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Special Meeting of the Development Control Committee

Tuesday, 31 July 2007 6.00 p.m.
Civic Suite, Town Hall, Runcorn

David W R

Chief Executive

COMMITTEE MEMBERSHIP

Councillor Paul Nolan (Chairman)
Councillor Dave Thompson (Vice-Chairman)
Councillor Peter Blackmore
Councillor Sue Blackmore
Councillor Ron Hignett
Councillor Dave Leadbetter
Councillor Keith Morley
Councillor Shaun Osborne
Councillor Rob Polhill
Councillor Colin Rowan
Councillor Tim Sly

Please contact Michelle Simpson on 0151 424 2061 Ext. 1126 or michelle.simpson@halton.gov.uk for further information.
The next meeting of the Committee is on Monday, 13 August 2007

ITEMS TO BE DEALT WITH
IN THE PRESENCE OF THE PRESS AND PUBLIC

Part I

In accordance with the Health and Safety at Work Act the Council is required to notify those attending meetings of the fire evacuation procedures. A copy has previously been circulated to Members and instructions are located in all rooms within the Civic block.

Agenda Item 2

REPORT TO:	Special Development Control Committee
DATE:	31st July 2007
REPORTING OFFICER:	Strategic Director - Environment
SUBJECT:	Consultation in respect of Notification under Section 36 of the Electricity Act 1989 and section 90(2) of the Town and Country Planning Act 1990 to the Secretary of State for Trade and Industry.

The following consultation is submitted to the Special meeting of the Development Control Committee for consideration with a recommendation.

PLAN NUMBER:	07/00068/ELC
APPLICANT:	INEOS Chlor
CONSULTATION/ DESCRIPTION OF PROPOSAL:	Notification under Section 36 of the Electricity Act 1989 and section 90(2) of the Town and Country Planning Act 1990 to the Secretary of State for Trade and Industry for consent to construct and operate an energy from waste combined heat and power generating station with an approximate capacity of 360MW thermal and up to 100MW of electrical power
ADDRESS OF SITE:	Land off Picow Farm Road at INEOS Chlor
WARD:	of Borough wide interest

INTRODUCTION

This report relates to a consultation received from the Department for Trade and Industry for consent to construct and operate an energy from waste combined heat and power generating station with an approximate capacity of 360MW thermal and up to 100MW of electrical power.

The Borough Council is not the only consultee, but clearly has a significant responsibility as the host Authority for the proposed facility. The response of the Authority will be considered along with all other representations received by the Department of Trade and Industry before any decision is reached.

Under Department of the Environment Circular 14/90 'Electricity Generating Stations and Overhead Lines', which sets out that the Council should complete a 'Form B' (A copy of the from can be found at the end of the main report) which asks the Council to outline the grounds of any objection it may have to the proposed development and also if the Council wish a public inquiry to be held before the Secretary of State reaches his decision on the application. The Council are also asked to: identify who they consulted, to forward any representations received, identify any restrictions on the land, whether or not the development affect a building of architectural or historic interest, if the planning authority would wish to see modification s or conditions made to the proposal prior to consent being granted.

The Council will ensure that all representations and papers received will be sent to the DTI for consideration along with the comments of this Authority.

CONSULTATIONS

As part of the procedure and to ensure the widest consideration could be given to the proposal extensive consultation has been undertaken by the Borough Council and others involved in the process.

The Council consulted: -

979 individual properties within the vicinity of the site by letter. A site notice was also placed in the area. The following were also individually consulted:

Councillors (via weekly lists and copies of the non- technical summary, which accompanied the consultation)
Halton & St Helens Primary Care Trust
Halton Friends of the Earth
Helsby Parish Council
Wildlife Habitat Trust
Cheshire County Council
Weston Point Residents Association
Weston Village Residents Association
Mersey Estuary Conservation Group
Moore Parish Council
Preston Brook Parish Council
Hale Parish Council
Daresbury Parish Council
Frodsham Town Council
British Waterways
The Fire Service
United Utilities
Health and Safety Executive

Peel Holdings
Health Protection Agency
Liverpool City Council
Knowsley Metropolitan Council
St Helens Metropolitan Borough Council
Warrington Borough Council
Vale Royal Borough Council
Liverpool Airport PLC
Derek Twigg MP
Mike Hall MP
Friends of the Earth
Merseyside Environmental Advisory Service (environmental advisors to the Council)
Sutton Weaver Parish Council
Sutton Parish Council
Ellesmere Port & Neston Borough Council
Dutton Parish Council

The Department of Trade and Industry also consulted the following bodies/ organisations directly:

Environment Agency
Health & Safety Executive
Natural England
Government Office of the North West
Department for Transport
Ministry of Defence
Civil Aviation Authority
Department for the Environment, Food and Rural Affairs

INEOS Chlor as part of their submission process also consulted:

Approximately 900 surrounding premises
Derek Twigg MP
Mike Hall MP
Members of the INEOS site community forum (including local residents, and representatives from the Environment Agency, Police, Halton Borough Council, Vale Royal Borough Council and local schools)
Westlink Shipping
Environment Agency
Health and Safety Executive
Scottish and Southern Electricity
Halton Friends of the Earth
Halton Borough Council
Vale Royal Borough Council
INEOS also placed notices in the press.

In response to the consultation process the following representations have been received:

Summary of responses

CONSULTEE	SUMMARY OF RESPONSE	FULL DOCUMENT AVAILABLE AT APPENDIX
Cheshire County Council	No objection in principle. However additional information is required on traffic movements within Cheshire and the environmental implications of these movements. The County Waste Manager supports the application.	Appendix 1 – Document 1
Warrington Borough Council	No objection: • WBC supports the principle of sustainable waste management by moving waste up the waste hierarchy and supports the generation of energy from waste. • WBC consider the proposal consistent with PPS 10 as the facility would be of regional significance providing a major contribution to the long term regional waste management needs; and • No highways objections to the proposed facility.	Appendix 1 – Document 2
Helsby Parish Council	Raised objection on the grounds of Human Health Risk to the residents of Helsby and surrounding area. Helsby Parish Council submitted a	Appendix 1 – Document 3

	report written by Professor J Dearden on 'Human Health Risk Assessment. The report claims that the report submitted with the application was flawed and ignores impacts of fine and ultra fine particulate emissions, underestimates the risks to infants, and underestimates the cancer risk to the general population. It also states that it ignores the health effects of traffic pollution.	
Moore Parish Council	Objects on the grounds that Halton is historically polluted, that the proposal can only increase the threat to health and cause health problems and lead to traffic congestion.	Appendix 1 – Document 4
Derek Twigg MP	Raises concerns relating to the following: • Halton receiving large amount of the North West's Waste and impact on the image of the borough; • The height of the stack and the topography of the surrounding area and the impact the emissions would have on housing; • Health impact of emissions; and • The significant increase in the number of heavy goods vehicles.	Appendix 1 – Document 5
Mike Hall MP	Raises objection on the following grounds: • Threat posed to public health from the proposed facility and associated traffic; and • Traffic congestion	Appendix 1 – Document 6

Frodsham Town Council	Objects on the following grounds: • Detrimental to health; • Detrimental to ecology and nature conservation; • Adverse impact to local people due to noise, light, disruption and general amenity; and • Detrimental impact on transport infrastructure.	Appendix 1 – Document 7
British Waterways	Support the aspiration to transport Solid Recovery Fuel to the site via a wharf (not yet constructed).	Appendix 1 – Document 8
United Utilities	No objection to the proposal.	Appendix 1 – Document 9
Friends of the Earth	Objects on the following grounds: • Proposal adds additional and unacceptable pollution load in a borough that has been exposed to heavy industry and has some of the worst health in the country; • The perceptions of local residents of the impact of the facility on health; • Impact on health from emissions; • Unacceptable impacts on the visual amenity for local residents; • Unacceptable increase in traffic. • Impact on local economy in terms of investment, property values and the NHS; and • Impact on RAMSAR sites.	Appendix 1 – Document 10
Vale Royal Borough	No objection to the proposed facility subject to	Appendix 1 – Document 11

Council	• Further transport information identifying any impacts from the facility within Cheshire; • Detailed site investigation and mitigation measure in relation to contamination; • Detailed landscaping; • Provision of a Green Travel Plan; • A construction and environmental management plan; and • Provision of an off site ecological mitigation strategy.	
Halton and St Helens Primary Care Trust	The Director of Public Health, comments: • The applicant does not identify any significant concerns regarding particulate emissions from the process or their impact on human health in the surrounding area and, without any operational data; these assertions are not able to be reviewed. The Committee for the Medical Effects of Air Pollution have recently concluded that as there are clear associations between both daily and fine particles and effects on the cardiovascular system, a precautionary approach should be adopted in future planning. • Specific concerns relate to the transport of fly ash and flue gas treatment residues from Weston Point to Randle Island landfill site; this will result in twenty heavy goods' vehicle movements per day. If this hazardous waste is in the form of a dry dust, there is potential for it to become airborne, which could result in significant	A copy of the full report has previously circulated to all Members, but is again appended for ease of reference. Appendix 1 – Document 12

	depositions of dioxins, furans and metals at a local level. The report also states that existing evidence suggests that contemporary incineration facilities are less polluting and that modern abatement technology will help reduce the hazard from emissions provided that the facilities are properly operated at all times. The report recommends that the applicant quantify the effects of the additional particulate air pollution from the proposal on health of residents, a full Health Impact Assessment is commissioned and appropriate control measures are put in place in relation to the transportation of hazardous waste.	
Ward Councillor	Objects to the proposal and raises concerns regarding the potential impact on residents of Halton. Mainly the risks to health, the impact on the already congested local highway network, the impact of noise on neighbouring residents and the impact on the image of the borough and how this will affect investment. The councillor states that recycling items is preferable to burning them and believes that communities should take responsibility for their own waste and is concerned about the implications of the proposal on global warming.	A copy of the full report has previously circulated to all Members, but is again appended for ease of reference. Appendix 1 – Document 13
Halton Action Group Against The Incinerator	Raise objections due to the location of the facility in such close proximity to residential properties. The report raises further objections on the grounds of Human Health Risk to the residents of the surrounding area.	This report has already been copied to members and attached with additional information received from

	The report claims that the report submitted with the application was flawed and ignores impacts of fine and ultra fine particulate emissions, underestimates the risks to infants, and underestimates the cancer risk to the general population. It also states that it ignores the health effects of traffic pollution. The report raises questions over the calculation of the stack height and the adequacy of a 105m high stack.	the action group see appendix 2 This appendix also includes letters/ correspondence received following the Members Briefing and Awareness meeting of the 21st June, 2007

In addition 826 letters of objections and 2 petitions of 211 signatures have been received raising objections on the following grounds:

- That Runcorn is already one of the highest polluted areas in the country due to industrial heritage and soil pollution, air pollution traffic and air traffic
- Proposal would increase the threat to health
- Already high standard mortality ratio and cancer, heart and respiratory diseases
- Dioxins and poisonous gasses produced
- Proposed plant source of cancer and birth defects
- Detrimental environmental impact
- Impact on already congested roads
- Noise pollution
- Impact of chemical industry in Weston village in the past community devastated from dangerous gases
- Chimney too low compared to surrounding area prevailing winds blowing emissions on to surrounding area
- High existing levels of emissions the development would not enhance the town as suggested in government policy
- Capacity of proposal far exceeds local area
- Undermine disposal of waste in an environmentally sensitive way
- Large quantities of waste would be generated and would be toxic
- Undermines effects to reduce carbon emissions
- Undermines proximity principle
- Undermines councils healthy living programme
- Resident’s not properly informed and insufficient time given for debate

- Would blight the town as high tech business will not wish to locate hence impact on image now considered to be up and coming
- Luvella incinerator closed down 18 years ago due to health grounds
- Impact on road network and capacity
- Massive eyesore
- Light pollution with 24 hour working
- Close to residential properties and densely populated area
- Emissions from traffic
- Devalue properties
- Anxiety of living in close proximity to facility
- Dust and fumes
- Impact on children
- Already effected by toxic air chocked by fumes
- Hugh amount of heavy goods vehicles
- Storage of waste would encourage vermin
- Removal of mature trees
- Proposal contravenes the stated aims and objectives of the adopted UDP
- Negative effect on economic activity
- Visual intrusion
- Effects on health of residents
- Due to recycling targets the fuel for incineration is likely to be significantly reduced and therefore may have to shut down or find alternative sources of energy.
- 1 tonne of waste generates 2 tonnes of Co2 INEOS would produce 1.7 million tones per year.
- Incineration inefficient way of producing energy when compared to coal, gas and oil.
- Children more susceptible to dioxins
- Precautionary principle should apply.
- Human Health Risk Assessment fails to take account of pollution from site traffic during construction and operation and ignores effects of thallium and vanadium and does not even mention the risks from polybrominated diphenyl ethers (PBDE’s)
- No sites on Frodsham and Helsby considered in relation to health
- No acknowledgement to effect on nature
- Not clear if terrain has been adequately considered
- Ignores above ground produce such as cabbages
- Incorrectly claims that all estimated carcinogenic risks are significantly below the claimed 1in 100,00, which itself is too high by a factor of 10
- Perceived threats stress and worry and house prices
- No account taken of background levels
- No alternative routes for if Picow Farm Road is closed

- Conflict on picow farm road with cyclists as Picow Farm Road is narrow
- Plumes from cooling towers
- Having to pay for the environmental statement
- Greater risks of road accidents
- Impact on wildlife
- Impact on air quality that already exceeds Government guidelines
- No consideration of residents purely financial decision
- Water contamination
- Contrary to Government policy
- Effects on employees
- Noise from railway for the properties that are very close by
- Quality of life for residents

1 letter of support has been received stating the following:

- The project has wider economic benefits
- That INEOS are responsible company and that he lives near by to the proposal
- Landfill cannot keep being used for waste disposal

Representation received from the DTI

A number of representations have been forwarded to the Council from the Department for Trade and Industry, for consideration. These include: -

580 letters of objection and 1 petition of 254 signatures raising the issues mentioned above.

44 letters of support relating to job security and the proposal is in accordance with government guidance. The following comments were also received: -

Ministry of Defence confirms no safeguarding objections to the proposal.

Civil Aviation Authority made the following comments:

- Aviation obstruction lighting may be required;
- Flaring and venting of gas should be anticipated, even if only during emergency situations. This might have a potential impact upon the safe operation of aircraft in the immediate vicinity. If there were such a danger, the site would need to be promulgated to the aviation community along with advisory avoidance.

Environment Agency has no objections in principle, but would like to make the following comments:

- The documentation provided highlights the potential for contaminant sources to exist at the site. No supporting information on the likely extent of contamination or the risks posed to controlled waters from such contamination has been provided. Intrusive investigations at the site should be provided before any planning permission is granted.
- If permission is granted the Environment Agency recommends a number of conditions relating to contamination and an oil interceptor.

Natural England have concerns about the potential additional visual impact of the proposed development which include a 105m stack and large buildings of 47m height and considerable mass. It would be sited in a very prominent area in close proximity to pats of the Mersey Estuary, which are of high value for landscape, recreation and nature conservation. Whilst it is recognised that the site has many practical advantages and is within a highly degraded industrial setting, it is important every effort is made to ensure that the proposed development has an overall positive, rather than negative or neutral, visual impact. The EIA has considered the visual and landscape impact, but further information should have been provided.

Natural England are satisfied with the methodology and findings of the ecological surveys, but consider that opportunities for mitigation, particularly in terms of enhancement, have been lost.

In addition to these consultation exercises, the Council also hosted a briefing session for all Members, on the 21st June, when presentations were given by INEOS, Halton Action Group Against The Incinerator, the Director of Public Health and the Environment Agency. An opportunity to ask questions of the various parties was given. The transcript of this briefing session is appended to this report, as is the response from the interest groups to questions raised on the evening and in subsequent correspondence. (Appendix 3 – Transcript of the Members Briefing and Awareness Session)

In response to issues raised at this session, authorities both in England and across Europe, who have incinerators within their areas were contacted and asked to share their knowledge and experiences. As a consequence letters were received from Antwerp (the response received was from the interlocal incineration company ISVG) and the Head of Environmental Health at Enfield. Copies of there letters can be found in Appendix 4. We have also approached Coventry City Council, Kirklees Metropolitan Council, Authorities in Bonn and Cologne and are still awaiting responses.

SUMMARY OF PROPOSAL AND JUSTIFICATION PROVIDED BY THE APPLICANT IN SUPPORT OF THE PROPOSAL.

The proposal is a Notification under Section 36 of the Electricity Act 1989 and Section 90(2) of the Town & Country Planning Act 1990 to the Secretary of State for Trade and Industry for consent to construct and operate an energy from waste combined heat and power generating station with an approximate capacity of 360MW thermal and up to 100MW of electrical power.

The proposal

The site in total comprises approximately 10.7 hectares. The proposal would require the relocation of the existing INEOS workshop and training facility from the main site to a separate location (known as the secondary site). This site has been identified in the application and occupies an area of 1.4 hectares and is adjacent to Gate 2 at the Runcorn Site off Bankers Lane. The secondary site is to be subject of a separate planning application.

The applicant in support of the application provided an Environmental Assessment and Human Health Risk Assessment. Both are appended to this report to assist Members.

The application seeks approval for the demolition of the existing buildings, site clearance and provision of a generating station comprising: boiler building (47m in height), bunker, tipping hall, flue gas treatment, turbine hall, cooling towers, stack of 105m in height, workshop and stores, administration building, water treatment plant, switch house, weighbridge and rail sidings (x6), new access road and car parking and ancillary development including services and utilities.

The proposed EfW plant would act as a Combined Heat and Power (CHP) facility to produce both steam and electricity that would be consumed on the Runcorn site. The plant would have a total capacity of approximately 360MW (thermal) and would be capable of generating up to approximately 100MW of electrical power and 140 tonnes per hour of steam for export to and use on the Runcorn site. The plant would provide approximately 20% of the Runcorn site's energy requirement and replace energy that is currently derived from natural gas. The plant would operate on a 24 hour, 365 days per year basis.

Large amounts of electricity are required for the processes carried out by INEOS. The Runcorn Site is the largest single consumer of energy in the UK, taking about 1% of the national supply of electricity. In addition, the Site produces other chemicals such as OVC, solvents, refrigerants and sulphur-based compounds, which require heat provided by steam. The average energy consumption of the Site is about 335MW (electrical) of electricity and about 160MW (thermal) of process heat (steam).
Some steam is generated by the burning of surplus hydrogen and as a by-product of the chemical process. However, the vast majority of the Runcorn Site's energy needs are met through the purchase of natural gas. Approximately 30% of this is burnt directly within the site to produce steam and some electricity. The remaining 70% is supplied to a neighbouring power station operated by Rocksavage Power Limited (RPL).

Fuel

The fuel for the facility is derived from municipal waste. The fuel is known as both SRF (Solid Recovered Fuel) and RDF (Refuse Derived Fuel). It is expected that it would be sourced primarily from local authorities in the northwest region.

RDF/SRF is derived from Municipal Solid Waste (MSW) which is the remnant of household waste after kerbside recycling. This means that in principle the major recyclables (for example glass, metal cans, plastic bottles, paper, and garden waste etc) do not enter the MSW stream. In practice, however, kerbside recycling is not 100% effective, and MSW does contain limited quantities of these materials.

Prior to the formation of RDF, MSW is processed in a Mechanical and Biological Treatment (MBT) plant. MBT plants tend to go through a process of removing remaining recyclables.

The material remaining after these processes contains material that is not recyclable, such as wood, cardboard, non-recyclable paper, non-recyclable plastics, textiles, rubber, leather, inerts etc. It is this that is used to produce the RDF that is proposed for use as fuel for the Energy from Waste facility. The resulting material has a higher calorific value than untreated waste. MBT facilities do not form part of the project subject to the current application.

There are relatively few options to manage such residual materials; the main options in common use are Landfill and Incineration.

Landfill is categorised as a method of 'disposal' which sits at the bottom of the waste hierarchy. Incineration without energy recovery similarly represents a 'disposal' option. Incineration with energy recovery, or energy from waste facilities, recover useful energy and can reduce the amount of waste requiring disposal by landfill to less than 10% of the amount fed. It has been proposed that plants with an overall Low Calorific Value (LCV) thermal efficiency of greater than 26% may be categorised as 'recovery' rather than 'disposal' options. The overall LCV thermal efficiency of the proposed Runcorn plant is anticipated to be over 39% and would therefore fall into this recovery category, a tier above disposal in the waste hierarchy.

The facility would have the capacity to consume approximately 750,000 to 850,000 tonnes of fuel per year. The municipal waste would be taken directly from local authorities and taken to treatment facilities. These treatment facilities are not part of this application and not owned or proposed by INEOS.

Process and technology

The fuel would be delivered to the tipping hall and the fuel discharged into the fuel bunker. The fuel would be burned in the boilers, which would each comprise a combustion chamber and a steam generator section.

The fuel bunker would have up to approximately five days storage at full operation capacity the fuel would pass through equipment to ensure that the particle size and composition is suitable for feeding to the boilers.

Since the Environmental Statement INEOS Chlor have selected Water-Cooled Moving Grate (WCMG) as the technology to be used in the proposed facility. As part of the initial design phase of the project the applicant reviewed all available technologies. These included advanced combustion technologies (ACT) such as Pyrolysis, Gasification and Plasma gasification as well as conventional combustion technologies. The assessment found that there were few ACT plants operating in Europe and these were only at a small scale and not appropriate for the proposed plant. A number of large plants have been built using pyrolysis technology but these failed to operate successfully and have been shutdown.

In terms of conventional technology both moving grate and fluidised bed technologies were considered. The conclusion of the study was that fluidised bed technology offered no energy efficiency or cost advantages over the moving grate technology. Fluidised bed technology is relatively uncommon and a number of plants have had significant operating problems. On the other hand, the study concluded that the moving grate technology is well proven with many years experience of successful operation. Moving grate technology is the industry standard across Europe. In addition fluidised beds produce a far higher proportion of hazardous ash that requires disposal.

At the time of writing the Environmental Statement, the detailed combustion technology had not been finalised. However, the Environmental Statement was based on conservative ‘worst case’ assumptions for each topic to ensure that the environmental effects were not underestimated. Therefore the applicant believes that the selection of the technology does not affect the conclusions reached in the Environmental Statement. The technology selection will be considered by the Environment Agency in detail as part of the Prevention Pollution Control application process to demonstrate the use of Best Available Techniques (BAT).

Each boiler would comprise a combustion chamber where the fuel is burned and steam generator section where high-pressure steam is produced. The combustion chamber would maintain the hot flue gases at 850 °C for a two second resistance time, in compliance with the Waste Incineration Directive (WID). The flue gases would then pass over evaporator, superheater and economiser banks that cool the flue gases by generating steam. This steam would be fed to the condensing/ passout steam turbines. Air supply for the boilers would be drawn from the bunker area to remove the emission of dust and odours from the bunker and tipping hall.

Bottom ash would be extracted from the furnace section and fly ash from the steam generation section. Bottom and fly ash would then be conveyed to storage silos for removal from site.

The flue gases from the boilers would be treated prior to discharge to atmosphere. This would include injection of hydrated lime and activated carbon to neutralise any acidity in the flue gases and absorb any contaminants. Further particulate removal would take place by passing the flue gases through bag filters. Induced draft fans would then transfer the flue gases to the multi-flue single stack for discharge.

Water would be pumped via the economisers into the boiler drums. Water would be taken from these drums and evaporated and superheated o produce steam. The steam would then pass into two passout condensing steam turbines. Process steam for the Runcorn site would be extracted from the turbine. This would then be superheated to 240 °C, at which temperature it would be exported to the Runcorn site via an existing steam main. Up to 140 tonnes per hour of steam may be exported. The steam not exported would pass through the steam turbine to the condenser. The condenser would be cooled using re-circulating cooling water. This water in turn would be cooled by evaporative cooling towers.

The CHP plant would generate up to 100 MW of electricity. A small proportion of this would be used to power the electrical equipment within the facility; the remainder would be transmitted to the Runcorn site's existing electrical distribution.

Alternative sites considered by the applicant

A review has been carried out of possible alternative sites for the project. A key consideration was that the project would be a combined heat and power facility, supplying steam to the Runcorn site in addition to electricity. Given that it is not practical to transport steam over long distances, sites on or close to the Runcorn site were considered to be preferable. A further key criterion was the availability of road, rail and water-borne transportation links. Sites with good multi-modal links or potential for such links were considered to be preferable.

The following are alternative locations that were considered by the applicant:

Former Lagoons, Clifton – This site lies to the South East of the Runcorn Site. The plot is considered to be of sufficient size to accommodate the development and has good access to the road network being adjacent to the Runcorn Expressway/M56 Junction 12 intersection. It also borders the Weaver Navigation, and hence would be accessible to water-borne transport. However the site has no rail link. The nearest possible rail connection is approximately 1km away but no suitable rail route has been found to the site. This site is also located approximately 1.5kms from the large steam consumers on the Runcorn site. Therefore, the use of this location would require a major upgrading of the steam distribution system. It was concluded that the disadvantages of this site in terms of the feasibility of provision of a suitable rail link, the likely environmental effects of such provision and the operation feasibility and efficiency with respect to steam distribution, were such that this site was not a preferred site.

Site of existing Weston Point Power Station – The power station is located at the centre of the Runcorn site, adjacent to the Runcorn & Weston Canal. It is the current hub of steam supplies to the site, and has an existing electrical power infrastructure. The power station is due to be taken out of service in the near future, and some facilities could be retained for new development.

The construction of the plant would require a minimum operational area of 8ha of land. Demolition of the existing power station would release approximately 3 ha, which is considered to be insufficient. The site is bordered by operating chemical plants, which it is not considered practical or cost effective to relocate.
Although the power station was previously connected by rail, the link was removed some years ago and the route built over such that it is not feasible to reinstate the rail link. In addition access to the Weaver navigation is difficult to achieve due to the presence of a major pipe and cable route. Road vehicles can access the site via the expressway. However, the transport links within the site are poor and the additional traffic would have a negative impact on current operations. Similarly, the need for construction personnel to access this central part of a top tier COMAH site on an extended basis would give rise to safety and security concerns. It was concluded that this location is constrained by a number of factors, particularly a lack of space and rail facilities.

Site of Former Chemical Plant, Adjacent to Gate 2 – part of this site was formerly occupied by a chemical production facility. The location is considered to be of a sufficient size to accommodate the proposed facility but its shape is such that an efficient layout cannot be achieved. In addition, the scope for construction lay down area to be provided near to the site is very limited.
This site would have good road links. However the nearest rail link is at Picow Farm sidings, approximately 1km away. With respect to rail, the location is adjacent to the former rail link into the Runcorn site, which was removed some years ago and which ran significantly close to a number of residential properties. Reinstatement of this rail link is considered to be undesirable due to the loss of amenity to local residents and disruption to traffic caused by the operation of the two level crossings. It was concluded that this site was limited by the disturbance that would be caused by reinstating the rail link and the poor layout of the development.

Ecology and nature conservation

The application site and the surrounding area have been subject to a study to identify any features of ecological or nature conservation importance. This study confirmed that the site is not subject to any nature conservation interest. The nearest statutory designated site is the Mersey Estuary, which is a site of international importance for nature conservation and is located 0.2 km to the west of the site of the proposed EfW plant. This site is designated as a Special Protection Area (SPA),Ramsar site and Site of Special Scientific Interest (SSSI) and is of importance for its large areas of intertidal sand and mudflats and smaller areas of reclaimed marshland, saltmarsh, brackish marshes and boulder clay cliffs, and for its bird population interest during the summer and winter months.

Effects arising from the project on the designated habitats and the important wintering bird populations supposed are assessed as negligible. There is thus no likelihood of a significant effect on any of these sites. No effects on any other designated sites within the study area are likely to result from the project.
A habitat survey of the application site was undertaken to identify the habitat type present and the potential for any notable species. The main site comprises existing industrial buildings, hard standing, areas of boundary tree planting, scrub and amenity grassland and planting. The workshop relocation site comprises existing INEOS industrial buildings and hard standing, which consists of mainly large areas of disused plant with scattered scrub.
The majority of the buildings on the site are unsuitable for roosting bats due to their construction, having pitched steel corrugated roofs, flat-topped roofs and steel vessels. The Weston Photographic Studios building was subject to a daytime bat survey, which confirmed that it is unsuitable for hibernating bats. No evidence of bats was recorded within the roof space or cellar of the building and no further survey work for bats is considered necessary.
The project would result in the loss of species poor semi-improved grassland within the former allotments adjacent to the railway. This habitat is suitable for common species of reptiles namely slow worm and common lizard and these are assumed to be present but would be translocated to a suitable receptor site prior to construction. The significance of the effect on these species is considered by the applicant as minor adverse.

<u>Waste products</u>

The facility would produce bottom ash, fly ash and Flue Gas Treatment (FGT) residues.

Bottom ash
This is a non-hazardous material suitable for use in building blocks, road aggregates etc. it is anticipated that this material would be sold to a contractor for reuse and opportunities would be sought for its beneficial reuse. Any quantities that cannot be reused would be disposed to landfill. Transport of the bottom ash from the site would be by road.

Fly ash and FGT residues
These residues would be classed as a hazardous waste as they contain substances including heavy metals and dioxins etc. INEOS operates an existing landfill site at Randle Island in Runcorn that is licensed for the disposal of hazardous materials. It is envisaged that fly ash and FGT residues arising from the project would be transported to Randle Island for disposal. The distance between the application site and Randle Island is approximately 4km, and transportation would be by road.

It is anticipated that approximately 260,000 tonnes per year of these materials would be produced, although the exact quantities would depend on the composition of the fuel and the technology of the boiler. The indicative ranges (originally stated) are as follows:

- Bottom ash: 110,000 to 220,000 tonnes per year;
- Fly ash: 10,000 to 120 tonnes per year;
- FGT residues: 30,000 to 35,000 tonnes per year.

These figures have subsequently been amended to:

The maximum tonnes per annum area as follows:

- Bottom ash 191,000
- Fly ash 21,000
- FGT residues 54,000

(Confirmed in Paragraph 7.6 in the response to question raised by Merseyside Environmental Advisory Service)

Socio-economic effect

INEOS Chlor Limited is the largest of the companies operating on the Runcorn site and provides a co-ordinating role and a number of services to other companies. The site currently employs approximately 2200 personnel, of which approximately 6000 are contract employees and visiting employees who service the resident companies. The majority of employees work normal daytime hours, although at night and at weekends there are typically approximately 100 people working on the site.

The proposal would require construction personnel to support the construction process throughout a period of approximately three and a half years. During the early stages of the civil works approximately 100 workers would be employed. This would increase throughout the construction programme and would peak at approximately 750 workers (during the plant erection stage) In addition, the project would result in a capital expenditure of approximately £300 million.

The local area is likely to benefit indirectly through associated expenditure of construction personnel at local shops and businesses. The indirect employment and economic benefits generated through the construction phase would include, for example, the local purchase of raw materials and the temporary hiring of plant and machinery. This multiplier effect would be likely to support other construction businesses based within the region, including haulage companies and plant hire services. The overall effect on employment is considered to be minor to moderate beneficial.

During operation it is anticipated that the project would provide employment for approximately 50 people. At this time, it is not possible to predict accurately where these employees may be currently based or whether they would be likely to relocate. However, it can be assumed that at least a proportion would be already resident within the northwest and possibly, within the borough.

The proposal would also provide wider regeneration of the area. The access road into the site would provide access to Salt Union and eventually to Weston Docks. This would remove HGV traffic from Sandy Lane. The access road would also allow the full redevelopment of Weston Docks, which at present is restricted due to poor access through a residential area.

Traffic and Transport

The fuel for the proposed facility would be delivered by rail and road. The fuel generated in the Manchester area will be delivered by rail. The worst-case scenario has been assessed for the other northwest regions, which is that the fuel would come in by road, there is a possibility that some may come in by rail, this is dependant on the location of the fuel plants. Even with this worst-case scenario, the applicant states, there is likely to be no significant adverse impact on the highway network. The site would be accessed from a new access road that will form a priority junction with Picow Farm Road. This would ensure that no traffic would need to travel through the Weston Point residential area. Once the road is constructed access will be provided from Picow Farm Road to Salt Union and Weston docks when development comes forward, thus removing HGV traffic from Sandy Lane.

The existing railway sidings would be modified and extended to allow several trains at a time. The fuel coming in by rail would then be offloaded from the trains using a gantry crane onto shuttle vehicles, which would then transport the containers within the site to the tipping hall, where they would discharge into the fuel bunker.

When the road deliveries reach the site, they will pass over a weighbridge and then directly into the tipping hall. The tipping hall would be an enclosed building where the containers and lorries would discharge their contents into the fuel bunker.

During construction the maximum number of HGV movements to and from the development would not exceed 400 movements a day (200 In and 200 Out). The 400 movements are during concrete pouring at other periods the movements should not exceed 150 movements per day.

The Civil phase would require approximately 100 construction staff generating 124 movements a day. The plant erection phase requires the most staffing with a figure of up to 750 construction workers, this would generate approximately 930 movements a day during the busiest periods of construction. This is assuming the car driver mode share of 62% (source: Neighbourhood Statistics for Halton Borough).

Operational Phase

All deliveries are to be routed from the expressways along Picow Farm Road onto a new access road into the site, taking away all HGV movements from Weston village. Table 6 of the T.A indicates 384 HGV movements a day, this is two way 192 in and the same out over a 12 hour period, 16 HGVs in per hour one every 4 minutes in. This will then distribute onto the expressways either North or South. This gives a daily impact on the expressways of 3%or less dependent on the North South split.

Congestion currently occurs on the northbound Expressway on the approach to the Silver Jubilee Bridge and on the southbound A557 on the approach to the M56 Junction 12. The applicant's traffic assessment concludes that this congestion would not be significantly affected by the traffic arising from the project.

Rail link for waste deliveries

Transport of waste to the site from Manchester is proposed by rail, and it is the intention of INEOS to encourage all other the relevant local waste authorities to include obligation for transport fuel by rail during their MBT contract placement process.

Rail access is included in the Transport Assessment. This states 6 rail sidings are available to accommodate fuel deliveries, waiting and unloading. This would allow a further 3 for extraordinary demand. The reports state 5 trains per day will deliver fuel to the site, 3 from Manchester and up to 2 trains from other sources.

Discussions between Ineos and Network Rail identify the need for some improvements to the signalling on the branch line.

Transport of Hazardous Waste from the site

The Transport Assessment shows that there will be up to 20 vehicle movements per day associated with fly ash and reaction products, which will need to be transported to the hazardous waste site at Randle Island. The route to Randle Island is Picow Farm Road to the Expressway, leaving at the Astmoor junction and travelling over the swing bridge via Astmoor Road.

Employee travel demands

The assessment project that staffing level at the plant will be 50 employees providing 24-hour cover.

Noise

The noise assessment provided indicates that the noise and vibrational effects from the site are likely to have no significant effects. Provision for noise mitigation along the southern boundary of the site has been made within the project design.
Paragraph '9.10 of the ES states that --"It is considered that the following construction sources would have the potential to give rise to significant vibration effects:

- Demolition of existing structures on the site; and
- Driven piling or vibratory piling (bored or augured piles would be unlikely to give
  rise to significant levels of vibration)."

If this is the case strict controls and procedures for contractors to ameliorate the effect will be essential. The applicant has confirmed that it not take place without prior consultation with the Council.

Paragraph 9.11 of the ES states that --- "Significant vibration effects due to HGV's are unlikely provided that the haul roads do not contain significant pot holes or ruts"

Air Quality

The proposed facility will be designed to meet the limits specified within the EU Waste Incineration Directive and the site and emissions would be monitored. The emissions from the facility and from traffic are not considered to have significant adverse effects. (Further information is provided below)

Townscape and Views

The project would comprise a layout of several buildings housing the main equipment for production of electricity and steam using fuel derived from municipal waste. The main building/boiler house would be located in the northern section of the site. The building comprises a simple rectilinear form, clad in metal sheeting, with a roof height of 47m. A stack for the discharge of flue gas would rise to 105m at the northern end of the site. Smaller buildings linking to the production of steam and electricity include fuel bunkers, turbine hall, offloading station and tipping hall. Cooling towers are associated with these buildings. A small office building and weighbridge would be located near the sites road entrance, which provides a new link from Picow Farm Road. The existing rail link would be modified to incorporate unloading areas, gantries and sidings.

The project site is typical of the urban character of the industrial district of Runcorn. This area has a poor condition, local value and a low sensitivity to change. The introduction of a group of relatively large scale buildings and infrastructure elements and a high level stack into this location would form a visually prominent new element in an industrial setting, and is unlikely to be out of context with its surroundings.

The applicant has provided further supporting information and has responded to a number of questions raised by the Council, Merseyside Environmental Advisory Service and the Halton Action Group Against The Incinerator. These responses have been attached in Appendix 5 – Information received from the applicant.

SUMMARY OF RELEVANT POLICIES

European and National

The introduction of the European Union Landfill Directive (1999/31/EEC) has fundamentally change the way waste is managed in the UK, with the most significant requirement being the progressive reduction in the amount of waste permitted in landfill. For example, by 2020 no more than 35% of the amount of biodegradable municipal solid waste produced in 1995 can be disposed of in landfill sites. This may place a greater emphasis on incineration as a means of waste disposal.

The European Union Waste Incineration Directive (often termed '-WID') 2000/76/EC will further reduce the potential to pollute. This was transposed into UK law on 28 December 2002 and all-new incinerators already have to comply with the tighter provisions of this Directive. This new Directive aims to reduce and/or prevent possible negative effects on the environment caused by emissions into air, soil, surface water and groundwater, and thus lessen the risks which these pose to human health. As well as stricter emissions limits, this Directive also requires better management systems and increased monitoring of emissions. The Waste Incineration Directive therefore imposed stricter operating conditions and emissions standards.

The overall objective of Government policy on waste, as set out in the strategy for sustainable development, is to protect human health and the environment by producing less waste and by using it as a resource wherever possible.

The Governments Waste Strategy 2007 (published in May 2007) sets out the national overview for dealing with waste. The Strategy includes the following points as two of its main objectives:

- Securing the investment in infrastructure needed to divert waste from landfill and for the management of hazardous waste; and
- Getting the most environmental benefit from that investment, through increased recycling of resources and recovery of energy form residual waste using a mix of technologies.

The Government has a number of key proposals for action, on of the main elements of the new strategy being to incentivise efforts to reduce, re-use, recycle waste and recover energy from waste.

The Government proposes that one of the key ways to secure its objectives is to secure investment in infrastructure. One of the ways the Government aims to secure this is through Obligation Certificates (ROCs) to encourage a variety of energy recovery technologies (including anaerobic digestion) so that unavoidable residual waste is treated in the way, which provides the greatest benefits to energy policy. The Strategy considers that recovering energy from waste (EfW), which cannot sensibly be recycled, is expected to account for 25% of municipal waste by 2020.

The Governments overall objective for waste policy in securing the future is the protection of human health and the environment by producing less waste and by using it as a resource wherever possible. Through more sustainable waste management – reduction, re-use, recycling, composting and using waste as a source of energy – the Government aims to break the link between economic growth and the environmental impact of waste.

Chapter 5 of the Strategy deals specifically with recovering energy from waste and states that:
‘Recovering energy from waste which cannot sensibly be reused or recycled is an essential component of a well-balanced energy policy, and most of our European competitors already pursue this vigorously. Denmark, for instance, derives 3.6% of its electricity supply from municipal waste.’

INEOS have been quite open about the fact that an increase in gas prices which has affected the ability of the site to run efficiently has led to the formulation of the proposal for the EfW facility. The Governments Waste Strategy 2007 also recognizes this fact and establishes it as a reason why we should be looking towards deriving energy from waste. It states:
‘Recent sharp increases in energy prices, and continuing instability in a number of supplier countries, underline the importance of maximising

energy recovery from the portion of waste which cannot be recycled. This means using the most efficient technology for the job, and recovering heat as well as electricity where practicable.'

The Strategy also recognizes the public concerns regarding EfW facilities, stating that:
'The recovery of energy from waste has been held back by public fears over alleged health effects, and fears that the development of suitable infrastructure would lock in wastes which could otherwise be minimised or recycled. Concern over health effects is most frequently cited in connection with incinerators. Research carried out to date shows no credible evidence of adverse health outcomes for those living near incinerators. The relevant health effects – primarily cancers – have long incubation times, but the available research demonstrates an absence of symptoms relating to exposures twenty or more year ago, when emissions from incineration were much greater than they are now. Very demanding EU standards for dioxin emissions now apply. The Health Protection Agency has published a short position statement on the health impacts for municipal waste incineration which reaches similar conclusions.'

The Waste Strategy 2007 clearly indicates that in order to resolve the landfill crisis and effectively manage the disposal of our waste we should consider Energy from Waste Facilities as part of the solution. Not only can these facilities aid the reduction of waste going to land fill but can also provide an energy source. The Government clearly recognizes public health concerns but advises that through research carried out there is no 'credible' evidence to support such fears.

In respect of waste management, Local Planning Authorities are advised within-

Planning Policy Statement 10 Planning for Sustainable Waste Management that

- Paragraph 26: In considering planning applications for waste management facilities, waste-planning authorities should concern themselves with implementing the planning strategy in the development plan and not with the control of processes which are a matter for the pollution control authorities.

- Paragraph 27: the planning and pollution control regimes are separate but complementary. Pollution control is concerned with preventing pollution through the use of measures to prohibit or limit the release of substances to the environment to the lowest practicable level. It also ensures that ambient air and water quality meet standards that guard against impacts to the environment and human health. The planning system controls the development and use of the land, and the impacts of those uses on the development and use of land. Waste planning authorities should work on the assumption that the relevant pollution control regime will be properly applied and enforced.

- Paragraph 30: Modern, appropriately located, well-run and well-regulated, waste management facilities operated in line with current pollution control techniques and standards should pose little risk to human health. The detailed consideration of a waste management process and the implications, if any, for human health is the responsibility of the pollution control authorities. However, planning operates in the public interest to ensure that the location of proposed development is acceptable and health can be material to such decisions.

- Paragraph 31: Where concerns about health are raised, waste-planning authorities should avoid carrying out their own detailed assessment of epidemiological and other health studies. Rather, they should ensure, through drawing from Government advice and research and consultation with the relevant health authorities and agencies, that they have advice on the implications for health, if any, and when determining planning applications consider the locational implications of such advice. In turn, the relevant health authorities and agencies will require sufficient understanding of the proposed waste management process to provide considered advice.

- Paragraph 36: waste management facilities in themselves should be well-designed, so that they contribute positively to the character and quality of the area in which they are located. Poor design is in itself undesirable, undermines community acceptance of waste facilities and should be rejected.

The above highlights that planning process should not duplicate the control regimes set out in separate legislation and that the planning authority should assume that the pollution control regime will be properly applied and enforced.

Further relevant guidance is given within Planning Policy Guidance (PPG24) Planning and Noise and PPS 23

PPG24 outlines the Government's view on noise and planning and *focuses on the planning of new noise-sensitive development in already noisy environments*. It establishes Noise Exposure Categories (NECs) that are applicable when planning new residential developments affected by transport noise or by mixed noise sources in which industrial noise does not dominate. However, these NECs cannot be used for assessing noise impacts of new or existing noise sources on existing housing. In the case of proposed noise-producing development affecting existing noise sensitive premises, PPG24 advises that BS 4142:1997 can be used, within its own terms of reference, to predict the likelihood of complaints, and hence assist in the assessment. However, many planning authorities adopt more stringent standards than are implied in PPG24, which really only discusses the likelihood of complaints. PPG24 does not offer a single set of criteria, but introduces the concept of NECs that provide flexibility to take account of local conditions and the needs of the local community and economy.

(Planning Policy Statement 23) states that where there is a reason to suspect contamination, such as the existence of former industrial uses, there should normally be a desk study of the readily-available records assessing the previous uses of the site and their potential for contamination in relation to the proposed development as a minimum. If the potential for contamination is confirmed, further studies by the intending developer to assess the risks and identify and appraise the options for remediation should be required.

Recent guidelines in PPS23 set out the Government's policies on pollution control and planning. Annex 1 paragraph 1.48 regarding planning conditions states "*planning conditions could be used in respect of [...] impacts such as noise, vibrations, odour, air pollutants and dust from certain phases of the development such as demolition and construction*".

<u>Local and Regional Policy Considerations</u>

There are a number of policies at both the Regional and Local level, which will be of importance for the INEOS Chlor development. The current Regional Spatial Strategy (RSS) was adopted in March 2003, but it is currently being reviewed and the emerging draft RSS is currently at an advanced stage with the Panel Report of the Examination in Public of the RSS having been received in May 2007. The UDP was adopted in April 2005 and currently the policies within this document are saved as part of the Halton Local Development Framework (LDF).

Draft RSS (January 2006 and Panel Report May 2007)

The draft RSS includes a standard policy on development principles for all proposals and schemes (Draft RSS - DP1) this states that developments, such as that proposed by INEOS Chlor, 'must demonstrate excellent design quality, sustainable construction, efficiency in resource use and respect for their physical and natural setting'. The Panel Report recommends making stronger and has suggested that a new policy is created to promote environmental quality (Panel Report - DP6). To meet the requirements of this policy it will be important that the design, construction and environmental quality of the INEOS Chlor development are of the highest possible standards.

There are also a number of policies within the RSS that deal more specifically with waste management issues (Draft RSS - EM10, 11,12 and 13). The first of these (Draft RSS - EM10) looks to ensure that all sustainable new waste management infrastructure reduce harm to the environment, improve the efficiency of resources, stimulate investment and maximise economic opportunities. The next policy (Draft RSS - EM11) sets out more about the waste hierarchy. With the subsequent policy (Draft RSS - EM12) providing further detail on the proximity principle, which suggests that facilities for the treatment and disposal of waste should be sited as close to the source of the waste as possible so as to avoid the unnecessary transportation of waste material over long distances. The final policy (Draft RSS - EM13) looks for an appropriate type, size and mix of development opportunities to support the waste management facilities. To meet the requirements of these policies the INEOS Chlor development will need to demonstrate that it will reduce harm to the environment, including reducing the impacts of climate change, that it sited as close to the source of waste as possible and that waste material will not be unnecessarily transported over long distances. However, it should be noted that the Panel have recommended that a partial review of the RSS is carried out as soon as possible, including a review of the waste policies especially the identification of broad areas for the location of facilities.

RSS (March 2003)

The current RSS contains a similar range of policies in relation to both the quality of design and in terms of waste management. Policy DP3 highlights the need for development to demonstrate ‘good design quality and respect for its setting’. Whilst Policies EQ4, 5 and 6, provide details on the waste hierarchy, regional self sufficiency, the proximity principle, the need for a mixed approach to waste management and the need for waste management facilities to adopt sequential approach outlined in the RSS. To meet the requirements of these policies the development should promote self sufficiency, that is most waste should be treated or disposed of within the region within which it is produced, the development should also follow the values of the ‘proximity principle’ and should ensure that waste is managed as near to its place of production as possible and the development should be accessible by rail and water.

Halton Unitary Development Plan (April 2005)

There are a significant number of policies within the Halton UDP which are relevant to the proposed development. Some of these policies are specific to the location to the development, some are specific to the use of the proposed development as an Energy from Waste Facility and some are general to all development within the Borough.

Starting with the policies which are specific to the location of the development, the proposed to development is located within the Runcorn and Weston Docklands Action Area and within an Environmental Priority Area, due to its location it is also likely to be affected by COMAH policy, the Liverpool Airport Height Restriction Zone and possibly by its proximity to the Mersey Estuary SPA, Ramsar and SSSI.

Policies S1 and RG4 both relate to the designation of Runcorn and Weston Docklands as an Action Area. S1 provides the strategic policy, which provides details on what will be expected of development within the Action Areas, which include stimulating economic development, reclaiming derelict and contaminated land and protecting and enhancing the local environment. To meet the requirements of this policy, the development will need to demonstrate that it will create jobs for local people and that it will protect and enhance the local environment. RG4 proposes the more detailed uses for the Runcorn and Weston Docklands, it suggest that this area should be used for storage and distribution uses. However, it does list other possible uses such as B1, B2, B8, open space, ancillary employment uses, education and housing, which would allow for the proposed development. The policy then goes on to set principles for development, the proposed development will be required to demonstrate that it has met these principles, which include the need for new development to: enhance existing rail links; improve road access and remove traffic from the adjoining residential areas; enhance the visual quality of the built and natural environment; and enhance its surroundings in order to raise the overall image and appearance of the area through the quality of design, it also states that new development should not be unsightly nor a source of noise, dust, odour or pollution that is considered to be detrimental to the future regeneration prospects of the area.

As an Environmental Priority Area the Council will be looking for any new developments to be of a quality of design that enhances the character and appearance of the area and that where a development is adjacent or visible from a main road or rail route that the quality of design in terms of landscaping, boundary treatments and facing materials is high.

Due to its location within the Liverpool Airport Height Restriction Zone and within a COMAH consultation zone, the development will need to ensure that it will not cause a hazard to air travellers, that it will not increase the likely accidental risk level from the COMAH site and that proposals are made to mitigate the likely effects of a potential major accident so that they are not considered significant.

The proximity of the proposed development to the Mersey Estuary SPA, Ramsar and SSSI will mean that consideration will need to be given to the effect of the development on the Estuary.

Next taking the policies which are specific to the proposed use of the INEOS Chlor development, these include S7, 8 and 9, MW1, 2, 3, 13 and 14. The first of these policies provides criteria for the development of waste treatment facilities. To meet with the requirements of this policy the proposed development will need to demonstrate that it will not have an unacceptable impact upon, amongst others, air quality, the amenity of local people, the highway network and visual amenity. This list is then added to by Policy MW1, to include: dwellings or other environmentally sensitive developments in terms of visual amenity; noise; vibration; dust; windblown materials; odour; litter; vermin; air, land or water pollution or other nuisance. This policy also promotes the use of sustainable transport modes, the need for development to be sited at a sufficient distance from dwellings or other sensitive nearby properties and the requirement for a restoration plan to be produced. Policy S8 provides details on the waste hierarchy, regional self-sufficiency, the proximity principle, sustainable transport and aftercare, whilst S9 requires that the need for the waste facility are demonstrated along with the long term environmental benefits. Policies MW2 and 3 set out the requirements for the details to be submitted with the application. Policies MW13 states that proposals for any facility to dispose of wastes which have a potential for energy recovery will not be permitted unless it makes provision for energy recovery. Whilst MW14 goes on to provide a detailed criteria for incineration plants, therefore the proposed INEOS Chlor development must demonstrate that it meets all the following criteria:

- be located within a Primarily Employment Area and not within close proximity to residential areas or other sensitive land-uses;
- illustrate that there are no existing suitable disposal facilities, or potential sites for the development of suitable disposal facilities closer to the source of waste arisings;
- not have an unacceptable detrimental visual impact;
- not have an unacceptable detrimental impact on economic regeneration or investment confidence;
- not have an unacceptable detrimental impact on existing industries, particularly food manufacturing and high technology activities;
- incorporate proposals for energy recovery or combined heat and power utilisation;
- incorporate a Materials Recycling Facility (MRF) where dealing with wastes with a recyclable component;
- where practicable be located so as to make use of rail or water transport methods;
- not cause pollution or emissions that would have an unacceptable detrimental impact on surrounding land uses;

- with specific reference to clinical and chemical wastes, the proposal must demonstrate the need for the facility in a regional and sub regional context.

Finally, there are a number of policies which relate to all new developments. These cover a number of policy areas such as pollution, design and accessibility.

Policies S4, PR1, 2, 3 and 4 and TP19 are all related to pollution, the first of these policies is a general policy whilst each of the PR policies covers a specific issue. The policies state that development will not be permitted where it is likely to cause unacceptable pollution in terms of air, water, noise or light.

Policies S2 and BE1 and 2 are related to design, again the first of these is a general policy, whilst the other policies are more detailed. Together these policies will require the proposed to development to be of a high quality of design, that respects or creates local distinctiveness, that is well landscaped, that does not cause unacceptable loss of amenity to occupiers or users of adjacent land or buildings, that it considers energy efficiency, that it maximises the use of recycled materials, that it provides a quality built frontage and that it maintains and protects views which are important to the character and visual amenity to the area.

Policies TP1, 6, 7, 12 and 15 are related to the accessibility of new developments, they require that all new developments are built within 400m of a bus stop or railway station, that they have access for cycles, that appropriate cycle parking is provided, that safe and convenient pedestrian access is provided and that appropriate levels of car parking is provided. They also state that development will not be permitted which increases traffic to undesirable levels, unless improvements are made to the transport network.

<u>Other Relevant Regulatory Controls</u>

Pollution Prevention & Control Regulations

The site will only be able to operate with a permit issued by the Environment Agency under the Pollution Prevention & Control (PPC) Regulations. Planning controls cannot be used to duplicate the pollution control process and it should not be necessary to use planning conditions to control the pollution aspects where the facility requires a permit from the pollution control authority. In some cases, however, it may be appropriate to use planning conditions to control other aspects of the development. Planning authorities should work on the assumption that the relevant pollution control regime will be properly applied and enforced.

Pollution control regimes are not only concerned with preventing pollution through the use of measures to prohibit or limit the release of substances to the environment to the lowest practicable level but also ensures that ambient air and water quality meet standards that guard against impacts to the environment and human health.

Noise and vibration are included within the definition of “emissions” as set out in the Pollution Prevention & Control regime Regulations. Conditions will need to be included within the Permit for the control of noise, as appropriate to the specific situation. For this PPC application it is likely that a noise Management Plan will be required to be drawn up by the Operator and agreed by the EA. Simple predictions of noise can be based upon relatively straightforward equations and principles. However, detailed noise prediction and modeling requires the use of computers and commercially available prediction or mapping software.

The PPC permit in so far as ensuring that there is no degradation of the land and groundwater quality at the site during the operation of the plant also covers land contamination.

OBSERVATIONS/ RESPONSES

Following an initial assessment of the ES, it was considered that a number of areas, lacked detail and needed to be addressed, expanded upon or clarified by the applicant and or the authors of the assessment. The additional information and responses are included in the background papers (Appendix 5 – Information received from the applicant.)

In assessing the report it should be noted that the applicant did not undertake a detailed Health Impact Assessment (HIA) but has provided a human health risk assessment. This is beneficial but is limited in the evaluation of possible effects on the health of all populations likely to be exposed to emissions from the proposal. A true HIA is a more complex process that includes consideration of qualitative and quantitative evidence about the relationships between a proposal and the health of a population, including the views of communities who may be affected by it. It tries to identify all potential health impacts: intended and unintended, positive and negative.

The health risk assessment and the conclusions contained within it have been referred to the appropriate health protection bodies and their findings are the subject of a separate report and background paper. (See response from the Director of Public Health).

It is generally accepted that incinerators emit pollutants into the environment but provided they comply with modern regulatory requirements, such as the

Waste Incineration Directive, they should contribute little to the concentrations of monitored pollutants in ambient air and will under these circumstances only make a very small contribution to background levels of air pollution. This Directive aims to reduce and/or prevent possible negative effects on the environment caused by emissions into air, soil, surface water and groundwater, and thus lessen the risks which these pose to human health. As well as stricter emissions limits, this Directive also requires better management systems and increased monitoring of emissions. The Waste Incineration Directive imposes stricter operating conditions and emissions standards.

In order to assess the impact the proposed Energy from Waste Facility will have on air quality during operation, computer models have been prepared to simulate the dispersion patterns of pollutants from the stack. The dispersion models have allowed pollutant concentrations at various locations to be predicted, which can then be compared to both health based and ecological standards to predict the potential effects. A number of commercially available dispersion models are available to predict ground level concentrations The ES uses two advanced models ADMS and AERMOD PRIME. Such an approach is in line with good practice advocated by the Environment Agency.

Combined effects in the air quality assessment have been addressed through the selection of baseline ambient air quality data that already includes effects associated with existing industrial facilities

The height of the stack required to ensure effective dispersion of the residual emissions in the stack was determined using worse case assumptions (both in terms of the emission limits – taken to be maximum Waste Incineration Directive levels and in terms of prevailing weather patterns.) Two models were used to predict the required stack height. With a stack height of 105 m, the models predicts that overall, the effect of the incinerator on existing pollution levels is neutral – slight adverse. The application states that for the “slight adverse” conditions to be realised, the facility would need to operate at the maximum permissible Waste Incineration Directive limits during periods coinciding with the worst case meteorological conditions. Notwithstanding, this modelling exercise has been commissioned to test these outcomes/ conclusions. At the time of writing this report the findings of the assessment are not available, so will be reported orally to the Committee.

The application assumes that because the existing industry has been in the area for so long, the emissions from these sources has shaped the background pollution levels. Therefore any background monitoring that has been done in the vicinity of the proposed site has already taken into account the contribution from these other sources and claim that the issue concerning “cumulative effects” of pollution with the existing industry in the areas has therefore been addressed. “Combined effects in the air quality assessment have been addressed through the selection of baseline ambient air quality data that already includes effects associated with existing industrial facilities”

The application proposed states that fly ash and residues will be disposed of locally at the Randle Island waste site. This hazardous waste is in the form of dry dust. If it were released on route it could result in significant depositions in or adjacent to residential property. There is no detail of the design of the construction of vehicles, nor originally safety procedures to be but in place to prevent unwanted dispersion from vehicles, nor how residential areas will be protected during the trips to Randle Island for the disposal of fly ash and residues. The applicant has however, subsequently confirmed that the fly ash will be dampened down to avoid release.

The fuel to be used within the facility will require approval by the Environment Agency under the PPC permit. The permit will cover conditions concerning the appropriate storage and handling of the fuel. It has been confirmed that no untreated municipal waste or waste material generated on the Runcorn site will be used as fuel. It has been confirmed that in the event that there is insufficient RDF to fill the plant, the facility will be used to burn other non-hazardous materials such as biomass. The nature of the biomass could include: shredded paper, wood pellets, wood chippings and crops grown purposely for their energy content.

The application states “Construction phase dust effects would be controlled through the Code of Construction Practice developed for the project, a draft of which is included in Appendix 2.3 ”There are a number of sources of dust and emissions from construction activities that can release a range of particles. Recent guidelines in PPS23 set out the Government’s policies on pollution control and planning. Annex 1 paragraph 1.48 regarding planning conditions states “planning conditions could be used in respect of [...] impacts such as noise, vibrations, odour, air pollutants and dust from certain phases of the development such as demolition and construction”. In addressing issues around construction dust the following three principles are well established and are central to the control strategies. They follow a hierarchy to control the emissions of dust and other emissions and reduce human exposure: 1 prevention, 2 suppression, 3 containment.

Noise effects of all construction traffic has been considered in the EIS and results of the assessment indicate that a significant noise effect would not occur as a result of construction traffic using local roads. The noise effect on Picow Farm Road has been predicted to be 1dB during building construction and earthworks and 2dB during concrete pours which are not considered to be significant noise effects. No noise change is predicted for Expressway North or South for any scenario.

The guidance in PPS 23 states that further investigations and risk assessment will be needed if this initial assessment does not clearly and reliably demonstrate that the risk from contamination is acceptable. Where the desk study and site reconnaissance do not provide sufficient information to assess the risks and appraise remedial options, further investigations will need to be carried out before the application is determined. In consideration of the above points it is recommended that the planning authority ensures that the applicant provides the appropriate information to allow the comprehensive and robust assessment of land contamination risks to be undertaken, in line with the appropriate guidance and best practice, before it determines the application. If remedial measures were subsequently required it would be anticipated that these works could be controlled by conditions to any approvals.

Based on good practice guidance outlined in PPG24 and BS 4142, in order to prevent noise creep and to augment the Environment Agency Controls in any PPC permit, it may be appropriate and should be considered by the planning authority to set an overall boundary noise level using the criteria set out in the ES. This will need to be done in full consultation with the Environment Agency.

This proposal if authorised will be a major construction site and whilst specific activities can be the subject of detailed discussion at the time it would be appropriate to include a condition which governs the hours of operation start and finish on Weekdays on Saturdays Sundays, Bank Holidays or Public Holidays in line with those mitigation statements included in the ES.

For such a large undertaking which could well have a potential impact negative or positive on the well being of the local population other than the emissions from the process it would seem pertinent to seek to be assessed through health assessment modeling.

Heath Impact Assessment (HIA) can add value to decision making in the land use planning process. HIA is not a statutory requirement for any planning application at this point in time, but can be undertaken on a voluntary basis. In this case the applicant has provided a health assessment as opposed to a full HIA. The Health Protection Agency and the Primary Care Trusts are statutory consultees on any new local Pollution PPC permit applications and have experience of assessing the health impact of industrial developments. Given the level of expertise built up by these bodies it is felt appropriate that their comment upon the human health risk assessment be given substantial weight. Their report and findings constitute a separate stand-alone report and is appended at the rear of this report.

Air quality management

The Government's Air Quality Strategy requires the Council to periodically review and assess local air quality against health-based standards and objectives for specified air pollutants. This task is undertaken annually. The pollutants considered are:

- Carbon Monoxide
- Benzene
- 1,3 – Butadiene
- Lead
- Nitrogen dioxide
- Sulphur dioxide
- Particulates (PM10)

Halton's first review and assessment of air quality was completed in November 1999, (although air quality monitoring in the borough goes back to the 1960's) and these are followed up with new rounds of "updating and screening assessment" annually the last completed one being in 2006. These reviews have been submitted to the Government for scrutiny and the findings have been accepted. The assessment considers emissions from a range of sources such as transport, industry and domestic that could potentially affect local air quality. In assessing these emissions a number of tools are used including monitoring equipment (real time analysers and diffusion tubes), modelling of the major roads, and emissions data from the industrial sector.

The first "Review and Assessment of Air Quality in Halton" was published in November 1999. Its conclusion was that the air quality objectives for carbon monoxide, benzene, 1,3-butadiene and lead would be achieved and that the likelihood was that the objectives for sulphur dioxide, nitrogen dioxide and breathable particulate matter (PM_{10}) would also be achieved.

Further reviews are carried each year to satisfy ourselves and the government that the situation has not deteriorated and the most recent review carried out in 2006 has concluded that ambient levels of sulphur dioxide, nitrogen dioxide and breathable particulate matter (PM_{10}) remain below the Government's standards and that the Government's objectives for air quality are being achieved. Levels of carbon monoxide, benzene, 1,3-butadiene and lead have not deteriorated since the first review

Incinerators emit pollutants into the environment but provided they comply with modern regulatory requirements, such as the Waste Incineration Directive, they should contribute little to the concentrations of monitored pollutants in ambient air and will only make a very small contribution to background levels of air pollution.

The by-products of the incineration process may contain hazardous or toxic pollutants and emissions will contribute to background pollution levels. Since 1996 there have been significant cuts in emissions from incinerators in order to meet strict European Union legislation. This has led to the phasing out of the older, more polluting plants as new emission and operation standards were introduced. As a result contemporary facilities are substantially less polluting and modern abatement technology will help reduce the hazard from emissions provided that the facilities are properly operated at all times.

The general public can be exposed to atmospheric emissions associated with incinerators through a number of routes, by direct inhalation and/or by indirect entry via the food chain. For many pollutants including some of the trace metals, and carcinogenic organic compounds, the major route of exposure is through the food chain. For example the majority (more than 90%) of non-occupational human exposure to dioxins occurs via the diet.

Air-monitoring data demonstrate that emissions from incinerators are not a major contributor to ambient air pollution. However, it will be up to the applicant and the Environmental Agency to assess the contribution to local pollutant levels on a site-specific basis. This level of detail will be addressed in the processing of the permit to operate the plant issued by the Environment Agency. Even at locations where background concentration is already high, incinerator facilities will most likely be permitted under IPPC so long as emission limit values are not breached, because the relative contribution of pollution from the incinerator is considered small. There should be a working assumption that the relevant pollution control regime will be properly applied and enforced.

In considering the effect that the proposed Energy from Waste Facility will have on air quality consideration needs to be given to:

- Operational effects
  - emissions from storage of waste material
  - emissions from the exhaust stack
  - emissions from operational vehicles
- Construction effects
  - emissions from construction vehicles
  - dust from construction activity

Operational effects

Emissions from the storage of waste material

The application states that the proposed Energy from Waste Facility will use fuel derived from municipal waste (Solid Recovered Fuel and Refuse Derived Fuel) as the main source of energy in the plant. However it will also be designed to process biomass. Several questions were raised concerning the nature of the waste material as this can affect the combustion conditions and hence the emissions generated. Also there were concerns regarding odour from the storage of the material. RPS on behalf of INEOS has confirmed the specification of the fuel in terms of calorific value. This should ensure stable combustion conditions and thus consistent waste products and emissions. This will allow the abatement techniques that are to be employed to be designed to be effective and will be further examined in the any PPC application.

The material "will be delivered to the site in sealed containers or covered bulk transporters. The reception hall will be fully enclosed and the roller shutter doors will normally be kept in a closed position, save for when a vehicle is entering or leaving the unloading hall. The air within the unloading hall will form the primary air feed supply to the furnace and will be under slight negative pressure, ensuring combustions (and thus minimising the potential for emissions) of odorous gases and dust"

It has been confirmed that in the event that there is insufficient RDF to fill the plant, the facility will be used to burn other non-hazardous materials such as biomass. The nature of the biomass could include: shredded paper, wood pellets, wood chippings and crops grown purposely for their energy content. Thus the biomass material is not of a nature that would generate odours. RPS also comments "these are all natural products which contain no hazardous or potentially hazardous components". This is a detail that is likely to be and should be addressed by the PPC permit

The fuel to be used will require approval by the Environment Agency under the PPC permit. The permit will also cover conditions concerning the appropriate storage and handling of the fuel. It has been confirmed that no untreated municipal waste or waste material generated on the Runcorn site will be used as fuel.

It does however, have to be accepted that the creation of waste derived fuel is for the United Kingdom, a comparatively new technology and little historic evidence of quality is available

Emissions from the exhaust stack

In the application RPS state "The project has been designed to minimise pollutant emissions using appropriate abatement techniques and to ensure minimal air quality effects from residual emissions by release through a stack of an appropriate height."

Although RPS stated that: "The exhaust gases will be treated in the flue gas treatment system" no details of the proposed abatement systems were provided in the application. RPS was asked to provide further information on the techniques that will be used to treat the emissions. In response they have stated that "There are a number of abatement techniques available for EfW plants . . . . . each of these techniques is capable of achieving the required emission levels defined in the Waste Incineration Directive . . . . typically this will include a three-stage process as follows:

- NO_x reduction: A selective non-catalytic reduction system would be utilised to assist in the reduction of nitrogen oxide in the flue gases by the injection of ammonia water into the boiler.
- Removal of Contaminants and Acidic Gases: The flue gases would pass through a scrubbing system which includes injection of hydrated lime and activated carbon to neutralise any acidity in the flue gases and absorb contaminants. The main types of scrubbing systems are dry and semi dry.
- Filtration: Further particulate removal would take place by passing the flue gases through bag filters"

Monitoring equipment will be installed to demonstrate compliance with the emission limits and to alert plant operators of any problems so that appropriate action can be taken. As the application states "A continuous emissions monitoring system will be provided for each flue. Each system comprises equipment to carry out measurements of the flue gases for particulates and chemical composition". Monitoring the emissions will take place at intervals and in a manner specified by the Environment Agency under the PPC Permit. The emission limits will be those specified in the Waste Incineration Directive.

The height of the stack required to ensure effective dispersion of the residual emissions in the stack was determined using worse case assumptions (both in terms of the emission limits – taken to be maximum Waste Incineration Directive and in terms of prevailing weather patterns.) Two models were used to predict the required stack height. One model predicted that a stack height of 105m should suffice. However the other predicted a height of 115m. Due to aviation limits (the proximity of Liverpool John Lennon airport) the stack height was limited to 105m.

This decision, needed justification as one of the models suggested that a greater height was needed in order to ensure effective dispersion of the pollutants. RPS have since argued that the worse case scenario was used in the models and in reality the actual emissions are likely to be less than those that were used in the model. Also at the time of the original application the type of technology to be used had not been confirmed. It has now been decided that a Water-cooled Moving Grate system will be used. RPS have said that "The height of the proposed main building has subsequently been reduced to 42m". The height originally proposed for the main building was 47m. As this is the largest building in the vicinity of the stack the 5m reduction in height suggests a reduction of the required stack height. " In addition RPS state that "emission characteristics associated with this technology results in marginally improved stack momentum flux (higher volumetric flows and associated higher velocities)" A stack height of 105m was used in the dispersion model and the results of this predict that overall, the effect of the incinerator on existing pollution levels is neutral – slight adverse, using the criteria provided by RPS. As stated independent verification of the stack height is still awaited.

Dispersion models

In order to access the impact the proposed Energy from Waste Facility will have on air quality during operation, computer models have been prepared to simulate the dispersion patterns of pollutants from the stack. The dispersion models have allowed pollutant concentrations at various locations to be predicted, which can then be compared to both health based and ecological standards to predict the potential effects. RPS states that "The assessment has been undertaken in accordance with the Environment Agency guidance for detailed air dispersion modelling" and two models have been used.

The models have been developed using baseline conditions based on the current situation and the emissions from the proposed exhaust stack have been taken as the Waste Incineration Directive limits (as these are the maximum permissible concentrations that could be released). RPS state that "In reality, emissions from the EfW facility are likely to be less than the Waste Incineration Directive limits due to the effectiveness of the air pollution control system"

Parameters such as meteorological data and terrain have been incorporated. Meteorological data was taken from Liverpool John Lennon Airport

Background pollution levels have also been incorporated. This information has been obtained from a number of sources including Halton Borough Council monitoring data and national monitoring sites. Not all potential pollutants are monitored in every location. When attempting to assemble ambient air quality data it is often necessary in the absence of local data to go to the nearest available site. Some of the locations from where data was sourced were quite a distance from the site (for example the background levels of dioxins and furans has taken to be that measured in Manchester). RPS have since responded to these concerns stating that when choosing data to run the model the "worse-case" data has been used in the model.

It should again be noted that this modelling exercise is being independently assessed and the outcome of this will be reported to Members before any decision is made.

The ES acknowledges that there are future developments and lists them in technical appendix 4.1 the significant ones being Weston Point Docks, The Mersey Gateway and Liverpool Airport Expansion and these have been considered in the air quality assessment. Likewise the report acknowledges that there are a number of existing point sources of pollutants in the vicinity of the proposal, which could have a cumulative effect. The report assumes that because the existing industry has been in the area for so long, the emissions from these sources has shaped the background pollution levels. Therefore any background monitoring that has been done in the vicinity of the proposed site has already taken into account the contribution from these other sources and claim that the issue concerning "cumulative effects" of pollution with the existing industry in the areas has therefore been addressed. "Combined effects in the air quality assessment have been addressed through the selection of baseline ambient air quality data that already includes effects associated with existing industrial facilities"

Concern has been expressed in public response that consideration had only been given to PM_{10} Particulate matter and not to $PM_{2.5}$.this was brought to the attention of the applicant. RPS has argued that limits for PM_{10} have been achieved and there are currently no limits specified for $PM_{2.5}$ to which the levels predicted from the model can be compared. However, they have since re-run the model assuming that all particulate data is $PM_{2.5}$ and the results show that ground level concentrations are considered to be of neutral significance.

Air has tiny solid particles or fine liquid droplets suspended within it often called particulates. Usual concentrations are invisible but high concentrations can be seen as a haze, a mist or smoke especially when accompanied by condensing water vapour. The large majority are less than a hundredth of a millimetre across and are known as PM tens (PM_{10}). The fraction of the PM10's, which are less than 2.5 micrometres across and are called PM2.5's. There are many millions of PM10's suspended in each cubic metre of even clean air. The chemistry of suspended particulate matter is varied and depends upon the source and can contain carbon, nitrates, sulphates, metals, polycyclic aromatic hydrocarbons to name but a few. When coal or wood is burnt, many of the poisonous emissions start as vapour but quickly condenses onto surfaces such as the inside surface of chimneystacks or onto the surfaces of the suspended particles. General annual averages for UK cities are between 15 and 35 ug/m3 but less for many rural areas. Measurements of PM10 in Halton show an average of 24 ug/m3. By comparison Environmental tobacco smoke can expose an individual to anywhere between 17 and 5000ug/m3 PM 2.5's.

Since the original application was made to the Council air quality data gathered from around the Borough in 2006 has been assessed. Analysis of this data revealed that there were some areas where the levels for NO_2

were elevated due to road traffic and getting close to acceptable air quality standards. RPS agreed to undertake further analysis of the contributions from the proposed EfW facility to these areas. The results show that the emissions from the EfW facility would have little adverse effect on these areas.

As the proposed EfW is to be introduced into an area in which other industry is already present, it is necessary to determine what effect the proposed facility will have on existing dispersion plumes. In the original application the Weston Point CHP plant was considered and the results demonstrated that the proposed facility with have no effect.

RPS was asked to give consideration to other industry in the area. The response from RPS is that “UK government guidance indicates that tall buildings have the potential to affect dispersion from point sources out to a distance of five times the building height. In the case of the proposed EfW facility, the main building was assumed to be 47m. Therefore the dispersion of exhaust plumes from stacks within 235m of the EfW facility main building has the potential to be affected due to the proximity of the EfW facility. There are no other significant point sources within 235m of the EfW facility main building and therefore it is only relevant to include consideration of the Weston Point CHP plant Process stacks associated with the rest of the INEOS Runcorn site and other neighbouring industry are located well beyond 250m from the proposed EfW facility site and therefore exhaust emissions from other stacks are not likely to be affected by the project proposals”

Emissions from operational vehicles

RPS state that “The potential effects on ground level concentrations of NO_2 and PM_{10} due to changes in traffic have been assessed. The effects have been assessed for opening year of the project and compared to the relevant air quality objectives” “The effect on air quality due to the additional emissions from operational traffic is considered as being neutral”

RPS has agreed that monitoring of NO2 can be undertaken using diffusion tubes. “This will be carried out for a period of 12 months prior to and 36 post commissioning”. This is a major construction operation and vehicle movements will be significant during this phase of the application. This is an area outside the PPC permitting process but has potential to impact locally on traffic related pollution emissions particularly NO2. The planning process needs to protect other adjacent land users and as such the applicant should be expected to put in place a detailed amelioration regime, which included monitoring throughout the construction phase including the effect of construction traffic.

Construction effects

Emissions from construction vehicles

RPS states "The potential effects on ground level concentrations of NO2 and PM10 due to temporary changes in traffic flows during the construction phase have been assessed. The effects have been assessed for the year of peak construction activity and compared to the relevant air quality objectives" "The effect on air quality due to the additional emissions from construction traffic is considered as being neutral"

This is a major construction operation and vehicle movements will be significant during this phase of the application. This is an area outside the PPC permitting process but has potential to impact locally on traffic related pollution emissions particularly NO2 and PM10. The planning process needs to protect other adjacent land users and as such the applicant should be expected to put in place a detailed amelioration regime, which included monitoring throughout the construction phase including the effect of construction traffic.

The accuracy of the traffic assessment was queried. If this was the case then it would be necessary to re evaluate if there would be any adverse effect on air quality as a result of the changes to traffic flow. RPS have since commented that in the original application the worst-case scenario was assumed and therefore the conclusions reached regarding the impact on air quality remain unchanged.

Dust from construction activity

The application states "Construction phase dust effects would be controlled through the Code of Construction Practice developed for the project, a draft of which is included in Appendix 2.3 of ES"

There are a number of sources of dust and emissions from construction activities that can release a range of particles. Dust – includes all particulate matter up to 75 micrometres in diameter and comprising both suspended and deposited dust Particulate matter includes a wide range of sizes and types of particles and will vary in composition from place to place and time to time. Most dust particles are too big to be inhaled but can cause eye, nose and throat irritation and lead to deposition on cars, windows and property. Emissions of particles and dust from construction can also have an impact on indoor air quality in the neighbouring area.

The potential for a demolition or construction site to impact at sensitive receptors is dependant on many factors, which include the following:

- location of the building site
- proximity of sensitive receptors
- whether demolition will need to take place

- extent of any intended excavation
- nature, location and size of stockpiles and the length of time they are to be on-site
- occurrence and scale of dust generating activities - including cutting, grinding and sawing
- necessity for on-site concrete crusher or cement batcher
- number and type of vehicles and plant required on-site
- potential for dirt or mud to be made airborne through vehicle movements and
- weather conditions.

Under Part III of the Environmental Protection Act (EPA) 1990, emission of dust, fumes and other effluvia from construction sites can be identified as a statutory nuisance if prejudicial to health or a nuisance. Control of a statutory nuisance is contained within section 80 and a local authority is under a mandatory duty to serve an abatement notice on the person responsible for the nuisance (or the owner or occupier of the premises on which the statutory nuisance is present) if it is satisfied that a statutory nuisance exists, or is likely to occur or recur.

Contaminated land

There are two elements of the land contamination issues that have a relevance to the proposed development and require appropriate consideration and supporting information. As a large industrial facility there is a potential for the proposal impact on land quality throughout its operational lifetime, and as the area already has an industrial past the site may pose an unacceptable risk to either the development or to the environment or the development may create new pathways for existing contamination.

As discussed the IPPC permitting process and subsequent monitoring and enforcement should ensure that there are no detrimental impacts on land and groundwater quality from the facility. If any degradation is identified the enforcing authority, the Environment Agency, will require the complete cleanup of the contamination.

In considering planning applications, the potential for contamination to be present must be considered in relation to the existing use and circumstances of the land, the proposed new use and the possibility of encountering contamination during development. In the Environmental Statement INEOS have acknowledged that the site has the potential to be contaminated and make reference to historical data available for the site and surroundings. INEOS intend to undertake a site investigation and detailed assessment of contamination risks prior to the commencement of construction.

However, national planning policy in relation to land contamination (Planning Policy Statement 23) states that where there is a reason to suspect contamination, such as the existence of former industrial uses, there should normally be a desk study of the readily-available records assessing the previous uses of the site and their potential for contamination in relation to the proposed development as a minimum. If the potential for contamination is confirmed, further studies by the intending developer to assess the risks and identify and appraise the options for remediation should be required.

The lack of a detailed assessment of the potential contamination has been questioned by the Council and, in the response prepared by RPS on behalf of INEOS, it is acknowledged that the information provided to date is only preliminary and that a detailed investigation, assessment and management plan would be developed in advance of construction. However, INEOS consider that this can be address through applying conditions to any planning approval.

The guidance in PPS 23 states that further investigations and risk assessment will be needed if this initial assessment does not clearly and reliably demonstrate that the risk from contamination is acceptable. Where the desk study and site reconnaissance do not provide sufficient information to assess the risks and appraise remedial options, further investigations will need to be carried out before the application is determined.

In consideration of the above points it is recommended that the applicant provides the appropriate information to allow the comprehensive and robust assessment of land contamination risks to be undertaken, in line with the appropriate guidance and best practice, before it determines the application. If remedial measures were subsequently required it would be anticipated that these works could be controlled by conditions to any approvals.

Noise & Vibration

It is recognised that control of noise is achieved primarily through environmental protection legislation and implementation of the legislation will usually fall to the Local Authority and to the Environment Agency. The planning permission should not seek to duplicate such controls. However, the planning system has a role to play in preventing and minimising the impact of noise through its influence over the location and design of new developments. For new proposals, planning conditions are still likely to be necessary to control issues that may not be covered by IPPC. Where appropriate, planning conditions should be attached to planning permissions, which would reduce the adverse impact of noise and enable development.

Noise and vibration are included within the definition of “emissions” as set out in the Pollution Prevention & Control (PPC) Regulations. Conditions will need to be included within the Permit for the control of noise, as appropriate to the specific situation. IPPC requires the use of BAT in setting emission limit values or equivalent parameters, and in determining conditions relating to process parameters or technical measures. The aim of BAT should be to achieve the following:

- underpinning of good practice, a basic level of which the Operator should employ for controlling noise, including adequate maintenance of any parts of plant or equipment whose deterioration may cause increases in noise. For example, this would include bearings, air handling plant, and the building fabric as well as specific noise attenuation measures associated with plant, equipment or machinery;
- noise levels should not be loud enough to give reasonable cause for annoyance to persons in the vicinity, which is a more appropriate environmental standard than that of Statutory Nuisance and is normally the aim of most planning or other conditions applied by local authorities;
- prevention of creeping ambient (often referred to as creeping background), which is the gradual increase in ambient sound levels as industry expands and areas develop.

Simple predictions of noise can be based upon relatively straightforward equations and principles. However, detailed noise prediction and modeling requires the use of computers and commercially available prediction or mapping software. Noise predictions can be useful at a proposed facility where noise must be quantified to ensure that no noise problems will arise from the installation once it is operational, For new plant, clear targets may be needed to ensure that noise emissions do not contribute to a creeping background (ambient) sound level. In the case of new plant, sound levels should be predicted and modeled. Monitoring for subsequent compliance may be required and this may result in the need for additional noise reduction measures. For new plant, IPPC should, in most cases, come to the same conclusion to provide adequate protection of the environment. Theoretically, a situation might arise in which the Agency believes that the balance of costs and benefits, or the balance of cross–media impacts, cannot justify such conditions. In these unusual circumstances, the IPPC Permit may contain conditions that are less strict than the planning conditions.

Noise assessments were carried out of the existing daytime and night-time noise environments at the nearest noise sensitive receptors (NNSRs) and comparisons drawn the future noise levels that would be expected to occur, at those locations, should the EfW facility be constructed. Existing noise levels were determined by a field study as per accepted procedure.

The Council has carried out similar surveys that show the background levels in the same range as the RPS survey findings.

Various measures are proposed by the developer will be adopted to attenuate noise levels to ensure that noise levels in the external and internal general plant areas do not exceed HSE requirements, and acoustic barriers will be used along the access roads to minimise noise generated by vehicle movements.

Construction would be anticipated to be three and a half years excluding site clearance. It includes Demolition of existing buildings, ground excavations, including piling, building construction and equipment installation; and nighttime concrete pours. Working hours being restricted but requiring some 'out of hours' work to be carried out with prior consent from the council. Normal construction hours are stated as being 07:00 to 19:00 hrs five days a week.

The applicant has confirmed that typical areas of out of hours working could include the following:

- Continuous concrete pours;
- Major crane lifts / erection sequences;
- Delivery of large or abnormal loads;
- Radiography of welds / pressure testing of equipment;
- Commissioning'

This is an inevitable consequence of large-scale construction sites, has the potential to cause nuisance, and requires strict controls and procedures for contractors, which are available under separate legislation if not conditioned by planning. It is not possible for a definitive list or programme to be provided for the project at this stage; however any out of hours work would be carried out following consultation with the Council.

The only construction source that has potential to give rise to significant vibration effects is driven piling. Due to the hammer energies, which will be utilised, and the distance of the works from residential buildings, it is considered unlikely that there will be any significant vibration effect to occur during the construction phase of the project and no mitigation would be required.

Construction traffic

Noise effects of all construction traffic has been considered and results of the assessment indicate that a significant noise effect would not occur as a result of construction traffic using local roads. The noise effect on Picow Farm Road has been predicted to be 1dB during building construction and earthworks and 2dB during concrete pours, which are not considered to be significant noise effects. No noise change is predicted for Expressway North or South for any scenario.

Commissioning

Some activities associated with the commissioning of the plant are likely to give rise to high noise levels. These activities would be these activities are temporary and of a very short duration be undertaken during normal daytime working hours and, where practicable, using silencers to minimise the noise emissions.

Operational Effects

The results of the BS4142 assessment indicate that the design criterion would be satisfied and the significant adverse noise effects would not be expected to occur as a result of the development during the daytime or nighttime at any of the NNSRs.

Consideration was asked to be given to the equipment which will be used to make up the plant in relation to vibration due to concerns raised from previous experience with power generating plants in the Borough i.e. Rocksavage Power Station

The applicant has responded that the proposed EfW facility is not likely to give rise to low-frequency noise emissions similar to those from Rocksavage Power Station because:

- The EfW plant has a quieter combustion process than that of a Combined Cycle Gas Turbine (CCGT) power station;
- Noise from the EfW combustion process is attenuated but he boiler and flue gas treatment (FGT) equipment, which provides greater attenuation than that for a typical CCGT power station which relies largely upon the heat recovery steam generators (HRSGs) for attenuation; and
- The proposed EfW is significantly smaller, with an electrical capacity of 100MW, than Rocksavage power station, which has a capacity of 748MW

Following an appraisal the applicant has asserted that HBC’s concerns regarding low-frequency noise from the proposed EfW are likely to be unfounded.’

Noise change assessment

The results of the assessment of both the static and mobile noise sources indicate that a significant adverse noise change would not be expected to occur at any of the NNSRs during the nighttime nor at the majority of the

NNSRs during the daytime. However there is predicted to be minor adverse effect to properties on Clarks Terrace that has been considered an acceptable effect as the noise change would only occur during the daytime and therefore would not affect sleep.

Noise from Operational Traffic

The Transport Assessment has provided the predicted future traffic flows for 2011 and 2026 and for the cumulative effect situation with the project with other committed development. This indicated that a significant noise effect would not occur as a result of increased traffic flows.

RPS final statement and details of further mitigation ES (para '9.48**)**

The assessment has indicated that a minor adverse noise effect would only be expected to occur at approximately 15 properties on Clarks Terrace, to the south of the facility during the daytime. The project design includes a noise barrier along the southern boundary. It is considered that it would not be practicable for this barrier to be any higher and, therefore, no further mitigation has been proposed. For the majority of NNSRs during the daytime and for all of the NNSRs during the nighttime, no significant effects have been predicted and no further mitigation would be required.

Transport

Access is taken via Mersey View and South Road, from Sandy Lane. All these streets are residential roads and are not suitable for a significant increase in HGV traffic.

Sandy Lane connects to Picow Farm Road at a simple priority junction. This in turn links to the A557 Weston Point Expressway by way of a 2 level junction. To the South of the junction is junction 12 of the M56, and North to the Silver Jubilee Bridge over the Mersey and on to Merseyside or the M62.

There is a single-track rail access to the site from the West coast main line at Runcorn Station, there are a number of sidings of this track, and there are proposals for a new link to the Port of Weston.

To the West of the site is the Manchester Ship Canal the Weaver navigation and the disused Runcorn and Weston Canal all offering possible berthing points.

The new proposal is to provide access to the new and existing Industrial activities from a new access road from Picow Farm Road allowing alterations to be made to the highway network to reduce the problems caused by HGV traffic on Weston Village.

The exact design and alignment of this new access needs to been finalised. Discussions are progressing between INEOS, Port of Weston and Halton Borough Council to resolve the outstanding issues.

The Construction phase

The construction phase of the project is expected to be completed with 3 years. There is potential for overlapping during theses operations, and the exact workings are not fully known at this stage, and the traffic generation and distribution are based on' most likely case' and assumes worst case scenarios. Any transport impact during the construction phase is likely to be of a temporary nature and will need to be managed by the client and the contractor as part of the construction contract in liaison with the Council.

The civil phase

This would require on average approximately 100 construction staff generating 124 movements a day, and 100 HGV movements a day. During the later part of this stage there will be a short period of concrete pouring as detailed below.

Concrete slip forming

This work will require continuous 24 hour working, for short periods of time. These short periods are unlikely to exceed 4-5 days although it is possible that during the construction of the largest building on site concrete pouring may continue for approximately 2 weeks. The number of concrete wagon associated with this phase is around 150, creating 300 movements in the 24 hour period, 13 movements per hour. Also there will be a requirement for a number of other HGV movements of during this time approximately 100 over 12 hours. Creating a total of up to 21 HGV and concrete wagon movements per hour. It would appear from the report that this phase would occur during the latter part of the civil work stage (T.A 3.3),

Plant erection phase

This phase of the operation requires the most staffing with a figure of up to 750 construction workers, this would generate approximately 930 movements a day, during the busiest periods of construction

Impact on highway network

The following table as supplied by the applicant shows their worst case traffic generation for the construction period.

Table 1

	0600-0700			1900-2000			Daily		
	Arr	Dep	Tot	Arr.	Dep	Tot	Arr	Dep	Tot
Max. Car Movements	465	0	465	0	465	465	465	465	930
HGV's	7	6	13	6	7	13	200	200	400
Total	472	6	478	6	472	478	665	665	1,330

It should be noted that the applicant assumes that all the construction workforce will be on site before 07.00 and will leave after 19.00, and although these figures show a large percentage increase for the Silver Jubilee Bridge these increases occur outside the normal peak and so should have little impact. However, movements need to be managed to ensure they occur outside the peak.

The assessment assumes certain measure can be implemented to manage traffic demand. The present measures included, within the transport assessment, are the use off existing INEOS car parks with traffic directed away from the residential area of Weston and connected to the site by shuttle buses.

Operational phase

The calculation set out in the Transport Assessment assumes that 480,000 tonnes of waste is transported by road to the site. This represents the worst case amount based on the assumption that all waste that does not come from Manchester comes by road and that the upper throughput figure is 850,000 tonnes of waste per year. Additional to the waste to be burnt a number of other HGV movements will be required to transport materials to the site and remove waste from the site.

All deliveries are to be routed from the expressways along Picow Farm Road onto a new access road into the site, taking away all HGV movements from Weston village. Table 6 of the T.A indicates 384 HGV movements a day, this is two way 192 in and the same out over a 12 hour period, 16 HGVs in per hour one every 4 minutes in. This will then distribute onto the expressways either North or South. This gives a daily impact on the expressways of 3% or less dependent on the North South split. This is not considered significant, however a contribution for minor highway improvements is required.

Rail link for waste deliveries

Transport of waste to the site from Manchester is proposed by rail, and it is the intention of INEOS to encourage all other the relevant local waste authorities to include obligation for transport fuel by rail during their MBT contract placement process.

Rail access is included in the T.A. This states 6 rail sidings are available to accommodate fuel deliveries, waiting and unloading. The reports state 5 trains per day will deliver fuel to the site, 3 from Manchester and up to 2 trains from other sources.

Discussions between INEOS and Network Rail identify the need for some improvements to the signalling on the branch line may be required. Regarding the capacity of the rail network, the applicant has identified no major obstacles, however, there are no details of expected delivery times, which may have to be made during the night.

Transport of hazardous waste from the site

The Transport Assessment shows that there will be up to 20 vehicle movements per day associated with fly ash and reaction products, which will need to be transported to the hazardous waste site at Randle Island. The route to Randle Island is Picow Farm Road to the Expressway, leaving at the Astmoor junction and travelling over the swing bridge via Astmoor Road.

Employee travel demands

The assessment projects that staffing level at the plant will be 50 employees providing 24-hour cover. This posses no significant impact on the highway network, however measures to provide sustainable travel options should be further explored, this should part of a travel plan. Cycle parking spaces are to be provided within the site, changing and shower facilities should also be provided. The Transport Assessment does not identify any improvements for the pedestrian and cycleway network. These can be conditioned.

As INEOS Chlor is making this application and this company employs more than 100 people and does not at present have a travel plan, a condition that they enter into a Travel Plan is required. This should also include the entire Runcorn site including INEOS enterprise, INEOS Fluor and other components.

Merseyside Advisory Service (MEAS)

The Merseyside Advisory Service advises the Council on environmental management. MEAS raised a number of questions and outstanding issues, with the original documentation. The applicant has since provided further clarification on the questions raised by MEAS. MEAS have commented that a number of concerns originally expressed have now been addressed by the applicant, but still advise that:

- The Council should consider that the failure of Merseyside's waste to meet the specification for the proposed facility could lead to Merseyside becoming a significant long-term importer of waste;
- An expanded response in relation to the type of technology to be used would be helpful. They accept that the choice of technology does not materially affect the conclusions reached in the Environmental Statement; and
- A Great Crested Newt survey should be made available prior to determination.

MEAS are generally supportive of proposals, that seek to recover energy from waste efficiently, as they have the potential to increase sustainable waste management practices according to the waste hierarchy, while at the same time supporting increased energy generation from renewable sources as promoted by the energy hierarchy and reducing demand for primary fossil fuels.

MEAS comments can be found in Appendix 6.

CONCLUSION

There are clearly many matters which need to be considered in the assessment of proposals, such as that now the subject of this consultation. As explained within the body of the report many relate to controls which are imposed through other licensing and authorisation regimes and are not for Local Planning Authorities (LPA) to impose control. However, there are equally as many material considerations and issues which are for the LPA to properly satisfy itself upon.

These considerations include the range of physical and visual impacts which Members are often asked to consider when dealing with major infrastructural proposals, such as appearance, traffic generation/movement, environmental controls over noise and dust etc and the positives which come from large scale investment on the local economy. In respect of this particular proposal, however, the single most important issue is that of the impact the proposal may have on the health and general well-being of the residents of Halton and the surrounding areas. With this in mind the views of the Director of Public Health/ and PCT are considered particularly pertinent.

In general terms, it can be concluded that the facility proposed by INEOS and for which they have shown there are compelling business efficiency reasons to support, would help towards the Governments targets for waste management. It also needs to be acknowledged that whilst public health concerns are legitimate considerations, that modern well run, well regulated waste management facilities operated in line with the latest guidance and controls pose little risk to human health. It is also advised that planning authorities should work on the assumption that relevant pollution control regimes will be properly applied and enforced. The supporting documentation provided by INEOS, with the consultation and subsequently, seek to ensure that stringent environmental and pollution control regimes will all be in place and indeed have to be before the plant can operate. As such, the justification and evidence put forward by INEOS does not ask the Council to make a judgement between a substantial infrastructural investment, and all of the stated benefits that will bring and the health and well-being of it's residents, but rather seeks to ensure that the development will have very few adverse impacts upon the Borough.

This general assumption is based upon known and measurable factors, and also on assumptions which in some ways are not within the control of INEOS. One major and significant and as yet not clearly defined impact will be the movement of fuel in and out of the Borough. The entire facility success is premised upon the delivery of fuel derived from municipal waste, at a time when most of the regions waste authorities have yet to procure and determine how they are to process their waste and equally where these process will take place.

The INEOS case makes certain worst case scenarios to address this issue and conclude that there is capacity and flexibility within the proposal, in its widest sense, to adapt to these uncertainties.

In reality this leaves a gap in information as to the precise method of fuel movement, its direction of travel and the impacts that may have on Halton's roads and rail infrastructure and the environmental impacts of such movement. This gap in information will no doubt in time evolve and as such can be re-assessed at a later date, as such, it may well be considered appropriate to control by condition should the DTI be mindful to authorise the proposal. A particular need to establish what rail capacity there is and during which hours of operation this capacity is available is important if for instance hours of delivery etc were to be controlled as part of the process. Notwithstanding, that the time multi-model nature of fuel delivery cannot be known at this stage, it is generally accepted by both the rail operator and highway authority that there is with appropriate improvement and conditions, overall capacity.

One particular aspect of transportation movement which did originally give rise to concern was that relating to the movement of fly ash from the proposed site to Randle Island landfill site. This issue related to the potential for hazardous material to become airborne in transit, however, INEOS have now confirmed that this product will be dampened down to prevent such an eventuality.

Returning to the comments of the Director of Public Health. This confirms Governments advice that contemporary incineration facilities are less polluting and that modern abatement technology will help reduce the hazard from emissions provided the facility is properly operated. However, attention is also drawn to the fact that INEOS does not identify any significant concerns regarding particulate emissions, an assertion which could not be verified without operational data. The report further states that the Committee for Medical Effects of Air Pollution have recently concluded that there are clear associations between daily and long term average concentrations of air pollutants, in particular fine particles and the effects on the cardiovascular system, and in this regard a precautionary approach should be taken in future planning.

The recommendation within the report ask that the DTI consider requiring the applicant to quantify the effects of the additional particulate air pollution generated on the health of residents of Halton: that a Health Impact Assessment be commissioned and that the movement of dry dust is controlled. This later point has already been addressed and could be appropriately conditioned. Having regard to Halton's historic health records the first two recommendations seem reasonable and justifiable. Both matters could be conditionally required as part of the approved process.

As mentioned earlier in this report there are many areas of work, both during the construction period and after commissioning which would need to be properly controlled by conditions. Therefore to assist the DTI and to address a number of the concerns properly raised throughout the process it is recommended that if they are mindful to approve the application then the conditions suggested in Appendix 7 are attached to any decision given.

In addition to these suggested conditions, it would also be appropriate and necessary for INEOS to enter into a planning obligation with this Authority to address area of mitigation which cannot properly be covered by planning condition. Generally this obligation would look to provide off site environmental improvements and assurances.

Clearly, the proposal has proven to be particularly emotive and as can be seen from the volumes of information included with this report has given rise to much comment and in many areas contradictory evidence. In the absence of many years of work and much more research some of the points raised may never be possible to answer. However, it is recognised that the DTI have to make a decision on the application and that Halton's comments are an integral part of that process. From the above commentary, Members will see that various concerns have been expressed about the need to provide further information before the DTI makes a decision and it is agreed that, that should be the case.

It is therefore recommended that:-

RECOMMENDATION

1.This application raises a number of important and complex issues. The Council and its consultees, including the Primary Care Trust, have given due consideration to these issues and the views of local residents. The Council would wish the Secretary of State to address the issues raised within the attached report and ask that the Secretary of State is fully satisfied that the proposal will not have any adverse impacts upon the health of the Boroughs residents before authorising the proposal. Particular attention is drawn to the observations of the Director of Public Health and the request for further information made therein.

2. If the Secretary of State is minded to approve the application then he is requested to consider the imposition of conditions as set out in appendix 7 and the need for a Section 106 agreement between the Local Planning Authority and Ineos.

PART II INFORMATION AND OBSERVATIONS

[To be completed by the Halton Borough Council]

LPA Planning Reference No.:

1. Names of interested parties consulted as to the proposals with details of any observations received.

2. Particulars of any representations which have been made to the local planning authority objecting to the proposals.

3. Have any general or specific restrictions been imposed by any authority on development of the land affected by the proposed development?

4. Does the proposed development involve the demolition, alteration or extension of a building of special architectural or historic interest included in a list complied or approved under s1 of the Planning (Listed Buildings and Conservation Areas) Act 1990?

5. Does the local planning authority agree that the proposed development should be approved by the Secretary of State for Trade and Industry as described? (if the answer is no, please answer question 6.)

6. Would the local planning authority be prepared to agree that the proposed development should be approved subject to modifications or conditions? (If so, specify the modifications or conditions proposed and state whether they are acceptable to the applicant). (Note: the precise form of any modifications or conditions subject to which the consent or directions(s) are given is a matter for the Secretary of State, but he will have regard to the form of words used by the local planning authority.)

Date: .... Signed:..............................

Designation

Halton Borough Council

[Two completed copies of this Form, both signed, should be returned to the applicant for submission by it to the Department of Trade and Industry]

07/00068/ELC

PART 1 CERTIFICATE

(To be completed by the Halton Borough Council)

The Halton Borough Council

(i)*object on the grounds set out below/have no objection to make to the development described overleaf;

(ii)* request/do not request that a public inquiry to be held pursuant to paragraph 2 of schedule 8 to the Electricity Act 1989 before the Secretary of State reaches his decision on the application.

**Delete as appropriate*

Dated: Signed:

Designation

on behalf of the Halton Borough Council

[*Add reasons for objections*]

APPENDIX 1

REPRESENTATION AND CONSULTATION REPLIES RECEIVED

CHESHIRE COUNTY COUNCIL

Environmental Planning Service

Backford Hall
Backford
Chester CH1 6PZ

Alan S Thornley
County Planning Officer

Andrew Plant
Environmental and Regulatory Service Department
Halton Borough Council
Rutland House
Halton Lea
Runcorn
WA7 2GW

Date 18 April 2007

Our Ref

Your Ref

HALTON BOROUGH COUNCIL
ENVIRONMENT AND DEVELOPMENT DIRECTORATE
RECEIVED 23 APR 2007
FOR ATTENTION OF AF LB ASP

Dear Sir/Madam

TOWN AND COUNTRY PLANNING ACT 1990
CONSULTATION ON PLANNING APPLICATION

APPLICATION NUMBER: AA/07/00068/ELC

PROPOSAL: Notification under Section 36 of the Electricity Act 1989 and Section 90(2) of the Town and Country Planning Act 1990 to the Secretary of State for Trade and Industry for consent to construct and operate an energy from waste combined heat and power generating station with an approximate capacity of 360MW thermal and up to 100MW of electrical power.

LOCATION: Ineos Vinyls UK Ltd, 4056 The Heath Business & Technical, RUNCORN, WA7 4QX

APPLICANT NAME: Ineos Chlor Vinyls, South Parade, Runcorn

Further to my letter acknowledging your request for the County Council's comments as strategic planning authority on the above application, I am now able to inform you of the County Council's response.

The matter was considered under the County Planning Officer's delegated powers, and the response is: -

That Halton Borough Council be informed that Cheshire County Council as strategic planning authority does not object to the principle of an energy from waste combined heat and power generating station at Ineos Chlor Vinyls, South Parade, Runcorn as it accords with Adopted RSS policies DP1, EQ4 EQ5 and EQ6, however it is considered that additional information shoul on traffic movements within Cheshire (particularly of HGV's) and specifically in the Vale Royal area and the environmental implications of these movements

Thank you for consulting the County Council on this matter, and I hope this information is of use to you.

Yours faithfully

Emma Hancock
Phone: 01244 603117
Email: plancontrol@cheshire.gov.uk
Fax: 01244 603033

DELEGATED REPORT - STRATEGIC CONSULTATION

APPLICATION NUMBER: AA/07/00068/ELC

PROPOSAL: Notification under Section 36 of the Electricity Act 1989 and Section 90(2) of the Town and Country Planning Act 1990 to the Secretary of State for Trade and Industry for consent to construct and operate an energy from waste combined heat and power generating station with an approximate capacity of 360MW thermal and up to 100MW of electrical power.

LOCATION: Ineos Vinyls UK Ltd, 4056 The Heath Business & Technical, RUNCORN, WA7 4QX

APPLICANT: Ineos Chlor Vinyls, South Parade, Runcorn

DECISION CRITERIA AND CONSIDERATIONS

Introduction

Ineos Chor Limited is seeking the consent of the Secretary of State for Trade and Industry for the development of an 'Energy from Waste' (EfW) Plant on land at the INEOS site in Runcorn. Halton Borough Council has consulted the County Council on this consultation under Section 36 of the Electricity Act 1989 and Section 90(2) of the Town and Country Planning Act 1990 from the Secretary of State for Trade and Industry. The proposal is on a 18.6 hectare brownfield site within the northern part of the INEOS Runcorn plant.

This proposed EfW plant would act as a combined heat and power facility to produce both steam and electricity to be consumed on the Runcorn site, with a capacity of 360MW (thermal) and 100MW of electricity. This would provide 20% of INEOS's Runcorn site energy requirements and replace energy derived from natural gas. The plant would operate 24 hours a day 365 days a year. The facility would have a range of buildings with the main EfW building at 47 metres in height with a 105 metre high stack.

The facility would be fuelled from treated municipal waste sourced primarily from local authorities in the North West region. It would have the capacity to consume approximately 750,000 to 850,000 tonnes of fuel per year. This would be sufficient to consume fuel that could be produced by Manchester, Merseyside, Halton, Cheshire and Warrington. The facility would be served by both road and rail, with an estimated 400 HGV vehicles per day, 62 light vehicles movements and 5 trains servicing the site. There is the opportunity for future receipt of fuel by barge, depending on the prospects of the proposed Western Docks/Port of Weston development. The facility would employ approximately 50 people.

The EfW plant would produce approximately 260,000 tonnes per year of bottom ash, fly ash and flue gas treatment residues. The bottom ash can be reused for building blocks and road aggregates. The fly ash and residues are classed as hazardous waste and would be taken to an existing landfill operated by INEOS licensed for hazardous waste at Randle Island, Runcorn 4km away by road.

Policy Considerations:-

National Policy – PPS10 Planning for Sustainable Waste Management sets out guidance on locating waste management facilities.

Adopted Regional Spatial Strategy
The Core Development Principles policies DP1 – 4 set the regional framework for all development proposals. Policy DP1 advocates economy in the use of land and buildings taking into account the sequential approach to meeting development needs with the reuse of buildings and infrastructure, followed by previously developed land, followed by undeveloped land. Policies DP2 - 4 aim to enhance the quality of life, quality in new development and promote sustainable economic growth and competitiveness and social inclusion.

Policy SD2 aims to secure wide ranging regeneration and environmental enhancements. It states very significant environmental enhancement, in terms of image and opportunities for a higher quality of life overall is required in Runcorn. Development within these areas should be sustainable and complementary to the development required in order to fulfil Policy SD1 above. Policies EQ4, EQ5 and EQ6 deal with regional approach to planning for waste management facilities and state that proposals will be required to adopt the sequential approach set out in the core development principles and the spatial development framework.

Submitted Draft Regional Spatial Strategy (The Panel Report is awaited.)
Policy DP1 sets out the regional development principles reiterating the sequential approach, and the need to tackle climate change by reducing $C0^2$ emissions including from energy generation. Runcorn is in the Northern part of the Liverpool City region covered by Policy LCR3.

Policies EM10, EM11EM12 and EM13 set the regional framework for locating waste management facilities. One of the waste management principles includes recovering value in the form of energy from waste that is not recycled.

Halton Unitary Development Plan (Adopted 2005)
Policy MW 13 Energy Recovery states proposals for any facility to dispose of wastes which have a potential for energy recovery will not be permitted unless it makes provision for energy recovery. Policy MW14 Incineration states proposals for waste incineration plants must meet a list of criteria, which include location within Employment Area and not within close proximity to residential areas or other sensitive land uses, no other suitable sites closer to waste arisings, not have an unacceptable visual impact or detrimental impact on economic regeneration or investment confidence, or existing industries, incorporate a MRF, be located so as to make use of rail or water transport methods and would not cause pollution that would have an unacceptable detrimental impact on surrounding land uses.

Consultation Responses:-

2 letters of objection from members of the public on the grounds of; capacity of the incinerator exceeds the capacity required to burn all of Cheshire's waste and will undermine recycling; incineration produces ash which requires disposal by landfill; noise and traffic impacts from 24 hour operation; existing pollution in area; not true form of renewable energy and does not follow the proximity principle.

Sutton Parish Council object to the application on the grounds; the installation would have detrimental effects on the local area and given human fallibility and mechanical failure represents a health risk to local people; it would be an eyesore; it would require the transportation on local roads of tens of thousands of tonnes of hazardous waste each year; risk of dioxins, dust and heavy metals into the local environment some of which are carcinogenic.

Frodsham Town Council object to the proposal on the grounds that the proposed development would be detrimental to the health of our residents; the ecology and nature conservation of the area; the amenity of the local population in terms of noise, light, disturbance and general amenity; and the local transport infrastructure. The Town Council requests a public inquiry is held to examine all the aspects of the impacts of the proposal.

The County Engineer states the Transport Assessment submitted with the application purely covers the impact of development on the roads in the immediate vicinity of the Ineos Chlor site. The TA states that the proposal could receive 150,000 tonnes of waste from the Cheshire area and 187 daily HGV trips on the Expressway South. However there is no breakdown of the figures to indicate the number of HGV movements which would be generated by the proposals within the Cheshire area or more specifically the Vale Royal Area. It is therefore difficult to comment on the transport implications of the proposal within Cheshire.

The County Waste Manager supports the application and their comments are appended in full to this report.

The County Environmental Protection Officer states that based on an assessment of the information accompanying the application, the proposed development should not cause any significant air quality and noise impacts in Cheshire. However, it would appear that no consideration has been given to the environmental impacts of the associated road transport on the Cheshire road network.

Strategic Planning Issues:-

The proposed location is a brownfield site in an existing industrial area. The site therefore meets the sequential test for locating development in terms of regional planning policy. The proposed EfW plant would be a compatible use within the existing industrial uses and would complement the existing employment uses on the site. It would also provide local employment opportunities and provide energy to the existing on site industry.

The buildings associated with the EfW Plant are 47 metres in height with a stack of 105 metres for the discharge of flue gas. The visual impact of the plant from settlements within Cheshire, namely Frodsham and Helsby and M56 motorway would be minimal set within the existing industrial context.

The site also has the ability to receive waste by rail and potentially water transport methods if proposals at Weston Docks/Port of Weston come forward. The proposal therefore complies with policy aims of reducing transportation of waste by road. The split between road and rail would determined by the local authorities in the location of the MBT plants providing the

RDF/SDF fuel, therefore the true multi-modal nature of the proposal is unknown at this stage, although the potential is there. Therefore assuming that the waste from Cheshire would be transported by road, the Transport Assessment does not consider the impact of the traffic movements of waste being transported from Cheshire to the proposed plant by road. Likewise the Environmental Statement does not consider the environmental impacts of this traffic generation.

The energy produced from this plant would replace energy currently produced by the existing on-site gas fired power station. The proposal provides an opportunity to create energy from pre-treated waste, which is supported by policies in policy EM11 of the submitted draft RSS.

There is a need to divert waste from landfill under the requirements of the EU Landfill Directive. This proposal would provide a destination for pre-treated waste, which will be required as part of the region's network of sustainable waste management facilities. The capacity of the facility would be sufficient to meet a large quantity of the regions treated waste arisings, including Cheshire's.

Conclusion: -

A brownfield site within an existing industrial installation is in principle a suitable location for an Energy from Waste Plant in line with Adopted RSS policies DP1 and policies EQ4- 6. The proposal would be complimentary to an existing industrial installation and provide energy from waste which can be utilised on site for existing processes which currently use energy generated by natural gas. The proposed site also has the opportunity for waste to be transported by rail and potentially by water linking in with the Port of Weston development and therefore conforms with RSS policy EQ6. However it is considered additional information is required relating to traffic movements that would the proposal would generate and the environmental implications of these within the Cheshire area.

RECOMMENDATION:

That Halton Borough Council be informed that Cheshire County Council as strategic planning authority does not object to the principle of an energy from waste combined heat and power generating station at Ineos Chlor Vinyls, South Parade, Runcorn as it accords with Adopted RSS policies DP1, EQ4, EQ5 and EQ6, however it is considered that additional information should be requested on traffic movements within Cheshire (particularly of HGV's) and specifically in the Vale Royal area and the environmental implications of these movements.

SIGNED: -

Case Officer: ......E Mannard...................... Date: ...17/4/07

Authorising Officer: ......S Sukume...................... Date: ..17/4/07......

CHESHIRE
COUNTY COUNCIL

Waste Management Service

Backford Hall
Chester
Cheshire CH1 6PX

Harold Collin
County Waste Manager

Tel: 01244 603559
Fax: 01244 603746
E-mail: Harold.Collin@cheshire.gov.uk

Mr Alan Thornley
County Planning Officer
Environmental Planning Service
Cheshire County Council
Backford Hall
Chester
CH1 6PX

Date: 2[nd] April 2007

Our reference	Your reference	Telephone	Ask for
WMS/JPT/SAH		01244 603579	John Thistlewood

Dear Mr Thornley,

CONSULTATION RESPONSE OF, CHESHIRE COUNTY COUNCIL, IN ITS STATUTORY CAPACITY AS WASTE DISPOSAL AUTHORITY,

STRATEGIC PLANNING APPLICATION

APPLICATION NO: AA/07/00068/ELC

PROPOSAL : Notification under Section 36 of the Electricity Act 1989 and Section 90(2) of the Town and Country Planning Act 1990 to the Secretary of State for Trade and Industry for consent to construct and operate an energy from waste combined heat and power generating station with an approximate capacity of 360MW thermal and up to 100MW of electrical power.

LOCATION: Ineos Vinyls UK Ltd, 4056 The Heath Business and Technical, Runcorn, WA7 4QX

APPLICANT: Ineos Chlor Vinyls, South Parade, Runcorn.

Thank you, in your capacity as Strategic Planning Authority for seeking the views of the Waste Disposal Authority on the Application by Ineos Chlor Vinyls UK Ltd as outlined in a memorandum from Emma Hancock, Environmental Planning Service, Cheshire County Council dated 27 February 2007.

The responses expressed below are made by me as County Waste Manager on behalf of the Waste Disposal Authority and duly authorised in that regard. I therefore request that this reponse is appended to the wider response that you will make to Halton Borough Council .

1. Major changes are required to waste management practices in Cheshire to ensure that Government targets for recycling and landfill diversion are met or exceeded.

Continued/overleaf

Continued/2

2. In order to meet these requirements, new waste management infrastructure will be required. The County Council does not own or operate any waste treatment facilities.

3. The Cheshire Waste Partnership (CWP) comprising the County Council (Waste Disposal Authority) and the six District Councils (Waste Collection Authorities) has been working together to review the way in which household waste is managed.

4. The CWP considered a broad range of technological and performance solutions in the development of its waste management strategy and following detailed evaluation and appraisal of short listed options determined a Reference Project which was felt to meet the CWP's objectives and ensure Cheshire's landfill allowances would be met.

5. The Reference Project was defined as high recycling, with residual waste going to a Mechanical Biological Treatment (MBT) process with the resulting Refuse Derived Fuel (RDF) arising as a by product going to either a third party facility or a bespoke facility that would burn the RDF to produce energy in the form of electricity and/or heat.

6. New facilities will be required to deliver the Reference Project.

7. The project proposed by Ineos Chlor Vinyls UK Ltd could deliver that part of Cheshire's Reference Project involving the thermal treatment of RDF. If this residual waste was sent to landfill, the County Council could fail to achieve its biodegradable municipal waste diversion targets and if so would be liable to volume-linked "fines" incurred under the Landfill Allowance Trading Scheme ("LATS") as imposed by the Waste and Emissions Trading Act (2003). Because of Cheshire's household waste volumes, those fines could run into millions of pounds and comprise a very significant additional burden on the Council tax in Cheshire.

8. The County Council has started the procurement of long term waste management contracts. The County Council is proposing to procure the waste treatment services PFI contract(s) as two separate service elements or Lots for which separate contracts may be awarded. Lot 1 is for a design, build, finance, operate (DBFO) waste treatment facility or facilities to treat residual waste such that BMW is diverted from landfill in accordance with performance standards. BMW diversion performance may either be achieved in totality within Lot 1 or through the production of an appropriate quantity of RDF which is then managed by others through Lot 2. Lot 2 is for a DBFO facility or facilities to handle the RDF output of Lot 1 in accordance with performance standards. Ineos Chlor Vinyls UK Ltd has expressed interest in Lot 2.

9. The Regional Spatial Strategy (RSS) for the North West of England recognises that although primary residual municipal waste treatment will be located in the Waste Planning Authority area in which the waste arises, secondary treatments such as energy recovery from Refuse Derived Fuel (RDF) are more likely to be located on a regional strategic basis. The proposal would therefore be, in conformity with the RSS.

Continued/overleaf

Continued/3

10. It is the view of the Waste Disposal Authority that the proposal by Ineos Chlor Vinyls UK Ltd is consistent with Government policy for local authorities to reduce the amount of waste they dispose of to landfill and as such would play an important part in the UK's overall waste management strategy.

11. The facility would provide a potential outlet for RDF produced as part of any waste treatment solution proposed for Cheshire. It would help to meet the County's obligations under the Landfill Directive. For these strategic reasons, **the Waste Disposal Authority supports the Application.**

Yours sincerely

Harold A. Collin

Harold Collin
County Waste Manager

Environmental and Regulatory Services Department
Rutland House
Halton Lea Road
Runcorn
Cheshire
WA7 2GW

Warrington Borough Council

John Earle
Head of Service
Regeneration &
Development

Environment Services
Directorate
New Town House
Buttermarket St.
Warrington
WA1 2NH

Our ref: dar/ineoschlor03
Your ref: 07/00068/ELC

Date: 20 March 2007

21 MAR 2007

Dear Sir

41/LB ASP

Notification under Section 36 of the Electricity Act 1989 and Section 90 (2) of the Town and Country Planning Act 1990 for consent to construct and operate an EfW/CHP generating station. Ineos Chlor, Runcorn. Application reference 07/00068/ELC

Thank you for consulting the Borough Council on the above submission.

WBC does not wish to raise any objections to the proposed development but would like to make the following comments.

1. WBC supports the principle of sustainable waste management by moving waste up the waste hierarchy in order to reduce the amount of waste going to landfill. The Council acknowledges the significant energy usage of the Ineos Chlor plant and supports the generation of energy from waste and in particular the use of the energy within the existing plant infrastructure.

2. This facility will be of regional significance providing a major contribution to the long term regional waste management needs in the event that adjoining authorities commit to the production of appropriate fuel sources. It is therefore the case that the facility would be consistent with PPS 10 and draft RSS. WBC is currently revising the MWMS and is hopeful that the Borough will be able to deal with its own waste arisings.

3. The ES transport assessment has been reviewed and this includes both a construction and operational element. The construction element can be discounted as Warrington would only be affected by the daily operational traffic movements to and from the facility.

   The total anticipated HGV generation is 384 movements/day with some 62 car trips in and out of the site. Given that the site is located in Runcorn, the potential vehicle movements that may affect Warrington are from the Manchester conurbation and almost all of these trips will use the motorway network in particular the M56. The Merseyside movements have no need to come through Warrington and the same applies to the vehicles from Cheshire. Therefore when the total number of new trips is broken down

Alan Stephenson
Strategic Director
Environment Services

Chief Executive
David Whitehead

www.warrington.gov.uk
If you have difficulty making
contact please dial (01925) 444400

and distributed onto the road network the percentage of traffic coming towards Warrington in only small and even this will, in the main be kept on the motorway network.

In summary, there are no highways objections to the proposed facility. In the interests of sustainable development it is recommended that the DTI require the developer to maximise the use of the rail network for the delivery of waste materials to the plant. It is also recommended that in the event the proposal is approved the DTI conclude an agreement or attach an appropriate condition to restrict all HGV movements to the motorway network and prohibit wagon movements through the built up areas of the Borough.

The comments of the Environmental Health & Protection service have not yet been received and these will be forwarded to you as soon as possible.

Please do not hesitate to give me a call if you need any further clarification of the above.

Yours faithfully

D. Ringwood

David Ringwood

Minerals and Waste Planning Officer

Please contact:	David Ringwood
Direct Dial:	01925 442814
Fax:	01925 442823
Email address	dringwood@warrington.gov.uk

Ack 5131075.c.

Helsby Pari_ _ _uncil

Parish Cler
Jeanette Hughe
Primrose Cottag
Back Lar
Alvanle
Frodshai
WA6 9A]
Tel/Fax: 01928 7264?
email:alvanley@screaming.n

2nd March 07

Mr P Watts – Operational Director
Environment & Regulatory Services
Halton Borough Council
Rutland House
Halton Lea
Runcorn
WA7 2GW

HALTON BOROUGH COUNCIL
ENVIRONMENT AND DEVELOPMENT DIRECTORATE
RECEIVED 05 MAR 2007
FOR ATTENTION OF PS ASP

Dear Sir,

Application No. 07/00068/ELC

Notification under Section 36 of the Electricity Act 1989 and Section 90(2) of the Town & Country Planning Act 1990 to the Secretary of State for Trade and Industry for consent to construct and operate an energy from waste combined heat and power generating station with an approximate capacity of 360MW thermal and up to 100MW of electrical power at Ineos Chlor Vinyls South Parade Runcorn Cheshire

Please be advised, that it is the opinion of the Parish Council to recommend the refusal of the above-mentioned application on the grounds of 'Human Health Risk' to the residents of Helsby and surrounding area.

We enclose a report, written by Prof. J C Dearden on the Council's behalf, entitled 'Human Health Risk Assessment' and this report, in its entirety, is the evidence of the health impact of perceived threat. We strongly urge you to read the report prior to making your decision.

We would be obliged if you could furnish us with copies of any amendments to the application and/or your recommendation to the DTI (by e-mail if more convenient) by way of keeping us informed, thanks very much.

We look forward to hearing from you.

Yours sincerely,

Jeanette Hughes (Mrs)
Parish Clerk

cc. Mr Mike Hall MP
Mr R Ellison – Head of Planning & Building Control VRBC
Secretary of State for Trade and Industry
Vale Royal Borough Councillors - Mrs Gretta Cousins
Prof. Les Ford
Mr Alan McKie

Enc.

QUALITY PARISH COUNCIL

Report on 'Human Health Risk Assessment', part of a planning application by INEOS Chlor for an Energy from Waste Project on the INEOS Chlor chemical site at Runcorn, Cheshire

Prepared for Helsby Parish Council by
J.C. Dearden
BSc, MSc, PhD, ACGI, MRPharmS(Hon)

QSTAR CONSULTING

The Robins
10 Landscape Dene
Helsby
Cheshire WA6 9LG

February 2007

Tel: 01928-722292

Report on 'Human Health Risk Assessment', part of a planning application by INEOS Chlor for an Energy from Waste Project on the INEOS Chlor chemical site at Runcorn, Cheshire

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CONTENTS

1. Introduction

INEOS Chlor submitted to the Department for Trade and Industry on 19 January 2007 an application for consent to construct and operate a generating station on their Runcorn site. The application included a Human Health Risk Assessment (HHRA) prepared by Dr. A. Hashm of RPS, Conrad House, Beaufort Square, Chepstow, Monmouthshire NP16 5EP. The present report is a comment on the above-mentioned HHRA.

The INEOS Chlor application is for an energy-from-waste (EfW) heat- and power-generating station that would burn between 750,000 and 850,000 tonnes per year (tpy) of refuse-derived fuel (RDF). It would have a capacity of about 360 megawatts (MW) thermal and 100 MW electrical power.

The HHRA examined chemicals that would be likely to have acute or immediate effects and those that would be likely to have chronic or long-term effects. Those in the former category were given as acid substances, such as sulphur dioxide, nitrogen dioxide, hydrochloric and hydrofluoric acids, and other inorganic chemicals such as carbon monoxide and fine particulate matter. Those chemicals in the second category were given as metals and semi-volatile and non-volatile organic chemicals such as dioxins and furans.

Potential human health impacts were evaluated not only in terms of inhalation, but also in terms of overall long-term exposure *via* other viable routes such as the food chain. Hence the assessment was carried out on persistent substances that have the potential to accumulate in the environment over the operational life of the facility. Worst-case scenarios were assumed, even though these were considered unlikely. The 105 metre high stack was assumed to be the only source of emissions.

2. General comments

The HHRA is quite wide-ranging, but in my view is flawed in several respects. Most serious is the total omission of any consideration of the health impact of fine particulate matter. The HHRA mentions that the majority of dioxins and furans will be emitted in the particle or particle-bound phase, but fails to recognise that fine particles *per se* are dangerous.

The HHRA assumes that the only source of emissions would be the stack. It neglects to take account of the pollution from site traffic during construction and operation.

The HHRA ignores the toxic effects of thallium and vanadium, and does not even mention the risks from polybrominated diphenyl ethers (PBDEs).

No sites within Frodsham town or Helsby village were considered in the HHRA assessment.

The HHRA fails to acknowledge the existence of perceived threat from a plant of this nature.

It is not clear from the HHRA whether, in the dispersion studies, the nature of the terrain was adequately taken into account.

The HHRA assumes that above-ground produce is protected within an outer covering, so that root uptake is the primary mechanism through which above-ground protected produce becomes contaminated.

The HHRA uses an erroneous intake target level for dioxins of 50 pg/kg(of body weight)/day for infant exposure through breast milk (pg = picogramme, 10^{-12} g, 1 million millionth of a gramme), thereby incorrectly claiming that the estimated daily intakes are well below the target level.

The HHRA incorrectly claims that all estimated carcinogenic risks are significantly below the target level of 1 in 100,000, and also uses an incorrect target level.

The presentation of some numerical and other information in the HHRA is unclear.

3. Health impacts of fine particulates

Fine and ultrafine particulate matter is increasingly recognised as a dangerous pollutant. (By "fine" is meant particles smaller than about 2.5 microns in diameter (PM2.5s), whilst "ultrafine" means particles smaller than about 0.1 micron in diameter (PM0.1s). Such particles do not settle out readily, but remain suspended, and can thus travel for many miles. Neither do they deposit in the upper reaches of the respiratory tract, but are drawn deep into the lungs. They are produced in large quantities in an incinerator, and they are too small to be filtered out; this is the case especially for the ultrafine particles, which are also the most dangerous. The HHRA does not discuss particle size at all, thereby failing to recognise that the important parameter is surface area; for a given weight of particles, the surface area of PM2.5s is four times that of PM10s, and that of PM0.1s is 100 times that of PM10s. This is important, because pollutants are adsorbed onto the surfaces of the particulate matter, and are thus drawn deep into the lungs with the particles. In addition, toxic pollutants such as dioxins are formed post-incineration in concentrations up to 100-fold the concentration during incineration, so that the particulate matter can be very highly toxic. In addition the particulate matter itself can lead to fibrosis, leading in turn to cytokine release, which results in blood platelet formation and hence heart attacks and strokes [1]. These tend to peak about four days after a high release of particulates. Fine particulates have also been associated with respiratory disease [2, 3], lung cancer [4], reduced immunity [5] and other health problems [6]. A very recent paper [7] demonstrates that short-term exposure to PM2.5s increases the risk of hospital admission for cardiovascular and respiratory diseases. Persistent free radicals are present in combustion-generated fine and ultrafine PMs, and these radicals can induce DNA damage, leading possibly to cancer [8]. There is also evidence that sudden infant death syndrome (SIDS) is linked to airborne particulates [9]. Pope and Dockery [10], Cormier et al. [11] and Gwinn and Vallyathan [12] have recently reviewed the health effects of fine particulate pollution. The last-named authors comment that "Large numbers of studies have reported associations between ultrafine particle exposure and morbidity in elderly and compromised individuals. Furthermore, recent studies also emphasize the impact of day-to-day variations in particle concentrations and exposures for short periods as important factors in cardiac events in predisposed population".

It is interesting to note that in 1999 Michael Meacher, the then Minister for the Environment, in evidence to a House of Lords Select Committee on the European Communities [13], said: "*Incinerator plants are the source of serious toxic pollutants: dioxins, furans, acid gases, particulates, heavy metals, and they all need to be treated very seriously. There must be absolute priority given to human health requirements and the protection of the environment*", and "*I repeat that the emissions from incinerator processes are extremely toxic. Some of the emissions are carcinogenic. We know scientifically that there is no safe threshold below which one can allow such emissions. We must use every reasonable instrument to eliminate them altogether*".

It is thus clear that fine and ultrafine particulate emissions have serious acute and chronic effects. The HHRA is seriously flawed by its failure to consider particulate emissions.

4. Health impacts of traffic pollution

The HHRA neglects to take account pollution from the estimated 446 vehicle (384 HGV + 62 car) movements per day during operation, and the peak estimated 1330 vehicle (400 HGV + 930 car) movements per day during construction. It may be noted also that the estimated 62 car movements (31 cars) per day during operation seems very low.

Cordier et al [14] have observed that the incidence of cardiac anomalies, obstructive uropathies and skin anomalies increased rectilinearly with road traffic density in the vicinity of an incinerator. Of course, there is much through traffic on the Runcorn Expressway close to the proposed site of the EfW plant, but the additional traffic generated at the site will add to the problem.

5. Health impacts of thallium, vanadium and polybrominated diphenyl ethers (PBDEs)

The HHRA states that in the absence of toxicological data for thallium, and in the absence of chemical-specific data for vanadium for the estimation of its concentration in different exposure media, these metals were not included in the assessment.

In fact, there is considerable toxicological information available for these metals. For example, the human LD_{50} value (dose to kill 50% of recipients) is given as 15 mg/kg [15]. The rat LD_{50} value of vanadium is about 50 mg/kg, and the estimated safe intake is 100 μg/day; vanadium is known to cause respiratory problems. Much concern was expressed locally about vanadium toxicity when Ince B power station was burning oremulsion, which had a high vanadium content. It should have been possible for the HHRA to have included at least a rough estimate of the likely health impacts of thallium and vanadium from the proposed EfW plant.

PBDEs are very widely used as flame-retardants in plastics, textiles, construction materials and electronic equipment [16]. They are resistant to degradation and accumulate in the food chain and in the body because they are highly lipophilic. It has been reported [17] that incineration converts PBDEs to polybrominated and polybrominated/polychlorinated dioxins and furans. It is not known whether PBDEs

can survive incineration or be re-formed post-incineration, although the latter is quite possible. Because of this, and because of the ubiquity of PBDEs, especially the most toxic, namely decabromodiphenyl ether, it is considered that an assessment of the risk that these chemicals pose should have been included in the HHRA.

6. Health impacts in Frodsham and Helsby

No "sensitive receptor locations" to assess potential health impacts of the plant were located in Frodsham town or Helsby village, although four sites on Helsby and Frodsham Marshes were used. There are a number of "sensitive receptor locations" that could have been utilised, such as primary and secondary schools and old people's residential/nursing homes. It is considered that the omission of such sites in Frodsham and Helsby constitutes a serious failure of the health impact assessment.

7. Health impacts of perceived threat

The HHRA makes no mention of perceived threat. However, wherever an incinerator is proposed, there is always strong local opposition to it, because of a perceived threat to health and amenity. Such perceived threat can cause stress and worry, as was highlighted in a recent report [18]. It should also be noted that the threat of an incinerator generally causes property prices in the area (up to several miles away) to fall [19-23], which is an additional cause of stress and worry.

8. The nature of the terrain

The HHRA states that, in the dispersion studies, the nature of the terrain was taken into account. However, there are houses close by, A stack of about 100 metres in height is normally considered necessary for flat terrain, so it would appear that a 105 metre stack for the proposed EfW plant is inadequate.

Appendix 10.1, Annex A, of the Air Quality Assessment documents submitted with the planning application for the EfW plant give some details of why a stack height of 105 metres was chosen. Two modelling procedures, AERMOD and ADMS 3.3, were used to determine stack height. Initially flat terrain was assumed, yielding recommended stack heights of 95 m (AERMOD) and 115 m (ADMS). Assuming complex terrain, AERMOD results indicated that, for stack heights > 105 m, ground level contributions from the stack did not decrease materially with increasing stack height. A similar finding was observed with ADMS for stack heights > 115 m.

However, consultations with Liverpool John Lennon Airport revealed that, because of aviation safety issues, stack height was limited to a maximumof 106 m. It was therefore decided to recommend a stack height of 105 m.

There are houses close to the proposed EfW plant site, at a considerably higher level than the plant, and Runcorn town rises to an elevation of about 80 metres, whereas the base of the stack would be at an elevation of about 15 metres. It seems odd, to say the least, that when the average recommended stack height from AERMOD and ADMS is 105 m based on a flat terrain model, the final recommended stack height is exactly the same. That is, the hilly nature of Runcorn has been completely ignored. Some housing

in Runcorn would be only 40 m above the top of the stack, which is far below the minimum recommended by the AERMOD and ADMS models.

Annex A also appears to be somewhat disingenuous in saying that for stack heights above a specified value, ground level contributions from the stack would not decrease materially with increasing stack height. What is not said is what those ground level contributions were calculated to be; they are highly likely to be in excess of those calculated for flat terrain.

However, in the final analysis, a totally extraneous factor, the proximity of Liverpool John Lennon Airport, has restricted stack height to 105 m, a height that, based on the above comments, is almost certain to increase ground level contributions from the stack to unacceptably high levels.

The conclusion must therefore be drawn that the Ineos Chlor site is unacceptable, from a health risk standpoint, for the EfW plant.

9. Contamination of above-ground produce

The HHRA assumes that above-ground produce is protected within an outer sheath such as a pod, so that root uptake is the primary mechanism through which above-ground protected produce becomes contaminated. The HHRA ignores widely-grown vegetables such as cabbage, Brussels sprouts and lettuce, none of which has a protective sheath, some peas and beans that are eaten with their pods, and a wide variety of fruit, both hard and soft. The HHRA also assumes that corn grown for cattle-feed is protected, whereas in fact such corn-cobs are usually eaten with their protective covering still in place. Thus the estimates of human uptake from above-ground produce, and of uptake by cattle from corn-feed, are clearly too low.

10. Estimation of risks to infants

The HHRA states that the USEPA (United States Environmental Protection Agency) intake target level of dioxins (calculated as 2,3,7,8-TCDD TEQ (toxic equivalents)) is 50 pg/kg/day. This is totally incorrect. In fact the USEPA has no intake target level, preferring to base estimates of toxicity on body burdens (i.e. the total amount of dioxins in the body). This was confirmed to me by Dr. Dwain Winters of the USEPA in a telephone conversation on 21 February 2007. He stated that the typical United States dioxin intake was 1 pg/kg/day, which he stated is a level to cause concern, and said that a safety factor of 10-100 could be applied to that figure, yielding an acceptable intake level of 0.01-0.1 pg/kg/day. Even the top level is 500 times lower than that claimed incorrectly by the HHRA. However, Professor Janna Koppe of The Netherlands has stated [24] that there is no safe level of dioxin intake for babies. Prof. Koppe is an internationally recognised expert on the effects of dioxins on infants and children, and has published widely on the subject [25-28]. Prof. Koppe has also recently presented data at the 2006 Dioxin Congress [29] showing delayed initiation of breast development in girls with higher prenatal dioxin exposure; this confirms similar findings in rats [30]. Boersma and Lanting [31] have pointed out that the daily dioxin intake of breast-fed infants may be as high as 80-fold higher than in adults.

Table 3.9 in the HHRA shows predicted daily dioxin intakes for infants at various receptors around the proposed EfW plant. The HHRA claims that levels at all receptors are well below their (incorrect) target level of 50 pg/kg/day. In fact, using the target level suggested by the USEPA of 0.01-0.1 pg/kg/day, levels at all receptors are above the 0.01 pg/kg/day level, and in all but two cases are above the 0.1 pg/kg/day level.

It follows that the proposed EfW plant, far from yielding dioxin levels well below the USEPA target level, would yield dioxin levels well above acceptable levels for infants. Hence effects such as those found by Koppe (*loc. cit*) and others could be expected. This is an extremely serious failure of the HHRA.

11. Estimation of carcinogenic risks

The HHRA states that the target level for cancer risk is 1 in 100,000, or 10^{-5}. It then goes on to state that the calculated cancer risks for children and adults at various receptors around the proposed EfW plant are all significantly below the target level of 10^{-5}. In fact, several of the calculated cancer risks are quite close to the 1 in 100,000 target level, and one is actually slightly above.

However, the main criticism of the HHRA in this respect is that the USEPA's generally accepted target level for cancer risk is not 1 in 100,000, but 1 in 1,000,000 (one in a million). This is a *de minimis* level [32], and Michaelson [33] has pointed out that the USEPA has usually determined that only *de minimis* levels of risk (one in a million) are acceptable. This means that for 23 out of the 37 receptors, the calculated cancer risk from the proposed EfW plant is greater than the accepted target level. Hence the proposed plant is shown, by the calculated figures given in the HHRA, to be a serious cancer risk for the surrounding population.

12. Unclear presentation of data

Mention is made in the HHRA of compounds such as dioxins and furans, and specific examples of these, without explanation for the non-scientist of what they are. It would have helped to have a brief explanation, as has been provided in Appendix 1 of this report.

The use of units in some parts of the HHRA is unclear. For example, it is stated on page 12 of the HHRA that the normalised volumetric flow rate has units of $Nm^{-3}S^{-1}$, where m represents metres and S represents seconds. In fact, N presumably means "normalised", and is not a scalar quantity. Furthermore, volumetric flow rates should be in cubic metres per second, not per cubic metre per second. That is, the units of normalised volumetric flow rate should be written as $m_N{}^3S^{-1}$.

A second criticism is that the headings of Tables 2.2 and 2.3 in the HHRA are unclear. Firstly there are two columns with identical headings (Emission Concentration (mg Sm^{-3})), with no explanation of their differences. Secondly, concentrations are normally in units of, for example, milligrammes per cubic metre (mg m^{-3}), but units of time appear to be included. It is possible to envisage milligrammes per cubic metre per second (mg $S^{-1}m^{-3}$), but not milligramme.seconds per cubic metre, which is what "mg Sm^{-3}" means. Neither it is explained how the final column, Emission rate (g s^{-1}) is arrived at, nor why the representation of seconds has changed from S to s.

There is no explanation of units or abbreviations of units for the non-scientist reading the HHRA. A simple table, such as that provided in Appendix 2 of this report, would have helped.

13. Conclusions

The HHRA has been found to be flawed in a number of respects. It is seriously flawed in that it ignores the health impacts of fine and ultrafine particulate emissions, underestimates the risks to infants, and underestimates the cancer risk to the general population. It is also flawed in that it ignores the health effects of traffic pollution, of thallium, vanadium and of polybrominated diphenyl ethers. It fails to estimate health effects in two large local centres of population, Frodsham and Helsby, and it fails to recognise the effects of perceived threat. It does not appear adequately to have taken into account the nature of the terrain in the dispersion modelling, and it incorrectly assumes that above-ground produce will not be affected by air-vegetation transfer of pollutants. It is also unclear in several aspects of presentation.

It is recommended that the HHRA be not accepted as part of Planning Application 07/00068/ELC without major correction and revision.

14. References

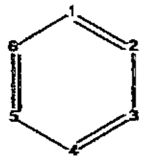
1. Miller K.A., Siscovick D.S., Sheppard L., Shepherd K., Sullivan J.H., Anderson G.L. and Kaufman J.D. Long-term exposure to air pollution and incidence of cardiovascular events in women. *New England Journal of Medicine* **356** (2007) 447-458.
2. Thompson J. and Anthony H. The health effects of waste incinerators. *Journal of Nutritional and Environmental Medicine* **15** (2005) 115-156.
3. Morgan G., Corbett S. and Wlodarczyk J. Air pollution and hospital admissions in Sydney, Australia, 1990-1994. *American Journal of Public Health* **88** (1998) 1761-1770.
4. Pope C.A., Burnett R.T., Thun M.J., Calle E.E., Krewski D., Ito K. and Thurston G.D. Lung cancer, cardiopulmonary mortality, and long-term exposure to fine particulate air pollution. *Journal of the American Medical Association* **287** (2002) 1132-1141.
5. Seaton A., MacNee W., Donaldson K. and Godden D. Particulate air pollution and acute health effects. *Lancet* **345** (1995) (No. 8943) 176-178.
6. Wichmann H.E. and Peters A. Epidemiological evidence of the effect of ultrafine particle exposure. *Philosophical Transactions of the Royal Society of London* **358** (2000) 2751-2769.
7. Dominici F., Peng R.D., Bell M.L., Pham L., McDermott A., Zeger S.L. and Samet J.M. Fine particulate air pollution and hospital admissions for cardiovascular and respiratory diseases. *Journal of the American Medical Association* **295** (2006) 1127-1134.
8. Dellinger B., Pryor W.A., Cueto R., Squadrito G.L., Hedge V. and Deutsch W.A. Role of free radicals in the toxicity of airborne fine particulate matter. *Chemical Research in Toxicology* **14** (2001) 1371-1377.

