unlike ERF.

Of the studies listed above, the Lovett Power Plant study is considered to be similar to the conditions at Portland ERF study area for the following reasons:

- Both plants have a buoyant release.
- The terrain in both instances rises above the stack height by at least 50 m (unlike Martins Creek where the stack is close to the peak elevation).
- The terrain is flat for a wide area of water before approaching the terrain – i.e. established laminar flow with low surface roughness.

However, the Lovett Power Plant study does not include the effect of building downwash and the validation is carried out against sulphur dioxide (SO_2) concentrations. In the validation document[6] CERC explain that there are issues with using SO_2 as a tracer which include:

- The limitations of detection are usually of the order of 16 µg/m^3, and concentrations below these are set to one-half of the limit. This leads to considerable inaccuracy when modelled concentrations are low.
- SO_2 is released from other sources. If estimates of these background concentrations are not available, then the model will underestimate concentrations, particularly long-term averages.

[6] CERC, ADMS 5 Complex Terrain Validation Lovett Power Plant, November 2016

The Baldwin Power Plant and Martins Creek validation documents are based on complex terrain and buildings. However, the complex terrain in both instances is unlike that at Portland. As complex terrain is the main driver for the Portland ERF, it is considered appropriate to consider the Lovett Power Plant study.

The validation studies include scatter plots, quantile-quantile plots, and a comparison between the observed and modelled maximum and robust highest concentration.

- The scatter plots compare predicted and measured concentrations at a particular location at a particular time.
- The quantile-quantile plots compare the distribution of predicted and measured concentrations during the period having abandoned the (x,t) pairing – i.e. comparing the first highest concentration from the monitored with the first highest concentration predicted.
- The highest concentration is subject to extreme variations. Therefore, the robust highest concentration (RHC) is used due to its stability which is based on a tail exponential fit to the upper end of the distribution. The RHC is strongly related to the average and standard deviation.

Figure 1: Frequency Scatter and Quantile-quantile Plots - Lovett Power Plant Validation Study

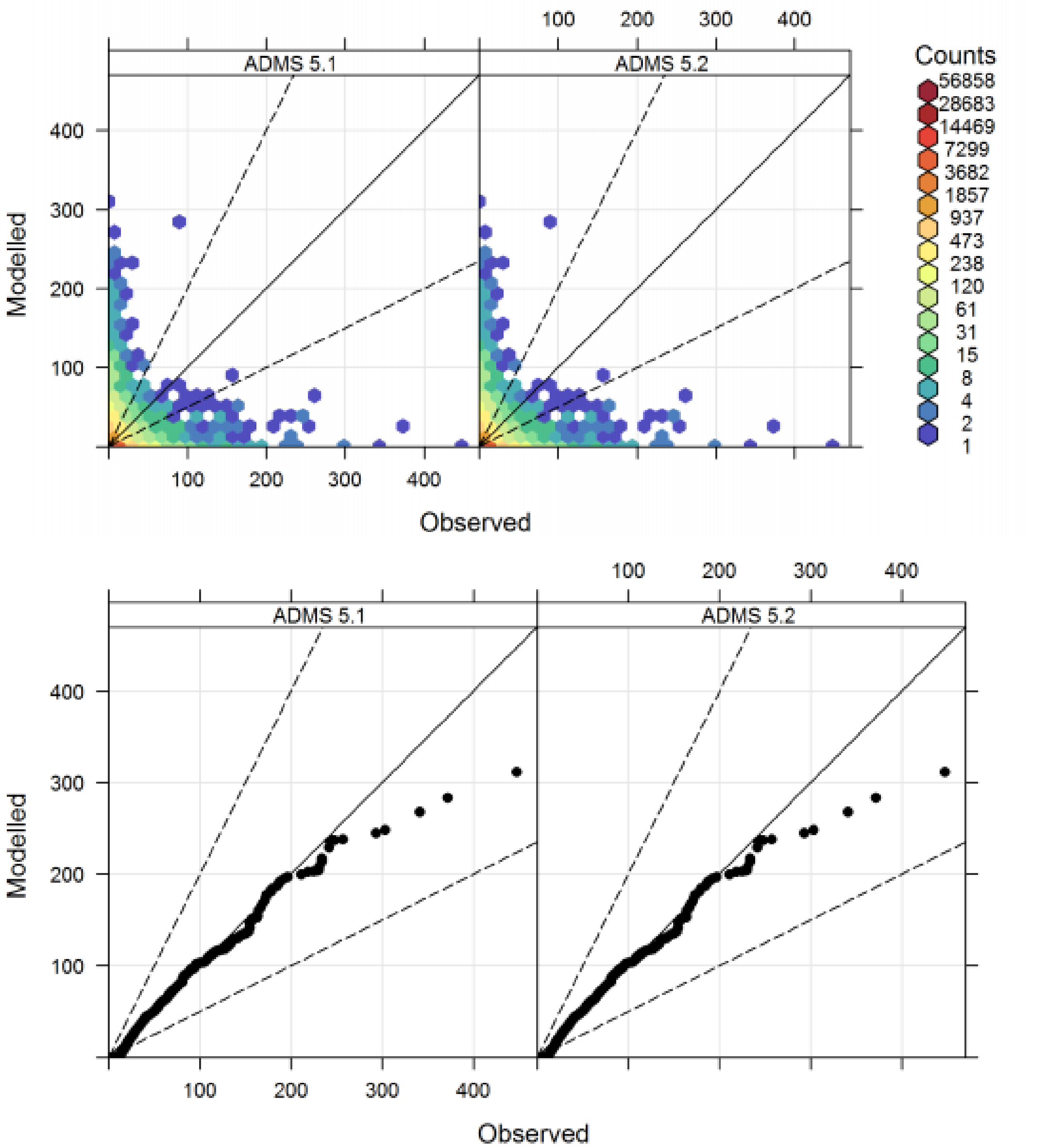


Figure 6 – Frequency scatter plots and quantile-quantile plots of ADMS results against observed concentrations (µg/m^3).

Source: CERC Lovett Power Plan Validation Study Nov 2016

The scatter plot and quantile-quantile plots (Figure 1) show a relatively good agreement between the modelled and observed concentrations for ADMS 5.2 with only a few of the higher concentrations being under predicted in ADMS.

The statistics, extracted from this validation study, extracted from the CERC Lovett Power Plan Validation Study Nov 2016, presented below, demonstrate this with the mean monitored to observed ratio being within 5% for the RHC.

Statistics	Data	Maximum Concentrations (µg/m³)									Mean M/O ratio
		P3	P4	P5	P6	P7	P8	P9	P10	P11	
1-hour maximum	Observed	231	257	151	448	372	157	230	193	155	-
	ADMS 5.1	115	101	131	237	312	174	238	229	181	0.85
	ADMS 5.2	115	101	131	237	312	174	238	229	181	0.85
3-hour maximum	Observed	146	137	66	184	136	109	102	103	83	-
	ADMS 5.1	61	67	67	179	168	141	185	164	98	1.11
	ADMS 5.2	61	67	67	179	168	141	185	164	98	1.11
24-hour maximum	Observed	76	22	21	40	47	21	22	29	19	-
	ADMS 5.1	25	17	43	90	107	59	63	34	24	1.76
	ADMS 5.2	25	17	43	90	107	59	63	34	24	1.76

Table 5 – Observed (O) and modelled (M) maximum concentrations (ug/m³) per receptor point, and the mean ratio of modelled/observed values for each statistic.

Statistics	Data	Robust Highest Concentrations (µg/m³)									Mean M/O ratio
		P3	P4	P5	P6	P7	P8	P9	P10	P11	
1-hour RHC	Observed	287	235	119	408	255	171	237	181	108	-
	ADMS 5.1	116	108	158	293	374	204	242	208	177	1.04
	ADMS 5.2	116	108	158	293	374	204	242	208	177	1.04
3-hour RHC	Observed	174	138	74	217	141	107	105	112	58	-
	ADMS 5.1	65	68	75	162	188	99	149	123	106	1.03
	ADMS 5.2	65	68	75	162	188	99	149	123	106	1.03
24-hour RHC	Observed	51	27	23	42	47	23	23	28	23	-
	ADMS 5.1	18	17	23	41	46	34	40	33	16	1.01
	ADMS 5.2	18	17	23	41	46	34	40	33	16	1.01

Table 6 – Observed (O) and modelled (M) robust highest concentrations (RHC) per receptor point, and the mean ratio of modelled/observed RHC for each statistic (number of points = 26).

Source: CERC Lovett Power Plan Validation Study Nov 2016

A ratio above 1 indicates that the model is over predicting the monitored concentration and a ratio below 1 indicated that it is under predicting the monitored concentration.

There is variation between sites. However, the highest RHC is predicted well:

- 1-hr RHC – highest observed value is 408, compared to highest modelled value of 374 (ratio 1.09).
- 3-hr RHC – highest observed value is 217, compared to highest modelled value of 188 (ratio 1.15).
- 24-hr RHC – highest observed value is 51, compared to highest modelled value of 46 (ratio 1.10).

Hence, we consider that the validation study confirms that the ADMS modelling results are, on average and as a maximum, within 10% of the hourly and daily concentrations. We would expect the accuracy over a longer time frame, such as a year, to be at least as high as this. This study does not indicate that the level of uncertainty would affect the conclusions of the DMA.

The Tracy Power Plant validation study is not considered to be representative of the conditions around the Portland ERF due to the significantly more complex terrain. However, the Tracy Power Plant validation study[7] still shows that for ground-level receptors (i.e. those following the level of the terrain and actually at a height of 0.5 m) the quantile-quantile graph shows good representation of observed data with higher observed concentrations being slightly over predicted using ADMS (figure 5 of the CERC validation study, reproduced below as our Figure 2).

Figure 2: Frequency Scatter and Quantile-quantile Plots - Lovett Power Plant Validation Study

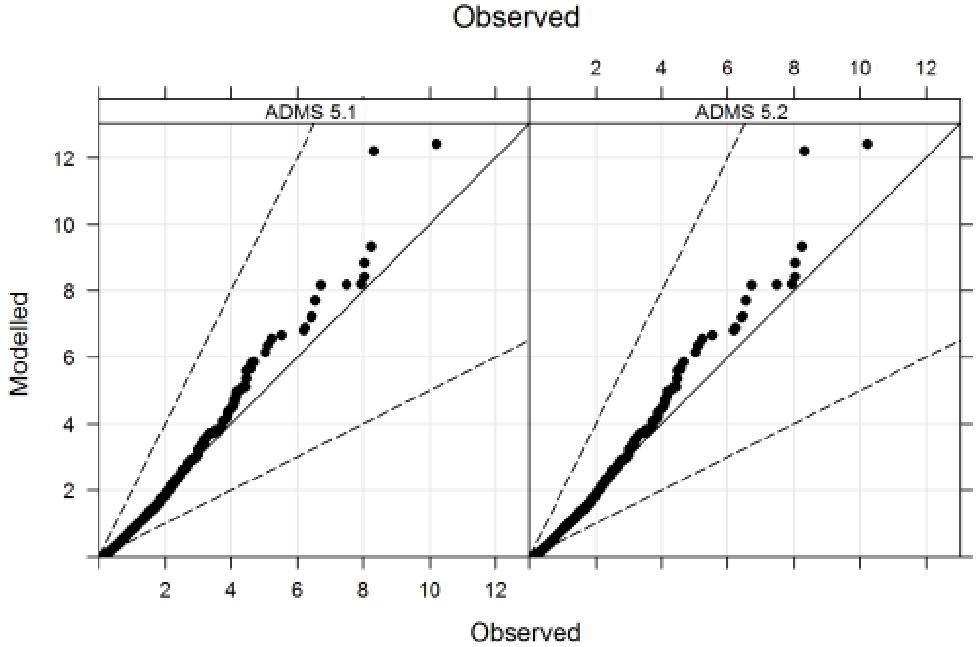


Figure 5 – Scatter plots and quantile-quantile plots of ADMS results against for the ground-level receptors (us/m³).

Source: CERC Lovett Power Plan Validation Study Nov 2016

The Tracey Power Plant study also includes two elevated points which are located on a tower at a height of 43 m and 104 m above the terrain. While the results at those specific elevated points are underestimated, this does not indicate that results at ground level are underestimated. As set out in the CERC validation document the analysis at height is for a single location and the expected accuracy of the model is lower. The validation study provides an additional explanation for the reduced accuracy in predictions for the 43 m height receptor, explaining that the AERMOD meteorological profile indicates that for a number of hours in the experiment there was reverse flow region in the valley and this is not fully represented in the ADMS model. This is not an issue which would be experienced at Portland as there are no valleys present.

The Tracy Power Plant validation study does not show that the ADMS model underestimates observed predictions at elevated receptors associated with gradients, merely that the model does not perform well at a single point in the atmosphere well above ground level. At ground level, the model performs well.

[7] CERC, ADMS 5 Complex Terrain Validation Tracy Power Plant, November 2016

In conclusion it is acknowledged that the ADMS model may not be suitable in extremely complex terrain. However, as shown there is only a very small area of the calculated flow field (the study area) where the terrain slopes are greater than the recommended levels. The CERC model validation study has shown that in a similar setting the model performs well. Whilst there are other studies which show less favourable validation in complex terrain these are not considered to be representative of the Portland area. The validation studies do not indicate that the level of uncertainty would affect the conclusions of the DMA. The additional technical note produced by CERC sets out why CERC considers that the use of ADMS is entirely appropriate as the model has been designed for these types of locations.

4 Sensitivity analysis

The DMA includes full details of the input parameters used. As set out in in section 6 of the DMA, a sensitivity analysis of the choice of surface roughness length for the dispersion site and terrain data was not included as it was deemed that it would be appropriate to model taking into account both the variable terrain and surface roughness lengths across the area of interest, rather than using a single value. This section details the sensitivity of the predicted impacts to the choice of inputs, specifically the choice of:

- Minimum Monin-Obukov length;
- Surface roughness length;
- Terrain data;
- Meteorological data; and
- Dispersion model.

4.1 Minimum Monin-Obukov length

The Monin-Obukov length provides measure of the stability of the atmosphere. In urban areas there is a significant amount of heat generated from buildings and traffic which warms the air this is known as the urban heat island effect. This has the effect of preventing the atmosphere from ever becoming very stable. In general, the larger the area, the more heat is generated and the stronger this effect becomes. This means that in stable conditions the Monin-Obukov length will never fall below a minimum value, the larger the city, the larger the minimum value.

ADMS has a function to be able to set the minimum Monin-Obukov length which allows the model to account for the urban heat island effect which is not reflected in the meteorological data.

The value for the Portland meteorological site used in the dispersion model is considered to be representative of the local area given that the site is located away from any built-up area and there is not likely to be any significant warming effect from the built environment. Therefore, the sensitivity of the model results to the choice of minimum Monin-Obukov length for the meteorological site has not been carried out.

The value for the dispersion site was selected as 10 m in the DMA. This is the value recommended in the ADMS model interface for areas described as “small towns”, such as Portland. The other values recommended in the ADMS interface are:

- Default value for rural areas = 1 m
- Mixed urban / industrial areas = 30 m
- Cities and large towns = 30 m
- Large conurbations > 1 million = 100 m

Clearly the area is not a large conurbation of more than 1 million and so a Monin-Obukov length of 100 m would be entirely inappropriate. Therefore, the dispersion model has been re-run with a minimum Monin-Obukov length for the dispersion site set to the default value or 1m and 30 m to determine the sensitivity of the predicted results to the choice of this parameter.

The following table presents the annual mean, maximum 1-hour, 99.79%ile of 1-hour and maximum 24-hour concentration for the point of maximum impact, all as a percentage of the predicted concentration using the assumption in the original dispersion modelling.

Table 4: Minimum Monin-Obukov Length

Minimum Monin-Obukov length	Percentage of value calculated using assumptions in DMA			
	Annual mean	Maximum 1-hour mean	99.79%ile of 1-hour mean	Maximum 24-hour mean
Point of maximum impact				
Default – rural	99%	89%	100%	100%
10 m	100%	100%	100%	100%
30 m	101%	106%	100%	100%
Maximum on land				
Default – rural	99%	89%	100%	100%
10 m	100%	100%	100%	100%
30 m	101%	106%	100%	100%
Maximum at Portland eco site				
Default – rural	99%	81%	100%	100%
10 m	100%	100%	100%	100%
30 m	104%	106%	100%	100%
Maximum at Chesil eco site				
Default – rural	99%	100%	100%	100%
10 m	100%	100%	100%	100%
30 m	110%	111%	100%	100%
Note: Original DMA assumed a minimum Monin-Obukov length for the dispersion site of 10m.				

As shown the choice of minimum Monin-Obukov length has very little effect on the maximum 24-hour mean or 99.79%ile of 1-hour mean. The maximum 1-hour and annual mean impact varies slightly with a slightly greater impact with the higher minimum Monin-Obukov length.

The contour plots presented in Figure 6 to Figure 8 contained in Appendix A show that there is very little difference in the distribution of emissions on an annual mean or 24-hour basis. There is some difference in the distribution of peak 1-hour concentrations with the peak concentration predicted to occur closer to the stack with the higher minimum Monin-Obukov length.

The value of 10 m is considered appropriate for the modelling domain given the nature of the local area. However, if a higher value was to be used, which would indicate a larger urban heat island effect, the peak 1-hour concentration would be predicted to be slightly higher than that presented in the DMA. When considering the impact in relation to the AQAL the peak 1-hour nitrogen dioxide concentration increases from 6.1% to 6.4% of the AQAL if operating at the daily ELV, but the 99.79 percentile impact does not change.

Therefore, the choice of minimum Monin-Obukov length is not considered to have a significant effect on the predicted impacts.

4.2 Surface roughness

Surface roughness length is proportional to the average height of the roughness elements of the surface. This is the height at which the mean horizontal wind speed is zero and is used to define the wind-speed profile with height.

The ADMS user interface includes the following recommended values for specific land coverings:

- Sea = 0.0001
- Short grass = 0.005 m
- Open grassland = 0.02 m
- Root crops = 0.1 m
- Agricultural (min) = 0.2 m
- Agricultural (max) = 0.3 m
- Parkland, open suburbia = 0.5 m
- Cities, woodlands = 1 m
- Large urban areas = 1.5 m

4.2.1 Meteorological site

In the DMA, the surface roughness length for the meteorological site was set to 0.0001 m which is appropriate for areas of sea. This is considered to be representative of the 1 km square around the observation site, given that the prevailing wind direction would mean that the winds would come from the sea which is located only just over 200 m from the observation site (as shown in Figure 20 in Appendix A). However, closer to the observation site a higher roughness value could be deemed more appropriate. The model has been re-run changing the surface roughness value for the observation site to 0.005 m which is appropriate for short grass. Given the nature of the headland, this is considered to be the most representative surface roughness value for the immediate surroundings of the observation site and is the highest value which could be reasonably justified.

The following table presents the annual mean, maximum 1-hour, 99.79%ile of 1-hour and maximum 24-hour concentration based on the modelled NOx release rate for the point of maximum impact as a percentage of the predicted concentration using the assumption in the original dispersion modelling. Figure 9 to Figure 11 set out in Appendix A show the distribution of emissions.

Table 5: Surface Roughness Length - Met Site

Surface roughness length	Percentage of value calculated using assumptions in DMA			
	Annual mean	Maximum 1-hour mean	99.79%ile of 1-hour mean	Maximum 24-hour mean
Point of maximum impact				
0.0001 m	100%	100%	100%	100%
0.005 m	114%	87%	102%	108%
Maximum on land				
0.0001 m	100%	100%	100%	100%
0.005 m	114%	87%	102%	108%
Maximum at Portland eco site				
0.0001 m	100%	100%	100%	100%

Surface roughness length	Percentage of value calculated using assumptions in DMA			
	Annual mean	Maximum 1-hour mean	99.79%ile of 1-hour mean	Maximum 24-hour mean
0.005 m	140%	88%	103%	140%
Maximum at Chesil eco site				
0.0001 m	100%	100%	100%	100%
0.005 m	105%	116%	96%	106%
Note: Original DMA assumed a surface roughness length for the meteorological site of 0.001 m.				

As shown the choice of surface roughness length for the meteorological site has a slight effect on the predicted impact. The predicted maximum impact is generally greater with the higher surface roughness value for the meteorological site with the exception of the peak 1-hour concentration which is lower closer to the stack. Whilst the change as a percentage of the value used in the DMA is in some instances up to 40% greater (maximum 24-hour mean), the distribution of impacts is similar as shown in Figure 9 to Figure 11 contained in Appendix A.

The peak annual mean nitrogen dioxide impact would increase from 1.4% of the AQAL to 1.6%, but this is not considered to be a significant difference. The annual mean impact at Portland ecological site would increase from 1.3% to 1.8% and the daily mean impact from 12.6% to 17.6%. Contour plots of the annual mean and daily mean oxides of nitrogen impact as a percentage of the Critical Level are provided in Figure 12 and Figure 13 of Appendix A. This demonstrates that, whilst there is a difference in the peak impact, the change in distribution of impacts is marginal.

Therefore, whilst the choice of surface roughness length for the meteorological site has some effect, it is not considered to be significant, and this does not change the conclusions of the assessment.

4.2.2 Dispersion site

The modelling domain has significant differences in the surface roughness with the sea areas having a very low value compared to the higher values in the built-up environment. A variable surface roughness file was generated using the recommended values from the ADMS interface and analysis of the aerial mapping of the area. A visualisation of the surface roughness values used in the original modelling was set out in Figure 2 of the DMA and has been reproduced in Figure 14 contained in Appendix A.

Due to the significant differences in surface roughness, across the modelling domain the use of a constant surface roughness value was not deemed to be appropriate. However, it is acknowledged that the model could be sensitive to the choice of surface roughness length used.

As an alternative source of surface roughness length, the land-use class for each point in the file has been extracted from the CORINE Land Cover database[8] and cross-referenced with the most likely surface roughness length value[9]. The following tables sets out the land use classifications within the CORINE Land Cover database identified within the extents needed for modelling

8 https://land.copernicus.eu/pan-european/corine-land-cover

9 Taken from "Roughness length classification of Corine Land Cover classes", Megajoule Consultants, 2007.

purposes and the associated surface roughness length. A visual representation is also provided in Figure 14 contained in Appendix A.

Table 6: Surface Roughness Lengths Used for Different Land Use Classes Identified in Domain

Land Use Classification	CORINE 2018 Land Use Codes	Surface Roughness Length (m)
Coastal lagoons	521	0.0001
Sea and ocean	523	0.0001
Beaches, dunes, sands	331	0.0003
Mineral extraction sites	131	0.005
Sparsely vegetated areas	333	0.005
Natural grasslands	321	0.1
Pastures	231	0.3
Discontinuous urban fabric	112	0.5
Industrial or commercial units	121	0.5
Port areas	123	0.5
Broad-leaved forest	311	0.75

The CORINE Land Cover database has allocated the hillside to the west of the Portland ERF to be code 311 (“broadleaved forest”) and the recommended surface roughness value is 0.75 m. However, this area is actually scrub habitat and it is considered that a surface roughness value of 0.5 is more appropriate, albeit still on the high side. As such, a modified variable surface roughness file, reducing the surface roughness of the land to the west of the Portland ERF to 0.5 m, has also been generated. A visualisation of this modified surface roughness file is provided in Figure 14 contained in Appendix A.

The dispersion model has been re-run with a surface roughness file based on the CORINE Land Cover database (and the modified version) to determine the sensitivity of the choice of surface roughness length to the predicted results.

The following table presents the annual mean, maximum 1-hour, 99.79%ile of 1-hour and maximum 24-hour concentration for the point of maximum impact as a percentage of the predicted concentration using the assumption in the original dispersion modelling. Figure 15 to Figure 17 of Appendix A show the distribution of emissions.

Table 7: Surface Roughness - Modelling Domain

Surface roughness length	Percentage of value calculated using assumptions in DMA			
	Annual mean	Maximum 1-hour mean	99.79%ile of 1-hour mean	Maximum 24-hour mean
Point of maximum impact				
Original	100%	100%	100%	100%
Corine	102%	103%	100%	92%

Surface roughness length	Percentage of value calculated using assumptions in DMA			
	Annual mean	Maximum 1-hour mean	99.79%ile of 1-hour mean	Maximum 24-hour mean
Modified Corine	105%	106%	101%	101%
Maximum on land				
Original	100%	100%	100%	100%
Corine	102%	103%	100%	92%
Modified Corine	105%	106%	101%	101%
Maximum at Portland eco site				
Original	100%	100%	100%	100%
Corine	94%	103%	98%	103%
Modified Corine	102%	99%	101%	103%
Maximum at Chesil eco site				
Original	100%	100%	100%	100%
Corine	95%	104%	101%	102%
Modified Corine	94%	102%	101%	103%

As shown the choice of surface roughness length has a minor effect on the predicted impacts, with some increasing and some decreasing, and the distribution of impacts is similar.

When considering the impact in relation to the AQAL, Critical Levels and Critical Loads the change in impact is minimal and would not significantly change the impacts presented in the DMA.

Therefore, whilst the choice of surface roughness length for the dispersion site has some effect this is not considered to be significant.

4.3 Terrain

The terrain data used for the model was taken from the Ordnance Survey (OS) Terrain 50 dataset. This is clearly the most appropriate data available for the UK and so no other data has been used. However, the terrain data is processed by ADMS and the sensitivity of the model to this processing has been considered.

A discussion of how ADMS treats terrain is provided in Section 3.2. The CERC technical specification explains that for each wind direction a wind-aligned rectangle is described around the terrain points. An internal calculation grid is set up over the rectangle. The resolution of this grid can be specified by the user. A finer grid can lead to a more accurate representation of the terrain, but will also significantly increase the run time of the model. Therefore, in the DMA, a grid resolution of 128 x 128 was used as this was considered to be a reasonable balance between accuracy and runtimes.

The dispersion model has been re-run with a various flow field resolutions to determine the sensitivity of the choice of resolution to the predicted results. The following table presents the annual mean, maximum 1-hour, 99.79%ile of 1-hour and maximum 24-hour concentration as a percentage of the predicted concentration using the assumption in the original dispersion modelling. Figure 18 to Figure 20 contained in Appendix A show the distribution of emissions.

Table 8: Terrain Resolution

Terrain grid resolution	Percentage of value calculated using assumptions in DMA			
	Annual mean	Maximum 1-hour mean	99.79%ile of 1-hour mean	Maximum 24-hour mean
Point of maximum impact				
32 x 32	77%	82%	81%	71%
64 x 64	95%	88%	91%	97%
128 x 128	100%	100%	100%	100%
256 x 256	100%	105%	103%	100%
Maximum on land				
32 x 32	77%	82%	81%	71%
64 x 64	95%	88%	91%	97%
128 x 128	100%	100%	100%	100%
256 x 256	100%	105%	103%	100%
Maximum at Portland eco site				
32 x 32	83%	82%	88%	82%
64 x 64	96%	89%	93%	87%
128 x 128	100%	100%	100%	100%
256 x 256	101%	104%	101%	100%
Maximum at Chesil eco site				
32 x 32	96%	93%	95%	94%
64 x 64	99%	98%	97%	98%
128 x 128	100%	100%	100%	100%
256 x 256	100%	101%	98%	101%

As shown the choice of terrain resolution for the flow field has a significant effect on the predicted impacts. The maximum predicted impacts using a coarser grid (32 x 32 and 64 x 64) are lower. The maximum predicted impacts using the 128 and 256 grid resolutions are similar as is the distribution of emissions. However, the 256 resolution model took significantly longer to run.

Therefore, there is limited benefit of running all the models with the 256 x 256 resolution flow field resolution. The use of the 128 x 128 resolution flow field grid as used in the DMA is considered appropriate and the use of the more detailed resolution would not significantly change the predicted impacts.

4.4 Meteorological data

4.4.1 Sources of data

The dispersion modelling was carried out using 5 years of weather data from the Isle of Portland observation station. This was considered appropriate for use given that the observation station is located in a similar setting to the dispersion site, monitors all of the data needed for a dispersion model, and has a high level of data capture. The location of the meteorological observation site is presented on Figure 21 contained in Appendix A.

Wind roses of the data from the Isle of Portland observation station are presented in Figure 22 contained in Appendix A. This shows that at the Isle of Portland observation station generally the winds are from the south-west but with a large westerly component. This is expected given the location to the south of the UK on a headland protruding into the English Chanel. Using this data, the prevailing wind direction would mean that generally emissions from the Portland ERF would travel in a north-westerly direction across the sea and away from any sensitive receptors. However, there is also a small contribution of winds from the east and north-east. During these periods emissions from the Portland ERF would be blown towards the land and towards sensitive receptors.

An additional breakdown of the wind data has been carried out for this sensitivity study to determine the seasonal variability in the wind direction and speed. This shows that generally the more easterly winds (i.e. those which would mean emissions from the Portland ERF would travel towards sensitive receptors) occur in the spring and summer months.

In the DMA (section 4.3.2), it was explained that an alternative source of meteorological data from the harbour was available. The location of this site is shown on Figure 21 of Appendix A. This data is available covering the period from March 2016 but only includes wind speed and direction. As such, this was not sufficient to carry out the dispersion modelling as parameters such as temperature, relative humidity and cloud cover were not available. However, a high-level comparison of the wind roses was carried out which demonstrated that the wind data was similar between the datasets (i.e. the wind speed and direction was comparable) and it was concluded that using the complete dataset with all the parameters needed for modelling purposes and over a 5-year period was appropriate.

Further analysis of the meteorological data has been carried out for this sensitivity study analysing the seasonal variability in the wind data. This has focussed on 2017 and 2018 so a direct comparison can be made of the full year of data from each site. Annual and seasonal wind roses of the wind data recorded at Portland Harbour can be found in Figure 23 of Appendix A. As shown, on an annual basis these are similar to that from the Isle of Portland observation station. However, there is a slightly larger contribution of winds from the east during the spring and summer than for the Isle of Portland dataset.

The OpenAir package[10] has been used to analyse if there is any bias in the wind speed and direction in the Portland Harbour data compared to the Isle of Portland data as used in the DMA. The results are presented as a wind rose, with an angle of 0° (shown as pointing north) meaning no bias and an angle of 30° meaning that the Portland Harbour data for that hour is 30° greater than the Isle of Portland dataset. This is shown in Figure 24 contained in Appendix A. This confirms that the datasets are broadly similar.

- In 2017, around 80% of the wind measurements were within 20° of each other, with an overall bias of 7° clockwise.
- In 2018, around 75% of the wind measurements were within 20° of each other, with an overall bias of 4° clockwise.
- The difference in wind speeds is about 0.5 m/s on an annual basis.

The differences are explained by the location of each site in relation to the land mass. The Portland Harbour site is located off the breakwater and as such is not influenced by any land when the wind

[10] Carslaw, D. C. and K. Ropkins, (2012) openair --- an R package for air quality data analysis. Environmental Modelling & Software. Volume 27-28, 52-61

direction is from the east, but is likely to see slightly fewer and slower winds from the south-west. The Isle of Portland observation station is located on the west of the headland and based on the topography it is likely that winds from the east would be slowed down by the land mass.

4.4.2 Sensitivity

Neither weather station will be perfectly representative of the winds at the Portland ERF site, which is also influenced by the land mass. It is likely that the true position will lie between the two. Therefore, the sensitivity of the choice of meteorological data has also been carried out. To do so, meteorological datasets in ADMS format has been created for 2017 and 2018 by substituting the wind speed and direction in the Isle of Portland dataset with that from Portland Harbour, but using the other parameters (temperature, relative humidity and cloud cover) from the Isle of Portland dataset as these would not be expected to vary significantly across the Isle.

The following table presents the annual mean, maximum 1-hour, 99.79%ile of 1-hour and maximum 24-hour concentration as a percentage of the predicted concentration using the Isle of Portland data. Figure 25 to Figure 27 contained in Appendix A show the distribution of emissions.

Table 9: Met Data Source

Scenario	Percentage of value calculated using assumptions the Isle of Portland data			
	Annual mean	Maximum 1-hour mean	99.79%ile of 1-hour mean	Maximum 24-hour mean
Point of maximum impact				
Harbour 2017	119%	134%	114%	141%
Harbour 2018	130%	117%	107%	104%
Maximum on land				
Harbour 2017	119%	134%	114%	141%
Harbour 2018	130%	117%	107%	104%
Maximum at Portland eco site				
Harbour 2017	115%	130%	121%	108%
Harbour 2018	178%	117%	107%	158%
Maximum at Chesil eco site				
Harbour 2017	57%	96%	89%	64%
Harbour 2018	86%	112%	96%	195%

As shown the choice of meteorological data has an effect on the distribution of emissions, which would be expected due to the slight differences in the wind speed and direction between the two datasets. Generally, the maximum predicted impacts are higher using the Harbour data. Although the percentage change in the peak predicted impacts is a useful statistic, consideration of the extent of impacts and impact in relation to the assessment level is also important.

The following table provides a break-down of the annual mean and daily mean oxides of nitrogen impact as a percentage of the Critical Level at the Portland and Chesil ecological sites using each of the five years of data from the Isle of Portland (as used in the DMA) and the two years of data from Portland Harbour.

Table 10: Met Data Sensitivity - Effect on on Ecological Impacts

Met data	Annual mean impact (as % of CL)		Daily mean impact (as % of CL)	
	Portland	Chesil	Portland	Chesil
2014 Isle of Portland	0.9%	0.5%	9.6%	3.8%
2015 Isle of Portland	0.8%	0.5%	14.3%	3.4%
2016 Isle of Portland	1.0%	0.5%	15.3%	3.8%
2017 Isle of Portland	0.9%	0.5%	11.3%	5.4%
2018 Isle of Portland	1.3%	0.5%	12.6%	3.8%
2017 Portland Harbour	1.0%	0.3%	12.2%	3.4%
2018 Portland Harbour	2.2%	0.5%	19.8%	7.4%
Average using all data	1.2%	0.5%	13.6%	4.4%
Average using Isle of Portland only	1.0%	0.5%	12.6%	4.0%

Figure 28, shows the areas where the annual mean NOx impact is greater than 1% of the Critical Level, and Figure 29 where the maximum daily mean NOx impact is greater than 10%, using the 5 years of data from the Isle of Portland (as used in the DMA) and the two years of data from Portland Harbour. As shown, using the 2018 data from Portland Harbour results in a larger area of the land where impacts cannot be screened out as insignificant. However, this is away from the port area and the hillside. Using the 2017 data from Portland Harbour, the 1% contour is within the 1% contour using the 2018 data from the Isle of Portland. Therefore, whilst there are some differences between the predicted impacts the change is considered to be within the variability of using different years of meteorological data and the results are considered to be broadly similar.

Therefore, whilst the impacts are different using the wind data from the Portland Harbour, the wind data is not significantly different, the model results are broadly similar and the conclusions of the DMA would be the same.

4.5 Dispersion model

An alternative gaussian plume model is AERMOD. This was developed by AERMIC a collaborative group formed of the American Meteorological Society and the US Environmental Protection Agency (USEPA).

A significant difference between ADMS and AERMOD is the treatment of terrain. Within AERMOD, the effect of terrain is modelled by scaling the sum of two possible extreme plume states. As detailed in the technical response from CERC[11]:

> *"AERMOD …. uses a weighted average of terrain following and sea-level following plumes, effectively ensuring a smooth transition between the two extreme cases (so no splitting into*

[11] CERC, Technical Note: Portland Energy Recovery Facility.

two layers). In both cases, the plume trajectories follow a straight line in the wind direction, meaning that the sea-level following plume can end up going 'through' the hill and out the other side. This means it includes some effects of plume impaction even for only moderately stable flows, resulting in totally unrealistic elevations in concentration on hillsides in such conditions. Such increases in concentration are unphysical and should be ignored except possibly for hills of many hundreds of metres in height, when ADMS would also model plume impaction"

Therefore, Fichtner does not consider that AERMOD is a suitable model in this instance where variations in meteorological effects are significant due to the presence of terrain (and variable surface roughness). The dispersion model has been re-run with AERMOD to substantiate this.

The following table presents the annual mean, maximum 1-hour, 99.79%ile of 1-hour and maximum 24-hour concentration as a percentage of the predicted concentration using ADMS. Figure 30 to Figure 32 contained in Appendix A show the distribution of emissions. Contours have been presented both with and without the effects of terrain included in the model.

Table 11: ADMS vs AERMOD

Scenario	Percentage of value calculated using ADMS			
	Annual mean	Maximum 1-hour mean	99.79%ile of 1-hour mean	Maximum 24-hour mean
AERMOD				
Point of maximum Impact	153%	631%	347%	325%
Maximum on land	153%	631%	347%	325%
Maximum at Portland eco site	281%	660%	365%	365%
Maximum at Chesil eco site	61%	68%	95%	73%

The maximum hourly average predicted using AERMOD is over 6 times higher than for ADMS at the point of maximum impact, which for AERMOD is on the rising terrain close to the stack. These short term differences lead to a significantly higher annual mean impact. The contour plots clearly show this but also show that without the effect of terrain the results are comparable between ADMS and AERMOD, confirming that the differences are primarily due to the different approaches to terrain modelling.

In contrast, AERMOD predicts lower impacts around the headland at Chesil and The Fleet SAC. This is because ADMS stimulates the flow of the airflow (and emissions) around the terrain, unlike AERMOD which assumes straight line transport.

Therefore, the choice of model (ADMS or AERMOD) has a significant effect on the predicted impact with the impact using AERMOD significantly higher than ADMS. However, Fichtner considers that AERMOD is not a suitable model in this situation as it is unable to account for the terrain, as explained by CERC. Therefore, Fichtner considers that the results from AERMOD should be ignored.

5 Modelling Uncertainty

The Environment Agency has requested that the level of uncertainty in the predictions is estimated. To do so, the results of the model validation documentation and the sensitivities have been considered, and the conservatism in the modelling has been reviewed.

5.1 Uncertainty

The validation documentation shows that the levels of uncertainty in the ADMS model with respect to the peak predicted concentrations are typically within 10% of the hourly and daily concentrations, with accuracy over long time frames expected to be at least as high as this.

The sensitivity analysis shows that varying the Monin-Obhukov length and changing the approach to surface roughness leads to changes in the peak results of around 5-15%, which is a similar order to the modelling uncertainty.

Variations in weather data are more complex and feed into the inter-annual variability discussed below.

5.2 Conservative assumptions

In order to allow for modelling uncertainty, the DMA includes a number of conservative assumptions. These are explained and quantified in this section.

5.2.1 Interannual variability

The detailed results tables presented in the DMA included the breakdown of the peak concentration using each year of meteorological data. The maximum predicted impact over the 5-years of data was then used as the basis of the assessment.

Although the interannual variability in the data was presented (in Table 12 and Table 13 in the DMA), the variability of the results was not discussed. This section expands upon the detailed results tables presented in the DMA. The following table provides a breakdown of the range of the predicted impacts for each averaging period. Within this analysis “Portland eco site” refers to the grid points contained within the Isle of Portland to Studland Cliffs SAC and Isle of Portland SSSI, and “Chesil eco site” refers to the grid points contained within Chesil and The Fleet SAC and SSSI.

Table 12: Interannual Variability

Averaging time	**Impact as percentage of maximum**	
	Minimum	**Average**
Point of maximum impact		
Annual mean	71%	88%
Max 1-hour	80%	95%
99.79%ile 1-hour	86%	94%
99.73%ile 1-hour	83%	92%
99.9%ile 15-min	88%	93%
Max 24-hour	57%	81%

Averaging time	Impact as percentage of maximum	
	Minimum	Average
Maximum at Portland eco site		
Annual mean	67%	78%
Max 24-hour	63%	82%
Max weekly mean	56%	81%
Maximum at Chesil eco site		
Annual mean	87%	94%
Max 24-hour	64%	75%
Max weekly mean	76%	85%

For the point of maximum impact, the annual average over all five years of weather data is 88% of the highest year, with a range from 71% to 100%. This suggests that using the peak year introduces a conservatism of around 10%. There is less inter-annual variability for shorter-term impacts but still a 5% conservatism is introduced.

At the Portland ecological site, the annual average over all five years of weather data is 78% of the highest year, with a range from 67% to 100%. For ecological impacts the long-term deposition rate of pollutants is important, allowing for interannual variability assuming the impact is the maximum is extremely conservative and on average concentrations would be lower.

5.2.2 Plant availability

The DMA was based on the assumption that the Portland ERF would operate for 100% of the time. This is a very conservative assumption. The plant would be off for periods of maintenance with the expected annual availability of approximately 8,000 hours per year (91%).

5.2.3 Emission limits

The DMA was based on the assumption that the Portland ERF would operate at the long term emission limits for 100% of the time. The ERF will be designed to achieve the limits so would need to operate below these with a safety margin, which means that the actual emissions would be at least 10% below the emission limits. For some pollutants, operating data from other ERFs shows that emissions would be even lower than this.

5.2.3.1 VOCs

The analysis assumed that the entire TOC emissions consist of only benzene or 1,3-butadiene. This is an extremely conservative assumption as the emissions would consist of a range of VOCs and typically emissions are well below the daily ELV of 10 mg/Nm^3. Fichtner has analysed annual performance reports submitted to the EA from all of the energy from waste plants across England in 2019. This has shown that, in 2019, the maximum monitored daily VOC concentration across the entire fleet was 4.3 mg/Nm^3 (or 43% of the ELV) and the average was 0.53 mg/Nm^3 (or 5.3% of the ELV).

5.2.3.2 Cadmium

As set out in Section 7.4 of the DMA, the Waste Incineration BREF shows that the average concentration recorded from UK plants equipped with bag filters was 1.6 µg/Nm^3 (or 8% of the ELV of 0.02 mg/Nm^3), the highest recorded concentration of cadmium and thallium was 14 µg/Nm^3 (or 70% of the ELV of 0.02 mg/Nm^3) and only three lines recorded concentrations higher than 10 µg/Nm^3 (or 50% of the ELV of 0.02 mg/Nm^3).

Assuming that the Portland ERF would operate at the level of the average UK plant the impact would be 0.29% of the AQAL at the point of maximum impact using the maximum predicted impact over 5 years of weather data. Taking into account the average concentration using the 5-years of weather data the impact would be reduced to 0.26 % of the AQAL. This still conservatively assumes that the Portland ERF would operate 100% of the year.

5.2.3.3 Acid gases

A lime (or sodium bicarbonate) dosing system is used for the control of acid gases on other energy from waste plants in England. The level of dosing is linked to achieve the emission limit. Hydrogen chloride is usually used as the marker and the dosing linked to achieving the limit within about 10%. The level of dosing typically ensures that sulphur dioxide levels are also reduced. The Waste Incineration BREF introduces a lower ELV for hydrogen chloride and sulphur which none of the existing energy from waste plants needs to currently achieve. However, the review of the annual performance reports submitted to the EA from all of the energy from waste plants across England has shown that in 2019 the maximum monitored daily mean sulphur dioxide concentration was 43 mg/Nm^3 (compared to the current ELV of 50 mg/Nm^3) and the average was 14.7 mg/Nm^3. The average monitored concentration was well within the proposed ELV of 30 mg/Nm^3.

In addition to this, it is expected that the dosing rate of lime will be increased at existing UK plants (and at Portland) to achieve the lower hydrogen chloride ELV. This will also result in lower sulphur dioxide levels.

5.2.3.4 Nitrogen oxides and ammonia

Typically, an energy from waste plant uses an SNCR system to control emissions of oxides of nitrogen. An ammonia / urea solution is used and can result in emissions of ammonia (known as ammonia slip). Fichtner has analysed annual performance reports submitted to the EA from all of the energy from waste plants across England. This shows that the lower the level of oxides of nitrogen emissions, the higher the levels of ammonia slip.

The system is designed to inject sufficient ammonia to achieve the emission limit and typically will operate within 10% of the limit for oxides of nitrogen. The levels of ammonia slip vary considerably but all are well within the emission limit. The limit for oxides of nitrogen at Portland ERF is significantly lower than any of the existing plants and so it cannot be confirmed what the likely levels of ammonia would be. However, the plant will be designed to achieve the limits for oxides of nitrogen and ammonia simultaneously with a margin of error, which means that actual emissions will be around 10% less than emission limit.

5.2.4 Short term impacts

For short term impacts (as set out in Section 7.5 of the DMA) it was assumed that the period when the plant would need to operate at the half-hourly ELV would occur for an entire hour, during the worst-case weather conditions for dispersion. Even with this assumption, all short term impacts could be screened out as insignificant with the exception of nitrogen oxides and sulphur dioxide.

This is a highly conservative assumption. In order to achieve the daily ELV, ERFs are operated to achieve the daily ELV for each hour, with only occasional emissions above this.

Furthermore, the half-hourly ELV is that from the IED. The WI BAT Conclusions introduce a lower daily limit for oxides of nitrogen and sulphur dioxide, which mean that the Portland ERF will generally be operating at lower emission levels and so short term excursions above the daily ELV are likely to be lower. The IED half-hourly limit for oxides of nitrogen is 2 times the IED daily limit, whilst the half-hourly limit for sulphur dioxide is 4 times the daily limit. With the reduced ELVs, the half-hourly limit will be 3.3 times the daily ELV for oxides of nitrogen, and 6.7 times the daily ELV for sulphur dioxide. Therefore, it is unlikely that peaks in short term emissions would be this high given that a lower daily ELV needs to be achieved.

A breakdown of the effect of this upon the short-term nitrogen dioxide and sulphur dioxide impacts was presented in Table 17 of the DMA. This showed that if this same ratio is applied to the emissions from the Portland ERF and it is assumed that the plant operates at this level during the worst-case meteorological conditions for dispersion, then the maximum 1-hour impact of nitrogen dioxide and sulphur dioxide is less than 10% of the AQAL. The maximum impact of 15-minute sulphur dioxide emissions remains slightly above 10% of the AQAL but this would be over a very small area. This is not considered to be a significant impact.

5.3 Overall effect on results

The conservative assumptions explained above mean that the overall impacts presented in the DMA will be overestimates.

1. Annual mean impacts are overstated by around 10% due to plant availability, by around 10% when inter-annual variability is considered and by at least 10% when allowing for operation below the emission limits. This means that, overall, the annual mean impacts in the DMA have inbuilt conservatism of at least 30%.
2. For short term impacts, selecting the worst case weather conditions across all five years of weather data introduces conservatism of at least 5%, and assuming operation at the short term ELVs introduces conservatism of as much as 50-70%.
3. The validation documentation shows that the level of uncertainty in the model are on average within 10% of the hourly and daily concentrations, with accuracy over long time frames expected to be at least as high as this.
4. The sensitivity analysis shows that variations in modelling assumptions leads to changes in the peak concentrations of 5-15%.

Therefore, it is considered that the results presented in the DMA are robust as the inbuilt conservatism is of a similar order to the uncertainty in the modelling.

6 Summary and conclusions

This report has been produced to provide clarifications on the approach used in the DMA and to conduct a sensitivity analysis on the effect of the choice of model inputs on the predicted impacts.

A review of the technical and validation documents for the ADMS model has been undertaken and used to explain why it is considered that the ADMS model is appropriate for modelling impacts from the proposed ERF in Portland. This has demonstrated that the location conditions are well within the modelling capabilities. CERC has provided a technical note which explains that the use of the model is entirely appropriate as the model has been designed for these types of locations.

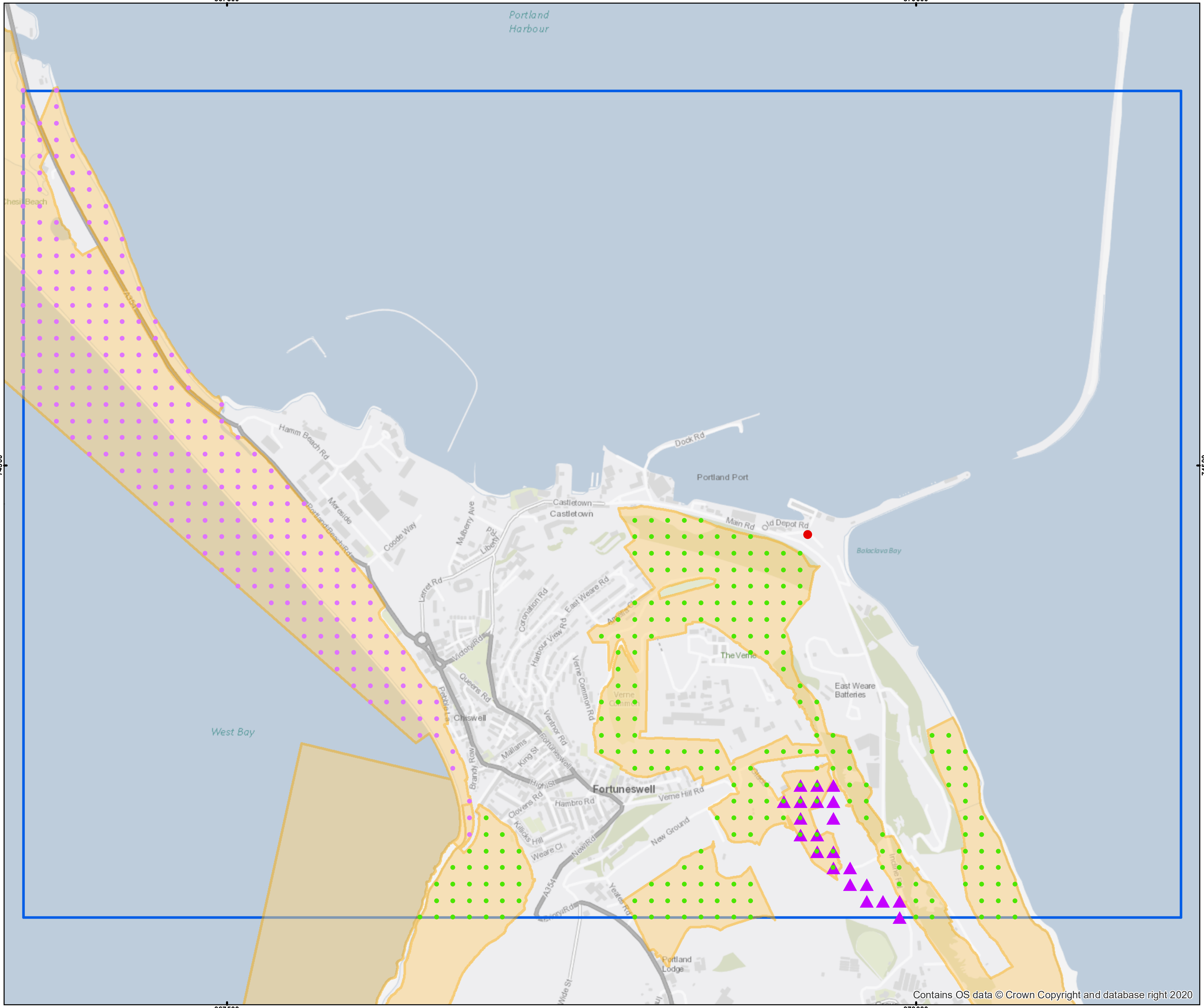
The sensitivity analysis has shown that, whilst the dispersion model is sensitive to the choice of input parameters for the ADMS model, these do not have a significant effect on the predicted results with the distribution of emissions broadly similar. In each case, the conclusions of the DMA would be the same if different input parameters were used.

The choice of model has a significant effect with significantly higher impacts predicted using AERMOD on the area of elevated terrain close to the plant. However, Fichtner considers that AERMOD is not a suitable model for the terrain around the Portland ERF and therefore considers that the results from AERMOD should be disregarded.

An estimation of the uncertainty in the modelling has been carried out to determine whether the uncertainty would affect the conclusions set out in the DMA. This has shown that the overall impacts presented in the DMA are robust as the inbuilt conservatism is of a similar order of uncertainty in the modelling.

Appendices

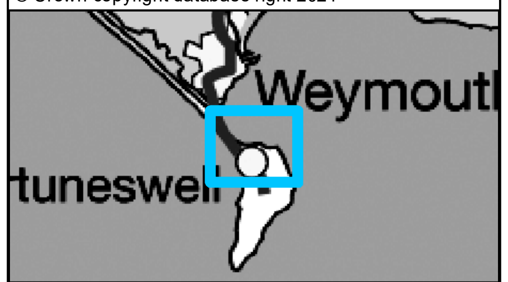
A Figures



Legend

- Chesil and the Fleet
- Portland
- Nicademus Heights
- Main Stack
- SAC
- Output grid extent

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	Figure 3 Ecological Sites
Drawn by: RSF	Date: 15/11/2021



0 0.125 0.25 0.5 km

Scale: 1:13,000

N

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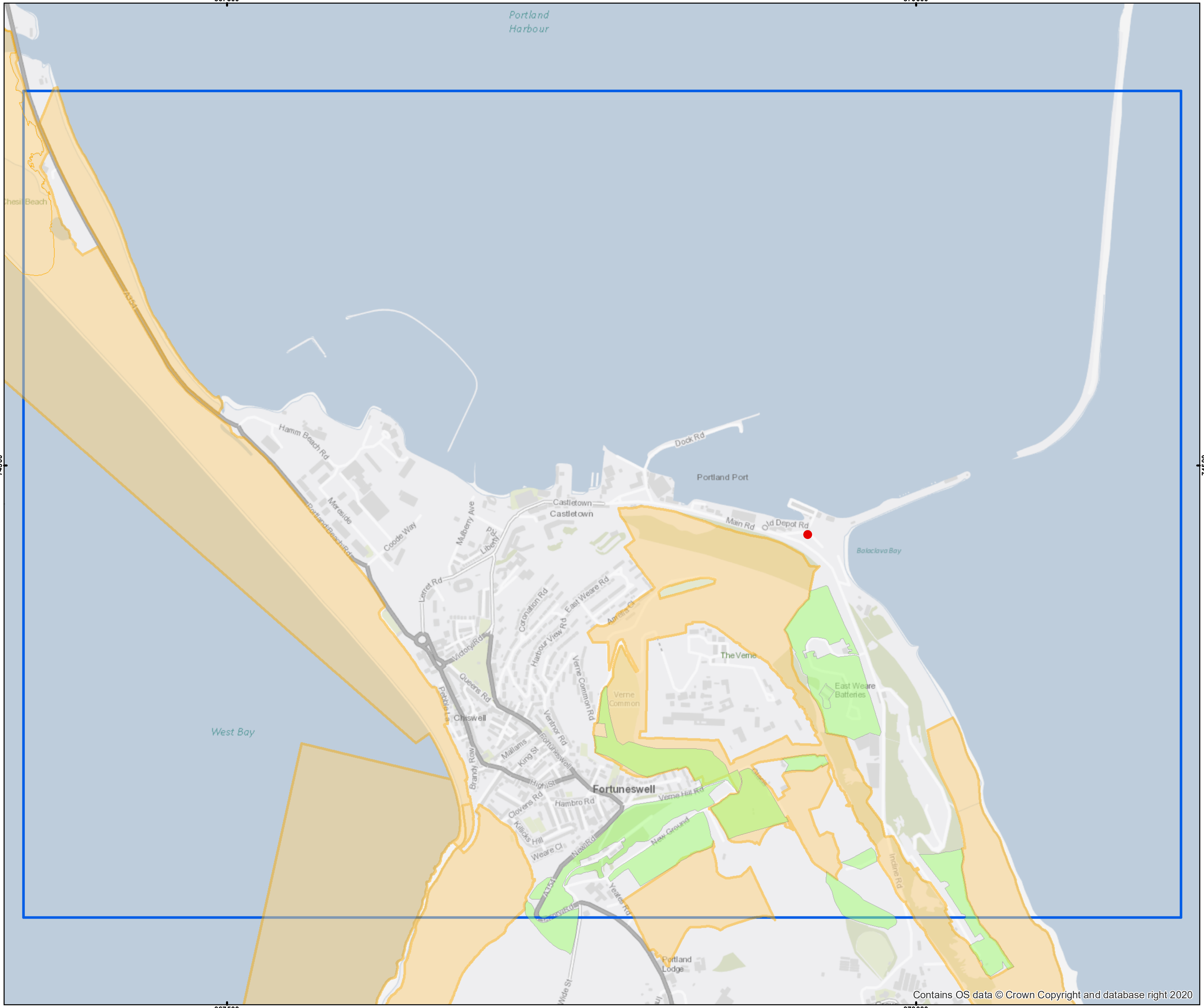


Legend

Main Stack

Local ecological sites

SPA

SAC

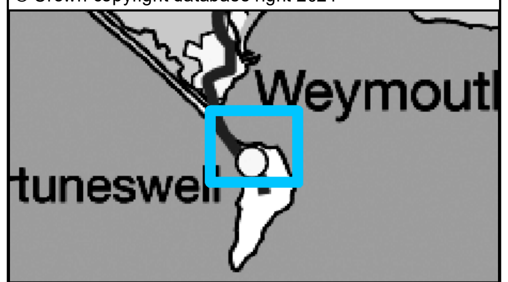
Output grid extent

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953

Title:

Figure 4
Local Ecological Sites

Drawn by: RSF | Date: 15/11/2021



0 0.125 0.25 0.5 km

N

Scale: 1:13,000

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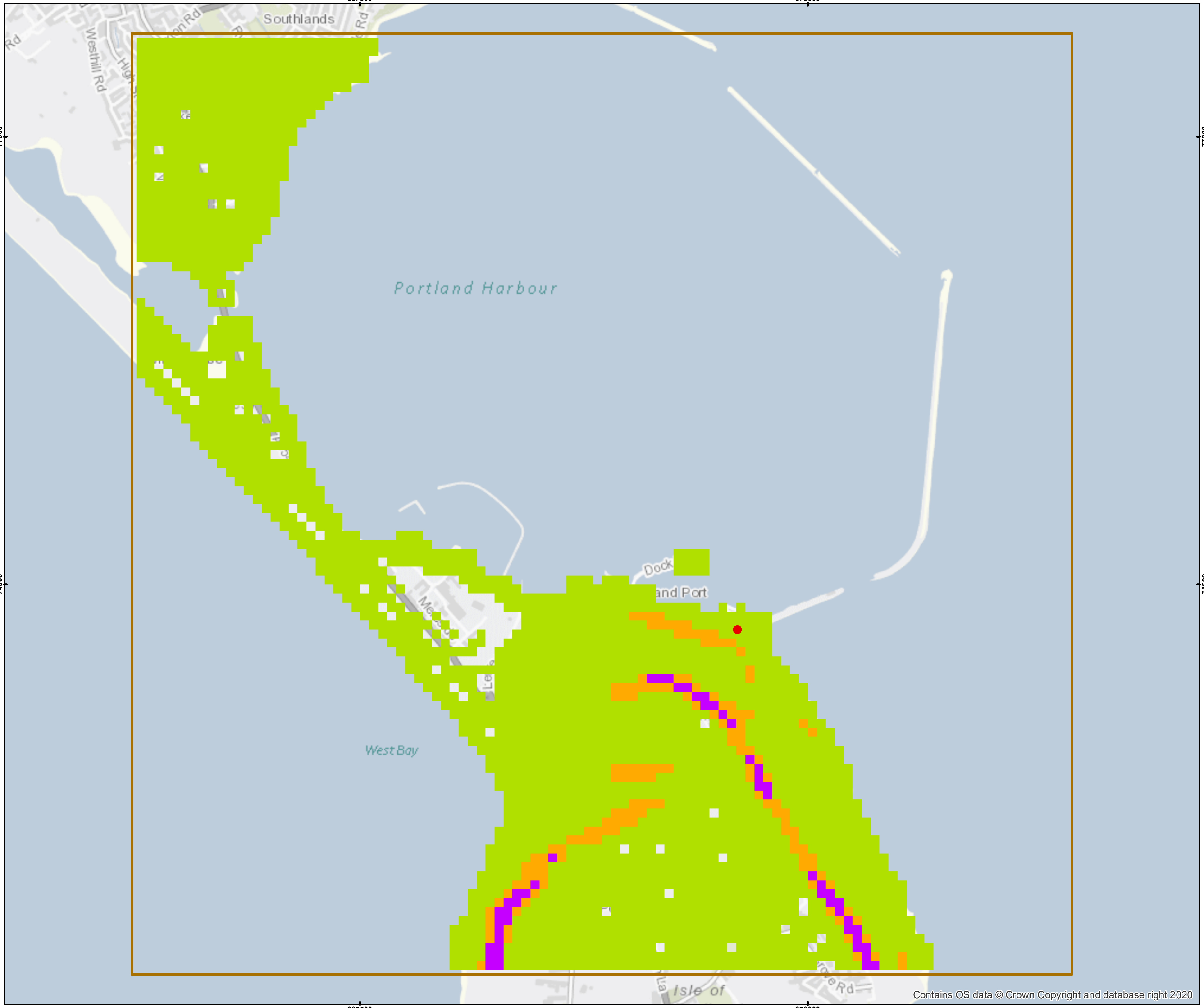


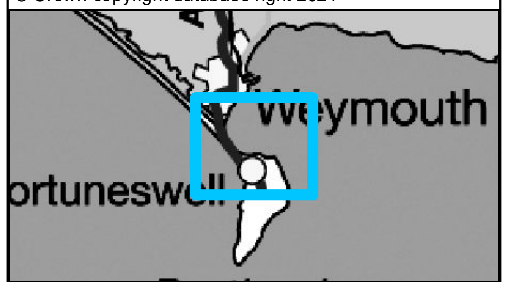
Legend

- Main Stack
- Terrain Extents

Angle of Slope

- 0 - 1
- 1 - 33%
- 33 - 50% i.e. > 1:3
- >50% i.e. > 1:2

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	Figure 5 Slope Analysis
Drawn by: RSF	Date: 15/11/2021



0 0.2 0.4 0.8 km

Scale: 1:20,000

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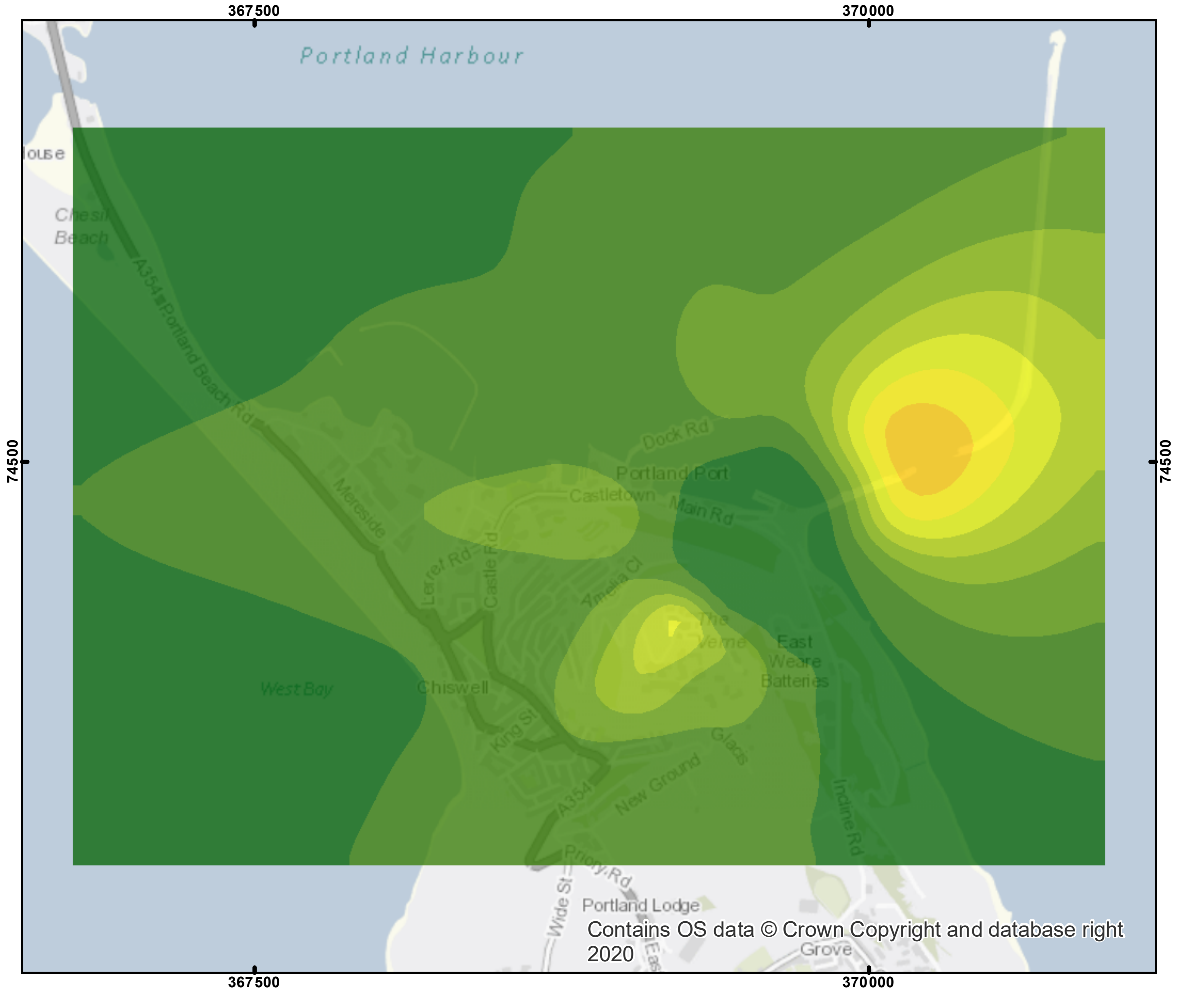
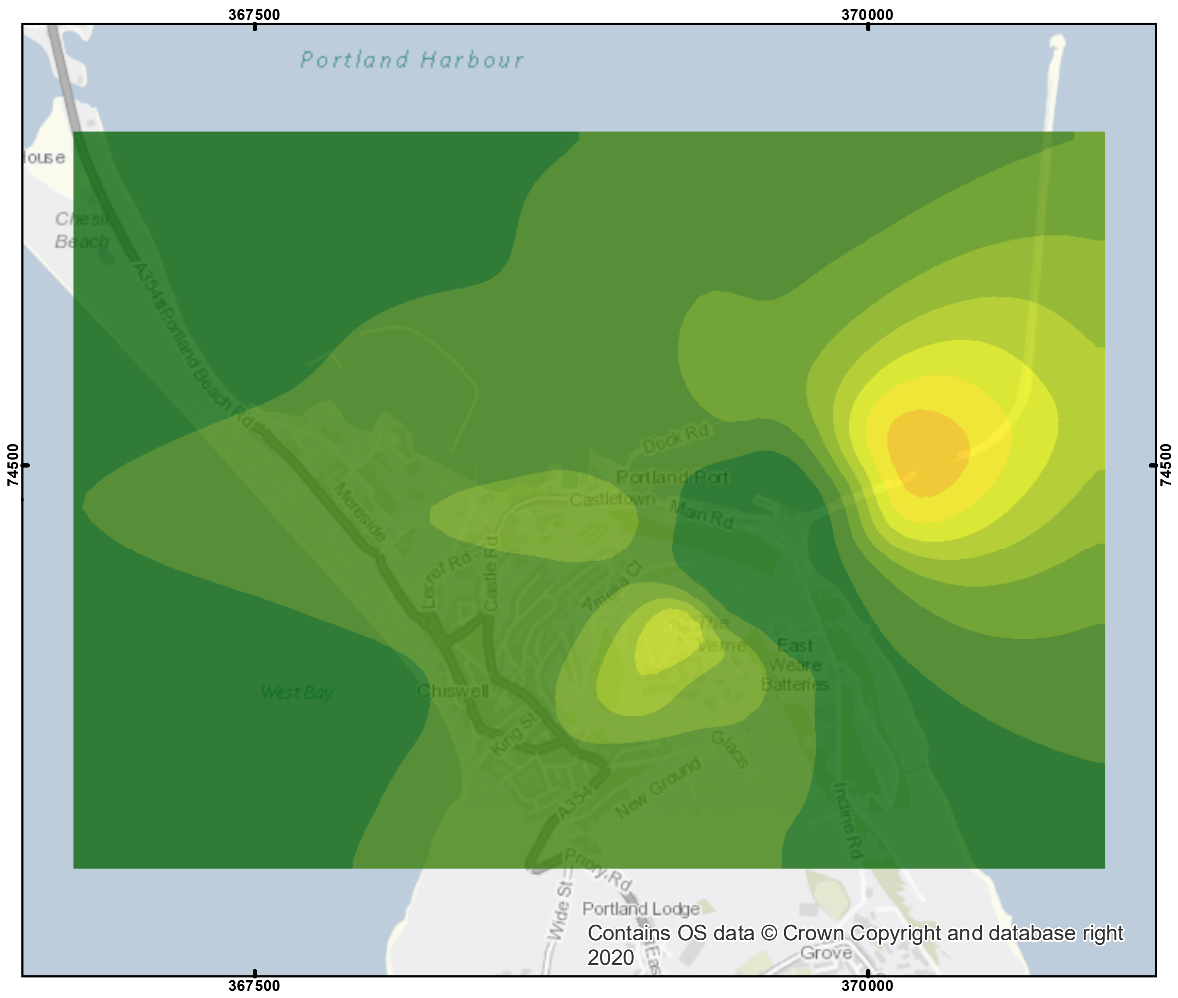
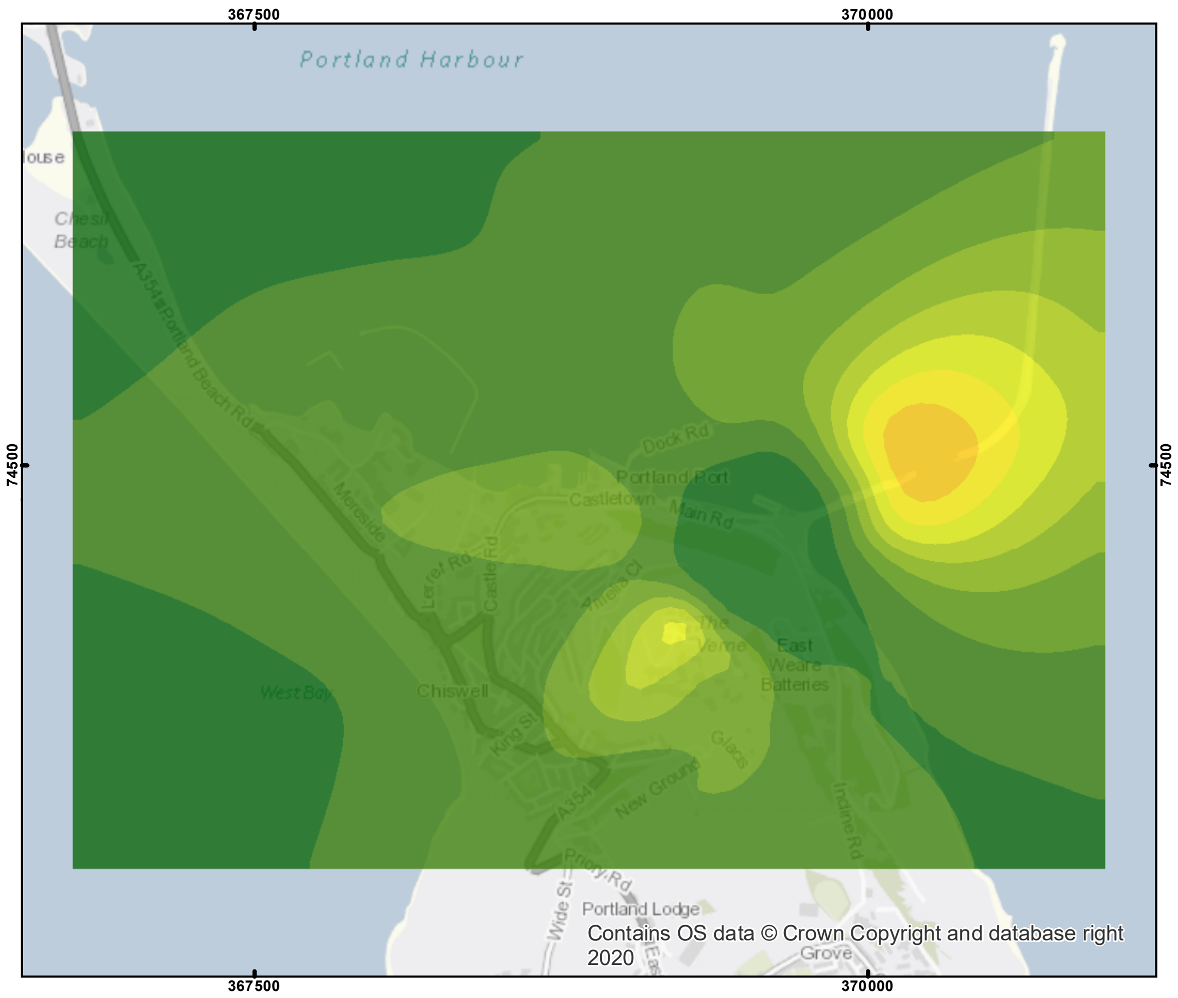
Base



Minimum Monin Obukov Length = 1 m - default



Minimum Monin Obukov Length = 30 m

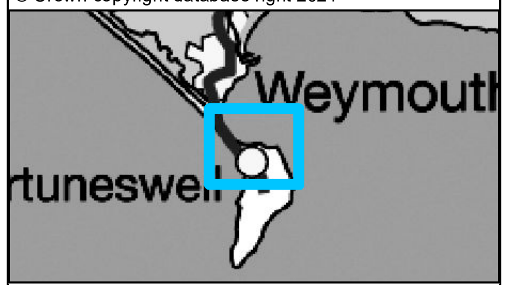


Legend

Annual mean NOx ug/m3

- <0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- 0.8 - 0.9
- 0.9 - 1
- 1 - 1.1
- 1.1 - 1.2

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	Figure 6: Minimum Monin Obukov Length Sensitivity Analysis
Drawn by: RSF	Date: 09/11/2021



0 0.3 0.6 1.2 km

Scale: 1:30,800

N

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Stockport, Cheshire, SK4 1LW
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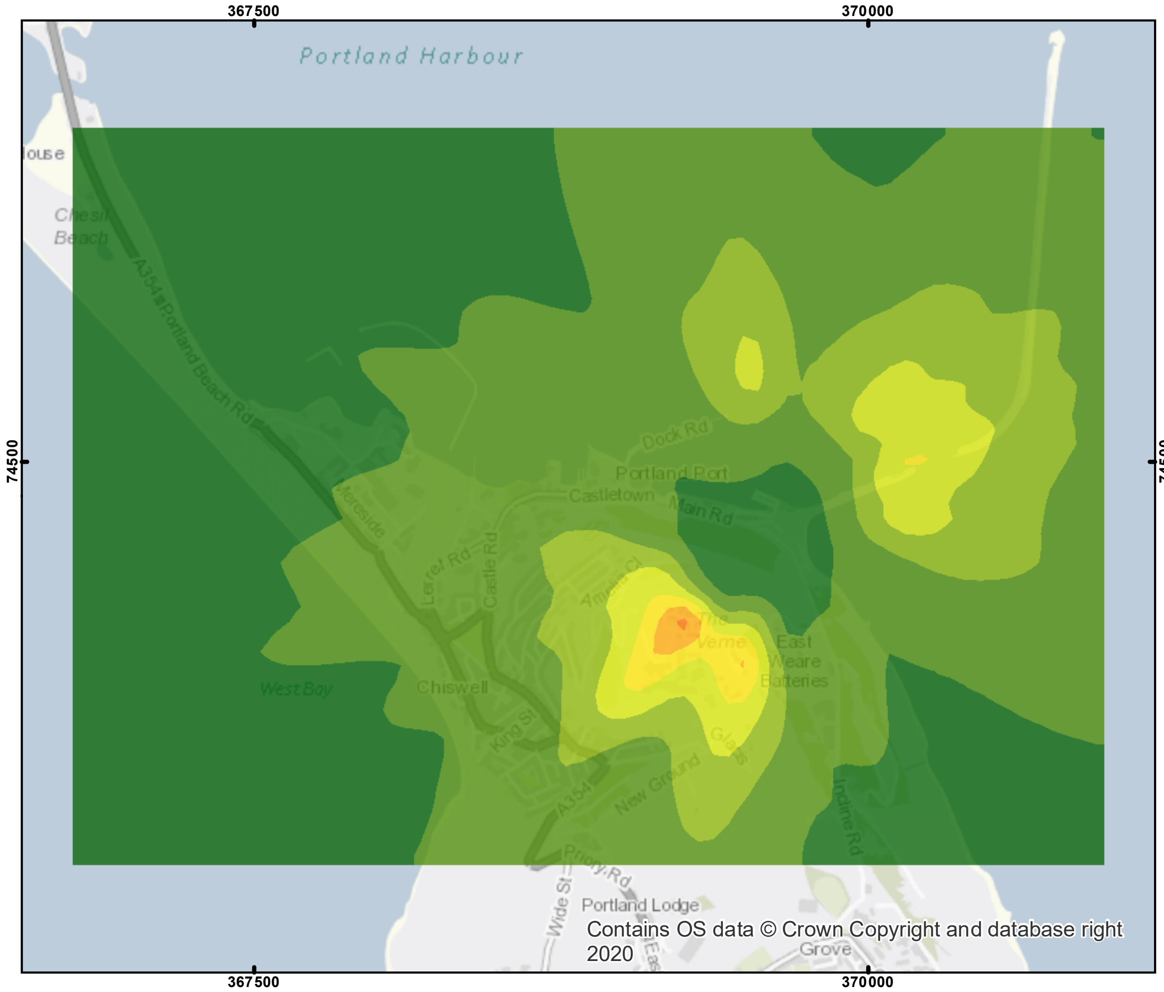
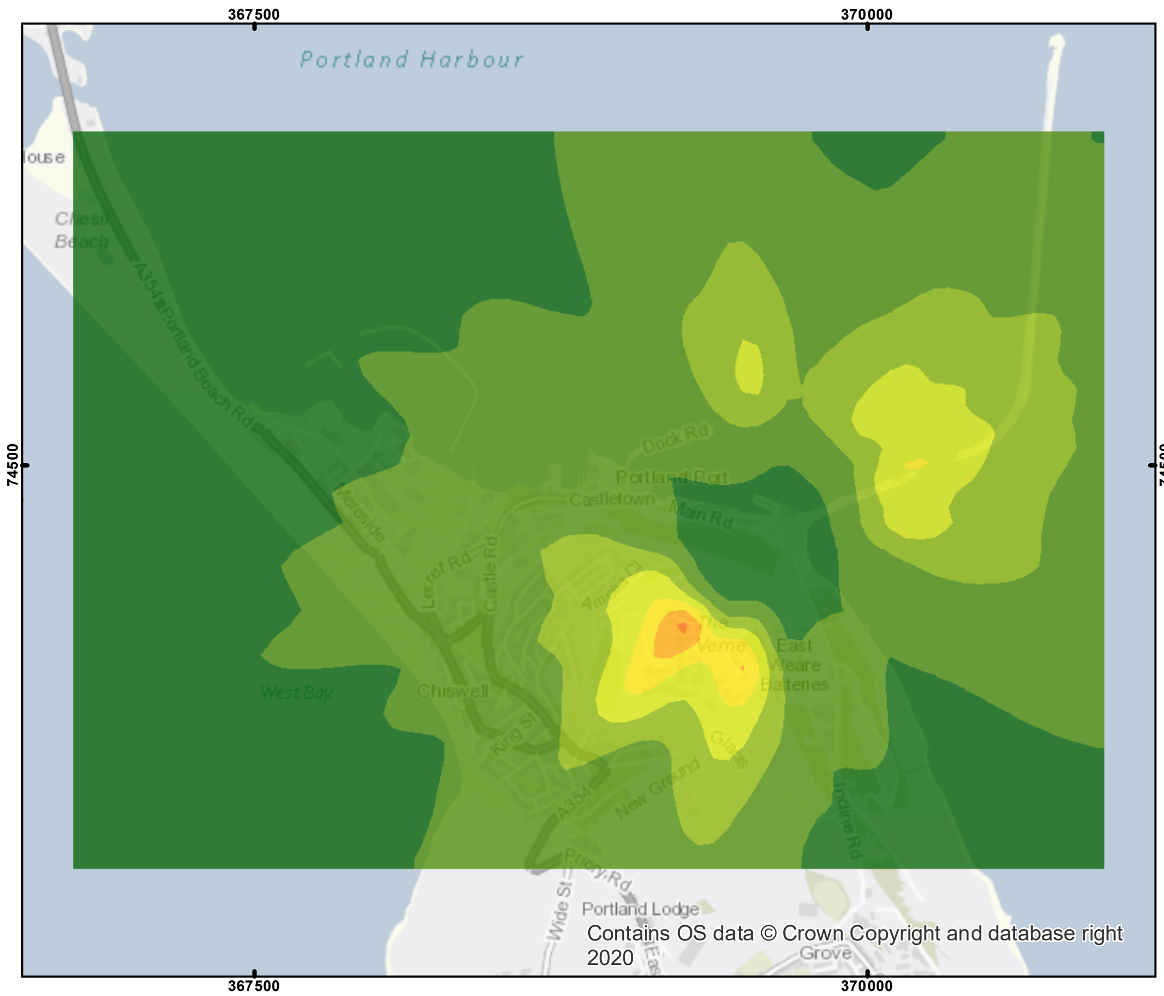
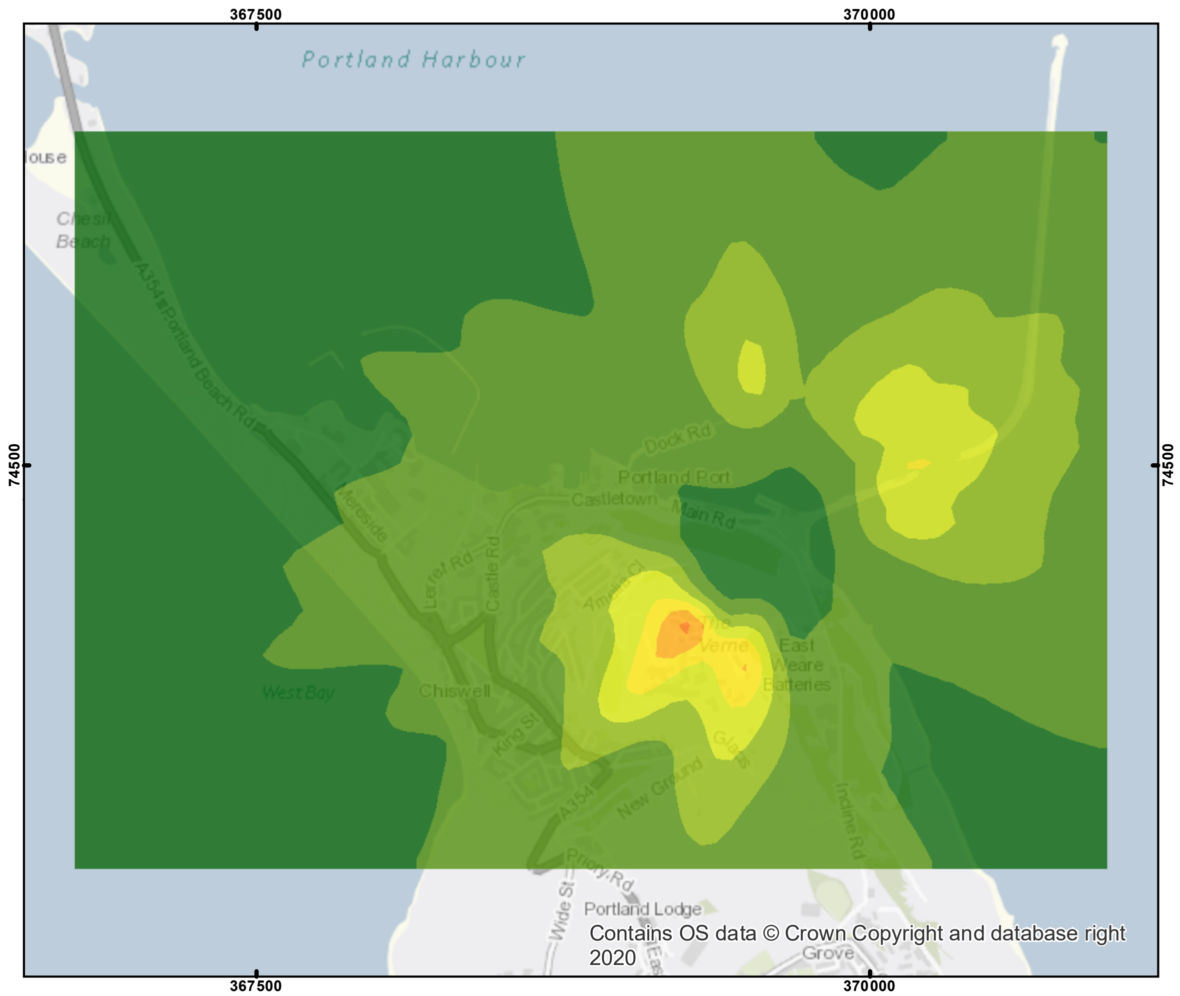


Minimum Monin Obukov Length = 1 m - default



Minimum Monin Obukov Length = 30 m



Legend

Maximum 24-hour mean NOx

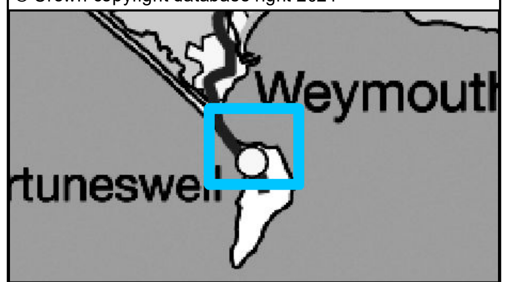
ug/m3

- < 2
- 2 - 4
- 4 - 6
- 6 - 8
- 8 - 10
- 10 - 12
- 12 - 14
- 14 - 16

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	

Figure 7:
Minimum Monin Obukov Length
Sensitivity Analysis

Drawn by: RSF | Date: 09/11/2021



0 0.3 0.6 1.2 km

N

Scale: 1:30,800

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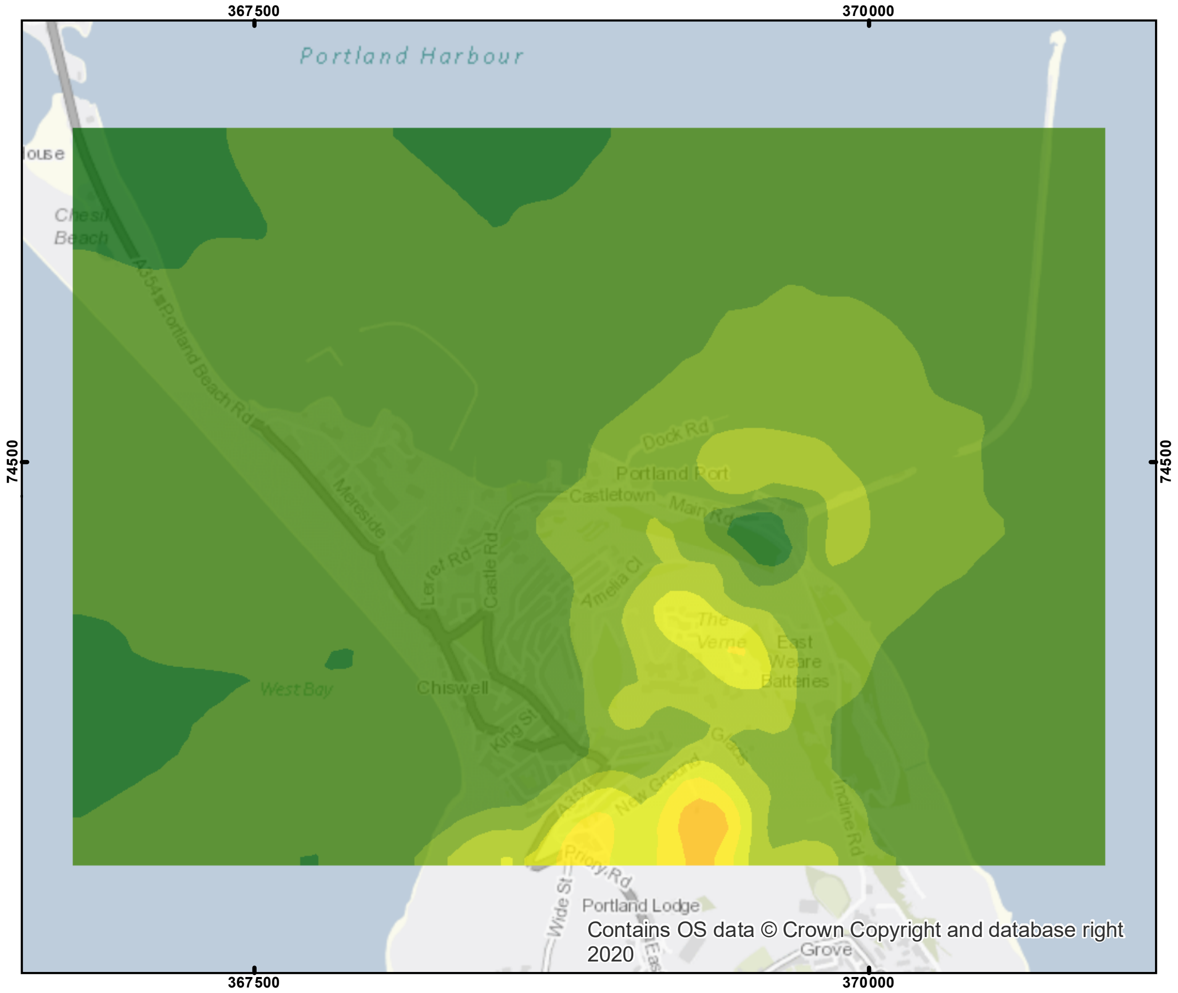
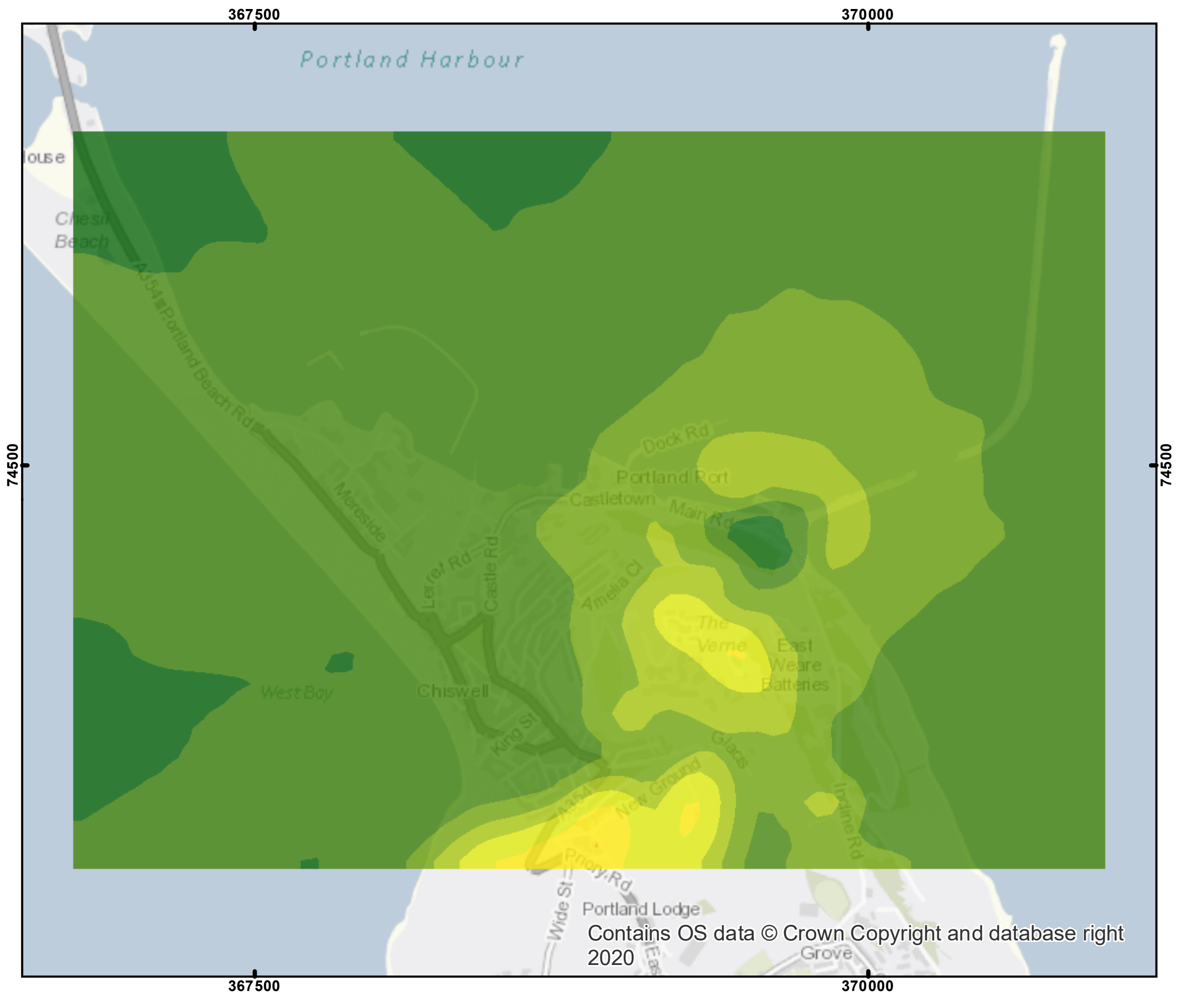
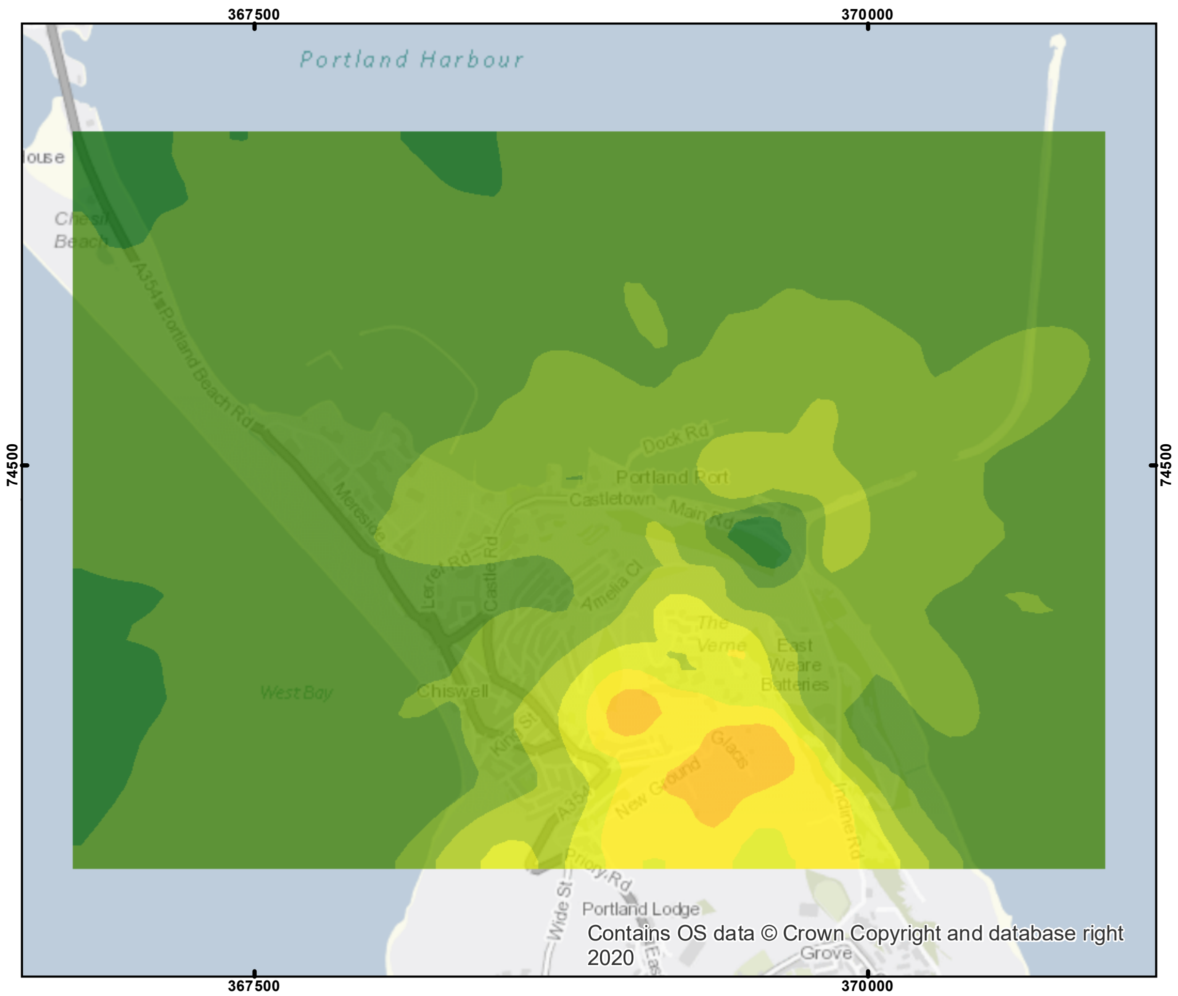


Minimum Monin Obukov Length = 1 m - default



Minimum Monin Obukov Length = 30 m



Legend

Maximum 1-hour mean NOx

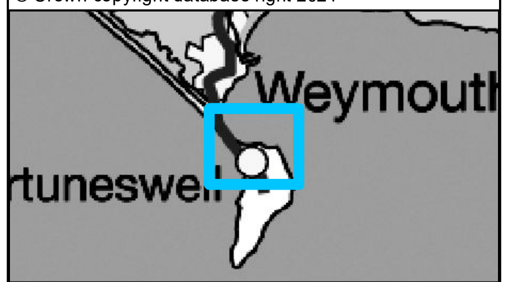
ug/m3

- <5
- 5 - 10
- 10 -15
- 15 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 45
- 45 - 50

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	

Figure 8:
Minimum Monin Obukov Length Sensitivity Analysis

Drawn by: RSF	Date: 09/11/2021



0 0.3 0.6 1.2 km

N

Scale: 1:30,800

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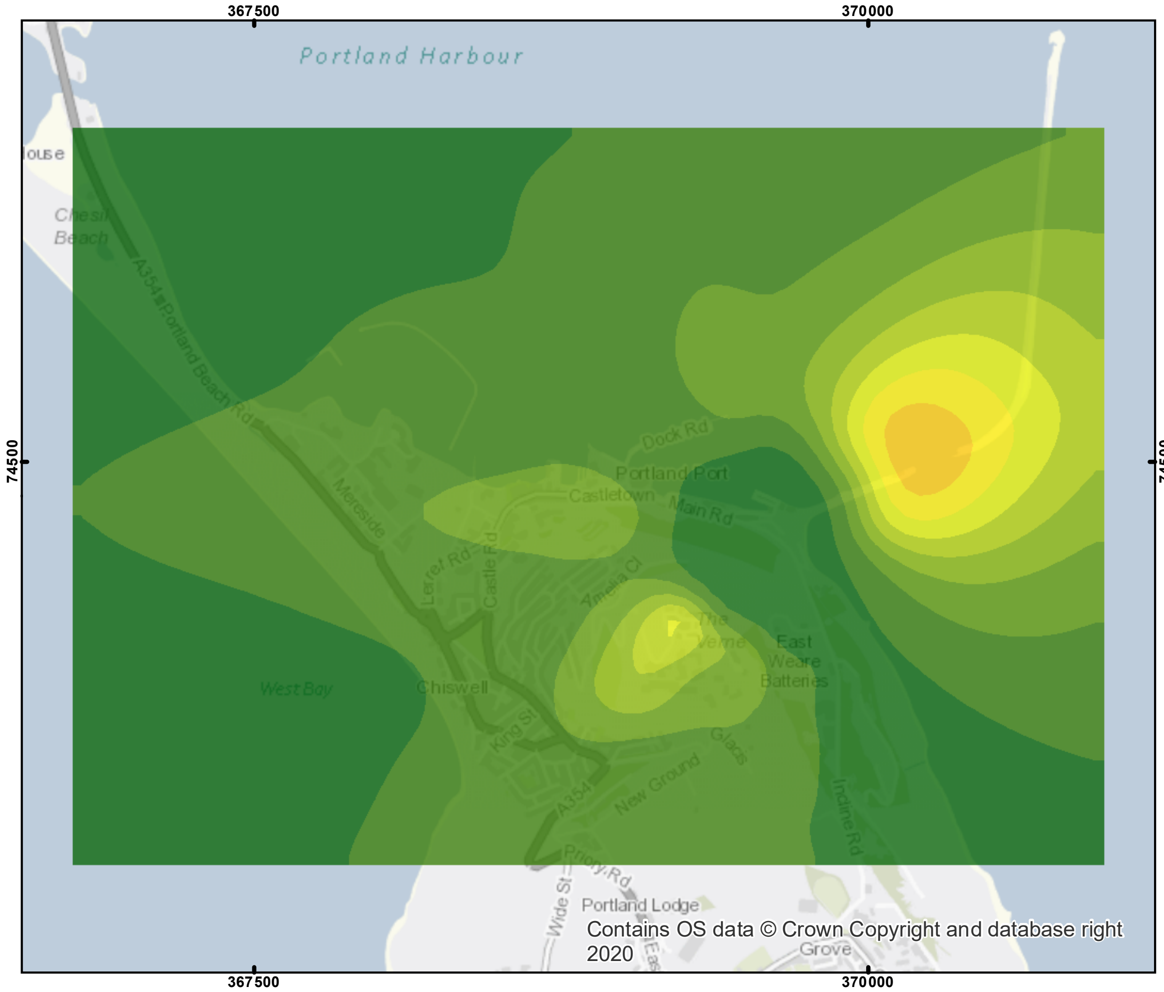
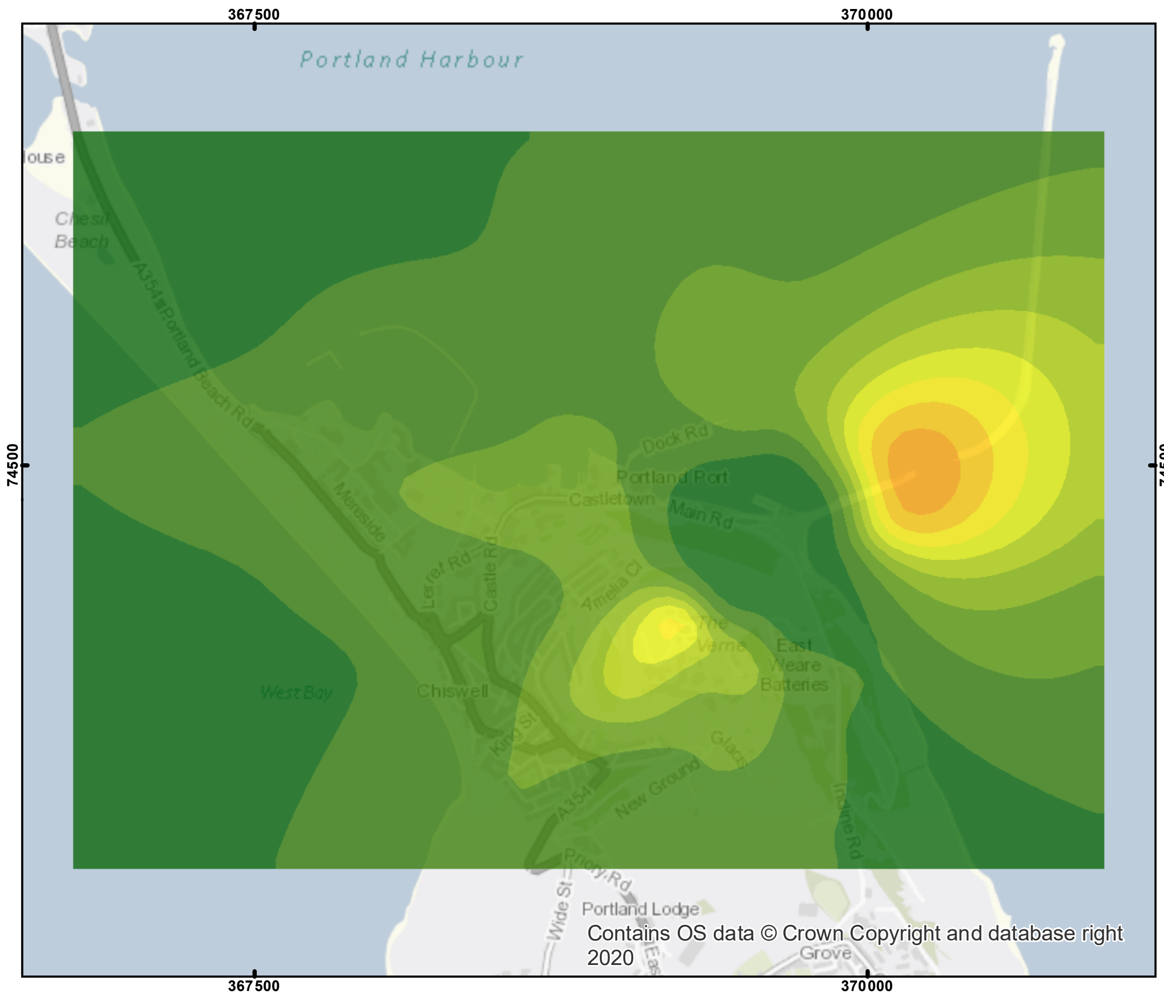
Base



Met Site Surface Roughness = 0.005 m



Legend

Annual mean NOx

ug/m3

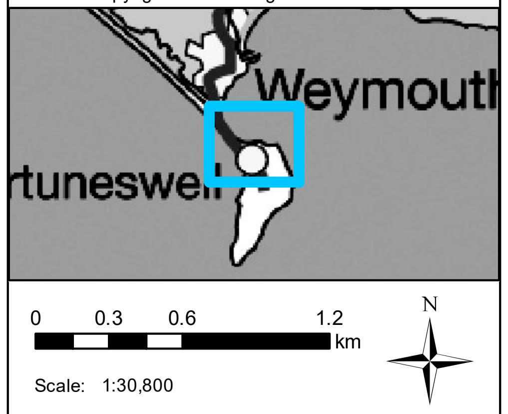
- <0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- 0.8 - 0.9
- 0.9 - 1
- 1 - 1.1
- 1.1 - 1.2

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953

Title:

Figure 9
Met Site Surface Roughness Length Sensitivity Analysis

Drawn by: RSF | Date: 09/11/2021



Scale: 1:30,800

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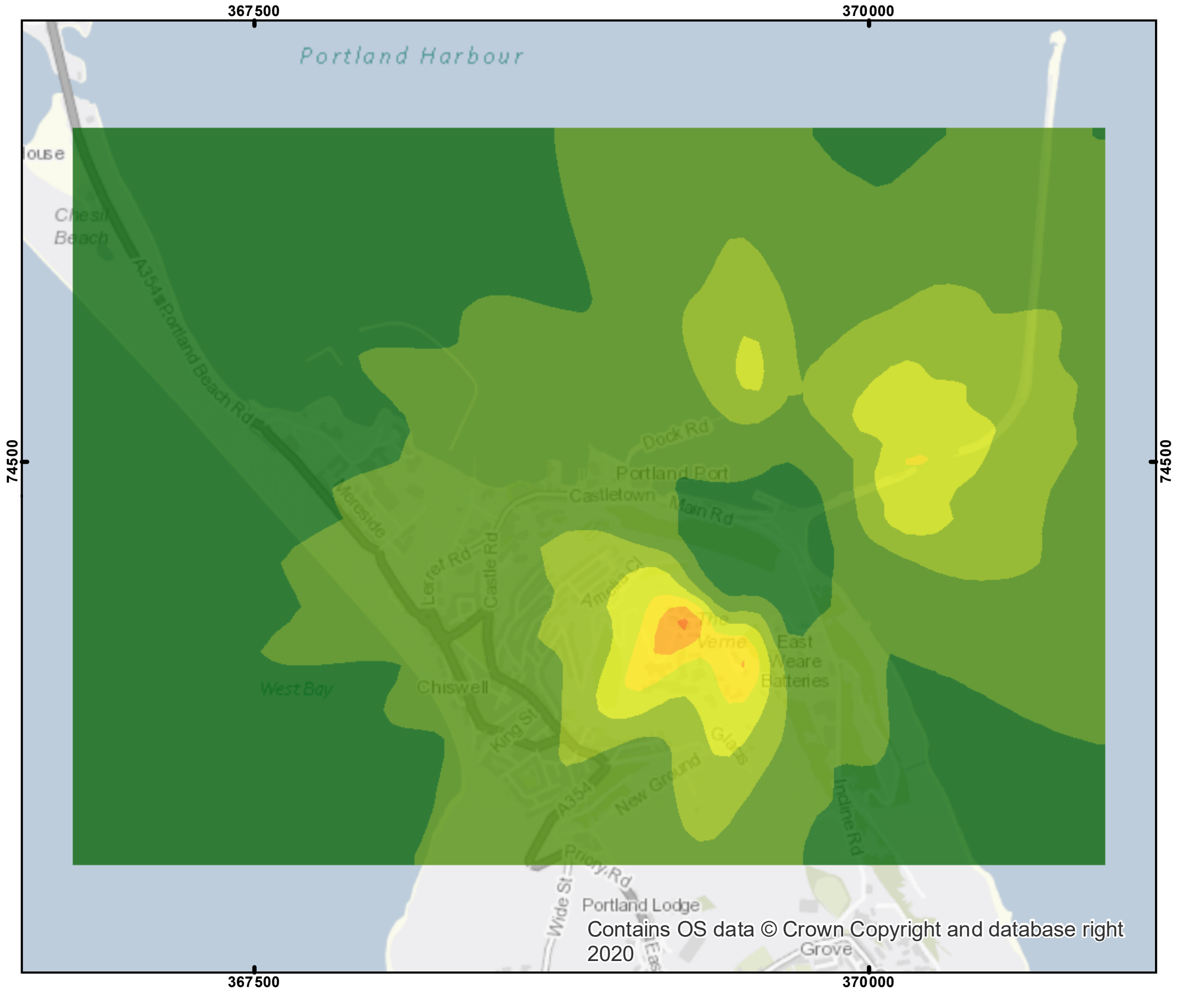
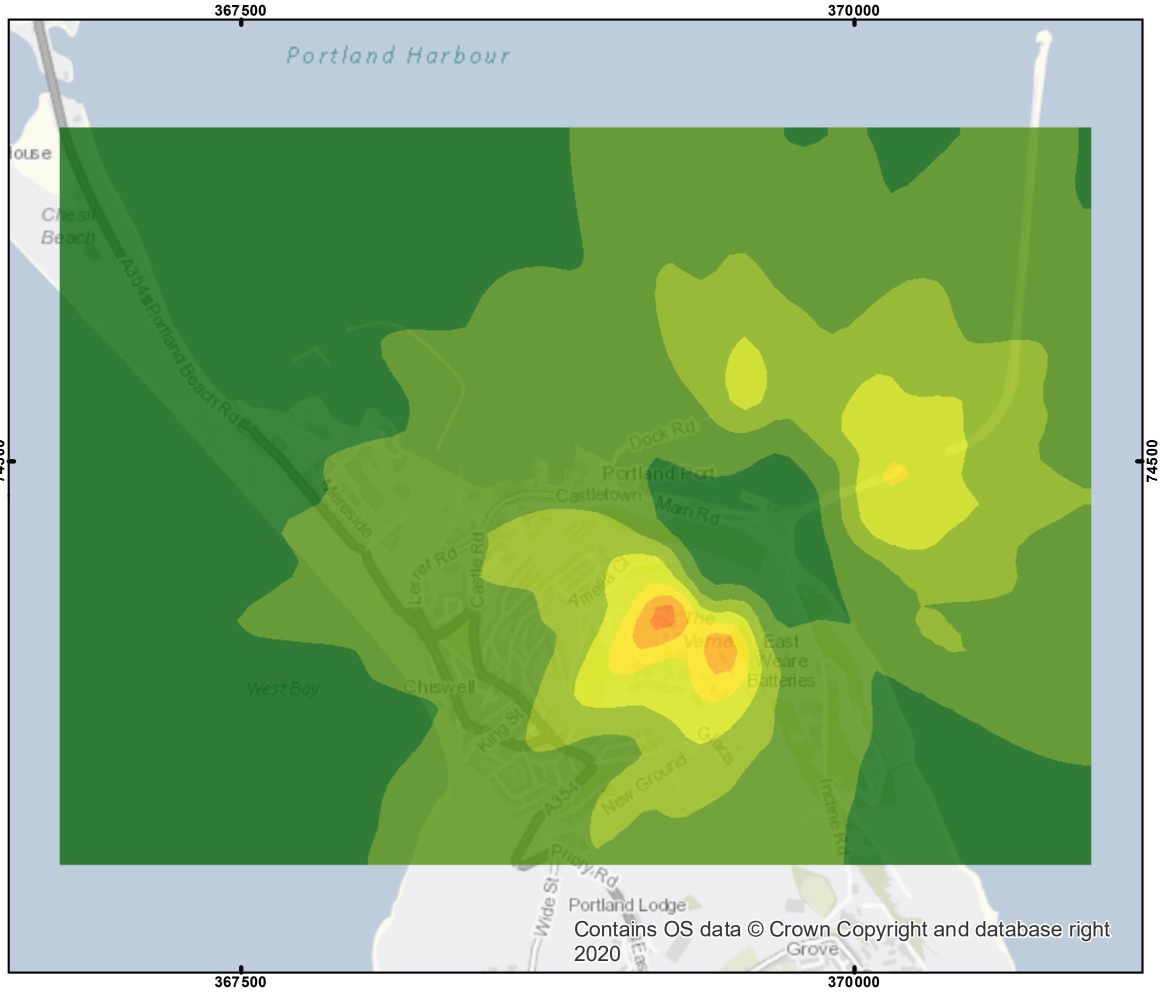
Fax: 0161 474 0618

Base



Met Site Surface Roughness = 0.005 m



Legend

Maximum 24-hour mean NOx

ug/m3

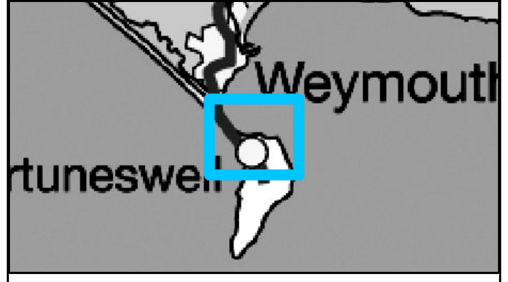
- < 2
- 2 - 4
- 4 - 6
- 6 - 8
- 8 - 10
- 10 - 12
- 12 - 14
- 14 - 16

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953

Title:

Figure 10
Met Site Surface Roughness Length Sensitivity Analysis

Drawn by: RSF | Date: 09/11/2021



Scale: 1:30,800

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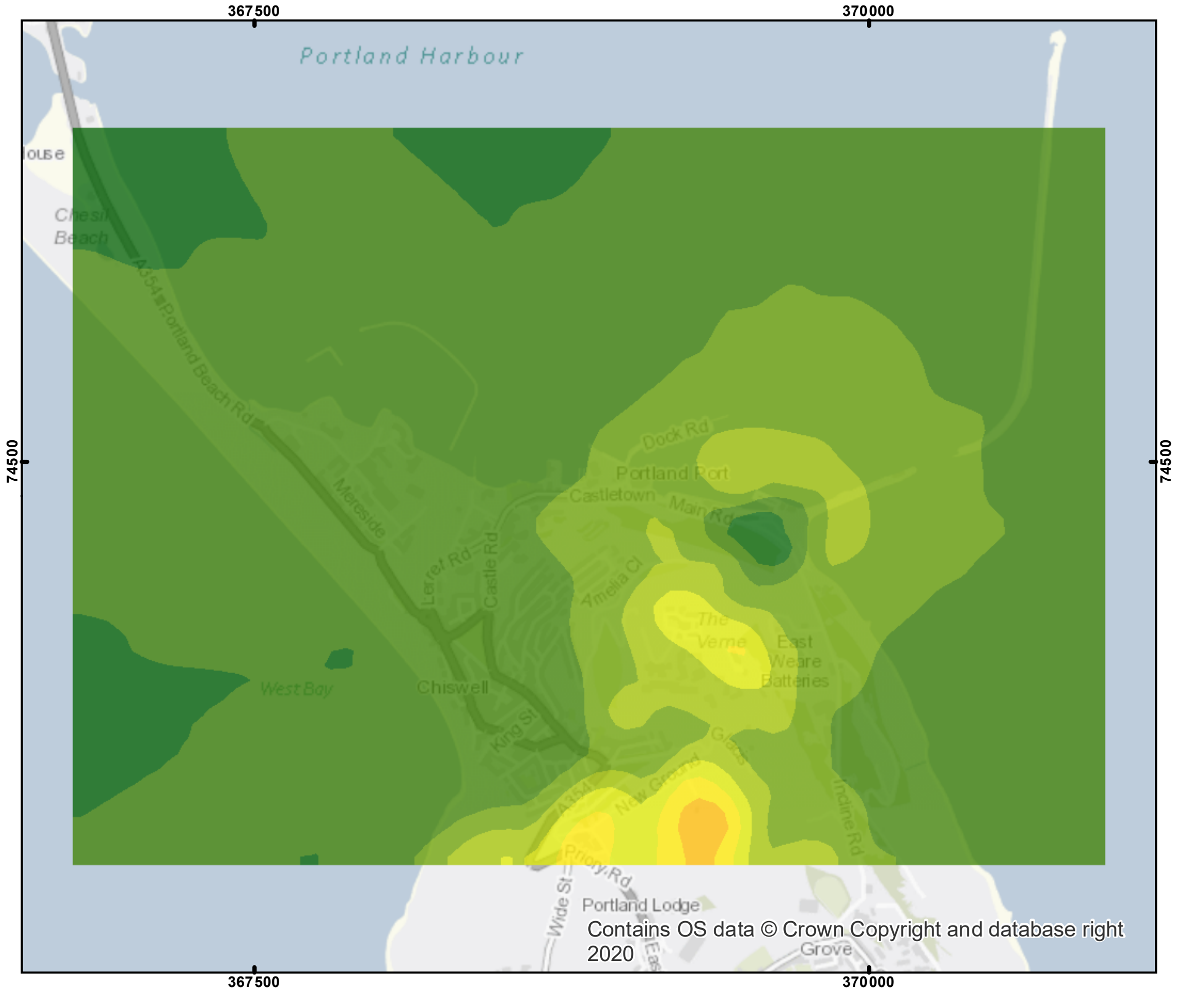
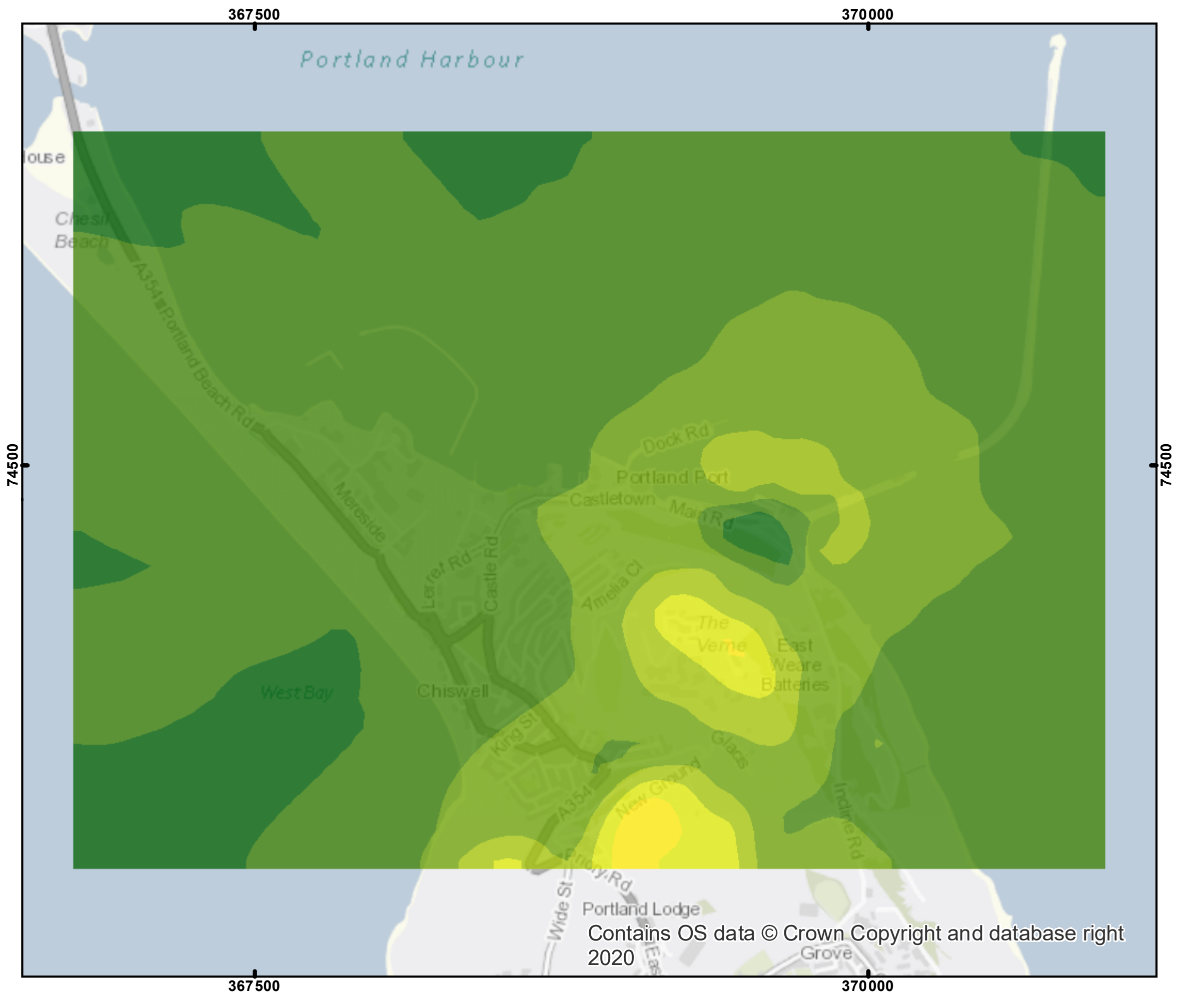
Base



Met Site Surface Roughness = 0.005 m



Legend

Maximum 1-hour mean NOx

ug/m3

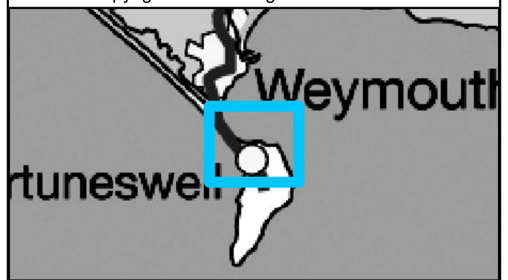
- <5
- 5 - 10
- 10 -15
- 15 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 45
- 45 - 50

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953

Title:

Figure 11
Met Site Surface Roughness Length Sensitivity Analysis

Drawn by: RSF | Date: 09/11/2021



0 0.3 0.6 1.2 km

Scale: 1:30,800

N

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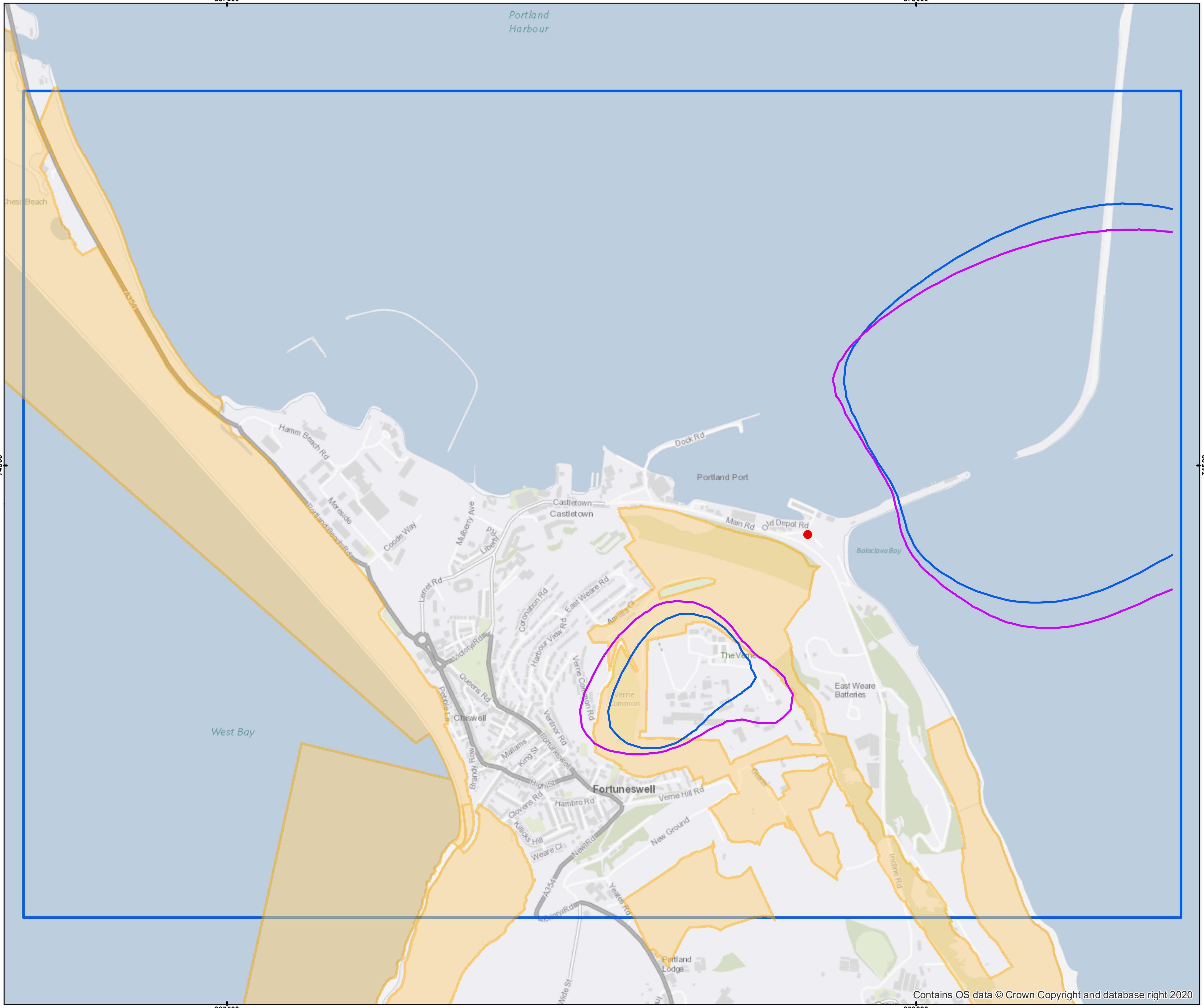
Fax: 0161 474 0618

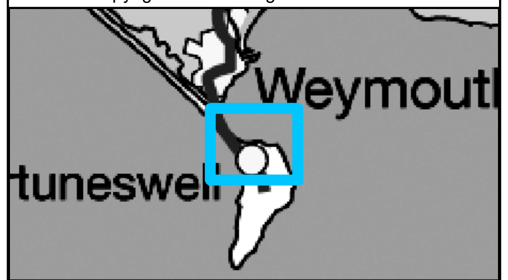


Legend

- Short Grass Surface Roughness
- DMA Assumption
- Main Stack
- SAC
- Output grid extent

Contour of 1% of Critical Level, assuming 100% operation at the ELV

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	Figure 12 Annual Mean NOx Impact - Met Station Surface Roughness Sensitivity
Drawn by: RSF	Date: 15/11/2021



0 0.125 0.25 0.5 km

Scale: 1:13,000

N

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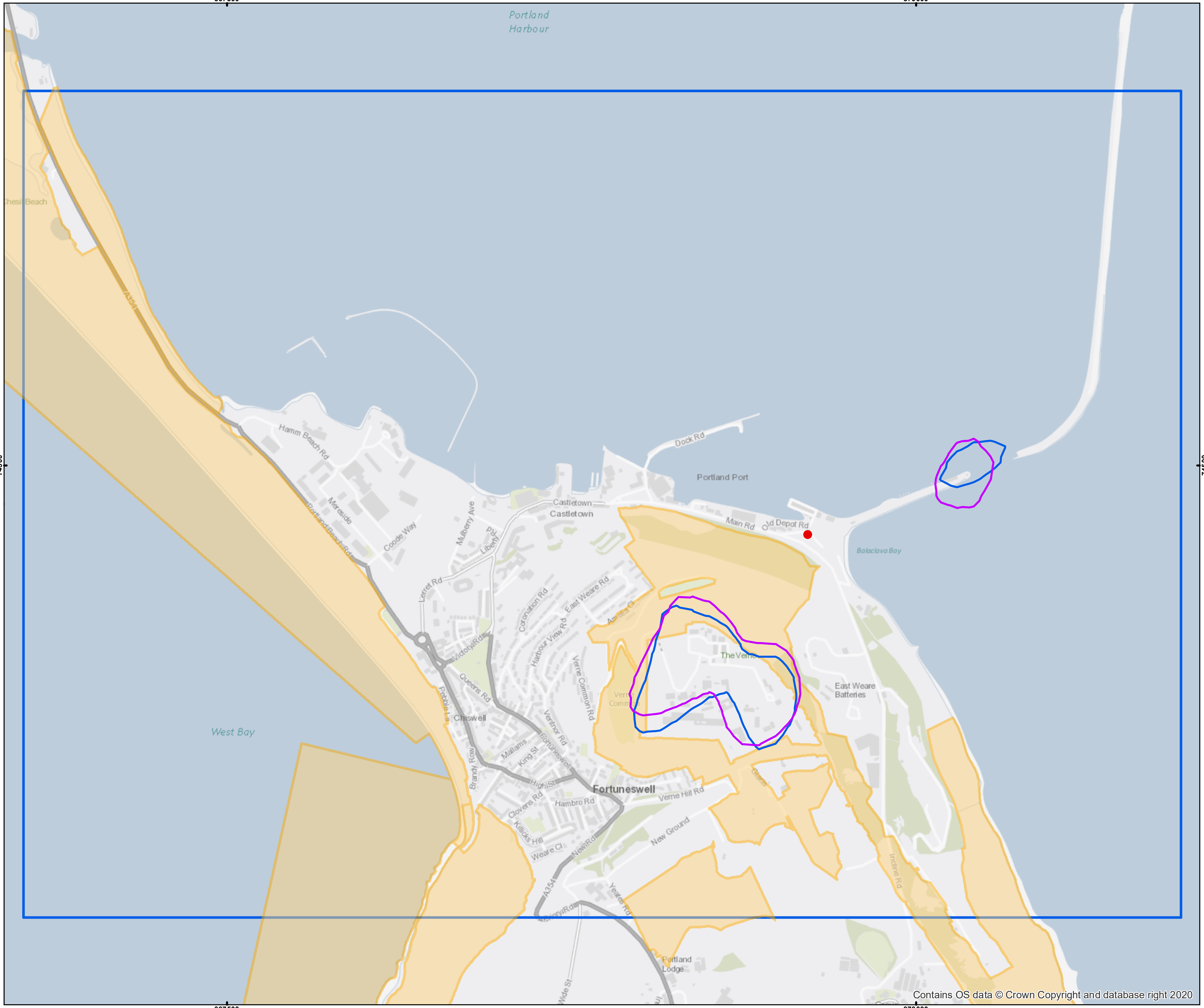


Legend

- Short Grass Surface Roughness
- DMA Assumption
- Main Stack
- SAC
- Output grid extent

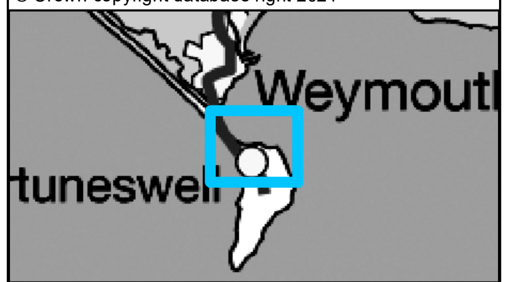
Contour of 10% of Critical Level, assuming 100% operation at the ELV

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953

Title:

Figure 13
Daily Mean NOx Impact - Met Station Surface Roughness Sensitivity

Drawn by: RSF	Date: 15/11/2021



0 0.125 0.25 0.5 km

N

Scale: 1:13,000

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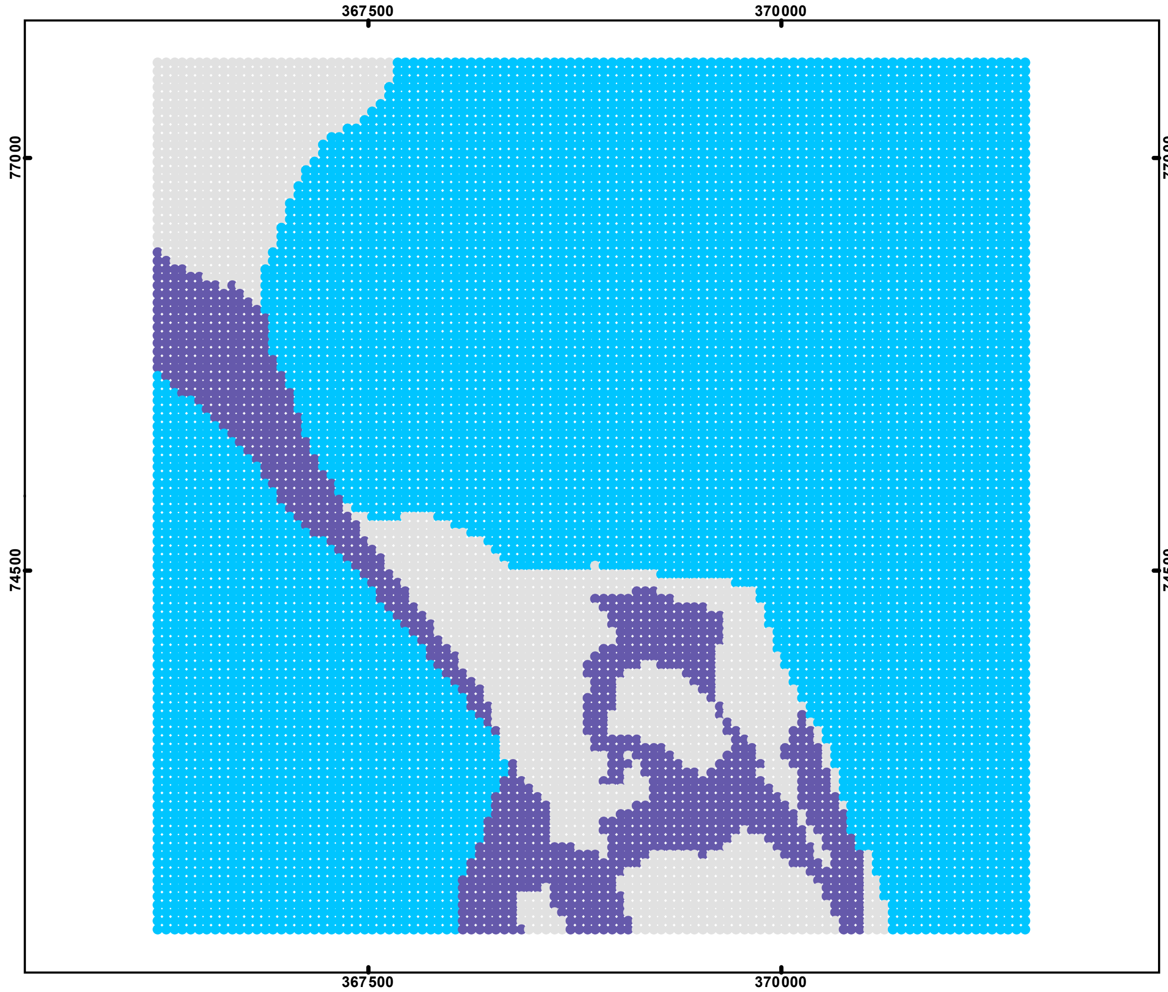
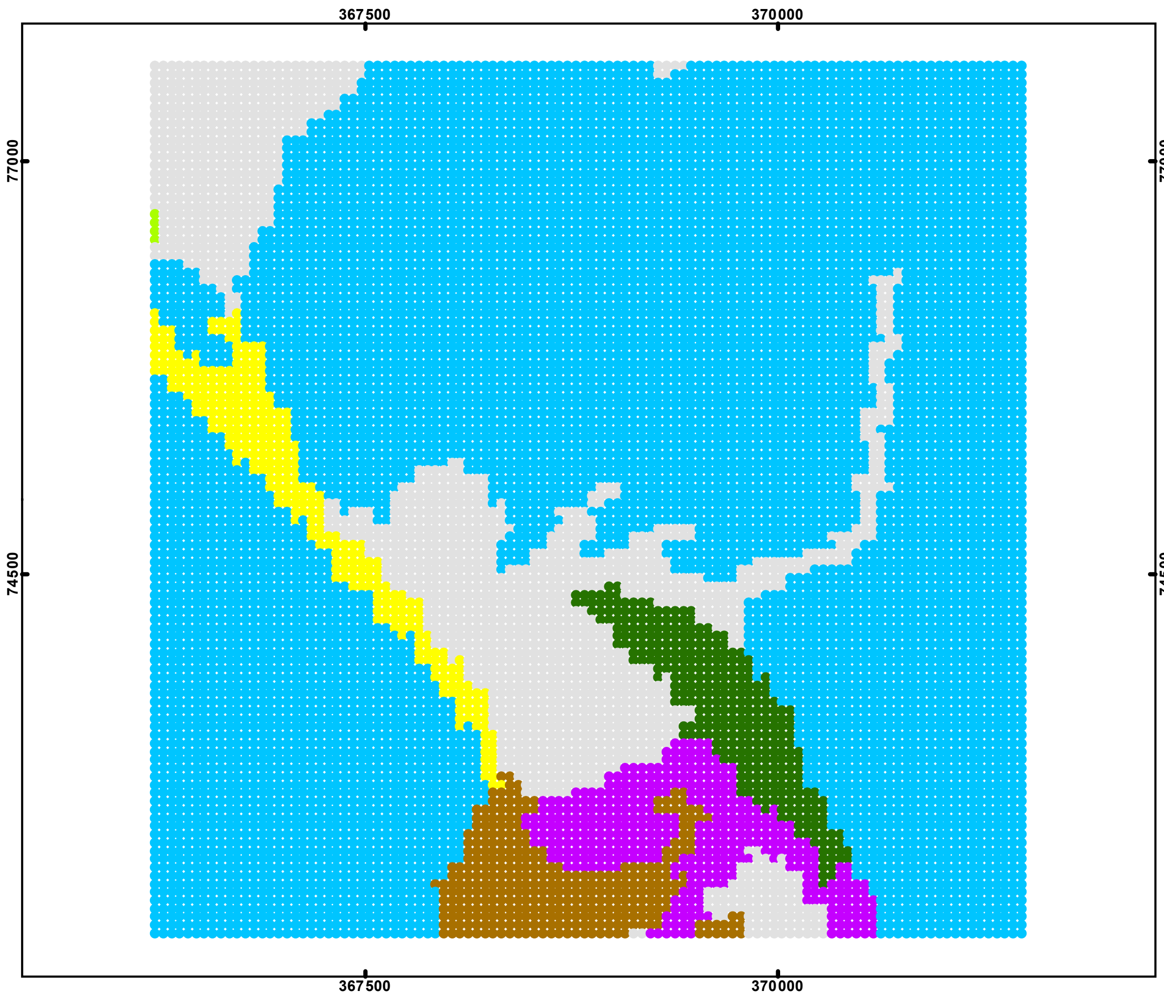
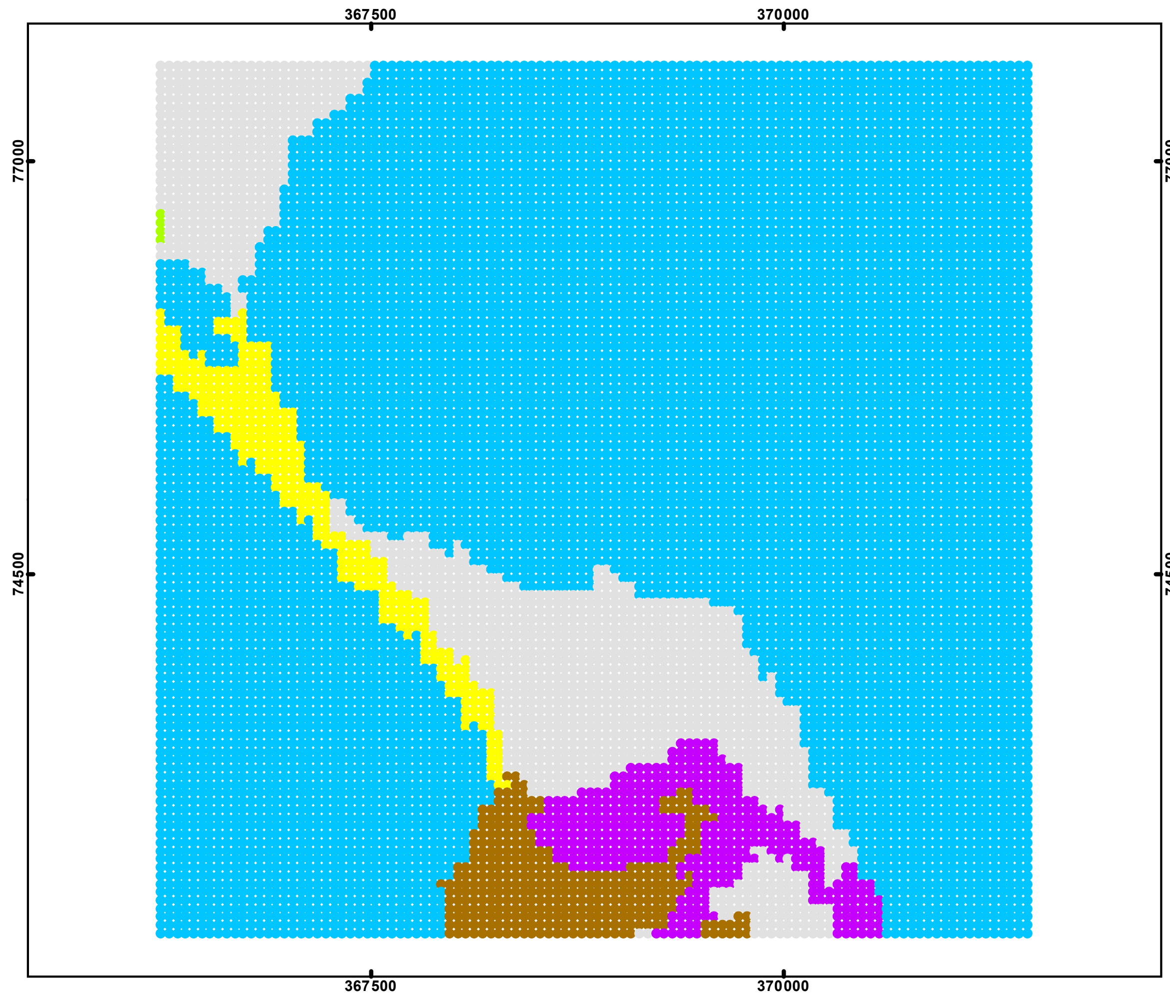
Base



Variable Surface Roughness Length - CORINE



Variable Surface Roughness Length - CORINE modified



Legend

Roughness Length (m)

- 0.0001
- 0.0003
- 0.005
- 0.02
- 0.1
- 0.3
- 0.5
- 0.75

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	

Figure 14
Domain Surface Roughness Length

Drawn by: RSF	Date: 15/11/2021

Scale: 1:45,759

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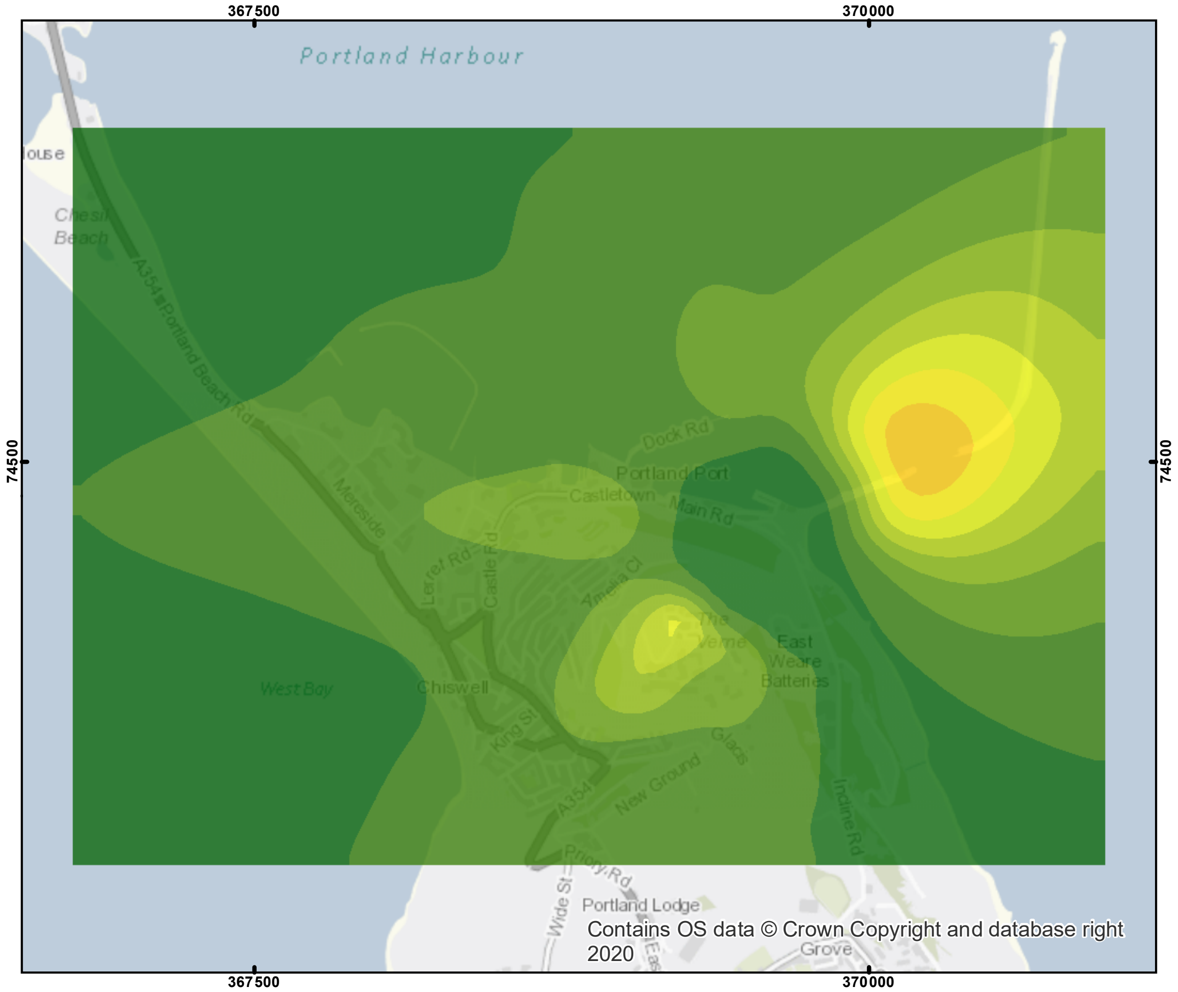
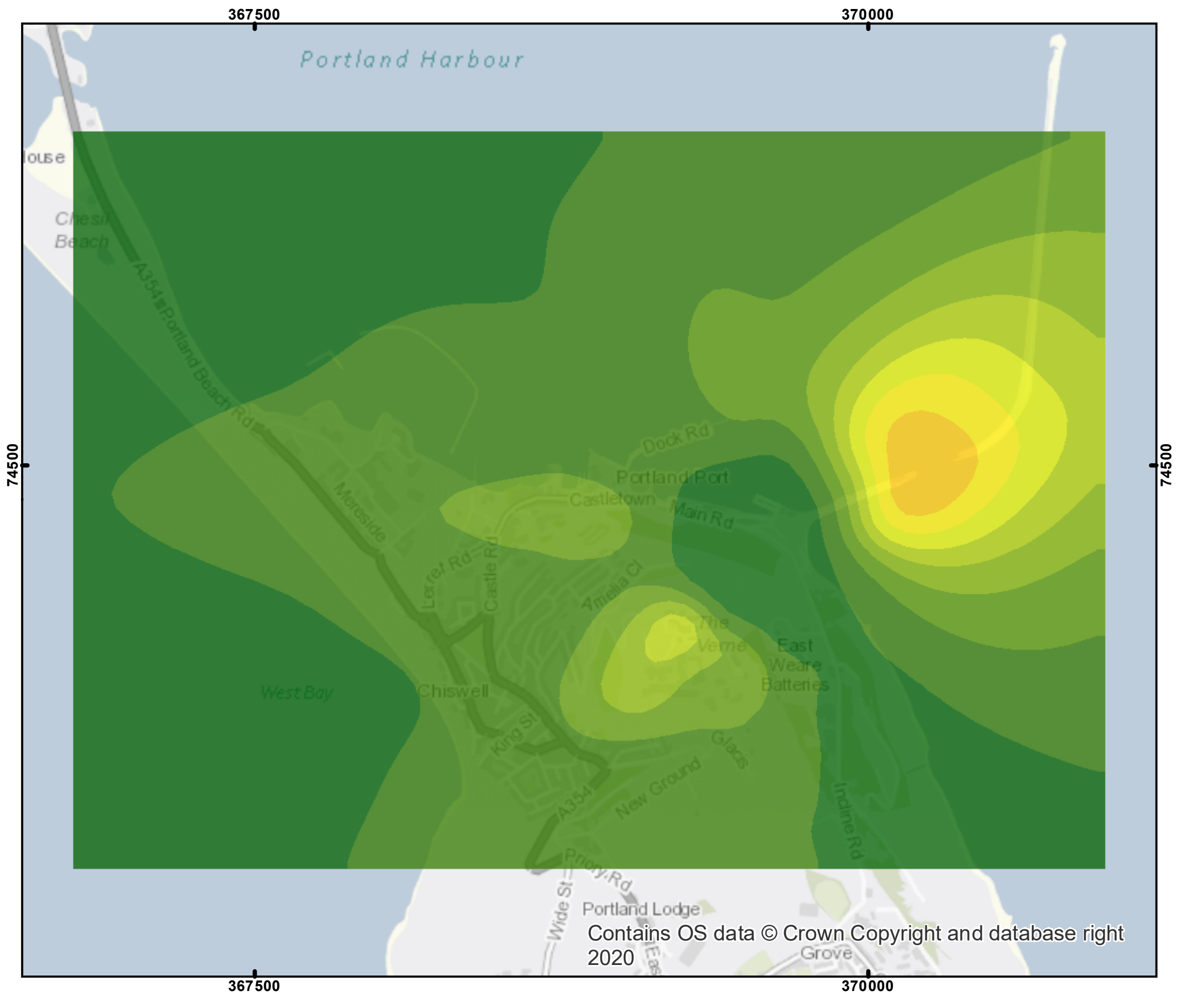
Fax: 0161 474 0618

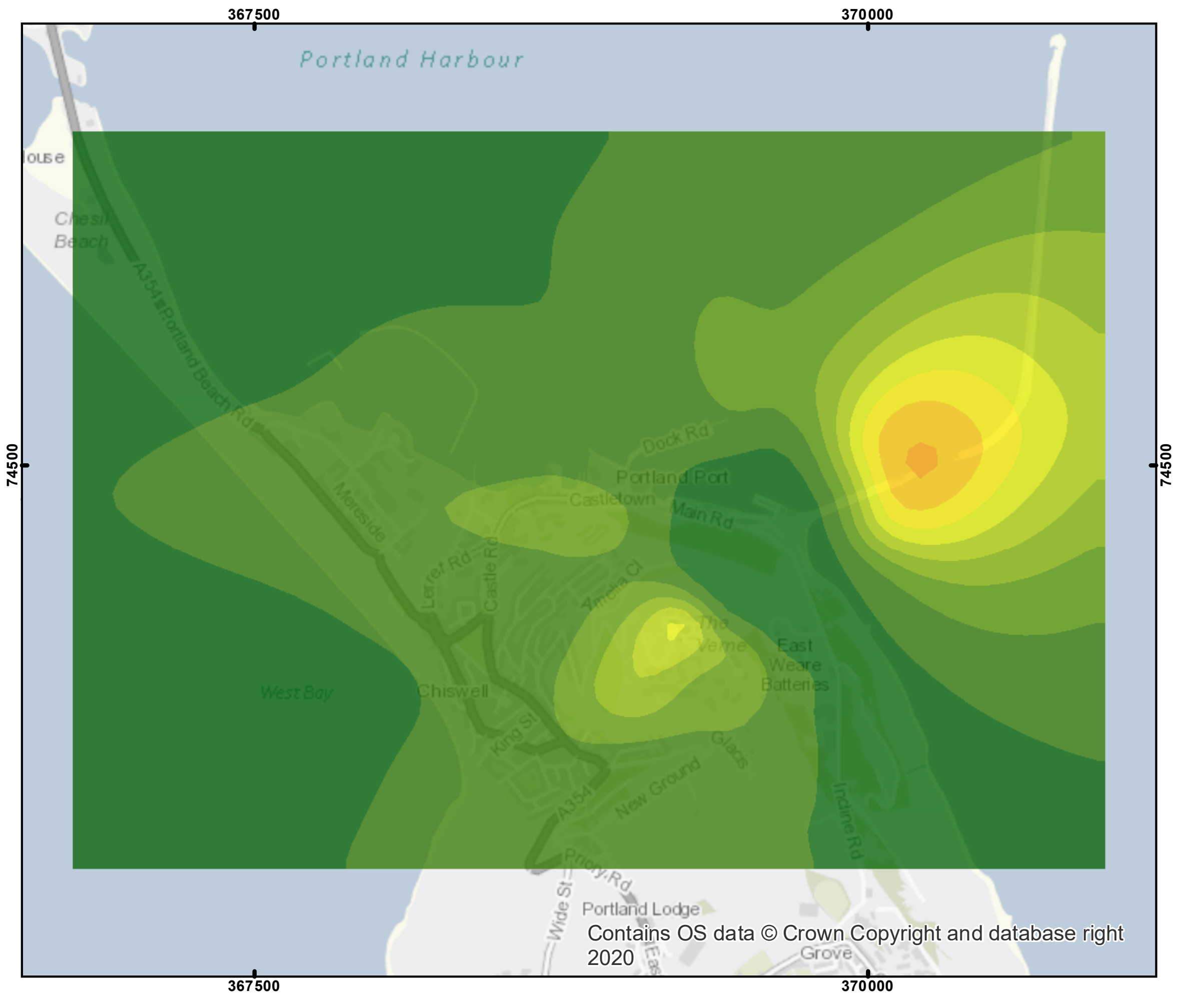
Base



Variable Surface Roughness Length - CORINE



Variable Surface Roughness Length - CORINE modified



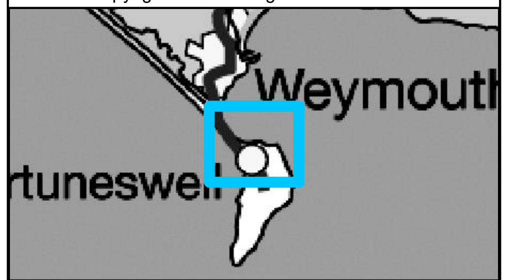
Legend

Annual mean NOx

ug/m3

- <0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- 0.8 - 0.9
- 0.9 - 1
- 1 - 1.1
- 1.1 - 1.2

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	Figure 15 Domain Surface Length Sensitivity Analysis
Drawn by: RSF	Date: 15/11/2021



0 0.3 0.6 1.2 km

N

Scale: 1:30,800

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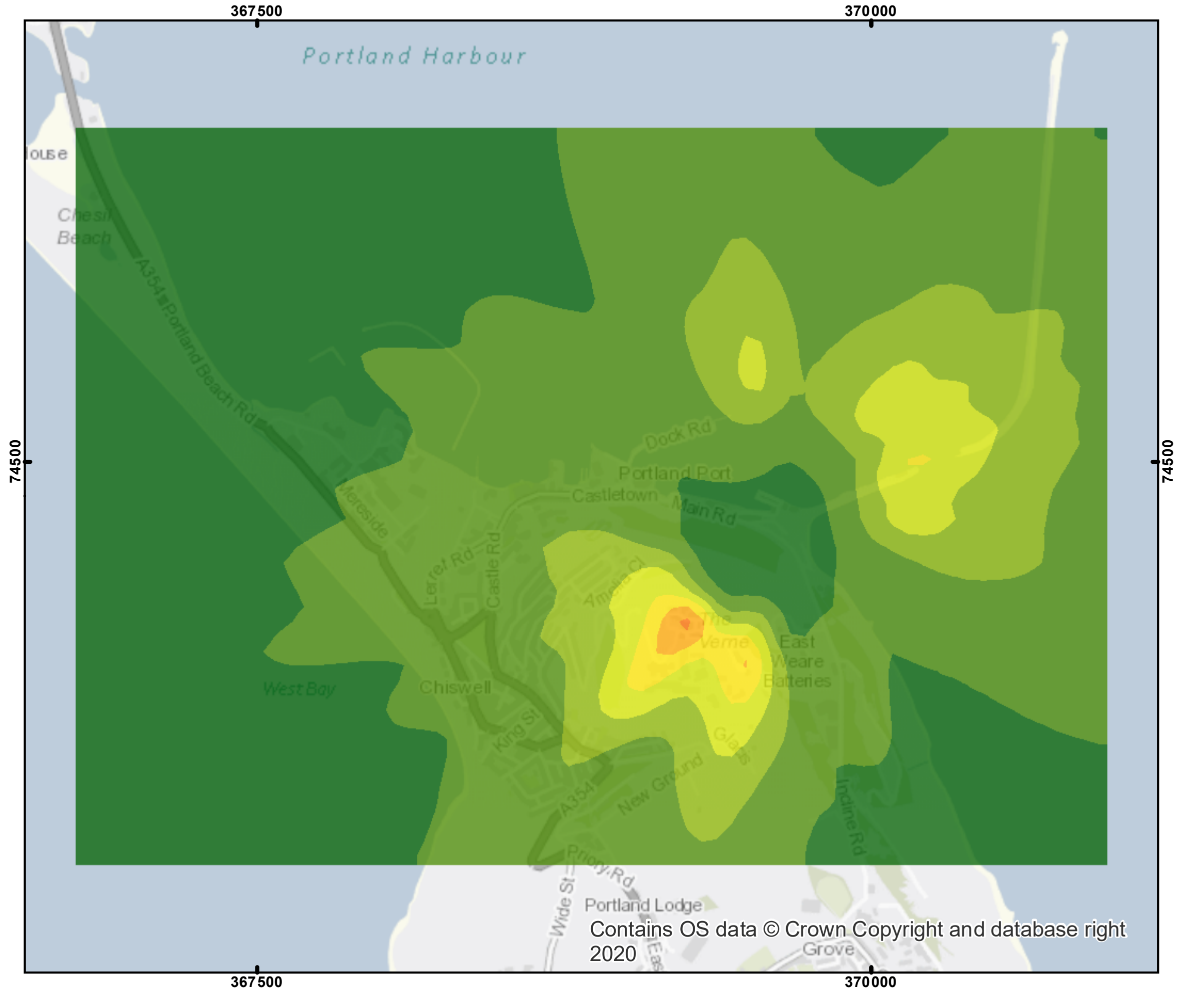
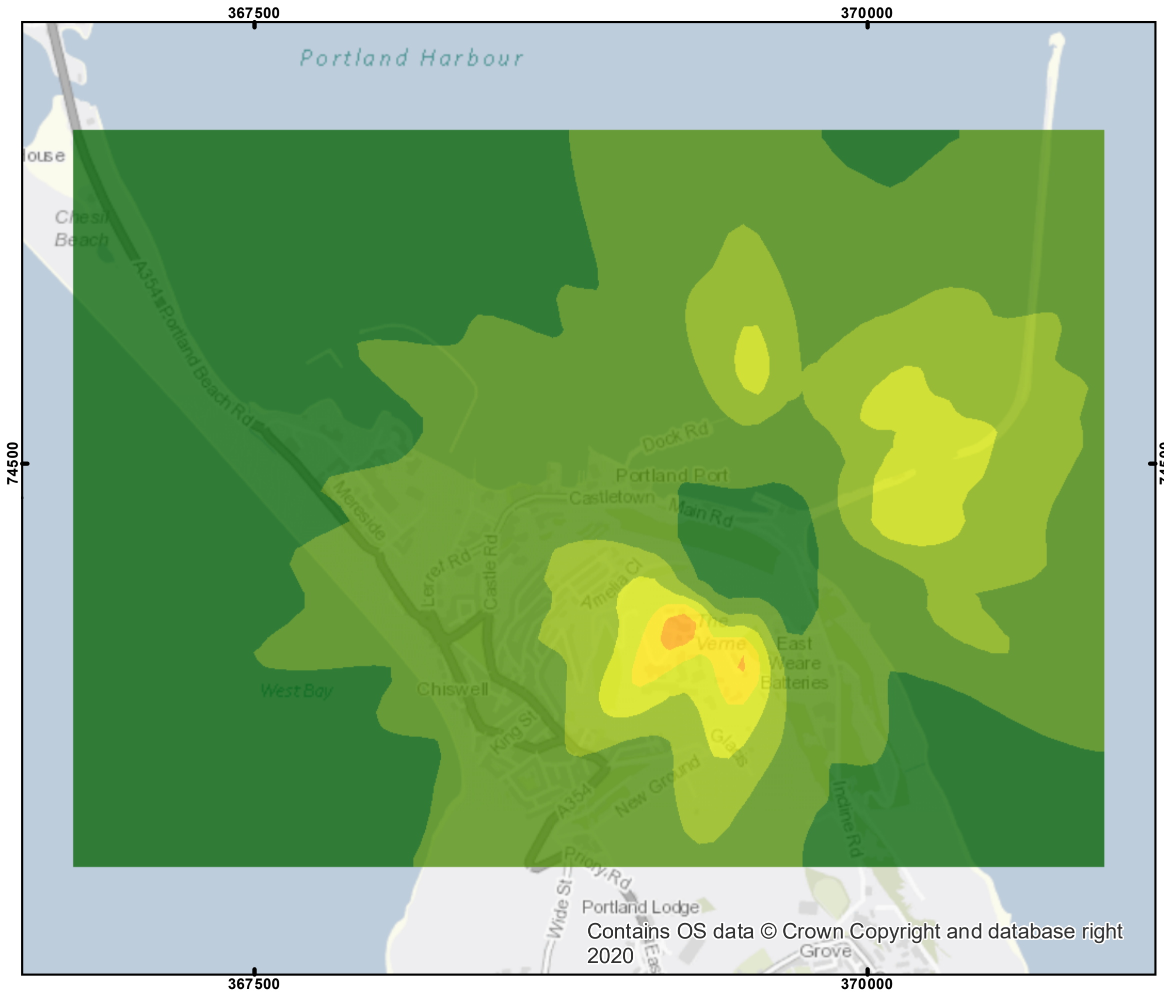
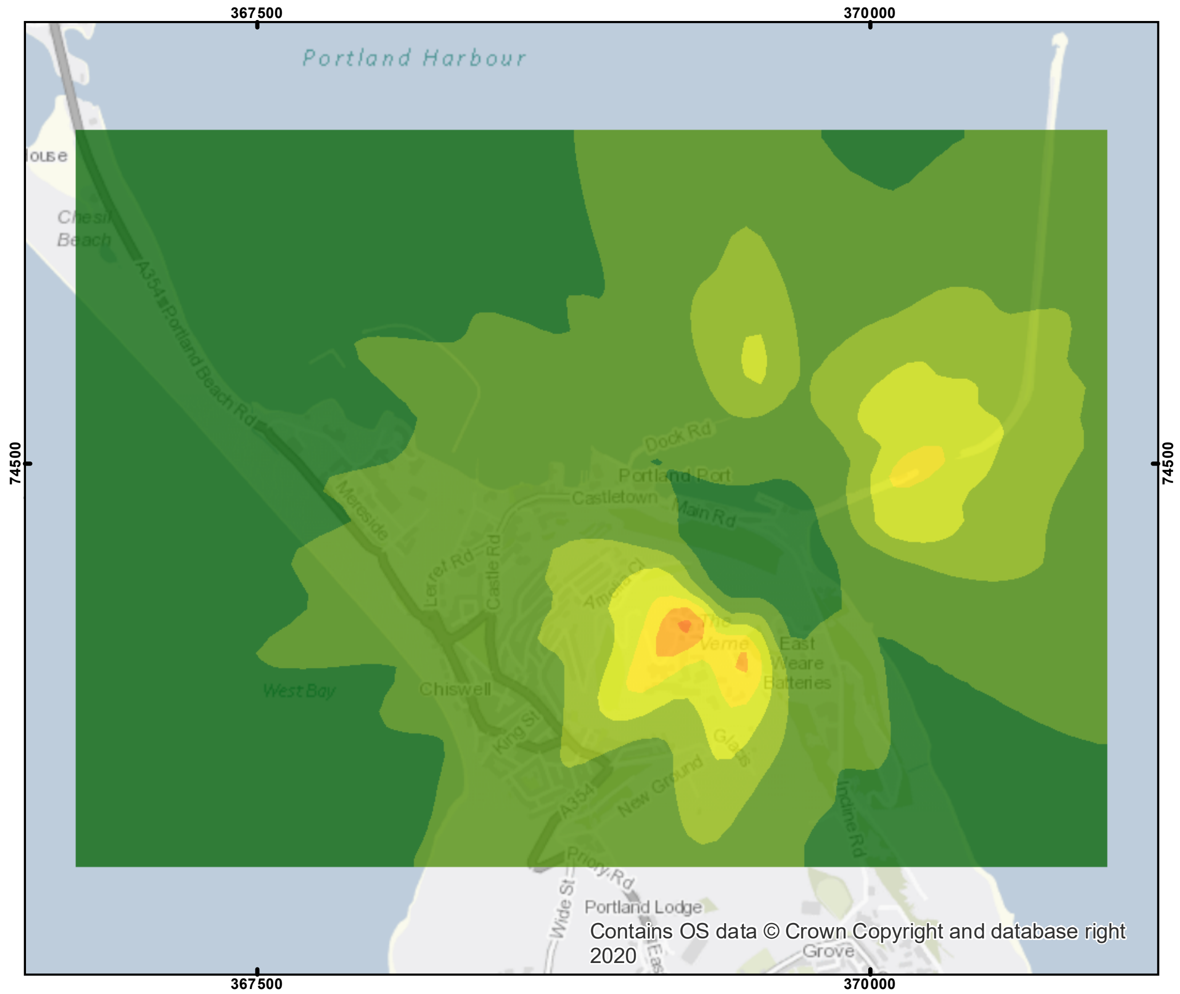
Base



Variable Surface Roughness Length - CORINE



Variable Surface Roughness Length - CORINE modified



Legend

Maximum 24-hour mean NOx

ug/m3

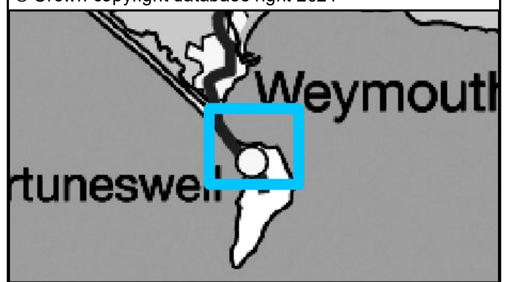
- < 2
- 2 - 4
- 4 - 6
- 6 - 8
- 8 - 10
- 10 - 12
- 12 - 14
- 14 - 16

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953

Title:

Figure 16
Domain Surface Length
Sensitivity Analysis

Drawn by: RSF | Date: 09/11/2021



0 0.3 0.6 1.2 km

N

Scale: 1:30,800

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Stockport, Cheshire, SK4 1LW
Tel: 0161 476 0032
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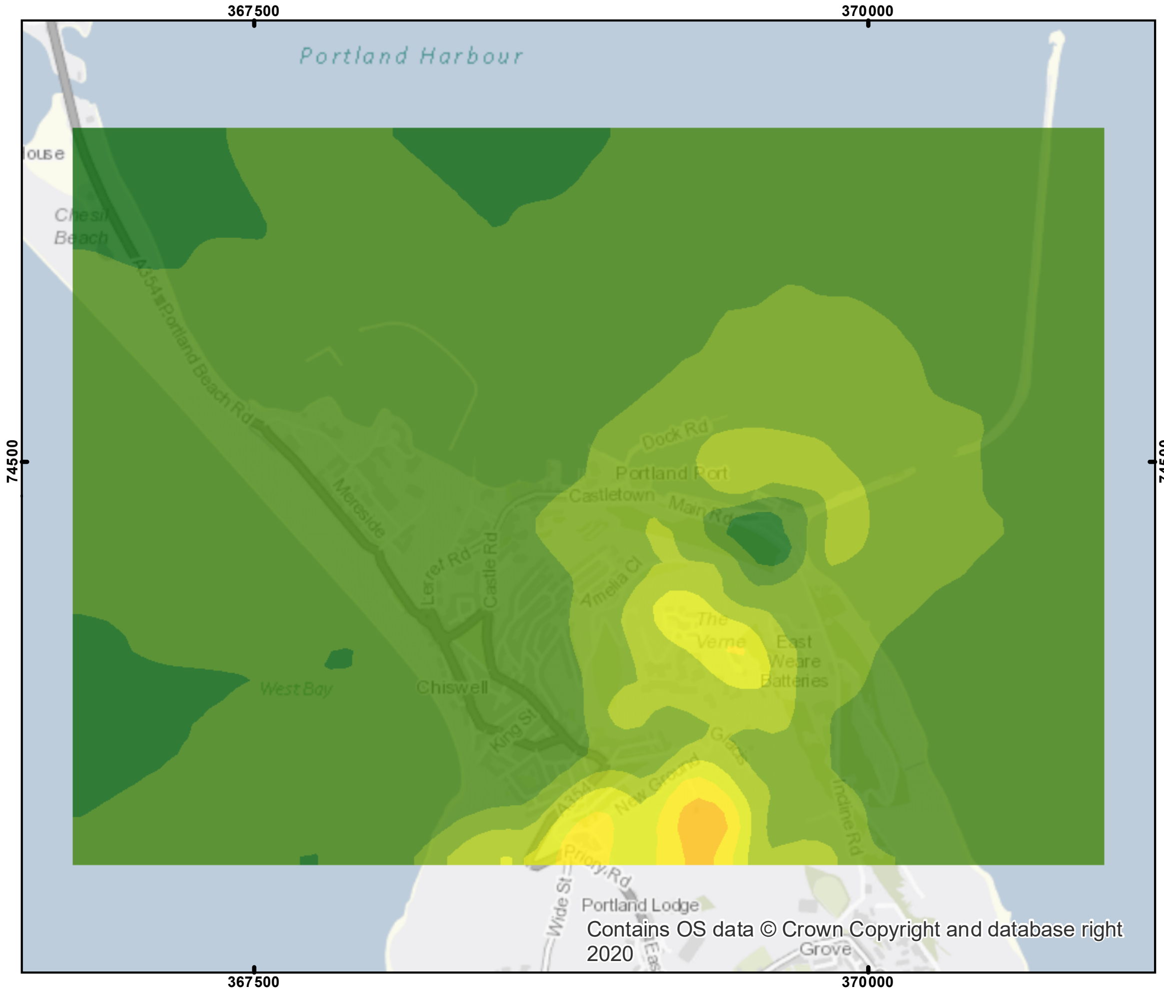
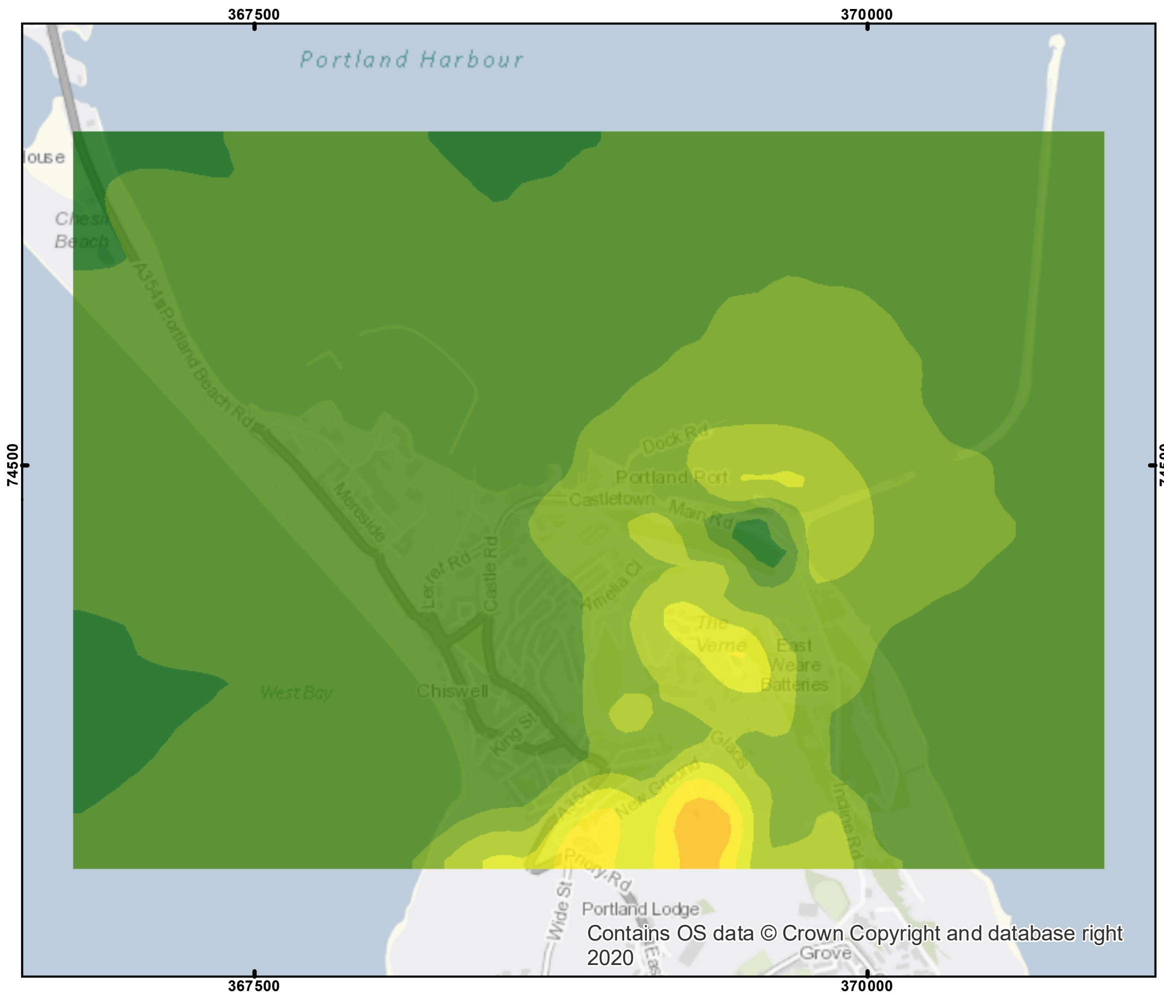
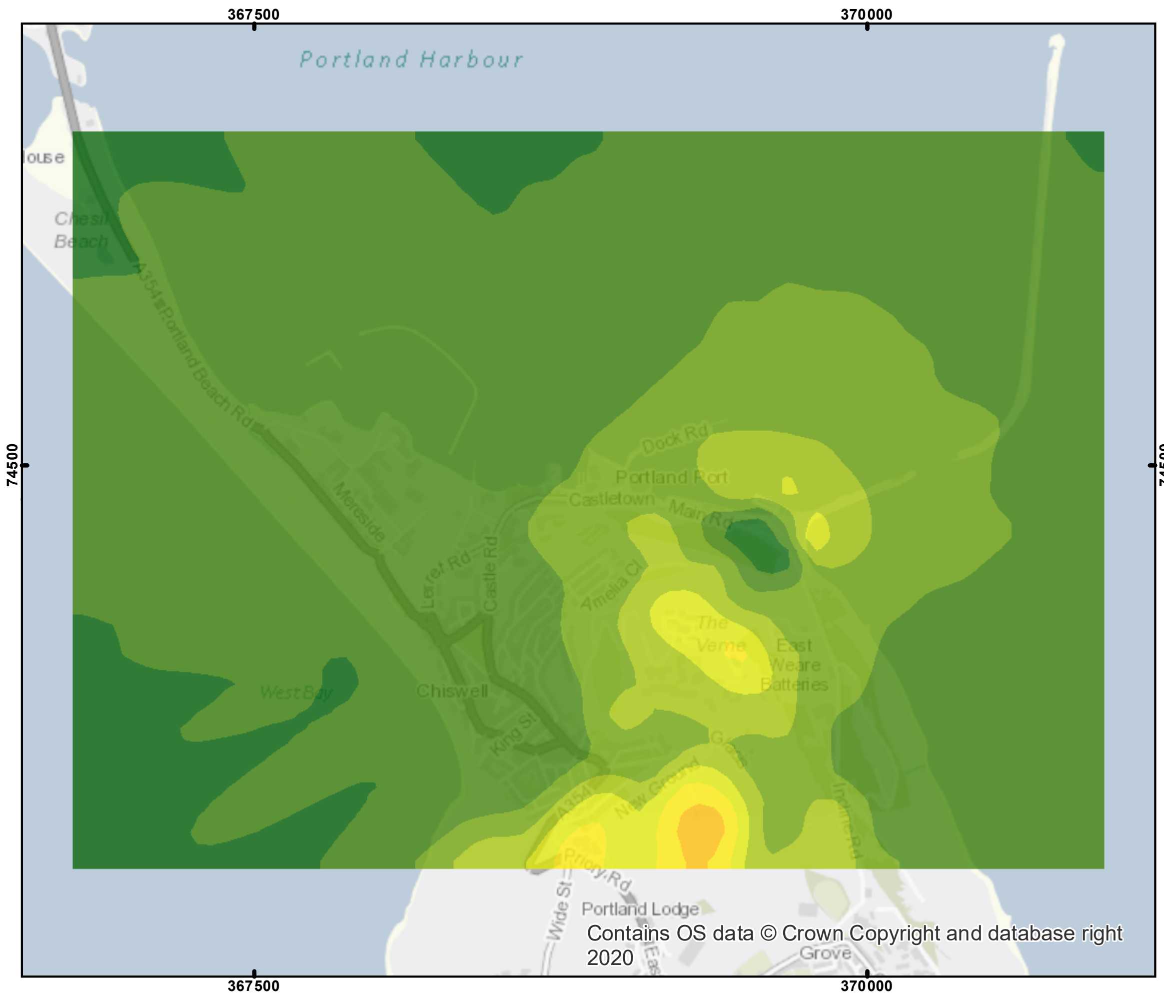
Base



Variable Surface Roughness Length - CORINE



Variable Surface Roughness Length - CORINE modified



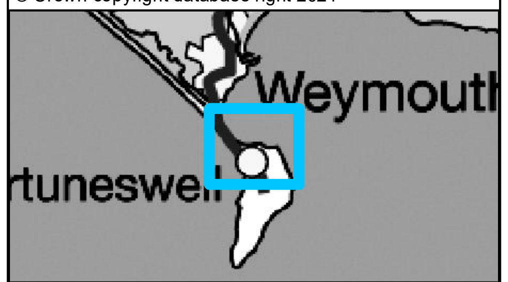
Legend

Maximum 1-hour mean NOx

ug/m3

- <5
- 5 - 10
- 10 -15
- 15 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 45
- 45 - 50

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	Figure 17 Domain Surface Length Sensitivity Analysis
Drawn by: RSF	Date: 09/11/2021



0 0.3 0.6 1.2 km

N

Scale: 1:30,800

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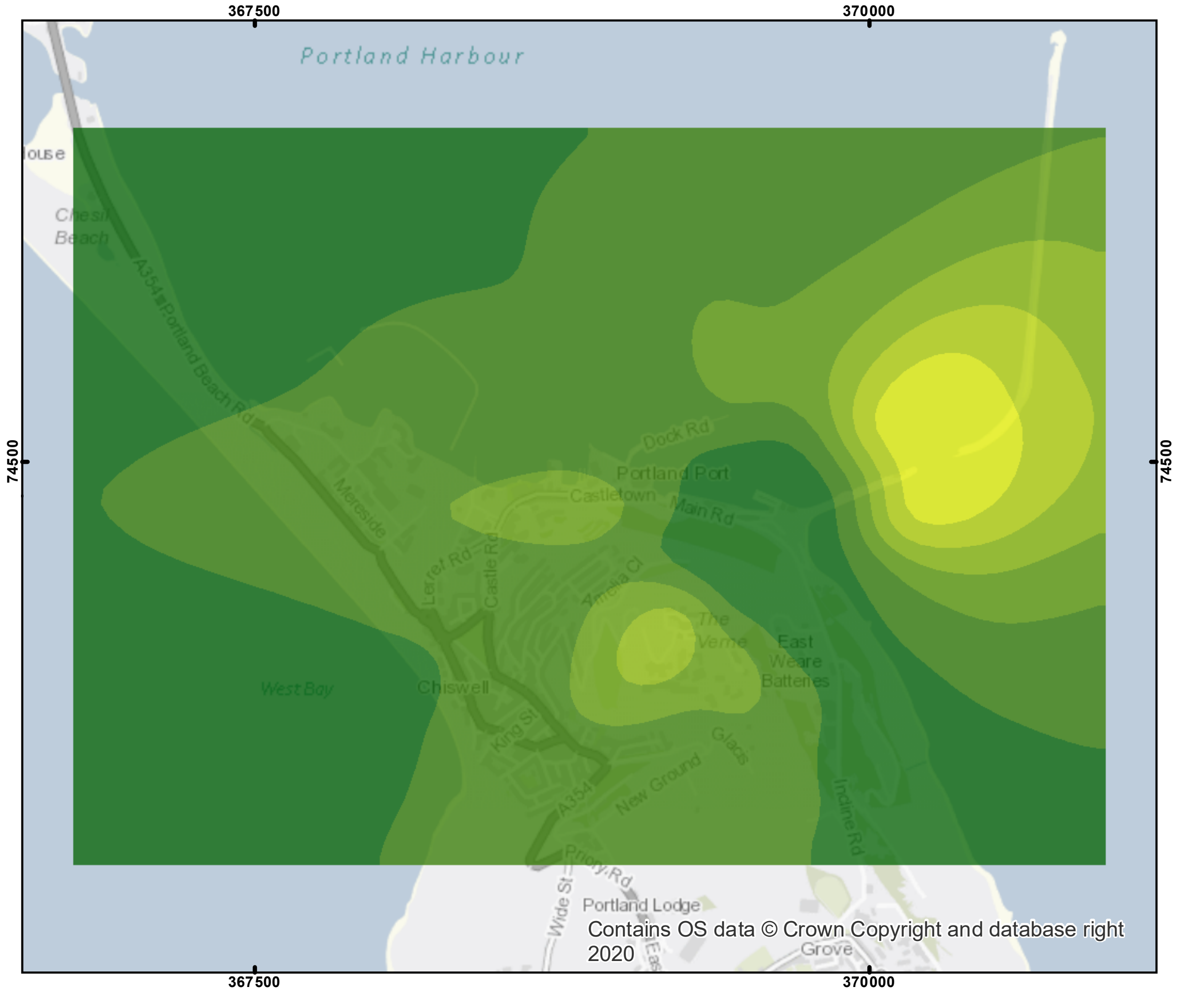
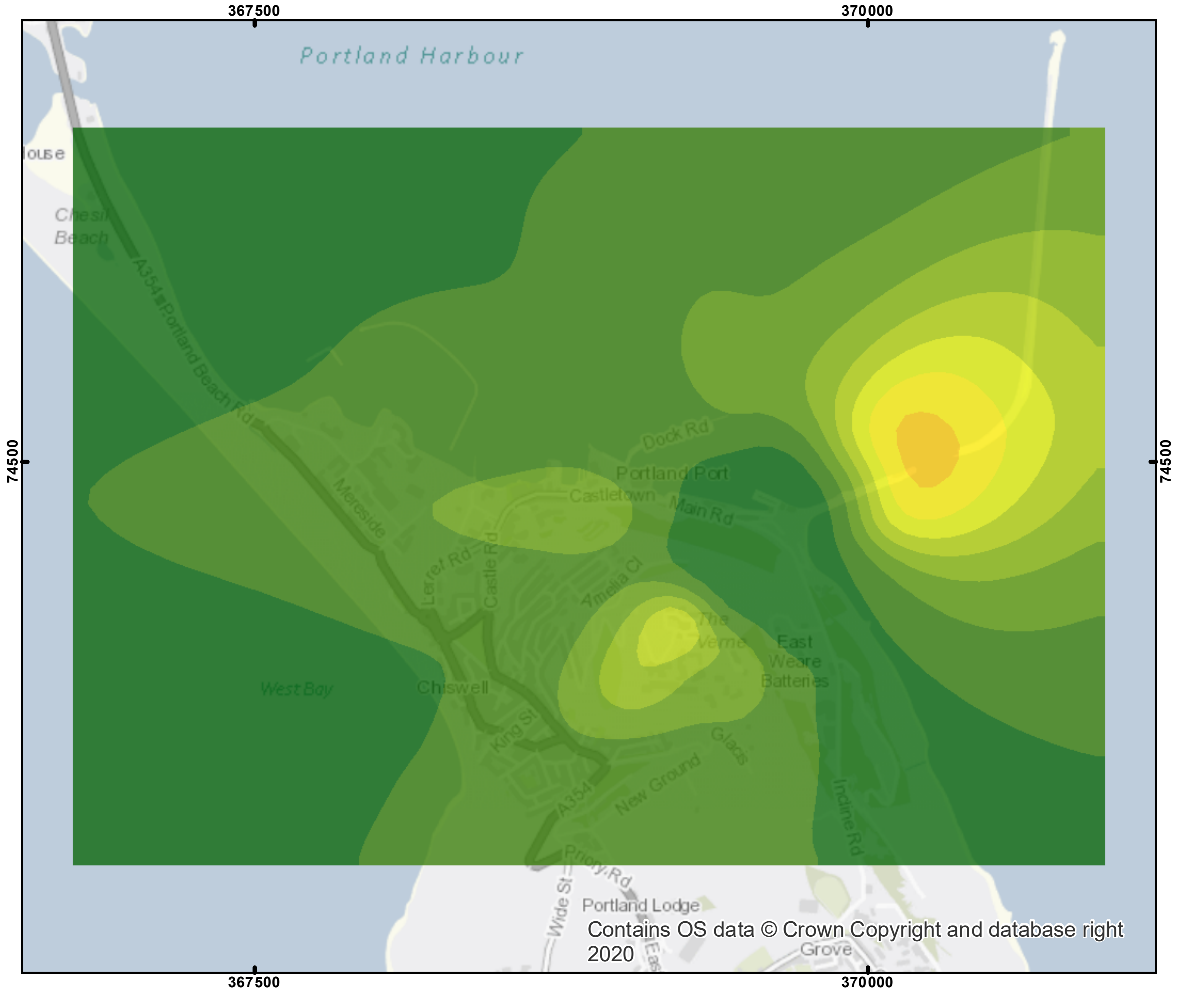
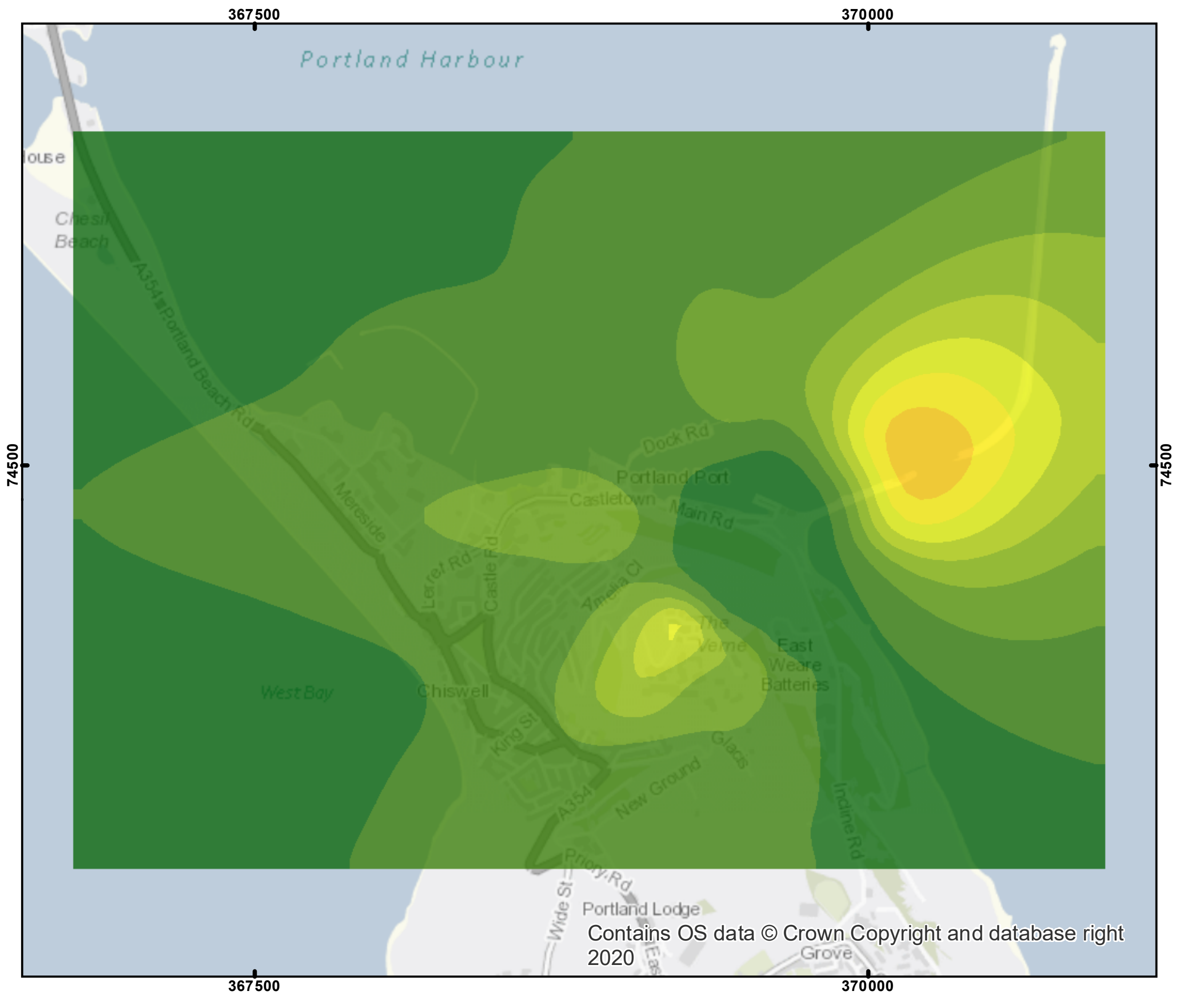
32 x 32



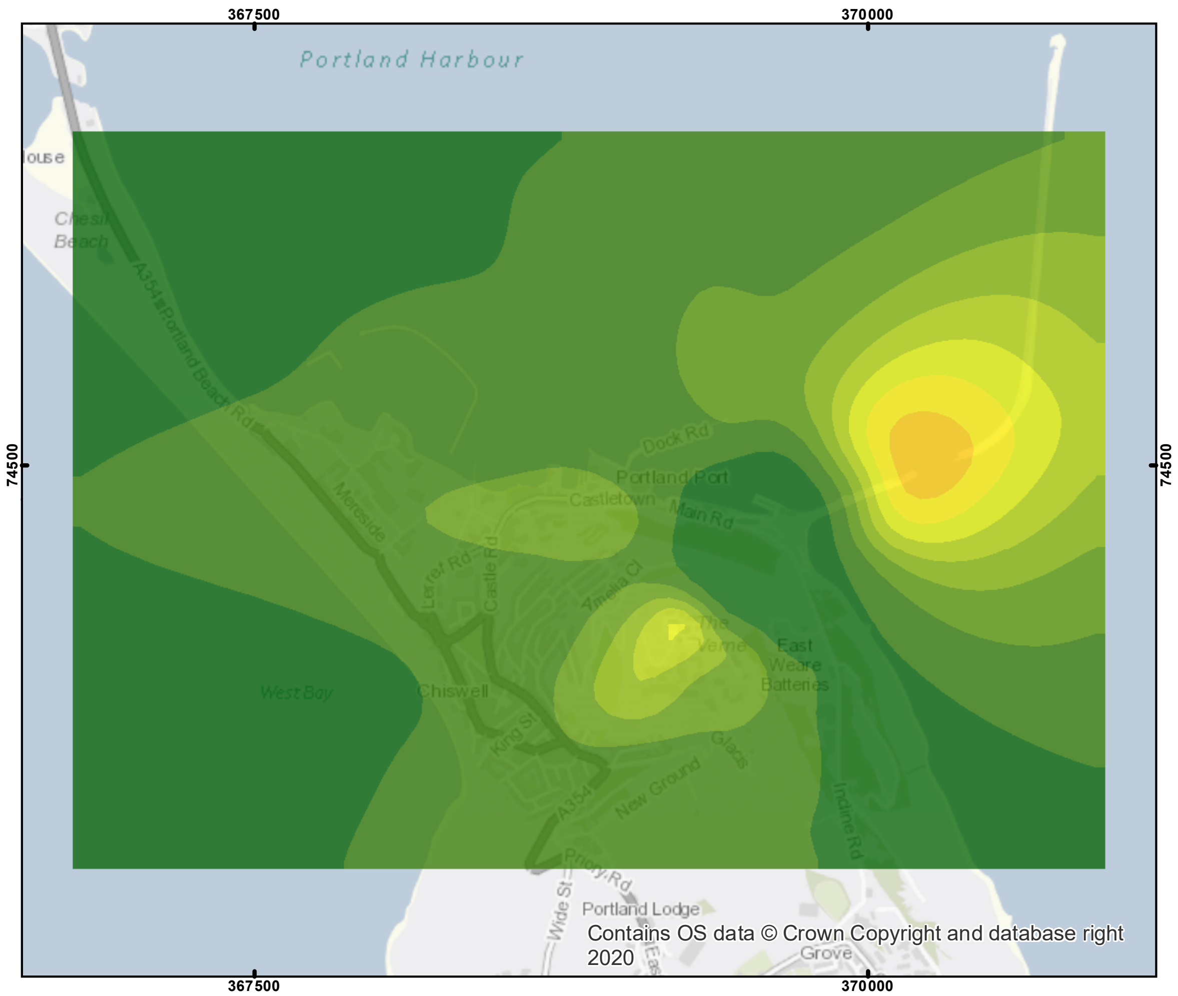
64 x 64



128 x 128 - as used in DMA



256 x 256



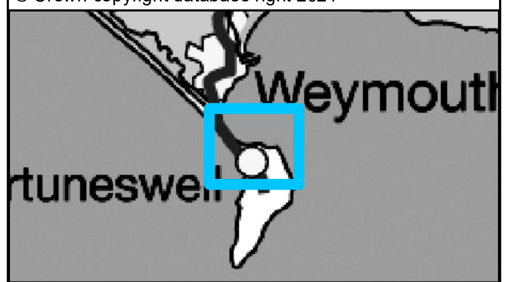
Legend

Maximum Annual Mean NOx

ug/m3

- <0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- 0.8 - 0.9
- 0.9 - 1
- 1 - 1.1
- 1.1 - 1.2

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	Figure 18 Flow Field Resolution Sensitivity Analysis
Drawn by: RSF	Date: 15/11/2021



0 0.325 0.65 1.3 km

N

Scale: 1:30,800

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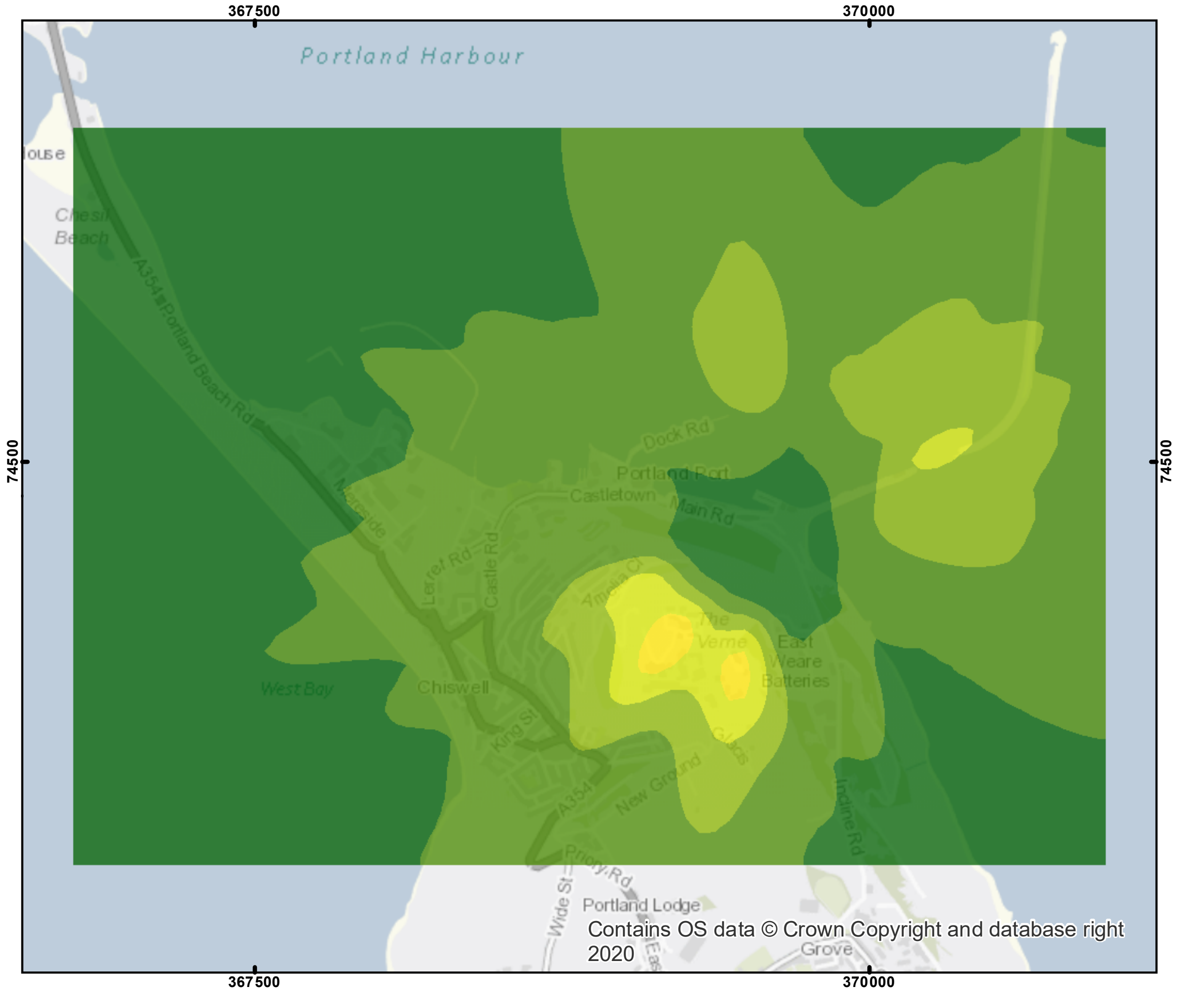
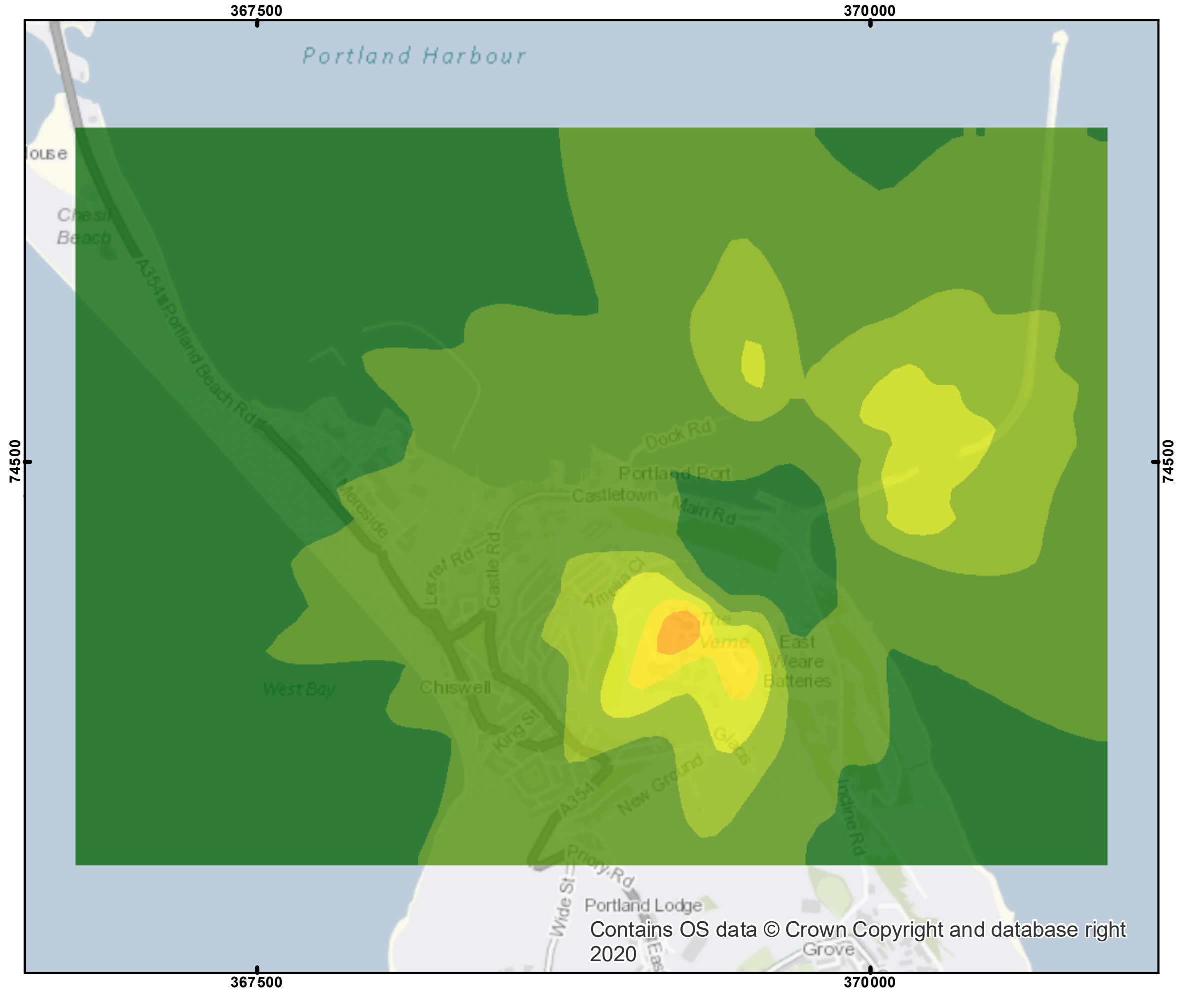
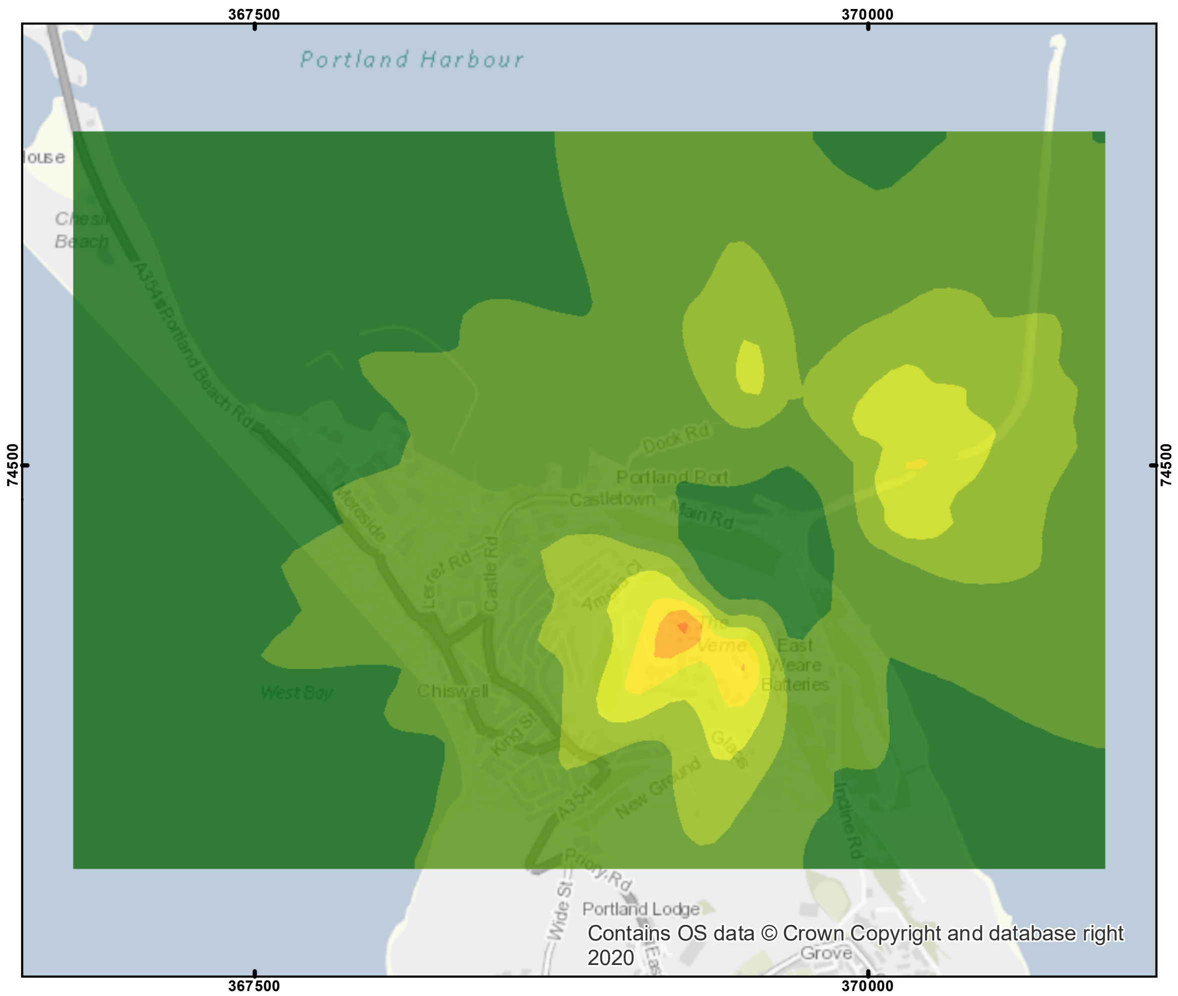
32 x 32



