

## 5.0 Conclusions

- 5.1 The proposal site is a greenfield site in the urban fringe not allocated for any form of development within the WLP; indeed, it is specifically protected against built development and allocated as part of the Green Network in the east of the Telford urban area. It is in or capable of beneficial agricultural or other countryside use and has clear and strong amenity, recreation and landscape value, especially in the longer term. There is a policy presumption in favour of preserving the Green Network (*WLP Saved Policy OL3*) and the proposed EfW does not meet any of the criteria established within the Local Plan that might justify the release of land within the Green Network for development (*WLP Saved Policy OL4*).
- 5.2 Notwithstanding the prematurity of the submission of the planning application, it is considered that the site itself is wholly unsuitable for the development of a permanent waste management facility of this size and effect. Indeed, there is no clarity that the proposal is either a suitable or best practicable means of contributing to local waste management needs.
- 5.3 EfW as a waste management option in principle is more acceptable than landfill as it is higher up the waste hierarchy. It should, however, form part of a combined waste management strategy which prioritises options further up the hierarchy and only resorts to incineration (and landfill) once these options have been exhausted. It should also be noted that there are different types of EfW technology, some of which (as has been discussed in EfW cases elsewhere) are more advanced and are more preferable to traditional waste incinerators such as that proposed at Granville as they are cleaner, less polluting, smaller scale and more similar in nature to general industrial land uses.
- 5.4 Benefits of co-location can arise where waste management facilities (i.e. recycling, composting, energy recovery and landfill) are located adjacent to each other or form part of a single operation, however there are no demonstrated co-location benefits at the Granville EfW site.
- 5.5 The adjacent Granville landfill site has a temporary planning permission which lapses in 2025. Whilst this could be active for some 15 years going forward whilst an EfW were operational this must be considered against the restoration of the site which, within 15-17 years, should be restored to open countryside with significant public access in accordance with the Council's long term countryside/recreation aims for this area of Telford. If the

EfW facility were developed this would thereafter remain permanently as an uncharacteristic and intrusive development in the local and wider open landscape.

- 5.6 It is potentially the case that the adjacent permanent CRS will be removed following the development of a new facility at Hortonwood and following the review of all CRSs within Telford that is currently being undertaken. In any event, even if it were to remain, this facility is small in comparison to the proposed EfW and the planning balance should consider the site as an open land resource within the protected Green Network and, following the cessation of the landfill, its future as a public recreation asset with strong links to Granville Country Park.
- 5.7 The proposal also does not allow for pre-incineration sorting and minimisation of waste that can be dealt with further up the waste hierarchy. This undermines the PPS10 requirement that *"the envisaged facility will not undermine the waste planning strategy through prejudicing movement up the waste hierarchy"* (Paragraph 25).
- 5.8 A benefit of EfW as a waste management option is its creation of energy by providing heat and electricity outputs. This application, however, does not include proposals for the export of the heat generated to any industrial or other user.
- 5.9 There is sufficient capacity within local and regional waste management facilities to allow the Council time to undertake a full and robust appraisal of the various waste management options open to them and to produce a waste management strategy to meet future requirements. It therefore cannot currently be proven that the proposed EfW facility is *'the right type', 'in the right place', or 'at the right time'*, as required by PPS10 (Paragraph 2).
- 5.10 Other than isolated residential buildings to the west and the crematorium to the south, the nearest buildings are on Donnington Wood Industrial Estate. These are large industrial buildings but should not justify this facility within the Green Network. Unlike the current proposal, they are on allocated industrial land and not on an elevated site that is visible from a number of sensitive viewpoints such as the neighbouring golf course.
- 5.11 There is acknowledged significant development pressure on land within the urban fringe (*WMRSS1 Paragraph 8.25*) and the EfW facility would increase this, forming an island of built development separate within the Green Network isolated from

the built up areas of Telford. It is further not justified in terms of exceptions in the Development Plan. This could increase pressure from other forms of development for the release of further Green Network land and would undermine the spatial strategy for the future direction of development in Telford as provided within the Development Plan.

