MVV Environment Devonport Ltd Energy from Waste Combined Heat and Power Facility, North Yard, Devonport

Habitats Regulations Assessment

April 2011

Prepared for

MVV Environment Devonport Ltd

Revision Schedule

Habitats Regulations Assessment
April 2011

Rev	Date	Details	Prepared by	Reviewed by	Approved by
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1 Introduction

1.1 Background to the Project

1.1.1 URS/Scott Wilson has been appointed by MVV Environment Devonport Ltd to produce a report to inform a Habitats Regulations Assessment (HRA) of a project to develop an Energy from Waste Combined Heat and Power (EfW CHP) facility, on land in the north east of Her Majesty's Naval Base (HMNB) Devonport, Plymouth. The objective of the assessment is to identify any aspects of the project that are likely to have a significant [adverse] effect on the integrity of Natura 2000 sites, otherwise known as European sites (Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)) or, as a matter of Government policy, Ramsar sites, either in isolation or in combination with other plans and projects.

1.1.2 The site under consideration covers an area of approximately 6.3 hectares in the northern section of HMNB, Devonport, Plymouth, and the proposed EfW CHP facility would have the capacity to process 265,000 tonnes per annum of waste. An EIA Scoping Report was produced in June 2010[1].

1.1.3 The site of the proposed development is not one of the five sites allocated in Plymouth City Council's (PCC) Waste Development Plan Document (DPD)[2] as being suitable for a range of strategic waste management facilities. However, Policy W7 of the Waste DPD states that such facilities at unallocated sites can still achieve planning permission assuming a series of criteria are met. An HRA Screening exercise undertaken in 2007 on this DPD concluded no likely significant effects on European designated sites[3]. However, since the Waste DPD did not include the North Yard site as a proposed location it was not specifically assessed in the HRA of the DPD. In addition, the HRA of the Waste DPD was a high-level HRA to inform a strategic forward planning document produced by the Council; as proposals for individual projects come forward it is necessary for project-specific HRAs to be undertaken since it is only at the project level that the full details of proposed schemes are available.

1.1.4 This report is intended to accompany the planning application for the works and we have therefore avoided reproducing extensive information already presented in the accompanying application documents which include an Environmental Statement. In summary the key elements of the scheme are as follows:

- Construction will take approximately 35 months (including the mobilisation, main construction and commissioning phases). Construction is expected to occur between early 2012 and late 2014.
- The built facility will have the capacity to process 265,000 tonnes of waste per annum
- The waste will be combusted (in a main building of 45m height) and the heat will be used to generate steam. The steam will drive a steam turbine and generate renewable electricity for use at the facility, to supply Devonport Dockyard and HMNB and for export to the grid.

[1] URS/Scott Wilson (June 2010). MVV Umwelt Energy from Waste Combined Heat and Power Facility North Yard, Devonport EIA Scoping Report
[2] Plymouth City Council, April 2008. Plymouth's Waste DPD.
[3] Plymouth City Council, June 2007. Habitat Regulations Assessment of the Plymouth City Council Waste Development Plan Document Screening Report
http://www.plymouth.gov.uk/homepage/environmentandplanning/planning/planningpolicy/ldf/sa/environmentplanninghabitatregs.htm

Steam will also be extracted from the turbine and fed into the Devonport Dockyard and HMNB steam network to be used for heating purposes.

- Solid residues would be left in the form of bottom ash, which will be transported off site for recycling, and flue gas cleaning residue, which will require disposal off site at a licensed hazardous waste landfill. Treated flue gases will be released into the atmosphere via a 95m chimney. A surface water drainage strategy has been developed. All waste, residues, products and other materials will be stored in designated on-site storage areas, bunkers or containers.
- The facility will primarily deal with Municipal Solid Waste (MSW) from south-west Devon authorities, with some processing of commercial and industrial waste also.
- A new clear-span bridge sufficient to take traffic in both directions at once will be required to replace two existing crossings of Weston Mill Stream. The Stream has hydrological connectivity to the Tamar-Tavy Estuary and Plymouth Sound.
- Quality and Environmental Management Systems, compliant with ISO 9001 and ISO 14001, will be implemented. Policies and procedures for the prevention and control of spillages that may cause harm to the environment will be developed, maintained and implemented.

1.2 Current Legislation

1.2.1 The need for an assessment of impacts on Natura 2000 sites is set out within Article 6 of the EC Habitats Directive 1992, and interpreted into British law by the Conservation of Habitats and Species Regulations 2010. The ultimate aim of the Directive is to "*maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest"* (Habitats Directive, Article 2(2)). This aim relates to habitats and species, not the European sites themselves, although the sites have a significant role in delivering favourable conservation status.

1.2.2 The Habitats Directive applies the precautionary principle to European sites. Plans and projects can only be permitted having ascertained that there will be no adverse effect on the integrity of the site(s) in question. Plans and projects with predicted adverse impacts on European sites may still be permitted if there are no alternatives to them and there are Imperative Reasons of Overriding Public Interest (IROPI) as to why they should go ahead. In such cases, compensation would be necessary to ensure the overall integrity of the site network.

1.2.3 In order to ascertain whether or not site integrity will be affected, an assessment should be undertaken of the plan or project in question. While the competent authority (e.g. the local planning authority) makes the formal decision as to whether significant effects are likely, they are entitled to request the applicant to produce the necessary information to assist them. That is the purpose of this document.

Box 1. The legislative basis for Appropriate Assessment

Habitats Directive 1992

Article 6 (3) states that:

"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives."

Conservation of Habitats and Species Regulations 2010

The Regulations state that:

"*A competent authority, before deciding to … give any consent for a plan or project which is likely to have a significant effect on a European site … shall make an appropriate assessment of the implications for the site in view of that sites conservation objectives… The authority shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site*".

1.2.4 Over the years the phrase 'Habitats Regulations Assessment' has come into wide currency to describe the overall process set out in the Conservation of Habitats and Species Regulations from screening (Likely Significant Effects) through to IROPI. This has arisen in order to distinguish the process from the individual stage described in the law as an 'appropriate assessment'. Throughout this report we use the term Habitat Regulations Assessment for the overall process and restrict the use of Appropriate Assessment to the specific stage of that name.

