Outline

- Background on Rockingham County
- Challenges Facing the County
- Strategic Planning Elements
- Recommendations
- Lessons Learned
Rockingham County

- 572 sq mi
- 93,800 population (2010)
- 99,400 tpy generated solid waste
- Rockingham County Landfill - primary disposal facility
  - 232 acre site
  - 82 acres permitted for disposal
  - 315 tpd disposal rate
Current Recycling Program

- 6 mobile drop-off trailers
- 10 permanent drop-off centers
- Drop-off centers require material sorted by type
- Curbside recycling in a couple communities (Madison and Stoneville)
- Low recycling rate

Proposed Private Landfill

- Proposed private regional landfill in the County
- Same company proposed privatization of the County’s landfill
- County need to evaluate these proposals and its own operations
- GBB was hired to assist with the evaluation
SUMMARY STRATEGIC PLAN

Gershman, Brickner & Bratton, Inc.

- Established in 1980
- Solid Waste Management and Technology Consultants
- Helping Clients Turn Problems into Opportunities

Quality – Value – Ethics – Results
Focus of Study

• Evaluate Landfill Performance
• Review Waste Disposal Market
• Evaluate the Public/Private Partnerships
• Review County’s Recycling Program
• Review Waste Conversion Technologies

Summary Strategic Plan Elements

• Operations Review
• Landfill Operating Scenarios
• Solid Waste Disposal Marketplace
• Improving Recycling
• Waste Conversion Technologies
• Public/Private Partnerships
• Private Landfill Feasibility Review
• Strategic Plan Recommendations
OPERATIONS REVIEW

Operational Conclusions

- Site is well maintained
- Adequate number and type of personnel
- Equipment
  - Sell the 2 pans (scrapers)
  - Purchase D8 dozer and sell 1 D6 dozer
  - Purchase 1 haul truck
Operational Conclusions (continued)

• Consider alternate leachate management options
  – Evaporation using LFG
  – Discharge to constructed wetlands
  – Recirculation
  – Forcemain to WWTP

• Consider additional waste tonnage in manageable increments

Operational Conclusions (continued)

• Consider capping Phase 1
• Consider Landfill waste compaction monitoring technology
  – Airspace is landfill’s asset
  – Industry standard 1,300-1,400 lbs/cyd
  – Prior to 2005, 1,000 lbs/cyd
  – 2011 study, 1,200 lbs/cyd
Landfill Life vs. Waste Volumes

<table>
<thead>
<tr>
<th>Waste Volume (tpd)</th>
<th>Current Permit</th>
<th>Vertical Expansion</th>
<th>Expansion 1</th>
<th>Expansion 2</th>
<th>Expansion 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>315</td>
<td>2036</td>
<td>2047</td>
<td>2076</td>
<td>2093</td>
<td>2100</td>
</tr>
<tr>
<td>815</td>
<td>2022</td>
<td>2028</td>
<td>2044</td>
<td>2056</td>
<td>2061</td>
</tr>
<tr>
<td>1,315</td>
<td>2018</td>
<td>2022</td>
<td>2033</td>
<td>2041</td>
<td>2044</td>
</tr>
</tbody>
</table>

Personnel and Equipment at Higher Waste Volumes

<table>
<thead>
<tr>
<th>Waste Volume (tpd)</th>
<th>Equipment</th>
<th>Personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>315</td>
<td>Existing Equipment</td>
<td>Existing Personnel</td>
</tr>
<tr>
<td>815</td>
<td>Replace D6 with D8 Bulldozer AND Additional Haul Truck</td>
<td>Personnel Overtime OR One Additional Operator</td>
</tr>
<tr>
<td>1,315</td>
<td>Replace D6 with D8 Bulldozer AND Additional Haul Truck</td>
<td>Personnel Overtime AND One Additional Operator</td>
</tr>
</tbody>
</table>
SOLID WASTE DISPOSAL MARKETPLACE

75 Mile Radius Map
Potential Sources of Additional Solid Waste

<table>
<thead>
<tr>
<th>Source Location</th>
<th>Potential Quantity (tpd)</th>
<th>Expected Disposal Fee Range ($/ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC Counties and Cities</td>
<td>700</td>
<td>$23.50-$30.00</td>
</tr>
<tr>
<td>VA Counties and Cities</td>
<td>400</td>
<td>$20.00-$33.00</td>
</tr>
<tr>
<td>Total</td>
<td>1,100</td>
<td>$20.00-$33.00</td>
</tr>
</tbody>
</table>

IMPROVING RECYCLING
Improving Drop-off Program

- Consider less sorting
  - More convenient for public
  - Cardboard and mixed recyclables
  - Possible separate glass (local market for glass cullet)

- Possibly take advance of new Waste Management single stream recycling facility in Forsyth County

Curbside Collection

- Would result in increased recycling participation and recovery
- Collection costs could be significant
WASTE CONVERSION TECHNOLOGIES

Waste Conversion Technologies

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Risks/Liability</th>
<th>Risk Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass Burn</td>
<td>Proven Commercial Technology</td>
<td>Low</td>
</tr>
<tr>
<td>RDF</td>
<td>Proven Commercial Technology</td>
<td>Low</td>
</tr>
<tr>
<td>Anaerobic Digestion</td>
<td>Proven Technology; Limited US Experience</td>
<td>Moderate</td>
</tr>
<tr>
<td>Pyrolysis</td>
<td>Uncertain Commercial Potential; No Large Scale Operations</td>
<td>High</td>
</tr>
<tr>
<td>Gasification</td>
<td>Limited Small Scale Operations; Potential Scale-up Issues</td>
<td>High</td>
</tr>
</tbody>
</table>
PUBLIC/PRIVATE PARTNERSHIPS

Public/Private Partnerships

- Sale of Landfill
- Leasing of Landfill
- Private Operations of Public Landfill
PRIVATE LANDFILL FEASIBILITY REVIEW

Private Landfill Feasibility Review

- Second landfill in County not needed
- Proposed landfill could create financial hardship to County
- Recommended against County taking further action to consider landfill
RECOMMENDATIONS

Recommendations

• Mobile Equipment
• Landfill Staffing Levels
• Partial Landfill Closure
• Compaction Monitoring Technology
• Additional Waste Volumes
• Waste Conversion Technologies
• Public/Private Partnerships
LESSONS LEARNED

Lessons Learned

• Helpful for the County / Elected Officials to understand the landfill
• Opportunities to improve County landfill operations and efficiency
• Additional waste volumes could be accepted at landfill and from where
• County needs to look at improving recycling
• Waste conversion may provide opportunities in future
• Privatization not needed at this time
Thank you!

Lance Metzler
lmetzler@co.rockingham.nc.us
(336) 342-8101

Ronnie Tate
rtate@co.rockingham.nc.us
(336) 342-8104

John Carlton
jcarlton@gbbinc.com
(908) 319-5992