CHAPTER 15 – OVERALL HEALTH IMPACT

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List of Acronyms

AQMA	Air Quality Management Area
BEWL	Broad Energy Wales Limited
Development	All activities within the red line planning boundary (see Drawing ECL-BQ-000 in Technical Appendix TA1-1)
Development Site	The physical site on which the Development is to be located as defined by the red line planning boundary (see Drawing ECL-BQ-000 in Technical Appendix TA1-1)
DNS	Development of National Significance
EHP	Environmental Health Practitioner
EIA	Environmental Impact Assessment
ERF	Energy Recovery Facility
GP	General Practitioner
HGV	Heavy Goods Vehicle
HIA	Health Impact Assessment
HZI	Hitachi Zosen Inova
LHB	Local Health Board
LSOA	Lower Super Output Area
NO_2	Nitrogen Dioxide

List of Acronyms (cont)

PINS	Planning Inspectorate National Service
Powys CC	Powys County Council
RCV	Refuse Collection Vehicle
SSSI	Site of Special Scientific Interest
WFG	Well-being of Future Generations
WHIASU	Wales Health Impact Assessment Support Unit
WIMD	Welsh Indices of Multiple Deprivation

List of Amendments

- Section 15.12 (Summary of Pre-Application Comments and Responses) has been added to this chapter.

15. OVERALL HEALTH IMPACT

15.1. Introduction

15.1.1. This chapter provides an overview of the assessment undertaken and conclusions arising from the comprehensive Health Impact Assessment ("HIA") which has been undertaken to determine the wider health impacts from the Proposed Development. This chapter also sets out the proposed recommendations to address identified potential unintended consequences and to also maximise positive health impacts. The detailed HIA is contained in Technical Appendix 15.1 of this ES.

15.1.2. This chapter does not follow the methodology adopted for other EIA assessment chapters. This is because any likely significant effects to population and human health have been assessed in detail within specific KEA chapters of this ES insofar as they are relevant to specific topics (for example, the Air Quality chapter). For ease of reference, the population and human health impact conclusions and mitigation contained within each KEA chapter are reproduced in Section 15.10 below. Assessments undertaken within each KEA chapter all conclude that no significant environmental effects to population or human health will arise from the Development. The HIA cross references these topics and aims to assess from the wider determinants perspective and discusses indirect impacts, as well as additional direct risk factors. The HIA has been undertaken in accordance with HIA best practice guidance which was endorsed by PINS within the Scoping Direction. It is designed to consider the overall wider impact of the Buttington Energy Recovery Facility ("ERF") on the health and wellbeing of relevant stakeholders in accordance with the principles of a HIA.

15.2. Requirement for a Health Impact Assessment

15.2.1. Regulation 4(2) and Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 provide that the ES must assess any likely significant effects on population and human health. As noted above, where relevant to specific topics, impacts to population and human health have been considered within specific chapters of this ES relating to relevant topics. For example, the Air Quality chapter assesses air quality impacts of the Development, including on the most sensitive residential receptors. In addition, a HIA was proposed within the Request for Scoping[i] in order to consider the wider impact of the Development specifically on human health and wellbeing using a holistic approach and in accordance with HIA principles not addressed elsewhere within the ES.

15.2.2. A HIA is defined as 'a combination of procedures, methods and tools by which a policy, program or project may be judged as to its potential effects on the health of a population and the distribution of those effects within the population.'[ii]

15.2.3. The Planning Inspectorate for England and Wales ("PINS") confirmed within the EIA Scoping Direction[iii] that a HIA should be provided.

15.3. Principles of a HIA

15.3.1. The HIA has been undertaken to assess the potential unintended consequences of the

proposed ERF on the health and wellbeing of relevant stakeholders. Consequently, this prospective HIA ensures the appraisal findings and recommendations can address any significant effects on human health and influence the project at this crucial stage and be incorporated prior to commencement of the Proposed Development.

15.3.2. The HIA also highlights the positive impacts from the Proposed Development which may have been otherwise overlooked. The HIA suggest ways in which opportunities for health gain can be maximised.

15.3.3. The HIA is a methodical and impartial way of assessing both the potential positive and negative impacts of a proposal on health and well-being. The HIA looks at health in its broadest sense, using the wider determinants of health.

15.3.4. The HIA process must be:

- transparent through involvement of stakeholders;
- ethical through the use of evidence and methods of participation;
- equitable through a presumption in favour of reducing health inequalities;
- robust by demonstrating academic evidence and participation;
- participatory by actively engaging and involving a wide range of stakeholders;
- sustainable through consideration of impacts that are both short and long term, direct and indirect; and
- democratic by emphasising the rights of people to participate in major decisions that have the potential to impact their lives.

15.4. Methodology

15.4.1. Within the Request for Scoping, the use of the toolkits and guidance developed by the Welsh Health Impact Assessment Support Unit ("WHIASU") was proposed. The DNS: EIA Scoping Direction stated that the use of the WHIASU resources is endorsed by the Inspectorate.

15.4.2. The HIA followed the systematic methodology described in the WHIASU 'Health Impact Assessment: A Practical Guide'[iv] and is described below.

- Screening – using the WHIASU Screening/Appraisal Tool and Record Sheet, screening takes an initial look at the potential health impacts of the Proposed Development on the local population and any specific vulnerable groups defined within it. The outcome of screening is a decision whether or not to undertake HIA and, if so, to determine what type of HIA will be required;
- Scoping – using the WHIASU Scoping Checklist, this stage establishes the terms of reference, roles and responsibilities and the overall strategy for the HIA. A steering group should be established for a variety of expertise and to also ensure shared ownership of the HIA. The scoping process should not be done in isolation but should take account of the screening process findings to help determine the focus of the HIA which should be on the impacts that are most likely to occur and have the greatest potential impact on health and inequalities. Throughout the process, other health impacts may be identified and these should also be taken into consideration;
- Appraisal of Evidence – a wide range of evidence must be examined and discussed

to inform the potential nature, size, likelihood and distribution of the proposal's health impacts. Key environmental factors, such as air quality, noise and water have been appraised by technical experts within specific chapters within the ES. Therefore, the HIA cross references these topics and aims to assess from the wider determinants perspective and discusses indirect impacts, as well as direct risk factors;

- Reporting and Recommendations – following completion of the above, recommendations are proposed which aim to mitigate against any unintended consequences and maximise any potential health and well-being benefits;
- Monitoring and Evaluation – The findings of the HIA should be communicated to all stakeholders identified and continued monitoring of progress against the recommendations should be undertaken to evaluate the success of the recommendations.

15.5. HIA Screening

15.5.1. In order to begin the initial screening exercise, a rough geographical boundary around the Development site, based on Lower Super Output Areas ("LSOA's"), was required. The LSOA's chosen were within approximately 10 – 15km of the Development site to encompass all likely receptors where grounding of the stack plume may occur in any direction. This radius also took into consideration other possible concerns, noise, odour, and Heavy Goods Vehicle ("HGV") trips to and from the Development site that could result in an impact much further afield.

15.5.2. Invitations to join a Steering Group were sent to a number of organisations and individuals. Consultation letters requesting comments / concerns were sent to 23 organisations and individuals representing a range of stakeholders. The range of organisations was developed after review of the 'Interim Report on the HIA of the Waste Incineration Development Planned in Trident Park, Splott, by Viridor Ltd', which highlighted the importance of maximising engagement in the HIA process.

15.5.3. Those invited to join the Steering Group included Public Organisations with an interest in any potential impacts on the local communities they serve, but many declined due to a 'conflict of interest'. Whilst there is an appreciation of the 'potential' conflict of interest, this could be considered a barrier to the meaningful delivery of what is supposed to be an open, transparent and holistic process. The lack of engagement can impact on the usefulness and trust in the HIA process.

15.5.4. The Steering Group consisted of the following:

- Environmental Compliance Limited;
- Broad Energy (Wales) Limited;
- Key Technical Contractors;
- Local Councillor;
- Trewern Community Council
- North Wales Mineral and Waste Planning Service; and
- Powys County Council Environmental Health.

15.5.5. The Steering Group was established and met in May 2019 with discussions informed by the

initial screening. The Key Technical Contractors were unfortunately not able to attend the meeting. The meeting discussions identified additional considerations such as potential impact on ground waters/private water supplies, and that consideration should be given to communities located on the English border who are relatively close to the site.

15.5.6. The initial screening exercise was undertaken to provide an overview of potential impacts of the proposal on the local population and any specific vulnerable groups identified within it. This was achieved through collation and review of the Wales Indices of Multiple Deprivation[v] ("WIMD") for the LSOA's.

15.5.7. As previously discussed, it was determined that a comprehensive HIA was required due to the complexity of the Development.

15.6. HIA Scoping

15.6.1. A geographical boundary was discussed that, at a minimum, had to encompass the plume grounding area for any stacks associated with the development. A rough boundary of 10 – 15km was agreed but using the LSOA boundaries, for health data and statistics. As air pollution does not respect geographical boundaries, impact on sensitive ecological sites would be assessed through the statutory requirements of the EIA and the respective distances used for screening in or out. It was also noted that impact of vehicle movements may be experienced further afield, so consideration to this aspect would be given.

15.6.2. The early review of WIMD data suggests that 'Access to Services', 'Housing', and 'Age Demographic' could be potential aspects that require further investigation and consideration in terms of impact from the development. All other elements identified from screening were also assessed for potential impacts, along with identifying benefits.

15.6.3. The range of stakeholders was identified as:

- The Developer;
- Technical Contractors of plant & equipment;
- Welsh Government (Planning/Waste - possibly others);
- Public Service Board (and member organisations);
- Local residents;
- Local Councillors;
- Local Authority (Planners / EHP / local highways authority / care services / education providers);
- Trunk Road Agent;
- Local businesses; and
- Local Third Sector support services

15.6.4. The roles and responsibilities for delivering the HIA were identified as below:

- ECL – coordinate and chair Steering Group (meetings/workshops/interviews etc.), coordinate collation of data/evidence gathered, and write report.
- Developer to provide background and rationale to project, scope of process, decision for location.
- Technical Contractors to provide understanding of process, controls, mitigation technologies and field technical queries, provide supporting data and evidence of

technical capability of equipment and plant to minimise polluting impacts.

- Other stakeholders to hopefully provide perspectives, views, opinions and raise concerns of specific local issues or potential impacts from the proposed development, along with any benefits and opportunities that may be realised from the project.

15.6.5. A range of sources of evidence would be required to undertake the HIA and help inform potential health impacts, identify vulnerable groups, inform mitigation measures and ascertain benefits they may be derived from the development. The various evidence sources are detailed below.

- Review of local health data (WIMD);
- Stats Wales web searches for other relevant health and social determinants data;
- Public Health Wales Observatory data;
- Data Wales searches for relevant subjects;
- Additional project specific data such as traffic / environmental searches / air quality / sensitive receptor sites (environmental and human);
- Peer reviewed research of health impacts relating to incineration, energy from waste and waste handling;
- Peer reviewed research of public perception of incineration / energy from waste;
- Questionnaires of local community;
- Public engagement;
- Stakeholder workshops;
- Feedback forum/website;
- Statutory engagement;
- Letter drop with feedback forms/email contact; and
- Local health query for LHB / GP Cluster Group.

15.7. Appraisal of Evidence

Literature Review

15.7.1. A literature review was undertaken to critically assess evidence relating to any identified health impacts from a range of sources, along with understanding public perception of 'incineration'. Initial findings were inconclusive in that there is little evidence to suggest that new incineration plants have a direct health impact but importantly, there is also very little evidence to say that they don't have a health impact. As noted above, air quality impacts have been assessed in detail within Chapter [ ]. The policy context has also been assessed.

15.7.2. The following topics were discussed specifically related to health impact within the literature review:

- incineration;
- public perception;
- light pollution;
- air pollution;
- noise pollution;
- odour pollution;
- traffic pollution;

- accidents;
- water quality;
- mental health and well-being; and
- policy.

Community Profiling

15.7.3. Various data sources were used to undertake community profiling for both the areas around the proposed development and those across the border in Shropshire, either adjacent the border or within approximately 10 -15km of the development site. The profiling assessed a range of subjects to obtain a holistic appreciation of the locality and the communities within it. Data sources used resulted in a 'span of years' from which data was sourced, and it was also noted that the collation and presentation of data differs between Wales and England, such that comparison becomes difficult. The subjects assessed were:

- Geographical Profile Area;
- Population;
- Age Demographic;
- Welsh Indices of Multiple Deprivation;
- Indices of Multiple Deprivation for Shropshire LSOA's;
- Society, Ethnicity and Religion;
- Health and Care;
- Qualifications, Economic Activity and Employment Sectors; and
- Housing, Environment and Community Safety.

Participation

15.7.4. In addition to reviewing evidence and community profiling, participation forms a crucial element of an HIA, particularly at a local level. It was agreed that public engagement events should be organised to provide the local community opportunity to comment on the Proposed Development. Two 'drop-in' events were delivered in July 2019, one in Middletown Village Hall and the other at Buttington Trewern Community Centre. A total of 39 visitors attended the events. A lack of understanding of the HIA process, at what point in the development it should be undertaken and a lack of trust in the HIA process delivered from the private sector hampered meaningful engagement with the local community. Two 'formal' consultation responses were received and also key themes discussed during the 'drop in' sessions were used to inform the HIA.

15.7.5. The period of notice and perceived limited scope of notification was criticised by the local community during the engagement events. The Project Team accepted this and, in order to address this, it was decided to circulate information about the Proposed Development and provide further opportunity to comment by way of sponsoring the November edition of the "Border Gossip" which is circulated to the local communities around the Trewern Community Council area. Unfortunately, no further correspondence has been received following the November edition circulation.

15.7.6. Whilst only two formal responses to consultation have been received, key themes identified during discussions at the 'drop-in' events were noted and have been discussed in relation to the potential associated health and well-being impacts.

15.8. Main Findings and Recommendations

15.8.1. The appraisal findings and associated recommendations are provided in Table 15-1 based on the identified health and well-being determinants following initial screening, scoping, evidence review, community profiling and input from relevant stakeholders.

Table 15-1: Main Findings and Recommendations

Health and Wellbeing Determinant – Lifestyles		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
	During the construction phase physical activity around the site is likely to be restricted for safety purposes. Although access to the footpath will not be affected, there may be a perception that the use of the footpath located at the edge of the Development Site is not safe to use.. Even after the development has been completed, there may be a perception that physical activity will be hindered due to pollution from the development. *Physical activity related to gardening and home-grown food may also be impacted due to fears that pollution from the development may affect crops, particularly through bioaccumulation.* *'Stress' created from the development impacting on individuals may result subconsciously in greater use of alcohol / cigarettes etc.*	*As shown by the literature review evidence, physical activity and access to the physical environment is a contributing factor to health. Vulnerable groups are those with pre-existing health conditions including obesity. The community profiling revealed 25% of the Welshpool Llanerchyddol Ward population as living with a limiting long-term illness and 135 people claiming Disability Living Allowance and 38 claiming Severe Disability Allowance (2011 data).* *The potential decreased physical activity may result in a negative impact on those already suffering from health conditions in the short term, although existing access may already be limited.*
The public footpath, which traverses the site, would not need to be closed or diverted as part of the development. However, there may be an opportunity to improve and upgrade it for more use. A wider review of the footpath and incorporation of public information boards along the route as it passes the development could improve the enjoyment of the footpath. There may also be potential for environmental projects to enhance biodiversity in the area along the footpath.		*In the longer term, the vulnerable groups may benefit due to the increased access to the physical environment as a result of the development, particularly if disability access design is incorporated.* *Potential incorporation of a community resource where physical activity can be enhanced would possibly benefit wider population groups.*

Table15-1: Main Findings and Recommendations (cont)

Health and Wellbeing Determinant – Lifestyles (Cont.)		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
A wider review of community benefits from the project may identify a community resource where physical activity could be enhanced.		
Recommendations		
1. Mitigation: BEWL to implement safe operational procedures during construction and operation. Assess ways to improve safe access to the footpath and surrounding natural environment for the local community to enjoy. BEWL will construct a fence to ensure safe access to the footpath is maintained throughout all development phases.		
2. Recommendation: Powys CC to promote the use of the footpath and any improved natural area in collaboration with local health boards and GP surgeries to ensure those who have pre-existing health conditions are aware of the opportunities available to increase their physical activity.		
Health and Wellbeing Determinant – Social and Community Influences on Health		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
	The area is highly regarded for its rural landscape and features. Whilst the majority of the development will be within the quarry bowl, there will be a certain amount of visual impact from the buildings and the stack that will be visible above the development. This has the potential to have a detrimental visual impact and therefore could result in a loss of community identity and local pride.	*The community profile shows less than 50% of the residents in each of the 8 wards assessed in Powys are born in Wales. This may be reflective of the close proximity to the border with England. This should not be interpreted as the community having little identity or pride. Indeed, it was noted when trying to make arrangements for the 'drop-in' sessions it was difficult to find suitable available time slots due to the regular use of the facilities by various community groups.*

Table15-1: Main Findings and Recommendations (cont)

Health and Wellbeing Determinant – Social and Community Influences on Health (Cont.)		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
		The community profile also identifies that there are higher percentages in the 45-64, and +64 years age groups. Some of these may be retirees, or moved to the area for retirement, and chosen their home based on location. Unwelcome views of the development may cause anxiety or other concerns.
	Divisions in the community may result if some members support the proposal whilst others may strongly object. This could result in community tensions, impact sense of belonging and community cohesion. Neighbourliness and the sense of citizen power and influence could be undermined.	*Community views appeared polarised at the 'drop-in' sessions, with some supporting the development but the majority opposing. The tensions that may be caused could affect the majority of the population groups.*
The development does provide an opportunity, if the developer agrees, to enhance social capital, support and local networks. This could be through such things as supporting community events, sponsoring local sports teams etc.		*Liaison with the local community will be required to ascertain how best to deliver support to local networks / organisations. Any support provided will help those directly concerned, but may also support the wider community, even if only through promoting a sense of belonging and community cohesion.*
Recommendations		
Local pride may be linked to the idea of detrimental visual impact and community divisions that may be created as a result of the development. 1. *Mitigation: BEWL to create strong communication links with relevant stakeholders, such as through a Liaison Group, to ensure those members with concerns regarding the proposed development are voiced in a formal manner and can be addressed in order to reduce the division in the community. It will also allow both the negative and positive views on the development to be highlighted. Request feedback on the visual design through planning consultation.* 2. *Recommendation: BEWL to invite stakeholders to establish a Liaison Group for on-going discussion and addressing community concerns. Assess what support can be provided to local organisations / events.*		

Table15-1: Main Findings and Recommendations (cont)

Health and Wellbeing Determinant – Mental Health and Well-Being		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
Improved access of the footpath and potential other improvements in the vicinity of the footpath may provide opportunities for the local community to enjoy increased access to nature which help improve mental health. Numerous academic studies have shown that psychological stress, fatigue, anxiety and depression have been lessoned when time is spent in the natural environment.		*As identified in the literature review evidence, access to green space is beneficial to mental health and well-being. Those with pre-existing conditions will benefit the most, but all population groups could potentially benefit*
The development provides the potential for participation in community and economic life, but possibly limited to those whom are accepting of the development. Likewise, participation in the development proposals and the ability to influence the development are afforded to the local community through consultation processes. This should contribute to a feeling of being valued and part of the decision-making process.	*An inappropriate level of consultation, or a failure to engage in consultation, could result in a feeling of lack of control potentially impacting on a person's emotional wellbeing and resilience.*	*Those with pre-existing mental health conditions, the older generation (aged 65+) whose percentage is increasing for this particular age range, as well as the homeowners in the area may feel a lack of control over the proposals. Vulnerable groups will also include those who have voiced objections to the proposal previously.*
	The proposal does not support a sense of control. Many people would feel a complete lack of control over such proposals and have a distrust of planning processes and regulations to believe that their concerns would be addressed. Combined with the very poor public perception of 'incineration', the perceived lack of control could result in anxiety and stress, affecting mental wellbeing.	*Previous objectors will be more vulnerable, especially to the perceived risk of incineration and impacts on health.*

Table15-1: Main Findings and Recommendations (cont)

Health and Wellbeing Determinant – Mental Health and Well-Being (Cont.)		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
The ERF is to be located within an existing quarry and the location characteristics may already be considered for house prices. The potential for job creation in the area may benefit house prices.	*House prices may decrease in the area as it may become a less desirable place to live, especially in close proximity to the development. This has the potential to result in stress and anxiety, even if house prices do not actually change.*	*Adult population (45-65 years) who are homeowners who may not want to raise a family in close proximity to the proposed development and wish to relocate.*
Recommendations		
1. *Mitigation: BEWL to create strong communication links with relevant stakeholders, such as through a Liaison Group, to ensure the identified vulnerable groups can attend and voice their concerns and feel a sense of control in the entire process from planning through to operation of the site. It should be noted that the HIA can be a good way to achieve participation and collaboration, if local communities engage in the process.*		
2. *Mitigation: The various potential impacts and unintended consequences from the development and the mitigation identified from the proposals to date are listed in 'Living and Environmental Conditions Affecting Health', below. Communication of these measures should be undertaken, particularly where vulnerable population groups may be more affected. The perceived risks in relation to mental well-being need to be addressed sensitively. Effective communication of the various assessments should form part of the communication.*		
3. *Recommendation: BEWL and Powys CC to advertise the footpath that passes the development site to encourage the use of the open areas for recreational purposes. Powys CC to ensure the promotion of the areas for those suffering with mental health conditions e.g. advertising in local GP surgeries and at mental health support groups. The advertisements should also target those Wards which rank the highest on the WIMD with the prominent domain being health (Welshpool Castle and Welshpool Gungrog 1).*		
4. *Recommendation: BEWL to establish a Liaison Group for the development.*		

Table15-1: Main Findings and Recommendations (cont)

Health and Wellbeing Determinant – Living and Environmental Conditions Affecting Health		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
Clever design techniques could result in complimenting the location or providing an opportunity to create a 'feature' out of the structures that form the development.	*Inappropriate or unsympathetic design could impact the attractiveness of the area or result in unacceptable visual impact. Therefore, the design of the development will be extremely important within the context of the area and how the interaction between the urban/rural and natural environment are dealt with.*	*Most vulnerable will be those who will be able to see the proposed development from their home/garden. The view, and how 'imposing' it is, will determine the level of impact that it has.*
	There are a number of potential consequences from the development that are not unintended but anticipated, as part of the development. However, if these aspects are not dealt with appropriately, they could result in unintended, and indeed, unwelcome consequences. These impacts could be individual sources, or cumulative effects from the sources, which include: • Light; • Noise; • Odours; • Water Quality; and • Air Quality.	
	Light - The development will be a reasonably large site operating 24h a day, therefore, flood lighting will be required which could impact locally if not installed correctly. *Light pollution can result in sleep deprivation, depression, cardiovascular disease, insomnia and cancer.*	*Direct light emission from the site is only likely to affect those with a view of the proposed development, however, light hue may be visible from a much wider area unless 'light spill' is minimised. Light spill would affect a larger number of people but will not necessarily affect any particular population groups more than others.*

Table15-1: Main Findings and Recommendations (cont)

Health and Wellbeing Determinant – Living and Environmental Conditions Affecting Health (Cont.)		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
	Noise - The 24h operation of the facility will give rise to noise generation night and day. The rural location is likely to exhibit low background noise levels, particularly at night time and therefore the locality is likely to be more sensitive to night time noise. Careful design and mitigation measures are likely to be required to minimise noise breakout and potential nuisance to nearest sensitive receptors. Noise could be a potential problem during the construction, operational and decommissioning phases of the development. *Noise pollution can result in loss of hearing sensitivity, sleep disturbance and deprivation and physiological and behavioural effects. Hypertension and cardiovascular disease can result from exposure to noise disturbance.* *The site setting is rural with a low population and population density which may result in less people being affected but the magnitude of the impact may be greater as there are likely to be very low levels of background noise.*	*Those closest to the development are likely to be worst affected, with sleep disturbance potentially the worst impact particularly for those who work.* *Tonal or low frequency noise from the development may cause disturbance for those further away, especially if directional effects are present and that may impact on residential developments.* *Academic research has identified young children (aged 5-24), older generations (65+), chronically ill and those suffering existing health conditions, such as tinnitus, as the vulnerable groups.* *Community profiling has also shown that the 65+ age range is steadily increasing with six wards possessing higher than average percentage of single occupants as pensioners. This age group may be more greatly affected by the development, such as from noise and dust, as they are likely to spend more time in the vicinity.*
	Odours - The facility will be processing waste so odours could be a potential impact if appropriate management procedures are not in place. A further consequence could relate to pests.	*Those closest to the development and downwind of any odour release will be affected the most. However, pests or flies could become problematic further away, depending on the scale of any particular circumstances.*

Table15-1: Main Findings and Recommendations (cont)

Health and Wellbeing Determinant – Living and Environmental Conditions Affecting Health (Cont.)		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
	Odour pollution can result in health impacts such as respiratory problems, nausea, nose & throat irritation, headaches, nasal congestion and shortness of breath.	
The development would require groundworks to be undertaken and it is proposed that a Sustainable Urban Drainage Scheme ("SUDS") would be implemented as part of the project, thereby improving drainage and providing biodiversity through the relocation of settlement ponds.	*Water Quality - Poor construction management, facility design, inappropriate processing and management could all result in potential impact on water quality, ground waters and surface waters.*	*Pollution incidents from construction projects can impact on water quality resulting in impact to water course, ground water and potentially drinking water quality, which can be a concern for private water supplies. For this location, the Powys CC EHP confirmed there were no private water supplies in the immediate vicinity, and others identified were up-gradient from the site and therefore would not be affected.*
	Air Quality - A key concern of incineration relates to the impact on air quality. The range of pollutants from ERF will depend on the technology utilised, and how well they are operated and maintained. The pollution, and range of pollutants, will depend on what material is being processed (hazardous / non-hazardous) and the quantities being processed. *Location characteristics become important if the existing air quality is already poor, the population around the site and any existing health issues within the population, along with sensitive environmental receptors.* *Air pollution impacts health by causing asthma, eye, nose, and throat irritation. Chronic exposure can result in cardiovascular and respiratory illness.*	*Research has shown that young children, the older generation and those with pre-existing conditions are more susceptible.* *Also it has been established that interactions between air pollution and deprivation strengthened associations with health impacts, such as respiratory diseases. Therefore, people living in areas which exhibit poor economic and health indicators are deemed more vulnerable.*

Table15-1: Main Findings and Recommendations (cont)

Health and Wellbeing Determinant – Living and Environmental Conditions Affecting Health (Cont.)		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
	The health and safety of construction workers, along with members of the public in the vicinity of the development will require consideration. Safe working practices and risk assessments for the various stages and tasks will be key management control mechanisms. According to the HSE, the construction industry had 30 fatal accidents during 2018/19, with nearly half relating to falls from height. Therefore, harm of workers would be an unintended consequence. *The public right of way footpath that traverses the site will not be closed during the construction phase. However, consideration will be needed for members of the public that may trespass and could be seriously harmed due to the hazardous environment of a construction site.*	*Development construction workers and contractors.* *BEWL / HZI employees and contractors.* *Possible trespassers, such as young persons (aged 5-24) and general adult population (aged 25-64).*
The level of vehicles trips associated with the operational phase is not considered to be significantly higher than the existing situation. The site is not located within an air quality management area ("AQMA") with the closest located in the centre of Shrewsbury, approximately ~20km to the east. It is highly unlikely that the vehicle trips associated with the development will have a significant impact on this AQMA.		

Table15-1: Main Findings and Recommendations (cont)

Health and Wellbeing Determinant – Living and Environmental Conditions Affecting Health (Cont.)		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
The waste deliveries to the site may replace some of the existing waste transfers already being undertaken along the routes to the site. Potentially there could be slightly less HGV trips on the road. *Work is on-going to assess the feasibility of having a 'green' fleet of refuse collection vehicles ("RCV") to service the ERF which would help to reduce traffic related pollution along the collection and delivery routes.*	*Traffic movements must also be considered. The entrance to the site will be via the A458. The construction phase will see an increased level of vehicle trips to and from the site, in addition to the existing vehicle movements associated with the current site activities. During the construction phase many of the additional vehicles will relate to HGV bringing in raw materials, plant and equipment. Movement of HGVs carrying large tonnages on the local road network could result in serious road traffic accidents if not effectively controlled.* *Additionally, air pollution, such as nitrogen dioxide ("NO_2") and particulates, from vehicles increases the risk of poor health and mortality. Whilst there will be a definite increase in vehicles visiting the site during construction, this will be for a limited period of 18 months to two years.*	*Young people (15-24) using the road networks for recreational purposes, general adult population and older generation either within a vehicle themselves or using the road for recreational purposes, such as walking or cycling.* *Public Health Wales have stated that air pollution from vehicles will affect vulnerable population groups, such as children, older generation, those with pre-existing health conditions, and those exposed to higher concentrations because of living or commuting in urban or deprived locations.*
Trying to ensure material and equipment deliveries do not occur at school opening and closing times would help reduce risks during the construction phase. Likewise, arranging shift changeovers to occur outside of school opening and closing, and possibly restricting waste deliveries to outside of these times would also reduce risks.	*Road safety will require consideration due to the increased HGV vehicle movements and the nature of the local road network. The local school is accessed via the same routes that construction vehicles will be using.*	*Young children (5 – 12) will be most at risk, particularly those that either walk or cycle along the route to school. Although due to the location it is not considered there would be many who will be walking, and probably less cycling.*

Table15-1: Main Findings and Recommendations (cont)

Health and Wellbeing Determinant – Living and Environmental Conditions Affecting Health (Cont.)		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
	Access, availability and quality of green space is unlikely to be affected, however, there may be a perception that it is no longer attractive due to health concerns of being in the vicinity of the ERF or road safety concerns in reaching the green space.	*The benefits of access to green space have been documented so it is important that the proposed development does not create a barrier for the community to access local green space. Perceptions of health or safety concerns relating to the facility could affect any of the population groups, with exception of the very young. Although parents/carers of the very young may have concerns.*
The job opportunities for the development, and potential future jobs for other on site businesses may improve the local housing market, either through house value or more house building.	*There are a number of potential impacts for housing quality and tenure. These could include impact on house prices, pride in the home, transient population for the construction period and longer-term impact if employees are from outside of the area.*	*Home owners / tenants / or those affected to the extent that impacts the enjoyment of their home will be affected the most.*
The purpose for the development is to provide a means to deal with waste materials that are not capable of being recycled, or are the remaining fractions of wastes that have been through waste treatment to remove recyclates. These materials would have to be sent for landfill in the absence of any other disposal route.		*The development will be making a contribution towards the zero waste policy and reducing waste going to landfill, which should benefit all population groups for the future, from this perspective.*
Recommendations		
1. Mitigation: (Light) – A lighting plan has been developed to minimise impact off site, and having due consideration to impact on wildlife, such as bats. The stack will have a 'night vision' goggles visible light fitted, as requested by the local airport.		
2. Recommendation: Ensure the lighting plan is effective and that light spill does not encroach on surrounding areas.		

