

Case Study: Regional Municipal Waste Landfill

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THE REGIONAL ENVIRONMENTAL CENTER
for Central and Eastern Europe



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Ady Endre ut 9-11, 2000 Szentendre, Hungary
Tel: (36-26) 504-000, Fax: (36-26) 311-294, E-mail: info@rec.org, Website: www.rec.org

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Regional Municipal Waste Landfill

Introduction

A site with a total area of 9.7 hectares has been selected on territory belonging to the village. The site, designed for the disposal of municipal waste, is situated about eight kilometres southwest from the main town of the county. It will serve three municipalities.

The landfill will comprise five separate cells, which shall be built simultaneously. The project comprises a landfill and waste transfer station.

General Landfill's Description

The landfill will include the following components:

- external communications and access roads, water supply, power supply, and drainage of leachate from the WWTP to the town's sewerage system;
- five cells, including surrounding and partition dikes, with a road and fence, controlled drainage, a bottom-watertight seal and drainage system for leachate collection, and a gas pipeline in the surrounding dike;
- a front area including an office, traffic-control building, weigh bridge; garage with repair room and store, car wash, an emergency generator plant, station for purification and burning of bio-gas and a WWTP;
- wells for monitoring and controlling ground waters (three outside the landfill and three around the station for the purification and burning of bio-gas); and
- machinery and equipment, including a bulldozer (front-end loader) for spreading and flattening the loose wastes and for applying the daily soil cover; a compactor to carry out threefold compaction of waste; a dump-truck for transporting earth and other loose materials; and a central computer.

The construction of roads comprises development of an access road to the site, as well as a site network of service roads to allow dumping of wastes in the different sections on a daily basis.

Watertight sealing of the bottom of the cell shall include a clay screen, HDPE liner and sand. Drainage for leachate collection is placed above.

The main dike is envisaged to surround the cells with a road and fence. To form the five cells of the land-

fill, the construction of four partition dikes is planned. The dikes shall be made out of earth and will be faced with clay and an HDPE liner.

Description of Landfill Elements

Sealing

Sealing of the bottom of the landfill includes the following:

- controlled drainage - the drainage system will be installed under the bottom liner after levelling the landfill;
- geotextile – which is laid over the drainage control;
- clay membrane - which shall be placed over the geotextile as a sealing layer of clay spread and compacted into thick individual layers;
- HDPE liner – one layer of which is spread over the clay membrane;
- sand layer – comprising a thick layer for protection of the HDPE liner; and
- leachate drainage - a system which shall be constructed in order to collect and drain away storm water from the body of the landfill storm that has infiltrated the waste. The leachate shall be pumped to the WWTP. After treatment, the water shall be discharged into the Sozopol sewerage system.

Gas abstraction system

For abstraction of the bio-gas from the landfill a gas extraction system shall be constructed. It will consist of:

- blanket drainage – which will be constructed by placing a layer of gravel on top of the filled waste, and beneath the sealing top layer of the cells; and
- three gas abstraction wells –which shall be constructed continuously and parallel with operation of the cells and the depositing of waste. In addition, there will be a surrounding gas pipeline for leading the gas away from gas wells to the gas-purification and burning station.

Fence

The fence will be constructed to prevent uncontrolled access of people and cattle. The fence, made of reinforced concrete, shall surround the site.

Daily operation

After completion of works, the operation of the landfill will start with the filling in of Cell 1. Dumped waste shall be spread and compacted in layers of 20 to 30 centimetres. Deposition of waste shall be conducted daily in sections of 1.8 metres in height. Sections shall be separated with soil and crushed construction waste. After reaching a thickness of 1.8 metres, the waste layer shall be covered by a 0.2 metre layer of soil. Deposition will continue in this way until the crest of the surrounding and partition dikes is reached. Afterwards, the waste body will be shaped to form a slope with an inclination towards the dike's crest. Operation of the other cells shall be similar.

Capping layer

After reaching the planned elevation of the waste body in each cell, the waste shall be covered with a capping layer. This shall include humus to allow grass to be planted.

Waste Transfer Station

Since two out of three municipalities that will be served by the landfill are located at a distance of 60 kilometres from the landfill, a waste transfer station for these municipalities is envisaged. It shall be constructed on the territory of one of these municipalities, in the area of the existing waste depositing site. The terrain selected for the waste transfer station has a total area of 0.7 hectares.

The following equipment shall be installed in the transfer station:

- a press for waste;
- ten press containers with exhaust gas heating;
- two trucks with trailing wagons; and
- a shovel loader (wheel machine with shovel).

The vehicles transporting municipal waste are brought up through a ramp in the transfer station. They unload the solid municipal waste at a site located over the press. The waste is dumped into the press funnel and is pressed directly into the containers. Special vehicles transport the filled containers to the landfill for three municipalities.

A weigh bridge shall be installed next to the office of the transfer station.