1.3 Scope of the Project

1.3.1 There is no pre-defined guidance that dictates the physical scope of an HRA of a project such as the proposed EfW CHP facility. Therefore, in considering the physical scope of the assessment, we were guided primarily by the identified impact pathways rather than by arbitrary 'zones'. The only instance where geographic zones were used relates to air quality; the Environment Agency guidance on screening point-source pollution emitters for more detailed assessment[4] lists the presence of a Natura 2000 site within 10km as one of the indicators that detailed assessment (i.e. dispersion-modelling) may be required for a planning application/ Integrated Pollution Prevention and Control (IPCC) consent. Therefore we have used the 10km figure as a basis on which to screen sites in and out of assessment.

1.3.2 There are two European designated sites that lie within 10km of the proposed EfW CHP facility boundary:

- Plymouth Sound and Estuaries SAC, approximately 500m to the west; and
- Tamar Estuaries Complex SPA, approximately 2km to the north-west.

[4] Environment Agency. 2003. Integrated Pollution Prevention and Control - Environmental Assessment and Appraisal of BAT. Horizontal Guidance Note IPPC H1

1.3.3 Although South Dartmoor Woods SAC lies outside the 10km zone, it is nonetheless included in the assessment since it is only 400m outside this zone; this was requested by Natural England. It has also been requested by PCC officers that Dartmoor SAC should also be considered although it lies considerably more than 10km distant. It was agreed in discussions over scope with Natural England that Blackstone Point SAC would not need to be assessed as part of this HRA[5]. The figure in Appendix 1 shows the location of the European sites in relation to the site. The interest features for the internationally important sites discussed in this assessment (i.e. their reasons for designation) are given in Appendix 2.

1.4 This Report

1.4.1 Chapter 2 of this report explains the process by which the HRA has been carried out. Chapter 3 explores the relevant pathways of impact and sets these into the context of the proposed plan of works. Chapter 4 details an HRA Screening exercise undertaken to determine whether there could be likely significant adverse effects of the works on European designated sites. The key findings are summarised in Chapter 5: Overall Conclusions.

[5] Meeting between Ian Roach, Danny Duce and Paul Gregory (URS/Scott Wilson) with Simon Dunsford and Sarah Jones of Natural England on 03/11/10

2 Methodology

2.1 Introduction

2.1.1 In practice, HRA of projects can be broken down into three discrete stages, each of which effectively culminates in a test. The stages are sequential, and it is only necessary to progress to the following stage if a test is failed. The stages are:

2.2 Stage 1 – Likely Significant Effect Test

2.2.1 The purpose of this test is to decide whether Appropriate Assessment is required. The essential question is:

"Is the project, either alone or in combination with other relevant projects and plans, likely to result in a significant [adverse] *effect upon European sites?"*

2.2.2 If it can be demonstrated that significant effects are unlikely, no further assessment is required.

2.2.3 Legal judgments in the field of HRA/Appropriate Assessment, particularly the 'Dilly Lane' case[6], have identified that when undertaking the screening appraisal it is legally acceptable to take account of measures which have been developed to ensure that a significant effect is unlikely: "*If certain features (to use a neutral term) have been incorporated into that project, there is no sensible reason why those features should be ignored at the initial, screening, stage merely because they have been incorporated into the project in order to avoid, or mitigate, any likely effect on the SPA"*. This has therefore been the approach taken to screening in this document, considering the project as a whole.

2.3 Stage 2 – Appropriate Assessment

2.3.1 If it cannot be satisfactorily demonstrated that significant effects are unlikely, an 'Appropriate Assessment' will be required. In many ways this is analogous to an Ecological Impact Assessment, but is focussed entirely upon the designated interest features of the European sites in question. Bespoke survey work and original modelling and data collation are usually required. The essential question here is:

"Will the project, either alone or in combination with other relevant projects and plans, actually result in an adverse effect upon the integrity of any European sites, without mitigation?"

2.3.2 If it is concluded that adverse effects will occur, measures will be required to either avoid the impact in the first place, or to mitigate the ecological effect to such an extent that it is no longer significant. Note that, unlike standard Ecological Impact Assessment, compensation for adverse effects (i.e. creation of alternative habitat) is not permitted at the Appropriate Assessment stage.

[6] EWHC 1204 (Admin). 2008. THE QUEEN ON THE APPLICATION OF HART DISTRICT COUNCIL v THE SECRETARY OF STATE FOR COMMUNITIES AND LOCAL GOVERNMENT, LUCKMORE LIMITED and BARRATT HOMES LIMITED

2.4 Stage 3 – Imperative Reasons of Overriding Public Interest (IROPI) Test

2.4.1 If a project will have an adverse effect upon a European site, and this effect cannot be either avoided or mitigated, the project cannot proceed unless it passes the IROPI test. In order to pass the test it must be objectively concluded that no alternative solutions exist. The project must be referred to Secretary of State on the grounds that there are Imperative Reasons of Overriding Public Interest as to why the plan should nonetheless proceed.

2.5 Confirming Other Plans and Projects That May Act In Combination

2.5.1 It is a requirement of the Regulations that the impacts of any plan or project being assessed are not considered in isolation but in combination with other plans and projects that may also be affecting the European site(s) in question. The principal other plans and projects of relevance in this case are:

Projects

- New England Resource Recovery Centre, Lee Mill, Devon; and
- Devonport Landing Craft Collocation Project.

Plans

- Plymouth LDF Core Strategy (Adopted, 2007);
- Cornwall LDF Core Strategy (Options, 2011);
- South Hams LDF Core Strategy (Adopted, 2006);
- West Devon LDF Core Strategy (Submission, 2010; Recommended Changes, 2010);
- Dartmoor National Park LDF Core Strategy (Adopted, 2008);
- Plymouth Waste DPD (Adopted, 2008);
- Plymouth Municipal Waste Management Strategy (2007);
- Torbay Municipal Waste Strategy (Adopted, 2008);
- Municipal Waste Strategy for Devon (2005);
- Cornwall Waste Local Plan (2003);
- Devon and Torbay Local Transport Plan 3 (Proposed, 2011);
- Cornwall draft Local Transport Plan 3 (2010); and
- Tamar Estuaries Management Plan 2006-2012.

2.5.2 It should be noted that, while the broad potential impacts of these other projects and plans will be considered, we do not propose carrying out full HRA on each of these plans/projects – we will however draw upon existing HRA that have been carried out for surrounding regions and plans.

