Landfilling Past Present and Future

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19th February 2009
Rochestown Park Hotel
Landfill Past

1960/1970s Refuse collection confined to towns and some villages
Refuse Disposal at many uncontrolled dumps to facilitate farmers filling quarries etc.
Problems with Litter; Vermin; Fires
In Cork City Straight Road Dump closed, Kinsale Road opened.
Landfill Past

1980s
Refuse collection systems became more organised. A handful of dumps remained in North Cork.

1990s
ERA of modern landfills
Engineered Landfills:
  Ballyguyroe, North Cork;
  Louth;
  Kerry
Cork City and County Joint Waste Management Strategy.
Reduce Reuse Recycle Campaign
Pay by use; Wheel Bins
Landfill Present

2000 Bottlehill Landfill site announced
2009 Kinsale Road Landfill to close
2010 Youghal Landfill to close
Bottlehill Landfill to open
Strategy

Waste Management Strategy
Cork Region 1995

- **Policy** – Expand Recycling Facilities
  Target – Develop Bring Sites & Civic Amenity Sites.

- **Policy** – Reduce volume Landfill by pre-treatment of Waste
  Target – Develop Materials Recovery Facility.

- **Policy** – Proper disposal of residues to Landfill in accordance with EU / EPA requirements.
  Target – Develop **Central Residual Landfill** for Cork County
Cork City Council
Budget 2009

A  Housing and Building  € 42,120,000  21%
B  Road Transport and Safety  € 32,168,700  16%
C  Water Services  € 23,427,700  12%
D  Development Management  € 9,868,500  5%
E  Environmental Services  € 45,966,800  23%
F  Recreation and Amenity  € 24,898,500  12%
G  Agriculture, Education, Health & Welfare  € 15,842,500  8%
H  Miscellaneous Services  € 4,869,600  3%

€ 199,162,300  100%

Total €45,967 m
Service Division E 23 %
Cork City Council
Budget 2009

How the Service Division is Spent

<table>
<thead>
<tr>
<th>Service Division</th>
<th>Expenditure (€)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landfill</td>
<td>8,167,300</td>
<td>18%</td>
</tr>
<tr>
<td>Recycling</td>
<td>1,330,100</td>
<td>3%</td>
</tr>
<tr>
<td>Waste Collection</td>
<td>6,809,000</td>
<td>15%</td>
</tr>
<tr>
<td>Street Cleaning &amp; Litter Control</td>
<td>8,462,000</td>
<td>18%</td>
</tr>
<tr>
<td>Burial Grounds</td>
<td>1,887,500</td>
<td>4%</td>
</tr>
<tr>
<td>Fire Protection &amp; Prevention</td>
<td>16,809,900</td>
<td>36%</td>
</tr>
<tr>
<td>Waste Manage &amp; Pollution Control</td>
<td>1,736,300</td>
<td>4%</td>
</tr>
<tr>
<td>Safety of Structures</td>
<td>764,700</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>45,966,800</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
How the Service Division is Funded

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landfill Charges</td>
<td>€4,350,000</td>
<td>9%</td>
</tr>
<tr>
<td>Refuse Charges</td>
<td>€8,264,500</td>
<td>18%</td>
</tr>
<tr>
<td>Misc Waste Disposal Income</td>
<td>€925,000</td>
<td>2%</td>
</tr>
<tr>
<td>Burial Fees</td>
<td>€529,500</td>
<td>1%</td>
</tr>
<tr>
<td>Fire Protection Income</td>
<td>€302,000</td>
<td>1%</td>
</tr>
<tr>
<td>Other Local Authorities</td>
<td>€990,700</td>
<td>2%</td>
</tr>
<tr>
<td>Government Grants</td>
<td>€290,000</td>
<td>1%</td>
</tr>
<tr>
<td>Other Income</td>
<td>€1,402,600</td>
<td>4%</td>
</tr>
<tr>
<td>Rates &amp; Local Gov Fund</td>
<td>€28,912,500</td>
<td>62%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>€45,966,800</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

