Construction and the environment

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1.1 Scenario

A local authority is considering a planning application for a waste incineration plant on the site of a disused coal gas works. The existing site is surrounded by an industrial estate to the north and new residential estate including a school to the south. To the east runs the River Black flowing south to the Black reservoir.

Figure 1.1

1.2 Tasks

1. As a group discuss the issues of pollution. In particular consider the following:
   - The soil pollution of the existing site. Coal gas works usually have considerable soil contamination.
   - The disposal of the hazardous waste – methods used and the issues of health and safety.
   - The air pollution during the excavation and removal process. What will happen to the contaminated material?
   - The alternatives to the disposal of household waste. Landfill is becoming a major concern. Eventually there will be very limited availability.

2. Make notes about the group comments and produce a list of the main points for comparison later.
Figure 1.2  River to the right of the site.

Figure 1.3  Gas holders.
3 Download and read the document relating to the incineration of household waste from http://www.parliament.uk/post/pn149.pdf. (Remember the law on copyright if you want to copy any of the document.)

4 Using *Building in the 21st Century*, Chapter 10, read the sections on types of pollution. As you are reading consider the scenario against the following issues:
   - Are the problems local, regional or global? There may be more than one type.
   - What are the three main elements in the natural environment that could be polluted?
   - What legislation should be complied with?

5 You should now have an understanding of the main issues concerned with the planning application.

### 1.3 Activity 1

If you are working as part of a group, prepare for a mock planning debate and select:

- five students to represent the local authority planning committee
- two students to be the technical representatives of the waste disposal company applying for the planning permission
- two students to be representatives of local ‘green’ party members concerned with any environmental issues
- two students to represent the local businessmen from the industrial estate
- two students to represent the local school parent–teacher association
- three students to represent the local residents’ association
- two students to represent the local newspaper and who should take notes

Each section of students should research as much information about the planning issues as they can. Obviously, some will be very much in favour of the project and some very much against it (*Building in the 21st Century*, Chapter 9 should be helpful). The planning committee must not have any connection with the applicant or it will invalidate the debate.

The issues that should be considered are:

1. The existing derelict site is not providing much tax revenue to the local authority. The development will significantly increase the tax revenue.
2. The development will bring increased employment to the area.
3. Reduced mileage for the waste disposal trucks will mean less pollution.
4. The contaminated soil will be removed.
5. The temperature required for incineration; what fuel will be used?
6. What happens to non-combustible waste?
7. Will there be a waste transit site to remove recyclable material? If so will it be on the same site?
8. Will commercial waste or medical waste be incinerated on the site?
Will electricity generation or a combined heat and power (CHP) plant be incorporated? (Look at *Building in the 21st Century*, Chapter 11.)

The above suggestions are to enable a starting point. There are many different issues that have not been mentioned above.

At least a week should be allowed for preparation. Consider photographing your local waste collection vehicles. Are there specific vehicles to collect salvage/recyclable materials and others for household waste?

### 1.4 Activity 2

If you are working as individual students, you must present evidence to match the grading criteria for the National Award and National Certificate in Construction units. For copyright reasons the exact criteria have not been included; however, completion of the following tasks should allow assessment to be achieved.

Using the scenario described in this pack, the book *Building in the 21st Century* and the download from http://www.parliament.uk/post/pn149.pdf, present the following:

1. Identify the natural elements that could be polluted if the proposed waste incineration plant is given planning permission. Your presentation should include all aspects from site clearance of the hazardous materials, possible pollution during the site clearance, right through to when the building is fully operational.

   If you include specific natural features that could be affected and present practical methods to overcome the problems and protect the natural environment, a merit could also be achieved.

2. State in your opinion whether the likely pollution will be local, regional or global. It is arguable that it is all three: if you agree, state why and give full explanations. Will there be any indoor air pollution? If so, what in particular? Consider the problem of household waste. Look at what your family puts in waste bags or bins. How long does it remain awaiting collection, especially in the warmer months. Think about smells, dust and germs.

   For a merit compare and contrast the pros and cons for the proposed project: for example, incineration versus landfill; combustion gases versus decomposition gases from landfill; shorter travelling distances versus localised air pollution near densely populated areas. These are only examples; you can add to them or use your own.

3. Prepare an environmental audit based on the new building being constructed in skeletal frame metal clad with new office accommodation for the waste disposal company. There will be 40 office staff, six laboratory staff and a small works canteen on site. A hint would be to consider the combined heat and power (CHP) issue and the end of life for the buildings (see Chapters 8, 10 and 11).
For a merit produce a simple action plan to deal with the issues raised in the environmental audit. An example could be that the incineration process will require maintenance so regular shutdowns will be required. How will the offices be heated and powered during the shutdown periods? One option would be to carry out the work during the summer and close the offices for a compulsory holiday shutdown whilst maintenance is carried out.

To enable the distinction criterion to be met, substantial depth of study will be required justifying your proposed action plan both in the short and longer term. Within your justification emphasis on the environmental benefits must be shown.

4 Present practical methods that can be used to protect the natural environment both during site clearance and construction, and during plant operation in the longer term. In particular, show how the three specific elements soil, fresh water and air are to be protected. It is not necessary to go into great detail: show the basic methods. It may be easier to use hand drawn graphics to illustrate the methods. Colour will enhance your presentation and the use of coloured pencils as opposed to computer printed graphics will benefit the environment.

5 Prepare a checklist of all the materials that will be used in the proposed waste incineration plant. Look at Chapter 10 for help with identifying materials for salvage and those for recycling. Chapters 4–7 will help with the elements of the structure. In particular look at the type of foundations required for a skeletal framed building. What materials will be used? Are there any pollution issues with using them? When forming your checklist, consider the structure from the foundations to the top of the roof in an elemental form. Remember there is a river close by; therefore what type of soil conditions are likely? The soil will affect the suitability of foundation type. For your response, state the soil and subsoil type and the selected foundation type. You will also find Chapter 8 useful. Look at the various skeletal frame buildings and consider the materials from a recycling or salvage point of view.

To meet the merit criterion justify your selection for sustainable construction techniques. Note it is sustainable construction techniques, not the materials. Look at the construction issues and the end of life issues.