GRM Development Solutions
geoenvironmental - civil - structural

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Case study 6:

GRM's expertise enables former landfill site to be granted planning permission

KEY FACTS

- Former landfill site
- Previously backfilled with construction waste, road planings, and wood; and then capped
- Planning permission refused on previous occasions
- Carbon Dioxide and Methane gas detected at hazardous levels
- GRM reduced gas levels from >20% to <2% by volume

Construction project proceeded safely

The challenge

GRM were requested to investigate a former county council landfill site, historically a gravel pit which had been backfilled and capped, in Norton Lindsey.

The developer wished to build 11 luxury detached homes on the site, covering an area of approximately $^{1}/_{2}$ hectare. GRM were tasked to update previous site reports, carry out further investigation and develop a remedial strategy that would render the site safe for development.

The investigation

A detailed site investigation was carried out, both to update previous records by utilising existing boreholes, and also to conduct a more detailed analysis by creating additional monitoring points and excavating trial pits to assess ground conditions and the extent of former gravel extraction. Gas and groundwater monitoring was also undertaken.

Analysis of soil samples revealed metals and Polycyclic Aromatic Hydrocarbons (PAH) at concentrations which posed a risk to human health. Close monitoring of the gas regime also exposed Methane and Carbon Dioxide at dangerous levels and flow rates which offered high explosive potential.

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The solution

A Detailed Quantitative Risk Assessment (DQRA) was conducted to determine remedial options that would protect human health, following the Environment Agency's CLEA model and CIRIA guidelines.

In consultation with the Local Authority, developer and remediation contractor, the chosen method of remediation was to excavate the site and remove the source of ground gas. Emplacement of the excavated material would be followed up by capping of the site with clean inert materials in garden and landscaped areas. As a further precaution, full gas protection measures were recommended for the developments.

The excavation unearthed approximately five thousand tonnes of decomposing wood, bricks, concrete and road planings that were recycled off site; as well as various other waste products including the remains of two cows!

During the backfilling operation, GRM installed and built up two boreholes at the base of the former gravel pit for continued monitoring over six months post completion, to verify the long-term success of the project.

Additional inert material and clean soils were also imported to raise ground levels, and to enable future owners of the luxury residences to grow plants in gardens and landscaped areas.

Conclusion

GRM successfully neutralised the risks to human health, which had previously caused the site to be refused planning permission on several occasions. The detailed investigations allowed GRM to thoroughly understand the extent of the problem and create a remedial solution that fully addressed each issue. Effective monitoring also meant that GRM did not waste time and money attempting to rectify potential areas of concern, such as the groundwater underlying the site, which was not found to be affected. GRM effectively reduced harmful gas levels from >20% to <2% by volume, and decreased the concentration of metals and PAHs to below safety targets. These results satisfied the Local Authority and Environment Agency, and the developer's plans were subsequently approved.

GRM's project management skills also ensured that the project was completed to the agreed schedule and within the client's £250k budget.

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T: 01283 551 249
www.grm-uk.com