3.0 NEED FOR THE SCHEME AND ALTERNATIVE CONSIDERED

3.1 The Need for the Scheme

3.1.1 The need for the proposed BEC development is described in detail within Section 3.0 of the Planning Statement (PS) which forms Part 3 of the PAD. The conclusions from Section 3.0 of the PS are provided in the following paragraphs.

3.1.2 The need for the proposed BEC development (and the associated benefits arising from the scheme) has been considered in the context of a number of strategic waste policy documents and the current waste management position within the East Midlands region. In addition, it has also been evaluated in terms of national and regional renewable energy policy and need. The assessment has established the following.

National Waste Policy

- Waste Strategy England 2007 sets a number of targets to reduce the quantities of biodegradable municipal solid waste (MSW) and commercial and industrial (C&I) waste sent to landfill. It is accepted within national guidance that the balance of MSW / C&I waste not recycled will need to be managed further down the hierarchy with a preference for energy recovery over disposal.
- Increases in the Landfill Tax regime, introduced in the March 2010 budget, will rapidly increase the need for alternative facilities for the management of MSW and commercial and industrial (C&I) waste to come forward. This fiscal measure is a driver for the achievement of national sustainable waste management targets.
- From a national (and indeed regional and sub-regional) perspective, all relevant extant and emerging policy and strategy documents support the thermal treatment of waste with energy recovery.
- The biodegradable fraction of waste is acknowledged as being a potential source of renewable energy generation and its contribution to the achievement of renewable energy targets is acknowledged in the Government's Energy White Paper (May 2007), Waste Strategy for

England (2007), the UK Renewable Energy Strategy (2009), the Renewable Heat Incentive (November 2011) and the Government Review of Waste Policy in England 2011 (June 2011).

Regional Waste Policy and Position

- The regional position regarding the requirement for residual waste treatment capacity has been assessed, this has established that:
  - The East Midlands Region produces between 8.9 million and 8.5 million tonnes of MSW and C&I waste per annum. Of this circa 4.07 million tonnes currently requires residual waste treatment;
  - There is currently 1,248,003 tonnes of residual capacity in the region. This is a significant shortfall of circa 2.82 million tonnes per annum when compared to the regional requirement;
  - There is a prospect of circa 1.17 million tonnes of capacity within proposed facilities coming forward in the future;
  - In combination, all of the existing and planned capacity would theoretically equate to circa 2.48 million tonnes which is still a shortfall of circa 1.58 million tonnes when compared to the residual waste requiring treatment. Thus, there is not likely to be a future overprovision of capacity and more residual waste treatment infrastructure is required in the East Midlands Region;
  - Whilst there is a prospect of circa 1.17 million tonnes of capacity within proposed facilities coming forward, history would suggest that a number of the facilities that are not proposed in connection with established waste management contracts, or are proposed for planned contracts that have not been let may never ultimately be developed. Accordingly, the capacity shortfall is likely to be far greater than the 1.58 million identified in this assessment.
  - There is only circa 102,250tpa of capacity in relevant facilities that are currently within the planning system in the region. Thus, even if this facility were to obtain planning permission, funding and subsequently be developed there would still be a very considerable shortfall in capacity; and
  - Taking the aforementioned points into account, with a proposed throughput of circa 117,300 tonnes the proposed BEC

development would contribute positively towards the achievement of the additional capacity requirement.

- There are number of other factors and limitations to the delivery of major waste treatment facilities that could further reduce the amount of planned capacity that will be available in the region in the future; and
- Finally, and of very considerable significance to this assessment of need, a number of recent appeal decisions have given **no** weight whatsoever to alternative capacity that is not built and operational. On this basis, it must be concluded that there is currently a clear and demonstrable lack of available and operational capacity in the East Midlands Region to deal with the volume of residual waste requiring management.

County Waste Policy and Position

- An assessment of the figures presented within the WCS indicates that there is between **139,000 and 387,000tp**a of additional energy recovery capacity for C&I waste required within Nottinghamshire and Nottingham. With a planned throughput of circa 117,300tpa the proposed BEC development would make a significant contribution to addressing the identified shortfall of residual waste management capacity.