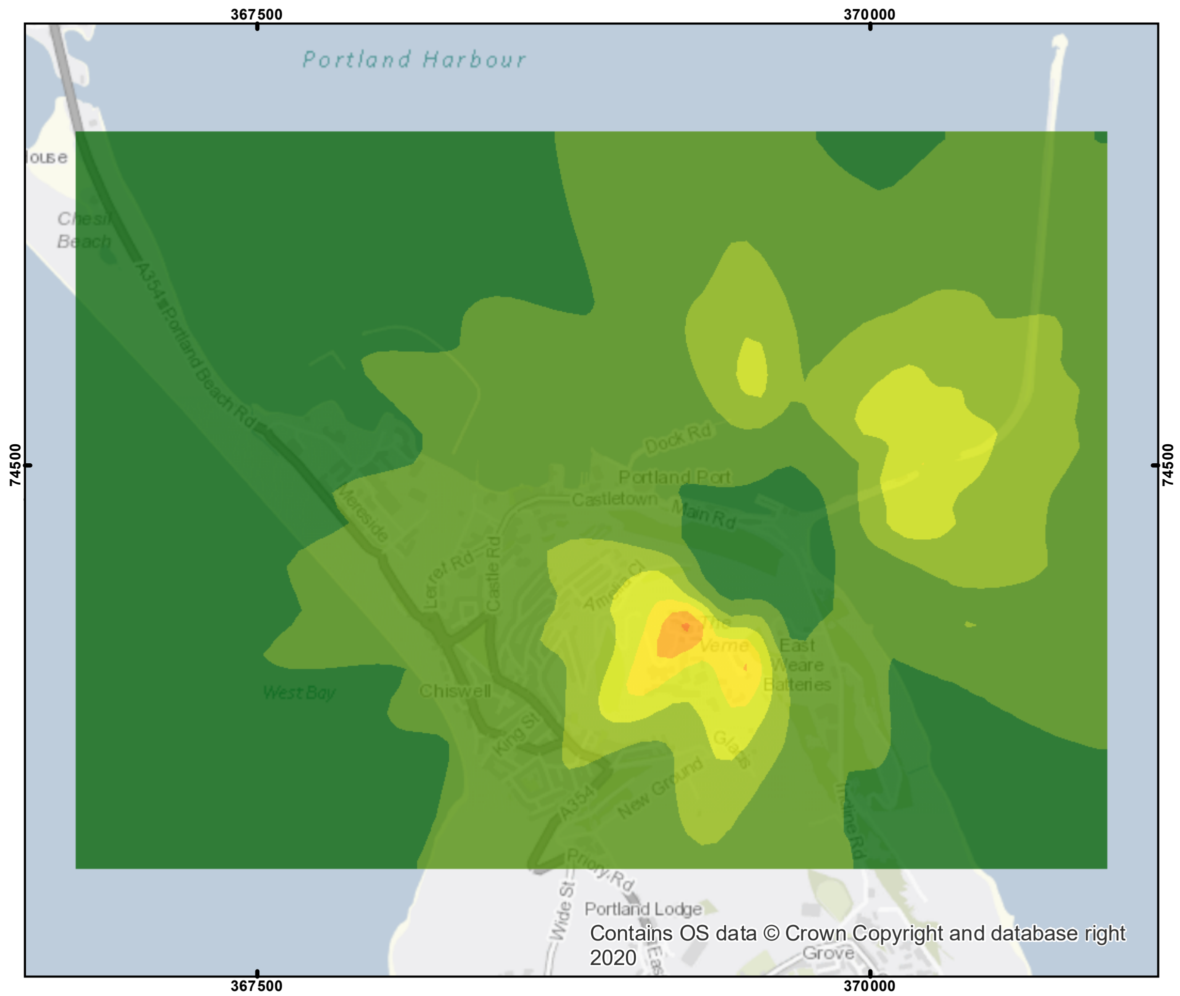
64 x 64



128 x 128 - as used in DMA



256 x 256

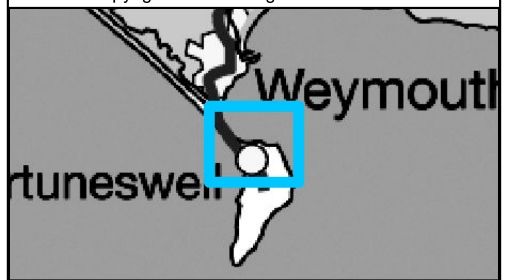


Legend

Maximum 24-hour NOx ug/m3

- < 2
- 2 - 4
- 4 - 6
- 6 - 8
- 8 - 10
- 10 - 12
- 12 - 14
- 14 - 16

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	Figure 19 Flow Field Resolution Sensitivity Analysis
Drawn by: RSF	Date: 09/11/2021



0 0.325 0.65 1.3 km

N

Scale: 1:30,800

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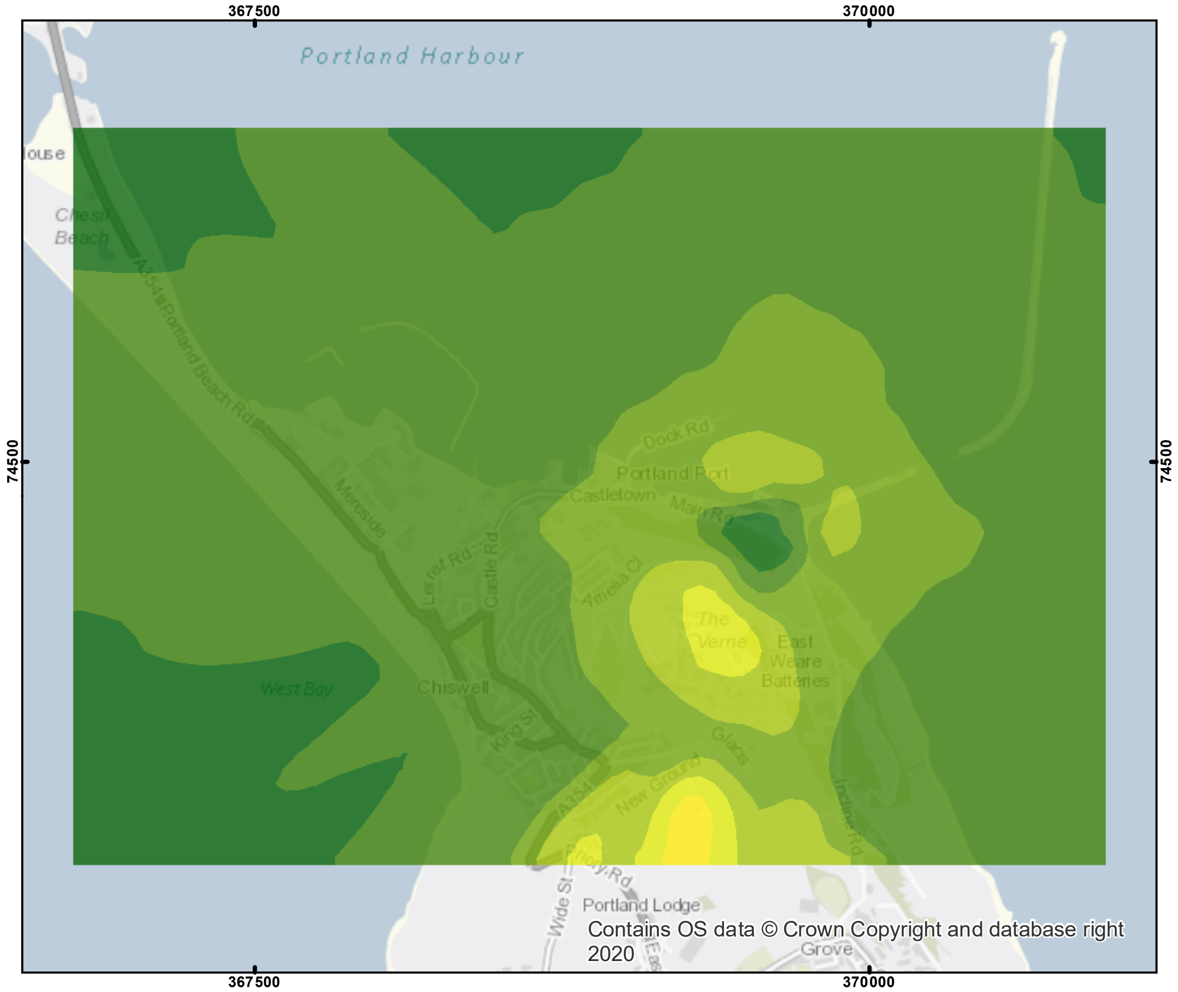
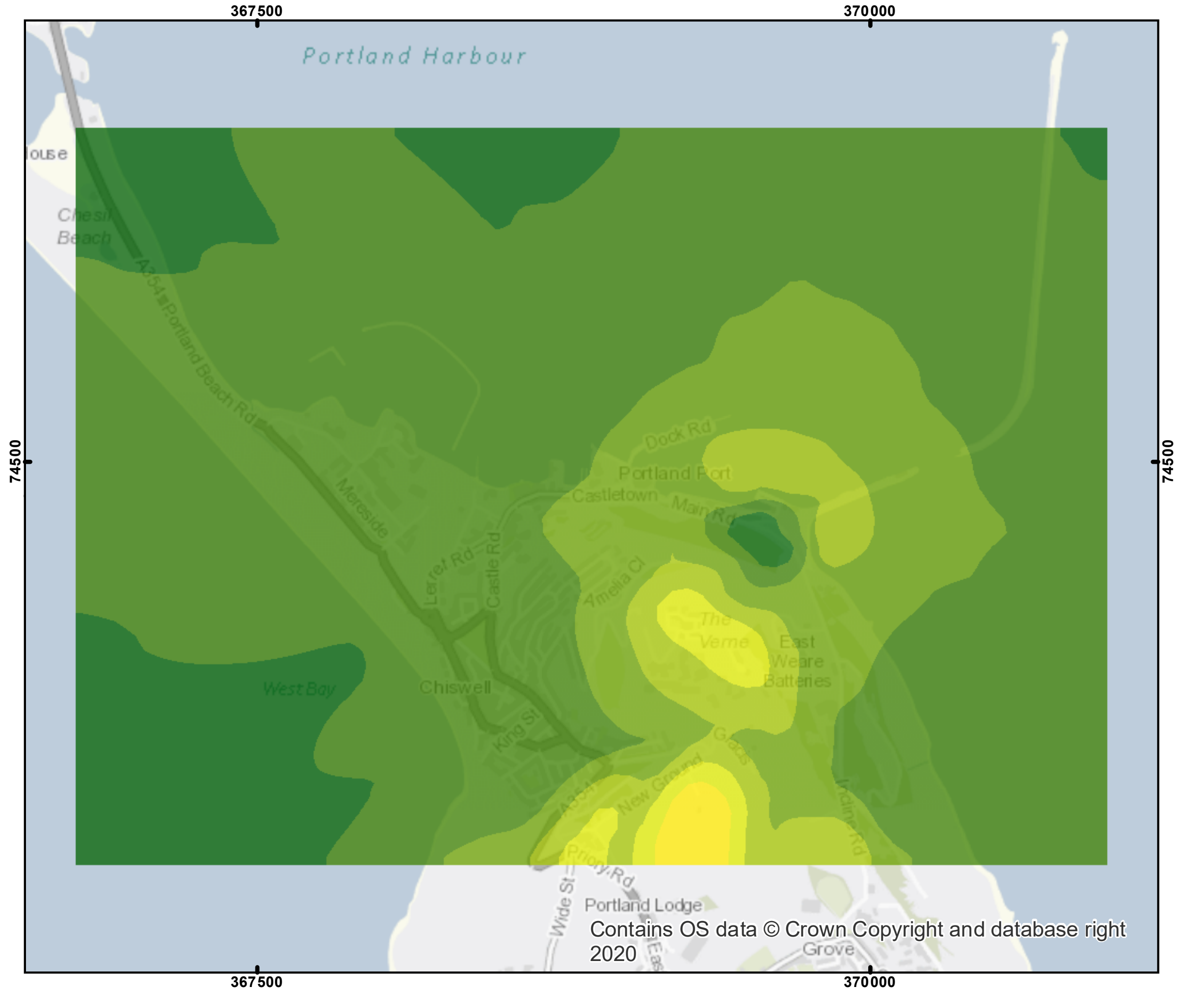
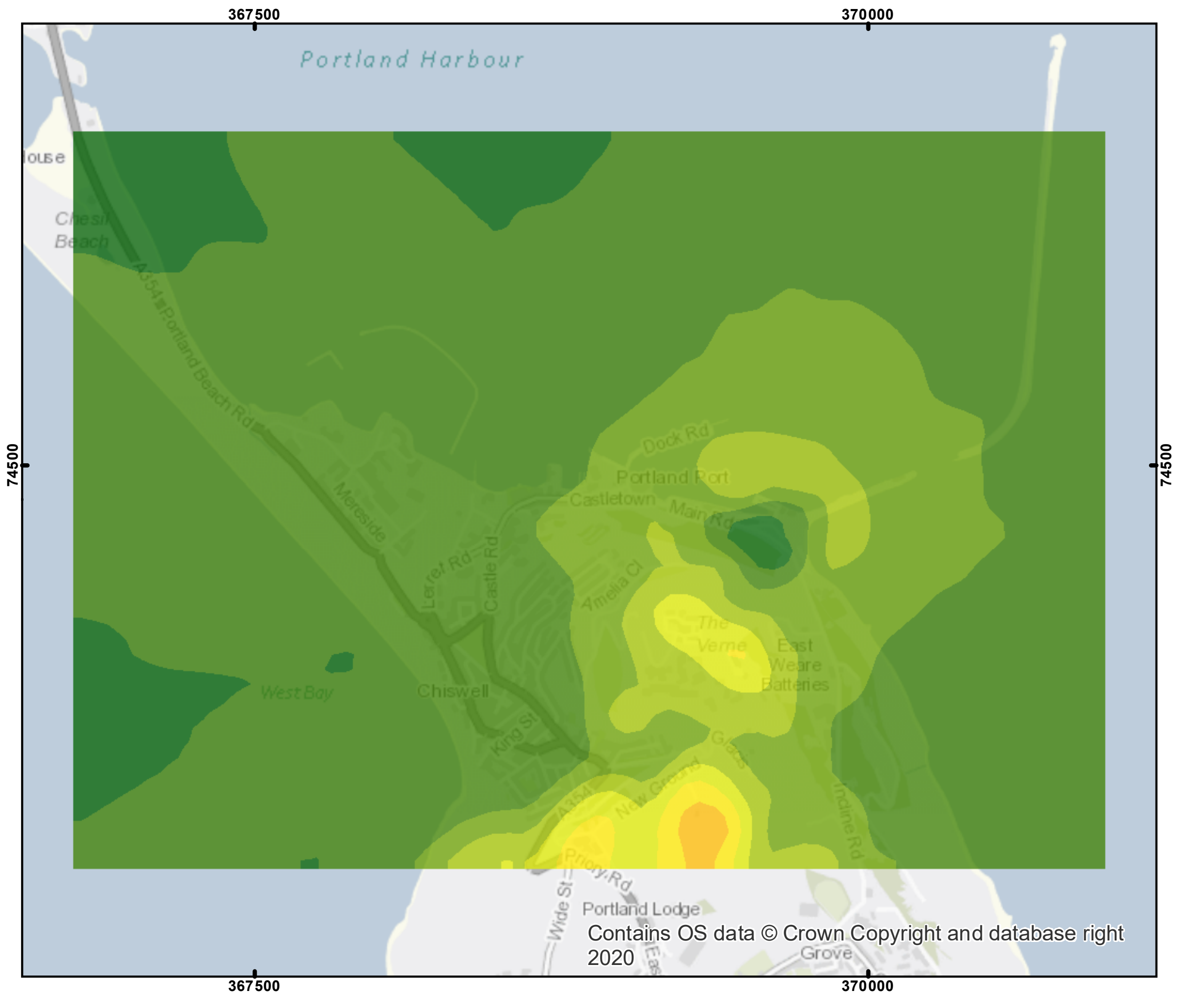
32 x 32



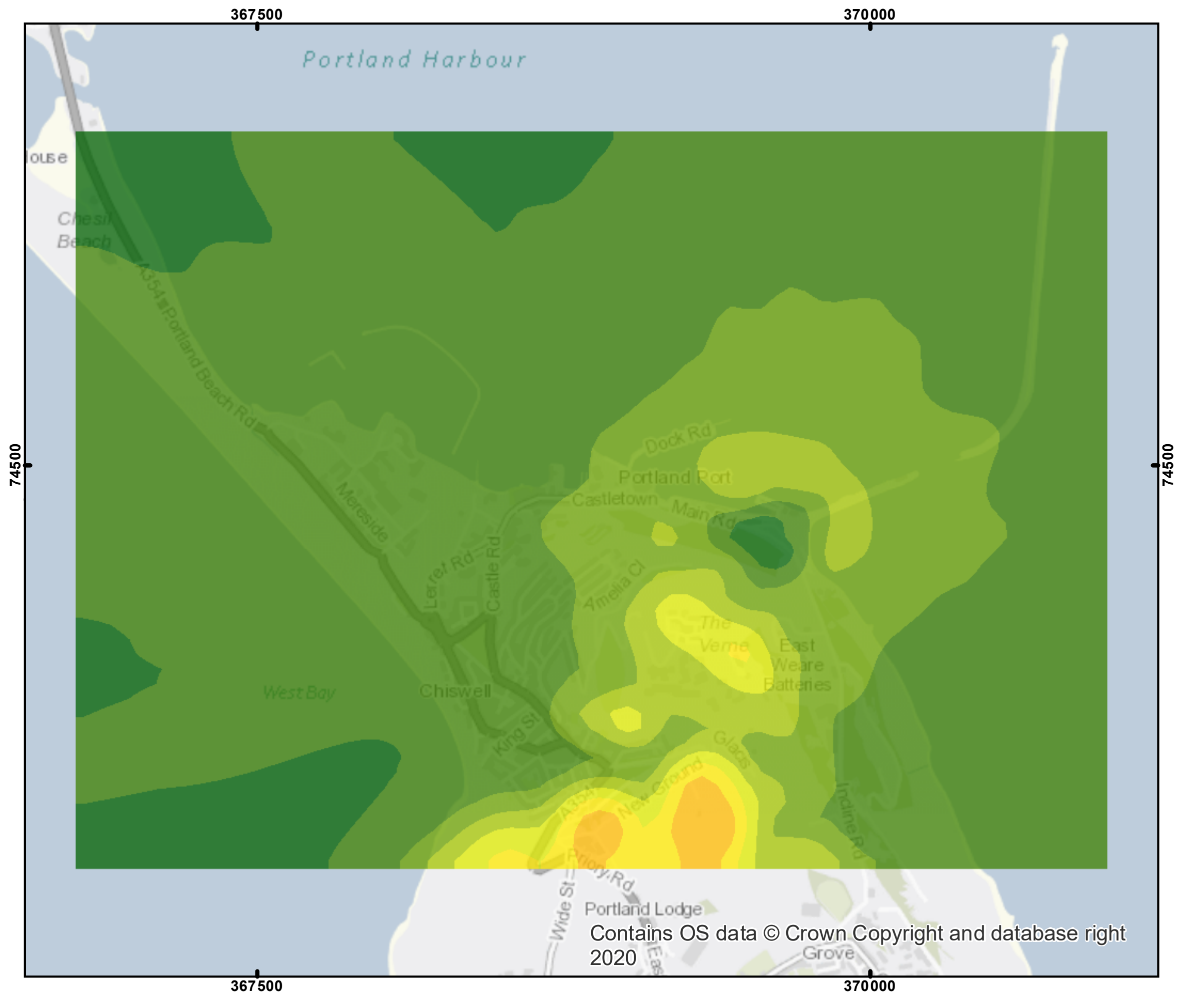
64 x 64



128 x 128 - as used in DMA



256 x 256



Legend

Maximum 1-hour NOx ug/m3

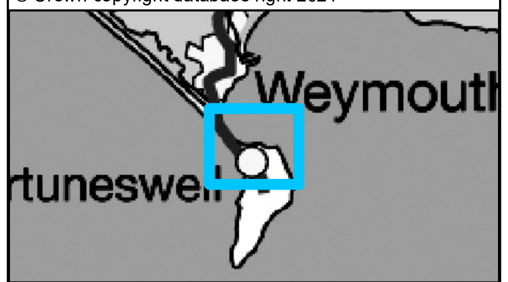
- <5
- 5 - 10
- 10 -15
- 15 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 45
- 45 - 50

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953

Title:

Figure 20
Flow Field Resolution
Sensitivity Analysis

Drawn by: RSF	Date: 09/11/2021



0 0.325 0.65 1.3 km

N

Scale: 1:30,800

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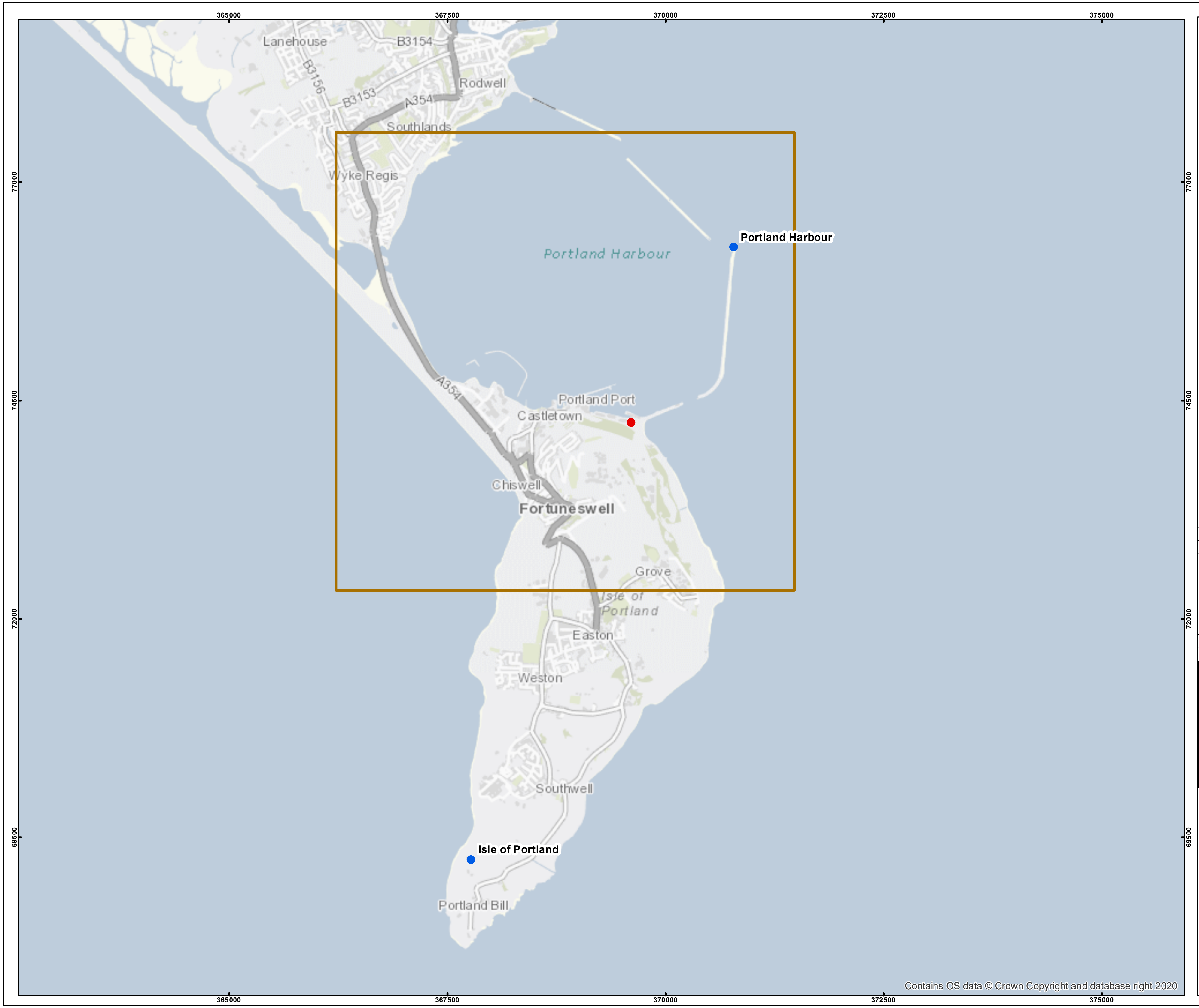


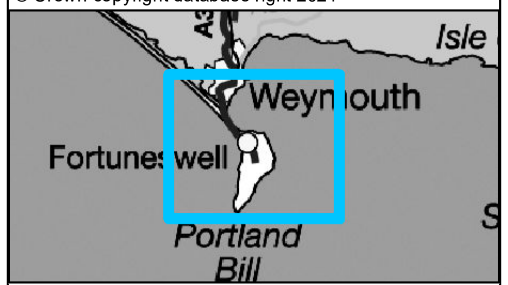
Legend

- Main Stack
- Meteorological Observation Site
- Terrain Extents

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	

Figure 21
Meteorological Observation Stations

Drawn by: RSF	Date: 09/11/2021



0 0.4 0.8 1.6
km
N

Scale: 1:40,000

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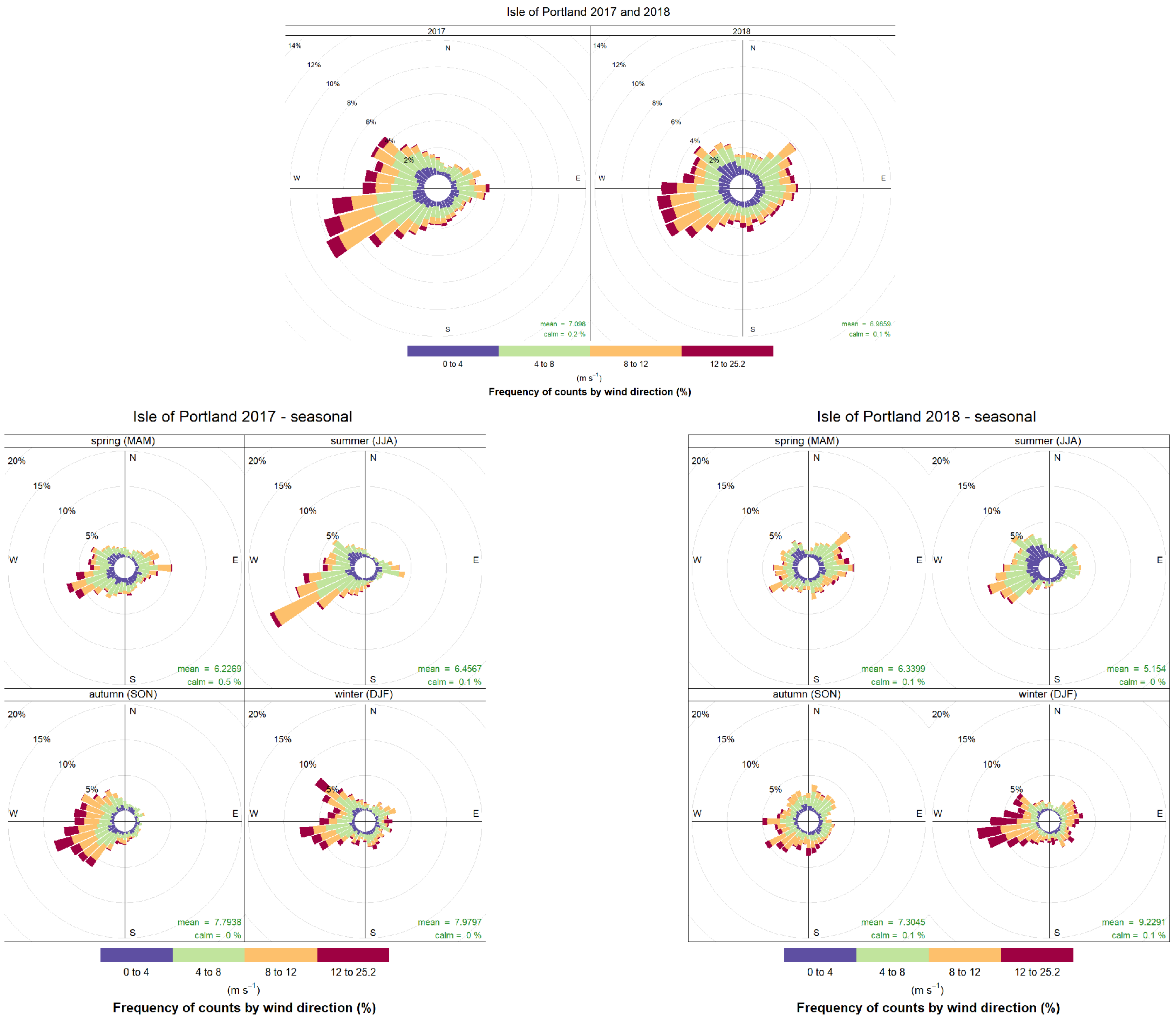
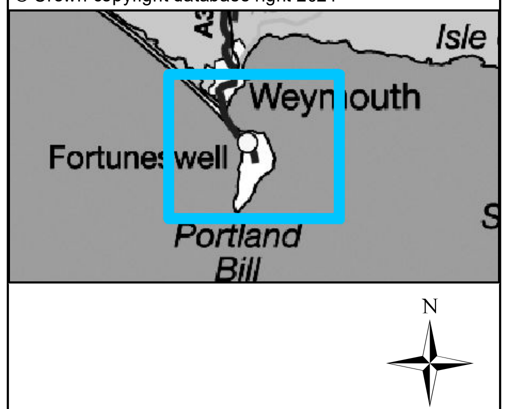


Legend

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	Figure 22 Isle of Portland Wind Data
Drawn by: RSF	Date: 10/11/2021



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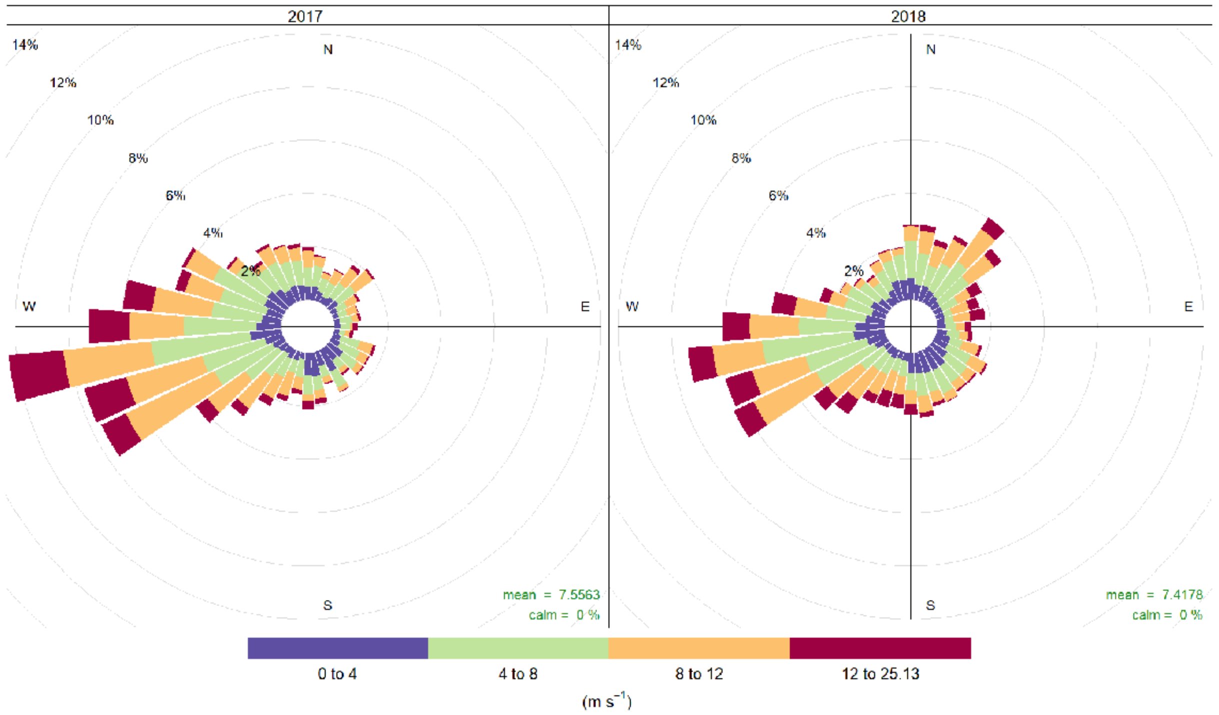
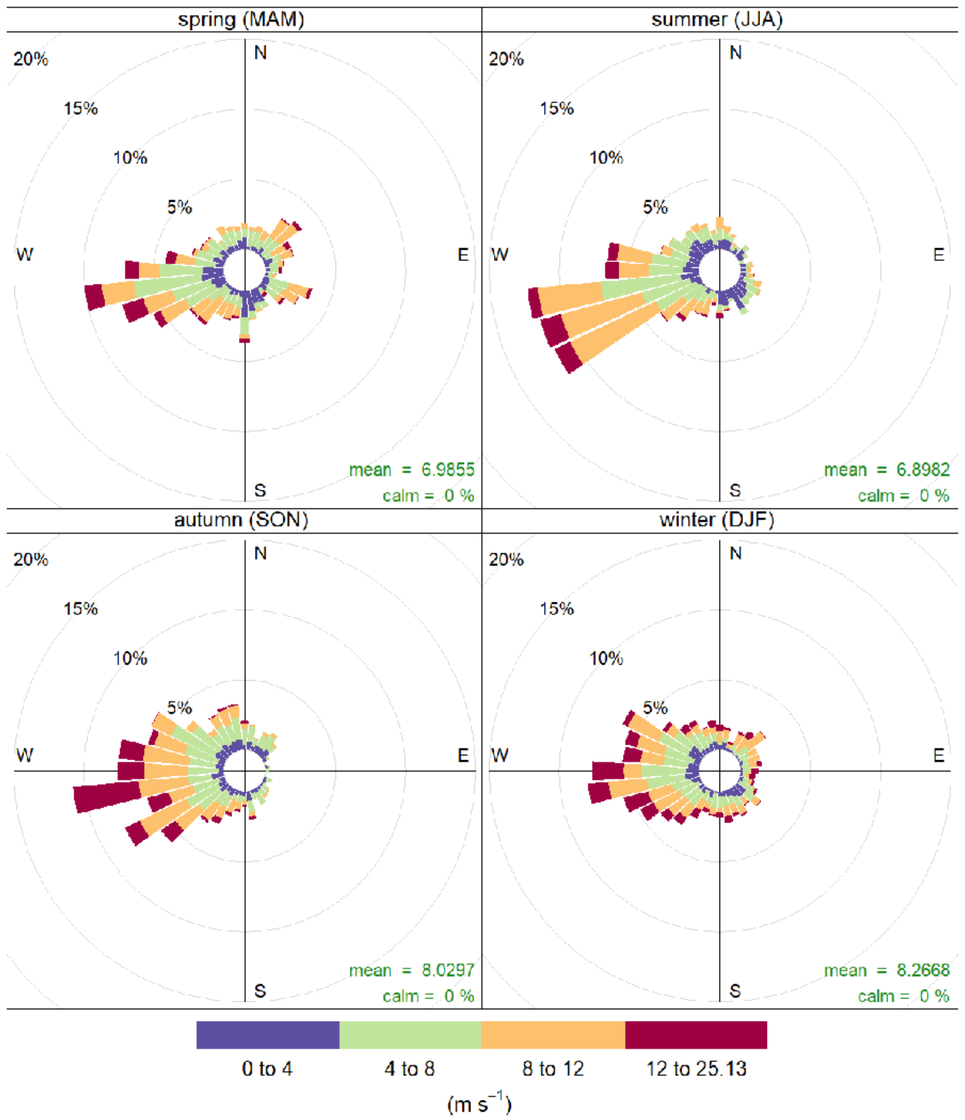
Stockport, Cheshire, SK4 1LW
Tel: 0161 476 0032
Fax: 0161 474 0618

Portland Harbour 2017 and 2018



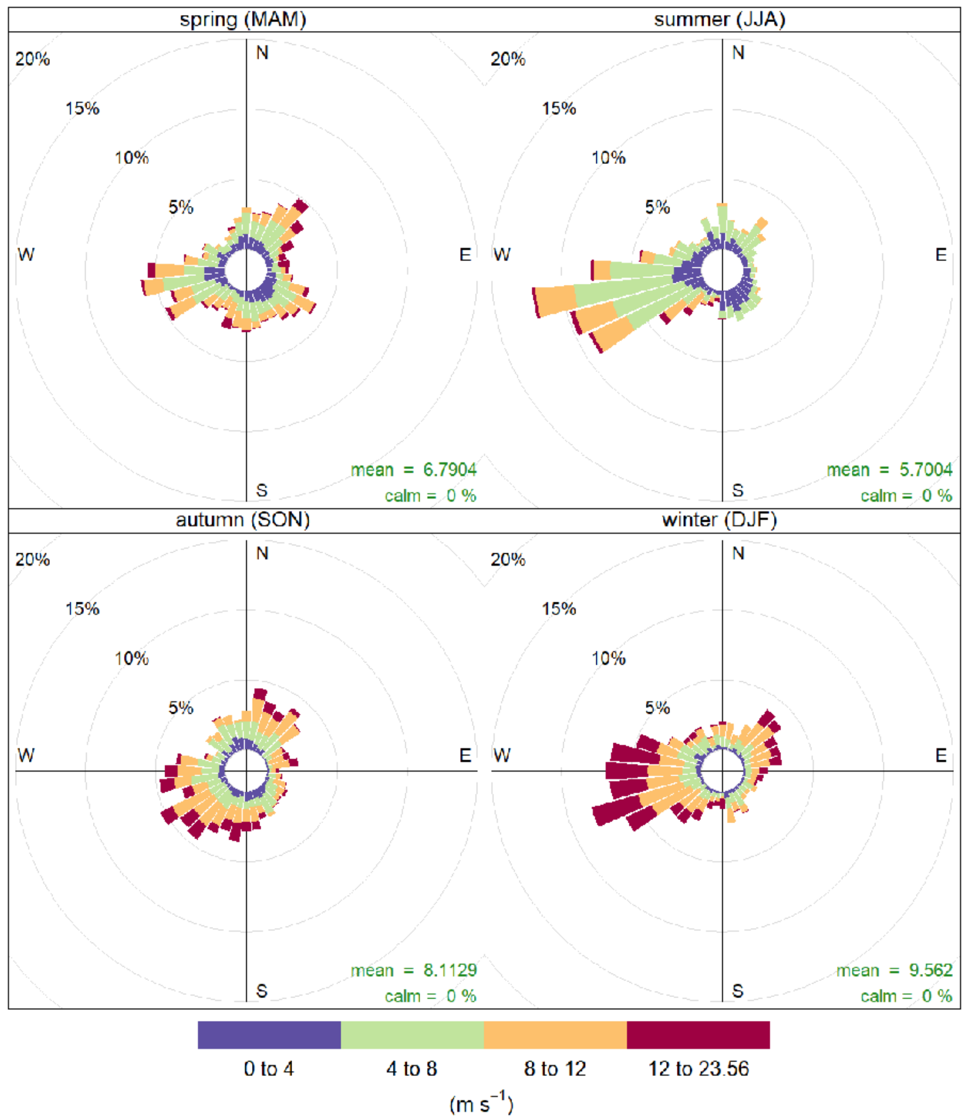
Frequency of counts by wind direction (%)

Portland Harbour 2017 - seasonal



Frequency of counts by wind direction (%)

Portland Harbour 2018 - seasonal



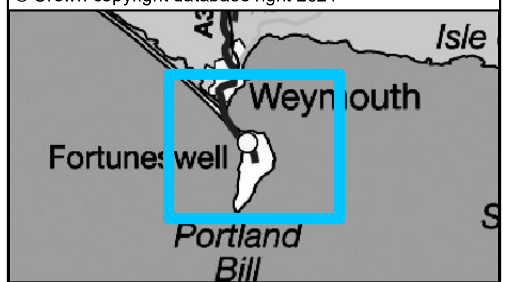
Frequency of counts by wind direction (%)

Legend

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	

Figure 23
Portland Harbour Wind Data

Drawn by: RSF | Date: 15/11/2021



N

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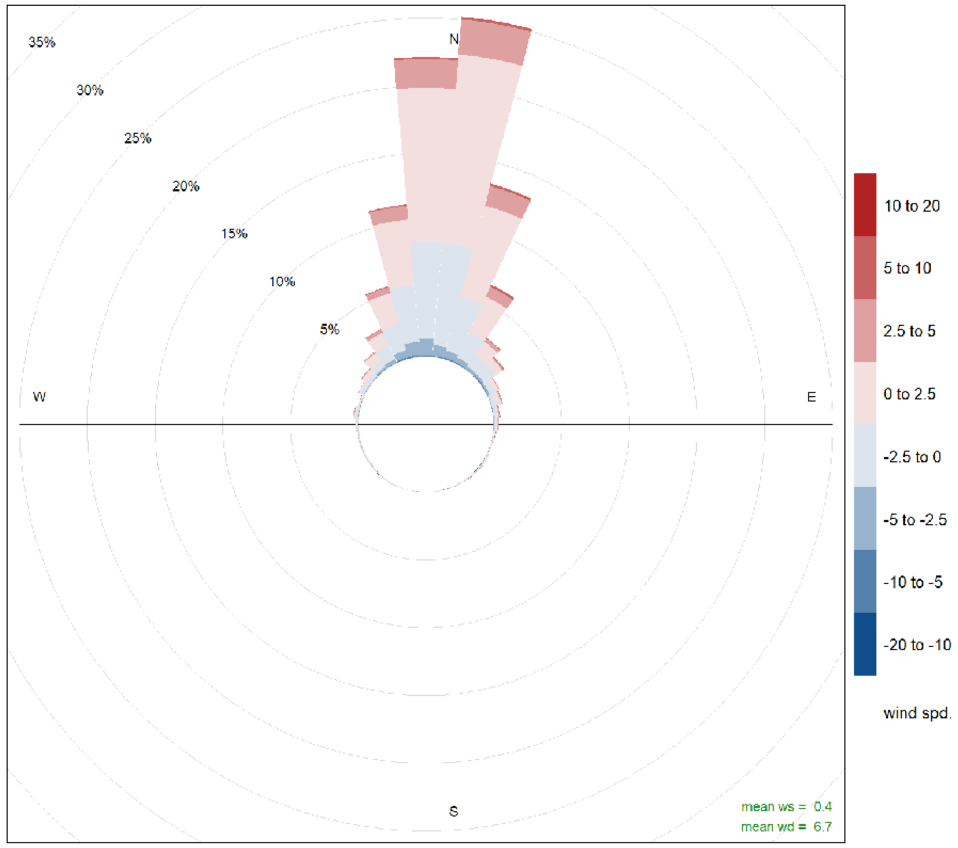
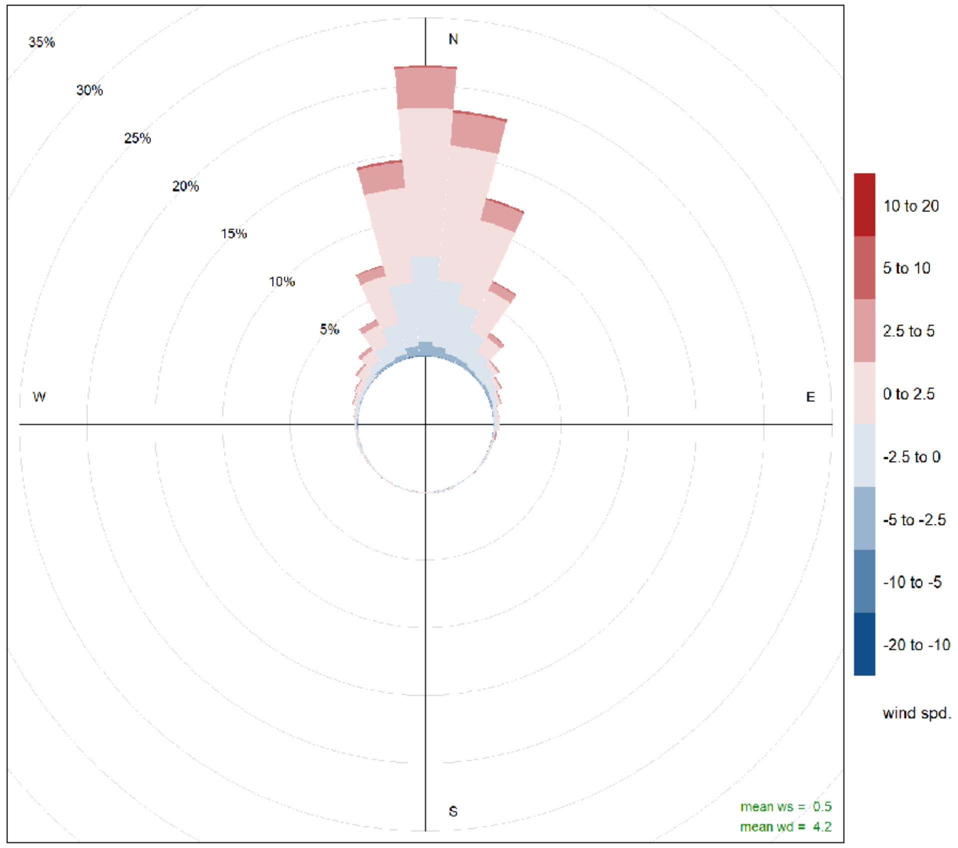
Fax: 0161 474 0618

Portland Harbour 2017 compared to Isle of Portland 2017



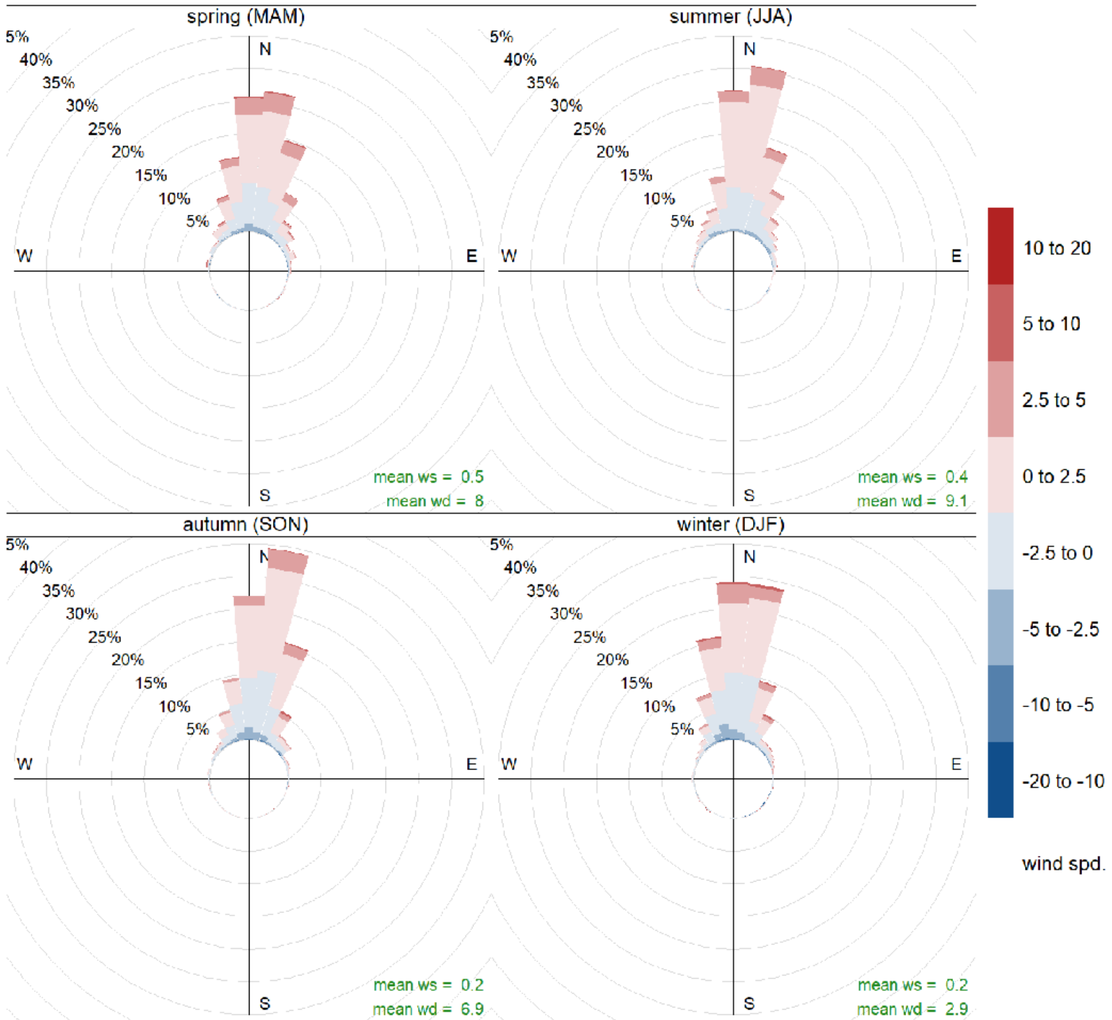
Frequency of counts by wind direction (%)

Portland Harbour 2018 compared to Isle of Portland 2018



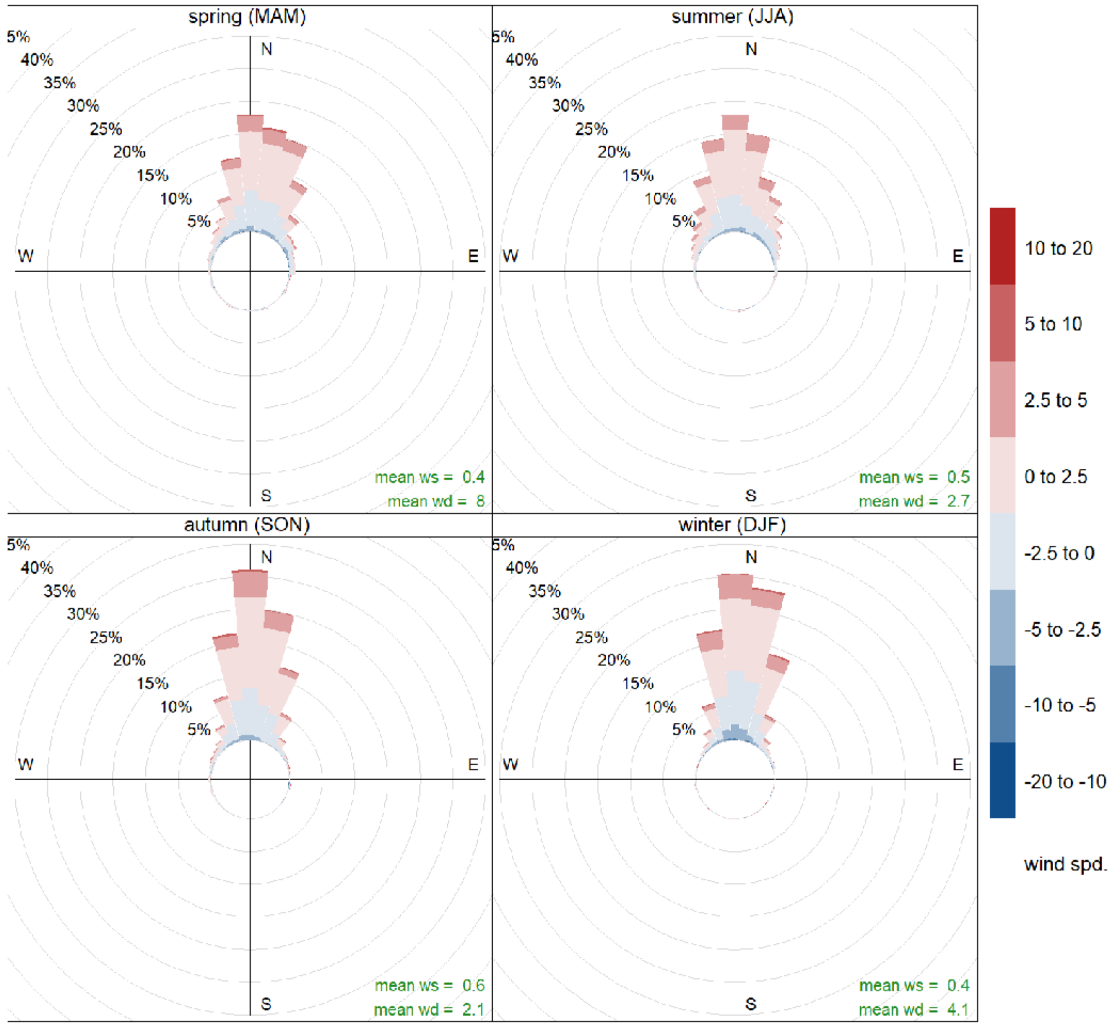
Frequency of counts by wind direction (%)

Portland Harbour 2017 compared to Isle of Portland 2017 - seasonal



Frequency of counts by wind direction (%)

Portland Harbour 2018 compared to Isle of Portland 2018 - seasonal



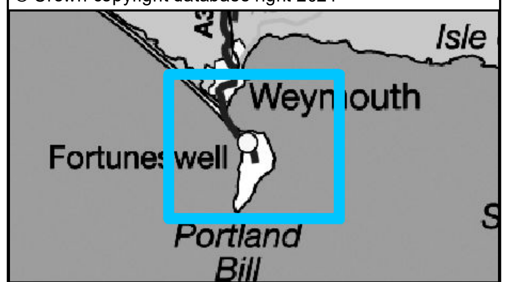
Frequency of counts by wind direction (%)

Legend

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	

Figure 24
Wind Data Comparison

Drawn by: RSF	Date: 15/11/2021



N

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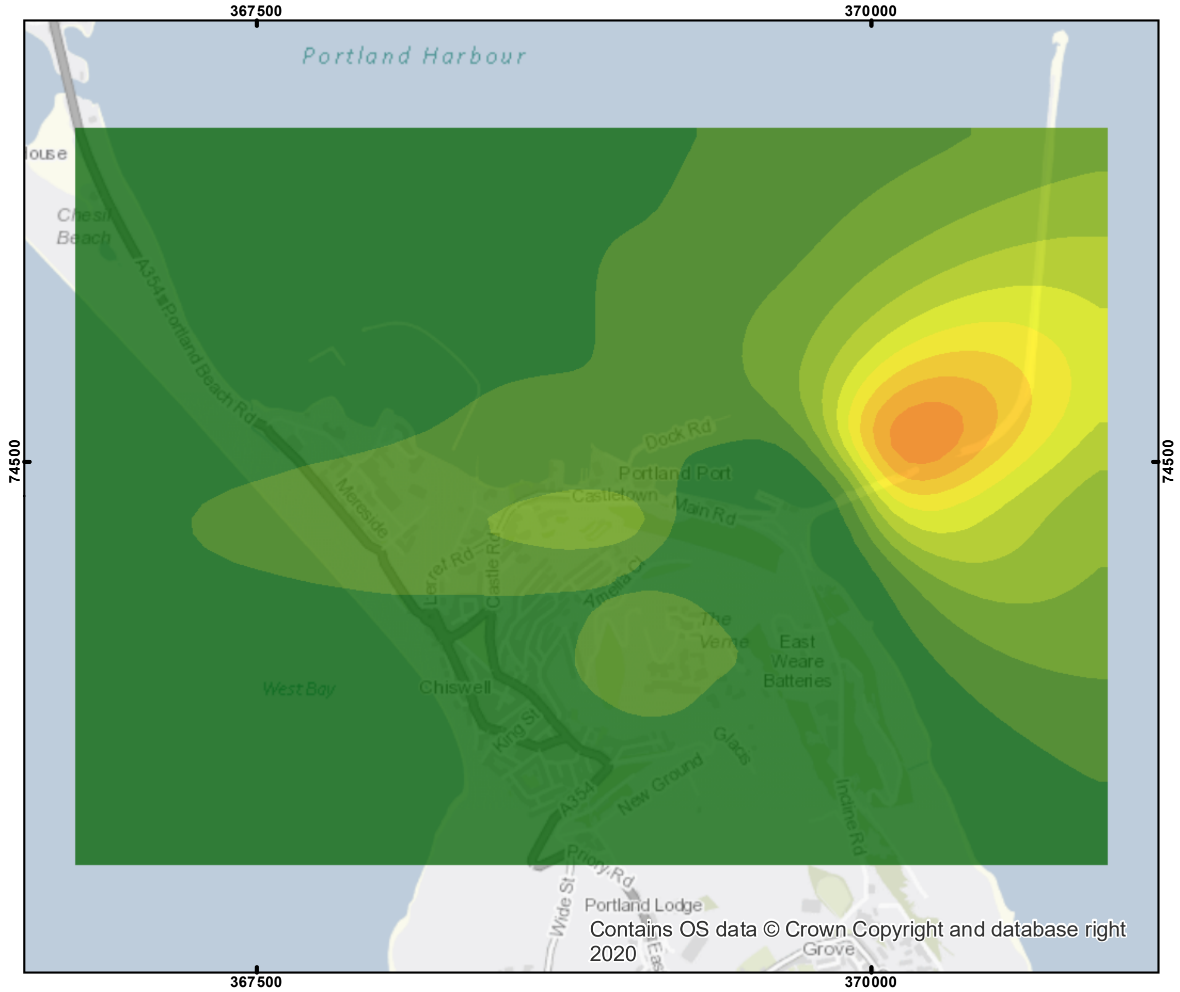
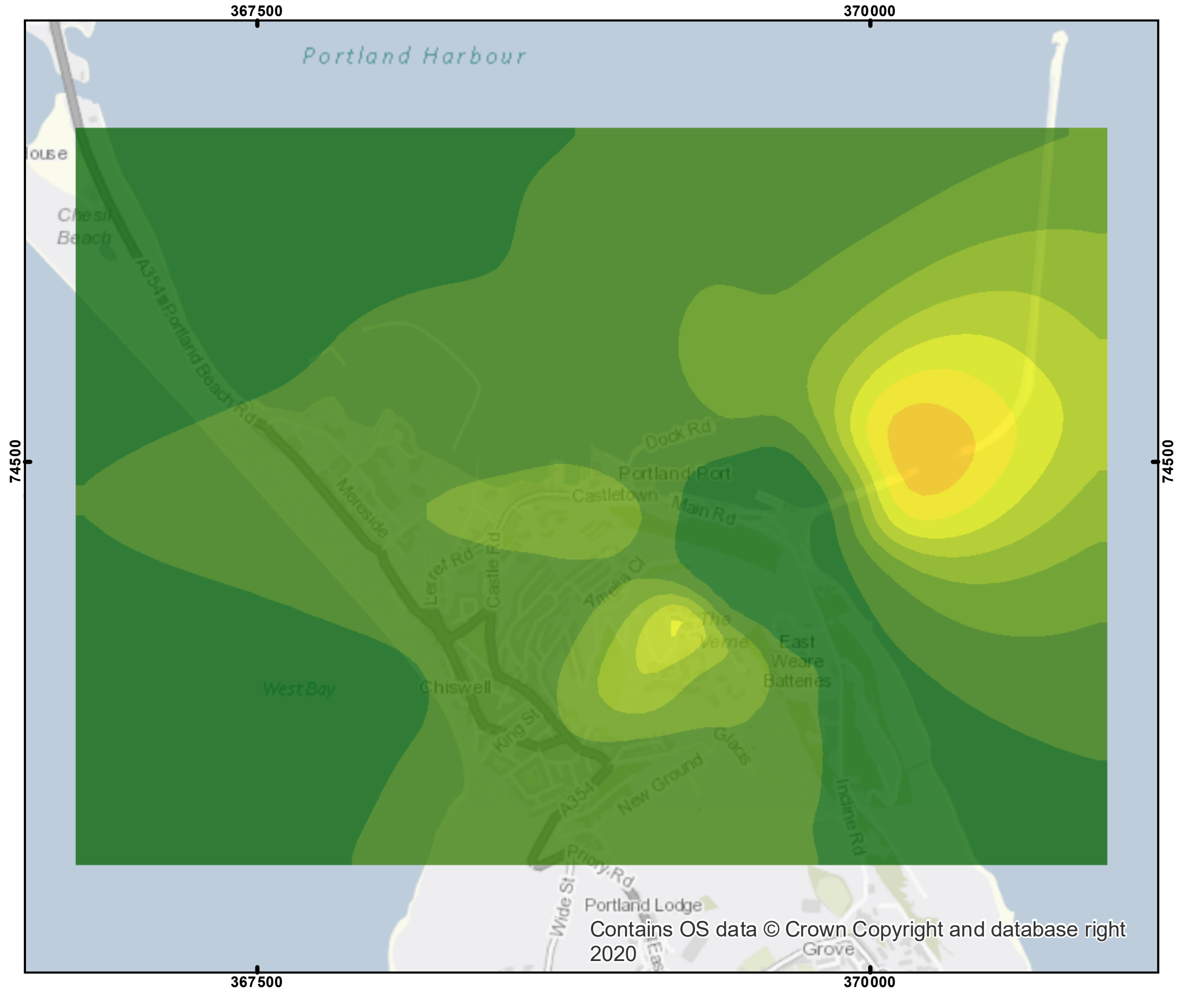
Fax: 0161 474 0618

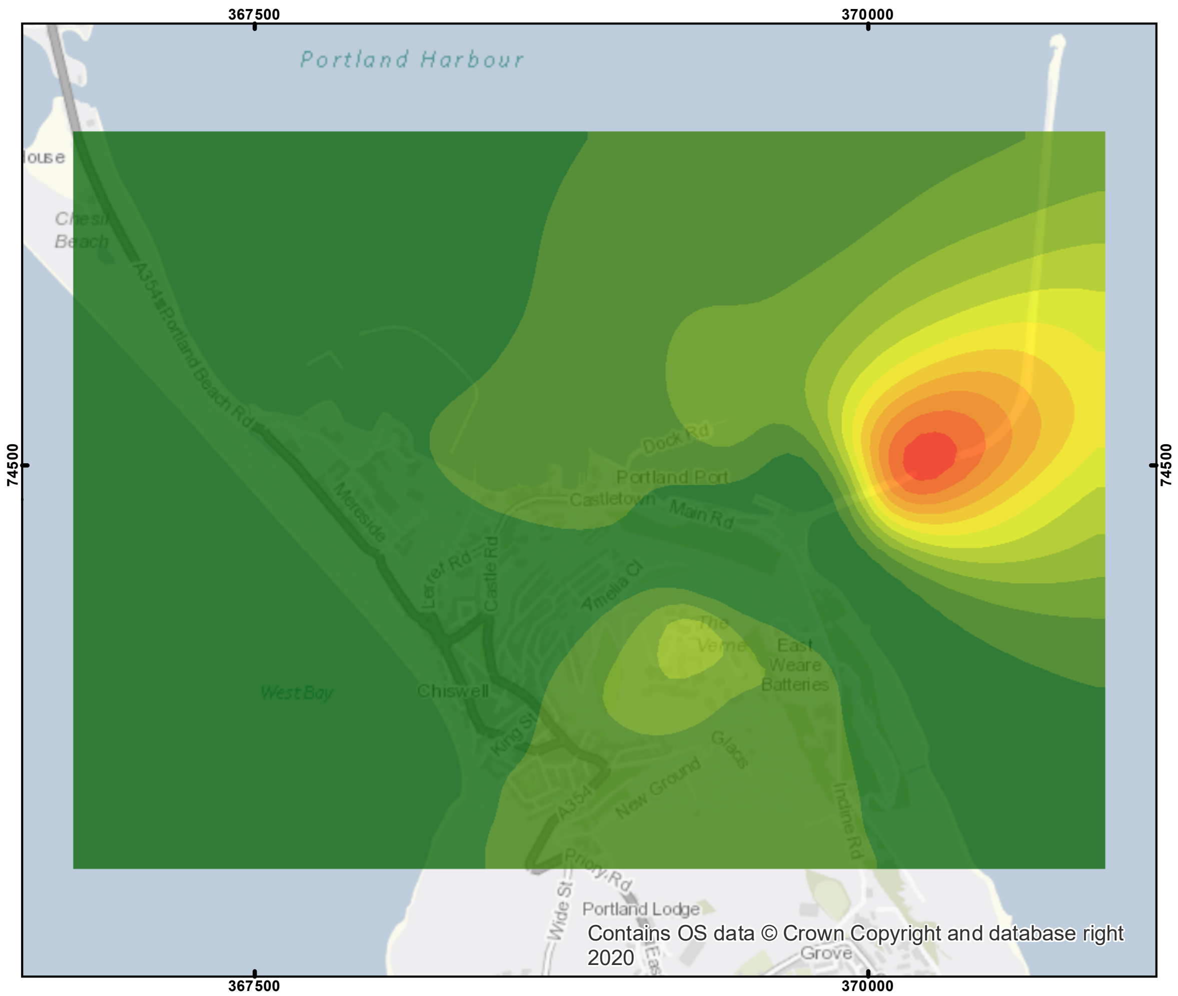
Isle of Portland - 2017



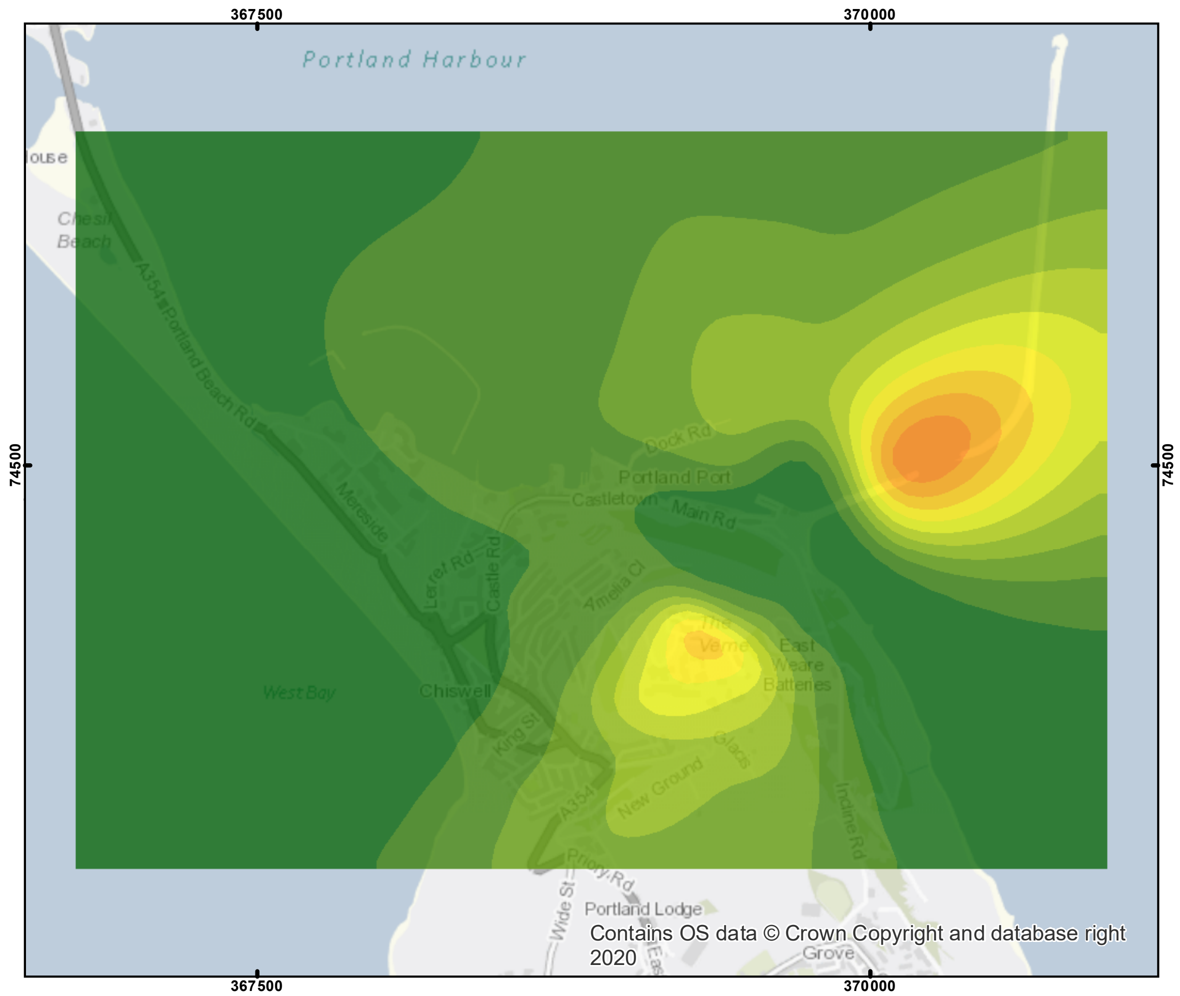
Isle of Portland - 2018



Portland Harbour - 2017



Portland Harbour - 2018



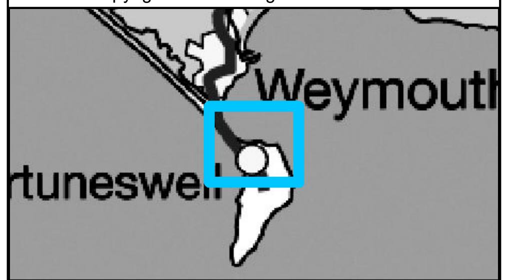
Legend

Maximum Annual Mean NOx

ug/m3

- <0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- 0.8 - 0.9
- 0.9 - 1
- 1 - 1.1
- 1.1 - 1.2

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	Figure 25 Met Data Sensitivity Analysis
Drawn by: RSF	Date: 10/11/2021



0 0.3 0.6 1.2 km

N

Scale: 1:30,800

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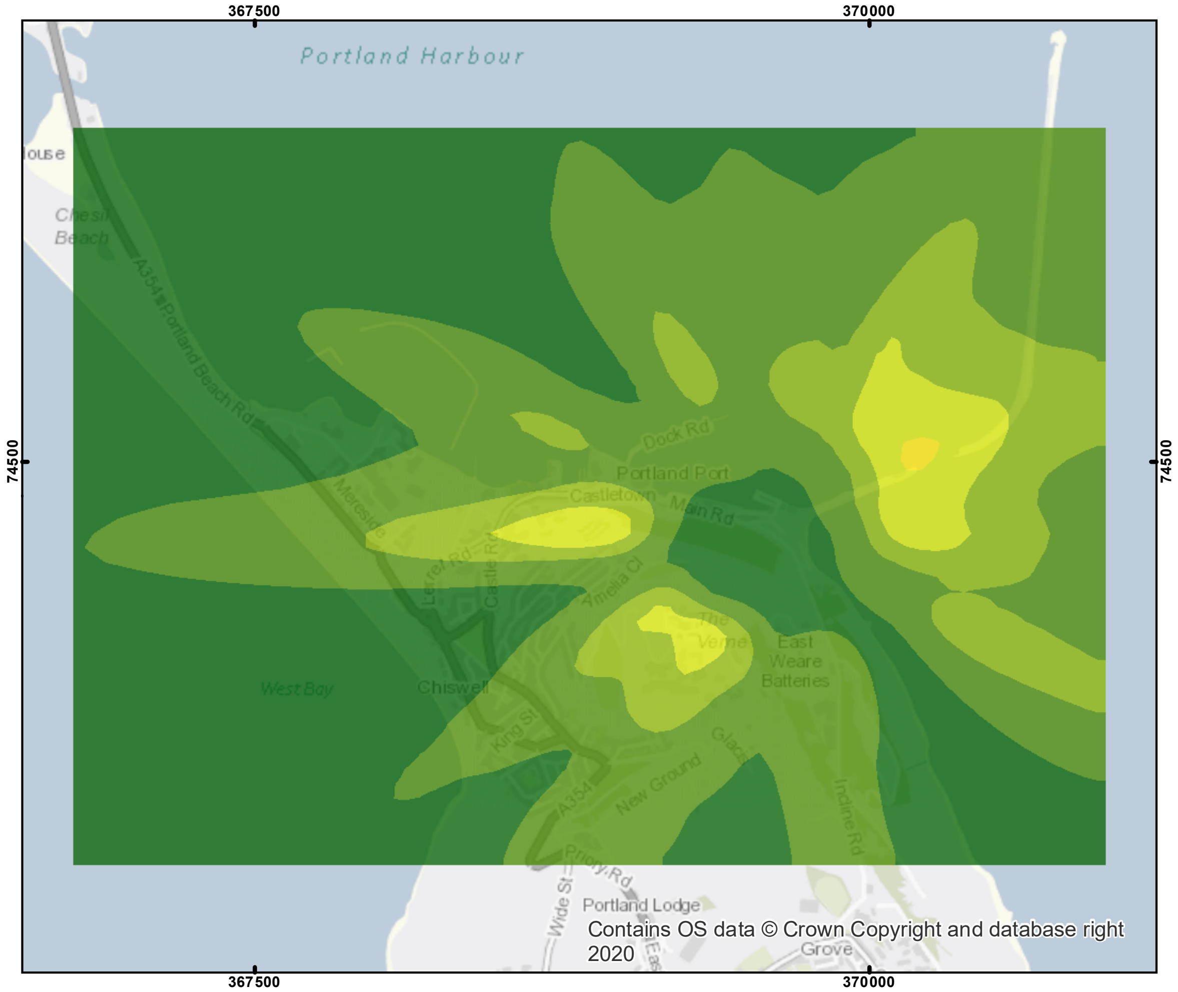
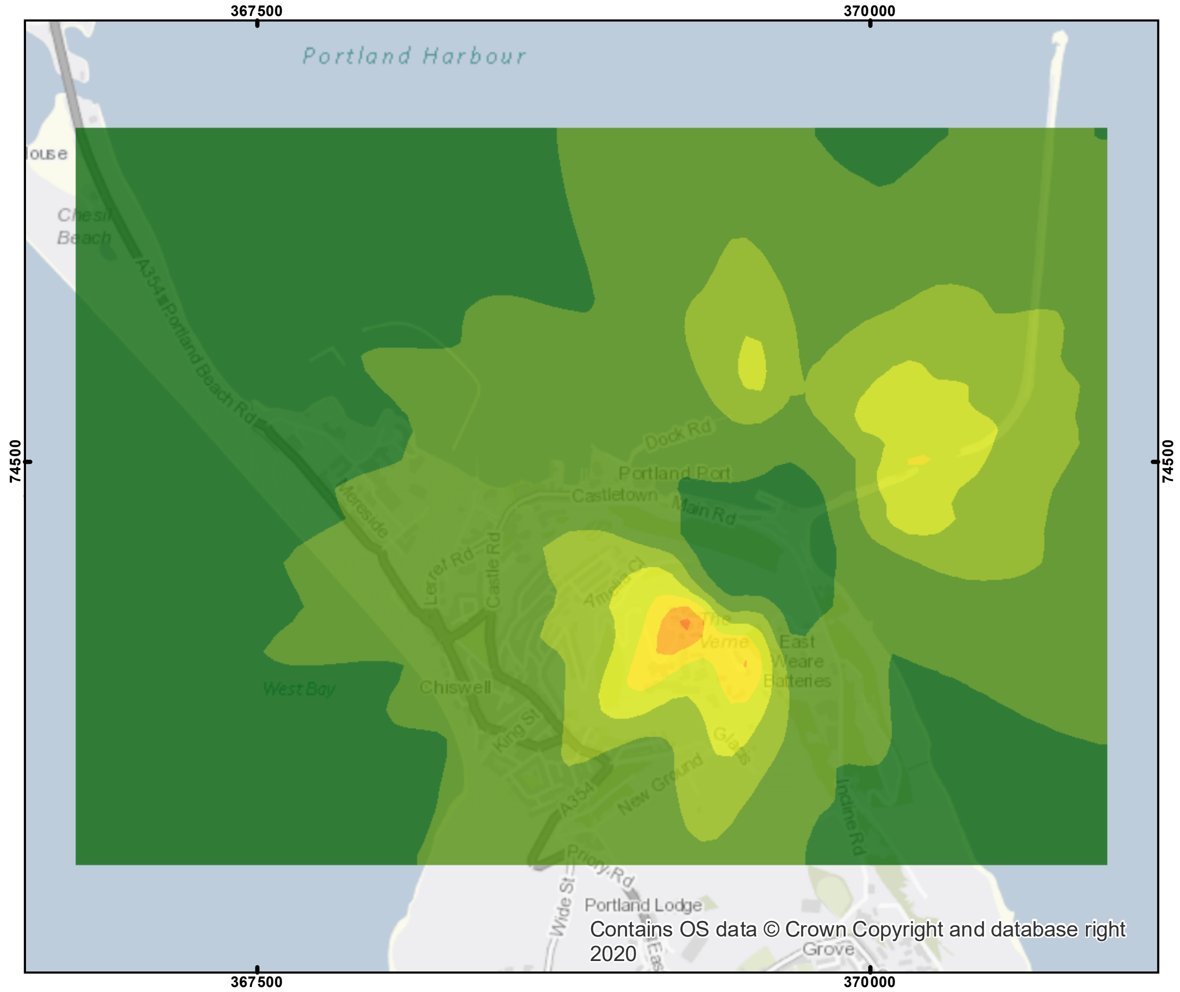
Stockport, Cheshire, SK4 1LW
Tel: 0161 476 0032
Fax: 0161 474 0618

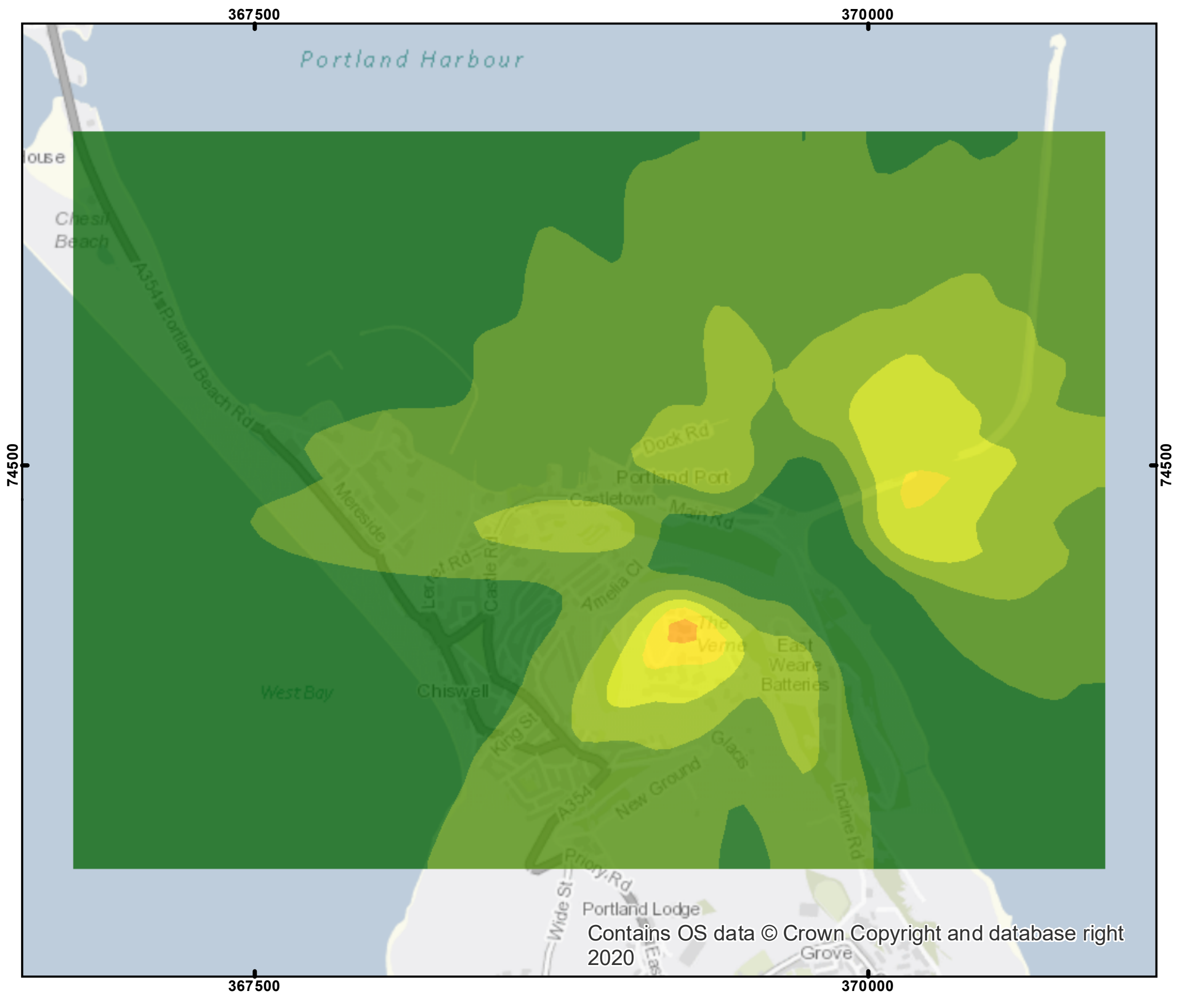
Isle of Portland - 2017



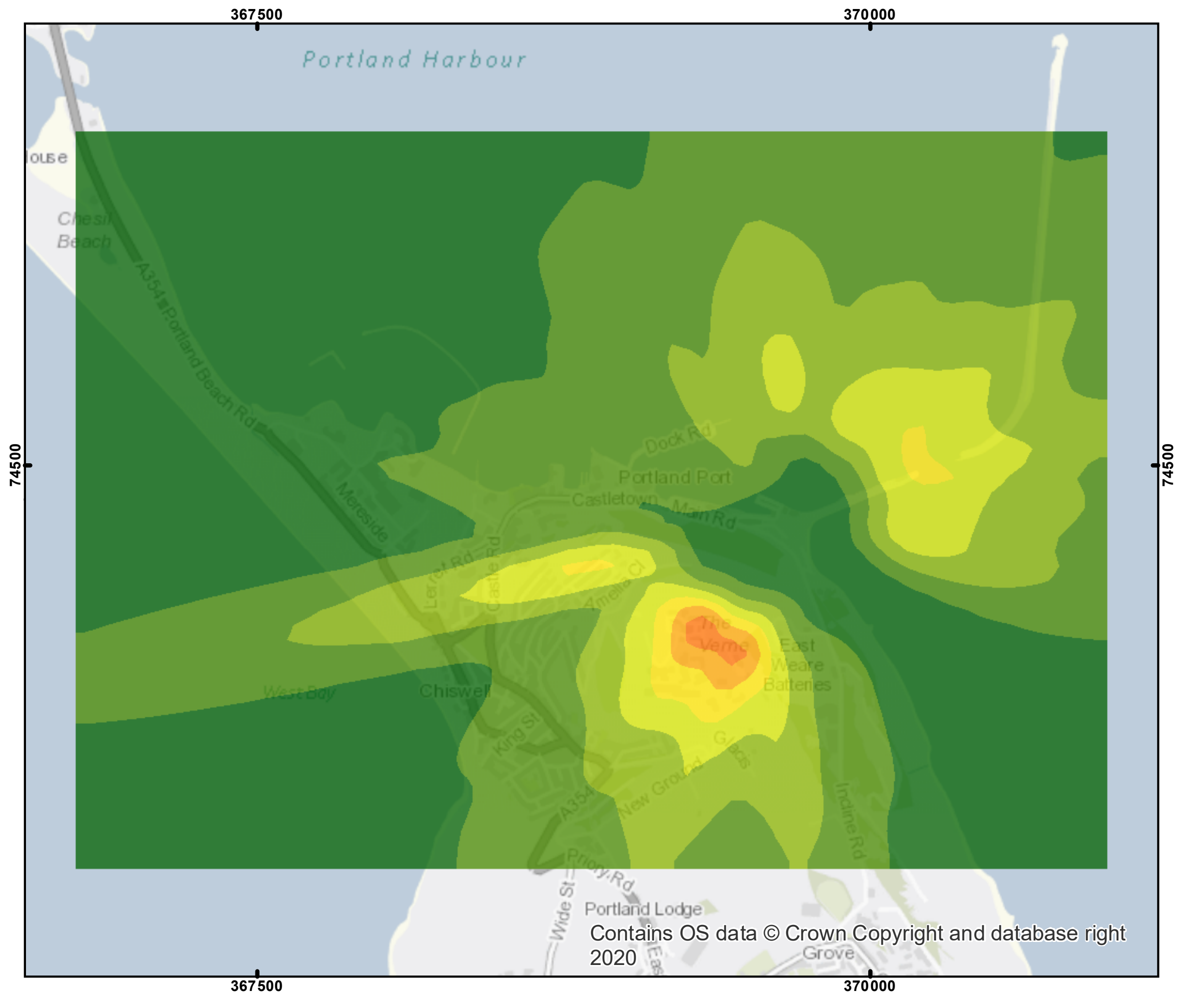
Isle of Portland - 2018



Portland Harbour - 2017



Portland Harbour - 2018

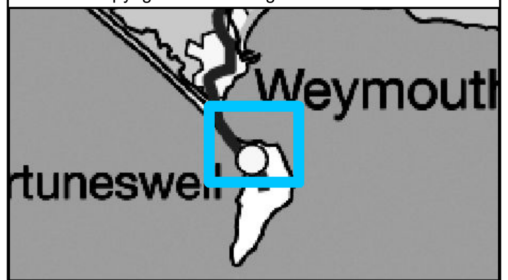


Legend

Maximum 24-hour NOx ug/m3

- < 2
- 2 - 4
- 4 - 6
- 6 - 8
- 8 - 10
- 10 - 12
- 12 - 14
- 14 - 16

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	Figure 26 Met Data Sensitivity Analysis
Drawn by: RSF	Date: 10/11/2021



0 0.3 0.6 1.2 km

Scale: 1:30,800

N

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Consulting Engineers Limited

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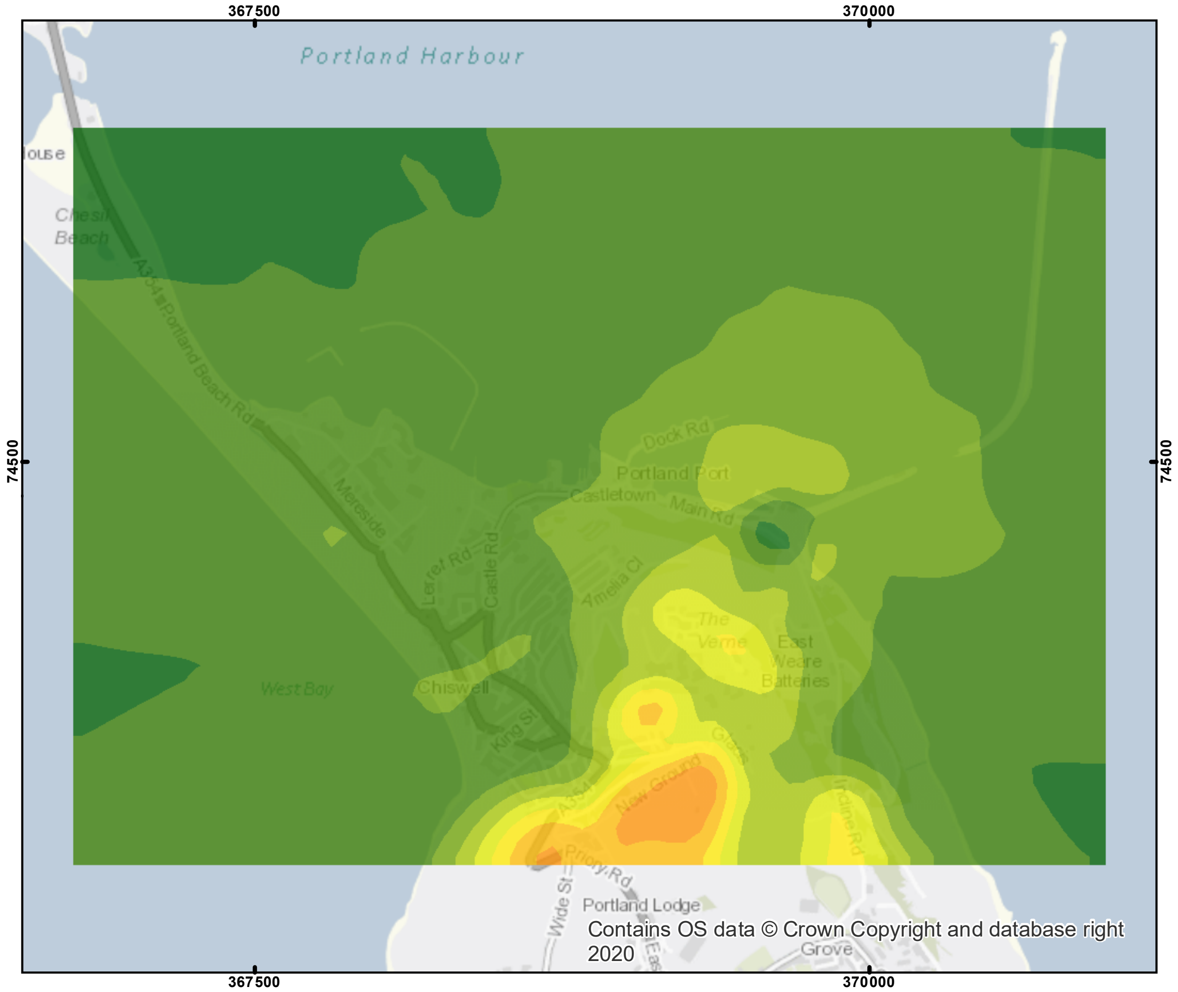
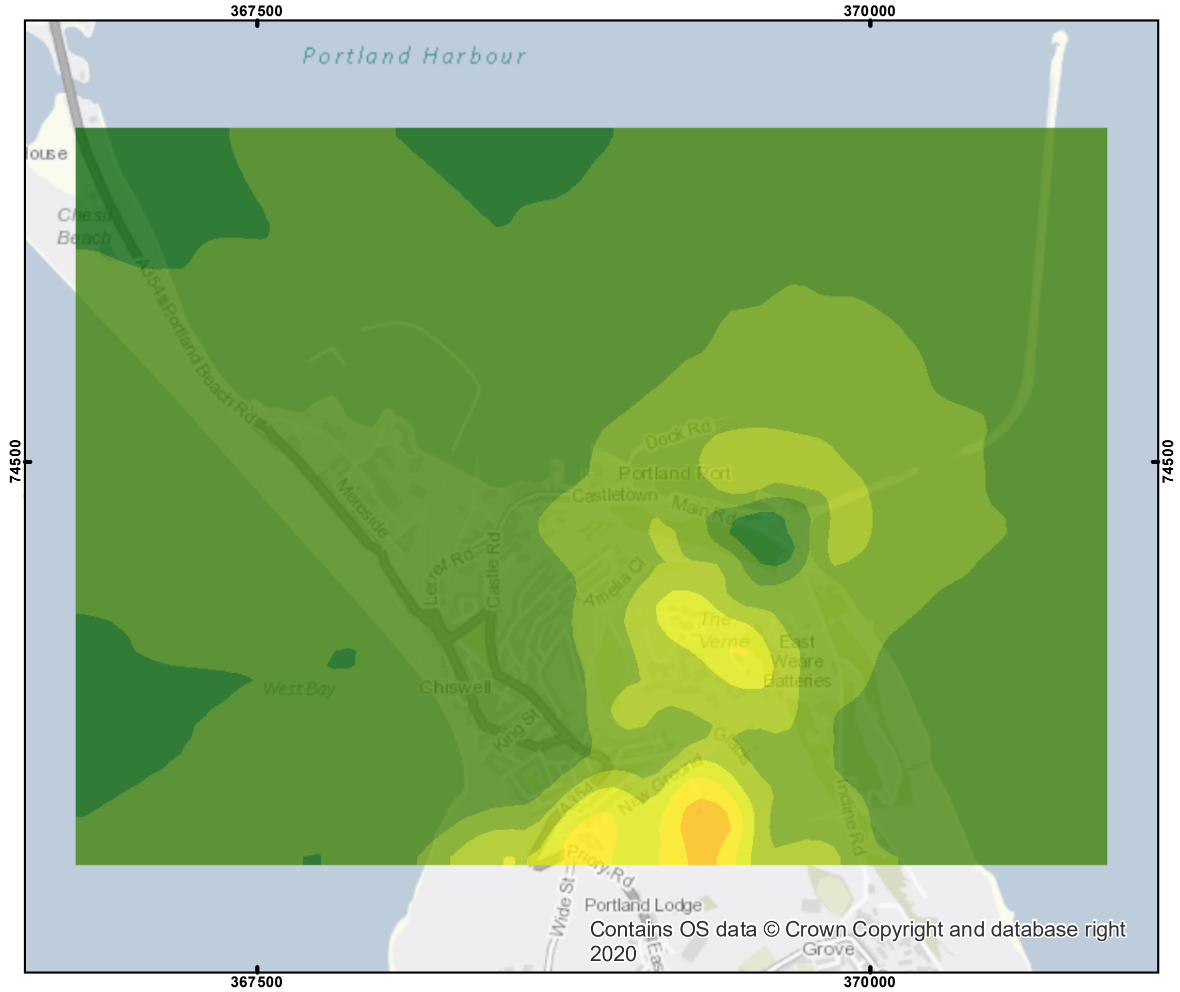
Stockport, Cheshire, SK4 1LW
Tel: 0161 476 0032
Fax: 0161 474 0618

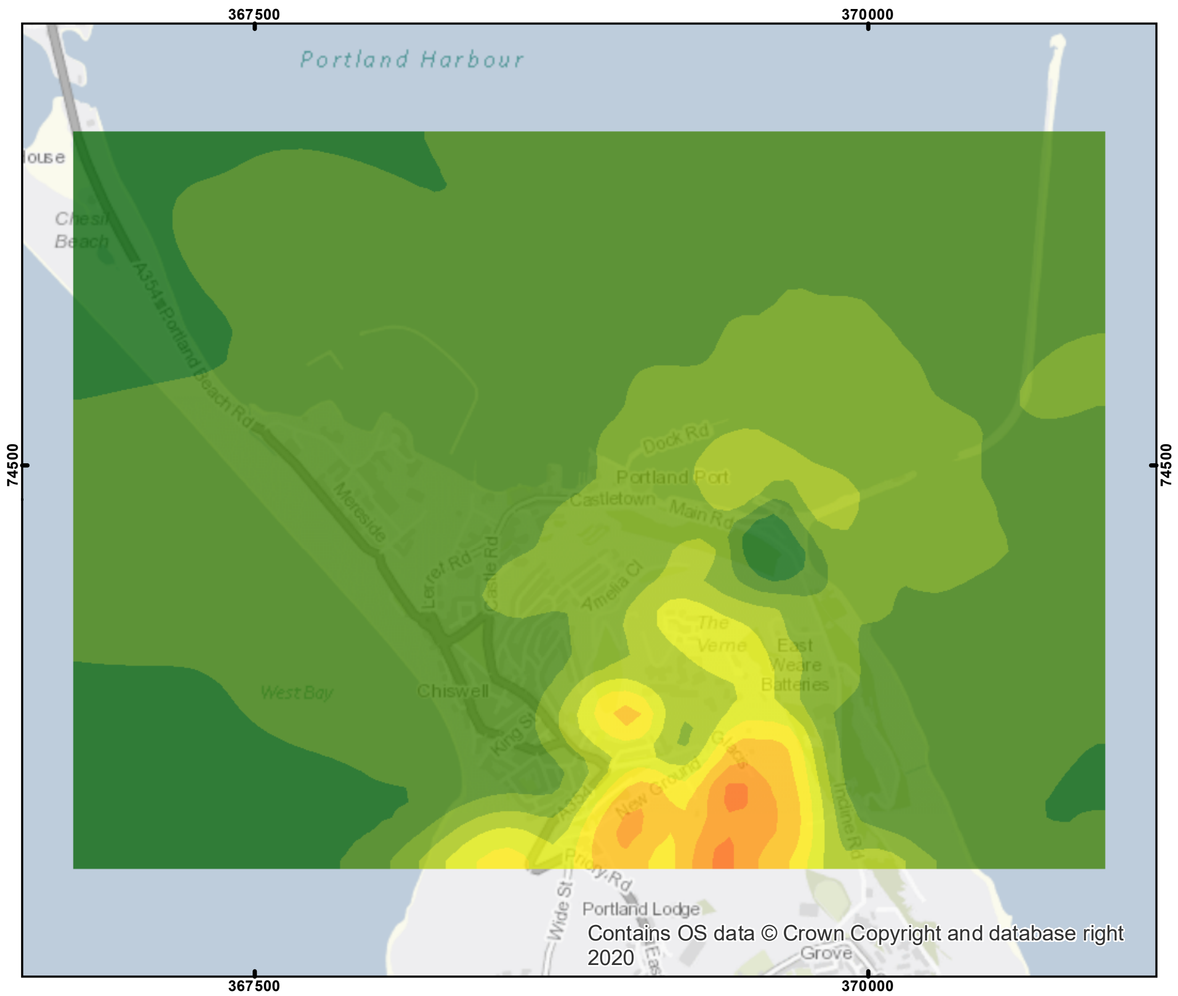
Isle of Portland - 2017



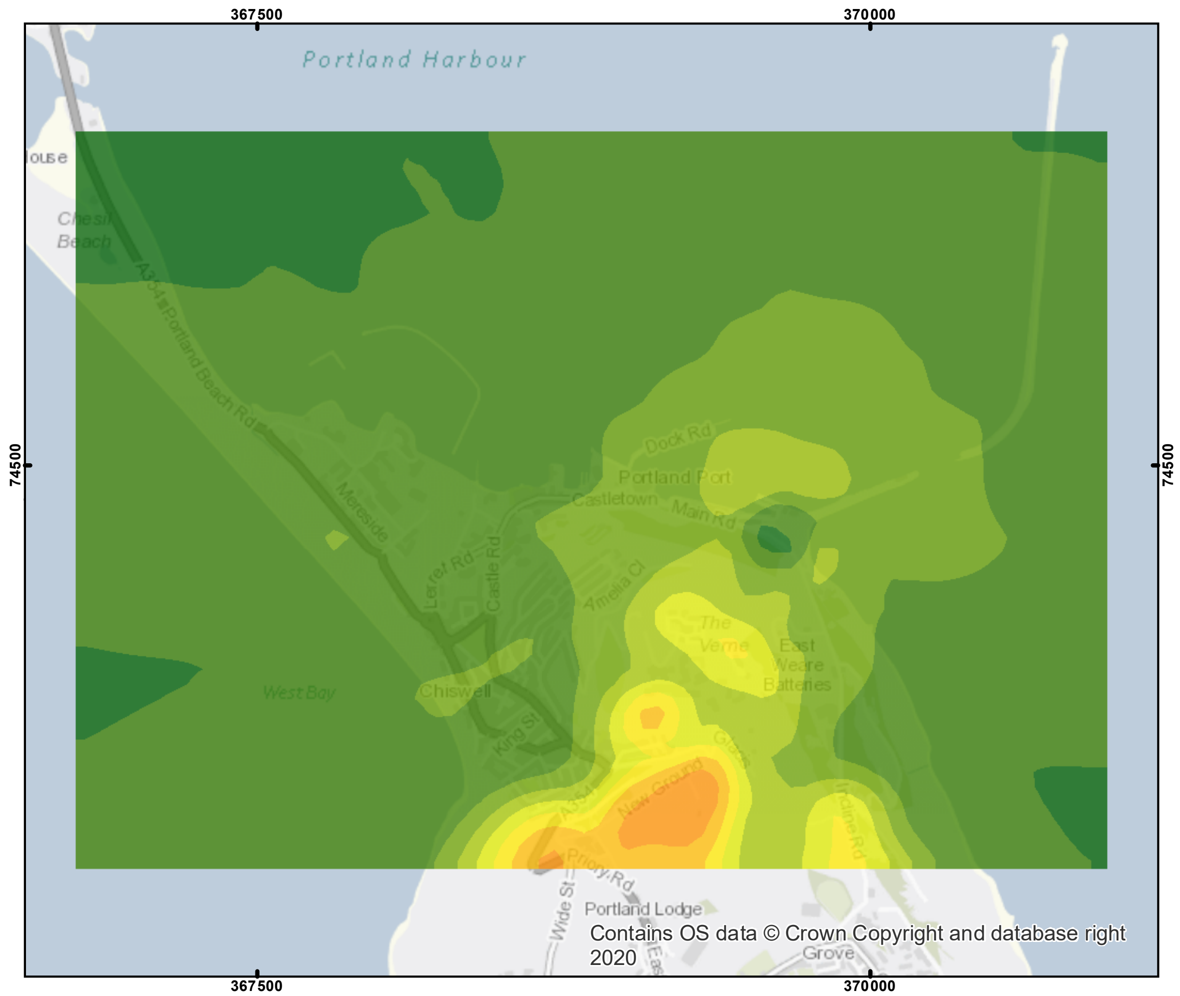
Isle of Portland - 2018



Portland Harbour - 2017



Portland Harbour - 2018

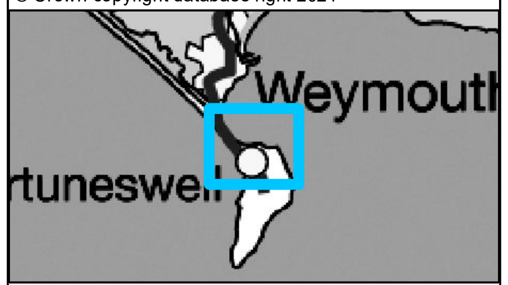


Legend

Maximum 1-hour NOx ug/m3

- <5
- 5 - 10
- 10 -15
- 15 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 45
- 45 - 50

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	Figure 27 Met Data Sensitivity Analysis
Drawn by: RSF	Date: 09/11/2021



0 0.3 0.6 1.2 km

N

Scale: 1:30,800

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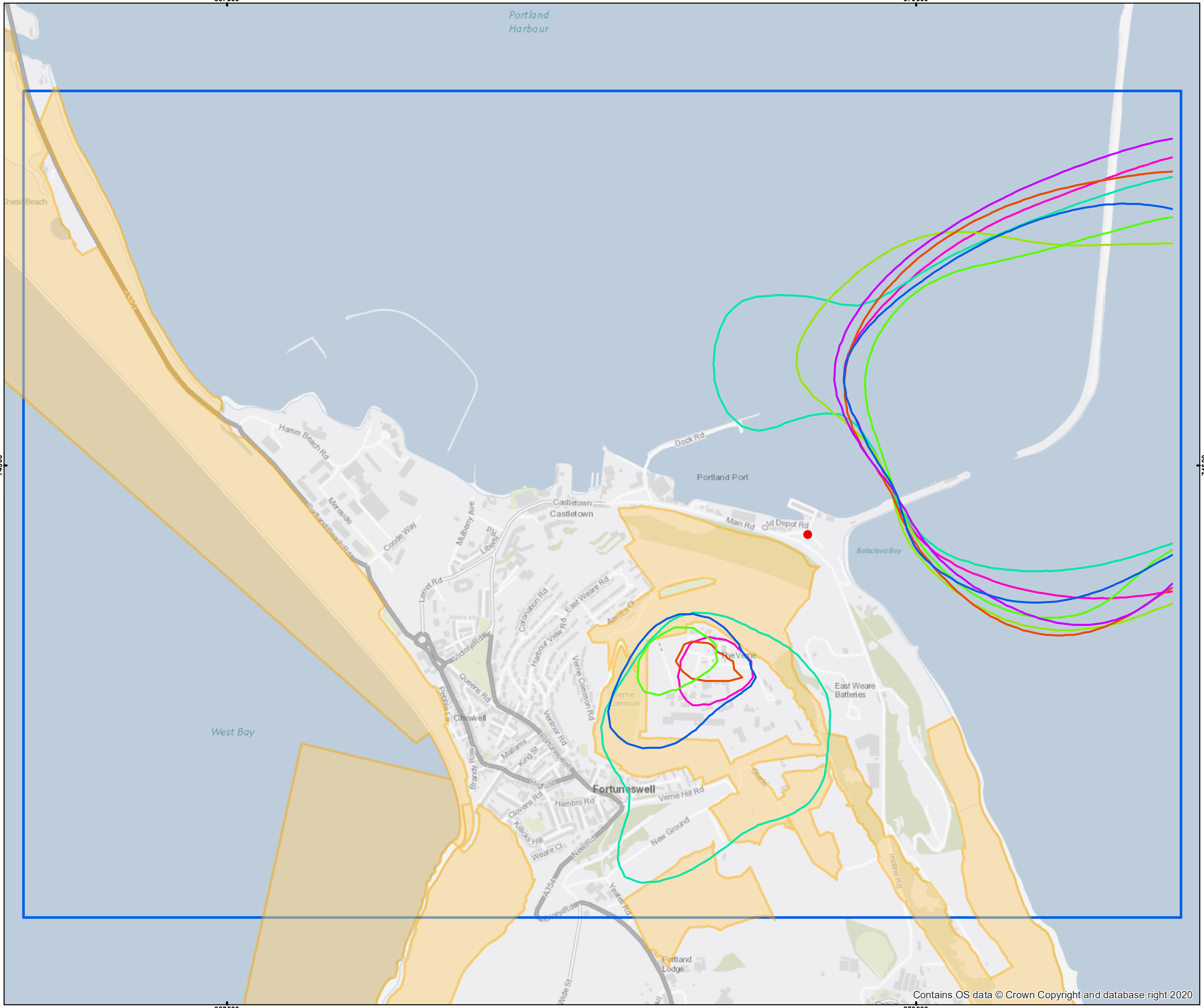
Tel: 0161 476 0032
Fax: 0161 474 0618



Legend

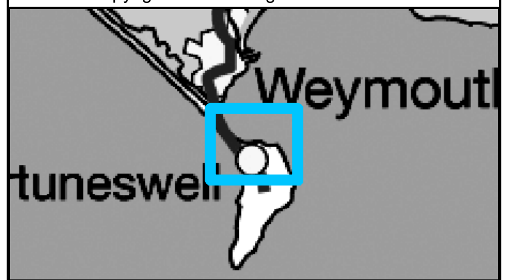
- 2018 Isle of Portland
- 2017 Isle of Portland
- 2016 Isle of Portland
- 2015 Isle of Portland
- 2014 Isle of Portland
- 2018 Portland Harbour
- 2017 Portland Harbour
- Main Stack
- SAC
- Output grid extent

Contour of 1% of Critical Level, assuming 100% operation at the ELV

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	

Figure 28
Annual Mean NOx Impact
Met Data Sensitivity

Drawn by: RSF	Date: 15/11/2021



0 0.125 0.25 0.5 km

Scale: 1:13,000

N

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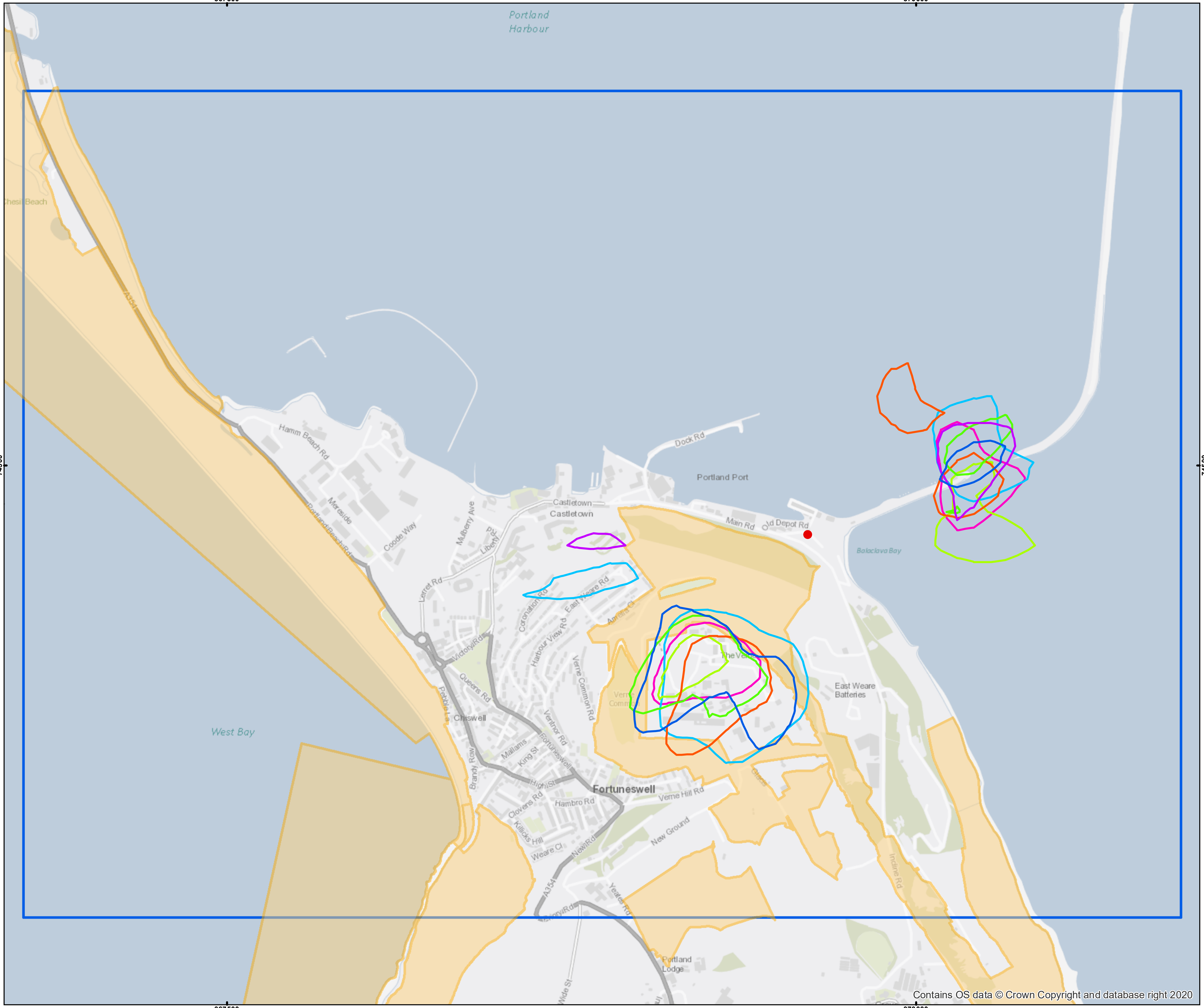
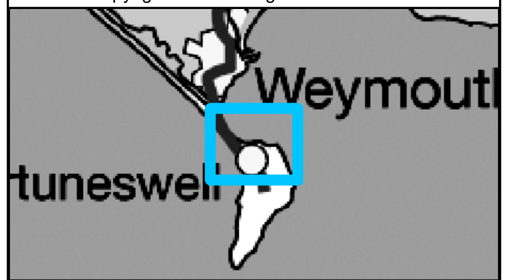


Legend

- 2018 Isle of Portland
- 2017 Isle of Portland
- 2016 Isle of Portland
- 2015 Isle of Portland
- 2014 Isle of Portland
- 2018 Portland Harbour
- 2017 Portland Harbour
- Main Stack
- SAC
- Output grid extent

Contour of 10% of Critical Level, assuming 100% operation at the ELV

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	Figure 29 Daily Mean NOx Impact Met Data Sensitivity
Drawn by: RSF	Date: 15/11/2021



0 0.125 0.25 0.5 km

Scale: 1:13,000

N

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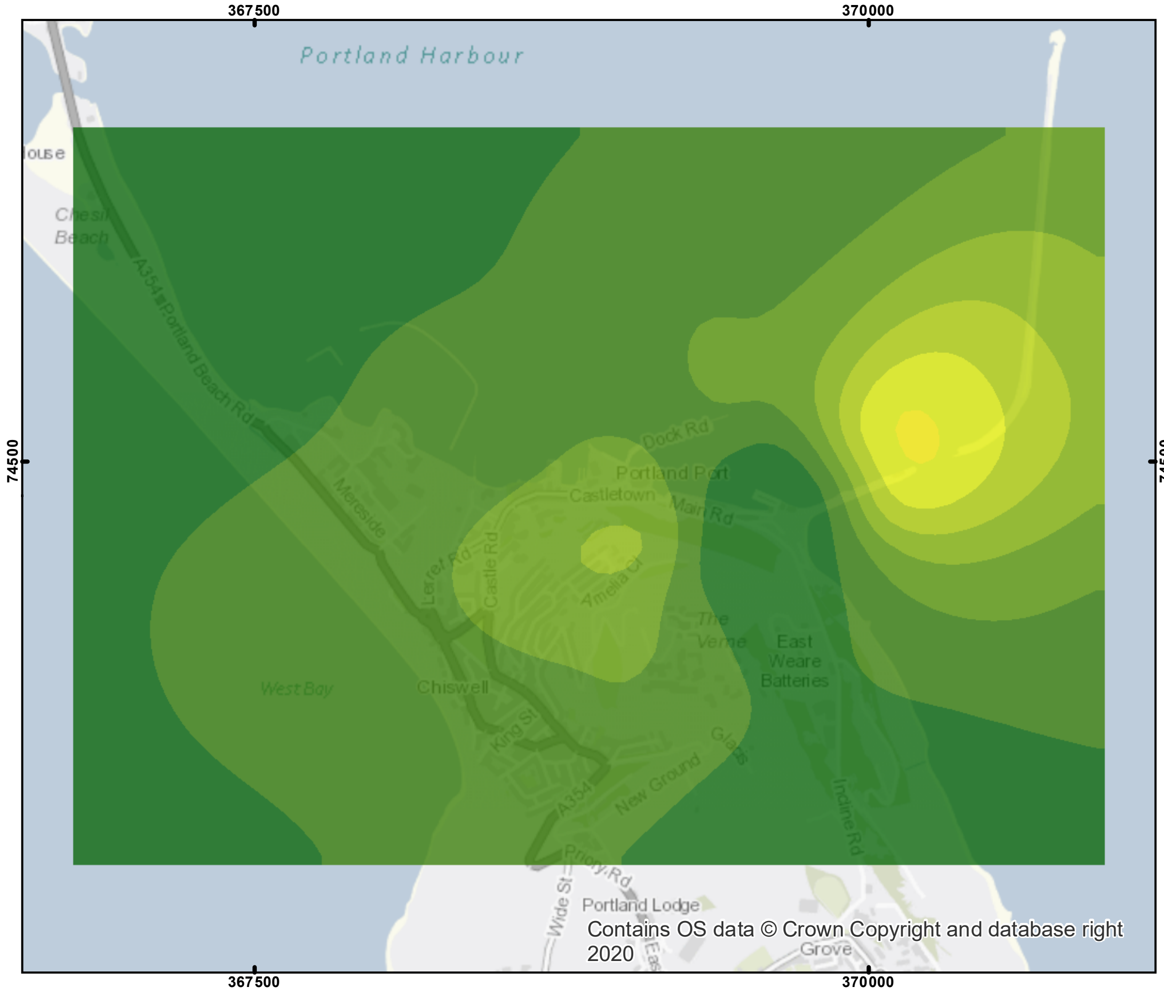
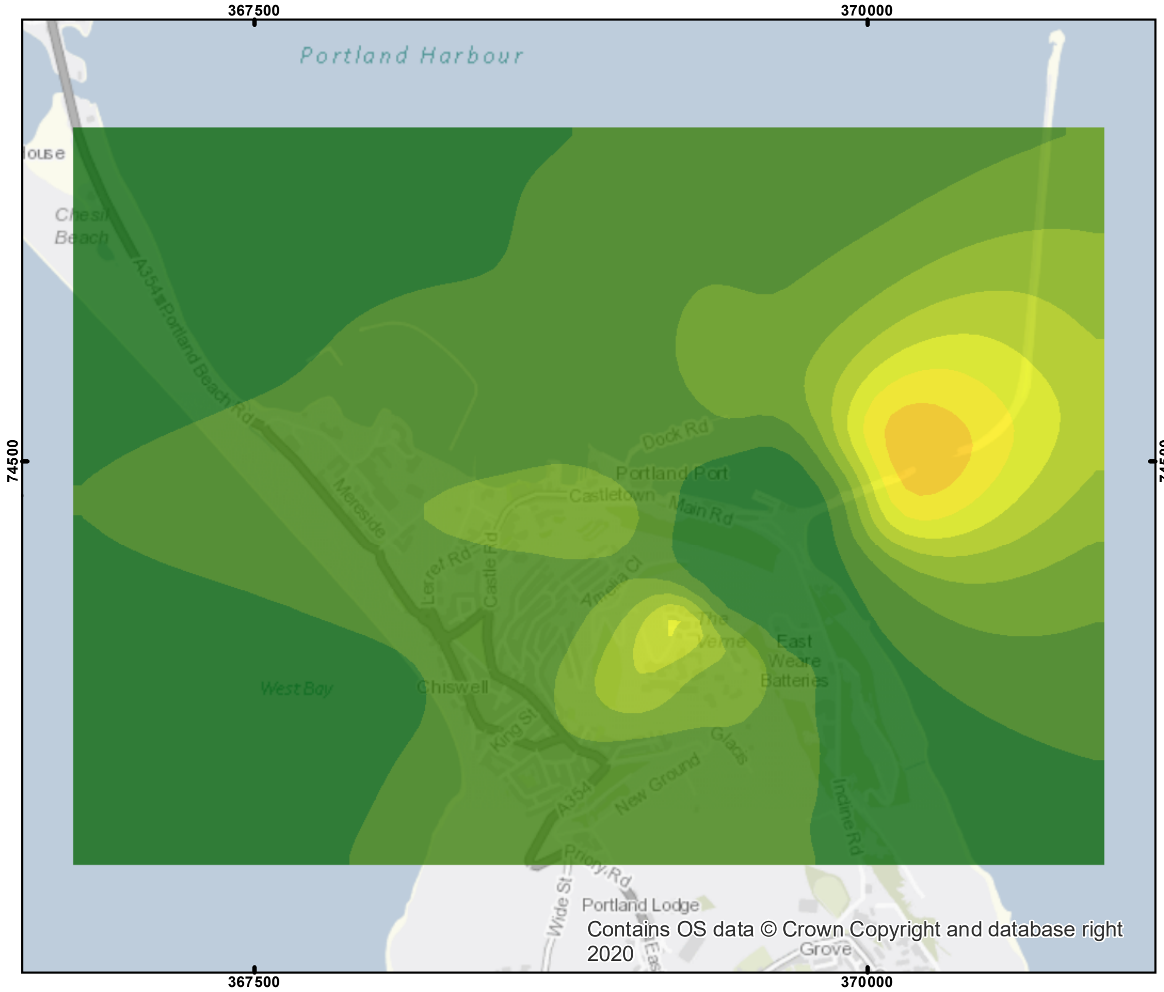
ADMS - Excluding Terrain

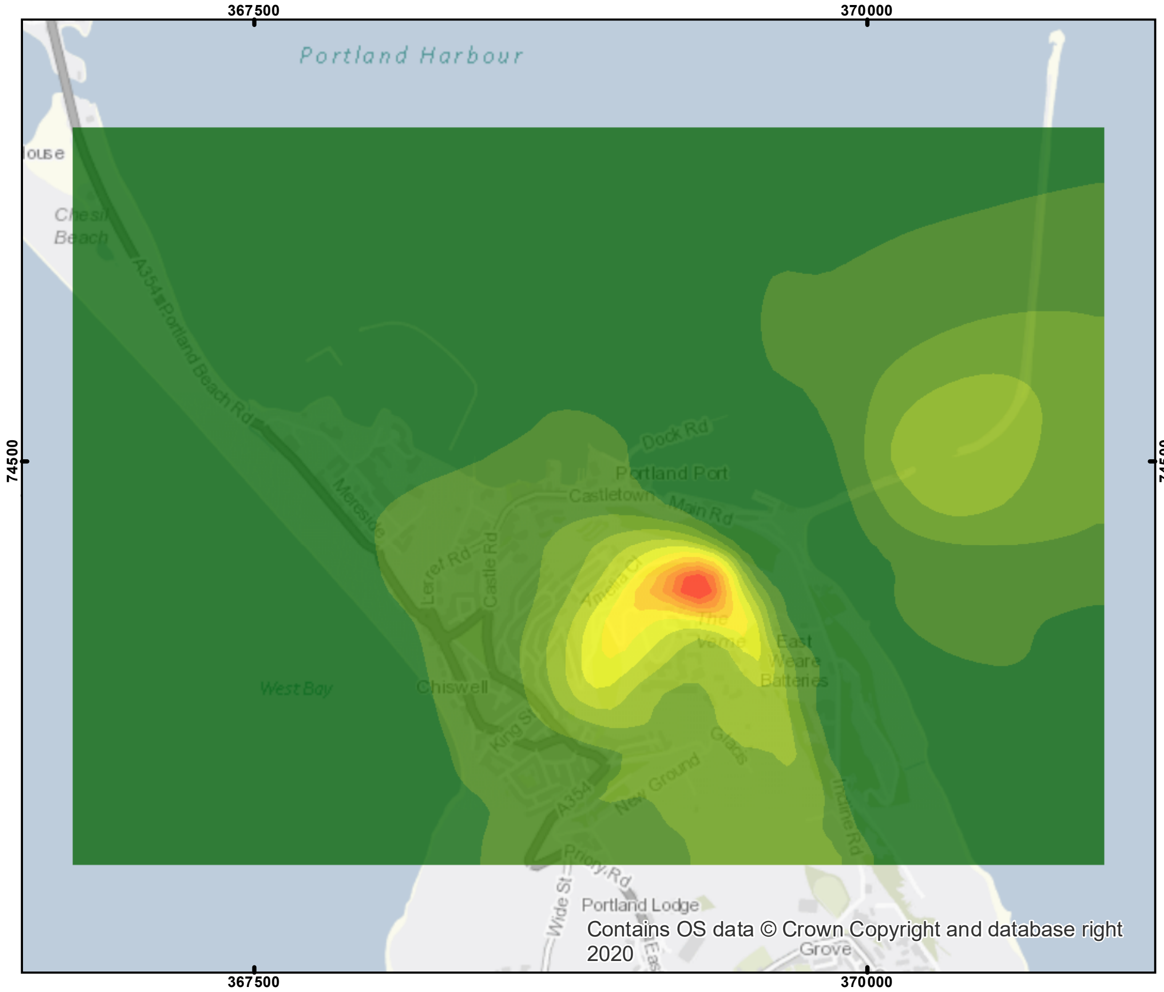


AERMOD - Excluding Terrain

ADMS - Including Terrain



AERMOD - Including Terrain



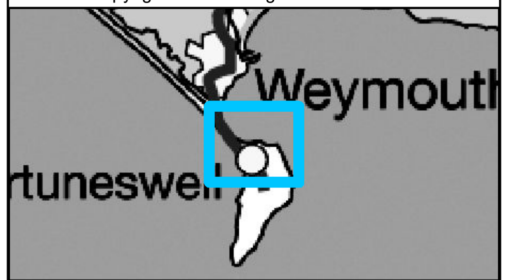
Legend

Annual Mean

ug/m3

- <0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- 0.8 - 0.9
- 0.9 - 1
- 1 - 1.1
- 1.1 - 1.2

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	Figure 30 Model Sensitivity Analysis
Drawn by: RSF	Date: 15/11/2021



0 0.325 0.65 1.3 km

N

Scale: 1:30,800

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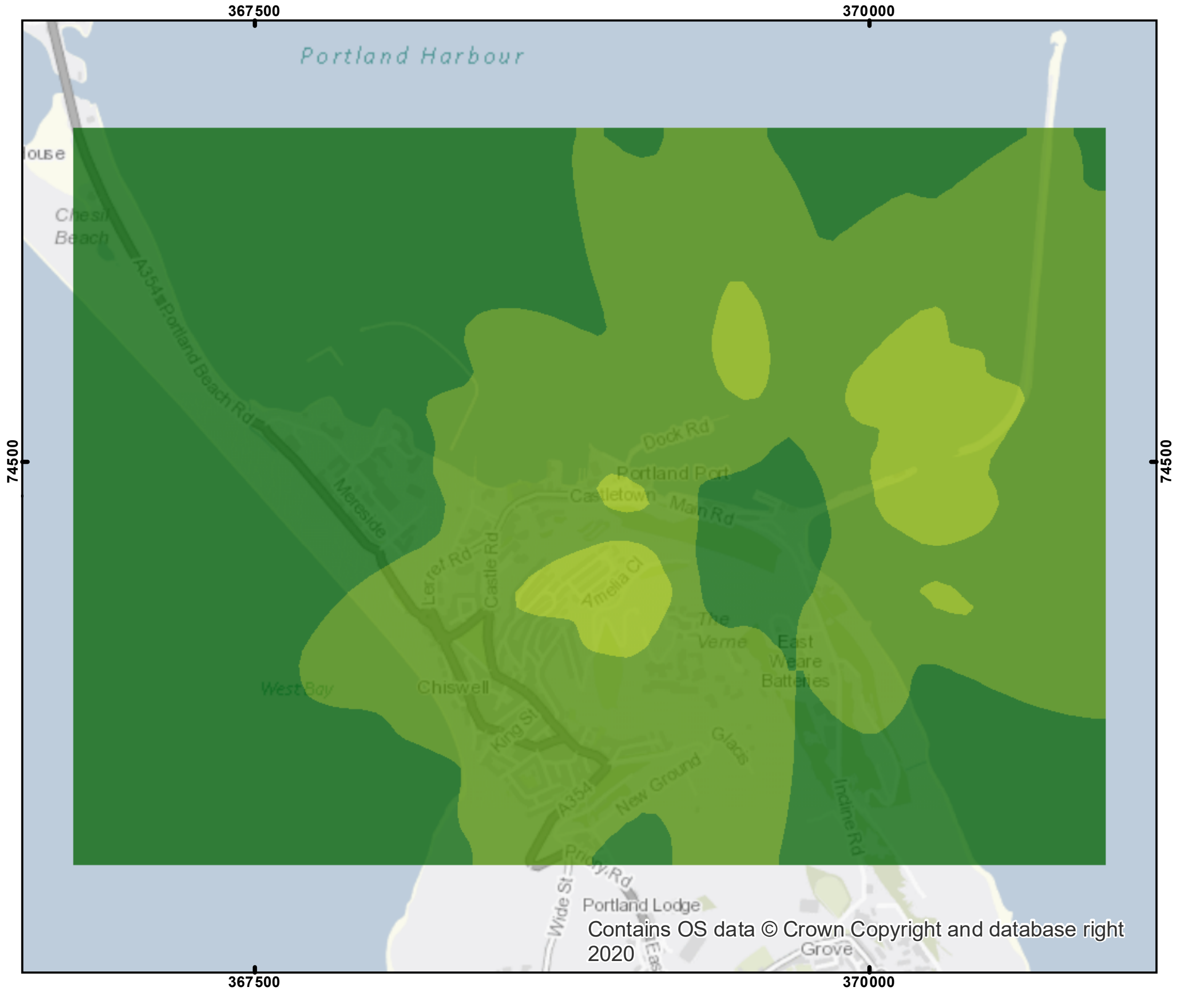
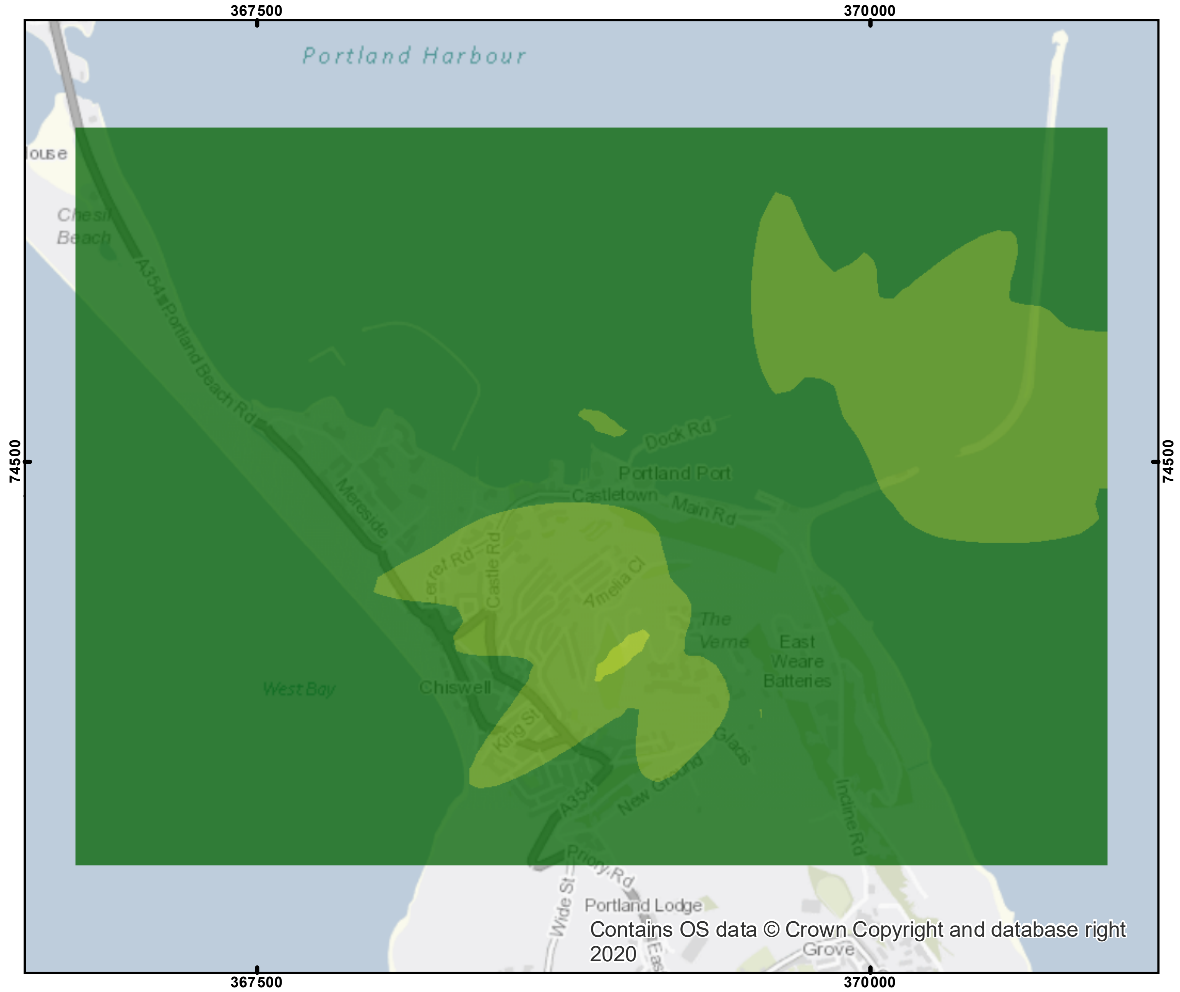
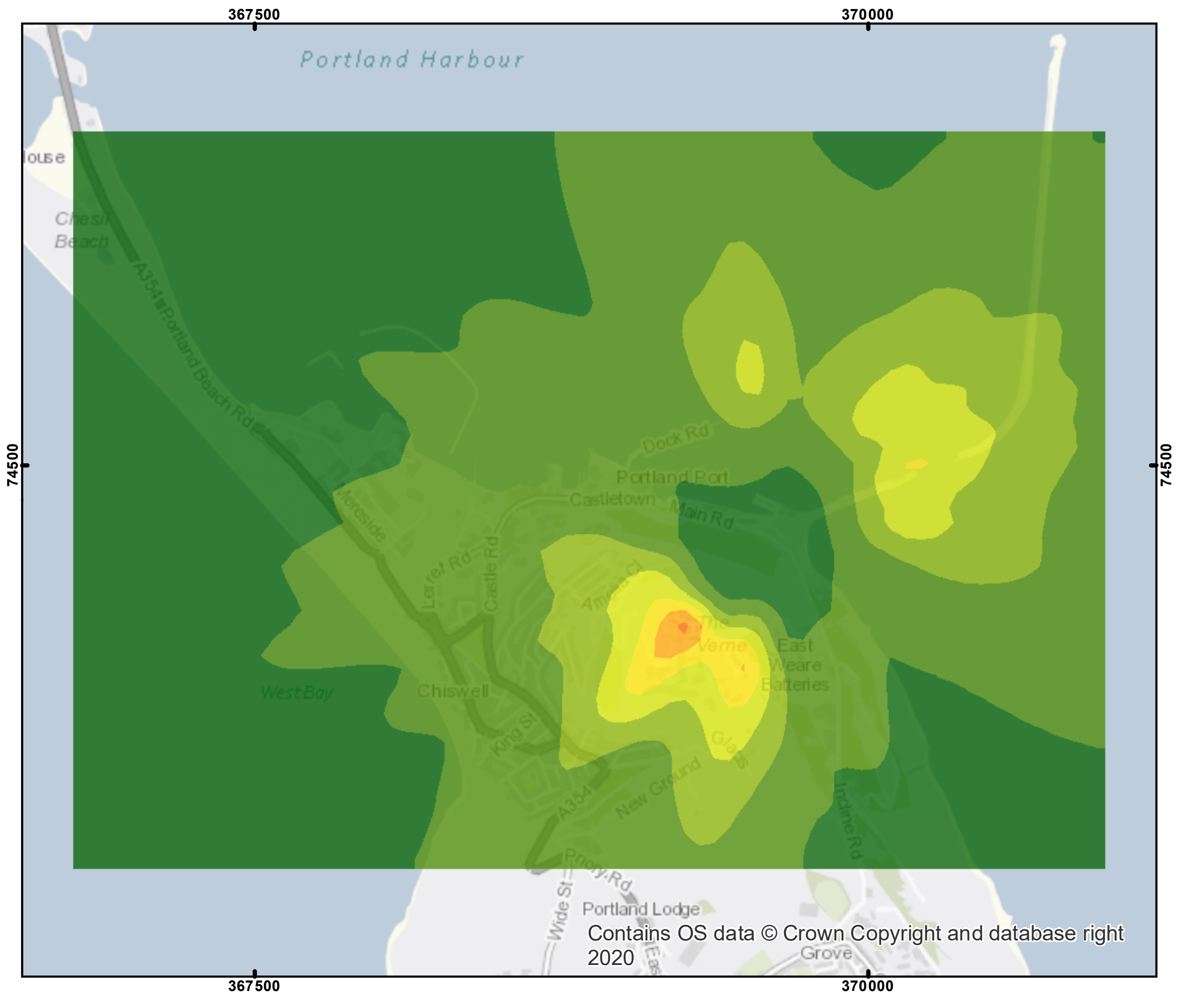
ADMS - Excluding Terrain



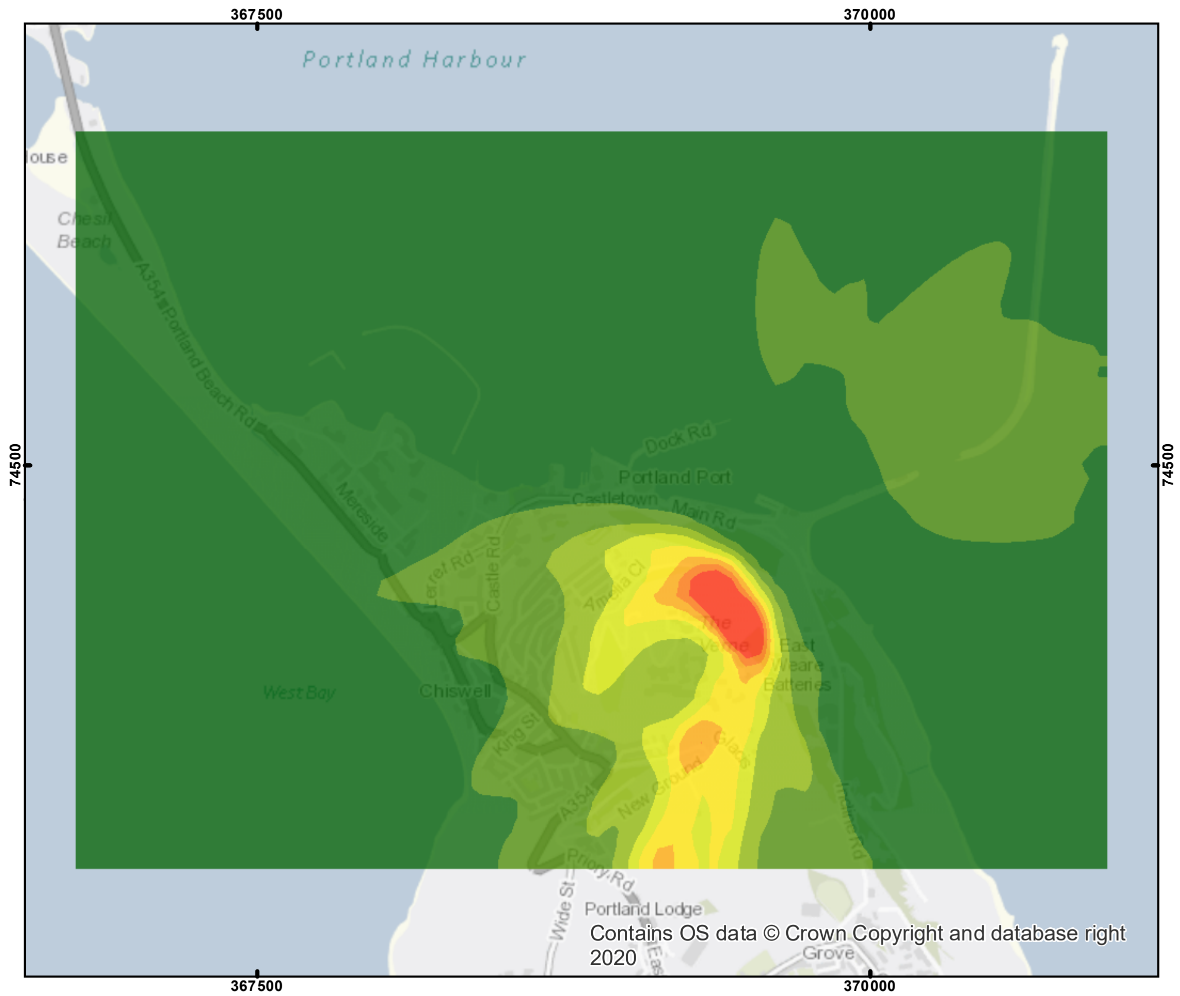
AERMOD - Excluding Terrain



ADMS - Including Terrain



AERMOD - Including Terrain

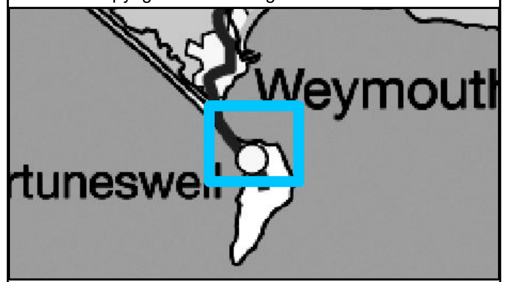


Legend

Maximum 24-hour NOx ug/m3

- < 2
- 2 - 4
- 4 - 6
- 6 - 8
- 8 - 10
- 10 - 12
- 12 - 14
- > 16

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	Figure 31 Model Sensitivity Analysis
Drawn by: RSF	Date: 15/11/2021



0 0.325 0.65 1.3 km

Scale: 1:30,800

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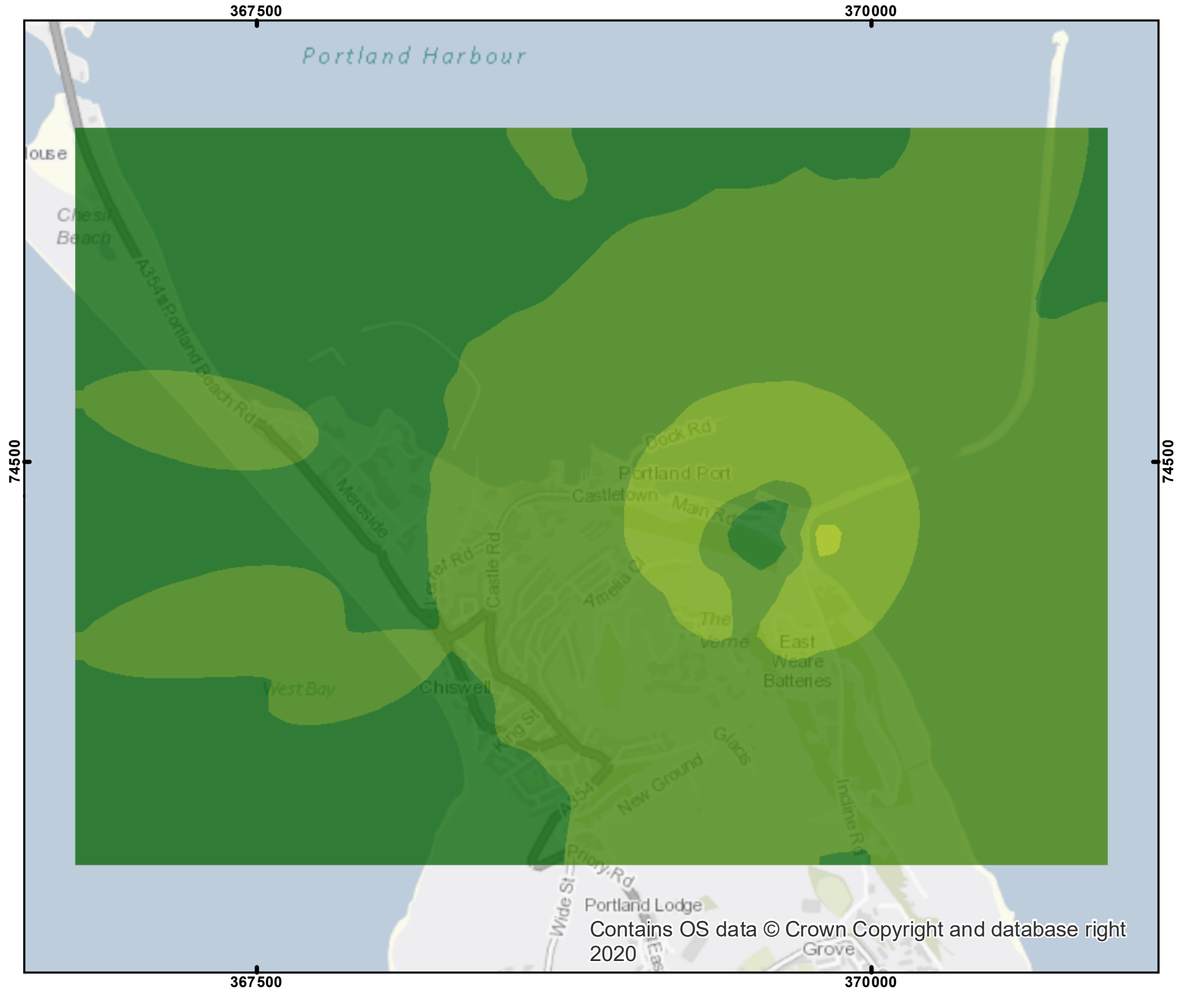
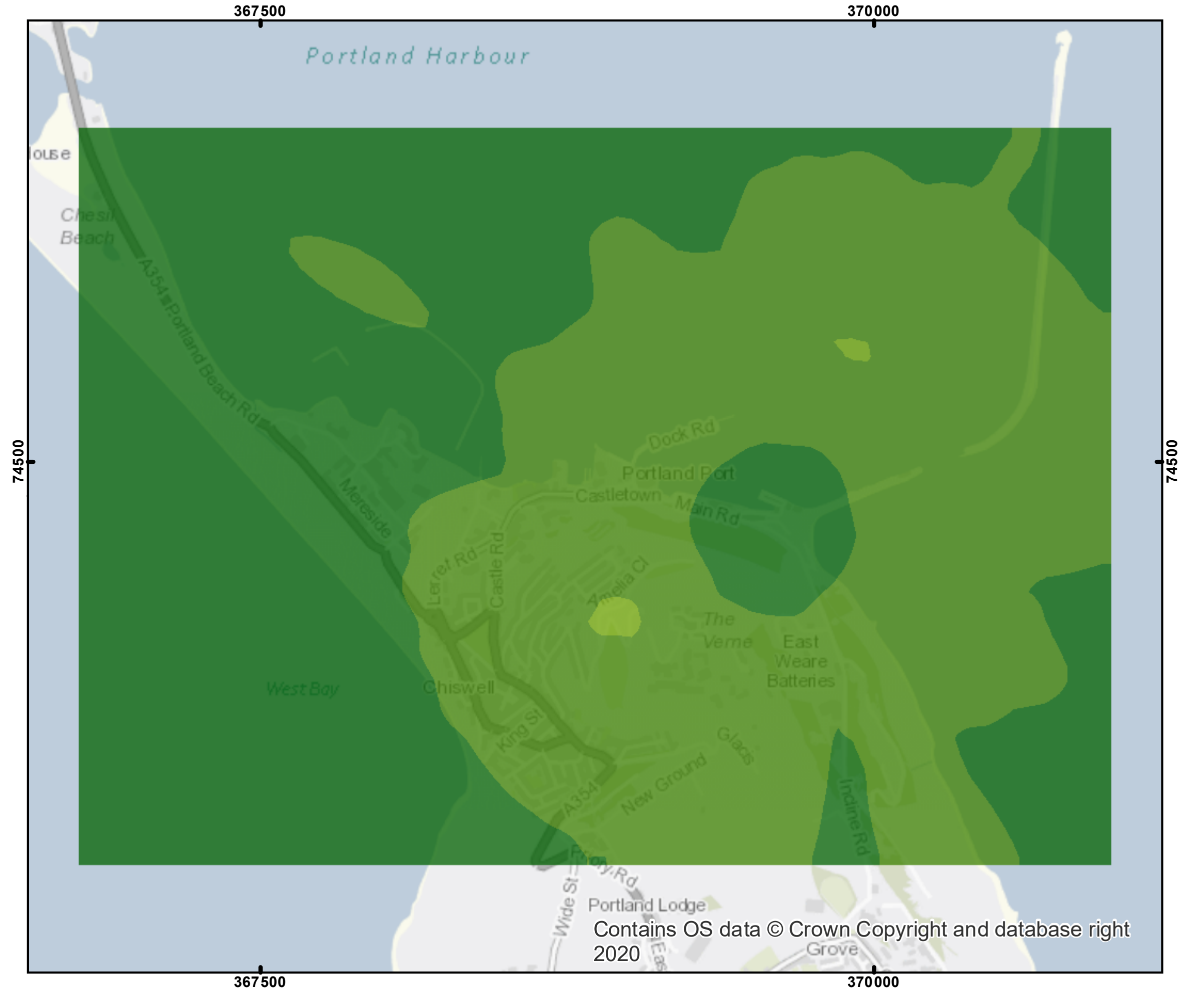
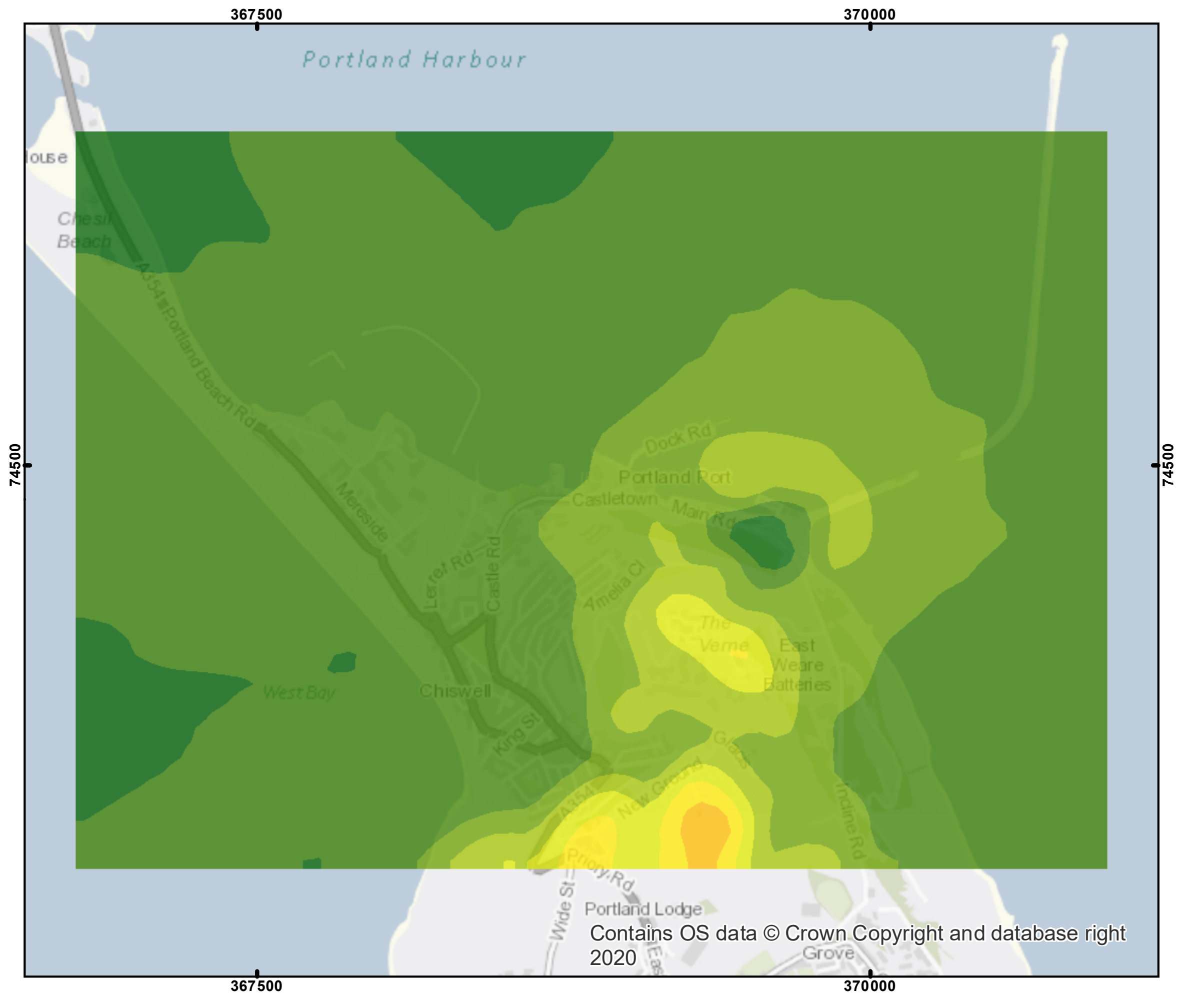
ADMS - Excluding Terrain



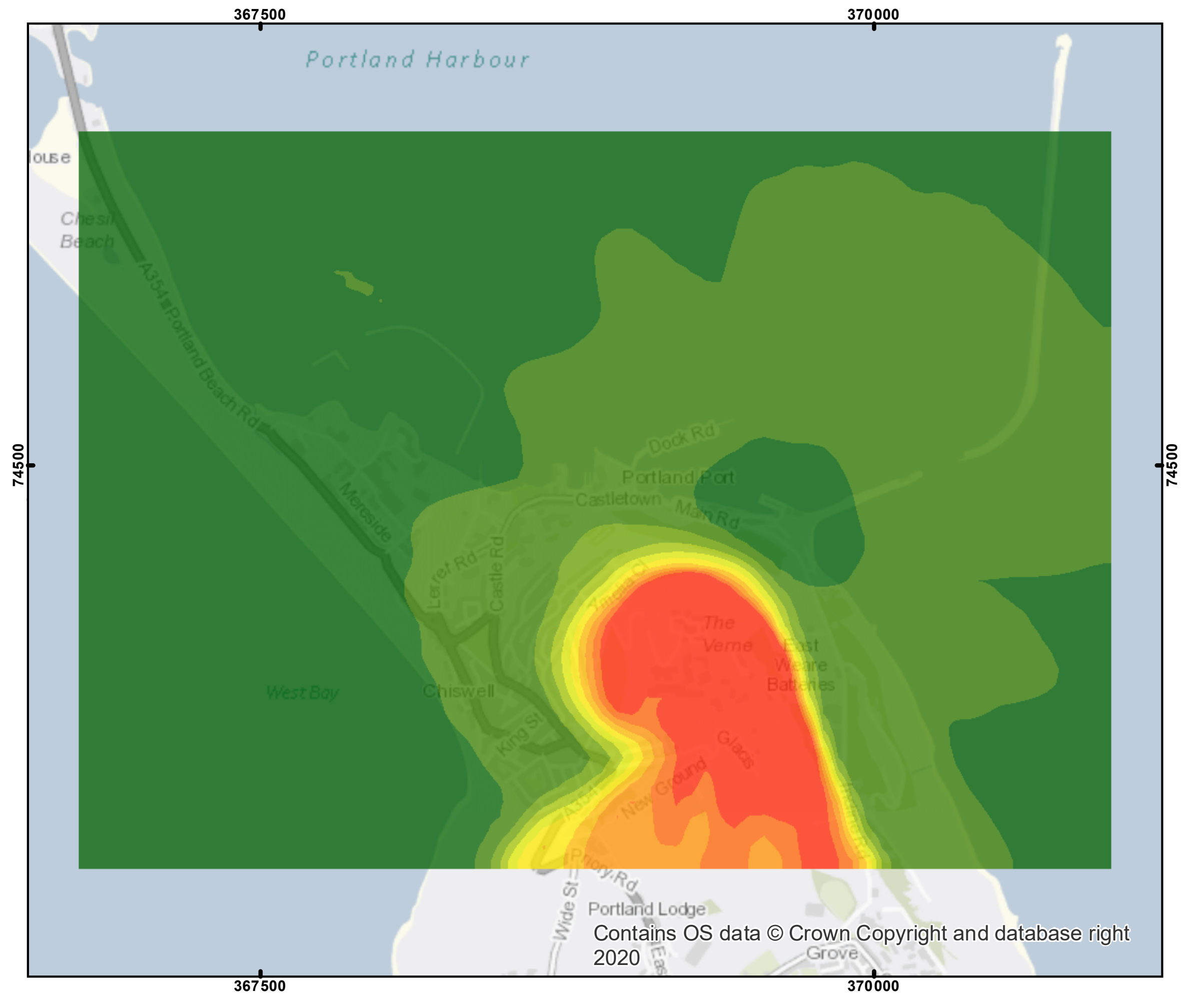
AERMOD - Excluding Terrain



ADMS - Including Terrain



AERMOD - Including Terrain

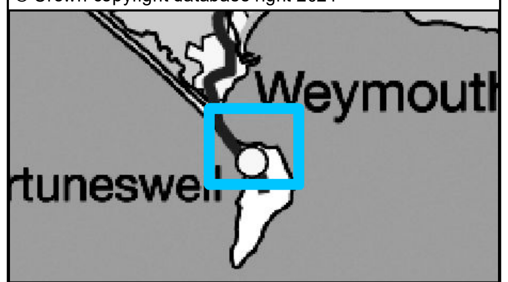


Legend

Maximum 1-hour NOx ug/m3

- <5
- 5 - 10
- 10 -15
- 15 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 45
- > 45

Client:	Powerfuel Portland Limited
Site:	Portland
Project:	2953
Title:	Figure 32 Model Sensitivity Analysis
Drawn by: RSF	Date: 15/11/2021



0 0.325 0.65 1.3 km

N

Scale: 1:30,800

FICHTNER
Consulting Engineers Limited

Kingsgate, Wellington Road North,
Stockport, Cheshire, SK4 1LW
Tel: 0161 476 0032
Fax: 0161 474 0618

B CERC Technical Note

CERC Technical Note: Portland Energy Recovery Facility

Authors: David Carruthers and Martin Seaton

26th November 2021

This technical note is produced by CERC, the scientific and software developers of the ADMS model, in response to questions raised by Fichtner regarding dispersion modelling of emissions from the Portland Energy Recovery Facility. For reference, the terrain and stack location are shown in Figure 1.

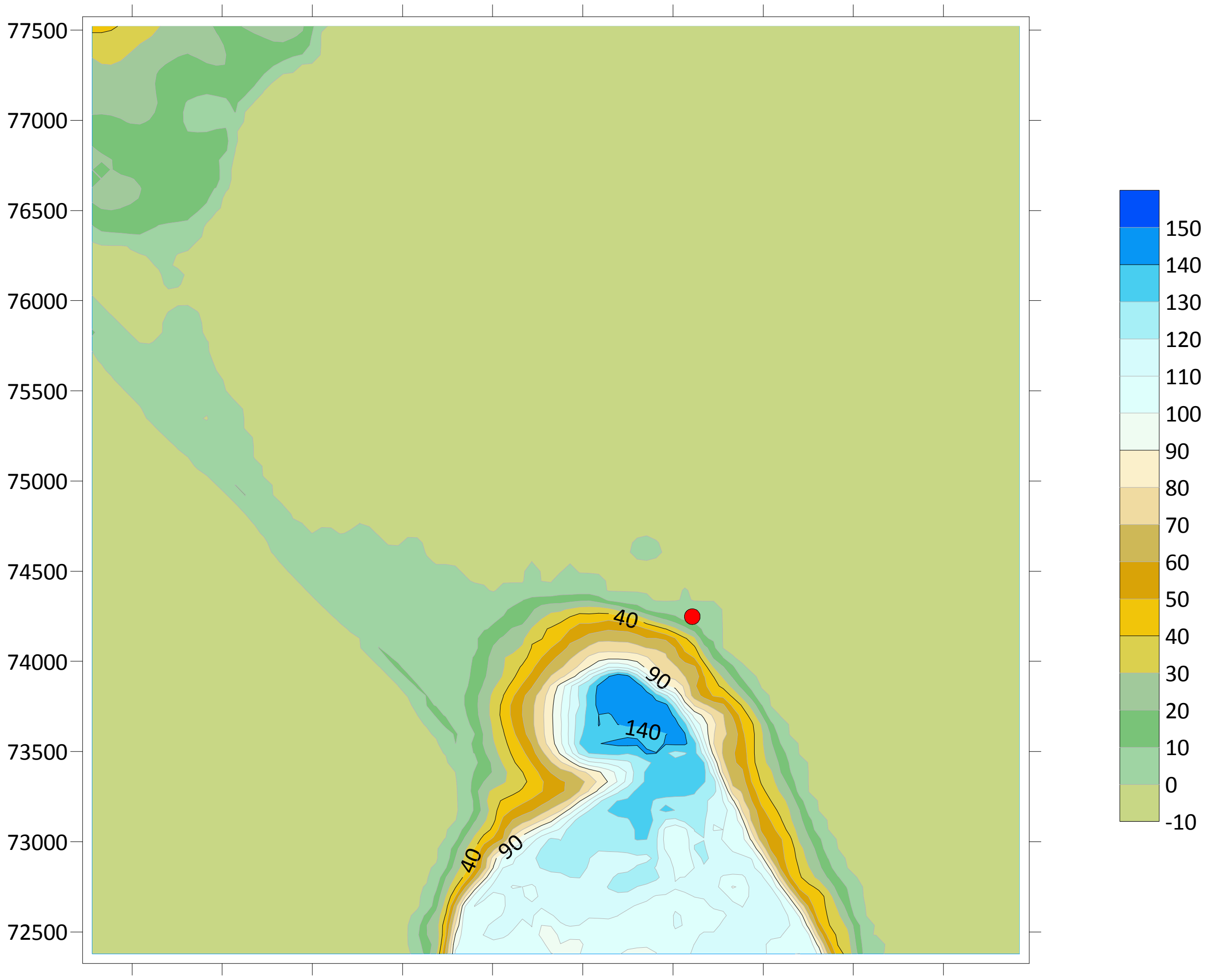


Figure 1 - Terrain and stack location (red circle)

1 Use of ADMS in complex terrain

Is ADMS appropriate where slopes are greater than 1:3? In this context, what is the relevance of US-EPA Guidance[1], especially paragraph 7.2.1.2 which states "In very rugged hilly or mountainous terrain, along coastlines, or near large land use variations, the characteristics of the winds are a balance of various forces, such that the assumptions of steady-state straight-line transport both in time and space are inappropriate."

The US-EPA guidance, especially 7.2.1.2, is discussed in our response to Question 3 below.

The ADMS documentation indicates that optimum performance of the complex terrain module is achieved for gradients of up to 1 in 3, however the model can be used beyond that limit. The ADMS 5.2 User Guide states:
"If modelled, ideally hills should have moderate slopes (say less than 1 in 3) but the model is useful even when this criterion is not met."

The Complex Terrain Technical Specification P14/01[2] on CERC's web site states:
"In line with the assumptions on which the model is based, terrain should have no more than moderate slopes (up to 1:3) although the model is useful even when this criterion is not met (say up to 1:2)."

Also of note is that Dr David Carruthers, who is one author of this note, wrote the FLOWSTAR complex flow model used in ADMS in conjunction with Professor Julian Hunt[3,4,5,6,7]. Both are experts in flow over complex topography and both have advised the US-EPA on this topic. The hill slope has most impact on the airflow immediately in the lee of hill summits where, depending on the surface roughness, local separation may take place for slopes greater than 1 in 3 (not relevant here). On the upstream slopes (of particular relevance here), impacts of higher slopes than 1 in 3 are well modelled; on these upstream slopes, of most relevance to the flow is the aspect ratio of the hill as a whole, rather than the aspect ratio of small sections of steep slopes. In this case, from stack location to hill summit the aspect ratio is 0.28, i.e. 1 in 3.6.

It is also of note that the original validation of FLOWSTAR was conducted using field data from Brent Knoll and the Isles of Askervein[8] and Blashaval[9]; these sites have similar slopes and terrain height to Portland. Modelling Portland with ADMS/FLOWSTAR seems entirely appropriate; the model is designed for these types of locations.

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[1] https://www.epa.gov/sites/default/files/2020-09/documents/appw_17.pdf
[2] https://www.cerc.co.uk/environmental-software/assets/data/doc_techspec/P14_01.pdf
[3] Hunt, J.C.R., Richards, K.J. & Brighton, P.W.M. 1988a. Stably stratified shear flow over low hills. Q.J.R. Meteorol. Soc. 114, 859-886.
[4] Belcher, S.E., Xu, D.P. & Hunt, J.C.R. 1990 The response of the turbulent boundary layer to arbitrarily distributed surface roughness changes. Q.J.R. Meteorol. Soc. 116, 611-635.
[5] Carruthers, D.J. & Choularton, T.W. 1982 Airflow over hills of moderate slope. Q.J.R. Meteorol. Soc. 108, 603-624.
[6] Carruthers, D.J. & Hunt, J.C.R. 1990 Fluid mechanics of airflow over hills: Turbulence, fluxes and waves in the boundary layer. AMS Monograph.
[7] Carruthers DJ, Hunt JCR and Weng W-S, 1988: A computational model of stratified turbulent airflow over hills—FLOWSTAR I. Proceedings of Envirosoft. In Computer Techniques in Environmental Studies (editor P. Zanetti), pp. 481-492. Springer-Verlag.
[8] https://www.cerc.co.uk/environmental-software/assets/data/doc_validation/CERC_ADMS5.2_Study_Validation_Askervein.pdf
[9] https://www.cerc.co.uk/environmental-software/assets/data/doc_validation/CERC_ADMS5.2_Study_Validation_Blashaval.pdf

2 Validation studies

What validation studies are most relevant to the Portland ERF project and what do the most relevant studies show?

The situation being modelled at Portland is of a hill (150 m) with the stack lower than the height of the hill. As noted in the response to Question 1, the case of an isolated hill was modelled in the Askervein Hill[8] and Blashaval[9] flow field validation studies. Both of these studies show good results for the wind speed, with the best performance on the upstream slope.

In terms of concentration validation studies, the Lovett Power Plant study[10] has a similar situation of a stack near to a hill. This study shows good agreement between the modelled and observed data and, as noted in the discussion section, the best agreement occurs at receptors on the upwind face of the hill rather than at the sides or downwind face.

The Westvaco corporation study[11] also has some similarities, but in this case the hill is much larger (350 m); again the modelled and observed concentrations show good agreement.

The Tracy Power Plant study[12] is more valley-like, with high (>400 m) terrain on two sides of the modelling area, this study also shows good agreement for ground level receptors between the modelled and observed concentrations.

The other studies are less relevant to Portland: either highly complex with several stacks of varying heights in various locations (e.g. Martin's Creek study[13]), or with stacks significantly higher than the surrounding terrain.

[10] https://www.cerc.co.uk/environmental-software/assets/data/doc_validation/CERC_ADMS5_Study_Validation_Lovett_5.2_vs_5.1.pdf
[11] https://www.cerc.co.uk/environmental-software/assets/data/doc_validation/CERC_ADMS5_Study_Validation_Westvaco_5.2_vs_5.1.pdf
[12] https://www.cerc.co.uk/environmental-software/assets/data/doc_validation/CERC_ADMS5_Study_Validation_Tracy_5.2_vs_5.1.pdf
[13] https://www.cerc.co.uk/environmental-software/assets/data/doc_validation/CERC_ADMS5_Study_Validation_MartinsCreek_5.2_vs_5.1.pdf

3 Differences between ADMS and Aermod treatment of complex terrain

What are the differences between the way ADMS and AERMOD treat terrain, and does this affect modelling of plume impaction with hills?

The impact of hills on airflow is well established from many studies (field experiments, wind tunnel studies and numerical simulations). For most weather conditions, the wind is deflected by terrain, and will generally flow over and or/around the hill and does not impact onto it directly (Figure 2a-c). An exception is during very stable conditions, where plume impaction onto hillsides may occur. In these very stable conditions, the flow splits into two layers, with the upper layer flowing over the hill and a lower layer impacting onto the hill and flowing around it (Figure 2d). The depth of the lower layer is determined by atmospheric stability, wind speed and the height of the hill. The height of the hill at Portland is small (150 m) so that the depth of lower layer will always be much smaller than the stack height, therefore the plume released from the stack will always flow over the hill. ADMS includes a flow model derived form FLOWSTAR for these very stable flows. The modelling, which has been undertaken, confirms no plume impaction, but the model does show the influence of the hill on concentrations in the neighbourhood of the hill top where the plume is closer to the ground due to converging streamlines; for example, see closed contour in Figure 7 in the modelling report.

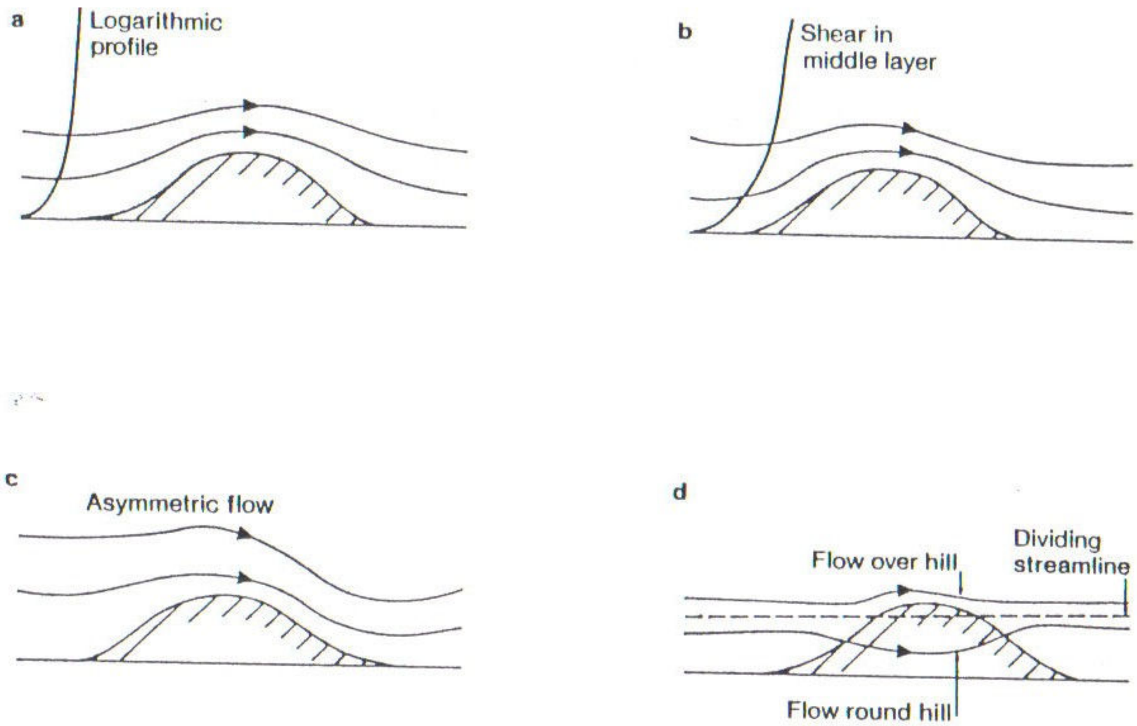

Figure 2 - Flow patterns over a three-dimensional hill for (a) neutral flow, (b) weak stratification, (c) moderate stratification and (d) strong stratification

AERMOD uses a quite different approach. It uses a weighted average of terrain following and sea-level following plumes, effectively ensuring a smooth transition between the two extreme cases (so no splitting in to two layers). In both cases, the plume trajectories follow a straight line along the wind direction, meaning that the sea-level following plume can end up going 'through' the hill and out the other side. This means it includes some effects of plume impaction even for only moderately stable flows, resulting in *totally unrealistic* elevations in concentration on hillsides in such conditions. Such increases in concentration are unphysical and should be ignored except possibly for hills of many hundreds of metres in height, when ADMS would also model plume impaction. For more details of treatment of stable flow over hills in ADMS and AERMOD, see Carruthers et al (2011).[14]

Research by ul Haq, et al., comparing outputs from AERMOD with tracer measurements in complex terrain, found that *"AERMOD overestimated the concentration at receptors which were at the point of direct impaction of plume and ridge"*.[15]

Regarding the use of models in very rugged hilly or mountainous terrain, Section 7.2.1.2 of the US-EPA document[1] states:

"In very rugged hilly or mountainous terrain, along coastlines, or near large land use variations, the characteristics of the winds are a balance of various forces, such that the assumptions of steady-state straight-line transport both in time and space are inappropriate."

The complex terrain option of ADMS is far from being a straight-line transport model. For each hour, ADMS takes the meteorological, terrain and surface roughness data and uses this to generate a fully 3D air flow and turbulence field. The plume trajectory is then calculated from this flow field and includes lateral and vertical movement of the plume; in addition, turbulent diffusion is modelled using the local turbulence field. A schematic of this is shown in Figure 3. As part of these calculations, ADMS has a special consideration for strongly stable conditions, when some airflow is likely to go around rather than over any terrain.

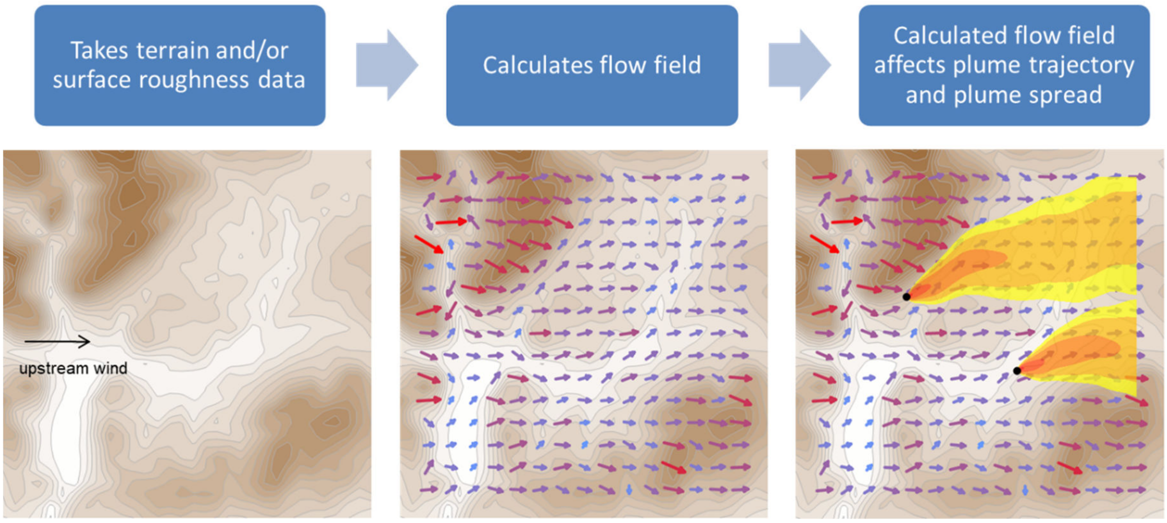

Figure 3 - Schematic of complex terrain modelling within ADMS

[14] Carruthers, D., Seaton, M., McHugh, C., Sheng, X., Solazzo, E. and Vanvyve, E. (2011) Comparison of the complex terrain algorithms incorporated into two commonly used local-scale air pollution dispersion models (ADMS and AERMOD) using a hybrid model. *Journal of the Air and Waste Management Association*, **61**, 11, 1227-1235

[15] Ul Haq, A., Nadeem, Q., Farooq, A., Irfan, N., Ahmad, M. Ali, M (2019) Assessment of AERMOD modeling system for application in complex terrain in Pakistan. *Atmospheric Pollution Research*, **10,** 1492–1497

AERMOD has no complex terrain *airflow* model. It uses a straight-line transport model with the concentration due to complex terrain calculated as a weighted average of terrain following and sea-level following plumes. It does not take account of any changes in mean flow and turbulence on turbulent diffusion.

We would caution against applying US-EPA guidance to complex terrain too literally for UK conditions. Conditions in the USA are often much more stable than in the UK, the terrain is of much larger scales and coastlines typically have large temperature contrasts with consequent buoyancy-driven flows. At Portland (essentially an island), strongly stable conditions are very rare, the terrain is of small scale and temperature contrasts between land and sea are small.

APPENDIX: Authors Qualifications and Experience

Dr David Carruthers
David's research background is in airflow, turbulence and dispersion in the atmospheric boundary layer. He has particular expertise in flow over complex terrain and within complex urban settings. At CERC, he has overall responsibility for CERC's consultancy, software and scientific research; he has been a technical director of CERC since 1994. He has directed many projects in air quality assessment both in the UK and internationally. Throughout the development of ADMS models, David has led CERC in model development and validation and has been at the forefront of technical debate in the UK and internationally. David leads CERC's participation in the US Environmental Protection Agency, UK Environment Agency and Defra co-operation on Air Quality Modelling and Exposure Science. He has participated in US-EPA Modeling Conferences and has presented the ADMS models internationally for government approval. David is a member of the UK Government's Air Quality Expert Group (AQEG) which provides independent scientific advice to Defra on air quality, and has advised national governments around the world on air quality policy. David has a PhD entitled 'Models of airflow over hills, orographic clouds and orographic rain' from the University of Manchester Institute of Science and Technology (UMIST). He is an author in over 100 scientific papers.

Dr Martin Seaton
Martin Seaton has over 15 years of experience in the field of air quality modelling. He specialises in the development and application of air dispersion models. Within CERC he oversees the scientific development of CERC's range of air dispersion models including ADMS 5 and ADMS-Roads which are regularly used for Air Quality Impact Assessments and Habitats Regulations Assessments. Martin ensures that the models are scientifically robust and developed according to strict coding standards. He is also involved with model evaluation using air pollutant concentration measurement datasets. Martin has a PhD in Mathematics from the University of Cambridge.

B Air quality assessment of EDGs (Q3b)

FICHTNER

Consulting Engineers Limited

Portland Energy Recovery Facility

Powerfuel Portland Ltd

Annex B to Schedule 5 Request – Air Quality Impact of Operation of Emergency Diesel Generators

ENGINEERING CONSULTING

Document approval

	Name	Signature	Position	Date
Prepared by:	Rosalind Flavell	RFlavell	Senior Environmental Consultant	26/11/2021
Checked by:	Stephen Othen		Technical Director	26/11/2021

Document revision record

Revision no	Date	Details of revisions	Prepared by	Checked by
0	26/11/2021	Draft for client review	RSF	SMO
1	03/12/2021	Final version	RSF	SMO

Contents

1 Introduction

The Portland Energy Recovery Facility (ERF) will include an Emergency Diesel Generator (EDG). This will be required to safely shutdown the ERF in the event of a loss of grid connection to maintain operation of the abatement control systems. This event would typically occur for no more than 4 hours. In this operating scenario, the EDG would need to operate at 100% load following the initial loss of grid connection. However, as the shutdown sequence progressed the abatement and control systems would be reduced in operation so that the EDG could operate at a reduced load prior to be switched-off until the grid connection could be reinstated to enable the ERF to commence the start-up sequence with power for start-up being provided by the grid connection, not the EDG.

A representative of the port has informed us that there have been three grid outages at the port over the last six years, so it is unlikely that the EDG would operate more than once every year. Given the low likelihood of an emergency, it is the regular testing that should be the main consideration in the context of the impact of the EDGs.

2 Technical characteristics

The thermal capacity of the EDG will be subject to detailed design and procurement of the engines by the technology provider. However, taking into consideration the parasitic load of the ERF (2.2 MWe), and a conservative electrical efficiency of 30%, the EDG will have a thermal capacity of approximately 7.3 MWth. Therefore, the EDG will not be subject to the Large Combustion Plant requirements of the IED but will be subject to the requirements of the Medium Combustion Plant Directive (MCPD) which applies to combustion plant with a thermal capacity of less than 50 MWth.

The MCPD states:

> *"Member States should be able to exempt medium combustion plants used in cases of emergency and operated during limited time periods from compliance with the emission limit values set out in this Directive."*

Furthermore, the TA Luft guidance for new and existing liquid fuelled engines (which the EA referred to in the Schedule 5 request) states:

> *"limits do not apply to emergency engines …"*

On this basis, it is understood that the emission limit values within the MCPD and the TA Luft guidance do not apply to the EDGs. However, the EDG would be designed to achieve the emission limit values in the MCPD after the initial warming up period.

3 Modelling methodology

The air quality impact of the operation of the EDG has been quantified using the ADMS dispersion model. This is the same model as used to carry out the dispersion modelling of the emissions from the main stack as detailed in the Dispersion Modelling Assessment (DMA) which was submitted as Appendix D of the EP application and as Appendix D2 of the Environmental Impact Assessment to support the planning application.

The principal inputs into the model with respect to emissions to air from the EDG are presented in Table 1 and Table 2. This data has been calculated from a datasheet for a 2.28 MWe diesel generator, similar to that which would be installed at site.

Table 1: Stack source data

Item	Unit	Value
Stack Data		
Height	m	8
Internal diameter	m	0.525
Location	m, m	369640, 72343
Flue Gas Conditions		
Temperature	°C	450
Exit moisture content	% v/v	7.7%
Exit oxygen content	% v/v dry	9.5%
Reference oxygen content	% v/v dry	15.0%
Volume at reference conditions (dry, ref O_2)	Nm^3/s	4.94
Volume at actual conditions	Am^3/s	7.36
Flue gas exit velocity	m/s	34.0

Table 2: Stack emissions data

Pollutant	Conc. (mg/Nm^3)		Release rate (g/s)	
	Unabated	Abated	Unabated	Abated
Oxides of nitrogen (as NO_2)	894	200	4.415	0.938
Notes: All emissions are expressed at reference conditions of dry gas, 15% oxygen, 273.15K. Unabated emission concentrations of oxides of nitrogen were provided by the engine supplier.				

As set out above, the EDG would operate under the following scenarios:

- For testing and maintenance purposes – expected to be tested every two weeks for less than 30 minutes; and
- In the event of loss of grid connection to maintain operation of the abatement and control systems to enable a safe shutdown the ERF – assumed to be typically no more than 4 hours for any one event.

In each case, the EDG would gradually 'warm up' over approximately 5-7 minutes. During this period the loading on the EDG would gradually increase until full load. Following this the EDG would operate at full load for the testing which would last up to 20 minutes. In total the EDG would be operational for up to 30 minutes.

Although the emission limit values in the MCPD do not apply to the EDG as it would operate for less than 500 hours in any calendar year, the EDG would be able to achieve the emission limits set out in the MCPD following the initial 'warm up' period. During the 'warm up' period the emissions of NOx would be significantly higher until the combustion system has settled, but the volume of air flow would also be increasing until full load is reached. It is not possible to account for this short term variability in loading in the dispersion modelling. However, the higher emissions during this 'warm up' period have been accounted for by conservatively calculating the emissions during this initial period by multiplying the emission concentration by the volume when operating at full load.

3.1 Testing

When modelling the impact of testing it has been assumed that:

- The EDG operates at full load for the entire 30 minutes of testing;
- The emissions of NOx during the first 10 minutes of testing are at the unabated level, while the remaining 20 minutes of testing are at the abated level;
- For the remaining 30 minutes of the 1-hour period the engine is off – i.e. no emissions; and
- Testing could start at any time between the hours of 08:00 and 17:00.

To allow for this the model has been set up with the unabated release rate and the results factored before comparison with AQALs. A time varying emission profile has been included in the model to ensure that the EDG is only modelled to operate between the hours of 08:00 and 18:00. This profile has been applied for all days of the year. The testing envelope is significantly longer than would be anticipated as this would normally occur at a set time. However, this ensures that the model assumes operation during the worst-case weather conditions which are likely to occur given the testing constraints of normal working hours.

3.2 Emergency Operation

When modelling the impact of the emergency operation it has been assumed that:

- The EDG operates at full load for the first hour, followed by 70% loading for the second hour, and 50% loading for the remaining 2 hours of emergency operation;
- The emissions of NOx during the first 10 minutes of operation are at the unabated level;
- For the remaining time, emissions are at the abated level; and
- Emergency operation could occur over any 4-hour rolling period in the year.

Due to the shorter stack on the EDG it is not appropriate to use the same grid resolution as for the modelling of the main stack of the ERF. Therefore, a nested grid has been incorporated into the grid used for the DMA. The modelling domain grid has the following parameters. The grid spacing of the finer resolution area covering the site is less than 1.5 times the stack height.

Table 3: Modelling Domain

Parameter	Large Grid	Fine Grid
Grid Spacing (m)	60	7.5
Grid Start X	366760	369175
Grid Finish X	370960	369925
Grid Start Y	72860	73775
Grid Finish Y	75860	74525

All other model inputs are as set out in the DMA.

4 Assessment levels

This analysis has considered the impact of the testing and emergency operation of the EDG. This has considered both the impact on human health and ecology.

The assessment level for the protection of human health considered in this analysis is:

- The 1-hour AQAL for nitrogen dioxide of 200 µg/m^3, which can be exceeded 18 times per year.

The assessment level for the protection of ecosystems considered in this analysis is:

- The maximum 24-hour Critical Level for oxides of nitrogen of 75 µg/m^3 which is applicable at ecological sites.

The impact of testing and emergency operation has not been considered in relation to the annual mean assessment levels as the contribution to annual mean impacts would not be significant due to the limited period of operation.

The EA's "guidance for air quality assessments for specified generators"[1] is designed to assess the situation where a generator only operates occasionally but in every year. This guidance requires an applicant to carry out statistical analysis if short term predictions show that there are a number of hours for which the impact exceeds the environmental standard at a sensitive receptor over the modelled operating envelope. The guidance states that *"Where the probability exceeds*

- *1% or less – exceedances are highly unlikely*
- *less than 5% – exceedances are unlikely as long as the generator plant operational lifetime is no more than 20 years*
- *more than or equal to 5% – there's potential for exceedances and the regulator will consider if acceptable on a case by case basis."*

[1] Environment Agency, Specified Generators: dispersion modelling assessment, at https://www.gov.uk/guidance/specified-generators-dispersion-modelling-assessment.

5 Results - testing

5.1 Human health

Table 4 presents the maximum predicted impact at any grid point when testing. Results have been presented for each of the 5-years of meteorological data considered.

The 1-hour AQAL does not apply where public would not be expected to have regular access. Therefore, whilst this analysis has considered the point of maximum impact the AQAL does not necessarily apply at this point.

The AQAL is set as nitrogen dioxide whilst the model was used to predict concentrations of oxides of nitrogen. To allow for comparison to the AQAL, it has been assumed that 35% of the NOx will convert to nitrogen dioxide[2]. The EA's Air Quality Modelling and Assessment Unit (AQMAU) has stated that this is likely to be an overestimate and close to the stack, where the main impacts occur, the conversion is more likely to be 15%[3].

Table 4: Impact of Testing - Human Health

Weather data	Maximum 1-hour PC as % of AQAL
2014	226%
2015	227%
2016	237%
2017	233%
2018	246%

As shown, the maximum 1-hour nitrogen dioxide process contribution is predicted to exceed the AQAL. However, this conservatively assumes that testing occurs during the worst-case weather conditions for dispersion in the hours of 08:00 and 18:00 (i.e 3650 hours in each year). Testing would occur on a 2-week basis and as such would only occur about 26 times in a year.

Therefore, it is necessary to assess how likely it is that the testing period would coincide with the worst case weather years. To do this, a cumulative hypergeometric distribution calculation has been carried out in line with the EA's guidance for specified generators[4], which is designed to assess the situation where a generator only operates occasionally.

The 1-hour AQAL for nitrogen dioxide is 200 ug/m^3 not to be exceeded more than 18 times a year. Therefore, the calculation should be based on the probability of randomly selecting 19 or more exceedance hours (failures) in the sample size. This is the same as selecting at most 'N' minus 19 non-exceedance hours (successes) in the sample. The probability is defined using the following equation (from the EA's guidance for specified generators):

$$P = \sum_{i=0}^{N-19} \frac{\binom{K}{i}\binom{M-K}{N-i}}{\binom{M}{N}}$$

[2] Considered appropriate as the primary NOx to NO2 ratio is less than 10%

[3] Environment Agency, Diesel generator short term NO2 impact assessment, AQMAU-C1457-RP01, 2016.

[4] Environment Agency, Specified Generators: air dispersion modelling example short term statistical analysis.

In order to carry out the analysis it has been assumed that:

- The sample size denoted by 'N' is the number of hours of testing – 26
- The population size denoted by 'M' is the operating envelope – 8760
- The number of exceedance hours (e) has been calculated in ADMS by outputting the number of exceedances of a threshold.
- The number of successes in the population is denoted by 'K' where K = M – e.

As a conservative assumption, it is also assumed that an emergency event would occur each year which would last for 4 hours and cause 4 exceedance hours. Therefore, the probability has been calculated as randomly selecting 15 or more (i.e. 19 - 4) exceedance hours in the sample size.

The number of exceedance hours has been calculated by ADMS by outputting the number of exceedances of the following concentrations (allowing for testing for 30 minutes and the remaining 30 minutes offline, and a NOx to NO_2 conversion of 35%):

- 200 µg/m^3 – i.e. the PC exceeds the AQAL; and
- 200 µg/m^3 minus a background concentration of 23 µg/m^3 – i.e. the PEC exceeds the AQAL allowing for the background concentration.

Table 5: Probability Analysis - Testing

Weather data	PC exceeds AQAL		PEC exceeds AQAL allowing for background of 23 µg/m^3	
	Max number of exceedances at any point	Probability of exceedance of the AQAL	Max number of exceedances at any point	Probability of exceedance of the AQAL
2014	146	<0.1%	340	<0.1%
2015	132	<0.1%	293	<0.1%
2016	137	<0.1%	316	<0.1%
2017	194	<0.1%	404	<0.1%
2018	167	<0.1%	318	<0.1%
Note: Probability of an exceedance of more than 15 times 200 mg/m^3 which allows for 4 exceedances as a result of emergency operations.				

This has shown that the probability of the PEC exceeding the AQAL (allowing for the tolerable exceedances and emergency operation) is less than 0.1%, indicating that short term exceedances are highly unlikely, using the EA's criteria.

This assumes that testing occurs for 26 periods in a year. The calculation has also been used to calculate the number of hours of testing could occur before the probability of the PEC exceeding the AQAL (allowing for the tolerable exceedances and emergency operation) exceeds 5%. This has shown that if testing occurred for up to 190 hours the probability of the PEC exceeding the AQAL (allowing for the tolerable exceedances and emergency operation) would be less than 5%. In line with the EA guidance this indicates that short term exceedances would be unlikely even if testing was to occur for up to 200 periods in a year.

5.2 Ecological impacts

Table 6 presents the maximum predicted impact at any grid point within the Isle of Portland SSSI and SAC. Impacts have been presented for each site individually because the extents of the designations are slightly different where the greatest impacts from the EDG occur, with the SSSI being closer to the Portland ERF than the SAC.

Results have been presented for each of the 5-years of meteorological data considered. The results are based on the assumptions that:

- The EDG operates at full load for the entire 30 minutes of testing;
- The emissions of NOx during the first 10 minutes of testing are at the unabated level, while the remaining 20 minutes of testing are at the abated level;
- For the remaining 30 minutes of the 1-hour period the engine is off – i.e. no emissions; and
- Testing could start at any time between the hours of 08:00 and 17:00.

The PEC has also been calculated. This is based on the 2018 Defra mapped background dataset for the 1 km grid square containing the impacts. The Defra mapped background concentration for the grid square containing the port area is very high. The concentration predicted is higher than many other ports in the UK. Owing to the significantly lower number of vessels operating out of Portland this seems unusual. Reviewing the mapped background dataset shows that in 2017 there was a step change in the predicted concentration. This is attributed to a change in the way shipping emissions are accounted for in the mapped background dataset.

Therefore, a sensitivity has been carried out by calculating the number of exceedances of the critical level assuming both the higher background concentration and a more realistic background concentration of 23 µg/m^3 concentration, noting that this is still significantly higher than the concentration for the surrounding 1km grid squares.

Table 6: Impact of Testing at Portland Ecological Site

Weather data	Maximum PC as % of CL		Maximum PEC as % of CL	
	SSSI	SAC	SSSI	SAC
Assumed background concentration = 34 µg/m^3				
2014	47.5%	43.5%	92.9%	88.9%
2015	41.7%	33.8%	87.0%	79.2%
2016	47.5%	39.3%	92.8%	84.6%
2017	45.2%	40.5%	90.6%	85.8%
2018	51.2%	33.7%	96.5%	79.0%
Assumed background concentration = 23 µg/m^3				
2014	47.5%	43.5%	78.2%	74.2%
2015	41.7%	33.8%	72.4%	64.5%
2016	47.5%	39.3%	78.1%	69.9%
2017	45.2%	40.5%	75.9%	71.2%
2018	51.2%	33.7%	81.9%	64.4%
Note: PEC includes background contribution of NOx of 34 µg/m^3				

As shown the maximum predicted PC does not exceed the daily mean NOx Critical Level as a result of testing. Even when the background concentration is included, the PEC does not exceed the Critical level in the SSSI or the SAC.

6 Results – emergency operations

6.1 Human health

Table 7 presents the maximum predicted impact at any grid point during an emergency event. Results have been presented for each of the 5-years of meteorological data considered.

This assumes that:

- The event would last for 4 hours and could occur at any time of the day or night;
- The EDG operates at full load for the first hour, followed by 70% loading for the second hour, and 50% loading for the remaining 2 hours of emergency operation;
- Emissions of NOx:
  - are at the unabated level during the first 10 minutes;
  - are at the abated level for the remaining time;

Table 7: Impact of Emergency Operations - Human Health

Weather data	Maximum 1-hour PC as % of AQAL
2014	330%
2015	333%
2016	360%
2017	361%
2018	361%

As shown, the maximum 1-hour nitrogen dioxide process contribution is predicted to exceed the AQAL. This conservatively assumes that the emergency event occurs during the worst-case weather conditions for dispersion.

However, as noted earlier, the AQAL for nitrogen dioxide can be exceeded 18 times in a year and so emergency operation could only lead to an exceedance if there were to be more than 4 events in a year. This is extremely unlikely as emergency operation is only required if there is a loss of grid connection and there have only been three such occurrences over the past six years.

The hypergeometric distribution calculation carried out in section 5.1 assumed that an emergency event of four hours would occur every year, that the AQAL would be exceeded for each of these four years, and then calculated the probability of more than 18 exceedances of the AQAL due to testing. The probability of an exceedance of the AQAL (allowing for the tolerable exceedances and emergency operation) was calculated to be less than 0.1%, indicating that an exceedance of the AQAL is highly unlikely even combined with an emergency event.

6.2 Ecological impacts

Table 8 presents the maximum predicted impact at any grid point within the Isle of Portland SSSI and SAC. Results have been presented for each of the 5-years of meteorological data considered.

This assumes that:

- The event would last for 4 hours and could occur at any time of the day or night;

- The EDG operates at full load for the first hour, followed by 70% loading for the second hour, and 50% loading for the remaining 2 hours of emergency operation; and
- Emissions of NOx:
  - are at the unabated level during the first 10 minutes; and
  - are at the abated level for the remaining time.

In order to compare with the daily mean Critical Load, the maximum rolling 4 hour mean has been divided by 6. This accounts for operation during the worst case conditions for dispersion, assuming that the EDG would not be operated for the remainder of the 24 hour period.

As explained earlier, the results have been presented for two background concentrations.

Table 8: Impact of Emergency Operations at Portland Ecological Site

Weather data	Maximum PC as % of CL		Maximum PEC as % of CL	
	SSSI	SAC	SSSI	SAC
Assumed background concentration = 34 µg/m^3				
2014	151.9%	94.3%	197.2%	139.6%
2015	127.5%	87.8%	172.8%	133.1%
2016	122.6%	85.1%	167.9%	130.5%
2017	136.3%	83.4%	181.6%	128.8%
2018	127.8%	104.1%	173.1%	149.4%
Assumed background concentration = 23 µg/m^3				
2014	151.9%	94.3%	182.6%	125.0%
2015	127.5%	87.8%	158.2%	118.5%
2016	122.6%	85.1%	153.3%	115.8%
2017	136.3%	83.4%	167.0%	114.1%
2018	127.8%	104.1%	158.4%	134.7%

The PEC has been calculated by adding the annual mean background concentration to the PC. This is considered appropriate in line with the LAQM approach to account for background concentrations when calculating daily mean impacts.

As shown the maximum 24-hour impact is predicted to exceed the Critical Level of 75 µg/m^3. However, this conservatively assumes that the EDG ia required for emergency usage during the worst-case weather conditions. The probability of this occurring has been calculated as follows:

1. The dispersion model has been used to determine how many times the contribution from the operation of the EDG during an emergency event is more the headroom – i.e. more than the critical level of 75 µg/m^3 minus the background concentration.
2. There are 8757 hours during the year in which an event could have started and lasted for four hours during the year.
3. The chance of an event occurring which could have led to an exceedance is calculated as (1) divided by (2), assuming that one event occurs per year.

Table 9: Probability Analysis - Emergency Operations - Ecological Sites

Weather data	SSSI		SAC	
	Max number of PEC exceedances of the Critical Level at any point	Probability PEC exceeding the Critical Level	Max number of PEC exceedances of the Critical Level at any point	Probability PEC exceeding the Critical Level
Assumed background concentration = 34 μg/m^3				
2014	119	1.36%	24	0.27%
2015	82	0.94%	17	0.19%
2016	137	1.56%	19	0.22%
2017	110	1.26%	15	0.17%
2018	171	1.95%	19	0.22%
Average	124	1.41%	19	0.21%
Assumed background concentration = 23 μg/m^3				
2014	47	0.54%	5	0.06%
2015	35	0.40%	9	0.10%
2016	38	0.43%	4	0.05%
2017	43	0.49%	2	0.02%
2018	51	0.58%	10	0.11%
Average	43	0.49%	6	0.07%

As shown, the probability of the PEC exceeding the daily mean Critical Level in an emergency scenario in an average year is 1.41% in the SSSI, with the high background concentration, and 0.21% in the SAC.

The EA's "guidance for air quality assessments for specified generators"[5] is designed to assess the situation where a generator only operates occasionally, but in every year, hence a 5% probability of an exceedance of the daily mean Critical Level in any one year leads to a likely exceedance over a 20 year period (5% x 20 years = 100%).

The average probability of the PEC exceeding the daily mean Critical Level in the SSSI is 1.4% meaning that the DSG would need to operate for 70 years for the probability of the PEC exceeding the Critical Level in the SSSI to exceed 100% (100% / 1.41% = 70 years), or 466 years for the SAC even with the high background concentration. This is conservative, as there have only been three grid outages over the past six years. Therefore, an exceedance of the daily mean Critical Level is unlikely.

[5] Environment Agency, Specified Generators: dispersion modelling assessment, at https://www.gov.uk/guidance/specified-generators-dispersion-modelling-assessment.

7 In combination impact with the ERF

The preceding analysis has been based on the operation of the EDG in isolation. The modelling has shown that impacts from the EDG occur close to the site. The contribution from the ERF in this area is minimal as the taller stack height of the ERF means that to the emissions travel further, and avoid significant building downwash effects.

Testing would occur at the same time as the operation of the ERF. However, it is highly unlikely that a significant contribution from the ERF would coincide with the operation of the EDG, or that the conditions which results in the greatest ground level contributions would occur in the same hour due to the significantly different stack heights.

During an emergency, the EDG would be used to safely shut down the ERF. Therefore, whilst there would be emissions from both the EDG and ERF initially, this would not be for any significant length of time. In addition, it is unlikely that the area impacted by the emergency operation of the EDG would also be impacted by emissions from the ERF during shut down.

As such it is not considered that including the contribution from the ERF would significantly change the conclusion of this assessment, that the operation of the EDG would not be significant.

8 Summary

Dispersion modelling has been carried out to determine the impact of the operation of the EDG during testing and an emergency event (specifically, the loss of grid connection). This has considered the impact on human health and ecology with reference to the short term assessment levels. The impact of testing and emergency operation has not been considered in relation to the annual mean assessment levels as the contribution to annual mean impacts would not be significant due to the limited time of operation.

1. Impact of testing on human health
    a. The EDG would run for about 30 minutes every 2 weeks, or 26 times a year.
    b. If a test coincided with the worst case weather conditions, the 1-hour air quality assessment level would be exceeded at the point of maximum impact.
    c. However, the air quality standard allows this to be exceeded 18 times a year. The chance of an exceedance of the air quality standard, even assuming that an emergency generator event also happened during the year, is less than 0.1%. Under the EA's assessment criteria, this can be described as "highly unlikely".
2. Impact of testing on ecology
    a. Even under worst case weather conditions, and assuming a high background concentration, the daily average air quality assessment level is not predicted to be exceeded during a test of the EDG.
3. Impact of emergency operation on human health
    a. The EDG would only run if there is a loss of grid connection to the site. This is expected to happen less than once a year.
    b. The EDG would run for up to four hours to facilitate a safe shutdown of the plant.
    c. If emergency operation coincided with the worst case weather conditions, the 1-hour air quality assessment level would be exceeded at the point of maximum impact.
    d. However, the air quality standard allows this to be exceeded 18 times a year and the emergency operation would only last for four hours. This has been included in the testing assessment.
4. Impact of emergency operation on ecology
    a. The short term critical level for the protection of ecology is a daily average. The EDG would only run for four hours, so we have calculated the impact over a four hour period and then divided by six to show the contribution to the daily average.
    b. The dispersion model has been used to determine the number of times in a year that emergency operation of the EDG could have led to an exceedance of the daily mean critical level, allowing for background concentrations.
    c. Allowing for a conservative background concentration, the chance of an exceedance is 1.4% in the Isle of Portland SSSI. If there were an emergency operation every year, then the chance of an exceedance can be described as "unlikely" over a period of 70 years.
    d. Allowing for a more realistic background concentration, the chance of an exceedance is 0.5% in the Isle of Portland SSSI. Under the EA's assessment criteria, this can be described as "highly unlikely".
    e. Allowing for a conservative background concentration, the chance of an exceedance is 0.21% in the Isle of Portland SAC, dropping to under 0.1% with a more realistic background concentration. This can be described as "highly unlikely".

C Regulation 25 (Q4)

C.1 Regulation 25 Request

Planning and Community Services
County Hall, Colliton Park, Dorchester DT1 1XJ
01305 221 000
www.dorsetcouncil.gov.uk

Mr Rogers
Terence O'Rourke
by email…

Date: 30 April 2021
Ref: WP/20/00692/DCC

Dear Mr Rogers,

Planning application WP/20/00692/DCC for the construction of an energy recovery facility with ancillary buildings and works including administrative facilities, gatehouse and weighbridge, parking and circulation areas, cable routes to ship berths and existing off-site electrical sub-station, with site access through Portland Port from Castletown.

I refer to the above planning application that was received on 7th September 2020, and which required an Environmental Impact Assessment. I am now writing with a request for additional information and clarification in relation to your client's proposal.

The Council considers some of the information requested below constitutes further environmental information, and where this is applicable it is requested in accordance with Regulation 25 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 and Section 62(3) of the Town and Country Planning Act 1990.

The points below have been numbered to assist with referencing of your response.

<u>Landscape</u>

1. Additional detail and assessment in relation to the vapour plume from the stack and its visibility. This should include additional photomontages and/or visualisations which show the likely plume in different meteorological conditions.

2. Further interpretive background detail in relation to the scale of the development, and its context in relation to the existing Port.

3. More detail of the proposed PVC coating, its durability, and potential issues in respect of degradation during the design life of the facility.

4. Further consideration and information in respect of relevant landscape issues raised through representations on the first consultation as appropriate.

<u>Health</u>

5. Additional detail responding to issues in respect of potential benefits or impacts upon public health as a result of changes in air quality. In particular, this should address outstanding issues raised by PHD.

6. Further consideration and information in respect of relevant health related issues raised through representations on the first consultation as appropriate.

Historic Environment

7. Further detail and assessment in respect of specific mitigation measures proposed to mitigate potential harm caused to the historic environment from the proposal, which should have regard to impacts on the setting of designated heritage assets. Proposals for mitigation should include the consideration of a footpath link on Port land immediately beneath the prison.

8. Assessment of potential impacts upon footpath S3/72 which runs past the Royal Naval Cemetery, in relation to the potential impacts on the historic environment.

9. Further consideration and information in respect of relevant historic environment related issues raised through representations on the first consultation as appropriate.

Ecology

10. Additional information as required by Natural England and other ecological stakeholders to address the outstanding issues raised in respect of nationally/internationally designated sites raised through the initial consultation. This should include consideration of legal points which have been raised in respect of the robustness of the Shadow HRA.

11. Further consideration and information in respect of general ecology related issues raised through representations on the first consultation as appropriate, including the potential for management or improvement of habitat within the Port below the prison site.

District Heating

12. Further detail in respect of how the prison and young offender institution could be connected to a district heating system supplied from the development. This should include the required infrastructure, technical supporting information, and description of the environmental (including climate change) and economic (for both for the supplier and purchaser) impacts.

13. Further consideration and information in respect of relevant district heating related issues raised through representations on the first consultation as appropriate.

Electricity Generation

14. Further clarification on how the development will be connected to the grid, and secure benefits in relation to the generation of electricity. This should include detail of how the grid connection will be constructed and the proposed cabling.

15. Further consideration and information in respect of relevant issues related to the generation of electricity raised through representations on the first consultation as appropriate.