- 5.12 Based on an initial assessment of alternative sites available, it is evident that there are a number of sites that are significantly preferable to the release of the Granville site for the proposed development. There are currently over 200 hectares of vacant employment land within the Borough, a large proportion of which is within established and expanding industrial estates on land that has been allocated within the adopted Local Plan for employment uses. Planning policy favours the development of waste management facilities within such employment/industrial areas, as stated in PPS10 (*paragraph 20*) and the WMRSS2 (*Policy W5 and paragraph 8.91*).
- 5.13 For example, there are vacant allocated employment sites within Donnington Wood Business Park which would be able to accommodate the proposed development, notably land adjacent to the Dairy which appears to comprise a prepared development plateau that could well be appropriate for a waste management facility and employ waste heat in the immediately adjacent Dairy building use. Adjacent land to this site has the potential for co-location with an EfW (if this were determined after due consideration to be the suitable choice of waste disposal facility) for development for other forms of waste reduction and recycling.
- 5.14 There are also vacant allocated employment sites within Hortonwood Industrial Estate. Surrounding land uses are appropriate for a waste management facility, the Industrial Estate has excellent road links and a Rail Freight Terminal has been developed adjacent to the estate making it highly accessible in rail terms. Whilst it is understood that most waste entering the facility would arrive by road, the rail freight terminal could be particularly beneficial for the transport of bottom ash and fly ash away from the site.
- 5.15 The 'old' site that was formerly allocated for the rail freight terminal within Halesfield Industrial Estate also remains vacant. This has excellent road links to the M54 and would also provide an appropriate alternative location for a waste management facility.
- 5.16 **Based on the above analysis, it is therefore evident that:**

- The proposed Granville EfW site is located within the protected and allocated Green Network of Telford and the proposed use would be contrary to Development Plan policy;
- The proposed EfW facility does not meet the criteria that would justify the release of Green Network land;
- There are no demonstrated advantages of co-location with the Granville Landfill site or CRS;
- Releasing Green Network land for an EfW facility would increase pressure for the release of further Green Network land in the urban fringe;
- The planning application is premature in that it would serve to undermine the consideration of a robust and tested waste management strategy;
- In the absence of integrated pre-treatment facilities to reduce and recycle waste and also without the demonstrated use of the waste incineration product of heat, the proposals do not raise the disposal of waste significantly up the waste hierarchy;
- The length of time for restoration of the adjacent Granville landfill site could be affected and has not been assessed;
- The EfW facility would on a permanent basis alter the character of the urban fringe countryside and recreational area detrimentally;
- There are vacant, available and significantly preferable alternative sites that could accommodate an EfW or other form of waste management facility elsewhere within the Telford area;
- There is no substantial urgency for releasing the land in the proposed location for the development; and
- There are no overriding reasons why Development Plan policy should not be followed

5.17 If the Council were minded to refuse the planning application, there is a justifiable basis for the refusal.

5.18 Following a short-term vision of considering the proposed waste management option (which may or may not be part of the future strategy) would be to pre-empt the content of the future Revised LDF.

5.19 It is therefore considered that the right way forward would be to avoid approval of the application until a revised Core Strategy is in place which would include generic overarching waste policies. This would be supported by an approved and adopted Minerals and Waste DPD providing more detailed policies on waste issues. This option would enable the application to be assessed against a publicly-agreed strategy that identifies the local waste management needs of the Borough of Telford & Wrekin within the local and regional capacity context.

5.20

Such delay would have no material effect on overall waste management and treatment planning and could ensure an optimal solution based on full understanding of needs and alternative opportunities.

- 5.1 The application proposes the diversion of approximately 62,000te/a of wastes from landfill by utilising direct combustion Energy from Waste technology. Energy from waste is above landfill in the waste hierarchy and in that respect the application is in accordance with the Waste Strategy for England.
- 5.2 The need for alternative methods for diverting residual waste from landfill is not disputed, nor is the potential role of Energy from Waste as part of an integrated waste management strategy dismissed. However, the selection of a single Energy from Waste facility for the current residual municipal waste arisings is not considered the most sustainable option. It does not maximise techniques higher up the waste hierarchy such as recycling or biological treatment. In developing a long term strategy for municipal waste management, it will first be necessary to determine the options available utilising existing or planned treatment capacity and having regard to maximising options higher up the waste hierarchy.
- 5.3 The adoption of a municipal waste strategy based on single technology solutions brought forward by "ad hoc" or "stop gap" development proposals such as the current one is likely to lead to inflexible solutions that are detrimental to the promotion of options towards the top of the hierarchy, in particular recycling and anaerobic digestion. Any strategy or proposals based on seeking to maximise waste reduction and recycling would be undermined by a single technology solution such as the current EfW proposal at Granville.
- 5.4 There are no demonstrated advantages of co-location of the proposal with adjacent Granville landfill site or CRC. In any event, the landfill is temporary until 2025. Further, the propensity for failing to restore the landfill in accordance with the timescale in its March 2008 planning permission exists by reason of diversion of wastes to the EfW facility. This has not been considered in the ES.
- 5.5 Whilst the utilisation of treatment facilities outside of the Borough could be seen as less sustainable on the basis of proximity in comparison with the proposed development, the utilisation of surplus capacity can be seen to be more sustainable in maximising energy recovery or treatment capacity at those facilities, thus making them more viable. Once the capacity of existing or permitted facilities is taken into account, the optimum waste management strategy can be determined. There is likely to be substantial spare capacity for waste disposal in the region existing or coming on stream in the next few years. Further, the requirements for waste disposal capacity in terms of volume of waste arisings has been significantly overestimated in the recent past as the volume of waste reduction and recycling has been underestimated.

