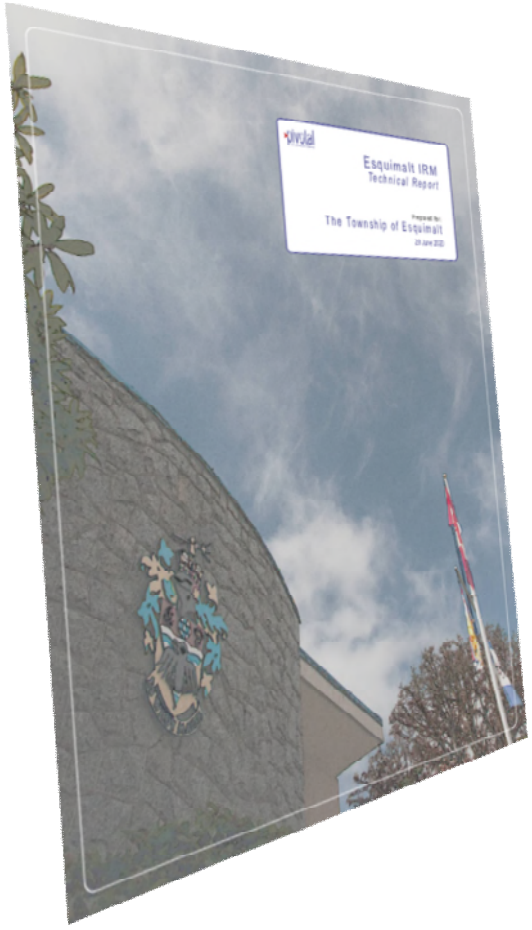


Esquimalt IRM

Technical Report Summary

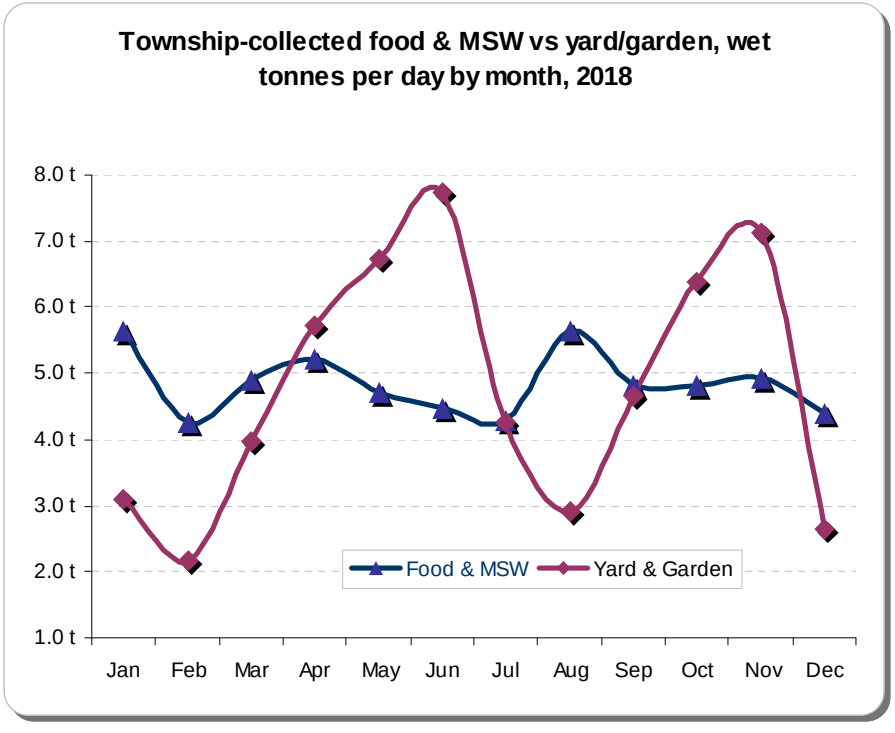
30 June 2020

Graeme Bethell
Chris Corps

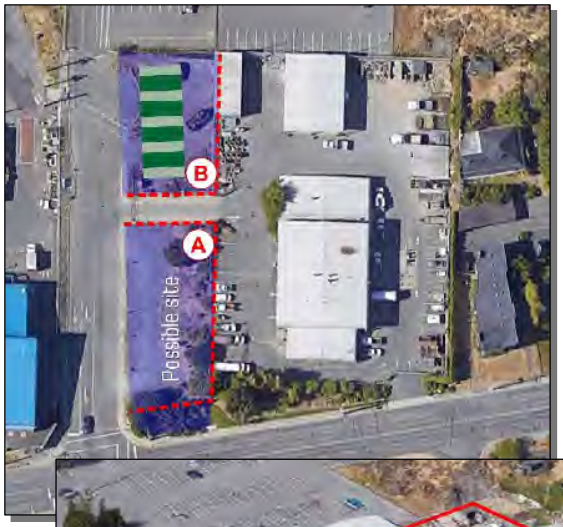
pivotal
integrated resource management

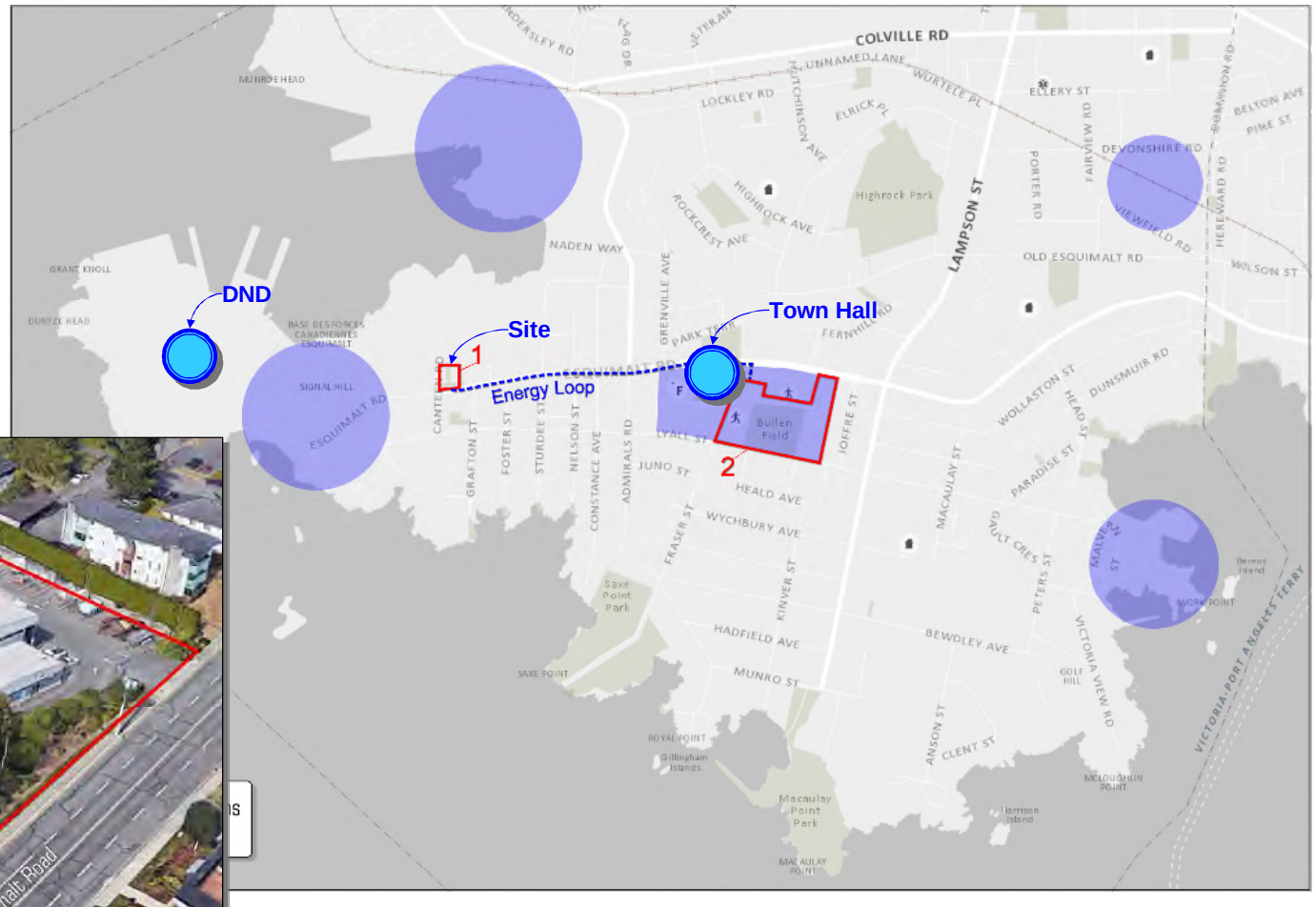
Study Overview

- Assess IRM using gasification
  - Integrating waste streams
  - Factors: statutory, financial & environmental
- Main aspects identified
  - Township collects ≈52% of community waste
