

Doncaster Waste Strategy Community Panel Report

Doncaster Metropolitan Borough Council

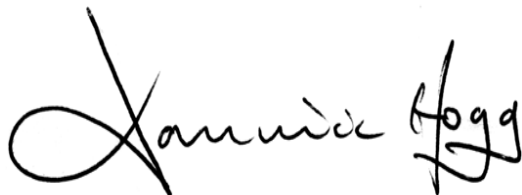
December 2008

Report for:

Doncaster Metropolitan Borough Council

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A handwritten signature in black ink, reading 'Dominic Hogg'. The signature is fluid and cursive, with the first name 'Dominic' and the last name 'Hogg' clearly distinguishable.

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Disclaimer

Eunomia Research & Consulting has taken due care in the preparation of this report to ensure that all facts and analysis presented are as accurate as possible within the scope of the project. However no guarantee is provided in respect of the information presented, and Eunomia Research & Consulting is not responsible for decisions or actions taken on the basis of the content of this report.

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1.0 Introduction

This community panel report forms part of the Doncaster Waste Strategy (DWS). The purpose of the report is to outline the process through which a citizen's panel developed a series of criteria for use in appraising options for the Municipal Waste Management Strategy in Doncaster. The document details how the panel were selected and explains the nature of the process, outlining the content of the different meetings and the work which was undertaken in meetings. The outcomes of the panel's deliberations are presented and the report concludes with a section reflecting on the process, including feedback given by the panel members and the independent chair.

The structure of the DWS follows guidance from Defra on the production of such strategies. The Strategy itself comprises:

- a Headline Strategy document which sets the long term direction and policies for the Borough. The intention is that this will need only occasional revision; and
- an Action Plan which sets a detailed plan of action for achieving the Strategy's vision and objectives. It is anticipated that this will be regularly (annually) updated and form the basis for an annual waste workplan for the Authority.

The Strategy is supported by a number of other documents that help to explain how it was developed and provide the evidence base supporting its conclusions. Table 1 lists the eight key documents.

Table 1: Documents Comprising the DWS

Document No.	Document Name
Headline Strategy & Action Plan	
1	Headline Strategy
2	Action Plan
Technical Reports	
3	Baseline Review
Process Reports	
4	How This Strategy Was Produced
5	Community Panel Report
6	Public Consultation Report
Strategic Environmental Assessment	
7	SEA Scoping Report
8	Environmental Report

2.0 Background & Purpose

Doncaster Metropolitan Borough Council (DMBC) is in the process of developing a Municipal Waste Management Strategy. This strategy will detail how the Council will take waste management forward in its area until 2020/21. It will focus on activities at all levels of the waste management hierarchy looking at waste prevention and re-use, waste recycling and composting and finally technologies for residual waste treatment.

At each level of the hierarchy a number of options will be considered and these will need to be appraised thoroughly in order to determine the optimal outcomes for Doncaster.

The aim of the Community Panel was, therefore, to develop a series of criteria against which the options and initiatives at each level of the waste management hierarchy could be assessed, thus assisting in both strategic decision making and subsequent procurement of services and technologies.

2.1 Rationale

In choosing between forms of consultation, one has to consider:

- The type of information one is seeking; and
- The fact that a trade off exists between:
 - the statistical significance of any sample whose opinions are being taken into account; and
 - the depth of information which can be communicated to them, and received from them.

The nature of the decision as to what type of initiatives, services and treatment technologies are appropriate for Doncaster is not a straightforward one. It is unlikely to be the case that what are inevitably perfunctory questionnaires sent to large numbers of people can extract information of the desired quality, since this information generally lacks much by way of deliberative content. In order to gain higher quality information based on deeper deliberation, a larger amount of information needs to be presented, and more involved discussion needs to take place with, inevitably (given resources and time available), smaller numbers of people.

Consideration of various options has led to the view that an appropriate way to extract the type of information being sought is through use of a Community Panel.

It is worth reflecting further on the rationale for this type of approach:

1. First of all, there is no straightforward way in which to make decisions as to which waste management options should be considered 'the best' for Doncaster. The concept of Best Practicable Environmental Option (BPEO) was used in the past to justify the need to commission facilities of many different types. It lost credibility partly because it was not a scientifically objective means of identifying the best option. New ways of understanding how decisions concerning waste strategies are gaining acceptance, and given:

- the difficulties in making what might be considered a scientifically objective decision; and
- the potential of these decisions to give rise to objections at the planning stage

engagement with citizens has an important role to play (arguably, a rather more important one than any expert-led assessment of the options); and

2. Major waste strategy development exercises do not happen every year, and given that the strategy is set to take Doncaster forward until 2020/21 it seems sensible to ensure that citizens' views are taken on board when such decisions are being made (not least given the fact that it is council taxpayers' money that is being used to provide the necessary funds).

The Panel were given the remit of:

- identifying key criteria deemed to be of significance in making decisions concerning the initiatives, services and technologies for use in Doncaster;
- giving weightings to those criteria to be used in options appraisal; and
- devising relevant questions associated with these criteria so as to clarify the intentions of the Panel.

The expected end result was a set of criteria and weightings that could be used in the assessment of options for actions at each level of the waste hierarchy in Doncaster.

3.0 Panel Process and Selection

3.1 Planning the Meetings

It was necessary to give consideration to the nature of the process, the number of people that should be included, and the process by which they should be selected. In order to do this, it was also necessary to develop a relatively clear idea as to how the process was likely to unfold, recognising that the process might have to be adapted according to developing circumstances. This in turn led to consideration as to the number of meetings which would be needed, their duration and their timing.

The first issue which needed to be appreciated was that a large amount of information which needed to be transferred to citizens before any of the work concerning criteria selection could be started. This was necessary to convey the context in which the strategy is being developed. Because the work had to be conducted in a very compressed timeframe the question arose as to how best to ensure the programme of meetings could be conducted within the desired timeframe, whilst also allowing sufficient time to convey to the panel the considerable amount of information that needed to be passed on and assimilated. For this reason, the decision was made to have the first meeting on a Saturday, so that the whole day could be assigned to the exchange of key information.

The second issue to be considered was the number of meetings which panel members could reasonably be expected to attend. The decision was initially made to have four meetings in total, an all-day meeting on a Saturday, and three others taking place over the following two weeks between 6:30 - 8:30 pm (so that working people could attend).¹

In order to maintain the dynamics of a 'small group' and ensure that Panel members felt able to comment during the proceedings, it was decided to aim for 20 participants, but also to allow sufficient people to provide broadly representative results.

3.2 Recruiting Panel Members

The task of selecting the participants was given to Sutton Research, a specialist market research company. In order to ensure that the panel was broadly representative of the Doncaster community, census data for Doncaster (see summary in Appendix 1) were examined and the recruiter was given the task of recruiting 22 people matching specific criteria, on the basis that, from past experience, 20 were likely to attend. The criteria were:

- **Gender:** equal split of men and women (Census gives more or less equal split, and more or less equal in all groups);
- **Age:** ideally, around 3 between 20 and 29, 11 between 30 and 59, and 6 over 60 (in line with Census);

¹ Following discussions with officers, a fifth meeting was arranged in order to allow planning issues would be discussed.

- **Ethnicity:** around 19 white, 1 non-white (a fair approximation of the Census); and

- **Spread of representation:**
The residential postcodes within Doncaster MBC are:

DN 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14,

S 64, 66

WF 8

It was not possible to accurately weight the population between these. For the purposes of the panel at least one resident was to be recruited from each of DN 1, 2, 3, 4, 5, 6, 10, 11, 12 and S 64.

Ideally, it was proposed that the panel would also meet the following non-essential criteria:

- **Disability:** between 1 and 2 disabled or long-term sick (e.g. in receipt of Disability Living Allowance or on long-term leave from work);
- **Marital status:** preferably around a half married (in line with Census); and
- **Economic status:** around 11 employed, 3 retired and 1 full-time student (in line with Census).

Panel members were not selected if a questionnaire revealed that they had close ties with the waste management sector.

In order to make sure the recruitment of the panel matched this desired profile a prequalification questionnaire was drawn up to assist those responsible for the recruitment. This is shown in Appendix 2.

3.3 Panel Composition and Attendance

A brief analysis demonstrates that the participants' profile broadly reflected the specification, as shown in Table 2 and Table 3.