9. Ha E.H., Lee J.T., Kim H., Hong Y.C., Lee B.E., Park H.S. and Christiani D.C. Infant susceptibility of mortality to air pollution in Seoul, South Korea. *Pediatrics* **111** (2003) 284-290.
10. Pope C.A. and Dockery D.W. Health effects of fine particulate air pollution: lines that connect. *Journal of the Air and Waste Management Association* **56** (2006) 709-742.
11. Cormier S.A., Lomnicki S., Backes W. and Dellinger B. Origin and health impacts of toxic by-products and fine particles from combustion and thermal treatment of hazardous wastes and materials. *Environmental Health Perspectives* **114** (2006) 810-817.
12. Gwinn M.R. and Vallyathan V. Nanoparticles: health effects – pros and cons. *Environmental Health Perspectives* **114** (2006) 1818-1825.
13. House of Lords Select Committee on the European Communities, 11th Report, HL Paper 71, 15 June 1999.
14. Cordier S., Chevrier C., Robert-Gnansia E., Lorente C., Brula P. and Hours M. Risk of congenital anomalies in the vicinity of municipal solid waste incinerators. *Occupational and Environmental Medicine* **61** (2004) 8-15.
15. www.emedicine.com/emerg/topic926.htm **(accessed 21.2.07).**
16. Rahman F., Langford K.H., Scrimshaw M.D. and Lester J.N. Polybrominated diphenyl ether (PBDE) flame retardants. *Science of the Total Environment* **275** (2001) 1-17.
17. Söderström G. and Marklund S. PBCDD and PBCDF from incineration of waste containing brominated flame retardants. *Environmental Science and Technology* **36** (2002) 1959-1964.
18. Environmental Health Team, Centre for Public Health, Liverpool John Moores University. Rapid health impact assessment of the proposed Ince Resource Recovery Park. August 2006.
19. Kiel K.A. and McClain K.T. The effect of an incinerator siting on housing appreciation rates. *Journal of Urban Economics* **37** (1995) 311-323.
20. Kiel K.A. and McClain K.T. House prices during siting decision stages – the case of an incinerator from rumor through operation. *Journal of Environmental Economics and Management* **28** (1995) 241-255.
21. Farber S. Undesirable facilities and property values: a summary of empirical studies. *Ecological Economics* **24** (1998) 1-14.
22. McCluskey J.J. and Rausser G.C. Estimation of perceived risk and its effect on property values. *Land Economics* **77** (2001) 42-55.
23. Cameron T.A. Directional heterogeneity in distance profiles in hedonic property value models. *Journal of Environmental Economics and Management* **51** (2006) 26-45.
24. Koppe J.G. E-mail dated 22 February 2007 to Prof. J.C. Dearden.
25. Pluim H.J., Koppe J.G., Olie K., van der Slikke J.W., Kok J.H., Vulsma T., van Tijn D. and de Vijlder J.J.M. Effects of dioxins on thyroid function in newborn babies. *Lancet* **339** (1992) (No. 8804) 1303.
26. Pluim H.J., Koppe J.G., Olie K., van der Slikke J.W., Slot P.C. and van Boxtel C.J. Clinical laboratory manifestations of exposure to background levels of dioxins in the perinatal period. *Acta Paediatrica* **83** (1994) 583-587.
27. ten Tusscher G.W. and Koppe J.G. Perinatal dioxin exposure and later effects – a review. *Chemosphere* **54** (2004) 1329-1336.
28. ten Tusscher G.W., de Weerdt J., Roos C.M., Griffioen R.W,., de Jongh F.H. Westra M., van der Slikke J.W., Oosting J., Olie K. and Koppe J.G. Decreased

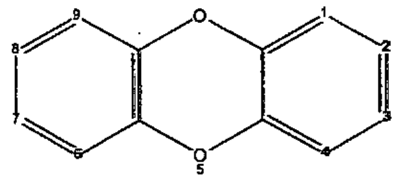
lung function associated with perinatal exposure to Dutch background levels of dioxins. *Acta Paediatrica* **90** (2001) 1292-1298.

29. Leijs M.M., Koppe J.G., Olie K., de Voogt P., Vulsma T., van Aalderen W.M.C. et al. Delayed initiation of breast development in girls with higher prenatal dioxin exposure. Oral presentation at the DIOXIN2006 Congress held in Oslo, Norway, 21-25 August 2006.
30. Fenton, S.E., Hamm J.T., Birnbaum L.S. and Youngblood G.L. Persistent abnormalities in the rat mammary gland following gestational and lactational exposure to 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD). *Toxicological Sciences* **67** (2002) 63-74.
31. Boersma E.R. and Lanting C.I. Environmental exposure to polychlorinated biphenyls (PCBs) and dioxins: consequences for long-term neurological and cognitive development of the child (from) lactation. In: *Short- and Long-Term Effects of Breast-Feeding on Child Health* (Koletzko B., Michaelsen K.F. and Hernell O., Eds.), Kluwer Academic/Plenum Publishers, New York, 2000, pp. 271-288.
32. Castorina R. and Woodruff T.J. Assessment of potential risk levels associated with U.S. Environmental Protection Agency reference values. *Environmental Health Perspectives* **111** (2003) 1318-1325.
33. Michaelson J. Rethinking regulatory reform: toxics, politics, and ethics. *Yale Law Journal* **105** (1996) 1891-1925.

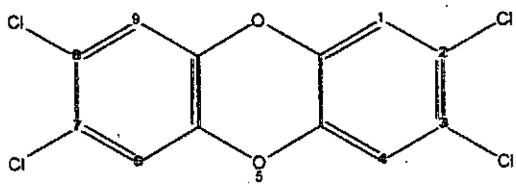
Appendix 1. Representations of relevant chemical structures



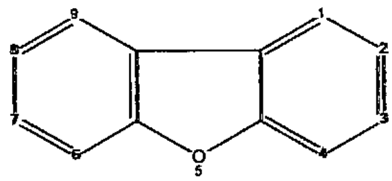
Benzene: a ring of 6 carbon atoms, each with 1 hydrogen atom attached



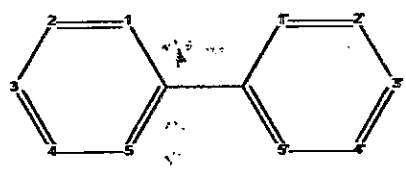
Dibenzo-*p*-dioxin, with substituent positions numbered. There are 75 possible polychlorinated dibenzo-*p*-dioxins



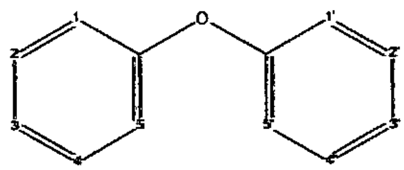
2,3,7,8-tetrachlorodibenzo-*p*-dioxin, the most toxic polychlorinated dioxin



Dibenzofuran, with substituent positions numbered. There are 135 possible polychlorinated dibenzofurans



Biphenyl, with substituent positions numbered. There are 209 possible polychlorinated biphenyls



Diphenyl ether, with substituent positions numbered. There are 209 possible polybrominated diphenyl ethers

16. Appendix 2: Explanation of units

The basic unit of weight in the metric system is the gramme (g). There are approximately 454 g in 1 lb.

1 kilogramme (1 kg)	= one thousand grammes (1000 g, 10^3 g)
1 milligramme (1 mg)	= one thousandth of a gramme (0.001 g, 10^{-3} g)
1 microgramme (1 µg)	= one millionth of a gramme (0.000001 g, 10^{-6} g)
1 nanogramme (1 ng)	= one thousand millionth of a gramme (0.000000001 g, 10^{-9} g)
1 picogramme (1 pg)	= one million millionth of a gramme (0.000000000001 g, 10^{-12} g)
1 femtogramme (1 fg)	= one thousand million millionth of a gramme (0.000000000000001 g, 10^{-15} g)

The basic unit of length in the metric system is the metre (m). 1 metre is about 3 ft 3 in.

A concentration of, say, 5 picogrammes per cubic metre is written as 5 pg m^{-3}.

A flow rate of, say, 50 cubic metres per second is written as 50 m^3 s^{-1}.

Mr. P Edmonds
Chairman, Moore PC
Beechfield, Hobb Lane
Moore
Warrington WA4 5QS

Secretary of State for Trade & Industry
c/o Bay 2121
1 Victoria Street
London
SW1H 0ET

POL 1815 VS

HAI ENV

17 MAY 2007

Dear Sir or Madam,

Town and country planning act 1990 Application Number 07/00068/ELC
Consent to Construct and Operate an Energy from Waste Combined Heat and Power Generating Station on Land owned by INEOS at Weston Point, Runcorn, Cheshire.

As Chairman of Moore Parish Council, I am writing to lodge my strong objection to the proposed construction and operation of an energy from waste combined heat and power generating station in this area.

Halton is already one of the most highly polluted areas in the Country, resulting from its industrial heritage, extensive soil pollution, air pollution associated with traffic emissions, and the increase in air traffic to and from the Liverpool John Lennon Airport. Together, these are particularly prevalent in the area identified for the construction of the proposed generating station, and can only increase the threat to the health and well being of residents who live in an area which has one of the highest standard mortality ratios (SMR's) and levels of cancer, heart and respiratory diseases in the United Kingdom.

The arguments presented against a previous application for a similar plant in this area still apply to the proposed plant in Weston Point. There can be no denying that some dioxins and poisonous gasses will be formed and released into the atmosphere. The operation of an incinerator burning waste derived fuel, containing carbon from paper, wood and card and chlorine compounds (which are building blocks for the formation of carcinogenic compounds such as dioxins) is highly undesirable. To then extend the residence time in the 600-300 degrees centigrade phase by passing the fumes through a heat exchanger merely serves to guarantee their formation.

Even if the proposed Plant operated under all relevant regulations and laws, the proposed site of this potential source of cancer and birth defect-causing poisons at the bottom of a fifty metre hill within a residential area and a primary school on the slopes, poses a real threat of harm for the residents of the area of Halton as a whole, and would have a major impact on the lives of all concerned.

Apart from this, any development that envisages twenty four hour traffic, seven days a week, would overstretch the already overcrowded roads of Halton, furthering traffic pollution and noise and adding to the problems of maintenance to the Borough's road systems. If rail were to be used, this would again add to the current high level of noise pollution in the area.

Moore is directly in line to suffer from the increased air pollution and any of the proposed transport arrangements, as the village is close to both major road and rail networks. The village already has a large landfill site on its doorstep, and I feel that this incinerator would be a step too far.

To date, as Halton Borough Council's Officers are already aware, other similar plants have been denied permission to build or operate in this area, and I fail see why this application should be regarded more favourably.

Yours faithfully

Peter Edmonds
Chairman, Moore Parish Council

Copy to: Operational Director
Environmental & Regulatory Services
Halton Borough Council
Rutland House, Runcorn, Cheshire. WA7 2GW

HOUSE OF COMMONS

Ref: DT/MT/4019/21 LONDON SW1A 0AA

16 March 2007

Mr Phil Watts, Operational Director
Environment & Planning Directorate
Halton Borough Council
Rutland House
Halton Lea, Runcorn
Cheshire WA7 2ES

20 MAR 2007

43, can you acknowledge on my behalf, – let Derek know. We will build in the comments into our response to the DT and into any future reports

Dear Phil

07/00068/ELC Planning Application Ineos Chlor

I have received 20 letters from constituents voicing their opposition to the above planning application. I have also met Ineos to discuss with them my concerns which are the following:

- Halton being a receptacle for a large amount of the North West's waste and the impact on our image.

- The height of the stack and the fact that large parts of the land around the Ineos site are higher. While the prevailing wind may take emissions most of the time away from housing, this will not always be the case.

- Health impact of any emissions, particularly given the carcinogenic nature of dioxins, although I believe there would have to be strict controls about the level of emissions

- The potential significant increase in the number of heavy goods vehicles coming into Halton to deliver waste.

As the Council is a statutory consultee and the planning authority (albeit with no decision making power on this application) I would be grateful if the contents of my letter can be brought to the attention of the relevant committee.

Yours sincerely,

Derek Twigg

Derek Twigg

Cc: Chris Tane, Ineos

THE CONSTITUENCY OF HALTON
WIDNES RUNCORN (WEST) HALE

Constituency Office: Tel: 0151 424 7030 Fax: 0151 495 3800

 ACK 2013107S.C.

HOUSE OF COMMONS

LONDON SW1A 0AA

Mr P Watts – Operational Director
Environment & Regulatory Services
Halton Borough Council
Rutland House
Halton Lea
Runcorn
WA7 2GW

15 MAR 2007

ASP

Our Ref: ***HUGH01006/01070278MF***
(Please quote in all correspondence)

12 March 2007

Dear Mr Watts,

Planning Application 07/00068/ELC

I have been contacted by a number of constituents and Helsby Parish Council who object to the above.

The primary objections of my constituents and Helsby Parish Council is the threat posed to public health by the proposed heat from the waste incinerator at Weston Point Runcorn.

Helsby Parish Council has commissioned Professor Dearden to produce a Human Health Risk Assessment Report which details concerns about the threat to public health from the emissions from the proposed incinerator and the emissions from vehicles bringing waste to and from the site.

The Report by Professor Dearden is a comprehensive one that details the risk to public health in the general population, the infant population and the carcinogenic risks.

I share the concerns about the risk to public health from the incinerator which will spread across a large and diverse area. I am particulary concerned about the emission of dioxins from the proposed incinerator. Dioxins are a very dangerous and carcinogenic chemical. They pose a real threat to public health in an area that already suffers from poor health.

The increase in heavy goods vehicles bringing into Halton waste from Liverpool, Manchester, Cheshire and beyond will also add to congestion and increase exhaust emissions. This in turn will also have an impact on the environment, the quality of the air and on public health.

For the above reasons I wish to register my objections to Planning Application 07/00068/ELC.

SERVING THE CONSTITUENTS OF WEAVER VALE
Constituency Office: Office 4, Castle Park, Frodsham, Cheshire, WA6 6SB
Tel: 01928 735000 E-mail: hallm@parliament.uk
www.epolitix.com/Mike-Hall

Can you please ensure my views are put before the relevant committee of the Council when this planning application comes forward for consideration.

Yours sincerely,

Mike Hall

Mike Hall MP

 Ack. 30/3/07 sc

Connor, Sarah - Environment

From: council@frodsham.gov.uk
Sent: Friday, March 30, 2007 11:31 AM
To: Control, Dev
Subject: Planning Application 07/00068/ELC

Dear Sir/Madam

Please find below the Frodsham Town Council's objections to the above proposal:

1. Frodsham Town Council believes that the proposed development would be detrimental to the health of our residents.

2. The proposal is detrimental to the ecology and nature conservation of the area.

3. The proposal is detrimental to the amenity of the local population in terms of noise, light, disturbance and general amenity

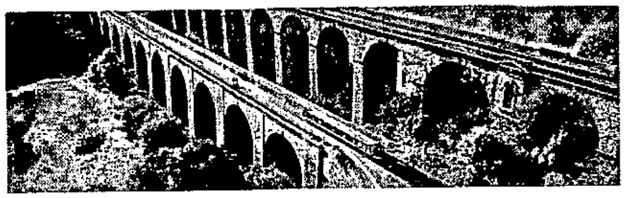
4. The proposal will have a huge and detrimental impact on the local transport infrastructure.

Frodsham Town Council states that a public enquiry should be called to examine all aspects and impacts of this proposal.

If you should require any further information, please do not hesitate to contact me.

Regards

Anne Pitt
Frodsham Town Council
01928 735201



British Waterways
Dyfrffyrdd Prydain

Our reference: WBC-HAT-07-38

Mr Andrew Plant
Halton Borough Council (Planning)
Rutland House
Halton Lea
Runcorn
Cheshire
WA7 2GW

HALT[illegible]
ENVIRO[illegible]
RECEIVED 09 MAR 2007

ASP.

Date: 07 March 2007.

Dear Mr Plant,

Application number: 07/00068/ELC.
Proposal: consent to construct and operate an energy from waste combined heat and power generating station with an approximate capacity of 360MW thermal and up to 100MW of electrical power.
Location: Ineos Chlor Vinyls, South Parade , Runcorn, Cheshire.
Waterway: Weaver Navigation.

Thank you for the consultation in respect of the above. After due consideration of the application details, we would like to take this opportunity to support the aspiration to transport Solid Recovery Fuel to the site via a wharf (not yet constructed) on the Runcorn and Weston Canal and the surrounding waterway network. This would utilise sustainable transport modes other than road in accordance with policies MW1 and MW14 of the Halton Unitary Development Plan (April 2005). In order that we can effectively monitor our role as a statutory consultee, please send me a copy of the decision notice in due course.

Yours sincerely,

John Spottiswood BA BPl MA MRTPI
Planner

British Waterways
Wales and Border Counties Waterways

Cynllunydd

Dyfrffyrdd Prydain
Cymru a'r Gororau

British Waterways Wales & Border Counties Navigation Road Northwich Cheshire CW8 1BH

Dyfrffyrdd Prydain Cymru a'r Gororau Navigation Road Northwich Cheshire CW8 1BH
T/T 01606 723800 **F/Ff** 01606 871471 **E** enquiries.wbc@britishwaterways.co.uk
www.britishwaterways.co.uk

ACK 7131075.C.

Direct Line 01925 537254
Direct Fax 01925 537516
Lesley.Johnson@uuplc.co.uk

Andrew Plant
Environment
Halton Borough Council
Rutland House Halton Lea
Runcorn
,WA7 2GW

Your ref	07/00068/ELC
Our ref	07/866
Date	27-FEB-07

Dear Mr Plant

Location : Ineos Chlor Vinyls, South Parade, Runcorn
Proposal : Not stated

Thank you for your planning consultation of 09 February 2007.

I have no objection to the proposal.

This falls outside United Utilities area for electricity.

Yours sincerely

Lesley Johnson
Asset Protection

United Utilities
Lingley Mere

United Utilities
External Planning Liaison
Ground Floor, Thirlmere House
Lingley Green Avenue
Warrington
WA5 3LP.

Deni Newman, Co-ordinator
Halton Friends of the Earth
C/o 93, Highfield Road
Widnes
Cheshire WA8 7DH
Tel: 0151 424 2324

8th March 2007

Mr. Robert Pridham
Onshore Power Consents
Department for Trade and Industry
C/o Bay 2121
1, Victoria Street
London SW1H 0ET

APPLICATION NO. 07/00068/ELC - INEOS Runcorn site, RDF Planning Application

Dear Mr. Pridham,
I am writing on behalf of Halton Friends of the Earth to express our objection to the above proposal. Please consider this as a holding objection as we shall be responding more fully on the following points:

- **Local Health:** the proposed facility will create an additional and unacceptable pollution load in a borough that for decades has been exposed to heavy industrial and chemical pollution, has some of the worst health in the country and lower life expectancy levels than elsewhere
- **The perceptions** of local residents of existing and proposed industrial developments and associated impacts on human health are such that stress is a real factor affecting the quality of life for many
- In spite of improvements in technology we are aware that emissions will still occur, especially of fine particulates (<PM10s, ie PM2.5) heavy metals and hormone disrupting chemicals, all of which are harmful to human health
- We are concerned that the projected figures for emissions trumpet the fact that they will be below authorised levels (50-65%) but do not appear to take into account the cumulative effects of ***all*** registered pollutants from this site or, indeed, industry in Halton as a whole; please note that this proposed facility will form part of the largest chemical producing plant in the UK on the very edge of a major town
- The proposed facility is unacceptably close to residential areas in terms of both possible impacts on human health and visual amenity
- The proposed facility will give rise to unacceptable traffic increase both in

bringing materials and disposing of waste ... with associated traffic pollution

- We are concerned that this proposal attempts to justify the burning of waste to create power and may to some extent be supported by the forthcoming Merseyside Waste Planning strategy, for which the public consultation commencement date has been delayed from February 23 to March 19
- **Local Economy:** We believe that the impact on the local economy will be severe: in spite of great efforts by the local authority Halton does not enjoy a reputation for being the healthiest or most attractive place to live and work. We do not believe that any short-term new jobs created by the construction of this plant will advance the local economy. We do not believe that sufficient long-term jobs will be created to off-set the long-term damage to the borough as a whole (or indeed the region) in terms of health, well-being and attractiveness.
- It is possible that the intention to expand the Ineos Chlor plant will have a major negative impact on local economy as stated above and also on the NHS (health impacts, including stress), property values and other investment opportunities
- The proposal contravenes the stated aims and objectives of the adopted Halton Unitary Development Plan
- I wish to register this initial response to express our strongest objections to this application and we will respond more fully in due course.

Yours sincerely,

Deni Newman
For and on behalf of Halton Friends of the Earth

Vale Royal Borough Council

Social and Community Services Directorate

Wyvern House, The Drumber,
Winsford, Cheshire CW7 1AH

Tel: 01606 862862
Fax: 01606 862100 / 862088
01606 867771 (departmental)
DX: DX722041 Winsford 2 (departmental)
Web: www.valeroyal.gov.uk

The Operational Director of Environmental Health & Planning
Environment Directorate
Halton Borough Council
Rutland House
Halton Lea
Runcorn
WA7 2GW

HALTON BOROUGH COUNCIL
ENVIRONMENT AND DEVELOP... DIRECTORATE
RECEIVED 22 JUN 2007
FOR ATTENTION OF

Richard P Hallows MBA, MCIEH
Director of Social and Community Services

our reference: Andrew Plant your reference: please ask for: Louise Roberts date: 20.6.2007

Dear Andrew,

Re: Notification under Section 36 of the Electricity Act 1989 and Section 90(2) of the Town and Country Planning Act 1990 to the Secretary of State for Trade and Industry for consent to construct and operate an energy from waste combined heat and power generating station with an approximate capacity of 360MW thermal and up to 100MW of electrical power at Ineos Chlor Vinyls, South Parade, Runcorn

With reference to the above application. I am writing to advise you that Vale Royal Borough Council Planning Committee has considered the proposal. The Council informs Halton Borough Council that it makes no objections to the proposed facility at the site, subject to specific requirements set out in paragraph 9.3 of the attached report. The following concerns have also been raised by members:

1. that use be made of water bourne transportation facilities to deliver waste to this proposed development;
2. a more detailed assessment of effect on human health be made. Particularly on the receptors in Frodsham and Helsby areas;
3. size of particulates and toxicity of emissions – in particular if Halton Borough Council or the Department for Trade and Industry has any doubts over the design of the plant in that the standards for emissions set by Department for Environment Food and Rural Affairs and monitored by the Environment Agency in the flue gases emitted by the plant will be exceeded, then the independent advice of a consultant who is a member of the Institute of Chemical Engineers should be sought and funded by Ineos Chlor;
4. that Cheshire's waste is given a priority over that of other areas; and
5. that where it is clear that this development will have an impact on Vale Royal, any mitigation to minimise those impacts in terms of the provision of planning obligations/ commuted sums provided for by a Section 106

I trust this information is of assistance. Vale Royal Borough Council would wish to encourage HBC to take account of its comments when formulating a response to the DTI. Should you require any further information please do not hesitate to contact me.

Yours sincerely

Louise Roberts
Planning Officer

VALE ROYAL BOROUGH COUNCIL

Date: 17th April 2007
Report of: Head of Planning & Building Control Services
Title: Notification under Section 36 of the Electricity Act 1989 and Section 90(2) of the Town and Country Planning Act 1990 to the Secretary of State for Trade and Industry for consent to construct and operate an energy from waste combined heat and power generating station with an approximate capacity of 360MW thermal and up to 100MW of electrical power at Ineos Chlor Vinyls, South Parade, Runcorn, Cheshire.

Report No:

1.0 Purpose of report

1.1 To consider a request from Ineos Chlor, Via Halton Borough Council adjoining authority consultation process, to erect the above mentioned facility at their Runcorn site.

2.0 Decision required

2.1 That the Council informs Halton Borough Council that it makes no objections to the proposed facility at the site, subject to specific requirements set out in paragraph 9.3 of the report.

3.0 Site Location (see Appendix A for location plan)

3.1 The site for the new facility would be within the existing Ineos complex on the Runcorn site. The existing site lies around the southern and western edge of the Runcorn peninsula and is an integrated complex of chemical plants based on the production and use of chlorine, caustic soda, chlorine derivatives and fluorine derivatives.

3.2 The site for the Energy from Waste Combined Heat and Power Generating Stattion (EfW) plant occupies an area of 10.7ha in the northern part of the Runcorn site, in the locale of Weston Point. This is bounded to the north and west by the Ineos Salt Plant and an adjoining power station, owned by Scottish and Southern Energy. Land beyond this is occupied by an industrial estate to the north and by Weston Point Docks to the west.

3.3 The Mersey Estuary is located approximately 200m to the west of the site, beyond Weston Point Docks. To the east of the Mersey, closer to the site, lies the Weaver Navigation, Manchester Ship Canal and the Runcorn & Weston Canal.

3.4 To the east of the site is a mix of industrial and recreational uses, with the Weston Point Expressway (A557) beyond. The site includes an area of partially used rail sidings which provides a link to Runcorn Station. To the south of the site is a main stores facility that services Ineos operations and beyond that is the Weston Point residential area.

4.0 Proposal

4.1 Ineos Chlor Ltd is seeking the consent of the Secretary of State for Trade and Industry for the development of an Energy from Waste Plant (EfW) on land at the Ineos Runcorn Site. The proposal would accept fuel derived from municipal waste to generate electricity and steam, which would be used at the Runcorn site.

4.2 The proposed EfW plant would act as a Combined Heat and Power (CHP) facility to produce both steam and electricity that would be consumed on the Runcorn site. The plant would provide approximately 20% of the Runcorn Site's energy requirement and replace energy that is currently derived from natural gas. The plant would operate on a 24 hour, 365 days per year basis.

4.3 Fuel derived from municipal waste would provide the main source of energy for the plant and it is expected that this would be sourced primarily from local authorities in the North West region. The fuel is the end product of the treatment of raw municipal waste. Treatment facilities are not part of the proposal at the Runcorn site.

4.4 The project would have the capacity to consume approximately 750,000 to 850,000 tonnes of fuel per year. This capacity would be sufficient to consume the quantities of fuel that could be produced by Manchester, Halton, Cheshire and Warrington.

4.5 In order to make space available on the site for the new facility the proposal will also involve the relocation of a number of existing Ineos workshop and training facilities within the Runcorn site. The proposed workshop and training facility would replace the existing workshop building on the site of the new complex. The new location for these buildings would be served by the Runcorn Expressway from the Bankes Lane slip road, which serves as the main vehicular route for road traffic entering the Runcorn site.

5.0 The Facility

5.1 The fuel would be burned in boilers, which would each comprise a combustion chamber and a steam generator section. The boilers would be housed in a boiler building up to 47m in height.

5.2 The high pressure steam produced would be passed through turbines to generate electricity. Medium pressure steam would be exported for use on the Runcorn Site. The gasses from the boilers would be treated prior to discharge into the atmosphere. The stack height would be approximately 105m in height in order to achieve the required gas dispersion.

5.3 In addition to the facilities mentioned above the proposal would also require support facilities including:

- Water treatment plant for the purification and storage of water for use in the boilers;
- Services and utilities;
- Offices; and
- workshops

6.0 Transport

6.1 It is anticipated that the fuel would arrive by both rail and road. A Transport Assessment has been conducted along these grounds with the worse case scenario of all fuel arriving by road taken into account. The results of this assessment do not predict any significant impact upon the highway network as a result of the proposal.

6.2 Due to the proximity of the site to the Manchester Ship Canal and the Weston Point Docks there would also be the opportunity for the future receipt of fuel by barge should any of the fuel providers be able to utilise this facility.

7.0 Consultations

7.1 A letter of objection has been received from Halton Friends of the Earth on the grounds of health impact through pollution and the perception of the development causing stress, air emissions, sustainability and economical impact.

7.2 A letter of objection has also been received from Helsby Parish Council on the ground of impact to human health..

7.3 Further consultation responses are dealt with in more detail later on in the report.

8 Issues

8.1 Planning Policy
National planning policy - Planning Policy Statement 10 Planning for Sustainable Waste Management (July 2005). Paragraph 6 (second bullet point) states that the RSS should deal with the pattern of waste management facilities of national, regional and sub-regional facilities. The requirement for regional planning bodies to consider the need for waste management capacity of regional or sub-regional significance and reflect any requirement for waste management facilities identified nationally is reaffirmed in paragraph 11.

8.2 The first Decision-Making Principle in paragraph 4 explains the relationship between regional spatial strategies (RSS) and local development documents (LDDs). It says that local authorities should prepare LDDs that reflect their contribution to delivering the RSS. Further guidance is given in paragraph 16. It indicates that LDDs should set out policies and proposals for waste management in line with the RSS.

8.3 Planning Policy Statement 10 (PPS10) 'Planning for Sustainable Waste Management' was published in July 2005 and states at paragraph 5 that if up-to-date waste development plans are unavailable then the policies in PPS10 can supersede policies in the development plan. However, paragraph 21 of PPS10 states that in deciding which sites are suitable for waste management facilities, priority should be given to the re-use of previously developed land.

8.4 Regional Planning Guidance for the North West (2003) (RSS)
RSS states that the 'proximity principle' should be one of the key principles that should govern decisions about waste management options (policy EQ4). The proximity principle states that waste should be managed as near as possible to its place of production to minimise transportation and its associated environmental impacts.

8.5 Policy EQ6 requires new major waste management proposals to adopt the sequential approach outlined in the Core Development Principles and Spatial Development Framework. The Core Development Principles through policy DP1 sets out this sequential approach. It gives priority to the use of previously developed land before the use of greenfield land.

8.6 This proposal is located on a brownfield site unlike the similar proposal that is located at Ince Marshes on a Greenfield site, previously considered by this Council with objections made to the County Council and subsequently refused the planning application.

8.7 Draft Regional Spatial Strategy for the North West (2006)
Policy EM12 maintains the 'proximity principle' as a key objective in planning for new waste management facilities.

8.8 Policy EM13 requires local planning authorities to enable the provision of facilities to deal with the indicative volumes of waste for their sub-region set out in tables 9.3, 9.4 and 9.5. In planning

for these facilities to meet these indicative sub-regional targets, the policy asks for account to be taken of the scope for co-location of complimentary activities such as resource recovery parks.

8.9 The supporting text to the policy in paragraph 11.27 says that new primary residual waste treatment capacity will be located within the local waste planning authority area in which the waste arises. In the case of secondary treatments, it indicates that these are more likely to be located on a strategic regional basis. Paragraph 11.30 discusses strategic facilities further. It says that they will include hazardous waste treatment, energy recovery from RDF, re-processing capacity for source segregated recyclate and new landfill capacity. Further research into the development of the integrated waste/reprocessing park concept is encouraged.

8.10 The proposal includes energy recovery both in the form of electricity and steam generation that will both be used on site.

8.11 The draft RSS is deliberately unspecific on the need for strategic facilities. It goes no further than recognising that they <u>may</u> be needed. It says that further work is necessary on the development of resource recovery parks. No work has been undertaken as yet to identify any need for strategic facilities in the region and hence there is no requirement or encouragement in the RSS for such facilities to be identified in LDDs.

8.12 <u>Halton Borough Unitary Development Plan (2005)</u>
The site is allocated in the Halton Borough Unitary Development Plan under Policy RG4 as an Action Area for Runcorn and Weston Dockland and is principally for proposals for freight handling and storage and distribution. The policy states that the following key issues should be addressed, amongst others:

(i) Part of the area should be developed as a rail freight facility;
(ii) Provision should be made for the commercial dock to continue operating;
(iii) Existing rail links should be enhanced;
(iv) Road access should be improved to remove traffic from adjacent residential roads; and
(v) Development should not be a source of noise, dust, odor or pollution that is detrimental to the future regeneration prospects of the area.

8.13 In principle, it is considered that the proposed development would not conflict with this Policy.

8.14 Halton Waste Management Strategy 2004
The Halton Waste Strategy 2004 is currently being updated but at present this is only at the options stage. The 2004 Strategy states that Energy From Waste could play a part in the treatment of residual waste but the exact method of treatment will depend upon local geographical and economic factors, planning regimes etc.

8.15 Cheshire Joint Waste Strategy
The Cheshire Joint Waste Strategy which was considered by this Council's Executive Board in June 2002 pointed out that the Joint Waste Strategy had a number of policy implications for the Council and the principles of the strategy could potentially lead to the support of new waste handling facilities including energy from waste plants.

8.16 The Cheshire Partnership which was part of the consultation process for the review of the strategy recommended in respect of energy from waste facilities that the need for such facilities should be reviewed in 2004 by assessment of recycling rates, monitoring of the growth of household waste and investigation into the development of alternative thermal treatment facilities to incineration. Most importantly the Partnership recommended that if required, the scale and type of any thermal treatment selected would depend upon the expected volume of waste and the most appropriate technology available. The summary of the report in relation to energy from waste made it clear that for Vale Royal landfill will continue to be required. The Executive Board accepted the reports recommendations.

8.17 Currently waste disposal contracts run until 2008 and allow sufficient quantities of waste materials to be taken out of the waste stream to meet recycling targets. However, the view undertaken in the report which the Executive Group approved was that there is uncertainty about the most appropriate technology in the long term. The technologies for thermal treatment of waste are under rapid development and therefore these may present alternative methods of treatment and provide for reduced environmental impact. The Council, in accordance with the report recommendations, have undertaken a programme of assessment, monitoring and investigation with respect to the waste management strategy.

8.18 Although the Borough currently meets it's recycling targets under the current waste strategy this is considered to be for the shorter term and as targets are raised by Europe and Central government the Borough's ability to meet these targets may be stretched. In this respect, although as a Borough we are committed to our own programme of recycling and refuse collection, the proposed facility may represent a much needed facility for the future which should be planned for in advance.

8.19 Need – The need to reduce the Uk's reliance upon landfill as a final destination for waste is identified through policy at European, national and regional levels. At each level, measurable objectives for that reduction are provided with incremental targets set over time.

8.20 It is recognised at a national and regional level that the continuing practice of large scale landfilling of waste is not a sustainable long term solution to waste disposal and recycling schemes are being increasingly encouraged. In the case of waste that cannot be recycled, it is considered that it's use as a fuel material is the next most suitable process. The proposed facility at the Runcorn Site is therefore considered by Ineos to contribute towards meeting the needs and objectives of landfill policy requirements at European, national and regional levels.

8.21 The Runcorn site is a substantial consumer of electricity on a national scale. The proposed plant has the potential to provide one fifth of the total energy needs for the Runcorn site.

8.22 Sustainability – The proposed facility would make a demonstrable contribution toward reducing the amount of non-recyclable waste that is directed towards landfill in the region through provision of an alternative facility for such waste. The facility would have the capacity to consume approximately 750, 000 to 850, 000 tonnes of fuel per year. In addition, the facility would generate energy from waste, thereby significantly contributing to the energy requirements

of the Ineos Runcorn Site and reducing its energy demand from other sources by approximately 20%.

8.23 The proposed facility would be of a sufficient size to take waste from surrounding areas of Manchester, Cheshire, Liverpool and Halton. It would therefore comply with the sustainable concepts of regional self-sufficiency and proximity (i.e. that each region ensures it has the capacity to deal with it's own waste production), at European, National and regional levels.

8.24 Visual & Residential amenity – The site lies within the Runcorn industrial and commercial area. Construction activities would result in large scale changes at the main site. Taking into account the extensive industrial nature of the area, this is likely to result in a minor adverse affect on the appearance and character of the area during the daytime and no significant effect during night-time.

8.25 Once operational, the proposed EfW facility would comprise a range of buildings and structures which would include a 47m high main building and a 105m high stack. Landscape planting is proposed around the site perimeter where this lies adjacent to neighbouring residential and industrial properties. The EfW facility would be large scale and introduce new tall structures into the townscape. However, there are existing buildings on the site of a similar height and an existing stack of the same height which is to be demolished.

8.26 Given the industrial nature of the site and surrounding building it is not considered that either the main building or stack would create any significant visual amenity issues to justify an objection from the Council. There is already a stack of a similar height at the site which will be removed.

8.27 It is proposed that some landscaping will take place in order to enhance the proposed facility but further details will be required for any detailed comments regarding this issue to take place. Landscaping details can be achieved through appropriate conditioning.

8.28 Nature/ Wildlife – appropriate studies have been carried out to analyse the effect that the proposal would have on any features of ecological or nature conservation. Effects arising from the project on the designated habitats and the important wintering birds on the adjacent Mersey Estuary are assessed as negligible.

8.29 No evidence of bats has been uncovered. The project would result in the loss of species of poor semi-improved grassland within the former allotments adjacent to the railway. This habitat is suitable for common species of reptiles, namely slow worm and common lizard and these are assumed to be present but would be transported to a suitable receptor site prior to construction. The significance of the effect on these species is assessed as minor adverse.

8.30 Contamination/ ground conditions – The site is part of the former ICI plant, originally developed in 1896 and redeveloped to the existing workshops in the 1950's. The previous use of the site and surrounding area means that there are sources of potential contamination.

8.31 Detailed assessment of targeted areas will be undertaken to confirm the nature and extent of contamination on site prior to construction. The development of the site provides the opportunity to address any existing contamination. Excavation of contaminated soils and remediation, if required, as part of the project would mitigate existing risks associated with contamination which would result in a moderate beneficial effect.

8.32 Drainage – The site is above the floodzone according to the Environment Agency Flood Map. A drainage assessment has been carried out and a s a result the existing drainage system will be upgraded and where possible rainwater will be collected and reused within the plant.

8.33 Traffic – The transport assessment assumes that all fuel would be delivered to the site by rail and road. The split between rail and road would be determined by the local authorities providing the fuel. Manchester, which is the largest waste authority in the region, has already declared that all its material could be transported by rail.

8.34 The site would be accessed from a new access road that will form a priority junction with Picow Farm Road. This would ensure that no site traffic would need to travel through the Weston Point residential area.

8.35 A traffic assessment of the predicted increase in road traffic generated by the proposed scheme both during construction and operation has concluded that there would be no significant adverse effects on the local highway network.

8.36 The trains associated with the transportation of fuel to the site would re-use an existing rail route that does not pass through any residential or other sensitive area before joining the existing main line at Runcorn Station.

8.37 The County Council's Highways Engineers have reviewed the transport assessment submitted and have no objections to the facilities provided that that further information be submitted relating to traffic movements, particularly HGV's, to and from the proposed EfW facility, within the Cheshire area and specifically the Vale Royal area. To aid the sustainability of the scheme and minimise road trips it is recommended that a legal 106 agreement is undertaken in order to achieve a 'Green Travel Plan' which will reduce the need for road trips and encourage the use of the rail network and waterways which surround the site.

8.38 Noise – A noise assessment has been carried out and baseline information has been obtained from noise surveys carried out at the nearest noise sensitive location, which are residential properties adjacent to the proposed facility. The assessment of noise and vibration effects from construction activities, including traffic, has indicated that no significant effects at any noise sensitive locations are likely to arise.

8.39 The assessment of noise and vibration effects from operational activities, including traffic, has indicated that there would be no significant noise effects from the majority of nearby locations or properties. The assessment indicated that there would be a slight increase in noise during the daytime at properties to the south of the facility. Provision for noise mitigation along the southern boundary of the site has been made within the design proposals to reduce the noise effects within this area.

8.40 Environmental Protection have no objections to the proposal in terms of noise implications.

8.41 Air Quality – During construction, dust effects would be controlled through the Code of Construction Practice developed for the project. The effect on air quality due to the additional emissions from construction traffic is considered to be neutral.

8.42 The proposed EfW facility will be designed to minimise emissions from the stack via an air pollution control system to limits specified within the EU Waste Incineration Directive. Residual emissions will be dispersed from a 105m stack, the height of which was determined as the optimum for the effective dispersion of pollutants taking into account local building heights.

8.43 Emissions for the EfW facility have been assessed through detailed dispersion modelling following the Environment Agency's Good Practice guidelines. The results reported in the assessment indicate that predicted contributions and resultant environmental concentrations of all pollutants considered are well within the relevant air quality objectives and limit values. The dispersion modelling results showed that no significant adverse effects of any of the designated sites are anticipated.

8.44 The Council's Environmental Protection Team have assessed the information and have raised no objections to the proposed development in relation to both noise and air quality issues. The Officers have also advised that these issues will also be considered during the 'Permitting Process' that is governed by the Environment Agency.

8.45 Objections – Helsby Parish Council have objected on the grounds of risk to human health and have submitted a 'Human Health Risk Assessment' in support of their objection which concludes that the report submitted in respect of the proposal is flawed.

8.46 An objection has been received from a resident at Sandfields, Frodsham on the grounds that pollution effects associated with the operation of an incinerator burning waste and traffic impact. However, the proposal is not for an incinerator burning general waste and the transport assessment has concluded that there will be no significant impact upon the highway network.

9 Conclusion

9.1 Although the Council have recently objected to an EFW proposal at Ince Marsh it should be noted that this was a stand alone project without many of the benefits of this proposal. The Runcorn proposal is on brownfield land, within an industrial land and will help Cheshire contribute towards European and central government objectives to reduce the amount of landfill being produced each year. Although the Vale Royal Borough is currently meeting it's recycling targets, Cheshire may not meet it's landfill diversion targets within the current strategy. As such it should be considered that should this opportunity be passed up there would be a need for Cheshire to provide appropriate thermal treatment facilities within its boundaries on suitable sites within the guidelines of the Waste Local Plan.

9.2 The objections received largely relate to the issues of air quality and impact on human health and traffic implication for the Borough. The Council's Environmental Health Officers have raised no objections to the proposed facility and do not consider there to be any significant noise of air quality issues raised by the proposal for the Borough's residents. The County Council's Highways Engineer has advised that more traffic information on a wider geographical area will be required but this can be achieved through suitable conditioning.

9.3 It is therefore considered that the Runcorn EFW facility is capable of providing a high quality EFW facility that will accommodate the re-cycling needs of a large geographical area. The Transport Assessment and Environmental Statement have not identified any significant serious risks for the residents of the Borough and therefore it is recommended that the Committee does not object the proposal subject to the following requirements:

- Further transport information is submitted in relation to HGV movements to and from the facility within the Cheshire and specifically the Vale Royal area;
- A detailed site investigation to determine the level of contamination and any proposed mitigation measures in the form of a contamination and remediation strategy;
- Detailed landscaping scheme;
- The provision of a Green Travel Plan to maximise the use of rail;
- A construction and Environmental Management Plan; and
- An off site ecological mitigation strategy.

For further information:

Officer – Louise Roberts – Planning Officer – 01606867786 – Lroberts@valeroyal.gov.uk

Documents used in the preparation of this report:

- 'Energy from waste Facility' – Environmental Statement, Non-Technical Summary, RPS, January 2007.

Runcorn Energy from Waste Project
Ineos Chlor Limited

Report on behalf of the Director of Public Health, Halton and St Helens Primary Care Trust.

4 June 2007

Report prepared by:

Helen Casstles
Kevin O'Brien
Centre for Public Health
Liverpool John Moores University
Castle House
North Street
Liverpool
L3 2AY

liverpool JMU

Centre for Public Health

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1.0 Introduction

This report has been prepared on behalf of Ms. F. Johnstone, the Director of Public Health of Halton and St Helens NHS Primary Care Trust (PCT). The report was produced by the Environmental Public Health Team at the Centre for Public Health, Liverpool John Moores University and in collaboration with Dr. A. Stewart from the Health Protection Agency (Consultant in Health Protection, Cheshire and Merseyside Health Protection Unit). The report provides a commentary in response to the planning consultation process and focuses on perceived and potential health effects from a proposed energy from waste plant at Ineos Chlor Limited (Ineos).

Ineos is seeking the consent of the Secretary of State for Trade and Industry at the Department of Trade and Industry (DTI) for the development of an Energy from Waste plant (EfW) on land at the Ineos Runcorn Site chemical manufacturing complex in Cheshire. The project would accept fuel derived from municipal waste to generate electricity and steam, which would be used within the Runcorn Site. The application is an outline of the proposed development and further information will be submitted should the application proceed to the next stage of the planning process.

Due to the relatively short time available to comment on the proposals before the end of the consultation period and limited resources, the aim of this report is to provide the DTI with information it would otherwise not have with regard to public health, in order to assist in the decision making process regarding the suitability of this energy from waste plant at this location.

The report is evidence based and draws on authoritative documents from appropriate agencies, such as the Health Protection Agency and on the information provided by the applicant. It assumes that any development is appropriately regulated under existing legislation designed to protect the environment and human health. Should the application be successful, a permit to operate will be required under the Pollution, Prevention and Control Regulations 2000; this is granted by the Environment Agency and a detailed application will be sent to the PCT for consultation. This provides opportunity to comment on the specific emissions to land, air and water and their potential impacts on health. This outline planning application does not provide sufficient detail to comment at this level of detail.

2.0 Key public health issues

Energy from waste can be considered a form of renewable energy and this development has the potential to reduce green house gas emissions for a variety of reasons. The development has the potential to create jobs, during the construction and operational phases of the development, in an area with considerable unemployment and regenerate a derelict area located within one of the council's action areas for regeneration. The construction phase of the development has potential to be quite disruptive, in terms of noise and traffic movements, these will however be mitigated through appropriate planning conditions.

Epidemiological studies and risk assessments based on estimated exposures, indicate that the emissions from modern incinerators have little effect on health. The proposed development will be regulated to ensure compliance with all appropriate legislation and the Primary Care Trust will have opportunity to comment on specific operational issues and emissions through the pollution permitting regime.

As the development is to be located in a local authority whose population has significantly higher than average levels of poor health, including respiratory disease, we would like to make the following specific comments:

- The applicant does not identify any significant concerns regarding particulate emissions from the process or their impact on human health in the surrounding area and, without any operational data, these assertions are not able to be reviewed. The Committee for the Medical Effects of Air Pollution[1] have recently concluded that as there are clear associations between both daily and long-term average concentrations of air pollutants, in particular fine particles and effects on the cardiovascular system, a precautionary approach should be adopted in future planning.
- We have a specific concern related to the transport of fly ash and flue gas treatment residues from Weston Point to Randle Island landfill site; this will result in twenty heavy goods' vehicle movements per day. If this hazardous waste is in the form of a dry dust, there is potential for it to become airborne which could result in significant depositions of dioxins, furans and metals at a local level.

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[1] http://www.advisorybodies.doh.gov.uk/comeap/statementsreports/CardioDisease.pdf (accessed 17 May 2007)

Existing evidence suggests that contemporary incineration facilities are less polluting and that modern abatement technology will help reduce the hazard from emissions provided that the facilities are properly operated at all times.

3.0 Recommendations

3.1 That the DTI consider requiring the applicant to quantify the effects of the additional particulate air pollution generated from this proposal on health of residents of Halton to inform the planning process.

3.2 If planning permission is granted, that the DTI require a Health Impact Assessment to be commissioned by the applicant. It is expected that this will be carried out by independent and experienced practitioners. The scope of the Health Impact Assessment should be agreed by the Director of Public Health and engage the local community.

3.3 That appropriate control measures are put into place to ensure that the local population are not exposed hazardous waste in the form of a dry dust during transportation to landfill. We would wish to be assured that the risk is controlled appropriately.

4.0 Technical summary of proposed development

There are four distinct parts to consider related to the proposed development: construction, operation, associated issues and remediation of the site when operations cease.

4.1 Construction

It is understood that the construction of the EfW plant would necessitate the re-siting of the Ineos Weston Workshops to create the space for the main facility and this phase of the works would take approximately fourteen months. The construction of the main facility would take approximately three and a half years. Normal construction hours of 07.00 – 19.00 hrs for five days per week would be extended to include nights and weekends during critical phases such as cement pouring. The resulting structures would include 47m, 40m and 22m high buildings and a 105m high stack.

At the peak of the construction phase, the application estimates that there will be 930 car movements and 400 heavy goods vehicle (HGV) movements in addition to the normal vehicle movements in the area.

4.2 Operation

Once operational, the site will run for 24 hours per day burning treated municipal waste in a continuous process. The plant will be capable of burning more than 2250 tonnes of refuse derived fuel (RDF), i.e. not untreated waste, per day creating up to 1000 tonnes of ash and waste gas treatment residue per day. The energy will be captured from the heat in the flue gases and the electrical output generated from the resulting high pressure steam is expected to be 100MW with 140,000 tonnes per hour of medium pressure steam for use on the Ineos site.

The EfW plant will burn up to 850,000 tonnes of RDF per annum. At full capacity the plant will require all of the waste produced by Manchester, Merseyside and Cheshire including Halton and Warrington to maintain its energy output. The RDF will be transported by rail or road and there is a possibility that some waste will be delivered by barges utilising the Manchester Ship Canal. RDF would be discharged into a fuel bunker in an enclosed tipping hall.

The EfW plant will burn up to 100 tonnes of RDF per hour in a continuous process. The fuel will be fed directly into the incinerator from the fuel bunker and will be

burned in a combustion chamber. The hot flue gases will be maintained at 850°C for two seconds residence time in accordance with the Waste Incineration Directive. Air supply to the boilers will be taken from the fuel bunker to reduce the risk of dust and odours escaping from the bunker and tipping hall. The flue gases would then pass over an evaporator, a superheater and an economiser which would cool the gas stream and produce steam. The process would, at full capacity, produce up to 220,000 tonnes of bottom ash per year which would be stored on site in silos prior to removal.

The flue gases from the process would be treated prior to discharge into the atmosphere. Ammonia water will be injected into the boiler to assist in the catalytic reduction of nitrogen oxide in the flue gases. Further treatment would include the injection of hydrated lime and activated charcoal into the gas stream to neutralise acidity and to absorb any contaminants. Particulate removal would be achieved using bag filters. The process would, at full capacity, produce up to 120,000 tonnes of fly ash and 35,000 tonnes of flue gas treatment residues per year which would be stored on site in silos prior to removal.

4.3 Associated activities

The fly ash and flue treatment residues are classed as hazardous wastes and will be sent to the Ineos owned hazardous waste landfill site at Randle Island. The bottom ash resulting from the burning of RDF is considered by the applicant to be non-hazardous and will be sold as a building material or road aggregate; any unsold bottom ash will be sent to landfill.

The application provides information on the heavy goods' vehicle (HGV) road movements likely to be generated by the operation of the EfW plant. The total daily estimated HGV movements are given as 384 derived from assumptions of annual deliveries by road of 480,000 tonnes of RDF and deliveries of flue gas treatment chemicals and other products related to the process. The figure also assumes the removal of 220,000 tonnes of bottom ash, and 7,200 tonnes and 31,700 tonnes of fly ash and reaction products (flue gas treatment products) respectively.

4.4 Site closure

The remediation and restoration of the land at the end of the working life of the EfW facility will be dealt with in the IPPC application should the planning consent be given.

5.0 Health profile

Halton local authority is a Spearhead local authority (LA); this means that it is in the bottom fifth nationally for three or more of the following 5 indicators:

1. Male life expectancy at birth
2. Female life expectancy at birth
3. Cancer mortality rate in under 75s
4. Cardio Vascular Disease mortality rate in under 75s
5. Index of Multiple Deprivation 2004 (Local Authority Summary), average score

The Government has set a Public Service Agreement target to address geographical inequalities in life expectancy, cancer, heart disease, stroke and related diseases. The expectation of government is that there will be faster progress to address these health inequalities in the Spearhead LAs compared to the 'average' LAs.

The community health profile for Halton in 2006[2] comprises a number of indicators demonstrating the health of the population in comparison with both regional and national levels. Within Halton, 22 of these indicators are significantly worse than the national average, for example life expectancy and early deaths from cancer and heart disease.

Table 1 illustrates a number of health indicators for Halton and whether they are high, average or low compared to regional or national figures. Further details regarding health indicators are appended (appendix 1) and the results of the recent Lifestyle Survey for Halton are included in appendix 2.

[2] http://www.communityhealthprofiles.info/ (accessed 14 May 2007)

Table 1: Health indicators

Indicator	**Halton LA**
Life expectancy **(compared to national)**	LOWER
Deprivation **(compared to national)**	HIGHER
Deaths and hospital admissions (13 indicators – compared to North West Average)	
Deaths from all causes	HIGHER
Deaths from circulatory disease (Heart Disease/Stroke)	HIGHER
Deaths from cancer	HIGHER
Elective (pre-planned) admissions to hospital	HIGHER
Emergency admissions to hospital	HIGHER
Hospital admissions for road traffic accidents	HIGHER
Hospital admissions for stroke	AVERAGE
Hospital admissions for acute respiratory conditions	HIGHER
Hospital admissions for cardiovascular conditions	HIGHER
Hospital admissions where asthma was a factor	HIGHER
Hospital admissions where Chronic Obstructive Pulmonary Disease (COPD) was a factor	HIGHER
Hospital admissions where lung cancer was a factor	HIGHER
Hospital admissions where a mental health condition was a factor	HIGHER
Perception of General Health – (compared to national average)	
Percentage of people having a long-term limiting illness	HIGHER
Feeling "in poor health"	HIGHER
Lifestyle – (compared to national average)	
Smoking	AVERAGE
Obesity	AVERAGE
Alcohol (binge drinking)	HIGHER
Healthy eating	LOWER

LOWER = statistically significantly lower
HIGHER = statistically significantly higher
AVERAGE = not statistically significantly different to the average

6.0 Regeneration

The quality of life for many of Halton's residents is below average when measured against many social and economic indicators. Halton has a population of approximately 118,000 people and deprivation is relatively high.

Despite the considerable investment in Runcorn during the 1960's and 70's when it was developed as a New Town and considerable success in Widnes in reclaiming derelict land in the 1970's and 1980's, the area has not enjoyed the levels of investment and prosperity that have benefited other areas of the UK in recent decades. This has resulted in higher levels of social deprivation and unemployment than elsewhere. One of the greatest challenges for the Council is to implement policies and proposals that will reverse population decline through an holistic approach to economic, social and environmental regeneration. The success of this will depend in large part on an increase in investment confidence in the Borough and region as a whole.

A Regeneration Strategy for Halton was approved in 1998. It was prepared in a partnership between the Council and the Halton Partnership. The purpose of the Strategy is as follows:

- to build on the strengths and embrace opportunities;
- to drive forward the regeneration of the Borough;
- to create a thriving area in which people will want to live, work, and invest; and
- to revitalise Halton.

The strategy identified both areas and themes for regeneration. In 1999 the Council adopted an Economic Development Strategy as one of the key corporate strategies developed by the Council. It sets out a series of key challenges and specific critical actions, which need to be considered. The challenge to 'enhance the Borough's economic infrastructure' is addressed by the Unitary Development Plan (UDP) by the provision of a portfolio of sites and premises to meet the needs of local businesses and potential inward investors.

One of the strategic aims of the Council is to transform the quality of Halton's environment and improve economic prosperity and social progress through sustainable development, thereby enhancing the health of the population. In

particular, Action Areas have been identified that require comprehensive development or redevelopment in order to achieve regeneration within the Borough. Each Action Area has particular problems to be overcome and opportunities to be taken.

The Ineos proposal lies within the Runcorn and Weston Docks Action Area. This is predominantly an area of employment uses and includes commercial docks, general industry, storage and distribution uses, along with a large amount of derelict and underused land. The legacy of previous uses includes large worn out buildings with few services, and large areas of derelict land. Road access is poor, with a history of conflict between heavy goods traffic and local residents. The general image and appearance of the area is poor. There is an opportunity to reverse this decline and build upon the strengths of the area for the handling and storage of freight, and the location of the area on the Manchester Ship Canal and with links to the West Coast Main Line. The redevelopment of the area for employment uses will provide much needed employment for Halton.

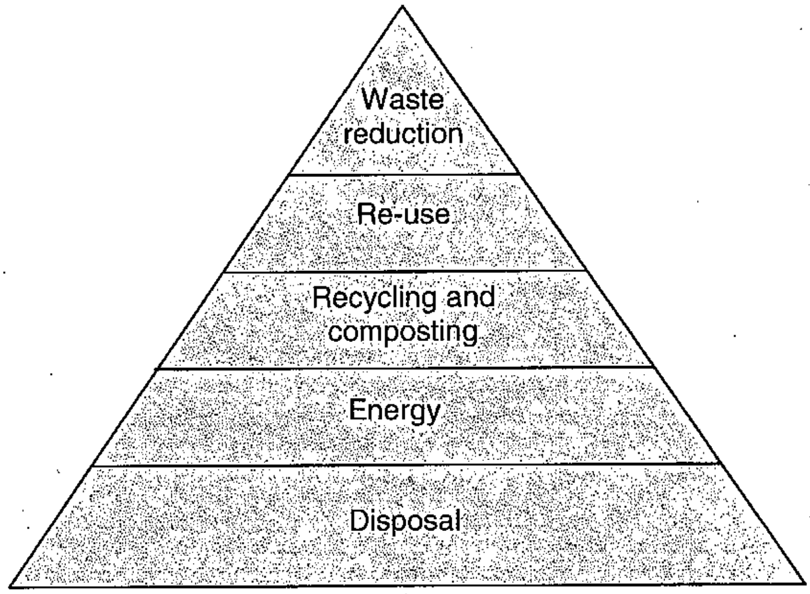
7.0 Waste disposal

Local councils are required by law to collect municipal waste. In the UK, the most common method of dealing with this waste is through disposal in suitably designed landfill sites. However, this dependence on landfill sites is being tested by a growing scarcity of suitable land and a European Union Directive on Landfill (EU Landfill Directive 99/31/EC), which focuses on reducing this practice. The EU Landfill Directive has been adopted into UK national law under what is known as the Waste Strategy 2000. It is influenced by the need to deliver more sustainable development – decision makers must strike a balance between continued economic development and the need to protect and enhance the environment. There is increasing disquiet concerning the health effects of landfill, in addition to the longer-term global effects of methane contributions to climate change.

Under the Waste Strategy 2000[3], a number of waste management options have been devised to reduce the amount of waste that needs to be disposed of at landfill. These options have been set out in the form of a 'Waste Hierarchy', where the aim is to move further up the hierarchy and away from disposal. The waste strategy supports the generation of energy from waste.

[3] http://www.defra.gov.uk/Environment/waste/strategy/cm4693/index.htm (accessed 10 May 2007)

Figure 1: Hierarchy of Waste



The Waste Strategy reflects the Government's sustainable development strategy which has the following four overarching aims:

1. social progress which meets the needs of everyone;
2. effective protection of the environment;
3. prudent use of natural resources; and
4. maintenance of high and stable levels of growth and employment.

In England 9% of municipal waste is currently incinerated. The capacity of incinerators and the number of incinerators are increasing; there are currently seventeen municipal incinerators operating in England and Wales. By comparison, the European average for incineration of municipal waste is 17.3 %, with Denmark incinerating 56% of its municipal waste[4].

7.1 Energy from Waste

Whilst a reduction in waste generation is clearly the best environmental option, waste combustion with energy recovery is an established way to dispose of waste. As no new fuel sources are used, other than the waste that would otherwise be sent to

[4] www.environment-agency.gov.uk/yourenv/eff/1190084/resources_waste/213982/203410/?version=1&lang=_e (accessed 10 May 2007)

landfills, energy from waste is often considered a renewable power source[5]. It decreases the volume of the waste and allows for recovery of metals and other potentially recyclable elements. The heat recovered can be used to generate electricity, or can be used for industrial heat applications. Power is produced by using the steam raised in the combustion process to drive a steam turbine to generate electricity, in a similar manner to a conventional coal fired power station. The application from Ineos purports that 20% of their substantial energy requirements will be from the new plant.

8.0 Air Quality Management

Local authorities have statutory duties for local air quality management (LAQM) under the Environment Act 1995. They are required to carry out regular reviews and assessments of air quality in their area against standards and objectives in the National Air Quality Strategy (AQS). Where it is found these are unlikely to be met, authorities must designate air quality management areas (AQMAs) and prepare and implement remedial action plans to tackle the problem. The objectives for air pollution are concentrations over a given time period that are considered to be acceptable in the light of what is known about the effects of each pollutant on health and on the environment.

The pollutants for which there is an air quality standard are:

- benzene
- 1, 3-butadiene
- carbon monoxide
- lead
- nitrogen dioxide
- oxides of nitrogen
- ozone
- particles (PM_{10})
- sulphur dioxide

The Environment Agency[6] report that emissions to air from major industrial sites in the North West have reduced substantially over recent years; however air quality,

[5] US Environment Protection Agency www.epa.gov/cleanenergy/muni.htm (accessed 10 May 2007)
[6] http://www.environment-agency.gov.uk/commondata/acrobat/nwenv_summary_1473612.pdf (accessed 10 May 2007)

particularly in the region's cities, is adversely affected by road traffic. Traffic in the region has increased by 20% in the last ten years and almost three million cars travel on the North West's roads. Industrial emissions to air from Environment Agency regulated premises in the North West have decreased significantly. Of the eight key air pollutants prioritised by the government, only carbon monoxide emissions are higher now than in 1998.

8.1 Local air quality

Halton Borough Council has assessed local air quality and has not declared any AQMAs. The air quality in Halton has been improving year on year. An update of local air quality conducted by Halton BC in 2006[7] considered emissions from a range of sources (transport, industry and domestic) that could potentially affect local air quality. It concluded that air quality objectives for carbon monoxide, benzene, 1,3-butadiene, lead, sulphur dioxide and particulate matter PM_{10} had been achieved. Whilst background levels of nitrogen dioxide across the Borough met the standards there are two locations in Widnes where the results of a diffusion tube survey indicate that the objectives for NO_2 are being exceeded.

There have been no considerable changes to industrial processes since the previous round of review and assessment and no major changes to the road network in Halton. The impact of new developments proposed for the Borough at the time of the survey were also considered and no adverse effect on air quality is predicted as a result of these developments.

9.0 Potential health effects from energy from waste plant

Recent work by the authors included a search of the scientific literature to identify the best available evidence from reputable sources for perceived and potential health impacts from the installation[8].

It should be noted that there is a hierarchy of evidence and where available, systematic reviews are considered to be the gold standard of scientific evidence on which to base decisions. There are a number of published papers which claim to provide evidence on the health effects of incineration, some published in peer

[7] http://www2.halton.gov.uk/pdfs/environment/environmentalhealth/airquality2006 (accessed 10 May 2007
[8] http://www.wcheshirepct.nhs.uk/default.asp?page=news/default.asp&action=story&ID=144 (accessed 14 May 2007)

reviewed scientific journals and others published by special interest (campaign) groups. Some of these papers do not stand up to rigorous scrutiny; both the Health Protection Agency and Enviros Consulting Ltd (on behalf of Surrey County Council) have published authoritative responses to one such paper that has been circulated widely during the last year, all of which can be viewed online[9].

In reviewing the evidence on incineration, one factor that needs to be taken into account is that the majority of the studies, and any associated environmental data, originate from incineration facilities whose emission profile was significantly different from today's modern incinerators. Up until the mid-1990's, incinerators in the UK were fitted with rudimentary emission controls and therefore emitted quite significant amounts of air pollutants. Newly constructed incinerator plants have to meet much stricter controls on emissions and are significantly cleaner.

It should also be noted that a lack of evidence of adverse health effects of energy from waste plant might be due to the limitations regarding the available data. If no evidence is identified for a perceived health impact, this does not necessarily mean that there will be no effect, only that no robust evidence can be found at this point in time to establish a cause and effect relationship between exposure and a health impact. There are often confounding factors such as socio-economic variables, exposure to other emissions, population variables and spatial/temporal issues to be taken into consideration.

The Health Protection Agency, in their position statement on Municipal Solid Waste Incineration,[10] conclude that incinerators emit pollutants into the environment but provided they comply with modern regulatory requirements, such as the Waste Incineration Directive, they should contribute little to the concentrations of monitored pollutants in ambient air. Epidemiological studies, and risk estimates based on estimated exposures, indicate that the emissions from such incinerators have little effect on health.

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[9] http://www.ecomed.org.uk/pub_waste.php accessed (14 May 2007)
[10] Health Protection Agency (2005) Municipal Solid Waste Incineration http://www.hpa.org.uk/chemicals/incineration.htm (accessed 10 May 2007)

The Department for the Environment, Food and Rural Affairs (DEFRA) commissioned a review of the effects of waste management[11], which was peer reviewed by the Royal Society. Cancer, respiratory disease and birth defects were all considered, and no evidence was found for a link between the incidence of the disease and the current generation of incinerators. It concluded that although the information is incomplete and not ideal, the weight of evidence from studies so far indicate that the present day practice for managing solid municipal waste has, at most, a minor effect on health and the environment, particularly when compared to other everyday activities.

The Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (2000)[12] concluded that any potential risk of cancer due to residency (for periods in excess of ten years) near to municipal solid waste incinerators was exceedingly low and probably not measurable by the most modern techniques.

Evidence has begun to emerge that congenital malformations may be associated with environmental pollution[13]. Whilst most studies have focused on hazardous landfill sites, there has been speculation that increased rates of congenital malformations are linked with exposure to dioxins and furans. However, predicted emissions from the proposed EfW plant will be regulated and will need to comply with limits set by the Environment Agency and intended to protect the environment and health.

Dioxins and furans are emitted during the process of incineration. Abatement processes using the 'Best Available Technique' will be used to reduce these to permissible levels. Although it is theoretically possible that people who consume local produce may be exposed to dioxins, predicted levels of dioxin emissions from the plant are unlikely to increase the human body burden appreciably.

[11] Department for Environment, Food and Rural Affairs (2004) Research: review of the environmental and health effects of waste management www.defra.gov.uk/environment/waste/research/health/ (accessed 10 May 2007)
[12] Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (2000) Cancer incidence near municipal solid waste incinerators in Great Britain COC statement COC/00/S1 www.advisorybodies.doh.gov.uk/coc/munipwst.htm (accessed 10 May 2007)
[13] Environment Agency (2005) Health Impact Assessment of Waste Management: Methodological Aspects and Information Sources. Science Report P6-011/1/SR1

Whilst there is some epidemiological evidence that air pollution (specifically traffic emissions) may provoke acute asthma attacks or aggravate existing chronic asthma the effect, if any, is generally small and the effect of air pollution appears to be relatively unimportant when compared with several other factors (e.g. infections and allergens) known to provoke asthma[14]. There is currently little convincing evidence that ambient levels of air pollution can cause acute adverse health effects in healthy people; furthermore the air quality standards are set at a level designed to protect the health of vulnerable people, i.e. they take into consideration that not all of the population are well.

The Committee on Medical Effects of Air Pollutants conclude that clear associations have been reported between both daily and long-term average concentrations of air pollutants and effects on the cardiovascular system, reflected by a variety of outcome measures including risk of death and of hospital admissions. They recommend that as these associations may be causal, then a precautionary approach should be adopted in future planning. They could not be certain which components of the ambient pollution mixture are responsible for these effects but it is likely that fine particles play an important part[15].

10.0 Conclusion

This report provides a commentary on the known evidence regarding the proposed development and its potential effect on health. In particular, it has considered issues which are material considerations during the planning process and is based on information submitted by the applicant. Should the development receive planning permission, the applicant will be required to submit a detailed pollution, prevention and control permit application which will be forwarded to the Primary Care Trust to make comment on specific emissions and their potential effects on health.

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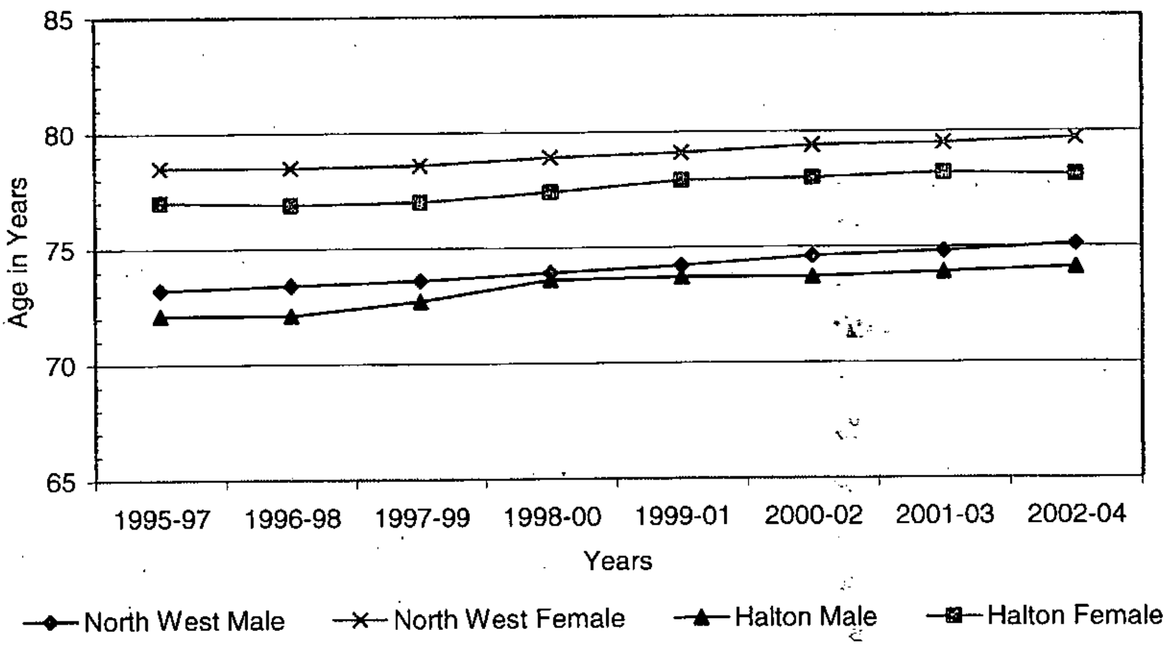
14 Committee on the Medical Effects of Air Pollutants (1995)*Asthma and Outdoor Air Pollution* www.advisorybodies.doh.gov.uk/comeap/statementsreports/airpol2.htm (accessed 10 May 2007)

15 http://www.advisorybodies.doh.gov.uk/comeap/statementsreports/CardioDisease.pdf (accessed 17 May 2007)

Appendix 1: Health indicators

Life expectancy in Halton, at 74.1 years for men and women 78.1 years, is lower than the regional (75.1 for men and 79.7 for women) and national average (76.5 for men and 80.9 for women). Within Halton there is a gap in life expectancy of 6.4 years between the poorest and the most affluent areas (the largest gap nationally being 10.1 years and the smallest 2.7). Over the period 1995 to 2004, life expectancy at birth has been increasing at a similar rate to the regional increase. Figure 2 compares the trends in life expectancy at birth for men and women in Halton, with life expectancy for men and women in the northwest region.

Figure 2: Male and female life expectancy in Halton, 1995-2004
(direct age-standardised rates, three-year rolling average).



For Halton local authority, all but one of the death and hospital admission health indicators were worse than the regional average, as shown in table 2.

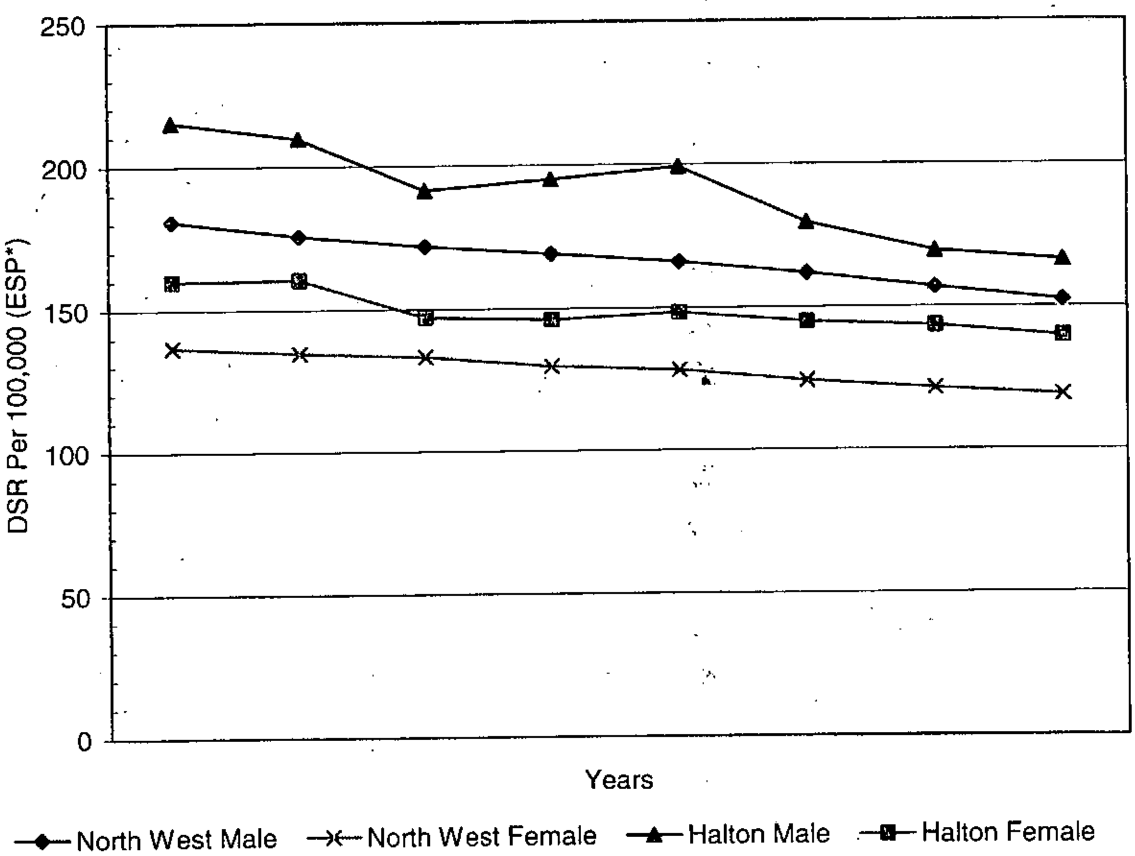
Table 2: Selected health indicators for Halton Local Authority with 95% confidence intervals (regional average = 100) 1998/99 to 2002/03

Selected Health Indicators	Halton		
	Ratio	LCI*	UCI*
All Elective Admissions t*	**106.7**	**105.8**	**107.6**
All Emergency Admissions i*	**119.9**	**118.8**	**121.0**
Stroke i*	102.6	96.1	109.4
Acute Respiratory Conditions i*	**133.1**	**128.2**	**138.2**
Cardiovascular Conditions i*	**116.9**	**114.0**	**119.9**
Road Traffic Accidents i*	**117.2**	**108.3**	**126.7**
Asthma p*	**171.3**	**167.5**	**175.3**
Chronic Obstructive Pulmonary Disease p*	**160.3**	**155.6**	**165.2**
Lung Cancer p*	**117.7**	**108.5**	**127.5**
Mental Health Conditions p*	**143.6**	**138.8**	**148.7**
All Causes Mortality	**122.2**	**119.1**	**125.3**
Circulatory Disease Mortality	**117.7**	**112.9**	**122.7**
Cancers Mortality	**123.7**	**117.8**	**129.8**

Indicators in bold are statistically different from NW Region
* i = Hospital Incidence p = Hospital Prevalence t = Hospital Treatment
LCI / UCI = Lower / Upper Confidence Intervals

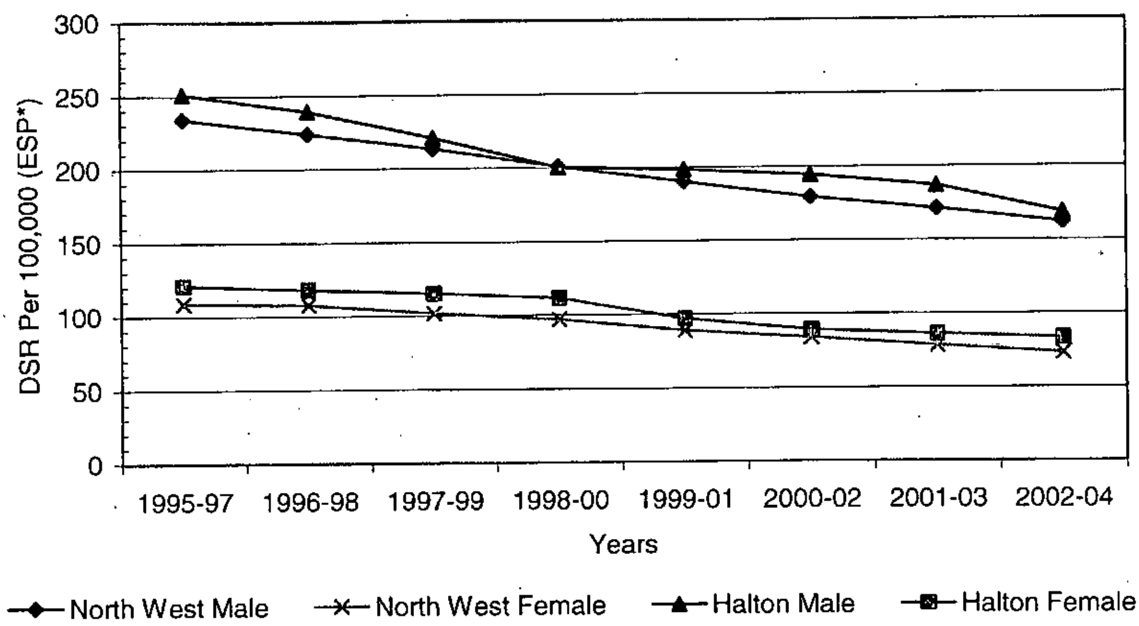
Deaths from cancer in both men and women aged under 75 years were above the regional average between 1995 and 2004, however, the rates are decreasing in line with the regional average. In men, in particular, the rate has declined by 23% between 1995 and 2004. Deaths from circulatory disease aged under 75 years were slightly above the regional average, although the rate has declined by around a third between 1995 and 2004. Figures 3 and 4 compare the trends in deaths for men and women under 75 years due to cancer and circulatory disease with those for the northwest region.

Figure 3: Deaths from cancer for men and women under 75 years of age in Halton, 1995-2004 (direct age-standardised rates, three-year rolling average).



ESP: European Standard Population

Figure 4: Deaths from circulatory diseases for men and women under 75 years of age in Halton, 1995-2004 (direct age-standardised rates, three-year rolling average).



ESP: European Standard Population

Appendix 2: Lifestyle survey

Health and lifestyle surveys are an established method of gathering information; the results are used to inform health promotion activities and Health Improvement Plans and are a useful tool to address health inequalities.

During 2006, a Health, Lifestyle and Community Survey was commissioned by Halton PCT to better understand local health needs and health-related behaviours within Halton. Survey respondents were asked to indicate how their health had been on the whole in the past 12 months. Overall, 71.6% of residents reported their health to be 'good', 'very good' or excellent'. A higher proportion of males reported 'good' health; 73.6% compared with 69.6% percent of females. As may be expected the percentage reporting good health decreased with age.

Overall, 25.6% of Halton residents responded that they currently smoke; this suggests that there are approximately 24,500 adult smokers in the borough. These figures suggest a reduction in smoking prevalence within Halton since 2001, when prevalence was estimated to be 29.2%. As in 2001, current estimates suggest that there is a slightly higher proportion of male smokers overall, 26.1% compared with 25% of females.

The percentage of overweight residents has increased from 52% in 2001 to 56.6% in 2006. A prevalence of almost 57% suggests that approximately 54,200 adults in Halton are overweight. Obesity within Halton has also increased quite substantially since 2001; with 20.2% of residents currently measuring as obese, this compares with 15.1% at the time of the last survey.

Overall, 17.5% of Halton respondents indicated that they drank more units per week than considered safe under national guidelines. This represents an increase on the 2001 figure of 15.7%. Whilst a greater proportion of males drink to unsafe levels, (22.5% compared with 12.4% of females), the proportion of women drinking unsafely has increased considerably from the 6.9% figure reported in 2001, whereas the proportion of males drinking unsafely has decreased from 24.8% in 2001.

Almost 80% of Halton residents indicated that they ate less than the recommended 5 portions of fruit and/or vegetables a day. Overall, 17.8% of residents indicated that they had a poor diet, however this is an improvement on previous results, which indicated that 21% of residents consumed an unhealthy diet.

46.6% of respondents indicated that they lead a sedentary lifestyle, whilst this is a high proportion of residents who are not getting the health promoting benefits of vigorous exercise; figures have improved since 2001, when 51% of residents undertook no regular vigorous exercise. As may be expected, exercise levels decrease with age; 72% of those in the 65+ age band lead a sedentary lifestyle. Males are generally more active than females, with 42% of all men reporting no vigorous exercise, compared with 51% of women.

Acknowledgments

Colleagues from the Centre for Public Health, in particular Clare Perkins

Halton & St Helens Primary Care Trust

Halton Borough Council (Environmental Health, Enforcement and Building Control)

32 Clifton Road
Runcorn
Cheshire
WA7 4SZ

21 February 2007

Mr Phil Watts
Halton Borough Council
Planning & Policy Division
Environment & Regulatory Services
Rutland House
Halton Lea
Runcorn
Cheshire WA7 2GW

Dear Mr Watts,

Planning Application Number: 07/00068/ELC

I wish to object to the proposal to construct and operate an energy from waste combined heat and power generating station with an approximate capacity of 360MW thermal and up to 100MW of electrical power at Ineos Chlor Vinyls South Parade Runcorn Cheshire.

I am very concerned about the potential impact on residents of Halton. My main concerns are the risks to the health of people living in Halton caused by the emissions from the power station and the impact of the construction activity on the congested local highway network and the people living near the site.

I will examine how this proposal for dealing with waste conforms to the Merseyside policy on waste disposal, as Halton is now linked to the Merseyside councils for this function. The report on waste planning submitted to Halton Council's Executive Board on 25th January 2007, identified four aims of the Merseyside Joint Waste Development Plan Document namely:

1. To reduce the amount of waste generated and move waste management away from landfill disposal;
2. To encourage the people and business communities of Merseyside to take responsibility for their own waste by sufficient and timely provision of waste management facilities that meet the needs of the community and reduce the need for waste to travel unnecessary distances for disposal;
3. To minimise any negative impacts from waste management on the people and communities and environment of Merseyside;
4. To act as a catalyst for creating wealth and employment opportunities through the transformation of waste to resources.

Reducing the amount of waste generated and move waste management away from landfill disposal

I am aware of the lack of landfill capacity, but believe the recycling of items such as paper, wood and plastics is preferable to burning them. Barbara Young, the Environment Agency's Chief Executive has said 'Waste from energy is being over-egged. Black bag burning must not happen. Unsorted waste burning must not be part of the waste strategy. We are very unhappy about any solution that sees energy from waste as a big, simple turnkey solution that is easier than waste minimisation and recycling.' (New Civil Engineer 2 March 2006.)

Furthermore, incineration will significantly increase the carbon dioxide in the atmosphere with all its implications for attendant global warming and climate change.

Encouraging the people and business communities of Merseyside to take responsibility for their own waste by sufficient and timely provision of waste management facilities that meet the needs of the community and reduce the need for waste to travel unnecessary distances for disposal

I believe communities should take responsibility for their own waste by sufficient and timely provision of waste management facilities that meet their needs and reduce the need for waste to travel. This proposal will involve bringing waste from outside the Borough and runs counter to this objective. Although it is proposed to import a substantial proportion of the waste by rail or canal, much of the waste is likely to be delivered by road. This will impose further congestion especially on the Silver Jubilee Bridge and junction 12 on the M56.

The transport assessment concludes that '*the traffic generated by the proposal would have no significant adverse effects on the local highway network*'.

During construction, there would be a maximum of 465 vehicles arriving and departing from the parking areas and a maximum of 400 heavy vehicle movements per day. I do not know the location of the car parks, but drivers from outside Runcorn are likely to use either the Silver Jubilee Bridge or Junction 12 of the M56 motorway. There are long queues on both routes extending beyond the traditional peak hours and traffic flows of this volume are likely to have a significant impact. During the operational period, there would be approximately 400 heavy vehicle movements per day, which would rise to a higher level if the planned 10 train movements bringing waste do not materialise. Unless the Mersey Gateway project is implemented as planned, existing congestion would increase significantly during the operational period.

Minimising any negative impacts from waste management on the people and communities and environment of Merseyside

It is essential that any negative impacts from waste management on the people and communities and environment are minimised. This proposal will cause health damage in a borough that has enough of these problems already. The suggested location could not be worse. This is a site at near sea level adjacent to a hill with prevailing winds in a westerly direction to provide the maximum fallout over the whole of Runcorn. A 105m high unsightly chimney will be constructed to disperse the toxic fumes from the incinerator but they will fall on Runcorn and Widnes increasing the risk of cancers and respiratory illness. These towns already suffer from a high level of lung cancer and respiratory diseases. Household waste is an inefficient fuel as it is so variable in content and the optimum burning temperature which reduces the airborne toxins is harder to achieve. The nature of the feedstock will almost certainly mean that it will contain chlorocompounds and toxic metals from time to time leading to dioxins and heavy metal fallout with the consequential health implications.

During construction it is anticipated that workers would arrive before 7am and leave after 7pm. There would also be continuous 24 hour working during the concrete works. The construction and traffic noise over such a long period must have a negative impact on people living near the site.

Furthermore, although construction workers traditionally work long hours, one of the causes of construction accidents is worker fatigue. The Construction (Design and Management) Regulations, which were introduced because of the high accident rate in the construction industry, stress the need to reduce health and safety risks in the planning stage. I consider that the designers are not complying with the spirit of the Regulations if the project is planned so that the workforce needs to work hours well in excess of the Working Time Directive.

Acting as a catalyst for creating wealth and employment opportunities through the transformation of waste to resources

The massive gas-fired power station at Rocksavage was constructed to provide cheap electricity for the chemical industry in Runcorn. Due to what may be a temporary rise in gas prices, local people are now being asked to accept another incinerator with a building up to 47m high on their doorstep, which will only provide 20% of the Runcorn site's requirements. This will not act as a catalyst for creating wealth and employment opportunities through the transformation of waste to resources. It is more likely to deter the high quality business and science facilities we now see coming to the Heath Technical Park and Daresbury Science Park.

I urge the Council to oppose this waste incinerator proposal due to the potential impact on the health of local people, the traffic congestion it will create, especially during construction, and because it runs counter to the principles of the draft Merseyside Joint Waste Development Plan Document.

Yours sincerely

Mike Hodgkinson
Heath Ward councillor

APPENDIX 2

CORRESPONDENCE FROM HALTON ACTION GROUP AGAINST THE INCINERATOR

HALTON ACTION GROUP AGAINST THE INCINERATOR

Ineos Chlor Limited
Energy from Waste Generating Facility

Proposal for Weston Point
Runcorn

The Action Group's
Statement of Concerns Relating to the Proposal

June 2007

Table of Contents

2. Introduction

We fully support Halton Borough Council's plans to develop more sustainable waste disposal solutions and to seek to reduce levels of waste currently going to landfill. However, there are other more environmentally friendly and much less dangerous routes available for waste disposal than energy from waste incinerators.

We are opposed to the building of a large energy from waste incinerator of the type proposed at Weston Point, in order to provide a Regional Centre for waste disposal, in this densely populated, highly polluted, deprived area with one of the worst health records in the United Kingdom, to the detriment of the Borough, and to the health and quality of life enjoyed by the people who live here.

This Proposal is unrelated to the Borough's Waste Management Policy and is solely motivated by Ineos Chlor's commercial interests.

Our response identifies specific concerns that we have about the Proposal, and the reasons why we strongly believe that it should not be supported! These concerns have in common the one recurring theme, that for the people of Halton, this Proposal has no identifiable benefits, only enormous risks! We therefore recommend application of the Precautionary Principle viz:- "When an activity raises threat of harm to human health or environment, precautionary measures should be taken, even if some of the cause and effect relationships are not fully established scientifically. In this context, the proponent of the activity, rather than the public, should bear the burden of proof".

In our judgement, there is sufficient evidence to support our view that the exercise of reasonable doubt should lead to rejection of the Proposal.

3. Location of the Proposed Incinerator

1. Dangers of the Location

The Proposal fails to recognize or understand the dangers of locating an incinerator of the type envisaged in the centre of one of the most polluted areas in the U.K., with large areas of contaminated land, "especially heavier air pollution levels" due to traffic flows, emissions, and increasing pollution fall out caused by air traffic as the Liverpool John Lennon Airport expands. The Halton Health Report identified the presence of toxic substances but also stressed the threat in the form of the possible 'cocktail' effects of the combination of those substances. In this respect, the location of this incinerator in one of the largest Chemical Industry complexes in Europe must be a cause of great concern.

2. Population Density

Halton Borough has the highest population density in Cheshire, and 10,190 people live within 2km of the site of the proposed incinerator. The Proposal therefore conflicts with Government advice that such installations should not be sited near densely populated areas. **It also conflicts with Halton Borough's Unitary Development Plan's criteria that waste incineration plants should not be located "within close proximity to residential areas or other sensitive land uses",** ***(Ref 1),*** **or "cause pollution or emissions that would have an unacceptable detrimental impact on surrounding land uses",** *(Ref 2)*. Has due consideration therefore been given to the fact that residential housing is located only 50m from the proposed site? Further, given that children are believed to be at greater risk from substances emitted from incinerators *(Ref 3)*, what account has been taken of the presence of three primary schools, three pre-schools and a College in close proximity to the site?

3. The Case for Incineration

Waste incineration produces CO_2 as its major pollutant. Now that the threat of global warming has been exposed, any activity, which increases CO_2, is, in general not a good thing. In this case the first priority for waste reduction and the simplest and cheapest is to significantly reduce the amount of waste by more thoughtful use of materials and recycling, before considering incineration. Halton and other surrounding NW areas have some way to go to achieve this. This proposal to incinerate waste removes this incentive and even could be said to encourage profligacy, as municipal waste will now have a positive value (more is good!?)

4. The Incomplete Nature of the Proposal

This proposal cannot and should not be judged on its own. In fact it is deficient in a large amount of important and critical information concerning its essential partner as producer of the "processed waste" fuel, possibly because it has not yet been determined. Some key questions are:

- Where will processing take place?
- What will be the true logistics of waste movement into the processing plant and out to the incinerator?
- What will be the nature, and consistency of the processed fuel (chlorine, bromine, heavy metal content, etc.) and its burning characteristics?

The answers to these questions will have a direct bearing on the suitability of the proposed site, in terms of the combustion process, the stack height, the at risk population and adverse health airborne pollutants, and the significantly increased road traffic across the Mersey and through Halton.

5. The Location and Stack Height

The supporting modelling studies for the proposal essentially assume a flat terrain. The proposed location, however, is next to an escarpment with residential housing downwind. The prevailing winds are south and west, with Runcorn/Daresbury and even Widnes directly downwind. The effects on the prevailing wind and air currents of the escarpment are not known. There may be eddies causing down drafts and fallout downwind.

In Cheshire there is and have been power station stacks close to an escarpment (the Brunner Mond station at Winnington by the Barnton escarpment). The history of this relationship has been one of continuing particulate fallout and residential unhappiness. This piece of concrete evidence shows what the outcome of the current proposed siting is likely to be.

The height of the proposed stack (105 metres) seems to have been chosen to suit airport approval requirements, not to reduce the potential pollution risks downwind. A conservative estimate might be that the stack needs to be a further 40 metres high, which is unacceptable to the Airport, to avoid the adverse effects of the escarpment.

How can a 100m chimney height be deemed appropriate for the Ince Incinerator burning 200,000 tonnes of fuel less than the much larger Ineos Incinerator, and located on flat level ground with no concentrated housing nearby, and yet the Ineos Incinerator needs only another 5 metres chimney height despite being located at the bottom of an 80m hill with three residential areas and three schools adjacent? It defies belief!

We recommend that this most important issue is resolved through an independent specialist report commissioned by the Council, since it would be unwise to rely solely on information supplied by Ineos Chlor. The Proposal could fail on this major issue of safety alone!

The proposal suggests that the location is in an industrial area with very little residential property nearby. However, the reality is that the dense residential wards on the higher ground of Runcorn stretching all the way to Daresbury and even parts of Widnes will be at risk from the plume fallout caused by the prevailing south and west winds. There is no modelling or other quality information to refute this. Nor is consideration given to the 'calm' period of the year (approx 12% of the year) when there is minimum dilution of emissions, thereby causing fall out in greater concentrations onto houses and residents close to the site. *(Appendix 2 and 5)*

6. Potential Pollutants

The proposal gives no details of the composition of the "processed waste" fuel, nor of any specification requirements. This is worrying! However, it is not difficult to imagine, from our own individual experience, what municipal waste contains (almost anything?) It will certainly have halogen elements (from PVC, etc), heavy metals and other toxic chemicals. It is difficult to see without any information, how 'processing' will not simply concentrate all of these 'nasties' in the fuel. Also there is no information given, based on experimental fact, on the resulting nature of the gaseous discharge whatever cleaning processes are applied and it is, therefore, not unreasonable to suppose that the known health adverse contaminants of incineration will be present.

Furthermore the lack of fuel quality specification would allow the operator to perhaps add other waste of indeterminate quality or provenance to improve their economics, thus increasing the already high risk.

7. Summary

From the foregoing, it is clear that the proposal presents little or no information on the most critical and important issues. There is no information on the necessary 'waste fuel' processing plant; there is no information on the specification of the fuel or the nature of its combustion, and entirely unrepresentative information on the modelling of the effects of the downwind plume and fallout of health adverse substances. For these reasons alone it would be unwise to support this proposal.

Effectively this proposal is a large experiment to see what happens if municipal waste is compacted/processed into fuel, and is burnt in an incinerator. Unfortunately the citizens of Runcorn and Widnes will be the unwitting guinea pigs in this experiment.

Because of the density of the threatened residential areas, it is likely that, if the proposal went ahead, complaints, real or imagined, will be regular and vociferous. This will adversely affect Halton in the long term with property prices being depressed and new businesses relocating away from Halton. At particular risk will be the new and emerging image of Runcorn as a "Science and Technology/New Business" hotspot with the growing Runcorn Heath and Daresbury Science Parks. This new image is a 21st century construct, whilst a waste incinerator is a throwback to a 19th century age.

8. Conclusion

In conclusion we can identify no benefits to Halton from the proposal but only serious risks of an experiment in building an incinerator upwind of dense residential areas. This site must be one of the worst possible locations in the U.K. for an energy from waste incinerator!

4. The Incinerator and the Environment

1. Size of the Incinerator

The Incinerator would be the largest of its kind built in the U.K. to date, and, therefore, the largest source of emissions. It would dramatically INCREASE, not reduce, the amount of waste going to landfill in Halton, and, in particular, the amount of hazardous toxic waste dumped at Randle Island. It cannot, therefore, be viewed as a solution to Halton's own waste disposal problems, but rather as a Regional Centre seeking to attract the Region's rubbish to be dumped in Halton, after burning, to satisfy Ineos Chlor's commercial interests.

2. Fuel and Residue

The Incinerator would burn some 850,000 tonnes of treated waste per year, of which only 30,000 tonnes (4%) would be Halton's waste. After burning, 375,000 tonnes of fuel would become residue, and of that, 155,000 tonnes (approximately 50%) would be hazardous material to be dumped at Randle Island. Therefore, of the 155,000 tonnes of hazardous material, the amount from Halton's waste would total only 6,200 tonnes, and so, <u>every year</u>, the equivalent of 25 years of Halton's own hazardous material would be dumped there!

It is important to note that the Government's proposed targets for reducing waste through increases in re-use, recycling etc, would necessarily reduce the amount of waste coming from the Region. Thus, a recycling target of 50% would reduce the 850,000 tonnes of fuel identified above to some 567,000 tonnes (and Halton's 30,000 tons to 20,000 tonnes) whilst a target of 60% would reduce it to 453,000 tonnes (and 16,000 tonnes) and a target of 70%, (as achieved in Germany) to 340,000 tonnes (and 12,000 tonnes) respectively. It is therefore, clear that the current recycling target of 50% would leave the Incinerator some 300,000 tonnes short of its fuel capacity.

However, this Incinerator would require its 'feed' of 850,000 tonnes if it were to run efficiently. It would be reasonable to assume therefore, that Ineos Chlor would seek to import the required waste either from other areas of the Country or abroad over the operating period of 25 years.

It is also important to note that despite the filtering processes employed, the quality of the 'feed' fuel cannot be strictly controlled, and is bound to be variable in its content. Given the variability that will occur in the waste from which the 'fuel' is derived, there can be no steady state conditions. Controls over that imported from abroad would be even more difficult to maintain thus rendering the process and its output in emissions and residues even more unpredictable and potentially hazardous.

Ineos do not say where the Refuse Derived Fuel (RDF) will be produced, yet there are no existing recycling and processing facilities in the North West capable of producing the required 850,000 tonnes per annum. They do state that "the present application does not include any area for producing the raw waste into fuel".

So, where will Halton's waste be processed? Is it to be transported out of Halton for processing, and returned for burning? Or, if this Proposal is approved, will there be a further proposal for the building of a treatment centre on the same site, and possibly other facilities? With these in place how can we guarantee that Ineos would not in the future seek to take in raw waste direct, including that imported from abroad? Consider the consequences this would have for local residents!

In addition, vehicle movements in and out of Halton, relating to the transporting of Halton's raw waste have not yet been identified, but these must further add to traffic congestion and pollution from emissions!

3. Inadequate Monitoring and Control

Abatement equipment will not prevent the incinerator emitting the potentially dangerous fine and ultra fine particles, which have been linked to increases in birth defects, respiratory diseases and cancers. The standard response from those companies operating incinerators is that they operate to statutory standards and are, therefore, safe! However, independent monitoring of dioxins only takes place twice a year. All other monitoring is on a self-reporting basis.

Regulations do not guarantee safety! As measurements and monitoring techniques improve, limits are being continually lowered for exposure to other threats, such as those from asbestos and radiation, where it is acknowledged that long-term low-level exposure has a cumulative effect not previously recognized. Recent concerns about the effects on the health of those people living near mobile phone masts have led to their removal from densely populated areas. In our every day lives we are accustomed to changes in accepted safety standards, which continually occur.

It is important to recognize that current U.K. regulations only require monitoring of particulates of 10 microns or above. This means that the most dangerous ultra fine particulates are not monitored. The World Health Organization's fact sheet *(Page 3)* showed that unmonitored particulates (PM2.5) seriously affect health, increasing deaths from cardiovascular and respiratory diseases and lung cancers. "Studies on large populations show a strong effect of PM2.5 on mortality, and have been unable to identify a threshold concentration below which ambient PM has no effect on health: a no effect level".

The Halton Health Report (2003) forewarned us of the dangers, viz. "There is good evidence that pollution from particulate matter at levels previously thought to be 'safe' is associated with increased risk of mortality and morbidity (death and disease) from cardiopulmonary disease, especially in people with other risk factors".

4. Transportation of Fuel and Residue

The importation of waste from outside of the Borough is contrary to the 'Proximity Principle', which requires local communities to deal with their waste as close to its source as possible.

In our view, the Ineos Proposal understates the effects of road traffic to and from the site via the Jubilee Bridge and increased levels of congestion, noise and pollution from traffic emissions inflicted on an area which already suffers from these problems. 400 road vehicle movements per day (7.00am to 7.00pm) can only add to congestion and pollution, with particularly adverse effects on residents living closest to the site, reinforced by train deliveries throughout the night, causing other problems, particularly noise.

The routes for heavy goods vehicles carrying the hazardous waste to Randle Island will pass residential properties and access the dump at a point immediately adjacent to the Wigg Island Country Park. This is likely to adversely affect the image of the Park and its appeal to visitors.

A major concern must be the massive increase in the amount of toxic waste dumped at the Randle Island. Apart from the problems generated by wind borne pollution associated with the dumping of fly ash, the site is next to the Manchester Ship Canal and the River Mersey, and in close proximity to residential areas in Runcorn and Widnes, and the Astmoor and Daresbury Business Parks. The adverse effects impacting on these businesses will vary, but concerns have been expressed with regard to the location of toxic residue disposal close to medical, food and scientific establishments.

It must also be asked how 'safe' is the dump itself? Has it the capacity to take such a large increase in toxic waste each year? What is its total 'life'. What are the guarantees against leakages? Dioxins and heavy metals do not 'break down'. Will the ground water or aquifers be irreversibly contaminated?

5. Pollution and the Environment

Energy from Waste Incineration is not environmentally friendly or 'green'. Incinerators INCREASE not reduce global warming, and are widely believed to discourage the full use of more preferable methods of waste disposal.

5. Health Risks

1. Background

It has been recognised for many hundreds of years that exposure to high levels of dust can lead to ill health and particularly lung disease. As the Industrial Revolution progressed, it became clear that workers involved in mining, foundry work and stone grinding were particularly at risk of developing silicosis. It is now well established that there are a number of diffuse fibrotic conditions of the lung associated with industrial exposure to smaller particles including; pneumoconiosis in miners, bissinosis in cotton workers and, more recently, asbestosis amongst laggers and associated trades. The first indication that serious pathology could arise from low-dose exposure to particles came with the recognition that asbestos fibres could cause the previously rare tumour pleural mesothelioma.

It took many years to recognise the specific causes of these debilitating and usually fatal diseases. It was too late to help those who suffered and died from these dreadful conditions. We must not put the health of present and future generations at risk by ignoring these lessons from the past.

2. Concerns

- A comprehensive evaluation of the research findings now provides persuasive evidence that exposure to fine particulate air pollution also has adverse effects on cardiopulmonary health. *(Ref 4)*

- Incinerators are a major source of fine (PM2.5s) and ultrafine (PM0.1s) particulates, of toxic metals, and of persistent organic pollutants (POPs) including known carcinogens, mutagens and hormone disrupters. *(Ref 5)*

- Particulates are tiny particles in the air that are classified by size. The smaller the size of the particles, the more dangerous the health effects become. Their miniscule size allows them to be breathed deeply into the lungs and absorbed into the bloodstream. The human body has no natural defences against these manufactured organo-chlorine and carbon-chloro compounds. *(Ref 6)*

- The World Health Organization has concluded that fine particulate air pollution has a strong effect on mortality and that there is no safe threshold concentration below which ambient fine and ultrafine PMs have no effect on health. In any case, current regulations do not require the monitoring of fine and ultrafine particulate emissions. *(Ref 7)*

- A large number of studies have shown higher rates of adult and childhood cancers and of birth defects around incinerators. *(Ref 5, Ref 8 and Appendix 1)*

- Of greatest concern is the bioaccumulation of particulate air pollution and its long-term effects on the health of the community especially the risk to the developing embryo and infant. *(Ref 5)*

- Two recent papers have highlighted the excess risk of kidney mortality and morbidity in Runcorn that already exists in the population living closest to several sources of pollution. We do not want to put the health of the local community at even greater risk by building a massive waste incinerator in such close proximity to an urban community. *(Ref 9 and Ref 10)*

- There is also the cocktail effect, whereby combinations of pollutants create an enhanced negative effect.

- Past experiences show the costly consequences of disregarding early warnings about environmental hazards. Today the need for applying the Precautionary Principle is even greater than before. *(Ref 5 page 27 and Ref 11)*

- Michael Meacher, Minister of Environment stated to a House of Lords Select Committee in 1999 that, "I repeat that the emissions from incinerator processors are extremely toxic. Some of the emissions are carcinogenic. **We know scientifically that there is no safe threshold below which one can allow such emissions".**

In addition, increased traffic pollution, and noise levels from a plant operating 24 hours a day every day of the year leading to sleep deprivation and mental stress will be additional health hazards for the local communities.

3. Is it worth the risk?

The standardised mortality rate (SMR) for Halton residents is already 23% above the national average. Only recently we had the scandal of HCBD emissions from the industrial waste dumped in the Weston quarry by ICI. To site the proposed Energy from Waste Combined Heat and Power Generating station at Weston Point is, at best, a gamble with the future health of the residents of Halton, which has already been compromised in the past by industrial pollution. **It is not a risk worth taking.**

6. Economic and Social Factors

1. The Image of the Borough

The Proposal directly conflicts with the Borough Council's regeneration policies, which have sought successfully to attract to the Borough 'clean' industries housed in low-rise buildings situated in 'green' environments. In our view it would adversely affect the image of the Borough and reverse the improvements achieved over the last 30 years.

- Over that period, much has been done, at great expense, to improve both the image and environment of Halton by reducing the pollution of old industries and bringing in new cleaner industry. Improvements to the infrastructure in Widnes and developments such as those at Norton and Sandymoor, have created a place which is a much more pleasant place in which to live and work. Weston Point itself is a deprived but improving area, as can be seen by the amount of house building, improvement and home ownership taking place there. The Proposal to build an incinerator will in itself adversely affect that image!

- The Ineos proposal would be totally contrary to 'Halton Vision', and the 5 specific objectives of the Council as quoted in Chapter 1, Page 6 of the Council's Constitution as detailed below:-

Our Vision for Halton Borough Council
Halton will be a thriving and vibrant Borough where people can learn and develop their skills; enjoy a good quality of life with good health; a high quality, modern urban environment; the opportunity for all to fulfil their potential; greater wealth and equality; sustained by a thriving business community; and a safer, stronger and more attractive neighbourhood.

"The Council has identified the following key priority areas for action".

A Safer Halton – Our overall aim
To ensure pleasant, safe and secure neighbourhood environments with attractive, safe surroundings, good quality local amenities and the ability of people to enjoy life where they live.

A Healthy Halton – Our overall aim
To create a healthier community and work to promote well-being, a positive experience of life with good health (not simply an absence of disease), and offer opportunities for people to take responsibility for their health with the necessary support available.

Halton's Urban Renewal – Our overall aim
To transform the urban fabric and infrastructure, to develop exciting places and spaces and to create a vibrant and accessible Borough that makes Halton a place where people are proud to live and see a promising future for themselves and their families.

Children and Young People in Halton – Our overall aim
To ensure that in Halton, children and young people are safeguarded, healthy and happy, and receive their entitlement of high quality services that are sensitive to need, inclusive and accessible to all.

Employment Learning and Skills in Halton – Our overall aim
To create an economically prosperous Borough that encourages investment, entrepreneurship, enterprise and business growth, and improves the education, skill.

- Many new, clean businesses have been attracted to Halton and it is hoped many more will be. Businesses decide location on commercial grounds that include whether the location matches the image they wish to project and whether their existing or prospective employees will be attracted to the location. An important development has been the attraction of 'high tech' industries to the Daresbury and Heath Science Parks. The perception of Halton as the dumping ground of the North West's waste and incinerator emissions, will not only reduce Halton's attraction to new businesses, but will harm retention of existing businesses.

- Many residents have informed us that they would seriously consider moving away from Halton if the incinerator became operational. This is particularly strongly felt by residents with prospects of having children, or grandchildren, and residents of Mersey and Heath Wards particularly feel that their neighbourhoods would be seriously affected as residential areas. The potential loss to Halton of existing and new residents, many with the skills required in the area, would far outweigh any employment opportunities arising from the Proposal.

- In the Proposal, Ineos Chlor fails to recognise the concerns encountered amongst residents relating to the perceived threat of the risks associated with the Incinerator, on their lives. We believe that residents are generally opposed to the Proposal.

- The Proposal to build an incinerator will in itself have a detrimental effect on property values in Halton. This will not be of concern to Ineos, but will be a major concern to existing residents and businesses and would have some detrimental effect on Council Rates income.

2. The Effects on Jobs

It has been claimed that failure to implement this proposal would put at risk the Ineos operation in Runcorn and the jobs involved. However, there is no guarantee given that the proposed plant would secure the operation for the 25 year life of the incinerator.

- Ineos is a major international supplier of products vital to our modern society and it seems unlikely that they would not be able to continue providing such products. It may be suggested that they may move their operation to another Country, but this may happen anyway (then leaving Halton with the Incinerator). Such a decision would be taken for many commercial reasons and not just for the sake of providing themselves with cheaper energy for 20% of their requirements.

- If the current and future U.K. cost of energy for Ineos (shared by all U.K. industry) makes their operation so fragile, it is difficult to see why their Proposal covers only 20% of their Runcorn energy requirements. Logically, 100% would be beneficial (and Halton would become the waste and pollution centre of not just the region, but of the U.K. and beyond). Perhaps subsequent proposals are likely and these would be impossible to refuse if this initial Application is approved.

- Similar threats to employment have been made in the past. For example, in the discussion about the future of the Luvella incinerator, and again when the Rocksavage Power Station was approved. Subsequently, I.C.I. sold the site to Ineos!

- Ineos do not claim that the Proposal would create even one new job. Operation of the Incinerator would be undertaken by re-deployment of existing personnel.

7. Local Concerns Relating to the Immediate Area

1. The Effects on Residents

For residents living closest to the incinerator, in addition to those concerns affecting all the Borough's residents, there are particular problems relating to noise, disturbance and the visual effects of such a massive building and associated plant.

It is very disturbing to read in the planning application how Ineos minimises those problems and ignores other contributory factors. The Assessment states, "The noise assessment provided indicates that the noise and vibration effects from the site are likely to have no significant effects".

- How the additional 400 heavy goods vehicle movements per day will not add to the present high ambient noise levels close to the incinerator is not explained. Of course this will not only be by their deliveries, but also in manoeuvring to dump or pick up their loads, and the use of reversing alarms that, particularly at night, will be a constant source of irritation!

- The Plant itself will contain machinery whose noise should be possible to minimise, but as this is secondary to performance we are well aware from experience that, even when noise limits are broken, it is often not possible to obtain more than a minimal improvement before the operators of the plant state that they are at 'Best Possible Practice and it would be financially unacceptable to reduce the disturbance further'. Effectively then residents are left to bear the noise nuisance.

- We are all too well aware that disturbance to our lives and environment will occur. It will be a nightmare for those closest to the incinerator with the noise from road and rail traffic, the inevitable dust, and even the threat of having our houses under the permanent cloud of water vapour from the six cooling towers required for the operation.

2. The Transportation

In addition to our concern about road transport of the fuel into the site, and residue out of the site, there are other concerns relating to the fuel transportation by rail.

According to the Ineos Application, 'information presented in the Technical Assessment, demonstrates that trains using this rail track do not pass residential properties and would therefore have no detrimental environmental impacts in terms of noise or disturbance'.

- This is untrue because it omits reference to the existence of over thirty houses that back directly onto the rail track and to substantial new residential development which is taking place immediately adjacent. It also fails to take into account the houses in Picow Farm Road, Crofton Road and Westfield Road which are also within close proximity. *(Appendix 3)*

- Five trains per day will arrive at the site, therefore five trains per day must consequently leave. Add to this that the majority of train movements are limited to the night times, because of the restrictions on the main line through Runcorn, and this equates to ten trains per night passing within fifty metres of these houses at rooftop height! They **will** have "significant effects" for the people living there!

3. The Construction Phase

It needs to be recognised that the concerns mentioned would take effect following the three and a half years of disturbance for twelve hours a day during the construction and commissioning of the plant. Again we would question whether it would seem possible to build such a large installation as a power station without, for example, pile driving for the foundations. To say that the noise and vibrations from this and similar activities would have no detrimental effect on homes less than 100 metres from the site is inconceivable!

4. The Visual Aspect

It is however, in the 'visual aspects' section of the application that Ineos denigrates the area in giving the impression that the neighbourhood closest to the site is of low value and impoverished. Lack of local knowledge may have been responsible for the miss-naming of the six Avenues containing semi detached houses, close to the site as 'Terraces', but how could it be conceived that the detached four-bedroom double garaged properties at Minster Court could be so described!

As we have already indicated above, we believe that Ineos has understated the effects on the immediate visual environment of the presence of such a massive building and associated plant and of the height of the chimney itself. The cosmetic landscaping planned will not, in our view, disguise the serious deterioration in outlook currently available to residents.

5. The Decimation of the Village of Weston

The Village of Weston, which overlooks the proposed site, provides a vivid testimony to the impact of pollution on land, buildings and people, caused by the past dumping of toxic waste from the industrial site. As a result, houses were sealed or demolished, the Village was decimated, polluted areas were landscaped and identified as unfit for development and people were forced to re-locate, as the life of the Village was destroyed. Fortunately, the Village is beginning to rediscover itself, as people have moved in and new residential development is taking place. Now the Village feels that it is, once again, under threat.

6. The Vision for Halton

All this runs counter to Halton's Constitution, which promises that "Halton will be where people can enjoy a good quality of life with good health, in a high quality, modern urban environment", and also promises "To ensure pleasant, safe and secure neighbourhood environments with attractive safe surroundings". How can these promises be kept for the people who live here, if this Incinerator is built?

Nearly twenty years ago, this area was placed in a similar position when the Luvella Incinerator was built very near to the same location because of the limited and inaccurate case that was presented to Councillors.

- Local residents spent the vast majority of the next three years fighting to have that decision reversed. That they were successful in the end owed a great deal to Councillors who appreciated the dangers of locating an incinerator in such a dangerous position!

- We hope that, on this occasion, Councillors will recognize the seriously detrimental effects that this incinerator would have, day in and day out, on the health and quality of life of the people of this area, and take appropriate action to ensure that this Proposal is rejected!

8. Conclusion

The fundamental question which remains, is why would Halton wish to permit the building of this Incinerator in the Borough?

We can identify no advantages or benefits, only costs and great risks, detrimental to its image, the health and quality of life enjoyed by its residents, and to its future social economic development.

We strongly recommend that the Borough Council rejects the Proposal and support the Action Group in opposing the Ineos Application.

9. Bibliography

References

1. Halton Unitary Development Plan 7/4/2005 – Waste Incineration Section MW14/1A (Appendix 4)

2. Halton Unitary Development Plan 7/4/2005 – Waste Incineration Section MW14/1I (Appendix 4)

3. Analysis of Official Health Statistics 2003 to 2005. Dr Dick van Steenis

4. 2006 Critical Review – Health Effects of Fine Particulate Air Pollution – C Arden Pope III and Douglas W Dockery

5. The Health Effects of Waste Incinerators – 4th Report of the British Society for Ecological Medicine – December 2005

6. Influence of ambient atmospheric particulate aerosols on health – an evolutionary perspective. Professor Vyvyan Howard

7. World Health Organization Fact Sheet Euro/04/05 (Appendix 1) – Particulate matter air pollution: how it harms health. 14th April 2005

8. Birth defect rates in England: 1995-2002. Michael Ryan. 22nd August 2005

9. Excess risk of kidney disease in a population living near industrial plants. (Runcorn and Widnes) Brian Staples et al 2004

10. Kidney Disease Mortality and Environmental Exposure to Mercury (Runcorn). American Journal of Epidemiology. Susan Hodgson et al 2007

11. Understanding factors affecting health in Halton. Lancaster University Department of Geography and Institute for Health Research. Commissioned by Halton Health Partnership in 2002. Published in 2003

12. Report on 'Human Health Risk Assessment'. Professor J C Dearden. Feb 2007

10. Appendices

1. World Health Organization, Europe. Fact sheet Euro/04/05, Berlin, Copenhagen, Rome, 14 April 2005. Particulate matter air pollution: how it harms health.

2. Topographical Graph of Runcorn, Weston Point to Norton.

3. Photograph of Rail Track adjacent to houses in Percival Lane.
Photographs of houses in Weston Point / Weston Road and Weston Village.

4. Halton Unitary Development Plan. MW14 Incineration.

5. Windrose and map of Weston Point.

APPENDIX 1

WORLD HEALTH ORGANIZATION
EUROPE

Fact sheet EURO/04/05
Berlin, Copenhagen, Rome, 14 April 2005

Particulate matter air pollution: how it harms health

Definition

Particulate matter (PM) is an air pollutant consisting of a mixture of particles that can be solid, liquid or both, are suspended in the air and represent a complex mixture of organic and inorganic substances. These particles vary in size, composition and origin. Their properties are summarized according to their aerodynamic diameter, called particle size.

- The coarse fraction is called PM_{10} (particles with an aerodynamic diameter smaller than 10 µm), which may reach the upper part of the airways and lung.
- Smaller or fine particles are called $PM_{2.5}$ (with an aerodynamic diameter smaller than 2.5 µm); these are more dangerous because they penetrate more deeply into the lung and may reach the alveolar region.

The size of the particles also determines the time they spend in the atmosphere. While sedimentation and precipitation removes PM_{10} from the atmosphere within few hours of emission, $PM_{2.5}$ may remain there for days or even a few weeks. Consequently, these particles can be transported over long distances.

Principal sources

The major PM components are sulfate, nitrates, ammonia, sodium chloride, carbon, mineral dust and water. Particles may be classified as primary or secondary depending on their formation mechanism.

Primary particles are directly emitted into the atmosphere through man-made (anthropogenic) and natural processes. Anthropogenic processes include combustion from car engines (both diesel and petrol); solid-fuel (coal, lignite and biomass) combustion in households; industrial activities (building, mining, manufacturing of cement, ceramic and bricks, and smelting); erosion of the pavement by road traffic and abrasion of brakes and tyres; and work in caves and mines. Secondary particles are formed in the air, usually by chemical reactions of gaseous pollutants, and are products of atmospheric transformation of nitrogen oxides mainly emitted by traffic and some industrial processes, and sulfur dioxide resulting from the combustion of sulfur-containing fuels. Secondary particles are mostly found in the fine PM fraction.

Health hazards
The systematic data assessment completed in 2004 by the WHO European Centre for Environment and Health, Bonn, indicates that:

- PM increases the risk of respiratory death in infants under 1 year, affects the rate of lung function development, aggravates asthma and causes other respiratory symptoms such as cough and bronchitis in children;
- $PM_{2.5}$ seriously affects health, increasing deaths from cardiovascular and respiratory diseases and lung cancer. Increased $PM_{2.5}$ concentrations increase the risk of emergency hospital admissions for cardiovascular and respiratory causes; and
- PM_{10} affects respiratory morbidity, as indicated by hospital admissions for respiratory illness.

Relation of health effects to PM concentration
In the last decade, studies of the short-term effects of PM, based on association between daily changes in PM_{10} concentrations and various health outcomes, were conducted in many cities in the WHO European Region, including Erfurt and Cologne in Germany. In general, results indicate that short-term changes in PM_{10} at all levels lead to short-term changes in acute health effects (Table 1). Effects related to short-term exposure include: inflammatory reactions in the lung, respiratory symptoms, adverse effects on the cardiovascular system and increases in medication use, hospital admissions and mortality.

Table. 1. Short-term effects on health from 10-µg/m^3 increases in PM_{10} concentration

Health outcome	**Estimated percentage increase in risk per 10 µg/m^3 PM_{10} (95% confidence interval)**	**Estimates available for meta-analysis**
All-cause mortality	0.6 (0.4–0.8)	33
Mortality from respiratory diseases	1.3 (0.5–2.0)	18
Mortality from cardiovascular diseases	0.9 (0.5–1.3)	17
Hospital admissions for respiratory disease, people age 65 years and over	0.7 (0.2–1.3)	8
Cough, children aged 5–15 years with chronic symptoms	0.0 (–1.3–1.1)	34
Medication use, children aged 5–15 years with chronic symptoms	0.5 (–1.9–2.9)	31

Source: Anderson HR et al. *Meta-analysis of time series studies and panel studies of particulate matter (PM) and ozone (O_3). Report of a WHO task group*. Copenhagen, WHO Regional Office for Europe, 2004 (http://www.euro.who.int/document/e82792.pdf, accessed 8 April 2005).

Because long-term exposure to PM results in a substantial reduction in life expectancy, the long-term effects clearly have greater significance to public health than the short-term effects. $PM_{2.5}$ shows the strongest association with mortality, indicating a 6% increase in the risk of deaths from all causes per 10-µg/m³ increase in long-term $PM_{2.5}$ concentration.[1] The estimated relative risk amounts to 12% for deaths from cardiovascular diseases and 14% for deaths from lung cancer per 10-µg/m³ increase in $PM_{2.5}$.[2]

The effects related to long-term exposure include: increases in lower respiratory symptoms and chronic obstructive pulmonary disease, reductions in lung function in children and adults, and reduction in life expectancy, due mainly to cardiopulmonary mortality and probably to lung cancer

Studies on large populations show a strong effect of $PM_{2.5}$ on mortality, and have been unable to identify a threshold concentration below which ambient PM has no effect on health: a no-effect level. After a thorough review of recent scientific evidence, a WHO working group therefore concluded that, if there is a threshold for PM, it lies in the lower band of currently observed PM concentrations in the European Region.

Estimated change in health damage due to PM in the EU through implementation of current legislation, 2000–2020

Health end-point	Units (1000s)	2000	2020	Difference
EU				
Mortality – long-term exposure	Life years lost	3001	1900	1101
Mortality – long-term exposure	No. premature deaths	288	208	80
Infant mortality	Cases	0.6	0.3	0.3
Chronic bronchitis	Cases	136	98	37
Respiratory hospital admissions	Cases	51	33	19
Cardiac hospital admissions	Cases	32	20	12
Restricted activity	Days	288 292	170 956	117 336
Respiratory medication use, children	Days	3510	1549	1961
Respiratory medication use, adults	Days	22 990	16 055	6935
Lower respiratory symptoms, children	Days	160 349	68 819	91 529
Lower respiratory symptoms, adults with chronic disease	Days	236 498	159 723	76 773
Germany				
Mortality – long-term exposure	Life years lost	657	413	244
Mortality – long-term exposure	No. premature deaths	65	48	17

[1] Pope AC et al. Lung cancer, cardiopulmonary mortality, and long-term exposure to fine particulate air pollution. *Journal of the American Medical Association*, 287:1132–1141 (2002).

[2] Pope AC et al. Lung cancer, cardiopulmonary mortality, and long-term exposure to fine particulate air pollution. *Journal of the American Medical Association*, 287:1132–1141 (2002); and Pope AC et al. Cardiovascular mortality and long-term exposure to particulate matter air pollution. *Circulation*, 109:71–77 (2004).

Infant mortality	Cases	0.09	0.05	0.04
Chronic bronchitis	Cases	31	21	10
Respiratory hospital admissions	Cases	11	7	4
Cardiac hospital admissions	Cases	7	4	3
Restricted activity days	Days	63 832	36 216	27 616
Respiratory medication use, children	Days	781	324	457
Respiratory medication use, adults	Days	5166	3522	1645
Lower respiratory symptoms, children	Days	32 291	13 406	18 884
Lower respiratory symptoms, adults with chronic disease	Days	52 636	34 993	17 644

Source: Pye S, Watkiss P. *CAFE CBA: baseline analysis 2000 to 2020*. Vienna, International Institute for Applied Systems Analysis, 2005 (AEAT/ED51014/Baseline Scenarios; http://www.iiasa.ac.at/docs/HOTP/Mar05/cafe-cba-baseline-results.pdf, accessed 8 April 2005).

For more technical information contact:

TECHNICAL INFORMATION:

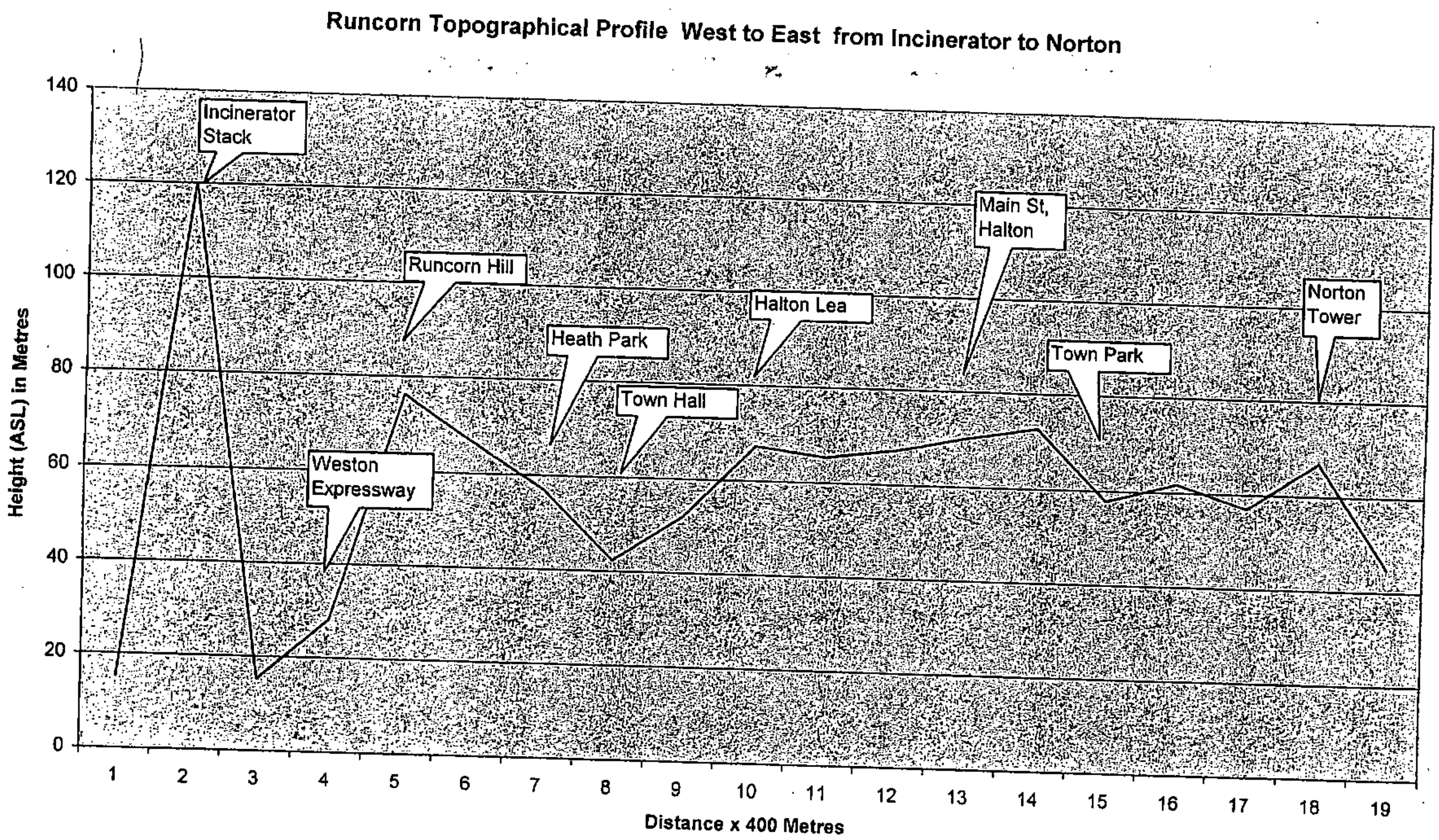
Dr Michal Krzyzanowski
Regional Adviser, Air Quality and Health
WHO European Centre for Environment and Health, Bonn
WHO Regional Office for Europe
Bundeshaus, Görresstraße 15
D-53113 Bonn, Germany
Tel.: + 49 228 209 4405. Fax: +49 228 209 4201
Email: mkr@ecehbonn.euro.who.int

PRESS INFORMATION:

Ms Liuba Negru
Press and Media Relations Officer
WHO Regional Office for Europe
Scherfigsvej 8, DK-2100 Copenhagen Ø, Denmark
Tel.: +45 39 17 13 44. Fax: +45 39 17 18 80
E-mail: LNE@euro.who.int

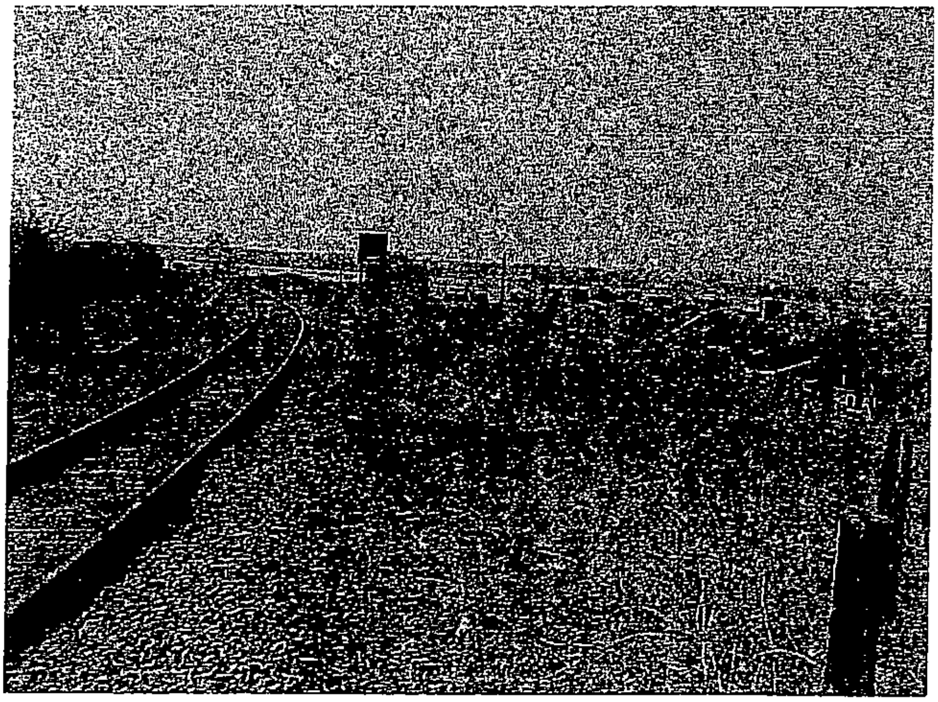
Ms Cristiana Salvi
Technical Officer, Communication and Advocacy
WHO European Centre for Environment and Health, Rome
WHO Regional Office for Europe
Via Francesco Crispi 10, I-00187 Rome, Italy
Tel.: +39 06 4877543. Mobile: +39 348 0192305
Fax: +39 06 4877599
E-mail: csa@ecr.euro.who.int

APPENDIX 2

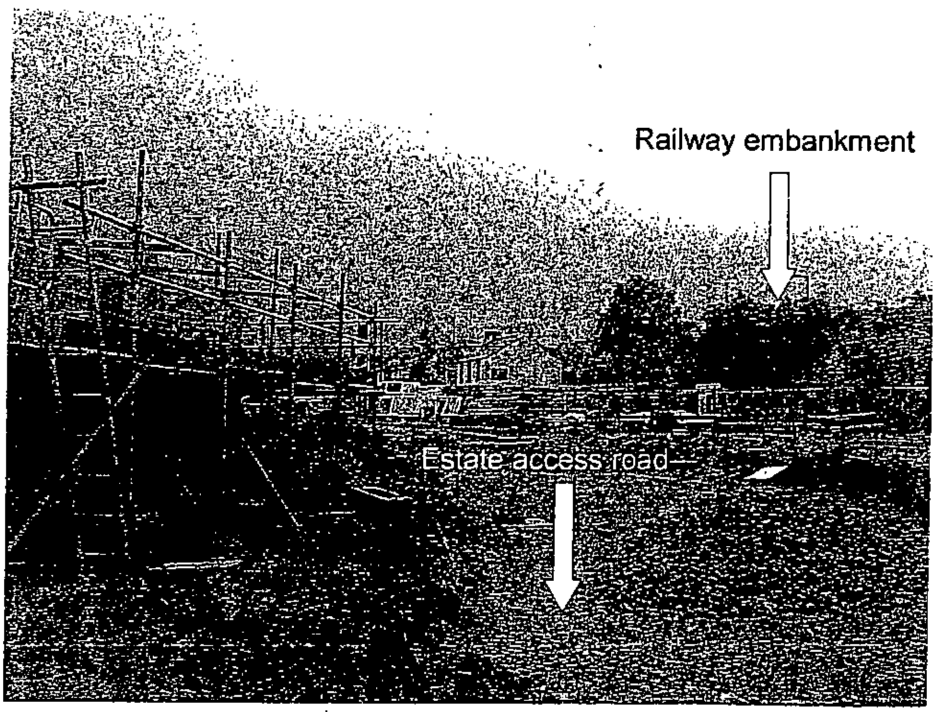


Stack height 105m (+15m above sea-level = 120m overall height)
Height differential is only approximately 40m above Runcorn Hill

APPENDIX 3

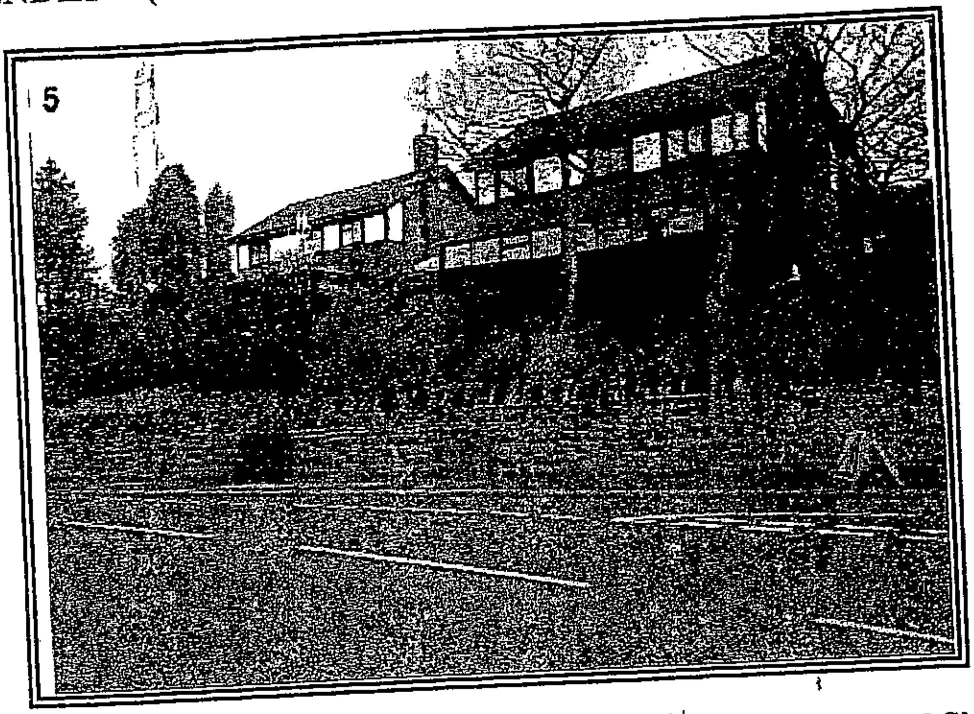


Waste Rail Track Route
Immediately adjacent to houses in Percival Lane



New houses being built in Percival Lane adjacent to Rail Track

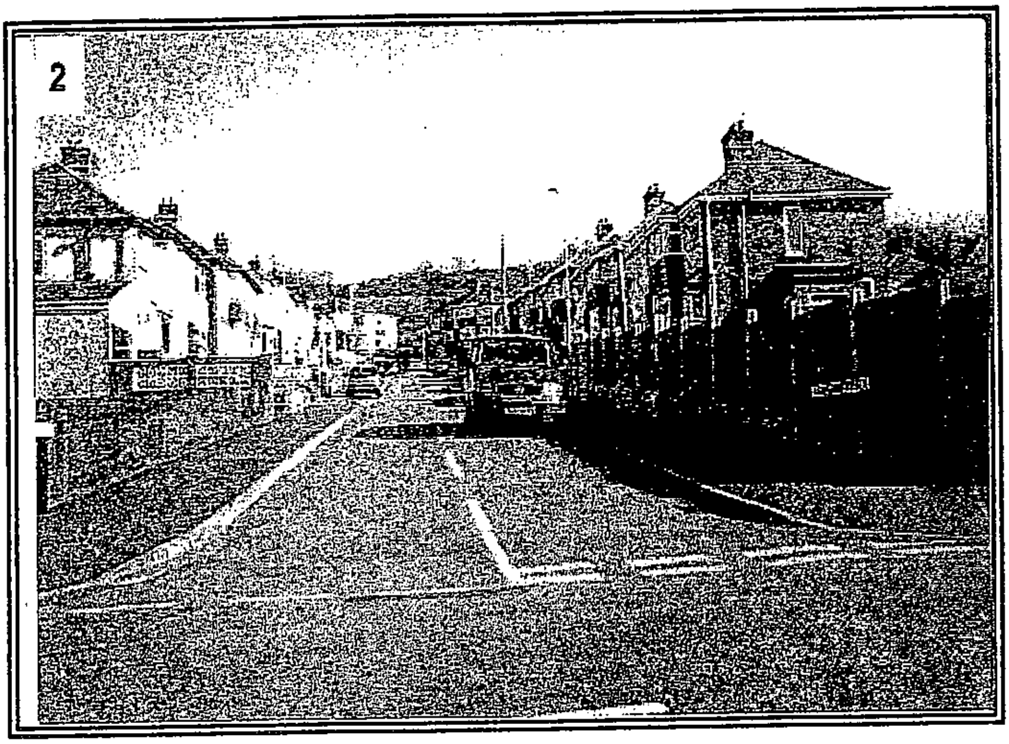
APPENDIX 3 (Continued)



Minster Court houses (on side of Runcorn Hill) overlooking Proposed Site

View from Minster Court
(Stack will be approximately 50m above this point)

APPENDIX 3 (Continued)

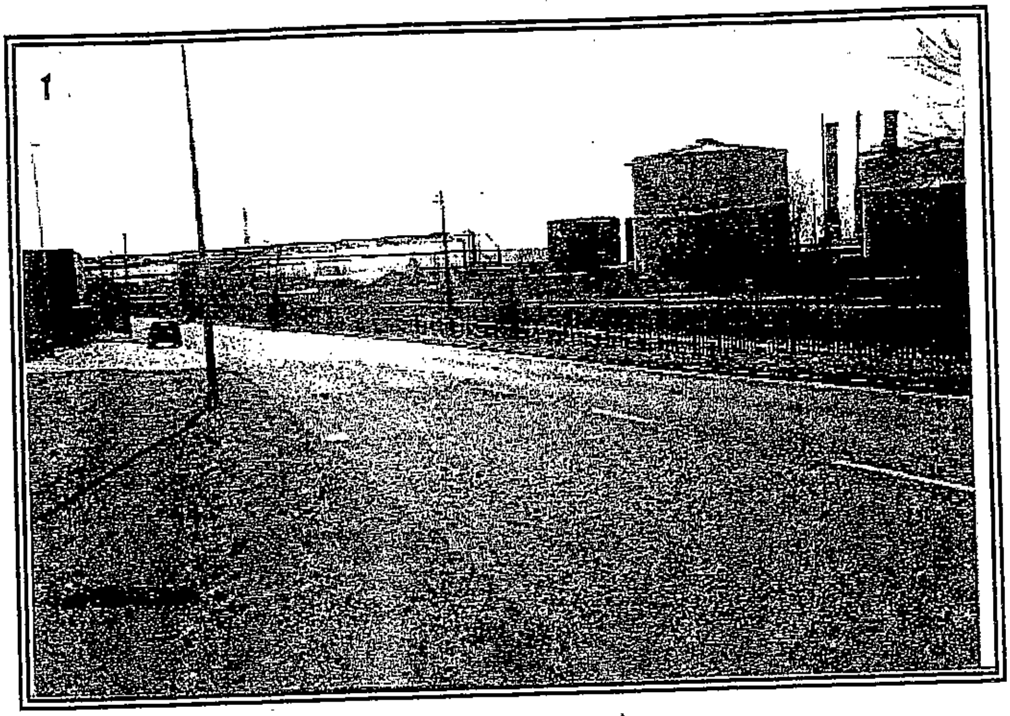


Cameron Avenue from Russell Road

Looking down on the Proposed Site

Ineos describe these houses using the word 'terrace'
all these properties are on the incline provided by the elevation of Runcorn Hill

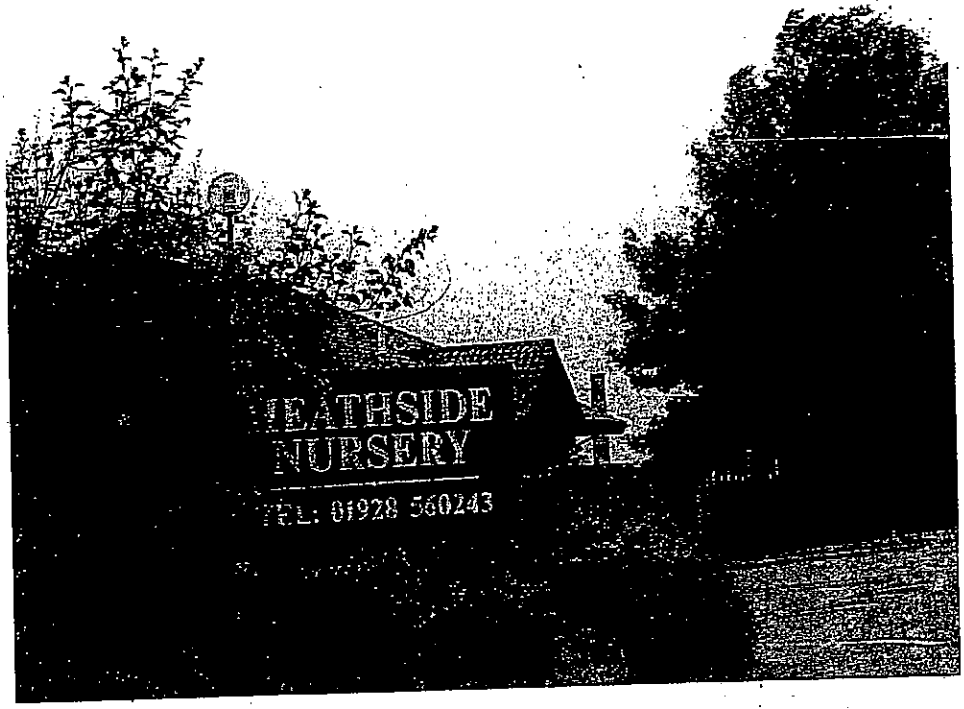
APPENDIX 3 (Continued)



Picow Farm Road looking towards the Proposed Site
The 'tree lined road' as described by Ineos (Ref 5.35)
Trees in relation to views is irrelevant as they will have minimal effect on reducing the visual appearance of a massive forty-seven metre high main building

View from Weston Road
Showing the proximity to the Proposed Site
(The current highest stack in background is smaller and much further away than the Proposed new stack)

APPENDIX 3 (Continued)

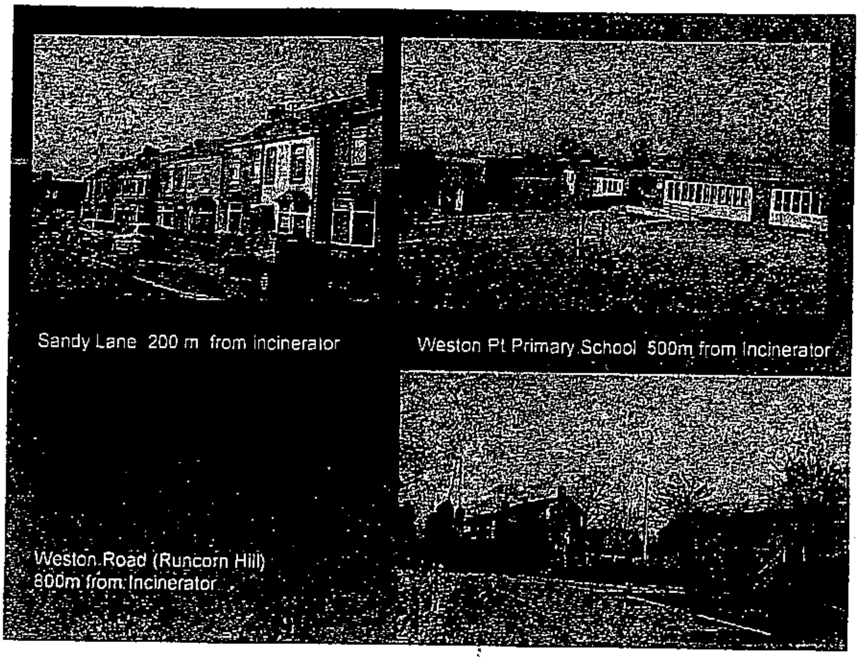


Photograph of Heathside Nursery

Houses in Banks Lane, Weston Village

Both Views show the proximity to the Proposed Site
(The current highest stack in background is smaller and much further away than the Proposed new stack)

Appendix 3 (Continued)



Photographs of houses in Weston Point and Weston Road

Beaconsfield Wood
Part of the environmental improvements of Weston Point

Chapter 5 – Minerals & Waste Management
MW14 – Incineration
http://www.cartoplus.co.uk/halton/text/05_mw_minerals.htm#mw14

WASTE INCINERATION

1 Waste incineration can constitute a sustainable form of waste management, when associated with the reclamation of recyclable materials and the utilisation of energy from waste, or as part of a combined heat and power process. Proposals for incinerators can lead to large-scale public concern, principally related to safety and health risks from emissions. Whilst public concern over pollution risks may be a material planning consideration, pollution risks from emissions are principally a matter for the Environment Agency who are the competent authority. Government guidance is that planning authorities should not seek to duplicate the controls of other agencies under other legislation.

top

MW14 INCINERATION

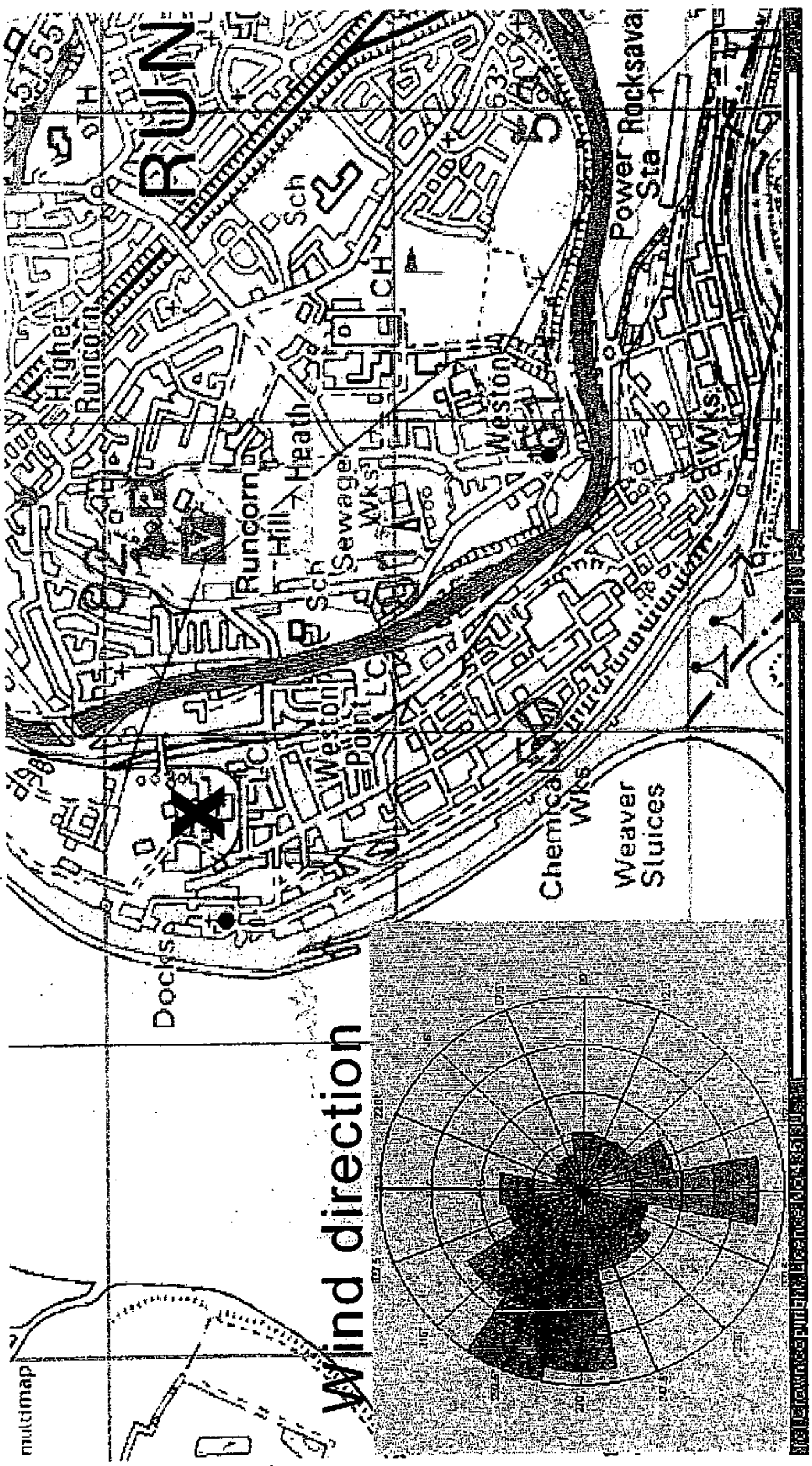
1 Proposals for waste incineration plants must meet all the following criteria:

- **a be located within a Primarily Employment Area and not within close proximity to residential areas or other sensitive land-uses;**
- **b illustrate that there are no existing suitable disposal facilities, or potential sites for the development of suitable disposal facilities closer to the source of waste arisings;**
- **c not have an unacceptable detrimental visual impact;**
- **d not have an unacceptable detrimental impact on economic regeneration or investment confidence;**
- **e not have an unacceptable detrimental impact on existing industries, particularly food manufacturing and high technology activities;**
- **f incorporate proposals for energy recovery or combined heat and power utilisation;**
- **g incorporate a Materials Recycling Facility (MRF) where dealing with wastes with a recyclable component;**
- **h where practicable be located so as to make use of rail or water transport methods;**
- **i not cause pollution or emissions that would have an unacceptable detrimental impact on surrounding land uses;**
- **j with specific reference to clinical and chemical wastes, the proposal must demonstrate the need for the facility in a regional and sub-regional context.**

JUSTIFICATION

2 The Local Planning Authority considers that the criteria set out in the above policy will enable development proposals to be assessed and to ensure that any such developments are appropriately located where they will not have an unacceptable impact.

