



# Fact Sheet — Remediation

Sydney Olympic Park Authority is responsible for the day-to-day and long-term management of ten engineered landfills constructed between 1983 – 2001; these have been rehabilitated and transformed into open space and parklands.

- Legal and illegal landfilling operations occurred over several decades on lands that are now within Sydney Olympic Park. The majority of landfilling operations were broadacre fill, and few if any environmental controls were applied.
- In a site-wide study conducted in 1991, boreholes were installed on a 50m grid across the site, generally to a depth of 1.6m. Soil and groundwater samples were collected for laboratory analysis to determine the locations and nature of wastes; further investigations were conducted where indicated. Approximately 160-hectares of the site was identified as containing wastes including:
  - power station ash
  - demolition rubble
  - asbestos
  - industrial hydrocarbons
  - domestic garbage
  - dredging material from the Parramatta River

- Between 1992 and 2000, the NSW Government allocated \$137 million for remedial action to clean up polluted areas. Remedial action varied according to the type and location of the waste and local hydrogeological conditions. It included the recovery, consolidation and on-site containment of approximately nine million cubic metres of waste.
- Arising from the extensive clean up program was a quantity of excavated soil contaminated with scheduled chemical waste, which underwent a specialised treatment procedure. Following remediation, the landfills were certified as suitable for particular land uses by an accredited site auditor (as established by the NSW Contaminated Lands Management Act 1997). This remediation project was the largest of its kind in Australia and represents a significant environmental achievement and legacy for the people of NSW.

## Acid sulphate soils

- Several areas of the parklands were found to contain naturally formed acid sulphate soils (mainly located in or adjacent to estuarine areas such as the Parramatta River and Haslams Creek). When naturally occurring sulphides (from acid sulphate soils) are disturbed and exposed to air, oxidation occurs and sulphuric acid is ultimately produced. This sulphuric acid can drain into waterways and have severe detrimental environmental effects. Where acid sulphate soils were excavated, these soils were transported, consolidated in deep pits or used as landfill mounds and covered in a manner designed to avoid acid leaching into local waterways and polluting the environment.

## Scheduled Chemical Waste

- Arising from the extensive clean up program was a quantity of excavated soil contaminated with scheduled chemical waste. Broadly, scheduled chemical waste can be defined as hazardous material containing chemicals exceeding a concentration threshold and is difficult to safely dispose of without special technologies and facilities. The treatment of scheduled chemical waste at Sydney Olympic Park pioneered use of innovative environmental technology and successfully reduced contaminants with a concentration of up to 900,000 parts per million to a concentration of less than one part per million.
- There are 24 compounds listed in the 1994 Scheduled Chemical Waste Chemical Control Order, under the Environmentally Hazardous Chemicals Act (1985). These include a range of chlorinated benzenes, chlorinated phenols and organochlorine compounds formerly commonly used as pesticides such as DDT, DDE, DDD, Dieldrin, Endrin, Heptachlor and Chlordane. Material is considered to be scheduled chemical waste if it contains one or more of the listed 24 compounds where the total concentration of those constituents is more than one milligram per kilogram (or one part per million).
- Arising from the extensive excavation and remediation works during the initial development of infrastructure at Sydney Olympic Park, approximately 400 tonnes of contaminated material was stockpiled in a secure area.
- In 1999 the NSW Environment Protection Authority (EPA) issued the Olympic Coordination Authority (now Sydney Olympic Park Authority) with a licence under the Environmentally Hazardous Chemicals Act (1985) to treat this waste material. In determining the appropriate treatment process, the Authority undertook extensive consultation with national and local stakeholders. A summary of the proposed treatment process was advertised in state and local newspapers inviting submissions from the local community. Sydney Olympic Park Authority also consulted with members of the Homebush Bay Environmental Reference Group. This group included community representatives, academics and environmental non-government organisations and was established to facilitate public communication in relation to remediation activities occurring at the Park.
- The treatment process occurred in two stages — Indirect Thermal Desorption (ITD) and Base Catalysed Destruction (BCD). Prior to developing this technology, the only option was the permanent storage of highly contaminated materials in secure warehousing. The EPA, the Homebush Bay Environmental Reference Group and various environmental organisations endorsed the treatment process.

- The treatment process can be simply summarised as:
  - in August 1999 the stockpiled waste material was sorted, mechanically screened and crushed
  - the Stage 1 ITD process commenced in September 1999 and used heat to separate the concentrated chemical waste from the soil. End products included: treated residual soil, water and a concentrated chemical sludge (stockpiled for treatment in Stage 2 of the process)
  - the Stage 2 BCD treatment processed concentrated waste and therein created more easily managed end products.
- In accordance with the EPA Licence, environmental monitoring of dust, vapours, noise and water occurred throughout the project.
- The Stage 2 treatment was completed in May 2002. Approximately 37,000kg of highly concentrated material, some in the order of 900,000 parts per million (ppm), was treated down to a final aggregated concentration of less than 1 part per million. Under the Scheduled Chemical Waste Chemical Control Order, this treated material was no longer classified as scheduled chemical waste.
- With the completion of treatment of the waste, all residual materials were disposed to appropriately licenced facilities and the final site validation processes and documentation were completed (March 2003) with final sign off from the Independent Site Auditor received 3 April 2003.

## Remediated Lands Management

- Today, Sydney Olympic Park Authority has responsibility for the day-to-day and long-term management of ten engineered landfills constructed between 1983 and 2001. These span some 105 hectares and have been rehabilitated and transformed into open space and parklands. The Authority is committed to managing remediated landfills and leachate systems to ensure:
  - their integrity is maintained
  - human health and the environment is protected
  - statutory compliance is achieved
- The decomposition of waste produces leachate which must be contained and treated without risk to people or the environment. The leachate transfer system consists of over 12 kilometres of rising mains, 26 pump pits, 12 treatment ponds, and three storage tanks. Leachate collected in subsurface collection drains gravitates to a pump pit where it is transferred under pressure to a treatment location.
- The majority of leachate is treated at a nearby commercial liquid waste treatment plant.
- Some leachate is treated in constructed evaporation ponds. Leachate from the site of a former gas works facility at Wilson Park is treated in bioremediation ponds where bacteria degrade hydrocarbons to water and carbon dioxide.
- An innovative wetland system that treats contaminants onsite through natural biological processes was launched in 2014 to treat and dispose of leachate generated by the Blaxland Common Landfill. This environmentally friendly and sustainable alternative to offsite processing, has been designed to be reliable, have lower operational requirements and use less electricity. The Authority is looking to introduce other innovative systems to treat leachate at other landfill sites in the Park.