Phase I Environmental Due Diligence Assessment

Wolstenholme International Ltd, Darwen, Blackburn, Lancashire, UK

FINAL REPORT

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Wolstenholme International Ltd

Phase I Environmental Due Diligence Assessment: *Wolstenholme International Ltd, Darwen, Blackburn, Lancashire, UK*

December 2003

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For and on behalf of
Environmental Resources Management

Approved by:

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Date: 18 December 2003

SUMMARY OF PHASE I ENVIRONMENTAL DUE DILIGENCE ASSESSMENT: Wolstenholme International Ltd, Darwen, Blackburn, Lancashire, UK

Finding/Issue	Potential Expenditure (UK£)
EXECUTIVE SUMMARY	
The key material issues (> UK£25k) identified during the assessment are as follows:	
Emissions to Air	
• The Solvent Emissions Directive has introduced a slightly different definition of 'organic solvent' to include substances that are volatile at room temperature and substances that release organic solvents under the conditions of use (includes the application of heat). Under this new definition, the varnish manufacturing operation may fall under the more recent PPC regulatory regime, and as such an authorisation may be required. This issue will be clarified following the publication of the revised process guidance note for coating Manufacturing Processes. In the event that such an authorisation is deemed necessary, site management reported that the local authority may require the ink manufacturing process to be included in the authorisation as the varnish is subsequently used in this process.	Given that the full implications of PPC on the varnish and ink manufacturing operations are currently unknown at this stage, the possibility of any material plant upgrades/ improvements required under a PPC authorisation (if required) cannot be discounted at this stage, but are considered unlikely by site management.
Asbestos	
• Management reported asbestos containing materials (ACMs) are present on roofing to the aluminium powder buildings (store, packing room, plant), and on certain walls of the aluminium plant. In addition, there are two small annexes to the aluminium plant, which could potentially be built with asbestos cement sheeting. Management reported no ACMs are reportedly present in insulation or ceiling tiles on the site. The inks building, built in 1997, is of concrete block construction with steel frames and metal clad roofing (i.e. does not contain ACMs). An asbestos survey was conducted in January 2003 by Bradshaw Gass & Hope, and involved an internal and external visual inspection of the site to identify the presence of any asbestos. The majority of the asbestos identified by the survey was noted as being in generally good or reasonable order. However, a number of areas were identified that required repair, however these are not anticipated to incur material costs.	Future material removal and/or encapsulation costs cannot be discounted at this stage, for instance in the event of refurbishment, redevelopment or demolition. However, based on the findings of the January 2003 survey, no material costs are anticipated in the short to medium term.

Finding/Issue	Potential Expenditure (UK£)
Site history	
• During the ERM site walkover, part of the floor slab of D-Room in Bronze manufacturing area was observed to have risen. Site management reported that this was attributed to the expansion of iron slag beneath the building, exacerbated by relatively high temperatures in the building. This was confirmed from a review of an engineering report dated 1997 prepared by Bradshaw Gass & Hope. A second survey was carried out by Steve Hunt Partnership in September 2002. Site management monitors the floor movement in this area every six months. Steve Hunt Partnership stated in correspondence with the site that "although the existing B Room slab shows significant signs of movement due to heave, any further movement in our opinion will be small in nature and will be progressive over a long period of time. We believe that there should be no sudden movements which would affect the machinery or the personnel working within the building." The site intends to continue to monitor this situation and ensure that recommendations made by the engineering/ surveyors reports are adopted. There are no immediate plans to remedy this problem.	Site estimate: Minor cost for surveys, but material remedial cost implications (UK£150-200k), if and when action is required.
Soil & Groundwater Contamination	
• A number of potential current and historic on-site and off-site sources of soil and groundwater contamination have been identified as part of this assessment. Given the nature of these sources, the possible presence of material soil and/or groundwater contamination cannot be discounted at this stage. The nature and extent of any on-site contamination can only be confirmed after conducting an intrusive investigation. The site is underlain by a considerable thickness of low permeability boulder clay/ mudstone horizons, which will provide protection to the underlying Coal Measures (minor aquifer). However, a tributary of Davy Field Brook runs through the northern part of the site, and this is vulnerable to on-site contamination.	ERM estimate for full baseline phase II investigation £25k to £35k. Requirements (and costs of) any remediation works will be dependent on the findings of a Phase II investigation.
Noise	
• The internal noise survey conducted in July 2002 indicates that numerous areas exceed the current noise limits (i.e. the 2nd action level of 90dB(A)) under the existing *Noise At Work Regulations 1989*, as well as the future noise exposure limits of 87 dB(A) that will be set in 2006 through the Physical Agents (Noise) Directive. Although the site has completed this noise survey, action should be taken to fully assess the engineering controls that needed to reduce current noise levels below 90dB(A) and future noise limits below 87 dB(A) as of 2006. This being the case, it is recommended that an acoustic engineering survey is performed. The costs associated with any additional abatement measures or possibly new machinery/ equipment to meet limits set out in existing and future regulations (if required following the acoustic engineering survey) cannot be determined at this stage, but could be material in the context of this assessment.	Minor costs for the Acoustic Engineering Survey. However, any additional abatement measures or new equipment/ machinery could be material.

Where `minor' has been stated in the Potential Expenditure column, this indicates a figure <UK£25K.

SUMMARY OF PHASE I ENVIRONMENTAL DUE DILIGENCE ASSESSMENT: Wolstenholme International Ltd, Darwen, Blackburn, Lancashire, UK

SITE DESCRIPTION AND OPERATIONS

Number of Employees	*Site Area*	*Hours*	*Owned/Leased*	*Auditors*	*Date of Audit*
185 employees, of which 3 are temporary workers and 10 are part time (Nov 2003).	Total: 20.6 ha (206,000 m^2) Processing area: 7.0 ha (70,000 m^2)	'Bronze and Aluminium': 2/3 shifts per day, 7 days per week, 49 weeks per year. 'Inks': 1 shift per day, 5 days per week, 49 weeks per year. Occasionally inks may work a 2 shift pattern depending on workload. Annual shut downs are two weeks in July and one week over Christmas.	The property is owned by Wolstenholme International Ltd. There are three tenant farmers at the site, who lease the northern part of the site.	Elizabeth Watts.	27th and 28th November 2003, and part of 2nd December 2003.

A Phase I environmental due diligence assessment was conducted at Wolstenholme International Ltd (Wolstenholme), located on Lower Eccleshill Road, Darwen, Lancashire in June 2000 as part of a due diligence programme. The purpose of this environmental assessment is to update the findings of the June 2000 report in relation to a potential sale and leaseback programme on the site land and buildings.

The site is located on Lower Eccleshill Road, Darwen, Blackburn, Lancashire, UK, in the northern outskirts of the town of Darwen, set within a predominantly industrial area. During the visit Elizabeth Watts of ERM had interviews with Mr John Maynard, Safety & Regulatory Affairs Manager, Mr Les Campbell, Engineering Manager and Mr Ray Johnson, SARA Systems Administrator.

The site comprises a main production area situated at the southern part of the site with the northern part of the site undeveloped, the latter comprising open field with trees and bushes. The main production area consists of approximately eight main buildings, comprising Springfield House, the pilot plant/ technical services, ink production, aluminium, redundant aluminium D-mills, aluminium store, aluminium packing and bronze. The construction of the above buildings is summarised below:

- *Springfield House* – A two storey brick-built building (constructed 1985) with steel clad roof, used predominantly as offices with a research and development laboratory on part of the ground floor.
- *Pilot Plant/ Technical Services* – A predominantly single storey brick-built building (constructed in the early 1970s) with corrugated asbestos cement sheeting roof and concrete floor, used as a pilot plant in the northern section and the technical services laboratory with offices in the southern section. A two storey section is present in part of the western section of the building used as offices for the technical services laboratory.
- *Bronze Manufacture* – A predominantly single storey brick-built building (constructed 1962) with a *Siporex* roof covered with bitumen and chippings and a concrete floor. A covered (perspex) yard is present in the western section of this building, used for storage purposes. The pasting and solvent stores adjoining this building are constructed of asbestos cement sheeting walls and roof.
- *Ink Production* – A predominantly single storey building (constructed 1996) with steel clad walls and roof and a concrete floor comprising a two storey section in the western section used as offices and ink laboratory (quality control and development), with the eastern section used for the storage of raw materials and the manufacture of various inks.
- *Aluminium mill area/ dryer* – A single storey brick-built building, with some asbestos cement cladding on parts of the walls and the roof and concrete floor.
- *Aluminium Store* – asbestos cement clad walls and roof with a concrete floor.
- *Aluminium Packing* – A single storey building, constructed of asbestos cement sheeting on all sides and the roof, with a concrete floor.

A number of ancilliary buildings are also present on-site, in particular, the ablutions building, the amenities building, the SCADA/ shift building, the TR plant, the ACT building and the gatehouse. All of the above buildings, with the exception of the TR plant and the ACT building, are single storey brick-built buildings with a flat roof, whilst the TR plant and ACT building are pre-fabricated buildings.

Three key processes are undertaken at the site, (1) the manufacture of bronze powder, (2) the processing of aluminium to produce powder, and (3) the manufacture of gold (bronze) and silver (aluminium) inks.

(1) Manufacture of Bronze Powder

Bronze powder and copper powder is manufactured by melting copper ingot and copper bright wire scrap, zinc ingot and < 0.5% aluminium ingot in a foundry. Atomising the molten metal using compressed air to produce a grain. The grain is then milled and polished in a series of ball mills to give a fine powder. There are two furnaces at the foundry, one electric and one gas fired. There are currently 27 ball mills used in the bronze powder production, which are contained in three separate areas in the bronze production building.

Site processes associated with bronze powder production include:

- oxidising the powder in one of five electric ovens to produce different colours;
- producing powder pellets. Pellet production involves mixing the powder with resins and solvents (n propyl acetate acts as a carrier), drying, and cutting;
- producing tarnish resistant bronze powder. This involves coating the powder with xylene (acts as a carrier) and silicone, drying in electrically heated pots (to extract the xylene) and cooling. The xylene is recovered with a water cooled condenser; and,
- producing a paste. This involves mixing the powder with solvents to produce a paste.

(2) Manufacture of Aluminium Powder

Aluminium powder is manufactured by mixing pre-atomised aluminium powder with white spirit and a lubricant (to reduce flammability) to produce a slurry. This aluminium slurry then passes through a filter press, and a vacuum dryer (reduced oxygen atmosphere) to extract the white spirit. There are currently three ball mills in aluminium powder production. The resulting powder is packed into 200 litre drums. The pre-atomised powder is supplied from an off-site supplier. In addition, the site grinds and atomises aluminium foil, to supplement the pre-atomised powder. The final use of this powder is in the manufacture of concrete breeze blocks.

(3) Manufacture of Bronze and Aluminium Inks

Ink manufacture involves mixing and blending bronze powder (gold ink) and aluminium powder (silver ink) with toners, petroleum distillates, and varnish. Note: the aluminium powder used in inks manufacture is purchased from an off-site supplier. The ink is then packed into 5 and 10 litre pots. A 'side' operation to the ink plant involves the manufacture of varnish, which is used by the site and also sold separately. Varnish production involves heating resin, petroleum distillate, and solvents in one of two varnish pots. The larger of the two pots is heated using a gas heated thermal fluid jacket, whilst the smaller pot is provided with no external heating. The varnish is then cooled and packed into 200 litre drums.