National Renewable Energy Policy

- The Energy White Paper includes targets which aim to see renewables grow as a proportion of electricity supply to 10% in 2010, with an aspiration for this to rise to 20% in 2020.
- The UK Renewable Energy Strategy promotes investment in renewable energy technology (including the type proposed), in order to meet the EU set target that renewables will constitute 15% of the UK energy mix by 2020. This figure is explicitly a **minimum** target.
- The national policy message on renewable energy, energy security and climate change is both clear and unambiguous. There must be more renewable / low carbon energy and greater security of supply as a national priority.

- There is extensive policy support at the National level for CHP, noting that the proposed BEC development would be fully *'CHP ready'*.

Contribution to National Renewable Energy Need

- Following the on-going revocation of Regional Strategies by the Government and the continued move towards Localism, the achievement or otherwise of the targets within the Regional Plan has become less relevant. Thus, a far greater emphasis is now being placed upon the extent to which of facilities contribute towards the national objective of promoting renewable energy technologies;
- At the end of 2011 the UK was producing 8.7% of electricity form renewables which is still some 1.3% below the target for 2010.
- The production of 8.7% of electricity from renewables is well below the contribution of 30% that the Government consider would be required if the EU binding target of 15% of energy from renewables by 2020 is to be achieved.

Regional Renewable Energy Policy and Position

- Electricity data for the East Midlands Region published by DECC in March 2013 show the most recent total electricity consumption figures as that for 2011. This shows that total electricity consumption in the East Midlands was 20,582GWh. DECC's most recent regional ReSTATs data (for the calendar year of 2012) shows that the total renewables electricity generation in the East Midlands in 2011 was 1,776.2GWh. This equates to **8.63%** of the region's consumption.
- Based on the available DECC data, the East Midlands region is failing in the deployment of renewables and meeting its obligations to contribute to the national renewables targets of 10% by 2010 and 15% by 2020. Furthermore, when considered in light of the government's *'lead scenario'* to achieve the 2020 target, the poor contribution of the region towards 30% of electricity from renewables is even more apparent.
- The proposed BEC development would generate 13.6MW of electricity. Of the electricity generated, it has been assumed that 60% would be

classed as renewable. This would equate to 8.16MW of the electricity generated by the BEC. Based upon 8,000 hours of generation per annum, the proposed BEC development would generate 65,280MWh/yr (65.28GWh/yr) *'net'* of renewable electricity. This would increase the current installed capacity in the region by circa 3.67%.

Climate Change Benefits

- The proposed BEC development would contribute towards the government's climate change objectives and should be afforded some weight in this regard.

Economic Benefits

The economic benefits of the scheme include:

- The creation of circa 46 permanent jobs together with a maximum of 300 temporary jobs during the construction phase (180 on average) of the development. This would include local employment opportunities.
- Opportunities to deliver annual fiscal benefits in the order of £0.40m to NSDC, through the retention of business rates;
- Opportunities to ensure that local residents and businesses have access to the employment and business supply chain opportunities which may emerge;
- Generating electricity from a renewable source;
- Opportunities to create further value in the waste processing chain through the sorting of recyclable materials and the utilisation of process by-products which can be used in other sectors (i.e. slag in the construction sector);
- The potential creation of 57 FTE direct, indirect (local supply chain) and induced jobs in the impact area. These jobs could support around £4.3m of GVA per annum; and
- The economic benefits of the proposed BEC development should not be underestimated (particularly given the prevailing economic climate over the past 5 – 6 years).

3.1.3 In conclusion, there is a clear, demonstrable and overriding need for the proposed BEC development and the benefits it would bring relate to both contributing towards delivering sustainable waste management and combating climate change through renewable energy production. The scheme offers very significant benefits of county and regional significance and in accordance with the identified policy framework these should be afforded very significant positive weight (in planning terms).