APPENDIX 5


Higher Runcorn
Runcorn Hill
Heath
Sewage Wks
Weston
Weston Point
Docks
Chemical Wks
Weaver Sluices
Power Sta
Sch
Wind direction
multimap

Comments for meeting with Halton Borough Council on 21.7.07

Prof. John Dearden

Stack height

The two software programs used to model stack emission dispersion (ADMS and AERMOD) give different results, but they both predict that the presence of hilly terrain adjacent to the stack has no effect whatsoever on pollution levels, for a 105 metre stack height. This appears to me to be a strange prediction. It presumably appeared strange to Vale Royal Borough Council also, since they have called for an independent assessment of pollution from the EfW facility. A technical adviser from Cambridge Environmental Research Consultants (the developers of the ADMS software) also agreed with me on the telephone on 21.6.07 that it was unexpected.

Moreover recent analysis of Government infant mortality statistics has shown that, around virtually every large waste incinerator in the country, infant deaths are much higher downwind than upwind. Three examples, from Ryan and van Steenis, using 2003-2005 statistics, are:

Incinerator	Upwind deaths per 1000 live births	Downwind deaths per 1000 live births
Edmonton (London)	2.5	10.5
Cheylesmore (Coventry)	3.2	8.2
Kirklees (Yorkshire)	3.5	9.4

Also, in "leafy middle-class areas" the same pattern emerges. Downwind of the Colnbrook incinerator near Slough, infant mortality rates are about three times the national average.

Particulate emissions

The Ineos Human Health Risk Assessment (HHRA) ignores the contribution to toxicity of particulate emissions from the EfW facility. It is now increasingly being recognised that fine particulates (PM2.5 and below) are very dangerous (because they are drawn deep into the lung and can enter cells and disrupt cell signalling), and can cause a range of both short-term and long-term health problems. Fine and (especially) very fine (PM0.1 and below) particulates cannot be filtered out, even in modern incinerators, and thus pose the greatest risk. Of course, particulates arise from other sources as well, but the EfW facility would add considerably to particulate emissions in the area. It should be noted that in this country there is no requirement to measure particulates smaller than PM10 (10 microns in diameter), so the risks are not quantifiable.

HHRA errors concerning predicted health risks from the EfW facility

1. *Risks to breast-fed babies.* The HHRA claims (p. 33) that the USEPA (United States Environmental Protection Agency) target level for infant intake of dioxin (as 2,3,7,8-TCDD TEQ) is 50 $pg.kg^{-1}.day^{-1}$. This figure is incorrect; I

have consulted with Dr. Dwain Winter of the USEPA, and two Dutch experts in dioxin toxicity, Prof. Janna Koppe and Prof. Gavin ten Tusscher, and all of them have told me that there is no such figure. The actual intake can be as high as 50 $pg.kg^{-1}.day^{-1}$, because there can be high concentrations of dioxins in breast-milk. The USEPA uses a target level for adults (who are much less susceptible than are infants) of about 0.001 $pg.kg^{-1}.day^{-1}$, although the WHO uses a figure of 1-4 $pg.kg^{-1}.day^{-1}$.

(Note: a picogram (pg) is one million millionth of a gram, that is, 0.000000000001 g. This gives some indication of the extremely high toxicity of dioxins. The units $pg.kg^{-1}.day^{-1}$ mean picograms of dioxin per kilogram of body weight per day).

Furthermore, the HHRA ignores the uptake of dioxins by unborn babies, which is considered by some experts to be greater than that from mother's milk. The concern is that dioxins, which are among the most toxic of all chemicals, have much greater effects on foetuses and infants than on adults. This fact probably accounts for at least some of the high mortality rates found around incinerators.

2. *Acceptable cancer risk from the EfW facility*

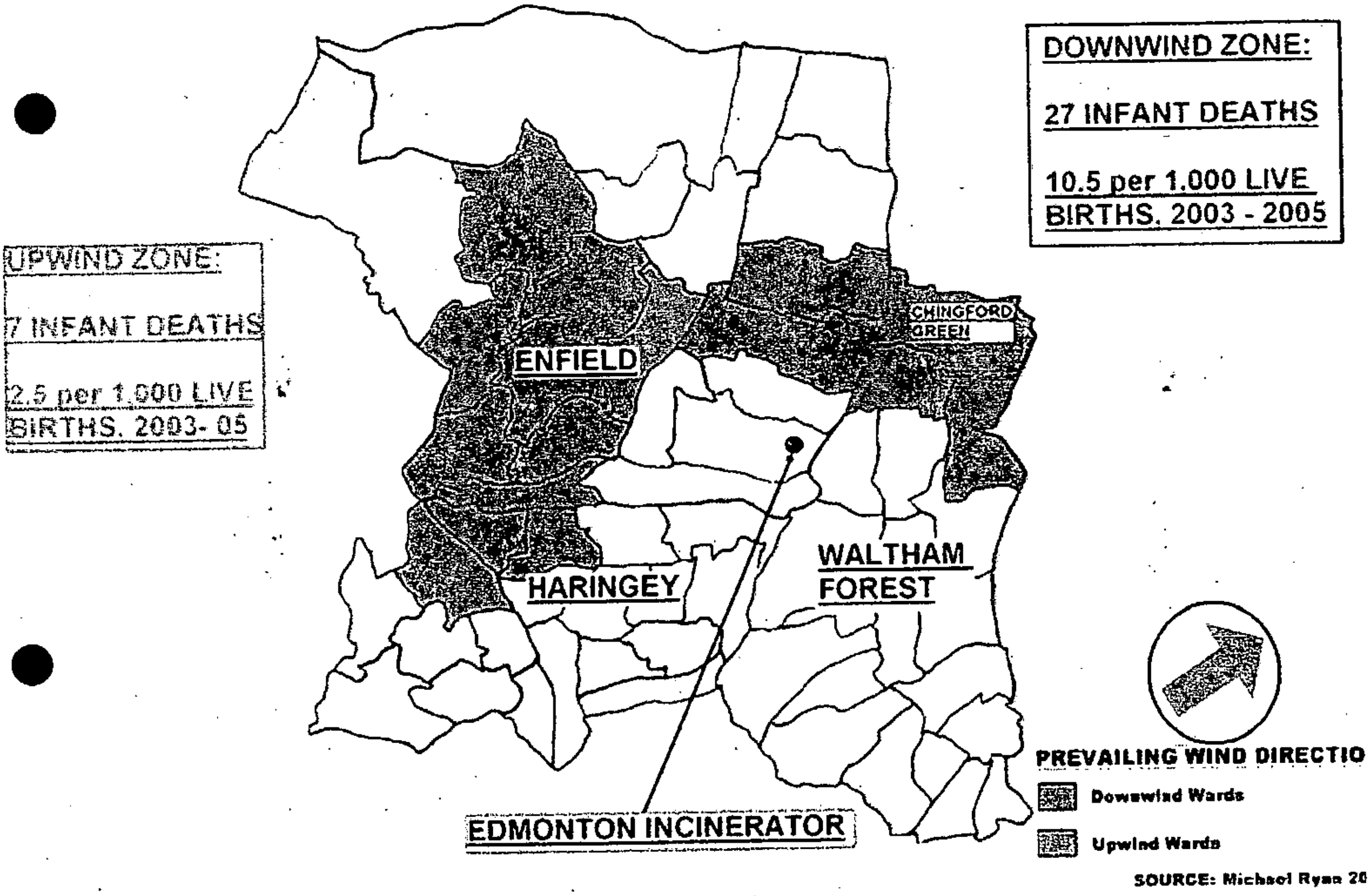
The HHRA appears to indicate (p. 25) that an acceptable risk of cancer from the EfW facility is 1 in 100,000. In fact, the USEPA recommended acceptable cancer risk in 1 in 1,000,000 (1 in a million). On that basis, the data given in Table 3.2 of the HHRA show that, for 23 of the 37 resident receptors at various locations around the area, the predicted risk of cancer is greater than 1 in a million.

This figure is only for the risk from the EfW facility, and does not include existing risks from other pollutants. It follows that the proposed EfW facility will raise the risk of cancer in the area to an unacceptably high level.

EDMONTONAREAMAP . JPG

BOROUGHS OF ENFIELD. HARINGEY& WALTHAM FOREST WARD MAP

EDMONTON INCINERATOR AND INFANT DEATHS . 2003 - 2005



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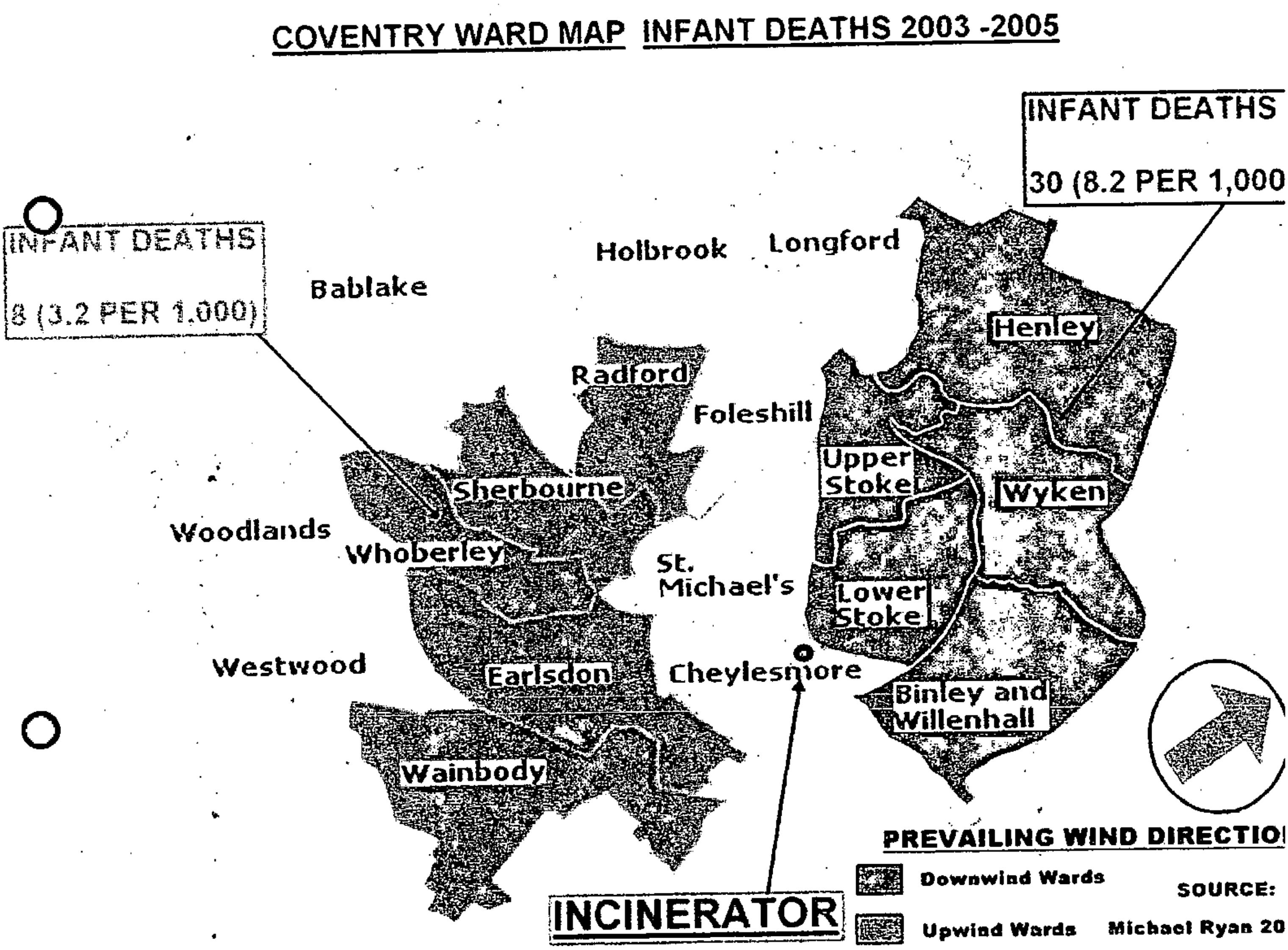

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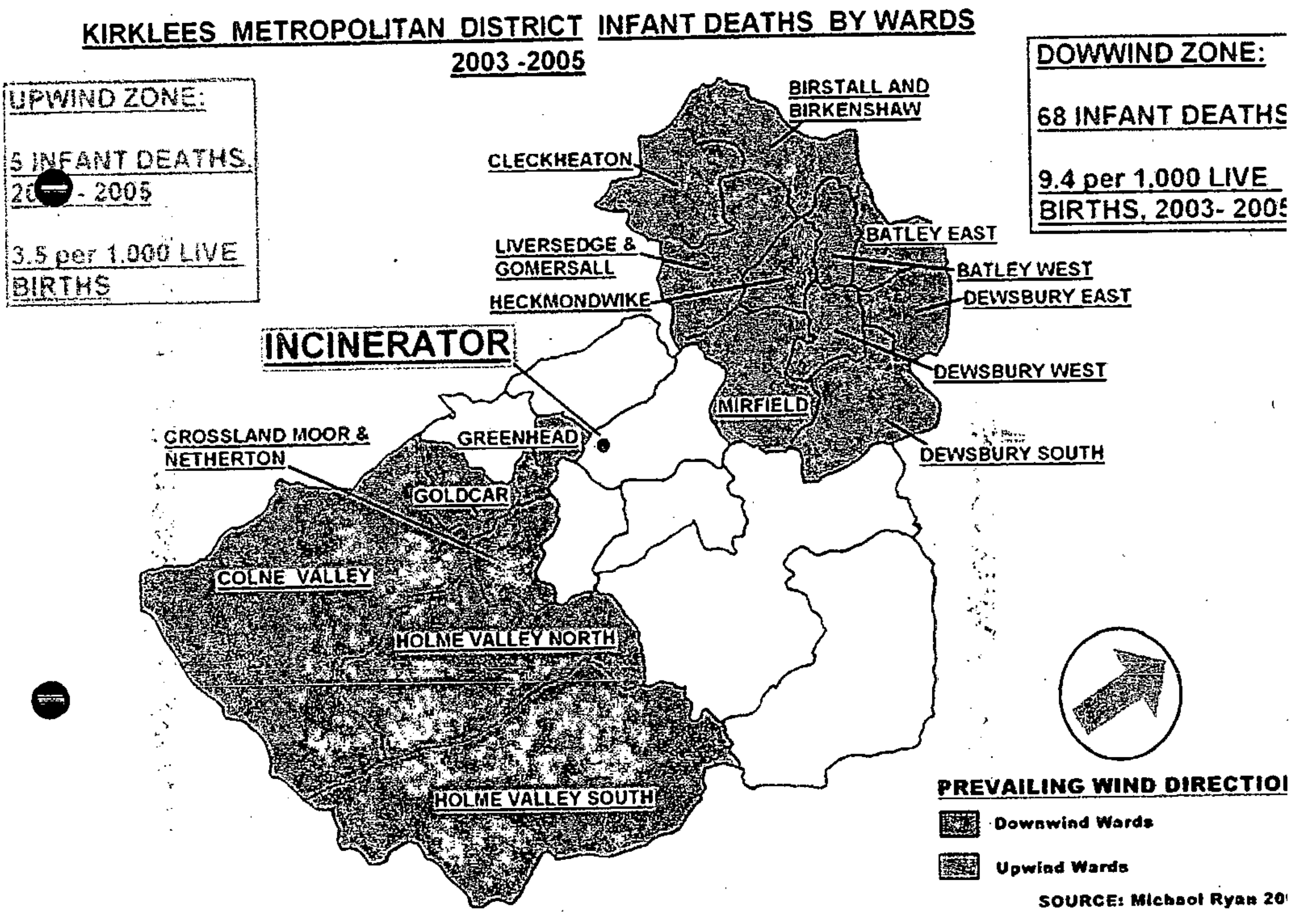

RecC 10/07/07

Halton Action Group Against The Incinerator

40 Royden Avenue
Runcorn
Cheshire
WA7 4SP
09/07/07

Mr P Watts
Operational Director
Environmental and Regulatory Services
Rutland House, Halton Lea
Runcorn, WA7 2GW

RPS/Ineos responses of April 2007

Dear Mr Watts

I am writing to you with regard to the above documents, kindly forwarded by Andrew Plant, following our meeting with you. After due consideration we have concluded that they do not, in any way, address satisfactorily the issues we have identified in our Statement of Concerns and in our recent meetings with Councillors and yourselves.

I enclose a copy of Professor Dearden's 'Comments on RPS Response to Report by Qstar Consulting' which identifies eleven specific continuing concerns, including, inter alia, the failure to acknowledge the emissions of the unregulated fine and ultra fine particles and their effects on health and the unresolved saga of the chimney stack height. The Action Group continues to believe that independent expert opinion should be sought and shares Professor Dearden's concern that the problems he has identified have still to be satisfactorily addressed.

I also enclose a copy of Dr John Beacham's comments on the 'Energy from Waste, Runcorn (response to HBC from RPS/Ineos, April 2007) which again, confirms that the issues we have raised in relation to the location of the incinerator, the stack height, the nature, specification, variability, quality control and sources of the proposed fuel, the logistics of the incineration process, start up and shutdown or malfunction, the nature of the emissions and the specification of the incinerator itself, still require clarification. In relation to the adequacy of any abatement equipment, we would again emphasise that bag filters will not prevent the emission of the most dangerous fine and ultra fine particulates. I also note that the Water Cooled Moving Grate (WCMG) technology with bag filters is the preferred technology. This is exactly the same technology used in the Luvella incinerator 20 years ago, so one is bound to ask, how can this be classed as a 'modern' incinerator?

Reference is made to a 'similar' incinerator in Cologne but no details have been provided as to its specification and history, or to other important relevant factors such as density of population, terrain, wind direction, the nature and specification of the 'fuel' etc. in a country with a different recycling history as compared with that of the U.K.

We continue to share Dr Beacham's concerns regarding the transportation of the toxic waste and its dumping at Randle Island and RPS/Ineos estimates of traffic movements by train and road, congestion and increased pollution in what is already a heavily polluted area. In particular we deplore RPS/Ineos's failure to acknowledge the detrimental effect the incinerator will have on the lives of a large number of people and their visual environment.

In addition we share Professor Dearden's concerns (Para 5) that at no time have RPS/Ineos acknowledged the effects of the perceived threat, shared by residents, to their health and quality of life posed by the proposed incinerator.

Yours sincerely

Ken Green

Sir Kenneth Green

Chairman

Copy ; Andrew Plant
Environmental and Regulatory Services
Rutland House
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p.s. Please also find enclosed a press release which must be a major cause for concern in suggesting that agreements have been reached prior to decisions related to the Ineos proposal and thereby pre-empting HBC's consideration of this incinerator. I welcome your comments.

Comments on RPS 'Response to Report by QSTAR Consulting'

Prof. J.C. Dearden
QSTAR Consulting

Following my February 2007 "Report on 'Human Health Risk Assessment', part of a planning application by INEOS Chlor for an Energy from Waste project on the INEOS Chlor chemical site at Runcorn, Cheshire", RPS have submitted a response. I give below my comments on that response.

1. I commented that the Human Health Risk Assessment (HHRA) failed to recognise that fine particles *per se* are dangerous. The RPS response does not deny this, and refers to a number of scientific studies that confirm the health risks of fine particulates. However, the RPS response restricts itself to commenting on PM2.5, whereas I specifically drew attention to ultrafine particles such as PM0.1, which are much more dangerous than PM2.5, both because they are drawn very deeply into the lungs and can penetrate systemically, and because for a given weight concentration they have a much greater surface area on which toxic chemicals can be adsorbed, compared with PM2.5 and PM10. It is virtually impossible to filter out PM0.1, because filters would have to be so fine that they would seriously impede the flow of emissions from the stack. Hence RPS have not answered my criticism of the HHRA's neglect of the dangers of ultrafine particulates.
2. I commented that the HHRA assumed that the only source of emissions would be the stack. Page 15 of the HHRA states that: "For the purposes of assessing the effect of the EfW facility, the stack is assumed to be the only source of emission". In fact, as pointed out in the RPS response, the Environmental Statement gives details of how potential vehicular emissions were assessed. Hence the HHRA was incorrect, and thus misleading.
3. I commented that the HHRA ignored the toxic effects of thallium and vanadium, and did not even mention the risks from polybrominated diphenyl ethers (PBDEs), which are widely used fire retardant agents. The RPS response has taken my criticisms on board, and gives estimates for thallium and vanadium toxicity. These appear to be relatively quite low, which is reassuring, but that information should have been in the HHRA. I would also comment that when Ince B power station was burning Orimulsion, which contains vanadium, much concern was expressed locally about possible vanadium toxicity. In connection with PBDE toxicity, the RPS response has again taken my criticisms on board, and seeks to give reassurance about possible toxicity. I have to say that I am not entirely convinced by what they say, partly because PBDEs are relatively very new toxicants and their toxicities have not been fully evaluated. Much concern has been expressed about PBDE toxicity in the scientific literature. Whilst the RPS response to my report has sought to correct the original omissions of the HHRA, the fact remains that these matters should have been dealt with in the HHRA.

4. I criticised the fact that no sites within Frodsham town or Helsby village were considered in the HHRA. The RPS response claims that HHRA receptors were chosen on the basis of representing key vulnerable population centres (for example, local schools and health clinics). There is a very large comprehensive school (some 1400 pupils), two primary schools and a health centre in Helsby, and there are two nursing homes for frail elderly people in Helsby. Frodsham has a population about twice that of Helsby, and also has a number of schools and nursing homes. There is therefore no excuse for not considering receptors within Helsby and Frodsham. I challenge the statement in the RPS response that their modelling "incorporated receptors representing the areas of Frodsham town and Helsby village". Where are those receptors?
5. I commented that the HHRA failed to acknowledge the existence of perceived threat from a plant of this nature. The RPS response fails totally to respond adequately to my comments. There is much published work on the stresses and health effects brought about by perceived threat, and this was highlighted in the Primary Care Trust report on the possible health effects of the proposed Peel incinerator on Ince Marshes. The HHRA was seriously at fault in not drawing attention to this.
6. I commented that it was not clear from the HHRA whether, in the dispersion modelling studies, the nature of the Runcorn terrain was adequately taken into account. That statement is still valid, and the HHRA was at fault in not explaining how the nature of the terrain was taken into account. The Air Quality Assessment Appendix 10.1 addressed the nature of the terrain; Two modelling packages, ADMS and AERMOD, were used for the dispersion modelling. Remarkably, although Runcorn rises quite steeply immediately behind the proposed EfW plant site, both models predicted that the presence of the hill would have no effect whatsoever on the dispersion of pollutants from a 105 metre stack (although the numerical values for pollutant concentrations were quite different, by a factor of two, for the two modelling packages). This result appeared to me to be so strange that I contacted Cambridge Environmental Research Consultants, the developers of the ADMS model, to ask for their view; their comment was that the result appeared very strange to them also. At the very least, therefore, there needs to be an independent reassessment of the dispersion modelling, including whether the arbitrary limit of 105 metres placed on the stack height by the proximity of Liverpool John Lennon Airport is unduly restrictive.
7. I commented that the HHRA assumes that above-ground produce is protected within an outer covering, so that root uptake is the primary mechanism through which above-ground protected produce becomes contaminated. I accept that RPS did consider non-protected above-ground produce, but my comment above is still valid. The HHRA ignored the fact that some above-ground protected produce is eaten with its protective sheath, and thus any toxicants sorbed on the sheath are also ingested. Examples of such produce are some peas and beans that are eaten with their pods, and maize grown for cattle-feed.
8. I commented that the HHRA used an erroneous intake target level (which they claimed was a USEPA target level) for dioxins of 50 pg/kg bw-day for infant exposure through breast milk, thereby incorrectly claiming that the estimated

daily intakes are all well below the target level. This is correct. The USEPA (United States Environmental Protection Agency) has no target level for intake of dioxins by infants. The RPS response gives many facts and figures to try to justify what was stated in the HHRA. However, they are confusing target level (by which is meant an acceptable level with minimal risk) and actual intake. I fully accept that intake of dioxins by breast-fed babies can be of the order of 50 pg/kg bw-day, but this is much too high. The argument that is often used to claim that such a level is acceptable is that breast-feeding is for only a short time (e.g. 9 months), and that infants grow very quickly, thereby "diluting" the body burden of dioxins. This argument is invalid, because recent research (some of which I cited in my February 2007 report) has shown that infant exposure to dioxins can have serious and long-lasting effects on development. Furthermore, I pointed out that exposure of the foetus in the womb (by uptake of dioxins present in the mother's body) has been shown to be as risky as (if not more risky than) exposure through breast-milk. Both the HHRA and the RPS response totally ignored the risk to foetuses from dioxins.

9. I commented that the HHRA incorrectly claimed that all estimated carcinogenic risks were significantly below the target level of 1 in 100,000, and also used an incorrect target level. The RPS response claims that the target level of 1 in 100,000 is for individual toxicants, and is not for total risk. However, on page 28 of the HHRA it is stated that total cancer risks given in Table 3.2 "are significantly below the target level... of 1E-5 (1 in 100,000) for... cancer risk". It is quite clear from that statement that RPS used the 1 in 100,000 target level to refer to total cancer risks, and not those from individual toxicants. The RPS response also states that the USEPA target level of 1 in 1 million is a lifetime target level, whereas the figure of 1 in 100,000 that they used is an annual figure. However, on page 25 of the HHRA it is stated that "a risk of 1 x 10^{-5} is interpreted to mean that an individual has up to a one in 100,000 chance of developing cancer *during their lifetime* (my italics) from the evaluated exposure". Clearly, therefore, the HHRA was using the figure of 1 in 100,000 as a lifetime target level, and not as an annual target level, as the RPS response claims. It should also be pointed out that the figures given in the HHRA relate only to predicted emissions from the proposed EfW plant, and take no account of existing cancer risks in the area. It has very recently been reported that Halton has the highest mortality from early cancer in the whole country. It therefore seems to me unwise, to say the least, deliberately to impose yet more cancer risk on the population of Halton.

10. I commented that the presentation of some numerical and other information in the HHRA is unclear. The RPS response accepts this, and states that a glossary of acronyms and units will be provided. I disagree with the RPS statement that "none of the units are (*sic*) expressed incorrectly in the (HHRA)". For example, on page 12 of the HHRA it is stated that the units of normalised flow rate are $Nm^{-3}S^{-1}$. This should be $Nm^{3}S^{-1}$, i.e. normalised cubic metres per second.

11. The RPS response has failed to respond to point 12 in my report, dealing with estimation of Nox levels.

Energy from Waste, Runcorn
Response to HBC from RPS/Ineos (April 2007)

1. Introduction

The responses are to questions from HBC (dated 22 February 2007) before the residents/action group had any knowledge and, therefore, do not particularly address the current concerns. These notes are my interpretation of the information supplied.

2. Project

The technology has been fixed as Water-Cooled Moving Grate (WCMG) boilers. However, there is no real new information on the fuel production and its quality, except for the following:

- Phase 1 375,000t.pa (275,000t.pa from Manchester sponsored plant delivered by 5 trains per day, and the rest from somewhere else by road).
- Plant commissioned in 2011, one year after the Manchester waste plant.
- The traffic increase on the bridge appears small in numbers, but there is no information on its effect on congestion (i.e. normal expected traffic levels in 2011, and frequency and length of delays).
- There is no new information on the quality of the fuel other than "it will be reasonably homogeneous and it will be the responsibility of the supplier".
- The fuel is described only by its calorific content, which is stated to be variable and not completely known.
- They plan to check fuel by its calorific content and by analysing the flue gas for Cl content (after the event). There is no information on heavy metals.
- There is no new information on startup/shutdown or maloperation.
- They still say that they may use other unspecified fuel albeit with approval from the Environmental Agency.

3. Visual Impact

All concerns on visual impact are effectively dismissed (cavalierly in my opinion).

4. New Pollution

- There are some details of possible ash results.

Bottom	191,000t.pa
Fly ash	21,000t.pa
Flue Gas treated residues	54,000t.pa
	266,000 t.pa to Randle Tip

A lifetime of 28 years for Randle is stated.

- There is no new information on groundwater contamination which remains unknown.

- There is a lot of information by modelling on possible downstream effects and they say that "terrain data has been taken into account". However this cannot be and the effects of the escarpment remains unknown.

- There is no new information about the stack height, other than that based on the discredited modelling (my view!). 105m was chosen, (in my opinion) to be as high as the airport approach approval would allow.

- They dismiss low frequency noise concerns, but there is no practical data to base this on.

- There is no new information on potential pollutants and their possible effects. They are relying on claiming that they will meet standards set by the Environment Agency (and occasionally tested).

5. **In Summary**

Our claim that this is an experimental process and that downstream pollution and health risks will increase, has not changed by this information.

Similarly our concerns over road/rail movements remain.

It remains surprising that no practical information on the operation of the fuel processing or WCMG technology is provided (from existing plants), to enable an assessment of the actual outcomes of this proposal.

Manchester agrees plan to burn residual waste

03-07-2007

Residual waste from the Manchester region is likely to be burnt at Runcorn in Cheshire under an agreement reached with operators of the Ineos Chlor petro-chemical plant.

Announcing the plan to burn the waste at a new combined heat and power plant for which planning permission is now being sought, it was also revealed by the Greater Manchester Waste Disposal Authority that its signing of a contract with its preferred PFI bidder has been delayed until September.

The disposal authority announced on Friday that it intends to supply solid recovered fuel produced from mechanical biological treatment and anaerobic digestion plants to Ineos Chlor. Annually about 600,000 tonnes of material that cannot be recycled will be taken to five MBT and AD plants in the area.

A planning application has been submitted for a plant to burn Manchester's residual waste at this site in Runcorn

The plants are to be built in Salford, north and south Manchester, Oldham and Stockport under the £320 million PFI contract for which Viridor Waste Management and construction partner Laing are the preferred bidder.

Approval

The decision to try and build a CHP plant at Ineos Chlor is thought to have won support from Defra because the department is concerned that traditional energy from waste plants are not recovering the heat generated even though they create electricity. A planning application has been submitted and will be considered by the Department for Business, Enterprise and Regulatory Reform (formerly the DTI) because it is for a power generation facility.

The speed of approval will depend on whether or not a public inquiry is held - the plant is due to be up and running in 2010. Local consultation is currently underway and concludes next month. Mr Judson noted that the local authorities in the area have the opportunity to have a plant in place much quicker than might have been the case if it was on other sites.

Working out the impact of the CHP plant on the contract with Viridor/Laing is one of the reasons for the delay in the contract, according to Tim Judson, head of procurement for the authority.

Mr Judson, who is on secondment from Defra, explained that the usage of the waste as fuel is very important. "We are working out the role of ROCs - renewable

obligation certificates - and enhanced capital allowances on the financial side of the facility. The exact rules for ROCs and other factors are still a matter of discussion and we need to know precisely what the rules of the game are."

Mr Judson added that part of the delay was also because the consultations now involve Ineos Chlor as well as Viridor/Laing.

Some observers have commented that the delay of the contract award until September could be linked to speculation about the future of Viridor, in case its owner the water utility Pennon Group ever became involved in a sale of some sort. One suggestion was that Manchester wished to make sure the contract was as "watertight as possible". However, Mr Judson said that he could "categorically state" that this was not the reason for the delay.

Government is introducing new financial incentives on renewable energy and we are keen to see some of those benefits flowing to Greater Manchester taxpayers

Cllr Neil Swannick, GMWDA

Cost

With Viridor's highly competitive bid for the contract and also the potential for the sale of renewables certificates from a CHP plant, the waste disposal contract could cost the authority as much as £1 billion less than expected.

Viridor and Laing's price is now understood to have been even below the waste disposal authority's outline business case. Mr Judson confirmed that this was the case although "they were not unique in the bidding process in terms of affordability."

Councillor Neil Swannick, chair of GMWDA, said of the Ineos Chlor proposal: "There is a clear link to jobs in the regional economy, we we can continue to use rail transport, and as a technical solution it fits very well with the Authority's ambitions for an efficient energy solution that makes local use of steam as well as electricity. We have seen a succession of government announcements about action on climate change, security of energy supply and more sustainable waste solutions. I am pleased that locally we are able to quickly give those good intentions a practical edge."

Cllr Swannick added: "We are very keen to see the new facilities in place as quickly as possible. We recognise that government is introducing new financial incentives on renewable energy and we are keen to see some of those benefits flowing to Greater Manchester taxpayers. We expect this total contract cost to be £1 billion less than what we expected to have to pay over 25 years. In that context we can wait a few weeks to dot the 'i's and cross the 't's on the contract".

Related links

Ineos Chlor
Greater Manchester WDA

With the £1 billion reduction, the councillor was referring to cost projections a few years ago of £4 billion for the contract.

Halton Action Group Against The Incinerator

40 Royden Avenue
Runcorn
Cheshire
WA7 4SP
09/07/07

Mr P Watts
Operational Director
Environmental and Regulatory Services
Rutland House, Halton Lea
Runcorn, WA7 2GW

RPS/Ineos responses of April 2007

Dear Mr Watts

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Yours sincerely

Ken Green

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APPENDIX 3

TRANSCRIPT OF THE MEMBERS BRIEFING AND AWARENESS SESSION

21st June, Awareness Raising Session: Transcript.

Start, 6.00pm,

Good evening everybody, for those who have not met me my name's David Parr, Chief Exec here at Halton Council, I've been asked to chair this meeting by Councillor McDermott, the Leader of the Council who unfortunately is away from the Borough today so isn't able to be here, he's asked me to send his apologies and to indicate to you its not lack of interest it's a personal commitment that he has to today, it's a family commitment which he needs to be at.

Just very quickly to explain the procedure that will follow I think everybody will have received an agenda for this evening meeting and I'm hoping to stick to that as closely as we possibly can, I know people have got other appointments this evening and I would like to conclude by 7.30 so that people can get to those other meetings. We've got guests here tonight as well as elected members, guests from Ineos from the Local Residents Group, from the Primary Care Trust and from the Environment Agency and as you will of all of seen from the agenda what we are proposing to do is to have a brief presentation from each of those Groups and then an opportunity for elected members to ask questions of those individual groups and then towards the end of the evening we will have an open forum where everybody will be able to ask a question of whoever they wish to ask a question of. Tonight is not about decision making directly anyway, on this evening its about sharing of information and trying to obtain further information and that will affirm the basis of a transcript that will be placed before the Development Control Committee when they deliberate on this matter on the 31 July. That of course will follow the normal format of the Development Control Committee. It is a special meeting but it will be a public meeting and the normal rules and regulations for the Development Control Committee will apply. That will be a meeting where the press will be able to attend and members of the public will be able to attend. Today is a closed meeting because its about information gathering for elected members. I don't need to say this but I am going to say this! If we could show respect to all the speakers and the politeness that is normally shown within this Council Chamber - I don't have the power and influence of the Mayor Councillor Hodgkinson, but I hope you will respect the opportunity for people to give there case even if you disagree with it and for people to ask questions even if you might disagree with those and indeed the answer. So I'm not going to say anymore I'm going to start the session by inviting Ineos to make a presentation for 15 minutes maximum please perhaps- Chris you might want to introduce yourself and your team in that process.

Ok fine well good evening ladies and gentlemen if I may introduce myself and my team my name is Chris Tane I'm the Chief Executive of Ineos Chlor Vinyls my colleagues here on the front row are Craig Welsh, Louise Calviou and Ian Barlow. Next to him is Gordan Mudge, he's from a company called RPS, they are the Independent Environmental Consultants that prepared the Environmental statement for us. First of all I'd like to thank you for the opportunity to speak to you tonight to explain to you why it is that we are here and why the project that we are proposing is so very important for our business. Really there are two things that I would like to do tonight if I can. First of all just to explain the important of all of this for the Ineos Chlor Vinyls Business here in Halton and then secondly to address some of the

misconceptions about the project we are proposing. If I could just start with a bit of information about our business so as I have mentioned we are Ineos Chlor Vinyls, were headquartered here in Halton, we have about ten sites. We have five manufacturing companies. The products that we make are in the view of national government are vital to UK industry as the products we make are going to medicines, pharmaceuticals, there widely used in hospitals, there going into personal care, soaps, detergents, they purify all the water in the UK. It is estimated that if our site stopped production the water in the UK would be unsafe to drink in a few days, so that maybe gives you some idea of the scale of what we do here and the importance of that to the national economy and to the local economy. Of course what really matters I guess is people. A survey that was done a few years ago calculated that 133 thousand jobs in the UK depend on our site and the products that we produce. Perhaps of more importance and relevance to yourselves tonight we provide 9 thousand jobs in Halton of those 9 thousand, 3 thousand are our own direct employees on the Runcorn site and the other 6 thousand are employees in supplier companies that provide product and services to our business. In terms of your own constituents, about a quarter of those people are actually living here in Halton and hopefully voting for the Councillors and I should mention probably that this project that were proposing will increase the number of jobs in this area.

There will be about 15 new direct jobs created by this project and in the actual construction process and considerably more than that of course, moving to the financial aspects we spend 60 million pounds every year on employees wages and we spend 100 million pounds with suppliers based in the Halton Borough area. In the last 5 years we have invested 400 million pounds on the Runcorn site, if this project goes ahead then in total we will of spend 800 million pounds which to put it in a Halton context is the same as building two new Mersey Crossings, so I think you can see from that that we have a very significant role to play in creating jobs in the Borough and contributing to the prosperity of the Borough. I will say at this point the, over the years we have a had a lot of warm and welcome support from Halton Borough Council and is really the business environment that has been created here that's allowed us to have the confident to invest in the business in the way in which I've just described. We do however need that same support again because the issue that we are now facing is a major threat to our ability to continue to give the jobs to our employees and the prosperity to the Borough in the way that we want to do. Let me try and explain the importance of this to us and the whole issue for us is an issue of energy, an issue cost is critical to our business the best way of looking at that is of our products. 70 percent of the cost of making those products is the cost of energy to put it another way we are the largest single electricity user in the UK, we use about as much of electricity as the city of Liverpool. All of our electricity is currently generated from gas and I am sure all of you in looking at your gas bills over the last couple of years have seen some very big increases going through. What does that means for us at the Runcorn site? 18 months ago I guess was our gas bill went to by 25 million pounds per month and for a period of 6 or 7 months we were loosing millions of pounds per week, we were with in days at one point close to closing the site. As many of you will know if the site has to close down then it's a very very difficult and extremely costly issue to try and re start it. We were generally looking at very severe threat to the future of our business at that point. Following that experience its been absolutely clear in my mind that we have to do something as a business, we must do something to address our dependence on gas. I cannot in

all honesty with the responsibilities I have to my business to my employees and I hope to the local community allow the business to face that threat again in the future and so since that time we have been working hard to try and find ways to reduce the amount of gas that we consume and to get our electricity from a more sustainable, renewable form of fuel and that's what this project from our point of view as a business is all about. Its simply a way of providing a non fossil fuel renewable source of energy on the more predictable more reliable basis so that's why were here and why this represents a significant issue for our business. Let me know turn to the project itself and just to address some of the issues I know are in peoples minds. First of all let me say straight off this is not just another incinerator. This is a quite different technology, this is a quite different type of plant the standards and the controls which apply today as I'll show you in a minute are very very different from where they were 10 years ago. Technology were proposing to use is proven technology, it has a well established track record, its in use throughout Europe, very widely and its been demonstrated that it is a technology that its safe for environment and for people's health. Now obviously we recognise local concerns and we share those local concerns, you know we do employee 3 thousand people living and working in the community so we are clearly as you would expect to a company that has invested 400 million pounds in environmental proven in last few years. We do take our employees safety, employees health and the environmental conditions around our site we take those very seriously indeed so of course when it comes to the issues concerning people, we have researched those issues very thoroughly and I just want to address the two main concerns and try and put them into a perspective. First of all let me talk about dioxins, I think you can see from this graph, this is a graph if you can't see it well which is Total UK Emissions of Dioxins from Waste Burning Plants and you can see that somewhere in the middle of the 1990's things changed very dramatically so of course we understand when people think back and think this is sort of the sort of plant we are trying to build here is the sort of plant that would have been built in the early 19's of course we can understand the concern but the reality is the technology has changed, the law has changed, the standards have changed and the plant were going to build is a plant that as you can see will be producing dioxins at extremely low levels indeed. To put it another way round in this country as you know we have bonfire night the levels of dioxins emitted on that one night from bonfires in the UK is 24 times higher than all of the dioxin emissions from all of this type of plant in the UK for a whole year so I think you can see from that point of view the issues of dioxins is really not as significant issue with the technology and standards that apply today. The second issue that causes a lot of concern I'm sure you've heard a lot about is the issue of fine particulates and we have as you will hear, I'm sure if you want to ask questions later we have studied the fine particulates issue very thoroughly. The issue, the type of particle you will hear referred to is a very fine particle called a PN2.5. I'm not going to bore you with what that means but it refers to a very very small particle size and of course the concern is whether that kind of particle is emitted from this kind of technology at levels that can do harm to peoples health. Well I can tell you that on our estimates even if all of the particles emitted from our plant were all of this very very fine size even under those circumstances, the level of emission will be less than 1 percent of the standard of emissions required by draft European legislation. So again I think when you put that in context what were talking about here is very very low in terms of its effect on environment and people. Of course, Halton residents have go every right to expect that there health and there environment should be looked after and we are confident

that what were proposing here will not significantly affect either of those two things but of course you don't have to take our word for it I mean the fundamental factor of these kind of projects is that the authorities, national government authorities in this case will regulate what we do very very tightly. Indeed, will study our proposals very very thoroughly, will make there own judgements about the effect on health and the environment and if they don't think we come to the acceptable standards we will not get permission to build the plant and equally once we've built the plant if we get permission to do that we will be monitored and regulated extremely tightly by the Environment Agency, by the Council itself and again if we fail to meet the standards the plant will be shut down. So I think when it comes to the confidence that we can have in that process, we feel confident that the residents in Halton and our own employees can be, there concerns can be addressed, they can be sure that they can be protected and there interests will be respected. Maybe I could just quickly talk about where this plant fits into the national waste policy. I'm sure many of you know the UK is the highest, the third highest rate of landfill in Europe, your probably aware that there are all sorts of new laws and regulations coming in which will drive the level of landfill in the UK down very significantly and the way that translates into practice is there will be heavy fines for Councils that aren't able to reduce there landfill volumes very significantly in the future. Its been estimated that for a typical Council the cost per tonne of landfill will rise from about 35 pounds today to 200 pounds a tonne in the future and I'm pretty sure that for Council that if they do face that increasing cost that is going to translate into a rise in Council tax. Of course the right answer to that is recycling and many times its been said that projects such as ours undermine recycling in some way well the fact of the matter is projects such as this are fundamental of a drive to greater and greater recycling. Why do I say that? Well its like this even if, we can persuade residents to recycle as much as they possibly can there will still be about a third of waste which cannot be recycled. That third has either got to be buried in landfill or burnt, our view is that burning it is an environmental advantage,it reduces the amount of green house gas emissions. Burying it is an environmental disadvantage it leaves rubbish in the ground for future generations to cope with so we believe this kind of technology is a fundamental part of the drive to greater recycling and again if you look at the statistics about Countries in Europe where recycling is much more predominant than it is here there is a strong correlation between the amount of recycling and the frequency with which this kind of plant is in operation in those Countries.

Yeah, just to sum up we have been a major contributor to prosperity here in Halton and we want to remain that in the future but to do that we will have to resolve this energy problem that we have faced and we will face again in the future. We cannot afford to delay in doing that it is a life and death issue for our business. The plant were proposing is built to the tightest standards and we believe does not represent a significant impact on the environment or on peoples health, were very grateful for the support you have given us in the past and we hope we can rely on your support on this issue in the future, thank you very much.

David Parr- Ok, I'm going to ask members to indicate if they want to ask questions if you could ask one question in the first instance and if there's more time within this 15 minutes we go onto a second question from individual members. You've seen that there is 20 minutes at the end to try and pick up questions that we might not been able to get through in the 15 minutes but I'm trying to be as fair and equitable to all parties throughout so who would like to ask questions of Ineos.

Councillor Thompson, ask your questions and leave your hands up and I'll make a note while your asking the question.

Could you just, comment on how you determine the actual height of the stack?

Ian Barlow-Right let me answer that its not just based on getting down to the concentration that is required to meet the standards, what is done is the calculations are carried out using sophisticated models, these models are approved by environment agency, there used throughout Europe and America Modelling actually looks at increasing stack height up to quite high amounts and then actually the height of the stack is fixed at where the improvements that your getting in terms of ground level concentrations tail off that is to say when your stack gets higher you see the benefit coming down and then it levels out and the stack height is determined at the point when you get no further significant improvement for increasing the stack height and that results in ground level concentrations well below the standards that are set for the individual components.

Councillor Bradshaw.

Thank you David, my questions about that actual residual waste that's left over from your processes, I didn't see any comment about it in your presentation on the environmental waste summary but according to other figures there's got to something like 155 thousand tonnes of residual waste of a rather nasty type of substance that is going to landfill here in this Borough, so all I can see is a sort of mountain growing on Randles Island of toxic material? I'm wondering what sort of, what your answer is to that and what sort of measures your taking to stop it leaking into the sub ground and into the river?

Ian Barlow-Me again, yeah, let me start by clarifying the actual amounts of waste to come from the plant, yes there is some, there is two types of ash from the plant, one is called bottom ash and we expect about 165 tonnes a year of that, that ash can actually be recycled, its not hazardous, it goes into building aggregates and things like that, there is a smaller proportion of what is called fly ash which is a very fine ash and also the residuals from the process. Because there is flowing systems on the back of the plant, when we initially did the environmental statement we weren't clear on exactly the details of technology in terms of the amount of this ash that will be produced so there's quite a wide range. We've now selected our technology and we expect about 75 thousand tonnes a year of that ash, still a significant amount I accept but that means about 10 percent of the amount of fuel going into the plant ends up as landfill as against the whole of it if you didn't have energy from waste. The material is classed as hazardous, it contains amounts of heavy metals that have been removed from the waste and very small amounts of dioxins, ok and therefore it has to go to a hazardous land facility such as Randle. Now in order to dispose of it at

Randle we have to agree with the Environment Agency how it will be handled and re take tests and everything will be done like that before the permission is finally granted so that we are certain that there is no question of it actually being able to leak down into the ground or anything like that. I mean Randle has been picked because picked because it is a suitable site for hazardous waste and it is very carefully regulated by the Environment Agency.

Possibly follow up later Councillor Bradshaw.

Councillor Lowe, Alan Lowe.

I've read your report and on your submission. I've read it quite carefully but there seems to be a number of things that have been omitted shall I say for example you've omitted to mention any of,houses backing onto the railway lines. Would you consider that to be a mistake because there are houses that butt up to the railway lines, would that be a mistake?

Ian Barlow-Yeah. I mean environmental statement is a large and complex document and yes we would accept that were some houses on the railway line towards Runcorn station that we did not, we weren't aware off when we did the recent environmental statement. Following the request from Halton Council we are now actually doing the noise assessment for that area and if at the completion of that there is a noise issue we will look at mitigation to reduce that but yes we'll accept that was an error and an oversight in the environmental statement, we apologise.

What I'm saying is that

There was that one, the houses all around the actual development , which were close to the railway track, were all included in the noise assessments, ok.

DP- Councillor Blackmore, Sue Blackmore.

Thank you, have you any future plans to build a treatment plant on this site, this site as well?

IB- no, I mean our interest is purely in the energy so our interest is only in having an energy plant we have no interest in any of the sort of waste treatment, we are not a waste treatment company so no we have no intention to build any sort of waste treatment on our site ok.

Councillor Mrs Lowe.

Yes, its practically the same as the first question that was asked but just for me to see it clearly. When this machine measures it says here taking into account local building heights how does that take into account the sudden rise of ground level of houses on Runcorn Hill and its taking that height the difference from the ground where the stack would be built to the height of the houses?

IB-Short answer is yes it does, these models are very sophisticated, a very detailed map of the terrain of all the ground including the hills and everything like that is input

into the model and that is fully assessed in the coming up with the conclusion of the height of the stack. The reference to local building height is actually to do with the height of the building very close to the stack in fact the main thing that influences the height of the stack is actually the height of the building which is the main boiler plant actually right next to the stack because of the way the wind blows across that and that's what that reference was but the modelling includes all of the terrain it includes the Runcorn Hill, it includes the Helsby Hill.

Yes, yes all of that is allowed for.

Ok Councillor Ratcliffe.

My question is on health. What medicals do you intend to give to your personnel and what is the screening you'd be looking for, is it 1 monthly, 6 monthly, 12 monthly and what are you particularly looking for when they have this medical i.e. liver, kidney, etc because if you are given this medical to the people then maybe the residents deserve the same medical.

IB- I think as the environmental statement of the health assessment says, we do not think there is any risk to health from this project and there is no intention no need to do any additional health monitoring of any of our personnel in relation to this project.

Chris Inch.

Thanks, your proposal relies on a supply of waste for energy, do you have any knowledge of where that's coming from and does that rely on Halton's supply?

IB- Ok at this stage we have no contracts in place so we have no fuel supply at the moment but its fair to say the plant has been sized to take the fuel that we produce from Halton, Merseyside, from Cheshire and from Manchester and if we were successful with all of those contracts that's the capacity of the plant but at this point in time we obviously have no contracts yet. There were very strict public procurement rules that all authorities have to go through to award those contracts, Merseyside is due, which Halton is partners with, due to kick off its process shortly and we will be tendering for that, we have no idea whether we will be successful or not, we have already pre qualified for the Cheshire contract and we are in discussions with Manchester at the moment and they are the only three parties we are talking to.

Councillor Lowe

Thank you, in the presentation you alluded to the fact that the technologies are tried and tested and is widely used throughout Europe, where are the nearest facilities that are similar to this and how are they performing environmentally? Have we got anything or have you anything available that can show us the impact that there having at the moment?

Louise Calviou - I can comment on where plants are, I mean for example the city of Cologne actually built a plant in about 2001 that is running that is a similar size to this, it treats about 550,000 tonnes a year of solid recovered fuel and as far as I am aware we have in doing all of the health assessments and impact assessments, all of the data from those sorts of plants have been looked at but there are plants operational in Belgium, Germany, Scandanavia, there are several of them. The one in Cologne is the one I've got the most details on that's a very similar size to this.

Councillor Nordahl

Yes, I did have several questions, some of them have already been answered but not clearly, especially where the process of the fuel was going to take place, making the fuel. If it's in Halton it would be a disaster for Halton, if the processing of the fuel. But my question which hasn't been asked yet is, is there really a market big enough to take the ash you're planning to use most of the waste for, is the market big enough to take those building material?

IB -Erm the short answer is yes, we have already had preliminary discussions with companies that take this material and then convert it and recycle it in aggregates and things like that, and yes the market is there for this material.

DP-I have one more question in this session, have I missed anybody

Councillor Bryant

The waste you're bringing in how are you going to secure the safety of it, before it comes in, before we burn it, who is responsible for actually cleaning this stuff before we actually incinerate it, if it goes that far? If you are going to bring it from all over everywhere to burn in our borough, how safe is it? Because, I'm not convinced with your facts that it is safe!

IB- Let me start by just pointing out we are not bringing in waste, we are not bringing in black bin bags or anything like that. We are bringing in the fuel that has already been through what is called an MBT process. Mechanical Biological Treatment process, where further recycling is done and the stuff is composted already. So the material coming in to us is a refined form of waste, it's fairly dry, it will be coming in sealed containers, either by rail as containers or by lorries. Those containers are then taken into what's called a tipping hall, which is an enclosed building which is kept under suction all the time for the air going to the boilers and it is within there. Fine, so I mean the material does not normally smell anyway because it has already been treated and it is totally enclosed, so there is no question of the fuel being blown around or anything like that. I understand it is a fuel, it's not waste, it's not black bin bags, this plant cannot burn those.

And just to be absolutely clear on this question on whether we are going to have a waste treatment facility here, absolutely not, just to be absolutely clear on that point. If it wasn't made clear before. The only facility we are proposing here is one that burns the fuel not that treats the waste.

DP-Councillor McInerney-. Final question in this round.

Well just referring back to the last question really. I mean I was in Fiddlers Ferry Power Station and you're talking about 75,00 tonnes of fly ash, they're taking out 17 million tonnes of ash and the question is really, do we need to come in by road? If this gets the go ahead, do you need to come in by road, can't you use a rail import infrastructure? They're putting a new railhead in there to stop the amount of vehicles going back empty because there is no railhead. If you can take it off the roads I think that's another safety point.

IB-Yes and we would fully agree with that. The plant is designed so it can take all the fuel in by rail. We referred earlier to Manchester. We believe that Manchester will be sending all its material by rail, that is what they have said. I think in terms of the other authorities, in the end it's for the authorities to decide how they are going actually transport the material. Now, as all local authorities have requirements around sustainability we will certainly be encouraging them to bring it in by rail. But in the end it is up to the authorities to decide how they are going to transport it and this partly depends on where they put their MBT plants because they need to be near rail facilities and that but we would strongly encourage and we hope that all the authorities go for rail transports in which case we won't need to bring any of the fuel in by road.

DP-OK so if we close that particular section off. Sir Kenneth if you want to bring your people across and I am conscious that we have slipped over a couple of minutes but we'll make those minutes up. You'll get the same amount of time and for Members if any more questions come into people's minds then we can pick those up under the open session at the end.

Good evening ladies and gentlemen my name is Ken Green. I was born 73 years ago in Percival Lane, you've probably heard that mentioned already this evening, like many generations of my family before me. The members of my team tonight are myself and two other speakers who are Mike Stackpool and Maureen Meehan. The other members of our group who are present are Professor John Dearden, Jeff Meehan, Alan Glory and Debbie Hamilton, and two of our members who are absent and are key members of our group who have professional engagements elsewhere are in fact Doctor Simon Lafenny and Doctor John Beecham and they have had a central role in the development of our case. Obviously in fifteen minutes we can only outline our concerns in brief. But they are more fully documented in the paper which we circulated in the last few days which I urge you all to read. We fully support the Council in its plans to develop more sustainable waste disposable solutions thereby reducing the levels of waste going to landfill. But this proposal by Ineos is entirely unrelated to the Borough's waste management policy, we have been told. And it is, therefore, solely motivated by Ineos' commercial interests, and in fact I think Mr Tane confirmed that this evening. It will increase not reduce pollution and waste going to landfill in the borough, and in particular vastly increase the amount of toxic waste dumped here. Now if that's the policy for reducing waste disposal in the borough, then certainly the earth is flat and I'm the man in the moon. This proposal also conflicts with the Council's vision for Halton, as outlined in the Constitution, and

fails to meet the criteria identified in the Unitary Development Plan. This is fundamental, since the Unitary Development Plan clearly states that proposals for waste incineration must meet all the criteria. Our statement of concerns identifies issues where these have not been met. We are totally opposed to the building of a large energy from waste incinerator at Weston Point to provide a regional centre for the disposal of treated waste from across the North West and probably beyond.

This is a densely populated, highly polluted, deprived area with one of the worst health records in the UK, particularly in relation to those medical conditions which have also been linked to incinerators. We can identify in this proposal no opportunities only threats, no advantages or benefits only costs and great risks for Halton residents. We believe that this development could only be detrimental to the borough's image and adversely affect the health and quality of life enjoyed by its residents and its future social and economical development. Throughout this presentation, I would ask you to keep in mind just one fundamental question – why would Halton Borough Council wish to see the largest regional energy from waste incinerator built here in Halton?

Mike Stackpool

Councillors, ladies and gentlemen my name is Mike Stackpool. I'm a Halton resident and a member of the Halton Action Group. I would like to share with you some of the concerns we have about the proposed incinerator at Weston Point. First of all, location. The incinerator would not be built in an isolated industrial area but in the midst of a housing estate. Some of the houses are only 50 metres away from the plant. The proposal also locates in an area which is in conflict with the Unitary Development Plan, the guidelines of which state that an incinerator plant should not be located and I quote "within close proximity to residential areas or other sensitive land uses. In fact this area is one of the most densely populated regions in Cheshire, with over 10,000 people living within 2 kilometres of the plant. This also includes three schools, pre schools and a sixth form college. So what are the dangers to these residents and the rest of Halton? Well it is a well established fact that incinerators of this type generate pollutants such as carcinogenic dioxins, acid gases and particulates. All of which threaten the health of people living close to incinerators. Due to the prevailing winds, mainly from the west and the south, the pollutants will be blown both over Runcorn and Widnes. The chimney stack height of the incinerator is proposed to be 105 metres, a height believed to be governed primarily by the aircraft safety requirements of Liverpool Airport. However, if one considers the incinerators at Ince Marsh, for example, the stack height recommended for smoke dispersal there was 100 metres. There are some worrying discrepancies between the stack heights of the Ince incinerator and this one at Weston Point. Firstly, the Ince incinerator was of much smaller capacity than that proposed at Weston Point. Secondly, the residential housing in Weston Point is much closer to the plant. Thirdly, the Ince incinerator was on flat land, whereas the Weston Point incinerator would be in an area of hilly terrain. For example, houses in Higher Runcorn at an elevation of about 80 metres would only be about 40 metres below the top of the stack and, therefore, subject to smoke pollution. It seems illogical, therefore, that the stack on flat land should be 100 metres and yet one in a hilly area is only 105 metres. There is no way that a lay man can challenge this

commuter model derived stack height but if this is such a serious pollution concern that we believe it needs to be checked out by an independent agency.

Second point. I would like to raise some concerns about the size of this incinerator. It will be the largest in the UK and need 850,000 tonnes of waste derived fuel to feed it. However, the Halton waste is only a small fraction of this at 30,000 tonnes. In other words 4% of the total and that is all. The overwhelming of waste will be transported into Halton from Manchester, Merseyside and the whole of the North West and will require 400 heavy goods vehicles per day from five train loads to bring the waste in. The rail is mainly night time transport. It is hard to see how this continuous vast amount of movement of waste into the plant and residue out of the plant cannot cause problems of congestion, noise and pollution to people in the area. As an example, five train loads of fuel, which is ten journeys, will pass within approximately 20 metres of housing along Percival Lane at roof height. This is every day and every night, 365 days a year. How this cannot impinge on the lives of the residents along this track is hard to believe. Regarding the incinerator residue, this will require a fleet of heavy goods vehicles to transport the 155,000 tonnes per year of hazardous incinerator residue through the roads of Runcorn to the dump at Randle Island.

The fly ash residue containing heavy metals and dioxins has the potential for causing air borne pollutions with risks to medical, food and scientific establishments in areas of Astmoor, Manor Park and the Daresbury Science Park. Similarly, the Wigg Island Country Park which is next door to Randle Island, will lose much of its attraction being located so close to the waste dump. To get things in context, the equivalent of 25 years of Halton's toxic waste will be deposited every year at Randle Island. Coming now to monitoring and control. Whilst it is claimed that the plant will be built to standard regulations, regulations do not guarantee safety. Abatement equipment will not prevent the incinerator emitting potentially dangerous fine and ultra fine particles which have been linked to increases in birth defects, respiratory disease and cancers. Present regulations do not require the monitoring control of these fine particles that's under 10 microns but these are now known to be the most dangerous to health, especially to the unborn and infants. Similarly, the requirements for Government monitoring of dioxins is only conducted twice per year. This would lead to concerns regarding the intervening unmonitored periods. Furthermore, there is growing scientific beliefs that there is actually no safe level of dioxins below which cancers cannot be induced. Finally, Halton residents already have one of the country's worst ill health records, they will not thank you if you vote to continue this legacy. We, therefore, urge the Councillors to reject the planning permission for the sake of health and quality of life of the people of Halton. I now hand over to Maureen.

Maureen Meehan

Good evening, my name is Maureen. I speak not only for myself but also for many others who can't be here tonight. I have lived in Runcorn all my life and cannot imagine living anywhere else. My home, which I love, will unfortunately, be one of the closest to the incinerator. I am very aware of all the improvements which have been made in our area and I think it would be a huge backward step to allow this

incinerator. It would undo so much hard work that has already been carried out, both by the Council and local community.

In their application, Ineos Chlor's view of the area is grossly misleading. They appear to deliberately undermine the locality and its wealth of detached and semi-detached properties within close proximity to its boundaries.

I was involved in the fight against the Luvella Incinerator and I, like many others, remember the considerable stress its operation had on the local community. No-one should be subjected to that again. I'm no expert in technical matters but I have read several reports and newspaper articles and there are statements like incinerator fumes in baby death link, waste incinerators cause pollution linked to cancer, health disease, infant mortality and birth defects. Even Halton's Unitary Plan says that incinerators should not be built close to residential areas, why? This frightens me. If every other incinerator of the type envisaged has these disastrous effects on health and particularly on children and the unborn child, what makes the Ineos Incinerator the exception. I tried to gain more understanding about the application so with difficulty I have read as much as I could about it. This did not allay my fears. One thing I particularly noticed was that Ineos claims that up to ten trains a night can pass within yards of our homes and not cause detrimental effects, I couldn't believe that. From the experience of Luvella, I remember the nuisance of ash on our windowsills and cars, the constant noise from its operation 24 hours a day, 7 days a week, and now to add to this we will have trains running and shunting, lorries sounding reversing alarms day and night, plus all the additional traffic to our already busy roads. It will be a nightmare, this can't be denied.

The visual aspects. Ineos say that the area will be landscaped with shrubs but as the main building would be five times higher than my house, I can't imagine which shrubs they intend to use. Halton residents are well aware of the effects from the Fiddlers Ferry Power Station's cooling towers. To put six more within yards of our homes will condemn us to live under a permanent cloud. My garden, which provides me with so much pleasure, would become a noisy, dusty place, cut off from the sunshine and all the while the prospects of knowing that even the air we breathe will be harmful to us. We who live closest will the most affected, but over 10,000 people live within 2 kilometres of the site. Please, for the sake of our and our children's health, please please I urge you to reject this application. Thank you so much for listening to me.

Sir Kenneth Green

If I could just wind-up on behalf of the Action Group. In addition to the deficiencies that we have already heard describe this morning, this evening in the Ineos prospectus, which is what it is. It presents little or no information on a number issues, such as the nature and composition of the processed fuel or of any quality specification, the nature of the emissions, where Halton's waste will be treated and where Ineos will obtain its fuel if the Government's recycling targets, in the first instance of 50%, reduce the overall amount coming in from the North West. It completely ignores the considerable evidence available, well documented, in relation to the health risks to residents living downwind from energy from waste incinerators and fails to recognise residents' perceptions of the adverse effects on their health

and quality of life. Due to its spin doctor's tradition, the environmental statement is bland and disarming, it is difficult to find a page where issues or effects are other minor, minor adverse, neutral, insignificant and so on. All meaningless phrases designed to mollify and disarm the reader. I can assure you from my own experience this would not stand up for very long in any reasonable academic seminar.

As we have indicated if this incinerator is built it will have a profound and detrimental effect on the image of the borough and the lives of its residents. As far as the residents are concerned they do not like this proposal and they will vote with their feet. So consider my original question, why would Halton Borough wish to see the largest energy from waste incinerator in the UK built in Halton and finally, if I can just tell this little anecdote, four weeks ago Doctor Lafenny and I met Professor Viviane Howard, a leading national and international authority on incineration and its effects on health and currently leading a major piece of research into these issues. As we were leaving after being treated to a two hour academic master class on incineration, his final words regarding this proposal were, it's utter madness, it's difficult to think of a worse place in the UK to build a waste incinerator. Now that says it all. Thank you.

Thank you very much.

David Parr

If you want to stay there and we'll take questions from Members. Again we'll take the same approach, if you put your hands up I'll get your names and if Councillor Inch wants to start the question then I won't lose any time, hopefully.

Councillor Inch

You claim in your report that we received that the proposed height of the chimney stack is a matter of serious concern, can you explain why?

Professor Dearden

Thank you, good evening ladies and gentlemen, I'm John Dearden, I'm Professor of Medicinal Chemistry at Liverpool John Moores University and part of my expertise is in (inaudible) toxicology. Let me stress that I have no expertise in calculating stack heights but in looking at the documents provided by Ineos, I was concerned to note that the predicted concentrations at ground level were identical for whether the calculations were done with the absence of Runcorn Hill or the presence of Runcorn Hill. Now I have to say from a layman's point of view, I found that very surprising that the hill apparently made no difference, whatsoever. Now, RBS use two software packages to do their calculations, one called ADMS and one called AERMOD. ADMS is supplied by Cambridge Environmental Research Consultants and I spoke to one of their people this afternoon and they said I found it surprising that their calculations seem to indicate that the presence of the hill made no difference whatsoever to the predicted concentrations. The lady I spoke to said "I find that very surprising too". So I can only conclude that she was concerned, she did ask if she could see the original calculations which of course I haven't got. But I think this

supports the argument that's already been made and which Vale Royal Borough Council have made, that there needs to be an independent assessment of the predicted health risks based on stack heights and so on.

Councillor Murray.

The question I would like to ask is, if the refuse derived fuel is safe, how does the incineration process generate the nasty results that you're concerned about?

Geoff Meehan

Good evening, I'm Geoff Meehan. I'm no expert in anything. However, because of the involvement we had with Luvella, I did have to look very carefully at the time at the combustion process. The fuel as it's being brought in contains carbon atoms from the wood, paper and card which is present in all domestic waste. It also contains and cannot be taken out, plastic. They need the plastic to lift the calorific value of the fuel. Plastic contains chlorine atoms. In the combustion process, if you have chlorine atoms and you have carbon atoms, during the cooling down phase from 600°C to 300°C the carcinogenic forms of dioxins and fumes are formed. That's what turns, what is basically a safe inert fuel, when it comes into the plant, into a position where some of the nasties are trapped in the ash which goes to a toxic landfill, but no abatement process in the world can stop the very fine particles which act as carriers for the dioxins and fumes and will therefore come up the stack and land on all of you.

Councillor McInerney

Right thanks. I'm sure from a residents' point of view, the main worry to them is about their health and you've stated a few times about what it's supposed to do and what it isn't supposed to do and I'm sure Ineos can find as many experts to tell you it won't do anything as you'll find to tell you it will, but I would just be interested to know that in Ineos' presentation they said they've got a place in Cologne and in the back of your document you've got technical information from somebody from the WHO in Bonn and I'm just wondering if you had any information from Bonn or from Cologne plants as to what its supposed to have done to the health of those people, it's been there since 2001, and it would be of interest mainly for yourselves and for Ineos to come up with an answer to that. Thanks.

Geoff Meehan

The plant itself in Cologne we have no particular information for. If you look in the back of the report we have circulated it's the World Health Organisation and it's a generalisation, it's a concern that they are raising about fine particulate matter and the health risks that that causes. It's a generalised thing, it's not isolated to one plant.

Councillor ?

You have particularly emphasised the health risk which had been linked with incinerators, yet Ineos Chlor claim tonight that it is low and acceptable. Acceptable to who and who am I to believe?

Professor Dearden

Mention has already been of particulate emissions and the risks that they pose. I would stress that the greatest concern is not about PM 2.5 as was mentioned earlier, but in fact about PM1 or PM0.1 because these very fine particles can be drawn deep into the lungs, they have a much greatest surface area than the larger particles for a given weight, they can therefore absorb a lot more toxins, take them down into the lungs, they can be taken into the body and all sorts of problems such as destruction cell signalling can occur. There are also concerns that I have about the figures in the Human Health Risk Assessment document that was submitted with the application, for example, it indicates that an acceptable cancer risk is 1 in 100,000 and quotes that as being a figure derived from the US Environmental Protection Agency. In fact, that is incorrect, the US Environmental Protection Agency figure is 1 in 1,000,000 and that is a de minimis figure, and, therefore if you take that figure of 1 in 1,000,000 cancer risk as being acceptable 23 of the 37 receptor points, which are detailed in the Human Health Risk Assessment document, are in fact above that figure of 1 in 1,000,000, in other words on Ineos' own figures there is a significant cancer risk from this plant alone, and that ignores all the existing pollution that we have already, so their own document in my view indicates that it is an unacceptably high risk. Can I mention briefly one other thing. Questions have been asked about other plants, like Cologne and so on, and it was also mentioned the very statement that this proposed plant will be using the latest technology and so on. Can I very briefly show you some figures which have just come out. The Government has released fairly recently figures showing infant mortality for fairly small districts throughout the whole country. These have been examined in detail for infant mortality around existing incinerators. These, by the way, are for 2003/2005. They are not old data so they are existing incinerators, presumably using modern technology. Let me just show you very briefly three. Here is one in Edmonton, the incinerator is located here the prevailing wind is in this direction, the areas marked green have got an infant mortality rate of 2.5 per 1,000 live births. The area marked red, which is downwind of the incinerator, has an infant death more than four times that, 10.5 per 1,000 live births. Another one, this of the many incinerators I'll just mention three. This is near Coventry. Up wind infant deaths mortality 3.2 per 1,000 live births, downwind 8.2 per 1,000 live births. And finally one in Yorkshire in Kirklees, upwind 3.5 deaths per 1,000 live births, downwind 9.4. So the facts from the Government's own figures indicate that around incinerators, and especially downwind, there is increased infant mortality.

David Parr

Councillor Peter Blackmore and then finally Councillor Howard.

Councillor Blackmore

If the proposed incinerator operates to the standards required would that mean that it is safe?

Mike Stackpool

Regulations don't guarantee safety. They can put whatever regulations they like on it, if there are accidents people will get injured. So just building to standard regulations, and certainly some of the regulations are quite slack. When we are talking about dioxins, it's only twice per year that they are going to be actually monitoring this thing. What happens in the intervening times, that is just not acceptable. It should be continuous monitoring or not at all and in fact we are very worried about the two periods per year that they are monitored by the Government Agencies because I believe the incinerator plant operators are given advance warning when they are going to have a check on their emissions so on those days it's not surprising they will probably pass them. So regulations don't guarantee safety and as Professor Deardon was just saying, the fine particulates less than say 2 microns or even 1 micron, the regulations don't even cover monitoring those, they stop at 10 microns and so the regulations, maybe they will increase in the future, but at the moment when the plant's being running they will be 10 microns above only, so that regulation wouldn't catch the dangerous ones.

David Parr

Councillor Howard to finish the questions

Councillor Howard

As a number of the speakers have said, I have lived in the town all my life, as in Widnes and now in Runcorn. I have also earned my living in the chemical industry all my life. I accept that I live in an area which has a high intensity of process industries. I might prefer to live Bermuda but I don't. I certainly don't want to live in an area that's unsafe. I certainly am impressed by one of the points that have been made by the Action Group tonight, in terms of the, not of the health effects because I really am not convinced by what either the Action Group have said and I've read the document that the Action Group sent, or what Ineos have said on that. I think I will leave that to the real experts who will have a heck of a job in making that decision. But I am impressed by the comments about the impact on the people in the area with the transport, so I would be very interested to know what Ineos intend to do about that. But my question to the Action Group, is, have you in making your comments, because what your colleague just said about regulations and what he said earlier, really bothered me. Because if we can't rely on regulations we have got nothing left, have you taken into account the fact that this isn't (inaudible) this is Runcorn. It doesn't mean that Runcorn people don't deserve the best but it does mean that we will have the best surely in a somewhat different environment than might be the case in other parts of the country.

There is now a whole speech that cannot be heard on the tape

David Parr

We are going to move on now to Fiona Johnstone, the Director of Public Health from the Primary Care Trust.

I think we will be finishing near to 7 o'clock in terms of following the timetable that is in front of you. I think it is very important that the time is important and well spent tonight. I do appreciate some people have other meetings they have to go to and please if you need to do that leave as appropriate.

Fiona over to you.

Fiona Johnstone

Can I introduce who I have with me so you are clear who is coming to the presentation. On my right is Helen Castles who is from the Environmental Public Health Team at John Moores University and on her right is Doctor Alex Stewart who is from the Health Protection Agency and I have sought both their expert advice in coming to the conclusions that I am going to present here this evening. Can I thank you for the opportunity to actually join in the discussion around this. I think clearly what I would like to do this evening is perhaps provide you with an understanding of the role of the Primary Care Trust and the key messages that have come out of the report that I have commissioned and the key recommendations that come from that report and you may wish to consider those in making your own decisions at a local level. So in terms of the role of the Primary Care Trust, at this point in the planning process there is no statutory role for the Primary Care Trust and I just say that to inform you really. The statutory consultation role for a Primary Care Trust comes at the integrated pollution prevention control stage of any development. The report that I have commissioned has come from the fact that I have received a lot of questions about this proposal at a local level, people have been asking me for a view, including my own Board in terms of the Primary Care Trust, and I have been asked to review the evidence, relating to energy from waste plants, and to provide in my role as an independent Director of Public Health, a view on whether there are issues which may impact on the health of our local population. In doing that, I have tried to ensure that the report is evidence based. It has been prepared by the Environmental Public Health Team at the Centre for Public Health at John Moores University and the Health Protection Agency. I commissioned it from them independently and asked for the report to be brought to you so I could present the report and it is a commentary on the available evidence relating to the perceived and potential health effects from the proposed energy from waste plant that we have been hearing about. What the report aims to do and I would like to say that I will be putting it in the public domain because I am only giving you the headlines tonight and you may want to have a look at it in more detail individual, but it aims to inform the decision making process and I suppose that is just as true at a local level as it is in terms of informing the DTI.

In terms of the scope, the report is evidence based and draws on authoritative documents from appropriate agencies, such as the Health Protection Agency, and also on the information provided by the applicant. It does assume, and we have just touched on this point I think, that any development is appropriately regulated under existing legislation which is designed to protect the environment and human health. Should the situation come where the PCT is consulted that would be as I say at an IPPC process and so the report that I have relates to the outline planning application

that we have seen to date. So having reviewed the evidence and having thought through what are the issues that I would want to ensure were considered in ensuring the safety and health of our local population, as your Director of Public Health. There are a number of things that we have to take into account. We've acknowledged, I think, in all the presentations the need for this country to do something about waste. Energy from waste is a form of renewable energy in some senses. It has to be acknowledged that constructing a plant like this, and the processes around it, will increase potential noise and traffic nuisance, but I would hope to see in any planning application that there would be some conditions put in place to mitigate against these and we would expect to see that in the planning regulation.

The development I think also, in terms of positive health impact, does have the potential to create employment and regenerate the area. The evidence, the epidemiological studies and risk assessments indicate that emissions from modern incinerators have little effect on health. We have made the assumption that the proposed development will be regulated and that there will be further opportunities for comment on specific operational issues and emissions through the pollution prevention permitting regime. Having said that, the development is proposed to be located in a local authority whose population has significantly higher than average levels of poor health including respiratory disease and cancers and heart disease, we have heard that there are both high levels of these issues and that is certainly the case.

As a result of that there are two key issues that I have put into the report that I would perhaps want to put into the debate this evening. The first is, in the application we have seen, it doesn't identify any significant concerns regarding particulate emissions from the process, or their impact on human health in the surrounding area and without any operational data it is not possible to review the potential health effect. The Committee for the Medical Effects of Air Pollution has recently concluded that as there are clear associations between both daily and long term average concentrations of air pollutants, in particular fine particles, and effects on the cardio vascular system, though a precautionary approach should be adopted in future planning. The second issue to perhaps highlight is a specific concern related to the transport of fly ash and flue gas treatment refuse from Weston Point to Randle Island landfill site. This will result in about, from the application, 20 heavy goods vehicle movement per day, and I suppose the risk is if this hazardous waste is in the form of a dry dust there is the potential for it to become airbourne, which could result in significant deposition of dioxins, furans and metals at a local level. From the report that has been produced, I have focussed on three key recommendations. First of all we need to understand the full health impact of a proposal like this and I would recommend to the Department of Trade and Industry that a Health Impact Assessment should be commissioned if independent. The second issue relating to the particulate evidence that we are aware of and has been touched upon is that the DTI consider a requiring the applicant to quantify the effects of the additional particulates air pollution generated from this proposal on the health of local residents. And finally, that appropriate control measures need to be put in place to ensure that the local population are not exposed to hazardous waste in the form of the dry dust during transportation to landfill.

As I have said to you already, the full report will be available to you from tomorrow. I will make it available to anybody who requests it and I am more than happy to put that into the public domain. It is based on evidence that we have to date and I think that point I'll conclude.

David Parr

Open to questions from Members to Fiona or her colleagues.

Councillor Murray

I have listened very intently to both sides and I think they have both presented it quite well, being objective. But I think the most significant thing that I've seen here today is what the Doctors held up five minutes ago with regards to the direction of the wind and the increase deaths. I've noticed that you are saying you've got evidence to date, have you taken any of that into account when considering what you were going to say today.

Alex Stewart

I'm Alex Stewart from the Health Protection Agency.

I've looked very briefly at the maps that the Professor showed but I haven't sat and studied them in detail. My first question when looking at data like that is what else is going on there and I would want to know, for example, how the communities to the east and the west of these incinerators compare in terms of deprivation, wealth, that kind of thing, because that has a huge impact on health. And then there's a whole raft of other things that I would want to look at as well. If they were taken into account then I'd have another look at it.

Councillor Lowe

You've just asked about what other things are going on there. A couple of years ago we had, a thing that was left over from Ineos' predecessors ICI, about the contaminated land. It was all over Weston Point. ICI totally refused to investigate the area on the other side of the expressway, siting that the expressway stopped any contaminants going through there. I failed to see that and still fail to see it. But that is the sort of answers that we keep getting. One of the things that came out from your department was a survey of renal problems within the area. Can I ask you if you remember that? where was the highest incidence of renal problems, which ward was it in?

Alex Stewart

Sorry my ignorance of Halton detail is going to come to the fore here. I don't know the names of the wards but if you look at the map of Halton the highest incidence is in all the wards round the plant and inland for several miles, however, there are also hot spots of renal disease in Widnes and downwind in Warrington so it is quite a bit wider than just round the Weston area.

Councillor Norddahl

Is it true that as many of the local people smoke that they will be at greater risk from air pollution than the general UK population?

Fiona Johnstone

Smoking really has an effect on your respiratory health in terms of breathing.

Councillor Norddahl

Will they be at greater risk with air pollution from the incinerator?

Fiona Johnstone

One of things that I have recommended is that we understand the effects because actually at this point in the process I don't know the answer to that because the information isn't available to me.

Alex Stewart

If you have got pre existing heart disease, pre existing lung disease, and you are subjected to particles in the air your condition might very well get worse. I can't promise it will but some people's will get worse.

Councillor Bryant

What would be your recommendation on the sanctioning, the checks on it because they told us tonight there are only two checks per year, could you not put a sanction on it that it's checked on a weekly or monthly basis through health reasons?

Helen Castles

I can answer in terms of what's happened to date with the Environment Agency,with requests we've made under integrated pollution prevention and control from health authorities right across the North West. We do get an opportunity to request monitoring and modelling information and for that to be fed back to the Primary Care Trust and we have on occasion requested specific frequencies of that. The Environment Agency do generally respect our requests and feed them back to us as and when they get those data.

Councillor Rowe

At the start of the presentation you indicated that effectively this is a review of existing evidence. Are you satisfied that there is sufficient evidence over the effect of exposure to the smallest of the particulates?

Fiona Johnstone

One of the reasons we mentioned the Committee that provided the medical effects of air pollution is because it does acknowledge that there needs to be further research and evidence to understand the impact.

Councillor Philbin

There is just one on the medical aspect. Professor Deardon gave us some startling figures on mortality rate in clusters around there and I wonder whether you or anyone else has the figures prior to those incinerators being there, what were the figures like before that?

Fiona Johnstone

You are talking about the maps we saw there before and did we have the information before and after? I haven't seen that information, certainly I think we would need to find out whether it was available. But there is not to our knowledge a before and after situation. It may be that this is a new set of knowledge and if you like at some point there has always got to be a before and this might be it.

Councillor ?

The question I'd like to say, I asked a question before about medicals and screening and gentleman said he thought there was no reason whatsoever of any other medical than the normal, do you agree with that?

Alex Stewart

You've got to have a good reason to put a screening programme in, because screening by itself will cause anxiety in the people. So to put any sort of screening programme in, there is a clear set of criteria that we like to meet to do with what we know about the condition we're looking for, what we know about the test, what we know about the community we are doing it in and what resources we've got to respond to the people if we do something, so it's quite a big job to do that. At this point we don't have enough information to say you should screen or you shouldn't screen. I think it's unlikely that screening would be of help. I think it would be better to tackle the situation in different ways to ensure that the emissions are as low as possible, for example, rather than to go for screening. Screening's a bit late in many ways, you want to catch it before you get to that point.

Councillor Norddahl

I did notice in the presentation that you advised caution by saying caution should be taken in planning, does that in fact mean that you are advising against the proposal?

Fiona Johnstone

The presentation I've given you today is not recommending for or against the proposal. It is reviewing the known evidence about the likely health impact. At the moment the evidence that I have available to me suggests that modern incinerators do not have a huge impact on human health. However, there are a couple of

questions that have been raised by information not available to me, which I have identified and shared with you today. The decision on whether or not this particular application should go ahead, I don't think can be taken by me without understanding the information further.

David Parr

We are now going to move to the Environment Agency. We have Ian Grady with us. Ian, I am told doesn't have a presentation but is available to answer any questions that Members may have. I don't know whether you want to comment about the regulatory process Ian, just to help people understand your role in this process. That would be helpful I think before inviting Members to ask questions.

IanGrady

The Environment Agency doesn't really get involved in this process until after the decision has been made by yourselves to allow (David Parr – it's the DTI rather than the Council). Once that decision is made, Ineos will be required to make an application under IPPC to get a licence to operate under these environmental regulations. That's when our work starts. We will then take this application, we will then determine it and if all is well we will issue a permit. At the start of the determination process we will invite comments from various statutory bodies, plus local members of the public. Statutory bodies will include yourselves, the local authority, Health and Safety Executive, Primary Care Trust and one or two other organisations which might get involved if they are in the proximity, I don't think the Harbours Authority perhaps will get involved but they are an option. And of course members of the public will be invited to make representation. All comments will be viewed by the Agency. The determining process will come up with a permit which will contain conditions and those conditions are generally standard, however, there will be some bespoke aspects to it which will be particularly release limits, either to air and to water, the kind of limits there will be on the incoming raw material we will define precisely what is allowed in as the raw material, the fuel. We will determine the quality of the waste as it leaves the site, and company will decide where it is actually going to go, but there will be some controls on the disposal of that waste. That in a nutshell is the work. The determination is the first part of the process after the permit issued and the plant commences operations we then start our regulatory role and we will regulate according to the conditions of the permit.

David Parr

Questions for Ian.

Councillor Loftus.

There have been some concerns expressed tonight over the regulation and statutory and whether people are going to be prewarned when the emissions are going to be checked. Is that a fact of life? If the emissions actually go over the level for emissions what powers do you have, taking into account this is a major investment, that if they continually breach their emission levels to close them down?

Ian Grady

To take the second part of the question, our power are, yes we can shut them down if they continually breach

Councillor Loftus

I know you can shut them down, what would be realistic, would you shut them down?

Ian Grady

Realistically, it probably wouldn't happen once it is up and running but we would work very strongly with the company to make sure that they brought into line what was out of line. This is a routine thing the Agency does with all its regulated.

Councillor Loftus

Do you pre warn people that your coming to monitor?

Ian Grady

I don't. The Agency doesn't. Whenever we have a routine monitoring regime to undertake, we clearly have to give some notice to the company, otherwise they might not be running at the time our people turn up. Now that would be a waste of everyone's time and money so we have to make sure that they are operating at the time that the testing team go in.

Councillor Lowe

You say that they might not be running when your team went in. It's a 365 24 hour 7 day a week turnover and it's got to be done. That's what they are telling us so it wouldn't matter whether you gave them notice or not. And notwithstanding that, I am more concerned about the process as far as Randle Island goes. We had an island right next to that in Wigg Island, couldn't be used for years because of the contamination that their predecessors had put on it. We finally managed to get that right, cost us a fortune but we managed to get it right and turn it into a nature sanctuary. That's going to be affected by Randle Island being contaminated yet again. What are you going to do to prevent that?

Ian Grady

Specifically, I don't know the conditions on Randle Island, I don't know the conditions of the new material that is going to put onto this landfill but when we do find out we will put on appropriate conditions, I can't say any more than that because I just don't know. But there will be appropriate conditions to protect the local environment.

Councillor S Blackmore

My question relates to an ongoing situation where there has been a company who has constantly broke their boundary emissions, they are supposed to keep the

emissions within their boundary but constantly over four years it comes out of the boundary. We get complaints from constituent continually and when I question what could be done, after arguing about it for four years, I am told that the company only has to prove that they are using best practice and if they can prove they are using best practice we can't actually do anything about that. Can you enlighten me then if Ineos Chlor were doing the same, if they were breaking the boundary of their emissions, and they proved that they were using best practice, what could we do about that?

Ian Grady

The term best practice that you use, we have a different phrase, it's called best available techniques BAT. The company is required to use BAT to operate its plant, all its plants not just this one. We know that by using BAT that the emission limits we will set, and these limits are set across Europe, they are European wide standards, we know they can be met. So if this plant doesn't achieve those limits then they can't be using BAT by definition.

Councillor S Blackmore

So why haven't you called the company in after four years then.

I don't know the company you are talking about so I can't really comment.

Councillor Rowe

Monitoring.. One of the major concerns for people is, not so much what's happening on the plant as what's happening on the street. Obviously there will be techniques for air quality monitoring that could be set up throughout the borough to monitor the air quality. However, I can foresee there will be problems with that in identifying the source of the pollution. Any thoughts?

Ian Grady

The kind of particulates that I would imagine will come from an operation like this will be ash particulate and ash particulate is going to be much the same as anything else that comes out of a chimney anywhere. How you would identify Ineos's ash from Fiddlers Ferry ash from any ash, I have no idea. Unfortunately, it's in the local authority's remit to do environmental monitoring.

David Parr

I'm going to go to open forum now. First of all I'm going to give Members the opportunity to raise any questions that they haven't had the opportunity to raise with our colleagues.

Councillor Norddahl

(Question inaudible)

Sir Kenneth Green

First of all can I refer Members to our actual written documents. I have in mind here particularly Councillor Philbin's question, where in the bibliography you will find a list of papers where some of the issues he was trying to raise are in fact described. But to answer the specific question, I doubt whether anyone on Ineos' side and certainly not on this side, will give any guarantees about anything. Because you are dealing with science and there is nothing certain about science, it's the very nature of the exercise. So basically, what we are talking about is probability, correlations, probable risks and whether those risks are worth taking and that's why some of the questions are worthy. Our major platform has been that most of the things that we are saying are fearful are not measured, lower level regulations are not required to measure so, therefore, so trotting out stories about regulations don't cover this issue. In America they are monitored at those levels. There is a rumour that 2010 the same measures of operating in America will operate here but they don't currently and that is exactly what Professor Deardon was trying to point out. Therefore, in this paper and that's why I drew attention to it, Doctor Lafrenia wrote the whole of our health section specifically identifies a number of cases in the past where regulations seem to suggest that things were safe and there is a whole list of them. Most people here will remember in Widnes was the whole issue of asbestos, where people said it was safe etc etc because there were no immediate effects but it's one of those diseases that takes years and years to come out. Therefore the point I am trying to make is the regulations only do what they say at the time. They only regulate what they can regulate, however, inevitably some of these conditions come out later and that's the problem with this kind of exercise why my colleague who spoke last couldn't give an answer to say you can spot it here or you can spot it there. That's why, finally I want to say this, as the Halton Health Report said in 2003, and I was on the PCT Health Board at the time, and I had a lot to do with the examination of that report, it was very clear, it said there was strong evidence of particulate pollution in this borough, more than in fact is evident from the potential areas. It then went on to say we recommend strongly that precautionary principle is applied. That is the onus is on the proposer, in this case Ineos Chlor, to prove there are no health affects etc. The onus is not on (Inaudible) that is an important principle as if I understand it Mr Parr was adopted by the Council.

David Parr

I'm sure that report will be considered by the Council and by the advisers from the Health Agency.

Councillor Inch

I have a question for Ineos. In terms of this plant will generate 20% of your energy, therefore, if the gas price changed as he described by 25,000,000 a month, you'd still be borne with a 20,000,000 hit. Wouldn't that have a major impact, if this was the answer to the security of the site wouldn't this be generating 40 or 50% of your energy?

Chris Tane

Yes, you are quite right. This will be a very significant step to where we need to get to but it is by no means the only one we need to take so, for example, I can tell you that other things we are looking at, which are nothing to do with Halton Borough, you will be pleased to hear, for example we are talking to companies about off shore wind farms as a source of electricity for us and so on, so we're not saying this is the only answer we need, we are saying it's a very significant part of the answer we need.

Councillor Murray

Good I ask your opinion on this Mr Chairman because I just want to clarify something that's in this document but I think I need to address the planning but it's a matter of fact as opposed to opinion. Would that be possible?

David Parr asked Councillor to ask the question.

Councillor Murray

In page 4 of this document it talks about the Unitary Development Plan criteria and it says that waste incineration plants should not be located within close proximity to residential areas. It's the residential area I'm asking about. The first part of the question is, is that accurate? The second part, in close proximity, has that ever been defined, 5 metres, 20 metres or is it taken on a case by case basis?

David Parr

I think that's a reasonable question for Members to have answered. It doesn't go to the decision at the end of the day but we're here to have more information and if we can share that, if Phil can answer that.

Phil Watts

The UDP doesn't define proximity in terms of distance so it's always a judgement in all cases are dealt with on merit. In terms of what the UDP said, the quote is directly taken from the UDP, all I would say is and I'm not here to pre-empt any report I'm about to write or my officers are about to write as we haven't done that yet, is that the UDP cannot be read in isolation one paragraph or one clause. You have to read the UDP both in part 1 wider strategic policies and part 2 which are the operational and land use policies. We can't just look at one in isolation, you have to look at it in its entirety.

David Parr

The officers report that goes to the Development Control Committee will be able to address a number of issues that have been raised and Members will be able to ask questions at that meeting as well specifically on the duty and obligations that the Development Control have at that meeting on 31st.

Councillor Bradshaw

I was expecting by this time that we'd have had some more fully comprehensive authoritative and independent reports on the process itself, the effects on health, the effects on transport, none of which yet seem to have been done although they were promised. So at this stage until we do see these reports, is it absolutely essential that we rely on precautionary principle. Not when an activity raises a threat of harm to human health or environment, precautionary measures should be taken, even if it's not been absolutely established scientifically.

David Parr

I think you are referring to a conversation you and I had a week or so ago at another seminar and I indicated we'd provide reports as quickly as they were available to Members. Those reports have not yet been finalised, the reports that have been finalised have been provided to Members to date and when the reports are available they will be made available as soon as possible.

Councillor Bradshaw

So we will be able to look at them before the actual Development Control meeting and decision.

David Parr

That is what we are working towards Councillor Bradshaw and I am pleased to see that Phil's nodding his head.

Councillor Alan Lowe

Over the years the ICI, Ineos has come to this Council on numerous occasions for one thing and another. I can remember ICI asking for something and they said if we don't get it we are pulling out. We gave it to them and they pulled out, sold it to Ineos. Ineos have been to us and the Government and have asked for money from the Government and favours from us and each time they have said if we don't get it, we're going to cut the workforce, and eventually cut the work force. Can I ask what guarantees you are going to give about the workforce in your area? Are you going to guarantee that there'll still be over 3,000 employees there directly employed in 10 or 20 years time?

Chris Tane

Maybe I can just pick up a couple of those points. First of all I think it's fair to say, I'm not here to stand up and talk for ICI because we are not ICI. But I think it is fair to say ICI's point previously was the Runcorn site if it is not able to make profit and prosper it will have to close and that, fundamentally, that is the nature of business today. We are in a very very competitive market and if we aren't able to compete with the Chinese, the Middle Eastern countries then sooner or later, we cannot sustain losses at the levels we saw last year. So I don't want to go back into that, I understand your question, of course I can't stand here and predict or guarantee what the situations are going to be in 20 years time, I can guarantee quite clearly, if we are able to overcome this issue, on this issue at least it will give us a platform to

continue to invest the sort of money that we have done already. I repeat again, we have invested £400,000,000 in five years in this site. That is because,

Cllr Lowe

How many jobs

Chris Tane

We have reduced by, I don't know, 150 or 200. We have reduced jobs, no question of that. Why – because we have to remain competitive. You see the whole picture, we are making ourselves more competitive, we are solving our problems that energy costs being one of our major problems and when we do that we invest in growth and I very much hope that in future there will be more jobs on this site. I don't have any problem with growing the site, getting more prosperous and building new plants. I would love to do that and I would love to stand here and ask you to give us permission to build new plants on the site, I hope I can do that but we will not be able to do that unless we've got the financial conditions in place to enable us to invest in the future and that's what this is all about from that point of view.

Councillor Ratcliffe

At a past presentation the waterways were mentioned for transport, casually, and waterways has not even been mentioned at all tonight. I see waterways could be the biggest potential for transport they've got because the waterways we've got in Runcorn is open to the world and one of my concerns would be that Ineos, quite rightly, be looking for the cheapest fuel and the cheapest fuel could come from the third world. If that's the case, what regulations are going to be put in place because we had the EEC standards but we don't have any standards round there. Do they intend to use that waterway to its full extent.

Louise Calview

There is actually several questions I think in that. The first one is that the standard for the fuel, as I think the EA actually mentioned, would be part of the IPPC permit so it wouldn't actually matter where the fuel came from, it would be to a standard. But let me reassure you that we have no intention, and in fact we are not planning to import fuel from outside this country, we are focussed on waste, the fuel from the North West region, potentially some fuel could come from outside the North West, but we have no intention, no plan, no consideration to actually import fuel. And yes the waterways is another way because the port is there to bring it in, so if there was an MBT plant in Cheshire, for example, that was situated on the waterways and that was the best way to bring it in the plant, then that would be considered.

Councillor Mrs Lowe

My question is to the Environment. Would you being doing spot checks on the fuel coming in?

Ian Grady

We would be reviewing the quality control of the company in that respect. We don't have a facility for doing laboratory analysis so in some respects we reply on the company but they rely on their suppliers. If the supplier doesn't treat the end user, Ineos, correctly, then they are likely to lose that contract. If we find that their emissions are awry because of the raw materials they are bringing in are incorrect, then we will take appropriate action against Ineos and they will bounce that action back to their suppliers. So we don't have a direct monitoring the incoming raw material.

Councillor Rowe

This is a question aimed at the Ineos team and it surrounds the current usage of Randle Island. We've had instruction that that is the proposed site for disposal of the residues. Can you perhaps give us a little bit of history about that site itself and the currently volumes of usage?

Ian Barlow

Can't give you a lot of detail. Randle Island is a waste disposal site that has been used for many years and has been used to dispose of potentially hazardous material from the site at Runcorn. What I can say is that, I think part of your question is can Randle actually accept this fly ash and residues going forward in time and the answer to that is yes. Randle has capacity to actually take these for the entire life of the plant, well over 25 years. I think the other thing, if I might just add to that, is that although at the moment these residues have to be disposed of to landfill, there is work going on and processes are actually being developed to treat this so it can actually be recycled. We have not mentioned the planning application because it probably some years away but in the medium term we would be looking to actually be able to reuse that material and actually to recycle it.

David Parr

It's now 7.00 p.m. Councillor Blackmore

Councillor Blackmore

Is the cost of the actual fuel that you get in to power the incinerator, is that actually cheaper than paying for gas, that you pay for now?

Louise Calview

The economics of the project are very different from a gas station. The capital cost is much higher and the operating costs are much higher and you actually get paid to take the fuel because the alternative is that it goes to landfill, so it's actually a cost saving in the fact that it's a lower charge to send it to us than it is to landfill it, but the economics only work because you are paid to actually take it, because the capital cost is so high.

Councillor Fraser

We know that the toxins are proved but we haven't proved anything else the other things hypothetical on both sides of the argument. But the big debate with me is what the lady says on your doorstep. I think this is the biggest question for a lot of people who are residents, where they are it's on my doorstep, because I happen to live in Weates Close and we've got a site problem on our doorstep.

David Parr

So you'd like to ask Ineos their views on their doorstep, I think, is the question, or on the doorstep of the neighbours rather than on Ineos' doorstep.

Chris Tane

I didn't hear all the question I'm afraid.

Repeated

Chris Tane

Where I live is in Chester, where I work is here. I've worked here 25 years, I actually spend more time working here than I do at home. Would I like it in my back garden, of course I wouldn't and I'd be stupid to stand up and say I would. Would I agree to it, would I object to it being in my back garden, on health grounds, absolutely not.

Inaudible

Chris Tane

Absolutely not, no I'm, sorry

David Parr

Respect people's comments and you've done brilliantly at that, thank you very much.

Chris Tane

Genuinely, I repeat what we said before, genuinely, I would not, you don't have to take my word for it about residents, I would not with our employees put them in that kind of health risk if I thought there was a significant health risk. We have exactly the same on our manufacturing site at the moment, our standards in terms of controlling the exposure our workers have on a number of difficult chemicals that we use, we are extremely tight and we invest a huge amount of money, a very large proportion of the £400,000,000 that we've talked about is all about reducing the exposure that our workers have to levels which are very much lower than the standards that we have to apply. And so when I say to you I would not object on health grounds, I might object on house price grounds or noise grounds which is understandable, but I would not object on health grounds if there was one built near my house. I am absolutely genuine on that point.

David Parr

OK, I'm going to close there. The first thing I would like to say is thank you to everybody for the way they have conducted themselves. I think it is a credit to everybody in the room with the way the meeting has been organised and how people have conducted themselves. So thank you very much for that. Can I say thank you to all our guests for the way that they have put their case over and the questions that they have asked. Thank you very much for giving up your time to give Members the opportunity to have more information and I hope that that will enhance the decision making process. Can I also thank Andrew, who has been running around with the mic backwards and forwards and I hope you have a safe journey home.

Thank you very much.

END

APPENDIX 4

CORRESPONDENCE FROM OTHER AUTHORITIES WITH INCINERATORS

T Williams

Mr P Watts
Operational Director
Env & Regulatory Service
Rutland House
Halton Lea
Runcorn
Cheshire
WA7 2GW

020 8379 3687

11/07/2007

Dear Mr Watts

Energy from Waste Facilities

I refer to your letter of the 26 June regarding the above. Enfield does have a large EFW plant operating in the borough, which has been in existence since 1969. Until recently it was the largest incineration plant in Europe. The site also operates ancillary activities, such as autoclaving to sterilise waste, metal recovery and storage and reuse of 'bottom ash' residue into building materials.

In responding to your query about health impacts, similar questions have been raised, from time to time, by the public. Neither the Council or the local health professionals are aware of any health issues of any significance in the borough which may be attributable to the operation of the site.

The Council has carried out its review and assessment of air quality and the associated update assessments all of which incorporated the EFW plant emissions as a point source. They were not found to be of any significance in respect of air quality in Enfield. The incinerator plant has a stack some 100m high which makes dispersion efficient. The Environment Agency set stringent operating and monitoring conditions, details of which we receive for the Public Register. In respect of these issues a number of studies were carried out several years ago, by the National Society for Clean Air and the Environment Agency, all of which lend weight to the argument that modern waste incineration methods and tight regulation is an effective, clean waste management tool.

The principal air pollutants of concern in Enfield remain those associated with the use of motor vehicles, i.e. oxides of nitrogen and small particles.

Other issues which you may wish to consider include typical nuisance issues, depending on location such as;

- Vehicle movements (refuse vehicles and other contractor/commercial HGV's)
- Noise
- Odour
- Dust
- Ancillary site developments associated with waste management, which may not subsequently require planning permission.

I trust the above is of assistance. If you wish to speak to me direct please do not hesitate to contact me on 0208 379 3687 or by e-mail above.

Yours Sincerely,

Trevor Williams
Head of Environmental Health.

Plant, Andrew - Environment

From: Watts, Phil - Environment
Sent: 11 July 2007 15:49
To: Plant, Andrew - Environment
Subject: FW: Energy from waste enquiry

Halton enquiry response030707....

-----Original Message-----
From: Trevor.Williams@enfield.gov.uk
[mailto:Trevor.Williams@enfield.gov.uk]
Sent: 03 July 2007 14:31
To: Watts, Phil - Environment
Subject: Energy from waste enquiry

Dear Phil
I tried to phone, but no reply.
Hope this is of assistance. Please call me if there is anything further I can help with.

(See attached file: Halton enquiry response030707.doc)

Plant, Andrew - Environment

From: Watts, Phil - Environment
Sent: 11 July 2007 15:30
To: Plant, Andrew - Environment
Subject: FW: Energy from waste

for info

-----Original Message-----
From: Stijn Valgaeren [mailto:Stijn.Valgaeren@stad.Antwerpen.be]
Sent: 05 July 2007 16:31
To: Watts, Phil - Environment
Cc: johnny.bakx@isvag.be
Subject: Energy from waste

Dear Mr Watts,

In your letter to Mr Verhaert, secretary of the city of Antwerp, sent the 26th of June, you have asked some information into the health effects of installations and monitoring.

We contacted the interlocal incineration company, ISVAG, to answer all your questions. ISVAG has also an agreement with Electrabel for energy recuperation.

Feel free to contact Mr Johnny Bakx, company leader of ISVAG (www.isvag.be).

Yours sincerely,

On behalf of Mr Roel Verhaert

Stijn Valgaeren

Stad Antwerpen | secretariaat stadssecretaris
Grote Markt 1 | 2000 Antwerpen
tel 03 220 82 79 | gsm 0495 20 20 37 | fax 03 220 86 51
stijn.valgaeren@stad.antwerpen.be <mailto:stijn.valgaeren@stad.antwerpen.be> | www.antwerpen.be

't Stad is van iedereen.

Plant, Andrew - Environment

From: Watts, Phil - Environment
Sent: 11 July 2007 15:31
To: Plant, Andrew - Environment
Subject: FW: your letter to Roel Verhaert - stadssecretaris Antwerpen

for info
-----Original Message-----
From: Johnny Bakx [mailto:johnny.bakx@isvag.be]
Sent: 06 July 2007 13:49
To: Watts, Phil - Environment
Cc: Stijn Valgaeren; Andrea Schonken; Karin Van Couwenberg
Subject: your letter to Roel Verhaert - stadssecretaris Antwerpen

Dear Mr Watts,

I received a call from Mr Stijn Valgaeren concerning your questions. I hope I can help you.

We believe (and it is proven) that a waste-to-energy plant, operating under the European conditions (2004/107/EG concerning air quality, and others...), will have **no** significant effect onto the health of local residents.
The operating conditions with best available technology, witch have to be met by any (waste-to-energy) plant, can be found on the internet site of the European community.
Of course, these conditions are also integrated under Belgian law in the VLAREM registrations. I have no idea how they are covered under English law.

Most recent studies, concerning bio monitoring of health of a population, showed no significant impact on local residents nearby a waste-to-energy installation. These last studies can be found on the internet under www.milieu-en-gezondheid.BE. However, I think these studies are only available in Flemisch language.
In Flanders we have a well known institute named VITO, Vlaams Instituut voor Technologisch Onderzoek (Flemish Institute on Technological Studies). They where one of the investigators in the above mentioned studies. You can perhaps contact them for further information on www.vito.be. This site is also available in English language. Their Mr Raf De Fré is one of the leading specialists concerning air pollution. You can contact him with my greetings.

Monitoring the operating conditions of a plant is done by online analysers. We are measuring emissions in the chimney, not immissions on a certain spot further away from the plant. Under the earlier mentioned European and Belgian guide lines and laws, we are obliged to measure and registrate on a permanent basis, the following items: Dust, CnHm, HCl, CO, SO2, NOx, O2 and the flow of the flue gasses.
There is also an obligation to monitor the flue gasses on dioxins and furans. This is done by constantly leading a known part of the gasses through a bulb filled with a restraining powder. Every two weeks the bulbs are changed an analysed in a laboratory. After a fortnight you receive the results.
Every contaminant has a determinated maximum to be respected.

Hopefully this will answer your questions, if not please do not hesitate to contact me again,

Kind regards,

Johnny Bakx
Bedrijfsleider

ISVAG

Boomsesteenweg 1000
B-2610 Wilrijk
Tel.: + 32 (0)3 877 28 55
Fax: + 32 (0)3 887 09 28

APPENDIX 5

INFORMATION RECEIVED FROM THE APPLICANT

ELECTRICITY ACT 1989
SECTION 36 APPLICATION

LPA Ref: 07/00068/ELC/HA06/001

Application to Construct and Operate an Energy from Waste Combined Heat and Power Generating Station with an Approximate Capacity of 360MW Thermal and up to 100MW of Electrical Power at INEOS Chlor Vinyls, South Parade, Runcorn, Cheshire.

Response to Comments by Professor Dearden for Meeting on 21 June 2007

July 2007

INEOS Chlor
Applicant

Response to Comments by Professor Dearden for Meeting on 21 June 2007

July 2007

Prepared by:
Andrew Buroni
Senior Consultant
July 2007

Authorised by:
Dan Smyth
Technical Director
July 2007

....
Signature

....
Signature

RPS
6-7 Lovers Walk
Brighton
East Sussex
BN1 6AH

Tel 01273 546800
Fax 01273 546801
Email rpsbn@rpsgroup.com

Introduction

This report has been produced by RPS on behalf of INEOS Chlor, the applicant, to provide Halton Borough Council with a response to the points raised in the report from Professor Dearden presented to Halton Borough Council Elected Members and Officers on Thursday 21 June 2007.

Stack Height

Professor Dearden's comment: "The two software programs used to model stack emission dispersion (ADMS and AERMOD) give different results, but they both predict that the presence of hilly terrain adjacent to the stack will have no effect whatsoever on pollution levels, for a 105 metre stack height. This appears to me to be a strange prediction."

1.1 Detailed terrain data was incorporated in the dispersion modelling undertaken to support the Air Quality Assessment and Human Health Risk Assessment that form part of the Environment Statement submitted by the applicant. Figure 6.3, which is shown in Appendix 10.1 presents a shaded relief map of terrain in the study area constructed from terrain data included within the dispersion modelling.

1.2 The dispersion modelling was carried out using two different dispersion models (ADMS and AERMOD) to address model uncertainty. Although both models include different methods for the treatment of terrain within dispersion calculations, they aim to account for the altered airflow and turbulence around areas of complex terrain. Both models have been subject to extensive validation studies externally.

1.3 Both models were run initially assuming flat terrain to determine firstly the stack height required in terms of local buildings. Further modelling was then undertaken, to incorporate complex terrain to determine whether the presence of the local terrain would necessitate an increase in stack height.

Results

1.4 Figures A.1-A.4 of the Environmental Statement Appendix 10.1 present the stack heights for each model assuming flat and complex terrain.

Flat Terrain:

1.5 AERMOD results assuming flat terrain (Figure A.1) indicate that for stack heights below 85m, local building wake effects are predicted to affect dispersion substantially. For stack heights above 85 m, ground level contributions do not reduce materially with increasing stack height.

1.6 ADMS results assuming flat terrain (Figure A.2) indicate that for stack heights below 75m, local building wake effects are predicted to affect dispersion substantially. There is a near linear decrease in predicted ground level concentrations between 75m and 105m, above which ground level contributions do not reduce materially with increasing stack height.

Complex Terrain

1.7 AERMOD results assuming complex terrain (Figure A.3) indicate that for stack heights above 105m, ground level contributions do not reduce materially with increasing stack height.

1.8 ADMS results assuming complex terrain (Figure A.4) follow a similar profile to those derived for flat terrain with ground level contributions not reducing materially with increasing stack height beyond 105m.

1.9 The results of both models therefore indicate that a stack height of 105m is optimum for the dispersion of pollutants from the proposed EfW facility. The chosen stack height of 105m was therefore used within the wider dispersion modelling undertake to support the Air Quality Assessment. The results of the Air Quality Assessment indicate that contributions to ground

level concentrations of all pollutants from the EfW facility are minimal and are not considered significant.

1.10 It is acknowledged that terrain can affect deposition of pollutants. In fact, Figure 7.4 shown in Appendix 10.1 of the Environmental Statement presents a contour plot of annual average NO_2 contributions. The highest annual mean contributions are predicted to occur to the southeast of the EfW site, with the maximum point of impact coinciding with Runcorn Hill. This clearly demonstrates that the influence of terrain on the modelling results has been taken into account.

1.11 However, the influence of the terrain is not predicted to have any significant effect on the dispersion of emissions for a 105m stack.

Infant Mortality

Professor Dearden's comment: "Recent analysis of Government infant mortality statistics has shown that, around virtually every large waste incinerator in the country, infant deaths are much higher downwind than upwind."

1.12 Professor Dearden makes reference to a study by Michael Ryan and Dr Dick van Steenis that indicates a correlation between infant mortality and proximity to EfW and other similar facilities.

1.13 It should be noted that the work of van Steenis and Ryan in this case is simply a collection of commonly cited web articles as opposed to a coherent peer reviewed study. As such, the methodology, approach or rationale to any of the conclusions drawn is not provided.

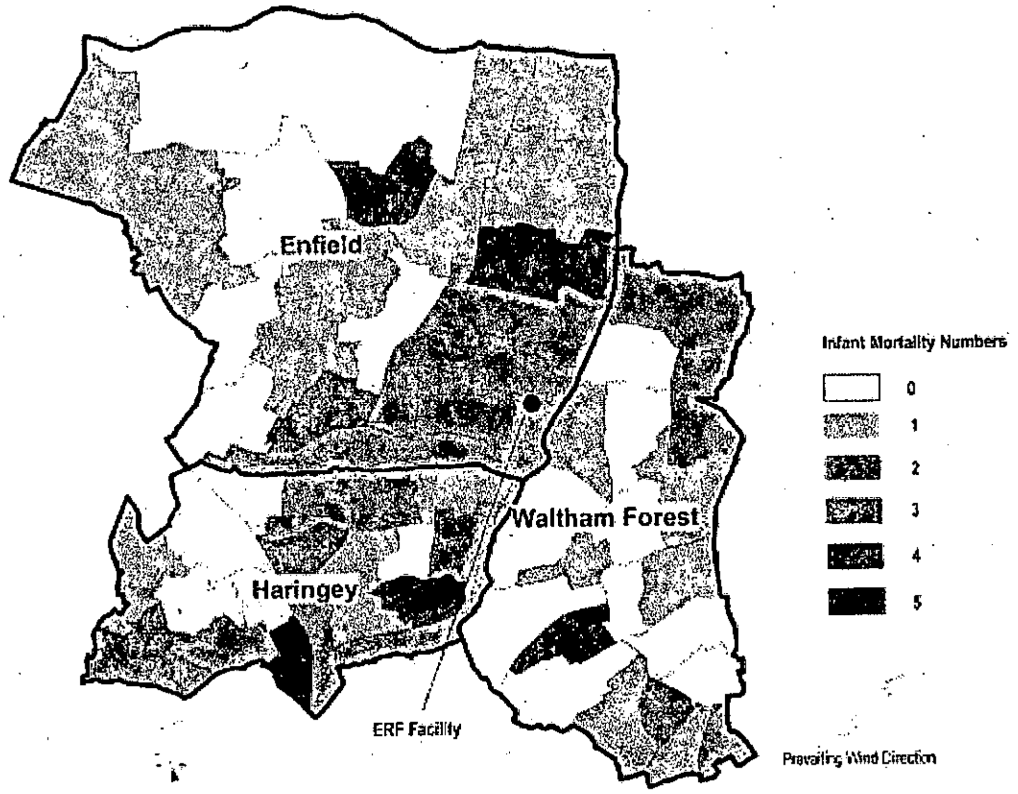
1.14 Secondly, the examples put forward by Professor Dearden fail to reference the applied statistics, do not provide a rationale as to how or why Ward level data has been aggregated, and are selective in that they fail to provide the full picture of infant mortality in other neighbouring Wards.

1.15 A data search at the Office for National Statistics, at Public Health Observatories, and Primary Care Trusts (PCTs) has been unable to replicate the data presented by Professor Dearden.

1.16 The reason why such data are not routinely applied at the Ward level is that infant mortality rates are too low to be applied with statistical significance below the wider Primary Care Trust Level. The low count of infant mortality within a Ward area, coupled with other risk factors involved means it is not possible to draw any meaningful conclusion at the Ward level.

1.17 In an attempt to replicate Professor Dearden's study without aggregating or selectively mapping data, a review of infant mortality counts is provided below for the Edmonton ERF.

Figure 2.1: Ward Level Infant Mortality Counts (2005)



Data Source: *VS4 BIRTHS AND MORTALITY 2005 BY WARD BOUNDARIES (DEATHS REGISTRATIONS). Available upon request from the Office for National Statistics: Vital Statistics.*

1.18 Figure 2.1 indicates that when applying the actual count of infant mortality for 2005 there is no consistent pattern of increased infant mortality downwind from the Energy Recovery Facility.

1.19 Similar claims by Ryan and van Steenis have been expressed about a number of other proposed EfW and other energy facilities and generally conflict with the views of experts, the UK Health Protection Agency and local Primary Care Trusts (PCTs).

1.20 As an example, the Director of Public Health at Telford & Wrekin Primary Care Trust commissioned a peer reviewed report to address the assertion by Ryan and van Steenis that a local power station was responsible for existing health burdens, and that a proposed EfW facility would further increase rates of:

- all cause mortality;
- premature mortality;
- respiratory disease;
- mortality from myocardial infarction (heart attack);
- cancer mortality;

- suicide; and
- infant mortality.

1.21 The report concludes that a review of the relevant health statistics by trained health professionals and independent experts failed to substantiate the claims made by Ryan and van Steenis[1].

1.22 It has not been possible to identify any peer-reviewed study showing that modern Municipal Waste Incinerators release hazardous substances at a level causing any harm to the people in the vicinity. Monitoring studies have shown that emissions from modern facilities that are operating within the strict EU limits have a negligible contribution to background levels. No study has shown any adverse health effects in the vicinity of a modern Municipal Waste Incinerator to be clearly related to the plant [2,3].

1.23 It is considered that modern Municipal Waste Incinerators do not have a significant impact on the health of the population in their neighbourhood. Indeed, the Health Protection Agency's position statement on Municipal Solid Waste Incineration states that 'emissions from such incinerators have little effect on health'. [2]

Particulate Emissions

Professor Dearden's comment: "The INEOS Human Health Risk Assessment (HHRA) ignores the contribution to toxicity of particulate emissions from the EfW facility.

1.24 There is recent strong evidence to conclude that particles with a mean aerodynamic diameter of less than 2.5 µm ($PM_{2.5}$) are potentially more hazardous to human health than larger particles[4]. The European Commission has adopted a Thematic Strategy on Air Quality under the Clean Air for Europe (CAFE) programme. The Strategy recognises that the current limit values relating to PM_{10} give disproportionate consideration to concentrations of larger particles.

1.25 A new EU air quality directive, replacing all previous directives, is proposed to deliver the aims of the Thematic Strategy. Among the proposals for the new directive include the introduction of a cap of 25 $\mu g.m^{-3}$ on annual mean urban background $PM_{2.5}$ concentrations to be met by 2010. The aims of this cap are to protect human health.

1.26 The effect of fine particles has been considered within our previous response to comments raised by Helsby Parish Council. In summary, if all particulate emissions from the proposed EfW facility are assumed to be $PM_{2.5}$, the results of the assessment indicate that annual mean

[1] Dr Catherine Woodward. Director of Public Health. (2006). Telford & Wrekin Primary Care Trust. Report of an Investigation into Claims of Ill-health in Telford & Wrekin Related to a Power Station in Ironbridge Gorge http://www.telfordpct.nhs.uk/patient_information/Publications/VA%20Investigation%20into%20Claims%20of%20Ill-health%20in%20T%20and%20W%20JUNE%202006.pdf

[2] UK Health Protection Agency. (2005). Position Statement on Municipal Solid Waste Incineration http://www.hpa.org.uk/chemicals/ippc/incineration_posn_statement.pdf

[3] Dieter Schrenk. (2006). Health Effects of Municipal Waste Incinerators - A Literature Survey. http://www.dublinwastetoenergy.ie/files/july-2006/appendix/Appendix_13_3_Health_effects_of_municipal_incinerators.pdf

[4] The Committee on Medical Effects of Air Pollution (COMEAP) 1998 Quantification of the Effects of Air Pollution on Health in the UK

contributions[5] would represent approximately 0.4% of the proposed objective for urban background locations. Predicted contributions of $PM_{2.5}$ from the EfW facility to ground level concentrations are therefore considered to be insignificant.

Health errors concerning predicted health risks from the EfW facility

Professor Dearden's comment: "The HHRA claims that the USEPA target level for infant intake of dioxin (as 2.3.7.8-TCDD TEQ) of 50 $pg.kg^{-1}.day^{-1}$. This figure is incorrect. . The actual intake can be as high as 50 $pg.kg^{-1}.day^{-1}$ because there can be high concentrations of dioxins in breast-milk. The USEPA uses a target level of 0.001 $pg.kg^{-1}.day^{-1}$, although the WHO refers to a figure of 1-4 $pg.kg^{-1}.day^{-1}$."

General:

This comment reflects three distinct issues, namely:

- concern that the target level applied within the Human Health Risk Assessment is incorrect;
- that actual infant intake can reach the target level via breast feeding; and
- the USEPA theoretical Reference Dose and comparison with international Dioxin exposure guidance.

Target Level:

1.27 We do not consider the target level used in the HHRA to be incorrect and consider it to be conservative in comparison to other suggested values, such as the higher target level of 60 pg/kg bw-day value (over 1 year, for nursing infants) reported by USEPA.

Risk via Breast Feeding:

1.28 The Ministry of Agriculture Fisheries and Food (MAFF) 'Food Surveillance Sheet 105' provides estimates of dietary intakes of dioxins and PCBs by breast-fed infants. MAFF calculated these intakes to be 170 pg TEQ kg^{-1} bw day^{-1} at two months, dropping to 39 pg TEQ kg^{-1} bw day^{-1} at 10 months [6].

1.29 Despite the high intakes of dioxins experienced by nursing infants, the impact of breast-feeding on infant body burden of dioxin is markedly less dramatic. Peak infant body burdens are set around twice those of an adult, a consequence of the infant's rapidly expanding body weight and lipid volume, as well as a possibly faster elimination rate.

1.30 When considering infant daily intakes, the Food Standards Agency confirmed its previous advice that, although dioxin intakes are higher than desirable for breast-fed babies, encouragement of

[5] The predicted annual mean particulate contribution is 0.1 $\mu g.m^{3}$ at the point of maximum impact as presented in Table 7.6 of the Environmental Statement Appendix 10.1 – Air Quality Assessment.

[6] Department for Environment, Food and Rural Affairs and the Environment Agency. (2004). CONTAMINANTS IN SOIL: COLLATION OF TOXICOLOGICAL DATA AND INTAKE VALUES FOR HUMANS. DIOXINS, FURANS AND DIOXIN-LIKE PCBs. Section 7.1. http://www.deq.state.mi.us/documents/deq-rrd-uk-soil-dioxins-intake.pdf

breast-feeding should continue on the basis of overwhelming evidence of the benefit of human milk to the overall health and development of the baby [7].

1.31 This is supported by the World Health Organisation that concludes that in studies of infants, breastfeeding was associated with beneficial effects, in spite of the contaminants present [8].

USEPA Reference Dose and Comparison with International Dioxin Exposure Guidance:

1.32 Professor Dearden refers to the USEPA theoretical reference dose of 0.001 pg/kg-bw/day. This value is not applied in risk assessment and has been widely criticised, as it is two to three times in order of magnitude below current background exposure levels in the US.

1.33 The Human Health Risk Assessment applied the internationally accepted World Health Organisations Dioxin exposure guidance range of 1-4 $pg.kg^{-1}.day^{-1}$ (over an average lifetime of exposure). The WHO range is consistently conservative and implements a composite uncertainty factor of 10 to account for any potential uncertainties.

Acceptable cancer risk from the EfW Facility

Professor Dearden's comment: "The HHRA appears to indicate that an acceptable risk of cancer from the EfW facility is 1 in 100,000.. In fact, the USEPA recommended acceptable cancer risk is 1 in 1,000,000. This figure is only for the risk from the EfW facility and does not include existing risks from other pollutants."

1.34 Professor Dearden comments that the HHRA applies an incorrect target level of $1x10^{-5}$. However, Professor Dearden has mistaken the Annual Risk of 1×10^{-6} with the Lifetime Risk of $1x10^{-5}$. As such, RPS confirms that the assessment of carcinogenic risk represents a reasonable and robust analysis.

1.35 In response to Professor Dearden's assumption that the figures provided in the HHRA account for only the proposed EfW facility; the figures provided in the HHRA report take into account background concentrations of pollutants and the contribution from the proposed EfW facility. Contrary to Professor Dearden's observations, the risk of cancer in the area will not be raised to an unacceptable level.

END OF DOCUMENT

[7] Department for Environment, Food and Rural Affairs and the Environment Agency. (2004). CONTAMINANTS IN SOIL: COLLATION OF TOXICOLOGICAL DATA AND INTAKE VALUES FOR HUMANS. DIOXINS, FURANS AND DIOXIN-LIKE PCBs. Section 7.1. http://www.deq.state.mi.us/documents/deq-rrd-uk-soil-dioxins-intake.pdf

[8] EUROPEAN COMMISSION HEALTH & CONSUMER PROTECTION DIRECTORATE-GENERAL. (2000)Report of experts participating in Task 3.2.5 7 June 2000 Assessment of dietary intake of dioxins and related PCBs by the population of EU Member States. Page 21.

ELECTRICITY ACT 1989
SECTION 36 APPLICATION

LPA Ref: 07/00068/ELC/HA06/001

Application to Construct and Operate an Energy from Waste Combined Heat and Power Generating Station with an Approximate Capacity of 360MW Thermal and up to 100MW of Electrical Power at INEOS Chlor Vinyls, South Parade, Runcorn, Cheshire.

Response to Halton Borough Council regarding letter from Mr Phil Watts dated 26 June 2007

July 2007

INEOS Chlor
Applicant

Introduction

1. This report has been produced by INEOS Chlor, the applicant, assisted by RPS to provide Halton Borough Council with a response to the points raised in the letter from Mr Phil Watts dated 26 June 2007.

Q1: The source of the fuel and how you will ensure quality control

Source of Fuel:

2. Fuel derived from municipal waste (SRF, RDF) would provide the main source of energy for the plant. It is expected that it would be sourced primarily from local authorities in the North West region. However, in the event that there is insufficient RDF to fill the plant, INEOS may wish to use the facility to burn other non-hazardous materials, such as some types of biomass, confidential waste (shredded paper) and appropriately treated commercial or industrial waste. Any such use would be subject to the approval and grant by the Environment Agency of the necessary statutory Pollution Prevention and Control (PPC) permit in accordance with the Pollution Prevention and Control (England and Wales) Regulations 2000.

3. Biomass is an expensive fuel. Consequently there is a strong commercial incentive to maximise the amount of RDF burnt, and only burn other fuels when insufficient RDF can be sourced.

4. It is confirmed that no untreated municipal waste or waste material generated on Runcorn Site will be burnt.

5. Table 2.1 of the ES gives the predicted quantities and sources of RDF that will be burnt in the facility. The figure of 275,000 tonnes per annum from Greater Manchester is taken from the Draft Output Specification issued by Greater Manchester Waste Disposal Authority (GMWDA) on 9 November 2006.

Table 2.1: Predicted Quantities and Sources of Fuel

Area	**Approx tonnes/year**
Greater Manchester	275,000
Halton	30,000
Merseyside	200,000
Cheshire	150,000
Warrington	30,000
Merchant/Spot market	65,000
Total	*750,000*

6. The figures for other WDAs shown in the table are estimates that have been derived from the GMWDA information.

7. It is anticipated that construction will be phased, with two lines to be built in the first phase, and the remaining two lines following on when there is certainty that sufficient fuel will be available.

8. Phase 1 is founded upon the GMWDA contract. INEOS Chlor is developing a working partnership with Viridor Waste Management and John Laing Infrastructure who have been selected by GMWDA as their preferred bidder for the production of SRF. Furthermore, GMWDA has recently confirmed its intention to supply SRF to the proposed INEOS Chlor EfW plant at Runcorn Site.

9. The Phase 1 capacity would be 375,000 tonnes per annum, of which 275,000 tonnes per annum would come from GMWDA. INEOS' preference would be to fill this gap using

locally produced RDF, but some RDF could be sourced from elsewhere in the United Kingdom. Viridor is actively engaged in the EfW business, and is co-owner of a 410,000 tonnes per annum facility at Colnbrook, Berkshire. Based on experience from the Colnbrook facility, it believes that in 2011 there will be sufficient RDF available on short-term contracts to achieve this. Alternatively, biomass or other alternative fuels could be used to bridge the gap.

Control of Quality:

10. As has been outlined previously, the RDF will be produced to a specification, and in the first instance, it will be the responsibility of the suppliers to implement Quality Assurance systems to ensure compliance. INEOS recognises the importance of working closely with the MBT plants to maintain the flow of in-specification RDF.

11. In addition, it will be necessary for the EfW plant to verify the quality of the RDF. This will be achieved by routine sampling.

12. The proposed facility at Runcorn will use RDF that, by virtue of the MBT process, produces a reasonably homogenous fuel product. Once discharged into the bunker, the fuel is continually mixed to ensure maximum consistency prior to being fed to the combustion chambers. It is proposed to sample and inspect mixed material from the bunker. A sample would be taken by one of the grab cranes, and deposited in a dedicated sampling area. Here it would be inspected, and a sub-sample would be taken for analysis.

13. It is inevitable though that there will be variation in the quality of the fuel used. The plant is designed to operate with a wide variation in fuel quality and still remain within the emission levels set out in the Waste Incineration Directive. INEOS has selected water-cooled mechanical grate technology for the boilers. These boilers are robust in their operation and are able to operate successfully on a wide range of fuels with varying LCVs and impurities. The plant will have comprehensive flue gas treatment trains; these will be designed to remove the higher levels of contaminants that could be present due to variations in fuel quality and ensure the Waste Incineration Directive levels are met at all times.

Q2. Quantify the level and range of emissions from the proposed facility in particular relating to the fine particles and demonstrate how these will be controlled.

14. This point has been previously addressed in our response to comments raised by Helsby Parish Council. This notes that a combination of European Union Directives and associated national legislation provides a legal framework for the regulation of ambient concentrations of fine particulates in the UK. EU Directive 1999/30/EEC specifies limit values for a number of pollutants in ambient air including concentrations of particulate matter. A number of air quality regulations (and their amendments) have transposed the aforementioned EU directive into UK legislation. The EU Directives and relevant UK regulations aim to protect human health and the environment by avoiding, reducing or preventing harmful concentrations of air pollutants. Full details of relevant ambient air quality legislation are provided in Section 4 of the Environmental Statement Appendix 10.1 (Air Quality Assessment).

15. The effects on air quality as a result of the operation of the proposed EfW facility have been assessed against relevant EU and UK air quality directives and regulations. The current legal framework specifically addresses particulates with a mean aerodynamic diameter of 10 µm or less (PM_{10}). The air quality assessment provided within the Environmental Assessment has assumed that all particulate emissions from the EfW facility stack are as PM_{10}. The results of the dispersion modelling undertaken as part of

the air quality assessment indicate that predicted contributions of PM_{10} from the EfW facility to ground level concentrations are of neutral significance, typically representing less than 1.0% of relevant air quality objectives and limit values. The addition of predicted contributions from the EfW facility to background concentrations representative of the study area indicate that ground level concentrations of PM_{10} remain well below relevant air quality objectives and limit values set for the protection of human health.

16. There is recent strong evidence to conclude that particles with a mean aerodynamic diameter of less than 2.5 µm ($PM_{2.5}$) are potentially more hazardous to human health than larger particles. The European Commission has adopted a Thematic Strategy on Air Quality under the Clean Air For Europe (CAFE) programme that recognises the current limit values relating to PM_{10} give disproportionate consideration to concentrations of larger particles.

17. A new EU air quality directive, replacing all previous directives, is proposed to deliver the aims of the Thematic Strategy. Among the proposals for the new directive include the introduction of a cap of 25 $\mu g.m^{-3}$ on annual mean urban background $PM_{2.5}$ concentrations to be met by 2010. The aims of this cap are to protect human health.

18. If all particulate emissions from the proposed EfW facility are assumed to be $PM_{2.5}$, the results of the assessment indicate that annual mean contributions[1] would represent approximately 0.4% of the proposed objective for urban background locations. Predicted contributions of $PM_{2.5}$ from the EfW facility to ground level concentrations are therefore considered of neutral significance.

19. The proposed facility has been designed taking into account European air quality standards and will be regulated by the Environment Agency under the Pollution Prevention and Control system. Like the rest of the operations at Runcorn Site, it will operate well within the accepted UK and EU standards set for emissions to safeguard health and the environment.

Q3. Impacts on the highways network and rail network. Can you also provide details of the noise survey undertaken for the rail link including the likely time of operation.

Impact on Highways:

20. As is outlined in the conclusion of the Transport Assessment for this project, the traffic generated is not predicted to have any significant effect on the local highway network. The site would be accessed from a new access road that will form a priority junction with Picow Farm Road. This would ensure that no site traffic would need to travel through the Weston Point residential area.