Table15-1: Main Findings and Recommendations (cont)

Health and Wellbeing Determinant – Living and Environmental Conditions Affecting Health (Cont.)	
Recommendations	
3.	*Mitigation: (Noise) - BEWL to ensure that the agreed noise limits of 4dB(A) above representative background levels are not exceeded for both construction and operational phases. Best Practical Means to be employed through the Construction Environmental Management Plan (CEMP), (i.e. such as regularly maintained equipment, use of silencers or acoustic hoods on equipment). Plant design to include insulated cladding, air cooled fans, vent silencers, acoustic doors, acoustic ventilation louvres, non-tonal reversing alarms, acoustic screen along entrance road.*
4.	*Recommendation: Undertake additional noise monitoring during construction phase and operational phase, communicate the results to stakeholders. Ensure the CEMP is available to stakeholders.*
5.	*Mitigation: (Odours) – The waste reception hall is an enclosed building under negative pressure to ensure odours do not escape. Access is via fast acing roller shutter doors that remain closed, except for access. The waste bunker will store waste for up to 4 days and is fitted with a fine spray dust suppression system which can also deliver de-odouriser.*
6.	*Recommendation: Ensure that all designed mitigation measures are implemented to minimise any potential odour issues.*
7.	*Mitigation: (Water Quality) – The CEMP will detail measures for the protection of ground & surface waters and streams, such as bunded tanks for chemicals and fuels, dedicated storage areas, use of settlement ponds for silt collection, appropriate handling and transfer of materials. Relocation of soils on site will be checked for contaminants, likewise imported soils will have pre-acceptance checks and further checks on arrival. The use of SUDS is also proposed.*
8.	*Recommendation: - Ensure the CEMP is available to stakeholders and that site/project contact details are made available. Implement the SUDS.*
9.	*Mitigation: (Air Quality) – For the construction phase the CEMP will detail all the mitigation measures required to ensure minimal impact from dust generation (which should not traverse the site boundary), odours, vehicle/plant emissions and noise. The ERF will have a 70m stack to ensure adequate dispersion of emissions at the lowest concentrations. The facility will utilise secondary non-catalytic selective (SNCR) reduction system for control of NOx emissions, along with a flue gas treatment system to remove acid gases. The plume visibility will be for about 30% of daylight hours. An Environmental Permit will be required from Natural Resources Wales and will include conditions to minimise environmental impact, including the use of continuous monitoring equipment.*
10.	*Recommendation: - Ensure the CEMP is available to stakeholders and that site/project contact details are made available. Research a collaborative AQ monitoring project / proposal with the local school.*
11.	*Mitigation: (Safety) - Extend security measures/infrastructure, such as fencing, to prevent unauthorised access onto the site, particularly during construction, which may now be deemed dangerous. Site safety briefings and 'tool box' talks for construction workers and contractors is standard practice, as is ensuring risk assessments have been undertaken and safe working practices adopted.*

Table15-1: Main Findings and Recommendations (cont)

Health and Wellbeing Determinant – Living and Environmental Conditions Affecting Health (Cont.)		
Recommendations		
12. Recommendation: Visible warning signs highlighting the dangers of the construction site. Information leaflet and parents letter to the local school explaining the dangers and to ensure children are not tempted to trespass on the site. Liaison with local police, council and community groups. Where possible, avoid deliveries and shift changeovers at school opening and closing times.		
13. Mitigation: (Traffic) – Intention is to have a 'green' RCV fleet to service the ERF.		
14. Recommendation: Continue work on feasibility of 'green' RCV fleet.		
15. Recommendation: Implement a Safe Driving Policy to include maximum tonnage for loads and speed limits restrictions etc.		
16. Mitigation: (Access to green space) – Access to green space is not being affected, however relocation of habitat on site will be undertaken and improvements made to existing. This should help protect local biodiversity, and hopefully improve it, not just on site but in the surrounding area.		
17. Recommendation: BEWL and Powys CC to advertise and promote the access and use of green space.		
18. Recommendation: (Housing) Investigate if there are any contributions or means to deliver housing improvement for those wards where it is identified as a potential issue.		
19. Recommendation: (Waste) Use the opportunity presented by the development to assist educational awareness of waste issues caused by, and impacting on, society. Link to the waste policies and WFG.		
Health and Wellbeing Determinant – Economic Conditions Affecting Health (Cont.)		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
The development, if consented, would create a number of jobs which could be fulfilled from local sources with appropriate training provided. The wider aspirations for the site could create potential jobs which again could be fulfilled from local sources. Employment results in a better quality of living, better housing conditions and improved health.	*If there is no commitment to source employees locally then this could result in resentment towards the development and create tensions within the community, and for those whom would be re-locating to take employment at the development site.*	*With the exception of Welshpool Castle, the 7 other LSOA's have employment rates in the 50% of least deprived areas of Wales. However, the creation of jobs would have economic benefits to the area, particularly if additional jobs are created in the longer term on the site.*

Table15-1: Main Findings and Recommendations (cont)

Health and Wellbeing Determinant – Economic Conditions Affecting Health (Cont.)		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
The type of work created by the development could be both full and part-time, which could benefit local people, but could also be associated with support services for the development. This may create further jobs. The nature of the development is likely to require some skilled positions which may create apprenticeship opportunities and potential partnership opportunities with local schools and colleges.		
	The nature of the work associated with the development is industrial and dealing with waste so there are implications for the health and safety of the employees	*BEWL / HZI employees, and contractors for the development would be most at risk.*

Recommendations

1. *Recommendation: BEWL to implement a policy to employ local workforce.*
2. *Recommendation: BEWL to work with educational institutions, careers advisors, training providers and Powys CC to ensure provisions are made available for local people to gain the necessary skills and education that would provide the best opportunities to be employed at the development or associated support services for it.*
3. *Recommendation: BEWL to ensure that appropriate health and safety measures are in place to mitigate risks to employees and contractors from the nature of the work being undertaken.*

Table15-1: Main Findings and Recommendations (cont)

Health and Wellbeing Determinant – Access and Quality of Services		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
Education and training could benefit from contribution from the development, if considered as part of the overall package		*Younger people of school / college age, and those who are seeking to learn a trade or gain an apprenticeship*
I.T., the internet and digital services will be necessary requirements for the safe and optimum control of a modern ERF. The implementation of these services for the development may help to enhance these services locally for the community.		*Could potentially benefit all population groups in some way.*
Leisure, Health & Caring Services, public amenities, shops and transport, may all potentially benefit from the development. These would have to be assessed on a case by case basis, particularly for determining maximum benefits.	*Leisure, Health & Caring Services, public amenities, shops and transport, may all potentially be negatively affected by the development. More local knowledge is required to understand potential impacts.*	*Access to services has been identified as an area of concern for 5 of the LSOA's where it appears as the worst domain. Without more detailed knowledge of the locality and understanding of how access can be improved, it is difficult to identify either mitigation measures or opportunities to make improvements. All population groups are potentially affected.*
Recommendations		
Participation and engagement to date has failed to identify specific opportunities for how the development may contribute to the three determinant areas above. It has also not been possible to the development may impact these determinants. *1. Recommendation: Try to target these areas through further engagement and participation as part of the planning consultation.*		

Table15-1: Main Findings and Recommendations (cont)

Health and Wellbeing Determinant – Macro-economic, Environmental and Sustainability Factors		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
The development would require profiling and geotechnical works that could result in benefit and enhancement of local biodiversity if planned appropriately.	*Local biodiversity could be damaged if the development is not designed and implemented appropriately, or if operated inappropriately.*	*Improving biodiversity could be a positive for all members of the local community.*
There are potential contributions to cost of living through job creation, education and training and the facility would contribute towards economic development and trade. These would therefore lead on to gross domestic product.	*Unintended consequences may relate to impact on services and local amenities, and with potential extra costs for the public purse in respect of extra road maintenance, provisions of services and regulation. None have specifically been identified as yet.*	*Those with pre-existing health conditions will be vulnerable, although it was identified that health was the best domain for 4 of the 8 LSOA's assessed within the locality. Job creation, education and training may help improve health in the other 4.*
The development would contribute to a number of government policies and in some ways contribute towards tackling climate change.	*There is potential conflict with government policy on air quality and the emissions released from the Installation. Traffic associated with the development could be considered as additional, although there will already be waste transported along the routes identified.*	*It is acknowledged that there is a trade off on these issues and that the overall impacts need consideration. If all necessary mitigation is implemented and additional benefits derived from the development, then potentially all population groups may benefit.*
Recommendations		
1. Recommendation: BEWL to collaborate with ecologists during the construction phase of the Development to achieve the positive outcome to its greatest potential.		
2. Recommendation: BEWL to work with educational institutions, careers advisors, training providers and Powys CC to ensure provisions are made available for local people to gain the necessary skills and education that would provide the best opportunities to be employed at the development or associated support services for it.		

15.9. Summary of KEA Human Health Impact and Mitigation

15.9.1. Impacts to population and human health have been assessed in detail within specific KEA chapters of this ES. The assessments undertaken within each KEA chapter all conclude that no significant environmental effects to population or human health will arise from the Development. The conclusions and mitigation measures related to human health impacts within each KEA chapter are reproduced in Table 15-2 below for ease of reference.

Table15-2: Health Impact Related KEA Chapter Conclusion and Mitigation

KEA Title	Phase	Effect	Conclusion	Mitigation
Air Quality	Construction	Reduced air quality due to generation of dust during construction works	The environmental impact of the development of the site is considered to be not significant. Any dust generated will be confined to the site boundary, and if required water suppression will be used.	A CEMP has been prepared. This will be updated by the Engineering, Procurement and Construction ("EPC") Contractor and will be agreed with the Local Authority in advance of construction activities. This will detail measures, such as those proposed in Section 6.4.10. of Chapter 6, to ensure there is no detrimental impact on air quality.
		Reduced air quality due construction traffic on local road network	The environmental impact of the development of the site is considered to be not significant. Changes to the background air quality will be negligible.	No mitigation measures required.
		Reduced air quality due to construction vehicles within Development Area	The impact of construction vehicles within the development area is not significant. Vehicles will be correctly serviced and maintained and if hydrogen fuelled excavators are commercially available their use will be considered.	A CEMP has been prepared. This will be updated by the EPC Contractor and will be agreed with the Local Authority in advance of construction activities. This will detail measures, such as those proposed in Section 6.4.10. of Chapter 6, to ensure there is no detrimental impact on air quality.
	Operation	Reduced air quality and odour generation due to generation of dust during tipping of waste into bunker	There will be no impact from the tipping of waste as the operation is undertaken within the confines of the waste reception hall. The waste reception hall will be kept under negative pressure. Fast acting roller shutter doors will be installed to the waste reception hall and will remain closed when not in use. The mitigation is incorporated into the design of the building and the operational procedures.	No further mitigation required.

Table15-2: Health Impact Related KEA Chapter Conclusion and Mitigation (cont)

KEA Title	Phase	Effect	Conclusion	Mitigation
Air Quality	Operation	Emission of pollutants from the main stack at the maximum point of impact during operation of incinerator	Emissions of pollutants from the main stack are considered to be not significant overall. The predicted maximum ground level concentrations are well within both the short and long term air quality objectives and are also assessed as not significant (less than 1% long term or 10% short term of the relevant air quality standards) for most pollutants assessed, and for those are potentially significant, further screening has demonstrated that it is unlikely that any Air Quality Standards ("AQSs") will be exceeded and impacts can be described as negligible in accordance with the Institute of Air Quality Modelling guidance. An Environmental Permit will include strict controls to control emissions	The mitigation is incorporated into the design of the 70m high stack and the operational procedures. No further mitigation required.
		Emission of pollutants from the main stack at potentially sensitive human receptors	Emissions of pollutants from the main stack are considered to be not significant at the locations of all sensitive receptors considered. The predicted maximum ground level concentrations are well within both the short and long term air quality objectives and are also assessed as not significant (less than 1% long term or 10% short term of the relevant air quality standards) for most pollutants assessed, and for those are potentially significant, further screening has demonstrated that it is unlikely that any AQSs will be exceeded and impacts can be described as negligible in accordance with the Institute of Air Quality Modelling guidance. An Environmental Permit will include strict controls to control emissions	

Table15-2: Health Impact Related KEA Chapter Conclusion and Mitigation (cont)

KEA Title	Phase	Effect	Conclusion	Mitigation
Air Quality	Operation	Plume visibility	The plume will only be visible for 40% of all hours, and when visible the length is predicted to be short (4m) for 30% of daylight hours. A visible plume would only extend to 107m for 5% of the time, thus would remain within the site boundary. Consequently, plume visibility can be considered not significant.	The mitigation is incorporated into the design of the 70m high stack and the operational procedures. No further mitigation required.
		Abnormal emissions	The impact of abnormal emissions from the Installation is considered to be not significant. Short term impacts of pollutants under extreme worst case scenario conditions are less than 10% of the air quality standards, the exception being NO_2 which at a process contribution of 10.93% can be described as a small impact. Long term impacts also are considered not significant, or can be classed slight on further screening. An Environmental Permit will include strict controls to control emissions	
	Decommissioning	Reduced air quality due to generation of dust from demolition activities	The environmental impact of the development of the site is considered to be not significant. Any dust generated will be confined to the site boundary, and if required water suppression will be used.	A Decommissioning Environmental Management Plan ("DEMP") will be prepared. This will be similar in nature to the CEMP (Technical Appendix 4-1) and will be agreed with the Local Authority in advance of decommissioning activities. This will detail measures, such as those proposed in Section 6.4.10. of Chapter 6, to ensure there is no detrimental impact on air quality.
		Reduced air quality due to additional vehicles on local road network and within Development Area	Decommissioning traffic is likely to be similar to the construction phase, consequently it is assumed that the environmental impact of the decommissioning will not significant. Changes to the background air quality will be negligible. The impact of decommissioning vehicles within the development area is not significant.	

Table15-2: Health Impact Related KEA Chapter Conclusion and Mitigation (cont)

KEA Title	Phase	Effect	Conclusion	Mitigation
Transport	Construction and Decommissioning	Traffic congestion	The environmental impact of traffic congestion in the construction and decommissioning phase is considered not significant as daily HGV levels would be less than 100 on the major road network for each phase.	Implementation of HGV routing strategy to be agreed with the Local Highways Authority
		Pedestrian severance, delay, amenity, fear and intimidation associated with walking in the vicinity of the Development	Heavy Goods Vehicles ("HGV") commissioning phase traffic would be concentrated on the major road network where pedestrian facilities are intermittent and consequently pedestrian activity is low. As such, it is considered that HGV traffic associated with the commissioning phase would not materially affect pedestrian severance, delay, amenity, fear or intimidation.	No mitigation considered to be required.
	Operation	Pedestrian severance, delay, amenity, fear and intimidation associated with walking in the vicinity of the Development	The operational development traffic, which would be modest only, would enter and leave the development via the A458. Footways provided along the A458 are intermittent. However, due to the rural location of the site and lack of pedestrian facilities within the vicinity of the site, the locality is not expected to have notable levels of pedestrian activity. As such, the operational phase of the development is not expected to materially affect pedestrian severance, delay, amenity, fear or intimidation.	No mitigation considered to be required.
Landscape	Construction and Decommissioning	Direct change of landscape character	The Development Site currently displays few of the distinctive attributes and qualities identified through LANDMAP for the MNTGMVS370 Crewgreen to Forden Hill and Scarp Visual and Sensory Aspect Area. Ground modelling and earthworks will be necessary to facilitate the Development. As part of mitigation measures, the partially completed screen bund along Sale Lane will be finished.	No further mitigation is required.

Table15-2: Health Impact Related KEA Chapter Conclusion and Mitigation (cont)

KEA Title	Phase	Effect	Conclusion	Mitigation
Landscape (cont.)	Construction and Decommissioning	Direct change of landscape character	Along with proposed screen bunds, this will be grass seeded and planted with native woodland trees. Decommissioning will involve the removal of built form and ground restoration. The effects are considered to be not significant and will be of a neutral nature.	No further mitigation is required.
		Indirect change of landscape character	Indirect effects on landscape character within the principal study area will be limited overall due to the current context of the Development Site, the nature of the Development and incorporated mitigation measures. Some effects (of a neutral nature) in relation to the MNTGMVS370 Crewgreen to Forden Hill and Scarp Visual and Sensory Aspect Area (outwith the Development Site) and the adjacent MNTGMVS650 River Severn Flood Plain and may extend to a medium range. However, this will not be significant. For other Aspect Areas, effects will then reduce to a more typical Negligible level at a medium and long range with potentially, No Impact in terms of the latter. The effects are therefore considered not significant.	
	Operation	Direct effect on landscape character	The Development Site is located in the MNTGMVS370 Crewgreen to Forden Hill and Scarp Visual and Sensory Aspect Area according to LANDMAP. The Development will introduce new elements namely, the proposed ERF building and stack. Mitigation measures include the location of the aforementioned built form in the quarry void in the central environs of the Development Site (i.e. at a low level). In addition, the choice of cladding colours and proposed native broadleaved tree planting is relevant. The effects are considered to be not significant and will be of a neutral nature.	

Table15-2: Health Impact Related KEA Chapter Conclusion and Mitigation (cont)

KEA Title	Phase	Effect	Conclusion	Mitigation
Landscape (cont.)	Operation	Indirect effect on landscape character	Indirect effects on landscape character will be restricted overall due to the current context of the Development Site, the nature of the Development and incorporated mitigation measures. Some limited effects will occur mainly at a close range of a neutral nature, for example, in relation to the MNTGMVS370 Crewgreen to Forden Hill and Scarp and MNTGMVS650 River Severn Flood Plain Visual and Sensory Aspect Areas. However, this will not be significant. Effects will decline at a medium range in both cases. For the remaining Aspect Areas in the principal study area, there is a more typical Negligible level at a medium and long range with potentially No Impact in terms of the latter.	No further mitigation is required.
		Proposed lighting scheme - night time levels	The proposed lighting scheme is represented by the report and Drawings prepared by Illume Design (Dated 1 August 2019) which are provided in the ES. A detailed assessment is provided in the Landscape and Visual Impact Assessment ("LVIA") contained in Technical Appendix 9-1. In conclusion, whilst some localised Moderate (neutral) significant of effect might be experienced, the overall effects are more likely to have a Minor (neutral) or Negligible (neutral) significant of effect for identified receptors. In terms of significance of effect, given the base line of a night sky that has existing light sources and is not wholly dark, in that sense, the proposed lighting scheme is not predicted to have a significant (adverse) effect. The effects are therefore considered not significant	
Water Quality	Construction and Decommissioning	Reduced surface water quality due to elevated suspended solids loading in site runoff	It was identified that there is the potential for a moderate impact. However, following the implementation of the mitigation measures, the assessment undertaken within Chapter 11 - the Water Environment concludes that no significant environmental effects to population or human health will arise from the Development.	CEMP and DEMP prepared and adopted on site with appropriate induction training for relevant site personnel.

Table15-2: Health Impact Related KEA Chapter Conclusion and Mitigation (cont)

KEA Title	Phase	Effect	Conclusion	Mitigation
Water Quality (cont)	Construction and Decommissioning	Reduced surface water quality due to elevated suspended solids loading in site runoff (cont.)	See above.	Phasing of construction works to ensure appropriate surface water management measures are in place prior to construction commencing. Appropriate use of temporary silt control measures, such as silt fences and/or 'siltbuster' settlement tanks, as required in areas of exposed quarry faces or spoil, or in adverse weather conditions. These measures will also provide additional upstream protection of the site's surface water drainage system during the decommissioning phase. All new slopes created within the main quarry void to be hydraseeded with an annual Westerwold grass mix to rapidly establish vegetation cover and minimise suspended solids loading in runoff, prior to final planting schemes establishing.
	Construction, Operation and Decommissioning	Reduced surface water quality in tributary watercourse which flows through the Development, due to discharge of pollutants in site runoff.	It was identified that there is the potential for a moderate impact to the watercourse than runs through the Development site. However, following the implementation of the mitigation measures, the assessment undertaken within Chapter 11 - the Water Environment concludes that no significant environmental effects to population or human health will arise from the Development.	CEMP and DEMP prepared and adopted on site with appropriate induction training for relevant site personnel.

Table15-2: Health Impact Related KEA Chapter Conclusion and Mitigation (cont)

KEA Title	Phase	Effect	Conclusion	Mitigation
Water Quality (cont)	Construction, Operation and Decommissioning	Reduced surface water quality in tributary watercourse which flows through the Development, due to discharge of pollutants in site runoff (cont.)	See above.	Appropriate spill response equipment stored securely on site. Traffic management plan adopted on site including measures to minimise vehicle movements on site, ensure adequate visibility and appropriate signage. Appropriate storage of potentially polluting liquids in bunded tanks with secondary spill containment. Concrete delivered to site as required in ready-mixed form (no on-site batching plant). Servicing and refuelling of vehicles on site to be minimised through the CEMP/DEMP. Any servicing or refuelling to be undertaken over proprietary absorbent spill mat or tray.
	Operation	Potential discharge of contaminated leachate into surface water and groundwater during waste handling and storage.	It was identified that there is the potential for a moderate impact. However, following the implementation of the mitigation measures, the assessments undertaken within Chapter 11 - the Water Environment concludes that no significant environmental effects to population or human health will arise from the Development.	The operation of the ERF would be in accordance with an Environmental Permit issued by Natural Resources Wales.

Table15-2: Health Impact Related KEA Chapter Conclusion and Mitigation (cont)

KEA Title	Phase	Effect	Conclusion	Mitigation
Water Quality (cont.)	Operation	Potential discharge of contaminated leachate into surface water and groundwater during waste handling and storage (cont).	See above.	Waste unloading and handling would be restricted to the enclosed tipping hall, with wastes deposited within the fully sealed bunker. The waste bunker shall be designed in accordance with the requirements of BS EN 1992-3: Eurocode 2: Design of concrete structures. Liquid containing and retaining structures, with an appropriate grade of reinforced concrete to be suitable for a minimum design life of 40 years. A detailed risk assessment and design study would inform the bunker design and would be submitted in support of the Environmental Permit application.
Geotechnical and Materials Management	Construction	Contamination of site soils, surface waters and groundwater from import of soils and aggregates. Risk to human health of construction workers and neighbouring site users	Contamination of site soils, surface waters and groundwater and the risk to human health from the import of soils and aggregate is considered not significant provided that the mitigation is followed.	Pre-import assessment of chemical test data for materials Post-import sampling, testing and quantitative assessment of import materials to confirm suitable for use Any materials found to be unsuitable to be removed from site

Table15-2: Health Impact Related KEA Chapter Conclusion and Mitigation (cont)

KEA Title	Phase	Effect	Conclusion	Mitigation
Geotechnical and Materials Management (cont.)	Construction	Contamination of site soils, surface waters and groundwater from accidental spillage of construction materials, fuels etc. Risks to human health of construction workers and neighbouring site users	Contamination of site soils, surface waters and groundwater and risk to human health from accidental spillage of site construction materials and chemicals should not be significant provided that the mitigation is followed.	Prepare a drainage plan. Store all oils, fuels and chemicals in a fully bunded area. Carry out any activities (such as refuelling) that could cause pollution (leaks/spills) in a designated area, away from surface water or boreholes. Where possible it should drain to the foul sewer. Use settlement ponds to remove silty water. Emergency procedure plan.
		Contamination of site soils, surface waters and groundwater due to encountering unexpected potentially contaminated soils. Risk to human health of construction workers and neighbouring site users	Contamination of site soils, surface waters and groundwater and the risk to human health from is considered not significant provided that the mitigation is followed.	Inspection, sampling and testing to determine whether unexpected soils are contaminated. If unacceptable contamination is identified affected soils can be treated or removed from site.
	Operation	Contamination of site soils, surface waters and groundwater accidental spillage of stored fuels, chemical and waste products. Risk to human health of site occupiers and neighbouring site users.	Contamination of site soils, surface waters and groundwater and risks to human health are considered not significant provided that the mitigation is followed	Storage containers/tanks will be suitably bunded.

Table15-2: Health Impact Related KEA Chapter Conclusion and Mitigation (cont)

KEA Title	Phase	Effect	Conclusion	Mitigation
Geotechnical and Materials Management (cont.)	Operation	Contamination of site soils, surface waters and groundwater accidental spillage of stored fuels, chemical and waste products. Risk to human health of site occupiers and neighbouring site users (cont.)	Contamination of site soils, surface waters and groundwater and risks to human health are considered not significant provided that the mitigation is followed	Operations will be undertaken on an impermeable surface to prevent downward migration of spilt/leaked contaminants into the ground. Spill response procedures will be detailed in the CEMP.
	Operation	Human exposure to Radon Gas	Risk to human health is considered not significant provided that the mitigation is followed.	Installation of Radon Gas Protection
	Decommissioning	Contamination of site soils, surface waters and groundwater and risk to human health of site occupiers and neighbouring site users from accidental spillage of stored fuels, chemical and waste products during removal from site or accidental spillage of substance used during decommissioning.	Contamination of site soils, surface waters and groundwater and risks to human health are considered not significant provided that the mitigation is followed.	Storage containers/tanks will be suitably bunded. Operations will be undertaken on an impermeable surface to prevent downward migration of spilt/leaked contaminants into the ground. A spill response procedure will be included in the DEMP. Measures to avoid accidental spillage of materials and measures to control surface run-off will be documented and implemented. A drainage plan will be prepared and implemented. Store all oils, fuels and chemicals in a fully bunded area.

Table15-2: Health Impact Related KEA Chapter Conclusion and Mitigation (cont)

KEA Title	Phase	Effect	Conclusion	Mitigation
Geotechnical and Materials Management (cont.)	Decommissioning	Contamination of site soils, surface waters and groundwater and risk to human health of site occupiers and neighbouring site users from accidental spillage of stored fuels, chemical and waste products during removal from site or accidental spillage of substance used during decommissioning.	Contamination of site soils, surface waters and groundwater and risks to human health are considered not significant provided that the mitigation is followed.	Carry out any activities (such as refuelling) that could cause pollution (leaks/spills) in a designated area, away from surface water or boreholes. Where possible it should drain to the foul sewer. Emergency procedure plan to be prepared and implemented. Sample, test and assess site soils and groundwater to confirm no contamination has occurred. Treat/remove any contamination found to exist
Noise	Construction/ Decommissioning	Increase in noise levels due to construction works	Noise generated in the construction/decommissioning is considered to be not significant, provided that the noise mitigation measures outlined in the CEMP and DEMP are followed.	Application of best practice in accordance with BS5228. Implementation of CEMP and DEMP.
		Increase in road traffic noise due to construction works	The increase in road traffic noise is not significant at the majority of receptors. It was identified that there is the potential for noise from construction traffic to impact on the property known as Brookfields House at the existing quarry entrance. However, following the installation of a temporary acoustic fence during the construction phase, the assessments undertaken within Chapter 14 - Noise concludes that no significant environmental effects to population or human health will arise from the Development.	The introduction of a temporary acoustic screen at site entrance along boundary with Brookfield House for the construction phase of the development. Application of best practice in accordance with BS5228 and where appropriate/practicable a route agreement to and from site. Implementation of the CEMP.

Table15-2: Health Impact Related KEA Chapter Conclusion and Mitigation (cont)

KEA Title	Phase	Effect	Conclusion	Mitigation
Noise (cont.)	Operation	Increase in noise levels due to ERF operations	The rating level relative to baseline noise would indicate a negligible impact at all receptors. Based on this receptor (i.e. the worst-case receptor) the operational noise impacts from the ERF are considered not significant. The noise mitigation strategy has been incorporated into the design of the Installation to control noise.	No further mitigation is required.
	Operation	Increase in road traffic noise due to ERF operations	The increase in road traffic noise during the operation phase is shown to be negligible at all receptors and therefore not significant.	No mitigation measures necessary on local road network

15.11. Monitoring and Evaluation

15.11.1. The development has the potential to impact on the locality both through the construction phase and the operational phase. Many of the environmental factors are appraised by Technical experts within the various EIA Chapters and mitigation is proposed where potential impact is identified. Ensuring the mitigation is implemented is crucial to minimising the health impact.

15.11.2. Some potential benefits have also been identified within the HIA, but further work is required to formalise these benefits, particularly in respect of the local communities. Recommendations have been suggested as part of the HIA and the implementation and continued monitoring and evaluation of these recommendations will be undertaken as the Development progresses.

15.11.3. A summary of all the monitoring and mitigation proposed is provided in Chapter 16.

15.12. Summary of Pre-Application Comments and Responses

15.12.1. Comments have been received from a range of stakeholders covering various aspects of the development proposals, which are; Planning Policy, Need, Socio-economic, Highways, Air Quality, Ecology, Noise, Geotechnical and Landscape.

15.12.2. Comments ranged from seeking clarification, justification of statements made, requesting more details on certain aspects, confirmation of the approach taken or methodologies used, and more in-depth assessment of subject matter.

15.12.3. Responses to the comments received have provided clarification on various aspects, and highlighted additional mitigation measures that are proposed, such as enhanced woodland planting and measures to protect Great Crested Newts around the development site. Additional work is being undertaken to provide more detailed information on those aspects where clarification has been requested.

15.12.4. Some responses require more detail that existed but that was not made clear in the various EIA Chapters and therefore, additional confirmation text is being provided. Where required, additional information is being collated for responses that will hopefully satisfy respective stakeholders that commented.

15.12.5. It is not considered that any of the comments specifically related to the HIA, although some subjects commented on are covered within the HIA. Therefore, none of the pre-application comments received materially change the contents of the HIA, at this stage. However, as the HIA is a 'live document' it will be reviewed as and when additional or updated information relating to the proposed development is available.

15.13. Conclusion

15.13.1. As noted above, impacts to population and human health have been assessed in detail within specific KEA chapters of this ES insofar as they are relevant to specific topics (for example, the Air Quality chapter). The population and human health impact conclusions and mitigation contained within each KEA chapter are reproduced in Section 15.10.

Assessments undertaken within each KEA chapter all conclude that no significant environmental effects to population or human health will arise from the Development.

15.13.2. In addition, the HIA cross references these topics and aims to assess impacts to human health from a wider perspective.

15.13.3. In conclusion, in the short term, there are potential dust, noise and additional vehicle movements associated with the construction phase. However, mitigation measures and recommendations can be implemented to ensure that population health impacts are addressed and controlled and no significant effects arise.

15.13.4. The community 'acceptance', or not, of the development is difficult to determine in terms of impact and severity. Opposition at the engagement events was obvious and it will require careful and considered communication to try and ensure the concerns and fears of the local communities are dealt with sensitively and appropriately. This may require a multi-organisational approach, which could potentially be delivered through a Liaison Group.

15.13.5. The HIA has also identified there are potential positive health impacts which can be achieved in the long term, such as employment, educational and training opportunities. More local jobs would help improve living conditions, housing and ultimately health and well-being. Further meaningful engagement from the local communities may generate additional positive health benefits through community support projects and other requested support from the development, if achievable.

15.13.6. In all cases, the health impacts have been assessed in respect of vulnerable groups and the recommendations suggested contribute to achieving equity and reducing inequalities.

15.14. References

[i] Request for Scoping ECL.001.01.02/RFS, Environmental Compliance Limited, August 2018

[ii] Health Impact Assessment: Main Concepts and Suggested Approach. Brussels: Gothenburg Consensus Paper. World Health Organisation (Regional Office for Europe - European Centre for Health Policy), 1999

[iii] DNS: EIA Scoping Director 3201953, The Planning Inspectorate, October 2018

[iv] 'Health Impact Assessment: A Practical Guide', Chatterton, C., Elliot, E., Green, L., Lester, J. and Williams, G., 2012.

[v] *Welsh Index of Multiple Deprivation data'* (LSOA Maps), available at: https://lle.gov.wales/catalogue/item/LowerSuperOutputAreas/?lang=en , Welsh Government, 2011

Technical Appendix 15-1
Comprehensive Health Impact Assessment

COMPREHENSIVE HEALTH IMPACT ASSESSMENT FOR THE ENERGY RECOVERY FACILITY AT BUTTINGTON QUARRY

BROAD ENERGY

ECL Ref: ECL.001.01.02/Comprehensive HIA
Issue: Final
February 2021

COMPREHENSIVE HEALTH IMPACT ASSESSMENT ON THE ENERGY RECOVERY FACILITY AT BUTTINGTON QUARRY

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ACRONYMS / TERMS USED IN THIS REPORT

AM's	Assembly Members
AQMA	Air Quality Management Area
APCr	Air Pollution Control residues
BEWL	Broad Energy Wales Limited
BIIG	Buttington Incinerator Impact Group
C&I	Commercial & Industrial
CEMP	Construction Environmental Management Plan
dB	Decibel
DEFRA	Department for Environment, Food and Rural Affairs
DNS	Development of National Significance
EA	Environment Agency
ECL	Environmental Compliance Limited
EFW	Energy from Waste
EIA	Environmental Impact Assessment
ERF	Energy Recovery Facility
EP	Environmental Permit
EU	European Union
FoE	Friends of the Earth
GP	General Practitioner
HGV	Heavy Goods Vehicle
HIA	Health Impact Assessment
HPA	Health Protection Agency
HPS	Health Protection Scotland
HZC	Hitachi Zosen Corporation
HZI	Hitachi Zosen Inova
IBA	Incinerator Bottom Ash
IMD	Indices Multiple Deprivation
LCA	Life Cycle Analysis
LDP	Local Development Plan
LHB	Local Health Board
LSOA	Lower Super Output Area
MBT	Mechanical and Biological Treatment
MP's	Minister of Parliament
MSW	Municipal Solid Waste
MWI	Municipal Waste Incinerator
NMWTRA	North & Mid Wales Trunk Road Agent
NGR	National Grid Reference
NO_2	Nitrogen Dioxide
NRW	Natural Resources Wales
ONS	Office National Statistics
PHW	Public Health Wales
PPW	Planning Policy Wales
PSB	Public Service Board
ROMP	Review of Mineral Permission
SEPA	Scottish Environmental Protection Agency
SSSI	Site of Special Scientific Interest
SUDS	Sustainable Urban Drainage Scheme

ACRONYMS / TERMS USED IN THIS REPORT (CONT.)

SWIP	Small Waste Incineration Plant
UK	United Kingdom
WG	Welsh Government
WFG	Well-being of Future Generations
WHIASU	Wales Health Impact Assessment Support Unit
WHO	World Health Organisation
WIMD	Wales Indices of Multiple Deprivation

1. EXECUTIVE SUMMARY

1.1. The Study

1.1.1. Environmental Compliance Ltd ("ECL") has been commissioned by Broad Energy (Wales) Limited ("BEWL") to undertake a Health Impact Assessment ("HIA") for the proposed Energy Recovery Facility ("ERF"), hereafter referred to as "the Installation", at Buttington Quarry, Powys in support of a Development of National Significance ("DNS") application to the Welsh Ministers.

1.1.2. The HIA has been used to assess the potential positive impacts along with the unintended consequences of the proposed ERF on the health and wellbeing of the local community and any others that may be affected by it. The HIA has been undertaken in a holistic manner and in accordance with the guidance issued by the Wales Health Impact Assessment Support Unit ("WHIASU") and using their toolkit provided for delivering HIA's. Due to the size and scale, the project is deemed as a development of national significance ("DNS") and therefore, it is considered appropriate that a comprehensive HIA would be delivered.

1.1.3. In order to begin the initial screening exercise, a rough geographical boundary around the proposed development site, based on Lower Super Output Areas ("LSOA's"), was needed. The LSOA's chosen were within approximately 10 – 15km of the Development site which should encompass all likely receptors where grounding of the stack plume may take place in any direction. It was however appreciated that stack emissions were not the only concern and that others existed, such as noise, odour, and Heavy Goods Vehicle ("HGV") trips to and from the site that could impact much further afield.

1.1.4. The initial screening exercise was undertaken to provide an overview of potential impacts of the proposal on the local population and any specific vulnerable groups identified within it. This was achieved through collation and review of the Wales Indices of Multiple Deprivation ("WIMD") (WIMD, 2011 and 2014) for the LSOA's.

1.1.5. A literature review was undertaken to critically assess evidence relating to any identified health impacts from a range of sources, along with understanding public perception of 'incineration'. Initial findings were inconclusive in that there is little evidence to suggest that new incineration plant have a direct health impact (Heath Protection Agency, 2009), but importantly, there is also very little evidence to say that they don't have a health impact (Health Protection Scotland, 2009). The policy context has also been assessed.

1.1.6. In addition to reviewing evidence, participation forms a crucial element of an HIA, particularly at a local level. Invitations to join a Steering Group were sent to a number of organisations and individuals. Consultation letters requesting comments / concerns were sent to 23 organisations and individuals representing a range of stakeholders.

1.1.7. A Steering Group was established including the Developer, the local Councillor, Community Council, North Wales Mineral and Waste Planning Services and Powys County Council ("PCC") Environmental Health. The Steering Group met in May 2019 with discussions informed by the initial screening and basic literature review.

1.1.8. This provided additional considerations such as potential impact on ground waters / private water supplies, and that consideration should be given to communities located on the English border who are relatively close to the site. This helped the scoping for the HIA and understanding the geographical boundary. There was unfortunately a lack of understanding of the HIA process and a perception that meaningful discussion could only take place once the final plans were decided. However, this is not the case as the findings of the HIA are used to inform and influence the proposed development at an early stage through to completion and operation of the ERF.

1.1.9. It was agreed that public engagement events should be organised to provide the local community opportunity to comment on the proposed development. Two 'drop-in' events were delivered in July 2019, one in Middletown Village Hall and the other at Buttington Trewern Community Centre. A total of 39 visitors attended the events. Again, a lack of understanding of the HIA process, at what point in the development it should be undertaken, and a lack of trust in the HIA process delivered from the private sector hampered meaningful engagement with the local community. Only two 'formal' consultation responses were received.

1.1.10. The period of notice and perceived limited scope of notification was criticised by the local community during the engagement events. The Project Team accepted this and, therefore, it was decided to circulate information about the development and provide further opportunity to comment by way of 'sponsoring' the November edition of the "Border Gossip" which is circulated to the local communities around the Trewern Community Council area. No further correspondence has been received following the November edition circulation.

1.1.11. Whilst only two formal responses to consultation have been received, key themes identified during discussions at the 'drop-in' events were noted and have been used to help inform the HIA.

1.1.12. The construction and operational stages of the proposed development have the potential to create noise, dust, light, odour, air quality, water, and traffic issues for the local community. These specific topics are assessed by technical experts within various Environmental Impact Assessment ("EIA") chapters of the Planning Application and should be read in conjunction with this HIA. The relevant chapters recognise the potential issues and offer mitigation through design and physical interventions to minimise the impact, such as enclosed waste reception hall, lighting design strategy, Construction Environment Management Plan, Dust Mitigation Plan, and Sustainable Urban Drainage Scheme.