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- 5.6 The application proposal must be considered against Government waste management policy, in particular the waste management hierarchy. The current proposal has no capacity for removing materials from the waste stream for management by methods higher up the waste hierarchy, such as recycling or biological treatment.
- 5.7 Alternative technologies are available and becoming more widely used in the UK, both for municipal waste and commercial and industrial wastes. The argument that those technologies are at the research and development stage and do not represent viable options is being dispelled by the development on a commercial scale of those types of waste management facilities within the West Midlands Region, such as the proposed large MBT plant in Warwickshire and gasification plants with resource recycling elsewhere in the UK, including by the Applicant Company in Avonmouth, Derby, Sheepbridge and Dagenham.

## Section 5 Discussion and Conclusions

- 5.1 Following on from EDP's review of the landscape planning context, the ES and our own field appraisals the following conclusions can be drawn:

### **Landscape Matters as Addressed in the Environmental Statement**

- 5.2 SLR's methodology and fieldwork is substantially compliant with the '*Guidelines for Landscape and Visual Impact Assessments*' which landscape practitioners use as a reference document for the preparation of ES material. EDP does have a number of reservations about the landscape chapter of the ES:
- The photographs used as a basis for the assessment have not been taken on a clear day; some of the photomontages of the development do not illustrate the scheme in wintertime circumstances, so it is doubtful that the material within the ES illustrates the scheme at its most visible. There is a risk therefore that SLR have underestimated the potential visual impacts of the scheme;
  - SLR have failed adequately to define clear thresholds between one level of impact and another, so there is some opacity regarding the degree to which the magnitude and sensitivity to change is defined;
  - The conclusions regarding the impact of the scheme on landscape character fail adequately to acknowledge the substantial change which the site and its immediate surroundings will undergo in the medium term as the operational life of the landfill comes to an end and is restored in accordance with the restoration proposals;

- Viewpoints within the urban areas are under-represented in the assessment; some selected viewpoints do not fully illustrate the impact of the proposals; and
  - The landscape chapter of the ES do not provide an adequate assessment of potential night time effects of the proposal.
- 5.3 These issues do not individually comprise 'fatal flaws' in the ES but rather, leave the reader unclear about the true visual effects of the proposal and their significance in landscape terms. EDP suspects that the SLR conclusion that the "*Visual impact of the proposed development would be widespread...although in most cases the level of impact would be very low*" underestimates the magnitude and significance of the impacts likely to be experienced.

#### **Compliance with Policy**

##### Green Network

- 5.4 The Green Network (protected by saved policies OL3 and OL4 of the WLP), of which the site forms part, remains a coherent structure to the east of Telford unlike other parts of the Network which have become fragmented. This is for good reason; the nearby Granville Country Park and Shropshire Golf Club, both of which also lie within the Network are important open space and recreational areas. Other land surrounding the application site is characterised by a wildlife site to the north and west of the site and two scheduled ancient monuments close by. The Green Network in this area '*feels*' more rural than urban and accentuates the sense that the site lies not within the urban area, but in a rural fringe location. This sense is presently dispelled only by the operational landfill site which is the only parcel of land in the area not to have been designated as part of the Green Network.
- 5.5 Even here, in due course, the approved land reclamation scheme will create an informal/semi-natural appearance through the planting of broadleaved woodland, scrub, reedbeds and grassland, all bisected by footpaths connecting the area to the Country Park and golf course. When restored, the landfill site will return to a use

compatible with the purposes of the Green Network at which time, it may be appropriate to consider including the restored landfill site within the Green Network to unify it this side of the town.

- 5.6 The importance of incidental open spaces to the fabric of towns, particularly their interface with rural areas, is acknowledged at all levels of policy:
- Policy P20 of the JSP was not saved but addressed the need to identify and protect a network of open space within the defined built up areas;
  - More recently Policy QE4 of the WMRSS '*Greenery, Urban Greenspace and Public Spaces*' endorses the identification of urban green spaces. Policy QE4 states that development plan policies should ensure that adequate protection is given to urban green spaces; and
  - As such, policy QE4 directly underpins and endorses saved policies OL3 and OL4 of the WLP which protect the Green Network and provides control of development within it.
- 5.7 To comply with policy OL4 '*Development In the Green Network*' development proposals must comply with three criteria:
- There must be exceptional circumstances;
  - The development must be complimentary to the aims of the Network; and
  - There must be environmental and community benefits as part of the proposal.
- 5.8 It is beyond the remit of this report to determine whether 'exceptional' circumstances exist; certainly in landscape terms, given the availability of so much allocated employment land on sites less sensitive in landscape terms than the application site, it seems improbable that such circumstances exist in landscape terms. Although the applicants propose a visitor centre (thus meeting the third of the above tests), the proposals do not meet any of the six

aims of the Green Network defined at para 8.2.12 of the WLP. The proposed development therefore fails at least one and probably two of the three tests for permitted development in the Green Network.