3 Pathways of Impact

3.1 Introduction

3.1.1 In carrying out an HRA it is important to determine the various ways in which the project in question could theoretically impact on European sites by following the pathways along which development can be connected with European sites, in some cases many kilometres distant. Briefly defined, pathways are routes by which a change in activity associated with a development can lead to an effect upon a European site. In this case, following consideration of the sensitivities of the surrounding European sites and the details of the project, the following pathways have been identified (note that this does not mean that significant effects are likely, that will be considered in Chapter 4):

- Disturbance from noise and vibration or the visual presence of construction workers;
- Air quality impacts from deposition of pollutants; and
- Water quality impacts via Weston Mill Stream (both in terms of direct discharge/runoff of water into the Stream and sediment impacts from the bridge installation).

3.2 Disturbance

Disturbance of fish and other aquatic wildlife

3.2.1 Construction of a facility such as an EfW CHP facility in close proximity to aquatic habitats has the potential to create effects on aquatic wildlife.

3.2.2 The main risk posed by operations such as piling and the associated underwater noise generated on fish is physical injury. Underwater noise emissions (at high sound pressure levels) can cause fish injuries such as swim-bladder rupture and the formation of gas embolisms in the bloodflow, especially in the eyes[7].

3.2.3 A further risk associated with underwater noise generated by piling is the creation of an acoustic barrier to fish migration. Acoustic barriers/deterrents have the potential to impede fish as they migrate up and down an estuary. Any factor that limits the ability of fish to reach spawning grounds will potentially have an effect of poor recruitment for a given species in that year.

Disturbance of birds

3.2.4 Human activity can affect birds either directly (e.g. through causing them to flee) or indirectly (e.g. through damaging their habitat). The most obvious direct effect is that of immediate mortality such as death by shooting, but human activity can also lead to behavioural changes (e.g. alterations in feeding behaviour, avoidance of certain areas *etc.*) and physiological changes (e.g. an increase in heart rate) that, although less noticeable, may ultimately result in

[7] Turnpenny A W H, Nedwell J R (1994) 'The effects on marine fish, diving mammals and birds of underwater sound generated by seismic surveys'. FARL Report Reference: FCR 089/94, October 1994

major population-level effects by altering the balance between immigration/birth and emigration/death[8].

3.3 Atmospheric Pollution

3.3.1 The main pollutants of concern for European sites are oxides of nitrogen (NOx), ammonia (NH_3) and sulphur dioxide (SO_2). NOx can have a directly toxic effect upon vegetation. In addition, greater NOx or ammonia concentrations within the atmosphere will lead to greater rates of nitrogen deposition to soils. An increase in the deposition of nitrogen from the atmosphere to soils is generally regarded to lead to an increase in soil fertility, which can have a serious deleterious effect on the quality of semi-natural, nitrogen-limited terrestrial habitats.

Table 1: Main sources and effects of air pollutants on habitats and species

Pollutant	Source	Effects on habitats and species
Acid deposition	SO_2, NOx and ammonia all contribute to acid deposition. Although future trends in S emissions and subsequent deposition to terrestrial and aquatic ecosystems will continue to decline, it is likely that increased N emissions may cancel out any gains produced by reduced S levels.	Can affect habitats and species through both wet (acid rain) and dry deposition. Some sites will be more at risk than others depending on soil type, bed rock geology, weathering rate and buffering capacity.
Ammonia (NH_3)	Ammonia is released following decomposition and volatilisation of animal wastes. It is a naturally occurring trace gas, but levels have increased considerably with expansion in numbers of agricultural livestock. Ammonia reacts with acid pollutants such as the products of SO_2 and NO_X emissions to produce fine ammonium (NH_4+)- containing aerosol which may be transferred much longer distances (can therefore be a significant trans-boundary issue.)	Adverse effects are as a result of nitrogen deposition leading to eutrophication. As emissions mostly occur at ground level in the rural environment and NH_3 is rapidly deposited, some of the most acute problems of NH_3 deposition are for small relict nature reserves located in intensive agricultural landscapes.
Nitrogen oxides NO_x	Nitrogen oxides are mostly produced in combustion processes. About one quarter of the UK's emissions are from power stations, one-half from motor vehicles, and the rest from other industrial and domestic combustion processes.	Deposition of nitrogen compounds (nitrates (NO_3), nitrogen dioxide (NO_2) and nitric acid (HNO_3)) can lead to both soil and freshwater acidification. In addition, NO_x can cause eutrophication of soils and water. This alters the species composition of plant communities and can eliminate sensitive species.
Nitrogen (N) deposition	The pollutants that contribute to nitrogen deposition derive mainly from NO_X and NH_3 emissions. These pollutants cause acidification (see also acid deposition) as well as eutrophication.	Species-rich plant communities with relatively high proportions of slow-growing perennial species and bryophytes are most at risk from N eutrophication, due to its promotion of competitive and invasive species which can respond readily to elevated levels of N. N deposition can also increase the risk of damage from abiotic factors, e.g. drought and frost.
Ozone (O_3)	A secondary pollutant generated by photochemical reactions from NO_x and volatile organic compounds (VOCs). These	Concentrations of O_3 above 40 ppb can be toxic to humans and wildlife, and can affect buildings. Increased ozone concentrations

[8] Riley, J. 2003. Review of Recreational Disturbance Research on Selected Wildlife in Scotland. Scottish Natural Heritage.