1.1.13. There is a potential that those living nearby may feel they will no longer be able to access the green space around the development, grow their own food, make use of the public footpath (B39) traversing the site, or enjoy their garden due to air pollution from the facility.

1.1.14. The air quality assessment associated with the proposal identifies that there will not be any likely significant impact and that no air quality limits will be breached during normal operation, or during abnormal circumstances. This will need to be communicated appropriately to provide necessary assurances and mitigate potential stress and mental health issues, along with ensuring physical activity is not 'self-restricted' for those within

the vicinity.

1.1.15. The public footpath will still be accessible during the construction and operational phase, however, due regard to safety of those using the footpath will be required.

1.1.16. Comments received during the 'drop-in' sessions in respect of lack of trust in the HIA process, planning and regulators cause concern for mental health issues, stress, anxiety and well-being. The reasons for miss-trust and perceptions associated with it are beyond the scope of this HIA, however, these will be elements that will make people feel they have a lack of control and perceive their opinions will not be listened to. This may mean they feel it is not worth commenting, despite being given various opportunities to do so. This creates a barrier to delivering effective HIA's and to making the best use of them for development proposals, and ultimately for delivering the goals and objectives of the Well-being of Future Generations (Wales) Act 2015 ("WFG").

1.1.17. The proposed development has been designed to be located within the quarry bowl, however, it is acknowledged that parts of the building and stack will be above the top of the quarry and visible from various directions. The form, orientation, mass, and levels of the construction have been considered and designed to minimise their impact. These aspects are very subjective and will depend on individual's perspectives as to how acceptable the facility will be within the location, if permission is granted.

1.1.18. Review of the Welsh Indices of Multiple Deprivation ("WIMD") for eight Powys wards identified that 'Access to Services' and 'Housing' are two determinants that are key concerns for a number of local communities. The lack of engagement failed to identify ideas that would assist with improving these specific aspects from the development. There may be opportunities as yet not identified that may become known through the Planning Consultation and which can then feed in to further assessment of the HIA.

1.1.19. The proposed development provides an opportunity for jobs, some of which can be sourced locally, and may contribute towards future apprenticeships. This can tie in with educational opportunities about the development and the wider subject of waste minimisation. The creation of jobs will contribute to the local economy and potentially help alleviate the trend of people leaving the area for employment. This could help strengthen the communities.

1.1.20. A review of Indices of Multiple Deprivation ("IMD") for five Shropshire wards was undertaken but due to data being collated and assessed differently to the Powys wards, direct comparison was not possible. For crime, the IMD score ranged from 7 to 10 (where a score of 10 has the lowest crime rates), and for assessment of lack of services the scores ranged from 4 to 8 (where a score of 10 has the least services).

1.1.21. The ERF is designed for Combined Heat and Power ("CHP") and therefore will have heat output that can be used locally. A local farm has expressed interest but there may also be other potential users, such as market garden opportunities or potential future uses for businesses on the site.

1.1.22. Whilst access to services and housing have been identified as domains of concern for some wards in the locality, no specific elements of the proposed development have been

identified as causing further direct impact on these domains. A lack of engagement has resulted in no specific contributions from the development being identified that would improve either domain.

1.1.23. Mitigations through design and construction principals have been put forward, but it is hoped that greater engagement during the planning consultation process will result in proposals for more positive and clear contributions from the development, along with identifying any, as yet, unintended consequences that may impact vulnerable groups within the community. This information would be used to re-assess the HIA where appropriate to ensure maximum gain and minimum impact from the proposal.

2. INTRODUCTION

2.1. Requirement for a Health Impact Assessment

2.1.1. In May 2017, the Town and Country Planning (Environmental Impact Assessment) ("EIA") Regulations were updated. This included clarification that 'population and human health' are on the list of topics that must be considered in an EIA. Accordingly, an HIA was proposed within the Request for Scoping.

2.1.2. The DNS Scoping Direction from The Planning Inspectorate confirmed that it would be appropriate to undertake an HIA and agreed with the proposed methodology of using the WHIASU tools and guidance.

2.1.3. As a result, an HIA has been undertaken to identify any potential unidentified consequences on the health and wellbeing of any relevant vulnerable populations groups that may be impacted from the proposed ERF and will be submitted as part of the planning application. Consequently, the appraisal findings and recommendations can influence the project at this crucial stage and be incorporated prior to commencement of the Project, should Planning Consent be granted. The HIA will also highlight positive impacts from the development which may have been otherwise overlooked.

2.1.4. BEWL have stated they are committed to ensuring that disturbance and pollution to both the environment and amenity of the area will be kept to an absolute minimum.

3. METHODOLOGY

3.1. Health Impact Assessment (HIA)

3.1.1. HIA has been defined as "*a combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population"* (WHO, 1999).

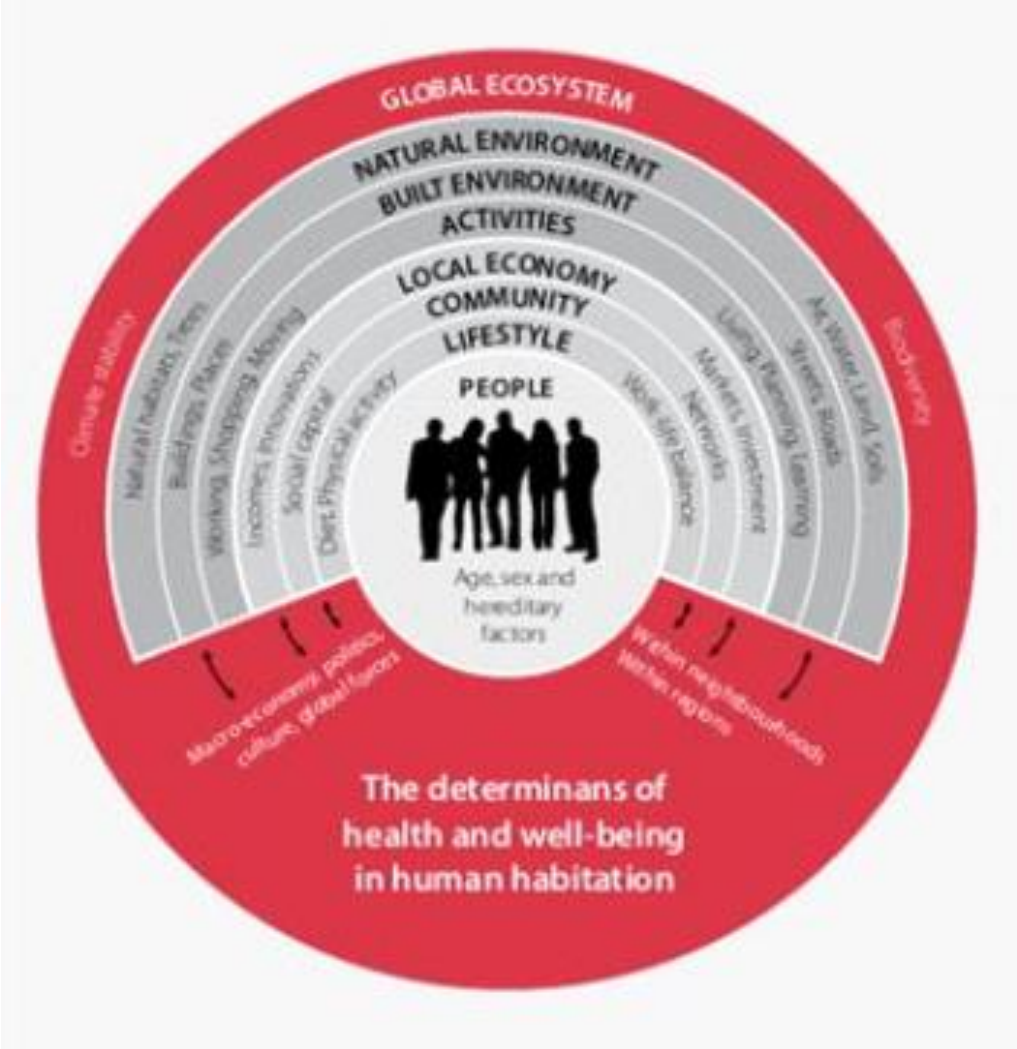
3.1.2. HIA is used in "*a systematic, objective and yet flexible and practical way of assessing both potential positive and negative impacts of a proposal on health and wellbeing and suggests ways in which opportunities for health gain can be maximised and risks to health minimised"* (Chadderton, C., et al., 2012).

3.1.3. The HIA methodology is referenced back to two key frameworks, illustrated in Figures 1 and 2 below, where the social determinants have been described graphically by Dahlgren and Whitehead (1991), and the ecological framework described by Barton and Grant (1998). WHIASU presented these figures in their HIA guidance (Chadderton, C., et al., 2012).

Figure 1: Social Determinants of Health

Dahlgren and Whitehead (1991)

Figure 2: Ecological Framework of Health



Barton and Grant (1998)

3.1.4. Planning Policy Wales 10 was issued in 2018 introducing, and putting great emphasis on, place making. The concept is described as "*a key element to deliver on the aspirations of (The Wellbeing of Future Generations) Act and drive plan making and development management decisions*" (PPW 10, 2018). Combined with the push to increase public health-based decision making in the planning process creates a greater requirement to fully understand and undertake HIA such that holistic approaches are used to deliver sustainable development. There are three core elements to place making which are:

- Productive and Enterprising Places;
- Active and Social Places; and
- Natural and Distinctive Places.

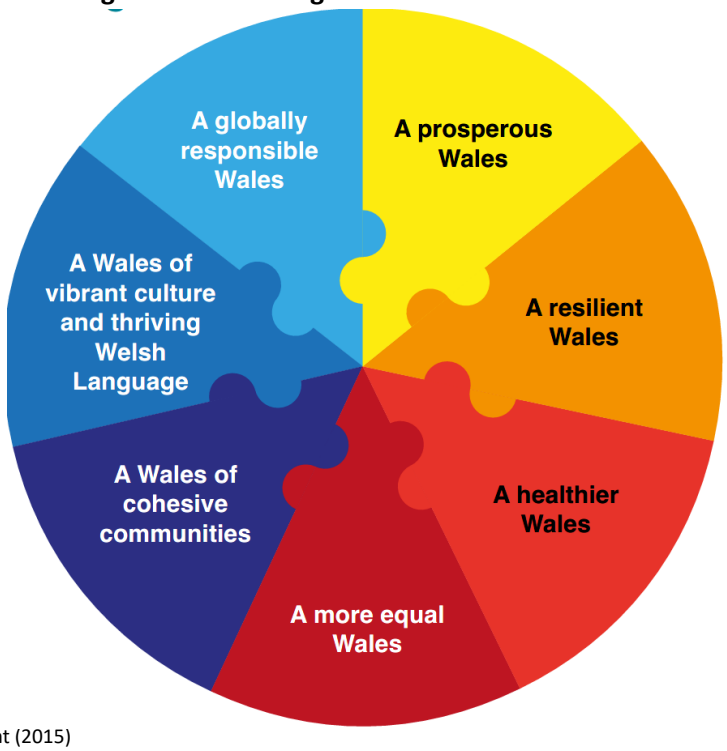
3.1.5. The mechanisms to deliver place making through sustainable development principals are described as the five ways of working, which are detailed in the Wellbeing Act (Welsh Government, 2015) and require public bodies to have regard to them in decision making processes.

3.1.6. The five ways of working are:

- Collaboration;
- Prevention;
- Long Term;
- Involvement; and
- Integration.

3.1.7. Both sustainable development and HIA help underpin various goals of the WFG as shown in Figure 3 below.

Figure 3: Well-being of Future Generations Goals



Welsh Government (2015)

3.1.8. Since the WHIASU guidance has been issued, further understanding of the determinants of health has been gained and the important aspect of mental well-being has been recognised to a greater degree with the inclusion of additional guidance provided. A mental well-being checklist that has been developed and provides three key aspects, detailed below, supported by a detailed list of considerations (South London and Maudsley NHS, 2011).

- Enhancing Control;
- Increasing Resilience and Community Assets; and
- Facilitating Participation and Inclusion.

3.1.9. The holistic and overarching toolkits encompassed within the HIA methodology create a powerful tool with which to use for assisting delivery of the goals and objectives of the WFG.

3.2. How the HIA was Undertaken

3.2.1. The HIA would adopt a holistic approach and focus on the distribution of health impacts across the affected population in order to address any existing health inequalities and inequities, as well as preventing additional inequalities or inequities from being created as a result of the proposed ERF.

3.2.2. The HIA followed the systematic methodology described in the WHIASU 'Health Impact Assessment: A Practical Guide' (Chadderton, C., et al., 2012).

3.2.3. An initial screening exercise was undertaken to assess the potential health impacts from the proposed development and would help identify initial areas of research. Basic scoping was performed to provide discussion points for initial engagement.

3.2.4. The early research undertaken looked at existing reviews of incineration, mainly undertaken on behalf of government departments, scientific research of health studies relating to incineration and gathering local data derived from WIMD. The research information and initial basic scoping would help inform discussions with the Steering Group.

3.2.5. A Steering Group would be established and discussions about the proposed development would aim to identify local concerns which may require additional research. Public participation would also be undertaken to establish locals concerns in respect of the proposed development and look for opportunities where positive local benefits could be delivered.

3.2.6. The information and knowledge gathered from research and stakeholder engagement would be used to identify mitigation measures that may be required to minimise any potential health impacts and to generate recommendations for interventions that would deliver positive local benefits.

3.3. Systematic Steps

3.3.1. The initial step undertaken was to determine a rough geographical boundary around the Development site, based on Lower Super Output Areas (LSOA's). The LSOA's chosen were within approximately 10 – 15km of the site and are shown in the Powys Electoral Ward map in Appendix I. The Electoral Wards are as follows:

- Forden;
- Guilsfield;
- Llandrinio;
- Welshpool Castle;
- Welshpool Grungrog 1;
- Welshpool Grungrog 2; and
- Welshpool Llanerchyddol.

3.3.2. Following identification of the above LSOA's, an appraisal of the population health impacts was undertaken focusing on the wider determinants of health and identified vulnerable groups. This was achieved through collation of the WIMD data for the areas identified and briefly reviewing the data. The brief review identified that 'Access to Services' and 'Housing' appeared to be main the main issues for some of the LSOA's.

3.3.3. Along with the WIMD data review, a literature review was undertaken focussing on health impacts from incineration plants. The initial findings were inconclusive in that there is little evidence to suggest that new incineration plant have a direct health impact, but importantly, there is also no evidence to say that they don't have a health impact.

3.3.4. An initial screening exercise was then undertaken to provide an overview of the potential impacts of the proposal on the local population and any specific vulnerable groups defined within it. The output from the initial screening and early literature review helped inform discussions at a Steering Group.

3.3.5. A Steering Group meeting took place at the site in May 2019. This proved very beneficial as it delivered different perspectives from the meeting attendees and their various roles within the process. For example, consideration of potential impact on ground waters and in particular private water supplies, and that consideration should be given to communities located on the English border, who are located relatively close to the site at a distance of approximately 5km. It was agreed that public engagement should be undertaken to help inform the HIA and specific considerations for the project.

3.3.6. The Steering Group consisted of:

- Environmental Compliance Limited;
- Broad Energy (Wales) Limited;
- Key Technical Contractors;
- Local Councillor;
- Trewern Community Council
- North Wales Mineral and Waste Planning Service; and
- Powys County Council Environmental Health.

3.3.7. Following the Steering Group meeting, the initial screening exercise was reviewed and revised and the updated information used in the WHIASU Population Groups Checklist, WHIASU Wellbeing Determinants Checklist and WHIASU Screening Record Sheet, which are all provided in Appendix II. The screening exercise helped to define the focus of the HIA, although it should be noted that impacts can emerge during the appraisal stage which were not identified during screening.

3.3.8. Following the screening exercise, scoping of the HIA was undertaken. The completed WHIAUS Scoping Checklist for this project is contained within Appendix III.

3.3.9. The scoping provided further insight for the literature review which would focus on the potential health impacts highlighted through the screening exercise and which would be undertaken using a number of evidence sources.

3.3.10. Community profiling was also completed, with additional data compiled for wards in the Shropshire area close to or adjacent to the border using data sets such as demographics and health status. Both the literature review and the community profiling help inform the HIA of the vulnerable groups with elevated susceptibility to potential health impacts from the proposed ERF. The specific Shropshire wards assessed are listed below and illustrated in Appendix I:

- Chirbury & Worthen;
- Llanymynech;
- Longden;
- Loton; and
- Rea Valley.

3.3.11. Participation and collaboration of relevant stakeholders is an instrumental part of an HIA (Chadderton, C., et al., 2012) and therefore the following stakeholders were engaged during the process through email correspondence, a proposal leaflet and invitation to public engagement events:

- local community members;
- local Councillors for the wards identified around the proposed development site (both Powys and Shropshire);
- Community Council (Trewern);
- County Councillor;
- Clwyd-Powys Archaeological Trust;
- Local school (Buttington & Trewern County Primary School);
- Natural Resources Wales;
- Planners (local and Welsh Government);
- Powys Local Health Board;
- Powys County Council (Contaminated Land, Environmental Health, & Highways);
- Public Health Wales / Public Health England;
- Public Service Board;
- North and Mid Wales Trunk Roads Agent;
- Buttington Incinerator Impact Group (BIIG); and
- Assembly Member's / Ministers of Parliament.

3.3.12. Stakeholder and public engagement were undertaken. Two 'drop-in' events were delivered in July 2019, one in Middletown Village Hall and the other at Buttington Trewern Community Centre. A total of 39 visitors attended the events. A lack of understanding of the HIA process, at what point in the development it should be undertaken and a lack of trust in the HIA process delivered from the private sector hampered meaningful engagement with the local community. Two 'formal' consultation responses were received as a result of the engagement.

3.3.13. The period of notice and perceived limited scope of notification was criticised by the local community during the engagement events. The Project Team accepted this and, in order to address this, it was decided to circulate information about the Proposed Development

and provide further opportunity to comment by way of sponsoring the November edition of the “Border Gossip” which is circulated to the local communities around the Trewern Community Council area. Unfortunately, no further correspondence has been received following the November edition circulation.

3.3.14. Whilst only two formal responses to consultation have been received, key themes identified during discussions at the ‘drop-in’ events were noted and have been discussed in relation to the potential associated health and well-being impacts.

3.3.15. A selection of photographs and feedback form from the events are provided in Appendix IV.

3.3.16. Following the participation and engagement, a more in-depth appraisal of the population health impacts was undertaken focusing on the wider determinants of health and identified vulnerable groups. This also encompassed reviewing the individual technical reports associated with the EIA Chapters and prepared by technical experts on the various topics. These chapter reports offer mitigation were potential impacts are identified. Recommendations to address the findings from the appraisal are proposed including the suggested responsible organisations.

4. PROJECT OVERVIEW

4.1. The Applicant, Site Location and Setting

4.1.1. BEWL are a part of The Broad Group which comprises Broad Environmental, Broad Fuels and Broad Energy. The Broad Group is a multi-disciplinary group of companies providing Environmental Waste Management Services, Renewable Energy Infrastructure Development and Alternative Fuel Supply Chain Services to the renewable energy sector.

4.1.2. BEWL is a special purpose company that has been established by Broad Group (UK) Limited to develop the proposed ERF. This independently owned and operated company will form the key anchor with an aim of delivering long term cost effective and efficient energy and heat services as part of the wider plans by the owners of Buttington Quarry to create a sustainable eco-business park.

4.1.3. BEWL has formed a strategic partnership with the global company Hitachi Zosen Inova ("HZI") to design, build and operate a facility that will support the generation of renewable energy and heat through the use of non-recyclable waste. The partnership states that it aims to ensure that all future developments at the site contribute to the local economy and provide job opportunities to the local community.

4.1.4. HZI is a wholly owned subsidiary of Hitachi Zosen Corporation ("HZC"). They would be the main technology provider and also the operator of the ERF. HZI have specialised in the design, procurement and construction of moving grate Energy from Waste facilities, with over 500 Energy from Waste references worldwide, including 11 in the UK and Ireland.

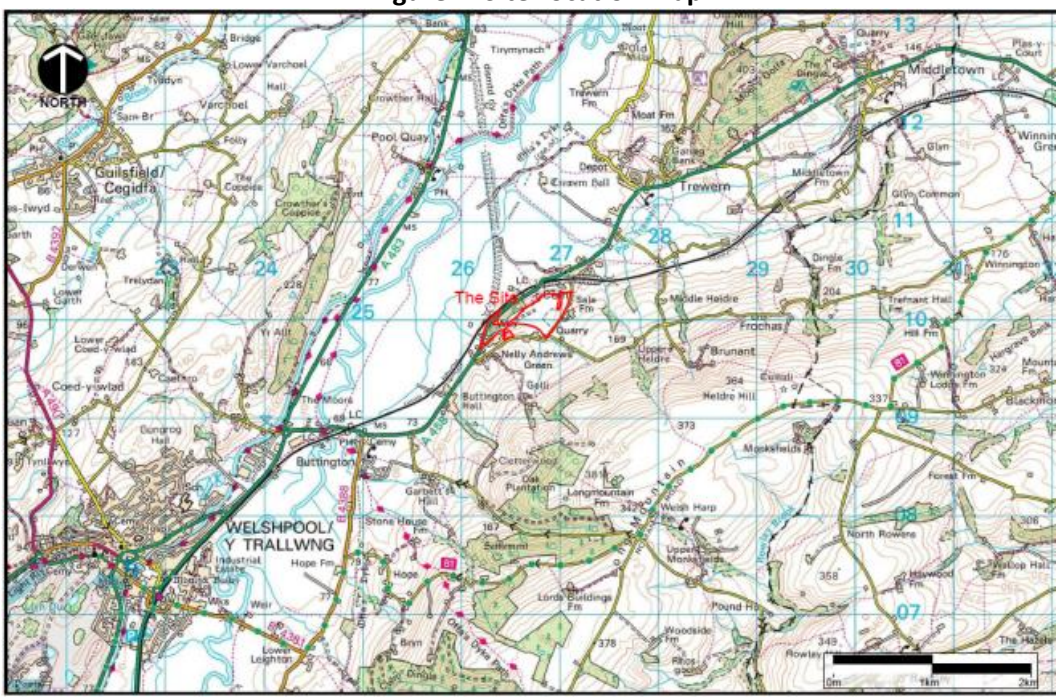
4.1.5. Buttington Quarry is located on the A458 Shrewsbury to Welshpool Road at National Grid Reference ("NGR") 326690, 310106. It is approximately 1.5km to the south east of the village of Trewern, and approximately 2km north-west of the village of Buttington.

4.1.6. The quarry occupies an area of approximately 18 hectares being bounded to the north-west by the A458, Sale Lane to the east and Heldre Lane to the south (both lanes unclassified roads). The Welshpool-Shrewsbury railway line runs immediately north-west of the A458. The site is surrounded mainly by open countryside, although in addition to the villages of Buttington and Trewern, there is an area known as Cefn which comprises sporadic houses, a larger residential development and the Buttington Trewern County Primary School.

4.1.7. The proposed ERF would be located within the quarry bowl which would be subject to re-profiling and earth works to facilitate the structural and operational layout of the facility. The far north-east face of the quarry, meeting the site boundary, is designated as a Site of Special Scientific Interest ("SSSI") in respect of geology, however this is outside of the proposed development boundary.

4.1.8. An indication of the location of the proposed ERF site is illustrated in Figure 4. The exact location is shown on the Site Location Plan contained in Appendix V.

Figure 4: Site Location Map



4.2. Description of Historical and Current Site Operations

4.2.1. The quarry operated from the 19th Century and included a brick-works with permissions approved in 1961 and 1997 for extensions to the original quarry workings. The quarry now operates in accordance with requirements of the planning permission granted in 2010 as a "Review of Mineral Permissions" ("ROMP") under the Environment Act 1995 (Planning Permission reference P/2010/0165). In addition, planning permissions have been granted for an improved access 155m north east of the existing quarry access (Planning Permission reference P/2015/0439).

4.2.2. There are a number of aggregate stockpiles around the site and these are sold from the site under the operating name of Border Hardcore. The historical activity of brick manufacture no longer takes place and the three stacks associated with the brick-works no longer exist.

4.2.3. The remaining brickworks buildings are utilised by third parties. These relate to Speed Welshpool, which is a freight forwarding service, and occupies warehousing facilities near the current site entrance, along with a freight haulage operator that uses the quarry as the operating centre with office facility near to where the old brick-works were located. All three site activities have vehicle movements associated with them.

4.2.4. Six hectares of the Quarry, including the existing quarry void and the former brick-works site, has been allocated for B1, B2 and B8 employment development under Policy E1 - Employment Proposals on Allocated Employment Sites, in the adopted Powys Local Development Plan ("LDP") 2011-2026. The supporting text in the Plan also suggests that it may also be an appropriate location for the storage and processing of wastes arising from construction and demolition.

4.3. Proposed Energy Recovery Facility (ERF)

4.3.1. The proposal relates to a 'state of the art' purpose designed and built ERF that will thermally process non-hazardous municipal waste along with non-hazardous commercial and industrial waste ("C&I"). All of the wastes accepted would have been previously treated in materials recovery facilities, consequently would have little, if any, recyclates to be recovered. It is proposed that up to 167,000 tonnes of waste would be accepted per annum.

4.3.2. The proposed development would comprise the following elements:

- A waste reception hall and bunker;
- ERF to recover the energy and heat from the residual waste; and
- Facilities to manage the products and outputs from the ERF.

4.3.3. The main building would comprise the undercover waste reception hall for waste deliveries, a waste bunker which is loaded by overhead cranes that then supplies the feed hopper for the ERF. Additional elements include an administration building, maintenance building, air cooled condensers and a 70m high discharge stack.

4.3.4. Ancillary infrastructure would include:

- Weighbridge and associated offices;
- Transformer and energy generation buildings;
- Storage tank and silos;
- Access road and site haul roads;
- Utilities and services (including lighting);
- Security, CCTV and fencing; and
- A sustainable urban drainage scheme ("SUDS") and associated balancing ponds.

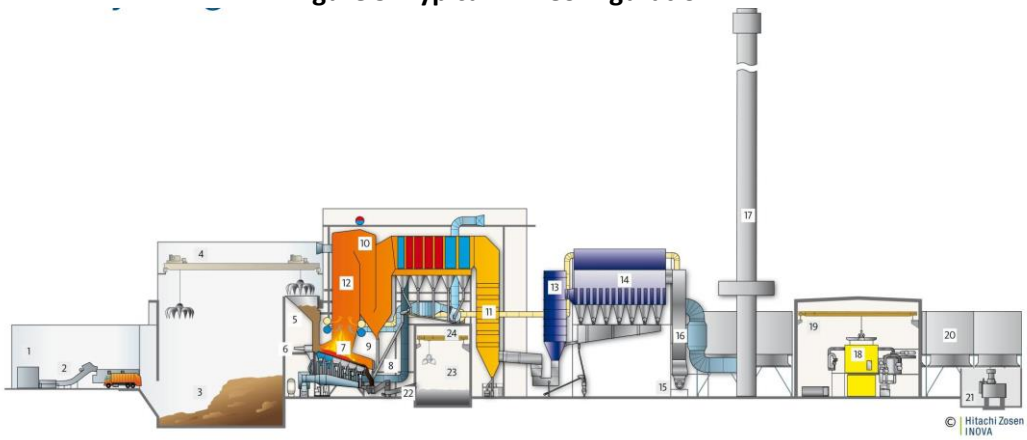
4.3.5. The ERF would be a combined heat and power plant where the combustion of residual waste would generate energy in the form of steam. The steam would then drive a steam turbine to generate electricity. A small proportion of the energy generated would be the parasitic load required for the ERF, with the remaining 12.80 MWe circa exported to the local electricity grid. Based on the maximum electrical output and approximately 7,900 operational hours per year, the Development would export circa 101,120 MWe hours per annum.

4.3.6. Excess heat from the facility would be available for use off site. A local farmer has expressed interest in accessing the heat, and there may be opportunities for other uses locally.

4.3.7. The basic operation of the plant involves the transfer of waste material from the feed hopper to a ram feeder that pushes the waste material to a 'moving grate' where the waste material then undergoes thermal treatment. The hot combustion gases pass through a five-stage boiler with the gases then passing through the filtration plant before being discharged through the stack to atmosphere. Steam raised in the boiler is fed to the turbine where the electricity is generated and passed to the transformer.

4.3.8. A typical layout for such a plant is shown in Figure 5 below.

Figure 5: Typical ERF Configuration



Fuel reception and storage	Combustion and boiler	Flue gas treatment	Energy recovery	Residue handling and treatment
1 Tipping hall	5 Feed hopper	12 Ammonia Injection	18 Turbine	22 Bottom ash conveyer
2 Shredder	6 Ram feeder	13 Semy-dry reactor	19 Turbine building	23 Bottom ash bunker
3 Solid fuel bunker	7 HZI grate	14 Fabric filter	20 Air cooled condenser	24 Bottom ash crane
4 Solid fuel crane	8 Primary air	15 Inducted draft fan	21 Transformer	
	9 Secondary air	16 Silencer		
	10 Five-pass boiler	17 Stack		
	11 Economiser			

(Hitachi Zosen INOVA, 2019)

4.3.9. There would be a number of distinct emissions from the process activity which are:

- Stack emissions;
- Incinerator Bottom Ash ("IBA");
- Air Pollution Control residues (from the filter plant) ("APCr");
- Non-combustible fractions (i.e. metals);
- Noise;
- Light;
- Heat;
- Potential vibration;
- Water run-off; and
- Pollutant matter relating to vehicle movements, plant operations and maintenance.

4.3.10. The proposed development would have to be fully compliant with all the relevant European Union ("EU"), United Kingdom ("UK"), and Welsh Government ("WG") legislation. It will be required to operate under the conditions of an Environmental Permit to be issued by Natural Resources Wales ("NRW").

4.4. Cumulative Impacts

4.4.1. There are a number of potential cumulative impacts associated with the proposal which are:

- Additional traffic from the proposal combined with existing site traffic. The site has been identified for potential future additional uses, which are likely to create further additional traffic movements;
- Noise from the proposal will be additional to that existing, but also will be twenty four hours a day through the continuous operation of the facility;
- Noise may also be an issue during the construction phase but this will be limited to the duration of construction so therefore, a short term impact. Breakdowns or major maintenance could be additional to the day to day operational noise;
- Dust is a potential impact during construction, but again this will be limited to the duration of construction so therefore, short term; and
- Emissions to atmosphere will be additional to anything currently released from the site. The continuous operation means there will be continuous stack emissions from the facility.

5. COMMUNITY PROFILE

5.1. Geographical Profile Area

5.1.1. The Lower Super Output Areas ("LSOA") covered for the community profile review are detailed in Tables 1 and 2 below. A map illustrating the area is shown in Appendix I.

Table 1: Powys LSOA

LSOA Name	LSOA Reference
Forden	W01000441
Guilsfield	W01000444
Llandrinio	W01000457
Trewern	W01000497
Welshpool Castle	W01000498
Welshpool Gungrog [1]	W01000499
Welshpool Gungrog [2]	W01000500
Welshpool Llanerchyddol	W01000501

[1] Powys CC 2019: Electoral Ward & County Profiles
[2] InfoBase Cymru – sourced from Office for National Statistics ("ONS")

Table 2: Shropshire LSOA

LSOA Falls Within Electoral Division	LSOA Reference
Chirbury & Worthen	E01033530
Llanymynech	E01028913
Longden	E01028979
Loton	E01028978
Rea Valley	E01028975

5.2. Population

5.2.1. The population densities for the LSOA's are detailed in Table 3 below. All wards in Powys have less than 50% of the population born in Wales, as does Powys as a county. This may be reflective of the fact that it borders with England.

Table 3: Population and Population Density

LSOA Name	Population	Born in Wales	Density
Parameter / Units	**No.**	**%**	**Per km²**
Forden[1]	1,422	39	0.41
Guilsfield[1]	2,389	44	0.41
Llandrinio[1]	2,152	25	0.48
Trewern[1]	1,448	30	0.45
Welshpool Castle[1]	1,553	39	0.85
Welshpool Gungrog [1]	1,297	39	7.14
Welshpool Gungrog [1]	1,530	45	1.25

Table 3: Population and Population Density (Cont.)

LSOA Name	Population	Born in Wales	Density
Parameter / Units	**No.**	**%**	**Per km²**
Welshpool Llanerchyddol[1]	2,262	47	3.25
Powys[2]	132,447	49.8	25.6
Wales[2]	3,138,631	72.7	151.4
Chirbury & Worthen[3]	3,020	n/a	24.7
Llanymynech[3]	4,364	n/a	67.3
Longden[3]	3,997	n/a	95.2
Loton[3]	4,141	n/a	34.1
Rea Valley[3]	4,265	n/a	122.0
Shropshire[4]	320,274	n/a	100.0
England[4]	66,435,600	n/a	430

Note to Table:
[1] Powys CC 2019: Electoral Ward & County Profiles
[2] InfoBase Cymru – sourced from Office for National Statistics ("ONS")
[3] Shropshire Council: Electoral Ward & County Profiles
[4] Statista [Online]

5.2.2. Powys comprises approximately 4.2% of the population of Wales but covers approximately 25% of the area of Wales. As can be seen in Table 3 above, the population densities for the wards assessed are very low, reflecting the rural nature of the location. The rural nature and low population density may result in potentially greater impact from the development. The Shropshire wards, whilst also relatively rural locations, exhibit higher population numbers and significantly higher population densities.

5.3. Age Demographic

5.3.1. The data for age demography within the LSOA's in presented in Table 4 below. Due to inconsistent data compilation between Wales and England, it is not possible to directly compare the age profile data.

Table 4: Population Age Demographic (%)

LSOA Name	Aged 0 - 15	Aged 16 - 29	Aged 30 - 44	Aged 45 - 64	Aged 65+
Forden	16.9	14.9	16.9	**26.7**	24.5
Guilsfield	16.7	13.7	13.7	**30.1**	25.7
Llandrinio	19.4	19.4	19.0	**29.0**	21.1
Trewern	20.4	20.4	16.6	**30.5**	20.7
Welshpool Castle	19.9	19.9	18.4	**25.8**	19.2
Welshpool Gungrog [1]	16.7	16.7	20.2	**22.6**	21.0

Note to Table: Data taken from Electoral Ward & County Profiles, Powys CC Website & Shropshire Council website.

Table 4: Population Age Demographic (%) (Cont.)