In addition, Metasheen is produced in the inks department. Production of Metasheen is similar to that of silver ink, however, a super fine aluminium powder is used, and the ink thinned with ethyl acetate. The result is a superior mirror-type finish.

On average approximately 1,900 tonnes of bronze powder, 870 tonnes of metallic inks (gold and silver inks), 400 tonnes of aluminium powder and 61 tonnes of Metasheen are manufactured annually.

Ancillary services include a pilot plant, an engineering workshop and store, offices, canteen (food preparation activities is limited to the occasional buffet and toasted tea cakes at breakfast), staff amenities, four laboratories, ten cooling towers, two process boilers (thermal fluid), two flammable goods stores, an incinerator and ten electrical transformers. Energy is supplied via electricity (Powergen) and gas (Shell Gas Direct Ltd). Site management reported that the year ending 2003 discounted climate change levy paid on electricity and gas was UK£18,285 and UK£ 4,495 respectively, giving an annual climate change levy figure for 2003 of UK£22,780. Until 1996, diesel was used in the furnaces; currently its use is limited to refuelling of forklift trucks and heating purposes in the amenities building. Diesel is stored in three currently operational above ground storage tanks (ASTs) on-site. Distribution and security activities at the site are contracted out.

Day-to-day management of environmental issues at the facility is the responsibility of Mr John Maynard, the Safety & Regulatory Affairs Manager. The site is currently certified to ISO 14001 environmental management system.

A Pollution Prevention Control Audit was conducted by an external consultant in March 2002 and an action list was developed. Site management reported that there are no outstanding actions from this audit.

Site management reported that there are no specific EHS capital expenditure (CAPEX) items planned or budgeted for the next year. There are no significant construction projects or process/ manufacturing or utility changes planned for the next five years.

Annex A contains a Site Location Map and Site Plans.

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)

SITE LOCATION & SURROUNDING LAND USES

The site is of a varied topography. The processing area of the site is generally flat. However, a steep bank is present on the southern site boundary, which slopes down gradient from the adjacent property onto the site. The processing area and the northern part of the site are also separated by a steep bank, of around 10 metres, and as such the processing area is elevated above the northern part of the site. In addition, the site gatehouse and amenities building are also situated at a higher level than the rest of the site to the north.

A public footpath crosses through the northern part of the site. Neighbours to the facility include:

North - Davy Field Brook adjacent, the M65 motorway running generally east to west approximately 50m to the north at its closest point, followed by an industrial estate (from 130m N). Flash Brook appears to flow into Davy Field Brook at a point adjacent to the northern boundary of the subject property.

East - vacant land and green fields immediately adjacent and extend further in this direction.

South – a former industrial landfill immediately adjacent and elevated above the site, with by Express Ashalt (50m SSE) further in this direction.

West - a railway line, followed by a number of industrial premises at a lower level than the subject property including ELW Contract Warehousing and Distribution (20m NW), Akzo Nobel Polymer Plant (100m NW), paper manufacturer (100m NW), GGI Office Furniture (70m NW), B&L Distribution (150m NW) amongst others.

The nearest residential property is located approximately 380m to the south-east of the site.

The nearest surface watercourse is a pond in the northern part of the site, which is connected to Davy Field Brook located adjacent the northern site boundary. Three on-site surface water ponds / marshes are also located to the south of the Inks building.

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
Site management reported that they have had no issues of concern in relation to their neighbours apart from lodging a complaint with the local authority with respect to one of the adjoining properties burning waste in the summer of 2001. It is understood that the local authority inspected this adjoining property, and no further problems have occurred since 2001.		

OPERATIONAL ISSUES

Emissions to Air

Primary sources of emissions to air relating to the three key on-site processes are discussed separately below, relating to ink manufacture, aluminium powder production and bronze powder production.

Ink Manufacture

Principal emissions to air from **ink manufacture** arise from:

- manufacture of varnish (hydrocarbons, volatile organic compounds (VOCs)). The exhaust from the varnish plant is fitted with a water-cooled condenser with a wet scrubber on the exhaust.
- metasheen production (VOCs, ethyl acetate, n isopropyl acetate). The metasheen production area is segregated from the main inks production area and fitted with a local exhaust ventilation (LEV) unit.
- ink mixing, in particular during the addition of bronze and aluminium powder (particulates). Each mixing unit is fitted with a LEV unit, which passes through a filter.
- use of the thermal fluid boiler (combustion products and particulates), with a thermal capacity of 235 kilowatts (kW). No abatement equipment is fitted, nor required for the operation of the boiler.

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
Organic solvents, as defined under the Local Authority Air Pollution Control (LAAPC), are not reportedly used in the ink and varnish manufacturing processes, and as such no authorisation is required. Organic solvents, as defined by LAAPC, are limited to the Metasheen production process. The more recent Pollution Prevention Control (England and Wales) Regulations 2000 (PPC) are currently in the process of replacing the old IPC and LAAPC regulatory regime. Under section 6.5 Part B (a) (i) of the PPC regulations a facility involved in "manufacturing or formulating printing ink or any other coating material containing, or involving the use of, an organic solvent, where carrying out an activity is likely to involve the use of 100 tonnes or more of organic solvents in any 12 month period" requires an authorisation. The facility manufactures on average approximately 61 tonnes of Metasheen annually, which equates to the use of approximately 29 tonnes of Ethyl Acetate MS 1530, approximately 27 tonnes of Isopropyl Acetate MS 1538, approximately 0.5 tonnes of Butyl Glycol MS2300, approximately 0.1 tonnes of PnB MS2306, approximately 1.5 tonnes of Dowanol PMA MS1959, approximately 3 tonnes of Dowanol PM MS 1528 and approximately 0.6 tonnes of MMB KS115. This gives a total annual volume of approximately 61.7 tonnes of organic solvent involved in Metasheen production, which is below the 100 tonne limit under PPC and as such no authorisation is required. Management reported that no regular monitoring of air emissions from the Metasheen plant is undertaken, as no monitoring is currently required.		

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
The Solvent Emissions Directive has introduced a slightly different definition of 'organic solvent' to include substances that are volatile at room temperature and substances that release organic solvents under the conditions of use (includes the application of heat). Under this new definition, the varnish manufacturing operation may fall under the more recent PPC regulatory regime, and as such an authorisation may be required. Site management has been in correspondence with Darwen with Blackburn Borough Council regarding this issue, however they cannot advise the site at this stage as to whether a PPC authorisation is required. This issue will be clarified following the publication of the revised process guidance note for coating Manufacturing Processes. In the event that such an authorisation is deemed necessary, site management reported that the local authority may require the ink manufacturing process to be included in the authorisation as the varnish is subsequently used in this process. If this is the case, site management reported that they would enter into discussions with the local authority as to whether the ink manufacturing operation should be included given the conditions of use of the varnish in the process (i.e. the use of varnish at ambient temperature).	As soon as the revised process Guidance Note has been published for Coating Manufacturing Processes, the site should obtain written confirmation from Blackburn with Darwen Borough Council as to whether or not the varnish manufacturing operation requires a PPC authorisation. If such an authorisation is required the site should ensure that the necessary application is lodged, and any conditions imposed on the site under the new authorisation are met (including any improvement programmes, if necessary). Given that the full implications of PPC on the varnish and ink manufacturing operations are currently unknown at this stage, the possibility of any material plant upgrades/ improvements required under a PPC authorisation (if required) cannot be discounted at this stage, but are considered unlikely by site management.	ERM cost estimate: Initially management time and minor cost, if application is required to be lodged.
Aluminium Powder Manufacture Principal sources of emissions to air from **aluminium powder** production arise from: • white spirit vapour from the ball mills. Air is passed through the ball mills to increase oxidation of the aluminium, and the exhaust air is pumped to atmosphere. Approximately 40 tonnes of white spirit is used annually on-site, with less than 5 tonnes used in the bronze production process and remainder used in the aluminium powder production. The discharge of white spirit from the ball mills is via a steel pipe, connected directly to a 205 litre drum provided with secondary containment vented to atmosphere and as such any liquid condensate is collected in the drum. • the vacuum dryer exhaust, which is fitted with a water cooled condenser to recover the white spirit.	No material compliance issues were identified with respect to air emissions from the production of aluminium powder.	

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)

- the transfer of white spirit from the filter press to the three above ground storage tanks. Due to the use of compressed air, the white spirit enters the tanks at 30 psi.
- use of the thermal fluid boiler (combustion products and particulates), with a thermal capacity of 235 kilowatts (kW). No abatement equipment is fitted, nor required for the operation of the boiler.

Management reported that aluminium powder production did not require a Local Authority Air Pollution Control Authorisation under the old LAAPC regulatory regime, as the finished product is not used as a coating material. A letter from the Borough of Blackburn in September 1992 confirmed this to be the case. This being the case, no authorisation is deemed to be required under the more recent PPC regulatory regime.

Management reported that no regular monitoring of air emissions from the aluminium plant is undertaken. A study determined that in 1998, 7.3 tonnes of white spirit was emitted from the aluminium process. No other such studies have been conducted since this time.

Bronze Powder Manufacture

Sources of emissions to air from **bronze powder production** arise from:

- melting and atomising copper and zinc in an electric furnace, and holding in a gas fired furnace (particulates) to produce a grain. Fumes are extracted with a filter unit. This unit is continuously monitored for particulates. A 'spot check' of the monitoring equipment by ERM during the site walkover indicated a particulate level of 16.1 mg/m^3, which is in compliance with the 50 mg m^{-3} authorisation limit (refer below). However, it was reported that typically levels of particulate are generally less than 5 mg m^{-3} and that this higher level was caused by filter cabinet failures. A review of recorded particulates for October 1999 to September 2003 revealed one exceedance on 23 November 1999, where a level of 88 mg m^{-3} was recorded. This result was submitted to the local authority in accordance with authorisation requirements.

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
• grinding and polishing the grain in ball mills to produce a finer powder (particulate, metal). Management reported that a daily visual check is undertaken of the exhaust from the mills, which are fitted with filter units. Currently, there are 27 ball mills and 26 polishers in operation. • oxidising the powder in an electric oven to produce a range of colours. • mixing the powder with organic solvent to produce a paste. • binding with a resin (n propyl alcohol is used as a carrier) to produce pellets. Solvent is recovered using a water cooled condenser. Monitoring of this involves the mass balance calculation of the quantity of organic solvent (n-propyl acetate) used. An explanation of the mass balance calculation was sent to the local authority in May 2000. Data relating to the solvent losses in the pellet plant from 18th August 2002 to 3rd November 2003 were reviewed by ERM, and three exceedences of the solvent losses limit of 11kg in any 8 hour period were noted in October 2002 and February 2003. Site management reported that the local authority has been notified of these exceedences. It is understood that the site explained to the local authority that the long term trend in solvent emissions from the pellet plant were well within emission limits, and as such no concerns were raised by the local authority and no further action required. • coating with silicone (xylene is used as a carrier) to produce a tarnish resistant powder. Solvent is recovered using a water cooled condenser. Monitoring of this involves the calculation of quantity of organic solvent (xylene) used. Data of xylene emission monitoring data from the tarnish plant from 2nd January 2003 to 13 November 2003 were reviewed by ERM, and no exceedences of the solvent loss limit of 11kg in any 8 hour period was noted during this period.		
• intermittent operation of a gas fired incineration unit for disposal of solvent impregnated rags. Use of the incinerator is recorded in a log book. Management reported that the incinerator is fitted with an after burner.	Refer to *Waste Management* section below.	