Shore Power

16. Further clarification and additional detail in respect of how the shore power element of the proposal would work. This should include a response to issues raised in representations, and justification of any assumptions made in respect of modelling of carbon savings which might result.

17. Further consideration and information in respect of relevant issues related to the provision of shore-based power raised through representations on the first consultation as appropriate.

Air Quality

18 Further information and modelling in respect of the impacts on air quality, and particularly as a result of the provision of shore-based power to Navy and cruise ships. The modelling should be accompanied by a separate document setting out the basis for any assumptions in respect of substitution for diesel fuel.

19. Additional air quality modelling in respect of the emissions from traffic on the section of the A354 leading to the site.

20. Inclusion of the use of the diesel back-up generator in the cumulative (in-combination) assessment.

21. Further consideration and information in respect of relevant air quality related issues raised through representations on the first consultation as appropriate.

Carbon Balance/Climate Change

22. Additional information on the baseline scenarios requested by the council. These should have particular reference to points raised through the consultation on the robustness of the carbon balance scenarios set out in the current version of the ES. Additional clarification should also be provided in respect of the approach to carbon capture for the facility itself, and the circumstances under which it might be installed and operated.

23. A report has been submitted by UKWIN which makes a variety of technical points in relation to the suitability of the proposed technology and the robustness of some the claims made in respect of its effectiveness and environmental benefits. An assessment should be made of the technical points made in this report, and an appropriate response should be provided in respect of the issues raised.

Traffic

24. Further clarification in respect of opportunities to export of IBA by sea, including the identification of specific sites that could accept the material when transported using this method.

25. Additional information in respect of the expected impacts (if any) of users of the Coast Path needing to cross the road in Castletown on the route used by HGVs to access the proposed plant.

26. Further consideration and information in respect of relevant transport related issues (including in respect of traffic modelling and baseline and future baseline conditions) raised through representations on the first consultation as appropriate.

Surface Water Discharge

27. Further detail in respect of the acceptability of the sea outfall, addressing the comments of Dorset Council Flood Risk Management Team explaining how the issues raised will be addressed and overcome.

28. Further consideration and information in respect of relevant surface water management issues raised through representations on the first consultation as appropriate.

Contaminated Land/Geology

29. Further information in respect of suitability of the site to accommodate the proposed development in terms of historic contamination, geology and ground stability.

Need

30. Further clarification and explanation in respect of potential alternative treatment facilities within three hours drive by road, in respect of the need for the capacity the facility provides. Further detail in respect of likely sources of the RDF proposed to be managed should be provided, which should have regard to existing contracts for the management of RDF which are in place with competing facilities.

31. Further detail in respect of the potential impacts (or lack of) of your proposal upon the potential delivery of an RDF operation at Eco Sustainable Solutions, should the planning authority be minded to grant planning permission for it.

32. Further detail in respect of the impact of the development on the future process of RDF in mainland Europe, and future issues surrounding exporting UK waste to these facilities. The information provided should include discussion of the likely differences in respect of overall efficiency between the proposed plant and those plants in mainland Europe for which it may compete in relation to future feedstock.

Jobs

33. Additional detail to support the assumptions which lie behind the stated number of additional jobs created.

Planning Policy

34. It would be useful if you could provide your comment and perspective in respect of representations received on way in which you have interpreted planning policies as set out in your Supporting Statement.

Environmental Permit

35. We note that you are making some updates to your Environmental Permit application, and request that the additional detail and assessment you are undertaking in respect of air quality, noise and fire prevention is incorporated into your planning application and EIA, so the assessment of the project is consistent across both regulatory regimes.

As you are already aware, the further information you provide will be advertised, and will then be subject to a further statutory consultation process, during which stakeholders and interested parties will be invited to comment, should they so wish.

Yours sincerely,

Adrian Lynham
On behalf of Dorset Council

C.2 Regulation 25 Response - Covering Letter

TERENCE O'ROURKE

Mr Adrian Lynham
Planning Case Officer
Minerals and Waste Planning Team
Dorset Council
County Hall
Colliton Park
Dorchester
Dorset
DT1 1XJ

6 August 2021

Our Reference: 262701

Dear Mr Lynham

LONDON
23 Heddon Street
London
W1B 4BQ

BIRMINGHAM
Enterprise House
115 Edmund Street
Birmingham
B3 2HJ

BOURNEMOUTH
Everdene House
Deansleigh Road
Bournemouth
BH7 7DU

TELEPHONE
020 3664 6755

www.torltd.co.uk

Response to Dorset Council Letter (30 April 2021)

Planning application WP/20/00692/DCC for the construction of an energy recovery facility with ancillary buildings and works including administrative facilities, gatehouse and weighbridge, parking and circulation areas, cable routes to ship berths and existing off-site electrical sub-station, with access through Portland Port from Castletown.

Further to your letter, issued on behalf of Dorset Council and dated 30 April 2021, the applicant has reviewed its content and has since worked towards compiling a comprehensive response, with the aim of providing the requested information, to enable the waste planning authority to assess the proposal and determine the application.

It is noted that the council considers that some of the information requested, constitutes 'further environmental information', and where this is applicable it is requested in accordance with Regulation 25 of the Town and Country Planning (Environmental Impact Assessment Regulations 2017 (as amended) and section 62(3) of the Town and Country Planning Act 1990 (as amended). Conversely, some of the information requested does not fall within the auspices of Regulation 25 and therefore comprise clarification or supporting information to assist the council's planning assessment.

Information deemed to fall under Regulation 25 is provided in the Environmental Statement Addendum (ES Addendum) and its associated appendices. Other supporting information, that may cover environmental matters outside of the scope of the Environmental Impact Assessment, is provided as a series of stand-alone technical documents, and these are not formally submitted under the cover of Regulation 25.

To help clarify this, the applicant has sought to organise the information in a logical manner. The documents providing 'further environmental information' under Regulation 25 are listed in table 1 below, also signposting to the relevant points in the council's letter.

It is, however, for the waste planning authority to determine what information it considers to be captured under the provisions of Regulation 25 and what is not. The applicant expects Dorset Council to undertake a further period of public consultation, with comments invited only on the information submitted here, rather than on the original planning application documents that have previously been consulted upon.

Table 1: Regulation 25 documents

- ES Addendum, (points 1, 3, 4, 5, 7, 8, 10, 11, 12, 14, 16, 18, 19, 20, 21, 22, 24, 25, 27, 29 and 35) together with:
- Appendix 1.1: Dorset Council's letter (30.04.21)
- Appendix 2.1: Potential district heating connection routes (point 12)
- Appendix 3.1: Additional dispersion modelling (point 18)
- Appendix 3.2: Update tables for technical Appendix D2
- Appendix 3.3: Modelling results at discrete receptor locations (point 35)
- Appendix 4.1: Updated carbon assessment (point 22)*
- Appendix 5.1: Human health risk assessment addendum (point 5)
- Appendix 5.2: Health impact assessment addendum (point 5)
- Appendix 6.1: Framework heritage mitigation strategy (point 7)
- Appendix 7.1: Preliminary slope stability assessment (point 29)
- Appendix 8.1: Plume visibility modelling results (point 1)
- Appendix 8.2: Replacement ES figures 9.16 and 9.17* and new ES figures 9.38 to 9.47 (point 1)
- Appendix 9.1: DERC report (point 10)
- Appendix 9.2: Phase 1 walkover of East Weare heritage features for proposed remedial vegetation clearance works (point 10)
- Appendix 9.3: Potential marine impacts of the proposed Portland ERF (point 10)

The non-Regulation 25 documents providing supporting information and clarification are shown in table 2 below, also signposting to the relevant points in the council's letter.

Table 2: Stand-alone supporting and clarification documents (not Regulation 25)

- Supplemental planning supporting statement (points 2, 3, 5, 7, 10, 11, 12, 14, 16, 22, 24, 27 and 35 in summary and specifically point 34 in detail)
- Consultation response summary document (points 3, 4, 6, 9, 11, 13, 15, 17, 21, 22, 23, 26, 28, 29, 30, 31, 32, 33, and 34 specifically in respect to consultee comments)
- Updated shadow appropriate assessment (points 10 and 11)*
- Design and access statement (DAS) addendum (points 1, 2 and 3)
- District heating report (point 12)
- Updated shore power strategy report (point 16)*
- Waste need paper (points 30, 31 and 32)
- Portland ERF post combustion capture plant - Pre-feasibility assessment (point 22)
- Flood risk assessment addendum (point 27)
- Incinerator bottom ash (IBA) paper (point 24)
- Grid connection paper (point 14)
- BS4142 noise impact assessment (point 35)
- Fire prevention plan (point 35)
- Access path strategy (point 7)

Documents notated with an asterix comprise direct updates of documents submitted with the original planning application.

All other documents are either addendum documents, that should be read in conjunction with the main document submitted with original planning application or are new documents that have been prepared to provide the council with the requested information.

The applicant believes that its original planning application submission robustly and comprehensively demonstrates that the proposed ERF is acceptable in planning and environmental terms. The information provided in response to the council's request addresses all of the concerns expressed during the original consultation, and further underlines the compelling case for the development. In conclusion the benefits of the ERF scheme carry great weight and as such the planning balance is judged to come down firmly in favour of the grant of planning permission.

We trust that the information provided will enable you to complete your assessment of the application. However, please do contact me should you require any further clarification.

Yours sincerely,

Paul Rogers
Technical Director

cc	Giles Frampton	Powerfuel Portland Ltd
	Steve McNab	Powerfuel Portland Ltd

C.3 Regulation 25 Response - Relevant Extracts

Portland energy recovery facility

Supplemental planning supporting statement

August 2021

PORTLAND ENERGY RECOVERY FACILITY (ERF)

SUPPLEMENTAL PLANNING SUPPORTING STATEMENT

POWERFUEL PORTLAND LIMITED

AUGUST 2021

Contents

SUMMARY

S1. In September 2020, Powerfuel Portland Ltd submitted a full planning application to Dorset Council for the construction of an energy recovery facility (ERF) on land at Portland Port, Portland.

S2. Having assessed the application Dorset Council has formally requested that additional information and clarification be provided, some of which is deemed to be 'further environmental information' in accordance with Regulation 25 of the EIA Regulations and Section 62(3) of the Town and Country Planning Act 1990.

S3. Dorset Council has provided 35 points, covering various topics, where further information is requested. The applicant has responded to this request through the following documents:

- An ES Addendum, with associated appendices (dealing with matters specifically deemed to be covered under Regulation 25 of the EIA Regulations).

- A Consultation Response Summary Document (CRSD) and this Supplemental Planning Supporting Statement (SPSS), which refer to the original planning submission, the ES Addendum and technical appendices, and stand-alone supporting documents (dealing with aspects not deemed to be covered under Regulation 25 of the EIA Regulations).

S4. The case for the development is multi-faceted but in summary the ERF will:

- Represent a sustainable form of waste management, reducing landfill and managing waste further up the waste hierarchy.

- Enable Dorset to manage more of its residual waste in the county reducing the existing reliance upon the export of waste to other facilities in neighbouring waste authority areas, or outside of the UK, and in doing so Dorset's residual waste management system will become better aligned with the self-sufficiency and proximity principles.

- Deliver sufficient residual waste management capacity in Dorset to meet the existing and future shortfall.

- Accord with the Dorset Waste Plan (DWP) spatial strategy and policy approach, which provides flexibility for unallocated sites to come forward where sites deliver advantages over allocated sites. Advantages include its large scale, its ability to provide shore power to the port and district heating to the two local prisons. Furthermore, its location enables materials to be imported and exported by ship and provides future potential for the implementation of a carbon capture and storage (CCS) scheme.

- Be located on brownfield previously developed land safeguarded for industrial use, located within an operational port, and upon which an extant planning consent exists permitting the development of an energy plant, fuelled in part by waste materials (waste oils and tyres).

- Meet the requirements of all relevant policies in the Dorset Waste Plan, West Dorset, Weymouth & Portland Local Plan, Dorset Minerals Strategy, and the Portland Neighbourhood Plan.

S5. Furthermore, it has been demonstrated that all of the refuse derived fuel (RDF) produced at the Canford mechanical biological treatment (MBT) facility in Dorset (around 82,000 tonnes per annum) would be made available to the Portland ERF. A planned increase in capacity at Canford, would supply over 80% of Portland's RDF requirements from Dorset waste. It was made public on 6 August 2021 that Beauparc has been awarded the 3-6 year contract by BCP Council to process household, commercial and litter bin waste. This will be processed at the Canford Magna facility, and the residue will be used to produce RDF which will be suitable for treatment at the ERF[1]. This would be the most rational and efficient solution for Dorset, and more sustainable than exporting this material around 120 km to the Bridgwater ERF in Somerset or other locations.

S6. There is insufficient capacity to treat all of Dorset's residual waste at existing ERFs within the defined catchment area and, even accounting for planned capacity, there is still a capacity gap greater than the proposed capacity of the ERF. The ERF would not prejudice other waste management facilities from coming forward in Dorset, including the much smaller scale Eco-Sustainable Solution ERF, Parley, if this is consented, and investment was able to be raised so it could be built.

S7. The ERF would have little impact on the European RDF market. European ERFs will instead focus their capacity on the large volumes of European waste still sent to landfill. The ERF, by means of its CHP capability, will be of equal standing to European ERFs in terms of its efficiency.

S8. The scheme will deliver renewable/low carbon energy responding to local and national climate emergency declarations, contributing towards various targets for carbon reduction, and increasing energy security.

S9. The ERF will deliver shore power to Portland Port to meet its existing demands and will also help the UK shipping industry meet national targets to reduce carbon emissions and other air pollutants.

S10. The Portland ERF will deliver a better carbon outcome against all of the alternative scenarios assessed. It performs better than current waste management practice and also future waste management practice in Dorset (relating to the transfer of some waste to the Bridgwater ERF in Somerset).

S11. The applicant's net zero commitment will ensure that the ERF achieves net zero carbon emission during its operational lifetime. Furthermore, the applicant is committed to an emission reduction route-map to ensure that emissions are physically reduced in preference to off-setting. As part of this route-map the ERF is 'CCS ready' and the applicant is willing to implement carbon capture and storage (CCS) technology, as and when this becomes technically and commercially viable.

[1] Please note due to the timing of this announcement it has not been possible to include this in particular in the Waste Need Paper, as part of the wider response to Dorset Council's request letter

S12. In respect to district heating, whilst the ERF is 'CHP ready' the applicant has gone further and identified a near term credible anchor district heating scheme supplying the prisons on the island with heat.

S13. The ERF has significant advantages in respect to its ability to deliver both shore power and district heating. In carbon and economic value terms this outperforms other allocated Dorset waste sites, where such potential is, in the case of shore power not relevant, and in the case of district heating much more limited. This must be considered to be a specific site advantage.

S14. There is a need for new economic investment at Portland to help address existing socio-economic concerns and generate sustainable regeneration by taking advantage of Portland's assets, opportunities, and excellent growth potential. The ERF will provide new jobs and provide opportunities for training and education to increase skills, and knowledge for local people, and help to address existing pockets of social deprivation at Portland.

S15. The ERF will help achieve transformational change to unlock key employment sites, such as within Portland Port, exploit the area's strengths and potential opportunities in respect to the development of renewable energy and low carbon technologies and support tourism related activities. The provision of shore power will enable the port to remain commercially competitive in the cruise sector, avoiding the future loss of cruise liner visits if shore power cannot be secured, safeguarding existing jobs and supporting future economic growth,

S16. An assessment of potential plume visibility has been undertaken and this has concluded that the plume would only be visible for very short periods of time, on a limited number of occasions and in limited months of the year (all of which are outside the main tourist season). This has not changed the original conclusions of the landscape, seascape and visual impact assessment and the ES. Whilst the development would result in some impact, overall, this is deemed to be acceptable.

S17. Information has been provided that demonstrates the proposed PVC cladding is robust and fully capable, through the use of tonal variations (such as camouflage), of achieving its objective of ensuring that the main building is recessive against its context when viewed from key locations.

S18. Additional air quality modelling has been undertaken to take account of the net change in emissions of several pollutants due to the use of shore power provided by the ERF to ships berthed at the port. Its findings were used to update the original human health risk assessment and health impact assessment, which did not identify any significant health effects. The additional modelling demonstrates that the ERF, combined with shore power, will result in a reduction in emissions and pollutants in many cases due to the reduced use of diesel engines onboard vessels at Portland port. In all cases the proposed development will not lead to any significant effects on air quality and the ES conclusions remain valid.

S19. A framework heritage mitigation strategy has been devised that will result in works to the E Battery East Weare scheduled monument, to enable its removal from the Historic England Heritage at Risk Register. Other benefits include enhanced public access through the extension of the footpath at East Weare and enhanced opportunities for public appreciation through the provision of interpretation for the group of related heritage assets at East Weare. These significant public heritage benefits more than outweigh any harm caused to the setting of local heritage assets arising from the ERF development.

S20. The heritage benefits will result in other secondary benefits including the removal of scrub allowing former habitats, such as lowland calcareous grassland, to re-establish once the scrub is removed, contributing towards the objective to return the Isle of Portland Site of Special Scientific Interest (SSSI) to a favourable condition. Some tourism benefit is achieved by allowing an “around the island” circuit of the coastal path by creating a new section of permissive footpath through currently inaccessible parts of the secure port estate to connect to the existing public accessible land/rights of way.

S21. The original shadow Appropriate Assessment conclusion, that the process emissions arising from the ERF, and its associated transport movements, would not result in an adverse impact on the integrity of any designated national site network (NSN) site, remains unchanged. There would be no significant effects on the nationally designated SSSI or other local designated areas.

S22. There would be no significant effects associated with the proposed ERF in respect to the marine environment, and protected species and habitats. An assessment undertaken by marine consultant ABPmer has considered the potential impacts on the marine environment, and human health, arising from potential ERF emissions to the air and water. It concludes that there are no significant risks associated with the human consumption of local fish or shellfish and on that there should be no rational basis to anticipate a negative impact on fish and shellfish related businesses and employment.

S23. The proposed Portland ERF is fully compliant with DWP Policy 4 criterion a, in that the proposed Portland ERF site has demonstrated many advantages over the DWP allocated sites.

S24. The analysis of the waste capacity gap in the ERF’s catchment area (ignoring the potential availability of waste being exported to Europe and passing the site by sea), demonstrates that the objectors’ comments that there is insufficient waste available for the facility, and that Portland ERF would prejudice the delivery of DWP allocated sites are inaccurate and unfounded. The proposed ERF fully accords with Policy 4 criterion b.

S25. The Portland ERF accords with the DWP vision and its spatial strategy to manage Dorset’s waste in Dorset, in line with the self-sufficiency and proximity principles and fully accords with Policy 4 criterion c.

S26. The Portland proposal complies with the requirements of Policy 6 in respect to its contribution to meeting the DWP identified waste treatment need, its spatial strategy, the provision of CHP (through both shore power and district heating), the safeguarding of protected NSN ecological sites and the transport of residual materials by sea.

S27. The additional information submitted in response to the council’s letter confirms the original conclusion that the Portland ERF is compliant with other relevant DWP policies in respect to amenity, quality of life and health, heritage, landscape, flood risk and natural heritage.

S28. In considering the original planning application material, together with updated and further supporting information, it is clear that the compelling planning and environmental case remains, and that this is becoming stronger given the pressing need to take action to deliver the above benefits.

S29. The benefits of the proposed ERF are significant and should be afforded significant weight, outweighing any identified adverse effects, such that in the planning balance permission should be granted.

1. Introduction

Dorset Council's request for further information and clarification

1.1 In September 2020, Powerfuel Portland Ltd submitted a full planning application to Dorset Council for the construction of an energy recovery facility (ERF) with ancillary buildings and works including administrative facilities, gatehouse and weighbridge, parking and circulation areas, cable routes to ship berths and existing off-site electrical sub-station, with site access through Portland Port from Castletown (application reference: WP/20/00692/DCC) on land within Portland Port.

1.2 The application was accompanied by an environmental statement (ES) prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended; hereafter the EIA Regulations), which provides an assessment of the likely significant effects associated with its construction and operation.

1.3 Dorset Council has consulted on the application and also appointed Tetra Tech to undertake a review of the ES, which ensured that the council had access to sufficient expertise to examine the ES. Representations have been submitted to Dorset Council by consultees, members of the public and other interested parties in response to the consultation on the planning application. Dorset Council has taken these representations into account in its consideration of the application.

1.4 Following the consultations, the council formally requested additional information and clarification in a letter dated 30 April 2021. The council confirms that it considers some of the information requested constitutes 'further environmental information' and, where this is the case, it is requested in accordance with Regulation 25 of the EIA Regulations.

1.5 An ES Addendum has been prepared to review the council's letter and provide the information that is considered to be 'further environmental information' under Regulation 25 of the EIA Regulations. It forms an addendum to the submitted ES.

The purpose of this report

1.6 The review of the council's letter also identified that some of the information requested, while it may not constitute 'further environmental information' within the remit of Regulation 25 of the EIA Regulations, is deemed necessary for the waste planning authority to comprehensively assess the planning and environmental effects of the proposed development and to enable it to robustly determine the application.

1.7 This Supplemental Planning Supporting Statement (SPSS) provides clarification and supporting information (not covered under Regulation 25 of the EIA Regulations), by highlighting relevant sections of the documents already submitted, summarising key aspects of the additional information provided in supporting stand-alone technical documents, and where appropriate setting out clarification for matters specifically referenced to in the council's letter.

1.8 In addition to this document, the applicant has prepared a separate Consultation Response Summary Document (CRSD), which provides a summary response to the principal topics raised during the consultation by statutory consultees, other non-statutory consultees, and local interest groups. It also provides a summary response to topics of concerns raised by the wider public.

The applicant's response to the council's letter of 30 April 2021

1.9 The submission comprises the following components:

Regulation 25 further environmental information

- ES Addendum, together with
- Appendix 1.1: Dorset Council's letter (30.04.21)
- Appendix 2.1: Potential district heating connection routes (point 12)
- Appendix 3.1: Additional dispersion modelling (point 18)
- Appendix 3.2: Update tables for technical Appendix D2 (point 19)
- Appendix 3.3: Modelling results at discrete receptor locations (point 35)
- Appendix 4.1: Updated carbon assessment (point 22)
- Appendix 5.1: Human health risk assessment (HHRA) addendum (point 5)
- Appendix 5.2: Health impact assessment (HIA) addendum (point 5)
- Appendix 6.1: Framework heritage mitigation strategy (point 7)
- Appendix 7.1: Preliminary slope stability assessment (point 29)
- Appendix 8.1: Plume visibility modelling results (point 1)
- Appendix 8.2: Replacement ES figures 9.16 and 9.17 and new ES figures 9.38 to 9.47 (point 1)
- Appendix 9.1: DERC report (point 10)
- Appendix 9.2: Phase 1 walkover of East Weare heritage features for proposed remedial vegetation clearance works (point 10)
- Appendix 9.3: Potential marine impacts of the proposed Portland ERF (point 10)

Other supporting technical information

- Supplemental planning supporting statement (this document)
- Consultation response summary document
- Updated shadow appropriate assessment
- Design and access statement (DAS) addendum
- District heating paper
- Updated shore power strategy report
- Waste need paper
- Portland ERF post combustion capture plant - Pre-feasibility assessment
- Flood risk assessment addendum
- Incinerator bottom ash (IBA) paper

- Grid connection paper
- BS41442 noise impact assessment
- Fire prevention plan
- Access path strategy paper

The scope of this Supplemental Planning Supporting Statement (SPSS)

1.10 Section 2 of this supplemental statement provides a summary overview of the planning and environmental case for the proposed Portland ERF focusing on its key benefits.

1.11 Section 3 of this document provides a summary of the information provided in respect to the following topic areas. Where appropriate this provides a reference to the specific points in the Dorset Council letter where further information is requested.

- Landscape – interpretive background detail and external materials (points 2 and 3)
- Health – impact on public health (point 5)
- Historic environment – heritage benefits (point 7)
- Ecology – improvement of habitat (points 10 and 11)
- District heating (point 12)
- Electricity generation (point 14)
- Shore power (point 16)
- Carbon balance and climate change (including carbon capture and storage) (point 22)
- Traffic – export of IBA (point 24)
- Surface water discharge (point 27)
- Waste need (points 30, 31 and 32)
- Environmental permit (point 35)

1.12 Section 4 of this report, which should be read in conjunction with the submitted Planning Supporting Statement, clarifies and confirms why the proposed development is compliant with the development plan. It specifically addresses point 34 of the council's letter in respect to the applicant's interpretation of planning policies.

1.13 Section 5 of this report addresses the relevant planning conditions and planning obligations in so far as these relate to the matters raised in the council's letter.

1.14 Section 6 provides a conclusion in respect to both the information originally submitted with the planning application and the further information and clarification (including further environmental information) now submitted in response to the context of the council's letter, in the context of the planning balance to be struck by the decision maker.

The scope of the Consultation Response Summary Document (CRSD)

1.15 The council's letter also requests that further responses be given to topic-based issues raised in the representations to the first consultation. In some cases, reference is made in the council's letter to a specific consultee response, or aspects that are most relevant to the consideration of that topic area.

1.16 To address these requests, the applicant's response is provided in the CRSD to the range of detailed technical points that were raised by statutory consultees and technically competent consultees during the first consultation. Specifically, the CRSD covers the following:

- Design and materials (point 3) - also covered in detail in the DAS Addendum and summarised in chapter 3 of the SPSS
- Landscape (point 4)
- Health (point 6)
- Historic environment (point 9)
- Ecology (point 11)
- Combined heat and power (CHP) District heating (point 13)
- Electricity generation and distribution (point 15)
- Shore power (point 17)
- Air quality (point 21)
- Carbon balance and greenhouse gas emissions – including UKWIN (points 22 and 23), also covered in detail in the ES Addendum and summarised in chapter 3 of the SPSS
- Traffic (point 26)
- Surface water drainage (point 28)
- Contamination and geology (point 29) covered in detail in the ES Addendum
- Economic effects and jobs (point 33)
- Need and waste arisings (points 30, 31 and 32) – also covered in detail in the Waste Need Paper and chapter 3 of the SPSS
- Compliance with development plan policy (point 34) – also covered in detail in chapter 4 of the SPSS

1.17 For completeness, the CRSD also covers some other topic areas where consultees have made comments, but these are not covered by the council's request for further information.

- Alternative sites
- Fall back scheme
- World heritage site

1.18 Annex A to the CRSD provides the applicant's response to UKWIN's comments on the planning application submission (point 23).

1.19 Annex B to the CRSD provides a summary response to a wide range of topic areas raised by the public

2. Summary of the case for the development

Overview

2.1 The planning case for the development is set out in full in the original Planning Supporting Statement. However, with the submission of further ‘environmental information’ under the provisions of Regulation 25 (of the EIA Regulations), and the provision of other clarification and supporting information, the applicant considers it is helpful to reiterate the core aspects of its case that together justify the grant of planning permission.

2.2 The proposed Portland ERF will:

- Use residual waste in the form of RDF as a fuel to generate low carbon energy representing a sustainable form of waste management, diverting waste from landfill disposal, and managing waste further up the waste hierarchy (without impacting negatively on Dorset’s admirable recycling rates) in accordance with paras 152 and 155 of the NPPF (2021) and the Government’s overarching National Planning Policy Statement for Energy (NPS-EN1).
- Enable Dorset to manage more of its residual waste in the county, reducing the existing reliance upon the export of waste to other facilities in neighbouring waste authority areas, or outside of the UK, and in doing so Dorset’s residual waste management system will become better aligned with the self-sufficiency and proximity principles.
- Play an important part in delivering the Dorset Waste Plan (DWP) vision and objectives to deliver sufficient residual waste management capacity in Dorset to meet the existing and future shortfall.
- Accord with the DWP’s spatial strategy and policy approach, which provides flexibility for unallocated sites to come forward (Policy 4 criterion a) where sites deliver advantages over allocated sites. The key advantages of the Portland location are:

  - proximity to, and ability to supply a local heat network serving the two Portland prisons. The Ministry of Justice has confirmed an interest in taking heat, enabling its fossil fuelled boilers to be taken off-line, delivering carbon savings and local air quality benefits

  - ability to provide shore power to the port, which cannot viably be provided by alternative means, enabling visiting cruise liners and the stationed Royal Fleet Auxiliary (RFA) to turn off their fossil fuelled engines when in port delivering carbon savings and net air quality benefits in terms of particulates and other pollutants. Portland Port’s chief executive officer has confirmed in writing that the port is aware that it needs to offer shore power capability in order to maintain the existing levels of business, the loss of which in relation to the cruise ships would have knock-on adverse impacts for the broader Dorset tourist economy.

  - facilitation of the import of RDF and export of residual materials (IBA). This would also facilitate Carbon Capture and Storage (CCS), when this becomes technically and commercially viable, through the transfer of captured carbon by ship.

- proximity to adjoining employment land within the port that can accommodate linked activities, including the future provision of recycling and CCS technologies.

- land availability on commercial terms and of a size that is capable of delivering an ERF with sufficient capacity to make a substantial contribution towards meeting Dorset's residual waste needs, using proven and bankable technology with economies of scale.

- Comply with all of the provisions of DWP energy recovery policy (Policy 6), including the provision of CHP capable of supplying electricity to shore power and the local grid and heat to a local heat network serving identified heat customers. Specifically, further information provided in the District Heating Paper has confirmed that a heat network route has been identified to serve the two prisons, without causing any significant environmental effects, and is also technically and economically viable, further supported by both economic and environmental policy drivers.
- Located on vacant, brownfield previously developed land specifically allocated for industrial use in the West Dorset, Weymouth & Portland Local Plan and Neighbourhood Plan, within an operational port, and upon which an extant planning consent exists permitting the development of an energy plant, fuelled in part by waste materials (waste oils and tyres).
- Meet the requirements of all relevant policies in the Dorset Waste Plan, West Dorset, Weymouth & Portland Local Plan, Dorset Minerals Strategy, and the Portland Neighbourhood Plan.

Waste

2.3 The evidence presented confirms that the ERF will meet a demonstrable waste need in respect to the following:

- Large volumes of residual waste arisings in Dorset, the region and nationally (both municipal and commercial and industrial), a significant proportion of which could be diverted from landfill to energy recovery.
- Dorset has a predicted shortfall in residual waste treatment capacity of 234,000 tonnes by 2033, in the absence of any additional treatment capacity. An ERF at Portland with a capacity to process around 183,000 tonnes per annum of residual waste (and up to a maximum of 202,000 tonnes per annum) would help meet these needs.
- Dorset has no remaining landfill capacity and no energy recovery facilities to manage existing and future waste. Almost all of Dorset's residual waste is either managed by intermediate MBT to create RDF which is currently exported to Europe or other energy from waste facilities or landfill outside of Dorset. The provision of this ERF in Dorset would provide a higher degree of sustainability and self-sufficiency and accord with the proximity principle. Specifically:

- All of the RDF produced at the Canford facility (around 82,000 tonnes per annum), is currently sent to European ERFs. It is understood that this may shortly be sent to the Bridgwater ERF in Somerset, some 120 km from Canford. The Portland ERF would provide a more logical and closer Dorset facility providing carbon and cost benefits.

- The operator of the Canford facility (Panda Beauparc), and Geminor (an associate fuel supplier) have both confirmed that they would prioritise the supply of RDF material derived from Dorset waste to the Portland ERF, if it is consented.

- Additionally, by the time the ERF becomes operational it is expected that Canford facility would have increased from the existing Environment Agency permitted level of 125,000 tonnes per annum to 200,000 tonnes per annum, increasingly RDF production from around 82,000 tonnes per annum to around 150,000 tonnes per annum.

- It should therefore be possible to supply over 80% of Portland's RDF requirements from Dorset waste processed at Canford alone. If the Portland ERF is available, we expect this would lead to further RDF production within Dorset, as opposed to export of pre-treated waste outside the country as is currently the case. Full processing of waste in Dorset would be the most rational and efficient solution for Dorset waste and far more sustainable than exporting this material to other facilities outside of the county, including the Bridgwater ERF in Somerset.

• There is insufficient capacity to treat all of Dorset's residual waste at existing ERFs within the defined catchment area, with many required to prioritise their local authority collected waste under contract. Even accounting for planned ERF (which may or may not be developed), there is still sufficient waste available for the ERF. This does not account for the 195,000 tonnes and 310,000 tonnes per annum of RDF being exported by sea from the UK and Ireland that passes in close proximity to Portland.

• The ERF would not prejudice other waste management facilities from coming forward on DWP allocated sites, including the Eco-Sustainable Solutions ERF at Parley, which if consented and built would deliver 50,000 tonnes per annum of thermal treatment capacity (noting that this represents only 30% of the capacity envisaged by the DWP).

• The proposed ERF would have little impact on the European RDF market, with the amount of RDF exported from the UK expected to continue to fall due to a number of factors, including the provision of more RDF processing capacity in the UK. European ERFs will instead focus their capacity on the large volumes of European waste still sent to landfill. The proposed Portland ERF, by means of its CHP and shore power capability, will be of equal standing to other European ERF in terms of its efficiency.

Energy

2.4 The evidence presented in this application supports the following conclusions in respect to energy and need:

- There is a need in Dorset for more renewable and low carbon energy generation infrastructure to contribute towards meeting the Dorset target of 7.5% of all energy generation to be from renewable sources, to support the Dorset and UK local authority climate emergency declaration.
- There is a need to provide shore power, supplied by lower carbon energy facilities, both nationally and locally at Portland Port in Dorset, to meet the existing demand and help the UK shipping industry contribute towards meeting national targets to reduce carbon emissions and other pollutants. Portland Port has confirmed that it requires shore power to provide a lower carbon source of electricity to maintain its existing customer base and meet their expectations, and also to support national efforts to decarbonise the marine sector. Failure to provide this source of lower carbon power so will have economic consequences for the port and the wider local economy.
- There is a need at the local and national levels for a wide mix of energy infrastructure, including energy from waste facilities, to increase national energy security.
- There is a national need for urgent action to reduce the emission of greenhouse gasses in accordance with international agreements, such as the 2015 Paris Agreement.
- There is a need for new renewable and low carbon energy infrastructure that will contribute towards meeting the UK's statutory carbon reduction targets, enshrined within the 2008 Climate Change Act (as amended) to reduce the UK's net greenhouse gases emissions by 100% by 2050 relative to the 1990 baseline.
- There is a need for more investment in energy efficiency and clean energy technologies, and to grow the low carbon economy by rolling out low carbon heating, by building and extending heat networks across the country and by delivering clean, smart, and flexible power encouraging renewable and low carbon energy, in accordance with the 2009 UK Low Carbon Transition Plan and the 2017 Clean Growth Strategy.

Socio-economic

2.5 The evidence set out within this planning application supports the following conclusions in respect to socio-economics and need:

- There is a need for new economic investment at Portland to help address existing socio-economic concerns and generate sustainable regeneration by taking advantage of Portland's assets, opportunities, and excellent growth potential.
- There is a need to create more high quality and well paid jobs to help retain and attract younger people to the Portland area and provide

opportunities for training and education to increase skills, and knowledge for local people.

- There is a need for investment in Portland to improve overall standards of living, including helping to address relatively low levels of pay, diversifying the mix of employment opportunities, and reducing a dependence on lower paid seasonal sectors, also providing job opportunities locally that reduce the need to out commute for work.
- There is a need for investment and stimulation of economic growth to help address the existing pockets of social deprivation that are evident on some parts of Portland.
- There is a need for transformational change at Portland to unlock key employment sites, such as within Portland Port, to exploit the area's strengths and potential opportunities in respect to the development of renewable energy and low carbon technologies and support other tourism related activities such as the cruise ship sector.
- There is a need at the UK level for new development that is capable of delivering economic growth and supporting the drive to transform the UK into a dynamic economy through investment in low carbon infrastructure, and a focus on skills and knowledge to increase productivity and generate greater prosperity for all.
- There is a need for the planning system to support the delivery of sustainable development, especially development that can contribute towards building a strong, responsive, and competitive economy, support strong, vibrant, and healthy communities and protect the environment, whilst also supporting the move towards a low carbon UK economy.

Carbon and greenhouse gasses

2.6 The applicant acknowledges that the Portland ERF would need to reduce its carbon intensity over its operational life. To demonstrate how the Portland ERF can meet more stringent emission standards the applicant has set out a road-map to support its transition to the Government's 2050 Net Zero target and show how the facility would contribute to a reduction in carbon emissions associated with waste management on its day of opening and progressively reduce these emissions up to 2050. The road map identifies a mix of the technologies that the applicant is exploring across its business with full decarbonisation of the Portland ERF likely to be achieved using one of, or a combination of, the three longer term measures.

Day 1 of Operations (assumed 2025)

- The Portland ERF will operate with R1 compliance, reducing greenhouse gas emissions by diverting waste from landfill and export abroad.
- The Portland ERF will generate low carbon electricity for the Port (shore power) and for export to the grid.
- The Portland ERF is designed to be 'CHP ready' for connection to a district heating scheme. Unlike other facilities, the Portland ERF benefits from two high demand heat users (being the adjoining prison and young offenders centre) that could cornerstone the upfront capital investment

required for a district heat network and, in due course, this could expand to include other potential local end users already identified, to use lower carbon energy and heat generated by the facility.

- The Portland ERF will be designed to allow fuel flexibility should the nature of the incoming waste change over time and recycling levels increase.

Short Term (assumed 2025–2035)

- The Portland ERF can accommodate changes to the composition of the fuel mix to reduce the non-biogenic carbon contained in the incoming waste stream driven by Government policy on recycling; and
- The Portland ERF can promote the potential co-location of a facility(facilities) within the Port to recycle/reuse products extracted from the incoming waste stream (circular economy) reducing the non-biogenic content of the fuel mix and displacing CO_2 emissions associated with the production of products or feedstocks which the extracted products replace.

Longer Term (assumed 2030–2050)

- The Portland ERF could accommodate Carbon Capture Storage and Use either within the port or for export by sea once this technology becomes technically and commercially viable.

2.7 The updated carbon assessment confirms that the Portland ERF will deliver a better carbon outcome against all of the alternative scenarios assessed. Specifically:

- In comparison with the other scenarios (export to UK ERF, European ERF or DWP allocated sites with equivalent ERF), the Portland ERF performs best with shore power and district heating capable of saving a further 8,749 tCO_2e when compared to the base case scenario (baseline being Portland exporting electricity only to the grid).
- On the basis of shore power only the Portland ERF significantly outperforms all UK options for waste processing, including potential options within Dorset.
- The benefit of the proposed Portland ERF over the current residual waste management approaches for Dorset's waste is estimated to be around 7,200 tCO_2e per year, increasing to 15,000 tCO_2e per year in the maximum case with lower NCV waste. These calculations do not take account of the additional benefits that would be provided by shore power from the proposed Portland ERF, which would displace around 4,500 to 5,500 tCO_2e per year, or the potential benefit of district heating, which would displace around a further 3,000 tCO_2e per year.
- The lifetime carbon benefit of the Portland ERF has been calculated compared to the current baseline for Dorset's waste and is estimated to be 157,548 tCO_2e, with a net benefit in each year.

- The Portland ERF has significant advantages in respect to its ability to deliver both shore power and district heating. In carbon terms this option outperforms other allocated Dorset waste sites, where such potential is more limited. This must be considered to be a specific site advantage.
- Whilst the proposals are based on ensuring that the ERF would at worst be net-zero carbon, the proposed Portland site is well located in a commercial port with access to shipping and land to facilitate the implementation of CCS as this becomes technically and commercially viable.

Landscape and visual - plume

2.8 Further information has been provided in respect to the plume modelling undertaken (using the accepted ADMS dispersion modelling software and appropriate local weather data for Portland). Specifically:

- Based on a 5 year study period of hourly weather data (using the ADMS dispersion model which is an industry leading model and is approved by the Environment Agency), the percentage of daylight hours annually with any visible plume when the cloud cover is not high would be 0.55% (24.2 hours). This 5 year period includes the 2018 "Beast from the East" and "Storm Emma" weather patterns which were abnormal weather events and we include normalised figures adjusted for this in the detail below.
- The plume length is typically relatively short, being less than 50m for over 50% of the total visible time. The longest predicted plumes of over 100m only likely to occur for four hours per year. The plume montage images published by the local campaign groups are inaccurate, and in some cases over predict the maximum length of the plume and visibility by a factor of 21 times. This misleading visual material should not be attributed any weight.
- The ES Addendum confirms the conclusions of the original landscape, seascape, and visual impact assessment, that the plume is likely to produce only a very minor alteration to the view for a very limited number of hours in a very limited number of months (all of which are outside the main tourist season).
- The DAS Addendum visualisations further demonstrate that the plume, on the limited occasions it would be visible, would be variable in length and would not cause any unacceptable visual impact from the key viewpoints.
- The additional environmental information provided in the ES Addendum and further supporting information in the DAS Addendum on plume visibility demonstrates that whilst the development would result in some impact, overall, this is deemed to be acceptable.

Air quality and public health

2.9 The air quality assessment has been updated to take account of the net change in emissions of nitrogen oxides (NO_x), nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$) and sulphur dioxide (SO_2) due to the use of shore power provided by the ERF to ships berthed at the port. The findings were used to update the HHRA and HIA. The analysis has shown that:

- For particulate matter, there will be a net benefit associated with the proposed development at all points modelled. For NO_2 and SO_2, there will be a net benefit for the majority of the area modelled. Where there is a net increase, the increase will be extremely small.
- The proposed development will not lead to any significant effects on air quality and the ES conclusions remains valid.
- The additional information and assessment provided in the updated HHRA and HIA did not identify any significant health effects.

Heritage

2.10 The ES Addendum (appendix 6.1) includes the framework for the proposed heritage mitigation strategy, which will deliver the following benefits:

- Works to the E Battery scheduled monument and grade II listed building to enable its removal from the Historic England Heritage at Risk Register.
- Enhanced public access through the extension of the footpath at East Weare (known as Cemetery Road).
- Enhanced opportunities for public appreciation through the provision of interpretation for the group of related heritage assets at East Weare.

2.11 In addition to the above heritage benefits this work will also result in other secondary benefits:

- Ecological benefits, achieved by the clearance of some scrub from around the E Battery East Weare monument within the Isle of Portland SSSI. This will allow former habitats, such as lowland calcareous grassland, to re-establish once the scrub is removed, contributing towards the objective to return the SSSI to a favourable condition.
- Tourism benefits, achieved by allowing an "around the island" circuit of the coastal path by creating a new section of permissive footpath through currently inaccessible parts of the secure port estate to connect to the existing public accessible land/rights of way.

Ecology

2.12 The ecological information submitted with the original application has been reviewed and updated. Specifically:

- The original shadow Appropriate Assessment conclusion, that the process emissions arising from the ERF, and its associated transport movements, would not result in an adverse impact on the integrity of any designated national site network (NSN), remains unchanged.
- There would be no significant effects on the nationally designated SSSI or other local designated areas.

- There would be no significant effects associated with the proposed ERF in respect to the marine environment, and protected species and habitats.
- The implementation of the heritage mitigation strategy will lead to some ecological benefits arising from scrub removal around the scheduled monument and improving access into the area so that other ecological management activities (such as establishment of grazing units) can take place in the future.

Conclusion

2.13 The original planning application robustly demonstrated that there is a compelling planning case for the proposed ERF.

2.14 In terms of waste management this was based on its ability to meet Dorset's current needs for the provision of significant new residual waste management capacity (234,000 tonnes), reduce the need for landfill, and address the existing practice of exporting residual waste to other areas, outside of county to landfill or to other ERFs in the UK or Europe. This is much more closely aligned to the waste hierarchy and the self-sufficiency and proximity principles.

2.15 Further clarification is provided in the Waste Need Paper demonstrating that there is more than sufficient waste available in the ERF catchment, even when taking account of the limited existing or planned capacity. It also confirms that the Canford Magana facility can supply around 82,000 tonnes per annum (tpa) of Dorset derived RDF to Portland, increasing to around 150,000 tpa as Canford's planned RDF production increases, such that the facility could supply over 80% of the ERF's capacity requirement, using Dorset-derived residual waste. If the Portland ER is approved, it is reasonable to assume that further RDF production will occur using Dorset waste. Finally, the ERF would have little effect on the European RDF market as existing ERF capacity would be redeployed to divert other European residual waste away from landfill, whilst the Portland ERF is planned to have a high efficiency because of shore power and district heating and therefore would be of comparable efficiency and would have a reduced carbon impact given the reduction in transport required.

2.16 From an energy perspective the proposed ERF would be highly efficient providing energy for the provision of a shore power facility at the port and heat to a future district heating network serving identified local heat customers such as the two Portland prisons. In doing so it would meet the need for renewable and low carbon energy generation and derive carbon savings by displacing existing fossil fuels. This would contribute towards meeting national and local targets for reductions in carbon and greenhouse gases.

2.17 The updated carbon assessment has shown that the Portland ERF, with shore power and district heating, outperforms all of the other ERF alternative scenarios considered. It will also deliver significant carbon benefits against the existing, and the future baseline, for Dorset waste management practice. Furthermore, potential exists at the site to accommodate CCS, when this becomes technically and commercially viable, facilitated by the port location.

2.18 The ERF would also bring a series of other socio-economic benefits to the area, arising from a circa £100 million investment, and associated creation of construction and operational jobs, helping to deliver transformational change at Portland and unlocking potential opportunities in the renewable/low carbon sector and promoting tourism by supporting cruise sector growth.

2.19 In respect to landscape and visual impact associated with the plume, the assessment concludes that the plume is likely to produce only a very minor alteration to the view for a very limited number of hours in a very limited number of months (all of which are outside the main tourist season). Whilst the development would result in some limited impact, overall, this is considered be acceptable.

2.20 In respect to air quality matters, it is concluded that the provision of shore power will result in net benefits in respect to reducing particulates and other pollutants relative to the existing position. In respect to ecology the ERF there would be no significant impact upon protected ecological habitats and species. In terms of heritage, the previously identified impact on the setting of the East Weare heritage assets arising from the ERF would be off-set by the public heritage benefits resulting from the mitigation works to remove a scheduled monument from the at risk register and facilitating public access for appreciation and interpretation of the wider group of heritage assets on the East Weare. There would also be some secondary ecological and tourism related benefits arising from the heritage mitigation.

2.21 In considering the original planning application material, together with updated and new supporting information provided in response to the council's letter, it is clear that this compelling case remains and indeed is becoming stronger given the pressing need to take action to deliver the above benefits.

3. Further submitted information

Landscape

Introduction

3.1 The council's letter requested the following information and clarification in relation to landscape (points 1, 2 and 3 in the council's letter):

- Additional detail and assessment in relation to the vapour plume from the stack and its visibility. This should include additional photomontages and/or visualisations which show the likely plume in different meteorological conditions (point 1).

- Further interpretive background detail in relation to the scale of the development, and its context in relation to the existing Port (point 2).

- More detail of the proposed PVC coating, its durability, and potential issues in respect of degradation during the design life of the facility (point 3).

3.2 A DAS Addendum has been prepared and is submitted to provide the information requested above and this is summarised below, together with the findings of the ES Addendum.

Plume visibility (point 1)

3.3 The technical modelling and landscape and visual assessment of the predicted plume is specifically addressed through chapter 8 of the ES Addendum and appendices 8.1 (Plume visibility modelling results) and 8.2 (updated ES figures 9.16 and 9.17 and new ES figures 9.38 to 9.47).

3.4 The additional plume visibility modelling report provided in the ES Addendum (appendix 8.1) states that, in an average year, the percentage of daylight hours with any visible plume when the cloud cover is not high (seven to eight oktas(2)) would be 0.55% (24.2 hours). The plume would be obscured by cloud on cloudy days. Excluding the 'Beast from the East' and 'Storm Emma', which were abnormal weather events, the maximum percentage of hours with any visible plume would be 0.51% (22.2 hours).

3.5 While the plume would be visible for an average of 24.2 hours per year, its length would not be consistent for the entire duration, which would change the visual impact it would have from the various locations being considered. Therefore, the number of daylight hours the plume would be visible has been broken down by plume length, as follows:

- 0-20 m in length: 6.4 hours (6.2 hours excluding the 'Beast from the East' and 'Storm Emma')

- 20-50 m in length: 7.4 hours (6.6 hours excluding the 'Beast from the East' and 'Storm Emma')

[2] A unit used to express the extent of cloud cover, equal to one-eighth of the sky.

- 50-100 m in length: 6.4 hours (5.8 hours excluding the ‘Beast from the East’ and ‘Storm Emma’)

- 100-200 m in length (although it should be noted that the maximum predicted length was 187.89 m for one hour in February 2016): 4.0 hours (3.6 hours excluding the ‘Beast from the East’ and ‘Storm Emma’)

3.6 The ES Addendum states that these results confirm the conclusions set out in the original landscape, seascape, and visual impact assessment that the plume is likely to produce only a very minor alteration to the view for a very limited number of hours.

3.7 Section 2 of the DAS Addendum provides supporting information and illustrative material derived from the results of the additional plume modelling undertaken, in respect of the predicted plume occurrence and length using the ADMS dispersion model.

3.8 A series of visualisations are provided to assist Dorset Council to assess the visual impact of the likely plume, on the limited occasions when this would be visible. Views are provided from the key viewpoints that were agreed with landscape officers at the Osmington White Horse, Nothe Fort and Ferrybridge Inn. The visualisations show a worst case scenario with the maximum length of plume (187.89m) and the wind direction blowing at 90 degrees to the observer, in clear summer weather conditions. Visualisations are also provided showing plume visibility in winter conditions. These are based on the maximum predicted plume length and with the wind blowing to the north-east as this represents the predominant south-westerly wind conditions when the plume is most likely to form.

3.9 The DAS Addendum visualisations further demonstrate that the plume, on the limited occasions it would be visible, would be variable in length and would not cause any unacceptable visual impact from the key viewpoints.

3.10 Furthermore, as shown in section 2 of the DAS Addendum, this visual material (based on Environmental Agency approved modelling software, using 5 year hourly local weather data for Portland), demonstrates that the plume montage images published by the local campaign groups are inaccurate, and in some cases over predict the maximum length of the plume and visibility by a factor of 21 times. Therefore, this misleading visual material should not be attributed any weight.

3.11 The further environmental information provided in the ES Addendum and additional supporting information in the DAS Addendum on plume visibility demonstrates that whilst the development would result in some limited impact, overall, this is deemed to be acceptable and would accord with the provisions of DWP Policy 14 (landscape and design quality).

Interpretive background detail (point 2)

3.12 As requested by Dorset Council, further analysis has been undertaken to interpret the scale of the Portland ERF in the context and setting of the wider port. A contextual island elevation drawing has been prepared to demonstrate this, which forms part of the DAS Addendum (Introduction).

3.13 The elevation shows the proposed ERF’s scale sitting comfortably within the context of the existing port development area, which is characterised by a range of other large scale and tall buildings and structures. These include the coaling shed, dock cranes, inner coaling pier, ship docks and associated shipping. The wider context view also shows the tall nature of the former naval block (Prince Andrew House) and the Ocean Views apartments.

3.14 The contextual analysis also illustrates the presence of a series of other large scale buildings, located off Incline Road associated with the Glencore operations. It show that substantial industrial style buildings already exist, set midway up the East Weare undercliff. These are at a higher elevation than the ERF, which sits within the main port area, at the base of the East Weare undercliff and some way below the East Weare cliff face above.

3.15 The further contextual elevation clearly demonstrates that the scale of the proposed ERF building can comfortably sit within the context of the range of existing large-scale structures and buildings and the man made harbour area, associated with the operational port area and the wider port domain. The presence of the ERF at this location, by means of its scale would not, as is suggested by some objectors, be out of context with the existing industrial background of development in this brownfield location.

3.16 The proposal is deemed to accord in this respect with DWP Policy 14 (landscape and design quality).

Additional detail on the proposed PVC mesh (point 3)

3.17 Dorset Council has requested more information on the external cladding materials and specifically the proposed PVC mesh, and its durability over time. The DAS Addendum (section 1) provides supplementary information on the approach to the areas of 'green wall'. The design approach is to ensure that the green wall is recessive (not invisible), by providing sufficient tonal and colour variation to ensure the form of the ERF building is not immediately obvious, particularly from the more sensitive viewpoints in the world heritage site (WHS) and area of outstanding natural beauty (AONB) to the east.

3.18 In order to create a water-tight envelope, the building will be enclosed using a sheet metal cladding, which will be fixed back with cladding rails to the steel frame. It is proposed that this cladding will be dark green (similar to that used at the Glencore development at the Upper Osprey site) to create a suitable backdrop colour. The proposed PVC mesh will then be installed on a sub-frame that is spaced slightly off the surface of the façade and securely fixed to the steel frame. The fabric will be attached to the building using a tensioned system with aluminium profiles. Should the mesh need to be temporarily removed, for example for maintenance, the underlying dark green cladding would ensure that the building remained recessed within the landscape.

3.19 The PVC mesh is provided with a 10-year warranty. It is designed with a high tenacity base cloth to prevent deformation and top coatings to prevent elongation and tearing and provide resistance to dirt and UV fading. These will help to enhance the material's durability, protect it from environmental and chemical influences, repel dirt and intensify colours and image depth. To ensure that the PVC mesh camouflage remains effective throughout the ERF's lifespan, Powerfuel Portland Ltd is committed to reviewing the effectiveness and structural integrity at the end of the 10-year warranty period and each year afterwards, and to replacing the wrap after a maximum of 15 years for the life of the building.

3.20 Further details of the PVC fabric material's weathering capabilities are provided in the DAS Addendum (section 1.4) and these confirm that the material's resistance to UV light is high and that the degree of degradation, shown through accelerated weathering testing, is negligible.

3.21 The DAS Addendum gives further consideration to the image types that could be applied to the PVC mesh, including military camouflage and an alternative tourism-based image approach (using well-known images from the Jurassic Coast). It also considers their ability to provide tonal variation and their seasonal effectiveness, concluding that these options can ensure that the building is recessive from long distance views from the AONB and WHS.

3.22 The DAS Addendum confirms that the underlying green cladding and the overlying printed PVC mesh material are suitably durable and resistant to weathering. Suitable safeguards will also be put in place by the applicant (and subsequently enforced by Dorset Council) to ensure that the material continues to be effective over its lifespan. Furthermore, it has been shown that an appropriate image, such as camouflage can be applied to the PVC mesh to provide tonal variation to successfully deliver the recessive green wall, and that the details of this can be considered further and agreed by means of a suitably worded planning condition.

3.23 The proposal therefore accord with DWP Policy 14 (landscape and design quality) in respect to the use of materials.

Public health

Introduction

3.24 Dorset Council's letter requested the following additional information and clarification in relation to public health (points 5 in the council's letter):

- Additional detail responding to issues in respect of potential benefits or impacts upon public health as a result of changes in air quality. In particular, this should address outstanding issues raised by PHD.

3.25 ERM, who undertook both the human health risk assessment (HHRA) and health impact assessment (HIA) for the original ES, has prepared addenda to these documents to provide the further information requested by the council in relation to the potential benefits or impacts on public health due to changes in air quality and to address the issues raised by Public Health Dorset. Their findings are summarised in section 5 of the ES Addendum and the full reports are contained in appendices 5.1 (HHRA) and 5.2 (HIA) to the ES Addendum.

Human Health Risk Assessment (point 5)

3.26 As explained in section 3 of the ES Addendum, the air quality assessment has been updated to take into account the net change in emissions of NO_x, NO_2, PM_{10}, $PM_{2.5}$ and SO_2 due to the use of shore power provided by the ERF to ships berthed at the port. The results of the updated air quality assessment have been used to update the HHRA. The emissions of metals and dioxins will not be affected by the provision of shore power, so only the assessment of health effects associated with changes in NO_2, PM_{10}, $PM_{2.5}$ and SO_2 has been updated.

3.27 The analysis has shown that, for particulate matter, there will be a net benefit associated with the proposed development at all points across the modelling domain. For NO_2 and SO_2, there will be a net benefit for the majority of the area. Where there is a net increase in emissions, the increase will be extremely small such that any impact is concluded to be negligible. Therefore, the overall conclusion of the ES that the proposed development will not lead to any significant effects on air quality and health remains valid.

Health impact assessment (point 5)

3.28 The HIA addendum took account of the findings of the updated air quality assessment and HHRA and addressed the following topics that were raised by stakeholders during the consultation:

- Potential for differential or disproportionate impacts on the mental health and wellbeing of the local population
- Potential for differential or disproportionate impacts as a result of existing health inequalities within the local population
- Potential for impacts on the resident ‘static’ inmate population at HMP The Verne

3.29 Chapter 5 of the ES Addendum summarises the main findings of the HIA in respect to the potential impact of the construction of the ERF in terms of anxiety and mental well-being and sets out a series of measures that would be implemented to minimise any effects. These include:

- A local liaison group will be established, which will meet on a regular basis to discuss the operation of the ERF and any potential issues or queries from members of the local community
- Measures that will be put in place through the framework construction environmental management plan (CEMP; see technical appendix C of the original ES) to minimise construction noise will ensure that there will be no significant health effects on the occupants of HMP The Verne during construction.

3.30 The updated noise assessment confirmed that the proposed development will not generate significant operational noise, as levels will be controlled through the design of the building and the site layout. The low levels of operational traffic mean that no significant traffic noise effects are predicted. The updated HIA confirms that no significant adverse effects are predicted on health and wellbeing as a result of noise.

3.31 The health of local communities, particularly those of an older demographic or experiencing other health inequalities, may be marginally impacted as a result of increased HGV movements on the local road network. During construction, as set out in the framework CEMP, the contractor will be responsible for liaising with the local community to ensure that there is awareness of when and what HGV deliveries will be required and to identify any constraints or mitigation required to address the specific needs to the community. However, the worst case scenario of an additional 80 HGV movements per day (40 each way) during and post-construction equates to an average of one additional HGV every 15 minutes and the traffic and transport assessment confirmed that there will be negligible effects on pedestrian severance, delay and amenity. As a result, it is not expected that traffic associated with the proposed development will exacerbate mental health issues or current health inequalities within the local communities.

3.32 The updated HIA states that the visual presence of industry can lead to feelings of dissatisfaction, as well as stress, anxiety and concern. As the proposed development is located in an industrial port that is not accessible to the public, where there is already constant activity, and construction works will be temporary, no significant effects are predicted on local mental health and wellbeing, including at HMP The Verne. The design of the building has been carefully considered to minimise visual impacts and no significant adverse effects are predicted on population health and wellbeing post-construction as a result of changes to views.

3.33 Health benefits will be experienced for the duration of the employment generated by the proposed development, both during and post-construction, and would be most beneficial to those currently experiencing socio-economic deprivation, economic inactivity or unemployment within the area. Opportunities to target employment within these sections of the community should be maximised wherever possible. In addition to income and improved socio-economic status, health benefits such as delayed mortality, decreased illness and improved wellbeing can be experienced by those employed during the operational phase and will be of longer term benefit. This could contribute to reducing some of the current health inequalities present in the area.

3.34 The updated HIA sets out recommendations for ongoing engagement with local communities and wider stakeholders and concludes that advance visibility, engagement and ongoing liaison should mitigate potential increases in anxiety arising from project-related activities. It highlights that mitigation measures will be integrated into the building design, the CEMP and construction management planning to minimise the potential for adverse effects on health and wellbeing. This will include the publication of the CEMP, adoption of contact mechanisms during construction and advance notification of proposed works.

3.35 In advance of construction, specific engagement will be undertaken with HMP The Verne to minimise the potential for adverse effects on health and wellbeing. In particular, this will address the potential for anxiety over proposed construction activities. The proposed development will be subject to strict regulatory controls and the requirement for ongoing monitoring of various activities, including emissions. To reduce potential anxiety, consideration should be given to the periodic publication of environmental monitoring data that local communities, and wider stakeholders, can access via the project website.

3.36 The additional information and assessment provided in the updated HHRA and HIA has identified the potential benefits or impacts upon public health as a result of changes in air quality address and addressed the comments made by Public Health Dorset. It did not identify any significant health effects.

3.37 The proposed Portland ERF fully accords with the provisions of DWP Policy 13 in respect to airborne emissions (amenity and quality of life) and other relevant policies.

Historic environment

Introduction

3.38 Dorset Council's letter requested the following additional information and clarification in relation to the historic environment (point 7 in the council's letter):

- Further detail and assessment in respect of specific mitigation measures proposed to mitigate potential harm caused to the historic environment from the proposal, which should have regard to impacts on the setting of designated heritage assets. Proposals for mitigation should include the consideration of a footpath link on Port land immediately beneath the prison.

Framework heritage mitigation strategy (point 7)

3.39 A framework heritage mitigation strategy has been prepared and submitted in response to this Regulation 25 request (provided as ES Addendum appendix 6.1), based on guidance provided by both the Dorset Council conservation officer and Historic England officers. The framework strategy provides details of the proposed mitigation and how this would be delivered to off-set the effect of the setting of the East Weare heritage assets, in terms of the overall objectives, the proposals for staged works, future management, and monitoring and review.

3.40 The overall framework strategy objectives broadly cover the following:

- E Battery East Weare (scheduled monument and listed building grade II) – undertake clearance and agreed repairs and removal of risk factors to enable its removal from the Historic England Heritage at Risk Register and appropriate public presentation of the monument.

- Enhanced public access through the extension of the footpath at East Weare (known as Cemetery Road) to allow an "around the island" circuit of the coastal path by creating a new section of permissive footpath through currently inaccessible parts of the secure port estate to connect to the existing public accessible land/rights of way.

- Enhanced opportunities for public appreciation through the provision of interpretation for the group of related heritage assets at East Weare (the A-E batteries, the former detention camp and the undesignated WWII features).

3.41 The framework heritage mitigation strategy demonstrates that the harm to the setting of the East Weare heritage assets identified in the ES (and deemed to be less than substantial harm) can suitably be off-set through the proposed mitigation and that this will deliver significant heritage related public benefits, in full accordance with NPPF (2021) guidance (specifically paragraph 202).

3.42 The deliverability of the framework heritage mitigation strategy, from a heritage perspective is supported by the findings of a preliminary visual site inspection of the E Battery, undertaken by an accredited specialist conservation engineer. This concluded that vegetation removal could progress, with a suitable methodology being defined, and that the benefits of undertaking the work far outweigh any very small (and manageable) risk to the monument.

3.43 Consideration has been given to potential ecological implications relating to the removal of invasive scrub vegetation around the structure and access paths. A Phase 1 walk over ecological survey has been undertaken.

3.44 The survey concluded that the vegetation clearance works to enable permanent access and restoration of the E Battery will result in the loss of small amounts of scrub. Whilst the removal of this habitat itself will not have any significant effects on the interest features of the designated sites, there is potential for impacts on nesting birds and reptiles in the absence of suitable mitigation. Provided suitable mitigation is deployed, the ecological impacts of the works will be considered negligible.

3.45 In addition to the heritage benefits outlined above this work will also deliver secondary ecological benefits associated with the clearance of some scrub from around the E Battery monument within the Isle of Portland SSSI unit (which is currently in an unfavourable condition). This will allow former habitats, such as lowland calcareous grassland, to re-establish once the scrub is removed, contributing towards the objective to return the SSSI to a favourable condition.

3.46 The proposed heritage mitigation strategy is deliverable and will ensure that the ERF can be deemed to be compliant with heritage asset policies: DWP Policy 19, West Dorset, Weymouth & Portland Local Plan Policy ENV4, and Portland Neighbourhood Plan Policy Port/EN4. Adherence to the agreed strategy should be included in a planning condition see chapter 5 of this document.

3.47 In addition to enabling public access to view and interpret all of the heritage features present within the East Weare area, the creation of an ‘around the island’ enhanced coastal path connection across the port estate will deliver wider public benefits in relation to recreation and local tourism, specifically contributing to the sustainable tourism objectives of Policy Port/ST1 of the adopted Portland Neighbourhood Plan.

Ecology

Introduction

3.48 Dorset Council’s letter requested the following additional information and clarification in relation to ecology (point 11):

- Further consideration and information in respect of general ecology related issues raised through representations on the first consultation as appropriate, including the potential for management or improvement of habitat within the Port below the prison site.

3.49 The applicant’s response to general ecological issues raised in respect to the shadow Appropriate Assessment and the ES, through representation on the first consultation, is addressed in the CRSD.

Improvement of habitat (point 11)

3.50 The applicant has given further consideration to the potential for management or improvement of habitat within the port below the prison. This potential ecological benefit relates to:

- Vegetation clearance required by the framework heritage mitigation strategy
- The allocation of biodiversity net gain funds to off-site projects within the local area

3.51 The removal of existing scrub, located on and around the E Battery scheduled monument and the access paths to it, will lead to some ecological benefits. For example, it will allow former habitats now lost, such as lowland calcareous grassland to re-establish once the scrub is removed, contributing towards the objective to return the SSSI to a favourable condition. It will also open up access to the area for future ecological management.

3.52 An ecological walk over survey has been undertaken and demonstrates that the heritage mitigation framework can be implemented, provided that suitable ecological mitigation measures are put in place.

3.53 The proposed ERF will result in the loss of some open mosaic habitat on-site, and whilst some on-site mitigation is possible, it is recognised that the majority of this mitigation and the need to demonstrate biodiversity net gain will be met through off-site enhancements.

3.54 A Biodiversity Plan has been submitted to, and been agreed by, Dorset Council Natural Environmental Team (DNET), which includes a financial contribution towards delivering off-site enhancement.

3.55 A Statement of Common Ground, between the applicant, Natural England, DNET and Portland Port is being progressed in respect to ecological enhancements arising from both the heritage mitigation works and also a range of potential local projects that could benefit from the funds secured by DNET under the Biodiversity Plan. The allocation of funds will be determined by DNET but could include contributions towards schemes to reintroduce grazing at sites on the Isle of Portland including if possible “Portland” breed sheep, or contributions towards schemes for control of scrub within sites of nature conservation importance.

3.56 The applicant is fully supportive of the opportunities to introduce measures for the management or improvement of habitat within the port below the prison site, and is committed to working with the port, as landowner, and other partners to maximise this benefit.

District heating

Introduction

3.57 Dorset Council’s letter requested the following additional information and clarification in relation to district heating (point 12):

- Further detail in respect of how the prison and young offender institution could be connected to a district heating system supplied from the development. This should include the required infrastructure, technical supporting information, and description of the environmental (including climate change) and economic (for both for the supplier and purchaser) impacts

3.58 The District Heating Paper provides further clarification in respect to what district heat networks are and how they operate. It reiterates that the key benefits of district heating are carbon reductions, reduced heating costs for users and improvements in air quality. It further explains the technical work that has been undertaken to date in relation to the opportunity to provide District Heating from the proposed ERF, and the unique position of the proposed ERF relative to other sites in the Dorset Waste Plan or the UK generally.

District heating information (point 12)

The existing situation

3.59 The UK is some way behind its European counterparts in the context of delivering heat networks, with over 50% of the population of some countries served by district heating. The Committee for Climate Change Net Zero Technical Report published in May 2019 confirms that direct emissions from buildings resulting primarily from the use of fossil fuels for heat contributed 85mtCO_2e in 2017, accounting for 17% of UK GHG emissions. Given the success achieved in decarbonising the electricity system over the past decade the UK focus is now shifting to other sectors, including provision of heat.

3.60 Currently, heat networks of all types provide only around 2% of the UK's heat. Full decarbonisation of heat is one of the biggest challenges in reducing emissions from the energy system to net zero by 2050.

3.61 The Committee on Climate Change's central scenario for the fifth carbon budget assumes heat networks will need to provide at least 18% of the UK's heat by 2050 if the net-zero ambition is to be achieved. As a result, Government policy has focussed on improving this area, both in requiring the public sector to find routes to decarbonise where possible and putting in place subsidy and incentive programmes to bring forward private investment capital in heat networks, in the same way that the Government initially provided subsidy/incentives to enable the power generation carbon transition.

3.62 Figures provided by Tolvik Consulting show that of the 54 ERFs in the UK in 2020 only 12 currently provide any form of heat offtake. In 2020 the UK ERF sector exported 7,762 GWh_e and 1,651 GWh_{th}. This means that 82% of energy produced was power export with only 18% heat export. Contrasting this with the European position, where on average almost 50% of the energy produced is heat leads to the conclusion that existing UK ERFs are losing significant potential value by only being able to run their facilities in power-only due to the lack of district heating network infrastructure and local, high demand, bankable off-takers.

3.63 In addition to lower revenues, operating in power-only mode also results in higher overall emissions and higher carbon impact, in both cases because the offset that a district heating network provides on reducing high-emitting gas boilers is not realised.

3.64 For those limited number of facilities that do currently provide a district heat network offtake, in the majority of cases the heat offtake was developed in a phased approach post the construction of the ERF facility. This is because it is necessary to identify and contract with heat off-takers prior to making the significant capital investment required to install the district heat network, and it is only possible to progress formal contractual discussions with off-takers once they are confident that the source of the heat (i.e. the ERF facility) will be delivered.

Barriers to district heating network

3.65 To date there have been barriers to achieving ERF heat offtake in the UK. The majority of ERFs do not export heat because there are no available off-takers with sufficient heat demand and financial standing locally to support the upfront capital investment in the district heating network.

3.66 Historically many ERF facilities have been located in rural areas, away from large housing or industrial communities. This means that a heat connection is not viable as the distance to the end users is too great. Again, this contrasts with Europe where government and municipal authorities influence waste and energy planning, resulting in the development of ERF facilities close to end heat users (in many cases within large cities).

3.67 Where the geographical location is not a challenge, the investment risk must also be considered. A district heating network is a high capital expenditure project with uncertain returns where the supply is to a disparate group of off-takers. From an investment perspective whilst the capital expenditure is understood the revenues can be very uncertain in this scenario.

Portland locational advantages for district heating

3.68 The proposed Portland ERF site has a significant advantage due to its location close to HMP The Verne and HMP YOI Portland (referred to in the District Heating Paper as the cornerstone off-takers). Both have significant demand for heat and the financial standing to support an investment in a district heating system that could benefit the wider community. Specific advantages include:

- Location – both HMP The Verne and HMP YOI Portland are very close to the proposed ERF location. This means that the capital expenditure is much lower than would be the case for the majority of UK ERFs

- Demand – both HMP The Verne and HMP YOI Portland are large heat demand users and, importantly, this demand is expected to be required over the long term.

- Financial Standing - a key concern when considering investment in a district heating network is the certainty of future cashflows. A long term contract for heat (and potentially power) with HMP The Verne and HMP YOI Portland would generate the long term, contracted and therefore bankable cashflows that would allow external finance to be raised to fund the upfront capital investment.

3.69 The existence of the cornerstone heat off-takers is a key differentiator of the proposed ERF from other facilities in the UK, and also other allocated sites in the Dorset Waste Plan, which rarely have such an advantage. Once the cornerstone heat off-takers are in place, there is clear potential for the expansion to supply other customers on the island including community infrastructure and social and private housing both existing and proposed/planned.

3.70 The proposed ERF provides an opportunity to use a merchant ERF facility to provide heat offtake to a local community. Whilst this is common in Europe this would be a key step-forward for Dorset, and the UK as a whole, in demonstrating its commitment to net zero and the circular economy.

3.71 This approach accords with national waste strategy (2007), with paragraph 28 recognising that:

"Any given technology is (where applicable) more beneficial if both heat and electricity can be recovered. Particular attention should therefore be given to the siting of plant to maximise the opportunities for Combined Heat and Power.'

3.72 None of the other allocated sites identified in the Dorset Waste Plan would be capable of delivering a similar opportunity and this represents a significant advantage in context of DWP Policy 4.

Planning and implementation

3.73 The District Heating Paper also considers the planning approach to implementation of the district heating network.

3.74 Neither the planning application, nor the environmental permit ("EP") application currently includes details of the physical infrastructure required for a district heat network. The majority of the infrastructure required for a district heating network will be located outside of the planning application "red line" boundary. This approach is standard for ERF applications of this type in the UK, where the primary purpose is not heat supply and where contractual agreements with heat off-takers are usually not in place upfront.

3.75 Potential heat customers will need to do significant work to understand technically how they could participate in the district heating network. Until the heat source has been consented and is certain to be delivered, that work could be premature and without completing this they cannot contract their participation.

3.76 The applicant has engaged with the Ministry of Justice over the past 12 months and feedback suggests that a heat offtake would be an attractive option, specifically given the UK Government focus on reducing the carbon impact of its estate and wider UK carbon reduction targets.

3.77 The applicant has also completed an initial technical and planning review of the potential district heat network to confirm there are no overriding risks to delivery of the district heat network on the assumption that an appropriate contract can be agreed with the Ministry of Justice.

Potential route appraisal

3.78 The applicant has identified a route that can convey the heat from the ERF to the potential heat customers using the existing road network. The EIA Addendum has considered the potential environmental effects of constructing the required district heating network infrastructure and indicates that this would not lead to any significant adverse environmental effects.

Implementation

3.79 The applicant would expect to implement the district heat network in phases, beginning with the two cornerstone heat off-takers. This approach will enable the infrastructure and benefits of heat supply to be realised quickly but also allow for expansion of the district heat networks to other users over time. Appropriate technology specification would facilitate future modular extensions and can therefore be seen as “future proof”.

3.80 The initial installation will be along the “southern route” to provide heat to the two prisons with further expansions of the “southern route” and delivery of the “northern route” to follow.

3.81 In each case, prior to implementation a separate planning application will need to be submitted and approved by Dorset Council and appropriate investment funding be identified, supported either by contracted cashflows from the heat customers or by Government grant funding.

3.82 The applicant has engaged with the Ministry of Justice, AECOM (their external engineering consultants), the Cabinet Office and BEIS over the past 12 months to ensure that the key technical requirements for the district heat network were understood by all.

3.83 It should be noted that it is unusual for an ERF developer and potential heat off-takers to engage in this way at this (pre-planning) stage, but in this case all parties recognise the unique opportunity at Portland to develop and implement a merchant CHP ERF facility that will deliver low carbon heat over the long term to the Ministry of Justice that will reduce the carbon impact of the estate.

3.84 The applicant would be willing to agree an appropriate commitment with Dorset Council that would oblige the applicant to take reasonable steps to look to implement the district heating network, subject to agreement of commercial terms with the heat off-takers that mean the project is commercially viable. This is addressed further in chapter 5 of this statement.

Technical infrastructure

3.85 Chapter 6 of the provides more technical design information in respect to the process and the key technical infrastructure required to connect the heat network to the prisons.

3.86 Key equipment on the network side includes the primary heat exchangers and substations, insulated pipework, distribution pumps, pressurisation pumps and valves. On the customer side the technology primarily involves a secondary heat exchanger which transfers heat from the network so that it can be used by the customer building, without any direct contact between the district heating network hot water and the customer network hot water.

3.87 In addition to providing heat via a district heating network, the proposed ERF would also be capable of supplying electricity direct to the prisons over a private network, thereby avoiding costs and losses arising in the public transmission and distribution system.

Potential carbon savings

3.88 The implementation of a district heating network will lead to significant carbon reductions. The revised Carbon Assessment compares the carbon impact of the proposed ERF to a number of comparators, including scenarios where the proposed ERF operates in power-only mode, CHP mode and where is provides shore power electricity supply. This forms appendix 4.1 to the ES Addendum.

3.89 The calculated carbon benefit of the proposed ERF increases by around a further 3,000 tCO_2e emissions per annum when the proposed ERF is operated in CHP mode, as opposed to power-only mode. This reduction in CO_2e emissions is due to the avoided emissions produced by natural gas boilers at customers of the district heat network, which will no longer be required.

Economic viability

3.90 Chapter 8 of the District Heating Paper provides a further explanation in respect to the economic viability of the district heating network in context of the environmental permit application and commercial analysis.

3.91 As part of the environmental permit application an assessment of the costs and revenues associated with the construction and operation of the proposed district heating network was undertaken by Fichtner using the Environment Agency's CBA template. This is within the CHR-Ready Assessment document (CHP-r Assessment).

3.92 The CHP-r Assessment takes account of the assumed district heat network capital and operating costs, heat sales revenue and lost electricity revenue as a result of diverting energy to the heat network. The analysis assumes a capital investment cost for the district heating network of £9.42m spread over a 3 year investment horizon which is based on Fichtner's experience from various reference projects that it has worked on previously.

3.93 The output of the economic analysis is that the nominal project internal rate of return (IRR) for the district heat network at the proposed ERF is calculated to be 11.7%. The IRR is a metric used by investors to determine the future profitability of an investment. The upfront capital expenditure will need external financing and the investor will have a specified return hurdle rate that it will need to exceed in order to conclude the investment is attractive. The 11.7% IRR means that an investor will recover their upfront investment and earn an average of 11.7% interest on this investment amount, every year for the full 30 year period.

3.94 The CHP-r Assessment uses an investment hurdle rate of 17%. This is the rate that is suggested by the Environment Agency and is used across the market by all consultants when completing this analysis for the purposes of applying for an environmental permit. The result is that the CHP-r Assessment concludes that the project is economically unviable. This is because whilst it delivers an 11.7% return on investment for every year over a 30 year term, this is lower than the 17% that the CHP-r Assessment assumes is required by an investor.

3.95 Based on the CHP-r Assessment, objectors have concluded that the proposed Portland district heating network is unviable, and this is contrary to the applicant's stated planning position.

3.96 The District Heating Paper clarifies the difference between the 17% hurdle used as standard practice for the CHP-r Assessment, and the commercial hurdle that would be required given the specific risk profile of the district heating investment opportunity at Portland. The applicant's commercial analysis demonstrates that the commercial viability of the Portland ERF differs significantly from a standard ERF in two key ways:

- Firstly, it is located near to two major users of heat where it is reasonable to expect that this heat will continue to be required for the lifetime of the district heat network (so there is no volume or demand risk)
- Secondly, the potential customer (Ministry of Justice) has the appropriate financial standing to enter into long term contracts to support the upfront capital investment (so there is no credit risk)

3.97 A “standard” ERF district heat network does not have these significant advantages. Typically, a standard scenario would need to contract with a disparate group of off-takers, all of varying credit quality, with no guarantee that these off-takers will survive the full operational life of the district heat network.

3.98 This uncertainty results in the 17% -return hurdle assumed to be required by a district heat network investor under the CHP-r analysis.

3.99 However, in this case the proposed ERF this would benefit from certain volume and contracted long term cashflows, backed by UK Government credit. For reference, BEIS currently applies a 7.6% investment hurdle rate for EfW CHP3. It is therefore commercially logical to assume that a district heating network investment that relies on the underlying performance of the EfW CHP would attract a similar hurdle rate, perhaps with a small increase given the increased functional risk of the district heat network over and above the proposed ERF.

3.100 In any case, the hurdle return that an investor would need to provide the district heat network funding will be below the 11.7% IRR, and therefore will mean the project is investable and economically viable.

Summary conclusions

3.101 The District Heating Paper has shown that the UK is substantially behind other European countries in maximising the benefit of heat from ERFs for use in district heat networks and that the challenge of heating buildings must be overcome if the UK is to meet its target for net-zero carbon by 2050. Relatively few ERFs are currently exporting heat to heat networks, and this is much less efficient. There are often locational barriers to implementation. such as the absence of viable heat off-takers or the distance to heat off-takers is too great. Also, uncertainty in respect to heat off-takers undermines the ability to secure finance.

3.102 A heat network route has been identified using exiting road corridors and this has been found to be deliverable from a technical, environmental, and economic perspective. It would also deliver significant carbon and emissions savings, allowing the existing prison heating systems to be largely retired and used only to provide backup when the ERF is not operational. The heat network, in common with other networks, would be implemented in a phased approach with the southern route provided first to serve the two prisons, with opportunities for the network to be extended further in the future.

3.103 Although the CHR-Ready Assessment document (CHP-r Assessment) states that the district heat network is unviable, this is based on a ‘standard’ industry investment hurdle rate of 17%. This ‘standard’ rate does not reflect the ‘actual’ risk profile where

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[3] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/911817/electricity-generation-cost-report-2020.pdf

the Portland site is located near to two major users of heat (which will continue to require heat for the lifetime of the district heat network), and the Ministry of Justice has the appropriate financial standing to enter into long term contracts to support the upfront capital investment.

3.104 The output of the economic analysis is that the nominal project internal rate of return (IRR) for the district heat network at the proposed ERF is calculated to be 11.7%. The applicant confirms that the hurdle return that an investor would need to provide the district heat network funding will be below the 11.7% IRR, and therefore will mean the project is investable and economically viable.

3.105 The Portland site has significant key advantages in so far as it is located close to cornerstone heat off-takers, which have a large heat demand and are of a financial standing that provides certainty to investors to support the upfront capital expenditure to implement the network. These locational advantages are highly sought after and none of the other allocated sites identified in the Dorset Waste Plan would be capable of delivering a similar opportunity, thus representing a significant advantage in context of DWP Policy 4.

3.106 In these circumstances there is a high probability that a district heating network will be implemented from a technical, environmental ,and economic perspective and this would give rise to significant carbon benefits. As such, the site's potential to provide a district heating network should be afforded substantial weight in the planning balance.

Shore power

Introduction

3.107 Dorset Council's letter requested the following additional information and clarification in relation to shore power (point 16):

- Further clarification and additional detail in respect of how the shore power element of the proposal would work. This should include a response to issues raised in representations, and justification of any assumptions made in respect of modelling of carbon savings which might result.

3.108 Information on the provision of shore power was provided in the originally submitted Shore Power Strategy Report. However, as the request of Dorset Council, this has been reviewed and updated to provide additional information in respect to how this would work, how shore power sits in relation to other alternative sources of ship power, recent relevant policy announcements in relation to the provision of shore power in the UK and reflections upon the carbon savings that could be derived from the implementation of shore power at Portland.

Shore power need, alternatives and carbon savings (point 16)

3.109 The Shore Power Strategy Report (Updated July 2021) highlights comments made in the Commission on Climate Change (CCC) Sixth Carbon budget (December 2020) in respect to shore power. It reinforces the views on shore power in the Clean Maritime Plan. It states that:

"The emissions reductions in our scenarios result from some acceleration in efficiency improvements and electrification" and

"By 2050, 3 TWh/year of electricity is used in electric propulsion and shore power"

3.110 It has been suggested by some objectors that there are already available alternatives to the provision of shore power. The Sixth Carbon Budget indicates that while it sees ammonia as the main zero carbon fuel, its commercial deployment will not even start until 2030.

3.111 The importance of shore power and the need for its implementation is further evidenced in the UK Government's recently published Decarbonising Transport[4] document. It includes a commitment:

"We will consult this year on the appropriate steps to support and, if needed, mandate the uptake of shore power in the UK." (our emphasis)

3.112 This commitment is justified by the following statements:

"*Plugging in domestic and international vessels while in port and ensuring charging capacity is provided for the roll out of electric ships has the potential to quickly reduce greenhouse gas and pollutant emissions from the ports and shipping sector.*

Shore power has a role to play in immediately reducing emissions from vessels visiting ports, and is an option that is likely to be 'low/no regrets' as vessels utilising the less energy dense alternatives will look to plug in where they can."

3.113 This recognises that policy is moving to adopt shore power as a means to "*quickly reduce greenhouse gas and pollutant emissions*". Shore power's role in early reduction of greenhouse gases will have a disproportionate benefit in climate change mitigation compared to other solutions which will take longer to be introduced and to adopted.

3.114 Research In the 'Barriers and Solutions for UK Shore-Power[5], produced by the Tyndall Centre for Climate Change Research identifies the following practical advantages of shore power:

"*shore-power is a proven technology that can be implemented now. Many of the other highly-touted alternatives in shipping to tackle air pollution or climate change, such as ammonia and hydrogen, are years away at best from commercial deployment at scale.*

"it is one of the few technologies which deliver strongly on both air quality and climate change. For example, ammonia could be net-zero GHG, but has issues with NO_x pollution; LNG cuts local air pollution, but as many interviewees pointed out, is still very high carbon"

"it fits with the general drive in ports and shipping towards greater electrification."

3.115 This provides further evidence, based on government reports and academic research in the climate change field, that the objectors' claim that alternative methods should be

[4] Department for Transport, 'Decarbonising Transport', A Better, Greener Britain, UK Government, July 2021

[5] Barriers and solutions for UK shore-power. Bullock, S, Tyndall Centre for Climate Change Research, University of Manchester, December 2020

adopted now, instead of implementing shore power, is highlight optimistic and not based in fact or reality.

3.116 There are challenges to the introduction of shore power. Two challenges are specifically identified in the Barriers and Solutions for UK Shore-Power report relate to grid provided electricity. These are:

"*The UK's industrial electricity prices are among the highest in Europe, in part due to electricity network charges, environmental taxes and VAT.*"

"…there may not be grid capacity to supply sufficient power."

3.117 As evidenced in the original and updated Shore Power Strategy reports, and supporting application documents, such as the Energy Need Statement and Planning Supporting Statement, both of these barriers to the successful implementation of shore power in the UK will be successfully addressed at Portland through the provision of energy from the proposed ERF. Without the proposed ERF, the provision at Portland Port is deemed to be prohibitively expensive due to the high reinforcement cost of the local distribution system that would be required.

3.118 Some objectors suggest that shore power could be provided by some other form of energy generation but these suggestions propose intermittent technology that is either unproven (e.g. tidal or wave power) or that is not feasible for Portland given the limited available land area (e.g. solar or onshore wind).

3.119 The Shore Power Strategy Report (updated July 2021), includes information derived from the updated Fichtner's Carbon Assessment Report and its carbon modelling. This concludes that the use of shore power will add to the ERF's carbon emission saving by 4,500 to 5,500 tCO_2/annum.

3.120 In addition to carbon savings, additional air quality modelling has shown that provision of shore power will reduce emissions of NO_x, particulate matter and SO_2 whilst ships are connected to it.

3.121 Furthermore, Fichtner's Additional Dispersion Modelling Report (ES Addendum Appendix 3.1), which plots emissions of particulate matter, NO_2 and SO_2, describes the overall emission impact of the ERF taking shore power into account. It shows that shore power use alongside the operation of the ERF will provide a net benefit in the emission of particulate matter throughout the modelled area, as the reduction in vessel diesel generation more than off-sets emissions from the ERF.

3.122 For NO_2 reductions the report shows that shore power use will provide a net benefit in the majority of the modelled area, leaving an extremely small increase over the remaining. There is a similar conclusion for SO_2.

3.123 The Fichtner modelling on carbon and air quality together demonstrate that the provision of shore power at Portland, facilitated by the proposed Portland ERF, will lead to net savings in both carbon emissions and other airborne pollutants, that arise from existing ship exhausts

3.124 It is suggested by some objectors that shore power is no longer needed, and that if implemented it would soon become redundant being superseded by other technologies and fuels. The applicant disagrees with this view, which is not supported by the facts.

3.125 Whilst shore power is a benefit in Portland and for climate change mitigation now, it will continue to be a benefit in the future when other propulsion fuels become available. It can supply shipping with electric propulsion, it can allow engines supplied by carbon-based fuels such as Compressed Natural Gas (CNG) or Liquefied Natural Gas (LNG) to be shut down when in port, removing their emissions. It may even be used to avoid NO_x emissions from net-zero carbon ammonia fuel, an issue noted in Barriers and Solutions for UK Shore-Power.

3.126 The submitted updated information on shore power and air quality together further demonstrates that ERF-enabled shore power can provide real and important carbon reductions and air quality benefits for Portland and the wider Dorset area, both now and in the future, as efforts to decarbonise the maritime sector begin to step up to address the challenge of climate change.

3.127 Portland Port provide further evidence for the provision of shore power. In its response to the application consultation in November 2020, it confirms that shore power meets an important part of the port's operational needs which will provide an alternative to on-board diesel generation with its associated airborne pollution and carbon emissions. It confirmed that the RFA's main driver for using shore power was governmental policy to reduce carbon emissions from its estate and activities, whilst the main driver for cruise liner operations is a commercial one with their customers demanding a greener experience, underlined by a rapidly changing legislative and policy framework around fuels and emissions. It has also recognised the potential impact on local tourism that would arise if shore power were not provided, associated with a reduction in cruise ship visits to the port.

3.128 Some objectors suggest that the port's future projections for cruise liner visits are overly optimistic, and that the UK cruise industry would fail to recover following the Covid-19 pandemic. Portland Port has confirmed in its further letter of support dated July 2021 (appendix A to this document), that there has been a surge in cruise ship visits for 2021 and bookings for 2022 and beyond. This evidence confirms that the objector's claims are made without basis.

3.129 The updated Shore Power Strategy Report further reinforces the conclusion of the Planning Supporting Statement, in that the Portland site's ability to host an ERF to facilitate a shore power system serving Portland Port (and helping to safeguard its commercial future) is a significant locational advantage in accordance with Policy 4 criterion a.

3.130 No other DWP allocated site can deliver shore power or achieve these benefits. The proposed ERF and shore power provision fully aligns with recent policy, strategies and action plans, at the national and local levels, to reduce carbon emissions from the maritime sector. This should be afforded great weight in the decision making process.

Carbon balance and climate change

Introduction

3.131 Dorset Council's letter requested the following additional information and clarification in relation to carbon balance, climate change and carbon capture and storage (point 22):

- Additional information on the baseline scenarios requested by the council. These should have particular reference to points raised through the consultation on the robustness of the carbon balance scenarios set out in the current version of the ES. Additional clarification should also be provided in respect of the approach to carbon capture for the facility itself, and the circumstances under which it might be installed and operated.

Carbon balance and assessed scenarios (point 22)

3.132 A carbon balance and greenhouse gas emissions assessment was submitted as part of the original ES. An updated assessment report has been prepared to provide the additional information on the baseline scenarios requested by the council (point 22 in the council's letter). This updated report replaces the original assessment that formed technical appendix E to the ES. Its findings are summarised in section 4 of the ES Addendum and the full report is also contained in ES Addendum appendix 4.1.

3.133 As requested by Dorset Council, the carbon emissions from the proposed ERF have been compared with four alternatives:

- Sending the RDF to other ERFs in the UK
- Sending the RDF to other ERFs overseas
- Sending the RDF to an ERF constructed at one of the four alternative sites allocated in the adopted Bournemouth, Christchurch, Poole and Dorset Waste Plan (2019)
- Continuing to manage the waste under Dorset Council's existing arrangements

Other ERF options

3.134 The assessment recognises that direct carbon emissions from combusting waste are the same whether it is combusted at Portland or elsewhere. This means that, from a carbon perspective, the only differences between ERFs at different locations are the impacts from transporting waste and any differences in the carbon displaced by generating power or heat.

3.135 The results for the different ERFs are set out in the revised carbon assessment. It shows that there is relatively little difference between the UK options. While the Portland ERF (base case of exporting electricity to the grid only) has higher emissions than the other allocated sites in the DWP, this difference is more than compensated for by the potential benefits of shore power. Similarly, while the additional transport emissions for shipping waste to Europe are outweighed by the benefits of district heating, the final Portland ERF option incorporating both shore power and district heating has the lowest emissions of all compared scenarios. The Portland ERF with shore power and district heating is capable of saving 8,749 tCO_2e when compared to the base case scenario.

Existing management of Dorset's waste

3.136 The revised carbon assessment also considers the relative carbon performance of the Portland ERF against the existing management of Dorset waste, which assumes a new baseline with some residual waste being sent to other ERFs in the UK and some sent to landfill.

3.137 In summary, the benefit of the proposed Portland ERF over the current residual waste management approaches for Dorset's waste is estimated to be around 7,200 tCO_2e per year, increasing to 15,000 tCO_2e per year in the maximum case with lower net calorific value (NCV) waste. It should also be noted that these calculations do not take account of the additional benefits that would be provided by shore power from the proposed Portland ERF, which would displace a further 4,500 to 5,500 tCO_2e per year, or the potential benefit of district heating, which would displace around a further 3,000 tCO_2e per year.

Future management of Dorset's waste

3.138 Once the Bridgwater ERF is operational, it is understood that the RDF from Canford Magna will be transported to Bridgwater rather than to Europe. Therefore, an alternative baseline has been considered for Dorset's waste where 80,000 tonnes per year of RDF is sent to the Bridgwater ERF rather than Europe. This future baseline is compared with the proposed development.

3.139 The benefit of the proposed Portland ERF over the future residual waste management approaches for Dorset's waste is estimated to be around 10,500 tCO_2e per year, increasing to 18,000 tCO_2e per year in the maximum case with lower NCV waste. Again, it should also be noted that these calculations do not take account of the additional benefits that would be provided by shore power from the proposed Portland ERF, which would displace a further 4,500 to 5,500 tCO_2e per year, or the potential benefit of district heating, which would displace around a further 3,000 tCO_2e per year.

Lifetime benefit

3.140 The lifetime benefit of the proposed ERF compared to the baseline of sending waste to landfill remains as originally assessed in paragraph 5.34 of the ES at around 62,000 tCO_2e based on an illustrative, conservative calculation. The lifetime benefit compared to the current baseline for Dorset's waste has also now been calculated and is estimated to be 157,548 tCO_2e, with a net benefit in each year. The original ES conclusion that the proposed development will have a significant beneficial effect as a result of reduced carbon emissions compared to the baseline therefore remains valid and unchanged.

3.141 The updated carbon assessment demonstrates that the Portland ERF has significant advantages in respect to its ability to deliver both shore power and district heating and that in carbon terms this option outperforms other allocated DWP sites, where such potential is more limited.

3.142 The carbon assessment fully supports the applicant's view that the Portland site has advantages over the allocated DWP sites and can fully comply with the requirements of DWP Policy 4 criterion a.

Carbon capture and storage (point 22)

3.143 The applicant has commissioned Fichtner Consulting Engineers Ltd to prepare a Portland ERF Pre-feasibility Assessment, to assess the feasibility of integrating a post combustion carbon capture (PCCC) plant into the proposed Portland ERF. It outlines the technical and commercial challenges of developing a PCCC plant alongside and connected to the proposed ERF. This is submitted to Dorset Council to set out the applicant's approach to PCCS and the circumstances upon which it might be installed and operated.

The applicant's road map to zero carbon

3.144 The operation of a PCCC at the Portland ERF would provide a means of capturing approximately 95% of the CO_2 produced. The CO_2 would then be transported by ship for utilisation and/or storage offsite.

3.145 The Pre-feasibility Assessment finds that no ERF or EfW plant anywhere in world currently has a commercial scale PCCS attached, and it is not currently commercially feasible. It is also not a requirement of current law or policy to impose PCCS on a plant like the proposed Portland ERF.

3.146 However, the applicant is aware of some early stage policy activities that may evolve and mature and become part of Government policy in the future. Most notably recent advice from the Committee on Climate Change (a Government advisor) which considers "providing support to enable existing EfW plants to begin to be retrofitted with CCUS from the late 2020s and introducing policy to ensure that any new EfW plants are built either with CCUS or are 'CCUS ready'".

3.147 Due to the significant upfront capital cost and substantial operational costs, it is not considered commercially feasible to deploy CCUS or CCS at plants like the proposed ERF at this time. The increased cost of processing the waste in a PCCC equipped plant will need to be borne somewhere and the applicant is aware that, via the BEIS ongoing consultation on "Energy from Waste with CCUS", the Government is considering this issue and potential financial support regimes based on a "contract for differences" structure to support the deployment of CCUS.

3.148 The requirement for CCUS and CCS is still some considerable distance from becoming official government policy, but the applicant is prepared to make a planning commitment that will be proposed to and negotiated with Dorset Council to be set out in an appropriately worded S.106 planning obligation to achieve a route map to net zero or carbon positive operations. This matter is addressed further in chapter 5 of this statement in relation to planning obligations.

3.149 The road map identifies a mix of the technologies that the applicant is exploring with full decarbonisation of the Portland ERF likely to be achieved using one of, or a combination of, these longer term measures.

Day 1 of Operations (assumed 2025)

- The Portland ERF will operate with R1 compliance, reducing greenhouse gas emissions by diverting waste from landfill and export abroad or out of county;
- The Portland ERF will generate low carbon electricity for the Port (shore power) and for export to the grid.
- The Portland ERF is designed to be 'CHP ready' for connection to a district heating scheme, initially to the adjoining prison and young offenders centre, to use lower carbon energy and heat generated by the facility
- The Portland ERF will be designed to allow fuel flexibility should the nature of the incoming waste change over time and recycling levels increase.

Short Term (assumed 2025–2035)

- The extension of the district heating network to other potential local end users already identified, to use lower carbon energy and heat generated by the facility

- The Portland ERF can accommodate changes to the composition of the fuel mix to reduce the non-biogenic carbon contained in the incoming waste stream driven by Government policy on recycling; and

- The Portland ERF can promote the potential co-location of a facility (facilities) within the Port to recycle/reuse products extracted from the incoming waste stream (circular economy) reducing the non-biogenic content of the fuel mix and displacing CO_2 emissions associated with the production of products or feedstocks which the extracted products replace.

Longer Term (assumed 2030–2050)

- The Portland ERF could accommodate Carbon Capture Storage and Use either within the Port or for export by sea. CCS may become technically and commercially viable earlier should appropriate support regimes become available along with new necessary legal and policy changes.

3.150 This approach is consistent with the applicant's pledge to achieve net-zero carbon, through carbon off-setting measures. In any period where the ERF is net carbon positive the applicant will make a base financial commitment of £[100,000] to fund "voluntary offsetting measures" targeted at measures with higher social impact and fuel poverty alleviation.

The advantage of port locations for CCS

3.151 The International Energy Agency (IEA) recommends that, where a PCCC plant is located close to a port, the captured gases are liquefied and discharged directly to a vessel. This avoids the need for road tankering or extensive pipeline connections. This would be the preferred approach for a PCCC solution for the Portland ERF, given its port based location.

3.152 This port location creates a significant relative advantage over any inland waste sites. None of the allocated sites in the DWP at which an ERF may be brought forward are located at a port. At those inland locations a CCS solution associated with any ERF which may be delivered would appear to be much less achievable than the Portland Port location. Any CO_2 that is captured and liquefied at those sites would need to be road tankered or pipeline conveyed to a long-term repository or industrial user, which is likely to be much more disruptive and less environmentally sustainable than transport by sea.

3.153 Fichtner estimates that an appropriate scale PCCC plant would require a footprint of up to 4,000 m^2. Less land may be required for containerised solutions, which are a feature of certain technology options that may be available, or if some of the equipment, in particular storage can utilise vessels located at the port. Powerfuel and Portland Port has confirmed that sufficient additional land is available at the port proximate to the location for the proposed ERF, so the ERF can be considered to be "CCS-ready".

3.154 The ERF's location within a commercial port, with its ability to transport captured CO_2 by sea and the availability of sufficient land, both of which are necessary to implement a future CCS scheme represents a significant advantage over other DWP allocated sites, in accordance with DWP Policy 4 criterion a. This should be afforded significant weight in the planning decision.

Traffic - export of IBA

Introduction

3.155 Dorset Council's letter requested the following additional information and clarification in relation to opportunities to export IBA by sea (point 24)

- Further clarification in respect of opportunities to export of IBA by sea, including the identification of specific sites that could accept the material when transported using this method

Approach to IBA movement (point 24)

3.156 When IBA is exported by sea, it will be loaded into a sheeted trailer and transported to the quayside, where it will be loaded onto large dedicated vessels using a mechanical grab machine. A banksman on the quayside will assist the delivery trucks and ensure there is no conflict between the grab operations and the trucks. Once the ship has been loaded, bi-fold doors will close over the top for protection and to prevent any escape of material. Any spillage of the inert IBA would be dealt with promptly and appropriately. The process is highly regulated and all parties will need to ensure that compliance is achieved with existing legislation.

3.157 The applicant is in discussions with the Day Group, which operates several IBA processing plants in the UK and has extensive experience of IBA transport by sea. The Day Group has indicated that it would be willing to enter into a long term contract to enable IBA to be collected from the proposed ERF by vessel and transported to its facility at Greenwich.

3.158 While it is envisaged that the Day Group's Greenwich plant will be the chosen location for export of IBA by sea, there are other plants within the UK and northern Europe that are accessible by sea, including two in Avonmouth and one in Middlesbrough, one in Ireland, two in the Netherlands, two in Belgium and one in Germany.

3.159 Further information in respect to the options for sea based transfer and processing / recycling of IBA is given in the Incinerator Bottom ash (IBA) Paper. These provisions demonstrate that the ERF accords with the provisions of DWP Policy 6 in respect to the sustainable transport of IBA by sea.

Surface water discharge

Introduction

3.160 Dorset Council's letter requested the following additional information and clarification in relation to the proposed use of sea outfalls (point 27)

- Further detail in respect of the acceptability of the sea outfall, addressing the comments of Dorset Council Flood Risk management Team explaining how the issues raised will be addressed and overcome.

Surface water drainage strategy (point 27)

3.161 Dorset Council in its role as Lead Local Flood Authority raises matters relating primarily to the condition of existing drainage infrastructure at the port which was to be re-used.

3.162 Further investigations have been carried on the points of connection for surface water that are to be re-used and as a result a revised surface water drainage strategy is now proposed. This now provides appropriate surface water attenuation tank storage with a volume of up to 230m3 to account for the limited capacity of the northern outfall pipe and provide capacity to manage flows up to the 100 year return period (plus 40% climate change).

3.163 The information gained through further investigations and the revised surface water drainage strategy together with responses to the matters raised by DCLLFA are set out in the Flood Risk Assessment Addendum.

3.164 All of the matters raised are addressed in the Flood Risk Assessment Addendum and it is expected that the usual planning conditions relating to submission of further drainage details prior to commencement will be applied.

3.165 There are no overriding development constraints in respect to surface water drainage and the development can therefore accord with DWP policies 16 (natural resources) and 17 (flood risk).

Waste need

Introduction

3.166 Dorset Council's letter requested the following additional information and clarification in relation to waste need (point 30, 31 and 32):

- Further clarification and explanation in respect of potential alternative treatment facilities within three hours' drive by road, in respect of the need for the capacity the facility provides. Further detail in respect of likely sources of the RDF proposed to be managed should be provided, which should have regard to existing contracts for the management of RDF which are in place with competing facilities.
- Further detail in respect of the potential impacts (or lack of) of your proposal upon the potential delivery of an RDF operation at Eco Sustainable Solutions, should the planning authority be minded to grant planning permission for it.

- Further detail in respect of the impact of the development on the future process of RDF in mainland Europe, and future issues surrounding exporting UK waste to these facilities. The information provided should include discussion of the likely differences in respect of overall efficiency between the proposed plant and those plants in mainland Europe for which it may compete in relation to future feedstock.

Alternative treatment facilities (point 30)

Waste capacity and alternatives

3.167 Section 3 of the Waste Need Paper provides further information in respect to the amount of residual waste that is available within the defined catchment area and how much capacity already exists and may potentially exist (either with planning permission or with planning applications submitted and awaiting determination). From this, the existing capacity gap between existing/planned and required capacity in the catchment area has been calculated.

3.168 Market analysis by Tolvik identified around 910,000 tonnes per annum of residual waste arising within the defined catchment, comprising around 570,000 tonnes per annum of residual municipal collected waste and around 340,000 tonnes per annum of residual C&I wastes. This is in addition to the 195,000 tonnes and 310,000 tonnes per annum of RDF currently being exported from the UK and Ireland that passes in close proximity to Portland.

3.169 There are four certain ERF facilities within the defined catchment area (Marchwood, Chineham, Exeter and Bridgwater. Whilst these have a combined capacity of around 400,000 tonnes per annum, with the exception of the Bridgwater ERF, all are subject to existing local authority municipal waste contracts that take up the vast majority of their available capacities. In the case of the Hampshire ERFs (Marchwood and Chineham), these are required under planning conditions to prioritise the treatment of waste arising from Hampshire and in the face of rising county demand have little spare capacity and cannot be relied upon by Dorset to manage its residual waste in future.

3.170 While there are a number of other merchant ERF projects either with planning consent or in the planning system seeking consent, the Waste Need Paper demonstrates that these could provide a capacity of around 200,000 tonnes per annum. The proposed Eco-Sustainable Solutions ERF at Parley is one such proposal, together with an ERF at Alton in Hampshire. However, even where planning permission is granted and the facilities are built (and it is not certain that all of the proposed facilities would achieve a consent or be funded to delivery), the analysis shows that there is still a significant capacity gap (even accounting for greater recycling) that would facilitate an ERF one and a half times bigger than that proposed at Portland.

3.171 The above assumes that 100% of the RDF feedstock is sourced from the defined catchment area. If the potential for 25% of the Portland ERF's feedstock to be imported by sea is taken into account then there is sufficient waste in the catchment area to supply an ERF over twice the capacity of the Portland ERF.

3.172 The above analysis is based on waste arisings today. The Waste Need Paper includes figures from the Bournemouth, Dorset and Poole Waste Plan, Background Paper 3 that that total waste arisings from LACW and C&I waste will increase by c. 20% from the existing 840,000 tonnes to 1,000,000 tonnes by 2033. Even under the most bullish scenarios based on major societal behaviour change, strong Government policy, adherence to circular economy principles, and further significant increases in recycling (above the already high level in Dorset), there will clearly be sufficient volume of residual waste arising in Dorset during the life of the proposed ERF that will require a treatment solution.

Expected sources of RDF

3.173 The Waste Need Paper (section 3) confirms that the Canford Magna facility received 118,484 tonnes of residual waste in 2020 and, post processing, exported 82,017 tonnes of RDF to Europe. In July 2020, the plant operators (Beauparc) were awarded a contract with Dorset Council to continue to manage its residual waste. Beauparc has stated in writing that if the Portland ERF were to be built, in the context of the processing of its RDF, it would provide the most efficient route to market to manage waste and generate energy.

3.174 Geminor has an existing relationship with Beauparc, having worked with it to manage waste demand/supply across a number of projects. Geminor has also entered into a long term waste supply contract with the Bridgwater ERF project in Somerset to supply approximately 80,000 tonnes of RDF per annum. If the proposed Portland ERF does not receive planning permission from Dorset Council, then it is likely that Geminor will satisfy its supply obligations to Bridgwater by allocating a portion of the RDF produced at the Canford Magna facility. This would necessitate Dorset's waste to travel around 120 km to Somerset, with associated financial and carbon costs.

3.175 However, Geminor has confirmed that, subject to the proposed Portland ERF receiving planning permission, it intends to enter into a similar supply contract with the Portland project, supplying the full volume of around 180,000 -200,000 tonnes per annum of RDF. Contractual terms for this fuel supply contract are well advanced and this will be entered into subject to planning permission being awarded for the ERF.

3.176 If the proposed Portland ERF receives planning permission, then it is expected that Geminor/Beauparc will allocate 100% of the Canford Magna RDF (currently around 82,000 tonnes per annum) to the Portland facility, given its proximity advantage.

3.177 However, by the time the ERF becomes operational it is expected that Canford Magna RDF production would have increased from the existing Environment Agency permitted processing level of 125,000 tonnes per annum to 200,000 tonnes per annum. This reason for this increase is to allow Canford Magna to process additional local authority collected waste and, in particular, C&I waste arising in Dorset. The impact of this would be an increase the RDF production at Canford Magna from the existing level to allow it to provide over 80% of Portland's RDF requirements from Dorset waste.

3.178 It was made public on 6 August 2021 that Beauparc has been awarded the 3-6 year contract by BCP Council to process household, commercial and litter bin waste. This will be processed at the Canford Magna facility, and the residue will be used to produce RDF which will be suitable for treatment at the ERF, as discussed above. Please note that due to the timing of this announcement it has not been possible to include this in particular in the Waste Need Paper, as part of the wider response to Dorset Council's request letter.

3.179 Processing the Dorset-produced waste in Dorset (as opposed to Somerset or Europe) will reduce costs and the carbon impact, relative to the existing position. It will also free up capacity at Bridgwater for other RDF supplies and therefore will increase energy recovery on a UK wide basis.

3.180 The net result of this will be a reduction in UK waste that is either landfilled and/or exported for energy recovery to Europe.

3.181 If the proposed ERF is granted planning permission, then this implies that it should be possible to supply over 80% of its RDF requirements from Dorset waste that is processed at Canford Magna in Dorset. This would be the most rational and efficient solution for Dorset. If this RDF processing capacity is available in Dorset this should lead to further investment in RDF supply facilities, and therefore reduce the volumes of untreated waste being exported from the county.

3.182 This approach accords with DWP Policy 4, in enabling Dorset waste to be managed in Dorset, reducing the need for the export of residual waste to other areas outside of Dorset, in line with the proximity and self-sufficiency principles, and helping to reduce landfill in line with the waste hierarchy.

Impact on Eco-sustainable solutions (point 31)

3.183 Section 4 of the Waste Need Paper considers the effect of granting planning permission for the Portland ERF on the proposed Eco-Sustainable Solutions ERF at Parley. The Parley proposal involves a 60,000 tonnes per annum project, with c.20% of the waste recycled and the remainder processed via moving grate technology to generate energy. The net impact on residual waste arisings within our defined catchment area is therefore 50,000 tonnes per annum.

3.184 The expectation of delivering a large-scale ERF at Parley has not been realised and having been proposed for a large scale facility with a capacity of up to 220,000 tonnes per annum during the preparation of the DWP, it was subsequently reduced to 160,000 tonnes per annum. At the current proposed scale of 60,000 tonnes per annum it is now providing 30% of its assessed capacity in the DWP, primarily as a consequence of its very constrained location.

3.185 Based on the assessment of waste capacity and need, and assuming that (a) the project is granted planning permission and (b) that it can raise investment funding and can be successfully delivered, it can be shown that in this scenario there are sufficient waste arisings in Dorset and the catchment area to meet the waste need case for the ERF, without prejudicing the Parley scheme.

3.186 In the context of DWP Policy 4 criterion b (Applications for waste management facilities not allocated in the Waste Plan), the granting of planning to the proposed ERF would not have a material impact on the potential to deliver the Eco-Sustainable Solutions site. It would not therefore sterilise or prejudice the delivery of this allocated site that would otherwise be capable of meeting waste needs, by reason of cumulative or other adverse impacts.

Processing of RDF in Europe (point 32)

3.187 Section 5 of the Waste Need Paper provides detailed information in respect to the development of the UK RDF export market to Europe and the key economic and policy drivers behind its growth, and more recently the reduction in the volume of RDF exported. This is due to various factors including higher transport costs, increased European competition, the application of UK waste policy measures (such as the proximity principle and self-sufficiency), European waste policy and taxation and carbon and climate considerations. It is also influenced by an increase in UK RDF processing capacity.

3.188 The Waste Need Paper refers to UK market analysis and concludes that despite increases in UK RDF processing capacity, large volumes of UK residual waste are still being landfilled and there remains more than sufficient UK waste to justify further facility investment.

3.189 As such there is no “spare” capacity in the UK; and whilst there may be over supply of capacity in certain regions, other regions (like Dorset) have no capacity and therefore are essentially exporting their waste responsibilities, ultimately to either a landfill or RDF export route. This does not sit comfortably with the principles of sustainable waste management, these being the waste hierarchy and the self-sufficiency and proximity principles.

3.190 Further analysis of the European RDF market is provided in the Waste Need Paper, which concludes that export of RDF for the UK to Europe remained attractive despite higher overall costs, because of a lack of capacity in the RDF processing capacity in the UK, and the higher relative cost of landfill.

3.191 Historically, a key difference between European and UK facilities has been that European facilities typically operate in CHP mode, utilising both heat and power. This compares to the UK ERF fleet which has traditionally focussed on power only, in part due to the relative sparsity of commercial heat offtakers and the lack of policy and financial support for district heating in the UK. The result of this is that European plants are able to export a significantly higher level of total energy per tonne of waste than their UK counterparts, i.e. they are more efficient and have a competitive advantage, which, in addition to greater carbon benefits, allowed European facilities to accept lower gate fees and therefore subsidise the additional transport costs in an environment when the only other option was landfill (with the associated tax).

3.192 The development of the UK ERF market in recent years has provided another option for UK waste management and, going forward it is expected that new UK facilities, including the proposed Portland ERF, will be CHP ready and will take steps to identify and connect to existing heat off-takers to improve the carbon outcome and generate additional revenues. As such the attractiveness of European export is likely to continue to reduce.

3.193 European facilities do not need to attract UK RDF export to remain viable, given the existing on continent demand and significant increase in demand anticipated as a result of policy requirements. According to data published by the European Commission, in 2019 53 million tonnes of municipal waste was sent to landfill and 60 million tonnes was incinerated.

3.194 Further in line with the EU Landfill Directive (EU, 1999, 2018a), Member States must reduce the amount of municipal waste sent to landfill to 10% or less of the total amount of municipal waste by 2035.

3.195 In 2019 only 10 Member States had achieved this target, with several of these countries incinerating a significant amount of municipal waste. The remaining 17 Member States required further changes to their waste management approach, and 12 of these had landfill rates that were four times or more the EU target (in Eastern Europe it is still typical for over 50% of municipal waste to be landfilled).

3.196 This suggests that there is more than enough waste available to keep all of the ERF plants in Europe operating at full capacity, which is the most economically sensible approach as opposed to reducing gate fees to look to continue to attract UK waste.

Environmental permit

Introduction

3.197 Dorset Council's letter requested the following additional information and clarification in relation to the Environmental Permit (point 35):

- We note that you are making some updates to your Environmental Permit application, and request that the additional detail and assessment you are undertaking in respect of air quality, noise and fire prevention is incorporated into your planning application and EIA, so the assessment of the project is consistent across both regulatory regimes

3.198 The applicant submitted an application to the Environment Agency in December 2020 for an Environmental Permit, which will be required before the ERF would be permitted to operate. Further information and clarification has been submitted in respect to air quality, noise and fire prevention matters, and this is summarised further below.

Air quality (point 35)

3.199 The additional air quality information requested by the Environment Agency related to the modelling of impacts at specific human health receptors. Fichtner Consulting Engineers Ltd prepared a technical note to provide this, which is provided in the ES Addendum appendix 3.3.

3.200 This presented the impact at a number of residential properties, including HMP The Verne and these are summarised in the air quality section of ES Addendum (chapter 3). The additional modelling confirms that there will be no significant adverse air quality effects at sensitive receptors in the vicinity of the proposed ERF as a result of process emissions from the plant.

Noise (point 35)

3.201 The Environment Agency requested that a further assessment of noise impact for the proposed ERF be undertaken. Specifically, a more detailed assessment was requested in line with British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound.

3.202 This request was made because the original noise assessment submitted with the application was undertaken during the Covid-19 lockdown period, which prevented a baseline survey from being undertaken at that time. Furthermore, it was likely that any survey undertaken during that period would have been unrepresentative of more typical conditions due to the general reduction in economic and commercial activity. Consequently, that previously submitted noise assessment used baseline survey data collected around the port as part of on-going environmental monitoring using an approach agreed with Dorset Council.

3.203 The updated noise assessment, submitted as requested as part of this response, concludes the predicted rating sound levels from the ERF to be below the background levels at the locations assessed. In absolute terms the levels are also low, indicating that the effect of noise from operation of the ERF would be not significant.

Fire prevention plan (point 35)

3.204 It was necessary to submit a preliminary Fire Prevention Plan (FPP) for the proposed ERF to the Environment Agency as part of the Environmental Permitting process. The objective of the FPP is to identify the provisions which have been taken into account during the development phase of the facility. In addition, provisional operational measures have also been identified where these are available. The preliminary FPP report will be subject to review following completion of the detailed process design.

3.205 The preliminary FPP provides information in respect to fire prevention and the management and storage of waste. The Environment Agency requested some additional information under its ‘duly made’ checking procedures comprising a site location plan, a drawing showing sensitive receptors and updated table of receptors with a reference number added to each receptor. The full preliminary FPP has been submitted to Dorset Council (including the additional information requested by the Environment Agency).

3.206 Whilst the FPP is the subject of consideration by the Environment Agency under Environmental Permitting regulations, some consultees to the planning application have raised concerns about fire risk. The FPP provides Dorset Council and consultees with details of measures to be taken to ensure that any fire risk would be effectively managed under the remit of the Environmental Permit, and demonstrates that fire risk is not a significant planning concern.

4. Compliance with the development plan

Introduction

4.1 The submitted Planning Supporting Statement provides a summary of the development plan framework (chapter 5) and other material considerations considered to be relevant to the proposals.

4.2 Chapter 6 of the Planning Supporting Statement provides a comprehensive and robust planning assessment of the ERF's compliance with the development plan, especially the Dorset Waste Plan (DWP: 2019) and other material considerations, including directives, regulations, policies, strategies, and guidance in respect to both waste management and renewable energy.

4.3 In the context of the DWP, the Planning Supporting Statement fully assesses the proposals in respect to the following core waste management principles and policy matters:

- The waste hierarchy
- Self-sufficiency principle
- Proximity principle
- Spatial strategy
- Sustainable waste management (Policy 1)
- Allocated waste sites (Policy 3)
- Unallocated waste sites (Policy 4)
- Recovery facilities (Policy 6)
- Transport and access (Policy 12)

4.4 The Planning Supporting Statement also considered other relevant policies in the DWP, West Dorset, Weymouth & Portland Local Plan, Dorset Minerals Strategy, and Portland Neighbourhood Plan and the assessment of compliance is summarised in tables 6.1 to 6.4.

4.5 It is not the intention of this document to duplicate the policy assessment previously undertaken and set out in full within the Planning Supporting Statement. Rather this chapter provides clarification, as requested by Dorset Council, as to the applicant's interpretation of key principles and policies in context of representations made to the planning application.

Interpretation of planning policies (point 34)

4.6 This section provides a response to the request made by Dorset Council in its letter (point 34), which states:

- *"It would be useful if you could provide further comment and perspective in respect of representations received on way in which you have interpreted planning policies as set out in your supporting statement".*

4.7 The applicant's response to policy points raised by consultants acting on behalf of local objector groups (principally Stop Portland Waste Incinerator (SPWI) and The Portland Association) is provided in the Consultation Response Summary Document (CRSD). The CRSD is intended to assist Dorset Council by providing clarification in respect to policy points raised during consultation, rather than new environmental information under Regulation 25 of the EIA Regulations. However, the remainder of this chapter focuses in more detail on the key strategic policies and principles in the DWP that objectors believe have been misinterpreted.

4.8 The majority of consultation comments made were in relation to the ERF's compliance with the adopted DWP and principally the following listed policies in so far as they cover key guiding principles for sustainable waste management, the DWP spatial strategy and other key planning considerations in respect to both allocated and unallocated sites in the DWP:

- Policy 1 (sustainable waste management)
- Policy 3 (sites allocated for waste management development)
- Policy 4 (applications for waste management facilities not allocated in the Waste Plan)
- Policy 6 (recovery facilities)

4.9 Many objectors focused upon the Portland ERF's compliance with Policy 4 and criteria a to g, which are to be met if waste management facilities on unallocated sites are to be permitted. Whilst objections were raised in respect to all of the criteria, the majority have been directed at criterion a (availability of allocated sites or locational advantages), criterion b (prejudice of delivery of allocated sites) and criterion c (spatial strategy, need and the waste hierarchy).

Policy 4 criterion a)

4.10 The response submitted by Adams Hendry (on behalf of SPWI) suggests that the applicant has not provided evidence that the DWP allocated sites are not available or would not be capable of serving the waste management need that the proposal is designed to address. It also states that the applicant has purposefully misinterpreted Policy 4 criterion a) in an attempt to ensure compliance, stating that this criterion does not require an assessment to determine whether it is capable of accommodating the applicant's proposal, but rather the requirement is whether the allocated sites could serve the same waste management need that the proposal is designed to address.

4.11 In response to these points and to further clarify, the applicant is not primarily seeking to demonstrate that there is no 'available' site allocated for serving the waste management need that the Portland ERF is expected to serve. However, the Planning Supporting Statement (paragraphs 6.77 to 6.84) states there are significant doubts as to whether sufficient capacity will, or can, come forward on the DWP allocated sites to meet Dorset's expected shortfall in residual waste management capacity. This is primarily because of the planning and environmental constraints to development identified and set out within the DWP itself, and the findings of the applicant's DWP Allocated Sites Assessment study.

4.12 Policy 4 criterion a), states:

"*there is no available site allocated for serving the waste management need that the proposal is designed to address* <u>*or*</u> *the non-allocated site provides advantages over the allocated site*" (our emphasis added).

4.13 Whilst the applicant has concluded that there are significant doubts as to whether the DWP allocated sites (Policy 3) would be capable of delivering facilities with sufficient capacity to meet Dorset's expected residual waste treatment need, it is not suggesting that such sites are not available in the context of criterion a. Rather the comparative assessment of DWP allocated sites was undertaken to demonstrate that the Portland site provides advantages over the allocated sites, as required by Policy 4 (criterion a), and as requested by officers in pre-application advice. The relevant policy test under criterion a in this instance is whether the unallocated Portland site provides advantages over the allocated sites.

4.14 The proposal is specifically for a large-scale ERF with a maximum capacity of 202,000 tpa to meet Dorset's waste management needs. It is entirely reasonable for the applicant to consider whether the delivery of such a facility at the Portland site would deliver advantages over the allocated sites. The DWP does not exclude incineration at allocated sites but rather indicates that there is potential for adverse impact. The DWP adopts a flexible approach and does not preclude any technologies from coming forward on the allocated sites, as has been confirmed by the recent planning application for a smaller scale incineration-based ERF on the Eco-Sustainable Solutions site at Parley (Inset 7).

4.15 On that basis it is entirely appropriate for the applicant to consider the relative merits of a larger scale ERF at the Portland site against DWP allocated sites to demonstrate that clear advantages exist.

4.16 The Portland ERF site clearly and demonstrably provides significant advantages over the DWP allocated sites, as follows:

- It is of a sufficient size that is capable of accommodating a large-scale ERF, that is commercially viable, technically proven, and deliverable and with capacity to meet Dorset's existing and future waste management needs. Other DWP allocated sites are either of insufficient size to accommodate a large-scale ERF of the type proposed at Portland, or are subject to planning or environmental constraints that limit their scale. Smaller scale ERF plants, and/or alternative advanced thermal technologies generally carry a higher risk of failure because of difficulties in securing funding due to either low investment returns or, in the case of alternative advanced thermal technologies, the technical risks that have resulted in numerous project failures and losses for investors. There are multiple examples of UK sites that were previously consented for advanced thermal technologies that are now adjusting their technology such that it is similar to the proposed ERF.

- It is able to provide power directly to a shore power facility to serve visiting cruise liners and Royal Fleet Auxiliary (RFA) and other shipping equipped with shore power capability This enables ships to turn off their engines when in port reducing associated ship emissions to air. Other DWP allocated sites cannot provide direct power supply to the port, due to electrical supply infrastructure constraints at Portland, and could not deliver shore power and reduce ship emissions to air.

- It is able to supply heat to a future district heating network, through its inbuilt CHP capability, and is very well located in relation to specific heat customers in the immediate vicinity (the two Portland prisons). The prisons have a large heating requirement, and the Ministry of Justice (MoJ) has indicated that it is interested in taking heat once the network is implemented. Whilst some DWP allocated sites have potential for CHP, no heat customers have indicated that they would take heat even if a heat network were to be provided. Other DWP allocated sites are too geographically remote from potential heat users and have no realistic CHP potential given the inability of off-takers to stand behind the long term contracts required to justify the upfront capital investment.

- It is located in a commercial port with direct access to existing port related infrastructure, enabling it to import RDF fuel and export residual materials such as IBA sustainably by ship. The site has a unique locational advantage, in the Dorset context, of having flexibility to import and export materials by sea, a sustainable mode of transport, and is not reliant upon the transport of material by road only. None of the DWP allocated sites enjoy the benefits of a port location and this inherent flexibility. In contrast they are reliant upon the transport of waste and residual materials by road, a distinct disadvantage in comparison to the Portland site.

- It is located adjoining other available employment land where emerging green technologies in connection with circular economy initiatives which would have synergies with the Portland ERF, such as recycling of plastics can be located.

- It has excellent potential to incorporate carbon capture and storage (CCS) when this becomes technically and commercially viable, because of its port location. Portland Port has significant land available within its demise to facilitate the installation of carbon capture technology, and the site's location within a commercial port provides opportunities for captured carbon to be stored and transported by sea to disposal locations, once these have been developed and become available. Other DWP sites are likely to be either too small to accommodate CCS on site or are constrained by existing waste management uses that would need to be reconfigured or removed. Critically, none of the other DWP sites benefit from a port location and they do not have the potential to transport captured carbon in bulk vessels by sea, instead being entirely reliant upon transporting captured carbon by road, which is less sustainable and would be much less commercially viable.

- It has scored highly in the DWP Allocated Sites Assessment against a set of operational and planning and environmental criteria and has outperformed all of the four DWP allocated sites identified for strategic residual waste management. Irrespective of the study outcomes and objector criticism of the criteria applied, none of the DWP allocated sites can deliver all of the advantages set out above that the Portland ERF site can.

4.17 The objectors' suggestion that the applicant has purposefully misinterpreted Policy 4 criterion a is strongly rejected for the reasons given. The information presented in the Planning Supporting Statement, DWP Allocated Sites Assessment, other supporting technical documents, and further in this supplemental statement, provides compelling evidence that the Portland ERF site has clear and substantial advantages over the other DWP allocated sites.

4.18 It is firmly considered by the applicant that the proposed Portland ERF is fully compliant with Policy 4 criterion a, in that the proposed Portland ERF site has demonstrated many advantages over the DWP allocated sites.

Policy 4 criterion b)

4.19 Objections submitted by Adams Hendry and Freeth on behalf of opposition groups claim that no evidence has been submitted to demonstrate that the proposal would not sterilise or prejudice the delivery of a DWP allocated site and that this is contrary to Policy 4 criterion b).

4.20 The applicant's position in respect to compliance with criterion b) is set out in the Planning Supporting Statement (paragraphs 6.97 to 6.99). The objectors' comments place considerable weight on the fact that the Portland ERF will meet a substantial proportion of the DWP residual waste capacity and that this would prejudice delivery of one or more of the allocated sites.

4.21 The Planning Supporting Statement concludes that the proposed ERF at Portland would not preclude a range of waste management uses from coming forward on the DWP allocated sites. However, given that residual waste, post recycling, can only be managed by means of landfill or energy recovery, it is assumed that objectors consider that the DWP sites could deliver a thermal treatment facility (either traditional or ACT). To assess whether this concern is valid it is necessary to consider whether the allocated sites could realistically deliver a large-scale residual waste treatment facility and how much of the 'assessed' capacity of the DWP allocated sites is likely to be delivered in reality given current evidence, in the context of the Portland ERF and the shortfall of residual waste capacity.

4.22 The DWP (paragraph 7.76) states that the plan allocates three sites for the provision of new facilities for the management of residual waste, plus additional capacity at the existing MBT facility at Canford Magna.

4.23 These four sites combined have a total assessed capacity of 385,000 tpa. It is further explained that this exceeds the identified needs of the plan area, to ensure that the plan remains flexible in the event that one or more of the allocations does not come forward for the treatment of residual waste. The DWP adopts a flexible approach, with paragraph 6.9 stating that, although the allocated sites may currently be available for waste uses, circumstances may change during the plan period, and these may not come forward as expected. It also adds that private sector businesses and commercial considerations will determine whether facilities will actually be built and what types of technology will be brought forward.

4.24 The Eco-Sustainable Solutions site (Inset 7) is assessed to provide 160,000 tpa of residual waste treatment capacity, based on evidence presented to the draft DWP indicating that a facility of this scale was feasible. The current proposal for this site is a small scale ERF with a residual thermal waste capacity of 50,000 tpa. Assuming this facility is consented, financed, and built (which the applicant doubts will be the case given its size based on feedback from experienced industry investors) this would represent a shortfall of 110,000 tpa against the DWP assumed capacity for this site. This reduced residual waste treatment capacity is symptomatic of the challenging planning and environmental constraints at this location. It is therefore site constraints that are prejudicing the delivery of 'assessed' additional capacity, rather than the

Portland ERF. The DWP's over-provision capacity figure of 385,000 tpa would be significantly reduced to 275,000 tpa.

4.25 The potential impact of the proposed Portland ERF on the proposed Eco-Sustainable Solutions ERF at Parley in respect to waste capacity and waste arisings is addressed in more detail in the Waste Need Paper and above in the direct response to point 31 of the council's letter.

4.26 The Canford Magana site (Inset 8), is assessed as providing a further 25,000 tpa of treatment capacity from the existing facility MBT facility. Whilst the MBT is expected to significantly increase its capacity to manage more of Dorset's waste (refer to the submitted Waste Need Paper), this is an intermediate waste process that removes some recyclable materials from the waste stream but produces significant quantities of RDF, which ultimately requires management at other facilities. Although planning permission was granted for an advanced combustion facility (ACT) at the Canford site, it was only part implemented and was never completed. The site owner has no plans to complete or operate the ACT facility given the technical challenges noted with this technology.

4.27 Whilst the Canford facility will continue to provide an important waste management function by processing increased volumes of Dorset's residual waste and producing higher volumes of RDF, an outlet is required for the RDF before it can be said that the residual waste has been finally treated. The Portland ERF will provide that outlet. The operator of the Canford MBT facility has stated that its RDF output would be supplied to the Portland ERF, if it secures planning permission and is constructed, because it would be the nearest appropriate facility.

4.28 Given that the Canford site is expected to continue to focus its operations on increasing its intermediate residual waste treatment activity and RDF production, it is difficult to understand how the proposed ERF would prejudice additional capacity coming forward at this site. Conversely, by providing a Dorset based outlet for its RDF output, the Portland ERF is likely to stimulate and support increased waste management capacity at the Canford site and potentially other intermediate processing locations within Dorset.

4.29 The Mannings Heath site (inset 9) is assessed to have a potential capacity of 100,000 tpa. It is a relatively small site that is currently in use for other waste management uses. There is no evidence to suggest that this site is likely to come forward with an alternative residual waste treatment facility of the scale that is suggested in the DWP. The provision of 100,000 tpa of capacity at this site therefore would appear to be highly optimistic. Investment for a project of this size is again challenging – a conventional technology (such as the proposed ERF) does not meet return hurdles at this size due to high fixed capital costs and an ACT technology project is unlikely to be able to raise investment due to the technical failures and investment losses experienced elsewhere in the UK market.

4.30 The Binnegar Quarry site (Inset 10) is assessed in the DWP as having a potential residual waste treatment capacity of 100,000 tpa. The site is located in a remote area, adjacent to sensitive ecological habitats and with no opportunities for implementing CHP. It therefore realistically offers very little potential as a location for establishing a new residual waste treatment facility. Whilst a materials recycling facility exists on the site, this was mothballed for many years and the operator Viridor has since moved to dispose of the site. The applicant considers it highly unlikely that this site will deliver the assessed capacity. Again, the considerations regarding the investment case for a site of this size are relevant, even in the unlikely scenario that planning was approved.

4.31 Under the scenario that neither the Manning's Heath nor the Binnegar Quarry sites are likely to deliver any of the significant residual waste treatment capacity expected in the DWP, and that the proposed Eco-Sustainable Solutions ERF at Parley will only provide 50,000 tpa (some 110,000 tpa less than was expected in the DWP), there would remain a significant residual waste management capacity shortfall in Dorset of around 184,000 tpa, against the 234,000 tpa requirement. This shortfall would of course increase if the Eco-Sustainable Solution ERF does not obtain planning permission or cannot raise funding and therefore is not built.

4.32 It is for precisely these reasons that the DWP recognises that flexibility is required to account for sites not coming forward. As the DWP states (paragraph 6.9), the plan allows for other acceptable sites to come forward for waste uses. Such provision will provide additional flexibility, including in circumstances where allocated sites do not come forward for waste development.

4.33 It is therefore entirely appropriate that new sites, such as the Portland ERF site, can be considered on their merits, particularly as it appears that the assessed capacity for the DWP allocated sites is likely to be much less than envisaged at the plan making stage.

4.34 Nonetheless, the applicant considers that the DWP allocated sites can still play an important role in meeting Dorset's waste management needs. However, rather than accommodating large scale thermal treatment facilities in highly constrained areas, they are deemed to be more suited to the production of RDF (to support facilities such as the Portland ERF), or to accommodate other waste management activities such as waste transfer and recycling.

4.35 When considered from a waste arisings perspective, the Waste Need Statement confirms that based on analysis undertaken of Dorset's residual waste arisings, the potential available feedstock for the Portland ERF (comprising both LACW and C&I) is around 320,924 tonnes. Given that the nominal capacity of the Portland ERF is 183,000 tpa (with a maximum capacity of 202,000 tpa), and around 25% of the plant capacity (approximately 50,000 tpa) might be expected to come by sea, the amount of residual waste potentially available to the Portland ERF from Dorset alone far exceeds its capacity, and would not prejudice other facilities coming forward on allocated sites.

4.36 Given these considerations, the objectors' concerns that the Portland ERF would prejudice the delivery of DWP allocated sites are unfounded and the proposal fully accords with Policy 4 criterion b.

Policy 4 criterion c)

4.37 The main thrust of the objectors' case is that the proposed ERF at Portland does not comply with the DWP spatial strategy because the site is less well related to the Poole, Bournemouth and Christchurch conurbation (as a significant source of waste arisings) than the allocated DWP sites and does not comply with the proximity principle. It also suggests that the facility does not comply with the proximity principle because the ERF has the capability to manage waste arising from within a defined three hour HGV drive time terrestrial catchment, and also has the ability to bring waste into the facility by sea from further afield.

4.38 Chapter 6 of the Planning Supporting Statement (paragraphs 6.35 to 6.59) sets out the case for the proposed ERF in respect to the proximity principle. However, to provide further clarification the applicant considers that the objectors are applying the proximity principle in a very narrow sense.

4.39 The proximity principle requires waste to be recovered or disposed of as close as possible to where it is produced. However, in the context of decision making the proximity principle requires that waste be managed at 'one of the nearest appropriate installations' (our emphasis) but not necessarily at the nearest appropriate installation. The objectors fail to recognise that the Portland ERF would enable Dorset's waste to be managed in Dorset as one of the nearest installations for the treatment of Dorset's residual waste.

4.40 This would remain the case even if one of the allocated sites were developed to provide additional residual waste management capacity. The objectors also fail to recognise that the proximity principle is a guiding principle, that must be applied flexibly, given that waste markets are dynamic and complex. The proximity principle should not be applied in an overly restrictive way.

4.41 Some objectors have suggested that Dorset's waste should instead go to the Marchwood ERF as this is geographically closer to the south east Dorset conurbation (and more proximate) than the Portland site. Notwithstanding that this would result in Dorset continuing to rely upon the export of all of its residual waste to other areas, contrary to the self-sufficiency principle, it doesn't consider the realities of the waste market and the availability of capacity.

4.42 All of Hampshire's ERFs are contracted to manage Hampshire's local authority collected waste, are operating at or close to their capacities, and are subject to planning conditions that require priority to be given to managing Hampshire's waste over waste derived from other waste authority areas. For these reasons they may not be available to manage any of Dorset's residual waste need in future. Paragraphs 6.40 to 6.44 of the Planning Supporting Statement set out how the Portland ERF will comply with the proximity principle at the Dorset level.

4.43 Objectors also suggest that because the Portland ERF could manage residual waste arising from within the sub-region, or the UK or elsewhere, that this is in some way contrary to the proximity principle. This again looks to apply the proximity principle in an overly restrictive way which fails to recognise that the proximity principle can apply at various geographical scales.

4.44 Paragraphs 6.45 to 6.50 of the Planning Supporting Statement demonstrate that the Portland ERF could manage some of the large volume of RDF material that is currently being produced (both in the south west region and nationally) that is being exported to other European countries for management in other ERFs. The Portland ERF will provide one of the nearest appropriate installations for this material in accordance with the proximity principle (and also UK self-sufficiency) and is more proximate than continuing to export to Europe.

4.45 In all of these respects the objectors look to apply and interpret the proximity principle in an overly rigid and narrow way that fails to recognise the dynamics of waste flows, waste markets and the fact that the Portland ERF does not need to be the closest available geographically to the source of the waste arisings (as it would be one of the nearest appropriate facilities) to accord with the provisions of the proximity principle.

4.46 Paragraphs 6.60 to 6.72 of the Planning Supporting Statement consider the proposal in context of the DWP spatial strategy. These demonstrate how the proposed Portland ERF will help Dorset to ensure that its residual waste is managed within Dorset, as opposed to the current practice of exporting waste out of county to landfill or other ERF in the UK or Europe.

4.47 The DWP Inspector recognised that the purpose of allocating sites (albeit close to the urban area) was to "facilitate the treatment of an increased tonnage of waste to enable recovery within the County instead of transporting waste to landfill or recovery facilities outside Dorset, as happens at present".

4.48 Whilst the Inspector noted that the DWP had identified strategic requirements for residual waste management and recycling, and allocated sites to meet those requirements, which are well related to the sources of waste, it is explicitly made clear in the DWP that some or all of those allocated sites might not come forward and deliver the necessary capacity. The DWP explicitly recognises that additional residual waste treatment capacity may be appropriate elsewhere to ensure that the capacity gap is adequately addressed.

4.49 To address this, Policy 4 permits waste management facilities to come forward on unallocated sites where these can demonstrate significant advantages over allocated sites and meet specified criteria. The DWP Inspector (paragraph 56) fully recognises the need for this flexibility and supports the approach, provided allocated sites are not prejudiced and the unallocated sites offer advantages such as the provision of heat and energy sources.

4.50 Whilst the DWP has identified sites near to the south east Dorset conurbation, as this is where a significant proportion of Dorset's residual waste arises, it also accepts that these sites are constrained and therefore some or all of these allocations might not deliver the required capacity. Given the level of uncertainty over the deliverability of allocated sites, the DWP adopts a positive and flexible approach to ensuring that sufficient waste capacity is provided in Dorset to meet its needs over the plan period. This is entirely sensible planning.

4.51 Whilst it is recognised that the Portland ERF site is not as close to the south east Dorset conurbation as the DWP allocated sites, this does not mean that the proposed development is contrary to the proximity principle or is not capable of supporting the delivery of the spatial strategy.

4.52 The Portland ERF site would result in significant heat and power advantages by facilitating shore power and district heating and would provide a final treatment facility in Dorset for RDF material produced at facilities located on the DWP allocated sites (such as at Canford).

4.53 In this way residual waste arising from the main conurbation can be subject to further pre-treatment to remove recyclable materials close to its point of arising, further reducing its weight and volume prior to transporting the final RDF to Portland. As set out in the carbon assessment, the benefits of capturing heat and power at Portland outweigh any modest carbon emissions associated with transporting RDF to Portland. The proposal does not fundamentally undermine the spatial strategy as is being suggested by objectors, but rather supports it, contributing to meeting the residual waste management needs identified in the DWP, helping to achieve more sustainable waste management by moving this further up the waste hierarchy, reducing the need for landfill, and adhering to the proximity principle by providing a Dorset facility for Dorset waste.

4.54 Whilst regard has to be given to the DWP spatial strategy, it is not correct for objectors to conclude that the spatial strategy must be afforded overwhelming weight in the planning balance to the exclusion of all other factors. Paragraphs 6.67 to 6.69 of the Planning Supporting Statement refer to the Avonmouth Resource Recovery Centre appeal decision from 2011 (Appeal Reference APP/Z0116/A10/2132294). As set out in paragraph 6.67, this is an example where the Inspector considered a project's compliance with a spatial strategy with a wider set of sustainability considerations. This example demonstrates that absolute compliance with a spatial strategy must be balanced with the strategic objectives that inform and direct the overall spatial strategy for waste management. In that case the Inspector concluded that waste miles are not an overriding factor when balanced against other benefits of reduced landfill and low carbon energy.

4.55 The objectors seem to be suggesting that decision makers, including Inspectors are bound to give priority to consideration of spatial strategy over other considerations. Clearly, given this appeal decision that is not correct. Furthermore, in referring to this example the applicant is not recognising that the proposed development does not accord with the DWP spatial strategy, but rather is highlighting that in this case waste miles should not be an overriding factor when balanced against other important benefits. In this case the carbon savings derived from the provision of shore power and district heating at Portland would more than off-set any additional carbon associated with transport miles.

4.56 The applicant concludes that the Portland ERF fully accords with the provisions of Policy 4 criterion c.

Policy 6

4.57 Objectors have suggested that the proposals conflict with Policy 6 (recovery facilities), specifically that the facility does not comply with the requirement for processing facilities for IBA to be located at or close to source of the waste arising. The applicant's position is clearly set out in the Planning Supporting Statement (paragraphs 6.152 to 6.158.

4.58 However, for clarity the residual materials arising from the ERF (IBA and APCr) will be sent to specialist reprocessing facilities, with the port location enabling residual material to be transported sustainably by water. The proximity principle requires waste to be disposed of, or recovered, in one of the nearest appropriate installations by means of the most appropriate methods and technologies. The Portland ERF in sending residues to the nearest appropriate installation fully accords with the proximity principle.

4.59 A small number of specialist IBA facilities exist that receive and process the residual material taking advantage of economies of scale. Whilst some larger scale ERFs have on site IBA processing facilities, the majority do not and transport material to a specialist facility by road.

4.60 The Portland site enables IBA to be transferred sustainably by water to specialist recycling facilities. This is accords with the underlying objectives of the policy, which is to ensure the most sustainable treatment of residues both in terms of the method of treatment (in this case recycling) and method of transport (in this case transport by sea). The DWP and specifically Policy 6 could not have reasonably anticipated that a site, located within a commercial port, would come forward for an ERF and its wording does not recognise the sustainability advantages of moving IBA by sea, which would reduce the need for transportation of residual material by road and its associated environmental effects.

4.61 The applicant is willing to accept a suitably worded planning condition, requiring the transportation of IBA to specialist reprocessing facilities by sea. Notwithstanding this, the applicant is committed to a planning obligation to review future options to establish a IBA/APCr reprocessing facilities at or in close proximity to the site (see above). Furthermore, the objectors ignore the clear future potential at Portland for establishing local facilities to treat residues.

4.62 The applicant therefore maintains its stated view that the Portland proposal broadly complies with the requirements of Policy 6 in respect to treatment of residual materials.

Other DWP policies

4.63 Objections were made in respect to many of the DWP development management policies, principally these were:

- Policy 12 (transport and access)
- Policy 13 (amenity and quality of life)
- Policy 14 (landscape and design quality)
- Policy 15 (sustainable construction and operation of facilities)
- Policy 16 (natural resources)
- Policy 17 (flood risk)
- Policy 18 (biodiversity and geological interest)
- Policy 19 (historic environment)

4.64 The Planning Supporting Statement (chapter 6) provides an assessment against these DWP policies and concludes that the Portland ERF is compliant with their requirements. However, where additional environmental information has been provided under this submission, further consideration has been given to compliance with the relevant polices.

Policy 13 – amenity and quality of life

4.65 The applicant has submitted revised air quality assessment information to address comments made during the consultation on the application and to reflect the findings of additional technical air quality modelling work undertaken to quantify the effect of delivering shore power, which would result in shipping turning off its marine diesel engines when docked in port. The overall conclusion of the original ES, that the proposed development will not lead to any significant effects on air quality, remains valid and in fact for some emissions the position post development of the ERF will be an improvement on the existing air quality. The updated HHRA and HIA also did not identify any significant health effects arising from the proposed development.

4.66 Overall, the proposed development remains in accordance with Policy 13 criterion b (airborne emissions).

4.67 The applicant has submitted to the Environment Agency, through its Environmental Permit application (reference: EPR/AP3304SZ/A001), a revised noise impact assessment. This was required to ensure that more representative baseline noise conditions were captured, post-Covid 19 pandemic restrictions on activity. The updated noise assessment concludes the predicted noise levels from operation of the ERF would be below background levels at the locations assessed and low in absolute terms. The conclusion of the original assessment that the ERF would not cause any adverse noise impact remains valid.

4.68 The proposed development therefore remains in line with the requirements of Policy 13 criterion a (noise and vibration).

4.69 As described in chapter 8 of the ES Addendum (LVIA) and the DAS Addendum, further modelling and visualisations have been provided in respect to the predicted plume on the limited occasions when this would be visible. The additional assessment has concluded that the findings of the original ES and LVIA are unchanged. It is therefore considered that the Portland ERF would not give rise to unacceptable landscape, seascape and visual impacts.

4.70 The proposed development is therefore considered to accord with Policy 13 criterion h (visual impact).

4.71 Additional ground stability assessment has been undertaken and this has concluded that the risk of any ground instability is acceptable and can be minimised through careful design and construction.

4.72 The proposed development therefore remains in accordance with the requirements of Policy 13 criterion j (stability of the land at and around the site, both above and below ground level).

Policy 14 Landscape and design quality

4.73 The applicant has submitted further detailed information in respect to the technical plume modelling undertaken, visualisations showing the plume in various meteorological conditions, the proposed ERF viewed in the context of the existing port development, and the proposed external cladding system, addressing points 1, 2 and 3 in the council's letter. As requested by the Dorset Council landscape officer, further consideration has been given to the potential visual effects of the proposed ERF development at night time, through the submission of night time photomontages. These are summarised in chapter 2 and addressed in full within the DAS Addendum and the ES Addendum.

4.74 The additional plume modelling confirmed the conclusions set out in the original landscape, seascape and visual impact assessment that the plume is likely to produce only a very minor alteration to the view for a very limited number of hours in a limited number of months. As a result, the assessment of visual effects remains unchanged. Similarly, the additional night-time visualisations produced of the proposed development confirmed the conclusions set out within the lighting report and the landscape, seascape and visual assessment that the night-time effects of the proposed development on views will be negligible and not significant.

4.75 The additional information demonstrates that the proposed ERF has been carefully designed to ensure that it is compatible with its setting and complies with the requirements of Policy 14.

Policy 17 Flood risk

4.76 Further information has been submitted in respect to comments made by Dorset Council in its role as Lead Local Flood Authority (LLFA) in respect to the capacity, condition and suitability of the existing surface water network and associated outfalls.

4.77 Awcock Ward Partnership (AWP), who prepared the original flood risk assessment (FRA) and surface water drainage strategy, has produced a FRA Addendum. This illustrates a revised drainage strategy that demonstrates that the existing drainage network is suitable for use and that surface water from the site can be drained via existing outfalls to Balaclava Bay and Portland Harbour, with the use of appropriate surface water attenuation storage when required (point 27 in the council's letter).

4.78 The proposed development therefore fully accords with the relevant requirements of Policy 17.

Policy 18 Biodiversity and geological interest

4.79 The applicant has provided additional assessment of effects on off-site designated nature conservation sites and proposals for the management of habitat within the port (points 10 and 11 in the council's letter) in chapter 9 of the ES Addendum. In addition an updated version of the shadow appropriate assessment has also been prepared and submitted, providing additional information requested by Natural England and other ecological stakeholders (point 10 in the council's letter). Furthermore, a technical note prepared by ABPmer provides additional assessment of the potential for marine impacts, including on designated sites (point 10 in the council's letter). The full technical note is provided in appendix 9.3 of the ES Addendum and its findings are summarised in section 9.

4.80 The additional information does not change the conclusions of the original ES and shadow appropriate assessment, such that the proposed ERF fully complies with the provisions of Policy 18.

Policy 19 Historic environment

4.81 A framework heritage mitigation strategy has been prepared and submitted (provided as ES Addendum appendix 6.1), based on guidance provided by both the Dorset Council conservation officer and Historic England officers. The framework strategy provides details of the proposed mitigation proposed and how this would be delivered to off-set effects on the setting of the heritage assets at East Weare, in terms of the overall objectives, the proposals for staged works, future management, and monitoring and review.

4.82 The heritage framework would comprise works to remove the E Battery East Weare (scheduled monument and listed building) from the Historic England Heritage at Risk Register, to provide enhanced public access by means of a new permissive linking path across currently inaccessible parts of the secure port estate to connect to the existing public accessible land/rights of way, and to create enhanced opportunities for public appreciation of the wider group of heritage assets at East Weare.

4.83 The framework heritage mitigation strategy demonstrates that the harm to the setting of heritage assets at East Weare identified in the ES (and deemed to be less than substantial harm) can suitably be off-set through the proposed mitigation and that this will deliver significant heritage related public benefits. As such the proposed ERF is in full accordance with Policy 19 requirements.

Conclusion

4.84 As requested by Dorset Council, further comment and perspective has been provided in respect to the applicant's interpretation of planning policies, with particular attention paid to DWP Policy 4 and 6, as these relate specifically to the consideration of core waste management principles and how these are applied in the context of Dorset, its spatial strategy and site allocations.

4.85 The applicant maintains that the proposed Portland ERF is fully compliant with these policies and considers that objector claims that the policies have been misinterpreted are without basis.

4.86 In respect to Policy 4 criterion a, the proposed Portland ERF site has many significant and clear advantages over the DWP allocated sites, principally relating to the following:

- It is of a sufficient size that is capable of accommodating a large-scale ERF, that is commercially viable, technically proven and deliverable, with capacity to meet Dorset's waste management needs

- It can provide power directly to a shore power facility to serve visiting cruise liners and Royal Fleet Auxiliary (RFA) and other shipping equipped with shore power capability, enabling ships to turn off their engines when in port, reducing associated ship emissions to air.

- It can supply heat to a district heating network, through its CHP capability, and is very well located to heat customers in the immediate vicinity, with the MoJ in discussion with the applicant to take heat to supply the two local prisons.

- It is located in a commercial port with direct access to existing port-related infrastructure, enabling it to import RDF fuel and export residual materials such as IBA sustainably by ship.

- It has excellent potential to incorporate carbon capture and storage (CCS) and other green technologies such as recycling of plastics when this becomes commercially viable, because of its port location, land availability and the associated potential for the storage and transport of captured carbon by sea.

- It has scored highly in the DWP Allocated Sites Assessment against a set of operational and planning and environmental criteria and has outperformed all of the four DWP allocated sites identified for strategic residual waste management.

4.87 The Portland ERF site therefore accords with the requirements of Policy 4 criterion a.

4.88 In respect to Policy 4 criterion b, the Portland ERF would not sterilise, or prejudice the delivery of an allocated site that would otherwise be capable of meeting Dorset's waste needs. This is because:

- There is potential available feedstock (comprising both LACW and C&I) in Dorset of around 320,924 tonnes. Taking account of the ERF capacity, and with around 25% of the RDF expected to come by sea, the amount of residual waste potentially available to the Portland ERF from Dorset alone far exceeds its capacity.

- The Bournemouth, Dorset and Poole Waste Plan, Background Paper 3 that total waste arisings from LACW and C&I waste will increase by c. 20% from the existing 840,000 tonnes to 1,000,000 tonnes by 2033, reinforcing the need for new additional treatment capacity to be secured.

- Whilst the DWP over allocates 'assessed' capacity at 385,000 tonnes across four allocated sites, it is clear that even with this over provision these sites are unlikely to meet expectation and deliver the significant residual waste capacity required to meet the shortfall.

- There is more than sufficient waste available for the proposed 60,000 tpa (50,000 tpa residual waste) Eco-Sustainable Solutions ERF to come forward (if consented and built) together with the Portland ERF.

- Other DWP allocated sites are either focusing on existing intermediate waste management activities to produce RDF (Canford Magna), or are unlikely to deliver the scale of residual waste management capacity required (Mannings Heath and Binnegar Quarry) due to restrictions on size which result in a challenging investment case.

- The Portland ERF would not physically preclude any of the allocated sites from accommodating the expansion of existing or providing new waste management activities.

- The DWP specifically allows for other acceptable sites to come forward for waste management uses. Such provision will provide additional flexibility, including circumstances where allocated sites do not come forward for waste development.

4.89 Given these considerations, the objectors' concerns that the Portland ERF would prejudice the delivery of DWP allocated sites are unfounded and the proposal fully accords with criterion b.

4.90 In respect to Policy 4 criterion c, the Portland ERF supports delivery of the spatial strategy, meets the needs of the plan and moves wate up the waste hierarchy and adheres to the proximity principle. Specifically by:

- Providing residual waste management capacity in Dorset, enabling it to meet its needs and reduce the existing need for this waste to be transported out of Dorset (as required by the DWP Inspector) aligns with the Dorset spatial strategy and principle of self-sufficiency

- Providing waste management capacity for residual waste that would otherwise be sent to landfill in accordance with the need to push waste management up the waste hierarchy

- Supporting the waste management activities at DWP allocated sites (such as Canford), which is producing RDF, and providing a destination for this material within Dorset

- Applying the proximity principle in the correct way to reflect the dynamics of waste markets, rather than in the narrow sense applied by objectors, with the Portland ERF providing one of the nearest appropriate installations for managing Dorset's waste, but also regional and national residual waste where this is being sent to Europe for treatment.

- Recognising that the DWP provides flexibility and supports unallocated sites that offer advantages such as the provision of heat and energy sources

4.91 Furthermore, planning Inspectors have held that waste miles should not be considered an overriding factor when balanced against other significant benefits such as reduced landfill and generation of low carbon energy.

4.92 The applicant concludes that the Portland ERF fully accords with the provisions of Policy 4 criterion c.

4.93 For the reasons set out above, the ERF is considered to comply with Policy 6 (criteria a and b) by supporting the delivery of the spatial strategy and meeting the needs identified in the DWP and not displacing the management of waste, already managed further up the waste hierarchy. It also fully accords with criterion c (enclosed buildings), criterion d (provision of CHP) and criterion f (effects on the integrity of European sites). The Portland ERF broadly complies with Policy 6 in respect to treatment of residual materials, by managing these sustainably by ship transport. The proposals therefore fully accord with Policy 6.

4.94 The revised and additional information submitted in response to the council's letter also confirms the original conclusion that the Portland ERF is compliant with other relevant DWP policies in respect to amenity, quality of life and health, heritage, landscape, flood risk and natural heritage.

5. Planning conditions and obligations

Introduction

5.1 Chapter 8 of the Planning Supporting Statement sets out the applicant's position in relation to planning conditions and obligations, when the application was submitted in September 2020. These proposals still stand and have not been repeated here.

5.2 The remainder of this chapter sets out those conditions that have been proposed by consultees and conditions that the applicant has put forward to address some of the matters identified during the consultation process, specifically relating to the source of waste feedstock and materials. It also provides further statements in respect to obligations building upon those aspects set out in the original Planning Supporting Statement.

Planning conditions

Conditions proposed during consultation

5.3 The consultation response from technical consultees has suggested the use of planning conditions in respect to the following:

Heritage (Dorset Council Conservation)

- A revised site layout is to be provided and approved in writing demonstrating the retention of the extant tracks of the Breakwater Branch Railway.
- Details of proposed temporary protection works to the Inner Breakwater (e.g. commemorative plaque) and Dockyard Offices (if required) are to be provided and approved in writing.
- Additional verified views are to be provided and approved in writing showing the impacts of the proposed lighting scheme in night-time conditions.
- Samples and/or product details of the proposed roofing, walling and cladding materials are to be provided and approved in writing.
- The final designs for the proposed printed photographic elements of the buildings' cladding are to be provided and approved in writing.
- Before commencement, a Heritage Strategy outlining a programme of heritage-related mitigation is to be agreed with the Local Planning Authority in writing. Any agreed works are to be undertaken and completed before completion of the main works on site, taking into account the need for any consents.

5.4 The applicant has developed its thoughts on this topic with Dorset Council conservation and Historic England officers and includes its proposed approach to mitigation in the framework heritage mitigation strategy which is expected to be subject to a planning condition, described above in chapter 3. This also links to the access path strategy which should be linked to a planning obligation.

Flood risk and drainage (Dorset Council LLFA)

- Potential request for planning condition/s and informative/s to cover detailed design, future maintenance and potential requirement for other permissions

Contamination (Environment Agency)

- No development approved by this planning permission shall commence until a remediation strategy to deal with the risks associated with contamination of the site in respect of the development hereby permitted, has been submitted to, and approved in writing by, the local planning authority. This strategy will include the following components:

  1. A preliminary risk assessment which has identified:

     - all previous uses
     - potential contaminants associated with those uses
     - a conceptual model of the site indicating sources, pathways and receptors
     - potentially unacceptable risks arising from contamination at the site

  2. A site investigation scheme, based on (1) to provide information for a detailed assessment of the risk to all receptors that may be affected, including those off-site.

  3. The results of the site investigation and the detailed risk assessment referred to in (2) and, based on these, an options appraisal and remediation strategy giving full details of the remediation measures required and how they are to be undertaken.

  4. A verification plan providing details of the data that will be collected in order to demonstrate that the works set out in the remediation strategy in (3) are complete and identifying any requirements for longer-term monitoring of pollutant linkages, maintenance and arrangements for contingency action.

  Any changes to these components require the written consent of the local planning authority. The scheme shall be implemented as approved.

- Prior to any part of the permitted development being brought into use, a verification report demonstrating the completion of works set out in the approved remediation strategy and the effectiveness of the remediation shall be submitted to, and approved in writing, by the local planning authority. The report shall include results of sampling and monitoring carried out in accordance with the approved verification plan to demonstrate that the site remediation criteria have been met.

- If, during development, contamination not previously identified is found to be present at the site then no further development (unless otherwise agreed in writing with the local planning authority) shall be carried out until a remediation strategy detailing how this contamination will be dealt with has been submitted to, and approved in writing by, the local planning authority. The remediation strategy shall be implemented as approved.

- Piling using penetrative methods shall not be carried out other than with the written consent of the local planning authority. The development shall be carried out in accordance with the approved details.

Biodiversity (Environment Agency)

- No development approved by this permission shall be commenced until a Construction Environmental Management Plan, incorporating pollution prevention measures, has been submitted to and approved by the Local Planning Authority. The plan shall subsequently be implemented in accordance with the approved details and agreed timetable.

5.5 The applicant considers these suggested conditions to be reasonable and expects these can all be captured in suitably worded planning conditions. It is also recognised that additional conditions will be applied by Dorset Council as deemed appropriate.

External cladding materials

5.6 The DAS Addendum provides further clarification on the proposed approach to the ERF external cladding system.

5.7 The building will be enclosed using a sheet metal cladding, which will be fixed back with cladding rails to the steel frame. It is proposed that this cladding will be dark green to create a suitable backdrop colour. The proposed PVC mesh will then be installed on a sub-frame that is spaced slightly off the surface of the façade and securely fixed to the steel frame. The fabric will be attached to the building using a tensioned system with aluminium profiles.

5.8 The DAS Addendum identifies potential options for the image to be printed onto the PVC mesh. This includes variations of military camouflage pattern, or the use of images from the Dorset Jurassic coast, using colours and patterns that help the ERF become recessive to its surroundings.

5.9 Whilst the strategy is to use these types of disruptive patterns and images to ensure that the ERF blends into its surroundings, some consultees have suggested that the use of a photographic image of the East Weare background, as suggested in the DAS, may not be capable of providing the required tonal variation throughout the various seasons and as vegetation changes. To address this, the DAS Addendum considers potential alternative options.

5.10 The applicant suggests that a suitably worded planning condition be applied that requires details of proposed external cladding materials and finishes be submitted to and approved by Dorset Council. This will enable council officers to consider potential options and agree with the applicant the most suitable option in terms of achieving its recessive objective.

5.11 If required the applicant considers that a planning condition and/or planning obligation can also be applied requiring the cladding material to be inspected at appropriate time intervals (expected to be not less than 5 years unless there is damage caused by unforeseen weather events) to assess its condition and effectiveness, with replacement undertaken when this is considered necessary.

Incinerator bottom ash (IBA)

5.12 Further details are provided in the IBA note in respect to the opportunities to export IBA by sea, including specific sites that could accept the material by these means (refer to council point 24). The applicant believes that transportation of IBA material by sea, represents a sustainable and viable option for movement for this material, facilitated by the site's port location.

5.13 The applicant is willing to accept a suitably worded planning condition or obligation, requiring IBA material to be transported off-site by means of ship, whilst providing flexibility for road transport to be used in specific circumstances when sea transportation is not possible, for example if required infrastructure is unavailable or during periods of extreme weather conditions that would temporarily preclude its use.

Capacity of site

5.14 The following condition is proposed in respect to the control of waste capacity.

The maximum combined total tonnage of refuse derived fuel imported on to the site in any calendar year shall not exceed 202,000 tonnes. For the avoidance of doubt a calendar year shall comprise the period between 1 January and 31 December. The site operator shall maintain a record of the tonnage of refuse derived fuel delivered to the site per day, the numbers of HGVs delivering waste and the number of HGVs exporting residues and their destinations, and/or the volume of waste and residues imported and exported by sea per day. Within 14 days of a written request, a copy of the waste input report shall be provided to the WPA to demonstrate compliance or otherwise with the capacity limit of the site.

Reason To ensure that the total volume of refuse derived fuel managed on site does not exceed the permitted maximum annual capacity.

Recovery status of the development

5.15 The following condition is proposed in respect to the recovery status of the development.

Prior to the facility being brought into commercial use, details confirming verification that the facility has achieved Stage R1 Status through Design Stage Certification from the Environment Agency, shall have been submitted to and approved in writing by the WPA.

Reason To confirm the recovery status of the development and ensure that the facility manages waste at a higher level of the waste hierarchy to comply with Policy 6 of the Dorset Waste Local Plan.

Residual heat recovery

5.16 The following condition is proposed in respect to the recovery of heat derived from the development.

Prior to the commissioning of the development hereby approved:

i. a scheme shall be submitted to and approved in writing by the WPA to identify a route for the supply of heat to the boundary of the site. Thereafter, the proposed route of the heat connection to the boundary of the site shall be safeguarded throughout the operational life of the development.

ii. a review of the potential to utilise the residual heat from the process shall be carried out. The review shall incorporate further evaluation of the options to export recoverable heat from the process, developing the options identified within the Environment Statement Addendum or other suitable alternative options, specifically incorporating feasibility/market analysis/market testing and any legal constraints. The conclusions/findings of this appraisal shall be submitted to the WPA for its written approval.

iii The operator shall thereafter undertake all reasonable endeavours to apply for planning permission for all viable options in writing by the WPA.

iv In the event that the WPA conclude that viable heat recovery options are not currently available in the local area at the time of this review,

Once the plant is operational:

v. The operator shall repeat the heat investigation process every three years during the operational life of the development.

Reason: To ensure that potential to recovery heat energy from the process is not prejudiced, thus satisfying the objectives of European and National Policy, notably the revised EU Waste Framework Directive the Waste (England and Wales) Regulations 2011.

Planning obligations

5.17 As set out in chapter 8 of the Planning Supporting Statement (paragraph 8.15), the applicant expects the S106 to cover the following topics, with the addition of waste source and access path:

- Waste source
- Route-map to achieving net-zero carbon
- Shore power
- Off-site ecology
- Access path
- Training and education
- Treatment of residual material (IBA/APCr)
- Vehicle routing
- Local community or municipal power

- Community liaison and monitoring

5.18 The applicant remains committed to addressing the above topic areas, subject to discussion and agreement with Dorset Council.

Waste source

5.19 As set out in paragraphs 8.6 to 8.9 of the Planning Supporting Statement, the Portland ERF is proposed as a merchant waste management facility that requires flexibility to secure waste commercially from a range of sources and locations. It is also clearly stated that whilst the facility is located in Dorset and is ideally placed to manage all of Dorset's waste, the facility would accept suitable RDF material delivered from within its 3 hour HGV drive time catchment area and/or diverted RDF delivered to the site by sea from elsewhere.

5.20 The applicant has previously stated that the imposition of restrictive planning conditions that unreasonably restrict the source of waste would not be considered acceptable. Such conditions would interfere in the commercial waste market and have not been deemed acceptable by decision makers, such as Inspectors and the Secretary of State in appeal decisions.

5.21 However, the applicant recognises the concerns expressed by some consultees that the Portland ERF is being provided specifically to serve waste authority areas outside of Dorset and the UK and will therefore not make any meaningful contribution to meeting Dorset's waste needs.

5.22 Whilst the applicant maintains the position that it must retain the required flexibility to source waste from within the market, it believes that the Portland ERF is very well placed to manage Dorset's waste, should it be awarded residual waste contracts by Dorset Council and/or BCP Council. Whilst it cannot be guaranteed that the applicant would secure these residual waste contracts, the applicant is confident that given its location in Dorset, its advantages in terms of proximity to the source of waste arisings and its partnership with fuel suppliers, it will secure significant volumes of residual waste derived from Dorset.

5.23 To address local concerns on waste sources, the applicant is willing to enter into an appropriately worded planning obligation that would require the applicant to commit to making reasonable endeavours to source RDF from Dorset where such waste is available and can be secured on acceptable commercial terms. Once the ERF is eligible to participate in public procurement, run by Dorset waste authorities in respect to residual waste, Powerfuel would commit to do so (with or without partners). Where this is not possible, the applicant would be free to secure suitable residual waste from other commercial sources, to make use of any spare ERF capacity. Powerfuel would be willing to discuss the wording of such an obligation with Dorset Council officers.

5.24 Such an approach demonstrates the applicant's commitment to managing local Dorset waste, where this becomes possible, but also ensures that the ERF can operate to its full capacity and can maximise the environmental benefits of diverting residual waste from landfill and generating heat and power for the shore power facility and a local heat network.

Route map to achieving net zero carbon

Our net-zero commitment

5.25 The applicant acknowledges that the Portland ERF would need to reduce its carbon intensity over its operational life. As set out in chapter 8 of the Planning Supporting Statemen (paragraph 8.16):

"The applicant commits that the Portland ERF will operate as a net-zero carbon infrastructure asset. It is believed that this would be the first such facility in the UK to commit to achieving net-zero carbon and carbon neutrality for its operational life. This means that all process derived greenhouse gas (GHG) emissions from the combustion of the fossil-fuel derived component of the residual waste RDF would be off-set by other measures and activities avoiding the emission of or removing an equivalent amount of GHG from the atmosphere."

5.26 The Planning Supporting Statement (paragraphs S11 and S12) summarises the approach:

"*The ERF will be capable of achieving more sustainable treatment of Dorset's residual waste and delivering local benefits through the supply of low carbon energy and reducing carbon. The ERF is predicted to lead to a net reduction in greenhouse gas emissions of approximately 30,000 tonnes of CO_2-equivalent (CO_2e) per annum when exporting heat to a district heating scheme and power to ships moored in the Port, against the current baseline. In future years the net reduction will likely be less on an annual basis, given changes in the wider regulatory context and possible societal behaviour shifts towards greater circularity, but over the full lifetime, the expectation is that the ERF will still be net positive. In periods where the plant is net negative in operations it will offset the net emissions as described below as part of its net zero carbon pledge."*

and

"In order to create certainty on the long term net carbon position, the applicant commits that the Portland ERF will operate as a net-zero carbon infrastructure asset for its operational life. It is believed that this would be the first such facility in the UK to commit to achieving net-zero carbon This means that all process derived greenhouse gas (GHG) emissions from the combustion of the fossil-fuel derived component of the residual waste RDF, in excess of emissions from the counterfactual baseline, would be off-set by other measures and activities avoiding the emission of or removing an equivalent amount of GHG from the atmosphere. The applicant is committed to funding additional carbon off-setting measures in each year that the ERF reduces GHG emissions (compared to baseline), and in each year that the ERF increases GHG emissions (compared to the baseline) will compensate for this by purchasing carbon offsets. This means the ERF will reduce GHG emissions over its lifetime and will achieve carbon neutrality, or better in every operating year. A minimum financial contribution of £100,000 per annum will be available for offsetting activity, aggregating to £2.5m over the expected operational life."

Emission reduction route map

5.27 To demonstrate how the Portland ERF can meet more stringent emission standards the applicant has set out below a route-map to support its transition to the Government's

2050 Net Zero target and show how the facility would contribute to a reduction in carbon emissions associated with waste management on its day of opening and progressively reduce these emissions up to 2050. It identifies a mix of the technologies that the applicant is exploring with full decarbonisation of the Portland ERF likely to be achieved using one of, or a combination of, these longer term measures.

Day 1 of Operations (assumed 2025)

- The Portland ERF will operate with R1 compliance, reducing greenhouse gas emissions by diverting waste from landfill and export abroad or out of county;
- The Portland ERF will generate low carbon electricity for the Port (shore power) and for export to the grid.
- The Portland ERF is designed to be 'CHP ready' for connection to a district heating scheme, initially to the adjoining prison and young offenders centre, to use lower carbon energy and heat generated by the facility.
- The Portland ERF will be designed to allow fuel flexibility should the nature of the incoming waste change over time and recycling levels increase.

Short Term (assumed 2025–2035)

- The extension of the district heating network to other potential local end users already identified, to use lower carbon energy and heat generated by the facility.
- The Portland ERF can accommodate changes to the composition of the fuel mix to reduce the non-biogenic carbon contained in the incoming waste stream driven by Government policy on recycling; and
- The Portland ERF can promote the potential co-location of a facility (facilities) within the Port to recycle/reuse products extracted from the incoming waste stream (circular economy) reducing the non-biogenic content of the fuel mix and displacing CO_2 emissions associated with the production of products or feedstocks which the extracted products replace.

Longer Term (assumed 2030–2050)

- The Portland ERF could accommodate Carbon Capture Storage and Use either within the Port or for export by sea. CCS may become technically and commercially viable earlier should appropriate support regimes become available along with new necessary legal and policy changes.

5.28 Consistent with the net zero commitment described in paragraph 5.25, the active emission reduction steps outlined above would reduce net emissions and therefore reduce off-setting requirement. This is consistent with good practice to reduce emissions before off-setting.

Carbon capture and storage

5.29 The CCS Pre-feasibility Assessment, states that the Portland site is ideally located to accommodate CCS, by means of its location within a commercial port and ability to utilise ship based carbon storage and transport. There are also large areas of vacant industrial land available within the port that could accommodate the land based elements of the system. The Portland Port has agreed to make the required land available. The Portland ERF can therefore be considered to be ‘CCS ready’.

5.30 It is recognised by both government and the waste industry that CCS is not currently commercially viable, without some form of financial support. The Department for Business, Energy, and Industrial Strategy (BEIS) is giving consideration to potential mechanisms for supporting the application of CCS in the waste sector in respect to new and existing ERF.

5.31 As set out in the CCS paper, the applicant is willing to commit in principle to installing CCS at Portland, given that the site has unique locational advantages in the Dorset context that would enable it to accommodate CCS, provided this is technically feasible and commercially viable.

5.32 The above route map can be encapsulated in the legal agreement, ensuring that the ERF becomes zero carbon during its lifetime, alongside the net-zero commitment.

Shore power

5.33 As set out in the Planning Supporting Statement (chapter 8), the applicant and Portland Port have reached an agreement that the proposed ERF, if consented, would provide power to this facility. As such, the applicant and Portland Port are willing to enter into an obligation that would encourage visiting shipping to make use of the shore power facility, if they are equipped to do so. It is envisaged that this will predominantly be used by visiting cruise liners and the resident RFA fleet but would also be available to other shipping as appropriate.

5.34 The applicant and the port believe that the price at which shore power could be provided will create a great incentive to encourage its use i.e. there will be a material cost reduction in meeting their customer’s power needs.

5.35 The applicant reaffirms this commitment and the details of such an obligation can be discussed further with Dorset Council officers.

Off-site ecology

5.36 As discussed in chapter 3 of this statement, a Biodiversity Plan has been agreed with the Dorset Natural Environment Team (DNET), to mitigate for the loss of on-site habitat. This will comprise the re-provision of some compensatory habitat on the ERF site, but the majority of this will be achieved off-site. The Biodiversity Plan uses a standardised methodology that calculates the required off-site biodiversity compensation cost. The Biodiversity Plan also sets out the measures that would be implemented to achieve a biodiversity net gain.

5.37 The approved Biodiversity Plan includes an agreed biodiversity payment of £82,231.28. This is expected to be used by DNET to secure the restoration of associated habitats. Whilst the allocation of funding to projects will ultimately be determined by DNET, the applicant is supportive of this being applied to projects in the Portland area, which may include measures to improve habitats within the port estate at East Weare below the prisons.

5.38 The applicant expects the agreed Biodiversity Plan to be reflected within the legal agreement to address habitat compensation and biodiversity need gain requirements arising from the development.

Access path

5.39 The applicant has provided a framework heritage mitigation strategy, which is expected to be secured by means of a heritage planning condition (see paragraph 5.3). The provision of a new permissive access path, linking existing footpath routes together across currently inaccessible private land, is driven by and forms part of the proposed framework heritage mitigation strategy.

5.40 The purpose of the access path, as set out in the access path strategy paper, is to primarily provide heritage benefit by enabling the public to appreciate and interpret (including education) the various heritage assets located within the East Weare area. However, the access path will also facilitate secondary ecological and leisure and recreation benefits associated with removal of invasive scrub and linking up existing public footpaths, to fill in the 'missing link' enabling a round island route to be achieved.

5.41 The applicant and Portland Port (as land owner) are together willing to enter into a planning obligation to enable the access path to be delivered, and the details of such an obligation can be discussed further with Dorset Council officers.

Other obligations

5.42 Please refer to Planning Supporting Statement (chapter 8), for information relating to other proposed obligations, which are still applicable.

6. Conclusions and the planning balance

Introduction

6.1 In September 2020, Powerfuel Portland Ltd submitted a full planning application to Dorset Council for the construction of an energy recovery facility (ERF) on land at Portland Port, Portland.

6.2 Having assessed the application Dorset Council has formally requested that additional information and clarification be provided, some of which is deemed to be ‘further environmental information’ in accordance with Regulation 25 of the EIA Regulations and Section 62(3) of the Town and Country Planning Act 1990.

6.3 Dorset Council has provided 35 points, covering various topics, where further information and clarification is requested. The applicant has responded to this request through the following documents:

- An ES Addendum, with associated appendices (dealing with matters specifically deemed to be covered under Regulation 25 of the EIA Regulations)

- A Consultation Response Summary Document (CRSD) and this Supplemental Planning Supporting Statement (SPSS), which refer to the original planning submission, the ES Addendum and technical appendices, and stand-alone supporting documents (dealing with aspects not deemed to be covered under Regulation 25 of the EIA Regulations).

The summary case for the development

6.4 The case for the development is multi-faceted but in summary the ERF will:

- Represent a sustainable form of waste management, reducing landfill and managing waste further up the waste hierarchy

- Enable Dorset to manage more of its residual waste in the county reducing the existing reliance upon the export of waste to other facilities in neighbouring waste authority areas, or outside of the UK, and in doing so Dorset’s residual waste management system will become better aligned with the self-sufficiency and proximity principles

- Deliver sufficient residual waste management capacity in Dorset to meet the existing and future shortfall

- Accord with the DWP’s spatial strategy and policy approach, which provides flexibility for unallocated sites to come forward where sites deliver advantages over allocated sites. Advantages include its large scale, its ability to provide shore power to the port and district heating the two local prisons. Furthermore, its location enables materials to be imported and exported by ship and provides future potential for the implementation of a carbon capture and storage (CCS) scheme.

- Be located on brownfield previously developed land safeguarded for industrial use, located within an operational port, and upon which an extant planning consent exists permitting the development of an energy plant, fuelled in part by waste materials (waste oils and tyres)

- Facilitate the delivery of low carbon shore power to Portland Port and supply heat to a viable and deliverable district heating network, capable of serving the existing prison and young offenders institute, with future expansion to other local heat customers

- Meet the requirements of all relevant policies in the Dorset Waste Plan, West Dorset, Weymouth & Portland Local Plan, Dorset Minerals Strategy, and the Portland Neighbourhood Plan

6.5 Furthermore, it has been demonstrated that all of the RDF produced at Canford in Dorset (around 82,000 tonnes per annum) would be made available to the Portland ERF. A planned increased in RDF capacity at Canford to around 200,000 tonnes processing capacity per annum would supply over 80% of Portland's RDF requirements from Dorset waste. It was made public on 6 August 2021 that Beauparc has been awarded the 3-6 year contract by BCP Council to process household, commercial and litter bin waste. This will be processed at the Canford Magna facility and the residue will be used to produce RDF which will be suitable for treatment at the ERF[6]. This would be the most rational and efficient solution for Dorset, and more sustainable than exporting this material around 120 km to the Bridgwater ERF in Somerset, or further afield to other ERFs (including potentially Europe).

6.6 There is insufficient capacity to treat all of Dorset's residual waste at existing ERFs within the defined catchment area and, even accounting for planned capacity, there is still a capacity gap greater than the proposed capacity of the ERF. The ERF would not prejudice other waste management facilities from coming forward in Dorset, including the much smaller scale Eco-Sustainable Solution ERF, Parley, if consented and built.

6.7 The ERF would have little impact on the European RDF market. European ERFs will instead focus their capacity on the large volumes of European waste still sent to landfill. The ERF, by means of its CHP capability, will be of equal standing to European ERFs in terms of its efficiency.

6.8 The scheme will deliver renewable/low carbon energy responding to local and national climate emergency declarations, contributing towards various targets for carbon reduction, and increasing energy security.

6.9 The ERF will deliver shore power to Portland Port to meet its existing demands, and nationally also help the UK shipping industry meet national targets to reduce carbon emissions and other air pollutants.

6.10 The Portland ERF will deliver a better carbon outcome against all of the alternative scenarios assessed. It performs better than current waste management practice in and future waste management practice in Dorset (relating to the transfer of some waste to the Bridgwater ERF in Somerset).

[6] Please note due to the timing of this announcement it has not been possible to include this in particular in the Waste Need Paper, as part of the wider response to Dorset Council's request letter

6.11 The applicant has committed to meeting net-zero carbon during the ERF's lifetime and will look to implement CCS technology, as and when this becomes technically commercially viable (enabled by its port location).

6.12 The ERF has significant advantages in respect to its ability to deliver both shore power and district heating. In carbon terms this outperforms other allocated Dorset waste sites, where such potential is more limited. The strategic and carbon advantages of providing shore power and district heating must be considered to be a specific site advantage.

6.13 There is a need for new economic investment at Portland to help address existing socio-economic concerns and generate sustainable regeneration by taking advantage of Portland's assets, opportunities, and excellent growth potential. The ERF will provide new jobs and provide opportunities for training and education to increase skills, and knowledge for local people, and help to address existing pockets of social deprivation at Portland.

6.14 The ERF will help achieve transformational change to unlock key employment sites, such as within Portland Port, to exploit the area's strengths and potential opportunities in respect to the development of renewable energy and low carbon technologies and support tourism related activities.

6.15 An assessment of potential plume visibility has been undertaken and this has concluded that the plume would only be visible for short periods of time and at limited times of the year, all of which are outside the main tourist season. This has not changed the original conclusions of the landscape, seascape and visual impact assessment and the ES, that whilst the development would result in some impact, overall, this is deemed to be acceptable.

6.16 Information has been provided that demonstrates the proposed PVC cladding is robust and fully capable, through the use of tonal variations (such as camouflage), of achieving its objective of ensuring that the main building is recessive against its context when viewed from key locations.

6.17 Revised air quality modelling has been undertaken to take account of the net change in emissions of NO_x, NO_2, PM_{10}, $PM_{2.5}$ and SO_2 due to the use of shore power provided by the ERF to ships berthed at the port. Its findings were used to update the original HHRA and HIA, which did not identify any significant health effects. The proposed development will not lead to any significant effects on air quality and in fact should lead to an improvement across a number of emissions relative to the existing position. As such the ES conclusions remain valid.

6.18 A framework heritage mitigation strategy has been devised that will result in works to the E Battery East Weare scheduled monument, to enable its removal from the Historic England Heritage at Risk Register. Other benefits include enhanced public access through the extension of the footpath at East Weare and enhanced opportunities for public appreciation through the provision of interpretation for the group of related heritage assets at East Weare. These significant public heritage benefits more than outweigh any harm caused to the setting of local heritage assets arising from the ERF development.

6.19 The heritage benefits will result in other secondary benefits including the removal of scrub allowing former habitats, such as lowland calcareous grassland, to re-establish once the scrub is removed, contributing towards the objective to return the Isle of Portland SSSI to a favourable condition. Some tourism benefit is achieved by allowing an "around the island" circuit of the coastal path by creating a new section of permissive footpath through currently inaccessible parts of the secure port estate to connect to the existing public accessible land/rights of way.

6.20 The original shadow Appropriate Assessment conclusion, that the process emissions arising from the ERF, and its associated transport movements, would not result in an adverse impact on the integrity of any designated NSN site, remains unchanged. There would be no significant effects on the nationally designated SSSI or other local designated areas.

6.21 There would be no significant effects associated with the proposed ERF in respect to the marine environment, and protected species and habitats. The ABPmer report also concludes that there should be no adverse impact on the local shellfish industry and other water based activities.

6.22 The proposed Portland ERF is fully compliant with DWP Policy 4 criterion a, in that the proposed Portland ERF site has demonstrated many advantages over the DWP allocated sites.

6.23 The analysis of the waste capacity gap in the ERF's catchment area (notwithstanding the potential availability of waste being exported to Europe and passing the site by sea), demonstrates that the objectors' concerns that there is insufficient waste available for the facility, and that Portland ERF would prejudice the delivery of DWP allocated sites are unfounded, and that the proposed ERF fully accords with Policy 4 criterion b.

6.24 The Portland ERF accords with the DWP vision and its spatial strategy to manage Dorset's waste in Dorset, in line with the self-sufficiency and proximity principles and fully accords with Policy 4 criterion c.

6.25 The Portland proposal complies with the requirements of Policy 6 in respect to its contribution to meeting the DWP identified waste treatment need, its spatial strategy, the provision of CHP (through both shore power and district heating), the safeguarding of protected NSN ecological sites and the transport of residual materials by sea.

6.26 The additional clarification submitted in response to the council's letter confirms the original conclusion that the Portland ERF is compliant with other relevant DWP policies in respect to amenity, quality of life and health, heritage, landscape, flood risk and natural heritage.

Conclusion

6.27 The original planning application robustly demonstrated that there is a compelling planning case for the proposed ERF. In considering the original planning application material, together with new information provided under the Regulation 25 request and further supporting clarifications, it is clear that this compelling case still remains and indeed has become even stronger given the urgent need to take action to deliver the above benefits.

The planning balance

6.28 The Portland ERF accords with the provisions of the development plan as a whole and is subject to many significant material considerations to which substantial weight should be afforded. It is considered that the benefits of the proposed development far outweigh the limited dis-benefits (all of which have been further reduced through appropriate mitigation) and that the planning balance must come down strongly in favour of the scheme. In light of the urgent need and clear benefits, planning permission should be granted without delay.

Appendix A: Portland Port Letter of Support November 2020

PORTLAND PORT LIMITED

PORT OFFICE, PORTLAND PORT
CASTLETOWN, PORTLAND, DORSET DT5 1PP.
TELEPHONE: +44(0)1305 824044.
E-mail info@portland-port.co.uk www.portland-port.co.uk

PORTLAND PORT
A PERFECT LOCATION
A UNIQUE OPPORTUNITY

Head of Planning
Planning and Community Services
Dorset Council
County Hall
Dorchester
Dorset
DT1 1XJ

23 November 2020

Dear Sir

Portland Energy Recovery Facility - WP/20/00692/DCC

Portland Port supports Powerfuel's request for planning permission to build a 15 MW power station on a brownfield site on port land that is recognised in the West Dorset Weymouth and Portland Local Plan area as a "Key Employment Site". This project is vital to the future development, growth and continued success of the port. The maritime services sector is important for the local area and includes the shipping, ports and maritime business services industry as well as supporting other industries in Dorset. Portland Port is the only deep water port in Dorset and is also of national and international importance. The land and water space combined is in excess of 2400 hectares. It is a vital part of the local economy and the south west region. The port has been very successful over the last 24 years in attracting and supporting a broad range of tenants and port users, including both large and small companies. The port attracts employment and investment to the area and is a major asset to the local community.

If we are to continue to grow, we will need more electrical power, whether that be for tenants or ships. The existing power supply to the island has a capacity of 18 MW. The current peak demand is 11 MW, and another 2 MW is reserved for projects in process, whilst a further 0.8 MW will be used by a project under construction when it comes online in 2021. That leaves only 4.2 MW spare capacity if the power station is not built. If you then take the potential power requirements of ships at berth, and focus solely on demand from cruise vessels, there is a clear shortage of capacity. Neither the port nor local government can afford the multi-million pound investment required to secure the additional supply across the causeway.

To illustrate the issue, a single small cruise ship requires more than the available spare capacity, needing around 6 MW. The largest cruise ships currently in operation require up to 12 MW at berth. Scale that up to multiple ships at berth and include non-cruise shipping and you have some idea of the Port's challenge, and why Powerfuel offers the first viable solution. Having worked on potential offshore wind, tidal and other energy projects for in excess of a decade we have experienced significant disappointment and therefore hope this project will be seen as an essential local solution. Clearly, without the power station the port will not be able to provide shore power to the cruise lines. From the discussions that we have had with our cruise line customers it is equally clear that in the next few years they will reach a point where they start to plan their itineraries around the ports which can provide shore power. Thus, the provision of this service at Portland Port is both an opportunity and a threat.

In considering the need for environmental compliance, ports are without question one of the most highly regulated industries in the world. We engage frequently with a number of regulatory bodies, including the Local Planning Authority, Environment Agency, Natural England, Maritime and Coastguard Agency, and Marine Management Organisation. We have a high degree of respect for these organisations and are confident that the project can be delivered such that it complies with all applicable regulations. We must stress the point that, having secured planning permission Powerfuel must also secure an environmental permit to operate the facility from the Environment Agency and is subject to ongoing scrutiny for the lifetime of the operation. This will require the operator to continuously monitor the emissions and report any breaches. Failure to meet the strict air quality conditions results in severe penalties, including the closure of the facility.

Regarding landscape considerations, we stress our earlier point that the port is a key employment site comprising an industrial operational business park. We have welcomed the engagement between the Powerfuel project team and the key decision-makers on this matter through the planning process, and can see the evidence of this in how the design of the facility has evolved taking account of its surroundings i.e. the industrial nature, the landscape, geology and heritage.

On the matter of transport, our sea and road links are fundamental to the operation of the port, and a reason why the port proactively engages with the local authority on an ongoing basis. It is an obvious location for the Powerfuel project, on a site with pre-existing consent for a power station and offering land and sea transport options. We hope that the key decision-makers won't be deterred by a marginal increase in traffic which, based on the worst-case scenarios, equates to only 0.4% of vehicle movements per day across the causeway. It is vital that we all continue the good work to improve access to Portland and Portland Port with the significant wider benefits that form part of the Western Growth Corridor.

This project is absolutely vital to the future of Portland Port and will provide essential electrical power headroom for the continued development of businesses on the island of Portland.

Yours faithfully

[redacted]

pp. **W T REEVES**
Chief Executive

Appendix B: Portland Port Letter of Support July 2021

PORTLAND PORT LIMITED

PORT OFFICE, PORTLAND PORT
CASTLETOWN, PORTLAND, DORSET DT5 1PP.
TELEPHONE: +44(0)1305 824044.
E-mail info@portland-port.co.uk www.portland-port.co.uk

PORTLAND PORT
A PERFECT LOCATION
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WTR/PPL 710/8

Adrian Lynham
Planning Officer
Dorset Council
Planning and Community Services
County Hall
Colliton Park
Dorchester
DT1 1XJ

30 July 2021

Dear Mr Lynham

The recent intensification of effort by governments globally in dramatically reducing their nations CO2 emissions that are associated with industry and bulk transportation of goods and passengers, allied with the general public's increased awareness of the issues, is now impacting upon commercial decisions being made by organisations as diverse as the Royal Fleet Auxiliary (RFA) and cruise line operators. These trends directly affect Portland Port's future operational needs in terms of infrastructure and the provision of shore power as an alternative to on-board diesel generation with its attendant airborne pollution and CO2 contribution.

The RFA's fleet is already capable of accepting shore power, and many of the cruise ships that are visiting Portland Port Limited (PPL) are, or will be shortly, shore power capable. In the case of the RFA, the driver is a governmental policy to reduce CO2 emissions from the HMG Estate and activities. In the case of cruise line operators, the decision is a commercial one with their cruising clientele demanding a "greener" experience, which is underscored by rapidly changing legislation on fuels and emissions.

Portland Port is aware that some objectors to the application to build a power station have suggested that our cruise business is gone for good as a result of the pandemic. Nothing could be further from the truth. The cruise industry has seen a surge in bookings and the port is hosting 54 cruise passenger visits in 2021, all of which are cruises around the UK. We already have bookings for a further 66 day visits for 2022 and we are taking bookings for 2023. These numbers are in excess of those that were used in the shore power and socio-economic modelling that forms part of the planning application.

I also take this opportunity to confirm the RFA numbers. There are commercial, client confidentiality and national security issues relating to our arrangements with the MOD. However, the model used in shore power air quality analysis includes for 260 berth days per annum and I can confirm that this is significantly below the actual days that the RFA ships berth with us. In the last few years, the number of berth days would normally be in the range 20-30% more (depending on the year). The MOD is interested in using future shore power sources at the port and the pricing of the shore power provision of electricity will be set at a level that will be significantly incentivising to potential users.

In order to maintain both customer bases, Portland Port must move with the times and provide a low carbon source of electricity at the port. Work has been carried out to establish the cost of augmenting the limited power supply to the Island of Portland, and the cost of a new dedicated electricity supply is measured in the tens of millions of pounds, rendering an off-island solution commercially unviable.

Portland Port currently has planning consent for the development of a power station, and a plant generating electricity and heat could already have been built on site, but we believe that a Refuse Derived Fuel (RDF) fuelled power station that could help Dorset, our host county, out of its ongoing waste disposal crisis is a far better option than importing Tyre Crumb and Palm Oil to be burnt for energy production.

I can confirm that PPL fully supports the efforts being made in the provision of a "round island" walkway, to be enjoyed by visitors and give a boost to the local economy. Where the path traverses the Port's land a Permissive Path will be created, subject to contract and to that path not adversely affecting the Port's commercial operations, or precluding Port expansion/development, and also meeting stringent security standards for the protection of the Port and its lawful users. PPL also supports the "path" initiative as part of multi-agency efforts to create safe working environments for activities that include ecology works and works associated with heritage assets that are otherwise inaccessible.

Furthermore, I understand that Powerfuel intend to monitor the fast-evolving status of carbon capture and storage technology that could potentially be fitted to capture carbon emissions directly and that such technology may require additional land of up to 4,000m^2 for the related infrastructure. We have land available within the port close to the power station site and will, subject to contract, make that available to Powerfuel.

Yours sincerely

[redacted]

W T REEVES
Chief Executive

Portland energy recovery facility

Environmental statement
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August 2021

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Introduction

NTS.1 In September 2020, Powerfuel Portland Limited submitted a full planning application to Dorset Council for the construction of an energy recovery facility (ERF) with ancillary buildings and works including administrative facilities, gatehouse and weighbridge, parking and circulation areas, cable routes to ship berths and existing off-site electrical substation, with site access through Portland Port from Castletown (application reference: WP/20/00692/DCC) on land within Portland Port.

NTS.2 The application was accompanied by an environmental statement (ES) prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended; hereafter the EIA Regulations), which provides an assessment of the likely significant effects associated with its construction and operation.

NTS.3 Dorset Council has consulted on the application and also appointed Tetra Tech to undertake a review of the ES, which ensured that the council had access to sufficient expertise to examine the ES. Representations have been submitted to Dorset Council by consultees, members of the public and other interested parties in response to the consultation on the planning application. Dorset Council has taken these representations into account in its consideration of the application.

NTS.4 Following the consultation, the council formally requested additional information and clarification in a letter dated 30 April 2021. The council confirmed that it considers that some of the information requested constitutes ‘further environmental information’, and where this is the case it is requested in accordance with Regulation 25 of the EIA Regulations and Section 62(3) of the Town and Country Planning Act 1990.

NTS.5 This report has been prepared to review the council’s letter and provide the information that is considered to be ‘further environmental information’ under Regulation 25 of the EIA Regulations. It forms an addendum to the ES and is summarised in this non-technical summary.

NTS.6 The review of the council’s letter also identified where matters raised are considered to be clarifications, which are not formally requested under Regulation 25 and do not form ‘further environmental information’. Responses to these points, and other issues raised during the consultation, are provided in stand alone documents within the submission, including the consultation response summary document (CRSD).

Further environmental information

NTS.7 This section presents a summary of the further environmental information provided in the ES addendum and follows the structure of the main report.

District heating, electricity generation and shore power

NTS.8 Dorset Council's letter requested further detail on the provision of district heating, including the necessary infrastructure and potential effects. This information is provided in the ES addendum, with the potential effects examined under each environmental topic heading. Further details were requested on the proposed electricity cabling, the connection to the grid and the provision of shore power. This information is also provided in the ES addendum.

NTS.9 The letter also requested responses to the various issues relating to district heating, electricity generation and shore-based power provision raised by representations to the consultation, which are provided in the separate CRSD.

NTS.10 Work is ongoing to identify potential heat customers and Powerfuel Portland Limited is in discussions with the Ministry of Justice to provide heating to HMP The Verne and HMP / Young Offender Institution Portland. The final route for the district heating network pipes has not yet been confirmed, but they will run within the local road network. For the purposes of the assessment, a feasible potential route has been identified where district heating network pipes could be installed to connect the prison and the young offender institution to the proposed ERF. This runs within Incline Road, Grove Road, Easton Lane, Yeates Road, New Ground and Glacis. In addition, a second potential route has been identified that runs within Main Road to the port boundary and then within Castletown. It would be open to other potential users to request a connection to the ERF using this route in the future.

NTS.11 The installation of district heating networks within roads is very common and is governed by relevant British Standards. Two pre-insulated pipes will be installed beneath the road network: one carrying the heated water from the ERF to the heat users and one bringing the water back to the ERF to be re-heated and re-circulated. Full details will be confirmed at the detailed design and planning stage, but it is likely that the pipes will be buried around 500 mm below the ground surface in a trench around 1,500 mm wide at the top, reducing to around 1,000 mm wide at the bottom. The trench will be excavated in lengths of around 50 m to 60 m at a time to allow the pipes to be installed. It is likely that the heat exchangers will be within the existing boiler houses, so no new buildings will be needed.

NTS.12 A new 1.75 km long cable will be installed connecting the Portland ERF substation to the Scottish and Southern Energy (SSE) supply point (the Victoria Square substation) near Lerret Road. This new cable will be buried beneath the road network in a trench around 550 mm wide and 900 mm deep. It will follow the route of Incline Road onto Main Road to the main port gate. From there, it will follow Castletown, Castle Road and Lerret Road to the substation. Subject to the grant of planning permission, SSE has been commissioned to carry out these works, including installing the cable.

NTS.13 A new series of switchgear, converters and transformers, together with a substation, will be installed next to the existing SSE substation on the northern side of Canteen Road to provide shore power from the Portland ERF substation directly to ships berthed at the port. This new installation will be shore power substation 1 and will be connected to the Portland ERF substation by a new 40 m long buried cable underneath Canteen Road.

NTS.14 The converters and transformers will be connected to shore power substation 2 on the Coaling Pier and shore power substation 3 on Queens Pier by buried cables running along Main Road and Dock Road, with a total combined length of around 2.2 km.

Air quality

NTS.15 The council's letter requested further information and modelling in respect of the impacts on air quality associated with the provision of shore-based power to Royal Fleet Auxiliary and cruise ships, traffic emissions on roads in Castletown leading to the site and the use of the diesel back-up generators. Further modelling was also undertaken of the cumulative impact of road and process emissions associated with the proposed development and other consented projects on designated nature conservation sites. This information is provided in the ES addendum. Additional information on the modelling of impacts at specific human health receptors, which was requested by the Environment Agency as part of the environmental permitting process, is also provided.

NTS.16 The letter also requested responses to the various air quality-related issues raised by representations to the consultation. Further information is provided in the ES addendum in relation to the baseline data used in the assessment, modelling methodologies, effects on air quality in the Boot Hill area, effects on existing air quality management areas and effects at Ocean View. The responses to the other points raised during the consultation are considered to be clarifications, so they are set out in the CRSD.

NTS.17 The additional information provided in the ES addendum on the baseline data and modelling methodologies confirmed that updating the baseline data would not change the findings of the assessment and that appropriate modelling methods were used. The additional analysis showed that there will be no significant effects on designated nature conservation sites or residential receptors as a result of the proposed development, including at HMP The Verne, Castletown, Boot Hill, existing air quality management areas and Ocean View. Similarly, there will be no significant air quality effects as a result of the provision of shore power or the use of the diesel back-up generators.

NTS.18 The installation of the district heating pipes will be carried out in accordance with standard working practices and appropriate mitigation will be put in place through a construction environmental management plan (CEMP) to minimise dust generation, as will be the case for the proposed ERF as a whole. As a result, there is no potential for significant cumulative effects on air quality.

NTS.19 The conclusions of the original ES that the proposed development will not lead to any significant residual air quality effects therefore remain valid and are unchanged by the submitted further information.

Carbon balance and greenhouse gas emissions

NTS.20 In relation to carbon balance and greenhouse gas emissions, the council's letter requested additional information on the various baseline scenarios used in the ES. This information is provided in the ES addendum. Clarification was requested on the potential ways in which carbon capture could be installed and operated at the proposed ERF in future, which is provided in a stand alone technical note. The letter also requested a response to points raised by UKWIN in its consultation response, which is provided in the separate CRSD.

NTS.21 The updated assessment first compared the carbon emissions from the proposed ERF with three alternatives:

- Sending the refuse-derived fuel (RDF) to other ERFs in the UK
- Sending the RDF to other ERFs overseas
- Sending the RDF to an ERF constructed at one of the four alternative sites allocated in the adopted Bournemouth, Christchurch, Poole and Dorset Waste Plan (2019)

NTS.22 The updated assessment found that there is relatively little difference between the proposed ERF and other ERFs in the UK or the four allocated sites. While the Portland ERF would have higher carbon emissions from transport than a plant on the allocated sites, this difference would be outweighed by the potential benefits of providing shore power. The additional transport emissions created by shipping waste to Europe are outweighed by the benefits of the more efficient district heating available at European plants. However, when both the provision of shore power and district heating are taken into account, the proposed Portland ERF would have the lowest carbon emissions of all the other existing and potential ERFs examined.

NTS.23 The carbon emissions from the proposed ERF were then compared with continuing to manage the waste under Dorset Council's existing arrangements. These were assumed to include a combination of sending waste to other ERFs in the UK, ERFs in Europe, and landfill. The benefit of the proposed Portland ERF over the current arrangements for residual waste management in Dorset was estimated to be at least 7,200 tonnes of carbon dioxide equivalent a year, even without taking account of the potential benefits that would be provided by shore power and district heating. The original ES conclusion that the proposed development will have a significant beneficial effect as a result of reduced carbon emissions compared to the baseline therefore still applies.

NTS.24 The carbon benefits associated with the provision of district heating were taken into account in both the original and updated carbon assessments, as set out above, so no further consideration is needed. The conclusions of the original assessment that the proposed development will have a significant beneficial effect through reduced carbon emissions compared to the baseline remain valid and unchanged as a result of the additional information provided in the ES addendum.

Community, health and economic effects

NTS.25 The council's letter requested additional detail relating to potential benefits or impacts on public health as a result of changes in air quality, as well as coverage of issues raised by Public Health Dorset. This information is provided in the ES addendum. The letter also requested responses to the various health-related issues raised by representations to the consultation, which are provided in the separate CRSD.

NTS.26 In relation to economic effects, the council's letter requested additional detail to support the assumptions that lie behind the number of additional jobs to be created. Responses to queries on the basis behind these assumptions are provided in the separate CRSD. No additional information or clarifications were requested in relation to community effects.

NTS.27 The detailed human health risk assessment was updated to take account of the change in emissions of nitrogen dioxide, sulphur dioxide and particulate matter due to the use of shore power provided by the ERF to ships berthed at the port. The emissions of metals and dioxins will not be affected by the provision of shore power, so this part of the assessment remains unchanged.

NTS.28 The modelling found that the offsetting of shipping emissions of particulate matter and nitrogen dioxide will lead to a negligible beneficial effect on health. For sulphur dioxide, the shipping emissions offset will be smaller and there will be a negligible adverse effect on health. The proposed development will still not lead to a single additional case of any of the relevant health conditions examined, including heart disease, heart failure and stroke. The conclusion of the original assessment that there will be no significant adverse health effects at sensitive receptors as a result of the proposed development remains valid and unchanged.

NTS.29 The health impact assessment was updated to examine the potential for impacts on the mental health and wellbeing of the local population, the potential for impacts as a result of existing health inequalities, and the potential for impacts on inmates at HMP The Verne. The study identified several existing health inequalities in the Weymouth and Portland area that could mean people are at greater risk of health impacts, including a higher proportion of older residents, high levels of deprivation and unemployment in some areas, relatively high levels of some health conditions, and the presence of vulnerable groups such as homeless people and prison inmates.

NTS.30 The updated assessment identified several measures to mitigate potential increases in anxiety arising from project-related activities, including ongoing engagement with local communities and wider stakeholders, periodic publication of environmental monitoring information, publishing the CEMP, providing contact points during construction, advance notification of proposed works, and specific engagement with HMP The Verne before construction. With those measures in place, the updated health impact assessment concluded that there will be no significant adverse effects on mental health and wellbeing, on existing health inequalities, or on the inmates of HMP The Verne. Health benefits will be experienced as a result of the employment created by the proposed development, both during and after construction. This could contribute to reducing some of the current health inequalities present in the area.

NTS.31 Any construction impacts associated with the installation of the district heating works will be temporary and short term and are therefore unlikely to lead to significant effects on the health and wellbeing of local residents and inmates at HMP The Verne. Temporary works within the local road network, similar to those undertaken during other utility works, are also not considered likely to affect local property prices. No significant cumulative community and health effects are therefore predicted. The provision of district heating was taken into account in the original economic assessment, so no further consideration is needed.

NTS.32 The conclusions of the original ES that the proposed development will not lead to any significant adverse community and health effects therefore remain valid and unchanged. The findings of the economic assessment also remain the same.

Cultural heritage

NTS.33 Dorset Council's letter requested further information on specific measures proposed to mitigate potential harm to the historic environment as a result of the proposed development, as well as assessment of the potential for effects on footpath S3/72 where it runs past the Royal Naval Cemetery. This information is provided in the ES addendum. The letter also requested responses to the various other historic environment issues raised by representations to the consultation, which are provided in the separate CRSD.

NTS.34 A framework structure and broad principles have been developed for a heritage mitigation strategy to mitigate effects on the setting of the East Weare batteries, which will be secured through a planning condition. The works proposed include scrub clearance and agreed repairs to enable E Battery East Weare (a scheduled monument and grade II listed structure) to be removed from the Historic England Heritage at Risk Register.

NTS.35 The strategy also proposes a footpath extension to allow an 'around the island' circuit of the coastal path. A new section of permissive footpath will be created through currently inaccessible parts of the secure port estate to connect to existing publicly accessible land and rights of way. Interpretation will be provided for the group of related heritage assets at East Weare (A-E batteries, the former detention camp and the undesignated World War II features). Information boards will be provided at specific viewing areas. The additional access path can be secured by planning obligation.

NTS.36 The strategy sets out five proposed stages of work for E Battery, including preliminary ecological surveys, enabling works and a condition survey, development and agreement of the proposed works and obtaining the necessary consents and licences, carrying out the main works, and maintenance and inspections. Three proposed stages of work are identified for the new permissive footpath: planning (including surveys and obtaining the necessary consents and licences), carrying out the work (including vegetation clearance, installation and repair of fences and gates, laying the path and security), and monitoring, inspection and future maintenance.

NTS.37 The removal of E battery from the Heritage at Risk Register and the provision of interpretation to allow improved public understanding of the battery will fully mitigate the slight to moderate, significant adverse effect originally predicted as a result of the proposed development. This effect will therefore be removed.

The new footpath link and associated interpretation will provide opportunities for appreciation and understanding of the group of heritage assets at East Weare, which will be a moderate, significant beneficial effect.

NTS.38 The assessment of the potential effects on footpath S3/72 considered the quality of the experience and the value of the footpath in enabling views that allow appreciation and understanding of the cemetery and the assets relating to the military use of north east Portland. The change to the quality of the experience of the historic environment from the footpath due to changes to the view as a result of the proposed ERF will be a negligible to slight adverse effect that will not be significant. The extension of the footpath around East Weare and the repair of the battery will increase the value of the footpath as a focus for public appreciation of the wider group of heritage assets within the secure port estate. This will be a slight to moderate, significant beneficial effect.

NTS.39 As the district heating pipes will run within the local road network, no significant effects are predicted on archaeology or built heritage as a result of their installation. It is intended that the pipes will be routed into the prisons using the existing utility ducts so the only works envisaged to the citadel scheduled monument at HMP The Verne relate to the installation of the pipes within the highway along the Glacis where it passes within the designation. Once the final routeing of the pipes is confirmed, the necessary consents for any works required would be part of the future planning submissions.

NTS.40 The measures set out in the framework heritage mitigation strategy will remove the slight to moderate, significant residual effect on the East Weare batteries scheduled monument and listed structure. A moderate, significant beneficial effect is predicted as a result of the other elements of the strategy. The assessment of the potential for effects on footpath S3/72 in relation to the historic environment concluded that the change to views as a result of the ERF will be a negligible to slight adverse effect that will not be significant. The change to the experience of the historic environment because of the extension of the footpath will be a slight to moderate, significant beneficial effect. All the other residual cultural heritage effects remain as assessed in the original ES and no significant cumulative effects are predicted as a result of the provision of district heating.