LSOA Name	Aged 0 - 15	Aged 16 - 29	Aged 30 - 44	Aged 45 - 64	Aged 65+
Welshpool Gungrog [2]	17.1	16.4	17.5	**30.1**	19.0
Welshpool Llanerchyddol	17.8	13.9	16.6	25.4	**26.3**
Powys	16.6	9.2	19.6	**29.2**	25.3
Wales	17.9	12.0	23.9	26.7	19.9
	Aged 0 - 4	**Aged 5 - 19**	**Aged 20 - 64**	**Aged 64 – 85**	**Aged 85 +**
Chirbury & Worthen	3.1	16.8	**56.4**	21.6	3.1
Llanymynech	4.4	14.9	**55.1**	23.3	2.4
Longden	4.4	17.2	**54.3**	21.5	2.6
Loton	4.6	19.4	**55.0**	19.0	2.1
Rea Valley	4.5	16.7	**53.4**	22.0	3.3
Shropshire	4.8	16.4	**55.4**	20.3	3.1

Note to Table: Data taken from Electoral Ward & County Profiles, Powys CC Website & Shropshire Council website.

5.3.2. The Powys LSOA's show a reasonably consistent split over the first three age bands with a generally wider variation for the last two. As mentioned above, it is not possible to draw comparison with the Shropshire LSOA's due to the age banding being of different age groupings. The largest population group is for the age band aged 45 to 64. The figures in bold represent the highest percentage for each age band. Trewern has three of the highest percentage figures despite having one of the lowest LSOA populations.

5.3.3. Powys has a significantly higher percentage (25.3%) of the population over the age of 64, compared to Wales. The 15 – 64 age range for Powys is about 4.6% lower than for Wales, and likewise, the 0 – 15 age range is 1.3% lower than for Wales. The higher percentage of older people may mean they are potentially at greater risk from the development through being at home more.

5.4. Welsh Indices of Multiple Deprivation (WIMD) Data

5.4.1. Presented below in Figures 6 to 13 are the summary WIMD data for each of the Powys LSOA as an info graphic. Each one covers the domains of:

- Income;
- Employment;
- Health;
- Education;
- Access to Services;
- Community Safety;
- Physical Environment; and
- Housing.

5.4.2. The data is derived from the WIMD 2014 data set and for each LSOA includes its individual ranking within Wales and where it lies in the overall determination of deprivation. The collated data as infographics has been sourced from Data Cymru.

Figure 6: Forden WIMD 2014

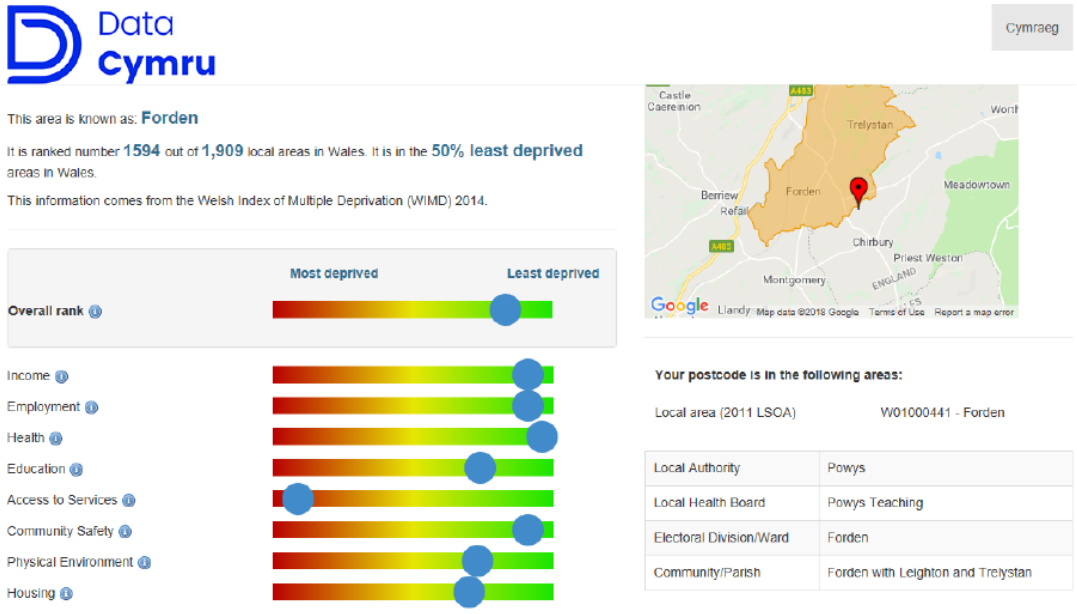


Figure 7: Guilsfield WIMD 2014

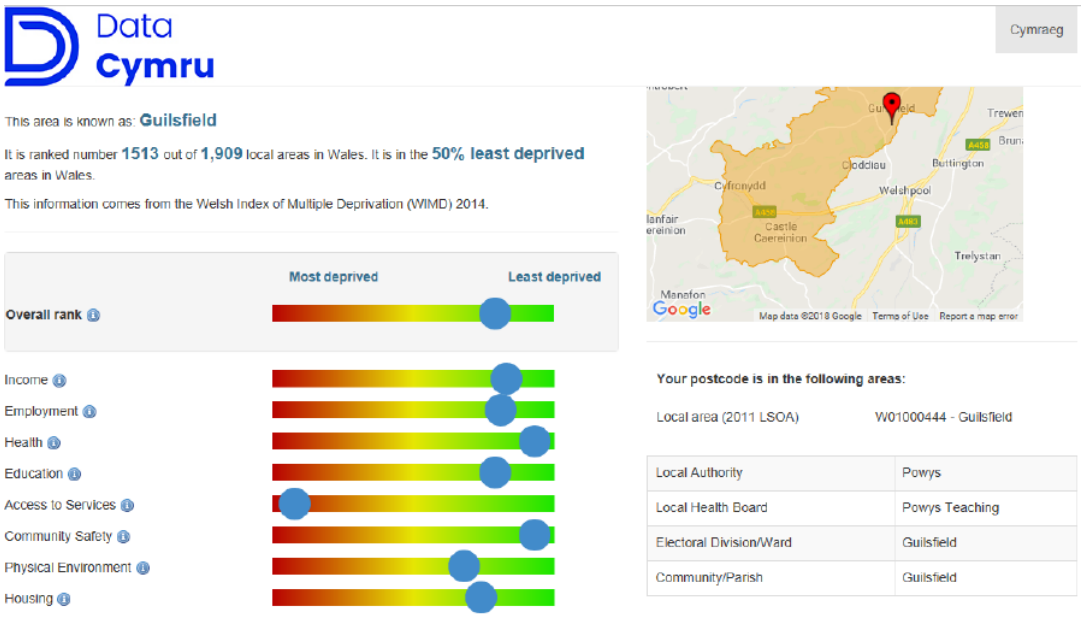


Figure 8: Llandrinio WIMD 2014

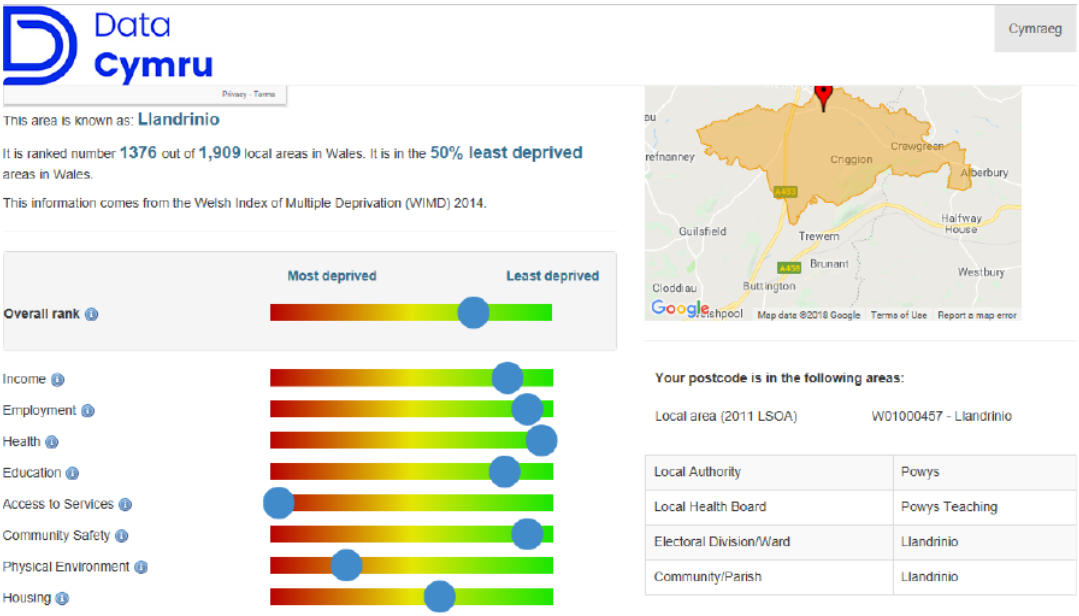


Figure 9: Trewern WIMD 2014

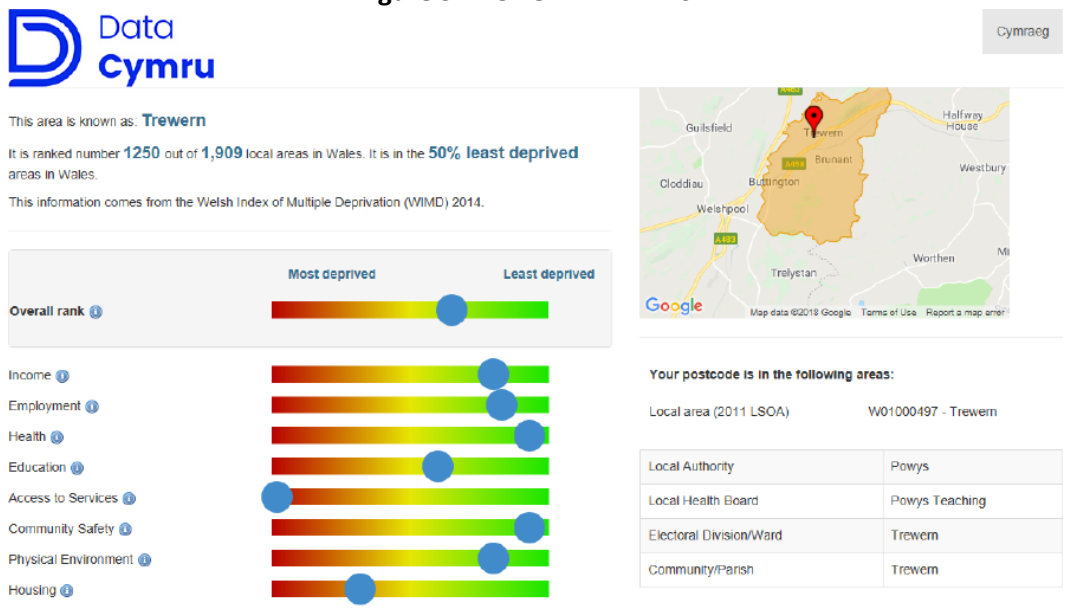


Figure 10: Welshpool Castle WIMD 2014

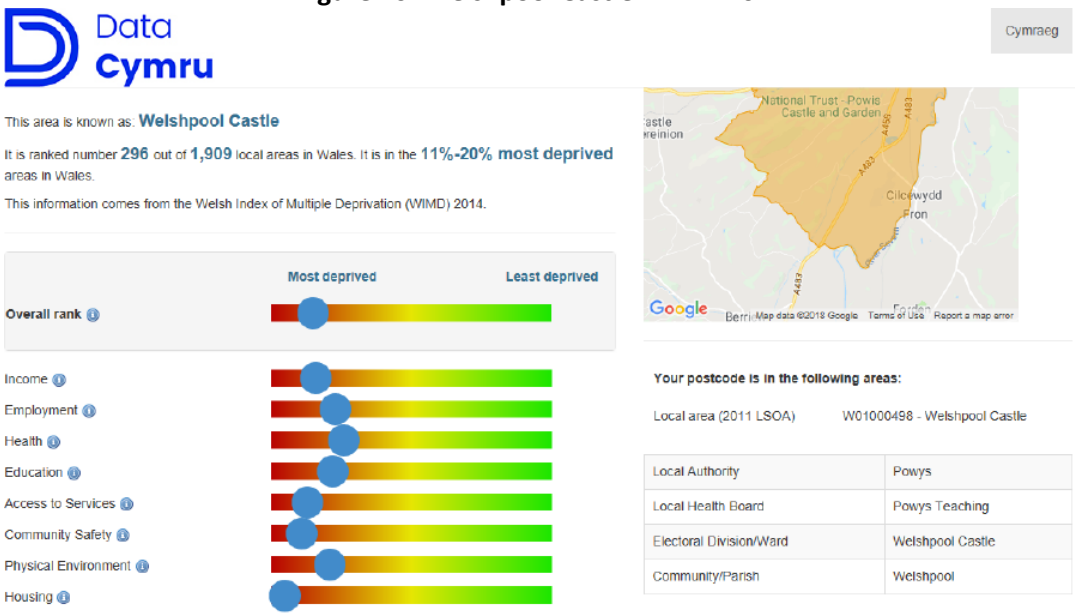


Figure 11: Welshpool Gungrog 1 WIMD 2014

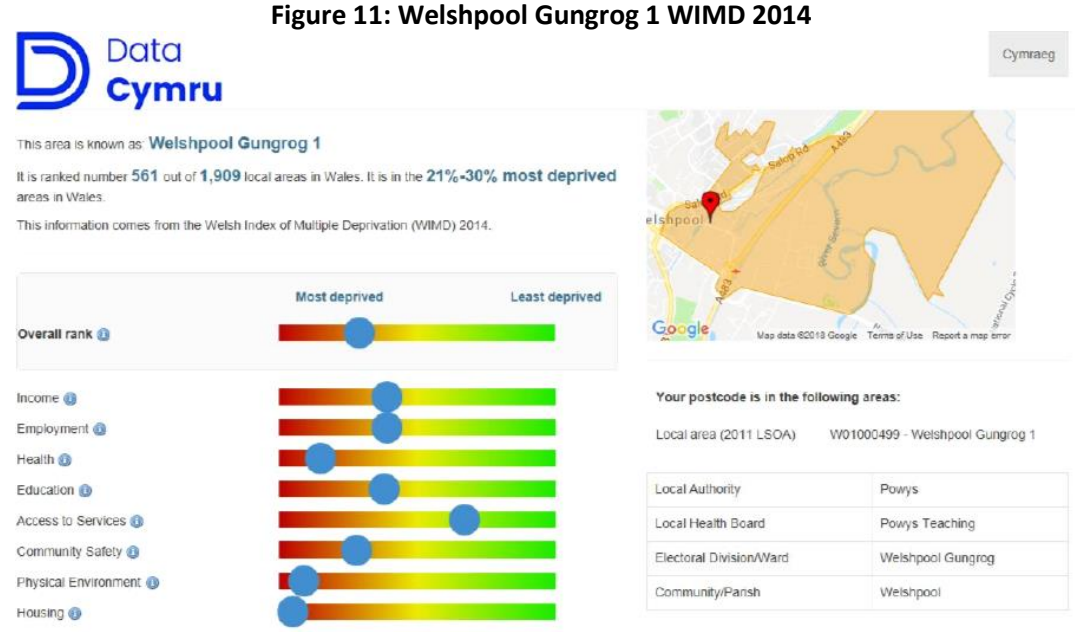


Figure 12: Welshpool Gungrog 2 WIMD 2014

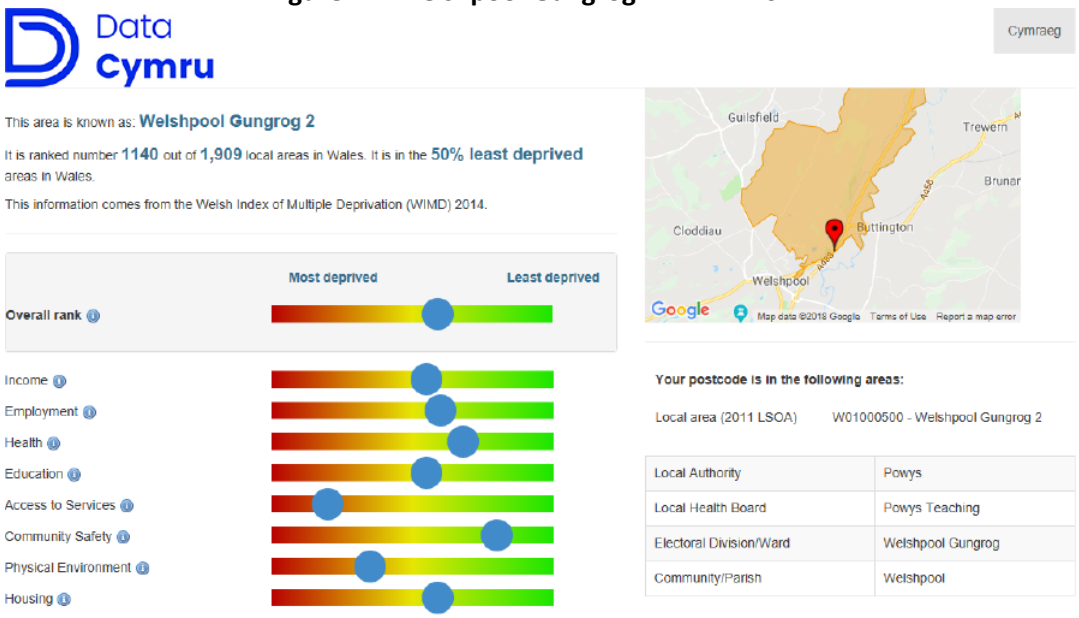
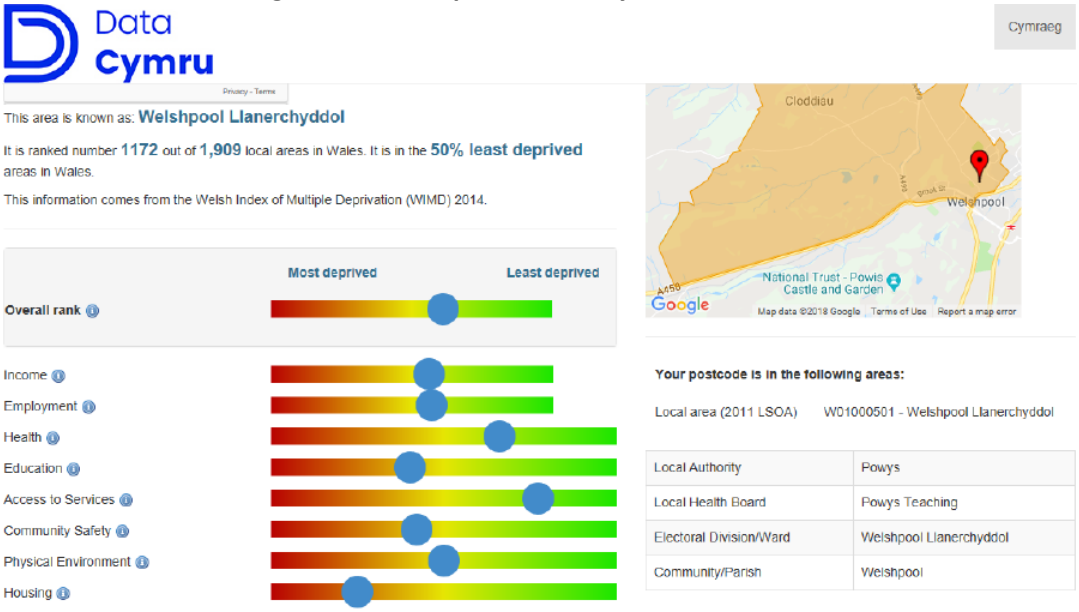


Figure 13: Welshpool Llanerchyddol WIMD 2014



5.4.3. Of the eight LSOA's, six of them fall within the 50% least deprived status for Wales. However, Welshpool Gungrog 1 falls within the 21-30% most deprived status, and Welshpool Castle falls within the 11-20% most deprived status.

5.4.4. Closer inspection of the individual domain information illustrates a different perspective to the summary information. Table 5 below provides details for the best and worst domain 'scores' for each Powys LSOA. Of the 8 WIMD domain assessed, only four are reflected in best and worst 'scores'.

Table 5: Best and Worst Domain 'Scores'

LSOA Name	Health		Access to Services		Community Safety		Housing	
	Best	Worst	Best	Worst	Best	Worst	Best	Worst
Forden	X			X				
Guilsfield *	X			X	X			
Llandrinio	X			X				
Trewern *	X			X	X			
Welshpool Castle	X							X
Welshpool Gungrog 1			X					X
Welshpool Gungrog 2				X	X			
Welshpool Llanerchyddol			X					X

Note to Table 5: *These LSOA had joint best for 2 domains.

5.4.5. Health is the best WIMD domain for five of the LSOA's whilst access to services is worst for five of them. Housing was also worst for three of the LSOA's. For Welshpool Castle, all WIMD domains were below the 20% most deprived status, so although health is listed as best in Table 5 above, it is only marginally better than all other domains for the LSOA. Welshpool Castle is also ranked 296 out of 1909 LSOA. By contrast, Welshpool Gungrog 1 was below the 30% most deprived status for all domains except access to services, which falls in the 50% least deprived status.

5.4.6. Access to services and housing appear to be two key domains that require consideration in terms of the proposed ERF and how it may impact on the locality, for the Powys LSOA's identified.

5.4.7. Information relating to the domains assessed as part of the scoring of the WIMD status are discussed below through sections 5.6 to 5.9 and tabulated data for these sections are presented in Appendix VI.

5.5. Indices of Multiple Deprivation (IMD) Data for Shropshire LSOA's

5.5.1. The information and data for Indices of Multiple Deprivation for the Shropshire LSOA's is assessed and displayed differently to those for Powys. The domains on which the IMD scores are based relate to:

- Income deprivation;
- Employment deprivation;
- Health deprivation and disability;
- Education deprivation;
- Barriers to housing and services;
- Crime; and
- Living environment deprivation.

5.5.2. Table 6 below provides the IMD deprivation status for each of the Shropshire LSOA's using data from 2015. The IMD are designed to identify areas where communities lack resources and are in need.

Table 6: Shropshire LSOA's Deprivation Status (2015) (by Ward)

Ward Name	National Decile ranking (1-10) [where 1 is highest and 10 lowest]
Chirbury & Worthen	5 & 5
Llanymynech	4, 6 & 7
Longden	5, 7 & 8
Loton	4, 5, 6 & 7
Rea Valley	6, 7 & 8

5.5.3. Information relating to the domains assessed as part of the scoring of the IMD status are discussed below through sections 5.6 to 5.9 and tabulated data for these sections are presented in Appendix VI.

5.6. Society, Ethnicity and Religion

5.6.1. The data between Powys and Shropshire is not comparable as it assesses different parameters. Guilsfield has the highest percentage (25%) of residents with some Welsh language skills, and Welshpool Llanerchyddol has the highest percentage (1.96%) of Black and Minority Ethnic residents.

5.6.2. Chirbury and Worthen and Llanymynech have the largest percentage (97.2%) of white British residents, whilst Longden and Loton have the highest percentage (0.8%) of mixed / multiple ethnic groups. Loton has the widest range and highest Black and Minority Ethnic resident population of 2.5%.

5.6.3. Christians make up the largest religious group within the population with Llanymynech at 72.4%. All other religions are represented by less than 1% of the population within each LSOA.

5.7. Health and Care

5.7.1. Under health and care, Welshpool Gungrog 1 has the highest all-cause death rate (2,841), significantly higher than any other LSOA. As a comparison, Gungrog 1 has a rate nearly 75% higher than Llandrinio with a rate of 734, which is the lowest of the LSOA. However, Llandrinio has the highest cancer incidence rate of 693. Welshpool Llanerchyddol has the highest percentage (25%) of people living with a limiting long-term illness.

5.7.2. Loton has the highest percentage (50.1%) of people reporting very good health, whilst Longden and Rea Valley have the highest percentage (1.1%) reporting very bad health. Rea Valley also has the highest percentage (9.2%) reported as living with long-term limiting illness.

5.7.3. Welshpool Castle has the highest number of people living on Income Support but Welshpool Llanerchyddol has the highest number claiming both Disability Living Allowance and Severe Disablement Allowance.

5.7.4. The Shropshire LSOA have been assessed in terms of unpaid care work provided by percentage of the population. Chirbury and Worthen have 9.2% of the population providing between 1 and 19 hours per week, and 1.7% of the population providing between 20 and 49 hours per week. However, Llanymynech has 3.1% of the population providing over 50 hours of unpaid care a week.

5.8. Qualifications, Economic Activity and Employment Sectors

5.8.1. Welshpool Gungrog 1 has the highest percentage (38%) of people aged between 16 and 74 without any qualifications. Welshpool Castle has the highest percentage of School Absence Rates for both Primary and Secondary schools, 7.7% and 9.6% respectively. The highest percentage (78%) of Full Time Employed people live in Welshpool Gungrog 1, despite having the highest number without any qualifications. The highest number of people claiming Job Seekers Allowance live in Welshpool Castle.

5.8.2. Approximately a third of the people employed within the Powys LSOA's assessed work within the Manufacturing and Wholesale & Retail trade sectors. Public Administration and Other community, social & personal services sectors employ about 8.5% of those in employment within the LSOA's.

5.8.3. Chirbury and Worthen has the highest percentage (14.6%) of people with no qualifications. Longden and Rea Valley have the highest percentage (20%) of people who are Economically Inactive, whilst Loton has the highest percentage (81.9%) who are Economically Active. The highest percentage (4.1%) of Unemployed live in Longden and the highest percentage (1.0%) claiming Job Seekers Allowance live in Chirbury & Worthen.

5.8.4. The main employment sectors within the Shropshire LSOA's are skilled trades and professional occupations. Process plant and machine operatives, along with sales and customer service occupations employ the lowest number of those in employment within the LSOA's.

5.9. Housing, Environment and Community Safety

5.9.1. Welshpool Llanerchyddol has the largest number of households (1,011) and Trewern has the highest average household size of 2.57.

5.9.2. Guilsfield is the largest of the LSOA's covering an area of 571,802 hectares, of which 763 is covered by woodland. The ward also benefits from 206 hectares of common land. By contrast, Welshpool Gungrog 1 covers the smallest area at 18,160 hectares, of which only 3 hectares are covered by woodland. Llandrinio benefits from 101 hectares of land designated as Sites of Special Scientific Interest ("SSSI"), and also water bodies cover an area of 54 hectares.

5.9.3. In terms of Community Safety, Welshpool Castle has the highest rate of reported Incidents across all domains, significantly higher for Violent Crime and Youth Offenders (aged 10-17), although it is acknowledged that 25% of the data was not published across the domain parameters.

5.9.4. Llanymynech has the highest number of properties owned outright at 49.1%. Chirbury and Worthen has the highest number of private rented properties (16.6%) and Longden the highest number of social rented properties (15.1%).

5.9.5. Rea Valley has the highest number of households with a Lone Person (27.5%) and also households with one person over 65 years of age (16.2%). Loton has the lowest number of households with a Lone Person (20.4%) and properties with one person over 65 years of age (9.5%). However, Loton has the highest number of households with a Lone Parent with children (5.3%), Married Couples with dependent children (19%) and Co-habiting couples with dependent children (4.0%).

5.9.6. Chirbury and Worthen is the largest LSOA at 12,206 hectares but has the lowest number of households (1,262) and dwellings (1,349). Rea Valley is the smallest LSOA at 3,497 hectares but has the largest number of households (1,787) and dwellings (1,851).

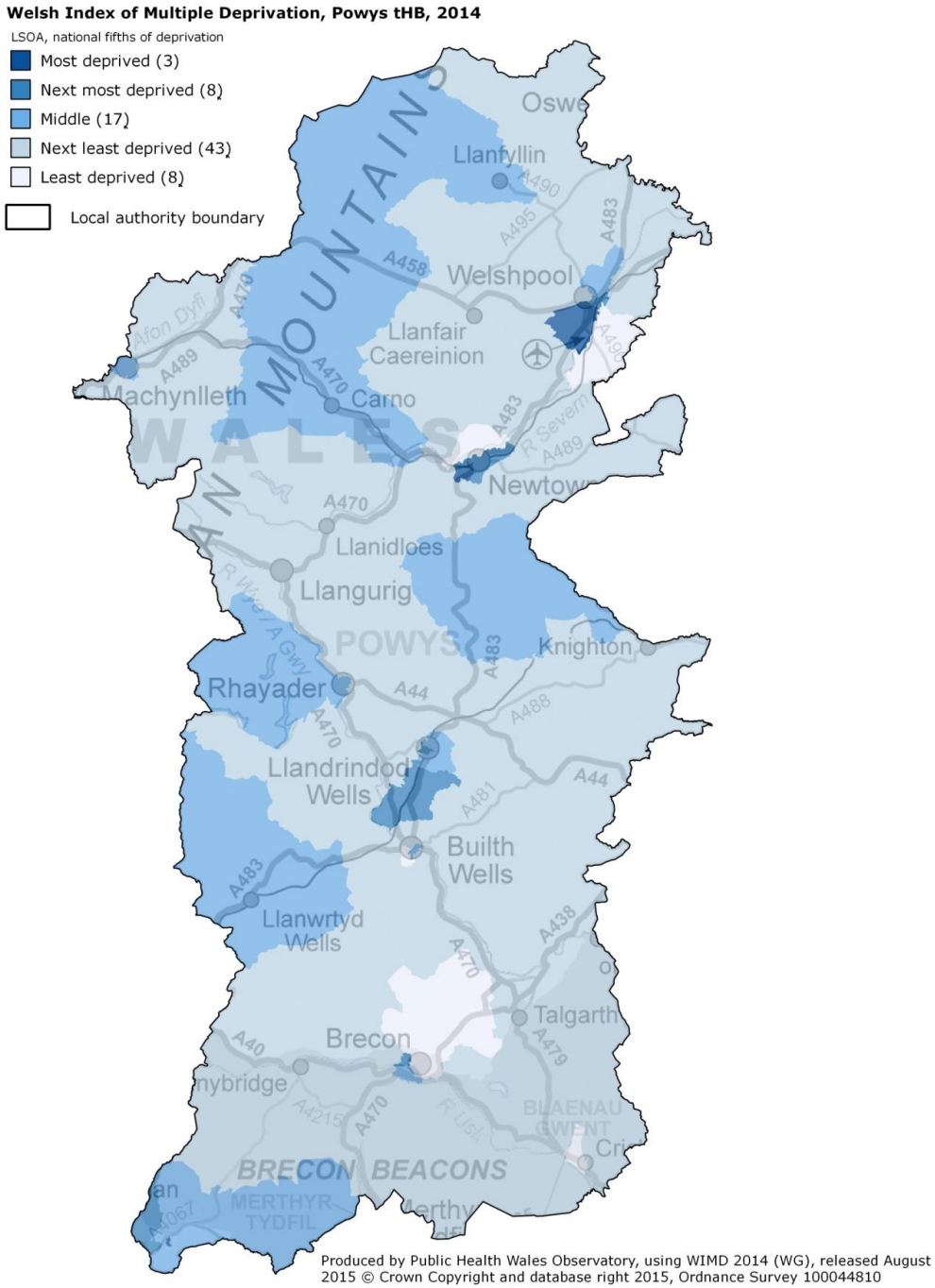
5.9.7. In terms of Community Safety, Longden has the highest incident rate of crime of 38.5 per 1000 population. Llanymynech has the lowest incident rate of 17.6 per 1000 population.

5.10. Health Indicators

5.10.1. Public Health Wales Observatory has produced LSOA maps of the WIMD 2014 for Wales and each health board. The WIMD for Powys Teaching Health Board which covers the Powys region is displayed in Figure 14. WIMD is compiled from eight domains;

- Income;
- Employment;
- Health, education;
- Housing;
- Access to services;
- Physical environment; and
- Community safety.

Figure 14: Welsh Index of Multiple Deprivation 2014: Health Board Maps – Powys Teaching (Public Health Wales Observatory, 2015)



5.10.2. Table 7 below summarises the ranking for each of the LSOA assessed in Powys in relation to the HIA.

Table 7: Welsh Index of Multiple Deprivation

LSOA Name	Ranking in Wales (out of 1909 LSOA's) (1 is most deprived)	Most Prominent Domain
Forden	1,594	Access to Services
Guilsfield	1,513	Access to Services
Llandrinio	1,376	Access to Services
Trewern	1,250	Access to Services
Welshpool Castle	296	Housing
Welshpool Gungrog 1	561	Housing
Welshpool Gungrog 2	1,140	Access to Services
Welshpool Llanerchyddol	1,172	Housing

5.10.3. Welshpool Castle is ranked the most deprived out of those assessed and within the top 10% most deprived in Wales, with housing as the most prominent domain. Welshpool Gungrog 1 is the second most deprived with housing also featuring as the most prominent domain. Welshpool Gungrog 2 is the third most deprived due to access to services.

5.11. Summary and Interpretation

5.11.1. Following assessment of the community profile, the overall findings and interpretation in the context of the proposed development are described below:

- Powys and the eight Wards selected have a relatively low population and associated population density.
  - *The area surrounding the site is rural with open countryside and very low background noise. There is potential for the proposed ERF activities to disturb this rural setting and the impacts to be felt more greatly than in a more densely populated urban environment. Less people will be affected but the magnitude of the impact may be greater.*

- The majority of the population in the LSOA's assessed are of the age range 45-64, with 65+ population steadily increasing.
  - *Those close to retirement age or who are retired may spend more time in the local area, and with the site operating continuously there may be an increase in the potential for those members of the community to experience a greater health impact from the development.*

- There is a low percentage of welsh born, welsh speakers, however it may be that many have chosen to relocate to the area for retirement, or returned after moving away.
  - *Those that visited the drop-in events displayed a great pride in their area and associated communities. The majority who visited were opposed to the*

development due to the detrimental impact on the environment, health and aesthetics of the area and therefore may experience division in the community and loss of local pride.

- *Home owners may become anxious or stressed by the potential for a decrease in house prices as the area may become less desirable as a result of the ERF. This would more likely be the case for the younger 45-65 years who may not want to raise a family in the area and look to relocate. However, for older people this may become more of a mental health issue if they feel they do not have the means to move again but worry about the impact on their health.*

- Welshpool Gungrog 1 has the highest all cause death rate, 50% higher than the next nearest (Welshpool Castle) and 75% higher than the lowest (Llandrinio). Welshpool Llanerchyddol has the highest number of people claiming Disability Living Allowance Severe Disablement Allowance.
  - *As discussed in the literature review, those with pre-existing medical conditions could be more vulnerable to the health impacts from the proposed development. For example, those with asthma may be more greatly affected by any fugitive emissions to air, e.g. PM_{10} and $PM_{2.5}$, They may also perceive the risks to be greater which could result in worry and stress.*

- Both Welshpool Castle and Welshpool Gungrog 1 have lower employment levels than the other LSOA's, which may relate to the generally poorer health of the communities.