3.2 Alternatives Considered

Introduction

3.2.1 The issue of alternatives stems primarily from the Town and Country Planning (Environmental Impact Assessment) Regulations 2011. Schedule 4 of the Regulations identifies the information for inclusion in Environmental Statements. Parts 1 (2) and 2 (4) include: *"An outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for the choice made, taking into account the environmental effects."*

3.2.2 Paragraph 83 of Circular 2/99 which accompanies the Regulations notes that: *"Although the Directive and the Regulations do not expressly require the developer to study alternatives, the nature of certain developments and their location may make the consideration of alternatives a material consideration…."*

3.2.3 In addition to the above NCC have also indicated within their EIA Scoping Opinion of 1st May 2013 that the ES should include an assessment of alternatives and that the following matters should be considered:

- *"The 'do nothing' situation and the benefits that may be derived from the proposed development;*
- *The choice of site: The ES should outline which other sites (if any) have been considered for the development and the reasons why the proposed development has been selected;*
- *The choice of technology: the ES should incorporate a review of the various energy recovery technologies that are available and the reasons for choosing a gasification facility;*

- *Potential for exporting heat: the ES should incorporate an assessment of the potential market for utilising surplus heat from the recovery process in the vicinity of the Bilsthorpe site. If potential markets for heat energy exist, what steps have been taken to secure the use of the heat? Assessments should also be undertaken for the alternative sites considered by the developer to demonstrate that the preferred Bilsthorpe site offers the greatest potential for recovering the most energy from the waste feedstock."*

3.2.4 Whilst the consideration of alternatives is clearly a matter that the Waste Planning Authority considers to merit detailed consideration, it is perhaps important to first clarify the general planning position on this matter before any further assessment is provided.

The General Position with Regard to Alternatives

3.2.5 Except in rare circumstances not here applicable, there is no requirement in planning law or policy for developers to demonstrate that their chosen site or technology is the best and provides the best environmental outcome, or that there are no preferable alternatives. The test is simply whether the proposed BEC development on a particular site is acceptable in its own right, having regard to the development plan and other material considerations.

3.2.6 This position is supported by the Secretary of State in two EfW inquiry decisions, both using the same technology type as the Appeal Proposal. In the Lostock decision (reference: DPI/A0665/11/10), the Secretary of State's decision letter confirms that: *"A number of representations have been made concerning the emphasis in the NPPF on transition to a low carbon economy. One of the core principles at paragraph 17 of the NPPF refers to supporting "the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change, and encourage the reuse of existing resources, including conversion of existing buildings, and encourage the use of renewable resources (for example, by the development of renewable energy)". It is apparent from the NPSs, however, that the kind of technology to be used by the proposed Development is not to be ruled out as contrary to the objectives of developing low carbon energy sources. Whilst it may be true that there are other technologies that may be superior from a purely low*

carbon point of view, it should be noted in response to this and a number of other representations made by objectors that the role of the section 36 process is not to ask whether there is a better way to generate the electricity a proposed generating station will generate, or a possible better use of the proposed Development site, but to consider whether the impacts of the Company's proposal would be (or can be made) acceptable in planning terms. From a carbon emissions point of view, the Secretary of State sees no reason to depart from the analysis and conclusions of the Inspector."

3.2.7 In the same decision, the Inspector (who was supported by the Secretary of State on this matter) stated:

iv) Consideration of Alternative Technology:

16.29 The current guidance in EN-3 (para 2.5.11) states that in decisions on combustion plants such as that proposed, the decision-maker should not be concerned about the type of technology used. Waste policy does not require the consideration of alternative technologies at either national or development plan level and the consideration of alternatives does not form part of the Council's case. The EA, through the EP process, will determine which technologies represent BAT, particularly in respect of abatement technologies, as set out in para 2.5.45 of EN-3. (7.20, 7.48, 10.6, 10.54-56, 11.8)

16.30 The choice of technology is ultimately a commercial decision for the operator and economic and reliability factors are likely to figure heavily in that choice as with this proposal. Whilst some of the alternative technologies have advantages in terms of lower emissions and residual ash, like plasma gasification, it has been demonstrated that generally at this time they have greater problems with efficiency and reliability. Disposal and/or re-use of bottom ash and disposal of APC residue are operational matters which would be covered by the EP. (9.5)

16.31 The technology which has been chosen after consideration of alternatives, including other sources of energy, is tried and tested but could not be said to be outdated. As such, there can be confidence in its reliability and ability to be effectively regulated.