- 5.9 Policy OL4 does permit exceptions, including "*solar panels and other renewable forms of energy production*". Even if energy from waste fulfils the definition of a 'renewable energy' source, such exceptions must still be '*restricted to predominantly open land uses*' (para 8.3.14 of the WLP) and '*Any proposal must also be of a sensitive design and layout*' (para 8.3.17).
- 5.10 Having regard to all these matters, our conclusion is that the proposed development :
- Does not meet the tests for development to be permitted in the Green Network and is therefore not compliant with saved policy OL4 of the TWLP;
  - Is not consistent with the six aims of the Green Network set out at para 8.2.12 and is therefore not in accordance with saved Policy OL3 of the TWLP; and therefore
  - Is not in accordance with Policy QE4 of the WMRSS which encourages LPAs to develop and protect urban open space such as Telford's Green Network.

The Siting of Proposals for Waste Management : Landscape Considerations

- 5.11 Relevant policy related to the siting of waste management proposals includes saved Policy P67 of the JSP and saved Policy NR1 of the WLP – both of which permit the siting of waste management proposals where it can be demonstrated that the proposal will not have unacceptable adverse impacts on interests of acknowledged importance. In the case of P67, such interests include '*landscape character*' while in the case of NR1 the requirement is to accord with other policies in the Plan regarding Countryside and Open Land and the Historic Environment'. The Open Land policies have not been

saved, but taken collectively, it is clear that any waste management proposal must demonstrate that there will be no unacceptable adverse impacts on the landscape.

- 5.12 As noted in Section 3, the site lies in a commanding position on elevated land to the north-east of the town. As such, development of the scale and mass proposed has the potential to affect both the setting of the town and the character of the wider rural landscape.
- 5.13 Various references provide an insight into the level of sensitivity which should be attached to development in this location. Some are from policies which are not saved and to which therefore no 'weight' can now be attached, in the planning balance; they are nonetheless helpful contextual references which add to our understanding of the Council's priorities and objectives past and present:
- Paragraph 8.2.7 of the WLP states that "*The Council does not want to see the edges of the town eroded or spoilt and has therefore undertaken landscape appraisals of Telford's urban fringe*". EDP has not been able to obtain these (now rather dated) assessments but the paragraph continues to state that "*The north east (of the town) includes the attractive and sensitive landscape between Telford and Lilleshall with a mixture of future housing development, Granville Country Park and recreational uses*";
  - The assessment of housing capacity around the fringes of Telford undertaken for TWC by White Consultants in May 2009 concludes of potential land in the vicinity of the proposed EFW scheme "*the site has no capacity for housing as it is a rural use away from the settlement edge. The tip and pylons are no justification for housing development nearby*";
  - The wider landscape to the east of Telford is identified in the Shropshire Landscape Typology as an area for 'repair' of the landscape;

- Policy P42 of the JSP has not been saved but highlighted the importance attached to the conservation of the landscape around the edges of towns. It stated "*The countryside around towns has a particular importance and will be subject to management initiatives that will secure its visual enhancement and its use for access, wildlife, open space....having regard to the setting and character of the town*";
- EDP's own field appraisals confirm that the proposed EfW site occupies a commanding location; development here would be visible from across wide areas within the town, the Green Network and landscapes to the north of the town. While similar large buildings do exist nearby, comparisons need to be carefully made and one could not justify a building of the mass of the EfW scheme on the grounds of the deemed acceptability of the nearby Donnington Wood Business Park buildings This is because:
  - The Business Park buildings are on land that is significantly lower than the application site meaning that they are not seen as a skyline feature in the same way as will the EfW proposals;
  - The Business Park buildings are closer to and better integrated with the urban area rather than separated from it by the open land of the Green Network; and
  - In planning (rather than landscape) terms of course, the Business Park buildings were built on allocated employment land rather than in the Green Network and so fell to be tested against a wholly different set of planning criteria.
- Para 16.35 of the JSP – the supporting text to saved policy P67 states "*Telford and Wrekin have a range of international, national and locally sensitive sites or areas of wildlife, landscape, historical, archaeological or geological importance. If a more sustainable approach to waste management is to be achieved such sites and*

*species need to be properly protected"* (EDP underlining). The *'locally sensitive sites'* would include Telford's Green Network.

- 5.14 Taken collectively, these references suggest that there are indeed 'interests of acknowledged importance' in landscape terms which would be harmed by the siting of an EfW plant in this location. Coupled with the findings of our own landscape appraisals these references lead EDP to conclude that the location of the proposed development is not compliant with the requirements of saved policy P67 of the JSP nor with the requirements of Policy NR 1 of the WLP.