  The proposed development will provide an opportunity for employment, both directly and potentially from support services. Those who may find employment may potentially improve their lifestyles, living environment and therefore their health.

- The WIMD for the Powys Teaching LSOA's show Welshpool Castle as the most deprived of the LSOA with Welshpool Gungrog 1 and Welshpool Gungrog 2 second and third highest ranked with the most prominent domain related to housing and access to services.
  - *Significantly, whist health is not listed as a prominent domain for any of the 8 LSOA's, for Welshpool Castle and Welshpool Gungrog 1 it will be a consideration. Both have housing as the worst domain, which could be a contributory factor for poor health. The fact that there is poor access to services generally in the area could be another contributory factor, however, these two LSOA's are detailed as having better access than the other six.*

6. LITERATURE REVIEW

6.1. Incineration

6.1.1. As incineration has become more prevalent, the concerns around health impacts have increased, along with other issues relating to resource use and false market places for waste (FoE, 1997). The arguments against incineration were deemed sufficient to cause concern for continued government policy support of incineration leading to a number of reviews of available evidence.

6.1.2. A Department for Environment and Rural Affairs ("DEFRA") commissioned report (DEFRA, 2004) reviewed environmental and health effects of municipal solid wastes ("MSW") and similar wastes. Whilst an overarching review of waste management, it considered the impact from incineration of MSW. At the time of the report it was noted MSW contributed about 27% of the total UK emissions of methane and about 10% of cadmium, with the majority of this contribution from landfill. This was important because the waste policy had to take account of the Landfill Directive which would require alternative disposal routes for the future (Defra, 2004).

6.1.3. An important factor for looking at overall health impact from waste is that MSW contributed less than 2.5% of all other emissions to atmosphere, with the exception of methane and cadmium mentioned above (Defra, 2004). Therefore, waste contributes a relatively small fraction, compared to for example transport, and incineration is only one sector within the management regime of MSW (Defra, 2004).

6.1.4. At the time, the 2004 report was the first peer-review of existing scientific literature that had been used to inform government policy of the environmental and health effects from the waste management regime (Defra, 2004).

6.1.5. Of particular note, the year before the Defra report, a review study undertaken (DIT, 2003) identified health impacts, such as acute or chronic respiratory symptoms, primary liver cancer, laryngeal cancer, soft tissue sarcoma and lung cancer, from incineration facilities but based on environmental and health studies associated with older incineration plant. However, it was recognised there were limitations to some of the study methodologies (DIT, 2003).

6.1.6. The limitations of health studies around incinerator sites has been highlighted in other reviews (WHO, 2004) that raise concern in respect of additional sources of air, and potentially, other sources of pollution that may impair the quality of health data assessed. For example, other local industrial sources and transport associated with 'industrialised' locations can contribute to health impacts. Additionally, the quality of emissions data, the relatively small sample size for studies and lack of validation of exposure assessments all have a bearing on the robustness of the methodologies used for studies (WHO, 2004 & Porta et al, 2009).

6.1.7. A review in Scotland undertaken by Health Protection Scotland and Scottish Environmental Protection Agency (HPS & SEPA, 2009) also concluded that older studies had uncertainties in respect of the reported health impacts. It summarised that any emissions to air from individual facilities should be much lower now due to improved technology and stricter

regulatory standards which reduce risk to human health.

6.1.8. The review also quoted from another recent review at the time (HPA, 2009) that stated:

'While it is not possible to rule out adverse health effects from modern, well-regulated municipal waste incinerators (MWI) with complete certainty, any potential damage to the health of those living close-by is likely to be very small, if detectable'.

6.1.9. In contrast, a more targeted and extensive study assessing health impacts from incinerators and other hazardous waste disposal activities funded by Spain's Health Research Fund concluded the results of the study supported the hypothesis that there was a statistically higher risk of dying from all cancers for those living in towns located near to incinerators and hazardous waste treatment plants in Spain (Garcia-Perez, J., et al, 2013).

6.1.10. Toxicity of emissions from incinerators has been a public concern for many years, and in particular heavy metals and dioxins. A study was undertaken to assess whether heavy metals emissions could be identified from specific incinerators within the locality of operation as part of ambient emissions monitoring (Font, A., et al, 2015). The study covered six incinerator sites, one of which was located within Wales (Crymlyn Burrows), but concluded that there was no heavy metals contribution in ambient metals concentrations around four of the incinerators studied and there was little contribution to ambient PM_{10} concentrations from any of the six incinerators.

6.1.11. Two research studies were published in 2019 assessing separate health aspects of incineration. One study looked at whether there is any evidence of impact on fetal growth, stillbirth, infant mortality and other birth outcomes but concluded there was no evidence that exposure to PM_{10} from, or living within the vicinity of, municipal waste incinerators resulted in increased risks (Ghosh, R. E., et al., 2019). The other study looked at impact on infant deaths and sex ratios but again concluded there was no evidence to suggest increased risks in areas where MWI had opened (Freni-Sterrantino, A., et al., 2019). It is worth noting that Crymlyn Burrows was included in this study also.

6.1.12. Whilst air pollution from incinerators appears to be one of the key health impact concerns, the toxicity of the incinerator bottom ash ("IBA") and air pollution control residues ("APCr") have also been of concern particularly as the majority of these wastes end up in landfill sites (FoE, 1997). However, in recent years research in to recovery or reuse of APCr and fly ash ("FA") has been undertaken. A review of the technologies to manage these waste by-products of incineration has identified four additional recovery routes (Quina, M. J., et al, 2018). These are:

- detoxification (or washing);
- product manufacturing such as glass-ceramics, cement and lightweight aggregates;
- recovery of rare metals, zinc and salts; and
- applications such as CO_2 sequestration.

6.1.13. Progress has been made over recent years with almost all of IBA being recycled and about 20% of APCr now recycled (Tolvik Consulting Limited, 2019).

6.1.14. The tightening restrictions on landfill capacity through the Landfill Directive is partly responsible for increased incineration capacity, albeit through policy levers, but raised questions over the environmental sustainability of the shift in waste management. This aspect was reviewed through the use of life cycle analysis ("LCA") with eleven specific criteria assessed (Jeswani, H.K., and Azapagic, A., 2016).

6.1.15. At the time of the review there were 25 MSW incinerators in the UK with energy recovery. The review concluded that incineration with electricity generation and energy recovery had lower impacts than landfill for 9 of the 11 LCA criteria. The two that were higher than landfill were for global warming and human toxicity (Jeswani, H.K., and Azapagic, A., 2016).

6.1.16. The development proposal relates to the incineration of residual wastes that cannot be landfilled. This was an area of concern for the county of Powys, which sent 28% of their waste to landfill in 2017-18, as illustrated in Figure 15 below. This is more than double the Wales Average of 11% (Data Cymru, 2019). However, it is noted that a review of the 2018-19 data to assess any change in the figures reveals a completely different data set being reported and access to landfill information is no longer available (Data Cymru, 2020). The information now relates to waste recycled, reused or composted, as shown in Figure 16 There is unfortunately no breakdown within the categories.

Figure 15: Powys Landfill Rate (2017-18)

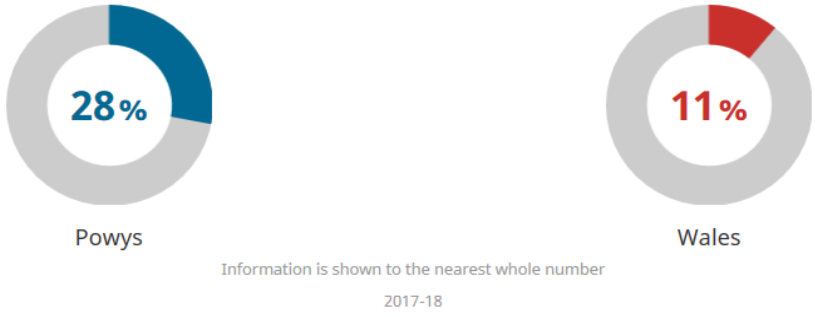
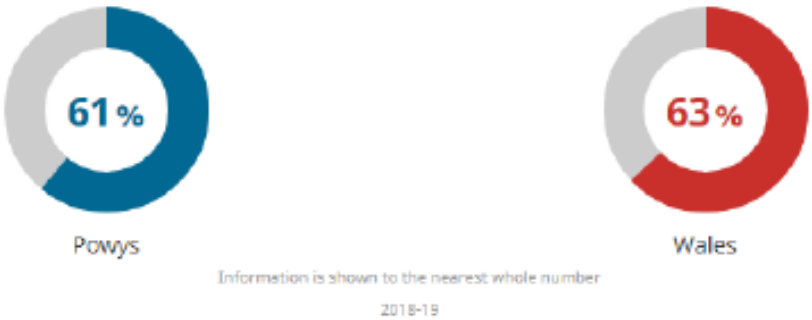


Figure 16: Powys Waste Data (2018-19)



6.2. Public Perceptions

6.2.1. The regulatory perspective of incineration was provided by the Environment Agency (EA, 2009) with a Science Report looking at the public perception of incineration. It provided an overview of the level of incineration in the country at that time which stated there were 17 MWI operating with a capacity of 3.8 million tonnes a year. The capacity and numbers of incinerator were gradually increasing but it was highlighted that the majority of applications for new plant fail at the planning stage due to coordinated public opposition (EA, 2009).

6.2.2. The Welsh Government Petitions Committee received a lengthy and organised submission calling for the proposed Newport incinerator facility, which was being developed through the Project Green consortium, to be halted citing that incineration was the worst waste treatment option. Mechanical and Biological Treatment ("MBT") was suggested as a far more sustainable option, although admitting it was not perfect (SNIC, 2011).

6.2.3. A similar lengthy and well considered submission was made in response to a planning consultation for an incineration facility proposed for Deeside in Flintshire which challenged the need for the development and how the facility contradicted various elements of Welsh Government policy, guidance, and strategy that underpin the means to work towards and achieve Zero Waste (FoE Cymru, 2014).

6.2.4. A list of incineration facilities proposed, in use and refused/failed is available online and provides a total of 20 entries for Wales (UKWIN, 2019). Although not completely up to date, the website documents the current incinerators operational in Wales and also references the proposed development in Powys which is the subject for this HIA. Comments are included against a number of facilities citing reasons for objections to the continued operation or proposed development for new sites.

6.2.5. Another entry in the table of incineration plant (UKWIN, 2019) refers to the Barry Wood Waste Incinerator plant located on Woodham Road, Barry Dock, which was the subject of public protest outside of the Senedd in November 2019 (BBC, 2019).

6.2.6. Poor perception may not just relate to concerns over pollution released from incinerators. Organisations such as UK Without Incineration Network (UKWIN) and Arnika actively publicise their concerns. Reference is made to consistent and frequent breaches of emissions limits, such as for Dumfries and Dundee, but also cover general concerns over sustainability and impeding recycling through creating markets for waste (Arnika, 2019).

6.2.7. A review of all continuously monitored emissions to air for 92% of EfW in the UK (Tolvik Consulting Limited, 2019) identified that, on average, emissions were 28% of the Emission Limit Values (ELV) for 2018, and 31% for 2017.

6.2.8. Accidents at incineration facilities are also of concern, which are not only an immediate impact for employees but can cause longer term issues for the locality. A glossary of incinerator accidents presented on maps illustrates the number and widespread nature of such incidents. Clicking on map pins provides details of the nature and extent of the accident highlighted for particular facilities (Arnika, 2019).

6.2.9. For the UK, eleven map pins are shown with information relating to fires and incidents from the 1970's through to the last couple of years (Arnika, 2019). Some sites have suffered multiple events. The Crymlyn Burrows site is included on the map and details relate to two incidents of fires, one in 2004 and then again in 2010. The site was shut down 'briefly' at the start of 2011 (Welsh Government, 2017). These events give rise to unintentional pollution and at levels far in excess of what would be released during normal site operations. A fire at a site in Dumfries took two and a half days to extinguish (Arnika, 2019).

6.2.10. Whilst eleven sites have been identified, and although some sites have more than one incident, the total number of fully operational incinerator sites across the UK was forty two, at the end of 2018 (Tolvik Consulting Ltd, 2019). It is also acknowledged that perhaps not every site that has suffered an incident is detailed by Arnika.

6.2.11. Fires tend to result in greater impacts, particularly off-site. The Arnika website references a significant number of incinerator plant fires, however, the actual cause of such fires is often not identified. Much work has been undertaken to research the cause of fires at waste facilities to better understand how to tackle such fires and avoid them in the first place (WISH, 2017). A particular cause of fires at waste sites has been linked to batteries being left in mixed waste streams (RWM, 2018) that contain substances likely to explode or catch fire under certain conditions. This is often beyond the control of operators and is very much an educational issue for the general public (RWM, 2018).

6.2.12. A review of incineration in various countries around the world attempted to assess how public perception had been tackled. This was to be used to help inform how China would tackle the poor perception of incineration as it continues to invest in such facilities to deal with the growing waste issues (Yuan, X., et al., 2019). The latest proposed incineration facility is for Shenzhen, which will reportedly be the largest in the world processing 5000 tonnes of waste a day (South China Morning Post, 2019).

6.2.13. Perception of incineration may go beyond the actual process of incineration. This type of process has historically been considered as dirty and polluting and this, in part, may relate to the very general design of such facilities. It has been argued that architecture is an expression of values, and these can change over the years, and therefore the way we build can be an expression of the way we live (Bianco, L., 2017). A prominent example of how the perception of incineration has been tackled through design is the Amager Bakke incineration plant in Denmark which has a ski slope facility built in to the design of the roof, and is reportedly one of the cleanest in the world, in terms of emissions (BBC, 2019).

6.2.14. Despite the reviews of health research suggesting minimal health impacts, public concerns with incineration still exist. A recent application by Biffa for a small waste incineration plant (SWIP) for their site in Swansea attracted a lot of local, and it could be argued, national opposition in the form of Extinction Rebellion who were protesting on the grounds of health and well-being of the human population, wildlife and ecology of the surrounding area (Resource, 2019). The application was refused at the planning stage with the decision based on visual impact on the nearby residential area and nature reserve, and would be close to a school (Resource, 2019).

6.2.15. The assessment of risk can be very subjective, and whilst professionals may have the necessary skills, knowledge and experience to interpret risk, this will not be the case for many members of the public. They will have their own perception and interpretation of risk which will affect how they determine whether development is acceptable to them, largely based on life experiences and background. They will have uncertainty about the significance of the risks, the severity and how these may impact on them and their community, along with significance of cumulative impacts. These factors can affect mental well-being and research is ongoing to understand these factors with the development of a psychosocial model to aid the understanding of public perception in impact assessment studies (Baldwin, C., Rawstorne, P., 2018).

6.3. Light Pollution

6.3.1. Incinerator facilities are likely to operate 24 hours to ensure they are financially viable which requires lighting around the site to provide safe operating conditions. Lighting, if not installed appropriately, can cause pollution, become a nuisance and contribute to health impacts such as sleep deprivation. The levels of light pollution have been increasing exponentially over the natural nocturnal levels (Falchi, F, et al, 2011) which can result in affecting the circadian clock (24hour day/night cycle) that can impact physiological processes in almost all organisms (Chepesuik, R., 2009). The disruption of the circadian clock can result in depression, cardiovascular disease, insomnia and cancer (Chepesuik, R., 2009). The impacts from light pollution can affect both wildlife and public health.

6.3.2. Although the location of the proposed development would be classed as rural, the general night time light levels have gradually got worse. Table 8 below shows the change in radiance data between 2012 and 2019. The data is derived from Visible Infrared Imaging Radiometer Suites ("VIIRS") located on the SUOMI NPP and NOAA-20 satellites that orbit the earth, along with Sky Quality Meter ("SQM") data from observatory sites located across the world.

Table 8: Radiance Statistics (Light Pollution Map, 2019)

Location	Coordinates (1km radius)		Radiance Statistics (Mean W/cm^2)		Difference (%)
	Longitude	Latitude	2012	2019	
Shrewsbury	-2.74649	52.70740	20.1556	15.6026	-22
Buttington	-3.11171	52.66793	1.5267	1.9823	+23
Cambrian Mountains	-3.55248	52.65312	0.1364	0.2847	+52

6.3.3. Table 8 appears to show a significant change in the light levels between 2012 and 2019, with a marked decrease for Shrewsbury and increases for both Buttington and Cambrian Mountains. Care is needed with interpretation of the data as the data collection methods changed over the time period (Stare, J., 2019).

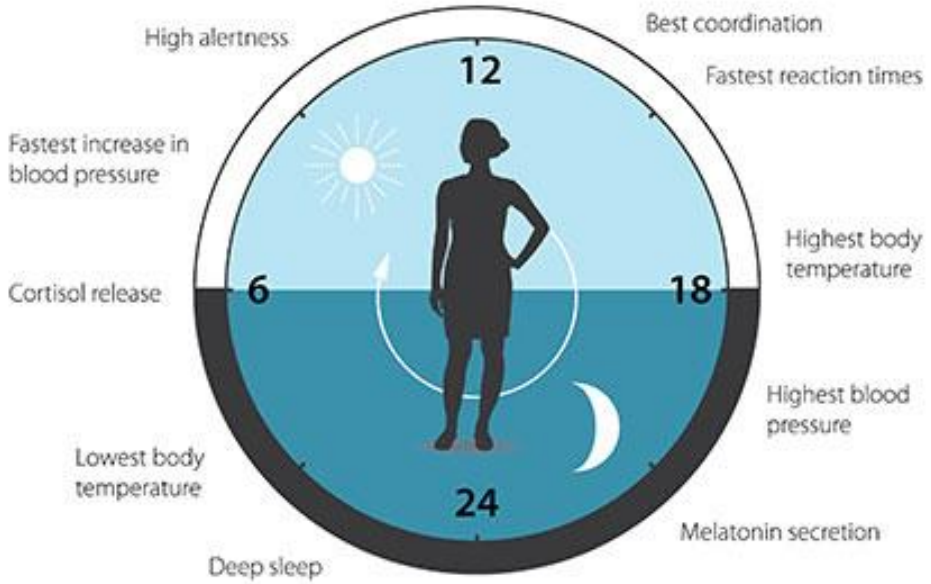
6.3.4. Figure 17 below provides a graphical representation of the average night time light levels in the locality for 2019. The data source is the same as for the data presented in Table 8 above. The approximate site location is shown as a red circle.

Figure 17: Night Time Light Levels (2019)

(Light Pollution Map, 2020)

6.3.5. Further research has led to a better understanding of the circadian clock and the importance of it. Research by Jeffery C. Hall, Michael Rosbash and Michel W. Young (1984 - 1994) has resulted in the discovery of the molecular mechanisms that control the circadian rhythm and which adapts our physiology to the different phases of the day, as illustrated in Figure 18 below. They were awarded the 2017 Nobel Prize in Physiology or Medicine (Nobel Prize, 2017) for their research work.

Figure 18: Circadian Rhythm Adapting Physiology



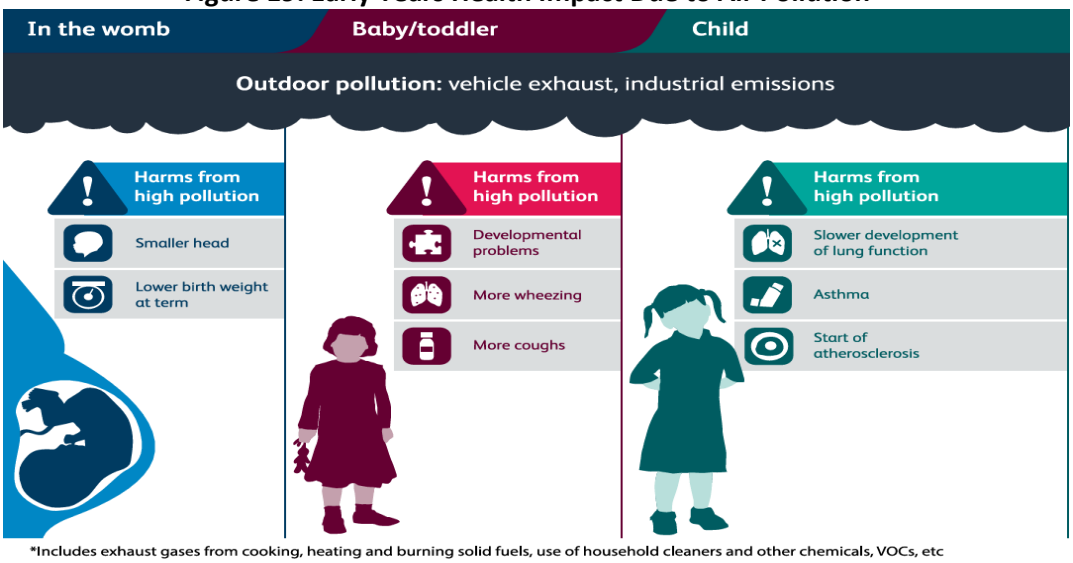
(Mattias Karlén, The Nobel Committee for Physiology or Medicine, 2017)

6.4. Air Pollution

6.4.1. The effects of air pollution have been well documented in recent years but can be illustrated with the following infographics in Figures 19 to 21, which summarise various studies/research and published by the Royal Society of Physicians (Royal Society of Physicians, 2016).

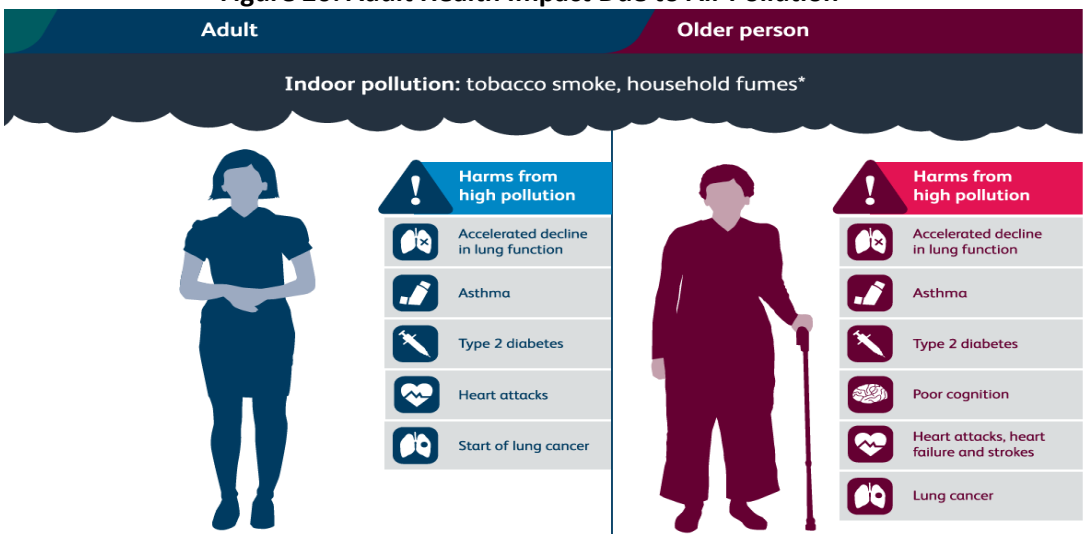
6.4.2. Whilst the health impacts of air pollution are widely recognised the degree of impact across society is perhaps not as widely acknowledged. The links between air pollution, health and deprivation have been investigated and identified that for those living in deprived areas the burden on health from pollution can be disproportionately greater (Brunt, H., *et al*, 2016).

Figure 19: Early Years Health Impact Due to Air Pollution



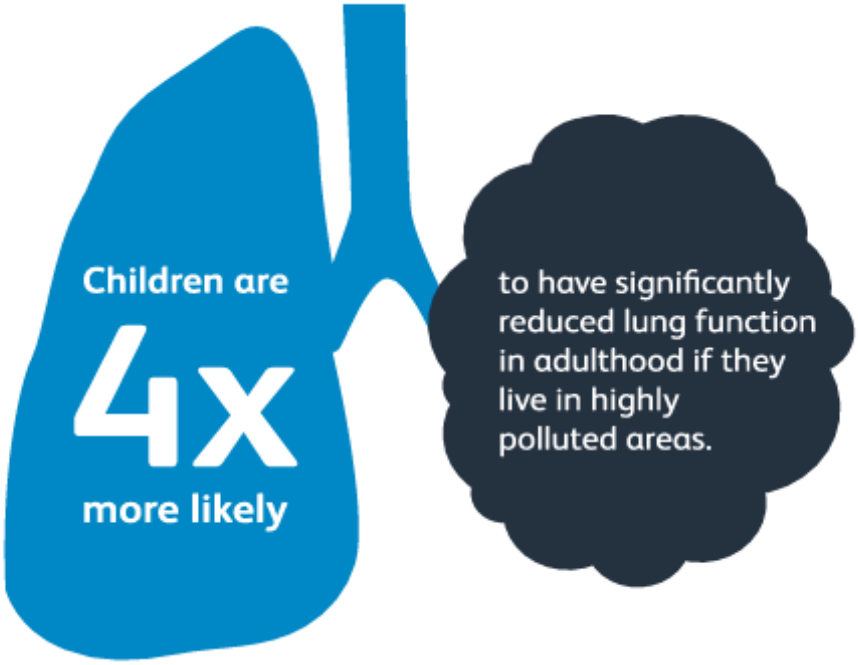
(Royal Society of Physicians, 2016)

Figure 20: Adult Health Impact Due to Air Pollution



(Royal Society of Physicians, 2016)

Figure 21: Potential Pollution Health Impact for Children Living in Deprived Areas



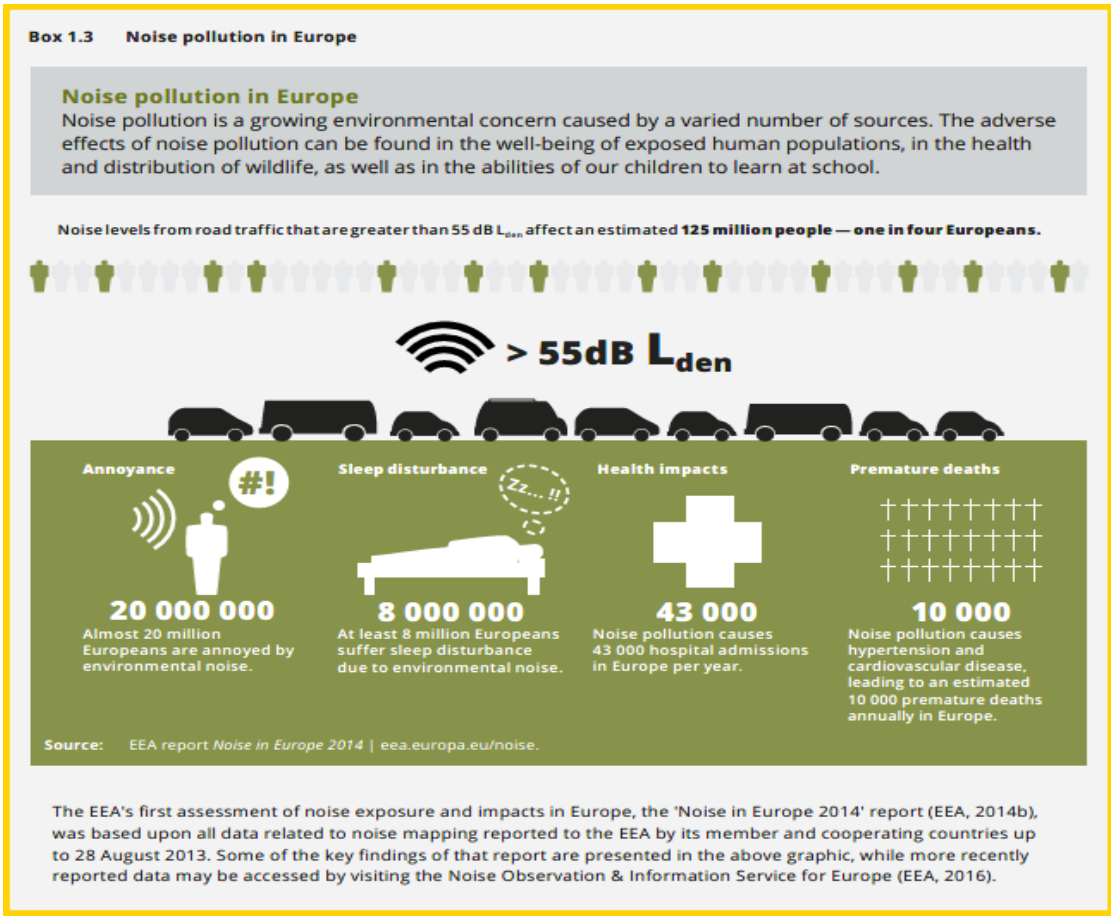
(Royal Society of Physicians, 2016)

6.5. Noise Pollution

6.5.1. The 24-hour operation of an incineration plant has the potential to cause noise pollution, not just from the Installation itself but also the associated traffic movements. Noise has various health impacts such as hypertension, cardiovascular disease and sleep disturbance. The health impacts are far reaching, as illustrated in Figure 22 below (European Environment Agency, 2016).

6.5.2. Those most at risk from noise are young children, particularly of school age as it can impact their ability to learn, the older population, shift workers, the chronically, ill, those with mental illness, and people suffering from existing health conditions such as tinnitus (Kamp, I. and Davies, H., 2013).

Figure 22: Health Impact of Noise Pollution in Europe (2014)



(European Environment Agency, 2016)

6.5.3. Road traffic noise is a significant contributor to noise pollution and in Wales, in 2017, an estimated 297,100 people were subject to a day-evening-night sound level (L_{DEN}) of greater than or equal to 55dB, whilst 184,300 were subject to a night time sound level (L_{Night}) of greater than or equal to 50dB (EEA, 2020).

6.5.4. Moderate associations between traffic and noise pollution in relation to myocardial infarction health impacts were identified for a study in London (Tonne, C., *et al*., 2015).

6.5.5. Welsh Government issued interim policy guidance (Welsh Government, 2016) which made specific links between air pollution and noise and detailing that it was important not to improve one at the detriment of the other. The policy document also recognised that whilst the two can be related to transport, the effects may not be experienced at the same location, therefore, interventions are required to look more holistically to ensure unintended consequences are minimised (Welsh Government, 2016).

6.6. Odour Pollution

6.6.1. Municipal solid waste is generally a mixture of various types of waste, typically composed of non-recyclable and often contaminated recyclable material. There is a potential for the waste to be odorous, particularly the longer it has been stored. Odour can be a problem for neighbouring residents, and if bad enough, can become a statutory nuisance.

6.6.2. There are a wide range of health effects associated with odour, such as (SEPA, 2010):

- Respiratory problems;
- Nausea;
- Drowsiness;
- Fatigue
- Eye complaints;
- Nose and throat irritation;
- Hoarseness;
- Headaches;
- Diarrhoea;
- Chest tightness;
- Nasal congestion;
- Palpitations; and
- Shortness of breath.

6.6.3. Odours associated with waste facilities are likely to relate to putrescible type material or possibly mixed waste that is old and decaying, and if not dealt with appropriately, these types of wastes can attract pests, such as vermin and flies. Flies in large numbers can become a nuisance and have the potential to transmit disease. Likewise, birds and rodents can be attracted to accessible wastes and also have the potential to transmit disease, and become a nuisance (WHO, 2008).

6.7. Traffic Pollution

6.7.1. The transportation of waste involves significant numbers of HGV movements across the country. There would be various types of vehicle movement associated with the construction, maintenance and operation of an incineration plant. Traffic pollution results in elevated levels of nitrogen dioxide ("NO_2") and particulate matter ("PM_{10}", "$PM_{2.5}$" and ultra-fines) (Natural England, 2016) (Ricardo Energy & Environment, 2016). It is estimated there are 1,320 deaths a year in Wales due to particulate matter (Public Health Wales, 2016). The highest concentrations of traffic related air pollution are generally recorded in areas which exhibit the greatest levels of deprivation, which results in greater impact for those living in areas with the most vulnerable and where health needs are the greatest (Brunt, H., et al, 2016).

6.7.2. There are currently 45 Air Quality Management Areas (AQMA) in Wales, 44 of which have been designated on the basis of traffic related NO_2 (AQW, 2020). Table 9 below details the council areas that currently have AQAM and the number of them. Powys revoked their only

AQMA on 15th March 2017, which had originally been designated for NO_2 and related to two properties at the Dolfor Junction on New Road in Newtown. The Neath Port Talbot AQMA has been designated on the basis of industry related PM_{10}. All of the current AQMA are located within local authorities in South and South-West Wales.

Table 9: AQMA in Wales

Council	Number of AQMA
Bridgend	1
Caerphilly	2
Cardiff	4
Carmarthenshire	3
Merthyr Tydfill	1
Monmouthshire	2
Neath Port Talbot	1
Newport	11
Pembrokeshire	2
Rhondda Cynon Taff	16
Swansea	1
Vale of Glamorgan	1

(Air Quality in Wales, 2020)

6.7.3. The recent Clean Air Plan for Wales consultation document suggests the establishment of a new national air pollution monitoring network which will primarily focus on sensitive receptor locations. This could be locations such as hospitals, schools and care homes (Welsh Government, 2019). Locations of particular concern are where evidence of poor air quality is adding to existing persistent problems relating to deprivation and chronic illness. In terms of waste, an additional proposal is to change the waste collection fleet to run on electricity or hydrogen (Welsh Government, 2019).

6.8. Accidents

6.8.1. In 2008, road accidents claimed the lives of, or injured, 230,000 people in the UK. The majority of these accidents occurred on roads with a speed limit of 30 miles per hour. The average estimated cost, including medical and post output, was about £56,000 (Wood, S., Bellis, M.A., Watkins, S., 2012).

6.8.2. The proposed development will be a large-scale construction project. The construction industry sector has improved safety levels significantly over the years but there were still 30 fatal injuries to workers in 2018/19, and nearly half of these relating to falls from height (HSE, 2020). There were 4,872 non-fatal injuries reported through RIDDOR during the same period of which 32% related to falls from height and 30% related to slips, trips and falls on the same level (HSE, 2020).

6.8.3. The waste industry, by contrast, had 7 fatal accidents and 1,724 non-fatal accidents reported through RIDDOR during 2018/19 (HSE, 2020). The 7 fatalities related to contact with moving machinery, struck by moving vehicle and struck by moving/falling object, whilst the vast majority of injuries relate to slips, trips and falls, and also handling, lifting or carrying (HSE, 2020).

6.9. Water Quality

6.9.1. Poor water quality caused by pollution is considered one of the world's leading causing of death and disease. There are many sources of water pollution, some natural and many man-made. They range from chemicals and substances to pathogens and bacteria, resulting in wide ranging health impacts (Soni, H.B., 2019).