Ground conditions and water quality

NTS.41 In relation to ground conditions, the council's letter requested additional information on the suitability of the site for the proposed development in respect of historic contamination, geology and ground stability. Information on geology and ground stability is provided in the ES addendum. Responses to the historic contamination issues raised during the consultation, which confirm that sufficient information was provided in the original ES, are set out in the CRSD. No additional information was requested in relation to effects on water quality.

NTS.42 In addition, the council's letter requested further detail on the proposed use of existing outfalls to discharge surface water to the sea. As the flood risk assessment (FRA) and surface water drainage strategy report did not form part of the original ES, this information has been provided in a stand alone addendum to the FRA. Its key elements are summarised in the ES addendum.

The letter also requested responses to the various surface water management issues raised by representations to the consultation, which are provided in the separate CRSD.

NTS.43 Surveys of the existing drainage outfalls and modelling found that the two eastern drainage outfalls into Balaclava Bay have enough capacity to drain the clean roof runoff from the proposed development. The northern outfall into Portland Harbour does not have enough capacity to drain the treated runoff from the roads, parking areas and service yard during more severe storms. The surface water drainage strategy was therefore revised to include a water storage tank beneath the proposed car park in the north east of the site. This means that there will be no significant increase in flood risk as a result of the proposed development and the ERF will not be at risk from flooding.

NTS.44 A desk-based review was undertaken of available ground conditions information on slope stability at the site and within the wider Isle of Portland area to assess the potential risk to the proposed ERF. Portland has a history of landslips along the coastline and the coastal slopes to the south of the site, next to the Upper Osprey site, are the most active landslip area on Portland.

NTS.45 However, recent landslips in that area are mainly considered to have been caused by poorly executed earthworks and failure to control water flows properly, rather than natural instability. The records of historical slope movements along the north east coast of Portland indicate a low rate of movement on the slopes above the site and suggest they are in a different setting from the areas to the south where the main landslides have occurred.

NTS.46 Ground modelling was carried out to assess the likelihood of slope instability at the site. This found that the site in its current condition is very unlikely to be affected by deep-seated instability in the slope above. There is the potential for shallow slope movements that could block the highway at the base of the cliff, although the port does not have any records of such slips occurring in the past.

NTS.47 Embedded retaining walls will be used in the excavation of the RDF bunker, which will prevent shallower slips from occurring and the proposed development will not increase the risk of deep-seated slips. The modelling showed that the proposed development is not likely to have a significant effect on the stability of the hillside above. Further work, including ground investigations, will be undertaken to confirm the findings of the modelling. The proposed RDF bunker excavation and embedded retaining wall will be designed to mitigate stability risks and a long term monitoring strategy will be put in place to mitigate the risk of shallow slope instability. With these measures in place, no significant effects are predicted.

NTS.48 The district heating pipelines will be installed using shallow excavations within the existing road network. If made ground with the potential to be locally contaminated is encountered during this process, it will be managed in accordance with good practice for such utility excavations. The district heating network will be a closed loop system and will not lead to any additional outflows to the sea. The potential pipework routes will not cross any watercourses and the installation of the pipes will not increase the impermeable area of the road network. As a result, no significant cumulative ground conditions and water quality effects are predicted from the provision of district heating.

NTS.49 The FRA addendum concluded that the proposed development will not be at risk of flooding, or increase flood risk off-site. The preliminary slope risk assessment concluded that the proposed development is not likely to lead to any significant effects on the stability of the hillside above the site. Given this, and the fact that no significant cumulative effects are predicted on ground conditions and water quality as a result of the provision of district heating, the conclusions of the original ES chapter that there will be no significant ground conditions and water quality effects remain valid and unchanged.

Landscape, seascape and visual effects

NTS.50 In relation to landscape, seascape and visual effects, the council's letter requested additional detail on the vapour plume from the stack and its visibility. A note has been prepared setting out the results of the plume visibility modelling in more detail and photomontages of the plume have been prepared on the original viewpoint photographs in accordance with relevant Landscape Institute guidance. These are provided in the ES addendum. In addition, further illustrative photomontages showing the plume in a range of weather conditions are provide in the separate design and access statement addendum.

NTS.51 The council also requested responses to the various other landscape issues raised by representations to the consultation. Further information is provided in the ES addendum on potential night-time effects, the introduction of a connection between footpaths S3/72 and S3/81 and the zone of theoretical visibility mapping. The responses to the other points raised during the consultation are considered to be clarifications and are provided in the separate CRSD.

NTS.52 The letter also requested more detail on the proposed PVC mesh that will be used on the ERF building. This is provided in full in the design and access statement addendum and is summarised in the ES addendum. In addition, the council's letter requested further interpretive background material showing the scale of the proposed ERF in the context of the port. As this material is for illustrative purposes, it is provided in the design and access statement addendum and has not been used to inform the landscape, seascape and visual effects assessment.

NTS.53 The additional plume modelling confirmed the conclusions set out in the original landscape, seascape and visual impact assessment that the plume is likely to produce only a very minor alteration to the view for a very limited number of hours per year. As a result, the assessment of visual effects on all of the receptors remains unchanged. Similarly, the additional night-time visualisations produced of the proposed development confirmed the conclusions set out within the lighting report and the landscape, seascape and visual assessment that the night-time effects of the proposed development on views will be negligible and not significant.

NTS.54 Further discussions with consultees and Tetra Tech have resulted in a proposal to create a connection between footpaths S3/72 and S3/81, which currently end at a high security fence. The visual effects of the proposed ERF at construction and completion from this new footpath connection will be as assessed for the other rights of way: a moderate, significant adverse effect during the day-time and a negligible effect at night-time that will not be significant. Additional zone of theoretical visibility mapping is provided in the ES addendum, including public rights of way.

NTS.55 The building will be enclosed with dark green metal cladding, which will sit behind the proposed PVC mesh. The mesh will have a 10-year warranty and is designed to resist deformation, tearing, dirt and fading. To ensure the PVC mesh camouflage remains effective throughout the ERF's lifespan, Powerfuel Portland Limited is committed to reviewing its effectiveness and structural integrity at the end of the 10-year warranty period and each year afterwards, and to replacing the wrap after a maximum of 15 years for the life of the building.

NTS.56 The district heating network pipes will be installed below ground within the existing road network. The provision of district heating will therefore not lead to any significant cumulative landscape, seascape and visual effects beyond those already assessed in the original ES.

NTS.57 The additional landscape, seascape and visual information and assessment has not identified any new or additional significant effects on landscape and seascape character or sensitive views. Given this, and the fact that no additional cumulative effects are predicted as a result of the provision of district heating, the conclusions of the original ES chapter remain valid and unchanged.

Natural heritage

NTS.58 Dorset Council's letter requested additional information to be provided as required by ecological stakeholders, such as Natural England, in relation to effects on nationally and internationally designated nature conservation sites. It also requested information on the potential for management or improvement of habitat within the port below the prison. This is provided in the ES addendum. Additional assessment of the potential for marine impacts, including on designated sites, has also been carried out.

NTS.59 An updated version of the shadow appropriate assessment report has been prepared and submitted separately in response to the council's request, as this did not form part of the original ES. The letter also requested responses to the various other ecology-related issues raised by representations to the consultation, which are provided in the separate CRSD.

NTS.60 The findings of the additional air quality modelling were reviewed and the assessment concluded that there will be no significant effects on off-site designated nature conservation areas as a result of emissions from the proposed development and its associated traffic, either alone or combined with other developments in the area. The conclusions of the original ES therefore remain valid.

NTS.61 The heritage mitigation works discussed above will take place within the Isle of Portland to Studland Cliffs Special Area of Conservation (SAC) and Isle of

Portland Site of Special Scientific Interest (SSSI). The potential for effects on these designated sites was therefore also examined. The habitats in the work area consist almost entirely of scrub, with small areas of grassland and bare ground. The removal of scrub to allow inspection and repair of the scheduled monument and to create the permissive footpath will not have any significant adverse effects on the designated nature conservation sites. The small grassland areas will not be affected by the works.

NTS.62 No evidence of protected species was recorded in the works area, but the habitats present are suitable to support nesting birds and reptiles. An Ecological Clerk of Works will supervise all scrub clearance and, if a nest is found, all work will stop to establish a 5 m buffer zone around the nest. Works would only start again once birds had fledged from the nest. If removal of reptile habitat is needed, this would also be supervised by the Ecologist Clerk of Works and would use phased strimming of vegetation to move reptiles away from the areas being cleared. With these measures in place, no significant effects are predicted on protected species as a result of the heritage mitigation works.

NTS.63 A financial contribution will be made towards off-site works to mitigate the loss of on-site habitats and provide biodiversity net gain. Several potential projects have been identified in the local area for which these funds could be used, including the creation of scrapes and monitoring of the least owlet moth in the Hamm Beach area, regular cutting and management of grassland on Hamm Beach, contributions towards schemes to reintroduce grazing at sites on Portland, and contributions towards schemes for the control of scrub within the Isle of Portland SSSI.

NTS.64 In addition, the scrub clearance works associated with the heritage mitigation will help to improve the condition of the Isle of Portland SSSI. Stock-proof fencing will be installed along the new permissive footpath, which will allow for the development of a grazing unit within the SSSI to improve its condition further. The enhancement of the footpath route will also enable vehicle access associated with management activities such as stock movement, welfare checks and habitat management. Discussions are ongoing with Natural England and Dorset Council regarding a statement of common ground for the off-site ecological enhancement works.

NTS.65 The additional assessment of the marine environment considered the potential for effects as a result of emissions to air of several pollutants, including from ocean acidification, increased nutrient levels and deposition of mercury and dioxins. It also reviewed the potential for effects as a result of discharges to the marine environment. The assessment confirmed the original ES conclusion that the proposed ERF will not lead to any significant adverse effects on the marine environment, including designated nature conservation sites.

NTS.66 Short sections of the potential district heating pipework route to the prisons within the road network run through the Isle of Portland to Studland Cliffs SAC and Isle of Portland SSSI. The pipework will only be installed within the carriageway and a survey will be carried out along the road verges of the stretches running through and alongside the designated areas to ensure that any particularly sensitive areas are suitably protected. A range of mitigation measures will be put in place through the CEMP for the district heating application, including temporary fencing of the road edges, dust management and appropriate training and signage. With these measures in place, no significant cumulative natural heritage effects are predicted as a result of the provision of district heating.

NTS.67 The conclusions of the original ES that the proposed ERF will not lead to any significant residual natural heritage effects therefore remain valid and are unchanged by the submitted further information and assessment.

Traffic and transport

NTS.68 In relation to traffic and transport, Dorset Council's letter requested additional information regarding impacts on users of the England Coast Path needing to cross the road in Castletown on the route used by HGVs to access the proposed plant. It also requested further detail on opportunities to export incinerator bottom ash (IBA) by sea. This information is provided in the ES addendum. The letter also requested responses to the various other transport-related issues raised by representations to the consultation, which are provided in the separate CRSD.

NTS.69 If the IBA is exported by sea, it will be loaded into a sheeted trailer and transported to the quayside, where it will be loaded onto large dedicated vessels using a mechanical grab machine. A banksman on the quayside will assist the delivery trucks and ensure there is no conflict between the grab operations and the trucks. Once the ship has been loaded, bi-fold doors will close over the top for protection and to prevent any escape of material. Any spillage of the inert IBA would be dealt with promptly and appropriately. The process is highly regulated and all parties will need to ensure that compliance is achieved with existing legislation.

NTS.70 Powerfuel Portland Limited is in discussions with the Day Group, which operates several IBA processing plants in the UK and has extensive experience of IBA transport by sea. The Day Group has indicated that it would be willing to enter into a long term contract to enable IBA to be collected from the proposed ERF by vessel and transported to its facility at Greenwich.

NTS.71 While it is envisaged that the Day Group's Greenwich plant will be the chosen location for export of IBA by sea, there are other plants within the UK and northern Europe that are accessible by sea, including two in Avonmouth and one in Middlesbrough, one in Ireland, two in the Netherlands, two in Belgium and one in Germany.

NTS.72 The England Coast Path (a national trail) crosses the road at the Castletown / Castle Road roundabout. The crossing has dropped kerbs and an island to help people cross the road. The proposed development will lead to a maximum of 80 two-way HGV trips a day (40 in each direction). This equates to an average of one HGV every 15 minutes passing through the crossing point. This is a negligible change that will not affect the ability of users of the England Coast Path to cross the road in a safe manner.

NTS.73 The installation of the district heating pipelines within the local road network will lead to the type of minor disruption that is associated with any utility works in the highway. These will be addressed through standard measures that will be set out in the CEMP and through road access licensing by Dorset Council. As a result, no significant cumulative traffic and transport effects are predicted to arise from the provision of district heating.

NTS.74 The conclusions of the original ES that the proposed development will not lead to any significant residual traffic and transport effects therefore remain valid and are unchanged by the submitted further information.

Waste

NTS.75 Dorset Council's letter did not request any additional information and clarification in relation to waste impacts. The provision of district heating from the proposed ERF will not increase the area's residual waste treatment capacity, so there is no potential for significant cumulative effects on waste. As a result, the original ES waste chapter remains unchanged.

World heritage site

NTS.76 Dorset Council's letter did not request any additional information and clarification in relation to impacts on the Dorset and East Devon Coast World Heritage Site (WHS). However, the assessment of effects on the WHS in the original ES was based on the conclusions of the cultural heritage and landscape, seascape and visual assessments. Any changes to the conclusions of these assessments would also be relevant to the assessment of effects on the WHS. The further information provided on these issues was therefore reviewed to determine whether any associated changes were required to the WHS assessment.

NTS.77 The additional assessment of the plume visibility confirmed the conclusions set out in the original landscape, seascape and visual impact assessment that the plume is likely to produce only a very minor change to the view for a very limited number of hours, so the effects remain as originally assessed. The assessment of night-time effects also remained unchanged by the additional information provided in the ES addendum.

NTS.78 The conclusions of the landscape, seascape and visual impact assessment that were used in the original assessment of effects on the WHS therefore remain as originally assessed and no changes are needed to the WHS assessment. In addition, no changes are needed to the WHS assessment as a result of the revised cultural heritage impacts set out above.

NTS.79 As discussed above, no significant cumulative cultural heritage or landscape, seascape and visual effects are predicted as a result of the provision of district heating. Given these conclusions, the installation of the district heating pipe network is not predicted to lead to significant cumulative effects on the WHS.

NTS.80 No changes are needed to the WHS assessment as a result of the further information provided in this ES addendum in relation to cultural heritage and landscape, seascape and visual effects. Given this, and the fact that no additional cumulative effects are predicted as a result of the provision of district heating, the conclusions of the original ES chapter remain valid and unchanged.

Other issues outside the scope of the EIA

NTS.81 Dorset Council's letter requested additional information and clarification on several issues that are outside the scope of the EIA, relating to need, planning policy, noise impacts and fire prevention. As these elements are outside the scope of the EIA, the additional information is not considered to be 'further environmental information' under Regulation 25 of the EIA Regulations and is not provided within this report. Instead, several stand alone documents have been produced to provide this information.

Conclusion

NTS.82 The only changes to the significant residual effects identified in the original ES as a result of the further environmental information provided in the ES addendum relate to cultural heritage effects. The slight to moderate, significant adverse residual effect on the East Weare batteries scheduled monument and listed structure identified in the original ES has been removed by the heritage mitigation strategy. The improved public access and interpretation and opportunities for greater appreciation and understanding of the range of assets across East Weare as a result of the measures set out in the strategy will be a moderate, significant beneficial effect. In addition, the change to the experience of the historic environment because of the new permissive path link around East Weare is predicted to result in a slight to moderate, significant beneficial effect.

NTS.83 No new or different significant residual effects have been identified for any of the other EIA topics as a result of the further environmental information. Therefore, with the exception of the above beneficial changes to the findings of the cultural heritage assessment, the conclusions of the ES remain valid and unchanged.

1 Introduction

1.1 In September 2020, Powerfuel Portland Limited submitted a full planning application to Dorset Council for the construction of an energy recovery facility (ERF) with ancillary buildings and works including administrative facilities, gatehouse and weighbridge, parking and circulation areas, cable routes to ship berths and existing off-site electrical substation, with site access through Portland Port from Castletown (application reference: WP/20/00692/DCC) on land within Portland Port.

1.2 The application was accompanied by an environmental statement (ES) prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended; hereafter the EIA Regulations), which provides an assessment of the likely significant effects associated with its construction and operation.

1.3 Dorset Council has consulted on the application and also appointed Tetra Tech to undertake a review of the ES, which ensured that it complied with the requirement of Regulation 4(5) of the EIA Regulations to have access to sufficient expertise to examine the ES. Representations have been submitted to Dorset Council by consultees, members of the public and other interested parties in response to the consultation on the planning application. Dorset Council has taken these representations into account in its consideration of the application.

1.4 Following the consultation, the council formally requested additional information and clarification in a letter dated 30 April 2021. The council confirmed that it considers some of the information requested constitutes ‘further environmental information’, and where this is applicable it is requested in accordance with Regulation 25 of the EIA Regulations and Section 62(3) of the Town and Country Planning Act 1990.

1.5 The full letter is provided in appendix 1.1 and requests additional information and clarification on the following issues:

- Landscape
- Health
- Historic environment
- Ecology
- District heating
- Electricity generation
- Shore power
- Air quality
- Carbon balance / climate change
- Traffic
- Surface water discharge
- Contaminated land / geology
- Need
- Jobs
- Planning policy
- Environmental permit

1.6 This document reviews the council's letter and provides the information that is considered to constitute 'further environmental information' under Regulation 25 of the EIA Regulations. It forms an addendum to the original ES and follows the ES's topic structure. It is submitted in accordance with the requirements of Regulation 25 of the EIA Regulations and should be read alongside the original ES. A non-technical summary is provided at the front of this document.

1.7 The review of the council's letter also identifies where matters raised are considered to comprise clarifications, which are not formally requested under Regulation 25 and do not comprise 'further environmental information'. Responses to these points, and other issues raised during the consultation, are provided in stand alone documents within the submission, including the consultation response summary document (CRSD).

2 District heating, electricity generation and shore power

Introduction

2.1 Dorset Council's letter requested the following additional information and clarification in relation to the provision of district heating, electricity generation and shore power by the proposed development:

- Further detail in respect of how the prison and young offender institution could be connected to a district heating system supplied from the development. This should include the required infrastructure, technical supporting information, and description of the environmental (including climate change) and economic (both for the supplier and purchaser) impacts (point 12 in the council's letter)
- Further consideration and information in respect of relevant district heating-related issues raised through representations on the first consultation as appropriate (point 13)
- Further clarification on how the development will be connected to the grid, and secure benefits in relation to the generation of electricity. This should include detail of how the grid connection will be constructed and the proposed cabling (point 14)
- Further consideration and information in respect of relevant issues related to the generation of electricity raised through representations on the first consultation as appropriate (point 15)
- Further clarification and additional detail in respect of how the shore power element of the proposal would work. This should include a response to issues raised in representations, and justification of any assumptions made in respect of modelling of carbon savings that might result (point 16)
- Further consideration and information in respect of relevant issues related to the provision of shore-based power raised through representations on the first consultation as appropriate (point 17)

2.2 Powerfuel Portland Limited has prepared a district heating paper to provide the further information requested by the council in relation to the required infrastructure and technical supporting information (point 12 in the council's letter), which is submitted as a stand alone document. The additional detail in relation to the district heating proposals is summarised in this section. The potential environmental impacts of the provision of district heating are set out in the remaining sections of this report. As the district heating network does not form part of the planning application, the potential environmental impacts are considered as cumulative effects.

2.3 Powerfuel Portland Limited has produced a report providing further details on how the development will be connected to the grid, including the construction of the grid connection and the proposed cabling (point 14 in the council's letter) and the shore power connections (point 16). Its key elements are summarised in this section and the full report is submitted as a stand alone document.

2.4 Arup has prepared an updated shore power report providing further detail in respect of the benefits of the provision of shore power and the rationale behind it (point 16 in the council's letter). This detail is considered to be a clarification of the reasoning behind the provision of shore power and its benefits, rather than the provision of 'further environmental information' under Regulation 25. The updated report is therefore submitted as a stand alone document.

2.5 Arup and Powerfuel Portland Limited have also provided responses to the various issues relating to district heating, electricity generation and shore-based power provision raised by representations to the consultation (points 13, 15 and 17 in the council's letter). These responses are considered to be clarifications, rather than the provision of 'further environmental information' under Regulation 25, so they are set out in the CRSD.

Further information on district heating

2.6 While the installation of the district heating network does not form part of the planning application, as set out in the ES the space and necessary valves to enable connection to make the heat available will be included within the plant. Work is ongoing to identify potential heat customers and Powerfuel Portland Limited is in discussion with the Ministry of Justice regarding a memorandum of understanding to provide heating to HMP The Verne and HMP / Young Offender Institution Portland.

2.7 The final route for the district heating network pipes has not yet been confirmed, but they will run within the local road network (comprising local authority highway land or private port road land). For the purposes of the assessment, a feasible potential route has been identified where district heating network pipes could be installed to connect the prison and the young offender institution to the proposed ERF (see appendix 2.1). This runs within Incline Road, Grove Road, Easton Lane, Yeates Road, New Ground and Glacis. In addition, a second potential route has been identified that runs within Main Road to the port boundary and then within Castletown (see appendix 2.1). It would be open to other potential users to request a connection to the ERF via this route in the future.

2.8 The installation of district heating networks within roads is very common and is governed by relevant British Standards, such as BS EN 13941:2019 *District heating pipes – Design and installation of thermal insulated bonded single and twin pipe systems for directly buried hot water networks*. Two pre-insulated pipes will be installed beneath the road network: one carrying the heated water from the ERF to the heat users and one bringing the water back to the ERF to be re-heated and re-circulated.

2.9 Full details of the installation will be confirmed at the detailed design and planning stage, but it is currently envisaged that the pipes will be buried approximately 500 mm below the ground surface in a trench approximately 1,500 mm wide at the top, reducing to approximately 1,000 mm wide at the bottom. The trench will be excavated in lengths of around 50 m to 60 m at a time to allow the pipes to be installed. It is envisaged that the heat exchangers will be located within the existing boiler houses, so no new buildings will be required.

Further information on grid connection, cabling and shore power

2.10 A new 33 kV substation will be built in the north west of the site, which will serve as the connection point for the development and the Scottish and Southern Energy (SSE) distribution network. This was referred to in the original application documents as the transformer compound.

2.11 A new 1.75 km long 33 kV cable will be installed connecting the Portland ERF substation to the SSE supply point (the Victoria Square substation) near Lerret Road. This new cable will be buried beneath the road network in a trench approximately 550 mm wide and 900 mm deep. It will follow the route of Incline Road onto Main Road to the main port gate. From there, it will follow Castletown, Castle Road and Lerret Road to the substation. Subject to the grant of planning permission, SSE has been commissioned to undertake these connection works, including the installation of the connection cable.

2.12 A new series of containerised switchgear, converters and transformers, alongside a further containerised substation, will be installed next to the existing SSE substation on the northern side of Canteen Road in order to provide shore power from the Portland ERF substation directly to ships berthed at the port. This new installation will form shore power substation 1 and will be connected to the Portland ERF substation via a new approximately 40 m long buried 33 kV cable underneath Canteen Road.

2.13 The converters and transformers will be connected to shore power substation 2 on the Coaling Pier and shore power substation 3 on Queens Pier by buried 11 kV cables running along Main Road and Dock Road, with a total combined length of approximately 2.2 km.

3 Air quality

Introduction

3.1 Dorset Council's letter requested the following additional information and clarification in relation to effects on air quality:

- Further information and modelling in respect of the impacts on air quality, and particularly as a result of the provision of shore-based power to Navy and cruise ships. The modelling should be accompanied by a separate document setting out the basis for any assumptions in respect of substitution for diesel fuel (point 18 in the council's letter)
- Additional air quality modelling in respect of the emissions from traffic on the section of the A354 leading to the site (point 19)
- Inclusion of the use of the diesel back-up generator in the cumulative (in-combination) assessment (point 20)
- Further consideration and information in respect of relevant air quality-related issues raised through representations on the first consultation as appropriate (point 21)
- We note that you are making some updates to your environmental permit application and request that the additional detail and assessment you are undertaking in respect of air quality, noise and fire prevention is incorporated into your planning application and EIA, so the assessment of the project is consistent across both regulatory regimes (point 35)

3.2 Fichtner Consulting Engineers Ltd, who undertook the air quality assessment for the original ES, has prepared a technical report to provide the further information and modelling requested in relation to the air quality impacts associated with the provision of shore-based power (including the assumptions behind the modelling; point 18 in the council's letter). The report also quantifies the cumulative impact of road and process emissions associated with the proposed development and other consented projects on national site network (NSN) nature conservation sites. The full report is contained in appendix 3.1 and its findings are summarised in this section.

3.3 In addition, Fichtner Consulting Engineers Ltd has provided further information in respect of traffic emissions on the roads in Castletown leading to the site and the operation of the diesel back-up generators (points 19 and 20 in the council's letter). This further information is provided in this section.

3.4 Fichtner Consulting Engineers Ltd has also provided responses to the various other air quality-related issues raised by representations to the consultation (point 21 in the council's letter). Further information is provided in this section in relation to the baseline data used in the assessment, the choice of dispersion models, model verification, the meteorological data used, the grid resolution used, the justification of the stack height, effects on air quality in the Boot Hill area, effects on air quality management areas (AQMAs) and effects at Ocean View.

3.5 In addition, typographical errors were identified in tables 18, 19 and 22 in technical appendix D2. The error noted in table 22 was the units for sulphur dioxide, which were stated to be ng/m^3, whereas the concentration was presented as µg/m^3. No other changes are needed to this table, so this has not been reproduced. However, for tables 18 and 19 there was an error in the calculation sheet and the predicted environmental concentration (PEC) was incorrectly calculated when it was assumed that each metal is emitted as per the maximum monitored by the Environment Agency. The corrected tables 18 and 19 are provided in appendix 3.2.

3.6 The responses to the other points raised during the consultation are considered to be clarifications and confirmations that the assessment remains valid, taking into account changes in the baseline since the original submission, rather than the provision of 'further environmental information' under Regulation 25. They are therefore set out in the CRSD.

3.7 As part of the environmental permit application process, the Environment Agency requested some additional information in relation to air quality, noise and fire prevention (point 35 in the council's letter). Noise and fire prevention are addressed in section 13 of this report. The additional air quality information requested by the Agency related to the modelling of impacts at specific human health receptors and Fichtner Consulting Engineers Ltd prepared a technical note to provide this. The full technical note is contained in appendix 3.3 and its findings are summarised in this section.

Baseline

3.8 A thorough review of baseline conditions was carried out to support the original ES. The review was undertaken using the data that were available at the time of producing the ES and included consideration of mapped background datasets, as well as local and national monitoring data. The review showed that the only local monitoring was of nitrogen dioxide (NO_2), carried out by the former Weymouth & Portland Borough Council (now Dorset Council) at a few roadside locations on the Isle of Portland. The ES included a review of the past few years of data to demonstrate if there had been any trends in the baseline concentrations.

3.9 As stated in technical appendix D1 to the ES, the mapped background concentration was taken from the 2017 Defra mapped background dataset. This was the dataset published at the time of production of the ES. The Defra dataset includes projections for future years, and all pollutants in the dataset are projected to decrease in the future. However, as set out in the ES, as a conservative assumption, the concentration for the year that the dataset was validated for was used, as this eliminates any potential uncertainties over anticipated trends in future background concentrations.

3.10 For completeness, table 3.1 presents the maximum mapped background concentrations within 5 km of the application site using the 2017 and most recently available (2018) datasets. As shown, using the 2018 dataset will result in a slight reduction in the mapped background concentration used within the assessment. However, the change is only slight and would not alter the conclusions of the assessment.

Pollutant	2017 dataset (as used in ES; µg/m^3)	2018 dataset (most recently available dataset; µg/m^3)	Difference % change from 2017
NO_2	22.01	21.97	- 0.2%
Oxides of nitrogen (NO_x)	35.09	33.78	- 3.7%
Particulate matter (as PM_{10})	14.74	14.19	- 3.7%
Particulate matter (as $PM_{2.5}$)	8.68	7.94	- 8.5%
Ammonia (NH_3)	0.82	0.82	0

Table 3.1: Comparison of 2017 and 2018 datasets
Notes: Maximum concentration within 5 km of the application site

3.11 The review of the local monitoring data focused on the data presented in the annual status report that was available at the time the ES was produced (the Weymouth & Portland Borough Council 2019 Annual Status Report). This included the bias adjusted annual mean monitoring data up to the end of 2018. Dorset Council has since published the annual monitoring data for the whole of 2019, 2020 and January 2021 (date accessed: 17.06.21). These data were only used for model verification purposes. The effect of any change in baseline concentration between 2018 and 2019 is discussed further with reference to the model verification below.

3.12 The baseline concentrations used in the ecology assessment were taken from the Air Pollution Information System (APIS) website, which includes mapped background concentrations of NO_x and sulphur dioxide (SO_2) on a 1 km x 1 km spatial resolution and NH_3, nitrogen deposition and acid deposition on a 5 km x 5 km spatial resolution. This is calculated as a rolling average three-year concentration and is updated on a periodic basis. The latest update was published in March 2021 and has been updated to the three-year average for 2017 to 2019.

3.13 The previous shadow appropriate assessment and ES used the data available at the time of submission, which was the three-year average from 2016 to 2018. The baseline data were presented in technical appendix D1 of the ES, but were only drawn upon in the shadow appropriate assessment. As part of the updated shadow appropriate assessment, a review of the APIS dataset has been carried out. This has shown that, using the latest three-year average data, the background concentration is slightly greater than that used in the original shadow appropriate assessment. The updated shadow appropriate assessment uses the most recent available data.

Dispersion modelling of process emissions

Choice of model

3.14 Modelling of process emissions from the ERF to support the ES was carried out using the ADMS software package (version 5.2). There have been no updates to the modelling software since the original modelling was carried out. This is an industry standard model that is routinely used for modelling of emissions from similar projects to the satisfaction of the Environment Agency and local authorities. The model can be used to account for the varying terrain and surface roughness around the proposed development. In addition, the ADMS model can be used to quantify whether a plume is likely to be visible and its length. It was therefore an appropriate model to use in the assessment of the proposed development.

Meteorological data

3.15 Modelling was carried out using five years of weather data from Portland meteorological site for the years 2014 to 2018. These were the most recent complete years of meteorological data that were available when the ES was produced. Five years of weather data were used in line with Environment Agency guidelines to ensure that interannual variability in weather conditions was accounted for. The use of more recent weather data (i.e. from 2019 and 2020) is not expected to change the conclusions of the ES.

Grid resolution

3.16 Modelling was carried out to determine the impact of process emissions from the ERF across a grid. The resolution of the grid was chosen to balance the computational time while ensuring that the grid was suitable to capture the peak impacts. The grid resolution used was 60 m, with a stack height of 80 m. It is common practice that the grid resolution is at least 1.5 times the stack height, which would be 120 m by 120 m. The chosen grid size was half this and is therefore considered to be appropriate. Changing the grid resolution is not expected to change the conclusions of the ES.

Justification of stack height

3.17 A stack height assessment was carried out and presented within technical appendix D2 of the ES. The stack height assessment considered the operation of the ERF in isolation to ensure that the stack height is appropriate for the building configuration. As set out in technical appendix D2 of the ES, the stack height was chosen based on the change in the angle of the slope at the Isle of Portland to Studland Cliffs Special Area of Conservation (SAC). Including existing emissions from road and shipping (or the back-up diesel generators) would not change the justification for the stack height.

Dispersion modelling of road emissions

Choice of model

3.18 Modelling of road emissions to support the ES was carried out using the ADMS Roads software package (version 5.0). There have been no updates to the modelling software since the original modelling was carried out. This is an industry standard model that is routinely used for modelling emissions from road traffic for similar projects to the satisfaction of local authorities.

Model verification

3.19 It is best practice to verify the model output against local monitoring data. To do this, ideally the meteorological data, traffic data and monitoring data should all be from the same period. However, as set out in technical appendix D2 of the ES, at the time of the assessment monitoring data from the former Weymouth & Portland Borough Council were not available for the same period as the traffic data (2019). In lieu of this, the model was verified using the 2019 baseline traffic flows and meteorological and monitoring data from 2018. This was considered the most appropriate approach, given that the baseline monitoring of traffic was carried out in the beginning of 2019, and it is considered unlikely that traffic flows would be significantly different from 2018 levels.

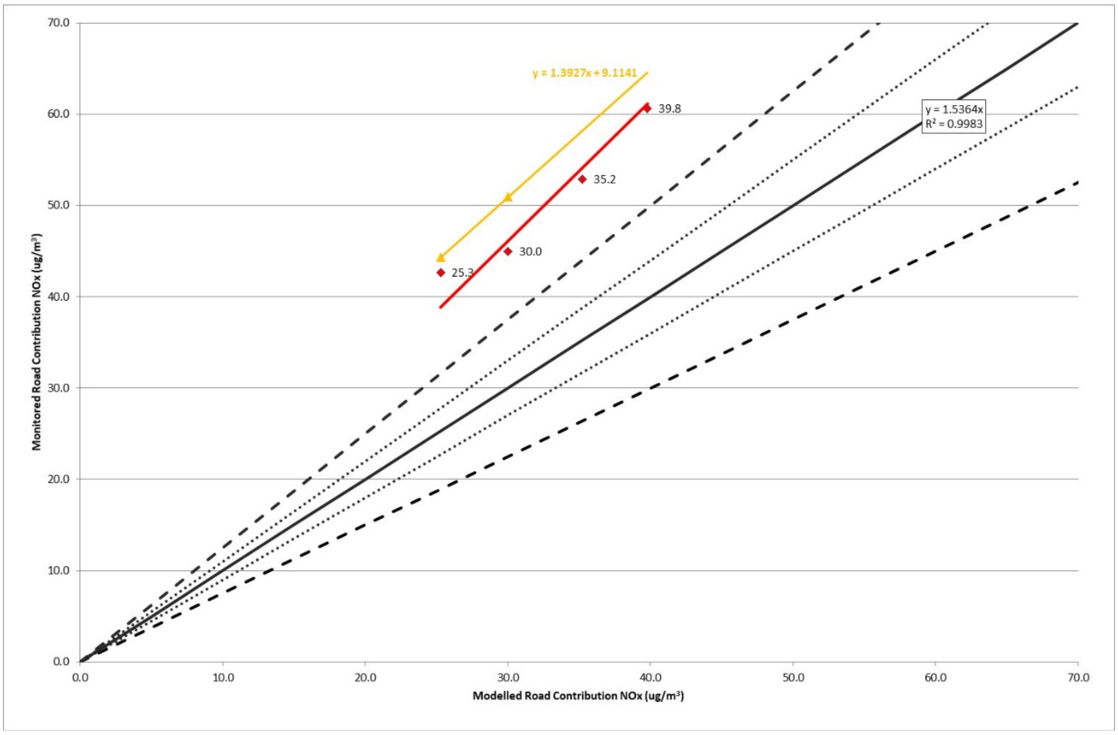
3.20 Table 3.2 presents the data for 2018 and 2019 for those sites that were used for the roads model verification process.

Site	2018 (as used in ES; µg/m³)	2019 (annual mean bias adjusted; µg/m³)	Difference % change from 2018
Boot Hill (367541,78471)	39.6	Not available	-
10: Rodwell Road (367542,78548)	32.8	36	9.8%
32: Portmore Gardens (367528,78554)	31.8	33	3.8%
51: Rodwell Inn (367550,78485)	36.3	27	-25.6%

Table 3.2: 2018 and 2019 NO_2 data for sites used in roads model verification
Notes: Data from 2019 sourced from the Dorset Council website.

3.21 As shown in table 3.2, at sites 10 and 32 the monitored NO_2 concentration in 2019 was higher than in 2018, but at site 51 the monitored concentration was lower than in 2018. However, monitoring at site 51 was based on seven months of data and the annual mean concentration stated on Dorset Council's website does not match well with the monitoring data. As a result, it is not possible to accurately compare monitored to modelled concentrations at this site.

3.22 The following graph shows the comparison of monitored against modelled road NO_x, as set out in graph 5 of technical appendix D3 of the original ES. In addition, the analysis comparing the 2019 data has also been included. As shown, the verification factor using the 2019 monitoring data would be slightly lower than used for the purposes of the ES. Therefore, this would result in lower road traffic impacts than set out in the ES; however, the change is relatively small and this would not change the conclusions of the road emissions assessment presented in the ES.



Impacts on air quality from traffic on the roads in Castletown leading to the site

3.23 As set out in chapter 4 of the ES, the assessment of the impact of emissions was carried out using industry standard guidance from the Institute of Air Quality Management (IAQM) and EPUK. The contribution from the proposed development was calculated and compared to the air quality assessment levels (AQAL) for the protection of human health. In line with the stated assessment methodology, where the contribution from the proposed development was predicted to be greater than 0.5% of the AQAL, additional consideration was made of the baseline concentration and the predicted impact where the AQALs apply.

3.24 The impact of traffic associated with the proposed development was screened out from detailed assessment, as the change in vehicle numbers did not exceed the criteria (i.e. the change in HGV numbers is not expected to exceed 100 per day). Although not presented in the ES or its technical appendices, the impacts at receptors in Castletown close to the proposed development were calculated. Figures 1 and 2 of technical appendix D2 to the ES included the locations of these receptors. Tables 3.3 and 3.4 below set out the combined impacts of traffic and process emissions associated with the proposed development.

Receptor	ERF (μg/m^3)	Future baseline roads (μg/m^3)	With development roads (μg/m^3)	Impact of proposed development (μg/m^3)	As % of AQAL	Magnitude of change descriptor
R1	0.18	15.45	15.77	0.50	1.2%	Negligible
R2	0.18	15.51	15.84	0.51	1.3%	Negligible
R3	0.18	15.49	15.80	0.49	1.2%	Negligible
R4	0.18	15.29	15.58	0.47	1.2%	Negligible
R5	0.18	15.09	15.36	0.45	1.1%	Negligible
R6	0.18	15.14	15.41	0.45	1.1%	Negligible
R7	0.17	15.40	15.67	0.44	1.1%	Negligible
R8	0.17	15.54	15.81	0.44	1.1%	Negligible
R9	0.17	15.64	15.90	0.43	1.1%	Negligible
R10	0.17	17.99	18.28	0.46	1.1%	Negligible
R11	0.17	24.39	24.77	0.55	1.4%	Negligible
R12	0.17	21.69	21.86	0.34	0.9%	Negligible
R13	0.17	17.32	17.50	0.35	0.9%	Negligible
R14	0.16	15.37	15.53	0.32	0.8%	Negligible
R15	0.16	14.29	14.43	0.30	0.7%	Negligible
R16	0.15	13.83	13.96	0.28	0.7%	Negligible
R17	0.13	12.35	12.39	0.17	0.4%	Negligible
R18	0.12	14.74	14.90	0.28	0.7%	Negligible

Table 3.3: NO_2 impact at receptors in Castletown in 2023 (worst case roads modelling scenario)
Notes:
Assumes no change in fleet composition – i.e. 2017 emission factors for opening year of 2023.
Assumes background concentration does not reduce from mapped 2017 background concentration.

Receptor	ERF ($\mu g/m^3$)	Future baseline roads ($\mu g/m^3$)	With development roads ($\mu g/m^3$)	Impact of proposed development ($\mu g/m^3$)	As % of AQAL	Magnitude of change descriptor
R1	0.18	12.12	12.23	0.29	0.7%	Negligible
R2	0.18	12.14	12.26	0.30	0.7%	Negligible
R3	0.18	12.15	12.25	0.28	0.7%	Negligible
R4	0.18	12.09	12.19	0.28	0.7%	Negligible
R5	0.18	12.04	12.13	0.27	0.7%	Negligible
R6	0.18	12.07	12.16	0.27	0.7%	Negligible
R7	0.17	12.17	12.26	0.26	0.7%	Negligible
R8	0.17	12.23	12.32	0.26	0.7%	Negligible
R9	0.17	12.29	12.38	0.26	0.7%	Negligible
R10	0.17	13.23	13.33	0.27	0.7%	Negligible
R11	0.17	15.90	16.04	0.31	0.8%	Negligible
R12	0.17	14.98	15.05	0.24	0.6%	Negligible
R13	0.17	13.11	13.17	0.23	0.6%	Negligible
R14	0.16	12.31	12.36	0.21	0.5%	Negligible
R15	0.16	11.88	11.93	0.21	0.5%	Negligible
R16	0.15	11.71	11.75	0.19	0.5%	Negligible
R17	0.13	11.21	11.23	0.15	0.4%	Negligible
R18	0.12	12.03	12.09	0.18	0.4%	Negligible

Table 3.4: NO_2 impact at receptors in Castletown in 2023 (best case roads modelling scenario)
Notes:
Assumes fleet changes in line with projections – i.e. 2023 emission factors from Defra's emissions factor toolkit.
Assumes background concentration does not reduce from mapped 2017 background concentration.

3.25 As shown in tables 3.3 and 3.4, the combined impact of emissions from traffic associated with the proposed development and process emissions from the ERF is a maximum of 1.4% of the AQAL if it is conservatively assumed that the UK vehicle fleet mix does not change from 2017 levels (the base year of the emissions factor toolkit). However, it if is assumed that the fleet changes in line with projections (i.e. a turnover of older HGVs with new vehicles and a take-up of electric vehicles), the maximum impact is 0.8% of the AQAL. In both instances, in accordance with the matrix in figure 4.1 of the ES, the magnitude of change is described as negligible because the contribution from the proposed development is 1% (i.e. between 0.5% and 1.5%) and the total concentration including background sources is less than 94% of the AQAL.

3.26 Based on the matrix, the magnitude of change for an impact of 1% of the AQAL would be described as 'slight adverse' if the total concentration was between 95-102% of the AQAL and 'moderate adverse' if the total concentration was greater than 103% of the AQAL. It should be noted that the magnitude of change descriptor should be used with professional judgement to determine the significance of the effect, taking into account factors such as the uncertainty in the modelling and extent of impacts.

3.27 The predicted total concentration at the most impacted receptor in Castletown (R11) is 25 $\mu g/m^3$ (0.17 + 24.77 $\mu g/m^3$), which equates to 62% of the AQAL, assuming no change in fleet from the 2017 composition. Although the local operations at the port have not been specifically included within the modelling, the mapped background data will account for these emissions (albeit averaged over the 1 km grid square).

3.28 The impact from operations at the port would need to increase NO_2 levels by 13.2 $\mu g/m^3$ for the impact of the proposed development to be described as slight adverse, or 16.4 μg/m^3 for the impact of the proposed development to be described as moderate adverse. It is considered that there is little risk of the impact of operations at the port increasing pollution levels in this area by this amount, particularly as if they were to be close to the AQAL Dorset Council should have declared an AQMA due to potential exceedances of the AQAL and no declaration has been made.

Impacts on air quality in the Boot Hill area

3.29 The modelling of road traffic emissions in the original ES specifically considered the impact of the proposed development within the Boot Hill area, where elevated NO_2 concentrations have been monitored. While this area has not been declared an AQMA, as a conservative approach the IAQM and EPUK screening threshold for an AQMA was applied. The modelling only considered the impact of emissions from vehicles. As explained in technical appendix D3, the contribution of process emissions from the ERF will be extremely small in the Boot Hill area, so it was not considered necessary to provide a combined impact assessment of process and traffic emissions on this area.

3.30 To substantiate this, reference has been made to modelling used in the human health risk assessment (HHRA), which formed technical appendix G of the original ES, and data used to create the contour plots presented in the additional air quality information (see appendix 3.1). The modelling for the HHRA covered a much wider area to ensure that impacts within Weymouth were quantified (albeit they were very small), due to the large population present in this area. The modelling for the HHRA predicted the contribution of NO_2 from the ERF to be <0.06% of the AQAL. This additional contribution would not alter the conclusions of the assessment presented in the original ES and the effect on the Boot Hill area is considered not to be significant.

3.31 The original modelling did not include the Boot Hill area as a street canyon. However, the verification has been carried out using data from the monitoring sites in this area. If the area was modelled as a canyon, it is likely that the modelled road contribution NO_x would have been higher, resulting in a lower verification factor. In terms of the impacts at receptors, while the modelled impact would be higher, this increase in modelled impact would be balanced out by the lower verification factor. Therefore, it is likely that the results would be broadly similar. This is not expected to change the conclusions of the ES that the effect of the proposed development on the Boot Hill area is not significant.

Impacts on AQMAs

3.32 As set out in technical appendix D1 of the original ES, the closest AQMA to the proposed development is in Dorchester, over 15 km to the north of the site. The Dorchester AQMA is located along the B3150 in the centre of the town. It is unlikely that any vehicles associated with the proposed development would pass through this area and the contribution from the ERF would be miniscule. As such, the impact of the proposed development on this AQMA was not considered further.

3.33 The Chideock AQMA lies to the west of the proposed development, along the A35. As set out in technical appendix A (scoping) of the original ES, the HGV routeing breakdown set out in ES chapter 11 (traffic and transport) confirms that the additional HGV movements on the wider Dorset road network will be below the levels that would trigger the requirement for detailed analysis. Only eight of the 80 HGV trips are predicted to be along the A35 westbound. For this reason, the impact of the proposed development on any AQMA was scoped out from the assessment.

Impacts at Ocean View

3.34 As part of the consultation response, reference was made to the underestimation of potential impacts of emissions from the ERF at Ocean View, as this is a high rise development and the assessment considered the impact at ground level. The Ocean View development is located approximately 1 km to the west of the proposed development. The dispersion model has been re-run with a series of receptors at heights to represent each floor of the Ocean View development. The results are set out in table 3.5.

Height (m)	Annual mean NO_2 impact	
	μg/m^3	as a % of AQAL
0	0.17	0.4%
3	0.17	0.4%
6	0.17	0.4%
9	0.17	0.4%
12	0.18	0.4%
15	0.18	0.4%
18	0.18	0.4%
21	0.18	0.5%
24	0.18	0.5%
27	0.19	0.5%
30	0.19	0.5%
33	0.19	0.5%
36	0.20	0.5%
39	0.20	0.5%
42	0.21	0.5%
45	0.21	0.5%
48	0.22	0.5%

Table 3.5: Impact of process emissions at height at the Ocean View development

3.35 As shown in table 3.5, there will be a very slight increase in concentrations at height at the Ocean View development. However, the change in impact is marginal. Applying the matrix set out in figure 4.1 of the original ES, the magnitude of change would be described as negligible irrespective of the total concentration. Therefore, the inclusion of receptors at height at the Ocean View development does not change the conclusion of the ES that the proposed development will not have a significant effect on air quality.

Impacts on air quality from the provision of shore-based power

3.36 As set out in the original ES, the proposed development will facilitate the provision of shore power to ships in the port. These are currently required to use onboard engines to provide power, which are a source of emissions. The impacts presented in the original ES, and this ES addendum, are worst case because they are based on the impact of the proposed development without allowing for the offset of emissions that would result from the ships no longer needing to use onboard engines to provide power when in the port.

3.37 A technical study has been carried out to quantify the impact of the emissions from the ships that will no longer be emitted as the electricity generated from the onboard engines would be provided by the ERF. This contribution has then been subtracted from the contribution of the ERF to determine the net change, allowing for the offset. The assumptions behind the modelling and the full results are provided in appendix 3.1. The modelling considered the impact of emissions from cruise ships, which are berthed for less than a day each, and two Royal Fleet Auxiliary ships, which are berthed on a longer term basis.

3.38 The onboard engines are typically powered by fuel oil and result in emissions of NO_x, SO_2, PM_{10} and $PM_{2.5}$. The impact of all other emissions will not be affected by the provision of shore power and will be as set out in the original ES.

3.39 The analysis has shown that, for particulate matter, there will be a net benefit associated with the proposed development at all points across the modelling domain. This is because the impact of emissions from the engines, which would no longer be needed, is higher than the impact of emissions from the ERF. The reductions in annual mean particulate matter concentrations were up to -0.01 $\mu g/m^3$ on land and ranged from -0.01 $\mu g/m^3$ to -0.2 $\mu g/m^3$ at sea. The greatest reductions were predicted closest to where the ships are berthed. This beneficial effect will be negligible and not significant.

3.40 For NO_2 and SO_2, there will be a net benefit for the majority of the area. Where there is a net increase, the increase will be extremely small. The largest increase is predicted to be 0.05 $\mu g/m^3$ on land and 0.15 $\mu g/m^3$ at sea for both pollutants. This is still a reduction in impact from the operation of the ERF with no provision of shore power. It should also be noted that the modelling has made a very conservative assumption that the majority of the onboard generators are modern, and as such the emissions would be lower than for older generators. If less conservative assumptions were used, and the emissions from onboard generators were assumed to be higher, the net change would show a greater benefit from the proposed development.

3.41 Both the beneficial effects from the reduction in emissions and the adverse effects from the increase will be negligible and not significant. As a result, the overall conclusion of the ES that the proposed development will not lead to any significant effects on air quality remains valid.

Cumulative air quality impacts on NSN nature conservation sites

3.42 The original assessment considered the impact of road and process emissions and screened out the need for further consideration of the cumulative impact with other development at NSN nature conservation sites because the total impact of process and road traffic emissions associated with the proposed development was predicted to be less than 1% of the relevant assessment levels. The NSN sites that have the potential to be impacted by cumulative road traffic and process emissions are Chesil and The Fleet SAC and Isle of Portland to Studland Cliffs SAC.

3.43 The original dispersion modelling included all the cumulative developments, as the trips associated with these were incorporated in the predicted 2023 traffic flows for both the future baseline and 'with development' scenarios. The change in impact between the future baseline and 'with development' scenarios was predicted. However, results were not presented to show the cumulative change in impact from the 'do nothing' scenario for 2023 that did not include the trips associated with the cumulative developments.

3.44 The detailed modelling was updated and the 'do nothing' scenario run using the same ADMS Roads 5.0 model as was used for the original assessment. All inputs relating to meteorological data and dispersion site parameters were the same. The difference between the 'with development' and 'do nothing' scenarios was then calculated to determine the cumulative impact of emissions from the proposed development (the ERF and associated traffic) and other cumulative projects. This focused on the impacts of traffic-related emissions for which there is an assessment level set for the protection of ecosystems: NO_x, NH_3 and nitrogen deposition. The full modelling results are provided in the technical report in appendix 3.1 and summarised here.

3.45 For Chesil and The Fleet SAC, the modelling shows that the impact of the proposed development alone on annual mean NO_x levels is predicted to be less than 1% of the critical level within 2 m of the road. The cumulative impact with other developments is predicted to be much greater, at more than 5% of the critical level within 50 m of the road. The total concentration of NO_x is predicted to exceed the critical level within 3 m of the road. However, this exceedance is predicted to occur as a result of other cumulative schemes and the additional contribution from the proposed development will not significantly change the distance at which exceedances of the critical level are predicted (i.e. less than 1 m). The impacts are predicted to be less than 70% of the critical level by 11 m from the road in both the future baseline and 'with development' scenarios.

3.46 In relation to NH_3, the modelling shows that the impact of the proposed development alone is predicted to be less than 1% of the critical level within 1 m of the road. The cumulative impact with other developments is predicted to be much greater, at more than 8% of the critical level within 50 m of the road. The total concentration of NH_3 is predicted to exceed the critical level within 3 m of the road. However, as for NO_x, this exceedance is predicted to occur as a result of the cumulative schemes and the additional contribution from the proposed development will not significantly change the distance at which exceedances of the critical level are predicted (less than 1 m). The impacts are predicted to be less than 70% of the critical level by 9 m from the road in both the future baseline and 'with development' scenarios.

3.47 The impact of the proposed development alone on nitrogen deposition at Chesil and The Fleet SAC is predicted to be less than 2 kgN/ha/year within 4 m of the road. The greatest source of emissions to nitrogen deposition is NH_3 from road traffic emissions. The cumulative impact with other developments is predicted to be much greater, at 18 kgN/ha/year at 50 m from the road. The total concentration is predicted to be very similar for the future baseline and 'with development' scenarios. This demonstrates that the majority of the increase in deposition is due to the cumulative developments.

3.48 For the Isle of Portland to Studland Cliffs SAC, the modelling shows that the impact of the proposed development alone on annual mean NO_x levels is predicted to be less than 1% of the critical level within 13 m of the road. Again, the cumulative impact with other developments is predicted to be much greater, at more than 3% of the critical level within 50 m of the road. However, the total concentration is predicted to be well below the critical level at all distances from the road.

3.49 In relation to NH_3, the modelling shows that the impact of the proposed development alone is predicted to be more than 1% of the critical level for lichen sensitive communities along the transect from the road, but less than 1% of the critical level for non-lichen sensitive communities at a distance greater than 4 m from the road. The cumulative impact with other developments is again predicted to be much greater, at more than 6% of the critical level for lichen sensitive communities and 2% of the critical level for non-lichen sensitive communities within 50 m of the road. However, the total concentration is predicted to be below the critical level for lichen sensitive communities within a few metres of the road.

3.50 The impact of the proposed development alone on nitrogen deposition at the Isle of Portland to Studland Cliffs SAC is predicted to be less than 1 kgN/ha/year within 4 m of the road. The cumulative impact with other projects is predicted to be much greater, at 3 kgN/ha/year at 50 m from the road. The total concentration is predicted to be very similar for the future baseline and ‘with development’ scenarios, which again illustrates that the majority of the increase in deposition is due to the cumulative developments.

3.51 Further discussion of the above impacts is provided in section 9 of this report on natural heritage and the updated shadow appropriate assessment, which is submitted as a stand alone document because the original did not form part of the ES.

Impacts on air quality from the diesel back-up generators

3.52 As set out in the original ES, the proposed development includes diesel back-up generators. These would only be used when the ERF is offline and when power is not available from the grid to provide power for the ERF. These generators are required to ensure that the ERF can be safely shut down in the event that the grid connection is not available, and will normally only need to operate for testing and maintenance purposes. To ensure that the diesel generators will function if required, they will be regularly started for testing purposes and will operate for approximately 30 minutes every two weeks, or 13 hours per year. This is less than 0.2% of the time that the ERF would be running.

3.53 The greatest impacts will generally occur when the atmosphere is stable, which is usually during the early mornings. Testing of the engines would typically occur within standard working hours (08:00-17:00), i.e. generally outside the worst case conditions for dispersion. The diesel generators would be located on the shore side of the main building, with a short stack. Therefore, the emissions from the generators will be limited to a very small area close to the building, away from any areas of public or ecological exposure and well away from where the impacts from the ERF would occur. This will not lead to a significant effect on the local environment.

Impacts on air quality at specific human health receptors

3.54 The original air quality assessment in the ES was based on the maximum predicted impact at any grid point using all five years of weather data. Impacts were presented for the point of maximum impact, noting that this occurred at sea. The total concentration (the PEC) was also presented, which was calculated as the contribution from the ERF and the contribution from background sources. For some pollutants, additional analysis was carried out to determine the maximum concentration from process emissions on land and at any area identified as containing residential properties. These residential properties included HMP The Verne.

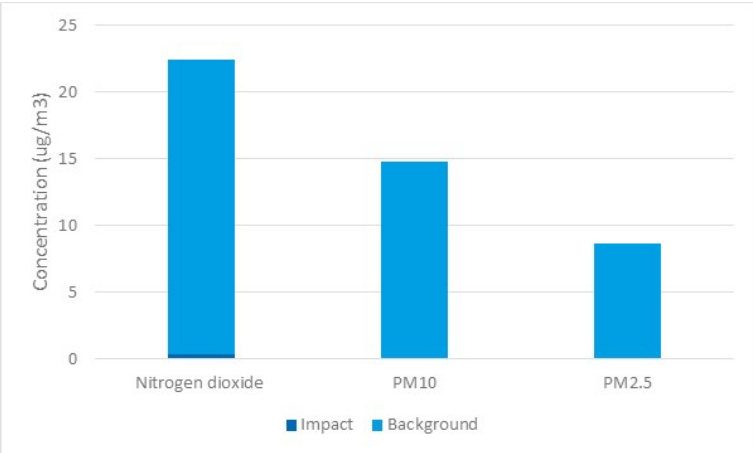
3.55 To satisfy the requirement of the Environment Agency for information on impacts at specific human health receptors, as part of the 'duly making' checks for the environmental permit application a short technical note was submitted (see appendix 3.3). This presented the impact at a number of residential properties, including HMP The Verne. As this was produced for permitting, no reference was made to the assessment methodology used in the ES and the magnitude of change was not set out. The results were presented for those impacts for which process emissions at the point of maximum impact were greater than 1% of the AQAL.

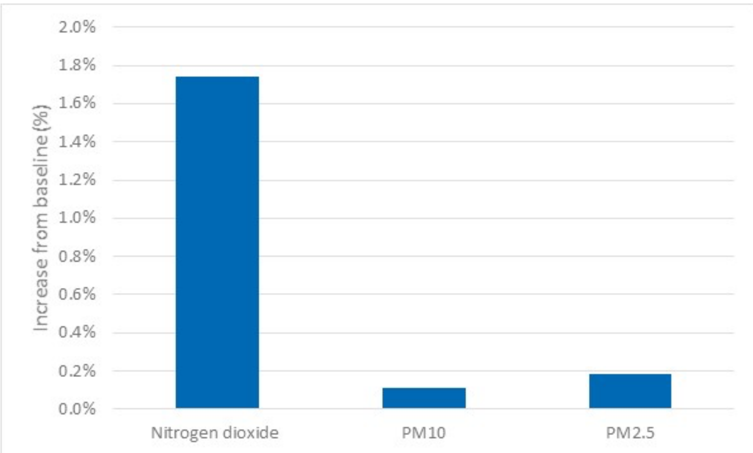
3.56 In summary, at the maximum impacted receptor:

- The impact of annual mean NO_2 emissions is predicted to be 0.97% of the AQAL and the PEC is predicted to be 56% of the AQAL. On this basis, the magnitude of change can be described as negligible
- The impact of annual mean volatile organic compound (VOC) emissions is predicted to be 0.92% of the AQAL for benzene, and the PEC is predicted to be 6.3% of the AQAL for benzene. On this basis, the magnitude of change can be described as negligible. This conservatively assumes that the entire VOC emissions consist only of benzene
- The impact of annual mean VOC emissions is predicted to be 2.05% of the AQAL for 1,3-butadiene and the PEC is predicted to be 6.1% of the AQAL for 1,3-butadiene. On this basis, the magnitude of change can be described as negligible. This conservatively assumes that the entire VOC emissions consist only of 1,3-butadiene
- The impact of annual mean cadmium emissions is predicted to be 1.8% of the AQAL if it is assumed that the entire cadmium and thallium emissions consist of only cadmium, and 0.15% of the AQAL if the ERF was to perform similarly to other ERFs. On this basis, the magnitude of change can be described as negligible
- The impact of short term NO_2 and SO_2 emissions is predicted to be greater than 10% of the AQAL if it is assumed that the ERF operates at the half-hourly emission limit value set in the Industrial Emissions Directive. However, if it is assumed that the ratio between short term and long term emissions would be the same as in the Industrial Emissions Directive, taking into account the lower emissions limit value introduced by the Waste Incineration BREF, the impact would be less than 10% of the AQAL. On this basis, the magnitude of change can be described as negligible

3.57 The maximum impacted receptor in all cases is R4, which is used in the technical note to represent HMP The Verne. The AQALs have been set to protect human health and account for vulnerable populations. The impact of emissions from the ERF at HMP The Verne is very small and is assessed as negligible and not significant.

3.58 For completeness, the following graphs show the baseline concentrations of NO_2, PM_{10} and $PM_{2.5}$ at HMP The Verne and the additional contribution from the ERF to demonstrate that the change in impact is minimal. This assumes that the ERF continually operates at the proposed emission limits, when in reality the ERF will be offline for periods of maintenance and will operate below the emission limits to ensure compliance with the environmental permit. This also conservatively assumes that the entire emissions of particulate matter consist only of PM_{10} or $PM_{2.5}$.





3.59 The additional modelling prepared by Fichtner Consulting Engineers Ltd in response to the Environment Agency's request confirms that there will be no significant adverse air quality effects at sensitive receptors in the vicinity of the proposed ERF as a result of process emissions from the plant.

Assessment of effects associated with the provision of district heating

3.60 The installation of the district heating pipes will be undertaken in accordance with standard working practices and appropriate mitigation will be put in place through a construction environmental management plan (CEMP) to minimise dust generation, as will be the case for the proposed ERF as a whole. As a result, there is no potential for significant cumulative effects on air quality to arise from the provision of district heating.

Conclusions

3.61 The additional air quality information and assessment has not identified any significant effects on sensitive human or ecological receptors in the vicinity of the proposed ERF. Given this, and the fact that no significant cumulative effects are predicted as a result of the provision of district heating, the conclusions of the original ES chapter that there will be no significant air quality effects remain valid and unchanged.

4 Carbon balance and greenhouse gas emissions

Introduction

4.1 Dorset Council's letter requested the following additional information and clarification in relation to carbon balance and greenhouse gas emissions:

- Additional information on the baseline scenarios requested by the council. These should have particular reference to points raised through the consultation on the robustness of the carbon balance scenarios set out in the current version of the ES. Additional clarification should also be provided in respect of the approach to carbon capture for the facility itself, and the circumstances under which it might be installed and operated (point 22 in the council's letter)
- A report has been submitted by UKWIN, which makes a variety of technical points in relation to the suitability of the proposed technology and the robustness of some of the claims made in respect of its effectiveness and environmental benefits. An assessment should be made of the technical points made in this report, and an appropriate response should be provided in respect of the issues raised (point 23)

4.2 Fichtner Consulting Engineers Ltd, who undertook the carbon balance and greenhouse gas emissions assessment for the original ES, has prepared an updated assessment report to provide the additional information on the baseline scenarios requested by the council (point 22 in the council's letter). This replaces the original assessment that formed technical appendix E to the ES, with amendments from the original shown as track changes. The full report is contained in appendix 4.1 and its findings are summarised in this section.

4.3 Fichtner Consulting Engineers Ltd has prepared a technical note providing clarification of the potential approach to carbon capture at the proposed development (point 22). As this is a clarification of the potential ways in which carbon capture could be installed and operated at the proposed ERF in the future, it is not considered to comprise 'further environmental information' under Regulation 25. The technical note is therefore submitted as a stand alone document.

4.4 Fichtner Consulting Engineers Ltd has also reviewed the UKWIN report and produced a response to the issues raised (point 23 in the council's letter). As this forms a response to consultee comments, it is considered to be a clarification rather than the provision of 'further environmental information' under Regulation 25. The response is therefore contained within the CRSD.

Alternative assessment scenarios

4.5 As requested by Dorset Council, the carbon emissions from the proposed ERF have been compared with four alternatives:

- Sending the refuse-derived fuel (RDF) to other ERFs in the UK
- Sending the RDF to other ERFs overseas

- Sending the RDF to an ERF constructed at one of the four alternative sites allocated in the adopted Bournemouth, Christchurch, Poole and Dorset Waste Plan (2019)
- Continuing to manage the waste under Dorset Council's existing arrangements

4.6 This updated assessment replaces the assessment in paragraphs 5.36 to 5.51 of the original ES chapter 5: Carbon balance and greenhouse gas emissions. It focuses on the treatment of waste generated in Dorset.

Portland ERF

4.7 The proposed ERF is 60 km from Canford Magna mechanical biological treatment (MBT) plant, which currently produces around 82,600 tonnes of RDF per year. Considering the other main conurbations in Dorset, the proposed ERF is a similar distance away from Poole and Bournemouth, but only 20 km from Dorchester. This suggests that Dorset waste would travel around 55 km on average to the site. In order to present a fair comparison, the carbon emissions for the proposed ERF have been calculated using this distance, rather than the 160 km used in the comparison with landfill emissions. This gives waste transport emissions of 673 tonnes of carbon dioxide equivalent (tCO_2e) per year. All other emissions are unchanged from the original assessment.

Other ERFs

4.8 The direct carbon emissions from combusting waste are the same whether it is combusted at Portland or elsewhere. This means that, from a carbon perspective, the only differences between ERFs at different locations are the impacts from transporting waste and any differences in the carbon displaced by generating power or heat. These differences are set out below for the different ERFs and then the results for all the ERFs are presented in a single table for comparative purposes.

Existing UK ERFs

4.9 The primary focus of this part of the assessment is on RDF produced at the Canford Magna MBT plant. The remaining waste for the proposed ERF could come from a wider catchment area in Dorset, which could be closer to or further away from the alternative ERF. Two existing ERFs and one that will shortly be operational have therefore been compared with the proposed ERF.

4.10 Marchwood ERF is the closest alternative and is currently used by Dorset Council. It is 47 km from Canford Magna, 50 km from Bournemouth and 80 km from Dorchester, which means that waste would be transported around 50 km on average, giving waste transport emissions of 612 tCO_2e per year. According to its 2019 annual report to the Environment Agency, the Marchwood ERF exported 582 kwh/te of waste processed. It is unclear what the net calorific value (NCV) of this waste was but, given that Marchwood ERF treats residual household waste, it is likely to be around 10 MJ/kg, which is consistent with the NCV for the proposed ERF in the maximum capacity case. This gives an efficiency of 20.95%.

4.11 Lakeside ERF near Slough is currently used by Bournemouth, Christchurch and Poole (BCP) Council for waste from Poole. It is around 145 km away from Bournemouth and Canford and 181 km from Dorchester, which means that waste would be transported around 150 km on average, giving waste transport emissions of 1,836 tCO_2e per year. Lakeside ERF did not report its power generation to the Environment Agency in 2019. However, according to its application for R1 status in 2014, it has a net electrical efficiency of 23.5%, which means that it would be expected to export 16.4 MWe when processing the same waste as the proposed ERF.

4.12 The Bridgwater gasification plant is currently under construction and will have a capacity of around 112,000 tonnes per year. Bridgwater is included in the future Dorset baseline section below, rather than this section, because it is not large enough to be a direct alternative to the proposed Portland ERF. Once it is operational, the Bridgwater plant is expected to receive waste from Canford Magna, although this would be replaced by the proposed Portland ERF if consented. Bridgwater is around 120 km from Canford Magna, which gives waste transport emissions of 1,469 tCO_2e per year for 182,640 tonnes of waste. This figure is included for direct comparative purposes with the proposed Portland ERF, as the Bridgwater plant will not actually be able to process this much waste. According to its environmental permit decision document, the Bridgwater plant has a net electrical efficiency of 22.14%, which means that it would be expected to export 15.44 MWe if it could process the same waste as the proposed ERF.

Other ERFs in Europe

4.13 Comparing the carbon emissions for waste exported to ERFs in Europe is complex, because there are several significant uncertainties in relation to transport emissions, the type of electricity displaced and the potential for exporting heat. If the RDF was exported to Europe from Southampton, the road transport distance would be similar to that for the proposed development, so it is assumed that the road transport emissions would be identical (612 tCO_2e). Shipping 183,000 tonnes of RDF from Southampton to Rotterdam is estimated to generate 834 tCO_2e per year, while shipping the RDF to Gothenburg would generate 2,387 tCO_2e per year.

4.14 The type of electricity displaced depends on the country the RDF is sent to. However, overall it is likely that generation of electricity from RDF in Europe would lead to a reduction in fossil fuel generation similar to that in the UK. The main difference between the proposed Portland ERF and facilities in Europe relates to heat export. More European plants are connected to district heating systems than UK plants and many are connected to extensive systems with multiple heat sources and users. Therefore, there is more potential for heat displacement for European plants. It has been assumed that European plants export three times as much heat as is assumed for the proposed Portland ERF, giving a heat efficiency of 9.84%. It has also been assumed that the European plants have the same electrical efficiency as Portland, but that this would be reduced by the additional heat export, giving an electrical efficiency of 20.3%.

4.15 It should be noted that European ERF plants, particularly those linked to district heating schemes, are likely to be running at capacity with significant quantities of waste still being sent to landfill. This means that burning UK waste in these plants means that some other European waste is not being burned and is probably being landfilled. This factor has not been taken into account.

Other ERFs in Dorset Waste Plan

4.16 The assessment assumed that an ERF constructed on one of the alternative sites in the Dorset Waste Plan would be identical to the proposed Portland ERF. This meant that the only differences, in carbon terms, would be the distance travelled to deliver waste, the potential for exporting heat and the potential for exporting power directly to users. It did not take into account whether such a facility would be deliverable on the other sites.

4.17 The Eco Sustainable Solutions site in Parley has some potential for district heating, but no specific heat users have been identified. It is 10-15 km from Poole and Bournemouth, 50 km from Dorchester and 16 km from Canford Magna MBT plant. This suggests that Dorset's waste would travel around 15 km on average, releasing 184 tCO_2e per year.

4.18 The Canford Magna, Poole site has the potential to supply district heating to Magna Business Park, but no specific heat users have been identified. The site already includes the MBT plant, so the RDF produced by this plant could be processed in an ERF with no transport emissions. The site is 10-15 km from Poole and Bournemouth and 40 km from Dorchester. Allowing for zero transport for the RDF already present, this suggests that Dorset waste would travel around 10 km on average, releasing 122 tCO_2e per year.

4.19 The Mannings Heath Industrial Estate, Poole site has the potential to supply district heating within the industrial estate, but no specific heat users have been identified. The site is 10 km from the centres of Poole and Bournemouth, 40 km from Dorchester and 6 km from Canford Magna MBT plant. This suggests that Dorset waste would travel around 10 km on average, releasing 122 tCO_2e per year.

4.20 The Binnegar Environmental Park in East Stoke does not have any potential district heating customers. It is 20-30 km from Dorchester, Poole and Bournemouth and around 24 km from Canford Magna MBT plant. This suggests that Dorset waste would travel around 25 km on average, releasing 306 tCO_2e per year.

Results for alternative ERFs

4.21 The results for the different ERFs are set out in table 4.1. For the proposed ERF, three cases are shown:

- Base case (export of electricity to grid only)
- With shore power (SP)
- With shore power and district heating (SP + DH)

4.22 These are then presented in order of net emissions, showing the difference from the base case.

ERF	Transport (tCO_2e)	Heat offset (tCO_2e)	Power offset (tCO_2e)	Direct emissions (tCO_2e)	Net emissions (tCO_2e)	Difference from base case (tCO_2e)
Marchwood	1,381	0	-40,807	89,751	50,325	1,570
Portland (base case)	1,442	0	-42,438	89,751	48,755	0
Binnegar	1,075	0	-42,438	89,751	48,388	-367
Parley	953	0	-42,438	89,751	48,265	-490
Canford Magna	892	0	-42,438	89,751	48,204	-551
Mannings Heath	892	0	-42,438	89,751	48,204	-551
Lakeside	2,605	0	-45,770	89,751	46,586	-2,169
Portland + SP	1,442	0	-48,012	89,751	43,182	-5,573
Gothenburg	3,826	-11,190	-39,534	89,751	42,853	-5,902
Rotterdam	2,275	-11,190	-39,534	89,751	41,302	-7,453
Portland + SP + DH	1,442	-4,144	-47,043	89,751	40,006	-8,749

Table 4.1: Comparison of ERF options

4.23 Table 4.1 shows that there is relatively little difference between the UK options. While the Portland ERF (base case of exporting electricity to the grid only) has higher emissions than the other sites in the Dorset Waste Plan, this difference is compensated for by the potential benefits of shore power. Similarly, while the additional transport emissions for shipping waste to Europe are outweighed by the benefits of district heating, the final Portland ERF option incorporating both shore power and district heating has the lowest emissions of all the compared scenarios.

Existing management of Dorset's waste

4.24 As set out in chapter 12 of the original ES, Dorset's residual local authority collected waste (including Bournemouth, Christchurch and Poole) is currently sent outside the county for energy recovery (109,984 tonnes in 2018) or disposal to landfill (51,344 tonnes in 2018). Sending the local authority collected residual waste to the proposed development, together with enough commercial waste from within Dorset to use up spare capacity at the plant, has been assumed for the purposes of the assessment to divert waste from the following three routes:

- 20,000 tonnes of waste sent to ERFs in the UK. It has been assumed that half the waste is sent to Marchwood and half to Lakeside
- 80,000 tonnes of RDF sent to ERFs in Europe. It has been assumed that the waste goes to a plant in the Netherlands
- 82,000 tonnes of waste sent to landfill in the UK (101,912 tonnes in the maximum case). This is considered in the main assessment of the original ES chapter

4.25 These three routes have been combined to form a new baseline, which is compared with the proposed development in table 4.2.

Parameter	Tonnes CO_2e per year (nominal capacity)	Tonnes CO_2e per year (maximum capacity
Baseline (existing Dorset waste management)		
Releases from landfill gas	37,099	45,001
Transport of waste and outputs to landfill	443	546
Offset of grid electricity from landfill gas engines	-4,986	-6,048
Total landfill emissions	**32,556**	**39,500**
Transport of waste to and outputs from alternative ERFs	1,217	1,211
Offset of heat from alternative ERFs	-4,901	-4,433
Offset of grid electricity with alternative ERF generation	-22,057	-19,952
Emissions from the alternative ERFs	49,141	41,385
Total alternative ERF emissions	**23,400**	**18,211**
Total baseline emissions	**55,957**	**57,711**
Proposed ERF		
Transport of waste to and outputs from the ERF	1,442	1,582
Offset of grid electricity with ERF generation	-42,438	-42,438
Emissions from the ERF	89,751	83,562
Total ERF emissions	**48,755**	**42,705**
Net benefit of the proposed ERF	**7,202**	**15,006**
Net benefit with shore power, 2024	11,840	19,644
Net benefit with shore power, 2045	12,775	20,579

Table 4.2: Summary comparison with existing management of Dorset's waste

4.26 In summary, the benefit of the proposed Portland ERF over the current residual waste management approaches for Dorset's waste is estimated to be around 7,200 tCO_2e per year, increasing to 15,000 tCO_2e per year in the maximum case with lower NCV waste. It should also be noted that these calculations do not take account of the additional benefits that would be provided by shore power from the proposed Portland ERF, which would displace a further 4,500 to 5,500 tCO_2e per year, or the potential benefit of district heating, which would displace around a further 3,000 tCO_2e per year.

4.27 The sensitivity of these results to the grid displacement factor for electricity and the landfill gas capture rate has been considered, based on the assumption that the grid displacement factor for all electricity generated by all plants is the same. The full results are set out in appendix 4.1, but in summary it was found that there is a benefit for all landfill gas capture rates and grid displacement factor combinations except for a scenario with a very high landfill gas capture rate with no export of power to ships. This is a very unlikely combination of circumstances.

Future management of Dorset's waste

4.28 Once the Bridgwater ERF is operational, it is understood that the RDF from Canford Magna will be transported to Bridgwater rather than to Europe. Therefore, an alternative baseline has been considered for Dorset's waste where 80,000 tonnes per year of RDF is sent to the Bridgwater ERF rather than Europe. This future baseline is compared with the proposed development in table 4.3.

Parameter	Tonnes CO_2e per year (nominal capacity)	Tonnes CO_2e per year (maximum capacity
Baseline (future Dorset waste management)		
Releases from landfill gas	37,099	45,001
Transport of waste and outputs to landfill	443	546
Offset of grid electricity from landfill gas engines	-4,986	-6,048
Total landfill emissions	**32,556**	**39,500**
Transport of waste to and outputs from alternative ERFs	1,201	1,195
Offset of heat from alternative ERFs	0	0
Offset of grid electricity with alternative ERF generation	-23,628	-21,373
Emissions from the alternative ERFs	49,141	41,385
Total alternative ERF emissions	**26,714**	**21,207**
Total baseline emissions	**59,271**	**60,707**
Proposed ERF		
Transport of waste to and outputs from the ERF	1,442	1,582
Offset of grid electricity with ERF generation	-42,438	-42,438
Emissions from the ERF	89,751	83,562
Total ERF emissions	**48,755**	**42,705**
Net benefit of the proposed ERF	**10,516**	**18,002**
Net benefit with shore power, 2024	15,154	22,640
Net benefit with shore power, 2045	16,089	23,575

Table 4.3: Summary comparison with future baseline management of Dorset's waste

4.29 In summary, the benefit of the proposed Portland ERF over the future residual waste management approaches for Dorset's waste is estimated to be around 10,500 tCO_2e per year, increasing to 18,000 tCO_2e per year in the maximum case with lower NCV waste. It should also be noted that these calculations do not take account of the additional benefits that would be provided by shore power from the proposed Portland ERF, which would displace a further 4,500 to 5,500 tCO_2e per year, or the potential benefit of district heating, which would displace around a further 3,000 tCO_2e per year.

Lifetime benefit

4.30 The lifetime benefit of the proposed ERF compared to the baseline of sending waste to landfill remains as originally assessed in paragraph 5.34 of the ES at around 62,000 tCO_2e based on an illustrative, conservative calculation. The lifetime benefit compared to the current baseline for Dorset's waste has also now been calculated and is estimated to be 157,548 tCO_2e, with a net benefit in each year. The original ES conclusion that the proposed development will have a significant beneficial effect as a result of reduced carbon emissions compared to the baseline therefore remains valid and unchanged.

Assessment of effects associated with the provision of district heating

4.31 The carbon benefits associated with the provision of district heating were taken into account in both the original and updated carbon assessments, as set out above, so no further consideration is required.

Conclusions

4.32 The updated carbon assessment has shown that the Portland ERF scenario incorporating both shore power and district heating would have lower carbon emissions than both the UK and European alternatives. The updated assessment also confirmed that the proposed Portland ERF would lead to carbon savings when compared to the existing and potential future management of Dorset's waste. The original ES conclusion that the proposed development will have a significant beneficial effect as a result of reduced carbon emissions compared to the baseline remains valid and unchanged.

5 Community, health and economic effects

Introduction

5.1 Dorset Council's letter requested the following additional information and clarification in relation to effects on health:

- Additional detail responding to issues in respect of potential benefits or impacts upon public health as a result of changes in air quality. In particular, this should address outstanding issues raised by Public Health Dorset (point 5 in the council's letter)
- Further consideration and information in respect of relevant health-related issues raised through representations on the first consultation as appropriate (point 6)

5.2 In addition, the following additional information and clarification was requested in relation to economic effects:

- Additional detail to support the assumptions that lie behind the stated number of additional jobs created (point 33 in the council's letter)

5.3 No additional information or clarifications were requested in relation to community effects.

5.4 ERM, who undertook both the human health risk assessment (HHRA) and health impact assessment (HIA) for the original ES, has prepared addenda to these documents to provide the further information requested by the council in relation to the potential benefits or impacts on public health due to changes in air quality and to address the issues raised by Public Health Dorset (point 5 in the council's letter). The full addenda reports are contained in appendices 5.1 (HHRA) and 5.2 (HIA) and their findings are summarised in this section.

5.5 ERM has also provided responses to the various other health-related issues raised by representations to the consultation (point 6 in the council's letter). These responses are considered to be clarifications, rather than the provision of 'further environmental information' under Regulation 25, so they are set out in the CRSD.

5.6 ERM also undertook the economic assessment and has provided responses to queries on the basis behind the assumptions relating to the number of additional jobs created by the proposed development (point 33 in the council's letter). These responses are considered to be clarifications, rather than the provision of 'further environmental information' under Regulation 25, so they are set out in the CRSD.

Human health risk assessment

5.7 As discussed in section 3, the air quality assessment has been updated to take into account the net change in emissions of NO_x, NO_2, PM_{10}, $PM_{2.5}$ and SO_2 due to the use of shore power provided by the ERF to ships berthed at the port. The results of the updated air quality assessment have been used to update the HHRA. The emissions of metals and dioxins will not be affected by the provision of shore power, so only the assessment of health effects associated with changes in NO_2, PM_{10}, $PM_{2.5}$ and SO_2 has been updated.

5.8 The updated assessment shows that the exposure of the population to $PM_{2.5}$ will decrease compared to the existing baseline, as a consequence of the proposed ERF providing shore power and the associated reduction in emissions from ships berthed at the port. Using the same method to calculate years of life lost as in the original HHRA, this results in a gain of 2.0 years of life distributed across the whole of the exposed population. While those in the highest exposure group would gain the most, the results averaged across the exposed population give a gain of approximately 32 minutes per person per year, or 16.5 hours gained throughout the 30-year lifetime of the plant.

5.9 The decreased exposure to PM_{10} compared to the existing baseline as a result of the provision of shore power and associated reduction in shipping emissions will lead to a negligible improvement in the health of the local population. This will not be significant, and the changes in health will not be discernible in the population, but there will be an overall reduction in the incidence of all the health indicators considered for this pollutant. This reduction ranges from -0.00020 cases of cardiovascular mortality per year to -0.0070 cases of cardiovascular admissions to hospital per year.

5.10 Overall, there will be a net decrease in NO_2 concentrations, although the change will be negligible. This decreased exposure overall, compared to the existing baseline as a result of the provision of shore power, will lead to a negligible improvement in the health of the local population that will not be significant. The changes in health will not be discernible in the local population, but there will be an overall reduction in the incidence of all the health indicators considered for this pollutant. This reduction ranges from -0.0011 cases of cardiovascular mortality per year to -0.022 admissions to hospital due to ischaemic heart disease.

5.11 Unlike the other pollutants, there is still predicted to be a negligible adverse effect on health as a result of increased exposure to SO_2 compared to the existing baseline. However, this will not be significant and will not lead to an additional case of any of the health outcomes considered over the 30-year lifetime of the proposed development. The annual increase in cases ranges from 0.00058 cerebrovascular admissions to hospital to 0.0087 cardiovascular admissions.

5.12 Overall, the health effects associated with emissions of NO_2, SO_2, PM_{10} and $PM_{2.5}$ from process emissions, transport and the provision of shore power will be negligible and not significant.

Health impact assessment

5.13 The HIA addendum took account of the findings of the updated air quality assessment and HHRA and addressed the following topics that were raised by stakeholders during the consultation:

- Potential for differential or disproportionate impacts on the mental health and wellbeing of the local population

- Potential for differential or disproportionate impacts as a result of existing health inequalities within the local population
- Potential for impacts on the resident 'static' inmate population at HMP The Verne

5.14 The study identified several existing health inequalities in the Weymouth and Portland area that could mean people are more susceptible to health impacts, including a higher proportion of older residents, high levels of deprivation and unemployment in some areas, relatively high levels of some health conditions, including depression, hypertension, diabetes and cancer, and the presence of vulnerable groups, including prison inmates and homeless people. The assessment followed the structure of the original HIA, although social capital and accidents and trespass were not assessed because they were sufficiently covered in the original assessment and no further potential issues were identified.

5.15 As discussed in section 3, the air quality modelling shows that there will be no significant health effects on the occupants of HMP The Verne as a result of the proposed development, either from increased traffic or operational emissions, as changes in the concentrations of all pollutants will be negligible and not significant.

5.16 The updated HIA states that, while there is currently no evidence directly linking waste disposal facilities to negative health effects, it is understood that the perceived air quality risk can lead to effects on anxiety levels and mental wellbeing. It is therefore important that engagement and ongoing communication are undertaken with local communities to minimise this. A local liaison group will be established, which will meet on a regular basis to discuss the operation of the ERF and any potential issues or queries from members of the local community. It will provide a forum for community stakeholders to be informed and consulted regarding site operations and procedures.

5.17 Measures that will be put in place through the framework CEMP (see technical appendix C of the original ES) to minimise construction noise will ensure that there will be no significant health effects on the occupants of HMP The Verne during construction. To reduce anxiety associated with construction activities, it will be important that engagement and ongoing communication are undertaken, including establishing a contact point to report any noise disturbance.

5.18 The updated HIA notes that consistent heightened noise levels can affect the health of local people through stress, annoyance and a decreased sense of wellbeing. The updated noise assessment confirmed that the proposed development will not generate significant operational noise, as levels will be controlled through the design of the building and the site layout. The low levels of operational traffic mean that no significant traffic noise effects are predicted. The updated HIA confirms that no significant adverse effects are predicted on health and wellbeing as a result of noise.

5.19 The risk to the health of local communities, particularly those of an older demographic or experiencing other health inequalities, may rise as a result of increased HGV movements on the local road network. During construction, as set out in the framework CEMP, the contractor will be responsible for liaising with the local community to ensure that there is awareness of when and what

HGV deliveries will be required and to identify any constraints or mitigation required to address the specific needs of the community. However, the worst case scenario of an additional 80 HGV movements per day (40 each way) during and post-construction equates to an average of one additional HGV every 15 minutes and the traffic and transport assessment confirms that there will be negligible effects on pedestrian severance, delay and amenity. As a result, it is not expected that traffic associated with the proposed development will exacerbate mental health issues or current health inequalities within the local communities.

5.20 The updated HIA states that the visual presence of industry can lead to feelings of dissatisfaction, as well as stress, anxiety and concern. As the proposed development is located in an industrial port that is not accessible to the public, where there is already constant activity, and construction works will be temporary, no significant effects are predicted on local mental health and wellbeing, including at HMP The Verne. The design of the building has been carefully considered to minimise visual impacts and no significant adverse effects are predicted on population health and wellbeing post-construction as a result of changes to views.

5.21 Health benefits will be experienced for the duration of the employment generated by the proposed development, both during and post-construction, and would be most beneficial to those currently experiencing socio-economic deprivation, economic inactivity or unemployment within the area. Opportunities to target employment within these sections of the community should be maximised wherever possible. In addition to income and improved socio-economic status, health benefits such as delayed mortality, decreased illness and improved wellbeing can be experienced by those employed during the operational phase and will be of longer term benefit. This could contribute to reducing some of the current health inequalities present in the area.

5.22 The updated HIA sets out recommendations for ongoing engagement with local communities and wider stakeholders and concludes that advance visibility, engagement and ongoing liaison should mitigate potential increases in anxiety arising from project-related activities. It highlights that mitigation measures will be integrated into the building design, the CEMP and construction management planning to minimise the potential for adverse effects on health and wellbeing. This will include the publication of the CEMP, adoption of contact mechanisms during construction and advance notification of proposed works.

5.23 In advance of construction, specific engagement will be undertaken with HMP The Verne to minimise the potential for adverse effects on health and wellbeing. In particular, this will address the potential for anxiety over proposed construction activities. The proposed development will be subject to strict regulatory controls and the requirement for ongoing monitoring of various activities, including emissions. To reduce potential anxiety, consideration should be given to the periodic publication of environmental monitoring data that local communities, and wider stakeholders, can access via the project website.

Assessment of effects associated with the provision of district heating

5.24 The main potential health impacts associated with the provision of district heating relate to noise during installation, particularly at HMP The Verne given that it is envisaged that the district heating pipes will be connected into the prison. Consideration and control of vibration impacts will be required during installation, due to the close proximity of the road network to dwellings. There is also the potential for concern around access to the nearby healthcare facilities, as the installation of pipes within local road networks could lead to disruption during the works. It is therefore important that engagement and ongoing communication are undertaken to reduce anxiety associated with these construction activities, including establishing a contact point to report disturbance.

5.25 As discussed above, the presence of construction works can lead to feelings of dissatisfaction, as well as stress, anxiety and concern. In this case, the construction impacts will be short term and temporary and are therefore unlikely to lead to significant effects on the mental health and wellbeing of local residents and inmates at HMP The Verne. Temporary works within the local road network, similar to those undertaken during other utility works, are also not considered likely to affect local property prices. No significant cumulative community and health effects are predicted as a result of the provision of district heating.

5.26 The provision of district heating was taken into account in the original economic assessment, so no further consideration is required.

Conclusions

5.27 The additional information and assessment provided in the updated HHRA and HIA did not identify any significant health effects. Given this, and the fact that no significant cumulative effects are predicted as a result of the provision of district heating, the conclusions of the original ES chapter that there will be no significant adverse community and health effects remain valid and unchanged. The findings of the economic assessment also remain the same.

6 Cultural heritage

Introduction

6.1 Dorset Council's letter requested the following additional information and clarification in relation to cultural heritage effects:

- Further detail and assessment in respect of specific mitigation measures proposed to mitigate potential harm caused to the historic environment from the proposal, which should have regard to impacts on the setting of designated heritage assets. Proposals for mitigation should include the consideration of a footpath link on Port land immediately beneath the prison (point 7 in the council's letter)
- Assessment of potential impacts on footpath S3/72, which runs past the Royal Naval Cemetery, in relation to the potential impacts on the historic environment (point 8)
- Further consideration and information in respect of relevant historic environment-related issues raised through representations on the first consultation as appropriate (point 9)

6.2 Terence O'Rourke Ltd, who undertook the cultural heritage assessment for the original ES, has prepared a framework heritage mitigation strategy outlining the proposed contents and broad principles for heritage mitigation, which provides the further information requested by the council in relation to specific mitigation measures to mitigate potential harm to the historic environment (point 7 in the council's letter). The framework heritage mitigation strategy is contained in appendix 6.1 and its key elements are summarised in this section. In addition, Terence O'Rourke Ltd has assessed the potential impacts on footpath S3/72 in relation to the historic environment (point 8 in the council's letter). The assessment is contained in this section.

6.3 Terence O'Rourke Ltd has also provided responses to the various other historic environment issues raised by representations to the consultation (point 9 in the council's letter). These responses are considered to be clarifications, rather than the provision of 'further environmental information' under Regulation 25, so they are set out in the CRSD.

Further mitigation measures to address cultural heritage effects

6.4 The framework document in appendix 6.1 sets out the structure and broad principles for a heritage mitigation strategy to mitigate effects on the setting of the East Weare batteries, which will be secured through a planning condition. The works proposed include scrub clearance and agreed repairs and removal of risk factors to enable E Battery East Weare (a scheduled monument and grade II listed structure) to be removed from the Historic England Heritage at Risk Register. Appropriate public presentation of the monument will also be provided, allowing curated visits only.

6.5 The strategy also proposes a footpath extension to allow an 'around the island' circuit of the coastal path by creating a new section of permissive footpath through currently inaccessible parts of the secure port estate to connect to existing publicly accessible land and rights of way. The path will be fenced and will be wide enough to allow access for maintenance vehicles and ongoing management of the Isle of Portland Site of Special Scientific Interest (SSSI). The additional access path can be secured by planning obligation.

6.6 Interpretation will be provided for the group of related heritage assets at East Weare (A-E batteries, the former detention camp and the undesignated World War II features). Information boards will be provided at specific viewing areas, one relating to E battery and one allowing clear views of the wider group of assets. The boards will be designed to integrate with the existing interpretation in the area, such as the Portland stone features at the Fancys Farm open space at the top of Incline Road.

6.7 Five proposed stages of work are identified for E battery: preliminary surveys to determine the vegetation clearance required to allow access for surveyors and provide an initial assessment of potential ecological issues; enabling works and a condition survey, including determining the vegetation clearance required, obtaining any necessary ecological licences and carrying out the full condition survey; development and agreement of the proposed works, scheduled monument consent application to Historic England and obtaining any further ecological licences; undertaking the main works; and annual maintenance and five-yearly inspections of the battery. Further information on the potential for ecological effects and associated mitigation is provided in section 9 of this ES addendum.

6.8 Three proposed stages of work are identified for the new permissive footpath: the planning stage, including confirming ecological surveys, producing documentation and obtaining necessary consents and licences; undertaking the works, including vegetation clearance, installation / repair of fences and gates, path treatments and security; and monitoring, inspection and future maintenance. Further information on the potential for ecological effects and associated mitigation is provided in section 9 of this ES addendum.

6.9 The mitigation strategy that will be produced based on the framework at appendix 6.1 is focused on the E battery above the site at East Weare, which is both a scheduled monument and listed at grade II. The proposed works of vegetation clearance and repair will allow the removal of the monument from the national Heritage at Risk Register. In addition, the provision of interpretation of the battery, both individually and as part of the wider group of defences across East Weare, will enable improved public appreciation and understanding of the monument. The slight to moderate, significant adverse effect of the proposed ERF as a result of the changed qualities and character of the setting predicted in chapter 7 of the original ES will therefore be fully mitigated, removing the predicted significant adverse residual effect.

6.10 Other elements of the strategy relate to the connecting of footpaths S3/72 and S3/81 by creating a fenced section of new permissive path through the secure port estate, linking together the sections of the public footpath and coastal path around East Weare. The new path will provide a sequence of new vantage points, allowing views across East Weare and improved appreciation of the range of military features, their setting and the connections between them. The path will also allow a full circuit of The Verne Citadel and create new publicly accessible views of the east side of the fortress, above the cliff face. The provision of an integrated programme of interpretation will enable improved public appreciation and understanding of the assets and of their shared functional and historic setting on the coastline below the citadel.

6.11 The group of heritage assets at East Weare includes both the scheduled monuments and listed buildings and a number of non-designated assets (see figures 7.1-7.3 in the original ES and figure 1 attached to the framework strategy in appendix 6.1). In accordance with figure 7.4 of the original ES, these range from high to low importance. The alteration to the significance of the heritage assets at East Weare because of the enhanced public access and new opportunities for appreciation and understanding of the assets and their setting will be a small to medium change to assets of high to low importance, which will result in a long term, moderate, significant beneficial effect.

Impacts on public footpath S3/72

6.12 Footpath S3/72 currently leads up to the port security fence (new ES figures 9.46 and 9.47 in appendix 8.2 show the boundaries of the port estate). It was formerly known as Cemetery Road and followed a route around the base of the natural escarpment, straightened and embanked at some points, and opening out to the levelled area at the Royal Naval Cemetery. The cemetery was established in 1876 by the War Office to serve both the garrison at The Verne Citadel and the Royal Navy using the harbour refuge. It was transferred to Admiralty in 1907 and remained part of the naval base until it closed. It is owned by the Ministry of Defence, is still in use and is maintained by the Commonwealth War Graves Commission.

6.13 There is a series of open areas and vantage points on the west portion of the path that allow extensive views across the residential areas to the north, the harbour and breakwaters, Osprey Quay and the marina, Portland Beach Road and the coastline beyond; and closer views of The Verne Citadel above (see the photographs in figure 7.10 of the original ES). For much of its length to the east once beyond the cemetery, views are largely obscured by the scrub growth closely bordering the path.

6.14 The requested assessment of the potential effects on the footpath relating to the historic environment concerns the quality of the experience and the value of the footpath in enabling views that allow appreciation and understanding of the cemetery itself and the assets relating to the military use of the north east part of Portland. These are, *inter alia*, The Verne Citadel and the harbour within the breakwaters. The only one of the group of batteries at East Weare that can currently be seen from the path is E battery, which is largely obscured by vegetation. These views are a minor element of the significance of the designated and non-designated assets, which range from high to low importance.

6.15 The change to the quality of the experience of the historic environment from the footpath as a result of visual changes because of the proposed ERF development will be a negligible magnitude of change to assets of high to low importance, which will result in a long term, negligible to slight adverse effect that will not be significant.

6.16 The extension of the footpath around East Weare and the clearance and presentation of E battery, with some controlled curated public access, will increase the value of the footpath as the focus for public appreciation of the wider group of assets within the secure port estate. The change to the quality of the experience of the historic environment as a result of the extension completing the circuit around the island will be a small magnitude of change to assets of high to low importance, which will result in a long term, slight to moderate, significant beneficial effect.

Assessment of effects associated with the provision of district heating

6.17 As the district heating pipes will run within the local road network, no significant effects are predicted on archaeology or built heritage as a result of their installation. It is intended that the pipes will be routed into the prisons using the existing utility ducts, so it is not envisaged at this stage that works would be required to the listed structures or the citadel scheduled monument at HMP The Verne, with the exception of the installation of the pipes within the highway along the Glacis where it passes within the scheduled monument designation. Once the final routeing of the pipes is confirmed, the necessary consents for any works required would be part of the future planning submissions.

Conclusions

6.18 The measures set out in the detailed heritage mitigation strategy to be developed based on the framework (appendix 6.1) will remove the slight to moderate, significant adverse residual effect on the East Weare batteries scheduled monument and listed structure. The other elements of the strategy, relating to the improved public access and interpretation and opportunities for greater appreciation and understanding of the range of assets across East Weare, are predicted to result in a moderate, significant beneficial effect.

6.19 The assessment of the potential for effects on footpath S3/72 in relation to the historic environment concludes that the change to the experience of the historic environment from the footpath as a result of the visibility of the ERF development will be a negligible to slight adverse effect that will not be significant. The change to the experience of the historic environment because of the extension of the footpath around East Weare is predicted to result in a slight to moderate, significant beneficial effect.

6.20 All the other residual cultural heritage effects remain as assessed in the original ES and no additional significant cumulative effects are predicted as a result of the provision of district heating.

7 Ground conditions and water quality

Introduction

7.1 Dorset Council's letter requested the following additional information and clarification in relation to ground conditions effects:

- Further information in respect of suitability of the site to accommodate the proposed development in terms of historic contamination, geology and ground stability (point 29 in the council's letter)

7.2 In addition, the following additional information and clarification was requested in relation to surface water discharge:

- Further detail in respect of the acceptability of the sea outfall, addressing the comments of Dorset Council Flood Risk Management Team explaining how the issues raised will be addressed and overcome (point 27 in the council's letter)
- Further consideration and information in respect of relevant surface water management issues raised on the first consultation as appropriate (point 28)

7.3 No further information was requested in relation to effects on water quality.

7.4 Arup, who undertook the ground conditions assessment for the original ES, has produced a report to provide the further information requested by the council on geology and ground stability (point 29 in the council's letter). The full report is contained in appendix 7.1 and its findings are summarised in this section. Arup has also provided responses to the historic contamination issues raised by representations to the consultation, which confirm that sufficient information was provided in the original ES. These responses are considered to be clarifications, rather than the provision of 'further environmental information' under Regulation 25, so they are set out in the CRSD.

7.5 Awcock Ward Partnership (AWP), who prepared the original flood risk assessment (FRA) and surface water drainage strategy, has produced an addendum to the FRA demonstrating that, subject to additional attenuation, the surface water runoff from the site can be drained via existing outfalls to Balaclava Bay and Portland Harbour (point 27 in the council's letter). Its key elements are summarised in this section and, as the FRA and surface water drainage strategy report did not form part of the original ES, the FRA addendum is submitted as a stand alone document.

7.6 AWP has also provided responses to the various surface water management issues raised by representations to the consultation (point 28 in the council's letter). These responses are considered to be clarifications, rather than the provision of 'further environmental information' under Regulation 25, so they are set out in the CRSD.

Further detail on surface water drainage

7.7 Surveys of the existing drainage outfalls and hydraulic modelling have been undertaken to determine the capacity of the outfalls and the peak flow rates for up to a 1-in-100 year storm, including a 40% allowance for climate change. This confirmed that the two eastern drainage outfalls into Balaclava Bay have sufficient capacity to drain the clean roof runoff from the proposed development. However, the northern outfall into Portland Harbour was only found to have sufficient capacity to drain the treated runoff from the roads, parking areas and service yard for up to a 1-in-2 year storm.

7.8 Beyond this, the network would become overwhelmed and up to 230 m^3 of flood volume would occur in the event of a 1-in-100 year storm. It is considered that the 1-in-2 year storm capacity would drain the first flush from a storm with a greater return period, thereby reducing the risk of pollution from overland exceedance flows. The surface water drainage strategy has been revised to include an offline geo-cellular attenuation tank beneath the proposed car park in the north east of the site, which can provide up to 230 m^3 of water storage. The FRA addendum therefore concludes that the proposed drainage system will ensure that there will be no significant increase in flood risk as a result of the proposed development and the ERF will not be at risk from flooding.

Suitability of the site in relation to geology and ground stability

Introduction

7.9 A desk-based review was undertaken of available ground conditions information on slope stability at the site and within the wider Isle of Portland area to assess the potential risk to the proposed ERF. The development site is relatively flat and sits at approximately 7 m above Ordnance datum (AOD). It is bordered to the south west by a hillside that rises inland to approximately 140 m AOD. The hillside comprises an upper steep escarpment of limestone / sandstone over a shallower slope formed of landslip deposits over the underlying bedrock, with a slope angle of around 8 degrees. Towards the base of the hillside, the slope steepens to a gradient of around 30 degrees.

Geology

7.10 As discussed in the original ES, ground investigations were carried out on site by RPS in 2009. The ground conditions on site were recorded to comprise a layer of made ground, approximately 5-8 m thick, marine gravel deposits in the north east corner of the site and a weathered zone of Kimmeridge Clay in the north of the site resting above the Kimmeridge Clay bedrock. While site-specific investigations have not been undertaken on the adjacent hillside, historical British Geological Society borehole logs on the slope indicate the thickness of landslip deposits to be at least 5 m, with some boreholes recording up to 13 m. Evidence from neighbouring sites indicates the presence of a disturbed zone at the top of the Kimmeridge Clay that is associated with historical landslips.

Historical slope stability

7.11 Very slow natural movements occur within the colluvium[(1)] along the slopes. The movement is understood to be aided by coastal erosion, which removes some of the weight at the toe of the slope. The stability of the natural slopes is

[1] Colluvium is material that accumulates at the foot of a steep slope as a result of natural weathering and degradation.

considered to be controlled by the slope angle of the upper surface of the Kimmeridge Clay and the presence of water within the slope. There are considered to be three possible modes of slope failure:

- Deep-seated slumps within the colluvium and fill material
- Along soft clays on the interface between the Kimmeridge Clay and overlying colluvium
- Reactivation of very deep-seated rotational failures through the Kimmeridge mudstone, at depths below the colluvium / Kimmeridge Clay interface

7.12 The Isle of Portland has a history of landslips, with records of slips along the coastline from 1665 to the present day. On the slopes to the west of the site, there are records of four landslips with a well defined deep-seated shallow circular form. Individual shallow movements have been recorded at rates of between 3.5-9 mm per year in the last 50 years. The development of the harbour resulted in extensive cut and fill at the base of the slope and the dredging of the harbour entrances also removed weight from the toe of the slope.

7.13 The only slips indicated to be immediately above the development site were recorded in the 1600s. However, it should be noted that the exact location of these slips is not precisely known and they were just recorded in this general area of the coast. In this part of the Isle of Portland, undercutting of the toe of the slope by sea erosion is considered to be a predominant control on the slope movements. However, because the development site at the base of the slope is formed from reclaimed land, it will be protecting the slope from coastal erosion.

7.14 The coastal slopes to the south of the site, adjacent to the Upper Osprey site, are the most active landslip area on the Isle of Portland. The largest landslide occurred in 1792 following a period of high rainfall and comprised a massive, deep-seated slip. Several more recent failures have occurred in this area, which are predominantly considered to be as a result of poorly executed earthworks and a failure to control water flows properly, rather than due to the natural instability of the slope.

7.15 Surface movement monitoring was undertaken along the north east coast of Portland between 1977 and 1988. The results indicate that shallow movements were occurring on the slopes to the west of the site and deep-seated movements were occurring on the slopes to the south. While the survey points on the slope above the site were limited in number, they indicate a low rate of movement in this area. The records of historical slope movements along the north east coast of the Isle of Portland suggest that the slopes above the site are in a different setting from the areas to the south where the main landslides have occurred.

7.16 No site-specific monitoring data are available for the slope above the site. However, the Environment Agency's annual LiDAR elevation data have been examined to identify indications of relative displacement. A comparison of available data over 12 years from 1998 to 2010 did not identify any consistent differential movement in any areas of the slope above the site. Anecdotal evidence from Portland Port also indicates that there has been no record of any recent slope movements adjacent to the site, with recent slope movements only recorded on the slopes to the north and to the south at Upper Osprey.

7.17 The former rail embankment that runs along the side of the site at the toe of the slope has been in place for over 100 years and does not appear to have been affected by any large scale slope movements directly above the site.

Slope assessment

7.18 Ground modelling was undertaken to enable an assessment of the likelihood of slope instability at the site. It was based on a series of assumptions, full details of which are provided in appendix 7.1. Software was used to explore potential failure surfaces and changes to the factor of safety that may occur in the future.

7.19 A 'global factor of safety' is the ratio of the forces resisting movement to the forces causing movement. A slope with a factor of safety of less than 1.0 would be unstable. Many natural slopes have a factor of safety between 1.0 and 1.2 and can be considered marginally stable, i.e. they may become unstable under certain conditions such as sustained wet weather. A factor of safety in the range between 1.3 and 1.5 is commonly sought for newly engineered slopes.

7.20 Without detailed information on the stratigraphy, geotechnical properties of each soil layer and groundwater conditions, the absolute factor of safety cannot be calculated with certainty. However, for existing slopes, the relative change in the factor of safety can be considered. For example, if a slope is thought to be marginally stable, but with no evidence of recent instability, implementing drainage to increase the factor of safety by 0.1 may be considered acceptable, rather than targeting a particular absolute factor of safety. The assessment therefore considered the likely relative changes in the factor of safety of the slope over time.

7.21 An analysis was carried out of the current situation with the existing made ground in place. This indicated that the stability of the slope above the site is likely to be marginal, primarily due to the presence of the disturbed zone at the top of the Kimmeridge Clay. This is consistent with the evidence of progressive creep movements that affect the shallow surface soils. The rate of movement is potentially a few millimetres a year. However, it is likely that the rate of movement accelerates during wet weather and at some time in the future this may lead to a sudden shallow slope movement, which is likely to be along pre-existing shear surfaces within the upper 5 m of the slope. Such a movement could result in debris at the toe of the slope that could affect or partially block the highway, although it should be noted that the port does not have records of such slips occurring in the past.

7.22 However, the buttressing effect of the made ground at the toe of the slope significantly increases the factor of safety of deeper slips that could affect the development site itself. This means that the site in its current condition is very unlikely to be affected by deep-seated instability in the slope above.

7.23 The potential of the proposed excavation of the RDF bunker at the base of the slope to affect stability was then analysed. The following assumptions were made for the assessment:

- The excavation will not be carried out using battered slopes, but with a robust embedded retaining wall that will form part of the permanent structure
- The retaining wall will extend to at least -8 m OD (the maximum envisaged excavation depth) and will prevent any slip circles above this level
- Any reduction in slope stability would therefore be primarily due to the loss of weight at the toe of the slope

7.24 This analysis showed that the slip circles would need to go much deeper within the undisturbed Kimmeridge Clay to pass beneath the embedded retaining wall and the factor of safety is significantly higher than is expected for shallow slips on the slope above the site. The embedded retaining walls will prevent shallower slips from occurring. The excavation will result in a significant removal of weight at the toe of the slope, which will reduce the factor of safety of potential deep-seated failures passing beneath the embedded retaining walls from 2.5 to 1.8.

7.25 However, the removal of weight will only return the site to the original state of stress before it was filled for the development of the port. After construction of the proposed ERF buildings and structures over the pit area, the total weight at the toe of the slope is likely to be similar to, or more than, the existing. The width of the excavation (20 m) perpendicular to the slope is very narrow in relation to the potential slip circle indicated in the model. The deeper slips that have been recorded historically to the west and south of this area have been at least 80 m to 100 m wide, suggesting that a very narrow, elongated slip is highly unlikely. The actual factor of safety would therefore be much higher than the 1.8 indicated by the analysis, because of the considerable 3D effects of such an elongated slip. However, as discussed in paragraph 7.19, even a factor of safety of 1.8 would not normally be of concern and is considered likely to be acceptable.

7.26 Further ground investigations will be undertaken to confirm the assumptions made in the assessment, as follows:

- Position boreholes, likely to be on the former railway line, to confirm the thickness of colluvium and the nature of the disturbed zone on the slope (assuming it is practicable to access the slope)
- Position boreholes at the toe of the slope, on the edge of the highway, to confirm ground conditions in this zone
- Position boreholes across the development site to confirm the thickness of made ground, presence of marine gravels, absence of a disturbed zone and absence of shear surfaces within the underlying Kimmeridge Clay
- Borehole techniques should be designed to allow detailed logging of the soils, in particular evidence of existing polished shear surfaces
- Laboratory testing to explore effective stress parameters, including residual shear strengths
- Install piezometers in the boreholes at discrete depths to confirm piezometric profiles
- Install inclinometers on the former railway and on the side of the highway to confirm current depths and rates of any slope movement. These can

be maintained during operation of the facility to provide early warning of any change in the rate of movement

7.27 The engineering process will include the following:

- Based on the results of the ground investigations, a detailed slope stability assessment will be undertaken to confirm the assumptions presented in the preliminary assessment. This should include consideration of potential non-circular slip surfaces
- Design of the proposed excavation and embedded retaining wall with consideration of the potential for destabilisation of the adjacent slope
- Developing a long term monitoring strategy to mitigate the risk of shallow slope instability on the development, including potential blockage of the highway

7.28 While the above further work will be undertaken to confirm the assumptions used in the preliminary assessment, it is concluded that the proposed development is unlikely to have any significant effects on the stability of the hillside above the site.

Assessment of effects associated with the provision of district heating

7.29 The potential for ground conditions effects as a result of the installation of the district heating pipelines is the same as was assessed for the installation of the electricity cables in the original ES. The pipeline routes will require shallow linear excavations within the existing road network. During this process, made ground with the potential to be locally contaminated may be encountered and this would be managed in accordance with good practice for such utility excavations. As a result, no significant cumulative effects are predicted.

7.30 The provision of district heating will not result in any additional outflows to the sea because it is a closed loop system. There is therefore no potential for significant cumulative effects on coastal water quality. As the pipes will be within the local road network, there will be no increase in the impermeable surface area. The identified potential pipework routes will not cross any watercourses, so there is also no potential for significant cumulative effects on surface water quality.

Conclusions

7.31 The FRA addendum concluded that the proposed development will not be at risk of flooding, or increase flood risk off-site. The preliminary slope risk assessment concluded that the proposed development is not likely to lead to any significant effects on the stability of the hillside above the site. Given this, and the fact that no significant cumulative effects on ground conditions and water quality are predicted as a result of the provision of district heating, the conclusions of the original ES chapter that there will be no significant ground conditions and water quality effects remain valid and unchanged.

8 Landscape, seascape and visual effects

Introduction

8.1 Dorset Council's letter requested the following additional information and clarification in relation to landscape, seascape and visual effects:

- Additional detail and assessment in relation to the vapour plume from the stack and its visibility. This should include additional photomontages and / or visualisations that show the likely plume in different meteorological conditions (point 1 in the council's letter)
- Further interpretive background in relation to the scale of the development, and its context in relation to the existing port (point 2)
- More detail of the proposed PVC coating, its durability, and potential issues in respect of degradation during the design life of the facility (point 3)
- Further consideration and information in respect of relevant landscape issues raised through representations on the first consultation as appropriate (point 4)

8.2 Fichtner Consulting Engineers Ltd, who undertook the plume visibility modelling for the original ES, has prepared a technical report setting out the results of the plume visibility modelling in greater detail, which is contained in appendix 8.1. This is additional information to the previous plume visibility modelling report that formed technical appendix J4 of the ES.

8.3 Terence O'Rourke Ltd, who undertook the landscape, seascape and visual impact assessment for the original ES, has prepared photomontages of the plume on the original viewpoint photographs for viewpoints 8 (Ferry Bridge), 9 (Sandsfoot Castle), 11 (White Horse Hill) and 12 (National Trust car park at Ringstead Bay) (point 1 in the council's letter). These are provided in appendix 8.2 as new ES figures 9.38 to 9.41, and further text in relation to the assessment of the visual effects of the plume is set out in this section.

8.4 In addition to the photomontages produced for the landscape, seascape and visual impact assessment, which were prepared in accordance with relevant Landscape Institute guidance, further illustrative photomontages showing the plume in a variety of meteorological conditions are provided in the design and access statement addendum prepared by Terence O'Rourke Ltd. This also contains Fichtner Consulting Engineers Ltd's plume visibility modelling and graphically illustrates the results.

8.5 Further interpretive background material showing the scale of the proposed ERF in the context of the port and other nearby large structures and features (point 2 in the council's letter) is provided in the design and access statement addendum prepared by Terence O'Rourke Ltd. This material is for illustrative purposes and has therefore not been used to inform the assessment of landscape, seascape and visual effects, so it is not reproduced in this document.

8.6 More detail on the proposed PVC mesh (point 3 in the council's letter) is provided in the design and access statement addendum prepared by Terence O'Rourke Ltd and is summarised in this section.

8.7 Terence O'Rourke Ltd has also provided responses to the various other landscape, seascape and visual effects issues raised by representations to the consultation (point 4 in the council's letter). Further information is provided in this section in relation to potential night-time effects, the introduction of a connection between footpaths S3/72 and S3/81, and the zone of theoretical visibility (ZTV) mapping. The responses to the other points raised during the consultation are considered to be clarifications, rather than the provision of 'further environmental information' under Regulation 25, so they are set out in the CRSD.

Plume visibility

8.8 Further information is provided in new ES figures 9.38 to 9.41 (see appendix 8.2) to illustrate the plume at its maximum visible length on a non-cloudy day of 187.89 m, with the wind direction coming from the south west (the predominant wind direction). This maximum length of visible plume would only have been visible once within the last five years, for a period of one hour in February 2016.

8.9 The original plume visibility modelling report produced by Fichtner Consulting Engineers Ltd, which formed technical appendix J4 to the ES, stated that the maximum percentage of hours in a year with any visible plume would be 1.5%, and that the average percentage of hours in a year over the five years between 2014 and 2018 with any visible plume would be 0.6%. These figures included all plumes on cloudy and non-cloudy days, and the unusual weather conditions experienced during the 'Beast from the East' and 'Storm Emma'.

8.10 The additional plume visibility modelling report provided in appendix 8.1 states that, in an average year, the percentage of daylight hours with any visible plume when the cloud cover is not high (seven to eight oktas[2]) would be 0.55% (24.2 hours). The plume would be obscured by cloud on cloudy days. Excluding the 'Beast from the East' and 'Storm Emma', which were abnormal weather events, the maximum percentage of hours with any visible plume would be 0.51% (22.2 hours).

8.11 While the plume would be visible for an average of 24.2 hours per year, its length would not be consistent for the entire duration, which will change the visual impact it will have from the various locations being considered. Therefore, the number of daylight hours the plume would be visible has been broken down by plume length, as follows:

- 0-20 m in length: 6.4 hours (6.2 hours excluding the 'Beast from the East' and 'Storm Emma')
- 20-50 m in length: 7.4 hours (6.6 hours excluding the 'Beast from the East' and 'Storm Emma')
- 50-100 m in length: 6.4 hours (5.8 hours excluding the 'Beast from the East' and 'Storm Emma')
- 100-200 m in length (although it should be noted that the maximum predicted length was 187.89 m for one hour in February 2016): 4.0 hours (3.6 hours excluding the 'Beast from the East' and 'Storm Emma')

[2] A unit used to express the extent of cloud cover, equal to one-eighth of the sky.

8.12 These results confirm the conclusions set out in the original landscape, seascape and visual impact assessment that the plume is likely to produce only a very minor alteration to the view for a very limited number of hours. As a result, the visual effects for each of the receptors set out in the tables from paragraphs 9.128 to 9.143 of the ES chapter remain as originally assessed.

Night-time effects

8.13 Following discussions with Dorset Council and Tetra Tech, night-time baseline photographs and photomontages are provided as new ES figures 9.42 to 9.45 from viewpoints 9 (Sandsfoot Castle) and 12 (National Trust car park at Ringstead Bay).

8.14 The proposals will see the introduction of an ERF that will have associated external lighting, including aviation warning lighting on the stack. Lighting on the roof will only be required when maintenance is taking place and will be controlled via a switch, so the roof will not be illuminated for most of the time. The site lighting has been designed in accordance with best practice guidance and will be warm white to minimise the potential for effects on bats using the area.

8.15 The stack will be lit in accordance with Civil Aviation Authority and Ministry of Defence requirements. Although this will be located at the top of the stack, there are already lights at the top of The Verne, on the highest point of the Isle of Portland, associated with the prison and the satellite dish, that are clearly visible from Ringstead Bay and Sandsfoot Castle. The traffic lights at the entrance to The Verne, which alternate between green, amber and red, are also clearly visible from Sandsfoot Castle. These are significantly higher than the light at the top of the stack. The lighting will be seen in the context of the existing lighting at the port and has been designed to have minimal light spill.

8.16 The lighting report submitted in support of the planning application included light spill calculations. The calculations show that there will be zero light spill measured vertically 11 m from the eastern site boundary into Balaclava Bay and zero light spill measured vertically at 16 m from the western site boundary towards the cliff face. Incline Road is bounded by a cliff face and steep hill to the west. The light spill above the height of the columns (5 m) will be zero, so direct light spill into the SSSI and SAC will be limited by the cliff face. The council's consultation response requested that the light columns be no higher than 6 m in the car park and service yard. Arup has therefore adjusted the light columns to 6 m along the access road and service yard and 5-6 m in the car park.

8.17 The night-time visualisations confirm the conclusions set out within the lighting report and within the assessment tables from paragraphs 9.128 to 9.143 of the original ES chapter that the night-time effects at completion will be negligible and not significant.

Introduction of footpath connection

8.18 The table at paragraph 9.135 of the original ES chapter assesses the visual effects from public rights of way S3/68, S3/70, S3/72 and S3/81. Following submission of the application, further discussions with the consultees and Tetra Tech have resulted in a proposal to create a connection between footpaths

S3/72 and S3/81, which are currently dead ends culminating in a high security fence. The visual effects as a result of the proposed ERF at construction and completion from this new footpath connection will be as assessed for the other rights of way: a medium magnitude of change and a moderate, significant adverse effect. The night-time effects will be negligible adverse and not significant.

ZTV mapping

8.19 The Coe Design report commissioned by Stop Portland Waste Incinerator suggested that it would be helpful to provide ZTVs at a closer distance of 1.5 km from the site and to include the public rights of way. ES figures 9.16 and 9.17, which provided the original ZTVs, are therefore replaced with the updated versions in appendix 8.2 (now figures 9.16 and 9.17 revision A) that include public rights of way, the Rodwell Trail and the England Coast Path. New figures 9.46 and 9.47 in appendix 8.2 provide additional ZTVs for a 1.5 km study area.

8.20 Figures 9.46 and 9.47 show the England Coast Path and illustrate that the majority of this route lies outside the ZTV. The figures illustrate the coastal margin, which the National Trails website[3] describes as an area to the seaward side of the trail that the public has the right to explore away from the path. The website goes on to state that *"although you have the right to explore away from the path please use common sense – the England Coast Path includes land that is steep, unstable and not readily accessible. Just because the map says you can go there doesn't mean it is safe to do so."*

8.21 Although the coastal margin covers the whole of the land between the England Coast Path to Balaclava Bay and Portland Port, including the Inner Breakwater, the reality is that large areas of this are not accessible. Portland Port has a secure area where public access is not permissible, and HMP The Verne is not accessible (other than the Jailhouse Café). This makes large areas of the coastal margin inaccessible in close proximity to the proposed ERF. This is illustrated on figures 9.46 and 9.47, showing which areas are not accessible to the general public within the coastal margin.

Additional detail on the proposed PVC mesh

8.22 To create a water-tight envelope, the building will be enclosed using a sheet metal cladding, which will be fixed back with cladding rails to the steel frame. It is proposed that this cladding will be dark green to create a suitable backdrop colour. The proposed PVC mesh will then be installed on a sub-frame that is spaced slightly off the surface of the façade and securely fixed to the steel frame. The fabric will be attached to the building using a tensioned system with aluminium profiles. Should the mesh need to be temporarily removed, for example for maintenance, the dark green cladding would ensure that the building remained recessed within the landscape.

8.23 The PVC mesh is provided with a 10-year warranty. It is designed with a high tenacity base cloth to prevent deformation and top coatings to prevent elongation and tearing and provide resistance to dirt and UV fading. These will help to enhance the material's durability, protect it from environmental and

[3] https://www.nationaltrail.co.uk/en_GB/trails/england-coast-path-south-west/.

chemical influences, repel dirt and intensify colours and image depth. To ensure that the PVC mesh camouflage remains effective throughout the ERF's lifespan, Powerfuel Portland Limited is committed to reviewing its effectiveness and structural integrity at the end of the 10-year warranty period and each year afterwards, and to replacing the wrap after a maximum of 15 years for the life of the building.

Assessment of effects associated with the provision of district heating

8.24 The district heating network pipes will be installed below ground within the existing road network. As a result, the provision of district heating will not lead to any significant cumulative landscape, seascape and visual effects beyond those already assessed in the original ES.

Conclusions

8.25 The additional landscape, seascape and visual information and assessment has not identified any new or additional significant effects on landscape and seascape character or sensitive views. Given this, and the fact that no additional cumulative effects are predicted as a result of the provision of district heating, the conclusions of the original ES chapter remain valid and unchanged.

9 Natural heritage

Introduction

9.1 Dorset Council's letter requested the following additional information and clarification in relation to natural heritage effects:

- Additional information as required by Natural England and other ecological stakeholders to address the outstanding issues raised in respect of nationally / internationally designated sites raised through the initial consultation. This should include consideration of legal points that have been raised in respect of the robustness of the shadow Habitats Regulations Assessment (HRA) (point 10 in the council's letter)
- Further consideration and information in respect of general ecology-related issues raised through representations on the first consultation as appropriate, including the potential for management or improvement of habitat within the port below the prison site (point 11)

9.2 Dorset Environmental Records Centre (DERC), which provided information on statutory and non-statutory wildlife sites for the original ES, has provided further information on the distribution of selected species within the Isle of Portland to Studland Cliffs SAC, the Chesil and The Fleet SAC and the Isle of Portland SSSI. DERC's report is contained in appendix 9.1.

9.3 Terence O'Rourke Ltd, who undertook the assessment of effects on off-site natural heritage for the original ES, has provided additional assessment of effects on off-site designated nature conservation sites, including as a result of the framework heritage mitigation strategy discussed in section 6, and proposals for the management of habitat within the port (points 10 and 11 in the council's letter). This further information is set out in this section and a phase 1 habitat survey of the heritage mitigation area is provided in appendix 9.2. In addition, ABPmer has prepared a technical note providing additional assessment of the potential for marine impacts, including on designated sites (point 10 in the council's letter). The full technical note is provided in appendix 9.3 and its findings are summarised in this section.

9.4 Terence O'Rourke Ltd also prepared the original shadow appropriate assessment and has now produced an updated version providing the additional information requested by Natural England and other ecological stakeholders (point 10 in the council's letter). As the shadow appropriate assessment did not form part of the original ES, the updated report is submitted as a stand alone document.

9.5 Terence O'Rourke Ltd has also provided responses to the various other ecology-related issues raised by representations to the consultation, including the legal points raised in respect of the shadow appropriate assessment (points 10 and 11 in the council's letter). These responses are considered to be clarifications, rather than the provision of 'further environmental information' under Regulation 25, so they are set out in the CRSD.

Effects on off-site designated nature conservation sites

Effects from emissions to air on ecological receptors

9.6 The findings of the additional air quality modelling of the proposed ERF alone discussed in section 3 are analysed in detail in the stand alone updated shadow appropriate assessment. This demonstrates that, at all NSN sites, where the impact exceeds 1% of the long-term or 10% of the short-term critical level or load, the PECs will remain below the lower end of the relevant critical level or load. The exception is for nitrogen deposition on Chesil and The Fleet SAC, which is assessed in detail in the updated shadow appropriate assessment. The original ES conclusion that there will be a negligible magnitude of change on sites of high (or international) importance remains valid and unchanged, meaning that there will be no significant effects on any of the NSN sites.

9.7 The findings of the additional air quality modelling have also been reviewed in terms of the potential for effects on the Isle of Portland SSSI, which forms part of the Isle of Portland to Studland Cliffs SAC. The SSSI boundary also extends beyond the SAC boundary. As discussed above, the updated shadow appropriate assessment concludes that there will be no significant effects on the interest features of the SAC as a result of the operation of the ERF. As set out in the original ES, the SSSI has additional invertebrate interest features that are not covered by the shadow appropriate assessment. However, a records search undertaken by DERC has not identified any notable invertebrates within areas of the SSSI that sit outside the boundary of the SAC. In areas of the SSSI where elevated rates of nitrogen deposition, or increased concentrations of NH_3 and NO_x are predicted to occur, the impacts have been assessed and the conclusions of the ES that there will be no significant effects on species associated with the SSSI remain unchanged.

9.8 The original ES also examined the potential for effects on marine designated nature conservation sites and sites with marine elements, including Studland to Portland SAC, Chesil and The Fleet SAC / SSSI, Chesil Beach and The Fleet Special Protection Area (SPA) / Ramsar site, Portland Harbour Shore SSSI, Chesil Beach and Stennis Ledges Marine Conservation Zone (MCZ), South of Portland MCZ and Purbeck Coast MCZ, as a result of discharges to the marine environment. As discussed in more detail below, a review of the potential for effects on the marine environment by ABPmer has confirmed that deposition from stack emissions and discharges to the marine environment do not pose a risk of significant effects to these designated sites. The conclusions of the original ES remain unchanged.

9.9 The additional air quality modelling discussed in section 3 in relation to the potential cumulative effects of road traffic along the local road network has also been examined in detail in the updated shadow appropriate assessment. This concludes that there will be no significant effects from the cumulative emissions on NSN sites, which confirms the conclusion of the original ES.

9.10 An assessment for the potential for cumulative effects on the parts of the Isle of Portland SSSI that are adjacent to the roads used to access the proposed ERF has also been undertaken. The habitat of this part of the SSSI is shown as maritime cliffs and slopes on the Magic website (https://magic.defra.gov.uk). The critical load for coastal scrub habitat within the SSSI given on the APIS website (http://www.apis.ac.uk) is 10-20 kgN/ha/year. APIS also states that sensitive bryophytes and lichens may be present in W22 scrub with the SSSI. NO_x critical levels are set at the standard levels for the protection of all vegetation.

9.11 For the grid reference 369459,74251, APIS gives maximum background levels of nitrogen deposition of 14.1 kgN/ha/year. The maximum NH_3 concentration is 0.71 μg/m^3 and the maximum NO_x concentration is 35.33 μg/m^3. The air quality modelling shows that the impacts of road traffic (combined with the emissions from the ERF) will be localised, with the highest concentrations of NH_3 and rates of nitrogen deposition occurring within 5 m of the road. The greatest source of these emissions is from road traffic. Levels of NO_x will exceed the relevant critical load with or without the proposed development.

9.12 Unit 33 of the Isle of Portland SSSI is currently largely covered by dense scrub. A 2016 report undertaken by DERC looked at the distribution of scrub within the Isle of Portland SSSI(4). The report found that W22 scrub has spread across virtually all of Verne Common (Unit 33). Scrub coverage in 1997 was mapped at 11.28 ha of scattered scrub and 11.83 ha of dense scrub. By 2014, the scattered scrub had developed into dense scrub, with 22.79 ha of dense scrub recorded.

9.13 The report confirms that no stands of species-rich scrub or bryophyte-rich scrub are known to be present in Unit 33. This unit supports the largest stand of W22 scrub within the SSSI. DERC's 2021 report (see appendix 9.1) confirms that there are no records of scarce or notable lower plants or insects occurring in the 150 m strip of the SSSI that runs along the southern edge of the application boundary.

9.14 W22 scrub is widespread across lowland Britain and occurs on mesotrophic soils. As demonstrated by the 2016 DERC study, this scrub community has spread rapidly across Unit 33, and the changes in rates of nitrogen deposition predicted as a result of the proposed development are not considered likely to have an adverse impact on this habitat.

9.15 The absence of scarce and notable lower plants in this part of the SSSI means that localised changes in NH_3 concentrations will not have an adverse impact on the interest features of the SSSI. The localised changes in NO_x concentrations are also not considered to be significant. Localised concentrations of NO_x are likely to decrease over the medium to long-term with the progressive electrification of cars, vans and HGVs and the move towards the use of shore power by ships within Portland Harbour. The conclusion of the original ES that there will be no significant cumulative effects on the SSSI therefore remain unchanged.

Effects associated with the framework heritage mitigation strategy

9.16 The framework heritage mitigation strategy discussed in section 6 includes proposals for the removal of existing scrub around E Battery East Weare to allow for the repair and ongoing maintenance of this scheduled monument. The

4 Edwards, B., 2016, *A review of the current status of scrub on the Isle of Portland*. Report of Dorset Wildlife Trust. Portland Living Landscapes Project. DERC Report.

phase 1 habitat survey of the heritage mitigation area (see appendix 9.2) found that the habitats consist almost entirely of scrub, with a small pocket of calcareous grassland and short perennial vegetation, together with bare ground and the battery structures. The majority of the access paths and the buildings are covered in, and surrounded by, dense scrub that is typical of the East Weare cliffs and consistent with the Isle of Portland SSSI description in areas away from the man-made building and made ground around it. Bramble and ivy dominate over areas of hardstanding and tracks. Ruderal species, including nettle, dominate in features such as the gun battery ditch, where nutrients are washed down and concentrate.

9.17 The NVC scrub community W22 forms part of the suite of NVC communities that comprise the Annex 1 habitat vegetated sea cliffs of the Atlantic and Baltic coasts. The coastal scrub habitats are also mentioned in the SSSI citation. Small scale removal of above ground growth to facilitate inspection and repair of the monument will not have any significant effects on the interest features of the protected sites. The proposed heritage mitigation works include scrub clearance to gain access to the gun battery and the cutting of a 2.5 m wide path through the largely blackthorn scrub to link up the existing footpaths.

9.18 The limited areas of calcareous grassland and short perennial habitats have formed where scrub cannot grow. Calcareous grassland is a priority habitat and also forms part of the designation for the Isle of Portland SSSI. While important, it is unlikely that this habitat will be impacted by the proposed clearance works because it is only present in areas that do not require clearance to facilitate access or repair the gun battery. In the long term, it is likely that scrub clearance at the site will increase the quality and extent of the calcareous grassland habitat present, creating an overall enhancement for biodiversity (see below). The short perennial habitats will also be retained and not impacted by the works.

9.19 No evidence of protected species was recorded during the walkover survey, but the habitats present are suitable to support species such as dormice, nesting birds and reptiles. However, the desk study conducted as part of the original ES did not return any records of dormice and they are not thought to be present on Portland. The presence of dormice has therefore been ruled out and they are not considered further.

9.20 The scrub provides habitat suitable for a wide range of nesting bird species. To protect nesting birds during the works, all scrub clearance should either be undertaken between October and February, outside of the nesting season, or should be preceded by a nesting bird check by an experienced ecologist. In this instance, it would be possible to identify nests by a search prior to clearance commencing. An Ecological Clerk of Works (ECoW) would supervise all scrub clearance and, if a nest is found, all work would stop to establish a 5 m buffer zone around the nest. Works would only recommence once birds had fledged from the nest.

9.21 Scrub edges, areas of grassland and short perennial vegetation provide suitable habitats for reptiles and there are records of common lizard and slow worm from within 1 km of the survey area. The majority of vegetation clearance will be within areas of dense scrub that are not suitable for reptiles. However, small areas of reptile habitat may require clearance and these can be identified on the ground with the ECoW. Removal of these habitats, if required, would be carried out under the ECoW's supervision using the 'strim and push' method. This involves a search by the ECoW and phased strimming of vegetation to ensure reptiles move away first through disturbance from a high cut. A low cut is then made at least 30 minutes later to make the habitat unsuitable prior to full clearance.

9.22 With the above measures in place, the ecological effects of the heritage mitigation works on the Isle of Portland SSSI and protected species using the area will be negligible and not significant.

Proposals for habitat management within the port

9.23 The original ES identified impacts from the loss of on-site open mosaic habitat as a result of the proposed development, and there is also the need to deliver biodiversity net gain in accordance with policy requirements. A Biodiversity Plan has been agreed with the Dorset Natural Environment Team (DNET) covering on-site mitigation measures to be incorporated into the scheme (as set out in the original ES) and a financial contribution towards relevant local projects off-site.

9.24 A key principle of net gain is that the gains are additional to the conservation measures that would have occurred regardless to ensure good practice and avoid double-counting. Several potential projects have been identified in the local area where funds could be used to implement projects that deliver measures specifically targeted at species or habitats that are beyond the scope of the measures identified by Natural England for the protection of the Isle of Portland SSSI. These may include the following:

- Creation of scrapes and monitoring of least owlet (a moth species) within grassland between the A354 and the shore of Portland Harbour (Hamm Beach area)
- Regular cutting and management of grassland on Hamm Beach
- Contributions towards schemes to reintroduce grazing at sites on the Isle of Portland including, if possible, 'Portland' breed sheep
- Contributions towards schemes for the control of scrub within the Isle of Portland SSSI
- Additional fencing costs beyond those required for the heritage mitigation strategy (see below)

9.25 As discussed above, the framework heritage mitigation strategy includes for the removal of existing scrub around E Battery East Weare. These works would contribute towards the objective of moving Unit 33 of the Isle of Portland SSSI towards favourable recovering status. The strategy also includes the creation of a new permissive footpath through currently inaccessible parts of the secure port estate to connect to existing rights of way. The path will be fenced and will be approximately 2.5 m wide to allow access for maintenance vehicles and future management of the SSSI. Parts of the fencing proposed along the footpath route will be stock-fencing. This will run along the southern boundary of the footpath extension, bisecting Unit 33. Fencing will also be installed on the northern (port) side of the footpath route. While this will be a different specification from the stock-proof fence, it would still serve to contain grazing animals if they are introduced north of the footpath at a future date.

9.26 The fence line will run along the entire length of the footpath extension and beyond, along the existing public footpath to the cemetery wall. If the current southern boundary of the cemetery is not stock-proof, the fencing will extend along this until it reaches the access gates. The installation of a stock-proof fence will provide a boundary to allow for the development of one of three grazing units planned for Unit 33 in the future. The heritage works will only provide some of the fencing required to create the grazing units. The enhancement of the footpath route will facilitate vehicle movements associated with management activities such as stock movement, welfare checks and habitat management.

9.27 Discussions are ongoing with Natural England and DNET regarding a statement of common ground for the off-site ecological enhancement works.

Potential marine impacts

9.28 The additional assessment examined the potential for effects on the marine environment as a result of increased emissions to air of SO_2, CO_2, NO_x, NH_3, mercury and dioxins. It also reviewed the potential for effects as a result of discharges to the marine environment.

SO_2 and CO_2

9.29 Seawater has a high buffering capacity and no localised changes in pH would be expected as a result of deposition of SO_2 or CO_2 into the marine environment. This capacity is used elsewhere as part of flue gas desulphurisation processes for major coal-fired power stations that involve much larger quantities of SO_2 than will be emitted by the Portland ERF with no localised effects on pH. While anthropogenic releases of CO_2 contribute to ocean acidification at a global scale, the contribution of CO_2 from the proposed ERF will be negligible in a global context. It should also be noted that, as set out in section 4 of this ES addendum, the proposed ERF will lead to lower carbon emissions than other alternative methods of waste management. The contribution to ocean acidification as a result of emissions from the ERF is therefore assessed as negligible and not significant.

NO_x and NH_3

9.30 In considering the potential for deposition of NO_x and NH_3 in the marine environment, it is important that the changes in concentrations of these pollutants in the air are examined in the context of concentrations of nitrogen in marine waters. As set out in chapter 4 of the original ES, the baseline concentrations of NO_2 and NH_3 in the air in the local area are 22 $\mu g/m^3$ and <1 $\mu g/m^3$ respectively. The process contribution from the ERF to ground level concentrations of NO_2 and NH_3 will be very small at less than 1 $\mu g/m^3$ for NO_2 and negligible for NH_3.

9.31 In contrast, background concentrations of nitrogen in seawater, primarily as nitrate, are many orders of magnitude greater. For example, sampling by the Environment Agency in Weymouth Bay[5] indicated that the winter total nitrogen concentration between 2010 and 2017 was between 0.1 and 0.5 mg/l

[5] https://environment.data.gov.uk/water-quality/view/sampling-point/SW-50034657?_all=true.

(equivalent to 100-150 mg/m^3). This is roughly four orders of magnitude greater than the concentrations in the air. On this basis, the negligible process contribution from the ERF will not materially contribute to nutrient concentrations in the adjacent marine waters and there will be no significant effects on eutrophication. There is therefore no increased risk to marine features such as seagrass that would potentially be sensitive to increases in dissolved nitrogen and no potential for significant effects on any of the marine designated sites in the area.

Mercury

9.32 Baseline data on the concentrations of mercury in seawater in Portland Harbour are available from Environment Agency monitoring[(6)] for between 2000 and 2010. Over this period, the majority of the 94 recorded values for dissolved mercury were <0.01 µg/l, with a few values recorded as 0.01 µg/l and single values recorded as 0.03 and 0.06 µg/l. This compares to a marine environmental quality standard (EQS) of 0.05 µg/l as an annual average and 0.07 µg/l as a maximum allowable concentration, as established by the EU Priority Substances Directive 2008/105/EC.

9.33 Modelling was carried out to estimate the potential contribution that deposition from emissions to air by the proposed ERF will make to concentrations of mercury in seawater. It was based on the following conservative assumptions:

- Using the same 5 km x 5 km study area as the HHRA as a basis for the main area of sea where impacts from the ERF will be experienced, the modelling domain covers approximately 4,000 ha of sea
- The annual worst case potential loading for mercury was calculated on the assumption that all modelled ground concentrations of mercury are deposited within the marine environment
- The background concentration of mercury in seawater was assumed to be 0.005 µg/l (50% of the <0.01 µg/l value typically recorded), in accordance with accepted modelling methods where recorded values are below the limit of detection
- The volume of seawater within the 4,000 ha area was estimated based on an average water depth of 5 m, which is likely to be conservative over the modelling domain
- A daily tidal exchange volume (the proportion of water that is exchanged within the 5 km x 5 km area with each tide) of 0.1 was assumed based on the average exchange rate coefficient for mixed estuaries, which is likely to be conservative for more open coastal waters, including Portland Harbour

9.34 The daily average worst case potential input of mercury into the 4,000 ha area of sea surrounding Portland Harbour is 1,720 mg (approximately one-fifth of a teaspoon over an area of 40 km^2 of sea). It is estimated that this would increase the background concentration of mercury in seawater to 0.00508 µg/l, which is a change of less than 2%. Ambient concentrations of mercury will remain at around 10% of the saline EQS value and this marginal increase in ambient

[6] https://environment.data.gov.uk/water-quality/view/sampling-point/SW-50044494?_all=true.

concentration as a result of worst case aerial deposition of mercury is assessed as not significant.

9.35 Within the marine environment, some mercury will adsorb to organic particles and sediment within the water column, meaning it may deposit within local marine sediments. The potential risk of accumulation of mercury within local sediments was modelled for the same 4,000 ha area, based on the worst case assumption that all modelled ground concentrations of mercury are deposited within the modelled area. The modelling estimated that worst case deposition of mercury as a result of the proposed ERF would increase the sediment concentration of mercury by 112 ng/kg of sediment (dry weight) per year. This equates to 0.09% of the interim sediment quality guideline (ISQG) of 0.13 mg/kg set to protect sea life[7].

9.36 Based on the above, the proposed ERF will not lead to significant risks to any of the marine designated sites or shellfish and fish populations from increased mercury emissions, either as a result of risks to marine water quality standards or sediment contamination. There are also no increased risks associated with the human consumption of local fish or shellfish.

Dioxins

9.37 In the marine environment, dioxins will strongly adsorb to organic particles and sediments within the water column and may deposit within local marine sediments. Dissolved concentrations in the water column will be negligible. The potential risk of accumulation of dioxins within local sediments was modelled for the same 4,000 ha area, based on the worst case assumption that all emissions of dioxins are deposited within the modelled area. The modelling estimated that worst case deposition of dioxins as a result of the proposed ERF would increase the sediment concentration of dioxin by 0.013 ng/kg of sediment (dry weight) per year. This equates to 1.5% of the ISQG of 0.85 ng/kg set to protect sea life[8]. This is a highly conservative estimate because it assumes that all dioxins emitted to air will deposit locally, whereas in reality only a small proportion will be deposited.

9.38 Based on the above, no significant risks are predicted to any of the marine designated sites or shellfish and fish populations from increased dioxin emissions as a result of sediment contamination. There are also no increased risks associated with the human consumption of local fish or shellfish and no significant effects are predicted on fish or shellfish-related businesses and employment.

Discharges to the marine environment

9.39 As set out in the original ES, no process effluent or foul water discharges are proposed to the marine environment from the ERF, as these waste streams will be discharged to the wastewater sewer network. The area's wastewater is treated at Weymouth Wastewater Treatment Works and discharged to the sea

7 Canadian Council of Ministers of the Environment, 1999, *Canadian Sediment Quality Guidelines for the Protection of Aquatic Life – Mercury.*

8 Canadian Council of Ministers of the Environment, 2001, *Canadian Sediment Quality Guidelines for the Protection of Aquatic Life – Polychlorinated dibenzo-p=dioxins and polychlorinated dibenzofurans (PCDD/Fs).*

around 1 km offshore, west of Portland Harbour. The effluent from the proposed ERF will be a minor component of the overall discharge from the treatment works. As a result, no significant risks are predicted to the marine environment or designated marine nature conservation sites and there will be no increased risks associated with sea bathing.

9.40 The original ES provided details of how incinerator bottom ash (IBA) will be handled and further information is provided in section 10 of this ES addendum. This will form part of the ERF's environmental permit issued by the Environment Agency and will ensure that risks to the environment, including the marine environment, are adequately managed. Any mitigation and monitoring requirements will be incorporated within the ERF's environmental management system, which will ensure that risks to designated sites or the wider marine environment from spillages or leaks of IBA can be effectively managed. As a result, no significant effects are predicted on the marine environment.

Assessment of effects associated with the provision of district heating

9.41 Short sections of the potential district heating pipework route to HMP The Verne and HMP / Young Offender Institution Portland within Incline Road, New Ground and Glacis run through the Isle of Portland to Studland Cliffs SAC and Isle of Portland SSSI. The pipework will only be installed within the carriageway, and an ecological survey for lower plants will be undertaken along the road verges of the stretches running through and alongside the SAC / SSSI to ensure that any particularly sensitive areas are suitably protected.

9.42 As part of the CEMP for the district heating application, the following mitigation measures will be required:

- Heras fencing will be installed along the edge of the sections of the road that run through the SAC / SSSI to prevent machinery from leaving the carriageway within the designated area and to prevent verges and roadside areas being used for stockpiling / laydown
- Dust management measures, such as wetting down of works areas, dust sheeting or fencing, will be used when the works pass through or near the SAC / SSSI
- A pollution event strategy will be prepared to avoid spillage or ingress of hazardous substances into the SAC / SSSI
- A toolbox talk and appropriate signage will be provided to make workers aware of their responsibilities and ecologically sensitive areas

9.43 With these measures in place, no significant cumulative natural heritage effects are predicted as a result of the provision of district heating.

Conclusions

9.44 The additional natural heritage information and assessment has not identified any significant effects on off-site designated nature conservation sites, either terrestrial or marine, as a result of the proposed ERF. Given this, and the fact that no significant cumulative effects are predicted as a result of the provision of district heating, the conclusions of the original ES chapter that the proposed development will not lead to any significant residual natural heritage effects remain valid and unchanged.

10 Traffic and transport

Introduction

10.1 Dorset Council's letter requested the following additional information and clarification in relation to traffic and transport effects:

- Further clarification in respect of opportunities to export incinerator bottom ash (IBA) by sea, including the identification of specific sites that could accept the material when transported using this method (point 24 in the council's letter)
- Additional information in respect of the expected impacts (if any) of users of the Coast Path needing to cross the road in Castletown on the route used by HGVs to access the proposed plant (point 25)
- Further consideration and information in respect of relevant transport-related issues (including in respect of traffic modelling and baseline and future baseline conditions) raised through representations on the first consultation as appropriate (point 26)

10.2 Powerfuel Portland Limited has produced a paper to provide additional detail in relation to the export of IBA by sea (point 24 in the council's letter). Its key elements are summarised in this section and the full paper is submitted as a stand alone document.

10.3 Awcock Ward Partnership (AWP), who undertook the assessment of traffic and transport effects for the original ES, has examined the potential impacts of additional HGV traffic on the ability of users of the England Coast Path to cross the road in Castletown (point 25 in the council's letter). The additional discussion of the potential impacts is provided in this section.

10.4 AWP has also provided responses to the various other transport-related issues raised by representations to the consultation (point 26 in the council's letter). These responses are considered to be clarifications, rather than the provision of 'further environmental information' under Regulation 25, so they are set out in the CRSD. The only exception is in relation to table 11.3 of ES chapter 11: traffic and transport, in which a transposition error was identified. The corrected table is provided in this section and replaces table 11.3 of the ES.

Export of IBA by sea

10.5 If the IBA is exported by sea it will be loaded into a sheeted trailer and transported to the quayside, where it will be loaded onto large dedicated vessels using a mechanical grab machine. Prior to the vessel berthing, details of the berth will be approved by the Harbour Master of the port, with specific note of the tidal range and height of the quay in relation to the position and reach of the ship-based materials handler to access the cargo on the quay.

10.6 The ship's master will oversee the ship operations, supported by a materials handler operator on the vessel. All crew will be qualified and trained as appropriate to their rank and responsibilities onboard. A banksman on the quayside will assist the delivery trucks and maintain the safe operation of the exclusion zone where the mechanical grab will operate. To ensure grab operations do not conflict with the delivery trucks, the banksman will communicate with the materials handler operator on the vessel.

10.7 The management of the quayside operation remains the responsibility of the port. This includes carrying out the necessary risk assessment regarding the movement of trucks and the load-bearing capacity of the quay. Once the vessel has been loaded, bi-fold doors will close over the top for protection and to prevent any escape of material. Any spillage of the inert IBA would be dealt with promptly and appropriately. The process is highly regulated and all parties will need to ensure that compliance is achieved with existing legislation.

10.8 Powerfuel Portland Limited is in discussions with the Day Group, which operates several IBA processing plants and has extensive experience of IBA transport by sea. The Day Group has indicated that it would be willing to enter into a long term contract to enable IBA to be collected from the proposed ERF by vessel and transported to its facility at Greenwich.

10.9 While it is envisaged that the Day Group's Greenwich plant will be the chosen location for export of IBA by sea, there are other plants within the UK and northern Europe that are accessible by sea, including two in Avonmouth and one in Middlesbrough, one in Ireland, two in the Netherlands, two in Belgium and one in Germany.

Impacts of additional HGV traffic on users of the England Coast Path in Castletown

10.10 The England Coast Path (a national trail) crosses the road at the Castletown / Castle Road roundabout and the Ramblers has raised concerns about the impact of development traffic on this crossing, referring to an increase in HGV movements of 200% at Castletown. As set out in ES chapter 11: traffic and transport and the transport assessment (TA) in technical appendix L of the original ES, the proposed development will lead to a maximum of 80 two-way HGV trips per day (40 in each direction).

10.11 The higher increases in traffic quoted in the Ramblers' response are due to potential traffic generation from already permitted development at the port that may occur in the future, independent of the proposed ERF. The path crossing the road at Castletown has dropped kerbs and an island, which will aid pedestrians crossing on the path. In addition, it is important to note that the HGV movements associated with the proposed ERF will equate to an average of one HGV every 15 minutes passing through this crossing point. This is considered to be a normal level of interaction with traffic and is significantly less than that already experienced on Portland Beach Road. An average increase in HGV movements of one every 15 minutes is a negligible change that will not affect the ability of users of the England Coast Path to cross the road in a safe manner.

Corrected table 11.3: Baseline traffic flows

10.12 As identified above, a transposition error was made in table 11.3 of ES chapter 11: traffic and transport. This related to the PM peak inbound and annual average daily traffic (AADT) inbound traffic flows. The transposition error did not affect the traffic modelling or the impact assessment. A replacement table 11.3 is provided below.

Link ref	Link	AM peak		PM peak		AADT	
		Outbound	Inbound	Outbound	Inbound	Outbound	Inbound
1	Castletown (at port access)	14	38	40	16	333	333
2	A354 Portland Beach Road	789	669	626	828	8,732	9,238
3	A354 Portland Road (south of Foord's Corner Roundabout)	809	590	958	1,014	10,904	9,898
4	A354 Buxton Road (north of Foord's Corner Roundabout)	422	330	515	455	5,782	4,844
5	A354 Buxton Road (Boot Hill)	1,142	643	738	912	11,602	9,596
6	A354 Weymouth Way (south of Granby Roundabout)	673	643	566	639	7,646	7,911
7	A354 Weymouth Relief Road (south of Stadium Roundabout)	1,058	1,283	1,297	1,021	14,533	14,218
8	B3157 Granby Way	746	853	731	1,395	9,115	13,872
9	B3156 Portland Road	590	809	1,014	958	9,898	10,904

Table 11.3: 2017 and 2019 baseline traffic flows

Assessment of effects associated with the provision of district heating

10.13 The installation of the district heating pipelines within the local road network will lead to the type of minor disruptive impacts that are associated with any utility works in the highway. These will be addressed through standard measures that will be set out in the CEMP and through road access licensing by Dorset Council. As a result, no significant cumulative traffic and transport effects are predicted to arise from the provision of district heating.

Conclusions

10.14 The additional assessment of the potential for impacts on users of the England Coast Path as a result of increased HGV traffic has not identified any potentially significant effects. Given this, and the fact that no significant cumulative effects are predicted as a result of the provision of district heating, the conclusions of the original ES traffic and transport chapter remain valid and unchanged. No significant residual traffic and transport effects are predicted as a result of the proposed development.

11 Waste

Introduction

11.1 Dorset Council's letter did not request any additional information and clarification in relation to waste impacts.

Assessment of effects associated with the provision of district heating

11.2 The provision of district heating from the proposed ERF will not increase the area's residual waste treatment capacity, so there is no potential for significant cumulative effects.

Conclusions

11.3 As no additional information and clarification was requested in relation to waste impacts, and no significant cumulative effects are predicted as a result of the provision of district heating, the original ES waste chapter remains valid and unchanged.

12 World heritage site

Introduction

12.1 Dorset Council's letter did not request any additional information and clarification in relation to impacts on the Dorset and East Devon Coast World Heritage Site (WHS). However, the assessment of effects on the WHS in the original ES was based on the conclusions of ES chapters 7: cultural heritage and 9: landscape, seascape and visual effects. Any changes to the conclusions of these chapters would also be relevant to the assessment of effects on the WHS. The further information provided above in sections 6 (cultural heritage) and 8 (landscape, seascape and visual effects) has therefore been reviewed to determine whether any associated changes are required to the assessment of effects on the WHS.

Consideration of the potential for additional effects on the WHS

12.2 Terence O'Rourke Ltd, who undertook the landscape, seascape and visual impact assessment for the original ES, has prepared a number of additional photomontages as part of this ES addendum (see appendix 8.2). These show the plume on the original viewpoint photographs for viewpoints 8 (Ferry Bridge), 9 (Sandsfoot Castle), 11 (White Horse Hill) and 12 (National Trust car park at Ringstead Bay), which form new ES figures 9.38 to 9.41. Night-time photomontages have also been prepared from viewpoints 9 and 12, which form new ES figures 9.43 and 9.45.

12.3 The additional assessment of the plume visibility in section 8 of this ES addendum has confirmed the conclusions set out in the original landscape, seascape and visual impact assessment that the plume is likely to produce only a very minor alteration to the view for a very limited number of hours. There is no change to the effects as originally assessed. The assessment of night-time effects has also remained unchanged.

12.4 The conclusions of the landscape, seascape and visual impact assessment that were used in the original assessment of effects on the WHS therefore remain as originally assessed and no changes are required to the WHS assessment. In addition, no changes are required to the WHS assessment as a result of the revised cultural heritage impacts assessed in section 6 of this ES addendum.

Assessment of effects associated with the provision of district heating

12.5 The consideration of the potential for cumulative cultural heritage effects as a result of the provision of district heating in section 6 of this ES addendum did not predict any significant effects on archaeology or built heritage as a result of the installation of the district heating pipes within the road network. Similarly, section 8 of the ES addendum concluded that the provision of district heating will not lead to any significant cumulative landscape, seascape and visual effects beyond those already assessed in the original ES. Given these conclusions, no significant cumulative effects are predicted on the WHS as a result of the provision of district heating.

Conclusions

12.6 No changes are required to the WHS assessment as a result of the further information provided in this ES addendum in relation to cultural heritage and landscape, seascape and visual effects. Given this, and the fact that no additional cumulative effects are predicted as a result of the provision of district heating, the conclusions of the original ES chapter remain valid and unchanged.

13 Other issues outside the scope of the EIA

13.1 Dorset Council's letter requested the following additional information and clarification in relation to need, planning policy and the environmental permit, which are issues outside the scope of the EIA:

- Further clarification and explanation in respect of potential alternative treatment facilities within three hours' drive by road, in respect of the need for the capacity the facility provides. Further detail in respect of likely sources of the RDF proposed to be managed should be provided, which should have regard to existing contracts for the management of RDF that are in place with competing facilities (point 30 in the council's letter)
- Further detail in respect of the potential impacts (or lack of) your proposal upon the potential delivery of an RDF operation at Eco-Sustainable Solutions, should the planning authority be minded to grant planning permission for it (point 31)
- Further detail in respect of the impact of the development on the future process of RDF in mainland Europe, and future issues surrounding exporting UK waste to these facilities. The information provided should include discussion of the likely differences in respect of overall efficiency between the proposed plant and those plants in mainland Europe for which it may compete in relation to future feedstock (point 32)
- It would be useful if you could provide your comment and perspective in respect of representations received on the way in which you have interpreted planning policies as set out in your supporting statement (point 34)
- We note that you are making some updates to your environmental permit application, and request that the additional detail and assessment you are undertaking in respect of air quality, noise and fire prevention is incorporated into your planning application and EIA, so the assessment of the project is consistent across both regulatory regimes (point 35)

13.2 Powerfuel Portland Limited has produced a waste need paper providing commentary on the likely sources of the RDF for the proposed development, including in relation to potential alternative facilities within three hours' drive, existing contracts, the export of RDF to facilities in mainland Europe, and the potential impacts on the delivery of an RDF operation at Eco Sustainable Solutions (points 30-32 in the council's letter). As waste need is outside the scope of the EIA, the waste need paper is submitted as a stand alone document.

13.3 Terence O'Rourke Ltd, who prepared the original planning supporting statement, has prepared a supplemental planning supporting statement addressing the applicant's interpretation of planning policies (point 34 in the council's letter). As the planning supporting statement did not form part of the original ES, the supplemental planning supporting statement is submitted as a stand alone document.

13.4 As part of the environmental permit application process, the Environment Agency requested some additional information in relation to air quality, noise and fire prevention (point 35 in the council's letter). The additional information relating to air quality has been provided in section 3 and appendix 3.3.

13.5 The Environment Agency requested a more detailed noise assessment in line with British Standard 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*. This has been prepared by Arup and assessed the potential for effects on residential properties to the west of the site and on the north west side of the harbour at Wyke Regis, HMP The Verne, Portland Hospital and Portland Marina as a result of operational noise from the proposed ERF. It confirmed that there would be no significant adverse effects at any of the sensitive receptors. As the noise report did not form part of the original ES, the new report is submitted as a stand alone document.

13.6 The Environment Agency also requested clarification of the location of the sensitive receptors referred to in the fire prevention plan submitted as part of the environmental permit application. The fire prevention plan was not submitted as part of the original planning application but, for completeness, the original report and the additional drawings showing the receptors' locations are now submitted as a stand alone document.

14 Conclusions

14.1 This ES addendum has provided the further environmental information formally requested by Dorset Council on 30 April 2021 under Regulation 25 of the EIA Regulations in relation to the proposed Portland ERF. Matters raised in the council's letter that are considered to comprise clarifications, rather than further environmental information, have been addressed in stand alone documents within the submission, including a CRSD.

14.2 The only changes to the significant residual effects identified in the original ES as a result of the further environmental information provided in this ES addendum relate to cultural heritage effects. The slight to moderate, significant adverse residual effect on the East Weare batteries scheduled monument and listed structure identified in the original ES has been removed by the heritage mitigation strategy. The improved public access and interpretation and opportunities for greater appreciation and understanding of the range of assets across East Weare as a result of the measures set out in the strategy will be a moderate, significant beneficial effect. In addition, the change to the experience of the historic environment because of the new permissive path link around East Weare is predicted to result in a slight to moderate, significant beneficial effect.

14.3 No new or different significant residual effects have been identified for any of the other EIA topics as a result of the further environmental information. Therefore, with the exception of the above beneficial changes to the findings of the cultural heritage assessment, the conclusions of the ES remain valid and unchanged.

Portland energy recovery facility

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2.1

Potential district heating connection routes

Key:
- Powerfuel Portland ERF
- Indicative DH Route - South
- Indicative DH Route - North

Drawing not to scale,
For information purposes only.
Not for construction.

Notes:
Routes are designed to use only public highways and footpaths.

Issue Log:

Issue:	Revision Details:	Date:
01	Initial Issue	30/03/2021
02	Additional routes added	13/04/2021
03	Routes revised	24/06/2021
04	Drawing revised	30/06/2021
05	Drawing revised	30/06/2021

Powerfuel
[redacted]

Project Name:
Powerfuel Portland

Document Name:
District Heating Connection Plan

Document Reference #:
1081-02-37

Scale: 1:7,500@A3 Issue: 05

Produced:	Checked:	Date:
RC	##	30/03/2021

Portland energy recovery facility

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Addendum
Appendices

3.1

Additional dispersion modelling

FICHTNER
Consulting Engineers Limited

Portland ERF

Powerfuel Ltd

Additional Dispersion Modelling

ENGINEERING CONSULTING

Document approval

	Name	Signature	Position	Date
Prepared by:	Rosalind Flavell		Senior Environmental Consultant	28/06/2021
Checked by:	Stephen Othen		Technical Director	28/06/2021

Document revision record

Revision no	Date	Details of revisions	Prepared by	Checked by
Final	28/06/2021	Final for issue	RSF	SMO

Contents

1 Introduction

1.1 Background

Fichtner Consulting Engineers Ltd (Fichtner) has been engaged to provide supporting evidence to confirm and clarify the statements set out in the Environmental Statement (ES) regarding the following:

- The net change in impacts on air quality due to the provision of shore power for ships whilst in berth at Portland Harbour; and
- The cumulative impact of road and process emissions associated with the proposed development and other consented projects on sites of European ecological importance.

The original assessment of emissions associated with the proposed development (as set out in Chapter 4 [Air Quality] of the ES) quantified the impacts on air quality associated with deliveries by road and noted that the use of ships for the delivery material would reduce the HGV movements on the local roads network and as such would reduce air quality impacts away from the immediate port area. Within the ES, it was explained that there would also be a reduction in emissions from berthed ships which would use shore power provided by the ERF, but that this benefit had not been quantified. These ships would otherwise be using on-vessel generators, with associated emissions. The net change associated with the proposed development has now been quantified as set out in this report.

The original assessment considered the impact of road and process emissions and screened out the need for further consideration of the cumulative impact with other plans and projects at National Site Network (NSN) sites of European ecological importance as the total impact was predicted to be less than 1% of the relevant assessment levels. The cumulative impact with other plans and projects has now been quantified as set out in this report.

1.2 Objectives

The aims of this report are to:

- set out the net change in impacts on air quality due to the provision of shore power for ships whilst in berth at Portland Harbour; and
- set out the cumulative impact of road and process emissions associated with the proposed development and other consented plans and projects on NSN sites of European ecological importance.

2 Discussion

2.1 Shipping emissions

The ES qualitatively explained that the results presented were worst-case as they did not account for the offset of emissions from shipping which would be connected to shore power. These ships would otherwise be using on-vessel generators, with associated emissions. To support this statement, additional modelling has been undertaken which quantifies the impact of emissions from those ships which would be connected to shore power provided by the ERF – i.e. those ships whose on-vessel generator emissions would be displaced as a result of the proposed development.

Detailed modelling of emissions from the ships has been carried out using ADMS 5.2 as per the modelling of process emissions from the ERF. All inputs relating to meteorological data and dispersion site parameters are the same as those used when modelling the ERF in isolation as set out in the ES. The modelling has considered the impact of emissions from cruise ships, which are berthed for less than a day each, and two Royal Fleet Auxiliary (RFA) ships, which are berthed on a longer term basis. The assumptions for each are set out in Appendix A.

The emissions associated with the on-vessel generators are those from the combustion of fuel oil – namely oxides of nitrogen, sulphur dioxide and particulate matter. The impact of all other emissions would be as set out in the ES.

2.1.1 Results

Plot files are provided in Appendix B for each pollutant which show:

- The impact of emissions from the shipping which would be connected to shore power provided by the ERF;
- The impact of emissions from the ERF; and
- The net change in impact.

As shown, for particulate matter there is a net benefit associated with the proposed development at all points across the modelling domain. This is because the impact of emissions from the on-vessel generators, which would no longer be needed, is higher than the impact of emissions from the ERF. For nitrogen dioxide, there is a net benefit for the majority of the area. Where there is a net increase, the increase is extremely small (0.05 µg/m^3 at the point of greatest increase on land and 0.15 µg/m^3 at the point of greatest impact at sea), which can be compared with current background concentrations of around 22 µg/m^3. For sulphur dioxide, there is a net benefit for the majority of the area. Where there is a net increase the increase is extremely small (0.05 µg/m^3 at the point of greatest increase on land and 0.15 µg/m^3 at the point of greatest impact at sea), which can be compared with current background concentrations of around 2 µg/m^3.

As set out in Appendix A, the modelling has made very conservative assumptions over the emissions from the on-vessel generators. The assumptions have assumed that the majority of the generators are modern and as such the emissions would be lower than older generators. If less conservative assumptions were used, and the emissions from the on-vessel generators assumed to be higher, the net change would show a greater benefit of the proposed development.

2.2 Ecological impacts

The original assessment considered the impact of road and process emissions and screened out the need for further consideration of the cumulative impact with other plans and projects at NSN sites of European ecological importance as the total impact of process and road traffic emissions associated with the proposed development was predicted to be less than 1% of the relevant assessment levels. The NSN sites of European ecological importance identified which would be impacted by cumulative emissions from road traffic and process emissions were:

- Chesil and The Fleet SAC; and
- Isle of Portland to Studland Cliffs SAC.

The original dispersion modelling included all the committed developments as the trips associated with the committed developments were included in the predicted 2023 flows for both the do-minimum and do-something scenarios. The change in impact between the do-minimum and do-something flows was predicted. However, results were not presented to show the cumulative change in impact from the do-nothing scenario, which did not include the trips associated with the committed developments.

The detailed modelling has been updated and the do-nothing scenario run using ADMS Roads 5.0 as per the modelling of traffic emissions as set out in the ES. All inputs relating to meteorological data and dispersion site parameters are the same as those set out in the ES. The only difference is the traffic data which is set out in Appendix B. Full details of the committed developments included are as set out in the Transport Assessment. The difference between the do-something and do-nothing has been calculated to determine the cumulative impact of emissions from the proposed development (the ERF and traffic) and other consented projects. This has focussed on impacts of traffic related emissions which there is an assessment level set for the protection of ecosystems – i.e. oxides of nitrogen, ammonia and nitrogen deposition.

Results have been provided for a transect from the road across the SAC as set out in the ES.

For the purpose of this analysis the background concentration of oxides of nitrogen has been taken from the DEFRA mapped background dataset as set out in the ES minus the "primary road in" sector. This is because the contribution of oxides of nitrogen from the road traffic from major roads within the modelling domain has been explicitly modelled and using the total oxides of nitrogen concentration would lead to an overestimation of the PEC. The ammonia and nitrogen deposition background rates have been taken from the APIS background dataset. For ammonia and nitrogen deposition these are on a 5 km x 5 km spatial resolution which is calculated as a rolling average 3-year concentration. This is updated on a periodic basis. The latest update was published in March 2021 and has been updated to the 3-year average for 2017 to 2019. The previous shadow appropriate assessment used the data available at the time of submission which was the 3-year average from 2016 to 2018. An analysis of the differences has shown that the latest 3-year average data is slightly greater than that used in the original shadow appropriate assessment. Therefore, this data produced to support the updated shadow appropriate assessment uses the most recent available data. Unlike the DEFRA dataset the APIS dataset does not source apportion the concentration. Therefore, it is not possible to remove the road contribution modelled. As such the PEC is likely to be an overestimation for the PEC as the baseline contribution from road sources will be double counted.

2.2.1 Results

Graphs are provided in Appendix D for Chesil and the Fleet SAC, and Appendix E for the transect across the Isle of Portland to Studland Cliffs SAC for each pollutant which show the cumulative impact of emissions from the ERF, road vehicles associated with the operation of the proposed development, and the other additional cumulative developments.

As shown, the transect is very similar for the total concentration with and without the proposed development (the do-something and do-minimum scenarios). The do-nothing scenario is much lower. This shows that the impact from the proposed development is minimal and impacts are dominated by the other consented schemes.

In terms of annual mean oxides of nitrogen impacts at Chesil and the Fleet SAC:

- Figure 8 shows that the impact of the proposed development is predicted to be less than 1% of the critical level within 2m of the road.
- Figure 7 shows that the cumulative impact (with other plans and projects) is predicted to be significantly greater with cumulative impacts within 50m of the road greater than 5% of the critical level.
- Figure 9 shows that the total concentration is predicted to exceed the critical level very close to the road (within 3m of the road). This exceedence is predicted to occur as a result of other cumulative schemes and the additional contribution from the proposed development will not change the distance at which exceedances of the critical level are predicted significantly (i.e. less than a metre). In any case impacts are predicted to be less than 70% of the critical level by 11m from the road for both the do-minimum and do-something scenario.

In terms of annual mean ammonia impacts at Chesil and the Fleet SAC:

- Figure 12 shows that the impact of the proposed development is predicted to be less than 1% of the critical level within 1m of the road.
- Figure 11 shows that the cumulative impact (with other plans and project) is predicted to be significantly greater with cumulative impacts within 50m of the road greater than 8% of the critical level.
- Figure 14 shows that the total concentration is predicted to exceed the critical level close to the road (within 3m of the road). This exceedence is predicted to occur as a result of other cumulative schemes and the additional contribution from the proposed development will not change the distance at which exceedances of the critical level are predicted significantly (i.e. less than a metre). In any case impacts are predicted to be less than 70% of the critical level by 9m from the road for both the do-minimum and do-something scenario.

In terms of nitrogen deposition impacts at Chesil and the Fleet SAC:

- Figure 16 shows that the impact of the proposed development is predicted to be less than 2kgN/ha/yr within 4m of the road. The greatest source of emissions to nitrogen deposition is ammonia from road traffic emissions.
- Figure 15 shows that the cumulative impact (with other plans and project) is predicted to be significantly greater.
- Figure 18 shows that the total concentration is predicted to be similar for the do-minimum and do-something scenario.

The greatest source of emissions to nitrogen deposition is ammonia from road traffic emissions.

In terms of annual mean oxides of nitrogen impacts at Isle of Portland to Studland Cliffs SAC:

- Figure 23 shows that the impact of the proposed development is predicted to be less than 1% of the critical level within 13m of the road.
- Figure 22 shows that the cumulative impact (with other plans and project) is predicted to be significantly greater with cumulative impacts within 50m of the road greater than 3% of the critical level.
- Figure 24 shows that the total concentration is predicted to be well below the critical level.

In terms of annual mean ammonia impacts at Portland to Studland Cliffs SAC:

- Figure 28 shows that the impact of the proposed development is predicted to be greater than 1% of the critical level for lichen sensitive communities along the transect, but Figure 26 shows that at a distance greater than 4m of the road the impact of the proposed development is predicted to be less than 1% of the critical level for non-lichen sensitive communities.
- Figure 25 and Figure 27 show that the cumulative impact (with other plans and project) is predicted to be significantly greater with cumulative impacts within 50m of the road greater than 6% of the critical level for lichen sensitive communities and 2% for non-lichen sensitive communities.
- Figure 30 shows that the total concentration is predicted to be below the critical level for lichen sensitive communities within a few metres of the road.

In terms of nitrogen deposition impacts at Portland to Studland Cliffs SAC:

- Figure 32 shows that the proposed development is predicted to be less than 1 kgN/ha/yr within 4m of the road. The greatest source of emissions to nitrogen deposition is ammonia from road traffic emissions.
- Figure 31 shows that the cumulative impact (with other plans and project) is predicted to be significantly greater.
- Figure 33 shows that the total concentration is predicted to be similar for the do-minimum and do-something scenario. The do-nothing scenario is very similar to the background as there are very few vehicles along the dock road in the do-nothing scenario.

These results have been fed into the updated shadow appropriate assessment.

Appendices

A Shipping modelling assumptions

This section details the assumptions made when calculating the inputs for the dispersion modelling relating to the shipping emissions. Note only the emissions which would be displaced as a result of the proposed development have been modelled.

A.1 Cruise ships

The following table sets out the assumptions relating to the cruise ships:

Table 1: Cruise Ships - Assumptions

Assumption	Units	Value	Justification / source
Time connected to shore power			
Cruise visits per year	Visits	60	Visits in 2024 from Powerfuel
Connected to shore power	%	62%	% connected in 2024 from Powerfuel
Connected to shore power	Visits	36	Calculated
Average length of stay	Hours	11	From Powerfuel
Start of cruise season	-	Beginning of April	Portland Harbour cruise timetable
End of cruise season	-	End of October	Portland Harbour cruise timetable
Consumption per year	MWh	3,168	Calculated from demand and duration of connection
Energy content of fuel	kg/MWh	180	Energy content of diesel
Fuel usage when docked	tpa	570	Calculated from consumption and energy content of fuel
Emissions			
Stack height	m	60	Agreed assumption – reasonable assumption as an average
Velocity	m/s	25	Agreed assumption
Temperature	°C	300	Agreed assumption
Volume flow	Am^3/s	16.74	Calculated from fuel usage using combustion calculator
Diameter	m	1.46	Calculated to achieve the stated velocity
Sulphur dioxide			
Sulphur content of fuel	%	0.1%	MARPOL Annex VI limit
Release rate	g/s	0.80	Calculated from sulphur content of fuel
Oxides of nitrogen			
Tier emission standard	-	III	

Assumption	Units	Value	Justification / source
Limit	g/kWh	2.0	Assumed to be new ships. If an older ship the emissions would be higher and thus the offset greater
Release rate	g/s	4.44	Calculated from limit and power needed
Particulate matter			
Emission standard	-		US Marine Diesel Engines
Limit	g/kWh	0.5	
Release rate	g/s	1.11	Calculated from limit and power needed

The results are considered to be conservative for the following reasons:

- The number of cruise ship visits and the fraction of cruise ships which are connected to shore power are both expected to increase year on year. Therefore, for future years the emissions offset as a result of providing shore power would be greater.
- The emissions of oxides of nitrogen have been calculated assuming the cruise ships are new (post 2016). Many operational cruise ships were constructed before 2016 andthe limit for NOx for older ships is higher. Therefore, the emissions offset as a result of providing shore power would be greater initially, depending on how quickly older cruise ships are replaced.

For the purpose of the dispersion modelling a time varying fac file has been used. This has been set up to only have emissions from the cruise ships from the hours of 8am to 7pm each day from the beginning of April to the end of October.

The model output has then been factored by the number of hours cruise ships are likely to be berthed and connected to shore power in that period.

$$\frac{Number\ of\ hours\ berthed\ (11)\ x\ Number\ of\ visits\ (36)}{Modelled\ hours\ (11\ x\ 214)}$$

A.2 RFA shipping

The following table sets out the assumptions relating to the RFA ships:

Table 2: RFA Ships - Assumptions

Assumption	Units	Value	Justification / source
Time connected to shore power			
Days in port per year (berth days)	Days	260	From Powerfuel
Connected to shore power	%	100%	From Powerfuel
Average demand	MW	2.75	From Powerfuel
Energy consumption per year	MWh	17,160	Calculated from demand and duration of connection

Assumption	Units	Value	Justification / source
Energy content of fuel	kg/MWh	180	Energy content of diesel
Fuel usage when docked	tpa	3,089	Calculated from power needed and energy content of fuel
Emissions			
Stack height	m	25	Agreed assumption – reasonable assumption as an average
Velocity	m/s	25	Agreed assumption
Temperature	°C	300	Agreed assumption
Volume flow	Am3/s	5.81	Calculated from fuel usage using combustion calculator – includes for % of year connected
Diameter	m	0.86	Calculated to achieve the stated velocity
Sulphur dioxide			
Sulphur content of fuel	%	0.1%	MARPOL Annex VI limit
Release rate	g/s	0.28	Calculated from sulphur content of fuel
Oxides of nitrogen			
Tier emission standard	-	II	Assumed to be oldish ships, there is a mix of ages and the older ship emissions would be higher and thus the offset greater
Limit	g/kWh	7.7	
Release rate	g/s	5.88	Calculated from limit and power needed
Particulate matter			
Emission standard	-	-	US Marine Diesel Engines
Limit	g/kWh	0.5	
Release rate	g/s	0.38	Calculated from limit and power needed

The results are considered to be conservative for the following reason:

- The emissions of oxides of nitrogen have been calculated assuming the RFA ships were constructed between 1 January 2011 and 31 December 2015 and have an engine with a rated speed of > 2000 rpm. A number of the RFA ships were constructed before this period and have a lower rated speed. Therefore, the emissions offset as a result of providing shore power would be greater.

For the purpose of the dispersion modelling the model outputs were factored to account for the number of days the RFA ships would be connected to shore power.

B Do Nothing Traffic Data

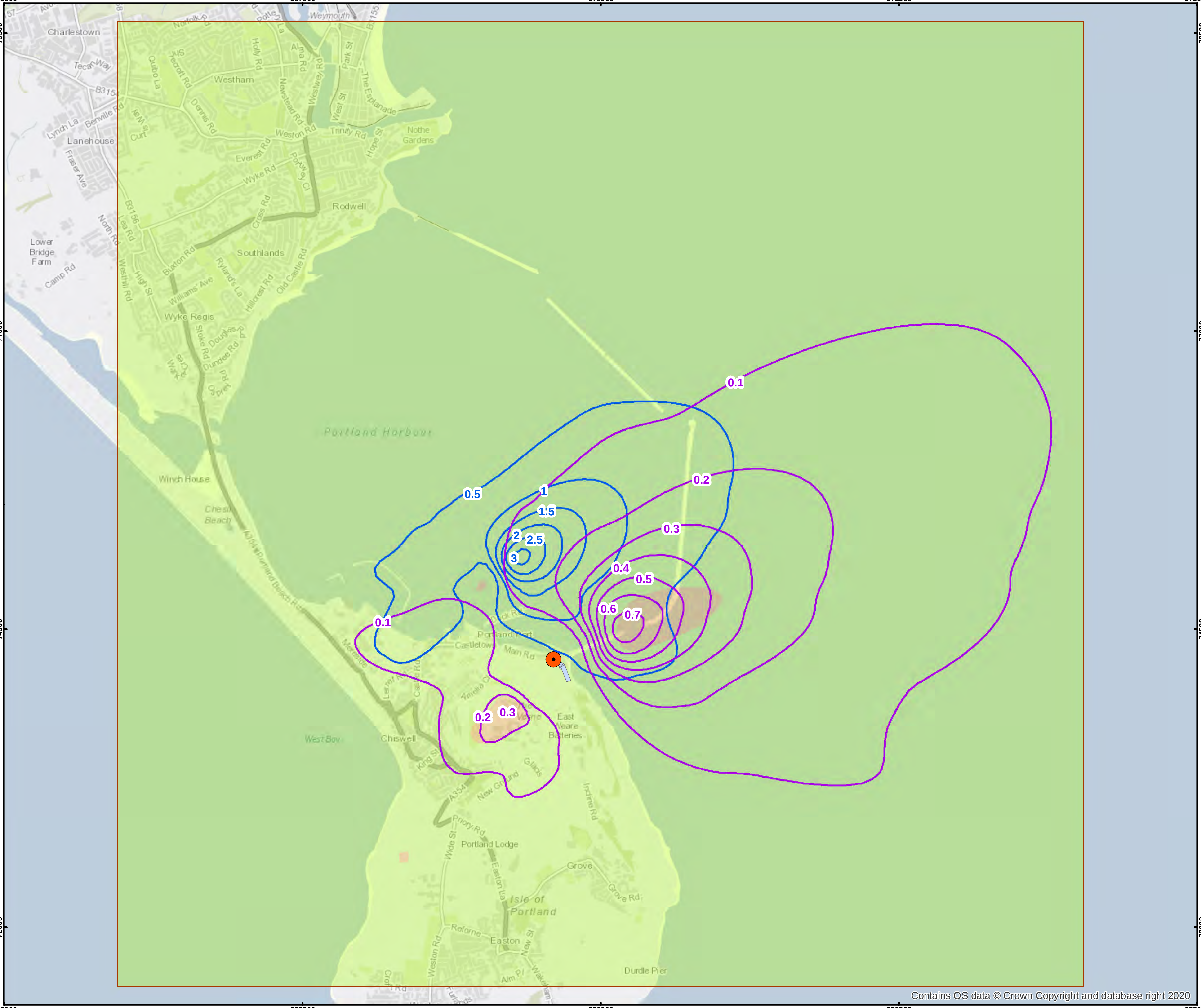
The following table sets out the traffic data used for the do-nothing scenario. This only focussed on links A and B in the main modelling as all other links are far enough from the area of concern that any contribution from these would be minuscule. For full details of the traffic data for the do-minimum and do-something scenarios, reference should be made to Technical Appendix D2 of the ES.