#### Impacts on Designated Landscapes

- 5.15 As noted above in para. 2.10 there are not considered to be any adverse impacts on the Shropshire Hills AONB.
- 5.16 There are locations within the Strine Levels from which the site and the development proposed will be clearly visible. EDP's view is that the ES has underestimated the significance of views from the Strine Levels. However, due primarily to the considerable distance between the viewer and the development, we are satisfied that any effects on the character and visual amenity of the Strine Levels will not amount to a 'significant effect' in landscape terms (i.e. one which as a result of the sensitivity of the viewer combined with the likely magnitude of change experienced, gives rise to an effect of 'moderate/substantial' impacts or greater as defined in the ES matrices). The development is therefore not considered to offend policies OL2 of the WLP or CS12 of the Core Strategy.

#### **Conclusions**

- 5.17 Having completed a review of the relevant planning context, the applicant's Environmental Statement (with particular regard to Chapter 7 'Landscape and Views') and undertaken our own field studies, EDP's overall conclusions are:
- That the development would yield greater impacts than predicted in the ES. These impacts are not consistent with the aims of the designated Green Network (saved Policy OL3 of the

WLP) of which the site forms part and are not compliant with the requirements for development within the Green Network (saved policy OL4);

- Based on the work we have conducted to date, we believe that the development does not offend the aims of saved policy OL2 , which protects designated landscapes such as the Shropshire Hills AONB and the Strine Levels ASLC;
- However, by virtue of its commanding location in an elevated location on the interface between the town and the rural landscape, the proposed development does not comply with the provisions of saved Policy P67 of the JSP and saved Policy NR1 of the WLP, both of which require that proposals for waste management should not yield unacceptable impacts on interests of acknowledged importance, including landscape character.

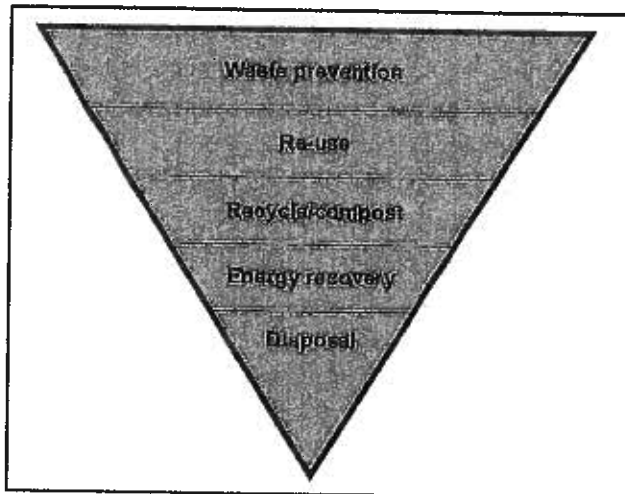
*The Environmental Dimension Partnership, November 2009*

## APPENDICES

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### A1.1 Introduction

The Waste Strategy for England 2007 sets out the waste hierarchy, with the preferred method of managing waste, waste prevention, at the top, and least preferred, disposal at the bottom.



The Strategy sets a target to reduce the amount of household waste not re-used, recycled or composted from over 22.2 million tonnes in 2000 by 29% to 15.8 million tonnes in 2010 with an aspiration to reduce it to 12.2 million tonnes in 2020, a reduction of 45%.

The Strategy sets a target for:

- recycling and composting of household waste to at least 40% by 2010, 45% by 2015 and 50% by 2020; and
- recovery of municipal waste to 53% by 2010, 67% by 2015 and 75% by 2020.

Although the same hierarchy is applied to commercial and industrial waste, there are no binding targets for the diversion of these wastes. However, there are strong commercial factors driving the commercial and industrial sectors to reduce waste production and divert waste from landfill.

### A1.2 Prevention

Waste prevention is the preferred waste management option. Quite simply, the less waste produced, the less there is a requirement to manage.

## APPENDICES

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Waste prevention must largely be led by the manufacturing and retail sectors, although on a domestic scale, significant reductions can be made through product choice, for instance showing preference for products with less packaging and by careful shopping and management of food, avoiding kitchen waste through avoiding buying too much and exceeding "use by" dates.

One of the largest sources of waste is packaging used in the provision of industrial goods as well as for the retail market. Legislation and Government initiatives and voluntary schemes are helping reduce the amount of packaging through good design and public awareness. EC Directives implemented through UK legislation, such as the Packaging (Essential Requirements) Regulations have been introduced to reduce waste arising from packing. These regulations place a duty on producers of packaging to ensure that the packaging used around products is kept to the minimum amount necessary without breaching required levels for safety and hygiene and consumer acceptance. An example of a voluntary scheme by the retail sector to reduce waste production is the removal of single use carrier bags from display at supermarkets, encouraging the use of re-useable bags.