21. During the peak period of construction there would be a maximum of 465 light vehicles arriving and departing from the parking areas at the beginning and end of the working day. Construction workers would be bussed between the site and remote car parks. It is expected that there would be a maximum of 400 heavy vehicle movements per day during short periods of construction when concrete slip casting is underway. Of these, 300 are expected to be spread over the 24-hour day. During more typical periods of construction the level of HGV generation is expected to be 150 movements spread over the 12-hour working day.

[1] The predicted annual mean particulate contribution is 0.1 $\mu g.m^{3}$ at the point of maximum impact as presented in Table 7.6 of the Environmental Statement Appendix 10.1 – Air Quality Assessment.

22. Congestion currently occurs on the northbound Expressway on the approach to the Runcorn-Widnes (Silver Jubilee) Bridge and on the southbound A557 on the approach to the M56 Junction 12. This congestion would not be significantly worsened by the operation of the EfW and it is anticipated that this would in future be alleviated by the programmed construction of the Mersey Gateway crossing to the east of Runcorn.

23. Although RPS has modelled a number of alternative scenarios and considered the effect of recent data made available by Halton Borough Council, the overall conclusions of the Environmental Statement and Transport Assessment remain valid. Therefore, it remains the case that the main effects of traffic associated with the construction and operation of the proposed EfW plant are predicted to be:

- no significant or perceptible effect in respect of driver delay, accidents and safety, hazardous loads and dust and dirt; and
- some potential for minor beneficial effects in relation to severance, pedestrian delay and pedestrian amenity, particularly during operation when light and heavy vehicle movements through the Weston Point residential area are reduced.

Impact on Rail Network:

24. Initial discussions have been held between INEOS Chlor and Network Rail. It has been identified that in order to accommodate this number of trains, some improvements to the signalling on the branch line may be required. Regarding the capacity of the rail network, no major obstacles have been identified by Network Rail at this stage.

25. Network Rail has also been asked to carry out a preliminary study of the Network capability and times of operation. At the time of writing, this has not been made available to INEOS, but it is understood that there is sufficient capacity in the system. The focus of this study has been on the trains that will be arriving from Manchester under Phase 1 of the project. At this stage it is not possible to predict the source of the trains for Phase 2, hence it is not possible to be precise about Network capacity or times of arrival.

26. It is expected that it will be possible to run a proportion of the Manchester trains during the day, but it remains likely that some trains will need to operate during the night

Noise Survey:

27. Details of the noise survey undertaken and the effect of the use of the rail link have been provided recently. For convenience, these are attached as Appendix 1.

Q4. The transportation method of the waste from the facility in particular the treatment of the fly ash and also the capacity of Randle Island.

Transportation method of the waste from the facility in particular the treatment of the fly ash

Bottom Ash:

28. This is a non-hazardous material suitable for use in building blocks, road aggregates etc. It is anticipated that this material would be sold to a contractor for reuse and opportunities would be sought for its beneficial reuse. Any quantities that cannot be reused would be disposed to landfill. Transport of bottom ash from the site would be by road.

Fly Ash and FGT Residues:

29. These residues would be classed as a hazardous waste as they contain substances including heavy metals and dioxins etc. INEOS operates an existing landfill site at Randle Island in Runcorn that is licensed for the disposal of hazardous materials. It is envisaged that fly ash and FGT residues arising from the project would be transport to Randle Island for disposal. Transport of fly ash and FGT residues would be by road.

30. The fly ash and FGT residues are both dry and of a powder-type nature and it is necessary to manage these materials in a manner that will prevent airborne emissions.

31. Both the fly ash and flue gas residues will be treated prior to disposal. The treatment process is relatively simple and there are a number of examples in operation in the UK. A standard industry process is to combine the ash and residues and then add water or water/acid mixture creating a "damp" waste that will:

- neutralise the alkalinity of the FGT residues (if acid used);
- form a "damp" solid that allows the waste to be easily handled and eliminates the problems of dry materials being blown about by the wind;
- produce a waste stream that will subsequently set after landfilling.

32. This process is normally carried out at the disposal site, in which case the dry materials would be transported in sealed bulk powder tankers and then mixed with water/acid before landfilling. This is proven technology that is used successfully within the UK. However, as the landfill site is very close to plant the applicant is intending to treat these materials at the EfW site. The damp cake would then be transported to Randle Island in sealed vehicles or demountable containers designed to prevent any egress of waste.

Capacity of Randle Island:

33. The capacity of Randle Landfill Site is about 3.5 million m^3. The current rate of landfill is about 17,000 m^3 per annum.

34. The current estimate is that the EfW plant will produce a maximum of 75,000 tonnes per annum of fly ash and flue gas treatment residues giving a volume of 107,000 m^3 per annum. Combined with the volume from other sources, the total volume land-filled will be 124,000 m^3 per annum.

35. This equates to a minimum life in excess of 28 years for Randle Landfill Site.

Q5. Can you please provide comparisons between the emissions from landfill and coal fired power stations?

36. The proposed facility is a CHP plant producing electricity and heat, and it is not therefore meaningful to compare it solely with electricity proposed in a coal fired power station. But, to answer the question, the emissions likely to be emitted from the proposed facility will be compared with a coal fired power station producing electricity and a coal fired boiler plant producing heat.

37. It is expected that 60% of the RDF supplied to the EfW facility will be classed as biomass, which is regarded as a "renewable" and thus does not count towards the carbon footprint of the plant. For the proposed plant, 750,000 tpa of RDF with an LCV of 13 GJ/te will produce 540 GWh/yr of electricity (net of parasitic load) and 447 GWh of heat. In doing so, this amount of RDF will give rise to 692,000[2] te total CO_2 emissions. Of these, 60% is biomass derived, so the non-biogenic (fossil fuel) emissions are 277,000 tpa.

[2] Assumes Carbon Emissions factor = 71 kg CO2/GJ LCV

38. A generally accepted figure for carbon emissions from a coal fired power station is 0.88 te CO_2/MWh (based on 38% NCV efficiency and 92.36 kgCO_2/GJ coal). Thus 540GWh/r of electricity would give rise to 474,000 te CO_2.

39. A coal fired boiler plant might operate at 85% NCV efficiency. Thus 1MWh of heat would give rise to 392kg CO2, and 447GWh/r of heat would give rise to 175,000 te CO_2.

40. Adding the heat and electricity related emissions shows that the coal fired alternative would give rise to 649,000 te/yr of CO_2 emissions, which is 2.3 times what will be emitted from the proposed plant.

Comparison versus landfill:

41. There are many parameters that need to be taken into account when considering the relative Greenhouse Gas (GHG) emissions from landfill, including the following:
    - waste constituents (percentage of different waste streams);
    - the presence of biogenic/non-biogenic carbon;
    - degradable organic carbon content (DOC) (fraction of waste that is biodegradable carbon);
    - dissimilable DOC (fraction of DOC that mineralises to CO2 and or CH4);
    - collection efficiency of landfill (assuming some energy is recovered);
    - credits for avoided emissions through materials recovered including heat, electricity, ferrous metals etc; and
    - sequestration of carbon within landfill.

42. Because of this, it is not possible to quote a single robust figure for GHG emissions from landfill. However, an EC commissioned study "Waste Management Options and Climate Change[3]" estimated net GHG flux of 327 kg of CO_{2eq} generated per tonne MSW sent to landfill.

43. Assuming this figure is valid for RDF, 750,000 te sent to landfill would give rise to 245,000 te CO_2 emissions. Whilst this answers the question asked, this figure is meaningless in isolation.

Comparison versus the real alternative scenario:

44. A more meaningful comparator is to look at the real alternative scenario:
    - 750 kte/yr of waste would get sent to landfill; and
    - 540 GWh electricity would be generated in a coal fired power station; and
    - 477 GWh of heat would be generated in a gas-fired boiler plant.

45. The carbon emissions from each of these sources is as follows:
    - the landfill would emit 245,000 te CO_2 equivalent (paragraph 43)
    - the coal fired power station would emit 474,000 te CO_2 (paragraph 38)
    - the gas-fired boiler plant would emit 102,000 te CO_2 (based on 90% NCV boiler efficiency and 57.2 kg CO2/GJ gas)

46. Total carbon emissions in the "real alternative" scenario are 821,000 te/yr. This compares with 692,000 te/yr total emissions from the proposed EfW-CHP plant, of which only 277,000 te/yr are non-biogenic. Thus the net carbon saving from this project is calculated as 544,000 te/yr

[3] EC Publication 2001, available from http://ec.europa.eu/environment/waste/studies/climate_change.htm

47. The EC report referred to in paragraph 42 covers this topic in some detail, and is valuable reading for persons interested in the climate change impact of various waste disposal options. As stated previously, net GHG flux for municipal waste sent to landfill is estimated to be +327 kg of CO_{2eq} generated per tonne. (Table A2.31 on page 104). Net GHG flux for waste burnt in a CHP plant is calculated in Appendix 3. Table A3.39 on page 121 shows the net GHG flux to be -348 kg of CO_{2eq} generated per tonne waste. The differential between these two options is 675 kg of CO_{2eq} generated per tonne waste.

48. When multiplied by 750,000 te/yr, the differential between these two options is 504,000 te/yr, which is very similar to the figure derived in paragraph 46 (some difference is to be expected, because the analysis done here is based on a specific project, whereas the EC analysis is generic.)

49. It can be seen that incineration of waste in combined heat and power plant compares very favourably, in terms of GHG emissions, with other options for waste management and energy generation. The figures quoted above are based on assumptions made regarding other waste management options. However, there is sufficient differential between the two scenarios for this conclusion to valid even if different assumptions are used for GHG emissions from landfill.

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APPENDIX 1: ASSESSMENT OF NOISE FROM EFW RELATED TRAINS

Introduction

An Environmental Statement (ES) was prepared for the proposed Energy from Waste (EfW) facility at the INEOS ChlorVinyls site in Runcorn and submitted with the application for consent under Section 36 of the Electricity Act 1989. Within the ES document, it was stated that trains using the rail link between the proposed EfW site and the mainline would not pass any residential receptors. However, it is now acknowledged that there are a number of houses backing onto the rail link at Percival Lane and Picow Farm Road, near to where the rail link joins the mainline. In addition, there is a recent housing development to the north of Percival Lane.

This report provides an assessment of the noise effects on residential properties arising from the use of the rail link by trains associated with the operation of the proposed EfW. Comparison is made with the existing noise environment, with reference to national planning policy.

Noise Units, Standards and Guidance

Noise and Noise Units:

Noise is defined as unwanted sound. The range of audible sound is from 0 dB to 140 dB. The frequency response of the ear is usually taken to be about 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting that is most widely used and that correlates best with subjective response to noise is the dB(A) weighting. This is an internationally accepted standard for noise measurements.

For variable noise sources such as traffic, a difference of 3 dB(A) is just distinguishable. In addition, a doubling of a noise source would increase the overall noise by 3 dB(A). For example, f one item of machinery results in noise levels of 30 dB(A) at 10 m, then two identical items of machinery adjacent to one another would result in noise levels of 33 dB(A) at 10 m. The *"loudness"* of a noise is a purely subjective parameter, but it is generally accepted that an increase/decrease of 10 dB(A) corresponds to a doubling/halving in perceived loudness.

External noise levels are rarely steady but rise and fall according to activities within an area. In an attempt to produce a figure that relates this variable noise level to subjective response, a number of noise metrics have been developed. These include:

- L_{Aeq} noise level - This is the *"equivalent continuous A-weighted sound pressure level, in decibels"* and is defined in BS 7445 [1] as the *"value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time"*. It is a unit commonly used to describe community response plus, construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.

- L_{A90} noise level - This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.

- L_{A10} noise level - This is the noise level that is exceeded for 10% of the measurement period and gives an indication of the noisier levels. It is a unit that has been used over many years for the measurement and assessment of road traffic noise.

- Sound Exposure Level (SEL) – this is the level at the reception point which, if maintained constant for a period of 1-second, would cause the same A-weighted sound energy to be received as is actually received from a given noise event. It is a unit that is used to categorise and quantify the noise generated by individual railway vehicles and individual trains in the prediction of noise from railways.

Standards and Guidance:

National planning guidance is contained within Planning Policy Guidance Note 24: Planning and Noise (PPG 24) [2]. PPG 24 offers guidance to local authorities on the assessment of noise and its potential impact on noise sensitive dwellings. Section 10 of PPG 24 primarily concentrates on proposed new residential units and considers the introduction of a noise generating development and advises that:

> *'Much of the development, which is necessary for the creation of jobs and the construction and improvement of essential infrastructure, will generate noise. The planning system should not place unjustifiable obstacles in the way of such development. Nevertheless, local planning authorities must ensure that development does not cause an unacceptable degree of disturbance. They should also bear in mind that a subsequent intensification or change of use may result in greater intrusion and they may wish to consider the use of appropriate conditions'.*

The glossary of PPG 24 notes that:

> *"A change of 3 dB(A) is the minimum perceptible under normal circumstances, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound"*

Noise Change

Consideration has also been given to the effect on the ambient noise level (L_{Aeq}), with any change greater than 3 dB(A) being considered significant. The following semantic scale (Table 0.1) has been adopted to describe permanent noise change:

Table 0.1: Semantic Scale for Describing Noise Change

Predicted Noise Change		Scale Rating
Decrease of more than 3 dB	Significant Decrease	Significant Positive Effect
Less than 3 dB	No Significant Change	No Impact
Increase of 3 – 5 dB	Minor Increase	Significant Negative Effect
Increase of 6 – 10 dB	Moderate Increase	
Increase of more than 10 dB	Major Increase	

Calculation of Railway Noise

The Department of Transport document Calculation of Railway Noise (CRN) [3] is primarily concerned with procedures for calculating noise from moving railway vehicles as defined in the Noise Insulation (Railway and Other Guided Transport Systems) Regulations [4]. These procedures are necessary to enable entitlement under the Regulations to be determined but they also provide guidance on the calculation of railway noise for more general applications e.g. the assessment of the noise impact of railways, the design and location of new tracks

and land use planning in the vicinity of existing or planned railways. The document can also be used to generate scaling factors for expected increases in use.

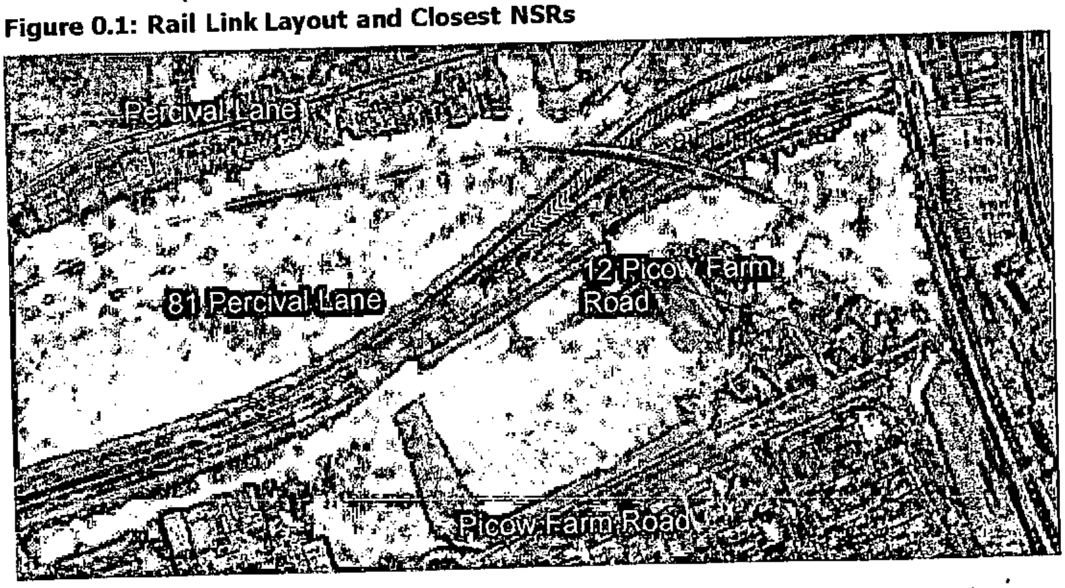
The CRN method of predicting noise at a reception point from a railway consists of five main parts:

- Divide the railway into one or more segments such that the variation of noise within the segment is small;
- Calculate the reference SEL at a distance of 25 m from the near-side railhead of the track segment taking into account the length of the train and track support system;
- Correct the reference SEL for distance of the reception point from the track, ground and air absorption, the effect of screening by barriers etc., and the angle of view and the effect of reflections at the reception point;
- Convert the SEL to the L_{Aeq} at the reception point, taking into account the time period required and the number of trains;
- Combine the individual L_{Aeq} for each segment to obtain the total day and night L_{Aeq} for the railway.

Site and Baseline Noise Levels

The main residential receptors that are near to the INEOS Chlor EfW rail link are on Percival Lane (see Figure 0.1). Other residential properties are on Picow Farm Road near the junction with Holloway. The Percival Lane noise sensitive receptors (NSRs) are two-storey, terraced houses on the southern side of Percival Lane and at their closest location are approximately 22.5 m from the railhead. There is a recent housing development of 132 no. 2, 2.5 and 3-storey houses to the north of Percival Lane and adjacent to Campus Drive. Noise sensitive receptors within this development are further away from the railway line than, and are partially screened by the houses on the southern side of Percival Lane. The noise effect at the recent housing development will be less than the noise effect at the houses on the southern side of Percival Lane. There are three potentially affected two-storey detached NSRs on Picow Farm Road, which at their closest point are only 34m from the railhead. An electrical substation partially shields the closest of these receptors, number 12 Picow Farm Road.

Figure 0.1: Rail Link Layout and Closest NSRs



Percival Lane, the rail link and the A557 Weston Point Expressway are broadly parallel and orientated east/west. At the closest point, the rear (southern) façades of houses on the

southern side of Percival Lane are approximately 22.5m, 119m and 185m to the north of the rail link, A557 Weston Point Expressway and the Runcorn Branch of the West Coast Main Line (WCML), respectively. The WCML runs approximately north/south, whereas the rail link and Expressway run approximately east to west. The Picow Farm NSRs are approximately 34m, 80m and 65m from the rail link, A557 Weston Point Expressway and the WCML, respectively.

The Weston Point Expressway is elevated at the western end where the road (from Picow Farm Road to the roundabout adjacent to the new housing development) falls towards the east, where it is in cutting as it passes below the WCML. The Weston Point Expressway is a busy dual carriageway and carries approximately 40,000 two-way vehicle movements between the hours of 0600-0000 hrs. The speed limit of the road is 60 mph, with a mean observed speed of 50 mph.

The rail link is on a substantial embankment in the order of 8-9m above the ground floor elevations of the NSRs on Percival Lane, as shown in Figure 0.2. At Picow Farm Road, the rail link is of a comparable elevation to the ground floor elevations of the two storey residential properties, see Figure 0.3.

Figure 0.2: View from Percival Lane of the Rail Link Embankment

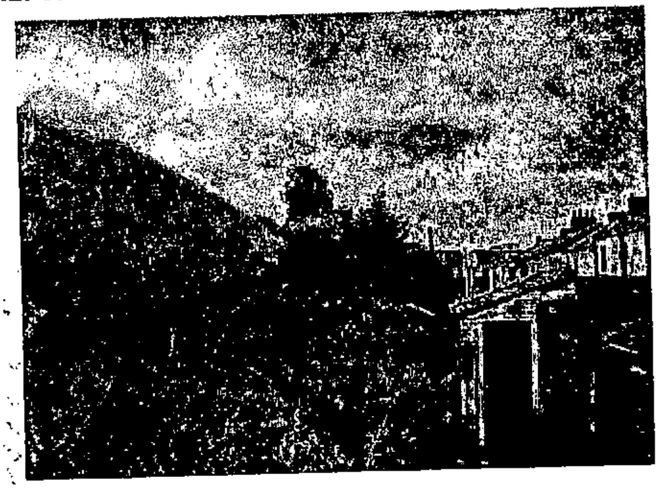
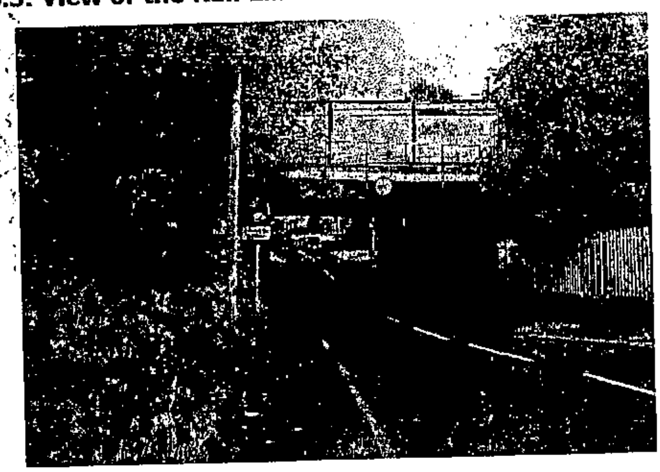


Figure 0.3: View of the Rail Link from Picow Farm Road



Baseline Noise Monitoring

Representative baseline noise monitoring was carried out to determine the existing noise environment at two locations currently affected by local noise sources and rail activity. The

results of the surveys were used to consider the potential noise effects of introducing additional activity on the rail link.

The first 24-hour noise survey was carried out in the rear garden of 81 Percival Lane, which is situated to the north of the railway. This survey data was recorded during the period 10:00 on Monday 18th June 2007 until 10:00 on Tuesday 19th June 2007. The second noise survey was carried out in the rear garden of 12 Picow Farm Road and was conducted from 15:00 on Monday 18th June 2007 until 10:00 on Tuesday 19th June 2007. This survey was made to provide further data on the local noise environment and in addition to quantify the noise level of trains currently en route to the INEOS Chlor site. The locations of these surveys are indicated in Figure 0.1.

The 24-hour survey at 81 Percival Lane was undertaken using a Rion NL-31 Type 1 Sound Level Meter (SLM); complete with environmental protection kit. The survey at 12 Picow Farm Road was undertaken using a Rion NL-32 Type 1 SLM, which was able to record the noise of any event greater than 75 dB(A).

The calibration of each SLM was checked using a Rion NC-74 calibrator at the beginning and end of each survey period and no significant deviation was found. The meteorological conditions during the survey period were monitored and were favourable for noise monitoring purposes.

In addition to the measured noise data, aural observations were taken during the set up and collection of the noise monitoring equipment.

In the rear yard of 81 Percival Lane, road traffic noise from local roads, namely Percival Lane itself and Weston Point Expressway and intermittent sounds from over flying aircraft and bird song were observed. At the Picow Farm Road location, aural observations indicated that the dominant source of noise was from road traffic noise on Weston Point Expressway and Picow Farm Road. In addition train noise from the main line was also audible including train horns. No trains using the rail link were aurally observed during the set up and collection of monitoring equipment. However the homeowner at Picow Farm Road commented that two separate trains had been observed during the day time (in total 4 pass-bys).

Table 0.1 summarises the existing noise environment at each location.

Table 0.1: Baseline noise levels

Location	Ref. time period (dB)	Leq	Lmax	Lmin	L10	L50	L90
Percival Lane	Day 7-23	52.4	79.0	33.3	51.8	48.7	46.4
	Night 23- 7	49.1	76.3	26.9	45.3	40.5	36.3
Picow Farm Road	Day 7-23	58.7	85.3	39.7	59.0	56.2	53.2
	Night 23- 7	54.1	77.1	32.5	54.5	48.7	43.4

From inspection of the data, the times of these train pass-bys were investigated at 81 Percival Road and two noise events were matched to trains using the rail link, see Table 0.2. The freight trains were noted by the homeowner to be hauling chemical tanker wagons. Of note, the audio recordings confirmed that the curvature of the track caused severe wheel/rail squeal, which based on the sound pressure level data, was not present at the Percival Lane site. No nighttime activity on the rail link was observed.

Table 0.2: Train Pass-bys On Rail Link

Train Time Start	Train Time End	Duration	Location	L_{Aeq}	L_{AE}	L_{AMax}
17:25:39	17:26:28	00:00:49	Picow Farm Road	73.0	90.0	82.0
17:47:47	17:48:51	00:01:04	Picow Farm Road	73.8	91.9	83.7
17:57:35	17:59:00	00:01:25	Picow Farm Road	74.8	94.2	82.8
08:19:36	08:20:18	00:00:42	Picow Farm Road	76.9	93.2	85.3
17:47:11	17:48:33	00:01:22	81 Percival Lane	71.3	90.5	79.0
08:20:06	08:20:56	00:00:50	81 Percival Lane	65.8	82.9	70.7

Table 0.2 clearly shows that train pass-bys on the rail link near Percival Lane are of a lower magnitude than those measured near the main line, principally due to the effect of the wheel squeal.

Rail Link Noise Modelling

The current use of the rail link is approximately 3 trains per week and it is elevated by approximately 8-9m above the rear gardens of the Percival Lane NSRs, such that the rail head is above the overall height of the dwellings. At the Picow Farm Road NSRs, the rail link is of a similar elevation to the gardens of the houses. There is currently no night time activity on the rail link. It has been estimated that there are approximately 25 freight train services on the WCML between approximately 0700 and 2200 hrs. From the information available, there are no services during the night-time. (Source: www.freightmaster.net). Examination of the national rail train timetable indicates that there are approximately 100 passenger trains through Runcorn Station and approximately 10 during the night time hours of 2300-0700 hrs.

Assessment of Noise from EfW Related Trains:

The assessment of the noise effects due to the use of the WCML and rail link by operational EfW trains has been undertaken on a 'worst-case' basis, which assumes 2 additional train pass-bys during the daytime (0700 to 2300 hours) and 8 pass-bys during the night-time (2300 to 0700 hours), ie 5 trains in total per day. Each train is assumed to comprise one Class 66 diesel locomotive and thirteen 20m length container wagons travelling between 30 and 40 kmph. The result of the reference prediction of noise from EfW operational trains is provided in Table 0.1. It has been confirmed that the wagons would not suffer from wheel squeal due to their independent axels and pivoting bogies.

Table 0.1: EfW Related Railway Noise Prediction

Class 66 loco + 13 Container Wagons	Loco	Wagons
Baseline SEL Correction (dB)	16.6	7.5
Speed (kmph)	30	30
SEL_V (dB)	77.3	68.2
No.Vehs	1	13
Total SEL (dB)	77.3	79.3
Track Correction (dB)	2.5	
Total SEL inc Corrn (dB)	79.8	81.8
No.Trains per Day	2	

No.Trains per Night	8	
Total train SEL (dB)	83.9	
$L_{Aeq,18h}$ @ 25 m (dB) (Daytime)	**39.3**	
$L_{Aeq,6h}$ @ 25 m (dB) (Night-time)	**48.3**	

The additional trains due to the operation of the EfW will not give rise to significant effects on the WCML during the daytime or night-time because the additional maximum of 10 train pass-bys will not give rise to a perceptible noise increase compared with the current flows.

Correcting the above predictions for distance and with reference to the estimated baseline ambient noise levels provided in Table 0.1, the predicted noise changes at the rear of the houses on the southern side of Percival Lane and the closest property on Picow Farm Road are provided in Table 0.2 and Table 0.3.

Table 0.2: Predicted Noise Change – Percival Lane

	Daytime	**Night-time**
	$L_{Aeq,18h}$ (dB)	**$L_{Aeq,6h}$ (dB)**
Without EfW Trains (baseline)	52.4	49.1
Development EfW Trains corrected for distance	38.0	47.0
Total noise	52.6	51.2
Noise Change	0.2	2.1
Significant?	No	No

Table 0.3: Predicted Noise Change – Picow Farm Road

	Daytime	**Night-time**
	$L_{Aeq,18h}$ (dB)	**$L_{Aeq,6h}$ (dB)**
Without EfW Trains (baseline)	58.7	54.1
Development EfW Trains corrected for distance	39.5	48.5
Total noise	58.8	55.2
Noise Change	0.1	1.1
Significant?	No	No

The noise change during the day is predicted to be less than 1 dB. With reference to Table 0.1 and the glossary of PPG 24, this is not considered a significant change. The noise change during the night is predicted to be 2.1 dB or less, which is similarly not considered to be a significant change.

No mitigation measures are therefore required.

Conclusions

The additional trains due to the operation of the EfW are not anticipated to give rise to significant effects on the mainline due to the current volume of passenger express and freight trains that currently use the Runcorn Branch of the WCML and the noise contribution from local roads.

The noise change at the most potentially affected residences to the rail link is predicted to be less than 1 dB during the day and 2.1 dB or less during the night. All calculations have been based upon a 'worst-case' assumption of operational train movements. The noise contribution of the trains is not therefore considered significant and no further mitigation is required.

References

1. British Standards Institution (2003) British Standard 7445: Description and Measurement of Environmental Noise, Part 1. Guide to Quantities and Procedures.

2. Department of the Environment. Planning Policy Guidance: Planning and Noise (PPG 24). HMSO. 1994.

3. Department of Transport. 1995. *Calculation of Railway Noise.* HMSO.

Building and Buildings, Statutory Instrument 428. The Noise Insulation (Railways and Other Guided Transport Systems) Regulations. HMSO. 1996.

INEOS ChlorVinyls

Combined Heat & Power Energy from Waste Plant

Reference 07/00068/ELC Notification under Section 36 of the Electricity Act 1989 and Section 90(2) of the Town and Country Planning Act 1990 to the Secretary of State for Trade and Industry for consent to construct and operate an energy from waste combined heat and power generating station with an approximate capacity of 360MW thermal 100MW of electrical power at INEOS ChlorVinyls South Parade Runcorn Cheshire.

Purpose Statement:

This document is intended as a response to the recommendations outlined in the 'Report on behalf of the Director of Public Health, Halton and St Helens Primary Care Trust' dated 4 June 2007.

July 2007

Recommendations made in the Report

3.1 That the DTI consider requiring the applicant to quantify the effects of the additional particulate air pollution generated from this proposal on health of residents in Halton to inform the planning process.

To inform the planning process, we have provided information on particulate emissions in our response to the letter from Mr Phil Watts dated 26 June 2007, an extract of which is:

"The effects on air quality as a result of the operation of the proposed EfW facility have been assessed against relevant EU and UK air quality directives and regulations.

"The current legal framework specifically addresses particulates with a mean aerodynamic diameter of 10 μm or less (PM_{10}). The air quality assessment provided within the Environmental Assessment has assumed that all particulate emissions from the EfW facility stack are as PM_{10}. The results of the dispersion modelling undertaken as part of the air quality assessment indicate that predicted contributions of PM_{10} from the EfW facility to ground level concentrations are of neutral significance, typically representing less than 1.0% of relevant air quality objectives and limit values. The addition of predicted contributions from the EfW facility to background concentrations representative of the study area indicate that ground level concentrations of PM_{10} remain well below relevant air quality objectives and limit values set for the protection of human health.

"There is recent strong evidence to conclude that particles with a mean aerodynamic diameter of less than 2.5 μm ($PM_{2.5}$) are potentially more hazardous to human health than larger particles. The European Commission has adopted a Thematic Strategy on Air Quality under the Clean Air For Europe (CAFE) programme that recognises the current limit values relating to PM_{10} give disproportionate consideration to concentrations of larger particles.

"If all particulate emissions from the proposed EfW facility are assumed to be $PM_{2.5}$, the results of the assessment indicate that annual mean contributions[1] would represent approximately 0.4% of the proposed objective for urban background locations. Predicted contributions of $PM_{2.5}$ from the EfW facility to ground level concentrations are therefore considered of neutral significance."

3.2 If planning permission is granted, that the DTI require a Health Impact Assessment to be commissioned by the applicant. It is expected that this will be carried out by independent and experienced practitioners. The scope of the Health Impact Assessment should be agreed by the Director of Public Health and engage the local community.

INEOS has provided a detailed Human Health Risk Assessment within the Environmental Statement for this application. This concludes that there should be no adverse impact on health from the proposed EfW facility.

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[1] The predicted annual mean particulate contribution is 0.1 $\mu g.m^{3}$ at the point of maximum impact as presented in Table 7.6 of the Environmental Statement Appendix 10.1 – Air Quality Assessment.

If however the planning authority believes that following review of this data a further Health Impact Assessment is required, then INEOS is prepared to commission an independent assessment as a condition of planning consent.

It is worthy of note that the Primary Care Trust would be consulted directly on this facility by the Environment Agency as part of the Pollution Prevention Control (PPC) Permit application that would be required before the facility could become operational.

3.3 That appropriate control measures are put into place to ensure that the local population are not exposed to hazardous waste in the form of dry dust during transport to landfill. We would wish to be assured that the risk is controlled adequately.

Our position with respect to the transportation of hazardous waste from the EFW facility is detailed in our response to the letter from Mr Phil Watts dated 26 June 2007, an extract of which is:

"It is envisaged that fly ash and FGT residues arising from the project would be transport to Randle Island for disposal. Transport of fly ash and FGT residues would be by road. The fly ash and FGT residues are both dry and of a powder-type nature and it is necessary to manage these materials in a manner that will prevent airborne emissions. Both the fly ash and flue gas residues will be treated prior to disposal. The treatment process is relatively simple and there are a number of examples in operation in the UK. A standard industry process is to combine the ash and residues and then add water or water/acid mixture creating a "damp" waste. This process is normally carried out at the disposal site, in which case the dry materials would be transported in sealed bulk powder tankers and then mixed with water/acid before landfilling. This is proven technology that is used successfully within the UK. However, as the landfill site is very close to plant the applicant is intending to treat these materials at the EfW site. The damp cake would then be transported to Randle Island in sealed vehicles or demountable containers designed to prevent any egress of waste."

END OF DOCUMENT

INEOS ChlorVinyls

Combined Heat & Power Energy from Waste Plant

Reference 07/00068/ELC Notification under Section 36 of the Electricity Act 1989 and Section 90(2) of the Town and Country Planning Act 1990 to the Secretary of State for Trade and Industry for consent to construct and operate an energy from waste combined heat and power generating station with an approximate capacity of 360MW thermal 100MW of electrical power at INEOS ChlorVinyls South Parade Runcorn Cheshire.

Purpose Statement:

This document is intended as a supplement to the briefing given to Halton Borough Council Elected Members and Officers on Thursday 21 June 2007.

The document follows a Question & Answer format and deals specifically with questions that arise in response to the report 'The Action Group's Statement of Concerns Relating to the Proposal', submitted by Halton Action Group Against The Incinerator.

For ease of reference the document is structured to follow the order of the afore-mentioned report, with an introduction dealing with the need for energy from waste at Runcorn Site.

July 2007

Introduction: The case for energy from waste at Runcorn Site

INEOS ChlorVinyls' requirement for energy is the key to why we need the energy from waste plant at Runcorn Site. Electricity accounts for 70% of our production costs at Runcorn Site; we are the largest consumer of electricity in the UK, using the same as the City of Liverpool.

We currently rely solely on gas to generate the electricity we need. There have been massive rises in gas prices in the UK in recent years and supplies are becoming increasingly unstable. Over a period of just two months last year, gas cost us an extra £50 million - this brought us to the brink of shutting down.

It would be irresponsible of us to allow ourselves to be put in this position again – this is a question of securing long term commercial viability for the benefit of our business, our customers, our employees and Halton. This plant would significantly improve our energy position by reducing our dependence on expensive gas.

Q **You justify the need for this plant based on rising gas prices – but haven't they come down recently?**

A It is true that gas prices have come down recently, but that masks the long-term trend whereby prices have become very volatile and have increased significantly in recent years. As UK gas production declines, and we become increasingly dependent on imports, it is likely that prices will increase. The impact of price rises on industrial consumers is far more acute than it is for domestic consumers as we see the impact immediately.

Q **This seems like a very big plant just to provide you with 20% of your energy – is this justified?**

A Yes, moving 20% of our electricity generation away from gas would present us with a very significant step forward in managing our energy costs and securing our long-term future in Halton.

Q **If gas prices continue to rise, could you need another CHP plant in the future?**

A INEOS is looking at other forms of renewable energy in addition to the planned energy from waste plant, such as investment in offshore wind farms.

Section 1: Location of the proposed energy from waste plant

It is vital that the proposed plant is located as close as possible to Runcorn Site, where the energy is required for our processes. The plant will be located on a brownfield site within an existing industrial area, therefore no green belt land or land that is suitable for other purposes will be used. The site has excellent transport links and through its design will encourage the use of sustainable modes of transport such as rail and water. The established steam demand on Runcorn Site means that the plant will be a combined heat and power facility, which significantly improves efficiency compared to plants that only generate electricity.

"Dangers of the location"

Q **Won't building your plant in the middle of the community put health at risk?**

A Plants such as these are regulated to the highest standards ever enforced in the UK and there exists no evidence that modern energy from waste facilities pose a risk to human health, a view that has been confirmed by Halton & St Helens Primary Care Trust and the Health Protection Agency. As with the rest of Runcorn Site, our plant would be regulated by the Environment Agency, which exists to protect people and the environment. If the Agency believes the plant isn't safe we will not be in a position to build it. Even if we gain permission to build, we would still

have to obtain a Pollution Prevention Control (PPC) permit from the Environment Agency before the plant could operate.

Q **Did your Environmental Statement consider the 'cocktail' effect that could be created through the combination of emissions from your plant with other local emissions as identified in the Halton Health Report?**

A Our Environmental Statement was conducted by well-respected and independent environmental consultants. In line with the required standards, the Statement fully assessed emissions from the proposed facility in relation to emissions from the wider environment.

"Population Density"

Q **How do you respond to criticism that the site for your proposed energy from waste plant does not meet the criteria of Halton Borough Council's Unitary Development Plan?**

A As the key consultee Halton Borough Council will determine the merits of our application against many different measures, including we expect its fit with the Unitary Development Plan. It would be inappropriate for us to speculate on the position that the Council will take in this matter.

Q **Did your Environmental Statement take into account the proximity of the local population and specifically local schools?**

A The Health Risk Assessment that accompanied our Environmental Statement fully considered the impact of the proposed development on the local community and has concluded that there would be no significant risk to human health; the assessment specifically included the local schools.

"The Case for Incineration"

Q **What is the impact of this development on Global Warming?**

A Studies have shown that energy from waste plants have a positive effect on Climate Change. Energy from waste plants burn material that would otherwise go to landfill where it would produce methane, which is a large contributor to Climate Change. In addition, the energy generated by the plant ultimately displaces power produced from coal.

Q **What about carbon emissions?**

A The new facility will result in a reduction in carbon emissions as about 60% of the energy content of the fuel is from renewable resources. This will reduce the overall carbon footprint of Runcorn Site.

Q **How do you respond to the criticism that energy from waste discourages recycling?**

A The evidence does not support this. In fact there is a strong correlation between those countries with the highest recycling levels and those with the highest preponderance of energy from waste plants. The reason is that recycling and recovering the energy content of what remains is part of the same process. The reality is that under the kind of schemes that councils are now developing almost two thirds of waste collected can be recycled as part of the process.

"The Incomplete Nature of the Proposal"

Q **Why doesn't your application provide more information about who will provide the fuel for the plant?**

A Our application covers only those processes that would be operated at the energy from waste plant site. The processes by which the fuel is created will be managed by the waste disposal authorities and would be the subject of separate applications made by them or others acting on

their behalf. The fuel supplied to our plant will conform to standards that we would agree with the Environment Agency as part of our operating permit.

Q **What will be the true logistics of moving the waste into the processing plant and out to the energy from waste plant?**

A We have fully considered all of the traffic that would be associated with the construction and operation of our facility and this has been fully taken into account when assessing the overall impact of movements on the local community and environment.

Q **What is the nature and consistency of the proposed fuel and its burning characteristics?**

A The fuel will meet strict criteria as agreed with the Environment Agency. These criteria will set out what can and can't be burnt in the energy from waste plant to ensure that health and the environment are not harmed.

"The Location and Stack Height"

Q **Have you fully considered the hills in Runcorn, Frodsham and Helsby in relation to the dispersion of emissions?**

A The local terrain, including the hills at Runcorn, Frodsham and Helsby have been fully taken into account when looking at the height of the stack and the dispersion of emissions from the proposed plant. Full details of this are provided in the Environmental Statement.

Q **Did your modelling take into account local prevailing wind conditions?**

A Yes, details of the modelling are provided in the Environmental Statement.

Q **Is it true that you have capped the height of your stack to ensure that you don't get into bother with John Lennon Airport?**

A No. The height of the stack was determined by sophisticated computer modelling using methods approved by the Environment Agency. The stack height is modelled to provide the best possible emissions performance, not to meet local height restrictions.

Q **If you could have had a higher stack, what would have been the impact on emissions performance, and therefore health and the environment?**

A Our data shows that our stack height will provide the best possible emissions performance and ensure that there is no significant risk to people or the environment from emissions. Our data shows that a higher stack would not yield any significant further improvement to the emissions performance of the plant.

Q **Why is your stack height not much higher than the Ince scheme, yet you are handling much more waste?**

A Our stack height has been determined using sophisticated computer modelling, which fully takes into account the amount of fuel burnt and the surrounding environment. Our data shows that our stack height, combined with adopted technology in the plant, will provide the best possible emissions performance and ensure that there is no significant risk to people or the environment from emissions.

Q **Would INEOS support the call by residents for an independent study into the stack height?**

A Details of all modelling we have carried out in relation to the stack are provided in the Environmental Statement. The modelling was carried out in accordance to the procedures specified by the Environment Agency. It is for the Council, and subsequently the DTI, to determine whether further information is required in order to be satisfied that the stack height is sufficient.

"Potential Pollutants"

Q **How can we be sure that the fuel you would burn is safe?**
A The specification of the fuel that can be burned would be agreed with the Environment Agency before the plant could become operational. We would not be allowed to burn fuel that does not conform to this specification.

Q **What contaminants could be in the fuel and what emissions will this produce?**
A The mechanical and biological treatment of the waste would remove the vast majority of contaminants from the resulting fuel before it arrives at our plant. The plant design incorporates a sophisticated 'scrubbing' system that will capture any remaining contaminants during the incineration process and ensure that any emissions from the plant will be well within the safe standards.

Q **So what would be emitted from the stack?**
A The full range of emissions from the stack is detailed in the Environment Statement. The emissions levels are set and controlled by EU and UK legislation. The main constituents are nitrogen, carbon dioxide and water vapour. There are low concentrations of oxides of nitrogen, oxides of sulphur, particulates, heavy metals and very low levels of dioxin.

Q **Will other sources of fuel, other than municipal waste, be used in the plant?**
A Fuel derived from municipal waste would provide the main source of energy for the plant. It is expected that it would be sourced primarily from local authorities in the North West region. However, in the event that there is insufficient fuel to fill the plant, INEOS may wish to use the facility to burn other non-hazardous materials such as some types of biomass, confidential waste (shredded paper) and appropriately treated commercial or industrial waste. This would not include toxic materials that are classified as hazardous waste. Any such use would be subject to approval by the Environment Agency under the PPC permit.

Section 3: The Energy from Waste Plant and the Environment

The operations at Runcorn Site are some of the most tightly regulated in the UK, which ensures that we operate to the highest safety, health and environmental standards. Over many years the environmental performance at Runcorn Site has shown a marked improving trend, which has been achieved by tighter industry regulation, by investing in modern environmentally friendly technology, and through the sheer hard work and dedication of the people who work for us. The Environment Agency has recognised our staff as having a high degree of environmental awareness.

"Size of the Energy from Waste Plant"

Q **Is it true that your proposed energy from waste plant will dramatically increase the amount of hazardous waste going to landfill in Halton?**
A That is a much-distorted view. Our hazardous waste facility at Randle Island has a licensed capacity; the waste products from the proposed plant that cannot be recycled will take up some of the existing capacity at this site, capacity that is there to be used. The hazardous waste accounts for less than 10% of the fuel that will be used by the plant.

Q **Why should Halton deal with everyone else's waste?**
A This is not the case. All of the waste will be treated close to where it is generated, so only the resulting fuel will come to Halton. The fuel accounts for only one third of all the original waste, with the remainder having been recycled. Our energy needs are such that our plant is scaled to take all of the fuel produced in the North West.

"Fuel and Residue"

Q **Where exactly would the fuel come from?**
A We are hoping to enter into contracts with the various waste disposal authorities in the North West such as Merseyside, Cheshire and Manchester.

Q **So are you planning to take fuel derived from Halton's waste?**
A The facility could take fuel derived from Halton's waste, however it is for Halton to decide how it wishes to proceed as part of its waste management strategy.

Q **If you were not to enter into a contract with Halton, would you still build the plant?**
A We will build the plant if we have sufficient contracts in place for the provision of the fuel. If we do not have a contract with Halton the project could still proceed, so long as other contracts were in place.

Q **Why should councillors support your application when Halton's waste would be such a small percentage of the overall total?**
A We are asking for support on the basis that the proposed plant will provide us with a much needed solution to our severe energy problem and help us to secure our long term future as one of the largest private employers in Halton. The proposals also provide local waste disposal authorities with a potential solution to their waste management problem.

Q. **Are you not competing for the same waste as Peel Holdings?**
A Yes we are competing against Peel and others to try and win the waste derived fuel from waste disposal authorities in the North West. There is a limited amount of fuel available within the North West; our facility is big enough to handle all of the fuel that would be generated in the Region.

Q **Have you signed any contracts yet for the fuel?**
A No, but we are in ongoing discussions with a number of waste disposal authorities and do not see any reason why we would not secure contracts if permission to build the plant were forthcoming.

Q **If there was a shortage of fuel from the North West could the plant end up taking fuel from up and down the country?**
A Some supply of fuel from outside of the North West is possible, but we are only tendering for local contracts (Merseyside, Cheshire, Manchester) and we will only be building this plant if we have secured contracts with local authorities to provide us with fuel.

Q **Would INEOS ChlorVinyls ever import fuel from abroad?**
A No.

Q **So where in the North West is the waste treated to make the fuel?**
A It will be for the respective waste disposal authorities to decide where their treatment facilities will be, but these will be located close to where the waste is collected.

Q **Are you going to build a waste treatment plant nearby?**
A No, we have no plans to construct a waste treatment plant at Runcorn.

"Inadequate Monitoring and Control"

Q **Is it true that the Environment Agency only monitors your performance twice per year and warns you when they're coming?**

A The monitoring regime will be one of the most stringent in the world. Not only can the Environment Agency audit us at any time, but we will be required to continuously monitor our emissions 24 hours a day. If any of our readings show our emissions to be in breach of the standards, we have a legal responsibility to advise the Environment Agency who can take whatever enforcement action they deem appropriate.

Q **How can we be sure that regulatory control is sufficient to protect people and the environment?**

A Such regulations have been established in law to protect people and the environment. Adherence to these regulations is compulsory.

Q **What will you do if the regulations change?**

A We are designing the plant to operate well within current and expected future standards. We would have no choice but to meet the regulations that are required by law.

Q **How do you respond to the criticism of UK regulatory standards that only require monitoring of particulates of 10 microns or above?**

A Our plant will exceed UK requirements by operating well within the limits set in draft EU legislation.

"Transportation of Fuel and Residue"

Q **Have you fully considered the impact of traffic associated with fuel and residuetransportation and the congestion and pollution it could create?**

A The planning consultants have undertaken a comprehensive analysis of all traffic associated with the proposed plant and have concluded that there are no significant issues with regards to congestion or pollution.

Q **Are there any health impacts of disposing of the waste fly ash in Halton?**

A Fly ash has to be disposed of safely in properly licensed landfill sites as it contains traces of heavy metals that are captured from the incineration process. The fly ash from our plant would be sent to our Randle Island hazardous landfill site. INEOS is very experienced in the management of hazardous waste and has an excellent safety record at Randle Island. Our processes will ensure that the fly ash is fully contained and all disposal activities would be regulated by the Environment Agency to ensure that there was no hazard to human health or the environment.

Q **Is there really a market for the waste ash that you say will be recycled?**

A Yes, there is a market for the bottom ash, which accounts for the significant proportion of the waste produced by the plant after burning of the fuel – this is used for example to make building aggregates. There are companies that are also working to identify how to recycle the fly ash, however this is some time off. For the time being the fly ash would need to be disposed of at Randle Island.

Q **How will you manage any potential for dust emissions from Randle Island?**

A INEOS has long standing in house expertise in solids management. Fly ash is normally transported as a dry powder in sealed tankers to the disposal site where it is mixed with water or dilute acid to make a wet cake that then sets solid. In our case, as the disposal site is so close we are intending to carry out the mixing at the energy from waste plant so there would be no possibility of dust emissions during transportation/deposition.

Q **If you are filling up Randle with waste from this plant, does this mean that you will run out of capacity ahead of plan, and would you need another landfill site?**

A No. Randle Island has enough capacity to meet our needs, including this plant, well into the future.

Q **Is there any potential for ground water contamination at Randle Island?**

A No. The facility is designed to prevent emissions and is closely monitored and regulated by the Environment Agency.

Q **How can we be sure the operations at Randle Island are safe?**

A It is fully regulated by the Environment Agency.

Q **What other alternatives are you considering to generate energy?**

A In addition to energy from waste we are also looking at offshore wind energy and evaluating novel sources of energy such as fuel cells and tidal power.

Section 4: Health Risks

Protecting safety, health and the environment is the top priority for everyone who works at Runcorn Site. We fully recognise that health is a key concern for people living or working near to our proposed plant. Quite rightly, the residents of Halton expect that their health and the environment will not be damaged by industrial activity – as a company and as individuals who work here, we share this expectation.

Q **How do you respond to the World Health Organisation's conclusion that particulate air pollution has a strong effect on mortality?**

A Particulate air pollution is a very serious matter and one that INEOS fully understands. We have fully considered all the potential emissions from the plant including particulates. Specifically, very fine particles have been fully assessed. Our plant will meet both current and draft regulations on these emissions. Our plant, even if all of the emissions were the finest particulates, would contribute less than 1% of the limits set in EU draft legislation.

Q **How do you justify discrediting many of the health studies that criticise energy from waste technology?**

A An important review conducted in 2004 on behalf of the Department for Environment, Food & Rural Affairs (DEFRA), and peer reviewed by the Royal Society, concluded that there was no evidence found to support a link between incidences of cancer, respiratory disease and birth defects and modern day incinerators. This concurs with the findings of the Medical Research Council; this view has also been supported by Halton & St Helens Primary Care Trust and the Health Protection Agency. Many of the studies referred to by the local media were carried out on old style incinerators that were in operation well before the Waste Incineration Directive came into force. Implementation of the Directive in the UK has drastically cut emissions from waste burning plants. To put this into context, dioxin emissions from fireworks and bonfires on November 5th each year are 24 times higher than the total emissions from all energy from waste plants in the UK for the whole year.

Q **Halton already has one of the worst health records in the North West – won't your plant make this worse?**

A There are many factors that contribute to ill health, such as lifestyle, many of which have nothing to do with industry. We share in the desire to improve the health of local people, which is why we have invested nearly £400 million in environmental improvements to our plants. These improvements mean that the environmental performance of Runcorn Site has never been better,

and we operate well within the targets set by the regulators to protect human health and the environment. If we believed that this plant would compromise this position we simply would not build it.

Q **The stress caused by the health concerns surrounding this plant will have a very serious effect on local people – have you taken this into consideration?**

A We take our responsibility to the local community very seriously. We recognise local concerns about our plant and we hope that through continued dialogue with the community we can address some of the misconceptions and subsequently allay some of the concerns held by residents.

Q **What about the criticisms of your Health Risk Assessment made by Professor Dearden?**

A With respect to Professor Dearden, we disagree that the Health Risk Assessment conducted in support of our application is flawed. We have every confidence in the assessment, which is based on acknowledged sources, for example data from DEFRA, the US Environmental Protection Agency and the World Health Organisation. The Health Risk Assessment was prepared by leading consultants in this field and is only one aspect of the extensive work we have carried out to assess the potential impact of the proposed development on health. Our assessment fully examines a range of issues, including emissions, and their impact upon the local community and environment.

Q **What do you say about the maps Professor Dearden showed linking infant mortality to incinerator location?**

A This data is nothing new and has been used by anti-incineration campaigners up and down the country. There is no credible evidence to suggest that infant mortality rates are linked directly to incinerator location. There are many different factors that are proven to have a direct impact on life expectancy as outlined in the briefing by the Health Protection Agency. It is simple; our plant would not be licensed if there were data to suggest that the health of local people would be damaged as a result of its operation.

Section 5: Economic and social factors

The biggest benefit we as a private company can bring to Halton is by continuing to thrive and invest enabling us to continue to create high quality, skilled jobs in the long term. We want to be a long-term business partner in Halton and play an active role in creating and maintaining prosperity here. We recognise however that in securing our future we also have an obligation to ensure that our growth and prosperity is not at the cost of the community in which we operate. Indeed, our aim, as you would expect, is to grow in harmony with the community and to share some of the benefits that will accrue to our business from this project with the people of the Borough.

"The Image of the Borough"

Q **Do you agree that the proposed development will discourage inward investment in the Borough?**

A No. Runcorn Site is a key source of employment in Halton, supporting some 9,000 skilled jobs. We pay around £60 million in wages every year and spend more than £100 million a year with Halton based suppliers. The new energy from waste plant would bring our total investment in the Borough to nearly £800m – the equivalent of two Second Mersey Crossings. All of this makes us a major stakeholder in Halton – contributing to and sharing in the benefits of the growth and prosperity of this Borough. We firmly believe that our presence in Halton has a role to play in supporting continued inward investment into the Borough.

Q **What do you say to those residents of Weston Point and other areas who have concerns about the plant?**

A We recognise that there is concern about this facility in the local community, but we have an excellent track record of managing our developments in harmony with our neighbours and we will ensure that this development is managed in the same way. We will continue to communicate with key stakeholders and manage our communications with the local community effectively to ensure that people have access to accurate information about the proposed plant.

Q **How do you respond to concerns that your development will have a negative impact on property values in Halton?**

A We understand our proposals to be fully in accordance with the land use allocation for this area as outlined in the local development plan, upon which the people of Halton have been consulted. It is unfair to suggest that INEOS would be directly responsible for any reduction in houses prices in the area, however we recognise that some people will perceive this to be the case. We are confident that safe operation of our facility will restore public confidence in us.

"The Effects on Jobs"

Q **Is there really a risk to jobs if INEOS ChlorVinyls were not to get this plant?**

A Energy underpins the fundamental viability of our entire business. We must resolve this very serious energy issue now, and recognise the danger of delay, if we are to protect our investment and the many thousands of jobs that depend on our operations.

Q **How can we be sure that you won't build this plant and then move away leaving the community with a lasting legacy?**

A Runcorn Site remains at the heart of the INEOS operations in the North West, and is a very key site for INEOS in the UK. The importance of the site to INEOS is demonstrated by our willingness to invest well in excess of £400 million in Halton, with a further commitment of £350 million for this plant. We see our future in Halton for the long term.

Q **If you got permission, and the project was successful, isn't there a real chance that you would want to generate even more of your energy through energy from waste and hence want to build another incinerator?**

A If we had wanted to generate more of our electricity through energy from waste we would have scaled our plant accordingly now rather than build another plant later. These plants are very expensive and the payback period is over decades, rather than years. This plant could take all of the fuel produced by the North West - we would expect that as councils adopt this technology more of these plants would emerge to handle waste from other areas, so it is unlikely that the opportunity to build another plant at Runcorn would occur, as there would not be the fuel for it.

Q **What sort of jobs will be created at the plant and how many?**

A There will be around 50 new skilled permanent jobs, mostly in process operator and maintenance roles. During construction of the project, some 700 or so construction jobs would also be created.

Section 6: Local Concerns Relating to the Immediate Area

INEOS ChlorVinyls takes very seriously its responsibility to the community. Our plant has been designed so that there will be as little impact as possible upon the local community, both during construction and operation. As with the rest of our operations at Runcorn Site, we will run the plant with full consideration of the community and environment in which we operate so that we remain a good neighbour and an

integral part of the community. Our safety, health and environmental performance is our most important and most visible measure, one by which the regulators and the wider community quite rightly judge us.

"The Effects on Residents"

Q **How noisy will the plant be and what will be the impact on residents who live nearby?**

A The facility will operate 24 hours a day, 365 days a year, which is the same as the other plants at Runcorn Site. As part of our application we were required to fully consider what noise may be generated during both construction and operation of the facility. All our equipment will be designed to meet strict noise control specifications and we will take all practical steps to ensure that noise levels are kept to a minimum. Noise levels will be monitored both during construction and operation to ensure that we do not exceed agreed limits and there will be no adverse effect on local residents.

"The Transportation"

Q **Why did your Environmental Statement fail to take into account the houses that are near to the rail line on Percival Lane?**

A. We recognised this omission some time ago and have since undertaken additional work to assess the potential impact on these houses from rail movements. If there is any potential issue identified regarding noise, we will ensure that we put in place measures to address this so that local residents are not disturbed.

Q **What about the houses on Picow Farm Road, Crofton Road and Westfield Road – have these been taken into account?**

A Yes.

Q **Would INEOS ChlorVinyls consider moving the fuel by daytime only so as not to disturb residents at night?**

A Although it is possible that some deliveries will arrive during the night (which is consistent with most freight movements on the UK rail network) our intention is not to offload the fuel during the night, therefore keeping noise levels to a minimum.

"The Construction Phase"

Q **How can you ensure that such a massive construction project would not have a negative impact on local residents?**

A INEOS is very experienced in major construction projects. This project is of a similar size and scale to Project Genesis, which saw the construction of a new chlorine cellroom, boiler plant and centralised control room at Runcorn Site. Project Genesis lasted for around two and a half years and at the peak of construction there were up to 1,000 additional workers on site. During this time we had very few complaints from the local community. We will adopt the same level of consideration for the local community during this project and will ensure that residents are informed right the way through the process. We have also signed up to the Considerate Constructors Scheme and will be monitored against a Code of Considerate Practice, designed to encourage best practice beyond statutory requirements.

"The Visual Aspect"

Q **How do you respond to criticism that in your Environment Statement you have tried to create the impression that the area is very industrial and of low value?**

A This is simply not the case. It would be wrong to suggest that our application was trying to create a misleading impression of the area. It is not in our interests to present inaccurate information to the DTI or the Council.

Q **Can you minimise the visual impact of the stack/buildings?**

A We are mindful of the visual impact of the facility and will work with the Council to agree final finishes. However, you have to bear in mind that the site is within an existing industrial area and the size and scale of the building is determined principally by the technical requirements of the plant including those needed to ensure its safe operation.

Q **Given the level of concern in the local community, and given this is the largest incinerator in the UK, don't you think it is only right this should go to Public Inquiry, if only to demonstrate that people's views and concerns have been taken into account?**

A The consultation process currently under way ensures that everyone has the chance to voice his or her opinion about this development. A Public Inquiry would be a huge set back for us as it would delay the project by about two years, costing us several million pounds in project costs alone. During this time we would continue to be exposed to gas price volatility and we would have to make some very difficult decisions about our future. These delays could also have severe consequences for local authorities in that they would need to find other ways to reduce landfill, risking heavy fines if they fail. We need to deliver this project as early as possible to protect our future and the future of the thousands of people who rely on the site for employment.

END OF DOCUMENT

ELECTRICITY ACT 1989
SECTION 36 APPLICATION

LPA Ref: 07/00068/ELC/HA06/001

Application to Construct and Operate an Energy from Waste Combined Heat and Power Generating Station with an Approximate Capacity of 360MW Thermal and up to 100MW of Electrical Power at INEOS Chlor Vinyls, South Parade, Runcorn, Cheshire.

Response to Merseyside Environmental Advisory Service Memo from Paul Slinn to Halton Borough Council, dated 12 April 2007

Draft

May 2007

INEOS Chlor
Applicant

Contents

A. Introduction

This report has been produced by INEOS Chlor, the applicant, assisted by RPS to provide Halton Borough Council with a response to the points raised in the Memo from Merseyside Environmental Advisory Service to Halton Borough Council, dated 12 April 2007.

Responses to the specific comments raised by Merseyside Environmental Advisory Service (MEAS) are provided in the sections below, numbered as in the Memo from MEAS.

B. Introductory and General Comments

B1. Introductory Comments

INEOS welcome MEAS' comments in support of proposals like this project that seek to recover energy from waste efficiently, as they have the potential to increase sustainable waste management practices according to the waste hierarchy, while at the same time supporting increased energy generation from renewable sources as promoted by the energy hierarchy and reducing demand for primary fossil fuels.

B2. General Comments

MEAS Para 1

Many of the predicted environmental impacts identified are capable of being managed and mitigated and the ES contains a range of appropriate proposals to do so. We advise that all proposed mitigation measures are secured through binding mechanisms such as consent conditions, section 106 agreements or by inclusion within an environmental management plan.

Response

1.1 The ES includes details of a range of measures to which the applicant is committed and which are outlined in Chapter 2 of the ES, the appendices to Chapter 2 and in the 'Measures Adopted as Part of the Project' sections of the topic chapters. INEOS have no objection to the securing of such measures by condition. As described in the Section 36 Application, dated 19 January 2007 INEOS has prepared a schedule of draft planning conditions for discussion and agreement with Halton Borough Council prior to submission to the Secretary of State for his consideration. The draft conditions seek to regulate land use and environmental issues.

MEAS Para 2

The ES contains welcome commitments to the proposed use of procedural mitigation in the form of a Code of Construction Practice (CoCP) linked to a Construction Environmental Management Plan (CEMP), particularly as a draft of the document is provided for review in the ES appendices. However, there is no apparent proposal for an ongoing Environmental Management Plan (EMP) and no indication of how the operation of the plant will interface with other management practices employed on the site by the operator. We advise that an EMP would be an appropriate vehicle for taking forward the implementation of key mitigation measures, and that it should be submitted to the Secretary of State for approval prior to the commencement of works. Merseyside EAS would be pleased to review and comment on the draft EMP prior to agreement. This can be secured through a suitably-worded planning condition.

Response

2.1 The draft Code of Construction Practice provided as Appendix 2.3 of the ES details the measures to be undertaken during construction of the project. INEOS have no objection in principle to the provision of an operational management plan for the facility, which would refer to and interface with existing operating procedures at the Runcorn Site. This could be secured by condition.

MEAS Para 3

The EMP should be time limited and should include details of the measures envisaged during construction to manage and mitigate the main environmental effects of the proposed development. Included within its scope should be measures related to construction and demolition waste management, pollution prevention, soil resource management, noise, vibration, air quality and the prevention of nuisance. The EMP should be compiled in a coherent and integrated document and should be accessible

to the site manager(s), all contractors and sub-contractors working on site, forming a single point of reference for site environmental management. Arrangements for review should be put in place and relationships to wider site environmental management systems and procedures should be defined.

Response

3.1 This paragraph refers to the EMP, detailing measures to manage effects envisaged during construction. It was our understanding from paragraph 2 of the MEAS letter that the request for an EMP related to the ongoing (i.e. operational) management of the facility. A draft Code of Construction Practice (CoCP) is already provided within the ES. This is proposed to manage effects during construction. The draft CoCP provides measures to address the matters raised by MEAS in paragraph 3 of their letter and would be updated once a contractor is appointed to include any planning conditions relating to construction. The final CoCP would be adopted by the contractor and would provide the functions outlined by MEAS in paragraph 3.

MEAS Para 4

The justification for the project included a discussion of emerging waste and energy policy drivers and is set out in Chapter 3 of the ES. It places the project in the context of the favourable drivers for the adoption of energy from waste technology, combined heat and power schemes, and energy from renewable sources. This is a valid approach, especially with regard to the specific characteristics of this particular site, but could have been strengthened with a clearer discussion of the relationship to climate change, the waste and energy hierarchies and wider sustainability issues. We would expect that a project of this scale and type would have been accompanied by a sustainability appraisal but, in the absence of one, the proposal would benefit from a much more detailed discussion of these issues in the ES.

Response

4.1 The project is described in Chapter 2 of the ES, which details the sources of waste that would be used as the basis for the fuel for the facility, the process by which the waste would be converted to fuel and the modes of transport anticipated for fuel delivery. The relevant policy considerations, including the waste hierarchy are set out in the Policies and Plans chapter of the ES. Emissions from the facility are considered in the chapters relating to air quality, ecology and hydrology, hydrogeology and contamination.

4.2 The information provided demonstrates that the RDF that will be used as fuel for the proposed EfW facility will be derived from Municipal Solid Waste (MSW) which is the remnant of household waste after kerbside recycling. This means that in principle the major recyclables (for example glass, metal cans, plastic bottles, paper, and garden waste etc) do not enter the MSW stream. In practice, however, kerbside recycling is not 100% effective, and MSW does contain limited quantities of these materials.

4.3 Prior to the formation of RDF, MSW is processed in a Mechanical and Biological Treatment (MBT) plant. The MBT technology that will be used on Greater Manchester's MSW will go through further physical processes to remove remaining recyclables. Remaining organic material will be subjected to anaerobic digestion (AD), which drives off moisture and breaks down material biologically to generate a biogas that can be used to generate electricity. It is anticipated that the Manchester plants will, combined, generate about 5MW of power.

4.4 The material remaining after these processes contains material that is not recyclable, such as wood, cardboard, non-recyclable paper, non-recyclable plastics, textiles, rubber, leather, inerts etc. It is this that is used to produce the RDF that is proposed for use as fuel for the EfW facility.

4.5 There are relatively few options to manage such residual materials; the main options in common use are:

- Landfill;
- Incineration.

4.6 Landfill is categorised as a method of 'disposal' and as such it sits at the bottom of the waste hierarchy. Incineration without energy recovery similarly represents a 'disposal' option. Incineration with energy recovery, or energy from waste facilities, recover useful energy and can reduce the amount of waste requiring disposal by landfill to less than 10% of the amount fed. It has been proposed that plants with an overall LCV thermal efficiency of greater than 26% may be categorised as 'recovery' rather than 'disposal' options. The overall LCV thermal efficiency of the proposed Runcorn plant is anticipated to be over 39% and would therefore easily fall into this recovery category, a tier above disposal in the waste hierarchy.

4.7 It is therefore considered that the proposed MBT/EfW process is entirely complementary with recycling and the fact that there will always be a requirement to deal with the non-recyclable components of household waste. Overall, the MBT/EfW route will result in a diversion of waste from landfill; a diversion greater than would result from MBT followed by land-filling.

4.8 With respect to the emission of greenhouse gases, energy from waste facilities require an energy input to operate but produce a net energy gain, therefore reducing the need to obtain energy (with consequent potential for emission of greenhouse gases) from other sources. EfW facilities produce emissions, including CO_2. In comparison, landfill of waste results in a breakdown of waste components, resulting in emissions including CO_2 and methane.

4.9 The European Commission has given broad figures of +327 kg of CO_{2eq} generated per tonne MSW treated for waste sent to landfill, compared with an estimated -348 kg CO_{2eq} for CHP plants.

4.10 It is accepted that there are many parameters that need to be taken into account when considering the relative greenhouse gas emissions from EfW and landfill, including:

- Waste constituents (percentage of different waste streams)
- The presence of biogenic/non-biogenic carbon;
- Degradable organic carbon content (DOC) (fraction of waste that is biodegradable carbon);
- Dissimilable DOC (fraction of DOC that mineralises to CO2 and or CH4);
- Collection efficiency of landfill (assuming some energy is recovered);
- Credits for avoided emissions through materials recovered including heat, electricity, ferrous metals etc.;
- Sequestration of carbon within landfill.

4.11 Nevertheless, the EC figures indicate that incineration of waste combined with energy recovery can compare favourably in terms of greenhouse gas emissions compared to the alternative landfill option.

C. Description of the Project

MEAS Para 5

It is accepted that the proposal is for a combined heat and power plant, and that the Ineos site has significant heat and power requirements in order to operate. However, the ES lacks detail about the precise inputs and emissions from the CHP, and whether this is proven to be the Best Available Technology. This lack of detail has bearing on the impacts of the proposed operational plant and its justification in terms of the energy hierarchy, waste strategy and climate change. We advise that the applicant be requested to provide clarification on this matter prior to determination.

Response

Plant Inputs

5.1 The plant inputs are as follows:

- Fuel
- Flue Gas Treatment materials
  - Lime / Sodium bicarbonate
  - Activated carbon
  - Ammonia
- Water Treatment Plant chemicals
  - Hydrochloric acid
  - Caustic soda
- Services
  - Process water
  - Demineralised water
  - Potable water
  - Natural gas
  - Electrical power

Plant Emissions

5.2 A description of the plant emissions is provided in paragraphs 2.49 to 2.55 of the Environmental Statement, and includes:

Gaseous

5.3 Gaseous discharges will arise from the following:

- Stack emissions. These are described in paragraphs 10.19 to 10.21 of the ES;
- Steam. Paragraph 2.50 describes that there will be small emissions from the steam system such as boiler start-up and blowdown vents deaerator vents and steam traps;
- Purge Vents. Paragraph 2.50 describes that the natural gas system will have small purge vents which will operate on start up;
- Stock Tanks / Silos. Paragraphs 2.51 and 2.52 describe the type of vents and their treatment;
- Diesel Powered Fire Pumps. Refer to paragraph 2.52.

Aqueous:

5.4 Aqueous discharges will arise from the following:

- Boiler blowdown: it is expected that approximately $5m^3$/hr of water would be continuously purged from the boiler water circulation system to prevent the build up of contaminants in the system;
- Cooling tower purge: The circulating water for the cooling towers would be continuously purged at a rate of approximately $60m^3$/hr;
- Effluent from demineralised water polishing plant: The water treatment process requires periodic regeneration with hydrochloric acid and caustic soda. The acid would be delivered by road tanker and the caustic soda by a small pipeline from the adjacent storage facility. Following regeneration the

waste liquor/washings would be blended and pH adjusted to a neutral condition prior to discharge.

5.5 In addition to the above there will be surface water and domestic drainage. These are described in paragraphs 2.61 to 2.66 of the ES.

5.6 It would be INEOS' intention to reduce the demand on process water and reduce aqueous emissions by re-use of water wherever practicable. For example, rainwater could be collected and stored for re-use as cooling tower make-up, as discussed in paragraph 7.34. In addition, it is normal practice on plants of this nature to re-use boiler blowdown for ash quenching and other process uses. Consideration will also be given to using part of the cooling tower purge for these purposes. Refer also to the response to para 12.

Best Available Technology

5.7 As discussed in paragraph 2.30 of the ES, the technology selection will be considered by the Environment Agency in detail as part of the PPC application process to demonstrate the use of Best Available Techniques (BAT).

Technology Selection

5.8 An assessment of the technology options and the reasons for the selection of the water cooled moving grate (WCMG) technology is given in the response to Paragraph 9 of the MEAS letter.

5.9 The EA's guidance document for waste incineration plants, S5.01 (http://www.environment-agency.gov.uk/yourenv/consultations/530870/) identifies moving grate technology as suitable for RDF applications.

5.10 We consider that the WCMG technology provides a proven, robust solution, and offers improved environmental performance over the main Circulating Fluidised Bed (CFB) alternative.

Combined Heat and Power (CHP) Plant

5.11 A major benefit of siting the plant on INEOS' Runcorn Site compared with other potential locations is the opportunity this provides to operate the facility as a CHP. This gives the plant higher energy efficiency credentials than a conventional power plant and more of the heat generated in the combustion process is used beneficially.

5.12 The government has set criteria for determining whether a plant can be classed as "good quality CHP". This calculates the energy efficiency of the plant and compares it against a benchmark.

5.13 The two criteria for a plant to be deemed as 100% Good Quality CHP are:

- Electrical efficiency greater than 20% GCV;
- The CHP quality index (CHPQI) greater than 100%.

5.14 The proposed plant will have an electrical efficiency and a CHPQI which will exceed these values. It will therefore qualify as Good Quality CHP and contribute towards the Government's CHP target of 10,000MW by 2010.

Conclusion

5.15 In the context of the above, INEOS consider that the proposed facility provides the Best Available Techniques. This will be considered fully by the Environment Agency (EA) in the PPC application.

MEAS Para 6

Section 2.21 gives predicted quantities of RDF/SRF from the surrounding sub-regions. Section 2.22 discusses the possibility of burning of other non-hazardous wastes or

biomass. There is no discussion of the quantities of other biomass, where it would be sourced from, what it would be or how it would get to site. We advise that the applicant be requested to provide clarification on this matter prior to determination.

Response

6.1 Fuel derived from municipal waste would provide the main source of energy for the plant. It is expected that it would be sourced primarily from local authorities in the North West region. However, in the event that there is insufficient RDF to fill the plant, INEOS may wish to use the facility to burn other non-hazardous materials, such as some types of biomass, confidential waste (shredded paper) and appropriately treated commercial or industrial waste. Any such use would be subject to the approval and grant by the Environment Agency of the necessary statutory Pollution Prevention and Control (PPC) permit in accordance with the Pollution Prevention and Control (England and Wales) Regulations 2000.

6.2 The biomass could include the following:

- Wood pellets derived from sawdust;
- Wood chippings;
- Crops such as coppice- willow or miscanthus which are purposely grown for their energy content.

6.3 These are all natural products which contain no hazardous or potentially hazardous components, and will not affect the conclusions reached in the Environmental Assessment.

6.4 Biomass is an expensive fuel. Consequently there is a strong commercial incentive to maximise the amount of RDF burnt, and only burn other fuels when insufficient RDF can be sourced.

MEAS Para 7

Section 2.47 discusses waste products from the process. This is not particularly well quantified ranging from 150,000 and 275,000 tonnes per annum. The worst case scenario is that there would be 32.4% residue from an original 850,000tonnes input. This in itself is an impact for consideration. We would wish to see all bottom ash beneficially used, as this would represent a poor use of landfill void. However, the ES fails to discuss the potential market demand for the beneficial re-use of bottom ash and it is therefore unclear what proportion it may be possible to re-use compared to the expected landfill requirement. We advise that the applicant be requested to provide clarification on this matter prior to determination. The amount of residue produced should be an important factor informing the choice of process technology for the scheme and we would expect this to be reflected in a more detailed discussion in the context of BATNEEC as part of the examination of alternative options (see also paragraph 9 below).

Response

7.1 The application left open the choice of technology between Circulating Fluidised Bed (CFB) boilers and Water-cooled Moving Grate (WCMG) boilers. These technologies result in different proportions of bottom and fly ash, and the application was written to cover the worst cases. Following further work, WCMG technology has been selected, which now enables us to be more precise about waste production.

Bottom Ash

7.2 The maximum ash content of the RDF will be 25% of a dry basis. It is expected that 90% of this will appear as bottom ash, and 10% will appear as fly ash.

7.3 Taking the worst possible combination of volume and inerts content, maximum production will be 22.5% of 850,000 tonne/yr, viz 191,000 tonnes per annum.

Fly Ash

7.4 Taking the worst possible combination of volume and inerts content, maximum fly ash production will be 2.5% of 850,000 tonnes per annum, viz 21,000 tonnes per annum. This assumes the total ash content will be 25%.

Flue Gas Treatment (FGT) Residues

7.5 As the furnace gasses are similar for both options and the flue gas treatment is similar, the amount of residues is common for both.

7.6 Using worst case figures, it is expected that 0.064 tonne of residues are produced for each tonne of fuel burnt. Taking the worst case throughput of 850,000 tonnes per annum, maximum FGT residue arisings will be 54,000 tonnes per annum.

Total Waste Arising

	Maximum (tonnes per annum)
Bottom Ash	191,000
Fly Ash	21,000
FGT residues	54,000
Total Waste Arising	266,000

7.7 Bottom ash is non-hazardous and, after suitable treatment, it can be used as a replacement aggregate in concrete, asphalt, block manufacture or Type 1 sub-base. There are companies (e.g. Ballast Phoenix) who specialise in this activity, and it is our intention either to let out a contract to one of these companies or to do the work in-house. We confirm that it is not planned to send this material to landfill where an appropriate alternative is available.

7.8 Fly ash and Flue Gas Treatment Residues are hazardous, and there is little alternative but to send this material to a landfill site licensed to handle hazardous waste

7.9 WCMG boilers produce approximately 10% fly ash and 90% bottom ash. The competing technology – circulating fluidised bed boilers – produce nearer 50% fly ash and 50% bottom ash. The fact that WCMG boilers produces the minimum possible quantity of residues for landfill was a significant factor in the choice of this technology.

MEAS Para 8

With regard to fly ash and FGT residues, there is a proposal to dispose of this to Randle Island landfill, but there is no detail regarding the capacity and lifespan of the landfill, or the impacts of this disposal requirement once the landfill closes in terms of hazardous waste landfill availability in the North West region. We advise that the applicant be requested to provide clarification on this matter prior to determination.

Response

8.1 The capacity of Randle Landfill Site is about 3.5 million m^3. The current rate of landfill is about 17,000 m^3 per annum.

8.2 The current estimate is that the EfW plant will produce a maximum of 75,000 tonnes per annum of fly ash and flue gas treatment residues. The density of these is ca 0.7 tonnes/m^3, giving a volume of 107,000 m^3 per annum. Combined with the volume from other sources, the total volume land-filled will be 124,000 m^3 per annum. This equates to a **minimum** life in excess of 28 years for Randle Landfill Site.

MEAS Para 9

We are concerned that the section on alternatives focuses on location and layout, failing to discuss technological options. Attention should be given to alternative technologies, for example plasma gasification, which is more efficient in terms of power generation and produces minimal quantities of residue. However, we also note that the detailed technology selection has not yet been made (para 2.30 of the ES) and we are concerned that this is not made more clear in the ES and its implications for the impact studies explained. It is our view that this uncertainty over the final form that the process will take, together with the failure to discuss the main technological alternatives, constitutes a significant weakness in the ES. We advise that the applicant be requested to provide clarification on this matter prior to determination as the choice of technology will have a material effect on the significance and nature of environmental impacts within the EIA.

Response

Technology Selection

9.1 As discussed above, INEOS Chlor has now selected water-cooled moving grate (WCMG) as the technology for the proposed plant.

9.2 The proposed plant would provide the outlet for the vast majority of the SRF/RDF produced in the North West of England and represents an alternative to landfill. This would be a waste of such fuel resulting in higher CO_2 emissions, use of remaining landfill capacity and would result in significant landfill taxes and other financial penalties being incurred.

9.3 It is of paramount importance therefore both to the Waste Disposal Authorities and to INEOS that the proposed plant uses technology with a proven operating performance on a similar scale to the proposed plant. Furthermore, much of the funding for this venture will be provided by banks. The banks will only be prepared to invest if they are satisfied that the plant will be capable of sustained performance.

9.4 For these reasons, reliability of operation and the ability to obtain finance were very important considerations in selection of the technology.

9.5 As part of the initial design phase of the project all available technologies were reviewed. These included advanced combustion technologies (ACT) such as Pyrolysis, Gasification and Plasma gasification as well as conventional combustion technologies. Our assessment found that there were very few ACT plants operating in Europe and these were only at a small scale and not appropriate for the proposed plant. A number of larger plants have been built using pyrolysis technology but these failed to operate successfully and have been shutdown. ACT plants also have a very high capital cost such that they are not financially viable unless heavily subsidised by local or national government.

9.6 In terms of conventional technology both moving grate and fluidised bed technologies were considered. The conclusion of the study was that fluidised bed technology offered no energy efficiency or cost advantages over the moving grate technology. Fluidised bed technology is relatively uncommon and a number of plants have had significant operating problems. On the other hand moving grate technology is well proven with many years experience of successful operation.. Moving grate technology is the industry standard across Europe. In addition fluidised beds produce a far higher proportion of hazardous ash that requires disposal. It was therefore concluded that modern moving grate technology was the best available technology for the site.

IMPACT OF TECHNOLOGY SELECTION ON ENVIRONMENTAL IMPACTS

9.7 At the time of writing the ES, the detailed combustion technology had not been finalised. However, the ES was based on conservative 'worst-case' assumptions for each topic to ensure that the environmental effects were not underestimated. For example, the ES assumed a main building height that related to the technology requiring the largest scale building. Therefore the selection of the technology does not affect the conclusions reached in the ES.

MEAS Para 10

Section 2.70 states that the majority of fuel would be received by rail (600,000 tonnes) and the rest by road (480,000 tonnes). Is this a realistic assumption given that some uncertainties remain about the technology to be used and the mix of SRF and biomass fuel to be employed? Some of the alternative sites are ruled out because of the lack of rail links. We encourage the scheme to promote sustainable transport options wherever possible within the context of the strategic transport infrastructure for waste, but we do not feel that the soundness of the ESs projections for fuel transport have been thoroughly demonstrated. We advise that the applicant be requested to provide clarification on this matter prior to determination.

Response

10.1 The assumptions made in terms of traffic numbers and mode of waste delivery are set out in Section 6 of our previous response to Halton Borough Council.

10.2 Given that a significant proportion of the waste is anticipated to be received by rail, it is considered appropriate that the potential for accessing site options by rail was a factor in the site selection process. We welcome MEAS comments regarding the promotion of sustainable transport solutions.

MEAS Para 11

Section 3.16 states that RDF is likely to contain 60% biomass, but RDF is derived from municipal solid waste and, whilst this will contain organic matter, it is not biomass fuel and is likely to contain a significant quantity of plastics. However, the application fails to make clear what the precise specification and minimum requirement for the composition of the fuel will be and this therefore requires further elaboration. There needs to be clearer discussion within this section on the relationship between the waste and energy hierarchies, and a reasoned estimate should be provided of the proportion of the generated energy that can be designated as arising from renewable sources, including the proposed co-firing with separately-sourced biomass fuels, for which little detail is given. We advise that the applicant be requested to provide clarification on this matter prior to determination.

Response

11.1 The EU Renewable Energy Directive (2001/77/EC) carries a definition of biomass[1] and recognises the biomass fraction of mixed wastes as a source of renewable energy. Consequently, if the biomass fraction of the RDF is 60% NCV, then it is legitimate to claim that 60% of the energy generated is renewable.

11.2 60% is a generally[2] accepted proportion and the MBT processes proposed by Manchester will produce an SRF with 60% renewable. It is considered that this is also a valid assumption to use for RDF arising from other sources.

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[1] Biomass is defined as "the biodegradable fraction of products, wastes and residues from agriculture.... forestry and related industries, as well as the biodegradable fraction of industrial and municipal waste."

[2] For example, see the report "Extending ROC Eligibility to Energy from Waste with CHP" issued by Ilex Energy Consulting in September 2005 on behalf of the DTI. The first bullet in Paragraph 3.2 supports the 60% biomass number

11.3 The biomass fraction of RDF generally comprises food, paper, cardboard, garden waste, leather, wood and some textiles e.g. cotton etc. The non-biomass fraction of RDF generally consists of various plastics, man-made textiles and rubber. Contrary to what might be expected, it has been found that the biomass fraction of MWS/RDF does not vary significantly as the amount of recycling increases.

11.4 As stated previously, it is INEOS' intention to burn RDF. However it is intended to retain the capability to burn biomass in the event of inability to source sufficient RDF. In the event that biomass is burnt, it will result in the overall biomass fraction increasing above 60%.

D. Water Resources and Drainage

MEAS Para 12

Section 2.53 discusses emissions to water and contaminants in the 'operational' water. There is no quantification of the contaminants in the various effluent streams, but significant quantities of effluent are likely to be discharged. We advise that the applicant be requested to provide clarification on this matter prior to determination.

Response

12.1 The sources of aqueous discharges from the site are divided into 2 categories:

- Rainwater;
- Process water.

Rainwater

12.2 Section 2.63 and 2.64 of the ES describe the measures to handle rainwater.

Process Water

12.3 Section 2.53 of the ES describes the process effluent arisings as follows:

- Boiler blowdown: it is expected that some 5m3/hr of water would be continuously purged from the boiler water circulation system to prevent the build up of contaminants in the system;
- Cooling tower purge: The circulating water for the cooling towers would be continuously purged at a rate of approximately 60m3/hr;
- Effluent from demineralised water polishing plant: The water treatment process requires periodic regeneration with hydrochloric acid and caustic soda. The acid would be delivered by road tanker and the caustic soda by a small pipeline from the adjacent storage facility. Following regeneration the waste liquor/washings would be blended and pH adjusted to a neutral condition prior to discharge.

12.4 The facility requires water for a number of uses within the plant. Some require clean water, but others are capable of using 'brown' water. These include, for example, bottom ash cooling and production of the lime slurry for use in the flue gas treatment area.

12.5 In addition to the effluents described above there are other minor streams such as drainings from the Fuel Bunker and Ash Bunker. These are expected to be less than 1 m^3 per day and it is the design intent that these streams are re-used within the plant, and not sent to outfall.

12.6 It is anticipated that the boiler blowdown and cooling tower purge streams will be re-used whenever possible. However, there will be times when the process effluent water arisings are greater than the demand. In this event, it is intended that surplus water from the cooling tower purge will be directed to the INEOS Salt outfall.

Composition of the Water Streams

Cooling Tower Blowdown

12.7 The plant cooling system is not in contact with the process and therefore is not contaminated by any of the materials in the process. However pure water evaporates from the cooling tower causing the impurities in the cooling system to increase. The level of impurities is controlled by a purge from the system. This purge contains the same chemicals as the makeup water added to the tower (typically river or towns water) but in higher concentrations. The purge also contains chemical additives which are used to condition the cooling water.

12.8 Assuming grade one river water is used as make up, we would expect the cooling tower purge to have the following composition:

Conductivity:	2000 uS/cm
Chemical analysis	
Na	115 mg/l as Na
Mg	25 mg/l as Mg
Ca	140 mg/l as Ca
Cl	150 mg/l as Cl
SO_4	240 mg/l as SO4
PO_4	< 20 mg/l as PO4
TOC	< 25 mg/l due to natural organics in the raw water + chemical additives
pH:	8.0 to 8.5
Suspended solids:	< 20 mg/l
Flow:	Up to approximately 60 m^3/hr

12.9 The above is based on the use of sodium hypochlorite as a biocide, a phosphate-based corrosion inhibitor and a dispersant.

Water Treatment Plant

12.10 The stream from the water treatment plant is intermittent in nature. It is estimated that flows of approximately 60 m^3/hour will occur for 1 hour every day. It is anticipated that the composition of the water will be approximately as follows:

Conductivity:	25000 uS/cm
Chemical analysis	
Na	4400 mg/l as Na
Mg	very low, < 100 mg/l as Mg
Ca	very low, < 250 mg/l as Ca
Cl	6800 mg/l as Cl (assuming HCl as regenerant)
SO_4	very low, < 250 mg/l as SO4 (assuming HCl as regenerant)
pH:	5.0 to 9.0
Suspended solids:	< 10 mg/l
Flow:	Up to approximately 60m3/hr for a 1 hour period per day.

12.11 It is not envisaged that water from WTP will be suitable for re-use due to its low overall flow and relatively high conductivity levels and it will therefore be directed to the INEOS Salt outfall.

Boiler Blowdown

12.12 This is a purge from a system fed with demineralised water, it typically contains:

Conductivity:	< 100 uS/cm
Chemical analysis	
Na	< 5 mg/l as Na (assuming sodium phosphate based treatment in the "normal" range)
Mg	<< 1 mg/l as Mg
Ca	< 1 mg/l as Ca
Cl	< 2 mg/l as Cl
SO_4	< 2 mg/l as SO4
PO_4	< 10 mg/l as PO4
Ammoniacal N	< 2 mg/l as N if used
pH:	9 to 10.5
Suspended solids:	< 5 mg/l

MEAS Para 13
Section 7.34 discusses the proposals for surface water management. Surface water drainage provision is currently inadequate on the site and this will be upgraded as part of the development. We commend the proposal to re-use surface water run-off, and would recommend that this is further enhanced by collection of roof run off. The current proposal is for roof run off to go to soakaway. It would be more beneficial if this was re-used. Also, should ground contamination be revealed, it may not be possible to use infiltration systems. However, in line with the provisions of Policy Planning Statement 25, Development and Flood Risk, Merseyside EAS supports the use of Sustainable Urban Drainage Systems (SUDS) techniques wherever they are appropriate.

Response
13.1 MEAS commend the proposal to re-use surface runoff and for sustainable infiltration systems. INEOS would have no objection to the collection and reuse of roof runoff.

MEAS Para 14
Although it is stated that cooling waters will be discharged via existing pipes and outfalls into the Runcorn – Weston Canal and eventually the Mersey Estuary, there is no explanation or consideration of the likely temperature of the cooling waters on discharge. It will be important to know if the cooling water discharge will be at ambient temperature of the receiving water course, lower, or higher. Given the proximity of the Mersey Estuary SPA a matter such as this should have been considered and we advise that the applicant be requested to provide clarification on this matter prior to determination.

Response
14.1 Section 7.73 of the EA states that:
The application site currently drains to Runcorn & Weston Canal via the neighbouring works drainage system to Salt 3 outfall. This is also used for general surface water drainage from the Salt Works site. There are 2 other outfalls from the Salt Works, Salt 5 and Salt 7. These discharge into the Manchester Ship Canal. One takes the cooling water discharge from the combined heat and power plant (Salt 7) and the other is the process outfall from the Salt Works (Salt 5).

14.2 The cooling water and water treatment plant streams would be routed to discharge at Salt 5 outfall and/or Salt 7 outfall after treatment and testing as required. These outfalls are currently subject to WRA 91 authorisation with agreed consent limits. The temperature and flows from the two streams will be within these existing consent limits.

14.3 All discharges to the environment will be included in the PPC application, and will be subject to approval by the EA.

MEAS Para 15
The ES acknowledges that the CHP plant will use large quantities of water. However no estimate is given for the actual quantity and rate of use and the implications for additional abstraction of water are not provided. Whilst this is primarily a matter for the Environment Agency through abstraction and discharge licensing and consent processes, we advise that the applicant should be requested to clarify process water supply arrangements and quantities, both in absolute terms and as an additional proportion of existing abstraction licenses held by the applicant (If applicable), prior to determination.

Response

15.1 The main use of water for the plant is cooling tower make-up. It is expected that the typical total water usage will be approximately 250 m^3/hr. Runcorn Site currently uses approximately 700m^3/hr of water on average. INEOS Chlor do not intend to abstract any water, but to source the water from United Utilities or another water supplier.

15.2 As discussed, it is INEOS' intention to re-use water wherever practicable, by, for example, recycling process water and use of surface water as cooling tower make-up.

E. Ecology

MEAS Para 16
The impact of the extent and proposed treatment of the contaminated land on the site has been considered only from a human health angle. The Contaminated Land Regulations identify specific ecological receptors that should be considered, including European nature conservation sites such as SPAs, SACs etc. This appears to be an omission. We advise that the applicant be requested to provide clarification on this matter prior to determination.

Response
16.1 MEAS states that the assessment of effects relating to contaminated land deal with human health aspects only and that effects on ecological receptors (such as SPAs, SACs etc) should be considered.

16.2 Contaminated land is considered in Chapter 7 (Hydrology, Hydrogeology and Contamination) of the ES. Para 7.3 of the ES refers to the sources of information used in establishing the sensitivity of the environmental setting, which includes the information gathered as part of the ecological assessment for Chapter 6. Para 7.5 identifies ecologically important sites as 'receptors'. Table 7.3 provides a preliminary risk assessment, which includes effects on surface water and the Mersey Estuary.

16.3 Paras 7.13 to 7.34 explain the measures that would be adopted to control the effects of ground contamination and to protect ground water and surface water.

16.4 Under the heading Ecologically Sensitive Land Use, para 7.76 identifies the following categories of protected sites:

- Sites of international importance for nature conservation (Ramsar sites & Special Protection Areas);
- Site of national importance for nature conservation (Sites of Special Scientific Interest);
- Sites of importance for nature conservation (SINCs).

16.5 Sites in the last category are locally designated non-statutory sites.

16.6 Para 7.77 states that these sites include the Mersey Estuary, which is designated as a Ramsar Site, Special Protection Area and Site of Special Scientific Interest.

16.7 Para 7.125 considers the potential effects of contamination at the site on surface water quality, including the ecologically important Mersey Estuary, taking into account the measures to control such effects, and concludes that treatment of existing contamination at the site would result in a minor beneficial effect.

16.8 It is evident that the ES has considered the potential ecological effects on the only designated site sufficiently close to the proposed development site for there to be any potential for effects as a result of contaminated land, and has assessed those effects. The chapter concludes that there would be no significant effect on the Mersey Estuary (which includes the SPA) or on other surface water bodies in the area.

MEAS Para 17
Figure 2.1 shows the landscape proposals that are included within the scheme as 'built-in' mitigation. These proposals indicate that a visual planted screen will be created to the south of the facility only. The proposals form barely an acceptable minimum and do nothing to improving screening of industry from the Estuary. It is difficult to see how the proposals meet the advice contained in PPS9, particularly key principle (ii) and paragraph 14 where the advice states "Development proposals

provide many opportunities for building-in beneficial biodiversity or geological features as part of good design. When considering proposals, local planning authorities should maximise such opportunities in and around developments, using planning obligations where appropriate." We advise that the applicant should be asked to look again at the landscape proposals and enhance the biodiversity gains within this proposal.

Response

17.1 It is not considered appropriate for this project to be required to include measures that would screen industry generally from the Estuary.

17.2 There is limited scope within the application area for habitat creation and landscape planting. Nevertheless, landscape proposals comprising planting have been incorporated as an integral part of the project, with structure planting to be established along the southern perimeter of the site. Native tree and shrub species would form a robust mix to filter views of the development and add visual and ecological diversity to the townscape. As stated in Chapter 5 of the ES, this proposed planting would enhance the existing poor quality of the area's urban character and provide important buffers with neighbouring residential areas.

MEAS Para 18

We advise that the methodology used in assessing the impact on Ecology (Chapter 6 of the ES) is acceptable, although it should be noted that the applicant has taken a 'pick and mix' approach to acceptable methodologies and this can lead to selectivity of significance of impacts. This chapter summarises the issue of appropriate assessment under the Habitat Regulations with reference to the air quality assessment – that is considered in Chapter 10 Air Quality. The ecological significance (or not) of those identified air quality impacts is not dealt with sufficiently.

Response

18.1 MEAS states that the assessment methodology used is acceptable but refers to it as a 'pick and mix' approach.

18.2 The methodology is set out at paras 6.2 to 6.33 of the ES. As explained at para 6.2, this takes account of the following relevant guidance:

- Institute of Environmental Assessment (1995) Guidelines for Baseline Ecological Assessment;
- Department for Transport (2004) Transport Analysis Guidance (TAG): The Biodiversity Sub-Objective (TAG Unit 3.3.10);
- Institute of Ecology and Environmental Management (2006) Guidelines for Ecological Impact Assessment in the United Kingdom.

18.3 The IEA guidelines for baseline assessment are the industry standard and are used. Similarly the IEEM guidelines for ecological impact assessment are the industry standard and are used. However they lack an assessment of the overall significance of effects and thus it is difficult to assess the ecological effects in the context of the other topics covered in an ES. Therefore we adopt the method for assessment of significance from the DoT TAG guidance since this enables this assessment to be carried out. This is not a 'pick and mix' approach. It is a considered method for addressing the shortcomings in the guidance so that the potential ecological effects can be properly assessed.

MEAS Para 19

We have considered the question "is there enough information submitted to enable the screening of the proposal against the requirements of the Habitat Regulations, specifically regulations 48 & 49?" There is a discrepancy between this list of European

sites in this chapter and those quoted in the Air Quality assessment (Appendix 6.5). Additional sites between 10 and 15km from the application site are considered in the Air Quality Assessment (Midland Mosses & Meres Phase 1 and 2 Ramsar sites). These should have been included in the Ecology chapter. From our review of the information, this aspect is the one of most concern. For example, no detail has been provided on the expected dispersion pattern of NOx, SOx and acid deposition and its relationship to prevailing wind characteristics. Also, the basis for the air quality assessment parameters used is unclear. Accordingly, we advise that without additional information the competent authorities would not be able to screen the proposal as required under the Habitat Regulations. Clearly therefore the applicant will need to provide this additional information to assist the competent authorities in discharging their statutory duties under the Habitats Regulations. This information should be provided prior to determination. Natural England should be consulted on the application and whether, in its view, there is a likelihood of significant effects.

Response

European Sites Assessed

19.1 The tables referred to by MEAS are provided for different purposes and therefore relate to different areas.

19.2 The area of interest for ecological impact assessment identified in the IEA guidance is usually a distance of 2km from the proposed development, since beyond this distance there is little potential for significant ecological effects. The only European site within 2km of the proposed development is the Mersey Estuary SPA (which is also a wetland designated under the Ramsar Convention). The potential effects of air pollution on the estuary are addressed in the main text of Chapter 6. Table 6.4 provided in the ecology chapter details all the sites designated for nature conservation (including locally designated sites) within 2km for the purposes of the main ecological assessment.

19.3 However, in some circumstances (for example power stations) the guidance recognises that the effects of changes in air quality may extend beyond 2km. The ES recognises this and, as referred to at para 6.165 of Chapter 6, the potential effects of aerial deposition on the estuary, and other European sites within 15km of the proposed facility are assessed in Appendix 6.5. Appendix 6.5 is an appendix to the ecology chapter (and therefore part of the ES) and the information contained within it is used to form the basis of the consideration of effects provided within the main chapter. Therefore, sites such as Midland Mosses and Meres have been considered as part of the ecological assessment.

19.4 The assessment in Appendix 6.5 follows the guidance of the Environment Agency's document Work Instruction: (Appendix 7) – Further Guidance on Applying the Habitats Regulations to Integrated Pollution Control (IPC), Pollution Prevention and Control (PPC) (V6).

19.5 This guidance states (Stage 1 and 2 Assessment of new PIR permissions under the Habitats Regulations para 1.3.1) that, with some exceptions, a distance of 10km to a European site should be used as an initial indication to determine whether the Habitat Regulations are relevant. The only instance where a greater distance is indicated is for centrally dispatched coal and oil-fired power stations where the relevant distance is 15km. On a precautionary basis, the ES uses this 15km distance rather than the 10km threshold.

Dispersion Modelling

19.6 The air quality technical appendix (Appendix 10.1) includes contour plots of short-term and long-term dispersion patterns from the proposed facility. Although these have been generated for the pollutant NO_2 only, Paragraph 7.22 within Appendix 10.1

acknowledges that the "contour plots are considered to be representative of the dispersion patterns for all pollutants". Therefore, the expected dispersion patterns of NO_x, SO_2 and aerial deposition can be inferred from the contour plots included in Appendix 10.1.

19.7 The dispersion modelling input parameters have been documented within the methodology (Section 6) reported in Appendix 10.1. All available best practice guidance has been taken into account to inform the methodology for the air quality assessment studies. Specifically with reference to the post-processing of dispersion modelling results to derive aerial deposition rates, the methodology used is that set out in the Environment Agency's Technical Guidance on detailed modelling approach for an appropriate assessment for emissions to air (AQTAG 06, Habitats Directive 2004).

Consultations

19.8 RPS wrote to Natural England on 14th November 2006 consulting them regarding the provision of information for an Appropriate Assessment under the Habitat Regulations. We provided our proposed Ecological/Air Quality Methodology, based on EA guidance for this type of facility, and requested any comments or data that would assist in the assessment of the potential effects.

19.9 Natural England responded by e-mail on 30th November 2006 providing 'The Regulation 33 Statutory Advice for the Mersey Estuary' which provides details of the conservation objectives together with any operations which may cause harm or damage to natural habitats, or the habitats of species, or the disturbance of species. Natural England also recommended that we obtain the advice of the Environment Agency regarding the Habitat Regulations Assessment.

19.10 The Regulation 33 document includes Advice on Operations in Section 6. This includes sections on Toxic Contamination (6.8.1 iv) and Non-toxic Contamination (6.8.1 v). The document refers to the Mersey Estuary having one of the largest concentrations of heavy industry in the UK, as well as a large human population in its catchment. The pollutant concerns referred to are entirely due to water-borne contaminants, emphasising the importance of this pathway. In spite of the high concentration of industry, there is no reference to airborne contaminants indicating the relevance insignificance of such sources in the context of the estuary.

19.11 RPS wrote to the Environment Agency (also on the 14th November 2006) requesting information relevant to the assessment of effects on the Mersey Estuary. No written response was received but the methodology for the assessment of the effects of air quality was informally discussed with the Agency. The method used for modelling is that set out in the Environment Agency's Technical Guidance on detailed modelling approach for an appropriate assessment for emissions to air. AQTAG 06. Habitats Directive (2004). As referred to above, the assessment in Appendix 6.5 follows the guidance of the Environment Agency's document Work Instruction: (Appendix 7) – Further Guidance on Applying the Habitats Regulations to Integrated Pollution Control (IPC), Pollution Prevention and Control (PPC) (V6).

MEAS Para 20

A series of mitigation measures have been included in the ES and we advise that these should be subject to planning conditions as follows:

- *Paragraph 6.35 – no vegetation clearance between 01 Mar and 31 Aug in any year.*
- *Paragraph 6.36 – reptile survey for submission and approval together with detailed method statement for translocation methodology and receptor site/timing etc to be agreed prior to any works commencing.*

- *Paragraph 6.37 – CoCP- Appendix 2.3 paragraphs 1.30 – 1.31 are acceptable and should be subject to planning condition.*
- *Paragraph 7.131 – proposals to consider ponds as SuDS – condition required for submission of detailed drainage proposals that include biodiversity enhancement and landscape mitigation.*

Response

20.1 As discussed above, where measures have been committed to within the ES INEOS have no objection to these being subject to planning conditions. All measures outlined in Chapter 2, the appendices to Chapter 2 and in the 'Measures forming Part of the Project' sections of the topic chapters are considered to be part of the project and are measures to which INEOS is committed. It should be noted that where measures are identified as 'further mitigation' at the end of chapters these are recommendations for consideration made by the chapter authors but are not part of the development applied for.

MEAS Para 21

Paragraph 6.45 – no details of the surveyor(s) qualifications or experience have been submitted. It would be premature to accept the extended phase 1 survey and species list until those details are submitted and are found to be acceptable. This goes to the heart of the quality of the data used in the assessment and we advise that this information be requested from the applicant prior to determination.

Response

21.1 RPS employ fully qualified and experienced ecologists to undertake ecological survey work for proposed developments. The work for Chapter 6 was undertaken by Kerry Nicholson (BSc, C.Env., MIEEM) and Brian Chilcott (BSc, MSc, E.Env, MIEEM).

21.2 Kerry has a degree (BSC Hons) in Environmental Science and is a full member of the Institute of Ecology and Environmental Management. She is also a Chartered Environmentalist. She is a Principal Ecological Consultant with RPS and has eight years experience as an ecological consultant for WSP and RPS. Kerry is a protected species licence holder, with experience in protected species surveys and development of mitigation strategies.

21.3 Brian has a degree in anthropology (BSc Hons) and a masters degree and diploma in nature conservation. Brian is a full member of the Institute of Ecology and Environmental Management and a Chartered Environmentalist. Brian is a principal ecologist with 10 years experience and holds licences relating to protected species from English Nature, Countryside Council for Wales, DEFRA and the Welsh Assembly Government. He has particular experience in providing advice and mitigation plans for developments affecting protected mammal and herpetofauna species and in the implementation of mitigation measures, including translocation of habitat and protected mammal and herpetofauna species.

MEAS Para 22

Paragraph 6.93 – does not highlight the Section 74 list of principal habitats and species that local planning authorities must take into account under the Countryside and Rights of Way Act. For example, has the phase 1 survey or desk study identified the presence of any of these principal habitats and species? We advise that the applicant be requested to provide clarification on this matter prior to determination.

Response

22.1 MEAS refer to the absence of references to the S74 list of principal habitats and species under S74 of the Countryside and Rights of Way Act (now superseded by S41 of the Natural Environment and Rural Communities Act) at para 6.93 of the ES.

22.2 All of the relevant habitats and species are identified as Valued Ecological Receptors in Table 6.5 of the ES. However, it is the case that, in addition to being identified as Cheshire BAP habitats as referred to in the ES, Coastal saltmarsh, Mudflats and Lowland heathland are also included in the S74 list and are UK BAP priority habitats. Similarly, great crested newt and common pipistrelle bat (identified as VERs in Table 6.5) are included in the S74 list.

MEAS Para 23

Paragraph 6.144 – A hand-search of potential refugia for great-crested newts has been undertaken. This is an unreliable method of determining whether great-crested newts are present on the site. There is a likelihood of a small remnant population (cf. the small population translocated from the other Ineos Chlor site that is reference in the ES). Hence, we advise that a great-crested newt survey is required prior to determination. This survey needs to be undertaken using the standard methodology and can take place between February and June depending on local climatic conditions.

23.1 At the time of production of the ES (winter 2006/2007), newt survey work was not appropriate. As we explain at para 6.44, newts were translocated from the Rocksavage Power Station site, which is part of the wider Ineos Runcorn site approximately 3 miles south of this project site. The major part of the newt population was translocated to a site some 6 miles away in Frodsham, although a small proportion was retained on the site.

23.2 The suitability of the two ponds on the site for amphibians is considered at para 6.125 of the ES. This states that:

'The two ponds on site are very isolated in a highly urbanised environment. Both ponds are man made, steep banked and one is fed with water from a disused workshop on site. The other pond is currently dry. The surrounding road network, active railway and urban nature of the main INEOS Runcorn Site all act as barriers for amphibian dispersal onto this part of the site. Their location is considerably distant from the nearest known population of Great Crested Newts. The ponds have been examined to consider their potential as newt habitat and this is considered to be minimal.'

23.3 This remains our view. It is supported by the consultation response from the Cheshire Amphibian Group, reported in Table 6.3, who stated that great crested newts were unlikely to be present on the site due to its severed location away from any wildlife corridors.

23.4 Notwithstanding our view as to the unlikelihood of the presence of the species, a great crested newt survey is currently underway to confirm presence/absence.

MEAS Para 24

Paragraph 6.166 – states that there is no requirement for a habitat regulations assessment as there is no likely significant effect on any of the sites. This does seem to be at odds with the statements in the Air Quality assessment where deposition will add to the current rates of deposition that already exceeds critical loads. On this basis, we advise that it is not possible to conclude that there is no likely significant effect on the information submitted and that the proposal does need to be screened in detail.

Response

24.1 As explained at para 2.6.1 of the Environment Agency's document Work Instruction: (Appendix 7) – Further Guidance on Applying the Habitats Regulations to Integrated Pollution Control (IPC), Pollution Prevention and Control (PPC) - Stage 1 and 2

Assessment of new PIR permissions under the Habitats Regulations (V6), for long term effects:

'Where the concentration within the emission footprint in any part of the European site(s) is less than 1% of the relevant long-term benchmark (EAL, Critical Level or Critical Load), the emission is not likely to have a significant effect alone or in combination irrespective of the background levels.'

24.2 Referring to the tables in Appendix 6.5 of the ES, for NO_x (Table 5), all of the predicted contributions from the proposed facility for European sites are below this threshold (and can therefore be assessed as being unlikely to have a significant effect) other than the maximum level for the Mersey Estuary. The same is true for SO_2 (Table 6).

24.3 The Environment Agency's guidance sets out the criteria to be employed where the 1% threshold is exceeded based on the predicted environmental concentrations (PEC). These are:

'2.6.5 Where the PEC within the emission footprint in any part of the European site(s) is less than 70% of the relevant long-term benchmark (EAL, Critical Level or Critical Load), the emission is not likely to have a significant effect.

2.6.6 Where the PEC within the emission footprint in any part of the European site(s) is greater than 70% of the relevant long-term benchmark (EAL, Critical Level or Critical Load), the emission is [sic] we cannot conclude that the emission is not likely to have a significant effect at this Stage.'

24.4 For SO_2 the maximum PEC for the Mersey Estuary would be only 25% of the EQS (Table 6). It can therefore be concluded that this would not be likely to have a significant effect.

24.5 For NO_x, the maximum predicted environmental concentration for the Mersey Estuary would be close to the EQS (Table 5). The guidance in this circumstance is provided by the Environment Agency's Stage 3 and 4 Assessment of new PIR permissions under the Habitats Regulations (V6). At para 1.8.2 this provides the following general guidance:

- *i) If the process contribution plus background concentration is less than 70% of the appropriate environmental criteria, then it can be assumed there will be **no adverse affect***
- *ii) If the background concentration is less than the appropriate environmental criteria, but a small process contribution leads to an exceedence then a decision should be made on the basis of local circumstances, taking account of the information outlined above.*
- *iii) If the background concentration is currently exceeding the appropriate environmental criteria and the new process contribution will cause an additional **small** increase then, as for ii) a decision will have to be made based on the individual circumstances*
- *iv) If the background concentration is less than the appropriate environmental criteria, but the process contribution is significant and leads to an exceedence, then you cannot conclude that there will be no adverse affect*

24.6 Thus where the maximum predicted environmental concentration for NO_x for the Mersey Estuary would be close to the EQS (Table 5), this falls between the Environment Agency's scenarios i) and ii). In this case the decision as to whether

there would be an adverse effect should be made on the basis of local circumstances. As explained at para 2.3 of Appendix 6.5 of the ES:

'...this maximum contribution is predicted to occur over mud and sand that is regularly inundated by the open water of the estuary and hence is not sensitive to such deposition. Thus the annual mean limit value of 30 µg.m-3 for the protection of vegetation is not relevant. Average NO_x contributions across the Mersey Estuary, including the fringes where vegetation is present, are significantly less (less than 0.5% of the critical level).'

24.7 It can thus be concluded that there would again be no adverse effect.

24.8 For acid deposition (Table 7) the predicted contributions at the Midland Mosses and Meres (Phases 1 and 2) and Oak Mere European sites exceed the threshold of 1% of the EQS. As explained at para 2.7 of Appendix 6.5, there are no critical loads for such acid deposition for the Mersey Estuary because of the high buffering capacity of estuarine waters. Table 8 shows the predicted contributions of the proposed facility in the context of the existing background deposition at these sites.

24.9 The situation at the Midland Mosses and Meres, and Oak Mere is that the background concentration is currently exceeding the appropriate environmental criteria and the new process contribution will cause an additional small increase. This thus corresponds to the Environment Agency's (iii) where a decision will have to be made based on the individual circumstances.

24.10 In this case the background concentrations are so far in excess of the critical loads (ranging from 17.9 x to 18.2 x the Critical Loads or 1790% to 1820%) and the process contributions so small (ranging from 0.5% to 0.6% of the existing background) that the contribution from the proposed facility is inconsequential and it can be concluded that there is not likely to be a significant effect on the European sites.

24.11 The predicted nitrogen deposition (Table 9) does not exceed the 1% threshold for any of the European sites. Again there are no critical loads for the Mersey Estuary. As explained at para 2.11 of Appendix 6.5:

'...Under some circumstances nutrient enrichment may lead to excessive growth of phytoplankton or attached plants. Generally nitrogen is the limiting factor in estuaries and coastal waters, although phosphorus may be limiting close to significant freshwater inputs. Nutrient enrichment via aerial deposition from local sources will not be significant in comparison with release of nitrates, nitrites and ammonia from industrial and other sources (e.g. agriculture). Thus the nature of the estuarine environment and the habitats supported is such that they are not sensitive to aerial deposition of these materials.'

24.12 This is supported by the Regulation 33 Statutory Advice for the Mersey Estuary provided by Natural England (see under Air Quality - Consultations above). Thus it can be concluded that for N deposition it is not likely that there would be significant effects on the European sites.

24.13 We therefore conclude, as set out at para 6.166 of the ES, that there is no likelihood of a significant effect on any of these sites and no requirement for the competent authority to carry out an Appropriate Assessment under the Habitat Regulations. However, we appreciate that this is a decision for the competent authority, advised by Natural England. Should this advice indicate that such a assessment should be carried out, it is our view that the ES, together with the additional clarification and

explanation provided above, should enable the competent authority to conclude there would be no effects on the integrity of the relevant European sites.

F. Construction and Demolition

MEAS Para 25

The demolition of any remaining structures must take place in a manner that does not pose unacceptable risks to the environment or human health. The demolition methodology must also consider the potential for impacts on the nearby controlled waters and its ecology, which may be caused by demolition debris or solids transported by water. We advise that the applicant should review 'Pollution Prevention Guidance Note 6', produced by the Environment Agency (web link http://publications.environment-agency.gov.uk/pdf/PMHO0203AUDJ-e-e.pdf?lang=_e), which provides specific information for use in construction and demolition projects, and incorporate this into the agreed method statements for the CoCP.

Response

25.1 INEOS have no objection to incorporating appropriate measures from the EA Pollution Prevention Guidance Note 6 into the agreed method statements for the CoCP.

MEAS Para 26

We advise that the applicant produce a suitable demolition methods statement, which must receive prior written approval before before any demolition works commence. The methods statement must be linked to the Site Waste Management Plan (see below), which will detail the types and quantities of waste likely to be encountered and methods of handling the material on-site, and also to the EMP, if appropriate. This can be secured through a suitably worded planning condition.

Response

26.1 Demolition would be included within the works to be covered by method statements as part of the CoCP. In addition, INEOS recognises the land use regulatory aspects of demolition works and will propose for Halton Borough Council's agreement a draft condition which will require that prior to commencement of demolition works measures proposed to protect controlled water and its surrounding ecology from environmental impacts caused by demolition debris or solids capable of migration by water shall be submitted for approval.

MEAS Para 27

The proposed development may generate a significant quantity of waste, some of which may be non-hazardous, inert or possibly hazardous. We advise that the developer should prepare a Site Waste Management Plan (SWMP) in accordance with Paragraph 34 of Planning Policy Statement 10 'Planning for Sustainable Waste Management'. The SWMP should be prepared in accordance with DTI guidance 'Site Waste Management Plans: Guidance for Construction Contractors and Clients – Voluntary Code of Practice', available at the following internet address: www.dti.gov.uk/construction/sustain/site_waste_management.pdf. This can be secured through a suitably worded planning condition. The SWMP must be linked to the demolition methods statement and also to the EMP and should address the following issues:

- *Wastes to be produced and where possible how they will be recycled/ recovered;*
- *Steps to be taken to minimise the quantities of waste produced and maximise the on-site use of recycled materials;*
- *Procedures for the management of waste onsite and waste leaving the site;*
- *Relevant information associated with the Duty of Care (i.e. details of the waste carriers, waste transfer and sites that have been identified to accept the waste).*

Response

27.1 INEOS Chlor is a responsible operator of a high hazard chemical plant and takes pride in its excellent environmental performance. Underpinning this performance are a

range of Site Instructions which include ENV02 'Waste Management and Disposal'. Within this document, particular reference is made to the waste management for demolition and re-development projects. This includes reference to the DTI guidance on Site Waste Management Plans.

27.2 The Draft Code of Construction Practice (CoCP) included within the ES describes the waste management objectives which form part of the construction process. Sections 1.64 to 1.74 of the draft CoCP describe the waste management measures that will be adopted, namely:

- Minimisation of waste;
- Re-use material;
- Segregation and recycling of materials;
- Management of wastes on site;
- Management of waste materials leaving the site, including information relevant to Duty of Care.

27.3 The applicant would have no objection to the provision of a Site Waste Management Plan, to be secured as a planning condition requiring appropriate measures to identify the volume and type of material to be demolished and/or excavated, opportunities for the reuse and recovery of materials and to demonstrate how disposal of waste will be minimised and managed.

MEAS Para 28

It is important that the applicant actively seeks to achieve waste minimisation during construction activities. The SWMP should include measures to ensure the identification of suitable material for re-use and recycling on-site wherever feasible. It is recommended that a full building audit and site investigation takes place to identify the different wastes present onsite and likely to be encountered during demolition and construction work. This is consistent with the Key Planning Objectives stated in paragraph 3 of Planning Policy Statement 10. It is important that the material to be re-used on-site is fully characterised to ensure it is suitable for use and that there are no unacceptable risks or potential disposal activities carried out without appropriate approval. The demolition of any buildings without first determining the nature and quantity of material contained within it will result in a lost opportunity to maximise a valuable resource.

Response

28.1 Refer to Para 27 above.

G. Soils and Ground Contamination

MEAS Para 29

We note that the ES acknowledges that potential sources of ground contamination have been identified on site. Consideration is given to the requirements for a site investigation to determine whether there is any ground contamination at the site (paras 7.91 to 7.98). However, this has not been carried out and the impacts of this cannot therefore be adequately quantified or assessed. We will defer to comments from colleagues in the Halton Borough Council Environmental Health Department with respect to contamination issues associated with the proposal.

Response

29.1 We note that MEAS defer to Halton Borough Council with regard to potential contamination. RPS have provided a response to specific queries raised by Halton Borough Council in this respect.

MEAS Para 30

Section 2.92 refers to the civil works required in preparation of development. It is hoped that a cut and fill balance is achieved. There is no consideration given to the impacts of disposal of surplus materials, import of extra materials, or disposal of unsuitable materials. We advise that the applicant be requested to provide clarification on this matter prior to determination.

Response

30.1 As discussed in paragraph 2.92 of the ES, the site is generally flat and a substantial site levelling exercise is not envisaged. However, there would be excavations for some of the foundations, including the bunker and stack. A preliminary assessment of the cut and fill has been carried out, the results of which indicate that an approximate cut and fill balance will be achieved, thus minimising the need to import or export materials. A more detailed cut and fill exercise would be carried out prior to construction to ensure that as far as practicable removal of surplus fill material is minimised and that an approximate cut and fill balance is achieved.

30.2 The disposal of any unsuitable and/or surplus material will be in accordance with the principles described in the response to Paragraph 27.

H. Air Quality

MEAS Para 31

Whilst air quality is note one of Merseyside EAS's core areas of expertise, we note that the air quality assessment of particulate emissions covers only PM10s. We are aware of emerging concern regarding the potential health impacts of finer particulate matter and in a development of this type and scale and it would seem appropriate for this issue to receive attention.

Response

31.1 A response to the query regarding the emission of finer particles is provided at paragraphs 1.2 to 1.9 of our draft response to Halton Borough Council to the queries raised by Helsby Parish Council.

I. Cumulative Impacts

MEAS Para 32

With regard to air quality, some consideration is given to cumulative impacts with other proposed construction activities, and with the vehicular as well as CHP impacts from the proposed development. However, cumulative impacts with existing industrial chemical air emissions do not seem to be assessed. The existing emissions seem to be referred to as ambient air quality. This does not seem appropriate. We advise that the applicant be requested to provide clarification on this matter prior to determination.

Response

32.1 A response to this query has been provided in Section 9 of the previous response to Halton Borough Council.

J. Conclusion

Para 33

In conclusion, whilst we wish to be supportive of the principle of the proposed development, the application has some significant weaknesses that we consider must be addressed prior to determination. The most substantive of these are:

- *Inadequate discussion and justification of the technology to be chosen over other technologies. Particular attention should be given to BATNEEC, Energy Hierarchy, emissions and climate change, and the relationship with waste strategy;*
- *Insufficient information on the specification and nature of the SRF/RDF. This is important for several reasons including an assessment of what proportion of the fuel can be defined as biomass and therefore as 'renewable'. However, given the scale of the development and the scale of the fuel need for the facility is such that it could have a significant impact on the emerging municipal waste management strategies in the fuel 'catchment' areas such as Merseyside. For example, if it is known that there is an outlet for SRF/RDF this could have a significant impact on technology choice. Whilst this may have potential benefits there are also risks in terms of future specifications and energy technologies.*
- *Lack of a comprehensive sustainability appraisal; and*
- *Insufficient information for Habitats Regulations Assessment.*

33.1 These points have been addressed in previous paragraphs.

ELECTRICITY ACT 1989
SECTION 36 APPLICATION

LPA Ref: 07/00068/ELC/HA06/001

Application to Construct and Operate an Energy from Waste Combined Heat and Power Generating Station with an Approximate Capacity of 360MW Thermal and up to 100MW of Electrical Power at INEOS Chlor Vinyls, South Parade, Runcorn, Cheshire.

Response to Halton Borough Council

June 2007

INEOS Chlor
Applicant

Contents

TABLES:

APPENDICES:

1. Introduction

1.1 This technical note addresses the issues raised at the meeting between Bruce Bamber, Richard Wakeman, John Farmer and Andrew Plant on 16 May 2007 at Halton Borough Council (HBC) offices, Runcorn.

1.2 As requested by HBC it includes:

- An assessment of the potential impact of right turning queuing traffic at the Picow Farm Road/Expressway interchange taking into account agreed assumptions about traffic distribution (see section 2);
- Sensitivity testing of traffic flows and potential impacts predicted in the Transport Assessment and Environmental Statement using currently available base flow data (see Section 3);
- An assessment of potential traffic impacts during the construction and operational phases of development on the Runcorn Bridge and the Clifton Interchange (see Section 4);
- Clarification of the total amount of waste assumed to be transported by road (see Section 5);
- The feasibility of improving junction visibility at the northbound Picow Farm Road/ Expressway off slip to the north (see Section 6);
- Additional information on access on foot and by bicycle (see Section 7);
- Rail access assumptions (see Section 8);
- Summary and conclusions (see Section 9).

2. Capacity of Picow Farm Road/Expressway Junction

2.1 In reply to HBC's request, PICADY assessments have been undertaken on the junctions of Picow Farm Road and the Weston Point Expressway to ascertain the maximum right turn queue length from Picow Farm Road on to the Weston Point Expressway in both north and south directions.

2.2 Five different scenarios have been used to assess the possible impact on the two above right turn lanes. In all five scenarios, the observed 2006 traffic flows, growthed to the relevant construction and operational years using National Road Traffic Forecast high growth rates, were used to provide base flows. The scenarios were run for both the AM and PM Peak Hours.

2.3 For construction effects, construction flows have been added to 2009 base flows and tested in 3 scenarios; one where all HGV generated traffic is from/to the north, one where all HGV movements are from/to the south and lastly where there is a 50-50 split of north and south movements.

2.4 For the operational effects, operational traffic flows have been added to 2011 base flows and tested in two agreed scenarios; one where 65% of movements are from/to the south and the other in which 80% of the movements are from/to the north.

2.5 The results (see Table 1) demonstrate that there is not predicted to be any impact on right turning queuing traffic at the Picow Farm Road/Expressway Interchange during either the AM or the PM peak hours in any of the 5 scenarios. The PICADY outputs are presented in Appendix 1.

2.6 Therefore, it is concluded that even when worst case assumptions are used (as in the agreed scenarios tested) the predicted construction and operational traffic movements arising from the project are not likely to cause any significant hazard to existing traffic at the Picow Farm Road/Expressway junction. This is consistent with the conclusions reached in the Environmental Statement.

3. Sensitivity Testing

General

3.1 During discussion, HBC has requested a number of factors be considered in order to test the assessed effects of traffic flows and potential impacts predicted in the Transport Assessment and Environmental Statement. The following factors are considered in this technical note:

- The reduction of assumed percentage (%) of HGV's on the Expressway (existing flows) from 27% to 20% in line with the current most reliable source of information;
- Amendment of traffic flows on Picow Farm Road to make best use of the data that is available;
- Amendment of the assessed % impact of construction and operational traffic to ensure flows are compared on a like for like basis (some original data on the Expressway were originally expressed as 2-way development traffic compared with 1-way flows on the expressway, thereby overestimating the effect);
- Worst case assumptions made regarding HGV traffic during peak hours to the effect that there would be no avoidance by HGV traffic of the peak hours.

3.2 The effect of these factors on the assessed traffic flows and potential impacts is considered in detail in the sections below. Overall, the assessed effects based on the assumptions above do not alter the conclusions set out in the Transport Assessment and Environmental Statement.

HGV Content

3.3 The original traffic flow data used in the ES for the existing flows on the A557 Weston Point Expressway was supplied by HBC for the A557 Expressway. However, this did not classify vehicles into light and heavy categories and therefore an assumption was made based on data sources available at the time of the EIA work, including the Highways Agency's Trads2 Traffic Information Database. This provided the assumed HGV percentage flow on the Expressway of 27%.

3.4 Since publication of the ES, the classified traffic information for the A557 has been withdrawn from the Trads2 Database. A review of current sources has been undertaken. It is considered that the most robust and up to date data source currently available is the Great Britain National Road Traffic Survey (DfT, 2005). This indicates an HGV content of 20.0% for the A557 Weston Point Expressway. The following sections of this technical note present the original tables from the ES revised to show the effect of using this lower HGV percentage flow figure on the predicted flows.

Table 8.3

3.5 Table 8.3 of the Environmental Statement shows existing traffic flows on the local network. These have been amended to incorporate the figure of 20% HGVs in the Table 8.3A provided below. The original figures are indicated in parentheses. In addition, the traffic flows for Picow Farm Road have been amended to make best use of currently available data taking into account the difficulties encountered due to vandalism of the automatic traffic counter at this location.

Table 8.3A: Existing Traffic Flows

	Weekday					
	AM Peak Hour 0800-0900		PM Peak Hour 1700-1800		24 Hour	
	Total	HGV	Total	HGV	Total	HGV
Picow Farm Road (2-Way)	284 {236}	38 {30}	258 {286}	16 {32}	3,247 {3297}	461 {471}
Expressway (southbound)	1,535 {1,534}	307 {414}	1,518 {1,518}	304 {410}	20,764 {20,764}	4,153 {5,606}
Expressway (northbound)	1,661* {1,834}	332 {495}	1,628 {1,628}	326 {440}	21,271* {21,190}	4,254 {5,721}

**Flows based on most recently available sources.*

3.6 It can be seen that taking into account the most up to date information, there is a slight difference between the existing flows on Picow Farm Road shown in Table 8.3A compared to those shown in Table 8.3 of the ES. The most significant change is during the AM peak hour where base flows are 48 vehicles greater. There are also two differences in the Expressway northbound flows. The difference in 24hr flows is negligible being of the order of less than 0.5%. The difference in AM peak hour flows is of the order of a 10% decrease.

Table 8.4

3.7 Table 8.4 of the ES sets out the predicted effect of construction traffic on Picow Farm Road in 2009. It is based on a period 06.00-20.00 to include traffic generated by any construction workers arriving before 07.00 and leaving after 19.00. It should also be noted that the tables in the ES assumed, as a worst case, that all construction personnel vehicles would use Picow Farm Road. In order to maintain a worst case assessment this current assessment is also based on this assumption. In fact, it is likely that some construction personnel would use Bankes Lane to access parking areas. Table 8.4A below presents the revised Table 8.4 based on the amendments to the existing traffic flows discussed above.

Table 8.4A: Percentage Impact of Worst Case Construction Traffic on Picow Farm Road, 2009

	Weekday (0600-2000)	
	Total	HGV
Existing Traffic	3,024 {2,877}	441 {470}
Construction Traffic	1,205 {1,205}	275 {275}
% Increase	+39.8% {+41.9%}	+62.4% {+58.5%}

3.8 As expected, the assessment demonstrates that amendment of existing flows results in a slight reduction in the % impact of total traffic flow and a marginal increase of predicted HGV flows. This slight increase in the predicted effect of HGV construction traffic does not affect the conclusions set out in the ES. It should be noted that such effects would be temporary and occur only during peak periods of construction activity.

Table 8.5

3.9 Table 8.5 of the ES sets out the predicted effect of construction traffic on the Expressway in 2009. It is based on the weekday period 06.00-20.00 and includes traffic generated by construction workers arriving before 07.00 and leaving after 19.00. An error in this table led to the figures expressing 2-way generated traffic as a % of one-way flows factored to 2009. This over-estimates the % effects of construction traffic. Table 8.5A takes into account the amendments made to existing traffic flows discussed above and correctly expresses 2-way construction traffic flows as a % of 2-way flows.

Table 8.5A: Percentage Impact of Worst Case Construction Traffic on Expressway, 2009

To/From North	Weekday (0600-2000)	
	Total	HGV
Existing Traffic	39,826 {20,188}	7,965 {5,451}
Construction Traffic	696 {606}*	138 {141}*
% increase	+1.8% {+3.0%}	+1.8% {+2.6%}
To/From South**		
Existing Traffic	39,826 {17,743}***	7,965 {4,791}
Construction Traffic	510* {413}	138* {134}
% increase	+1.3% {+2.3%}	+1.7% {+2.8%}

* in accordance with currently agreed trip generation and distribution

** south of Bankes Lane junction

*** original figure based on a one-way 12 hour flow

3.10 This table demonstrates that the worst case percentage impact of construction traffic on the Expressway is less than set out in the ES. Therefore the conclusion reached in paragraph 8.52 of the ES that the percentage increase on the strategic highway network does not represent a significant increase in traffic flows remains valid.

Table 8.6

3.11 Table 8.6 of the ES sets out the 12 hour effect of operational traffic on Picow Farm Road. Table 8.6A presents the total and percentage increase figures as amended to reflect existing traffic flows as discussed for Table 8.3 above.

Table 8.6A: Percentage Impact of Development Traffic on Picow Farm Road, 2011 (12 hour: 07.00-19.00)

	Weekday	
	Total	HGV
Existing Traffic	2,998 {2,983}	444 {476}
Development Traffic	446 {446}	384 {384}
% Increase	+14.9% {+8.5%}*	+86.4% {+80.7%}

* original figure of 8.5 is a typographical error and should read 15%.

3.12 As expected, Table 8.6A shows that updating baseline flows results in an amendment to the predicted effect of total traffic and HGV flows over the 12 hour period. However, the potential increase in HGV flows is marginal and does not affect the conclusions set out in the ES, which remain valid.

Table 8.7

3.13 Table 8.7 of the ES expresses the effect of operational traffic as a % increase of assumed 2011 north/south traffic flows on the Expressway. Table 8.7A represents this information, taking into account the most recent information relating to existing traffic flows and (as for Table 8.5A) correctly combining 2-way generated traffic with 2-way network flows:

Table 8.7A: Percentage Impact of Development Traffic on Expressway, 2011 (12 hour: 0700-1900)

To/From North	Weekday (0700-1900)	
	Total	HGV
Existing Traffic	37,508 {19,110}	7,502 {5,160}
Development Traffic	228* {231}	197 {197}
% increase	+0.6% {+1.2%}	+2.7% {+3.8%}
To/From South		
Existing Traffic	37,508 {18,398}	7,502 {4,967}
Development Traffic	206 {206}	187 {187}
% increase	+0.6% {+1.1%}	+2.6% {+3.8%}

* in accordance with currently agreed trip generation and distribution

3.14 Table 8.7A demonstrates that the predicted effects on the Expressway would be less than indicated in the ES. Therefore the conclusion reached in paragraph 8.56 of the ES that the percentage increase on the Expressway is not likely to have any significant effects on the Expressway remains valid.

Table 8.8

3.15 Table 8.8 of the ES presents information regarding hourly baseline and construction traffic flows on Picow Farm Road and the Expressway (north and south). Table 8.8A represents this information updated to incorporate currently available baseline data and agreed trip generation.

Table 8.8A: 2009 Hourly Flows on Local Network

	AM Peak Hour		PM Peak Hour	
	0600-0700	0800-0900	1900-2000	1700-1800
Picow Farm Rd	123	300	133	272
	{123}	{300}	{183}	{272}
Construction Traffic	300*	21	300*	21
	{432}	{21}	{432}	{21}
Expressway N	1,961	3,375	1,693	3,332
	{923}	{1,754}	{836}	{1,719}
Construction Traffic	290*	11	290*	11
	{240}	{11}	{240}	{11}
Expressway S**	1,961	3,375	1,693	3,222
	{1,038}	{1,621}	{857}	{1,603}
Construction Traffic	196	10	196	10
	{146}	{10}	{146}	{10}

*in accordance with currently agreed trip generation and distribution

**south of Bankes Lane junction

3.16 Table 8.8A demonstrates that it remains the case that the increases in flows on the Expressway during the peak periods of construction worker arrival and departure are considerably less than the difference in base flows between the network peak periods and the times when the site is generating most traffic. The conclusions drawn in the ES therefore remain valid.

4. Traffic Impacts at Runcorn Bridge and Clifton Interchange

4.1 HBC has requested that the potential impact of traffic generated by the proposed development on the Runcorn Bridge and the Clifton Interchange be assessed and quantified. The information provided below relates to the predicted effects at these specific locations during the construction and operational phases. For the purpose of assessment, the percentage of existing traffic on the Expressway that comprises HGV's is assumed to be 20%.

4.2 Construction and operational flows have been applied to base flows to determine the worst case effect at different locations on the Weston Point Expressway. All flows used have been reproduced in Appendix 2. The flows produced within this Technical note update the corresponding flows in the Transport Assessment.

4.3 Base flows were taken from observed 2006 levels and growthed using the National Road Traffic Forecast (NRTF) high growth rates. Committed flows from other known development within the area were added to this growthed figure.

4.4 The construction traffic effect has been measured against 2009 base flows using a growth rate of 1.056 and the operational traffic effect has been measured against 2011 Base Flows using a growth rate of 1.095.

4.5 The three points at which the impacts were measured on the Weston Point Expressway were on Runcorn Bridge, south of the Picow Farm Road junction and at the Clifton Interchange.

Construction Effect

4.6 Table 2 shows the worst case scenarios for construction effects at the three separate locations. In all three scenarios the light vehicle traffic remained the same as assumed in the Transport Assessment and Environmental Statement with 186 movements along Bankes Lane between the Picow Farm Road junction and the Clifton Interchange and 279 movements going to/from the north of Picow Farm Road during both AM and PM peaks.

4.7 The Transport Assessment assumed that HGV movements apart from those associated with concrete delivery would arrive out of the peak hours. This remains likely to be the case. However, for the purpose of this assessment effects considered include HGV deliveries within the peak hours (the worst case). In this worse case scenario, the total HGV movements in the peak hours would be 21 2-way.

4.8 The effect on Runcorn Bridge was calculated with all HGV movements to/from the north of Picow Farm Road junction. This shows that during the AM peak the two-way total vehicle impact comprises a 9% increase compared to existing flows with an increase in HGV movements of 3%. In the PM peak, increases are 9% in total flows and 3% in HGV's. The daily impact comprises increases of 1% in total flows and 2% in HGV's.

4.9 The effect on the Weston Point Expressway south of Picow Farm Road was calculated with all HGV movements to/from the south of Picow Farm Road. This shows that during the AM peak the two-way total vehicle impact comprises an increase of 1%, with an increase in HGV's of 5%. In the PM peak total flows are predicted to increase by 1% and HGV's by 6%. On a daily basis the increase in total flows is 1% and 5% for HGVs

4.10 Since detailed traffic flows data at the Clifton Interchange are not available it has not been possible to quantify impacts in terms of % increases. However, it is possible to identify the absolute increase in vehicle numbers associated with the construction phase of development. This indicates a total increase in traffic of 206 movements in the peak hours, of which 20 would be HGV's if it assumed that HGV's are evenly distributed north and south. If all HGV's are assumed to route to and from the south the total peak hour flows increase by 21 HGV movements giving a total increase in traffic of 207 vehicle movements. On a daily basis assuming an even distribution of HGV's there would be 572 additional vehicle movements at the Clifton Interchange, 200 of which would be HGV's. If all HGV's route to and from the south this figure would increase by 400 HGV movements to 772 vehicle movements.

4.11 It is concluded that with worst case assumptions about HGV distribution the construction phase of development could lead to 21 additional HGV movements in the peak hours at the Runcorn Bridge if all HGV's travel to and from the north or at the Clifton Interchange if all HGV's route to and from the south. This equates to one additional HGV movement roughly every three minutes. The light vehicle movements associated with construction worker traffic during the busiest periods of construction would add some 186 vehicle movements to the Clifton Interchange representing an increase of some 3 vehicle movements per minute.

Operational Effect

4.12 Table 3 shows the worst case scenarios of the operational traffic impacts at the three separate locations. These have been calculated using agreed traffic distribution figures of either 80% to and from the north or 65% to and from the south.

4.13 The effect on Runcorn Bridge was calculated with 80% of all vehicle movements going to and from the north of Picow Farm Road junction. This shows that during the AM peak the two-way total vehicle impact comprises an increase of 1% with an increase in HGV's of 2%. In the PM peak there is an increase of 1% in total flows and 2% in HGV's. On a daily basis there is a less than 1% increase in total flows and a 2% increase in HGV's.

4.14 The effect on the Weston Point Expressway south of Picow Farm Road was calculated with 65% of all vehicle movements going to and from the south of Picow Farm Road. This shows that during the AM peak the two-way total vehicle impact is an increase of 1% in total flows with an increase in HGV's of 3%. In the PM peak there is an increase of 1% in total flows and an increase of 3% in HGV's. On a daily basis the increase is 1% in total flows and 3% in HGV's.

4.15 Since detailed traffic flows data at the Clifton Interchange are not available it has not been possible to quantify impacts in terms of % increases. However, it is possible to identify the absolute increase in vehicle numbers associated with the operational phase of development adopting the worst case assumption of 65% of waste being transported to and from the south. This indicates a total increase in traffic of 33 movements in the peak hours, of which 21 would be HGV's. On a daily basis there would be 286 additional vehicle movements at the Clifton Interchange, 250 of which would be HGV's.

4.16 It is concluded that traffic associated with the operational phase of development adopting worst case assumptions on distribution of HGV movements could account for negligible increases in total flows on the Expressway and at the Runcorn Bridge although in terms of HGV's the increase would be slightly greater being of the order of 2%-3%. At the Clifton Interchange the increase in HGV's could be in the order of one additional movement every 3 minutes.

4.17 It is concluded that with worst case assumptions regarding the distribution of operational traffic there would not be any significant impacts on the Runcorn Bridge, the Weston Point Expressway and the Clifton Interchange.

5. Total Waste Transported by Road

5.1 HBC have asked for clarification on the amount of waste transported by road.

5.2 Paragraph 2.20 of the ES explains that the RDF/SRF to be used as fuel would be created by the processing of raw municipal waste by, for example, MBT facilities, which, in the case of Manchester, will be operated by a private company under contract to GMWDA.

5.3 Regarding the method of transport of fuel from the different local authority areas, it is intended that it would be a condition of the GMWDA (Manchester) contract that all fuel would be delivered by rail. The mode of transportation from other local authority areas is not known at this stage, as the development of their waste treatment services contracts are not sufficiently advanced. It would however be the intention of INEOS to encourage the relevant local waste authorities to include obligations for transport fuel by rail during their MBT contract placement processes. However, for the purposes of the current assessment of road traffic impacts, it is assumed that all non-Manchester deliveries would be by road; this is a conservative (worst case assumption).

5.4 The calculation set out in the Transport Assessment assumes that 480,000 tonnes of waste is transported by road to the site (Table 6). This represents the worst case amount based on the assumption that all waste that does not come from Manchester comes by road and that the upper throughput figure is 850,000 tonnes of waste per year, as defined in Section 2.21 of the Environmental Statement.

5.5 For clarification, Table 8 of the Transport Assessment sets out estimates of annual waste from various sources, and is based on Table 2.1 of the Environmental Statement. The information is only used to derive the distribution of waste transport vehicles.

6. Visibility at Picow Farm Road/Expressway Junction

6.1 HBC have requested that the layout of the junction of the northbound off-slip from the Expressway with Picow Farm Road be investigated to assess the feasibility of improving visibility to the east.

6.2 An analysis of visibility at this junction was provided in the response to HBCs queries in April 2007.

6.3 It has been found that to move the stop-line forward by around 3m so that the width of the remaining carriageway of Picow Farm Road at this point was 7.3m would increase visibility to the left for emerging traffic by around 1.5m. It is concluded that there exists very limited scope to achieve any significant increase in visibility to the left for emerging traffic through such alterations. However, INEOS would be happy to discuss options at this junction with HBC.

7. Access by Cyclists and Pedestrians

7.1 HBC have requested consideration be given to improvements to facilities for cyclists and pedestrians in order to encourage sustainable travel.