Pollutant	Source	Effects on habitats and species
	are mainly released by the combustion of fossil fuels. The increase in combustion of fossil fuels in the UK has led to a large increase in background ozone concentration, leading to an increased number of days when levels across the region are above 40ppb. Reducing ozone pollution is believed to require action at international level to reduce levels of the precursors that form ozone.	may lead to a reduction in growth of agricultural crops, decreased forest production and altered species composition in semi-natural plant communities.
Sulphur Dioxide SO_2	Main sources of SO_2 emissions are electricity generation, industry and domestic fuel combustion. May also arise from shipping and increased atmospheric concentrations in busy ports. Total SO_2 emissions have decreased substantially in the UK since the 1980s.	Wet and dry deposition of SO_2 acidifies soils and freshwater, and alters the species composition of plant and associated animal communities. The significance of impacts depends on levels of deposition and the buffering capacity of soils.
Hydrogen fluoride HF and Hydrogen Chloride HCl	Both of these chemicals are produced in small amounts as a result of certain energy from waste facilities, principally incineration.	HF is the most phytotoxic of all air pollutants. It accumulates in very high concentrations in the margins of leaves. In sensitive species this may lead to distortion of the leaf shape, chlorosis (yellowing), red colouration and, in extreme cases, death of tissues. HCl can also have local, direct, effects on plants, but there is little information available about dose-response relations
Dioxins	These are long-lived organic compounds, which form when chlorinated substances in the waste, such as PVC plastic, are burnt. Dioxin emissions to air from incinerators are thought to have decreased significantly in recent years. Four sources account for 74% of the total air emissions. These are legal municipal waste incineration (26%), sinter plants (18%), residential wood combustion (boilers, stoves, fireplaces, 16%) and incineration of hospital waste (14%). The incineration of hazardous industrial waste contributes less than 1%.[9]	Accumulate in the food chain.

3.3.2 Sulphur dioxide emissions are overwhelmingly influenced by the output of power stations and industrial processes that require the combustion of coal and oil as well as,particularly on a local scale, shipping. The UK Air Pollution Information Systems (APIS)[10] results do not suggest that sulphur deposition is a problem at most European sites, although where port or shipping expansions are concerned, sulphur emissions can be a significant issue.

3.3.3 Ammonia emissions are dominated by agriculture, with some chemical processes also making notable contributions. NOx emissions, however, are dominated by the output of vehicle exhausts (more than half of all emissions). For example, within a 'typical' housing development,

[9] Chlorine Online Information Resource website
http://www.eurochlor.org/upload/documents/document57.pdf
[10] www.apis.ac.uk

by far the largest contribution to NOx (92%) will be made by the associated road traffic. Other sources, although relevant, are of minor importance (8%) in comparison[11].

3.3.4 According to the World Health Organisation, the critical NOx concentration (critical threshold) for the protection of vegetation is 30 μgm^{-3}.

3.3.5 The National Expert Group on Transboundary Air Pollution (2001)[12] concluded that:

- In 1997, critical loads for acidification were exceeded in 71% of UK ecosystems. This was expected to decline to 47% by 2010.
- Reductions in SO_2 concentrations over the last three decades have virtually eliminated the direct impact of sulphur on vegetation.
- By 2010, deposited nitrogen was expected to be the major contributor to acidification, replacing the reductions in SO_2.
- Current nitrogen deposition is probably already changing species composition in many nutrient-poor habitats, and these changes may not readily be reversed.
- The effects of nitrogen deposition are likely to remain significant beyond 2010.
- Current ozone concentrations threaten crops and forest production nationally. The effects of ozone deposition are likely to remain significant beyond 2010.
- Reduced inputs of acidity and nitrogen from the atmosphere may provide the conditions in which chemical and biological recovery from previous air pollution impacts can begin, but the timescales of these processes are very long relative to the timescales of reductions in emissions.

3.3.6 Grice *et al*[13] [14] do however suggest that air quality in the UK will improve significantly over the next 15 years due primarily to reduced emissions from road transport and power stations.

3.3.7 Since ammonia is of relevance to European sites primarily through its effect upon nitrogen deposition, it is not considered independently of nitrogen deposition in this assessment. Since NOx can be directly toxic to plants, it is considered separately from its influence on nitrogen deposition in this assessment.

3.3.8 Eutrophication of sensitive habitats through atmospheric deposition is a widely acknowledged phenomenon, although it is extremely difficult to measure as its effects are often hidden by changes in local nutrients (i.e. via direct fertilisation) or changes in grazing pressure.

3.3.9 In well-managed sites, the effects of eutrophication may be to some extent counteracted through an increase in grazing pressure. Bobbink et al.[15] suggest that sites with low intensity

[11] Proportions calculated based upon data presented in Dore CJ et al. 2005. UK Emissions of Air Pollutants 1970 – 2003. UK National Atmospheric Emissions Inventory. http://www.airquality.co.uk/archive/index.php
[12] National Expert Group on Transboundary Air Pollution (2001) Transboundary Air Pollution: Acidification, Eutrophication and Ground-Level Ozone in the UK.
[13] Grice, S., T. Bush, J. Stedman, K. Vincent, A. Kent, J. Targa and M. Hobson (2006) Baseline Projections of Air Quality in the UK for the 2006 Review of the Air Quality Strategy, report to the Department for Environment, Food and Rural Affairs, Welsh Assembly Government, the Scottish Executive and the Department of the Environment for Northern Ireland.
[14] Grice, S., J. Stedman, T. Murrells and M. Hobson (2007) Updated Projections of Air Quality in the UK for Base Case and Additional Measures for the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007, report to the Department for Environment, Food and Rural Affairs, Welsh Assembly Government, the Scottish Executive and the Department of the Environment for Northern Ireland.

management may have lower critical thresholds than those in higher levels of management. Reintroducing grazing into ungrazed or under-grazed sites can help to counteract changes in vegetation due to nitrogen deposition; however increasing grazing on sites that are already well-grazed may have a direct adverse impact on the plants for which the site was designated. Moreover, the droppings of grazing animals will themselves contribute to nutrient enrichment, which must be taken into consideration to ensure that the presence of the livestock themselves does not negate the purpose of intensifying the management.

3.3.10 Furthermore, air pollution can act synergistically with insufficient grazing to exacerbate management problems and lead to a coarser species-poor sward. A changing climate (i.e. rising temperatures and reduced summer rainfall) is further exacerbating the situation by putting sensitive habitats and species under increasing stress, in turn reducing their competitive ability and increasing susceptibility to pathogens.

Oxides of nitrogen and nitrogen deposition

3.3.11 The most acute impacts of NOx take place close to where they are emitted, but individual sources of pollution will also contribute to an increase in the general background levels of pollutants at a wider scale, as small amounts of NOx and other pollutants from the pollution source are dispersed more widely by the prevailing winds.

3.3.12 The main sources of NOx in the UK are[16]:

- Road and other transport (approximately 47%; greater in urban areas);
- Public power generation using fossil fuels (22%);
- Combustion in industrial processes[17] (14%); and
- Domestic and commercial sources (4%), e.g. commercial boilers in schools, hospitals etc.