These initiatives will help to drive down waste production from current levels and the results are probably being seen already through a small but measurable decrease in household waste arisings over the past 4 years, which contrasts with a growth rate of 3% per year widely predicted in the early part of the decade.

Although rigorous product design and initiatives can be promoted by Government (National and Local) and industry (retail and non-retail sectors) and driven by consumer pressure, there will remain a requirement for the management of wastes.

### A1.3 Re-use

Re-use of goods and materials can be carried out at both industry and domestic levels. Industry looks favourably at re-use of, in particular, packaging, with returnable containers, pallets etc. The same is true at a domestic level, but this has largely been left to the retail sector to lead, for instance providing re-useable containers that can either be returned or re-filled at the store.

As a society the western world has become accustomed to "the throw-away society", driven largely by consumerism, in turn driven by rapid advances in technology. An example of the consumer attitude is provided by the mobile 'phone. These came into accessible use only in the last 20 years or so, but the majority of people now either own or contract them and replace them frequently, either to satisfy a craving for enhanced functions or in tune with fashions. A generation ago,

consumer goods such as radios or televisions would be replaced only when they broke beyond repair. However, most mobile phones can be re-used and there are schemes, largely supporting charities, that take mobile phones for reconditioning prior to re-use in emerging economies. Similar schemes are also in place for the re-use of ink cartridges from printers that many homes as well as offices have with the advance of the information technology sector.

Re-use is also encouraged at a domestic level by donating unwanted, but still serviceable items to charity shops.

Just as with waste minimisation, whilst reductions can, and no doubt will, be made through re-use initiatives and EU and central Government legislation such as the Waste Electrical and Electronic Equipment Directive, there will remain for the foreseeable future a need to manage wastes.

#### A1.4 Recycling/compost

**Recycling** is the recovery of materials that are suitable for re-using as a resource for making more of the same product or an alternative use. Common examples are the recycling of paper and card to make more paper, and glass for making more bottles. Apart from saving in disposal costs, the principle advantages of recycling are the saving of resources (trees or silica sand in the examples of paper and glass) and the associated environmental impacts, and savings in energy in producing the final product in comparison with producing it from raw materials.

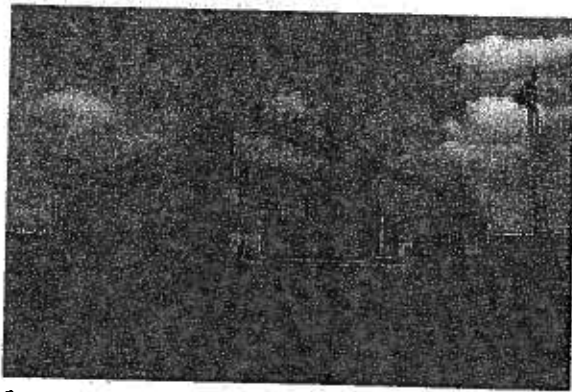
Historically waste, in particular municipal or household waste, was mixed in the household prior to collection. Much of the potentially recyclable materials were contaminated, particularly paper and card, for instance by food wastes, which rendered them of little or much lower value. Segregation at source, by the householder or commercial sector, has led to improved recovery rates and quality of recyclable material. In some cases, the separately collected material can be sent directly to a reprocessing facility. However, to avoid the provision of numerous bins for the separate storage and collection of recyclable materials, it is more common for those materials to be collected together in a single bin for kerbside collection, "bulked up" and sent to a "materials recycling facility" or MRF. Other recyclable materials are collected at "bring" sites such as bottle banks or at Community Recycling Centres.

At the MRF the materials typically travel along a conveyor belt and the specific fractions are gradually removed. Ferrous metal may be extracted using magnets,

paper taken off by weight and other screening devices used such as eddy current separators to separate aluminium.

Due to the problems of plastic identification, these are still hand separated at many MRFs, however advances in technology are enabling some MRFs to use electronic means to identify and separate different plastics from the waste stream.

MRFs can be of various sizes, depending on the range of wastes and throughput. Typically they are to all intents and purposes no different in appearance to industrial buildings seen on many industrial parks around Telford.