Table 2: Analysis of Community Panel Attendees by Postcode

Area	Number Proposed	Number Attending
DN1	At least 1	2
DN2	At least 1	2
DN3	At least 1	1
DN4	At least 1	6
DN5	At least 1	3
DN6	At least 1	0
DN10	At least 1	1
DN11	At least 1	2
DN12	At least 1	0
S64	At least 1	1
Other postcodes		2
Total	20	20

Table 3: Analysis of Community Panel Attendees by Other Criteria

Criteria		Target	Actual
Gender	female	10	11
	male	10	9
Age	20 - 29	3	5
	30 - 59	11	11
	over 60	6	4
Ethnicity	white	19	20
	non white	1	0

Panel meetings 1 to 4 were held at the Mansion House in Central Doncaster. Meeting 5 was held at the Carr House Centre, Doncaster.

The attendance at each meeting is shown in Table 4. Meetings 1 to 4 inclusive can be seen to be close to or achieving the desired level of attendance. Only meeting 5 fell significantly below the desired level; this was a result of the meeting being additional to the schedule the panel had originally committed to.

Table 4: Attendance at Community Panel Meetings

Meeting No.	1	2	3	4	5
Attendees	20	20	18	18	16

3.4 Others Involved in Panel Meetings

Although (and perhaps because) the process was organised by Eunomia Research & Consulting it was felt that the meeting needed to be chaired by an independent person who was knowledgeable in the field. This would, it was felt, help to ensure that the panel members would not be unduly influenced by any bias (intentional or unintentional) on the part of Eunomia staff, an important factor given the contentious nature of some of the questions which could be asked in the context of the panel's work.

Consequently:

- The panel was chaired by Daryl Hill (DH), an independent waste consultant. He has prepared an independent report which is included, in its unedited form, as Section 6.0; and
- The Eunomia representatives were, depending upon the meeting being held, John Redmayne (JR), Joe Papineschi (JP), Claire Stonier (CS), Mike Brown (MB) and Dr. Dominic Hogg (DHg).

In addition, various officers from Doncaster MBC attended each meeting as observers.

4.0 The Process

In this section, we outline the process which the panel went through. We have followed a meeting-by-meeting approach to illustrate the nature of the process fully.

4.1 Meeting 1

20 participants attended the first meeting; the agenda is shown as Table 5.

Table 5: Agenda for Meeting 1

Doncaster MWMS <u>MEETING 1 (KNOWLEDGE SHARING)</u> 21 st April 2007 The Board Room, Mansion House, Doncaster Start time 10.30 Finish time 16.00		
Time	Topic	Lead
10.30	Welcome & Introductions	DH
	What the Meetings are for	JP
	Ways of Working	DH
	Agenda for Today	JP
11.00	What is Waste?	JP
	Waste Policies & Legislation	JP
11.30	<i>coffee</i>	
11.45	Waste Management in Doncaster	JR
1.00	<i>lunch</i>	
1.45	Ways of Managing Waste: <i>Prevention</i>	JP
	Ways of Managing Waste: <i>Recycling & Composting</i>	JP
2.45	<i>tea</i>	
	Ways of Managing Waste: <i>Treatment & Disposal</i>	JR
3.45	Criteria (first run)	JP
3.55	Next Meeting	DH

The meeting focused on the following issues:

- **Aims of the process and method of working**
The Chair² outlined the way the Panel was expected to work and what was being sought from the process.
- **Waste Management (EU and England)**
A presentation on basic aspects of waste management, key legislation driving change, and the policy responses in England so far.
- **Current situation in Doncaster**
The presentation of the current situation in Doncaster included a description of performance and services thus far.
- **Waste treatments**
The overwhelming majority of the afternoon was spent discussing different ways of dealing with waste. Some time was given over to discussing prevention & reuse and recycling & composting but most was spent discussing treatments for residual waste since it was anticipated that this was an area with which they were least familiar, and also, since decisions concerning residual waste are likely to be some of the more contentious decisions for the Council (and hence, quality input from the panel would be most valuable here). The panel were provided with a written summary of different waste treatment technologies, a copy of which is included as Appendix 3.

At the end of the afternoon, the idea of criteria for use in decision making was introduced and some initial criteria identified through a short brainstorm session. Theses were recorded for use in meeting 2 and are shown in Figure 1. In general, the meeting was well received, and the panel members showed a high level of engagement. Most of the panel members offered some opinion or asked questions.

Figure 1: Initial Criteria (Meeting 1)

Minimum landfill	Future proof
Ozone friendly	Look of it
Economic	No big black clouds
Simple	Latest technology
Efficient	Not smelly
Maximum by products (good ones)	Upgradeable
Minimum by products (bad ones)	Future in mind

² The independent chair for the meeting was unable to attend due to illness; as a result the presenters undertook this role on the day.

4.2 Meeting 2

20 participants attended the second panel meeting; the agenda is shown in Table 6.

Table 6: Agenda for Meeting 2

Doncaster MWMS AGENDA <u>MEETING 2</u> 25 th April 2007 Board Room, Mansion House, Doncaster Start time 18.30 Finish time 20.30		
Time	Topic	Lead
6.30	Welcome	JR
6.30	Review of Progress to Date	JR
6.35	Agenda for this Evening	DH
6.40	Development of Criteria <ul style="list-style-type: none">• First run list• Identify additional criteria• Rationalise list	JR
7.35	Break (print off lists of criteria for scoring)	
7.45	Weighting of Criteria <ul style="list-style-type: none">• What is weighting?• Weighting by Panel• Weighting input• Weighting of cost to others• Results	Claire
8.25	Next Meeting	DH
8.30	Close	

Following a brief summary of the key points and any questions arising from the previous meetings the list of criteria developed at the end of meeting 1 was reviewed by the whole group. Discussion was then entered into to try to refine the criteria,

grouping headline criteria where there were clear overlaps, and adding new criteria where they had not been previously identified. The group were asked to confirm that they were content with the outputs of this process. All agreed that the result was consistent with the views of the panel. The list of criteria resulting from this discussion is shown in Table 7 below.

Table 7: Criteria (Meeting 2)

CRITERIA	SUB-CRITERIA
Environmental	
Minimum by products not to landfill	Hazardous Non hazardous
Minimum landfill	Hazardous Non hazardous
Maximum by products (good ones)	Recycling Composting Reuse
Location	Co-location Not near houses Proximity Location at brownfield sites
Global Emissions (balances)	Ozone friendly Green house gases
Local Emissions	Air pollution No big black clouds
Energy (balances)	
Impact on wildlife, flora and fauna.	
Social	
Visual Impact	Landscape and design Look of it
Education	Young people Householders
Convenience	Clear and easy to follow services for public Simple

CRITERIA	SUB-CRITERIA
Nuisance	Noise Odour (Not smelly)
Transport	Damage to buildings Availability of networks Transport disruption
Health (Safety)	
Employment (local)	
Technological	
De-commissioning problems	
Future proof	Latest technology Upgradeable Future in mind Lifetime of plant
Proven technology (reliable)	
Economic	
Economic (cost)	Set up cost Running costs economy of scale – share facilities

The panel were then asked to assign a weighting to each of these criteria. The rationale for weighting the criteria was explained.

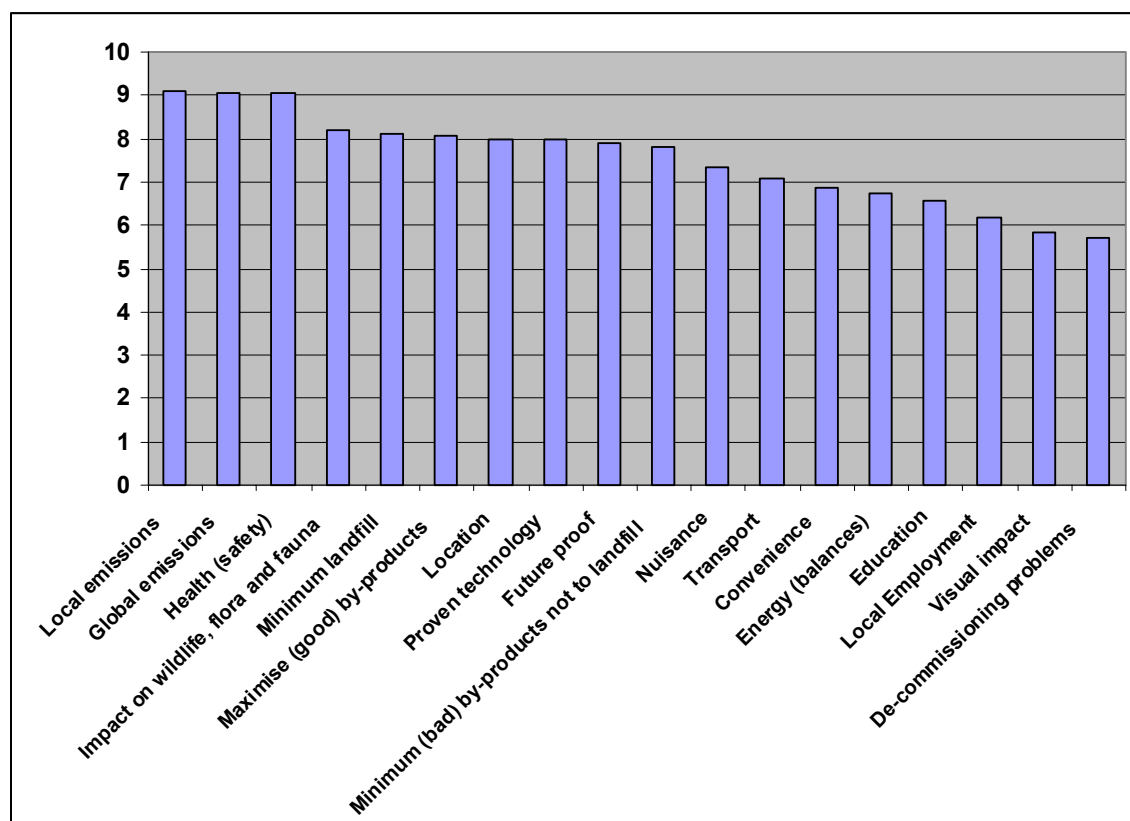
Each panel member was given a printed version of the criteria (a printer was taken to the venue) and asked to give a weighting, between 0 and 10, with 0 being the least important, and 10 being what they perceived the most important criteria to be. They were asked to score at extremes as far as possible to highlight their preferences.

