4. SITE INVESTIGATION - METHOD OF WORKS

Utilizing existing technical information relating to the presence of phosphorus and other landfill materials recorded at a few selected trial pit locations (W.S. Atkins Report: 53533/1987), Bostock Hill and Rigby constructed a dense grid network for trial pit locations to enable more accurate delineation of the phosphorus, and other landfill materials present.

An assessment of the information obtained would enable the provision of advice on the suitability of the site for intended redevelopment.

4.1 Objectives

- Assess the nature, degree and extent of contamination present by excavation, sampling, analysis and visual assessment.
- Delineate the depth of contamination.
- Delineate the lateral extent of contamination.
- Assess suitability of the site for redevelopment.

4.2 Grid System

A 15 m grid was generated across the site and used to provide 54 trial pit locations (Figure 1) of which 53 were excavated.

4.3 Sampling Regime

This included:-

- Trial pit excavations to a maximum depth of 5.6 m
- Soil and water samples retrieved from the trial pit excavations.
- Gas and radioactivity measurements at each trial pit location.
- Maintaining record of the materials encountered at each excavation.
- A photographic record maintained throughout the site investigation.
- An assessment of the most appropriate samples for chemical analysis.

4.4 Analytical Regime

A selection of samples visually exhibiting the presence of phosphorus were submitted for confirmatory chemical analysis. A selection of samples visually free from phosphorus contamination were also submitted for a quantative analysis for phosphorus.

Selected samples were also submitted for a range of 'other' contaminants likely to be present.

Consideration of the chemical results obtained enabled:

- assessment of the relationship between visually observed presence of phosphorus and analytically confirmed presence.

- assessment of the extent of 'other' contaminants present in the landfill materials.

- assessment of the lateral and vertical distribution of these materials across the site.

5. RESULTS OF SURVEY

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5.1 Visual Assessment

- The majority of the site was covered with a coarse grass and scrub cover.

- A swathe of denser vegetation comprising bushes and trees runs approximately east west across the centre of the site.

- The ground level rises gently away from Strode Road across the site becoming more level at the sites' western boundary.

- Fuming phosphorus could be seen in materials excavated from locations shown in Figure 2.

- Materials from Trial Pit 43 sparked and ignited when exposed to air and required a good cover of inert material to stop the activity.

- Other landfill materials were present in the form of ash/clinker, glass bottles and brick with limited evidence of organic material mainly in the form of roots in ashy material.

- A high water table (perched) was present eg: 1.0 -1.5m below ground level.

5.2 Chemical Analysis

5.2.1 Phosphorus

- The phosphorus results are given in Table 1. Percentage levels up to 4.1% were found in Trial Pits 16,29 and 30. Figure 3 gives a schematic representation of the phosphorus results obtained across the site.

- A high phosphorus concentration was present in the water from Trial Pite 32 (640mg/l)

5.2.2 Combustibility

- Based on analytical tests, it is apparent that an exothermic reaction is involved when phosphorus in the soil samples is exposed to air. This action drives off water and therefore allows further combustion to take place.

5.2.3 Other contaminants

- Slightly elevated sulphide levels were detected in Trial Pit 3 and Mid 1, up to a concentration of 300 mg/Kg in Trial Pit 3.

- Slightly elevated sulphate levels were detected in Trial Pits 5,7 and Mid 1, up to a concentration of 7600 mg/Kg in Trial Pit 5.

- Elevated lead levels were detected in Trial Pit 3 and Mid 1, up to a concentration of 1100 mg/Kg in Mid 1.

- Copper and zinc concentration of 310 mg/Kg and 1300 mg/Kg respectively were found in Trial Pit Mid 1.

5.2.4 Gas analysis

- No methane was detected during the site investigation using direct reading instrumentation.

- Extraction of gas samples, from methane monitoring points installed on site, and their subsequent analysis gave methane results of less than 0.1%.

TABLE 1

Analytical Results - Total Phosphorus

Sample No. *	Depth (m)	Phosphorus Concentration as P (mg/kg)
TP1/2	1.3	880
TP1/3	2.5	1100
TP3/2	04	1000
TP5/1	0.1	480
TP6/2	1.0	280
TP6/3	2.2	430
TP7/3	0.5	490
TP11/1	1.1	460
TP13/1	1.9	690
TP14/1	0.1	65
TP14/2	2.9	420
TP16/1	0.1	3800
TP16/2	2.2	13000
TP17/1	0.7	1500
TP17/2	3.2	480
TP19/1	0.6	1800
TP19/2	1.6	510
TP21/1	0.1	500
TP24/1	0.2	270
TP26/1	0.2	1600
TP28/2	2.0 - 3.0	1300
TP29/1	0.1	8800
TP29/2	1.2	13000
TP29/4	2.3	8400
TP30/1	0.2	21000
TP30/2	0.5	41000
TP32/2	0.5	3700
TP33/1	0.2	2800
TP33/2	1.9	3400