Source: Shanks Waste Solutions

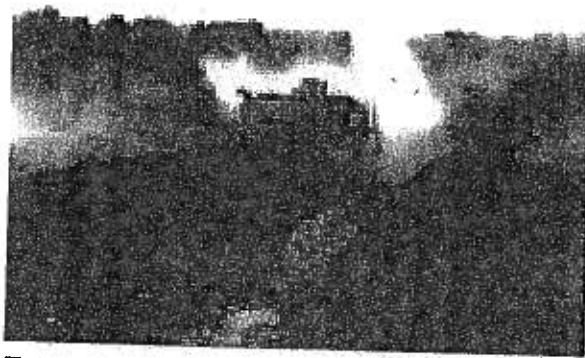
**Mechanical Biological Treatment (MBT)** processes incorporate mechanical sorting and separation of the waste stream to separate the biodegradable materials, which are sent to a biological process, from the non-biodegradable materials. Non biodegradable materials can be subject to further separation to recover recyclable materials, using similar technologies to those used in materials recycling facilities. Biological treatment can be treated by anaerobic digestion or composting, depending on the nature of the material, which in turn, is a function of the waste input. Depending on the materials the stabilised biological materials can be used as soils conditioners or restoration materials or sent to landfill without counting towards LATS targets for landfilled BMW, provided the material meets certain pre-determined levels of stabilisation. An alternative treatment is bio-drying to produce a refuse derived fuel which can be used to generate heat and power in an energy from waste plant or as an alternative fuel in cement kilns.

MBT plants can be modular and added to or reduced in scale to meet changing waste volumes or waste stream characteristics. They are similar in appearance to MRFs, with the appearance of typical industrial buildings.

**Composting** is a natural process in which organic material is broken down by the action of micro-organisms. Typical materials suitable for composting include greenwaste (garden waste) and kitchen wastes and other enriched organic waste streams such as sewage sludge, agricultural and food processing wastes. The majority of Biodegradable Municipal Waste (BMW) composted in the UK consists of garden type waste collected at civic amenity sites, the remainder being source segregated kerbside-collected garden waste or garden waste co-collected with kitchen waste.

Composting processes for municipal waste management primarily fall into two categories: windrow composting, for green, or garden derived wastes, and in-vessel composting for both garden and kitchen / catering derived organic wastes.

Windrow composting is an established technology for dealing with green wastes in the UK, where the material is piled in elongated rows and aerated through either turning of the windrows or through air forced through the material. This may take place in buildings or externally.



External Windrow Composting. Source WRAP

The term 'in-vessel composting' is used to cover a wide range of composting systems all of which feature the enclosed composting of waste, therefore allowing a higher degree of process control than is possible with windrow composting. In-vessel systems can be broadly categorised into six types: containers, silos, agitated bays, tunnels, rotating drums and enclosed halls.



Tunnel IVC, source WRAP

**A1.5 Mechanical Heat Treatment** is a form of solid waste treatment that utilises heat, steam and pressure (**autoclaving**) in the processing of waste. Waste autoclaves process waste in batches. Saturated steam is pumped into the autoclave at temperatures around 130°C to 160°C. Super heating conditions and steam generation are achieved by variable pressure control, which cycles between ambient and negative pressure within the sterilization vessel. The process causes paper and other fibrous material to disintegrate into a fibrous mass, or flock, and plastic bottles to soften and flatten. The process reduces the volume of the waste by in the order of 60%.

Following the removal of water, fibre, metals, and much of the plastics, the residual waste stream for disposal may be less than 10% by weight of the original stream. The fibre can be made into refuse derived fuel or burned in biomass plants, processed through anaerobic digestion or used as a soil conditioner.

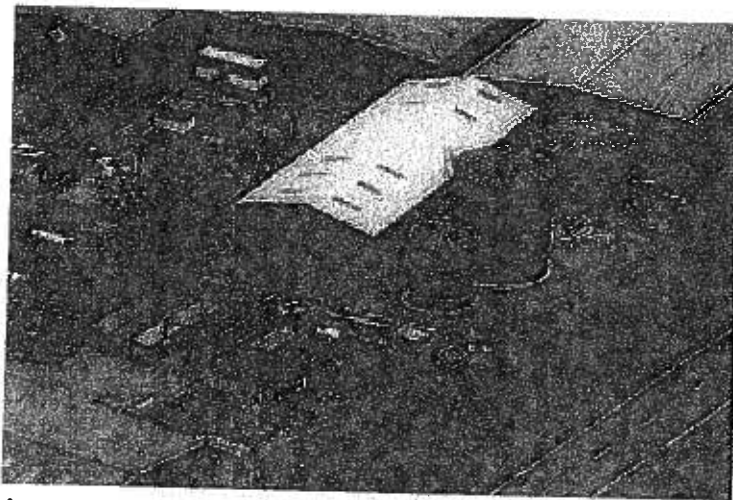
There is currently one operational autoclave plant in the UK, in Rotherham, South Yorkshire, with an initial capacity to treat of in the order of 100,000te year, with permission to expand to 200,000te/year. The plant occupies an unremarkable industrial unit and is indistinguishable from neighbouring industrial units. The same operator has gained planning permission to develop a similar sized facility near Cardiff.