The panel were asked to consider the Cost criterion separately. Each member of the panel was given a separate sheet with cost written on it and were asked to rank the significance of cost relative to all the other criteria by assigning a percentage weight to 'cost' and a percentage weighting to 'all other criteria' (with the sum adding up to 100%).

The individual criteria and weightings sheets of the panel members were collected and retained. The weightings were then entered into a spreadsheet and the

weightings from all panel members summed to give a total score as well as an average for each criteria. The results are shown in Figure 2.

Figure 2: Criteria; Average Weightings (Meeting 2)



It was pointed out that the panel had not generally (and in common with most people asked to score such things) used the full range of weightings and that, as a result, there was not a great difference in the average weightings for the different criteria (from 5.7 to 9.1). The majority of criteria fell within a narrow range. As a result a normalisation exercise was carried out on the data using the computer.

Normalisation is a tool used to spread figures over the full range available. The highest scoring criteria is given the weighting 10 and the lowest the weighting 1, the weightings for the remaining criteria are then spread across this range whilst maintaining:

- their positions in the order of weighting; and
- the relative distances between them.

This results in a greater spread of weightings and is potentially more useful when the weightings are applied to options. They are shown in Figure 3.

The results of the comparison of cost to other criteria are shown in Figure 4.

Figure 3: Normalised and Average Criteria Weightings (Meeting 2)

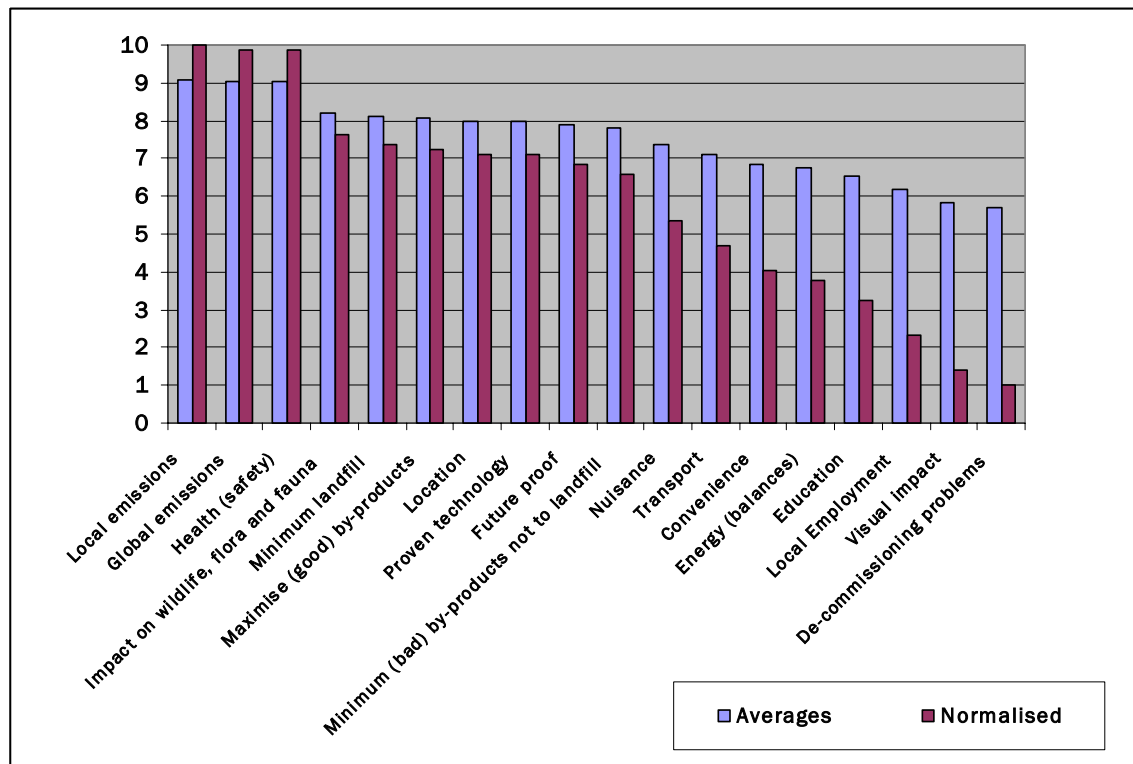
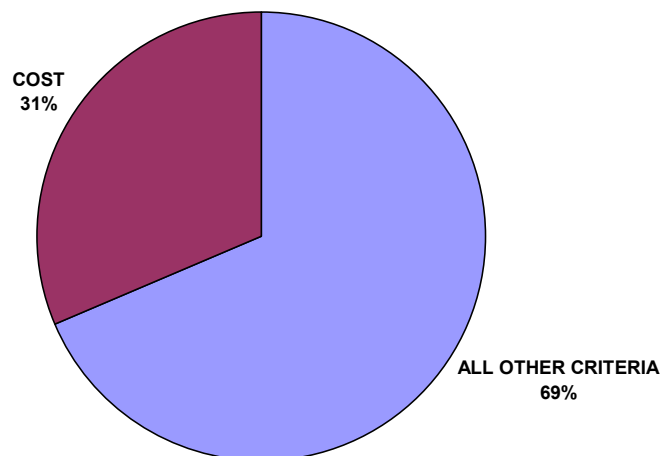


Figure 4: Weighting of Cost : All other Criteria (Meeting 3)



4.3 Meeting 3

18 panel members attended this meeting, one apology was received; the agenda is shown in Table 8.

Table 8: Agenda for Meeting 3

Doncaster MWMS AGENDA <u>MEETING 3</u> 30 th April 2007 The Boardroom, Mansion House, Doncaster Start time 18.30 Finish time 20.30		
Time	Topic	Lead
6.30	Welcome	DH
	Review of Progress to Date	JR
	Review of Weightings	CS
	Agenda for this Evening	DH
	Criteria	JR
	Criteria for each tier of hierarchy	CS, DH, JR
	Review of Results by whole Panel	JR
8.25	5th meeting to develop planning criteria – agree date	JR
8.30	Next Meeting	DH

The meeting started with a brief summary of the progress made in the previous meetings and the opportunity to ask any questions.

The panel were then shown the results of the exercises undertaken in the previous meeting to weight and rank the criteria, and to show the results of weighting cost against all other criteria.

The main aim of this meeting was to determine which of the criteria that had been developed were relevant to each of the three key stages of the waste management hierarchy; these being:

- Waste Prevention & Re-Use;
- Waste Collection for Recycling and Composting;

➤ Residual Waste Treatment.

The chairman explained to the panel that only those criteria that would allow those undertaking the appraisal to distinguish between different approaches in that level of the hierarchy should be allowed through this stage.

It is perhaps worth explaining this in more detail as it could be misinterpreted as a diversion of the panel's intentions. In carrying out the SEA each option being considered will be appraised against each criterion which it is felt meaningful to appraise the option against. Criteria which apply equally to all options are clearly not helpful in making these distinctions. Equally, criteria which cannot be meaningfully applied to an appraisal of options at a given tier of the hierarchy are also redundant for that purpose.