Table 3: Traffic Data – 24-hour AADT – Do-Minimum

Road Link		Do-nothing 2023	
		Cars	HGVs
A	Port – Lichen Beds	1,111	1,111
B	Portland Beach Road	16,710	7,306

Source: AWP

C Figures - Shipping



Legend

- Facility stack
- Facility buildings
- Modelling domain
- Facility
- Ships

Net nitrogen dioxide

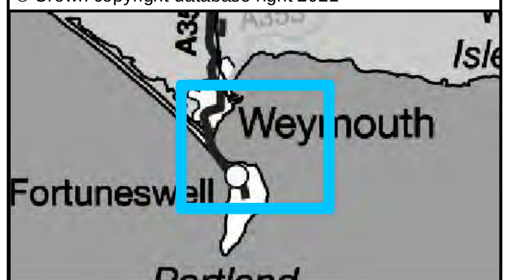
- Decrease
- Increase

Notes:
All nitrogen dioxide concentrations are displayed as concentrations (ug/m3)
Assumes 70% conversion of NOx to NO2

Client:	Powerfuel
Site:	Portland
Project:	2953
Title:	

Figure 1 - Annual mean nitrogen dioxide

Drawn by: Rosalind Flavell	Date: 29/04/2021

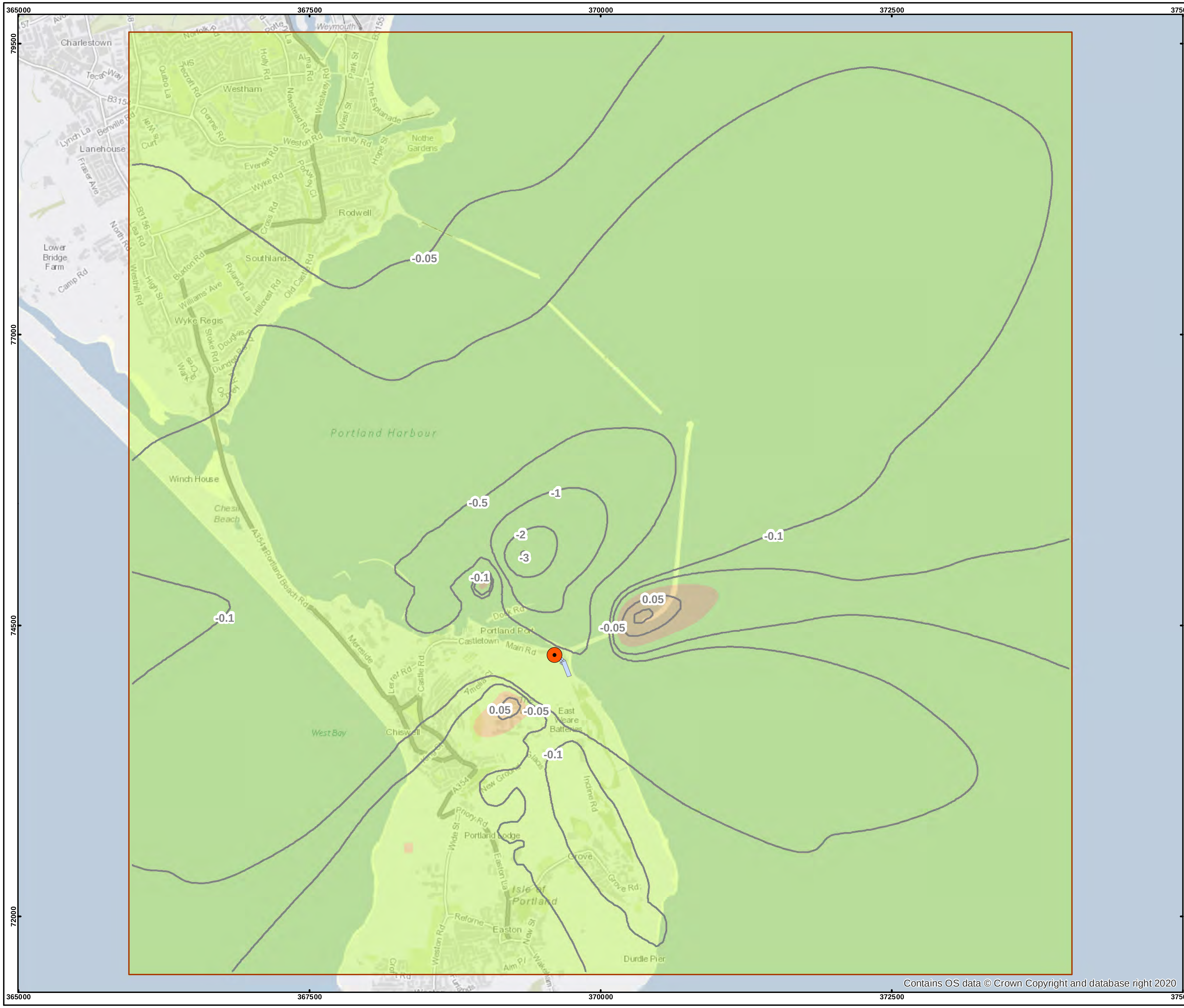


0 0.3 0.6 1.2 km

Scale: 1:30,000

FICHTNER
Consulting Engineers Limited

Kingsgate, Wellington Road North,
Stockport, Cheshire, SK4 1LW
Tel: 0161 476 0032
Fax: 0161 474 0618



Legend

- Facility stack
- Facility buildings
- Modelling domain
- Net change

Net nitrogen dioxide

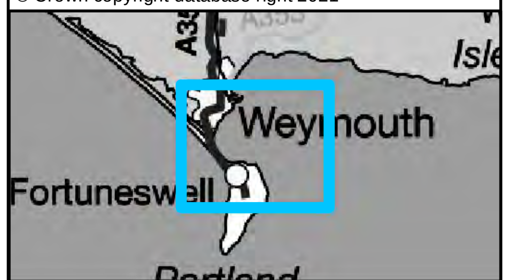
- Decrease
- Increase

Notes:
All nitrogen dioxide concentrations are displayed as concentrations (ug/m3)
Assumes 70% conversion of NOx to NO2

Client:	Powerfuel
Site:	Portland
Project:	2953
Title:	

Figure 2 - Annual mean nitrogen dioxide net change

Drawn by: Rosalind Flavell | Date: 29/04/2021

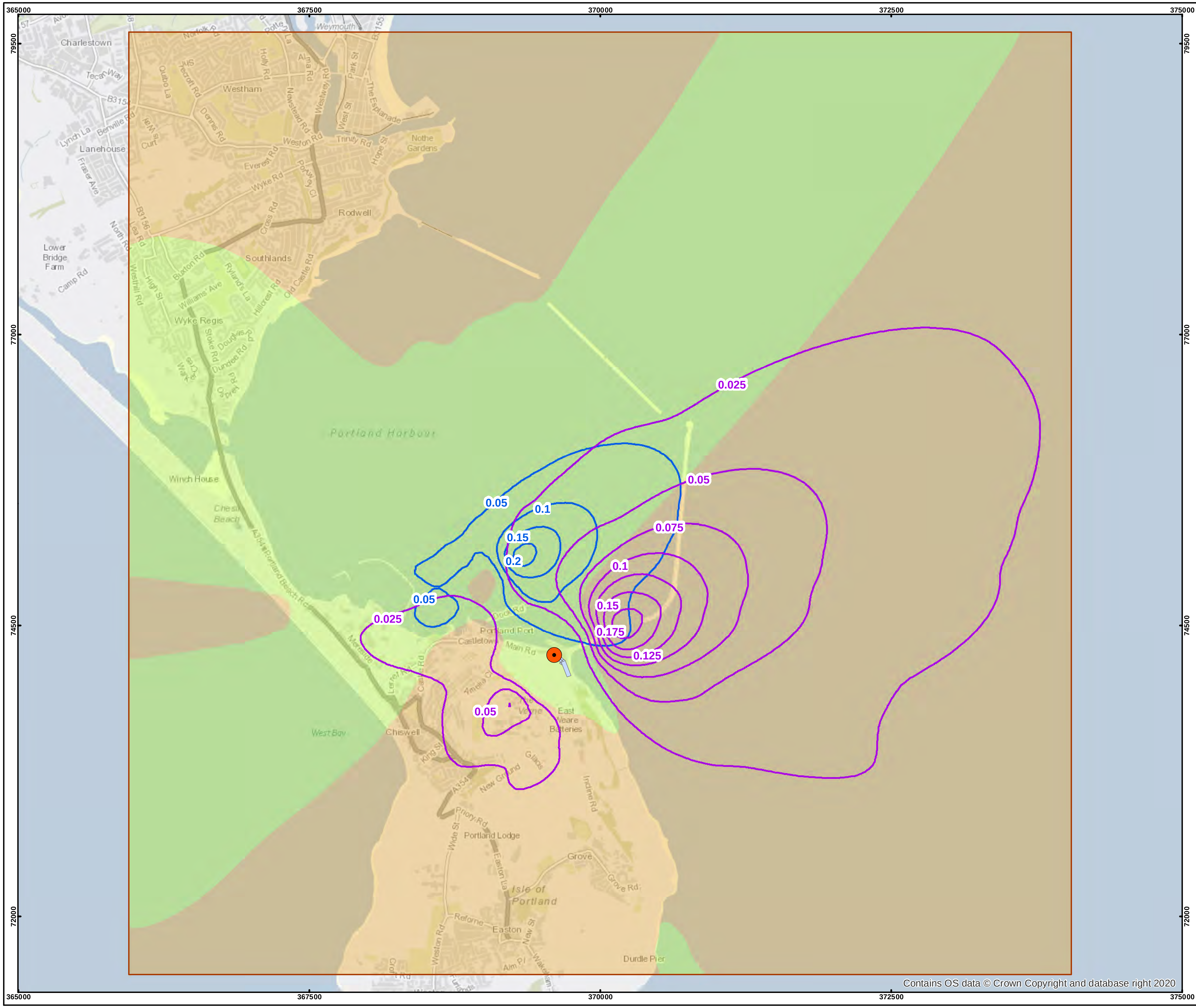


0 0.3 0.6 1.2 km

N

Scale: 1:30,000

FICHTNER
Consulting Engineers Limited
Kingsgate, Wellington Road North,
Stockport, Cheshire, SK4 1LW
Tel: 0161 476 0032
Fax: 0161 474 0618



Legend

- Facility stack
- Facility buildings
- Modelling domain
- Facility
- Ships

Net sulphur dioxide

- Decrease
- Increase

Notes:
All sulphur dioxide concentrations are displayed as concentrations (ug/m3)

Client:	Powerfuel
Site:	Portland
Project:	2953
Title:	Figure 3 - Annual mean sulphur dioxide

Drawn by: Rosalind Flavell | Date: 29/04/2021

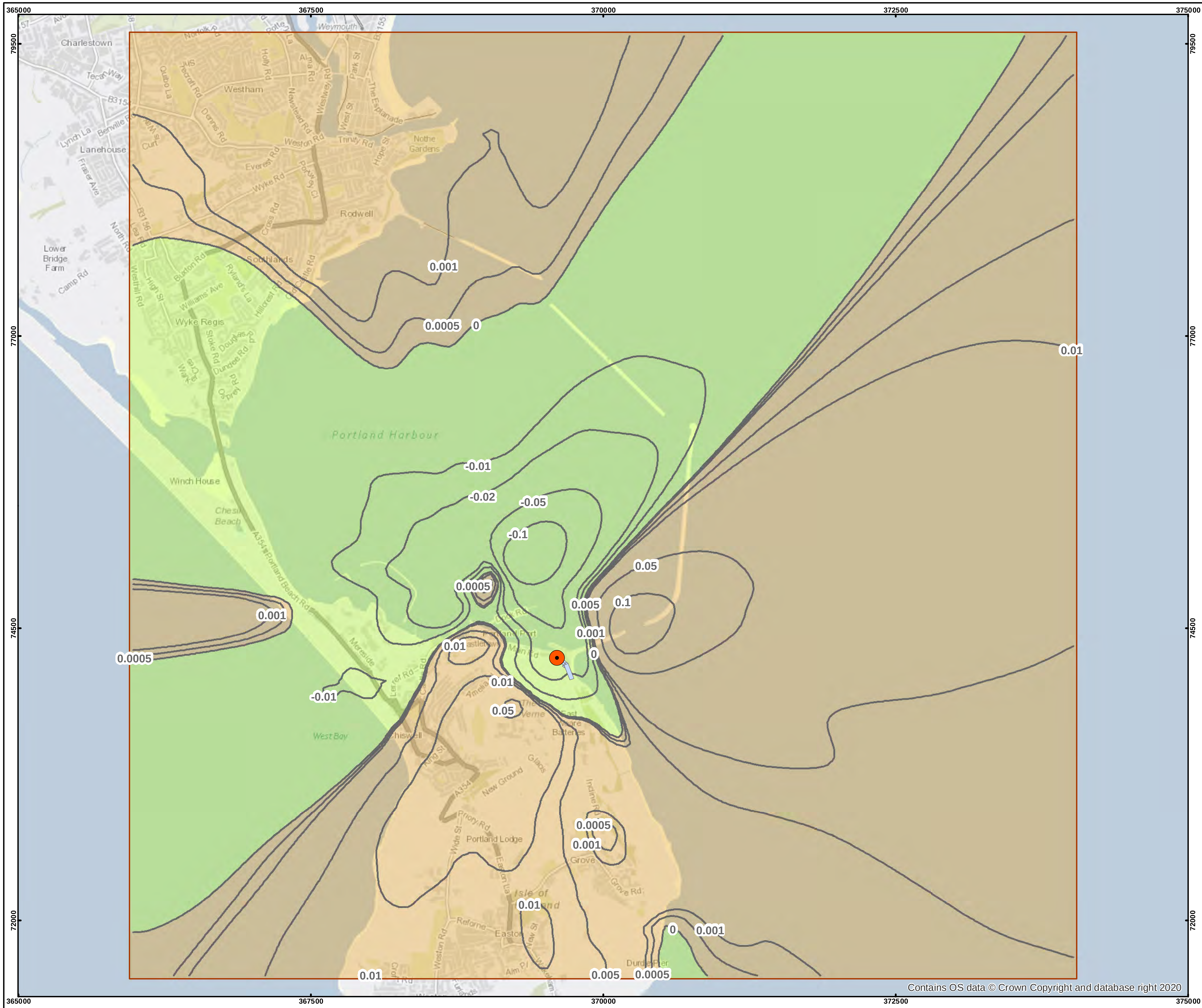
0 0.3 0.6 1.2 km

N

Scale: 1:30,000

FICHTNER
Consulting Engineers Limited

Kingsgate, Wellington Road North,
Stockport, Cheshire, SK4 1LW
Tel: 0161 476 0032
Fax: 0161 474 0618



Legend

- Facility stack
- Facility buildings
- Modelling domain
- Net change

Net sulphur dioxide

- Decrease
- Increase

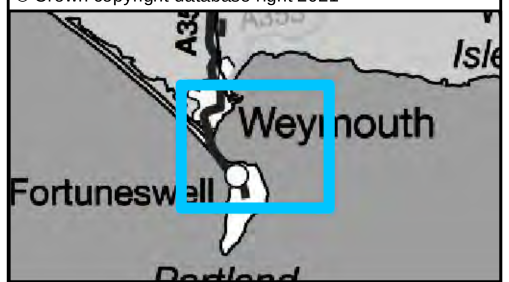
Notes:
All sulphur dioxide concentrations are displayed as concentrations (ug/m3)

Client:	Powerfuel
Site:	Portland
Project:	2953

Title:

Figure 4 - Annual mean sulphur dioxide net change

Drawn by: Rosalind Flavell | Date: 29/04/2021



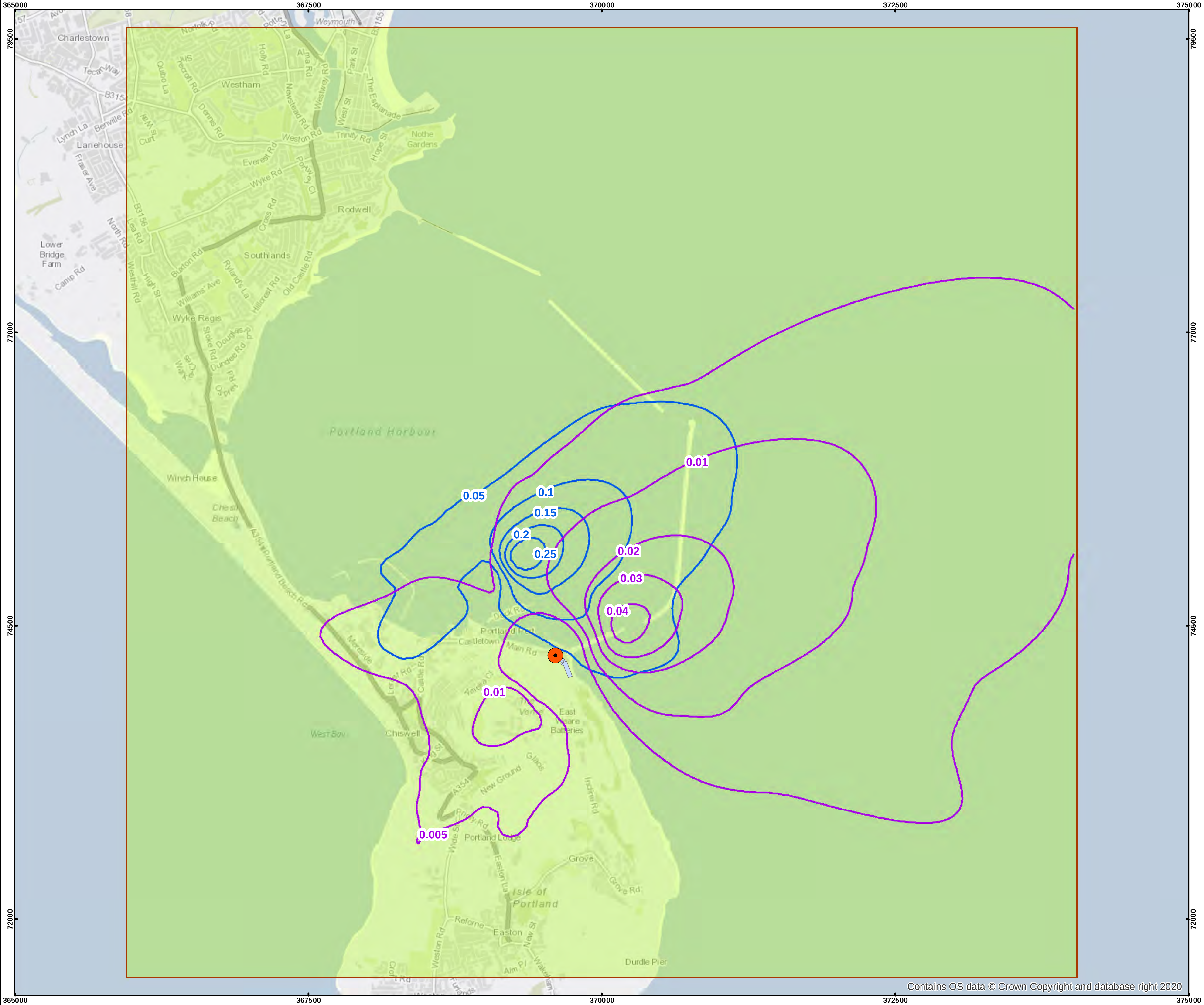
0 0.3 0.6 1.2 km

N

Scale: 1:30,000

FICHTNER
Consulting Engineers Limited

Kingsgate, Wellington Road North,
Stockport, Cheshire, SK4 1LW
Tel: 0161 476 0032
Fax: 0161 474 0618



Legend

- Facility stack
- Facility buildings
- Modelling domain
- Facility
- Ships

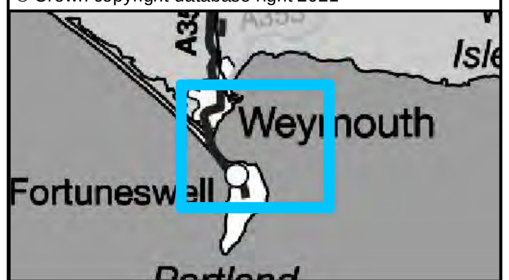
Net particulate matter

- Decrease
- Increase

Notes:
All particulate matter concentrations are displayed as concentrations (ug/m3)

Client:	Powerfuel
Site:	Portland
Project:	2953
Title:	Figure 5 - Annual mean particulate matter

Drawn by: Rosalind Flavell | Date: 29/04/2021



0 0.3 0.6 1.2 km

Scale: 1:30,000

N

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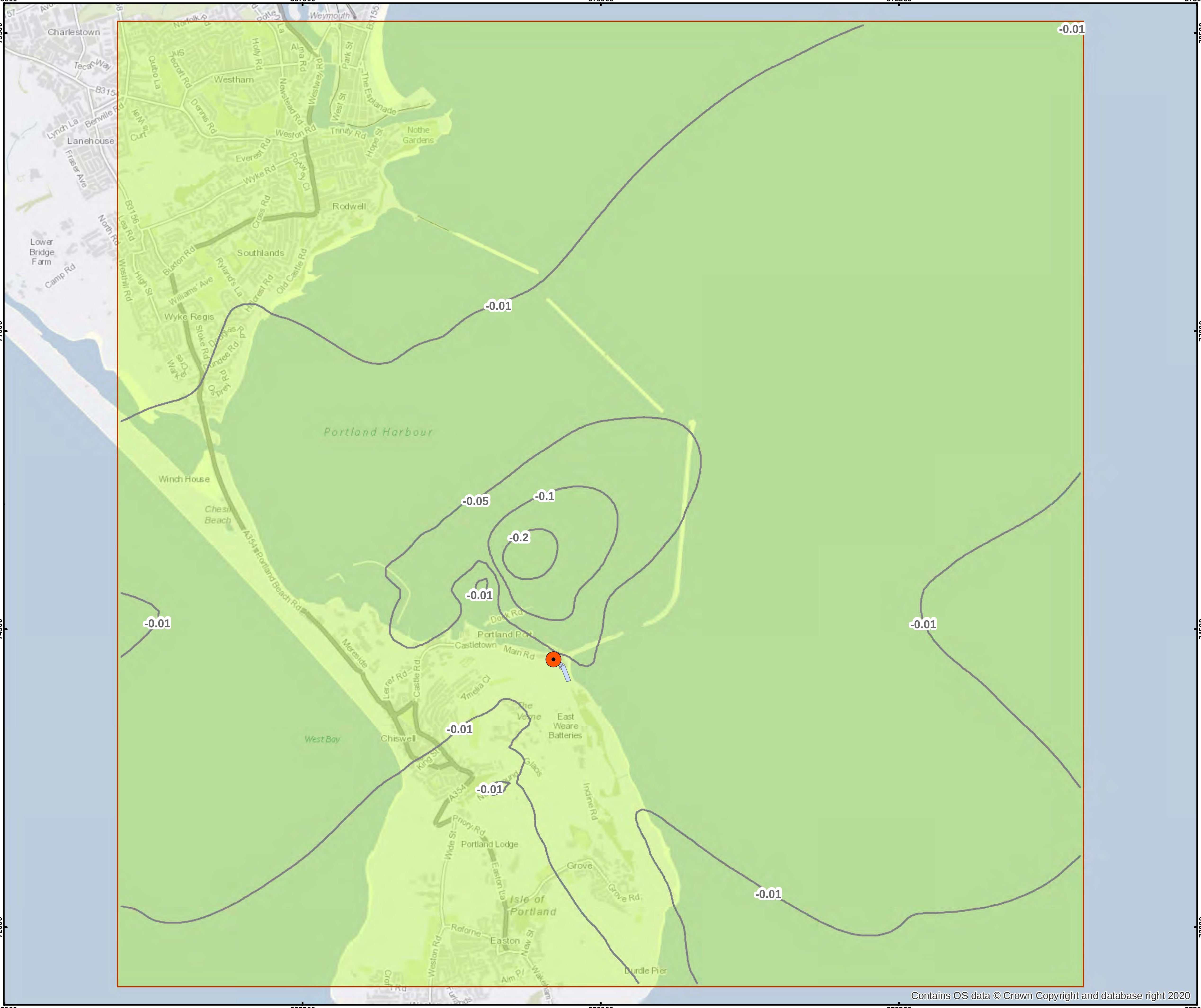
Stockport, Cheshire, SK4 1LW
Tel: 0161 476 0032
Fax: 0161 474 0618



Legend

Facility stack

Facility buildings

Modelling domain

Net change

Net particulate matter

Decrease

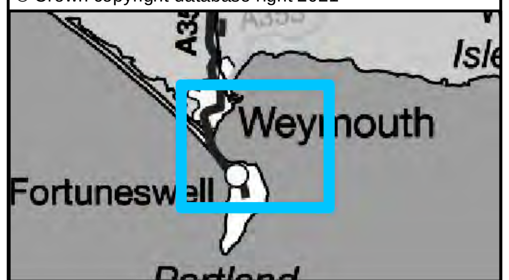
Increase

Notes:
All particulate matter concentrations are displayed as concentrations (ug/m3)

Client:	Powerfuel
Site:	Portland
Project:	2953
Title:	

Figure 6 - Annual mean particulate matter net change

Drawn by: Rosalind Flavell	Date: 29/04/2021



0 0.3 0.6 1.2 km

N

Scale: 1:30,000

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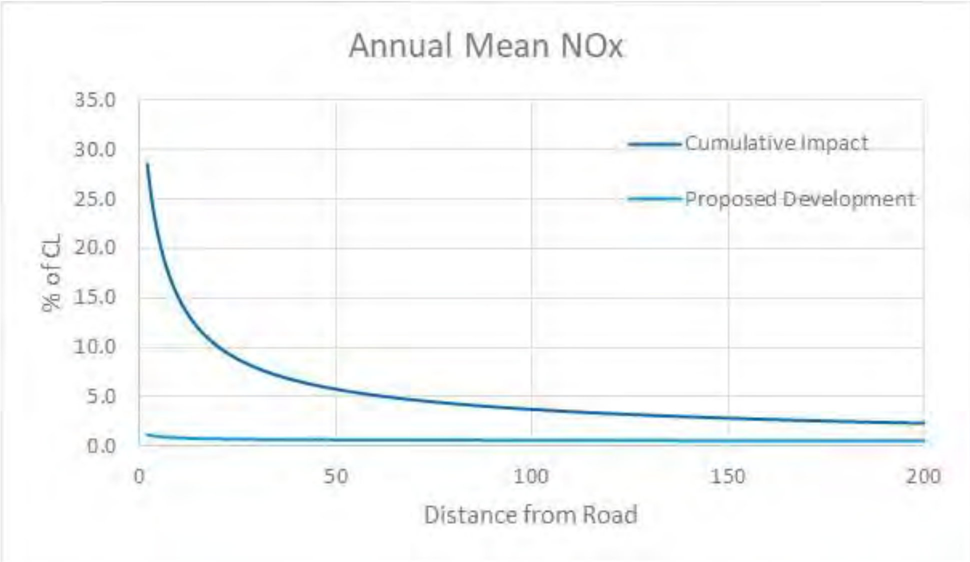
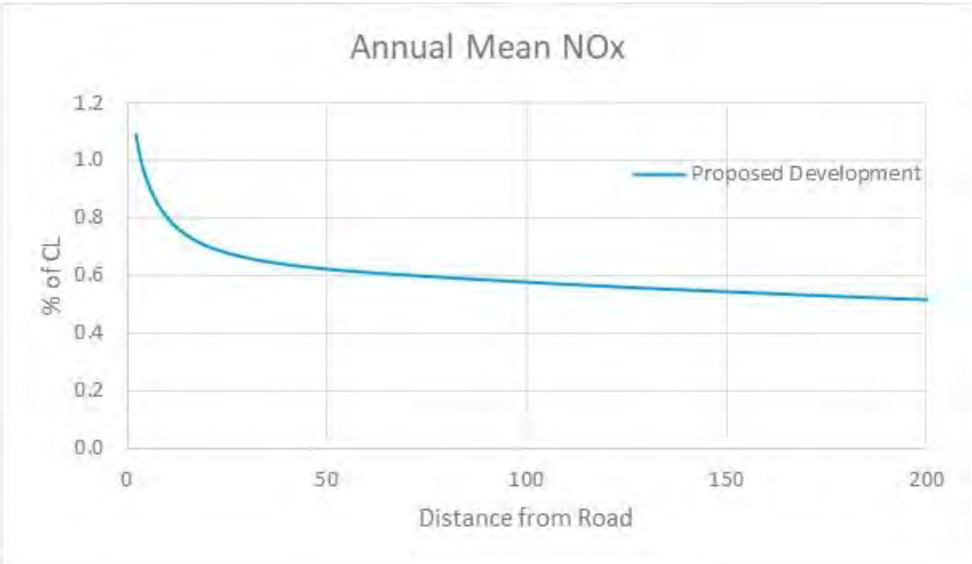
D Figures – Eco Impacts at Chesil

Figure 7: Annual Mean NOx – Chesil Beach



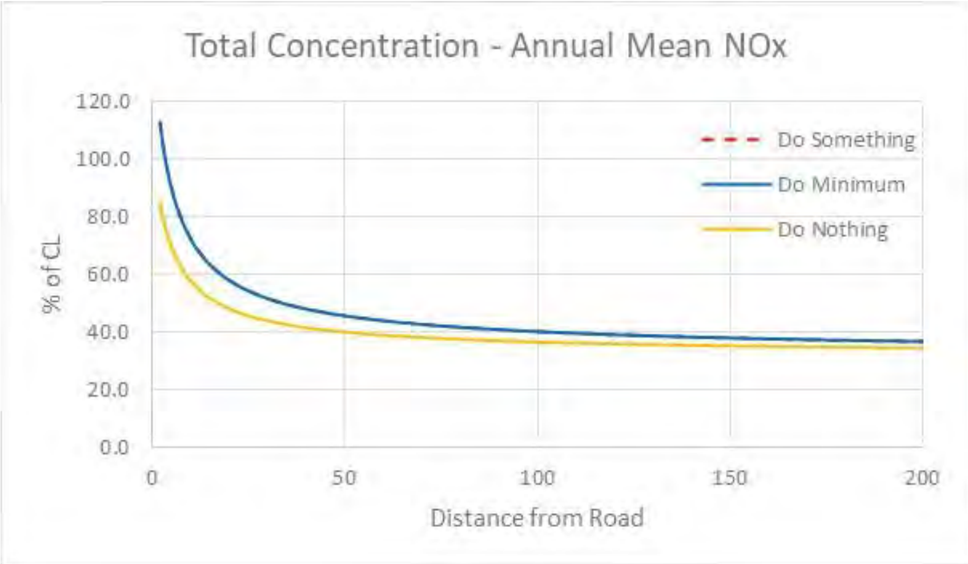
Note: Impacts presented as % of critical level of 30 µg/m³

Figure 8: Annual Mean NOx Proposed Development Only – Chesil Beach



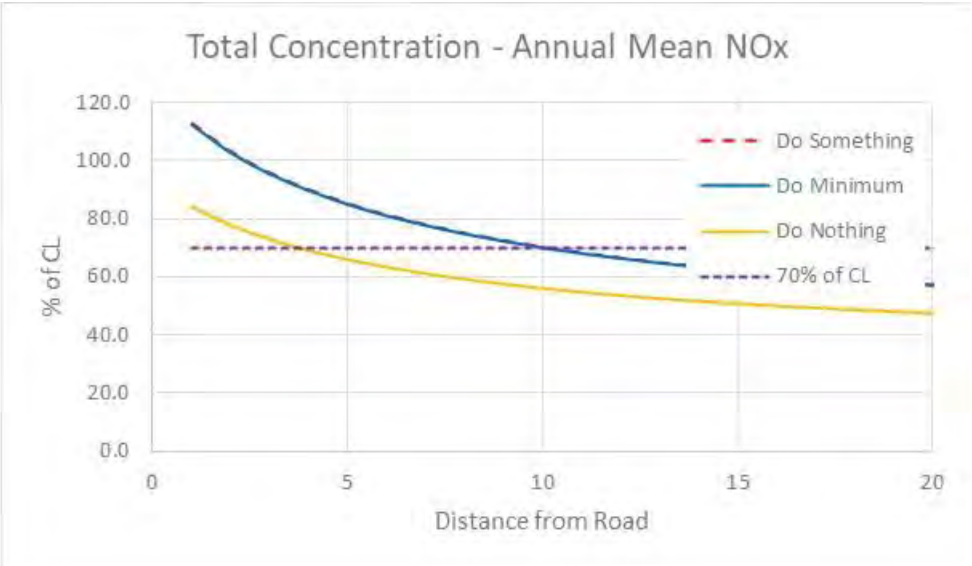
Note: Impacts presented as % of critical level of 30 µg/m³

Figure 9: Annual Mean NOx PEC – Chesil Beach



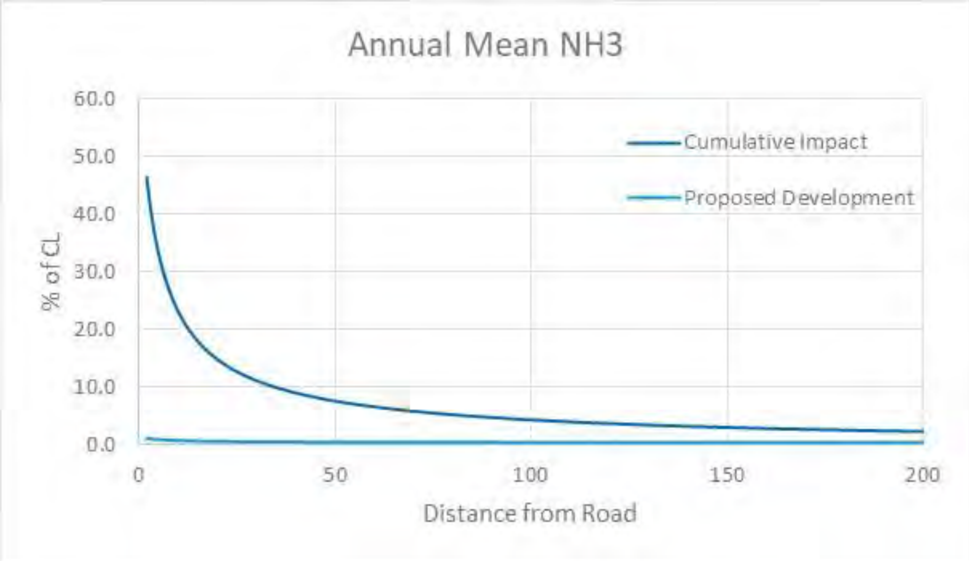
Note: Impacts presented as % of critical level of 30 µg/m³

Figure 10: Annual Mean NOx PEC – Chesil Beach - Analysis



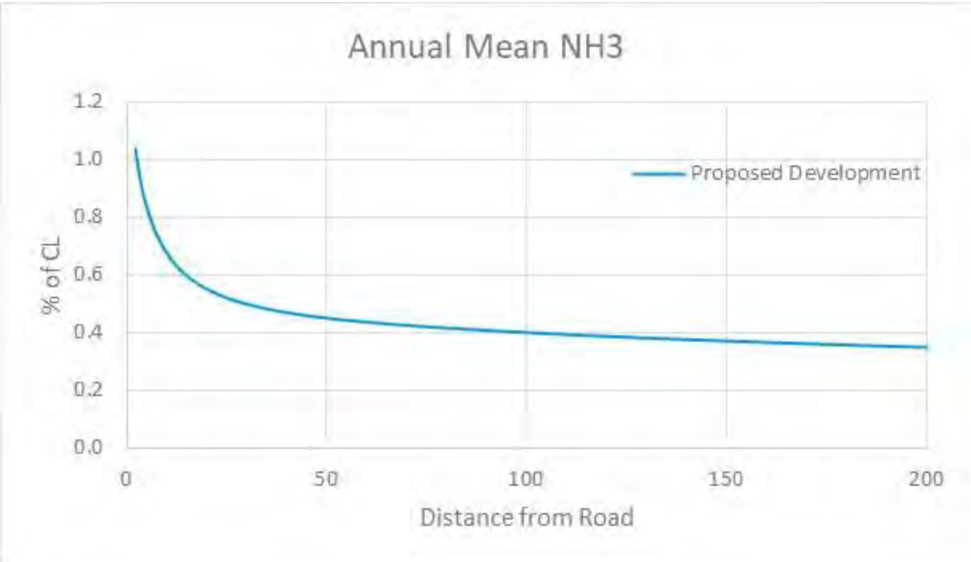
Note: Impacts presented as % of critical level of 30 µg/m³

Figure 11: Annual Mean Ammonia – Chesil Beach



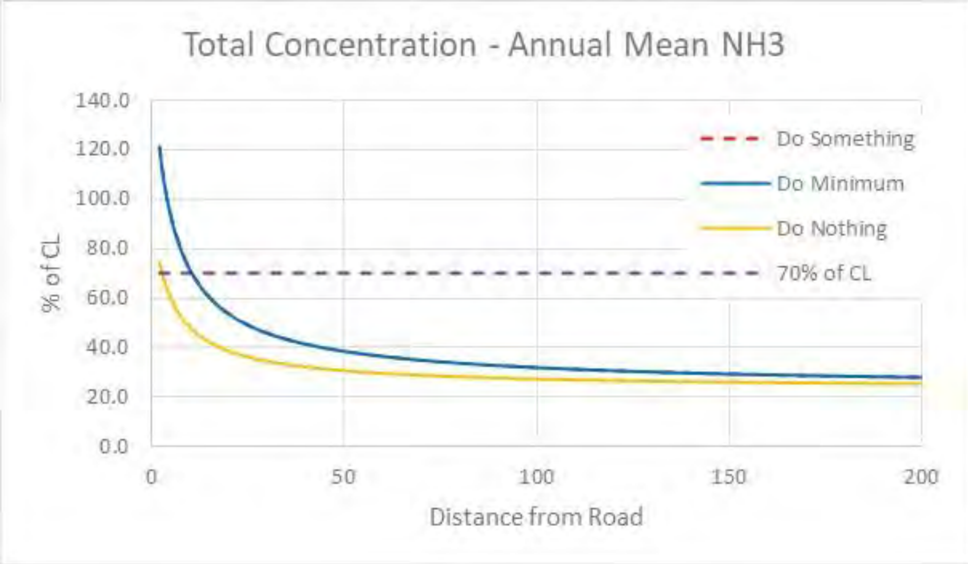
Note: Impacts presented as % of critical level of 3 µg/m³

Figure 12: Annual Mean Ammonia Proposed Development Only – Chesil Beach



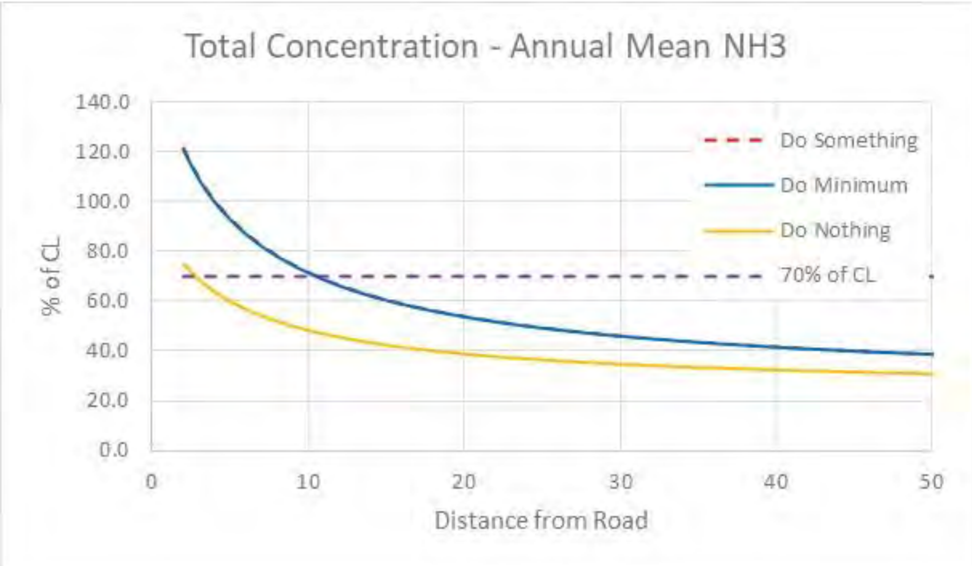
Note: Impacts presented as % of critical level of 3 µg/m³

Figure 13: Annual Mean Ammonia PEC – Chesil Beach



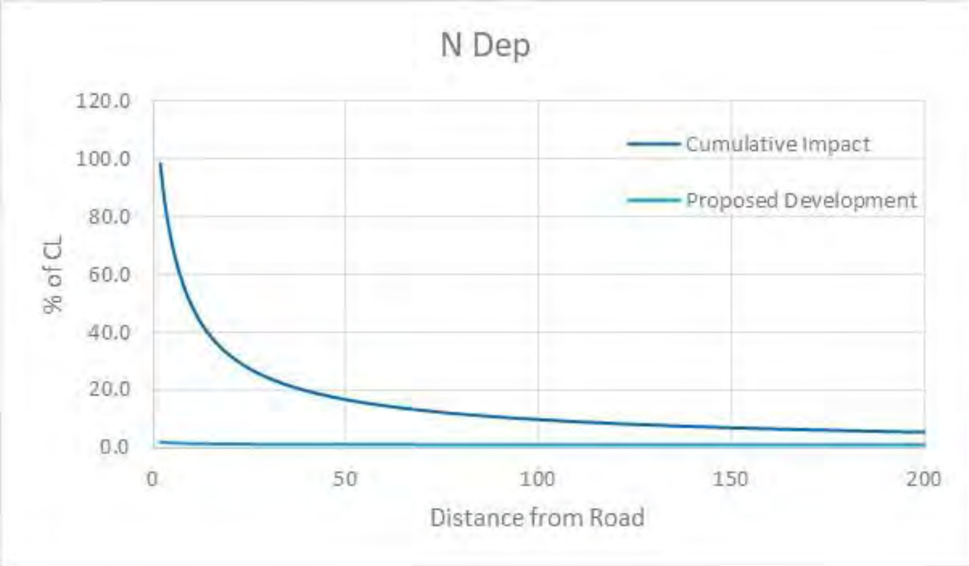
Note: Impacts presented as % of critical level of 3 µg/m³

Figure 14: Annual Mean Ammonia PEC – Chesil Beach - Analysis



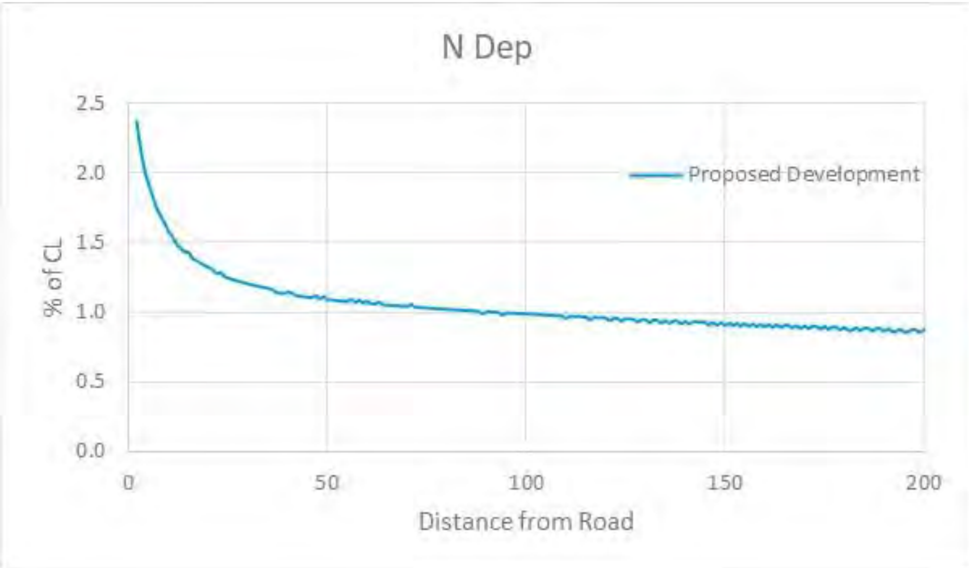
Note: Impacts presented as % of critical level of 3 µg/m³

Figure 15: Annual Mean N Dep – Chesil Beach



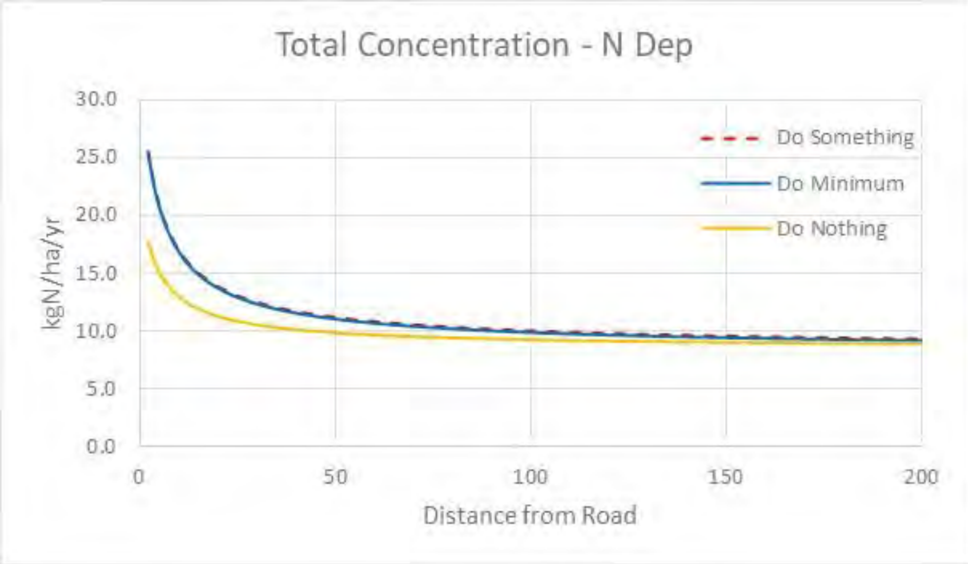
Note: Impacts presented as % of CL 8 and include the contribution from nitrogen dioxide and ammonia emissions from traffic and the ERF

Figure 16: Annual mean N Dep Proposed Development Only – Chesil Beach



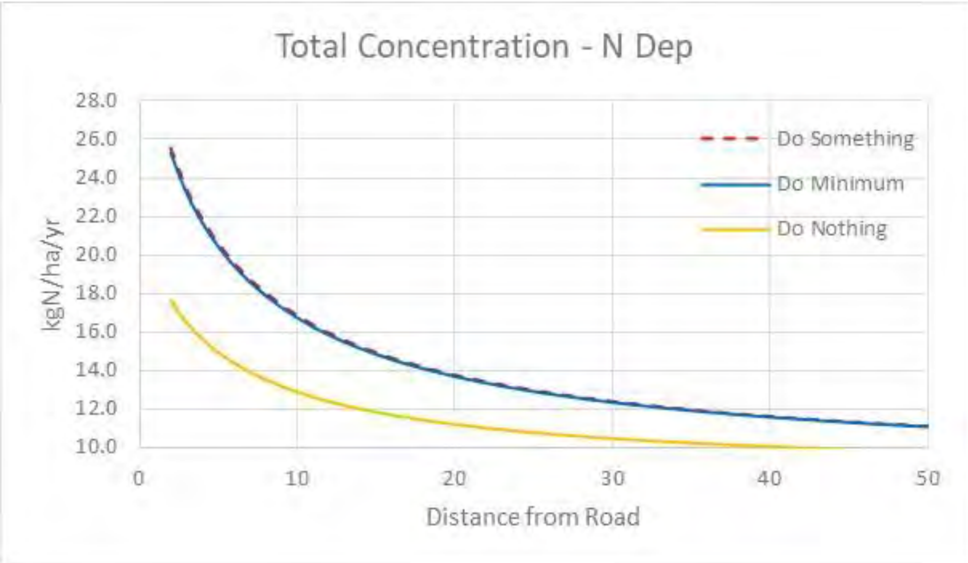
Note: Impacts presented as % of CL 8 and include the contribution from nitrogen dioxide and ammonia emissions from traffic and the ERF

Figure 17: Annual mean N Dep PEC – Chesil Beach



Note: Impacts presented as kgN/ha/yr and include the contribution from nitrogen dioxide and ammonia emissions from traffic, the ERF and mapped background

Figure 18: Annual mean N Dep PEC – Chesil Beach - Zoomed



Note: Impacts presented as kgN/ha/yr and include the contribution from nitrogen dioxide and ammonia emissions from traffic, the ERF and mapped background

Legend

ADMS Road Source

Proposed Development

Impact as % of CL

<1%

>1%

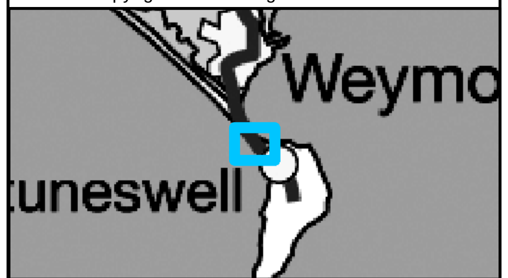
SAC

Client:	Powerfuel Ltd
Site:	2953 - Portland ERF
Project:	2953 - Portland ERF

Title:

Figure 19
Annual Mean NOx -
Proposed Development

Drawn by: RSF	Date: 23/12/2020



0 0.05 0.1 0.2 km

N

Scale: 1:5,000

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Tel: 0161 476 0032
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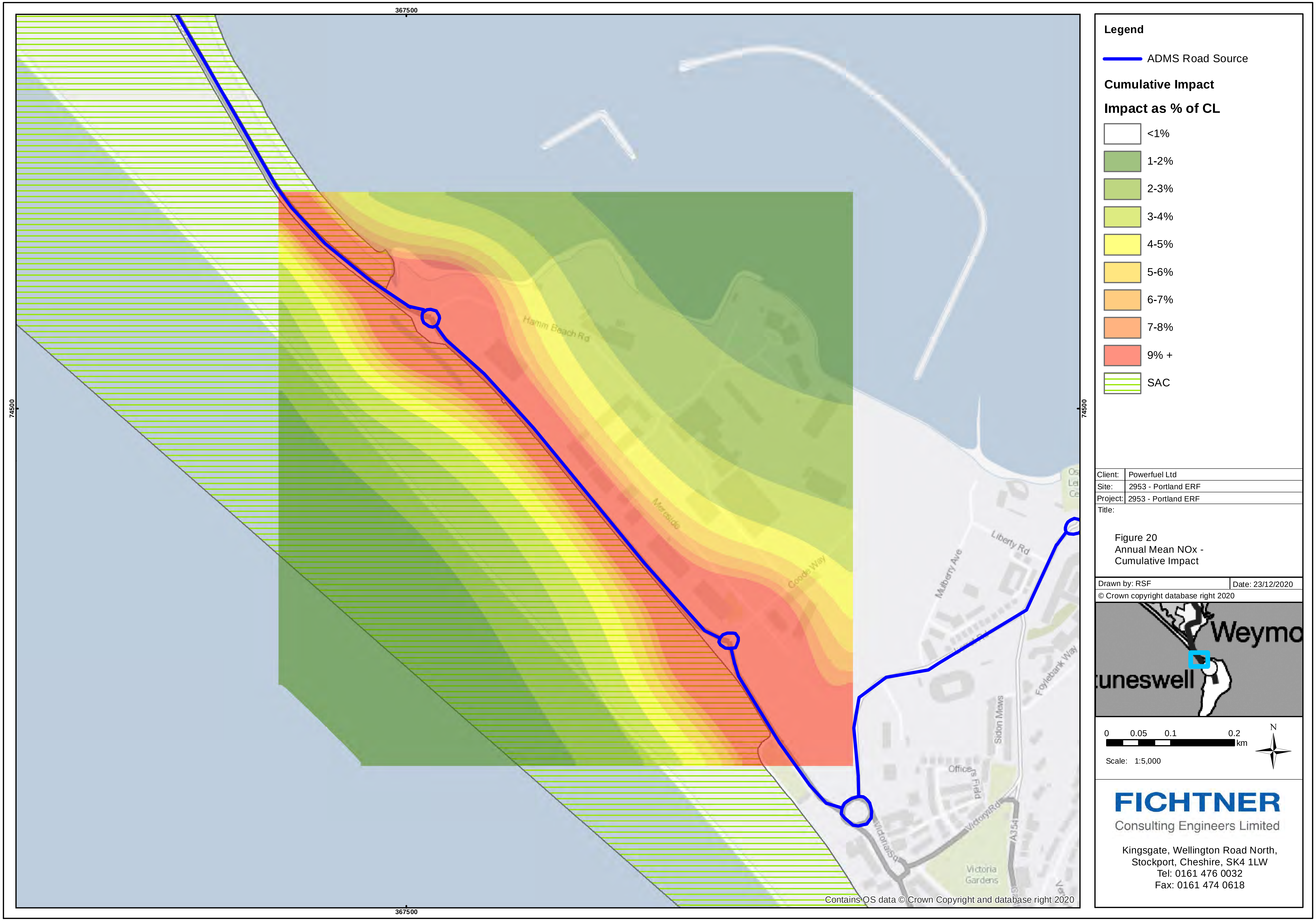

367500
74500
Hamm Beach Rd
Merceside
Goode Way
Liberty Rd
Mulberry Ave
Foylebank Way
Sidon Mews
Office
Victoria Sq
Victory Rd
A354
Victoria Gardens
Contains OS data © Crown Copyright and database right 2020
Legend
ADMS Road Source
Cumulative Impact
Impact as % of CL
<1%
1-2%
2-3%
3-4%
4-5%
5-6%
6-7%
7-8%
9% +
SAC
Client: Powerfuel Ltd
Site: 2953 - Portland ERF
Project: 2953 - Portland ERF
Title:
Figure 20
Annual Mean NOx -
Cumulative Impact
Drawn by: RSF
Date: 23/12/2020
© Crown copyright database right 2020
Weymo
uneswell
0 0.05 0.1 0.2 km
Scale: 1:5,000
N
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Stockport, Cheshire, SK4 1LW
Tel: 0161 476 0032
Fax: 0161 474 0618

Legend

ADMS Road Source

Do-Something PEC

PEC as % of CL

<70%

70-100%

100% +

Proposed Development

Impact as % of CL

<1%

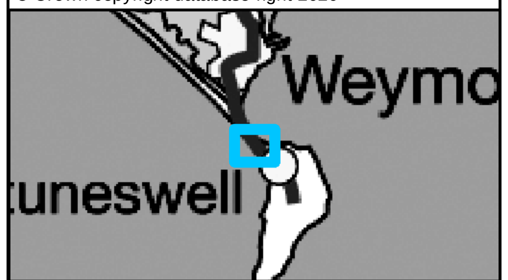
>1%

SAC

Client:	Powerfuel Ltd
Site:	2953 - Portland ERF
Project:	2953 - Portland ERF
Title:	

Figure 21
Annual Mean NOx -
Do-Something

Drawn by: RSF | Date: 23/12/2020



0 0.05 0.1 0.2 km

Scale: 1:5,000

N

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Kingsgate, Wellington Road North,
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Tel: 0161 476 0032
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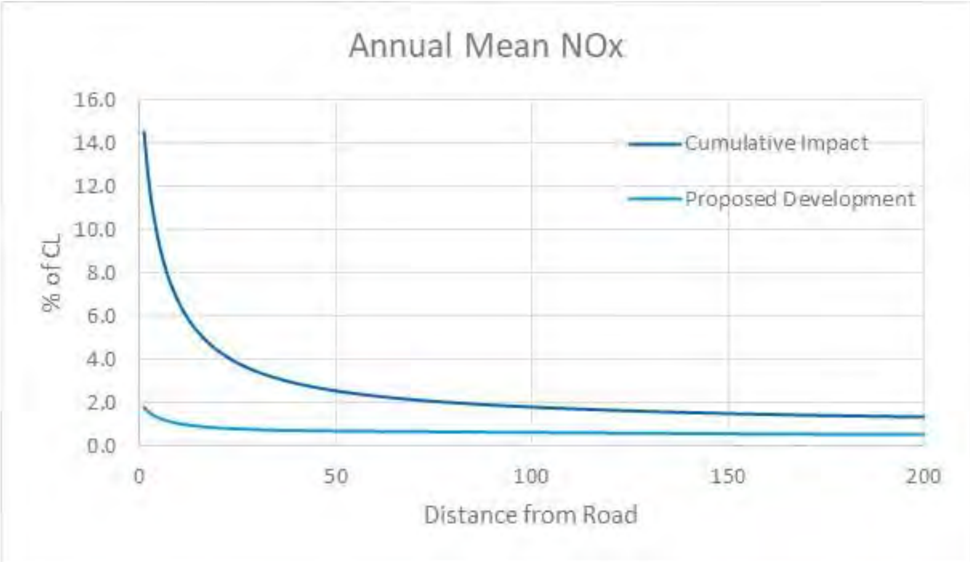
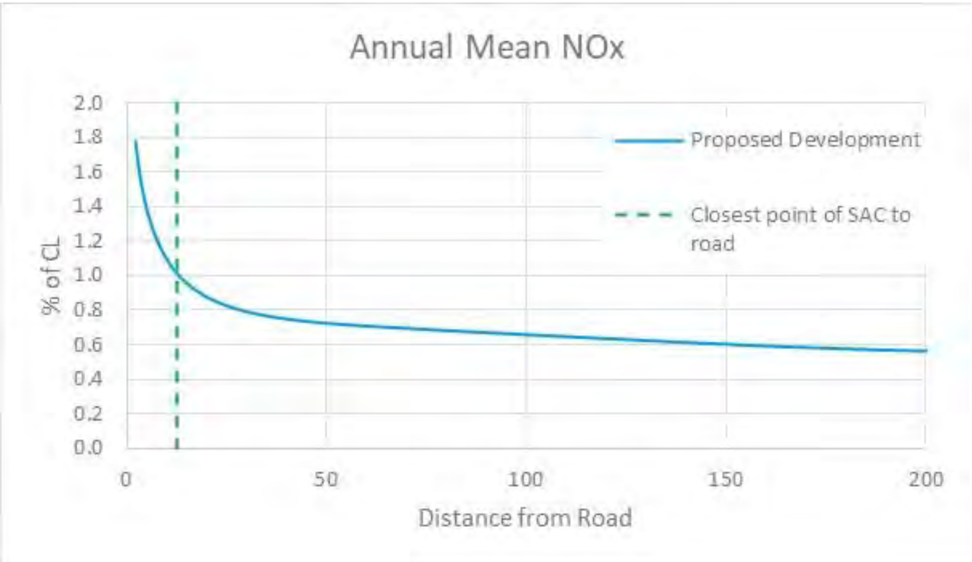
E Figures – Eco Impacts at Portland

Figure 22: Annual Mean NOx – Isle of Portland to Studland Cliffs



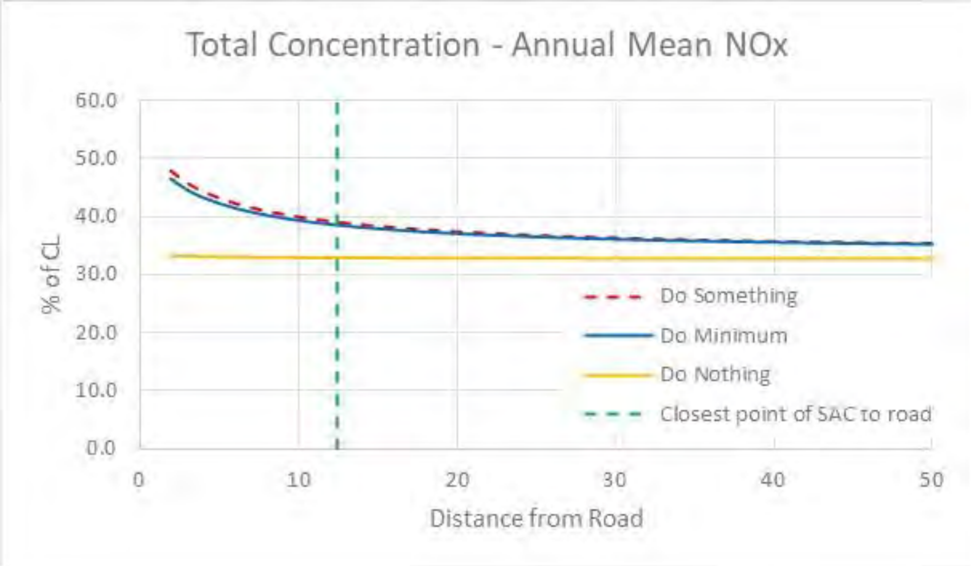
Note: Impacts presented as % of critical level of 30 µg/m³

Figure 23: Annual Mean NOx Proposed Development Only – Isle of Portland to Studland Cliffs



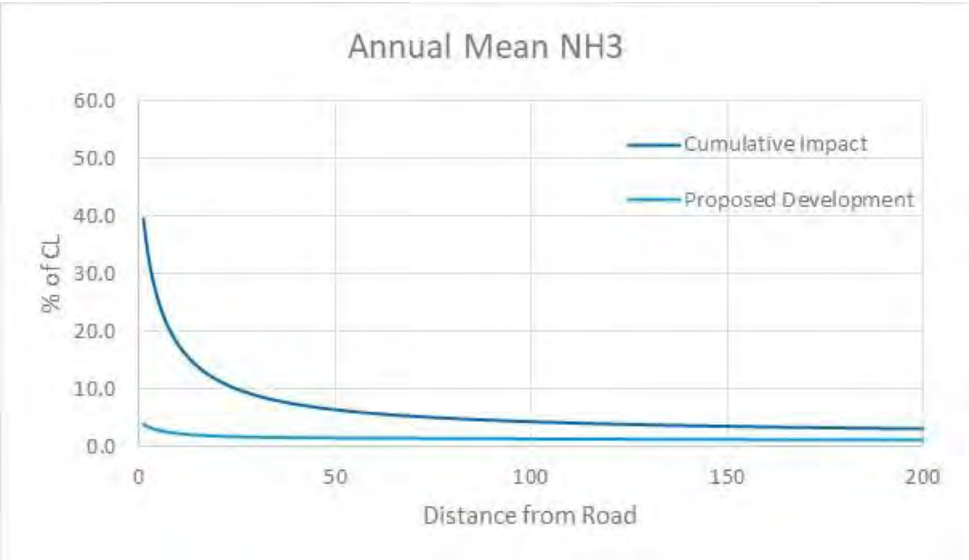
Note: Impacts presented as % of critical level of 30 µg/m³

Figure 24: Annual Mean NOx PEC – Isle of Portland to Studland Cliffs



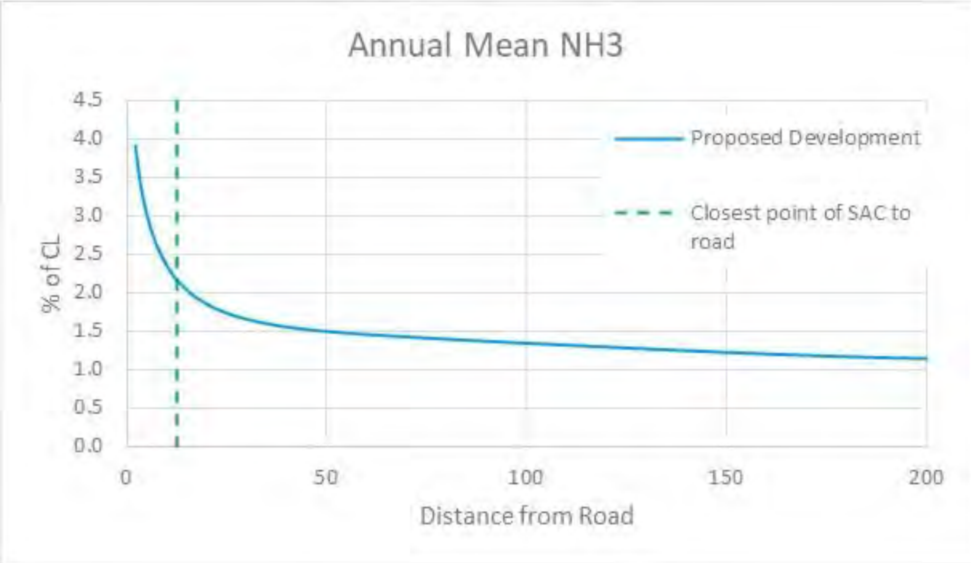
Note: Impacts presented as % of critical level of 30 µg/m³

Figure 25: Annual Mean Ammonia – Isle of Portland to Studland Cliffs



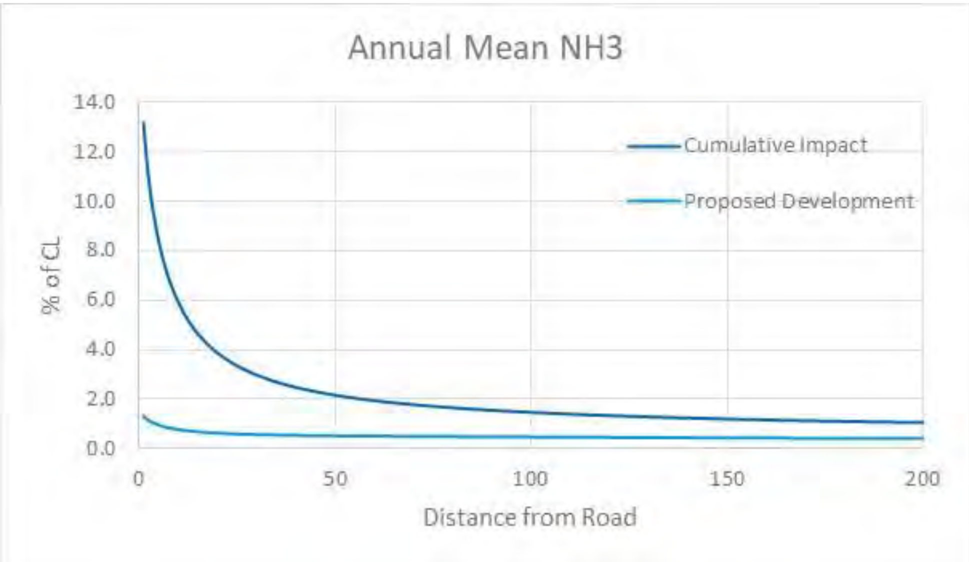
Note: Impacts presented as % of critical level of 1 µg/m³

Figure 26: Annual Mean Ammonia Proposed Development Only – Isle of Portland to Studland Cliffs



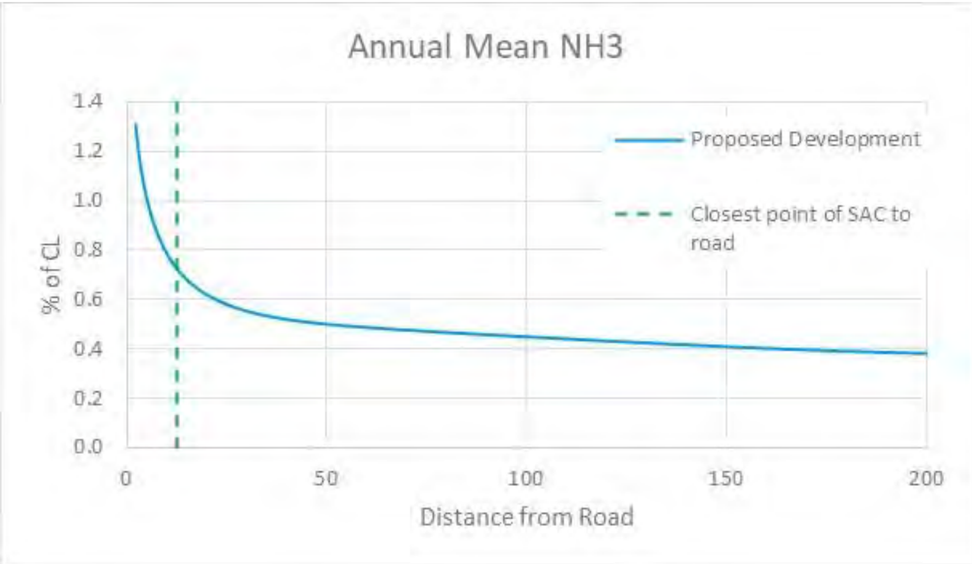
Note: Impacts presented as % of critical level of 1 µg/m³

Figure 27: Annual Mean Ammonia – Isle of Portland to Studland Cliffs



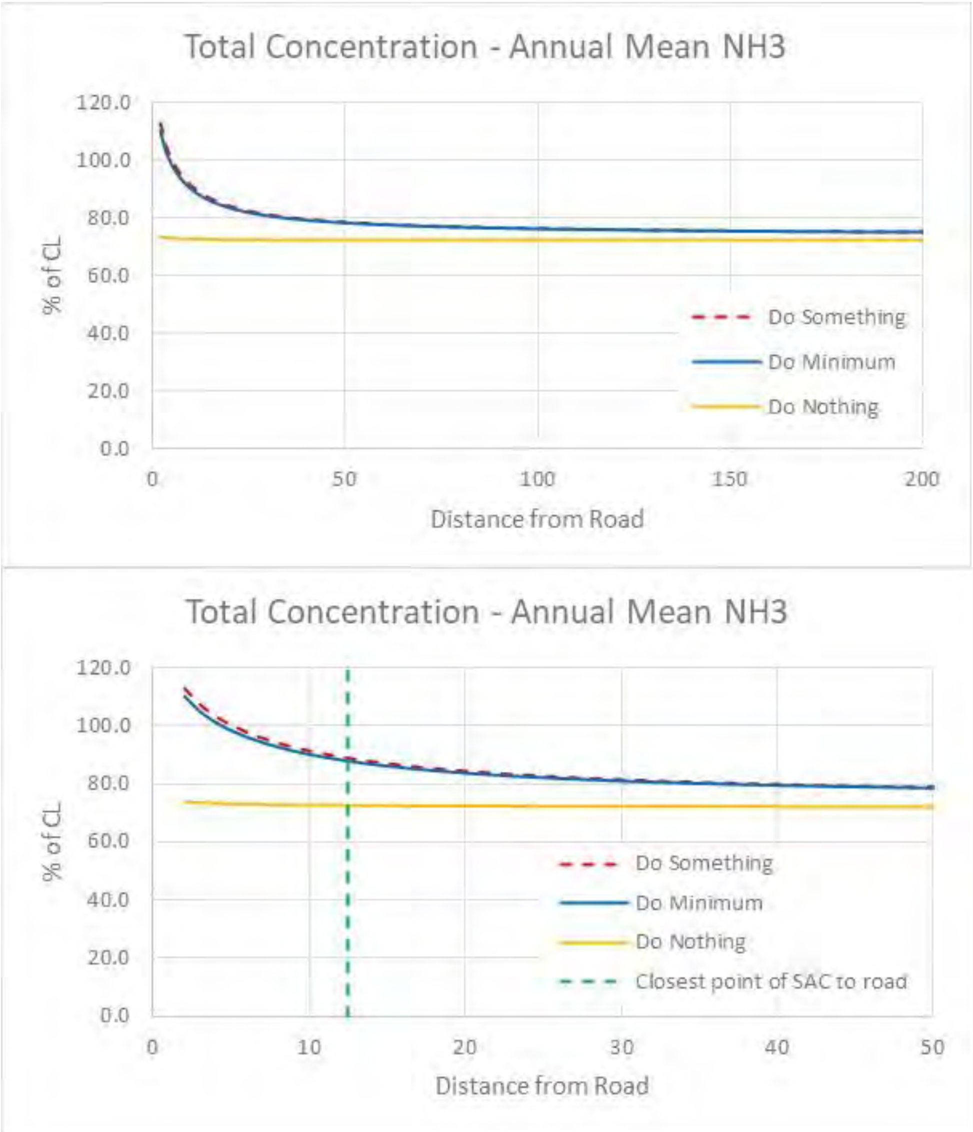
Note: Impacts presented as % of critical level of 3 µg/m³

Figure 28: Annual Mean Ammonia Proposed Development Only – Isle of Portland to Studland Cliffs



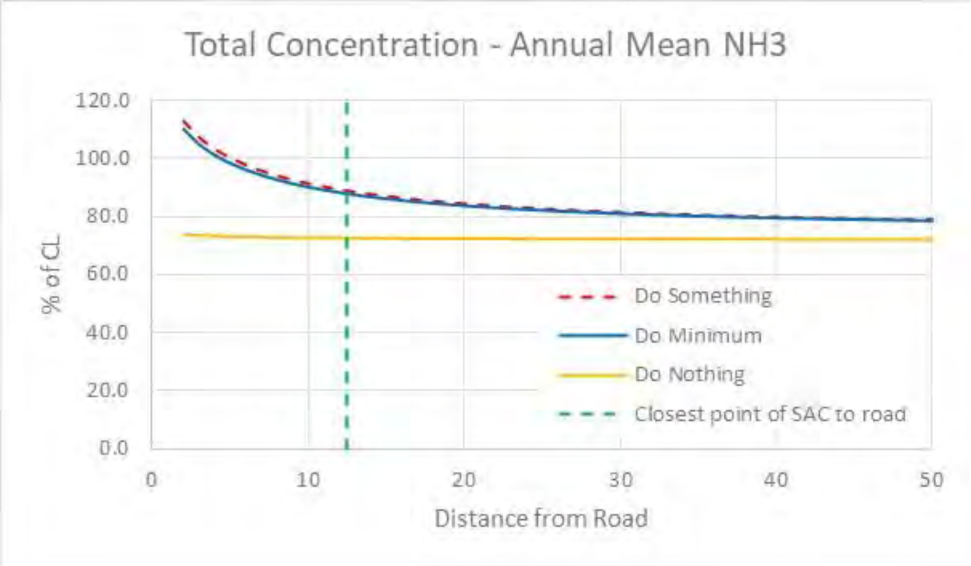
Note: Impacts presented as % of critical level of 3 µg/m³

Figure 29: Annual Mean Ammonia PEC – Isle of Portland to Studland Cliffs



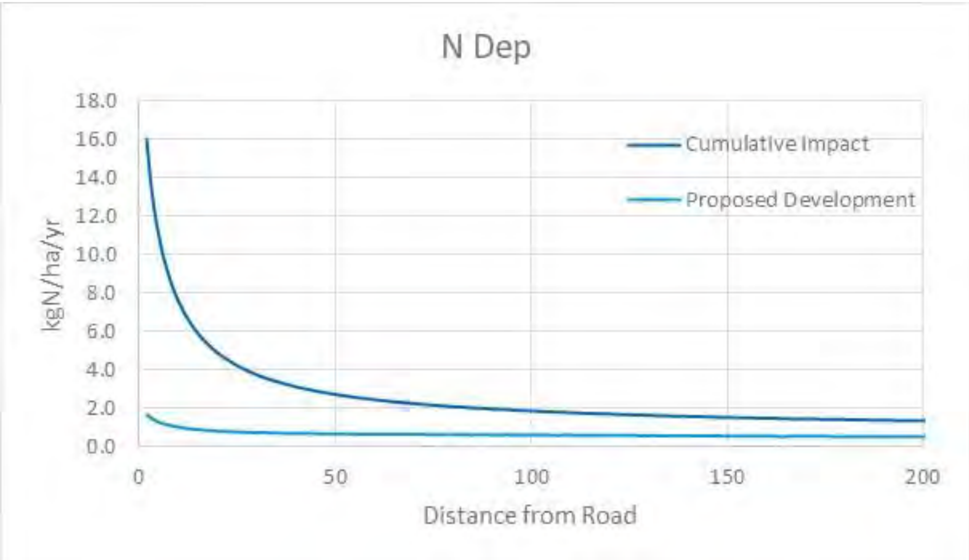
Note: Impacts presented as % of critical level of 1 µg/m³

Figure 30: Annual Mean Ammonia PEC – Isle of Portland to Studland Cliffs - Analysis



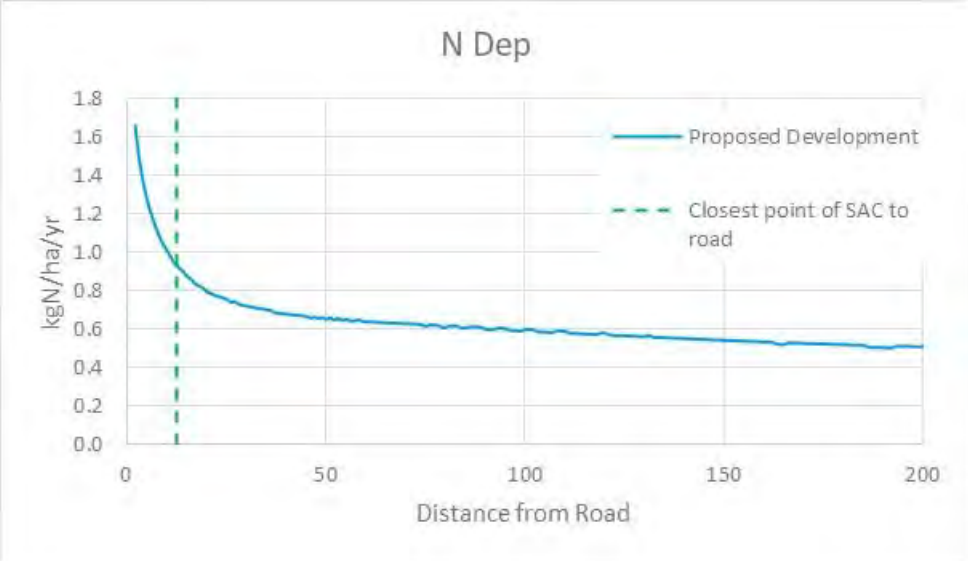
Note: Impacts presented as % of critical level of 1 µg/m³

Figure 31: Annual Mean N Dep – Isle of Portland to Studland Cliffs



Note: Impacts presented as kgN/ha/yr and include the contribution from nitrogen dioxide and ammonia emissions from traffic and the ERF

Figure 32: Annual mean N Dep Proposed Development Only – Isle of Portland to Studland Cliffs



Note: Impacts presented as kgN/ha/yr and include the contribution from nitrogen dioxide and ammonia emissions from traffic and the ERF

Figure 33: Annual mean N Dep PEC – Isle of Portland to Studland Cliffs

Note: Impacts presented as kgN/ha/yr and include the contribution from nitrogen dioxide and ammonia emissions from traffic, the ERF and mapped background

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FICHTNER

Consulting Engineers Limited

Kingsgate (Floor 3), Wellington Road North,
Stockport, Cheshire, SK4 1LW,
United Kingdom

t: +44 (0)161 476 0032
f: +44 (0)161 474 0618

www.fichtner.co.uk

POWERFUEL

Portland energy recovery facility

Environmental statement
Addendum
Appendices

4.1

Updated carbon assessment

FICHTNER

Consulting Engineers Limited

Powerfuel Portland Ltd

Carbon Assessment

ENGINEERING + CONSULTING

Document approval

	Name	Signature	Position	Date
Prepared by:	Stephen Othen		Technical Director	02/09/2020
Checked by:	James Sturman		Lead Environmental Consultant	02/09/2020

Document revision record

Revision no	Date	Details of revisions	Prepared by	Checked by
00	02/09/2020	For Issue	SMO	JRS
01	04/07/2021	Revised for Regulation 25 submission	SMO	RSF
02	19/07/2021	Revised to add Bridgewater ERF	SMO	RSF
03	28/07/2021	For issue	SMO	JRS

Contents

1 Introduction

1.1 Background

Powerfuel Portland Ltd is proposing to build an Energy Recovery Facility (ERF) facility (the ERF) at a site within Portland Port on the Isle of Portland in Dorset.

The ERF will be a single stream design and has been designed to treat 183,000 tonnes of refuse derived fuel (RDF) per year (the nominal design capacity), with a 10% design tolerance to treat up to 202,000 tonnes per annum (the maximum capacity). The ERF will generate 18.1 MWe at the nominal design capacity with approximately 15.2 MWe available for export.

1.2 Objective

The purpose of this Carbon Assessment is to determine the relative carbon impact of processing waste in the ERF, compared to alternative disposal ~~in a landfill~~routes. This has been assessed at the nominal and maximum capacities. The sensitivity of the results to changes in grid displacement factors and landfill gas recovery rates has also been assessed.

~~Landfill~~Initially, landfill has been used as the comparator as this is the primary alternative treatment route available for residual waste. This is because the UK does not have enough ERF capacity to treat all residual waste, so quite a lot of residual waste goes to landfill. If a new ERF is built in the UK, this means that less waste overall will be sent to landfill and therefore, at a national level, the correct comparator is landfill. This approach is supported by national guidance, specifically “Energy from Waste: A Guide to the Debate” and “Energy recovery for residual waste – A carbon based modelling approach”, both published by DEFRA in 2014.

~~It~~However, it is acknowledged that residual waste produced in Dorset does not all go to landfill at present and so the specific waste which would be processed at the Portland ERF might not currently go to landfill. Therefore, as requested by Dorset Council, the relative carbon benefits of the Portland ERF compared to alternative sites for an ERF in Dorset, elsewhere in the UK and Europe have also been considered, as well as the relative carbon benefits compared to current residual waste management routes in Dorset, which are a combination of landfill and ERFs outside Dorset. However, these comparisons do not take account of the second order effects, as any ERF which is currently processing residual waste from Dorset would need to secure waste from elsewhere and it is likely that the replacement waste will currently be going to landfill.

The carbon benefits of the project can be increased by exporting heat to a district heating scheme and power to ships moored in the port. These have also been considered.

2 Conclusions

2.1 Comparison with landfill

1. The carbon emissions have been calculated for the ERF. This takes account of:
   a. carbon dioxide released from the combustion of fossil-fuel derived carbon in the ERF;
   b. releases of other greenhouse gases from the combustion of waste;
   c. combustion of gas oil in auxiliary burners; and
   d. carbon dioxide emissions from the transport of waste, reagents and residues.
2. The ERF has been given credit for exporting electricity, displacing carbon emissions from other power stations. The power displacement factor used in the main assessment was obtained from the UK fuel mix table and reflects the marginal source of displaced electricity, which is currently gas-fired power stations. It is considered that the construction of the ERF would have little effect on how other renewable energy plants operate and that a gas-fired power station is a reasonable comparator for the purposes of this assessment.
3. The net emissions for the ERF (items 1 and 2) have been compared with the net carbon emissions from sending the same waste to landfill, taking account of:
   a. the release of methane in the fraction of landfill gas which is not captured; and
   b. emissions offset from the generation of electricity from landfill gas.
4. In the base case, the ERF is predicted to lead to a net reduction in greenhouse gas emissions of approximately 21,900 tonnes of CO_2-equivalent (CO_2e) per annum compared to the landfill counterfactual if operating at the nominal design capacity. At the maximum design capacity, this increases to 34,100 tCO_2e per annum.
5. There is the potential for the benefit of the ERF to be increased.
   a. If the ERF were to export power to ships moored in Portland Port, avoiding the operation of diesel engines, then the carbon benefit of the ERF over landfill would increase by around a further 4,500 to 5,500 tCO_2e per annum.
   b. If the ERF were to export heat as well as power, the carbon benefit of the ERF over landfill would increase by around a further 3,000 tCO_2e emissions per annum.

   Hence, the overall benefit of the ERF at the nominal design capacity, while exporting heat to a district heating scheme and power to ships moored in the port, is estimated to be about 30,000 tCO_2e per annum. This would be increased if operating at the maximum design capacity.
6. The sensitivity of this calculation to different grid displacement factors and different landfill gas recovery rates has also been considered. The lower figures used in the sensitivity analysis for grid displacement factor would only be relevant if the ERF were to displace other renewable sources of electricity. The results of the sensitivities for the base case provide a net reduction of greenhouse gas emissions within a range of -~~6,700~~7,600 to +69,200 tonnes of CO_2e emissions per annum. There is only a predicted increase in greenhouse gas emissions if there is a high landfill gas capture rate, a low grid displacement factor, no heat export and no export of power to ships, which is a very unlikely combination of circumstances.
7. The benefit of the ERF over its lifetime will vary depending on how the electricity grid develops and when shore power and district heating are implemented. However, we have included an illustrative conservative calculation which shows that the ERF could reduce greenhouse gas emissions by at least 62,000 tCO_2e over its lifetime compared to landfill, allowing for gradual decarbonisation of the electricity grid and improved landfill performance as well as incremental take-up of shore power.

2.2 Comparison with other alternatives

1. As requested by Dorset Council, the carbon emissions have been calculated for managing Dorset's waste in a range of alternative ERFs:
   a. Current UK plants – Lakeside and Marchwood.
   b. Current overseas plants – near Rotterdam and Gothenburg.
   c. Potential plants at four allocated sites in Dorset.
2. The differences between these plants are due to different transport distances for the waste and different energy efficiencies, with the European plants recovering more heat.
   a. The proposed Portland ERF, as the base case, has higher transport emissions than the other sites in the Dorset Waste Plan, but this is more than offset by the potential benefits of shore power.
   b. The additional transport emissions for shipping waste to European plants is outweighed by the benefits of district heating at those plants, but the proposed Portland ERF has the lowest emissions of all the options if both shore power and district heating are implemented.
3. Dorset's waste is currently managed by a combination of landfill, UK ERFs and export to Europe. Compared to this baseline, the Portland ERF is predicted to lead to a net reduction in greenhouse gas emissions of approximately 7,200 tonnes of CO_2-equivalent (CO_2e) per annum if operating at the nominal design capacity. At the maximum design capacity, this increases to 15,000 tCO_2e per annum, with further increases if shore power and district heating are implemented.

~~7.~~4. The benefit of the Portland ERF over its lifetime will vary depending on how the electricity grid develops and when shore power and district heating are implemented. However, we have included an illustrative conservative calculation which shows that the ERF could reduce greenhouse gas emissions by around ~~62~~157,000 tCO_2e over its lifetime compared to the current solution for Dorset's residual waste.

~~3 Calculations~~

3 Comparison with Landfill

3.1 Energy Recovery Facility

The combustion of waste generates direct emissions of carbon dioxide. It also produces emissions of nitrous oxide, which is a potent greenhouse gas.

Methane may arise in minimal extents from the decomposition of waste within the waste bunker; however, decomposition will be actively avoided, and methane is not regarded to have relevant climate impacts in quantitative terms from the ERF. In addition, combustion air will be drawn from the bunker area. This means that any methane which does form from the decomposition of waste within the bunker will be drawn into the combustion chamber and burnt. As the methane would have arisen from biodegradable waste, any carbon dioxide produced by burning that methane will also be derived from biodegradable waste. Therefore, methane arising from the decomposition of waste within the bunker has been excluded from the assessment.

Exporting energy to the grid offsets greenhouse gas emissions from the generation of power in other ways. In the case of the ERF, the displaced electricity will be the marginal source which is currently gas-fired power stations. It is considered that the construction of the ERF will not significantly affect how nuclear, wind or solar plants operate. Therefore, the use of a gas-fired power station is considered a reasonable comparator when assessing the grid offset of the ERF. This is discussed in further detail in section 3.1.3.

The following sections provide detail of the calculation of the carbon burdens and benefits associated with the ERF. Unless otherwise specified, all values presented are on an annual basis.

3.1.1 Waste Throughput and Composition

The ERF will be designed to process waste with a range of NCV's in accordance with the firing diagram for the ERF. Therefore, the hourly throughput will vary in accordance with the NCV of waste that is processed. A lower NCV of waste is typically associated with a lower fossil carbon content, therefore each tonne processed will have lower associated carbon emissions.

This assessment has been undertaken based on two waste compositions. The first is based on the nominal NCV and processing capacity of the ERF while the second is based on waste with a lower NCV and increased capacity up to the design threshold.

Waste composition data has been taken from different published sources to determine a composition which best reflects the design NCV of the ERF. The waste is a mixture of Commercial and Industrial (C&I) waste and municipal waste, so data has been taken from two sources to produce the assumed waste composition for the ERF.

- WRAP Cymru: "Commercial and Industrial Waste in Wales", January 2020. This report gives an estimate for C&I waste for 2017. We are not aware of a more recent report for English waste.
- WRAP: "National Municipal Waste Composition, England 2017", January 2020. We have used the Residual Municipal Waste composition from Table 3, which is a mixture of household and commercial waste.

We have used about one third C&I waste and two-thirds municipal waste. In both cases, since the waste is will be processed into RDF before being delivered to site, we have removed 90% of glass and WEEE and 80% of bricks and rubble from these waste compositions. We have also removed 90% of plastic bags to reflect the significant change in this waste stream since the data was collected in 2017. This gives waste with a NCV of 11 MJ/kg, which is the design NCV at the nominal design point.

For the maximum capacity case, the waste composition has been adjusted by removing 23% of the dense plastics, given the government's focus on this waste stream.

Table 1 below shows the characteristics of the assumed waste compositions that are relevant to the Carbon Assessment. We have used about one third C&I waste and two-thirds municipal waste.

Table 1: Waste characteristics

Waste Scenario	Carbon content (% mass)	Biocarbon (% carbon)	NCV (MJ/kg)	Waste throughput (tpa)
Nominal capacity	28.42	55.93	11	182,640
Maximum capacity	26.07	59.97	9.95	201,912

3.1.2 Direct Emissions

The combustion of waste generates direct emissions of carbon dioxide, with the tonnage determined using the carbon content of the waste.

For this Carbon Assessment, only carbon dioxide emissions from fossil sources (e.g. plastics) needs to be considered, as carbon from biogenic sources (e.g. paper and wood) has a neutral carbon burden. The biogenic material in the residual waste which is being processed is considered to be 'waste' material. This means that there is no requirement to consider, for example, any land use implications in producing the biogenic material as, unlike energy crops which are grown for combustion, biogenic waste already exists.

The UK Government's document "Energy from Waste: A Guide to the Debate" states, in paragraph 40, *"Considering the energy from waste route, if our black bag of waste were to go to a typical combustion-based energy from waste plant, nearly all of the carbon in the waste would be converted to carbon dioxide and be released immediately into the atmosphere. Conventionally the biogenic carbon dioxide released is ignored in this type of carbon comparison as it is considered 'short cycle', i.e. it was only relatively recently absorbed by growing matter. In contrast, the carbon dioxide released by fossil-carbon containing waste was absorbed millions of years ago and would be newly released into the atmosphere if combusted in an energy from waste plant."* For landfill, paragraph 42 states *"Burning landfill gas produces biogenic carbon dioxide which, as for energy from waste, is considered short cycle."* Therefore, this carbon assessment is in line with government guidance for exactly this type of assessment.

It has been assumed that all of the carbon in the waste is converted to carbon dioxide in the combustion process as, according to Volume 5 of the Intergovernmental Panel on Climate Change (IPCC) Guidelines for Greenhouse Gas Inventories, it can be assumed that waste incinerators have combustion efficiencies of close to 100%. The mass of fossil derived carbon dioxide produced is determined by multiplying the mass of fossil carbon in the waste by the ratio of the molecular weights of carbon dioxide (44) and carbon (12) respectively as shown in the equation below:

$$Mass\ of\ CO_2\ out = Mass\ of\ C\ in \times \frac{Mr\ CO_2}{Mr\ C}$$

Where Mr = molecular weight. The total fossil derived carbon emissions are presented in Table 2.

Table 2: Fossil CO_2 emissions

Item	Unit	ERF – Nominal	ERF - Maximum
Fossil carbon in waste	t C	22,873	21,071
Fossil derived carbon dioxide emissions	**t CO_2**	**83,869**	**77,259**

The process of recovering energy from waste releases a small amount of nitrous oxide and methane (from incomplete combustion), which contribute to climate change. The impact of these emissions is reported as CO_2e emissions and is calculated using the Global Warming Potential (GWP) multiplier. In this assessment the GWP for 100 years has been used.

Emissions of nitrous oxide and methane depend on combustion conditions. Nitrous oxide emissions are also influenced by flue gas treatment systems and the types of reagents used. These details are based on the final design of the ERF, which is not available at this stage. Therefore, default emission factors from the IPCC have been used to determine the emissions of these gases, as shown in Table 3.

Table 3: N_2O and CH_4 assumptions

Item	Unit	Value	Source
N_2O default emissions factor	kg N_2O/tonne waste	0.044	IPCC Guidelines for Greenhouse Gas Inventories, Vol 2, Table 2.2 Default Emissions Factors for Stationary Combustion in the Energy Industries, Municipal Wastes (non-biomass) and Other Primary Solid Biomass, using a NCV of 11 MJ/kg
CH_4 default emissions factor	kg CH_4/tonne waste	0.33	
GWP – N_2O to CO_2	kg CO_2e/kg N_2O	310	United Nations Framework for Climate Change Global Warming Potentials
GWP – CH_4 to CO_2	kg CO_2e/kg CH_4	25	

Nitrous oxide and methane emissions from both the biogenic and non-biogenic fractions are considered as a carbon burden. Both the biogenic and non-biogenic fractions of waste have the same default emissions factor. Table 4 shows the emissions of nitrous oxide and methane and the equivalent carbon dioxide emissions.

Table 4: N_2O and CH_4 emissions

Item	Unit	ERF – Nominal	ERF - Maximum
N_2O emissions	t N_2O	8.04	8.88
Equivalent CO_2 emissions	**t CO_2e**	**2,491**	**2,754**
CH_4 emissions	t CH_4	60.27	66.63

Item	Unit	ERF – Nominal	ERF - Maximum
Equivalent CO_2 emissions	**t CO_2e**	**1,507**	**1,666**

The ERF would be equipped with auxiliary burners which would burn gasoil and would have a capacity of about 60% of the boiler capacity; assumed to be approximately 41.86 MWth. The auxiliary burners would only be used for start-up and shutdown. We have assumed that there would be 10 start-ups a year, which is a conservative assumption, and that the burners would operate for 18 hours total for start-up and shut down. Hence, the approximate total fuel consumption can be calculated as follows:

$$41.86 \times 10 \times 18 = 7{,}533.9\ MWh$$

Each MWh of gasoil releases 0.25[1] tonnes of carbon dioxide, so the emissions associated with auxiliary firing would be 7533.9 x 0.25 = 1,883 t CO_2e. This is the same for both cases.

Table 5 shows the total direct equivalent carbon dioxide emissions for the combustion of waste in the ERF.

Table 5: Total equivalent CO_2 emissions from the combustion of waste

Item	Unit	ERF – Nominal	ERF - Maximum
CO_2 emissions	t CO_2	83,869	77,259
N_2O emissions	t CO_2e	2,491	2,754
CH_4 emissions	t CO_2e	1,507	1,666
Burner emissions	t CO_2e	1,883	1,883
Total emissions	**t CO_2e**	**89,751**	**83,562**

3.1.3 Grid Offset

3.1.3.1 Displacement Factor

Sending electricity to the grid offsets the carbon burden of producing electricity using other methods. In the case of an energy from waste plant, such as the ERF, the displaced electricity would be the marginal source which is currently gas-fired power stations, for which the displacement factor is 0.349 t CO_2e/MWh[2]. Electricity generated by the ERF would be exported to the National Grid. DEFRAs '*Energy from Waste – A Guide to the Debate 2014*' (specifically, footnote 29 on page 21) states that "A gas fired power station (Combined Cycle Gas Turbine – CCGT) is a reasonable comparator as this is the most likely technology if you wanted to build a new power station today". Therefore, the assessment of grid offset uses the current marginal technology as a comparator.

It is considered that the construction of the ERF will have little or no effect on how nuclear, wind or solar plants operate when taking into account market realities (such as the phase-out of nuclear plants and the generous subsidies often associated with the development and operation of wind and solar plants).

[1] DEFRA – Greenhouse gas reporting: Conversion factors 2019

[2] DEFRA – Fuel Mix Disclosure Table – 01/04/2018 – 31/03/3019

Current UK energy projections[3] indicate that nuclear power stations will continue to be used over the coming decade, but it is generally expected that there will be a reduction in the number of nuclear plants up to 2050[4]. It is understood that nuclear power stations operate as baseload stations run with relatively constant output over a daily and annual basis[5], with limited ability to ramp up and down in capacity to accommodate fluctuations in demand. Power supplied from existing nuclear power stations is relatively low in marginal cost and has the benefit of extremely low CO_2 emissions. The Committee on Climate Change (COCC's) recent report on achieving net zero by 2050[6] includes nuclear power in all scenarios for future energy generation up to 2050.

Combined cycle gas turbines (CCGTs) are the primary flexible electricity source. Since wind and solar are intermittent, with the electricity supplied varying from essentially zero (on still nights) to more than 16 GW (on windy or sunny days), CCGTs supply a variable amount of power. However, there are always some CCGTs running to provide power to the grid.

Gas engines, diesel engines and open cycle gas turbines also make a small but increasing contribution to the grid. These are mainly used to provide balancing services by balancing intermittent supplies. As they are more carbon intensive than CCGTs, it is more conservative to ignore these.

In addition, recent bidding of energy-from-waste plants into the capacity market mean that they are competing primarily with CCGTs, gas engines and diesel engines. It is therefore considered that CCGT is the correct comparator and may possibly be conservative.

It is acknowledged that the UK government has recently set a target which will require the UK to bring all greenhouse gas emissions to net zero by 2050. Taking this into consideration, in the future, it is anticipated that the power which the ERF will generate will displace other forms of power generation, including renewable energy power stations. However, at this stage the mix of future generation capacity additions to the grid that might be displaced by the project is uncertain, and the emissions intensity of future displaced generation cannot be accurately quantified. Therefore, for the purposes of this assessment, it has been assumed that the ERF will displace a gas fired power station as this is considered a reasonable comparator.

In the recent decision letter on the Development Consent Order for the Riverside Energy Park, a large energy-from-waste plant (ref. EN010093, dated 9 April 2020), the secretary of state said in paragraph 4.12 that "CCGT is the appropriate counterfactual against which the Development should be assessed." This supports the approach taken in this carbon assessment.

The effect of changing the grid offset displacement factor has been considered as a sensitivity in Section 3.4.3.

3.1.3.2 Shore Power

It is intended that the plant will be able to export power to ships moored in Portland Port which currently run their own engines. This would cover vessels from the Royal Fleet Auxiliary (RFA) and cruise ships. The carbon intensity of ship-board power is relatively high, so displacing this type of electricity would have an increased carbon benefit compared to displacing grid power.

[3] ~~https://www.gov.uk/government/publications/updated-energy-and-emissions-projections-2018~~ https://www.gov.uk/government/publications/updated-energy-and-emissions-projections-2018

[4] National Grid's Future Energy Scenarios, 2019

[5] https://www.ofgem.gov.uk/data-portal/electricity-generation-mix-quarter-and-fuel-source-gb

[6] Committee on Climate Change, "Net Zero: the UK's contribution to stopping global warming), May 2019

- Powerfuel Portland Ltd has estimated that the demand for shore power would be around 20,328 MWh in 2024, increasing to 24,423 MWh by 2045. This assumes that 60 - 65 cruise ships visit Portland each year and the RFA ships spend 260 days in port a year, with a gradual increase in the fraction of ships which are capable to taking power from the shore.
- Ship engines have a specific diesel fuel consumption of 180 to 200 g/kWh. The carbon intensity of diesel fuel is 3,206.62 $kgCO_2e/te$[7]. Hence, the carbon intensity of shore power is 0.577 tCO_2e/MWh or more.

As this is not certain, we have assessed the carbon offset for the ERF with and without shore power.

3.1.3.3 Electricity only

The amount of carbon dioxide offset by the electricity generated by the ERF is calculated by multiplying the net electricity generated by the grid displacement factor. The ERF will be designed to generate 18.1 MWe and export 15.2 MWe.

The carbon dioxide offset by electricity generation is counted as a carbon benefit and is shown in Table 6 below.

Table 6: ERF electricity offset

Item	Unit	ERF - Both cases	
Net electricity export	MW	15.2	
Net electricity exported	MWh	121,600	
Total CO_2 offset through export of electricity to grid only	**tCO_2e p.a.**	**42,438**	
With Shore Power		**2024**	**2045**
Shore power output	MWh	20,328	24,423
CO_2 offset through shore power	tCO_2e p.a.	11,733	14,097
Electricity output to grid	MWh	101,272	97,177
CO_2 offset through export to grid	tCO_2e p.a.	35,344	33,915
Total CO_2 offset through exported electricity	**tCO_2e p.a.**	**47,077**	**48,012**

3.1.3.4 Heat Export

This assessment assumes that any heat output from the ERF will offset emissions from natural gas boilers. Table 7 details the assumptions for heat export. The average heat output from the ERF is assumed to be 2.29 MW, which is based on a heat network being constructed to supply the Osprey Leisure Centre, HMP The Verne, HMP YOI Portland and the Comer Homes development.

A boiler efficiency of 90% has been assumed, to determine the quantity of natural gas combusted that the exported heat would offset. This is then converted to a carbon dioxide offset by multiplying the amount of natural gas displaced by the grid displacement factor for natural gas.

[7] DEFRA – Greenhouse gas reporting: Conversion factors 2019

The export of heat will reduce the electrical output of the Facility. The reduction in electrical output is determined using the Z ratio, which has been estimated based on guidance from the combined heat and power quality assurance (CHPQA) scheme. Assuming an average heat export of 2.29 MWth, the electrical output would be **14.85 MWe.**

Table 7: ERF heat export assumptions

Item	Value	Source
Boiler efficiency	90%	Typical boiler efficiency
Natural gas offset factor	0.20374 kg CO_2/kWh	BEIS "Greenhouse gas reporting: conversion factors 2020
Z ratio	6.6	CHPQA Guidance note 28

Table 8 details the carbon dioxide offset through natural gas offset and the reduced carbon dioxide electricity offset as a result of the lower electricity export.

Table 8: ERF heat and electricity export offset

Item	Unit	ERF – Both cases	
Heat output	MWth	2.29	
Total heat output	MWh	18,307	
Natural gas offset	MWh	20,341	
CO_2 offset through natural gas offset	**t CO_2e p.a.**	**4,144**	
Net electrical output (with heat output)	MWe	14.85	
Total electricity generated (with heat output)	MWh	118,826	
CO_2 offset through generated electricity to grid only	**t CO_2e p.a.**	**41,470**	
With Shore Power		**2024**	**2045**
Shore power output	MWh	20,328	24,423
CO_2 offset through shore power	tCO_2e p.a.	11,733	14,097
Electricity output to grid	MWh	98,498	94,403
CO_2 offset through export to grid	tCO_2e p.a.	34,376	32,947
Total CO_2 offset through exported electricity	**tCO_2e p.a.**	**46,109**	**47,043**

3.2 Landfill

When waste is disposed of in landfill, the biogenic carbon degrades and produces landfill gas (LFG). LFG is comprised of methane and carbon dioxide, so has a significant carbon burden. Some of the methane in the LFG can be recovered and combusted in a gas engine to produce electricity.

3.2.1 Emissions

The emissions associated with LFG can be split into:

1. carbon dioxide released in LFG;
2. methane released in LFG; and
3. methane captured and combusted in LFG engines and flares, producing carbon dioxide as a result of the combustion.

Since 1 and 3 result in the release of carbon dioxide derived from biogenic carbon in the waste, these should both be excluded from the calculation. Therefore, the focus of this calculation is the methane which is released to atmosphere. This is calculated as follows:

1. The biogenic carbon in the waste comes from the waste composition, discussed in Section 3.1.1 above.
2. 50% of the degraded biogenic carbon is released and converted into LFG. The released carbon is known as the degradable decomposable organic carbon (DDOC) content.
   a. This assumes a sequestration rate of 50%, which is considered to be a conservative assumption and is in accordance with DEFRAs 'Energy from Waste – A Guide to the Debate' (2014).
   b. There is considerable uncertainty in literature surrounding the amount of biogenic carbon that is sequestered in landfill. The high sequestration used in this assessment (i.e. 50%), combined with the use of high landfill gas capture rates (assumed 68% capture) is considered to be conservative. Therefore, it is not considered appropriate to give additional credit for sequestered carbon as this would result in an overly conservative assessment.
3. LFG is made up of 57% methane and 43% carbon dioxide, based on a detailed report carried out by Golder Associates for DEFRA[8].
4. Based on the same report, the analysis assumes 68% of the LFG is captured and that 10% of the remaining 32% is oxidised to carbon dioxide as it passes through the landfill cover layer. The unoxidized LFG is then released to atmosphere.
5. Based on the same guidance, 90.9% of the captured LFG is used in gas engines to generate electricity, although 1.5% of this captured LFG passes through uncombusted and is released to atmosphere. The remainder is combusted in a flare. We have assumed that the flares fully combust the methane.

Table 9 outlines the LFG assumptions and Table 10 shows the equivalent carbon emissions associated with landfill.

Table 9: LFG assumptions

Item	Value	Source
DDOC content	50%	DEFRA Review of Landfill Methane Emissions Modelling (WR1908) (2014)
CO_2 percentage of LFG	43%	
CH_4 percentage of LFG	57%	
LFG recovery efficiency	68%	
Molecular ratio of CH_4 to C	1.33	Standard Values
Molecular ratio of CO_2 to CH_4	2.75	
Molecular ratio of CO_2 to C	3.67	

[8] Review of Landfill Methane Emissions Modelling (WR1908), Golder Associates, November 2014

Item	Value	Source
Global Warming Potential – CH_4 to CO_2	25	United Nations Framework for Climate Change Global Warming Potentials

Table 10: LFG emissions

Item	Unit	ERF – Nominal	ERF – Maximum
Biogenic carbon	tonnes	29,033	31,571
Total DDOC content (biogenic carbon not sequestered – degradable)	tonnes p.a.	14,517	15,785
Methane in LFG[9], of which:	tonnes p.a.	11,033	11,997
- Methane captured	tonnes p.a.	7,502	8,158
- Methane oxidised in landfill cap (capping material)	tonnes p.a.	353	384
- Methane released to atmosphere directly	tonnes p.a.	3,177	3,455
Methane leakage through LFG engines	tonnes p.a.	102	111
Total methane released to atmosphere	tonnes p.a.	3,280	3,566
CO_2e released to atmosphere	**tCO_2e p.a.**	**81,992**	**89,158**

The value for biogenic carbon in Table 10 above is calculated by multiplying the annual tonnage of waste by the carbon content percentage of the waste, and then again by the percentage of the carbon which is derived from biogenic sources.

3.2.2 Grid Offset

The methane in the LFG that has been recovered can be used to produce electricity. This electricity will offset grid production, and results in a carbon benefit of sending waste to landfill as per Section 3.1.3. The assumptions for the amount of LFG methane captured and used in a typical LFG engine are shown in Table 11.

Table 11: LFG grid offset assumptions

Item	Value	Source
Landfill gas recovery efficiency	68%	DEFRA Review of Landfill Methane Emissions Modelling (Nov 2014)
Methane captured used in LFG Engines	90.9%	
Methane leakage through LFG engines	1.5%	
LFG engine efficiency	36%	

[9] Calculated as (Total DDOC content) x (% of landfill gas that is methane) x (molecular ratio of methane to carbon)

Item	Value	Source
Methane net calorific value	47 MJ/kg	Standard value

The power produced by the LFG engine is based on the amount of methane, the heat content of methane and the engine efficiency, as per the assumptions in Table 11. The power generated by the LFG engines and the carbon dioxide offset are shown in Table 12.

Table 12: LFG grid offset

Item	Unit	ERF – Nominal	ERF - Maximum
Methane captured, of which:	tonnes p.a.	7,502	8,158
- Methane flared	tonnes p.a.	682	742
- Methane leakage through LFG engines	tonnes p.a.	102	111
- Methane used in LFG engines	tonnes p.a.	6,718	7,305
Fuel input to LFG engines	GJ	113,665	343,334
Power generated	MWh	31,574	34,333
Total CO_2e offset through grid displacement	**t CO_2e p.a.**	**11,019**	**11,982**

3.3 Transport

There would be carbon emissions associated with the transport of waste and reagents to the ERF, and the transport of residues (i.e. Incinerator Bottom Ash (IBA) and Air Pollution Control Residues (APCr)) from the process to their respective waste treatment/disposal facilities. The assumptions for determining these emissions are presented in Table 13. These all assume that all transport is by road.

If waste and/or residues are transported by ship, then the emissions would be reduced. This is because there would be no net carbon emissions associated with sea transport because it is envisaged that this would divert RDF to Portland Port from existing shipments that currently pass through the English Channel. Therefore, this has not been considered further and the assessment of transport impacts is considered to be conservative and worst case as a proportion of the waste is expected to be delivered by ship.

Table 13: Transport assumptions

Parameter	Unit	Value	Source
Articulated lorry load size – waste to landfill	tonnes	24	Project-specific assumption. (65% by bulker, 35% by RCV)
Articulated lorry load size – waste to the ERF	tonnes	24	100% by bulker
Articulated lorry load size – Export of APCr	tonnes	27.1	Project-specific assumption
Articulated lorry load size – Export of IBA	tonnes	12	

Parameter	Unit	Value	Source
Articulated lorry load size – Import of lime	tonnes	27.5	
Articulated lorry load size – Import of activated carbon	tonnes	21	
Articulated lorry load size – Import of ammonia	tonnes	10	
Articulated lorry load size – Import of fuel oil	tonnes	32	
Articulated lorry load size – Export of ferrous metals from the ERF	tonnes	17	
Articulated lorry CO_2 factor - 100% loaded	kg CO_2/km	0.96235	BEIS "Greenhouse gas reporting: conversion factors 2020" HGV (all diesel) Articulated (>3.5- 33t)
Articulated lorry CO_2 factor - 0% loaded	kg CO_2/km	0.64607	
Waste distance to landfill (one way)	km	80	
Waste distance to the ERF (one way)	km	160	Max transport distance. ~~See section 4.4 for sensitivity assessment on this figure.~~
IBA distance to recovery	km	160	Transport to Avonmouth
APCr distance to recovery	km	160	Transport to Avonmouth
Ferrous metals distance to recovery	km	5	Local outlet
Lime distance to the ERF	km	350	Transport from Buxton
Activated carbon distance to the ERF	km	300	Assumption
Ammonia distance to the ERF	km	300	Assumption
Fuel oil distance to the ERF	km	50	Assumption
		Nominal	**Maximum**
Mass of waste	tonnes	182,640	201,912
Mass of IBA (15% of waste)	tonnes	27,396	30,287
Mass of APCr (3.4% of waste)	tonnes	6,210	6,865
Mass of recovered ferrous metals (10% of ash)	tonnes	2,740	3,029
Mass of lime (estimated)	tonnes	3,700	3,700
Mass of activated carbon (estimated)	tonnes	53	53
Mass of ammonia (estimated)	tonnes	900	900
Mass of fuel oil (from earlier)	tonnes	595	595

The carbon burden of transporting the waste is determined by calculating the total number of loads required and multiplying it by the transport distance to generate an annual one-way vehicle distance. This is multiplied by the respective empty and full carbon dioxide factor for HGVs to determine the overall burden of transport. It is recognised that this is conservative, as it may be possible to coordinate HGV movements to reduce the number of trips.

Table 14: Transport calculations

Parameter	Unit	Waste to landfill	Waste to the ERF	IBA to recovery	APCr to recovery	Lime to the ERF	Carbon to the ERF	Ammonia to the ERF	Fuel oil to the ERF	Total for ERF
ERF - Nominal										
Tonnage	tonnes p.a.	182,640	182,640	27,396	6,210	3,700	53	900	595	
Number of loads required	p.a.	7,610	7,610	2,283	230	135	3	90	19	
One-way distance	km	80	160	160	160	350	300	300	50	
One-way total vehicle distance per year	km	608,800	1,217,600	365,280	36,800	47,250	900	27,000	950	
Total CO_2 emissions	**t CO_2e p.a.**	**979.21**	**1,958.41**	**587.52**	**59.19**	**76.00**	**1.45**	**43.43**	**1.53**	**2,728**
ERF - Maximum										
Tonnage	tonnes p.a.	201,912	201,912	30,287	6,865	3,700	53	900	595	
Number of loads required	p.a.	8,414	8,414	2,524	254	135	3	90	19	
One-way distance	km	80	160	160	160	350	300	300	50	
One-way total vehicle distance per year	km	673,120	1,346,240	403,840	40,640	47,250	900	27,000	950	
Total CO_2 emissions	**t CO_2e p.a.**	**1,082.66**	**2,165.32**	**649.54**	**65.37**	**76.00**	**1.45**	**43.43**	**1.53**	**3,003**

~~4.0~~3.4 Results

~~4.1.0~~3.4.1 Energy Recovery Facility – power only

The results of the assessment are shown below. It can be seen that there is a net carbon benefit of about **21,900 tonnes of carbon dioxide equivalent emissions per annum** for the ERF compared to sending the same waste to landfill, increasing to **34,100 tonnes of carbon dioxide equivalent emissions per annum** in the maximum capacity case. These figures increase further if power is exported to ships in port.

Table 15: Summary

Parameter	Units	Nominal	Maximum
Releases from LFG	t CO_2e	81,992	89,158
Transport of waste and outputs to landfill	t CO_2e	979	1,083
Offset of grid electricity from LFG engines	t CO_2e	-11,019	-11,982
Total landfill emissions	**t CO_2e**	**71,952**	**78,259**
Transport of waste to and outputs from the ERF	t CO_2e	2,728	3,003
Offset of grid electricity with ERF generation	t CO_2e	-42,438	-42,438
Emissions from the ERF	t CO_2e	89,751	83,562
Total ERF Emissions	**t CO_2e**	**50,040**	**44,126**
Net Benefit of the ERF	**t CO_2e**	**21,912**	**34,132**
Net Benefit with shore power, 2024	t CO_2e	26,550	38,771
Net Benefit with shore power, 2045	t CO_2e	27,485	39,705

Another way of expressing the benefit of the ERF is to consider the additional power generated by recovering energy rather than sending the waste to landfill and calculating the effective net carbon emissions per MWh of additional electricity exported.

The effective net carbon emissions per MWh of additional electricity exported for the ERF is calculated as follows in the nominal case:

1. Additional power exported = 121,600 – 31,574 = 90,026 MWh
2. Net Carbon released = (89,751 + 2,728) – (81,992 + 979) = 9,507 tCO_2e
3. Effective carbon intensity = 9,507 ÷ 90,026 = 0.106 t CO_2e/MWh

A similar calculation for the maximum case gives an effective carbon intensity of -0.042 t CO_2e/MWh.

~~4.2.0~~3.4.2 Energy Recovery Facility – CHP mode only

The results of the assessment are shown below for the plant operating in CHP mode. It can be seen that there is a net carbon benefit of about **25,100 tonnes of carbon dioxide equivalent emissions per annum** for the ERF compared to sending the same waste to landfill, which is an improvement of over **3,000 tonnes** over the power-only case. In the maximum capacity case, this increases to **37,300 tonnes of carbon dioxide equivalent emissions per annum** and further increases if power is exported to ships in port.

Table 16: Summary

Parameter	Units	Nominal	Maximum
Releases from LFG	t CO_2e	81,992	89,158
Transport of waste and outputs to landfill	t CO_2e	979	1,083
Offset of grid electricity from LFG engines	t CO_2e	-11,019	-11,982
Total landfill emissions	**t CO_2e**	**71,952**	**78,259**
Transport of waste to and outputs from the ERF	t CO_2e	2,728	3,003
Offset of boiler natural gas use	t CO_2e	-4,144	-4,144
Offset of grid electricity with ERF generation	t CO_2e	-41,470	-41,470
Emissions from the ERF	t CO_2e	89,751	83,562
Total ERF Emissions	**t CO_2e**	**46,864**	**40,950**
Net Benefit of the ERF	**t CO_2e**	**25,088**	**37,308**
Net Benefit with shore power, 2024	t CO_2e	29,271	41,444
Net Benefit with shore power, 2045	t CO_2e	30,206	42,378

Again, the effective net carbon emissions can be calculated, allowing for the benefit of displacing heat. The effective net carbon emissions per MWh of additional electricity exported for the ERF is calculated as follows:

1. Additional power exported = 118,826 – 31,574 = 87,252 MWh
2. Net Carbon released = (89,751 + 2,728 – 4,144) – (81,992 + 979) = 5,363 tCO_2e
3. Effective carbon intensity = 5,363 ÷ 87,252 = 0.061 t CO_2e/MWh

A similar calculation for the maximum case gives an effective carbon intensity of -0.093 t CO_2e/MWh.

~~4.3.0~~3.4.3 Sensitivities

The two key assumptions in this carbon assessment are the grid displacement factor for electricity and the landfill gas capture rate.

- There is some debate over the type of power which would be displaced and so we have considered the effect of using lower figures, which would only be relevant if the ERF were to displace other renewable sources of electricity. The lowest figure, 0.219 t CO_2e/MWh, is the long run marginal generation-based emission factor for 2024 taken from the "Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal", published by BEIS.
- The Golders Associates report for DEFRA states that the collection efficiency for large, modern landfill sites was estimated to be 68% and the collection efficiency for the UK as a whole was estimated to be 52%. There have been suggestions in other guidance that a conservative figure of 75% should be used. The sensitivity of the results to this assumption has also been assessed below.

Table 17 shows the estimated net benefit of the ERF (in power-only mode), in tonnes of carbon dioxide equivalent emissions per annum, for different combinations of grid displacement factor and landfill gas capture rate. Table 18 shows the same for the ERF in CHP mode. Both tables are based on the nominal design case. In both cases, the results have been shown with and without shore power.

It can be seen that there is a benefit for all LFG capture rate and grid displacement factor combinations, except for a very high LFG capture rate and a low grid displacement factor with no shore power and no heat export.

Table 17: Sensitivity analysis – power only

Grid Displacement Factor (t CO_2e/MWh)	LFG Capture Rate			
	75%	68%	60%	52%
No Shore Power				
0.349	3,664	**21,912**	42,766	63,620
0.30	-588	17,501	38,173	58,845
0.~~23~~219	-~~6,662~~7,616	~~11,199~~10,208	~~31,611~~30,580	~~52,023~~50,951
Shore Power (2024)				
0.349	8,303	**26,550**	47,405	68,259
0.30	5,047	23,135	43,807	64,479
0.~~23~~219	~~396~~-335	~~18,256~~17,490	~~38,668~~37,861	~~59,080~~58,232
Shore Power (2045)				
0.349	9,238	**27,485**	48,339	69,193
0.30	6,182	24,270	44,942	65,614
0.~~23~~219	1,~~818~~132	~~19,678~~18,956	~~40,090~~39,328	~~60,502~~59,699

Table 18: Sensitivity analysis – CHP Mode

Grid Displacement Factor (t CO_2e/MWh)	LFG Capture Rate			
	75%	68%	60%	52%
No Shore Power				
0.349	6,841	**25,088**	45,942	66,796
0.30	2,725	20,813	41,485	62,157
0.~~23~~219	-~~3,156~~4,080	~~14,705~~13,745	~~35,117~~34,116	~~55,529~~54,488
Shore Power (2024)				
0.349	11,479	**29,727**	50,581	71,435
0.30	8,359	26,447	47,119	67,792
0.~~23~~219	3,~~902~~202	21,~~763~~027	~~42,175~~41,398	~~62,587~~61,769
Shore Power (2045)				
0.349	12,414	**30,661**	51,515	72,369
0.30	9,494	27,582	48,255	68,927
0.~~23~~219	~~5,324~~4,669	~~23,184~~22,493	~~43,596~~42,864	~~64,009~~63,236

4 Alternatives for Dorset Waste

Dorset Council has asked for the carbon emissions from the proposed ERF to be compared with four alternatives:

- The carbon emissions of sending the RDF to other ~~Energy Recovery Facilities~~ERFs in the UK;
- The carbon emissions if sending the RDF to other ~~Energy Recovery Facilities~~ERFs overseas;
- The carbon emissions of managing the RDF in ~~Energy Recovery Facilities~~ERFs within Dorset on allocated sites (Insets 7-10 of the new Waste Plan); and
- The current combination of waste management approaches in Dorset.

Each of these alternatives has been considered below ~~in semi-quantitative terms~~.

4.1 Portland ERF for Dorset Waste

In this section, we have focussed on the treatment of waste generated in Dorset. This is different to the assessment in section 3, which considered waste which could have been delivered from anywhere within the catchment area considered in the transport assessment.

The proposed ERF is 60 km from Canford Magna, which produces around 82,600 tonnes of RDF per annum. Considering the other main conurbations in Dorset, the proposed ERF is a similar distance away from Poole and Bournemouth, but only 20 km from Dorchester. This suggests that Dorset waste would travel around 55 km on average to the site. In order to present a fair comparison, we have calculated the carbon emissions for the proposed ERF using this distance, rather than 160 km as in the main assessment. This gives waste transport emissions of 673 tCO_2e. All other emissions are unchanged.

~~4.4~~4.2 Other ERFs ~~in the UK~~

The direct carbon emissions from combusting waste are the same whether it is combusted at Portland or elsewhere. This means that, from a carbon perspective, the only differences between ERFs at different locations are the transport impacts for transporting waste and any differences in the carbon displaced by generating power or heat. We have set out these differences for the different ERFs below, and then presented the results for all ERFs in a single table in section 4.2.4.

4.2.1 Existing UK ERFs

We consider that the primary focus here is on RDF produced at the Canford Magna MBT plant ~~which is 60 km away from the proposed development and produces around 60,000 tonnes of RDF p.a.~~. The remaining waste for the proposed ~~development~~ERF could come from a wider catchment area in Dorset, which could be closer to or further away from the alternative ERF. We have therefore compared two ~~possible~~existing ERFs with the proposed ~~development~~ERF and one which will shortly be operational.

Marchwood ~~ERF, which is 47 km away from Canford Magna and~~

~~4.~~ Marchwood ERF is the closest alternative and is currently used by Dorset Council~~; and~~

~~5. Lakeside EfW near Slough, which is 145 km away and which is currently used by~~. It is 47 km from Canford Magna, 50 km from Bournemouth~~, Christchurch and Poole (BCP) Council for waste~~ and 80 km from ~~Poole.~~

~~**Portland vs Marchwood**~~

~~The difference in transport impacts from Canford Magna is marginal. Transporting 60,000 tonnes of waste an additional 13 km to Portland ERF would increase carbon impacts by around 52 tCO_2e per annum.~~

~~The change in transport impacts for the remaining waste is unclear as~~Dorchester, which means that waste ~~could arise closer to or further away from Marchwood. If the remaining 122,000 tonnes of waste were~~would be transported ~~an additional 30~~around 50 km ~~to Portland~~ on average~~, this would increase carbon impacts by around 120 tCO_2e/annum.~~ (giving waste transport emissions of 612 tCO_2e per year).

According to its 2019 annual report to the Environment Agency, the Marchwood ERF exported 582 kWh/te of waste processed. It is unclear what the NCV of this waste was but given that Marchwood ERF treats residual household waste, it is likely to be around 10 MJ/kg, which is consistent with the NCV for the ~~Portland ERF in the maximum capacity case. For this case, the Portland ERF is expected to export 602 kWh/te. Therefore, the Portland ERF would export an additional 20 kWh/te, or 4,040 MWh per annum. If this displaces CCGTs, as in the base case, the additional benefit would be 4,040 MWh x 0.349 $teCO_2e$/MWh = 1,410 $teCO_2e$.~~proposed ERF in the maximum capacity case. This gives an efficiency of 20.95%.

~~Combining these differences, the Portland ERF would reduce greenhouse gas emissions by around an additional 1,240 te CO_2e per annum compared to the Marchwood ERF. This ignores the potential benefits of 4,500 to 5,500 te CO_2e per annum from exporting power to ships, which is not available at Marchwood.~~

~~Portland vs~~ Lakeside

~~The difference in transport impacts from Canford Magna to~~ Lakeside ~~is less marginal. Transporting 60,000 tonnes of~~ERF near Slough is currently used by Bournemouth, Christchurch and Poole (BCP) Council for waste ~~an additional 85~~from Poole. It is around 145 km ~~to Lakeside would increase carbon impacts by around 340 tCO_2e per annum.~~

~~The remaining~~away from Bournmouth and Canford and 181 km from Dorchester, which means that waste ~~is likely to arise closer to Portland ERF. If the remaining 122,000 tonnes of waste were~~would be transported ~~an additional 70 km to Lakeside~~around 150 km on average~~, this would increase carbon impacts by around 610 tCO_2e/annum.~~ (giving waste transport emissions of 1,836 tCO_2e per year)

Lakeside ERF did not report its power generation to the Environment Agency in 2019. However, according to its application for R1 status in 2014, it has a net electrical efficiency of 23.5%, which means that it would be expected to export 16.4 MWe when processing the same waste as the ~~Portland ERF. Therefore, the Lakeside ERF would export an additional 1.2 MWe, or 9,600 MWh per annum. If this displaces CCGTs, as in the base case, the additional benefit would be 9,600 MWh x 0.349 $teCO_2e$/MWh = 3,350 $teCO_2e$.~~proposed ERF.

~~Combining these differences, the Portland ERF would reduce greenhouse gas emissions by around 2,400 te CO2e per annum less than the Lakeside ERF. This ignores the potential benefits of exporting power to ships, which is not available at Lakeside and would improve the benefit by around 4,500 – 5,500 $teCO_2e$ per annum, and the potential benefit of district heating, which is a further 3,000 $teCO_2e$ per annum.~~

~~Conclusion~~

~~From this simple calculation, it can be seen that sending waste to the Portland ERF would have a slight benefit over sending the same waste to Marchwood ERF but a slight disbenefit compared to the Lakeside ERF. However, this disbenefit is more than outweighed by the potential advantages of exporting power to ships.~~

Bridgewater

The Bridgewater gasification plant is currently under construction and would have a capacity if around 112,000 tonnes per annum. Bridgewater is included in the future Dorset baseline, as it is not large enough to be a direct alternative to the proposed ERF.

Once it is operational, it is expected to receive waste from Canford Magna, although this would be replaced by the proposed Portland ERF, if consented. It is around 120 km from Canford Magna, which gives waste transport emissions for 182,640 tpa of 1,469 tCO_2e per year (for direct comparison purposes with the Portland ERF, as the Bridgewater plant could not actually process this much waste.)

According to the environmental permit decision document, the Bridgewater plant has a net electrical efficiency of 22.14%, which means that it would be expected to export 15.44 MWe if it could process the same waste as the proposed ERF.

~~4.4.2~~4.2.2 Other ERFs in Europe

Comparing the carbon emissions for waste exported to ERFs in Europe is complex, because there are a number of significant uncertainties. While the direct emissions from combusting the waste are the same, the transport emissions are very different, the type of electricity which is displaced may be different and the potential for exporting heat will be different.

1. Transport
   a. RDF is transported to Europe by ship from a number of ports. In some cases, the RDF is transported by road to the east of England before being shipped, but we have assumed that waste from Dorset would go to a local port (Southampton). The waste would be transported from the port to the EfW plant by road as well and this distance could be similar to the distance to Portland ERF. Hence, we can assume that the road emissions are the same in both cases~~.~~ (612 tCO_2e per year).
   b. According to data in WRATE, the Environment Agency's modelling tool, carbon emissions from ship transport of waste are 0.00849 $kgCO_2e$ per tonne of waste per km.
   c. Hence, if 183,000 tonnes of waste is shipped from Southampton to Rotterdam (about 290 nautical miles or 537 km), the emissions would be 0.00849 x 183,000 x 537 ÷ 1000 = 834 tCO_2e per year. If the same waste is shipped to ~~Gothenbury~~Gothenburg (about 830 nautical miles, or 1,537 km), the emissions would be 2,387 tCO_2e per year.
2. Electricity displacement
   a. The type of electricity displaced depends on the country which the waste is sent to. The five primary destinations for RDF from England are The Netherlands, Sweden, Germany, Norway and Denmark.
      i. Sweden and Norway generate most electricity from renewables and export electricity to other European countries. This means that generation of electricity from waste is likely to lead to a reduction in fossil fuel generation elsewhere in Europe.
      ii. The Netherlands, Denmark and Germany also use a reasonable quantity of renewables but not as much as Sweden and Norway, so it is likely that generation of electricity from waste is likely to lead to a reduction in fossil fuel generation. The Netherlands and Germany, in particular, still generate more electricity from coal than in the UK but also generate power from natural gas.
   b. The UK also imports electricity from Europe, particularly France and The Netherlands, and the electricity grid on mainland Europe is generally more integrated between different countries. This means that electricity generated from energy-from-waste plants in The

Netherlands, for example, could displace UK electricity, in much the same way that electricity generated from UK energy from waste plants does.

c. Hence, it is likely that the carbon benefits of power displacement will be similar for European plants.

3. Heat displacement
   a. More European plants are connected to district heating systems than UK plants. Many are connected to extensive systems with multiple heat sources and users. Therefore, there is more potential for heat displacement for plants in Europe.
   b. As demonstrated in the main assessment, displacing heat has a carbon benefit. ~~If~~We have assumed that the European ~~plant exports~~plants export three times as much heat as assumed for the Portland ERF, ~~then~~giving a heat efficiency of 9.84%. We have also assumed that the European plants have the same electrical efficiency as Portland, but that this would be reduced by the additional ~~benefit would be around 9,000 tCO_2e per annum~~ heat export, giving an electrical efficiency of 20.3%.
4. Waste displacement
   a. A final complicating factor is that European ~~EfW plants~~ERFs, particularly those linked to district heating schemes, are probably still running at capacity and significant quantities of waste is being sent to landfill. This means that burning UK waste in these plants means that some other European waste is not being burned and is probably being landfilled. This factor has not been taken into account.

~~Overall, exporting waste to European EfW plants may have a carbon benefit over sending waste to a UK plant, but it would not contribute to diverting waste, overall, from landfill.~~

~~4.4.3~~4.2.3 Other ERFs in Dorset Waste Plan

We have assumed that an ERF constructed at one of the sites in the Dorset Waste Plan would be identical to ~~the~~that proposed ~~development~~at Portland, with a nominal design capacity if 183,000 tpa. This means that the only differences, in carbon terms, would be the distance travelled to deliver waste, the potential for exporting heat and the potential for exporting power directly to users. The direct emissions to atmosphere and the benefits of displacing other forms of electricity by exporting to the grid would be identical for all cases.

The four sites are discussed in detail in the Comparative Assessment against Waste Local Plan Allocated Sites. The points which are relevant for the carbon assessment are covered below. In particular, we have not considered whether an ERF of this size is deliverable at these sites and note that the site at Mannings Heath Industrial Estate, Poole, is too small for an ~~EfW plant~~ERF of the same capacity as the proposed development at Portland.

1. Eco Sustainable Solutions, Parley
   a. The site has some potential for district heating but no specific heat users have been identified.
   b. The site is 10-15 km from Poole and Bournemouth, 50 km from Dorchester and 16 km from Canford Magna MBT plant. This suggests that Dorset waste would travel around 15 km on average, releasing 184 tCO_2e per annum.
2. Canford Magna, Poole
   a. The site has potential for district heating for Magna Business Park, but no specific heat users have been identified.
   b. The site already includes an MBT plant and produces 60,000 tonnes per annum of RDF for export to Europe. This RDF could be processed in an ERF with no transport.

   c. The site is 10-15 km from Poole and Bournemouth and 40 km from Dorchester. Allowing for zero transport for the RDF already present, this suggests that Dorset waste would travel around 10 km on average, releasing 122 tCO_2e per annum.

3. Mannings Heath Industrial Estate, Poole
   a. The site may have potential for district heating as it is in an industrial estate but no specific heat users have been identified.
   b. The site is 10 km from the centres of Poole and Bournemouth, 40 km from Dorchester and 6 km from Canford Magna MBT plant. This suggests that Dorset waste would travel around 10 km on average, releasing 122 tCO_2e per annum.
4. Binnegar Environmental Park, East Stoke
   a. There is no potential for district heating.
   b. The site is 20-30 km from Dorchester, Poole and Bournemouth, and 24 km from Canford Magna MBT plant. This suggests that Dorset waste would travel around 25 km on average, releasing 306 tCO_2e per annum.

~~For comparison purposes, the proposed development is 60 km from Canford Magna and a similar distance away from Poole and Bournemouth, but only 20 km from Dorchester. This suggests that Dorset waste would travel around 55 km on average, releasing 673 tCO₂e per annum. Therefore, carbon emissions associated with transporting waste by road to Portland ERF would be around 370 to 550 tCO₂e higher. However, the Portland ERF has three potential advantages which more than outweigh this disadvantage:~~

5. ~~Potential for district heating with several potential customers identified (as set out in section 3.1.3.4), which would displace around 3,000 tCO₂e per annum.~~
6. ~~Potential for exporting power to ships, which would displace around 4,500 to 5,500 tCO₂e per annum.~~
7. ~~Potential for waste to be delivered by ship from longer distances away, with an associated reduction in road traffic emissions.~~

4.2.4 Results for Alternative ERFs

The results for the different ERFs are set out below. For the proposed ERF, we have shown three cases.

- Base case (export of electricity to grid only);
- With shore power (SP); and
- With shore power (SP) and district heating (DH).

These are then presented in order of net emissions, showing the difference from the base case.

Table 19: Comparison of ERF options

	Marchwood	**Portland**	Binnegar	Parley	Canford Magna	Mannings Heath	Lakeside	**Portland + SP**	Gothenburg	Rotterdam	**Portland + SP + DH**
Transport	1,381	**1,442**	1,075	953	892	892	2,605	**1,442**	3,826	2,275	**1,442**
Heat offset	0	**0**	0	0	0	0	0	**0**	-11,190	-11,190	**-4,144**
Power offset	-40,807	**-42,438**	-42,438	-42,438	-42,438	-42,438	-45,770	**-48,012**	-39,534	-39,534	**-47,043**
Direct emissions	89,751	**89,751**	89,751	89,751	89,751	89,751	89,751	**89,751**	89,751	89,751	**89,751**
Net emissions	50,325	**48,755**	48,388	48,265	48,204	48,204	46,586	**43,182**	42,853	41,302	**40,006**
Difference from base case	1,570	**0**	-367	-490	-551	-551	-2,169	**-5,573**	-5,902	-7,453	**-8,749**
All figures are in tCO2e per year. All figures are rounded.											

This table shows that there is relatively little difference between the different UK options. While Portland, as the base case, has higher emissions than the other sites in the Dorset Waste Plan, this difference is compensated by the potential benefits of shore power. Similarly, while the additional transport emissions for shipping waste to European plants is outweighed by the benefits of district heating, the final Portland option, incorporating both shore power and district heating, has the lowest emissions of all.

~~4.4~~4.3 Existing Management of Dorset Waste

Dorset Council has asked that the carbon ~~benefits~~emissions of the ERF be compared with the current management of Dorset's waste from council collections.

1. **Household waste**

   At present, we understand that residual waste generated in Dorset is exported from the county to energy from waste plants elsewhere in the UK or to landfill sites elsewhere in the UK (specifically Hampshire and Somerset), and some is converted to RDF and exported to Europe. According to the DEFRA Dataset ENV18-LACW 2018/19, 51,344 tonnes was sent to landfill and 109,984 tonnes was sent to ERF from the whole of Dorset (including Bournemouth and Poole). Some of the waste sent to ERFs was sent to Veolia's plants in Hampshire and to the Lakeside EfW in Slough, while some is treated at the Canford Magna MBT to produce RDF which was exported to Europe via Southampton.

2. **Commercial waste**

   It is unclear where the commercial waste generated in Dorset is treated. A baseline report prepared by consultants on behalf of the Bournemouth, Dorset and Poole waste authorities in October 2017, provided estimates of C&I waste arisings in the waste plan area and indicated that 92,558 tonnes of waste was sent to landfill.

We have assessed the case where all of the council-collected residual waste is sent to the new ERF, along with enough commercial waste (currently going to landfill) to fill the plant. Considering the nominal design case, this means that waste is diverted from three routes.

1. **ERF in the UK – ~~40~~20,000 tonnes.**

   This is considered in section ~~4.4.1 and it was shown~~4.2. We have assumed that half of the ~~carbon emissions from sending~~ waste ~~from Dorset~~is sent to ~~the~~ Marchwood ~~EfW plant, which is the closest, would be similar~~and half to ~~sending waste to the Portland ERF~~Lakeside.

2. **ERF in Europe – ~~60~~80,000 tonnes.**

   This is considered in section 4.2.2~~ and it was concluded that there might be a benefit if the European plant exports heat. For a~~. We understand that Canford is currently producing 82,600 tonnes of waste per annum for energy recovery. We have assumed that the waste goes to a plant in the Netherlands~~, the estimated benefit would be around 8,000 tCO_2e for 183,000 tonnes of waste, so would be 2,600 tCO_2e for 60,000 tonnes of waste~~.

3. **Landfill in the UK – 82,000 tonnes (101,912 tonnes in the Maximum Case)**

   This is considered in the main assessment. ~~In the nominal design case, the benefit of the Portland ERF over landfill was 21,912 tCO_2e for 183,000 tonnes of waste, so would be 9,820 tCO_2e for 82,000 tonnes of waste.~~

We have combined these three routes to form a new baseline, and compared this with the proposed development below.

Table 20: Summary, Current Dorset Baseline

Parameter	Units	Nominal	Maximum
Baseline			
Releases from LFG	t CO_2e	37,099	45,001
Transport of waste and outputs to landfill	t CO_2e	443	546
Offset of grid electricity from LFG engines	t CO_2e	-4,986	-6,048

Parameter	Units	Nominal	Maximum
Total landfill emissions	**t CO_2e**	**32,556**	**39,500**
Transport of waste to and outputs from alternative ERFs	t CO_2e	1,217	1,211
Offset of heat from alternative ERFs		-4,901	-4,433
Offset of grid electricity with alternative ERF generation	t CO_2e	-22,057	-19,952
Emissions from the alternative ERFs	t CO_2e	49,141	41,385
Total Alternative ERF Emissions	**t CO_2e**	**23,400**	**18,211**
Total Baseline Emissions	**t CO_2e**	**55,957**	**57,711**
Proposed ERF			
Transport of waste to and outputs from the ERF	t CO_2e	1,442	1,582
Offset of grid electricity with ERF generation	t CO_2e	-42,438	-42,438
Emissions from the ERF	t CO_2e	89,751	83,562
Total ERF Emissions	**t CO_2e**	**48,755**	**42,705**
Net Benefit of the Proposed ERF	**t CO_2e**	**7,202**	**15,006**
Net Benefit with shore power, 2024	t CO_2e	11,840	19,644
Net Benefit with shore power, 2045	t CO_2e	12,775	20,579

Therefore, the benefit of the ~~Portland~~proposed ERF over current residual waste management approaches for Dorset Waste is estimated to be around 7,200 tCO_2e per annum, increasing to 15,000 tCO_2e per annum in the maximum case with lower CV waste. This does not take account of the additional benefits associated with the provision of shore power from the proposed Portland ERF, which would otherwise not be available and which would improve the benefit by around 4,500 – 5,500 teCO_2e per annum, or the potential benefit of district heating, which is a further 3,000 teCO_2e per annum (see section 3.4.2).

We have considered the sensitivity of these results to the grid displacement factor for electricity and the landfill gas capture rate, as before, noting that we have assumed that the grid displacement factor for all electricity generated by all plants is the same. It can be seen that there is a benefit for all LFG capture rate and grid displacement factor combinations, except for a very high LFG capture rate with no shore power.

Table 21: Sensitivity analysis – Dorset Baseline case – power only

Grid Displacement Factor (t CO_2e/MWh)	**LFG Capture Rate**			
	75%	**68%**	**60%**	**52%**
No Shore Power				
0.349	-1,055	**7,202**	16,638	26,074
0.30	-3,144	5,040	14,394	23,747
0.219	-6,598	1,467	10,684	19,902

Grid Displacement Factor (t CO_2e/MWh)	LFG Capture Rate			
	75%	68%	60%	52%
Shore Power (2024)				
0.349	3,584	**11,840**	21,276	30,712
0.30	2,491	10,675	20,028	29,382
0.219	683	8,748	17,966	27,183
Shore Power (2045)				
0.349	4,518	**12,775**	22,211	31,647
0.30	3,626	11,810	21,164	30,517
0.219	2,150	10,215	19,433	28,650

Table 22: Sensitivity analysis – Dorset Baseline case – district heating

Grid Displacement Factor (t CO_2e/MWh)	LFG Capture Rate			
	75%	68%	60%	52%
No Shore Power				
0.349	2,121	**10,378**	19,814	29,250
0.30	168	8,352	17,706	27,059
0.219	-3,061	5,004	14,221	23,439
Shore Power (2024)				
0.349	6,760	**15,017**	24,453	33,888
0.30	5,803	13,987	23,341	32,694
0.219	4,220	12,285	21,503	30,720
Shore Power (2045)				
0.349	7,695	**15,951**	25,387	34,823
0.30	6,938	15,122	24,476	33,829
0.219	5,687	13,752	22,969	32,187

4.4 Future management of Dorset Waste

Once the Bridgewater ERF is operational, we understand that the RDF from Canford Magna will be transported to Bridgewater rather than to Europe. Therefore, we have considered an alternative baseline for Dorset's waste, where 80,000 tpa is sent to Bridgewater ERF rather than to Europe.

Table 23: Summary, Future Dorset Baseline

Parameter	Units	Nominal	Maximum
Baseline			
Releases from LFG	t CO_2e	37,099	45,001
Transport of waste and outputs to landfill	t CO_2e	443	546
Offset of grid electricity from LFG engines	t CO_2e	-4,986	-6,048

Parameter	Units	Nominal	Maximum
Total landfill emissions	**t CO_2e**	**32,556**	**39,500**
Transport of waste to and outputs from alternative ERFs	t CO_2e	1,201	1,195
Offset of heat from alternative ERFs		0	0
Offset of grid electricity with alternative ERF generation	t CO_2e	-23,628	-21,373
Emissions from the alternative ERFs	t CO_2e	49,141	41,385
Total Alternative ERF Emissions	**t CO_2e**	26,714	21,207
Total Baseline Emissions	**t CO_2e**	59,271	60,707
Proposed ERF			
Transport of waste to and outputs from the ERF	t CO_2e	1,442	1,582
Offset of grid electricity with ERF generation	t CO_2e	-42,438	-42,438
Emissions from the ERF	t CO_2e	89,751	83,562
Total ERF Emissions	**t CO_2e**	**48,755**	**42,705**
Net Benefit of the Proposed ERF	**t CO_2e**	**10,516**	**18,002**
Net Benefit with shore power, 2024	t CO_2e	15,154	22,640
Net Benefit with shore power, 2045	t CO_2e	16,089	23,575

Therefore, the benefit of the proposed ERF over future residual waste management approaches for Dorset Waste is estimated to be around 10,500 tCO_2e per annum, increasing to 18,000 tCO_2e per annum in the maximum case with lower CV waste. This does not take account of the additional benefits associated with the provision of shore power from the proposed Portland ERF, which would otherwise not be available and which would improve the benefit by around 4,500 – 5,500 teCO_2e per annum, or the potential benefit of district heating, which is a further 3,000 teCO_2e per annum~~.~~ (see section 3.4.2).

~~4~~5 Lifetime Benefit

The benefits discussed above all relate to a single year. The ERF is expected to start operating in late 2023 and to have a life of at least 25 years, so the carbon benefits will accumulate over time. However, the benefits will vary over time as a number of the key assumptions will vary.

In this section, we have considered the lifetime benefits of the ERF on an illustrative basis. We have varied a number of assumptions with time.

1. The government's policy is to decarbonise grid electricity, which means that the benefit of displacing electricity will reduce. While we consider, as explained in section 3.1.3, that the correct comparator at present is power from CCGTs and that this will remain the case for some time, for illustrative purposes we have used the long run marginal generation-based emission factor taken from the "Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal", published by BEIS. This is considerably more conservative, starting at 0.2191 kg CO_2e/kWh in 2024 and dropping to 0.0276 kg CO_2e/kWh by 2048.
2. Shore power is assumed to ramp up linearly from 20,328 MWh in 2024 to 24,423 MWh in 2048.
3. District heating is assumed to take longer to be developed. First users are assumed to be connected in 2027, with a linear ramp up to the full heat export of 18,307 MWh by 2034, 10 years after the plant opens. (This is expected to be conservative as key potential heat users (including the 2 prisons) are interested in a heat supply much sooner, whereas new housing that may connect to the heat network is likely to be delivered in stages).
4. Landfill gas capture rates are assumed to increase gradually from 68% in 2024 to 75% in 2045, as it is likely that landfill performance will improve.

It is likely that waste composition will vary, but we consider that it is not possible to predict waste composition over 25 years and so we have not allowed for this. Variations in waste composition could make the performance of the ERF compared to landfill better or worse. We understand that Powerfuel will take account of the changing composition of the waste when calculating their net carbon position over time for the purposes of their net-zero carbon commitment (discussed in the report "Achieving Carbon Neutrality".)

With these assumptions, the net benefit of the Portland ERF over landfill over 25 years is estimated to be 61,926 tCO_2e. The net benefit per year and the cumulative benefit over time are illustrated below~~.~~ in Figure 1.

We have also considered the lifetime benefit compared to the current baseline for Dorset Waste. This is estimated to be 157,548 tCO_2e, with a net benefit in each year. The net benefit per year and the cumulative benefit over time are illustrated below in Figure 2.

Figure 1: Lifetime Carbon Benefit Compared to Landfill

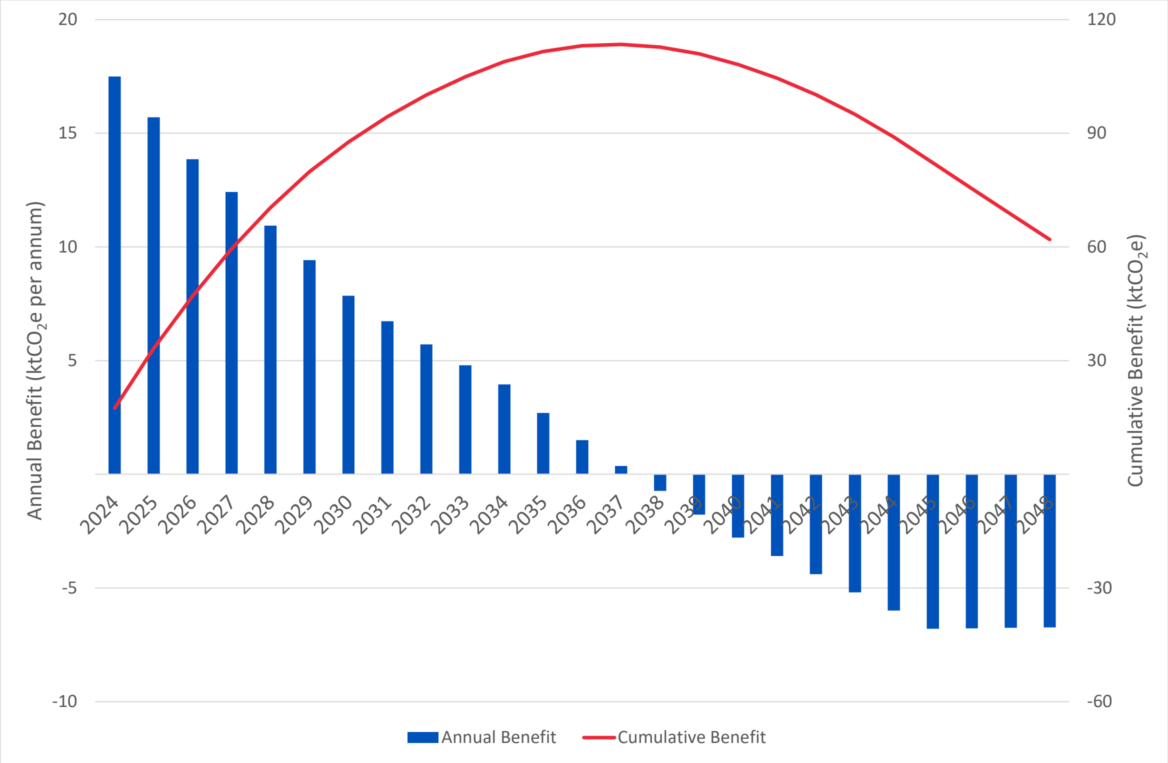
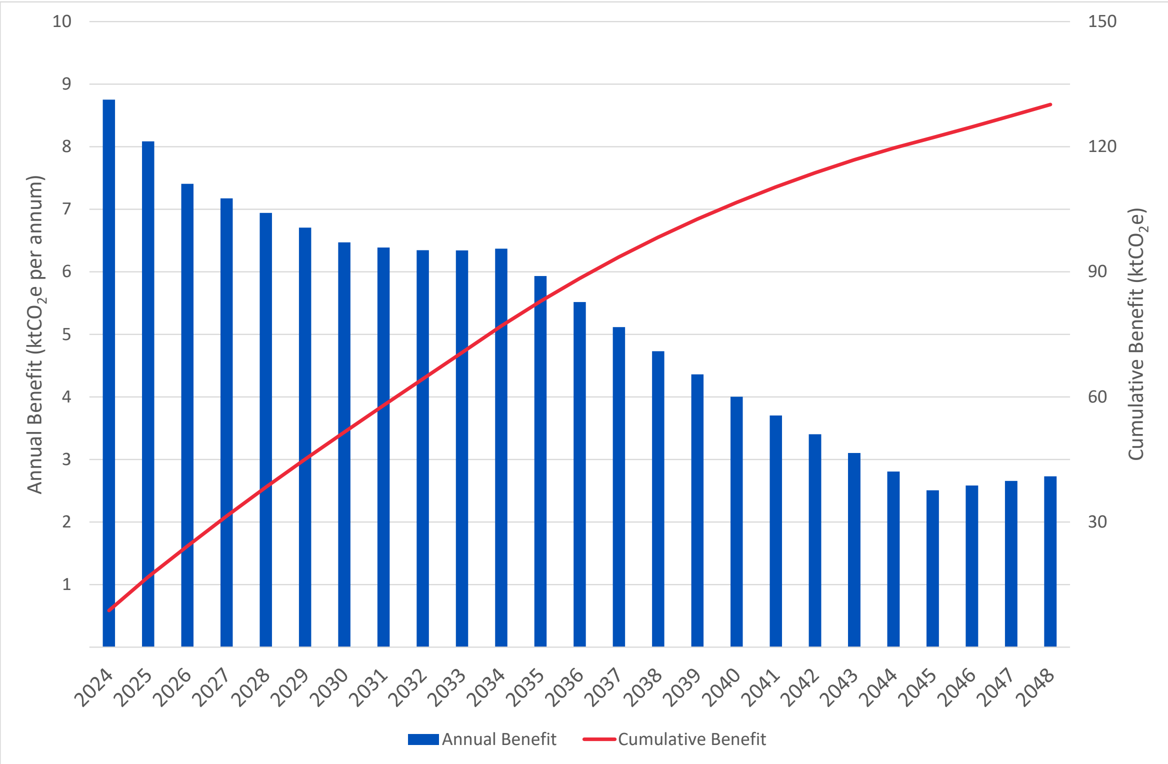


Figure 2: Lifetime Carbon Benefit Compared to Current Baseline



ENGINEERING CONSULTING

FICHTNER
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Human health risk assessment addendum

Human Health Risk Assessment - Addendum

Portland Energy Recovery Facility

07 July 2021

Project No.: 0552187

The business of sustainability

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Signature Page

07 July 2021

Human Health Risk Assessment - Addendum

Portland Energy Recovery Facility

Chris HazellMarshall
Technical Director

Simon Aumônier
Principal Partner

Environmental Resources Management Limited

2nd Floor Exchequer Court

33 St Mary Axe

London

EC3A 8AA

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1. INTRODUCTION

As part of the Planning Application for the Portland Energy from Waste plant, ERM undertook a Human Health Risk Assessment (HHRA) on behalf of Powerfuel. The HHRA considered emissions from the ERF and traffic generated by project on roads in Portland, along Chesil beach and in Weymouth. This HHRA focused on the potential for negative impacts associated with the proposed project.

However, a key element of the ERF project is that the plant will provide shore power for shipping in Portland Harbour. Currently, ships in Portland Harbour run their diesel engines to provide electrical power whilst in dock. Under the shore power scheme, ships will take power supply provided by the ERF and will shut down their engines, with a consequent reduction in emissions.

The Air Quality Impact Assessment has been updated to take into account the net change in emissions due to the use in shore power. The AQIA considered the net change in emissions and impacts of oxides of nitrogen (NO_x), particulate matter (as PM_{10} and $PM_{2.5}$) and sulphur dioxide (SO_2).

The AQIA identified that, for NO_x, NO_2, PM_{10} and $PM_{2.5}$, air quality is, on average, improved when the plant provides shore power. This is because the increase in pollutant concentration due to the plant and plant traffic is smaller than the existing impacts of ship emissions. The results for SO_2 are slightly different, with some locations showing an improvement, and other areas a worsening of impact. The results of the updated AQIA taking into account this improvement in air quality have been taken forward into the HHRA, and are presented here.

The HHRA considers two aspects: impacts associated with changes in NO_2, PM_{10}, $PM_{2.5}$ and SO_2; and impacts associated with other emissions such as metals and dioxins. As the offset of shipping emissions impacts only NO_2, PM_{10}, $PM_{2.5}$ and SO_2, this element of the HHRA has been updated.

The method for the HHRA is unchanged, and therefore the method and underlying population data have not been replicated in this report. The first HHRA report should be considered for points of methodology and population data. The only changes are to the assumed number of days that the ships are in port (260 berth days). This report sets out only the updated results, arising from the updated results presented in the AQIA.

2. UPDATED ASSESSMENT OF HUMAN HEALTH EFFECTS OF SO_2, NO_2, PM_{10} AND $PM_{2.5}$

2.1 Years of Life Change Through Exposure to $PM_{2.5}$

As noted in Section 1, the exposure of the population to $PM_{2.5}$ will decrease as a consequence of the plant providing shore power and off-setting existing emissions from ships in port. Using the same method used to calculate years of life lost in the original HHRA, this results in a gain of 2.0 years of life distributed across the exposed population.

The measure of life years gained would not be equally distributed throughout the exposed population. Statistically, those in the highest exposure group would gain the most. However, leaving this qualification aside, the result averaged over the exposed population gives a gain of approximately 32 minutes per person per year, or 16.5 hours gained throughout the 30 year lifetime of the plant.

2.2 Particulate Matter (PM_{10})

Table 2.1 shows the change in health outcomes due to the changes in PM_{10} concentrations, resulting from the plant emissions, traffic emissions and offset shipping emissions.

Table 2.1 Estimate of Health Effects from Change in Exposure to PM_{10}

Outcome	Per annum	Per 30 years of operation
All mortality	-0.007	-0.22
Cardiovascular mortality	-0.00020	-0.0060
Cardiovascular admissions	-0.007	-0.22
Ischeamic heart disease admissions	-0.0060	-0.171
Heart failure admissions	-0.0017	-0.052
Cerebrovascular admissions	-0.0013	-0.039

The decreased exposure to PM_{10} will lead to a negligible (albeit positive) improvement in the health of the local population. Whilst this is not significant, and the changes in health would not be discernible in the population, there is a net improvement due to the reduction in shipping emissions.

To put these figures into context, for example, there are 18 cases of cardiovascular mortality in the Study Area each year, compared to a reduction of 0.0060 cases due to the operation of the ERF.

2.2.1 Nitrogen Dioxide (NO_2)

Table 2.2 shows the change in health outcomes due to the changes in NO_2 concentrations resulting from the plant emissions, traffic emissions and offset shipping emissions. The overall net change in NO_2 concentrations is a decrease, albeit the change is negligible.

Table 2.2 Estimate of Health Effects from Change in Exposure to NO_2

Outcome	Per annum	Per 30 years of operation
All mortality	-0.024	-0.71
Cardiovascular mortality	-0.0011	-0.034
Ischeamic heart disease admissions	-0.022	-0.65
Heart failure admissions	-0.0082	-0.25
Cerebrovascular admissions	-0.0066	-0.20

As with PM_{10}, the decreased exposure to NO_2 will lead to a negligible (albeit positive) improvement in the health of the local population. Again, whilst this is not significant, and the changes in health would not be discernible in the population, there is a net improvement due to the reduction in shipping emissions.

To put these figures into context, they can be compared to the total number of Ischaemic Heart Disease (Coronary Heart Disease) primary diagnoses. In the Study Area, there are 581 cases of Ischaemic Heart Disease each year, compared to a reduction of 0.066 due to the operation of the ERF.

2.2.2 Sulphur Dioxide (SO_2)

Table 2.3 shows the change in health outcomes due to the changes in SO_2 concentrations resulting from the plant emissions, traffic emissions and offset shipping emissions.

Table 2.3 Estimate of Health Effects from an Increased Exposure to SO_2

Outcome	Per annum	Per 30 years of operation	Number of years operation for 1 additional case
Cardiovascular mortality	0.00011	0.003	9486
Cardiovascular admissions	0.0087	0.26	114
Ischeamic heard disease admissions	0.005	0.15	195
Heart failure admissions	0.00067	0.020	1499
Cerebrovascular admissions	0.00058	0.017	1710

Unlike PM_{10} and NO_2, there is a neglibile (albeit negative) impact. During the estimated 30 year operating period, there will not be an additional case for any of the health outcomes considered. Again, to put these figures into context, there are 581 cases of Ischaemic Heart Disease in the Study Area each year, compared to an additional 0.005 cases due to the operation of the ERF.

2.3 Conclusions

In the case of PM_{10} and NO_2, the offsetting of shipping emissions will lead to a negligible but positive improvement in health in the exposed population. Whilst this is not significant, it is nevertheless an improvement. In the case of SO_2, the shipping emissions offset is smaller and there are some locations where there is a very slight worsening in health outcomes. Again, these are not significant.

When those health outcomes that are common for PM_{10}, NO_2 and SO_2 are considered together, the overall effect on health is beneficial.

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Vietnam

ERM's [Swansea]
Ethos
Kings Road
SA1 Swansea Waterfront
Swansea SA1 8AS

T: +44 (0) 1792 306930
F: +44 (0) 1792 306056

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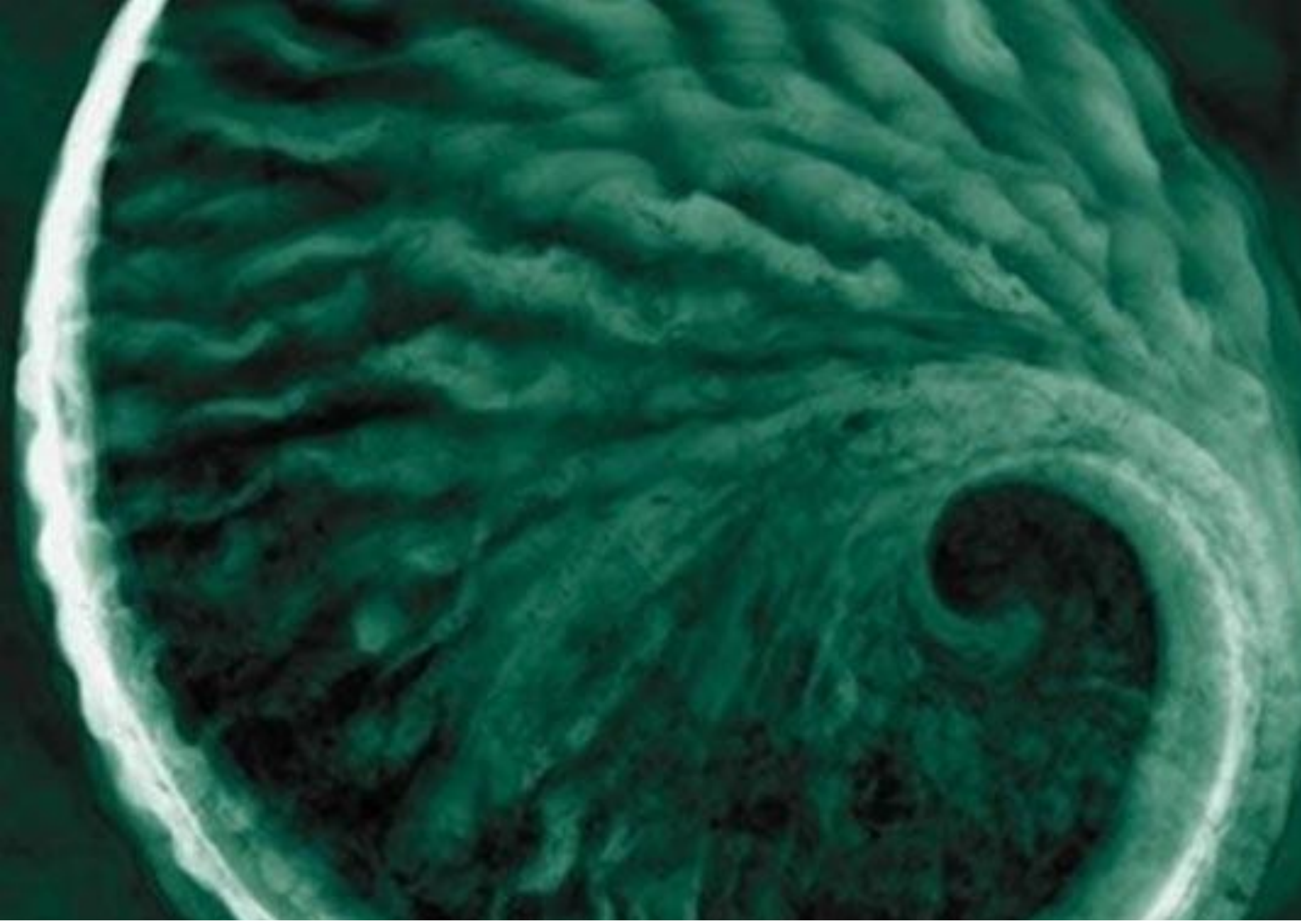
Health impact assessment addendum



Health Impact Assessment – Reg 25 Addendum

Portland Energy Recovery Facility

08 July 2021

Project No.: 0552187

The business of sustainability

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08 July 2021

Health Impact Assessment – Reg 25 Addendum

Portland Energy Recovery Facility

Simon Aumônier
Principal Partner

Environmental Resources Management Limited

2nd Floor Exchequer Court

33 St Mary Axe

London

EC3A 8AA

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Acronyms and Abbreviations

Name	Description

1. INTRODUCTION

1.1 Background

Powerfuel Portland Ltd. submitted a planning application for a proposed Energy Recovery Facility (ERF) on the Isle of Portland, Dorset on 3rd September 2020. Following review of the application and consideration of consultation responses, Dorset Council have requested additional information and clarification in relation to the proposal. The request was received on 30th April 2021. The Council considers that some of the information requested below constitutes further environmental information and, where this is applicable, it is requested in accordance with Regulation 25 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended) and Section 62(3) of the Town and Country Planning Act 1990.

Environmental Resources Management (ERM) has been commissioned to update the Health Impact Assessment (HIA) in line with this request, providing the following.

- Additional detail responding to issues in respect of potential benefits or impacts upon public health as a result of changes in air quality. In particular, this should address outstanding issues raised by Public Health Dorset.
- Further consideration and information in respect of relevant health related issues raised through representations on the first consultation as appropriate.

The method for undertaking the updates to the HIA is in line with Section 2 of Technical Appendix G of the submitted Environmental Statement, as well as the principles outlined in the Mental Wellbeing Impact Assessment published by the National MWIA Collaborative (England) in May 2011[1], as described in the following sub-section. This has included assessing how the population's characteristics influence wider determinants, including equity and social justice, and what positive or negative impacts the proposed development will have on the core protective factors for mental wellbeing.

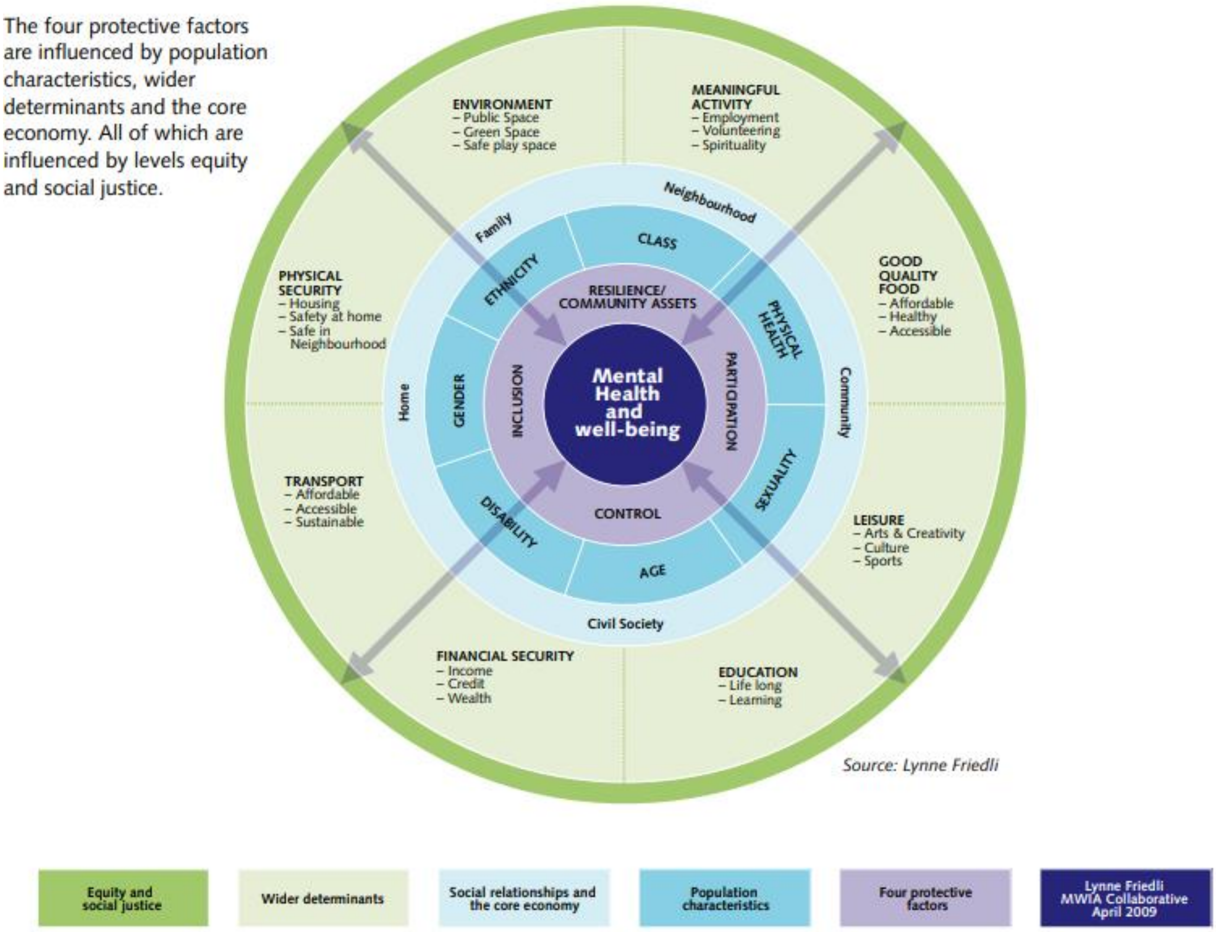
A standalone MWIA was not considered to be appropriate. However, the principles of the MWIA have informed this health impact assessment addendum, specifically where the consideration of the local communities' mental wellbeing has been assessed.

1.2 Mental Wellbeing Impact Assessment

The Mental Wellbeing Impact Assessment (MWIA) enables people and organisations to assess and to improve a policy, programme, service or project in order to ensure that it has a maximum equitable impact on people's mental wellbeing. It was published in 2011 by the National MWIA Collaborative (England). The MWIA toolkit provides an evidence-based framework for improving wellbeing through commissioning processes, project and service design and delivery, community engagement and impact assessment. The main output of a MWIA is a "set of evidence based recommendations" specifically designed to influence planners, funders and those delivering proposals. These recommendations are specifically designed to maximise potential positive impacts and to minimise potential negative impacts. There are a number of dimensions of mental wellbeing that can be influenced by different aspects of a person's life. These factors should be considered when assessing the mental wellbeing impact, as shown in Figure 1.1.

[1] National MWIA Collaborative (England) (2011) Mental Well-being Impact Assessment. Available at: https://q.health.org.uk/document/mental-wellbeing-impact-assessment-a-toolkit-for-wellbeing/?bp-attachment=MentalWellbeingImpactAssessmentAtoolkitforwellbe.pdf

Figure 1.1 A dynamic model of mental wellbeing for assessing impact



1.3 Scope and Structure of this report

The remainder of this addendum report is structured as follows:

- Section 2: Consultation Responses & Stakeholder Engagement;
- Section 3: Community Profile;
- Section 4: Literature Review;
- Section 5: Impact assessment; and
- Section 6: Recommendations.

The objective of this document is to address the key health stakeholder's expectations that the community and wider public have a full understanding of the assessment of health and wellbeing, and to provide reassurance to the local community through addressing key concerns. It should be read in conjunction with the original HIA in technical appendix G of the ES.

A non-technical summary has also been published.

2. CONSUTLATION RESPONSES & STAKEHOLDER ENGAGMENT

2.1 Consultation Responses

Dorset Council received consultation responses on the assessment of health and wellbeing from a number of stakeholders, including Public Health England, Public Health Dorset and Weymouth and Portland Primary Care Unit.

A meeting was held between ERM and Public Health Dorset (26th February 2021) to discuss their feedback and better understand their expectations.

The responses were analysed and key issues raised by stakeholders included the request for further consideration of the following topics, which will be addressed in the remainder of this document:

- Overview of the mental health and wellbeing of the local population, and any potential differential or disproportionate impacts which may arise;
- Overview of existing health inequalities within the local population, and any potential differential or disproportionate impacts which may arise; and
- Overview of any potential impacts to Her Majesty's Prison (HMP) The Verne and the resident 'static' inmate population.

2.2 Engagement with Stakeholders

Due to the COVID pandemic, ERM did not have the opportunity to engage with key health stakeholders in 2020. However, as Public Health Dorset (PHD) is now happy to facilitate engagement, it has provided ERM with recommendations as to stakeholders with whom to engage.

ERM, on behalf of Powerfuel Portland Ltd., will contact the key health stakeholders identified by PHD, to inform them of the upcoming consultation, share the updated assessment and non-technical summary, and invite them to respond either through the official Reg. 25 request and/or by inviting them to a feedback session as part of extended consultation. These key health stakeholders are:

- Public Health Dorset;
- Weymouth and Portland Primary Care Network & Patient Participation Group;
- HMP The Verne; and
- Island Community Action (suggested by PHD).

If additional stakeholders are identified during consultation, these will be subsequently contacted and engaged.

3. COMMUNITY PROFILE

3.1 Overview

Assessing the profile of the community is an important component of a HIA, as it informs the understanding of how those communities may be susceptible to potential health impacts and benefits arising from the Proposed Project. There is evidence to suggest that community characteristics such as ethnicity, deprivation and social and demographic structures can influence how susceptible is a population is to external changes. Analysing the profile of a community can help to identify communities, or sub-sections of communities, who may be differentially or disproportionately impacted by the Proposed Project and support the identification of how best to avoid, minimise or mitigate such impacts.

3.2 Mental Health and Wellbeing

Public Health England publishes data on the percentage of patients/residents, aged 18 and over, who have been diagnosed with depression and those with long-term mental health problems (all ages).

According to Public Health England's Public Health Profiles,[2] there are six GP practices in the Weymouth and Portland area:

- Cross Road Surgery, Weymouth;
- Royal Crescent Surgery, Weymouth;
- Royal Manor Health Care, Portland;
- The Bridges Medical Centre, Weymouth;
- The Dorchester Road Surgery, Weymouth; and
- Wyke Regis & Lanehouse Surgery, Weymouth.

Table 3.1 presented these figures for the different surgeries in Weymouth and Portland, as well as the comparative figures for Dorset and England. All GP surgeries in the area have a higher percentage of patients recorded with depression in 2019/2020, compared with Dorset and England as a whole.

The Bridges Medical Centre recorded the highest incidents of depression, followed by Wyke Regis & Lanehouse Medical Practice. Furthermore, a higher percentage of patients reported long-term mental health problems when compared to Dorset in five out of the six GP surgeries, and when compared to the English average in four out of the six GP surgeries. The highest percentage of patients reporting long-term mental health problems was in Cross Road Surgery, followed by Royal Manor Health Centre (situated on the Isle of Portland).

[2] Public Health England (2020) Public Health Profiles: GP practices within 5 miles of Weymouth. Available at: https://fingertips.phe.org.uk/search/depression#page/8/gid/1/pat/166/par/E38000045/ati/7/are/J81068/iid/848/age/168/sex/4/cid/4/tbm/1

Table 3.1 Prevalence of Depression (18+) and Severe Mental Illness (all ages)

GP / Area	% of patients reporting long-term mental health problems (all ages) (2020)[3]	% of patients recorded with depression (ages 18+) (2019/2020)[4]
Cross Road Surgery	14.26	13.50
Royal Crescent Surgery	10.97	14.70
Royal Manor Health Care	11.58	15.18
The Bridges Medical Ctr.	11.21	22.13
The Dorchester Rd Surgery	6.29	13.24
Wyke Regis & Lanehouse Medical Practice	10.00	18.78
Dorset	**9.99**	**11.59**
England	**10.55**	**11.56**

Public Health England also presents data around self-reported wellbeing.

Table 3.2 presents the data for people with high anxiety scores. The data are only available at a county, regional and national level[5]. As illustrated, Dorset has a higher percentage of the population reporting high anxiety scores compared with the regional and national figures.

[3] Public Health England (2020) Public Health Profiles: Depression. Available at: https://fingertips.phe.org.uk/search/depression#page/0/gid/1/pat/166/par/E38000045/ati/7/are/J81068/iid/848/age/168/sex/4/cid/4/tbm/1

[4] Public Health England (2020) Public Health Profiles: Long-term mental health problem. Available at: https://fingertips.phe.org.uk/search/mental%20health#page/0/gid/1/pat/166/par/E38000045/ati/7/iid/90581/age/1/sex/4/cid/4/tbm/1/page-options/car-do-0

[5] Public Health England (2020) Public Health Profiles: Anxiety. Available at: https://fingertips.phe.org.uk/search/anxiety#page/0/gid/1/pat/6/par/E12000009/ati/102/iid/22304/age/164/sex/4/cid/4/tbm/1

Table 3.2 Self-Reported Wellbeing – People with a High Anxiety Score

GP / Area	% Reporting High Anxiety Scores (2019/2020)
Dorset	22.4
South West Region	21.1
England	21.9

3.3 Vulnerable Groups

There a number of characteristics of people/communities that can contribute to health inequalities. These include vulnerable sections of society, or 'inclusion health' groups. Inclusion health has been used to define a number of groups of people who are not usually well provided for by healthcare services, and have poorer access, experiences and health outcomes. The definition encompasses people who are homeless and rough sleepers, vulnerable migrants (refugees and asylum seekers), sex workers, prison inmates and those from the Gypsy, Roma and Traveller communities[6]. For the purpose of this updated assessment, the community profile has been updated with available data, specifically information relating to homeless and rough sleeper populations, prison inmates, and traveller communities.

3.3.1 Homelessness

The Ministry of Housing, Communities & Local Government (MHCLG) published statistics on the rate of those defined as being homeless and in priority need per 1000 households in the population. The data for the six Dorset district and borough councils, presented annually from 2008-09 to 2016-17,[7] are presented in the figures below.

[6] NHS (2019) Definitions for Health Inequalities. Available at: https://www.england.nhs.uk/ltphimenu/definitions-for-health-inequalities/

[7] Dorset Council (2018) Homelessness in Dorset: Review of Evidence. Available at: http://moderngov.dorsetcouncil.gov.uk/Data/272/201807041000/Agenda/Homelessness%20appendix.pdf

Figure 3.1 suggests that there has been a steady increase in the rate of households accepted as homeless and in priority need over this nine-year period. Over the last three years, the rate in Weymouth and Portland has been higher than elsewhere in the county. In recent years, there has also been a greater tendency for some of the Dorset districts to exceed the overall figure for the South West. This has been the case in Weymouth and Portland, North Dorset, and Purbeck in three of the last four years.

Figure 3.2 shows that in the last three years Weymouth and Portland had the highest number of households accepted as homeless and in priority need.

Figure 3.1 Homeless Acceptances per 1000 Households

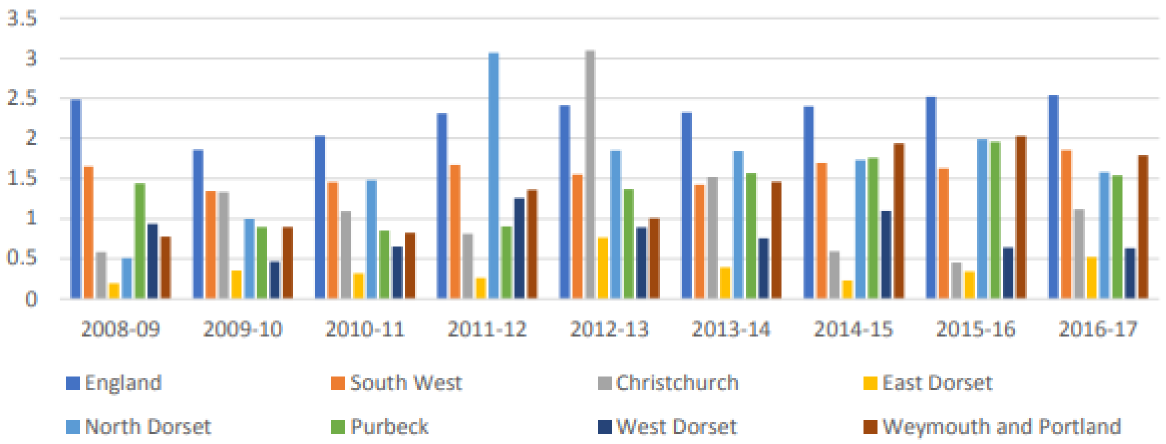


Figure 3.2 Number of Households Accepted as Homeless and in Priority Need

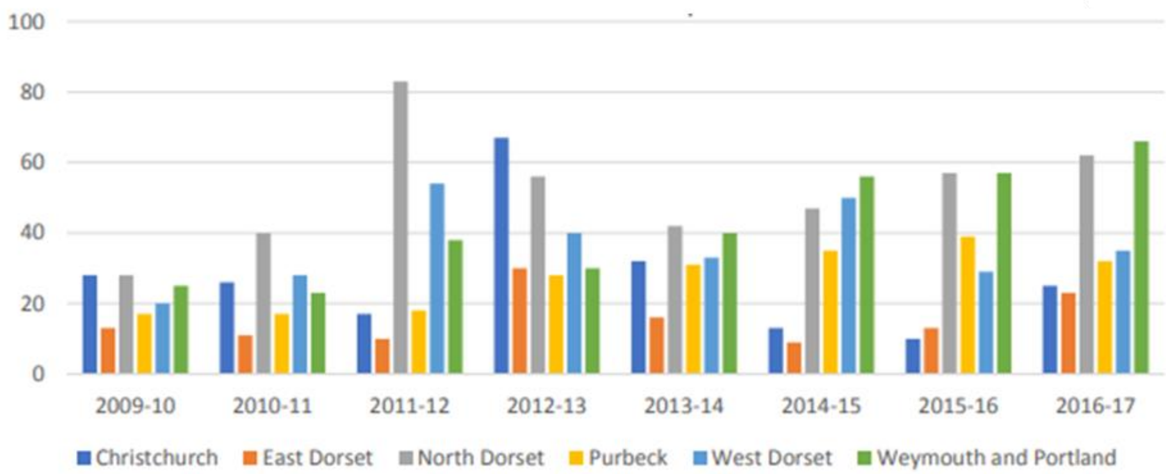
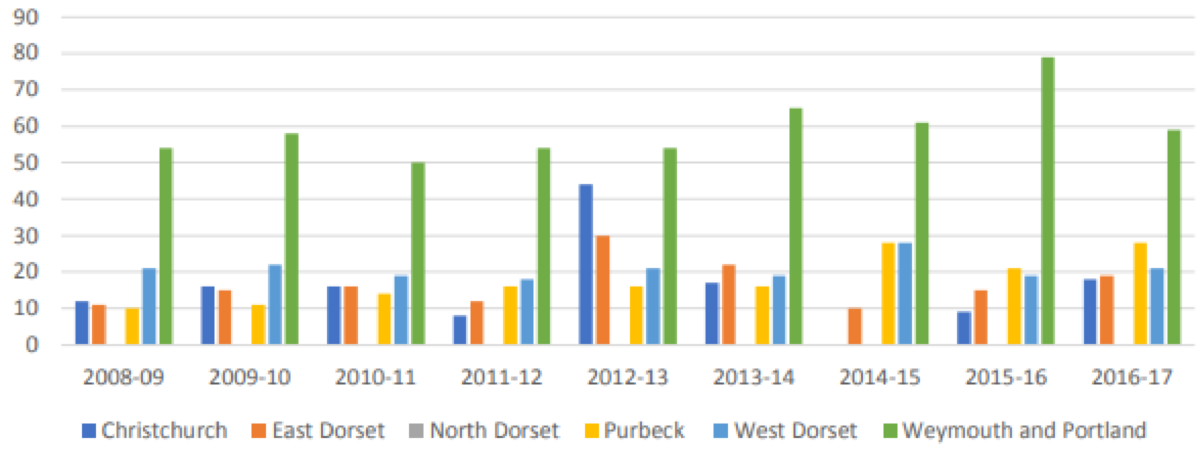


Figure 3.3 shows the number of households that, once accepted as being in priority need, were residing in temporary accommodation in each area. As can be seen, Weymouth and Portland consistently has far more households living in temporary accommodation, whether leased by the local authority, or bed and breakfast. Mainly, this is because there is more temporary accommodation available in Weymouth and Portland than there is in West Dorset or North Dorset, and the Dorset Councils Partnership (DCP) is therefore more likely temporarily to rehouse homeless people in that borough, regardless of where they presently reside.

Figure 3.3 Number of Households in Temporary Accommodation



3.3.2 *'Rough Sleepers'*

The Ministry of Housing, Communities & Local Government (MHCLG) publishes a statistical release on the annual single night snapshot of the number of people sleeping rough in local authorities across England,[8] see Table 3.3.

Table 3.3 Total Number of People Sleeping Rough (2020)

	Dorset	South West Region	England
Total	**16**	**354**	**2,688**
Gender			
Male	15	294	2,277
Female	0	55	377
Unknown	1	5	34
Nationality			
UK	15	310	1,922
EU (Non-UK)	1	30	472
Non EU	0	6	128
Unknown	0	8	166
Age			

[8] MHCLG (2021) Statistical Data Set: Live Tables on Homelessness. Available at: https://www.gov.uk/government/statistical-data-sets/live-tables-on-homelessness

Under 18	0	0	1
18-25	0	19	138
Over 26	15	314	2,349
Unknown	1	21	200

3.3.3 HMP The Verne

The majority of prisoners in England and Wales self-identify as male, but the number of inmates from minority and ethnic groups, women and older prisoners has rapidly risen (Haris, Hek and Condon 2006).[9]

HMP The Verne is approximately 430m to the South West of the Site at the top of a steep slope. HMP The Verne is a Category C Adult males' prison, with capacity for 580 inmates. Those incarcerated at the prison are serving either a life sentence or a sentence of 4 years or over. The Independent Monitoring Board (IMB) published data on the age profile and ethnic background of the inmates at HMP Verne in 2019[10]. These totals differ, although the IMB provided no explanation for this discrepancy. Tables 3.4 and 3.5 below show that the largest age group within the inmate population is those aged 50-59, whilst the majority of inmates identify as 'white'.

The HM Inspectorate of Prisons reported in June 2020 that HMP The Verne was found to be safe, with low violence and self-harm. Few prisoners reported feeling unsafe and when violence or antisocial behaviour did occur, incidents were investigated and victims received good support. 97% of prisoners reported that most staff treated them with respect. However, healthcare provision was less positively reported. The health services team was considered to be under-resourced and unable to meet the needs of the population[11].

[9] Harris F, Hek G and Condon L (2006) Healthcare needs of prisoners in England and Wales: the implications for prison healthcare of gender, age and ethnicity, *Health and Social Care in the Community* 15 (1) 56-66

[10] IMB (2019) Annual Report of the Independent Monitoring Board at HMP The Verne. Available at: https://s3-eu-west-2.amazonaws.com/imb-prod-storage-1ocod6bqky0vo/uploads/2019/11/Annual-report-Verne-18-19-for-circulation-.pdf

[11] Justice Inspectorate (2020) HMP The Verne – safe and respectful prison for sex offenders which should improve activity provision. Available at: https://www.justiceinspectorates.gov.uk/hmiprisons/media/press-releases/2020/06/hmp-the-verne-safe-and-respectful-prison-for-sex-offenders-which-should-improve-activity-provision/

Table 3.4 Age Profile

Age Range	Number	Percentage
21-29	50	11
30-39	74	15.75
40-49	102	21
50-59	121	26.25
60-69	84	17.75
70+	51	9.25
Total	**482**	**100**

Table 3.5 Ethnic Background

	Number	Percentage
White E/W/S/NI	329	69
White other	16	4
Asian	27	6
Black British Caribbean	26	5.25
Black British African	18	4.25
White Gypsy/ Irish Traveller	16	3.25
Mixed Black/ White Caribbean	8	1.5
Other	38	6.75
Total	**478**	**100**

3.3.4 Ethnic Groups

As stated in the community profile in Technical Appendix G of the submitted Environmental Statement, the majority of the population of Weymouth and Portland self-identify as White British (97.34%). The table below illustrates the ethnic groups of Weymouth and Portland's population compared with county and national numbers as per the 2011 Census. More up-to-date data were not available. As can be seen, the Gypsy, Traveller and Irish Traveller group makes up only 0.07% of the population. This is a smaller proportion than for Dorset (0.13%) and England (0.1%).

Table 3.6 Ethnic Groups (2011)

	Weymouth and Portland	Dorset	England
White	63,432	403,762	45,226,247
Gypsy / Traveller / Irish Traveller	48	555	54,895
Mixed / Multiple ethnic group	653	3,400	1,192,879
Asian / Asian British: Indian	97	737	1,395,702
Asian / Asian British: Pakistani	21	151	1,112,282
Asian / Asian British: Bangladeshi	93	525	436,514
Asian / Asian British: Chinese	173	943	379,503
Asian / Asian British: Other Asian	256	1,477	819,402
Black / African / Caribbean / Black British	321	924	1,846,614
Other Ethnic Group	73	431	548,418
Total	**65,167**	**412,905**	**53,012,456**

Source: Census 2011

While Gypsy, Roma and Traveller people tend to be absent from many surveys and other data collection methods, there are enough evidence sources to give a good picture of the inequalities that the Communities face. The 2011 census for England and Wales revealed that 14% of Gypsy/Travellers described their health as “bad” or “very bad”, more than twice as high as the white British group. Furthermore, Gypsy and Traveller people are less likely to be satisfied with access to a GP than white British people (60.7% compared to 73.8%) and are also less likely to be satisfied with the service they receive (75.6% compared to 86.2% for white British). Gypsies and Travellers also have the lowest rate of economic activity of any ethnic group, at 47%, compared with 63% for England and Wales overall.[12]

[12] Parliament UK (2019) What we know about inequalities facing Gypsy, Roma and Traveller communities. Available at: https://publications.parliament.uk/pa/cm201719/cmselect/cmwomeq/360/report-files/36005.htm

3.4 Health Inequalities

Health inequalities are categorised as unfair and avoidable differences in health across the population, and between different groups within society[13]. Health inequalities arise because of the conditions in which we are born, grow, live, work and age. These conditions influence our opportunities for good health, and how we think, feel and act, and this shapes our mental health, physical health and wellbeing.

In Technical Appendix G of the submitted Environmental Statement, Section 4 presents the community profile used during the initial assessment and this will be drawn upon as part of this update, as well as some additional profile data presented in the previous section. The profile is useful in highlighting 'hot spot' areas of high inequality which may be more susceptible to health impacts and benefits. The characteristics prevalent in Weymouth and Portland that contribute to health inequalities include the following.

- Demographic – 46% of the population are aged 50+; the proportion of residents within the area in the age groups between 0-44 years is statistically lower than the national average, reflecting an older population resident in the areas; only 2.5% of the population identify as belonging to an ethnic minority group, which is a much smaller proportion compared with the population of England, where ethnic minorities represent around 15%. The population is significantly more ethnically homogenous than the national average and inequalities may be experienced by those from ethnic minority groups.
- Deprivation - The north of Portland tends to experience higher deprivation than the south, with the four northernmost lower super output areas (LSOAs) ranked within the most deprived 25% of LSOAs in the country; the most deprived LSOA in Portland is ranked within the most deprived 10% of LSOAs in the country for income, employment, education, skills and training, and health and disability.
- Employment and Economic Activity – Unemployment in Weymouth and Portland is amongst the highest in Dorset; employment in the area is dependent on three main sectors Accommodation & Food Services, Health and Retail (52.8%); in 2017 (the last year for which information is available at the local level) Weymouth and Portland had an average annual gross earning of £27,180 which is significantly lower than Dorset (£30,042), the South West region (£31,645) and England more widely (£36,076). Higher levels of unemployment, coupled with below average earnings, contribute to pockets of high socio-economic deprivation in the area.
- Physical and mental health and well-being - A study into the global burden of disease in the Weymouth and Portland area for 2020 reported in its key findings that adult depression was significantly higher than the national average for all GP practices within Weymouth and Portland, as was the prevalence of hypertension (high blood pressure); rates of diabetes, hypertension and incidence of certain cancers are significantly above what is expected of the national average, as are hospital stays for self-harm and hospital admissions for heart attacks. Hospital admissions for injuries for under 5s and under 15s are also significantly higher.
- Crime levels - Weymouth and Portland experiences more recorded crimes compared with surrounding areas and with the wider Dorset area in 2015/16, adjusted for population size; the total number of crime incidents per 1,000 people was 69.4 for Weymouth and Portland, compared with 40.8 for the Dorset DCC area and 67.8 in England and Wales.
- Vulnerable groups – The Isle of Portland has two prisons, HMP The Verne and Grove Young Offenders Institute, accounting for around 580 people as a 'static' population; Weymouth and Portland had the highest number of households accepted as homeless and in priority need, compared to other Dorset districts and boroughs, as of 2017. The rate of households accepted as homeless and in priority need was also higher in Weymouth and Portland than elsewhere in

[13] NHS – Definitions for Health Inequalities. Available at: https://www.england.nhs.uk/ltphimenu/definitions-for-health-inequalities/#:~:text='-,Definition%20of%20Health%20Inequalities,%2C%20live%2C%20work%20and%20age.

the country, in 2017. Gypsy, Traveller and Irish Traveller groups are present in Weymouth and Portland accounting for 0.07% of the population (in 2011).

4. LITERATURE REVIEW

4.1 Healthcare in Prisons

The UK Government states that inmates or prisoners are eligible for and should receive the same standard of healthcare and treatment as all other members of the population. Treatment is free, but has to be approved by a prison doctor or member of the healthcare team. A prisoner can refuse treatment. However, the healthcare team may choose to give treatment if the prisoner is not capable of making decisions themselves (for example, they have a mental health condition)[14].

However, in the past concerns have been raised about serious inadequacies in the prison health system in terms of standards of care, and variations in quality and delivery of health services (Harris, Hek and Condon 2006). More recently, in 2018, the House of Commons Health and Social Care Committee concluded that the UK Government is failing in its duty of care towards people detained in England's prisons[15]. The protection of health and wellbeing of prisoners is, therefore, an ongoing issue and challenge across the nation.

4.1.1 Mental Health and Vulnerable Prisoners

Global studies of prisoner health suggest that they experience high levels of mental illness. Mental illness is well-recognised as an increasing problem in the prison system, with some research suggesting that 89% of prisoners have depressive symptoms and 74% have stress-related symptoms, many of which are not diagnosed until incarceration (Söderlund and Newman 2017).[16]

Prisoners are a vulnerable group, with multiple complex health needs and worse health outcomes relative to the general population worldwide. High rates of pre-existing mental disorders, suicide and self-harm are a concern, and research suggests there are links between poor mental health, suicide, and self-harm, and reoffending behaviour (Hewson, Shepherd, Hard and Shaw 2020).[17]

Her Majesty's Prison Service and the Department of Health reported in 2001 that 90% of prisoners experienced a diagnosable mental illness, substance misuse issues or both.[18] Staff are trained to spot prisoners at risk of bullying, suicide or self-harm.[19]

Whilst mental health continues to be a serious problem across the prison estate, the IMB reported that this has not been a major issue at HMP The Verne.[20] Residents who threaten self-harm are placed on an ACCT (assessment care in custody teamwork). They are carefully monitored (hourly if necessary) and frequently reviewed by a multi-disciplinary staff team until it is felt safe for the ACCT to be closed.

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[14] Gov.UK – Prison Life; healthcare in prison. Available at: https://www.gov.uk/life-in-prison/healthcare-in-prison#:~:text=Prisoners%20get%20the%20same%20healthcare,with%20by%20the%20healthcare%20team.

[15] House of Commons (2018) Health and Social Care Committee – Prison Health. Available at: https://publications.parliament.uk/pa/cm201719/cmselect/cmhealth/963/963.pdf

[16] Söderlund J and Newman P (2017) Imporving Mental Health in Prisons through Biophilic Design, *The Prison Journal* 97 (6) 750-772

[17] Hewson T, Shepherd A, Hard J and Shaw J (2020) Effects of the Covid-19 pandemic on the mental health of prisoners, *The Lancet Psychiatry*, Volume 7 568-570.

[18] Public Health England (2016) Rapid review of evidence of the impact on health outcomes of NHS commissioned health services for people in secure and detained settings to inform future health interventions and prioritisation in England. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/565231/Rapid_review_health_outcomes_secure_detained_settings_.pdf

[19] Gov.UK – Prison Life; Vulnerable Prisoners. Available at https://www.gov.uk/life-in-prison/vulnerable-prisoners

[20] IMB (2019) Annual Report of the Independent Monitoring Board at HMP The Verne. Available at https://s3-eu-west-2.amazonaws.com/imb-prod-storage-1ocod6bqky0vo/uploads/2019/11/Annual-report-Verne-18-19-for-circulation-.pdf

4.1.2 Covid-19

A number of factors in the prison system contribute to a higher risk of transmission of infectious diseases, including overcrowding, delays in diagnosis and treatment, limited access to water, soap or clean laundry.[21] Two prisoners to a cell is standard, as is limited access to hygiene facilities and showers. Kothari et al (2020) reported that prisoner care may worsen during the Covid-19 pandemic due to prison officer quarantine and sickness.[22]

The UK Government published guidance for preventing and controlling outbreaks of Covid-19 in prisons. Guidance included periods of isolation for those with symptoms of Coronavirus, reminders to wash hands more frequently with soap and water for at least 20 seconds, regularly cleaning objects and surfaces that are touched regularly, the use of PPE for staff and where appropriate, staff should follow social distancing guidelines (when not performing duties requiring close contact). In the event of a suspected outbreak of Covid-19 in a prison, the prescribed place of detention leader is required to refer to the local health protection teams in line with outbreak control plans that are in place for all infectious diseases.[23]

Prisoners, many of whom are physically vulnerable, will have understandable worries about infection, resulting in high anxiety and increased need for support (Kothari et al 2020). Suspension of jury trials and delays to court hearings in many countries, including the UK, have increased the time spent on remand for many prisoners. Remand is a period in which offenders are especially vulnerable and often ruminate about legal outcomes and have distress, uncertainty, and anxiety about their future. These emotions could be intensified by the unpredictability of the COVID-19 pandemic (Hewson, Shepherd, Hard and Shaw 2020).

The BBC reported that, as of the 25th of February 2021, more than 120 inmates at HMP The Verne had Covid-19, whilst some prison officers were also self-isolating.[24]

4.2 Anxiety in Populations Living in Close Proximity to Waste Management Facilities

Waste management facilities have characteristics that are associated with high opposition and social conflict (Petts 1994).[25] For the public, waste management facilities are associated with dread and unknown risks (Lima 2004).[26] The perception of risk associated to an incinerator, or waste management facility, near a place of residence, and a low sense of control and knowledge of the threat could induce psychological and physiological stress responses. Lima hypothesises that living near an installation perceived as dangerous can enhance the stress of those exposed (even when it is not proved that the installation has adverse direct health consequences).

A systematic review of literature for waste incinerators and health was undertaken following community groups expressing concerns around health impacts for proposed incinerators in

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[21] World Health Organisation (2014) Prisons and Health. Available at: https://www.euro.who.int/__data/assets/pdf_file/0005/249188/Prisons-and-Health.pdf

[22] Kothari R, Forrester A, Greenberg N, Sarkissian N and Tracy DK (2020) Covid-19 and prisons: Providing mental health care for people in prison, minimising moral injury and psychological distress in mental health staff, Medicine Science and the Law 0 (0) 1-3

[23] Gov.UK (2021) Guidance: Preventing and controlling outbreaks of COVID-19 in prisons and places of detention https://www.gov.uk/government/publications/covid-19-prisons-and-other-prescribed-places-of-detention-guidance/covid-19-prisons-and-other-prescribed-places-of-detention-guidance

[24] BBC News (2021) Covid outbreak at Dorset prison affects more than 120 inmates. Available at: https://www.bbc.co.uk/news/uk-england-dorset-56199201

[25] Petts J (1994) Effective waste management: Understanding and dealing with public concerns. *Waste Management and Research* (12) 207–222

[26] Lima ML (2004) On the influence of risk perception on mental health: living near an incinerator, *Journal of Environmental Psychology* (24) 71-84

Australia.[27] Seventeen eligible studies examined waste incinerator impacts on a range of other health outcomes. Adverse health effects, including on overall mortality and burden of disease, cardiovascular, respiratory, metabolic, dermatologic, childhood developmental delay and mental health were absent or insignificant. Only one study investigated stress levels secondary to the fear of occupational exposure to dioxins among municipal solid waste incinerator workers, which was lower than the general stress experienced by office workers.[28]

However, it should be noted that there have been few studies to date which focus on this issue of mental wellbeing in relation to waste incinerators and definitive studies on the link between waste incineration and health are difficult to conduct due to the diversity of pollutants emitted, and the complex nature of mental health and wellbeing.

[27] Tait, P.W., Brew, J., Che, A., Costanzo, A., Danyluk, A., Davis, M., Khalaf, A., McMahon, K., Watson, A., Rowcliff, K. and Bowles, D. (2020), The health impacts of waste incineration: a systematic review. Australian and New Zealand Journal of Public Health, 44: 40-48. https://doi.org/10.1111/1753-6405.12939

[28] Nakayama O, Ohkuma K. (2006) Mental health status of municipal solid waste incinerator workers compared with local government office workers. Ind Health. 44(4):613–18.

5. IMPACT ASSESSMENT

The assessment of health and wellbeing draws upon the findings of the wider relevant technical assessments, in order to assess the cumulative effects on health and wellbeing, during both construction and operation of the Proposed Project. This assessment draws upon the wider technical assessments of Air Quality, Noise, Landscape, Seascape and Visual, and Local Economy. Social Capital and Accidents and Trespass have not been included as they are already covered in the original HIA.

The assessment considers the potential effect on health and wellbeing for three key sub-sections of the community, namely:

- Those experiencing poor mental health;
- Those experiencing health inequalities; and
- Inmates at local prisons, in particular HMP The Verne.

A second prison, HMP The Grove (a male adult/ young offenders institution) is also located on the Isle of Portland, 2km (1.24miles) South East of the Proposed Project. For the purposes of this assessment, it is assumed that the proximity of HMP The Verne renders it a more significant receptor in terms of potential impact and has been assessed as such.

5.1 Air Quality

As part of the Planning Application for the Portland Energy Recovery Facility, Fichtner undertook the Air Quality Assessment and ERM undertook a Human Health Risk Assessment (HHRA). Both assessments considered emissions from the ERF and traffic generated by project on roads in Portland, along Chesil beach and in Weymouth.

A key element of the ERF project is provision by the plant of shore power for shipping in Portland Harbour. Currently, ships in Portland Harbour run their on-vessel diesel engines to provide electrical power whilst in dock. Under the shore power scheme, ships will take power supply provided by the ERF and will shut down their engines, with a consequent reduction in emissions. The Air Quality Impact Assessment and Human Health Risk Assessment have been updated to take into account the net change in emissions due to the use of shore power and these updates are considered in this addendum.

The location of HMP The Verne, approximately 430m to the south west of the proposed development, was identified as requiring further consideration of the impact of exposure to emissions from both construction and operation of the development to the 'static' inmate population.

The updated assessment obtained information on existing air quality by collating the results of automatic monitoring carried out on behalf of Defra and monitoring undertaken by the former Weymouth & Portland Borough Council. Chapter 4: Air Quality of the Portland Energy Recovery Facility Environmental Statement provides more information on the baseline in section 4.20, 4.21 and 4.49.

5.1.1 Potential Impacts during Construction

HMP The Verne

During the construction period, a number of vehicles will be required for construction works. The assessment assumed that the maximum HGV movements would occur during piling operations, which are likely to take place for between six and nine months. During this time, a maximum of 37 deliveries are predicted to be required.

Due to the location of the prison away from the route that will be used by construction traffic, it is not expected that the inmate population will be affected by emissions associated with the construction vehicles.

5.1.2 Potential Impacts during Operation

HMP The Verne

For annual mean NO_2 in all residential areas, the impact is assessed to be less than 0.5% of the Air Quality Assessment Levels (AQAL). AQALs are defined in the Air Quality chapter as the collective term for the Ambient Air Directive target and limit levels, Air Quality Strategy objectives, and Environmental Assessment Levels which are set at levels well below those at which significant adverse health effects have been observed in the general population and in particularly sensitive groups. An increased level of impact has been assessed at HMP The Verne, where impacts will be between 0.5% and 1.5% of the AQAL; this does not take into account the benefits that the shore power scheme provides, which are outlined below. In this area, the baseline concentration is likely to be similar to the background concentration, meaning that the predicted environmental concentration (PEC) will be well below 75% of the AQAL. The effects will therefore be negligible and not significant. Chapter 4: Air Quality of the Portland Energy Recovery Facility Environmental Statement does not state any further potential impacts from other pollutants during the operation phase that are likely to occur at HMP The Verne.

Shore Power Scheme

The ES qualitatively explained that the results presented in the submitted Air Quality assessment were worst-case, as they did not account for the offset of emissions from shipping which would be connected to shore power. These ships would otherwise be using on-vessel generators, with associated emissions. Therefore, additional modelling has been undertaken which quantifies the impact of emissions from those ships which would be connected to shore power provided by the ERF – i.e. those ships whose on-vessel generator emissions would be displaced as a result of the proposed development.

For particulate matter, there is a net benefit associated with the proposed development at all monitoring points. This is because the impact of emissions from the on-vessel generators, which would no longer be needed, is higher than the impact of emissions from the ERF. For nitrogen dioxide and sulphur dioxide, there is a net benefit for the majority of the area, Where there is a net increase, this is extremely small and therefore not likely that there will be any measureable decrease in the local communities' health, or exacerbate existing health inequalities.

The HHRA concluded that the exposure of the population to particulate matter will decrease as a consequence of the plant providing shore power and offsetting existing emissions from ships in port. Using the same method used to calculate years of life lost in the original HHRA, this results in a gain of 2.0 years of life distributed across the exposed population. The result averaged over the exposed population gives a gain of approximately 32 minutes per person per year, or 16.5 hours gained throughout the 30 year lifetime of the plant. There will also be a decrease in exposure to nitrogen dioxide. These decreases in exposure will lead to a negligible improvement in the health of the local population. Whilst this is not significant, and the changes in health would not be discernible in the population, there is a net improvement due to the reduction in shipping emissions. Unlike particulate matter and nitrogen dioxide, for sulphur dioxide there is a negligible negative impact, albeit this is not significant. During the estimated 30 year operating period, there will not be an additional case for any of the health outcomes considered. When those health outcomes that are common for PM_{10}, NO_2 and SO_2 are considered together, the overall effect on health is beneficial.

Health Inequalities and Mental Wellbeing

Public concern regarding the health impacts of waste disposal facilities has mainly focused on concerns around the impact of incineration on air quality and the risk this may pose to nearby residents. Public Health England has published a position statement on the impacts on health of emissions to air from municipal waste incinerators. This concluded that 'modern, well managed incinerators make only a small contribution to local concentrations of air pollutants. It is possible that such small additions could have an impact on health but such effects, if they exist, are likely to be very small and not detectable'. There is also currently no evidence directly linking waste disposal facilities to negative health effects and therefore one may conclude that the likelihood of the proposal development intensifying current health inequalities is low.

Nonetheless, there is an understanding that members of the public may express concerns around their mental wellbeing and the exacerbation of anxiety as a result of the perceived air quality risk. Therefore, it is important that engagement and ongoing communication is undertaken with local communities, including sharing information around the pollutant levels from the stack to reduce anxiety associated with the proposed development. A local liaison group will be established, which will meet on a regular basis to discuss the operation of the ERF and any potential issues or queries from members of the local community. It will provide a forum for community stakeholders to be informed and consulted regarding site operations and procedures.

5.2 Noise

The previous Noise assessment was undertaken during the Covid-19 lockdown period, which prevented a baseline survey from being undertaken at that time. It was likely that any survey undertaken during that period would be unrepresentative of more typical conditions due to the general reduction in economic and commercial activity. Therefore, following the partial lifting of lockdown restrictions, a baseline sound survey was undertaken in April 2021 and the assessment updated accordingly. The baseline sounds levels were taken at four locations: HMP The Verne; Wyke Regis (Castle Cove area); Wyke Regis (south); and Residences at East Weare Road, Leet Close, and Beel Close.

The Noise Impact Assessment reported representative baseline sound levels. A logging sound level meter was installed and data collected were considered to be representative of the sound levels experienced at HMP The Verne. The data can be found in Table 1 of the BS4142 Noise Impact Assessment Report.

5.2.1 Potential Impacts during Construction

The maximum number of additional vehicle movements is expected to be up to 37 HGV deliveries (74 HGV movements in total) and 22 staff cars (44 staff vehicle movements in total) per day. Additional road traffic during construction would lead to a temporary increase in noise, but the duration and magnitude of effect are such that the effect is assessed as not significant change in level. It is also unlikely to have significant impacts on HMP The Verne as construction traffic will not use the road networks near the prison.

Construction noise is anticipated as a result of site clearance, excavation, foundations construction and superstructure construction (including steelwork). The noise assessment stated that construction noise will be controlled and best practicable means of working used, such that there will be no significant effects. HMP The Verne is approximately 430m to the South West of the site, at the top of a steep slope, which may provide some natural noise mitigation. Furthermore, construction noise will be controlled and best practicable means of working used such that there will be no significant effects on local residents and businesses. Including HMP The Verne.

Working hours defined in the framework CEMP are assumed to be Monday-Fridays 07:00-19:00; Saturday 08:00-13:00, and no noisy working on Sunday and Bank Holidays (other than special works subject to prior agreement with the local authority). These hours are subject to confirmation with Dorset Council. It is important that engagement and ongoing communication is undertaken to reduce anxiety associated with construction activity, including the establishment of a hotline or contact point to report noise disturbance.

5.2.2 Potential Impacts during Operation

The predicted rating sound emissions from the proposed ERF do not exceed the measured background level at the assessed receptors, indicating that any effect of sound from the ERF would be not significant. The baseline has been established during the period in which Covid 19 restrictions are being lifted. Some economic activity may have been lower than was typical prior to the pandemic. Any effect that this would have on the assessment would be to lead to a cautious assessment ie an over-prediction of impacts and effects.

The main sources of operational noise will be RDF unloading, the flue stack, turbine hall and the air-cooled condensers. The air-cooled condensers are the main significant source but would be screened from HMP The Verne and the closest residential properties to the west by the ERF building.

The provision of electricity to docked ships will require two 15MW transformers and containerised converters (to provide 60Hz AC) and include cooling fans. These will be designed such that the overall noise emission from the proposed scheme will comply with the environmental noise emission requirements.

Operation of the facility is expected to require up to 80 HGV movements per day on the public highway. Some waste materials will arrive by ship and be unloaded at the harbour. There is expected to be a relatively small number of such deliveries and noise levels would be of similar level and character to existing ship movements at the port. Therefore, these activities are expected not to cause any significant effect from noise.

It is recognised that consistent heightened noise levels can affect the health of local people, with impacts including stress, annoyance and a decreased sense of wellbeing. Noise from the operation of the proposed scheme can and should, therefore, be controlled through the design of the building envelope, such that noise emissions would not lead to a significant effect on health and wellbeing.

5.3 Traffic and Transport

Chapter 11: Traffic and Transport of the Portland energy recovery facility Environmental Statement provides information on the existing baseline traffic flows. This information can be found in table 11.3.

5.3.1 Potential Impacts during Construction and Operation

The potential typical maximum number of daily deliveries each way is likely to be experienced during piling operations, when 37 trips are anticipated each way. In order to ensure a worst-case, the assessment has been based on up to 80 two-way movements. Both total vehicle flows and HGV flows are predicted to increase by less than 2.5% during operation of the proposed development on all road, even in the worst case scenario of 100% of deliveries to the site being made by road. Vulnerable groups in society will be affected most by the increase in traffic levels. Those such as young children and the elderly may experience negative health impacts. The elderly may experience annoyance from increased noise, whereas young children are at higher risk of road accidents and health impacts associated with potential air pollution.

The low percentage increases in traffic associated with the construction and operation of the Proposed Project means that the potential for increased collisions is assessed to be negligible, and therefore the risk to health is low, and not expected to be significant.

There is an understanding that the risk to health of the local communities, particularly those of an older demographic, which characterises the area, or those experiencing health inequalities, may rise due to the increased presence of HGV's on the local road network. However, both total vehicle flows and HGV flows are predicted to increase by less than 2.5% as a result of the proposed development on all road links modelled, even in the worst case scenario of 100% of deliveries to the site being made by road. An additional 80 HGV movements a day equates to an average of one additional HGV every 15 minutes. As a result, negligible effects that will not be significant are predicted on severance, driver and pedestrian delay and pedestrian amenity on all road links. The construction contractor will also be responsible for liaising with the local community to ensure there is awareness of when and what HGVs will be required by road, and to identify any constraints or mitigation required to address the specific needs of the community. This forms part of the framework CEMP.

In light of the proposed mitigation, it is not expected that the impacts from the proposed development will exacerbate the mental health issues or current health inequalities within the local communities.

5.4 Landscape, Seascape and Visual

The location of the proposed development is an industrial port, and the landscape, seascape and visual effects assessment concluded that the landscape is able to accommodate a large change without undue consequences.

There are sea views from the edge of the cliffs on the eastern boundary of HMP The Grove and HMP The Verne, including views of the Dorset coast. The landscape assessment concluded that the area is able to accommodate a medium change without undue consequences arising on the condition or quality of its defining characteristics. The landscape receptor was therefore judged to be of medium/ low sensitivity.

5.4.1 Potential Impacts during Construction

The construction of the proposed development will require a large degree of activity and disturbance from the movement of machinery and the introduction of construction elements will alter the landscape setting. As the proposed location is an industrial port, where there is already constant activity, and the construction period will be short term for a temporary period, the assessment concluded that potential effects to the populations' health and wellbeing is not significant.

Construction will bring new elements to the landscape. However, the landscape and visual assessment concluded that this will be barely perceptible, and localised to a very small area along the ridgeline of the cliffs south of The Verne. The construction of the upper parts of the building and stack will be visible and there may be some noise associated with the construction.

The visual presence of industry can lead to feelings of dissatisfaction, as well as stress, anxiety and concern. In this case, the assessment concluded that construction effects will be short-term, temporary and partially reversible and is unlikely to have significant effects on the mental health and wellbeing of inmates.

5.4.2 Potential Impacts during Operation

The proposed development will develop a currently derelict site at the Industrial Port. The proposed development is large in scale. However, the design of the building has been carefully considered and a high quality building is proposed. Therefore, the assessment concluded that negative effects on the population health and wellbeing are unlikely.

The landscape and visual assessment concluded that, upon completion, there would be some inter-visibility with the site from HMP The Verne. The effects of the proposal will be localised to a very small area along the ridgeline of the cliffs south of The Verne. The landscape effects at completion will be long-term and beyond 25 years. The degree of effect is assessed to be slightly adverse but not significant. Therefore, this assessment concludes that negative effects on the population health and wellbeing generally, and in respect of the inmate population at HMP The Verne, are unlikely.

5.5 Local Economy

Following consultation with Public Health Dorset, there is a requirement to provide more detailed considerations of the likely impacts on physical and mental health and wellbeing of the local population, and the potential of the proposed development exacerbating existing health inequalities. As noted in Section 3.3, a person's employment and economic activity can influence their health and well-being and contribute to health inequalities.

The Community Profile provided in Section 3 of this Health Impact Assessment – Reg 25 Addendum and Section 4 of the Health Impact Assessment provides an insight into the existing community, including specific areas of sensitivities, susceptibilities and inequalities. The Community Profile demonstrated broad alignment with the national picture on many factors, including employment structure and economic activity, home ownership and car and van ownership. Self-rated health is also broadly in line with the national average. There are a number of specific health indicators where the Weymouth and Portland area performs notably worse than the national average. Rates of diabetes, hypertension and incidence of certain cancers are significantly above what is expected of the national average, as are hospital stays for self-harm and hospital admissions for heart attacks. Hospital admissions for injuries for under 5s and under 15s are also significantly higher. Dorset also has a higher percentage of the population reporting high anxiety scores compared with the regional and national figures. Disparities exist within the Weymouth and Portland locality, and Weymouth and Portland includes some of the most deprived areas within the UK.

5.5.1 Potential Impacts during Construction and Operation

In Technical Appendix F2 of the submitted Environmental Statement, a detailed assessment of the economic effects of the scheme is presented. It outlines that, during construction, a total of a total of 566 direct and indirect full-time equivalent (FTE) jobs are expected to be either created or supported across the UK. Of these, 276 will be in the Weymouth and Portland area (Level 1) and Dorset, Bournemouth, Christchurch and Poole (Level 2). An additional 38 (approximately) should also be supported via testing and commissioning, but the whereabouts of these jobs is not yet known. During operation, the ERF is expected to create at least 30 directly employed FTE permanent jobs. The economic impact assessment concluded, after the actions of leakage, displacement and the multiplier, the original minimum 30 gross direct jobs that are created in Portland ultimately lead to the generation of some 110 net additional jobs in all.

Health benefits will accrue for the duration of the employment and would be of most benefit to those currently experiencing socio-economic deprivation, economic inactivity or unemployment within the area. Opportunities to target employment opportunities within these sections of the community should be capitalised upon wherever possible. In addition to income and enhanced socio-economic status, health benefits such as delayed mortality, decreased illness, and improved wellbeing will be experienced by those employed during the operation phase and will be of longer-term benefit. This could contribute to elevating some of the current health inequalities present in the area.

The Project has been assessed to generate significant socio-economic benefits as a result of the creation of employment in the local area. The health and wellbeing benefit this accrues to local communities can be maximised through local procurement policies and enhancing access to employment opportunities for those who are economically inactive or those on less favourable employment terms.

6. RECOMMENDATIONS

Ongoing engagement with local communities and wider stakeholders will be undertaken to minimise potential effects on health and wellbeing arising from anxiety over the proposed construction and operation activities. This is of particular importance given the characteristics of the demographic being of an above average older profile, and the high levels of depression and anxiety noted within the wider community. Advance visibility, engagement and ongoing liaison should mitigate against potential increases in anxiety arising from project related activities.

Mitigation measures will be integrated into building design, the CEMP and construction management planning to reduce potential effects on health and wellbeing. This will include the publication of the CEMP, the adoption of a hotline or alternative contact mechanisms and advance notification of proposed construction works, amongst other measures.

In advance of construction, specific engagement will be undertaken with HMP The Verne, to minimise potential effects on health and wellbeing. In particular, this will address those arising from anxiety over the proposed construction activities.

The Project will be subject to strict regulatory controls and the requirement for ongoing monitoring of various activities at the site. To reduce potential anxiety, consideration should be given to periodic publication of environmental monitoring data which local communities, and wider stakeholders, can access via the Project website.

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Preliminary slope stability assessment

Powerfuel Portland Ltd

Portland Energy Recovery Facility

Preliminary Slope Stability Assessment

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Ove Arup & Partners Ltd
9th Floor 3 St Paul's Place
Norfolk Street
Sheffield S1 2JE
United Kingdom
www.arup.com

ARUP

Contents

1 Introduction

1.1 Purpose and scope

This preliminary slope stability assessment has been prepared by Ove Arup and Partners Ltd (Arup) on behalf of Powerfuel Portland Ltd (Powerfuel) to assess the stability of the slope adjacent to the proposed Energy Recovery Facility (ERF) development on a site located within Portland Port on the Isle of Portland, Dorset.

This report has been produced to support the planning application for the proposed ERF development prior to detailed ground investigation being carried out and prior to detailed engineering design of the layout and structures within the development.

The intention of this report is to consider the site context, site history and existing information on the ground conditions and:

- assess the current risks at the site associated with slope stability;
- assess the likely impact of the proposed development on slope stability; and
- assess the suitability of the site in principle for the proposed ERF development

This report assumes that a more detailed assessment will be carried out once the results from site-specific ground investigation are available and the design of the proposed development has been further developed.

Sources of information reviewed as part of this assessment are listed in full in the References section and include historical ground investigation data and reports related to the site and surrounding area and other publicly available information. A site walkover was not considered necessary for this preliminary report and has not been undertaken as part of this assessment.

1.2 Proposed development

The proposed development will comprise an ERF that has been designed nominally to treat 183,000 tonnes of refuse-derived fuel (RDF) per year and the capacity to export 15.2 MWe of electricity to the grid. It will be a mass burn facility, using boiler and moving grate technology with a high efficiency steam boiler and high efficiency turbine.

The RDF will be stored in a bunker, envisaged to be approximately 40m long and 20m wide. The depth of the bunker is likely to be around 5m, and for the purposes of this report is it assumed that this may require a temporary excavation up to around 8m deep. The proposed building will enclose the RDF bale storage area in the fuel hall and waste bunker, tipping hall, cranes, conveyors, feed hopper, furnace boiler, condenser units and turbine/generator. The building height is likely to vary from approximately 19m in the area containing the tipping hall and bunker to 47m in the area containing the furnace and boiler.

In addition to the large excavation for the bunker, the development will require various other smaller excavations, for example utilities trenches, surface water storage tanks and foundations. These other excavations are considered negligible in relation to global slope stability and are not discussed further in this report.

2 Site context

2.1 Site description

The main development site is located in the northeast of the Isle of Portland, a peninsula island on the Dorset coast, within Portland Port approximately 600m east of the villages of Fortuneswell and Castletown as shown in Figure 1.

The Isle of Portland is formed by an escarpment which rises to a height of approximately 140m above Ordnance Datum (mOD), forming cliffs along the eastern side of the island.

The development site is roughly triangular in shape and comprises reclaimed land which has been developed for various uses since the 1800s. The site is currently vacant (all previous buildings have been demolished) and the groundcover is predominantly hardstanding.

Figure 1: Site location

The main development site is bounded to the east by overland fuel pipelines which supply marine fuel from Portland Bunkers fuel storage area in the nearby cliffs. Beyond the pipelines is the shingle shoreline of Balaclava Bay, which extends south from the Portland Harbour breakwaters. To the southwest is Incline

Road, a private road actively used by port traffic, and a former railway which runs along the toe of the slope. Beyond the former railway is a steeply rising hillside supporting grassland, scrub and woodland habitat. Existing operational port development lies to the north and northwest of the site.

2.2 Topography

The development site is relatively flat with an elevation of approximately 7mOD. The site is bounded to the southwest by a hillside which rises inland to a height of approximately 140mOD.

The hillside comprises an upper steep escarpment of limestone/sandstone over a shallower slope formed of landslip deposits over the underlying bedrock with a slope angle of around 8°. Towards the base of the hillside the slope steepens to a gradient of approximately 30°.

The former railway which runs towards the toe of the slope was constructed within a slight cut into the hillside around 10m above the elevation of the development site.

2.3 Site history

A detailed description of the site history can be found in the Geoenvironmental and Geotechnical Desk Study report [1] that formed technical appendix I1 to the Environmental Statement. Reference has also been made to www.portlandhistory.co.uk . The elements considered to be of most relevance to slope stability are described below.

The 1805 OS map (Figure 2) indicates the site prior to development of the harbour and shows the coastline to be approximately in the position of the current steep slope above the site.

The Admiralty Incline Railway was built in 1848-49 to transport stone from the quarries at the top of the Isle to Portland Nore, for use in construction of the breakwater arms of Portland Harbour. Construction of the breakwater arms continued until around 1872 and included placing fill in front of the steep slope to create the development site (Figure 3).

By 1903 a railway had been built on the hillside above the site (Figure 4). This appears to be on a combination of filled embankment, cuttings into the slope and free-standing viaduct.

The development site was used for a variety of uses by the Royal Navy after construction of the breakwaters, including buildings relating to the Admiralty Underwater Weapons Establishment. These were substantial industrial buildings that included basement structures. These buildings have been demolished over the last 20 years or so. Former basements have been backfilled with demolition arisings. In 2016/17, the main road was realigned along the base of the cliff along the western site boundary creating the current vacant site. The last of the stockpiled demolition rubble was cleared from the site in 2018.

Figure 2: 1805 OS Map (British Library, supplied under the Open Government License v1.0)

Figure 3: 1864 OS map (extract from Groundsure report [10] – copyright OS)

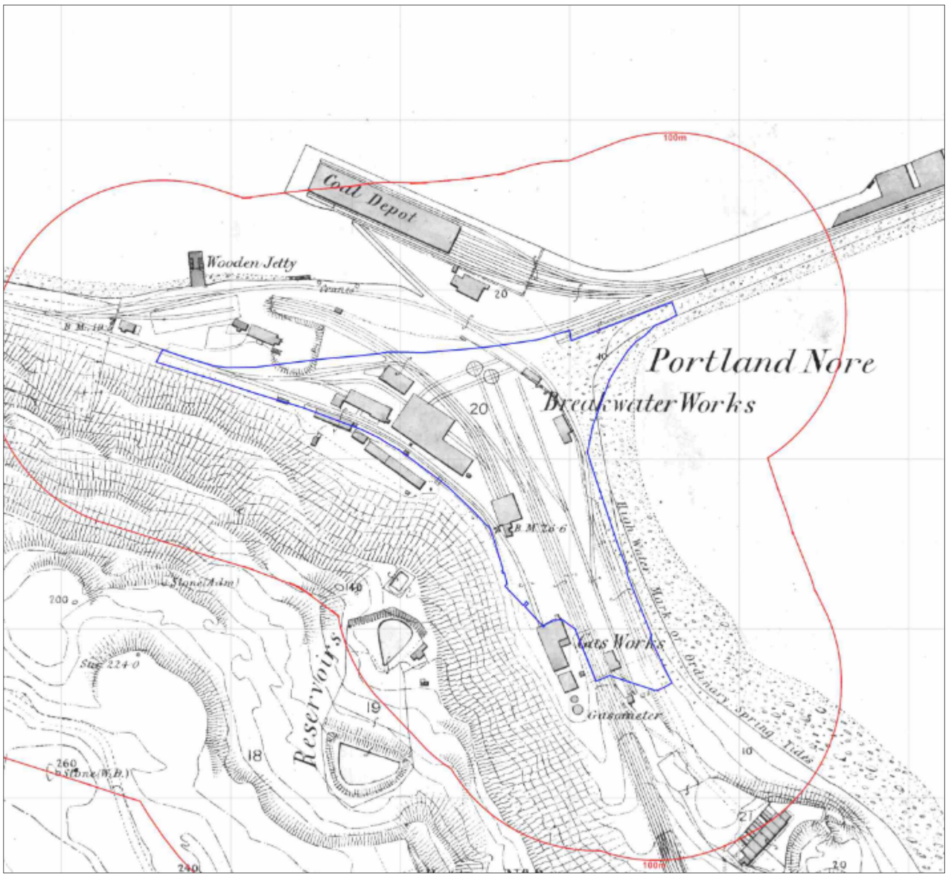
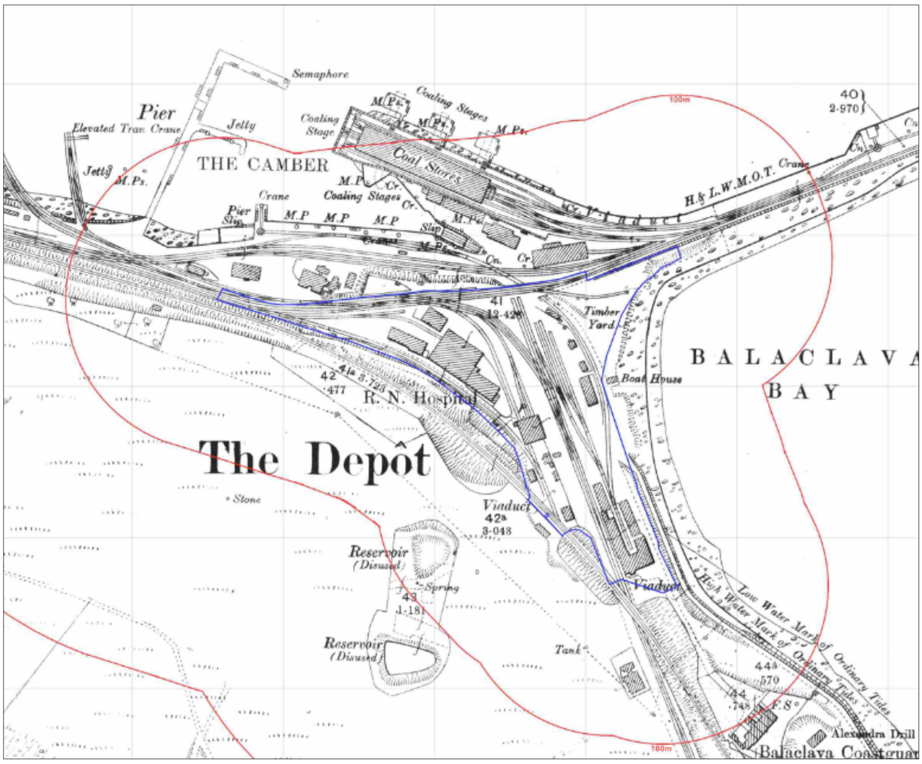


Figure 4: 1903 OS map (extract from Groundsure report [10] – copyright Ordnance Survey)



3 Geology

3.1 Regional geology

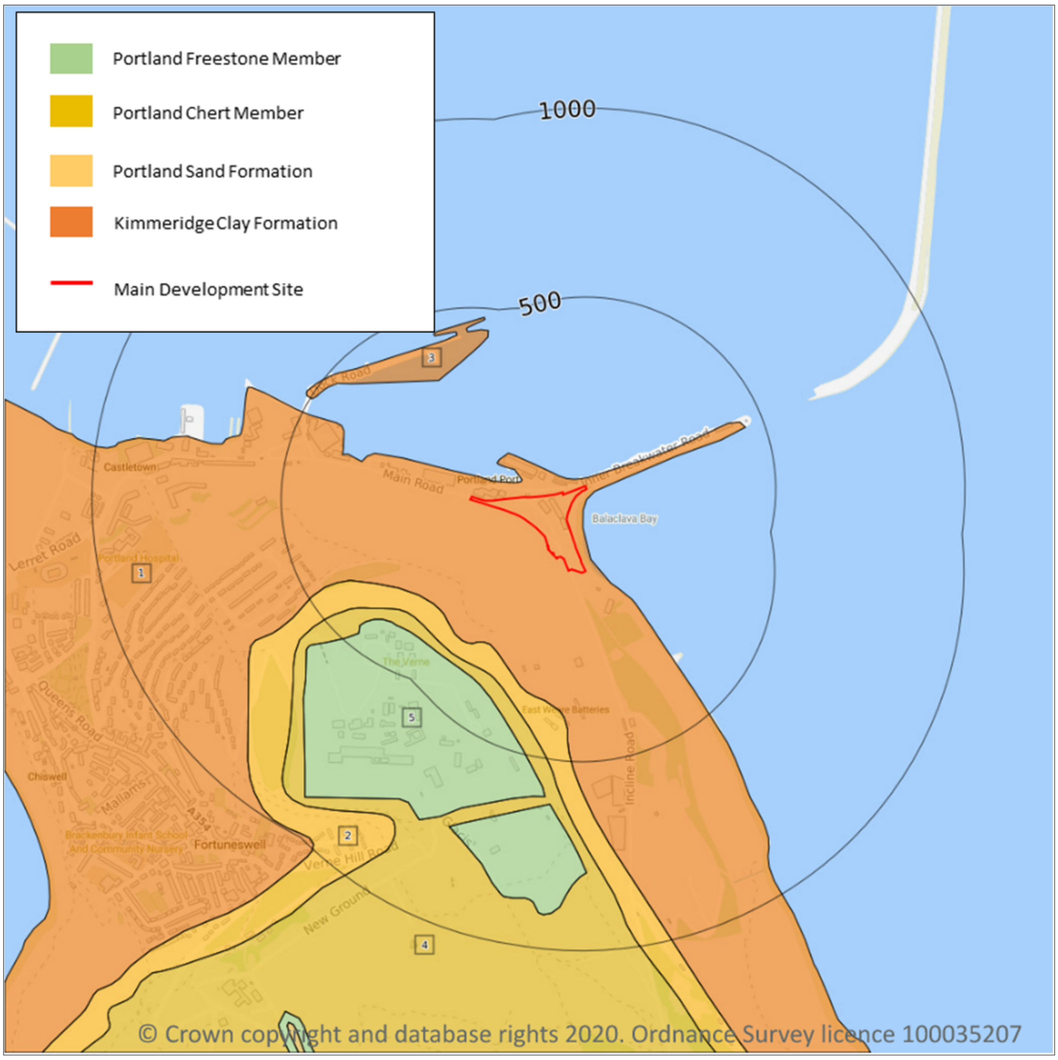
The Isle of Portland is formed of Jurassic sedimentary strata. The geological sequence within the cliffs above the site is shown in Figure 5 and comprises:

- Portland Stone Formation (Portland Freestone Member and Portland Chert Member) comprising limestone with oolitic bands and frequent nodules of chert;
- Portland Sand Formation comprising a silty to very silty mudstone with argillaceous bands of limestone and a variably sandy siltstone with some thin bands of nodular argillaceous limestone and layers of silty mudstone;
- Kimmeridge Clay Formation a calcareous mudstone with thin siltstone beds.

The Portland Stone Formation form the cliffs along the escarpment to the southwest of the site and overlies the Portland Sand which sub-crops at the base of the steep cliffs. The Kimmeridge Clay forms the lower slopes and extends towards the coast.

Landslip or colluvial deposits overlie the Kimmeridge Clay on the slopes and comprise variable deposits of gravel, cobbles and boulders of limestone, chert or siltstone with a varying sand and silty clay matrix. These deposits were formed as a result of the natural weathering and degradation of the cliffs.

Figure 5: Bedrock geology from Groundsure [10]



3.2 Geology at the site

A ground investigation was completed within the development site in 2009 by RPS [9]. The ground conditions within the site were recorded to comprise:

- Made ground approximately 5 to 8m thick comprising a mixture of firm, locally firm to stiff clay, gravelly clays, silty sands and gravels. Limited anthropogenic materials were recorded indicating that the material is largely reworked natural materials used to form the original port development in the 1800s;
- Superficial deposits were recorded in one location in the northeast corner of the site. These comprised grey and brown sands and gravels at a depth of 5m bgl to approximately 12m bgl and were considered likely to be Marine Gravel deposits;
- A weathered zone of Kimmeridge Clay was identified in two boreholes in the north of the site as a thin layer of firm to stiff grey clay containing limestone gravels resting above the Kimmeridge Clay bedrock. The top of the

Kimmeridge Clay was identified as depths from 5m to 12m bgl and was proven to a maximum depth of 21m bgl. The strata encountered largely comprised mudstones with occasional bands of stiff clay.

No site-specific ground investigation has been undertaken on the hillside above the development site, however historical British Geological Survey (BGS) borehole logs on the slope indicate the thickness of the landslip deposits to be up to at least 5m thick, with some boreholes recording thicknesses of approximately 13m.

The BGS logs indicate the landslip deposits comprise soft to firm clay with boulders, cobbles and gravels of chert and limestone.

Evidence from neighbouring sites indicates the presence of a disturbed zone at the top of the Kimmeridge Clay that contains slickensided shear surfaces [9]. This is associated with historical landslips.