3.2.8 In the Middlewich EfW Facility decision (reference: APP/R0660/A/10/2129865), the Secretary of State disagreed with the

Inspector on the matter of the requirement for the appellant to demonstrate the best overall environmental outcome in paragraph 24 of his decision letter:

24. The Secretary of State does not agree with the Inspector that Article 4(2) of the Waste Framework Directive applies to individual planning decisions (IR573). The Waste Framework Directive transposed in England and Wales through the Waste (England and Wales) Regulations 2011 and through an amendment to Planning Policy Statement 10 (PPS10). Both the first and second stage consultation (CD2/19 and CD2/20) make it clear that transposition of the hierarchy into planning would be through an update to PPS10, a point confirmed by the Chief Planner's letter of 30 March 2011. As a result, the Secretary of State believes that individual waste management proposals should be assessed against planning policy in PPS10 which has incorporated the revised waste hierarchy. Therefore the Secretary of State cannot accept the Inspector's conclusions in IR582 that the proposal would have an unacceptable conflict with this part of the Waste Framework Directive and that it is necessary for the appellant to demonstrate best overall environmental outcome.

3.2.9 A detailed assessment of relevant planning policy and guidance is provided within the Planning Statement contained within Section 3.0 of the Planning Statement (PS) which forms Part 3 of the PAD. Based upon the outcome of that appraisal it is clear that the proposed BEC development is an acceptable development on the application site having regard to the development plan (including the relevant key development criteria in the soon to be adopted WCS) and other relevant material considerations. In light of this, the matters of alternative sites and technologies should not become a relevant determinant in this case.

This Assessment

3.2.10 Notwithstanding the clearly stated position above, should it be found that there is some degree of material conflict between the proposal and the development plan (when considered as a whole) then it may be appropriate to consider alternatives. Consideration of alternatives has been made cognisant of the aforementioned planning position.

3.2.11 With regard to the information that NCC have requested in respect of alternatives it should be noted that:

- This Chapter does not specifically consider the benefits that are derived from the proposed BEC development. These are set out in the Planning statement contained within Section 3.0 of the Planning Statement (PS) which forms Part 3 of the PAD;
- This Chapter does not consider the potential for exporting heat which is provided within the Heat Plan contained within Part 6 of the PAD, thus not repeated again here; and
- The assessment has not sought to demonstrate that the preferred Bilsthorpe site offers the greatest potential for recovering the most energy from the waste feedstock (when compared to other locations) as it is not, as stated above, necessary for the appellant to demonstrate that a best overall environmental outcome, but merely that it is an acceptable / sustainable solution.

3.2.12 In the case of this planning application a number of alternatives have been considered, these are listed below. The following sections provide a summary of each of the alternatives considered.

- Alternative Sites / Locations;
- Alternative Technologies; and
- Alternative Design Solutions.

Alternative Sites / Locations

3.2.13 An assessment of possible alternative sites within Nottinghamshire and Nottingham for the proposed BEC development has been carried out in support of the proposed development and the full Alternative Site Assessment (ASA) report is contained within Appendix 3-1 of this ES.

3.2.14 The objective of the ASA has not been to prove that any specific site is the very best for the proposed development, but rather that the site ultimately selected is acceptable for the proposed use taking into account a range of relevant policy, environmental and technical criteria and other potential sites, evaluated through a structured and consistent process and thus representing one of the most sustainable sites.

3.2.15 The methodology was fixed in advance of undertaking this ASA. The study was carried out in three main stages, each of which had a number of sub-stages.

3.2.16 **Stage One – Site Identification and Short Listing:** The first sub-stage commenced with a site identification process. This process identified a total of 483 sites, however desk-top research concluded that 34 of which met the minimum site size threshold and were carried through to the *'high level'* assessment. The second sub-stage involved appraising the suitability of the sites against *'high level'* assessment criteria. This process led to 8 sites being carried forward to the final sub-stage. The final sub-stage involved an interim commercial check and this process led to 5 sites being carried forward to Stage Two.

3.2.17 **Stage Two – Evaluation and Categorisation:** the first sub-stage comprised of a further desk-top evaluation of the remaining 5 sites. This process resulted in 3 of the sites being subjected to the second sub-stage which comprised of site visits and evaluation against a range of planning, environmental and technical criteria. Having undertaken the site visits and evaluation the sites were categorised in accordance with the methodology. The appraisal work for the remaining 3 sites was recorded on pro-formas.