## A1.6 Energy Recovery

**Anaerobic Digestion (AD)** involves the break down of biodegradable material in the absence of oxygen by micro-organisms called methanogens. It has been widely used for many years to treat wastewater in the UK and can also be used to treat other organic wastes, including domestic and commercial food waste, manures and biofuel crops. The process is suitable for treating readily degradable organic wastes, but not for woody wastes including paper and card.

The process of anaerobic digestion provides a source of renewable energy, since the food waste is broken down to produce biogas (a mixture of methane and carbon dioxide), which is suitable for energy production. The biogas can be used to generate electricity and heat to power on-site equipment and the excess electricity can be exported to the National Grid. Other possible uses for the biogas currently being explored in the UK include injection to the gas grid and using it as a vehicle fuel.

Anaerobic digestion plants differ in scale and details of the process, but essentially have the appearance of industrial plants that utilise large tanks, such as dairies and other food processing industries. The development of anaerobic digestion plants generally requires sites between 1 and 1.5 hectares. Typically the plants have capacity to manage 20,000 to 50,000 tonnes of waste per annum.



Anaerobic digestion facility. Source Letsrecycle.com

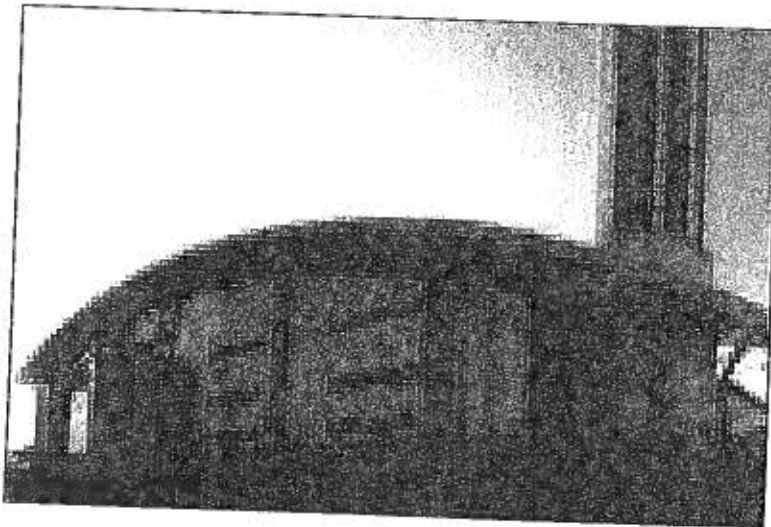
Apart from the biogas, the other main by-product of anaerobic digestion is a digestate, which is stored until required, and can be separated into liquid and solid fractions. Solid fractions can be processed further on site by composting operations for further processing or used directly on land. The liquid may also be used on the land as a biofertiliser.

### Energy from Waste

Energy from Waste (EfW) is a collective term for a number of thermal treatment techniques. The most commonly used to date in the UK is referred to as **Mass Burn** or **direct combustion** (incineration), such as the proposed plant at Granville, in which waste is burned to provide heat, which is then used to generate electricity. Some heat can be used for industrial or community heating as well as power generation and this is referred to as combined heat and power (CHP).

Unlike anaerobic digestion, energy from waste plants can burn any organic materials, including those that are not readily degradable such as wood based wastes and plastics. The outputs of direct combustion plants produce incinerator bottom ash (IBA) and fly ash, which is a product of the abatement processes used to remove pollutants from the flue gases. The bottom ash can be used as a secondary aggregate, subject to quality criteria. The fly ash must be disposed of as a hazardous waste.

Due to the configuration of the plant, typically with boilers above the furnace, direct burn EfW plants tend to require tall buildings, with large stacks for the dispersion of waste gases.



Lakeside EfW Plant Slough. Source Institute of Structural Engineers

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**Gasification and Pyrolysis**, sometimes referred to as advanced thermal treatment are both types of thermal treatment where the organic portion of waste is heated either in the complete absence of oxygen (pyrolysis) or with limited oxygen (gasification) to produce a chemical reaction. The gas produced (known as syngas) can be used as a fuel to manufacture steam or electricity. The other output is a low carbon char residue (pyrolysis) or ash (gasification).

Direct combustion, gasification and pyrolysis plants involve similar characteristics. Sites are typically between 2 and 5 hectares and require a large industrial building to house operations depending on the plant capacity. Emissions from gasification and pyrolysis are reported to be lower than for direct combustion, although the actual emissions from all three technologies have to be controlled to meet the same strict emission limits to comply with the Waste Incineration Directive. Due to the configuration of some gasification plant technologies, particularly those using gas engines rather than boilers for electricity generation, buildings for gasification plants tend to be less tall than direct burn EfW plants, with lower chimney height.

Unlike direct combustion energy from waste plants, gasification and pyrolysis plants are modular, hence units can be added or taken away as waste streams or volumes change.