3.3.13 The following air pollution limit value applies for the protection of vegetation and ecosystems from NOx:

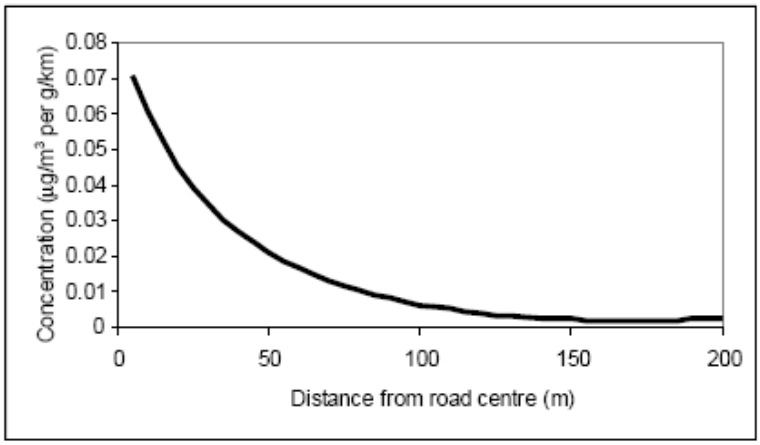
3.3.14 World Health Organisation 30 μgm^{-3} annual average; EU Air Quality Framework Directive 30 μgm^{-3} annual average away from areas close to main roads, built up areas or major industrial sites; Natural England policy in agreement with the Environment Agency in their Review of Consents process is that the 30 μgm^{-3} threshold should apply to all designated sites, due to the sensitivity of the habitats within the sites.

Transport exhaust emissions

3.3.15 According to the Department of Transport's Transport Analysis Guidance, "Beyond 200m, the contribution of vehicle emissions from the roadside to local pollution levels is not significant" [18].

[15] Bobbink, Ashmore, Braun, Fluckiger and Vanden Wyngaert. 2002. Work on critical loads for natural and semi-natural systems ("*Empirical nitrogen critical loads for natural and semi-natural ecosystems 2002 update*")
[16] Dore CJ et al. 2005. UK Emissions of Air Pollutants 1970 – 2003. UK National Atmospheric Emissions Inventory. http://www.airquality.co.uk/archive/index.php
[17] Combustion of coal and oil, some refinery processes and the production of sulphuric acid and other chemicals
[18] www.webtag.org.uk/archive/feb04/pdf/feb04-333.pdf

Figure 2 – Traffic contribution to concentrations of pollutants at different distances from a road (Source: DfT)



3.3.16 This is therefore the distance that has been used throughout this report in order to determine whether European sites are likely to be significantly affected by development under the MWDF. One European site within the scope of this assessment (Plymouth Sound & Estuaries SAC) lies within 200m of the A38 and it is therefore necessary to establish whether the proposed EfW CHP facility would result in a significant increase in traffic movements or deposition along the road side.

Energy from Waste

3.3.17 While traffic makes the largest overall contribution to NOx, some individual point sources can also result in substantial increases in the local NOx concentration. Of those point sources associated with waste treatment, thermal treatment / Energy from Waste facilities[19] have the potential to emit the greatest amounts, as any form of thermal treatment involves the emission of exhaust gases.

3.3.18 Incineration (mass burn) is currently the only thermal treatment technology that can be accurately modelled. Use of this technology can emit large quantities of NOx, but the NOx emissions of any form of incinerator, and their distances to deposition, are entirely dependent upon specific parameters of the facility (e.g. chimney height).

3.4 Water Quality

3.4.1 The quality of the water within and around European sites is an important determinant of the nature of their habitats and the species they support. Poor water quality can have a range of environmental impacts:

- At high levels, toxic chemicals and metals can result in immediate death of aquatic life, and can have detrimental effects even at lower levels, including increased vulnerability to disease and changes in wildlife behaviour.
- Eutrophication, the enrichment of plant nutrients in water, increases plant growth and consequently results in oxygen depletion. Algal blooms, which commonly result from

[19] Energy from Waste (or Waste to Energy) refers to those types of thermal treatment that incorporate energy recovery technology.

eutrophication, increase turbidity and decrease light penetration. The decomposition of organic wastes that often accompanies eutrophication deoxygenates water further, augmenting the oxygen depleting effects of eutrophication. In the marine environment, nitrogen is the limiting plant nutrient and so eutrophication is associated with discharges containing available nitrogen.

- Some pesticides, industrial chemicals, and components of sewage effluent are suspected to interfere with the functioning of the endocrine system, possibly having negative effects on the reproduction and development of aquatic life.

3.4.2 Vehicles and mechanical plant carrying fuel and construction materials and waste will be operating in the vicinity of European designated sites that are sensitive to water pollution and therefore there is potential for any spillages to cause significant adverse effects.

3.5 Summary

3.5.1 Given the pathways of potential impact described above, the Likely Significant Effect test detailed in the following chapter will investigate the following specific impacts on Plymouth Sound & Estuaries SAC, Tamar Estuaries Complex SPA, South Dartmoor Woods SAC and Dartmoor SAC:

- Disturbance due to noise/vibration during construction or operation on sensitive species;
- Water quality impacts; and
- Air quality impacts (both from the operational EfW CHP facility and from road traffic).

4 Likely Significant Effect Test (Screening)

4.1 Noise and vibration

Plymouth Sound & Estuaries SAC

4.1.1 Plymouth Sound and Estuaries SAC is situated approximately 500m to the west of the development site. The only interest feature of the SAC that is sensitive to noise and vibration is the Allis shad (*Alosa alosa*). While 'in river' piling can cause noise and vibration that can travel a significant distance through the water, and if undertaken at inappropriate times of year provide a barrier to fish dispersal or even direct kills, land-based piling involves a damping effect that considerably restricts travel of noise and vibration through adjacent waterbodies, particularly when situated as far away as the SAC is from this development site. Moreover, bored (as opposed to percussive) piling will be utilised as part of the EfW CHP facility construction which further reduces the noise and vibration that will be produced. As such it is considered very unlikely in this case that construction piling would have a significant effect on Allis shad.