The panel was split into 3 groups, one with each of the team. Each group was given a different level of the hierarchy to look at and were asked to highlight the criteria they considered relevant to their hierarchical level. The results of the discussions were recorded and then summarised back to the whole panel at the end of the meeting. The overall results of this are reproduced in Table 9.

The group were asked to raise any issues/ concerns that other members of the panel had. No concerns were raised at this stage.

Prior to the end of the meeting the panel were also asked whether they would be prepared to attend a fifth meeting, not previously proposed, at which to consider criteria for use in relation to planning. There was almost universal enthusiasm for this, however, several panel members indicated their interest but gave apologies due to other commitments on that date.

Table 9: Criteria Defined as Relevant to Each Stage of the Hierarchy.

Criteria	Sub-criteria	Prevention	Recycling	Treatment
ENVIRONMENTAL				
Minimum by products not to landfill	Hazardous Non hazardous	✓	✓	✓
Minimum landfill	Hazardous Non hazardous	✓	✓	✓
Maximum by products (good ones)	Recycling Composting Reuse	✓	✓	✓
Location	Co-location Not near houses Proximity Location at brownfield sites	X all	X all	X all
Global Emissions (balances)	Ozone friendly Greenhouse gases	✓	✓	✓
Local Emissions	Air pollution No big black clouds	X all	✓	✓
Energy (balances)		✓	✓	✓
Impact on wildlife, flora and fauna	Local Global	X local ✓ Global	X local ✓ Global	X local ✓ Global
SOCIAL				
Visual Impact	Landscape and design Look of it	X all	X all	X all
Education	Young people Householders	✓	✓	✓
Convenience	Clear and easy to follow services for public Simple	✓	✓	✓
Nuisance	Noise	X all	✓	✓

	Odour (Not smelly)			
Transport	Damage to buildings Availability of networks Transport disruption	X all	X all	X all
Health (Safety)		✓	✓	✓
Employment (local)		X all	✓	✓
TECHNOLOGICAL				
De-commissioning problems		X all	✓	✓
Future proof	Latest technology Upgradeable Future in mind Lifetime of plant	X all	✓	✓
Proven technology (reliable)		Low risk, proven initiatives	✓	✓
ECONOMIC				
Economic (cost)	Set up cost Running costs economy of scale – share facilities	✓	✓	✓

4.4 Meeting 4

18 panel members attended this meeting; the agenda is shown in Table 10.

Table 10: Agenda for Meeting 4

Doncaster MWMS AGENDA <u>MEETING 4</u> 2 nd May 2007 The Boardroom, Mansion House, Doncaster Start time 18.30 Finish time 20.30		
Time	Topic	Lead
6.30	Welcome	DH
	Review of Progress to Date	DH
	Agenda for this Evening	JR
	Review Criteria for Waste Treatment & Disposal	JR
	Develop specific questions for each criteria	JR, MB
	Weightings of Residual Criteria <ul style="list-style-type: none">• Weightings• Review of Results	JR, MB
	Next steps with strategy	JR
8.25	Next Meeting (NB different venue & start time)	DH

The meeting started with a brief summary of the information and results of the previous meetings and the opportunity to ask any questions. The list of criteria and agreed at the previous meeting for use in relation to residual waste management were reviewed.

As the most contentious aspect of decisions regarding waste management tends to be the selection of techniques for the management of residual waste, Eunomia explained to the panel that the focus of the meeting would be on developing questions and criteria for use in making distinctions between different technologies

for treating residual waste (waste left over after recycling and composting has taken place).

The purpose of developing questions for each sub-criteria (so as to ensure that the intentions of the panel in relation to each criterion were understood and could thus be correctly interpreted and applied during the SEA process) was explained.

In addition the fact that certain criteria have to, by law, be included in a SEA was explained to the panel and those that were not covered by the panel's criteria were identified as being:

- Soil;
- Water;
- Cultural heritage

It is worth noting here that the existence of 'a list' caused a heated discussion within the panel - with the allegation being made that the list of criteria the panel had come up with did not matter. This represents a not uncommon mistrust amongst the public of 'consultation exercises', whilst also demonstrating the ownership that the panel felt towards the criteria they had developed. Following this discussion the panel agreed that the additional criteria should be added so that they could include them in their review of the list, develop appropriate questions related to them, and then weight their importance (rather than ignore them and have them added later as a consequence of requirements of the SEA Regulations).³

Following this decision the panel reviewed each criterion in turn in a round table discussion with the aim of producing a question/questions to clarify their intentions and preferences. Not surprisingly, as the point of each criteria was reviewed, additional revisions to wordings and groupings were made. At the end of the process the panel reviewed the full list, agreed it represented their views, and then received a printed copy in order to carry out another weighting exercise. The fact that the weighting, like the criteria, was to be used specifically in the context of consideration of residual waste management options was reiterated.

The residual waste criteria and questions resulting from this meeting are shown in Table 11, the weightings (both raw and normalised) are shown in Figure 5 and the relative importance of cost to all other criteria is given in Figure 6.

The results were calculated and shown to the panel who agreed that they represented their views.

³ From Eunomia's perspective the most appropriate way of dealing with this issue is always difficult to judge. Honesty at this stage of the process was, however, considered important so as to ensure that the panel would have a direct overview of the criteria to be used. Having the flipcharts from the initial brainstorm of criteria available for reference proved valuable in demonstrating to the panel that there was an audit trail for the criteria they initially came up with.

Table 11: Meeting 4 - Criteria and Questions for Residual Waste Management

CRITERIA	SUB-CRITERIA	Questions/Indicators
Minimum by products to landfill	Hazardous Non hazardous	What proportion of waste input to facility by tonnage has to go to landfill as a residue? (for hazardous and non-hazardous wastes, separately)
Maximum by products (good ones)	Recycling Composting Reuse	What proportion of waste input to facility by tonnage is recycled, turned into useable compost or reused?
Global Emissions (balances)	Ozone friendly Green house gases	What is emitted and what is the quantity per tonne of waste treated? What impact will the emissions have on the ozone layer? What impact will emissions have on climate change?
Local Emissions	Air pollution No big black clouds Acid rain To water	What is the impact on health: immediate effect and 'genetic'? Will there be any impact on wildlife, flora and fauna? Will there be any impact on property?
Energy (balances)	Energy input Energy output	What is the net energy produced? (want to get more out than you put in)
Materials balance	Global impact on wildlife, flora and fauna.	What is the total impact on global resources as a result of the overall materials balance of the facility?
Water resources		How much net water is consumed as a result of the process per tonne of waste input? How much water is contaminated (requiring off site treatment) per tonne of waste input?
Soil	Site footprint	How much land is required by the facility per tonne of waste input?
Health (Safety)		What is the potential for catastrophic failure (e.g. explosion from facilities that collect methane gas) and what are the contingency plans in event of failure of system?
De-commissioning problems		Will it be possible to recycle the plant on decommissioning?
Future proof	Upgradeable Future in mind Lifetime of plant	Can the plant be upgraded in response to technology improvements? Can the capacity of the facility be changed?
Latest proven technology (reliable)		How many of these facilities are currently operating globally? What is the total tonnage throughput through these facilities? How long have they been operating? What is the % reliability of the facilities?
Economic (cost)	Set up cost Running costs Economy of scale – share facilities	How much will the treatment cost?