7.2 As discussed in Chapter 8 of the ES, the proposed access road for the EfW would lead directly from Picow Farm Road. This would result in the removal of site traffic from Sandy Lane and through the Weston Point residential area, thereby providing off site benefits to pedestrians in the local area.

7.3 Our previous response to HBC indicated the relative distances of residential areas from the site for pedestrians and cyclists. This indicated that the Weston Point residential area lies within 1km of the site access, with parts of the western side of Runcorn within 2km. The area within 5km includes almost all of the built-up area of Runcorn within the Expressway ring-road. It is concluded that the site is within walking distance of some local residential areas and within reasonable cycling distance of much of Runcorn. Cycle parking spaces are to be provided within the site which will facilitate and encourage cycling to work amongst employees.

7.4 Due to the location of the site, separated from Runcorn by the Expressway and the railway line, no obvious schemes or alterations to existing transport infrastructure have been identified that would deliver significant improvements to the local pedestrian and cycle networks around the site. However, if such opportunities arise, INEOS would consider such measures.

8. Rail Access

8.1 HBC have requested clarification on the issue of access by rail.

8.2 For the purposes of the assessment it was assumed that up to 5 trains per day will deliver fuel to the site. This assumption was based on an estimation of the amount of fuel to be received by rail and included provision for all fuel from Manchester to be delivered through this mode (up to 3 trains per day) and for up to 2 trains per day to deliver fuel from other sources. The extent to which the rail facility is used will depend on the location of the facilities provided by the other local authorities.

8.3 Initial discussions have been held between INEOS Chlor and Network Rail. It has been identified that in order to accommodate this number of trains, some improvements to the signalling on the branch line may be required. Regarding the capacity of the rail network, no major obstacles have been identified by Network Rail.

8.4 HBC have asked whether it might be possible to transport materials to the site by rail during the construction phase of development.

8.5 It is currently the intention that opportunities for the delivery of bulk materials to the site by rail will be investigated during the planning and detailed design phase. For the purposes of this assessment, in order to consider the worst case effects in terms of road traffic, it has been assumed that all materials are transported by road.

9. Conclusions

9.1 The construction and operation phases of the project have been considered with respect to the Picow Farm Road/Weston Point Expressway junction and are considered to have a negligible effect on right turning safety.

9.2 In order to consider the effects of utilising data recently available on HGV percentages for the Weston Point Expressway, the predicted traffic flow figures for a figure of 20% HGVs are presented.

9.3 Traffic flow information presented in Chapter 8 of the Environmental Statement is re-presented to take into account currently available data sources and other sensitivity assumptions requested during discussions with HBC. Although such sensitivity tests result in slight amendments to the predicted traffic flows, these changes are not sufficient to affect the conclusions presented within the ES, which remain valid.

9.4 Information about the effect on the Runcorn Bridge and Clifton Interchange has been provided. It is predicted that the construction phase of development could lead to 21 additional HGV movements in the peak hours at the Runcorn Bridge if all HGV's travel to and from the north or at the Clifton Interchange if all HGV's route to and from the south. This equates to one additional HGV movement roughly every three minutes. The light vehicle movements associated with construction worker traffic during the busiest periods of construction would add some 186 vehicle movements to the Clifton Interchange representing an increase of some 3 vehicle movements per minute.

9.5 Traffic associated with the operational phase of development adopting worst case assumptions about distribution of HGV movements could account for negligible increases in total flows on the Expressway and at the Runcorn Bridge with increases in terms of HGV's being of the order of 2%-3%. At the Clifton Interchange the increase in HGV's could be in the order of one additional movement every 3 minutes. These levels of increase are not considered significant.

9.6 It has been confirmed that the assumed 480,000 tonnes of waste per year transported by road represents a worst case assumption that all waste that does not come from Manchester comes by road and that the upper throughput figure is 850,000 tonnes of waste per year.

9.7 It is demonstrated that it is not likely that any significant improvement to visibility at the Expressway northbound off-slip/Picow Farm Road junction would be achieved by bringing the kerb forward.

9.8 Ongoing consideration will be given to opportunities to improve site access for cyclists and pedestrians.

9.9 Some improvements to the signalling on the local branch line may be required to allow the expected number of trains to access the site each day. Regarding the capacity of the rail network, no major obstacles have been identified by Network Rail.

9.10 The feasibility of transporting bulk construction materials by barge or by train will be explored at the detailed design stage.

TABLES

APPENDICES

APPENDIX 1:

Picady Outputs

APPENDIX 2:

Revised Traffic Flow Diagrams

PICADY
GUI Version: 5.00 AC Analysis Program Release: 3.0 INTERIM (MAR 2006)
© Copyright TRL Limited, 2006 Adapted from PICADY/3 which is Crown Copyright by permission of the controller of HMSO
For sales and distribution information, program advice and maintenance, contact:
TRL Limited Crowthorne House Nine Mile Ride Wokingham, Berks. RG40 3GA, UK — Tel: +44 (0)1344 770758 Fax:+44 (0)1344 770864 E-mail: softwarebureau@trl.co.uk Web: www.trlsoftware.co.uk
The user of this computer program for the solution of an engineering problem is in no way relieved of their responsibility for the correctness of the solution

Run Analysis

Parameter	Values
File Run	C:\..\Picady\JNY6040 Picow Farm-Expressway E Junction.vpi
Date Run	06 June 2007
Time Run	09:32:44
Driving Side	Drive On The Left

Arm Names and Flow Scaling Factors

Arm	Arm Name	Flow Scaling Factor (%)
Arm A	Picow Farm East	100
Arm B	Expressway South	100
Arm C	Picow Farm West	100

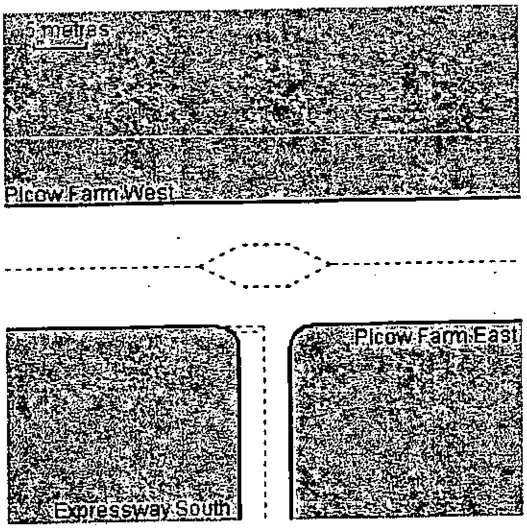
Stream Labelling Convention

Stream A-B contains traffic going from A to B etc.

Run Information

Parameter	Values
Run Title	JNY6040 Runcorn Energy from Waste Picow Farm Road- Expressway East Junction
Location	Runcorn
Date	18 May 2007
Enumerator	chapmand [29FH51J]
Job Number	JNY6040
Status	-
Client	-
Description	-

Junction Diagram



Demand Data

Modelling Periods

Parameter	Period	Duration (min)	Segment Length (min)
First Modelling Period	07:45-09:15	90	15
Second Modelling Period	16:45-18:15	90	15

ODTAB Turning Counts

Demand Set: 2011 Base + Operational 65% South AM Peak
Modelling Period: 07:45-09:15

From/To	Arm A	Arm B	Arm C
Arm A	0.0	138.0	342.0
Arm B	0.0	0.0	0.0
Arm C	69.0	38.0	0.0

Demand Set: 2011 Base + Operational 65% South PM Peak
Modelling Period: 16:45-18:15

From/To	Arm A	Arm B	Arm C
Arm A	0.0	180.0	238.0
Arm B	0.0	0.0	0.0
Arm C	93.0	82.0	0.0

Demand Set: 2011 Base + Operational 80% North AM Peak
Modelling Period: 07:45-09:15

From/To	Arm A	Arm B	Arm C
Arm A	0.0	138.0	357.0
Arm B	0.0	0.0	0.0
Arm C	70.0	28.0	0.0

Demand Set: 2011 Base + Operational 80% North PM Peak
Modelling Period: 16:45-18:15

From/To	Arm A	Arm B	Arm C
Arm A	0.0	180.0	248.0
Arm B	0.0	0.0	0.0
Arm C	95.0	67.0	0.0

Demand Set: 2009 Base + Construction All North AM Peak
Modelling Period: 07:45-09:15

From/To	Arm A	Arm B	Arm C
Arm A	0.0	133.0	601.0
Arm B	0.0	0.0	0.0
Arm C	67.0	24.0	0.0

Demand Set: 2009 Base + Construction All North PM Peak
Modelling Period: 16:45-18:15

From/To	Arm A	Arm B	Arm C
Arm A	0.0	173.0	233.0
Arm B	0.0	0.0	0.0
Arm C	90.0	54.0	0.0

Demand Set: 2009 Base + Construction All South AM Peak
Modelling Period: 07:45-09:15

From/To	Arm A	Arm B	Arm C
Arm A	0.0	133.0	591.0
Arm B	0.0	0.0	0.0
Arm C	67.0	35.0	0.0

Demand Set: 2009 Base + Construction All South PM Peak
Modelling Period: 16:45-18:15

From/To	Arm A	Arm B	Arm C
Arm A	0.0	173.0	223.0
Arm B	0.0	0.0	0.0
Arm C	90.0	65.0	0.0

Demand Set: 2009 Base + Construction 50% Split South-North AM Peak
Modelling Period: 07:45-09:15

From/To	Arm A	Arm B	Arm C
Arm A	0.0	133.0	596.0
Arm B	0.0	0.0	0.0
Arm C	67.0	29.0	0.0

Demand Set: 2009 Base + Construction 50% Split South-North PM Peak
Modelling Period: 16:45-18:15

From/To	Arm A	Arm B	Arm C
Arm A	0.0	173.0	228.0
Arm B	0.0	0.0	0.0
Arm C	90.0	59.0	0.0

ODTAB Synthesised Flows

Demand Set: 2011 Base + Operational 65% South AM Peak
Modelling Period: 07:45-09:15

Arm	Rising Time	Rising Flow (veh/min)	Peak Time	Peak Flow (veh/min)	Falling Time	Falling Flow (veh/min)
Arm A	08:00	6.000	08:00	9.000	08:30	6.000
Arm B	08:00	0.000	08:00	0.000	08:30	0.000
Arm C	08:00	1.337	08:00	2.006	08:30	1.337

Heavy Vehicles Percentages

Demand Set: 2011 Base + Operational 65% South AM Peak
Modelling Period: 07:45-09:15

From/To	Arm A	Arm B	Arm C
Arm A	-	10.3	12.5
Arm B	0.0	-	0.0
Arm C	12.7	33.0	-

Demand Set: 2011 Base + Operational 65% South PM Peak
Modelling Period: 16:45-18:15

From/To	Arm A	Arm B	Arm C
Arm A	-	4.3	7.9
Arm B	0.0	-	0.0
Arm C	1.2	16.4	-

Demand Set: 2011 Base + Operational 80% North AM Peak
Modelling Period: 07:45-09:15

From/To	Arm A	Arm B	Arm C
Arm A	-	10.3	13.9
Arm B	0.0	-	0.0
Arm C	12.5	19.1	-

Demand Set: 2011 Base + Operational 80% North PM Peak
Modelling Period: 16:45-18:15

From/To	Arm A	Arm B	Arm C
Arm A	-	4.3	10.5
Arm B	0.0	-	0.0
Arm C	1.2	9.4	-

Demand Set: 2009 Base + Construction All North AM Peak
Modelling Period: 07:45-09:15

From/To	Arm A	Arm B	Arm C
Arm A	-	10.3	7.1
Arm B	0.0	-	0.0
Arm C	12.7	8.7	-

Demand Set: 2009 Base + Construction All North PM Peak
Modelling Period: 16:45-18:15

From/To	Arm A	Arm B	Arm C
Arm A	-	4.3	9.7
Arm B	0.0	-	0.0
Arm C	1.2	2.0	-

Demand Set: 2009 Base + Construction All South AM Peak
Modelling Period: 07:45-09:15

From/To	Arm A	Arm B	Arm C
Arm A	-	10.3	5.5
Arm B	0.0	-	0.0
Arm C	12.7	37.2	-

Demand Set: 2009 Base + Construction All South PM Peak
Modelling Period: 16:45-18:15

From/To	Arm A	Arm B	Arm C
Arm A	-	4.3	5.7
Arm B	0.0	-	0.0
Arm C	1.2	18.6	-

Demand Set: 2009 Base + Construction 50% Split South-North AM Peak
Modelling Period: 07:45-09:15

From/To	Arm A	Arm B	Arm C
Arm A	-	10.3	6.3
Arm B	0.0	-	0.0
Arm C	12.7	24.3	-

Demand Set: 2009 Base + Construction 50% Split South-North PM Peak
Modelling Period: 16:45-18:15

From/To	Arm A	Arm B	Arm C
Arm A	-	4.3	7.8
Arm B	0.0	-	0.0
Arm C	1.2	10.3	-

Queues & Delays

Demand Set: 2011 Base + Operational 65% South AM Peak
Modelling Period: 07:45-09:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
07:45-08:00	B-AC	0.00	6.38	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	0.87	-	-	-	-	-	-	-	-
	C-B	0.48	8.56	0.056	-	0.00	0.06	-	0.8	0.12
	A-B	1.73	-	-	-	-	-	-	-	-
	A-C	4.29	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:00-08:15	B-AC	0.00	6.15	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.03	-	-	-	-	-	-	-	-
	C-B	0.57	8.28	0.069	-	0.06	0.07	-	1.1	0.13
	A-B	2.07	-	-	-	-	-	-	-	-
	A-C	5.12	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:15-08:30	B-AC	0.00	5.84	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.27	-	-	-	-	-	-	-	-
	C-B	0.70	7.90	0.088	-	0.07	0.10	-	1.4	0.14
	A-B	2.53	-	-	-	-	-	-	-	-
	A-C	6.28	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:30-08:45	B-AC	0.00	5.84	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.27	-	-	-	-	-	-	-	-
	C-B	0.70	7.90	0.088	-	0.10	0.10	-	1.4	0.14
	A-B	2.53	-	-	-	-	-	-	-	-
	A-C	6.28	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:45-09:00	B-AC	0.00	6.15	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.03	-	-	-	-	-	-	-	-
	C-B	0.57	8.28	0.069	-	0.10	0.07	-	1.1	0.13
	A-B	2.07	-	-	-	-	-	-	-	-
	A-C	5.12	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
09:00-09:15	B-AC	0.00	6.38	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	0.87	-	-	-	-	-	-	-	-
	C-B	0.48	8.56	0.056	-	0.07	0.06	-	0.9	0.12
	A-B	1.73	-	-	-	-	-	-	-	-
	A-C	4.29	-	-	-	-	-	-	-	-

Demand Set: 2011 Base + Operational 65% South PM Peak
Modelling Period: 16:45-18:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
16:45-17:00	B-AC	0.00	6.53	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.17	-	-	-	-	-	-	-	-
	C-B	1.03	10.06	0.102	-	0.00	0.11	-	1.6	0.11
	A-B	2.26	-	-	-	-	-	-	-	-
	A-C	2.99	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/segment)	Delay (veh.min/segment)	Mean Arriving Vehicle Delay (min)
17:00-17:15	B-AC	0.00	6.33	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.39	-	-	-	-	-	-	-	-
	C-B	1.23	9.80	0.125	-	0.11	0.14	-	2.1	0.12
	A-B	2.70	-	-	-	-	-	-	-	-
	A-C	3.57	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/segment)	Delay (veh.min/segment)	Mean Arriving Vehicle Delay (min)
17:15-17:30	B-AC	0.00	6.05	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.71	-	-	-	-	-	-	-	-
	C-B	1.50	9.44	0.159	-	0.14	0.19	-	2.8	0.13
	A-B	3.30	-	-	-	-	-	-	-	-
	A-C	4.37	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/segment)	Delay (veh.min/segment)	Mean Arriving Vehicle Delay (min)
17:30-17:45	B-AC	0.00	6.05	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.71	-	-	-	-	-	-	-	-
	C-B	1.50	9.44	0.159	-	0.19	0.19	-	2.8	0.13
	A-B	3.30	-	-	-	-	-	-	-	-
	A-C	4.37	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/segment)	Delay (veh.min/segment)	Mean Arriving Vehicle Delay (min)
17:45-18:00	B-AC	0.00	6.33	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.39	-	-	-	-	-	-	-	-
	C-B	1.23	9.80	0.125	-	0.19	0.14	-	2.2	0.12
	A-B	2.70	-	-	-	-	-	-	-	-
	A-C	3.57	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/segment)	Delay (veh.min/segment)	Mean Arriving Vehicle Delay (min)
18:00-18:15	B-AC	0.00	6.53	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.17	-	-	-	-	-	-	-	-
	C-B	1.03	10.06	0.102	-	0.14	0.11	-	1.8	0.11
	A-B	2.26	-	-	-	-	-	-	-	-
	A-C	2.99	-	-	-	-	-	-	-	-

Demand Set: 2011 Base + Operational 80% North AM Peak
Modelling Period: 07:45-09:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
07:45-08:00	B-AC	0.00	6.37	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	0.88	-	-	-	-	-	-	-	-
	C-B	0.35	9.50	0.037	-	0.00	0.04	-	0.6	0.11
	A-B	1.73	-	-	-	-	-	-	-	-
	A-C	4.48	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:00-08:15	B-AC	0.00	6.14	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.05	-	-	-	-	-	-	-	-
	C-B	0.42	9.17	0.046	-	0.04	0.05	-	0.7	0.11
	A-B	2.07	-	-	-	-	-	-	-	-
	A-C	5.35	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:15-08:30	B-AC	0.00	5.82	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.28	-	-	-	-	-	-	-	-
	C-B	0.51	8.73	0.059	-	0.05	0.06	-	0.9	0.12
	A-B	2.53	-	-	-	-	-	-	-	-
	A-C	6.55	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:30-08:45	B-AC	0.00	5.82	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.28	-	-	-	-	-	-	-	-
	C-B	0.51	8.73	0.059	-	0.06	0.06	-	0.9	0.12
	A-B	2.53	-	-	-	-	-	-	-	-
	A-C	6.55	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:45-09:00	B-AC	0.00	6.14	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.05	-	-	-	-	-	-	-	-
	C-B	0.42	9.17	0.046	-	0.06	0.05	-	0.7	0.11
	A-B	2.07	-	-	-	-	-	-	-	-
	A-C	5.35	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
09:00-09:15	B-AC	0.00	6.37	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	0.88	-	-	-	-	-	-	-	-
	C-B	0.35	9.50	0.037	-	0.05	0.04	-	0.6	0.11
	A-B	1.73	-	-	-	-	-	-	-	-

	A-C	4.48	-	-	-	-	-	-	-	-

Demand Set: 2011 Base + Operational 80% North PM Peak
Modelling Period: 16:45-18:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
16:45-17:00	B-AC	0.00	6.54	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.19	-	-	-	-	-	-	-	-
	C-B	0.84	10.65	0.079	-	0.00	0.09	-	1.2	0.10
	A-B	2.26	-	-	-	-	-	-	-	-
	A-C	3.11	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:00-17:15	B-AC	0.00	6.34	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.42	-	-	-	-	-	-	-	-
	C-B	1.00	10.36	0.097	-	0.09	0.11	-	1.6	0.11
	A-B	2.70	-	-	-	-	-	-	-	-
	A-C	3.72	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:15-17:30	B-AC	0.00	6.06	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.74	-	-	-	-	-	-	-	-
	C-B	1.23	9.96	0.123	-	0.11	0.14	-	2.1	0.11
	A-B	3.30	-	-	-	-	-	-	-	-
	A-C	4.55	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:30-17:45	B-AC	0.00	6.06	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.74	-	-	-	-	-	-	-	-
	C-B	1.23	9.96	0.123	-	0.14	0.14	-	2.1	0.11
	A-B	3.30	-	-	-	-	-	-	-	-
	A-C	4.55	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:45-18:00	B-AC	0.00	6.34	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.42	-	-	-	-	-	-	-	-
	C-B	1.00	10.36	0.097	-	0.14	0.11	-	1.7	0.11
	A-B	2.70	-	-	-	-	-	-	-	-
	A-C	3.72	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
18:00-18:15	B-AC	0.00	6.53	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.19	-	-	-	-	-	-	-	-
	C-B	0.84	10.65	0.079	-	0.11	0.09	-	1.3	0.10
	A-B	2.26	-	-	-	-	-	-	-	-
	A-C	3.11	-	-	-	-	-	-	-	-

Demand Set: 2009 Base + Construction All North AM Peak
Modelling Period: 07:45-09:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
07:45-08:00	B-AC	0.00	5.86	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	0.84	-	-	-	-	-	-	-	-
	C-B	0.30	9.65	0.031	-	0.00	0.03	-	0.5	0.11
	A-B	1.67	-	-	-	-	-	-	-	-
	A-C	7.54	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:00-08:15	B-AC	0.00	5.53	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.00	-	-	-	-	-	-	-	-
	C-B	0.36	9.15	0.039	-	0.03	0.04	-	0.6	0.11
	A-B	1.99	-	-	-	-	-	-	-	-
	A-C	9.00	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:15-08:30	B-AC	0.00	5.07	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.23	-	-	-	-	-	-	-	-
	C-B	0.44	8.46	0.052	-	0.04	0.05	-	0.8	0.12
	A-B	2.44	-	-	-	-	-	-	-	-
	A-C	11.03	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:30-08:45	B-AC	0.00	5.07	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.23	-	-	-	-	-	-	-	-
	C-B	0.44	8.46	0.052	-	0.05	0.05	-	0.8	0.12
	A-B	2.44	-	-	-	-	-	-	-	-
	A-C	11.03	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:45-09:00	B-AC	0.00	5.53	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.00	-	-	-	-	-	-	-	-
	C-B	0.36	9.15	0.039	-	0.05	0.04	-	0.6	0.11
	A-B	1.99	-	-	-	-	-	-	-	-
	A-C	9.00	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
09:00-09:15	B-AC	0.00	5.86	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	0.84	-	-	-	-	-	-	-	-
	C-B	0.30	9.65	0.031	-	0.04	0.03	-	0.5	0.11
	A-B	1.67	-	-	-	-	-	-	-	-
	A-C	7.54	-	-	-	-	-	-	-	-

Demand Set: 2009 Base + Construction All North PM Peak
Modelling Period: 16:45-18:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/segment)	Delay (veh.min/segment)	Mean Arriving Vehicle Delay (min)
16:45-17:00	B-AC	0.00	6.63	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.13	-	-	-	-	-	-	-	-
	C-B	0.68	11.51	0.059	-	0.00	0.06	-	0.9	0.09
	A-B	2.17	-	-	-	-	-	-	-	-
	A-C	2.92	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/segment)	Delay (veh.min/segment)	Mean Arriving Vehicle Delay (min)
17:00-17:15	B-AC	0.00	6.44	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.35	-	-	-	-	-	-	-	-
	C-B	0.81	11.22	0.072	-	0.06	0.08	-	1.1	0.10
	A-B	2.59	-	-	-	-	-	-	-	-
	A-C	3.49	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/segment)	Delay (veh.min/segment)	Mean Arriving Vehicle Delay (min)
17:15-17:30	B-AC	0.00	6.19	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.65	-	-	-	-	-	-	-	-
	C-B	0.99	10.81	0.092	-	0.08	0.10	-	1.5	0.10
	A-B	3.17	-	-	-	-	-	-	-	-
	A-C	4.28	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/segment)	Delay (veh.min/segment)	Mean Arriving Vehicle Delay (min)
17:30-17:45	B-AC	0.00	6.19	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.65	-	-	-	-	-	-	-	-
	C-B	0.99	10.81	0.092	-	0.10	0.10	-	1.5	0.10
	A-B	3.17	-	-	-	-	-	-	-	-
	A-C	4.28	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/segment)	Delay (veh.min/segment)	Mean Arriving Vehicle Delay (min)
17:45-18:00	B-AC	0.00	6.44	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.35	-	-	-	-	-	-	-	-
	C-B	0.81	11.22	0.072	-	0.10	0.08	-	1.2	0.10
	A-B	2.59	-	-	-	-	-	-	-	-
	A-C	3.49	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/segment)	Delay (veh.min/segment)	Mean Arriving Vehicle Delay (min)
18:00-18:15	B-AC	0.00	6.62	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.13	-	-	-	-	-	-	-	-
	C-B	0.68	11.51	0.059	-	0.08	0.06	-	1.0	0.09
	A-B	2.17	-	-	-	-	-	-	-	-

	A-C	2.92	-	-	-	-	-	-	-	-

Demand Set: 2009 Base + Construction All South AM Peak
Modelling Period: 07:45-09:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
07:45-08:00	B-AC	0.00	5.86	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	0.84	-	-	-	-	-	-	-	-
	C-B	0.44	7.70	0.057	-	0.00	0.06	-	0.9	0.14
	A-B	1.67	-	-	-	-	-	-	-	-
	A-C	7.42	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:00-08:15	B-AC	0.00	5.53	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.00	-	-	-	-	-	-	-	-
	C-B	0.52	7.31	0.072	-	0.06	0.08	-	1.1	0.15
	A-B	1.99	-	-	-	-	-	-	-	-
	A-C	8.85	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:15-08:30	B-AC	0.00	5.07	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.23	-	-	-	-	-	-	-	-
	C-B	0.64	6.78	0.095	-	0.08	0.10	-	1.5	0.16
	A-B	2.44	-	-	-	-	-	-	-	-
	A-C	10.85	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:30-08:45	B-AC	0.00	5.07	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.23	-	-	-	-	-	-	-	-
	C-B	0.64	6.78	0.095	-	0.10	0.10	-	1.6	0.16
	A-B	2.44	-	-	-	-	-	-	-	-
	A-C	10.85	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:45-09:00	B-AC	0.00	5.53	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.00	-	-	-	-	-	-	-	-
	C-B	0.52	7.31	0.072	-	0.10	0.08	-	1.2	0.15
	A-B	1.99	-	-	-	-	-	-	-	-
	A-C	8.85	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
09:00-09:15	B-AC	0.00	5.86	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	0.84	-	-	-	-	-	-	-	-
	C-B	0.44	7.70	0.057	-	0.08	0.06	-	0.9	0.14
	A-B	1.67	-	-	-	-	-	-	-	-
	A-C	7.42	-	-	-	-	-	-	-	-

Demand Set: 2009 Base + Construction All South PM Peak
Modelling Period: 16:45-18:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
16:45-17:00	B-AC	0.00	6.62	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.13	-	-	-	-	-	-	-	-
	C-B	0.82	9.96	0.082	-	0.00	0.09	-	1.3	0.11
	A-B	2.17	-	-	-	-	-	-	-	-
	A-C	2.80	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:00-17:15	B-AC	0.00	6.44	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.35	-	-	-	-	-	-	-	-
	C-B	0.97	9.72	0.100	-	0.09	0.11	-	1.6	0.11
	A-B	2.59	-	-	-	-	-	-	-	-
	A-C	3.34	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:15-17:30	B-AC	0.00	6.19	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.65	-	-	-	-	-	-	-	-
	C-B	1.19	9.39	0.127	-	0.11	0.14	-	2.1	0.12
	A-B	3.17	-	-	-	-	-	-	-	-
	A-C	4.09	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:30-17:45	B-AC	0.00	6.19	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.65	-	-	-	-	-	-	-	-
	C-B	1.19	9.39	0.127	-	0.14	0.14	-	2.2	0.12
	A-B	3.17	-	-	-	-	-	-	-	-
	A-C	4.09	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:45-18:00	B-AC	0.00	6.44	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.35	-	-	-	-	-	-	-	-
	C-B	0.97	9.72	0.100	-	0.14	0.11	-	1.7	0.11
	A-B	2.59	-	-	-	-	-	-	-	-
	A-C	3.34	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
18:00-18:15	B-AC	0.00	6.62	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.13	-	-	-	-	-	-	-	-
	C-B	0.82	9.96	0.082	-	0.11	0.09	-	1.4	0.11
	A-B	2.17	-	-	-	-	-	-	-	-
	A-C	2.80	-	-	-	-	-	-	-	-

Demand Set: 2009 Base + Construction 50% Split South-North AM Peak
Modelling Period: 07:45-09:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
07:45-08:00	B-AC	0.00	5.86	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	0.84	-	-	-	-	-	-	-	-
	C-B	0.36	8.47	0.043	-	0.00	0.04	-	0.6	0.12
	A-B	1.67	-	-	-	-	-	-	-	-
	A-C	7.48	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:00-08:15	B-AC	0.00	5.53	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.00	-	-	-	-	-	-	-	-
	C-B	0.43	8.04	0.054	-	0.04	0.06	-	0.8	0.13
	A-B	1.99	-	-	-	-	-	-	-	-
	A-C	8.93	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:15-08:30	B-AC	0.00	5.07	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.23	-	-	-	-	-	-	-	-
	C-B	0.53	7.44	0.072	-	0.06	0.08	-	1.1	0.14
	A-B	2.44	-	-	-	-	-	-	-	-
	A-C	10.94	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:30-08:45	B-AC	0.00	5.07	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.23	-	-	-	-	-	-	-	-
	C-B	0.53	7.44	0.072	-	0.08	0.08	-	1.1	0.14
	A-B	2.44	-	-	-	-	-	-	-	-
	A-C	10.94	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:45-09:00	B-AC	0.00	5.53	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.00	-	-	-	-	-	-	-	-
	C-B	0.43	8.04	0.054	-	0.08	0.06	-	0.9	0.13
	A-B	1.99	-	-	-	-	-	-	-	-
	A-C	8.93	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
09:00-09:15	B-AC	0.00	5.86	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	0.84	-	-	-	-	-	-	-	-
	C-B	0.36	8.47	0.043	-	0.06	0.05	-	0.7	0.12
	A-B	1.67	-	-	-	-	-	-	-	-

	A-C	7.48	-	-	-	-	-	-	-	-

Demand Set: 2009 Base + Construction 50% Split South-North PM Peak
Modelling Period: 16:45-18:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
16:45-17:00	B-AC	0.00	6.63	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.13	-	-	-	-	-	-	-	-
	C-B	0.74	10.68	0.069	-	0.00	0.07	-	1.1	0.10
	A-B	2.17	-	-	-	-	-	-	-	-
	A-C	2.86	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:00-17:15	B-AC	0.00	6.45	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.35	-	-	-	-	-	-	-	-
	C-B	0.88	10.41	0.085	-	0.07	0.09	-	1.4	0.10
	A-B	2.59	-	-	-	-	-	-	-	-
	A-C	3.42	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:15-17:30	B-AC	0.00	6.19	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.65	-	-	-	-	-	-	-	-
	C-B	1.08	10.05	0.108	-	0.09	0.12	-	1.8	0.11
	A-B	3.17	-	-	-	-	-	-	-	-
	A-C	4.18	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:30-17:45	B-AC	0.00	6.19	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.65	-	-	-	-	-	-	-	-
	C-B	1.08	10.05	0.108	-	0.12	0.12	-	1.8	0.11
	A-B	3.17	-	-	-	-	-	-	-	-
	A-C	4.18	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:45-18:00	B-AC	0.00	6.45	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.35	-	-	-	-	-	-	-	-
	C-B	0.88	10.41	0.085	-	0.12	0.09	-	1.4	0.11
	A-B	2.59	-	-	-	-	-	-	-	-
	A-C	3.42	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
18:00-18:15	B-AC	0.00	6.63	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.13	-	-	-	-	-	-	-	-
	C-B	0.74	10.68	0.069	-	0.09	0.08	-	1.1	0.10
	A-B	2.17	-	-	-	-	-	-	-	-
	A-C	2.86	-	-	-	-	-	-	-	-

Entry capacities marked with an '(X)' are dominated by a pedestrian crossing in that time segment.
In time segments marked with a '(B)', traffic leaving the junction may block back from a crossing so impairing normal operation of the junction.
Delays marked with '##' could not be calculated.

Overall Queues & Delays

Queueing Delay Information Over Whole Period

Demand Set: 2011 Base + Operational 65% South AM Peak
Modelling Period: 07:45-09:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	0.0	0.0	0.0	0.0	0.0	0.0
C-A	95.0	63.3	-	-	-	-
C-B	52.3	34.9	6.8	0.1	6.8	0.1
A-B	189.9	126.6	-	-	-	-
A-C	470.7	313.8	-	-	-	-
All	**808.0**	**538.6**	**6.8**	**0.0**	**6.8**	**0.0**

Demand Set: 2011 Base + Operational 65% South PM Peak
Modelling Period: 16:45-18:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	0.0	0.0	0.0	0.0	0.0	0.0
C-A	128.0	85.3	-	-	-	-
C-B	112.9	75.2	13.3	0.1	13.3	0.1
A-B	247.8	165.2	-	-	-	-
A-C	327.6	218.4	-	-	-	-
All	**816.2**	**544.1**	**13.3**	**0.0**	**13.3**	**0.0**

Demand Set: 2011 Base + Operational 80% North AM Peak
Modelling Period: 07:45-09:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	0.0	0.0	0.0	0.0	0.0	0.0
C-A	96.3	64.2	-	-	-	-
C-B	38.5	25.7	4.4	0.1	4.4	0.1
A-B	189.9	126.6	-	-	-	-
A-C	491.4	327.6	-	-	-	-
All	**816.2**	**544.1**	**4.4**	**0.0**	**4.4**	**0.0**

Demand Set: 2011 Base + Operational 80% North PM Peak
Modelling Period: 16:45-18:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	0.0	0.0	0.0	0.0	0.0	0.0
C-A	130.8	87.2	-	-	-	-
C-B	92.2	61.5	9.9	0.1	9.9	0.1
A-B	247.8	165.2	-	-	-	-
A-C	341.4	227.6	-	-	-	-
All	**812.1**	**541.4**	**9.9**	**0.0**	**9.9**	**0.0**

Demand Set: 2009 Base + Construction All North AM Peak
Modelling Period: 07:45-09:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	0.0	0.0	0.0	0.0	0.0	0.0
C-A	92.2	61.5	-	-	-	-
C-B	33.0	22.0	3.8	0.1	3.8	0.1
A-B	183.1	122.0	-	-	-	-
A-C	827.2	551.5	-	-	-	-
All	**1135.6**	**757.0**	**3.8**	**0.0**	**3.8**	**0.0**

Demand Set: 2009 Base + Construction All North PM Peak
Modelling Period: 16:45-18:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	0.0	0.0	0.0	0.0	0.0	0.0
C-A	123.9	82.6	-	-	-	-
C-B	74.3	49.6	7.2	0.1	7.2	0.1
A-B	238.1	158.7	-	-	-	-
A-C	320.7	213.8	-	-	-	-
All	**757.0**	**504.7**	**7.2**	**0.0**	**7.2**	**0.0**

Demand Set: 2009 Base + Construction All South AM Peak
Modelling Period: 07:45-09:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	0.0	0.0	0.0	0.0	0.0	0.0
C-A	92.2	61.5	-	-	-	-
C-B	48.2	32.1	7.2	0.1	7.2	0.1
A-B	183.1	122.0	-	-	-	-
A-C	813.5	542.3	-	-	-	-
All	**1136.9**	**758.0**	**7.2**	**0.0**	**7.2**	**0.0**

Demand Set: 2009 Base + Construction All South PM Peak
Modelling Period: 16:45-18:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	0.0	0.0	0.0	0.0	0.0	0.0
C-A	123.9	82.6	-	-	-	-
C-B	89.5	59.6	10.3	0.1	10.3	0.1
A-B	238.1	158.7	-	-	-	-
A-C	306.9	204.6	-	-	-	-
All	**758.4**	**505.6**	**10.3**	**0.0**	**10.3**	**0.0**

Demand Set: 2009 Base + Construction 50% Split South-North AM Peak
Modelling Period: 07:45-09:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	0.0	0.0	0.0	0.0	0.0	0.0
C-A	92.2	61.5	-	-	-	-
C-B	39.9	26.6	5.3	0.1	5.3	0.1
A-B	183.1	122.0	-	-	-	-
A-C	820.4	546.9	-	-	-	-
All	**1135.6**	**757.0**	**5.3**	**0.0**	**5.3**	**0.0**

Demand Set: 2009 Base + Construction 50% Split South-North PM Peak
Modelling Period: 16:45-18:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	0.0	0.0	0.0	0.0	0.0	0.0
C-A	123.9	82.6	-	-	-	-
C-B	81.2	54.1	8.6	0.1	8.6	0.1
A-B	238.1	158.7	-	-	-	-
A-C	313.8	209.2	-	-	-	-
All	**757.0**	**504.7**	**8.6**	**0.0**	**8.6**	**0.0**

Delay is that occurring only within the time period.
Inclusive delay includes delay suffered by vehicles which are still queuing after the end of the time period.
These will only be significantly different if there is a large queue remaining at the end of the time period.

Geometric Data

Geometric Parameters

Parameter	Minor Arm B
Major Road Carriageway Width (m)	8.00
Major Road Kerbed Central Reserve Width (m)	0.00
Major Road Right Turning Lane Width (m)	4.00
Minor Road First Lane Width (m)	2.20
Minor Road Visibility To Right (m)	0
Minor Road Visibility To Left (m)	0
Major Road Right Turn Visibility (m)	160
Major Road Right Turn Blocks Traffic	No

Slope and Intercept Values

Stream	Intercept for Stream B-A	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	439.579	0.073	0.185	0.116	0.264
B-C	573.963	0.080	0.203	-	-
C-B	797.213	0.282	0.282	-	-

Note: Streams may be combined in which case capacity will be adjusted
These values do not allow for any site-specific corrections

PICADY 5 Run Successful

PICADY
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TRL Limited Crowthorne House Nine Mile Ride Wokingham, Berks. RG40 3GA, UK	Tel: +44 (0)1344 770758 Fax:+44 (0)1344 770864 E-mail: softwarebureau@trl.co.uk Web: www.trlsoftware.co.uk

The user of this computer program for the solution of an engineering problem is in no way relieved of their responsibility for the correctness of the solution

Run Analysis

Parameter	Values
File Run	C:\..\Picady\JNY6040 Picow Farm-Expressway W Junction.vpi
Date Run	06 June 2007
Time Run	10:25:58
Driving Side	Drive On The Left

Arm Names and Flow Scaling Factors

Arm	Arm Name	Flow Scaling Factor (%)
Arm A	Picow Farm Road West	100
Arm B	Expressway North	100
Arm C	Picow Farm Road East	100

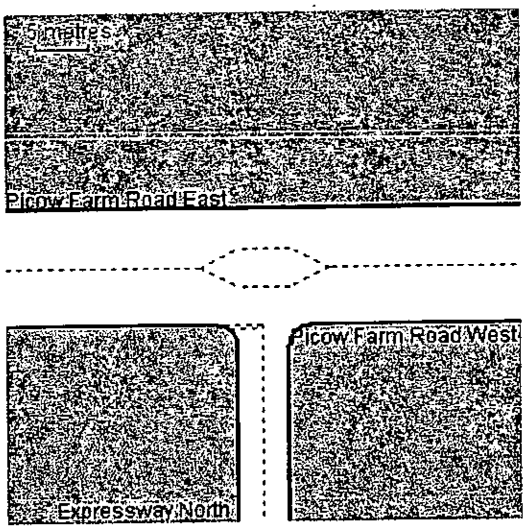
Stream Labelling Convention

Stream A-B contains traffic going from A to B etc.

Run Information

Parameter	Values
Run Title	JNY6040 Runcorn Energy from Waste - Picow Farm-Expressway North Junction
Location	Runcorn
Date	17 May 2007
Enumerator	chapmand [29FH51J]
Job Number	JNY6040
Status	-
Client	-
Description	-

Junction Diagram



Demand Data

Modelling Periods

Parameter	Period	Duration (min)	Segment Length (min)
First Modelling Period	07:45-09:15	90	15
Second Modelling Period	16:45-18:15	90	15

ODTAB Turning Counts

Demand Set: 2011 Base + Operational 65% from South AM Peak
Modelling Period: 07:45-09:15

From/To	Arm A	Arm B	Arm C
Arm A	0.0	102.0	262.0
Arm B	0.0	0.0	0.0
Arm C	200.0	141.0	0.0

Demand Set: 2011 Base + Operational 65% from South PM Peak
Modelling Period: 16:45-18:15

From/To	Arm A	Arm B	Arm C
Arm A	0.0	78.0	335.0
Arm B	0.0	0.0	0.0
Arm C	130.0	108.0	0.0

Demand Set: 2011 Base + Operational 80% from North AM Peak
Modelling Period: 07:45-09:15

From/To	Arm A	Arm B	Arm C
Arm A	0.0	112.0	253.0
Arm B	0.0	0.0	0.0
Arm C	216.0	141.0	0.0

Demand Set: 2011 Base + Operational 80% from North PM Peak
Modelling Period: 16:45-18:15

From/To	Arm A	Arm B	Arm C
Arm A	0.0	93.0	322.0
Arm B	0.0	0.0	0.0
Arm C	140.0	108.0	0.0

Demand Set: 2009 Base + construction all from North AM Peak
Modelling Period: 07:45-09:15

From/To	Arm A	Arm B	Arm C
Arm A	0.0	104.0	240.0
Arm B	0.0	0.0	0.0
Arm C	464.0	136.0	0.0

Demand Set: 2009 Base + construction all from North PM Peak
Modelling Period: 16:45-18:15

From/To	Arm A	Arm B	Arm C
Arm A	0.0	349.0	298.0
Arm B	0.0	0.0	0.0
Arm C	128.0	105.0	0.0

Demand Set: 2009 Base + construction all from south AM Peak
Modelling Period: 07:45-09:15

From/To	Arm A	Arm B	Arm C
Arm A	0.0	93.0	251.0
Arm B	0.0	0.0	0.0
Arm C	454.0	136.0	0.0

Demand Set: 2009 Base + construction all from south PM Peak
Modelling Period: 16:45-18:15

From/To	Arm A	Arm B	Arm C
Arm A	0.0	338.0	309.0
Arm B	0.0	0.0	0.0
Arm C	118.0	105.0	0.0

Demand Set: 2009 Base + construction 50% split north and south AM Peak
Modelling Period: 07:45-09:15

From/To	Arm A	Arm B	Arm C
Arm A	0.0	99.0	245.0
Arm B	0.0	0.0	0.0
Arm C	459.0	136.0	0.0

Demand Set: 2009 Base + construction 50% split north and south PM Peak
Modelling Period: 16:45-18:15

From/To	Arm A	Arm B	Arm C
Arm A	0.0	344.0	303.0
Arm B	0.0	0.0	0.0
Arm C	123.0	105.0	0.0

ODTAB Synthesised Flows

Demand Set: 2011 Base + Operational 65% from South AM Peak
Modelling Period: 07:45-09:15

Arm	Rising Time	Rising Flow (veh/min)	Peak Time	Peak Flow (veh/min)	Falling Time	Falling Flow (veh/min)
Arm A	08:00	4.550	08:00	6.825	08:30	4.550
Arm B	08:00	0.000	08:00	0.000	08:30	0.000
Arm C	08:00	4.262	08:00	6.394	08:30	4.262

Heavy Vehicles Percentages

Demand Set: 2011 Base + Operational 65% from South AM Peak
Modelling Period: 07:45-09:15

From/To	Arm A	Arm B	Arm C
Arm A	-	11.9	11.5
Arm B	0.0	-	0.0
Arm C	12.5	12.4	-

Demand Set: 2011 Base + Operational 65% from South PM Peak
Modelling Period: 16:45-18:15

From/To	Arm A	Arm B	Arm C
Arm A	-	22.3	7.3
Arm B	0.0	-	0.0
Arm C	11.9	3.0	-

Demand Set: 2011 Base + Operational 80% from North AM Peak
Modelling Period: 07:45-09:15

From/To	Arm A	Arm B	Arm C
Arm A	-	17.2	9.1
Arm B	0.0	-	0.0
Arm C	14.9	12.4	-

Demand Set: 2011 Base + Operational 80% from North PM Peak
Modelling Period: 16:45-18:15

From/To	Arm A	Arm B	Arm C
Arm A	-	26.3	5.4
Arm B	0.0	-	0.0
Arm C	16.2	3.0	-

Demand Set: 2009 Base + construction all from North AM Peak
Modelling Period: 07:45-09:15

From/To	Arm A	Arm B	Arm C
Arm A	-	16.7	7.9
Arm B	0.0	-	0.0
Arm C	5.6	12.4	-

Demand Set: 2009 Base + construction all from North PM Peak
Modelling Period: 16:45-18:15

From/To	Arm A	Arm B	Arm C
Arm A	-	5.6	3.9
Arm B	0.0	-	0.0
Arm C	15.2	3.0	-

Demand Set: 2009 Base + construction all from south AM Peak
Modelling Period: 07:45-09:15

From/To	Arm A	Arm B	Arm C
Arm A	-	6.8	12.0
Arm B	0.0	-	0.0
Arm C	3.5	12.4	-

Demand Set: 2009 Base + construction all from south PM Peak
Modelling Period: 16:45-18:15

From/To	Arm A	Arm B	Arm C
Arm A	-	2.5	7.3
Arm B	0.0	-	0.0
Arm C	8.0	3.0	-

Demand Set: 2009 Base + construction 50% split north and south AM Peak
Modelling Period: 07:45-09:15

From/To	Arm A	Arm B	Arm C
Arm A	-	12.5	9.8
Arm B	0.0	-	0.0
Arm C	4.5	12.4	-

Demand Set: 2009 Base + construction 50% split north and south PM Peak
Modelling Period: 16:45-18:15

From/To	Arm A	Arm B	Arm C
Arm A	-	4.2	5.5
Arm B	0.0	-	0.0
Arm C	11.8	3.0	-

Queues & Delays

Demand Set: 2011 Base + Operational 65% from South AM Peak
Modelling Period: 07:45-09:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
07:45-08:00	B-AC	0.00	6.22	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	2.51	-	-	-	-	-	-	-	-
	C-B	1.77	9.69	0.183	-	0.00	0.22	-	3.2	0.13
	A-B	1.28	-	-	-	-	-	-	-	-
	A-C	3.29	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:00-08:15	B-AC	0.00	5.95	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	3.00	-	-	-	-	-	-	-	-
	C-B	2.11	9.45	0.224	-	0.22	0.28	-	4.2	0.14
	A-B	1.53	-	-	-	-	-	-	-	-
	A-C	3.93	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:15-08:30	B-AC	0.00	5.57	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	3.67	-	-	-	-	-	-	-	-
	C-B	2.59	9.13	0.284	-	0.28	0.39	-	5.7	0.15
	A-B	1.87	-	-	-	-	-	-	-	-
	A-C	4.81	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:30-08:45	B-AC	0.00	5.57	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	3.67	-	-	-	-	-	-	-	-
	C-B	2.59	9.13	0.284	-	0.39	0.39	-	5.9	0.15
	A-B	1.87	-	-	-	-	-	-	-	-
	A-C	4.81	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:45-09:00	B-AC	0.00	5.95	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	3.00	-	-	-	-	-	-	-	-
	C-B	2.11	9.45	0.224	-	0.39	0.29	-	4.5	0.14
	A-B	1.53	-	-	-	-	-	-	-	-
	A-C	3.93	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
09:00-09:15	B-AC	0.00	6.22	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	2.51	-	-	-	-	-	-	-	-
	C-B	1.77	9.69	0.183	-	0.29	0.23	-	3.5	0.13
	A-B	1.28	-	-	-	-	-	-	-	-
	A-C	3.29	-	-	-	-	-	-	-	-

Demand Set: 2011 Base + Operational 65% from South PM Peak
Modelling Period: 16:45-18:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
16:45-17:00	B-AC	0.00	6.26	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.63	-	-	-	-	-	-	-	-
	C-B	1.36	10.41	0.130	-	0.00	0.15	-	2.2	0.11
	A-B	0.98	-	-	-	-	-	-	-	-
	A-C	4.20	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:00-17:15	B-AC	0.00	6.01	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.95	-	-	-	-	-	-	-	-
	C-B	1.62	10.13	0.160	-	0.15	0.19	-	2.8	0.12
	A-B	1.17	-	-	-	-	-	-	-	-
	A-C	5.02	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:15-17:30	B-AC	0.00	5.65	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	2.39	-	-	-	-	-	-	-	-
	C-B	1.98	9.73	0.204	-	0.19	0.25	-	3.7	0.13
	A-B	1.43	-	-	-	-	-	-	-	-
	A-C	6.15	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:30-17:45	B-AC	0.00	5.65	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	2.39	-	-	-	-	-	-	-	-
	C-B	1.98	9.73	0.204	-	0.25	0.25	-	3.8	0.13
	A-B	1.43	-	-	-	-	-	-	-	-
	A-C	6.15	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:45-18:00	B-AC	0.00	6.01	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.95	-	-	-	-	-	-	-	-
	C-B	1.62	10.13	0.160	-	0.25	0.19	-	2.9	0.12
	A-B	1.17	-	-	-	-	-	-	-	-
	A-C	5.02	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
18:00-18:15	B-AC	0.00	6.26	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.63	-	-	-	-	-	-	-	-
	C-B	1.36	10.41	0.130	-	0.19	0.15	-	2.3	0.11
	A-B	0.98	-	-	-	-	-	-	-	-
	A-C	4.20	-	-	-	-	-	-	-	-

Demand Set: 2011 Base + Operational 80% from North AM Peak
Modelling Period: 07:45-09:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
07:45-08:00	B-AC	0.00	6.22	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	2.71	-	-	-	-	-	-	-	-
	C-B	1.77	9.68	0.183	-	0.00	0.22	-	3.2	0.13
	A-B	1.41	-	-	-	-	-	-	-	-
	A-C	3.17	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:00-08:15	B-AC	0.00	5.95	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	3.24	-	-	-	-	-	-	-	-
	C-B	2.11	9.45	0.224	-	0.22	0.28	-	4.2	0.14
	A-B	1.68	-	-	-	-	-	-	-	-
	A-C	3.79	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:15-08:30	B-AC	0.00	5.56	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	3.96	-	-	-	-	-	-	-	-
	C-B	2.59	9.12	0.284	-	0.28	0.39	-	5.7	0.15
	A-B	2.06	-	-	-	-	-	-	-	-
	A-C	4.64	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:30-08:45	B-AC	0.00	5.56	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	3.96	-	-	-	-	-	-	-	-
	C-B	2.59	9.12	0.284	-	0.39	0.39	-	5.9	0.15
	A-B	2.06	-	-	-	-	-	-	-	-
	A-C	4.64	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:45-09:00	B-AC	0.00	5.94	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	3.24	-	-	-	-	-	-	-	-
	C-B	2.11	9.45	0.224	-	0.39	0.29	-	4.5	0.14
	A-B	1.68	-	-	-	-	-	-	-	-
	A-C	3.79	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
09:00-09:15	B-AC	0.00	6.21	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	2.71	-	-	-	-	-	-	-	-
	C-B	1.77	9.68	0.183	-	0.29	0.23	-	3.5	0.13
	A-B	1.41	-	-	-	-	-	-	-	-

	A-C	3.17	-	-	-	-	-	-	-	-

Demand Set: 2011 Base + Operational 80% from North PM Peak
Modelling Period: 16:45-18:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
16:45-17:00	B-AC	0.00	6.27	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.76	-	-	-	-	-	-	-	-
	C-B	1.36	10.41	0.130	-	0.00	0.15	-	2.2	0.11
	A-B	1.17	-	-	-	-	-	-	-	-
	A-C	4.04	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:00-17:15	B-AC	0.00	6.02	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	2.10	-	-	-	-	-	-	-	-
	C-B	1.62	10.12	0.160	-	0.15	0.19	-	2.8	0.12
	A-B	1.39	-	-	-	-	-	-	-	-
	A-C	4.82	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:15-17:30	B-AC	0.00	5.66	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	2.57	-	-	-	-	-	-	-	-
	C-B	1.98	9.72	0.204	-	0.19	0.25	-	3.7	0.13
	A-B	1.71	-	-	-	-	-	-	-	-
	A-C	5.91	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:30-17:45	B-AC	0.00	5.66	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	2.57	-	-	-	-	-	-	-	-
	C-B	1.98	9.72	0.204	-	0.25	0.25	-	3.8	0.13
	A-B	1.71	-	-	-	-	-	-	-	-
	A-C	5.91	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:45-18:00	B-AC	0.00	6.02	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	2.10	-	-	-	-	-	-	-	-
	C-B	1.62	10.12	0.160	-	0.25	0.19	-	3.0	0.12
	A-B	1.39	-	-	-	-	-	-	-	-
	A-C	4.82	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
18:00-18:15	B-AC	0.00	6.27	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.76	-	-	-	-	-	-	-	-
	C-B	1.36	10.41	0.130	-	0.19	0.15	-	2.3	0.11
	A-B	1.17	-	-	-	-	-	-	-	-
	A-C	4.04	-	-	-	-	-	-	-	-

Demand Set: 2009 Base + construction all from North AM Peak
Modelling Period: 07:45-09:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
07:45-08:00	B-AC	0.00	6.03	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	5.82	-	-	-	-	-	-	-	-
	C-B	1.71	9.76	0.175	-	0.00	0.21	-	3.0	0.12
	A-B	1.30	-	-	-	-	-	-	-	-
	A-C	3.01	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:00-08:15	B-AC	0.00	5.71	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	6.95	-	-	-	-	-	-	-	-
	C-B	2.04	9.54	0.214	-	0.21	0.27	-	3.9	0.13
	A-B	1.56	-	-	-	-	-	-	-	-
	A-C	3.60	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:15-08:30	B-AC	0.00	5.26	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	8.51	-	-	-	-	-	-	-	-
	C-B	2.50	9.24	0.270	-	0.27	0.37	-	5.3	0.15
	A-B	1.91	-	-	-	-	-	-	-	-
	A-C	4.40	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:30-08:45	B-AC	0.00	5.26	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	8.51	-	-	-	-	-	-	-	-
	C-B	2.50	9.24	0.270	-	0.37	0.37	-	5.5	0.15
	A-B	1.91	-	-	-	-	-	-	-	-
	A-C	4.40	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:45-09:00	B-AC	0.00	5.71	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	6.95	-	-	-	-	-	-	-	-
	C-B	2.04	9.54	0.214	-	0.37	0.27	-	4.2	0.13
	A-B	1.56	-	-	-	-	-	-	-	-
	A-C	3.60	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
09:00-09:15	B-AC	0.00	6.03	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	5.82	-	-	-	-	-	-	-	-
	C-B	1.71	9.76	0.175	-	0.27	0.21	-	3.3	0.12
	A-B	1.30	-	-	-	-	-	-	-	-
	A-C	3.01	-	-	-	-	-	-	-	-

Demand Set: 2009 Base + construction all from North PM Peak
Modelling Period: 16:45-18:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
16:45-17:00	B-AC	0.00	6.13	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.61	-	-	-	-	-	-	-	-
	C-B	1.32	9.69	0.136	-	0.00	0.16	-	2.3	0.12
	A-B	4.38	-	-	-	-	-	-	-	-
	A-C	3.74	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:00-17:15	B-AC	0.00	5.85	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.92	-	-	-	-	-	-	-	-
	C-B	1.57	9.26	0.170	-	0.16	0.20	-	3.0	0.13
	A-B	5.23	-	-	-	-	-	-	-	-
	A-C	4.46	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:15-17:30	B-AC	0.00	5.46	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	2.35	-	-	-	-	-	-	-	-
	C-B	1.93	8.66	0.222	-	0.20	0.28	-	4.1	0.15
	A-B	6.40	-	-	-	-	-	-	-	-
	A-C	5.47	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:30-17:45	B-AC	0.00	5.46	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	2.35	-	-	-	-	-	-	-	-
	C-B	1.93	8.66	0.222	-	0.28	0.28	-	4.3	0.15
	A-B	6.40	-	-	-	-	-	-	-	-
	A-C	5.47	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:45-18:00	B-AC	0.00	5.85	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.92	-	-	-	-	-	-	-	-
	C-B	1.57	9.26	0.170	-	0.28	0.21	-	3.2	0.13
	A-B	5.23	-	-	-	-	-	-	-	-
	A-C	4.46	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
18:00-18:15	B-AC	0.00	6.13	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.61	-	-	-	-	-	-	-	-
	C-B	1.32	9.69	0.136	-	0.21	0.16	-	2.4	0.12
	A-B	4.38	-	-	-	-	-	-	-	-

	A-C	3.74	-	-	-	-	-	-	-	-

Demand Set: 2009 Base + construction all from south AM Peak
Modelling Period: 07:45-09:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
07:45-08:00	B-AC	0.00	6.02	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	5.70	-	-	-	-	-	-	-	-
	C-B	1.71	9.76	0.175	-	0.00	0.21	-	3.0	0.12
	A-B	1.17	-	-	-	-	-	-	-	-
	A-C	3.15	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:00-08:15	B-AC	0.00	5.70	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	6.80	-	-	-	-	-	-	-	-
	C-B	2.04	9.54	0.214	-	0.21	0.27	-	3.9	0.13
	A-B	1.39	-	-	-	-	-	-	-	-
	A-C	3.76	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:15-08:30	B-AC	0.00	5.25	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	8.33	-	-	-	-	-	-	-	-
	C-B	2.50	9.24	0.270	-	0.27	0.37	-	5.3	0.15
	A-B	1.71	-	-	-	-	-	-	-	-
	A-C	4.61	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:30-08:45	B-AC	0.00	5.24	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	8.33	-	-	-	-	-	-	-	-
	C-B	2.50	9.24	0.270	-	0.37	0.37	-	5.5	0.15
	A-B	1.71	-	-	-	-	-	-	-	-
	A-C	4.61	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:45-09:00	B-AC	0.00	5.70	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	6.80	-	-	-	-	-	-	-	-
	C-B	2.04	9.54	0.214	-	0.37	0.27	-	4.2	0.13
	A-B	1.39	-	-	-	-	-	-	-	-
	A-C	3.76	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
09:00-09:15	B-AC	0.00	6.02	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	5.70	-	-	-	-	-	-	-	-
	C-B	1.71	9.76	0.175	-	0.27	0.21	-	3.3	0.12
	A-B	1.17	-	-	-	-	-	-	-	-
	A-C	3.15	-	-	-	-	-	-	-	-

Demand Set: 2009 Base + construction all from south PM Peak
Modelling Period: 16:45-18:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
16:45-17:00	B-AC	0.00	6.12	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.48	-	-	-	-	-	-	-	-
	C-B	1.32	9.69	0.136	-	0.00	0.16	-	2.3	0.12
	A-B	4.24	-	-	-	-	-	-	-	-
	A-C	3.88	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/segment)	Delay (veh.min/segment)	Mean Arriving Vehicle Delay (min)
17:00-17:15	B-AC	0.00	5.84	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.77	-	-	-	-	-	-	-	-
	C-B	1.57	9.26	0.170	-	0.16	0.20	-	3.0	0.13
	A-B	5.06	-	-	-	-	-	-	-	-
	A-C	4.63	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/segment)	Delay (veh.min/segment)	Mean Arriving Vehicle Delay (min)
17:15-17:30	B-AC	0.00	5.44	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	2.17	-	-	-	-	-	-	-	-
	C-B	1.93	8.66	0.222	-	0.20	0.28	-	4.1	0.15
	A-B	6.20	-	-	-	-	-	-	-	-
	A-C	5.67	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/segment)	Delay (veh.min/segment)	Mean Arriving Vehicle Delay (min)
17:30-17:45	B-AC	0.00	5.44	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	2.17	-	-	-	-	-	-	-	-
	C-B	1.93	8.66	0.222	-	0.28	0.28	-	4.3	0.15
	A-B	6.20	-	-	-	-	-	-	-	-
	A-C	5.67	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/segment)	Delay (veh.min/segment)	Mean Arriving Vehicle Delay (min)
17:45-18:00	B-AC	0.00	5.84	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.77	-	-	-	-	-	-	-	-
	C-B	1.57	9.26	0.170	-	0.28	0.21	-	3.2	0:13
	A-B	5.06	-	-	-	-	-	-	-	-
	A-C	4.63	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/segment)	Delay (veh.min/segment)	Mean Arriving Vehicle Delay (min)
18:00-18:15	B-AC	0.00	6.12	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.48	-	-	-	-	-	-	-	-
	C-B	1.32	9.69	0.136	-	0.21	0.16	-	2.4	0.12
	A-B	4.24	-	-	-	-	-	-	-	-
	A-C	3.88	-	-	-	-	-	-	-	-

Demand Set: 2009 Base + construction 50% split north and south AM Peak
Modelling Period: 07:45-09:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
07:45-08:00	B-AC	0.00	6.03	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	5.76	-	-	-	-	-	-	-	-
	C-B	1.71	9.76	0.175	-	0.00	0.21	-	3.0	0.12
	A-B	1.24	-	-	-	-	-	-	-	-
	A-C	3.07	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:00-08:15	B-AC	0.00	5.71	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	6.88	-	-	-	-	-	-	-	-
	C-B	2.04	9.54	0.214	-	0.21	0.27	-	3.9	0.13
	A-B	1.48	-	-	-	-	-	-	-	-
	A-C	3.67	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:15-08:30	B-AC	0.00	5.25	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	8.42	-	-	-	-	-	-	-	-
	C-B	2.50	9.24	0.270	-	0.27	0.37	-	5.3	0.15
	A-B	1.82	-	-	-	-	-	-	-	-
	A-C	4.50	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:30-08:45	B-AC	0.00	5.25	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	8.42	-	-	-	-	-	-	-	-
	C-B	2.50	9.24	0.270	-	0.37	0.37	-	5.5	0.15
	A-B	1.82	-	-	-	-	-	-	-	-
	A-C	4.50	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
08:45-09:00	B-AC	0.00	5.71	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	6.88	-	-	-	-	-	-	-	-
	C-B	2.04	9.54	0.214	-	0.37	0.27	-	4.2	0.13
	A-B	1.48	-	-	-	-	-	-	-	-
	A-C	3.67	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
09:00-09:15	B-AC	0.00	6.02	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	5.76	-	-	-	-	-	-	-	-
	C-B	1.71	9.76	0.175	-	0.27	0.21	-	3.3	0.12
	A-B	1.24	-	-	-	-	-	-	-	-

	A-C	3.07	-	-	-	-	-	-	-	-

Demand Set: 2009 Base + construction 50% split north and south PM Peak
Modelling Period: 16:45-18:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
16:45-17:00	B-AC	0.00	6.13	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.54	-	-	-	-	-	-	-	-
	C-B	1.32	9.69	0.136	-	0.00	0.16	-	2.3	0.12
	A-B	4.32	-	-	-	-	-	-	-	-
	A-C	3.80	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:00-17:15	B-AC	0.00	5.85	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.84	-	-	-	-	-	-	-	-
	C-B	1.57	9.26	0.170	-	0.16	0.20	-	3.0	0.13
	A-B	5.15	-	-	-	-	-	-	-	-
	A-C	4.54	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:15-17:30	B-AC	0.00	5.45	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	2.26	-	-	-	-	-	-	-	-
	C-B	1.93	8.66	0.222	-	0.20	0.28	-	4.1	0.15
	A-B	6.31	-	-	-	-	-	-	-	-
	A-C	5.56	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:30-17:45	B-AC	0.00	5.45	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	2.26	-	-	-	-	-	-	-	-
	C-B	1.93	8.66	0.222	-	0.28	0.28	-	4.3	0.15
	A-B	6.31	-	-	-	-	-	-	-	-
	A-C	5.56	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
17:45-18:00	B-AC	0.00	5.85	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.84	-	-	-	-	-	-	-	-
	C-B	1.57	9.26	0.170	-	0.28	0.21	-	3.2	0.13
	A-B	5.15	-	-	-	-	-	-	-	-
	A-C	4.54	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/ segment)	Delay (veh.min/ segment)	Mean Arriving Vehicle Delay (min)
18:00-18:15	B-AC	0.00	6.13	0.000	-	0.00	0.00	-	0.0	0.00
	C-A	1.54	-	-	-	-	-	-	-	-
	C-B	1.32	9.69	0.136	-	0.21	0.16	-	2.4	0.12
	A-B	4.32	-	-	-	-	-	-	-	-
	A-C	3.80	-	-	-	-	-	-	-	-

Entry capacities marked with an '(X)' are dominated by a pedestrian crossing in that time segment.
In time segments marked with a '(B)', traffic leaving the junction may block back from a crossing so impairing normal operation of the junction.
Delays marked with '##' could not be calculated.

Overall Queues & Delays

Queueing Delay Information Over Whole Period

Demand Set: 2011 Base + Operational 65% from South AM Peak
Modelling Period: 07:45-09:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	0.0	0.0	0.0	0.0	0.0	0.0
C-A	275.3	183.5	-	-	-	-
C-B	194.1	129.4	26.9	0.1	26.9	0.1
A-B	140.4	93.6	-	-	-	-
A-C	360.6	240.4	-	-	-	-
All	**970.4**	**646.9**	**26.9**	**0.0**	**26.9**	**0.0**

Demand Set: 2011 Base + Operational 65% from South PM Peak
Modelling Period: 16:45-18:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	0.0	0.0	0.0	0.0	0.0	0.0
C-A	178.9	119.3	-	-	-	-
C-B	148.7	99.1	17.7	0.1	17.7	0.1
A-B	107.4	71.6	-	-	-	-
A-C	461.1	307.4	-	-	-	-
All	**896.1**	**597.4**	**17.7**	**0.0**	**17.7**	**0.0**

Demand Set: 2011 Base + Operational 80% from North AM Peak
Modelling Period: 07:45-09:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	0.0	0.0	0.0	0.0	0.0	0.0
C-A	297.3	198.2	-	-	-	-
C-B	194.1	129.4	26.9	0.1	26.9	0.1
A-B	154.2	102.8	-	-	-	-
A-C	348.2	232.2	-	-	-	-
All	**993.8**	**662.5**	**26.9**	**0.0**	**26.9**	**0.0**

Demand Set: 2011 Base + Operational 80% from North PM Peak
Modelling Period: 16:45-18:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	0.0	0.0	0.0	0.0	0.0	0.0
C-A	192.7	128.5	-	-	-	-
C-B	148.7	99.1	17.7	0.1	17.7	0.1
A-B	128.0	85.3	-	-	-	-
A-C	443.2	295.5	-	-	-	-
All	**912.6**	**608.4**	**17.7**	**0.0**	**17.7**	**0.0**

Demand Set: 2009 Base + construction all from North AM Peak
Modelling Period: 07:45-09:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	0.0	0.0	0.0	0.0	0.0	0.0
C-A	638.7	425.8	-	-	-	-
C-B	187.2	124.8	25.3	0.1	25.3	0.1
A-B	143.1	95.4	-	-	-	-
A-C	330.3	220.2	-	-	-	-
All	**1299.3**	**866.2**	**25.3**	**0.0**	**25.3**	**0.0**

Demand Set: 2009 Base + construction all from North PM Peak
Modelling Period: 16:45-18:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	0.0	0.0	0.0	0.0	0.0	0.0
C-A	176.2	117.5	-	-	-	-
C-B	144.5	96.3	19.2	0.1	19.2	0.1
A-B	480.4	320.2	-	-	-	-
A-C	410.2	273.4	-	-	-	-
All	**1211.3**	**807.5**	**19.2**	**0.0**	**19.2**	**0.0**

Demand Set: 2009 Base + construction all from south AM Peak
Modelling Period: 07:45-09:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	0.0	0.0	0.0	0.0	0.0	0.0
C-A	624.9	416.6	-	-	-	-
C-B	187.2	124.8	25.3	0.1	25.3	0.1
A-B	128.0	85.3	-	-	-	-
A-C	345.5	230.3	-	-	-	-
All	**1285.6**	**857.1**	**25.3**	**0.0**	**25.3**	**0.0**

Demand Set: 2009 Base + construction all from south PM Peak
Modelling Period: 16:45-18:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	0.0	0.0	0.0	0.0	0.0	0.0
C-A	162.4	108.3	-	-	-	-
C-B	144.5	96.3	19.2	0.1	19.2	0.1
A-B	465.2	310.2	-	-	-	-
A-C	425.3	283.5	-	-	-	-
All	**1197.5**	**798.3**	**19.2**	**0.0**	**19.2**	**0.0**

Demand Set: 2009 Base + construction 50% split north and south AM Peak
Modelling Period: 07:45-09:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	0.0	0.0	0.0	0.0	0.0	0.0
C-A	631.8	421.2	-	-	-	-
C-B	187.2	124.8	25.3	0.1	25.3	0.1
A-B	136.3	90.8	-	-	-	-
A-C	337.2	224.8	-	-	-	-
All	**1292.5**	**861.6**	**25.3**	**0.0**	**25.3**	**0.0**

Demand Set: 2009 Base + construction 50% split north and south PM Peak
Modelling Period: 16:45-18:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	0.0	0.0	0.0	0.0	0.0	0.0
C-A	169.3	112.9	-	-	-	-
C-B	144.5	96.3	19.2	0.1	19.2	0.1
A-B	473.5	315.7	-	-	-	-
A-C	417.1	278.0	-	-	-	-
All	**1204.4**	**802.9**	**19.2**	**0.0**	**19.2**	**0.0**

Delay is that occurring only within the time period.
Inclusive delay includes delay suffered by vehicles which are still queuing after the end of the time period.
These will only be significantly different if there is a large queue remaining at the end of the time period.

Geometric Data

Geometric Parameters

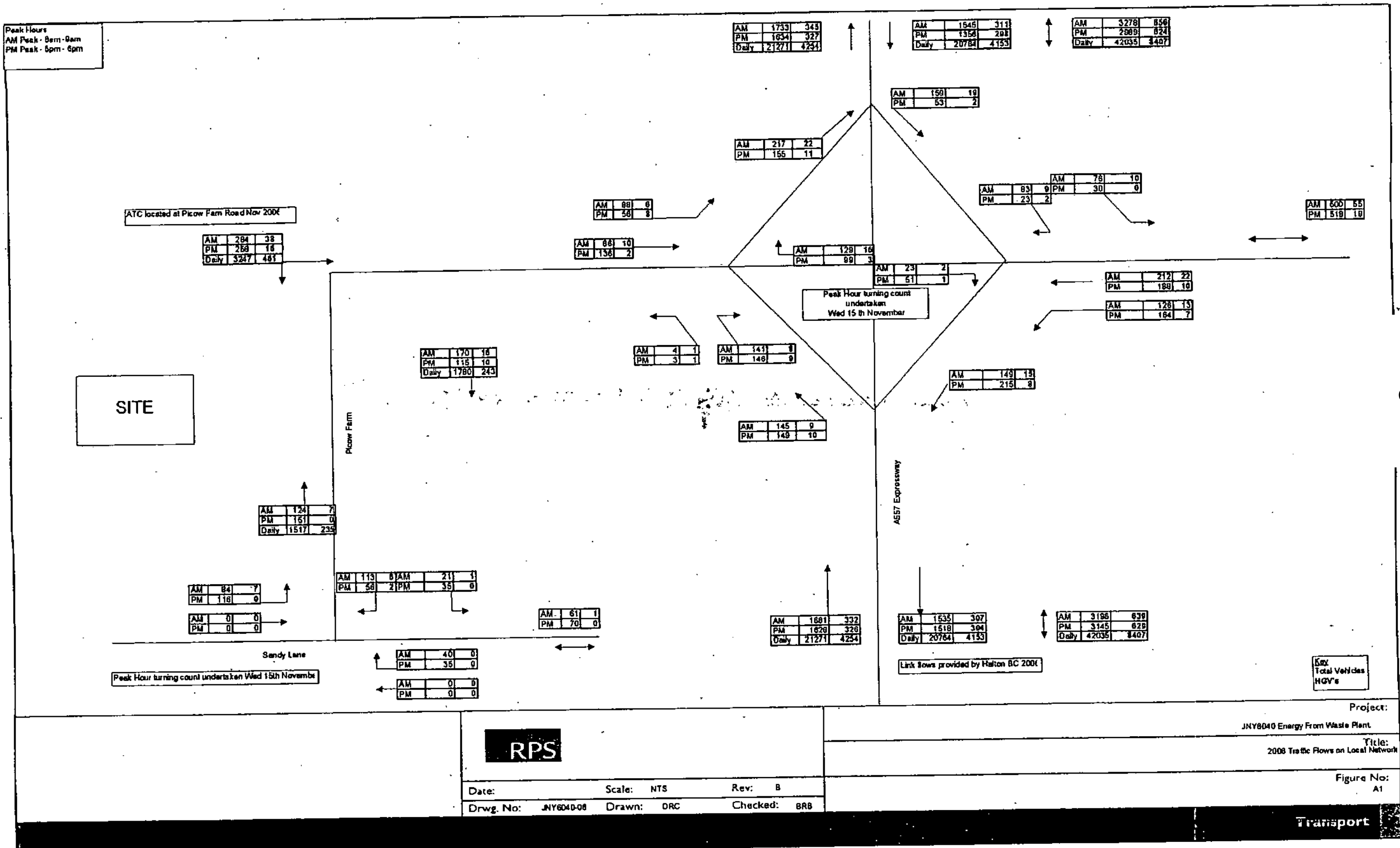
Parameter	Minor Arm B
Major Road Carriageway Width (m)	7.40
Major Road Kerbed Central Reserve Width (m)	0.00
Major Road Right Turning Lane Width (m)	3.80
Minor Road First Lane Width (m)	2.20
Minor Road Visibility To Right (m)	0
Minor Road Visibility To Left (m)	0
Major Road Right Turn Visibility (m)	90
Major Road Right Turn Blocks Traffic	No

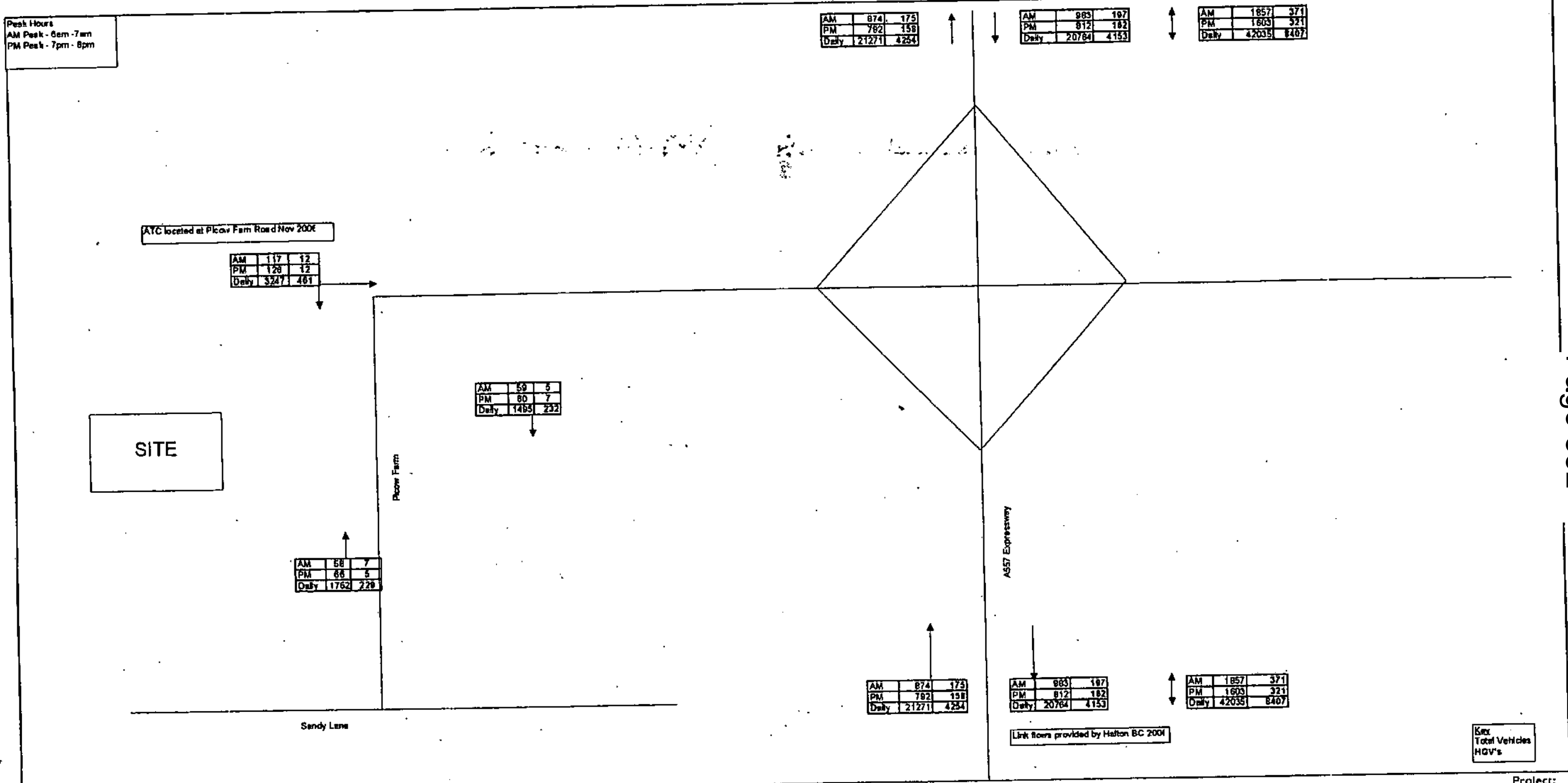
Slope and Intercept Values

Stream	Intercept for Stream B-A	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	439.579	0.075	0.190	0.120	0.271
B-C	573.963	0.083	0.209	-	-
C-B	735.106	0.267	0.267	-	-

Note: Streams may be combined in which case capacity will be adjusted
These values do not allow for any site-specific corrections

PICADY 5 Run Successful


Peak Hours
AM Peak - 8am - 9am
PM Peak - 5pm - 6pm
SITE
ATC located at Picow Farm Road Nov 2006
Picow Farm
Sandy Lane
Peak Hour turning count undertaken Wed 15th November
Peak Hour turning count undertaken Wed 15 th November
A557 Expressway
Link flows provided by Halton BC 2006
Key
Total Vehicles
HGV's
AM 1733 345
PM 1634 327
Daily 21271 4254
AM 1545 311
PM 1356 298
Daily 20784 4153
AM 3278 856
PM 2989 824
Daily 42035 8407
AM 159 19
PM 53 2
AM 217 22
PM 155 11
AM 76 10
PM 30 0
AM 83 9
PM 23 2
AM 500 55
PM 518 19
AM 88 6
PM 58 8
AM 86 10
PM 136 2
AM 284 38
PM 258 16
Daily 3247 481
AM 128 16
PM 99 3
AM 23 2
PM 51 1
AM 212 22
PM 188 10
AM 126 13
PM 164 7
AM 170 16
PM 115 10
Daily 1780 243
AM 4 1
PM 3 1
AM 141 8
PM 146 9
AM 149 13
PM 215 8
AM 145 9
PM 149 10
AM 124 7
PM 151 0
Daily 1517 235
AM 113 6
PM 56 2
AM 21 1
PM 35 0
AM 84 7
PM 116 0
AM 0 0
PM 0 0
AM 61 1
PM 70 0
AM 1681 332
PM 1628 326
Daily 21271 4254
AM 1535 307
PM 1518 304
Daily 20784 4153
AM 3196 639
PM 3145 629
Daily 42035 8407
AM 40 0
PM 35 0
AM 0 0
PM 0 0
RPS
Date:
Scale: NTS
Rev: B
Drwg. No: JNY6040-08
Drawn: DRC
Checked: BRB
Project:
JNY6040 Energy From Waste Plant
Title:
2006 Traffic Flows on Local Network
Figure No:
A1
Transport



RPS

Date: Scale: NTS Rev: B

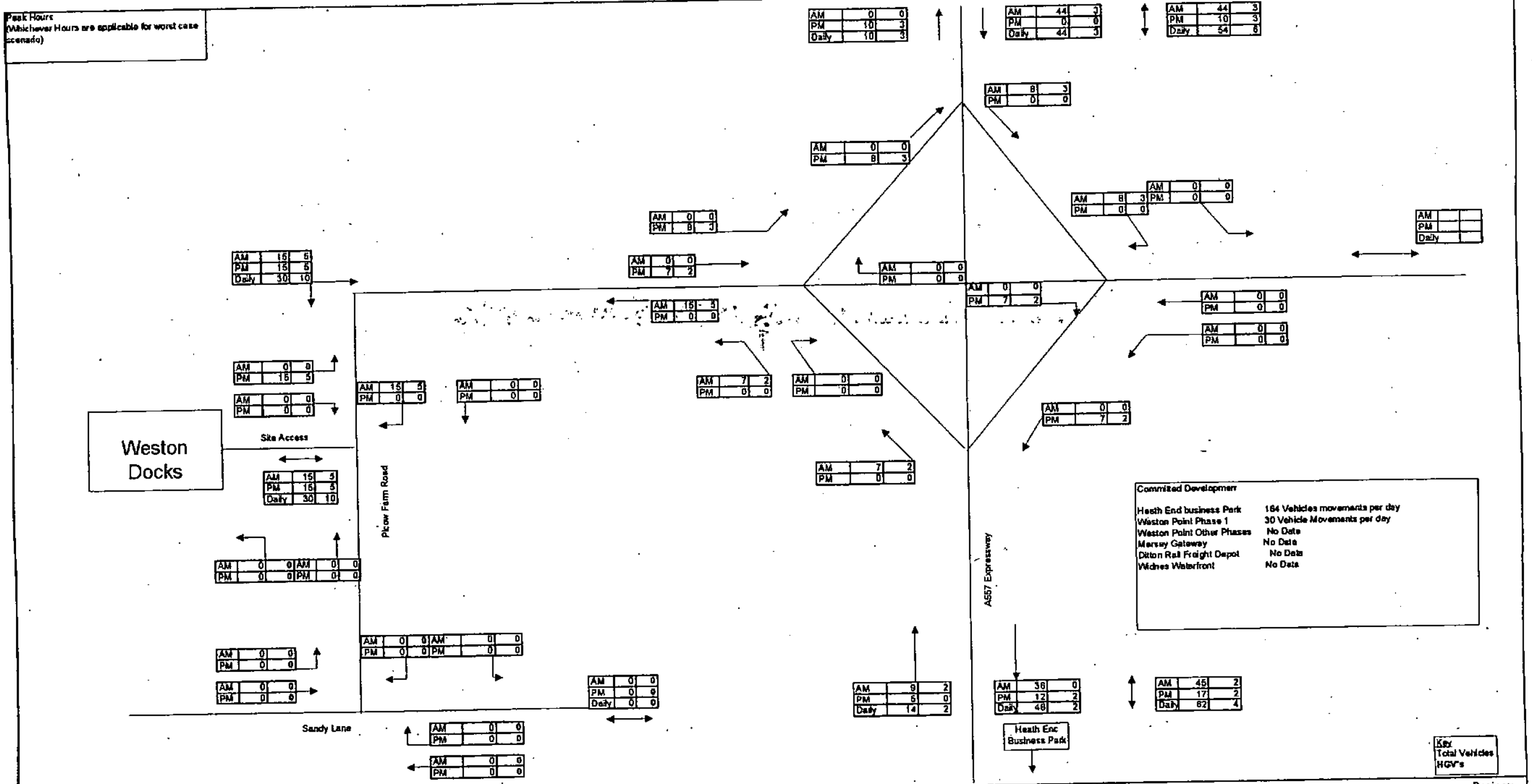
Drwg. No: JNY6040-38 Drawn: DRC Checked: BRB

Project: JNY6040 Energy From Waste Plant

Title: 2006 Traffic Flows on Local Network

Figure No: A1-8

Transport



RPS

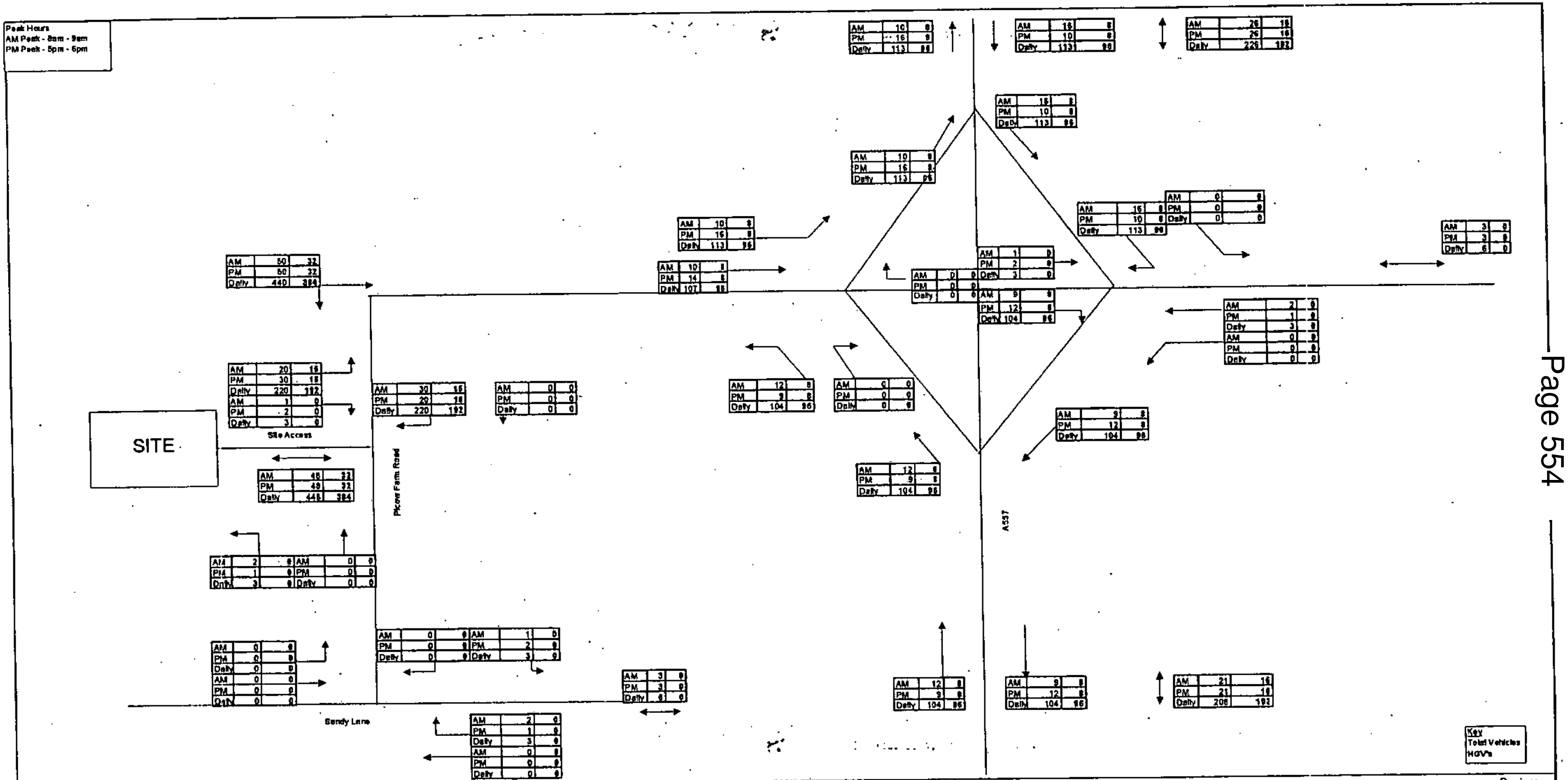
Date:		Scale: NTS	Rev: A
Drwg. No: JNY6040-07		Drawn: EL	Checked: BRB

Project:
JNY6040 Energy From Waste Plant.

Title:
Commited Development Flows

Figure No:
A2

Transport



Project: JNY6040 Energy From Waste Plant.

Title: Assignment of Operational Traffic

Figure No: A3

RPS

Date:

Scale: NTS

Rev: A

Drwg. No: JNY6040-13

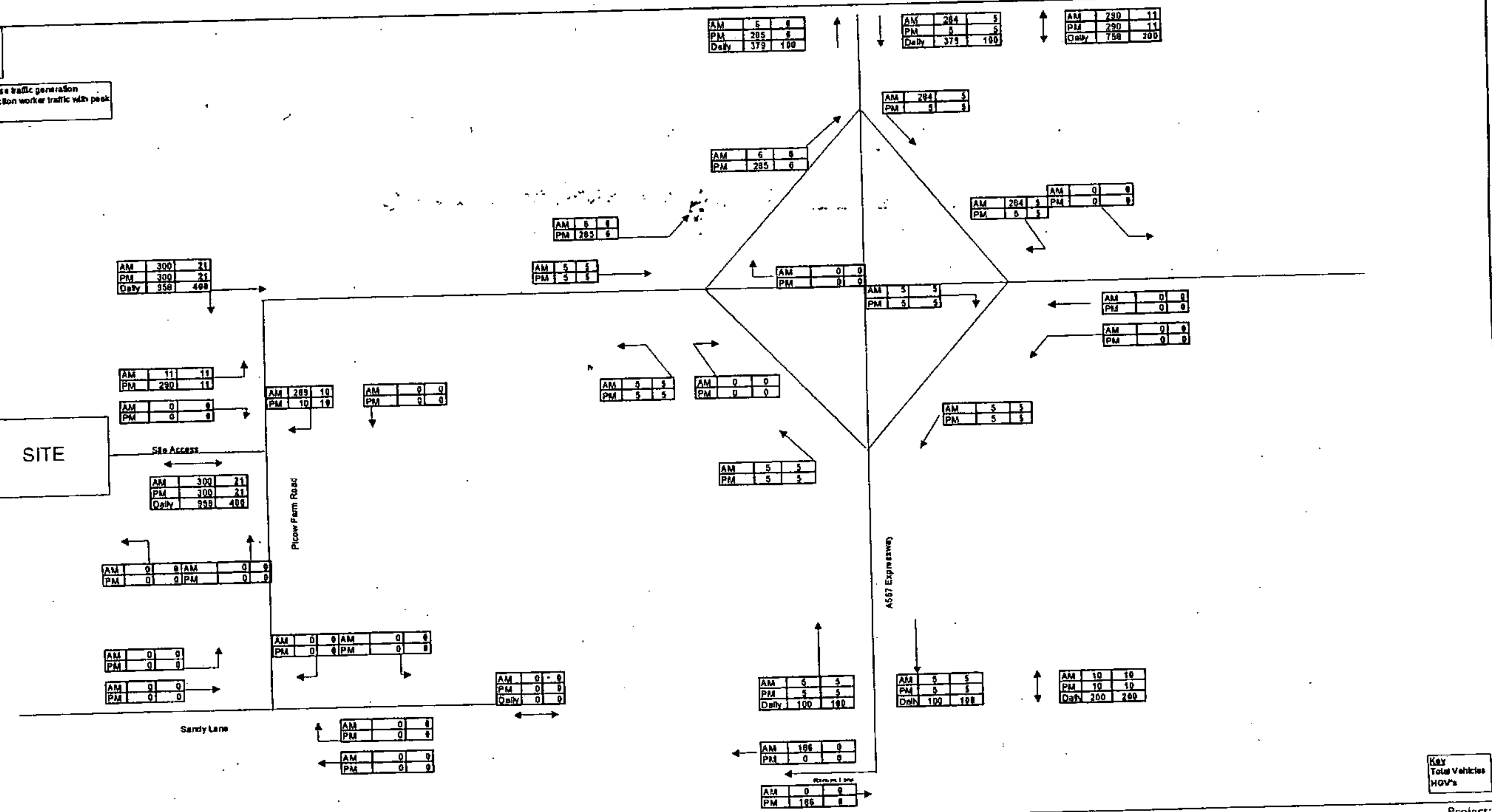
Drawn: EL

Checked: BRB

Transport

Peak Hours
AM Peak - 6am - 7am
PM Peak - 7pm - 9pm

Note: Assumes worst case traffic generation combining peak construction worker traffic with peak HGV generation.



RPS

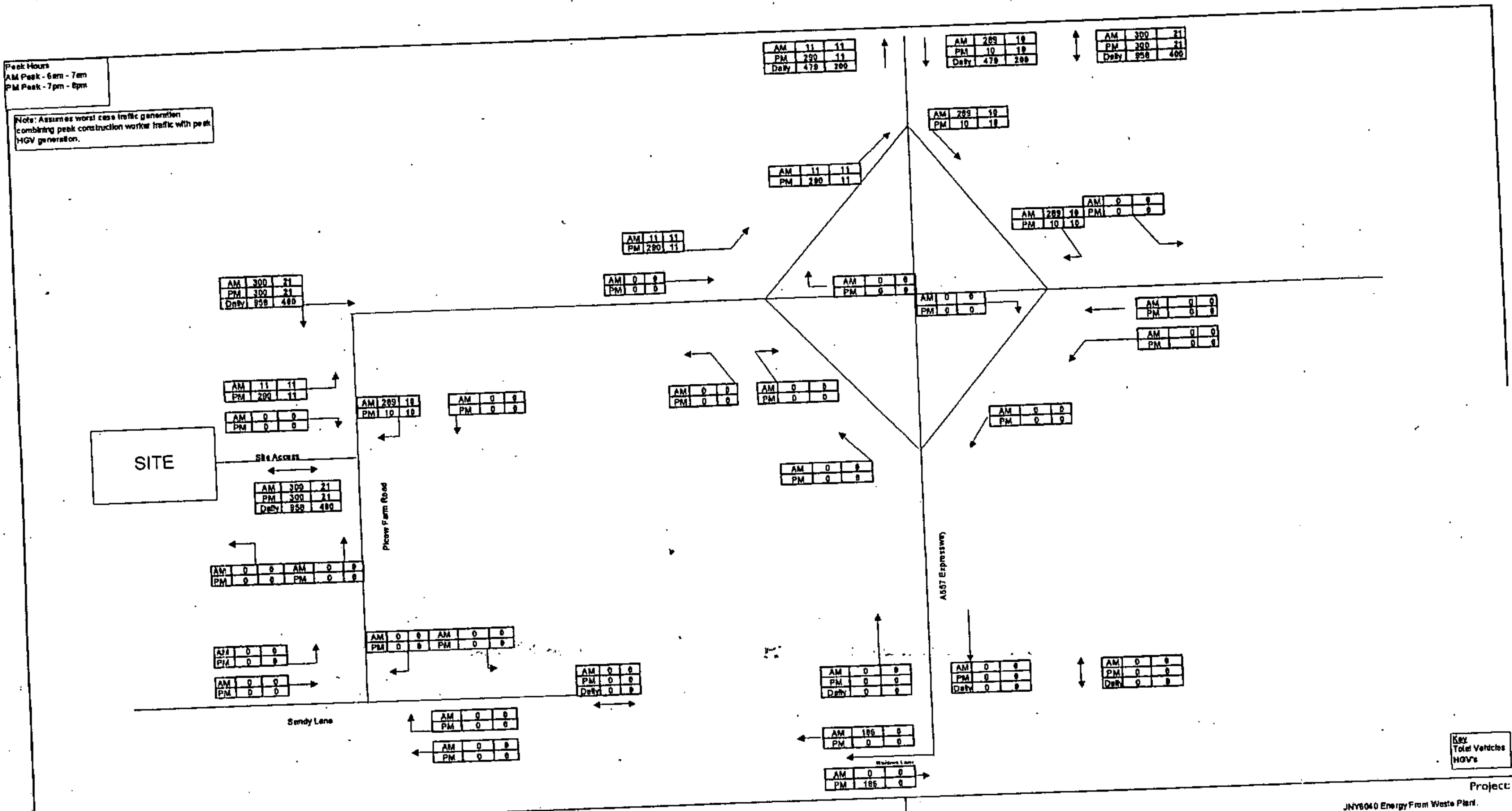
Project: JNY6040 Energy From Waste Plant.

Title: Assignment of Construction Traffic 50% arriving north and south

Figure No: A4

Date:
Scale: NTS
Rev: B
Drwg. No: JNY6040-08
Drawn: DRC
Checked: BB

Transport



Project:
JNY6040 Energy From Waste Plant.

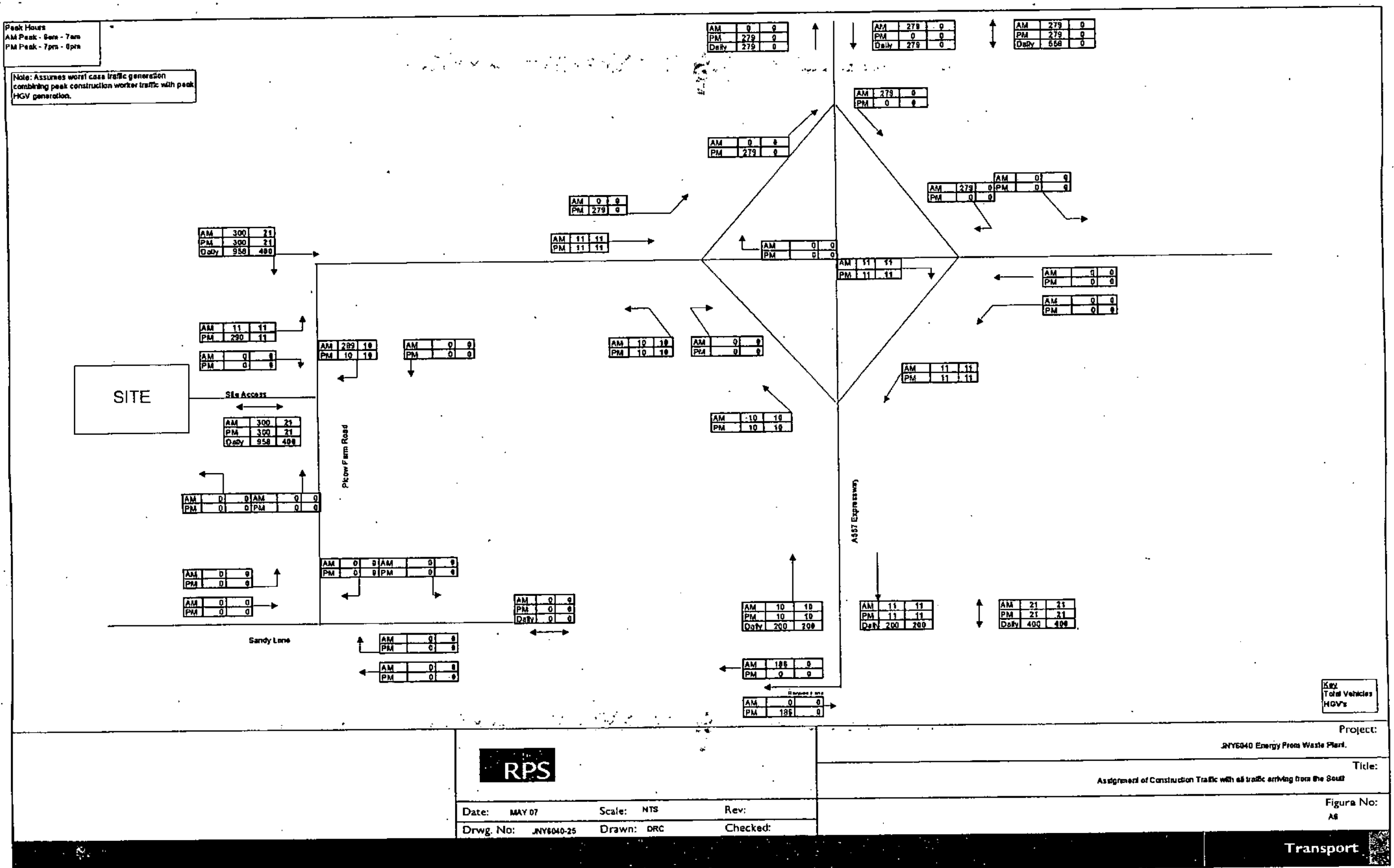
Title:
Assignment of Construction Traffic with all traffic arriving from the North

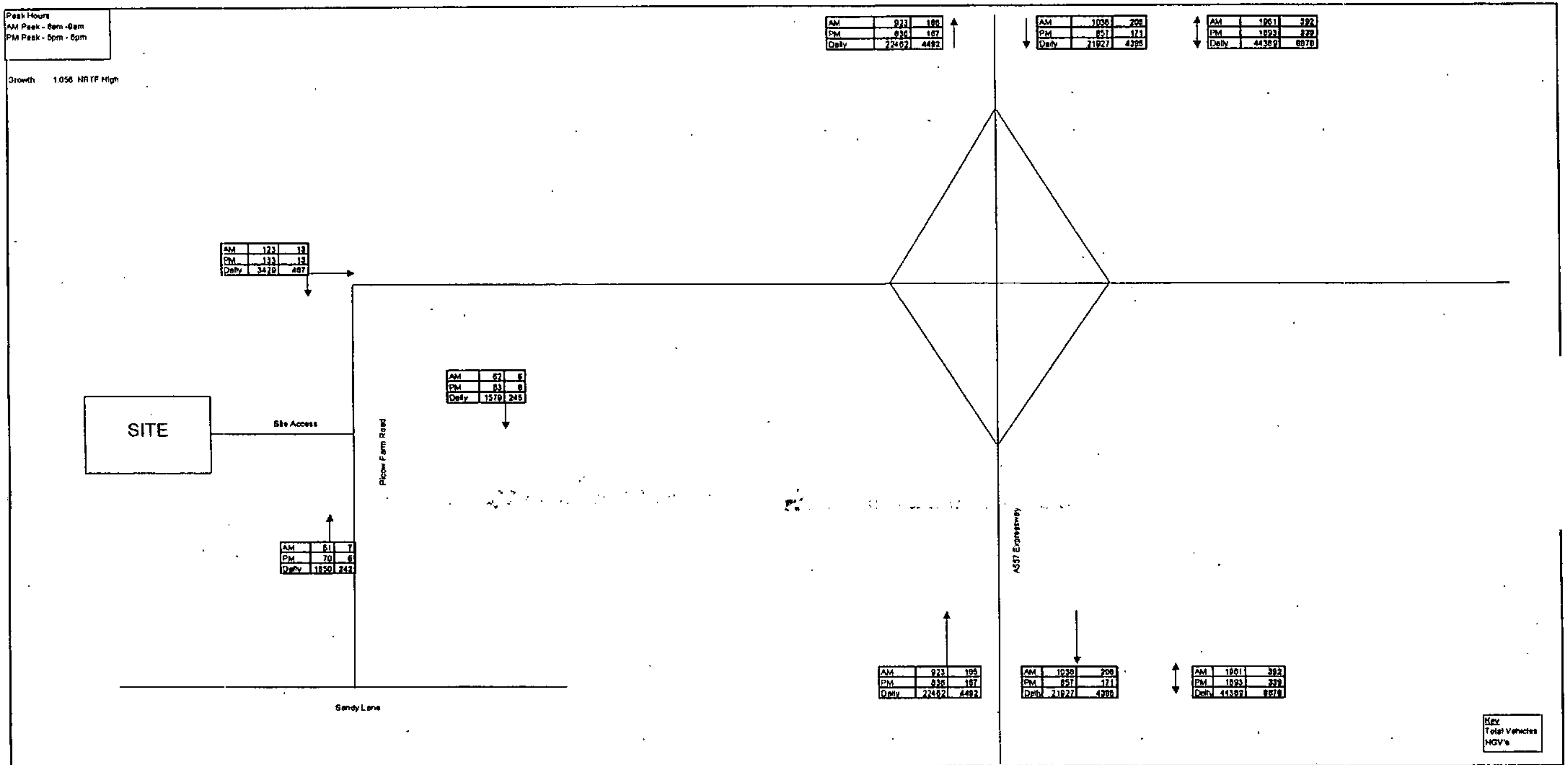
Figure No:
A5

RPS

Date:	MAY 07	Scale:	NTS	Rev:	
Drwg. No:	JNY6040-24	Drawn:	DRC	Checked:	

Transport


Peak Hours
AM Peak - 6am - 7am
PM Peak - 7pm - 8pm
Note: Assumes worst case traffic generation combining peak construction worker traffic with peak HGV generation.
SITE
Site Access
Pickow Farm Road
Sandy Lane
A557 Expressway
Key
Total Vehicles
HGV's
Project:
JNY6040 Energy From Waste Plant.
Title:
Assignment of Construction Traffic with all traffic arriving from the South
Figure No:
A8
RPS
Date: MAY 07
Scale: NTS
Rev:
Drwg. No: JNY6040-25
Drawn: DRC
Checked:
Transport



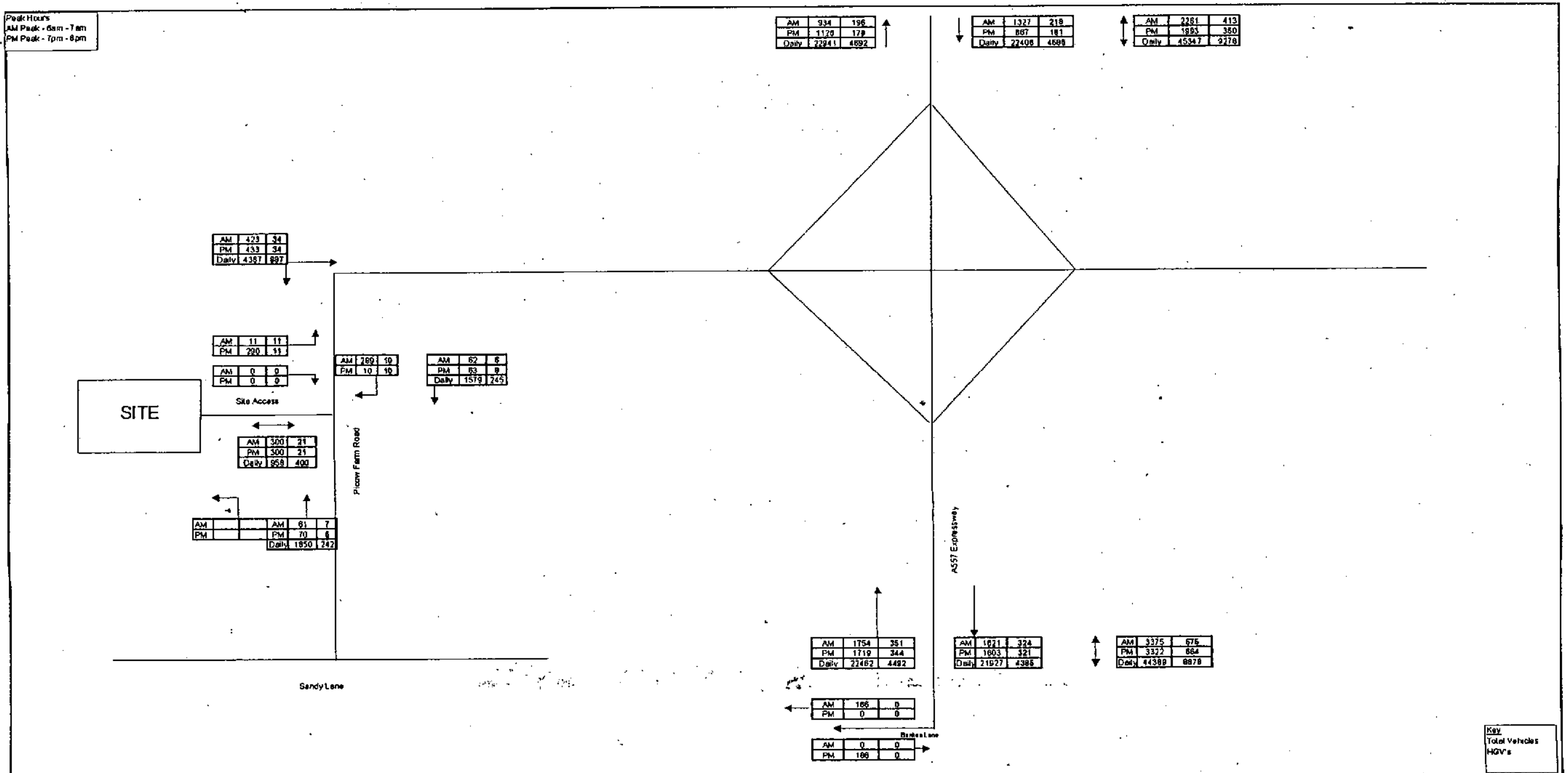
RPS

Date: MAR 07 | Scale: NTS | Rev: A
Drwg. No: JNY6040-26 | Drawn: DRC | Checked:

Project: JNY6040 Energy From Waste Plant, Runcorn
Title: 2009 Base Flows
Figure No: A1

Transport

DRC/JNY6040/07/08/2007/JNY6040 Runcorn Revised HGV movements 17052007 DRC/2009 Base Flows



RPS

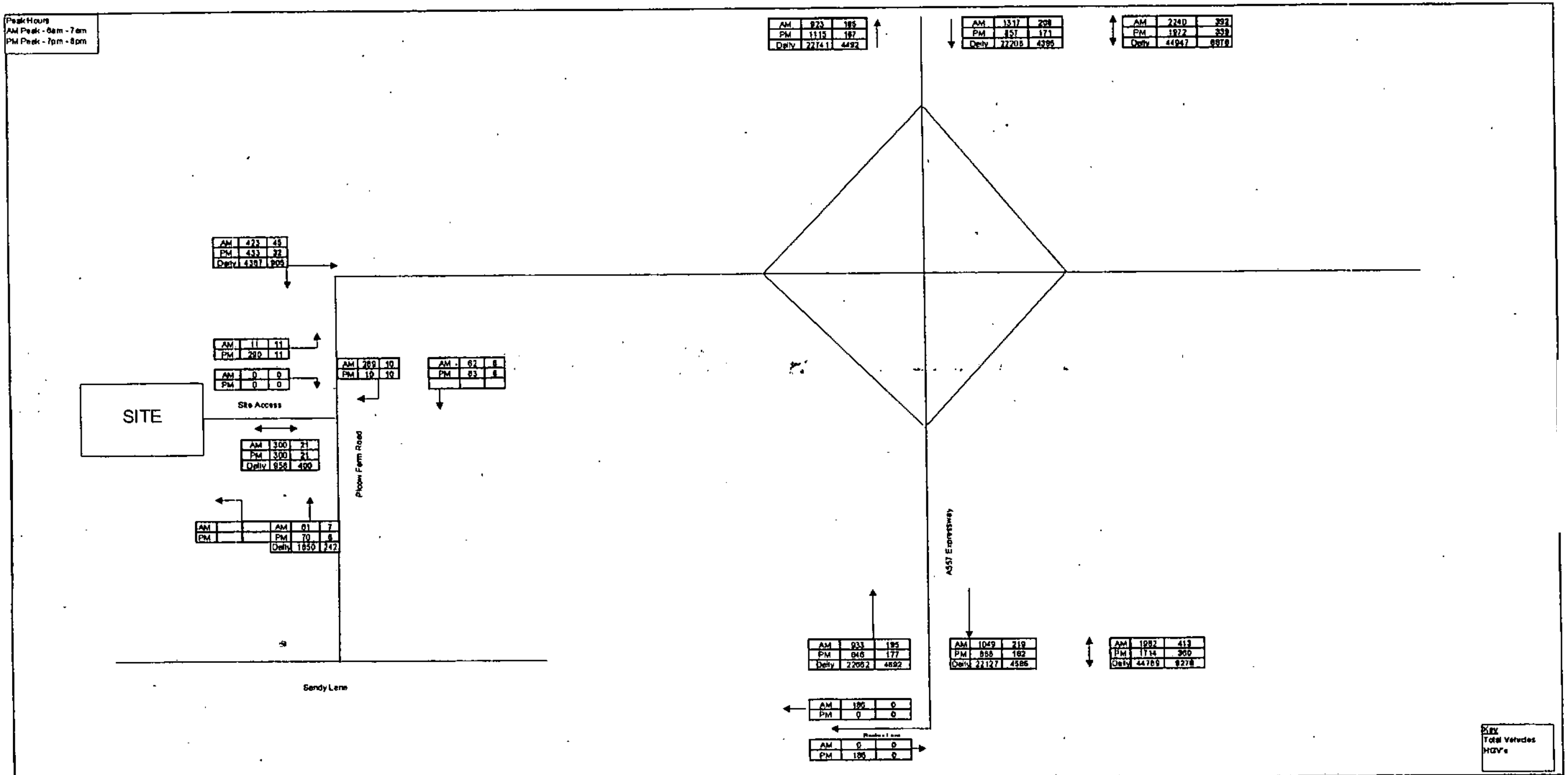
Date:	MAY 07	Scale:	NTS	Rev:	
Drwg. No:	JNY6040-27	Drawn:	DRC	Checked:	

Project:
JNY6040 Energy From Waste Plant

Title:
2009 Base Flows + Construction Traffic all arriving from the North

Figure No:
A8

Transport



RPS

Date: MAY 07 Scale: NTS Rev:

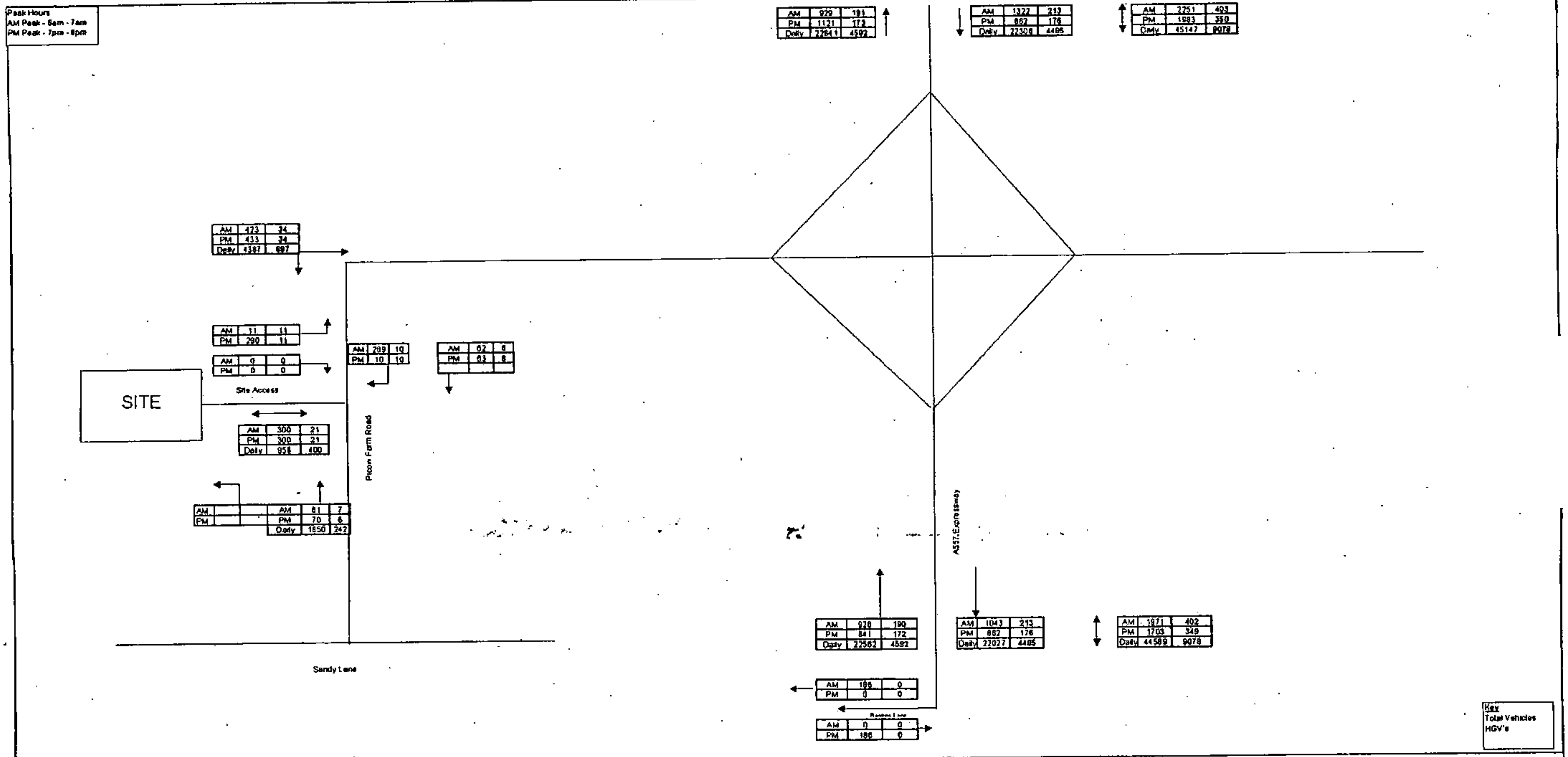
Drwg. No: JNY6040-28 Drawn: DRC Checked:

Project:
JNY6040 Energy From Waste Plant

Title:
2009 Base Flows + Construction Traffic all arriving from the South

Figure No:
A8

Transport



RPS

Project: JNY6040 Energy From Waste Plant

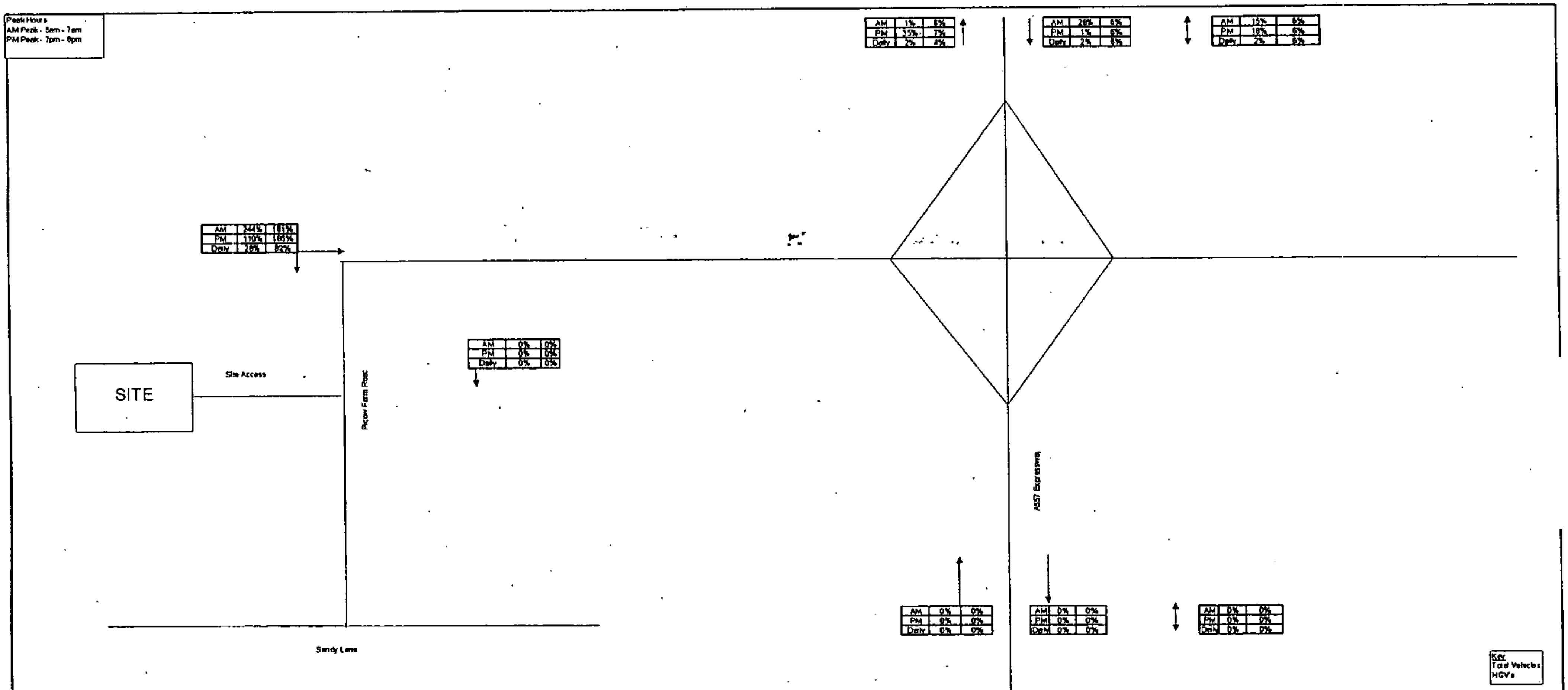
Title: 2009 Base Flows + Construction Traffic arriving 50% north and south

Figure No: A10

Date: MAY 07 Scale: NTS Rev:

Drwg. No: JNY6040-35 Drawn: DRC Checked:

Transport



RPS

Date: MAY 07 Scale: NTS Rev:

Drwg. No: JNY6040-29 Drawn: DRC Checked:

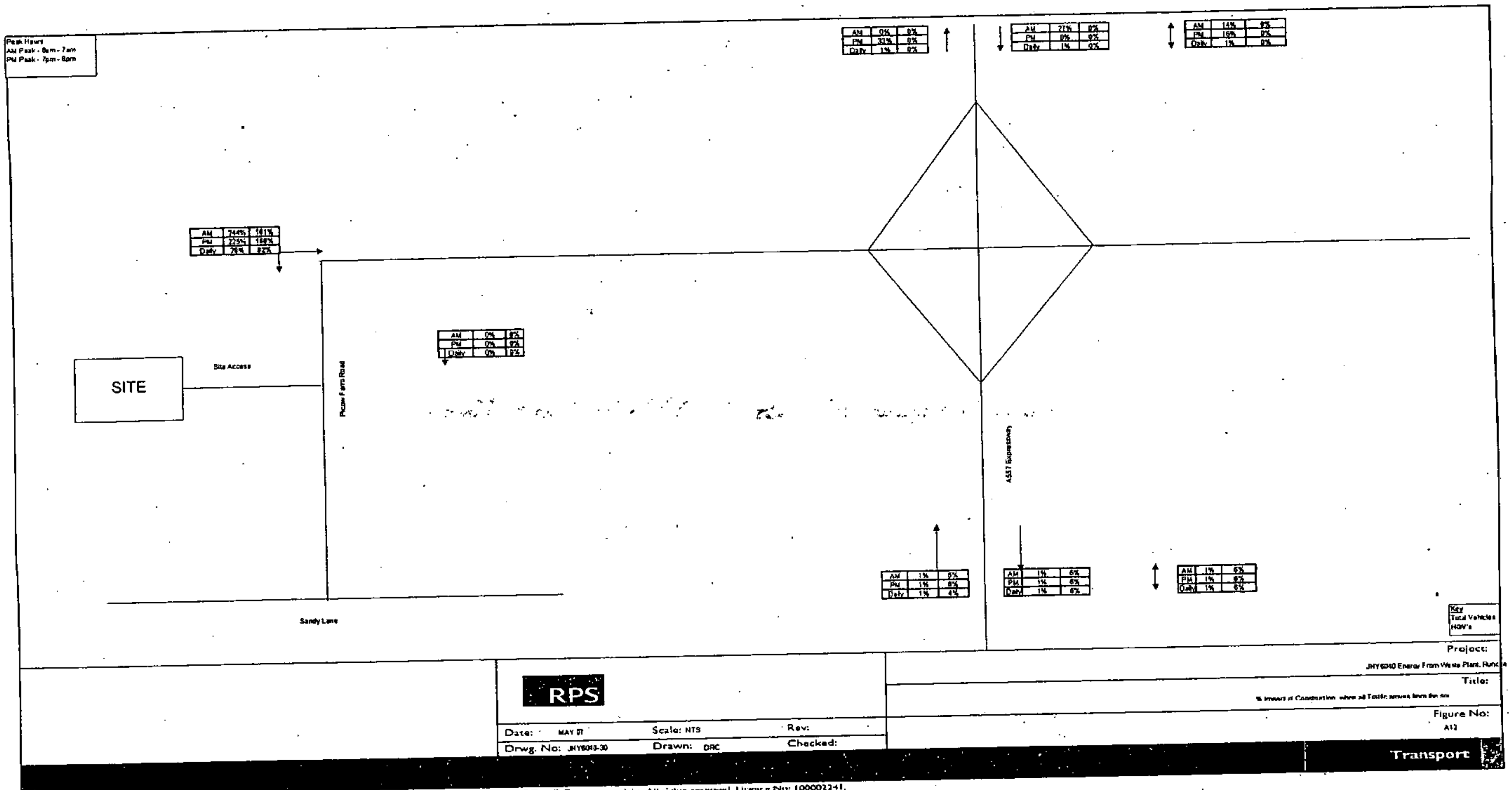
Project: JNY6040 Energy From Waste Plant, Runcorn

Title: % Impact of Construction when all Traffic arrives from the Nor

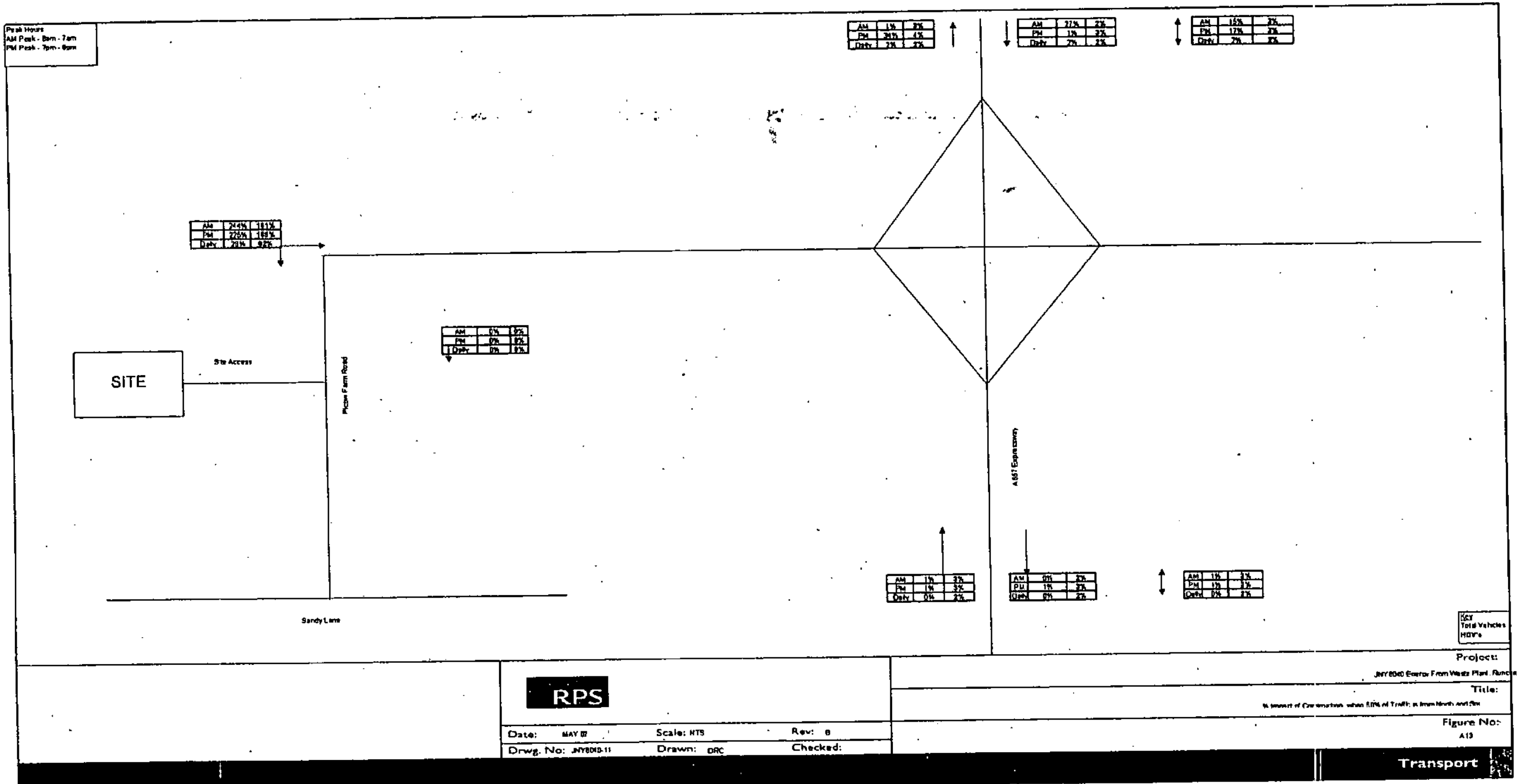
Figure No: A11

Transport

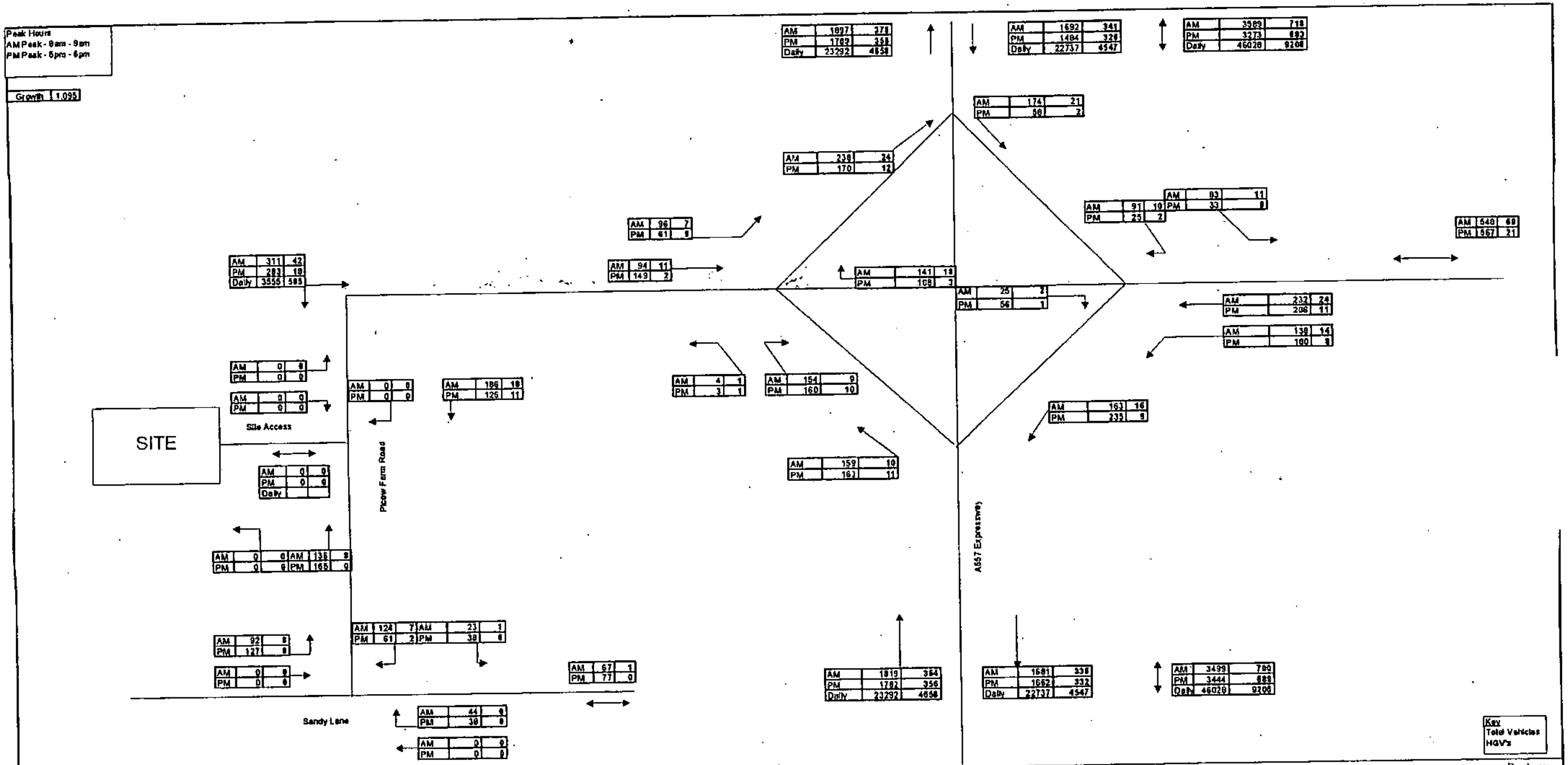
DRC/JNY6040/07/06/2007/JNY6040 Runcorn Revised HGV movements 17052007 DRC/% Impact of core Traffic all N



DRC/JNY6040/07/06/2007/JNY6040 Runcorn Revised HGV movements 17062007 DRC% impact of cons Traffic all S



Peak Hours
SITE
Site Access
Picow Farm Road
Sandy Lane
A557 Expressway
Key
Total Vehicles
HGV's
Project:
Title:
Figure No:
A13
RPS
Date: MAY 07
Scale: NTS
Rev: B
Drwg. No: JNY6040-11
Drawn: DRC
Checked:
Transport



Project: JNY6040 Energy From Waste Plant.

Title: 2011 Flows without Committed or Proposed Development

Figure No: A14

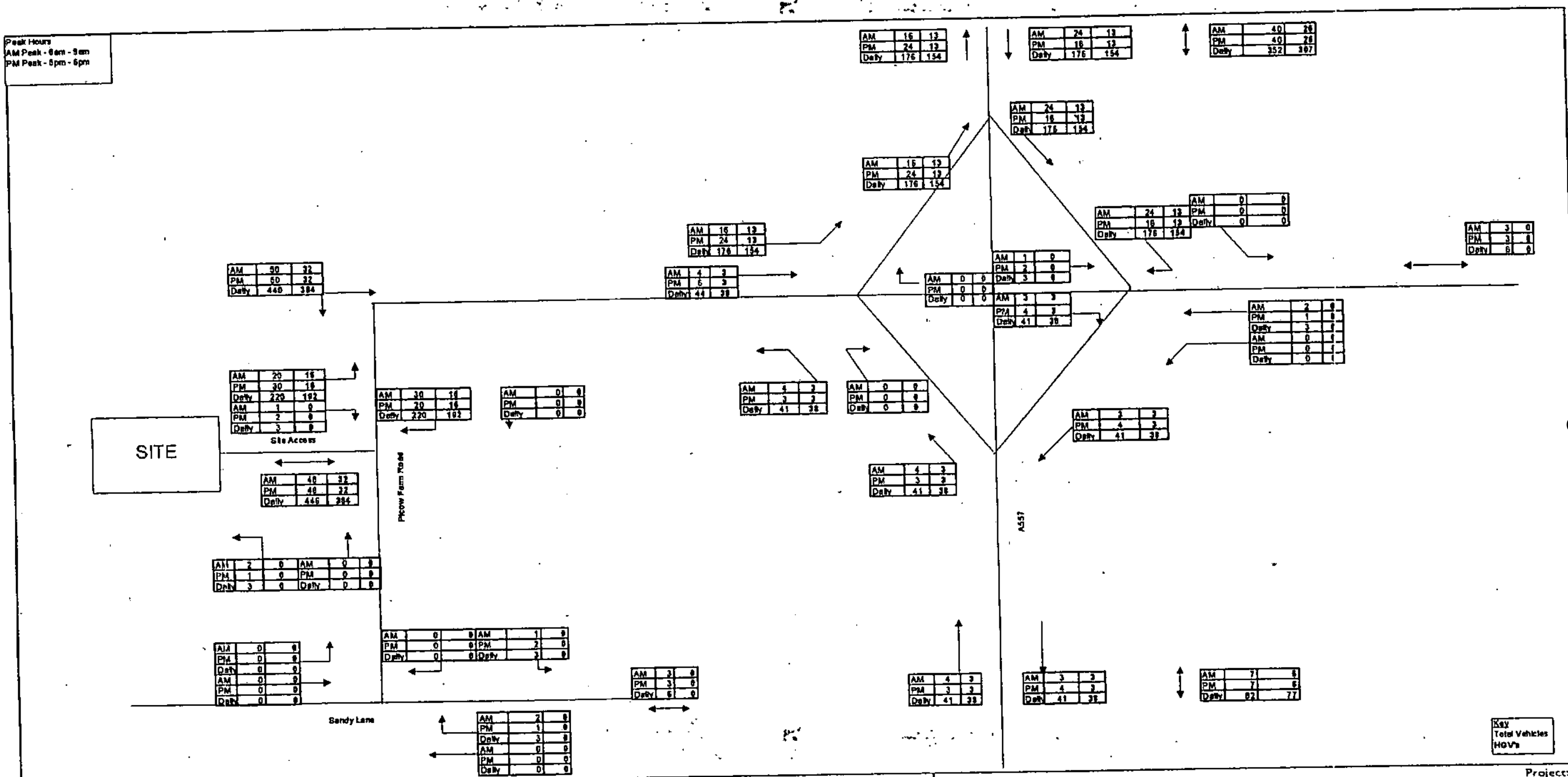
RPS

Date: | Scale: NTS | Rev: A

Drwg. No: JNY6040-14 | Drawn: EL | Checked: BRB

Transport

DRC/JNY6040/07/06/2007/JNY6040 Runcorn Revised HGV movements 17052007 DRC/2011 Base Flows



Project: JNY6040 Energy From Waste Plant.