**INCOME**

- Landfill Charges: €4,350,000
- Refuse Charges: €8,264,500
- Misc Waste Disposal Income: €925,000
- Burial Fees: €529,500
- Fire Protection Income: €302,000
- Other Local Authorities: €990,700
- Government Grants: €290,000
- Other Income: €1,402,600
- Rates & Local Gov Fund: €28,912,500
Cork City Council: Service provision

• Refuse Collection (33,000 customers in 2008 - 5,500 waivers);
• Mixed Dry Recyclables Collection;
• Civic Amenity Sites;
• Chem Car (Hazardous waste collection in cooperation with County Council);
• Landfill: Kinsale Road Landfill Site
View of Kinsale Road Landfill site
Kinsale Road Landfill Site: Operations

- Kinsale Road Landfill Site is EPA licensed & ISO14001 certified;
- City Council Landfill services for Cork City Council, Cork County Council and Private Sector;
- Civic Amenity Site (wide range of materials accepted);
- WEEE;
- Timber Recycling (CTO – input for new pallet factory);
- Composting (CTO);
- CHP (Combined Heat and Power) plant (Bioverda – methane to electricity);
- EPA licence conditions: control and monitoring (methane, visual, air, water, materials, energy);
Kinsale Road Landfill Site:
Eirblock Production
Kinsale Road Landfill Site: Eirblock Production
Various specialise mini contracts are in place to operate in accordance with EPA licence:

• Birds contract;
• Flare contract;
• Waste compaction contract;
• Landfill security;
• Electricity supply contract;
• Mech/Elec maintenance contract;
• Weigh bridge maintenance contract;
Kinsale Road Landfill Site: Mini Contract
Kinsale Road Landfill Site: Remediation

- Engineered Landfill Capping – ongoing;
- Leachate Collection and treatment;
- Surface water collection and disposal;
- Methane Gas Collection, treatment, and electricity generation;
- Capital expenditure to date > €20 million;
- Capital expenditure to be incurred to facilitate closure estimated ~ €15-20 million;
- Plans for recreation and amenity facilities post closure;
- Remaining void space – 5 months.
Kinsale Road Site:  
EPA control and monitoring
Kinsale Road Site: Leachate Treatment Plant
Kinsale Road Site: Leachate Treatment Trials
Kinsale Road Site: Remediation
Estimated impact of capture and use of landfill gas in CHP

Savings to the environment (CO₂ equiv):

- Reduced landfill gas to atmosphere 71,000 tonnes
- Displacing other fossil fuel 10,000 tonnes

**Total (theoretical):** 81,000 tonnes

- Continued capping = higher % captured
Bioverda plant at Kinsale Road Landfill

CHP system
- Fed by a series of integrated gas pipes
- 1 engine: capacity of 1.2MW
- Flare: used if a) engine shutdown; b) to burn inefficient gas

Environmental benefits:
- Reduces amount of methane emitted (71,000 tonnes CO₂ equiv.)
- Displaces other fossil fuels with a natural gas equivalent (10,000 tonnes CO2 equiv.)
CHP is heat and power?

Power (electricity):
• Providing electricity (1.2MW) for 1,000 households (3%) in Cork City

Heat:
• 2MW heat available
• Currently not being used
• Investigating possible future uses – district heating?
Benefits of Partnerships

Partners:

Bioverda; National Grid; Householders; The Environment; Cork City Council.

Role of partners:

- **Bioverda:** Own and operate 1 engine
- **National Grid:** Buy from Bioverda
- **Householders:** Buy from National Grid (1,000 houses equiv.)
- **Environment:** 81,000 tonnes CO₂ equivalent saving p/a
- **Cork City Council:**
  a) Collect waste from householders (>33,000)
  b) Installed gas collection infrastructure and flare
  c) Providing amenity benefits for future generations
Vision for the Future: CHP

- Kinsale Road Landfill Site closed in July 2009;
- Will continue to generate leachate and gas until ~2030 at diminishing rates;
- Role of CHP will become less important and the role of flare more important;
- Environmental impact will diminish over time;
Vision for the future: Landfill Site

- Cork City Council will continue to use part of the site as public **recycling/composting**;

- **Amenity park** for Cork people (e.g. pitch, multifunctional all-weather arena suitable for circuses, concerts etc.);

- **Linear walkways** around the site;

- **Natural bog-land habitat**;

- **Education** (e.g. various renewable energy plants);
Innovation at Kinsale Road

• Harvesting of on-site grass to yield biogas suitable for use in Council fleet;

• Biothermal heating for city council depots (from degrading waste mass);

• Alternative, natural methods of leachate treatment (currently being investigated);

✓ Production of waste wood inserts for pallets, creates 25 jobs locally.
Energy Reduction Measures

• Energy Audit carried out by Cork City Energy Agency.