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
Blackburn with Darwen Borough Council have issued the site with a LAAPC Authorisation for non ferrous metal processing under the Environmental Protection (Prescribed Substances and Processes) Regulations, 1991. The Authorisation reviewed by ERM was issued on the 22nd February 2002. No improvement programmes have been written into the existing LAAPC, and no planned improvements within the next three years are anticipated by site management. The regulation of Part B installations under PPC is being phased over a number of years in line with the timetable for publishing the revised LAAPC process guidance notes. Under the more recent PPC regime, the site is not be required to apply for a permit under PPC. The site will automatically be deemed to have made an application by 1st April 2004, with the local authority given 12 months from this date to determine the application.		
It was reported that a new LEV stack had been installed in June/ July 2003 to reduce workplace exposure to xylene. This represents an additional emission point that needs to be notified to the local authority.	Notify the local authority of the additional air emission point at the tarnish plant so the current number of emission points can be revised accordingly.	ERM cost estimate: Management time.
It was noted that the site is currently not in compliance with Condition 30 of their Part B Authorisation which states that an alarm should be fitted to the SCADA control system which shall activate when the differential pressure drop any particulate filter exceeds 4" WG. No alarm is currently fitted to the SCADA control system to monitor the differential pressure drop of the filters. It was reported that the Technical Department and the Engineering Department were currently reviewing this issue to determine whether the 4" WG limit is the correct figure or whether it is an arbitrary figure, and if this is not the correct figure the site will correspond with the local authority to revise this limit. Supplementary information provided by site management indicates that in February 2004 the data logging facility will be reinstated on the SCADA system and as such will be able to record the pressure differential. In addition, site management reported that the integration of an alarm system would not be effective until after the differential pressure limits on the filters had been agreed.		

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
Total solvent usage, for the LAPPC regulated bronze process, is submitted every six months to the Blackburn with Darwen Borough Council. A review of the submissions for 2003 revealed that approximately 16,000 kg of solvent is consumed annually.		
Water Supply		
Water is supplied by United Utilities (municipal supply) and is used for staff amenities, cooling, central heating boiler feed water, production of water-based inks (30-40% water content) and limited cleaning.	No material compliance issues identified.	
Management reported that on average approximately 60,000 m^3 of water is consumed annually. Accurate water consumption figures are held electronically by the site, however at the time of the ERM site visit these figures were incomplete as some of the figures had been accidentally deleted. This being the case more accurate figures for annual water consumption could not be obtained at this time. However, this is not considered to be an issue with any potentially significant environmental implications.		
Management reported that the ten cooling towers have been notified with the Blackburn and Darwen Borough Council, as required under the *Notification of Cooling Towers and Evaporative Condensed Regulations, 1992*. The notification certificates for these cooling towers were not available to ERM for review during the site visit. However, the site forwarded a letter to ERM dated 4th December 2003 from Blackburn with Darwen Borough Council following the site visit confirming that the ten cooling water towers had been, previously, notified to the local authority. Management reported that there are currently no planned upgrades in relation to these towers. It is reported that the site carry out weekly dip slide tests for legionella on all the towers, and these tests are reported to be replicated by an external contractor, GE Betz, four times a year. Analysis results from the GE Betz sampling exercises in February 2003, June 2003 and September 2003 indicate that legionella is not detected. It is understood that the cooling water towers are serviced twice a year and cleaned/disinfected every six months by GE Betz.	Site management should obtain copies of the notification certificates for the cooling towers from the local authority and hold them centrally on-site available for review.	ERM cost estimate: management time.
Management reported that the site does not abstract groundwater or surface water, and no abstraction wells were observed on-site.		

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
Wastewater		
Sources of wastewater at the site include sanitary wastewater, cooling water, cleaning wastewater (including from the steam cleaning operation), roof and yard stormwater run-off. In 1993, site management conducted a drainage survey at the site to determine the location of foul and stormwater drains. The drainage plan indicates that there are two discharges from the site: trade effluent/sanitary, and roof and yard water. Management reported that the drains are cleaned annually by a contractor. Management reported no upgrades are planned to the drainage system at the site.		
A review of the drainage plan shows a surface water drain (SW10) entering the site surface water sewer from neighbouring railway land from the south-west through to the site's oil interceptor. Site management reported that they had written to both the railway authority and the local authority to confirm the nature and source of this drain, however no response from either body has yet been received.	As best management practice, ERM recommends that the site chase up this issue with both the railway authority and the local authority to determine the nature and source of this wastewater stream. The pipe should then be blocked or diverted, as necessary.	ERM cost estimate: management time.
Trade effluent, including washwater from steam cleaning, is collected in a central pit located adjacent the northern wall of the bronze production building. Management reported that the supernatant is discharged intermittently into a foul drain via a permanent connection to the foul drain, whereas the solids are collected into 200 litre drums (refer *Waste Management*). Trade effluent and sanitary wastewater discharges into the public sewerage system (United Utilities).	No material compliance issues were identified.	
United Utilities issued the site with a Notice of Direction concerning the discharge of trade effluent in July 2001 registered to Wolstenholme International Ltd under the *Water Industry Act, 1991.* The consent pertains to wastewater derived from metal pigment and ink manufacture, and as such does not specially include wastewater from steam cleaning, cooling water, compressor blowdown and boiler make-up water discharges which were itemised in the previous consent.	To ensure compliance it is recommended that site management confirm with United Utilities that steam cleaning, cooling water and compressor blowdown are covered by the existing trade effluent discharge consent.	ERM cost estimate: management time.

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
Prior to pumping the supernatant into the foul drain, analytical tests are undertaken by the site for copper, zinc and pH. The site has analysed wastewater samples for separable grease in the past. The last wastewater sample analysed for separable grease was conducted on 4th February 2003. Site management was unaware as to the reason why separable grease was no longer sampled. A review of results from 14 January 2003 to 24 October 2003 indicated seven occasions in February, March and September 2003 when consent limits were exceeded for zinc and copper (10 mg/l limit). In addition one occasion was noted in September 2003 when the pH limit was marginally exceeded. Site management reported that these exceedences in February and March 2003 were largely due to the discharge of the ink bowl washings generated by Inks Production into the steam cleaning pit, however it was reported that this activity has since ceased. A review by ERM of the limited analytical data for separable grease indicated that concentrations of separable solids were generally in compliance with consent limits.	It is recommended that analysis for separable grease be reinstated, and records held on-site to confirm compliance with consent limits for separable grease.	ERM cost estimate: management time.
It was reported that when an exceedence with consent limits is detected the effluent from the steam cleaning pit is diluted prior to pumping the effluent to the foul sewer, ensuring compliance with consent limits. A review of the trade effluent discharge consent identified that a maximum of 5 m^3 of trade effluent can be discharged within a 24 hour period, which is a lower limit than the previous consent limit of 43 m^3. This information is not currently monitored/ recorded.	Given this lower limit of 5 m^3 site management should ensure that steps are taken to ensure that the volume of wastewater discharged per 24 hour period is monitored and recorded to ensure that this limit is not exceeded when diluting trade effluent prior to discharge to foul sewer.	ERM cost estimate: management time.
No monitoring apparatus for measuring and recording the volume and composition of the trade effluent discharged from the site to the foul sewer as required under condition 10 (b) of the consent. Site management reported that North West Water (now United Utilities) have visited the site in the past and taken samples, and have not indicated any issues of concern. However, there is no documentation held on-site indicating that the site is exempt from installing such monitoring equipment.	ERM recommends that written exemption should be obtained from United Utilities to confirm that the absence of monitoring apparatus of this trade effluent discharge is acceptable.	ERM cost estimate: management time.
Management reported that no material upgrades are anticipated within the next three years with regards the trade effluent discharge.		

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
Roof water and yard water run off from the majority of the site and site cooling water is collected in an three stage oil interceptor, located to the rear of the main office building. After passing through the interceptor, the run-off discharges to land through the northern part of the site, enters a surface water pond in the northern part of the site, and ultimately enters Davy Field Brook, located at the northern boundary of the site. There is no pipe directly linking the discharge from the interceptor to the Brook. Dye tracing by the Environment Agency (EA) in July 1997, confirmed that the discharge from the site reaches the Brook. The EA issued the site with a Consent to Discharge contaminated surface water and cooling water (reference no. 017180566) from the interceptor pit into the Davy Field Brook (a tributary of the River Darwen) in 1996. Management reported no pollution incidents or prosecutions in relation to this consent. The consent places a limit on the quantity of cooling water which can be discharged from the site (3 m^3 per day). Although the total discharge flow is measured (reported to be typically a couple of hundred m^3 per hour up to 1,000 m3 per hour depending on weather conditions), the cooling water component is not able to be ascertained. However, it was reported by site management the GE Betz verbally confirmed that the discharge rate of cooling water would not be exceeded given the nature and volume of the blowdown from the cooling towers. It was reported that plans are in place to install meters to monitor this wastewater discharge on their cooling water systems. A review of nine sets of monitoring data undertaken by the EA (October 2000 to September 2003) indicated that the site was generally in compliance with the consent limits for chemical oxygen demand (COD), pH, copper, zinc and aluminium, except for one occasion in July 2001 when there was an exceedence in COD concentrations (125 mg/l), compared to a consent limit of 100 mg/l. In addition, a review of in-house analytical results from January 2003 to November 2003, indicated that the site was generally in compliance with pH, zinc, and copper. One exceedance was noted for copper of 5 ppm (4 ppm limit) in October 2003. A number of exceedences were noted for aluminium and COD, these included 11 exceedences of aluminium in April, September, October and November 2003 and 14 exceedences in COD concentrations noted in April, July, September and November 2003.		

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
Management reported that two empty (approximately 500 litre) drums have been placed adjacent to the interceptor pit since the 2000 assessment for the collection of any visual oil detected during the daily interceptor pit inspection. Management reported that no capital upgrades are planned within the next three years to the surface water / cooling water discharge. However, it was reported that the site had investigated options to install wastewater treatment on-site (for example aeration, biological treatment etc) to further reduce COD concentrations. There is no current requirement from the regulatory authorities to install any further wastewater treatment at the site.		
Waste Management		
Sources of waste include waste product and raw materials, slag from the foundry, laboratory waste, waste white spirit and lubricant from aluminium powder production, general waste, packaging material (plastic, cardboard), empty drums and containers, solvent impregnated rags (*refer Air Emissions Section*), wastewater from the ink bowls, waste degreasing agent, feminine hygiene waste and stormwater from the bunds. Approximately 35 tonnes of special waste and approximately 100 tonnes of general waste is generated annually. The site also operates an on-site incinerator.	No material compliance issues were identified.	
Management reported that aluminium powder waste (from the former processing method (*refer HSE Visits/Improvement Notices Section*)) was historically burned on-site, with the resulting aluminium oxide sent to a landfill. However, this practice ceased in 1992, as the waste product is now returned into the product.	*Refer Soil and Groundwater Section.*	