Title: Assignment of Operational Traffic with 80% arriving from the North

Figure No: A15

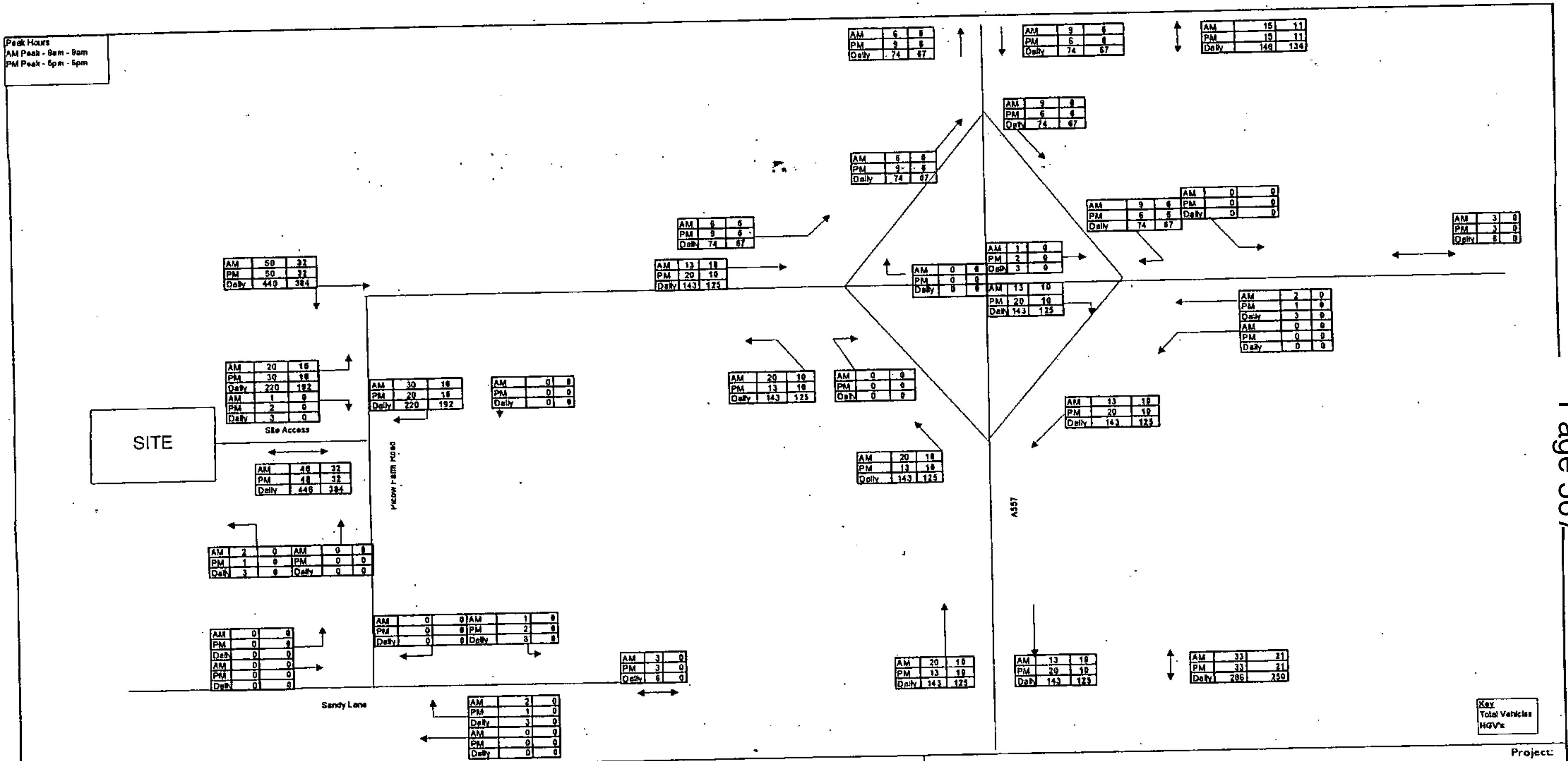
RPS

Date: MAY 07 Scale: NTS Rev:

Drwg. No: JNY6040-31 Drawn: DRC Checked:

Transport

DRC/JNY6040/07/06/2007/JNY6040 Runcorn Revised HGV movements 17352007 DRC/Operational Flows 80% north



RPS

Date: MAY 07 | Scale: NTS | Rev:

Drwg. No: JNY6040-32 | Drawn: DRC | Checked:

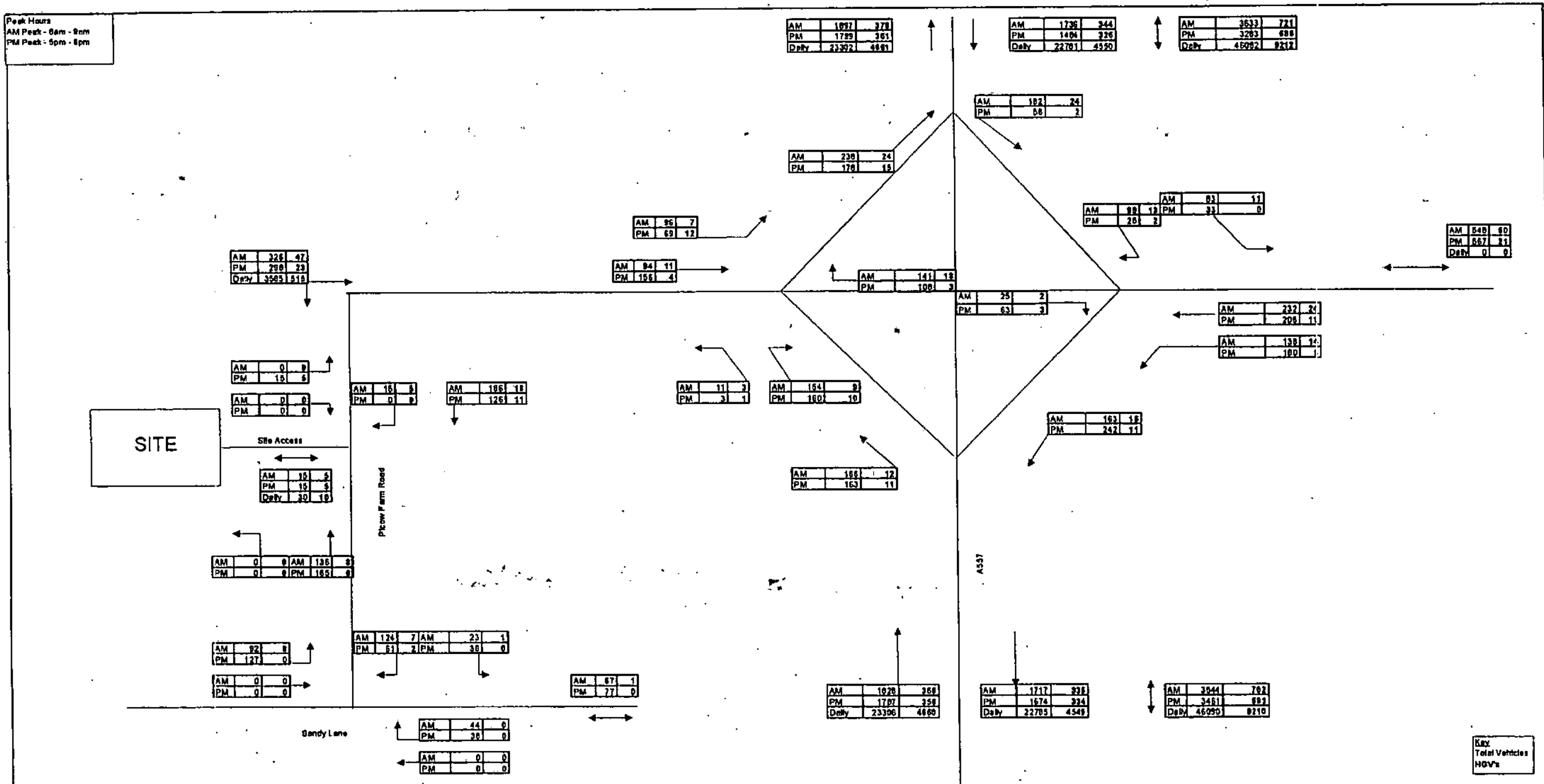
Project: JNY6040 Energy From Waste Plant.

Title: Assignment of Operational Traffic with 65% arriving from the South

Figure No: A16

Transport

DRC/JNY6040/07/06/2007/JNY6040 Runcorn Revised HGV movements 17052007 DRC/Operational Flows 65% south



RPS

Date:	Scale: NTS	Rev: A
Drwg. No: JNY6040-16	Drawn: EL	Checked: BRB

Project:

JNY6040 Energy From Waste Plant, Runcorn

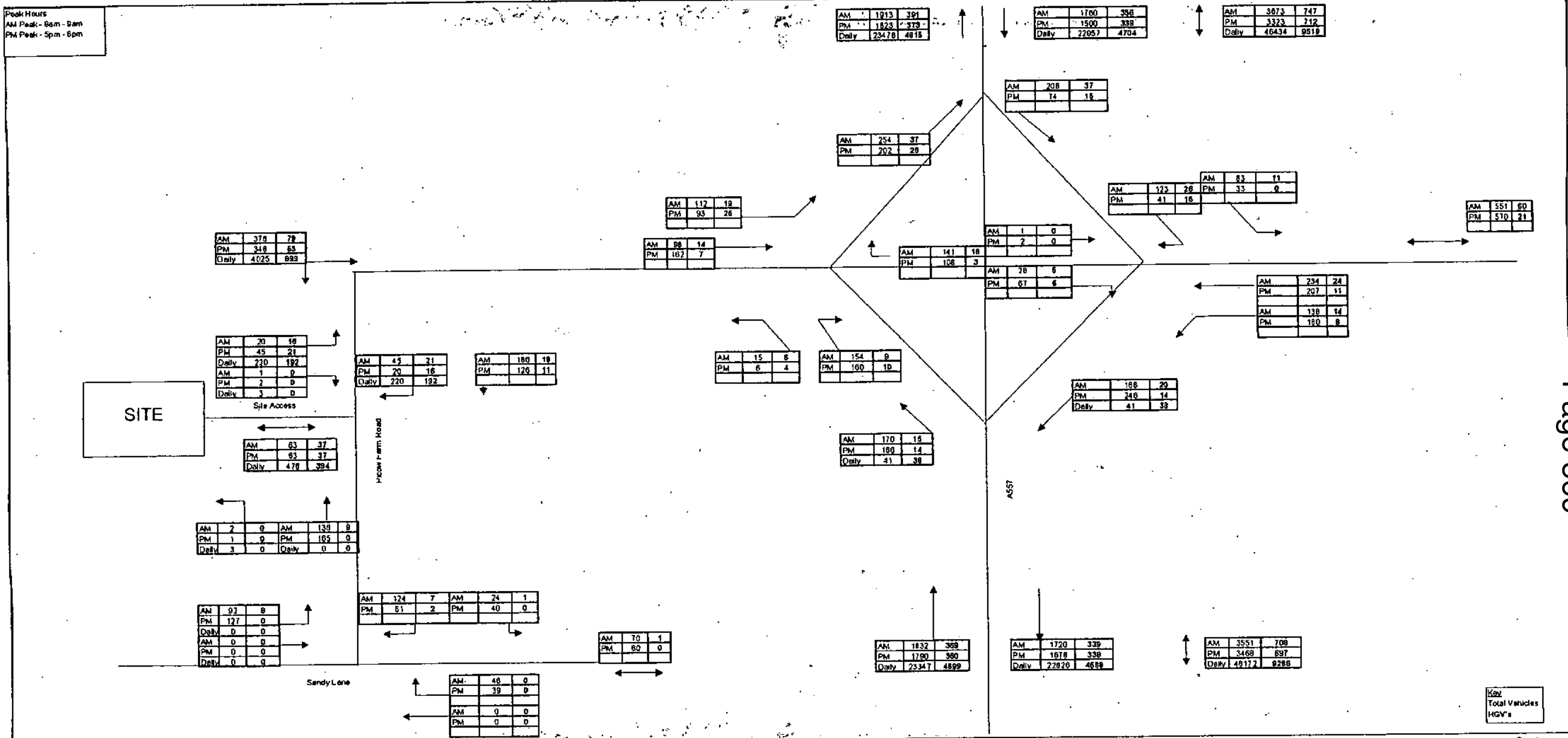
Title:

2011 Flows with Committed Development

Figure No:

A17

Transport



Project:
JNY6040 Energy From Waste Plant.

Title:
2011 Base + Comitted + Operational Flows 80% arriving from the North

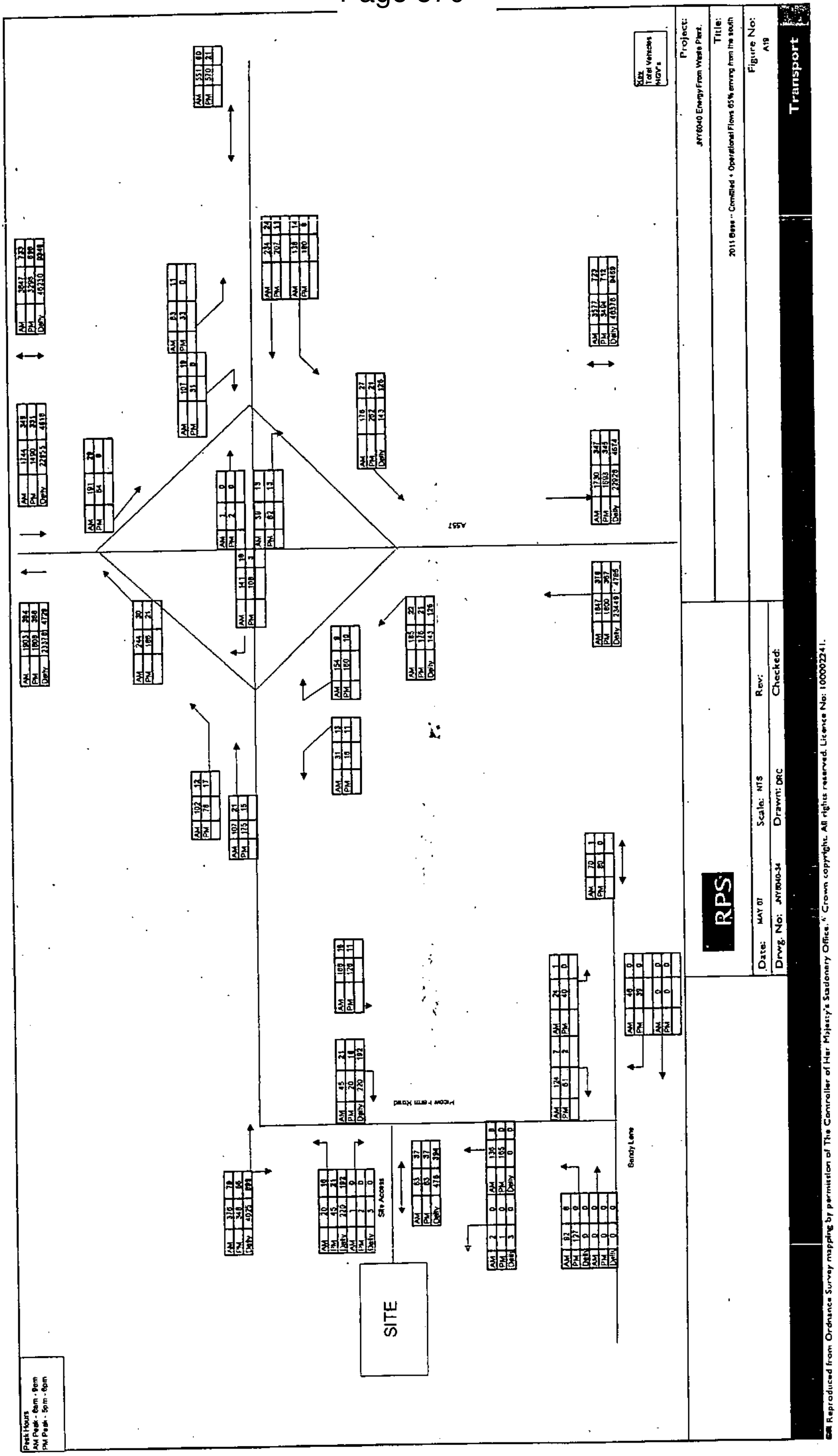
Figure No:
A18

RPS

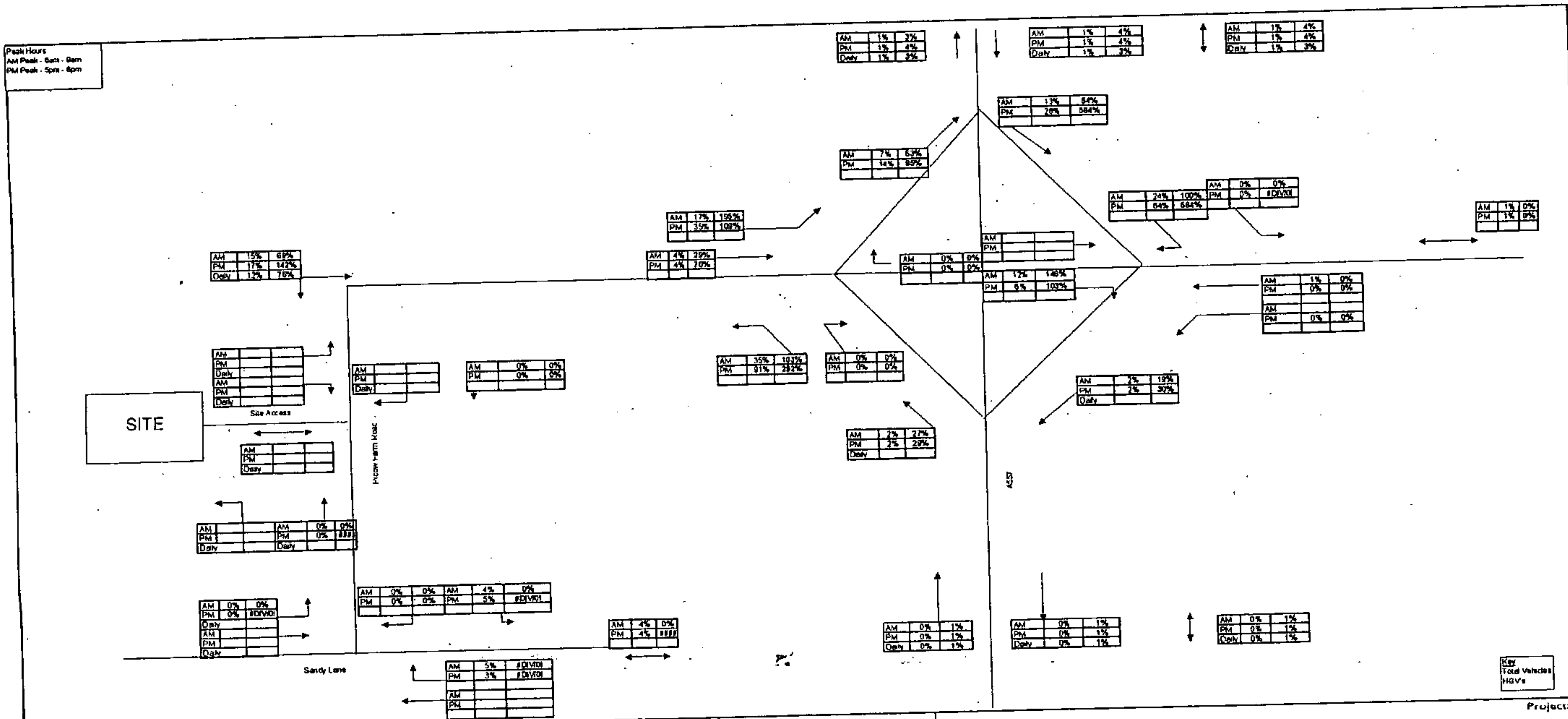
Date: MAY 07 | Scale: NTS | Rev:
Drwg. No: JNY6040-33 | Drawn: DRC | Checked:

Transport

DRC/JNY6040/07/06/2007/JNY6040 Runcorn Revised HGV movements 17052007 DRC/2011 Base + Com + Operat 80% N



Project:
JNY6040 Energy From Waste Plant.
Title:
2011 Base + Comitted + Operational Flows 65% arriving from the south
Figure No:
A19
Transport
RPS
Date: MAY 07
Scale: NTS
Drwg. No: JNY6040-34
Drawn: DRC
Rev:
Checked:
Key
Total Vehicles
HGV's
Peak Hours
AM Peak - 8am - 9am
PM Peak - 5pm - 6pm
SITE
Site Access
Bandy Lane
A557
Reproduced from Ordnance Survey mapping by permission of The Controller of Her Majesty's Stationery Office. © Crown copyright. All rights reserved. Licence No: 100002241.



RPS

Date: MAY 07 | Scale: NTS | Rev:
Drwg. No: JNY6040-37 | Drawn: ORC | Checked:

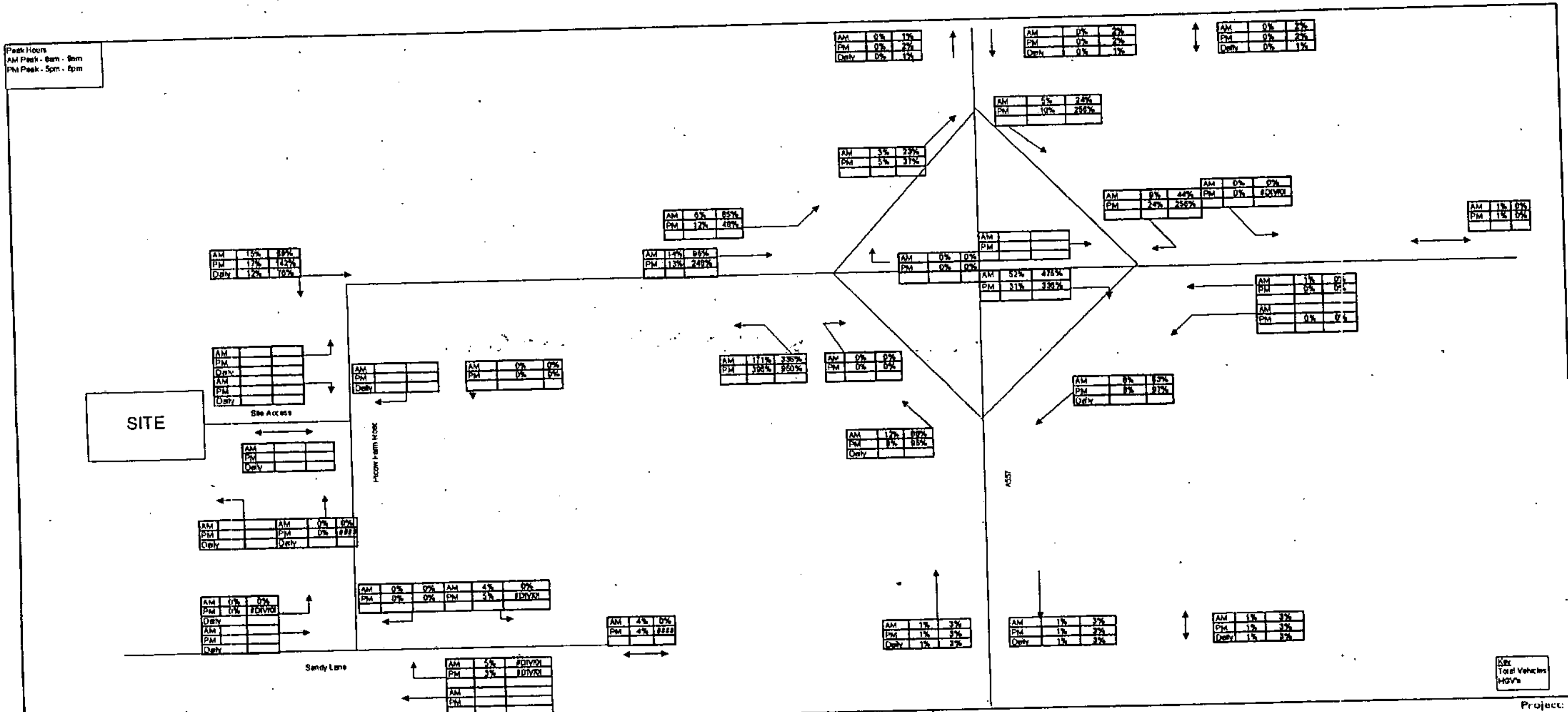
Project: JNY6040 Energy From Waste Plant

Title: Impacts of 80% operational traffic movements from Nor

Figure No: A20

Transport

ORC/JNY6040/07/06/2007/JNY6040 Runcorn Revised HGV movements 17052007 ORC/2011 oper 80% North impacts



Project:
JNY6040 Energy From Waste Plant

Title:
Impacts of 65% operational traffic movements from Sou

Figure No:
A21

RPS

Date: MAY 07 | Scale: NTS | Rev:
Drwg. No: JNY6040-35 | Drawn: DRC | Checked:

Transport

DRC/JNY6040/07/06/2007/JNY6040 Runcorn Revised HGV movements 17052007 DRC/2011 oper 65% South Impacts

Table 1 : Picady Assessment Results for Picow Farm Road/ Expressway North and South

	2011 Base + Operational 65% South Traffic		2011 Base + Operational 65% South Traffic		2011 Base + Operational 80% North Traffic		2011 Base + Operational 80% North Traffic		2009 Base + Construction all arriving from North		2010 Base + Construction all arriving from North		2009 Base + Construction all arriving from South		2009 Base + Construction all arriving from South		2009 Base + Construction arriving 50% split		2009 Base + Construction arriving 50% split	
	AM PEAK		PM PEAK		AM PEAK		PM PEAK		AM PEAK		PM PEAK		AM PEAK		PM PEAK		AM PEAK		PM PEAK	
	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Picow Farm Road-Expressway South	0.088	0	0.159	0	0.059	0	0.123	0	0.052	0	0.092	0	0.095	0	0.127	0	0.072	0	0.108	0
Picow Farm Road-Expressway North	0.284	0	0.204	0	0.284	0	0.204	0	0.27	0	0.222	0	0.27	0	0.222	0	0.27	0	0.222	0

Table 2. Potential worst case impact of construction traffic on the local highway network

HGV Construction Traffic Movements	Impact on	Time Period	Construction Traffic (2009 flows)																	
			Base Flows (Base Only)						Construction Flows						% Impact					
			Northbound		Southbound		Two Way		Northbound		Southbound		Two Way		Northbound		Southbound		Two Way	
			Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs
If All HGVs to/ from North	Runcorn Bridge	0600-0700	1900	380	1404	281	3304	661	11	11	289	10	300	21	1%	3%	21%	4%	9%	3%
		1900-2000	1640	328	1580	316	3220	644	290	11	10	10	300	21	18%	3%	1%	3%	9%	3%
		DAILY	44725	8945	44553	8911	89277	17855	479	200	479	200	958	400	1%	2%	1%	2%	1%	2%
If HGVs evenly distributed north and south	Runcorn Bridge	0600-0700	1900	380	1404	281	3304	661	6	6	284	5	290	11	0%	2%	20%	2%	9%	2%
		1900-2000	1640	328	1580	316	3220	644	285	6	5	5	290	11	17%	2%	0%	2%	9%	2%
		DAILY	44725	8945	44553	8911	89277	17855	379	100	379	100	758	200	1%	1%	1%	1%	1%	1%
If All HGVs to/from South	South of Picow Farm Road Junction	0600-0700	923	185	1038	208	1961	392	10	10	11	11	21	21	1%	5%	1%	6%	1%	5%
		1900-2000	836	167	857	171	1693	339	10	10	11	11	21	21	1%	6%	1%	6%	1%	6%
		DAILY	22462	4492	21927	4385	44389	8878	200	200	200	200	400	400	1%	4%	1%	5%	1%	5%
If HGVs evenly distributed north and south	South of Picow Farm Road Junction	0600-0700	923	185	1038	208	1961	392	5	5	5	5	10	10	1%	3%	0%	2%	1%	3%
		1900-2000	836	167	857	171	1693	339	5	5	5	5	10	10	1%	3%	1%	3%	1%	3%
		DAILY	22462	4492	21927	4385	44389	8878	100	100	100	100	200	200	0%	2%	0%	2%	0%	2%
If All HGVs to/from South	Clifton Interchange	0600-0700							196	10	11	11	207	21	n/a					
		1900-2000							10	10	197	11	207	21						
		DAILY							386	200	386	200	772	400						
If HGVs evenly distributed north and south	Clifton Interchange	0600-0700							191	5	5	5	196	10	n/a					
		1900-2000							5	5	191	5	196	10						
		DAILY							286	100	286	100	572	200						

* Using NRTF low growth rates on observed 2006 flows
* Runcorn Bridge Impacts are with all construction HGV traffic movements to/from the north.
* South of Picow Farm Road junction and Clifton Interchange Impacts are with all construction HGV traffic movements to/from the south.
* Clifton Interchange Flows include light vehicle traffic exiting at Bankes Road before Picow Farm Road
* No base flows are available for the Clifton Interchange Junction

Table 3. Potential worst case impact of operational traffic on the local highway network

All Operational Traffic Movements	Impact on	Time Period	Operational Traffic (2011 flows)																	
			Base Flows (Base + Committed)						Operational Flows						% Impact					
			Northbound		Southbound		Two Way*		Northbound		Southbound		Two Way		Northbound		Southbound		Two Way	
			Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs	Total	HGVs
If 80% of traffic movements to/from North	Runcorn Bridge	0800-0900	3702	740	1500	294	5203	1035	16	13	24	13	40	26	0%	2%	2%	4%	1%	2%
		1700-1800	3730	747	1638	328	5368	1075	24	13	16	13	40	26	1%	2%	1%	4%	1%	2%
		DAILY	46387	9278	46242	9243	92629	18521	176	154	176	154	352	307	0%	2%	0%	2%	0%	2%
If 65% of traffic movements to/from South	South of Picow Farm Road Junction	0800-0900	1828	366	1717	336	3544	702	20	10	13	10	33	21	1%	3%	1%	3%	1%	3%
		1700-1800	1787	356	1674	334	3461	691	13	10	20	10	33	21	1%	3%	1%	3%	1%	3%
		DAILY	23306	4660	22785	4549	46090	9210	143	125	143	125	286	250	1%	3%	1%	3%	1%	3%
If 65% of traffic movements to/from South	Clifton Interchange	0800-0900							20	10	13	10	33	21	n/a					
		1700-1800							13	10	20	10	33	21						
		DAILY							143	125	143	125	286	250						

* Using NRTF low growth rates on observed 2006 flows
* Runcorn Bridge Impacts are with 80% operational traffic movements to/from the north.
* South of Picow Farm Road junction and Clifton Interchange Impacts are with 65% operational traffic movements to/from the south.
* No base flows are available for the Clifton Interchange Junction

Notification under Section 36 of the Electricity Act 1989 and Section 90(2) of the Town and Country Planning Act 1990 to the Secretary of State for Trade and Industry to Construct and Operate an Energy from waste Combined Heat and Power Generating Station with an Approximate Capacity of 360MW and up to 100MW of Electrical Power at INEOS Chlor Vinyls Site, Runcorn.

Response to Letter to Halton Borough Council from Helsby Borough Council dated 2nd March 2007, including report by QSTAR Consulting: Draft for Discussion

April 2007

INEOS Chlor
RPS

Response to Report by QSTAR Consulting

1.1 This report has been produced by RPS on behalf of INEOS Chlor and is provided to Halton Borough Council to address points raised in the letter from Helsby Parish Council to Halton Borough Council dated 2nd March 2007. The text below provides a response to the key points raised in the report by J.C. Dearden of QSTAR Consulting accompanying the letter from Helsby Parish Council.

QSTAR Comment: *The HHRA is quite wide-ranging, but in my view is flawed in several respects. Most serious is the total omission of any consideration of the health impact of fine particulate matter. The HHRA mentions that the majority of dioxins and furans will be emitted in the particle or particle-bound phase, but fails to recognise that fine particles per se are dangerous.*

RPS Response:

1.2 A combination of European Union Directives and associated national legislation provides a legal framework for the regulation of ambient concentrations of fine particulates in the UK. EU Directive 1999/30/EEC specifies limit values for a number of pollutants in ambient air including concentrations of particulate matter. A number of air quality regulations (and their amendments) have transposed the aforementioned EU directive into UK legislation. The EU Directives and relevant UK regulations aim to protect human health and the environment by avoiding, reducing or preventing harmful concentrations of air pollutants. Full details of relevant ambient air quality legislation are provided in Section 4 of the Environmental Statement Appendix 10.1 (Air Quality Assessment).

1.3 The effects on air quality as a result of the operation of the proposed Energy from Waste (EfW) facility have been assessed against relevant EU and UK air quality directives and regulations. The current legal framework specifically addresses particulates with a mean aerodynamic diameter of 10 µm or less (PM_{10}). The air quality assessment provided within the Environmental Assessment has assumed that all particulate emissions from the EfW facility stack are as PM_{10}. The results of the dispersion modelling undertaken as part of the air quality assessment indicate that predicted contributions of PM_{10} from the EfW facility to ground level concentrations are of neutral significance, typically representing less than 1.0% of relevant air quality objectives and limit values. The addition of predicted contributions from the EfW facility to background concentrations representative of the study area indicate that ground level concentrations of PM_{10} remain well below relevant air quality objectives and limit values set for the protection of human health.

1.4 There is recent strong evidence to conclude that particles with a mean aerodynamic diameter of less than 2.5 µm ($PM_{2.5}$) are potentially more hazardous to human health than larger particles. The European Commission has adopted a Thematic Strategy on Air Quality under the Clean Air For Europe (CAFE) programme which recognises that the current limit values relating to PM_{10} give disproportionate consideration to concentrations of larger particles.

1.5 A new EU air quality directive, replacing all previous directives, is proposed to deliver the aims of the Thematic Strategy. Among the proposals for the new directive include the introduction of a cap of 25 $\mu g.m^{-3}$ on annual mean urban background $PM_{2.5}$ concentrations to be met by 2010. The aims of this cap are to protect human health.

1.6 If all particulate emissions from the proposed EfW facility are assumed to be $PM_{2.5}$, the results of the assessment indicate that annual mean contributions[1] would represent approximately 0.4% of the proposed objective for urban background locations. Predicted contributions of

[1] The predicted annual mean particulate contribution is 0.1 $\mu g.m^{-3}$ at the point of maximum impact as presented in Table 7.6 of the Environmental Statement Appendix 10.1 – Air Quality Assessment.

$PM_{2.5}$ from the EfW facility to ground level concentrations are therefore considered of neutral significance.

1.7 The health effects of air pollution have been studied intensively over the past decade in a range of studies worldwide. In recent years, research activity has increased significantly, especially in relation to the effects of particles on human health.

1.8 Evidence from a variety of studies suggests that there is a linear relationship between average particulate matter concentration and relative risk of a health outcome per 1 $\mu g.m^{-3}$ increase in exposure to PM.[2 3 4 5 6]

1.9 However, as demonstrated in the environmental statement, operational PM emissions are not considered to be significant and worst-case community exposure concentrations are not of an order to quantify any meaningful change in health effect.

QSTAR Comment: *The HHRA assumes that the only source of emissions would be the stack. It neglects to take account of the pollution from site traffic during construction and operation.*

RPS Response:

1.10 The air quality assessment supporting the environment impact assessment has considered the effects on local air quality associated with emissions of development related traffic. Key emissions of concern with respect to human health associated with road traffic to and from the site include oxides of nitrogen (NO_x) and particulates (as PM_{10}). Ambient concentrations of NO_x (specifically as NO_2) and PM_{10} are regulated for the protection of human health by EU directives and associated UK air quality regulations.

1.11 The air quality assessment concludes that the effect on air quality due to the additional emissions from development related traffic is considered as being of neutral significance. The relevant ambient air quality objectives and limits for NO_2 and PM_{10} set for the protection of human health are predicted to be met along affected road links either with or without development related traffic.

1.12 Research into the potential health effects of road vehicle emissions is extensive and provides statistically significant associations between many classical air pollutants and effects on a wide range of cardiovascular and respiratory health outcomes. Such research forms the founding principle for UK air quality objectives set to protect health.

1.13 Though road traffic produces a number of pollutants with the potential to impact upon health, research concentrates on risk from Particulate Matter (PM) and Nitrogen Dioxide (NO_2), which are generally considered to be the most significant and the primary focus for research by the

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[2] Dockery DW, Schwartz et al 1992 Air Pollution and daily mortality: associations with particulates and acid aerosols Environmental Research 62:362-73

[3] Schwela D 2000 Air pollution in urban areas Reviews in Environmental Health 15 13-42

[4] Schwartz 1991 Particulate air pollution and daily mortality in Detroit Environment Research 56 204-13

[5] WHO Regional Office for Europe (2000) Air Quality Guidelines for Europe, 91 (2nd ed) edn

[6] Kunzli N et al Public Health Impact Assessment of outdoor and Traffic related air pollution: A European Assessment The Lancet 2000 356 795-801

Committee of UK Medical Effects of Air Pollutants[7], Clean Air for Europe[8] and the World Health Organisation[9].

1.14 In both cases, potential health impacts reflect both acute and chronic exposures with varying risk per 1 μgm^{-3} increase in exposure to PM and NO_2 concentrations.

1.15 However, it is important to note that an increased risk of mortality and morbidity due to acutely elevated PM and NO_2 exposure is small, normally measured in population exposures of 100,000.

1.16 The approach to quantifying health effects for those pollutants where epidemiology has identified an association is encapsulated by the following linear equation.

$$\Delta E = \beta \times \Delta C \times P \times E,$$

Key

$(\Delta)E$ = (change in) background rate of events;

β = exposure-response coefficient;

ΔC = change in concentration of pollutant;

P = population exposed.

1.17 For example, PM_{10} is associated with all cause mortality[10], such that an increase in concentration of 1 $\mu g\ m^{-3}$ results in a 0.075% increase in the background rate of deaths. Thus, for a population of 100,000, experiencing a death rate of 1000 annually, an increase in the annual average concentration of 1 $\mu g\ m^{-3}$ results in 0.75 (1000 x 0.075%) of a 'death brought forward'.

1.18 However, as demonstrated in the ES, annual road traffic contributions of PM and NO_2 are not considered to be significant, and not of an order to quantify any meaningful change in health risk for either PM and NO_2.

QSTAR Comment: *The HHRA ignores the toxic effects of thallium and vanadium and does not even mention the risks from polybrominated diphenyl ethers (PBDEs).*

RPS Response:

1.19 As stated in the report, the USEPA HHRAP database does not include toxicological data for thallium and hence despite the inclusion of this compound in the model, it did not produce risk results for this reason.

1.20 Prior to undertaking the assessment, a review by RPS found that a number of previously published toxicological data by USEPA for different thallium compounds were withdrawn due to uncertainties associated with the derived values. Therefore it was decided to take the assessment no further for this compound, as any obtained results from uncertain toxicological data will not yield any meaningful conclusion.

1.21 Following the QSTAR review of the HHRA, a second review has been undertaken by RPS and a list of available toxicological data from the USEPA Risk Assessment Information System

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[7] Department of Health. Committee on the Medical Effects of Air Pollutants available at: http://www.advisorybodies.doh.gov.uk/comeap/index.htm.

[8] European Commission (2001) Clean Air For Europe available at: http://ec.europa.eu/environment/air/cafe/index.htm.

[9] World Health Organisation. (2000). Evaluation and use of epidemiological evidence for environmental health risk assessment. Guideline document. Copenhagen: World Health Organisation Regional Office for Europe.

[10] E van Kempen et al. (2005) RIVM Report 630400001 Selection and evaluation of exposure-effect relationships for health impact assessment.

(RAIS) was collected. The most conservative value (lowest allowable Reference Dose -RfD- of 8.0 x 10^{-5} mg/kgbw-day) was used in the model to derive an indication of potential risk from thallium. The highest predicted hazard quotient for thallium was 1.908 x 10^{-1} for an adult farmer in the location of Receptor 5 and 2.231 x 10^{-1} for a farmer-child in the same location, both much lower than the target hazard quotient of 1.

1.22 It was not possible to model vanadium due to its absence from the USEPA HHRAP database, attributed to its perceived low toxicity. Vanadium is expected to be emitted as oxides following combustion of fuels. Under environmental conditions, vanadium may exist in different oxidation states with the penta V^{+5} form being the most stable. These oxides are non-volatile and are sparingly soluble in water. Therefore exposure to vanadium is considered to be limited.

1.23 A review of toxicological data for vanadium compounds was carried out and a list of available values from the USEPA RAIS was collected. A comparison of the toxicity of vanadium with other compounds that have been assessed for the site is presented below to provide an indication of the level of potential risk.

1.24 USEPA RAIS provides three RfDs for three different vanadium compounds. These are vanadium pentoxide, vanadium sulphate and metallic vanadium with RfDs of 9.0 x 10^{-3}, 2.0 x 10^{-2} and 7.0 x 10^{-3} mg/kg bw-day respectively. The lowest of these value (7 x 10^{-3} mg/kg bw.day) was compared with the RfDs of compounds that have similar emission levels such as arsenic, chromium and thallium (with RfDs of 3 x 10^{-4}, 3.0 x 10^{-3} and 8.0 x 10^{-5} mg/kg bw.day respectively). None of these compounds exceeded their hazard quotient of 1 at any of the receptors as presented in the risk assessment report. Considering that the toxicity of vanadium is lower than all of these compounds, it can be considered that potential impact from exposure to vanadium is not of potential significance. It should be noted here that both arsenic and chromium are not only toxic but also carcinogens and therefore were assessed, in the report, both in terms of their toxicity and carcinogenity. The comparison here is only related to the toxicity, as vanadium is not a carcinogen.

1.25 There are no emission limits for PBDEs in the WID. Consistent with the requirements of the Stockholm Convention in reducing emissions of Persistent Organic Pollutants (POPs), which are organic compounds that are resistant to natural environmental degradation, TOC is regulated in accordance with BAT under the Waste Incineration Directive (WID) 2000/76/EC. In addition, dioxins and furans are POPs specifically regulated under the WID. Other POPs including Polychlorinated Biphenyls (PCBs) and Polycyclic Aromatic Hydrocarbons (PAHs) are not specifically regulated under the WID but are regulated through the limitation of TOC emissions.

1.26 A literature review has been carried out and very limited data was found in relation to the formation and emission of these compounds. In a study reported by Wang et al, nine large scale continuous municipal solid waste incinerators (MSWIs), two small-scale batch MWIs and nine industrial waste incinerators (IWIs) were investigated for 2,3,7,8 substituted PBDD/Fs. The study found that the PBDD/F were accompanied by PCDD/Fs that are in the same range in both the MSWIs and the IWIs with the total being much higher in the IWIs waste. The obtained TEQ ratios (in percentage) of the PBDD/F to the PCDD/F concentration were found to be very small in the stack flue gases at (0.72%) for MSWIs, (0.18%) for batch MWIs and (5.4%) for IWIs. Considering the nature of waste to be processed on the subject site, the emission of these compounds are not likely to be of potential significance.

QSTAR Comment: *No sites within Frodsham town or Helsby Village were considered in the HHRA assessment.*

RPS Response:

1.27 Receptors located within Frodsham town or Helsby Village have not been explicitly addressed within the HHRA. HHRA receptors were chosen on the basis of representing key vulnerable

population centres (for example, local schools and health clinics) and agricultural areas including dairy farms where ingestion of locally produced foodstuffs including meat and milk is likely.

1.28 However, the air quality assessment does present the results of deposition modelling across the whole modelling domain assumed (consisting of 10,000 receptor points). The modelling incorporates receptors representing the areas of Frodsham town and Helsby Village. The results of maximum metal deposition rates across the whole receptor grid assumed are presented in Table 7-9 of the Environmental Statement Appendix 10.1 (Air Quality Assessment) and compared against maximum deposition rates specified by the Environment Agency. The results indicate that metal deposition rates across the whole study domain are well within all relevant maximum deposition rates specified by the Environment Agency.

QSTAR Comment: *The HHRA fails to acknowledge the existence of perceived threat from a plant of this nature*

RPS Response:

1.29 Addressing perceptions of health risk are complex with numerous variables at the community and individual level. The key method of addressing community perceptions is through the factual investigation and dissemination of environmental and health effects.

1.30 The Environmental Statement (ES) constitutes a formal planning requirement to ensure that the proposed development will not constitute a significant risk to environment and health. However, it is also important to note that the ES, Non-Technical Summary and all technical appendices are public documents intended to inform communities and aid in alleviating perceived risks.

1.31 As pointed out in Professor Dearden's report, currently non-statutory processes such as Health Impact Assessment (HIA) can be used to identify and separate perceived from actual risk. However, effective HIA is often very dependant upon detailed and technical assessment outputs from EIA and the management of community concerns remain the same, through the effective dissemination of factual information through local communities.

1.32 Community perceptions of the environment and associated risks are important and one of the key reasons for the international development of Environmental Impact Assessment.

QSTAR Comment: *It is not clear from the HHRA whether, in the dispersion studies, the nature of the terrain was adequately taken into account.*

RPS Response:

1.33 The air quality assessment, which the HHRA references, provides the detailed description of the dispersion studies. This includes a description of local terrain and how this was taken into account.

1.34 Detailed terrain data was incorporated in the dispersion modelling undertaken to support the air quality assessment and Human Health Risk Assessment. Figure 6.3 of the Environmental Statement Appendix 10.1 (Air Quality Assessment) presents a shaded relief map of terrain in the study area constructed from terrain data included within the dispersion modelling.

1.35 The dispersion modelling used two different dispersion models (AERMOD and ADMS) to address model uncertainty. Although both models include different methods for the treatment of terrain within dispersion computations they aim to account for the altered air flow and turbulence around areas of complex terrain. Both models have been subject to extensive validation studies.

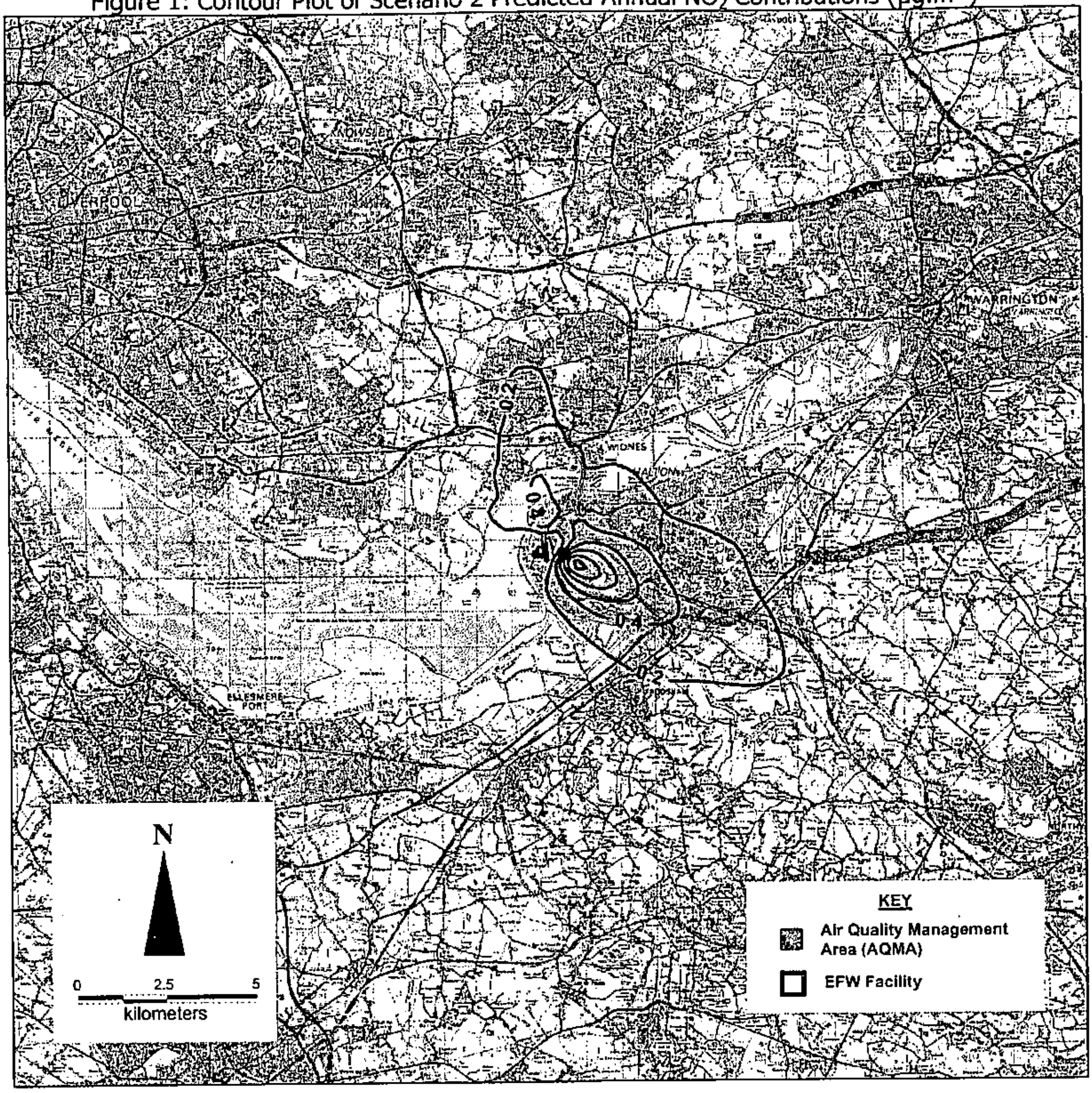
1.36 The selected stack height of 105m was assumed within the wider dispersion modelling undertake to support the air quality assessment. All dispersion modelling undertaken to

support the air quality assessment and Human Health Risk Assessment incorporated detailed terrain data. The results of the air quality assessment indicate that contributions to ground level concentrations of all pollutants from the EfW facility are minimal and are not considered significant. Figure 7.4 of the Environmental Statement Appendix 10.1 (Air Quality Assessment) presents a contour plot of annual average NO_2 contributions. This contour is reproduced below as Figure 1. The contour plot is considered to be representative of the long-term dispersion patterns for all pollutants.

1.37 The highest annual mean contributions are predicted to occur to the southeast of the site with the maximum point of impact coinciding with Runcorn Hill. This graphically demonstrates the influence of terrain on the modelling results and demonstrates the consideration of terrain within the dispersion modelling.

1.38 As noted within the air quality assessment, the primary determinant of the stack height is the local building height. For the purposes of planning, the stack height determination conservatively considered a 47m high main building. The actual height of the proposed main building is 42m and therefore the results of the stack height determination should be considered as overly conservative. The stack height determination will be repeated for a local building height of 42m to provide further evidence that a stack height of 105m is acceptable to ensure the adequate dispersion of pollutants.

Figure 1: Contour Plot of Scenario 2 Predicted Annual NO_2 Contributions ($\mu g.m^{-3}$)



Assumptions:

- Concentrations in $\mu g.m^{-3}$
- Proposed EfW operating at WID long-term limits
- 70% NO_x to NO_2 conversion
- 2004 meteorological year (worst case)
- Derived from ADMS modelling (worst case)
- Contour plots are spaced at 0.2 $\mu g.m^{-3}$

QSTAR Comment: *The HHRA assumes that above-ground produce is protected within an outer covering, so that root uptake is the primary mechanism through which above-ground protected produce becomes contaminated.*

RPS Response:

1.39 In the HHRA model, above ground produce is divided into two categories, exposed and protected above ground produce. Fruits, fruiting vegetables, leafy vegetables and what is classified as legumes such as snap bean are considered to be exposed and as such are assumed to be contaminated by three possible mechanisms including direct deposition of particles, vapour transfer and root uptake. Only fully protected above ground produce that are consumed following the removal of their protective cover are assumed to be contaminated by root uptake only.

QSTAR Comment: *The HHRA uses an erroneous intake target level for dioxins of 50 pg/kg bw-day) for infant exposure through breast milk, thereby incorrectly claiming that the estimated daily intake are well below all the target level.*

RPS Response:

USEPA Approach:

1.40 Chapter 2 of the HHRAP (2005) provides a detailed description of the way the Average Daily Dose of infant through breast milk was calculated. One approach the USEPA has taken to evaluate whether PCDDs and PCDFs emitted from waste combustion facilities are likely to cause significant health effects is to compare estimated TEQ exposures to national average background exposure levels (1pg TEQ/kg.day for adults and 60pgTEQ/kg.day for nursing infants). The average background level of PCDD/PCDFs and co-planar, dioxin-like PCBs in breast milk is 25 parts per trillion (ppt) of 2,3,7,8-TCDD TEQ. The 25-ppt 2,3,7,8-TCDD TEQ is the sum of the average breast milk concentration of 18-ppt TEQ from PCDD/PCDFs and 7-ppt TEQ from co-planar, dioxin-like PCBs. After normalising for infant body weight, this breast milk concentration of 25ppt TEQ results in an average, background intake for the infant, ADIb-inf, of 93 picograms per kilogram per day (pg/kg-day) of 2,3,7,8-TCDD TEQ. If exposures due to the facility's emission during the exposure duration of concern are low compared to background exposure, then the emission aren't expected to cause an increase in effects.

Defra and EA:

1.41 It should be noted that the UK national average background is even greater than that of the USA at a mean daily intake of 1.8 pg TEQ/kg.day for adults and about 100-fold of that for infants. MAFF has calculated the infant intakes to be 170pg TEQ/kg.day at two months, dropping to 39 pg TEQ/kg.day at 10 months. They stated that despite the high intakes of dioxins experienced by nursing infants, the impact of breast feeding on infant body burden of dioxin is markedly less dramatic and that peak infant body burdens are only around twice those of an adult, a consequence of the infant's rapidly expanding body weight and lipid volume, as well as a possibly faster elimination rate. The UK current tolerable daily intake of 2 greater than the adult background exposure of 1.8 further increases the daily exposure dose for infants. Consequently an intake target level of 50 pg/kg bw-day is considered to be an appropriate value.

QSTAR Comment: *THE HHRA incorrectly claims that all estimated carcinogenic risks are significantly below the target level of 1 in 100,000 and also uses an incorrect target level.*

RPS Response:

1.42 The cancer risk for all individual compounds were significantly less than the target level of 1×10^{-5} as presented in Tables 3.4 to 3.7 of the HHRA report. The combined cancer risk presented in Tables 3.2 and 3.3 of the report were close and in one occasion (receptor 5) was marginally higher than 1×10^{-5} at a value of 1.089×10^{-5}. However, the combined cancer risk was not to be directly compared with the target risk level of 1×10^{-5} as the latter relates only to exposure to individual contaminants. The reason for comparing the combined

risk with the target level of 1×10^{-5} was merely to identify the receptors that may need further investigation to show the actual risk for individual compounds and whether they are exceeding their relevant target level. The lifetime target level of 1×10^{-5} calculated by the model is not incorrect and the proposed value of 1×10^{-6} suggested by the reviewer is related to the annual risk as discussed below:

1.43 DEFRA and the Environment Agency (CLR9) state that to apply the concept of Quantitative Exposure Assessment (QEA) to derive an acceptable numerical level of risk for non-threshold (carcinogen) chemicals, it is necessary to take a view about the "acceptability" of levels of additional risk. Organisations such as the WHO and the USEPA use the simple "attributable lifetime probability of death" as the prime measure of risk, often referred to as "lifetime excess risk". The acceptable lifetime excess risk, for an individual member of the public, can range over orders of magnitude (for example 1×10^{-2} to 1×10^{-6}) between different organisations. This is largely attributable to differences in the meanings of the various terms used (for example, maximum tolerable risk, acceptable risk or negligible risk) and to differences in application. For example, whether the value refers to the sum of all the risks from a particular situation or activity, or to the risk from a single contaminant in a single environmental medium. In the UK, the figures quoted for an acceptable risk have usually been in the context of the risk from a particular industrial installation, or from a particular consumer product. On the other hand, the WHO, in its guidelines for drinking water quality allows a risk of 1×10^{-5} in respect of each carcinogenic contaminant considered. It follows that the total risk from drinking water as a whole (possibly containing several carcinogenic contaminants) could be greater than that estimated for an individual contaminant.

1.44 Despite the wide-ranging values reported by different authoritative organisations, there is some consensus for selecting a figure of 1×10^{-4} as the upper bound of acceptable additional lifetime risk from exposure to environmental contamination from any one source (such as, for example, a contaminated site). This corresponds to an annual excess risk of cancer of about 1×10^{-6} (one in a million per year). In the UK, the current risk assessment approach for carcinogens utilises a range of 1×10^{-3} to 1×10^{-5} for individual contaminants. Some of these target levels are currently under consultation (Assessing risk from land contamination. A Proportionate Approach, Soil Guideline Values - The Way Forward, Defra and EA) and are proposed to be revised upwards (from 1×10^{-5} to 1×10^{-4}).

QSTAR Comment: *The presentation of some numerical and other information in the HHRA is unclear*

RPS Response:

1.45 A detailed glossary of acronyms and units will be provided by RPS. None of the units are expressed incorrectly in the report. Clarification to specific comments can be provided on request.

Energy from Waste, Runcorn

Response to Halton Borough Council

April 2007

Prepared by:

RPS, Oxford
Mallams Court
18 Milton Park
Abingdon
Oxon
OX14 4RP

INEOS Chlor Ltd
Runcorn Site HQ
South Parade
Runcorn
Cheshire
WA7 4JE

Notification under Section 36 of the Electricity Act 1989 and Section 90(2) of the Town and Country Planning Act 1990 to the Secretary of State for Trade and Industry to Construct and Operate an Energy from waste Combined Heat and Power Generating Station with an Approximate Capacity of 360MW and up to 100MW of Electrical Power at INEOS Chlor Vinyls Site, Runcorn.

Response to Halton Borough Council

April 2007

INEOS Chlor
RPS

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Appendices

1. Introduction

1.1 This report is provided in response to the letter from Halton Borough Council of 22 February 2007 regarding the Environmental Assessment of the proposed Runcorn Energy from Waste (EfW) project. This report provides a response to each of the points raised in that letter.

1.2 The points raised are addressed by topic, with both the original question and the response provided.

2. Project Description

Will other sources of fuel, other than municipal waste (i.e. industrial, commercial or own site waste) be used?

2.1 Fuel derived from municipal waste (SRF, RDF) would provide the main source of energy for the plant. It is expected that it would be sourced primarily from local authorities in the North West region. However, in the event that there is insufficient RDF to fill the plant, INEOS may wish to use the facility to burn other non-hazardous materials, such as some types of biomass, confidential waste (shredded paper) and appropriately treated commercial or industrial waste. Any such use would be subject to the approval and grant by the Environment Agency of the necessary statutory pollution prevention and control (PPC) permit in accordance with the Pollution Prevention and Control (England and Wales) Regulations 2000.

2.2 Biomass is an expensive fuel. Consequently there is a strong commercial incentive to maximise the amount of RDF burnt, and only burn other fuels when insufficient RDF can be sourced.

2.3 It is confirmed that no untreated municipal waste or waste material generated on Runcorn Site will be burnt.

There is brief mention of the possibility of biomass being utilised as a fuel, how does this impact on the EIA?

2.4 The biomass could include the following:

- Wood pellets derived from sawdust;
- Wood chippings;
- Crops such as coppice- willow or miscanthus which are purposely grown for their energy content.

2.5. These are all natural products which contain no hazardous or potentially hazardous components, and will not affect any assessments made in the Environmental Assessment.

How were the figures for the quantities of RDF calculated, and how accurate are they? How are they likely to change over the medium to long term?

<u>Total volume</u>

2.6 The total size of the proposed plant is approximately 360MW (thermal), and it is this which controls the throughput of RDF. The plant is sized so that:

- it is sufficiently large to make a material non-fossil-fuel contribution to INEOS Chlor's energy consumption., ie approximately 20%.
- it is capable of taking all the RDF anticipated to arise from the local North West Waste Disposal Authorities (WDAs).

2.7 With a plant availability of about 90% (7800 hours/year), 360MW (thermal) equates to a total energy input of 10100 GWh per annum. The calorific value of the fuel then determines the mass throughput of RDF, eg:

- if all the fuel has an LCV of 13 GJ/te, the mass throughput is 770,000 tonnes per annum.
- if all the fuel has an LCV of 12 GJ/te, the mass throughput is 850,000 tonnes per annum.

2.8 The Planning Application was based on the worst case scenario, namely 850,000 tonnes per annum, which represents the upper bound in terms of mass throughput. Since it is now known that the GMWDA fuel will be produced with an LCV of 13 GJ/te, it now looks likely that the actual mass throughput will be less than this. INEOS Chlor proposes to adopt a "standard specification" for RDF of 13 GJ/te. However, it cannot be guaranteed that other WDA's will produce to this standard. Consequently the specification will permit receipt of RDF covering a

range from 11 GJ/te to 18 GJ/te. This is the normal operating range of Water Cooled Moving Grate boilers.

2.9 Table 2.1 of the ES gives the predicted quantities and sources of RDF that will be burnt in the facility. The figure of 275,000 tonnes per annum from Greater Manchester is taken from the Draft Output Specification issued by GMWDA on 9 November 2006.

2.10 There is not yet any firm data for volume or LCV of RDF anticipated to arise from the other WDA's mentioned in Table 2.1. The figures shown in the table are estimates that have been derived from the GMWDA information.

Change over time

2.11 Information provided by GMWDA indicates a peak of 273,000 tonnes per annum in 2012, but levelling off at 256,000 tonnes per annum after 2019.

2.12 We have no reason to believe that the profile of other RDF arising from the other WDA's would be significantly different.

Is there a contingency for the required MBT's not being on line before the facility is commissioned?

2.13 INEOS' main protection against there being insufficient RDF is the early years of the project is that construction of the plant can be phased. As mentioned, the plant would be sized to handle RDF arising from Manchester, Cheshire, Merseyside and other local WDA's. Manchester is currently leading the way, with the other WDA's apparently some 18 and 24 months behind. In this event, it is anticipated that construction will be phased, with two lines to be built in the first phase, and the remaining two lines following on when there is certainty that sufficient fuel will be available.

2.14 Phase 1 is founded upon the GMWDA contract. INEOS Chlor is developing a working partnership with Viridor Waste Management and John Laing Infrastructure who have been selected by GMWDA as their preferred bidder. It is currently expected that the GMWDA MBT plants will be commissioned by 3Q/2010. This is about a year ahead of the likely commissioning date for the proposed EFW plant.

2.15 The Phase 1 capacity would be 375,000 tonnes per annum, of which 275,000 tonnes per annum would come from GMWDA. INEOS' preference would be to fill this gap using locally produced RDF, but this is not in INEOS' control. As a short term contingency, some RDF could be imported from outside the region to fill the gap until material is available from other North West WDA's. Viridor are actively engaged in the EfW business, and they are co-owners of a 410,000 tonnes per annum facility at Colnbrook, Berkshire. Based on experience from their at Colnbrook facility, they believe that in 2011 there will be sufficient RDF available on short-term contracts to achieve this. Alternatively, biomass or other alternative fuels could be used to bridge the gap.

How will the quality of the RDF be verified and maintained?

2.16 The RDF will be produced to a specification, and in the first instance, it will be the responsibility of the suppliers to implement Quality Assurance systems to ensure compliance. INEOS recognise the importance of working closely with the MBT plants to maintain the flow of in-specification RDF.

2.17 In addition, it will be necessary for the EfW plant to verify the quality of the RDF. This will be achieved by routine sampling.

2.18 INEOS have selected water-cooled mechanical grate technology for the boilers. These plants are robust in their operation and are able to accept a wide range of fuels with varying LCVs and impurities whilst keeping their emissions within the requirements of the Waste Incineration Directive.

2.19 The proposed facility at Runcorn will use RDF that, by virtue of the MBT process, produces a reasonably homogenous fuel product. Once being discharged into the bunker, the fuel is continually mixed to ensure maximum consistency prior to being fed to the combustion chambers. It is therefore proposed to sample and inspect mixed material from the bunker. A sample would be taken by one of the grab cranes, and deposited in a dedicated sampling area. Here it would be inspected, and a sub-sample would be taken for analysis.

2.20 In addition to this manual sampling, there are various on-line methods that can be used to check the quality of the incoming fuel. However, these only detect problems after the fuel is burnt. Despite this, they are still capable of detecting that there has been a problem, which can then be addressed. These methods are as follows:

- Analysis of bottom ash can be used to verify that fuel complies with the specification for total inerts (ash) and individual components such as glass, metals, concrete etc.
- Analysis of the flue gases before the Flue Gas Treatment (FGT) plant will detect excess levels of chloride if the chlorine (PVC) content of the RDF is exceeded.
- Actual performance of the boiler plant (tonnes of steam per tonne of RDF) will be used to validate the calorific value of the RDF.

There is considerable variation in the estimates of volumes of waste generated by the facility. Can these be improved upon, and how has this been accounted for in the assessment?

2.21 The original Planning Application left open the choice of technology between Circulating Fluidised Bed (CFB) boilers and Water-cooled Moving Grate (WCMG) boilers. These technologies result in different proportions of bottom and fly ash, and the application was written to cover the worst cases. Following further work, it has now been decided that WCMG technology will be employed, which now enables us to be more precise about waste production.

Bottom Ash

2.22 The maximum ash content of the RDF will be 25% of a dry basis. It is expected that 90% of this will appear as bottom ash, and 10% will appear as fly ash.

2.23 Taking the worst possible combination of volume and inerts content, maximum production will be 22.5% of 850,000 tonne/yr, viz 191,000 tonnes per annum.

Fly Ash

2.24 Taking the worst possible combination of volume and inerts content, maximum fly ash production will be 2.5% of 850,000 tonnes per annum, viz 21,000 tonnes per annum. This assumes the total ash content will be 25%.

Flue Gas Treatment Residues

2.25 Using worst case figures, it is expected that 0.064 tonne of residues are produced for each tonne of fuel burnt. Taking the worst case throughput of 850,000 tonnes per annum, maximum FGT residue arisings will be 54,000 tonnes per annum.

Total Waste Arising

	Maximum (tonnes per annum)
Bottom Ash	191,000
Fly Ash	21,000
FGT residues	54,000
Total Waste Arising	266,000

2.26 This table should be compared with the original table given in Section 2.47 of the ES.

What is the capacity of Randle Landfill site, and how will this impact on the long term operation of the facility?

2.27 The capacity of Randle Landfill Site is about 3.5 million m^3. The current rate of landfill is about 17,000 m^3 per annum.

2.28 The current estimate is that the EfW plant will produce a maximum of 75,000 tonnes per annum of fly ash and flue gas treatment residues. The density of these is ca 0.7 tonnes/m^3, giving a volume of 107,000 m^3 per annum. Combined with the volume from other sources, the total volume land-filled will be 124,000 m^3 per annum.

2.29 This equates to a **minimum** life in excess of 28 years for Randle Landfill Site.

3. Need and Alternatives

Have alternative sources of energy been investigated?

3.1 A key driver for this project for INEOS Chlor is to meet the energy demands of Runcorn site whilst reducing its exposure to natural gas security of supply and price risks. Runcorn site has a requirement for both electricity and steam and there are very few alternatives sources of energy capable of supplying both simultaneously.

3.2 Options are:

- Other fossil fuels – Coal/Oil. These are non-renewable and with environmental taxes are anticipated to become more expensive over time.
- Biomass. At this stage the supply chain is not capable of supplying the necessary volume (700,000 to 1,000,000 tonnes per annum) and biomass is typically an expensive fuel, although (as discussed earlier) certain types of biomass may be also be used in addition to RDF.

3.3 INEOS strongly believes that the proposed EFW plant is an elegant solution which not only allows INEOS to recover energy from material that would otherwise be sent for landfill, but also meets the needs of Waste Disposal Authorities to divert this material away from landfill.

3.4 In addition to the EfW plant, INEOS is still actively seeking access to alternative sources of energy to further reduce its requirement for gas. It is expected that this energy (electricity only) will be fully renewable.

4. Townscape and Views

The scale and design of the plant are very prominent. Can this be reduced and can a more modern design be achieved? A modern design would give the impression of a high quality up to date facility. A quote from the Secretary of State regarding Quinn Glass Development inquiry is that the design of the buildings 'offer no pleasing or redeeming architectural features to offset the visible mass, they are the manifestation of functionality with no thought for design.' This could be the description of this development.

4.1 INEOS Chlor believes that the current building design is in keeping with other structures in the area. We would be happy to discuss building finishes and colours with Halton Borough Council to ensure that the new facility harmonises with its surroundings.

What rationalisation of the facility is being carried out and what are the improvements to townscape character mentioned in 5.78 of the ES?

4.2 Paragraph 5.78 of the ES deals with the sensitivity of the townscape of the INEOS site and its ability to accommodate change through redevelopment. The existing main site comprises a mix of office buildings, warehouses, workshops, storage tanks, infrastructure, rail sidings, hard standing, outdoor storage areas, roads and disused/derelict land. There is a great deal of visual clutter that is typical of an industrial site that has developed over many decades. Many of the elements within the site are of poor visual quality. Redevelopment of the site would allow existing features to be removed. The proposal would represent an integrated approach to design that would allow buildings, infrastructure and green space to combine, in a planned way, across the whole site. The provision of planting around the southern perimeter of the site would also benefit occupants of adjoining houses that form an important part of this mixed industrial and residential character area.

Can extra views be undertaken from Westfield Road area?

4.3 Following discussion with Andrew Panel at Halton Borough Council, a specific assessment of the views from the Westfield Road area, together with photos and location plan indicating the properties from which views could be gained has been provided (Landscape Figure 1).

4.4 Potential views of the site can be gained from high land north east of the site. This area of housing and public open space is covered by the Weston Point and Runcorn Hill Housing Estate character area and the Runcorn Hill Informal Open Space character area respectively (as described in Chapter 5 of the ES).

4.5 The addition of the EfW facility, as a large scale industrial development, into the Runcorn Industrial and Commercial character area would result in an indirect effect on the neighbouring residential and open space character areas. The proposal would appear as an addition to the extensive industrial development of this part of Runcorn.

4.6 It is considered that the magnitude of change in these views would be negligible. The significance of effect on the Weston Point and Runcorn Hill Housing Estate character area and Runcorn Hill Informal Open Space character area would remain as neutral as described in the ES.

4.7 Four groups of visual receptors lie within the additional area of ZVI. These are as follows:

i. 24 semi detached residential properties in Westfield Road;
ii. 19 semi detached residential properties in Westfield Crescent;
iii. Public Open Space at Westfield Crescent;
iv. The streets of Westfield Road and Westfield Crescent.

4.8 Residents within properties at Westfield Road would gain distant fragment views (590 to 630m) channelled at oblique angles along the road and over belts of mature trees, mainly from upper floor windows, towards the proposals.

4.9 Residents within properties at Westfield Crescent would gain distant fragmented views (630 to 770m) between intervening properties and over belts of mature trees, from first floor windows, towards the proposals.

4.10 Users of the public open space at Westfield Crescent would gain a series of distant channelled views (630 to 700m) framed by housing and filtered through tree belts and garden vegetation.

4.11 For these 3 groups of receptors the top of the main EfW building and stack would be visible within surrounding industrial development and a backdrop of the Mersey Estuary. The proposals would form a minor new element in views, mainly during winter when deciduous trees are not in leaf. These residential and public open space receptors are of high sensitivity. The magnitude of change they would experience is small and in the long term, resulting in a minor adverse/neutral significance of effect.

4.12 Motorists on Westfield Road and Westfield Crescent would gain similar views to those described above, however, views would be more limited by intervening housing and trees and gained at ground level. These receptors are of moderate sensitivity and would experience a small magnitude of change, which would be long term, resulting in a minor adverse/neutral significance of effect.

5. Hydrology, Hydrogeology and Contamination

Can a site assessment that considers the potential contamination risks on the overall site be undertaken in line with best practice and guidance. Including more baseline data such as borehole logs, site cross sections etc.

5.1 Paragraph 7.20 of the ES states that a site investigation of targeted areas and detailed assessment of contamination risks will be undertaken prior to construction to further confirm the nature and extent of contamination on site. This will lead to the development of a detailed management strategy based on the detailed design of the facility. This could be undertaken as a condition of the planning permission, allowing Halton Borough Council and the Environment Agency the opportunity of agreeing with INEOS the scope of the investigation and the detail of the management strategy.

5.2 It is suggested that the absence of a detailed site investigation at this stage should not prevent grant of permission for the scheme. It should be acknowledged that any contamination present on the site has arisen from past uses that have already occurred and that in the absence of the scheme the site would remain potentially contaminated. If the scheme is taken forward, a better understanding of this area would be gained through detailed investigation and any unacceptable contamination would be dealt with. This would be compliant with Local Plan policy which aims to make contaminated land safe and bring it back to beneficial use.

5.3 If required, we are able to provide additional baseline information in the form of the previous reports detailed at paragraph 7.51 of the ES and historic maps and plans detailed at paragraph 7.50 of the ES.

The document states that a Conceptual Site Model has been developed for the site but there is not a robust CSM within the document (one that is in line with best practice and guidance on CSMs e.g. CLR 11)

5.4 The ES notes at paragraph 7.6 that a conceptual model and preliminary risk assessment has been undertaken. We acknowledge that the information provided is preliminary at this stage. A full CSM and detailed assessment will be undertaken as part of the PPC permitting process, and would be completed prior to construction and will be based on the detailed design and the information arising from the site investigation.

The ES makes several very general statements that contamination will be assessed and dealt with, however in order to make a comprehensive assessment of the impacts this information needs to be part of the Environmental Statement.

5.5 The ES aims to provide information on the approach and principles that would be applied to the management of contamination. As set out at paragraph 7.13, all of the measures identified at paragraphs 7.18 to 7.27 form an integral part of the project applied for and are measures to which the applicant is committed. This, together with the draft Code of Construction Practice provided at Appendix 2.3 aims to demonstrate the commitment to the appropriate management of any contamination identified.

5.6 As stated at paragraph 7.20 of the ES, a detailed management strategy would be developed for the site prior to construction.

The geological maps for the area show parts of the site to be underlain by the Shirdley Hill Sand formation, this is potentially significant for the hydrogeology of the site but is not explicitly mentioned in the ES.

5.7 See below.

The significance of the Sherwood Sandstone as a Major Aquifer is only mentioned in passing, further consideration of the groundwater and the potential risks and need for protection and/or mitigation is required.

5.8 The ES acknowledges throughout the baseline and impact assessment sections the presence of sand and sand formations forming part of the underlying geology for the area. The presence of Sherwood Sandstone as part of the solid geology is recognised in the section on geology from paragraphs 7.63 to 7.66.

5.9 The importance of the Sherwood Sandstone as a major aquifer is specifically referenced in paragraph 7.67. The groundwater is also listed as a key receptor in Table 7.3 of the Preliminary Risk Assessment. However, it should also be recognised that the site is underlain by Glacial Boulder Clay deposits which would offer the deeper sandstone aquifer protection. It is accepted that further investigations and detailed assessment would be undertaken before construction works commence and that, as stated in paragraph 7.89 'avoiding pollution of the sandstone aquifer during or as a result of construction is of paramount importance.'

Given the above points, there needs to be a technical appendix covering contamination that includes up to date, detailed site investigation and risk assessment.

5.10 As discussed above, additional technical information can be provided. This includes baseline information in the form of previous assessments and historic maps examined as part of the assessment undertaken to date and referenced within Chapter 7 of the ES. A detailed assessment would be undertaken prior to construction and a management strategy would also be produced. This information would be based on the site investigation to be undertaken as a condition of the development, which would be developed with input from Halton Borough Council.

6. Traffic and Transportation

The report indicates that the fuel will come direct from Local Authorities, however this is not the case; this raises questions with regard to the accuracy of the transport assessment (e.g. how do we know fuel from Manchester will come in by rail?)

6.1 The ES does not assume that the fuel will come direct from local authorities. Paragraph 2.20 of the ES explains that the RDF/SRF to be used as fuel would be created by the processing of raw municipal waste by, for example, MBT facilities, which, in the case of Manchester, will be operated by a private company under contract to GMWDA.

6.2 Regarding the method of transport of fuel from the different local authority areas, it is intended that it would be a condition of the GMWDA (Manchester) contract that all fuel would be delivered by rail. The mode of transportation from other local authority areas is not known at this stage, as the development of their waste treatment services contracts are not as advanced as that of Manchester. It would be the intention of INEOS to encourage the relevant authorities to include obligations for transport fuel by rail during their MBT contract placement processes. However, for the purposes of the current assessment of road traffic impacts, it is assumed that all non-Manchester deliveries would be by road; this is a conservative (worst case assumption).

6.3 The traffic figures used in the ES are conservatively based on upper throughput figure of 850,000 tonnes per annum of fuel to provide a worst case estimate.

Please confirm that one vehicle movement does constitute two trips, and that one full vehicle entering is then recounted as an empty when leaving, and that there is no halving of movements by vehicles being full both trips.

6.4 It is confirmed that all references to movements are unidirectional; a vehicle arriving at the site counts as a single movement and the same vehicle leaving the site counts as another movement. A vehicle arriving and departing is therefore identified in the Transport Assessment as two vehicle movements.

TA does not adequately assess accessibility to the site by walking, cycling and public transport. Please can you provide further information on this area.

6.5 The TA contains information about accessibility by public transport in paragraphs 2.17 to 2.20. Chapter 8 of the ES includes an assessment of effects on pedestrian delay and pedestrian amenity. Figure 1 of Appendix 1 provides a plan showing areas within 1km, 2km and 5km of the site that could be accessible by walking or cycling. The distances are calculated on the basis of pedestrians or cyclists entering the EfW site at the point of vehicle access at the western end of the site access road.

6.6 The plan indicates that the Weston Point residential area lies within 1km of the site access, with parts of the western side of Runcorn within 2km. The area within 5km includes almost all of the built-up area of Runcorn within the Expressway ring-road. It is concluded that the site is within walking distance of some local residential areas and within reasonable cycling distance of much of Runcorn.

The plans provided showing the access need to be drawn up in further detail, as there are issues with geometry, visibility splays. Can you also provide more details of the access to Salt Union and Weston Docks.

6.7 Our transport consultant, Bruce Bamber, has discussed this requirement with Rick Wakefield of Halton Borough Council. In response to the queries raised, a drawing is provided within Appendix 2 (Drawing JNY 6040-04A) that shows the visibility splays at the Picow Farm Road junction, at the access to the site and at the Salt Union access. Forward visibility envelopes are shown along the access road. The drawing also provides the swept paths of heavy goods vehicles using the access road.

6.8 It is concluded that standard visibility splays and forward visibility can be achieved over either highway land or land associated with either this or the Weston Docks application land and that Heavy Goods Vehicles can negotiate the access road into and out of the proposed development without the need to stray onto the opposing carriageway.

Can you provide an assessment of Picow Farm particularly with regard to the junction visibility and provide details of any proposed changes to this junction.

6.9 Our transport consultant, Bruce Bamber, has discussed this requirement with Rick Wakefield of Halton Borough Council. It is noted from our site visits that the northbound slip road has been re-aligned to the south-west, apparently to improve visibility to the right for emerging vehicles. The current arrangement allows for a visibility of 58m to the right. This visibility is to the beginning of the fence along the top of the overbridge.

6.10 In reality visibility for vehicles approaching the stop-line is greater than the 58m since it is possible to see between the railings of the fence. As a vehicle gets close to the stop-line the railings appear as a more solid barrier. Visibility is slightly obstructed by the presence of a lighting column. Although this visibility is not standard it is not considered to present a significant safety or capacity issue. There have been no personal injury accidents over the past 3 years in the vicinity of this stop-line.

6.11 Visibility to the right at the southbound slip road is from 4.5m back from the stop-line is not restricted by the presence of the fence on the bridge. There is a shallow crest that restricts visibility to around 75m at road level and beyond this for heights above road level. A vehicle approaching from the right would be visible when it was further than 90m from the junction. It is not considered that this represents a constraint in either capacity or safety terms. There have been no personal injury road traffic accidents in the vicinity of this stop-line over the past 3 years.

6.12 On the basis of the above it is not proposed to introduce any modifications to the existing junction.

Can you confirm that there will be no parking on Picow Farm Road and that no construction traffic (construction personnel) will be entering the residential area.

6.13 We can confirm that no parking would be permitted on Picow Farm Road. Indeed, paragraph 1.45 of the Draft Code of Construction Practice (Appendix 2.3 to the ES) states that no parking on local roads would be permitted.

6.14 Parking for construction workers will be both on and off-site. Off site parking will be within existing car parks adjacent to the Runcorn Site – Gate 2. It is proposed to transport personnel using more distant car parks to the site by bus/miniibus. These would be routed via the Expressway junctions and this avoid travelling through the Weston Point residential area. Paragraph 1.42 of the Draft Code of Construction Practice provides a commitment to producing a Traffic Management Plan for the construction phase, taking into account the advice of Halton Borough Council.

The majority of traffic at the junction with Picow Farm Road is split 50:50, however dependant on the location of the concrete facilities this may not be the case. Can you please address this issue in the Transport Assessment.

6.15 Effects arising as a result of concrete pouring will be of limited frequency and duration. However, in order to address the likely effects should a greater percentage of traffic arise from one direction, the model has been run with all movements coming from the north and also with all movements coming from the south.

6.16 Figures 2 – 8 of Appendix 1 show the derivation of % impacts assuming that all HGV movements are via the north or the south. Figures 7 and 8 show that the increase in HGV movements during the AM peak, PM peak periods and on a daily basis as a result of the peak period of construction is expected to be in the region of 3% to the north of the Picow Farm

Road junction assuming all HGV movements are to and from the north and 3% to the south of the Picow Farm Road junction assuming that all HGV movements are to and from the south.

6.17 These scenarios are unlikely but have been undertaken as sensitivity tests to establish the worst case traffic scenario. These test show that even if all traffic were to arise from one direction, the conclusions of the Transport Assessment would not alter.

Is any construction material being transported by rail?

6.18 The opportunities for the delivery of bulk materials to the site by rail and barge will be investigated during the planning/detailed design phase. For the purposes of this assessment, in order to consider the worst case effects in terms of road traffic, it has been assumed that all materials are transported by road.

How will construction traffic be routed between site and remote car parks if full?

6.19 INEOS recognise that construction operative car parking is an area that requires close attention and active management. Indeed, during the recent major project activities on Runcorn Site, over 1000 construction operatives were accommodated without serious issue. INEOS will ensure that sufficient car parks are provided.

6.20 Those using the remote car parks will be provided with shuttle buses to transport them to and from the site. Signs will be provided on feeder roads to direct operatives to the appropriate correct car parks. The scope and content of such signs would be agreed with Halton Borough Council.

6.21 With respect to van deliveries or subcontractors, it is proposed that signs would be provided off-site to direct such construction traffic to the site by agreed routes. The scope and content of such signs would be agreed with Halton Borough Council.

Can the traffic impact on the bridge be undertaken especially having regard to HGV movements?

6.22 Traffic flows on the Runcorn Bridge have been supplied by Halton Borough Council. Appendix 3 shows the percentage impact of the generated flows assuming that 50% or 100% of HGV's use the bridge. This shows that with either 50% or 100% of HGV's routed over the bridge the impact in terms of total vehicles is a 5% increase in 2-way flows during the peak hours of traffic generation (06.00-07.00, 19.00-20.00) and a 2% increase on a daily basis. With 50% of HGV's routed over the bridge the peak hour increase in HGV's only is between 3% and 4% during the peak hours and 4% on a daily basis. With 100% of HGV's routed over the bridge the impact in terms of HGV's comprises increases of 6%-10% in the peak hours and 7% on a daily basis.

6.23 It should be noted that the duration of peak construction activity will be limited to the periods when continuous concrete pours are required to form the main structures on site. There are expected to be 2-3 periods of 4-5 days when such activities occur. For the main structure it is possible that the period of continuous concrete pouring could extend to approximately 2 weeks. The periods of peak impact during construction are therefore limited both in terms of number and duration.

6.24 Further, although the worst case assessments of the impact of construction traffic on the bridge show there to be increases in HGV flows up to around 10% during the peak hours, the increase in total flows during the peak periods is approximately 5% in the peak hours and 2% on a daily basis. In addition, the peak hours of impact from construction traffic do not coincide with the conventional weekday peak hours. It is concluded that, even with a worst case assumption, where all concrete wagons use the bridge, the impact will be limited in absolute terms as well as in terms of duration and frequency.

Have trips to Randle Island been taken into consideration?

6.25 Trips to Randle Island (for the disposal of fly ash and residues) have been included within the predicted operational traffic flows.

6.26 The Transport Assessment shows that there will be up to 20 vehicle movements per day associated with fly ash and reaction products that will need to be transported to the hazardous waste site at Randle Island. These are included in the total shown in the Transport Assessment figures (400 total daily movements).

6.27 The route to Randle Island is via the Expressway, leaving at the Astmoor Road junction and travelling to the swing bridge via Astmoor Road. This route is considered to be suitable for HGV movements.

Has the capacity study of the rail network been undertaken?

6.28 It is envisaged that up to 5 trains per day will deliver fuel to the site, of which up to three will originate from Manchester. The origin of the other trains is not known at this stage and will depend on the location of the facilities provided by the other local authorities.

6.29 Initial discussions have been held between INEOS Chlor and Network Rail. It has been identified that in order to accommodate this number of trains, some improvements to the signalling on the branch line may be required. Regarding the capacity of the rail network, no major obstacles have been identified by Network Rail at this stage.

7. Noise and Vibration

More detail on the materials/specification/noise attenuation of the proposed acoustic barriers is required.

7.1 Acoustic barriers will be constructed of materials that are acceptable from a landscape and visual perspective. The required superficial mass (mass per unit area) of the barriers will be calculated in accordance with the methodology contained within Calculation of Road Traffic Noise, DoT, 1988 as part of the detailed design works.

7.2 The extent, optimum height and location required for acoustic barriers would be determined during the detailed design for of the project and agreed with the planning authority prior to construction. However, it is likely that timber barriers would be preferred in landscape terms and given the relatively constrained areas (in terms of width) within which they would be located. Architecturally designed solutions would be possible but, from a landscape perspective, preference would be given to retaining space where possible for planting alongside the acoustic barriers.

It is our opinion, based on experience of the area, that the area considered to be potentially impacted by noise should be widened. To address this can further noise surveys be provided in the following areas: Weston Road, Lincoln Close, Beechwood? For further details on this request please contact Environmental Health.

7.3 The requirements of this request were clarified in a telephone conversation between RPS and Halton Borough Council Environmental Health on 20 March 2007. HBC confirmed that the concern was regarding low-frequency noise.

7.4 HBC has received noise complaints from residents in Weston Road, Lincoln Close and Clifton Road, regarding low-frequency noise, that have been attributed to groundborne noise emissions from Rocksavage Power Station. Therefore, HBC has requested assurance that similar noise would not be likely to give rise to complaints from residential receptors in the area of the proposed EfW facility. HBC considers that the receptors that could potentially be affected by the EfW facility are in Weston Road, Russell Road, Highlands Road and Westfield Road/Crofton Road.

7.5 RPS has experience of low-frequency noise emissions from a Combined Cycle Gas Turbine (CCGT) power station that gave rise to complaints from residents in the area during the night-time. The power station in question was constructed between 1992 and 1995, is capable of generating 1000 MW of electricity and uses gas as its primary fuel.

7.6 The nearest residents were approximately 700m from the power station and were close to a mainline railway and busy major trunk road. Daytime noise levels were dominated by noise from the road and railway and, due to the separation distance, the majority of noise emissions from the power station were not significant. However, under certain load and ambient temperature (low, around freezing) conditions, the noise emissions from the power station included a low-frequency tone that was not present for the majority of the time or, if present, was at a much lower level. The attenuation rate of noise in air reduces with frequency. Consequently, the low-frequency tone was audible at the residences when other noise from the power station was not. Furthermore, a discrete tone is more perceptible than broadband noise. When night-time background noise levels at the residences were low, which was typically during dry, calm and cold weather conditions, the low-frequency tone gave rise to complaints from the residents of the nearest houses.

7.7 The source of the low-frequency noise was identified as the Heat Recovery Steam Generators (HRSGs). A HRSG is a heat exchanger that recovers heat from a hot gas stream and produces steam that can be used in a process or used to drive a steam turbine. In a CCGT

power station, hot exhaust from the gas turbine is fed to an HRSG to generate steam, which in turn drives a steam turbine.

Rocksavage Power Station

7.8 Rocksavage Power Station was the world's first commercial use of combined cycle, sequential combustion gas-turbine technology. It commenced operations in 1998 and has a capacity of 748 MW.

7.9 Complaints about high levels of low-frequency noise have been received from residents of, Lincoln Close, Clifton Road and Weston Road, which are approximately 500, 700 and 1000 m from Rocksavage power station, respectively. At all of these locations, daytime noise levels are dominated by road traffic noise from the A557, Weston Point Expressway, which is a busy major trunk road.

7.10 HBC considers that the low-frequency noise is groundborne noise, which is where vibration from the power station would be transmitted through the ground and re-radiated by the walls, ceiling and floors of the house as airborne noise. The phenomena can occur in buildings above underground railways due to vibration from the trains. However, the source vibration levels that would be required to give rise to audible groundborne noise at the distances the houses are from Rocksavage Power Station, i.e. at least several hundreds of metres, would not, under any circumstances, occur within a power station. Some elements of a power station are sources of vibration but some elements are vibration sensitive, for example, the gas and steam turbines and electrical switchgear. It is considered that if the low-frequency noise was due to vibration within the Power Station, then the vibration would be immediately apparent and probably alarming to the employees and would be at such a level to be potentially damaging to the sensitive equipment and possibly even to the fabric or structure of the Power Station.

7.11 It is considered that, if the source of the low-frequency noise that gives rise to complaints from the residents of Lincoln Close, Clifton Road and Weston Road originates from Rocksavage Power Station, then it is more likely that the method of propagation is airborne rather than groundborne. A possible source of the low-frequency noise could be the HRSGs.

Proposed EfW Facility

7.12 The design of the EfW facility differs substantially to that of a CCGT power station. Typically, a CCGT power station has HRSGs after the gas turbine, which then exhaust into a stack. This type of plant largely relies on the HRSG to act as a silencer.

7.13 In contrast, an EfW plant uses a quieter combustion process than a CCGT power station and the boiler plant is followed by the flue gas treatment (FGT) process. The FGT plant includes a fabric filter, which is a large chamber with several hundred bags through which the gases pass. All of this plant (i.e. boiler and FGT) tends to suppress noise from the combustion process. Furthermore, the proposed EfW is significantly smaller, with an electrical capacity of 100 MW, than the Rocksavage Power Station, which has a capacity of 748 MW.

7.14 The remaining noise source is the ID fan, which sucks the flue gases through the EfW plant and discharges to the chimney. Noise emissions from the ID fan are broadband and enclosed to ensure that significant impacts are not expected to occur. Details are provided in the noise chapter of the ES.

Conclusions

7.15 HBC has received complaints regarding low-frequency noise from residents near to Rocksavage CCGT Power Station. HBC attributes the noise to groundborne noise from Rocksavage Power Station and, accordingly, has requested assurance that similar noise would not be likely to give rise to complaints from residential receptors in the area of the proposed EfW facility.

7.16 It is considered that it is highly unlikely that the levels of vibration that would be required to give rise to audible groundborne noise at the distance of the residential areas from Rocksavage Power Station could occur within a power station. Based on our experience of low-frequency noise from CCGT power stations, it is considered that noise from HRSGs at Rocksavage Power Station could be the source of the noise, which is propagated as airborne noise.

7.17 The proposed EfW facility is not likely to give rise to low-frequency noise emissions similar to those from Rocksavage Power Station because:

- The EfW plant has a quieter combustion process than that of a CCGT power station;
- Noise from the EfW combustion process is attenuated by the boiler and FGT equipment, which provides greater attenuation than that for a typical CCGT power station, which relies largely upon the HRSGs for attenuation; and
- The proposed EfW is significantly smaller, with an electrical capacity of 100 MW, than Rocksavage power station, which has a capacity of 748 MW.

7.18 On the above basis, HBC's concerns regarding low-frequency noise from the proposed EfW are likely to be unfounded.

What works are required on site outside standard hours e.g. concrete pouring, piling works?

7.19 Paragraph 2.85 of the ES states that 'Normal construction hours would be 07.00 to 19.00 hrs five days a week. However, there may be a need to work extended hours, including night-time and weekends for periods during the critical construction phases such as concrete pouring.'

7.20 At this stage of the project, it is not possible to fully define areas where out of hours working will be necessary. These will be established during the design phase when construction strategy and techniques will be developed. However, typical areas of out of hours working could include the following:

- Continuous concrete pours;
- Major crane lifts / erection sequences;
- Delivery of large or abnormal loads;
- Radiography of welds / pressure testing of equipment;
- Commissioning.

7.21 In addition, it may be necessary from time to time to work outside normal construction hours on critical areas which have fallen behind programme.

7.22 The query mentions piling. At this stage we are unable to define the type of piling which will be required. In the event of percussive piling being required (eg sheet piles), it would not be our intention to carry out this work outside normal working hours without prior consultation with Halton Borough Council.

8. Air Quality

Is the storage of the material within the building to be sealed?

8.1 All RDF and SRF will be delivered to the site in sealed containers or covered bulk transporters. The waste reception hall will be fully enclosed and the roller shutter doors will normally be kept in a closed position, save for when a vehicle is entering or leaving the unloading hall. The air within the unloading hall will form the primary air feed supply to the furnace and will be under a slight negative pressure, ensuring combustion (and thus minimising the potential for emissions) of odorous gases and dust.

8.2 Due to the nature of the fuel, there are no areas on site that have the potential to emit significant odours.

How have the emissions been accurately assessed without knowing the technology to be used?

8.3 Poyry, the project's technology advisor, provided data on plant emission characteristics and concentrations for both circulating fluidised bed (CFB) and moving grate (MG) technologies. Emissions data for the proposed EfW facility assumed within the air quality assessment have been based on CFB technology (3 streams) firing Solid Recovered Fuel (SRF). The CFB technology and fuel option represents the most conservative (worst case) assessment for emissions to air as it results in the lowest stack momentum flux due to the lower volumetric flows relative to other plant technology and fuel options. Assuming CFB technology emissions is also consistent with the worst case assumptions made regarding the EfW main building height.

8.4 In fact, it is now known that MG technology will actually be selected as the preferred technology choice for the proposed plant. Emissions characteristics associated with MG technology result in marginally improved stack momentum flux (higher volumetric flows and associated higher velocities). Therefore the emissions characteristics assumed within the assessment are conservative (worst case) relative to the emissions characteristics associated with the preferred technology.

8.5 The proposed EfW facility will be specified to achieve stringent limits on releases to air, which include those required by Annex V of the Waste Incineration Directive (2000/76/EC).

The most recent data from Halton BC is now available, i.e. data from 2006, can this information be used for modelling?

8.6 The data for 2006 were not available at the time that the air quality assessment was completed. A review of the available data for a number of years was undertaken, however, in setting the baseline against which modelling was carried out.

8.7 HBC have supplied RPS with the ratified monitoring data measured during 2006 at Lower House Lane, Widnes. This data is presented in Table 8.1 together with a comparison against the data used to define the baseline within the assessment.

Table 8.1: Comparison of Annual Mean Measured and Background Concentrations (μg.m^{-3})

Pollutant	2006 Measured Value	Assumed Background Concentration
Nitrogen Dioxide (NO_2)	27.9	26.0
Sulphur Dioxide (SO_2)	12.1	20
Particulates (PM_{10})	24.2	25.6

8.8 The 2006 measured values for SO_2 and PM_{10} are below the background values assumed within the assessment. This demonstrates that the background values selected for use within the assessment are conservative and robust for these two pollutants.

8.9 The 2006 measured value for NO_2 is higher than the background value assumed within the assessment. However, the difference is small and when the 2006 measured value is aggregated with the maximum predicted contribution from the proposed EfW facility (1.4 $\mu g.m^{-3}$), the combined Predicted Environmental Concentration (1.4 $\mu g.m^{-3}$ plus 27.9 $\mu g.m^{-3}$ = 29.3 $\mu g.m^{-3}$) remains below 75% of the air quality objective and limit value. Therefore, the conclusions to the assessment remain unchanged and the effects on local air quality as a result of the operation of the proposed EfW facility are unaffected.

Please discuss with the Councils Environmental Health Department that recent monitoring results indicate that HBC may have to declare AQMAs in some areas.

8.10 HBC have provided details to RPS of locations within the Borough that are of concern with respect to attainment of relevant air quality objectives. The three areas identified are as follows:

8.11

- Hale Road, Widnes (NGR – 348825, 384427), of concern with respect to both NO_2 and particulate concentrations;
- Milton Road, Widnes (NGR – 351387, 385644), of concern with respect to annual mean NO_2 concentrations; and
- Peel House Lane, Widnes (NGR – 352038, 386316), of concern with respect to annual mean NO_2 concentrations.

8.12 RPS has undertaken further analysis of contributions from the proposed EfW facility to these three identified areas. Table 8.2 summarises contributions of relevant pollutants to each of the three areas. For clarification, the data has been extracted from the original dispersion modelling datasets and is therefore consistent with the modelling results presented in the Environmental Statement.

Table 8.2: Predicted Contributions to HBCs Proposed AQMAs ($\mu g.m^{-3}$)

Pollutant	Averaging Period	Hale Road	Milton Road	Peel House Lane
Nitrogen Dioxide (NO_2)	Annual	0.34	0.19	0.14
	1 hour (99.79th percentile)	3.78	2.96	2.77
Particulates (PM_{10})	Annual	0.02	0.01	0.01
	24 hour (40.41st percentile)	0.09	0.05	0.04

8.13 The results presented in Table 8.2 indicate that contributions to NO_2 and PM_{10} concentrations in all three areas are less than 1% of the relevant air quality objective values with the exception of short-term NO_2 contributions. Using the criteria presented in the Environmental Statement (adapted from the NSCA), the magnitude of these contributions are considered to be "extremely small" with the exception of short-term NO_2 contributions which are considered to be "very small". As ambient air quality in these locations currently breach relevant air quality objectives and limit values, the significance of these contributions is considered to be "Slight Adverse".

8.14 Annual mean contributions of NO_2 to all three receptors represent less than 1% of the relevant air quality objective and therefore although the significance of these contributions is considered to be "Slight Adverse", they would not materially affect prevailing conditions.

Similarly, long-term and short-term contributions of PM_{10} to the area of Hale Road represent less than 1% of the relevant air quality objectives and would not, therefore, materially affect prevailing conditions.

Can an assessment of the pollution concentrations be undertaken using NO_2 diffusion tubes, particularly given that pollution concentrations may increase given increased road traffic to and from the site.

8.15 An assessment of the pollution concentrations can be undertaken using diffusion tubes. This will be carried out for a period of 12 months prior to and 36 months post commissioning to complement monitoring already being undertaken in the area.

HBC has recently commissioned modelling using ADMS Roads. Can this or a similar model be used to input the proposed facility as stationary source together with traffic forecasts and see what effect it has on concentrations on the roads of concern?

8.16 The key pollutant of concern with respect to cumulative effects from stack and road traffic emissions is NO_x. The predicted maximum annual mean contribution from the EfW facility stack is 1.4 $\mu g.m^{-3}$. The predicted maximum annual mean contribution from the development related traffic is 0.5 $\mu g.m^{-3}$. These contributions do not coincide, however, simple addition of these contributions indicates that 1.9 $\mu g.m^{-3}$ represents the upper bound worst-case cumulative impacts from the operation of the EfW facility. This cumulative contribution represents less than 5% of the relevant air quality objective and limit value.

8.17 A review of the contour plot presented in Figure 7.4 of the Environmental Statement Appendix 10.1 (Air Quality Assessment) indicates that the coincidence of the maximum annual mean contributions to ground level concentrations of NO2 from the EfW facility stack is unlikely to coincide with the roads likely to be most affected by development related traffic (Picow Farm Road). In reality, therefore, the maximum combined effect across the modelled domain is predicted to be less than 1.9 $\mu g.m^{-3}$.

8.18 As the combined effects from traffic and stack emissions are not considered to be significant, explicit consideration through the use of ADMS Roads is not considered relevant.

Are the transport forecasts accurate? If this is not the case, will the DMRB scenarios will need to be re-run with the new data?

8.19 The transport forecasts are based on worst case assumptions for road based transport to ensure a conservative assessment of the likely environmental impacts. These figures have been used as the basis for the assessment of quality effects, giving a worst case assessment of predicted effects. We do not consider there has been any change to the likely traffic flows since the production of the ES and there is therefore no need to re-run the DMRB assessment.

The stack height calculations give different results when using different models to determine the height required for optimum dispersion. AERMOD gives 105m for complex terrain, whereas ADMS gives 115m for complex and flat terrain. What is the justification for using the lower of the two calculations? Is it possible to construct a lower building that both models would calculate a stack height requirement below the 106m aviation restrictions?

8.20 The stack height of 105m formed part of the assumptions for the wider dispersion modelling undertake to support the air quality assessment. All dispersion modelling undertaken to support the air quality assessment and Human Health Risk Assessment incorporated detailed terrain data. The results of the air quality assessment indicate that contributions to ground level concentrations of all pollutants from the EfW facility are minimal and are not considered significant. Therefore the assessment demonstrated that the selection of a 105m stack height does not result in unacceptable effects on local air quality.

8.21 The stack height of 105m was selected on the basis of height modelling. As noted within the air quality assessment of the ES, the primary determinant of the stack height is the local building height. It should be recognised, however, that the stack height determination is only the first step in the process, as the proposed stack height is then tested under the air quality assessment carried out as part of the Environmental Impact Assessment. For the purposes of planning, the stack height determination conservatively considered a 47m high main building associated with CFB technology.

8.22 It now known that WCMG technology will actually be selected as the preferred technology choice for the proposed plant. The height of the proposed main building has subsequently been reduced to 42m and, therefore, the results of the initial stack height determination should be considered conservative. In addition, emissions characteristics associated with WCMG technology results in marginally improved stack momentum flux (higher volumetric flows and associated higher velocities). Therefore the emissions characteristics assumed within the assessment are conservative relative to the emissions characteristics associated with the preferred technology.

8.23 The stack height determination has been repeated for a local building height of 42m and with revised emission characteristics to provide further evidence that a stack height of 105m is acceptable to ensure the adequate dispersion of pollutants. The assessment methodology and results are presented below.

Emission Parameters

8.24 Emissions data for the proposed EfW plant have been based on a 100% plant load throughout the year. This represents the most conservative assessment for emissions to air. Table 8.3 summarises the model input data for the proposed EfW facility assuming WCMG technology.

Table 8.3: EfW Facility Emissions Data for WCMG Technology

Parameter	Unit	Value
Effective diameter	m	4.64
Efflux velocity	m/s	15 [(a)]
Efflux temperature	°C	140
Volumetric flow	$Am^3.s^{-1}$ (actual)	254
Emission rate	g/s	1

Note: (a) $15m.s^{-1}$ is the minimum stack velocity advocated by the EA

Model Setup

8.25 Simulations have been run using both ADMS 3.3 and AERMOD initially assuming flat terrain to determine what stack height is required to overcome local building wake effects. Further modelling with complex terrain incorporated was undertaken to determine whether the presence of local terrain would necessitate an increase in stack height.

Results – Flat Terrain

8.26 AERMOD results assuming flat terrain (Figure 8.1) illustrate that for stack heights below 85m, local building wake effects are predicted to affect dispersion substantially. For stack heights above 85m, ground level contributions do not reduce materially with increasing stack height.

8.27 ADMS results assuming flat terrain (Figure 8.2) illustrate that for stack heights below 75m, local building wake effects are predicted to affect dispersion substantially. There is a near linear decrease in predicted ground level concentrations between 75m and 105m, above which ground level contributions do not reduce materially with increasing stack height.

8.28 On the basis of the above, assuming flat terrain, AERMOD results would indicate a stack height of 85 while ADMS results would indicate a stack height of 105m.

Results – Complex Terrain

8.29 AERMOD results assuming complex terrain (Figure 8.3) illustrate that for stack heights above 105m, ground level contributions do not reduce materially with increasing stack height.

8.30 ADMS results assuming complex terrain (Figure 8.) follow a similar profile to those derived for flat terrain with ground level contributions not reducing materially with increasing stack height beyond 105m.

8.31 The results to both models therefore indicate that a stack height of 105m is optimum for the dispersion of pollutants from the proposed facility.

Discussion and Summary

8.32 The dispersion modelling results using both AERMOD and ADMS indicate that a stack height of 105m is appropriate (taking local terrain influences into account) with the preferred technology and associated lower main building height.

8.33 The air quality assessment undertaken as part of the EIA demonstrated that air quality effects associated with the selection of a 105m stack height (and a higher main building height) are not significant and, taking this into account, a stack height of 105m is considered a robust recommendation for the proposed EfW facility.

Figure 8.1: Predicted Contributions for Different Stack Heights (AERMOD Flat Terrain)

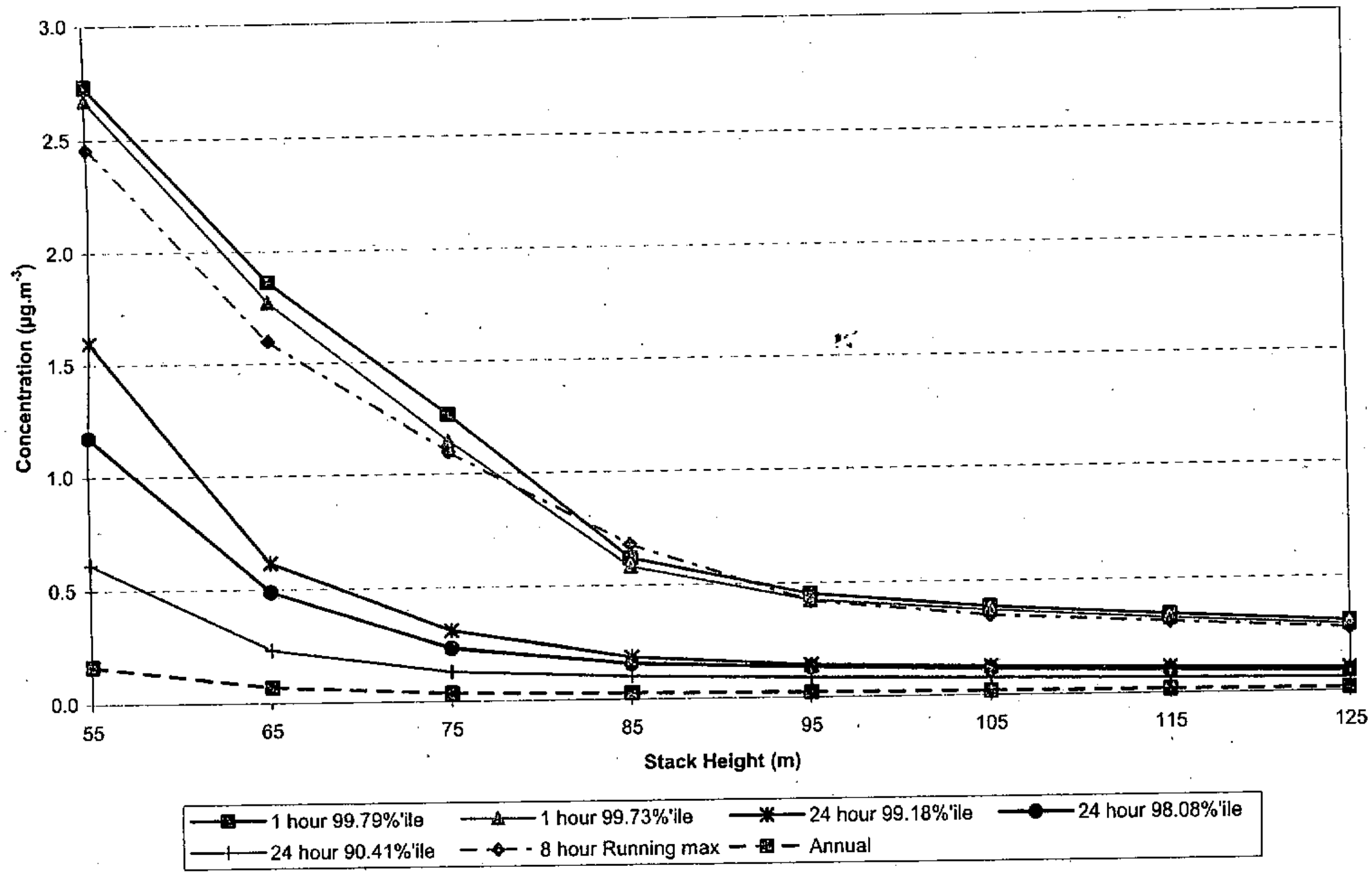


Figure 8.2: Predicted Contributions for Different Stack Heights (ADMS Flat Terrain)

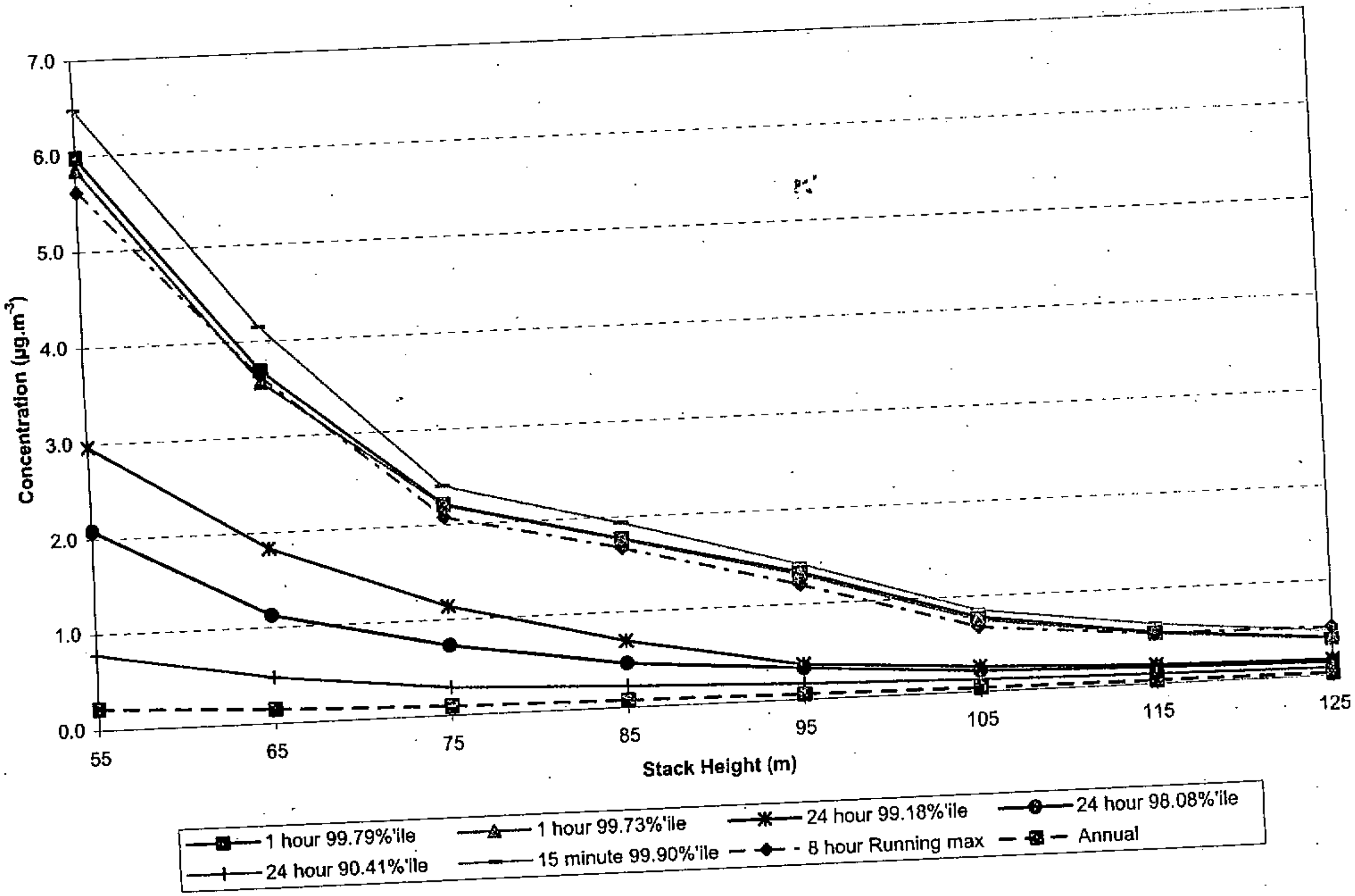


Figure 8.3: Predicted Contributions for Different Stack Heights (AERMOD Complex Terrain)

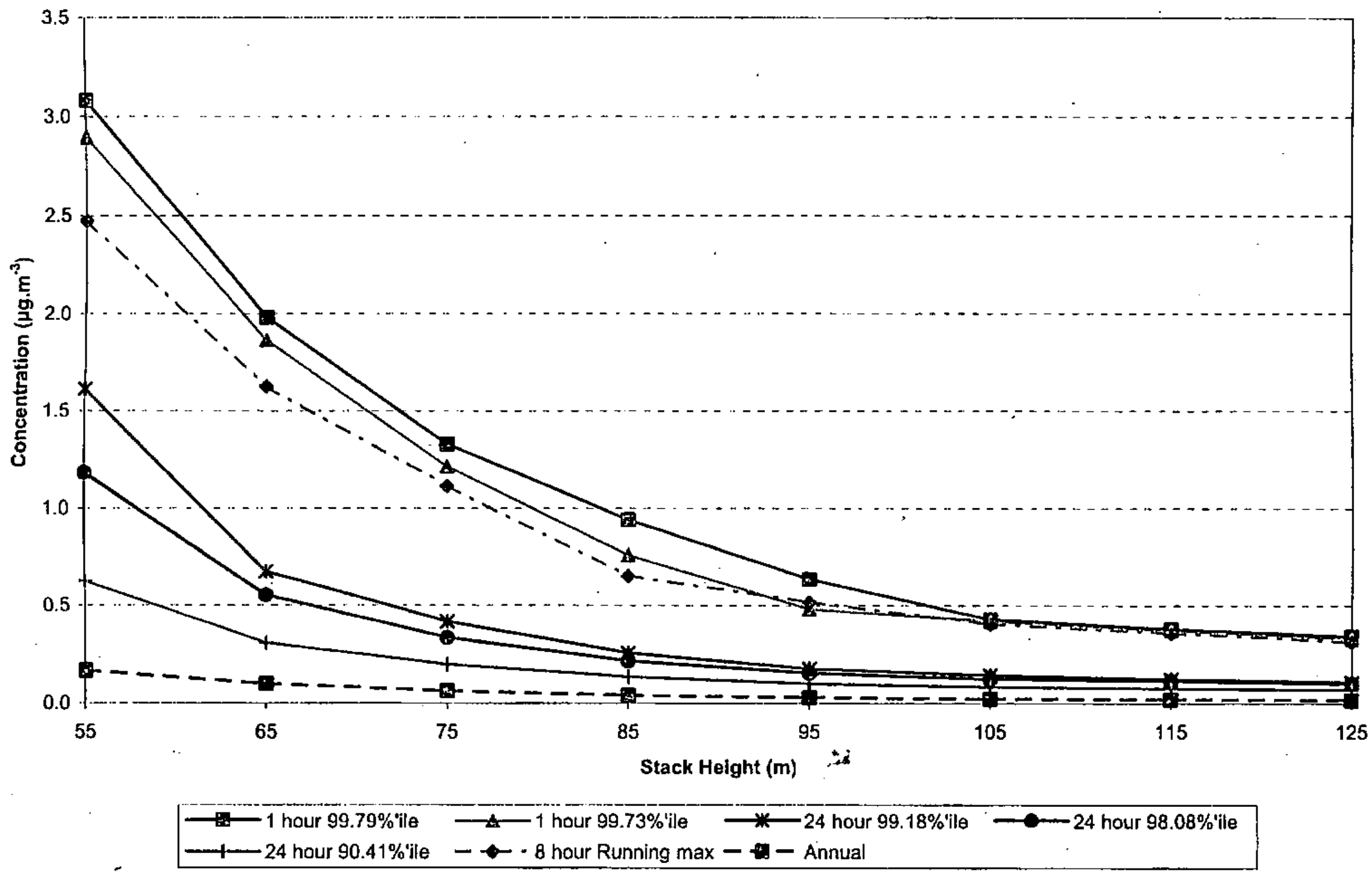
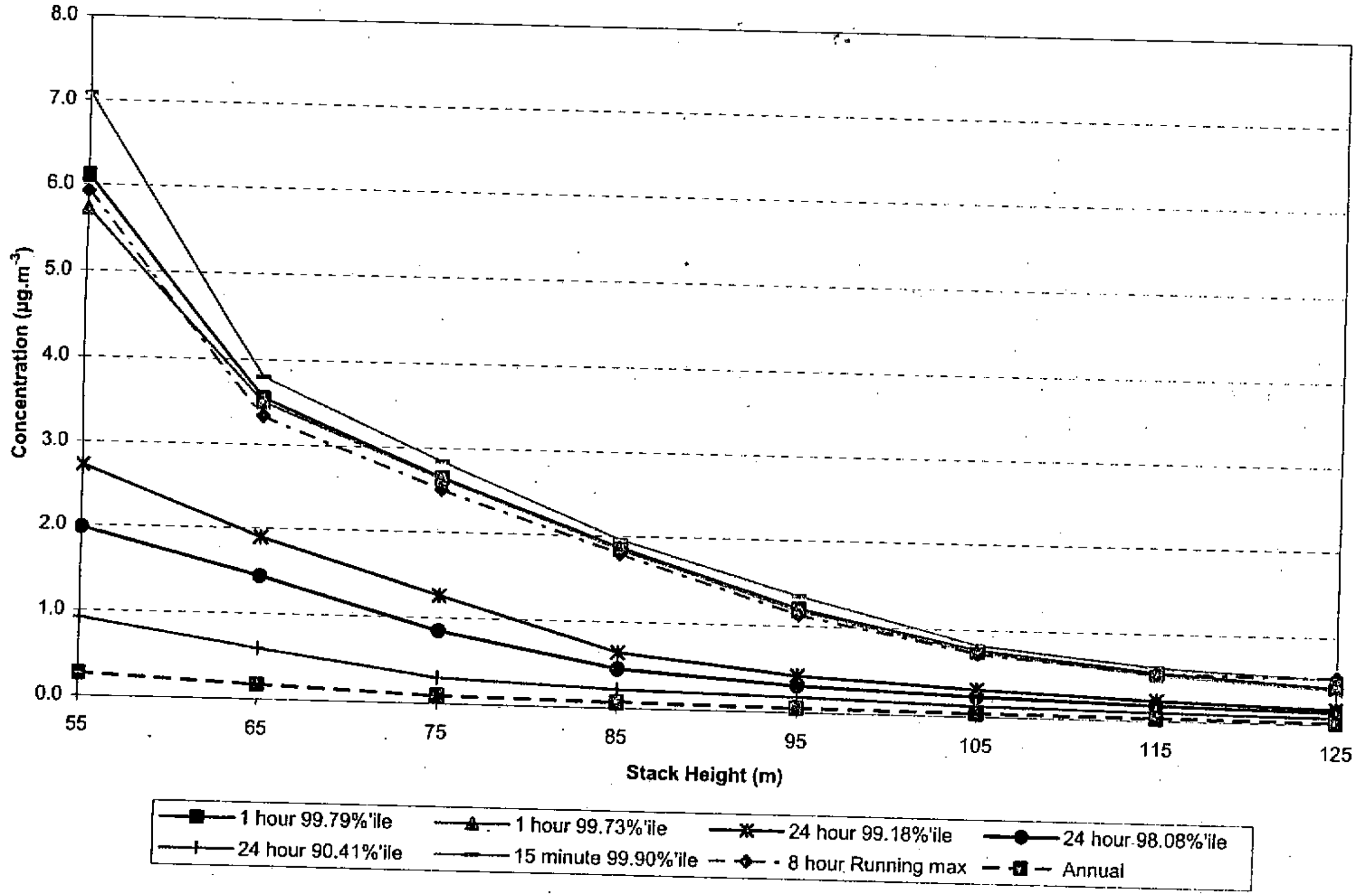


Figure 8.4: Predicted Contributions for Different Stack Heights (ADMS Complex Terrain)



The effect of the new incinerator on dispersion of existing plumes need to be given more consideration. In the submitted assessment, only the Weston Point CHP plant is considered.

8.34 UK government guidance[1] indicates that tall buildings have the potential to affect dispersion from point sources out to a distance of five times the building height. In the case of the proposed EfW facility, the main building height was assumed to be 47m. Therefore dispersion of exhaust plumes from stacks within 235m of the EfW facility main building have the potential to be affected due to the proximity of the EfW facility. There are no other significant point sources within 235m of the EfW facility main building and therefore it is only relevant to include consideration of the Weston Point CHP plant.

8.35 Process stacks associated with the rest of the INEOS Runcorn site and other neighbouring industry are located well beyond 250m from the proposed EfW facility site and therefore exhaust emissions from other stacks are not likely to be affected by the project proposals.

Further information is required on the techniques that will be used to treat the emissions from the stack.

What equipment will be used?

8.36 There are a number of abatement techniques available for EfW plants, and examples of these are described in the Environment Agencies guidance document S5.01 (http://www.environment-agency.gov.uk/yourenv/consultations/530870/). Each of these techniques is capable of achieving the required emission levels defined in the WID.

8.37 Precise details of the abatement technology and equipment are specific to individual suppliers. As the supplier has not been selected at this stage it is not possible to give further detailed information of the equipment. However, typically this will include a three stage process as follows:

- NO_x reduction: A selective non-catalytic reduction (SNCR) system would be utilised to assist in the reduction of nitrogen oxide (NOx) in the flue gasses by the injection of ammonia water into the boiler.
- Removal of Contaminants and Acidic Gasses: The flue gasses would pass through a scrubbing system which includes injection of hydrated lime and activated carbon to neutralise any acidity in the flue gases and absorb contaminants. The main types of scrubbing systems are dry and semi dry.
- Filtration: Further particulate removal would take place by passing the flue gasses through bag filters.

Details of the air pollution control system are required.

8.38 In order to meet the requirements of the WID, a continuous emissions monitoring system (CEMS) will be provided for each flue. Each system comprises equipment to carry out ttwo sets of measurements of the flue gasses as follows:

- Dust content
- Chemical composition

8.39 In addition, auxiliary measurements of flow, temperature and pressure are made.

8.40 The chemical composition measurements will define levels of HCl, SO_2, NO_x, CO, O_2 and TOC. These are recorded continuously giving reports of half hour and daily averages.

8.41 Periodically, extractive sampling is carried out and measurements are taken of:

- Dioxins
- Furanes
- Other dioxin-type PCBs

[1] HMIP 1993 "Guidelines on Discharge Stack Heights for Polluting Emissions", Technical Guidance Note (Dispersion) D1

- HF
- Cadmium and Thalium
- Mercury
- Other heavy metals

8.42 The frequency of such sampling is specified by the Environment Agency.

9. Human Health Risk Assessment

Can you provide the input parameters for the assessment and the justification for the use of default and adjusted values

9.1 The model requires a large number of parameters including those relating to toxicity, chemical specific data, air parameters, site parameters, and scenario parameters. All of these are provided with this response as Appendix 4 (air parameters) and Appendix 5 (site and scenario parameters).

9.2 With respect to toxicological data, the USEPA default data were used unchanged except for the addition of non-cancer toxicological data for dioxins and furans due to their absence in the model. These are UK toxicological data as published in R&D report TOX 12. The default toxicological data were compared with the UK published data and were found to be either the same or more conservative (worst case).

9.3 All air parameters are site specific and based on the output of the air dispersion modelling. Site parameters include those that are site specific such as annual average precipitation, annual average evapotraspiration and annual average runoffs. These were acquired from the UK Meteorological Office for the area.

9.4 In the absence of data for some of the site parameters such as quantity of silage/forage/grain eaten and the fraction that is grown on contaminated soil, the default values (conservative) were used. Similarly USEPA default site data such as lengths of plants exposed to deposition, interception fraction/edible portion of different plants that were derived from research work were used without change. This was considered to be either appropriate or conservative.

9.5 The USEPA default Scenario parameters such as ingestion rates of soil, produce, egg, poultry, pork and beef and other exposure parameters such as durations and frequencies of exposure for the different pathways were compared with UK data where available. It was found that the overall default parameters were more conservative and therefore were left unchanged. This is considered to be appropriate.

9.6 Conservative default COPC-site values such as metabolism factors and soil bioavailabilty factors were used in the absence of evidence to support less conservative assumptions.

Is the landform, particularly Runcorn Hill, taken into account in the exposure scenarios?

9.7 Terrain data is fully incorporated in the dispersion modelling assessment. The air quality assessment provides the detailed description of the dispersion studies. This includes a description of local terrain and how this was taken into account.

9.8 Detailed terrain data was incorporated in the dispersion modelling undertaken to support the air quality assessment. Figure 6.3 of the Environmental Statement Appendix 10.1 (Air Quality Assessment) presents a shaded relief map of terrain in the study area constructed from terrain data included within the dispersion modelling.

The report discusses threshold substances and the concept of reference doses in some detail, can you provide details of how the UK concept of an Index Dose for non-threshold substances have been taken into account.

9.9 The UK approach to assessment of non-threshold (carcinogens) utilises the Index Dose (ID in milligrammes per kg body weight per day or mg/kgbw.day). For threshold substances (non-carcinogens), the Tolerable Daily Intake (TDI) is used. The TDI and Reference Dose (RfD) are the UK and USA notations for the same parameter. The UK approach treats the ID in the same manner as the TDI with the exception of including the background exposure for the threshold compounds. It assesses the risk by calculating the ratio of Average Daily Exposure (ADE) to the Health Criterion (ID or TDI) and where the ratio is less than one, the

risk is considered to be acceptable. These Index Doses are related to levels of risk that are considered to be acceptable (usually 1×10^{-5} but sometimes as low as 1×10^{-3}).

9.10 The USEPA model treats carcinogens using a different approach by utilising slope factors for ingestion pathways and unit risks for inhalation. As such the results have to be compared with the risk criteria (for instance 1×10^{-5}) rather than comparing it with (ADE/HC) ratio of 1 used in the UK approach. In reality the outcome of the two approaches are similar. For a Health Assessment, it is commonly desired to present the risk in the manner the USEPA approach does compared with the excess lifetime cancer risk of 1 in 100,000.

9.11 Of the assessed contaminants, only arsenic and hexavalent chromium have a UK published Index Dose for the ingestion pathways, which is the most significant pathway for the type of exposures considered in this assessment. The USEPA default RfDs for arsenic and chromium are in fact similar to the UK IDs for these compounds at 0.3 and 3 mg/kgbw.day respectively. As such the results of the non-carcinogen assessment for arsenic and chromium covers both the USEPA threshold and the UK non-threshold effects of these compounds. The presentation of risk in the form of excess cancer risk done in the model is additional useful information for these compounds.

9.12 In summary, it is considered that the UK concept of an Index Dose for non threshold substances has been taken into account, as appropriate, within the limitations of the assessment methodology.

Does Ineos not think there are any issues relating to possible cumulative effects:
- From synergistic effects of the contaminants of concern, and;
- From other point emission sources in the area?

Synergistic effects:

9.13 International research into the synergistic effects of chemicals is limited due to the number of combinations that would need to be addressed, having regard to both synergistic and antagonistic outcomes. As such, all current international derived acceptable levels of exposure and standards (air quality, water and soil) are based on individual compounds.

9.14 However, it is recommended that cumulative effects for certain groups of chemicals such as Total Petroleum Hydrocarbons (TPH), Polycyclic Aromatic Hydrocarbons (PAH) and dioxins and furans are considered collectively due to similarities in their health effect.

9.15 Where cumulative effects are considered, the target risk level is increased with respect to the WHO approach set out in the previous section. It is also recommended that where this cumulative effect is considered, competitive availability is to be taken into consideration (the solubility and vapour pressure of a compound present with other similar compounds will generally be affected reducing its availability).

9.16 However the inclusion of these effects is usually very complex and not applied in standard assessments unless the predicted risk is anticipated to exceed its target level.

9.17 The USEPA model applied during the HHRA does not allow for the effect of competitive availability and as such is conservative (worst case) in respect of predicting cumulative effects.

9.18 The cumulative risk from dioxins and furans produced by the model does not exceed either of the assessment criteria, namely the index dose or cancer risk, even on this conservative basis.

Cumulative effect from other sources in the area:

9.19 The Air Quality Section of the Environmental Statement assessed if air quality objectives set to protect health would be met following the cumulative effect from existing emission

sources, the proposed facility and from future developments in the area. As such, acute cumulative respiratory exposure has been addressed for existing and future emission sources and is not anticipated to exceed air quality objectives set to protect health.

9.20 As can be seen in Table 3.8 of the Environmental Statement Appendix 10.1 (Air Quality Assessment), the main contributor to chronic health risk is via ingestion.

9.21 Long-term exposure through the ingestion pathway is strongly related to deposition of persistent substances and their accumulation in the soil and subsequent transfer into food items. This is a complex process where a number of simplifying assumptions are usually necessary. For the first tier of analysis, assumptions are usually made on a conservative basis. The combination of conservative assumptions in a cumulative impact assessment can lead to an unrealistically skewed analysis. Care is therefore required in any such analysis.

9.22 Deposition is usually limited to the area in the vicinity of the source based upon the prevailing meteorological conditions including wind direction. Loss of contamination from the soil especially at the surface can occur over time through several mechanisms such as leaching, runoff, erosion, biotic and abiotic degradation and volatilisation.

9.23 As an example of possible cumulative effects, the site assessment results show that the highest hazard quotient estimated for the site was 1.908×10^{-1} for thallium in the location of receptor 5 for a farmer-child receptor (the next highest reported was 1.824×10^{-2} for arsenic). The hazard quotient for thallium is less than 20% of the acceptable level of 1. The highest cancer risk was associated with an adult farmer receptor in the same location at a value of 2.53×10^{-6} for penta CDF 23478, approximately 25% of the acceptable level of risk of 1×10^{-5}.

9.24 On this basis, even where an equal or greater contribution, up to approximately 3 times from another facility was taken into consideration, the level of risk would still be within the acceptable criteria.

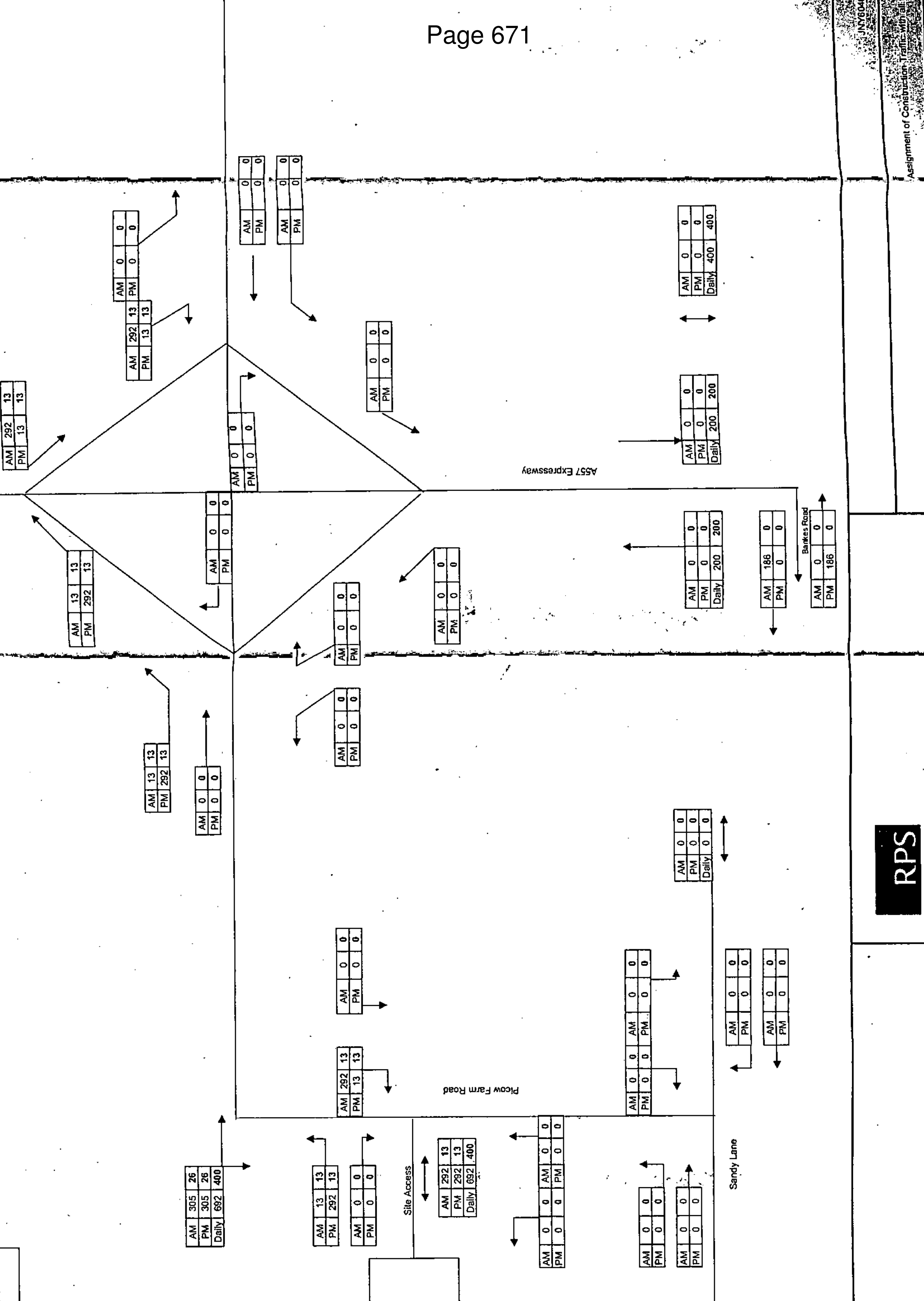
9.25 It should be acknowledged that this result was achieved with the assessment being based on extremely conservative assumptions in respect of the land uses in the area and the potential for all pathways of exposure (produce, dairy cattle, milk cattle, swine, chicken and animal feed produced on the same farm and all of their products are consumed by the farmers and their children for all of their lives) which is highly conservative. It can therefore be concluded that due to the low level of identified risk on this analysis, more detailed consideration of additional sources would not be expected to change the conclusions of the assessment.

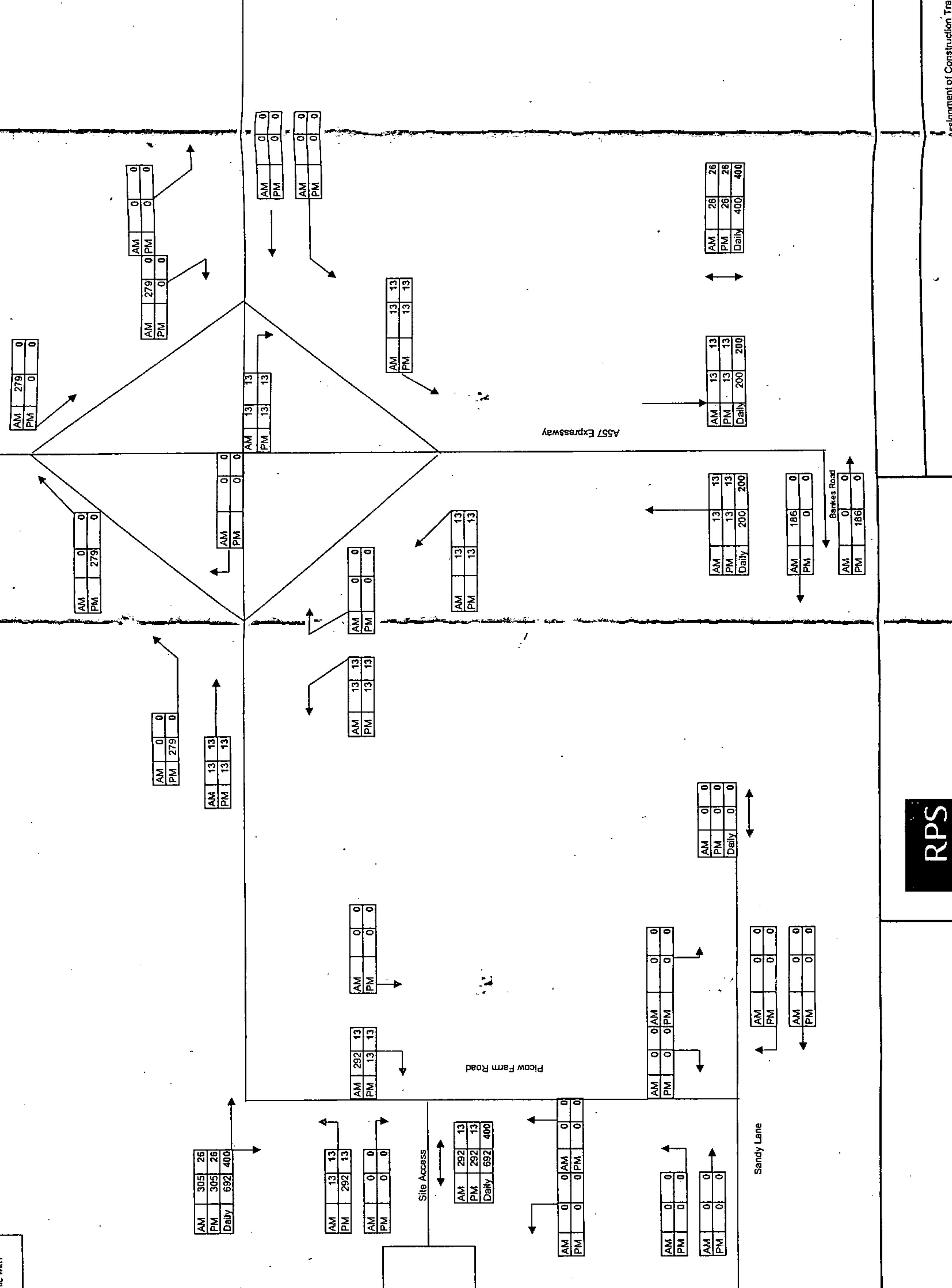
pen space at Westfield Crescent, to glimpses of industry beside Mersey Estuary beyond.