• 3% Reduction of Energy Consumption per annum by:
  a) Maintenance contract of all mechanical and electrical equipments onsite (Pumps, Aerators, Heating System etc.);
  b) Reduce security lighting to appropriate night time level;
  c) Negotiate optimum electricity rates by public tender;
  d) Promote staff awareness.
Post Closure July 2009

• All City Council collected waste will go to Youghal landfill site until its closure in 2010.

• Provision of transfer facility from Cork to Youghal by private sector contract.
Post Youghal Landfill Closure

• All City Council collected waste will go for treatment at Interim MRF facility which currently under tender.

• Residual waste will go to Bottle Hill landfill site.

• Waste transfer station construction currently subject to EPA Licence Review.
Cork City Council: Waste Reduction & Promotion

- Environmental best practice;
- Community Composting;
- Lifetime Lab – energy and waste: education, information & advice
Green Flag Schools

Green Schools:

- Holistic programme for environmental management, certification, and sustainable development education for schools.
- 17 Green Schools with Green Flag since 2007
- **The Seven Steps:**
  1. Green-Schools Committee;
  2. Environmental Review;
  3. Action Plan;
  4. Monitoring and Evaluation;
  5. Curriculum Work;
  6. Informing and Involving;
Community Composting

- Partnership CCC Housing, Environment Departments and RAPID;
- Ardbhaile Housing Scheme, Mayfield;
- Centralised Compostor: 75 households, 400kg per week – a great success!
- St. Francis Gardens, Blackpool (2009).
Bottlehill
Residual Landfill
Content

- Strategy.
- Site Selection.
- Public Consultation.
- Planning.
- Licensing.
- Consultants.
- Construction Tender Process.
- Construction.
- Environmental Monitoring.
- Ecology.
- Public Relations.
- Current Status.
Landfill Site Selection

3 Sites Short Listed

Bottlehill
Grenagh – Lyradane
Watergrasshill – Kearney’s Cross
Landfill Site Selection (cont.)

Short listed Sites
Parameters Assessed:

<table>
<thead>
<tr>
<th>Hydrogeology</th>
<th>Water Supplies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proximity of Housing</td>
<td>Tourism</td>
</tr>
<tr>
<td>Ecology</td>
<td>Socio – Economics</td>
</tr>
<tr>
<td>Planning</td>
<td>Agriculture</td>
</tr>
<tr>
<td>Animal Health</td>
<td>Noise</td>
</tr>
<tr>
<td>Visual Impacts</td>
<td>Landscape</td>
</tr>
<tr>
<td>Technical Factors</td>
<td>Financial Implications</td>
</tr>
</tbody>
</table>

- EPA Landfill Manual on Site Selection
  (2nd Draft 1996)
Planning

Preferred Site Announced June 2000 – Bottlehill.


Planning & Development Act 2000

Application made to An Bord Pleanála – 23rd May 2003
Oral Hearing held in Oct 2003. (45 Submissions)

Conditions of Planning

19 Conditions Imposed in total.

Date of Closure. Haulage Route. Buffer Zone.
Drinking Water. Pest Control. Management Agreement.
Liaison Committee. Environment Fund.
Licensing

EPA Licence Application

Application made to EPA – 23rd Aug 2001
Oral Hearing held in Dec 2002 / Jan 2003, (74 Submissions)

Conditions of Licence

179 Conditions Imposed in total.

<table>
<thead>
<tr>
<th>Facility Management.</th>
<th>Facility Infrastructure.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restoration &amp; Aftercare.</td>
<td>Facility Operation.</td>
</tr>
<tr>
<td>Emissions.</td>
<td>Nuisance Control.</td>
</tr>
<tr>
<td>Monitoring.</td>
<td>Contingency Arrangements.</td>
</tr>
<tr>
<td>Records.</td>
<td>Reporting.</td>
</tr>
</tbody>
</table>
Facility Description