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
The site currently receives waste aluminium foil for use in the aluminium powder plant. In addition a small incinerator and several drum crushers were reported and observed to be used on-site. Site management reported that less than 100 tonnes per week of both the aluminium foil used in aluminium powder production and waste drums are crushed. This being the case, it appears that these two activities are exempt from the Waste Management Licensing Regulations 1994. Similarly the incinerator operated on-site is reported to be designed to incinerate waste material (in this case solvent impregnated waste) at a rate less than 50 kg per hour, and as such is considered to be an "exempt incineration plant" under the PPC regulations. This being the case the incineration plant would also appear to be exempt from the waste management licensing regulations. It is understood that these exempt waste disposal activities have not been registered with the EA as required by the regulations.	Under the Waste Management Licensing Regulations 1994, exempt activities (namely the use of waste aluminium foil, the drum crushing activities and the waste incinerator) involving the recovery or disposal of waste are required to be registered with the appropriate registration authority.	ERM cost estimate: management time.
Generally, the management of waste transfer documentation as required under the Duty of Care requirements appeared to be good. Invoices for waste collection, the licenses of the waste carriers, and waste transfer notes were available to ERM for review. Contractors include SITA (general waste), Total Waste Solutions (cardboard), Ansville Pallets (pallets), Frank Barnes (ferrous and non ferrous metals), Frank Barnes (crushed steel drums), Safety Kleen UK Ltd (waste degreasing agent), Canon Hygiene Ltd (feminine hygiene waste) and Oil Salvage Ltd (centrate waste oil). A lack of waste transfer notes was evident in a number of areas, including sludge from the trade effluent pit, slag from the foundry, pallets and centrate waste oil. In addition, a waste carrier license was not held for SITA, Safety-Kleen UK Ltd and Canon Hygiene Ltd.	Ensure that all waste transfer documentation is available for review on-site for the required period under the duty of care regulations and special waste regulations (i.e. for two or three years depending or whether the waste is classified as non-special or special waste). In addition, site management should obtain a copy of SITA waste carrier license and hold it centrally on-site.	ERM cost estimate: management time.
Both the sludge from the trade effluent pit, which is reportedly packed into 200 litre drums, and the slag from the foundry are reported to be recycled/sold to a metal merchants, WH Marrens, as it is high in heavy metals such as copper. During the ERM site visit, Wolstenholme agreed with WH Marren's that waste transfer documentation will be issued with any future sales of these materials. Management reported that the northern part of the site was excavated by an external contractor to remove slag in the early 1960's.	Ensure that future consignments of sludge waste from the trade effluent pit and slag from the foundry sold to WH Marrens are issued with waste transfer documentation.	ERM cost estimate: management time.

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
In 1992, the site applied for a Waste Management License to dispose of 500,000 m^3 of waste over a ten year period. A letter from Dunlop Heywood Consultant Surveyors in 1995 revealed that a consent was never issued as the site could not reach an agreement on the terms of the license, and as such the site was reportedly not used for the disposal of this waste in the past.		
Management reported that the site is registered with the Environmental Agency directly (Registration number EI1997487) for their responsibilities under *The Producer Responsibility Obligations (Packaging Waste) Regulations, 1997.* It is understood that the site submitted its return to the EA on the 5th April 2003, and reports that it has been able to meet its obligations under these regulations.		
Environmental Noise & Vibration		
Significant sources of noise at the site include the ball mills, and the furnaces in the foundry. Management reported that a boundary noise survey was conducted at the site in April 1998, and noise levels between 59 dBA and 76 dBA were recorded. Management indicated that the site is not subject to boundary noise limits (e.g. planning consents etc).	No material compliance issues identified.	
Management reported that no complaints from noise have been received.		
Nuisance and Complaints (including Housekeeping)		
Management reported that no complaints have been received regarding dust, noise, litter or vehicle movements at the site.	No material compliance issues identified.	
During the ERM site walkover, general housekeeping on-site appeared to be good, apart from the external area situated adjacent to the south of the Inks Production area. It was observed that this area was used for the storage of significant quantities of liquid and solid waste materials generated from the ink manufacture operation. Secondary containment was limited in this area, with many of the drums and intermediate bulk containers (IBCs) containing liquid waste materials not provided with any form of secondary containment. Approximately three IBCs were observed to be stored directly on unprotected ground, with other 200 litre drums stored directly on paved surfaces adjacent to unprotected ground.	Site management should ensure that this area is cleaned-up and all waste materials, particularly liquid wastes, generated from the inks manufacture operation are stored in the central designated waste storage area (provided with secondary containment). If containers of liquid waste are stored at this location on a regular basis, consideration should be given to installing a second waste bunded area outside the inks building.	See *Oils, Chemicals & Hazardous Materials* section.

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
OILS, CHEMICALS & HAZARDOUS MATERIALS		
Storage & Handling of Oils & Chemicals		
No underground storage tanks (USTs) were observed during the site visit and none were reported by site management either current or historical. **Above ground storage tanks** (ASTs) include: • two petroleum distillate tanks (14,000 litre each), located at the eastern end of the inks building. These tanks are fitted with brick secondary containment, and are around 6 years old. • three white spirit tanks (5,000 litres each), located behind the aluminium powder plant. These tanks are fitted with brick secondary containment (with concrete internal lining), and are around 18 years old. The bund has recently being lined with concrete. • two white spirit tanks (clean and dirty, 5000 litres each), located at the western end of the aluminium powder plant. These tanks are fitted with brick secondary containment, and are around 18 years old. • one white spirit tank (20,000 litres), located outside the aluminium cutter room. This tank is over 18 years old, and is provided with brick secondary containment (with concrete internal lining). • one vacuum dryer condensate recovery tank (1,500 litres) located outside the aluminium powder plant. This tank is about 12 years old, and fitted with concrete breeze block secondary containment.	No material compliance issues identified.	

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
• two currently operational diesel tanks (5,000 litres and 10,000 litres), located at the rear of engineering and near the top laboratory. These tanks are 18 and 13 years old respectively. Aboveground pipework associated with the 5,000 litre diesel tank was observed to be rusting and hidden by undergrowth. In addition, there is a second 10,000 litre diesel tank located at the same location as the operational 10,000 litre diesel tank, which is disused. The two larger tanks, which are provided with brick secondary containment, were historically used during the operation of the diesel-operated furnaces. Black staining was noted in the area of the two larger tanks, including the brick bund walls, inside the bund and the area around the fill point outside the bund. At the time of the site visit, contaminated stormwater was present in many of the tank bunds due to recent wet weather conditions. However, it was reported that a programme to inspect and remove stormwater from the bunds on a regular basis has been implemented.	Under the Control of Pollution (Oil Storage) (England) Regulations 2001, bund base and walls must be impermeable to water and oil and checked regularly for leaks. This being the case, the internal lining of the brick bund walls should be lined with an appropriate impermeable sealant. In addition, the pipework associated with the 5,000 litre diesel tank should be renewed and relocated such that any leakages are immediately apparent. *Refer Soil and Groundwater Contamination section.*	ERM cost estimate: Minor cost.
Site management reported that a special sealant had been purchased for the internal lining of the distillate tanks. It is understood that the sealant will be applied when the weather improves, and if proved effective this material will be used to seal the remaining bund walls with no internally lining.	Under the Control of Pollution (Oil Storage) (England) Regulations 2001, ERM recommends that the site ensure that bund walls housing the petroleum distillate tanks are lined with a low permeability resin or similar (i.e. the special sealant). If this sealant proves effective, steps should be taken to ensure all other bunds are lined using the sealant.	ERM cost estimate: Minor cost.
Bulk storage of oil and chemical **drums** include the flammable store near the paste room (~ 90 x 205 litre drums), outside the paste room (~30 x 205 litre), outside the main compressor room (~40 x 205 litre, waste oil, engineering oil, empty, waste biocide) and outside the inks building (~100 x 200 litre drums, empty drums, product, waste ink and solvents and ~10 x 1000 litre IBCs waste ink bowl washings, calcium hydroxide suspension).	ERM recommends that improvements are made to the storage of drums, in particular, the provision of secondary containment for the storage area outside the inks building and outside the TR plant if liquid materials are to be stored at these locations on a regular basis.	ERM cost estimate: < material threshold.

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
In addition to the locations described above, there were a number steel containers used for storage outside the inks building (some of which were locked at the time of the site visit), a central bunded waste storage area is also present on-site (~100 x 205 litre drums of heavy ends from distillation plant at aluminium, ink/ solvent waste, steam cleaning sludge, oils and four x 1000 litre IBCs ink bowl washings and ~20 x 50 litre drums of ink waste) and chemicals storage area outside the pilot plant and technical services building (~10 x 25 kg containers of print base, white spirit, toluene, acetone, butyl acetate, glycol, acetone). The steel containers externally adjacent to the inks building were reported to be used for the storage of various Metasheen finished products and varnish as well as used as a solvent store of Mirasheen paste (200 kg) and other solvents (2,000 litres).		
Generally, the majority of drum storage locations were provided with secondary containment with the exception of the storage area outside the inks building. Many of the drums were observed to be stored on racking provided with secondary containment. Under the Oil Storage Regulations, drums of oil (with a capacity of 200 litres or greater) need to be provided with secondary containment that is able to contain either 110% of the largest container or 25% of the aggregate volume of oil stored at that location, whichever is greatest.	Site management should confirm that the capacity of the secondary containment provided for oil storage at the site meets the requirements of the Control of Pollution (Oil Storage) (England and Wales) Regulations 2001.	ERM cost estimate: management time.
Two 205 litre drums were observed between the TR plant and the heated bronze warehouse without secondary containment reported to be possibly used for the collection of condensate from the TR plant. In addition, one 205 litre drum of silicone was observed to be mounted vertically on top of a metal rack, which was vulnerable to traffic movement.	Consideration should be given to securing the 205 litre silicone drum outside the TR plant to the metal racking (i.e. with a strap).	ERM cost estimate: management time.
The site holds two petroleum licenses, valid until 30th May 2000, issued by the Blackburn with Darwen Borough Council for the storage of two times 2,500 litres of petroleum spirit/mixtures. With the introduction of the Regulatory Reform (Fire Safety) Order 2004, the requirement to hold valid petroleum licenses will be revoked from April 2004.		

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
At the time of the site visit, in the flammable store room near the paste room, were ~90 x 205 litre drums (~ 18,450 litres) of petroleum spirit and solvents, including toluene, ethyl acetate, iso-propyl acetate, xylene, and white spirit. The flammable store was observed to be provided with secondary containment, fitted with vents, and intrinsically safe lighting. Four spillages were recorded on the electronic database system maintained by the site between January and October 2003. These included a minor spillage of white spirit from the bronze area on 12th September 2003, a spillage from a water chiller unit on 11th June 2003, and two more spillages of white spirit to the drainage systems on the 25th March 2003 and 23 April 2003. The system indicated that the necessary action was taken to address these incidences. *Radioactive Substances* No radioactive substances were reported or identified during the site visit.	No material compliance issues identified.	