3.3 Groundwater

Limited groundwater level monitoring was undertaken on the main development site by RPS. Groundwater was encountered between depths of 7.18 m and 7.88m bgl within the Kimmeridge Clay and at a depth of approximately 7.7m bgl in the superficial deposits in the northeast of the site.

One historical BGS borehole on the hillside recorded groundwater at a depth of 10.4m bgl towards the base of the landslip deposits

Historical maps presented in the Arup 2020 desk study [1], which formed Appendix I1 to the ES, indicate the presence of some springs on the slope above the site.

4 Historical slope stability

4.1 Slope failure mechanisms

Very slow natural movements occur within the colluvium along the slopes. The movement is understood to be aided by coastal erosion which removes some of the weight from the toe of the slope [3].

The stability of the natural slopes is considered to be controlled by the slope angle of the upper surface of the Kimmeridge Clay and by the presence of water within the slope [4].

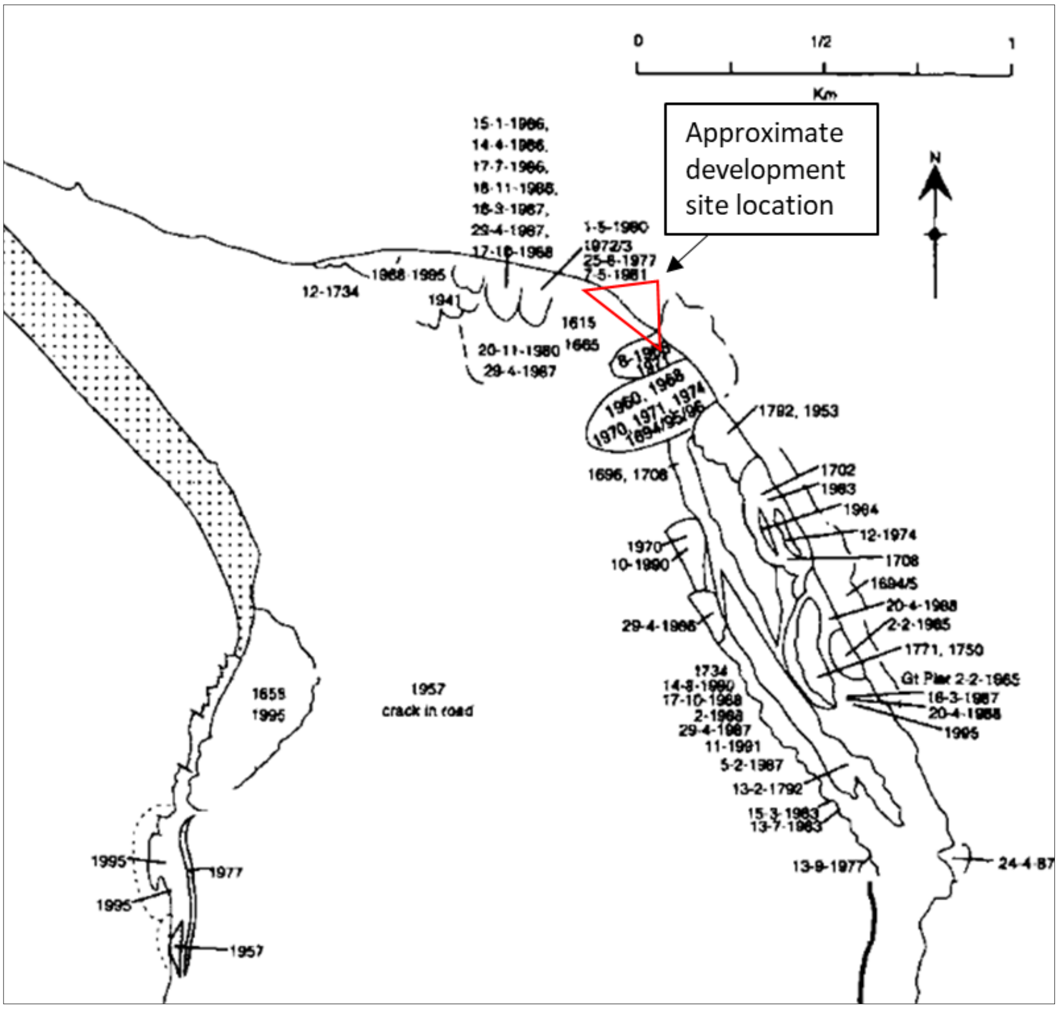
There are considered to be three possible modes of slope failure [4]:

- Deep-seated slumps which occur within the colluvium and fill material;
- Along soft clays on the interface between the Kimmeridge Clay and overlying colluvium;
- Re-activation of very deep-seated rotational failures through the Kimmeridge mudstone, at depths below the colluvium/Kimmeridge Clay interface.

4.2 Historical slope failures

The Isle of Portland has a history of landslips with records of slips along the coastline existing from the 1665 to the present day [3]. The distribution of recorded historical landslip locations is shown in Figure 6.

Figure 6: Location of known landslips, adapted from [3]



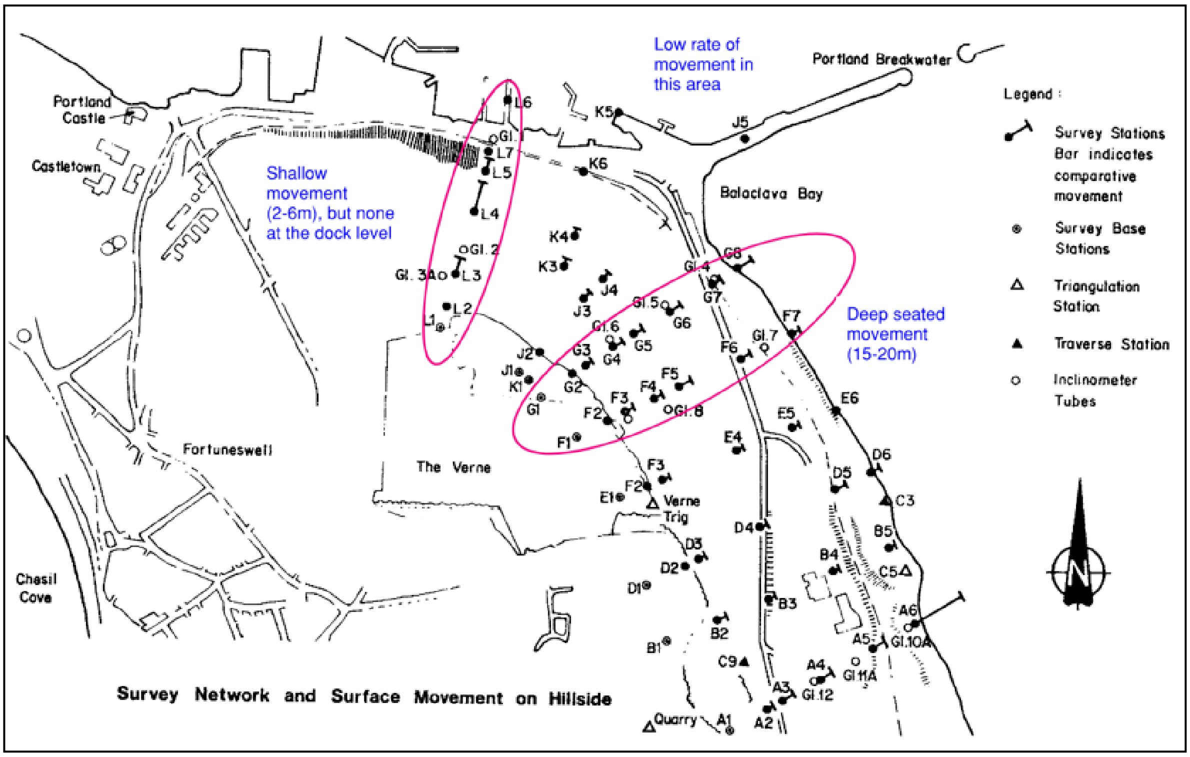
On the slopes to the west of the site there are records of four landslips that have a well-defined deep seated shallow circular form [3]. Individual shallow movements have been recorded at rates between 3.5-9mm per year in the last 50 years. The development of the harbour resulted in extensive cut and fill at the base of the slope and the dredging of the harbour entrances also removed weight from the toe of the slope.

The only slips indicated to be immediately above the development site are recorded to have occurred in the 1600s, however, it appears that the exact location of these slips are not known with any precision and were just in this general area of the coast. In this part of the Isle of Portland undercutting of the toe of the slope by sea erosion is considered to be a predominant control on the slope movements. However, due to the development site at the base of the slope being formed of reclaimed land, the site will be protecting the slope from future coastal erosion.

The coastal slopes to the south of the site, adjacent to the site known as Upper Osprey, forms the most active landslip area on the Isle of Portland. The largest landslide is reported to have occurred in 1792 following a period of high rainfall and comprised a massive, deep seated slip [4]. Several more recent failures have occurred within this area, and they are predominantly considered to be as a result of poorly executed earthworks and a failure to control water flows properly rather than natural instability of the slope [4].

Surface movement monitoring was undertaken along the north-east cost of Portland between 1977 and 1988 [5] as shown in Figure 7. The results indicated that shallow movements were occurring on the slopes to the west of the development site and deep-seated movement was occurring on the slopes to the south. While the survey points on the slope above the development site were of a limited number, they indicate a low rate of movement in this area.

Figure 7: Surface movement monitoring 1977 to 1988, adapted from [5]



The records of historical slope movements along the northeast coast of the Isle of Portland, suggests that the slopes above the development site are in a different setting to the areas to the south where the main landslides on Portland have occurred.

4.3 Recent evidence of slope movements

No site-specific settlement monitoring data is available for the slope above the development site. However, LiDAR data is published by the Environment Agency and updated annually. This provides elevation data that can be compared over time to identify indications of relative displacement. The elevation accuracy is only stated as +/-15cm and the quality of the data is affected significantly by vegetation, but nevertheless the LiDAR data can provide some information on relative movements.

Due to the vegetation on the slope there is considerable ‘noise’ in the available LiDAR data. A comparison of available data over 12 years from 1998-2010 did not identify any consistent differential movement in any areas of the slope above the development site.

Anecdotal evidence from the Port also indicates that there has been no record of any recent slope movements adjacent to the site, with recent slope movements only recorded on the slopes to the north and to the south at Upper Osprey. The former rail embankment that runs along the side of the site at the toe of the slope has been in place for over 100 years and does not appear to have been affected by large-scale slope movements directly above the site.

5 Ground model

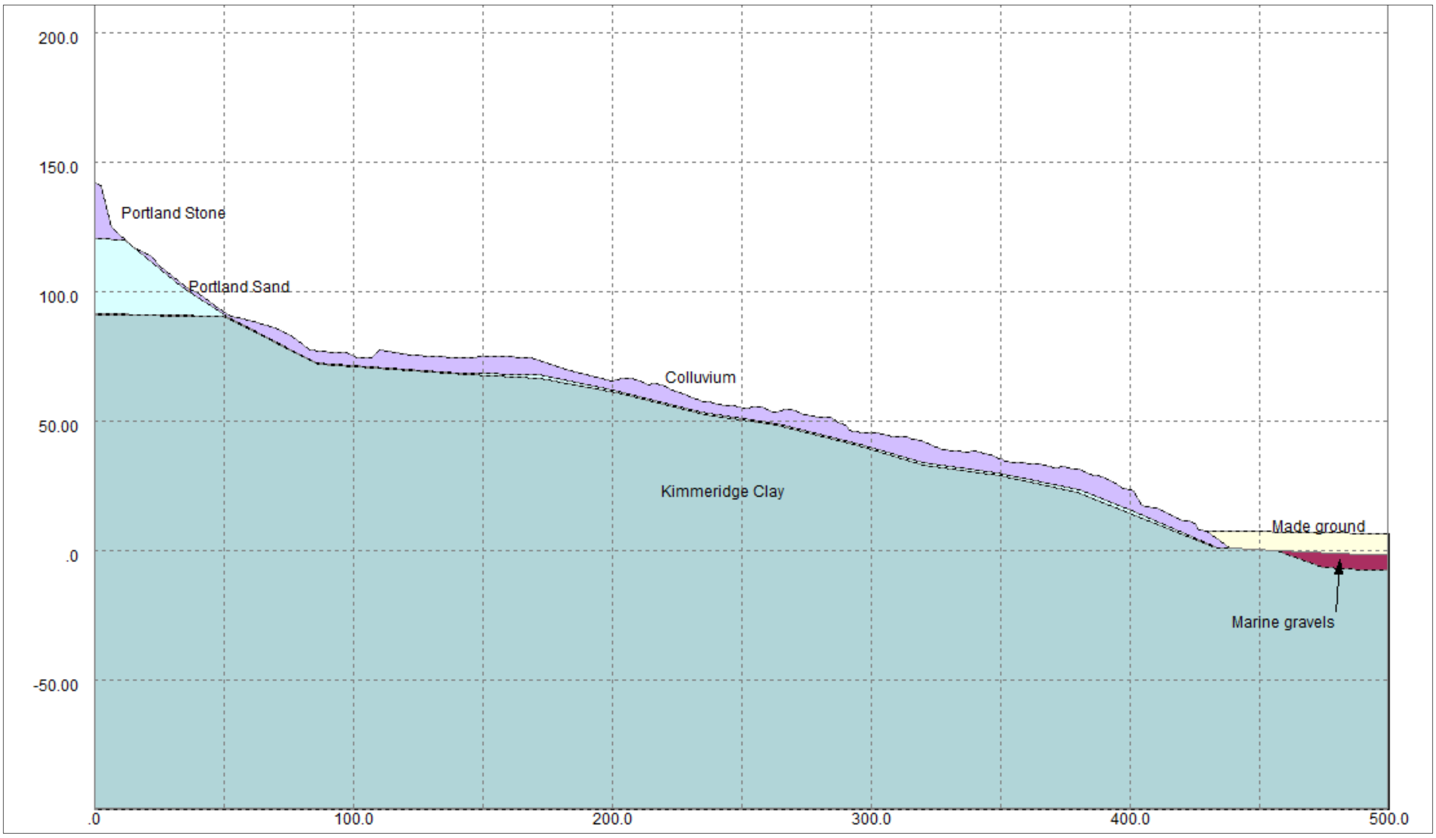
5.1 Stratigraphy

The section shown in Figure 8 indicates the assumed stratigraphy at the site. Note that this is based on limited existing ground investigation data and is heavily influenced by published papers [3], [5], [7] and ground investigation reports on nearby sites [4], [9].

The following main assumptions are made:

- Prior to the port development the coastline was at the toe of the existing slope
- Historically, erosion at the toe of the slope initiated slope instability and allowed a disturbed zone to develop at the top of the Kimmeridge Clay
- The colluvium layer is of limited thickness on the slope (5m or so)
- Colluvium would have been eroded from the toe of the slope and therefore no colluvium or disturbed zone is present beneath the made ground used to raise the ground for the port development. This is supported by borehole evidence from the site.
- The placement of fill for the port development will have provided weight at the toe of the slope and had a buttressing effect against further slope movement. The fill would also act to protect the toe of the slope from further coastal erosion.

Figure 8: Assumed site stratigraphy



5.2 Geotechnical parameters

5.2.1 Made ground

The made ground at the toe of the slope is variable in nature, likely derived from reworked soils that were excavated during the early development of the port/harbour. For the purposes of the following assessment, no attempt has been made to subdivide the made ground into fine and coarse parts. All of the made ground is given strength parameters typical of a well graded general fill.

5.2.2 Marine gravels

The sand and gravel encountered in a single borehole on the site (RT-2) has been interpreted as marine gravel. It is assumed to be a medium dense well-graded coarse soil.

5.2.3 Colluvium

The colluvium encountered on neighbouring sites is highly variable in nature, but in general can be considered a clay with varying amounts of gravels and boulders. For the purpose of strength parameters, the colluvium is assumed to be representative of a gravelly clay of low to intermediate plasticity. Laboratory testing data from neighbouring sites indicates relatively high peak and residual shear strengths. This is likely to be related to the presence of lithorelicts (fragments of rock) within the clay.

5.2.4 Disturbed Kimmeridge Clay

The upper surface of the Kimmeridge Clay is generally highly disturbed and in places softened due to past slope movements and the presence of groundwater. Polished ('slickensided') shear surfaces are commonly encountered on neighbouring sites. The presence of these shear surfaces means that it is appropriate to consider residual strength parameters. Data from neighbouring sites indicates these residual parameters to be very low.

5.2.5 Kimmeridge Clay

The Kimmeridge Clay is generally encountered as a weak rock (mudstone), although the upper part appears to be weathered to a clay directly beneath the development site.

5.2.6 Groundwater

The ground at the toe of the slope is assumed to be saturated at least to mean sea level. On the slope, on neighbouring sites, groundwater is typically recorded just below the top surface of the Kimmeridge Clay. Perched groundwater is also found at various levels within the colluvium.

A combination of piezometric levels and 'r_u' values have been used in the slope stability assessment.

5.2.7 Parameters used in preliminary assessment

The parameters provided in Table 1 have been assumed in the preliminary assessment presented in the following section. The parameters are based on data presented for neighbouring sites and on the professional judgement of the author. They are intended to be used for the preliminary assessment only to determine likely failure modes and potential impact of changes.

Table 1: Ground conditions parameters used for preliminary assessment

Stratum	Unit weight	Effective angle of shearing resistance	Effective cohesion	Groundwater
Made ground	19	33	2	$R_u = 0.3$
Marine Gravels	18	35	0	Piezometric
Colluvium	20	34	0	$R_u = 0.0$
Disturbed Kimmeridge Clay	20	15	10	$R_u = 0.1$
Kimmeridge Clay	22	35	20	Piezometric

6 Slope assessment

6.1 Proposed earthworks

The proposed ground level for the development will be similar to the existing site at approximately 7mAOD.

The RDF waste bunker will extend to a depth of approximately 5mbgl (2mOD) beneath the centre of the building. The depth of the excavation required to construct the bunker may extend up to 8mbgl which is anticipated to be towards the base of the made ground and geological boundary with the top of the Kimmeridge Clay. Based on the available ground conditions information it is anticipated that the base of the excavation will be below groundwater level.

6.2 Slope analysis

6.2.1 General approach

Assessment of slope stability has used Oasys SLOPE software to explore potential failure surfaces and changes to factor of safety that may occur in the future. Shallow superficial failures have been ignored (by specifying a minimum weight of slip). To simplify the assessment, only circular slip surfaces have been explored, although it is recognised that actual slips are likely to be non-circular, elongated along the disturbed zone at the top of the Kimmeridge Clay. The analysis method used is the Bishop method with variably inclined interslice forces. All analyses use unfactored soil parameters and give a global factor of safety on shear strength.

A 'global factor of safety' is the ratio of the restoring forces to the disturbing forces. A slope with a factor of safety of less than 1.0 would be unstable. Many natural slopes will have a factor of safety in the range 1.0-1.2 and can be considered marginally stable, i.e. they may become unstable under certain conditions such as sustained wet weather. A factor of safety in the range 1.3-1.5 is commonly sought for newly engineered slopes.

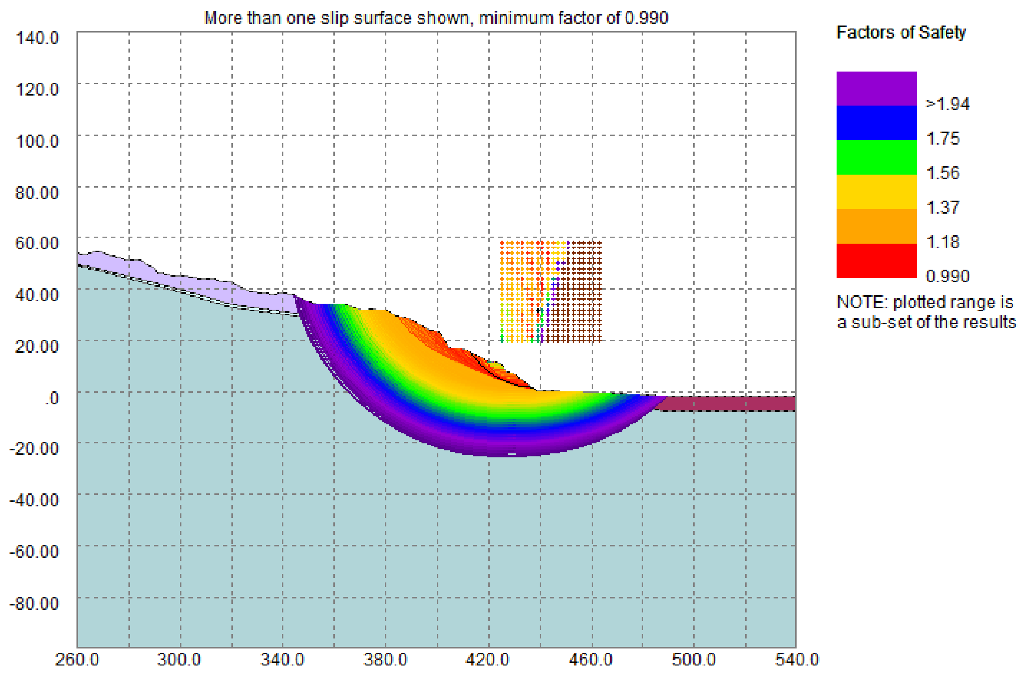
Without detailed information on the stratigraphy, geotechnical properties of each soil layer and groundwater conditions the absolute factor of safety may not be calculated with certainty. However, for existing slopes, it may be appropriate to consider the relative change in factor of safety. For example, if a slope is thought to be marginally stable, but with no evidence of recent instability, implementing drainage to increase the factor of safety by, say, 0.1 may be considered acceptable, rather than targeting a particular absolute factor of safety.

The following series of assessments was intended to consider the likely relative changes in factor safety of the slope over time.

6.2.2 Original situation

The first analysis (presented in Figure 9) was carried out to check that the chosen parameters give the likely failure mode with a factor of safety close to unity (1.0). The assumed original topography is without the existing made ground. Slope failures are likely to have frequently occurred along this part of the coastline. The minimum factor of safety is found for slip circles tangential to the disturbed zone, which is as expected.

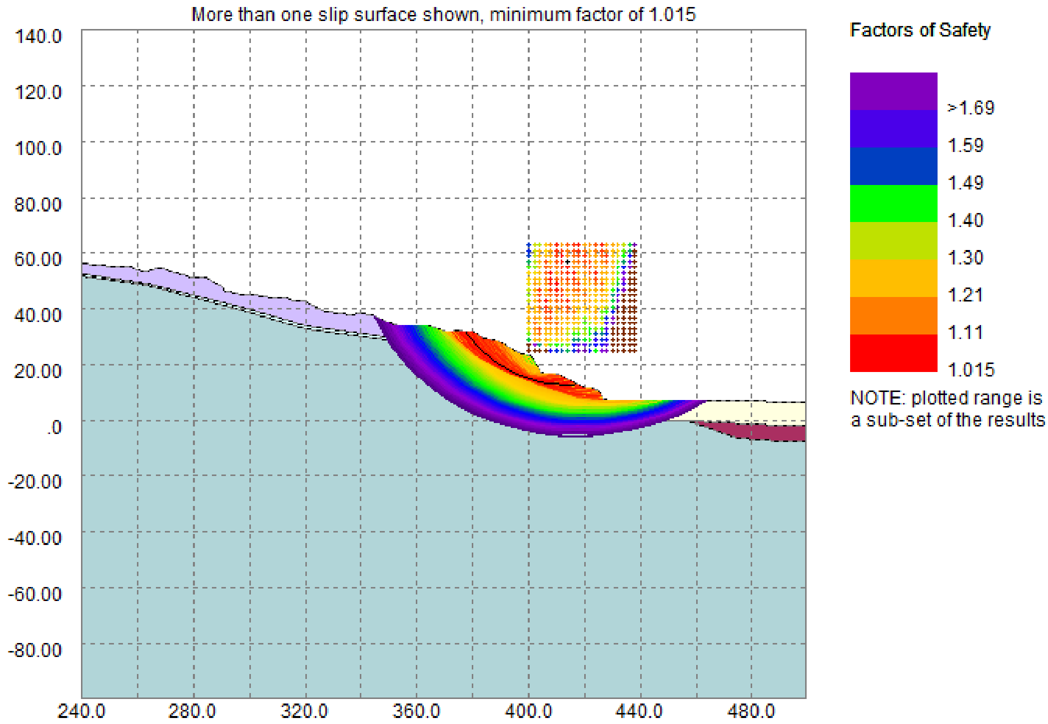
Figure 9: Slope analysis for original situation



6.2.3 Current situation

After the previous analysis had provided reassurance that the chosen strength parameters are reasonable, an analysis was carried out with the existing made ground in place (presented in Figure 10). The assessment indicates that the stability of the slope above the site is likely to be marginal, again primarily due to the presence of the disturbed zone. The buttressing effect of the made ground at the toe of the slope is seen to significantly increase the factor of the safety of deeper slips that may affect the development site itself.

Figure 10: Slope analysis for current situation



6.2.4 Proposed excavation

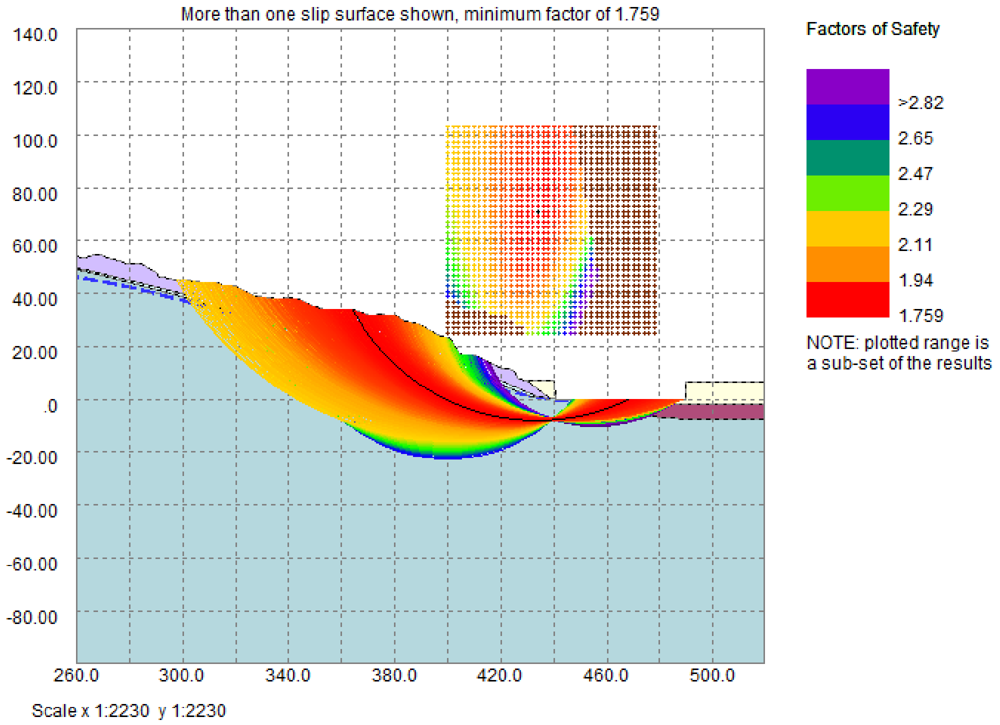
The next analysis considered the effect of the excavation at the toe of the slope.

Several assumptions have been made:

- The excavation would not be carried out using battered slopes, but with a robust embedded retaining wall that would form part of the permanent structure.
- The retaining wall would extend to at least around -8mOD and would prevent any slip circles above this level.
- A reduction in slope stability would therefore be primarily due to the loss of weight at the toe of the slope.

The results of the analysis are shown in Figure 11.

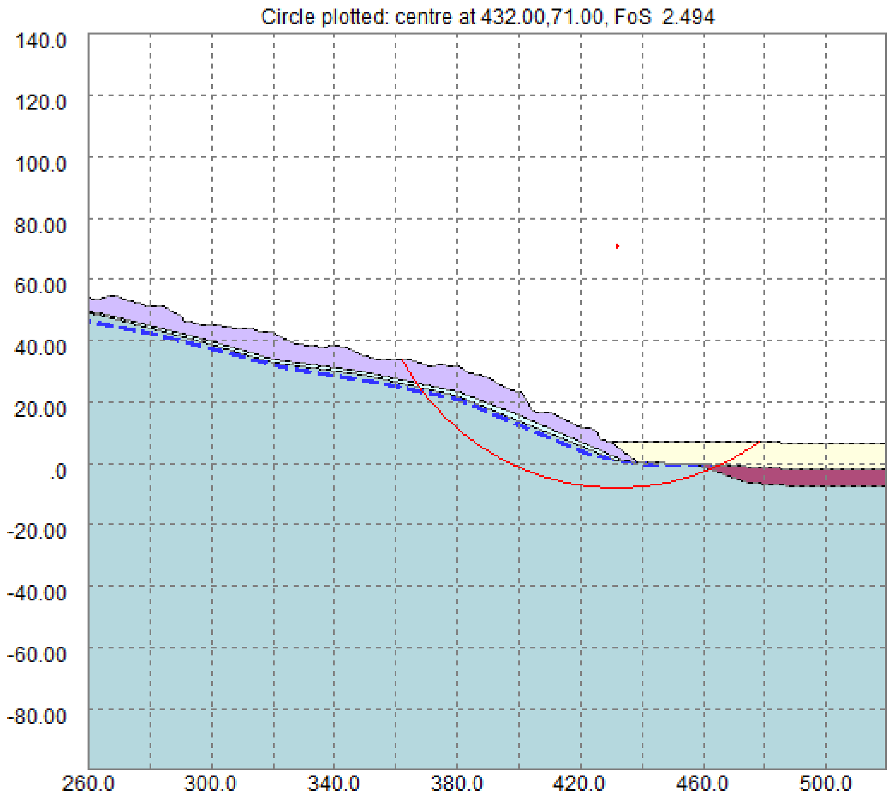
Figure 11: Slope analysis for proposed excavation



It can be seen that the slip circles must go much deeper within the undisturbed Kimmeridge Clay (to pass beneath the embedded retaining wall) and the factor of safety is significantly higher than expected for shallow slips on the slope above the site.

Using the minimum slip circle geometry in the above analysis, a check was made against the current situation, as shown in Figure 12.

Figure 12: Current situation showing minimum slip circle geometry

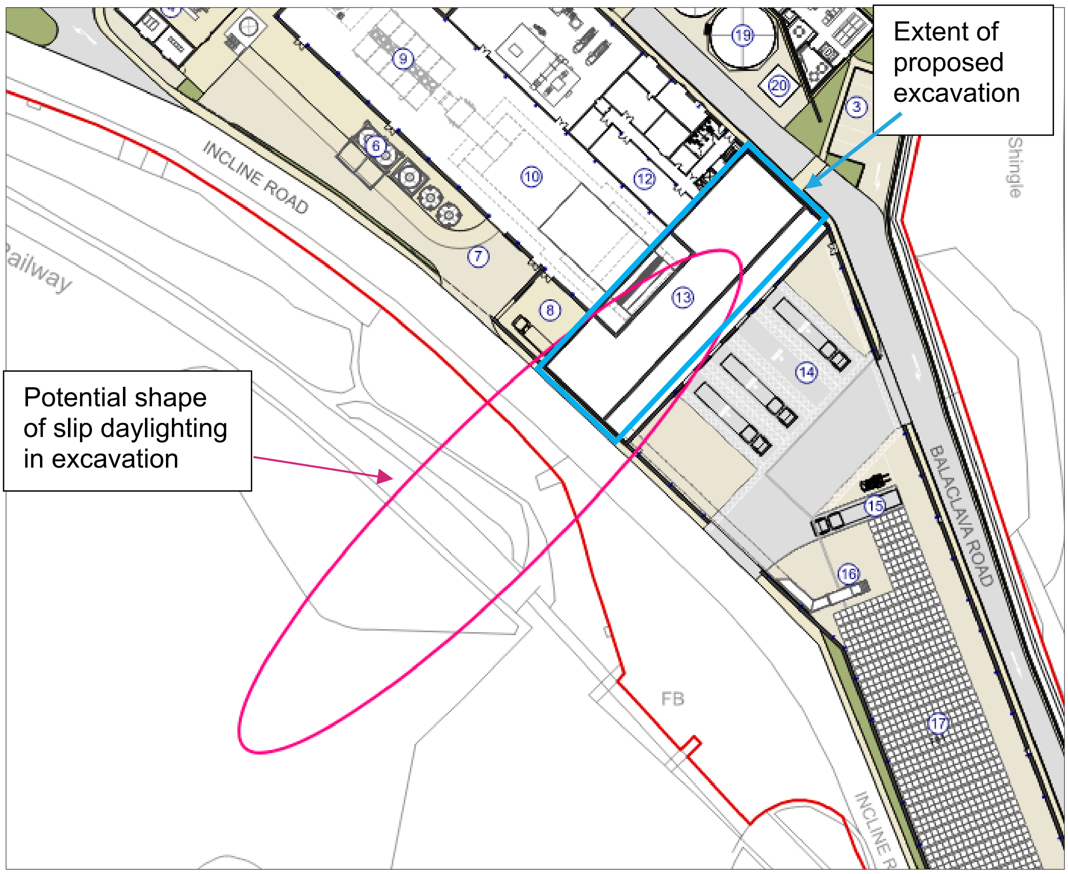


This suggests that the removal of weight at the toe of the slope would have a significant effect on factor of safety for this slip circle (from FOS 2.5 to FOS 1.8).

However, the following should be noted:

- The width of the excavation perpendicular to the slope (20m) is very narrow in relation to the potential slip circle indicated.
- The sketch shown in Figure 13 indicates the potential shape of slip that would be needed for this to occur.
- The deeper-seated slips that have been recorded historically to the west and south of this area are at least 80 to 100m wide and this suggests that a very narrow, elongated slip is highly unlikely.
- The actual FOS would be much higher than the FOS 1.8 from the analysis, due to the considerable 3-D effects of such an elongated slip.
- Notwithstanding the above, a FOS of 1.8 would not normally be of concern (refer to discussion of absolute FOS in Section 6.2.1).

Figure 13: Potential shape of slip needed for significant effect on factor of safety



7 Conclusions

The following conclusions are made based on the desk study assessment and stability analyses presented above:

- The north and eastern parts of the Isle of Portland have been significantly affected by slope instability in the past, and there is evidence of ongoing movement.
- The development site is at the northeastern corner of the Isle and historical records and the geomorphology of the slope indicates that it has been affected by past slope movements above the western and southern parts of the development site. The slope above the central part of the site has less evidence of historical instability, but there is historical monitoring data that indicates a low rate of creep at shallow depth.
- Prior to filling to existing ground levels for the original port development, the toe of the slope would have been exposed to coastal erosion processes that would have acted to destabilise the slope. The fill currently on the site provides toe weight and a buttressing effect to the slope and will also provide protection from future erosion.
- The development site, and particularly the central part of the site where excavation is proposed, is therefore situated in a position that has a lower risk of instability than neighbouring areas such as at Upper Osprey to the south.
- The development site in its current condition is very unlikely to be affected by deep-seated instability.
- The slope above the development site is known to be affected by progressive creep movements that affect the shallow surface soils. The rate of movement is potentially a few millimetres per year.
- It is likely that the rate of movement will accelerate during periods of wet weather and at some time in the future this may lead to sudden shallow slope movement, likely along pre-existing shear surfaces within the upper 5m of the slope.
- Sudden shallow slope movement could result in debris at the toe of the slope that could affect or partially block the highway. However, it is noted that the Port do not have records of such slips occurring in the past.
- The proposed excavation is orientated parallel to the slope and hence is narrow in relation to potential slope instability.
- Embedded retaining walls will be used to carry out the excavation, and these will prevent shallower slips from occurring.
- The excavation will result in a significant removal of weight at the toe of the slope. This will reduce the factor of safety of potential deep-seated failures passing beneath the embedded retaining walls. However, the removal of weight will only go back to the original state of stress before the site was filled for the port development. After construction of the structures and buildings

over the pit area, the total weight at the toe of the slope is likely to be similar to or more than existing.

- The geometry of such a slip would be very elongate and hence there would be considerable 3-D effects compared to the infinite slope assumed in the analyses. Even discounting these effects, the factor of safety is likely to be acceptable.
- Deep-seated slips would need to pass through the undisturbed Kimmeridge Clay and are considered highly unlikely unless there are relict shear surfaces from ancient landslide events.
- This preliminary assessment has made various assumptions that should be confirmed by further work, including site-specific ground investigation. However, in summary it is concluded that the proposed development is unlikely to have any significant effect on the stability of the hillside above.
- From this assessment it is considered that there is no reason in principle why development of the proposed ERF cannot safely occur (in relation to slope stability) with careful mitigation.

8 Recommendations

Ground investigation is required to confirm the assumptions made in this assessment:

- Confirm the thickness of colluvium and nature of disturbed zone on the slope, assuming that it is practicable to access the slope. It is likely to be possible to position boreholes on the former railway line.
- Position boreholes at the toe of the slope, on the edge of the highway, to confirm ground conditions in this zone.
- Boreholes across the development site to confirm the thickness of made ground, presence of marine gravels, absence of disturbed zone and absence of shear surfaces within the underlying Kimmeridge Clay.
- The borehole techniques should be designed to allow detailed logging of the soils, in particular evidence of existing polished shear surfaces.
- Laboratory testing to explore effective stress parameters, including residual shear strengths.
- Piezometers installed in boreholes at discrete depths to confirm piezometric profiles.
- Inclinometers installed on the railway and on the side of the highway to confirm current depths and rates of any slope movement. These can then be maintained during operation of the facility to provide early warning of any change in rate of movement.

The engineering process will include the following:

- Using the results of the ground investigation, carry out a detailed slope stability assessment to confirm the assumptions presented in this report. This should include consideration of potential non-circular slip surfaces.
- Design of the proposed excavation and embedded retaining wall with consideration of the potential for destabilisation of the adjacent slope.
- Developing a long-term monitoring strategy to mitigate the risk of shallow slope instability on the development, including potential blockage of the highway.

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Portland energy recovery facility

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9.1

DERC report

A. SAC features, Isle of Portland to Studland Cliffs SAC

1. Lower Plants

i). Bryophyte assemblage with comprising species with a Mediterranean distribution

Due to its southerly position and largely frost-free climate Portland supports many plants, bryophytes and lichens that show a Mediterranean or Southern Oceanic distribution as defined by Hill & Preston (1998). At present 41 bryophytes fall within these categories, 11 of these (Table 1) are Red Listed or Nationally Scarce, with a further 6 that are important at a regional or county level. 5 species, 3 mosses and 2 liverworts are on Section 41 of the NERC Act (2006) as species of Principal Conservation Importance in England.

Within the AoS there is only limited habitat for many of the species on the list with main populations found on the eastern undercliffs from King's Pier south to Freshwater Bay. Two Section 41 and Red Listed liverworts have been recorded from the AoS. ***Cephaloziella baumgartneri*** (S41, EN) was found overgrowing a large limestone boulder on Verne Common (SSSI Unit 33) in 1997. ***Southbya nigrella*** (S41, VU) was found growing on the same boulder as the *Cephaloziella* in 1997 and in 2010 a small population was found in a small area of scree GR SY69517375. Within the SAC *Cephaloziella baumgartneri* is found in around ten sites, mainly on the eastern undercliffs with one site in King Barrow Quarries, *Southbya nigrella* is known from twelve sites and often occurs with *C. baumgartneri* in open limestone grassland. Both species are found a little more widely within the SSSI in the abandoned quarries with sites in Bowers, Trade and Tout Quarries and west of Admiralty Quarries. Both these liverworts are confined in Dorset to the Isle of Portland, and also have their UK strongholds here with c. >50% of British population of *C. baumgartneri* and >90% of *Southbya nigrella* are found on the Island. The small acrocarpous moss *Pleurochaete squarrosa* has been recorded from open grassland between High Angle Battery and the Verne. There are three other recent records from Portland and it is also known from the Hamm Beach.

TABLE 1. Key bryophytes exhibiting an Oceanic or Mediterranean-Atlantic distribution

Species	Element	Status
Acaulon triquetrum	Submediterranean-Subatlantic	S41; EN; NR
Bryum canariense	Mediterranean-Atlantic	NS
Bryum torquescens	Mediterranean-Atlantic	NS
Cephaloziella baumgartneri	Mediterranean-Atlantic	S41; EN; NR
Cololejeunea rossettiana	Submediterranean-Subatlantic	NS
Eurhynchium meridionale	Mediterranean-Atlantic	VU
Funaria pulchella	Submediterranean-Subatlantic	S41; NT; NS
Grimmia orbicularis	Submediterranean-Subatlantic	
Gymnostomum viridulum	Mediterranean-Atlantic	NS
Leptodon smithii	Mediterranean-Atlantic	RR

Species	Element	Status
Marchesinia mackaii	Oceanic Southern-temperate	RR
Plagiochila killarniensis	Hyperoceanic Southern-temperate	RR
Pleurochaete squarrosa	Submediterranean-Subatlantic	NS
Porella arboris-vitae	Submediterranean-Subatlantic	DR
Porella obtusata	Oceanic Southern-temperate	RR
Pterogonium gracile	Submediterranean-Subatlantic	RR
Southbya nigrella	Mediterranean-Atlantic	S41; VU; NR
Weissia condensa	Submediterranean-Subatlantic	S41; NT

MAP 1. Location of bryophytes with a Mediterranean distribution

Red Line = Area of Search (AoS)   Blue hatch = SAC Blue line = SSSI

● = Location of feature

ii). Terricolous and saxicolous lichens considered to be characteristic and preferential to the following NVC Communities; W21, W22, CG1, CG3, CG4, MC1, MC5, MC8 and MC11.

The NVC communities listed above are all notified features of the Isle of Portland SSSI. Of these the maritime communities **MC1**, **MC5**, **MC8** and **MC11** are better developed on the coastlines in the southern half of the Island and are largely absent from the AoS. Calcareous (limestone) grasslands, **CG1**, **CG3** and **CG4**, are widespread across the Island in and around abandoned quarries, remnants of the old common at the Bill and Verne and on the wide undercliffs. **CG3** is by far the most abundant and occurs within the AoS on the slopes around the Verne and High Angle Battery. **CG1** and **CG4** are both much more local with the SSSI and SAC and are not known to occur within the AoS, although very small fragments of **CG1** occur just outside in King Barrow Quarries and east of Admiralty Quarry within Nicodemus Height's SSSI. Of the three limestone grasslands **CG1** is by far the most important for lower plants providing a habitat for several of key Mediterranean bryophytes and lichens particularly the S41 species ***Cephaloziella baumgartneri*** (S41, EN), ***Southbya nigrella*** (S41, VU) and ***Biatorella fossarum*** (S41, EN). The two liverworts are discussed in detail above. The terricolous lichen *Biatorella fossarum* is currently known from only four sites in Britain with Portland supporting the largest populations. Within the AoS it has been at High Angle Battery (SSSI Unit 54) in 2008 on limestone soil along a path. It has also been found just outside the AoS in King Barrow and Tout Quarries. Within the SAC it has been recorded from several sites on the eastern undercliffs from East Weare south to Duncecroft Quarries, and inland in King Barrow Quarries at High Angle Batteries, and at the only other known site in Dorset off of Portland from the undercliff at Emmetts Hill, Purbeck. The S41 lichen *Toninia sedifolia* has been recorded just outside the AoS in King Barrow Quarries, and has its best Dorset populations on Portland in the stands of CG1 grassland.

Scrub (**W21** and **W22**) is locally abundant on the eastern undercliffs and becomes almost dominant in the northern part of East Weare (SSSI Unit 34) and around to Verne Common (SSSI Unit 33). While there has always been an element of scrub in these areas it has increased in both area and density over the last 75 years (Edwards, 2016). The more mature shrubs of Blackthorn and Hawthorn in the more sheltered areas of Units 33 and 34 support a good range of epiphytic lichens which are typical of coastal scrub in southwest Britain. Of particular note are the two beard-lichens *Usnea articulata* and *U. esperantiana*, both of which are very sensitive to atmospheric pollution. ***Usnea articulata*** (S41, NT) was found on a large Blackthorn bush on Verne Common in 2008. This is the only known site on Portland and elsewhere in Dorset it mostly found on mature shrubs and in the canopy of woodland trees in the west of the county where it can be locally frequent. ***Usnea esperantiana*** (NT) was found on Blackthorn twigs in the western part of Verne Common in 2016. This is the only known site on Portland and in Dorset it is currently known from six other sites in the county but may be under-recorded due to past confusion with other *Usnea* species. Neither species has been recorded within the Isle of Portland to Studland Cliffs SAC, though suitable habitat for *U. esperantiana* is present.

MAP 2. Location of key lichens associated with particular NVC communities

Interest feature: ● = Terricolous lichens associated with open limestone grassland

● = Epiphytic lichens associated with wind-pruned coastal scrub (W21 & W22)

iii). Any of the 16 Red Data Book, 2 Nationally Rare and 39 Nationally Scarce lichens associated with coastal limestone and chert

The Isle of Portland is of national, and possibly international, importance for the lichen assemblages associated with limestone and maritime chert. The eastern undercliffs, especially between Church Ope Cove and Durdle Pier, are particularly rich but the interest extends locally into some of the abandoned quarries. There is very little of this habitat the slopes within Unit 33 is mainly over Kimmeridge Clay and lack the boulders that key to the assemblage. The area is now mainly scrub which shades the few boulders and rock outcrops that are there.

The two species found within the AoS are ***Diploschistes gypsaceus*** (NS) and ***Placidium pilosellum*** (NT) which are found on the large boulders above the huts on West Weare. *Diploschistes gypasaceus* is a very scarce lichen of shaded and sheltered hard limestone found in scattered sites north to central Scotland, but in southern England is only known from a few sites. In Dorset the only recent records are from Portland in sheltered ravines in long abandoned quarries and on the vertical sides of boulders on the undercliffs. Other sites within the SAC include screes below Grove and boulders near Durdle Pier both on the eastern undercliffs. *Placidium pilosellum* grows on highly calcareous or basic soils and is found in scattered sites mainly on the western side of the British Isles. In southern England it is uncommon with a few sites on chalk, limestone and basic sand dunes. In Dorset it is known from Portland overgrowing thin limestone soils on boulders and rock outcrops on the undercliffs and abandoned quarries and from chalk cliffs near Swanage. Other sites within the SAC include East Weare and near Durdle Pier, and the only Dorset site off of Portland at Ballard Cliff, Swanage.

MAP 3. Location of Red Listed, Nationally Rare and Nationally Scarce lichens associated with coastal limestone and chert

2. Butterflies

Records of either of the following butterflies occur with the proposed defined area of search: Lulworth skipper and Adonis blue

Lulworth Skipper *Thymelicus acteon* (S41, NT) is currently confined in Britain to the Dorset coast between Portland and Swanage (Ballard Down); there is an outlying colony to the west near Burton Bradstock. The caterpillars feed on Tor-grass *Brachypodium pinnatum* agg. which is abundant along the Dorset coast on chalk, limestone and occasionally calcareous clay, taller swards 20-50cm in height are preferred. On Portland it is a relatively recent addition (1980s) becoming established first in the south of the Island but has spread widely where Tor-grass is abundant. Within the AoS it has been recorded from Verne Common (SSSI Unit 33) and High Angle Batteries (SSSI Unit 54) with several other colonies just to the south of the AoS boundary. The Isle of Portland to Studland Cliffs will support many colonies also particularly between White Nothe and Gad Cliff, and the majority of colonies are found within the four SSSIs, Isle of Portland, South Dorset Coast Purbeck Ridge East and Purbeck Ridge West.

Adonis Blue *Polyommatus bellargus* (NT) is a specialist butterfly of short, south-facing chalk and limestone grassland where there is an abundance of the larval foodplant Horseshoe Vetch *Hippocrepis comosa*. Despite the abundance of Horseshoe Vetch Adonis Blue is very local on Portland for reasons that are unclear, although the swards are generally taller than on the typical downland sites further inland in Dorset. There are colonies scattered throughout the Island, the largest seem to be in the centre and north at High Angle Batteries, Penn's Weare and Tout Quarries. Within the AoS there are recent records from the slopes east of the Verne including the Verne Moat (SSSI Unit 52) and from High Angle Batteries (SSSI Unit 54), with other just to the south of the AoS boundary in King Barrow and Tout Quarries. Dorset is a UK stronghold for Adonis Blue where it is widespread inland on the chalk and on the coastal chalk and limestone. Within the Isle of Portland to Studland Cliffs SAC there are important colonies around Lulworth and on Ballard Down.

MAP 4. Location of key butterflies: Adonis Blue & Lulworth Skipper

Interest feature: ● = Adonis Blue *Polyommatus bellargus*

● = Lulworth Skipper *Thymelicus acteon*

B. Isle of Portland SSSI interest features

i). Lower plants

Presence of any of the following lower plant species within the AoS:
***Eurhynchium meridionale*, *Southbya nigrella*, *Roccella phycopsis*, *Arthonia endlicheri*, *Dirina repanda*, *Lecanactis grumulosa*, *Sclerophyton circumscriptum* and *Caloplaca granulosa*. Any species from genus: *Caloplaca*, *Verrucaria* and *Collema*.**

The species above are listed on the Isle of Portland SSSI Citation sheet and form part of the 'Lichen assemblage' and 'Bryophyte assemblage' both notified features of the SSSI. The first two are bryophytes of which only ***Southbya nigrella*** (S41, VU) has been recorded from the AoS, recorded from a large limestone boulder on Verne Common (SSSI Unit 33) in 1997, and from a small area of sheltered scree above East Weare Camp (SSSI Unit 34) in 2010. Its wider distribution has been discussed in more detail above. The six named lichens are all with limestone and chert rocks, particularly boulders on the eastern undercliffs and are found south of the AoS and have not been recorded any nearer than Folly Pier or Grove Point. Lichens of the genera *Caloplaca*, *Verrucaria* and *Collema* are widespread on limestone rocks, both natural outcrops on the undercliffs and 'man-made' quarry ravines. Many of the species are widespread and found throughout the Island suitable habitats. The most notable species are *Collema fragile* (S41; VU) and *C. polycarpon* (NS). Both are not found within the AoS and occur to the south on the eastern undercliffs near Grove Point. *Caloplaca maritima* and *C. ochracea* are both Nationally Scarce but have not been recorded within the AoS the nearest site near Grove Point on East Weare.

The Verne area has had less survey work for lower plants compared with the undercliffs and quarries and suitable habitat for some of these species may be present within the AoS within areas such as the Verne 'moat'.

ii). INVERTEBRATES

Presence of any of the following invertebrate species within the AoS: *Truncatellina britannica*, *Helica itala*, *Polyommatus coridon*, *Polyommatus bellargus*, *Plebejus argus*, *Sterrha degeneraria*, *Tyta lactuosa*, *Ectobius panzeri* and *Platycleis denticulata*.

Portland is a key site for butterflies in Southern England and supports a very wide range of other invertebrates with many rare and scarce species present. Within the AoS much of the land has a northerly aspect or is dense scrub and therefore does not provide optimum habitats for invertebrates, therefore areas on the southern side of the Verne and around High Angle Batteries has most interest including colonies of key butterflies. The neighbouring abandoned quarries at Tout and King Barrow just outside the AoS are some of the most important sites for butterflies on the Island. **Adonis blue *Polyommatus bellargus*** (NT) and **Silver-studded Blue *Plebejus argus*** (S41, VU) are both notified features of the Isle of Portland SSSI as is an 'invertebrate assemblage', which will include a range of Red Listed, Nationally Scarce and locally rare taxa and includes the **Chalk Hill Blue *Polyommatus coridon*** (NT). All three species have been recorded from the AoS at High Angle Batteries (SSSI Unit 54) which is one of key butterfly sites on the Island. Adonis Blue and Chalk Hill Blue have also been recorded from the slopes around Verne (SSSI Units 51 & 52). On Portland Chalk Hill Blue is the most frequent of the three with sites scattered through the middle and north of the Island with some very large colonies present, especially on the eastern undercliffs around Church Ope Cove. Chalk Hill Blue is declining inland in Dorset for reasons that are not fully known, it is probably extinct on the chalk downs west of Dorchester and the main colonies are now on the northeast chalk. The Portland colonies are therefore of considerable importance within the county.

Silver-studded Blue has declined significantly and is only known now from less than 10 colonies the main ones at Broadcroft Quarries and near Nicodemus Knob, with smaller ones at High Angle Batteries, King Barrow Quarries and Tout Quarries. This limestone form of the Silver-studded Blue in not known elsewhere in Dorset, the main form being confined to the Poole Basin heaths.

Moths are very well recorded thanks to the nightly traps set out by Portland Bird Observatory and others. Recording is much patchier than butterflies and the middle and southern part of the Island. Of the two moths listed above only **Portland Ribbon Wave *Idaea degeneraria*** has been recorded within or near the AoS. It feeds on various herbaceous plants including Bramble *Rubus fruticosus* on scrubby undercliffs and as a breeding resident in Britain it is confined to Portland and Purbeck. On Portland it is known to be resident on the undercliffs, particularly on the eastern side. Within the AoS it has been recorded from a moth trap at Fortuneswell and from just outside on the West Weare.

Grey Bush-cricket *Platycleis albopunctata* is a warmth-loving species confined to coastal areas of southern England. It is widespread all along the Dorset coast but is typically found within 50-100 metres of the cliff top. Due to its mild climate and the shelter afforded by the old quarries it is found throughout Portland in suitable habitat, which is typically calcareous grassland with pockets of bare ground and scattered low scrub. The only record within the AoS, is from 'Castletown' with no other details. The species is likely to occur elsewhere particularly on the southerly aspects of Verne slopes above Tillycombe. There are more records just outside the AoS with Tout and King Barrow Quarries. **Lesser Cockroach *Ectobius panzeri*** is one of three native cockroaches all of which are local or scarce and found mainly in Southern England and are often coastal. *E. panzeri* is the most frequent species in Dorset and is widespread on Portland and the Purbeck coast but very local elsewhere. It is found in warm, open often stony habitats on cliff tops, undercliffs and shingle, or inland on heaths and chalk grassland. On Portland it is mainly found in the middle and south of the Island in abandoned quarries or in maritime grassland where it can be found on the flowers of Wild Carrot. There are no from the AoS on the Island, but it has been recorded from the vegetated shingle on the Hamm Beach within Portland Harbour SSSI.

Mollusca are poorly recorded compared to most other invertebrate groups mainly due to a lack of recorders. The two species mentioned above, ***Helicella itala*** **Heath Snail** and ***Truncatellina callicratis*** **British Whorl Snail**, are both associated with high quality limestone grassland, the latter is very small (c. 2mm) and found in short turf. There are no records from the AoS, the nearest sites being Tout Quarries for *Truncatellina* and West Weares for *Helicella*.

MAP 6. Location of invertebrate interest features

Interest feature: ● = Key butterflies (Adonis Blue *Polyommatus bellargus*, Chalk Hill Blue *Polyommatus coridon* Silver-studded Blue *Plebejus argus*)

● = Key moths (Portland Ribbon Wave *Idaea degeneraria*)

♦ = Key Orthoptera (Grey bush-cricket *Platycleis albopunctata* & Lesser Cockroach *Ectobius panzeri*)

C. Chesil and the Fleet SAC features

i). Lower plants found within 200m of the Beach Road occurring within NVC communities characteristic of vegetated shingle feature; SD1; SD19; MC5; MC8; SM25

Lichens and bryophytes are not a particularly prominent feature of the vegetated shingle along Chesil Beach and Hamm Beach, but they are found locally, and on the more stable areas of shingle can be abundant. Within the AoS notable species are found in three main area or habitats of the SAC:

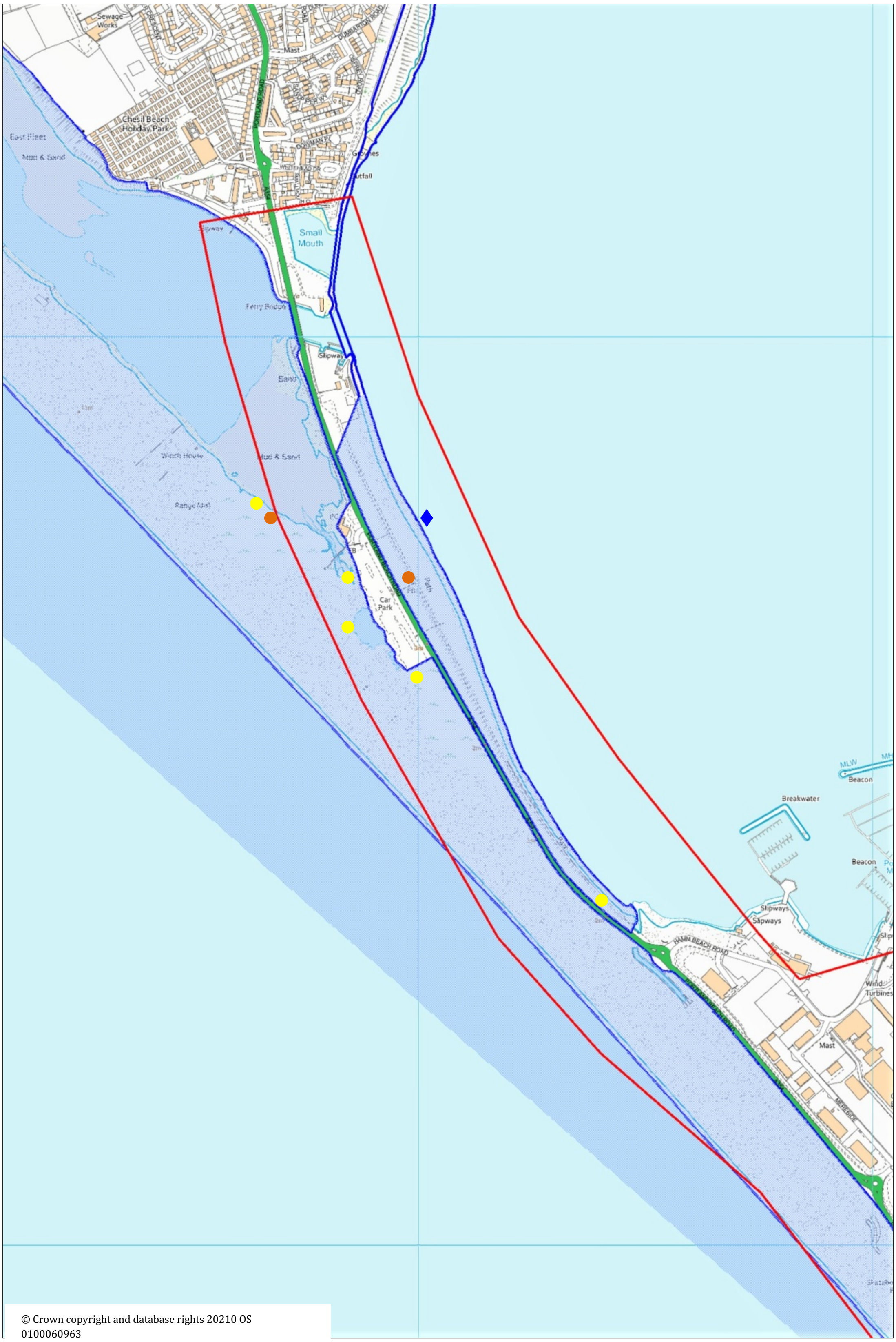
a). Chesil Bank – the stabilised sandy-shingle area at Ferrybridge is well vegetated and dominated by Red Fescue *Festuca rubra* and Thrift *Armeria maritima* (**MC8**) with a much more diverse flora in the more open patches (**MC5**) including the uncommon annuals Dune Fescue *Vulpia fasciculata*, Four-leaved Allseed *Polycarpon tetraphyllum* and Sand Cat's-tail *Phleum arenarium*. The pleurocarpous moss *Hypnum cupressiforme* var. lacunosum is abundant and terricolous lichens are present locally particularly *Cladonia rangiformis* and *Peltigera canina*, with smaller quantities of *Cladonia foliacea*, C. *furcata* subsp. *furcata*, *C. pyxidata* and *Peltigera hymenina*. The uncommon *Thelenella muscorum* was found overgrowing the moss *Ceratodon purpureus* in 2009. None of these species are Red Listed or Nationally Scarce.

The pebbles around Ferrybridge are generally poor for lichens due to disturbance and the lack of stability, with the common *Xanthoria parietina* the only species found with any frequency. The best areas of stabilised shingle are to the north of the AoS beyond the Tern colony enclosure.

b). Hamm Beach – the more open stands of **MC8** and the few very small stands of **SD19** support the moss *Syntrichia ruralis* var. *ruraliformis* which is typical of more calcareous sand dunes, with *Hypnum cupressiforme* var. *lacunosum* forming extensive patches in places. Most notable is the acrocarpous ***Pleurochaete squarrosa*** (NS) which is found as small scattered patches among the *Syntrichia*. *Pleurochaete* is a moss of open calcareous grassland and is currently known from two sites on Portland with around 15 scattered populations in Dorset in short chalk turf. In Britain it is mainly found in Southern England and the coasts of Wales with outlying populations north to Morecombe Bay.

c). SM25 stands – one of the SAC features are the stands of Shrubby Seablite *Suaeda vera* which fringe the Fleet and saltmarsh areas around Ferrybridge. The common yellow leafy lichen *Xanthoria parietina* is abundant on the older stems, and on closer inspection many stems and twigs support the yellow-orange crust-forming species ***Caloplaca suaedae*** (NT, NR), which was described new to science from specimens collected at Ferrybridge. Within the SAC it is found wherever there are large stands of Shrubby Seablite or very rarely Sea Purslane between Ferrybridge and Abbotsbury, and also on the Hamm Beach towards Osprey Quay. The only other locality in Dorset is from a Shrubby Seablite stand on the southern shore of Poole Harbour. In Britain it is currently only known from saltmarsh-shingle interfaces in Dorset and North Norfolk, and is thought to be endemic (Smith *et al*, 2009), but may occur in similar habitats in Atlantic and southern Europe.

MAP 7. Location of bryophytes and lichens associated with the vegetated shingle interest



Interest feature: ● = Terricolous bryophytes and lichens associated with sandy shingle (MC5 & MC8)

● = Lichens associated with *Suaeda vera* stands (SM25) (*Caloplaca suaedae*)

♦ = Mollusca associated with shorelines (*Truncatella subcylindrica* & *Paludinella littorina*)

ii). Invertebrates found within the SAC; *Truncatella subcylindrica* and *Paludinella globularis*, and any species associated considered typical of the vegetated shingle habitat

The Fleet and Portland Harbour are noted for their rich marine fauna with many rare and scarce species present. Most are exclusively marine, but the molluscs ***Truncatella subcylindrica*** and ***Paludinella globularis*** (Syn. *P. littorina*) can be found at or above Mean High Water in strandline debris and among saltmarsh plants, both are scarce nationally, although are more widely known within suitable habitat than formerly due to better recording.

There are records of ***Truncatella subcylinderica*** from within the AoS on the shoreline of Portland Harbour at Hamm Beach and the shore of the Fleet at Ferrybridge. Elsewhere in the SAC it is only known from the old salt pans at Grove Point, Portland, and in Dorset there are further sites along the shore of the Fleet and Portland Harbour, plus an unlocalised historical record from the Poole Harbour area.

Paludinella globularis is found in similar habitat and with records from the shore of the Fleet and from Portland Harbour, but there are currently no records from within the AoS. Elsewhere within the SAC it is known the old salt pans at Grove Point and from the shore of West Weare on Portland, with two recent records from Kimmeridge Bay on the Purbeck coast. Apart from these records it also known in Dorset from the shore of the Fleet and Portland Harbour plus an unlocalised historical record from the Poole Harbour area.

Both these molluscs are found along the South Coast from Cornwall to Hampshire with a few records from South Wales. *Truncatella* extends further east to the coast of Sussex, Kent and Essex (NBN Atlas).

Other key invertebrate species

Three species have their sole British location around Ferrybridge, formerly known as Small Mouth Sands.

The darkling beetle ***Omophlus pubescens*** (VU) has long been known from the area the larvae found in the sandy shingle among the roots of Thrift *Armeria maritima* in open vegetation (Alexander *et al*, 2014), recent surveys have only found it in one area to the northwest of the Chesil Centre close to the AoS, there are older records from within the AoS.

Another darlking beetle ***Anthicus tristis*** (VU) was formerly found more widely along the South Coast in sandy habitats close to brackish or saline waters (Alexander *et al*, 2014). The only recent UK records are from Ferrybridge, one from 2014 southeast of Chesil Centre is within the AoS.

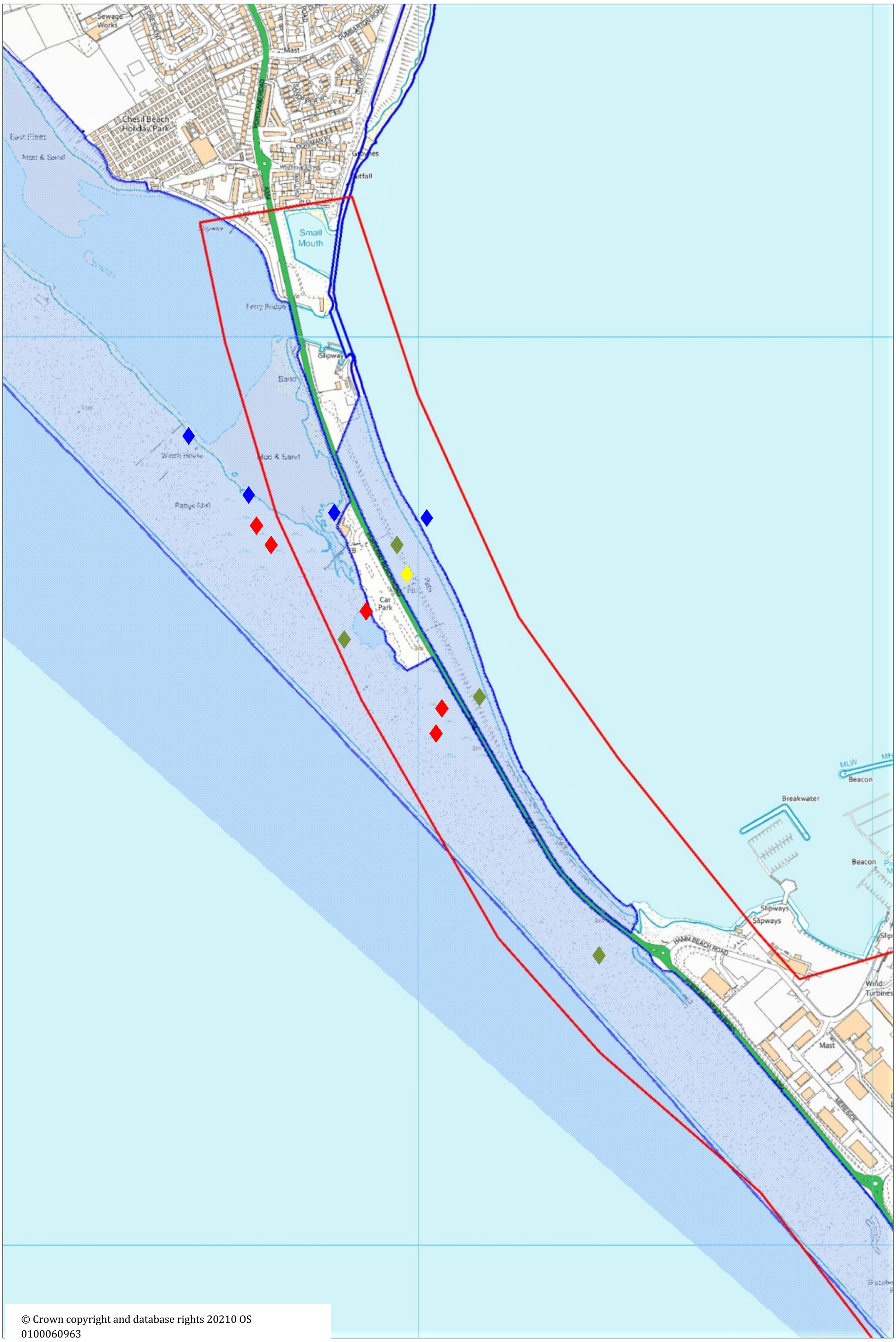
The micromoth ***Scythris siccella*** **Least Owlet** (S41) is only known in the UK from Hamm Beach where it is found in sparsely vegetated sandy habitats. The larvae feed on various herbaceous plants making a silken tube covered in sand grains down into the sand. Despite recent small-scale management and survey work there have been records of the moth in recent years, however it is too early to say whether the species is extinct or not. The site for this moth is within the AoS.

A well known species from the Ferrybridge area is **Scaly Cricket *Pseudomogoplistes vicentae*** (VU) which is a shingle specialist and is largely nocturnal and hiding under cobbles during the day. Thought to be confined to the Ferrybridge area it has now been found more widely along the Chesil Bank towards Abbotsbury. All Dorset sites are within the Chesil and the Fleet SAC. Apart from Chesil there are currently only two other known sites in Britain at Branscombe in Devon and at Marloes, Pembrokeshire.

***Hylaeus annularis* Shingle Yellow-face Bee** (NR) is a small black bee with yellow face markings confined to vegetated shingle habitats in Britain and is currently known in Britain from a handful of shingle sites from Dorset east to Suffolk. The bee has been found at flowers of Sea Mayweed and Wild Carrot and nest in dead hollow plant stems or in the ground (Else & Edwards, 2018) Within the AoS it has been found by the Chesil Centre and further south on the Chesil side of the road. All confirmed Dorset records are from the Chesil and the Fleet SAC and SSSI.

Phlegra fasciata (NT) is a small jumping spider found in coastal sand dune and sandy shingle sites along the South Coast from Devon to Kent and on the Gower Peninsula in South Wales. In Dorset it has been recorded from Chesil Beach and from Arne and Studland on the southern shore of Poole Harbour. It is uncertain whether the Chesil records are from within the AoS but one is from the Ferrybridge area.

MAP 7. Location of invertebrates associated with vegetated shingle interest feature



Interest feature: ♦= Mollusca associated with shorelines (*Truncatella subcylindrica* & *Paludinella littorina*)
♦= Beetles; *Anthicus tristis* and *Omophlus pubescens*
♦= Micromoth; *Scythris siccella*
♦= Orthoptera; Grey Bush-cricket and Lesser Cockroach

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POWERFUEL

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9.2

9.2

Phase 1 walkover of East Weare heritage features for proposed remedial vegetation clearance works

masterplanning
environmental assessment
landscape design
urban design
ecology
architecture
arboriculture
graphic design

Addlepool Business Centre
Clyst St George
Exeter
Devon
EX3 0NR

Tel: 01392 874499
mail@fpcr.co.uk
www.fpcr.co.uk

Our ref: 10256 Portland ERF, East Weare / APD

Kevin McGhee
Powerfuel Portland Limited
Suite B, The Core
Gore Cross Business Park
Bridport
Dorset DT6 3FH

30th July 2021

Dear Kevin

Phase 1 walkover of East Weare heritage features for proposed remedial vegetation clearance works.

Introduction

This letter report details a Phase 1 walkover survey of proposed works to clear vegetation, to aid in the repair of heritage features, including the East Weare battery above Portland Port. The aim of the walkover survey was to establish any ecological constraints that may be present within the footprint of the proposed works, and to make recommendations to enable the works whilst protecting ecological features of interest. The site is within the Isle of Portland Site of Special Scientific Interest and Isle of Portland to Studland Special Area of Conservation (SAC) and therefore, an assessment of the habitats was also requested by Dorset Natural Environment Team as part of the consultation process. The aim of the vegetation clearance works is to create access to the heritage features for repair and removal of risk factors and eventual curated public access and improved interpretation. This includes the clearance of pathways and the heritage feature itself, which has become overgrown.

Methods

The Phase 1 walkover survey was conducted on 13th July 2021, by experienced FPCR Ecologist Dale Cooper. Dale is a FISC level 4 botanist and has over 10 years' experience in surveying for protected species.

The survey was conducted using the methodology outlined in the Handbook for Phase 1 Habitat Survey (JNCC 2010)[1]. This involved a systematic walkover of the site to classify the habitat types

1 JNCC, (2010). Handbook for Phase 1 habitat survey – a technique for environmental audit, ISBN 0861396367.

present (using the standardised Phase 1 Habitat classification system) and mapping these onto an base map. Each habitat was described based on the botanical merits and target notes used to record features of habitats of particular interest, as well as any sightings, evidence of, or potential for protected or notable species. A full botanical species list (*Appendix A*) was compiled during the survey, and a Phase 1 plan of all major habitat types produced (*Figure 1*). Where necessary, the abundance of species was quantified using the DAFOR scale, ranging from Dominant (D) (>75%) to Abundant (A) (75-51%), through Frequent (F) (50-26%) and Occasional (O) (25-11%) to Rare (R) (10-1%).

In addition to recording the habitats present, a search for signs or evidence of protected species including, but not limited to badgers, dormice, nesting birds and reptiles was also undertaken. An assessment of the suitability of habitats present within the survey area to support protected species in the absence of obvious evidence was also made.

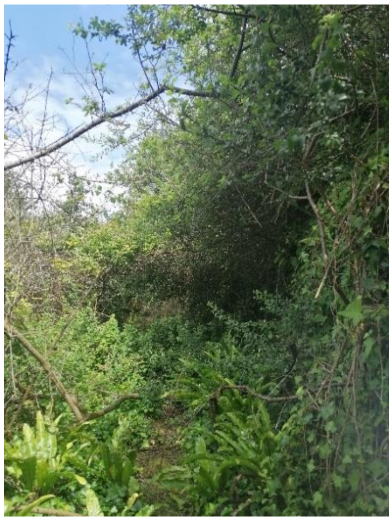
Results

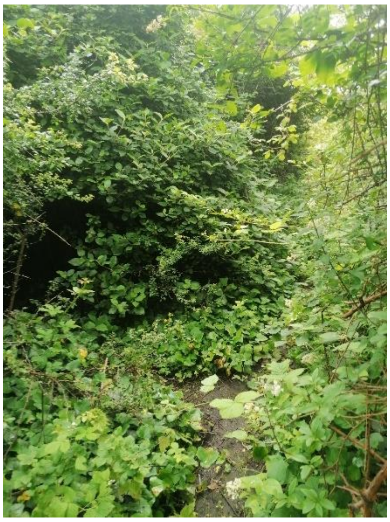
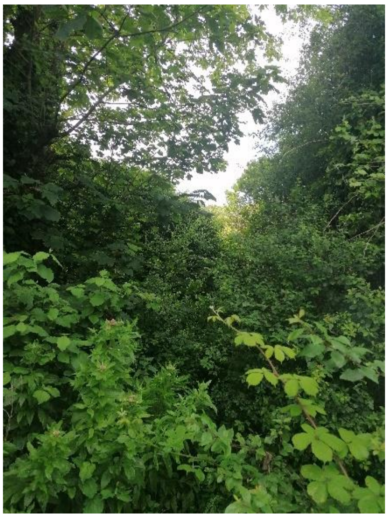
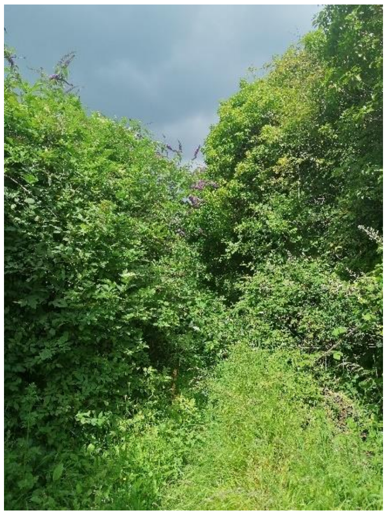
<u>Habitats</u>

The habitats identified within the survey comprised almost entirely of scrub, with a small pocket of calcareous grassland and short perennial, as well as bare ground and a building (gun battery heritage feature).

Scrub

The majority of access paths and gun battery building are covered in and surrounded by dense scrub, typical of the East Weare cliffs. The scrub is dominated by blackthorn *Prunus spinosa* with abundant bramble species *Rubus fruticosus agg.* and ivy *Hedera helix ssp. Hibernica*. Dogwood *Cornus sanguinea* is frequent and wayfaring tree *Viburnum lantana*, sycamore *Acer pseudoplatanus,* clematis *Clematis vitalba* and dog rose *Rosa canina* are all occasional. The ditch in front of the gun battery building is dominated by dense ivy and bramble. Bramble scrub also dominates on the edges where scrub cannot grow into rockier areas. Nettle *Urtica dioica,* patches are found where nutrient rich slumps have formed. Where scrub growth is overhanging and leaves clearer patches beneath, some woodland specialists are established including occasional pignut *Conopodium majus* and hart's-tongue fern *Asplenium scolopendrium.*



Photographs 1: Section of photographs of the scrub along the current partially accessible paths

Calcareous grassland

Calcareous grassland within the survey area was limited to one area (front gun mount) where scrub growth is prevented by a lack of or very shallow soils. This includes exposed rock and exposed areas of concrete that form the old gun battery building. These areas are almost ephemeral/short perennial in nature; however, the plant communities present suggest that calcareous grassland has begun to establish. The calcareous nature of the grassland is indicated by the presence of frequent upright brome *Bromus erectus*, lady's bedstraw *Galium verum* and salad burnet *Sanguisorba minor*, whilst other indicators including common restharrow *Ononis repens* and hoary plantain *Plantago media* are also present.

N.B. – a small area of late successional, closed-sward, calcareous grassland is present atop of the northern hand gun mount. The area was viewed briefly, but access is difficult so did not return. Area will not be impacted by the scrub clearance.

Short perennial

Short perennial communities again have a limited distribution on rocky or shallow substrates within the survey area, including in shadier areas beneath scrub growth along established tracks. Yorkshire fog *Holcus lanatus,* false oat-grass *Arrhenatherum elatius*, yellow-oat grass *Trisetum flavescens* and meadow fescue *Festuca pratensis* are all occasional, whilst the herb communities include frequent ribwort plantain *Plantago lanceolata*, agrimony *Agrimonia eupatoria* and creeping cinquefoil *Potentilla reptans*, occasional marjoram *Origanum vulgare*, hop trefoil *Trifolium campestre*, bird's-foot trefoil *Lotus corniculatus* and wood sage *Teucrium scorodonia* and rare shining cranesbill *Geranium lucidum*.

Photograph 2: Eastern (front) gun mount showing calcareous grassland, short-perennial and diverse scrub edge habitat

Bare ground and building

Areas of bare ground within the survey area were typically rock or rocky substrate where no plant communities were established. This included historic paths to the gun battery. The gun battery building itself is of stone and concrete construction, with some climbing plant species growing on it including clematis and mature ivy *Hedera helix ssp. helix*.

Protected species

No evidence of protected species was found within the survey area. However, the suitability of the habitats recorded during the walkover to support protected species is listed below:

- The scrub has potential to provide habitat for badgers, dormice, nesting birds and reptiles where ground cover is a mosaic of dense and open areas.
- Grassland and short perennial habitats are suitable habitat for reptiles.

Discussion

<u>Proposals</u>

Figure 1 demarks the proposed scrub clearance in order to gain access to the heritage feature. The removal is a combination of widening existing routes, which are still just about accessible but require cutting back to approximately 2m width and removing overhanging vegetation, and the cutting of a 2.5m wide path though largely blackthorn scrub to link up the existing paths and allow access around the perimeter of the feature.

Currently the feature can be accessed through a narrow track through the scrub from the main path. There is evidence across the feature that this access is frequently used by groups of people as a private area for drinking and other activities.

Habitats

Scrub accounts for the highest area of habitat within the survey area. The scrub composition is typical for the cliffs of Portland and consistent with the SSSI description in areas away from the man-made building and made ground around it. Bramble and ivy dominate over areas of hardstanding and tracks and ruderal species including nettle dominate in features such as the gun battery ditch, where nutrients are washed down and concentrate. The proposed works will include the removal of small areas of scrub to provide access to the gun battery and where scrub has encroached or covered the building itself. The NVC scrub community W22 forms part of the suite of NVC communities that comprise the Annex 1 habitat vegetated sea cliffs of the Atlantic and Baltic coasts. The coastal scrub habitats are also mentioned in the SSSI citation. Small scale removal of above ground growth to facilitate inspection and repair of the monument will not have any significant effects on the interest features of the protected sites.

The limited areas of calcareous grassland and short perennial habitats have formed where scrub cannot grow. Calcareous grassland is a priority habitat and also forms part of the designation for the Isle of Portland SSSI. Whilst being important, it is unlikely that any of this habitat will be impacted to the proposed clearance works. This is because it is present in areas that do not require clearance to facilitate access to or restore the gun battery. In the long-term it is likely that scrub clearance at the site will increase the quality and extent of the calcareous grassland present, creating an overall enhancement for biodiversity. Short perennial habitats will also be retained and not impacted by the works.

Protected species

No evidence of protected species was recorded during the walkover survey, however, the habitats present are suitable to support species including dormice, nesting birds and reptiles, that are difficult to record without targeted surveys. Dormice records were not returned in a desktop search for the nearby Portland ERF proposals in 2020 and are thought to be absent from the Isle of Portland. Therefore, their presence is ruled out.

The scrub provides habitat for a wide range of nesting bird species. Whilst no nests were recorded during the walkover survey, birds can build nests any time between March and September. Nesting birds are protected by the Wildlife and Countryside Act 1981 (as amended). To protect nesting birds during the works, all scrub clearance should either be undertaken outside of the nesting bird season (between October and February), or should be preceded by a nesting bird check by an experienced Ecologist. In this instance it would be possible to identify nests by a search prior to clearance commencing. An Ecological Clerk of Works (ECoW) would supervise the scrub clearance in case any nests were found during the works. If a nest was found all work should stop to establish a five-metre buffer zone around the nest. Works could only commence again once all birds had fledged from the nest.

Scrub edges and areas of grassland and short perennial provide suitable habitat for reptile species. There are records of common lizard *Zootoca vivipara*, and slow worm *Anguis fragilis* within one kilometre of the survey area. The majority of vegetation clearance is within dense scrub and limited to areas not suitable for reptiles, however, small areas of reptile habitat may require clearance which can be identified on the ground with the ECoW during the supervision. Removal of these habitats, if required, should be carried out under ECoW supervision and the “strim and push” method should be used. This method requires a search by the ECoW, and phased strimming of vegetation to ensure reptiles move away first through disturbance from a high cut and then a low cut is made at least 30 minutes later to make the habitat unsuitable prior to full clearance.

Summary

The proposed vegetation clearance works to enable permanent access and restoration of the East Wear gun battery heritage feature, will result in the loss of small amounts of scrub. Whilst there are no constraints to the removal of this habitat itself, there is potential for impacts on nesting birds and reptiles in the absence of suitable mitigation. An ECoW will be present during scrub removal to check for nesting birds and supervise a strim and push exercise for reptiles in sensitive areas. With these methods employed, the ecological impacts of the works will be negligible. In the long term, there is likely to be a small ecological benefit arising from the scrub clearance works in the form of increased calcareous grassland establishing in cleared sections, and the woodland ground flora along the paths will benefit from increased light.

Adam Day BSc (hons), MSc, ACIEEM
Principal Ecologist
FPCR Environment and Design Ltd

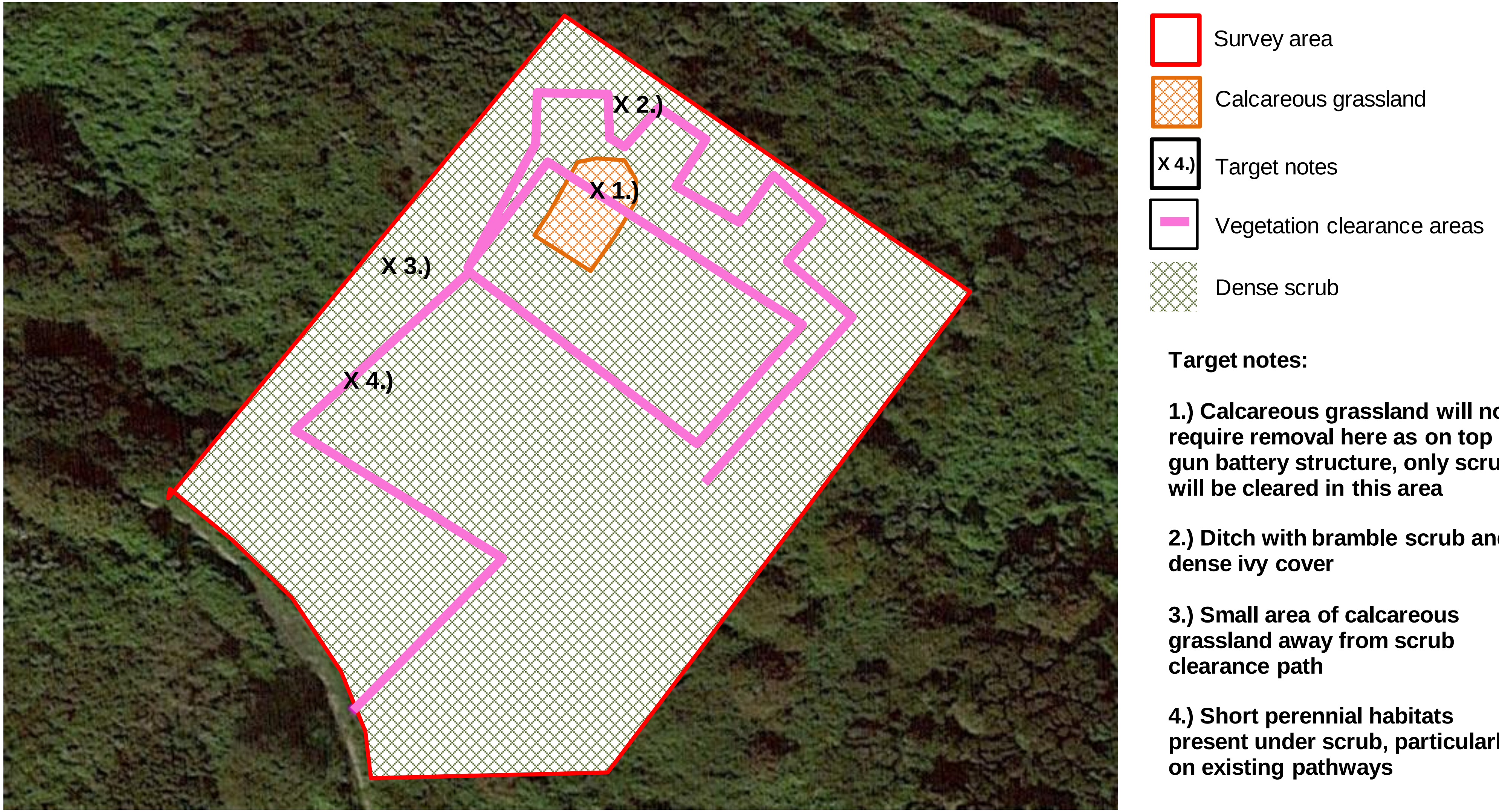
[redacted]

Appendix A: Botanical Species List

Common name	Scientific name
agrimony	*Agrimonia eupatoria*
bird's-foot trefoil	*Lotus corniculatus*
blackthorn	*Prunus spinosa*
bramble species	*Rubus fruticosus agg.*
burnet saxifrage	*Pimpinella saxifraga*
bush vetch	*Vicia sepium*
clematis	*Clematis vitalba*
cocksfoot	*Dactylis glomerata*
common restharrow	*Ononis repens*
common sorrel	*Rumex acetosa*
creeping bent	*Agrostis stolonifera*
creeping cinquefoil	*Potentilla reptans*
creeping thistle	*Rumex acetosa*
crested dog's tail	*Cynosurus cristatus*
dog rose	*Rosa canina*
dogwood	*Cornus sanguinea*
eyebright	*Euphrasia officinalis*
false oat-grass	*Arrhenatherum elatius*
germander speedwell	*Veronica chamaedrys*
great willowherb	*Epilobium hirsutum*
hart's-tongue fern	*Asplenium scolopendrium*
hawthorn	*Crataegus monogyna*
hedge bedstraw	*Galium mollugo*
hemp agrimony	*Eupatorium cannabinum*
herb robert	*Geranium robertianum*
hoary plantain	*Plantago media*
hoary plantain	*Plantago media*
hop trefoil	*Trifolium campestre*
ivy	*Hedera helix ssp. Hibernica*
lady's bedstraw	*Galium verum*
marjoram	*Origanum vulgare*
meadow fescue	*Festuca pratensis*
meadow vetchling	*Lathyrus pratensis*
nettle	*Urtica dioica*
pignut	*Conopodium majus*
prickly sow-thistle	*Sonchus asper*
ragwort	*Jacobaea vulgaris*
ribwort plantain	*Plantago lanceolata*
rough meadow grass	*Poa trivialis*
salad burnet	*Sanguisorba minor*
shining cranesbill	*Geranium lucidum*
sycamore	*Acer pseudoplatanus*
upright brome	*Bromus erectus*
wayfaring tree	*Viburnum lantana*
wild madder	*Rubia peregrina*
wood sage	*Teucrium scorodonia*

yellow-oat grass	*Trisetum flavescens*
Yorkshire fog	*Holcus lanatus*

Figure 1: Phase 1 plan with proposed clearance works overlay



Target notes:

1.) Calcareous grassland will not require removal here as on top of gun battery structure, only scrub will be cleared in this area

2.) Ditch with bramble scrub and dense ivy cover

3.) Small area of calcareous grassland away from scrub clearance path

4.) Short perennial habitats present under scrub, particularly on existing pathways

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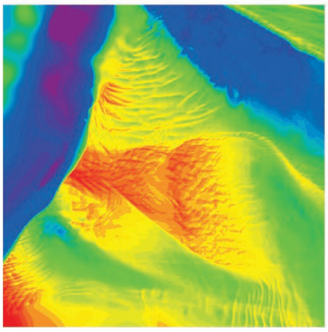
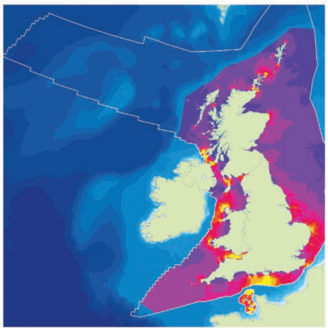
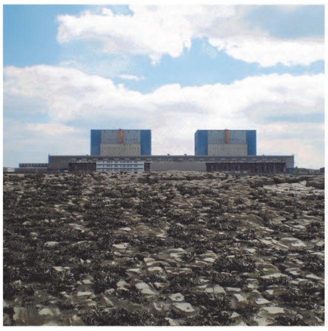
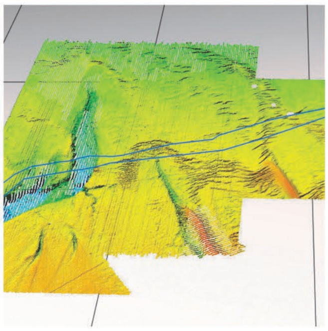
Potential marine impacts of the proposed Portland ERF

9.3

Powerfuel Portland Ltd

Potential Marine Impacts of the Proposed Portland Energy Recovery Facility (ERF)

June 2021

Innovative Thinking - Sustainable Solutions

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ABPmer
Quayside Suite, Medina Chambers, Town Quay, Southampton, Hampshire SO14 2AQ
T: +44 (0) 2380 711844 W: http://www.abpmer.co.uk/

1 Introduction

This note has been prepared by ABP Marine Environmental Research Ltd (ABPmer) on behalf of Powerfuel Portland Ltd (Powerfuel) in relation to potential marine impacts of the proposed Portland Energy Recovery Facility (ERF).

During public consultation on the planning application and accompanying Environmental Statement (ES) stakeholders have made a number of representations raising concerns about potential impacts on the marine environment as a result of emissions to air and to water during construction and operation of the facility. This includes representations about potential impacts to nearby nature conservation sites.

The request for additional information and clarification from Dorset Council dated 30 April 2021 also identifies two points relevant to matters considered in this note:

- 10. Additional information as required by Natural England and other ecological stakeholders to address the outstanding issues raised in respect of nationally/internationally designated sites raised through the initial consultation. This should include consideration of legal points which have been raised in respect of the robustness of the Shadow Habitats Regulations Assessment (HRA).

- 21. Further consideration and information in respect of relevant air quality related issues raised through representations on the first consultation as appropriate.

The information below addresses stakeholder representations about potential marine impacts and informs the above Points 10 and 21 from the Council's letter. It draws on information contained within the ES, and further contextual analysis undertaken by ABPmer.

ABPmer is an established marine environmental consultancy based in Southampton. They regularly undertake marine environmental impact assessments requiring the modelling and assessment of marine water and sediment quality, including the assessment of potential impacts to designated nature conservation sites. They are also a trusted advisor to marine regulators within the UK including the Marine Management Organisation, Natural Resources Wales and Marine Scotland and frequently provide advice on marine water and sediment quality assessments.

2 Emissions to Air

2.1 Assessment of potential impacts

Chapter 4 of the ES provides an assessment of the potential impacts to air quality associated with construction and operation of the ERF. This includes consideration in relation to Air Quality Assessment Levels (AQAL) for the protection of human health and in relation to critical levels and critical loads for the protection of designated nature conservation sites. Additional operational air quality assessment has subsequently been undertaken in response to Dorset Council's letter.

Effects on air quality during construction have been assessed as not significant as the estimated change in vehicle movements compared to the baseline will be negligible (s4.54 to 4.55 of ES).

Effects on air quality during operation have been assessed using an Atmospheric Dispersion Modelling System (ADMS) 5.2 air dispersion model. All modelling has been conducted on a conservative basis (ES s4.48).

The assessment against the AQALs concluded that there are no significant risks to human health as a result of air emissions during the operational phase of the project either on its own or cumulatively with other plans or projects (ES, s 4.100). This conclusion has not been altered by the additional assessment.

The assessment has followed the IAQM's (2019) good practice guidance '*A guide to the assessment of air quality impacts on designated nature conservation sites*' in relation to risks to designated site features from pollutants such as NO_x, SO_2, and ammonia.

Based on this guidance, the effects of such air emissions on local, national and internationally designated sites has been assessed as insignificant taking account of worst-case emissions from the project alone and cumulatively/in-combination with other projects and plans (ES s4.99; 4.100). This conclusion has not been altered by the additional assessment.

2.2 Stakeholder representations

Stakeholder representations have been made in relation to potential impact pathways by which air emissions may affect designated nature conservation sites and protected features within those sites. This includes representations about impacts of NOx and ammonia inputs to the local marine environment on seagrass (a feature of the Chesil Beach and the Fleet Special Areas of Conservation (SAC), Special Protection Area (SPA) and Ramsar[1]) and possible consequential impacts to bird species such as Mute Swan and Little Tern that are dependent on such features. Concerns have also been raised about risks to priority species such as long and short-snouted seahorses, which, while not designated features of the SAC or Ramsar site, are dependent on seagrass habitats.

There have also been more general representations about risks to features associated with the Isle of Portland to Studland Cliffs SAC and the Chesil Beach and the Fleet SAC, SPA and Ramsar and to local Marine Conservation Zones (Purbeck Coast, South Dorset, South of Portland and Chesil Beach and Stennis Ledges).

Concerns have also been raised about risks of ocean acidification as a result of SO2 and CO_2 emissions.

Stakeholder representations have also identified potential risks to fish and shellfish associated with deposition of persistent contaminants such as mercury and dioxins within Portland Harbour and associated impacts of such pollution on the reputation of the local seafood industry and related local tourism sector.

2.3 Analysis

The assessment presented in the ES and updated assessment has followed good practice guidance and adopted a conservative approach in assessing potential impacts, including those protected within designated nature conservation sites.

The assessment demonstrates that emissions from the development during both construction and operation, do not exceed relevant AQALs for the protection of human health, and generally emissions

1 Wetlands of international importance, designated under The Convention on Wetlands (Ramsar, Iran, 1971).

do not exceed critical levels or critical loads from ecologically important pollutants such as NO_x, SO_2, and ammonia air quality standards either alone or in combination with other plans or projects[2].

The critical levels and critical loads are precautionary and have been designed to provide high levels of protection to ecological features including those features protected within designated nature conservation sites.

2.3.1 SO_2 and CO_2

Stakeholder representations have commented on risks associated with ocean acidification as a result of SO_2 and CO_2 emissions to air.

Seawater has a high buffering capacity and no localised changes in pH would be expected as a result of deposition of SO_2 or CO_2 into the marine environment. Elsewhere, the buffering capacity of seawater has been widely harnessed as part of flue gas desulphurisation processes for major coal fired power stations with no localised effects on pH. These processes have involved much larger quantities of SO_2 being released into seawater with no diminution in pH.

Anthropogenic releases of CO_2 are recognised as contributing to ocean acidification at a global scale. The contribution of CO_2 from the ERF is negligible in a global context. Other treatment/disposal options for the waste give rise to higher levels of greenhouse gas emissions over time, and the "ES Carbon Assessment" submitted as part of the application compares the greenhouse gas emissions of the proposed ERF to alternative scenarios.

The contribution to ocean acidification as a result of emissions from the ERF is assessed as negligible.

2.3.2 NOx, and Ammonia

The assessment of critical levels and critical loads has demonstrated that emissions of NOx and ammonia will not pose a direct risk to ecological features. Stakeholder representations have also highlighted potential risks as a result of deposition of nitrogen (NOx and ammonia) within the local marine environment.

In considering the potential risks, it is important that the changes in concentrations of air pollutants such as NOx are seen in context, relative to concentrations of nitrogen in marine waters. The baseline concentrations of NO_2 and ammonia in air are 22µg m^{-3} and <1µg m^{-3} respectively (ES, Table 4.5). The process contribution from the ERF plume to ground level concentrations of NO_2 and ammonia is very small (< 1µg m^{-3} for NO_2 and negligible for ammonia). In contrast background concentrations of nitrogen (NO_{3-} ; NO_{2-} ; NH_3) in seawater (primarily as NO_{3-}) are many orders of magnitude greater. For example, sampling by Environment Agency in Weymouth Bay (SW-50034657) indicates that winter total nitrogen concentration in the period 2010 to 2017 was between 0.1 and 0.15mg l^{-1} (equivalent to between 100 to 150 mg m^{-3}) roughly 4 orders of magnitude greater than concentrations in air[3].

On this basis it is inconceivable that the small process contribution from the ERF will materially contribute to nutrient concentrations in adjacent marine waters and thus will contribute negligibly to any eutrophication. There is thus no risk to marine features such as seagrass that would potentially be

2 The updated air quality assessment indicates some localised exceedances of critical levels of NOx and ammonia (NH_3) along the A354 across the SAC/Ramsar. The lower end of the critical load range for N is exceeded with or without the project. The impacts of these localised exceedances on the Annex 1 habitats of Chesil Beach are covered under the updated HRA.

3 Environment Agency Data Viewer - https://environment.data.gov.uk/water-quality/view/sampling-point/SW-50034657?_all=true

sensitive to increases in dissolved nitrogen. Consequently, there is no risk to the seagrass feature associated with the Chesil Beach and the Fleet SAC, SPA and Ramsar sites, nor is there any risk to features such as Mute Swan or Little Tern that are, to some extent, dependent on seagrass habitat. Similarly, there are no significant risks to features associated with the Portland to Studland Cliffs SAC or to local Marine Conservation Zones (Purbeck Coast, South Dorset, South of Portland and Chesil Beach and Stennis Ledges).

2.3.3 Mercury

The air quality assessment presented in the ES has demonstrated that concentrations of mercury at ground level will not exceed relevant AQALs for the protection of human health. Stakeholder representations have, however, questioned whether emissions of mercury might pose risks to fish and shellfish within Portland Harbour and whether this might pose consequential risks to human consumption.

Some data on seawater concentrations of mercury in Portland Harbour is available from Environment Agency monitoring (Portland Harbour 1 - SW-50044494) covering the period 2000 – 2010[4]. Over this period, the great majority of the 94 recorded values for dissolved mercury were <0.01 µg l^{-1}, with a few values recorded as 0.01 µg l^{-1} and single values recorded as 0.03 and 0.06 µg l^{-1}. This compares to a marine Environmental Quality Standard of 0.05 µg l^{-1} as an annual average (AA-EQS) and 0.07 µg l^{-1} as a Maximum Allowable Concentration (MAC) as established by the EU Priority Substances Directive 2008/105/EC.

To estimate the potential contribution that deposition from air emissions from the proposed ERF might make to concentrations of mercury in seawater, a simple model has been developed and applied:

- A model boundary of 5 x 5 km has been established (Figure 1) – this uses the same model boundaries as the human health impact assessment and captures the main area of the sea where impact from the ERF would be experienced (and thus might deposit within the marine environment), the area of the sea in the modelling domain has been calculated as approximately 4,000 hectares;
- An annual worst-case potential loading for mercury has been calculated assuming that all modelled ground concentrations of mercury are deposited within the marine environment;
- The background concentration of mercury in seawater has been taken as 0.005 µg l^{-1} (50% of the < 0.01 µg l^{-1} value typically recorded[5]);
- The volume of seawater within the modelling domain (4,000 hectares) has been estimated assuming an average water depth is 5 m (5 m is likely to be conservative over the domain of the model);
- A daily tidal exchange volume of 0.1 (the proportion of water that is exchanged with the 5 x 5 km box on each tide) has been assumed based on Dyer (1979). This value is based on an average exchange rate coefficient for partially mixed estuaries and is therefore likely to be conservative for more open coastal waters, including areas within Portland Harbour.

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4 EA Data Viewer - https://environment.data.gov.uk/water-quality/view/sampling-point/SW-50044494?_all=true

5 Assuming a mean value of 50% of the detection limit is an accepted method where recorded values are below the limit of detection. The assumption has little bearing on the overall analysis as background concentrations are well below the saline EQS.

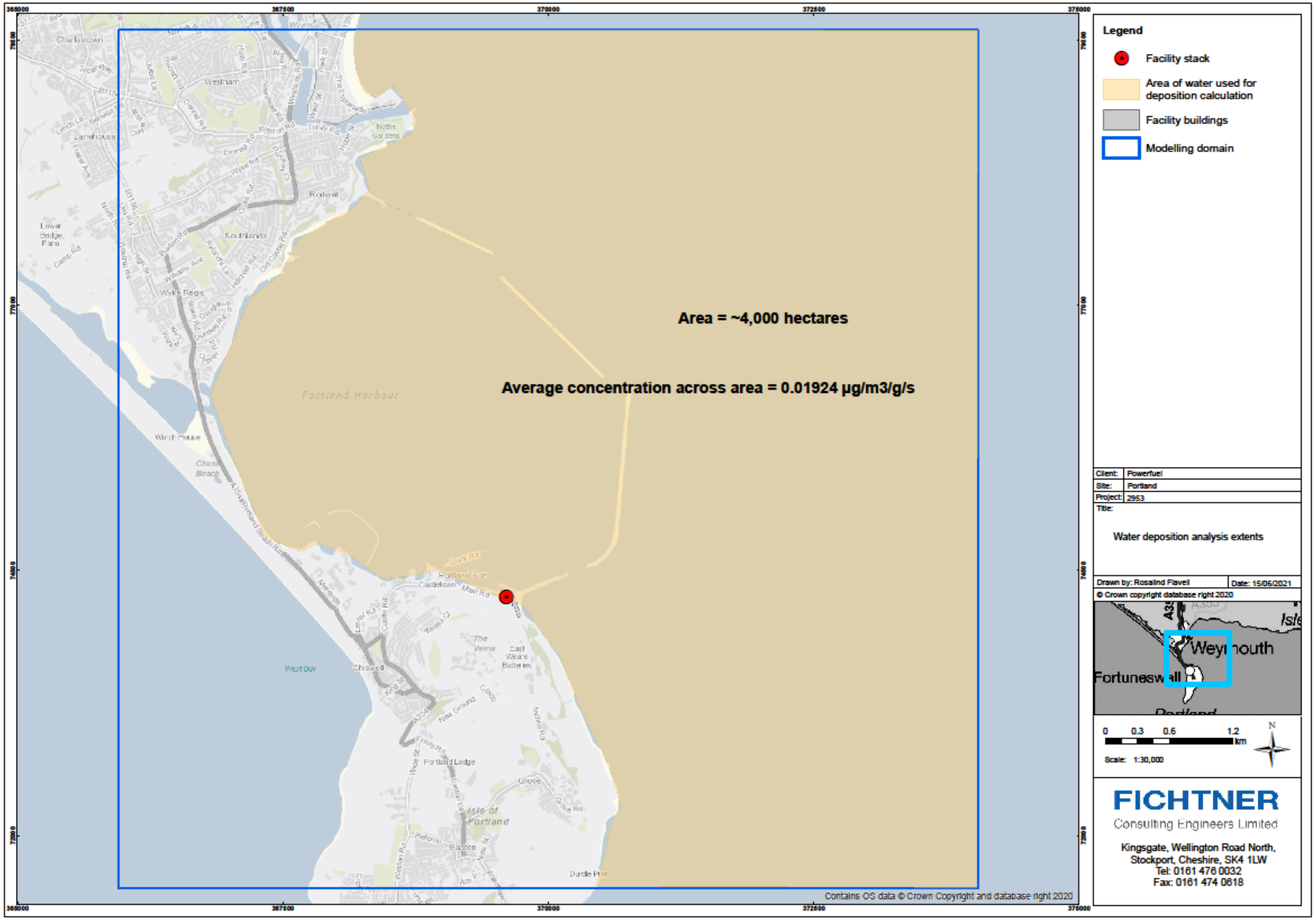

Figure 1. Study area showing model boundary

Based on the above:

- The daily average worst-case potential input of mercury into the 4,000-hectare area of sea surrounding Portland Harbour is 1,720 mg day^{-1} (approximately one-fifth of a teaspoon over an area of $40km^2$ of sea)
- Based on a daily average tidal exchange of 10% from the model domain and using a simple box model, it is estimated that the background concentration of mercury might increase from 0.005 µg l^{-1} to 0.00508 µg l^{-1} within approximately one month and then remain at this level thereafter (i.e. an increase in background concentration of less than 2%) (Figure 2).

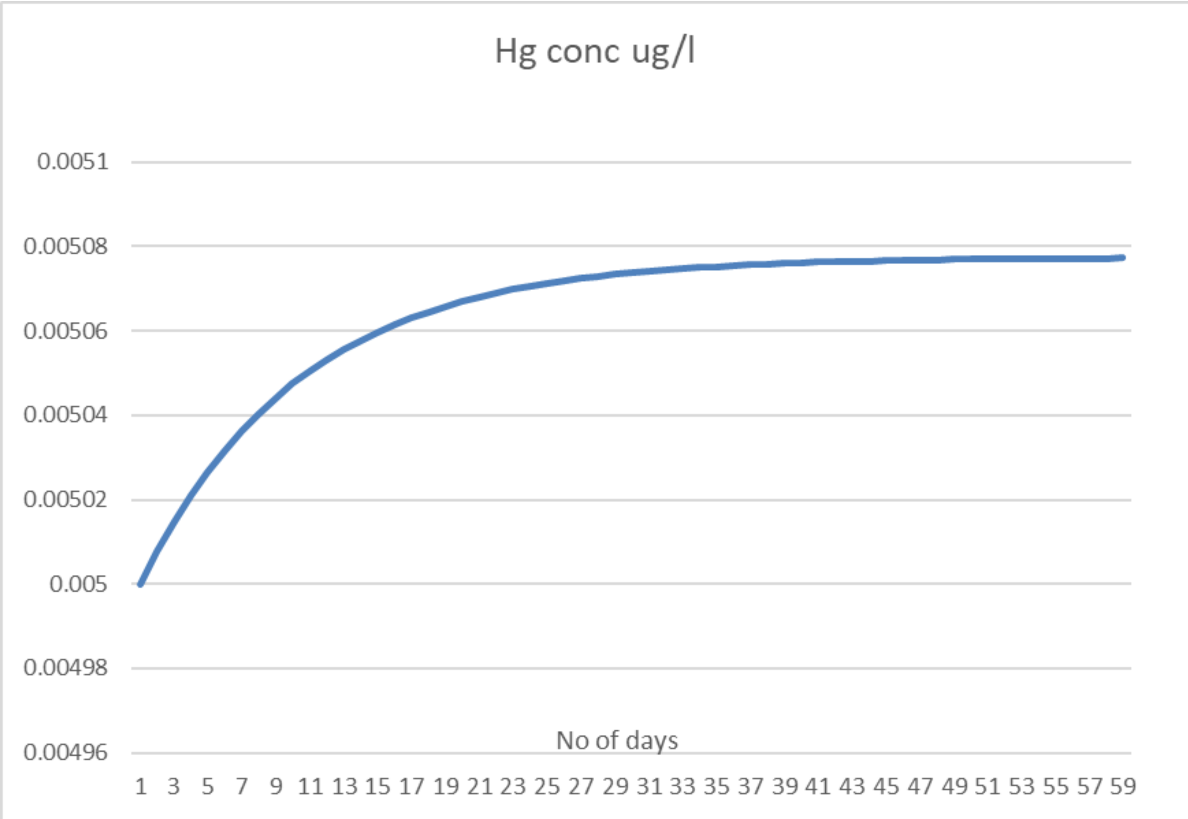

Figure 2. Estimated change in ambient mercury concentration over time based on worst-case aerial deposition and 10% daily tidal exchange

On this basis, it can be seen that the potential worst-case aerial deposition of mercury is estimated to increase the background concentration of dissolved mercury by less than 2% and ambient concentrations of dissolved mercury will remain at around 10% of the saline EQS value as established by the European Union. On this basis, the marginal increase in ambient concentration as a result of worst-case aerial deposition of mercury is assessed as not significant.

Within the marine environment, some mercury will adsorb to organic particles and sediment within the water column and may deposit within local marine sediments.

In order to assess the potential risk of accumulation of mercury within local sediments, a simple model has been developed and applied using the same boundaries as the water quality assessment above:

- The area of the sea in the modelling domain has been calculated as approximately 4,000 hectares;
- An annual worst-case potential loading for mercury has been calculated assuming that all modelled ground concentrations of mercury are deposited within model domain (approximately 627 g Hg yr^{-1});
- The mass of sediment within the model domain has been calculated, assuming an area of 4000 hectares and a depth of 10 cm, with sediment comprising medium sand (with a dry weight of 1.4 tonnes m^{-3}) (Parsmo, 2020)

The model estimates that deposition of this amount of mercury within the model domain would increase the sediment concentration of mercury by 112 ng kg^{-1} sediment (dry weight) per year. This equates to 0.09% of the Interim Sediment Quality Guideline (ISQG) designed to protect sea life (0.13 mg kg^{-1} dry weight sediment) (CCME, 1999).

Based on the above there are no significant risks to any of the local designated sites or to shellfish or fish populations associated with mercury emissions either in terms of risk to marine water quality standards or as a result of sediment contamination. Nor are there risks associated with human consumption of local fish or shellfish.

2.3.4 Dioxins

The air quality assessment presented in the ES has demonstrated that concentrations of dioxins at ground level will not exceed relevant AQALs for the protection of human health.

Within the marine environment, dioxins will strongly adsorb to organic particles and sediment within the water column and may deposit within local marine sediments. Dissolved concentrations in the water column will be negligible. In order to assess the potential risk of accumulation of dioxins within local sediments, a simple model has been developed and applied using the same boundaries as the water quality assessment above:

- The area of the sea in the modelling domain has been calculated as approximately 4,000 hectares;
- An annual worst-case potential loading for dioxins has been calculated assuming that all emissions of dioxins are deposited within model domain (approximately 73 mg dioxins yr^{-1});
- The mass of sediment within the model domain has been calculated, assuming an area of 4,000 hectares and a depth of 10 cm, with sediment comprising medium sand (with a dry weight of 1.4 tonnes m^{-3}).

The model estimates that deposition of this amount of dioxin within the model domain would increase the sediment concentration of dioxin by 0.013 ng kg^{-1} sediment (dry weight) per year. This equates to 1.5% of the Interim Sediment Quality Guideline (ISQG) designed to protect sea life (0.85 ng kg^{-1} dry weight sediment) (CCME, 2001). This is a highly conservative estimate as it assumes that all dioxin emitted to air will deposit locally whereas in reality only a small proportion will be deposited.

Based on the above there are no significant risks to any of the local designated sites or to shellfish or fish populations associated with dioxin emissions as a result of sediment contamination. Nor are there risks associated with human consumption of local fish or shellfish. Consequently, there should be no rational basis to anticipate a negative impact on fish and shellfish related businesses and employment. We are aware for example of other edge of water locations which host similar energy from waste facilities to the proposed ERF (including for example a much larger EfW plant at Copenhagen Harbour where fishing is an active pursuit.)

3 Emissions to Water

3.1 Assessment of potential impacts

Chapter 8 of the ES assesses potential impacts to ground conditions and water quality.

During construction, it is recognised (ES s8.56) that there is potential for contamination of marine waters through sediment run-off, spillages from vehicles/plant and concrete wash-waters as well as discharges from construction activities. There is also potential for contaminated run-off from stockpile areas. To mitigate potential construction impacts a framework Construction Environmental - Management Plans (CEMP) has been developed that will be agreed with the Environment Agency and Dorset Council. Proposed measures are set out in ES section 8.74 and 8.75. with these measures in place the effects on marine water quality are assessed as negligible (ES s8.76).

During operation, as agreed with Wessex Water subject to detailed design and permitting, it is proposed that all process effluent and foul water generated on site will be discharged to the sewer system. Clean surface water run-off from buildings will be discharged to sea. All surface water run-off from roads and hardstanding will be passed through an oil bypass separator prior to discharge. In addition, sustainable drainage systems in the form of a swale have been incorporated within the landscaping areas (ES s8.66). In consequence, the ES (s 8.67) assesses changes to marine water as neutral/insignificant. On this basis there are no significant risks to any of the local designated sites.

3.2 Stakeholder representations

Stakeholder representations have raised concerns about potential risks to the marine environment as result of thermal pollution from aquatic discharges and water quality risks associated with spillage/leakage of incinerator bottom ash (IBA) during loading of ships. Risks to people from sea bathing have also been raised.

3.3 Analysis

As noted above, there are no planned process effluent or foul water discharges direct to the marine environment during operation of the ERF. All such discharges will be made to sewer. These will be treated at Weymouth wastewater treatment works (WwTW) and discharged to the sea one kilometre offshore, west of Portland Harbour. The process and foul water effluent from the ERF will be a minor component of the overall discharge from the WWTW. On this basis there will be no significant risks to the marine environment or to any local designated sites from process effluent or foul water discharges from the plant. Nor will there be risks to people associated with sea bathing.

The handling of IBA will be subject to conditions in the Environmental Permit issued by Environment Agency governing the operation of the ERF. This will ensure that risks to the environment, including the marine environment are adequately managed. Any mitigation and monitoring requirements will be incorporated within the site’s Environmental Management System. This will ensure that risks to any local designated sites or the wider marine environment associated with spillages or leakages of IBA can be effectively managed. On this basis, taking account of the mitigation measures that will be applied, the risks to the marine environment from this pathway are assessed as insignificant.

4 References

CCME, (1999). Canadian Sediment Quality Guidelines for the Protection of Aquatic Life – Mercury. Canadian Council of Ministers of the Environment. Available at: https://www.ccme.ca/en/res/mercury-canadian-sediment-quality-guidelines-for-the-protection-of-aquatic-life-en.pdf

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Environment Agency Data Viewer - Water Quality - Weymouth
https://environment.data.gov.uk/water-quality/view/sampling-point/SW-50034657?_all=true

Environment Agency Data Viewer - Water Quality - Portland Harbour
https://environment.data.gov.uk/water-quality/view/sampling-point/SW-50044494?_all=true

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Contact Us

ABPmer

Quayside Suite,
Medina Chambers
Town Quay, Southampton
SO14 2AQ

T +44 (0) 23 8071 1840
F +44 (0) 23 8071 1841
E enquiries@abpmer.co.uk

www.abpmer.co.uk

Portland energy recovery facility

Flood risk assessment

Addendum

August 2021

Ada House
Pynes Hill
Exeter
EX2 5TU
Tel: 01392 409007
www.awpexeter.com

technical note

Portland Energy Recovery Facility

Flood Risk Assessment Addendum

Project No.	0979
Revision	Initial issue
Date	29 July 2021
Client	Powerfuel Portland Limited
Prepared	C Yalden
Checked	C Yalden
Authorised	I Awcock
File Ref.	**p:\0979 portland port erf\c documents\reports\0979 - portland erf - flood risk assessment addendum.docx**

1 Introduction

1.1 This Flood Risk Assessment (FRA) Addendum has been prepared on behalf of Powerfuel Portland Limited to accompany the August 2020 AWP FRA which was submitted in support of the detailed planning application for a merchant Energy Recovery Facility (ERF) on a brownfield site within the existing and operational Portland Port (Planning ref. WP/20/00692/DCC).

1.2 The addendum responds to matters raised by Dorset Council's (DC) Flood Risk Management (FRM) team through the consultation process, with a copy of their consultation email dated 11th November 2020 included within Appendix A of this addendum (DC ref. PLN20-069). The addendum also draws reference to further advice received from DC FRM through their charged advice service.

1.3 Each matter raised within DC FRM's consultation email has been set out below in italics, with further explanation or technical input provided to advise our response.

2 Response to matters raised

2.1 ***The applicant has not demonstrated in their application that the existing outfall pipes have adequate capacity for the unattenuated flows coming from the Waste Recovery Site.***

Although a free discharge to the sea is allowable at this location, as it will have no discernible impact on downstream tidal flood risk, the conveyance of this free discharge needs to be sized accordingly. Where existing connections are to be used, this should consider, not only the size of the pipe but any contributions from development elsewhere. If a full, unattenuated discharge cannot be achieved due to capacity issues, then some attenuation might be needed to reduce peak flows.

Surcharge of the system needs to be avoided during normal conditions as exceedance flows directly to tidal waters could conceivably convey contaminants off site.

2.2 The existing outfalls which serve the application site fall under the ownership and responsibility of Portland Port Ltd (PPL). Through discussions with PPL we have received copies of historic drainage records linked to the existing site drainage, together with recently commissioned drainage surveys.

2.3 The surveys confirm the presence of three separate drainage outfalls, all serving the application site only. Two eastern outfalls discharge into the foreshore at Balaclava Bay, with a final northern outfall discharging into Portland Port.

2.4 The eastern outfalls can be seen at ground level, secured to the foreshore. Their alignment is consistent with the historic drainage plans. The outfalls are 225mm and 300mm diameter, with assumed gradients 1:6.5 and 1:12 respectively, based on the gradient of the foreshore. The northern outfall is 100mm diameter, with approximately gradient 1:50.

2.5 The hydraulic capacity of the outfalls can be seen summarised within Table 2.1 below.

Table 2.1 – Existing Outfall Capacities

Outfall Ref.	Gradient	Hydraulic Capacity
Eastern 300mm	1:12	323 l/s

Outfall Ref.	Gradient	Hydraulic Capacity
Eastern 225mm	1:6.5	205 l/s
Northern 100mm	1:50	8.5 l/s

2.6 The Surface Water Management Plan (SWMP) within the August 2020 AWP FRA proposes to discharge the clean roof catchment through the eastern outfalls to Balaclava Bay, whilst runoff from the yard and trafficked highway areas would be discharged through the northern outfall to Portland Port.

2.7 The Q100 peak unattenuated flow for each site catchment has been calculated using the Modified Rational Method (HR Wallingford, 1990). The flow rate has been compared against the relevant outfall(s) to determine whether there is sufficient capacity to drain unattenuated flows from the site. The output from this exercise has been seen summarised within Table 2.2 below.

Table 2.2 – Unattenuated Site Discharges (Review)

Catchment Ref.	Catchment Area	Peak Flow (Q100)	Outfall Ref.	Hydraulic Capacity
Clean Roof	0.782 ha	265 l/s	Eastern Outfalls (300mm & 225mm)	528 l/s (cumulative)
Yard and Trafficked Areas	0.681 ha	231 l/s	Northern 100mm	8.5 l/s

2.8 Table 2.2 above demonstrates that the eastern outfalls have sufficient capacity to drain the clean roof area. It is recommended that any residual capacity within the eastern outfalls is proportionally distributed and therefore the preliminary drainage layout drawing which appends the FRA has been updated to show approximately 40% of the roof catchment draining to the 225mm outfall, with the remaining 60% draining to the 300mm outfall.

2.9 The above table also demonstrates that the northern outfall has insufficient capacity to drain the proposed yard and trafficked areas. We have prepared a series of hydraulic models to simulate the northern outfall and have run a range of unattenuated storm events to establish the potential flooded volumes that might occur.

2.10 The results from the above models have been summarised within Table 2.3, together with an adjusted attenuation requirement, which considers the capacity of the proposed swales promoted by the SWMP.

Table 2.3 – Northern Outfall Modelling

Return Period	Flooded Volume	FRA SWMP Attenuation	Adjusted Attenuation Req.
2 year (+40% CC)	65 m^3	65 m^3 (swales)	+0 m^3
5 year (+40% CC)	100 m^3		+35 m^3
10 year (+40% CC)	135 m^3		+70 m^3
30 year (+40% CC)	200 m^3		+135 m^3
100 year (+40% CC)	295 m^3		+230 m^3

2.11 Table 2.3 demonstrates that the northern outfall and proposed swales are able to accommodate runoff in up to the 2 year return period with 40% allowance for climate change. Beyond this the network would become overwhelmed and up to 230 m^3 of flooding would occur in the 100 year return period.

2.12 It is considered that a 2 year (+CC) capacity would drain the first flush from a greater return period storm, thereby reducing the risk of pollution due to overland exceedance flows. Through discussions with DC FRM it was suggested that the existing outfalls may not have to demonstrate capacity to manage flows in up to the 100 year return period (+CC), provided the network would not be regularly overwhelmed.

2.13 An appropriate design event for the northern outfall has not been agreed with DC FRM however the results within Table 2.3 identify the necessary attenuation provisions required mitigate on-site flooding for a range of storm events.

2.14 The preliminary drainage layout drawing which appended the August 2020 AWP FRA has been updated as part of this Addendum and now shows the surveyed outfall alignments, together with an offline geo-cellular attenuation tank which can provide up to 230 m^3 storage volume.

2.15 Copies of the updated Preliminary Drainage Layout drawing and any hydraulic modelling or calculations can be found within Appendix B and Appendix C respectively.

2.16 ***Due to the lack of survey information there can be no certainty that the current condition of the existing network is suitable for discharge of surface water from the site.***

2.17 The existing outfalls which serve the application site fall under the ownership and responsibility of PPL.

2.18 PPL have commissioned a series of CCTV condition surveys for each outfall. These have only been partially completed due to limited access for the eastern outfalls (survey required from submerged outfalls) and partial blockage for the northern outfall (PPL are due to undertake remedial repairs).

2.19 PPL have advised that the outfalls can be retained for re-use to serve the application site. PPL will retain ownership and responsibility for the systems and therefore we trust that a suitable planning condition can be agreed to secure the submission of post-repair surveys for all outfalls.

2.20 Copies of the currently available survey information can be found within Appendix D of this Addendum.

3 Conclusions

3.1 Following the consultation response received from DC FRM, we have undertaken further consultation, coordinated additional drainage surveys and completed a series of hydraulic models.

3.2 The additional design input has concluded that the existing eastern drainage outfalls to Balaclava Bay have sufficient capacity to receive unattenuated flows from the roof catchment only. CCTV condition survey of the eastern outfalls requires access to their submerged outfalls. Ownership and responsibility for the outfalls remains with PPL and it is recommended that further evidence can be submitted at discharge of condition stage, following any potential remedial repairs, to demonstrate the suitability of the existing outfalls.

3.3 It is concluded that the existing northern drainage outfall to Portland Port has sufficient capacity (in conjunction with the proposed on-site swales) to serve the yard and trafficked areas in up to a 2 year return period only (inc. climate change). This would also drain the first-flush from greater return period storms, reducing the risk of pollution from exceedance flows.

3.4 A suitable design event should be agreed with DC FRM, beyond which exceedance flows from the northern outfall can be allowed to flow overland towards Balaclava Bay/Portland Port. Any extra-over attenuation requirements to accommodate flows from the design event can be provided in the form of an offline geo-cellular attenuation tank.

3.5 The additional studies undertaken by this Addendum have demonstrated the presence of existing surface water outfalls that currently serve the application site. The ability to utilise these outfalls and a commitment to ensure they remain operational throughout the development's lifetime has been agreed with PPL.

3.6 The preliminary drainage layout drawing which appends this Addendum identifies additional offline attenuation. This attenuation will manage excess flows from the northern outfall up to an agreed design event.

3.7 Based on the outputs from this Addendum, it is concluded that the development can be undertaken in a sustainable manner and can remain safe from flooding whilst also reducing flood risk overall.

3.8 It is recommended that DC FRM advise the LPA that their objection can be removed, with suitable planning conditions covering a) the submission of further survey information to demonstrate serviceable drainage outfalls, and b) the submission of a final drainage scheme with capacity to manage flows up to an agreed design event, beyond which flows are permitted to exceed the system and route overland.

AWP

Appendix A DC FRM Consultation Response

Planning

From: FloodRiskManagement
Sent: 11 November 2020 17:04
To: Planning; Jerry Smith
Subject: RE: PLN20-069 - WP/20/00692/DCC - Portland Port, Castletown, Portland _ Consultation response

Follow Up Flag: Follow up
Flag Status: Flagged

Dorset Council, Flood Risk Management Team
Dorset Highways, County Hall, Dorchester

[redacted]

Lead FRM Officer: Rob Hanson
Direct Dial: [redacted]

Date: 11 November 2020

Internal LLFA Consultation – Surface Water (SW) Management

Our Ref: PLN20-069

Proposal: Construction of an energy recovery facility with ancillary buildings and works including administrative facilities, gatehouse and weighbridge, parking and circulation areas, cable routes to ship berths and existing off-site electrical sub-station, with site access through Portland Port from Castletown.

Your Ref: WP/20/00692/DCC

Location: Portland Port, Castletown, Portland DT5 1PP

Grid Ref: 368998, 74438

We write in response to the above consultation, sent to us as relevant Lead Local Flood Authority (LLFA), and statutory consultee for Surface Water (SW) management in respect of major development (as defined within Article 2(1) of the Town & Country Planning, Development Management Procedure, England Order 2015) and legislated for under The Town and Country Planning (Development Management Procedure) (England) Order 2015, schedule 4, paragraph (ze). Given that the proposal under consideration relates to a Waste / Minerals Site, we acknowledge that it qualifies as major development.

The brownfield site of the proposal is shown to fall largely within Flood Zone 1 (low risk of fluvial / tidal flooding), as indicated by the Environment Agency's (EA) indicative flood maps. Whilst according to the EA's Risk of Flooding from SW (RoFfSW) mapping there is no theoretical risk of pluvial flooding to the site up to the 1-in-100 year rainfall event with only some isolated ponding shown to develop during the 1-in-1000 year rainfall event.

Due to the proximity of coastal waters, the site is very close or directly adjacent to areas of Flood Zone 2 along both the north and east boundaries. Whilst, according to the EA's Risk of Flooding from SW (RoFfSW) mapping, the site is near to an additional small area of surface water ponding just outside the north boundary of the site during the 1-in-100 year rainfall event and above.

The risk to the site is considered low, however, regardless of prevailing risk, any development has the potential to exacerbate or create flood risk, if runoff is not appropriately considered and managed as evidenced by a substantiated SW strategy. Ordinarily therefore, and in keeping with the requirements of the National Planning Policy Framework (NPPF), all major development proposals must take due consideration of SW management and should offer a drainage strategy that does not create or exacerbate off site worsening and should mitigate flood risk to the site.

To this end, the information supplied in relation to SW management includes the following:

- Portland Energy Recovery Facility (Powerfuel Portland Limited) - *Flood Risk Assessment* by AWP – September 2020
- Coastal Flooding Assessment Report (June 2009) by RPS Consulting Engineers

The documents referenced above provide detail regarding drainage from the applicant's site. As a result, we can acknowledge the following:

- BGS data indicates that the site is underlain by a dominate bedrock of impermeable Mudstone (Kimmeridge Clay Formation) therefore infiltration methodologies are not proposed for surface water management.

- The applicant proposes to discharge surface water runoff at an unrestricted rate into the sea via two existing outfalls. The drainage strategy explains that surface water runoff from roof areas is proposed to be directed to an existing outfall at Balaclava Bay and runoff from the highway or yard areas are to be directed through a separate outfall at Portland Port.

- The applicant proposes to manage the risk of pollution of coastal waters from polluted surface water runoff from the highway and yard areas with rain gardens, a swale and an oil bypass separator.

- The applicant proposes that levels on site will be made to slope away from the built development in order to allow any water from wave overtopping to be redirected back towards the sea.

However, the following concerns need to be addressed / clarified further. At this time therefore, we recommend that a (Holding) Objection be applied to this proposal.

The applicant has not demonstrated the viability of the existing outfalls or how, legally and technically, a new outfall could be created. The following points need to be addressed:

- The applicant has not demonstrated in their application that the existing outfall pipes have adequate capacity for the unattenuated flows coming from the Waste Recovery Site.

  Although a free discharge to the sea is allowable at this location, as it will have no discernible impact on downstream tidal flood risk, the conveyance of this free discharge needs to be sized accordingly. Where existing connections are to be used, this should consider, not only the size of the pipe but any contributions from development elsewhere. If a full, unattenuated discharge cannot be achieved due to capacity issues, then some attenuation might be needed to reduce peak flows.

- Also due to the lack of survey information there can be no certainty that the current condition of the existing network is suitable for discharge of surface water from the site.

- Surcharge of the system needs to be avoided during normal conditions as exceedance flows directly to tidal waters could conceivably convey contaminants off site.

For the above reasons a proper survey is needed to ascertain whether the discharge route is viable and whether attenuation on site will be needed, given the capacity and condition of the existing pipes.

If, the applicant is not willing to undertake a survey, or if a survey suggests that the existing system is compromised or not viable, then the applicant will need to demonstrate how a new outfall can be legally created and put into use. Where this will rely on third parties, in principle agreement(s) will need to be submitted in support of these proposals. For instance, a new discharge route to sea, may need regulatory approval from the Marine Management Organisation (MNO).

Further details / evidence will need to be submitted in order to address / clarify the above concerns and to show that the drainage proposals are feasible.

We are unable to ascertain, to our satisfaction, the appropriateness of any SW management in accordance with the Ministerial statement 'Sustainable Drainage System' 2014, chapter 14 of the NPPF and Planning Policy Guidance (PPG). As relevant LLFA in this matter we are unable to confirm that the applicant has met DEFRA's technical guidance or relevant local and national policies concerning drainage.

Our (Holding) Objection may be overcome via the submission of further or additional details outlining a site-specific SW management scheme. Accordingly, we ask to be re-consulted on the SW scheme if further information is supplied. Our objection will be maintained until an adequate a SW scheme has been approved in-principle. We may at that stage request suitable planning condition/s and informative/s to cover detailed design, future maintenance and potential requirement for other permissions.

INFORMATIVES

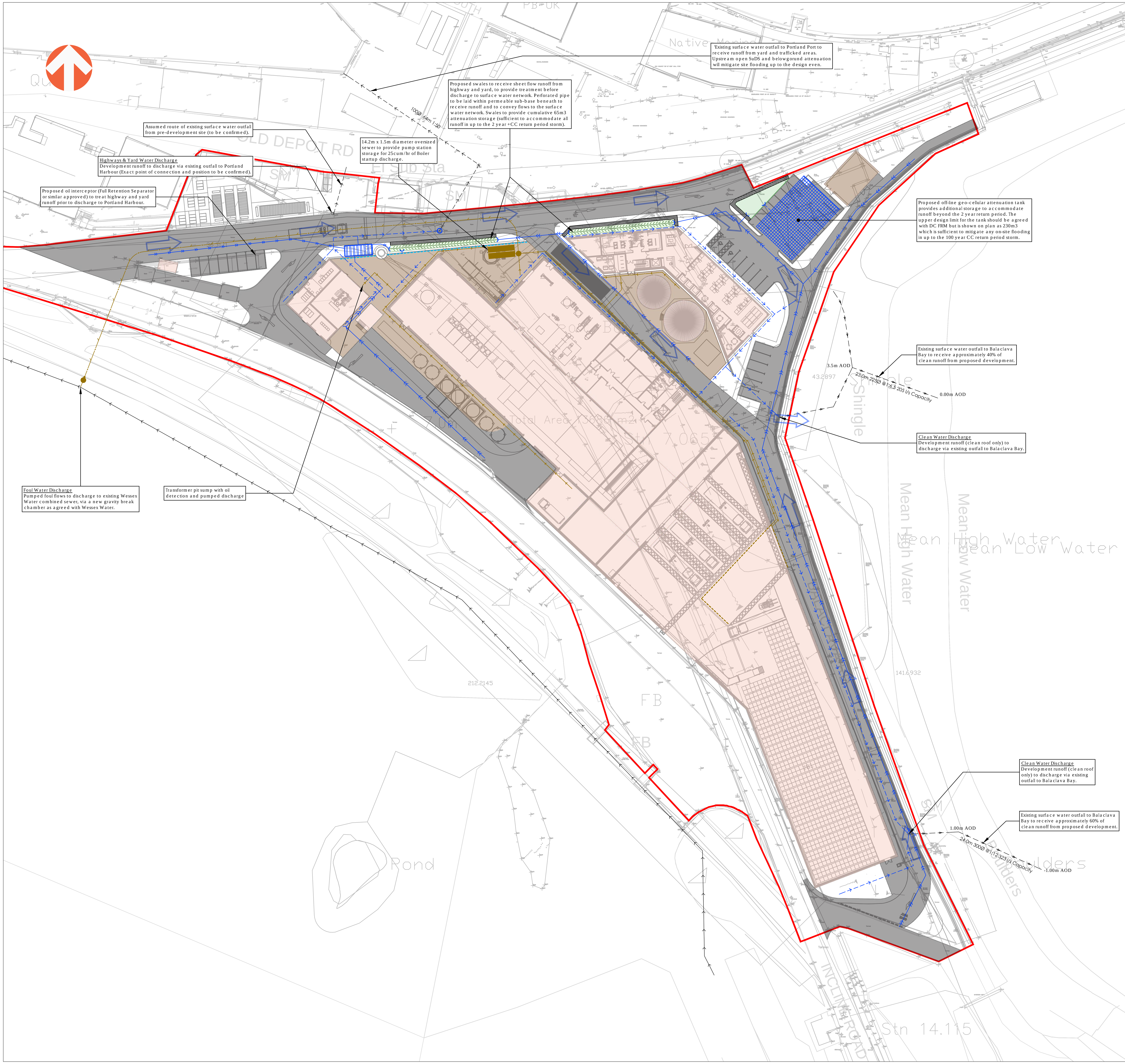
- Permissions from the EA or Marine Management Organisation (MMO) may be needed in respect of SW discharge(s) and any construction works. The applicant will need to ensure that they comply with any other legislation relevant to these proposals. We note that the EA and MMO have already been consulted.
- The applicant is advised to have early discussions with Wessex Water in relation to the possible adoption of SuDS features in order to ensure that the final designs are in line with their requirements.

Please do not hesitate to contact me should you require further clarification of our position or the scope of additional information that is required. To assist in this respect, I suggest the applicant review our generic guidance note, which can be found at: www.dorsetcouncil.gov.uk/localfloodrisk.

Yours Sincerely,

Rob Hanson,
Flood Risk Engineer.

Appendix B Preliminary Drainage Layout



Notes:

1. The proposed development has been assessed in line with the NPPF and The Dorset Waste Plan, to allow the planning application to be progressed and to show that the development can be undertaken in an acceptable manner from a flood risk perspective.
2. The extent of built development within the ERF area is limited to 'Flood Zone 1' only and is not considered to be at risk of flooding from pluvial, groundwater, infrastructure, artificial sources or wave action.
3. The wider application boundary includes land inside Flood Zones 2 and 3 however these areas are being used to facilitate utility and highway enabling works and will not be impacted by or have an impact on existing flood risk.
4. To ensure the development is safe throughout its lifetime, the surface water strategy accounts for runoff in up to the 100 year return period.
5. The strategy also safeguards against the upper end allowances for climate change (40%), providing betterment over undeveloped conditions, where the rate and volume of runoff would continue to increase due to climate change.
6. Made ground from previous site uses and the potential for raised groundwater related to tidal ranges precludes the use of soakaway based drainage.
7. Surface water runoff will be captured and discharged directly to sea and will seek to re-use existing points of outfall.
8. The proposed development reduces the sites existing impermeable catchment and therefore provides betterment in terms of peak rates and volumes of discharge.
9. Runoff from roofs will drain directly to Balaclava Bay, whilst highway and yard areas will drain through a new SuDS swale and bypass separator prior to discharging to Portland Port.
10. During exceedance events runoff will be directed towards areas of green space or yard areas where flows can be temporarily stored above ground.
11. The reduction in peak runoff from the site and the inclusion of SuDS treatment drainage systems, will ensure provide betterment over existing site conditions and will therefore have no adverse negative impacts on committed development sites that are being assessed as part of the EIA.
12. Due to existing levels, foul flows generated by the development will be pumped to the existing WW combined network to the west of the site.
13. Any private drainage networks or features will be designed in accordance with Building Regulations Part H. The operation and maintenance of all private drainage will be the responsibility of a third party management company.
14. Any adoptable drainage networks will be designed in accordance with Sewers for Adoption and will be handed to to the respective Water Authority for adoption.
15. This Preliminary Drainage Layout does not attempt to present a final design of the proposed drainage systems. Detailed design of the systems and any inherent features will commence upon approval of the strategy and will include assessments due to site investigations, health and safety, CDM ect.

Area Summary Schedule

Existing Impermeable Area	1.679 ha
Proposed Roof Area	0.782 ha
Proposed Highway & Yard Area	0.681 ha
Total Proposed Imp. Area	1.463 ha

Key:

Site Boundary

Existing Drainage:

Wessex Water Combined Sewer
Retained Surface Water Drainage

Proposed Catchment Areas:

Clean Roof Area
Yard Area
Highway Area

Proposed drainage:

Clean Roof Surface Water Sewer
Highway and Yard Surface Water Sewer
Drainage Channel
Shallow Swale With Permeable Sub-Base
Oil Interceptor
Foul Sewer (Will comprise multiple runs to separate trade and domestic waste)
Foul Raising Main
Foul Pumping Station
Foul Gravity Brake Chamber
Foul Drain
Exceedance Flow
Gabion Retaining Wall

REV	DATE	DESCRIPTION	BY	CHK	APD
D	29.07.2021	UPDATED POINT OF DISCHARGE AND DRAINAGE ROUTING	TMR	AJH	CPY
C	27.08.2020	BACKGROUND LAYOUT AMENDED	TMR	AJH	CPY
B	07.08.2020	UPDATES TO SUIT LANDSCAPING PLAN	TMR	AJH	CPY
A	10.07.2020	INITIAL ISSUE	TMR	AJH	CPY

DRAWING STATUS: PLANNING APPLICATION

CLIENT: POWERFUEL LIMITED

PROJECT: PORTLAND ERF

TITLE: PRELIMINARY DRAINAGE LAYOUT

PROJECT No: 0979

DRAWING No: PDL-101

REV: D

SCALE @ A1: 1:500 (0–25 metres)

DESIGN BY:

awp awcockward partnership

Awcock Ward Partnership, Kensington Court, Woodwater Park, Pynes Hill, Exeter, EX2 5TY
Tel: 01392 409007 Web: www.awpexeter.com

Appendix C MicroDrainage & Calcs

Colebrook-White Pipe Capacity Analysis

Project No.	*0979*
Project Title	*Portland Port ERF*
Client	*Powerfuel Portland Limited*
Sheet Ref	*P:\0979 Portland Port ERF\D Design and Analysis\SPREADSHEETS\01 Drainage\03 Sewer Design\[Colebrook White Equation (pipe velocity & capacity) - North.xlsx]Colebrook-White (NORTH)*

Calcs by	*TMR*
Checked by	*CPY*
Approved by	*IDA*
Date	*29.07.2021*
Revision	*INITIAL ISSUE*

Pipe capacity calculation based on the Colebrook White Equation (HR Wallingford, 1990);

$$V = -2\sqrt{(2gDS)}\log_{10}\left(\frac{k_s}{3.7D} + \frac{2.51\nu}{D\sqrt{(2gDS)}}\right)$$

Fluid type: **Surface**

Where:

D	*Pipe diameter*		**225**	mm
S	*Hydraulic gradient*	1 in	**6.5**	m/m
k_s	Effective pipe roughness		**0.6**	mm
g	*Gravitiational acceleration*		**9.81**	m/s^2
ν	*kinematic viscosity*		**1.01E-06**	m^2/s
A	*Cross-sectional flow area*		**0.040**	m^2
Q	*Discharge*		**205**	l/s
V	Velocity		**5.17**	m/s

Colebrook-White Pipe Capacity Analysis

Project No.	*0979*
Project Title	*Portland Port ERF*
Client	*Powerfuel Portland Limited*
Sheet Ref	*P:\0979 Portland Port ERF\D Design and Analysis\SPREADSHEETS\01 Drainage\03 Sewer Design\[Colebrook White Equation (pipe velocity & capacity).xlsx]Colebrook-White (SOUTH)*

Calcs by	*TMR*
Checked by	*CPY*
Approved by	*IDA*
Date	*29.07.2021*
Revision	*INITIAL ISSUE*

Pipe capacity calculation based on the Colebrook White Equation (HR Wallingford, 1990);

$$V = -2\sqrt{(2gDS)}\,\log_{10}\left(\frac{k_s}{3.7D} + \frac{2.51\nu}{D\sqrt{(2gDS)}}\right)$$

Fluid type: **Surface**

Where:

D	*Pipe diameter*		**300**	mm
S	*Hydraulic gradient*	1 in	**12**	m/m
k_s	Effective pipe roughness		**0.6**	mm
g	*Gravitiational acceleration*		**9.81**	m/s^2
ν	*kinematic viscosity*		**1.01E-06**	m^2/s
A	*Cross-sectional flow area*		**0.071**	m^2
Q	*Discharge*		**323**	l/s
V	Velocity		**4.56**	m/s

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	18.800	Add Flow / Climate Change (%)	0
Ratio R	0.345	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.515	4-8	0.199

Total Area Contributing (ha) = 0.714

Total Pipe Volume (m³) = 0.581

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	10.000	0.200	50.0	0.238	5.00	0.0	0.600	o	100	Pipe/Conduit	🔒
1.001	20.491	0.410	50.0	0.238	0.00	0.0	0.600	o	100	Pipe/Conduit	🔒
1.002	43.521	0.870	50.0	0.238	0.00	0.0	0.600	o	100	Pipe/Conduit	🔒

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.15	98.500	0.238	0.0	0.0	0.0	1.09	8.6«	32.2
1.001	50.00	5.47	98.175	0.476	0.0	0.0	0.0	1.09	8.6«	64.5
1.002	50.00	6.13	97.565	0.714	0.0	0.0	0.0	1.09	8.6«	96.7

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
MH 01	100.000	1.500	Open Manhole	1200	1.000	98.500	100				
MH02	100.000	1.825	Open Manhole	1200	1.001	98.175	100	1.000	98.300	100	125
MH03	100.000	2.435	Open Manhole	1200	1.002	97.565	100	1.001	97.765	100	200
	100.000	3.305	Open Manhole	0		OUTFALL		1.002	96.695	100	

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.002		100.000	96.695	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0   Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.800	Storm Duration (mins)	30
Ratio R	0.345		

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.700 Cv (Summer) 0.750
Region England and Wales Ratio R 0.345 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 0.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 2, 5, 10, 30, 100
Climate Change (%)	40, 40, 40, 40, 40, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Total Overflow Vol (m³)
1.000	MH 01	120 minute 1 year Winter I+40%	100.000	100.020	1.420	20.491	1.50		
1.001	MH02	60 minute 1 year Winter I+40%	100.000	100.015	1.740	14.959	1.58		
1.002	MH03	30 minute 1 year Winter I+40%	100.000	100.003	2.338	3.218	1.92		

PN	US/MH Name	Infil. Flow (l/s)	Infil. Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
1.000	MH 01			22.181	12.0	FLOOD
1.001	MH02			17.003	13.0	FLOOD
1.002	MH03			6.118	16.2	FLOOD

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.700 Cv (Summer) 0.750
Region England and Wales Ratio R 0.345 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 0.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 2, 5, 10, 30, 100
Climate Change (%) 40, 40, 40, 40, 40, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Total Overflow Vol (m³)
1.000	MH 01	120 minute 2 year Winter I+40%	100.000	100.032	1.432	32.039	1.52		
1.001	MH02	60 minute 2 year Winter I+40%	100.000	100.026	1.751	25.781	1.60		
1.002	MH03	30 minute 2 year Winter I+40%	100.000	100.008	2.343	8.262	1.92		

PN	US/MH Name	Infil. Flow (l/s)	Infil. Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
1.000	MH 01			33.730	12.2	FLOOD
1.001	MH02			27.833	13.2	FLOOD
1.002	MH03			11.162	16.2	FLOOD

5 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000   Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0   MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0   Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500   Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0   Number of Offline Controls 0   Number of Time/Area Diagrams 0
Number of Online Controls 0   Number of Storage Structures 0   Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR   M5-60 (mm) 18.700   Cv (Summer) 0.750
Region England and Wales   Ratio R 0.345   Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 0.0   DVD Status OFF
Analysis Timestep Fine   Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 2, 5, 10, 30, 100
Climate Change (%) 40, 40, 40, 40, 40, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Total Overflow Vol (m³)
1.000	MH 01	120 minute 5 year Winter I+40%	100.000	100.047	1.447	46.624	1.53		
1.001	MH02	120 minute 5 year Winter I+40%	100.000	100.040	1.765	39.562	1.60		
1.002	MH03	30 minute 5 year Winter I+40%	100.000	100.016	2.351	15.584	1.93		

PN	US/MH Name	Infil. Flow (l/s)	Infil. Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
1.000	MH 01			48.315	12.2	FLOOD
1.001	MH02			41.685	13.3	FLOOD
1.002	MH03			18.484	16.2	FLOOD

10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.700 Cv (Summer) 0.750
Region England and Wales Ratio R 0.345 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 0.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 2, 5, 10, 30, 100
Climate Change (%) 40, 40, 40, 40, 40, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Total Overflow Vol (m³)
1.000	MH 01	180 minute 10 year Winter I+40%	100.000	100.061	1.461	60.588	1.53		
1.001	MH02	120 minute 10 year Winter I+40%	100.000	100.052	1.777	52.174	1.61		
1.002	MH03	30 minute 10 year Winter I+40%	100.000	100.022	2.357	21.837	1.93		

PN	US/MH Name	Infil. Flow (l/s)	Infil. Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
1.000	MH 01			62.279	12.2	FLOOD
1.001	MH02			54.140	13.3	FLOOD
1.002	MH03			24.736	16.2	FLOOD

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.700 Cv (Summer) 0.750
Region England and Wales Ratio R 0.345 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 0.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 2, 5, 10, 30, 100
Climate Change (%) 40, 40, 40, 40, 40, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Total Overflow Vol (m³)
1.000	MH 01	180 minute 30 year Winter I+40%	100.000	100.087	1.487	87.124	1.53		
1.001	MH02	180 minute 30 year Winter I+40%	100.000	100.077	1.802	77.007	1.61		
1.002	MH03	60 minute 30 year Winter I+40%	100.000	100.035	2.370	35.234	1.93		

PN	US/MH Name	Infil. Flow (l/s)	Infil. Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
1.000	MH 01			88.794	12.2	FLOOD
1.001	MH02			79.079	13.4	FLOOD
1.002	MH03			38.134	16.3	FLOOD

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 0 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.700 Cv (Summer) 0.750
Region England and Wales Ratio R 0.345 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 0.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

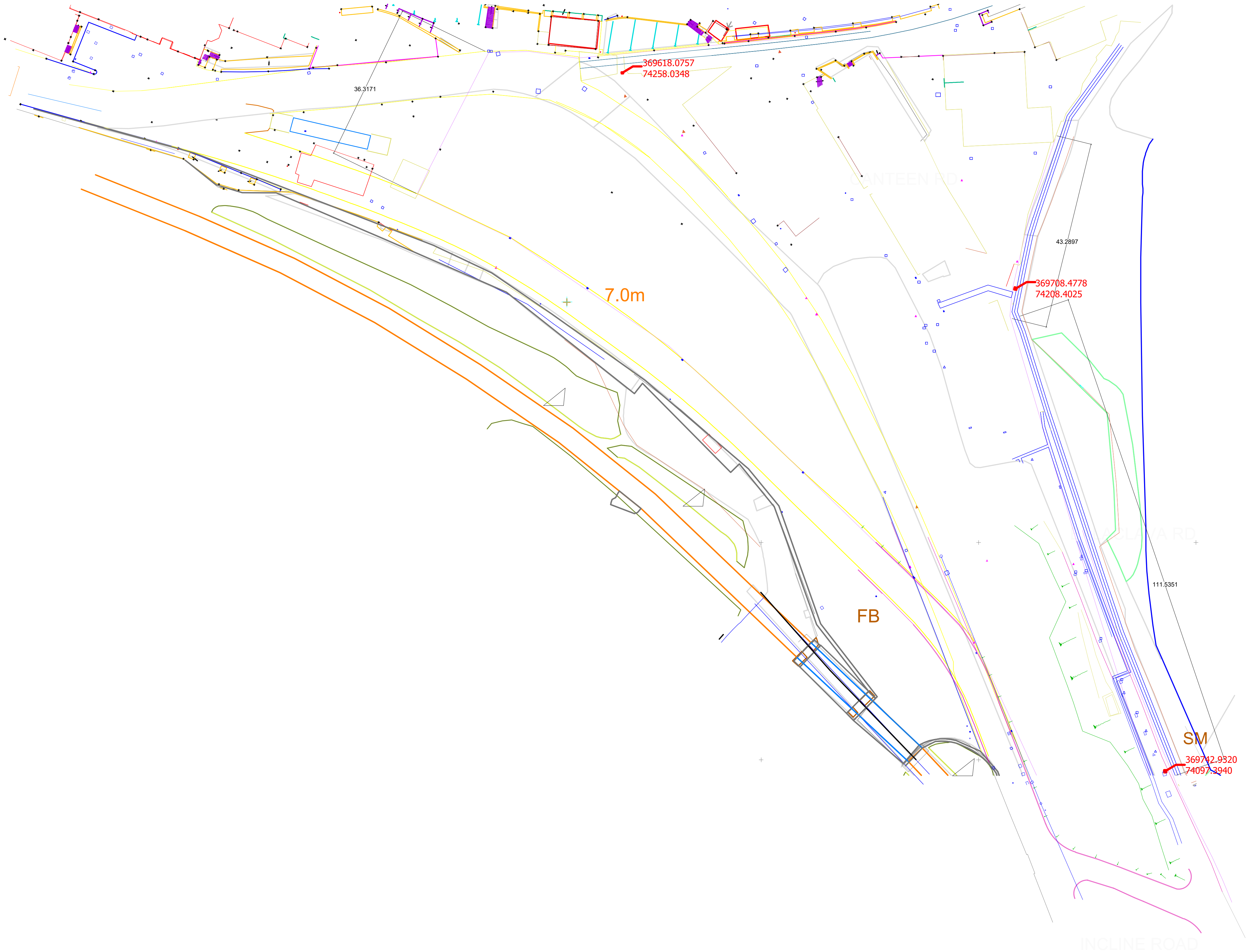
Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 2, 5, 10, 30, 100
Climate Change (%)	40, 40, 40, 40, 40, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Total Overflow Vol (m³)
1.000	MH 01	240 minute 100 year Winter I+40%	100.000	100.126	1.526	125.909	1.53		
1.001	MH02	240 minute 100 year Winter I+40%	100.000	100.113	1.838	112.757	1.62		
1.002	MH03	60 minute 100 year Winter I+40%	100.000	100.057	2.392	56.522	1.94		

PN	US/MH Name	Infil. Flow (l/s)	Infil. Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
1.000	MH 01			127.595	12.2	FLOOD
1.001	MH02			114.875	13.4	FLOOD
1.002	MH03			59.421	16.3	FLOOD

Appendix D CCTV Survey Information

The surface water tie in manholes have been identified in a thick red line. I have also supplied the coordinates for the chamber.



5011-002-001 Peat Bay A3 @ 1-1000

Project details

drawing name	5011(PEATBAY)-001-001		
drawn by	JAMES GREEN	18/05/2021	date
revision		A3@1:1000	scale

PORTLAND HARBOUR AUTHORITY

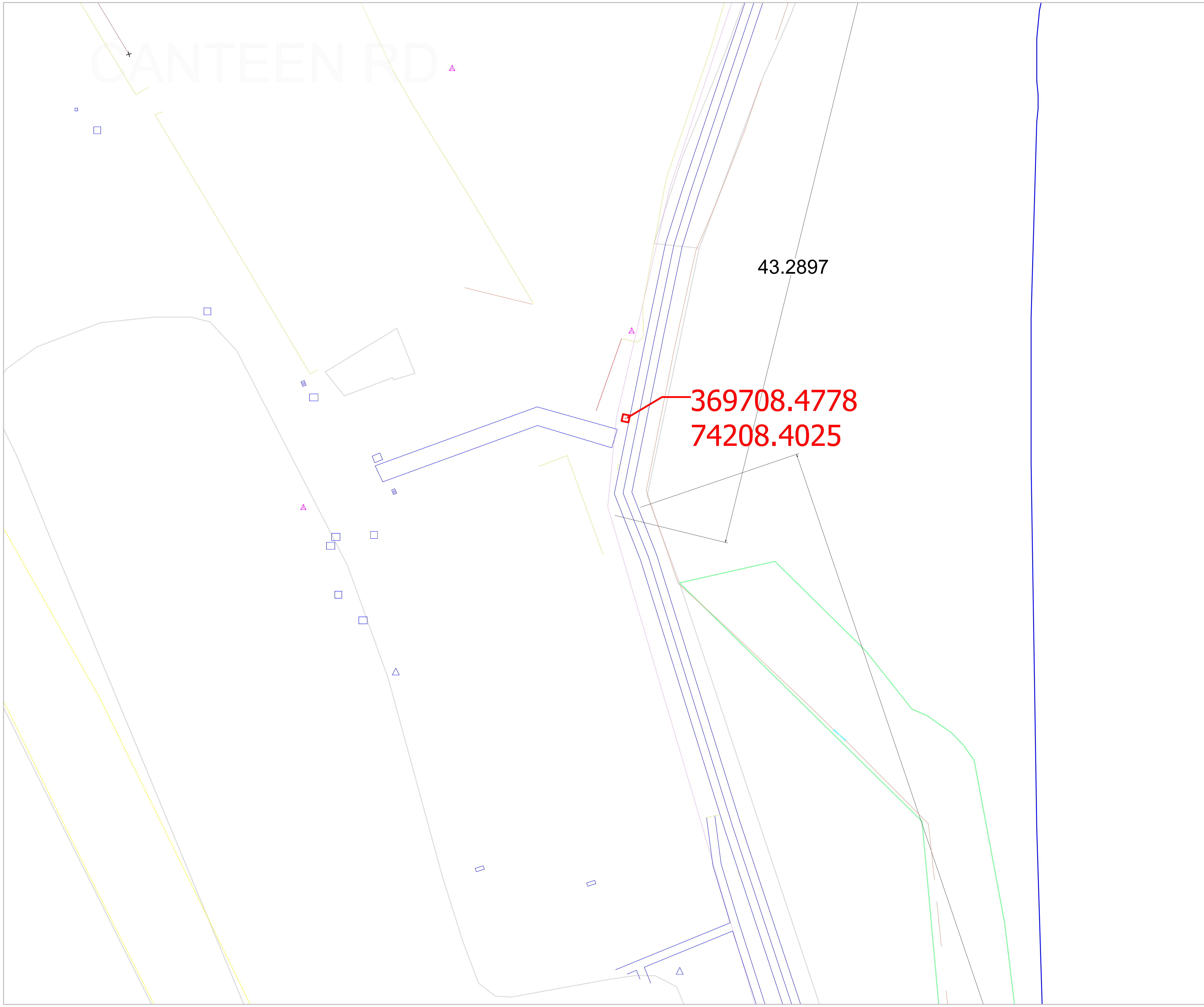
Portland Port Business Centre, Castletown, Portland DT5 1PP

A1 Portrait

Project details

drawing name	JG TEMP External 2019
drawn by	date 27.04.2020
revision	scale

Portland Port Business Centre, Castletown, Portland DT5 1PP



The surface water tie in manholes have been identified in a thick red line. I have also supplied the coordinates for the chamber.

5011-002-003 Eastern Outfall @ 1-250

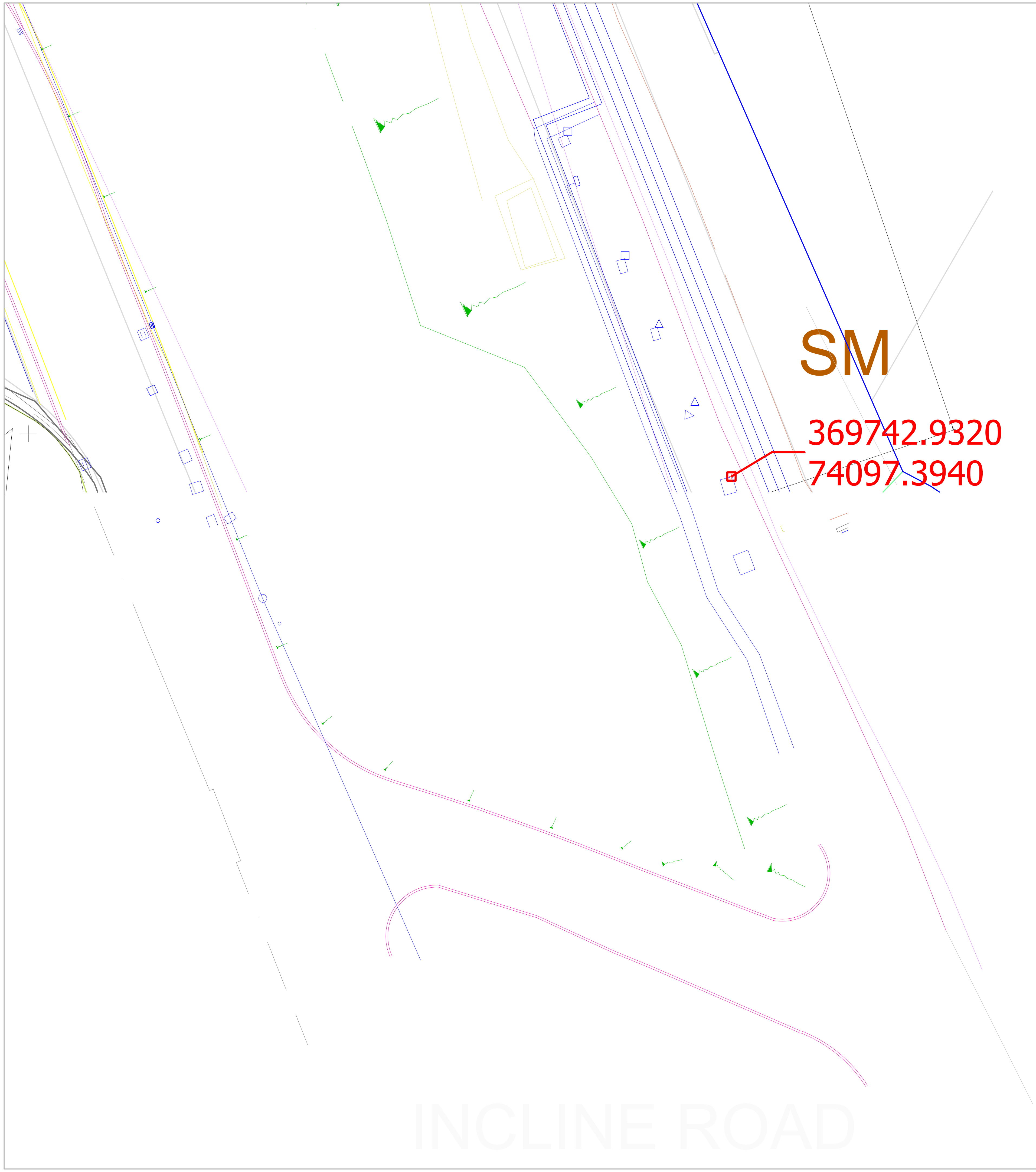
Project details

drawing name	5011(PEATBAY)-001-001
drawn by JAMES GREEN	date 18/05/2021
revision	scale A3@1:250

PORTLAND HARBOUR AUTHORITY

Portland Port Business Centre, Castletown, Portland DT5 1PP

The surface water tie in manholes have been identified in a thick red line. I have also supplied the coordinates for the chamber.



5011-002-002 Southern Outfall @ 1-250

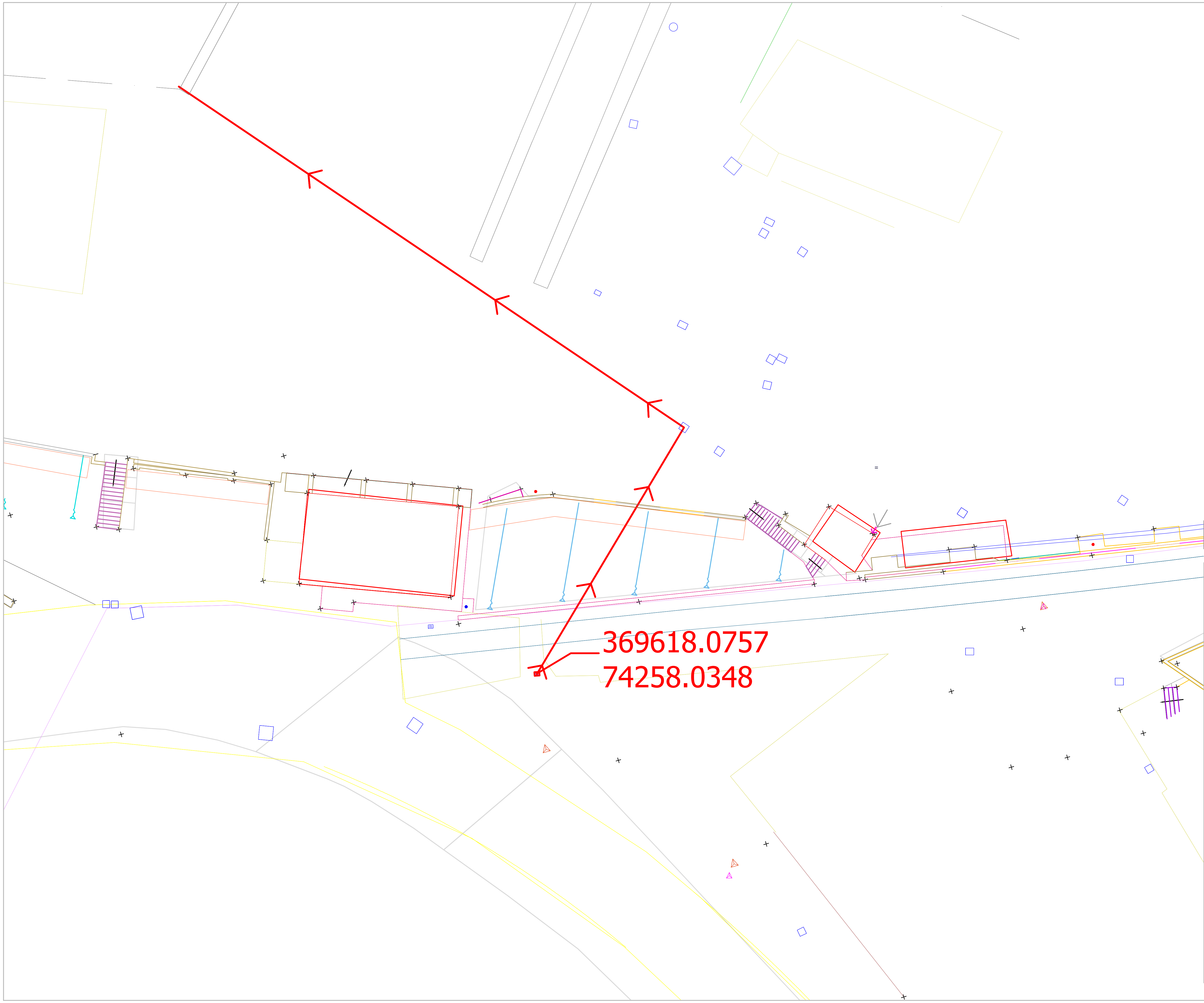
Project details

drawing name	5011(PEATBAY)-001-001		
drawn by	JAMES GREEN	18/05/2021	date
revision		A3@1:250	scale

PORTLAND HARBOUR AUTHORITY

Portland Port Business Centre, Castletown, Portland DT5 1PP

The surface water tie in manholes have been identified in a thick red line. I have also supplied the coordinates for the chamber.



Peat Bay Northern Outfall A3 @ 1-250 (2)

Project details

Untill line can be repaired and CCTV carried out, this is the assumed route of the pipeline.

drawing name	5011(PEATBAY)-001-001
drawn by	JAMES GREEN
date	13/07/2021
revision	2
scale	

PORTLAND HARBOUR AUTHORITY

Portland Port Business Centre, Castletown, Portland DT5 1PP

Drainage Report

Prepared For

JAMES GREEN
PORTLAND PORT
PORTLAND
DORSET

Site

JAMES GREEN
PORTLAND PORT
PORTLAND
DORSET

THE BLOGGS LTD
Surveyor: C. Blogg
TheBloggsLTD@Gmail.com
[redacted]

Total Defects for Project

0 1 1 7 0

Total DRB Grades for Project

1 0 3

Portland Peat Bay - CCTV Survey Report : 04/01/21

Name :	THE BLOGGS LTD
Contact :	Christopher Blogg
Location :	49 Addison Rd
Town :	Southampton
Region :	Hampshire
Postcode :	SO31 7ER
Email :	TheBloggsLTD@Gmail.com
Contact Number :	[redacted]
Surveyor :	C. Blogg
Valid Certification No :	

Client Information

Name :	JAMES GREEN
Contact :	PORTLAND PORT
Location :	PORTLAND PORT
Town :	PORTLAND
Region :	DORSET
Postcode :	
Tel :	
Mobile :	
Email :	
Fax :	

Site Information

Name :	JAMES GREEN
Contact :	PORTLAND PORT
Location :	PORTLAND PORT
Town :	PORTLAND
Region :	DORSET
Postcode :	
Tel :	
Mobile :	
Email :	
Fax :	

Total Defects for Project

0 1 1 7 0

Total DRB Grades for Project

1 0 3

Report interpretation.

Overview:

Each section of the drainage system is allocated a score indicating areas that require attention. These areas are detailed in the Overview section on the following page and also at the bottom right of the first few pages. We use colour coding as an indicator of severity. Additional information concerning rehabilitation options/recomendations is included in the Overview page, which can also be used as an, "at a glance" indication of system condition. More in depth information for each section, Including images can be found later in the report. Grade indicators are as follows:

Grade A: Drain is serviceable no recommendations required

Grade B: There is an issue that might require remedial works

Grade C: There is a defect that requires remedial works, the drain is not serviceable.

Observations:

Each section of drainage reported on (manhole to manhole for example), contains detailed information about that drain and any observations made concerning condition are detailed below the header section. The observations are colour coded and given a severity score, with more significant defects being given a higher score, using a scale from 1 to 5 as detailed below:

Severity 1 to 2: These defects may require remedial monitoring

Severity 3: These defects probably require some form of remedial works

Severity 4 to 5: Defects that will require remedial repair or replacement

General:

The information provided is relevant at the time of survey. The coding system in this report is based on the Manual of Sewer Condition Classification, 5th edition (MSCC5) domestic codes (BS EN 13508-1:2003). This is the official standard for the water industry.

The severity system is based on significant experience in general practice and the 1 -5 grades represent the severity of individual defects: 5 representing a more serious defect.

Please feel free to contact us for further explanation or pricing for remedial works required.

Total Defects for Project

0 1 1 7 0

Total DRB Grades for Project

1 0 3

Overview

Section: 1 **From: MH1** **To: U/S**	Grade C	**DRB Grade: C** **Pipe Size: 300** **Material: Vitrified Clay (i.e. all clayware)** **Use: Surface Water**

Section: 2 **From: MH3** **To: D/S**	Grade A	**DRB Grade: A** **Pipe Size: 300** **Material: Vitrified Clay (i.e. all clayware)** **Use: Surface Water**

Section: 3 **From: MH1** **To: MH2**	Grade C	**DRB Grade: C** **Pipe Size: 300** **Material: Vitrified Clay (i.e. all clayware)** **Use: Surface Water**

Section: 4 **From: MH2** **To: OUTFALL**		**DRB Grade: C** **Pipe Size: 300** **Material: Vitrified Clay (i.e. all clayware)** **Use: Surface Water**

Total Defects for Project

Total DRB Grades for Project

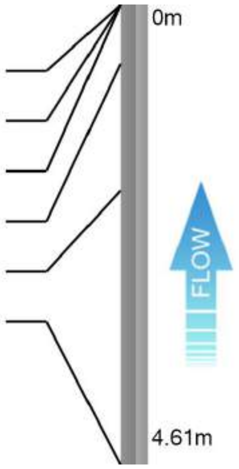
Site: PORTLAND PORT, PORTLAND — Section 1

Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
JAMES GREEN	PORTLAND PORT	PORTLAND		C. Blogg	04/01/2021

Start Node Ref:	MH1	Finish Node Ref:	U/S	Direction:	U	Height/Dia:	300
Start Node Depth:	2.50	Finish Node Depth:	0.00	Use:	S	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	VC	Cleaned	N

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	Remarks
A				D	N	4.61	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole		0_0	
00.00m	WL	Water level 0%			0:00:00
00.00m	JDL	Joint displaced large		0_2	0:00:20
00.59m	H	Hole in drain/sewer 11-02		0_3	0:02:53
01.86m	R	Roots		0_4	0:03:21
04.61m	MHF	Finish node type, manhole		0_99	



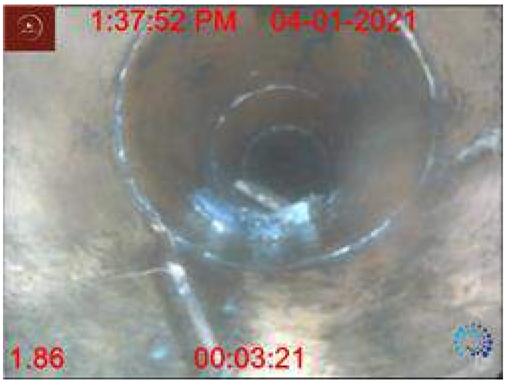
Total Defects for section

0 0 1 2 0

DRB Grade for Section

C

Descriptive Report with Remarks and Observation Images — Section 1

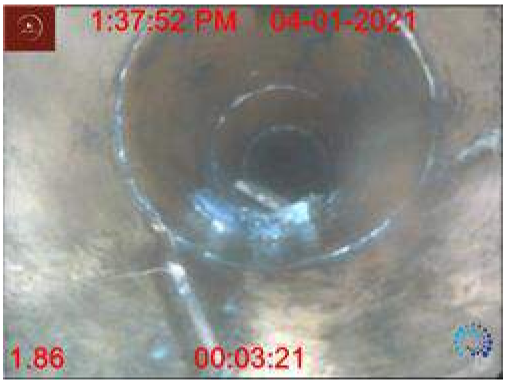
Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole MH1	Image Provided - Ref: 0_0 
00.00m	0:00:00	WL	Water level: 0% Height/Diameter	
00.00m	0:00:20	JDL	Joint displaced large - Severity 4	Image Provided - Ref: 0_2 
00.59m	0:02:53	H	Hole in drain/sewer from 11 o'clock to 02 o'clock - Severity 4	Image Provided - Ref: 0_3 

Total Defects for section

0 0 1 2 0

DRB Grade for Section

C

Pos	Video Ref	Code	Description	Image
01.86m	0:03:21	R	Roots - Severity 3	Image Provided - Ref: 0_4 
04.61m		MHF	Finish node type, manhole MH2	Image Provided - Ref: 0_9999 

Total Defects for section

0 0 1 2 0

DRB Grade for Section

C

Site: PORTLAND PORT, PORTLAND

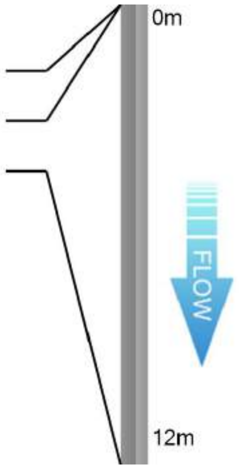
Section 2

Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
JAMES GREEN	PORTLAND PORT	PORTLAND		C. Blogg	04/01/2021

Start Node Ref:	MH3	Finish Node Ref:	D/S	Direction:	D	Height/Dia:	300
Start Node Depth:	3.20	Finish Node Depth:	0.00	Use:	S	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	VC	Cleaned	N

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	Remarks
A				D	N	12	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole			
00.00m	WL	Water level 0%			0:00:00
12.00m	MHF	Finish node type, manhole			



Total Defects for section

0 0 0 0 0

DRB Grade for Section

A

Descriptive Report with Remarks and Observation Images

Section 2

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole MH3	
00.00m	0:00:00	WL	Water level: 0% Height/Diameter	
12.00m		MHF	Finish node type, manhole D/S	

Total Defects for section

0 0 0 0 0

DRB Grade for Section

A

Site: PORTLAND PORT, PORTLAND

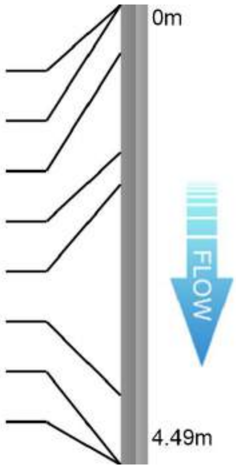
Section 3

Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
JAMES GREEN	PORTLAND PORT	PORTLAND		C. Blogg	04/01/2021

Start Node Ref:	MH1	Finish Node Ref:	MH2	Direction:	D	Height/Dia:	300
Start Node Depth:	3.30	Finish Node Depth:	0.00	Use:	S	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	VC	Cleaned	Y

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	Remarks
A				D	N	4.49	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole		2_0	
00.00m	WL	Water level 0%			0:00:00
00.47m	H	Hole in drain/sewer 12-01		2_2	0:00:22
01.44m	CM	Cracks, multiple 12-12		2_3	0:00:48
01.75m	H	Hole in drain/sewer 11-02		2_4	0:01:08
03.81m	H	Hole in drain/sewer 10-02		2_5	0:01:08
04.49m	BJ	Broken pipe 06-11 at joint		2_6	0:02:09
04.49m	MHF	Finish node type, manhole		2_99	



Total Defects for section

0 1 0 4 0

DRB Grade for Section

C

Descriptive Report with Remarks and Observation Images — Section 3

Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole MH1	Image Provided - Ref: 2_0 
00.00m	0:00:00	WL	Water level: 0% Height/Diameter	
00.47m	0:00:22	H	Hole in drain/sewer from 12 o'clock to 01 o'clock - Severity 4	Image Provided - Ref: 2_2 
01.44m	0:00:48	CM	Cracks, multiple from 12 o'clock to 12 o'clock - Severity 2	Image Provided - Ref: 2_3 

Total Defects for section

0 1 0 4 0

DRB Grade for Section

C

Pos	Video Ref	Code	Description	Image
01.75m	0:01:08	H	Hole in drain/sewer from 11 o'clock to 02 o'clock - Severity 4	Image Provided - Ref: 2_4 
03.81m	0:01:08	H	Hole in drain/sewer from 10 o'clock to 02 o'clock - Severity 4	Image Provided - Ref: 2_5 
04.49m	0:02:09	BJ	Broken pipe from 06 o'clock to 11 o'clock at joint - Severity 4	Image Provided - Ref: 2_6 
04.49m		MHF	Finish node type, manhole MH2	Image Provided - Ref: 2_9999 

Total Defects for section

0 1 0 4 0

DRB Grade for Section

C

Site: PORTLAND PORT, PORTLAND

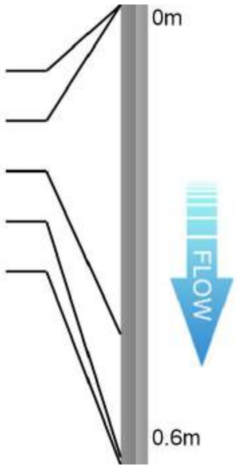
Section 4

Client:	Location (Street Name):	City/Town/Village	Cust Job Ref.	Surveyors Name:	Date:
JAMES GREEN	PORTLAND PORT	PORTLAND		C. Blogg	04/01/2021

Start Node Ref:	MH2	Finish Node Ref:	OUTFALL	Direction:	D	Height/Dia:	300
Start Node Depth:	0.50	Finish Node Depth:	0.00	Use:	S	Shape:	C
Start Node Coordinate:		Finish Node Coordinate:		Material:	VC	Cleaned	Y

Drain Type	Lining Type	Lining Mat.	Year Const.	Weather	Flow Cont.	Length	Remarks
A				D	N	0.6	

Position	Code	Description	CD	Pic	Video Ref
00.00m	MH	Start node type, manhole		3_0	
00.00m	WL	Water level 0%			0:00:00
00.43m	B	Broken pipe 04-07		3_2	0:00:19
00.59m	MC	Material of drain/sewer changes		3_3	0:00:36
00.60m	OCF	Finish node type, other special chamber		3_99	



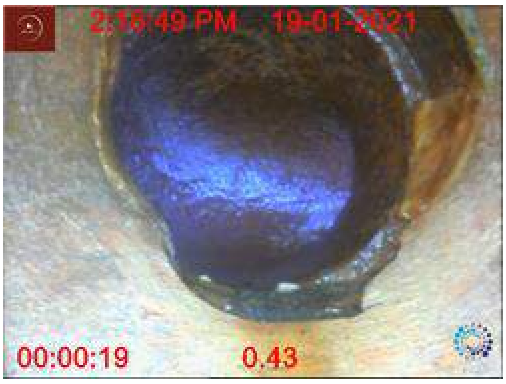
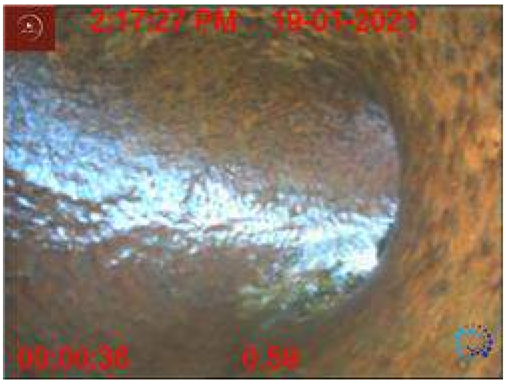
Total Defects for section

0 0 0 1 0

DRB Grade for Section

C

Descriptive Report with Remarks and Observation Images **Section 4**

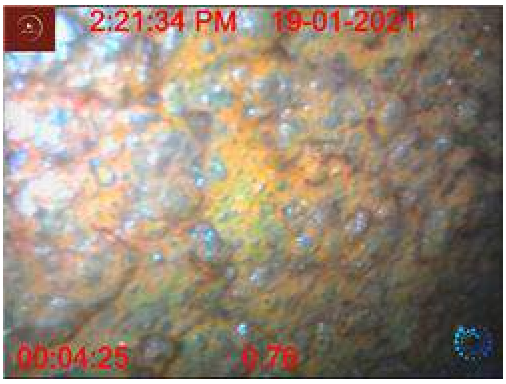
Pos	Video Ref	Code	Description	Image
00.00m		MH	Start node type, manhole MH2	Image Provided - Ref: 3_0 
00.00m	0:00:00	WL	Water level: 0% Height/Diameter	
00.43m	0:00:19	B	Broken pipe from 04 o'clock to 07 o'clock - Severity 4	Image Provided - Ref: 3_2 
00.59m	0:00:36	MCCI	Material of pipe changes to Cast Iron	Image Provided - Ref: 3_3 

Total Defects for section

0 0 0 1 0

DRB Grade for Section

C

Pos	Video Ref	Code	Description	Image
00.60m		OCF	Finish node type, other special chamber OUTFALL UNABLE TO TURN CORNER. AS UNSAFE TO DRIVE CAMERA ANY FURTHER AS RIGHT ON THE OUTFALL	Image Provided - Ref: 3_9999 

Total Defects for section

0 0 0 1 0

DRB Grade for Section

C

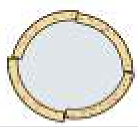
A guide to defects and other observations in drainage systems

More detailed information can be found in the National Standard (BS EN 13508-1:2003) and in the Manual of Sewer Condition Classification (MSCC) 5th Edition, written by the Water Research Centre (WRc).

Use	
Code	**Description**
C	Combined
F	Foul
S	Surface Water
T	Trade Effulent
W	Culverted Watercourse
Z	Other

Common Materials	
Code	**Description**
VC	Vitrified Clay
PVC	Polyvinyl Chloride
CO	Concrete
CI	Cast Iron
PF	Pitch Fibre
PE	Polyethylene
DI	Ductile Iron

Start Node	Description	Finish Node
MH	Manhole	MHF
IC	Inspection Chamber	ICF
GY	Gulley	GYF
RE	Rodding Eye	REF
SK	Soakaway	SKF
BN	Buchan Trap	BNF
BR	Major Connection without Ref	BRF
CP	Cacth Pit	CPF
OC	Other Special Chamber	OCF
OF	Outfall	OFF
OS	Oil Seperator	OSF
WR	Major Connection without mh	WRF
LH	Lamphole	LHF

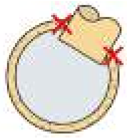
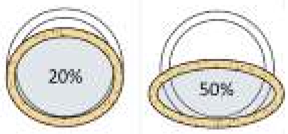
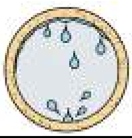
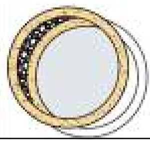
Code	Observation	Description	Attributes	
B	Broken	Pieces pipe have visibly moved	Defined by clock references. Associated with deformity in rigid pipe	
CC CL CM CR	Cracks	Cracks are break lines that are not visibly open	Defined by clock reference position/s. Longitudinal and radiating cracks attract only one clock reference	
CN	Connection	Lateral pipe has been connected after original construction	Described by clock reference position and diameter	

Total Defects for section

0 0 0 1 0

DRB Grade for Section

C

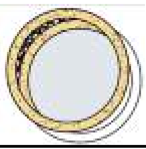
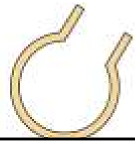
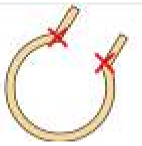
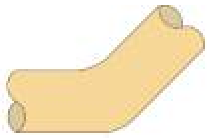
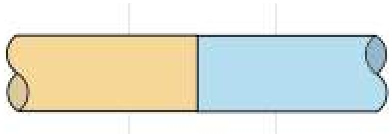
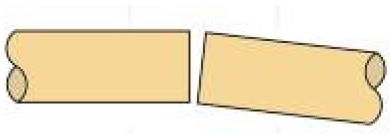
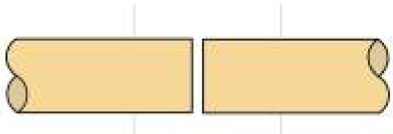
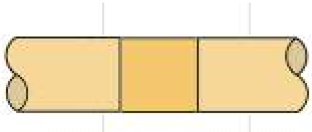
CX(I)	Defective Connection (Intruding)	Defective by intrusion or damage due to factors including: cracks, fractures, obstruction, position etc	Described by clock reference position and diameter (+ % intrusion)	
CU	Loss of Vision	Lens of camera is obscured by debris, water etc. Operator is unable to see drain clearly	'W' can be added if loss of vision is due to wate	
D	Deformed	Pipe has lost its structure	Described by percentage loss of height or width. Recorded in 5% increments	
DEE	Deposits Encrustation	Eg. Attached scale deposits evident	Described by clock referenced position and percentage loss of cross-sectional area (5% increments)	
DEG	Deposits Grease	Attached grease deposits evident	Described by clock referenced position and percentage loss of cross-sectional area (5% increments)	
DER DES	Deposits Coarse/Fine	Settled deposits on the invert of the pipe.	Described by percentage loss of height or diameter. Recorded in 5% increments.	
FC FL FM FR	Fractures	Fractures are visibly open. Pieces of pipe have not moved	Defined by clock reference position/s. Longitudinal and radiating fractures attract only one clock reference	
H	Holes	Section of pipe fabric is missing	Defined by clock reference location. Normally two clock references	
I	Infiltration	Water is infiltrating the pipe, normally via a joint but could be via another defect	Can be described in Remarks using terms such as Seeper, Dripper and Runner	
JDL	Joint Displaced Large	Pipe has moved at joint, perpendicular to axis of pipe	More than 1.5 times the pipe wall thickness must be visible	

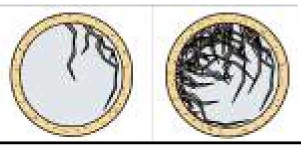
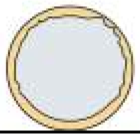
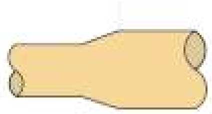
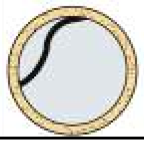
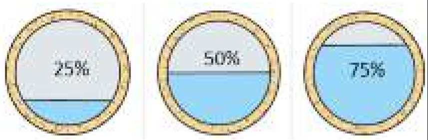
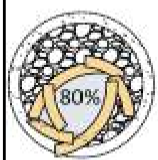
Total Defects for section

0 0 0 1 0

DRB Grade for Section

C

JDM	Joint Displaced Medium	Pipe has moved at joint, perpendicular to axis of pipe	Between 1 and 1.5 times the pipe wall thickness must be visible	
JN	Junction	Lateral pipe was installed at construction	Described by clock reference position and diameter	
JX	Defective Junction	Lateral pipe was installed at construction but is defective in some way	Joint can be defective due to factors including: cracks, fractures, obstruction, position etc	
LD LU LL LR	Line Deviation	LD = Line Down, LU = Line Up, LL = Line Left, LR = Line Right. Not related to CIPP lining.	Additional modifiers are added: Q = Quarter (22.5), H = Half (45), F = Full (90). In degrees.	
LC	Lining Changes	If the drain is lined, the lining material has changed	Position of lining material change	
MC	Material Change	The pipe material has changed	Position of change is noted. Type of material change can be defined	
OB	Obstruction/Obstacle	An obstruction or obstacle is affecting the flow through the pipe	Described in percentage loss of cross-sectional area	
OJL	Open Joint Large	Pipe has moved at joint, along the axis of pipe	More than 1.5 times the pipe wall thickness must be visible	
OJM	Open Joint Medium	Pipe has moved at joint, along the axis of pipe	Between 1 and 1.5 times the pipe wall thickness must be visible	
PC	Pipe Length Changes	Length of individual pipe changes	New length described at this position	

R	Roots	Evidence of root ingress	Roots will normally infiltrate via bad joints, cracks, fractures, breaks etc	
REM	Remark	General remark	Used for additional information	
S	Surface Damage	This might include corrosion, spalling and chemical attack	Position only. Additional information can be added in Remarks	
SA	Survey Abandoned	Used when a survey cannot continue for any reason	The reason for abandoning a survey should be noted in the remarks area	
SC	Shape Changes	Dimension of drain changes	Diameter dimension change recorded. Second dimension is recorded for no circular pipe changes	
SR	Sealing Ring	Sealing ring intrudes into pipe at joint	Described by clock reference position	
V	Vermin	Evidence of Vermin in pipe	Can also be used for evidence within manhole etc	
WL	Water Level	Used to record changes in water level. Always shown at the beginning of every survey, if dry noted as 00.	Described by percentage of height or diameter. Recorded in 5% increments	
XP	Collapsed	Drain is suffering from complete loss of structural integrity. Always followed by SA - Survey Abandoned	Percentage loss of cross-sectional area is recorded. Other related structural defects are not recorded	

POWERFUEL

Portland energy recovery facility

District heating paper

August 2021

Powerfuel Energy Recovery Facility (ERF)

District Heating Paper

Response to request for additional detail in respect of District Heating (Q12) received from Dorset Council on 30 April 2021

August 2021

Contents

1. Introduction

1.1. The purpose of this report is to provide responses to questions raised in the letter dated 30 April 2021 issued by Adrian Lynham on behalf of Dorset Council (the **Request**).

1.2. The points addressed in this paper are in relation to the District Heating section of the Request (point 12), included below for convenience:

1.2.1. **Request point 12:** Further detail in respect of how the prison and young offender institution could be connected to a district heating system supplied from the development. This should include the required infrastructure, technical supporting information, and description of the environmental (including climate change) and economic (for both for the supplier and purchaser) impacts.

1.3. Please note responses to point 13 of the Request ("Further consideration and information in respect of relevant district heating related issues raised through representations on the first consultation as appropriate") are included in the Consultation Response Summary Document.

2. Executive Summary

2.1. The UK is substantially behind other European countries in maximising the benefit of using heat from ERFs in district heat networks.

2.2. Of the existing 54 UK ERF facilities, only 12 currently export heat due to the absence of viable heat offtakers that can commit to long term agreements to support the upfront capital investment required. The result is that UK ERFs are less efficient and have a higher carbon impact than their European counterparts.

2.3. Powerfuel's overall ambition as a developer is to maximise the environmental benefits of the proposed ERF. It has already committed that the proposed ERF will operate as a net-zero carbon infrastructure asset for its operational life – it is believed that this would be the first UK facility to make such a commitment.

2.4. There is a credible opportunity at Portland to provide a district heating network (**DHN**) that would allow local stakeholders to benefit from low carbon heat whilst maximising the overall energy efficiency of the proposed ERF and minimising the carbon impact.

2.5. The Portland site has significant locational advantages as the upfront investment can be supported by contracting to deliver heat to large demand users that have the appropriate financial standing to enter into long term contracts to support the upfront DHN capital investment, being HMP The Verne and HMP YOI Portland (the **Cornerstone Offtakers**).

2.6. The existence of the Cornerstone Offtakers clearly differentiates the proposed ERF from other sites (both in the Dorset Waste Plan and elsewhere the UK) where, whilst the potential to supply heat might exist, commercially the local demand users are too small and/or do not have appropriate financial standing to support the upfront investment such that a DHN will never be delivered.

2.7. The proposed ERF will be CHP enabled from the outset and there is a high probability that the DHN will be delivered, due to the environmental, policy and financial incentives to do so. Whilst provision of the DHN will require further detailed technical and planning analysis (including a separate planning approval from Dorset Council) we have not identified any gating items or risks to delivery.

2.8. The National Waste Strategy (2007) states that "particular attention should therefore be given to the siting of plant to maximise for opportunities for Combined Heat and Power". As such the opportunity to supply a DHN should be afforded substantial weight in the planning balance for the proposed ERF.

2.9. Powerfuel would be happy to agree an appropriate commitment with Dorset Council that would oblige Powerfuel to take reasonable steps to look to implement the DHN, subject to agreement of commercial terms with the Cornerstone Offtakers that mean the DHN project is commercially viable.

3. District Heating Overview

3.1. The Heat Networks (Metering and Billing) Regulations 2014 define a district heat network as "the distribution of thermal energy in the form of steam, hot water or chilled liquids from a central source of production through a network to multiple buildings or sites for the use of space or process heating, cooling or hot water".

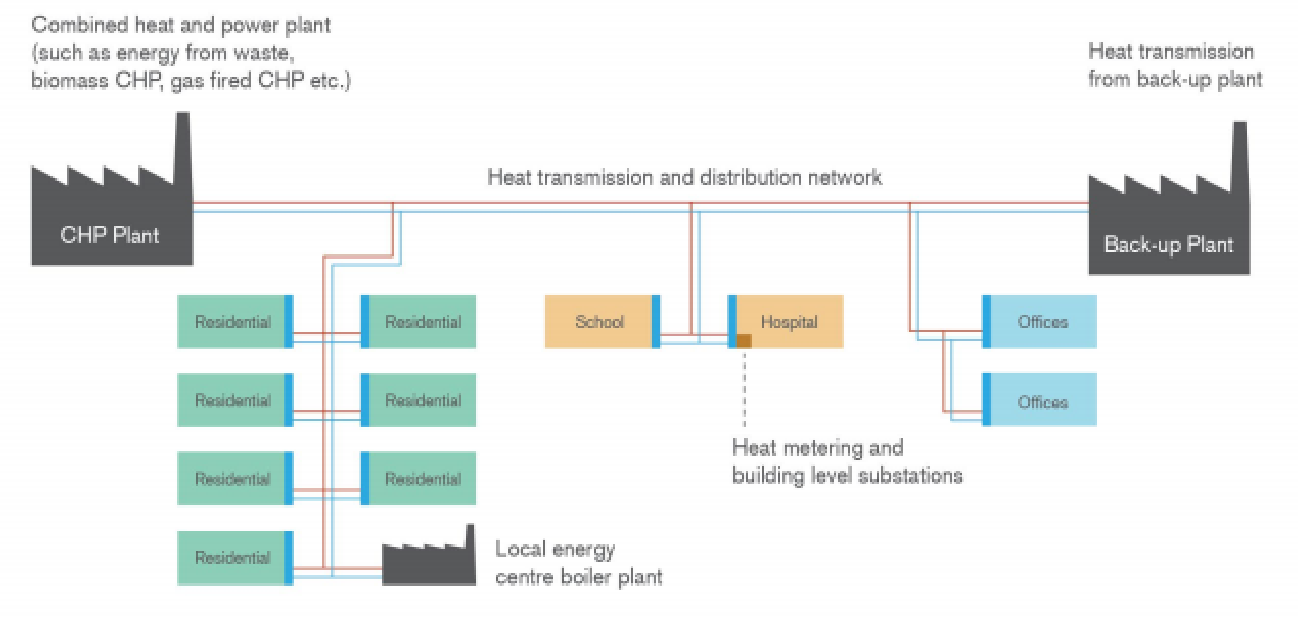
3.2. Whilst heat networks or district heating network (**DHN**) can vary in size, scope and heat source each has at its core one or more significant sources of heat that is then transported by pipes to end demand users, such that multiple buildings or premises can be heated from these centralised sources, as opposed to requiring independent boilers/heaters in each location.

3.3. The heat is typically generated by a related activity that produces heat where that heat is not required by the facility for its regular activities, for example power stations, ERF generators, and process industry.

3.4. Typically, the heat produced by such processes is lost unused as flue gas which is not efficient from an energy perspective.

3.5. A DHN allows the heat, in the form of hot water or steam, to be transported from the point of generation to an end-user. A DHN can serve different types of offtaker, from entire communities to a limited number of high demand users.

3.6. A typical DHN setup is shown below [1]:



[1] London Heat Map Manual 2014

3.7. There are a number of key benefits of district heating:

3.7.1. **Carbon Reduction:** The carbon emissions from a DHN are significantly lower than from traditional fossil fuel sources. This is because the facility that is generating the heat is able to do so at a much lower carbon intensity than even modern gas boilers. As a point of reference, Veolia confirms that their 225,000 tonnes per annum ERF supplied district heating network in Sheffield (developed as part of a 35-year PFI contract with Sheffield City Council) reduces carbon emissions for heating from 184g CO_2/kWh assuming a modern gas boiler (A or B rated) at 80% boiler efficiency (gas) to 8g CO_2/kWh [2].

3.7.2. **Cost:** A DHN allows large industrials and generators to identify a use for heat produced that is otherwise wasted and disposed of via the flue. This means that, absent the upfront capital cost to install the heat network, there are limited ongoing costs, in the case of generation mainly limited to lost electrical power generation to enable heat export. Once the network is installed to service the Cornerstone Offtakers, Powerfuel would anticipate extending to other users which would reduce heating costs for the local community generally.

3.7.3. **Air Quality:** A DHN allows existing heat generation to be largely retired therefore removing any associated emissions from this fossil fuel based generation that would previously have impacted the local population.

[2] https://www.veolia.co.uk/sheffield/dealing-waste/district-energy-sheffield-heat-network/benefits

4. UK Government Policy and Status

Background

4.1. Large heat networks are common in Europe, for example over 50% of the population in some European countries are served by District Heating and in Germany every town with a population of more than 80,000 residents has at least one heat network. This was in part due to historical acceptance and in part as a response to fossil fuel shocks in the 1970s.

4.2. The UK, by contrast, was until recently the world's largest market for gas boilers. In part this was driven by the availability of North Sea gas at the time when central heating was penetrating the UK market and in part due to poor experiences with badly designed and poorly operated early DHN schemes.

4.3. According to a BEIS Energy Trends report published in March 2018, at that time there were around 14,000 heat networks in the UK, of which only 2,000 were classified as district heating. The remaining c. 12,000 were classified as communal heating, meaning that the distribution of heat from a central source in a building that is occupied by more than one final customer, e.g. a hospital, prison or university.

4.4. The Committee for Climate Change Net Zero Technical Report published in May 2019 confirms that direct emissions from buildings resulting primarily from the use of fossil fuels for heat contributed 85mtCO_2e in 2017, accounting for 17% of UK GHG emissions.

4.5. Given the success achieved in decarbonising the electricity system over the past decade, the UK focus is now shifting to other sectors, including the provision of heat.

4.6. Currently, heat networks of all types provide around 2% of the UK's heat.

4.7. Full decarbonisation of heat is one of the biggest challenges in reducing emissions from the energy system to net zero by 2050. The Committee on Climate Change's central scenario for the fifth carbon budget assumes heat networks will need to provide at least 18% of the UK's heat by 2050 if the net-zero ambition is to be achieved.

4.8. As a result Government policy has focussed on this area, both in requiring the public sector to find routes to decarbonise where possible and putting in place subsidy and incentive programmes to bring forward private investment capital in heat networks, in the same way that the Government initially provided subsidy/incentives to enable the power generation transition.

ERF - Existing Contribution

4.9. Due to the existence of developed DHNs it is common for European ERFs to generate both power and heat. Around 15 million citizens in Europe receive heat generated by ERF plants via DHNs [3].

4.10. In contrast, as a result of historic under-investment in DHNs and the location of historical ERF facilities very few UK ERFs provide heat. This is very inefficient from an energy perspective and also results in a greater overall carbon impact.

4.11. Figures provided by Tolvik Consulting below show that of the 54 ERFs operating in the UK in 2020 only 12 currently provide any form of heat offtake.

<table>
<tr><th>EfW</th><th>First Operational Year, EfW</th><th>First Operational Year, Heat</th><th>2020 Export GWh_{th}</th><th>Heat/Steam Offtake</th></tr>
<tr><td>Runcorn</td><td colspan="2">2015</td><td>480</td><td>Steam supply to Ineos</td></tr>
<tr><td>Eastcroft</td><td colspan="2">1970's</td><td>405</td><td>Enviroenergy for electricity generation and hot water</td></tr>
<tr><td>Wilton 11</td><td>2016</td><td>2018</td><td>373</td><td>Adjacent Wilton International site</td></tr>
<tr><td>Kemsley</td><td colspan="2">2020</td><td>123</td><td>DS Smith papermill</td></tr>
<tr><td>Sheffield</td><td>2006</td><td>Pre 2006</td><td>95</td><td>District heating operated by Veolia</td></tr>
<tr><td>Devonport</td><td colspan="2">2015</td><td>54</td><td>Adjacent naval dock yard</td></tr>
<tr><td>Gremista</td><td colspan="2">1990's</td><td>50</td><td>District heating on the Shetland Islands (estimated)</td></tr>
<tr><td>SELCHP</td><td>1994</td><td>~2000's</td><td>40</td><td>District heating operated by Veolia</td></tr>
<tr><td>Leeds</td><td>2015</td><td>2018</td><td>14</td><td>District heating operated by Vital Energi</td></tr>
<tr><td>Coventry</td><td>1975</td><td>~2010-15</td><td>8</td><td>District heating operated by Engie</td></tr>
<tr><td>NewLincs</td><td colspan="2">2004</td><td>7</td><td>To local industry</td></tr>
<tr><td>Edmonton</td><td>1975</td><td>recently</td><td>2</td><td>Very modest export reported</td></tr>
<tr><td>Total</td><td></td><td></td><td>1,651</td><td></td></tr>
</table>

Source: Tolvik Consulting

4.12. In 2020 the UK ERF sector exported 7,762 GWh_e and 1,651 GWh_{th}. This means that 82% of energy produced was power export with only 18% heat export.

[3] Joint-statement of the role of waste-to-energy in the EU taxonomy, 19 October 2020

4.13. Contrasting this with the European position, where on average almost 50% of the energy produced is heat leads to the conclusion that existing UK ERFs are losing significant potential value by only being able to run their facilities in power-only due to the lack of DHN infrastructure and local, high demand, bankable offtakers.

4.14. In addition to lower revenues, operating in power-only mode also results in higher overall emissions and higher carbon impact, in both cases because the offset that a DHN provides on reducing high-emitting gas boilers is not realised.

4.15. For those limited number of facilities that do currently provide a DHN offtake, in the majority of cases the heat offtake was developed in a phased approach post the construction of the ERF facility.

4.16. This is because it is necessary to identify and contract with heat offtakers prior to making the significant capital investment required to install the DHN and it is only possible to progress formal contractual discussions with offtakers once they are confident that the source of the heat (i.e. the ERF facility) will be delivered.

ERF - Existing Requirements

4.17. UK ERF facilities are not currently required to be able to provide heat in order to be developed and operated, although this is encouraged in planning policy.

4.18. However, in order to achieve an Environmental Permit, a UK ERF that has a throughput of more than 3 tonnes per hour of non-hazardous waste (as the proposed ERF will have) is required to comply with CHP-ready Guidance published by the Environment Agency in February 2013 and also, since March 2015, carry out a cost-benefit analysis (CBA) of opportunities for CHP under Article 14 of the Energy Efficiency Directive when applying for an Environmental Permit.

4.19. The Environment Agency requires developers to demonstrate best available techniques (BAT) for a number of criteria, including energy efficiency.

4.20. One of the principal ways of improving energy efficiency is through the use of CHP, for which three BAT tests exist. The first involves considering and identifying opportunities for the immediate use of heat off-site. Where this is not technically or economically possible, the second test involves ensuring that the plant is built to be CHP-ready. The third test involves carrying out periodic reviews to determine whether the situation has changed and if there are opportunities for heat use off site.

4.21. Fichtner Consulting Engineers (**Fichtner**) has submitted a report for the proposed ERF for the purposes of the Environmental Permit application. This report includes a CHP-Ready Assessment and a CBA analysis, both produced in line with current Environment Agency guidance.

4.22. If there are existing agreements in place with heat offtakers then a facility can be classified as a CHP plant and therefore will meet the first of the BAT tests. This is not a typical position in the UK, given the lack of infrastructure to enable the offtake of heat and the reluctance of offtakers to engage until a potential ERF is fully permitted.

4.23. If there are not agreements in place with heat users (as is the case for the proposed ERF) then a project that is capable of achieving an Environmental Permit is likely to meet the criteria to be classified as a "CHP-ready facility", which means that it will be designed to be ready, with minimum modification, to supply heat in the future. This is the case for the proposed ERF.

4.24. However, post receipt of the Environmental Permit, historically ERFs have been built and operated on a power-only mode basis with the result that the efficiency and carbon benefits are significantly lower than could otherwise be achieved.

Typical Barriers to ERF Heat Offtake

4.25. The majority of ERFs do not export heat. The key reason for this is because there are no available offtakers that have sufficient heat demand and financial standing, locally to support the upfront capital investment in the DHN.

4.26. Historically ERF facilities have been located in rural areas, away from large housing or industrial communities. This means that a heat connection is not viable as the distance to the end users is too great. Again, this contrasts with Europe where government and municipal authorities influence waste and energy planning, resulting in the development of ERF facilities close to end heat users (in many cases within large cities).

4.27. Where location is not a challenge there is still the investment risk to be considered. A DHN is a high capital expenditure project with uncertain returns where the supply is to a disparate group of offtakers – from an investment perspective whilst the capital expenditure is understood the revenues can be very uncertain – both volume or heat and the price paid per unit of heat can be variable. This contrasts with the economics of an ERF where a number of the key revenue streams can be addressed via contracts.

4.28. The DHN schemes that have been successfully implemented in the UK to date have been possible due to local and national government support/subsidy. The below table provides some context on the existing schemes and public support provided.