Residual Waste Landfill

Facility Area – 138.2Ha
• Landfill Footprint – 45.7Ha
• Accommodation & Services – 54.3Ha
• Clay Borrow Source – 33.2Ha
• Entrance & Roads – 5.0Ha

Recent Construction of Phase 1 of 8.
Total Waste Capacity - 5.4m Tonnes
Permitted to operate until end 2025

<table>
<thead>
<tr>
<th>Waste Type</th>
<th>Maximum Tonnes per Annum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Year 1</td>
</tr>
<tr>
<td>Household</td>
<td>92,000</td>
</tr>
<tr>
<td>Commercial</td>
<td>61,000</td>
</tr>
<tr>
<td>Industrial</td>
<td>29,000</td>
</tr>
<tr>
<td>Street Cleaning</td>
<td>7,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>189,000</td>
</tr>
</tbody>
</table>
Const. Tender Process

Contract:

Development of Footprint of Landfill (c. 45Ha) & Construction of 1st of 8 Phases for Waste Deposition.

Construction of related infrastructure:

- Administration & Maintenance Buildings,
- Marshalling Yard,
- Weighbridges & Wheelwash,
- Leachate Management System,
- Surface Water Management System,
- Mechanical & Electrical Installations,
- SCADA system.
Construction

- Construction Commenced April 2005.
- Main Construction Contractor with nominated Sub-contractor for M&E Design & Installation
- Triple Liner design system used:
  1. Engineered Clay Liner
  2. Geo-composite Liner
  3. HDPE Liner
- Substantial Completion Reached August 2006.
Environmental Monitoring

- Environmental Monitoring now carried out by Facility Management and Environmental Consultants (yearly Contract).
- Monitoring Reports submitted to EPA on quarterly and annual basis.
- Current Monitoring includes (as per WL W0161-01):
  - Ground Water Monitoring,
  - Surface Water Monitoring,
  - Biological Assessment,
  - Dust Monitoring,
  - Noise Monitoring,
  - Gas Monitoring.
Public Relations

➢ Environmental Monitoring Committee established March 2005 (in accordance with ABP & EPA Conditions).

➢ The Committee has 13 members incorporating:
  Bottlehill Environmental Alliance,
  Mourneabbey Community Council,
  Glenville Community Council,
  Carrig Na bFhear Community Council,
  Remaining unrepresented local residents,
  Fianna Fail,
  Fine Gael,
  The Labour Party,
  Cork County Council staff.
Public Relations (cont.)

- Environmental Monitoring Committee meets 4 times per year in order to:
  "oversee the environmental monitoring of the development" (An Bord Pleanala Cond. 11).
  
  and to "facilitate communication between the local community and the licensee on the environmental performance of the facility and on the use of the annual fund required under condition 12.4 of the Waste Licence" (EPA WL 161-1 Cond. 2.4.2).

- Publicly Accessible Files are held relating to:
  EPA Correspondence,
  Complaints Register,
  Incidents Register,
  Environmental Monitoring.
Ecology

Circus Cyaneus

Hen Harrier
Ecology

The Heritage Council
Biodiversity Fund 2006

Provided Funding For the Habitat Enhancement of

- Rana Temporaria (Common Frog).
- Marsh Fritillary Butterfly.
**Current Status**

- Construction now complete.
- Testing & Commissioning complete
- Facility now handed over to Cork County Council
- Currently undertaking Interim period until Lead in to Waste Acceptance.
- Operational contracts currently being established during interim & lead-in period.
- Will commence waste acceptance following closure of Kinsale Rd and Youghal Landfills.
- Waste accepted at Bottlehill shall be subject to Treatment as per Landfill Directive.
Acknowledgements

• Joe Gavin (City Manager);
• Martin Riordan (County Manager);
• Gerry O’Berine (DOS Cork City Council);
• Louis Duffy (DOS Cork County Council);
• Tobin Consulting Engineers;
• Bioverda Ltd;
• CTO/Eirblock;
• Fehilly Timoney and Company;
• John Twomey (Landfill Manager);
• Kevin Ryan (Assistant Landfill Manager);
• Xiang Cheng (CCEA)