Other plans and projects

4.1.2 Numerous additional plans and projects are currently identified for delivery in the surrounding area including the New England Resource Recovery Centre at Lee Mill and the Devonport Landing Craft Collocation Project. In addition the Core Strategies for Plymouth, Cornwall, South Hams and West Devon will all result in an increase in housing (and potentially the population) around the SAC. The Plymouth Waste DPD also identifies other waste sites within the vicinity of Plymouth Sound & Estuaries.

4.1.3 However, there is no mechanism for the proposed EfW CHP facility at Devonport to operate 'in combination' with any of these projects or plans in terms of either heightening their effects (such that they would be rendered significant when previously judged to be 'not significant') or creating new impacts/effects that have not already been considered in this HRA. As such, significant effects are still considered unlikely.

Tamar Estuaries Complex SPA

4.1.4 The Tamar Estuaries Complex SPA is situated approximately 2km to the north-west of the development site and is separated from it by large amounts of urban development. Noise and vibration from piling can carry a considerable distance from the source. However, the noise levels will be effectively reduced to background noise well within 2km of the development site, which is sufficiently far from the boundary of the SPA for us to be able to conclude that significant effects are unlikely.

Other plans and projects

4.1.5 Conclusions are as for the Plymouth Sound & Estuaries SAC.

South Dartmoor Woods SAC

4.1.6 None of the interest features of this SAC are vulnerable to noise and vibration; furthermore the SAC is at considerable distance from the proposed site of the EfW CHP facility (>10km). Significant effects are therefore unlikely.

Dartmoor SAC

4.1.7 Although two interest features of the SAC (Atlantic salmon and otter) would be sensitive to noise and vibration, the SAC is sufficiently distant from the proposed EfW CHP facility site that there will be no perceptible noise/vibration above background levels anywhere within the SAC.

4.2 Water quality

Plymouth Sound & Estuaries SAC

4.2.1 Plymouth Sound and Estuaries SAC is situated approximately 500m to the west of the development site and its qualifying habitats and species are all sensitive to deterioration in water quality and (to a lesser extent) changes in flow patterns and rates.

4.2.2 A tributary of the SAC (the Weston Mill Stream) lies immediately adjacent to the development site. The drainage of hardstandings will pass through a class 1 by-pass petrol interceptor prior to being discharged to the Weston Mill Stream. An isolation valve is also provided on the discharge outfall to control any discharge in critical events.

4.2.3 There is currently no official drainage network servicing the site. Surface water generated on the low lying land to the north of the site is thought to infiltrate into the subsoil or drain to Weston Mill Stream.

4.2.4 There are a number of pollution prevention and drainage management features which are inherent within the design of the proposed EfW CHP facility. These will provide protection to surrounding water features and are summarised below:

- The facility will operate under strict operational conditions imposed by the Environmental Permit, to be issued and then monitored by the Environment Agency.
- Rapid acting roller shutter doors will be incorporated in the entrance to the tipping hall to minimise the time during which these doors are open.
- All transfer of waste from vehicles to the bunker and all waste handling will occur within the main building.
- Litter and detritus will be cleared up on a daily basis with particular emphasis on public areas. Any litter escaping the site or deposited by site users will be cleared up to a 10m distance from the site boundaries.
- The waste bunker is to be constructed from reinforced concrete rendering it impermeable and so preventing potential seepage to groundwater.
- Air pollution control (APC) residue silos will be emptied into sealed pneumatically loaded bulk powder carriers.
- Incinerator bottom ash (IBA) will be loaded inside the main building by means of an automatic travelling overhead grab crane into a collection vehicle. The vehicle will be sheeted before leaving the ash loading station.
- Air for the furnace will be extracted from above the waste bunker to help maintain a negative air pressure to control accumulation of dust.
- The water treatment plant to be used during the initial fill of boiler and small volumes of system top up will be located within a bunded area, with additional bunded storage areas to store the boiler water treatment chemicals.

- All chemical substances and hazardous materials are to be stored in accordance with Environment Agency guidelines in bunded areas.
- Kelda Water Services will carry out all works necessary to provide the water and sewerage connections to the facility.
- The drainage of hardstandings will pass through a class 1 by-pass petrol interceptor prior to being discharged to Weston Mill Stream, downstream of the existing access bridge.
- In normal operation, the plant will produce no liquid effluent. Clean water such as boiler blowdown water or backwash water from the boiler water treatment plant will be returned to the ash quench water seal system on the boiler. Dirty water such as the run-off from the IBA conveying system will be returned to the ash quench system. There are no emissions to water arising from the baling process. Therefore in normal operation the only discharge to foul sewer is from the sanitary and domestic facilities.
- Occasionally there will be the need to discharge process water from the facility (e.g. during shutdowns, when periods of increased steam off-take with high condensate losses by the MOD leads to increased waste water from the water treatment plant) and for this purpose a neutralisation tank and water quality testing are provided with a controlled discharge to the foul sewer to ensure compliance with the requirements of the trade effluent discharge consent for the facility.

4.2.5 A number of measures will be put in place during the construction phase to reduce the risk of adverse impacts on water quality; further detail is provided below. A Construction Environmental Management Plan (CEMP) will be produced prior to construction and an outline CEMP is provided in ES Appendix 6.3. In addition the civil engineering contractor, Kier, has produced a number of documents which contain information regarding the techniques and methods that will be used to limit the impact of the construction phase on the water environment as follows:

- Method Statement for the installation of foundations for the Air Cooled Condensers – see ES Appendix 6.4;
- Method Statement for the construction of the new clear span bridge – see ES Appendix 6.5; and
- Method Statement for the construction of the Bull Point access road – see ES Appendix 6.6.

4.2.6 There are various construction works which need to be carried out within and adjacent to Weston Mill Stream e.g. the demolition of two existing culvert road bridges and construction of their replacement clear span bridge. The design of the new structure has been significantly influenced by the need to ensure protection of the water environment, specifically the span of the new bridge will keep the new abutments clear of the water.

4.2.7 Land Drainage Consent will be required from the Environment Agency under the Land Drainage Act of 1991 well in advance of construction commencing.

4.2.8 Additional planned protection measures include extension of the existing sheet pile abutments and construction of the new abutments behind these so that any loose material cannot enter the watercourse. The excavation will be dewatered and all pumped water will be discharged through a series of 'Siltbuster' settlement tanks before it is allowed to enter the stream. In addition to this, during the more environmentally risky operations such as piling or concrete placement the stream will be continually visually monitored for turbidity and any impending risk of contamination. Plant maintenance checks will also be increased in frequency during these operations.