6.9.2. Construction activity can result in pollution of surface and ground waters through chemical / fuel spillage, run-off of sediments, soils and washings from plant and equipment. Control measures would normally be required for such activities but they need to be suitable and sufficient, and monitored to ensure the measures are in place (Soni, H.B., 2019).

6.10. Mental Health and Well-Being

6.10.1. Much of the literature review on incineration referenced impacts on the environment and potential direct health impacts, or causal links to long term health impacts. However, the impact on mental health and well-being must also be considered.

6.10.2. Those with pre-existing mental health conditions, such as anxiety, stress or those with a nervous disposition have the potential to be more sensitive to the health impacts. For example, stress and/or anxiety may be caused as result of the feeling of lack of control or uncertainty over the proposed development. If members of the community are protesting against the proposal, or if they feel they are not well informed throughout the phases of the planning or operation of the site, then their emotions may reflect the uncertainty and lack of control over the events (Mineka, S. and Kelly, K.A, 1989).

6.10.3. Academic research has introduced the concept of perceived risk having an impact on mental wellbeing. If a potential consequence of a development is perceived, this can lead to stress and anxiety. The ERF has perceived risks from air pollution, and complaints about smoke from stacks serving local biomass boilers were mentioned at the 'drop-in' events with comments on how much more pollution would be released from the ERF. Therefore, the perceived additional risks may lead to members of the local community, and in particular previous complainants, suffering from anxiety and stress (Sucker, K., et al., 2018).

6.10.4. Investigation of the interrelationship between perceived risk and health symptoms related to air pollution has shown that the adverse health impact of PM10 may not only be associated with the level of exposure but also by the perception of environmental impacts and the belief that exposure is hazardous to health (Orru, K., *et al*., 2018).

6.10.5. In contrast, a positive impact on health, including mental health, may be achieved as a result of the planned quarry re-profiling and restoration work associated with the proposed development. The public footpath (B39) that traverses the site (which may benefit from upgrading), along with the creation of new habitats with the aim to enhance and extend the present range of habitats and structural diversity of the vegetation will improve the natural environment in the vicinity of the development.

6.10.6. Access to physical activity has been shown to be an influence on both physical health, such as obesity and also on mental health (Hobbs, M., et al., 2017). In the short term, during the

construction phase, there may be reduced access to the physical environment as members of the community may avoid the area due to the perceived risk of increased traffic movements associated with the site. However, in the longer term following completion of the works and improvement of the surrounding environment, there may be increased physical activity with use of the footpaths and accessing open areas.

6.10.7. Reductions in psychological stress, fatigue, anxiety and depression have been linked to exposure to the natural environment (Hartig, T., et al., 2014). Vulnerable groups, such as those with pre-existing mental health conditions, are considered to benefit the most from exposure to the natural environment (Mitchell, R. and Popham, F., 2008). It was also documented that socio-economic inequality in mental well-being was shown to be less among those who reported good access to recreational areas compared to those with poorer access (Mitchell, R. and Popham, F., 2008).

6.10.8. A report by the Natural Environment and Health Fellowship, a partnership between the Department for the Environment, Food and Rural Affairs ("DEFRA") and the University of Exeter Medical School's European Centre for Environment and Human Health ("ECEHH*"), concluded "the weight of evidence suggests that those with responsibility for, or whose activities could influence or impact on the natural environment or health…should recognise the potential of the natural environment as a resource for promoting health…This potential should be integrated into future* decision making." (Lovell, R., Depledge, M. and Maxwell, S., 2018).

6.10.9. In support of the above evidence, authorisation by NHS Shetland was given in October 2018 for doctors working in ten General Practitioner ("GP") surgeries on the Shetland Islands to issue nature prescriptions to patients to treat mental illness, diabetes, heart disease, stress and other conditions (The Guardian, 2018).

6.11. Policy

6.11.1. The Stern Review (Stern, N. 2006) identified a range of global issues relating to climate change and the potential impacts from it. Waste was identified to contribute 3% towards Greenhouse Gas emissions in the year 2000. Energy efficiency was highlighted as "having the potential to be the biggest single source of emissions savings in the energy sector" (Stern, N., 2006).

6.11.2. The 'Towards Zero Waste' document references the Stern Review and also the Environment Strategy 2006 (Welsh Government 2010). The Environment Strategy was quoted as having an *"aspirational target that there would not be any additional landfill available for municipal waste from 2026".* Whilst the Stern Review was quoted as concluding *"Reusing and recycling lead to less resources being required to produce new goods and a reduction in associated emissions. Technologies such as energy-recovering incinerators also help to reduce emissions"* (Welsh Government 2010).

6.11.3. The Welsh Government 'Beyond Recycling' consultation launched in December 2019 sets the vision for creating a circular economy in Wales and presents updates to the Towards Zero Waste strategy (Welsh Government, 2019). The consultation presents eight headline actions and states that Welsh Government are "committed to dealing effectively with non-

recyclable waste through investing in infrastructure which generates electricity and heat from this material and disposes of it safely to the highest environmental standards".

6.11.4. Section 5.7 of Planning Policy Wales (Welsh Government, 2018) deals with energy generation and the need to reduce reliance on fossil fuels and promote renewable and low carbon alternatives. These are seen as part of the overall commitment to tackle climate change and increase energy security.

6.11.5. Section 5.13 of the policy (Welsh Government, 2018) describes sustainable waste management facilities and the role that Natural Resources Wales ("NRW") play in the planning process, particularly through expert advice and ensuring that proposals can be appropriately regulated. It also discusses the need to ensure that sufficient detailed information is submitted to ensure mitigating delays and refusals.

6.11.6. Technical Advice Note 21 - Waste (Welsh Government, 2014) provides the policy for dealing with and planning for waste in Wales. It supports and links with the Towards Zero Waste strategy and the legislation on waste controls.

6.11.7. The emphasis is on Prevention, Preparation for re-use, and Recycling. However, it acknowledges that mixed residual waste has to be dealt with in an appropriate manner, and Section 2.7.4 describes the Recovery operations that should be encouraged where wastes cannot be recycled. It considers that highly efficient facilities recovering energy from mixed municipal waste are a vital component of the waste management system in Wales. Where such facilities can be co-located with heat users is considered preferential in order to make use of the heat from the combustion process (Welsh Government, 2014).

6.11.8. The worldwide pandemic of Covid-19 changed the perspectives of society during severe lockdown measures designed to protect public health. The knock-on effects, both immediate and on-going, have been assessed to help plan recovery from the measures and to inform how society needs to adapt moving forward (Welsh Government, 2020). Updates to Planning Policy Wales have been issued addressing, and emphasising, greater importance on 'placemaking' and ensuring development contributes towards the sustainability requirements of planning policy (Welsh Government, 2020).

6.11.9. The crisis has been described as "drawing into sharp focus the importance of the communities in which we live and the essential services and infrastructure we rely on" (Welsh Government, 2020). Waste services are deemed a key service with guidance provided by Welsh Government on measures put in place to minimise the impact from disruption to waste services (Welsh Government, 2020).

7. EVIDENCE

7.1. Participation

7.1.1. Prior to beginning public engagement, the HIA Interim Report for the proposed Viridor Incinerator in Cardiff was reviewed to gain ideas on how to facilitate participation (Cardiff Communities 1st, Public Health Wales, WHIASU, 2010).

7.1.2. The majority of the stakeholder organisations and departments that were contacted are within the public sector. These organisations will all have a duty to participate and collaborate (WFG, 2015) as part of Public Service Boards ("PSB's") to produce 'service plans' that identify which WFG goals and objectives have been prioritised for action and demonstrate how, collectively, work is undertaken to achieve those priorities (WFG, 2015).

7.1.3. HIA will form, or be used to help inform, some of the work undertaken towards achieving the priorities, so it is important to have engagement from such organisations to achieve the best possible outcomes from the process.

7.1.4. Despite various requests for participation, with the exception of a local councillor, Environmental Health Officer, Planning Officer and a Community Councillor, no other volunteers came forward to participate in the process. General responses were:

- Did not feel they had a role;
- Did not see how they could contribute; and
- Did not know enough about HIA to take part.

7.1.5. It was agreed at the Steering Group meeting, and noted in the minutes (ECL, 2019), that public engagement should take place to provide an opportunity for comments and thoughts on the proposed development. Therefore, following review of the WHIASU guidance (Chadderton et al., 2012) and the HIA Interim Report for the proposed Viridor Incinerator in Cardiff (Cardiff Communities 1st, Public Health Wales, WHIASU, 2010) it was decided to deliver public engagement by way of 'drop-in sessions'. These would be organised in two separate locations and at different times of the day. This was to allow maximum attendance by members of the local communities.

7.1.6. Notification of the sessions was provided by means of advertisements in the local paper, notices on public notice boards and email correspondence to local community members and stakeholders. Sessions took place on Wednesday 10th July 2019 (10.00 – 18.00h) and Thursday 11th July 2019 (20.00 – 22.00h), and were specifically planned to avoid the school summer holidays and to try and maintain project timelines. The period of prior notification was 8 days, which could be considered inadequate for such events and with the school summer holidays beginning the week after the events.

7.1.7. Information boards and an information leaflet outlining the project proposal and the role of HIA in the planning process were provided. These are shown in Appendix IV, along with some photographs of the 'drop-in' venues. A total of 39 visitors attended, 17 on the 10th and 22 on the 11th. All visitors were asked to send any comments or concerns that they had using a form contained in the leaflet or using the form online, a copy of which is also shown in Appendix IV.

7.1.8. There was support and opposition, but mostly opposition. There appeared to be misconceptions about modern incineration facilities and a lack of understanding of HIA, its purpose and when it should be undertaken. Whilst the point at which HIA is used is not prescriptive, it makes sense to use early in development proposals to ensure potential negative impacts are avoided, or preferably as a minimum mitigated, and at a stage where the HIA can have real influence on a proposal design or implementation (Chatterton et al., 2012).

7.1.9. Some visitors were very passionate about their environment and how it may be impacted by the proposed development and were visibly emotional and distressed. There were some well researched and reasoned comments put forward.

7.1.10. A summary of key statements received from visitors at the sessions were:

- Concern over the pollution from incineration / traffic;
- What impact temperature inversions will have on emissions;
- Impact of extra traffic (HGV) and impact on highway (bridges);
- What health impact would there be on school children;
- Where the waste will be coming from;
- Will ECL be impartial if paid by the developer; and
- There was insufficient and not wide enough notification of 'drop-in' sessions.

7.1.11. Of particular concern is the lack of trust in the HIA process and its impartiality. The assumption was that the HIA would be written and delivered to meet the needs or requirements of the developer. It was very difficult trying to convince visitors that the process is independent, impartial and unbiased. The lack of trust in the process may be a reason only two feedback forms have been received to date.

7.1.12. The project team accepted that the period of notification for the 'drop-in' sessions was not sufficient and therefore agreed to sponsor the November edition of the 'Border Gossip' publication which is delivered to every household within the Trewern Community Council area, free of charge (Border Gossip, 2019). This action still failed to illicit any further comments from any interested parties.

8. APPRAISAL

8.1. Progress to Date

8.1.1. The HIA has reviewed evidence, technical documents, literature and comments received through participation to assess the potential health impacts for the local communities and the vulnerable populations groups within them.

8.1.2. Mitigation measures have been identified, along with recommendations for potential interventions, should the proposed development be approved.

8.1.3. Table 10 below describes the main findings and recommendations for the various Health and Well-being determinants.

Table 10: Main Findings and Recommendations

Health and Wellbeing Determinant – Lifestyles		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
	During the construction phase physical activity around the site is likely to be restricted for safety purposes. Although access to the footpath will not be affected, there may be a perception that the use of the footpath located at the edge of the Development Site is not safe to use.. Even after the development has been completed, there may be a perception that physical activity will be hindered due to pollution from the development. *Physical activity related to gardening and home-grown food may also be impacted due to fears that pollution from the development may affect crops, particularly through bioaccumulation.* *'Stress' created from the development impacting on individuals may result subconsciously in greater use of alcohol / cigarettes etc.*	*As shown by the literature review evidence, physical activity and access to the physical environment is a contributing factor to health. Vulnerable groups are those with pre-existing health conditions including obesity. The community profiling revealed 25% of the Welshpool Llanerchyddol Ward population as living with a limiting long-term illness and 135 people claiming Disability Living Allowance and 38 claiming Severe Disability Allowance (2011 data).* *The potential decreased physical activity may result in a negative impact on those already suffering from health conditions in the short term, although existing access may already be limited.*
The public footpath, which traverses the site, would not need to be closed or diverted as part of the development. However, there may be an opportunity to improve and upgrade it for more use. A wider review of the footpath and incorporation of public information boards along the route as it passes the development could improve the enjoyment of the footpath. There may also be potential for environmental projects to enhance biodiversity in the area along the footpath.		*In the longer term, the vulnerable groups may benefit due to the increased access to the physical environment as a result of the development, particularly if disability access design is incorporated.* *Potential incorporation of a community resource where physical activity can be enhanced would possibly benefit wider population groups.*

Table 10: Main Findings and Recommendations (Cont.)

Health and Wellbeing Determinant – Lifestyles (Cont.)		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
A wider review of community benefits from the project may identify a community resource where physical activity could be enhanced.		
Recommendations		
1. Mitigation: BEWL to implement safe operational procedures during construction and operation. Assess ways to improve safe access to the footpath and surrounding natural environment for the local community to enjoy. BEWL will construct a fence to ensure safe access to the footpath is maintained throughout all development phases.		
2. Recommendation: Powys CC to promote the use of the footpath and any improved natural area in collaboration with local health boards and GP surgeries to ensure those who have pre-existing health conditions are aware of the opportunities available to increase their physical activity.		
Health and Wellbeing Determinant – Social and Community Influences on Health		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
	The area is highly regarded for its rural landscape and features. Whilst the majority of the development will be within the quarry bowl, there will be a certain amount of visual impact from the buildings and the stack that will be visible above the development. This has the potential to have a detrimental visual impact and therefore could result in a loss of community identity and local pride.	*The community profile shows less than 50% of the residents in each of the 8 wards assessed in Powys are born in Wales. This may be reflective of the close proximity to the border with England. This should not be interpreted as the community having little identity or pride. Indeed, it was noted when trying to make arrangements for the 'drop-in' sessions it was difficult to find suitable available time slots due to the regular use of the facilities by various community groups.*

Table 10: Main Findings and Recommendations (Cont.)

Health and Wellbeing Determinant – Social and Community Influences on Health (Cont.)		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
		The community profile also identifies that there are higher percentages in the 45-64, and +64 years age groups. Some of these may be retirees, or moved to the area for retirement, and chosen their home based on location. Unwelcome views of the development may cause anxiety or other concerns.
	Divisions in the community may result if some members support the proposal whilst others may strongly object. This could result in community tensions, impact sense of belonging and community cohesion. Neighbourliness and the sense of citizen power and influence could be undermined.	*Community views appeared polarised at the 'drop-in' sessions, with some supporting the development but the majority opposing. The tensions that may be caused could affect the majority of the population groups.*
The development does provide an opportunity, if the developer agrees, to enhance social capital, support and local networks. This could be through such things as supporting community events, sponsoring local sports teams etc.		*Liaison with the local community will be required to ascertain how best to deliver support to local networks / organisations. Any support provided will help those directly concerned, but may also support the wider community, even if only through promoting a sense of belonging and community cohesion.*
Recommendations		
Local pride may be linked to the idea of detrimental visual impact and community divisions that may be created as a result of the development. 1. *Mitigation: BEWL to create strong communication links with relevant stakeholders, such as through a Liaison Group, to ensure those members with concerns regarding the proposed development are voiced in a formal manner and can be addressed in order to reduce the division in the community. It will also allow both the negative and positive views on the development to be highlighted. Request feedback on the visual design through planning consultation.* 2. *Recommendation: BEWL to invite stakeholders to establish a Liaison Group for on-going discussion and addressing community concerns. Assess what support can be provided to local organisations / events.*		

Table 10: Main Findings and Recommendations (Cont.)

Health and Wellbeing Determinant – Mental Health and Well-Being		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
Improved access of the footpath and potential other improvements in the vicinity of the footpath may provide opportunities for the local community to enjoy increased access to nature which help improve mental health. Numerous academic studies have shown that psychological stress, fatigue, anxiety and depression have been lessoned when time is spent in the natural environment.		*As identified in the literature review evidence, access to green space is beneficial to mental health and well-being. Those with pre-existing conditions will benefit the most, but all population groups could potentially benefit*
The development provides the potential for participation in community and economic life, but possibly limited to those whom are accepting of the development. Likewise, participation in the development proposals and the ability to influence the development are afforded to the local community through consultation processes. This should contribute to a feeling of being valued and part of the decision-making process.	*An inappropriate level of consultation, or a failure to engage in consultation, could result in a feeling of lack of control potentially impacting on a person's emotional wellbeing and resilience.*	*Those with pre-existing mental health conditions, the older generation (aged 65+) whose percentage is increasing for this particular age range, as well as the homeowners in the area may feel a lack of control over the proposals. Vulnerable groups will also include those who have voiced objections to the proposal previously.*
	The proposal does not support a sense of control. Many people would feel a complete lack of control over such proposals and have a distrust of planning processes and regulations to believe that their concerns would be addressed. Combined with the very poor public perception of 'incineration', the perceived lack of control could result in anxiety and stress, affecting mental wellbeing.	*Previous objectors will be more vulnerable, especially to the perceived risk of incineration and impacts on health.*

Table 10: Main Findings and Recommendations (Cont.)

Health and Wellbeing Determinant – Mental Health and Well-Being (Cont.)		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
The ERF is to be located within an existing quarry and the location characteristics may already be considered for house prices. The potential for job creation in the area may benefit house prices.	*House prices may decrease in the area as it may become a less desirable place to live, especially in close proximity to the development. This has the potential to result in stress and anxiety, even if house prices do not actually change.*	*Adult population (45-65 years) who are homeowners who may not want to raise a family in close proximity to the proposed development and wish to relocate.*
Recommendations		
1. Mitigation: BEWL to create strong communication links with relevant stakeholders, such as through a Liaison Group, to ensure the identified vulnerable groups can attend and voice their concerns and feel a sense of control in the entire process from planning through to operation of the site. It should be noted that the HIA can be a good way to achieve participation and collaboration, if local communities engage in the process.		
2. Mitigation: The various potential impacts and unintended consequences from the development and the mitigation identified from the proposals to date are listed in 'Living and Environmental Conditions Affecting Health', below. Communication of these measures should be undertaken, particularly where vulnerable population groups may be more affected. The perceived risks in relation to mental well-being need to be addressed sensitively. Effective communication of the various assessments should form part of the communication.		
3. Recommendation: BEWL and Powys CC to advertise the footpath that passes the development site to encourage the use of the open areas for recreational purposes. Powys CC to ensure the promotion of the areas for those suffering with mental health conditions e.g. advertising in local GP surgeries and at mental health support groups. The advertisements should also target those Wards which rank the highest on the WIMD with the prominent domain being health (Welshpool Castle and Welshpool Gungrog 1).		
4. Recommendation: BEWL to establish a Liaison Group for the development.		

Table 10: Main Findings and Recommendations (Cont.)

Health and Wellbeing Determinant – Living and Environmental Conditions Affecting Health		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
Clever design techniques could result in complimenting the location or providing an opportunity to create a 'feature' out of the structures that form the development.	*Inappropriate or unsympathetic design could impact the attractiveness of the area or result in unacceptable visual impact. Therefore, the design of the development will be extremely important within the context of the area and how the interaction between the urban/rural and natural environment are dealt with.*	*Most vulnerable will be those who will be able to see the proposed development from their home/garden. The view, and how 'imposing' it is, will determine the level of impact that it has.*
	There are a number of potential consequences from the development that are not unintended but anticipated, as part of the development. However, if these aspects are not dealt with appropriately, they could result in unintended, and indeed, unwelcome consequences. These impacts could be individual sources, or cumulative effects from the sources, which include: • Light; • Noise; • Odours; • Water Quality; and • Air Quality.	
	Light - The development will be a reasonably large site operating 24h a day, therefore, flood lighting will be required which could impact locally if not installed correctly. *Light pollution can result in sleep deprivation, depression, cardiovascular disease, insomnia and cancer.*	*Direct light emission from the site is only likely to affect those with a view of the proposed development, however, light hue may be visible from a much wider area unless 'light spill' is minimised. Light spill would affect a larger number of people but will not necessarily affect any particular population groups more than others.*

Table 10: Main Findings and Recommendations (Cont.)

Health and Wellbeing Determinant – Living and Environmental Conditions Affecting Health (Cont.)		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
	Noise - The 24h operation of the facility will give rise to noise generation night and day. The rural location is likely to exhibit low background noise levels, particularly at night time and therefore the locality is likely to be more sensitive to night time noise. Careful design and mitigation measures are likely to be required to minimise noise breakout and potential nuisance to nearest sensitive receptors. Noise could be a potential problem during the construction, operational and decommissioning phases of the development. *Noise pollution can result in loss of hearing sensitivity, sleep disturbance and deprivation and physiological and behavioural effects. Hypertension and cardiovascular disease can result from exposure to noise disturbance.* *The site setting is rural with a low population and population density which may result in less people being affected but the magnitude of the impact may be greater as there are likely to be very low levels of background noise.*	*Those closest to the development are likely to be worst affected, with sleep disturbance potentially the worst impact particularly for those who work.* *Tonal or low frequency noise from the development may cause disturbance for those further away, especially if directional effects are present and that may impact on residential developments.* *Academic research has identified young children (aged 5-24), older generations (65+), chronically ill and those suffering existing health conditions, such as tinnitus, as the vulnerable groups.* *Community profiling has also shown that the 65+ age range is steadily increasing with six wards possessing higher than average percentage of single occupants as pensioners. This age group may be more greatly affected by the development, such as from noise and dust, as they are likely to spend more time in the vicinity.*
	Odours - The facility will be processing waste so odours could be a potential impact if appropriate management procedures are not in place. A further consequence could relate to pests.	*Those closest to the development and downwind of any odour release will be affected the most. However, pests of flies could become problematic further away, depending on the scale of any particular circumstances.*

Table 10: Main Findings and Recommendations (Cont.)

Health and Wellbeing Determinant – Living and Environmental Conditions Affecting Health (Cont.)		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
	Odour pollution can result in health impacts such as respiratory problems, nausea, nose & throat irritation, headaches, nasal congestion and shortness of breath.	
The development would require groundworks to be undertaken and it is proposed that a Sustainable Urban Drainage Scheme ("SUDS") would be implemented as part of the project, thereby improving drainage and providing biodiversity through the relocation of settlement ponds.	*Water Quality - Poor construction management, facility design, inappropriate processing and management could all result in potential impact on water quality, ground waters and surface waters.*	*Pollution incidents from construction projects can impact on water quality resulting in impact to water course, ground water and potentially drinking water quality, which can be a concern for private water supplies. For this location, the Powys CC EHP confirmed there were no private water supplies in the immediate vicinity, and others identified were up-gradient from the site and therefore would not be affected.*
	Air Quality - A key concern of incineration relates to the impact on air quality. The range of pollutants from ERF will depend on the technology utilised, and how well they are operated and maintained. The pollution, and range of pollutants, will depend on what material is being processed (hazardous / non-hazardous) and the quantities being processed. *Location characteristics become important if the existing air quality is already poor, the population around the site and any existing health issues within the population, along with sensitive environmental receptors.* *Air pollution impacts health by causing asthma, eye, nose, and throat irritation. Chronic exposure can result in cardiovascular and respiratory illness.*	*Research has shown that young children, the older generation and those with pre-existing conditions are more susceptible.* *Also it has been established that interactions between air pollution and deprivation strengthened associations with health impacts, such as respiratory diseases. Therefore, people living in areas which exhibit poor economic and health indicators are deemed more vulnerable.*

Table 10: Main Findings and Recommendations (Cont.)

Health and Wellbeing Determinant – Living and Environmental Conditions Affecting Health (Cont.)		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
	The health and safety of construction workers, along with members of the public in the vicinity of the development will require consideration. Safe working practices and risk assessments for the various stages and tasks will be key management control mechanisms. According to the HSE, the construction industry had 30 fatal accidents during 2018/19, with nearly half relating to falls from height. Therefore, harm of workers would be an unintended consequence. *The public right of way footpath that traverses the site will not be closed during the construction phase. However, consideration will be needed for members of the public that may trespass and could be seriously harmed due to the hazardous environment of a construction site.*	*Development construction workers and contractors.* *BEWL / HZI employees and contractors.* *Possible trespassers, such as young persons (aged 5-24) and general adult population (aged 25-64).*
The level of vehicles trips associated with the operational phase is not considered to be significantly higher than the existing situation. The site is not located within an air quality management area ("AQMA") with the closest located in the centre of Shrewsbury, approximately ~20km to the east. It is highly unlikely that the vehicle trips associated with the development will have a significant impact on this AQMA.		

Table 10: Main Findings and Recommendations (Cont.)

Health and Wellbeing Determinant – Living and Environmental Conditions Affecting Health (Cont.)		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
The waste deliveries to the site may replace some of the existing waste transfers already being undertaken along the routes to the site. Potentially there could be slightly less HGV trips on the road. *Work is on-going to assess the feasibility of having a 'green' fleet of refuse collection vehicles ("RCV") to service the ERF which would help to reduce traffic related pollution along the collection and delivery routes.*	*Traffic movements must also be considered. The entrance to the site will be via the A458. The construction phase will see an increased level of vehicle trips to and from the site, in addition to the existing vehicle movements associated with the current site activities. During the construction phase many of the additional vehicles will relate to HGV bringing in raw materials, plant and equipment. Movement of HGVs carrying large tonnages on the local road network could result in serious road traffic accidents if not effectively controlled.* *Additionally, air pollution, such as nitrogen dioxide ("NO_2") and particulates, from vehicles increases the risk of poor health and mortality. Whilst there will be a definite increase in vehicles visiting the site during construction, this will be for a limited period of 18 months to two years.*	*Young people (15-24) using the road networks for recreational purposes, general adult population and older generation either within a vehicle themselves or using the road for recreational purposes, such as walking or cycling.* *Public Health Wales have stated that air pollution from vehicles will affect vulnerable population groups, such as children, older generation, those with pre-existing health conditions, and those exposed to higher concentrations because of living or commuting in urban or deprived locations.*
Trying to ensure material and equipment deliveries do not occur at school opening and closing times would help reduce risks during the construction phase. Likewise, arranging shift changeovers to occur outside of school opening and closing, and possibly restricting waste deliveries to outside of these times would also reduce risks.	*Road safety will require consideration due to the increased HGV vehicle movements and the nature of the local road network. The local school is accessed via the same routes that construction vehicles will be using.*	*Young children (5 – 12) will be most at risk, particularly those that either walk or cycle along the route to school. Although due to the location it is not considered there would be many who will be walking, and probably less cycling.*

Table 10: Main Findings and Recommendations (Cont.)

Health and Wellbeing Determinant – Living and Environmental Conditions Affecting Health (Cont.)		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
	Access, availability and quality of green space is unlikely to be affected, however, there may be a perception that it is no longer attractive due to health concerns of being in the vicinity of the ERF or road safety concerns in reaching the green space.	*The benefits of access to green space have been documented so it is important that the proposed development does not create a barrier for the community to access local green space. Perceptions of health or safety concerns relating to the facility could affect any of the population groups, with exception of the very young. Although parents/carers of the very young may have concerns.*
The job opportunities for the development, and potential future jobs for other on site businesses may improve the local housing market, either through house value or more house building.	*There are a number of potential impacts for housing quality and tenure. These could include impact on house prices, pride in the home, transient population for the construction period and longer-term impact if employees are from outside of the area.*	*Home owners / tenants / or those affected to the extent that impacts the enjoyment of their home will be affected the most.*
The purpose for the development is to provide a means to deal with waste materials that are not capable of being recycled, or are the remaining fractions of wastes that have been through waste treatment to remove recyclates. These materials would have to be sent for landfill in the absence of any other disposal route.		*The development will be making a contribution towards the zero waste policy and reducing waste going to landfill, which should benefit all population groups for the future, from this perspective.*
Recommendations		
1. Mitigation: (Light) – A lighting plan has been developed to minimise impact off site, and having due consideration to impact on wildlife, such as bats. The stack will have a 'night vision' goggles visible light fitted, as requested by the local airport.		
2. Recommendation: Ensure the lighting plan is effective and that light spill does not encroach on surrounding areas.		

Table 10: Main Findings and Recommendations (Cont.)

Health and Wellbeing Determinant – Living and Environmental Conditions Affecting Health (Cont.)	
Recommendations	
3.	*Mitigation: (Noise) - BEWL to ensure that the agreed noise limits of 4dB(A) above representative background levels are not exceeded for both construction and operational phases. Best Practical Means to be employed through the Construction Environmental Management Plan (CEMP), (i.e. such as regularly maintained equipment, use of silencers or acoustic hoods on equipment). Plant design to include insulated cladding, air cooled fans, vent silencers, acoustic doors, acoustic ventilation louvres, non-tonal reversing alarms, acoustic screen along entrance road.*
4.	*Recommendation: Undertake additional noise monitoring during construction phase and operational phase, communicate the results to stakeholders. Ensure the CEMP is available to stakeholders.*
5.	*Mitigation: (Odours) – The waste reception hall is an enclosed building under negative pressure to ensure odours do not escape. Access is via fast acing roller shutter doors that remain closed, except for access. The waste bunker will store waste for up to 4 days and is fitted with a fine spray dust suppression system which can also deliver de-odouriser.*
6.	*Recommendation: Ensure that all designed mitigation measures are implemented to minimise any potential odour issues.*
7.	*Mitigation: (Water Quality) – The CEMP will detail measures for the protection of ground & surface waters and streams, such as bunded tanks for chemicals and fuels, dedicated storage areas, use of settlement ponds for silt collection, appropriate handling and transfer of materials. Relocation of soils on site will be checked for contaminants, likewise imported soils will have pre-acceptance checks and further checks on arrival. The use of SUDS is also proposed.*
8.	*Recommendation: - Ensure the CEMP is available to stakeholders and that site/project contact details are made available. Implement the SUDS.*
9.	*Mitigation: (Air Quality) – For the construction phase the CEMP will detail all the mitigation measures required to ensure minimal impact from dust generation (which should not traverse the site boundary), odours, vehicle/plant emissions and noise. The ERF will have a 70m stack to ensure adequate dispersion of emissions at the lowest concentrations. The facility will utilise secondary non-catalytic selective (SNCR) reduction system for control of NOx emissions, along with a flue gas treatment system to remove acid gases. The plume visibility will be for about 30% of daylight hours. An Environmental Permit will be required from Natural Resources Wales and will include conditions to minimise environmental impact, including the use of continuous monitoring equipment.*
10.	*Recommendation: - Ensure the CEMP is available to stakeholders and that site/project contact details are made available. Research a collaborative AQ monitoring project / proposal with the local school.*
11.	*Mitigation: (Safety) - Extend security measures/infrastructure, such as fencing, to prevent unauthorised access onto the site, particularly during construction, which may now be deemed dangerous. Site safety briefings and 'tool box' talks for construction workers and contractors is standard practice, as is ensuring risk assessments have been undertaken and safe working practices adopted.*

Table 10: Main Findings and Recommendations (Cont.)

Health and Wellbeing Determinant – Living and Environmental Conditions Affecting Health (Cont.)	
Recommendations	
12.	*Recommendation: Visible warning signs highlighting the dangers of the construction site. Information leaflet and parents letter to the local school explaining the dangers and to ensure children are not tempted to trespass on the site. Liaison with local police, council and community groups. Where possible, avoid deliveries and shift changeovers at school opening and closing times.*
13.	*Mitigation: (Traffic) – Intention is to have a 'green' RCV fleet to service the ERF.*
14.	*Recommendation: Continue work on feasibility of 'green' RCV fleet.*
15.	*Recommendation: Implement a Safe Driving Policy to include maximum tonnage for loads and speed limits restrictions etc.*
16.	*Mitigation: (Access to green space) – Access to green space is not being affected, however relocation of habitat on site will be undertaken and improvements made to existing. This should help protect local biodiversity, and hopefully improve it, not just on site but in the surrounding area.*
17.	*Recommendation: BEWL and Powys CC to advertise and promote the access and use of green space.*
18.	*Recommendation: (Housing) Investigate if there are any contributions or means to deliver housing improvement for those wards where it is identified as a potential issue.*
19.	*Recommendation: (Waste) Use the opportunity presented by the development to assist educational awareness of waste issues caused by, and impacting on, society. Link to the waste policies and WFG.*

Table 10: Main Findings and Recommendations (Cont.)

Health and Wellbeing Determinant – Economic Conditions Affecting Health (Cont.)		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
The development, if consented, would create a number of jobs which could be fulfilled from local sources with appropriate training provided. The wider aspirations for the site could create potential jobs which again could be fulfilled from local sources. Employment results in a better quality of living, better housing conditions and improved health.	*If there is no commitment to source employees locally then this could result in resentment towards the development and create tensions within the community, and for those whom would be re-locating to take employment at the development site.*	*With the exception of Welshpool Castle, the 7 other LSOA's have employment rates in the 50% of least deprived areas of Wales. However, the creation of jobs would have economic benefits to the area, particularly if additional jobs are created in the longer term on the site.*
The type of work created by the development could be both full and part-time, which could benefit local people, but could also be associated with support services for the development. This may create further jobs. The nature of the development is likely to require some skilled positions which may create apprenticeship opportunities and potential partnership opportunities with local schools and colleges.		
	The nature of the work associated with the development is industrial and dealing with waste so there are implications for the health and safety of the employees	*BEWL / HZI employees, and contractors for the development would be most at risk.*
Recommendations		
1. Recommendation: BEWL to implement a policy to employ local workforce.		
2. Recommendation: BEWL to work with educational institutions, careers advisors, training providers and Powys CC to ensure provisions are made available for local people to gain the necessary skills and education that would provide the best opportunities to be employed at the development or associated support services for it.		
3. Recommendation: BEWL to ensure that appropriate health and safety measures are in place to mitigate risks to employees and contractors from the nature of the work being undertaken.		

Table 10: Main Findings and Recommendations (Cont.)

Health and Wellbeing Determinant – Access and Quality of Services		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
Education and training could benefit from contribution from the development, if considered as part of the overall package		*Younger people of school / college age, and those who are seeking to learn a trade or gain an apprenticeship*
I.T., the internet and digital services will be necessary requirements for the safe and optimum control of a modern ERF. The implementation of these services for the development may help to enhance these services locally for the community.		*Could potentially benefit all population groups in some way.*
Leisure, Health & Caring Services, public amenities, shops and transport, may all potentially benefit from the development. These would have to be assessed on a case by case basis, particularly for determining maximum benefits.	*Leisure, Health & Caring Services, public amenities, shops and transport, may all potentially be negatively affected by the development. More local knowledge is required to understand potential impacts.*	*Access to services has been identified as an area of concern for 5 of the LSOA's where it appears as the worst domain. Without more detailed knowledge of the locality and understanding of how access can be improved, it is difficult to identify either mitigation measures or opportunities to make improvements. All population groups are potentially affected.*
Recommendations		
Participation and engagement to date has failed to identify specific opportunities for how the development may contribute to the three determinant areas above. It has also not been possible to the development may impact these determinants. *1. Recommendation: Try to target these areas through further engagement and participation as part of the planning consultation.*		

Table 10: Main Findings and Recommendations (Cont.)