Figure 5: Average and Normalised Criteria Weightings for Residual Waste Management

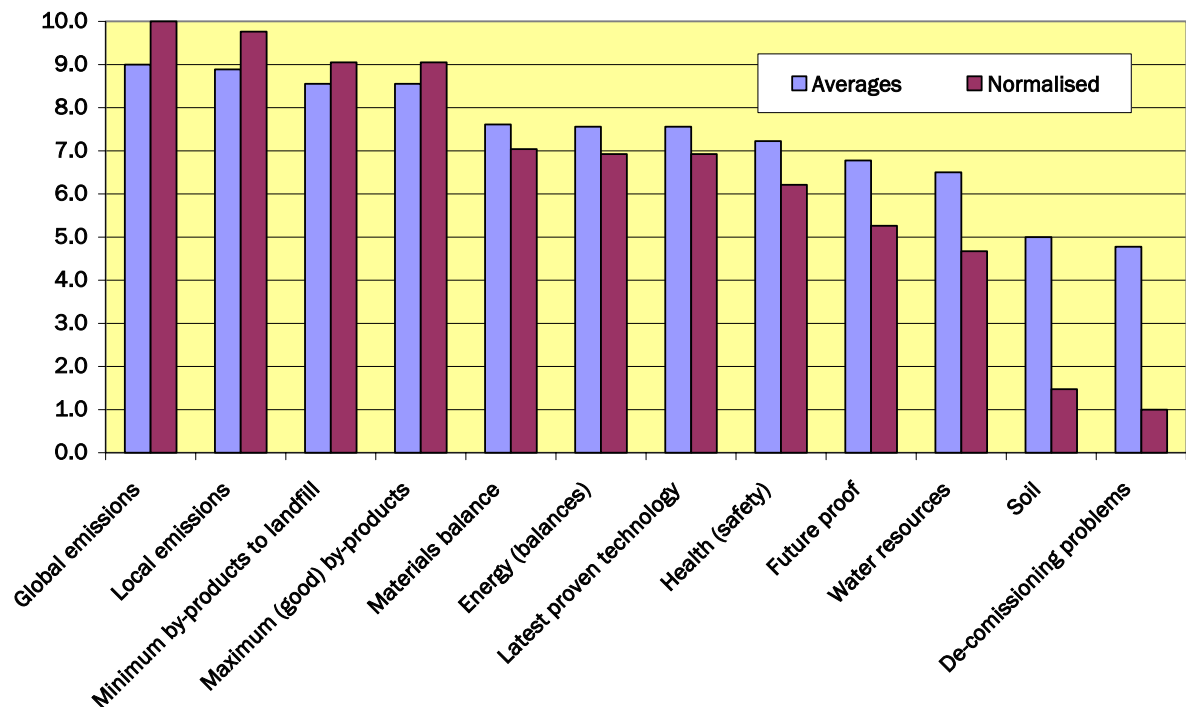
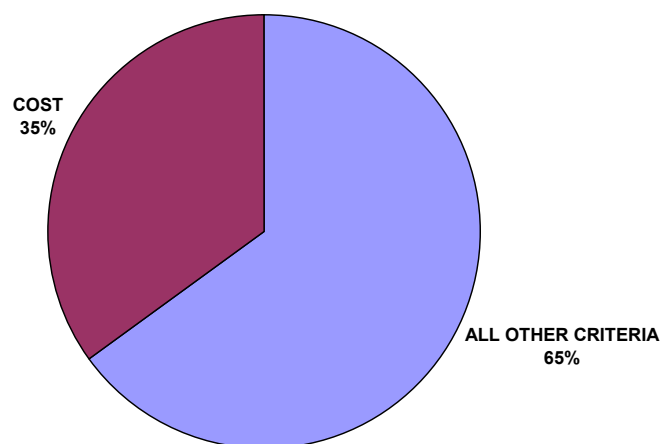


Figure 6: Weighting of Cost : All Other Criteria for Residual Waste Management



4.5 Meeting 5

16 panel members attended this meeting; apologies were received from 3 panel members who were unable to make the date of this additional meeting. The agenda is shown in Table 12 below.

Table 12: Agenda for Meeting 5

Doncaster MWMS AGENDA <u>MEETING 5</u> 9 th May 2007 Professional Development Centre, Carr House Centre, Doncaster Start time 18.00 Finish time 20.30		
Time	Topic	Lead
6.00	Welcome	DH
	Review of Progress to Date	DH
	Agenda for this Evening	JR
	Waste Planning Short presentation on how the system works and what is required from the meeting.	DHg
6.30	Review full list of criteria from meeting 2	JR
	Develop questions for each criteria	JR, DHg
	Weighting of criteria Results	JR, DHg
	Feedback sheets	JR
	Next steps with planning	DH
20.25	Thanks & close	DH

The meeting opened with a reminder of the work of the previous meetings and reiteration that the evening's meeting was an additional one, called to consider criteria that could be used in making locational (planning) decisions about waste management facilities.

A presentation was made introducing the concept of planning and looking specifically at planning for waste management facilities in Doncaster. A distinction was then made between:

- The planning process for strategic facilities for the management of residual municipal waste which is the subject of a joint development process between Barnsley, Doncaster and Rotherham Councils; and
- The planning process for local facilities in Doncaster which is the subject of a local development process by Doncaster MBC.

Having established this distinction it was explained that the meeting would focus on criteria which should be considered when seeking to designate sites for local waste management facilities. It was explained that it was not considered appropriate to attempt to develop criteria for strategic facilities without equal representation from Barnsley and Rotherham.

Having agreed this basis the full list of criteria developed in meeting 2 was reviewed with three types of revision shown:

- Additional criteria resulting from SEA legal requirements and identified by Eunomia at meeting 4;
- Amendments to wordings of criteria and sub-criteria made by the panel during meeting 4; and
- Specific locational criteria listed in Annex E of Government's Planning Policy Statement 10⁴ on waste planning but not covered by one of the panel's existing criteria, were added. These were:
 - Land instability;
 - Adjoining land use;
 - Litter; and
 - Vermin.

Following a brief discussion, the panel agreed to the inclusion of all these amendments to produce a 'long list' of criteria. The editing, defining and weighting of the criteria formed the basis of the rest of the meeting.

Following this decision the panel reviewed each criterion in turn in a round table discussion with the aim of producing a question/questions to clarify their intentions and preferences. Not surprisingly, as each criterion was reviewed, additional revisions to wordings and groupings were made. At the end of the process the panel reviewed the full list, agreed it and then received a printed copy in order to carry out a weighting exercise. The fact that the weighting, like the criteria, was specifically for use in consideration of planning for non-strategic waste management facilities was reiterated.

⁴ ODPM (July 2005) *Planning Policy Statement 10: Planning for Sustainable Waste Management*

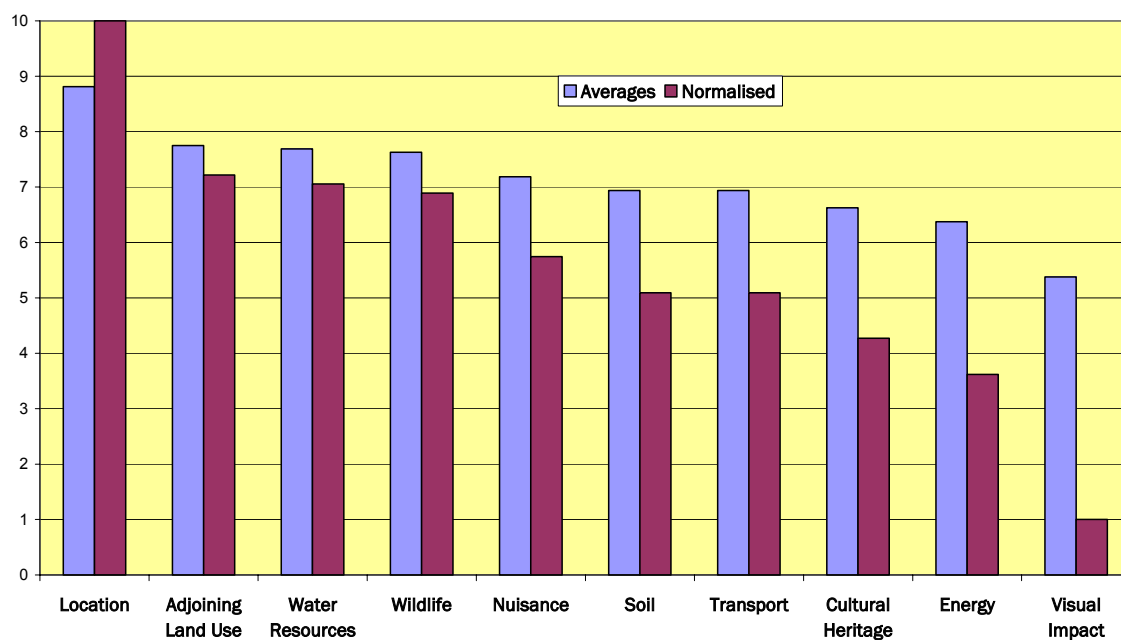
The criteria and questions developed by the panel through this process are shown below in Table 13 and the weightings given to them (both raw and normalised) in Figure 7.

The panel viewed the results of the scoring and normalising exercise and several commented that the results did not appear particularly consistent with the discussions held during the meeting. Time precluded a fuller discussion of this or a second attempt at the weightings.