3.2.18 **Stage Three – Commercial Availability and Final Evaluation:** The commercial availability assessment identified that 1 of the 3 remaining sites was unviable. The 2 remaining sites are:

- Site ref 5: Oddicroft Lane, off Penny Emma Way, Kirkby-in-Ashfield; and
- Site ref 16: Bilsthorpe Business Park, Bilsthorpe.

3.2.19 Given the outcome of the assessment, it can be concluded that both sites are the subject of a few environmental / technical constraints and commercially available. In this context, it must be noted that it has not been possible to confirm from the land agent whether the site at Oddicroft Lane is available for the proposed development, but in the absence of a response, it has been assumed that it would. Clearly, if a response to the contrary is received only the site at Bilsthorpe Business Park would be considered suitable and available for the proposed development.

3.2.20 Further to the above, whilst the aim of the assessment has only been to establish a range of sites that are suitable for the proposed development, it must be noted that having regard to the pro-formas, from the Stage Two evaluation process, the site at Bilsthorpe Business Park does, on balance, have less potentially significant environmental and technical constraints to its development. Accordingly, it is therefore more likely to deliver the best environmental outcome.

Alternative Technologies

3.2.21 With regard to technology choice, as stated previously, there is no requirement in planning law or policy for developers to demonstrate that their technology is the most suitable or whether there are other preferable options. The position regarding technology choice is supported by numerous national policy and guidance documents which are summarised below.

3.2.22 In June 2011, DEFRA published the Government Review of Waste Policy in England. The regulatory system identified within the Review is largely reliant upon voluntary targets and incentives as the primary means of cutting waste and encouraging recycling. Significantly, the Government has pledged to remove barriers to the rollout of energy from waste technologies, and produce a guide to energy from waste to help stakeholders and investors make decisions best suited to the specific requirements of an area: *"While remaining technology neutral, we will look to identify and communicate the full range of recovery technologies available and their relative merits - right fuel, right place and right time. The Government will also provide the necessary framework to address market failures and ensure the correct blend of incentives is in place to support the development of recovery infrastructure as a renewable source."* (Paragraph 22)

3.2.23 The issue of national policy remaining technology neutral is expressly emphasised in Paragraph 23 of the Review and the energy recovery summary on Page 62. The latter states the Government will: "*provide the necessary framework to address market failures in delivering the most sustainable solutions, while remaining technology neutral.*"

3.2.24 The issue of technology choice is also referenced in the National Policy Statements (NPS):

- EN-1 Overarching Energy NPS:
  - Paragraph 3.1.2 (extract): *It is for industry to propose new energy infrastructure projects within the strategic framework set by Government. The Government does not consider it appropriate for planning policy to set targets for or limits on different technologies.*
  - Paragraph 3.3.5 (extract): *There are likely to be advantages to the UK of maintaining a diverse range of energy sources so that we are not overly reliant on any one technology (avoiding dependency on a particular fuel or technology type).*
  - Paragraph 3.3.6 (extract): *Within the strategic framework established by the Government it is for industry to propose the specific types of developments that they assess to be viable. This is the nature of a market-based energy system.*
- EN-3 Renewable Energy Infrastructure NPS paragraph 2.5.11 (extract): *Waste and biomass combustion plant covered by this NPS may include a range of different combustion technologies, including grate combustion, fluidised bed combustion, gasification and pyrolysis. The IPC should not be concerned about the type of technology used.*

3.2.25 Waste Strategy England 2007 follows a similar theme, and in the context of providing express support for anaerobic digestion states at Chapter 5, Paragraph 25 (extract): *"…the Government does not generally think it appropriate to express a preference for one technology over another, since local circumstances differ so much."*

3.2.26 The issue of a preference for anaerobic digestion is a point made repeatedly by opponents to EfW. Thus, it should be noted that Lord Henley, the Waste and Recycling Minister stated (on a visit to SITA UK's materials recycling facility in West Sleekburn in Northumberland on 17th August 2010): *"I think there are many occasions where incineration is going to be the preferred route over anything else because it is the only route. But, where appropriate, anaerobic digestion is a good thing to do. But one must not begin to think it's the only option, because it is only an option for food waste."*