Health and Wellbeing Determinant – Macro-economic, Environmental and Sustainability Factors		
Positive/Opportunities	**Unintended Consequences**	**Vulnerable Groups/Distribution**
The development would require profiling and geotechnical works that could result in benefit and enhancement of local biodiversity if planned appropriately.	*Local biodiversity could be damaged if the development is not designed and implemented appropriately, or if operated inappropriately.*	*Improving biodiversity could be a positive for all members of the local community.*
There are potential contributions to cost of living through job creation, education and training and the facility would contribute towards economic development and trade. These would therefore lead on to gross domestic product.	*Unintended consequences may relate to impact on services and local amenities, and with potential extra costs for the public purse in respect of extra road maintenance, provisions of services and regulation. None have specifically been identified as yet.*	*Those with pre-existing health conditions will be vulnerable, although it was identified that health was the best domain for 4 of the 8 LSOA's assessed within the locality. Job creation, education and training may help improve health in the other 4.*
The development would contribute to a number of government policies and in some ways contribute towards tackling climate change.	*There is potential conflict with government policy on air quality and the emissions released from the Installation. Traffic associated with the development could be considered as additional, although there will already be waste transported along the routes identified.*	*It is acknowledged that there is a trade off on these issues and that the overall impacts need consideration. If all necessary mitigation is implemented and additional benefits derived from the development, then potentially all population groups may benefit.*
Recommendations		
1. Recommendation: BEWL to collaborate with ecologists during the construction phase of the Development to achieve the positive outcome to its greatest potential.		
2. Recommendation: BEWL to work with educational institutions, careers advisors, training providers and Powys CC to ensure provisions are made available for local people to gain the necessary skills and education that would provide the best opportunities to be employed at the development or associated support services for it.		

9. SUMMARY OF IMPACTS

9.1. Short Term Impacts

9.1.1. There are a number of potential short term impacts that may affect the locality and present health impacts during the construction period. Initial noise impacts will be from the re-profiling of the quarry to facilitate the construction and layout of the proposed development. Much of this will be within the quarry bowl, but working at higher levels and transportation of materials could impact to a greater extent on the local neighbouring community. Particular activities, such as piling, often cause concern for neighbouring residents, resulting in anxiety and potential mental health issues.

9.1.2. Types of noise, and duration, are likely to change during the construction period as work progresses, this will also be the case for associated traffic movements. There are likely to be 'lulls' in the levels of noise at different stages. Weather conditions can dictate when certain construction activities take place, this can impact on neighbours' ability to enjoy their outdoor space if noise from the site is intrusive. Uncertainty of noise sources, their duration and the lack of control over it, can be a psychological issue for some people and therefore affecting their well-being.

9.1.3. Dust is often an issue for construction sites, such as when soils and overburden are being moved and stock piled. The large number of HGV movements can also create dust generation, not only on the site but along the local highway network. Excessive dust can cause soiling of properties and impact health, particularly for those with existing respiratory conditions.

9.1.4. Extra vehicle trips will be created during the construction phase, many of them HGV. This will result in more traffic pollution and potential road safety issues, especially in respect of older members of the community and younger children attending the local school.

9.1.5. Lighting of a construction site is likely to alter as construction progresses. Temporary lighting is often used as it can be relocated easily to areas where and when needed. Inappropriate use of such lighting can impact on neighbouring premises and cause concern for residents. Use of such lighting is more difficult to plan.

9.1.6. Access to and use of the footpath and other local green space may be considered no longer viable by members of the local communities. This could be due to safety concerns of being near to the construction site, or accessing along roads with an increased number of HGV vehicles related to the development. This could result in less physical activity for some, and mean less enjoyment of the natural surroundings. Both of these impacts can result in further impact on mental well-being.

9.1.7. For those opposed to the development, the fact that construction has begun (if permission is granted) could be detrimental to their mental health. The proposed development has been under discussion for a number of years and some members of the communities are very emotional about the proposal and have strong objections.

9.1.8. The local economy could receive a boost during the construction period with a larger number of people in the area working at the site. Potentially, a lot of these could be 'locally'

employed, which would help create income for local families, consequently, having the potential to improve their health and lifestyle as a result of more disposable income.

9.1.9. If improvements to the footpath and / or other local green space can be identified, and delivered, as part of the development proposal then this could benefit the local communities with more attractive natural surroundings to visit and help keep them physically active. This turn would improve mental well-being.

9.2. Long Term Impacts

9.2.1. Noise could become a long term impact if not mitigated appropriately. Operation of the ERF would be continuous and therefore noise will be generated all day and night. Intrusive noise for long periods of time, whether deemed a nuisance or not, can have severe detrimental health impacts, such as sleep deprivation.

9.2.2. Air pollution will be emitted continuously from the stack serving the ERF. If the Installation is not operated to the necessary standards and with the correct controls in place, then the pollutant emission could impact on health, particularly those with existing poor health.

9.2.3. Odour from waste deliveries and storage prior to processing could be an impact if the proposed mitigation measures are not implemented or maintained. The odours would impact neighbouring premises, and could lead to pest or fly infestations. Impacts could range from annoyance to potential spread of disease.

9.2.4. Light intrusion from the development site could affect local residents if the lighting plan has not been designed correctly. This could impact on sleep for those affected which can lead to health impacts associated with sleep deprivation, which can include mental health impacts.

9.2.5. For those strongly opposed to the development, having witnessed the construction (assuming permission is granted) and then seeing the development operational may cause them severe anxiety and concern for their long term well-being. If they do not have the means to move, if that was their only perceived way of dealing with the situation, then this could be a significant impact on their mental health and well-being.

9.2.6. If the proposed development does not end up creating 'local' jobs, but instead employees are sourced elsewhere, this could cause resentment and community divisions, particularly for those who move to the area for the employment. This would potentially impact the 'sense of belonging', neighbourliness, and community cohesion. For some, it could affect their well-being and lead to other health impacts.

9.2.7. The proposed development could deliver more local jobs, not just for the site but for support services. This could in turn lead to educational improvements and potential apprenticeships or training programmes.

9.2.8. Locally, greater awareness of waste issues could be delivered through the proposed development, and over time the awareness may spread and therefore help to reduce the generation of waste.

9.2.9. The new jobs create more local income which would boost the local economy and perhaps help make improvement some local housing, which in turn could improve health for those residents.

9.2.10. If the proposed development resulted in support for local organisations, community groups or sports teams, then this could encourage community spirit, cohesion and pride in the communities.

9.2.11. If an excellent health and safety ethos is enshrined within site activities this could lead to improved health and safety standards within the community. This would benefit everyone in the locality.

9.2.12. Wider benefits result from waste that cannot be recycled or landfilled is used to create energy. Some of this energy could be used locally, if suitable proposals are identified.

9.2.13. The longer term aim is to provide more business uses on the overall quarry site which would create more jobs and further boost the local economy.

9.2.14. Although more vehicle trips will be created for the construction phase, for the operational phase it is planned that the RCV fleet will be 'green' such that emissions from them will be as low as possible. This would be a longer term benefit and contribute towards improving air quality.

10. SUMMARY OF RECOMMENDATIONS

10.1. BEWL should seek to establish a Liaison Group with relevant stakeholders and with links to the community such that concerns can raised and discussed and effective communication about the proposed development can be disseminated.

10.2. The Construction Environment Management Plan should include all necessary mitigation measures identified through the relevant EIA Chapters, along with inclusion of industry best practice to minimise any impacts on the environment and human health.

10.3. The Lighting Plan, as approved, should be installed to ensure that minimum light impact is created for the surrounding area.

10.4 The odour mitigation measures identified through the waste reception hall and bunker design methodology should be implemented such that odour issues are not created.

10.5 The Sustainable Urban Drainage Scheme should be implemented as designed to ensure that water management on site is controlled to minimise any pollution from site activities and to enhance the biodiversity of the relocated pond.

10.6 BEWL should liaise and collaborate with Powys County Council and other stakeholders for establishing an educational and training programme centred round the ERF activities.

10.7 BEWL and Powys County Council, along with other stakeholders, should collaborate to promote the use of the footpath and surrounding green space for physical activity and well-being.

10.8 BEWL should continue to seek participation from the local community to identify other beneficial outcomes from the proposed development, and identify any negative impacts that are, as yet, not known.

11. CONCLUSION

11.1. This HIA has been undertaken using the methodology and tools provided by WHIASU, gathering evidence from literature reviews, technical documentation, and feedback received through engagement. It is recognised that the level of engagement has not been as extensive as anticipated.

11.2. The proposed development has the potential to impact on the locality both through the construction phase and the operational phase. Many of the environmental factors are appraised by Technical experts within the various EIA Chapters. Mitigation is proposed where potential impact is identified. Ensuring the mitigation is implemented is crucial to minimising the impact.

11.3. Some potential benefits have been identified, but further work is required to formalise these benefits, particularly in respect of the local communities.

11.4. Perception and miss-trust of the HIA process has limited the level of engagement and potentially identifying more vulnerable groups that may be affected by the proposed development. It is hoped that a greater level of engagement may be achieved through the planning consultation stages and any further findings will be taken into consideration and discussed within the HIA prior to final submission.

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APPENDIX I
WARD MAPS (POWYS AND SHROPSHIRE)

POWYS WARD MAP

Powys County Council (2012) – Electoral Divisions in Powys (Extract from original map)

SHROPSHIRE WARD MAP

Geopunk (2020) – Wards within Shropshire (Extract from map)

APPENDIX II
POWYS ERF HIA CHECKLISTS AND SCREENING RECORD

ECL Ref: ECL.001.01.02/HIA
February 2021
Issue: Final

Vulnerable / Disadvantaged Group Checklist

The vulnerable / disadvantaged population groups that could be more impacted than others by the Broad Energy Buttington Energy Recovery Facility (ERF) are highlighted in red. –

SEX/GENDER RELATED GROUPS

- Female;
- Male;
- Transgender;
- Other (please specify)

AGE RELATED GROUPS (Could specify age range for special consideration)

- **Children and young people (Age 5-24);**
- **Early years (including pregnancy and first year of life);**
- **General adult population (Age 25-64)** ;
- **Older people (Age 65+).**

INCOME RELATED GROUPS

- **Economically inactive;**
- **People on low income;**
- **People who are unable to work due to ill health;**
- **Unemployed/workless.**

GROUPS AT HIGHER RISK OF DISCRIMINATION OR OTHER SOCIAL DISADVANTAGES

- Black and minority ethnic groups;
- Carers;
- Ex-offenders;
- Gypsies and Travellers;
- Homeless;
- Language/Culture (please specify);
- Lesbian, gay and bisexual people;
- Looked after children;
- People seeking asylum;
- **People with long term health conditions;**
- **People with mental health conditions;**
- **People with physical, sensory or learning disabilities/difficulties;**
- Refugee groups;
- Religious groups (please specify);
- Lone partner families; and
- Veterans.

Health Impact Assessment Screening Record Sheet

Date: 7th June 2019

Compiled by: Oliver Matthews – Principal Consultant (Environmental Compliance Limited)

(following the Steering Group meeting of 21st May 2019)

Title of programme, policy or project: Broad Energy Limited – Buttington Energy Recovery Facility Plant (ERF)

Description (including key aims and objectives)

The proposal relates to the collection of waste residual material across a regional area with transportation to the Buttington Quarry site located near Welshpool in Powys. The waste material would be off-loaded to the waste bunker before being subject to thermal treatment in a purpose built facility utilising latest technology and abatement plant to minimise pollutant emissions. All waste treatment activities will take place within a building. Energy generated from the process is proposed to be fed to the national grid.

The aim is to contribute towards minimising the need to send waste to landfill, whilst also trying to recover as much energy as possible from the thermal treatment process and therefore off-setting potential impacts. It is considered that, to be viable, 150,000 tonnes a year of waste will need to be processed.

Nature of Evidence considered / to be used (including baseline data, technical and qualitative research, expert and community knowledge)

- Data sets for Welsh Indices of Multiple Deprivation for the locality, and compared to Wales level data where appropriate.
- Health data sets for the locality, where available.
- Traffic data.
- Existing environmental data. (AQ/Noise/Light/biodiversity etc.)
- Lle Maps for Wales
- Technical data on thermal treatment, especially waste.
- Control measures for thermal treatment (EA/NRW/international)
- Peer reviewed research of impacts from thermal treatment (environmental/public perception/sustainability/policy)
- Engagement with local community / statutory consultees.
- Identify local knowledge of vulnerable groups (individuals?) (care homes / schools / hospital etc.)

Key population groups affected by the programme, policy or project.

Using the list of **vulnerable and disadvantaged groups** included, assess which groups amongst the general population will potentially be affected by the proposal

Vulnerable Groups

- Children and young people (Age 5-24);
- Early years (including pregnancy and first year of life);
- General adult population (Age 25-64);
- Older people (Age 65+);
- Economically inactive;
- People on low income;
- People who are unable to work due to ill health;
- Unemployed/workless;
- People with long term health conditions;
- People with mental health conditions;
- People with physical, sensory or learning disabilities/difficulties.

Other Groups

Could include retirees / horse riders / ramblers / cyclists / runners etc., local knowledge required on these.)

Screening

Using the Determinants of health and well-being checklist below, consider:

- how (in what way either positively or negatively)
- to what extent (significant/moderate/minor impact)

these groups within the population and the general population itself may be affected by the proposal or that the proposal may have implications for – and summarise it for each section on the screening sheet below.

Any missed opportunities for enhancing the proposal can be listed under the positive (+) column. Any missed detrimental impacts on health and wellbeing can be listed under the negative (-) column. If there are no likely impacts or they are very minimal then move to the next section.

Ask the question: How does this proposal impact upon these determinants, for example, physical activity or diet (within Lifestyles section) in a positive or negative way? Or not at all?

Determinants of Health

Lifestyles		**Vulnerable Groups Affected**
(Positive) +	(Negative) –	
Physical Activity		
The development could lead to improved physical activity through improvements to local facilities.	If no investment in local facilities people may feel restricted from physical activity in the vicinity of the plant and with extra traffic.	All Groups as physical activity is a key element of good health. (Moderate, depending on current level of activity)
Diet		
	The development may deter people from growing their own food/eating local produce. Allegations of pollutant deposition affecting food chain.	Those who grow their own food. (Minimal impact)
Social & Community Influences on Health		**Vulnerable Groups Affected**
(Positive) +	(Negative) -	
Citizen power and influence / Community cohesion / Divisions in community		
All could be improved through appropriate engagement with the community and provide confidence with any delivered development.	Inappropriate engagement could create community divisions and mistrust in the development leading to a less cohesive community.	Could affect all Groups. (Significant for both + & -)
Language / Cultural		
The project presents an opportunity to help promote the Welsh language through bilingual community engagement which will help promote cultural and sense of belonging within the community.	Development of the project without an appreciation of the historical and cultural background of the locality could create negative impacts for the community.	A brief review of data identified lower than average Welsh speakers and significantly higher than average non-Welsh residents. (This apparent disparity in the community, if polarised opinions exist, could have significant -ve impacts.) This could affect Groups but it may be the greatest affected are the Children & young people / older people groups.

Social capital, support and social networks / Neighbourliness / Social isolation		
There may be opportunities to improve social capital and networks through the project by bringing the community together and facilitating interaction and communication.	Neighbourliness and social isolation could be impacted by the development, particularly if there is polarised opinion within the community. In these circumstances the value of social capital, support and social networks could be compromised.	This could affect all groups but more likely with those of strong opinions on the development. It is difficult to identify particular vulnerable groups at this stage.
Mental Health and Wellbeing		**Vulnerable Groups Affected**
(Positive) +	(Negative) –	
Sense of control		
Providing an opportunity for public engagement allows people to participate in the decision making process possibly creating a feeling of empowerment and influence in the development project. This may be a significant benefit for those that may feel directly affected by the proposal.	For those that have moved to the area (perhaps for retirement) there is likely to be a sense of lack of control. For those that may be very opposed, and if consented, then complete lack of control may be the overriding feeling. This could lead to mental health, and wellbeing issues.	Older people and those with pre-existing mental health conditions are likely to be most affected (Significant). Possibly those already suffering mental health issues, or those who have moved to the area and/or those with no ability to move on if they wanted. i.e. retirees, or those who have lived locally for many years. (Significant)
Participation in community and economic life		
If dealt with appropriately the development provides an opportunity to improve the local community and economy (as long as full mitigation and environmental / health impacts are minimised).		General adult population, those on low income, and the unemployed may benefit from the development through work/training which could improve mental health and wellbeing (Significant for those that benefit).
Emotional wellbeing and resilience		
If the engagement is performed well then this could greatly improve the public perception with significant positive impact potentially creating the cultural changes required for dealing with waste issues and working	Thermal treatment of waste has a particularly negative public perception which will need to be addressed through the public engagement.	If the engagement is not done well then this could greatly affect the public perception with significant negative impact potentially resulting in emotional and health concerns.

towards the policy goal of zero waste.		
Living and Environmental Conditions affecting Health		**Vulnerable Groups Affected**
(Positive) +	(Negative) –	
Air Quality		
The facility will be serving a regional base which may provide positive outcome in reducing the distance that waste has to be transported further afield, or even abroad. This would comply with the Globally Responsible goal under WFG. The development will have a training / educational facility that may contribute to the cultural change needed to achieve the zero waste policy.	The existing local air quality in the area is likely to be good due to the rural location. This could only be validated by actual data which may not currently exist. The development will result in an air quality impact both from emissions related to the process/site and also traffic related.	Those with existing health conditions, the young and the old may be most at risk. The impact could be minor/moderate but will be dependent on technology used and control measures. Air quality will be a material consideration of the planning process.
Attractiveness of area		
A well designed development can improve visual appearance but this will be difficult in a rural location.	Visual impact could result from poor design.	Possibly older local people and local residents that have a view of the site may be affected (Minor)
Community safety		
		Community Safety – more information needed.
Access, availability and quality of green and blue space, natural space		
Access to and quality of green space may be improved if the opportunities exist. Local knowledge would inform this.	A lack of seeking opportunities to improve/promote green space around the facility could leave local people feeling restricted in their use/continued use of the local green space.	Could affect many of the groups but also cyclists / walkers / ramblers / horse riders. (Minor/Moderate)
Housing quality and tenure		
For some of the LSOA's, housing is below average but an economic boost to the area may help improve this situation.	An influx of workers needing accommodation may force some people out of their home if landlords want to take advantage of the situation. The housing quality for workers could be an issue if existing housing is already below average.	Poor housing conditions can create health issues or make existing issues worse. The very young, older persons and those with health conditions are most at risk. (Moderate/Significant)

	(Potential additional impact on services due to incoming workforce)	
Indoor environment		
	Indoor environment has a profound effect on health, so for those that are opposed to the project and living in proximity may feel their home is polluted by the project. Whilst the emotional and mental impacts may be greater, there is a risk that extra cleaning chemicals may be used to 'cleanse' the home subjecting residents to higher than normal dose of such substances. Additionally, lifestyle choices such as smoking and alcohol, combined with 'emotional' pressure can result in further health impacts.	Those within the groups that are particularly opposed. (Moderate) People within the general population with strong views opposed to the development whom become subconsciously affected. (Minor/Moderate)
Health and Safety		
With good project management during construction and operation along with a strong H&S ethos, the general culture of H&S can improve in the area. This is not only from the business perspective but within the community.	A project developed with little regard to H&S increases risks of accidents and injuries.	Workers associated with the development and members of the public in the vicinity of the development would be at risk (Minor/Moderate) [Assuming high standards of H&S are implemented]
Light Pollution		
	Light pollution can impact both human health and the environment. The rural setting of the development makes it more sensitive to light hue from the site, and the associated vehicles accessing the site. Light can be deemed a statutory nuisance.	Those living within view of the site, or will have sight of potential light hue from the site will be most affected. Also those living alongside the road network used by the extra vehicles associated with the development. (Minor) [*Need vehicle numbers and routes*]
Noise		
	Noise will be generated from the site both during	The process is likely to operate 24h/day which could be an

	construction and operation. Elevated noise levels in a rural setting could be a nuisance. Whilst existing activity takes place on site it is likely there will be a 'step change' in the level of activity.	issue for local residents, particularly those with existing health conditions and the potential anxiety this will cause. Also the unemployed, older people and those with mental health conditions could be affected, particularly as they are likely to spend more time at home and subject to the noise for longer periods. (Moderate/Significant)
Quality and safety of play areas		
		Quality & safety of play areas – more information needed!
Road safety		
Access to the site is not currently good for the number of extra vehicles that will need to access, but the development could provide an opportunity to improve the access and road safety, and potentially deliver other highway improvements in the locality as part of development gain.	Failure to address the access to the site, along with the implications for the associated road network could result in road safety issues.	All road users could be impacted from a failure to properly assess the implications. (Significant)
Odours		
	Odours issues with waste activities are well documented and generally relate to poor management practices and failure to implement the necessary control measures. Odours could also lead to pest issues, such as flies/vermin.	All those living within the vicinity of the site could be affected to some extent, and depending on weather conditions such as wind direction. The nature and level of the odours would determine significance of impact. (Minor/Moderate/Significant)
Urban/Rural built and natural environment & neighbourhood design		
A sympathetic design for the development could compliment the locality, although this may be difficult in the rural setting. Consultation on orientation and styling could provide an	Poor design with little regard to the setting and local community could create resentment and frustration with regard to the facility	Those with strong opinions and views of the development. (Minor/Moderate)

element of local 'buy-in' to the development.		
Waste disposal, recycling		
The purpose of the development is to provide a means of waste disposal that does not result in landfill and extracts the maximum benefit from the disposal activity, by way of generating energy. This could be a positive, particularly if the energy can be utilised locally and for those living in fuel poverty.	As with all waste disposal activities, there is a trade-off between sustainability and recovery, along with long term impacts. Inappropriate or lack of assessments could mean greater impacts from the development.	There could be either positive or negative impacts from the development and these would be for the wider population rather than any particular vulnerable groups. Difficult to determine the significance of impact.
Water quality		
	Inappropriate management of waste waters could result in pollution of nearby water courses or ground waters. If there are local residents with private water supplies then they could be affected.	The design of the facility should encompass water management considerations and the risks should be minimal. Those affected would be local private water supply residents. (Minor)
Economic Conditions affecting Health		**Vulnerable Groups Affected**
(Positive) +	(Negative) –	
Unemployment / Income / Poverty / Type of employment		
The development has the potential to deliver more local jobs, with a range of incomes and help alleviate local poverty. Training and education for the jobs may be delivered locally providing more benefits, and potentially for those that may not be employed within the development.	If few local jobs are delivered through the project, and/or training not delivered locally then this could result in community tension and resentment towards the development and those associated with it.	Unemployed, those on low income, young adults or adults who wish to retrain can all possibly benefit, for some this could be significant.
The project relates to 'energy from waste' which may be utilised locally. This could assist with those suffering fuel poverty.	Similarly, energy generated from the development not used locally could result in tensions and resentment.	Those in fuel poverty. (Significant)

Access and Quality of Services		**Vulnerable Groups Affected**
(Positive) +	(Negative) –	
Early review of local data has identified that access to services is a significant issue for some, therefore any contribution from the development towards IT services, access to services, education & training, care / medical / leisure services etc. would be very positive.	Failure to consider contributing and assisting with access to services may actually create a worse situation than already exists, which would be a significant negative impact.	All groups rely to some extent on access to services, so anything that may make the situation worse would be significant.
Macro-economic, Environmental and Sustainability Factors		**Vulnerable Groups Affected**
(Positive) +	(Negative) –	
The project is likely to result in economic benefits and Gross Domestic Product, with potential benefit for cost of living and biodiversity if dealt with appropriately. There is potential contribution to Climate Change and Government Policies but with trade-off's that need assessing.	Depending on the trade-off assessments, it maybe that the development would result in overall negative impact for some factors.	The benefits or potential negative impacts are valid for all groups, indeed everyone in the area, but to varying level of significance depending on the factor under consideration. More investigation is required for this element.

Summary of Potential Health Impacts Identified

1. Positive Impacts

   Potential if delivered through development –

   - Improved physical activity
   - Greater community cohesion and engagement
   - Help promote Welsh language, culture and sense of belonging
   - Social capital networks
   - Housing
   - H&S culture within community
   - Road safety

   As a consequence of the development –

   - Energy from waste

- Jobs / training / education
- GDP and potential for contribution to cost of living

2. Negative Impacts

   A poorly designed, consulted and implemented development could result in –

   - Reluctance for home grown food locally
   - Less physical activity or a feeling of restriction to green open space
   - Stress
   - Community divisions
   - Feeling of 'lack of control'
   - Visual impact
   - Increase in pollution of air/noise/odour/light/water
   - Road safety issues
   - Influx of workers creating housing pressures / pressure on services
   - Tension and resentment within the community

3. Impacts on Vulnerable groups

   Particular vulnerable groups identified as being potentially significantly negatively affected are –

   - Children and young people (Age 5-24)
   - Early years (including pregnancy and first year of life)
   - General adult population (Age 25-64)
   - Older people (Age 65+)
   - People on lower income
   - People living with long term health conditions
   - People living with mental health conditions

Recommendations

Are the impacts that have been identified above enough to warrant a more comprehensive health impact assessment?

Yes / No

If No, what are the reasons for not conducting an assessment?

Not applicable

Do any additional actions need to be taken as a result of this HIA process?

Yes / No

If Yes, please outline (list recommendations and /or mitigation / enhancement here)

Recommended Actions

- Obtain, where possible, data and information for those elements where needed in the determinants of health check list.
- Identify data and information sources to help inform discussions on particular areas where impacts have been identified.
- Where potential mitigation or enhancements for positive outcomes have been identified, follow up with those relevant stakeholders and look for opportunities to embed within the development proposal.

If a further HIA is required, outline the next steps (E.g. Date and time of scoping meeting)

Next Steps

- Establish a Stakeholder list to begin engagement and discussion (by end of June 2019).
- Continue literature review to help inform discussions and thoughts in respect of impacts and mitigation.
- Arrange Stakeholder engagement for July 2019.
- Collate comments feedback from Stakeholder engagement (August 2019)
- Agree feasible actions from feedback to support and mitigate where possible.
- Embed within project proposal.

Buttington Energy Recovery Facility (ERF)

Health Impact Assessment (HIA)

Health and Wellbeing Determinants Checklist

Category	Determinants
Lifestyles	• Potential perception that physical activity may be hindered in the vicinity of the site due to safety or health impacts. • Perception that home grown produce may be affected by pollution from the plant. • 'Stress' of development, impact on individuals may lead to increased use of alcohol/smoking etc.
Social and Community Influences on Health	The development has the potential to impact on: • Citizen power and influences *(+ & -)*. • Community cohesion, identity and local pride. • Divisions in community (*possibly be created*). • Language (*few Welsh speakers*), which may lead on to reduced cultural identity; • Cultural and spiritual ethos.(*may be opportunities to improve through awareness raising of waste issues and the means to tackle it*) • Neighbourliness (*or lack of*) • Sense of belonging (*or loss of*) • Social isolation/loneliness (*very rural area*) • Social capital, support and social networks (*potential opportunity to improve*).
Mental Health and Wellbeing	• The proposal may impact on the 'sense of control' for people (*particularly for retirees*) in the area and what say they have on development that takes place around them. The feeling of lack of control over what happens around you can create mental health and wellbeing issues for individuals. • It has the potential to enable participation in community and economic life (*will require effort to create (perhaps through the HIA & public engagement process)*). • It does have the potential to impact on emotional wellbeing and resilience (*poor public perception of thermal treatment of waste*.)
Living and Environmental Conditions affecting Health	• Air quality (range of pollutants) – the area has generally good air quality which could be impacted if the process is not appropriately controlled. • Attractiveness of the Area/Visual Impact – could be impacted if poor design choices are made. • Community safety – (*need more information*).

Category	Determinants
	• Access, availability and quality of green space, natural space (*may be less attractive for people to use the area either due to health concerns or road safety*). • Housing quality & tenure – number of potential impacts such as house price, pride in the home, transient population for the construction period which is estimated at about 3 years, potential longer term impact if employees of the facility will be from outside the area. • Indoor environment – perception of thermal treatment of waste and how emissions from it may impact on the home environment. • Health and safety – for workers and safety of public places during the construction and operation of the facility. • Light pollution – a large site operating 24h a day, therefore flood lighting will be required. Timing of deliveries could be important. • Noise – 24h/day operation therefore constant noise sources. Traffic related noise may also be an issue. • Quality and safety of play areas – (*more information needed*). • Road safety – increase in large vehicles accessing the site and using the highway network. (*The local highway authority consider the local network to be substandard and that vehicles should use the trunk road network for accessing the site*). • Odours – the site will be thermally treating waste so odours could create a potential impact if appropriate management procedures are not in place. • Urban/rural built & natural environment – the design of the development will be extremely important within the context of the area. • Waste disposal / recycling – the development is for achieving disposal of waste residues that are not capable of being recycled to avoid the need for landfill. (*could be deemed +*) • Water quality – inappropriate processing and management could have the potential to impact on water quality, potentially private water supplies as well.
Economic conditions affecting health	• Unemployment – the development has the potential to create jobs (*+*). • Poverty – jobs and revenue could be created from the development which may help the area. Energy generation is an output of the thermal treatment of waste process which may alleviate fuel poverty. • Income – creation of jobs, possible training opportunities, maybe apprenticeships could help to improve income.

Category	Determinants
	• Personal and household debt – may be alleviated for some through the development. • Type of employment – it may be that full and part time work are created through the development, which could be support services for the site as well. • The nature of the work is industrial and dealing with waste so there are implications for health and safety for employees.
Access and quality of services	• Education and training – there could be some contribution for these from the development. • IT, internet & digital services – (*more information needed, it may be these will have to be upgraded in the area for the development?)* • Leisure services / Medical & health services / Other caring services / Public amenities / Shops / Transport – **brief review of data for the area has highlighted that access to services is a key concern.**
Macro-economic, environmental and sustainability factors	• Biodiversity – inappropriate operation of the facility could impact on biodiversity. (*Also potential opportunities to enhance biodiversity through the development*). • Climate change – there is a trade-off between impacting climate change and working towards improvement of it. • Cost of living – Potential positive and negative impacts from the development (*more information needed*). • Economic development – the facility would be contributing towards economic development and trade. • Government policies – the overall development would contribute to a number of government policies but also be in conflict with some. (*The various policy themes require examination*). • Gross Domestic Product – there would be contribution to this. • Regeneration – possibly in a 'loose' sense, but likely considered as additional development due to size and nature.

APPENDIX III
SCOPING CHECKLIST

Scoping Checklist – determining the focus, methods and work-plan

(Broad Energy ERF, Buttington Quarry)

This stage establishes the terms of reference and agreed plan for a health impact assessment. It involves asking questions and making decisions in relation to undertaking the assessment.

It is not necessary for a screening tool or session to have been completed previously. However, a screening tool is useful and beneficial for helping to determine the focus of the health impact assessment. Ideally, the scoping should not be completed in isolation.

1) **What are the time scales? (And when do crucial decisions need to be made?)**

An HIA Report needs to be submitted as part of the Environmental Impact Assessment submission for Planning. The basis for the HIA relates to an actual development project, rather than a policy or strategy, so it would be preferable for it to run concurrently with the Planning process. Although a report is required for the submission of the Planning Application, to gain the most out of the HIA process, it will not be considered as the completion of the HIA. The HIA will remain an iterative process throughout the planning process such that maximum gains can be derived and necessary mitigation developed for unforeseen circumstances.

A list of stakeholders is required by the end of June 2019 ready for stakeholder engagement and to help inform final planning details. The Steering Group which has been established has discussed potential impacts and discussed a range of perspectives on the proposed project with a view to identifying positive and negative impacts from the proposal. Stakeholder engagement will further inform these discussions hopefully providing evidence for areas of intervention.

2) **What financial and human resources are available?**

The HIA is being delivered as part of an actual Planning Development Application and is being referred through PINS. Therefore the HIA is being paid for by the developer with resources provided by Environmental Compliance Limited.

3) **Geographical boundaries of the project?**

The absolute minimum boundary of consideration has to be the area affected by the potential plume grounding area of any stacks. However, possible highways issues will take the boundary further for impacts on the highways network. An additional consideration are the potential air quality impacts from increased vehicle movements on the highway, and in relation to the particular routes that may be used. (It is considered this is likely to be trunk roads).

Additionally, it is known that air pollution does not respect geographical boundaries and therefore the potential impacts on sensitive sites will need consideration. These aspects should be covered in other required assessments under the EIA and therefore help inform the

HIA discussions.

4) What kind of assessment is necessary and/or possible in the time available – rapid or in-depth?

It will be a Comprehensive HIA due to the nature of the development, its location and as it is considered of Development of National Significance ("DNS").

5) Should the assessments be an in-house exercise or should someone be commissioned to do the appraisal?

Environmental Compliance Limited (ECL) have been contracted by Broad Energy Limited to carry out the Health Impact Assessment as a supplementary element of their Planning Application for the development of an Energy Recovery Facility. The proposal has been referred to the Planning Inspectorate (PINS) for a Development Consent Order (DCO) which confirmed an HIA would be appropriate and supported the proposed methodology to follow the WHIASU guidance and toolkit. The HIA is therefore considered as being commissioned.

6) Should you set up a Steering Group and who should be involved?

It was considered that a Steering Group should be established, particularly after review of the 'Interim Report on the HIA of the Waste Incineration Development Planned in Trident Park, Splott, by Viridor Ltd'. The initial list of members considered were:

- The Developer
- Key Technical Contractors
- Local Councillor
- Planning Officer
- Local EHO
- Willing local resident/s (possibly community council)
- Nearest sensitive receptor organisations (school/hospital/care home etc.)(if any, and in consideration of the geographical extent of the study area)
- Public Health Wales
- Natural Resources Wales
- Public Service Board representative (which may be the NRW representative as they are a member of the PSB)
- Local Health Board representative (also a member of the PSB)
- Local school (Trewern) – at the request of the EHO

The actual Steering Group membership was:

- The Developer
- Technical Equipment Contractor
- Local County Councillor
- Planning Officer
- Local EHO
- Community Council
- ECL (consultants)

Unfortunately representation from Public Health Wales/England, Natural Resources Wales, Local Health Board, and Public Service Board was considered a potential 'conflict of interest' and therefore invitations to participate were declined.