Table 13 Criteria and Questions for Use in Planning for Non-Strategic Waste Management Facilities

CRITERIA	SUB-CRITERIA	Questions / Indicators
Location	Not near houses	Depends on process (odour, noise, etc.)
	Proximity	Minimise distance waste and product is moved
	Location at brownfield sites	Consider sites on own merits irrespective of whether previous use was for waste Strongly favour use of brownfield sites
Energy		Access to energy supply
Impact on wildlife, flora and fauna.	Local	Does the site minimise the impact on local wildlife, flora and fauna?
Water resources		Is there an adequate water supply? Is there a risk of polluting local water resources?
Soil	Site footprint	Is there room for expansion?
	Land instability	Is the land stable?
Visual Impact	Landscape and design	How well does the facility fit in to the environment?
	Look of it	Can consideration be given to landscaping?
Nuisance	Noise	Can the plant be designed so as to keep nuisance to a minimum (both during use and during development)?
	Odour	
	Litter	Can the plant be located so as to minimise nuisance?
	Vermin / birds	
Transport	Damage to buildings and cultural heritage	Will traffic create damage to property?
	Availability of networks	Can the plant be located in a location well served by existing transport networks? (ideally closer to more major roads)
	Transport disruption	Will the plant create additional problems of congestion?
Cultural heritage		Will there be a negative impact on cultural heritage?
Adjoining land use	Conflicts	Are adjoining land uses particularly sensitive?
	Co-location	Can good use be made of energy produced?

Figure 7: Average and Normalised Weightings of Criteria for Use in Planning for Non-Strategic Waste Management Facilities



5.0 Reflections on the Process

5.1 Impression Gained from Panel

Feedback forms were posted to each member of the panel (20 people) following the final meeting. The 14 forms returned have been analysed and the responses to the most important questions in terms of the results are shown here in both absolute (row 2) and percentage (row 3) terms. Where the totals do not add up to 100% this is a result of either the rounding of results, a response not being made or not being made in the appropriate box. Key comments made on each question are also shown.

2. Do you feel that the panel was successful in representing a cross-section of Doncaster residents?	
Yes	No
12.5	0.5
96%	4%

Questions 3- 5 related to the location and facilities for the meetings as well as the timing and spread of meetings. The responses are not reported here.

6. What do you think about the content of the background information that was given to you:				
A. On waste in general?				
Very poor	Poor	Average	Good	Excellent
0	0	0	7	6
0%	0%	0%	54%	46%
B. On waste in Doncaster?				
Very poor	Poor	Average	Good	Excellent
0	0	2	7	4
0%	0%	15%	54%	31%
C. On residual waste treatment technologies?				
Very poor	Poor	Average	Good	Excellent
0	0	0	6	7
0%	0%	0%	46%	54%
D. On planning issues relating to waste?				
Very poor	Poor	Average	Good	Excellent
0	0	0	9	3
0%	0%	0%	75%	25%
<p><i>"Extremely informative"</i></p> <p><i>"It was like being educated on the subject"</i></p> <p><i>"All relevant background was very good on all subjects"</i></p>				

7. What do you think about the way in which the information was presented (both written and spoken)?				
Very poor	Poor	Average	Good	Excellent
0	0	0	7	6
0%	0%	0%	54%	46%

8. How would you describe the way in which your level of understanding of waste issues has changed as a result of the Citizens Panel?			
More confused	No change	Improved	Greatly improved
0	1	5	7
0%	8%	38%	54%

9. Was the information you received sufficient to enable you to constructively contribute to the issues discussed?		
Yes	No	Don't know
12	0	1
92%	0%	8%

10. Were you given sufficient opportunity to make the points you wanted to make and share your opinions with the panel?		
Yes	No	Don't know
13	0	0
100%	0%	0%

11. Do you feel that your views were taken on board?		
Yes	No	Don't know
12.5	0.5	0
96%	4%	0%

12. Do you feel that the consensus outcome of the first four meetings of the community panel (i.e. the criteria) represented your view?		
Yes	No	Don't know
11	1	1
85%	8%	8%
<i>"Not enough emphasis on cost and value for money"</i>		

13. Do you feel that the consensus outcome of the fifth meeting of the community panel (i.e. the criteria) represented your view?		
Yes	No	Don't know
8	0	2
80%	0%	20%
4 of the respondents were unable to attend the meeting		

14. What was your overall impression of the community panel?				
Very poor	Poor	Average	Good	Excellent
0	0	1	5	7
0%	0%	8%	38%	54%
<i>"I don't think it needed improving"</i>				
<i>"Very good"</i>				

5.2 Impression from Eunomia Research & Consulting Ltd

The panel process seems to be a valuable way of generating criteria and weightings which reflect the perspective of ordinary citizens. Waste and its management is an issue that touches all of us, and Eunomia's staff are repeatedly impressed by the interest shown in the subject and the sophistication of the judgements people are able to make if they are given enough background information and a process to enable this to happen. It is interesting to note, for example, that the balance between cost and other criteria is broadly in line with what is being recommended by public sector bodies in the context of procurement.

The panel was lively in debate and developed a considerable ownership of the criteria they had developed. They expressed particular concern at the criteria being 'interfered with', and also at the idea that there was 'a list that would be used anyway' – which led some of them to suspect that the process of consultation might not be a genuine one, and that their views were being overturned. These issues arose in the context of the fourth meeting (see section 4.4). The questionnaire returns

would appear to suggest that this was a temporary concern which was alleviated once the reasons for the action taken in Meeting 4 was clearly explained.

Alternative approaches would have been to either:

- Start off by presenting a full list of criteria to the panel – this would have stifled the creativity they showed and subsequent debate; or
- Not tell the panel about the additional criteria, but add them subsequently during the SEA process (because this would demand consideration of them) – this would have precluded their discussion, elaboration and weighting by the panel.

In view of this, and the fact that we repeated this approach during the fifth meeting on planning without difficulty, it would appear that, on balance, the approach taken was the most appropriate one and that, once the reasons were fully explained to the panel, they were comfortable with it.

6.0 Chairman's Review

6.1 Introduction

The following section is the chairman's independent review. It is presented here in entirely unedited form.

6.2 The Review

DONCASTER METROPOLITAN BOROUGH COUNCIL WASTE MANAGEMENT STRATEGY COMMUNITY PANEL

May 2007

CHAIRMAN'S REVIEW

Introduction

The establishment of a panel to discover citizens' views about future waste management options, their locations and the conditions under which they should be adopted seems a simple thing to set out to do; but in order to achieve a balanced view of a complex set of issues there are various factors that need to be taken into account, these are:

- Convene a panel of people that 'represent' the wider community;
- Ensure that the panel is sufficient in number and yet a small enough group to allow a complex debate to unfold;
- Ensure that there is sufficient time and that panel members attend the meetings;
- Agree with the panel the boundary of the debate to be had, and to what extent the outcome from the panel will be taken into account;
- Impart sufficient information to the panel to allow them to develop informed opinions in order to have a meaningful influence on the debate;
- Ensure all panel members have their say;
- Reach an overall consensus of the panel; and
- Communicate this consensus to the decision makers that convened the panel.

Similarly, for the Council who will be in receipt of these views there are several things to do: Firstly, once the boundaries are set it must not try to prejudge or restrict the debate and outcomes from the panel; secondly it must accept that a successful outcome is the panel reaching consensus, whatever this consensus may be; and thirdly, it must act on this consensus in the manner agreed with the panel at the outset. If the convening organisation cannot commit to these things, then a citizen's panel is not the right tool.

From 21st April to 9th May, a community panel was convened by Doncaster Metropolitan Borough Council (DMBC). Its role was to advise DMBC in the

development of the Doncaster Waste Strategy (DWS) and in particular was asked to develop a set of criteria for use in assessment during the DWS process.

The Panel was run by Eunomia Research and Consulting and independently chaired by Daryl Hill of Environment & Energy Ltd.

What did we set out to do?

Our overall objective was to develop and reach consensus on a series of criteria for use in appraising options for waste prevention, waste recycling & composting, the treatment of residual waste and the criteria determining their locations in Doncaster. Within an advisory context, these criteria would set out the advice from the panel to help determine what waste management systems should be selected.

How was this Feasible?

Before summarising the process, it is worth noting that this is a complex subject area and that evaluating the relative merits of the different issues is quite often a subjective process, no matter the level of detail or the time, to which they are debated, an opinion is required.

This opinion is ultimately based as much on an individual's values and beliefs as on any relevant facts. There are therefore no right or wrong answers and sometimes too many facts can get in the way.

The process in Doncaster, of developing criteria rather than trying to assess specific proposals or considering particular options, made the debate initially more complex because panel members had to think in the abstract rather than the specific. But this criterion based approach actually made consensus more achievable, since the panel were not required to make specific decisions about specific proposals.

Finally, the method used to obtain a consensus was to aim for the group to agree some sort of middle ground. This was more about compromise than it is about majority over minority. This combined consensus and generic approach gave us confidence that we could reach consensus with lay people on DWS criteria in this short period of time.