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
Asbestos Management reported asbestos containing materials (ACMs) are present on roofing to the aluminium powder buildings (store, packing room, plant), and on certain walls of the aluminium plant. In addition, there are two small annexes to the aluminium plant, which could potentially be built with asbestos cement sheeting. Management reported no ACMs are reportedly present in insulation or ceiling tiles on the site. The inks building, built in 1997, is of concrete block construction with steel frames and metal clad roofing (i.e. does not contain ACMs). An asbestos survey was conducted in January 2003 by Bradshaw Gass & Hope (a company of architects, consulting engineers and quantity surveyors), and involved a visual inspection of the subject property to identify the presence of any asbestos. The inspection was conducted both externally and internally around the site. The majority of the asbestos present was identified as being in generally in good or reasonable order. A number of areas were identified that required patching, including one hole at high level in the pilot plant and several areas on the aluminium building and D Mills. The asbestos survey report made the following conclusions and recommendations: • "there appears to be only asbestos (white) in sheets or moulded form both internally and externally in the Works. • the holes through the outer skin whilst posing no obvious hazard should be sealed by non mechanically fixing a pad of similar profile sheet inside and out. • any asbestos which is in contact with personnel in a non-industrial setting i.e. aluminium plant canteen should be kept in a well painted condition. • if any low level asbestos appears worn in future this should also be painted or sealed. • there are no places in the works which suggest there could be hidden asbestos materials behind surfaces which were looked at."	ERM recommends that the holes identified in the asbestos survey report are patched (as recommended in the asbestos survey report). In addition, it is recommended by ERM that the site develop an asbestos register of all suspected asbestos-containing materials present on-site that can be updated and which records the risk assessment and prioritises ACMs in accordance with the Control of Asbestos at Work Regulations 2002 and the Method for the Determination of Hazardous Substances (MDHS) 100. Site management should also ensure that documentation is held on-site to demonstrate that the survey was completed competently. This can be achieved by obtaining copies of relevant certification (i.e. UKAS accreditation and/ or documentation that the individual surveyor has completed the P402 or S301 training courses or demonstrate experience of conducting asbestos surveys in the past to MDHS 100).	ERM cost estimate: management time/ minor costs. Future material removal and/or encapsulation costs cannot be discounted at this stage, for instance in the event of refurbishment, redevelopment or demolition. However, based on the findings of the January 2003 survey, no material costs are anticipated in the short to medium term.

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
Based on discussions with site management and observations made by ERM during the site visit, it was apparent that some of the aluminium plant has been painted, however the holes identified in the report have not as yet been patched. Site management developed an asbestos management plan following the asbestos survey, and a site plan is maintained by the engineering department recording the location and condition of these asbestos-containing materials. It was reported that no asbestos risk assessment has been carried out on-site, and the site does not have a system in place to record the condition of asbestos on-site when it is monitored at regular intervals. None of the asbestos-containing materials were labelled at the time of the ERM site visit, however it was reported by site management that the signs had been obtained and would be displayed in the near future. It was reported that there are no plans to remove/ encapsulate any asbestos-containing materials present on-site in the next three years.		
PCBs Site management reported that there are ten electrical transformers at the site. Management stated that these transformers are owned by the site, and date from 1966 to 1997. It was reported that all the transformers have now been refurbished, and as such site management indicated that PCBs were not present. Management reported that switchgear, which contained PCBs, was removed from the site around 7 ½ years ago.	No material compliance issues identified. However, confirmatory documentation regarding testing of the concentrations of PCBs (if present) in the transformers should be maintained on site.	ERM cost estimate: management time.
Ozone Depleting Substances (ODSs) Management reported that there are six water coolers, two chillers and 10 - 12 air conditioning units at the site. Management reported that these units contain the HCFC R22 as the refrigerant. In addition, there are two halon fire blanketing systems at the site, one for the computer room and a smaller one for the aluminium vacuum dryer control panel. It is understood that Chubb have been commissioned to removed the two halon fire extinguishing systems on the 9th December 2003 at a cost of UK£7,463 (excluding VAT). It was reported and observed that no halon fire extinguishers are present on-site.	Site management should ensure that these halon fire extinguishers are replaced as planned. In addition, the phase-out of HCFC R-22 is not expected until 2010, and as such this does not represent a significant issue of concern in the short term. However it is recommended that site management develop an inventory of all cooling systems operating on-site containing refrigerant gas, the type and volume of refrigerant gas present and the phase-out date for the refrigerant.	ERM cost estimate: management time and minor costs.

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
SOIL AND GROUNDWATER CONTAMINATION No Phase II intrusive investigations have been carried out on-site. In addition, site management reported that the subject property is not identified on a local authority contaminated land register. Information on the history of the site was obtained from a review of historical maps from 1849 to 1985 that was carried out as part of the previous assessment in 2000 and through discussions with site management during the 2000 and 2003 assessments. *Site History (On Site)* The 1849 map indicates that the site is undeveloped. Site management indicated that the site was first developed in 1870, as an iron works. This is consistent with the 1894 map, which shows the Darwen and Mostyn Iron Works at the site. Railway lines are shown adjacent the southern and western site boundaries. A pit is shown in the northern part of the site, and a well shown adjacent to the northern site boundary. A reservoir is situated in the centre of the site. The 1931 historical map shows further expansion of the pit in the northern part of the site. Site management indicated that the iron works closed in 1936. The 1955 map confirms that the iron works had closed by this time. The reservoir remains, and a surface water ditch is shown flowing from the reservoir to the north. The pit in the northern part of the site remains. The 1966 map shows the development of the bronze powder works at the site. Three main embankments are shown across the southern part of the site. The 1972 map shows that the pit in the northern part of the site has been in-filled / levelled. Site management indicated that during the 1960's and 1970's slag from removed from these areas to build roads. The 1985 map shows expansion at the site, to include one large building and four smaller buildings. The three embankments are no longer shown.	The potential for historical on-site land uses to have caused significant soil and groundwater contamination is considered moderate to high (i.e. presence of a former iron works at the site and the unknown nature of the in-fill at the site).	See *Risk Assessment* section.

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
Management reported that bronze powder production began at the site in 1963. Upgrades to this process include the installation of new ball mills, and replacing the two oil fired furnaces with one electric furnace and one gas-holding furnace. The furnaces were replaced in 1996.		
Information obtained from the Landmark 'Envirocheck' database report commissioned in 2003 indicates that two former landfill facilities are recorded on-site and registered to Wolstenholme Bronze Powders, as follows: (1) Licence L34 located at Eccleshhill Works, Darwen, Lancashire dated 1st July 1977 for the authorized disposal of construction/ demolition inert non-hazardous non-toxic wastes, fully cured polymer resins, industrial non-hazardous inert non-flammable and putrescible wastes. The operator of this landfill was located at Springfield Road, Sharples, Bolton, Lancashire. (2) Licence L207 located at Eccleshill, Darwen, Lancashire dated 1st October 1984 for to the authorised disposal of cement asbestos, ceramic waste, commercial waste, industrial wastes, slag, boiler and flue cleanings, glass, fully cured resins, and wood waste. Wolstenholme Bronze Powders (the operator) was registered at this same location. Both of these licenses are now listed as being lapsed/canceled/defunct.		
Site management reported that there was no on-site landfill on the Darwen property. However, it is understood that a landfill was operated since the 1970s on a site in Bolton that Wolstenholme Bronze Powders occupied prior relocating to the Darwen property. This could not be confirmed by ERM. Site management has issued two letters to the regulatory authorities to surrender waste disposal licenses held by Wolstenholme, in particular (1) a letter to Lancashire County Council dated 7th April 1995 for the surrender of waste disposal licence No. WD100/65 (dated 24 March 1977), and (2) a letter to Greater Manchester Waste dated 27th April 1994 for the surrender of waste disposal licence No. RD/LIC/91/M1 (issued 20th August 1991). The first licence (WD100/65) is registered to Wolstenholme Bronze Powders in Bolton for a landfill site at Eccleshill Works, Darwen, whilst the second licence RD/LIC/91/M1 is reported to relate to the former landfill site at Bolton. No specific information was available in relation to the landfills.	Given that the letters to the regulatory authorities for the surrender of the two licences do not tie in with the registered landfills identified in the third party database search, and as such clarification as the location, current status and responsibility for the landfills operated by Wolstenholme in the past requires clarification.	ERM cost estimate: management time/legal costs.

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)

Aluminum powder and ink production commenced in circa 1985. In 1997, ink production was relocated from the current amenities building to a purpose built building in the eastern part of the site. Since the ERM assessment in 2000, site management reported that there has been an on-going programme of installing new mills in the last few years. In addition, the former canteen adjacent to the amenities block had been demolished and developed as a car park approximately 18-24 months ago, technical services relocated to a building situated to the south of Springfield House and shared with the pilot plant. The heated warehouse in the Bronze production process has just been completed. The building formerly occupied by technical services and ink manufacture in the past is now used as the amenities building.

Site management reported that the site had an on-going issue during 2000 when COD concentrations were exceeding consent limits for surface water discharges. The problem was traced back to a disused pipeline that used to feed waste white spirit to the oil fired old foundry. The pipeline had been capped but was leaking white spirit into a surface water drain. There was reportedly no evidence of any land contamination. The pipeline was subsequently removed and the elevated COD concentrations ceased.

Site History (Off Site)

The 1849 map indicates that the land surrounding the site is undeveloped. The 1894 map shows railway lines adjacent the southern and western site boundaries. A brick works is shown 50 m south-west of the site. Flash Brook is shown 100 m to the east of the site.

The 1913 historical map shows the development of a clay pit 50 m south of the site.

The 1955 map shows that the brick works 50 m to the south-west and the pit 50 m to the south remain.

The 1972 map shows that the pit 50 m to the south designated as Eccleshill Quarry. The 1985 map shows the Eccleshill Quarry is designated as a landfill.

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
Information obtained from the 2003 Landmark 'Envirocheck' database report indicates that Summerleaze Re-Generation Ltd has held a landfill licence for the Goose House Quarry adjacent to the south (which is a different landfill from the Eccleshill Quarry) since 1995 for household, commercial and industrial waste landfilling. Prior to Summerleaze this landfill was operated by Graveson Waste from 1977 for the authorized disposal of various industrial wastes including asbestos, fuel oil, contaminated rubbish, inert waste, polyester resins, plasticol, paint waste, foundry sand, printing industry inks, slag, synthetic adhesive wastes and rubbers, textiles and wood. A letter to the site from Lancashire County Council in 1994 indicates that '*the Goosehouse Quarry (note name change) was used as a waste disposal facility since the 1940's. In addition to general industrial wastes the site has received significant quantities of chemical wastes in the forms of liquids, sludge's and drums. The site is known to be producing landfill gas in significant quantities*'. The status of the licence is indicated on the database search as being 'dormant'. Site management indicated that the Environment Agency indicated that there are three groundwater monitoring wells along the boundary between the site and the landfill, two of which are showing elevated conductivity.	The presence of this industrial landfill up-gradient and in close proximity presents a potential concern relating to contamination leachate and methane gas migration onto the subject site.	See *Risk Assessment* section.
Site management reported that there have been no subsistence problems at the site. Management are aware of landfill gas monitoring along the southern boundary of the site, however no analytical results relating to this monitoring are held by the site. In addition site management are aware of a leachate drain that flows along this boundary. In the early late 1990's, site management was approached by the landfill owner, who requested the site receive surface water from the capped landfill. This was rejected by site management at the time, however recently the site has agreed to an easement for the neighbouring landfill to discharge surface water to the on-site 'marsh ponds', (which ultimately discharge to the Davy Brook) situated to the south of the inks building. Site management reported that the EA agreed verbally that the discharge from the adjacent property onto the site would be regarded as an uncontaminated discharge and as such would not require authorisation under the Water Resources Act 1991. Wolstenholme have now instructed their solicitors to set up the terms of agreement.	It is recommended that the site obtain written confirmation from the EA that the discharge from the adjoining landfill would be regarded as an uncontaminated discharge, and as such does not require a wastewater discharge consent.	ERM cost estimate: management time.