Photo 2: View south west from Westfield Road to glimpses of industry and Mersey Estuary

Appendices


Key:
1 km
2 km
5 km
RUNCORN
Cavendish Farm
Weston
Higher Runcorn
Runcorn Hill
Westfield
Halton Brook
Halton Lodge
Grange
Stenhills
Halliwood Park
Beechwood
Rocksavage
Clifton
Dukesfield
RIVER MERSEY
Runcorn Sands
West Bank
Runcorn Gap


A557 Expressway
Bankes Road
Picow Farm Road
Site Access
Sandy Lane
RPS



A557 Expressway
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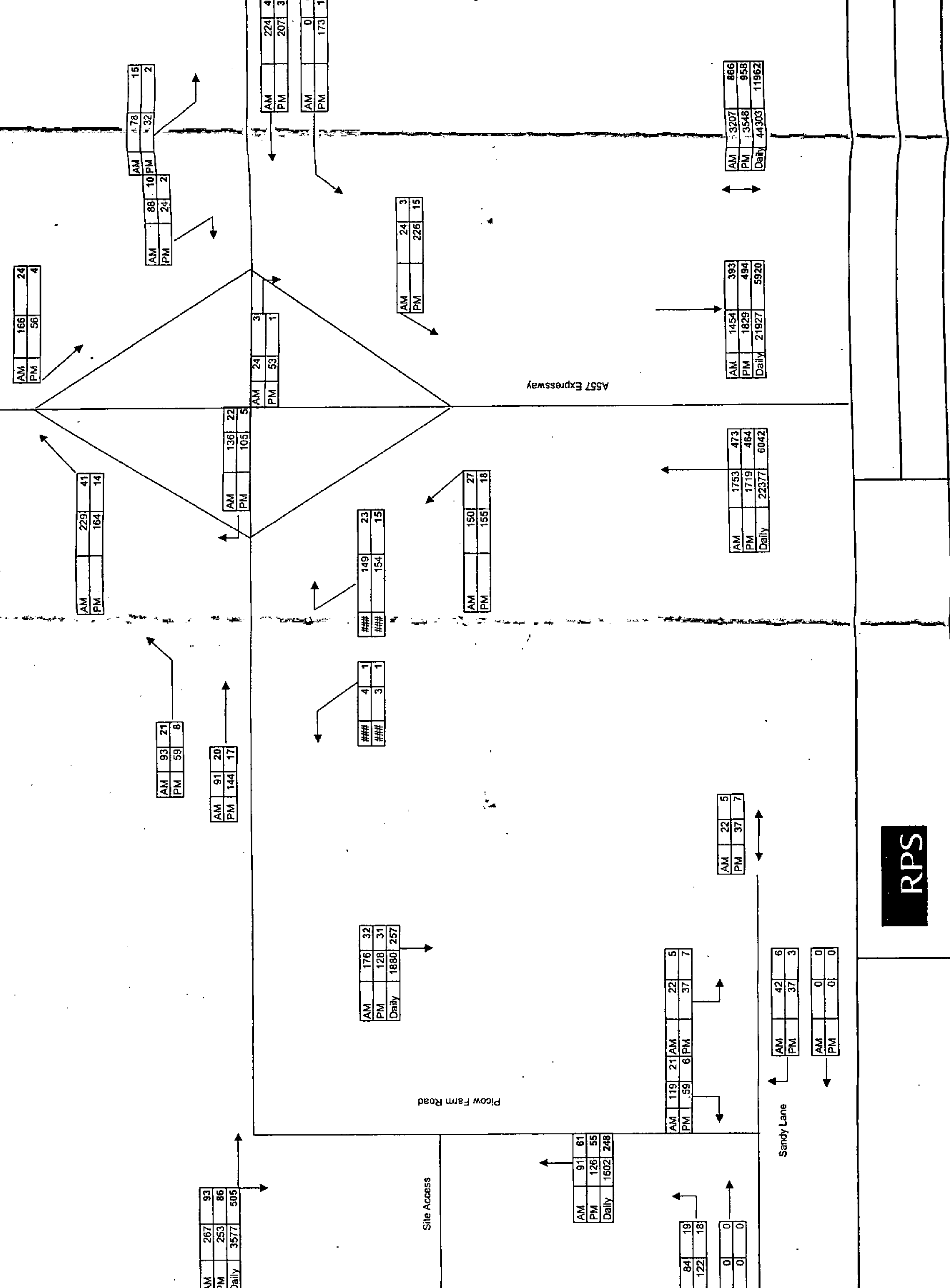
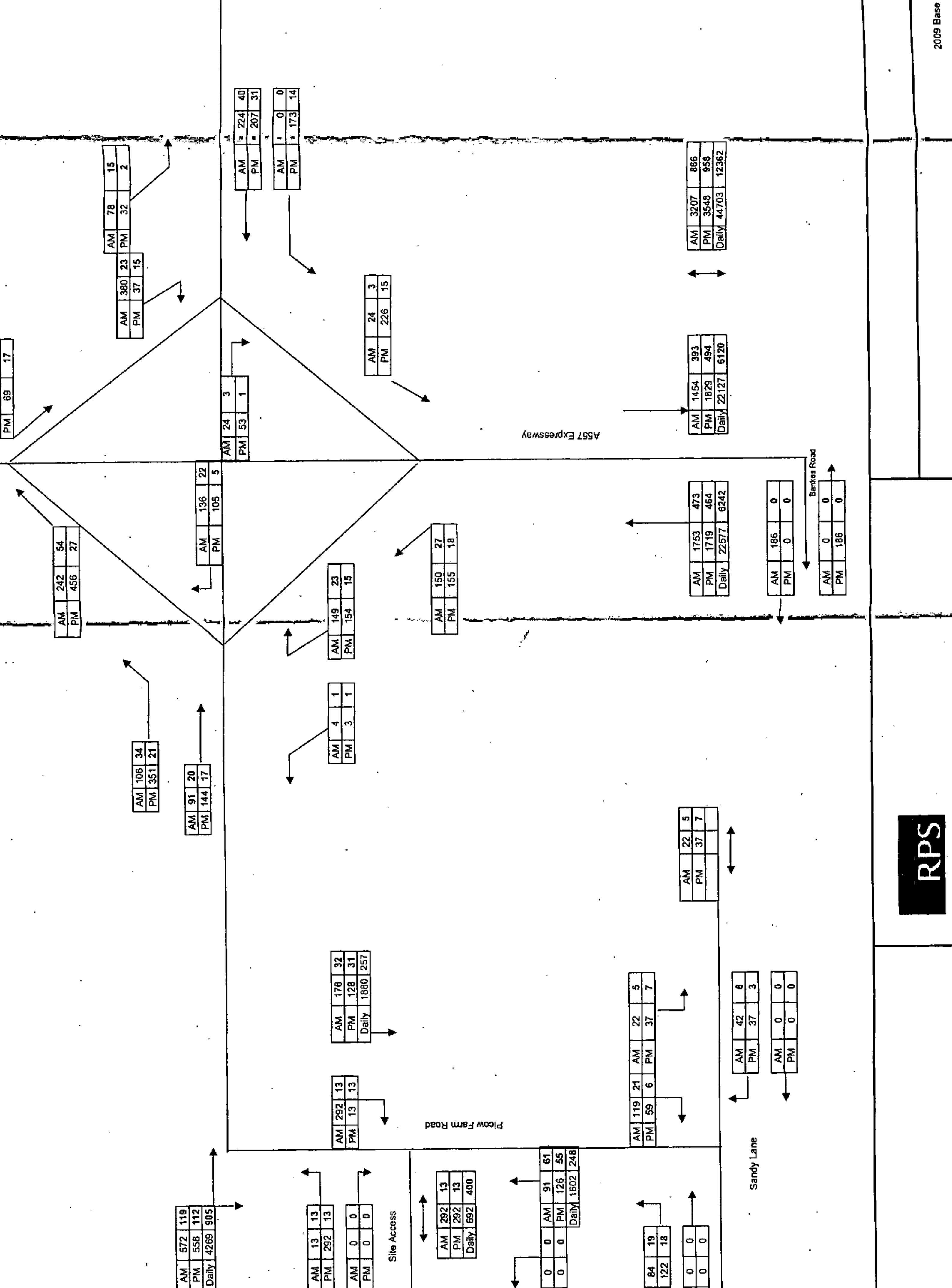
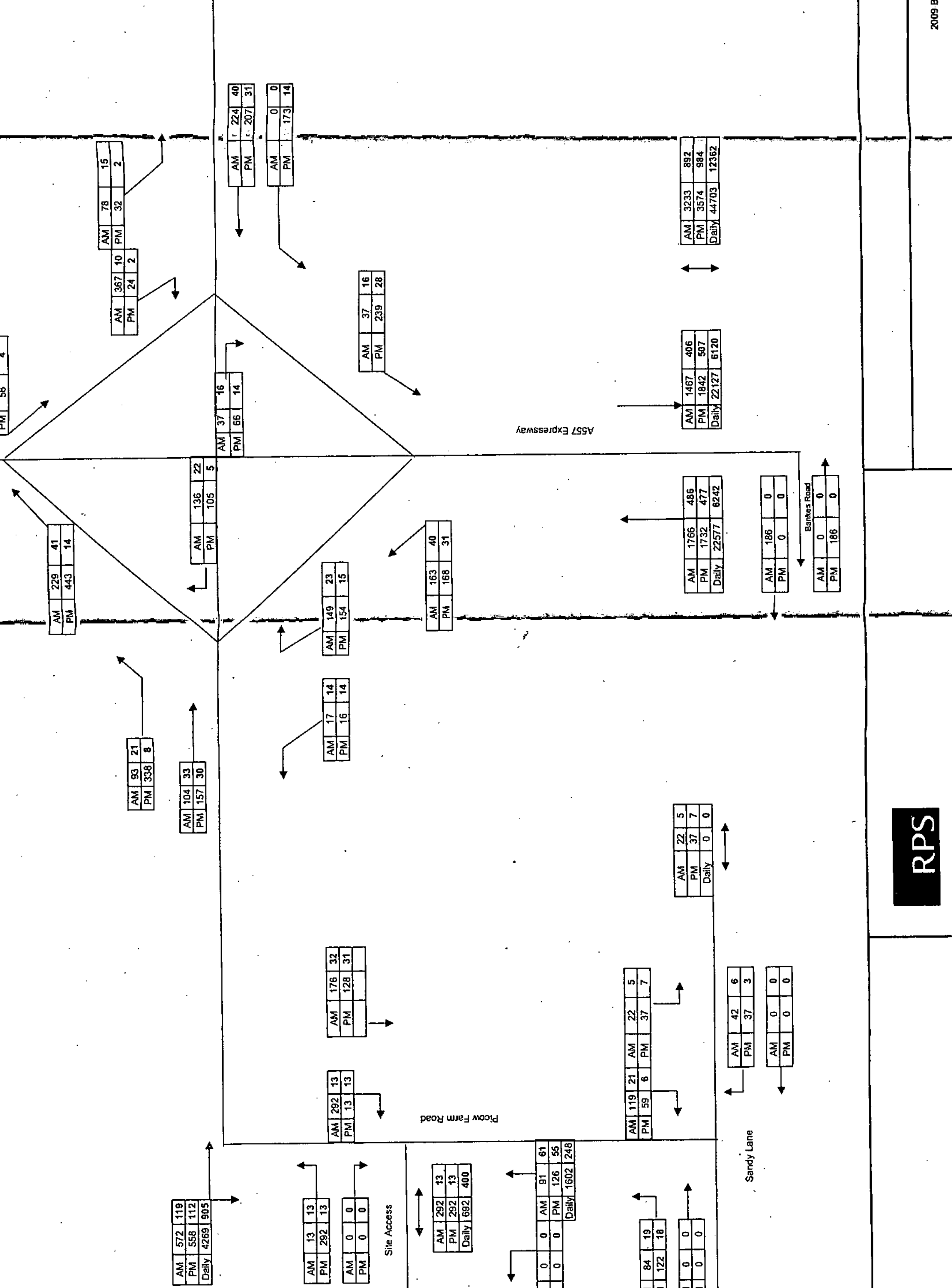
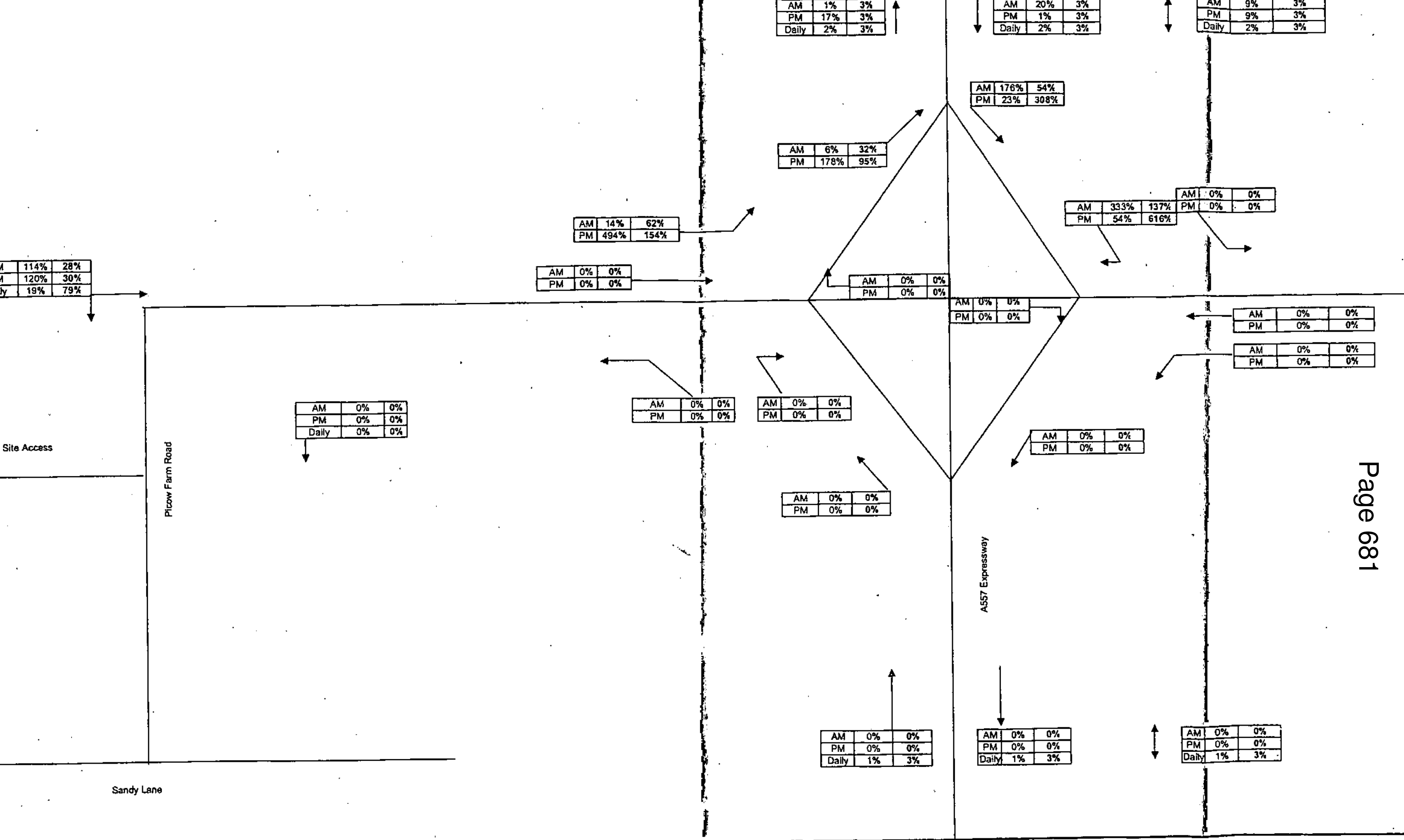
Picow Farm Road
Site Access
Sandy Lane
RPS


A557 Expressway
Picow Farm Road
Sandy Lane
Site Access
RPS


A557 Expressway
Bankes Road
Picow Farm Road
Sandy Lane
Site Access
RPS
2009 Base Flows + Co


A557 Expressway
Bankes Road
Picow Farm Road
Sandy Lane
Site Access
RPS
2009 Base Flows +

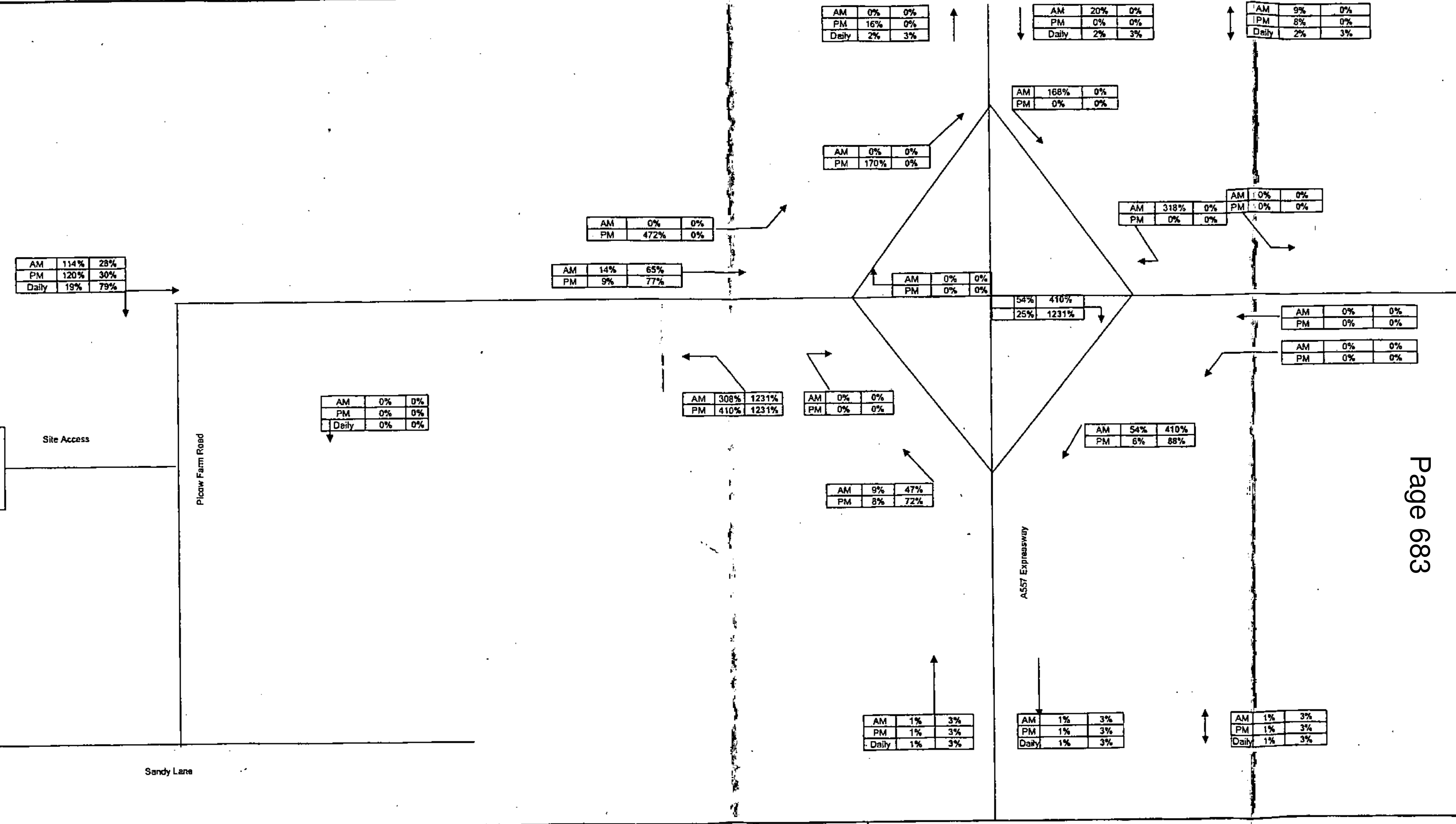


RPS

Date: MAR 07 | Scale: NTS | Rev:

Drwg. No: JNY6040-29 | Drawn: DRC | Checked:

% Impact of Constructi



RPS

Date:	MAR 07	Scale: NTS	Rev:
Drwg. No: JNY6040-30		Drawn: DRC	Checked:

% Impact of Construction when a

Appendix 2

Proposed Site Access


Scale: 1:500
Warehouse
Warehouse
Existing gated access
Existing gated access
4.5 x 90m Visibility splay
4.5 x 90m Visibility splay
Fence to be set back to accommodate visibility splay
1.8m Footway
43m Forward Visibility
2.0m Footway
Clarks Terrace
Beacon Hill View
Access to Salt Works
EXISTING BUILDING
ROUGH GROUND

Appendix 3

Impact of Construction Traffic on A533 Queensway Bridge

Tables Showing Impact of Construction Traffic on A533 Queensway Bridge

Northbound Flows

A533 Queensway Bridge

2006 Bridge Flows		
AM	2860	218
PM	3111	119
DAILY	31157	2628

2009 Growthed Bridge Flows		
AM	2961	226
PM	3221	123
DAILY	32254	2721

2009 Committed Flows		
AM	0	0
PM	10	3
DAILY	10	3

2009 Bridge + Committed Flows		
AM	2961	226
PM	3231	126
DAILY	32264	2724

2009 Proposed Flows (50% from North)		
AM	7	7
PM	286	7
DAILY	486	100

2009 Proposed Flows (All from North)		
AM	13	13
PM	292	13
DAILY	492	200

2009 Bridge + Committed + Proposed (50%)		
AM	2968	233
PM	3517	133
DAILY	32750	2824

2009 Bridge + Committed + Proposed (All)		
AM	2974	239
PM	3523	139
DAILY	32756	2924

2009 % Impact (50%)		
AM	0%	3%
PM	9%	6%
DAILY	2%	4%

2009 % Impact (All)		
AM	0%	6%
PM	9%	10%
DAILY	2%	7%

Southbound Flows

2006 Bridge Flows		
AM	2686	235
PM	2970	142
DAILY	30503	2611

2009 Growthed Bridge Flows		
AM	2781	243
PM	3075	147
DAILY	31577	2703

2009 Committed Flows		
AM	44	3
PM	0	0
DAILY	44	3

2009 Bridge + Committed Flows		
AM	2825	246
PM	3075	147
DAILY	31621	2706

2009 Proposed Flows (50% from North)		
AM	286	7
PM	7	7
DAILY	486	100

2009 Proposed Flows (All from North)		
AM	292	13
PM	13	13
DAILY	492	200

2009 Bridge + Committed + Proposed (50%)		
AM	3111	253
PM	3082	154
DAILY	32107	2806

2009 Bridge + Committed + Proposed (All)		
AM	3117	259
PM	3088	160
DAILY	32113	2906

2009 % Impact (50%)		
AM	10%	3%
PM	0%	5%
DAILY	2%	4%

2009 % Impact (All)		
AM	10%	5%
PM	0%	9%
DAILY	2%	7%

Two Way Flows

2006 Bridge Flows		
AM	5546	453
PM	6081	261
DAILY	61660	5239

2009 Growthed Bridge Flows		
AM	5741	469
PM	6295	270
DAILY	63830	5423

2009 Committed Flows		
AM	44	3
PM	10	3
DAILY	54	6

2009 Bridge + Committed Flows		
AM	5785	472
PM	6305	273
DAILY	63884	5429

2009 Proposed Flows (50% from North)		
AM	293	14
PM	293	14
DAILY	972	200

2009 Proposed Flows (All from North)		
AM	305	26
PM	305	26
DAILY	984	400

2009 Bridge + Committed + Proposed (50%)		
AM	6078	486
PM	6598	287
DAILY	64856	5629

2009 Bridge + Committed + Proposed (All)		
AM	6090	498
PM	6610	299
DAILY	64868	5829

2009 % Impact (50%)		
AM	5%	3%
PM	5%	5%
DAILY	2%	4%

2009 % Impact (All)		
AM	5%	6%
PM	5%	10%
DAILY	2%	7%

Key:		
Growthed Using NRTF Low Rate		1.0352
Daily is 12 hour flows 0700-1900		
	Total Vehicles	HGVs

Appendix 4

Input parameters: Air parameters

AIR PARAMETERS

Date : 18/12/2006

RECEPTOR : RCPTR_1 UTM X: 346,800.37 UTM 383,896.88

Crops1

SOURCE: sSTK_1

AIR PARAMETER DESCRIPTION	VALUE	SYMBOL	UNITS
Hourly air concentration - particle phase	4.6E-01	chp	ug-s/g-m^3
Hourly air concentration - particle bound	4.6E-01	chp_pb	ug-s/g-m^3
Hourly air concentration - vapor phase	4.73E-01	chv	ug-s/g-m^3
Hourly air concentration - vapor phase hg	4.73E-01	chv_hg	ug-s/g-m^3
Air concentration - particle phase	5.05E-03	cyp	ug-s/g-m^3
Air concentration - particle bound	5.05E-03	cyp_pb	ug-s/g-m^3
Air concentration - vapor phase	8.01E-03	cyv	ug-s/g-m^3
Air concentration - vapor phase hg	6.73E-03	cyv_hg	ug-s/g-m^3
Dry deposition - particle phase	1.46E-02	dydp	s/m^2 year
Dry deposition - particle bound	1.46E-02	dydp_pb	s/m^2 year
Dry deposition - vapor phase	1.25E-03	dydv	s/m^2 year
Dry deposition - vapor phase hg	6.06E-03	dydv_hg	s/m^2 year
Wet deposition - particle phase	1.33E-03	dywp	s/m^2 year
Wet deposition - particle bound	1.33E-03	dywp_pb	s/m^2 year
Wet deposition - vapor phase	0.0	dywv	s/m^2 year
Wet deposition - vapor phase hg	0.0	dywv_hg	s/m^2 year

RECEPTOR : RCPTR_10 UTM X: 351,645.81 UTM 381,399.58

Pewithal Primary School

SOURCE: sSTK_1

AIR PARAMETER DESCRIPTION	VALUE	SYMBOL	UNITS
Hourly air concentration - particle phase	5.65E-01	chp	ug-s/g-m^3
Hourly air concentration - particle bound	5.65E-01	chp_pb	ug-s/g-m^3
Hourly air concentration - vapor phase	6.43E-01	chv	ug-s/g-m^3
Hourly air concentration - vapor phase hg	6.44E-01	chv_hg	ug-s/g-m^3
Air concentration - particle phase	2.65E-02	cyp	ug-s/g-m^3
Air concentration - particle bound	2.65E-02	cyp_pb	ug-s/g-m^3
Air concentration - vapor phase	2.97E-02	cyv	ug-s/g-m^3
Air concentration - vapor phase hg	2.89E-02	cyv_hg	ug-s/g-m^3
Dry deposition - particle phase	1.53E-01	dydp	s/m^2 year
Dry deposition - particle bound	1.53E-01	dydp_pb	s/m^2 year
Dry deposition - vapor phase	4.33E-03	dydv	s/m^2 year
Dry deposition - vapor phase hg	2.42E-02	dydv_hg	s/m^2 year
Wet deposition - particle phase	3.9E-03	dywp	s/m^2 year
Wet deposition - particle bound	3.9E-03	dywp_pb	s/m^2 year
Wet deposition - vapor phase	0.0	dywv	s/m^2 year
Wet deposition - vapor phase hg	0.0	dywv_hg	s/m^2 year

AIR PARAMETERS Date : 18/12/2006

RECEPTOR : RCPTR 11	UTM X: 351.794.95	UTM	381.134.05

The Heath School

SOURCE: sSTK_1

AIR PARAMETER DESCRIPTION	VALUE	SYMBOL	UNITS
Hourly air concentration - particle phase	4.97E-01	chp	ug-s/g-m^3
Hourly air concentration - particle bound	4.97E-01	chp_pb	ug-s/g-m^3
Hourly air concentration - vapor phase	5.45E-01	chv	ug-s/g-m^3
Hourly air concentration - vapor phase hg	5.46E-01	chv_hg	ug-s/g-m^3
Air concentration - particle phase	2.69E-02	cyp	ug-s/g-m^3
Air concentration - particle bound	2.69E-02	cyp_pb	ug-s/g-m^3
Air concentration - vapor phase	2.97E-02	cyv	ug-s/g-m^3
Air concentration - vapor phase hg	2.89E-02	cyv_hg	ug-s/g-m^3
Dry deposition - particle phase	1.45E-01	dydp	s/m^2 year
Dry deposition - particle bound	1.45E-01	dydp_pb	s/m^2 year
Dry deposition - vapor phase	4.40E-03	dydv	s/m^2 year
Dry deposition - vapor phase hg	2.47E-02	dydv_hg	s/m^2 year
Wet deposition - particle phase	3.38E-03	dywp	s/m^2 year
Wet deposition - particle bound	3.38E-03	dywp_pb	s/m^2 year
Wet deposition - vapor phase	0.0	dywv	s/m^2 year
Wet deposition - vapor phase hg	0.0	dywv_hg	s/m^2 year

RECEPTOR : RCPTR_12	UTM X: 350,321.80	UTM	381,315.92

Weston Point Community Primary School

SOURCE: sSTK_1

AIR PARAMETER DESCRIPTION	VALUE	SYMBOL	UNITS
Hourly air concentration - particle phase	4.07E-01	chp	ug-s/g-m^3
Hourly air concentration - particle bound	4.07E-01	chp_pb	ug-s/g-m^3
Hourly air concentration - vapor phase	4.08E-01	chv	ug-s/g-m^3
Hourly air concentration - vapor phase hg	4.08E-01	chv_hg	ug-s/g-m^3
Air concentration - particle phase	2.9E-02	cyp	ug-s/g-m^3
Air concentration - particle bound	2.9E-02	cyp_pb	ug-s/g-m^3
Air concentration - vapor phase	2.92E-02	cyv	ug-s/g-m^3
Air concentration - vapor phase hg	2.91E-02	cyv_hg	ug-s/g-m^3
Dry deposition - particle phase	9.47E-02	dydp	s/m^2 year
Dry deposition - particle bound	9.47E-02	dydp_pb	s/m^2 year
Dry deposition - vapor phase	2.57E-03	dydv	s/m^2 year
Dry deposition - vapor phase hg	1.48E-02	dydv_hg	s/m^2 year
Wet deposition - particle phase	8.87E-03	dywp	s/m^2 year
Wet deposition - particle bound	8.87E-03	dywp_pb	s/m^2 year
Wet deposition - vapor phase	0.0	dywv	s/m^2 year
Wet deposition - vapor phase hg	0.0	dywv_hg	s/m^2 year

AIR PARAMETERS

Date : 18/12/2006

RECEPTOR :	RCPTR_13	UTM X:	351,125.66	UTM	380,646.64

Weston Primary School

SOURCE: sSTK_1

AIR PARAMETER DESCRIPTION	VALUE	SYMBOL	UNITS
Hourly air concentration - particle phase	5.24E-01	chp	ug-s/g-m^3
Hourly air concentration - particle bound	5.24E-01	chp_pb	ug-s/g-m^3
Hourly air concentration - vapor phase	5.37E-01	chv	ug-s/g-m^3
Hourly air concentration - vapor phase hg	5.38E-01	chv_hg	ug-s/g-m^3
Air concentration - particle phase	2.65E-02	cyp	ug-s/g-m^3
Air concentration - particle bound	2.65E-02	cyp_pb	ug-s/g-m^3
Air concentration - vapor phase	2.91E-02	cyv	ug-s/g-m^3
Air concentration - vapor phase hg	2.83E-02	cyv_hg	ug-s/g-m^3
Dry deposition - particle phase	1.11E-01	dydp	s/m^2 year
Dry deposition - particle bound	1.11E-01	dydp_pb	s/m^2 year
Dry deposition - vapor phase	3.99E-03	dydv	s/m^2 year
Dry deposition - vapor phase hg	2.23E-02	dydv_hg	s/m^2 year
Wet deposition - particle phase	3.35E-03	dywp	s/m^2 year
Wet deposition - particle bound	3.35E-03	dywp_pb	s/m^2 year
Wet deposition - vapor phase	0.0	dywv	s/m^2 year
Wet deposition - vapor phase hg	0.0	dywv_hg	s/m^2 year

RECEPTOR :	RCPTR_14	UTM X:	349,541.85	UTM	377,391.99

Grazing1

SOURCE: sSTK_1

AIR PARAMETER DESCRIPTION	VALUE	SYMBOL	UNITS
Hourly air concentration - particle phase	3.84E-01	chp	ug-s/g-m^3
Hourly air concentration - particle bound	3.84E-01	chp_pb	ug-s/g-m^3
Hourly air concentration - vapor phase	3.94E-01	chv	ug-s/g-m^3
Hourly air concentration - vapor phase hg	3.95E-01	chv_hg	ug-s/g-m^3
Air concentration - particle phase	1.24E-03	cyp	ug-s/g-m^3
Air concentration - particle bound	1.24E-03	cyp_pb	ug-s/g-m^3
Air concentration - vapor phase	2.33E-03	cyv	ug-s/g-m^3
Air concentration - vapor phase hg	1.84E-03	cyv_hg	ug-s/g-m^3
Dry deposition - particle phase	4.06E-03	dydp	s/m^2 year
Dry deposition - particle bound	4.06E-03	dydp_pb	s/m^2 year
Dry deposition - vapor phase	3.67E-04	dydv	s/m^2 year
Dry deposition - vapor phase hg	1.67E-03	dydv_hg	s/m^2 year
Wet deposition - particle phase	1.24E-03	dywp	s/m^2 year
Wet deposition - particle bound	1.24E-03	dywp_pb	s/m^2 year
Wet deposition - vapor phase	0.0	dywv	s/m^2 year
Wet deposition - vapor phase hg	0.0	dywv_hg	s/m^2 year

AIR PARAMETERS

Date : 1

RECEPTOR :	RCPTR_15	UTM X:	348,247.48	UTM	377,171.57

Crops4

SOURCE: sSTK_1

AIR PARAMETER DESCRIPTION	VALUE	SYMBOL	UNITS
Hourly air concentration - particle phase	4.66E-01	chp	ug-s/g-m^3
Hourly air concentration - particle bound	4.66E-01	chp_pb	ug-s/g
Hourly air concentration - vapor phase	5.08E-01	chv	ug-s/g-m^3
Hourly air concentration - vapor phase hg	5.12E-01	chv_hg	ug-s/g
Air concentration - particle phase	1.18E-03	cyp	ug-s/g-m^3
Air concentration - particle bound	1.18E-03	cyp_pb	ug-s/g
Air concentration - vapor phase	1.4E-03	cyv	ug-s/g-m^3
Air concentration - vapor phase hg	1.3E-03	cyv_hg	ug-s/g
Dry deposition - particle phase	4.37E-03	dydp	s/m^2 year
Dry deposition - particle bound	4.37E-03	dydp_pb	s/m^2
Dry deposition - vapor phase	2.2E-04	dydv	s/m^2 year
Dry deposition - vapor phase hg	1.18E-03	dydv_hg	s/m^2
Wet deposition - particle phase	6.76E-04	dywp	s/m^2 year
Wet deposition - particle bound	6.76E-04	dywp_pb	s/m^2
Wet deposition - vapor phase	0.0	dywv	s/m^2 year
Wet deposition - vapor phase hg	0.0	dywv_hg	s/m^2

RECEPTOR :	RCPTR_16	UTM X:	348,418.63	UTM	376,108.94

Dairy Farm

SOURCE: sSTK_1

AIR PARAMETER DESCRIPTION	VALUE	SYMBOL	UNITS
Hourly air concentration - particle phase	3.17E-01	chp	ug-s/g
Hourly air concentration - particle bound	3.17E-01	chp_pb	ug-s/g-m^3
Hourly air concentration - vapor phase	3.56E-01	chv	ug-s/g
Hourly air concentration - vapor phase hg	3.59E-01	chv_hg	ug-s/g-m^3
Air concentration - particle phase	6.47E-04	cyp	ug-s/g
Air concentration - particle bound	6.47E-04	cyp_pb	ug-s/g-m^3
Air concentration - vapor phase	1.17E-03	cyv	ug-s/g
Air concentration - vapor phase hg	9.37E-04	cyv_hg	ug-s/g-m^3
Dry deposition - particle phase	2.07E-03	dydp	s/m^2
Dry deposition - particle bound	2.07E-03	dydp_pb	s/m^2 year
Dry deposition - vapor phase	1.84E-04	dydv	s/m^2
Dry deposition - vapor phase hg	8.50E-04	dydv_hg	s/m^2 year
Wet deposition - particle phase	7.2E-04	dywp	s/m^2
Wet deposition - particle bound	7.2E-04	dywp_pb	s/m^2 year
Wet deposition - vapor phase	0.0	dywv	s/m^2
Wet deposition - vapor phase hg	0.0	dywv_hg	s/m^2 year

AIR PARAMETERS

Date : 18/12/2006

RECEPTOR : RCPTR_17	UTM X: 348,148.07	UTM 375,973.67

Grazing2

SOURCE: sSTK_1

AIR PARAMETER DESCRIPTION	VALUE	SYMBOL	UNITS
Hourly air concentration - particle phase	3.39E-01	chp	ug-s/g-m^3
Hourly air concentration - particle bound	3.39E-01	chp_pb	ug-s/g-m^3
Hourly air concentration - vapor phase	3.83E-01	chv	ug-s/g-m^3
Hourly air concentration - vapor phase hg	3.87E-01	chv_hg	ug-s/g-m^3
Air concentration - particle phase	6.24E-04	cyp	ug-s/g-m^3
Air concentration - particle bound	6.24E-04	cyp_pb	ug-s/g-m^3
Air concentration - vapor phase	1.14E-03	cyv	ug-s/g-m^3
Air concentration - vapor phase hg	9.11E-04	cyv_hg	ug-s/g-m^3
Dry deposition - particle phase	2.07E-03	dydp	s/m^2 year
Dry deposition - particle bound	2.07E-03	dydp_pb	s/m^2 year
Dry deposition - vapor phase	1.79E-04	dydv	s/m^2 year
Dry deposition - vapor phase hg	8.28E-04	dydv_hg	s/m^2 year
Wet deposition - particle phase	6.25E-04	dywp	s/m^2 year
Wet deposition - particle bound	6.25E-04	dywp_pb	s/m^2 year
Wet deposition - vapor phase	0.0	dywv	s/m^2 year
Wet deposition - vapor phase hg	0.0	dywv_hg	s/m^2 year

RECEPTOR : RCPTR_18	UTM X: 354,002.70	UTM 375,579.05

Hatley Farm

SOURCE: sSTK_1

AIR PARAMETER DESCRIPTION	VALUE	SYMBOL	UNITS
Hourly air concentration - particle phase	2.94E-01	chp	ug-s/g-m^3
Hourly air concentration - particle bound	2.94E-01	chp_pb	ug-s/g-m^3
Hourly air concentration - vapor phase	3.08E-01	chv	ug-s/g-m^3
Hourly air concentration - vapor phase hg	3.08E-01	chv_hg	ug-s/g-m^3
Air concentration - particle phase	2.75E-03	cyp	ug-s/g-m^3
Air concentration - particle bound	2.75E-03	cyp_pb	ug-s/g-m^3
Air concentration - vapor phase	4.02E-03	cyv	ug-s/g-m^3
Air concentration - vapor phase hg	3.36E-03	cyv_hg	ug-s/g-m^3
Dry deposition - particle phase	5.9E-03	dydp	s/m^2 year
Dry deposition - particle bound	5.9E-03	dydp_pb	s/m^2 year
Dry deposition - vapor phase	5.19E-04	dydv	s/m^2 year
Dry deposition - vapor phase hg	2.33E-03	dydv_hg	s/m^2 year
Wet deposition - particle phase	5.11E-04	dywp	s/m^2 year
Wet deposition - particle bound	5.11E-04	dywp_pb	s/m^2 year
Wet deposition - vapor phase	0.0	dywv	s/m^2 year
Wet deposition - vapor phase hg	0.0	dywv_hg	s/m^2 year

ι PARAMETERS

Date : 18/12/2006

ιECEPTOR : RCPTR_19 UTM X: 354,474.56 UTM 375,435.26

'ike Nook Farm

OURCE: sSTK_1

IR PARAMETER DESCRIPTION	VALUE	SYMBOL	UNITS
ourly air concentration - particle phase	3.52E-01	chp	ug-s/g-m^3
ourly air concentration - particle bound	3.52E-01	chp_pb	ug-s/g-m^3
ourly air concentration - vapor phase	3.71E-01	chv	ug-s/g-m^3
ourly air concentration - vapor phase hg	3.72E-01	chv_hg	ug-s/g-m^3
ir c entration - particle phase	2.44E-03	cyp	ug-s/g-m^3
r c entration - particle bound	2.44E-03	cyp_pb	ug-s/g-m^3
r concentration - vapor phase	3.81E-03	cyv	ug-s/g-m^3
r concentration - vapor phase hg	3.14E-03	cyv_hg	ug-s/g-m^3
y deposition - particle phase	6.04E-03	dydp	s/m^2 year
y deposition - particle bound	6.04E-03	dydp_pb	s/m^2 year
y deposition - vapor phase	5.27E-04	dydv	s/m^2 year
y deposition - vapor phase hg	2.36E-03	dydv_hg	s/m^2 year
ͅt deposition - particle phase	5.39E-04	dywp	s/m^2 year
ͅt deposition - particle bound	5.39E-04	dywp_pb	s/m^2 year
ͅt deposition - vapor phase	0.0	dywv	s/m^2 year
ͅt deposition - vapor phase hg	0.0	dywv_hg	s/m^2 year

ːCEPTOR : RCPTR_2 UTM X: 347,462.37 UTM 384,136.95

ɔps2

URCE: sSTK_1

P METER DESCRIPTION	VALUE	SYMBOL	UNITS
ırly air concentration - particle phase	4.9E-01	chp	ug-s/g-m^3
ırly air concentration - particle bound	4.91E-01	chp_pb	ug-s/g-m^3
ırly air concentration - vapor phase	5.03E-01	chv	ug-s/g-m^3
ırly air concentration - vapor phase hg	5.04E-01	chv_hg	ug-s/g-m^3
concentration - particle phase	5.24E-03	cyp	ug-s/g-m^3
concentration - particle bound	5.24E-03	cyp_pb	ug-s/g-m^3
concentration - vapor phase	7.89E-03	cyv	ug-s/g-m^3
concentration - vapor phase hg	6.75E-03	cyv_hg	ug-s/g-m^3
deposition - particle phase	1.47E-02	dydp	s/m^2 year
deposition - particle bound	1.47E-02	dydp_pb	s/m^2 year
deposition - vapor phase	1.24E-03	dydv	s/m^2 year
deposition - vapor phase hg	6.08E-03	dydv_hg	s/m^2 year
deposition - particle phase	1.33E-03	dywp	s/m^2 year
deposition - particle bound	1.33E-03	dywp_pb	s/m^2 year
deposition - vapor phase	0.0	dywv	s/m^2 year
deposition - vapor phase hg	0.0	dywv_hg	s/m^2 year

RECEPTOR : RCPTR_3 UTM X: 347,316.88 UTM 383,191.22

Crops3

SOURCE: sSTK_1

AIR PARAMETER DESCRIPTION	VALUE	SYMBOL	UNITS
Hourly air concentration - particle phase	4.82E-01	chp	ug-s/g-m^3
Hourly air concentration - particle bound	4.82E-01	chp_pb	ug-s/g-m^3
Hourly air concentration - vapor phase	4.95E-01	chv	ug-s/g-m^3
Hourly air concentration - vapor phase hg	4.97E-01	chv_hg	ug-s/g-m^3
Air concentration - particle phase	8.56E-03	cyp	ug-s/g-m^3
Air concentration - particle bound	8.56E-03	cyp_pb	ug-s/g-m^3
Air concentration - vapor phase	9.56E-03	cyv	ug-s/g-m^3
Air concentration - vapor phase hg	9.10E-03	cyv_hg	ug-s/g-m^3
Dry deposition - particle phase	2.75E-02	dydp	s/m^2 year
Dry deposition - particle bound	2.75E-02	dydp_pb	s/m^2 year
Dry deposition - vapor phase	1.5E-03	dydv	s/m^2 year
Dry deposition - vapor phase hg	8.29E-03	dydv_hg	s/m^2 year
Wet deposition - particle phase	1.83E-03	dywp	s/m^2 year
Wet deposition - particle bound	1.83E-03	dywp_pb	s/m^2 year
Wet deposition - vapor phase	0.0	dywv	s/m^2 year
Wet deposition - vapor phase hg	0.0	dywv_hg	s/m^2 year

RECEPTOR : RCPTR_4 UTM X: 347,986.16 UTM 383,500.40

North of Hale-Pickering Farm

SOURCE: sSTK_1

AIR PARAMETER DESCRIPTION	VALUE	SYMBOL	UNITS
Hourly air concentration - particle phase	4.87E-01	chp	ug-s/g-m^3
Hourly air concentration - particle bound	4.87E-01	chp_pb	ug-s/g-m^3
Hourly air concentration - vapor phase	5.02E-01	chv	ug-s/g-m^3
Hourly air concentration - vapor phase hg	5.03E-01	chv_hg	ug-s/g-m^3
Air concentration - particle phase	6.83E-03	cyp	ug-s/g-m^3
Air concentration - particle bound	6.83E-03	cyp_pb	ug-s/g-m^3
Air concentration - vapor phase	9.72E-03	cyv	ug-s/g-m^3
Air concentration - vapor phase hg	8.56E-03	cyv_hg	ug-s/g-m^3
Dry deposition - particle phase	2.02E-02	dydp	s/m^2 year
Dry deposition - particle bound	2.02E-02	dydp_pb	s/m^2 year
Dry deposition - vapor phase	1.52E-03	dydv	s/m^2 year
Dry deposition - vapor phase hg	7.73E-03	dydv_hg	s/m^2 year
Wet deposition - particle phase	2.09E-03	dywp	s/m^2 year
Wet deposition - particle bound	2.09E-03	dywp_pb	s/m^2 year
Wet deposition - vapor phase	0.0	dywv	s/m^2 year
Wet deposition - vapor phase hg	0.0	dywv_hg	s/m^2 year

R PARAMETERS Date : 18/12/2006

RECEPTOR : RCPTR_5 UTM X: 348,088.01 UTM 383,082.10

North of Hale-Hale Gate Farm

SOURCE: sSTK_1

AIR PARAMETER DESCRIPTION	VALUE	SYMBOL	UNITS
Hourly air concentration - particle phase	4.98E-01	chp	ug-s/g-m^3
Hourly air concentration - particle bound	4.98E-01	chp_pb	ug-s/g-m^3
Hourly air concentration - vapor phase	5.18E-01	chv	ug-s/g-m^3
Hourly air concentration - vapor phase hg	5.2E-01	chv_hg	ug-s/g-m^3
Air concentration - particle phase	9.53E-03	cyp	ug-s/g-m^3
Air concentration - particle bound	9.53E-03	cyp_pb	ug-s/g-m^3
Air concentration - vapor phase	1.14E-02	cyv	ug-s/g-m^3
Air concentration - vapor phase hg	1.07E-02	cyv_hg	ug-s/g-m^3
Dry deposition - particle phase	3.01E-02	dydp	s/m^2 year
Dry deposition - particle bound	3.01E-02	dydp_pb	s/m^2 year
Dry deposition - vapor phase	1.78E-03	dydv	s/m^2 year
Dry deposition - vapor phase hg	9.67E-03	dydv_hg	s/m^2 year
Wet deposition - particle phase	2.33E-03	dywp	s/m^2 year
Wet deposition - particle bound	2.33E-03	dywp_pb	s/m^2 year
Wet deposition - vapor phase	0.0	dywv	s/m^2 year
Wet deposition - vapor phase hg	0.0	dywv_hg	s/m^2 year

RECEPTOR : RCPTR_6 UTM X: 350,405.44 UTM 383,025.27

6th Form College

SOURCE: sSTK_1

AIR PARAMETER DESCRIPTION	VALUE	SYMBOL	UNITS
Hourly air concentration - particle phase	4.86E-01	chp	ug-s/g-m^3
Hourly air concentration - particle bound	4.86E-01	chp_pb	ug-s/g-m^3
Hourly air concentration - vapor phase	5.77E-01	chv	ug-s/g-m^3
Hourly air concentration - vapor phase hg	5.77E-01	chv_hg	ug-s/g-m^3
Air concentration - particle phase	1.23E-02	cyp	ug-s/g-m^3
Air concentration - particle bound	1.23E-02	cyp_pb	ug-s/g-m^3
Air concentration - vapor phase	1.37E-02	cyv	ug-s/g-m^3
Air concentration - vapor phase hg	1.33E-02	cyv_hg	ug-s/g-m^3
Dry deposition - particle phase	5.54E-02	dydp	s/m^2 year
Dry deposition - particle bound	5.54E-02	dydp_pb	s/m^2 year
Dry deposition - vapor phase	2.15E-03	dydv	s/m^2 year
Dry deposition - vapor phase hg	1.21E-02	dydv_hg	s/m^2 year
Wet deposition - particle phase	6.68E-03	dywp	s/m^2 year
Wet deposition - particle bound	6.68E-03	dywp_pb	s/m^2 year
Wet deposition - vapor phase	0.0	dywv	s/m^2 year
Wet deposition - vapor phase hg	0.0	dywv_hg	s/m^2 year

RECEPTOR : RCPTR_7 UTM X: 350,449.10 UTM 382,356.21

Westfield Primary School

SOURCE: sSTK_1

AIR PARAMETER DESCRIPTION	VALUE	SYMBOL	UNITS
Hourly air concentration - particle phase	4.11E-01	chp	ug-s/g-m^3
Hourly air concentration - particle bound	4.11E-01	chp_pb	ug-s/g-m^3
Hourly air concentration - vapor phase	4.12E-01	chv	ug-s/g-m^3
Hourly air concentration - vapor phase hg	4.13E-01	chv_hg	ug-s/g-m^3
Air concentration - particle phase	1.67E-02	cyp	ug-s/g-m^3
Air concentration - particle bound	1.67E-02	cyp_pb	ug-s/g-m^3
Air concentration - vapor phase	1.74E-02	cyv	ug-s/g-m^3
Air concentration - vapor phase hg	1.72E-02	cyv_hg	ug-s/g-m^3
Dry deposition - particle phase	7.73E-02	dydp	s/m^2 year
Dry deposition - particle bound	7.73E-02	dydp_pb	s/m^2 year
Dry deposition - vapor phase	2.18E-03	dydv	s/m^2 year
Dry deposition - vapor phase hg	1.25E-02	dydv_hg	s/m^2 year
Wet deposition - particle phase	9.22E-03	dywp	s/m^2 year
Wet deposition - particle bound	9.22E-03	dywp_pb	s/m^2 year
Wet deposition - vapor phase	0.0	dywv	s/m^2 year
Wet deposition - vapor phase hg	0.0	dywv_hg	s/m^2 year

RECEPTOR : RCPTR_8 UTM X: 350,765.56 UTM 382,305.30

Halton Primary Care Trust

SOURCE: sSTK_1

AIR PARAMETER DESCRIPTION	VALUE	SYMBOL	UNITS
Hourly air concentration - particle phase	4.05E-01	chp	ug-s/g-m^3
Hourly air concentration - particle bound	4.05E-01	chp_pb	ug-s/g-m^3
Hourly air concentration - vapor phase	4.06E-01	chv	ug-s/g-m^3
Hourly air concentration - vapor phase hg	4.06E-01	chv_hg	ug-s/g-m^3
Air concentration - particle phase	2.7E-02	cyp	ug-s/g-m^3
Air concentration - particle bound	2.7E-02	cyp_pb	ug-s/g-m^3
Air concentration - vapor phase	2.86E-02	cyv	ug-s/g-m^3
Air concentration - vapor phase hg	2.82E-02	cyv_hg	ug-s/g-m^3
Dry deposition - particle phase	1.26E-01	dydp	s/m^2 year
Dry deposition - particle bound	1.26E-01	dydp_pb	s/m^2 year
Dry deposition - vapor phase	3.34E-03	dydv	s/m^2 year
Dry deposition - vapor phase hg	1.91E-02	dydv_hg	s/m^2 year
Wet deposition - particle phase	6.98E-03	dywp	s/m^2 year
Wet deposition - particle bound	6.98E-03	dywp_pb	s/m^2 year
Wet deposition - vapor phase	0.0	dywv	s/m^2 year
Wet deposition - vapor phase hg	0.0	dywv_hg	s/m^2 year

Date : 18/12/2006

PARAMETERS

RECEPTOR : RCPTR 9 UTM X: 351.238.42 UTM 381.977.93

St Clements Catholic Primary School

SOURCE: sSTK_1

AIR PARAMETER DESCRIPTION	VALUE	SYMBOL	UNITS
Hourly air concentration - particle phase	6.1E-01	chp	ug-s/g-m^3
Hourly air concentration - particle bound	6.1E-01	chp_pb	ug-s/g-m^3
Hourly air concentration - vapor phase	6.11E-01	chv	ug-s/g-m^3
Hourly air concentration - vapor phase hg	6.11E-01	chv_hg	ug-s/g-m^3
Air concentration - particle phase	1.95E-02	cyp	ug-s/g-m^3
Air concentration - particle bound	1.95E-02	cyp_pb	ug-s/g-m^3
Air concentration - vapor phase	2.25E-02	cyv	ug-s/g-m^3
Air concentration - vapor phase hg	2.17E-02	cyv_hg	ug-s/g-m^3
Dry deposition - particle phase	8.38E-02	dydp	s/m^2 year
Dry deposition - particle bound	8.38E-02	dydp_pb	s/m^2 year
Dry deposition - vapor phase	2.97E-03	dydv	s/m^2 year
Dry deposition - vapor phase hg	1.65E-02	dydv_hg	s/m^2 year
Wet deposition - particle phase	4.55E-03	dywp	s/m^2 year
Wet deposition - particle bound	4.55E-03	dywp_pb	s/m^2 year
Wet deposition - vapor phase	0.0	dywv	s/m^2 year
Wet deposition - vapor phase hg	0.0	dywv_hg	s/m^2 year

Source Specific Emission Rate

SOURCE : SSTK-1 UTM X : 349865 UTM Y : 381790

Active: Yes

stack

CAS NO.	COPC NAME	EMISSION RATE
7440-36-0	Antimony	0.0111
7440-38-2	Arsenic	0.0111
7440-43-9	Cadmium	0.005
7440-47-3	Chromium	0.00555
18540-29-9	Chromium, hexavalent	0.00555
35822-46-9	HeptaCDD, 1,2,3,4,6,7,8-	3.4E-08
67562-39-4	HeptaCDF, 1,2,3,4,6,7,8-	8.8E-08
55673-89-7	HeptaCDF, 1,2,3,4,7,8,9-	8.6E-09
39227-28-6	HexaCDD, 1,2,3,4,7,8-	5.8E-09
57653-85-7	HexaCDD, 1,2,3,6,7,8-	5.2E-09
19408-74-3	HexaCDD, 1,2,3,7,8,9-	4.2E-09
70648-26-9	HexaCDF, 1,2,3,4,7,8-	4.4E-08
57117-44-9	HexaCDF, 1,2,3,6,7,8-	1.6E-08
72918-21-9	HexaCDF, 1,2,3,7,8,9-	8.4E-10
60851-34-5	HexaCDF, 2,3,4,6,7,8-	1.7E-08
7439-92-1	Lead	0.0111
7487-94-7	Mercuric chloride	4.80E-003
7439-97-6	Mercury	2.00E-005
7440-02-0	Nickel	0.0111
3268-87-9	OctaCDD, 1,2,3,4,6,7,8,9-	8.0E-08
39001-02-0	OctaCDF, 1,2,3,4,6,7,8,9-	7.2E-08
40321-76-4	PentaCDD, 1,2,3,7,8-	5.0E-09
57117-41-6	PentaCDF, 1,2,3,7,8-	5.6E-09
57117-31-4	PentaCDF, 2,3,4,7,8-	1.1E-08
1746-01-6	TetraCDD, 2,3,7,8-	6.2E-10
51207-31-9	TetraCDF, 2,3,7,8-	5.4E-09
7440-28-0	Thallium (I)	0.005

Appendix 5

Input parameters: Site and Scenario parameters

EXPOSURE SCENARIO PARAMETERS

Date : 18/12/2006

RECEPTOR: RCPTR_1	UTM X: 346,800.37	UTM Y: 383,896.88

Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child
Yes	Yes	No	No	No	No

DESCRIPTION	Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child	UNITS
Averaging time for carcinogens	70	70	70	70	70	70	yr
Averaging time for noncarcinogens	30	6	40	6	30	6	yr
Consumption rate of BEEF	0.0	0.0	0.00122	0.00075	0.0	0.0	kg/kg-day FW
Body weight	70	15	70	15	70	15	kg
Consumption rate of POULTRY	0.0	0.0	0.00066	0.00045	0.0	0.0	kg/kg-day FW
Consumption rate of ABOVEGROUND PRODUCE	0.00032	0.00077	0.00047	0.00113	0.00032	0.00077	kg/kg-day DW
Consumption rate of BELOWGROUND PRODUCE	0.00014	0.00023	0.00017	0.00028	0.00014	0.00023	kg/kg-day DW
Consumption rate of DRINKING WATER	1.4	0.67	1.4	0.67	1.4	0.67	L/day
Consumption rate of PROTECTED ABOVEGROUND	0.00061	0.0015	0.00064	0.00157	0.00061	0.00150	kg/kg-day DW
Consumption rate of SOIL	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002	kg/d
Exposure duration	30	6	40	6	30	6	yr
Exposure frequency	350	350	350	350	350	350	day/yr
Consumption rate of EGGS	0.0	0.0	0.00075	0.00054	0.0	0.0	kg/kg-day FW
Fraction of contaminated ABOVEGROUND PRODUCE	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction of contaminated DRINKING WATER	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction contaminated SOIL	1.0	1.0	1.0	1.0	1.0	1.0	--
Consumption rate of FISH	0.0	0.0	0.0	0.0	0.00125	0.00088	kg/kg-day FW
Fraction of contaminated FISH	1.0	1.0	1.0	1.0	1.0	1.0	--
Inhalation exposure duration	30	6	40	6	30	6	yr
Inhalation exposure frequency	350	350	350	350	350	350	day/yr
Inhalation exposure time	24	24	24	24	24	24	hr/day
Fraction of contaminated BEEF	1	1	1	1	1	1	--
Fraction of contaminated POULTRY	1	1	1	1	1	1	--
Fraction of contaminated EGGS	1	1	1	1	1	1	--
Fraction of contaminated MILK	1	1	1	1	1	1	--
Fraction of contaminated PORK	1	1	1	1	1	1	--
Inhalation rate	0.83	0.30	0.83	0.30	0.83	0.30	m^3/hr
Consumption rate of MILK	0.0	0.0	0.01367	0.02268	0.0	0.0	kg/kg-day FW
Consumption rate of PORK	0.0	0.0	0.00055	0.00042	0.0	0.0	kg/kg-day FW
Time period at the beginning of combustion	0	0	0	0	0	0	yr
Length of exposure duration	30	6	40	6	30	6	yr

:XPOSURE SCENARIO PARAMETERS

Date : 18/12/2006

RECEPTOR: RCPTR_10	UTM X: 351,645.81	UTM Y: 381,399.58

Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child
Yes	Yes	No	No	No	No

)ESCRIPTION	Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child	UNITS
\veraging time for carcinogens	70	70	70	70	70	70	yr
\veraging time for noncarcinogens	30	6	40	6	30	6	yr
:onsumption rate of BEEF	0.0	0.0	0.00122	0.00075	0.0	0.0	kg/kg-day FW
3ody weight	70	15	70	15	70	15	kg
:on[illegible]ption rate of POULTRY	0.0	0.0	0.00066	0.00045	0.0	0.0	kg/kg-day FW
:onsumption rate of ABOVEGROUND PRODUCE	0.00032	0.00077	0.00047	0.00113	0.00032	0.00077	kg/kg-day DW
:onsumption rate of BELOWGROUND PRODUCE	0.00014	0.00023	0.00017	0.00028	0.00014	0.00023	kg/kg-day DW
:onsumption rate of DRINKING WATER	1.4	0.67	1.4	0.67	1.4	0.67	L/day
:onsumption rate of PROTECTED ABOVEGROUND	0.00061	0.0015	0.00064	0.00157	0.00061	0.00150	kg/kg-day DW
onsumption rate of SOIL	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002	kg/d
xposure duration	30	6	40	6	30	6	yr
xposure frequency	350	350	350	350	350	350	day/yr
onsumption rate of EGGS	0.0	0.0	0.00075	0.00054	0.0	0.0	kg/kg-day FW
:action of contaminated ABOVEGROUND PRODUCE	1.0	1.0	1.0	1.0	1.0	1.0	–
action of contaminated DRINKING WATER	1.0	1.0	1.0	1.0	1.0	1.0	–
action contaminated SOIL	1.0	1.0	1.0	1.0	1.0	1.0	–
›nsumption rate of FISH	0.0	0.0	0.0	0.0	0.00125	0.00088	kg/kg-day FW
act[illegible] contaminated FISH	1.0	1.0	1.0	1.0	1.0	1.0	–
ıalation exposure duration	30	6	40	6	30	6	yr
ıalation exposure frequency	350	350	350	350	350	350	day/yr
ıalation exposure time	24	24	24	24	24	24	hr/day
ıction of contaminated BEEF	1	1	1	1	1	1	–
ıction of contaminated POULTRY	1	1	1	1	1	1	–
ıction of contaminated EGGS	1	1	1	1	1	1	–
ıction of contaminated MILK	1	1	1	1	1	1	–
ıction of contaminated PORK	1	1	1	1	1	1	–
alation rate	0.83	0.30	0.83	0.30	0.83	0.30	m^3/hr
ısumption rate of MILK	0.0	0.0	0.01367	0.02268	0.0	0.0	kg/kg-day FW
ısumption rate of PORK	0.0	0.0	0.00055	0.00042	0.0	0.0	kg/kg-day FW
e period at the beginning of combustion	0	0	0	0	0	0	yr
gth of exposure duration	30	6	40	6	30	6	yr

EXPOSURE SCENARIO PARAMETERS

Date : 18/12/2006

RECEPTOR:	RCPTR_11	UTM X:	351,794.95	UTM Y:	381,134.05
Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child
Yes	Yes	No	No	No	No

DESCRIPTION	Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child	UNITS
Averaging time for carcinogens	70	70	70	70	70	70	yr
Averaging time for noncarcinogens	30	6	40	6	30	6	yr
Consumption rate of BEEF	0.0	0.0	0.00122	0.00075	0.0	0.0	kg/kg-day FW
Body weight	70	15	70	15	70	15	kg
Consumption rate of POULTRY	0.0	0.0	0.00066	0.00045	0.0	0.0	kg/kg-day FW
Consumption rate of ABOVEGROUND PRODUCE	0.00032	0.00077	0.00047	0.00113	0.00032	0.00077	kg/kg-day DW
Consumption rate of BELOWGROUND PRODUCE	0.00014	0.00023	0.00017	0.00028	0.00014	0.00023	kg/kg-day DW
Consumption rate of DRINKING WATER	1.4	0.67	1.4	0.67	1.4	0.67	L/day
Consumption rate of PROTECTED ABOVEGROUND	0.00061	0.0015	0.00064	0.00157	0.00061	0.00150	kg/kg-day DW
Consumption rate of SOIL	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002	kg/d
Exposure duration	[illegible]	[illegible]	40	6	[illegible]	[illegible]	yr
Exposure frequency	350	350	350	350	350	350	day/yr
Consumption rate of EGGS	0.0	0.0	0.00075	0.00054	0.0	0.0	kg/kg-day FW
Fraction of contaminated ABOVEGROUND PRODUCE	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction of contaminated DRINKING WATER	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction contaminated SOIL	1.0	1.0	1.0	1.0	1.0	1.0	--
Consumption rate of FISH	0.0	0.0	0.0	0.0	0.00125	0.00088	kg/kg-day FW
Fraction of contaminated FISH	1.0	1.0	1.0	1.0	1.0	1.0	--
Inhalation exposure duration	30	6	40	6	30	6	yr
Inhalation exposure frequency	350	350	350	350	350	350	day/yr
Inhalation exposure time	24	24	24	24	24	24	hr/day
Fraction of contaminated BEEF	1	1	1	1	1	1	--
Fraction of contaminated POULTRY	1	1	1	1	1	1	--
Fraction of contaminated EGGS	1	1	1	1	1	1	--
Fraction of contaminated MILK	1	1	1	1	1	1	--
Fraction of contaminated PORK	1	1	1	1	1	1	--
Inhalation rate	0.83	0.30	0.83	0.30	0.83	0.30	m^3/hr
Consumption rate of MILK	0.0	0.0	0.01367	0.02268	0.0	0.0	kg/kg-day FW
Consumption rate of PORK	0.0	0.0	0.00055	0.00042	0.0	0.0	kg/kg-day FW
Time period at the beginning of combustion	0	0	0	0	0	0	yr
Length of exposure duration	30	6	40	6	30	6	yr

Date : 18/12/2006

›SURE SCENARIO PARAMETERS

EPTOR: RCPTR_12	UTM X: 350,321.80	UTM Y: 381,315.92

Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child
Yes	Yes	No	No	No	No

SCRIPTION	Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child	UNITS
raging time for carcinogens	70	70	70	70	70	70	yr
raging time for noncarcinogens	30	6	40	6	30	6	yr
nsumption rate of BEEF	0.0	0.0	0.00122	0.00075	0.0	0.0	kg/kg-day FW
dy w[illegible]t	70	15	70	15	70	15	kg
nsumption rate of POULTRY	0.0	0.0	0.00066	0.00045	0.0	0.0	kg/kg-day FW
nsumption rate of ABOVEGROUND PRODUCE	0.00032	0.00077	0.00047	0.00113	0.00032	0.00077	kg/kg-day DW
onsumption rate of BELOWGROUND PRODUCE	0.00014	0.00023	0.00017	0.00028	0.00014	0.00023	kg/kg-day DW
onsumption rate of DRINKING WATER	1.4	0.67	1.4	0.67	1.4	0.67	L/day
onsumption rate of PROTECTED ABOVEGROUND	0.00061	0.0015	0.00064	0.00157	0.00061	0.00150	kg/kg-day DW
onsumption rate of SOIL	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002	kg/d
xposure duration	30	6	40	6	30	6	yr
Exposure frequency	350	350	350	350	350	350	day/yr
Consumption rate of EGGS	0.0	0.0	0.00075	0.00054	0.0	0.0	kg/kg-day FW
Fraction of contaminated ABOVEGROUND PRODUCE	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction of contaminated DRINKING WATER	1.0	1.0	1.0	1.0	1.0	1.0	--
Fra[illegible] contaminated SOIL	1.0	1.0	1.0	1.0	1.0	1.0	--
Consumption rate of FISH	0.0	0.0	0.0	0.0	0.00125	0.00088	kg/kg-day FW
Fraction of contaminated FISH	1.0	1.0	1.0	1.0	1.0	1.0	--
Inhalation exposure duration	30	6	40	6	30	6	yr
Inhalation exposure frequency	350	350	350	350	350	350	day/yr
Inhalation exposure time	24	24	24	24	24	24	hr/day
Fraction of contaminated BEEF	1	1	1	1	1	1	--
Fraction of contaminated POULTRY	1	1	1	1	1	1	--
Fraction of contaminated EGGS	1	1	1	1	1	1	--
Fraction of contaminated MILK	1	1	1	1	1	1	--
Fraction of contaminated PORK	1	1	1	1	1	1	--
Inhalation rate	0.83	0.30	0.83	0.30	0.83	0.30	m^3/hr
Consumption rate of MILK	0.0	0.0	0.01367	0.02268	0.0	0.0	kg/kg-day FW
Consumption rate of PORK	0.0	0.0	0.00055	0.00042	0.0	0.0	kg/kg-day FW
Time period at the beginning of combustion	0	0	0	0	0	0	yr
Length of exposure duration	30	6	40	6	30	6	yr

Date : 18/12/2006

EXPOSURE SCENARIO PARAMETERS

RECEPTOR: RCPTR_13 **UTM X:** 351,125.66 **UTM Y:** 380,646.64

Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child
Yes	Yes	No	No	No	No

DESCRIPTION	Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child	UNITS
Averaging time for carcinogens	70	70	70	70	70	70	yr
Averaging time for noncarcinogens	30	6	40	6	30	6	yr
Consumption rate of BEEF	0.0	0.0	0.00122	0.00075	0.0	0.0	kg/kg-day FW
Body weight	70	15	70	15	70	15	kg
Consumption rate of POULTRY	0.0	0.0	0.00066	0.00045	0.0	0.0	kg/kg-day FW
Consumption rate of ABOVEGROUND PRODUCE	0.00032	0.00077	0.00047	0.00113	0.00032	0.00077	kg/kg-day DW
Consumption rate of BELOWGROUND PRODUCE	0.00014	0.00023	0.00017	0.00028	0.00014	0.00023	kg/kg-day DW
Consumption rate of DRINKING WATER	1.4	0.67	1.4	0.67	1.4	0.67	L/day
Consumption rate of PROTECTED ABOVEGROUND	0.00061	0.0015	0.00064	0.00157	0.00061	0.00150	kg/kg-day DW
Consumption rate of SOIL	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002	kg/d
Exposure duration	30	6	40	6	30	6	yr
Exposure frequency	350	350	350	350	350	350	day/yr
Consumption rate of EGGS	0.0	0.0	0.00075	0.00054	0.0	0.0	kg/kg-day FW
Fraction of contaminated ABOVEGROUND PRODUCE	1.0	1.0	1.0	1.0	1.0	1.0	–
Fraction of contaminated DRINKING WATER	1.0	1.0	1.0	1.0	1.0	1.0	–
Fraction contaminated SOIL	1.0	1.0	1.0	1.0	1.0	1.0	–
Consumption rate of FISH	0.0	0.0	0.0	0.0	0.00125	0.00088	kg/kg-day FW
Fraction of contaminated FISH	1.0	1.0	1.0	1.0	1.0	1.0	–
Inhalation exposure duration	30	6	40	6	30	6	yr
Inhalation exposure frequency	350	350	350	350	350	350	day/yr
Inhalation exposure time	24	24	24	24	24	24	hr/day
Fraction of contaminated BEEF	1	1	1	1	1	1	–
Fraction of contaminated POULTRY	1	1	1	1	1	1	–
Fraction of contaminated EGGS	1	1	1	1	1	1	–
Fraction of contaminated MILK	1	1	1	1	1	1	–
Fraction of contaminated PORK	1	1	1	1	1	1	–
Inhalation rate	0.83	0.30	0.83	0.30	0.83	0.30	m^3/hr
Consumption rate of MILK	0.0	0.0	0.01367	0.02268	0.0	0.0	kg/kg-day FW
Consumption rate of PORK	0.0	0.0	0.00055	0.00042	0.0	0.0	kg/kg-day FW
Time period at the beginning of combustion	0	0	0	0	0	0	yr
Length of exposure duration	30	6	40	6	30	6	yr

OSURE SCENARIO PARAMETERS

Date : 18/12/2006

EPTOR: RCPTR_14	UTM X: 349,541.85	UTM Y: 377,391.99

Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child
No	No	Yes	Yes	No	No

SCRIPTION	Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child	UNITS
raging time for carcinogens	70	70	70	70	70	70	yr
raging time for noncarcinogens	30	6	40	6	30	6	yr
sumption rate of BEEF	0.0	0.0	0.00122	0.00075	0.0	0.0	kg/kg-day FW
y weight	70	15	70	15	70	15	kg
su[illegible]n rate of POULTRY	0.0	0.0	0.00066	0.00045	0.0	0.0	kg/kg-day FW
sumption rate of ABOVEGROUND PRODUCE	0.00032	0.00077	0.00047	0.00113	0.00032	0.00077	kg/kg-day DW
sumption rate of BELOWGROUND PRODUCE	0.00014	0.00023	0.00017	0.00028	0.00014	0.00023	kg/kg-day DW
sumption rate of DRINKING WATER	1.4	0.67	1.4	0.67	1.4	0.67	L/day
sumption rate of PROTECTED ABOVEGROUND	0.00061	0.0015	0.00064	0.00157	0.00061	0.00150	kg/kg-day DW
sumption rate of SOIL	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002	kg/d
osure duration	30	6	40	6	30	6	yr
osure frequency	350	350	350	350	350	350	day/yr
sumption rate of EGGS	0.0	0.0	0.00075	0.00054	0.0	0.0	kg/kg-day FW
ction of contaminated ABOVEGROUND PRODUCE	1.0	1.0	1.0	1.0	1.0	1.0	--
ction of contaminated DRINKING WATER	1.0	1.0	1.0	1.0	1.0	1.0	--
ction contaminated SOIL	1.0	1.0	1.0	1.0	1.0	1.0	--
sumption rate of FISH	0.0	0.0	0.0	0.0	0.00125	0.00088	kg/kg-day FW
ctior[illegible]ontaminated FISH	1.0	1.0	1.0	1.0	1.0	1.0	--
ilation exposure duration	30	6	40	6	30	6	yr
ilation exposure frequency	350	350	350	350	350	350	day/yr
ilation exposure time	24	24	24	24	24	24	hr/day
ction of contaminated BEEF	1	1	1	1	1	1	--
ction of contaminated POULTRY	1	1	1	1	1	1	--
ction of contaminated EGGS	1	1	1	1	1	1	--
ction of contaminated MILK	1	1	1	1	1	1	--
ction of contaminated PORK	1	1	1	1	1	1	--
ilation rate	0.83	0.30	0.83	0.30	0.83	0.30	m^3/hr
sumption rate of MILK	0.0	0.0	0.01367	0.02268	0.0	0.0	kg/kg-day FW
sumption rate of PORK	0.0	0.0	0.00055	0.00042	0.0	0.0	kg/kg-day FW
e period at the beginning of combustion	0	0	0	0	0	0	yr
gth of exposure duration	30	6	40	6	30	6	yr

Date : 18/12/2006

EXPOSURE SCENARIO PARAMETERS

RECEPTOR: RCPTR_15	UTM X: 348,247.48	UTM Y: 377,171.57

Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child
No	No	Yes	Yes	No	No

DESCRIPTION	Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child	UNITS
Averaging time for carcinogens	70	70	70	70	70	70	yr
Averaging time for noncarcinogens	30	6	40	6	30	6	yr
Consumption rate of BEEF	0.0	0.0	0.00122	0.00075	0.0	0.0	kg/kg-day FW
Body weight.	70	15	70	15	70	15	kg
Consumption rate of POULTRY	0.0	0.0	0.00066	0.00045	0.0	0.0	kg/kg-day FW
Consumption rate of ABOVEGROUND PRODUCE	0.00032	0.00077	0.00047	0.00113	0.00032	0.00077	kg/kg-day DW
Consumption rate of BELOWGROUND PRODUCE	0.00014	0.00023	0.00017	0.00028	0.00014	0.00023	kg/kg-day DW
Consumption rate of DRINKING WATER	1.4	0.67	1.4	0.67	1.4	0.67	L/day
Consumption rate of PROTECTED ABOVEGROUND	0.00061	0.0015	0.00064	0.00157	0.00061	0.00150	kg/kg-day DW
Consumption rate of SOIL	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002	kg/d
Exposure duration	30	6	40	6	30	6	yr
Exposure frequency	350	350	350	350	350	350	day/yr
Consumption rate of EGGS	0.0	0.0	0.00075	0.00054	0.0	0.0	kg/kg-day FW
Fraction of contaminated ABOVEGROUND PRODUCE	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction of contaminated DRINKING WATER	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction contaminated SOIL	1.0	1.0	1.0	1.0	1.0	1.0	--
Consumption rate of FISH	0.0	0.0	0.0	0.0	0.00125	0.00088	kg/kg-day FW
Fraction of contaminated FISH	1.0	1.0	1.0	1.0	1.0	1.0	--
Inhalation exposure duration	30	6	40	6	30	6	yr
Inhalation exposure frequency	350	350	350	350	350	350	day/yr
Inhalation exposure time	24	24	24	24	24	24	hr/day
Fraction of contaminated BEEF	1	1	1	1	1	1	--
Fraction of contaminated POULTRY	1	1	1	1	1	1	--
Fraction of contaminated EGGS	1	1	1	1	1	1	--
Fraction of contaminated MILK	1	1	1	1	1	1	--
Fraction of contaminated PORK	1	1	1	1	1	1	--
Inhalation rate	0.83	0.30	0.83	0.30	0.83	0.30	m^3/hr
Consumption rate of MILK	0.0	0.0	0.01367	0.02268	0.0	0.0	kg/kg-day FW
Consumption rate of PORK	0.0	0.0	0.00055	0.00042	0.0	0.0	kg/kg-day FW
Time period at the beginning of combustion	0	0	0	0	0	0	yr
Length of exposure duration	30	6	40	6	30	6	yr

Date : 18/12/2006

OSURE SCENARIO PARAMETERS

ĊEPTOR: RCPTR_16 UTM X: 348,418.63 UTM Y: 376,108.94

Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child
No	No	Yes	Yes	No	No

SCRIPTION	A	C	A	C	A	C	UNITS
raging time for carcinogens	70	70	70	70	70	70	yr
raging time for noncarcinogens	30	6	40	6	30	6	yr
ısumption rate of BEEF	0.0	0.0	0.00122	0.00075	0.0	0.0	kg/kg-day FW
ly weight	70	15	70	15	70	15	kg
ısu[illegible]n rate of POULTRY	0.0	0.0	0.00066	0.00045	0.0	0.0	kg/kg-day FW
ısumption rate of ABOVEGROUND PRODUCE	0.00032	0.00077	0.00047	0.00113	0.00032	0.00077	kg/kg-day DW
ısumption rate of BELOWGROUND PRODUCE	0.00014	0.00023	0.00017	0.00028	0.00014	0.00023	kg/kg-day DW
ısumption rate of DRINKING WATER	1.4	0.67	1.4	0.67	1.4	0.67	L/day
ısumption rate of PROTECTED ABOVEGROUND	0.00061	0.0015	0.00064	0.00157	0.00061	0.00150	kg/kg-day DW
ısumption rate of SOIL	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002	kg/d
ıosure duration	30	6	40	6	30	6	yr
ıosure frequency	350	350	350	350	350	350	day/yr
ısumption rate of EGGS	0.0	0.0	0.00075	0.00054	0.0	0.0	kg/kg-day FW
ction of contaminated ABOVEGROUND PRODUCE	1.0	1.0	1.0	1.0	1.0	1.0	--
ction of contaminated DRINKING WATER	1.0	1.0	1.0	1.0	1.0	1.0	--
ction contaminated SOIL	1.0	1.0	1.0	1.0	1.0	1.0	--
ısu[illegible]ion rate of FISH	0.0	0.0	0.0	0.0	0.00125	0.00088	kg/kg-day FW
ction of contaminated FISH	1.0	1.0	1.0	1.0	1.0	1.0	--
ıalation exposure duration	30	6	40	6	30	6	yr
ıalation exposure frequency	350	350	350	350	350	350	day/yr
ıalation exposure time	24	24	24	24	24	24	hr/day
ction of contaminated BEEF	1	1	1	1	1	1	--
ction of contaminated POULTRY	1	1	1	1	1	1	--
ction of contaminated EGGS	1	1	1	1	1	1	--
ction of contaminated MILK	1	1	1	1	1	1	--
ction of contaminated PORK	1	1	1	1	1	1	--
ıalation rate	0.83	0.30	0.83	0.30	0.83	0.30	m^3/hr
ısumption rate of MILK	0.0	0.0	0.01367	0.02268	0.0	0.0	kg/kg-day FW
ısumption rate of PORK	0.0	0.0	0.00055	0.00042	0.0	0.0	kg/kg-day FW
e period at the beginning of combustion	0	0	0	0	0	0	yr
gth of exposure duration	30	6	40	6	30	6	yr

Date : 18/12/2006

EXPOSURE SCENARIO PARAMETERS

RECEPTOR: RCPTR_17	UTM X: 348,148.07	UTM Y: 375,973.67

Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child
No	No	Yes	Yes	No	No

DESCRIPTION	Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child	UNITS
Averaging time for carcinogens	70	70	70	70	70	70	yr
Averaging time for noncarcinogens	30	6	40	6	30	6	yr
Consumption rate of BEEF	0.0	0.0	0.00122	0.00075	0.0	0.0	kg/kg-day FW
Body weight	70	15	70	15	70	15	kg
Consumption rate of POULTRY	0.0	0.0	0.00066	0.00045	0.0	0.0	kg/kg-day FW
Consumption rate of ABOVEGROUND PRODUCE	0.00032	0.00077	0.00047	0.00113	0.00032	0.00077	kg/kg-day DW
Consumption rate of BELOWGROUND PRODUCE	0.00014	0.00023	0.00017	0.00028	0.00014	0.00023	kg/kg-day DW
Consumption rate of DRINKING WATER	1.4	0.67	1.4	0.67	1.4	0.67	L/day
Consumption rate of PROTECTED ABOVEGROUND	0.00061	0.0015	0.00064	0.00157	0.00061	0.00150	kg/kg-day DW
Consumption rate of SOIL	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002	kg/d
Exposure duration	30	6	40	6	30	6	yr
Exposure frequency	350	350	350	350	350	350	day/yr
Consumption rate of EGGS	0.0	0.0	0.00075	0.00054	0.0	0.0	kg/kg-day FW
Fraction of contaminated ABOVEGROUND PRODUCE	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction of contaminated DRINKING WATER	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction contaminated SOIL	1.0	1.0	1.0	1.0	1.0	1.0	--
Consumption rate of FISH	0.0	0.0	0.0	0.0	0.00125	0.00088	kg/kg-day FW
Fraction of contaminated FISH	1.0	1.0	1.0	1.0	1.0	1.0	--
Inhalation exposure duration	30	6	40	6	30	6	yr
Inhalation exposure frequency	350	350	350	350	350	350	day/yr
Inhalation exposure time	24	24	24	24	24	24	hr/day
Fraction of contaminated BEEF	1	1	1	1	1	1	--
Fraction of contaminated POULTRY	1	1	1	1	1	1	--
Fraction of contaminated EGGS	1	1	1	1	1	1	--
Fraction of contaminated MILK	1	1	1	1	1	1	--
Fraction of contaminated PORK	1	1	1	1	1	1	--
Inhalation rate	0.83	0.30	0.83	0.30	0.83	0.30	m^3/hr
Consumption rate of MILK	0.0	0.0	0.01367	0.02268	0.0	0.0	kg/kg-day FW
Consumption rate of PORK	0.0	0.0	0.00055	0.00042	0.0	0.0	kg/kg-day FW
Time period at the beginning of combustion	0	0	0	0	0	0	yr
Length of exposure duration	30	6	40	6	30	6	yr

Date : 18/12/2006

)SURE SCENARIO PARAMETERS

EPTOR: RCPTR_18 UTM X: 354,002.70 UTM Y: 375,579.05

Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child
No	No	Yes	Yes	No	No

SCRIPTION	Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child	UNITS
raging time for carcinogens	70	70	70	70	70	70	yr
raging time for noncarcinogens	30	6	40	6	30	6	yr
sumption rate of BEEF	0.0	0.0	0.00122	0.00075	0.0	0.0	kg/kg-day FW
y weight	70	15	70	15	70	15	kg
isur[illegible]n rate of POULTRY	0.0	0.0	0.00066	0.00045	0.0	0.0	kg/kg-day FW
isumption rate of ABOVEGROUND PRODUCE	0.00032	0.00077	0.00047	0.00113	0.00032	0.00077	kg/kg-day DW
isumption rate of BELOWGROUND PRODUCE	0.00014	0.00023	0.00017	0.00028	0.00014	0.00023	kg/kg-day DW
isumption rate of DRINKING WATER	1.4	0.67	1.4	0.67	1.4	0.67	L/day
isumption rate of PROTECTED ABOVEGROUND	0.00061	0.0015	0.00064	0.00157	0.00061	0.00150	kg/kg-day DW
isumption rate of SOIL	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002	kg/d
osure duration	30	6	40	6	30	6	yr
osure frequency	350	350	350	350	350	350	day/yr
nsumption rate of EGGS	0.0	0.0	0.00075	0.00054	0.0	0.0	kg/kg-day FW
iction of contaminated ABOVEGROUND PRODUCE	1.0	1.0	1.0	1.0	1.0	1.0	--
iction of contaminated DRINKING WATER	1.0	1.0	1.0	1.0	1.0	1.0	--
iction contaminated SOIL	1.0	1.0	1.0	1.0	1.0	1.0	--
nsu[illegible]ion rate of FISH	0.0	0.0	0.0	0.0	0.00125	0.00088	kg/kg-day FW
iction of contaminated FISH	1.0	1.0	1.0	1.0	1.0	1.0	--
ialation exposure duration	30	6	40	6	30	6	yr
ialation exposure frequency	350	350	350	350	350	350	day/yr
ialation exposure time	24	24	24	24	24	24	hr/day
action of contaminated BEEF	1	1	1	1	1	1	--
action of contaminated POULTRY	1	1	1	1	1	1	--
action of contaminated EGGS	1	1	1	1	1	1	--
action of contaminated MILK	1	1	1	1	1	1	--
action of contaminated PORK	1	1	1	1	1	1	--
halation rate	0.83	0.30	0.83	0.30	0.83	0.30	m^3/hr
onsumption rate of MILK	0.0	0.0	0.01367	0.02268	0.0	0.0	kg/kg-day FW
onsumption rate of PORK	0.0	0.0	0.00055	0.00042	0.0	0.0	kg/kg-day FW
me period at the beginning of combustion	0	0	0	0	0	0	yr
ength of exposure duration	30	6	40	6	30	6	yr

EXPOSURE SCENARIO PARAMETERS Date : 18/12/2006

RECEPTOR:	RCPTR_19	UTM X:	354,474.56	UTM Y:	375,435.26

Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child
No	No	Yes	Yes	No	No

DESCRIPTION							UNITS
Averaging time for carcinogens	70	70	70	70	70	70	yr
Averaging time for noncarcinogens	30	6	40	6	30	6	yr
Consumption rate of BEEF	0.0	0.0	0.00122	0.00075	0.0	0.0	kg/kg-day FW
Body weight	70	15	70	15	70	15	kg
Consumption rate of POULTRY	0.0	0.0	0.00066	0.00045	0.0	0.0	kg/kg-day FW
Consumption rate of ABOVEGROUND PRODUCE	0.00032	0.00077	0.00047	0.00113	0.00032	0.00077	kg/kg-day DW
Consumption rate of BELOWGROUND PRODUCE	0.00014	0.00023	0.00017	0.00028	0.00014	0.00023	kg/kg-day DW
Consumption rate of DRINKING WATER	1.4	0.67	1.4	0.67	1.4	0.67	L/day
Consumption rate of PROTECTED ABOVEGROUND	0.00061	0.0015	0.00064	0.00157	0.00061	0.00150	kg/kg-day DW
Consumption rate of SOIL	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002	kg/d
Exposure duration	30	6	40	6	30	6	yr
Exposure frequency	350	350	350	350	350	350	day/yr
Consumption rate of EGGS	0.0	0.0	0.00075	0.00054	0.0	0.0	kg/kg-day FW
Fraction of contaminated ABOVEGROUND PRODUCE	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction of contaminated DRINKING WATER	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction contaminated SOIL	1.0	1.0	1.0	1.0	1.0	1.0	--
Consumption rate of FISH	0.0	0.0	0.0	0.0	0.00125	0.00088	kg/kg-day FW
Fraction of contaminated FISH	1.0	1.0	1.0	1.0	1.0	1.0	--
Inhalation exposure duration	30	6	40	6	30	6	yr
Inhalation exposure frequency	350	350	350	350	350	350	day/yr
Inhalation exposure time	24	24	24	24	24	24	hr/day
Fraction of contaminated BEEF	1	1	1	1	1	1	--
Fraction of contaminated POULTRY	1	1	1	1	1	1	--
Fraction of contaminated EGGS	1	1	1	1	1	1	--
Fraction of contaminated MILK	1	1	1	1	1	1	--
Fraction of contaminated PORK	1	1	1	1	1	1	--
Inhalation rate	0.83	0.30	0.83	0.30	0.83	0.30	m^3/hr
Consumption rate of MILK	0.0	0.0	0.01367	0.02268	0.0	0.0	kg/kg-day FW
Consumption rate of PORK	0.0	0.0	0.00055	0.00042	0.0	0.0	kg/kg-day FW
Time period at the beginning of combustion	0	0	0	0	0	0	yr
Length of exposure duration	30	6	40	6	30	6	yr

POSURE SCENARIO PARAMETERS

Date : 18/12/2006

ECEPTOR: RCPTR_2	UTM X: 347,462.37	UTM Y: 384,136.95

Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child
Yes	Yes	No	No	No	No

ESCRIPTION	A	C	A	C	A	C	UNITS
eraging time for carcinogens	70	70	70	70	70	70	yr
eraging time for noncarcinogens	30	6	40	6	30	6	yr
nsumption rate of BEEF	0.0	0.0	0.00122	0.00075	0.0	0.0	kg/kg-day FW
dy weight	70	15	70	15	70	15	kg
nsumption rate of POULTRY	0.0	0.0	0.00066	0.00045	0.0	0.0	kg/kg-day FW
nsumption rate of ABOVEGROUND PRODUCE	0.00032	0.00077	0.00047	0.00113	0.00032	0.00077	kg/kg-day DW
nsumption rate of BELOWGROUND PRODUCE	0.00014	0.00023	0.00017	0.00028	0.00014	0.00023	kg/kg-day DW
nsumption rate of DRINKING WATER	1.4	0.67	1.4	0.67	1.4	0.67	L/day
nsumption rate of PROTECTED ABOVEGROUND	0.00061	0.0015	0.00064	0.00157	0.00061	0.00150	kg/kg-day DW
nsumption rate of SOIL	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002	kg/d
posure duration	30	6	40	6	30	6	yr
posure frequency	350	350	350	350	350	350	day/yr
nsumption rate of EGGS	0.0	0.0	0.00075	0.00054	0.0	0.0	kg/kg-day FW
ction of contaminated ABOVEGROUND PRODUCE	1.0	1.0	1.0	1.0	1.0	1.0	--
ction of contaminated DRINKING WATER	1.0	1.0	1.0	1.0	1.0	1.0	--
ction contaminated SOIL	1.0	1.0	1.0	1.0	1.0	1.0	--
nsumption rate of FISH	0.0	0.0	0.0	0.0	0.00125	0.00088	kg/kg-day FW
cti[illegible]ontaminated FISH	1.0	1.0	1.0	1.0	1.0	1.0	--
alation exposure duration	30	6	40	6	30	6	yr
alation exposure frequency	350	350	350	350	350	350	day/yr
alation exposure time	24	24	24	24	24	24	hr/day
ction of contaminated BEEF	1	1	1	1	1	1	--
ction of contaminated POULTRY	1	1	1	1	1	1	--
ction of contaminated EGGS	1	1	1	1	1	1	--
ction of contaminated MILK	1	1	1	1	1	1	--
ction of contaminated PORK	1	1	1	1	1	1	--
lation rate	0.83	0.30	0.83	0.30	0.83	0.30	m^3/hr
sumption rate of MILK	0.0	0.0	0.01367	0.02268	0.0	0.0	kg/kg-day FW
sumption rate of PORK	0.0	0.0	0.00055	0.00042	0.0	0.0	kg/kg-day FW
e period at the beginning of combustion	0	0	0	0	0	0	yr
gth of exposure duration	30	6	40	6	30	6	yr

EXPOSURE SCENARIO PARAMETERS

Date : 18/12/2006

RECEPTOR: RCPTR_3 **UTM X:** 347,316.88 **UTM Y:** 383,191.22

Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child
Yes	Yes	No	No	No	No

DESCRIPTION	Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child	UNITS
Averaging time for carcinogens	70	70	70	70	70	70	yr
Averaging time for noncarcinogens	30	6	40	6	30	6	yr
Consumption rate of BEEF	0.0	0.0	0.00122	0.0	0.0	0.0	kg/kg-day FW
Body weight	70	15	70	15	70	15	kg
Consumption rate of POULTRY	0.0	0.0	0.00066	0.00045	0.0	0.0	kg/kg-day FW
Consumption rate of ABOVEGROUND PRODUCE	0.00032	0.00077	0.00047	0.00113	0.00032	0.00077	kg/kg-day DW
Consumption rate of BELOWGROUND PRODUCE	0.00014	0.00023	0.00017	0.00028	0.00014	0.00023	kg/kg-day DW
Consumption rate of DRINKING WATER	1.4	0.67	1.4	0.67	1.4	0.67	L/day
Consumption rate of PROTECTED ABOVEGROUND	0.00061	0.0015	0.00064	0.00157	0.00061	0.00150	kg/kg-day DW
Consumption rate of SOIL	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002	kg/d
Exposure duration	30	6	40	6	30	6	yr
Exposure frequency	350	350	350	350	350	350	day/yr
Consumption rate of EGGS	0.0	0.0	0.00075	0.00054	0.0	0.0	kg/kg-day FW
Fraction of contaminated ABOVEGROUND PRODUCE	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction of contaminated DRINKING WATER	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction contaminated SOIL	1.0	1.0	1.0	1.0	1.0	1.0	--
Consumption rate of FISH	0.0	0.0	0.0	0.0	0.00125	0.00088	kg/kg-day FW
Fraction of contaminated FISH	1.0	1.0	1.0	1.0	1.0	1.0	--
Inhalation exposure duration	30	6	40	6	30	6	yr
Inhalation exposure frequency	350	350	350	350	350	350	day/yr
Inhalation exposure time	24	24	24	24	24	24	hr/day
Fraction of contaminated BEEF	1	1	1	1	1	1	--
Fraction of contaminated POULTRY	1	1	1	1	1	1	--
Fraction of contaminated EGGS	1	1	1	1	1	1	--
Fraction of contaminated MILK	1	1	1	1	1	1	--
Fraction of contaminated PORK	1	1	1	1	1	1	--
Inhalation rate	0.83	0.30	0.83	0.30	0.83	0.30	m^3/hr
Consumption rate of MILK	0.0	0.0	0.01367	0.02268	0.0	0.0	kg/kg-day FW
Consumption rate of PORK	0.0	0.0	0.00055	0.00042	0.0	0.0	kg/kg-day FW
Time period at the beginning of combustion	0	0	0	0	0	0	yr
Length of exposure duration	30	6	40	6	30	6	yr

Date : 18/12/2006

OSURE SCENARIO PARAMETERS

ĒPTOR: RCPTR_4 | UTM X: 347,986.16 | UTM Y: 383,500.40

Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child
No	No	Yes	Yes	No	No

ESCRIPTION	Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child	UNITS
eraging time for carcinogens	70	70	70	70	70	70	yr
eraging time for noncarcinogens	30	6	40	6	30	6	yr
nsumption rate of BEEF	0.0	0.0	0.00122	0.00075	0.0	0.0	kg/kg-day FW
ody weight	70	15	70	15	70	15	kg
onsumption rate of POULTRY	0.0	0.0	0.00066	0.00045	0.0	0.0	kg/kg-day FW
onsumption rate of ABOVEGROUND PRODUCE	0.00032	0.00077	0.00047	0.00113	0.00032	0.00077	kg/kg-day DW
onsumption rate of BELOWGROUND PRODUCE	0.00014	0.00023	0.00017	0.00028	0.00014	0.00023	kg/kg-day DW
onsumption rate of DRINKING WATER	1.4	0.67	1.4	0.67	1.4	0.67	L/day
onsumption rate of PROTECTED ABOVEGROUND	0.00061	0.0015	0.00064	0.00157	0.00061	0.00150	kg/kg-day DW
onsumption rate of SOIL	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002	kg/d
xposure duration	30	6	40	6	30	6	yr
xposure frequency	350	350	350	350	350	350	day/yr
Consumption rate of EGGS	0.0	0.0	0.00075	0.00054	0.0	0.0	kg/kg-day FW
Fraction of contaminated ABOVEGROUND PRODUCE	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction of contaminated DRINKING WATER	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction contaminated SOIL	1.0	1.0	1.0	1.0	1.0	1.0	--
Consumption rate of FISH	0.0	0.0	0.0	0.0	0.00125	0.00088	kg/kg-day FW
Fraction of contaminated FISH	1.0	1.0	1.0	1.0	1.0	1.0	--
Inhalation exposure duration	30	6	40	6	30	6	yr
Inhalation exposure frequency	350	350	350	350	350	350	day/yr
Inhalation exposure time	24	24	24	24	24	24	hr/day
Fraction of contaminated BEEF	1	1	1	1	1	1	--
Fraction of contaminated POULTRY	1	1	1	1	1	1	--
Fraction of contaminated EGGS	1	1	1	1	1	1	--
Fraction of contaminated MILK	1	1	1	1	1	1	--
Fraction of contaminated PORK	1	1	1	1	1	1	--
Inhalation rate	0.83	0.30	0.83	0.30	0.83	0.30	m^3/hr
Consumption rate of MILK	0.0	0.0	0.01367	0.02268	0.0	0.0	kg/kg-day FW
Consumption rate of PORK	0.0	0.0	0.00055	0.00042	0.0	0.0	kg/kg-day FW
Time period at the beginning of combustion	0	0	0	0	0	0	yr
Length of exposure duration	30	6	40	6	30	6	yr

EXPOSURE SCENARIO PARAMETERS

Date : 18/12/2006

RECEPTOR: RCPTR_5	UTM X: 348,088.01	UTM Y: 383,082.10

Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child
No	No	Yes	Yes	No	No

DESCRIPTION	Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child	UNITS
Averaging time for carcinogens	70	70	70	70	70	70	yr
Averaging time for noncarcinogens	30	6	40	6	30	6	yr
Consumption rate of BEEF	0.0	0.0	0.00122	0.00075	0.0	0.0	kg/kg-day FW
Body weight	70	15	70	15	70	15	kg
Consumption rate of POULTRY	0.0	0.0	0.00066	0.00045	0.0	0.0	kg/kg-day FW
Consumption rate of ABOVEGROUND PRODUCE	0.00032	0.00077	0.00047	0.00113	0.00032	0.00077	kg/kg-day DW
Consumption rate of BELOWGROUND PRODUCE	0.00014	0.00023	0.00017	0.00028	0.00014	0.00023	kg/kg-day DW
Consumption rate of DRINKING WATER	1.4	0.67	1.4	0.67	1.4	0.67	L/day
Consumption rate of PROTECTED ABOVEGROUND	0.00061	0.0015	0.00064	0.00157	0.00061	0.00150	kg/kg-day DW
Consumption rate of SOIL	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002	kg/d
Exposure duration	30	6	40	6	30	6	yr
Exposure frequency	350	350	350	350	350	350	day/yr
Consumption rate of EGGS	0.0	0.0	0.00075	0.00054	0.0	0.0	kg/kg-day FW
Fraction of contaminated ABOVEGROUND PRODUCE	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction of contaminated DRINKING WATER	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction contaminated SOIL	1.0	1.0	1.0	1.0	1.0	1.0	--
Consumption rate of FISH	0.0	0.0	0.0	0.0	0.00125	0.00088	kg/kg-day FW
Fraction of contaminated FISH	1.0	1.0	1.0	1.0	1.0	1.0	--
Inhalation exposure duration	30	6	40	6	30	6	yr
Inhalation exposure frequency	350	350	350	350	350	350	day/yr
Inhalation exposure time	24	24	24	24	24	24	hr/day
Fraction of contaminated BEEF	1	1	1	1	1	1	--
Fraction of contaminated POULTRY	1	1	1	1	1	1	--
Fraction of contaminated EGGS	1	1	1	1	1	1	--
Fraction of contaminated MILK	1	1	1	1	1	1	--
Fraction of contaminated PORK	1	1	1	1	1	1	--
Inhalation rate	0.83	0.30	0.83	0.30	0.83	0.30	m^3/hr
Consumption rate of MILK	0.0	0.0	0.01367	0.02268	0.0	0.0	kg/kg-day FW
Consumption rate of PORK	0.0	0.0	0.00055	0.00042	0.0	0.0	kg/kg-day FW
Time period at the beginning of combustion	0	0	0	0	0	0	yr
Length of exposure duration	30	6	40	6	30	6	yr

EXPOSURE SCENARIO PARAMETERS

Date : 18/12/2006

RECEPTOR: RCPTR_6 | **UTM X: 350,405.44** | **UTM Y: 383,025.27**

Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child
Yes	Yes	No	No	No	No

DESCRIPTION	Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child	UNITS
Averaging time for carcinogens	70	70	70	70	70	70	yr
Averaging time for noncarcinogens	30	6	40	6	30	6	yr
Consumption rate of BEEF	0.0	0.0	0.00122	0.00075	0.0	0.0	kg/kg-day FW
Body weight	70	15	70	15	70	15	kg
Consumption rate of POULTRY	0.0	0.0	0.00066	0.00045	0.0	0.0	kg/kg-day FW
Consumption rate of ABOVEGROUND PRODUCE	0.00032	0.00077	0.00047	0.00113	0.00032	0.00077	kg/kg-day DW
Consumption rate of BELOWGROUND PRODUCE	0.00014	0.00023	0.00017	0.00028	0.00014	0.00023	kg/kg-day DW
Consumption rate of DRINKING WATER	1.4	0.67	1.4	0.67	1.4	0.67	L/day
Consumption rate of PROTECTED ABOVEGROUND	0.00061	0.0015	0.00064	0.00157	0.00061	0.00150	kg/kg-day DW
Consumption rate of SOIL	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002	kg/d
Exposure duration	30	6	40	6	30	6	yr
Exposure frequency	350	350	350	350	350	350	day/yr
Consumption rate of EGGS	0.0	0.0	0.00075	0.00054	0.0	0.0	kg/kg-day FW
Fraction of contaminated ABOVEGROUND PRODUCE	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction of contaminated DRINKING WATER	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction contaminated SOIL	1.0	1.0	1.0	1.0	1.0	1.0	--
Consumption rate of FISH	0.0	0.0	0.0	0.0	0.00125	0.00088	kg/kg-day FW
Fraction contaminated FISH	1.0	1.0	1.0	1.0	1.0	1.0	--
Inhalation exposure duration	30	6	40	6	30	6	yr
Inhalation exposure frequency	350	350	350	350	350	350	day/yr
Inhalation exposure time	24	24	24	24	24	24	hr/day
Fraction of contaminated BEEF	1	1	1	1	1	1	--
Fraction of contaminated POULTRY	1	1	1	1	1	1	--
Fraction of contaminated EGGS	1	1	1	1	1	1	--
Fraction of contaminated MILK	1	1	1	1	1	1	--
Fraction of contaminated PORK	1	1	1	1	1	1	--
Inhalation rate	0.83	0.30	0.83	0.30	0.83	0.30	m^3/hr
Consumption rate of MILK	0.0	0.0	0.01367	0.02268	0.0	0.0	kg/kg-day FW
Consumption rate of PORK	0.0	0.0	0.00055	0.00042	0.0	0.0	kg/kg-day FW
Time period at the beginning of combustion	0	0	0	0	0	0	yr
Length of exposure duration	30	6	40	6	30	6	yr

EXPOSURE SCENARIO PARAMETERS

Date : 18/12/2006

RECEPTOR: RCPTR_7	UTM X: 350,449.10	UTM Y: 382,356.21

Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child
Yes	Yes	No	No	No	No

DESCRIPTION	Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child	UNITS
Averaging time for carcinogens	70	70	70	70	70	70	yr
Averaging time for noncarcinogens	30	6	40	6	30	6	yr
Consumption rate of BEEF	0.0	0.0	0.00122	0.00075	0.0	0.0	kg/kg-day FW
Body weight	70	15	70	15	70	15	kg
Consumption rate of POULTRY	0.0	0.0	0.00066	0.00045	0.0	0.0	kg/kg-day FW
Consumption rate of ABOVEGROUND PRODUCE	0.00032	0.00077	0.00047	0.00113	0.00032	0.00077	kg/kg-day DW
Consumption rate of BELOWGROUND PRODUCE	0.00014	0.00023	0.00017	0.00028	0.00014	0.00023	kg/kg-day DW
Consumption rate of DRINKING WATER	1.4	0.67	1.4	0.67	1.4	0.67	L/day
Consumption rate of PROTECTED ABOVEGROUND	0.00061	0.0015	0.00064	0.00157	0.00061	0.00150	kg/kg-day DW
Consumption rate of SOIL	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002	kg/d
Exposure duration	30	6	40	6	30	6	yr
Exposure frequency	350	350	350	350	350	350	day/yr
Consumption rate of EGGS	0.0	0.0	0.00075	0.00054	0.0	0.0	kg/kg-day FW
Fraction of contaminated ABOVEGROUND PRODUCE	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction of contaminated DRINKING WATER	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction contaminated SOIL	1.0	1.0	1.0	1.0	1.0	1.0	--
Consumption rate of FISH	0.0	0.0	0.0	0.0	0.00125	0.00088	kg/kg-day FW
Fraction of contaminated FISH	1.0	1.0	1.0	1.0	1.0	1.0	--
Inhalation exposure duration	30	6	40	6	30	6	yr
Inhalation exposure frequency	350	350	350	350	350	350	day/yr
Inhalation exposure time	24	24	24	24	24	24	hr/day
Fraction of contaminated BEEF	1	1	1	1	1	1	--
Fraction of contaminated POULTRY	1	1	1	1	1	1	--
Fraction of contaminated EGGS	1	1	1	1	1	1	--
Fraction of contaminated MILK	1	1	1	1	1	1	--
Fraction of contaminated PORK	1	1	1	1	1	1	--
Inhalation rate	0.83	0.30	0.83	0.30	0.83	0.30	m^3/hr
Consumption rate of MILK	0.0	0.0	0.01367	0.02268	0.0	0.0	kg/kg-day FW
Consumption rate of PORK	0.0	0.0	0.00055	0.00042	0.0	0.0	kg/kg-day FW
Time period at the beginning of combustion	0	0	0	0	0	0	yr
Length of exposure duration	30	6	40	6	30	6	yr

Date : 18/12/2006

)SURE SCENARIO PARAMETERS

EPTOR: RCPTR_8	UTM X: 350,765.56	UTM Y: 382,305.30

Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child
Yes	No	No	No	No	No

CRIPTION							UNITS
aging time for carcinogens	70	70	70	70	70	70	yr
aging time for noncarcinogens	30	6	40	6	30	6	yr
sumption rate of BEEF	0.0	0.0	0.00122	0.00075	0.0	0.0	kg/kg-day FW
/ weight	70	15	70	15	70	15	kg
sur n rate of POULTRY	0.0	0.0	0.00066	0.00045	0.0	0.0	kg/kg-day FW
sumption rate of ABOVEGROUND PRODUCE	0.00032	0.00077	0.00047	0.00113	0.00032	0.00077	kg/kg-day DW
sumption rate of BELOWGROUND PRODUCE	0.00014	0.00023	0.00017	0.00028	0.00014	0.00023	kg/kg-day DW
sumption rate of DRINKING WATER	1.4	0.67	1.4	0.67	1.4	0.67	L/day
sumption rate of PROTECTED ABOVEGROUND	0.00061	0.0015	0.00064	0.00157	0.00061	0.00150	kg/kg-day DW
sumption rate of SOIL	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002	kg/d
)sure duration	30	6	40	6	30	6	yr
)sure frequency	350	350	350	350	350	350	day/yr
sumption rate of EGGS	0.0	0.0	0.00075	0.00054	0.0	0.0	kg/kg-day FW
tion of contaminated ABOVEGROUND PRODUCE	1.0	1.0	1.0	1.0	1.0	1.0	--
tion of contaminated DRINKING WATER	1.0	1.0	1.0	1.0	1.0	1.0	--
tion contaminated SOIL	1.0	1.0	1.0	1.0	1.0	1.0	--
sumption rate of FISH	0.0	0.0	0.0	0.0	0.00125	0.00088	kg/kg-day FW
tio ntaminated FISH	1.0	1.0	1.0	1.0	1.0	1.0	--
lation exposure duration	30	6	40	6	30	6	yr
lation exposure frequency	350	350	350	350	350	350	day/yr
lation exposure time	24	24	24	24	24	24	hr/day
tion of contaminated BEEF	1	1	1	1	1	1	--
tion of contaminated POULTRY	1	1	1	1	1	1	--
tion of contaminated EGGS	1	1	1	1	1	1	--
tion of contaminated MILK	1	1	1	1	1	1	--
tion of contaminated PORK	1	1	1	1	1	1	--
lation rate	0.83	0.30	0.83	0.30	0.83	0.30	m^3/hr
sumption rate of MILK	0.0	0.0	0.01367	0.02268	0.0	0.0	kg/kg-day FW
sumption rate of PORK	0.0	0.0	0.00055	0.00042	0.0	0.0	kg/kg-day FW
; period at the beginning of combustion	0	0	0	0	0	0	yr
jth of exposure duration	30	6	40	6	30	6	yr

EXPOSURE SCENARIO PARAMETERS

Date : 18/12/2006

RECEPTOR: RCPTR_9	UTM X: 351,238.42	UTM Y: 381,977.93

Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child
Yes	Yes	No	No	No	No

DESCRIPTION	Resident Adult	Resident Child	Farmer Adult	Farmer Child	Fisher Adult	Fisher Child	UNITS
Averaging time for carcinogens	70	70	70	70	70	70	yr
Averaging time for noncarcinogens	30	6	40	6	30	6	yr
Consumption rate of BEEF	0.0	0.0	0.00122	0.00075	0.0	0.0	kg/kg-day FW
Body weight	70	15	70	15	70	15	kg
Consumption rate of POULTRY	0.0	0.0	0.00066	0.00045	0.0	0.0	kg/kg-day FW
Consumption rate of ABOVEGROUND PRODUCE	0.00032	0.00077	0.00047	0.00113	0.00032	0.00077	kg/kg-day DW
Consumption rate of BELOWGROUND PRODUCE	0.00014	0.00023	0.00017	0.00028	0.00014	0.00023	kg/kg-day DW
Consumption rate of DRINKING WATER	1.4	0.67	1.4	0.67	1.4	0.67	L/day
Consumption rate of PROTECTED ABOVEGROUND	0.00061	0.0015	0.00064	0.00157	0.00061	0.00150	kg/kg-day DW
Consumption rate of SOIL	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002	kg/d
Exposure duration	30	6	40	6	30	6	yr
Exposure frequency	350	350	350	350	350	350	day/yr
Consumption rate of EGGS	0.0	0.0	0.00075	0.00054	0.0	0.0	kg/kg-day FW
Fraction of contaminated ABOVEGROUND PRODUCE	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction of contaminated DRINKING WATER	1.0	1.0	1.0	1.0	1.0	1.0	--
Fraction contaminated SOIL	1.0	1.0	1.0	1.0	1.0	1.0	--
Consumption rate of FISH	0.0	0.0	0.0	0.0	0.00125	0.00088	kg/kg-day FW
Fraction of contaminated FISH	1.0	1.0	1.0	1.0	1.0	1.0	--
Inhalation exposure duration	30	6	40	6	30	6	yr
Inhalation exposure frequency	350	350	350	350	350	350	day/yr
Inhalation exposure time	24	24	24	24	24	24	hr/day
Fraction of contaminated BEEF	1	1	1	1	1	1	--
Fraction of contaminated POULTRY	1	1	1	1	1	1	--
Fraction of contaminated EGGS	1	1	1	1	1	1	--
Fraction of contaminated MILK	1	1	1	1	1	1	--
Fraction of contaminated PORK	1	1	1	1	1	1	--
Inhalation rate	0.83	0.30	0.83	0.30	0.83	0.30	m^3/hr
Consumption rate of MILK	0.0	0.0	0.01367	0.02268	0.0	0.0	kg/kg-day FW
Consumption rate of PORK	0.0	0.0	0.00055	0.00042	0.0	0.0	kg/kg-day FW
Time period at the beginning of combustion	0	0	0	0	0	0	yr
Length of exposure duration	30	6	40	6	30	6	yr

SITE PARAMETERS Date : 18/12/2006

RECEPTOR:	RCPTR_1	UTM X:	346,800.37	UTM Y:	383,896.88

SITE PARAMETER	VALUE	SYMBOL	UNITS
Soil dry bulk density	1.5	bd	g/cm^3
Forage fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_forage	--
Grain fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_grain	--
Silage fraction grown on contam. eaten by CATTLE	1.0	beef_fi_silage	--
Qty of forage eaten by CATTLE each day	8.8	beef_qp_forage	kg DW/day
Qty of grain eaten by CATTLE each day	0.47	beef_qp_grain	kg DW/day
Qty of silage eaten by CATTLE each day	2.5	beef_qp_silage	kg DW/day
Grain fraction grown on contam. soil eaten by CHICKEN	1.0	chick_fi_grain	--
Qty of grain eaten by CHICKEN each day	0.2	chick_qp_grain	kg DW/day
Average annual evapotranspiration	56.28	e_v	cm/yr
Fish lipid content	0.07	f_lipid	--
Fraction of CHICKEN's diet that is soil	0.1	fd_chicken	--
Universal gas constant	8.205e-5	gas_r	atm-m^3/mol-K
Average annual irrigation	0.0	i	cm/yr
Plant surface loss coefficient	18	kp	yr^-1
Fraction of mercury emissions NOT lost to the global cycle	0.48	merc_q_corr	--
Fraction of mercury speciated into methyl mercury in produce	0.22	mercmethyl_ag	--
Fraction of mercury speciated into methyl mercury in soil	0.02	mercmethyl_sc	--
Forage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_forage	--
Grain fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_grain	--
Silage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_silage	--
Qty of forage eaten by MILK CATTLE each day	13.2	milk_qp_forage	kg DW/day
Qty of grain eaten by MILK CATTLE each day	3.0	milk_qp_grain	kg DW/day
Qty of silage eaten by MILK CATTLE each day	4.1	milk_qp_silage	kg DW/day
Averaging time	1	milkfat_at	yr
Body weight of infant	9.4	milfat_bw_infant	kg
Exposure duration of infant to breast milk	1	milkfat_ed	yr
Proportion of ingested dioxin that is stored in fat	0.9	milkfat_f1	--
Proportion of mothers weight that is fat	0.3	milkfat_f2	--
Fraction of fat in breast milk	0.04	milkfat_f3	--
Fraction of ingested contaminant that is absorbed	0.9	milkfat_f4	--
Half-life of dioxin in adults	2555	milkfat_h	days
Ingestion rate of breast milk	0.688	milkfat_ir_milk	kg/day
Viscosity of air corresponding to air temp.	1.81e-04	mu_a	g/cm-s
Average annual precipitation	80	p	cm/yr

Date : 18/12/2006

: PARAMETERS

ECEPTOR:	RCPTR_1	UTM X:	346,800.37	UTM Y:	383,896.88

TE PARAMETER	VALUE	SYMBOL	UNITS
raction of grain grown on contam. soil eaten by PIGS	1.0	pork_fi_grain	--
raction of silage grown on contam. soil and eaten by PIGS	1.0	pork_fi_silage	--
ty of grain eaten by PIGS each day	3.3	pork_qp_grain	kg DW/day
ty of silage eaten by PIGS each day	1.4	pork_qp_silage	kg DW/day
ty of soil eaten by CATTLE	0.5	qs_beef	kg/day
ty of soil eaten by CHICKEN	0.022	qs_chick	kg/day
ty[illegible]il eaten by DAIRY CATTLE	0.4	qs_milk	kg/day
ty of soil eaten by PIGS	0.37	qs_pork	kg/day
verage annual runoff	8	r	cm/yr
ensity of air	1.2e-3	rho_a	g/cm^3
olids particle density	2.7	rho_s	g/cm^3
iterception fraction - edible portion ABOVEGROUND	0.39	rp	--
iterception fraction - edible portion FORAGE	0.5	rp_forage	--
iterception fraction - edible portion SILAGE	0.46	rp_silage	--
mbient air temperature	298	t	K
emperature correction factor	1.026	theta	--
oil volumetric water content	0.2	theta_s	mL/cm^3
ength of plant expos. to depos. - ABOVEGROUND	**0.16**	tp	Yr
ength of plant expos. to depos. - FORAGE	0.12	tp_forage	Yr
engt[illegible] of plant expos. to depos. - SILAGE	0.16	tp_silage	Yr
vel[illegible]annual wind speed	3.9	u	m/s
ry deposition velocity	0.5	vdv	cm/s
ry deposition velocity for mercury	2.9	vdv_hg	cm/s
Vind velocity	4.507	w	m/s
ield/standing crop biomass - edible portion ABOVEGROUND	2.24	yp	kg DW/m^2
ield/standing crop biomass - edible portion FORAGE	0.24	yp_forage	kg DW/m^2
ield/standing crop biomass - edible portion SILAGE	0.8	yp_silage	kg DW/m^2
oil mixing zone depth	2.0	z	cm

SITE PARAMETERS

Date : 18/12/2006

RECEPTOR:	RCPTR_10	UTM X:	351,645.81	UTM Y:	381,399.58

SITE PARAMETER	VALUE	SYMBOL	UNITS
Soil dry bulk density	1.5	bd	g/cm^3
Forage fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_forage	--
Grain fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_grain	--
Silage fraction grown on contam. eaten by CATTLE	1.0	beef_fi_silage	--
Qty of forage eaten by CATTLE each day	8.8	beef_qp_forage	kg DW/day
Qty of grain eaten by CATTLE each day	0.47	beef_qp_grain	kg DW/day
Qty of silage eaten by CATTLE each day	2.5	beef_qp_silage	kg DW/day
Grain fraction grown on contam. soil eaten by CHICKEN	1.0	chick_fi_grain	--
Qty of grain eaten by CHICKEN each day	0.2	chick_qp_grain	kg DW/day
Average annual evapotranspiration	56.28	e_v	cm/yr
Fish lipid content	0.07	f_lipid	--
Fraction of CHICKEN's diet that is soil	0.1	fd_chicken	--
Universal gas constant	8.205e-5	gas_r	atm-m^3/mol-K
Average annual irrigation	0.0	i	cm/yr
Plant surface loss coefficient	18	kp	yr^-1
Fraction of mercury emissions NOT lost to the global cycle	0.48	merc_q_corr	--
Fraction of mercury speciated into methyl mercury in produce	0.22	mercmethyl_ag	--
Fraction of mercury speciated into methyl mercury in soil	0.02	mercmethyl_sc	--
Forage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_forage	--
Grain fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_grain	--
Silage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_silage	--
Qty of forage eaten by MILK CATTLE each day	13.2	milk_qp_forage	kg DW/day
Qty of grain eaten by MILK CATTLE each day	3.0	milk_qp_grain	kg DW/day
Qty of silage eaten by MILK CATTLE each day	4.1	milk_qp_silage	kg DW/day
Averaging time	1	milkfat_at	yr
Body weight of infant	9.4	milfat_bw_infant	kg
Exposure duration of infant to breast milk	1	milkfat_ed	yr
Proportion of ingested dioxin that is stored in fat	0.9	milkfat_f1	--
Proportion of mothers weight that is fat	0.3	milkfat_f2	--
Fraction of fat in breast milk	0.04	milkfat_f3	--
Fraction of ingested contaminant that is absorbed	0.9	milkfat_f4	--
Half-life of dioxin in adults	2555	milkfat_h	days
Ingestion rate of breast milk	0.688	milkfat_ir_milk	kg/day
Viscosity of air corresponding to air temp.	1.81e-04	mu_a	g/cm-s
Average annual precipitation	80	p	cm/yr

'E PARAMETERS

Date : 18/12/2006

RECEPTOR: RCPTR_10 UTM X: 351,645.81 UTM Y: 381,399.58

SITE PARAMETER	VALUE	SYMBOL	UNITS
Fraction of grain grown on contam. soil eaten by PIGS	1.0	pork_fi_grain	--
Fraction of silage grown on contam. soil and eaten by PIGS	1.0	pork_fi_silage	--
Qty of grain eaten by PIGS each day	3.3	pork_qp_grain	kg DW/day
Qty of silage eaten by PIGS each day	1.4	pork_qp_silage	kg DW/day
Qty of soil eaten by CATTLE	0.5	qs_beef	kg/day
Qty of soil eaten by CHICKEN	0.022	qs_chick	kg/day
Qty of soil eaten by DAIRY CATTLE	0.4	qs_milk	kg/day
Qty of soil eaten by PIGS	0.37	qs_pork	kg/day
Average annual runoff	8	r	cm/yr
Density of air	1.2e-3	rho_a	g/cm^3
Solids particle density	2.7	rho_s	g/cm^3
Interception fraction - edible portion ABOVEGROUND	0.39	rp	--
Interception fraction - edible portion FORAGE	0.5	rp_forage	--
Interception fraction - edible portion SILAGE	0.46	rp_silage	--
Ambient air temperature	298	t	K
Temperature correction factor	1.026	theta	--
Soil volumetric water content	0.2	theta_s	mL/cm^3
Length of plant expos. to depos. - ABOVEGROUND	0.16	tp	Yr
Length of plant expos. to depos. - FORAGE	0.12	tp_forage	Yr
Length of plant expos. to depos. - SILAGE	0.16	tp_silage	Yr
Average annual wind speed	3.9	u	m/s
Dry deposition velocity	0.5	vdv	cm/s
Dry deposition velocity for mercury	2.9	vdv_hg	cm/s
Wind velocity	4.5	w	m/s
Yield/standing crop biomass - edible portion ABOVEGROUND	2.24	yp	kg DW/m^2
Yield/standing crop biomass - edible portion FORAGE	0.24	yp_forage	kg DW/m^2
Yield/standing crop biomass - edible portion SILAGE	0.8	yp_silage	kg DW/m^2
Soil mixing zone depth	2.0	z	cm

SITE PARAMETERS

Date : 18/12/2006

RECEPTOR: RCPTR_11 **UTM X:** 351,794.95 **UTM Y:** 381,134.05

SITE PARAMETER	VALUE	SYMBOL	UNITS
Soil dry bulk density	1.5	bd	g/cm^3
Forage fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_forage	--
Grain fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_grain	--
Silage fraction grown on contam. eaten by CATTLE	1.0	beef_fi_silage	--
Qty of forage eaten by CATTLE each day	8.8	beef_qp_forage	kg DW/day
Qty of grain eaten by CATTLE each day	0.47	beef_qp_grain	kg DW/day
Qty of silage eaten by CATTLE each day	2.5	beef_qp_silage	kg DW/day
Grain fraction grown on contam. soil eaten by CHICKEN	1.0	chick_fi_grain	--
Qty of grain eaten by CHICKEN each day	0.2	chick_qp_grain	kg DW/day
Average annual evapotranspiration	56.28	e_v	cm/yr
Fish lipid content	0.07	f_lipid	--
Fraction of CHICKEN's diet that is soil	0.1	fd_chicken	--
Universal gas constant	8.205e-5	gas_r	atm-m^3/mol-K
Average annual irrigation	0.0	i	cm/yr
Plant surface loss coefficient	18	kp	yr^-1
Fraction of mercury emissions NOT lost to the global cycle	0.48	merc_q_corr	--
Fraction of mercury speciated into methyl mercury in produce	0.22	mercmethyl_ag	--
Fraction of mercury speciated into methyl mercury in soil	0.02	mercmethyl_sc	--
Forage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_forage	--
Grain fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_grain	--
Silage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_silage	--
Qty of forage eaten by MILK CATTLE each day	13.2	milk_qp_forage	kg DW/day
Qty of grain eaten by MILK CATTLE each day	3.0	milk_qp_grain	kg DW/day
Qty of silage eaten by MILK CATTLE each day	4.1	milk_qp_silage	kg DW/day
Averaging time	1	milkfat_at	yr
Body weight of infant	9.4	milfat_bw_infant	kg
Exposure duration of infant to breast milk	1	milkfat_ed	yr
Proportion of ingested dioxin that is stored in fat	0.9	milkfat_f1	--
Proportion of mothers weight that is fat	0.3	milkfat_f2	--
Fraction of fat in breast milk	0.04	milkfat_f3	--
Fraction of ingested contaminant that is absorbed	0.9	milkfat_f4	--
Half-life of dioxin in adults	2555	milkfat_h	days
Ingestion rate of breast milk	0.688	milkfat_ir_milk	kg/day
Viscosity of air corresponding to air temp.	1.81e-04	mu_a	g/cm-s
Average annual precipitation	80	p	cm/yr

PARAMETERS

Date : 18/12/2006

:CEPTOR:	RCPTR_11	UTM X:	351,794.95	UTM Y:	381,134.05

'E PARAMETER	VALUE	SYMBOL	UNITS
action of grain grown on contam. soil eaten by PIGS	1.0	pork_fi_grain	--
action of silage grown on contam. soil and eaten by PIGS	1.0	pork_fi_silage	--
y of grain eaten by PIGS each day	3.3	pork_qp_grain	kg DW/day
y of silage eaten by PIGS each day	1.4	pork_qp_silage	kg DW/day
y of soil eaten by CATTLE	0.5	qs_beef	kg/day
y of soil eaten by CHICKEN	0.022	qs_chick	kg/day
y o eaten by DAIRY CATTLE	0.4	qs_milk	kg/day
y of soil eaten by PIGS	0.37	qs_pork	kg/day
erage annual runoff	8	r	cm/yr
nsity of air	1.2e-3	rho_a	g/cm^3
lids particle density	2.7	rho_s	g/cm^3
erception fraction - edible portion ABOVEGROUND	0.39	rp	--
erception fraction - edible portion FORAGE	0.5	rp_forage	--
erception fraction - edible portion SILAGE	0.46	rp_silage	--
ıbient air temperature	298	t	K
nperature correction factor	1.026	theta	--
l volumetric water content	0.2	theta_s	mL/cm^3
ıgth of plant expos. to depos. - ABOVEGROUND	0.16	tp	Yr
ıgth of plant expos. to depos. - FORAGE	0.12	tp_forage	Yr
ıgth plant expos. to depos. - SILAGE	0.16	tp_silage	Yr
erag annual wind speed	3.9	u	m/s
deposition velocity	0.5	vdv	cm/s
deposition velocity for mercury	2.9	vdv_hg	cm/s
ıd velocity	4.5	w	m/s
ld/standing crop biomass - edible portion ABOVEGROUND	2.24	yp	kg DW/m^2
d/standing crop biomass - edible portion FORAGE	0.24	yp_forage	kg DW/m^2
d/standing crop biomass - edible portion SILAGE	0.8	yp_silage	kg DW/m^2
mixing zone depth	2.0	z	cm

SITE PARAMETERS Date : 18/12/2006

RECEPTOR:	RCPTR_12	UTM X:	350,321.80	UTM Y:	381,315.92

SITE PARAMETER	VALUE	SYMBOL	UNITS
Soil dry bulk density	1.5	bd	g/cm^3
Forage fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_forage	--
Grain fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_grain	--
Silage fraction grown on contam. eaten by CATTLE	1.0	beef_fi_silage	--
Qty of forage eaten by CATTLE each day	8.8	beef_qp_forage	kg DW/day
Qty of grain eaten by CATTLE each day	0.47	beef_qp_grain	kg DW/day
Qty of silage eaten by CATTLE each day	2.5	beef_qp_silage	kg DW/day
Grain fraction grown on contam. soil eaten by CHICKEN	1.0	chick_fi_grain	--
Qty of grain eaten by CHICKEN each day	0.2	chick_qp_grain	kg DW/day
Average annual evapotranspiration	56.28	e_v	cm/yr
Fish lipid content	0.07	f_lipid	--
Fraction of CHICKEN's diet that is soil	0.1	fd_chicken	--
Universal gas constant	8.205e-5	gas_r	atm-m^3/mol-K
Average annual irrigation	0.0	i	cm/yr
Plant surface loss coefficient	18	kp	yr^-1
Fraction of mercury emissions NOT lost to the global cycle	0.48	merc_q_corr	--
Fraction of mercury speciated into methyl mercury in produce	0.22	mercmethyl_ag	--
Fraction of mercury speciated into methyl mercury in soil	0.02	mercmethyl_sc	--
Forage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_forage	--
Grain fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_grain	--
Silage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_silage	--
Qty of forage eaten by MILK CATTLE each day	13.2	milk_qp_forage	kg DW/day
Qty of grain eaten by MILK CATTLE each day	3.0	milk_qp_grain	kg DW/day
Qty of silage eaten by MILK CATTLE each day	4.1	milk_qp_silage	kg DW/day
Averaging time	1	milkfat_at	yr
Body weight of infant	9.4	milfat_bw_infant	kg
Exposure duration of infant to breast milk	1	milkfat_ed	yr
Proportion of ingested dioxin that is stored in fat	0.9	milkfat_f1	--
Proportion of mothers weight that is fat	0.3	milkfat_f2	--
Fraction of fat in breast milk	0.04	milkfat_f3	--
Fraction of ingested contaminant that is absorbed	0.9	milkfat_f4	--
Half-life of dioxin in adults	2555	milkfat_h	days
Ingestion rate of breast milk	0.688	milkfat_ir_milk	kg/day
Viscosity of air corresponding to air temp.	1.81e-04	mu_a	g/cm-s
Average annual precipitation	80	p	cm/yr

PARAMETERS

Date : 18/12/2006

:CEPTOR:	RCPTR_12	UTM X:	350,321.80	UTM Y:	381,315.92

'E PARAMETER	VALUE	SYMBOL	UNITS
action of grain grown on contam. soil eaten by PIGS	1.0	pork_fi_grain	--
action of silage grown on contam. soil and eaten by PIGS	1.0	pork_fi_silage	--
y of grain eaten by PIGS each day	3.3	pork_qp_grain	kg DW/day
y of silage eaten by PIGS each day	1.4	pork_qp_silage	kg DW/day
y of soil eaten by CATTLE	0.5	qs_beef	kg/day
y of soil eaten by CHICKEN	0.022	qs_chick	kg/day
y of soil eaten by DAIRY CATTLE	0.4	qs_milk	kg/day
y of soil eaten by PIGS	0.37	qs_pork	kg/day
'erage annual runoff	8	r	cm/yr
ensity of air	1.2e-3	rho_a	g/cm^3
lids particle density	2.7	rho_s	g/cm^3
erception fraction - edible portion ABOVEGROUND	0.39	rp	--
erception fraction - edible portion FORAGE	0.5	rp_forage	--
erception fraction - edible portion SILAGE	0.46	rp_silage	--
nbient air temperature	298	t	K
emperature correction factor	1.026	theta	--
il volumetric water content	0.2	theta_s	mL/cm^3
ngth of plant expos. to depos. - ABOVEGROUND	0.16	tp	Yr
ngth of plant expos. to depos. - FORAGE	0.12	tp_forage	Yr
ngth of plant expos. to depos. - SILAGE	0.16	tp_silage	Yr
'erage annual wind speed	3.9	u	m/s
y deposition velocity	0.5	vdv	cm/s
y deposition velocity for mercury	2.9	vdv_hg	cm/s
ind velocity	4.5	w	m/s
eld/standing crop biomass - edible portion ABOVEGROUND	2.24	yp	kg DW/m^2
eld/standing crop biomass - edible portion FORAGE	0.24	yp_forage	kg DW/m^2
eld/standing crop biomass - edible portion SILAGE	0.8	yp_silage	kg DW/m^2
il mixing zone depth	2.0	z	cm

Date : 18/12/2006

SITE PARAMETERS

RECEPTOR:	RCPTR_13	UTM X:	351,125.66	UTM Y:	380,646.64

SITE PARAMETER	VALUE	SYMBOL	UNITS
Soil dry bulk density	1.5	bd	g/cm^3
Forage fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_forage	--
Grain fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_grain	--
Silage fraction grown on contam. eaten by CATTLE	1.0	beef_fi_silage	--
Qty of forage eaten by CATTLE each day	8.8	beef_qp_forage	kg DW/day
Qty of grain eaten by CATTLE each day	0.47	beef_qp_grain	kg DW/day
Qty of silage eaten by CATTLE each day	2.5	beef_qp_silage	kg DW/day
Grain fraction grown on contam. soil eaten by CHICKEN	1.0	chick_fi_grain	--
Qty of grain eaten by CHICKEN each day	0.2	chick_qp_grain	kg DW/day
verage annual evapotranspiration	56.28	e_v	cm/yr
Fish lipid content	0.07	f_lipid	--
Fraction of CHICKEN's diet that is soil	0.1	fd_chicken	--
Universal gas constant	8.205e-5	gas_r	atm-m^3/mol-K
Average annual irrigation	0.0	i	cm/yr
Plant surface loss coefficient	18	kp	yr^-1
Fraction of mercury emissions NOT lost to the global cycle	0.48	merc_q_corr	--
Fraction of mercury speciated into methyl mercury in produce	0.22	mercmethyl_ag	--
Fraction of mercury speciated into methyl mercury in soil	0.02	mercmethyl_sc	--
Forage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_forage	--
Grain fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_grain	--
Silage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_silage	--
Qty of forage eaten by MILK CATTLE each day	13.2	milk_qp_forage	kg DW/day
Qty of grain eaten by MILK CATTLE each day	3.0	milk_qp_grain	kg DW/day
Qty of silage eaten by MILK CATTLE each day	4.1	milk_qp_silage	kg DW/day
Averaging time	1	milkfat_at	yr
Body weight of infant	9.4	milfat_bw_infant	kg
Exposure duration of infant to breast milk	1	milkfat_ed	yr
Proportion of ingested dioxin that is stored in fat	0.9	milkfat_f1	--
Proportion of mothers weight that is fat	0.3	milkfat_f2	--
Fraction of fat in breast milk	0.04	milkfat_f3	--
Fraction of ingested contaminant that is absorbed	0.9	milkfat_f4	--
Half-life of dioxin in adults	2555	milkfat_h	days
Ingestion rate of breast milk	0.688	milkfat_ir_milk	kg/day
Viscosity of air corresponding to air temp.	1.81e-04	mu_a	g/cm-s
Average annual precipitation	80	p	cm/yr

: PARAMETERS Date : 18/12/2006

ECEPTOR:	RCPTR_13	UTM X:	351,125.66	UTM Y:	380,646.64

TE PARAMETER	VALUE	SYMBOL	UNITS
action of grain grown on contam. soil eaten by PIGS	1.0	pork_fi_grain	--
action of silage grown on contam. soil and eaten by PIGS	1.0	pork_fi_silage	--
ty of grain eaten by PIGS each day	3.3	pork_qp_grain	kg DW/day
y of silage eaten by PIGS each day	1.4	pork_qp_silage	kg DW/day
y of soil eaten by CATTLE	0.5	qs_beef	kg/day
y of soil eaten by CHICKEN	0.022	qs_chick	kg/day
y c[illegible]l eaten by DAIRY CATTLE	0.4	qs_milk	kg/day
y of soil eaten by PIGS	0.37	qs_pork	kg/day
erage annual runoff	8	r	cm/yr
nsity of air	1.2e-3	rho_a	g/cm^3
lids particle density	2.7	rho_s	g/cm^3
erception fraction - edible portion ABOVEGROUND	0.39	rp	--
erception fraction - edible portion FORAGE	0.5	rp_forage	--
erception fraction - edible portion SILAGE	0.46	rp_silage	--
ibient air temperature	298	t	K
nperature correction factor	1.026	theta	--
l volumetric water content	0.2	theta_s	mL/cm^3
igth of plant expos. to depos. - ABOVEGROUND	0.16	tp	Yr
igth of plant expos. to depos. - FORAGE	0.12	tp_forage	Yr
igth of plant expos. to depos. - SILAGE	0.16	tp_silage	Yr
rag[illegible]nual wind speed	3.9	u	m/s
deposition velocity	0.5	vdv	cm/s
deposition velocity for mercury	2.9	vdv_hg	cm/s
d velocity	4.5	w	m/s
d/standing crop biomass - edible portion ABOVEGROUND	2.24	yp	kg DW/m^2
d/standing crop biomass - edible portion FORAGE	0.24	yp_forage	kg DW/m^2
d/standing crop biomass - edible portion SILAGE	0.8	yp_silage	kg DW/m^2
mixing zone depth	2.0	z	cm

SITE PARAMETERS

Date : 18/12/2006

RECEPTOR:	RCPTR_14	UTM X:	349,541.85	UTM Y:	377,391.99

SITE PARAMETER	VALUE	SYMBOL	UNITS
Soil dry bulk density	1.5	bd	g/cm^3
Forage fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_forage	--
Grain fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_grain	--
Silage fraction grown on contam. eaten by CATTLE	1.0	beef_fi_silage	--
Qty of forage eaten by CATTLE each day	8.8	beef_qp_forage	kg DW/day
Qty of grain eaten by CATTLE each day	0.47	beef_qp_grain	kg DW/day
Qty of silage eaten by CATTLE each day	2.5	beef_qp_silage	kg DW/day
Grain fraction grown on contam. soil eaten by CHICKEN	1.0	chick_fi_grain	--
Qty of grain eaten by CHICKEN each day	0.2	chick_qp_grain	kg DW/day
Average annual evapotranspiration	56.28	e_v	cm/yr
Fish lipid content	0.07	f_lipid	--
Fraction of CHICKEN's diet that is soil	0.1	fd_chicken	--
Universal gas constant	8.205e-5	gas_r	atm-m^3/mol-K
Average annual irrigation	0.0	i	cm/yr
Plant surface loss coefficient	18	kp	yr^-1
Fraction of mercury emissions NOT lost to the global cycle	0.48	merc_q_corr	--
Fraction of mercury speciated into methyl mercury in produce	0.22	mercmethyl_ag	--
Fraction of mercury speciated into methyl mercury in soil	0.02	mercmethyl_sc	--
Forage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_forage	--
Grain fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_grain	--
Silage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_silage	--
Qty of forage eaten by MILK CATTLE each day	13.2	milk_qp_forage	kg DW/day
Qty of grain eaten by MILK CATTLE each day	3.0	milk_qp_grain	kg DW/day
Qty of silage eaten by MILK CATTLE each day	4.1	milk_qp_silage	kg DW/day
Averaging time	1	milkfat_at	yr
Body weight of infant	9.4	milfat_bw_infant	kg
Exposure duration of infant to breast milk	1	milkfat_ed	yr
Proportion of ingested dioxin that is stored in fat	0.9	milkfat_f1	--
Proportion of mothers weight that is fat	0.3	milkfat_f2	--
Fraction of fat in breast milk	0.04	milkfat_f3	--
Fraction of ingested contaminant that is absorbed	0.9	milkfat_f4	--
Half-life of dioxin in adults	2555	milkfat_h	days
Ingestion rate of breast milk	0.688	milkfat_ir_milk	kg/day
Viscosity of air corresponding to air temp.	1.81e-04	mu_a	g/cm-s
Average annual precipitation	80	p	cm/yr

Date : 18/12/2006

TE PARAMETERS

RECEPTOR:	RCPTR_14	UTM X:	349,541.85	UTM Y:	377,391.99

SITE PARAMETER	VALUE	SYMBOL	UNITS
Fraction of grain grown on contam. soil eaten by PIGS	1.0	pork_fi_grain	--
Fraction of silage grown on contam. soil and eaten by PIGS	1.0	pork_fi_silage	--
Qty of grain eaten by PIGS each day	3.3	pork_qp_grain	kg DW/day
Qty of silage eaten by PIGS each day	1.4	pork_qp_silage	kg DW/day
Qty of soil eaten by CATTLE	0.5	qs_beef	kg/day
Qty of soil eaten by CHICKEN	0.022	qs_chick	kg/day
Qty of soil eaten by DAIRY CATTLE	0.4	qs_milk	kg/day
Qty of soil eaten by PIGS	0.37	qs_pork	kg/day
Average annual runoff	8	r	cm/yr
Density of air	1.2e-3	rho_a	g/cm^3
Solids particle density	2.7	rho_s	g/cm^3
Interception fraction - edible portion ABOVEGROUND	0.39	rp	--
Interception fraction - edible portion FORAGE	0.5	rp_forage	--
Interception fraction - edible portion SILAGE	0.46	rp_silage	--
Ambient air temperature	298	t	K
Temperature correction factor	1.026	theta	--
Soil volumetric water content	0.2	theta_s	mL/cm^3
Length of plant expos. to depos. - ABOVEGROUND	0.16	tp	Yr
Length of plant expos. to depos. - FORAGE	0.12	tp_forage	Yr
Length of plant expos. to depos. - SILAGE	0.16	tp_silage	Yr
Average annual wind speed	3.9	u	m/s
Dry deposition velocity	0.5	vdv	cm/s
Dry deposition velocity for mercury	2.9	vdv_hg	cm/s
Wind velocity	4.5	w	m/s
Yield/standing crop biomass - edible portion ABOVEGROUND	2.24	yp	kg DW/m^2
Yield/standing crop biomass - edible portion FORAGE	0.24	yp_forage	kg DW/m^2
Yield/standing crop biomass - edible portion SILAGE	0.8	yp_silage	kg DW/m^2
Soil mixing zone depth	2.0	z	cm

SITE PARAMETERS

Date : 18/12/2006

RECEPTOR:	RCPTR_15	UTM X:	348,247.48	UTM Y:	377,171.57

SITE PARAMETER	VALUE	SYMBOL	UNITS
Soil dry bulk density	1.5	bd	g/cm^3
Forage fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_forage	--
Grain fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_grain	--
Silage fraction grown on contam. eaten by CATTLE	1.0	beef_fi_silage	--
Qty of forage eaten by CATTLE each day	8.8	beef_qp_forage	kg DW/day
Qty of grain eaten by CATTLE each day	0.47	beef_qp_grain	kg DW/day
Qty of silage eaten by CATTLE each day	2.5	beef_qp_silage	kg DW/day
Grain fraction grown on contam. soil eaten by CHICKEN	1.0	chick_fi_grain	--
Qty of grain eaten by CHICKEN each day	0.2	chick_qp_grain	kg DW/day
Average annual evapotranspiration	56.28	e_v	cm/yr
Fish lipid content	0.07	f_lipid	--
Fraction of CHICKEN's diet that is soil	0.1	fd_chicken	--
Universal gas constant	**8.206e-5**	**gas_r**	**atm*m^3/mol*K**
Average annual irrigation	0.0	i	cm/yr
Plant surface loss coefficient	18	kp	yr^-1
Fraction of mercury emissions NOT lost to the global cycle	0.48	merc_q_corr	--
Fraction of mercury speciated into methyl mercury in produce	0.22	mercmethyl_ag	--
Fraction of mercury speciated into methyl mercury in soil	0.02	mercmethyl_sc	--
Forage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_forage	--
Grain fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_grain	--
Silage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_silage	--
Qty of forage eaten by MILK CATTLE each day	13.2	milk_qp_forage	kg DW/day
Qty of grain eaten by MILK CATTLE each day	3.0	milk_qp_grain	kg DW/day
Qty of silage eaten by MILK CATTLE each day	4.1	milk_qp_silage	kg DW/day
Averaging time	1	milkfat_at	yr
Body weight of infant	9.4	milfat_bw_infant	kg
Exposure duration of infant to breast milk	1	milkfat_ed	yr
Proportion of ingested dioxin that is stored in fat	0.9	milkfat_f1	--
Proportion of mothers weight that is fat	0.3	milkfat_f2	--
Fraction of fat in breast milk	0.04	milkfat_f3	--
Fraction of ingested contaminant that is absorbed	0.9	milkfat_f4	--
Half-life of dioxin in adults	2555	milkfat_h	days
Ingestion rate of breast milk	**0.688**	**milkfat_ir_milk**	**kg/day**
Viscosity of air corresponding to air temp.	1.81e-04	mu_a	g/cm-s
Average annual precipitation	80	p	cm/yr