Convening the Panel and Getting the Numbers Right

20 members of the public were recruited to the panel that were broadly representative of a cross section of the community of Doncaster by geography, gender, age etc. Attendance at panel meetings was good to excellent as follows:

Meeting	Attendees
1	20
2	20
3	18
4	18

5	16
Average	18.4
(92.0%)	

Such a high attendance level implies real motivation from panel members which in turn reflects well on the event as a whole.

It is crucial to get good attendance at these meetings to allow members to 'gel' with one another and with those running and convening the panel. To get a representative cross section of the community of Doncaster from a group of about 20 members is a little more difficult. Inevitably this is in part a compromise, since there is a practical number of panel members above which it simply isn't practical to have a proper debate. To help achieve consensus, the recruitment method sought to recruit members who did not already have a clear view on how waste should be managed, and members did understand that part of their responsibility was to try to think about what people in Doncaster would want – and not just what they wanted as individuals.

Having Enough Time

It is essential to have sufficient time both in terms of the number of meetings and the length of meetings.

The Doncaster Community Panel ran 5 meetings in just under 3 weeks. The first meeting was all day on a Saturday, with the remaining 4 meetings over 2 hours on weekday evenings.

Attempting to reach consensus in 3 weeks was ambitious and did risk not reaching consensus in time. On the other hand there were some real benefits in a tight timetable. The intellectual momentum was apparent. We deliberately did not minute meetings. Not just to save time, but because there was no need. Instead we kept a clear audit trail on the development of the criteria output documents from first draft through to final stage. People came fresh to most meetings ready to start where we had left off last time. Evidence of a real positive wish to participate was perhaps illustrated by the disappointment when we finished the last meeting. Members were almost unanimous in their wish to continue to be involved if that was possible. People respond well to a reasonable amount of pressure and I am sure that – although very tight – our collective deadline kept everyone very focussed on the job in hand.

Boundary of the Debate

The boundaries of the debate relating to DWS criteria were explained to panel members as follows:

- Dealing with DMBC's Waste: Geographically, the panel was aware that the DWS was being developed on a Doncaster wide basis;
- Dealing with Municipal Solid Waste (MSW): The panel was made aware that for the DWS the focus was primarily on MSW not other waste streams;

- The Panel's Role was Advisory: DMBC explained to the panel that it was seeking their views in the form of advice. Related decisions would ultimately be taken by the Council. However, whilst DMBC could not guarantee to act on the basis of all of the advice given by the panel – particularly if that advice cut across their statutory duties – there was a general presumption in favour of accepting the advice of the panel. Indeed, that was the whole purpose of seeking the advice from the panel in the first place; something that DMBC was not obliged to do.

Providing Information to Panel Members

It clearly is not possible for lay people to build up a high level of general knowledge on waste and resources issues in 3 weeks. However, it is possible to build on and extend their existing knowledge and experience of waste management. Perhaps the real test was the level of the debate within the panel itself. It became clear that there were some very detailed opinions emerging from the debate and that the panel had a great deal to say. There was generally good interaction within the panel itself. We achieved this through a combination of prepared presentations, bespoke information sheets and through interactive debate. The panel adopted a proactive approach to suggesting the initial list of criteria, and this continued throughout the process with the discussions on sub-criteria and descriptions. This demonstrated a comprehensive understanding of the issues. This is good evidence of a well informed and proactive panel.

Ensuring the Whole Panel has their Say

This is never easy. People contribute to debates in different ways. Some people will not wish to speak in groups. The important thing is to encourage input from all panel members, but to discourage domination by individual members. Equally important is to facilitate input from panel members in a variety of different ways. To this end, panel members were able to input into the debate in the following ways:

- Plenary session input: about three quarters of panel members contributed to the plenary sessions;
- Break-out groups: All members provided input when working in small groups of 6 or 7 members;
- Written input to weightings: All members in attendance at the relevant meetings provided their individual weightings for each criterion;
- Written feedback: All members were sent a written feedback questionnaire on the whole process.

Reaching Consensus

From the preceding evidence it is clear that the Doncaster Community Panel did reach a clear consensus on the final output criteria.

This does not mean that every panel member agreed with every part of the output document. But it does mean that they agreed that the document reflected the consensus view of the panel. It is therefore true that, in so far as the panel represents the people of Doncaster, then the DWS criteria also represent the views of Doncaster residents as a whole. As a consequence I am confident that the panel effectively feels ownership of this important document.

It is important to have an independent chair if consensus is to be reached. Members must feel confident that at all times they are moving towards consensus and not being lead in any particular direction. It is my view that the chair must try faithfully to facilitate the best consensus views of the panel, even where this may not coincide with the views of the convening organisation.

Communicating the Consensus to DMBC

This has been achieved through attendance of officers from DMBC as observers to the process. It is recommended that this document be distributed to all panel members as a record of the consensus of the panel.

What Next?

To some extent, convening a panel such as this can be seen as a risk to the convening organisation. What if the advice is for a change of direction? What if following the advice would be unaffordable? On the other hand a well convened panel understands that advice is just that – and the convening organisation may not take it. Furthermore it is surely better to know where there is likely to be support from the community and where there is not, before taking a decision. DMBC was prepared to take that risk and listen to the advice that the panel developed.

Although not specifically part of the work of the panel, the process will not in reality, be complete until the outcome of the whole DWS process is known and compared to the advice from the panel. Ideally therefore, there will be some ongoing contact between DMBC and the panel in the future as the DWS progresses towards adoption.

It was clear at the close of the final meeting from the very positive words to the panel from DMBC that the exercise had been very worthwhile.

Dr Daryl Hill, Environment & Energy Ltd

Independent Chairman

Doncaster Metropolitan Borough Council Community Panel 2007.

Appendix 1: Doncaster Data (from census 2001)

A.1.1 Resident Population

	Count
Population	286,866

A.1.2 Gender

	%
Male	49
Female	51

A.1.3 Age

Age Range	%
0 - 19	25.88
20 - 24	5.16
25 - 29	5.83
30 - 44	22.37
45 - 59	19.27
60 - 64	5.12
65 - 74	9.08
75 - 84	5.67
85 - 89	1.12
90 and over	0.5
Totals	100

A.1.4 Marital Status

Status	
All people aged 16 and over	226,894
All people aged 16 and over: Married	45%

A.1.5 Ethnic Group

Ethnic group	%
White	97.7
Mixed	0.6
Asian or Asian British	1.1
Black or Black British	0.4
Chinese or other ethnic group	0.3

A.1.6 Long Term Illness or Disability

	%
General health 'good'	64.5
General health 'fairly good'	23.5
General health 'not good'	12.0
Limiting long-term illness	22.9

A.1.7 Economic Activity

Economic Activity	
Population aged 16-74	206,011
Employed part-time	13.5%
Employed full-time	36.5%
Self-employed	6.0%
Economically active : unemployed	4.2%
Economically active : full time students	1.7%
Economically inactive : student	3.1
Retired	15.3%
Looking after family and home	7.6%
Permanently sick or disabled	8.4%
Economically inactive (other)	3.8%

Appendix 2: Suggested Recruitment Script

Hello / Good afternoon / etc.

We are looking for people to act as members of a panel which will be asked to inform decisions concerning the future of Doncaster's waste management. No specialist knowledge is required.

Are you interested, in principle, in participating in this process?

If yes, then proceed to ask questions...

We would like to ask some questions to help us to obtain the right mix of people for the panel:

(We do not need to ask their gender, but please record it)

1. Do you live within Doncaster Council area? (if clarity required ask who sends them a Council Tax bill – it should be Doncaster MBC)
2. What is your age?
3. What is the area postcode of where you live?
4. What is your ethnic origin and religion?
5. Are you disabled or unable to work due to long-term illness?
6. Are you single or married?
7. Are you in employment?
8. Are you an active (campaigning) member of any environmental organisation?
9. Are you employed in the waste management industry?
10. Do you hold shares in any waste management company?

We are looking for people who are available on the following dates:

Saturday 21 st April	10.30am-4.00pm
Wednesday 25 th April	6.30-8.30pm
Monday 30 th April	6.30-8.30pm
Wednesday 2 nd May	6.30-8.30pm

All meetings will be held at Mansion House, Doncaster.

The purpose of the meetings is to inform the development of the Doncaster Waste Management Strategy. No specialist knowledge is required and there will be no work outside the meetings. In our experience attendees at similar meetings in other areas have found them to be both enjoyable and interesting.

We are willing to pay £60 for attendance at the first meeting and £30 for the others – a total of £150. However, we need a clear commitment that you can attend all the meetings.