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
During the ERM site walkover, part of the floor slab of D-Room in Bronze manufacturing area was observed to have risen. Site management reported that this was attributed to the expansion of iron slag beneath the building, exacerbated by relatively high temperatures in the building. This was confirmed from a review of an engineering report dated 1997 prepared by Bradshaw Gass & Hope. A second survey was carried out by Steve Hunt Partnership in September 2002. Site management monitors the floor movement in this area every six months. Steve Hunt Partnership stated in correspondence with the site that "although the existing B Room slab shows significant signs of movement due to heave, any further movement in our opinion will be small in nature and will be progressive over a long period of time. We believe that there should be no sudden movements which would affect the machinery or the personnel working within the building."	The site intends to continue to monitor this situation and ensure that recommendations made by the engineering/ surveyors reports are adopted. There are no immediate plans to remedy this problem.	Site estimate: Minor cost for surveys, but material remedial cost implications (UK£150-200k), if and when action is required.
Potential Contaminant Sources Arising from Existing On Site Activities Site observations indicated the following potential contaminant sources arising from current on-site activities: • the use of solvents, resins, toners, and varnish at the site. Solvents include ethyl acetate, normal propyl acetate, mono-propylene glycol, toluene, industrial methylated spirits. and propanol. In addition, white spirit, mineral oils, xylene, and other petroleum spirits are used. There is bulk storage of white spirit, diesel fuel oil and mineral oil. Contaminants of concern include volatile organic compounds, hydrocarbons and BTEX. • the manufacture of aluminium powder and bronze powder, using solvents. Contaminants include aluminium, copper and zinc.	The potential for current on-site land uses to cause significant soil and groundwater contamination is considered high.	See *Risk Assessment* section.
Potential Contaminant Sources Arising from Existing Off Site Activities Observations from the site visit and a database review undertaken for significant land uses within a 1 km radius of the site indicate the following:	The potential for current off-site land uses to cause significant soil and groundwater contamination is considered high.	See *Risk Assessment* section.

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
• 13 local authority air pollution control authorizations are located within 1km, three of which are located within 500m of the site namely; a mineral drying and roadstone coating process, registered 49m south-west, a coatings of metal and plastic process and a electrical and rotary furnace process, registered 371m north-east. • 11 discharge consents are held within 1 km of the site, including to the River Darwen, one held by St Regis Paper (340m W) for the discharge of process water, one held by Akzo Nobel for the discharge of process water, 380 metres west, one held by United Utilities for the discharge of storm water overflow, 370 metres north-west and one held by Walpamur Co for the discharge of cooling water, 390 metres west (all distances are as registered in the database search). • One formerly licenced landfill located adjacent to the south held by Summerleaze Re-Generation Ltd. The landfill category is described as household, commercial and industrial waste landfilling. The status of the license is dormant. Graveson Waste Services Ltd, also had a license to operate on this site dated 1977 for the disposal of a variety of hazardous wastes including paints, slag and boiler flue waste, printing wastes and industrial effluent treatment sludge. The licence is indicated to have been superseded as of 1992. • One formerly licenced landfill registered 98 m south-west of the site boundary, held by Reed Paper and Board. This licence was first issued in 1977, and was authorised to accept construction and demolition wastes and industrial wastes. The license is registered as lapsed/cancelled. • One formerly licenced landfill registered 118 m north of the site boundary, held by Reed Paper and Board. This licence was first issued in 1977 and was authorised to accept construction and demolition wastes and industrial filter press sludge. The license is registered as lapsed/cancelled. • One formerly licenced landfill registered 269m north of the site boundary, held by Reed Paper and Board. This licence was first issued in 1979 and was authorised to accept excavated natural materials. The license is registered as lapsed/cancelled.		

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
• Four significant and two minor pollution incidents are registered on-site. Four of the incidents (all significant) occurred in 1991 and were for the release of industrial effluents (organic / metals) to the Tributary of the Davyfield Brook. One unspecified minor incident occurred in 1993 and the other minor incident occurred in 1999, also unspecified. Following the ERM site visit, site management contacted the EA on the 15th December 2003 to obtain further information relating to the above pollution incidents registered on the subject property. During this telephone conversation, the EA reported that they had two significant incidents (Category 2) associated with the subject property site in 1991, but have no further details recorded. It is understood that site management have requested the EA to investigate these incidents further. The EA reported that the remaining two significant incidents were not attributed to the Wolstenholme site. In relation to the minor incidents identified in the third party database search, the EA have no record of the 1993 minor incident. The EA reported that the minor incident in 1999 relates to observations made by an EA officer who was on-site at the time. The EA officer noticed some bronze powder contamination in one of the on-site ponds by the ink Department. Site management reported that the incident had occurred as a result of a drum containing powder falling off a forklift during transit to the bronze department. The resultant spillage had been cleaned up but some powder had been wind blown into the pond. • Six pollution incidents to controlled waters within 250m of the site boundary are identified, three as Minor (Category 3) and three as Significant (Category 2). The significant incidents are: release of diesel oil of unknown impact on 30th September 1991 (69m NE); inert suspended solids due to land runoff to unknown receiving water on 19th December 1996 (238m NE); and inert suspended solids due to land runoff to unknown receiving water on 11h September 1995 (243m NE). The minor incidents are: tip leachate release due to poor operational practice into freshwater stream/river on 3rd March 1998 (69m SE); petrol spill due to road traffic accident onto land on 1st March 1997 (97m SW); and unknown pollutant release of unknown impact on 1st February 1996 (155m W). All distances are as registered on the database search.		

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
• Other significant pollution incidences of note include: contaminated surface water due to poor maintenance on 17th January 1995 (275m W); inert suspended solids due to land runoff on seven separate occasions between 12th July 1995 and 20th March 1997 (between 299m and 312m NE); three industrial effluent incidents of unknown cause on 5th May 1992 and two on 8th July 1993 (327m W, 337m SW and 352m NW respectively); accidental chemical spillage on 16th May 1996 (389m SW); chemical (dyes and paint) spillage connected to surface drains on 24th July 1995 (406m W). All distances are as registered on the database search. • Two substantiated pollution incident registers within 250m of the site boundary include a tarry waste incident on 6th April 2001 (124m SE), classified as a minor incident to land; and sulphide oxide incident due to paper manufacturing on 26th July 2002 (193m SW) classified as a minor incident to air. • Seven registered waste transfer sites are identified within 1km of the site boundary as owned by: Blackburn Borough Council at 144m north for asbestos waste (license awarded 1985 - superceded); Blackburn Borough Council at 160m north for various wastes including hydrocarbons, distillation residue, acids and wastes of a similar nature (license awarded 1985 – lapsed / cancelled); two owned by Blackburn Borough Council Operations Dept. at 184m north of the site boundary (one for asbestos cement, clinical waste, tarmacadam, scrap, rubber and non-hazardous wastes (license awarded 1995 - operational) and the other for acids, pesticides, waste oil, waste solvents, plastics, scrap, paper and similar wastes (license awarded 1993 - superceded); Sita (Lancashire) Ltd at 563m north east for acids, pesticides, waste oil, waste solvents, plastics, scrap, paper and similar wastes (license awarded 1995 - operational); Akzo Nobel Decorative Coatings Ltd at 594m southwest for organic and inorganic chemicals and contaminated containers (license awarded 2001- operational); and T.H. Martin at 970m northwest for photo developer/fixer/activator and film (license awarded 1993 – lapsed / cancelled). All distances are as registered on the database search. • Two licenced waste treatment or disposal sites identified within 500m of the site boundary; one owned by P Fitzsimmons of A B Car Spares registered 375m southwest for scrap vehicles (license awarded 1996 - operational); and one owned by J P Fitzsimmons registered 395m southwest for scrap vehicles (license awarded 1996 - operational).		

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
• Integrated Pollution Control Authorisations registered 179m west, 265m northwest, 295m south and 306 northwest of the site boundary, all relating to the manufacture of organic chemicals. Integrated Pollution Control Authorisations registered 87m southwest, 236m west and 352m southwest of the site boundary pertaining to combustion processes within the fuel and power industry, and an Integrated Pollution Control Authorisation registered 347m southwest of the site boundary pertains to paper and pulp manufacturing processes. • The database review identified the following trade directory entries within 250m of the site boundary: asphalt and macadam suppliers (50m SW); office furniture and equipment (139m NW); distribution services (186m NW); and road haulage services (241m W). A further 84 trade entries are identified between 250m and 1km of the site boundary. All distances are as registered on the database search. *Environmental Receptors & Pathways* <u>Surface water resources</u>. The nearest surface watercourse is a brook which passes through the northern part of the site, and flows in a northerly direction. This ultimately discharges into Davy Field Brook, which is a tributary of the River Darwen. Davy Field Brook is classified as a having Class D (Fair) to Class A (Very Good) chemical water quality, depending upon the particular stretch of water. A database search indicates that there are six current licensed surface water abstractions within a 1 km radius of the site (137m N, 300m SW, 428m SW, 447m W, 453m W and 875m SW). The surface water is used for industrial paper making and cooling, boiler feed and general cooling. <u>Groundwater resources</u> Information on geology underlying the site was obtained through a review of the British Geological Survey Map 76: Rochdale. The site is underlain by drift deposits comprising boulder clay, underlain by Lower Westphalian Coal Measures and sandstone.	Given the potential for spills from the site to enter the brook crossing the site, ERM considers the surface water vulnerability be high. Given there are five licensed surface water abstractions, together with the classification of the Davy Field Brook, ERM considers surface water sensitivity to be high.	

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
A copy of a geo-technical report prepared in 1963 by GKN Reinforcements Ltd, prior to construction of buildings, shows that the geology underlying the site consists of compact made ground to depths of 2 - 3 m below ground level (bgl). The made ground consisted of sand, ash and iron slag, with a little gravel and brick rubble. In one borehole the fill was predominantly iron slag. Underlying the made ground is firm silty clay. Shallow groundwater was encountered within the made ground. The soil had a pH of around 11.		
The underlying boulder clay is classified as a non-aquifer by the Environment Agency (Groundwater vulnerability map of Central Lancashire, Sheet 10). The Coal Measures are classified as a minor aquifer, with variable permeability by the Environment Agency. Minor aquifers do not produce large quantities of water for abstraction but are important for local supplies and in supplying base flow to rivers.	Given the presence of a non aquifer beneath the site, the groundwater vulnerability (in terms of the underlying Coal Measures) is considered by ERM to be low. Shallow groundwater within the made ground is anticipated to be of poor quality.	
ERM obtained two geological borehole logs from the British Geological Survey to obtain information on the deeper geological profile beneath the site. The first borehole (ref: SD 62 SE 44) is registered to be located in the northern section of the site and comprised 2.80 m of made ground (predominantly iron slag with 'black tar' noted) underlain by approximately 10 m of glacial/ lacustrine clays, overlying 7 m of mudstones which in turn are underlain by ~4 m+ of sandstones (terminal depth of sandstone not proved). The second borehole (ref: SD 62 SE 174) is registered just off-site to the south, and comprised 1 m fill material ('top soil with brick fragments') underlain by 8.5 m of glacial clay, in turn overlying 1.0 m+ of mudstone (terminal depth of mudstones not proved). The above borehole logs indicate a considerable depth of low permeability horizons (clays and mudstones) beneath the site.		
A database search indicates that there are five current groundwater abstractions locations within 1 km of the site (at 290m SW, 308m S, 390m SW, 472m NW and 911m E) for paper and printing, industrial and public services, general cooling and public water supply. Management reported that there are no groundwater abstraction wells or monitoring wells at the site, and none were observed by ERM. The database search indicates that the public water supply is from a mineshaft. No details were given in the database regarding the source (i.e. geological strata) of the other groundwater abstractions.	Given there are five licensed groundwater abstractions within a 1 km radius of the site, the use of which includes public water supply, ERM considers the sensitivity to be high.	