4.2.9 Short term surveillance monitoring will be undertaken in advance of construction in order to establish a baseline. The short term surveillance monitoring should include specific water quality monitoring for shallow groundwater and surface water and assessment of existing Water Framework Directive data regarding the ecological status of the watercourse.

4.2.10 Further surveillance monitoring will then be undertaken during construction. Regular weekly monitoring and water sampling will be undertaken at specific points, these inspections should include visual reference, turbidity and pH levels. All records of water monitoring inspections will be kept on site throughout the duration of the project and be readily available for inspection by the Client, Kier or any regulatory body. In periods of heavy rainfall or excessive vehicle movements within the vicinity, monitoring should be increased to reduce risks of pollution incidents.

4.2.11 Spill kits will be made available, and site operatives trained in their use, to deal with any spillages. All spill kits will be fully stocked at all times and an inventory of equipment within the container will be clearly displayed within the lid.

4.2.12 Due care and attention will be made with regards to potential surface run-off affecting the water course, and stockpiling of any materials should ideally not be located within the vicinity of the watercourses. Where stockpiles have to be located in the vicinity of a watercourse a 7 m buffer strip should be in place to reduce pollution risks.

4.2.13 The positioning of fuel storage tanks and other potentially polluting materials and maintenance/refuelling facilities should be on bunded areas of hard standing with dedicated drainage systems. Stored materials on site will be checked regularly for containment integrity (both primary and secondary), quantity stored and security of storage.

4.2.14 A temporary swale will be installed along the eastern side of the site, into which runoff can be directed to reduce silt and suspended solids before discharge into the watercourse.

4.2.15 Construction of concrete structures during the construction phase would be monitored to prevent associated contaminated material entering any watercourses. Pre-cast work or permanent formwork will reduce the amount of in-situ concreting required adjacent and above the watercourses. Washing out of concrete wagons or other equipment used in concreting operations will be undertaken in designated contained washout areas. These will be located away from all watercourses and drains and will be impermeable to prevent infiltration to ground.

4.2.16 Piling activities required for the waste bunker and building foundations may extend down to the Secondary (B) Aquifer (Saltash Formation). A Foundation Works Risk Assessment will be prepared by the Contractor to confirm that the risk of contamination of the Secondary Aquifer through the mobilisation of contaminants within the made ground is low with the proposed use of rotary bored piles. The risk assessment will be agreed with the Environment Agency.

4.2.17 Where overpumping is required, the water will be put through an appropriate sized settlement tank, the flow rate set up must allow appropriate timescales for settlement. If the discharge is still showing as heavily silted, then a 'Siltbuster' settlement tank (or series of) is to be used with flocculants if appropriate.

4.2.18 Permission for any dewatering activities will need to be sought from the Environment Agency under the terms of the Water Act 2003, well in advance of construction commencing.

4.2.19 With these measures in place it is considered unlikely that a significant water quality effect on the interest features of the SAC will occur.

Other plans and projects

4.2.20 The Envirocheck Report (September 2009) indicates a total of 21 discharge consents licences are held within 1 km of the site (see Figure 11.3 of the Environmental Statement). These discharge consents are associated with South West Water (Camel's Head STW and storm sewage overflows), Devonport Dockyard (trade discharges and storm sewage overflows) and Bull Point Depot (trade discharges and treated effluent discharges). All 21 discharge consents discharge directly or indirectly (via the Weston Mill Stream and Weston Mill Lake) to the Tamar Estuary.

4.2.21 However, all of these discharges are subject to Environment Agency consent and will have been evaluated to ensure they are unlikely to lead to a significant effect on any European sites. Since the proposed EfW CHP facility is also unlikely to lead to any significant effect due to the in-built measures, no 'in combination' effect will result.

Tamar Estuaries Complex SPA

4.2.22 The Tamar Estuaries Complex SPA is situated approximately 2km to the north-west of the development site. There is unlikely to be a significant effect on the interest features of the SPA for the same reasons as for Plymouth Sound & Estuaries SAC.

Other plans and projects

4.2.23 Conclusions are as for Plymouth Sound & Estuaries SAC.

South Dartmoor Woods SAC and Dartmoor SAC

4.2.24 There is no hydrological connection between these SACs and the development site. Therefore significant effects from this pathway are unlikely either alone or in combination with other projects and plans.

4.3 Air quality

4.3.1 Municipal Solid Waste and Commercial and Industrial waste is already being collected and transported throughout the South West Devon Waste Partnership area to a network of disposal sites. The proposed EfW CHP facility will not significantly alter the overall quantum of waste movements in the area, and although it will relocate the geographical focus of those movements it will not increase traffic movements within 200m of any European sites.

4.3.2 Ground-level concentrations of the modelled pollutants relevant to sensitive ecological receptors have been predicted at 41 locations, as listed in Table 3.6 of the Air Quality Dispersion Modelling Report (ES Appendix 13.1). The locations of these receptors are also shown in Figure 4.2 of the Air Quality Dispersion Modelling Report; the Figure is reproduced as Appendix 3 in this report for ease of reference.

4.3.3 The 41 locations were selected in order to represent known locations where the most vulnerable habitats for which the sites were designated are known to be located. So for example the locations for modelling impacts on Plymouth Sound & Estuaries and Tamar Estuaries Complex focussed upon the margins of these sites where large areas of intertidal habitat and mudflat are to be found rather than on the large areas of open water below low tide, where the site's sensitivity will be much lower and nutrient inputs will be dominated by marine or fluvial sources rather than deposition from air.

4.3.4 Most of the interest features for which Plymouth Sound & Estuaries SAC was designated are either not vulnerable to changes in air quality (i.e. reefs, sub-tidal sandbanks and Allis shad) or are too broadly defined for empirical critical loads to be available and deposition impacts to be evaluated (i.e. 'estuaries' or 'large shallow inlets and bays'). As such, the assessment of deposition was based upon the most sensitive habitat for which the site was designated and an empirical critical load was available – saltmarsh, which has a critical load of 30-40 kgN/ha/yr and is used on APIS as a proxy for other marine/intertidal habitats for which the SAC was also designated such as mudflat. This is also the most sensitive habitat utilised by the species for which the Tamar Estuaries Complex SPA was designated.