Date : 18/12/2006

E PARAMETERS

RECEPTOR:	RCPTR_15	UTM X:	348,247.48	UTM Y:	377,171.57

SITE PARAMETER	VALUE	SYMBOL	UNITS
Fraction of grain grown on contam. soil eaten by PIGS	1.0	pork_fi_grain	--
Fraction of silage grown on contam. soil and eaten by PIGS	1.0	pork_fi_silage	--
Qty of grain eaten by PIGS each day	3.3	pork_qp_grain	kg DW/day
Qty of silage eaten by PIGS each day	1.4	pork_qp_silage	kg DW/day
Qty of soil eaten by CATTLE	0.5	qs_beef	kg/day
Qty of soil eaten by CHICKEN	0.022	qs_chick	kg/day
Qty of soil eaten by DAIRY CATTLE	0.4	qs_milk	kg/day
Qty of soil eaten by PIGS	0.37	qs_pork	kg/day
Average annual runoff	8	r	cm/yr
Density of air	1.2e-3	rho_a	g/cm^3
Solids particle density	2.7	rho_s	g/cm^3
Interception fraction - edible portion ABOVEGROUND	0.39	rp	--
Interception fraction - edible portion FORAGE	0.5	rp_forage	--
Interception fraction - edible portion SILAGE	0.46	rp_silage	--
Ambient air temperature	298	t	K
Temperature correction factor	1.026	theta	--
Soil volumetric water content	0.2	theta_s	mL/cm^3
Length of plant expos. to depos. - ABOVEGROUND	**0.16**	tp	Yr
Length of plant expos. to depos. - FORAGE	0.12	tp_forage	Yr
Length of plant expos. to depos. - SILAGE	0.16	tp_silage	Yr
Average annual wind speed	3.9	u	m/s
Dry deposition velocity	0.5	vdv	cm/s
Dry deposition velocity for mercury	2.9	vdv_hg	cm/s
Wind velocity	4.5	w	m/s
Yield/standing crop biomass - edible portion ABOVEGROUND	2.24	yp	kg DW/m^2
Yield/standing crop biomass - edible portion FORAGE	0.24	yp_forage	kg DW/m^2
Yield/standing crop biomass - edible portion SILAGE	0.8	yp_silage	kg DW/m^2
Soil mixing zone depth	2.0	z	cm

SITE PARAMETERS Date : 18/12/2006

RECEPTOR:	RCPTR_16	UTM X:	348,418.63	UTM Y:	376,108.94

SITE PARAMETER	VALUE	SYMBOL	UNITS
Soil dry bulk density	1.5	bd	g/cm^3
Forage fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_forage	--
Grain fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_grain	--
Silage fraction grown on contam. eaten by CATTLE	1.0	beef_fi_silage	--
Qty of forage eaten by CATTLE each day	8.8	beef_qp_forage	kg DW/day
Qty of grain eaten by CATTLE each day	0.47	beef_qp_grain	kg DW/day
Qty of silage eaten by CATTLE each day	2.5	beef_qp_silage	kg DW/day
Grain fraction grown on contam. soil eaten by CHICKEN	1.0	chick_fi_grain	--
Qty of grain eaten by CHICKEN each day	0.2	chick_qp_grain	kg DW/day
Average annual evapotranspiration	56.28	e_v	cm/yr
Fish lipid content	0.07	f_lipid	--
Fraction of CHICKEN's diet that is soil	0.1	fd_chicken	--
Universal gas constant	8.205e-5	gas_r	atm-m^3/mol-K
Average annual irrigation	0.0	i	cm/yr
Plant surface loss coefficient	18	kp	yr^-1
Fraction of mercury emissions NOT lost to the global cycle	0.48	merc_q_corr	--
Fraction of mercury speciated into methyl mercury in produce	0.22	mercmethyl_ag	--
Fraction of mercury speciated into methyl mercury in soil	0.02	mercmethyl_sc	--
Forage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_forage	--
Grain fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_grain	--
Silage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_silage	--
Qty of forage eaten by MILK CATTLE each day	13.2	milk_qp_forage	kg DW/day
Qty of grain eaten by MILK CATTLE each day	3.0	milk_qp_grain	kg DW/day
Qty of silage eaten by MILK CATTLE each day	4.1	milk_qp_silage	kg DW/day
Averaging time	1	milkfat_at	yr
Body weight of infant	9.4	milfat_bw_infant	kg
Exposure duration of infant to breast milk	1	milkfat_ed	yr
Proportion of ingested dioxin that is stored in fat	0.9	milkfat_f1	--
Proportion of mothers weight that is fat	0.3	milkfat_f2	--
Fraction of fat in breast milk	0.04	milkfat_f3	--
Fraction of ingested contaminant that is absorbed	0.9	milkfat_f4	--
Half-life of dioxin in adults	2555	milkfat_h	days
Ingestion rate of breast milk	0.688	milkfat_ir_milk	kg/day
Viscosity of air corresponding to air temp.	1.81e-04	mu_a	g/cm-s
Average annual precipitation	80	p	cm/yr

E PARAMETERS

Date : 18/12/2006

RECEPTOR: RCPTR_16 UTM X: 348,418.63 UTM Y: 376,108.94

SITE PARAMETER	VALUE	SYMBOL	UNITS
Fraction of grain grown on contam. soil eaten by PIGS	1.0	pork_fi_grain	--
Fraction of silage grown on contam. soil and eaten by PIGS	1.0	pork_fi_silage	--
Qty of grain eaten by PIGS each day	3.3	pork_qp_grain	kg DW/day
Qty of silage eaten by PIGS each day	1.4	pork_qp_silage	kg DW/day
Qty of soil eaten by CATTLE	0.5	qs_beef	kg/day
Qty of soil eaten by CHICKEN	0.022	qs_chick	kg/day
Qty of soil eaten by DAIRY CATTLE	0.4	qs_milk	kg/day
Qty of soil eaten by PIGS	0.37	qs_pork	kg/day
Average annual runoff	8	r	cm/yr
Density of air	1.2e-3	rho_a	g/cm^3
Solids particle density	2.7	rho_s	g/cm^3
Interception fraction - edible portion ABOVEGROUND	0.39	rp	--
Interception fraction - edible portion FORAGE	0.5	rp_forage	--
Interception fraction - edible portion SILAGE	0.46	rp_silage	--
Ambient air temperature	298	t	K
Temperature correction factor	1.026	theta	--
Soil volumetric water content	0.2	theta_s	mL/cm^3
Length of plant expos. to depos. - ABOVEGROUND	**0.18**	**tp**	**Yr**
Length of plant expos. to depos. - FORAGE	0.12	tp_forage	Yr
Length of plant expos. to depos. - SILAGE	0.16	tp_silage	Yr
Average annual wind speed	3.9	u	m/s
Dry deposition velocity	0.5	vdv	cm/s
Dry deposition velocity for mercury	2.9	vdv_hg	cm/s
Wind velocity	4.5	w	m/s
Yield/standing crop biomass - edible portion ABOVEGROUND	2.24	yp	kg DW/m^2
Yield/standing crop biomass - edible portion FORAGE	0.24	yp_forage	kg DW/m^2
Yield/standing crop biomass - edible portion SILAGE	0.8	yp_silage	kg DW/m^2
Soil mixing zone depth	2.0	z	cm

SITE PARAMETERS

Date : 18/12/2006

RECEPTOR:	RCPTR_17	UTM X:	348,148.07	UTM Y:	375,973.67

SITE PARAMETER	VALUE	SYMBOL	UNITS
Soil dry bulk density	1.5	bd	g/cm^3
Forage fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_forage	--
Grain fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_grain	--
Silage fraction grown on contam. eaten by CATTLE	1.0	beef_fi_silage	--
Qty of forage eaten by CATTLE each day	8.8	beef_qp_forage	kg DW/day
Qty of grain eaten by CATTLE each day	0.47	beef_qp_grain	kg DW/day
Qty of silage eaten by CATTLE each day	2.5	beef_qp_silage	kg DW/day
Grain fraction grown on contam. soil eaten by CHICKEN	1.0	chick_fi_grain	--
Qty of grain eaten by CHICKEN each day	0.2	chick_qp_grain	kg DW/day
Average annual evapotranspiration	56.28	e_v	cm/yr
Fish lipid content	0.07	f_lipid	--
Fraction of CHICKEN's diet that is soil	0.1	fd_chicken	--
Universal gas constant	8.205e-5	gas_r	atm-m^3/mol-K
Average annual irrigation	0.0	i	cm/yr
Plant surface loss coefficient	18	kp	yr^-1
Fraction of mercury emissions NOT lost to the global cycle	0.48	merc_q_corr	--
Fraction of mercury speciated into methyl mercury in produce	0.22	mercmethyl_ag	--
Fraction of mercury speciated into methyl mercury in soil	0.02	mercmethyl_sc	--
Forage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_forage	--
Grain fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_grain	--
Silage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_silage	--
Qty of forage eaten by MILK CATTLE each day	13.2	milk_qp_forage	kg DW/day
Qty of grain eaten by MILK CATTLE each day	3.0	milk_qp_grain	kg DW/day
Qty of silage eaten by MILK CATTLE each day	4.1	milk_qp_silage	kg DW/day
Averaging time	1	milkfat_at	yr
Body weight of infant	9.4	milfat_bw_infant	kg
Exposure duration of infant to breast milk	1	milkfat_ed	yr
Proportion of ingested dioxin that is stored in fat	0.9	milkfat_f1	--
Proportion of mothers weight that is fat	0.3	milkfat_f2	--
Fraction of fat in breast milk	0.04	milkfat_f3	--
Fraction of ingested contaminant that is absorbed	0.9	milkfat_f4	--
Half-life of dioxin in adults	2555	milkfat_h	days
Ingestion rate of breast milk	0.688	milkfat_ir_milk	kg/day
Viscosity of air corresponding to air temp.	1.81e-04	mu_a	g/cm-s
Average annual precipitation	80	p	cm/yr

Date : 18/12/2006

PARAMETERS

:CEPTOR:	RCPTR_17	UTM X:	348,148.07	UTM Y:	375,973.67

'E PARAMETER	VALUE	SYMBOL	UNITS
action of grain grown on contam. soil eaten by PIGS	1.0	pork_fi_grain	--
action of silage grown on contam. soil and eaten by PIGS	1.0	pork_fi_silage	--
:y of grain eaten by PIGS each day	3.3	pork_qp_grain	kg DW/day
ty of silage eaten by PIGS each day	1.4	pork_qp_silage	kg DW/day
ty of soil eaten by CATTLE	0.5	qs_beef	kg/day
ty of soil eaten by CHICKEN	0.022	qs_chick	kg/day
ty c[illegible]il eaten by DAIRY CATTLE	0.4	qs_milk	kg/day
ty of soil eaten by PIGS	0.37	qs_pork	kg/day
verage annual runoff	8	r	cm/yr
ensity of air	1.2e-3	rho_a	g/cm^3
olids particle density	2.7	rho_s	g/cm^3
ıterception fraction - edible portion ABOVEGROUND	0.39	rp	--
ıterception fraction - edible portion FORAGE	0.5	rp_forage	--
ıterception fraction - edible portion SILAGE	0.46	rp_silage	--
.mbient air temperature	298	t	K
'emperature correction factor	1.026	theta	--
;oil volumetric water content	0.2	theta_s	mL/cm^3
.ength of plant expos. to depos. - ABOVEGROUND	0.16	tp	Yr
.ength of plant expos. to depos. - FORAGE	0.12	tp_forage	Yr
.en[illegible]f plant expos. to depos. - SILAGE	0.16	tp_silage	Yr
ıverage annual wind speed	3.9	u	m/s
)ry deposition velocity	0.5	vdv	cm/s
)ry deposition velocity for mercury	2.9	vdv_hg	cm/s
Vind velocity	4.5	w	m/s
(ield/standing crop biomass - edible portion ABOVEGROUND	2.24	yp	kg DW/m^2
(ield/standing crop biomass - edible portion FORAGE	0.24	yp_forage	kg DW/m^2
(ield/standing crop biomass - edible portion SILAGE	0.8	yp_silage	kg DW/m^2
;oil mixing zone depth	2.0	z	cm

SITE PARAMETERS

RECEPTOR:	RCPTR_18	UTM X:	354,002.70	UTM Y:	375,579.05

SITE PARAMETER	VALUE	SYMBOL	UNITS
Soil dry bulk density	1.5	bd	g/cm^3
Forage fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_forage	--
Grain fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_grain	--
Silage fraction grown on contam. eaten by CATTLE	1.0	beef_fi_silage	--
Qty of forage eaten by CATTLE each day	8.8	beef_qp_forage	kg DW/day
Qty of grain eaten by CATTLE each day	0.47	beef_qp_grain	kg DW/day
Qty of silage eaten by CATTLE each day	2.5	beef_qp_silage	kg DW/day
Grain fraction grown on contam. soil eaten by CHICKEN	1.0	chick_fi_grain	--
Qty of grain eaten by CHICKEN each day	0.2	chick_qp_grain	kg DW/day
Average annual evapotranspiration	56.28	e_v	cm/yr
Fish lipid content	0.07	f_lipid	--
Fraction of CHICKEN's diet that is soil	0.1	fd_chicken	--
Universal gas constant	8.205e-5	gas_r	atm-m^3/mol-K
Average annual irrigation	0.0	i	cm/yr
Plant surface loss coefficient	18	kp	yr^-1
Fraction of mercury emissions NOT lost to the global cycle	0.48	merc_q_corr	--
Fraction of mercury speciated into methyl mercury in produce	0.22	mercmethyl_ag	--
Fraction of mercury speciated into methyl mercury in soil	0.02	mercmethyl_sc	--
Forage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_forage	--
Grain fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_grain	--
Silage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_silage	--
Qty of forage eaten by MILK CATTLE each day	13.2	milk_qp_forage	kg DW/day
Qty of grain eaten by MILK CATTLE each day	3.0	milk_qp_grain	kg DW/day
Qty of silage eaten by MILK CATTLE each day	4.1	milk_qp_silage	kg DW/day
Averaging time	1	milkfat_at	yr
Body weight of infant	9.4	milfat_bw_infant	kg
Exposure duration of infant to breast milk	1	milkfat_ed	yr
Proportion of ingested dioxin that is stored in fat	0.9	milkfat_f1	--
Proportion of mothers weight that is fat	0.3	milkfat_f2	--
Fraction of fat in breast milk	0.04	milkfat_f3	--
Fraction of ingested contaminant that is absorbed	0.9	milkfat_f4	--
Half-life of dioxin in adults	2555	milkfat_h	days
Ingestion rate of breast milk	0.688	milkfat_ir_milk	kg/day
Viscosity of air corresponding to air temp.	1.81e-04	mu_a	g/cm-s
Average annual precipitation	80	p	cm/yr

Date : 18/12/2006

: PARAMETERS

ECEPTOR:	RCPTR_18	UTM X:	354,002.70	UTM Y:	375,579.05

ITE PARAMETER	VALUE	SYMBOL	UNITS
raction of grain grown on contam. soil eaten by PIGS	1.0	pork_fi_grain	--
raction of silage grown on contam. soil and eaten by PIGS	1.0	pork_fi_silage	--
Qty of grain eaten by PIGS each day	3.3	pork_qp_grain	kg DW/day
Qty of silage eaten by PIGS each day	1.4	pork_qp_silage	kg DW/day
Qty of soil eaten by CATTLE	0.5	qs_beef	kg/day
Qty of soil eaten by CHICKEN	0.022	qs_chick	kg/day
Qty of soil eaten by DAIRY CATTLE	0.4	qs_milk	kg/day
Qty of soil eaten by PIGS	0.37	qs_pork	kg/day
Average annual runoff	8	r	cm/yr
Density of air	1.2e-3	rho_a	g/cm^3
Solids particle density	2.7	rho_s	g/cm^3
Interception fraction - edible portion ABOVEGROUND	0.39	rp	--
Interception fraction - edible portion FORAGE	0.5	rp_forage	--
Interception fraction - edible portion SILAGE	0.46	rp_silage	--
Ambient air temperature	298	t	K
Temperature correction factor	1.026	theta	--
Soil volumetric water content	0.2	theta_s	mL/cm^3
Length of plant expos. to depos. - ABOVEGROUND	0.16	tp	Yr
Length of plant expos. to depos. - FORAGE	0.12	tp_forage	Yr
Length of plant expos. to depos. - SILAGE	0.16	tp_silage	Yr
Average annual wind speed	3.9	u	m/s
Dry deposition velocity	0.5	vdv	cm/s
Dry deposition velocity for mercury	2.9	vdv_hg	cm/s
Wind velocity	4.5	w	m/s
Yield/standing crop biomass - edible portion ABOVEGROUND	2.24	yp	kg DW/m^2
Yield/standing crop biomass - edible portion FORAGE	0.24	yp_forage	kg DW/m^2
Yield/standing crop biomass - edible portion SILAGE	0.8	yp_silage	kg DW/m^2
Soil mixing zone depth	2.0	z	cm

SITE PARAMETERS

Date : 18/12/2006

RECEPTOR:	RCPTR_19	UTM X:	354,474.56	UTM Y:	375,435.26

SITE PARAMETER	VALUE	SYMBOL	UNITS
Soil dry bulk density	1.5	bd	g/cm^3
Forage fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_forage	--
Grain fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_grain	--
Silage fraction grown on contam. eaten by CATTLE	1.0	beef_fi_silage	--
Qty of forage eaten by CATTLE each day	8.8	beef_qp_forage	kg DW/day
Qty of grain eaten by CATTLE each day	0.47	beef_qp_grain	kg DW/day
Qty of silage eaten by CATTLE each day	2.5	beef_qp_silage	kg DW/day
Grain fraction grown on contam. soil eaten by CHICKEN	1.0	chick_fi_grain	--
Qty of grain eaten by CHICKEN each day	0.2	chick_qp_grain	kg DW/day
Average annual evapotranspiration	56.28	e_v	cm/yr
Fish lipid content	0.07	f_lipid	--
Fraction of CHICKEN's diet that is soil	0.1	fd_chicken	--
Universal gas constant	**8.205e-5**	**gas_r**	**atm-m^3/mol-K**
Average annual irrigation	0.0	i	cm/yr
Plant surface loss coefficient	18	kp	yr^-1
Fraction of mercury emissions NOT lost to the global cycle	0.48	merc_q_corr	--
Fraction of mercury speciated into methyl mercury in produce	0.22	mercmethyl_ag	--
Fraction of mercury speciated into methyl mercury in soil	0.02	mercmethyl_sc	--
Forage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_forage	--
Grain fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_grain	--
Silage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_silage	--
Qty of forage eaten by MILK CATTLE each day	13.2	milk_qp_forage	kg DW/day
Qty of grain eaten by MILK CATTLE each day	3.0	milk_qp_grain	kg DW/day
Qty of silage eaten by MILK CATTLE each day	4.1	milk_qp_silage	kg DW/day
Averaging time	1	milkfat_at	yr
Body weight of infant	9.4	milfat_bw_infant	kg
Exposure duration of infant to breast milk	1	milkfat_ed	yr
Proportion of ingested dioxin that is stored in fat	0.9	milkfat_f1	--
Proportion of mothers weight that is fat	0.3	milkfat_f2	--
Fraction of fat in breast milk	0.04	milkfat_f3	--
Fraction of ingested contaminant that is absorbed	0.9	milkfat_f4	--
Half-life of dioxin in adults	2555	milkfat_h	days
Ingestion rate of breast milk	**0.688**	**milkfat_ir_milk**	**kg/day**
Viscosity of air corresponding to air temp.	1.81e-04	mu_a	g/cm-s
Average annual precipitation	80	p	cm/yr

E PARAMETERS

Date : 18/12/2006

RECEPTOR:	RCPTR_19	UTM X:	354,474.56	UTM Y:	375,435.26

SITE PARAMETER	VALUE	SYMBOL	UNITS
Fraction of grain grown on contam. soil eaten by PIGS	1.0	pork_fi_grain	--
Fraction of silage grown on contam. soil and eaten by PIGS	1.0	pork_fi_silage	--
Qty of grain eaten by PIGS each day	3.3	pork_qp_grain	kg DW/day
Qty of silage eaten by PIGS each day	1.4	pork_qp_silage	kg DW/day
Qty of soil eaten by CATTLE	0.5	qs_beef	kg/day
Qty of soil eaten by CHICKEN	0.022	qs_chick	kg/day
Qty of soil eaten by DAIRY CATTLE	0.4	qs_milk	kg/day
Qty of soil eaten by PIGS	0.37	qs_pork	kg/day
Average annual runoff	8	r	cm/yr
Density of air	1.2e-3	rho_a	g/cm^3
Solids particle density	2.7	rho_s	g/cm^3
Interception fraction - edible portion ABOVEGROUND	0.39	rp	--
Interception fraction - edible portion FORAGE	0.5	rp_forage	--
Interception fraction - edible portion SILAGE	0.46	rp_silage	--
Ambient air temperature	298	t	K
Temperature correction factor	1.026	theta	--
Soil volumetric water content	0.2	theta_s	mL/cm^3
Length of plant expos. to depos. - ABOVEGROUND	**0.18**	tp	**Yr**
Length of plant expos. to depos. - FORAGE	0.12	tp_forage	Yr
Length of plant expos. to depos. - SILAGE	0.16	tp_silage	Yr
Average annual wind speed	3.9	u	m/s
Dry deposition velocity	0.5	vdv	cm/s
Dry deposition velocity for mercury	2.9	vdv_hg	cm/s
Wind velocity	4.5	w	m/s
Yield/standing crop biomass - edible portion ABOVEGROUND	2.24	yp	kg DW/m^2
Yield/standing crop biomass - edible portion FORAGE	0.24	yp_forage	kg DW/m^2
Yield/standing crop biomass - edible portion SILAGE	0.8	yp_silage	kg DW/m^2
Soil mixing zone depth	2.0	z	cm

Date : 18/12/2006

SITE PARAMETERS

RECEPTOR:	RCPTR_2	UTM X:	347,462.37	UTM Y:	384,136.95

SITE PARAMETER	VALUE	SYMBOL	UNITS
Soil dry bulk density	1.5	bd	g/cm^3
Forage fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_forage	--
Grain fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_grain	--
Silage fraction grown on contam. eaten by CATTLE	1.0	beef_fi_silage	--
Qty of forage eaten by CATTLE each day	8.8	beef_qp_forage	kg DW/day
Qty of grain eaten by CATTLE each day	0.47	beef_qp_grain	kg DW/day
Qty of silage eaten by CATTLE each day	2.5	beef_qp_silage	kg DW/day
Grain fraction grown on contam. soil eaten by CHICKEN	1.0	chick_fi_grain	--
Qty of grain eaten by CHICKEN each day	0.2	chick_qp_grain	kg DW/day
Average annual evapotranspiration	56.28	e_v	cm/yr
Fish lipid content	0.07	f_lipid	--
Fraction of CHICKEN's diet that is soil	0.1	fd_chicken	--
Universal gas constant	**8.205e-5**	**gas_r**	**atm-m^3/mol-K**
Average annual irrigation	0.0	i	cm/yr
Plant surface loss coefficient	18	kp	yr^-1
Fraction of mercury emissions NOT lost to the global cycle	0.48	merc_q_corr	--
Fraction of mercury speciated into methyl mercury in produce	0.22	mercmethyl_ag	--
Fraction of mercury speciated into methyl mercury in soil	0.02	mercmethyl_sc	--
Forage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_forage	--
Grain fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_grain	--
Silage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_silage	--
Qty of forage eaten by MILK CATTLE each day	13.2	milk_qp_forage	kg DW/day
Qty of grain eaten by MILK CATTLE each day	3.0	milk_qp_grain	kg DW/day
Qty of silage eaten by MILK CATTLE each day	4.1	milk_qp_silage	kg DW/day
Averaging time	1	milkfat_at	yr
Body weight of infant	9.4	milfat_bw_infant	kg
Exposure duration of infant to breast milk	1	milkfat_ed	yr
Proportion of ingested dioxin that is stored in fat	0.9	milkfat_f1	--
Proportion of mothers weight that is fat	0.3	milkfat_f2	--
Fraction of fat in breast milk	0.04	milkfat_f3	--
Fraction of ingested contaminant that is absorbed	0.9	milkfat_f4	--
Half-life of dioxin in adults	2555	milkfat_h	days
Ingestion rate of breast milk	**0.688**	**milkfat_ir_milk**	**kg/day**
Viscosity of air corresponding to air temp.	1.81e-04	mu_a	g/cm-s
Average annual precipitation	80	p	cm/yr

Date : 18/12/2006

E PARAMETERS

RECEPTOR:	RCPTR_2	UTM X:	347,462.37	UTM Y:	384,136.95

SITE PARAMETER	VALUE	SYMBOL	UNITS
Fraction of grain grown on contam. soil eaten by PIGS	1.0	pork_fi_grain	--
Fraction of silage grown on contam. soil and eaten by PIGS	1.0	pork_fi_silage	--
Qty of grain eaten by PIGS each day	3.3	pork_qp_grain	kg DW/day
Qty of silage eaten by PIGS each day	1.4	pork_qp_silage	kg DW/day
Qty of soil eaten by CATTLE	0.5	qs_beef	kg/day
Qty of soil eaten by CHICKEN	0.022	qs_chick	kg/day
Qt soil eaten by DAIRY CATTLE	0.4	qs_milk	kg/day
Qty of soil eaten by PIGS	0.37	qs_pork	kg/day
Average annual runoff	8	r	cm/yr
Density of air	1.2e-3	rho_a	g/cm^3
Solids particle density	2.7	rho_s	g/cm^3
Interception fraction - edible portion ABOVEGROUND	0.39	rp	--
Interception fraction - edible portion FORAGE	0.5	rp_forage	--
Interception fraction - edible portion SILAGE	0.46	rp_silage	--
Ambient air temperature	298	t	K
Temperature correction factor	1.026	theta	--
Soil volumetric water content	0.2	theta_s	mL/cm^3
Length of plant expos. to depos. - ABOVEGROUND	0.16	tp	Yr
Length of plant expos. to depos. - FORAGE	0.12	tp_forage	Yr
Le of plant expos. to depos. - SILAGE	0.16	tp_silage	Yr
Average annual wind speed	3.9	u	m/s
Dry deposition velocity	0.5	vdv	cm/s
Dry deposition velocity for mercury	2.9	vdv_hg	cm/s
Wind velocity	4.5	w	m/s
Yield/standing crop biomass - edible portion ABOVEGROUND	2.24	yp	kg DW/m^2
Yield/standing crop biomass - edible portion FORAGE	0.24	yp_forage	kg DW/m^2
Yield/standing crop biomass - edible portion SILAGE	0.8	yp_silage	kg DW/m^2
Soil mixing zone depth	2.0	z	cm

SITE PARAMETERS

Date : 18/12/2006

RECEPTOR:	RCPTR_3	UTM X:	347,316.88	UTM Y:	383,191.22

SITE PARAMETER	VALUE	SYMBOL	UNITS
Soil dry bulk density	1.5	bd	g/cm^3
Forage fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_forage	--
Grain fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_grain	--
Silage fraction grown on contam. eaten by CATTLE	1.0	beef_fi_silage	--
Qty of forage eaten by CATTLE each day	8.8	beef_qp_forage	kg DW/day
Qty of grain eaten by CATTLE each day	0.47	beef_qp_grain	kg DW/day
Qty of silage eaten by CATTLE each day	2.5	beef_qp_silage	kg DW/day
Grain fraction grown on contam. soil eaten by CHICKEN	1.0	chick_fi_grain	--
Qty of grain eaten by CHICKEN each day	0.2	chick_qp_grain	kg DW/day
Average annual evapotranspiration	56.28	e_v	cm/yr
Fish lipid content	0.07	f_lipid	--
Fraction of CHICKEN's diet that is soil	0.1	fd_chicken	--
Universal gas constant	8.205e-5	gas_r	atm-m^3/mol-K
Average annual irrigation	0.0	i	cm/yr
Plant surface loss coefficient	18	kp	yr^-1
Fraction of mercury emissions NOT lost to the global cycle	0.48	merc_q_corr	--
Fraction of mercury speciated into methyl mercury in produce	0.22	mercmethyl_ag	--
Fraction of mercury speciated into methyl mercury in soil	0.02	mercmethyl_sc	--
Forage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_forage	--
Grain fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_grain	--
Silage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_silage	--
Qty of forage eaten by MILK CATTLE each day	13.2	milk_qp_forage	kg DW/day
Qty of grain eaten by MILK CATTLE each day	3.0	milk_qp_grain	kg DW/day
Qty of silage eaten by MILK CATTLE each day	4.1	milk_qp_silage	kg DW/day
Averaging time	1	milkfat_at	yr
Body weight of infant	9.4	milfat_bw_infant	kg
Exposure duration of infant to breast milk	1	milkfat_ed	yr
Proportion of ingested dioxin that is stored in fat	0.9	milkfat_f1	--
Proportion of mothers weight that is fat	0.3	milkfat_f2	--
Fraction of fat in breast milk	0.04	milkfat_f3	--
Fraction of ingested contaminant that is absorbed	0.9	milkfat_f4	--
Half-life of dioxin in adults	2555	milkfat_h	days
Ingestion rate of breast milk	0.688	milkfat_ir_milk	kg/day
Viscosity of air corresponding to air temp.	1.81e-04	mu_a	g/cm-s
Average annual precipitation	80	p	cm/yr

Date : 18/12/2006

PARAMETERS

ECEPTOR:	RCPTR_3	UTM X:	347,316.88	UTM Y:	383,191.22

ITE PARAMETER	VALUE	SYMBOL	UNITS
raction of grain grown on contam. soil eaten by PIGS	1.0	pork_fi_grain	--
raction of silage grown on contam. soil and eaten by PIGS	1.0	pork_fi_silage	--
ity of grain eaten by PIGS each day	3.3	pork_qp_grain	kg DW/day
ity of silage eaten by PIGS each day	1.4	pork_qp_silage	kg DW/day
Qty of soil eaten by CATTLE	0.5	qs_beef	kg/day
Qty [illegible]oil eaten by CHICKEN	0.022	qs_chick	kg/day
Qty [illegible] soil eaten by DAIRY CATTLE	0.4	qs_milk	kg/day
Qty of soil eaten by PIGS	0.37	qs_pork	kg/day
Average annual runoff	8	r	cm/yr
Density of air	1.2e-3	rho_a	g/cm^3
Solids particle density	2.7	rho_s	g/cm^3
nterception fraction - edible portion ABOVEGROUND	0.39	rp	--
Interception fraction - edible portion FORAGE	0.5	rp_forage	--
Interception fraction - edible portion SILAGE	0.46	rp_silage	--
Ambient air temperature	298	t	K
Temperature correction factor	1.026	theta	--
Soil volumetric water content	0.2	theta_s	mL/cm^3
Length of plant expos. to depos. - ABOVEGROUND	0.16	tp	Yr
Length of plant expos. to depos. - FORAGE	0.12	tp_forage	Yr
Le[illegible] of plant expos. to depos. - SILAGE	0.16	tp_silage	Yr
Average annual wind speed	3.9	u	m/s
Dry deposition velocity	0.5	vdv	cm/s
Dry deposition velocity for mercury	2.9	vdv_hg	cm/s
Wind velocity	4.5	w	m/s
Yield/standing crop biomass - edible portion ABOVEGROUND	2.24	yp	kg DW/m^2
Yield/standing crop biomass - edible portion FORAGE	0.24	yp_forage	kg DW/m^2
Yield/standing crop biomass - edible portion SILAGE	0.8	yp_silage	kg DW/m^2
Soil mixing zone depth	2.0	z	cm

SITE PARAMETERS Date : 18/12/2006

RECEPTOR:	RCPTR_4	UTM X:	347,986.16	UTM Y:	383,500.40

SITE PARAMETER	VALUE	SYMBOL	UNITS
Soil dry bulk density	1.5	bd	g/cm^3
Forage fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_forage	--
Grain fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_grain	--
Silage fraction grown on contam. eaten by CATTLE	1.0	beef_fi_silage	--
Qty of forage eaten by CATTLE each day	8.8	beef_qp_forage	kg DW/day
Qty of grain eaten by CATTLE each day	0.47	beef_qp_grain	kg DW/day
Qty of silage eaten by CATTLE each day	2.5	beef_qp_silage	kg DW/day
Grain fraction grown on contam. soil eaten by CHICKEN	1.0	chick_fi_grain	--
Qty of grain eaten by CHICKEN each day	0.2	chick_qp_grain	kg DW/day
Average annual evapotranspiration	56.28	e_v	cm/yr
Fish lipid content	0.07	f_lipid	--
Fraction of CHICKEN's diet that is soil	0.1	fd_chicken	--
Universal gas constant	8.205e-5	gas_r	atm-m^3/mol-K
Average annual irrigation	0.0	i	cm/yr
Plant surface loss coefficient	18	kp	yr^-1
Fraction of mercury emissions NOT lost to the global cycle	0.48	merc_q_corr	--
Fraction of mercury speciated into methyl mercury in produce	0.22	mercmethyl_ag	--
Fraction of mercury speciated into methyl mercury in soil	0.02	mercmethyl_sc	--
Forage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_forage	--
Grain fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_grain	--
Silage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_silage	--
Qty of forage eaten by MILK CATTLE each day	13.2	milk_qp_forage	kg DW/day
Qty of grain eaten by MILK CATTLE each day	3.0	milk_qp_grain	kg DW/day
Qty of silage eaten by MILK CATTLE each day	4.1	milk_qp_silage	kg DW/day
Averaging time	1	milkfat_at	yr
Body weight of infant	9.4	milfat_bw_infant	kg
Exposure duration of infant to breast milk	1	milkfat_ed	yr
Proportion of ingested dioxin that is stored in fat	0.9	milkfat_f1	--
Proportion of mothers weight that is fat	0.3	milkfat_f2	--
Fraction of fat in breast milk	0.04	milkfat_f3	--
Fraction of ingested contaminant that is absorbed	0.9	milkfat_f4	--
Half-life of dioxin in adults	2555	milkfat_h	days
Ingestion rate of breast milk	0.688	milkfat_ir_milk	kg/day
Viscosity of air corresponding to air temp.	1.81e-04	mu_a	g/cm-s
Average annual precipitation	80	p	cm/yr

Date : 18/12/2006

'E PARAMETERS

RECEPTOR:	RCPTR_4	UTM X:	347,986.16	UTM Y:	383,500.40

SITE PARAMETER	VALUE	SYMBOL	UNITS
Fraction of grain grown on contam. soil eaten by PIGS	1.0	pork_fi_grain	--
Fraction of silage grown on contam. soil and eaten by PIGS	1.0	pork_fi_silage	--
Qty of grain eaten by PIGS each day	3.3	pork_qp_grain	kg DW/day
Qty of silage eaten by PIGS each day	1.4	pork_qp_silage	kg DW/day
Qty of soil eaten by CATTLE	0.5	qs_beef	kg/day
Qty of soil eaten by CHICKEN	0.022	qs_chick	kg/day
Q[illegible] soil eaten by DAIRY CATTLE	0.4	qs_milk	kg/day
Qty of soil eaten by PIGS	0.37	qs_pork	kg/day
Average annual runoff	8	r	cm/yr
Density of air	1.2e-3	rho_a	g/cm^3
Solids particle density	2.7	rho_s	g/cm^3
Interception fraction - edible portion ABOVEGROUND	0.39	rp	--
Interception fraction - edible portion FORAGE	0.5	rp_forage	--
Interception fraction - edible portion SILAGE	0.46	rp_silage	--
Ambient air temperature	298	t	K
Temperature correction factor	1.026	theta	--
Soil volumetric water content	0.2	theta_s	mL/cm^3
Length of plant expos. to depos. - ABOVEGROUND	0.16	tp	Yr
Length of plant expos. to depos. - FORAGE	0.12	tp_forage	Yr
Le[illegible] of plant expos. to depos. - SILAGE	0.16	tp_silage	Yr
Av[illegible]ge annual wind speed	3.9	u	m/s
Dry deposition velocity	0.5	vdv	cm/s
Dry deposition velocity for mercury	2.9	vdv_hg	cm/s
Wind velocity	4.5	w	m/s
Yield/standing crop biomass - edible portion ABOVEGROUND	2.24	yp	kg DW/m^2
Yield/standing crop biomass - edible portion FORAGE	0.24	yp_forage	kg DW/m^2
Yield/standing crop biomass - edible portion SILAGE	0.8	yp_silage	kg DW/m^2
Soil mixing zone depth	2.0	z	cm

Date : 18/12/2006

SITE PARAMETERS

RECEPTOR:	RCPTR_5	UTM X:	348,088.01	UTM Y:	383,082.10

SITE PARAMETER	VALUE	SYMBOL	UNITS
Soil dry bulk density	1.5	bd	g/cm^3
Forage fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_forage	--
Grain fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_grain	--
Silage fraction grown on contam. eaten by CATTLE	1.0	beef_fi_silage	--
Qty of forage eaten by CATTLE each day	8.8	beef_qp_forage	kg DW/day
Qty of grain eaten by CATTLE each day	0.47	beef_qp_grain	kg DW/day
Qty of silage eaten by CATTLE each day	2.5	beef_qp_silage	kg DW/day
Grain fraction grown on contam. soil eaten by CHICKEN	1.0	chick_fi_grain	--
Qty of grain eaten by CHICKEN each day	0.2	chick_qp_grain	kg DW/day
Average annual evapotranspiration	56.28	e_v	cm/yr
Fish lipid content	0.07	f_lipid	--
Fraction of CHICKEN's diet that is soil	0.1	fd_chicken	--
Universal gas constant	8.205e-5	gas_r	atm-m^3/mol-K
Average annual irrigation	0.0	i	cm/yr
Plant surface loss coefficient	18	kp	yr^-1
Fraction of mercury emissions NOT lost to the global cycle	0.48	merc_q_corr	--
Fraction of mercury speciated into methyl mercury in produce	0.22	mercmethyl_ag	--
Fraction of mercury speciated into methyl mercury in soil	0.02	mercmethyl_sc	--
Forage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_forage	--
Grain fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_grain	--
Silage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_silage	--
Qty of forage eaten by MILK CATTLE each day	13.2	milk_qp_forage	kg DW/day
Qty of grain eaten by MILK CATTLE each day	3.0	milk_qp_grain	kg DW/day
Qty of silage eaten by MILK CATTLE each day	4.1	milk_qp_silage	kg DW/day
Averaging time	1	milkfat_at	yr
Body weight of infant	9.4	milfat_bw_infant	kg
Exposure duration of infant to breast milk	1	milkfat_ed	yr
Proportion of ingested dioxin that is stored in fat	0.9	milkfat_f1	--
Proportion of mothers weight that is fat	0.3	milkfat_f2	--
Fraction of fat in breast milk	0.04	milkfat_f3	--
Fraction of ingested contaminant that is absorbed	0.9	milkfat_f4	--
Half-life of dioxin in adults	2555	milkfat_h	days
Ingestion rate of breast milk	0.688	milkfat_ir_milk	kg/day
Viscosity of air corresponding to air temp.	1.81e-04	mu_a	g/cm-s
Average annual precipitation	80	p	cm/yr

Date : 18/12/2006

'E PARAMETERS

RECEPTOR:	RCPTR_5	UTM X:	348,088.01	UTM Y:	383,082.10

SITE PARAMETER	VALUE	SYMBOL	UNITS
Fraction of grain grown on contam. soil eaten by PIGS	1.0	pork_fi_grain	--
Fraction of silage grown on contam. soil and eaten by PIGS	1.0	pork_fi_silage	--
Qty of grain eaten by PIGS each day	3.3	pork_qp_grain	kg DW/day
Qty of silage eaten by PIGS each day	1.4	pork_qp_silage	kg DW/day
Qty of soil eaten by CATTLE	0.5	qs_beef	kg/day
Qt[illegible] soil eaten by CHICKEN	0.022	qs_chick	kg/day
Qty [illegible] soil eaten by DAIRY CATTLE	0.4	qs_milk	kg/day
Qty of soil eaten by PIGS	0.37	qs_pork	kg/day
Average annual runoff	8	r	cm/yr
Density of air	1.2e-3	rho_a	g/cm^3
Solids particle density	2.7	rho_s	g/cm^3
Interception fraction - edible portion ABOVEGROUND	0.39	rp	--
Interception fraction - edible portion FORAGE	0.5	rp_forage	--
Interception fraction - edible portion SILAGE	0.46	rp_silage	--
Ambient air temperature	298	t	K
Temperature correction factor	1.026	theta	--
Soil volumetric water content	0.2	theta_s	mL/cm^3
Length of plant expos. to depos. - ABOVEGROUND	0.16	tp	Yr
Length of plant expos. to depos. - FORAGE	0.12	tp_forage	Yr
L[illegible]h of plant expos. to depos. - SILAGE	0.16	tp_silage	Yr
Average annual wind speed	3.9	u	m/s
Dry deposition velocity	0.5	vdv	cm/s
Dry deposition velocity for mercury	2.9	vdv_hg	cm/s
Wind velocity	4.5	w	m/s
Yield/standing crop biomass - edible portion ABOVEGROUND	2.24	yp	kg DW/m^2
Yield/standing crop biomass - edible portion FORAGE	0.24	yp_forage	kg DW/m^2
Yield/standing crop biomass - edible portion SILAGE	0.8	yp_silage	kg DW/m^2
Soil mixing zone depth	2.0	z	cm

Date : 18/12/2006

SITE PARAMETERS

RECEPTOR:	RCPTR_6	UTM X:	350,405.44	UTM Y:	383,025.27

SITE PARAMETER	VALUE	SYMBOL	UNITS
Soil dry bulk density	1.5	bd	g/cm^3
Forage fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_forage	--
Grain fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_grain	--
Silage fraction grown on contam. eaten by CATTLE	1.0	beef_fi_silage	--
Qty of forage eaten by CATTLE each day	8.8	beef_qp_forage	kg DW/day
Qty of grain eaten by CATTLE each day	0.47	beef_qp_grain	kg DW/day
Qty of silage eaten by CATTLE each day	2.5	beef_qp_silage	kg DW/day
Grain fraction grown on contam. soil eaten by CHICKEN	1.0	chick_fi_grain	--
Qty of grain eaten by CHICKEN each day	0.2	chick_qp_grain	kg DW/day
Average annual evapotranspiration	56.28	e_v	cm/yr
Fish lipid content	0.07	f_lipid	--
Fraction of CHICKEN's diet that is soil	0.1	fd_chicken	--
Universal gas constant	8.205e-5	gas_r	atm-m^3/mol-K
Average annual irrigation	0.0	i	cm/yr
Plant surface loss coefficient	18	kp	yr^-1
Fraction of mercury emissions NOT lost to the global cycle	0.48	merc_q_corr	--
Fraction of mercury speciated into methyl mercury in produce	0.22	mercmethyl_ag	--
Fraction of mercury speciated into methyl mercury in soil	0.02	mercmethyl_sc	--
Forage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_forage	--
Grain fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_grain	--
Silage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_silage	--
Qty of forage eaten by MILK CATTLE each day	13.2	milk_qp_forage	kg DW/day
Qty of grain eaten by MILK CATTLE each day	3.0	milk_qp_grain	kg DW/day
Qty of silage eaten by MILK CATTLE each day	4.1	milk_qp_silage	kg DW/day
Averaging time	1	milkfat_at	yr
Body weight of infant	9.4	milfat_bw_infant	kg
Exposure duration of infant to breast milk	1	milkfat_ed	yr
Proportion of ingested dioxin that is stored in fat	0.9	milkfat_f1	--
Proportion of mothers weight that is fat	0.3	milkfat_f2	--
Fraction of fat in breast milk	0.04	milkfat_f3	--
Fraction of ingested contaminant that is absorbed	0.9	milkfat_f4	--
Half-life of dioxin in adults	2555	milkfat_h	days
Ingestion rate of breast milk	0.688	milkfat_ir_milk	kg/day
Viscosity of air corresponding to air temp.	1.81e-04	mu_a	g/cm-s
Average annual precipitation	80	p	cm/yr

Date : 18/12/2006

E PARAMETERS

RECEPTOR:	RCPTR_6	UTM X:	350,405.44	UTM Y:	383,025.27

SITE PARAMETER	VALUE	SYMBOL	UNITS
Fraction of grain grown on contam. soil eaten by PIGS	1.0	pork_fi_grain	--
Fraction of silage grown on contam. soil and eaten by PIGS	1.0	pork_fi_silage	--
Qty of grain eaten by PIGS each day	3.3	pork_qp_grain	kg DW/day
Qty of silage eaten by PIGS each day	1.4	pork_qp_silage	kg DW/day
Qty of soil eaten by CATTLE	0.5	qs_beef	kg/day
Qty of soil eaten by CHICKEN	0.022	qs_chick	kg/day
Qty of soil eaten by DAIRY CATTLE	0.4	qs_milk	kg/day
Qty of soil eaten by PIGS	0.37	qs_pork	kg/day
Average annual runoff	8	r	cm/yr
Density of air	1.2e-3	rho_a	g/cm^3
Solids particle density	2.7	rho_s	g/cm^3
Interception fraction - edible portion ABOVEGROUND	0.39	rp	--
Interception fraction - edible portion FORAGE	0.5	rp_forage	--
Interception fraction - edible portion SILAGE	0.46	rp_silage	--
Ambient air temperature	298	t	K
Temperature correction factor	1.026	theta	--
Soil volumetric water content	0.2	theta_s	mL/cm^3
Length of plant expos. to depos. - ABOVEGROUND	0.16	tp	Yr
Length of plant expos. to depos. - FORAGE	0.12	tp_forage	Yr
Length of plant expos. to depos. - SILAGE	0.16	tp_silage	Yr
Average annual wind speed	3.9	u	m/s
Dry deposition velocity	0.5	vdv	cm/s
Dry deposition velocity for mercury	2.9	vdv_hg	cm/s
Wind velocity	4.5	w	m/s
Yield/standing crop biomass - edible portion ABOVEGROUND	2.24	yp	kg DW/m^2
Yield/standing crop biomass - edible portion FORAGE	0.24	yp_forage	kg DW/m^2
Yield/standing crop biomass - edible portion SILAGE	0.8	yp_silage	kg DW/m^2
Soil mixing zone depth	2.0	z	cm

Date : 18/12/2006

SITE PARAMETERS

RECEPTOR:	RCPTR_7	UTM X:	350,449.10	UTM Y:	382,356.21

SITE PARAMETER	VALUE	SYMBOL	UNITS
Soil dry bulk density	1.5	bd	g/cm^3
Forage fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_forage	--
Grain fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_grain	--
Silage fraction grown on contam. eaten by CATTLE	1.0	beef_fi_silage	--
Qty of forage eaten by CATTLE each day	8.8	beef_qp_forage	kg DW/day
Qty of grain eaten by CATTLE each day	0.47	beef_qp_grain	kg DW/day
Qty of silage eaten by CATTLE each day	2.5	beef_qp_silage	kg DW/day
Grain fraction grown on contam. soil eaten by CHICKEN	1.0	chick_fi_grain	--
Qty of grain eaten by CHICKEN each day	0.2	chick_qp_grain	kg DW/day
Average annual evapotranspiration	56.28	e_v	cm/yr
Fish lipid content	0.07	f_lipid	--
Fraction of CHICKEN's diet that is soil	0.1	fd_chicken	--
Universal gas constant	8.205e-5	gas_r	atm-m^3/mol-K
Average annual irrigation	0.0	i	cm/yr
Plant surface loss coefficient	18	kp	yr^-1
Fraction of mercury emissions NOT lost to the global cycle	0.48	merc_q_corr	--
Fraction of mercury speciated into methyl mercury in produce	0.22	mercmethyl_ag	--
Fraction of mercury speciated into methyl mercury in soil	0.02	mercmethyl_sc	--
Forage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_forage	--
Grain fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_grain	--
Silage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_silage	--
Qty of forage eaten by MILK CATTLE each day	13.2	milk_qp_forage	kg DW/day
Qty of grain eaten by MILK CATTLE each day	3.0	milk_qp_grain	kg DW/day
Qty of silage eaten by MILK CATTLE each day	4.1	milk_qp_silage	kg DW/day
Averaging time	1	milkfat_at	yr
Body weight of infant	9.4	milfat_bw_infant	kg
Exposure duration of infant to breast milk	1	milkfat_ed	yr
Proportion of ingested dioxin that is stored in fat	0.9	milkfat_f1	--
Proportion of mothers weight that is fat	0.3	milkfat_f2	--
Fraction of fat in breast milk	0.04	milkfat_f3	--
Fraction of ingested contaminant that is absorbed	0.9	milkfat_f4	--
Half-life of dioxin in adults	2555	milkfat_h	days
Ingestion rate of breast milk	0.688	milkfat_ir_milk	kg/day
Viscosity of air corresponding to air temp.	1.81e-04	mu_a	g/cm-s
Average annual precipitation	80	p	cm/yr

Date : 18/12/2006

PARAMETERS

CEPTOR:	RCPTR_7	UTM X:	350,449.10	UTM Y:	382,356.21

'E PARAMETER	VALUE	SYMBOL	UNITS
action of grain grown on contam. soil eaten by PIGS	1.0	pork_fi_grain	--
action of silage grown on contam. soil and eaten by PIGS	1.0	pork_fi_silage	--
y of grain eaten by PIGS each day	3.3	pork_qp_grain	kg DW/day
y of silage eaten by PIGS each day	1.4	pork_qp_silage	kg DW/day
ty of soil eaten by CATTLE	0.5	qs_beef	kg/day
ty [illegible]il eaten by CHICKEN	0.022	qs_chick	kg/day
ty of soil eaten by DAIRY CATTLE	0.4	qs_milk	kg/day
ty of soil eaten by PIGS	0.37	qs_pork	kg/day
verage annual runoff	8	r	cm/yr
ensity of air	1.2e-3	rho_a	g/cm^3
iolids particle density	2.7	rho_s	g/cm^3
nterception fraction - edible portion ABOVEGROUND	0.39	rp	--
nterception fraction - edible portion FORAGE	0.5	rp_forage	--
nterception fraction - edible portion SILAGE	0.46	rp_silage	--
Ambient air temperature	298	t	K
Temperature correction factor	1.026	theta	--
Soil volumetric water content	0.2	theta_s	mL/cm^3
Length of plant expos. to depos. - ABOVEGROUND	0.16	tp	Yr
Le[illegible] of plant expos. to depos. - FORAGE	0.12	tp_forage	Yr
L[illegible]h of plant expos. to depos. - SILAGE	0.16	tp_silage	Yr
Average annual wind speed	3.9	u	m/s
Dry deposition velocity	0.5	vdv	cm/s
Dry deposition velocity for mercury	2.9	vdv_hg	cm/s
Wind velocity	4.5	w	m/s
Yield/standing crop biomass - edible portion ABOVEGROUND	2.24	yp	kg DW/m^2
Yield/standing crop biomass - edible portion FORAGE	0.24	yp_forage	kg DW/m^2
Yield/standing crop biomass - edible portion SILAGE	0.8	yp_silage	kg DW/m^2
Soil mixing zone depth	2.0	z	cm

Date : 18/12/2006

SITE PARAMETERS

RECEPTOR:	RCPTR_8	UTM X:	350,765.56	UTM Y:	382,305.30

SITE PARAMETER	VALUE	SYMBOL	UNITS
Soil dry bulk density	1.5	bd	g/cm^3
Forage fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_forage	--
Grain fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_grain	--
Silage fraction grown on contam. eaten by CATTLE	1.0	beef_fi_silage	--
Qty of forage eaten by CATTLE each day	8.8	beef_qp_forage	kg DW/day
Qty of grain eaten by CATTLE each day	0.47	beef_qp_grain	kg DW/day
Qty of silage eaten by CATTLE each day	2.5	beef_qp_silage	kg DW/day
Grain fraction grown on contam. soil eaten by CHICKEN	1.0	chick_fi_grain	--
Qty of grain eaten by CHICKEN each day	0.2	chick_qp_grain	kg DW/day
Average annual evapotranspiration	56.28	e_v	cm/yr
Fish lipid content	0.07	f_lipid	--
Fraction of CHICKEN's diet that is soil	0.1	fd_chicken	--
Universal gas constant	8.205e-5	gas_r	atm-m^3/mol-K
Average annual irrigation	0.0	i	cm/yr
Plant surface loss coefficient	18	kp	yr^-1
Fraction of mercury emissions NOT lost to the global cycle	0.48	merc_q_corr	--
Fraction of mercury speciated into methyl mercury in produce	0.22	mercmethyl_ag	--
Fraction of mercury speciated into methyl mercury in soil	0.02	mercmethyl_sc	--
Forage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_forage	--
Grain fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_grain	--
Silage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_silage	--
Qty of forage eaten by MILK CATTLE each day	13.2	milk_qp_forage	kg DW/day
Qty of grain eaten by MILK CATTLE each day	3.0	milk_qp_grain	kg DW/day
Qty of silage eaten by MILK CATTLE each day	4.1	milk_qp_silage	kg DW/day
Averaging time	1	milkfat_at	yr
Body weight of infant	9.4	milfat_bw_infant	kg
Exposure duration of infant to breast milk	1	milkfat_ed	yr
Proportion of ingested dioxin that is stored in fat	0.9	milkfat_f1	--
Proportion of mothers weight that is fat	0.3	milkfat_f2	--
Fraction of fat in breast milk	0.04	milkfat_f3	--
Fraction of ingested contaminant that is absorbed	0.9	milkfat_f4	--
Half-life of dioxin in adults	2555	milkfat_h	days
Ingestion rate of breast milk	0.688	milkfat_ir_milk	kg/day
Viscosity of air corresponding to air temp.	1.81e-04	mu_a	g/cm-s
Average annual precipitation	80	p	cm/yr

Date : 18/12/2006

TE PARAMETERS

RECEPTOR:	RCPTR_8	UTM X:	350,765.56	UTM Y:	382,305.30

SITE PARAMETER	VALUE	SYMBOL	UNITS
Fraction of grain grown on contam. soil eaten by PIGS	1.0	pork_fi_grain	--
Fraction of silage grown on contam. soil and eaten by PIGS	1.0	pork_fi_silage	--
Qty of grain eaten by PIGS each day	3.3	pork_qp_grain	kg DW/day
Qty of silage eaten by PIGS each day	1.4	pork_qp_silage	kg DW/day
Qty of soil eaten by CATTLE	0.5	qs_beef	kg/day
Qty of soil eaten by CHICKEN	0.022	qs_chick	kg/day
Qt[illegible] soil eaten by DAIRY CATTLE	0.4	qs_milk	kg/day
Qty of soil eaten by PIGS	0.37	qs_pork	kg/day
Average annual runoff	8	r	cm/yr
Density of air	1.2e-3	rho_a	g/cm^3
Solids particle density	2.7	rho_s	g/cm^3
nterception fraction - edible portion ABOVEGROUND	0.39	rp	--
nterception fraction - edible portion FORAGE	0.5	rp_forage	--
nterception fraction - edible portion SILAGE	0.46	rp_silage	--
\mbient air temperature	298	t	K
'emperature correction factor	1.026	theta	--
;oil volumetric water content	0.2	theta_s	mL/cm^3
.ength of plant expos. to depos. - ABOVEGROUND	0.16	tp	Yr
.ength of plant expos. to depos. - FORAGE	0.12	tp_forage	Yr
er[illegible] of plant expos. to depos. - SILAGE	0.16	tp_silage	Yr
,ve[illegible]e annual wind speed	3.9	u	m/s
'ry deposition velocity	0.5	vdv	cm/s
'ry deposition velocity for mercury	2.9	vdv_hg	cm/s
/ind velocity	4.5	w	m/s
ield/standing crop biomass - edible portion ABOVEGROUND	2.24	yp	kg DW/m^2
ield/standing crop biomass - edible portion FORAGE	0.24	yp_forage	kg DW/m^2
ield/standing crop biomass - edible portion SILAGE	0.8	yp_silage	kg DW/m^2
ɔil mixing zone depth	2.0	z	cm

SITE PARAMETERS

Date : 18/12/2006

RECEPTOR:	RCPTR_9	UTM X:	351,238.42	UTM Y:	381,977.93

SITE PARAMETER	VALUE	SYMBOL	UNITS
Soil dry bulk density	1.5	bd	g/cm^3
Forage fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_forage	--
Grain fraction grown on contam. soil eaten by CATTLE	1.0	beef_fi_grain	--
Silage fraction grown on contam. eaten by CATTLE	1.0	beef_fi_silage	--
Qty of forage eaten by CATTLE each day	8.8	beef_qp_forage	kg DW/day
Qty of grain eaten by CATTLE each day	0.47	beef_qp_grain	kg DW/day
Qty of silage eaten by CATTLE each day	2.5	beef_qp_silage	kg DW/day
Grain fraction grown on contam. soil eaten by CHICKEN	1.0	chick_fi_grain	--
Qty of grain eaten by CHICKEN each day	0.2	chick_qp_grain	kg DW/day
Average annual evapotranspiration	56.28	e_v	cm/yr
Fish lipid content	0.07	f_lipid	--
Fraction of CHICKEN's diet that is soil	0.1	fd_chicken	--
Universal gas constant	8.205e-5	gas_r	atm-m^3/mol-K
Average annual irrigation	0.0	i	cm/yr
Plant surface loss coefficient	18	kp	yr^-1
Fraction of mercury emissions NOT lost to the global cycle	0.48	merc_q_corr	--
Fraction of mercury speciated into methyl mercury in produce	0.22	mercmethyl_ag	--
Fraction of mercury speciated into methyl mercury in soil	0.02	mercmethyl_sc	--
Forage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_forage	--
Grain fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_grain	--
Silage fraction grown contam. soil, eaten by MILK CATTLE	1.0	milk_fi_silage	--
Qty of forage eaten by MILK CATTLE each day	13.2	milk_qp_forage	kg DW/day
Qty of grain eaten by MILK CATTLE each day	3.0	milk_qp_grain	kg DW/day
Qty of silage eaten by MILK CATTLE each day	4.1	milk_qp_silage	kg DW/day
Averaging time	1	milkfat_at	yr
Body weight of infant	9.4	milfat_bw_infant	kg
Exposure duration of infant to breast milk	1	milkfat_ed	yr
Proportion of ingested dioxin that is stored in fat	0.9	milkfat_f1	--
Proportion of mothers weight that is fat	0.3	milkfat_f2	--
Fraction of fat in breast milk	0.04	milkfat_f3	--
Fraction of ingested contaminant that is absorbed	0.9	milkfat_f4	--
Half-life of dioxin in adults	2555	milkfat_h	days
Ingestion rate of breast milk	0.688	milkfat_ir_milk	kg/day
Viscosity of air corresponding to air temp.	1.81e-04	mu_a	g/cm-s
Average annual precipitation	80	p	cm/yr

Date : 18/12/2006

: PARAMETERS

ɛCEPTOR:	RCPTR_9	UTM X:	351,238.42	UTM Y:	381,977.93

ıTE PARAMETER	VALUE	SYMBOL	UNITS
ˈraction of grain grown on contam. soil eaten by PIGS	1.0	pork_fi_grain	--
ˈraction of silage grown on contam. soil and eaten by PIGS	1.0	pork_fi_silage	--
ɿty of grain eaten by PIGS each day	3.3	pork_qp_grain	kg DW/day
ɿty of silage eaten by PIGS each day	1.4	pork_qp_silage	kg DW/day
ɿty of soil eaten by CATTLE	0.5	qs_beef	kg/day
ɿty of soil eaten by CHICKEN	0.022	qs_chick	kg/day
[illegible]il eaten by DAIRY CATTLE	0.4	qs_milk	kg/day
ɿty of soil eaten by PIGS	0.37	qs_pork	kg/day
ıverage annual runoff	8	r	cm/yr
ɟensity of air	1.2e-3	rho_a	g/cm^3
ɨolids particle density	2.7	rho_s	g/cm^3
ıterception fraction - edible portion ABOVEGROUND	0.39	rp	--
ıterception fraction - edible portion FORAGE	0.5	rp_forage	--
ıterception fraction - edible portion SILAGE	0.46	rp_silage	--
ımbient air temperature	298	t	K
emperature correction factor	1.026	theta	--
oil volumetric water content	0.2	theta_s	mL/cm^3
ength of plant expos. to depos. - ABOVEGROUND	0.16	tp	Yr
ength of plant expos. to depos. - FORAGE	0.12	tp_forage	Yr
e[illegible]of plant expos. to depos. - SILAGE	0.16	tp_silage	Yr
ve[illegible] annual wind speed	3.9	u	m/s
ˈry deposition velocity	0.5	vdv	cm/s
ˈry deposition velocity for mercury	2.9	vdv_hg	cm/s
/ind velocity	4.5	w	m/s
ield/standing crop biomass - edible portion ABOVEGROUND	2.24	yp	kg DW/m^2
ield/standing crop biomass - edible portion FORAGE	0.24	yp_forage	kg DW/m^2
ield/standing crop biomass - edible portion SILAGE	0.8	yp_silage	kg DW/m^2
oil mixing zone depth	2.0	z	cm

APPENDIX 6

RESPONSE FROM MEAS

Merseyside Environmental Advisory Service
Bryant House, Liverpool Road North
Merseyside L31 2PA
Director: Alan Jemmett, PhD, MBA

Enquiries: 0151 934 4951
Fax: 0151 934 4955

Contact: Paul Slinn
Direct Dial: 0151 934 2791
Email: paul.slinn@eas.sefton.gov.uk

MEMO

To: Andrew Plant
Organisation: Halton Borough Council

From: Paul Slinn
Environmental Projects Team Leader

Your Ref: 07/00068/ELC
File Ref: HA06/001
W/P Ref: C:\Work\Ineos Chlor\DC Memo HA06001 Supplementary (2).doc
Date: 20 June 2007

Application to Construct and Operate an Energy from Waste Combined Heat and Power Generating Station with an Approximate Capacity of 360MW Thermal and up to 100MW of Electrical Power at Ineos Chlor Vinyls, South Parade, Runcorn, Cheshire

1. With reference to the above mentioned application, thank you for consulting us on the applicant's supplementary submission in response to our initial advice to Halton Borough Council contained in a memo dated 2 April 2007.

2. We welcome the generally thorough and constructive approach adopted by Ineos Chlor Ltd in addressing the issues we raised in our initial response. As a result of the way in which our concerns have been addressed, we are able to report that relatively few points of concern remain. Considering the scale of the waste management challenge facing Merseyside and the significant economic issues associated with these developments, Merseyside EAS is supportive in principle as the proposal could make a significant contribution to much needed waste treatment and energy recovery capacity. However, concerns remain to be addressed during the consent procedure. Whilst these are not significant enough to lead us to lodge an objection, we strongly encourage the applicant and consenting authorities to fully address the remaining outstanding matters within this memo prior to, or as conditions of, consent.

3. We advise that clarification has been provided to our satisfaction on the issues raised in paragraphs 2, 3, 5, 8, 12, 13, 14, 15, 16, 18, 19, 21, 22, 24, 25, 26, 27, 28 and 30 of our memo of 2 April and that we have no further comment to make on any of these issues at this time. Our comments on residual matters are detailed below.

4. *MEAS para 1; Ineos Chlor B2 1.1* - We welcome the commitment expressed by the applicant to working with Halton Borough Council to agree a schedule of draft planning conditions and we believe that it is now important for Halton to take forward discussions in a comprehensive and inclusive way to reach agreement. We note that the applicant has already prepared a draft set of conditions in association with its Section 36 application and we would be content for this to be used as the basis for initial discussions. Merseyside EAS would welcome the opportunity to comment on draft conditions, particularly those related to the following:

Merseyside Environmental Advisory Service
Bryant House, Liverpool Road North
Merseyside L31 2PA
Director: Alan Jemmett, PhD, MBA

Enquiries: 0151 934 4951
Fax: 0151 934 4955

Contact: Paul Slinn
Direct Dial: 0151 934 2791
Email: paul.slinn@eas.sefton.gov.uk

MEMO

To: Andrew Plant
Organisation: Halton Borough Council

From: Paul Slinn
Environmental Projects Team Leader

Your Ref: 07/00068/ELC
File Ref: HA06/001
W/P Ref: C:\Work\Ineos Chlor\DC Memo HA06001 Supplementary (2).doc
Date: 20 June 2007

Application to Construct and Operate an Energy from Waste Combined Heat and Power Generating Station with an Approximate Capacity of 360MW Thermal and up to 100MW of Electrical Power at Ineos Chlor Vinyls, South Parade, Runcorn, Cheshire

1. With reference to the above mentioned application, thank you for consulting us on the applicant's supplementary submission in response to our initial advice to Halton Borough Council contained in a memo dated 2 April 2007.

2. We welcome the generally thorough and constructive approach adopted by Ineos Chlor Ltd in addressing the issues we raised in our initial response. As a result of the way in which our concerns have been addressed, we are able to report that relatively few points of concern remain. Considering the scale of the waste management challenge facing Merseyside and the significant economic issues associated with these developments, Merseyside EAS is supportive in principle as the proposal could make a significant contribution to much needed waste treatment and energy recovery capacity. However, concerns remain to be addressed during the consent procedure. Whilst these are not significant enough to lead us to lodge an objection, we strongly encourage the applicant and consenting authorities to fully address the remaining outstanding matters within this memo prior to, or as conditions of, consent.

3. We advise that clarification has been provided to our satisfaction on the issues raised in paragraphs 2, 3, 5, 8, 12, 13, 14, 15, 16, 18, 19, 21, 22, 24, 25, 26, 27, 28 and 30 of our memo of 2 April and that we have no further comment to make on any of these issues at this time. Our comments on residual matters are detailed below.

4. *MEAS para 1; Ineos Chlor B2 1.1* - We welcome the commitment expressed by the applicant to working with Halton Borough Council to agree a schedule of draft planning conditions and we believe that it is now important for Halton to take forward discussions in a comprehensive and inclusive way to reach agreement. We note that the applicant has already prepared a draft set of conditions in association with its Section 36 application and we would be content for this to be used as the basis for initial discussions. Merseyside EAS would welcome the opportunity to comment on draft conditions, particularly those related to the following:

- Code of Construction Practice and Environmental Management Plan;
- Site Waste Management Plan and wider waste issues;
- Drainage;
- Ecological mitigation and landscaping;
- Contaminated land matters (if requested by Halton Borough Council).

5. *MEAS paras 4, 6 & ; Ineos Clor B2 4.1-4.4 & C 6.1-6.4 and 7.1-7.9* - It is understood that Greater Manchester provides the most advanced regional reference case on which to base initial consideration of RDF/SRF fuel specifications and sources and that Merseyside is not being excluded as a potential source of fuel. However, bringing forward the project prior to the completion of a reference case for Merseyside does involve some risk of incompatibility. We advise that Halton Council should consider that failure for Merseyside's MSW to meet the Ineos Chlor chosen RDF/SRF specification will result in a need for more new facilities in Merseyside and will lead to Merseyside (Halton in this case) becoming a significant long-term importer of SRF/RDF from elsewhere in the region and, potentially, more widely.

6. *MEAS para 9; Ineos Chlor C 9.1-9.7* - We note the additional information provided by the applicant in respect of choice of technology, though we are unconvinced by the rationale summarised in C 9.5 that Advanced Combustion Technologies (ACT) are not appropriate for this proposal. We would welcome an expanded response from the applicant on this point that provides additional detail on the evidence that has led to ACT solutions being discounted on this occasion, particularly in terms of the balance between economic and technical factors that led to the conclusion that was reached. We encourage the applicant to keep the potential application of ACT approaches under review with a view to potentially adding an ACT capability at a later date should circumstances allow. We advise that we accept the clarification provided in C 9.7 that the choice of technology does not materially affect the conclusions reached in the ES, as these were based on 'worst case' assumptions that have not been exceeded.

7. *MEAS para 10; Ineos Chlor C 10.2-10.2* - We note the clarification provided and will defer to Halton Borough Council for further consideration of transport issues.

8. *MEAS para 11; Ineos Chlor C 11.1-11.4* - We note the additional information concerning the renewable component of the RDF. While we are prepared to accept that the statement provided is likely to be broadly correct, we do not believe that the information provided is sufficient to completely justify the statement that the fuel will be 60% renewable. The applicant refers again to the Manchester MBT process in general but has not provided detail about the composition and specification for the RDF/SRF. We would like to see at least a more comprehensive set of references and details of a bench mark process with waste composition analysis of the MSW waste streams and proposed technology. We advise that the applicant should be requested to clarify this issue further by provided additional technical detail, particularly in respect of the reference case that has been derived for the RDF produced in Manchester.

9. *MEAS para 17; Ineos Chlor E 17.1-17.2* - We do not accept the statement that "*it is not considered appropriate for this project to be required to include measures that would screen industry generally from the Estuary*". No justification is offered for this statement, while our concern is not that this development should be required to screen "industry generally", but that it should incorporate proposals to screen itself from the Estuary as effectively as possible. While we accept that the scope for landscaping works on the proposed site is limited, we believe that more could be done to address this issue. Merseyside EAS would be pleased to participate in further discussions on this issue, if that would be helpful.

10. *MEAS para 20; Ineos Chlor E 20.1* - We welcome the clarification on the status of the various mitigation proposals put forward within the ES. However, we believe that the status of the measures identified as 'further mitigation' is ambiguous and needs to be clearly determined so that effective implementation planning can be ensured. Our preference would be for these measures to be secured on an equivalent basis to those to which Ineos Chlor has already indicated its commitment, as they have been proposed as part of the ES chapter authors' consideration of the issues. However, we recognise that there may be scope for discussion and we advise that Halton Borough Council seeks to resolve this in discussion with the applicant prior to determination.

11. *MEAS para 23; Ineos Chlor E 23.1-23.4* - We welcome the statement that a Great Crested Newt survey is underway. We advise that this should be made available for review prior to determination of the application.

12. *MEAS para 29; Ineos Chlor G29.1* - We note the response of the applicant and we will defer to Halton Borough Council's Environmental Health Department. However, Merseyside EAS is able to offer technical advice on contaminated land matters at Halton Borough Council's request.

13. *MEAS para 31 & 32; Ineos Chlor H 31.1 & I 32.1* - We note that the applicant has responded separately on these issues to Halton Borough Council and, as air quality matters are not part of our core expertise, we are content to defer to the Council for further consideration.

I would be pleased to discuss these matters further, if that would be helpful.

Paul Slinn
Environmental Projects Team Leader

 Rec 2/3/07 S.C.

Connor, Sarah - Environment

From: Paul Slinn [Paul.Slinn@eas.sefton.gov.uk]
Sent: Monday, April 02, 2007 8:42 AM
To: Control, Dev
Subject: Ineos Chlor Vinyls, Ref 07/00068/ELC

DC Memo HA06001.doc

FAO: Andrew Plant

Dear Andrew

Further to my e-mail of last Friday, I noticed that the memo with our comments concerning the Ineos Chlor energy from waste proposal had been sent without the paragraph cross-referencing at the foot of the first page having been completed. I have now updated this and am attaching the completed document. This does not affect the content. Please discard the earlier version.

Regards

Paul Slinn
Environmental Projects Team Leader
Merseyside Environmental Advisory Service
Bryant House
Liverpool Road North
Maghull L31 2PA

Tel. 0151 934 2791
Fax. 0151 934 4955
Email. paul.slinn@eas.sefton.gov.uk

Council does not
accept any responsibility in this regard."

Merseyside Environmental Advisory Service
Bryant House, Liverpool Road North
Merseyside L31 2PA
Director: Alan Jemmett, PhD, MBA

Enquiries: 0151 934 4951
Fax: 0151 934 4955

Contact: Paul Slinn
Direct Dial: 0151 934 2791
Email: paul.slinn@eas.sefton.gov.uk

MEMO

To: Andrew Plant
Organisation: Environmental & Regulatory Services Dept
Halton Borough Council

From: Paul Slinn
Environmental Projects Team Leader

Your Ref 07/00068/ELC
File Ref HA06/001
W/P Ref
Date 02 April 2007

Application to Construct and Operate an Energy from Waste Combined Heat and Power Generating Station with an Approximate Capacity of 360MW Thermal and up to 100MW of Electrical Power at Ineos Chlor Vinyls, South Parade, Runcorn, Cheshire

Thank you for consulting Merseyside EAS on the above Environmental Statement (ES), which encompasses the application referenced above. We have commented on issues that relate to our core expertise, but it is also important that the Council seeks the views of colleagues in other departments and also those of the Environment Agency on the acceptability of the ES and development proposal. Merseyside EAS was not consulted on the scoping of this environmental impact assessment, though we note that a scoping exercise did take place. We note that responsibility for determination of the application does not lie solely with Halton Borough Council and we are content for our comments to be brought to the attention of the Secretary of State for Trade and Industry where appropriate.

Merseyside EAS is generally supportive of proposals that seek to recover energy from waste efficiently, as they have the potential to increase sustainable waste management practices according to the waste hierarchy, while at the same time supporting increased energy generation from renewable sources as promoted by the energy hierarchy and reducing demand for primary fossil fuels. For those reasons, we would hope in due course to be able to support this proposal. However, as detailed below, we believe that the applicant has some further work to do in order to clearly demonstrate the sustainable nature of the project.

It is our general position that, while much of the information and analysis presented in the ES is appropriate, we feel that there are areas in which the Environmental Statement is not sufficiently definitive. Accordingly, we advise that there are a number of areas where it is necessary to require additional information prior to determination and that there are also a number of issues that will require attention through conditions of consent.

For ease of reference, our comments can be characterised as follows:

- Matters requiring clarification through additional information prior to determination can be found in paras 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 19, 21, 22, 23, 30 and 32.
- Matters that can be dealt with through condition can be found in paras 2, 20, 26 and 27.

We make the following comments:

General

1. Many of the predicted environmental impacts identified are capable of being managed and mitigated and the ES contains a range of appropriate proposals to do so. We advise that all proposed mitigation measures are secured through binding mechanisms such as consent conditions, section 106 agreements or by inclusion within an environmental management plan.

2. The ES contains welcome commitments to the proposed use of procedural mitigation in the form of a Code of Construction Practice (CoCP) linked to a Construction Environmental Management Plan (CEMP), particularly as a draft of the document is provided for review in the ES appendices. However, there is no apparent proposal for an ongoing Environmental Management Plan (EMP) and no indication of how the operation of the plant will interface with other management practices employed on the site by the operator. We advise that an EMP would be an appropriate vehicle for taking forward the implementation of key mitigation measures, and that it should be submitted to the Secretary of State for approval prior to the commencement of works. Merseyside EAS would be pleased to review and comment on the draft EMP prior to agreement. <u>This can be secured through a suitably-worded planning condition.</u>

3. The EMP should be time limited and should include details of the measures envisaged during construction to manage and mitigate the main environmental effects of the proposed development. Included within its scope should be measures related to construction and demolition waste management, pollution prevention, soil resource management, noise, vibration, air quality and the prevention of nuisance. The EMP should be compiled in a coherent and integrated document and should be accessible to the site manager(s), all contractors and sub-contractors working on site, forming a single point of reference for site environmental management. Arrangements for review should be put in place and relationships to wider site environmental management systems and procedures should be defined.

4. The justification for the project included a discussion of emerging waste and energy policy drivers and is set out in Chapter 3 of the ES. It places the project in the context of the favourable drivers for the adoption of energy from waste technology, combined heat and power schemes, and energy from renewable sources. This is a valid approach, especially with regard to the specific characteristics of this particular site, but could have been strengthened with a clearer discussion of the relationship to climate change, the waste and energy hierarchies and wider sustainability issues. We would expect that a project of this scale and type would have been accompanied by a sustainability appraisal but, in the absence of one, the proposal would benefit from a much more detailed discussion of these issues in the ES.

Description of the Project

5. It is accepted that the proposal is for a combined heat and power plant, and that the Ineos site has significant heat and power requirements in order to operate. However, the ES lacks detail about the precise inputs and emissions from the CHP, and whether this is proven to be the Best Available Technology. This lack of detail has bearing on the impacts of the proposed operational plant and its justification in terms of the energy hierarchy, waste strategy and climate change. We advise that the applicant be requested to provide clarification on this matter prior to determination.

6. Section 2.21 gives predicted quantities of RDF/SRF from the surrounding sub-regions. Section 2.22 discusses the possibility of burning of other non-hazardous wastes or biomass. There is no discussion of the quantities of other biomass, where it would be sourced from, what it would be or how it would get to site. We advise that the applicant be requested to provide clarification on this matter prior to determination.

7. Section 2.47 discusses waste products from the process. This is not particularly well quantified ranging from 150,000 and 275,000 tonnes per annum. The worst case scenario is that there would be 32.4% residue from an original 850,000tonnes input. This in itself is an impact for consideration. We would wish to see all bottom ash beneficially used, as this would represent a poor use of landfill void. However, the ES fails to discuss the potential market demand for the beneficial re-use of bottom ash and it is therefore unclear what proportion it may be possible to re-use compared to the expected landfill requirement. We advise that the applicant be requested to provide clarification on this matter prior to determination. The amount of residue produced should be an important factor informing the choice of process technology for the scheme and we would expect this to be reflected in a more detailed discussion in the context of BATNEEC as part of the examination of alternative options (see also paragraph 9 below).

8. With regard to fly ash and FGT residues, there is a proposal to dispose of this to Randle Island landfill, but there is no detail regarding the capacity and lifespan of the landfill, or the impacts of this disposal requirement once the landfill closes in terms of hazardous waste landfill availability in the North West region. We advise that the applicant be requested to provide clarification on this matter prior to determination.

9. We are concerned that the section on alternatives focuses on location and layout, failing to discuss technological options. Attention should be given to alternative technologies, for example plasma gasification, which is more efficient in terms of power generation and produces minimal quantities of residue. However, we also note that the detailed technology selection has not yet been made (para 2.30 of the ES) and we are concerned that this is not made more clear in the ES and its implications for the impact studies explained. It is our view that this uncertainty over the final form that the process will take, together with the failure to discuss the main technological alternatives, constitutes a significant weakness in the ES. We advise that the applicant be requested to provide clarification on this matter prior to determination as the choice of technology will have a material effect on the significance and nature of environmental impacts within the EIA.

10. Section 2.70 states that the majority of fuel would be received by rail (600,000 tonnes) and the rest by road (480,000 tonnes). Is this a realistic assumption given that some uncertainties remain about the technology to be used and the mix of SRF and biomass fuel to be employed? Some of the alternative sites are ruled out because of the lack of rail links. We encourage the scheme to promote sustainable transport options wherever possible within the context of the strategic transport infrastructure for waste, but we do not feel that the soundness of the ESs projections for fuel transport have been thoroughly demonstrated. We advise that the applicant be requested to provide clarification on this matter prior to determination.

<u>Fuel</u>

11. Section 3.16 states that RDF is likely to contain 60% biomass, but RDF is derived from municipal solid waste and, whilst this will contain organic matter, it is not biomass fuel and is likely to contain a significant quantity of plastics. However, the application fails to make clear what the precise specification and minimum requirement for the composition of the fuel will be and this therefore requires further elaboration. There needs to be clearer discussion within this section on the relationship between the waste and energy hierarchies, and a reasoned estimate should be provided of the proportion of the generated energy that can be designated as

arising from renewable sources, including the proposed co-firing with separately-sourced biomass fuels, for which little detail is given. We advise that the applicant be requested to provide clarification on this matter prior to determination.

Water Resources and Drainage

12. Section 2.53 discusses emissions to water and contaminants in the 'operational' water. There is no quantification of the contaminants in the various effluent streams, but significant quantities of effluent are likely to be discharged. We advise that the applicant be requested to provide clarification on this matter prior to determination.

13. Section 7.34 discusses the proposals for surface water management. Surface water drainage provision is currently inadequate on the site and this will be upgraded as part of the development. We commend the proposal to re-use surface water run-off, and would recommend that this is further enhanced by collection of roof run off. The current proposal is for roof run off to go to soakaway. It would be more beneficial if this was re-used. Also, should ground contamination be revealed, it may not be possible to use infiltration systems. However, in line with the provisions of Policy Planning Statement 25, *Development and Flood Risk*, Merseyside EAS supports the use of Sustainable Urban Drainage Systems (SUDS) techniques wherever they are appropriate.

14. Although it is stated that cooling waters will be discharged via existing pipes and outfalls into the Runcorn - Weston Canal and eventually the Mersey Estuary, there is no explanation or consideration of the likely temperature of the cooling waters on discharge. It will be important to know if the cooling water discharge will be at ambient temperature of the receiving water course, lower, or higher. Given the proximity of the Mersey Estuary SPA a matter such as this should have been considered and we advise that the applicant be requested to provide clarification on this matter prior to determination.

15. The ES acknowledges that the CHP plant will use large quantities of water. However no estimate is given for the actual quantity and rate of use and the implications for additional abstraction of water are not provided. Whilst this is primarily a matter for the Environment Agency through abstraction and discharge licensing and consent processes, we advise that the applicant should be requested to clarify process water supply arrangements and quantities, both in absolute terms and as an additional proportion of existing abstraction licenses held by the applicant (If applicable), prior to determination.

Ecology

16. The impact of the extent and proposed treatment of the contaminated land on the site has been considered only from a human health angle. The Contaminated Land Regulations identify specific ecological receptors that should be considered, including European nature conservation sites such as SPAs, SACs etc. This appears to be an omission. We advise that the applicant be requested to provide clarification on this matter prior to determination

17. Figure 2.1 shows the landscape proposals that are included within the scheme as 'built-in' mitigation. These proposals indicate that a visual planted screen will be created to the south of the facility only. The proposals form barely an acceptable minimum and do nothing to improving screening of industry from the Estuary. It is difficult to see how the proposals meet the advice contained in PPS9, particularly key principle (ii) and paragraph 14 where the advice states "Development proposals provide many opportunities for building-in beneficial biodiversity or geological features as part of good design. When considering proposals, local planning authorities should maximise such opportunities in and around developments, using planning

obligations where appropriate." We advise that the applicant should be asked to look again at the landscape proposals and enhance the biodiversity gains within this proposal.

18. We advise that the methodology used in assessing the impact on Ecology (Chapter 6 of the ES) is acceptable, although it should be noted that the applicant has taken a 'pick and mix' approach to acceptable methodologies and this can lead to selectivity of significance of impacts. This chapter summarises the issue of appropriate assessment under the Habitat Regulations with reference to the air quality assessment – that is considered in Chapter 10 *Air Quality*. The ecological significance (or not) of those identified air quality impacts is not dealt with sufficiently.

19. We have considered the question "is there enough information submitted to enable the screening of the proposal against the requirements of the Habitat Regulations, specifically regulations 48 & 49?" There is a discrepancy between this list of European sites in this chapter and those quoted in the Air Quality assessment (Appendix 6.5). Additional sites between 10 and 15km from the application site are considered in the Air Quality Assessment (Midland Mosses & Meres Phase 1 and 2 Ramsar sites). These should have been included in the Ecology chapter. From our review of the information, this aspect is the one of most concern. For example, no detail has been provided on the expected dispersion pattern of NOx; SOx and acid deposition and its relationship to prevailing wind characteristics. Also, the basis for the air quality assessment parameters used is unclear. Accordingly, we advise that without additional information the competent authorities would not be able to screen the proposal as required under the Habitat Regulations. Clearly therefore the applicant will need to provide this additional information to assist the competent authorities in discharging their statutory duties under the Habitats Regulations. This information should be provided prior to determination. Natural England should be consulted on the application and whether, in its view, there is a likelihood of significant effects.

20. A series of mitigation measures have been included in the ES and we advise that these should be subject to planning conditions as follows:

- Paragraph 6.35 – no vegetation clearance between 01 Mar and 31 Aug in any year.
- Paragraph 6.36 – reptile survey for submission and approval together with detailed method statement for translocation methodology and receptor site/timing etc to be agreed prior to any works commencing.
- Paragraph 6.37 – CoCP- Appendix 2.3 paragraphs 1.30 – 1.31 are acceptable and should be subject to planning condition.
- Paragraph 7.131 – proposals to consider ponds as SuDS – condition required for submission of detailed drainage proposals that include biodiversity enhancement and landscape mitigation.

21. Paragraph 6.45 – no details of the surveyor(s) qualifications or experience have been submitted. It would be premature to accept the extended phase 1 survey and species list until those details are submitted and are found to be acceptable. This goes to the heart of the quality of the data used in the assessment and we advise that this information be requested from the applicant prior to determination.

22. Paragraph 6.93 – does not highlight the Section 74 list of principal habitats and species that local planning authorities must take into account under the Countryside and Rights of Way Act. For example, has the phase 1 survey or desk study identified the presence of any of these principal habitats and species? We advise that the applicant be requested to provide clarification on this matter prior to determination.

23. Paragraph 6.144 – A hand-search of potential refugia for great-crested newts has been undertaken. This is an unreliable method of determining whether great-crested newts are

present on the site. There is a likelihood of a small remnant population (cf. the small population translocated from the other Ineos Chlor site that is reference in the ES). **Hence, we advise that a great-crested newt survey is required prior to determination.** This survey needs to be undertaken using the standard methodology and can take place between February and June depending on local climatic conditions.

24. Paragraph 6.166 - states that there is no requirement for a habitat regulations assessment as there is no likely significant effect on any of the sites. This does seem to be at odds with the statements in the Air Quality assessment where deposition will add to the current rates of deposition that already exceeds critical loads. On this basis, **we advise that it is not possible to conclude that there is no likely significant effect on the information submitted and that the proposal does need to be screened in detail.**

Construction and Demolition

25. The demolition of any remaining structures must take place in a manner that does not pose unacceptable risks to the environment or human health. The demolition methodology must also consider the potential for impacts on the nearby controlled waters and its ecology, which may be caused by demolition debris or solids transported by water. **We advise that the applicant should review *'Pollution Prevention Guidance Note 6'*,** produced by the Environment Agency (web link http://publications.environment-agency.gov.uk/pdf/PMHO0203AUDJ-e-e.pdf?lang=_e), which provides specific information for use in construction and demolition projects, and incorporate this into the agreed method statements for the CoCP.

26. **We advise that the applicant produce a suitable demolition methods statement, which must receive prior written approval before before any demolition works commence.** The methods statement must be linked to the Site Waste Management Plan (see below), which will detail the types and quantities of waste likely to be encountered and methods of handling the material on-site, and also to the EMP, if appropriate. This can be secured through a suitably worded planning condition.

Waste Management

27. The proposed development may generate a significant quantity of waste, some of which may be non-hazardous, inert or possibly hazardous. **We advise that the developer should prepare a Site Waste Management Plan (SWMP)** in accordance with Paragraph 34 of Planning Policy Statement 10 '*Planning for Sustainable Waste Management*'. The SWMP should be prepared in accordance with DTI guidance '*Site Waste Management Plans: Guidance for Construction Contractors and Clients - Voluntary Code of Practice*', available at the following internet address: www.dti.gov.uk/construction/sustain/site_waste_management.pdf. This can be secured through a suitably worded planning condition. The SWMP must be linked to the demolition methods statement and also to the EMP and should address the following issues:
    - Wastes to be produced and where possible how they will be recycled/ recovered;
    - Steps to be taken to minimise the quantities of waste produced and maximise the on-site use of recycled materials;
    - Procedures for the management of waste onsite and waste leaving the site;
    - Relevant information associated with the Duty of Care (i.e. details of the waste carriers, waste transfer and sites that have been identified to accept the waste).

28. It is important that the applicant actively seeks to achieve waste minimisation during construction activities. The SWMP should include measures to ensure the identification of suitable material for re-use and recycling on-site wherever feasible. It is recommended that a full building audit and site investigation takes place to identify the different wastes present onsite and likely to be encountered during demolition and construction work. This is consistent with the Key Planning Objectives stated in paragraph 3 of Planning Policy Statement 10. It is

important that the material to be re-used on-site is fully characterised to ensure it is suitable for use and that there are no unacceptable risks or potential disposal activities carried out without appropriate approval. The demolition of any buildings without first determining the nature and quantity of material contained within it will result in a lost opportunity to maximise a valuable resource.

Soils and Ground Contamination

29. We note that the ES acknowledges that potential sources of ground contamination have been identified on site. Consideration is given to the requirements for a site investigation to determine whether there is any ground contamination at the site (paras 7.91 to 7.98). However, this has not been carried out and the impacts of this cannot therefore be adequately quantified or assessed. We will defer to comments from colleagues in the Halton Borough Council Environmental Health Department with respect to contamination issues associated with the proposal.

30. Section 2.92 refers to the civil works required in preparation of development. It is hoped that a cut and fill balance is achieved. There is no consideration given to the impacts of disposal of surplus materials, import of extra materials, or disposal of unsuitable materials. We advise that the applicant be requested to provide clarification on this matter prior to determination.

Air Quality

31. Whilst air quality is note one of Merseyside EAS's core areas of expertise, we note that the air quality assessment of particulate emissions covers only PM_{10}s. We are aware of emerging concern regarding the potential health impacts of finer particulate matter and in a development of this type and scale and it would seem appropriate for this issue to receive attention.

Cumulative Impacts

32. With regard to air quality, some consideration is given to cumulative impacts with other proposed construction activities, and with the vehicular as well as CHP impacts from the proposed development. However, cumulative impacts with existing industrial chemical air emissions do not seem to be assessed. The existing emissions seem to be referred to as ambient air quality. This does not seem appropriate. We advise that the applicant be requested to provide clarification on this matter prior to determination.

Conclusion

33. In conclusion, whilst we wish to be supportive of the principle of the proposed development, the application has some significant weaknesses that we consider must be addressed prior to determination. The most substantive of these are
    - Inadequate discussion and justification of the technology to be chosen over other technologies. Particular attention should be given to BATNEEC, Energy Hierarchy, emissions and climate change, and the relationship with waste strategy;
    - Insufficient information on the specification and nature of the SRF/RDF. This is important for several reasons including an assessment of what proportion of the fuel can be defined as biomass and therefore as 'renewable'. However, given the scale of the development and the scale of the fuel need for the facility is such that it could have a significant impact on the emerging municipal waste management strategies in the fuel 'catchment' areas such as Merseyside. For example, if it is known that there is an outlet for SRF/RDF this could have a significant impact on technology choice. Whilst this may have potential benefits there are also risks in terms of future specifications and energy technologies.
    - Lack of a comprehensive sustainability appraisal; and

- Insufficient information for Habitats Regulations Assessment.

We would be happy to provide further information upon request.

Contact Officer: Paul Slinn
Tel: 0151 934 2791
Email: paul.slinn@eas.sefton.gov.uk

C:\Work\Ineos Chlor\DC Memo HA06001.doc

Connor, Sarah - Environment

From: Paul Slinn [Paul.Slinn@eas.sefton.gov.uk]
Sent: Friday, March 30, 2007 2:43 PM
To: Control, Dev
Subject: Ref. 07/00068/ELC - Ineos Chlor Vinyls

DC Memo HA06001.doc

FAO. Andrew Plant

Dear Andrew

Please find attached Merseyside EAS's comments regarding the proposed energy from waste project at Ineos Chlor Vinyls. I hope the comments are helpful and please don't hesitate to get in touch if we can be of further help.

Regards

Paul Slinn
Environmental Projects Team Leader
Merseyside Environmental Advisory Service
Bryant House
Liverpool Road North
Maghull L31 2PA

Tel. 0151 934 2791
Fax. 0151 934 4955
Email. paul.slinn@eas.sefton.gov.uk

Merseyside Environmental Advisory Service
Bryant House, Liverpool Road North
Merseyside L31 2PA
Director: Alan Jemmett, PhD, MBA

Enquiries: 0151 934 4951
Fax: 0151 934 4955

Contact: Paul Slinn
Direct Dial: 0151 934 2791
Email: paul.slinn@eas.sefton.gov.uk

MEMO

To:	Andrew Plant	Your Ref	07/00068/ELC
Organisation	Environmental & Regulatory Services Dept	File Ref	HA06/001
	Halton Borough Council	W/P Ref	
From:	Paul Slinn Environmental Projects Team Leader	Date	30 March 2007

Application to Construct and Operate an Energy from Waste Combined Heat and Power Generating Station with an Approximate Capacity of 360MW Thermal and up to 100MW of Electrical Power at Ineos Chlor Vinyls, South Parade, Runcorn, Cheshire

Thank you for consulting Merseyside EAS on the above Environmental Statement (ES), which encompasses the application referenced above. We have commented on issues that relate to our core expertise, but it is also important that the Council seeks the views of colleagues in other departments and also those of the Environment Agency on the acceptability of the ES and development proposal. Merseyside EAS was not consulted on the scoping of this environmental impact assessment, though we note that a scoping exercise did take place. We note that responsibility for determination of the application does not lie solely with Halton Borough Council and we are content for our comments to be brought to the attention of the Secretary of State for Trade and Industry where appropriate.

Merseyside EAS is generally supportive of proposals that seek to recover energy from waste efficiently, as they have the potential to increase sustainable waste management practices according to the waste hierarchy, while at the same time supporting increased energy generation from renewable sources as promoted by the energy hierarchy and reducing demand for primary fossil fuels. For those reasons, we would hope in due course to be able to support this proposal. However, as detailed below, we believe that the applicant has some further work to do in order to clearly demonstrate the sustainable nature of the project.

It is our general position that, while much of the information and analysis presented in the ES is appropriate, we feel that there are areas in which the Environmental Statement is not sufficiently definitive. Accordingly, **we advise that there are a number of areas where it is necessary to require additional information prior to determination and that there are also a number of issues that will require attention through conditions of consent.**

For ease of reference, our comments can be characterised as follows:

- Matters requiring clarification through additional information prior to determination can be found in paras ....
- Matters that can be dealt with through condition can be found in paras ....

We make the following comments:

General

1. Many of the predicted environmental impacts identified are capable of being managed and mitigated and the ES contains a range of appropriate proposals to do so. **We advise that all proposed mitigation measures are secured through binding mechanisms such as consent conditions, section 106 agreements or by inclusion within an environmental management plan.**

2. The ES contains welcome commitments to the proposed use of procedural mitigation in the form of a Code of Construction Practice (CoCP) linked to a Construction Environmental Management Plan (CEMP), particularly as a draft of the document is provided for review in the ES appendices. However, there is no apparent proposal for an ongoing Environmental Management Plan (EMP) and no indication of how the operation of the plant will interface with other management practices employed on the site by the operator. **We advise that an EMP would be an appropriate vehicle for taking forward the implementation of key mitigation measures, and that it should be submitted to the Secretary of State for approval prior to the commencement of works.** Merseyside EAS would be pleased to review and comment on the draft EMP prior to agreement. This can be secured through a suitably-worded planning condition.

3. The EMP should be time limited and should include details of the measures envisaged during construction to manage and mitigate the main environmental effects of the proposed development. Included within its scope should be measures related to construction and demolition waste management, pollution prevention, soil resource management, noise, vibration, air quality and the prevention of nuisance. The EMP should be compiled in a coherent and integrated document and should be accessible to the site manager(s), all contractors and sub-contractors working on site, forming a single point of reference for site environmental management. Arrangements for review should be put in place and relationships to wider site environmental management systems and procedures should be defined.

4. The justification for the project included a discussion of emerging waste and energy policy drivers and is set out in Chapter 3 of the ES. It places the project in the context of the favourable drivers for the adoption of energy from waste technology, combined heat and power schemes, and energy from renewable sources. This is a valid approach, especially with regard to the specific characteristics of this particular site, but could have been strengthened with a clearer discussion of the relationship to climate change, the waste and energy hierarchies and wider sustainability issues. We would expect that a project of this scale and type would have been accompanied by a sustainability appraisal but, in the absence of one, the proposal would benefit from a much more detailed discussion of these issues in the ES.

Description of the Project

5. It is accepted that the proposal is for a combined heat and power plant, and that the Ineos site has significant heat and power requirements in order to operate. However, the ES lacks detail about the precise inputs and emissions from the CHP, and whether this is proven to be the Best Available Technology. This lack of detail has bearing on the impacts of the proposed operational plant and its justification in terms of the energy hierarchy, waste strategy and climate change. **We advise that the applicant be requested to provide clarification on this matter prior to determination.**

6. Section 2.21 gives predicted quantities of RDF/SRF from the surrounding sub-regions. Section 2.22 discusses the possibility of burning of other non-hazardous wastes or biomass. There is no discussion of the quantities of other biomass, where it would be sourced from, what it would be or how it would get to site. **We advise that the applicant be requested to provide clarification on this matter prior to determination.**

7. Section 2.47 discusses waste products from the process. This is not particularly well quantified ranging from 150,000 and 275,000 tonnes per annum. The worst case scenario is that there would be 32.4% residue from an original 850,000tonnes input. This in itself is an impact for consideration. We would wish to see all bottom ash beneficially used, as this would represent a poor use of landfill void. However, the ES fails to discuss the potential market demand for the beneficial re-use of bottom ash and it is therefore unclear what proportion it may be possible to re-use compared to the expected landfill requirement. **We advise that the applicant be requested to provide clarification on this matter prior to determination.** The amount of residue produced should be an important factor informing the choice of process technology for the scheme and we would expect this to be reflected in a more detailed discussion in the context of BATNEEC as part of the examination of alternative options (see also paragraph 9 below).

8. With regard to fly ash and FGT residues, there is a proposal to dispose of this to Randle Island landfill, but there is no detail regarding the capacity and lifespan of the landfill, or the impacts of this disposal requirement once the landfill closes in terms of hazardous waste landfill availability in the North West region. **We advise that the applicant be requested to provide clarification on this matter prior to determination.**

9. We are concerned that the section on alternatives focuses on location and layout, failing to discuss technological options. Attention should be given to alternative technologies, for example plasma gasification, which is more efficient in terms of power generation and produces minimal quantities of residue. However, we also note that the detailed technology selection has not yet been made (para 2.30 of the ES) and we are concerned that this is not made more clear in the ES and its implications for the impact studies explained. It is our view that this uncertainty over the final form that the process will take, together with the failure to discuss the main technological alternatives, constitutes a significant weakness in the ES. **We advise that the applicant be requested to provide clarification on this matter prior to determination** as the choice of technology will have a material effect on the significance and nature of environmental impacts within the EIA.

10. Section 2.70 states that the majority of fuel would be received by rail (600,000 tonnes) and the rest by road (480,000 tonnes). Is this a realistic assumption given that some uncertainties remain about the technology to be used and the mix of SRF and biomass fuel to be employed? Some of the alternative sites are ruled out because of the lack of rail links. We encourage the scheme to promote sustainable transport options wherever possible within the context of the strategic transport infrastructure for waste, but we do not feel that the soundness of the ESs projections for fuel transport have been thoroughly demonstrated. **We advise that the applicant be requested to provide clarification on this matter prior to determination.**

<u>Fuel</u>

11. Section 3.16 states that RDF is likely to contain 60% biomass, but RDF is derived from municipal solid waste and, whilst this will contain organic matter, it is not biomass fuel and is likely to contain a significant quantity of plastics. However, the application fails to make clear what the precise specification and minimum requirement for the composition of the fuel will be and this therefore requires further elaboration. There needs to be clearer discussion within this section on the relationship between the waste and energy hierarchies, and a reasoned estimate should be provided of the proportion of the generated energy that can be designated as

arising from renewable sources, including the proposed co-firing with separately-sourced biomass fuels, for which little detail is given. **We advise that the applicant be requested to provide clarification on this matter prior to determination.**

Water Resources and Drainage

12. Section 2.53 discusses emissions to water and contaminants in the 'operational' water. There is no quantification of the contaminants in the various effluent streams, but significant quantities of effluent are likely to be discharged. **We advise that the applicant be requested to provide clarification on this matter prior to determination.**

13. Section 7.34 discusses the proposals for surface water management. Surface water drainage provision is currently inadequate on the site and this will be upgraded as part of the development. We commend the proposal to re-use surface water run-off, and would recommend that this is further enhanced by collection of roof run off. The current proposal is for roof run off to go to soakaway. It would be more beneficial if this was re-used. Also, should ground contamination be revealed, it may not be possible to use infiltration systems. However, in line with the provisions of Policy Planning Statement 25, *Development and Flood Risk*, Merseyside EAS supports the use of Sustainable Urban Drainage Systems (SUDS) techniques wherever they are appropriate.

14. Although it is stated that cooling waters will be discharged via existing pipes and outfalls into the Runcorn - Weston Canal and eventually the Mersey Estuary, there is no explanation or consideration of the likely temperature of the cooling waters on discharge. It will be important to know if the cooling water discharge will be at ambient temperature of the receiving water course, lower, or higher. Given the proximity of the Mersey Estuary SPA a matter such as this should have been considered and we **advise that the applicant be requested to provide clarification on this matter prior to determination.**

15. The ES acknowledges that the CHP plant will use large quantities of water. However no estimate is given for the actual quantity and rate of use and the implications for additional abstraction of water are not provided. Whilst this is primarily a matter for the Environment Agency through abstraction and discharge licensing and consent processes, **we advise that the applicant should be requested to clarify process water supply arrangements and quantities, both in absolute terms and as an additional proportion of existing abstraction licenses held by the applicant (If applicable), prior to determination.**

Ecology

16. The impact of the extent and proposed treatment of the contaminated land on the site has been considered only from a human health angle. The Contaminated Land Regulations identify specific ecological receptors that should be considered, including European nature conservation sites such as SPAs, SACs etc. This appears to be an omission. **We advise that the applicant be requested to provide clarification on this matter prior to determination**

17. Figure 2.1 shows the landscape proposals that are included within the scheme as 'built-in' mitigation. These proposals indicate that a visual planted screen will be created to the south of the facility only. The proposals form barely an acceptable minimum and do nothing to improving screening of industry from the Estuary. It is difficult to see how the proposals meet the advice contained in PPS9, particularly key principle (ii) and paragraph 14 where the advice states "Development proposals provide many opportunities for building-in beneficial biodiversity or geological features as part of good design. When considering proposals, local planning authorities should maximise such opportunities in and around developments, using planning

obligations where appropriate." We advise that the applicant should be asked to look again at the landscape proposals and enhance the biodiversity gains within this proposal.

18. We advise that the methodology used in assessing the impact on Ecology (Chapter 6 of the ES) is acceptable, although it should be noted that the applicant has taken a 'pick and mix' approach to acceptable methodologies and this can lead to selectivity of significance of impacts. This chapter summarises the issue of appropriate assessment under the Habitat Regulations with reference to the air quality assessment - that is considered in Chapter 10 *Air Quality*. The ecological significance (or not) of those identified air quality impacts is not dealt with sufficiently.

19. We have considered the question "is there enough information submitted to enable the screening of the proposal against the requirements of the Habitat Regulations, specifically regulations 48 & 49?" There is a discrepancy between this list of European sites in this chapter and those quoted in the Air Quality assessment (Appendix 6.5). Additional sites between 10 and 15km from the application site are considered in the Air Quality Assessment (Midland Mosses & Meres Phase 1 and 2 Ramsar sites). These should have been included in the Ecology chapter. From our review of the information, this aspect is the one of most concern. For example, no detail has been provided on the expected dispersion pattern of NOx, SOx and acid deposition and its relationship to prevailing wind characteristics. Also, the basis for the air quality assessment parameters used is unclear. Accordingly, we advise that without additional information the competent authorities would not be able to screen the proposal as required under the Habitat Regulations. Clearly therefore the applicant will need to provide this additional information to assist the competent authorities in discharging their statutory duties under the Habitats Regulations. This information should be provided prior to determination. Natural England should be consulted on the application and whether, in its view, there is a likelihood of significant effects.

20. A series of mitigation measures have been included in the ES and we advise that these should be subject to planning conditions as follows:

- Paragraph 6.35 - no vegetation clearance between 01 Mar and 31 Aug in any year.
- Paragraph 6.36 - reptile survey for submission and approval together with detailed method statement for translocation methodology and receptor site/timing etc to be agreed prior to any works commencing.
- Paragraph 6.37 - CoCP- Appendix 2.3 paragraphs 1.30 - 1.31 are acceptable and should be subject to planning condition.
- Paragraph 7.131 - proposals to consider ponds as SuDS - condition required for submission of detailed drainage proposals that include biodiversity enhancement and landscape mitigation.

21. Paragraph 6.45 - no details of the surveyor(s) qualifications or experience have been submitted. It would be premature to accept the extended phase 1 survey and species list until those details are submitted and are found to be acceptable. This goes to the heart of the quality of the data used in the assessment and we advise that this information be requested from the applicant prior to determination.

22. Paragraph 6.93 - does not highlight the Section 74 list of principal habitats and species that local planning authorities must take into account under the Countryside and Rights of Way Act. For example, has the phase 1 survey or desk study identified the presence of any of these principal habitats and species? We advise that the applicant be requested to provide clarification on this matter prior to determination.

23. Paragraph 6.144 - A hand-search of potential refugia for great-crested newts has been undertaken. This is an unreliable method of determining whether great-crested newts are

present on the site. There is a likelihood of a small remnant population (cf. the small population translocated from the other Ineos Chlor site that is reference in the ES). **Hence, we advise that a great-crested newt survey is required prior to determination.** This survey needs to be undertaken using the standard methodology and can take place between February and June depending on local climatic conditions.

24. Paragraph 6.166 – states that there is no requirement for a habitat regulations assessment as there is no likely significant effect on any of the sites. This does seem to be at odds with the statements in the Air Quality assessment where deposition will add to the current rates of deposition that already exceeds critical loads. On this basis, **we advise that it is not possible to conclude that there is no likely significant effect on the information submitted and that the proposal does need to be screened in detail.**

Construction and Demolition

25. The demolition of any remaining structures must take place in a manner that does not pose unacceptable risks to the environment or human health. The demolition methodology must also consider the potential for impacts on the nearby controlled waters and its ecology, which may be caused by demolition debris or solids transported by water. **We advise that the applicant should review '*Pollution Prevention Guidance Note 6*'**, produced by the Environment Agency (web link http://publications.environment-agency.gov.uk/pdf/PMHO0203AUDJ-e-e.pdf?lang=_e), which provides specific information for use in construction and demolition projects, and incorporate this into the agreed method statements for the CoCP.

26. **We advise that the applicant produce a suitable demolition methods statement, which must receive prior written approval before before any demolition works commence.** The methods statement must be linked to the Site Waste Management Plan (see below), which will detail the types and quantities of waste likely to be encountered and methods of handling the material on-site, and also to the EMP, if appropriate. This can be secured through a suitably worded planning condition.

Waste Management

27. The proposed development may generate a significant quantity of waste, some of which may be non-hazardous, inert or possibly hazardous. **We advise that the developer should prepare a Site Waste Management Plan (SWMP)** in accordance with Paragraph 34 of Planning Policy Statement 10 '*Planning for Sustainable Waste Management*'. The SWMP should be prepared in accordance with DTI guidance '*Site Waste Management Plans: Guidance for Construction Contractors and Clients – Voluntary Code of Practice*', available at the following internet address: www.dti.gov.uk/construction/sustain/site_waste_management.pdf. This can be secured through a suitably worded planning condition. The SWMP must be linked to the demolition methods statement and also to the EMP and should address the following issues:
    - Wastes to be produced and where possible how they will be recycled/ recovered;
    - Steps to be taken to minimise the quantities of waste produced and maximise the on-site use of recycled materials;
    - Procedures for the management of waste onsite and waste leaving the site;
    - Relevant information associated with the Duty of Care (i.e. details of the waste carriers, waste transfer and sites that have been identified to accept the waste).

28. It is important that the applicant actively seeks to achieve waste minimisation during construction activities. The SWMP should include measures to ensure the identification of suitable material for re-use and recycling on-site wherever feasible. It is recommended that a full building audit and site investigation takes place to identify the different wastes present onsite and likely to be encountered during demolition and construction work. This is consistent with the Key Planning Objectives stated in paragraph 3 of Planning Policy Statement 10. It is

important that the material to be re-used on-site is fully characterised to ensure it is suitable for use and that there are no unacceptable risks or potential disposal activities carried out without appropriate approval. The demolition of any buildings without first determining the nature and quantity of material contained within it will result in a lost opportunity to maximise a valuable resource.

Soils and Ground Contamination

29. We note that the ES acknowledges that potential sources of ground contamination have been identified on site. Consideration is given to the requirements for a site investigation to determine whether there is any ground contamination at the site (paras 7.91 to 7.98). However, this has not been carried out and the impacts of this cannot therefore be adequately quantified or assessed. We will defer to comments from colleagues in the Halton Borough Council Environmental Health Department with respect to contamination issues associated with the proposal.

30. Section 2.92 refers to the civil works required in preparation of development. It is hoped that a cut and fill balance is achieved. There is no consideration given to the impacts of disposal of surplus materials, import of extra materials, or disposal of unsuitable materials. We advise that the applicant be requested to provide clarification on this matter prior to determination.

Air Quality

31. Whilst air quality is note one of Merseyside EAS's core areas of expertise, we note that the air quality assessment of particulate emissions covers only PM_{10}s. We are aware of emerging concern regarding the potential health impacts of finer particulate matter and in a development of this type and scale and it would seem appropriate for this issue to receive attention.

Cumulative Impacts

32. With regard to air quality, some consideration is given to cumulative impacts with other proposed construction activities, and with the vehicular as well as CHP impacts from the proposed development. However, cumulative impacts with existing industrial chemical air emissions do not seem to be assessed. The existing emissions seem to be referred to as ambient air quality. This does not seem appropriate. We advise that the applicant be requested to provide clarification on this matter prior to determination.

Conclusion

33. In conclusion, whilst we wish to be supportive of the principle of the proposed development, the application has some significant weaknesses that we consider must be addressed prior to determination. The most substantive of these are
    - Inadequate discussion and justification of the technology to be chosen over other technologies. Particular attention should be given to BATNEEC, Energy Hierarchy, emissions and climate change, and the relationship with waste strategy;
    - Insufficient information on the specification and nature of the SRF/RDF. This is important for several reasons including an assessment of what proportion of the fuel can be defined as biomass and therefore as 'renewable'. However, given the scale of the development and the scale of the fuel need for the facility is such that it could have a significant impact on the emerging municipal waste management strategies in the fuel 'catchment' areas such as Merseyside. For example, if it is known that there is an outlet for SRF/RDF this could have a significant impact on technology choice. Whilst this may have potential benefits there are also risks in terms of future specifications and energy technologies.
    - Lack of a comprehensive sustainability appraisal; and

- Insufficient information for Habitats Regulations Assessment.

We would be happy to provide further information upon request.

Contact Officer: Paul Slinn
Tel: 0151 934 2791
Email: paul.slinn@eas.sefton.gov.uk

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APPENDIX 7

CONDITIONS

SCHEDULE OF PROPOSED CONDITIONS

Time limit

1. The development hereby permitted shall be begun before the expiration of three years from the date of this permission.

Approved plans

2. The development hereby approved shall be carried out in accordance with the written application, dated 19 January 2007 submitted to the Secretary of State and made pursuant to the Electricity Act 1989 Section 36 and the following plans hereby approved:

Location Plan Drawing No.: 14839/00/13/00002, Sheet 1
Location Plan Drawing No.: 14839/00/13/00002, Sheet 2
Land Ownership Plan Drawing No.: 14839/00/13/00005
Plan of Existing Facilities Drawing No.: 14839/00/13/00006
Elevation on Existing Facilities Drawing No.: 14839/00/13/00007
Demolition Plan Drawing No.: 14839/00/13/00008
Construction Laydown Plan Drawing No.: 14839/00/13/00009
Proposed EfW Plant Layout Drawing No.: 14839/00/13/00016, Sheet 1
Proposed EfW Plant Layout Drawing No.: 14839/00/13/00016, Sheet 2
Proposed EfW Plant Drawing No.: 14839/00/13/00017, Sheet 1
Proposed EfW Plant Drawing No.: 14839/00/13/00017, Sheet 2

Planning Permission

3. From the date of commencement of the development until the date of restoration of the site, as detailed by condition [39] below, a copy of this planning permission, granted pursuant to the Electricity Act 1989 Section 36, including all documents approved in accordance with this planning permission shall be available for inspection on the site during working hours.

Environmental and Waste Management

4. Development shall not commence until a scheme for the environmental management of the site has been submitted to and approved in writing by the Planning Authority. The scheme shall detail the measures proposed to manage and mitigate the main environmental effects of development. The scheme shall relate to demolition and construction waste management, pollution prevention measures, soil resource management, noise, vibration, air quality, prevention of nuisance, and ecological protection/ mitigation measures.

5. Prior to commencement of development a scheme for waste management shall be submitted to and approved in writing by the Planning Authority. The scheme shall detail a strategy to identify the volume and type of material to be demolished and/or excavated, opportunities for the reuse and

recovery of materials and to demonstrate how disposal of waste will be minimised and managed.

6. No part of the development hereby permitted shall commence until;

a) Prior to the commencement of development an appropriate investigation and assessment of all potential pollutant linkages is submitted to, and approved by, the Planning Authority. The investigation and assessment should be carried out by suitably qualified personnel and carried out in accordance with current Government, Environment Agency and British Standard guidance, and;

b) Should any significant risks be identified by such an investigation a remediation plan, including suitable monitoring and verification methodologies, should also be agreed in writing by the Planning Authority. A completion statement shall be issued upon completion of any remediation.

In the event that unexpected significant contamination is encountered during any development works, including works required by an approved remediation statement, works in the affected part of the site must cease and the local planning authority shall be contacted immediately. The local planning authority may at this stage request that a remediation statement, outlining plans for further investigation and the proposed method of dealing with the contamination, be submitted for written approval prior to development works continuing in the affected part of the site.

Noise

7. The commencement of the development shall not take place until there has been submitted to, approved in writing by, and deposited with, the Planning Authority a programme for the monitoring of noise generated during the construction of the development. The programme shall specify the measurement locations from which noise will be monitored and the maximum permissible levels at each such monitoring location. The programme shall make provision for such noise measurements to be undertaken as soon as possible following requests by the Planning Authority and such measurements shall be given to the Borough Council as soon as they are available. At each measurement location, noise levels during construction operations shall not exceed the levels specified in the approved programme unless otherwise approved in writing by the Planning Authority or in an emergency.

8. In any instance where the noise level referred to in Condition (7) is exceeded because of an emergency the Company shall within 2 working days provide the Planning Authority with a written statement detailing the nature of the emergency and the reason why the noise level could not be observed.

9. The testing and commissioning of the development shall not take place until there has been submitted to, approved in writing by, and deposited with the Planning Authority, a programme for the monitoring of noise generated

during the testing and commissioning of the development. The programme shall specify the measurement locations from which noise will be monitored, the method of noise measurement which shall be in accordance with BS4142 (1997) and the maximum permissible of noise at each such monitoring location. The programme shall make provision for such noise measurements to be taken by the Company as soon as possible following requests by the Planning Auhtority and such measurements shall be given to the Planning Authority as soon as they are available. At such monitoring locations noise levels shall not exceed the levels specified in the approved programme, except in an emergency.

10. In any instance where a noise level approved pursuant to condition (7) is exceeded because of an emergency the Applicant shall within 2 working days provide the Planning Authority with a written statement detailing the nature of the emergency and the reason why the noise level could not be observed. If the emergency period is expected to be for more than twenty four hours then the Applicant shall inform those residents affected by the effects of the emergency of the reasons for the emergency and the expected duration.

11. Except in an emergency, the Applicant shall give at least 2 working days prior notice in writing to the Planning Authority of any proposed operation of emergency pressure valves or similar equipment.
So far as is reasonably practicable, any such operation
(a) shall take place between the hours of 09.00 and 17.00 ; and
(b) shall not take place on any Saturday , Sunday or Bank Holiday.

12. No pile driving or use of percussion equipment shall take place on the site on any Sunday or Bank Holiday. On any other day the use of such equipment shall take place only between the hours of 0800 – 1800 on Monday to Friday and 0800 - 1200 on Saturday.

13. All plant, equipment and vehicles used on the site shall be properly silenced and maintained in efficient working order in accordance with the manufacturers specifications.

Access

14. Development shall not begin until details of the proposed new access road have been approved in writing by the Planning Authority, in consultation with the Highway Authority. Prior to commencment of development, the new access road must be constructed and surfaced to the satisfaction of the Local Planning Authority.

Vehicle Movements

15. The maximum number of Heavy Goods Vehicle movements to and from the development shall not, unless otherwise agreed in writing with the Planning Authority, exceed 400 per day (200 in and 200 out) during concrete

pouring and at all other times during construction works shall not exceed 150 movements per day.

16. All vehicles travelling to and from the site shall use the road network routes submitted to the Planning Authority for approval and agreed in writing.

Travel plans. Operation phase

17. Prior to commencement of the development hereby approved, a travel plan detailing the infrastructure and the co-ordination facilities that will be made available to the employees of the application site and all other Ineos operations within the Borough, to encourage sustainable travel. Shall be submitted to and approved in writing by the Council as Local Planning Authority. Such details that are approved shall be implemented to a time scale agreed with the Local Planning Authority.

Parking

18. The building shall not be occupied until vehicle parking for 26 staff and visitors (including 2 disabled bays), 5 motor cycles and 10 cycles has been provided on site.

19. Fuel deliveries shall not commence until vehicle parking for 10 fuel delivery vehicles has been provided on site.

Landscape works

20. All hard and soft landscape works including details of boundary treatment shall be carried out in accordance with the approved details. The works shall submitted to and approved in writing by the Local Planning Authority and be carried out prior to the occupation of any part of the development or in accordance with the program agreed in writing with the Planning Authority.

Demolition Method Statement

21. Prior to commencement of demolition works a scheme detailing a demolition method statement shall be submitted to and approved in writing by the Planning Authority. The scheme shall include measures proposed to protect controlled water and its surrounding ecology from environmental impacts caused by demolition debris or solids capable of migration by water.

Earthworks

22. No development shall take place until details of earthworks have been submitted to and approved in writing by the Planning Authority. These

details shall include the proposed grading and mounding of land areas including the levels and contours to be formed, showing the relationship of proposed mounding to existing vegetation and surrounding landform.

Dust

23. The best practicable means shall be used to suppress the occurrence of dust. Internal roads shall be kept free of dust and debris and sweepers and or water bowsers used as appropriate.

24. The commencement of the Development shall not take place until there has been submitted to, approved in writing by, and deposited with the Planning Authority, a scheme for the provision of wheel cleansing facilities for heavy commercial vehicles which has an operating weight exceeding three tonnes. Such approved facilities shall be installed in accordance with a timescale to be approved in writing by the Planning Authority and shall be maintained throughout the period of the construction of the Development unless any variation has been approved in writing by the Planning Authority.

25. The applicant shall provide a concrete or bituminous macadam road on the Site between the wheel cleansing facilities and any existing private roads or the public highway.

26. All heavy commercial vehicles and any other which has an operating weight exceeding three tonnes associated with the construction of the development leaving the site, other than those vehicles exclusively using tarmacadam roads, shall on each occasion, prior to leaving, pass through the wheel cleansing facilities.

27. The company shall as soon as reasonably practicable sweep or otherwise clear away any mud which may be carried onto the public highway by vehicles from the site during the period of construction.

Surface water

28. Throughout the period of construction, working and restoration all ground water will be tested and treated on site prior to discharging into surface water drains and all surface water drains shall be protected such that the flow of water is not impaired or the drainage on to and from adjoining land rendered less effective.

29. Prior to the commencement of development a scheme shall be submitted and approved in writing by the local planning authority in consultation with the Environment Agency showing the method and working of drainage facilities on the site. The scheme shall include measures to ensure that no leachate or any contaminated surface water from the site shall be allowed at any time to enter directly or indirectly into any watercourse or underground strata or onto adjoining land. Such facilities shall be put in place in accordance with the approved scheme.

Pollution prevention

30. All oil, diesel oil and lubricants stored on site shall be stored on a base impervious to both oil and water and surrounded by an impermeable bund wall. The bunded area shall be capable of containing 110% of the largest tanks capacity and all drain pipes, fill pipes and sight gauges shall, where practicable, be enclosed within its curtilage.

31. Prior to the commencement of development the details of the transportation of the fuel and of waste products shall be submitted to and approved by the Local Planning Authority.

Working hours

32. All construction, engineering, earthmoving operations and loading and unloading of Heavy Good Vehicles shall be undertaken during the following hours only:
0700 - 1900 Monday to Friday
0700 - 1400 Saturday
No such operations shall take place outside these hours or on Sundays or Bank or Public Holidays unless such work -
(a) is associated with an emergency; or
(b) does not cause existing ambient noise levels to be exceeded and is carried out with the prior written approval of the Planning Authority.

Lighting

33. Details of construction lighting, including temporary floodlighting, shall be submitted to and approved in writing by the local planning authority before the construction works commence. Development shall be carried out in accordance with the approved details.

34. Prior to the plant being commissioned a lighting scheme shall be submitted to the Planning Authority in writing. The scheme shall include details of all outside lighting, including floodlighting and safety lighting and measures to prevent light pollution, including from illumination within the plant.

Materials

35. The commencement of the development shall not take place until there has been submitted to, approved in writing by, and deposited with, the Borough Council a scheme which shall include:
(i) the siting, design, external appearance and dimensions of all buildings and structures which are to be retained following the commissioning of the development;
(ii) details of the colour, materials and surface finishes in respect of those buildings and structures referred to in (i) above and
(iii) phasing of works included in the scheme.

36. No development shall take place until samples of the materials to be used in the construction of the external surfaces have been submitted to and approved in writing by the Planning Authority.

Drainage

37. Development shall not begin until drainage works have been carried out in accordance with details to be submitted to and approved in writing by the local planning authority.

Reinstatement

38. The contractors' laydown area hereby permitted shall be removed and the land reinstated to its former condition in accordance with a scheme to be submitted to and approved in writing by the Planning Authority.

Contaminated land

39. Development shall not begin until a scheme for decontamination of the site has been submitted to and approved in writing by the Planning Authority and the scheme shall be fully implemented and completed before any building hereby permitted is occupied.

Storage

40. Waste and fuel materials and or containers shall not be stored, stacked or deposited on the site to a height exceeding [ ] metres.

41. Following commissioning there shall be no outside storage of waste, unless otherwise agreed in writing by the Planning Authority.

Restoration

42. Within twelve months of the permanent cessation of the use hereby permitted the generating station and all associated above ground infrastructure shall be demolished and the site restored within a period of twenty four months, in compliance with a scheme to be submitted to, and approved in writing by, the Planning Authority.

Prior approval

43. With respect to any condition that requires the prior written approval of the local planning authority, the works thereby approved shall be carried out in accordance with that approval unless subsequently otherwise approved in writing by that local planning authority.

44. The source and nature of refuse derived fuel or biomass incinerated at the plant shall be agreed in writing with the Local Planning Authority.

It is recognised that the above condition may not be suitable as a condition and may be more appropriate within the legal agreement. The Planning Authority wish to see some control over the source and nature of the fuel to address the Council's concern.

The Council also agree with the recommendations of the report from the Director of Public Health and ask for a Health Impact Assessment to be commissioned. The scope of the Health Impact Assessment should be agreed by the Council and the Director of Public Health and engage the local community.

HALTON
BOROUGH COUNCIL

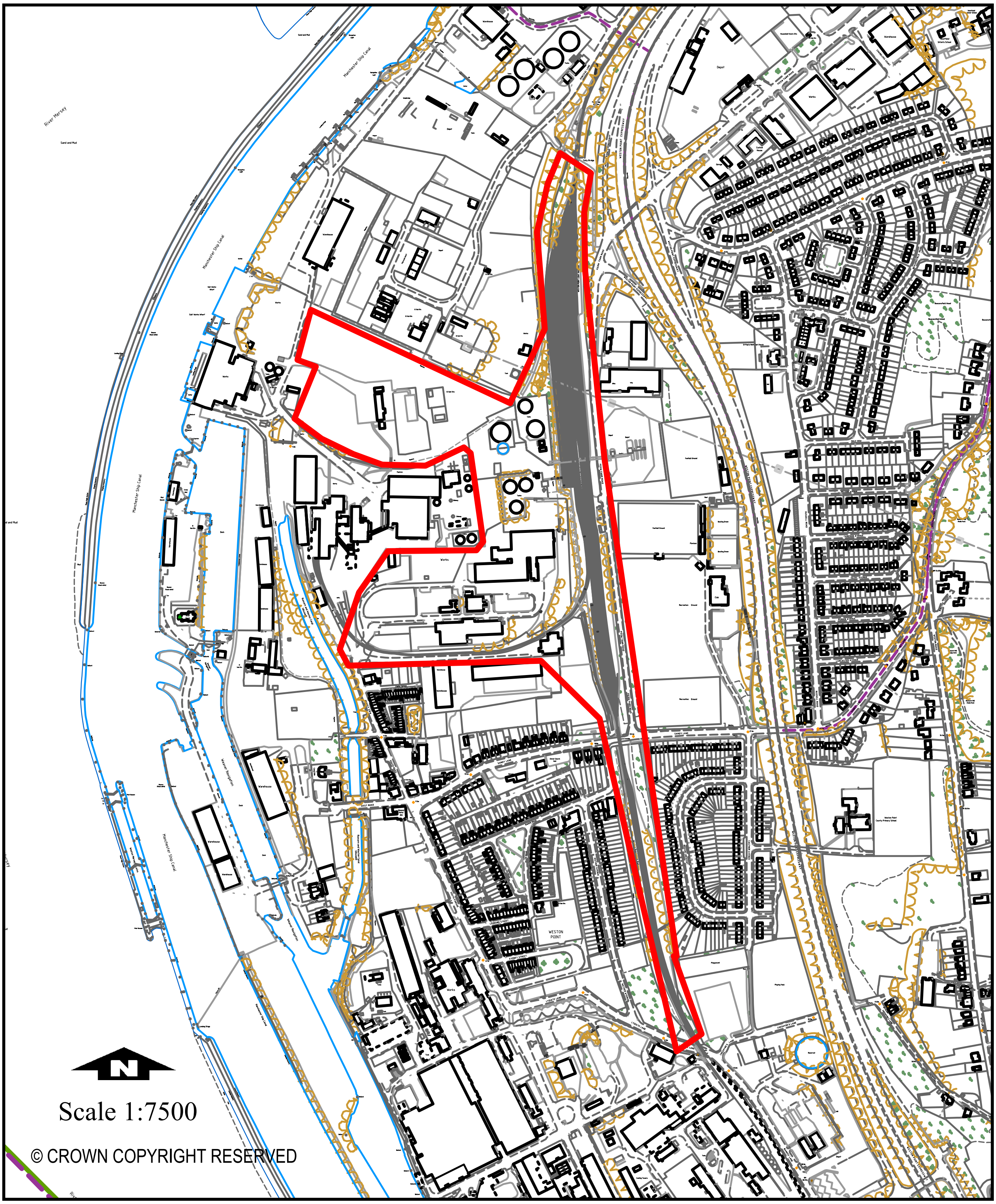
Development Control Committee Plans

31st July 2007

PLAN 1a
PLAN NUMBER 07/00068/ELC

HALTON BOROUGH COUNCIL

DEVELOPMENT CONTROL COMMITTEE 31 July 2007

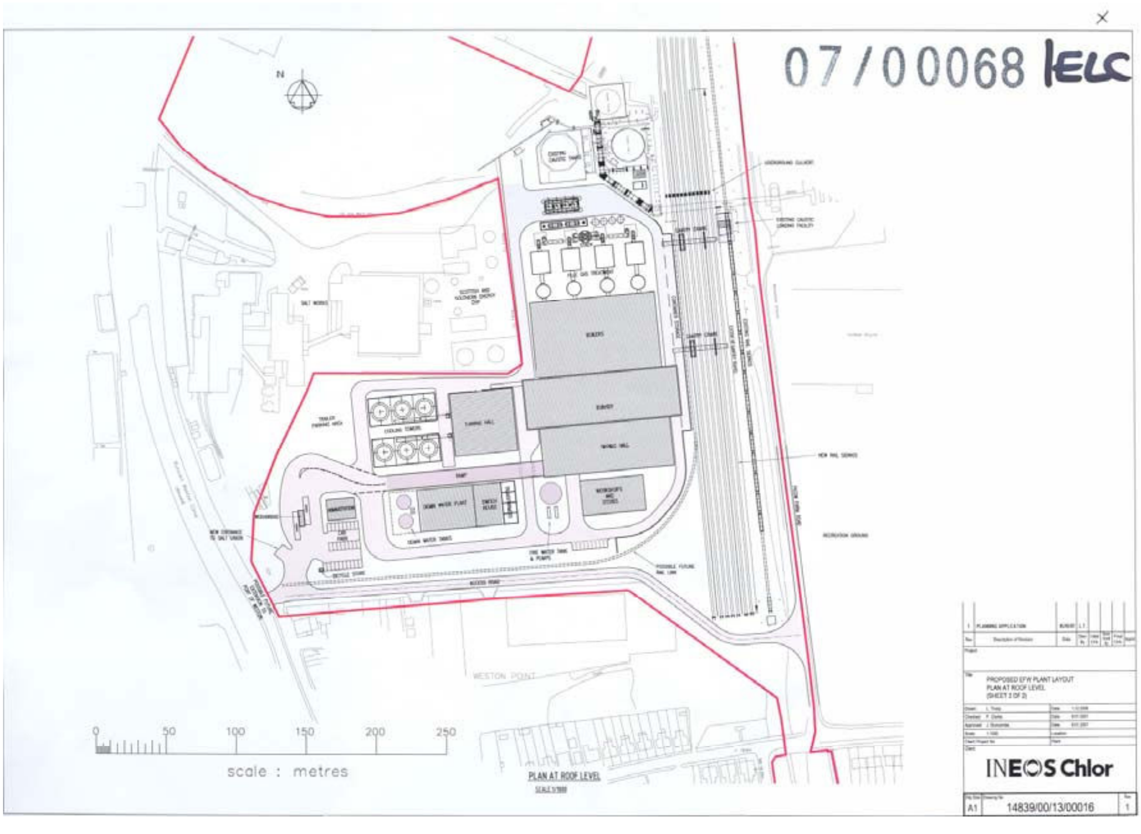


HALTON
BOROUGH COUNCIL

PLAN 1b
PLAN NUMBER 07/00068/ELC
LAYOUT PLAN

DEVELOPMENT CONTROL COMMITTEE

31st July 2007

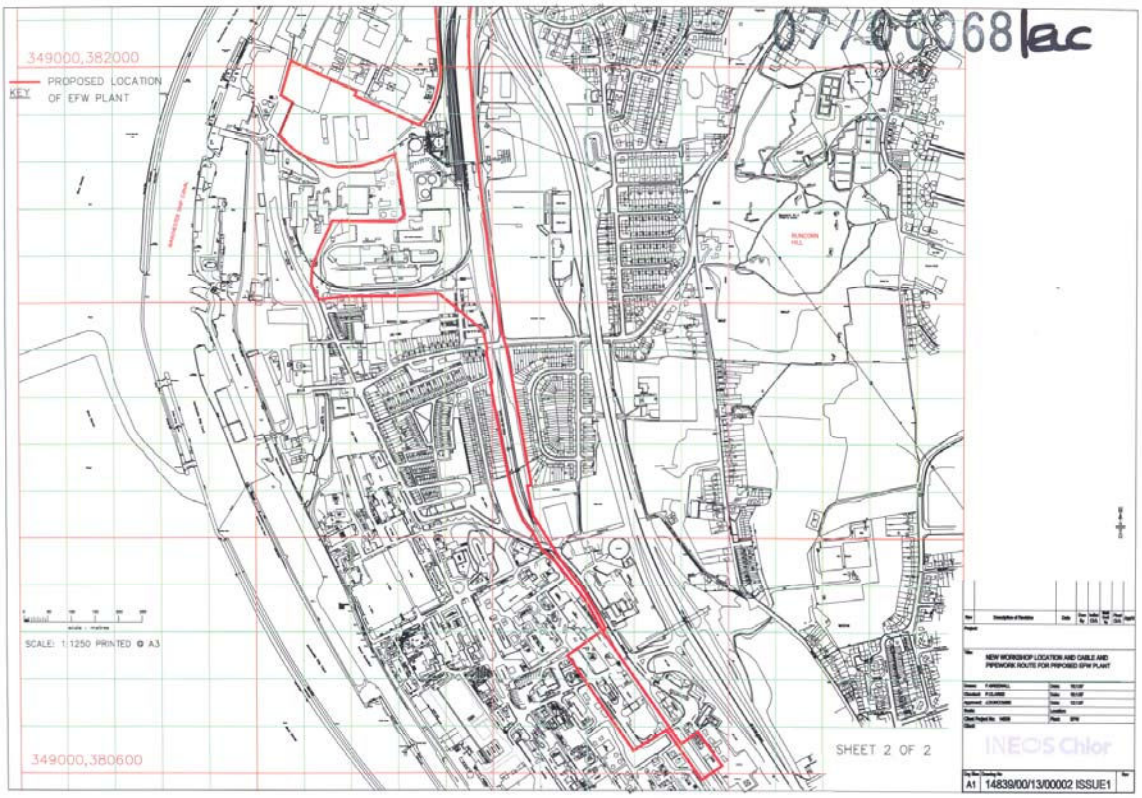


HALTON BOROUGH COUNCIL

PLAN 1c
PLAN NUMBER 07/00068/ELC
OVERVIEW

DEVELOPMENT CONTROL COMMITTEE

31st July 2007

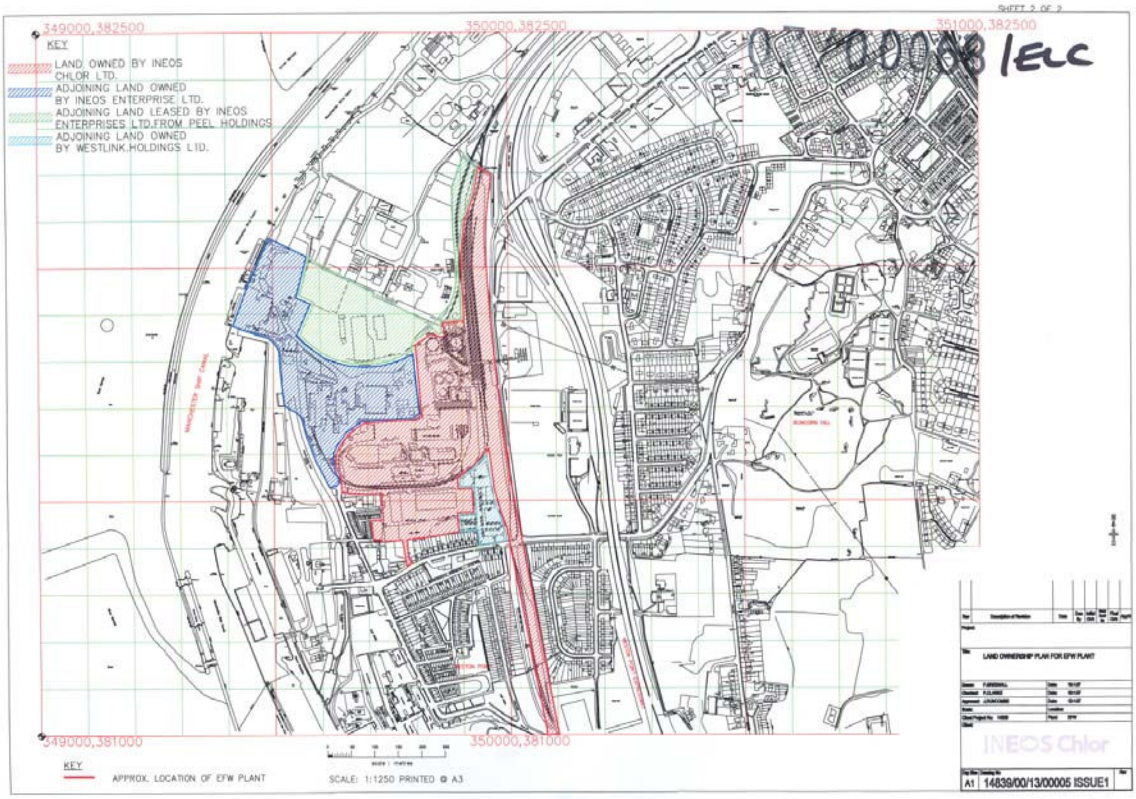


HALTON BOROUGH COUNCIL

PLAN 1d
PLAN NUMBER 07/00068/ELC
OVERVIEW

DEVELOPMENT CONTROL COMMITTEE

31st July 2007

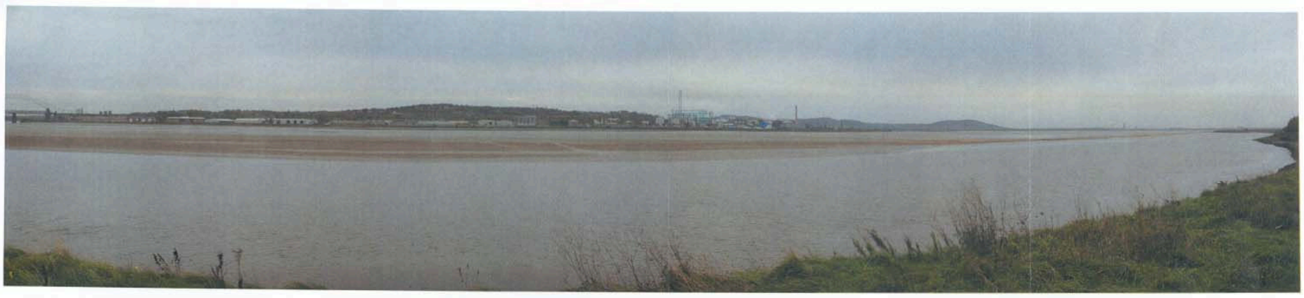


HALTON
BOROUGH COUNCIL

PLAN 1e
PLAN NUMBER 07/00068/ELC
PHOTOGRAPHS

DEVELOPMENT CONTROL COMMITTEE

31st July 2007



RPS

Title: Schematic illustrations of development

Figure: 5.21

Date: January 2007

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HALTON
BOROUGH COUNCIL

PLAN 1f
PLAN NUMBER 07/00068/ELC
PHOTOGRAPHS

DEVELOPMENT CONTROL COMMITTEE

31st July 2007

RPS

Title: Schematic illustrations of development

Figure: 5.22

Date: January 2007

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