3.2.27 The same point was made by the Coalition Government in the DEFRA and WAG 2nd stage consultation on the transposition of the rWFD (July 2010) – a proposals in respect of the Waste Hierarchy. This states: *"Although DEFRA and DECC are keen to see a greater uptake of Anaerobic Digestion, source segregated food waste is the optimal feedstock, not mixed residual waste."* (Page 50)

3.2.28 In addition, the Review of Waste Policy in England 2011 deals with anaerobic digestion in paragraphs 220 to 227. Paragraph 220 (extract) states: *"Anaerobic digestion can play an important role as a means of dealing with food waste…"* The Review makes no reference to it being deployed for the treatment of any other part of the MSW or C&I waste streams, referring only to animal wastes as another feedstock.

3.2.29 Furthermore, and as discussed in the introduction to this sub-section, the matter of technology choice has also been discussed in recent appeal decisions including the Lostock EfW Facility appeal.

3.2.30 This proposal is being put forward by PEMUKL and BWL on behalf of a specific technology provider (Waste2Tricity) and in light of the foregoing; it is not considered necessary to assess the proposals against alternative technologies. Notwithstanding, it is recognised that all of the potential residual waste treatment technologies do have their pros and cons. The particular merits associated with the chosen technology solution for the proposed BEC development are summarised below:

- The proposed front-end MRF would ensure that the processing of waste follows the waste hierarchy, allowing recycling to occur before recovery or disposal. Treatment of the waste in a MRF plant prior to sending it to the Gasification Facility ensures that the level of recycling achieved at the proposed BEC development is maximised;
- For facilities with a throughput like the proposed BEC development advanced thermal treatment facilities (like the proposed plasma Gasification Facility) are often the most cost effective option;
- With the proposed throughput, advanced thermal treatment facilities are often far more efficient than the alternatives, which is reflected to a

degree that the proposed development would accord with the R1 calculation as a recovery facility;

- The gasification technology not only allows for the generation of electricity and heat through the combustion of syngas in ICEs, it is also flexible in terms of also being able to be used in the formulation of biofuels or hydrogen for use in alkaline fuel cells; and
- The by-products of the process can be put to more beneficial uses than some alternatives and thus contribute towards a reduction in residues that must be sent to landfill.

Alternative Design Solutions

3.2.31 With regard to alternative design solutions, prior to selecting the current proposals for the proposed BEC development a number of design options were developed. The alternative design options considered can be categorised under the headings of alternative site layout and alternative building design. A full assessment of these options is set out in detail within the Design and Access Statement which accompanies the planning application (see Part 2 of the PAD) and is discussed below.

Site Layout

3.2.32 As a result of the shape of the application site (broadly rectangular) the principle of a linear building arrangement was established at an early stage of the concept layout design process. In addition, the layout of the individual building elements (i.e. reception area, MRF, the gasifier, syngas processing and power generation area) was dictated by process flow requirements. As a consequence, no significant alternative layout options were considered.

3.2.33 It was established early within the development of the concept layout that the gasification element of the proposed development and associated infrastructure should be located within the northern part of the site and the MRF and reception building within the south. This orientation was developed on the basis that the tallest elements of the proposed development (the gasifier and the exhaust stacks / flare stack associated with the power generation process) would be located more centrally within Bilsthorpe Business Park and in a location which benefits to a greater extent from the

visual screening afforded by the landscaped former colliery tips which surround the Business Park.

3.2.34 One of the key issues when formulating the layout of the proposed BEC development was the presence of two mine shafts associated with the former colliery within the site boundary. Whilst both of the mine shafts have been capped, it was established that if any development was proposed over them that would have a significant weight loading (heavy building / process equipment), it would be necessary to implement a costly construction solution to ensure building stability. As a consequence, a primary consideration when formulating the layout was to avoid any buildings being above or within a set radius of the shafts. It was determined that roads could be developed over the shafts as this would not generate the same loadings as the buildings / process equipment.

3.2.35 Early concept layouts experimented with a site access located towards the south eastern corner of site, due in part to the ability for vehicles to access the MRF. However, due to the need to cater for vehicle manoeuvring space this layout resulted in a significant area of wasted space. A further access options were also considered from the centre of the sites eastern boundary but these were also not found to provide adequate vehicle circulation around the site.