4.3.5 Specific significance criteria relating to impacts on sensitive designated ecological receptors are set out within the Environment Agency H1 guidance[20]. The impact of stack emissions can be disregarded as insignificant if:

- The Process Contribution (PC) amounts to less than 1% of the critical level/load; or if greater than 1% then
- The Predicted Environmental Contribution (PEC) is less than 70% of the critical load or critical level.

4.3.6 The results of the dispersion modelling of predicted impacts on sensitive ecological receptors are presented in Tables 5.9 to 5.15 of the Air Quality Dispersion Modelling Report (ES Appendix 13.1). The tables set out the predicted PC to atmospheric concentrations of NO_X, SO_2, NH_3 and HF, and also acid deposition and nutrient nitrogen deposition.

4.3.7 Even if the PEC is greater than 70% of the critical level/load this does not mean that a significant adverse ecological effect will result, but in such circumstances consideration will need to be given to the relative vulnerability of the site, current deposition levels and its relative ecological importance in determining whether the additional deposition will be of significance.

Plymouth Sound & Estuaries SAC

4.3.8 The assessment reported in the Air Quality Dispersion Modelling Report shows that the predicted impacts are within the criteria for insignificance at most of the selected receptors. PCs of slightly more than 1% of the long term Critical Load or Critical Level have been predicted to occur at some locations within the Plymouth Sound Estuaries SAC in respect of annual mean NO_X. However, the PEC remains well within 70% of the critical load at all locations within the modelled domain.

4.3.9 Shore dock is primarily sensitive to nitrogen deposition. The SAC population is at Rame Head approximately 7.5km to the south-west of the proposed EfW CHP site. The closest modelled location is E14 (see Appendix 3) for which the PC was 0.02 kgN/ha/yr and thus well below 1% of the critical load for shore dock of 15 kgN/ha.yr. Deposition at locations even further afield, such as Rame Head, will be even lower. Using the H1 criteria, these impacts can therefore be considered to be insignificant and dismissed.

Tamar Estuaries Complex SPA

4.3.10 The assessment reported in the Air Quality Dispersion Modelling Report shows that the predicted impacts are within the criteria for insignificance at all of the selected receptors. Significant adverse effects on this site are therefore unlikely and can be dismissed.

[20] Environment Agency (2010) Horizontal Guidance Note H1 – Annex (f), v2.2, August 2010

South Dartmoor Woods SAC

4.3.11 The assessment reported in the Air Quality Dispersion Modelling Report shows that the predicted impacts are within the criteria for insignificance at all of the selected receptors. Significant adverse effects on this site are therefore unlikely and can be dismissed.

Dartmoor SAC

4.3.12 This SAC was not specifically modelled since it lies 15km from the proposed EfW CHP facility. However since atmospheric emissions from the proposed EfW CHP facility are negligible for European sites considerably closer to the proposed EfW CHP facility, the facility is likely to make a negligible contribution to deposition on this SAC.

5 Conclusions

5.1.1 From the foregoing assessment it can be concluded that the proposed EfW CHP facility would be unlikely to lead to significant effects on any internationally designated wildlife sites either alone or in combination with other projects and plans. No Appropriate Assessment is therefore necessary.

5.1.2 A summary of the conclusions is presented in Table 2 below.

Table 2: Conclusions of the assessment

Site	Interest feature	Disturbance (noise/vibration)	Water quality	Air quality
Plymouth Sound & Estuaries SAC	Sandbanks which are slightly covered by sea water all the time	Not relevant	Unlikely to be significant due to 'designed in' aspects of the scheme and construction process which will protect water quality	Critical loads not available; PEC will be less than 1% of critical level
	Estuaries			Critical loads not available; PEC will be less than 1% of critical level
	Large shallow inlets and bays			Critical loads not available; PEC will be less than 1% of critical level
	Reefs			Critical loads not available; PEC will be less than 1% of critical level
	Atlantic salt meadows			PC will be less than 1% of critical level/load and/or PEC will be less than 70% of critical load/level
	Mudflats and sandflats not covered by seawater at low tide			PC will be less than 1% of critical level/load and/or PEC will be less than 70% of critical load/level
	Shore dock			Shore dock is primarily sensitive to nitrogen deposition. The SAC population is at Rame Head approximately 7.5km to the south-west of the site. The closest modelled location is E14 (see Appendix 3) for which the PC was 0.02 kgN/ha/yr and thus well below 1% of the critical load for shore dock of 15 kgN/ha.yr. Deposition at locations

				even further afield such as Rame Head will be even lower and impacts on shore dock can therefore be considered insignificant.
	Allis shad	Species is sensitive but since there will be no intertidal/subtidal works, impacts are unlikely to be significant		Atmospheric inputs will be effectively irrelevant compared to inputs from marine and fluvial sources. They can therefore be considered insignificant.
Tamar Estuary Complex SPA	Wintering avocet and little egret on passage	Species are sensitive but site is located 2km from the proposed EfW CHP boundary and noise impacts will effectively be insignificant at such a distance.	Unlikely to be significant due to 'designed in' aspects of the scheme and construction process which will protect water quality	PC will be less than 1% of critical level/load for most sensitive habitat used by these species and/or PEC will be less than 70% of critical load/level
South Dartmoor Woods SAC	Old sessile oak woods with Ilex and Blechnum in the British Isles	Not relevant	Not relevant	PC will be less than 1% of critical level/load and/or PEC will be less than 70% of critical load/level
	European dry heaths			PC will be less than 1% of critical level/load for most sensitive habitat used by these species and/or PEC will be less than 70% of critical load/level
Dartmoor SAC	Northern Atlantic wet heaths with Erica tetralix	Not relevant	Not relevant	This SAC was not specifically modelled since it lies 15km from the proposed EfW CHP facility. However since atmospheric emissions from the proposed EfW CHP facility are negligible for European sites considerably closer to the proposed EfW CHP facility, the site is likely to make a negligible contribution to deposition on this SAC.
	European dry heaths			
	Blanket bog			
	Old sessile oak woods with Ilex and Blechnum in the British Isles			
	Southern damselfly			
	Atlantic salmon	Species are sensitive but proposed EfW CHP site is 14km from the SAC – noise or vibration will not be perceptible at such a distance	No pathway connects the SAC to the proposed EfW CHP site	
	Otter			