We do not want attendees to be related to each other and reserve the right to refuse one of for instance a husband and wife turning up.

Appendix 3: Technologies Briefing Sheet

DIFFERENT TECHNOLOGIES – PROS AND CONS

GENERAL POINTS

- All methods of managing waste have environmental effects.
- All technologies result in the production of gases, liquids and solids – it is the type and relative quantities of these that vary.
- All processes require energy for the machinery etc; some also produce energy in forms that can be used. The relative amounts of these vary.

TECHNOLOGIES FOR SEPARATELY COLLECTED KITCHEN AND GARDEN WASTES

Composting

Happens in the presence of air. Main emissions to atmosphere are carbon dioxide and ammonia, as well as some smelly volatile organic compounds (VOCs). In enclosed compost facilities, these can be controlled by sucking the air through biofilters (heaps of moist wood chips) before the air is emitted to atmosphere. Fine particles (called bioaerosols) are also produced when the material is mechanically turned / agitated, especially if the material has become too dry.

The resulting compost is a useful soil improver, which improves soil properties and provides some nutrient value.

Anaerobic Digestion

Happens in the absence of air, often with the addition of water to turn the waste into a slurry. Generates 'biogas', which is a mixture of carbon dioxide and methane, with trace amounts of less pleasant compounds. Methane is effectively natural gas so can be used to generate energy. It can either be used directly, for the production of electricity and / or heat, or it can be purified and compressed to power vehicles. When the gas is burned, methane is converted to carbon dioxide, and some acid gases (sulphur dioxide and nitrogen).

After the digestion process has finished, a residue remains which is 'pressed' to separate the liquids from the solids. Some of the liquid is usually re-used in the process. The rest can be used as a fertilizer, though if no local market is available, it may have to be sent to a waste water treatment plant. The solid component is usually composted (not necessarily in enclosed areas) to produce a soil improver.

TECHNOLOGIES FOR MIXED RESIDUAL WASTES

Landfill

Basically holes in the ground that are filled with waste. In some modern landfills the filling continues above ground level forming 'landraises'. Landfills are lined with a membrane (the liner) to contain the waste and the liquid pollution generated by the decomposition of waste (called 'leachate'). In landfills the biodegradable material degrades in the absence of air (the material is compacted). As a result, as with anaerobic digestion, biogas is generated. This includes methane, carbon dioxide and volatile organic compounds. Landfills are equipped with systems to capture the gas generated. The aim is to capture as much of the methane as possible and use it to generate energy.

The decomposition process also causes materials to leach out of the waste. This leachate is collected at various points from the landfill and has to be treated. Generally, people believe that landfill liners will not last indefinitely. Consequently, a key concern relating to landfill is pollution of groundwater and of soil.

Incineration

Incineration is the burning of waste materials with the aim of generating energy – electricity and/or heat - from the process. The process involves waste being burned on a grate, with the hot gases passing to a boiler, which is either:

- a) used to heat water to generate steam, which in turn is used to generate electricity, or
- b) is used to provide heat for buildings (so called 'district heating').

Not all waste burns. Unburnt waste falls through the grate as ash. This ash ('bottom ash') contains all the steel and aluminium that entered the plant and so magnets and other equipment can be used to separate out these metals for recycling. The remaining ash can be used in tarmac or to make breeze blocks as it is not reckoned to be hazardous.

During combustion a wide range of gases are emitted, including carbon dioxide, acid gases, particulate matter and dioxins. All of these have the potential cause harm. Consequently, over time, increasingly elaborate systems have been developed for cleaning up the gases before they are released to the atmosphere. A European law called the Incineration Directive requires all operators to ensure that the gas eventually emitted from the incinerator meets specified standards. The gases finally emitted are present in far lower concentrations than they would be without the cleaning up process.

The cleaning up process does, however, generate some additional 'residues'. These residues – sometimes called 'fly ash' – are hazardous (partly because they result from removing hazardous elements from the gas emitted from burning waste). They are usually deposited in hazardous waste landfills.

For each tonne of waste, around 250kg of 'bottom ash' is generated. Around 35kg of 'fly ash' is also generated. '

Pyrolysis / Gasification

Pyrolysis and gasification are best understood as 'staged combustion'. There are many similarities with incineration, but because the process is staged, and to a degree, therefore, more controlled, the gases generated by the treatment of waste are likely to be cleaner. This means that in order to achieve environmental standards (the Incineration Directive also applies to pyrolysis and gasification), the investment in flue gas cleaning may not need to be so great (or alternatively, the same type of equipment as used on an incinerator would lead to cleaner emissions from the pyrolysis / gasification plant).

Pyrolysis and gasification are widely used in the oil industry. However, municipal waste is made up of a wide variety of materials and this 'mixture' has posed problems for companies trying to use pyrolysis and gasification to deal with municipal waste. Relatively few systems have been successfully deployed in Europe and these appear to be those which bear a close resemblance to incineration (the extent of 'staging' is limited). Even so, other systems are being developed and some may prove themselves in the near future.

Stabilisation

Mixed residual waste can also be put through a 'composting process'. This takes place in a building or other enclosed space. However, the fact that the waste is not sorted means that the residue is contaminated with all sorts of undesirable materials. Hence, what comes out of the process cannot really be considered as compost and may have to be landfilled. So what's the point? The point is that this process can reduce the extent to which waste is considered to be biodegradable. This process can, therefore, help to meet targets for reducing the quantity of biodegradable waste being landfilled by reducing its 'biodegradability'.

In addition to carbon dioxide and ammonia, volatile organic compounds are emitted during the process. These can be controlled using biofilters and other methods.

Frequently, in this type of process, metals and inert materials (typically, glass and stones) are separated for recycling through the use of mechanical processes.

Bio-drying

Both composting and stabilisation processes generate heat from the activity of micro-organisms. This drives off moisture from the waste. In order to keep the micro-organisms 'working', water has to be added to the waste (if it's dry, they die off).

It's possible to use this heat in another way. If the heat is used purely to drive off moisture, the process is described as bio-drying. When dry the material is easier to handle and to sort out some materials like metals, glass, etc. The remainder of the material will include dry paper and card and plastics, and will burn well.

This material can be used in power stations, cement kilns, etc. as long as they find the fuel acceptable, and as long as they comply with special conditions for their emissions which apply if they are burning waste. The material could also be used in incinerators, or pyrolysis / gasification plants.

An interesting point is that plants which operate to stabilize waste can be quite easily adapted to 'bio-dry' it. Some of the ways the plant operates need to be changed, but

in essence, the process can be very similar. This means that this type of plant could be quite flexible, adapting over time, or to market conditions, to generate different outputs.

Anaerobic Digestion

Anaerobic digestion was described above for pre-segregated wastes. The process can also be used to deal with mixed residual waste. However, in most operations, it forms a part of a larger system. Before material enters the digester, it's important to try to get non-organic materials out of the waste. So, these plants may be equipped with pre-sorting equipment designed to extract metals, plastics, and heavy materials such as glass and stones from the waste.

Also, digesters like to deal with small sized materials, so the remaining material is often sieved to produce two streams of 'mainly organic' material. The small size materials dropping through the sieve can be digested to produce energy etc. (see above). The larger sized ones are typically stabilised (see also above) using a composting-style process.

So, this approach is effectively a mix of sorting, anaerobic digestion and composting with the remaining residue being landfilled. Energy is also generated in the process.

Autoclave

Autoclaving involves putting waste in a vessel and heating it using steam under pressure. It's like a pressure cooker. In this case, the pressure cooker turns slowly like a tumble drier. Things like plastics shrink in the heat and become fairly easy to handle. The organic materials – paper, card, kitchen waste, textiles, and garden waste – are effectively sterilised and the material is broken into smaller pieces by the tumbling and the steam.

When the material comes out of the vessels, plastics (now in small lumps), metals (very clean, with the labels stripped off) and glass / stones etc. are separated out. This leaves for the most part a 'fibre' material.

This process is relatively new. It is attracting lots of interest from waste companies at the moment. A key point, though, is that the biodegradable material has not really changed much in terms either of its biodegradability, or the quantity of it. As a result, the question remains 'what to with the fibre?' Therefore, autoclaving needs to be part of a larger system, in which the fibre is either: Incinerated, pyrolysed / gasified, stabilised, or anaerobically digested - in other words, something else is needed in addition to the autoclave process.

The key atmospheric emissions are likely to be volatile organic compounds, which can be controlled to a degree. However, obviously, there would be other emissions associated with the further processing of the fibre material, so this is not the whole story.