Whilst there is an appreciation of the 'potential' conflict of interest, this could be considered a barrier to the meaningful delivery of what is supposed to be an open, transparent and holistic process. The lack of engagement will undermine the usefulness and trust in the HIA process, and ultimately prevent the Well-Being of Future Generations to be fully considered.

It is also noted that Participation Cymru produced 10 'National Principals for Public Engagement in Wales' that details what engagement is expected from the public organisations in Wales.

7) What elements of the policy/project/plan should the appraisal focus on?

Early review of the WIMD data has identified that 'access to services', 'housing', and possibly 'age demographic', are potential aspects that will need further investigation. Although the whole debate and public concern over energy from waste will need due consideration.

All those elements identified in the Screening Record Sheet based on the Health and Wellbeing Determinants Checklist will need to be looked at and the various statutory assessments should help inform that process. As the elements are reviewed it may be that the focus of the HIA will change. This could also result in co-opting other members / organisations to the Steering Group or as participatory stakeholders.

8) Who are the stakeholders?

The Developer
Technical Contractors of plant & equipment
Welsh Government (Planning/Waste - possibly others)
Public Service Board (and member organisations)
Local residents
Local Councillors
Local Authority (Planners/EHO/local highways authority/care services/education providers)
Trunk Road Agent
Local businesses
Local Third Sector support services

9) Roles and responsibilities?

- ECL – coordinate and chair Steering Group (meetings/workshops/interviews etc.), coordinate collation of data/evidence gathered, and write report.
- Developer to provide background and rationale to project, scope of process, decision for location.
- Technical Contractors to provide understanding of process, controls, mitigation technologies and field technical queries, provide supporting data and evidence of technical capability of equipment and plant to minimise polluting impacts.
- Other stakeholders to hopefully provide perspectives, views, opinions and raise concerns of specific local issues or potential impacts from the proposed development, along with any benefits and opportunities that may be realised from the project.

10) Methods for collecting evidence?

- Review of local health data (WIMD);
- Stats Wales web searches for other relevant health and social determinants data;
- Public Health Wales Observatory data;
- Data Wales searches for relevant subjects;
- Additional project specific data such as traffic / environmental searches / air quality / sensitive receptor sites (environmental and human);
- Peer reviewed research of health impacts relating to incineration, energy from waste and waste handling;
- Peer reviewed research of public perception of incineration / energy from waste;
- Questionnaires of local community;
- Public engagement;
- Stakeholder workshops;
- Feedback forum/website;
- Statutory engagement;
- Letter drop with feedback forms/email contact;
- Local health query for LHB / GP Cluster Group.

APPENDIX IV
ENGAGEMENT EVENTS INFORMATION

18th June 2019

Buttington Energy Recovery Facility (HIA)

Our Ref: ECL.001.01.02/HIA (21.05.19)

Your Multi-Disciplinary Consultancy

Buttington Energy Recovery Facility (ERF) – HIA Steering Group Meeting (21st May 2019)

1. Notes of Meeting

1.1. Attendees:

AH-B (Developer)
AJ (County Councillor)
AE (Clerk to Trewern Community Council)
DS (Powys EHO)
RWW (Planning)
SB (ECL)
OM (ECL)

1.2. Apologies:

RB (HZI)

2. Introductions and Background

2.1. Introductions were made and OM provided an overview of Health Impact Assessment (HIA) and the processes involved.

2.2. SB presented an overview of the project, the technology proposed and the various aspects of it that had been supplied by RB. Also discussed the various control measures and pollution minimisation techniques.

2.3. AHB provided the rationale for the proposed development and background of the proposed location. Beneficial considerations from the development where a potential electric vehicle battery charging station on site and that a local farm could make use of energy and heat from the development.

3. Initial Data Review

3.1. OM informed the Group of the initial findings from the review of Welsh Indices of Multiple Deprivation (WIMD) data for the surrounding areas. The key aspects were access to services which are generally quite poor. It was acknowledged that health services in the area are problematic and various services dispersed across the region which can result in significant distance to receive treatment. AJ queried whether data had been assessed for the nearest wards across the border in England, as the development site is relatively close to the border. It was confirmed that this had not been looked at but was agreed that it will be (*Action Point*). Discussions on the determinants of health and the various vulnerable population groups took place and the need for local knowledge to help inform any particular local issues. A brief discussion on the potential for a community hub type facility for the site took place.

3.2. During discussions it was highlighted that Severn Trent are the utility provider as opposed to Dwr Cymru, with a question asked of how much water the ERF will utilise? This was to be looked at. Potential pollution of water courses was discussed, resulting from site run-off / spillages etc. and a query raised on private water supplies in the locality and whether they may be affected. DS was asked if he would be able to identify how many there may be and the general location in relation to proximity to the site (*Action Point*).

3.3. The plant location was discussed, particularly with it being in a quarry and how this may affect emissions from the plant. SB explained the use of the Air Dispersion Modelling Software (ADMS) and the parameters used to inform the model of location characteristics, to get as accurate as possible predictions of effect on emissions dispersion. It was explained that further work was being undertaken on this. RWW suggested it would be worth identifying any un-validated weather monitoring sites in the area. This would be looked at. It was agreed that a list of sensitive receptors would be circulated (*Action Point*).

3.4. Other aspects discussed were the height of the stack and the protrusion of process buildings above the top of the quarry. Potential for light pollution and noise issues were mentioned, and in respect of a light on the stack (nearby airfield). Low flying aircraft was also mentioned as a potential concern. The use of any nearby footpaths or bridal ways being affected was also briefly mentioned.

4. Initial Research

4.1. OM discussed the research undertaken to date and that there is very little evidence to suggest direct health impacts from thermal treatment of wastes, but also no extensive research using sufficient criteria to state there are no health impacts. Most recent research papers advocate a precautionary approach whereby latest standards/technology and appropriate regulation are employed for any thermal treatment activity. The research has also identified that it is generally considered that thermal treatment has potentially less environmental impact than landfill. Further research will be undertaken to gather as much evidence as possible in the timeframe (*Action Point*). Public perception of thermal treatment of waste was the most

apparent aspect of the research, partly based on historical events and lack of efficient control measures leading to high profile incidents. OM highlighted the change in European legislation on thermal treatment of wastes with the introduction of the Industrial Emissions Directive (IED) which introduced more stringent controls, increased operating temperatures and a reduction in the range of wastes that could be 'burned', either under exemptions or as permitted activities.

4.2. Discussion took place with regard to local perception of accumulation of pollutants in the atmosphere, particularly with respect to a number of biomass plant in the locality, some of which have caused problems with emissions. The proliferation of biomass plant is a national issue, partly driven by government policy and incentives of financial gain through burning wood but also the creation of a false market place for wood waste to be used in biomass. A general lack of understanding of how to operate and maintain plant, and use of unseasoned wood and contaminated wood has led to the problems.

5. Public Engagement

5.1. The means to deliver public engagement was discussed, with a request to deliver drop-in centres within the wards to be considered, particularly for Trewern and Middleton. The livestock market and Trewern / Middleton Schools were also mentioned, as were Trewern Community Centre and Middleton Village Hall.

5.2. Ways to inform the public of the engagement event were:

- Advertise in the local paper (County Times)
- Leaflet drop
- Notice Boards
- Online through Border Gossip / My Welshpool / My Newton

5.3. It was suggested that both RG and GD should be informed of the dates of engagement events as they had local communications networks.

5.4. Engagement with Trewern School could be through FW (?) (Chair of Governors), particularly for getting a 'travel to school' survey undertaken.

5.5. AJ (Trewern) and C / J (Middleton) may be able to assist with arranging drop-in sessions.

6. Final Comments

6.1. A final query was raised in respect of 'end of life' concerns and how decommissioning would be performed. It was explained that this is dealt with as part of the application process and any permit issued would also require a site closure plan.

7. Action Points

7.1. Agreed action points were:

- Review health data for Shropshire wards nearest to the site;
- Identify water consumption for the ERF;
- Identify location of private water supplies around the site;
- Provide sensitive receptor list used for the air dispersion modelling;
- Make arrangements for public engagement; and
- Undertake more research on health impact of thermal treatment of waste.


What is ECL's role in the HIA?
Health Impact Assessment
Human Activity


What is ECL's role in the HIA?

Buttington Energy Recovery Facility (ERF) – Health Impact Assessment (HIA) Public Engagement

We would be very grateful for your thoughts on the proposed development and how you feel it may or may not impact on the local community and yourself. Please take some time to complete this form. Your details will not be circulated or appear in any publication associated with this public engagement exercise.

Contact Details	**Response**		**Office Use**
Name:			
Address:			
Telephone Number:			
Email:			
Would you mind if we contacted you later, if need be?	**YES**	**NO**	
Questions			
Do you have any specific concerns with regard to the proposed development, and if so, please list them?			
What negative impacts do you think would result from the development?			
What positive impacts do you think would result from the development?			
Have you found this public engagement useful or not? Please state why.			

o.matthews@ecl.world
Tel. 0800 130 3353
hia@broadenergywales.co.uk

Environmental Compliance Limited, Unit G1
The Willowford, Treforest Industrial Estate,
Pontypridd. CF37 5BF

Border Gossip

News from Middletown, Trewern, Buttington & Hope.
Facebook: Border Gossip
www.bordergossip.co.uk
October & November 2019

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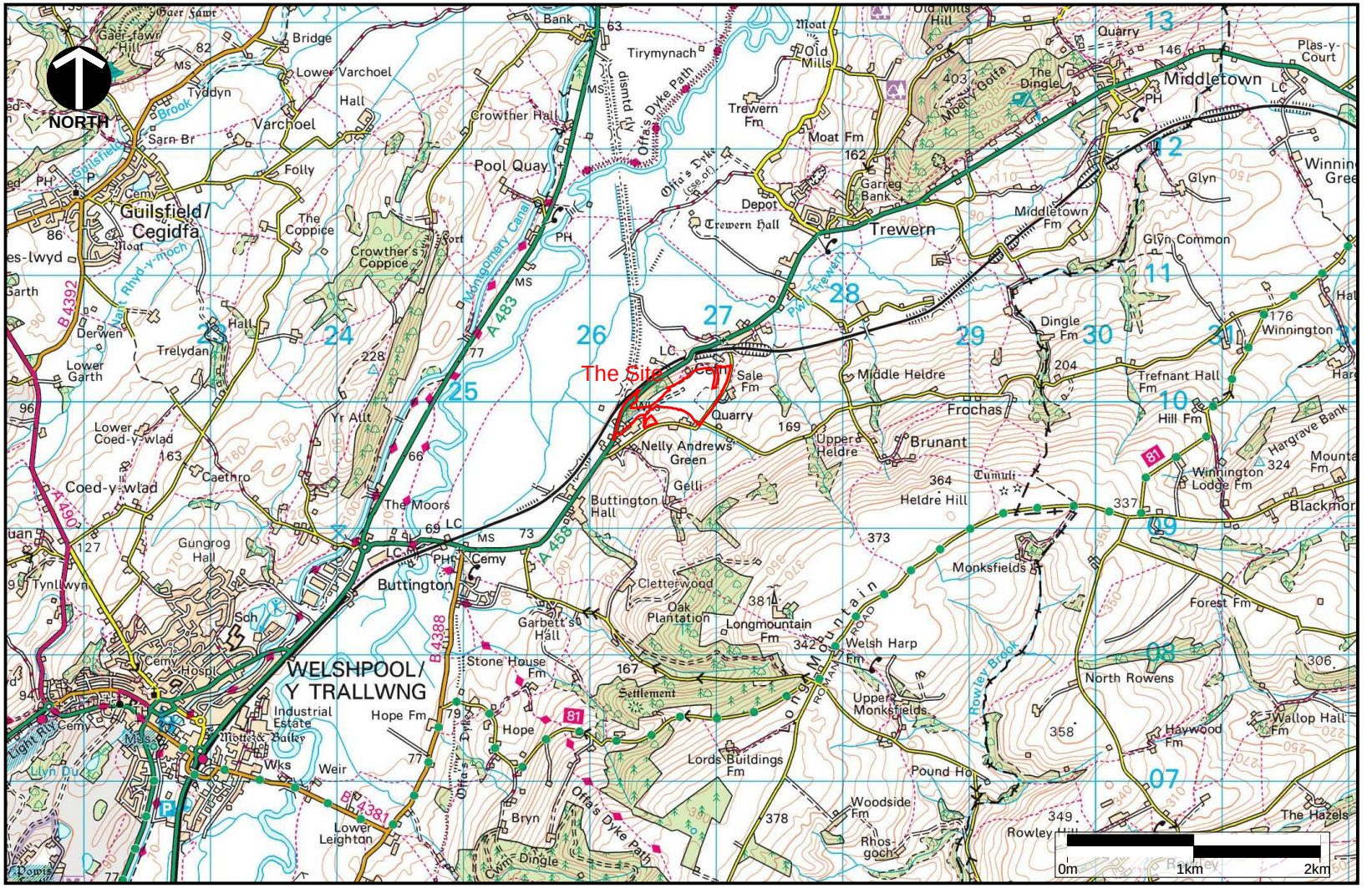
Broad Energy Wales are still undertaking various assessments for the preparation of the Environmental Impact Assessment (EIA) and Health Impact Assessment (HIA) for the proposed Buttington Energy Recovery Centre.

Please feel free to send your comments by email to hia@broadenergywales.com or telephone 0800 130 3353.

APPENDIX V
SITE LOCATION MAP



BROAD ENERGY

July 2020
Scale 1:50,000

BUTTINGTON QUARRY
Proposed Energy Recovery Facility (ERF)
LOCATION PLAN

APPENDIX VI
TABULATED WIMD AND IMD DATA

Powys Area and WIMD Data

Areas chosen for assessment as part of the HIA.

Lower super Output Area (LSOA) Name	LSOA Reference
Forden	W01000441
Guilsfield	W01000444
Llandrinio	W01000457
Trewern	W01000497
Welshpool Castle	W01000498
Welshpool Gungrog 1	W01000499
Welshpool Gungrog 2	W01000500
Welshpool Llanerchyddol	W01000501

POPULATION – Estimates for 2012

LSOA Name	All ages		Aged 0 - 15		Aged 16 - 29		Aged 30 - 44		Aged 45 - 64		Aged 65+		Born in Wales		Density: Persons per ha 2012	
Parameter/ Units	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Forden	1,422	100	241	16.9	212	14.9	240	16.9	380	26.7	349	24.5	-	39	0.41	-
Guilsfield	**2,389**	100	400	16.7	327	13.7	327	13.7	**720**	30.1	**615**	25.7	-	44	0.42	-
Llandrinio	2,152	100	**417**	19.4	**417**	19.4	**408**	19.0	625	29.0	454	21.1	-	25	0.49	-
Trewern	1,448	100	296	**20.4**	296	**20.4**	241	16.6	441	**30.5**	300	20.7	-	30	0.45	-
Welshpool Castle	1,553	100	305	19.9	305	19.9	282	18.4	396	25.8	294	19.2	-	39	0.86	-
Welshpool Gungrog 1	1,297	100	216	16.7	216	16.7	262	**20.2**	293	22.6	272	21.0	-	39	**7.14**	-
Welshpool Gungrog 2	1,530	100	261	17.1	251	16.4	267	17.5	460	30.1	291	19.0	-	45	1.25	-
Welshpool Llanerchyddol	2,262	100	403	17.8	315	13.9	375	16.6	574	25.4	595	**26.3**	-	**47**	3.26	-

EDUCATION & TRAINING – Average Point Score 2010/12

LSOA Name	Key Stage 2	Key Stage 3	Key Stage 4	Persons 16-74 with no qualifications 2011 (%)	School Absence Rate (% school sessions missed) Primary school (09/10-11/12)	School Absence Rate (% school sessions missed) Secondary school (09/10-11/12)
Wales	84	103	434	-	6.6	8.4
Forden	83	**115**	**477**	19	4.3	5.5
Guilsfield	86	110	470	21	5.1	6.9
Llandrinio	**87**	**115**	461	19	4.6	6.7
Trewern	84	112	444	25	5.5	6.6
Welshpool Castle	77	104	400	37	**7.7**	**9.6**
Welshpool Gungrog 1	74	107	399	**38**	7.1	8.2
Welshpool Gungrog 2	75	108	446	27	6.2	6.3
Welshpool Llanerchyddol	79	105	409	31	6.0	8.2

AREA CLASSIFICATION, ECONOMY, SOCIAL AND WELFARE

LSOA Name	2001 Census Area classification	Benefit Claimants Avg. Nov 12 – Oct 13 (number of)		
		Income Support	Disability Living Allowance	Severe Disablement Allowance
Forden	Rural Economies	11	41	11
Guilsfield	Rural Economies	13	104	24
Llandrinio	Farming and Forestry	6	89	11
Trewern	Farming and Forestry	10	74	14
Welshpool Castle	Small Town Communities	**40**	129	30
Welshpool Gungrog 1	Small Town Communities	28	95	30
Welshpool Gungrog 2	Countryside Communities	24	75	23
Welshpool Llanerchyddol	Rural Economies	29	**135**	**38**

SOCIAL AND WELFARE

LSOA Name	Rank (out of 1896)	Welsh Index of Multiple Deprivation 2011								
		Overall	Income	Employment	Health	Education	Access to Services	Housing	Physical Environment	Safety
Forden	Rank	1,605	1,723	1,761	1,847	1,630	**112**	1,276	1,341	1,664
	Decile %	90	100	100	100	90	**10**	70	80	90
Guilsfield	Rank	1,519	1,557	1,673	1,727	1,581	**115**	1,147	1,334	1,816
	Decile %	90	90	90	100	90	**10**	70	80	100
Llandrinio	Rank	1,591	1,632	1,761	1,755	1,583	**163**	999	1,063	1,807
	Decile %	90	90	100	100	90	**10**	60	60	100
Trewern	Rank	1,417	1,356	1,447	1,754	1,323	**162**	1,028	1,611	1,673
	Decile %	80	80	80	100	70	**10**	60	90	90
Welshpool Castle	Rank	471	401	655	805	482	268	538	702	360
	Decile %	30	30	40	50	30	20	30	40	20
Welshpool Gungrog 1	Rank	625	703	708	**168**	821	1,644	821	287	1,119
	Decile %	40	40	40	**10**	50	90	50	20	60
Welshpool Gungrog 2	Rank	1,226	1,145	1,327	1,341	1,003	378	749	800	1,556
	Decile %	70	70	70	80	60	20	40	50	90
Welshpool Llanerchyddol	Rank	1,167	978	1,111	1,289	966	928	489	1,092	793
	Decile %	70	60	60	70	60	50	30	60	50

TRANSPORT

LSOA Name	Average Time in Minutes by Foot or Bus 2011			
	Food shop	GP Surgery	Dentist	Post Office
Forden	47	**60**	49	**36**
Guilsfield	**51**	49	**60**	29
Llandrinio	35	34	39	22
Trewern	38	36	39	21
Welshpool Castle	19	30	20	21
Welshpool Gungrog 1	5	6	11	12
Welshpool Gungrog 2	15	16	24	25
Welshpool Llanerchyddol	9	15	12	13

HEALTH AND CARE

LSOA Name	All-Cause Death Rate (per 100,000 (03-12))	Cancer Incidence Rate (per 100,000 (03-12))	Singleton Low Birth Weights (<2500g (03-12)) (%)	People with Limiting Long Term Illness 2011 (%)
Forden	741	613	2.2	17
Guilsfield	775	182	5.2	19
Llandrinio	734	**693**	3.5	16
Trewern	749	536	3.9	17
Welshpool Castle	1,409	375	**6.6**	24
Welshpool Gungrog 1	**2,841**	639	5.5	22
Welshpool Gungrog 2	947	621	5.9	18
Welshpool Llanerchyddol	841	469	6.2	**25**

SOCIETY

LSOA Name	Welsh Language – Some Skill 2011 (%)	Black & Minority Ethnicity 2011 (%)
Forden	19	0.49
Guilsfield	**25**	0.73
Llandrinio	19	0.59
Trewern	21	0.84
Welshpool Castle	17	1.82
Welshpool Gungrog 1	17	1.40
Welshpool Gungrog 2	20	1.63
Welshpool Llanerchyddol	22	**1.96**

LABOUR MARKET

LSOA Name	Employment Status 2011 Census (%)			Benefit Claimants Avg. Apr-Mar 14 (Number of)
	Full-time	Part-time	Self-employed	Job Seekers Allowance
Forden	70	30	**21**	10
Guilsfield	69	31	19	18
Llandrinio	71	29	18	19
Trewern	68	**32**	16	9
Welshpool Castle	69	31	9	**49**
Welshpool Gungrog 1	**78**	22	5	22
Welshpool Gungrog 2	70	30	10	26
Welshpool Llanerchyddol	71	29	10	22

HOUSING

LSOA Name	Households 2011	Avg. Household Size 2011	Settlement Type
Forden	598	2.36	Rural Village and dispersed in a sparse setting
Guilsfield	1,005	2.31	Rural Village and dispersed in a sparse setting
Llandrinio	867	2.53	Rural Village and dispersed in a sparse setting
Trewern	556	**2.57**	Rural Village and dispersed in a sparse setting
Welshpool Castle	734	2.10	Rural Town and fringe in sparse setting
Welshpool Gungrog 1	555	2.17	Rural Town and fringe in sparse setting
Welshpool Gungrog 2	655	2.32	Rural Town and fringe in sparse setting
Welshpool Llanerchyddol	**1,011**	2.17	Rural Town and fringe in sparse setting

ENERGY AND INDUSTRY – Employment by Industry 2011

LSOA Name	Agriculture, forestry & energy		Manufacturing		Construction		Wholesale & retail trade		Hotels & restaurants		Transport, storage & communication	
Parameter / Unit	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Forden	93	15.4	79	13.1	79	**13.1**	94	15.6	36	6.0	29	4.8
Guilsfield	**131**	13.4	124	12.7	99	10.1	**213**	21.8	48	4.9	69	7.1
Llandrinio	115	12.5	101	11.0	**102**	11.1	177	19.2	54	5.9	64	6.9
Trewern	79	13.6	78	13.4	65	11.1	108	18.5	40	6.9	54	**9.3**
Welshpool Castle	36	6.1	165	28.0	46	7.8	152	**25.8**	**60**	**10.2**	32	5.4
Welshpool Grungrog 1	13	2.7	163	**33.3**	49	10.0	95	19.4	40	8.2	29	5.9
Welshpool Grungrog 2	53	**17.9**	162	24.0	63	9.3	127	18.8	46	6.8	53	7.9
Welshpool Llanerchyddol	36	4.2	**193**	22.7	84	9.9	194	22.9	56	6.6	**72**	8.5

LSOA Name	Finance & business		Public administration		Education		Health & social work		Other community, social & personal services		Totals	
Parameter / Unit	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Forden	94	15.6	37	6.1	62	10.3	80	13.3	30	5.0	713	100
Guilsfield	139	14.2	**61**	**6.3**	92	9.4	125	12.8	**60**	6.1	**1161**	100
Llandrinio	**147**	**15.9**	58	**6.3**	**104**	**11.3**	**139**	15.1	5.7	**6.2**	1118	100
Trewern	60	10.3	29	5.0	70	12.0	90	15.4	27	4.6	700	100
Welshpool Castle	49	8.3	14	1.4	36	6.1	80	13.6	22	3.7	692	100
Welshpool Grungrog 1	51	10.4	14	2.9	35	7.2	64	13.1	26	5.3	579	100
Welshpool Grungrog 2	87	12.9	31	4.6	53	7.9	91	13.5	23	3.4	789	100
Welshpool Llanerchyddol	110	13.0	48	5.7	56	6.6	136	**16.0**	36	4.2	1021	100

ENVIRONMENT

LSOA Name	Area (ha)	Area of Woodland (ha)	Area of Water (ha)	Area of Sites of Specific Interest (ha)	Area of Common Land
Forden	347184	444	34	0	0
Guilsfield	**571802**	**763**	32	29	**206**
Llandrinio	439526	336	**54**	**101**	0
Trewern	320564	374	19	74	197
Welshpool Castle	178975	344	33	8	0
Welshpool Gungrog 1	18160	3	8	1	0
Welshpool Gungrog 2	121998	108	19	12	0
Welshpool Llanerchyddol	69464	56	6	1	0

COMMUNITY SAFETY – Annual Incidence as % of Population

LSOA Name	Police Recorded Crime				Youth Offending Team	Probation Services	Fire Rescue Services
	Violent Crime 2009-11	Burglary 2010-12	Theft 2009-11	Criminal damage 2009-11	Youth Offenders (aged 10-17) 2009-10	Adult Offenders (age 18+) 2009-11	Fire Incidents 2011-13
Forden	0.4	0.7	Not Published	0.2	2.9	0.7	0.2
Guilsfield	0.4	Not Published	Not Published	0.3	1.7	Not Published	Not Published
Llandrinio	Not Published	0.4	0.2	0.2	Not Published	0.9	0.2
Trewern	0.5	0.5	Not Published	Not Published	Not Published	0.9	0.2
Welshpool Castle	**2.8**	**0.8**	**0.3**	**1.2**	**7.5**	**1.6**	**0.4**
Welshpool Gungrog 1	0.9	0.7	0.2	0.4	2.1	1.3	0.2
Welshpool Gungrog 2	0.5	Not Published	Not Published	0.2	2.8	0.7	Not Published
Welshpool Llanerchyddol	1.7	0.4	**0.3**	0.9	5.3	1.3	Not Published

Shropshire Area and IMD Data

KEY FACTS – 2011 Census

Ward Name	Total Population	Area (Ha)	Population Density	Average age	Total households	Total dwellings
Chirbury & Worthen	3,020	12,206	0.2	43.7	1,262	1,349
Llanymynech	4,364	6,334	0.7	45.5	1,687	1,784
Longden	3,997	4,198	1.0	43.5	1,649	1,691
Loton	4,141	12,132	0.3	41.2	1,576	1,640
Rea Valley	4,265	3,497	1.2	43.3	1,787	1,851
Shropshire	-	-	0.96	-	-	-

POPULATION & DIVERSITY– ONS Mid-year estimates for 2015

Age Structure

Ward Name	All ages	Aged 0 - 4		Aged 5 - 19		Aged 20 - 64		Aged 65 - 84		Aged 85 and over	
Parameter/Units	%	No.	%	No.	%	No.	%	No.	%	No.	%
All ages	100	-	6	-	17	-	59	-	15	-	2
Chirbury & Worthen	100	94	3.1	507	16.8	1703	56.4	653	21.6	63	3.1
Llanymynech	100	188	4.4	635	14.9	2,349	55.1	994	23.3	102	2.4
Longden	100	176	4.4	687	17.2	2,170	54.3	859	21.5	104	2.6
Loton	100	190	4.6	803	19.4	2,278	55.0	787	19.0	87	2.1
Rea Valley	100	192	4.5	712	16.7	2,278	53.4	938	22.0	141	3.3
Shropshire	100	-	4.8	-	16.4	-	55.4	-	20.3	-	3.1
England	100	-	6	-	17	-	59.0	-	15.0	-	2.0

Religion (%)

Ward Name	Christian	Buddhist	Hindu	Jewish	Muslim	Sikh	Other religion	No religion	Not stated
Chirbury & Worthen	68.8	0.5	0.0	0.0	0.1	0.0	0.6	22.0	7.9
Llanymynech	72.4	0.1	0.1	0.2	0.2	0.0	0.4	19.1	7.5
Longden	71.4	0.2	0.1	0.0	0.3	0.0	0.4	20.0	7.7
Loton	70.4	0.4	0.0	0.0	0.0	0.1	0.6	21.0	7.4
Rea Valley	71.3	0.1	0.2	0.0	0.1	0.1	0.3	19.6	8.2
Shropshire	68.7	0.3	0.1	0.0	0.3	0.1	0.4	22.8	7.3
England	59.4	0.5	1.5	0.5	5.0	0.8	0.4	24.7	7.2

Ethnicity (%)

Ward Name	White	White: British	Mixed / multiple ethnic groups	Asian / Asian British	Black / African / Caribbean / Black British	Other ethnic group	BME Total
Chirbury & Worthen	99.4	97.2	0.3	0.1	0.1	0.1	0.6
Llanymynech	99.1	97.2	0.5	0.4	0.0	0.0	0.9
Longden	98.5	96.4	0.8	0.4	0.0	0.4	1.6
Loton	97.5	95.9	0.8	1.4	0.3	0.0	2.5
Rea Valley	98.7	96.6	0.2	1.0	0.1	0.0	1.3
Shropshire	98.0	95.4	0.7	1.0	0.2	0.1	2.0
England	85.4	79.8	2.3	7.8	3.5	1.0	14.6

HEALTH – 2011 Census

Health Condition (%)

Ward Name	Very Good Health	Good Health	Fair Health	Bad Health	Very Bad Health	Long Term Limiting Illness
Chirbury & Worthen	49.8	33.7	12.0	3.5	1.0	7.1
Llanymynech	46.9	35.8	12.7	3.6	0.9	7.9
Longden	47.1	35.1	13.0	3.7	1.1	7.7
Loton	50.1	35.4	10.9	3.0	0.7	6.1
Rea Valley	46.3	35.0	13.7	3.8	1.1	9.2
Shropshire	46.5	34.9	13.5	3.9	1.1	8.4
England	47.2	34.2	13.1	4.2	1.2	-

Provision of social care (% of population providing unpaid care)

Ward Name	1 – 19 hours per week	20 – 49 hours per week	More than 50 hours per week
Chirbury & Worthen	9.2	1.7	2.5
Llanymynech	7.9	1.4	3.1
Longden	8.7	1.2	2.5
Loton	8.2	1.3	2.1
Rea Valley	7.4	1.2	2.2
Shropshire	7.5	1.3	2.4
England	6.5	1.4	2.4

QUALIFICATIONS and JOBS – 2011 Census

Qualifications (%)

Ward Name	Level 1	Level 2	Level 3	Level 4/5	Other qualifications	No qualifications
Chirbury & Worthen	15.0	19.0	13.1	32.7	5.6	14.6
Llanymynech	15.8	19.3	14.7	29.6	8.2	12.4
Longden	14.0	18.5	14.7	35.0	6.5	11.3
Loton	15.8	17.9	14.7	32.5	7.4	11.6
Rea Valley	13.8	19.9	14.6	29.2	8.3	14.1
Shropshire	15.4	19.4	14.7	29.4	7.1	14.0
England	15.2	17.2	14.5	29.7	8.6	150

Economic Activity and Unemployment (%)

Ward Name	Economically Inactive	Economically Active	Employed	Self Employed	Unemployed	Job Seekers Allowance
Chirbury & Worthen	19.0	81.0	78.1	24.2	2.9	1.0
Llanymynech	19.4	80.6	77.0	19.5	3.7	0.6
Longden	20.0	80.0	75.9	16.5	4.1	0.9
Loton	18.1	81.9	78.6	21.6	3.3	0.4
Rea Valley	20.0	80.0	76.1	15.2	3.9	0.5
Shropshire	19.9	80.1	75.8	13.5	5.4	1.1
England	-	-	-	-	-	1.8

Employment by Occupation (%)

Ward Name	1	2	3	4	5	6	7	8	9
Chirbury & Worthen	10.7	16.7	9.0	8.8	24.4	8.3	5.2	6.5	10.3
Llanymynech	13.0	15.8	11.3	9.2	17.8	9.9	5.4	7.9	9.8
Longden	12.9	20.2	10.0	8.9	16.4	9.8	5.9	5.7	10.2
Loton	13.1	17.5	10.4	9.5	20.9	9.0	5.1	5.9	8.7
Rea Valley	11.8	15.8	8.7	8.6	16.0	11.7	7.2	8.8	11.4
Shropshire	11.7	15.9	11.3	10.0	15.2	10.1	7.2	7.4	11.3
England	10.9	17.5	12.8	11.5	11.4	9.3	8.4	7.2	11.1

1= Managers, Directors and senior officials

2= Professional occupations

3= Associate professional and technical occupations

4= Administrative occupations

5= Skilled trades occupations

6= Caring, leisure and other service occupations

7= Sales and customer service occupations

8= Process plant and machine operatives

9= Elementary occupations

HOUSING – 2011 Census

Housing Tenure (%)

Ward Name	Owned outright	Privately rented	Social rented	Shared ownership	Owned with a mortgage
Chirbury & Worthen	45.6	16.6	7.2	0.3	27.1
Llanymynech	49.1	8.3	9.1	0.4	31.6
Longden	42.5	8.4	15.1	1.1	30.9
Loton	39.8	13.9	9.3	0.4	34.5
Rea Valley	42.2	10.2	14.7	0.6	30.4
Shropshire	38.6	15.0	13.5	-	-
England	-	-	17.7	-	-

Housing Type (%)

Ward Name	Detached	Semi-detached	Terraced
Chirbury & Worthen	68.3	21.5	6.0
Llanymynech	67.8	23.7	5.2
Longden	52.6	30.5	10.3
Loton	61.0	28.4	5.7
Rea Valley	49.8	32.1	9.3
Shropshire	39.5	33.4	16.8

Housing Composition (%)

Ward Name	Lone person	Lone parent with dependent children	One person pensioner (over 65)	Married couples with dependent children	Co-habiting couples with dependent children
Chirbury & Worthen	25.4	3.2	11.7	17.5	3.5
Llanymynech	23.5	2.5	12.6	16.4	3.9
Longden	26.0	4.1	13.5	16.7	3.5
Loton	20.4	5.3	9.5	19.0	4.0
Rea Valley	27.5	4.5	16.2	17.1	3.5
Shropshire	28.9	5.2	13.9	14.9	4.2
England	30.2	7.1	12.4	12.3	4.1

COMMUNITY SAFETY – ONS 2016

Crime – (rate per 1000 population)

Ward Name	Crime	National Decile ranking (1-10) [where 1 is highest and 10 lowest]
Chirbury & Worthen	22.5	9 and 10
Llanymynech	17.6	9 and 10
Longden	38.5	7, 8 & 9
Loton	29.5	7, 9 & 10
Rea Valley	28.8	7,8 & 9
Shropshire	44.9	-
England	78.4	-

Indices of Multiple Deprivation Crime Domain 2015 includes rates per 1000 population for:

- Violence
- Burglary
- Theft
- Criminal damage

Indices of Multiple Deprivation 2015

Ward Name	National Decile ranking (1-10) [where 1 is highest and 10 lowest]
Chirbury & Worthen	5 & 5
Llanymynech	4, 6 & 7
Longden	5, 7 & 8
Loton	4, 5, 6 & 7
Rea Valley	6, 7 & 8

Indices of Multiple Deprivation designed to identify areas where communities lack resources and are in need. Seven factors are considered, which are:

- Income deprivation
- Employment deprivation
- Health deprivation and disability
- Education deprivation
- Barriers to housing and services
- Crime
- Living environment deprivation