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
Surrounding Land uses: The nearest sensitive area is the residential properties, located 380 m south-east. Immediate land use includes the M65 motorway, a former landfill, and industrial properties. No sensitive areas such as nature reserves and Sites of Special Scientific Interest (SSSI's) were identified within 1 km of the site. An area of Unadopted Green Belt is located approximately 22m SE of the site boundary.	The site is located within an area of low environmental sensitivity in relation to immediate surrounding land uses.	
Risk Assessment Potential significant sources of soil and groundwater contamination include: • the former use of the site as an iron works, and the unknown nature of in-filled material at the site (former pits and reservoirs on-site); • the use of the site for bronze powder production activities for four decades, and for aluminium powder and ink production for 18 years; • the former and current use of fuel oil at the site and the historical on-site burning of aluminium; • the possible presence of former landfilling activities on-site (there appear to be two former landfill licences associated with the site, although site management is not aware of any historical on-site landfilling having taken place); • the current use of solvents and petroleum distillates at the site; • the current discharge of contaminated surface water onto land in the northern part of the site after passing through the interceptor; • two significant incidents which are registered on-site in the third party database search (See section on *Potential Contaminative Sources Arising from Existing Off-site* Activities) in 1991 for the release of industrial effluents to the tributary of the Davy Field Brook; • the former use of an adjacent property as an industrial landfill, with ongoing landfill gas and leachate generation; other former landfills are registered in the general area; and • the long industrial history of the surrounding land use.	The presence of material soil and/or groundwater contamination cannot be excluded. The nature and extent of any on-site contamination can only be confirmed after conducting an intrusive investigation. The site is underlain by a considerable thickness of low permeability boulder clay/ mudstone horizons, which will provide protection to the underlying Coal Measures (minor aquifer). However, a tributary of Davy Field Brook runs through the northern part of the site, and this is vulnerable to on-site contamination.	ERM estimate for full baseline phase II investigation £25k to £35k. Requirements (and costs of) any remediation works will be dependent on the findings of a Phase II investigation.

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
KEY HEALTH AND SAFETY		
Mr John Maynard, the Safety and Regulatory Affairs Manager, is responsible for health and safety matters at the site.		
Fire		
The site has separate fire certificates for the office block, the aluminium plant, the bronze building, the inks building, and the aluminium foil grinding plant. No fire certificate is held by the site for the pilot plant/ technical services building. The site contacted the fire authority to obtain a fire certificate for this area, however the fire authority informed them that they would not be issuing a fire certificates as they will be revoked from April 2004 with the introduction of the Regulatory Reform (Fire Safety) Order 2004.	No material compliance issues identified.	
There are currently 22 designated areas for fire extinguishers and site management reported that there are approximately 230 fire extinguisher units located throughout the site, and sand and fire blankets in place in the aluminium powder plant and store. Oakes Fire Protection undertakes the supply and maintenance of the fire extinguishers.		
In addition, fire risk assessments were undertaken in April 2000 of the aluminium plant, pilot plant/ technical services, technical centre/ CR lab, CSC, Springfield House, RD lab, bronze mills and inks department in accordance with the *Workplace Fire Precautions Regulations 1997*. In addition, fire risk assessments were also conducted in the pilot plant in November 2002. Both of these risk assessments cover the main site areas. No fire risk assessments have been conducted since these times. Significant areas of risk identified from the 2000 risk assessment included the aluminium powder process and metasheen production. The site has developed a fire procedure, which is followed by the site fire team in the main production areas. The procedure dated 20th November 2001 defines the responsibilities of both the site fire team and the fire team co-ordinator and sets out the procedures to be followed in the production areas, in particular bronze plant, aluminium plant, ink department, pellet plant and foundry.	It is recommended that the previous fire risk assessments are updated, and a programme is put in place to ensure that the fire risk assessments are conducted on an annual basis.	ERM cost estimate: management time.

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
Site management reported that the fire alarm is tested on a weekly basis, and fire drills are organised twice a year for each department. No formal joint fire drills with the fire authority are routinely carried out, however as part of the European Week of Health & Safety the site carried out a joint drill with the local fire authority. Emergency lighting is present in the customer service centre, inks and technical department, and standby lighting is present in the bronze mills. Standby lighting reportedly provides sufficient lighting to vacate the area in the event of a power failure. All emergency power lighting is checked on a monthly basis and the standby lighting is checked twice a year by the in-house engineering department. Site management reported that all fire related records on-site e.g. fire equipment tests, inspections and maintenance records are kept indefinitely by the engineering department.		
It was reported that from January to October 2003 there were 10 fires, six product fires and four process fires. All of which were dealt with by the internal site fire team, investigated and actions agreed.		
Management reported that an insurance review is undertaken annually. A review of the most recent insurance review report dated 16 June 2003 indicated that there were two recommendations outstanding at the time of the ERM site visit, one pertaining to the review of the site's storage arrangements for aluminium pastes and powders in the Ink Manufacture building, and the other to the development of a Disaster Recovery Plan. Site management reported that the insurance company is satisfied with the action taken by the site to address all issues identified by the insurance review.	It is recommended that the two outstanding recommendations in the latest insurance report are implemented.	ERM cost estimate: Management time/minor costs.
Accidents & Incidents Recording Programme		
All accidents/first aid incidents are reportedly recorded electronically. Site management reported that 14 accidents were registered between January to October 2003, with 13 accidents (one contractor accident) have occurred between January to October 2002. A review of accident statistics by ERM indicated that three accidents in 2003 and four accidents in 2002 were reportable to the HSE. No action was reported by site management to have been taken by the HSE in relation to these accidents.	No material compliance issues were identified.	

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
Compensation Claims Site management reported that there are currently seven 'live' outstanding compensation claims for the site: 1. 1975-79: deafness. 2. April 2002: damaged wrist with drum tipper. 3. May 2001: back injury rolling a drum off factory pallet onto another pallet. 4. September 2002: caught finger repairing a bronze mill fan. 5. 1978-2003: deafness. 6. 1971-1979: deafness. 7. 1990-1998: exposure to solvents. No information was held on-site in relation to the likely amount to be paid out in compensation in relation to any of the above outstanding claims.	Site management should review the current status and the amount of compensation to be paid out for each of these claims. Site management reported that all these claims are covered by the insurance company (there is no deductible). In addition, it is understood that liability in relation to the claim for exposure to solvent is currently being refuted by Wolstenholme.	
HSE Visits/Improvement Notices Management reported that there are no current health and safety notices pertaining to the site. Management reported that the last visit from the Health and Safety Executive was in October and December 2000 to investigate an incident that stopped plant for a 24 hour period. Approximately 200 litres of Metasheen ignited whilst stirring with an air pump causing smoke damage to plant. There are reportedly no outstanding issues relating to this incident. With regards historical claims, management reported that in 1992, there was an explosion in the aluminum plant, which resulted in the death of two employees. Management reported that the subsequent prosecution has been settled, and all claims also settled. As a result of this incident, the process of dry blending and dry milling of aluminum powder has been removed.	No material compliance issues were identified.	

Finding/Issue	Implication/Corrective Action	Potential Expenditure (UK£)
Noise		
Significant sources of workplace noise at the site include the bronze and aluminium ball mills and the foundry. Management reported that a noise survey was conducted in 1990, and as a result of this survey ear defenders are required in these areas. Since 1990, three key process changes have occurred, namely the installation of new ball mills, the replacement of the two oil fired furnaces in the foundry and the building of the new ink plant. A further in-house noise survey was carried out on the 16th July 2002 in the aluminium cutting room (92.4dB - 97.4dB), aluminium milling and press room (79dB – 101.2dB), the A Room (88dB – 96.4dB), the B room 87.2dB – 95.7dB), the C Room (89.5dB – 92.5dB), C11 Annex (88.7dB – 92.6dB), C`13 and C14 mill room (88.3dB – 90.2dB), bronze pellet plant (79dB – 89.5dB), mixing room (82.8dB – 96dB), covered yard, foundry and old pilot plant (89.8dB – 107.6dB), inks production (85dB – 99.5dB) and pilot plant/ technical services (87.4dB – 93dB). The survey indicates that hearing protection is required in all areas apart from the mixing room. The internal noise survey conducted in July 2002 indicates that numerous areas exceed the current noise limits (i.e. the 2nd action level of 90dB(A)) under the existing *Noise At Work Regulations 1989*, as well as the future noise exposure limits of 87 dB(A) that will be set in 2006 through the Physical Agents (Noise) Directive.	Although the site has completed this noise survey, action should be taken to fully assess the engineering controls that needed to reduce current noise levels below 90dB(A) and future noise limits below 87 dB(A) as of 2006. This being the case, it is recommended that an acoustic engineering survey is performed. The costs associated with any additional abatement measures or possibly new machinery/ equipment to meet limits set out in existing and future regulations (if required following the acoustic engineering survey) cannot be determined at this stage, but could be material in the context of this assessment.	Minor costs for the Acoustic Engineering Survey. However, any additional abatement measures or new equipment/ machinery could be material.

Where `minor' has been stated in the Potential Expenditure column, this indicates a figure <UK£25K.

Annex A

Site Location Map and Site Plans

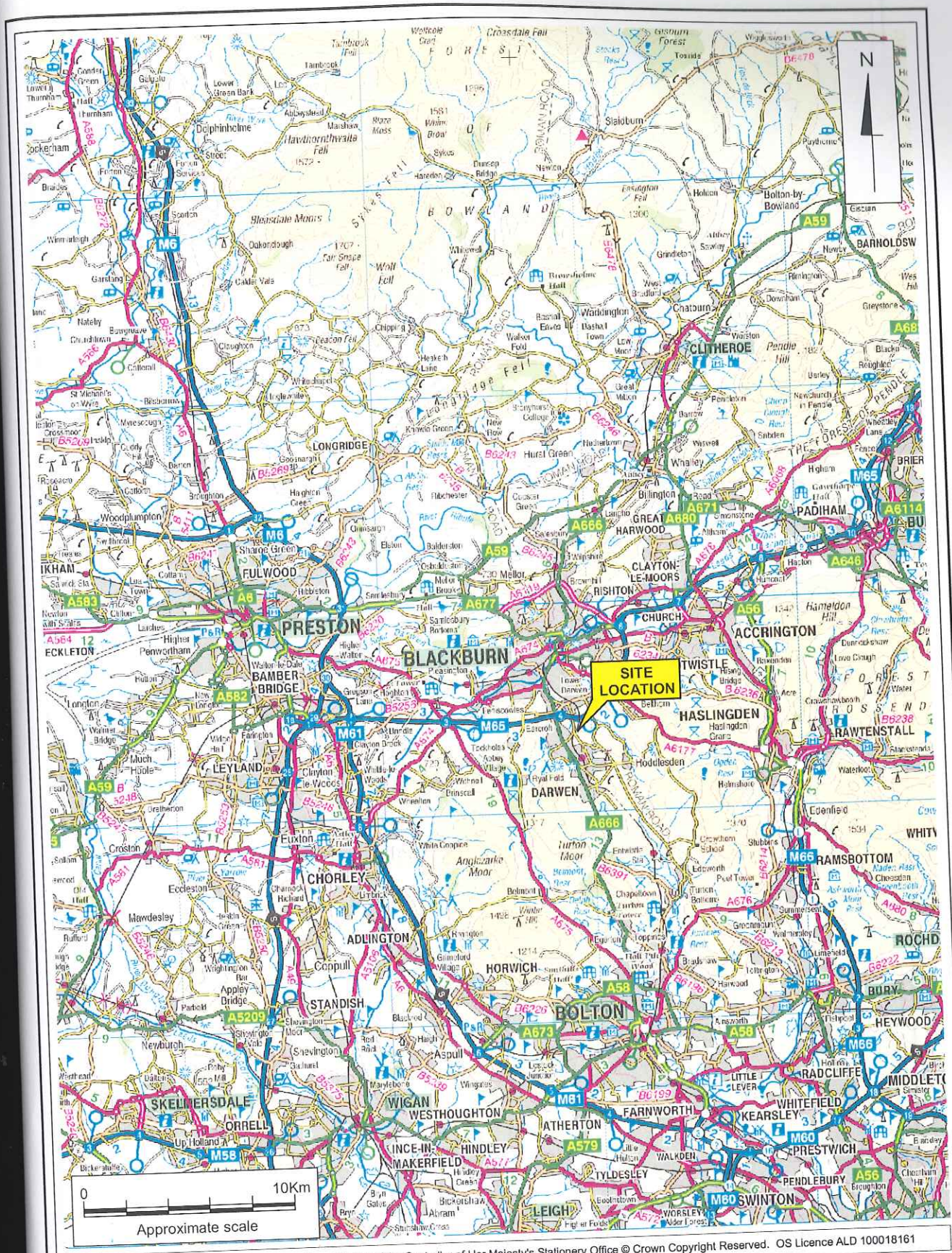

Figure 1: Site Location
Project: 0012728
Client: Wolstenholme International Ltd.
Location: Lower Eccleshill Road, Darwen, Lancashire
Source Job Code: 0012728