3.2.36 From the concept layouts the main layout of the MRF and gasification buildings emerged. This layout rationalised the built from by grouping shared process / building elements the development of a one-way circulation system with access from the northern boundary.

3.2.37 This approach was further refined to take account of other technical and environmental considerations that have arisen as a result of environmental assessment work, including the former mine shafts (referenced above), the requirement for a surface water attenuation feature within the north of the site, a desire to minimise the overall visual effects of the effluent treatment facility and other tanks / equipment that are not required to be located within a building.

3.2.38 The final layout takes involved the grouping of the main effluent treatment tanks between the buildings in order to screen them to some extent and provide the most preferable operational location within the proposed BEC development. In addition, the final designs introduced elements of landscaping and a surface water attenuation / biodiversity enhancement area. The surface water attenuation feature and associated landscaping has been provided to the north of the site adjacent to the proposed entrance to provide a more attractive frontage to the proposal when viewed from other businesses / users of the Business Park.

3.2.39 It is considered that the final layout takes full account of the environmental constraints associated with the site and the operation of the proposed BEC development including the desire to minimise its overall landscape / visual impacts.

Building Design

3.2.40 In parallel to the evolution of the site layout a review of alternative architectural design solutions were explored. Whilst the scale and mass of the buildings is dictated by the plant and equipment proposed to be housed within the buildings, pre-application dialogue with NCC confirmed that the visual aspects of the proposed BEC development are likely to be an important consideration during the determination of the application. Thus, from the outset the design team were conscious of the sites setting and the challenge of developing an architectural solution that would most appropriately mitigate the visual impact of the proposed BEC development.

3.2.41 The original concept design requirements were based upon information provided by the technology provider regarding the potential height and scale of internal process equipment and this included a worst case design height of circa 40 – 42m high gasification building. However, following further consideration of the equipment and in light of pre-application discussions with NCC, it was possible to develop an internal equipment solution that only required a 31.8m high building.

3.2.42 The option of a single or multi-height gasification building was also considered alongside the potential to introduce a curved roof or other

architectural feature (i.e. a curved band / hood which visually wraps over the gasification building). Whilst the curved roof introduced an interesting design feature, it meant that the height of the gasification building would be much larger than it actually needed to be and therefore a flat multi-height roof solution combined with an appropriate building layout arrangement (discussed above) was considered to represent the most suitable design, especially considering the pre-application dialogue with NCC.

3.2.43 As identified above, one of the main building design principles was grouping elements of the proposed BEC development together to create two main buildings / zones of function. This process also considered the option of introducing a louvered structure around the external tanks. However, this was dismissed due to maintenance and operational requirements

3.2.44 Due to the mass and scale of the buildings, to prevent them from appearing cumbersome and bulky, several options where considered to break up the overall elevation. Options included the introduction of a series of boxed elements (clad in a range of materials), the use of corrugated cladding, vertical or horizontal colours (including blocking) and the gradual use of colour (dark to light). A number of colour options were considered in the design of the proposed BEC development and the final colour scheme was adopted on the basis that the muted earth tones or greys and browns would help the design to fit in with the natural site context and surrounding landscape.

3.2.45 The use of boxed elements (clad in a range of materials) and horizontal block colour is considered to reduce the overall visual appearance of the built development, whilst also ensuring that both the gasification and MRF buildings share the same architectural language emphasising that they are both part of the same development.

3.2.46 In addition to the above, the height of the stacks was determined through modelling the dispersion of exhaust emissions at different stack heights. A series of models were developed in order to identify the stack height required. The models identified that a height of 60m would achieve the required emissions dispersion, taking account of average wind speeds, prevailing wind direction, local topography and the presence of other features (i.e. the wind

turbines). Further detail of the air quality modelling is provided in Chapter 13.0 and Appendix 13-1 of this ES.

3.2.47 During the design of the proposed BEC development, it was also confirmed following noise modelling that the gas engines would need to be incorporated within the building or enclosure to ensure that the effects of this were fully mitigated. This resulted in their inclusion in a low level building on the western side of the Gasification Facility.