Existing UK DHN Schemes

EfW	Offtake	Government Support
Eastcroft	Enviroenergy for electricity generation and hot water	Owned by Nottingham City Council
Sheffield	District heating operated by Veolia	Originally a joint venture with Sheffield Council. Currently wholly owned by Veolia
Gremista	District heating on the Shetland Islands	Developed by Shetland Charitable Trust
SELCHP	District heating operated by Veolia	Public/private sector partnership, originally developed by London Boroughs of Lewisham and Greenwich
Leeds	District heating operated by Vital Energi	Public/private sector partnership with Leeds City Council – funding support from West Yorkshire Combined Authority and Leeds City Region Enterprise Partnership
Coventry	District heating operated by Engie	Development of DHN by Engie under a 25 year concession agreement with Coventry City Council
Edmonton	Very modest export reported	Funding provided by The Mayor of London's Energy Efficiency Fund, the UK Government Heat Network Investment Programmes and from Enfield Council

Source: Powerfuel Analysis

Portland ERF Advantages

4.29. The proposed ERF has a significant advantage due to its location close to HMP The Verne and HMP YOI Portland (**Cornerstone Offtakers**).

4.30. Both the Cornerstone Offtakers have significant demand for heat and that could facilitate investment in a DHN that could benefit the wider community.

4.31. The specific advantages for Portland are:

4.31.1. **Location** – both potential offtakers are close to the proposed ERF location. This means that the capital expenditure is much lower than would be the case for the majority of UK ERFs.

4.31.2. **Demand** – both the Cornerstone Offtakers are large heat demand users and, importantly, this demand can be accurately projected to remain over the long term.

4.31.3. **Financial Standing** - a key concern when considering investment in a DHN is the certainty of future cash flows. A long term contract for heat (and potentially power) with HMP The Verne and HMP YOI Portland would generate the long term, contracted and therefore bankable cashflows that would allow external finance to be raised to fund the upfront capital investment.

4.32. The existence of the Cornerstone Offtakers is a key differentiator of the proposed ERF from other facilities in the UK and other allocated sites in the Dorset Waste Plan in the Dorset context, which do not have such an advantage. Once the Cornerstone Offtakers are in place then there is clear potential for the expansion to supply other customers on the island including community infrastructure and social and private housing both existing and proposed/planned.

4.33. As such the proposed ERF provides an opportunity to use a merchant ERF facility to provide heat offtake to a local community. Whilst this is common in Europe this would be a key step-forward for Dorset, and the UK as a whole, in demonstrating its commitment to net zero and the circular economy.

4.34. Siting the proposed ERF at Portland is also consistent with national policy. The National Waste Strategy 2007 states in paragraph 28 of Chapter 5 that:

"Any given technology is (where applicable) more beneficial if both heat and electricity can be recovered. Particular attention should therefore be given to the siting of plant to maximise the opportunities for Combined Heat and Power".

4.35. The proposed ERF at Portland provides an opportunity to deliver CHP to local high demand users and, in due course, the local Portland community. None of the other proposed sites identified in the Dorset Waste Plan would be capable of delivering a similar opportunity and this therefore represents a significant advantage in the context of DWP Policy 4.

5. Planning and Implementation

Planning Approach

5.1. Neither the Powerfuel ERF planning application nor environmental permit ("EP") application currently includes details of the physical infrastructure required for a DHN. The majority of the infrastructure required for a DHN will be located outside of the planning application "red line".

5.2. This is standard for ERF applications of this type in the UK, where the primary purpose is not heat supply and where contractual agreements with heat offtakers are not in place upfront.

5.3. Potential customers to a DHN will need to do significant work to understand technically how they could participate in the DHN. Until the heat source has been consented and is certain to be delivered, that work could be premature and without completing this they cannot contract their participation.

5.4. Powerfuel cannot "force" a customer to take the heat offered but can make this available to the customer such that it would be rational to contract with the proposed ERF (both on a carbon and cost grounds). Note this contrasts with the typical European approach where "mandatory connection" is a feature such that a proposed energy generator has a high degree of certainty that the heat will be demanded.

5.5. Powerfuel has engaged with the Cornerstone Offtakers over the past 12 months and feedback suggests that a heat offtake would be an attractive option, specifically given the UK Government focus on reducing the carbon impact of its estate.

5.6. Powerfuel has also completed an initial technical and planning review of the potential DHN to confirm there are no gating items or risks to delivery of the DHN on the assumption that an appropriate contract can be agreed with the Cornerstone Offtakers.

Planning – Potential Route Appraisal

5.7. There is an identified route for heat pipes that can convey the heat from the plant to identified potential customers along the existing road network.

5.8. The ES addendum confirms that the provision of district heating, including constructing the required DHN infrastructure and hosting pipes in the road, would not lead to any significant adverse environmental effects. Arup has confirmed that the local terrain would not create a barrier to the installation of a DHN.

Implementation

5.9. Powerfuel would expect to implement the DHN in phases, beginning with the Cornerstone Offtakers. This will enable the infrastructure and benefits of heat supply to be realised quickly but allow for expansion of the DHN to other users over time. Appropriate technology specification would facilitate future modular extensions and can therefore be seen as "future proof".

5.10. The initial installation will be along the DHN "southern route" to provide heat to the Cornerstone Offtakers with further expansions of the "southern route" and delivery of the "northern route" to follow.

5.11. Prior to implementation a separate planning application will need to be submitted and approved by Dorset Council and appropriate investment funding will need to be identified, supported either by contracted cashflows from the Cornerstone Offtakers or by Government grant funding.

5.12. In relation to the Cornerstone Offtakers, Powerfuel has engaged with the Ministry of Justice (**MoJ**), AECOM (their external engineering consultants), the Cabinet Office and BEIS over the past 12 months.

5.13. It should be noted that it is unusual for an ERF developer and potential offtakers to engage in this way at this (pre-planning) stage but in this case all parties recognise the unique opportunity at Portland to develop and implement a merchant CHP ERF facility that will also be able to deliver low carbon heat over the long term to the MoJ that will reduce the carbon impact of the estate.

5.14. The MoJ sustainability team and AECOM have participated in a number of calls with Powerfuel and Arup to ensure that the key technical requirements were understood on both sides.

5.15. BEIS has recommended that Powerfuel engage with wider stakeholders and potentially seek to collaborate with Dorset Council and other public bodies (e.g. Portland Town Council) with a view to submitting an application for grant funding to support a wider DHN.

5.16. Once planning approval for the proposed ERF is confirmed, Powerfuel expects to further develop the technical solution with the MoJ/AECOM and progress with local bodies as recommended by BEIS.

5.17. It should be noted that the availability of a DHN solution is often uncertain at the planning stage. Reference should be made to Paragraph 237 of the Government's Review of Waste Policy which states

"*Experience to date with CHP infrastructure has highlighted a potential difficulty in securing long term customers for heat ahead of construction of the plant".*

5.18. Whilst Powerfuel has not secured the Cornerstone Offtakers it has committed significant time and cost to develop a proposal with the MoJ and review the potential for a DHN such that it is confident that this could be delivered.

5.19. Powerfuel would be happy to agree an appropriate commitment with Dorset Council that would oblige Powerfuel to take reasonable steps to look to implement the DHN, subject to agreement of commercial terms with the Cornerstone Offtakers that mean the DHN project is commercially viable.

6. Technical Infrastructure and Design [4]

Overview

6.1. The proposed ERF is expected to process an average throughput of c. 22.8 tonnes per hour Refuse Derived Fuel (**RDF**), resulting in a total throughput of 183,000-202,000 tonnes RDF per year, depending on delivered plant efficiency and availability.

6.2. The RDF typically has a net calorific value of 11MJ/kg which allows the proposed ERF to potentially export both power and heat.

6.3. To export power the proposed ERF requires a connection to a local electricity distribution network. The connection in this case is to SSE Portland Sub-Station, located on Lerret Rd approximately 1.5 km to the west of the site. The route of the grid connection would follow existing highways. This connection allows the proposed ERF to export a maximum level of around 15.2MWe, on the assumption that it is operated in power-only mode, and no heat is exported.

6.4. It is also possible to operate the proposed ERF such that power and heat are produced. This increases the efficiency of a plant (greater energy, electrical and thermal, produced for each tonne of waste) and reduces its carbon impact. On the basis that the average heat load of 2.6MWth is exported, this reduces the power export by c. 400kWe.

Proposed ERF - Generation Loads

6.5. The proposed ERF comprises a single-line RDF combustion plant. The RDF is combusted in a moving grate furnace that produces high temperature combustion gases.

6.6. The gases from the furnace will then be passed through a heat recovery steam generator (boiler) to generate high pressure and temperature steam, which will then be passed through a steam turbine to generate electrical energy.

6.7. In the event that heat users are identified and can be connected, the turbine will be able to export medium pressure steam from an intermediate bleed point with the heat transferred to a hot water circuit to provide heat to users.

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[4] Technical details have been confirmed with Ove Arup & Partners Limited

Proposed ERF Operational Performance

Operational Performance	Minimum Stable Plant Load (70%)	Proposed Operational Plant Load (100%)	Maximum Plant Load (112%) [5]
Thermal Input (MW)	49 MW	70 MW	78 MW
Electricity only mode – net electrical output (MW)	12.7 MW	15.2 MW	17.4 MW
Electricity only mode – net electrical efficiency (%)	20.0%	21.8%	22.2%
CHP mode [6] – net electrical output (MW)	9.4 MW	14.8 MW	17.0 MW
CHP mode – net heat output (MW)	2.6 MW	2.6 MW	2.6 MW
CHP mode – net electrical efficiency (%)	19.3%	21.3%	21.8%
CHP mode – net heat efficiency (%)	5.2%	3.6%	3.2%
CHP mode – total efficiency, electricity and heat (%)	24.6%	25%	25.1%

Cornerstone Offtaker - Technical Requirements

6.8. Heat will be supplied to the Cornerstone Offtakers by a DHN. Indicative export and return requirements for each of the Cornerstone Offtakers is provided in the table below.

	HMP The Verne	HMP YOI Portland
Annual Energy Demand (MWh)	6,966	7,149
Peak Heat Load	4.1 MW	4.2 MW
Average Heat Load	874 kW	898 kW
Description of Heat Load Extraction	Hot Water	Hot Water
Description of Heat Load Profile	Variable	Variable
Flow Temperature	80°C	80°C
Return Temperature	55°C	55°C

[5] Note: it would only be possible to operate at this level for a limited duration
[6] Assuming average heat export

DHN Process Overview

6.9. The DHN is a closed network that circulates hot water via a pipe network at a temperature of c. 80°C from the proposed ERF to the Cornerstone Offtake facilities to provide heat. The water then returns to the proposed ERF along a second set of pipes are a lower temperature of c. 55°C.

6.10. The process starts at a heat exchanger (primary heat exchanger) where the cool water returning from the offtakers absorbs the heat from the identified steam extraction points in the proposed ERF.

6.11. The higher temperate water then leaves the proposed ERF and travels along the pipe network to the offtaker where it then transfers the heat to a second closed water network (the customer's network) via heat exchangers (secondary heat exchanger).

6.12. The water in the DHN will then return to the proposed ERF facility at the lower temperature and the process starts again.

DHN – Key Technical Infrastructure

6.13. The key equipment required as part of a DHN scheme include the following:

6.13.1. **Primary heat exchangers/substations** - steam extraction from the steam turbine is controlled based on the demand from the heat network, such that only the quantity of steam required would be extracted, and the remainder would be utilised for power generation. This enables the plant performance to be optimised regardless of district heating demand. The design of the proposed ERF incorporates an appropriately selected extraction condensing steam turbine, which allows for a continuous controlled bleed of medium pressure steam for heat use as well as for in-plant uses (deaeration of feed water). The amount of steam bled can be varied up to the maximums given above to enable the use of heat as and when this is required, without significantly affecting electrical efficiency for the plant running in "electricity only" mode. Pipes for this bleed have been sized appropriately to cater for the maximum flows given above, and blanked connections have been incorporated into the design to allow connection with minimal site works. Sufficient space has been allocated within the turbine hall for the steam-water heat exchangers required to convert the heat into usable hot water for the network.

6.13.2. **Pipework** - the hot water will be carried from the primary heat exchanger to the customers' network through pre-insulated carbon steel pipes. This type of pipe is typically used in district heating applications. The installation of district heating networks within roads is very common and governed by relevant British Standards, such as BS EN 13941:2019 *District heating pipes – Design and installation of thermal insulated bonded single and twin pipe systems for directly buried hot water* *networks.* Two pre-insulated pipes will be installed beneath the road network: one carrying the heated water from the ERF to the heat users and one bringing the water back to the ERF to be reheated and re-circulated. Full details of the installation will be confirmed at the detailed design and planning stage, but it is currently envisaged that the pipes will be buried approximately 500 mm below the ground surface in a trench approximately 1,500 mm wide at the top, reducing to approximately 1,000 mm wide at the bottom. The trench will be excavated in lengths of around 50 m to 60 m at a time to allow the pipes to be installed.

6.13.3. **Distribution pumps** - distribution pumps are the most important plant item for distributing the heat through the heat network carried by the hot water from the heat source to the customers. The pumps are controlled using variable speed drives which adjust the frequency of electricity supply to the pump to change the flow rate of the water as required. Without distribution pumps the DHN cannot function and therefore standby pumps are commonly installed to provide contingency. Various ancillary items including isolation valves, differential pressure gauges and strainers are installed around pumps to assist in monitoring, isolating for maintenance and protection of the impellers from particles that may be entrained in the flowing water.

6.13.4. **Pressurisation pumps -** pressure must be maintained at all points to ensure that sufficient water is maintained within the system to distribute heat and to prevent water vaporising within the pipe at the lowest pressure point. For this reason pressurisation pumps are essential and commonly linked to an expansion tank which allows for the removal of excess water and pressure from the system when the temperature increases and the water expands. As the temperature of the system falls, the same water held in the expansion tank may be re-introduced into the system to re-stabilise the pressure. Capture and re-use of this water is important since it is likely to be treated water and may retain some useful thermal energy, as such it is more valuable than the alternative of making up the system with fresh cold water. In some cases, directly connected pressurised thermal stores may act as expansion vessels.

6.13.5. **Valves -** isolation valves will be installed at regular intervals on the system and commonly at pipe work branches located in valve pits external to the consumer buildings to enable the supply to be controlled without having to enter the building. Isolation valves improve the resilience of the network by enabling parts to be shut off and sometimes bypassed. This allows damaged sections to be investigated and repaired without affecting the rest of the system, thereby minimising disruption to other consumers.

6.13.6. **Customer Side Technology –** the key equipment at the customer side is the secondary heat exchanger which transfers the heat from the DHN so that it can then be used within the customer building, without any direct contact between the DHN hot water and the customer network hot water.

The customer will also require control values, pressure/temperature instrumentation and a heat meter.

6.14. The expected design life for a DHN is typically assumed to be 30 years for the purposes of economic assessments but when correctly designed and installed it is reasonable to expect a lifespan of up to 50 years. The design life for the ancillary equipment, including the heat generating plant, distribution and pressurisation equipment and heat interface units is dependent on the type of technologies applied.

Private Electricity Supply

6.15. In addition to providing heat via a DHN, the proposed ERF would also be capable of supplying electricity direct to the Cornerstone Offtakers over a private network, thereby avoiding costs and losses arising in the public transmission and distribution system.

6.16. Electricity supply made in compliance with the Electricity Class Exemption Order does not have to be licensed and the regulatory burden of licensed supply does not apply.

6.17. Connecting the Cornerstone Offtakers to a private electrical network will require some alterations to the existing installations but this should not present any material difficulties.

6.18. The electrical cable should be able to follow the same route as the DHN. To cover the capital costs associated with a private wire solution, it will normally be necessary to enter into a long-term contract with the intended customers. The price at which electricity is to be supplied will also normally be benchmarked, to ensure customers obtain good value for money.

7. Environmental and Climate Change Impact

7.1. Fichtner Consulting Engineers Limited (**Fichtner**) have provided an update to the carbon assessment for the proposed ERF as a response to the request for further detail received from Dorset Council on 30 April 2020 (see Q22). This forms appendix 4.1 to the ES addendum.

7.2. The assessment compares the carbon impact of the proposed ERF to a number of comparators, including scenarios where the proposed ERF operates in power-only mode, CHP mode and where it provides shore power electricity supply.

7.3. The calculated carbon benefit of the proposed ERF increases by around a further 3,000 tCO_2e emissions per annum when the proposed ERF is operated in CHP mode, as opposed to power-only mode.

7.4. This reduction in CO_2e emissions is due to the avoided emissions produced by natural gas boilers at customers of the DHN, which will no longer be required.

8. Economic Impacts

Environmental Permit - Analysis & Assumptions

8.1. As part of the Environmental Permit application an assessment of the costs and revenues associated with the construction and operation of the proposed district heating network was undertaken by Fichtner using the Environment Agency's CBA temple. This is contained in the CHP-Ready Assessment document (**CHP-R Assessment**)

8.2. The CHP-R Assessment takes account of the assumed DHN capital and operating costs, heat sales revenue and lost electricity revenue as a result of diverting energy to the heat network.

8.3. The analysis assumes a capital investment cost for the DHN of £9.42m spread over a 3 year investment horizon which is based on Fichtner's experience from various reference projects that it has worked on previously.

8.4. The output of the economic analysis is that the nominal project internal rate of return (IRR) for the DHN at the proposed ERF is calculated to be 11.7%.

8.5. IRR is a metric used by investors to determine the future profitability of an investment. The internal rate of return is the discount rate that makes the net present value (NPV) of all cash flows from a particular project equal to zero. More simply, it is the average rate of return an investor should expect to achieve on a certain investment amount over a given time period.

8.6. In the case of the proposed DHN, a £9.42m capital investment would realise total cashflow receipts over time of approximately £44m, i.e. an investor would recover their upfront capital investment and earn an average return on this investment of 11.7%, every year for 30 years.

8.7. The upfront capital expenditure will need external financing and the investor will have a specified return hurdle rate that it will need to exceed in order to conclude the investment is attractive.

8.8. The CHP-R Assessment uses an investment hurdle rate of 17%. This is the rate that is suggested by the Environment Agency and is used across the market by all consultants when completing this analysis for the purposes of applying for an Environmental Permit.

8.9. The result is that the CHP-R Assessment concludes that the project is economically unviable. This is because whilst it delivers an 11.7% return on investment for every year over a 30 year term, this is lower than the 17% that the CHP-R Assessment assumes is required by an investor.

Commercial Analysis

8.10. The DHN at the proposed ERF is significantly different from a “standard” ERF DHN in two key ways.

8.10.1. Firstly, it is located near to two major users of heat where it is reasonable to expect that this heat will continue to be required for the lifetime of the DHN; and

8.10.2. Secondly, the potential customers (the Cornerstone Offtakers) have the appropriate financial standing to enter into long term contracts to support the upfront capital investment.

8.11. A “standard” ERF DHN does not have these advantages. Typically, it would need to contract with a disparate group of offtakers, all of varying credit quality, with no guarantee that these offtakers will survive the full operational life of the DHN. This uncertainty results in the 17% return hurdle assumed to be required by a DHN investor under the Environmental Permit CHP-R analysis.

8.12. However, in this case the proposed ERF would benefit from certain volume and contracted long term cashflows backed by UK Government credit.

8.13. For reference BEIS currently applies a 7.6% investment hurdle rate for EfW CHP[7]. It is therefore commercially logical to assume that a DHN investment that relies on the underlying performance of the EfW CHP would attract a similar hurdle rate, potentially with a small increase given the increased functional risk of the DHN over and above the proposed ERF.

8.14. In any case, as a result the hurdle return that an investor would need to provide the DHN funding will be below the 11.7% IRR, and therefore will mean the project is investable and economically viable.

8.15. As a point of reference the “energetic” scheme, sponsored by Enfield Council was setup to serve 15,000 properties using low-carbon heat created as a by-product from the Edmonton Eco Park ERF. The Council expected to invest £58m of a total capex cost of £85m (the difference covered by generated revenue).

8.16. The upfront expected IRR of the scheme, based on pre-construction assumptions of development build-out rates, was 6.74% post-tax (approximately 8.3% pre-tax), significantly lower than the 11.7% IRR expected for the DHN scheme at the proposed ERF.

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[7] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/911817/electricity-generation-cost-report-2020.pdf

8.17. Since inception the scheme has been successful in receiving over £50m in low cost loans and grant funding from Government bodies, including the HNIP, which is expected to allow expansion of supply to over 50k homes.

Cornerstone Offtaker - Analysis

8.18. From the perspective of the Cornerstone Offtakers, the potential to receive heat direct from the proposed ERF could provide a number of benefits.

8.19. In discussions with the Ministry of Justice to date it is clear that the key benefit identified is the potential to reduce the carbon impact of the Government estate.

8.20. If a DHN is installed, the low carbon heat provided by the ERF is expected to reduce the carbon impact by approximately 3,000 tonnes CO_2e per annum, relative to the existing high-emission gas boiler solution [8].

8.21. In addition, whilst we have not discussed detailed commercial terms at this stage (given neither the proposed ERF nor a potential DHN have local planning permission) it is anticipated that provision of direct heat would result in a cost benefit for the MoJ.

Portland Community - Analysis

8.22. On the assumption that a DHN is able to be installed this would provide a key first step to expanding this to the wider community at Portland, as has been seen in numerous other cases in the UK (see list of existing DHNs in section 4.28, most of which continue to expand).

8.23. The Committee for Climate Change has advised the UK Government it needs to consider phasing out all new gas boilers in the UK by 2035, and potentially earlier if it is to achieve its legally binding net zero 2050 target.

8.24. Given the prohibitive cost of alternative solutions and the limited space available on Portland it is likely to be difficult to replace existing gas or oil boilers with air or ground source heat pumps for the resident population.

8.25. In the event a DHN is installed this could provide part of the solution for the wider community.

[8] Note this figure assumes that the DHN supplies heat to the Cornerstone Offtakers and also the other identified potential customers (Osprey Leisure Centre and Comer Homes)

Portland energy recovery facility

Post combustion carbon capture plant pre-feasibility assessment

August 2021

FICHTNER

Consulting Engineers Limited

Portland ERF Post Combustion Carbon Capture Plant

Powerfuel Portland Limited

Pre-feasibility Assessment

ENGINEERING CONSULTING

Document approval

	Name	Signature	Position	Date
Prepared by:	C. Andrea Jordan	[redacted]	Lead Consultant	03/08/2021
Checked by:	Stephen Othen	[redacted]	Technical Director	03/08/2021

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0	03/08/2021	First issue	CAJ	SMO
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Contents

1 Introduction

1.1 Background

Powerfuel Portland Limited (Powerfuel Portland) is developing an energy recovery facility (ERF) with the capacity to process 183,000 tonnes per year of refuse derived fuel (RDF) at the Portland Port on the Isle of Portland in Dorset. The facility will be known as the Portland ERF and will have a gross power output of 18.1 MW and will emit approximately 180,000 tonnes of carbon dioxide (tCO_2) per annum at the nominal design capacity. Given the unrecovered biogenic content of the residual waste, Government policy classifies this ERF as a partially renewable generation source.

As part of the UK's commitment to meeting its net zero target by 2050, the UK government has identified carbon capture, usage and storage (CCUS) as a key route for decarbonisation of sectors such as energy from waste (EfW)[1]. As a consequence, and consistent with its stated approach to minimise the carbon intensity of the Portland ERF, Powerfuel Portland is assessing the feasibility of integration of a post combustion carbon capture (PCCC) plant into the Portland ERF. Operation of a PCCC at the Portland ERF would provide a means of capturing approximately 95% of the CO_2 produced. The CO_2 would then be transported by ship for utilisation and/or storage offsite.

Fichtner Consulting Engineers has been engaged to carry out an initial assessment to determine the potential technical feasibility of integrating a PCCC plant with the proposed ERF.

1.2 Objectives

The primary objectives of the pre-feasibility study are as follows:

1. Identify the most suitable PCCC technology for operation at the Portland ERF;
2. evaluate the technical feasibility of integration of PCCC at the ERF; and
3. provide high level commentary on the possible capital and operating costs for the PCCC plant and the potential government support to facilitate delivery of overall commercial viability of operation of the capacity of PCCC plant identified.

1.3 Abbreviations

Abbreviation	Meaning
BEIS	Department for Business, Environment and Industrial Strategy
CCC	Climate Change Committee
CCS	carbon capture and storage
CCUS	carbon capture usage and storage
EfW	energy from waste
ERF	energy recovery facility
ICC	Industrial Carbon Capture
PCCC	post combustion carbon capture
RDF	refuse derived fuel

1 Department for Business, Energy and Industrial Strategy, 2021: Carbon Capture, Usage and Storage - An update on the business model for Industrial Carbon Capture

2 Conclusions

2.1 Post combustion carbon capture

1. Post combustion capture of CO_2 using amine solvents has been used in the oil and gas sector for decades and is an established mature technology for the capture of CO_2 from flue gases.
2. Although PCCC technologies have a long track record in the oil and gas sector, commercial operation of these technologies on ERFs has only been demonstrated on three plants globally and none in the UK. Of these demonstration systems, the largest has a nominal capture capacity of 10 tonnes of CO_2 per day.
3. Extensive testing and development of amine solvents and the associated abatement systems for commercial deployment of amine based technologies in EfWs is ongoing by all of the major technology developers.
4. Given the significant capital and operating costs for implementation of PCCC, the Department for Business, Energy and Industrial Strategy (BEIS) is developing business models to incentivise investment in these technologies. In the absence of government support or alternative financing mechanisms, the EfW industry in the UK considers initial investment in these technologies to be prohibitive.
5. Currently, it is not a requirement of UK law or policy or planning law or policy to apply PCCC at ERFs or similar plants. Also, although the Environment Agency has issued BAT guidance on CCUS for power plants, it is not a requirement for environmental permitting.

2.2 Integration of PCCC at the Portland ERF

1. Integration of PCCC using amine solvents at the Portland ERF is technically feasible and would contribute to an increase in the R1 energy efficiency of the plant.
2. A PCCC plant with the capacity to capture 181,000 tCO_2 would occupy an area of approximately 4,000 m^2. We understand that sufficient land area is available close to the Portland ERF and Powerfuel Portland has reported that the Port landlord is supportive of providing access to the land subject to contract, to allow implementation of a PCCC plant in the future.
3. Relative to inland sites without access to a CO_2 transport pipeline, the Portland ERF has significant locational advantages given its port location as it avoids the need to transport the CO_2 by land with the associated cost, carbon impacts, and impacts on the highway network.

3 Carbon Capture and Storage

3.1 Process and technology description

In the carbon capture process, CO_2 is extracted from a mixture of gases to create a high purity CO_2 stream. The CO_2 captured can then be injected into underground formations (storage), used in the manufacture of a wide range of products including carbonated beverages, foaming plastics, and refrigerants or used as a plant growth enhancer in algae production and in commercial greenhouses. Overall, the process is referred to as carbon capture and storage (CCS).

Where the CO_2 can be used as a resource in another process the process is referred to as carbon capture, usage and storage (CCUS).

In the UK and in Europe, MSW and RDF are two of the main feedstocks used for power generation. These feedstocks contain a mixture of plant and fossil fuel derived materials which are of biogenic and non-biogenic origin respectively. Consequently, coupling of EfW plants with CCS allows for the capture of CO_2 produced from the combustion and gasification of both the biogenic and non-biogenic fractions of the waste. This means that EfW plants can become net-negative emission plants. Furthermore, for EfWs in the UK, CCS is considered by the UK government as essential to meeting the UK's 2050 net zero target[2].

To date, only three demonstration scale CCS systems have been operated on flue gas from EfW plants[3]. Of these plants, the largest has a nominal capture capacity of 10 t/day CO_2.

The major processes in CCS are:

1. separation and compression of CO_2 from a mixture of gases, which is collectively known as CO_2 capture;
2. transport of the compressed CO_2 to a storage/utilisation site; and
3. injection, measurement, monitoring and verification, which together are known as storage.

The technologies developed for carbon capture can be divided into four main categories:

1. pre-combustion;
2. post-combustion;
3. oxyfuel combustion; and
4. direct air capture (DAC).

Pre, post and oxyfuel combustion technologies all require a point source of CO_2, such as combustion of fossil fuels or biomass. A point source of combustion is not required for direct air capture systems.

Post-combustion capture is considered to be the most viable process for capture of CO_2 from power generation processes, as it provides a means for near-term capture from existing power generation and other industrial sources. It is currently the technology most widely developed and is the process which is discussed in this report for the capture of CO_2 from the Portland ERF.

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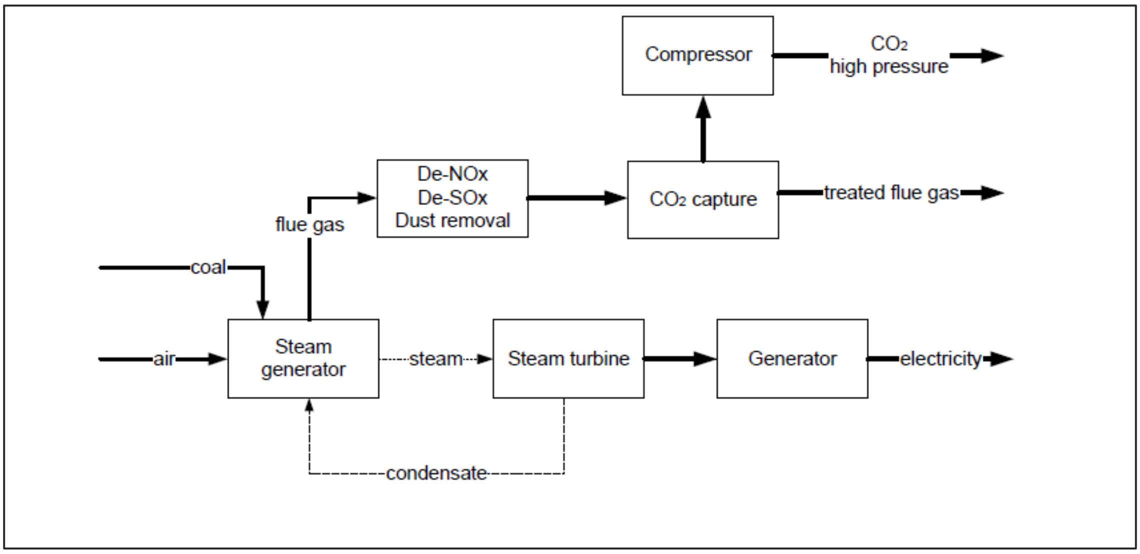
[2] Department for Business Industry and Environmental Strategy 2021: Carbon Capture Usage and Storage: Amendments to Contracts for Difference Regulations page 7.

[3] Larger plants have been installed on other (e.g. coal) power plants (the largest plant built to date is 3,250 t/day CO_2). The configuration of CCS plants is largely independent of the fuel used in the power plant, although there are differences in contaminants which need to be taken into account. An EfW plant in Norway, requiring a capture capacity of around 1,200 tCO_2/day has applied for European Innovation funding for construction of a full scale PCCC system. If funding is received, the plant is scheduled for completion in 2026.

3.2 Post combustion capture

Post-combustion capture refers to the capture of CO_2 from the flue gas produced from combustion of fuels. A process flow outline of the key component processes of post-combustion capture technology is illustrated below (this diagram is for a coal-fired steam generator, but the principles also apply to a waste-fired steam generator as in an EfW plant).

Figure 1: Process flow diagram of post-combustion CO_2 capture.



The main types of post-combustion capture technologies currently proposed and under investigation are as follows:

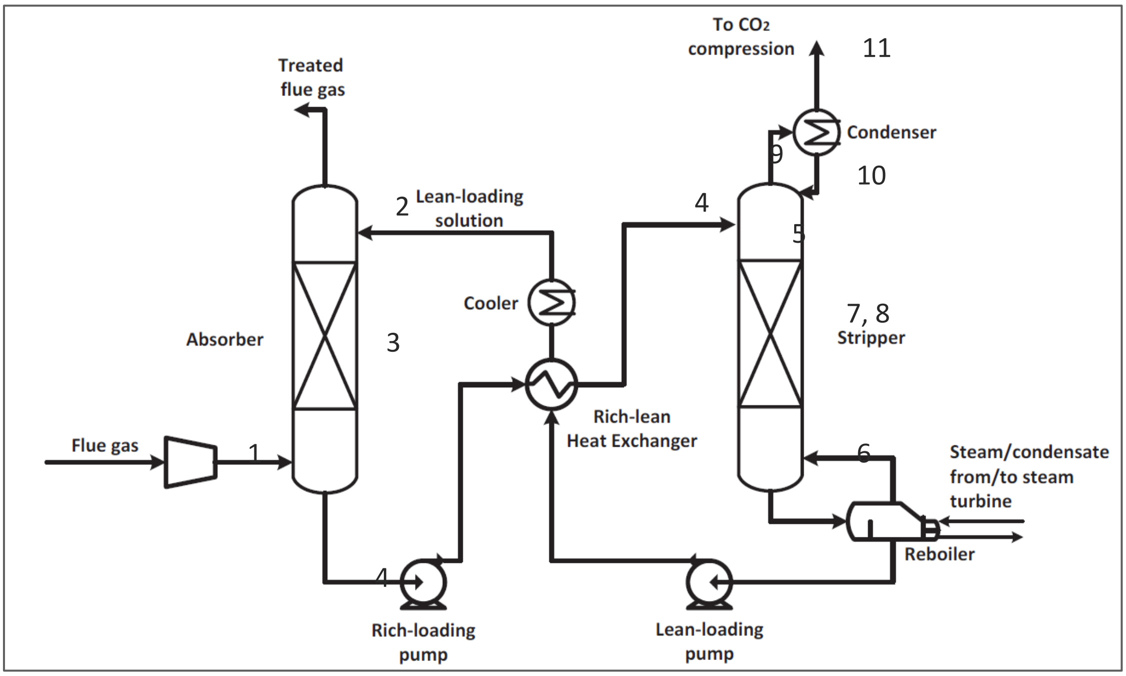
1. chemical absorption;
2. adsorption;
3. membrane separation;
4. chemical-looping combustion;
5. calcium-looping; and
6. cryogenic separation

Of these technologies, the most mature technology is chemical absorption using amine solvents, which has been used for decades in the removal of CO_2 from raw natural gas. Consequently, it is the technology which has been selected by EfW developers and operators across the globe for decarbonisation of this sector.

3.2.1 Post combustion capture using chemical absorption

In chemical absorption, a liquid sorbent is used to separate the CO_2 from the flue gas. The sorbent is then regenerated through a stripping or regeneration process by heating and/or depressurisation. The energy for regeneration is supplied by steam. Generally, 20-30% monoethanolamine (MEA, a class of alkanolamine) has been used as the primary reference solvent for chemical absorption. MEA has a high absorption efficiency for CO_2 of over 90%. A schematic outlining the process and key component systems in operation in a post-combustion capture process is shown in *Figure 2*.

Figure 2: Schematic of a basic chemical absorption process for CO_2 capture



Source: (Wang, Zhao, Otto, Robinius, & Stolten, 2017)

The process steps are numbered sequentially and occur as follows.

1. The flue gas from the EfW enters the bottom of the absorber and flows upwards.
2. The lean-loading solvent solution enters at the top of the absorber and flows downwards.
3. The counter-current flow between the flue gas and lean-loading solvent solution within the absorber results in absorption of some of the CO_2 in the flue gas into the solvent solution.
4. The solvent solution with absorbed CO_2 is called the rich-loading solution, which is pumped up to the top of the other column (known as the stripper).
5. In the stripper, the rich-loading solution flows down the column.
6. The stripping steam, generated in the reboiler, flows upwards in the stripper column.
7. This results in a counter current flow between the rich-loading solution and stripping steam.
8. The heat from the stripping steam breaks the chemical bonds between CO_2 and the solvent.
9. The CO_2 is carried up by the ascending steam towards the overhead condenser.
10. The condensed steam is directed back to the stripper as a reflux.
11. The product stream with high CO_2 purity is obtained.

4 Integration of a PCCC at the Portland ERF

4.1 Technical feasibility

Our review of the nominal design data for the Portland ERF shows that integration of PCCC at the proposed plant is technically feasible.

As there are no full scale PCCC plants in operation at EfWs, there are several key aspects of operation of PCCC systems which will need to be evaluated to ensure that the operation of the ERF is optimised. We are aware that developmental work is ongoing by all of the major carbon capture technology providers to ensure commercially viable optimised operations of integrated ERF and PCCC systems.

4.2 Portland locational advantages

The Portland ERF's location at the Portland Port offers a significant locational advantage in comparison to inland ERF sites which do not have access to pipeline transport for CO_2.

The International Energy Agency (IEA) recommends that where a PCCC plant is located close to a port, the CO_2 can be discharged directly to a liquefaction plant where it would be compressed and cooled by refrigeration before delivery to the ship[4].

Ships dedicated to the transport of CO_2 (CO_2 tankers) have been in operation since 1988, currently these tankers have carrying capacities of 1,000 m^3 (1,060 tCO_2) and are rated for medium pressure transport at 16 – 21 barg and -30°C. Tankers for the transport of liquified natural gas (LNG) have capacities ranging from 120,000 – 140,000 m^3 and it is envisaged that CO_2 tankers with similar capacities will be constructed to manage the projected global increase in transport of CO_2 due to large scale decarbonisation of the power and industrial sectors.

[4] International Energy Agency 2004; Greenhouse Gas R&D Programme Ship Transport of CO_2 – Report Number PH4/30, July 2004

5 Commercial Considerations

The capital and operating cost estimates outlined here include the capital costs for construction of a PCCC plant and compression of the CO_2 to the site boundary. It does not include any costs for the transportation and shipment of the CO_2.

Based on the projected capital and operating costs, integration of PCCC can significantly increase the development and operating costs for ERFs. Like several ERF developers, Powerfuel Portland believes that without Government support or other form of economic incentive, installation of CCS cannot be supported by existing revenues and would not be commercially viable. The estimated capital and operating costs for the CCS plant are outlined in the table below.

5.1 Cost estimates

Table 1: Estimated capital and operating costs for a PCCC plant at the Portland ERF

Parameters	Units	With 100% CCS
Estimated CCS plant capital cost	£m	70
Estimated CCS plant operating cost	£m/year	2

5.2 Eligibility criteria – BEIS Industrial Carbon Capture Model

As part of the UK government's plan to incentivise deployment of CCS in the EfW sector, BEIS is currently developing the ICC business model which outlines the commercial framework within which the contract will be managed. ICC contract holders will be paid for each tonne of CO_2 captured and transferred to a transport and storage company (T&SCo).

One of the key technical criteria proposed by BEIS for eligibility for award of an ICC contract is that the ERF will need to demonstrate that it is energy efficient through achievement of the R1 (or similar) energy recovery status. Based on the nominal design data for the Portland ERF, the facility could achieve an R1 of 0.69 which is higher than the threshold value of 0.65.

ENGINEERING + CONSULTING

FICHTNER
Consulting Engineers Limited

Kingsgate (Floor 3), Wellington Road North,
Stockport, Cheshire, SK4 1LW,
United Kingdom

t: +44 (0)161 476 0032
f: +44 (0)161 474 0618

www.fichtner.co.uk

Portland energy recovery facility

Consultation response summary document

August 2021

PORTLAND ENERGY RECOVERY FACILITY

CONSULTATION RESPONSE SUMMARY DOCUMENT

POWERFUEL PORTLAND LIMITED

AUGUST 2021

TERENCE O'ROURKE

Contents

1. Introduction

Dorset Council's request for further information and clarification

1.1 In September 2020, Powerfuel Portland Ltd submitted a full planning application to Dorset Council for the construction of an energy recovery facility (ERF) with ancillary buildings and works including administrative facilities, gatehouse and weighbridge, parking and circulation areas, cable routes to ship berths and existing off-site electrical sub-station, with site access through Portland Port from Castletown (application reference: WP/20/00692/DCC) on land within Portland Port.

1.2 The application was accompanied by an environmental statement (ES) prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended; hereafter the EIA Regulations), which provides an assessment of the likely significant effects associated with its construction and operation.

1.3 Dorset Council has consulted on the application and also appointed Tetra Tech to undertake a review of the ES, which ensured that the council had access to sufficient expertise to examine the ES. Representations have been submitted to Dorset Council by consultees, members of the public and other interested parties in response to the consultation on the planning application. Dorset Council has taken these representations into account in its consideration of the application.

1.4 Following the consultations, the council has formally requested additional information and clarification in a letter dated 30 April 2021. The council confirms that it considers some of the information requested constitutes 'further environmental information', and where this is the case, it is requested in accordance with Regulation 25 of the EIA Regulations and Section 62(3) of the Town and Country Planning Act 1990.

1.5 An ES Addendum has been prepared to review the council's letter and provide the information that is considered to be 'further environmental information' under Regulation 25 of the EIA Regulations. It forms an addendum to the ES.

The purpose of this document

1.6 The council's letter also requests that further responses be given to topic-based issues raised in representations to the first consultation. In some cases, reference is made in the council's Regulation 25 letter to a specific consultee response, or aspects that are most relevant to the consideration of that topic area.

1.7 To address these specific requests, the applicant's response is provided in this Consultation Response Summary Document (CRSD) to the range of detailed technical points that were raised by statutory consultees and technically competent consultees during the first consultation.

1.8 Specifically, the CRSD covers the following topic areas requested by the council's request for further information:

- Design and materials (point 3) - also covered in detail in the DAS Addendum and summarised in chapter 3 of the SPSS
- Landscape (point 4)
- Health (point 6)
- Historic environment (point 9)
- Ecology (point 11)
- Combined heat and power (CHP) - District heating (point 13)
- Electricity generation and distribution (point 15)
- Shore power (point 17)
- Air quality (point 21)
- Carbon balance and greenhouse gas emissions – including UKWIN (points 22 and 23) also covered in detail in the ES Addendum and summarised in chapter 3 of the SPSS
- Traffic (point 26)
- Surface water drainage (point 28)
- Contamination and geology (point 29) covered in detail in the ES Addendum
- Economic effects and jobs (point 33)
- Need and waste arisings (points 30, 31 and 32) – also covered in detail in the Waste Need Paper and summarised in chapter 3 of the SPSS
- Compliance with development plan policy (point 34) – also covered in detail in chapter 4 of the SPSS

1.9 For completeness, the CRD also covers some other topic areas where consultees have made comments but are not covered by the councils request for further information.

- Alternative sites
- Fall back scheme
- World heritage site

1.10 Annex A provides the applicant’s response to UKWIN comments on the submission (point 23).

1.11 Annex B to this CRSD provides a summary response to a wide range of topic areas raised by the public

2. Consultation response schedules

1. Need and waste arisings

Other consultees

Item	Topic	Summary of consultation comment	Applicant response
	Adams Hendry (on behalf of SPWI)		
1.1	Need for the ERF in context of managing Dorset residual waste and residual waste arising from outside of the Dorset area by road and or sea. Evidence to support waste arising figures provided. The importation of residual waste by sea from outside of Dorset and compliance with the proximity principle.	Paragraph 2.2 It would be reasonable to assume that the proposed Portland ERF would be limited to treating residual waste from within Dorset only and will not import waste from elsewhere. This does not appear to be the case given the volumes of waste that could be brought in by sea. No evidence is provided to support the volumes of RDF (arising from outside of Dorset), that are stated in the application as being available to the ERF. Great weight is given to the site's location at a port and the intention to import residual waste from outside of the Dorset area by sea or by road is contrary to the applicant's stated need case and is contrary to the proximity principle.	The Portland ERF is well located to manage Dorset's residual waste, reducing the need for the export of residual waste out of the county and out of the country to other ERF facilities. It will also help to reduce the amount of residual waste that is sent to landfill for disposal, the least sustainable method of management. The Waste Need Statement and Planning Supporting Statement demonstrate that there are already large volumes of residual waste arising within Dorset and this is expected to increase in future. These figures are derived from public statements issued by Dorset Council, including in the 2019 Dorset Waste Plan. The ERF will provide capacity to help Dorset to meet its own residual waste management needs and will also contribute towards meeting the regional and national waste need. The ERF will also contribute towards meeting a local, regional, and national need for low carbon energy and economic growth. The Waste Need Paper presents analysis in respect to the waste availability in the defined catchment area, taking account of existing capacity and potential planned capacity. It concludes that there is more than enough waste available with the catchment than could be managed by the Portland ERF, not accounting for potential sources of waste passing by Portland by sea. The proposed ERF is a merchant plant, not tied to a specific local authority contract. It is unreasonable to assume that such a plant would be restricted to waste arising in an administrative area. Whilst it is incorrect to say that 'great weight' is attributed to a port location, it is clearly a desirable attribute for an ERF to have direct access to a port facility to provide commercial flexibility and to enable waste to be brought to the site sustainably by sea [and the weight attached to the port location is also due to the opportunities to use the energy generated to provide shore power and district heating, both of which are not possible at other sites]. It is therefore a factor that should be given weight in the planning balance, among many other positive benefits associated with the proposed location at Portland Port. Figures provided in respect to potential waste sources are derived from the applicant's market analysis and sector knowledge and expertise provided by its fuel supply partner. The proximity principle requires that an adequate network of waste disposal installations be established, and that waste should be disposed of in one of the nearest appropriate installations, by means of the most appropriate methods and technologies in order to ensure a high level of protection of the environment and public health. The importation of residual waste by sea or road from outside of Dorset to the Portland ERF, as one of the nearest appropriate installations, would therefore be entirely in accordance with the proximity principle.
1.2	Extent of ERF catchment area and importation of waste	Paragraph 2.3 Given that the justification for the proposal is to avoid residual waste being sent to facilities in Hampshire and Somerset, why would it be acceptable to import waste	The Dorset Waste Plan strategy is to reduce the export of its residual waste by providing residual waste management capacity in Dorset in line with proximity and self-sufficiency principles.

Item	Topic	Summary of consultation comment	Applicant response
		from Hampshire and Somerset. The extended catchment necessary demonstrates the unsuitability of the site.	However, this comment fundamentally misunderstands the dynamic nature of the waste market, where waste frequently crosses administrative boundaries where it is appropriate to do so. Under the principle of self-sufficiency, if waste is being exported from Dorset, then waste can also be imported. In Dorset the balance is heavily skewed such that Dorset exports all of its residual waste due to the absence of capacity. The ERF will significantly reduce the export of Dorset waste to other counties, but equally is able to import waste secured from the catchment area market where deemed appropriate and necessary. The 3 hour catchment area is considered to be entirely appropriate for a facility of this type. The catchment area simply indicates from where residual waste might reasonably be sourced and this would apply to any ERF. It does not in any way indicate whether a location is suitable or not, as is being suggested here.
1.3	Availability of RDF from the New Earth Solutions Canford MBT	Paragraph 2.5 Given that Dorset Council's residual waste is contracted to the Canford MBT facility with the resultant RDF sent to the Bridgwater Resource Recovery Facility under a long-term supply contract. The RDF derived from the Dorset Council area is therefore not available to the Portland ERF.	Both Beauparc (the owner of the Canford MBT) and Geminor (the RDF supplier to both Bridgwater and, it is anticipated, to the ERF), have confirmed that should the Portland ERF be consented, the RDF derived from its Dorset residual waste contract would be diverted away from Bridgwater to Portland as the nearest appropriate facility to manage this waste, in line with the proximity principle and self-sufficiency. We understand that Geminor would replace the RDF that would have travelled over 120 km from Dorset to Bridgwater with other supplies. As set out in the Waste Need Paper, Beauparc will be increasing the RDF capacity of its Canford MBT facility from 125,000 to around 200,000 tpa. This will enable the facility to further increase its RDF production, and supply far more RDF to the Portland ERF (potentially supplying over 80% of the ERF feedstock from Dorset derived RDF). In addition, the location of an RDF processing plant in Dorset should encourage further investment in pre-treatment plants (like Canford) to ensure that more of the 321kt residual waste currently produced by Dorset (a figure that is expected to increase) is managed within Dorset, reducing the volumes sent to landfill or energy recovery at facilities located outside of the county or the UK.
1.4	The effect of the Environment Bill on waste arisings and the need for residual waste treatment capacity	Paragraph 2.6 The Environment Bill is expected introduce resource-efficiency standards for products to drive a shift in the market towards products that can be more easily recycled, as well as products that last longer and which can be re-used and repaired more easily. Furthermore, extended producer responsibility schemes and the introduction of a requirement for collection of certain waste materials, such as food waste will have an impact on future waste forecasts.	Powerfuel Portland welcomes the measures to be introduced by the Environment Bill and supports the intention to prevent waste and recover waste materials for re-use, thus reducing residual waste. The effect of such measures is not yet known and will inevitably take some time to have an effect on levels of residual waste. Irrespective of this, as the Waste Need Statement demonstrates, there are large volumes of residual waste currently arising in Dorset that far exceeds the capacity of the Portland ERF and the total volumes of residual waste arisings from LACW and C&I waste are projected (by Dorset council) to increase by 20% over the next 10 years. A need will therefore remain for the ERF capacity. Furthermore, the ERF has been robustly designed to operate at a range of calorific values, such that should the level of plastics in the residual waste stream fall in future, as is hoped to be the case, the facility would continue to operate successfully. Furthermore, the ERF has been robustly designed to operate at a range of calorific values, such that should the level of plastics in the residual waste stream fall in future, as is hoped to be the case, the facility would continue to operate successfully.
1.5	Reliance upon meeting the needs of other local waste authorities.	Paragraph 2.8 Whilst meeting Dorset's energy recovery capacity requirements, it is ERF is reliant upon the contribution it would make to meeting the needs of surrounding waste planning authorities as well as those further afield. Without understanding the facilities currently available in the waste catchment, it is impossible to determine whether the application site is best located to meet that need.	The Portland ERF is appropriately sized to manage a large proportion of Dorset's residual waste and is well placed to do so. As a merchant plant, the ERF would be capable of accepting waste from within its catchment area, depending on the market. The proposed ERF (sized at 183,000 tonnes per annum – nominal capacity) will be able to provide the opportunity to process a significant volume of Dorset's current residual waste (being 321,000 tonnes per annum) but, if spare capacity exists, then this could reasonably be used to manage residual waste arising from its catchment area, as is common practice across the UK.

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			Whilst there are other ERF facilities located within the catchment, the management of waste is subject to the market and available capacity. Where residual waste is not tied to contracts or cannot be managed by existing facilities due to capacity constraints, this could be sent to Portland where it is economically and practicably viable to do so.
1.6	Compliance with The National Policy Statement for Renewable Energy Infrastructure (EN-3) in respect to waste hierarchy and need	Paragraph 2.9 Decision making bodies should be satisfied, with reference to the relevant waste strategies and plans, that the proposed waste combustion generating station is in accordance with the waste hierarchy and of an appropriate type and scale so as not to prejudice the achievement of local or national waste management targets in England. No information has been provided on the proposal in relation to waste strategies and plans within the waste catchment area outside Dorset.	The ERF is positioned to meet a significant proportion of the residual waste treatment capacity requirements of Dorset, and this is fully addressed in the planning application. The ERF will manage RDF, which is waste where all recyclable and recoverable materials have been removed. Currently Dorset exports 100% of its RDF, either to out of county landfill solutions or to out of county/country processing facilities similar to the ERF. The ERF is therefore fully in accordance with the waste hierarchy by helping to reduce landfill and would not compromise recycling targets at the national or local levels for Dorset or any other authorities located within the waste catchment area.
1.7	Compliance with National Planning Policy for Waste (NPPW) in respect to existing and permitted facilities.	Paragraph 2.10 Waste planning authorities should consider the extent to which the capacity of existing operational facilities should satisfy any identified need. Information is therefore required on the capacities of facilities within the 3-hour drive catchment area. It is also important to consider future capacity with reference to permitted but not yet operational facilities. It is not possible to determine whether the Portland ERF will displace other preferable proposals for waste treatment.	As set out in the Waste Need Statement and Planning Supporting Statement, Dorset does not currently have any capacity for the final treatment of residual waste – the Canford MBT is an intermediate processing facility which requires the output to be exported to out of county landfill or processing facilities similar to the ERF. The Dorset Waste Plan strategy is based on the need for additional capacity to be provided in Dorset so that less residual waste exported to landfill, or other facilities located in neighbouring waste authority areas. There are no operational or permitted ERFs in Dorset. The existing ERFs in Hampshire (Marchwood, Portsmouth and Chineham are at capacity and as contracted facilities under Project Integra are required to give priority to dealing with Hampshire's residual waste arisings. The proposed Alton ERF is proposed as a merchant plant but is intended to provide additional capacity to serve Hampshire's needs. No planning permission has yet been granted for an ERF at Alton. The Exeter ERF is a relatively small scale facility (60,000 tpa) and also serves a specific local authority contract. The Bridgwater facility is under construction and is a merchant plant, albeit with a relatively small capacity of 100,000 tpa. The Waste Need Paper presents a capacity analysis taking account of other ERF in the catchment area that have planning permission but have not yet been built. It concludes that even accounting for this capacity and ignoring future projected increases in waste arisings in Dorset or the volumes that could be imported by sea, there is more waste available within the catchment than could be managed by the Portland ERF. Where plants are proposed, there is no guarantee that planning permission would be granted. Equally, where new facilities are permitted, there is no guarantee that they would be constructed or become operational. Our understanding from large waste investors is that the ability to raise capital to fund small ERFs (<100ktpa) or advanced conversion technology (ACT) (including pyrolysis and gasification plants) projects is very limited given (a) the low returns offered in the case of small ERFs (due to high capex per tonne of RDF) and (b) the numerous failures and significant losses suffered by investors in the case of ACT plants in the UK. This includes examples in Dorset. The planning application has demonstrated that there is no ERF capacity in Dorset and limited capacity available at existing ERFs located outside of Dorset, but within its catchment. As such the Dorset Waste Plan requires residual waste capacity to be provided in Dorset to meet Dorset's needs.
1.8.	Need in context of the Low-Carbon Energy Facility (Low CEF) permitted at Canford	Paragraph 2.15 The Dorset Waste Plan states that the Canford Low CEF can be developed to deal with approximately 100,000tpa of RDF/SDF arising within the Plan area. It is not	Refer to PSS paragraph 4.33. The Canford Low CEF consent (approved in 2018) was partly implemented and then subsequently abandoned on the basis that this used ACT technology which has proven to be technically and commercially unviable (see comment above). Powerfuel Portland is not aware of any plans to complete this facility or progress any other form of thermal treatment facility at the site.

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		clear to what extent this facility has been taken into account in the Applicant's arguments on the need for the Portland ERF. Further information is required.	The Low CEF capacity is unlikely to make any contribution towards meeting Dorset's needs. Rather, the Canford site will serve as a focal point for the intensification of RDF production, which as confirmed by the owner, Beauparc, in the Waste Need Paper, is planning to increase its RDF capacity to around 200,000 tpa, for use at other treatment facilities such as the Portland ERF. It has been suggested by some consultees that the Low CEF plant is operational and contributing towards meeting Dorset's residual waste capacity needs. That is incorrect.
1.9	Need in context of potential capacity of allocated sites in the DWP	Paragraph 2.17 The total potential capacity within the four allocated sites amounts to 385,000tpa, exceeding the identified needs of the plan area by over 150,000tpa. This ensures that the DWP is flexible in the event that one or more of the allocations does not come forward for the treatment of residual waste. The site allocations are existing waste management facilities.	The comment is correct in so far as the DWP identifies potential capacities for allocated sites, in excess of the capacity requirement. However, as set out in detail in the Planning Supporting Statement, this is only theoretical or potential capacity that may not come forward. The recent proposal for a small scale ERF at the Parley site of 60,000 tpa (or 50,000 tpa after recycling) provides only 30% of the capacity envisaged by the DWP due to site constraints. This may not gain planning permission and other sites may not come forward at all with any new capacity. As set out in the Supplemental Planning Supporting Statement there are significant challenges to fund the development of small scale (<100ktpa) ERF projects or ACT projects. As the projects identified in the DWP are all of this size it is unlikely that these will provide a credible solution for Dorset. Sensibly, the DWP provides flexibility for other sites to come forward (other than allocated sites) where this would have clear advantages over the allocated sites. This is clearly demonstrated in the Planning Supporting Statement, the Supplemental Planning Supporting Statement, and other supporting technical documents.
1.10	Need in context of DWP reference to existing surplus capacity.	Paragraph 2.18 The DWP states that the capacity of facilities in southern England with surplus capacity that could deal with Bournemouth, Christchurch, Poole and Dorset's residual waste will be considered on the basis that it makes little sense to build additional facilities where existing facilities have surplus capacity.	The response to section 7 above makes clear that there is no ERF capacity in Dorset and limited ERF capacity elsewhere within neighbouring local waste authority areas. The Waste Need Paper analysis shows that there is little existing surplus capacity in the catchment areas that could be relied upon to manage Dorset's residual waste, as most is tied to local authority contracts. Whilst it is right for Dorset Council to consider whether surplus treatment capacity already exists in southern England, the DWP (paragraph 7.78) recognises that if new facilities are not brought forward during the plan period then the Dorset area would need to rely on facilities outside of the plan area to manage its residual waste and that there is no guarantee that facilities would have capacity to meet projected arisings, this being contrary to the proximity principle and self-sufficiency. The clear intention is for the DWP to bring forward new facilities in the plan area given a demonstrable lack of existing capacity.
1.11.	Provision of satisfactory evidence to support proposals on unallocated sites.	Paragraph 2.19 The DWP require proposals for waste management facilities on unallocated sites to be supported by a satisfactory level of evidence, including the nature and origin of the waste to be managed, the levels of waste arising, the existing or permitted operating capacity and the potential shortfall in capacity or market need that the proposal seeks to address. This level of detail has not been provided by the applicant.	The Waste Need Statement identifies the nature and origin of the residual waste to be managed as far as is possible for a merchant plant of this type. It identifies the level of waste arising in Dorset, regionally and nationally with refence to published DEFRA data. The DWP clearly identities the potential shortfall of capacity for residual waste management and the need for new waste management infrastructure to be provided within Dorset. All of this evidence is fully set out in the Waste Need Statement. Further evidence on existing and permitted waste capacity, the waste capacity gap and sources of RDF are provided in the Waste Need Paper.
1.12	Capacity of existing residual waste treatment facilities within the 3 hour catchment area	Paragraph 2.20 No information has been provided by the Applicant on the capacity of existing facilities, particularly those within the defined 3-hour drive waste catchment	The applicant's market analysis, set out within the Waste Need Paper identifies only four ERFs that are deemed to be 'certain' within the defined 3-hour catchment. Three of these are operational (Marchwood, Exeter and Chineham) and the fourth is still under construction (Bridgwater). All these ERFs manage significant tonnages of residual local authority collected

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			waste under contract with limited merchant capacity for additional residual waste (household or C&I wastes). Veolia operates the existing ERFs at Marchwood and Chineham with a combined capacity of around 300,000 tpa. These ERFs are committed to long term waste contracts with Hampshire County Council for managing local authority collected waste. Policy 25 of the adopted Hampshire Minerals and Waste Plan (2013) states that the long term aim is to enable net-self-sufficiency in waste movements and divert 100% of waste from landfill. The ERFs are required under planning condition to give priority to the management of Hampshire's residual waste, above residual waste from other waste authorities. They are therefore unlikely to have any significant capacity available in future to manage Dorset's residual waste The Exeter ERF has a capacity of 55,000tpa and this is under contract with Devon County Council to manage the residual waste collected from households in Exeter, east Devon and Teignbridge. Devon County Council's contract with the Exeter ERF runs until July 2044. The ERF is therefore unlikely to have any capacity available to serve Dorset's needs. Veolia operates three existing ERFs at Marchwood, Portsmouth and Chineham with a combined capacity of around 300,000 tpa. All these ERFs are committed to long term waste contracts with Hampshire County Council for managing local authority collected waste. Policy 25 of the adopted Hampshire Minerals and Waste Plan (2013) states that the long term aim is to enable net-self-sufficiency in waste movements and divert 100% of waste from landfill. The ERFs are required under planning condition to give priority to the management of Hampshire's residual waste, above residual waste from other waste authorities. They are therefore unlikely to have any significant capacity available in future to manage Dorset's residual waste. The Bridgwater resource recovery facility is expected to be commissioned in 2021. It will have capacity to manage 100,000 tpa of commercial and municipal RDF. The facility is under contract with Geminor, who would supply 75,000 tonnes of RDF per annum. Whilst the RDF arising from the Dorset Council area (produced at the Canford MBT facility) is likely to be sent to the Bridgwater facility in the short term, the MBT operator (Beauparc) and Geminor has confirmed that this RDF would be diverted to the Portland ERF as the nearest suitable installation if planning was approved and the Portland ERF was constructed. We understand that Geminor would replace the RDF that would have travelled over 120 km from Dorset to Bridgwater with other supplies. Even if the Bridgwater facility had capacity to manage some or all of Dorset's residual waste (which it does not, providing potential for management of only 75,000 of the total 321,000 Dorset residual waste arisings), the transportation of RDF by road from Dorset to Somerset, would not fulfil the policy objectives of the DWP. It would not support Dorset to become self-sufficient in managing its own residual waste and would perform less well under the proximity principle, given that the proposed Portland ERF is in Dorset. The only other relevant residual waste treatment facility in the catchment area is the Canford MBT facility in Dorset. However, it is an intermediate facility in so far as it processes untreated residual waste and creates RDF, which is currently managed at out of county facilities but is expected to be processed at the Portland ERF in the future.

2. Alternative sites

Other consultees

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	Adams Hendry (on behalf of SPWI)		
2.1	Interpretation of Policy 4 part a in respect to allocated waste sites	Paragraph 2.32 The Applicant has misinterpreted Policy 4 in an attempt to demonstrate compliance. Criterion (a) does not require an assessment to determine whether it is capable of accommodating the Applicant's proposal, rather the requirement is whether the allocated sites could serve the same waste management need that the proposal is designed to address. The DWP (paragraphs 9.29 – 9.30) indicates that the development of energy from waste facilities involving incineration within the allocated sites has the potential to adversely affect European and internationally protected sites, suggesting that there are other residual waste treatment technologies such as advanced thermal treatment where adverse effects may be ruled out with much greater confidence.	This is incorrect. The assessment submitted in support of the application is not an alternative site assessment. The applicant selected the proposed site based on its advantages such as its location within a commercial port, the presence of an extant planning permission for an energy facility fueled by waste materials, its status in the development plan as a key industrial employment site, its potential to provide shore power, its potential for operation as a combined heat and power facility (via a local heat network to supply high demand, established adjacent heat users), and other site specific advantages. The assessment of DWP allocated sites was undertaken to demonstrate that the Portland site and the proposed ERF has advantages over the allocated sites in being capable of delivering an ERF of the type and capacity proposed, as required by Policy 4 (criteria a), and as requested by planning officers in pre-application advice. In doing so it also highlights the relative disadvantages of the DWP allocated sites because of the identified constraints (development considerations) listed in the DWP site allocations. The assessment was not undertaken to demonstrate that the allocated sites could not contribute towards meeting Dorset's waste management needs as is being suggested in this objection. The proposal is specifically for an ERF capable of meeting Dorset's residual waste management needs. The DWP does not specifically exclude incineration at allocated sites but rather indicates that there is potential for adverse impact. The DWP adopts a flexible position and does not preclude any technologies on the allocated sites. The recent submission of a planning application by Eco-Sustainable Solutions for an ERF at Parley shows that proposals can come forward for incineration on DWP allocated sites, provided this does not adversely impact protected European sites. However, its relatively small scale (50,000tpa for thermal treatment) confirms the assessment's conclusions that the Parley site is heavily constrained and cannot deliver the 160,000 tpa of treatment capacity envisaged in the DWP. Even at this smaller scale there is doubt as to whether planning permission would be granted, given the constraints imposed by protected heathland habitats and airport safeguarding. This also reinforces the assessment conclusion that the Portland site has the significant advantage of being less constrained and capable of accommodating a larger scale ERF that is capable of meeting Dorset's needs. The potential to raise funding to develop ACT (also known as advanced thermal treatment or ATT) projects in the UK is severely limited given the numerous technical failures that have occurred for these projects where RDF is the feedstock. We note that ACT/ATT is a potential technology for more homogenous feedstock (such as waste wood) but even in these circumstances operational performance is often significantly below projections (which impacts investment returns and risk). We further note that there are multiple examples in the UK of projects that were previously approved for ACT/ATT technology now seeking amendments to the approval to permit conventional ERF technology, similar to that proposed at the Portland ERF, further demonstrating that the broader market does not believe that ACT/ATT is a credible technology for treatment of RDF feedstock.

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			On that basis and in the context of the proposed ERF, it is entirely appropriate to consider the relative merits of the Portland site against allocated sites to demonstrate that clear advantages exist.
2.2	The role of DWP allocated sites in meeting the Dorset shortfall in residual waste management capacity.	Paragraph 2.33 No information has been provided to demonstrate that the allocated sites could not manage the shortfall in non-hazardous residual waste arising in Dorset. It is necessary to demonstrate that the proposal provides advantages over the allocated sites. The correct comparison should be a proposal for managing non-hazardous residual waste against the Applicant's proposal for an ERF. It would be perverse if the comparison was an ERF on the allocated sites when the DWP makes it clear that this is unlikely to be acceptable.	The applicant has not sought to demonstrate that the DWP allocated sites could not manage the predicted shortfall residual waste. However, from its assessment of the allocated sites and their constraints relative to the Portland site, it is clear that there must be significant doubt as to whether the allocated sites will be able to deliver sufficient capacity to meet all of Dorset's stated needs. The proposed ERF at Parley (50,000tpa residual waste), if granted permission and funded, would provide only 30% of the capacity that was assessed in the DWP allocation (160,000 tpa). As detailed in the Waste Need Paper, future waste activity at the Canford site is expected to be focused on increased RDF production at the MBT as an intermediate activity, with RDF production expected to increase to around 200,000 tpa. The Mannings Heath site is small and in use for other waste uses and is unlikely to deliver any significant residual waste treatment capacity, whilst the Binnegar Quarry site is very remote, is environmentally constrained and has no potential for establishing CHP. In addition, as noted in earlier responses, there are significant challenges to the ability to fund projects of this size given the high fixed capital costs per tonne of RDF processed (i.e. there are significant volume economies of scale associated with ERF projects). Whilst some parties have suggested that ACT/ATT technology could be used at a smaller scale, recent market experience of significant technical failures has meant this is no longer considered an investable solution (noting even ACT/ATT projects that were awarded significant Government subsidy support under the ROC and/or Contracts for Difference regime have failed to procure investment due to the identified technical risks). The planning application focuses on demonstrating the advantages of the Portland site over DWP allocated sites in delivering the proposed ERF technology. The applicant is proposing an ERF as a deliverable, robust and proven technology and is not proposing any other form of advanced thermal treatment technology. As such a comparison would be meaningless in this context. Furthermore, the DWP does not exclude incineration on allocated sites but highlights potential constraints and defers this for detailed application to address. This fact is demonstrated by the Eco-Sustainable Solution ERF proposal at Parley which comprises incineration technology.
2.3	DWP allocated sites assessment - operational criteria Access to waste outside of Dorset by sea (port) and by road	Paragraph 2.33 The operational criteria used in the comparative assessment are flawed. The sites have been included in the DWP to meet Dorset's waste needs. This is specifically set out as a guiding principle in paragraph 3.1 where it states that the Waste Plan's role is to identify sufficient opportunities to meet the identified needs of Bournemouth, Christchurch, Poole and Dorset for waste management. Meeting these needs does not require access to a port. It is not the purpose of the DWP to meet the waste management needs of authorities within a 3-hour drive time or potentially from further afield for waste transported by sea.	The ERF is a merchant facility that is well placed to manage Dorset's waste but given that it is not specifically tied to any local authority waste contract it also requires flexibility to manage waste from its wider catchment. Access to a port is not stated as a requirement or deemed necessary to meet Dorset's waste management needs. However, it does offer the potential for waste to be moved sustainably by water and must be considered a locational advantage over sites that do not have port access. The location at Portland also provides other significant advantages as detailed elsewhere, including the ability to provide shore power and district heating to local users. This comment aims to limit the ERF's role to managing Dorset waste only. This fails to recognise that the application makes it very clear that this is a merchant facility, which in common with other UK merchant facilities, can serve a wider waste market within its catchment area as well as its host administrative area. Furthermore, whilst the DWP sites may be allocated to provide capacity to meet Dorset's needs, waste regularly flows across administrative borders as part of a commercial waste market depending upon what commercial contracts are in place. The suggestion that such sites could not manage waste

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			from other areas does not reflect the reality of waste movement or the dynamics of the waste market. The comment also fails to recognise that the DWP seeks to provide sufficient capacity that is equivalent to meet Dorset's needs, but it does not necessarily follow that all of this treatment capacity would be used to manage waste arising in Dorset only. Ideally, the ERF would manage most or all of Dorset's residual waste, being very well placed commercially to do so being located within Dorset. Support from Beauparc and Geminor noted in the Waste Need Paper should provide comfort that the RDF produced at Canford will be made available to the Portland ERF should planning be approved. If there is not sufficient residual waste made commercially available to the Portland ERF then other waste would be secured by sea or elsewhere within its catchment. Provided that Dorset provides sufficient capacity overall to meet its needs, it will be able to achieve net-self-sufficiency. If residual waste continues to move out of Dorset to other treatment facilities under contract, then an equal amount of waste secured from elsewhere can be secured to compensate achieving net self-sufficiency. The operational criteria used are therefore appropriate for a merchant facility of this type and the assertion that this is flawed is incorrect.
2.4	DWP allocated sites assessment	Paragraph 2.35 There is no requirement for a facility dealing with the WPA's non-hazardous residual waste to contribute specifically to meeting Portland's electricity needs, rather the assessment should consider whether the facility would contribute to meeting Dorset's electricity needs.	The applicant was invited to consider a proposal by Portland Port to deliver energy to the Port and Portland. The need for shore power at the Port is set out in the application and is a legitimate operational requirement of the project. The ability to deliver shore power is a significant advantage of this site over the DWP allocated sites. The DWP cannot identify all potential advantages that a non-allocated site might have and DWP paragraph 6.11 requires proposals on unallocated sites to be considered on their merits. However, it is clear that the opportunities to provide power (and district heating) are important considerations in respect to site advantages and DWP paragraph 6.11 reflects this, stating that 'the provision of sustainable localised heat and energy sources could also be a positive consideration in appropriate locations'. The suggestion that Dorset's energy requirements should be assessed is not relevant in this context, although it should be recognised that the ERF would also contribute towards meeting Dorset's energy needs indirectly by first serving Portland. The ability to provide shore power to the port, in the absence of other viable means of providing electricity for shore power from the mainland, is a significant locational advantage and this comment seeks to downplay the importance of this operational ERF requirement and this significant site advantage.
2.5	DWP allocated sites assessment	Paragraph 2.36 There is a specific policy requirement for residues arising from the facility to be managed in accordance with the waste hierarchy and the proximity principle. This should be reflected in the operational criteria used in the assessment but yet it is not.	As set out in the planning application the proposal is for IBA to be transported by sea (an advantage over other DWP allocated sites due to reduced traffic impact) to a specialist processing facility that will recycle the material. This approach is entirely in accordance with the waste hierarchy and proximity principle in terms of transporting material sustainably by sea. There is no requirement for a treatment of residue criterion, however, given the site's port location, the potential to partner with local quarrying businesses to develop an IBA processing facility on site and its ability to transport by sea, it would likely score better than DWP allocated sites which do not have direct port access.
2.6	Consideration of the Portland site together with other allocated sites through the preparation of the DWP.	Paragraph 2.41 It clearly was not in the Applicant's interests to promote the proposed Portland ERF through the Waste Local Plan as it is seeking to meet a need over and above that required in Dorset. Sites such as this should have been considered through the Local Plan process so that they could be assessed on a consistent basis and	The site was not considered in the DWP even though the site was known to the Dorset Waste Partnership and was actively being discussed as a potential location for a strategic waste management facility to serve Dorset. The DWP had reached an advanced stage in its preparation and nearing the point of adoption at the time the applicant began progressing its proposals for the site. It was not possible to promote or include the Portland site at that advanced stage. It is therefore speculative, highly misleading and completely incorrect to

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		examined before an independent Inspector. To seek to undermine the strategy in the Local Plan within a year of it being adopted is unacceptable.	suggest that the applicant did not promote the site in the DWP on purpose, as is being suggested here. Irrespective of the above, the DWP recognises that the delivery of waste infrastructure is dependent on the market and the industry and therefore adopts a flexible approach to delivery, accepting that some or all of the allocated sites may not come forward, or that other sites may come forward with advantages over allocated sites (Policy 4). It is therefore entirely reasonable for unallocated sites to come forward, outside of the development plan process and for these to be considered on their merits in context of the development plan policy, through a planning application. Indeed, the DWP specifically makes provision for this. This is especially the case given the assumptions applied to the allocated sites in the DWP now appear to be challenging, noting the significantly reduced size of the Parley proposal (c. 30% of allocation volumes), the Canford proposals to expand its intermediate RDF production facility (as opposed to provide an RDF processing solution), the planning constraints identified in the Planning Support Statement and the broader commercial challenges to procuring finance to build projects to the small size specified for the allocated sites in the DWP. It is incorrect to claim that the promotion of an unallocated site with clear advantages over allocated sites is unacceptable, or in some way undermines the adopted DWP and deviates the proper planning process, irrespective of its age.
2.7	DWP allocated sites assessment – Operational criteria 'site size'	Paragraph 2.42 The site assessment submitted by the Applicant is contrived to ensure that the application site is ranked highest. There is no policy requirement for residual waste to be managed through incineration and therefore scoring each of the allocated sites on their suitability for an ERF is inappropriate. Sites have been assessed as being less suitable than the application site because they are less than 2ha when in reality the area of the site depends on the technology employed and the likely throughput of waste. There is no reason why a network of smaller sites utilising different technologies would be any less suitable than a single ERF.	The assessment of allocated sites is not contrived but rather is a reflection of the operational requirements of an ERF. The DWP is not technology specific and there is no policy requirement for any specific technology, ERF or otherwise. The suitability of allocated sites for an ERF and the consideration of the relative advantages and disadvantages between Portland and other allocated sites is a legitimate consideration for decision makers. The suggestion that this is inappropriate is misleading. Theoretically a network of smaller sites with different technologies could meet need, however it is unlikely that such a strategy, dependent on advanced thermal treatment technologies or smaller scale traditional thermal treatment technologies would be deliverable or meet the urgent need in Dorset. Dorset has a track record of failed proposals for higher risk technologies or small scale facilities that have left the county with no significant residual waste management facilities and a significant shortfall in capacity. The investment market appetite for ACT/ATT for RDF treatment has further reduced in the past 2-3 years given increasingly number of technical failures and the ability to finance conventional ERF at small scale (<100ktpa) is limited as the returns achieved do not provide adequate return for the risk profile (due to high fixed capital costs). The purpose of the assessment was to demonstrate that the Portland site is capable of accommodating a larger-scale ERF, with greater certainty of delivery, greater treatment capacity and energy recovery potential that this would bring, as an advantage over those sites less than 2ha in size which could not deliver those benefits.
2.8	DWP allocated sites assessment – Operational criteria 'proximity to primary road network'	Paragraph 2.43 The decision to score sites on their proximity to the primary road network fails to take account the nature of local roads. The nature of the road system connecting Portland to the mainland means that hold-ups or bottlenecks can have an effect which extends back through Wyke and the edges of Weymouth.	The function of the primary road network is to provide linkages between settlements and ports/airports with A roads intended to provide large-scale transport links between areas. The assessment considers at a strategic scale proximity to the primary road network. Local matters such as junction capacities, congestion or pinch points in the network are likely to occur across the entire primary road network and assessment of this is a matter for detailed transport assessment. A transport assessment has been undertaken for the proposal to consider this matter.

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2.9	DWP allocated sites assessment – Weighting of criteria	Paragraph 2.44 The assessment is flawed in that it assumes each criterion has the same weight when in reality this is not the case. There is a legal requirement to ensure that the integrity of European sites is not adversely affected by development. This clearly should carry much more weight in the assessment process than meeting Portland's electricity needs for example, for which there is no such legal requirement	The methodology applied applies equal weighting to criteria as a more objective approach than arbitrarily seeking to apply weighting. The methodology has been tested by Inspectors and the Secretary of State through examination at numerous public inquiries and has been found to be sound.
2.10	DWP allocated sites assessment – Consented scheme as an alternative	Paragraph 2.45 It is unclear why the previously consented scheme, which the applicants are relying on as a fallback, is not considered as an alternative.	The assessment considers the proposed ERF at Portland against DWP allocated sites. The consented scheme, whilst setting a precedent for an energy plant use at the application site, comprises a different technology to that adopted by the proposed ERF and would not provide a solution to Dorset's waste challenge. It does not represent a fallback as is suggested and therefore is not a realistic alternative and does not need to be considered as such, but it does evidence that development of an energy plant on this brownfield port location was previously deemed appropriate.
2.11	DWP allocated sites assessment – Consideration of compliance in relation to EIA regulations	Paragraphs 2.46 and 2.47 The comparative assessment against waste local plan allocated sites is not sufficient to meet the terms of the EIA Regulations. It is far too high level to understand, even in basic terms, what the likely effects would be on the environment	This is not correct. The approach adopted for the comparative assessment has been applied to many similar projects and has been tested by Inspectors and the Secretary of State through public inquiry and found to be sound and in accordance with EIA regulations. The EIA Regulations require 'an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects', which the report provides.
	Freeths (on behalf of the Portland Association)		
2.12	DWP allocated sites assessment – absence of weighting criteria	Page 4 The comparative assessment (CA) document explains that the methodology is to appraise the sites against each of the criteria on an equal basis and no weighting will be applied to any of the criteria. This is suggested by the Applicant that it makes the assessment more objective and robust and removes subjectivity. We strongly disagree. On the contrary it dilutes the credibility of the assessment in that all criteria are treated as equal when in reality this is evidently not the case. As an example, criteria 11 'Proximity to designated ecologically sensitive areas', which includes impacts on integrity of European sites for which there is a legal requirement to ensure that development does not adversely affect should have substantial weight in any decision making process. By comparison this is likely to be significantly more important than if a site is 3km or 5km from a primary road network (criterion 3 relates to proximity to primary road network). Whilst the CA claims that a non-weighting system reduces subjectivity, the reality is that the exercise is already highly subjective through a range of assumptions on how the parameters are set in respect of whether an impact falls within the 'Meets criterion', 'Partially meets criterion' or 'Does not meet criterion' categories.	As stated in the comparative assessment document, the methodology applied to the study applies equal weighting to criteria as a more objective approach than arbitrarily seeking to apply weighting. The methodology has been tested by Inspectors and the Secretary of State through examination at numerous public inquiries and has been found to be sound and robust. In trying to apply weighting this is more likely to introduce subjectivity and debate as to why particular weightings have been applied. The parameters set are considered to be reasonable and appropriate.
2.13	DWP allocated sites assessment – proximity principle criteria	Page 4 There is no category which analyses the proximity of the sites to the sources of waste. The principle of proximity means that waste should be recovered or disposed of, as close as possible to where it is produced. This is a key policy factor in decision making and forms part of the wider consideration of assessment under Policy 4 of the Waste Plan. It is central to the sustainability argument and therefore its absence from any comparison assessment is a significant omission	The role of the proximity principle, alongside the waste hierarchy and self-sufficiency principles is fully recognised and addressed in the Planning Supporting Statement. It is acknowledged that the DWP spatial strategy identifies and allocates three sites for strategic residual waste management in and around the south east Dorset conurbation to reflect that a significant proportion of Dorset's waste arises in this area. However, the DWP also allocates Binnegar Quarry, which is located outside of and some distance from the conurbation, reflecting the fact that there are also significant volumes of residual waste arising outside of the conurbation. Even if a criterion were to be added to reflect proximity to waste arisings and sites 7, 8 and 9 were deemed to fully meet that criterion, the Portland ERF site (site 13) is also located in close proximity to the Weymouth and Portland conurbation and capable of serving the towns of Dorchester and Bridport. It would therefore also be deemed to be well placed in respect to

Item	Topic	Summary of consultation comment	Applicant response
			centres of waste arising and so would potentially meet the criterion or, as an absolute minimum, would partially meet the criterion. Irrespective of the scoring of such a criterion, this would not alter the conclusions of the DWP allocated sites assessment or diminish the fact that the Portland ERF site can demonstrate significant advantages over the DWP allocated sites. These significant advantages are set out in the Planning Supporting Statement and are re-affirmed in the Supplemental Planning Supporting Statement.
2.14	DWP allocated sites assessment – site size limit	Page 5 The CA document advises that the site size has been chosen on the basis that a minimum of 2ha is required to accommodate a ERF building, circulation and car parking. Herein lies a fundamental misinterpretation of the tests of the policy. This is not an exercise to see whether any sites could accommodate the exact scheme proposed by the application. It is a comparison of advantages of the proposed development over allocated sites to meet the requirements of managing the non-hazardous waste. If therefore the proposed development site is larger and potentially may generate a higher output, then that may in theory be an advantage, but it should not automatically rule out a comparison to a smaller site. An example of this is that Site 9 – Land at Mannings Heath Industrial Estate, Poole, which has been excluded from the second sift of analysis on the basis that it is under 2ha. However, it is an allocated site within the Waste Plan that has been tested at examination. Although we have concerns about the Applicant's methodology it is noteworthy that it scores second in their 'league table' of sites. To dismiss this site on the basis of it being under 2ha, again undermines the comparison assessment.	The Proposed Portland ERF has a nominal residual waste capacity of 183,000 tonnes per annum and a maximum capacity of 202,000 tpa. As such the facility is of a scale that is economically viable and deliverable and is capable of managing a significant proportion of Dorset's residual waste arisings and recovering significant amounts of electricity to meet an identified local requirement (being shore power) whilst also being capable of producing heat for supply to local users via a district heating network. In waste management terms this is a significant advantage, and this is recognised in this comment. To deliver that benefit the site area required for such a facility is deemed to be a minimum of 2 ha. The purpose of the DWP allocated sites assessment is to compare the advantages of the Portland site against allocated sites. The ability of allocated sites to accommodate a larger scale facility, of the scale and type proposed at Portland, in terms of site size and land availability is a legitimate consideration. In the context of site 9, the Portland site has a distinct advantage in that it has the capability to accommodate a larger scale facility with the benefits that arise from that efficiency. We further note the comments regarding the commercial viability of smaller volume sites, and whether, even if progressed and approved through planning, this would in practice be able to attract the investment capital required to be built and provide an actual solution to Dorset's waste management challenges.
2.15	DWP allocated sites assessment – potential to meet Portland's energy needs	Page 5 This criterion for a comparative exercise of sites across the Dorset planning authority area is outright bizarre. The proposed development site is the only site in Portland and therefore evidently it has an unfair advantage over other sites. Clearly, if a 'meeting electricity needs' criterion is justified it should be based on a sites ability to contribute to Dorset's electricity needs to allow fair assessment.	The DWP allocated sites assessment (paragraphs 2.27 to 2.29), together with other supporting documents (Energy Need Statement and Shore Power Strategy Report) explain why there is a specific need for an economically viable electricity supply to Portland Port to provide shore power, given the supply constraints. The purpose of the comparative assessment is to demonstrate the advantages of the Portland site over other allocated sites, as required by policy 4 of the DWP. The site's location on Portland and its ability to directly supply electricity to the port for shore power is a significant locational advantage that other sites located on the Dorset mainland do not have. Indeed it is illogical that this comment suggests that a locational advantage is in some way 'unfair' simply because the alternative allocated sites do not possess that advantage and odd that a Dorset wide energy need criterion should be suggested as an alternative to make this 'fair'. This comment fails to recognise the very specific circumstances and need for additional electricity supply capacity on Portland to meet a specific Portland need. Furthermore, whilst the Portland site can meet a Portland energy need and contribute towards a wider Dorset energy need, the other DWP allocated sites conversely can only contribute to the latter. In addition, the opportunity for the Portland ERF to provide heating to local heat users is a further differentiator versus other allocated sites (as outlined in the District Heating Paper) and national policy specifically states that plant should be sited to allow benefit from opportunities to provide combined heat and power, an opportunity that is only realistically achievable at Portland given the high demand and credit quality of local off-takers.

Item	Topic	Summary of consultation comment	Applicant response
2.16	DWP allocated sites assessment – flawed exercise	Page 5 In summary the comparative assessment exercise is flawed and the Applicant has not met the requirements of criterion 'A'.	As set out in responses above to the comments made on the assessment criteria, the comparative assessment exercise is sound, robust and the comments made in respect to individual criteria are either entirely unfounded and/or would make no difference to the outcome of the assessment, which concludes that the Portland site has significant advantages over the DWP allocated sites.

TERENCE O'ROURKE

3. The fall back scheme

Other consultees

Item	Topic	Summary of consultation comment	Applicant response
	Adams Hendry (on behalf of SPWI)		
3.1	Consented scheme – fall back position (consented energy plant)	Paragraphs 2.48 and 2.49 In October 2019, Dorset Council issued a Certificate of Lawful use or Development confirming that the 2010 permission had been lawfully implemented and the consent remained extant. No information has been provided on the position of the accompanying listed building application (ref 09/00648/LBC). Further information is required on the implications of the listed building application on the purportedly extant consent. If the listed buildings application has lapsed, it is questionable as to whether the consent approved under 09/00646/FULES is in fact implementable.	Dorset Council's position is that the relevant consents have been implemented through a material start on site and that the permission is extant. The applicant is now seeking planning permission to construct the proposed ERF. However, the planning permission granted for an energy plant fueled by vegetable oil and/or waste tyres and the subsequent Certificate of Lawful Development together confirm the principle of locating an energy recovery facility in this allocated brownfield industrial port location.
3.2	Consented scheme – fall back position (likelihood of implementation)	Paragraph 2.50 On the assumption that the applications are extant, the likelihood of them being implemented is low given the passage of time that has elapsed since consent was issued. Whilst any extant consent is capable of being a material consideration, limited weight should be attached to it in these circumstances.	Dorset Council's position is that the relevant consents have been implemented through a material start on site and that the permission is extant. This is not an assumption. Furthermore, the extant consent could theoretically be implemented at any time (for example if market conditions were to become more favourable), and the period of time passed since the consent was granted is irrelevant in terms of the degree of weight that should be attributed to it. The extant consent continues to act as a precedent demonstrating that the site has been deemed suitable in principle for an energy plant use with waste derived material as a fuel, and of a similar nature to the proposed ERF. Accordingly, this should be afforded significant weight in the decision making process.

TERENCE O'ROURKE

4. Combined Heat and Power (CHP) – District Heating

Other consultees

Item	Topic	Summary of consultation comment	Applicant response
	Adams Hendry (on behalf of SPWI)		
4.1	Provision of CHP	Paragraph 2.23 The proposed ERF does not include provision for CHP	The ERF is specifically designed to provide both heat and power and will be equipped to deliver CHP, through the provision of electricity to the shore power facility and/or the wider electricity distribution network and energy in the form of heat to a district heating network. The proposed ERF does make provision for CHP. Discussions have been advanced with local creditworthy off-takers but, as outlined in the District Heating Paper, it is not logical or market practice to advance the technical or planning considerations for a CHP scheme where the energy source required is subject to planning approval. We further note that other allocated sites do not have the potential to provide heat to off-takers with a similar volume demand, or the financial standing to support the upfront capital investment required for a district heating network and therefore the potential to actually deliver CHP at Portland should positively impact the consideration of the Portland site relative to other DWP allocated sites.
4.2	District heating network – likelihood of implementation	Paragraph 3.6 Much is made of the potential of the proposed ERF to provide heat however the district heating network does not form part of the application and therefore limited weight should be given to this potential	The ERF is designed to enable connection to a local heat network (district heating – DH) and therefore makes provision for CHP. Few, if any, similar facilities in the UK directly provide the local heat network together with the ERF facility at planning stage, but instead are designed to connect to the heat network when that is provided. It has been demonstrated through the Heat Report, Planning Statement and Environmental Statement that there are identified heat customers near the site with significant heat demands, that have already expressed interest in joining a network as and when this is delivered. They also have the financial standing to enter into long term contracts for offtake to support the upfront capital investment. Further supporting information has been submitted through the District Heating Strategy Paper, that demonstrates that the district heating network, whilst not part of the application, is fully deliverable and viable in policy, technical and commercial terms. It is expected that the heat network will initially provide heat to the two Portland prisons, with the network expanding in future as other users come forward for connection to the system. The potential environmental effects of constructing the required district heating infrastructure are considered in the EA Addendum, which indicates that this would not have an unacceptable environmental impact. Therefore, it is entirely misleading to suggest that the proposals do not make provision for CHP, or that the weight to be applied to the benefits of district heating should be reduced simply because it does not form part of the ERF application. The Portland ERF will be CHP equipped from the outset and there is a high probability that the district heating network will be delivered because of the environmental policy and financial incentives to do so, coupled with the absence of any technical or environmental constraints that would preclude its delivery. On that basis the potential for supplying a district heating network should be afforded great weight.
4.3	District heating network – impact of terrain	Paragraph 3.7 Not only does the heat network not form part of the planning application, it is unclear how it could be connected to HM Prison The Verne given the terrain.	Further supporting information has been submitted through the District Heating Strategy Paper, that demonstrates that the district heating network is fully deliverable and viable in policy, technical and financial terms. In respect to terrain the report provides an indicative route between the ERF and the two prisons, utilising existing road corridors (which already provide a conduit for other utilities and services). As such terrain is not a constraint to implementation of the heat network infrastructure. The ES Addendum has also concluded that there are no overriding environmental constraints.

5. Electrical generation and distribution

Other consultees

Item	Topic	Summary of consultation comment	Applicant response
	Adams Hendry (on behalf of SPWI)		
5.1	Method of connection to the grid network	Paragraph 3.8 The ES sets out the route of the grid connection, but no information is provided on how this grid connection will be constructed. Bearing in mind that 4.5ha of the application site relates to the cable routes, this is a significant omission. It is not clear whether the cables will be buried or whether they will be overground or what, if anything, has been assessed in relation to the grid connection. Further information is required.	The grid connection will comprise a new cable that will be buried beneath the existing public highway similar to other utilities infrastructure. The potential environmental effects of this has been considered in the ES and the impact is not deemed to be significant. Any potential effects would be temporary during the construction phase. Further details are provided in the Grid Connection Paper submitted as further information in connection to the council's request letter.

TERENCE O ROURKE

6. Shore power

Other consultees

Item	Topic	Summary of consultation comment	Applicant response
	Adams Hendry (on behalf of SPWI)		
6.1	Cruise liner visits - impact of Covid 19 pandemic on expected cruise liner visits	Paragraph 3.10 The coronavirus pandemic has had a significant impact on the cruise industry, with services suspended for much of 2020. The anticipated rise in cruise ships docking at Portland Port is therefore highly unlikely in 2020/21. The long-term effect of the pandemic on the cruise industry is not known at this stage, but a 58% rise in cruise ships calling at Portland Port by 2025 seems highly improbable. Further justification is required to support these assumptions before the benefits of shore power for the cruise industry can be given any weight in the decision-making process for the ERF.	The figures for cruise ship calls were provide by the Port and the basis for the numbers is as described in the application documentation. Whilst the Covid 19 pandemic has inevitably had an impact on the cruise industry, this has had a temporary impact. During the Covid restrictions a number of cruise liners were berthed at Portland Port for longer periods of time and could have benefitted from the provision of shore power had it been available. Looking ahead, Portland Port has confirmed that, post easing of Covid 19 restrictions, the cruise industry has seen a surge in bookings with the port hosting 54 cruise passenger visits in 2021 and a further 66 visits planned for 2022 – in each case numbers that are in excess of those used in the shore power and socio-economic modellings for the planning application. As a result, the evidence suggests the “highly improbable” conclusion made by the report writer is not accurate, and with the provision of shore power this will only mean that Portland becomes increasingly attractive as a destination port.
6.2	Cruise liner visits – proportion of cruise visits benefitting from shore power	Paragraph 3.11 Only half of cruise ships have the facilities for connecting to shore power. As some cruise ships may call into Portland Port more than others, it is not possible to determine what proportion of calls to Portland Port would benefit from shore power. Further information is required.	The figures for cruise ship calls were provide by the Port and the basis for the numbers is as described in the application documentation. The information provided is the Port’s expectation of its cruise liner business. It is expected that the number of cruise liners (equipped with shore power) visiting Portland will increase over time as new ships join the fleet with in-built shore power capability and older ships are refitted and retrofitted with shore power capability. Irrespective of the actual proportion of cruise liners visiting Portland with shore power capability, the provision of Shore Power facilities at Portland will clearly support the UK’s Clean Maritime Plan objectives and comply with recent Government strategies such as ‘Decarbonising Transport’.
6.3	Cruise liner visits – number and duration of stay of large ship visits	Paragraph 3.12 The maximum demand for electricity is only likely to be reached when a large cruise ship is docked. In order to understand the benefits of this shore power, information is required on the number of occasions a large cruise ship has docked over the last year, and the duration of the stay.	The figures for cruise ship calls were provide by the Port and the basis for the numbers is as described in the application documentation. The information provided is the Port’s expectation of its cruise liner business and is further supplemented in the revised Shore Power report.
6.4	Royal Fleet Auxiliary –Royal Navy contract, number and duration of RFA ship docking.	Paragraph 3.13 No information is provided on what proportion of calls to the port are made up of RFA ships. Section 5 of the report suggests that Portland Port’s contract with the Royal Navy provides for RFA ships to be docked ‘for a large proportion of days per year’. This is particularly ambiguous. Further information is required on the length of the contract with the Royal Navy and on the number of ships likely to be docked at Portland Port per annum and the likely average duration of their stay.	As would be expected the Port’s contract with the Royal Navy is confidential. However, the figures for RFA ship calls were provided by the Port and the basis for the numbers is as described in the planning application documentation. For assessment purposes the assumed number of days that RFA ships will be docked at the Port is 260. Portland Port has confirmed that this is a highly conservative figure and that in the last few years the number of berth days has typically been 20-30% higher than this figure. Again, the provision of shore power will only make Portland a more attractive destination for the Royal Navy given the UK Government’s drive to reduce emissions from the HMG estate and activities.
6.5	Cruise liner visits – loss of visits due to absence of shore power	Paragraph 3.14 The applicant states that there is a risk to the port if shore power cannot be provided and that it will potentially reduce the number of cruise ship visits. This statement is unsubstantiated and goes against the forecast increase in cruise ships visits suggested, which are predicted in the absence of shore power.	The Port is seeking to attract more cruise liner visits to Portland and secure greater economic benefit for Portland and the wider Dorset area, from growth in the cruise sector. However, the cruise industry recognises that it must also make a significant contribution to reducing its carbon footprint. Its customers are increasingly aware of climate concerns and are demanding that action be taken to improve its environmental credentials. In response the cruise industry is looking for ways in which it can demonstrate a reduction in carbon and other

Item	Topic	Summary of consultation comment	Applicant response
			emissions to the atmosphere. The ability to connect to shore power is one such measure and ports are being asked to provide this facility. This demand will increase further. Cruise liners have a choice of destination and port and the availability of shore power will become increasingly important in continuing to attract cruise liners to Portland. The Port is a commercial organisation which must compete on the global stage for its business. It must remain competitive and if it cannot provide what the industry requires it will simply begin to lose business to other ports. Whilst the Port is aiming to increase ship visits the absence of shore power is expected to reduce cruise ship calls in the future. Therefore, the predicted increase in ship visits is unlikely to be sustained over future years if the Port cannot meet the requirement to provide Shore Power.
6.6	Deliveries of RDF fuel by ship	Paragraph 3.15 The ES suggests that in respect to ships bringing RDF fuel to the site, the onboard engines would only be used during the transportation and manoeuvring into the docks and that smaller auxiliary engines would be used when the ship is docked requiring minimal power consumption. This suggests that they would not benefit from the proposed shore power solution.	Shore Power is not provided to the primary quay where waste is intended to be unloaded, it should be noted that the Port Authority will use various quays on the Port at their discretion in response to wind/tide conditions. The fuel supply ships are relatively small in terms of power requirement and would only be docked for a short period of time (a few hours) and it has never been claimed that Shore Power would be made available for these vessels. The benefit of Shore Power is related to larger cruise liners and RFA shipping that will be in dock for longer periods of time (days) and will have significantly greater power demands.
6.7	Number of visits of cruise ships and RFA ships	Paragraph 3.16 Very little weight should be given to the benefits of shore power unless further credible information can be provided on the number of calls by cruise ships and RFA ships.	Disagree. The figures for ship calls were provided by Portland Port, and the basis for the numbers is as described in the planning application documentation. As noted above the numbers used for modelling purposes is highly conservative. The information on cruise liner business provided in the original application was the port's expectation of its future cruise business and updated confirmations from the port evidence that the report authors' expectation of a deterioration in cruise vessel business is not being realised in practice. The evidence submitted confirms that Shore Power will be of great benefit in respect to safeguarding cruise liner visits in future and the contribution these make to the local tourism sector (spend and related jobs) and reducing emissions to air from ship exhausts (including carbon) that result in an overall improvement in general air quality for Portland, relative to the existing pre-ERF position. Contrary to this comment, the provision of Shore Power and its associated environmental and economic benefits should be afforded substantial weight in the planning balance.

7. Design and materials

Statutory consultees

Item	Topic	Summary of consultation comment	Applicant response
	Dorset Council Landscape		
7.1		Two reservations over the use of PVC mesh: a. Durability of the PVC mesh. b. The main concern with the building treatment is the use of a 'printed image of the green wall to replicate the vegetation and tones.	Further information in respect to durability and environmental performance is provided in respect to external cladding material in the DAS addendum. The DAS Addendum considers potential alternative approaches to the use of a printed photograph of the backdrop, including potential use of camouflage patterns. Further discussion will be held with officers to consider the most appropriate materials, including use of samples and further information on durability and maintenance, and this can be controlled by means of condition.

Other consultees

Item	Topic	Summary of consultation comment	Applicant response
	Adams Hendry (on behalf of SPWI)		
7.2	Use of profiled cladding and printed PVC mesh	Paragraph 3.2 The PVC mesh will not reflect any seasonal changes in the surrounding vegetation, it will still represent an alien feature in the landscape.	The type of vegetation at Portland is not of a type that demonstrates significant seasonal change and the approach is intended to enable the facility to blend into the receiving landscape, rather than become invisible. The proposed PVC mesh has been suggested as a potential option, however other options exist such as the use of printed cladding and the adoption of relevant camouflage patterns that will be capable of reflecting any seasonal variation. Further information is provided in respect to external cladding material in the DAS Addendum.
7.3	Durability of the printed PVC mesh	Paragraph 3.3 It is not clear how well the PVC mesh will weather overtime. Evidence is required to demonstrate how this will work in practice and assurances given to ensure that any measures relied upon to mitigate landscape impacts can be secured in perpetuity. The long-term durability of this building treatment option needs to be demonstrated, preferably by showing that it has been successfully used on a building of this scale and in an exposed coastal location.	Further information in respect to durability and environmental performance is provided in respect to external cladding material in the DAS Addendum. Further discussion will be held with officers to consider the most appropriate materials, including use of samples and further information on durability and maintenance, and this can be controlled by means of condition.
7.4	Assessment of alternative options	Paragraph 3.4 As the proposed building treatment is critical to the mitigation of landscape and visual impact, if the long-term durability cannot be satisfactorily demonstrated, then an assessment should be undertaken of an alternative option or without the PVC mesh in place.	Further information in respect to durability and environmental performance is provided in respect to external cladding material in the DAS Addendum. Irrespective of this the landscape and visual assessment has considered the effects of the development based on a design approach using the PVC mesh or similar materials to achieve the same camouflage effect.

TERENCE O'ROURKE

8. Air quality

Other consultees

Item	Topic	Summary of consultation comment	Applicant response
	Ministry of Justice		
8.1	Air quality - Impacts on staff and inmate health	The MoJ is naturally concerned about the potential effects on its staff and inmates. Specifically, the concerns relate to reduced air quality from the facility's emissions and increased traffic. Having reviewed the application submission and supporting Environmental Statement (ES), the MoJ questions the robustness of the assessment of likely air quality effects, including cumulative effects. It is apparent that the ES does not consider all the likely air quality effects of the development in combination and against a reliable baseline of existing air quality. As such, the current analysis may have significantly underestimated the likely impacts on air quality in the local area and in turn the potential effects on the human health of nearby residents and occupiers, including those residing and working at HMP The Verne.	Updated analysis has been provided to the MoJ, noting that the analysis assumes a highly conservative set of assumptions that any occupant would be present and exposed to any perceived risk relating to the operational of the Portland ERF for the full operational life. In addition, in response to the regulation 25 request further detailed modelling has been carried out to quantify the impact of the emissions from engines on board ships which would be connected to shore power as a result of the proposal. Ships are a significant source of oxides of nitrogen, sulphur dioxide and particulate matter. The updated analysis concludes, consistent with the original submitted analysis, that the impact on occupants at HMP The Verne would be negligible. We note that Public Health England responded to the original analysis, confirming the modelling and assessment criteria used were in line with UK guidance and good practice and further that it was satisfied the approach taken was conservative, but not over-precautionary in terms of approaches to assessing the potential risks. HMP The Verne is located away from any major roads and as such it is likely that baseline concentrations are similar to background concentrations. DEFRA has produced maps of background concentrations on a 1km2 grid across the UK for key pollutants where baseline monitoring is not available. This has been produced from models of key sources (and would include the port) and validated against background monitoring sites. Given that HMP The Verne is away from main roads the use of this data set to describe baseline concentrations is appropriate. For other pollutants not included in the DEFRA mapped background datasets very conservative estimates have been made of the likely concentrations from UK wide monitoring networks. The dispersion modelling calculate the impact of the process emissions from the ERF. The impact was then compared to the Air Quality Assessment Levels set for the protection of human health which have been set by the Environment Agency based on the scientific understanding of the health effects of each pollutant. Additional modelling was carried out to determine the impact at specific receptors to support the EP application this included a receptor (R4) to represent HMP The Verne. This has been included as Appendix 3.3 (Modelling results at discrete receptors) to the ES Addendum. The modelling assumed the ERF operates for the whole year and continually releases emissions at the emissions limits, both of which are conservative assumptions. The results show the impact of emissions of the ERF at HMP The Verne is very small – the increase in NOx is 1.8% above baseline levels and the increase in PM_{10} and $PM_{2.5}$ in both cases being less than 0.2%. This level of impact is determined as being "negligible" using industry standard guidance from the Institute of Air Quality Management. As a further measure an assessment of the impact on health has been carried out which considered the overall impact of emissions from the ERF on health. This concludes that the carcinogenic and non-carcinogenic health risks associated with the Portland ERF are deemed to be negligible and that there should be no impact on the mental wellbeing for occupants at HMP The Verne or HMP YOI Portland. If the impact of Shore Power is included in the analysis, then this generally results in an improvement in air quality relative to the position today. The analysis again used conservative assumptions basing the modelling on a lower berth days than is experienced in practice and assuming that vessels are fairly modern (with newer vessels having lower emissions than older engines).

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Item	Topic	Summary of consultation comment	Applicant response
			The modelling (ERF with Shore Power) demonstrates that there would be a net benefit associated with the proposed development in all areas. This is because emissions would not be emitted from the engines on board vessels if they were connected to Shore Power. For nitrogen dioxide, there is a net benefit for the majority of the area. Where there is a net increase, the increase is extremely small (0.05 µg/m3 at the point of greatest increase on land), which can be compared with current background concentrations of around 22 µg/m3. For sulphur dioxide, there is a net benefit for the majority of the area. Where there is a net increase the increase is extremely small (0.05 µg/m3 at the point of greatest increase on land), which can be compared with current background concentrations of around 2 µg/m3. As a further measure an assessment of the impact on health has been carried out which considered the overall impact of emissions from the ERF on health taking into account the impact of Shore Power. This concludes that consideration of all impacts would lead to an overall beneficial effect on health.
	Public Health Dorset		
8.2	HIA – health effect of emissions and risk	The Health Impact Assessment states that: 'The Human Health Risk Assessment (HHRA) has concluded that the health effects associated with emissions of NO2, SO2, PM10 and PM2.5 from the ERF are shown to be very small and could reasonably be described as negligible.' It should be noted that this does not mean that there will be no impact on human health associated with emissions from the operation of the proposed development. In 2013 the World Health Organisation (WHO) concluded that 'there is no evidence of a safe level of exposure to PM (particulate matter) or a threshold below which no adverse health effects occur'. The proposed development, and associated increased traffic and transport, will lead to increased exposure of the local population to this pollutant, and others, even if they are, as the applicant asserts, 'very small'	Further information, which addresses these comments, is provided in the submitted update to the Human Health Risk Assessment (HHRA) and Health Impact Assessment (HIA), appended to the ES Addendum.
8.3	Emissions from shipping – evidence of potential health benefits	The application refers to the potential for the proposed development to provide 'shore to ship' power for vessels in Portland harbour. The applicant highlights that this would lead to a reduction in emissions levels by negating the need for vessels to use their own engines for power while in harbour. Providing a means of reducing emissions from vessels in Portland Harbour would, in principal, be beneficial but as detail of the current impact on air quality of this source is not provided it is not possible to understand the degree of potential benefit. We would welcome baseline information on emissions levels and health impacts of vessels in Portland Harbour, and modelled data on how the proposed development would reduce overall emissions levels.	The original submitted ES concluded that the impact of the ERF operating was deemed to be negligible to air quality and human health. The provision of Shore Power would result in a reduction in impacts of existing emissions from vessels docked in port which would otherwise be using onboard engines to provide power which generally results in an improvement to air quality and human health, relative to the existing position. The original ES included a qualitative analysis explaining that an additional benefit would be the offset of the emissions from onboard engines. A separate technical note to the ES Addendum has been provided and the results discussed in the ES Addendum. This confirms the qualitative analysis set out in the original ES. Further information, which addresses these comments, is provided in the submitted additional to air quality assessment], Human Health Risk Assessment (HHRA) and Health Impact Assessment (HIA), appended to the ES Addendum.
8.4	HIA – recommendations and communication of impacts	The Health Impact Assessment (HIA) included in the application emphasises the need to consider the impact of the proposed development on both physical and mental health. As the community profile in the HIA notes, the site is located within a community characterised by higher levels of deprivation than much of Dorset, and a population that experiences worse outcomes than Dorset's wider population across a number of health indicators. This includes levels of depression higher than the England average with 22.9% of adult primary care patients in Weymouth & Portland living with depression. The site of the proposed development is also, as detailed throughout the application, unique in its topography and built environment. For example, the site's near sea level location would result in the proposed stack	Further information, which addresses these comments, is provided in the submitted update to the Human Health Risk Assessment (HHRA) and Health Impact Assessment (HIA), appended to the ES Addendum.

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		terminating below the height of nearby residential areas. With these observations in mind, the recommendations of the HIA (paragraph 7.2) are generally welcome, but we recommend that the applicant extends their intention to 'communicate the findings of the Air Quality Assessment' (as a means of allaying public concern) to encompass communication to the community of how assessment of the potential impact of the development on air quality during construction and operation has taken account of the specific characteristics of the site (e.g. topography, weather conditions etc) prior to determination of the application.	
8.5	HIA – potential impact on physical and mental health and well being.	The HIA includes an assessment of the potential impacts of the proposed development on vulnerable groups and health inequalities. The proposed development is sited in close proximity to neighbourhoods which are among the 10% most deprived in England. Research demonstrates ongoing inequalities in exposure to air pollution, with deprived areas worst affected by high concentrations of particulate matter and nitrogen dioxide. Given that the proposed development has the potential for cumulative adverse impacts on the physical and mental health and wellbeing of the local population, potentially exacerbating existing health inequalities, we would welcome more detailed consideration of the likely impacts and mitigations. It is not clear whether the applicant has specifically considered the potential impact of emissions on the resident population of HMP Verne, and to a lesser extent, HMP/YOI Portland. Prisoners face particular challenges to leading healthy lives[4] and, in comparison to the wider population, are more likely to be exposed to any emissions associated with construction and operation of t*he proposed* development. We would suggest that the applicant clarifies how they have taken account of 'static' prisoner populations in the Environmental Statement prior to determination of the application.	Further information, which addresses these comments, is provided in the submitted update to the Human Health Risk Assessment (HHRA) and Health Impact Assessment (HIA), appended to the ES Addendum.
	Adams Hendry / Air Quality Consultants (on behalf of SPWI)		
8.6	Exclusion of on-site emissions – back up diesel generators	Paragraph 4.1 Part B Air Quality Paragraph 2.1 The only emission sources considered in the assessment are the main exhaust stack[1]. It is routine practice on schemes such as this to include a backup source of electrical power in order to avoid major accidents during emergency shut down. This is typically achieved by including diesel generators. The proposed Scheme appears to be no exception, since paragraph 2.19 of the ES clearly states that a diesel fueled standby generator will provide electricity during grid outages. Standby diesel generators require regular operation in order to ensure their continued function, and given the importance of ensuring an emergency back-up power supply, it is common practice for generators to thus be run periodically While no details of these on-site emission sources has been given, experience of sufficiently-sized diesel generators elsewhere has shown that they can give rise to very high levels of nitrogen oxides (NOx) emissions; particularly if plant are used which are not fitted with Selective Catalytic Reduction technology. The emissions can be sufficient that even just periodic testing (for example for 30 minutes every two weeks) can, when added to other onsite emissions, affect the outcomes of an assessment3. Similarly, while no details have been given as to the release height of the generator exhausts, unless they are routed to the top of the main exhaust stack (which seems unlikely given the position of the generator shown in Figure 2.3 of the ES) the plumes from the generators will be subject to less effective dispersion than has been modelled. This means that the impacts, per mass of NOx	Diesel generators will only be used when the main plant is offline and when power is not available from the grid to provide the power for the site. The probability of this event occurring is very low and if this does occur it would only be for a short period when the main plant is offline. It is acknowledged that the diesel generators would be tested during the year but testing would only occur for approximately 30 minutes every 2 weeks, or 13 hours in total. This is less than 0.2% of the time that the main plant would be running. Even if emissions are five times larger than for the main plant, this would only be 1% of annual emissions. As the stack would be shorter, the impacts would occur in different locations so this would not make a significant difference to local impacts. The diesel generators are also located on the shore side of the main building with a short stack. Therefore, the building would act as a barrier to minimise the impact of emissions from the diesel generators at areas of relevant exposure to both humans and ecology. The ES Addendum includes additional clarification on this point. The inclusion of the operation of the back-up diesel generators would not change the conclusions of the assessment that "the impact on air quality is not significant".

[1] Furthermore, Chapter 8 of the ES (Paragraph 8.4.17) specifically states that: "The only source of process emissions from the Proposed Development would be from the AAERF".

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		emitted, are likely to be much higher than those of the main stack (in other words, even though the total annual NOx and particulate matter emissions from the diesel generators are likely to be much lower than those from the main stack, their impacts will be disproportionate). By excluding the emissions from diesel generators from the assessment, the impacts of the scheme will have been underpredicted.	
8.7	In-combination impacts – traffic and process emissions	Paragraph 4.2 Part B Air Quality Paragraph 2.1 The combined impacts upon the SACs of additional traffic due to the scheme, with stack emissions have been considered, as set out in Section 6 of Appendix D3 of the ES. Therefore the 'in-isolation' impacts of these two aspects of this scheme have been considered. However, these results do not take into account the 'in-combination' traffic impacts with other plans and projects. In order to address this, the impact of additional traffic generated by the identified cumulative schemes should have been modelled with the additional traffic due to the Scheme, the resultant concentration added to the PC, and this value compared with the 1% screening criterion. If this had been carried out, the areas of the SACs where impacts could not be screened out as insignificant would be much larger.	This has been addressed as part of the ES Addendum. A separate technical note has been produced which includes transects showing the impact of emissions from road and the ERF at the Isle of Portland to Studland Cliffs SAC and Chesil and The Fleet SAC. These results have been fed into the Shadow Appropriate Assessment.
8.8	Use of spatially averaged background values	Paragraph 4.3 Part B Air Quality Paragraph 2.7 to 2.11 The use of spatially-averaged background values to represent location specific baseline values is not appropriate where there are significant localised sources of emissions within the study area, for example, when predicting concentrations alongside roads or near to areas affected by ship emissions. This under-prediction of the local baseline has the potential to affect the overall conclusions of the air quality assessment. Where the assessment has predicted total ambient concentrations (Predicted Environmental Concentrations or 'PECs') this has been done by adding the increment from the Scheme (the PC) to spatially-averaged background values. This is appropriate for those pollutants which, without the Scheme, are expected to be relatively spatially homogenous. It is not appropriate where there are significant localised sources of emissions within the study area; for example when predicting concentrations alongside roads or near to areas affected by ship emissions Failure to do this will have led to a large under prediction of the PEC alongside roads, especially the A354 alongside the Chesil Beach SAC and to a lesser extent at the Isle of Portland SAC near Castletown (which will also be influenced by ship emissions). In this area, the total modelled roadside concentrations from all traffic using the road (from ADMS-Roads) should have been added to the spatially-averaged background values, to derive an appropriate 'baseline' value to which the additional concentrations due to the scheme and other plans and projects should have been added to calculate the PEC. Given that there are sections of the Chesil Beach and Isle of Portland SACs alongside roads where the 1% screening criterion is exceeded, it is important that the PEC is calculated correctly. This under-prediction of the local baseline has the potential to affect the overall conclusions of the air quality assessment, and it is reasonable to expect the applicant to have assessed it robustly. This has not been done.	In terms of the impact on human health; a spatially averaged background concentration was used and then where the impact is predicted to be greater than 0.5% of the AQAL consideration made to the choice of baseline concentration. This included a discussion as to whether the mapped background data was suitable for the area in question. Therefore, consideration was included on the potential for the choice of baseline to affect the conclusions of the assessment. In terms of impacts on ecology, the ecological sites which are close to roads where this may be an issue are Isle of Portland Cliffs to Studland Cliffs SAC (and Isle of Portland SSSI) and Chesil and The Fleet SAC, SPA and Ramsar. A separate technical note has been produced which includes transects showing the impact of emissions from road and the ERF at the Isle of Portland to Studland Cliffs SAC and Chesil and The Fleet SAC. These results have been fed into the Shadow Appropriate Assessment. The dispersion modelling of these transects has included the contribution from baseline traffic emissions and mapped background data. Although the port operations have not been specifically modelled at the transects used the contribution from the port is likely to be similar to the mapped background. As such the variability in baseline concentrations has been considered in the assessment. The original shadow HRA should have referenced Section 6 of Appendix D3 of the ES

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		The extent of this underestimation is demonstrated by the results of nitrogen dioxide monitoring carried out on Portland by Weymouth and Portland Borough Council. The background value for the area, used to calculate PECs is 22 µg/m3, whereas the measured value at a roadside site on Portland in 2018 was 31 µg/m3. The concentrations used in the assessment are thus much too small to represent roadside conditions. These values have fed through to the Shadow Appropriate Assessment which has underpredicted the PECs associated with the Scheme.	
8.9	Process contributions – traffic NOx and ammonia emissions	Paragraph 4.4 Part B Air Quality Paragraph 2.12 to 2.14 The Process Contributions (PC) included in the shadow Appropriate Assessment do not take into consideration NOx and ammonia emissions from additional traffic generated by the scheme. The omission of these values means that the shadow Appropriate Assessment has failed to consider the entire impacts of the scheme. Scheme-generated ship emissions have not been modelled at all, and neither road traffic nor ship emissions are included in the concentrations considered, contrary to what is claimed in paragraph 5.97 of the shadow Appropriate Assessment The Process Contributions due to the scheme quoted in the Shadow Appropriate Assessment are those due to emissions from the stack in isolation, which appear to be taken from Technical Appendix D2 of the ES. These values do not take into consideration NOx and ammonia emissions from additional traffic generated by the scheme. The correct values are shown, graphically, in Section 6 of Technical Appendix D3 of the ES. The omission of these values means that the Shadow Appropriate Assessment has failed to consider the entire impacts of the scheme. This is particularly important as the graphs in Section 6 of the Technical Appendix D3 of the ES suggest that even with the project in-isolation, the combined impact of stack emissions and additional traffic on NOx and ammonia concentrations, and nitrogen deposition upon the Island of Portland SAC exceed the 1% screening criterion being used. As no numerical values are presented, the information provided is insufficient to determine whether there is a risk that the PECs will also be exceeded. The conclusions based on this erroneous information have been copied into the Natural Heritage chapter (Chapter 10) of the ES and to the Shadow Appropriate Assessment Furthermore, paragraph 5.97 of the Shadow Appropriate Assessment states that, “road traffic emissions, and those generated by ships in scenarios which have deliveries from both road and sea, have been factored into the modelling work and the impact on the increases in nitrogen oxides, ammonia and nitrogen deposition as a result of the operation of the facility have been assessed above”. This statement is plainly incorrect. Scheme-generated ship emissions have not been modelled at all (see Paragraph 2.20), and neither road traffic nor ship emissions are included in the concentrations considered in the Shadow Appropriate Assessment. The Shadow Appropriate Assessment is therefore highly misleading since it claims to cover emissions that have not been included.	The Shadow Appropriate Assessment has been updated to include the contribution of oxides of nitrogen and ammonia from emissions from additional traffic generated by the scheme.
8.10	Model grid resolution	Paragraph 4.5 Part B Air Quality Paragraph 2.15 and 2.16	The choice of grid has been selected to balance the computational time whilst ensuring that the grid is suitable to capture the peak impacts. The grid resolution is 60m, with a stack height of 80m. It is common practice that the grid resolution is at least 1.5 times the stack height, which would be 120m by 120m. The chosen grid size is half this and therefore considered to

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		The use of a course grid to model impacts is likely to have caused the near-field and maximum impacts to have been under-predicted and thus there may be areas of the SAC where impacts are greater than presented in the ES. The modelling presents the maximum predicted impacts anywhere on the receptor grid. However, these maxima values are dependent on the grid resolution chosen. It is highly likely that greater impacts would have been predicted if a finer receptor grid had been used. The grid resolution used is 60 m x 60 m even close to the stack. This is a particularly coarse grid and it is common and best practice to use a much finer resolution than this close to an emission source. The topography in the vicinity of the stack is complex, with the nearby receptors being located level with or higher than the stack. This includes areas of the SAC, some of which are very close to the stack. Therefore the choice to use a coarse grid is likely to have caused the near-field and maximum impacts to have been under-predicted and thus there may be areas of the SAC where impacts are greater than presented in the ES.	be appropriate. Changing the grid resolution is not expected to change the conclusions of the assessment.
8.11	Stack height analysis and ammonia emissions limits	Paragraph 4.6 and 4.7 Part B Air Quality Paragraph 2.17 to 2.19 It is not clear that the stack height is the optimum for minimising the adverse air quality impacts of the scheme as the effects of existing emissions from the road and shipping have not been quantified, and the combined effects of scheme-generated traffic, on-site diesel generator emissions, and emissions from the main stack have also not been considered. Section 5 of Appendix D2 details how the requirement for an 80 m stack was determined. The justification for an 80 m stack appears to be that most (but notably not all) impacts can, with this stack, be described as 'negligible' or 'not significant'. However, because the effects of existing emissions from the road and shipping have not been quantified, and the combined effects of Scheme-generated traffic, on-site diesel generator emissions, and emissions from the main stack have also not been considered, it is not possible to make this assessment. As a result, it is not at all clear that the stack height chosen is the optimum for minimising the adverse air quality impacts of the Scheme. Section 5 of Appendix D2 also considers the effect of a reduced ammonia emissions limit of 8 mg/Nm3 (compared with a BAT level of 2-10 mg/Nm3). This, in conjunction with an 80 m stack, would avoid stack impacts of greater than 1% of the critical level at the Chesil Beach SAC. However, such impacts would remain at the Portland SAC. BAT states that emissions as low as 2 mg/Nm3 are achievable. However, in order to achieve this, selective catalytic reduction (SCR) is required, rather than selective non-catalytic reduction (SNCR) (direct injection of ammonia solution into the combustion zone) which is proposed in the ES. Considering the high sensitivity of the receiving environment, i.e., a European designated site in unfavourable condition, with nitrogen sensitive features and the potential for further nitrogen deposition to hinder recovery, there is insufficient information presented to suggest that the ammonia emission limit presented in the ES is appropriate.	The stack height assessment considered the operation of the plant in isolation to determine that the stack height is appropriate for the building configuration. As set out in technical appendix D2, the stack height was chosen based on the change in the angle of the slope at the Isle of Portland to Studland Cliffs. Including existing emissions from road and shipping (or the diesel generators) would not change the justification of the stack height. As set out in Section 5 (Stack height assessment) of technical appendix D2, the ammonia limit is sufficient to ensure that the impact of the plant is less than 1% of the Critical Load at Chesil and the Fleet SAC where the baseline N deposition exceeds the Critical Level. In reducing it to 8 mg/Nm3, the ammonia contribution at the Isle of Portland to Studland Cliffs is reduced to a level at which the PEC remains below 70% of the Critical Level and therefore in both instances the impact is deemed not significant. In addition, this comment demonstrates a fundamental misunderstanding of emission limits. If the limit is set to 8 mg/Nm3, then actual emissions will be lower than this; the modelling is specifically worst case. The lower limits of the relevant critical loads and levels for semi-natural dry grasslands and scrubland facies: on calcareous substrates will not be exceeded if the proposals go ahead. The unfavourable condition of unit 33 is not due to nitrogen or ammonia deposition. The supplementary advice on conserving and restoring site features for the Isle of Portland to Studland Cliffs SAC notes that air quality for the qualifying features are currently within acceptable limits.
8.12	Combined impact with ship emissions	Paragraph 4.8 Part B Air Quality Paragraph 2.20	There will be periods whilst the ships are docking that the ship engines would be operating but this would only occur for a short period (less than an hour). Figure 13 of technical appendix D2 shows the area where the contribution from the plant is greater than 10% of the Critical Level.

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		Although there would only be an additional 2 ships per week as a result of the Scheme which would have a minimal impact on annual mean concentrations, there is potential for a combined impact of stack and ship emissions upon maximum 24-hour NOx concentrations. This is particularly important within the Portland SAC, as there is an area that could be directly downwind of both of these at the same time and thus impacts would combine. This issue requires assessment	Emissions from the ships would be at a much lower level than the plant and for the majority of the time these would be blown away from the cliffs. In the unusual event that the wind is from the north-east and blowing directly to the shore any emissions from the ships would impact at a much lower level than the stack emissions. On the lower flanks of the hill the stack emissions are <5% of the Critical Level, so including a contribution from ships (for an hour over a 24-hour period) would not significantly change the predicted impacts.
8.13	High-rise receptors	Part B Air Quality Paragraph 2.21 There are a number of tall residential buildings at the Ocean Views complex of Castle Road. The modelled grid would not have taken into account the height of these receptors. The modelled annual mean nitrogen dioxide concentration contour (labelled Figure 6.4 in Appendix D2) indicates that the stack is having an influence in this area. However, ground-level concentrations could be lower than those at upper floors and thus the impact will have been under-predicted.	The Ocean Views complex of Castle Road is located 1.2km to the west of the plant. Ground level concentrations were predicted to be well below 0.5% of the AQAL. Whilst the concentration could be greater at height the conclusions of the assessment would remain the same in that the impact would be not significant even at these elevated points. Additional clarification has been provided in the ES Addendum over the choice of receptors and impacts at specific receptors as requested by the EA as part of the EP determination process.
8.14	Traffic impacts on Portland	Part B Air Quality Paragraph 2.22 and 2.23 The Scheme would lead to an additional 72 HGV movements and 38 car (staff) movements per day. Whilst these traffic impacts fall below individual screening criteria for requiring detailed assessment (100 LDVs and 500 cars), these impacts would combine on Castletown which is very narrow, with receptors close to the kerb which means that annual mean nitrogen dioxide concentrations could be elevated. In addition, the impact of the stack on annual mean nitrogen dioxide concentrations appears to be only slightly less than 0.5% of the objective in this area (based on Figure 6.4 showing a small area above 0.5% just to the north of Castletown). Therefore, there could be the potential for the combined impact of stack emissions and those from additional traffic due to the Scheme to lead to a greater than 0.5% impact on annual mean nitrogen dioxide concentrations for residents of Castletown, which has not been quantified. Any consideration of impacts on Castletown would need to take into account the localised influence of all traffic on Castletown and emissions from ships using the nearby berths. Figures 1 and 2 of Appendix D3 of the ES appear to show roads model receptors along Castletown and Castle Road but no reference is made to them in the report and no results are presented.	Additional information has been provided in the ES Addendum and associated technical appendices to confirm the in combination impact of process and road traffic emissions in Castletown. This shows that the in combination impact is not significant and the conclusions of the original ES do not change.
8.15	Stack impacts on Boot Hill	Part B Air Quality Paragraph 2.24 Paragraph 4.78 of the ES notes that the impact of emissions from the stack on receptors on Boot Hill would be 'miniscule'. However, this is not quantified. Taking into account that the maximum impact of emissions from additional road traffic in this area is 0.47% of the objective, and the screening threshold is 0.5%, a 'miniscule' impact could potentially alter the conclusions and thus further information should have been provided. This is particularly important as annual mean nitrogen dioxide concentrations on Boot Hill in 2018 were only marginally below the objective (measured concentration of 39.6 µg/m3 where the objective is 40 µg/m3).	Although not quantified in the ES it can be seen from Figure 6.4 that the contribution from the plant will be very small. The Boot Hill area was outside the initial modelling domain. However, it was captured in the wider modelling carried out for the health impact assessment. This predicted the contribution to be <0.06% of the AQAL. Therefore, this additional contribution would not alter the conclusions of the assessment.
8.16	Queuing traffic on Boot Hill	Part B Air Quality Paragraph 2.26 The model results presented for Boot Hill in Table 5 of Appendix D3 of the ES are significantly higher (up to 60 µg/m3) than those measured on Boot Hill (maximum of 39.6 µg/m3) and shown at the verification sites in Table 4. This suggests that the additional emissions due to queuing traffic have been added to the	The emissions due to queuing were included in the verification. Table 5 sets out the worst-case assumption that there is no change to the fleet composition from 2017 levels together with the increase in vehicle flows for the 2023 assessment year. The results presented in Table 6 are the more "realistic" scenario which assumes that the fleet mix changes in line with the projections.

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		concentrations following verification. This approach is incorrect as queuing traffic will be having an influence on existing concentrations and thus should have been included in the verification process. Based on a comparison with measured values, this approach appears to have resulted in unrealistically high predicted concentrations on Boot Hill.	
8.17	Incorrect values in tables	Part B Air Quality Paragraph 2.27 to 2.30 There appear to be a number of incorrect values in Table 18 and 19 of Appendix D2 of the ES. For example, in Table 18, the background lead concentration is stated as 9.80 ng/m3, the PC 0.46 ng/m3 and the PEC 10.03 ng/m3. The PEC should equal the background plus the PC, but it this case it does not. A similar scenario occurs for lead in Table 19. In Table 19, the PCs presented for all metals are higher than the PECs, which is not possible. Table 22 of Appendix D2 states that the sulphur dioxide results are in ng/m3, whereas in Table 23 values 1,000 times higher are also stated to be in ng/m3. These errors highlight a lack of care that could be replicated in some other aspects of the model which it is not possible to review without the model inputs and outputs themselves	There was an error in the calculation of the PEC in tables 18 and 19. However, the conclusion of the assessment does not change. Table 22 of Appendix D2 should state $\mu g/m^3$ for sulphur dioxide results. The model inputs and outputs can be provided. However, each of the points raised above could have been calculated from other data in the report and identifying minor transcription errors does not undermine an entire assessment. These amendments have been made and updated tables provided as part of the ES Addendum. These are minor transcription errors and do not undermine the assessment. The conclusions of the original ES do not change.
8.18	Offsetting ship emissions removed by shore power	Part B Air Quality Paragraph 2.31 Paragraph 4.64 of the ES states that, "it should be noted that no allowance has been made for the offset of emissions from shipping that will use shore power by ERF, which this development enables". This statement ignores that fact that no emissions from ships have been explicitly modelled (either existing or associated with the Scheme), so it would not be possible to 'offset' any of these emissions within the assessment as they have not actually been quantified.	The impact of the proposed development should be based on the impact that the burning of the waste, and the vehicles used to import and export material, which is what has been done. However, a major benefit of the scheme is that power would be provided to ships which currently operate onboard engines to provide power when they are docked. A separate technical note to the ES Addendum has been provided and the results discussed in the ES Addendum. This confirms the qualitative analysis set out in the original ES.
8.19	Non-residential receptors	Part B Air Quality Paragraph 2.32 Where process contributions exceed the screening criteria, consideration has been given to the maximum concentrations, 'at any point', 'land' and 'residential'. No explicit consideration has been given to non-residential receptors such as the cruise terminal or footpaths. However, in this case the maxima at 'residential' appear to be the overall maxima and therefore this would not alter the conclusions of the assessment.	Additional clarification has been provided in the ES Addendum over the choice of receptors and impacts at specific receptors as requested by the EA as part of the EP determination process.
8.20	Misquoted guidance	Part B Air Quality Paragraph 2.33 The Shadow Appropriate Assessment misquotes the Environment Agency's guidance. The statement is incorrect for two reasons. First, the guidance referred to states that where the PC is greater than 1% of the critical level and the PEC is more than 70% of the critical level, a detailed assessment is required. It does not explicitly state that it can be concluded that there would be no significant effect. Secondly, no specific reference is made to this being 'alone or in combination'.	The Shadow Appropriate Assessment considers the impacts of the proposals both alone and in-combination as required by the relevant Regulations. By inference, those projects not requiring a detailed assessment are likely to be able to be screened out as having no likely significant effect. This is irrelevant to this application.
8.22	Crookhill Brick Pit SAC	Part B Air Quality Paragraph 2.35 Appendix D2 of the ES states that no further consideration is given to Crookhill Brick Pit because it is designated due to geological importance and thus not sensitive to air quality impacts. Whereas paragraph 4.82 of the ES states that has been designated for great-crested newts and 'while sensitive to air quality impacts,	Crookhill Brick Pits is covered by over lapping designations. It is notified as a SSSI for both biological and geological interest and designated as a SAC for great crested newts. The assessment of the biological interest of the site is covered in the shadow appropriate assessment.

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		no critical loads have been set' and this is stated as the reason for no assessment of impacts upon the site. This inconsistency indicates a lack of care and lack of understanding of the ecological impacts.	
8.23	Correlation coefficient	Part B Air Quality Paragraph 2.37 Under Graph 5 in Appendix D3 of the ES it is stated that the "correlation coefficient is 1.5364". This is incorrect, as this value is shown on the graph as being the slope of the best-fit line, which is not the same as the correlation coefficient.	This point is agreed, but this does not change the conclusions of the assessment.
8.24	Overall air quality assessment conclusions	Part B Air Quality Paragraph 3.1 It is clear that the air quality assessment presented in the ES is inadequate. This is important because, even though insufficient consideration has been given to combined and cumulative impacts within the assessment, it has still identified potentially significant air quality impacts on the SACs. In addition, the Shadow Appropriate Assessment has been based on incorrect information. Impacts upon human health may also have been under-predicted.	The air quality assessment has provided sufficient consideration of the combined impacts of process and traffic emissions associated with the proposed development. Potentially significant air quality impacts on the SAC were identified but this has been fully considered in the shadow Appropriate Assessment.

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9. Carbon balance and greenhouse gas emissions

Other consultees

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	Adams Hendry (on behalf of SPWI)		
9.1	Use of landfill as the comparator for carbon assessment	Paragraph 4.15 Landfill has been used as the comparator in the carbon assessment also. The justification for this as set out in paragraph 5.13 of the ES, is that the UK does not have enough ERF capacity to treat all residual waste so a considerable amount goes to landfill. For this assumption to be reasonable, it would need to be demonstrated that there is sufficient landfill capacity in the UK to treat all residual waste both now and for the next 25 years. This is highly unlikely to be the case as landfill capacity is decreasing across the country. This assumption is no more realistic than assuming all future residual waste is treated through ERFs.	Residual waste, being that which cannot be practicably recycled, can only be treated by ERF or landfill. Therefore, comparing with landfill is realistic. If insufficient ERF plants are built, then more landfills will be required.
9.2	Alternative carbon assessment scenarios	Paragraph 4.17 The applicants effectively dismiss the conclusions of the additional scenarios on the basis that any ERF currently processing residual waste from Dorset would need to secure waste from elsewhere and it is likely that the replacement waste will be currently going to landfill. No evidence is put forward to suggest that this assertion is reasonable. As a merchant facility, waste will be drawn from a wide catchment based on commercial terms.	The conclusions are not dismissed as the scenarios are fully considered. The statement in paragraph 5.21 merely notes that there is insufficient ERF capacity in the UK and so any new ERF plant will ultimately lead to a reduction in landfill. However, the revised Carbon Assessment includes a more detailed comparison of the current treatment methods for Dorset's waste with the proposed Portland ERF and demonstrates that there is carbon benefit.
9.3	Alternative carbon assessment scenarios – Marchwood or Lakeside ERF	Paragraph 4.18 Sending RDF to the Marchwood ERF or Lakeside EfW has been considered on the basis that they are both used by BCP Council. Lakeside EfW shows a benefit over Portland ERF but this is dismissed on the basis that it does not take into account the potential benefits of exporting power to ships. Both the Lakeside and Marchwood plants export energy to the grid and so it seems disingenuous to suggest this electricity is less beneficial in reducing carbon, simply because it does not directly export its power to ships. Similarly, the potential benefit to provide heating is suggested as providing an added benefit for the Portland ERF. As the current proposals do not include CHP, it is no better than the plants at Lakeside or Marchwood.	This comment fails to appreciate that there is currently insufficient power capacity available at the port to export power to ships. Hence, power generated at Lakeside and Marchwood, while beneficially displacing power from other power stations, cannot displace diesel engines used on ships. This can only be done by generating power at the port. The slight benefit of Lakeside over Portland is not dismissed, but the potential benefits of shore power need to be considered as well. Similarly, the potential for CHP is greater at Portland.
9.4	Alternative carbon assessment scenarios – export to European ERF	Paragraph 4.19 Exporting waste to European ERF plants would have a carbon benefit over sending waste to the Portland plant as the additional carbon savings from heat displacement would outweigh the additional transport emissions. The applicant suggests that importing waste from the UK would result in other European waste being landfilled. Again, this statement is entirely unsubstantiated and therefore cannot be relied upon. It seems unlikely that European ERFs are all operating at capacity and would not be able to process an additional 200,000 tonnes per annum, the amount of residual waste proposed to be treated at Portland Port	According to data published by the European Commission[2], in 2018 52 million tonnes of municipal waste was sent to landfill and 58 million tonnes was incinerated. This suggests that there is more than enough waste available to keep all of the ERF plants in Europe operating at full capacity, which is the most economically sensible approach.

[2] https://ec.europa.eu/eurostat/statistics-explained/index.php/Municipal_waste_statistics

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9.5	Alternative carbon assessment scenarios – Dorset Waste Plan (DWP) allocated sites	Paragraph 4.20 The comparison with sites allocated in the DWP did not produce a favourable outcome for the ERF at Portland. Given the distances involved from the major centres of population in Dorset, carbon emissions associated with transporting waste by road would be greater than for the allocated sites. The applicants suggest that the advantages of a facility at Portland, namely the potential for district heating, shore power and the delivery of waste by ship, would outweigh this disadvantage. Again, CHP does not form part of the application so this should not be taken into account and as before, all sites would be capable of providing electricity into the grid, which could offset any additional electricity required by the Port. Whilst delivering waste by ship would reduce carbon emissions associated with road transport, it does not eliminate carbon emissions from transport. Depending on where the waste is being transported from (on the assumption that there will be an element of road transport to take the waste to the port), the carbon emissions may in fact be higher.	It is acknowledged that transporting waste to Portland would lead to higher carbon emissions from transport, but the supporting application documents have explained that this is outweighed by the benefit of generating power at the port. As explained above, there is currently insufficient power capacity available at the port to export power to ships. It is also outweighed by the ERF's ability to supply a district heat network which, as explained further in the District Heating Paper, is a viable and deliverable prospect given the clear national policy and economic drivers to do so, and the identification of the Ministry of Justice as a likely anchor network customer.
9.6	Alternative carbon assessment scenarios – do nothing	Paragraph 4.21 The continuation of Dorset's current waste management operations has also been considered. The applicant has not assessed this scenario in isolation, rather it assumes that additional commercial waste from within Dorset (in sufficient quantity to use up spare capacity at the proposed ERF plant) would be managed in the same proportions as Dorset's residual local authority collected waste. This would result in 82,000 tonnes of waste being sent to landfill. This assumption is not supported by any evidence. Further information is required on what proportion of commercial waste is currently landfilled in order to properly assess this scenario.	In Appendix E, it is explained that over 92,000 tonnes of commercial and industrial waste is reported to be sent to landfill from Bournemouth, Dorset and Poole.
9.7	Emissions from the transportation of waste	Paragraph 4.22 It is unclear how the emissions associated with the transport of waste have been calculated as no information has been provided on the source of waste. A one-way distance of 160km for waste to site has been used in the assessment, but no explanation is given for this figure. If this is a reasonable proxy for the distance waste is transported, it cannot be said to accord with the proximity principle. Similar distances are quoted for the transport of IBA and APCr to recovery.	Table 13 in Appendix E states that this is the maximum transport distance. It was used as a conservative figure. In section 4.4.3 of Appendix E, it is noted that Dorset waste would travel an average of 55 km to the facility, emphasizing that 160 km is conservative. In the revised Carbon Assessment, this distance is used when considering the treatment of Dorset's waste.
9.8	Carbon assessment - CHP	Paragraph 4.23 It is noted that the carbon balance and greenhouse gas emissions assessment has assumed that a heat network is constructed to supply the Osprey Leisure Centre, HM Prison The Verne, HM Prison Young Offenders Institute Portland and the Ocean Views development. As the supply of heat does not form part of the planning application and by the Applicant's own admission a heat network would only be implemented should a practical off-site local user be identified, there is no certainty that this will come forward and therefore it should not form part of the Environmental Impact Assessment. The carbon balance and greenhouse gas emissions assessment should therefore be disregarded.	The assessment has been undertaken both with and without the provision of heat, thereby providing an estimate of the minimum beneficial effect if heat is not provided, together with an indication of the additional beneficial impact that could occur if heat is provided (one of several potential alternative scenarios assessed). The facility, with the provision of Shore Power, has a carbon benefit over landfill and all other identified UK based ERF options in both cases, with the benefit further increasing if heat is exported. The conclusion that there will be a significant beneficial effect is valid whether CHP is provided or not and it is incorrect to state that the assessment should be disregarded
9.9	Carbon assessment – CHP and environmental effects from construction	Paragraph 4.24 If the Waste Planning Authority accept the carbon balance and greenhouse gas emissions assessment as submitted, the full environmental effects of the construction of the heat network must be assessed.	The Carbon Assessment provides information on the impacts without heat generation, which is only assessed as a possible additional benefit that could occur if heat is to be provided in future. In the unexpected event that heat was not provided the Portland ERF (with Shore Power provision) would nevertheless outperform all other identified UK processing options, including landfill and other existing and potential ERFs.

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			However, as explained in the District Heating Paper there is a high likelihood that a district heating network will be implemented given the compelling economic, environmental and policy drivers in effect and the likelihood that the Ministry of Justice would become a heat taker. The report identifies viable routes for the heat network to provide connections to the HM Prison The Verne, HM Prison Young Offenders Institute Portland and other potential customers. The effects of constructing the network via these routes has been assessed through the Regulation 25 ES addendum, in respect to potential cumulative effects. This has concluded that its construction would not give rise to any significant adverse effects.
	UKWIN		
9.10	ES – reference to Committee on Climate Change position	The applicant's ES contains a mischaracterisation of the position of the Committee on Climate Change	These comments are specifically addressed in the Fichtner technical response document (Appendix A to this document).
9.11	Biogenic CO_2 release incineration v landfill	There is a failure to account for differences in the amount of biogenic CO2 that would be released through incineration compared to landfill	These comments are specifically addressed in the Fichtner technical response document (Appendix A to this document).
9.12	Use of landfill as the counterfactual	There is a flawed use of 'sending waste untreated to landfill' as the waste treatment counterfactual	These comments are specifically addressed in the Fichtner technical response document (Appendix A to this document).
9.13	Use if CCGT as the energy generation counterfactual	Inadequate use of CCGT as the energy generation counterfactual.	These comments are specifically addressed in the Fichtner technical response document (Appendix A to this document).
9.14	Carbon neutrality and position on carbon capture and storage	The applicant's document entitled 'achieving carbon neutrality' does not actually demonstrate that the proposed facility would achieve carbon neutrality. Despite the applicant's claims, if approved, the proposed development appears likely to result in significant adverse climate impacts. Whilst the applicant notes the possible potential for carbon capture in section 6.311 of their Planning Supporting Statement, it should be noted that the planning application is for a facility without carbon capture. The applicant states in section 3.111 of their Planning Supporting Statement that they might not employ carbon capture technology on the grounds of economic viability. This implies that the applicant's stated ambitions for achieving carbon neutrality could be hampered by cost considerations.	As stated in the Planning Supporting Statement (paragraph 6.311) Powerfuel is prepared to consider carbon capture and storage technologies as and when these become technically and economically viable. Since the submission of the planning application, there have been further developments in respect to carbon capture and storage and it is known that the Government is keen to explore options as to how existing and new ERF can apply carbon capture technologies. At this time, carbon capture and storage is a premature technology but could in future provide an opportunity to further mitigate carbon emissions from waste management, working alongside heat and energy recovery. The ERF site at Portland has the significant advantage of being located within a commercial port. Potential exists to utilise existing port infrastructure for carbon capture, storage and transportation. As an emerging technology, carbon capture and storage is not technically proven at scale for facilities of this type and carries a significant economic cost at this time such that it is not commercially viable without external financial support. However, the Government is keen to ensure that as carbon capture technologies develop technically to scale they can be applied to existing and proposed ERF, where possible, and is considering how the sector might be supported to stimulate the adoption of this new technology where potential exists. The Portland ERF is a project that has significant potential to adopt carbon capture and storage and is likely to attract interest from Government in terms of the provision of economic support to realise this potential. Further information on the applicant's approach to carbon capture is provided in the Carbon Capture Pre-feasibility Assessment.
9.15	Counterfactual baseline	As noted in section 6.306 of the applicant's Planning Supporting Statement, the applicant anticipates that the counterfactual baseline against which emissions will be assessed is expected to initially be the same as that "broadly established in the Fichtner Carbon Assessment". That would not be an appropriate starting point.	As set out in the Fichtner technical response document (Appendix A to this document), the counterfactual baseline (landfill) is appropriate as the UK does not have enough capacity to treat all residual waste, so quite a lot of residual waste goes to landfill. If a new EfW is built in the UK, this means that less waste overall will be sent to landfill and therefore, at a national level, the correct comparator is landfill. This approach is supported by national guidance, specifically "Energy from Waste: A Guide to the Debate" and "Energy recovery for residual waste – A carbon based modelling approach" both published by DEFRA in 2014.

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Item	Topic	Summary of consultation comment	Applicant response
9.16	Dynamic adjustment	Section 6.306 talks about "dynamically" adjusting the baseline to take account of changes such as a future ban on landfill, but does not explain how the impacts of the facility would be calculated were that to occur. The applicant similarly does not make it clear whether or not, once carbon capture becomes more widespread, the proposed dynamic adjustment process would result in incineration with carbon capture and heat export being used as the baseline against which the proposed development's GHG impacts should be compared.	The Applicant would agree the dynamic adjustments with the local authority. It is not appropriate to determine the approach in advance, when future policy is not known.
9.17	Unaffordability of mitigation	It is also not explained what would happen in the event that the applicant considered any mitigation measures to be unaffordable, which we consider to be plausible given the level of emissions anticipated from the facility set out above.	See response to point 9.18.
9.18	Mitigation of full emissions of CO_2	The global warming effects of CO_2 last for considerably longer than those for methane and some climate mitigation methods may take many years for their impacts to be seen. As such, to ensure net carbon neutrality it would necessary for the full emissions of CO_2 (fossil and biogenic) to be mitigated through contemporaneous reduction in CO_2 released from other sectors (that would themselves be likely to be reducing in any case on the route to Net Zero 2050) or the immediate removal of CO_2, rather than just the relative net release of CO_2e. Indeed, the measures set out at paragraph 6.309 of the Planning Supporting Statement appear to be the sort of measures one could expect to be occurring in the absence of the proposal as part of the move towards Net Zero 2050, and as such it is unclear what added value the proposed facility could offer throughout the 2030's and beyond.	The arguments made here appear to undermine carbon offsetting entirely. The Applicant does not accept them and can only restate paragraph 6.310 of the planning statement: *"Objectors may question the validity of carbon off-setting and suggest that such proposals do not actually deliver on achieving carbon neutrality, or simply represent a statistical exercise. Such criticisms do not apply to this application because the applicant is prepared to back up its net-zero commitment by entering into a legal agreement with Dorset Council to ensure that the proposed ERF does achieve carbon neutrality. Whilst the precise measures to be applied have yet to be determined, carbon neutrality will be achieved through supporting a number of projects which may include those mentioned above, or sequestration through tree planting or re-wilding off-site or otherwise the use of verified carbon credits such as those marketed as Gold standard carbon credits by retail off-setters, or through supporting local community scale energy efficiency measures."*
9.19	Cost estimates	No indicative cost estimates for mitigation or estimates regarding the profitability of the facility are provided to demonstrate that the operator would be in a financial position to pay for the full mitigation necessary to achieve carbon neutrality based on the costs of mitigating their plant's CO2e emissions based on: a) the applicant's own central assumptions, as set out in Chapter 5 of the Environmental Assessment; b) the sensitivity scenarios set out in Technical Annex E; c) the assumptions set out by UKWIN (e.g., accounting for biogenic carbon sequestration, lower grid factors, higher landfill gas rates, and/or using recycling as an alternative treatment option). d) a dynamic adjustment to the baseline based on changes in the generation mix feeding the UK grid (in line with the decarbonisation anticipated in the applicant's 'achieving carbon neutrality' report); e) a dynamic adjustment to the baseline based on increases in landfill gas capture rates (in line with the increase to 75% anticipated in the applicant's 'achieving carbon neutrality' report); f) a dynamic adjustment to the baseline based on landfill bans; and/or g) a dynamic adjustment to the baseline to compare the plant with the counterfactual of a carbon capture facility with combined heat and power.	This is not a planning consideration.
9.20	Weight to be attributed to carbon neutrality measures	Given the significant deficiencies and uncertainties associated with the applicant's stated intention to achieve carbon neutrality and the absence of a draft planning condition or obligation, it is not surprising that the applicant is not arguing that any weight should be given to their proposed measures for 'achieving carbon neutrality' within the planning balance.	It is not clear why UKWIN chooses to mis-represent the Applicant's position. The Applicant states, in paragraph 6.313 of the planning statement (our emphasis): *"Given that the applicant is committed to funding additional carbon off-setting measures in each year that the ERF reduces GHG emissions (compared to baseline), and in each year that the ERF increases GHG emissions (compared to the baseline) will compensate for this by purchasing carbon offsets, the proposed plant will reduce GHG emissions over its lifetime and will achieve carbon neutrality, or better in every operating year.* ***This should be afforded great positive weight in the planning balance.****"*

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10. Economic effects and jobs

Other consultees

Item	Topic	Summary of consultation comment	Applicant response
	Adams Hendry (on behalf of SPWI)		
10.1	Public perception	Paragraph 4.10 Chapter 6 of the ES seeks to address the public perception of energy recovery facilities. This appears as more of a public relations exercise than a proper consideration of the effects of the proposed Portland Port ERF on the local community and it is questionable as to whether it should form part of the ES.	The public perception section of this chapter identifies public concerns set out in published research and provides an objective and evidence-based response to these issues, using both published data and project-specific assessment findings, with sign-posting to where more detail can be found in other parts of the ES and other application documents. It is therefore appropriate for this to form part of the ES and incorrect to dismiss it as a public relations exercise.
10.2	Economic benefit	Paragraph 4.11 The assessment of economic effects suggests that the vast majority of spend will be directed to mainland Europe. The ES acknowledges that benefit of the proposed ERF to existing and new businesses in the Dorset area (levels 1 and 2) as a result of increased expenditure will be slight and will be negligible nationally. Similarly, the benefit of increased employment during construction to residents of Dorset will be slight.	This comment simply repeats the findings of the economic assessment. It does not however, recognise the positive contribution that such investment will make to the local economy, particularly given the evidence of local deprivation and the growth objectives of relevant economic development strategies.
10.3	Employment creation – use of multiplier	Paragraph 4.12 Once the ERF is operational, the ES suggests that a minimum of 17 jobs will benefit Weymouth and Portland with a further three jobs in the wider Dorset area. This is on the basis of using a multiplier that assumes an equal split between jobs in the Electricity, Gas, Steam and Air Conditioning (SIC 35) and the Sewerage, Waste Collection and Treatment (SIC 37-38) set out in the UK Input- Output Analytical Tables (ONS 2020). As the multiplier for SIC35 of 6.919 is significantly higher compared to the multiplier for SICs 37- 38 of 1.933, this can distort the results. Further justification is required to support the assumption that the jobs created would be equally split between the two sectors as it would seem more likely that the jobs would be heavily concentrated in the Sewerage, Waste Collection and Treatment SIC, resulting in fewer additional jobs.	This comment is not correct. The 17 jobs in Weymouth and Portland (or 20 in the wider area) do not depend on the multiplier or include its effects. The estimate of 17 (20) is obtained by reducing the original 30 direct jobs (expected to be required at the plant) downwards to account for workers who are likely to live outside of the target area and for jobs that would have existed anyway, both of which we have excluded so that we can identify the net effects. The multiplier effect will be applied to the 17 (or 20) jobs and will be additional to them. However, the effect of the multiplier, though it will be real and positive, has not been included at the local level.
10.4	Economic effects of shore power (cruise business)	Paragraph 4.13 The conclusions reached on the impact of shore power on the cruise business at Portland Port are totally unsubstantiated and contrary to the current projections quoted in the Shore Power Report for a 58% increase in cruise ships calling at the port in the near future in the absence of shore power. It is not reasonable to assume that shore power will not be made available at Portland Port in the next 25 years if the proposed ERF is not consented.	It is not correct to state that the conclusions reached on the impact of shore power on the cruise business are totally unsubstantiated. They are based on significant research and economic analysis. It is acknowledged that the forecast cruise ship calls in the two different reports are different. This is because they have been prepared for different purposes. The Shore Power report takes the Port's (higher) forecasts as its basis because it is necessary to ensure that sufficient energy supplies are planned such that the future demand for shore power can be accommodated. The use of lower figures here would risk under forecasting, the result of which would be inadequate energy supplies for visiting ships and artificially low costs of shore power at the planning stage. On the other hand, it is more appropriate for the economic analysis to use a more conservative estimate of cruise calls. The economic impact estimates are driven by a loss of tourism revenue (without the plant), which is estimated by considering the net differences between cruise ship visits under the with/without shore power scenarios. If higher figures were used under the 'with shore power' scenario, the differences between the with/without shore power scenarios would be greater, and the economic impact of the plant would be shown to be larger. While future cruise calls are likely to turn out to be more than envisaged in the economic analysis (and we note that the actual number is higher than the higher assumption used in the Shore Power report), the applicant and its technical consultants adopted a conservative approach. Doing so ensures that neither energy

Item	Topic	Summary of consultation comment	Applicant response
			infrastructure and associated costs are under-estimated, nor the economic impact of the scheme is exaggerated.
10.5	Waste management costs	Paragraph 4.14 The conclusions reached on the cost of waste management set out in paragraphs 6.137 - 6.138 are also misleading. Whilst 51,244 tonnes of residual waste were sent to landfill in 2018, it is not reasonable to assume that this level of residual waste would go to landfill for the next 25 years. The saving of £43 million quoted is spurious to say the least.	The paragraphs highlighted here are intended to show that local authorities are expected to be able to realise significant monetary savings if they substitute their current use of landfill for waste treatment at the proposed plant instead. This is because landfill rates are likely to be more expensive than the plant gate fees. The gate fee for the new plant is not yet known but, in the report, an example (which is clearly stated as such) estimated that if gate fees are pitched in the region of £80/tonne, then there is the potential for Dorset and BCP to save in excess of £2.5m per annum, relative to using landfill. Over the 25 year life of the plant, such a saving would add up to a net present value in the region of £43m. It is true that the councils may not continue to send their waste to landfill over the whole life of the plant, but it is the current situation and, for as long as the councils send waste to landfill, it will continue to cost them an estimated minimum of £2.5m pa beyond the cost of alternative treatment. The Local Authorities do not have a viable alternative to landfill at present and until such a viable (and preferably local) alternative is provided they will continue to send waste to landfill, incurring extra costs. If nothing is done the default option will continue resulting in a total cost (over the with project scenario) of £43m (NPV). Even if the amount of waste disposed of to landfill reduced over time, this is still likely to result in significant financial cost, aside from the environmental costs associated with landfill being the least sustainable waste management option under the waste hierarchy (given the resultant methane production).

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11. Cultural heritage

Statutory consultees

Item	Topic	Summary of consultation comment	Applicant response
	Historic England		
11.1	Impact on heritage assets – visual and associated relationship	Concerns regarding the potential impact on both visual and associative relationship of the proposed development on the significance of several nationally important heritage assets: Verne Citadel, Portland Castle, East Weares Camp, Battery 200yds (180m) E of the Naval cemetery, Underhill Conservation Area, Dockyard Offices and Dorset and East Devon Coast World Heritage Site including a number of listed buildings and non-designated assets..	Effects on heritage assets are considered in chapter 7 of the ES which found significant effects to the Inner breakwater and Dock Office, the East Weare battery, The Verne Citadel and Portland Castle. Effects on the WHS are considered in chapter 13 which found significant effects to OUV. The proposals included in the framework mitigation strategy, developed in consultation with DC conservation and Historic England (HE), aims to provide significant public heritage benefits to off-set any identified harm.
11.2	Impact on heritage assets – dominance and impact on views	Whilst it is acknowledged that the area has been a working naval base and in most recent years a working port, it is felt that the proposed development is too dominant a presence and will intrude in views to and from the heritage assets. Considers the impact on the individual assets within the area and the cumulative impact both close to the development and from distant views would be harmful from the introduction of a dominating and visually intrusive chimney and large industrial scale buildings.	The assessment of effects in chapter 7 of the ES included the effects on particular views to, from and of the heritage assets, making use of the range of site photographs and the visualisations included in chapter 9, landscape, seascape and visual effects. These images illustrate the relative scale of the proposed ERF structures and stack. Additional visualisations have been produced as part of the ES Addendum. The proposals included in the framework mitigation strategy, developed in consultation with DC conservation and HE, aims to provide significant public heritage benefits to off-set any identified harm.
11.3	Impact on heritage assets - heritage benefits	It is for your authority to establish if any heritage benefits could be achieved that would offset any harm (NPPF 200).	The framework mitigation strategy, developed in consultation with DC conservation and HE, aims to provide significant public heritage benefits to off-set any identified harm to heritage assets as a result of the proposed development.
	Dorset Council Conservation		
11.4	Impact on heritage assets – degree of harm and heritage-related benefits	We have identified less than substantial harm to the significance of the following designated heritage assets: • Battery 200 yds E of the Naval Cemetery (Scheduled Monument, 1002412; and • Grade II as 'East Weare Batteries at SY 694741', 1281863); • Verne Citadel (Scheduled Monument, 1002411), including associated designated heritage assets within; • Portland Castle (Scheduled Monument, 1015326; and Grade I, 1205262), including associated designated heritage assets; • The Citadel, North Entrance (Grade II*, 1206120); • Dockyard Offices (Grade II, 1203099); • Inner and Outer Breakwater, including Coaling Shed, Jetties and Forts (Grade II, 1205991); • Battery approximately 160m NE of East Weare Camp (Grade II, 1447946); • East Weare Camp (Grade II, 1205814); • Battery approximately 80m SE of East Weare Camp (Grade II, 1444030); and • Underhill Conservation Area. Taking into account the assessments of significance, the scale and nature of harm caused and the weight of public benefits, it is considered that, with the addition of	It is noted that the Dorset Council heritage officer has undertaken a comprehensive and robust assessment of the proposed ERF and has broadly agreed with the conclusions of the heritage impact assessment in the ES, finding that there would be less than substantial harm to the identified heritage assets. It also concludes that the harm caused to the heritage assets could be outweighed by public benefits and heritage-related benefits secured through a programme of mitigation. Further discussion has been held with the Dorset Council heritage officer, also with input from Historic England, to identify suitable heritage related benefits and this is set out in the submitted Framework Heritage Mitigation Strategy. The strategy is focused on a programme of works to the E Battery scheduled monument (1002412), that will remove invasive scrub vegetation and enable the asset to be managed such that it will be removed from Historic England's 'Heritage at risk register'. The heritage benefits will also include the provision of a new permissive footpath link across the Portland Port estate (currently not publicly accessible), completing the 'around Portland' walking path and enabling the public to view and fully appreciate the scheduled monument and other heritage assets that are located in this part of the Island, assisted by the provision of new interpretation information about the various heritage assets. The Framework Heritage Mitigation Strategy, intended to deliver heritage-related benefits, is considered to off-set any harm caused by the proposed development to local heritage assets, and the proposal is in accordance with national and local policy. Specifically, the proposals can demonstrate that the potential harm caused to the setting of heritage asset (less than

Item	Topic	Summary of consultation comment	Applicant response
		heritage-related benefits secured through a programme of mitigation, the public benefits will be made sufficiently substantial to outweigh the harm caused to the above heritage assets. Without this mitigation, it is not considered that the proposals meet the requirements of national and local plan policies.	substantial harm) can be suitably off-set by heritage-benefits, as required by NPPF (200) and directed by Historic England.

Other consultees

Item	Topic	Summary of consultation comment	Applicant response
	Adams Hendry (on behalf of SPWI)		
11.5	Heritage assessment - Use of 1km study area	Paragraph 4.25 It is noted that the study area for the assessment is only 1km from the boundary of the main site. This is not considered sufficient for a proposal with an 80m stack that has the potential to affect the setting of heritage assets much further afield. Despite this very tightly drawn study area, there are still 200 records listed in the Historic Environment Record (HER).	As effects on archaeology (terrestrial and marine) were scoped out of the assessment the HER data is included for completeness only. As stated in paragraph 7.14 of the ES chapter, the study area was extended where necessary to consider individual assets outside the 1km radius with the potential for setting effects.
11.6	Heritage assessment - methodology	Paragraph 4.26 The methodology used in the assessment is vague and ambiguous and seems to be designed to underplay the significance of heritage impacts. By way of example is the consideration of the sensitivity of receptors shown in Figure 7.4. A number of receptors e.g. Conservation Areas span the full range of sensitivities from high to negligible and is therefore of little use in informing the assessment. Table 7.2 seeks to identify the importance of receptors and concludes that listed buildings and schedule monuments are high and conservation areas are medium. No explanation is given for this assessment other than a reference back to Figure 7.4, which as discussed is meaningless. Given the statutory protection given to listed buildings and conservation areas, it is not clear why they have been assessed as having a different level of importance.	This is the standard Terence O'Rourke methodology applied to heritage assessments, which has been scrutinised by planning Inspectors at appeal on numerous occasions, most recently in Spring 2020. The assessment methodology is therefore considered to be appropriate, comprehensive and robust. Dorset Council's conservation officer raised no fundamental concerns in the formal consultation response in respect to the methodology. The comment also misinterprets the methodology, as it is the location of the text in the figure that shows the primary level of importance – for example, the 'conservation area' text is under the 'medium' header. The shading allows for some flexibility in interpretation according to individual circumstances, which would be explained in the text. Therefore, the assertion made here in respect to the methodology has no merit and carries no weight.
11.7	Heritage assessment – effect on listed buildings	Paragraph 4.27 Table 7.3 of the ES concludes that the proposed ERF will have a long term significant adverse effect on a number of listed buildings including the breakwater and former dock offices and the East Weare batteries as well as the Grade II* Verne Citadel and Portland Castle.	This comment simply repeats the assessment conclusions.
11.8	Heritage assessment – NPPF	Paragraph 4.28 The National Planning Policy Framework (NPPF) makes it clear at paragraph 193 that when considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation and the more important the asset, the greater the weight should be. Paragraph 194 states that any harm to, or loss of, the significance of a designated heritage asset, including from development within its setting should require clear and convincing justification.	Noted. This statement is covered in the legislation and policy section, paragraphs 7.2-7.12 of the ES chapter.

Item	Topic	Summary of consultation comment	Applicant response
11.9	Heritage assessment – impact on setting of heritage assets	Paragraph 4.29 It is not clear how the impact on setting has been assessed as the ES only includes images of the views in the absence of the proposal (see Figures 7.1 – 7.10). Further information is required to clearly show what impact the proposed ERF would have on these important heritage assets.	This is explained in the ES chapter methodology section (paragraphs 7.13-7.24 and figures 7.4 – 7.6). The ES chapter also refers to the ZTVs and visualisations in ES chapter 9.
11.10	Heritage assessment – impact from cable route	Paragraph 4.30 As information on the construction of the cable route has been omitted, it is not clear what has been assessed in relation to cultural heritage. Further information is required.	The reasons for scoping out the cable runs are explained in the ES chapter paragraph 7.72.
11.11	Heritage assessment – preservation of listed buildings	Paragraph 4.31 Section 66 of the Planning (Listed Buildings and Conservation Areas) Act 1990, places a statutory duty on local planning authorities to have special regard to the desirability of preserving listed buildings and their setting or any features of special architectural or historic interest which they possess. A similar duty is set out in section 72 of the Act in relation to development within conservation areas, which states that, *'….special attention shall be paid to the desirability of preserving or enhancing the character or appearance of the area'*.	Noted. This is covered in the legislation and policy section, paragraphs 7.2-7.12 of the ES chapter.
11.12	Heritage assessment – weight to be applied to impact on setting of heritage assets	Paragraph 4.32 The courts have held that *'preserving means doing no harm'* and have established that the desirability of preserving listed buildings and their settings should not simply be given careful consideration but should be given *'considerable importance and weight'* when the decision-maker carries out the planning balance. The fact that the ERF would have an adverse impact on the setting and significance of a range of heritage assets weighs heavily against it.	This is covered in the legislation and policy section, paragraphs 7.2-7.12 of the ES chapter. The Planning Supporting Statement sets out the clear justification for the project and the public benefits in relation to waste management, energy and carbon, socio-economics and other aspects, which giving the required weight to any harm to heritage assets, together outweigh the harm and tilt the planning balance in favour of the proposal. Furthermore, the submitted ES Addendum provides further information on heritage related mitigation, which it is considered provides significant heritage related public benefits that minimise and/or off-set any adverse effects on affected heritage assets. The wider public benefits (set out in the planning submission), together with the proposed heritage-related benefits are substantial. Given that the harm to heritage assets is accepted to be less than substantial, any adverse impact on heritage assets would be outweighed by public and heritage related benefits.

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12. Ground conditions and hydrology

Statutory consultees

Item	Topic	Summary of consultation comment	Applicant response
	Dorset Flood Risk Management		
12.1	Site drainage – viability and capacity	The applicant has not demonstrated the viability of the existing outfalls or how, legally and technically, a new outfall could be created. The following points need to be addressed: • The applicant has not demonstrated in their application that the existing outfall pipes have adequate capacity for the unattenuated flows coming from the Waste Recovery Site. • Although a free discharge to the sea is allowable at this location, as it will have no discernible impact on downstream tidal flood risk, the conveyance of this free discharge needs to be sized accordingly. Where existing connections are to be used, this should consider, not only the size of the pipe but any contributions from development elsewhere. If a full, unattenuated discharge cannot be achieved due to capacity issues, then some attenuation might be needed to reduce peak flows. • Also due to the lack of survey information there can be no certainty that the current condition of the existing network is suitable for discharge of surface water from the site. • Surcharge of the system needs to be avoided during normal conditions as exceedance flows directly to tidal waters could conceivably convey contaminants off site.	Further investigations have been carried on the points of connection for surface water that are to be re-used and as a result a revised surface water drainage strategy is now proposed. This now provides appropriate surface water attenuation storage where the capacity of the outfall pipe is limited. The information gained through further investigations and the revised surface water drainage strategy together with responses to the matters raised by DCLLFA are set out in the submitted Flood Risk Assessment Addendum. In summary, all of the matters raised are addressed and it is expected that the usual planning conditions relating to submission of further drainage details prior to commencement will be applied.

Other consultees

Item	Topic	Summary of consultation comment	Applicant response
	Adams Hendry (on behalf of SPWI)		
12.2	Extent of the study area	Paragraph 4.33 No information has been provided on the extent of the study area and therefore it is not clear whether the cable route has been assessed. Further information is required as this is an intrinsic part of the proposal.	The extent of the study area is discussed in the desk study report in technical appendix I1, which states that the main development site was the focus of the study as the works along the cable routes only comprise shallow linear excavations within the existing road network.
12.3	Impact of cable routing	Paragraph 4.34 It is not clear whether the grid connection will be buried or will be overground. Clearly, if it is intended to be underground, there is potential for significant impacts during construction.	The principles of the connection are indicated in the Utilities Report which accompanies the application. This includes the fact that cables are buried and that an order has been placed with SSE. Notwithstanding this, further information on the grid connection is provided in the Grid Connection Paper for clarity.
12.4	Suitability and extent of ground investigation	Paragraph 4.35 It is noted that no intrusive investigations were carried out to establish the baseline condition of the site and its surrounds, rather a desktop study was undertaken based on reports produced by RPS to support the application for an energy plant. Not only is this data over 10 years old, it is not clear what study area was used by RPS given that the previous proposals were of a significantly smaller scale.	As is typical for such a development, and in accordance with good practice, a comprehensive desk study has been prepared to inform the EIA and planning application that uses existing ground investigation data and other published sources of information. The extent of the RPS ground investigation (GI) is shown on figure 4 in the desk study report in technical appendix I1, which shows that the GI locations are within the main development area. Whilst it is acknowledged that the RPS GI is over 10 years old, the polluting potential of site activities since the RSK GI has been relatively low. As noted in the desktop study, an extensive ground

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Item	Topic	Summary of consultation comment	Applicant response
			investigation will be required to fully assess risks associated with contamination, to inform a remediation strategy and to satisfy environmental regulators.
12.5	Need for further ground investigation works	Paragraph 4.36 The need for further ground investigation works to provide additional information on ground contamination conditions at the site to refine the risk assessment and if necessary, produce a remediation strategy, is set out in paragraph 8.68. Further information is also required to characterise the ground gas prior to development (see paragraph 8.73 of the ES). If required, a scheme of ground gas protection will be incorporated into the remediation implementation plan and the new buildings will incorporate measures to prevent ingress of gases into confined spaces. It is not clear what these measures might entail or whether they will have an impact on the appearance of the building. Further information is required. It is noted that the design will follow BS 8485:2015. It is understood that this guidance has been withdrawn and replaced by BS 8485:2015+A1:2019. Confirmation is required that the design will follow current guidance.	The ground investigation will include ground gas monitoring, as identified in the desk study report in technical appendix I1. Gas monitoring will comply with British Standard BS8576 Guidance on investigations for ground gas – permanent gases and volatile organic compounds (VOCs) BSI, 2013. Gas risk assessment and if necessary gas protection measures will comply with BS 8485:2015+A1:2019 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings. If gas protection measures are required, the design will be confirmed on completion of the risk assessment. Preliminary assessment indicates ground gas risks are likely to be low, as no significant source has been identified. If required, gas protection measures will most likely comprise a membrane which is installed beneath the ground floor slab and therefore will not impact on the appearance of the building.
12.6	Validity of ES conclusions	Paragraph 4.37 In the absence of further information on ground conditions as discussed above, the validity of the conclusions set out in the ES and therefore compliance with the EIA Regulations, is questionable.	Sufficient information has been submitted to support the ES assessment and conclusions, at this planning stage. As noted above further extensive ground investigation will be required to fully assess risks associated with contamination, to inform a remediation strategy and to satisfy environmental regulators. This will be addressed through suitable planning conditions and other regulation. This is a standard approach and accords with the requirements of the EIA Regulations.
	GS Pettifer		
12.7	ES – consideration of ground instability	The site is located towards the toe of a major coastal landslip in Kimmeridge Clay, as shown on the local 1:50,000 scale Geological Map (i). Brunsden et al (ii) note that the toe of the landslide at this location is exposed to the full force of easterly winds and that the Kimmeridge Clay is undercut. Movements in this area are known to have occurred in the late 17th century and, more recently, in the 1960s and 1970s. Rates of movement of about 5mm per year have been calculated. It is possible that excavation work at this site, particularly in the southern part, and subsequent additional loading from new large structures, will reactivate the landslip at this location, potentially affecting both the ERF and adjacent buildings, roads and services. The possibility of ground instability at this location, and therefore any planned mitigation measures, has not been adequately considered in this planning application	The applicant has commissioned a Preliminary Slope Stability Assessment, which is submitted to Dorset Council as part of its response to the Regulation 25 request (point 29 in the Council's letter). This assessment examines the potential for land instability in and around the proposed ERF site, taking account of available historical records, data from technical studies, and the nature and scale of historical land uses at the site associated with its former military and civil activities. It also considers the potential risk of landslip in this location based on the current baseline position and in respect to the construction of the proposed ERF, based on accepted safety factors. This has concluded that the proposed ERF site lies at a position on the Portland coast where the risk of substantive landslip is deemed to be relatively low (compared to other locations on Portland) because of the presence of made ground and port structures at the toe of the cliff which forms a buttress protecting the area from coastal erosion and limiting natural movement. It concludes that the risk of triggering any significant landslip from construction activity is also relatively low, and that this risk can be minimised through the use of appropriate construction techniques. The assessment finds that the proposed development would not give rise to any significant ground stability issues that would preclude the construction of the ERF in this location.
	Portland Association		
12.8	Geotechnical stability – need for a cliff stability assessment	'ES Tech Appendix I1 Ground Conditions and water quality pt1', which states… *'Long term stability of the hillside, which could potentially affect the completed development, has not been considered in detail. However, it is noted that the former railway that ran along the side of the site at the toe of hillside, was in place for over 100 years and does not appear to have been affected by large-scale slope movements.'*	This comment draws upon the comments of GS Pettifer above in respect to ground stability. The applicants response is set out in relation to point 12.7 above and is addressed through the submitted Preliminary Slope Stability Assessment.

Item	Topic	Summary of consultation comment	Applicant response
		Therefore it seems that, based on the fact that nothing appears to have happened for over 100 years, this has led Powerfuel to the conclusion that nothing will happen in the future, appearing to be unaware that landslides are not predictable, and are dependent on many factors, including disturbance to the ground strata. Under para '6.1.2 Geotechnical risks', Powerfuel states… '*The assessment of the risk of future instability of the hillside to the west of the site is outside the scope of this report. However, it is considered that the proposed development should not significantly affect this risk, as any excavations that may remove toe weight will be of relatively local extent and will be supported in the temporary and permanent conditions.*' Given the environmental impact that a landslip could cause at the site of a 850 degree turbine waste incinerator, with toxic ash, ammonia and lime storage, all within a few metres of coastal waters, it would seem remiss of Powerfuel not to have commissioned a cliff stability assessment….Powerfuel needs to undertake these assessments/surveys and provide evidence that this site is a safe location.	

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13. Landscape, seascape and visual effects

Statutory consultees

Item	Topic	Summary of consultation comment	Applicant response
	Dorset AONB		
13.1	Visual impact – introduction of industrial element to AONB setting	Visible emissions would lead to a notable industrial element being added to the AONB's setting, in prominent position.	It is important to note that the site currently has an extant planning permission for the development of an energy plant fuelled by vegetable oil and waste rubber crumb from end-of-life tyres, which could be implemented in the absence of the proposed development. This would also have a stack with visible emissions if built.
13.2	Visual impact - impact of visible emissions on AONB	There are concerns about the effect of visible emissions on views out from the AONB and perceptions of the areas exceptional undeveloped coastline.	The reference made here to an undeveloped coastline is questionable. The site lies within Portland Port which is a key employment site and within the Northern Arc identified in the Portland Neighbourhood Plan as an area which is intended to 'cement' the location as a vital employment zone. The AONB officer acknowledges that the site has large-scale quasi-industrial buildings and other built development therefore this small part of the coastline is developed. The port is a working port with a number of large industrial buildings and permission for industrial buildings at Glencore Upper Osprey. There are also large vessels berthed within the Port and currently within Portland harbour. Queens View Apartments and the former naval block 'Prince Andrew House' lie just outside the port area and the ERF will lie at a similar elevation to these existing developments. The assessment in paragraph 9.141 of the ES addressed the impacts of the plume from the AONB. The effects were described as negligible and not significant. A DAS addendum on the plume has been produced as well as figures 9.38 to 9.41 of the ES illustrating verified photomontages of the plume. The analysis concludes that the plume will only be visible on average for 24.2 hours each year which represents only 0.56% of non-cloudy daylight hours, and all of these hours will occur outside the main tourist months. Of these hours for only 4 hours each year the plume would be between 100-200m in length, which is less than the length of the building. Figures 9.40 and 9.41 from two locations within the AONB illustrate the largest plume which would have been visible for just 1 hour in February 2016 within the last 5 years of weather data. The additional information supplied confirms that the assessment of negligible and not significant from the AONB is correct.
	Dorset Landscape Officer		
13.3	Photomomtage – inclusion of plume	The photomontages should represent a worst-case scenario of the visual impacts. With the plume not being included in the photomontages I would suggest they are not a fully accurate representation.	A DAS addendum on the plume has been produced as well as figures 9.38 to 9.41 of the ES illustrating verified photomontages of the worst case scenario for the plume, noting this would have occurred for just 1 hour in February 2016.
13.4	Plume model – consideration of coastal location	The Fichtner report explains how the 'model' used for the detailed modelling of process emission includes a function to model when the plume is visible, based on the water content of the plume'. What is not apparent is if that model considers the coastal location with its dynamic weather conditions or if the results are based off a generic algorithm?	Full details of the dispersion model are provided in Appendix D2 of the ES. This explains that the local conditions have been accounted for in the model. This includes the local terrain, variances in surface roughness between the land and sea, and the meteorological data has been taken from the Portland meteorological site. As such the model considers the coastal location and is not a generic algorithm.
13.5	Plume visibility – assessment of visual effects	In the Landscape, seascape & visual effects of the Environmental Statement the plume is described in many of the selected viewpoints as a minor impact. For instance, in section 9.139 of the LVIA Viewpoint 9 the Visual Effects at Completion are noted as 'likely to only produce a very minor alteration to the view for a very limited number of hours.' The eventuality the plume will be visible only for a limited time is understood, but I question if when the plume is visible that it will only have minor landscape and visual impacts.	The additional information supplied within the DAS addendum on the plume and the ES addendum figures 9.38 and 9.41 confirms that the assessment of the visual effects of the plume within the ES is correct.

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13.6	Cumulative effects	There will be a cumulative landscape and visual effect with the proposed ERF and industrial units. There is also a concern for inter-project cumulative effects with other proposed industrial units in this area. An assessment of these in relation to the proposed ERF would have been useful to address these concerns.	The LVIA chapter 9 within the ES addresses the landscape and visual cumulative effects. Chapter 3 of the ES sets out the full details of the cumulative schemes.
13.7	Viewpoint and photomontage 9 – magnitude of effect	Viewpoint 9 & Photomontage viewpoint 9, Figure 9.26 & 9.33 - Taken from Sandsfoot Castle. The conclusion of the view in the LVIA states the magnitude of effect is negligible adverse and the significance of visual impacts is negligible & significant. My judgment is that the significance should be greater, before the consideration of a plume which will increase the landscape and visual impacts further.	The LVIA chapter 9 paragraph 9.139 has been misread. The visual effects from Sandsfoot Castle are considered to be medium adverse at completion and therefore moderate adverse rather than negligible adverse as stated. The plume is not considered to increase the visual effects from those that are stated within the ES.
13.8	Visual impact – lighting from the car park	I do have reservations over the proposed lighting and its potential visual impacts…. The proposed columns in the car park and service yard are the largest proposed at 6-8 metres as described in section 4.3 and 4.5 of the Lighting Statement. To ease concern, I would like to propose these are no more than 6 metres and have the Flat glass luminaires fitted as specified in section 7.0 and a lighting cowl if this will also help prevent any light spill? In addition a verbal request was made for night-time photomontages from Sandsfoot Castle and Ringstead Bay car park.	ARUP have adjusted the light columns to 6m along the access road and service yard and 5-6m in the car park as requested. The lighting statement confirms that "The use of luminaires with very low or no upward distribution will minimise contribution to 'sky glow'. Light will be tightly controlled and considered to avoid light spill" and "Zero tilt and provision of accessories that will limit upward light spill with the use of flat glass lanterns and back shields to further mitigate light spill beyond the intended areas" will be incorporated into the lighting design. Night-time baseline photos and montages have been produced [from Sandsfoot Castle and Ringstead Bay car park] in the ES addendum figures 9.42 to 9.45 as requested. These confirm the conclusions of the night-time assessment at completion within chapter 9 of the ES. Refer to ES Addendum for additional information on night-time effects.
	Jurassic Coast Trust		
13.9	Visual impact – visible plume and introduction of industrial element to the setting of the WHS.	The overall impact of an operational ERF is not restricted to the presence of the building within the landscape. In spite of the sincere efforts to reduce its visual impacts, there is no escaping that it is a very large industrial building, beyond the scale of what is already at the port. For example, the lighting necessary for a facility of this size, particularly on the stack, means there will inevitably be a change to the balance in how the views out of the WHS are perceived to be of an industrial or natural coastline. Of more significant concern is the potential impact of a visible plume. The LVIA describes a visible plume as having minor effects for a limited time. I would not dispute the limited time element, but it is hard to accept a visible plume as having minor effects, considering that there are no other industrial facilities of this type or scale along the WHS. It would be helpful if the visual impacts of a visible plume were modelled in more detail using existing viewpoints with perhaps additions from the top of Portland itself. This would help greatly in understanding more fully the operational reality of the ERF. In summary, the application deals with impacts on the WHS fairly, with the exception of a detailed model for the visual impacts of a visible plume. My concern is whether or not an industrial development of this scale is appropriate within the setting of the WHS. The impacts of the structure itself on setting are not considered significant, but I question whether this reflects the ways in which an operational ERF might change how people perceive its surroundings as a natural or industrialised landscape	The site lies within Portland Port which is a key employment site and within the Northern Arc identified in the Portland Neighbourhood Plan as an area which is intended to 'cement' the location as a vital employment zone. The AONB officer has acknowledged that the site has large-scale quasi-industrial buildings and other built development and therefore the addition of the building within the landscape should not materially change how views out of the WHS are perceived, noting that there are often large vessels berthed at Portland, with associated lighting, etc. which are often larger in size than the proposed development. A DAS Addendum on the plume has been produced as well as figures 9.39 to 9.41 of the ES illustrating verified photomontages of the plume. Figures 9.39 (viewpoint 9 Sandsfoot Castle) is from a location within the WHS. This illustrates the largest plume which would have been visible for just 1 hour in February 2016 within the last 5 years of weather data. The additional information supplied confirms that the assessment of slight and not significant from the WHS is correct. The analysis concludes that the plume will only be visible on average for 24.2 hours each year which represents only 0.56% of non-cloudy daylight hours, and all of these hours will occur outside the main tourist months. Of these hours for only 4 hours each year the plume would be between 100-200m in length, which is less than the length of the building. ARUP has adjusted the light columns to 6m along the access road and service yard and 5-6m in the car park. Night-time baseline photos and montages have been produced in the ES Addendum figures 9.42 to 9.45. Figure 9.43 (viewpoint 9 Sandsfoot Castle) is a photomontage of the night-time effects from within the WHS. The stack will be lit in accordance with CAA and MOD requirements. Although this will be located at the top of the stack there are lights at the top of the Verne on the highest point of the Isle of Portland associated with the prison and the satellite dish clearly visible from Sandsfoot Castle. The traffic lights at the entrance to the Verne that alternate between green, amber and red are also clearly visible from Sandsfoot Castle. These will be significantly higher than the light at the top of the stack. The lighting will be seen in the context of the existing lighting at the port facilities (and lighting from vessels berthed at

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			the port) and has been designed with minimal light spill. This confirms the conclusions of the night-time assessment at completion as negligible from the WHS within chapter 9 of the ES. Refer to ES Addendum for additional information on night-time effects. Further comment in respect to the JCT response and the ES assessment is provided in table 17 below.
	Osmington Parish Council		
13.10	Visual impact from scheme lighting and aircraft warning light	There will be light pollution from the aircraft warning light on top of the stack as well as from the car park and the building.	See 13.8 above. Night-time montages have been produced in the ES addendum figures 9.42 and 9.43. these confirm the conclusions of the night-time assessment at completion within chapter 9 of the ES.

Other consultees

Item	Topic	Summary of consultation comment	Applicant response
	Adams Hendry (on behalf of SPWI)		
13.11	Landscape character area (LCA) - description	Paragraph 4.38 The application site lies within the Harbour / Wetland / Lagoon landscape character type. The Dorset Landscape Character Assessment (LCA) describes it as a large scale, open, tranquil and generally unspoilt landscape with important vistas and views of historic and cultural importance. It provides important and popular open space and recreational value and open and extensive views are available towards the Osmington Coast and Portland. The detrimental features described in the LCA include visually prominent development and the intrusive presence of heavy traffic on the A354.	The application site does not lie within the Harbour Wetland / Lagoon landscape character type as stated, but rather lies within the Limestone Peninsula. Therefore, everything subsequently described in this comment is incorrect.
13.12	Landscape character area (LCA) – impact on key land management features	Paragraph 4.39 and 4.40 The LCA includes key land management features for the Harbour / Wetland / Lagoon landscape character type. These include reducing and controlling diffuse pollution and maintaining the open, uncluttered and dramatic coastal landscape character of the area. The ES concludes that the ERF will enhance a currently derelict site within the industrial port underplays the significance of the impacts. It is implied that the current open nature of the site is having a negative effect on landscape character, but no evidence has been provided to support this conclusion. Rather, maintaining the open coastal landscape character is a key landscape management feature for this LCA.	The application site does not lie within the Harbour / Wetland / Lagoon landscape character type (rather the Limestone Peninsula) and therefore the commentary and management features described are incorrect.
13.13	Landscape and visual effects – legibility	Paragraph 4.41 The assessment of landscape and visual effects is difficult to follow and the need to print the photomontages and photowires at A1 makes it very difficult for members of the public to properly understand the likely impact of the proposal.	The photomontages and photowires have been produced in accordance with the Landscape Institute Technical Guidance Note 06/19, Visual Representation of Development Proposals, 17 September 2019. A hard copy of the complete planning application, including the LVIA has been available to view at the Portland Town Council.
13.14	Landscape and visual effects – viewpoints, meteorological conditions and plume photomontages	Paragraph 4.42 The way in which landscape and visual effects have been presented downplays their significance. The photographs from the various viewpoints have all been taken on days where low cloud is the prevailing meteorological condition. None of	The photographs have not all been taken on days where low cloud is the prevailing meteorological condition. Each photograph has a date and time and as can be seen in viewpoint 5 (fig 9.22) the photo was taken on the 16 March 2020 on a sunny day compared to viewpoint 8 (fig 9.25) taken on the 18 March 2020 taken in cloudy conditions. These are representative of different weather conditions at Portland.

Item	Topic	Summary of consultation comment	Applicant response
		the photomontages include the plume despite this being specifically requested by Dorset Council in pre-application advice.	Additional photomontages (from those viewpoints where non-plume photomontages have already been provided) showing the expected plume have been prepared and have been submitted to Dorset Council as part of the revised LVIA addendum. These comprise part of the submitted ES Addendum. These photomontages have been prepared in accordance with the Landscape Institute Technical Guidance Note 06/19, Visual Representation of Development Proposals, 17 September 2019 and therefore provide an accurate visual representation of the plume, based on modelled technical plume data provided by Fichtner. In addition, further information is provided in the Design and Access Statement (DAS) Addendum in respect to the frequency, duration, length and appearance of the plume.
13.15	Landscape and visual effects – viewpoints (before and after views)	Paragraph 4.45 It is common practice to show the viewpoints both with and without the proposal. As it stands, it is not possible to understand precisely how the view will be affected as the only information included is the approximate extent of the proposals.	Viewpoints 8, 9, 11 and 12 show the viewpoint with and without the proposals. These were agreed with Dorset Council and the AONB officer as the viewpoints from which to undertake photomontages and photowires. The remaining viewpoints are also in accordance with the Landscape Institute Technical Guidance Note 06/19, Visual Representation of Development Proposals, 17 September 2019.
13.16	Landscape and visual effects – viewpoint 3 (Portland Port and breakwaters, including the Sailing Academy and Portland Marina)	Paragraph 4.44 The photograph for viewpoint 3 looks like it was taken at dusk and is not representative of daytime conditions. The bulk and the massing of the ERF from this point (shown only by a line demarking the approximate extent of the site) will be dominant in the view and not as suggested in the table of page 9-55 that it will be of medium prominence and will cause a partial alteration to the composition of the view.	This photograph was not taken at dusk but was taken at 11.30am on the 18 March 2020. This is detailed on the photograph viewpoint 3 figure 9.20. This is an illustrative view from the port. The table referred to on page 9-55 (paragraph 9.132) is an assessment table of the visual receptors from Portland Port and breakwaters, including the Sailing Academy and Portland Marina and Portland Harbour. It is not an assessment table of that single viewpoint and therefore describes the visual experience of the receptors from the area
13.17	Landscape and visual effects – viewpoint 3 (Portland Port and breakwaters, including the Sailing Academy and Portland Marina - sensitivity of receptors	Paragraph 4.45 The conclusion that the receptor (local residents, workers and visitors using the harbour and marina facilities and taking part in water sports within the harbour) is of medium sensitivity is based on the assumption that their attention is likely to be on the surrounding landscape and therefore they would be less susceptible to the specific change associated with the ERF. This is nonsensical; the ERF will dominate the view and will not be considered a small change.	The table referred to on page 9-55 (paragraph 9.132) is an assessment table of the visual receptors from Portland Port and breakwaters, including the Sailing Academy and Portland Marina and Portland Harbour. It is not an assessment table of that single viewpoint and therefore describes the visual experience of the receptors from the area. The assessment that the receptors are of medium sensitivity is based on the value of the receptors as well as the susceptibility to change. While the ERF may be prominent in that particular view (viewpoint 3 which is a private view from the port not available to the public) there are many other viewpoints available to the receptors. The susceptibility to the change is considered to be medium and therefore the sensitivity will be medium.
13.18	Landscape and visual effects – viewpoint 3 (Portland Port and breakwaters, including the Sailing Academy and Portland Marina – magnitude of visual effects	Paragraph 4.46 It is not accepted that the magnitude of visual effects at completion will be small adverse with the significance of visual effects being slight.	This comment is incorrect. The table on visual effects from Portland Port and breakwaters, including the Sailing Academy and Portland Marina and Portland Harbour in paragraph 9.132 does not state that the magnitude of visual effects at completion will be small adverse with the significance of visual effects being slight. It states that the magnitude of visual effects at completion will be medium adverse with the significance of visual effects being moderate.
13.19	Landscape and visual effects – viewpoint 3 (Portland Port and breakwaters, including the Sailing Academy and Portland Marina – significance of the visual effect	Paragraph 4.47 Even if it was accepted that the receptor is of medium sensitivity (which it is not) and that there would be a partial alteration to the composition of the view (again which it is not) then by applying the criteria set out in Figure 9.6, the significance of the visual effect would be moderate to substantial and not slight as stated in the assessment.	This statement is incorrect. Either the author has been looking at a different table or they have misinterpreted the table in paragraph 9.132. The significance of the visual effect has already been assessed as moderate, not slight.
13.20	Landscape and visual effects – methodology and conclusions on likely significance	Paragraph 4.48	The assumptions on likely effects are not flawed and we have used the methodology correctly to reach conclusions on significance. The conclusions reached in the author's response (paragraphs 4.45 to 4.47) have been misinterpreted (possibly reading a different table to paragraph 9.132).

Item	Topic	Summary of consultation comment	Applicant response
		Not only are the assumptions on likely effects flawed, the applicant fails to follow its own methodology in reaching a conclusion on likely significance. The conclusions of the ES on landscape and visual effects should therefore be disregarded.	The conclusions of the ES on landscape and visual effects are robust and should not be disregarded.
	Coe Design (on behalf of SPWI)		
13.21	ZTV – zoomed in versions	Paragraph 2.3 It is requested that the ZTVs are produced at a closer distance of 1.5km and that PROW are added.	Figures 9.46 and 9.47 in appendix 8.2 of the Regulation 25 ES Addendum illustrate these zoomed in ZTVs.
13.22	ZTV – certainty of visibility and baseline photography	Paragraphs 2.3 and 2.5 There are a number of key locations at short-medium distance where we consider it critical, to enable consideration of the proposals, to be certain whether visibility is likely or not or where visibility is indicated to be likely based on the ZTVs. Baseline photography from a selection of these, would be necessary to include within the study. It is difficult to understand why some of the locations were not included in the scope of the baseline photography enabling them to be considered for photo-wire / photomontage analysis.	It is acknowledged that a baseline photograph is not provided from every location. To illustrate all potential viewpoints from which the proposals will be seen by the different visual receptors within the study area is not practical and is unnecessary for the purposes of the EIA. While it is important to have some baseline photography it is not the photographs that are assessed but the visual receptors. The baseline photographs are intended as a representative, specific or illustrative selection to aid the assessment process. To illustrate all potential viewpoints from which the proposals will be seen by the different visual receptors within the study area is not practical and is unnecessary for the purposes of the EIA. The visual receptors, methodology and viewpoints and photomontages/photowire locations were agreed with Dorset Council and the AONB Partnership. The photomontage / photowire locations were also discussed with the Jurassic Coast Trust in August 2020. The assessment tables consider the visual effects from specific visual receptors. Paragraph 9.132 assesses the visual effects from visitors to Portland Port and breakwaters, including the Sailing Academy and Portland Marina and Portland Harbour. Paragraph 9.135 assesses the visual effects for users of public rights of way S3/68, S3/70, S3/72 and S3/81. The Rodwell Trail is illustrated on figure 9.16 and 9.17 revision A in the ES addendum. As can be seen from these figures there will be extremely limited potential visibility from the Rodwell Trail other than from between the Ferrybridge Inn and Sandsfoot Castle. These are assessed in paragraphs 9.136 and 9.139. The official published circular walk of the Rodwell Trail does not extend down to the Ferrybridge Inn but stops at Sandsfoot Castle, and therefore will have even more limited visibility.
13.23	Plume modelling – need for plume modelling and photomontages	Section 3 Although it is predicted that a visible plume may be present for a limited time, it is agreed that the potential significant adverse visual effects associated with the plume warrants its inclusion in the selected photomontage studies. It is reasonable that the study would provide photomontages with and without the plume, to enable both scenarios to be considered separately. There are concerns that the assumption that that the visible plume will result in only minor landscape and visual effects, when visible, is under-estimated and that evidence should be provided within the study to allow more detailed judgements to be reached, with the opportunity for these to be scrutinised through the application process.	A DAS addendum on the plume has been submitted in addition to figures 9.38 to 9.41 of the ES addendum illustrating verified photomontages of the plume. The analysis concludes that the plume will only be visible on average for 24.2 hours each year which represents only 0.56% of non-cloudy daylight hours, and all of these hours will occur outside the main tourist months. Of these hours for only 4 hours each year the plume would be between 100-200m in length, which is less than the length of the building. The assessment tables therefore remain unaffected and the conclusions unchanged.
13.24	Assessed viewpoints and photomontage / photo-wire visualisation studies	Paragraph 4.6 The weather conditions present in the recorded photography do not enable a worst-case scenario to be assessed, either of the proposed building when seen against a backdrop of sky or of the plume, should it have been modelled.	It is not the photographs that are assessed but the visual receptors. The photographs give a range of different weather conditions typical of the area during winter. A qualified landscape professional is deemed able to undertake a landscape and visual assessment using their experience without the need for a photomontage or photowire from every location and it is the written assessment that should be considered not just the photography or visualisations. Chapter 9 of the ES fully assesses the closer range visual receptors in the visual assessment tables.

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Item	Topic	Summary of consultation comment	Applicant response
13.25	Efficacy of the proposed visual mitigation	Paragraph 5.3 Further assurance is sought of the efficacy of the proposed visual mitigation applied to areas of the building as photo printed PVC mesh.	The DAS addendum gives further detailed information on the PVC mesh including what the building would be like without the PVC mesh.
13.26	Summary of significance judgements	Paragraph 6.2 It would be of benefit if there was a summary of the judgements and effects that included all those judged to be non-significant together with those judged to be significant and for this to be able to be referenced back to viewpoint studies.	This suggested approach would be contrary to all the other chapters in the ES where the requirement of the ES is to determine the significant residual effects that remain after mitigation.
13.27	Visual effect of plume length	Page 1 The plume will be potentially 280m in length	This statement is not accurate. The maximum length of visible plume in daylight hours during non-cloudy day is 187.89m based on hourly data analysed at Portland over the past 5 years. Detailed technical information, derived from advanced plume modelling software, on plume length, duration and orientation is provided in the DAS plume addendum. The potential 280m length was during daylight hours but not taking into account how cloudy the skies were i.e. on a cloudy day the plume would be obscured by the cloud cover and therefore would not be visible.
13.28	Visual impact – effectiveness of printed PVC mesh	Page 1 The use of PVC mesh to camouflage the building in an attempt to blend it into the background will create an unnatural, unrealistic look, the PVC mesh printed with an image of the cliff face vegetation was chosen by Powerfuel Portland (PfP) to reflect the vegetated cliffs of East Weare, and the profiled metal cladding to imitate the exposed cliff face, yet the cliff face it is imitating is some 80m or so above the height of the proposed plant. There are flaws in the PVC mesh imaging - it will not reflect any seasonal changes in the surrounding vegetation, it will therefore still represent an alien, unnatural feature in the landscape. Nor will it reflect the daily change in weather conditions, for example on a stormy day whilst all vegetation in the area has movement with changing shades of colour, the plant will remain obstinately static and unchanging, again highlighting this alien and unnatural feature in the landscape. There is no evidence to show how it will weather over time particularly in such an exposed coastal location, nor if it will be durable and effective in the long term.	Further information is now contained within the DAS addendum on the proposed PVC mesh and various options that could successfully achieve the objective of blending the building in with its background. It is not intended to try to make the building invisible, but rather soften views particularly from longer distance views from the Dorset AONB and surrounding area. The DAS addendum on materials provides further information in respect to the durability of the materials, including impact of sunlight. It is considered that the precise approach to camouflage imagery and materials can be addressed by means of suitable planning condition relating to external materials and finishes.
13.29	Visual impact – night-time lighting	Page 2 With no photomontages provided of the effects of the lighting at night, there is no evidence presented of how much effect the lights will have. It is likely that the stack lighting, however, will be visual from many different viewpoints, day and night, and will have an adverse visual effect.	A lighting statement was submitted as part of the application. This was undertaken by Arup and informed the lighting assessment in the LVIA chapter 9 of the ES. Night time photomontages have been prepared and are included in the DAS addendum in figures 9.42 and 9.43 (submitted as part of the Regulation 25 ES addendum). The two viewpoints from which these were produced were agreed with the Dorset landscape officer and Tetra Tech consultant. These illustrate that the conclusions reached within the LVIA are correct.
13.30	Landscape character type (Limestone Peninsula) - characteristics and management objective	Page 4 and 13 The site lies within the Limestone Peninsula character type with the key characteristics including “a dramatic and distinctive wedge shaped limestone peninsula at the end of Chesil Beach with prominent cliffs”, “a unique coastal landmark with sweeping views along the coast” and “many key nature conservation sites of importance”. The overall management objective should be to maintain the integrity of the skyline. The proposal is not compatible with these characteristics or overall management objective.	This comment fails to include a number of other key characteristics noted for the character type including *“an open skyline dominated by manmade structures and features”* and *“a disjoined, untidy and neglected feel”.* They state that the overall management objective should be to maintain the integrity of the skyline. The proposed ERF has been carefully designed to ensure that it does not break the skyline from many views within the wider landscape such as from the AONB as illustrated in figures 9.34 to 9.37. When viewed from closer viewpoints such as Sandsfoot Castle and Ferry Bridge the narrowest part of the building will be visible and it will be seen within the context of tall structures within the port, including cranes, ship funnels, lighting columns and radar equipment and therefore is not considered to be inappropriate development.
13.31	Viewpoints – Abbotsbury Hill and Hardy’s monument.	Pages 4 and 13	The Abbotsbury Hill viewpoint is approximately 18km from the application site and therefore 8km beyond the study area. The Hardy’s monument is approximately 15.5km from the site and therefore 5.5km beyond the study area. The views and photomontage locations were agreed with Dorset Council and the AONB Partnership. The intention of an ES is to determine

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		An Abbotsbury Hill viewpoint has not been included in the ES "Landscape, seascape and visual effects environmental assessment", this is a major omission. It also fails to mention another well-known viewpoint, Hardy's Monument.	the significant residual effects after mitigation. Given the distance the visual effects from these viewpoints are considered to be not significant and therefore it would not be appropriate to include them within the ES.
13.32	Landscape character type (harbour/wetland/lagoon) - characteristics and management objective	Page 5 Importance is placed upon the harbour/wetland/lagoon landscape character type. The proposal will represent a breach of this character type objective in the control of development at the fringes to minimise its landscape, ecological and visual impacts, maintain key views and maintain the undeveloped character along the coast.	This comment fails to mention that this is a specific management objective of the harbour/wetland/lagoon character type from the Dorset County Landscape character assessment. The boundary of this character type does not extend along the Portland peninsula but stops at the northern end around Ferry Bridge as illustrated on figure 9.10 of the ES. Therefore, the management objective of controlling development at its fringes is restricted to the edges of its boundaries which are approximately 3.2km from the site and will not be affected. The management objectives are specific to the boundary of this character type and the key viewpoints described in the Dorset landscape character assessment are the views towards the old chapel on top of St. Catherine's Hill near Abbotsbury. These views will remain unaffected as the proposals are in the opposite direction. The Weymouth and Portland landscape Character Assessment February 2013 has a different boundary to the Dorset County harbour/wetland/lagoon landscape character type that extends further south across the causeway. It does state that wedge-shaped mass of Portland peninsula is visually prominent, forming the southern skyline from much of the area. However, it also describes that towards the northern and southern extents, the urban influences of Wyke Regis and Osprey Quay are notable. It goes on to state that "the remaining land use is predominantly urban, with a major transport corridor running the length of the area and large scale development at Osprey Quay" and that "built development is predominantly clustered towards the south" and that "the visual unity is weakened by modern industrial and residential development with varying architectural styles and materials." There are no management objectives described within the Weymouth and Portland landscape Character Assessment.
13.33	Landscape effects on the man-made harbour	Page 6 The LVIA conclusions on the magnitude of landscape and seascape effects is questioned and represents and under estimation.	The magnitude of change was considered to be medium and the degree of landscape effects was slight and not significant based on the methodology which was agreed with Dorset Council and the AONB Partnership. A low sensitivity receptor with a medium magnitude of change results in a slight degree of effect, which is not significant.
13.34	Viewpoints – times that viewpoints were taken	Page 7 Viewpoints 2 and 3 in the ES were "taken in the evening preventing the image from being 'read'.	This assertion is incorrect as the date and time of the photographs are recorded on figures 9.19 and 9.20. These were taken at 1.25pm and 11.30am on the 18th March 2020 and reflects one set of potential weather conditions at Portland. The photographs were taken over a number of days from the morning through to the afternoon in both sunny and cloudy conditions.
13.35	Viewpoint – A534 and Ridgeway Hill	Page 10 The applicant selected the visual effects from the A354 represented by one single point on an approximately 16 miles stretch of road that connects Dorchester, via Weymouth, to the Isle of Portland, choosing Ferrybridge on the extreme western edge of Portland, viewpoint 8. To only consider one viewpoint over 16 miles is another omission. This area has been given the landscape effect ranking of negligible and not significant, but this does depend on which point in the 16 mile stretch is being referred to. As you travel down Ridgeway Hill, this provides the first chance to see Portland and there is a certain wow factor, each and every time you travel down this road towards Weymouth.	With a LVIA it is not the viewpoints that are assessed but the experience of the visual receptors using the A354. The entire length of the A354 within the study area has been assessed in paragraph 9.136 using viewpoint 8 as an illustrative example of one representative view. The photographs have all been taken in accordance with the Guidelines for Landscape and Visual Impact Assessment, (GLVIA) 3rd Edition, Landscape Institute (LI) and Institute for Environmental Management and Assessment (IEMA) (2013) and the Landscape Institute Technical Guidance Note 06/19, Visual Representation of Development Proposals 17 September 2019. The LI requires the camera to be a Full Frame Sensor and 50mm focal length prime lens to be used and this is what has been used throughout the LVIA chapter 9 of the ES. Ridgeway Hill is over 10km from the site and therefore would have a negligible visual effect as illustrated by the assessment table in paragraph 9.130 on the visual effects from the South Dorset Ridgeway and Osmington White Horse. The ZTVs clearly demonstrate how little visibility there will be from the A354 from the study area boundary to Ferry Bridge where there will then be potential views across the causeway.

Item	Topic	Summary of consultation comment	Applicant response
13.36	Visual – mapping of the World Heritage Site (WHS)	Page 11 The mapping of the WHS (figure 9.8) is incorrect. The area of WHS from near Smallmouth beach all the way along to Nothe Castle and Weymouth Stone Pier has been omitted from the map in two key visually effected areas, namely Sandsfoot Castle and Nothe Fort.	This assertion is incorrect. This is illustrated as a narrow horizontal blue hatched area all along the coastline. The objection queries why the assessment separates the West Dorset Heritage Coastline from the Dorset and East Devon Coast UNESCO WHS despite the fact that they are the same area. This is incorrect. They are two separate areas sometime overlapping. Figure 9.8 illustrates the West Dorset Heritage Coastline as a blue diagonal hatch which extends out into the sea and the Dorset and East Devon Coast UNESCO WHS as a horizontal blue hatch. Each of these areas is assessed in paragraphs 9.142 and 9.143. The viewpoints themselves are not assessed as it is the experience of the receptors to the whole of these areas that are assessed. The views are only used as representative examples.
	Ramblers		
13.37	Visual impact on the England Coast Path	Section 5 The developers make no mention of the England Coast Path which is important both for the health and recreation of Portland residents but is part of the attraction of the island to visitors and will become of increasing importance in the future, both nationally and internationally, once the England Coast Path is completed and runs to the west of Weymouth as well as to the east. The Environmental Statement refers to the South West Coast Path rather than the England Coast Path, although they are largely synonymous, the England Coast Path has the important additional feature of the approved coastal margin.	This comment appears to focus on the approved coastal margin that is part of the England Coast Path. It is important to note that a large area of the coastal margin is private land associated with Portland Port and the East Weare where there is no public access or land within the prison which is not accessible to the general public. The England Coast Path, coastal margin and private (inaccessible) land is illustrated on figures 9.46 and 9.47 in the ES addendum. This shows that much of the coastal margin is not accessible to the public within 1.5km of the site. The ES while not specifically assessing the coastal margin assesses views from the South West Coast Path, Weymouth beachfront, Portland Port, Portland Marina and the sailing academy and the footpaths S3/68, S3/70, S3/72 and S3/81 on the steep cliff face to the west and south of the site as well as the West Dorset Heritage Coastline and the Dorset and East Devon Coast UNESCO World Heritage Site. These visual receptors cover the same area as the coastal margin and therefore the ES has assessed the visual impacts from the England Coast Path and coastal margin.
13.38	Assessment of views - National Sailing Academy and Portland Marina	Section 5 The National Sailing Academy and Portland Marina are places of public resort to which access on foot and bicycle has been provided and the views from those locations do not appear to have been adequately considered.	The ES chapter 9 paragraph 9.132 assesses the visual effects from these two areas and the building design has been carefully considered in terms of views from this area as set out in the DAS with the narrowest part of the building facing this direction.
13.39	Impact on local landscape and nature conservation designations	Section 7 The proposed development will impact upon an area of land immediately to the south which is designated as a site of National Importance for Nature Conservation and Land of Local Landscape Importance. These designations alone mean that a development of this kind would be contrary to numerous planning policies.	This comment fails to mention that the site is located within a key employment site and the Northern Arc within the Portland Neighbourhood Plan which is intended to 'cement' the location as a vital employment zone. In addition to this the site is a brownfield site located within an industrial port that currently has an extant planning permission for the development of an energy plant fuelled by vegetable oil and waste rubber crumb from end-of-life tyres, which could be implemented in the absence of the proposed development.
13.40	West Dorset, Weymouth and Portland Local Plan (2015) – vision	Section 7 The proposal does not comply with the vision (bullet points) in the West Dorset, Weymouth and Portland Local Plan (2015). Stated as: • Have maintained and enhanced the unique character of the island in terms of its built and natural assets, whilst thriving economically and socially for the benefit of residents and visitors; • Be the home of specialist maritime industries … • Have a broad tourist offer including activity based in sustainable tourism (water sports, climbing, walking and bird watching) that capitalises on its unique location.	This comment fails to include the full text in the second bullet point which should read: *"is the home of specialist maritime industries and other growth sectors that benefit from its unique location, providing it with a good supply of well-paid jobs that benefit the local community and wider area. Portland Port will have maintained and expanded its role as a port of national and international importance as a location for sustainable job creation"*. There is also a fourth bullet point that has been omitted which states: "*has reduced the levels of multiple deprivation and has good education and skills provision'*. The comment therefore presents an incomplete picture of the plan's wider vision.