Scale: 1:250,000
Date: 11/12/03
File: 0012728
Drawn by: PGH
Revised:

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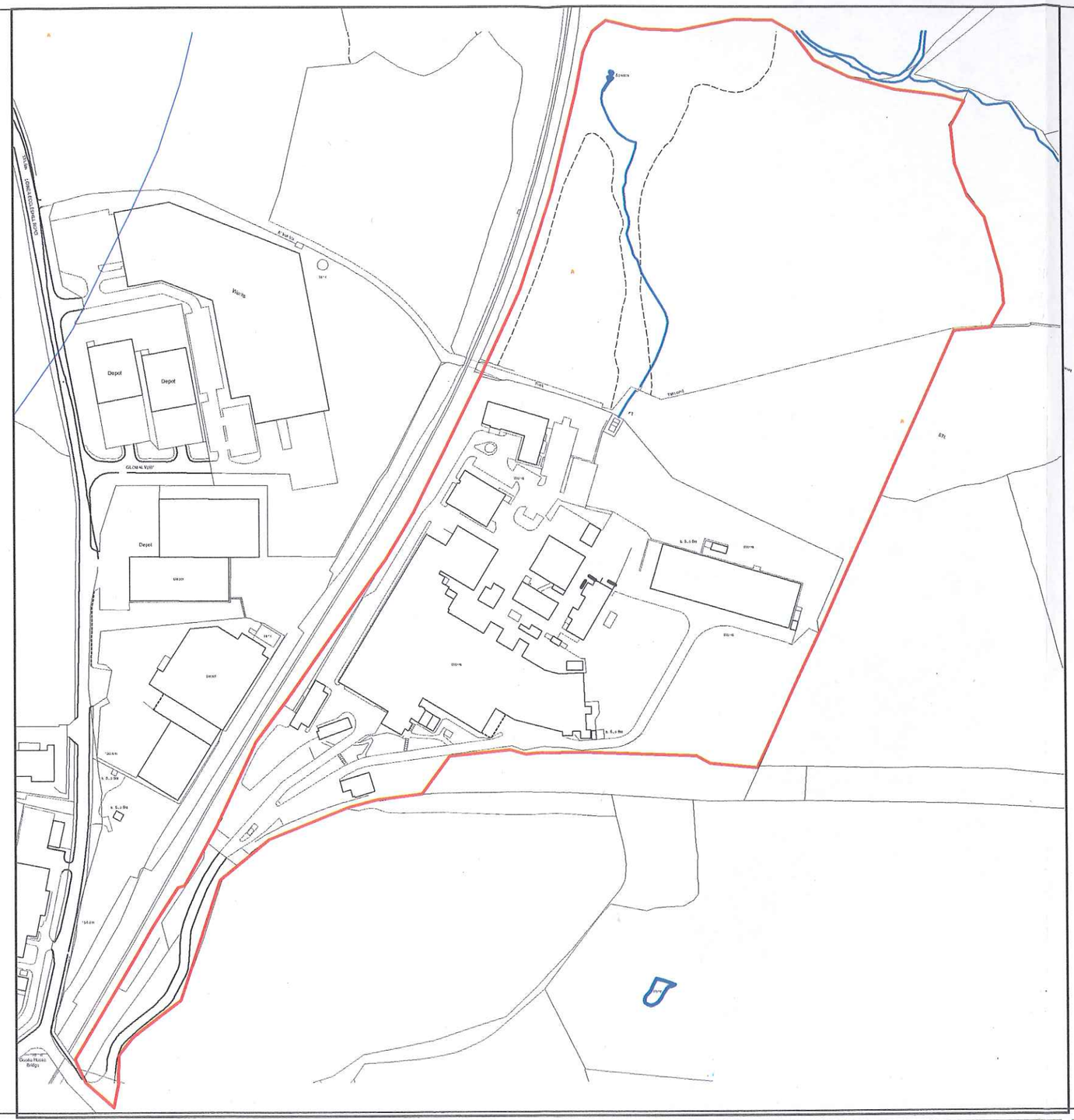

Figure 2a: General Site Environment
Project: 0012728
Client: Wolstenholme International Ltd.
Location: Lower Eccleshill Road, Darwen, Lancashire, UK
Source Job Code: 0012728

Scale: See Scale Bar
Date: 05/12/03
File: 0012728
Drawn by: PGH
Revised:

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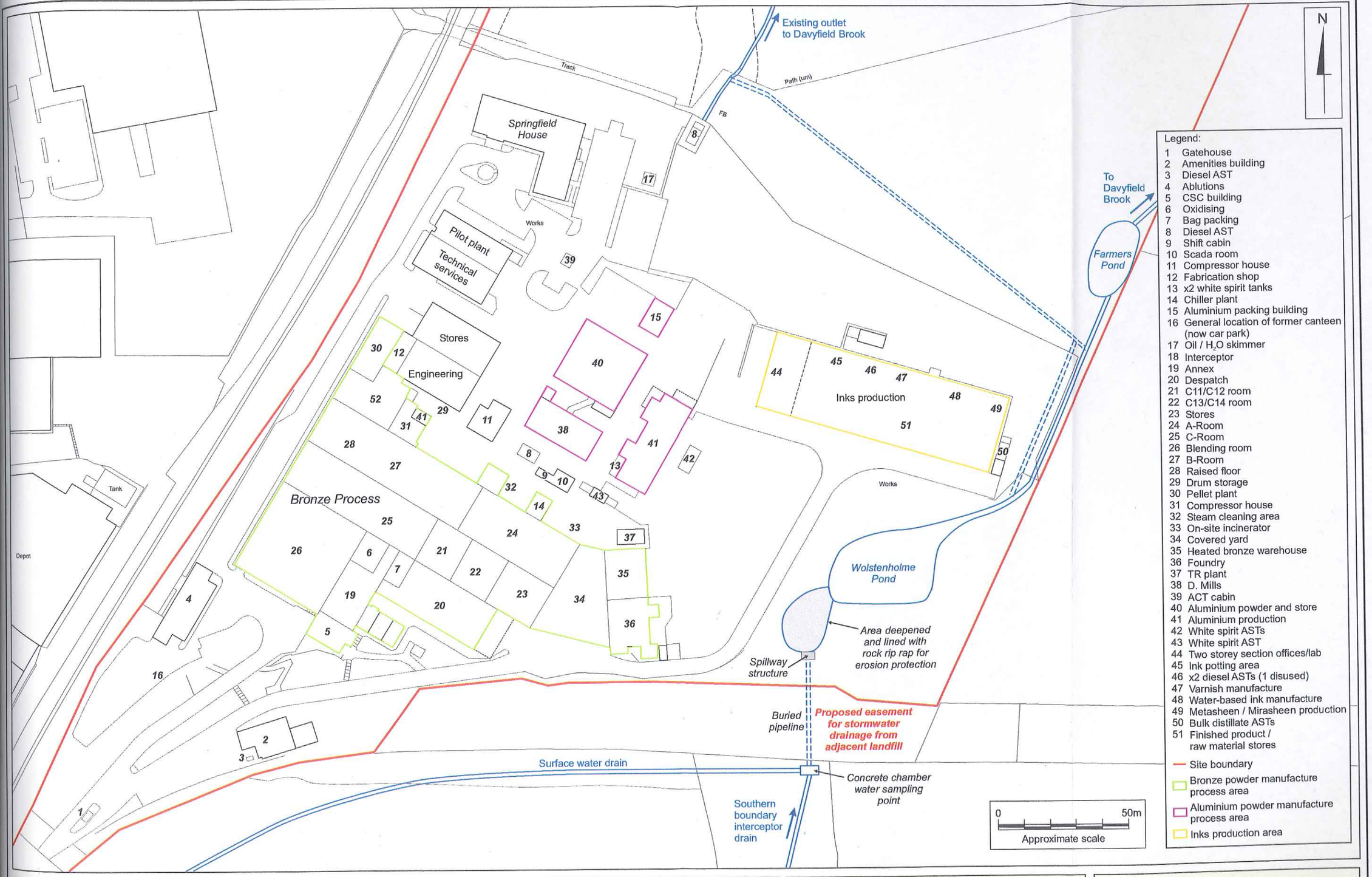

Legend:

1 Gatehouse
2 Amenities building
3 Diesel AST
4 Ablutions
5 CSC building
6 Oxidising
7 Bag packing
8 Diesel AST
9 Shift cabin
10 Scada room
11 Compressor house
12 Fabrication shop
13 x2 white spirit tanks
14 Chiller plant
15 Aluminium packing building
16 General location of former canteen (now car park)
17 Oil / H_2O skimmer
18 Interceptor
19 Annex
20 Despatch
21 C11/C12 room
22 C13/C14 room
23 Stores
24 A-Room
25 C-Room
26 Blending room
27 B-Room
28 Raised floor
29 Drum storage
30 Pellet plant
31 Compressor house
32 Steam cleaning area
33 On-site incinerator
34 Covered yard
35 Heated bronze warehouse
36 Foundry
37 TR plant
38 D. Mills
39 ACT cabin
40 Aluminium powder and store
41 Aluminium production
42 White spirit ASTs
43 White spirit AST
44 Two storey section offices/lab
45 Ink potting area
46 x2 diesel ASTs (1 disused)
47 Varnish manufacture
48 Water-based ink manufacture
49 Metasheen / Mirasheen production
50 Bulk distillate ASTs
51 Finished product / raw material stores

Site boundary
Bronze powder manufacture process area
Aluminium powder manufacture process area
Inks production area

Figure 2b: Site Layout
Project: 0012728
Client: Wolstenholme International Ltd.
Location: Lower Eccleshill Road, Darwen, Lancashire, UK
Source Job Code: 0012728

Scale: See Scale Bar
Date: 05/12/03
File: 0012728
Drawn by: PGH
Revised:

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