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14. Natural Heritage

Other consultees

Item	Topic	Summary of consultation comment	Applicant response
	Freeths (on behalf of the Portland Association)		
14.1	SHRA – lack of sufficient detail and signposting	Paragraphs 12 and 13 Where supporting information is provided in other supporting application documents this has not been explained in sufficient detail in the shadow HRA. Nor has there been any, or any sufficient signposting in the shadow HRA of other relevant data / evidence / paragraph numbers of other documents / sources to assist anyone reading it to understand the basis for the conclusions drawn.	The Freeths consultation response (see paragraph 8) makes clear that the observations made by its legally qualified professionals are based on the shadow HRA document alone. The fact that the legally qualified professionals have not undertaken a review of other relevant documentation, submitted as part of the application, to determine if they support the conclusions of the shadow HRA perhaps reflects the limited nature of the review commissioned, rather than any short-comings of the shadow HRA and its supporting information. Dorset Council, as the competent authority, will have access to all of the relevant supporting documents when undertaking its HRA and will no doubt take the necessary time to carefully review all the supporting documents to ensure they support the conclusions of the shadow HRA they will undertake. The legally qualified professionals will also be fully aware there is no framework for an appropriate assessment that a competent authority has to follow. Therefore, to suggest a lack of signposting (see paragraph 12) is a fundamental problem (see paragraph 13) is inaccurate. The scope and content of an appropriate assessment will depend on the nature, location, duration and scale of the proposed plan or project and the interest features of the relevant site. 'Appropriate' is not a technical term. It indicates that an assessment needs to be proportionate and sufficient to support the task of the competent authority in determining whether the plan or project will adversely affect the integrity of the site. (https://www.gov.uk/guidance/appropriate-assessment#what-is-a-habitats-regulations-assessment)
14.2	SHRA – approach to the likely significant effects (LSE) test	Paragraph 20 There is no explanation as to the basis for the decision to consider European / Ramsar sites only within 10km of the ERF. The 10km search area has not been explained or justified. Why have the authors not considered European sites further afield (given that stack emissions / traffic emissions / water pollution impacts may well be felt further away than 10km from the proposed stack). Justification and explanation is needed. The justification must be linked to and evidenced by the potential pathways of impact that are relevant, including stack emissions, other sources of emissions from the proposed ERF and traffic emissions.	The next closest SPA/Ramsar/SAC is the Dorset Heaths/Dorset Heathlands. The air quality modelling undertaken by Fichtner demonstrates that critical levels and loads related to emissions from the ERF are below 1% within 1km of the site for the closest NSN site. Based on the very limited zone of impact it makes no logical sense to extend the search area beyond 10km. This approach has been confirmed as acceptable with Natural England. There are no credible impact pathways for traffic or water pollution impacts on terrestrial NSN sites over 10km from the site. The comments regarding zones of impact potentially occurring beyond 10km are purely hypothetical. The likely significant effect test must be based on objective information and the risks must be real, not hypothetical (Boggis vs Natural England 2009). This comment does not appear to be applying the relevant case law to the likely significant effects test for this application. The 10km search area was taken from the EA guidance and is standard for these types of applications. In addition, the 10km search area was discussed and agreed with Natural England prior to the preparation of the documentation as an appropriate zone of influence for this application.
14.3	SHRA – road traffic emissions beyond 10km	Paragraph 23 In the case of traffic emissions, there must be consideration of likely routes of traffic to / from the ERF and then a search for European / Ramsar sites along those routes which might be affected (and hence the area of impact may well be more than 10km from the ERF facility).	A revised assessment looking at in-combination effects has been undertaken for those NSN sites where plausible in-combination effects relating to traffic emissions may occur has been submitted to Natural England (the statutory nature conservation organisation) and Dorset Council as the competent authority.

Item	Topic	Summary of consultation comment	Applicant response
14.4	SHRA - omission of any assessment of impacts on the Studland to Portland SAC European marine site	Paragraph 24 The shadow HRA gives no consideration of impacts on the Studland to Portland SAC European marine site. This is the case even though it is mentioned on Figure 1 as being within the 10km search area selected in the shadow HRA and even though marine pollution is a clear pathway of impact from the ERF and there is discussion of potential marine pollution impacts e.g. in section 5 (5.88) and section 6 (6.6, 6.9).	No critical levels or loads are available for this marine site. Pollutant levels from ERF likely to be negligible as site either downwind or 6km to east of site. ABPmer have reviewed the information provided for the application and has concurred with the view that aerial and marine pollution presents no credible risk to the Studland to Portland SAC (appendix 9.2 to the ES Addendum).
14.5	SHRA - failure to consider all qualifying features for European site	Paragraphs 27 to 30 A HRA must be undertaken “in view of the conservation objectives” of the relevant European sites (see regulation 63(1)) and also must consider each and every qualifying feature of each of the relevant European sites (see the case of C-461/17 Holohan v An Bord Pleanála). The shadow HRA fails to consider all the qualifying features even of the European sites that the author has selected to consider. Paragraph 4.9 lists the qualifying features of Chesil and the Fleet SAC but it omits two qualifying habitats: (i) Coastal vegetation outside reach of waves; and (ii) Mediterranean saltmarsh scrub. This means that there can be no confidence that all qualifying features of the other relevant European sites have been included.	The shadow appropriate assessment assesses impacts where there is considered to be a credible risk pathway that may result in an LSE. It has not listed all the reasons why qualifying features have been excluded from consideration. The receptors where impacts were considered likely was discussed with Natural England prior to submission of the SHRA. For the benefit of the competent authority details of all the qualifying features have been included in the revised document.
14.6	SHRA - relevant impact pathways in relation to all the relevant qualifying features	Paragraphs 32 to 46 There is a failure to consider/address adequately all relevant impact pathways in relation to all the relevant qualifying features. The shadow appropriate assessment omits assessment of functionally linked land (mobile species – bird and great crested newt). The assessment omits details of noise, odour, visual and the stack obstructing bird flights. No explanation is provided of why possible impacts have been dismissed. The assessment doesn't assess the risk of untreated IBA and contamination of the marine environment. The assessment doesn't explain why pathways have been screened out. Crookhill Clay Pits SAC –suggested failure to consider impact of road traffic.	The legal author has identified a long list of hypothetical impacts that do not reflect the location of the application site, the surrounding non-designated habitats, the ecology of qualifying species or the interest features of the NSN sites. They do however recognise that the likely significant effect test must be based on objective information and the risks must be real, not hypothetical (Boggis vs Natural England 2009). The author does not appear to be applying the relevant case law to the likely significant effects test for this application. For example, the Marine Accident Investigation Branch report on the incident of the explosion on a ship carrying IBA (referenced in paragraph 37) shows that the incident did not cause any environmental impact. The report also notes that the vessel did not suffer any structural damage. Identifying the presence of IBA as a potential LSE based on the cited evidence appears to be stretching the definition of real risks beyond the uppermost limits. It is unclear how the legal author has identified impacts on functionally linked land as a key issue for the shadow HRA (see paragraph 34) for great crested newts, or how odour (paragraph 35) may impact on Annex 1 habitats. As highlighted by the legal author in paragraph 38, caselaw requires that Dorset Council may only conclude “no LSE” in relation to a pathway of impact to any NSN site where, based on objective information, there is no risk (*with the exception only of hypothetical risks*) to the NSN site (emphasis added). The competent authority should apply this advice when considering the content of paragraphs 34 to 37 which are dedicated to identifying a range of hypothetical risks associated with the proposal. It is perfectly possible for a screening decision to be made based on an insignificant process contribution and low background levels of pollutants (significantly below relevant critical levels and loads). As highlighted earlier the observations made by the legal author are based on the shadow HRA document alone. The competent authority will have access to all the supporting documents when undertaking their HRA and will no doubt take the time to carefully review the supporting documents to ensure they support the conclusions of their shadow HRA.

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			Crookhill Clay Pits SAC is adjacent to the B3157 Chickerell Road which is not predicted to have any significant increases in traffic as the lorries will follow a proscribed one-way system that does not run past Crookhill Clay Pits SAC . At the closest point the SAC is over 275m from the affected roads. In respect to the comments made in Paragraphs 42.1 and 42.2 on impact on the Crookhill Clay Pits SAC, it is clear that the author has based their comments on the shadow HRA document alone, overlooking the information relating to the routing of traffic which would have clearly shown that there is no LSE relating to emission from traffic. These criticisms have no credible basis. There is no indication as to why the author believes that the improved grassland and developed land around the junction of Fleet Lane and the B3156 is functionally linked to the Crookhill Clay Pits SAC. These are further examples of the reviewers identifying hypothetical risks for assessment contrary to case law.
14.7	SHRA - clarity of screening out pathways in respect to LSE	Paragraphs 43 to 46 There is a failure to provide any clarity as to exactly which pathways of impact for which European sites are being screened out as having “no LSE”; and which are being taken forward to the stage 2 appropriate assessment stage of HRA.	To assist the competent authority information on the impact pathways screened in and out have been provided in the updated assessment document.
14.8	SHRA – application of Natural England’s air quality (traffic) guidance	Paragraphs 47 and 48 One of the pathways of impact acknowledged by the authors is air quality impacts from traffic. On this basis NE’s air quality guidance on the LSE screening test must be followed. The shadow HRA’s screening assessment makes no mention of this guidance and there is no evidence that the screening assessment has followed it.	The updated air quality assessment prepared by Fichtner addresses in-combination traffic and ammonia. This has been addressed as part of the ES Addendum. A separate technical note has been produced which includes transects showing the impact of emissions from road and the ERF at the Isle of Portland to Studland Cliffs SAC and Chesil and The Fleet SAC. These results have been fed into the Shadow Appropriate Assessment
14.9	SHRA – consideration of in combination effects at the LSE stage	Paragraphs 49 to 56 There has been no attempt to address the issue of “in combination effects” at the LSE stage. The authors seek to argue that there is no LSE from the project on the Crookhill Brick Pit SAC. Quite apart from the fact that no / no adequate reasoning has been provided, the explanation fails completely to address in combination effects. This is a particular concern with regard to emissions from the proposed ERF. The screening section of the shadow HRA does not explain how the proposed stack meets the requirements of the guidance and in any event fails to address impacts of the stack emissions “in combination with other plans and projects”. The requirement for an “in combination” air quality assessment at the HRA screening stage is well known, ever since the High Court decision in Wealden District Council v Secretary of State for Communities and Local Government, Lewes District Council and South Downs National Park Authority [2017] EWHC 351). The screening assessment in this shadow HRA fails to comply with these requirements. This is a major error.	Revised air quality modelling has been undertaken for relevant SACs, which details changes in concentrations or deposition rates for relevant pollutants both alone and in-combination with other plans and projects. As there are no other significant point-source emitters on the Isle of Portland and emissions from ships in the port has been included in the air quality modelling, emissions from traffic are the only likely in-combination effect for on NSN sites off the Isle of Portland.
14.10	SHRA – compliance with the CJEU decision in “People Over Wind”	Paragraphs 57 to 59 The well-known CJEU case of People Over Wind confirms that mitigation measures (measures which avoid or reduce impacts on European sites) may not	The Crookhill Clay Pits SAC has been added into the assessment. This is not a significant issue as there are no significant effects on this site predicted.

Item	Topic	Summary of consultation comment	Applicant response
		be relied upon at the HRA LSE screening stage. Instead mitigation measures may only be considered and relied upon at the appropriate assessment stage. Paragraph 5.12 of the shadow HRA confirms that the shadow HRA author regards the proposed stack height as a mitigation measure. Yet at 5.15 and 5.16 the author screens out air quality impacts in relation to certain (unspecified) qualifying habitats and The Crookhill Brick Pit SAC. No explanation has been given. However in any event this appears to have been concluded in the light of the stack size, which the author has stated must be regarded as mitigation. On that basis the conclusion contravenes People over Wind.	The amendments to the revised assessment document ensure that the requirements not to include mitigation at LSE screening stage (in this case increased stack height) is complied with, in line with the PoW judgement.
14.11	SHRA – requirements for the LSE stage	Paragraphs 60 and 61 What is required for the LSE assessment is actually completely standard in shadow HRAs produced by developers; and it is a real concern that this shadow HRA has not provided what is standard. Once there has been presented a clear, evidenced and justified approach to selecting the European / Ramsar sites which must be considered then what is needed, for each European / Ramsar site, is a table showing qualifying features, all possible pathways, assessment of these alone plus explanation of whether there is LSE alone or in-combination.	The legal author should be fully aware that there is no standard for LSE assessment that a competent authority has to follow, and therefore to suggest a table is the standard is inaccurate. This comment (paragraph 61) represents the author's view on how an LSE assessment might be done.
14.12	SHRA – HRA stage 2 appropriate assessment and no adverse impact on integrity test	Paragraphs 62 to 68 Under HRA rules, where it is concluded that there is a LSE from the ERF on any European / Ramsar site qualifying feature through any impact pathway then Dorset Council must conduct an appropriate assessment. Dorset Council must then decide if it can be certain that "there will be no adverse effect from the ERF on the integrity of any European site either alone or in combination with other plans or projects". As a matter of law, consent for the ERF may not be granted unless Dorset Council can be certain that that "there will be no adverse effect from the ERF on the integrity of any European site either alone or in combination with other plans or projects". This is a legal requirement. It is not a matter of planning discretion. Dorset Council will no doubt be aware of the caselaw relating to the strict standard of assessment required for an appropriate assessment and the subsequent "adverse effect on integrity test". Reference is made to best scientific knowledge and no reasonable scientific doubt remaining (CJEU C-127/02 paras 54 and 61) and there cannot be lacunae (CJEU-164/17 para 39). The plan or project in question may be granted authorisation only on the condition that the competent national authorities are convinced that it will not adversely affect the integrity of the site concerned (CJEU case C-127/02, paragraph 56). The shadow HRA (appropriate assessment) is considered to fail to meet these strict requirements.	The requirements are noted. However, the conclusion that the shadow HRA fails these tests is rejected.

Item	Topic	Summary of consultation comment	Applicant response
14.13	SHRA –consideration of all qualifying species and also other species necessary to the conservation of these qualifying features	Paragraphs 69 to 71 The CJEU decision in Holohan requires an appropriate assessment to consider all qualifying species of each relevant European site and also any other species which are "necessary to the conservation of the qualifying features". The shadow appropriate assessment does not meet either requirement.	As the legal author of this comment will be fully aware, there were very specific ecological requirements for the Annex II species in the Holohan case. The Annex II species in question relied on the presence of another species to allow it to complete its reproductive cycle. The Isle of Portland to Studland Cliffs SAC supports populations of the Annex II species early gentian. This species is not known to rely on any particular species of insect, bird or mammal to complete its lifecycle. Potential air quality impacts on the Annex II species (great crested newt) at Crookhill Clay Pits SAC have been ruled out as discussed earlier in the response ((see response to point 14.6). Despite the hypothetical impacts identified by the legal author of this comment, it is not considered there are any other plausible impact pathways on the interest features of the Crookhill Clay Pits SAC that require consideration. For example, with no impacts relating to changes in air quality identified, the marginal and aquatic vegetation used for egg-laying by great crested newts would therefore be unaffected by the proposed development. It is not considered necessary to assess impacts where no realistic impact pathway exists. ABPmer has reviewed the information provided for the application and has concurred with the view that aerial and marine pollution presents no credible risk to the Studland to Portland SAC (appendix 9.2 to the ES addendum).
14.14	SHRA – consideration of all relevant European sites and all impact pathways	Paragraph 72 There is a failure to consider / address all relevant European sites and all impact pathways. The failures in relation to these points are carried through into the shadow appropriate assessment which is also therefore deficient.	The applicant sought to agree all relevant impact pathways with Natural England in pre-application discussions. The impacts covered in the shadow appropriate assessment are those where there is a realistic impact pathway. It is correct that the shadow appropriate assessment does not cover the wide range of hypothetical impact pathways identified as requiring consideration by the legal author of this comment. As supported by relevant caselaw, and as set out earlier in this response to this criticism (see response to 14.6) there is no requirement to assess hypothetical impacts.
14.15	SHRA – consideration of functionally linked habitat outside of European/Ramsar sites.	Paragraphs 74 There is a failure to consider impacts on functionally linked habitat outside the European / Ramsar sites. As is the case in the screening assessment, this is also omitted from the shadow appropriate assessment.	At the time of preparation of the sHRA it was not believed there was any functionally linked land outside the NSN sites that need to be considered. It is correct that the shadow appropriate assessment does not cover the wide range of hypothetical impact pathways identified as requiring consideration by the legal author of this comment. As supported by relevant caselaw, and as set out earlier (see response to 14.6) in this response to this point there is no requirement to assess hypothetical impacts. In July 2021 Natural England notified the applicant that potential supporting habitat (calcareous grassland) had been identified in a new study undertaken by Dorset Environmental Records Centre). This grassland (not surveyed at the time of this response) is situated within the grounds of HMP The Verne. The air quality consultants have confirmed that the modelling work undertaken covers this area. The information currently available is sufficient to conclude that there will be no adverse impacts on integrity of the SAC
14.16	SHRA – reference to bird survey data	Paragraphs 76 and 77 No reference is made to any bird survey data collected to support the shadow appropriate assessment in relation to the Chesil Beach and the Fleet SPA/ Ramsar. It is standard that development applications such as this would be supported by bird survey data to assist in assessing impacts of the ERF on the qualifying species of the SPA / Ramsar both when in the SPA / Ramsar and when using other land / sea outside the SPA / Ramsar site. Claims are made by Powerfuel in the shadow appropriate assessment about the behaviour of certain qualifying bird species but this is without any supporting evidence / data (e.g. 5.82 and 5.83). This is not adequate.	As a legally qualified professional, the author should be fully aware that the Habitat Regulations do not set any standards for bird surveys to inform assessment of impacts on SPA and Ramsar sites. To imply that there are standards and that have not been followed is inaccurate. The comments made regarding a lack of survey data demonstrates a lack of understanding of the amount of baseline data for the site that is freely available and the ecology of the relevant SPA species and the habitat impacted by the development. The information on SPA species contained in paragraphs 5.82 and 5.83 could have easily been checked. The location of the little tern colony is well documented and even a basic knowledge of the feeding ecology on wigeon would allow the comment in 5.83 to be substantiated.

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			The legally qualified author who undertook this review does not appear to have enlisted any professional ecological advice when preparing this response. The competent authority will no doubt seek ecological input when undertaking their HRA.
14.17	SHRA – "in combination" shadow appropriate assessment of the ERF project with other plans and projects, and omission of agricultural plans and projects	Paragraphs 78 to 86 There is a failure to undertake correctly an "in combination" shadow appropriate assessment of the ERF project with other plans and projects. The shadow appropriate assessment must consider the impacts of the ERF project both alone and in combination with other plans and projects. Section 6 of the shadow appropriate assessment purports to undertake an "in combination" assessment. But it is incorrect and / or inadequate. An in combination assessment under HRA requires the assessor to identify a zone of influence around each of the European / Ramsar sites of concern to reflect the maximum distance from which each impact pathway of concern might affect that European site. The zones will differ depending on the pathway of impact. It is therefore not correct to identify a zone of influence around the proposed project location i.e. here around ERF. This is because the law is requiring an assessment of the impacts on the European site that the subject project is having together with any similar impacts on that same European site from other plans or projects. The author has not explained at all how the in combination projects listed in 6.2 have been identified. Table 3 is described as looking at "other projects in the area" which is unclear. It does not seem however that the author has identified the zone of influence of each relevant pathway of impact, as is required, nor does it seem that the author has considered zones of influence by reference to the locations of the European / Ramsar sites. Table 3 makes no mention of any agricultural plans or projects which may well give rise to air quality impacts which should be considered in combination with the ERF project. Table 3 and paragraph 6.3 rely on "distance" as the apparent basis for why there is no "in combination" effect between the ERF and certain other projects. But no distance figures or reasoning has been provided. This is wholly inadequate. An appropriate assessment "may not have lacunae and must contain complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the proposed works on the protected area concerned". The ERF's air quality impacts are a very significant issue for this project and the approach to "in combination" air quality effects is of paramount importance. Yet paragraph 5.20 of the appropriate assessment states that where a particular "PC" threshold is not met then Powerfuel concludes "no adverse effect on integrity of the site". This is inadequate and fails to comply with the legal requirements because no in combination assessment of other plans or projects (as required by Wealden and the Dutch nitrogen cases) has been mentioned or undertaken. Paragraph 5.20 states that the approach taken is in accordance with national guidance, but fails to inform the reader to which guidance it is referring. The shadow HRA discusses critical levels and critical loads in the shadow appropriate assessment at paragraphs 5.22 – 5.87. Again there is no mention / explanation of how "in combination" effects have been taken into account.	It is incorrect to state that the application of a zone of influence around the site is required under HRA to determine in-combination effects. The legislation and case-law does not set out any such requirement. This comment simply represents the view of a legal reviewer on how an in-combination assessment might be done. The scope and content of an appropriate assessment will depend on the nature, location, duration and scale of the proposed plan or project and the interest features of the relevant site. 'Appropriate' is not a technical term. It indicates that an assessment needs to be proportionate and sufficient to support the task of the competent authority in determining whether the plan or project will adversely affect the integrity of the site. The applicant contends that the competent authority can determine what is an appropriate method for determining in-combination effects. Further information on the identification of projects identified for the "in-combination" assessment will be provided in the revised shadow AA. The reference to agricultural plans and projects demonstrates a clear misunderstanding of the context of the sites and represents another example of the legal author highlighting hypothetical risks. No significant agricultural projects have been identified as being proposed along the Fleet. Further information on the rationale used to determine no likely in-combination effects as set out in Table 3 of the shadow HRA has been added to the revised document. This response highlights this as an omission.

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Item	Topic	Summary of consultation comment	Applicant response
14.18	SHRA – consideration of critical levels and critical loads	Paragraphs 87 and 88 The discussion of critical levels and critical loads in the shadow appropriate assessment is incomplete / not sufficiently evidenced. There is no presentation of the underlying modelling data or any isopleth information to show how the conclusions have been drawn. There is merely a reference in the text to the "Fichtner" modelling. There is no Fichtner report listed in the References at the back of the shadow HRA. There is no explanation as to how in combination effects have been taken into account The analysis fails to address each qualifying feature of each European / Ramsar site, the analysis fails to address other species necessary for the conservation of the qualifying features The shadow appropriate assessment relies on supposed emission levels expressed as PC or PEC in relation to critical levels and critical loads but in most cases does not then go on to consider ecological impacts in relation to the qualifying features. This is contrary to the High Court judgment in Compton Parish Council. The shadow appropriate assessment lacks required detail / data e.g., one sees time and time again "given the distance of the European site from the ERF….", but without any presentation of what the distance actually is.	As highlighted in the author's review (see paragraph 8) the observations made by a legally qualified author are based on the shadow HRA document alone. Much of the information highlighted as lacking could be found in the supporting documentation, referenced in the shadow HRA, and available to the author and the competent authority. The details of critical levels/loads thresholds are taken off APIS. The Compton Parish Council judgment (para 207) EWHC 3242 related to an SPA where background critical loads/levels were exceeded. This is not the case for this application for the majority of the interest features within the NSN sites. The legal author fails to note (as set out in paragraphs 5.6 and 5.7 of the shadow HRA) that if critical levels (alone or in-combination) are above those given, direct adverse effects on receptors may occur according to current knowledge. It follows therefore that if the critical level is below that given direct adverse effects on receptors will not occur. The same rationale applies where critical loads (alone and in-combination) fall below the thresholds given. If there is no chance of direct adverse effects on receptors according to current knowledge because the critical level/load remains below identified thresholds there are no impacts on qualifying features to assess. Where exceedance does occur, this is fully assessed.
14.19	SHRA – impacts relating to traffic and ship emissions	Paragraphs 89 to 92 The shadow appropriate assessment in relation to traffic / ship emissions impacts is unclear. The shadow appropriate assessment contains discussion of traffic / ship emission impacts at paragraphs 5.94-5.97. Whilst concerns are raised regarding potential impacts, no data or evidence is presented to support the conclusions and the conclusions themselves are not clear.	The revised air quality modelling sets out the impacts related to traffic. The assessment has been carried out on the basis of the impact of the ERF excluding the reduction in emissions from shipping as a result of the provision of shore power which would mean that shipping when berthed would not need to use their on board engines for power. Thus the results presented in the HRA are precautionary. The impact of the ERF is not significant and the provision of shore power would reduce emissions of NOx and SO2 (of which would have impacts on ecology).
14.20	SHRA – Chesil Beach and the Fleet SPA/Ramsar – consideration of acid deposition	Paragraphs 93 and 94 There is an omission of consideration of acid deposition impacts on Chesil Beach and the Fleet SPA / Ramsar sites.	The APIS website clearly states that neither wigeon or little tern are sensitive due to acidity impacts on broad habitats and there would be no expected negative impact on the species due to impacts on the species broad habitat.
14.21	SHRA – Portland to Studland Cliffs SAC and Studland to Portland Marine SAC – consideration of impacts on water pollution	Paragraphs 95 and 96 There is an omission of consideration of impacts of water pollution on Isle of Portland to Studland Cliffs SAC / Studland to Portland SAC. It is acknowledged that there may not be marine impacts on the Isle of Portland SAC but, if not, then this should be explained and if the screening assessment had been conducted as required then this would have been made clear).	Impacts on Studland to Portland Marine SAC excluded on the basis of distance from site. ABPmer have reviewed the information provided for the application and has concurred with the view that aerial and marine pollution presents no credible risk to the Studland to Portland SAC (appendix 9.2 to the ES addendum). There is no feasible impact pathway for Isle of Portland to Studland Cliffs SAC, this is another example of the legal author highlighting hypothetical risks.
14.22	SHRA – Portland to Studland Cliffs SAC – consideration of dust pollution impacts	Paragraphs 97 to 98 There is an omission of consideration of impacts of dust pollution on Chesil and the Fleet SAC even though its boundary appears on Figure 1 to abut the redline of the ERF.	Although the application red line extends towards the A354 it does not abut Chesil and the Fleet SAC and a clear gap is discernible on Figure 1 between the red line and Chesil and the Fleet SAC. Due to the distance between the red line and the SAC no impact pathway for dust exists. This comment is based on a misreading of the submitted information.

Item	Topic	Summary of consultation comment	Applicant response
	Adams Hendry/Jonathan Cox (on behalf of SPWI)		
14.23	SHRA – cumulative assessment	Part C Ecology and Biodiversity Paragraph 3.6 There is a lack of meaningful assessment of the proposed development with other proposed plans and projects in the area. This might include housing development resulting in increased road traffic and the development plans for Portland Harbour which could increase ship movements. The competent authority cannot determine their appropriate assessment of the proposed ERF until other plans or projects have been identified and the contribution these have to air quality has been assessed in combination with that derived from the development.	There are no other large permitted processes on the Isle of Portland. The assessment has been carried out on the basis of the impact of the ERF excluding the reduction in emissions from shipping as a result of the provision of shore power which would mean that shipping when berthed would not need to use their on board engines for power. Thus the results presented in the HRA are precautionary. The air quality modelling and likely significant effects (LSE) screening has shown the impacts of the proposed development are localised and only potentially significant in the vicinity of the proposed development and where the A354 crosses Chesil Beach. The traffic modelling and revised air quality modelling captures traffic growth from projects on Portland and future growth. It is also noted that the Portland Neighbourhood Plan (June 2019) Appropriate Assessment considers in-combination effect of 4 policies on the Chesil and the Fleet SAC (EN8 – The Verne, BE3 – New business premises BE4 – New business centres and BE6 The Northern Arc). The approved document, which will have addressed increased traffic flows along the A354 and potential impacts on the European sites, did not recommend any mitigation related to air quality impacts for the growth on Portland covered by this plan.
14.24	SHRA – Isle of Portland to Studland Cliffs SAC – presence of lower plants (liverworts and lichen)	Part C Ecology and Biodiversity Paragraph 3.7 to 3.9 Records indicate the presence of two rare liverworts on rocky outcrops in 1996 and two species of beard lichen on mature scrub (Usnea articulata and Usnea esperantiana). Lower plants are components of the wider calcareous grassland and scrub habitat for the site. They are highly vulnerable features of the habitat in close proximity to the proposed development.	The critical levels for ammonia, NOx and SO2 are below relevant levels set for protection of lower plants. Usnea articulata is known to be particularly sensitive to SO2 . The loss of this species from much of lowland England is believed to be due to SO2 pollution. Usnea articulata is found in areas defined as having 'pure' air on the Hawksworth and Rose scale (1970) designed to estimate mean winter sulphur dioxide levels in England and Wales using lichens growing of acidic tree bark . SO2 levels before and after the development remain well below those set for the protection of lower plants. Usnea articulata is believed to show a similar sensitivity to air pollution. The example of Usnea articulata is the only record from Portland but it is found on mature shrubs and in the canopy of woodland trees in the west of the county where it can be locally frequent. The example of Usnea esperantiana is also the only known record on Portland. This species has been recorded from another six sites in the county. The lack of records of either species from the W21 and W22 scrub communities across both the Isle of Portland and the Isle of Portland to Studland SAC raises questions whether either can be considered a typical species of the lichen communities of the SAC. Information on the distribution of calcareous grassland communities within an area of search defined by the air quality modelling provided by Dorset Environmental Records Centre (B Edwards, 2021) demonstrates that the most important calcareous grassland community for terricolous lichens is not present within the zone of impact. The report states that "CG1 is by far the most important for lower plants providing a habitat for several of key Mediterranean bryophytes and lichens".
14.25	SHRA – Isle of Portland to Studland Cliffs SAC -use of Predicted Environmental Contribution (PEC) and the precautionary principle	Part C Ecology and Biodiversity Paragraph 3.10 to 3.13 The use of the PEC, below 70% of the critical level or load, may be several years old and is not reliable. The approach is not precautionary enough given small rises in levels of various pollutants.	The competent authority's attention is drawn to work undertaken by Jonathan Cox Associates as recently as November 2017 where the Environment Agency thresholds were used for assessing impacts on the interest features of European sites. These thresholds, now being identified as potentially unreliable, were considered by the author of the note (Jonathan Cox) to be based on a suitable precautionary approach. The note states "it can be assumed that these thresholds have been set by Environment Agency and Natural England taking the precautionary approach required to conclude no likely significant effect".

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			No evidence to support the assertion that the Environmental Agency guidance cannot now be safely relied upon has been provided by Jonathan Cox. The same author has previously applied this thresholds in the same way as has been done in the submitted shadow appropriate assessment. In that case, the author considered that making an assumption, regarding the precautionary approach to setting of thresholds by Environment Agency and Natural England, was entirely appropriate. There is no evidence provided to support the suggestion that the impact of air pollution may prevent this part of the SAC being restored to favourable condition. Levels of relevant critical levels and loads remain below those recommended on APIS for calcareous grassland.
14.26	SHRA - Isle of Portland to Studland Cliffs SAC – impact on important invertebrates	Part C Ecology and Biodiversity Paragraph 3.14 The SAC calcareous grassland habitat also supports important invertebrate populations characterised by the presence of the Silver studded blue and Adonis blue butterflies. Potential impact of changes from air pollution on the structure and composition of grassland	The Adonis blue is found on south-facing short chalk and limestone grassland where there is an abundance of the larval foodplant horseshoe vetch Hippocrepis comosa. Information provided by Dorset Environmental Records Centre highlight the localised nature of the colonies on Portland. The largest colonies seem to be in the centre and north at High Angle Batteries, Penn's Weare and Tout Quarries. Within the Isle of Portland to Studland Cliffs SAC there are important colonies around Lulworth and on Ballard Down. It should be noted that Unit 33 of the SAC is currently dominated by scrub and is north-facing. This does not currently provide suitable habitat for Adonis blue. The critical load for calcareous grassland within the SAC is not exceeded so there should be no impacts on Adonis blue. Silver-studded blue has declined significantly and is only known now from less than 10 colonies, the main ones being at Broadcroft Quarries and near Nicodemus Knob, with smaller ones at High Angle Batteries, King Barrow Quarries and Tout Quarries. At Broadcroft Quarry surface scraping has been employed to create the conditions favoured by Silver-studded blue and the ants (primarily Lasius niger, also L. alienus). Given the limited mobility of adults (generally circa. 50m) this area is outside most of the key areas known to support this species. As with Adonis blue it is typically found in sheltered conditions and south-facing slopes. Food plants comprise black medick, common bird's-foot trefoil, common rock-rose, gorse and horseshoe vetch. A paper in conservation evidence indicates that successional vegetational changes within Broadcroft Quarry necessitated intervention (de Whalley et al, 2006)3. It should be noted that Unit 33 of the SAC is currently dominated by scrub and is north-facing. This does not currently provide suitable habitat for silver studded blue. The critical load for calcareous grassland within the SAC is not exceeded so there should be no impacts on silver studded blue. There is a single record of Portland Ribbon Wave. This species inhabits open grassland and scrubby areas on coastal limestone in Britain. Larval foodplants are unknown but captive larvae have been recorded feeding on bramble, lady's bedstraw, travellers joy, honeysuckle and dandelion (Waring and Townsend, 2017)4. Given the range of foodplants larvae have been recorded feeding on and the nature of the habitat used by this species, the changes in air quality are not considered likely to impact on this species.

[3] De Whalley, L., de Walley, B., Green, P., Gammon, N and Shreeves, W (2006) Digging scrapes to enhance silver-studded blue Plebejus argus habitat at Broadcroft Quarry, Isle of Portland, Dorset, England. Conservation Evidence, 2006. 3. 39-43.

[4] Waring, P and Townsend, M (2017) Field Guide to the Moths of Great Britain and Ireland. Third Edition. Bloomsbury Wildlife Guides. London.

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			The grey bush-cricket Platycleis albopunctata has been recorded from Castletown area. The critical load for calcareous grassland not exceeded so there should be no impacts on the habitats that support the invertebrate populations referred to.
14.27	SHRA – Chesil Beach and the Fleet SAC – assessment of vegetation communities	Part C Ecology and Biodiversity Paragraph 3.16 to 3.20 The process contribution (PC) for ammonia will exceed 1% of the critical level and is 0.9% of critical load for nitrogen. The assessment correctly identifies that the site supports areas of the Annex I habitat type referred to as Perennial Vegetation of Stony Banks, but considers this to consist only of the vegetation communities described by the National Vegetation Classification as SD1 Rumex crispus-Glaucium flavum shingle community. It dismisses other maritime grassland vegetation on Chesil Beach (MC5 and MC8) as not being a component of the Perennial Vegetation of Stony Banks habitat type (paragraph 5.54). This conclusion is based on an erroneous use of the EU Interpretation Manual to relate NVC communities to Annex 1 habitat types. The EU Interpretation Manual only provides a guide to those national vegetation classifications that equate to the Annex I habitat type, it does not provide an exhaustive or exclusive list of equivalent vegetation communities. The NVC describes vegetation types and not habitats. Although a vegetation community may be described as a maritime cliff vegetation, it is not confined to that habitat, but can occur in other habitats. For example, the Annex 1 Vegetated Shingle habitat can include examples of saltmarsh and even woodland NVC communities. A better understanding of the relationship between vegetation communities and vegetated shingle habitat is available in the Natural England commissioned report NECR054 on Coastal Vegetated Shingle The applicant has therefore not assessed the MC5 and MC8 communities as vegetated shingle but rather treated them as maritime cliff.	It is assumed that the correct paragraph reference here should be 5.64 (rather than 5.54 as is stated in this comment). The reference to the EU Interpretation Manual attributing MC5 and MC8 to the Annex 1 habitat vegetated sea cliffs of the Atlantic and Baltic coasts was purely to highlight to the competent authority the difference in critical loads given on APIS for the two habitat types, therefore it may not be appropriate to apply a blanket critical load across all the habitat types of the Annex 1 habitat perennial vegetation of stony banks community. This Annex 1 habitat type covers a wide range of NVC communities. Paragraph 5.64 does not actually state that MC5 and MC8 grassland are not part of the Annex 1 habitat perennial vegetation of stony banks. It simply states "*The EU interpretation manual identifies the NVC communities SD1 community as the community characteristic of the Annex 1 habitat type perennial vegetation of stony banks. The manual attributes the MC5 and MC8 maritime grassland communities to the Annex 1 habitat vegetated sea cliffs of the Atlantic and Baltic Coasts*. ". Both statements are factually correct. Para 5.63 highlights the different vegetation communities considered to fall into the Annex 1 habitat perennial vegetation of stony banks by Footprint ecology. Site specific advice is only provided for the N critical load for one SAC in the UK - Dungeness. This recommends a site relevant critical load for perennial vegetation of stony banks (H1220) of 10-15kg/N/ha/yr. (same as acid grassland) with the lower end of the range used to protect lichen-rich communities. Table 2 of the NERC054 Coastal vegetated shingle report (Murdock et al, 2010)[5] list the vegetation types relevant to H1220 recorded at Dungeness as being: SD1, MG1/MG1a, U1/U1a, MC8/MC8c/MC5. Crowther and Groome (2005) list the NVC communities recorded along the western side of the A354: SD1 (various), SM25, MC5, MC8 and MC11. Footprint Ecology (2018) list the NVC communities recorded along the western side of the A354: SD1 (various), SM25, MC5, MC8, MC11, SM14 and SM25. SD1, MC5 and MC8 communities occur at both Chesil and Dungeness. The applicant draws the competent authority's attention to the site relevant critical load supplied by Natural England for perennial vegetation of stony banks (H1220) at Dungeness, which supports a number of the same vegetation communities as Chesil. The critical load for that site is 10-15kg/N/ha/yr. with the lower end of the range used to protect lichen-rich communities. Crowther and Groome note that the MC5 grasslands support some element of fine-grained material within the shingle matrix, although almost never as great as that noted for the MC8 stands. The report notes that MC8 grassland requires a relatively high sand/silt component in the shingle matrix before coming into its own. All this would suggest that the lower end of the critical load range given for vegetated shingle may not be appropriate for those parts of the SAC supporting maritime grassland communities. As this comment recognises, the Annex 1 habitat type perennial vegetation of stony banks (H1220) includes a wide range of NVC communities. It does not seem credible that a single critical load for nitrogen would be applicable to all the varied communities listed in the NERC054 Coastal vegetated shingle report (Murdock et al, 2010).

[5] Murdock, A., Hill, A.N., Cox, J. & Randall, R.E. (2010) Development of an evidence base of the extent and quality of shingle habitats in England to improve targeting and delivery of the coastal vegetated shingle HAP. Natural England Commissioned Report, Number 054. Natural England. Peterborough.

Item	Topic	Summary of consultation comment	Applicant response
			APIS information for Portland Harbour Shore SSSI (the area east of the A354) lists 2 habitats SM14 (littoral sediment – Atriplex portulacoides saltmarsh) and MC8 (Supralittoral rock – Festuca rubra – Armeria maritima grassland) listing lichens and bryophytes as not present and a N critical load of 20-30 for saltmarsh habitat and no N critical load for MC8 grassland, but noting that it is sensitive to N deposition. Information on Hamm Beach provided by Dorset Environmental Records (Edwards, 2021) notes the more open stands of MC8 and the few very small stands of SD19 support the moss Syntrichia ruralis var. ruraliformis which is typical of more calcareous sand dunes, with Hypnum cupressiforme var. lacunosum forming extensive patches in places. Most notable is the acrocarpous Pleurochaete squarrosa (NS) which is found as small scattered patches among the Syntrichia. Pleurochaete is a moss of open calcareous grassland and is currently known from two sites on Portland with around 15 scattered populations in Dorset in short chalk turf. In Britain it is mainly found in Southern England and the coasts of Wales with outlying populations north to Morecombe Bay. This information shows that lower plants are not a major component of the vegetation communities along Hamm Beach. Photos of these communities are provided in the shadow appropriate assessment. Ammonia and NOx critical levels are exceeded within 4m of carriageway but rapidly fall away. The modelling for ammonia supports the conclusion of the NERC199 report (Smithers et al, 2016)[6] which states. “Gaseous ammonia is thus unlikely to be a key issue, and effects on vegetation are more likely to arise from enhanced deposition of nitrogen to the soil environment. This elevation in soil nitrogen will be limited to areas within tens of metres of roads due to the high rates of deposition of this gas.” Critical levels for NOx and NH3 will be exceeded with or without the project as will background N deposition (if the 8kg/N/ha/yr. critical load is applied). If any exceedance of these critical levels are deemed significant it would mean developments on the Isle of Portland could not legally be consented.
14.28	SHRA – Chesil Beach and the Fleet SAC – effect of nitrogen deposition	Part C Ecology and Biodiversity Paragraph 3.21 The shadow appropriate assessment relates the effects of N deposition on Chesil Bach with its effects on sand dune vegetation on acid and calcareous substrate. There is no evidence that shingle communities respond to differing substrate in the same way as sand dunes.	The shadow appropriate assessment does not directly link shingle communities to sand dune vegetation. It just highlights the differences in Ellenberg scores for pH for plants found in acid dunes and those found on Chesil Beach suggesting that the plant communities of Chesil Beach are not indicative of strongly acid communities. The Ellenberg scores also suggest that many of the species that occur in the SD1 communities are typical of sites with above intermediate fertility. The further information on lower plants supplied by Dorset Environmental Records Centre (Edwards, 2021) would support this conclusion with mosses typical of calcareous dunes or grassland occurring along Hamm Beach.
14.29	SHRA – Chesil Beach and the Fleet SAC – impacts of ammonia on lower plant communities	Part C Ecology and Biodiversity Paragraph 3.22 The impact of ammonia deposition is of considerable concern, particularly in relation the lichen and bryophyte communities present on Chesil Beach. These lower plants are a significant feature of the Annex I vegetated shingle habitat on Chesil Beach. The Shadow Appropriate Assessment dismisses them as not occurring within the pioneer shingle vegetation it considers is a component of the Annex I habitat type (Perennial vegetation of stony banks). However, lichens and bryophytes are frequent in some of the maritime grassland communities present,	The revised AQ modelling submitted has addressed this. The ammonia levels set for the protection of higher plants are below the relevant critical level except within a few metres of the carriageway. The vegetation surveys undertaken by Crowther and Groome and Footprint Ecology have shown the MC5 grassland stands are located some distance from the A354, with the closest recorded stands over 90m from the A354. Rodwell notes that bryophytes occur at low frequencies throughout MC5 grasslands but in some sub-communities they and lichens may attain up to 20% cover.

[6] Smithers, R., Harris, R and Hitchcock, G. (2016) The ecological effects of air pollution from road transport: an updated review. Natural England Commission Report, Number 199. Natural England. Peterborough.

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		for example, Groom and Crowther (2005)7 found 13 species of lichen and bryophyte in samples of MC5 maritime grassland on Chesil Beach. The impacts of ammonia on lower plant communities of MC5 grassland are not considered.	Lower plants recorded from the closest area of MC5 grassland were: Hypnum lacunosum, Campylopus introflexus, Cladonia furcata, Cladonia foliacea and Peltigera cf canina. Campylopus introflexus is a pioneer species of bare peat, burning or ploughing for forestry. First recorded in 1941 it is now widespread across British Isles. Peltigera cf canina has a scattered distribution with a concentration of records in Hampshire and Dorset. It is widespread but local in turf on dunes and on gravelly and sandy soils inland. Additional information provided by Dorset Environmental Records Centre (Edwards, 2021) notes that Chesil Bank – the stabilised sandy-shingle area at Ferrybridge is well vegetated and dominated by Red Fescue Festuca rubra and Thrift Armeria maritima (MC8) with a much more diverse flora in the more open patches (MC5). The pleurocarpous moss Hypnum cupressiforme var. lacunosum is abundant and terricolous lichens are present locally particularly Cladonia rangiformis and Peltigera canina, with smaller quantities of Cladonia foliacea, C. furcata subsp. furcata, C. pyxidata and Peltigera hymenina. The uncommon Thelenella muscorum was found overgrowing the moss Ceratodon purpureus in 2009. None of these species are Red Listed or Nationally Scarce. The best areas of stabilised shingle are to the north of the area of search beyond the Tern colony enclosure. Photos are provided in the shadow appropriate assessment. The pebbles around Ferrybridge are generally poor for lichens due to disturbance and the lack of stability, with the common Xanthoria parietina the only species found with any frequency. Xanthoria parietina is widespread across all of England and Wales. It is extremely common and widespread and very pollution tolerant. Ammonia critical levels are exceeded within 4m of carriageway but rapidly fall away. The modelling for ammonia supports the conclusion of the NERC199 report (Smithers et al, 2016) which states. "Gaseous ammonia is thus unlikely to be a key issue, and effects on vegetation are more likely to arise from enhanced deposition of nitrogen to the soil environment. This elevation in soil nitrogen will be limited to areas within tens of metres of roads due to the high rates of deposition of this gas."
14.30	SHRA – Chesil Beach and the Fleet SAC – impact of ammonia on a rare moth species	Part C Ecology and Biodiversity Paragraph 3.23 Increases in ammonia deposition threaten the habitat of the very rare moth Scythris scicella.	The micromoth Scythris siccella Least Owlet (S41) is only known in the UK from Hamm Beach where it is found in sparsely vegetated sandy habitats. The larvae feed on various herbaceous plants making a silken tube covered in sand grains down into the sand. Despite recent small-scale management and survey work there have been records of the moth in recent years, however it is too early to say whether the species is extinct or not. None of the species recorded are particularly rare or localised suggesting they are not particularly sensitive to changes in air quality. Ammonia critical levels are exceeded within 4m of carriageway but rapidly fall away. The modelling for ammonia supports the conclusion of the NERC199 report (Smithers et al, 2016) which states. "Gaseous ammonia is thus unlikely to be a key issue, and effects on vegetation are more likely to arise from enhanced deposition of nitrogen to the soil environment. This elevation in soil nitrogen will be limited to areas within tens of metres of roads due to the high rates of deposition of this gas."
14.31	Chesil and the Fleet SPA and Ramsar – air quality effect on widgeon	Part C Ecology and Biodiversity Paragraph 3.25 and 3.26 The intertidal areas of The Fleet are important for wintering flocks of wigeon. These ducks feed on the seagrass beds that are exposed at low tide. There is evidence	Reference is made to relevant critical levels and loads. APIS provides a N critical load range of 20-30kg/N/ha/yr. for littoral sediment. APIS shows that current levels of N and acid deposition for habitats are below minimum critical loads.

[7] Groom, G. and Crowther, K.C. (2005) National Vegetation Classification Survey of Annex 1 and listed habitats at Chesil and The Fleet SAC, Dorset.

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		that the extent of these seagrass beds has declined in recent years. The SPA and Ramsar site conservation objectives require that air pollution levels are maintained below critical loads and levels. The proposal may have an impact on sea grass beds affecting wigeon.	EMODNet[8] shows the extent of sea grass beds across the Fleet and clearly demonstrates that there is no seagrass present within 200m of the A354. (accessed 10/5/21).
14.32	ES - On-site ecology – value of open mosaic habitat	Paragraph 4.52 Part C Ecology and Biodiversity Paragraph 4.7 The Environmental Statement has ignored the value of open mosaic habitat within the proposed development site. This is a Priority habitat referred to in Section 41 of the NERC Act (2006) as a habitat of principal importance for the purpose of conserving biodiversity. The destruction of this habitat should be minimised and if possible avoided. The Applicant has failed to provide sufficient compensation to not only offset the loss of this habitat, but also to provide a net increase in biodiversity value.	The UK habitats classification of open mosaic habitat is very general and here applies to limited areas of short perennial, ephemeral and coastal grassland habitats, formed recently on a brownfield site. The value of this habitat type here is low in the context of its limited distribution and short timespan of establishment. There is significant provision of open mosaic habitat included in the proposed Biodiversity Plan and also significant off-site financial provision for local schemes relevant to the habitats present on site. This has all been agreed through consultation with Dorset Natural Environment Team (DNET).
14.33	ES - On-site ecology – description of habitat types and areas	Part C Ecology and Biodiversity Paragraphs 4.1 and 4.2 The ES describes the development site as being composed of three habitat types; Colonised hard-standing, Improved grassland and Scrub. It concludes that all three of these habitats are of Local/Low value. This description contradicts the vegetation and habitat description provided in Appendix K and paragraph 10.153 of the ES. Appendix K states that the development of the ERF would result in the loss of 0.5 hectares of open mosaic habitat together with areas of Scrub and Ephemeral/Short perennial vegetation. It makes no mention of Improved grassland. Chapter 10 of the ES (Natural Heritage) states that the development will result in the loss of 0.87ha of calcareous mosaic habitat.	The original assessment was undertaken using phase 1 classifications. The Defra metric uses UK Habs to attribute values to habitats. The definition of mosaic type habitats in simple terms is a combination of habitat types forming a contiguous area. This can include any habitat type, such as those listed. Definitions are likely to vary due to the differences in assessment types for habitat descriptions and then assessment through the BNG metric.
14.34	ES - On-site ecology – weight to be applied to open mosaic habitat	Part C Ecology and Biodiversity Paragraph 4.3 The presence of open mosaic habitat within this site is a significant feature as this is a Priority Habitat type as identified by Section 41 of the NERC Act (2006)9. The presence of Priority habitat types such as this must be given particular weight in planning decisions.	DNET have approved the Biodiversity Plan that provides significant areas of this habitat type on the site post development in perpetuity
14.35	ES - On-site ecology – value of open mosaic habitat in respect to breeding bird and invertebrate survey	Paragraph 4.53 Part C Ecology and Biodiversity Paragraph 4.4 The presence of open mosaic habitat on this site is further supported by the results of bird and invertebrate surveys. This habitat type is known to be particularly rich in invertebrates. This has been supported by the results of invertebrate surveys undertaken as part of the ES and reported in Appendix K part 3 of the ES. The bird surveys also found a significant population of Black Redstart, another species typically found in open mosaic habitats. The proper assessment of impacts on the open mosaic habitat and the requirement for compensation for its loss can only be undertaken on the basis of full ecological survey. The levels of breeding bird and invertebrate survey submitted with the application are inadequate to permit such an assessment.	The breeding bird habitat within the footprint of the proposed works is of negligible value due to a lack of vegetation and constant disturbance. The invertebrate survey effort was confirmed as suitable by the Dorset Natural Environment Team.

[8] https://www.emodnet-seabedhabitats.eu/access-data/launch-map-viewer/?activeFilters=&zoom=13&center=-2.553,50.614&layerIds=502&baseLayerId=-3&activeFilters=

[9] https://data.jncc.gov.uk/data/a81bf2a7-b637-4497-a8be-03bd50d4290d/UKBAP-BAPHabitats-40-OMH- 2010.pdf

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14.36	ES - On-site ecology – loss of priority habitat type and need to achieve biodiversity net gain	Part C Ecology and Biodiversity Paragraph 4.5 The destruction of 0.87 hectares of a Priority Habitat type represents a significant loss of biodiversity value on this site. The Environment Bill10, currently in Parliament, will require that development should result in at least a 10% Biodiversity Net Gain. This will be calculated by reference to the Defra Biodiversity Metric. Open Mosaic Habitat is considered a habitat of 'high' biodiversity value in the Metric, of equivalent value to Calcareous Grassland. Its loss and destruction should not be permitted unless sufficient compensatory habitat is provided, not only to offset the loss of this habitat, but also to provide a net increase in biodiversity value.	A detailed Biodiversity Plan for the site has been agreed in conjunction with Dorset Natural Environment Team. This includes significant relevant on-site provisions and financial contributions to relevant local off-site projects.
14.37	ES - On-site ecology – provision of sufficient habitat compensation	Paragraph 4.54 Part C Ecology and Biodiversity Paragraph 4.6 The current proposals for the development of the ERF will result in a significant net loss of biodiversity within the application site. The current mitigation proposals provide for the creation of 0.062 ha of mosaic habitat (ES Chapter 10, Table 10.9) to offset the loss of 0.87 ha of this habitat. This represents a significant decline in the biodiversity value. Substantially more habitat compensation and biodiversity gain should be provided as part of this proposed development.	A detailed Biodiversity Plan for the site was agreed in conjunction with Dorset Natural Environment Team. This includes significant relevant on-site provisions and financial contributions to relevant local off-site projects Whilst there is an overall loss of habitat area, the Biodiversity Plan enhancement proposals will provide habitats of a significantly better quality than those currently present in perpetuity, which cannot be impacted by the daily port activities.
14.38	ES - On-site ecology – biodiversity value, avoiding habitat loss, habitat compensation and biodiversity net gain.	Part C Ecology and Biodiversity Paragraph 4.7 The ES fails to recognise the current biodiversity value of habitat within the proposed development. It also fails to demonstrate how the proposals have sought to avoid or minimise habitat destruction and fail to provide sufficient compensation to offset the loss of this. Furthermore, the proposals have failed to provide any biodiversity net gain, as required by the Environment Bill (2020).	As of July 2021, the new Environment Bill has not been passed through parliament. There are therefore also no statutory requirements to provide a biodiversity net gain of 10% as specified in the bill. The policy for achieving biodiversity enhancements in Dorset, is specified through Dorset Council Natural Environment Team (DNET) Biodiversity Appraisal Protocol (BAP). This requires a Biodiversity Plan (BP) to be produced, which provides detailed mitigation and enhancement strategies for the site. Unless this BP is approved by DNET, with a certificate of approval provided, an application cannot progress. Lindsay Carrington Ecological Services have worked closely with DNET on the Dorset BAP since its inception. DNET have been consulted at every stage of this applications progress, from initial design through to final proposals. The biodiversity enhancement measures included in the site BP are focussed on mitigation for the loss of on-site habitats and ensuring an overall net gain, with site and local-specific ecology in mind. This includes mosaic type habitats, black redstart and coastal type vegetation communities. The BP was approved by DNET as part of this application.
14.39	ES - Bird survey - populations of importance to the Chesil and The Fleet SPA and Ramsar site.	Part C Ecology and Biodiversity Paragraph 4.8 The ES provides a substantial amount of information on wintering birds present in the vicinity of the proposed development. Bird counts are presented for the period October to March 2019. The results of these surveys do not indicate the presence of species populations of importance to the Chesil and The Fleet SPA and Ramsar site.	No qualifying bird species in relation to the nearby SPA sites were recorded during winter bird surveys.
14.40	ES - Bird survey – Presence of Black Redstart and survey methodology	Part C Ecology and Biodiversity Paragraphs 4.9 to 4.12 Black Redstarts were recorded on the development site throughout the winter and into March. The winter bird survey, reported in Appendix K of the ES suggests that they may have also bred on this site, with a singing male heard in March. The ES Chapter contradicts this view and specifically states that these birds were not thought to have bred on the site. This conclusion may have been reached as a	Whilst potential evidence of breeding black redstart was recorded within the boundary of the proposed development area, there is no suitable breeding habitat for black redstart within this boundary. Black redstart nest sites are typically within structures, or on external ledges of structures. No features of this type are within the areas of habitats to be lost. Suitable nesting sites for black redstart are included within the biodiversity enhancement proposals for the site.

[10] https://www.gov.uk/government/publications/environment-bill-2020

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		result of the breeding bird survey undertaken in the summer of 2020. This was based on two survey visits in June and July. Breeding bird surveys undertaken this late in the summer are unlikely to record the full diversity of breeding birds. Two survey visits is too few to record rare and often elusive species such as Black Redstart. Good Practice advice for survey of breeding Black Redstart is provided on by blackredstarts.org.uk. They state: "The following survey criteria has been drawn up by the BLACK REDSTART Action Plan Working Group for London and are recommended by the lead conservation agencies in London. • In principle a known breeding site or likely breeding site should be surveyed throughout the breeding season; from May to August. • At least one visit a week of 3hrs should be undertaken under favourable weather conditions (warm, windless days) in the early hours of the morning. Black redstarts are notorious for singing an hour before dawn and the visits should be timed to begin 1 hour before dawn. • During 3rd and 4th week of May further visits should be undertaken during the day to locate nesting sites." Given the lack of survey effort, it is not surprising that no evidence of breeding Black Redstart was found at the proposed development site.	
14.41	ES - Bird survey – Black Redstart assessment and conservation	Part C Ecology and Biodiversity Paragraph 4.13 Whereas a population of wintering and breeding Black Redstarts could be integrated into the proposed development, it is important that their presence is fully assessed in the Environmental Statement both in their own right and as a component of the Open Mosaic Habitat in which they live. Retaining and enhancing this population of rare birds should be fundamental to the development, as required by planning and nature conservation policy. This will require a full commitment to incorporate their conservation into the future of the development.	Black redstart were considered within the proposals. There will be extensive foraging habitat provided for the species through the BP, in addition to the extensive foreshore habitat already present. Furthermore, new nesting sites for the species are also to be included as part of the proposals.
14.42	ES - On-site ecology – presence of important bat species	Part C Ecology and Biodiversity Paragraph 5.1 The ES provides little information on the use of the proposed development site by bats. It is accepted that there are no bat roosts on the site, however, the cliffs and caves of the Dorset coast provide important roosts for rare bats, most particularly the Greater Horseshoe Bat, a species listed on Annex II of the EU Habitats Directive for which the nearby St Albans Head to Durlston Head Cliffs SAC has been designated. The ES states that Portland is known to have a relative paucity of bats, although provides no evidence to support this assertion.	The "nearby" sites for greater horseshoe bats referred to are approximately 30km north east over the sea in the Purbecks and are winter hibernation sites for this species. There are no open caves or tunnels within the scope of the proposed ERF site and a lack of suitable foraging habitat for this species within it. The desktop search returned very few records of bats within 2km of the site. The proposals will be very low impact for bats, due to an overall reduction in light levels on existing bat foraging habitats and through the creation of extensive new foraging habitats for this group of species. DNET approved the bat section within the BP for the site.
14.43	ES - On-site ecology – nocturnal bat surveys	Paragraph 4.55 Part C Ecology and Biodiversity Paragraph 5.2 and 5.3 The ES considers the habitat within the site unsuitable for bats although concedes that the south west fringe of the site could provide an attractive foraging and commuting route for bats. However, it considers the 'likelihood' of constant nocturnal lighting would deter bat use. The ES further states that nocturnal bat surveys were 'deemed unnecessary'. It is not clear how or why it reaches this conclusion. The lack of any nocturnal bat survey for the site is considered a significant short-fall in the provision of baseline ecological information.	The habitats within the proposed works area are of low value to foraging and commuting bats. The exposed nature of the site further degrades its suitability. The site has only been colonized by vegetation recently and would have historically been of very low value to bats. The data search did not return any significant nearby records for bat species. The undercliff does provide suitable foraging and commuting habitat, however it is currently well lit at night. The proposed renewed lighting scheme for the site will lower existing light levels on the undercliff and therefore improve its suitability for foraging and commuting bats.

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		It must be concluded that further survey is required to demonstrate the true value of the proposed development for bats. The conclusions in relation to bats cannot be relied upon in the absence of such information.	
14.44	ES - On-site ecology – presence of invertebrates and importance of the habitat	Part C Ecology and Biodiversity Paragraph 6.1 The invertebrates survey of the site was confined to a short survey period in the summer of 2020 (ES Appendix K part 3). Despite the short survey window, the survey recorded four nationally scarce species and 35 locally distributed species. Although not reaching SSSI qualifying levels, the report confirms the importance of the site for the priority Open Mosaic habitat.	Whilst the site did support nationally scarce and locally distributed invertebrate species, the low extent of suitable habitats for those species within the site boundary does not make the site significant at a local scale.
14.45	ES - On-site ecology – invertebrates survey	Part C Ecology and Biodiversity Paragraph 6.2 The level of survey undertaken is insufficient to fully characterise the value of the site for invertebrates. Further survey across the invertebrate recording season is very likely to reveal the presence of many more important species and further confirm the value of the habitat for invertebrate species. This is important in understanding the condition of the habitat within the development site and hence the quantum of compensation required to offset its loss.	DNET were satisfied that invertebrate surveys at the site were undertaken with appropriate frequency and scope to approve the Biodiversity Plan for the proposals. The proposed mitigation and enhancement habitats will provide a higher extent of suitable habitat for invertebrates, including those identified during the surveys in perpetuity.
14.46	ES - Off-site ecology – invertebrates and impact on Silver studded blue butterfly	Part C Ecology and Biodiversity Paragraph 6.3 The impact of the development on invertebrate habitats outside of the development site is also considered in the ES Chapter 10. This confirms the importance of the SSSI habitat for invertebrates in particular the Silver studded blue butterfly. Portland is important for its population of this butterfly where it occurs in atypical calcareous grassland habitat, in contrast to its more common heathland habitat. The calcareous grassland form of Silver studded blue uses different larval food-plants to its heathland form. This is not appreciated in the ES which mistakenly states that its food plant is heather (para 10.90). The larval food plant of the calcareous form of Silver studded blue includes a variety of vetch species including Bird's foot trefoil, a species that appears to be widespread on the development site.	Silver studded blue is not present in the SSSI area on the undercliff above the proposed development site, as confirmed by the DERC Isle of Portland SSSI interest features document. Limestone grassland is very sparse above the SSSI site due to the habitat being almost entirely encroached by scrub. The proposed enhancement habitats will include larval food plants for silver studded blue, which may allow them to colonise the site in the future. In addition to this, off-site payments will contribute to scrub clearance works on the undercliff, which will increase the availability of habitat for this species within the SSSI.
	SPWI		
14.47	Impact on the marine environment, protected areas and human health	Preserving the quality of the marine environment is critical in order to ensure the shellfish and other varieties of fish harvested from Portland Harbour and the nearby areas are fit for human consumption. In addition, the interdependency between the marine life inhabiting the waters and the conservancy of the marine environment is essential. Much of the sea around and to the south of Portland is protected as part of the *Studland to Portland Marine Protected Area (MPA).* The site has been made an MPA to protect reef habitats in the waters around the island, which are regarded as being of excellent quality and supporting a high number of plant and animal species. The *Studland to Portland SAC* covers a lot of the area and wraps around much of Portland. There is also the *South of Portland Marine Conservation Zone* off Portland Bill, as well as the *Chesil Beach and Stennis Ledges Marine Conservation Zone* in the Lyme Bay area. Concern is raised over the potential impact of pollution from the facility in respect to the following: • Oyster beds and a range of other shellfish species in the marine environment	The potential impacts of the proposed ERF on the marine environment have been assessed by specialist marine consultancy ABPmer, and their report is submitted to Dorset Council as further environmental information under Regulation 25 of the EIA Regulations. The report has considered potential impact on the marine environment from emissions to air. Its principal conclusion is that 'The assessment demonstrates that emissions from the development during both construction and operation, do not exceed relevant AQALs for the protection of human health, and generally emissions do not exceed critical levels or critical loads from ecologically important pollutants such as NO_x, SO_2, and ammonia air quality standards either alone or in combination with other plans or projects. The critical levels and critical loads are precautionary and have been designed to provide high levels of protection to ecological features including those features protected within designated nature conservation sites'. Also in respect to potential marine impact from emissions to air: • The contribution to ocean acidification as a result of emissions (SO_2 and CO_2) from the ERF is assessed as negligible • On the basis of the relative concentrations of nitrogen (NO_x and ammonia) in marine waters (which is of many orders of magnitude greater than any process emissions from the ERF) it is inconceivable that the small process contribution from the ERF will

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		• The impact of carbon dioxide emissions (and associated acidity) and particulates on marine ecology • The economic impact on people who depend on the marine environment for their living • The release of pollutants, such as heavy metals and persistent organic pollutants from the burning of plastics via emissions and ash • Potential for an increased amount of mercury and impact on fishermen • Areas of important seagrass	materially contribute to nutrient concentrations in adjacent marine waters and thus will contribute negligibly to any eutrophication. There is thus no risk to marine features such as seagrass that would potentially be sensitive to increases in dissolved nitrogen. • There is no risk to the seagrass feature associated with the Chesil Beach and the Fleet SAC, SPA and Ramsar sites, nor is there any risk to features such as Mute Swan or Little Tern that are, to some extent, dependent on seagrass habitat. Similarly, there are no significant risks to features associated with the Portland to Studland Cliffs SAC or to local Marine Conservation Zones (Purbeck Coast, South Dorset, South of Portland and Chesil Beach and Stennis Ledges). • The air quality assessment presented in the ES has demonstrated that concentrations of mercury at ground level will not exceed relevant AQALs for the protection of human health. • There are no significant risks to any of the local designated sites or to shellfish or fish populations associated with mercury emissions either in terms of risk to marine water quality standards or as a result of sediment contamination. Nor are there risks associated with human consumption of local fish or shellfish. • The air quality assessment presented in the ES has demonstrated that concentrations of dioxins at ground level will not exceed relevant AQALs for the protection of human health • There are no significant risks to any of the local designated sites or to shellfish or fish populations associated with dioxin emissions as a result of sediment contamination. Nor are there risks associated with human consumption of local fish or shellfish. Consequently, there should be no rational basis to anticipate a negative impact on fish and shellfish related businesses and employment. There are example of other edge of water locations which host similar energy from waste facilities to the proposed ERF (including for example a much larger EfW plant at Copenhagen Harbour where fishing is an active pursuit.) Also in respect to potential marine impact from emissions to water: • There are no planned process effluent or foul water discharges direct to the marine environment during operation of the ERF. All such discharges will be made to sewer. These will be treated at Weymouth wastewater treatment works (WWTW) and discharged to the sea one kilometre offshore, west of Portland Harbour. The process and foul water effluent from the ERF will be a minor component of the overall discharge from the WWTW. On this basis there will be no significant risks to the marine environment or to any local designated sites from process effluent or foul water discharges from the plant. Nor will there be risks to people associated with sea bathing. • The handling of IBA will be subject to conditions in the Environmental Permit issued by Environment Agency governing the operation of the ERF. This will ensure that risks to the environment, including the marine environment are adequately managed. Any mitigation and monitoring requirements will be incorporated within the site's Environmental Management System. This will ensure that risks to any local designated sites or the wider marine environment associated with spillages or leakages of IBA can be effectively managed. On this basis, taking account of the mitigation measures that will be applied, the risks to the marine environment from this pathway are assessed as insignificant. Overall, the ABPmer report considers that the concerns raised in this comment are unfounded and that the proposed ERF would not have any significant effects (in respect to potential emissions to the air or water) on the marine environment, protected areas or associated human health.

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15. Traffic and transport

Other consultees

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	Adams Hendry (on behalf of SPWI)		
15.1	Movements during scheduled shut-down and waste storage	Paragraph 4.57 It is noted in paragraph 11.17 of the ES that the ERF would only operate for approximately 11 months with scheduled periods of shut-down and that these periods of non-operational time were not included in the trip generation calculations to provide a robust assessment. In order for the conclusions of the assessment to be robust, confirmation is required that there would be no vehicle movements during these periods of shut-down and that the site would not simply stock-pile waste during this time pending the facility resuming operations	Annual shut down periods are programmed to allow for periods of annual maintenance. The size of the fuel store allows for management of fuel flows in the ERF which will accommodate fluctuations in supply and stock piling during shut down periods. Vehicle movements will occur during periods of shut down and may include some stocking of RDF as well as contractors vehicles undertaking maintenance. During periods of shut down there would be no ash removal which accounts for 20 vehicles of the 80 anticipated movements a day (on the basis of the Transport Assessment under which, conservatively, it is assumed that all RDF supply and ash removal occurs by road) and so overall during shut down periods there is anticipated to be fewer vehicle movements than when the plant is operational.
15.2	Scale and extent of the assessment	Paragraph 4.58 Given that the route to the site passes a Conservation Area, considered in the Institute for Environmental Assessment's Guidelines for the Environmental Assessment of Road Traffic as a sensitive area, the scale and extent of the assessment should include those areas where traffic flows increase by 10% or more.	Traffic flow increases are considered in Ch11 of the Environmental Statement which has been undertaken in general accordance with the IEMA Guidelines for the Environmental Assessment of Road Traffic and National Planning Practice Guidance. That assessment concludes that the impact is minimal with the 80 forecast traffic movements a day equating to an increase of approx. 0.4% on Portland Beach Road. All links where increases are over 10% have been assessed within the EIA.
15.3	Baseline traffic flows – use of 2017 and 2019 data	Paragraph 4.59 The information presented on baseline flows in ES Table 11.3 appears to include data collected in both 2017 and 2019. It is not clear whether the data presented is an average of the baseline flows for the two years or whether some links used 2017 and others 2019. Further explanation is required. Where 2017 data has been used in particular, confirmation is required that there have been no material changes in traffic flows as a result of new development in the intervening period.	Paragraph 11.1 of the Environmental Statement points readers towards the Transport Assessment (TA) for further information on the derivation of traffic flows. Paragraphs 3.21 – 3.36 of the Transport Assessment set out in detail the methodology used to derive baseline traffic flows. The usual traffic growth factors from TEMPro were applied to 2017 data, as outlined in the Transport Assessment, and those growth rates include planned development traffic. In addition the appraisal included cumulative traffic from a series of local developments including everything promoted for development within the Port, much of which has yet to be implemented.
15.4	Baseline flows – annual average daily traffic and total daily traffic figures	Paragraph 4.60 The baseline flows reported in the Transport Assessment (TA) included at Appendix L1 of the ES are inconsistent with those included at Table 11.3 in respect of Link ref 6 (A354 Weymouth Way south of Granby roundabout). It is not clear how the annual average daily traffic (AADT) figures in the ES (Table 11.3) have been calculated or how they relate to the total daily traffic movements quoted in the TA.	It is noted that a transcription error occurred in table 11.3. This has been corrected and does not change the conclusion of the Transport Assessment. A revised table 11.3a rectifying this transcription error is submitted within the Regulation 25 ES addendum document.
15.5	Future baseline flows - justification	Paragraph 4.61 Future baseline flows at 2023 are included at ES Table 11.4 for all vehicles and Table 11.5 for HGVs. It is surprising to note that in the space of four years, the AADT figures for all links are assessed as increased significantly (see table below). For example, in Table 11.3 outbound AADT at Castletown (at port access) (Link Ref 1) has increased by 89% from 333 at the baseline (either 2017 or 2019) to	The large increases in traffic are due to the development already permitted to be able to take place in the Port and are explained in detail in the Transport Assessment paragraphs 6.37-6.40 and Tables 6.8 & 6.9. The future year traffic flows have therefore been correctly derived and take account of the increases in traffic flow due to committed development, notably at Portland Port, in the future baseline. The effects of committed development are fully considered in the Transport Assessment.

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		2,927 by 2023. A similar increase in inbound AADT is also predicted from 333 to 3,877 or 90%. No explanation is provided to justify such an increase, suggesting an error in the reporting of baseline flows.	
15.6	Annual average daily traffic 2023 to 2033	Paragraph 4.62 In contrast to the massive changes in AADT flows in the four years between 2019 and 2023, the change in AADT over the 10 years 2023 to 2033 is much less significant, with flows on most links decreasing (see Table 2 below). The greatest change is on outbound AADT on link 4, A354 Buxton Road (Boot Hill) which sees a 28% increase in flows, all the other flows show a less than 20% change (in most cases, significantly less than 20%). Link Ref 1 sees a 5% reduction in outbound flows between 2023 and 2023 and a 6% increase in inbound flows.	The long term future growth of traffic to 2033 takes into account general background traffic growth since the impacts of both the proposed development and the committed development in the Port and on the Island are considered in the impact assessment to 2023. It is likely that some of the modelled Port development will occur in the period 2023 – 2033 so spreading the traffic impacts over a longer period and reducing the year on year impacts.
15.7	HGV baseline flows	Paragraph 4.63 Whilst future HGV baseline flows are included in the ES (Tables 11.5 and 11.7), no information is included on current baseline flows and therefore it is not possible to determine whether the estimate of future baseline flows is reasonable.	Whilst it is correct that the baseline HGV data was not shown in the reporting, the data itself is included within Appendix B of the Transport Assessment. This indicates the existing HGV flows and % HGV and for site 307 Portland Beach Road shows a 2 way 24hr HGV percentage as 11.2%.
15.8	Baseline flow reporting and assessment conclusion	Paragraph 4.64 On the assumption that baseline flows have been reported incorrectly, it follows that the assessment of traffic impact with the proposed ERF will be incorrect and should not therefore be relied upon.	As outlined in response to earlier points the baseline flows used are reliable and taken from council counts with logical assumptions made to bring data to a common baseline. Dorset Council highways officers will review the calculations and conclude whether or not the assessment of traffic impacts has been undertaken correctly and make recommendations as appropriate.
	Ramblers		
15.9	England Coast Path – impact on traffic	We note that the Stop Portland Waste Incinerator Campaign estimates that there could be an increase in articulated lorry movements of 200% at Castletown. This is the point at which England Coast Path users must cross the road. It is unacceptable for users of a nationally important path to have to contend with such traffic movements.	The additional anticipated lorry movements amount to only around 80 per day as set out in the submitted Transport Assessment. The high increases in traffic quoted are due to potential traffic generation from already permitted development at the Port which may occur in the future. The path crossing the road at Castletown has dropped kerbs and an island which will aid pedestrians crossing on the path but the proposed ERF will cause only one vehicle every 15 minutes to pass the location of the route of any ramblers, which is considered to be a normal level of interaction with traffic and significantly less than that experienced on Portland Beach Road. It is therefore considered that Ramblers would not need to "contend" with the proposed vehicle movements and be able to follow their route in a safe manner.

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16. World Heritage Site

Statutory consultees

Item	Topic	Summary of consultation comment	Applicant response
	Jurassic Coast Trust		
16.1	Visual impact – visible plume and introduction of industrial element to the setting of the WHS.	The overall impact of an operational ERF is not restricted to the presence of the building within the landscape. In spite of the sincere efforts to reduce its visual impacts, there is no escaping that it is a very large industrial building, beyond the scale of what is already at the port. For example, the lighting necessary for a facility of this size, particularly on the stack, means there will inevitably be a change to the balance in how the views out of the WHS are perceived to be of an industrial or natural coastline. Of more significant concern is the potential impact of a visible plume. The LVIA describes a visible plume as having minor effects for a limited time. I would not dispute the limited time element, but it is hard to accept a visible plume as having minor effects, considering that there are no other industrial facilities of this type or scale along the WHS. It would be helpful if the visual impacts of a visible plume were modelled in more detail using existing viewpoints with perhaps additions from the top of Portland itself. This would help greatly in understanding more fully the operational reality of the ERF. In summary, the application deals with impacts on the WHS fairly, with the exception of a detailed model for the visual impacts of a visible plume. My concern is whether or not an industrial development of this scale is appropriate within the setting of the WHS. The impacts of the structure itself on setting are not considered significant, but I question whether this reflects the ways in which an operational ERF might change how people perceive its surroundings as a natural or industrialised landscape	The Jurassic Coast trust response finds that the submitted EIA "deals with impacts on the WHS fairly". Chapter 13 of the ES concerning the WHS, which was based on the conclusions of chapter 7 cultural heritage and chapter 8 landscape, seascape and visual effects, concluded that the proposed development would result in a moderate adverse effect on the OUV of the WHS. The response to the concerns raised in relation to the visibility of the plume is given in the table relating to landscape, seascape and visual effects (table 13). This outlines the additional material and visualisations provided in relation to the appearance of the plume and the night-time effects. The ES Addendum chapter 8 concludes that there will be no change to the significance of effects as originally assessed and as incorporated into the WHS assessment in chapter 13.

Other consultees

Item	Topic	Summary of consultation comment	Applicant response
	The Portland Association		
16.2	World Heritage Site - Incorrect mapping of designations and the WHS	The map produced for 'Fig 9.8 Designations' is not only incorrect, but also misleading. …The mapping of the WHS is also incorrect, the area of WHS from near Smallmouth beach all the way along to Nothe Castle and Weymouth Stone Pier has been omitted from the map in two key visually effected areas, namely Sandsfoot Castle and Nothe Fort.	The WHS boundary shown on figure 9.8 uses the data from Historic England, which shows the correct inscribed area. The section of the WHS between Smallmouth beach and Nothe Fort is shown on the map; the designation at this point consists of a very narrow band along the coast so may not be clearly visible on the map showing the full list of relevant designations. The data is also shown on figure 13.1 in chapter 13 of the submitted ES, for the same 10km radius study area, on which the full extent of the WHS can be seen.
16.3	World Heritage Site - Omission of viewpoints from other areas of the WHS	Although Sandsfoot Castle and Nothe Fort are at least listed as viewpoints, other key areas from this part of the WHS have been omitted, for example the elements omitted from within the Portland Harbour Shore WHS stretch including Rodwell Trail, Castle Cove and Newtons Cove, all popular areas for both residents and tourists and that all enjoy glorious views of the Isle of Portland. Having ignored the WHS/Dorset Heritage Coastline at the closest viewpoints to the proposed site, PfP uses viewpoints much further afield to represent the visual effects from the West Dorset Heritage Coastline and the Dorset and East Devon Coast UNESCO World Heritage Site (VPs 1, 5, 7, 11, 12, and 14). These have	This comment, and subsequent ones, appear to conflate the two separate designations of the West Dorset Heritage Coastline and the Dorset and East Devon Coast WHS. The visual receptors, methodology and viewpoints and photomontages/photowire locations were agreed with Dorset Council and the AONB Partnership. The photomontage / photowire locations were also discussed with the Jurassic Coast Trust in August 2020. The objection queries why the assessment separates the West Dorset Heritage Coastline from the Dorset and East Devon Coast UNESCO WHS despite the fact that they are the same area. This is incorrect. They are two separate areas sometime overlapping. Figure 9.8 illustrates the West Dorset Heritage Coastline as a blue diagonal hatch which extends out into the sea and

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		been rather bizarrely treated as two different study areas, despite the fact that they are the same area, as can be seen by the fact the VPs 7, 11, 12 and 14 are covered in both studies, the only viewpoints not in both, are VPs 1 & 5, yet all of these VPs are part of the same WHS designation. Once again PfP images are taken in a poor light making it impossible to get a true visualisation. As the WHS site study concentrates on only those VPs at the furthest point of the 10km zone, ignoring the closer WHS sites at VP 9 and 10, the WHS is written off as the incinerator "will cause a very minor alteration to the composition of these distant views from the heritage coast, altering a negligible proportion of the field of view", therefore PfP rank the degree of effect as "slight and not significant". Not only is the closest section of WHS omitted, so too is all of the WHS to the west of Portland, which includes the Chesil Beach and The Fleet up to Abbotsbury and beyond. PfP only touch on this area to a very slight degree under their ANOB study, but again there are no VPs in the west.	the Dorset and East Devon Coast UNESCO WHS as a horizontal blue hatch. Each of these areas is assessed in paragraphs 9.142 and 9.143. The photographs have been taken on a number of different days in different meteorological conditions. Each photograph has a date and time and as can be seen in viewpoint 5 (fig 9.22) the photo was taken on the 16 March 2020 on a sunny day compared to viewpoint 8 (fig 9.25) taken on the 18 March 2020 taken in cloudy conditions. These are representative of different weather conditions at Portland. The viewpoints themselves are not assessed as it is the experience of the receptors to the whole of these areas that are assessed. The views are only used as representative examples. Each of these areas is assessed in paragraphs 9.142 and 9.143. The table at paragraph 9.143 describes the geographical extent of views from the WHS as "The visual effects at completion will be localised, with the ERF visible from a number of locations along the Jurassic Coastline, including areas between Weymouth and east beyond the 10 km study area. There will be closer views along the Chesil spit between Weymouth and Portland and parts of the South West Coast Path. The ERF will not be central to the focus of views." The magnitude of change is assessed taking into account a combination of the size/scale, geographical extent, duration and reversibility. The magnitude of visual effects on the experience of receptors visiting the WHS are assessed as negligible adverse and therefore the significance of visual effects are slight and not significant. Abbotsbury is approximately 18km from the application site and therefore 8km beyond the study area. The intention of an ES is to determine the significant residual effects after mitigation. Given the distance the visual effects from Abbotsbury are considered to be not significant and therefore it would not be appropriate to include them within the ES.
16.4	UNESCO – Jurassic Heritage Coast experiential setting	*Guidance from UNESCO describes the need to protect an area around the World Heritage Site, generally referred to as its setting*. In an applied sense, the setting of the Jurassic Coast provides the functional and experiential context for the Site's attributes and should therefore be sensitively managed as part of the protection of OUV. WHS Experiential setting: The setting should be regarded as the surrounding landscape and seascape, and concerns the quality of the cultural and sensory experience surrounding the exposed coasts and beaches. Building a massive plant 201m long by 51m (max) wide by 47m (max high) which is 6m higher than Portland Bill Lighthouse, together with an 80m stack breaking the skyline that from the N/NW direction will be viewed against a backdrop of the sky together with a plume potentially 280m long, will impact upon the experiential setting of the Portland Harbour Shore as well as the Chesil, Fleet and Portland Coast stretches of the WHS.	The relevant UNESCO guidance (Operational Guidelines for the Implementation of the World Heritage Convention, 2019), and material from the Jurassic Coast Partnership Plan 2020-2025; Management Framework for the Dorset and East Devon Coast World Heritage Site is outlined in chapter 13 of the submitted ES which provides an assessment of effects on the experiential setting of the WHS. That chapter concludes that the proposed development would result in a moderate adverse effect on the OUV of the WHS. The Jurassic Coast Trust response finds that the submitted EIA "deals with impacts on the WHS fairly".
16.5	World Heritage Site viewpoints	PfP downplay the value of Sandsfoot Castle, Park and Gardens, and do not mention it is within the Jurassic Heritage Coast. PfP admit the views at VP9 have historical importance as a scheduled monument and Grade II* listed building, ranking the value of the visual receptor as high to medium, but then underestimate the value of the view to visitors, claiming 'receptors' have a moderate interest in the views. PfP's justification for this claim is that the attention of visitors to the castle, park and garden is likely to be on the surrounding landscape, which is of relative importance to the setting of Sandsfoot Castle. PfP underestimate the importance of the view across Portland Harbour to the Isle of Portland, as being an integral and important part of that surrounding landscape. UNESCO states that "the health benefits of spending time in natural environments and near 'blue	The assessment of the receptors visiting Sandsfoot Castle describes that the sensitivity of the visual receptors are high to medium. The LVIA acknowledges that the ERF will break the skyline and will be viewed against the backdrop of the sky, however it will be seen within the context of tall structures within the port, including cranes, ship funnels, lighting columns and radar equipment. The building will form a new visible element to the port and will alter the horizon; however, it is a similar height to the largest ships that berth at the port and does not detract from the height of the Isle of Portland and The Verne, which tower above it.

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		spaces' (the sea) are becoming increasingly clear. Encouraging people to explore the beauty and diversity of the Jurassic Coast offers tremendous opportunities to promote active and healthy lifestyles." Building a massive waste incinerator within this surrounding landscape cannot be considered to be conducive to these values. From Sandsfoot Castle, the waste incinerator will break the skyline and will be viewed against a backdrop of the sky so will stand out as an alien silhouette against the skyline and as such also does not comply with the DC Dorset Landscape Character Type overall management objective to maintain the integrity of the skyline. PfP incorrectly claim this mass will only partially alter the composition of the views, and will form a new visible element to the port, that will alter the horizon but will not detract from the height of the Isle of Portland and The Verne. This is a nonsense, as both with or without the plume, it's size will become the focal point, taking the eye away from Portland Castle a Grade I listed heritage site. The view, is part of the reason people visit this area, to take pictures of the views towards Portland, and is photographed time and time again, however with an incinerator in the middle of it all, this will detract from the view and visitors enjoyment of it. PfP suggests the proposed low illumination levels for the incinerator expects that any obtrusive light in the direction of Sandsfoot Castle to the north would be barely noticeable in comparison to that of the existing port infrastructure, however they have underpredicted the additional impact from red aviation lighting indicators mounted at high level on the stack to meet CAA and MOD requirements.	Night-time baseline photos and montages have been produced in the ES Addendum figures 9.42 to 9.45. Figure 9.43 (viewpoint 9 Sandsfoot Castle) is a photomontage of the night-time effects from within the WHS. The stack will be lit in accordance with CAA and MOD requirements. Although this will be located at the top of the stack there are lights at the top of the Verne on the highest point of the Isle of Portland associated with the prison and the satellite dish clearly visible from Sandsfoot Castle. The traffic lights at the entrance to the Verne that alternate between green, amber and red that are also clearly visible from Sandsfoot Castle. These will be significantly higher than the light at the top of the stack. The lighting will be seen in the context of the existing lighting at the port facilities and has been designed with minimal light spill. This confirms the conclusions of the night-time assessment at completion as negligible from the WHS within chapter 9 of the ES. Refer to ES Addendum for additional information on night-time effects.
16.6	UNESCO – Jurassic Coast	The experiential setting of Chesil, The Fleet & Portland Coast and the Portland Harbour Shore stretches of the WHS Jurassic Heritage Coast will be compromised by the addition of such a large incongruous industrial building in such close proximity these stretches of the WHS. The setting should be regarded as the surrounding landscape and seascape, and concerns the quality of the cultural and sensory experience surrounding the exposed coasts and beaches.	Chapter 13 of the submitted ES provides an assessment of effects on the experiential setting of the WHS. That chapter concludes that the proposed development would result in a moderate adverse effect on the OUV of the WHS. The Jurassic Coast Trust response finds that the submitted EIA "deals with impacts on the WHS fairly".
16.7	World Heritage Site viewpoints & visualisations	Yet another heritage site to be effected and downplayed by PfP is Nothe Fort, which is not acknowledged as being situated within the Jurassic Heritage Coast. PfP acknowledge Nothe Fort is a scheduled monument and listed building and is located at the entrance to Weymouth Harbour, with views towards across Portland Harbour. The views are panoramic, including views of the proposed waste incinerator site, and PfP acknowledge these views are from a landscape containing a heritage asset, ranking the value of the visual receptor as high to medium. However, PfP underestimate the value of the view to visitors, claiming 'receptors' have a moderate interest in the views. PfP's justification for this claim is that the attention of visitors to the castle, park and garden is likely to be on the surrounding landscape, which is of relative importance to the setting of Nothe Fort. PfP underestimate the importance of the view across Portland Harbour to the Isle of Portland, as being an important part of the surrounding landscape. PfP claim the ERF will create very minor alterations to the composition of the view. The ERF will	The LVIA does not state that 'receptors' have a moderate interest in the views from Nothe Fort. We assume that the objector is getting confused between the assessment of Sandsfoot Castle and Nothe Fort. The LVIA acknowledges that there will be panoramic views with views on the southern side towards the site across Portland Harbour. The LVIA assesses the sensitivity as high to medium. The proposals will lie approximately 4.5km from Nothe Fort and will create very minor alterations to the composition of the view, with the development visible in the context of Portland Port, with a steep cliff backdrop. The magnitude of visual effects at

Item	Topic	Summary of consultation comment	Applicant response
		be visible from a small number of locations within the gardens. The degree of effect will therefore be moderate to slight and significant. PfP have underestimated the impacts on this heritage site, and once again have not provided the requested photomontages with and without plume, offering a better visualization of the impact on a waste incinerator at this site. PfP expect that any obtrusive light in the direction of Nothe Fort to the north would be barely noticeable in comparison to that of the existing port infrastructure. The only additional impact would be from aviation lighting indicators mounted at high level on the stack that are needed to meet CAA and MOD requirements, therefore the effects will therefore be negligible and not significant. Once again no photomontage with night lighting has been provided.	completion will be small and therefore the significance of visual effect will be moderate to slight and significant. There were no requests for photomontages from Nothe Fort. The photomontages/photowire locations were agreed with Dorset Council and the AONB Partnership. The photomontage / photowire locations were also discussed with the Jurassic Coast Trust in August 2020. Photomontages from Sandsfoot Castle have been undertaken including plume and night-time montages contained in the ES addendum.

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17. Compliance with development plan

Other consultees

Item	Topic	Summary of consultation comment	Applicant response
	Adams Hendry (on behalf of SPWI)		
17.1	Compliance with DWP Policy 1 (sustainable waste management)	Paragraph 5.6 The Dorset Waste Plan allocates sufficient sites to enable waste to contribute to moving waste up the waste hierarchy and for the Bournemouth, Christchurch, Poole and Dorset area to move towards net self-sufficiency in line with the proximity principle. There is no need for the proposed ERF to enable Dorset to become self-sufficient. As a merchant facility, the proposed ERF will result in Dorset becoming a net importer of waste, with waste being brought to the site from within a three-hour drive time or from further afield by ship and with IBA and APCr being transported to Avonmouth or London. The proposals for the Portland ERF are therefore contrary to Policy 1.	Dorset exports almost all of its residual waste out of county. This is contrary to Dorset being self-sufficient. The allocation of sites in the DWP to provide residual waste treatment does not in itself mean that sufficient (or any) capacity will be delivered to meet the shortfall in capacity as has been proven over recent plan periods. Consents granted for advanced thermal treatment facilities in Dorset have not been delivered. Furthermore, despite allocating sites for residual waste management facilities in previous waste local plans, little significant treatment infrastructure or capacity has been delivered (the only example being the Canford MBT which is an intermediate technology). Theoretically a network of smaller sites with different technologies (as proposed in the DWP) could meet need, however it is unlikely that such a strategy, dependent on advanced thermal treatment technologies or smaller scale traditional thermal treatment technologies would be deliverable. As noted above Dorset has a track record of failed proposals for higher risk technologies and the investment market appetite for ACT/ATT for RDF treatment has further reduced in the past 2-3 years given the increasing number of technical failures which has led to significant losses for investors. We further note that there are multiple examples in the UK of projects that were previously approved for ACT/ATT technology now seeking amendments to the approval to permit conventional ERF technology, similar to that proposed at the Portland ERF, further demonstrating that the broader market does not believe that ACT/ATT is a credible technology for treatment of RDF feedstock. It could be possible that a network of smaller volume ERF plants across the allocated sites could meet the need (i.e. repeats of the Parley proposal, which we note is 30% of the volume allocated in the DWP). However, the ability to finance conventional ERF at small scale (<100ktpa) is limited as the returns achieved do not provide adequate return for the risk profile (due to high fixed capital costs). Given the long term failure to deliver an effective solution for Dorset's residual waste, other than to export this out of the county, it is incorrect to state that there is no need for an ERF to enable Dorset to become self-sufficient. The ERF will enable a significant proportion of Dorset's residual waste to be managed in Dorset and reduce the amount of waste sent to landfill or facilities further away from the waste source, thus being complaint with the waste hierarchy, and proximity principle and self-sufficiency. This fully accords with Policy 1.
17.2	Compliance with DWP Policy 2 (Integrated waste management facilities)	Paragraph 5.7 The positive benefits of co-location and intensification of waste management activities are acknowledged by Policy 2 and the Waste Planning Authority has sought to maximise such opportunities through the allocation of sites in the DWP. In contrast, the proposed ERF will not intensify an existing waste management activity, and neither will it incorporate different types of waste management activities at the same location resulting in waste outputs (IBA and APCr) having to be transported a significant distance to be processed.	The proposed site provides opportunities to link with existing and future complementary activities at the port and energy businesses, with the potential to co-locate with IBA processing in the future if a proposal was progressed. Equally, the intensification of existing waste management sites could lead to the loss of some existing waste management uses.
17.3	Compliance with Policy 4 (Applications for waste management facilities not allocated in the Waste Plan) – criterion a	Paragraph 5.8 Applications for waste management facilities not allocated in the Waste Plan are covered by Policy 4. It makes it clear that proposals for waste management facilities will only be permitted where it is demonstrated that they meet all of the	The applicant does not primarily seek to demonstrate that there is no available site allocated for serving the waste management need that the Portland ERF would also serve, although as presented in the Planning Supporting Statement, there are significant doubts as to whether sufficient treatment capacity will or can come forward on the DWP allocated sites to meet the expected shortfall in residual waste management capacity, given the constraints to

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		criteria listed in the policy. These include that there is no available site allocated for serving the waste management need that the proposal is designed to address or the non-allocated site provides advantages over the allocated site. The DWP was adopted less than a year ago at which point all of the allocated sites were available (see paragraph 6.9 of the DWP). No evidence has been put forward by the applicant to demonstrate that the allocated sites are no longer available or that they would not be capable of serving the waste management need that the proposal is designed to address. This does not mean that the allocated sites should be capable of accommodating an ERF of a similar scale to the proposed Portland facility, rather that it must be demonstrated that the allocated sites are not capable of accommodating a facility e.g. advanced thermal treatment, capable of managing non-hazardous residual waste. The potential for residual waste treatment technologies not involving incineration is specifically noted in paragraph 9.30.	development set out in the DWP itself and the findings of the DWP allocated sites assessment study. This is evidenced by the Eco-Sustainable Solutions proposal for a small scale ERF of around 60,000 tonnes per annum (50,000 tonnes residual waste), on a site which the DWP expects to deliver 160,000 tpa (so c. 30% of allocated level). The Canford site is expected to focus on increasing its RDF production to around 200,000 tpa, providing an intermediate facility for fuel production for an ERF, rather than its own ERF facility and we note the previously consented ACT/ATT project has not been progressed since consent in 2018. There is currently no evidence to suggest that either the Mannings Heath Industrial Estate or the Binnegar Quarry sites will deliver any significant additional residual waste treatment capacity. The assessment of DWP allocated sites was undertaken to demonstrate that the Portland site has advantages over the allocated sites, as required by Policy 4 (criteria a), and as requested by officers in pre-application advice. The proposal is specifically for an ERF to meet Dorset's waste management needs. The DWP does not exclude incineration at allocated sites but rather indicates that there is potential for adverse impact. The DWP adopts a flexible approach and does not preclude any technologies on the allocated sites. On that basis it is entirely appropriate to consider the relative merits of an ERF at the Portland site against allocated sites to demonstrate that clear advantages exist.
17.4	Eco-Sustainable Solutions site	Paragraph 5.9 It is noted that Eco Sustainable Solutions have recently announced proposals for an energy from waste plant at one of the DWP allocated sites at Parley (Inset Map 7) with a throughput of 60,000 tonnes per annum.	Whilst a planning application has been submitted to BCP Council, this is only a proposal at this stage and there is no commitment in planning terms. There is no certainty that permission would be granted or that the facility would be viable and deliverable, and it is noted that the proposals are subject to objections from Bournemouth Airport, on a number of grounds including aerodrome safeguarding. As recognised in the DWP the site is subject to a number of constraints and development considerations that would need to be overcome and there are likely to be significant concerns in respect to the potential for emissions on adjacent Dorset heathlands (protected European sies). If the above planning constraints are mitigated/resolved such that planning is achieved, then there is still significant doubt whether the site will actually be built. Our understanding, from discussions with a number of major waste investors, suggest that raising finance to build a facility of this size would be very challenging as the returns achieved do not provide adequate return for the risk profile (due to high fixed capital costs). Even in the event that planning is achieved, and finance can be procured, such a facility would only address a small proportion of Dorset's residual waste treatment capacity shortfall.
17.5	Compliance with Policy 4 (Applications for waste management facilities not allocated in the Waste Plan) – criterion b	Paragraphs 2.38 and 5.10 No information has been provided to demonstrate that the proposal would not sterilise or prejudice the delivery of an allocated sites that would otherwise be capable of meeting waste needs contrary to criterion (b) of Policy 4. In the event that the proposal for an ERF is successful in dealing with residual waste in Dorset, it may well prejudice the delivery of the allocated sites as they would be required to import waste from greater distances. It has not been demonstrated that the ERF would not prejudice the delivery of an allocated site and therefore the proposal fails criterion (b).	The DWP allocated sites have been allocated because they are deemed to have potential to provide capacity to meet Dorset's residual waste management needs. It is not an absolute requirement that these sites be developed if an acceptable unallocated site comes forward that has significant advantages over allocated sites and can help meet Dorset's needs. The DWP has been written to be flexible to enable sufficient treatment capacity to come forward and recognises that some or none of the capacity attributed to allocated sites may came forward and be delivered. Nonetheless, the planning application demonstrates that there are substantial volumes of residual waste available in Dorset (both municipal and C&I) and elsewhere within the catchment and by sea that far exceeds the capacity of the ERF, such that it would not prejudice the development of other similar facilities on allocated sites. DWP paragraph 6.12 requires proposal for unallocated sites not to sterilise or prejudice their development for 'other or similar waste management needs'. Assuming that the Eco-Sustainable Solutions proposed ERF at Parley is permitted, funded and constructed, this would provide a modest contribution of 50,000 tpa of residual waste treatment capacity (c. 30% of the 160,000 tpa expected), against a stated DWP need of

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			234,000 tpa, Some 174,000 tpa of capacity would still need to be found for manging Dorset's residual waste alone. Given the nominal capacity of the Portland ERF is 183,000 tpa, and around 25% of the plant capacity might be expected to come by sea, it is clear that the amount of residual waste potentially available to the Portland ERF far exceeds its capacity and would not prejudice other facilities coming forward on allocated sites. This conclusion is reinforced by the capacity gap analysis detailed in the Waste Need Paper in respect to the ERF waste catchment. Furthermore, the application makes clear that the proposed Portland ERF would not physically sterilise the allocated sites or prevent other waste management uses from occurring on those sites. The allocated sites will have an important role to play in terms of maintaining and expanding existing operations for waste recycling and recovery and potentially to process residual waste to produce RDF. The operator of the existing Canford MBT facility, and fuel supply partner to the applicant, is preparing to increase the RDF throughput of the facility from 125,000 tpa to around 200,000 tpa, demonstrating how existing waste management sites, facilities and activities can be expanded, as part of an appropriate integrated network of waste management facilities linked to the proposed Portland ERF, if consented and built. The proposed ERF is more likely to stimulate investment and delivery of waste uses on DWP allocated sites, then prejudice it. The assertion that the ERF would prejudice delivery of facilities on allocated sites is therefore speculative, as is the claim that they would need to secure waste from greater distances. The proposed ERF accords with Policy 4 criterion b.
17.6	Compliance with Policy 4 (Applications for waste management facilities not allocated in the Waste Plan) – criterion c Compliance with the proximity principle	Paragraph 2.39, 2.40 and 5.11 As a merchant facility, the ERF would take in waste from outside Dorset, indeed, it would appear that the majority of waste processed at the site would be from outside Dorset. The fact that the waste catchment has been set at a 3-hour drive time certainly does not accord with the proximity principle. A facility at Portland would not only draw in waste from outside the county, 75% of the waste managed on the site would arrive by road. A coastal location for a facility that is mainly served by the road network cannot be considered to be the most appropriate in terms of the proximity principle. An inland location would likely have a smaller waste catchment, as acknowledged by Tolvik. The proposal does not therefore meet criterion (c) of Policy 4.	The waste need statement confirms that there are large volumes of residual waste arisings in Dorset that would fulfil the ERF capacity. However, as a merchant facility if there is spare capacity available this could be used for residual waste derived from the wider catchment, as is common with many similar UK facilities. All ERF have a defined potential catchment area by road, beyond which it is entirely reasonable to expect that waste would be managed by other facilities due to higher transportation costs, and in line with the proximity principle. The 25/75 ratio between sea and road delivery provides a reasonable likely scenario, although the ratio between road and sea will depend on the commercial availability of waste and the amount of waste arriving by road will vary and may be less than 75%. Conversely the amount of waste arriving by sea may be more than 25%. It is incorrect to say that most waste would be derived from outside Dorset given the significant predicted shortfall of required capacity in Dorset. Waste typically flows across waste authority administrative boundaries depending on the waste market. The Portland ERF will provide sufficient capacity for a significant amount of Dorset's residual waste to be managed in Dorset but there will remain some volumes that will continue to need to be managed out of county (as is currently the case for 100%). It is possible that the Canford RDF facility expansion could result in this facility supplying c. 80% of the ERF's capacity, derived from Dorset waste. The Portland ERF has received letters of intent from Beauparc, as owner of the Canford facility, that indicate RDF produced at Canford would be supplied to the Portland ERF if that facility was available. However, if for whatever reason some or all of Dorset's residual waste continues to be exported out of county, it is entirely reasonable for the Portland ERF to manage residual waste arising from outside of Dorset on the basis that Dorset would be able to demonstrate that it is achieving overall net-self-sufficiency in managing its residual waste arisings. A coastal location with access to a port is a significant locational benefit and the proposed site is well placed to serve Dorset in line with the proximity principle. Dorset's current practice of exporting waste out of county is clearly contradictory to the proximity principle and also self-

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			sufficiency. The application demonstrates compliance with the proximity principle and spatial strategy in line with Policy 4 criterion c.
17.7	Compliance with Policy 6 (Recovery facilities) Treatment of IBA and APCr)	Paragraph 2.24 to 2.26 and 5.12 The Planning Statement suggests that the facility is compliant with Policy 6 on the basis that IBA and APCr will be transported to appropriate licensed facilities as close as possible to the site. This is not what is required by the policy, rather it specifically requires processing facilities for IBA to be located at or close to the source of the waste arising. Incinerator bottom ash (IBA) will be sent to a company in either London or Avonmouth, while the Air Pollution Control residues (APCr) will be sent to a company in Avonmouth. This will require residues arising from the facility to be transported a considerable distance. The proposal is not compliant with Policy 6 because it requires processing facilities for IBA to be located at or close to the source of the waste arising.	Residual materials will be sent to specialist reprocessing facilities, with the port location enabling residual material to be transported by water sustainably and therefore avoiding the traffic movements that would be experienced at any of the allocated sites. The proximity principle requires waste to be disposed of, or recovered, in one of the nearest appropriate installations by means of the most appropriate methods and technologies. The ERF in sending residues to the nearest appropriate installation fully accords with the proximity principle.. A small number of specialist IBA facilities exist that receive and process the residual material taking advantage of economies of scale. Whilst some larger scale ERFs have on site IBA processing facilities, others commonly do not and transport material to a specialist facility by road. The Portland site provides the opportunity for IBA to be transferred sustainably by water to specialist recycling facilities. This is entirely in accordance with the principle of the policy, which is to ensure the most sustainable treatment of residues both in terms of the method of treatment (in this case recycling) and method of transport (in this case transport by sea). The DWP and specifically Policy 6 could not have reasonably anticipated that a site located within a commercial port would come forward for an ERF and its wording does not recognise the sustainability advantages of moving IBA by sea, reducing the need for transportation of material by road and its associated environmental effects, which is the clear driver behind this policy requirement. Further information on the transportation of IBA by ship and potential destinations is provided in the submitted IBA note. The applicant is willing to accept a suitable worded planning condition, requiring the transportation of IBA to specialist reprocessing facilities by sea. Notwithstanding this, the applicant is committed to a planning obligation to review future options to establish a IBA/APCr reprocessing facilities at or in close proximity to the site (see above). Furthermore, the objection ignores the clear future potential at Portland for establishing local facilities to treat residues.
17.8	Compliance with Policy 12 (Traffic and access) Baseline reporting	Paragraph 5.13 Policy 12 relates to transport and access. Given the suspected anomalies regarding the reporting of baseline flows, it is not possible to understand the impact of the proposed development on the road network.	Refer to response provided to Table 15, Items 15.3 to 15.8 (paragraphs 4.59-4.64)
17.9	Compliance with Policy 14 (Landscape and design quality) Durability and effectiveness of PVC mesh, and form, scale and mass of the plant	Paragraph 5.14 Landscape and design quality are covered by Policy 14. It states that proposals for waste management will be permitted where they are compatible with their settings and would conserve and/or enhance the character and quality of the landscape. This should be achieved through, among other things, appropriate use of scale, form, mass and materials. The use of PVC mesh to screen the building needs further evidence to show that it will be durable and effective in the long term. As discussed in the previous section on landscape and visual effects, the scale, form and mass of the proposed plant are entirely inappropriate for this prominent and sensitive location. This is contrary to Policy 14 of the DWP.	As stated in the Planning Supporting Statement (Table 6.1), the ERF has been carefully and sensitively designed, with guidance from Dorset Council landscape officers, to minimise visual impact on the local setting and character and wider views from designated landscape areas such as the AONB and the WHS. The design reflects the local geology of Portland and its immediate cliff setting, with this also translated into the use of appropriate cladding materials to provide a high quality building that provides a landscape feature, but also successfully blends into its surroundings to limit visual impact. The ES (Landscape and Visual Impact Assessment) recognises that whilst the development would result in some impact, overall this is deemed to be acceptable and to statutory consultees. Further information in respect to durability and environmental performance is provided in respect to external cladding material in the DAS addendum. Further discussion will be held

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			with officers to consider the most appropriate materials, including use of samples and further information on durability and maintenance, and this can be controlled by means of condition. The proposals are considered to accord with Policy 14.
17.10	Compliance with Policy 19 (Historic environment)	Paragraph 5.15 and 5.16 Policy 19 relates to the historic environment. It requires applicants for proposals for waste management facilities to demonstrate that heritage assets and their settings will be conserved and/or enhanced in a matter appropriate to their significance. Table 7.3 of the ES shows that the proposed ERF will have an adverse effect on a number of designated heritage assets including the breakwater and former dock offices and the East Weare batteries as well as the Grade II* Verne Citadel and Portland Castle. This is contrary to Policy 19 of the DWP.	As stated in the Planning Supporting Statement (Table 6.1), the ERF will result in some change to the setting of heritage assets, with this being within the slight to moderate range of significant adverse effects. Overall, the proposed ERF would not lead to any substantial adverse effects on heritage assets. Where harm does exist to the setting of heritage assets this is considered to be less than substantial harm in context of the NPPF. Further discussion with Dorset Council's heritage officer has identified potential for mitigation that will deliver significant public and heritage related benefits that will off-set any harm caused to heritage assets as a result of the proposed development. A framework heritage mitigation strategy has been submitted to Dorset Council, and these measures are now included in the ES Addendum as appropriate mitigation. These measures comprise a programme of works that will enable the East Weare E Battery scheduled monument and listed building grade II to be removed from the Historic England 'at risk register' and provision of a permissive public right of way, reconnecting existing rights of way, to facilitate public views and interpretation of the heritage features present along the East Weare, and facilitating an around Portland walking route. On this basis the proposed ERF would not be contrary to the provisions of Policy 19.
	Freeths (on behalf of The Portland Association)		
17.11	Compliance with Policy 4 (Applications for waste management facilities not allocated in the Waste Plan) – criterion b	Page 5 The key component of this test is whether the proposed development would prejudice the delivery of allocated sites that are otherwise capable of meeting waste needs. The Applicant provides no evidence for meeting this part of the criterion. After concluding that the scheme would not sterilise an allocated site they simply remark "Neither would the proposed ERF prejudice the existing activities taking place at any of the four sites identified as being suitable for the management of non-hazardous wastes or preclude the development of future management activities." It is important to remember that the Waste Plan is recently adopted and is less than a year old. The sites allocated in the Waste Plan have been done so to meet an identified need. The shortfall identified is 232,000 tpa. Total potential capacity within the four Allocated Sites amounts to 385,000 tpa, exceeding the identified needs of the Plan area. If you compare the potential residual waste capacity for each of the four sites allocated for the management of non-hazardous waste to the proposed development, it is clear that there is significant potential for the proposed development to prejudice the delivery of one or more allocated sites. • 7 - Eco Sustainable Solutions, Chapel Lane, Parley: 160,000 tpa • 8 – Land at Canford Magna, Magna Road, Poole: 25,000 tpa • 9 – Land at Mannings Heath Industrial Estate, Poole: 100,000 tpa • 10 – Binnegar Environmental Park, East Stoke: 100,000 tpa	The DWP allocated sites have been allocated because they are deemed to have potential to provide capacity to meet Dorset's residual waste management needs. It is not an absolute requirement that these sites be developed if an acceptable unallocated site comes forward that has significant advantages over allocated sites and can help meet Dorset's needs. The DWP has been written to be flexible to enable sufficient treatment capacity to come forward and recognises that some or none of the capacity attributed to allocated sites may came forward and be delivered. Nonetheless, the planning application demonstrates that there are substantial volumes of residual waste available in Dorset (both municipal and C&I) and elsewhere within the catchment and by sea that far exceeds the capacity of the ERF, such that it would not prejudice the development of other similar facilities on allocated sites. DWP paragraph 6.12 requires proposal for unallocated sites not to sterilise or prejudice their development for 'other or similar waste management needs'. Assuming that the Eco-Sustainable Solutions proposed ERF at Parley is permitted and was able to raise finance to allow construction, this would provide a modest contribution of 50,000 tpa of residual waste treatment capacity (c. 30% of the 160,000 tpa expected), against a stated DWP need of 234,000 tpa, Some 174,000 tpa of capacity would still need to be found for manging Dorset's residual waste alone. Given the nominal capacity of the Portland ERF is 183,000 tpa, and around 25% of the plant capacity might be expected to come by sea, it is clear that the amount of residual waste potentially available to the Portland ERF far exceeds its capacity and would not prejudice other facilities coming forward on allocated sites. Furthermore, the application makes clear that the proposed Portland ERF would not physically sterilise the allocated sites or prevent other waste management uses from occurring on those sites. The allocated sites will have an important role to play in terms of maintaining and

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		• Proposed Development at Portland: 202,000 tpa The proposed development has the capacity to meet 86% of the total identified shortfall and amounts to 52% of the capacity that could be derived from allocated sites. It is far larger than 3 of the 4 allocated sites and if permitted will clearly have a prejudicial impact on some or all of the allocated sites coming forward, as a significant proportion of need will be met by the proposed development. The proposed development is contrary to criterion B.	expanding existing operations for waste recycling and recovery and potentially to process residual waste to produce RDF that could be processed at Portland. Indeed, it is understood that Beauparc, the owner of the existing Canford MBT facility, is planning to increase the throughput of the facility from 125,000 tpa to around 200,000 tpa, demonstrating how existing waste management sites, facilities and activities can be expanded, as part of an appropriate integrated network of waste management facilities - we refer to the Beauparc letter of intent which makes it clear Beauparc expect to supply a large volume of RDF to the Portland ERF that will be local source waste. The proposed ERF is more likely to stimulate investment and delivery of waste uses on DWP allocated sites, then prejudice it. The assertion that the ERF would prejudice delivery of facilities on allocated sites is therefore speculative, as is the claim that they would need to secure waste from greater distances. The proposed ERF accords with Policy 4 criterion b.
17.12	Compliance with Policy 4 (Applications for waste management facilities not allocated in the Waste Plan) – criterion c Compliance with the proximity principle -	Page 6 It is evident that the site's location does not support the spatial strategy of the Waste Plan. Its location is far removed from the area where strategic provision should be concentrated and the scale of the proposed development fundamentally undermines the strategy. The proposed development is of a size that should have been considered as part of the development plan process. To approve a development with a capacity of managing residual waste accounting for approximately 86% the size of the need for the Waste Plan area up to 2033, in a location at odds with the spatial strategy within a year of adoption of the Waste Plan, would unarguably undermine both the spatial strategy itself and any public confidence in the Plan led system.	Chapter 6 of the Planning Supporting Statement (paragraphs 6.35 to 6.59) addresses the proximity principle generally and at the Dorset, regional and national context. Paragraphs 6.60 to 6.72 then consider the proposal in context of the DWP spatial strategy. These demonstrate how the proposed Portland ERF will help Dorset to ensure that its residual waste is managed within Dorset, as opposed to the current practice of exporting waste out of county to landfill or other ER in the UK or Europe. The DWP Inspector recognised that the purpose of allocating sites was to "facilitate the treatment of an increased tonnage of waste to enable recovery within the County instead of transporting waste to landfill or recovery facilities outside Dorset, as happens at present". Whilst the Inspector noted that the plan has identified strategic requirements for residual waste management and recycling and allocates sites to meet those requirements, which are well related to the sources of waste, it is explicitly made clear in the DWP that some or all of those allocated sites might not come forward and deliver the necessary capacity. The DWP also recognises that additional capacity may be appropriate elsewhere to ensure that the capacity gap is adequately addressed, and Policy 4 specifically permits waste management facilities to come forward on unallocated sites where these can demonstrate significant advantages over allocated sites and meet specified criteria. The DWP Inspector (paragraph 56) fully recognises the need for this flexibility and supports the approach provided allocated sites are not prejudiced and where unallocated sites offer advantages such as the provision of heat and energy sources. This comment seeks to apply the proximity principle in a rigid and inflexible way that fails to recognise that most of Dorset's residual waste is exported out of county to landfill or ERF facilities elsewhere in the UK or abroad. This clearly contrary to the proximity principle (and self-sufficiency). This is specifically what the DWP inspector sought to address. Whilst the DWP identified sites near to the main south east Dorset conurbation, as this is where a significant proportion of residual waste arises, it also accepts that these sites are constrained and therefore some or all of these allocations, might not deliver the required capacity. To address this the DWP provides further flexibility in recognising that other unallocated sites may bring significant advantages. The DWP takes a positive and flexible approach to ensuring that sufficient waste capacity is provided in Dorset to meet its needs over the plan period. Whilst it is recognised that the Portland ERF site is not as close to the south east Dorset conurbation as the allocated sites, this does not mean that the proposed development is contrary to the proximity principle or the spatial strategy, in so far as this would result in significant advantages by facilitating shore power and district heating and would provide a final treatment facility for RDF material produced at facilities located on allocated sites (such as Canford). It is noted that the allocated sites, for the planning and investment challenges noted elsewhere, are unlikely to be able to provide such a treatment facility for significant volume of Dorset source RDF and therefore, absent the Portland ERF, this will continue to be exported much

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			further to out of county facilities, therefore displacing waste from those areas that would need to be processed in other out of county areas and, ultimately, resulting in additional landfill volumes in the UK context. Residual waste arising from the main conurbation can be subject to further pre-treatment to remove recyclable materials close to its point of arising, further reducing its weight and volume prior to transporting the final RDF to Portland. As set out in the revised Carbon Assessment, the benefits of providing shore power and/or heat at Portland outweigh any modest carbon emissions associated with transporting RDF to Portland. The proposal does not fundamentally undermine the spatial strategy as is being suggested. This comment also questions the scale of the proposed ERF in respect to the DWP need to 2033. The ability of the proposed ERF to meet much of Dorset' need should be considered as a positive in providing certainty that Dorset's residual waste can in future be managed in Dorset subject to commercial contracts. This comment also fails to recognise that whilst the facility has been sized to meet Dorset's residual waste needs (and is well located in Dorset to do so) it is also a merchant plant with capability to accept waste from within its catchment area and by sea from other locations. In respect to the proposed ERF's scale in context of the development plan process and adoption date, it is entirely reasonable for unallocated sites to come forward for consideration through the planning application process, where they were not identified or deemed to be available at the time that the development plan was being prepared and was adopted. The DWP process could only take account of the available evidence at the time that the plan was being prepared.
		It is noted that the PS in assessing compliance with criterion 'c states *"Planning Inspectors have placed importance on the ability of EfW proposals to contribute to the underlying objectives of national and local waste policy and plans as a part of a balance. Less importance is placed on whether proposals accords precisely with a prescribed or envisaged spatial strategy".* Firstly, we would suggest that this statement is contradictory as an underlying objective of local waste policy would be compliance with a spatial strategy. A spatial strategy is the bedrock on which a development plan is based and the development plan is the first consideration of any development proposal. Secondly, it is clear from this statement that the Applicant recognises that the proposed development does not accord with the Waste Plan's spatial strategy. Finally, the suggestion of Planning Inspector's placing weight on certain factors is a completely generic statement with no reference to appeal decisions demonstrating any evidence to support this contention. Paragraph of 3.16 of the Waste Local Plan states *"The principle of proximity means that wastes should be recovered or disposed of <u>as close as possible to where it is produced</u> (our emphasis) and has been another important driver for the Waste Plan".* It is apparent from the geography of the site and its relationship with the wider district that the scheme fails the principle of proximity. This is perhaps best illustrated by the application of a 3 hour HGV drive time catchment area, in which the Applicant base their Need Assessment (Figure 6.1). This includes a number of large urban areas, including the Bournemouth, Christchurch and Poole conurbation, Weymouth and Portland, Exeter, Taunton, Yeovil, Salisbury, Southampton, Winchester, Eastleigh and Havant. The Need Assessment comments *"There is a pressing need for Dorset to reduce its reliance on the export*	Paragraph 6.67 to 6.69 of the Planning Supporting Statement refer to the Avonmouth Resource Recovery Centre appeal decision from 2011 and includes a footnote appeal reference (Appeal Reference APP/Z0116/A10/2132294). As per paragraph 6.67, this is an example where the Inspector considered compliance with a spatial strategy with a wider set of sustainability considerations. The reference to this example is intended to demonstrate that compliance with a spatial strategy, which as paragraph 6.69 states must be balanced with the strategic objectives that inform and direct the overall spatial strategy for waste management. In that the Inspector held that <u>waste miles are not an overriding factor</u> when balanced against other benefits of reduced landfill and low carbon energy. This comment seems to be suggesting that decision makers, including Inspectors are bound to give priority to consideration of spatial strategy over other considerations. Clearly, given this appeal decision that is not correct. Furthermore, in referring to this example the applicant is not recognising that the proposed development does not accord with the DWP spatial strategy (as is being suggested by this comment) but highlighting that in this case waste miles should not be an overriding factor when balanced against other benefits. It simply recognises that just because a site (such as an allocated DWP site) is closer to the main area of waste arisings than the Portland site, the latter is not necessarily contrary to the spatial strategy as waste miles should not be an overriding factor. The application identifies a 3 hour HGV drive time catchment area from which the proposed ERF could reasonably attract residual waste, on the basis that the facility could represent one of the nearest appropriate installations (as per the proximity principle). That is not to say that waste from within all of this area and the urban areas, would come to the Portland ERF but rather it could if the market dictates that to be economically viable to do so. Given the confirmations provided by Beauparc, the owner at Canford and the only significant producer of RDF in Dorset, that it plans to increase its capacity and that it would expect to supply a large volume to the Portland ERF, it is possible that c. 80% of the Portland ERF RDF supply could be provided from Dorset waste (ignoring any potential for increase in RDF

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		of residual waste, become more self-sufficient and treat more of its residual waste in Dorset closer to where it arises, in accordance with the proximity principle". However, the need argument is based on a much wider catchment and further the site's coastal location and distance from the main urban areas of the district mean that it is ill placed to deal with the waste derived from Dorset. The application seeks to give weight to addressing issues of waste management wider than the Dorset authority area. It sets out that the split of waste management is *"likely to be around 75% by road and 25% (around 50,000 tonnes) by sea. This would equate to around 20 ships a year and these ships would most likely be travelling from Northern Ireland, Republic of Ireland and other UK ports".* In short the application presents a clear contradiction. On the one hand it professes to adhere to the proximity principle by resolving outsourcing of Dorset's waste, despite it being poorly located to the principal urban areas of the District, but it is also reliant on a catchment area for need that covers 50% of the area of Devon, Somerset, Wiltshire and Hampshire. It is clear that the above strategy does not adhere to the proximity principle and the application seeks to address deficiencies in compliance with the Waste Plan by purporting to contributing to addressing wider issues of waste management on a more regional or national scale.	production elsewhere in Dorset in the future). As such it is reasonable to assume that if local parties act economically rationally, then a significant proportion of the Portland RDF supply should be Dorset source waste. It is incorrect to state that the need case is predicated in securing waste from the wider 3 hour HGV drive time catchment, given that the Waste Need Statement clearly demonstrates that there are large volumes of residual waste arising in Dorset alone to serve the proposed ERF, irrespective of the potential for residual waste to be secured from its defined terrestrial catchment area and from further afield by sea. The Waste Need Paper provides a detailed analysis of the residual waste arisings and capacity in the catchment area to demonstrate this. The application is very clear that whilst the proposed Portland ERF is located in Dorset and has been sized to meet Dorset's residual waste need in Dorset (as opposed to current practice to export waste to other counties) in line with the proximity principle. However, as a merchant plant is also has the capability to secure residual waste from its catchment and from elsewhere by sea. There is no contradiction here in respect to need (as this comment suggests), in so far as the proposed ERF can meet Dorset's need, and contribute towards meeting regional and national need. This comment fundamentally fails to understand the nature of a merchant plant, which must be free to secure its waste from within the waste market, recognising that because of its location within Dorset it is extremely well placed to secure waste from Dorset (depending on future contracts). However, this does not prevent the Portland ERF from managing waste from its defined catchment area or from further afield where this waste might otherwise go to landfill or be exported to Europe, contrary to the waste hierarchy, self-sufficiency and the proximity principle.
17.13	Compliance with Policy 4 (Applications for waste management facilities not allocated in the Waste Plan) - conclusion	Policy 4 requires compliance with each criteria. It is evident that the scheme fails against each of criteria a-c of the policy. The proposed development would substantially harm the spatial strategy of the development plan and would prejudice the ability of other recently allocated sites to come forward to meet a waste need. The comparison exercise between allocated sites and the proposed development has not been undertaken in a fair and rational manner and there are significant flaws in the methodology and hence the conclusions of that exercise	As set out in the responses above the proposed Portland ERF is compliant with Policy 4 (criteria a to c), in so far as it would be complementary to the spatial strategy, in line with the requirements of the proximity principle and would certainly not be harmful. Neither would it prejudice the ability of the allocated sites to come forward to provide waste management treatment capacity. The comparative assessment for the reasons given has been undertaken using a robust methodology that has been tested at inquiry and found to be sound and the suggestion in this comment that the methodology, outcome and conclusions are flawed is strongly refuted.

Appendix A: Response to UKWIN Planning Application submission

Appendix B: Summary response to public comments

Appendix B: Summary response to public comments

Item	Topic	Summary of consultation comment	Applicant response
1.	*Air Quality*		
		• There will be a continuous stream of poisonous residue, hazardous to local residents whichever way the wind blows • The increase in gaseous air pollutants, produced as a direct result of road traffic, contribute to the formation of other air pollutants such as ozone, acid rain and particulate matter • The proposed site is unsuitable given the close proximity of houses and the prison area, which appears to be above the proposed chimney height. During certain meteorological conditions pollution will blow over residences rather than be dispersed, with higher concentrations of pollutants increasing the incidence and severity of respiratory illnesses. • There are numerous risks to public health associated with these plants, from various pollutants and particulate some of which are extremely hazardous, and highly toxic/ carcinogenic at very low concentration levels. The siting of such a facility close to a local population including schools, a hospital, elderly residents, people with breathing difficulties and allergies is considered to be a high risk as is the potential exposure of young children and babies to extremely toxic substances. • There are serious concerns over the validity of the air quality monitoring submitted with the application and whether this properly accounts for the geography of Portland. • There is no evidence of any comprehensive wind studies of the impact on emissions plume that is directly influenced by an adjacent 'cliff' face, which also rises above the top height of the chimney and no evidence that the height of the chimney has been modelled to ascertain the best plume outcomes. The air quality assessment is therefore not robust. • The direction of the wind has been modelled incorrectly and the modelling is flawed by the meteorological date used and so cannot be relied upon • The meteorological conditions encountered at Portland, such as low lying cloud, sea mists, fog etc will prevent the effective dispersion of toxic particles and emissions, leading to the deposition of pollutants • The air quality modelling does not employ the ADMS complex terrain option. • Emission control is most effective when the feedstock is of a consistent composition. In practice, the operator will use whatever waste streams they can secure, resulting in less efficient pollution control. • Incinerator plants emit more sulfur dioxide, nitrogen oxides and carbon dioxide per unit of electricity generated than power plants burning natural gas • Diesel emissions from the waste transfer lorries would add to the already high levels of emissions on Boot Hill (Rodwell Road)	The effects of emissions from the proposed ERF have been fully assessed through the submitted ES (refer to chapter 4 of the ES) and Human Health Risk Assessment (HHRA) and Health Impact Assessment (HIA) have also been submitted. The flue gases will undergo a series of treatments that will clean the gases to a safe level before they are released to the environment. Modelling undertaken for a range of pollutants that will be emitted from the ERF showed that there will be no significant effects on air quality because of emissions from the proposed development. The submitted ES addendum, with updated air quality information and HHRA/HIA provides further information in these respects, demonstrating that the shore power provision will result in a reduction in pollutants arising from ship engines. The air quality modelling has been undertaken using an advanced model (ADMS 5.2). ADMS is routinely used for modelling of emissions for planning and Environmental Permitting purposes to the satisfaction of the Environment Agency and local authorities. The air quality model applies meteorological data for Portland and takes account of the topography and meteorological conditions at the proposed development site. The model does not indicate any concerns in respect to emission levels to air or impact on public health in respect to residential areas or the Portland prisons. Whilst the health concerns raised are noted, the emissions will also be subject to stringent controls under the Environmental Permit with input from Public Health England (PHE) in respect to safeguarding public health, to ensure these are well within permitted levels. It is not for the planning regime to seek to replicate or depart from this position. PHE's position (October 2019) is that modern, well run and regulated municipal waste incinerators are not a significant risk to public health. While it is not possible to rule out adverse health effects from these incinerators completely, any potential effect for people living close by is likely to be very small. This view is based on detailed assessments of the effects of air pollutants on health and on the fact that these types of facilities make only a very small contribution to local concentrations of air pollutants. The proposed ERF is designed to meet the new BREF Guidance and as such will be one of the most modern and up to date facilities of its kind in the UK. It will also need to comply with the BAT requirement. The ERF has been designed to manage RDF as its feedstock and therefore all RDF will need to be provided to an agreed composition and specification. Fuels outside of this will not be used.

Item	Topic	Summary of consultation comment	Applicant response
2.	*Carbon Dioxide and Greenhouse Gases*		
		• Off-setting the vast amount of CO_2 this development would produce is not credible, could not be enforced and is not a solution to this environmentally destructive proposal • The release of more than 550 tonnes per annum of CO_2 will be released each day onto the land and seas • Off-setting is unrealistic and immoral. Tree planting may not be successful and off-setting via purchase of carbon credits is likely to occur remotely from where the impact is caused impacting on those who are not responsible for causing climate change • The generation of huge amounts of CO_2 is a threat to national recycling goals and will require the importation of waste from other countries • Tree planting is impractical, and trees do not grow on Portland • Incineration can never be considered 'low carbon' as the process of burning waste results in high levels of greenhouse gas emissions with a higher carbon intensity than the conventional use of fossil fuels. • There is no commitment to carbon capture and storage • The project should aim to be 'zero-carbon dioxide equivalent' rather than net-zero	Paragraphs 6.302 to 6.313 of the Planning Supporting Statement set out the applicant's approach to achieving net-zero carbon. Whilst the proposed ERF will give rise to CO_2 emissions, the comments made in respect to CO_2 ignore the fact that the recovery of energy from waste can significantly reduce net GHG emissions in comparison to the alternative of landfill. Furthermore, the provision of shore power and the ability to supply a district heating network will lead to further net reductions in carbon. The applicant has committed to ensuring that the ERF will be net zero carbon over its lifetime. Whilst the facility is expected to operate as net carbon positive (it off-sets more carbon that it emits) at the point it is determined that it is operates as net carbon negative, the applicant would commit to purchasing carbon credits to off-set its carbon emissions. This can be achieved in various ways as set out in the submitted Achieving Carbon Neutrality Report. There are many different carbon credit generating projects across various sectors and whilst tree planting is one option there are many others. Carbon-offsetting through the use of carbon credits is a credible and recognised method for helping to reduce carbon emissions. It is not impractical or immoral as has been suggested. The applicant is willing to back up its net zero commitment by entering into a legal agreement to ensure that the proposed ERF actually does achieve carbon neutrality. The applicant has previously stated in the Planning Supporting Statement that it is prepared to consider the incorporation of appropriate carbon capture and storage (CC&S) technologies to the ERF should these prove to be technically and economically viable. Further consideration has been given to carbon capture and further information is provided in the carbo capture paper submitted as part of the Regulation 25 submission to Dorset Council. This confirms that as and when CC&S technology has matured to a sufficient stage and becomes commercially viable, the proposed site at Portland is ideally located to accommodate CC&S, because of its location advantage at a port for the storage and transport of captured carbon and the availability of industrial port land to accommodate land based infrastructure. Other alternative locations in Dorset do not enjoy these benefits. The introduction of CC&S when viable, which is supported by the applicant in principle, would allow the Portland ERF to move towards zero-carbon equivalent rather than net-zero carbon. In respect to low carbon, government policy is to move to zero landfill, and energy recovery from residual waste is regarded as part of the range of measures which are to be deployed to reach that aim. It should be recognised that ERFs are for planning policy purposes, a 'low carbon' energy source, even if they are not a 'no carbon' energy source and therefore are encouraged by existing policy as part of the move to address the climate change emergency. It must also be recognised that energy recovery from residual waste forms part of a set of initiatives designed to de-carbonise energy compared to the burning of fossil fuels and also treat residual waste that would otherwise be going to landfill. Whilst it is accepted that a proportion of residual waste will be fossil fuel derived, it must also be recognised that this waste and its associated carbon already exists

			as a waste and therefore must be managed. By managing this waste through ERF, this existing carbon can be beneficially used to replace energy derived from more conventional fossil fuels.
3.	*Natural Heritage*		
		• Heavy metals build up inside living organisms over a lifetime creating both physiological and psychological effects. Not only will this effect human life but also plants marine life wildlife their environment and diverse sites of ecological importance • Emissions to air from the plant will impact upon areas of conservation where wildlife, animals and plants live • This area is extremely rich in rare lichens and bryophytes (mosses) and these ecosystems are sensitive to nitrogen. The proposals will have an adverse impact on the SAC/SPA and a precautionary approach should be adopted given the risk to local ecology and biodiversity • Portland is home to several protected species. These include scarce and threatened moths and the protected Silver studded blue butterfly. Nitrogen emissions from the plant and the extra traffic will adversely affect grasslands and the habitat of these protected species. • The Fleet is a nature reserve, with migrating birds and rare species, the proposed facility could have an adverse impact on this habitat • The assessment of air quality impacts of the proposed ERF has been shown to contain major flaws and deficiencies. As a consequence, the predicted impacts on internationally and nationally designated wildlife sites cannot be relied upon. • The ES has ignored the value of open mosaic habitat within the proposed development site. • Portland Sea Lavender, Limonium recurvum, has evolved to grow in the cliffs of Portland and exists nowhere else. This will be severely impacted upon by emissions (both gases and particulates). • The chimney stack will vent directly onto rare and precious limestone and grasslands • The migration of birds is something that could be seriously affected by this proposed development • The plant is close to several SSSI, areas of SAC and Marine Conservation Zones • There has been no bat survey • The proposal could impact upon the Chesil and Fleet SAC and protected eel grass species	Potential impact on ecology, including protected habitats and species has been assessed through the ES (chapter 10). This has concluded that the proposed development would not give rise to any significant adverse effects on designated sites by means of its construction or operation. This takes account of the detailed air quality modelling undertaken to consider the potential levels of emissions to air and deposition. The air quality modelling has been undertaken by specialist consultants, using accepted methodology and modelling by the Environment Agency, and is considered robust for purposes of considering potential impact on human health and ecology. A shadow Appropriate Assessment, required under the Habitats Regulations has been submitted and this has concluded that the proposed development would not have an adverse impact the integrity of any of the relevant European designated sites (SPA/Sac and Ramsar). Following a review of the original consultation response the applicant has updated the ES chapter and shadow Appropriate Assessment, both of which have been submitted as part of the Regulation 25 response to Dorset Council. This has not however changed the original conclusion that the proposed development would not have an adverse impact on natural heritage or protected species and habitats, including those cited by consultees. The proposals include an agreed contribution with the Dorset Natural Environment Team (NET) to the provision of on-site and off-site ecological mitigation designed to mitigate for the loss of on-site habitats (such as the open mosaic habitat), through an agreed Biodiversity Plan. This will deliver a 10% biodiversity net gain against existing. Consideration has been given to potential impacts on the marine environment from the proposed ERF and the findings of this are presented in the marine paper prepared by specialist marine consultants ABPmer. This concludes that there would be no significant impact on marine ecology from either emissions to air or water.
4.	Economy, *jobs and the housing market*		
		• The plant will have a direct detrimental economic effect on Weymouth and Portland as tourist destinations and impact on small businesses. • Jobs suggested are vague and highly speculative. It's likely that construction crews will be brought in by buses and vans and there is no guarantee that the operating jobs will go to local people • Local people will not be employed to build it • There will be a fall in local property prices and houses could be left derelict • Will the local taxpayers have to bear the decommissioning costs for this incinerator? • The vast majority of spend will be directed to mainland Europe. The benefit of the proposed ERF to existing and new businesses in the Dorset area as a result of increased expenditure will be slight and will be negligible nationally • The conclusions reached on the cost of waste management are misleading as landfill will not all go to landfill over the next 25 years • The old naval accommodation block will never be developed	There is no evidence that the proposed ERF will have an adverse economic effect on Weymouth and Portland as destinations. There are examples of ERFs being located in tourist locations, including the Spittelau facility in Austria and Amager Bakke facility in Denmark, which through their designs have become local tourism attractions in their own right. The Portland facility has been carefully designed to be recessive in its setting, and whilst it is clearly not a tourist destination in its own right, it will as a consequence of its unique architectural design be a feature of some interest. The proposed jobs to be crated during construction and operation are deemed to be conservative and accurate, based on technical assessment provided in the Economic Impact Assessment. The ERF is a private waste management facility and there would be no local taxpayer liability for decommissioning at the appropriate time that this is required.

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		• The air and water borne pollution would affect the health and wellbeing of residents, with the most affected in the top 10% and 20% Index of Multiple Deprivation areas.	The applicant has set out in the Planning Supporting Statement its intention to employ local people where possible for construction and operation of the facility and also its commitment to encouraging construction contractors to operate an apprenticeship scheme. The applicant's ambition is to develop a longer term apprenticeship scheme, working with local colleges and companies such as Weymouth College and Manor Marine. A commitment is offered through a s106 legal agreement to support training, apprenticeships and education, through construction and operational phases, and its policy is set out in Appendix H. The project will create over £100m of investment in the construction and operation of the Portland ERF, resulting in significant economic benefits in terms of local business, direct, indirect and induced job creation, training and education opportunities, support for local tourism (through the provision of shore power at the port) to support the retention and growth of the cruise liner sector and provision of greater efficiency in the local energy networks, to support future economic growth. All of these would benefit local communities and help to raise living standards and address existing pockets of deprivation. It is not correct to state that most of the economic benefit would go to areas outside of Dorset and the Weymouth and Portland area. The costs for continued landfill of Dorset waste simply provide a cost for continuing to landfill residual waste in the way that Dorset has been doing, and is not misleading. Without addition residual waste treatment capacity being provided, there will be no alternative but to continue to send waste to landfill, the least sustainable waste management option. The proposed ERF would provide an alternative option to landfill and could help to reduce future waste management costs. Potential effect on property values is not a planning issue. Nonetheless, it is not expected that the ERF would result in any significant change in property values, based on experience from other UK locations where ERFs have been developed. The revised HHRA and HIA documents, appended to the ES Addendum consider impact on public health and well-being in areas affected by deprivation. They, together with other supporting documents, conclude that the project would not affect the health of local people.
5.	*Environment/Climate Change*		
		• Would contribute to global warming predicted to bring a 2.5 metre sea level rise even if the Paris climate goals are met • Breaches the UK's legal commitment under the Paris Climate accord to cut net emissions of greenhouse gases by 100% - relative to 1990 levels - within the next 30 years - and Dorset's low carbon policies • Particularly regrettable at a time when a separate proposal is being developed for a Dorset National Park, with all the funding and benefits to the local economy this could be expected to bring.	As set out in the Planning Supporting Statement and Carbon and Greenhouse gas Assessment, the proposed ERF is deemed a low carbon source of energy and is supported by government as part of a range of measures intended to reduce national carbon emissions to meet national and international carbon reduction commitments. The revised Carbon Assessment sets out how the proposed Portland ERF will off-set carbon emissions, in the context of other scenarios for waste management and across the lifetime of the facility, as a result of its CHP ability to provide energy to shore power for shipping and heat to a local district heating network serving the two Portland prisons. The proposed ERF would not impact upon a Dorset National Park if and when that might be designated.

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6.	*Explosions and fire*		
		• If there was a serious incident the impact on Portland and the surrounding area could be considerable • The applicants mention sprinklers, the submission is vague what type and where these will be installed. Is it site wide or only in specific areas. Is there a Fire Water retention pond or where will any fire water be stored pending discharge • A recent fire at Chickerell depot illustrates the potential fire risk and potential for pollution • The local fire service does not have the capability to deal with a fire at the plant • The proposed plant is adjacent to fuel supply pipelines and therefore represents a significant fire risk	A preliminary Fire Prevention Plan (FPP) for the proposed ERF has been submitted to the Environment Agency as part of the Environmental Permitting process. This provides information in respect to fire prevention measures and the management and storage of waste. A copy of the FPP has been submitted to Dorset Council for consideration, under the Regulation 25 request, as part of the planning process. Fire prevention will be strictly managed under the Environmental Permit process and the applicant is confident that this will ensure that fire risk is minimised and in the unlikely event that a fire occurs that appropriate procedures will be put in place to manage this effectively. No concerns have been raised by relevant statutory consultees, in terms of proximity to fuel supply pipelines.
7.	*Fuel supply and need*		
		• The capacity of the incinerator is around 3 times the current volume of refuse derived fuel (RDF) dealt with by Dorset Waste Partnership, a vast quantity of RDF would need to be brought to the island from elsewhere, either by road or ship for the plant to be economically viable, contrary to the proximity principle • The incinerator would be a threat to national and local recycling goals • The 3 hour drive time takes in areas that cannot be said to be local and Powerfuel will not accept any condition restricting the geographical source of the RDF. • Very little of Dorset Council's waste now goes to landfill. The true comparison is with the actual situation which, from 1 September 2021, is that Dorset Council's RDF will go for incineration to Bridgwater in Somerset. Whilst this is indeed a longer journey from CM than the journey to Portland Port, against this must be weighed the fact that PfP wish free rein to import RDF from anywhere in the world and even RDF transported by road could come from as far afield as Gloucester, Hammersmith or Worthing. • There is now a shortage of RDF due to overcapacity of incineration in Europe as a whole • England has sufficient capacity, either already operating or planned to 2020, to manage the country's residual waste requirements, and additional capacity would not necessarily be needed to meet the country's ambition of no more than 10% municipal waste to landfill by 2035 • The Dorset Waste Strategy (2017) covering the period until 2033 does not identify energy recovery as a need for waste in Dorset, and allocates four sites, which Portland is not one • No information has been given as to where the RDF)which the plant would burn would come from. The site certainly makes no logistical sense in the management of Dorset Council's black bin waste • It is far removed from Canford where the RDF from our waste is created and therefore does not comply with the 'proximity principle'.	The applicant's position on waste need is set out in the Waste Need Statement and the Planning Supporting Statement. Additional information has been submitted in the form of the Waste Need Paper, providing further information on need requested by Dorset Council's letter. These confirm that there are large volumes of residual waste being generated in Dorset that would provide potential feedstock for the Portland facility. The Waste Need Paper confirms that the Canford facility is currently producing around 83,000 tpa of RDF, derived both from municipal and commercial and industrial waste arising in Dorset. This is higher than the 60,000 tpa figure initially stated in the application as a conservative figure. The Canford facility is expected to significantly expand its RDF production capability in the near future to around 150,000 tpa and this waste is expected to be diverted to the Portland facility. As such there is a considerable volume of Dorset derived RDF available and the Portland ERF is suitably sized. It is also likely that, with additional RDF processing capacity at Portland, other existing waste operators will look to invest in RDF production capacity to supply Portland, avoiding the more expensive option of exporting out of county to landfill or other ERF facilities. The Supplemental Planning Supporting Statement and other supporting documents clearly demonstrate that the facility is in accordance with the proximity principle. The ERF would manage RDF, in so far as this is residual waste from which no further recycling or value can be gained other than energy. In encouraging more of Dorset's waste to be processed to RDF, more material will be recovered from waste that would otherwise go to mass burn ERF or landfill, increasing recycling rather than competing with it. As a merchant facility, the applicant cannot accept conditions limiting waste sources but the applicant is willing to enter into an appropriately worded planning obligation that would require the applicant to commit to making reasonable endeavours to source RDF from Dorset where such waste is available and can be secured on acceptable commercial terms (see chapter 5 of the Supplemental Planning Supporting Statement). Whilst RDF produced in Dorset is shortly expected to be transferred to the Bridgwater ERF, this is a significant distance from Dorset and further than Portland. It also represents an out of county solution contrary to the self-sufficiency principle and the DWP strategy to manage Dorset's waste in Dorset. The Carbon

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			Assessment also concludes that this is less beneficial in carbon terms than an ERF at Portland that provides shore power benefits. . The UK does not have sufficient capacity to manage residual waste as evidenced by the high volumes of waste that are still being landfilled or sent to Europe for treatment in ERFs. The planning policy case for the Portland ERF project in terms of its compliance with the DWP need and site allocations is set out in the Planning Supporting Statement and the Supplemental Planning Supporting Statement. These conclude that energy recovery is part of the DWP residual waste strategy and that unallocated sites can come forward where these have advantages over the allocated sites. The Portland ERF site can fully demonstrate such advantages. The Carbon Assessment demonstrates that the additional carbon emissions derived from transporting RDF from Canford to Portland is off-set by carbon savings derived from the provision of shore power and/or district heating and outperforms all other Dorset based and identified UK based alternative facilities. Further, on the basis that district heating is also provided it outperforms European facilities which historically have been significantly more efficient than UK operations.
8.	*Grid Connection*		
		• The ES sets out the route of the grid connection, but no information is provided on how this grid connection will be constructed. It is not clear whether the cables will be buried or whether they will be overground or what, if anything, has been assessed • If there were to be a need this could be met by upgrading the existing supply from the mainland	The grid connection would be constructed with underground cables, similar to other infrastructure. Further details as to how the ERF would be connected to the electricity grid and shore power is provided in the submitted Grid Connection Paper. The Shore Power Strategy report and the Energy Need Statement provide details as to the constraints to the existing supply network and why it is not economically feasible for the mainland supply to be upgraded to meet the Port's requirement for shore power.
9.	*District Heat Network*		
		• Powerfuel have not specified an actual customer for district heat. They use the words 'potential' or 'expected' which might give the impression of an agreement where in fact none exists. They mention the prisons. • How are you going to get the pipes there? • The heat would have to be ducted underground to the prisons and it is hard to conceive of any viable route which would not cross protected areas (SSSIs etc). The location of the site adjacent to a steep hill with cliffs also makes ducting of heat pipes unviable. District Heating is one of the pillars on which PfP try to argue that their plant would be carbon neutral. • Local and national guidance requires that new incineration plant should be able to supply a local heat network • The pipes will be ugly and potentially accessed by terrorists • The construction footprint for this scheme would be huge and would cancel out any gain in terms of use of heat • Any consent should have clause inserted ensuring the plant has the relevant technical equipment (PHE, Controls, Underground Piping etc) installed during construction and run to the boundary fence ready for future use. Only ~25% UK WtE plants currently utilise heat off take. There is precedent for this type of condition in any planning consent or via a S106 agreement • Installing underground ducted pipes to the prison via the road network would not be viable as it would involve the pipes travelling along Castletown, Castle Road and Verne Common Road, a distance which would mean that most heat would be lost en-route.	The applicant has held extensive discussions with the Ministry of Justice (MoJ) in respect to the potential opportunity to meet its heat demand for the two Portland prisons, including technical feasibility. The applicant and the MoJ are working towards an agreed memorandum of Understanding (MoU) confirming that the MoJ would take heat from a heat network if this is provided. The prisons would therefore provide the anchor tenants for the network, with potential for future expansion to other heat customers. The District Heating report provides details on a route that is viable from a technical and planning perspective, using existing roads and land within Port control, without crossing any ecologically designated areas. With a Government backed heat customer identified and a MoU in progression, the ERF is highly likely to deliver the required heat network. The ERF would be capable of supplying a local heat network, as required in local and national guidance. The heat pipes will be installed underground and would not be visible. We do not understand the reference to "a terrorist attack" noting the pipes will be transporting 80°C hot water which is unlikely to be a key target.

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		• PfP's carbon calculations repeatedly include supply of district heat they should be discounted • It is not clear that there is a good business case for siting the incinerator plant in this location. • The suggestion of a local domestic heating network is economically unrealistic, as evidenced by the lack of commercial interest • Powerfuel Portland have no plans to build infrastructures for heat transfer to the community. No community beneficiaries have been identified, and underground heat pipes to HMS Verne & Grove Prisons, identified as 'potential customers' are unfeasible	The applicant has stated that the ERF will be CHP ready and will be designed and constructed with equipment in place enabling the heat network to be connected. It has also offered to commit to an obligation in the s106 legal agreement for the ERF to supply such a local network with heat, subject to suitable commercial agreement being reached. The MoU being progressed with the MoJ makes this more likely to be achieved. The District Heating report provides details on the technical viability of implementing the heat network to serve the prisons. The heat pipelines are insulated and connection between the ERF and the prisons is achievable without significant heat loss. The installation of the heat network and long term supply and associated carbon benefits of heat to the prisons and potentially other users would far outweigh the relatively limited carbon input required during construction. The Carbon Assessment demonstrates that the Portland ERF with shore power capability outperforms all other identified facilities from a carbon perspective. There are additional carbon benefits of establishing a local heat network, which is supported by national and local policy frameworks. As demonstrated in the District Heating report, the MoJ interest in taking heat from a network confirms the credibility of the proposal and underlines the technical and commercial viability of its implementation. The applicant has demonstrated that there is high probability that the heat network will be delivered and that substantial weight should be attributed to the advantage of delivering a local heat network and carbon reductions.
10.	*Health Impacts*		
		• Health of residents exposed to the toxic residue of the incineration process will be adversely affected. • I fear that the air quality in the immediate area would be affected by the increase of congestion to a narrow road due to increased traffic due to HGV's and any employed at the site • There is published evidence in peer reviewed medical journals that fine particulate pollution is responsible for both cardiovascular and cerebrovascular mortality. The danger is greater than previously realised. • There are concerns around start-up and shut-down of incinerators as most assumptions around their safety are taken from data based on emissions during standard operating processes • The type of waste incinerated will be continually changing, this means unknown unidentified compounds will increase the potential for acute toxic effects on the immediate neighbourhood and further afield • The authorities have a duty of care to its citizens, which, I feel, would be breached should they grant permission for this waste plant. • Given the population carries a disproportionate level of ill health, we should not expose the population to further risk through adding a significant direct pollution source to the area. • A recent study (2020) of more than a thousand adults in south east London by researchers at Kings College, London (led by Dr Bakolis) found that 'an incremental increase in nitrogen dioxide, heightens the risk of common mental disorders by 39% and that people living in places with higher levels of particle pollution are twice as likely to experience mental health problems as those in the least polluted areas.' The other health impacts would be respiratory. That conclusion must raise serious concerns regarding this proposal • Incinerators are associated with an all round linear increase in mortality - Higher incidences of all cancer and congenital abnormalities Incinerators are a major source of carcinogenic dioxins, mutagens and other hazardous fine particles in the air. The evidence is irrefutable. • The health of thousands of residents and 1200 prisoners deteriorate	The emissions from the ERF have been modelled using sophisticated air quality modelling and this is subject to independent checking by Dorset Council's own technical consultants and is also subject to rigorous review by the Environment Agency under the Environmental Permitting regulations, the statutory authority for controlling emissions. The potential risk to human health from the proposed ERF has been assessed based on the air quality modelling dispersion, which concludes that pollutants in emissions are well below permitted levels set to protect human health. The Human Health Risk Assessment (HHRA) and Health Impact Assessments (HIA) and updates together demonstrate that the proposal will not have an adverse impact on public health. The references made to diseases and academic papers by consultees are ultimately considered by Public Health England (PHE), the Government's statutory advisors on such matters. PHE has reviewed all academic research and papers in relation to health impacts from such facilities and has adopted the following stated position. 'modern, well managed incinerators make only a small contribution to local concentrations of air pollutants. It is possible that such small additions could have an impact on health but such effects, if they exist, are likely to be very small and not detectable'. PHE's consultation response has considered the submitted information and in respect to air quality and human health has concluded that: *"The submitted assessments does not specify specific human sensitive receptors but identifies the maximum predicted process contribution for residential areas. No significant impacts have been identified in the documentation, and PHE is satisfied*

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			that the applicant is using a model and assessment criteria that are in line with UK guidance and good practice…. *PHE is satisfied that the approach taken in the assessment and the operator has adopted conservative but not over-precautionary approaches to assessing the potential risks."* Also in respect to traffic: *"It is, therefore, expected that any increased vehicle movements will not have a significant impact on local air quality, including at locations identified as being sensitive to traffic emissions."* In respect to fugitive emissions to air (dust and odour) PHE concludes that: *"We would expect that the use of a construction environmental management plan (CEMP) employing appropriate mitigation measures would ensure that dust does not have a significant impact on health during the construction phase. PHE note that the operation of the ERF will be subject to an Environmental Permit, the conditions of which would ensure that fugitive emissions beyond the site boundary are kept to a minimum."* Overall, PHE concludes that: *"PHE is satisfied that the applicant has approached the Environmental Impact Assessment (EIA) in a manner consistent with the UK requirements. They have utilised a satisfactory approach and methodology to predict the likely emissions, distribution of a range of key pollutants, and the impact on the local environment and receptors. The proposed facility will be regulated through the pollution prevention and control regime and we would recommend that the regulatory authority ensures that it will operate to Best Available Techniques (BAT)."* The PHE conclusion based on the technical information provided in the planning application and associated EIA confirms that the ERF would not have an adverse impact on public health and this will be further considered and regulated under the Environmental Permitting process.
11.	*Cultural Heritage*		
		• There are grade I and II listed buildings in the area who's settings would be adversely impacted by the plant. • Castletown is a conservation area and recently there have been many positive contributions and investments to the improvement of the area from residents and businesses. This development will seriously detract from the local landscape area. The detrimental visual impact will irreversibly damage the seascape • The effects and impacts of the proposed industrial building and plume, located on a site within the port has a significant effect on the settings of designations that have been awarded to the local landscapes, coastline and seascape including the World Heritage Site, AONB, and also to a Scheduled Ancient Monument, listed structures at sea, and architectural listings and conservation areas. • The methodology used in the cultural heritage assessment is vague and ambiguous and seems to be designed to underplay the significance of heritage impacts • the proposed ERF will have a long term significant adverse effect on a number of listed buildings including the breakwater and former dock offices and the East Weare batteries as well as the Grade II* Verne Citadel and Portland Castle • The courts have established that the desirability of preserving listed buildings and their settings should not simply be given careful consideration but should be given	The potential impact on local heritage assets, including Scheduled monuments, listed buildings and structures and conservation areas has been fully assessed by the heritage assessment that formed part of the EIA. This has been considered by Dorset Council's conservation officer who has concluded that there would be some harm caused to the setting of designated and undesignated heritage assets, but this harm was 'less than substantial'. On that basis any harm would need to be considered in the context of any public heritage-related benefits in line with NPPF guidance. The applicant has held further discussions with Dorset Council's conservation officer, in association with Historic England, to develop a Framework Heritage Mitigation Strategy that would facilitate works to be undertaken to remove scrub and stabilise the structure's condition, with future management, to enable the E Battery (scheduled monument) to be removed from the Historic England At Risk Register. Other benefits would include the establishment of a permissive public path across the Portland Port land estate, linking up existing paths and facilitating an around island route, to enable public appreciation of the heritage assets in this part of East Weare, together with the provision of interpretive information in respect to the various heritage assets.

		'considerable importance and weight' when the decision-maker carries out the planning balance. The fact that the ERF would have an adverse impact on the setting and significance of a range of heritage assets weighs heavily against it • I agree with the concerns raised by Historic England regarding the potential impact of this proposal on the setting and significance of several nationally important scheduled monuments that form a key component of the historic port • Locality the potential for any development to have direct and indirect and cumulative impact will need to be balanced against other sustainable development objectives	The principles of the Framework Heritage Mitigation Strategy have been discussed and developed with input from Dorset Council conservation, ecology, Historic England and Portland Port and broadly supported by all parties as deliverable. The Framework Heritage Mitigation Strategy will ensure that any harm caused to the setting of heritage assets is more than off-set by the public heritage-related benefits.
12.	*Light Pollution*		
		• Objections to the light pollution which I am informed is often on for 24 hrs of the day. • Red aviation warning lights will be provided on or near the top of the chimney stack in accordance with CAA and international guidance. Do the Civil Aviation authority have any observations which would be material considerations on this application? • Will safety needs of those flying in the area will be satisfied with the provision of just a night light at the top? • At present there is no provision in the design for highly conspicuous painted manifestation included in the design which might make it highly visible to emergency flights attending to an incident in the area	The planning application is accompanied by a Lighting Statement that considered the potential for light spill taking account of the exiting lighting conditions and the proposals for lighting at the ERF. It sets out a range of mitigation measures to minimise the potential for light spill and a lighting strategy. It concludes that operational requirements can be met whilst minimising light spill beyond the site and the surrounding area. In addition additional photo views and montages have been submitted at the request of the Dorset Council landscape officer to determine the longer view visibility. These are provided in the ES Addendum and also the DAS Addendum and demonstrate that the proposed lighting would not cause any unacceptable visual impact from key viewpoints Statutory consultees have confirmed that a red warning light would be required on the stack, but no other concerns or requirements have been raised in respect to safety for aircraft.
13.	*Noise and Odour*		
		• What about the noise of the plant, which will be running continuously? • What about odours coming from the waste being transported into the plant? • What happens to unbundled waste being transported? Surely it can easily be blown into the sea and onto the land? • Prevailing winds are from the South West and will carry smell to the mainland as well as the island. • Increased noise will come from construction, operation and transport, the noise from operation and transport will be infinite • There are many homes, schools and businesses along the only route on and off Portland. Each and every one of these properties will be affected 24 hours a day by noise, vibration, odours and pollution from the increase in heavy goods vehicles • I also live near to Portland harbour and am already aware that noise from the port travels across the water on a calm day. Therefore this incinerator will increase noise levels • The direction of the wind will mean we will likely frequently be able to smell the fumes in Wyke Regis • The smell will drift over Weymouth and lower tourism • It will be necessary to keep household windows closed at times when the wind is blowing fumes and dust in their direction • There will be increases in noise pollution, leading to lost productivity • The noise from the incinerator will affect many residents in Castletown • 14.I object to these plans on the grounds that they would constitute a nuisance detrimental to the mental health and wellbeing of nearby residents through excessive, constant noise. Further to the noise, dirt, vibration and pollution from the 80 HGV movements per day required to service the incinerator, I believe the plans include 3 x industrial cooling fans, with no acoustic insulation. These fans will produce a noise level of	Although noise and vibration were scoped out of the EIA and not being significant, the original planning application was accompanied by a stand alone Noise Impact Assessment. This concluded that the noise effects on local residents and businesses, from the construction and operation of the facility were not considered to be significant. It also highlighted that construction noise would be controlled through best practice means of working and operational noise through the ERF building design. An updated Noise Impact Assessment has been undertaken to consider potential noise impact, with the benefit of baseline noise survey information (not possible at the time of the application due to Covid-19 restrictions), reflecting more normal transport and commercial activity. This assessment concludes that the predicted rating sound levels from the ERF would be below the background levels at the locations assessed. In absolute terms the levels are also low, indicating that the effect of noise from operation of the ERF would be not significant. The submitted Health Impact Assessment (HIA) has also considered the potential for health impacts associated with noise during construction and operation of the ERF and concluded that this would not give rise to any significant health impacts. Based on the submitted technical information the ERF would not result in any significant impacts arising from noise and vibration. Noise levels will be further controlled through the use of planning condition and the Environmental Permit Odour was scoped out of the EIA as not significant. Chapter 2 of the ES sets out the mitigation measures that would be put in place to control odour. The

		approx. 80-100 Db each. This constant noise, 24 hours a day, will have a significant detrimental effect on the mental health and wellbeing of close residents, especially at night.	Environmental Permit will also include conditions to prevent fugitive emissions beyond the boundary of the site. The information submitted demonstrates that the concerns expressed in respect to noise and odour are unfounded.
14.	*Planning Policy*		
		• The proposal does not comply with the NPPF • The development does not comply with the development plan objectives and policies (Dorset Waste Plan, West Dorset, Weymouth and Portland Local Plan and Portland Neighbourhood Plan) in respect to sensitive landscape designated areas (AONB and WHS), heritage assets (scheduled monuments listed buildings and conservation areas), important and designated ecological sites (European protected sites, SSSI, local designations and marine designated areas), highways, recycling, and emissions to air (including carbon dioxide). • Does not comply with Dorset waste policy of locating incineration facility near to a facility for treating the ash generated • Does not comply with Dorset waste policy that waste incineration development should be at one of the allocated sites under Policy 3. • Eco Sustainable Solutions have announced their intention to submit a planning application for the Parley site which IS one of the allocated sites. That incinerator would be less than a third of the size and would still be larger than necessary for the burning of RDF generated from Dorset Council residual waste • The proposal does not meet the criteria set out in Policy 4 in respect to the location of waste management sites • Contradicts the Dorset Council's Declaration of a Climate and Ecological Emergency' and the associated draft Strategy and Action plan • Does not reflect the UK Government objective to become the world leader in low cost clean power generation • The application is not in compliance with the Dorset Waste Plan in terms of either the location or the importing of waste from outside the area • The original extant planning consent was not for a Wte plant and traffic movements of this scale • The proposal will fail to 'safeguard and enhance local amenity, landscape and natural resources, environmental, cultural and economic assets, tourism and the health and wellbeing of the people.' • The availability of such a facility in Dorset can only serve to distract from what is rightly the main focus of this objective to ensure sustainability, to reduce waste (the top level of the hierarchy). Moreover, when Dorset is successful in achieving this objective, there will be insufficient waste available in the county to supply the facility, necessitating the importation of waste from other areas. • The proposed plant will emit a huge amount of the key climate change gas, carbon dioxide, and this conflicts with the Waste Plan • The siting of a waste incineration plant on Portland seems to destroy the proximity principle. If this plant goes ahead it will compromise sites and plans that Dorset Council have made in their current Waste Plan. • This contravenes the National Government climate change targets: it is not situated close to a source of fuel; there is insufficient UK waste for the plant's lifetime; and the location contravenes government policy in that it discourages recycling • This would seriously damage the area's visitor economy. • The incinerator does not contribute in any way to the local plan, nor does it contribute to the operations of a successful port	The applicant has fully explained within the submitted Planning Supporting Statement and the Supplemental Planning Supporting Statement how the proposed ERF complies with the relevant policies of the local development plan, including the Dorset Waste Local Plan, Weymouth and Portland Local Plan and Portland Neighbourhood Plan, together with support from other plans, strategies, and frameworks that are important material considerations lending further weight to the case for the development. These documents explain how the proposals accord with the key waste management principles of the waste hierarchy, self-sufficiency and the proximity principle and how these should be applied. The Dorset ERF will provide residual waste treatment capacity in Dorset that is capable of meeting Dorset's needs, removing the current need for Dorset's waste to be exported out of county and reducing the need for landfill. This accords fully with these key waste management principles. The submitted information also sets out how the proposed ERF at Portland will provide advantages over DWP allocated sites including provision of shore power, district heating, port location and ability to accommodate carbon capture and storage when this becomes viable. It also fully demonstrates how the proposed ERF would not prejudice other DWP allocated sites coming forward (including the Eco-Sustainable Solutions facility at Parley), should that be granted planning permission and be successful in raising funding, and would support delivery of the spatial strategy through provision of a proximate outlet for RDF currently being produced from Dorset's residual waste. The Waste Need Statement clearly demonstrates that there is a need for additional treatment capacity to meet Dorset's needs and more waste feedstock available in Dorset than what the ERF capacity could deliver. As set out in the revised Carbon and Greenhouse Gas Assessment, the Portland ERF would deliver significant carbon reduction benefits by off-setting carbon through recovery of energy to supply shore power and district heating in comparison to the existing waste management scenario and other scenarios, which off-sets any modest additional carbon emissions arising from transportation of RDF material. The technology provides a low carbon source of energy and fully complies with the national and local strategies, declarations and action plans for carbon reduction. The potential to support carbon capture and storage, as a consequence of land availability and port location, further demonstrates the potential for further carbon reductions and the locational advantage of the Portland site over other DWP allocated sites. The ERF will support the production of more RDF, from which recyclables are extracted prior to management at the ERF, therefore increasing Dorset' existing high levels of recycling and managing waste that cannot be recovered. It would support more recycling rather than less recycling as is suggested in some comments, as it would avoid untreated waste being exported direct to landfill or mass burn incinerators.

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			The submitted Economic Impact Assessment demonstrates that the ERF will deliver substantial economic benefits for Portland, Weymouth and Dorset and the provision of shore power at Portland Port will safeguard existing jobs and support future local economic growth in tourism and other related activities associated with the cruise liner visit business. The extant consent for the WtE facility on the application site was proposed to be fuelled by vegetable oils (including waste oils), supplemented by waste tyres. Whilst the facility was termed an 'energy plant' it was intended and consented to be fuelled in part by waste materials and therefore is a relevant material consideration.
15.	*Shore Power*		
		• Given the main driver is to supply shore power (up to 15MW for shipping), this electricity would often not be available to the national grid, as was originally claimed. • On a practical level how will funders ensure compliance with the plant Power Purchase Agreement to sell all the electricity, if they plan to periodically offer shore power to the port. • AMP is a credible emission reduction technology provided only that the electrical power supplied to the vessel is generated from zero-carbon or renewable sources (wind, solar or nuclear). • The proposed Portland incinerator merely shifts the carbon/GHG pollution from the visiting ship's funnel, a few hundred metres to the incinerator smokestack; whilst contributing absolutely nothing to the reduction of local air pollution; thereby defeating all of the forthcoming regional (EU) and UK National objectives to improve air quality	Information in respect to the provision of shore power is provided in the original Shore Power Strategy report and the updated Shore Power Strategy report. The ERF will have an export capacity of 15.2MW and this power will be distributed between the shore power and the grid (subject to limited reduction if the facility operates in CHP mode). As demand will vary over time (ships will not be in port all the time), the excess energy will be sent to the local distribution grid. Appropriate financial mechanisms will be put in place to enable power to be distributed to shore power at the port. The ES Addendum and air quality assessment, provides quantitative information on the effects of shore power on air quality, resulting directly from shipping (cruise liners and RFA shipping) turning off their engines when docked in port. This demonstrates that the provision of shore power will deliver benefits in terms of net reductions in NO_x and particulates, and to a lesser degree sulphur. The revised Carbon Assessment concludes that shore power, facilitated by the ERF, would make a significant contribution towards achieving carbon emission reductions, by off-setting existing sources.
16.	*Tourism*		
		• Tourism (so important to the area) will be adversely affected. • Portland is a popular area for rockclimbers and several climbing areas are near the proposed site for this incinerator, which could be ruined by pollution and smell • Portland is home to the National Sailing Academy, which frequently hosts major international sailing regattas including the Olympics, because Weymouth Bay is one of the best sailing areas in the whole world. The incinerator would damage this reputation • We are seriously concerned with how people may experience the character of the local landscape and seascape and how this would impact on future visitor numbers and water sports businesses	The submitted Economic Impact Assessment demonstrates that the ERF will deliver substantial economic benefits for Portland, Weymouth and Dorset and the provision of shore power at Portland Port will safeguard existing jobs and support future local economic growth in tourism and other related activities associated with the cruise liner visit business. The applicant does not envisage that the ERF, by means of its location within a commercial port sited so that it is not visible from most parts of Portland, would dissuade rock climbers of sailors from continuing their activities and visiting Portland. There is no evidence that the provision of ERFs causes any reputational damage and it is considered that the ERF would form part of the industrial development associated with the existing commercial port. The site is a safeguarded employment site in the local development plan and is subject to an extant planning permission for an energy plant, comprising large industrial structures and stacks.
17.	*Traffic and transport*		
		• Road infrastructure is insufficient feeding • The incinerator accessed by lorry would make traffic congestion through Weymouth and on to Portland even worse than it is already daily	Potential impacts on road infrastructure and human health are considered in the submitted EIA and associated Transport Assessment, Air Quality Assessment and Health Impact Assessment.

		• HGV's are almost 7 x's more likely than cars to be involved in fatal collisions on the roads, in particular minor roads • Objector group counts of articulated lorries show that the number would increase by about 80% at Fords Corner and about 200% at Castletown • The increase in traffic, particularly lorries, is deeply concerning for roads that can already be extremely over-crowded in the summer. There is only one road route on and off Portland and access to the causeway is through residential areas. • Further congested from extra HVG vehicles is damaging to the local areas, to the quality of life of people and children living there, as well as having a detrimental effect on pollution, the environment and health as well as increased noise levels and damage to the road surfaces and adds to the likelihood of more accidents • There will also be an increase in traffic and the associated negative impacts during the construction phase. In an area which is trying to grow its tourism, for visitors to be faced with HVG vehicles moving on and off Portland, along with the congestion, particularly, in the summer months, will be greatly off-putting and not something that is conducive to nurturing this important local industry. • Any further traffic to and from Portland is going to have a negative effect • This traffic will also likely put air quality at Boot hill over the air quality limit and possibly in Chideock too if importing RDF from the West. • Surely a responsible Council should be asking, what is the very least we can do to ensure accidents are avoided in future? What are the very smallest measures we can take - now, today - to ensure there are safe, environmentally-sound routes to and from school for local children? • According to Public Health England, in the UK, between 28,000 and 36,000 deaths per year are attributed to long-term exposure to air pollution • The cycle route, the only "green" access to Portland, is adjacent to the road. It is already unpleasant, dangerous in bad weather, and the traffic intimidating for pedestrians and cyclists • The proposed Eden project will also attract extra traffic to the area. The existing Helicopter base is also an additional air polluter combined with the proposed increased traffic is not going to have a positive effect on our air	This has concluded that a safe access can be achieved and that the HGV movements associated with the facility when considered in the context of the overall highway network and traffic levels would not give rise to any significant highway impact. As such the concerns cited regarding the potential impact of the development on highway congestion and adverse impact tourism are without foundation. It also confirms that there would be no significant health related impacts arising either from the construction or the operation of the ERF, including from vehicle movements. Potential air quality impacts on Boot Hill and Chideock were considered as part of the original EIA and reported in the ES. Further consideration has been given to these aspects in the ES Addendum and associated air quality assessment and HHRA in respect to traffic and process emissions. In respect to Boot Hill, this found that the original ES assessment conclusion, that the effects would not be significant, was unchanged. The Chideock AQMA lies to the west of the proposed development, along the A35. As set out in technical appendix A (scoping) of the original ES, the HGV routing breakdown set out in ES chapter 11 (traffic and transport) confirms that the additional HGV movements on the wider Dorset road network will be below the levels that would trigger the requirement for detailed analysis. Only eight of the 80 HGV trips are predicted to be along the A35 westbound. For this reason, the impact of the proposed development on any AQMA was scoped out from the assessment.
18.	*Landscape and Visual Impact*		
		• This will destroy the view for which many visitors come (and return year after year). Visually the incinerator is hideous • This area of the south coast is a national heritage site and the buildings which will be visible from much of the cost line around Weymouth would decimate the natural landscape • It would have a detrimental effect on the landscape of Portland Island and the setting of the Jurassic coast world heritage site, as well as impinge on the Dorset AONB (potentially a new National Park) • The building looks very over-sized compared to anything else in the area and would spoil the area of specific interest and the Jurassic coast which the town and council should be promoting rather than spoiling. • The building would be a major eyesore • Such a large industrial plant, with a stack and plume which would be visible from Weymouth Bay and Portland Harbour, would have a detrimental effect on the landscape of the local area • The plan to 'camouflage' the stack with a photograph mimicking the landscape is, frankly, laughable , it demonstrates how ignorant the applicants are about Portland's specific geography; nobody local to the island would believe a photograph stands a chance of surviving the salt and high winds of a Portland winter. • The proposed architectural style is that of brutalism, which certainly doesn't complement the landscape	The ERF has been carefully and sensitively designed, with guidance from Dorset Council landscape officers, to minimise visual impact on the local setting and character and wider views from designated landscape areas such as the AONB and the WHS. The design reflects the local geology of Portland and its immediate cliff setting, with this also translated into the use of appropriate cladding materials to provide a high quality building that provides a landscape feature, but also successfully blends into its surroundings to limit visual impact. The ES (Landscape and Visual Impact Assessment) recognises that whilst the development would result in some impact, overall this is deemed to be acceptable. Further information has been requested by Dorset Council in respect to the potential effects of the plume, and night-time visibility associated with lighting. This has been provided by means of an update to the original LVIA, as part of the ES Addendum. Further information is provided in the DAS Addendum document in covering the likely number of occurrences and the timing of these, together with the duration of any visible plume based on meteorological data and the relative (and maximum) length of plume expected, together with additional visualisations These results confirm the conclusions set out in the original landscape, seascape and visual impact assessment that the plume is likely to produce only a very minor alteration to the view for a very limited number of hours. As a result, the visual

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		• The building will have a combination of printed PVC mesh with an image of the cliff face vegetation and profiled metal cladding. As the PVC mesh will not reflect any seasonal changes in the surrounding vegetation, it will still represent an alien feature in the landscape. • The long-term durability of this building treatment option needs to be demonstrated, preferably by showing that it has been successfully used on a building of this scale and in an exposed coastal location. As the proposed building treatment is critical to the mitigation of landscape and visual impact, if the long-term durability cannot be satisfactorily demonstrated, then an assessment should be undertaken of an alternative option or without the PVC mesh in place. • This mesh concept can only work when it is viewed from particular viewpoints. Other viewpoints will reveal a massive structure out of scale with every other building within at least a 30 mile radius. • This development is of a size and scale completely incompatible with its setting. The main building is absolutely enormous and will dwarf all other structures in the Port area, while the chimney at 87m above sea level would constitute an eyesore totally out of keeping with the rest of the environment • PfP have refused to comply with the instruction that they should produce images with the stack plume showing, as the visual impact of the plant is atrocious from all viewing angles without it; a 200m visual plume would highlight even further that that this development is completely out of scale with its surroundings • This massive plant would be a major eyesore, significantly damaging not only the iconic character of the Isle of Portland but also views from miles around, including the impressive views of the Isle as approached along the A354 causeway, distant views from Dorset's Area of Outstanding Natural Beauty and views from the sea. This would fundamentally harm the setting of the Jurassic Coast World Heritage Site and the landscape character of the whole region	effects for each of the receptors assessed in the ES chapter remain as originally assessed. The design approach is set out in the original DAS and the approach to develop a building that appears recessive through the use of a cladding system reflective of its setting and context is supported by Dorset Council's landscape officers. Further information is provided in the DAS Addendum in respect to the use of the pvc mesh cladding, and its durability and effectiveness with options identified for achieving the required tonal variation. The proposal is to apply this treatment to the main building (not the stack). The applicant is confident that the proposed approach will be successful and the details of cladding can be agreed with Dorset Council officers by planning condition. Whilst it is recognised that the scale of the ERF is large, further contextual analysis has been undertaken to consider the proposed building in the context of existing built development associated with the operational port area and its wider context. A wrap-around elevational drawing is provided in the DAS Addendum, illustrating that the proposed development sits comfortably within the scale of Portland and the existing large structures at the port and other buildings located within the East Weare. The development is therefore not out of scale when viewed in the context of existing development and buildings, as is being suggested by some comments.
19.	*Water Pollution*		
		• As a sailor and fisherman I am hugely concerned about the risk of water pollution • At present we have great diversity of marine life in the bay. Local restaurateurs, pub and café owners gain significant income from promoting and serving the local catch of fish and crab. Increased pollution in Weymouth Bay and the waters around Portland will affect marine life. Even if this were not the case, would visitors really want to eat fish or crab that has been caught in the waters around an incinerator burning toxic waste? • The increase in cargo to ship waste and removal of the resultant toxins increases the risk of pollutants from oil and from toxic waste. This will have a serious impact on marine life and to the health of our entire coastline and residents • As a fishing family we rely on making our living from the sea. We do not know what the impact of particles or run off would have to marine life. Have long term studies been done? • Pollution of sea and marine creatures around Weymouth and Portland could be irreversible should this go ahead, shellfish and fishing industries could be hit as fish shellfish, such as prawns razor fish winkles cockles breeding fish in Portland harbour could become subject to many changes in pollutants and the effects of tonnes of carbon dioxide mixing with salt water • The marine area around Portland harbour and the seas which surround Weymouth and Portland and very sensitive areas bursting with a multitude of marine inhabitants and the potential risk of adding residual contaminants into the tidal flows could be catastrophic to these delicate eco systems that are around our shores , we have a number of marine conservation areas as well. • The impact of low level but long term mercury emissions over coastal fisheries has not been adequately studied by consultant authorities • Humans bathing and engaging in water-sports, would be at potential risk from residual contaminants in water discharged from the plant into the sea	The potential environmental effects of the proposed ERF are considered in the original ES, taking account of the measures proposed to protect the water environment. These control measures, relating to the control of surface water drainage and waste water are set out in Chapter 2 of the ES. Potential environmental impacts form the proposed development are also addressed in chapter 8 of the ES (ground conditions and water quality). This details a number of measures that will be taken as part of an environmental management system to safeguard water quality. The assessment has also considered the potential for spillages form vehicles and from the delivery of RDF material to the site by ship. A framework Construction and Environmental Management Plan (CEMP) has been submitted, to be agreed with the Environment Agency and Dorset Council, to ensure that there are no adverse impacts on coastal water or ground water quality. The operation of the site will also be controlled through the Environmental Permit. As such the potential for any pollution of the water environment is considered to be negligible and not significant. The applicant has noted the concerns raised by local people in respect to the potential for pollution, and specifically the effect that emissions to air and water this might have on shellfish and the wider marine environment. The potential impacts of the proposed ERF on the marine environment have been assessed by specialist marine consultancy ABPmer, and its report is submitted to Dorset Council as further environmental information under Regulation 25 of the EIA Regulations. Overall, the ABPmer report considers that the concerns raised are unfounded and that the proposed ERF would not have any significant effects (in respect to

		• The potential for heavy metal build up in marine life cannot be ignored if the run off becomes contaminated. • There is also a high risk that the sea will be polluted as the rubbish cannot be 100% contained and this will kill birds, fish and marine mammals • The increase in shipping also causes concern for the state of the harbour and local dive sites if large ships are constantly disturbing the sea bed • Sea Grass is a necessary breeding ground for rare and vulnerable species such as seahorses and increased pollution and sea traffic will affect these and other species • there are no contingencies in case of a complete failure of the plant and no mention how one of England's most important Sea Bass spawning ground would be protected	potential emissions to the air or water) on the marine environment, protected areas or associated human health.

FICHTNER
Consulting Engineers Limited

Powerfuel Portland Ltd

Portland ERF

Response to UKWIN Planning Application Submission

1 Introduction

UK Without Incineration Network (UKWIN), a national group which campaigns against energy-from-waste (EfW) plants, has made a submission to the planning authority (Dorset Council) dated February 2021.

We have responded to each section of UKWIN's submission below. We have not necessarily responded to every word, but the failure to comment on something does not mean that we agree with it.

2 Committee on Climate Change

In paragraphs 7-32, UKWIN argues that the Environmental Statement (ES) which was submitted with the planning application misrepresents the position of the Committee on Climate Change (CCC).

The ES explained the CCC's position in its statement of 2 May 2019, which was the latest statement when the ES was prepared. UKWIN does not present any evidence to dispute the statement within the ES. The Applicant continues to consider that the CCC's position in May 2019 was that it was critical to divert waste from landfill, which the Facility would support.

UKWIN then include a variety of quotes from the CCC which post-date the ES. The Applicant agrees that the CCC's position supports an increase in recycling and a decrease in landfill, and that there is general support for the application of CCS to EfW plants in the future. However, it is important to acknowledge that the CCC notes that government support is required.

This is most obvious in "The Policies for the Sixth Carbon Budget Report", where UKWIN quotes some but not all of the primary policy. On page 188, the CCC states the following, where the points in bold were excluded by UKWIN:

> *"If EfW plants under construction and granted planning approval in the UK were all built, and plant utilisation rates remain unchanged, this would add3-10 MtCO2e/year to UK emissions. To prevent this major increase, either a substantial fraction –potentially a majority –of the EfW plant pipeline will have to remain unbuilt, EfW fleet utilisation rates will have to fall, or else carbon capture and storage (CCS) will need to be installed on plants from the mid/late-2020s onwards to mitigate the additional emissions.*
>
> ***–Falling EfW utilisation rates may only be possible in some cases via renegotiation of waste management contracts, in order to prioritise prevention and recycling efforts instead. Government support to assist Local Authorities will likely be required.***

–Government policy could also focus on EfW emissions, either through carbon taxation or inclusion in a UK ETS, and/or providing incentives for CCUS to be installed.

–For those plants not yet under construction, new energy-from-waste plants (and plant expansions) should only be constructed in areas confirmed to soon have CO2 infrastructure available, and should be built 'CCS ready' or with CCS."

The third bullet point should be read in the context of the Waste Sector Summary of the CCCs Sixth Carbon Budget Report, which notes (on page 16) that *"The costs of installing CCS on EfW plants are calculated by Element Energy modelling, factoring in energy inputs and the location/distance to sequestration points, and are typically £140-260/tCO2e."* Given that the current carbon price for the UK ETS is around £50/tCO2e, it is clear that further support may be required. This is presumably why the Balanced Net Zero Pathway scenario presented in the Waste Sector Summary assumes that *"All EfW plants are assumed to install CCS by 2050, starting from the early 2040s"*, rather than expecting CCS to be installed immediately.

Subsequently, the CCC has published a new report – "Progress in reducing emissions. 2021 Report to Parliament" (June 2021). This report takes a less positive view of EfW. Its key recommendations to government (on page 128) are as follows:

- *"The UK's combined recycling rate needs to increase from 52% to at least 59% by 2025 (45% to 50% for household waste), from which point key biodegradable waste streams should be banned from going to landfill.*
- *Energy from Waste (EfW) emissions, which have been rising rapidly, need to be constrained at approximately today's levels through increased waste prevention, re-use and recycling, and policy to enable EfW plants to be fitted with CCS from the late 2020s.*
- *Methane capture rates need to increase from 55% to 80% by 2050 to address fugitive emissions from landfill, while further actions are needed to reduce methane emissions from composting and wastewater treatment."*

The CCC also published in June 2021 its "Joint Recommendations – 2021 report to parliament." This includes a number of recommendations on waste policy, including the following priority recommendations to DEFRA:

- *Introduce the necessary planning guidance and policy to ensure any new Energy from Waste plants (including incineration, gasification & pyrolysis facilities) are built with carbon capture usage and storage (CCUS) or are 'CCUS ready'.*
- *Set out how existing Energy from Waste plants will be supported to be retrofitted with CCUS from late 2020s onwards, with 2050 a backstop date for full CCUS coverage.*
- *Set out capacity and usage requirements for Energy from Waste consistent with plans to improve recycling and waste prevention. Issue guidance to align local authority waste contracts and planning policy to these targets.*

The Applicant notes that the CCC does not make policy, but merely recommendations to government. The Applicant also notes that the CCC has decided to move from its position in December 2020 that the Balanced Net Zero Pathway requires the fitting of CCUS from 2040 to a recommendation in June 2021 for fitting of CCUS from the late 2020s, which is consistent with its "Tailwinds" scenario including much faster emissions reductions. It is not clear why the CCC has made this change. The CCC's recommendations also include gradual banning of waste from landfill, but only once there is sufficient alternative treatment capacity and CCUS has been fitted to sufficient EfW plants.

However, as explained in the Planning Statement, the Portland ERF is well placed to install CCS and export the captured CO2 by ship. Hence, the proposed Portland ERF will be CCS-ready, consistent with the CCC's recommendations.

3 Sequestration of Biogenic Carbon

In paragraphs 33 – 76, UKWIN argues that landfill should be given a credit for sequestering biogenic carbon and then carries out some calculations on the basis of this assertion. The Applicant does not accept this position and therefore does not accept the calculations.

In paragraph 37, UKWIN includes a quote from Eunomia's 2006 report for Friends of the Earth and links to a separate document which includes quotes from two further reports from Eunomia. The Applicant notes that the context of the three repo rts is important:

- The 2006 report "A changing climate for energy from waste" was written by the Chairman and founder of Eunomia for Friends of the Earth. The quotation represented the author's opinion on the correct treatment of biogenic carbon when comparing EfW with landfill. This opinion has not been generally accepted by relevant authorities or government, although it has remained Eunomia's position since then.
- The 2010 report was prepared for the European Commission but, again, represents the author's opinion on the correct treatment of biogenic carbon. The lead author from Eunomia was the same as for the 2006 report. As far as the Applicant is aware, the 2010 report did not lead to any changes in the approach to lifecycle assessment.
- The 2015 report was again prepared by the same author as the 2006 and 2010 reports. It was commissioned by Zero Waste Europe (a group which opposes the use of EfW) and was specifically intended to attack the approach taken under the United Nations Framework Convention on Climate Change (UNFCCC) to assessing the greenhouse gas emissions from the waste sector as part of the national inventories. The UNFCCC reporting guidelines currently mandate the use of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, which specifically exclude biogenic carbon. As far as the Applicant is aware, neither the UNFCCC nor the IPCC has changed its guidelines in response to the Eunomia report.

In summary, while these quotations demonstrate that the Chairman of Eunomia has held a consistent position on this point since 2006 and that UKWIN agrees with this position, the quotations do not support a change in approach by the relevant carbon authorities.

In paragraph 38, UKWIN also states that similar views have been expressed in the academic literature, but provides only one reference to an article published in the Journal of Industrial Ecology in January 2012. UKWIN provides a link to "a version of this paper", which makes it clear that the article is based on the PhD thesis of Annie Levasseur of the University of Montreal in which Ms, now Dr, Levasseur proposes a new approach to biogenic carbon in dynamic life cycle assessment. While this is an interesting thesis, the Applicant does not consider that it represents the academic literature.

The Applicant also notes that the conclusion of the thesis is counter-intuitive. The thesis considers the case study of the use of a wooden chair over 100 years and it concludes that, from a climate change perspective, it would be preferable to landfill the chair at the end of its life or to burn it with energy recovery, rather than refurbishing the chair. This conclusion does not match the waste hierarchy, as it promotes disposal or recovery over reuse.

Paragraphs 39-47 set out UKWIN's calculations on the basis of sequestering biogenic carbon. The Applicant does not accept the basis for these calculations and so has not commented on them.

In paragraphs 48-58, UKWIN disputes the suggestion that a combination of 50% sequestration and 68% landfill gas capture rate is conservative, but does not appear to understand the point which is being made, which is that the two assumptions interact.

Section 6.3 of the Defra Report "Energy Recovery from Residual Waste – A carbon-based modelling approach", read as a whole and attached as Appendix A, clearly indicates that the authors did not recommend that the potential carbon sink effect be included, as explained below:

1. While the impact of the sequestration effect on the carbon model was considered in paragraphs 172-184, the Defra 2014 Report notes that there was considerable uncertainty around the calculation. Paragraph 179 states:

   "A range of different values exist in the literature for the amount of biogenic carbon that is sequestered in landfill. The baseline assumptions used in this model result in a very high level of sequestration, around 53% for the baseline composition. The outcome will be sensitive to the level of sequestration in two ways. Reducing the level of sequestration will require less biogenic carbon to be included in the EfW side of the model and will also result in more methane being emitted from the landfill side. Both factors will favour EfW over landfill."

2. In the submitted Carbon Assessment for the facility (included as technical appendix E of the ES), the Applicant has used a sequestration rate of 50%, which is considered to be a conservative assumption. The Government report "Energy from Waste – A Guide to the Debate" suggests that up to half of the biogenic carbon would be sequestered.

3. Paragraph 184 of the Defra 2014 Report concludes that further work is required to understand sequestration levels:

   "There is an additional complicating factor regarding the assumptions around sequestration levels. The proportion of landfill gas captured is difficult to measure directly so assumed levels have previously been derived from a combination of measurement of the amount of landfill gas captured as a proportion of the amount modelled as being produced. However, the modelling for this also contains assumptions on sequestration. Therefore, any lowering in the sequestration assumptions will also inherently reduce the assumed level of landfill gas capture. This interaction has not been captured in the above analysis. As a result the scenarios outlined above will be particularly sensitive to sequestration levels with any drop in assumed sequestration significantly favouring EfW over landfill. Given all of these interactions there is a high degree of uncertainty and further work is required."

4. The Applicant considers this section of the Defra 2014 Report, taken as a whole, provides an explanation that the assumed landfill gas capture rates in the Defra 2014 Report are based on a high sequestration rate, which may not be correct, and which is at the higher end of rates in the literature (as stated in paragraph 179). If the sequestration rates are lower, then more landfill gas is being generated than expected and so the capture rates would be lower, making the impact of landfill considerably worse. Hence, the approach used in the Defra 2014 Report and in the Carbon Assessment (i.e., using high sequestration and landfill gas capture rates and not giving an additional credit for sequestered carbon) is considered to be conservative, in that it will tend to favour landfill over EfW facilities.

This can be illustrated with a simple example. The base assumptions in the Carbon Assessment are that 50% of biogenic carbon is sequestered and 68% of the released landfill gas is captured. This means that, for every 200 tonnes of biogenic carbon in the waste, 100 tonnes is sequestered, 68 tonnes is used to generate power and 32 tonnes is released as landfill gas. If, instead, only 45% of the biogenic carbon is sequestered, then 90 tonnes of the biogenic carbon would be sequestered and 110 tonnes would form landfill gas. In this example it is known, from measurements, that 68 tonnes is used to generate power and so the landfill gas capture rate would be 68/110 = 61.8%.

The carbon benefit of the Portland ERF can then be recalculated using these revised figures. The carbon benefit increases (in the nominal case) from 21,912 tCO_2e/yr to 46,713 tCO_2e/yr. At a sequestration rate of 29.5% (which is the sensitivity figure used in the Defra 2014 report), the benefit increases to 123,687 tCO_2e/yr. This is why the Applicant considers that the current assumptions are conservative.

UKWIN's arguments in paragraphs 59-65 refer to the Defra 2014 report, and so do not add anything further.

In paragraphs 66 to 67, UKWIN asserts that the sequestration rate is likely to be higher in the future because food and garden waste will be removed. Therefore, we have evaluated the sequestration rate which would be expected using the Decomposable Organic Carbon Content (DDOC) figures from Melmod, as reported in "Review of Landfill Methane Emissions Modelling (WR1908)".

- For the nominal case, the sequestration rate of biogenic carbon would be 47.6%.
- For the maximum case, with a lower CV, the sequestration rate of biogenic carbon would be 47%.
- For an adjusted nominal case, in which we have removed 80% of the food and 70% of the garden waste for illustrative purposes, the sequestration rate of biogenic carbon would be 49%.

This confirms that the assumed sequestration rate of 50% is conservative, and remains conservative even if most of the food/garden waste is removed.

In paragraphs 68 to 76, UKWIN asserts that material from the Canford MBT plant would have a lower degradability. We have no data on the output from Canford MBT. However, if we assume that there is a reduction is degradability of 30% (which was the performance of the AmeyCespa Cambridgeshire MBT? facility) and that this applies to 60,000 tonnes of waste in the nominal case, we can calculate that the adjusted sequestration rate would be 52.8%. This figure changes the net benefit of the nominal case from 21,912 tCO_2e/yr to 17,953 tCO_2e/yr.

4 Landfill as the Counter-factual

UKWIN makes a few specific points in paragraphs 77 to 87 relating to the use of landfill as a counterfactual. The Applicant notes that Dorset Council specifically asked for this case to be considered, as well as the four additional cases which are considered in section 4.4 of the Carbon Assessment.

UKWIN suggests that there is current overcapacity in incineration plants in some European countries. This is correct for individual counties. However, in the EU as a whole, large quantities of municipal waste are sent to landfill. According to Eurostat[1], 53 million tonnes of municipal waste was sent to landfill in the EU in 2019. Therefore, the Applicant continues to consider that incineration plants in the rest of Europe would replace UK waste with waste from elsewhere.

UKWIN suggests four other counterfactuals which were not considered. This is primarily because Dorset Council did not request them. However, none of the counterfactuals are realistic in any event.

1. Biowaste being stabilised and sent to landfill. This is not being done in the UK. It was done in Lancashire for a short while, but this proved to be uneconomic.
2. Increased recycling. The Portland ERF will treat residual waste, so does not compete with recycling.

[1] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Municipal_waste_statistics#Municipal_waste_treatment, accessed 8 June 2021.

3. An alternative plant equipped with carbon capture. This is because there are no such plants operational or planned and any incentive regimes which might lead to CCS would apply equally to the Portland ERF.
4. UK plants which operate as combined heat and power (CHP). This is because none of the UK plants which are in range of Dorset's waste are equipped with CHP.

5 CCGT as the Counter-factual

In paragraphs 88-108, UKWIN asserts that it is not appropriate to use CCGT as the counterfactual electricity source. The Applicant considers that the reasons for this choice are set out in section 3.1.3.1 of the Carbon Assessment and that almost all of UKWIN's points are already addressed therein. The Applicant continues to consider that CCGT is the correct counterfactual. For completeness, however, the Applicant has presented the results using the long term marginal emissions factor for 2024, the likely opening year, in the revised Carbon Assessment submitted with the ES Addendum.

However, the Applicant notes one further point. UKWIN asks for proof that EfW plants are obtaining capacity market contracts. The capacity market auction results are available from https://www.emrdeliverybody.com. As an example, EfW plants secured 74 MW of capacity (4.5%) in the T1 Delivery Year 2021/22 auction and 629 MW of capacity (5%) in the T4 Delivery Year 2024/5 auction, both conducted in March 2021.

6 Carbon Offsetting

In paragraphs 109-118, UKWIN casts doubt on the Applicant's commitment to carbon neutrality. It is difficult to see why. In paragraph 5.53 of the ES, the Applicant commits to agreeing a carbon assessment methodology with the local planning authority and then, if necessary, using verified carbon offsets to ensure that the process emissions are net zero over the lifetime of the plant. This commitment is expanded in paragraphs 6.302 to 6.313 of the planning statement.

The Applicant makes two primary responses to UKWIN's criticisms:

1. UKWIN disputes the appropriate baseline and notes that the methodology has not been stated. This is because the Applicant has committed to agreeing this with the local planning authority, which can be enforced via a planning condition.
2. UKWIN disputes the validity of carbon offsetting. While rejecting this criticism, the Applicant can only restate paragraph 6.310 of the planning statement:

> *"Objectors may question the validity of carbon off-setting and suggest that such proposals do not actually deliver on achieving carbon neutrality, or simply represent a statistical exercise. Such criticisms do not apply to this application because the applicant is prepared to back up its net-zero commitment by entering into a legal agreement with Dorset Council to ensure that the proposed ERF does achieve carbon neutrality. Whilst the precise measures to be applied have yet to be determined, carbon eutrality will be achieved through supporting a number of projects which may include those mentioned above, or sequestration through tree planting or re-wilding off-site or otherwise the use of verified carbon credits such as those marketed as Gold standard carbon credits by retail off-setters, or through supporting local community scale energy efficiency measures."*

3. UKWIN states “it is not surprising that the applicant is not arguing that any weight should be given to their proposed measures for 'achieving carbon neutrality' within the planning balance.” Nothing could be further from the truth and it is not clear why UKWIN chooses to mis-represent the Applicant’s position. The Applicant states, in paragraph 6.313 of the planning statement (our emphasis):

   “Given that the applicant is committed to funding additional carbon off-setting measures in each year that the ERF reduces GHG emissions (compared to baseline), and in each year that the ERF increases GHG emissions (compared to the baseline) will compensate for this by purchasing carbon offsets, the proposed plant will reduce GHG emissions over its lifetime and will achieve carbon neutrality, or better in every operating year. ***This should be afforded great positive weight in the planning balance****.”*

7 Conclusions

UKWIN’s conclusions depend on their earlier arguments, which the Applicant does not accept. Hence, the Applicant rejects UKWIN’s conclusions in their entirety.

Appendices

A - Extract from Defra Report

Section 6.3 of Energy recover for residual waste: A carbon-based modelling approach, February 2014.

Table 20. Central methane scenario (60% initial capture) minimum lifetime biogenic content required

	Minimum lifetime biogenic content required %						
Plant efficiency	Existing plant 1995-2020	Existing plant 2000-2025	Existing plant 2005-2030	Existing plant 2010-2035	New plant 2015-2040	New plant 2020-2045	New plant 2025-2050
30%	40.19	42.46	45.98	50.31	54.8	58.93	62.39
25%	43.47	45.51	48.63	52.46	56.44	60.08	63.12
20%	46.71	48.54	51.26	54.59	58.06	61.22	63.85
15%	49.93	51.53	53.87	56.71	59.68	62.35	64.57

170. Cells shaded green indicate where the lifetime biogenic content required is less than the 50% currently used for deeming of Renewables Obligation Certificates (ROCs). Orange indicates where the content falls in the 60-68% range currently considered likely for mixed municipal waste. This indicates that for the central set of assumptions all plants are viable for municipal waste with a biogenic content at the top end of the commonly used range. As might be expected the low methane scenario required higher biogenic content than the central scenario for a given plant while conversely the high methane scenario required lower biogenic content.

171. Once the plant reaches the end of its 25 year life it needs to still be providing a carbon benefit for that life to be extended. The minimum biogenic content to extend a plant's lifetime to a given year is shown in the table below. Higher biogenic content is required to justify extending a plant's lifetime beyond the initial 25 years under this set of assumptions.

Table 21. Central methane scenario (60% initial capture) Minimum biogenic content required to extend plant life beyond initial 25yr lifetime

	Minimum biogenic content required to extend plant lifetime beyond initial 25 year period %						
Plant efficiency	Existing plant 1995-2020	Existing plant 2000-2025	Existing plant 2005-2030	Existing plant 2010-2035	New plant 2015-2040	New plant 2020-2045	New plant 2025-2050
30%	47.12	52.86	59.67	61.93	64.53	66.48	67.61
25%	49.77	54.84	60.63	62.61	65.03	66.77	67.85
20%	52.4	56.8	61.59	63.29	65.53	67.06	68.09
15%	55.01	58.75	62.55	63.97	66.02	67.34	68.33

6.3. Treatment of biogenic CO_2

172. So far this analysis has ignored biogenic CO_2 emissions based on the assumption that it is short cycle and therefore has no net global warming impact. Impacts from factors such as changes in land use to grow the original plants are accounted for in overall carbon inventories elsewhere and are conventionally not considered as part of waste management or energy generation.

173. However, the model assumes that not all of the biogenic material decomposes in landfill but it is all converted to CO_2 in energy from waste. Landfill therefore acts as a partial carbon sink for the biogenic carbon. This is a potential additional benefit for landfill over energy from waste.

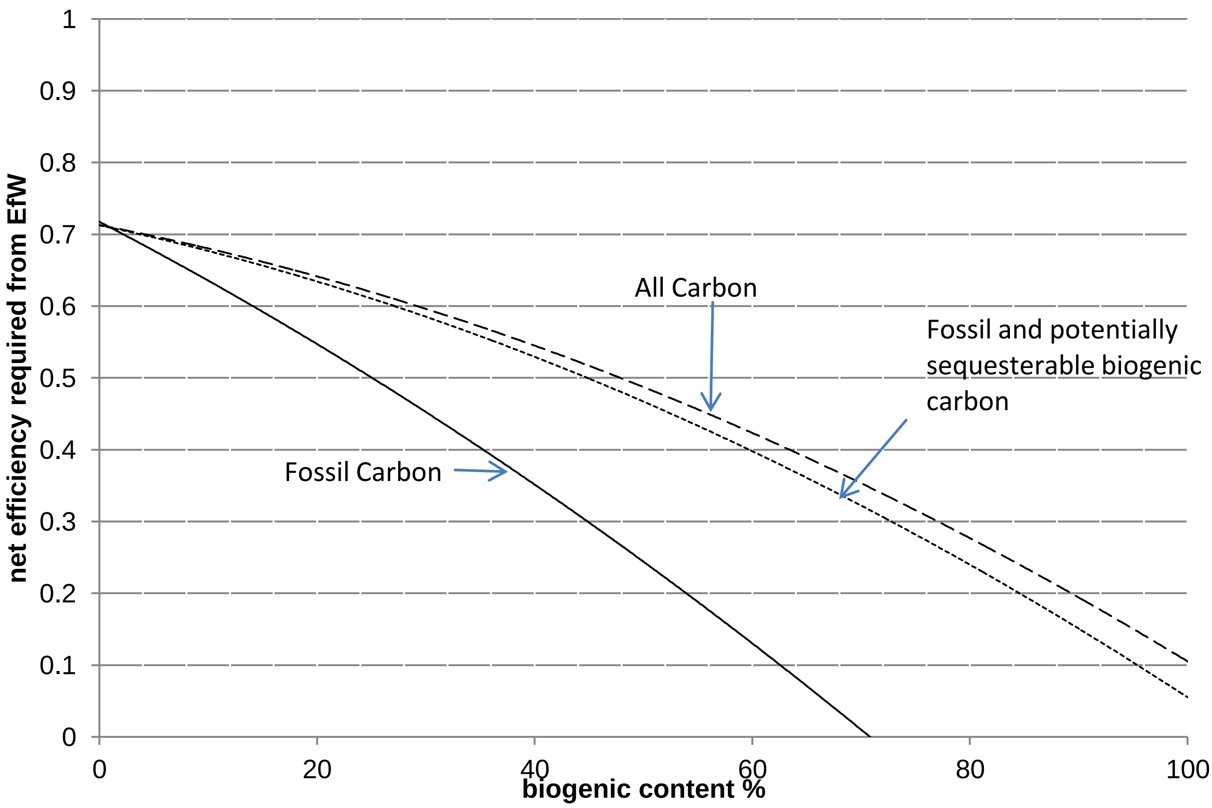
174. There are two ways to account for this additional effect:

- Estimate the amount of biogenic carbon sequestered and include the CO_2 produced from the same amount of carbon in the EfW side of the model (or subtract it from the landfill side)
- Include all carbon emissions, both biogenic and fossil on both sides of the model

175. While both approaches would address the issue of sequestered biogenic carbon the first would potentially be the better solution as it would avoid double counting carbon with other inventories.

176. Both approaches were examined in the model using the baseline set of assumptions (equivalent to the high capture low methane scenario) and the results are shown in Chart 15 below.

Chart 15. Net efficiency of EfW plant required with different biogenic content of waste considering EfW emissions of: only fossil carbon (solid line), fossil and potentially sequesterable biogenic carbon (dotted line) and all carbon (dashed line)



177. It can be seen from Chart 15 that both approaches deliver a very similar change with, as expected, EfW becoming more disfavoured relative to landfill with the greatest change at high biogenic content of the waste. Taking into account sequestered biogenic carbon in landfill will require greater EfW efficiency and/or biogenic content.

178. The similarity between the two approaches is unsurprising as biogenic carbon which is not sequestered in landfill or converted to methane becomes CO_2, as it would in EfW, so for that aspect the two sides of the model cancel out. The slight difference is due to the need for EfW to compensate for the CO_2 offset by electricity generation

from landfill gas when all emissions are considered. The small difference indicates how relatively small a contribution this energy makes to the overall balance. Given this similarity it may be better to consider only the sequestered biogenic C to avoid double counting with other inventories.

179. A range of different values exist in the literature for the amount of biogenic carbon that is sequestered in landfill. The baseline assumptions used in this model result in a very high level of sequestration, around 53% for the baseline composition. The outcome will be sensitive to the level of sequestration in two ways. Reducing the level of sequestration will require less biogenic carbon to be included in the EfW side of the model and will also result in more methane being emitted from the landfill side. Both factors will favour EfW over landfill. To examine the sensitivity of the model to changes in sequestration the baseline proportion of decomposable carbon in each waste type was increased by 50%. This changed the overall proportion of sequestered biogenic carbon from 53% to 29.5%. The values used are summarised in Table 22 below.

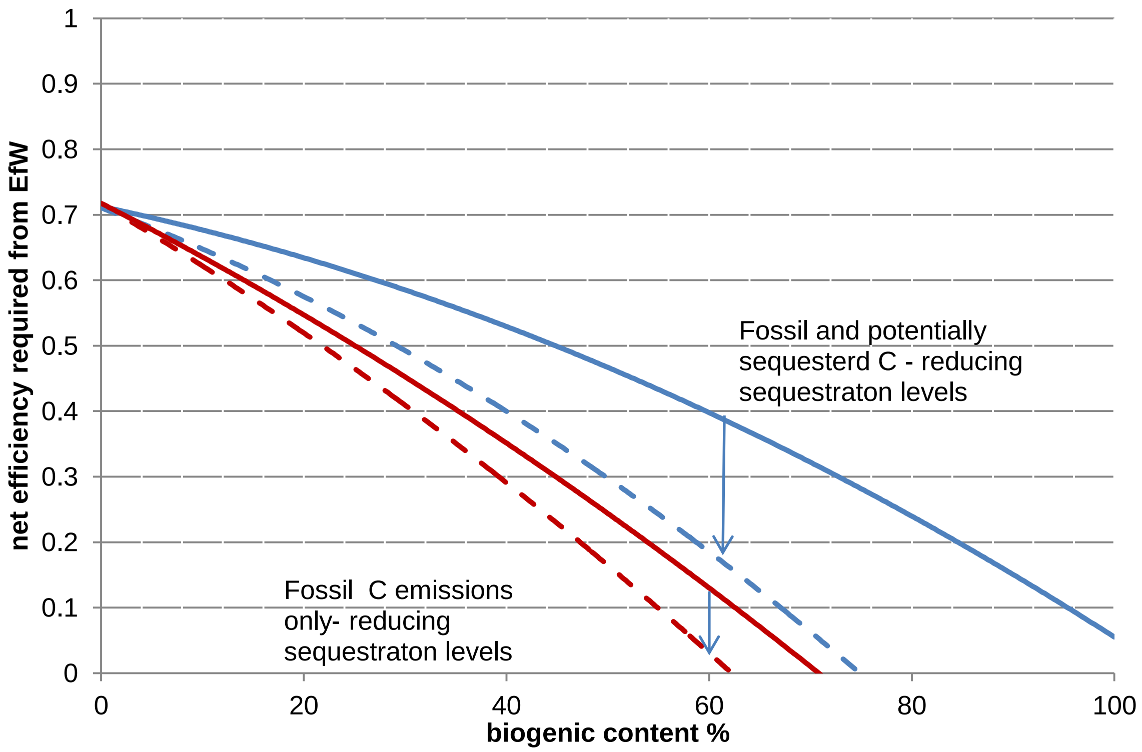
Table 22. Changes in modelled sequestration levels for each component by increasing the proportion of biogenic C considered sequesterable

Material	High sequestration % (model baseline)	Reduced sequestration %
Mixed Paper and Card	50.63	25.94
Plastics		
Textiles (and footwear)	66.65	49.98
Miscellaneous combustibles	53.21	29.82
Miscellaneous non-combustibles	100	100
Food	39.36	9.04
Garden	48.71	23.06
Soil and other organic waste	96.43	94.64
Glass	100	100
Metals, White Goods and Other Non-biodeg Products		
Non-organic fines		
Wood	71.52	57.28
Sanitary / disposable nappies	71.33	57
Total	53.00	29.50

180. By taking this approach materials which already have a high proportion of decomposable carbon are most greatly affected, i.e. Food, Paper and garden waste.

181. The impact of these changes on the model outputs is shown in Chart 16 below.

Chart 16. Impact of reducing the assumed level of carbon that decomposes on model outputs for fossil emissions (red) and fossil and potentially sequestered biogenic C (blue). Baseline model (solid line) and reduced sequestration (dashed line)



182. As noted above, changing the level of sequestration impacts on both the amount of biogenic carbon that needs to be counted on the EfW side of the model and the amount of methane emitted on the landfill side. As a consequence changing the sequestration level impacts not only when considering both fossil and sequestered carbon but also when considering fossil carbon alone.

183. In the example above for the baseline composition (61% biogenic) reducing the amount of sequestration of biogenic carbon from 50% to 30% results in a drop of 10% in the efficicncy required if just considering fossil carbon and 20% if considering both fossil and sequestered biogenic carbon.

184. There is an additional complicating factor regarding the assumptions around sequestration levels. The proportion of landfill gas captured is difficult to measure directly so assumed levels have previously been derived from a combination of measurement of the amount of landfill gas captured as a proportion of the amount modelled as being produced. However, the modelling for this also contains assumptions on sequestration, Therefore any lowering in the sequestration assumptions will also inherently reduce the assumed level of landfill gas capture. This interaction has not been captured in the above analysis. As a result the scenarios outlined above will be particularly sensitive to sequestration levels with any drop in assumed sequestration significantly favouring EfW over landfill. Given all of these interactions there is a high degree of uncertainty and further work is required.