  - Volume flows are uneven
  - Population & waste growth uncertain
  - Site: Public Works Yard or Recreation Centre
  - Key findings
    - Cost to taxpayers
    - GHG reduction
    - Heating & cooling, not electricity
    - Landfill diversion
    - Carbon sequestration

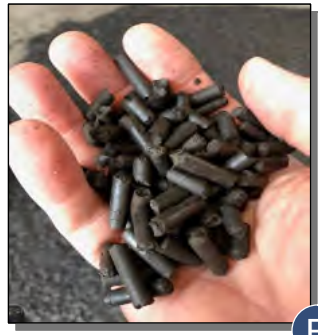


Recommended : Public Works Yard





RotoGasifier Examples : "Best Available Technology"



E

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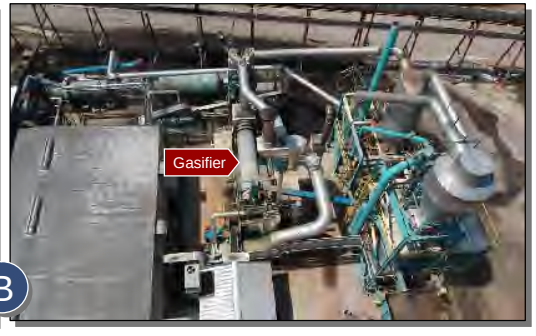
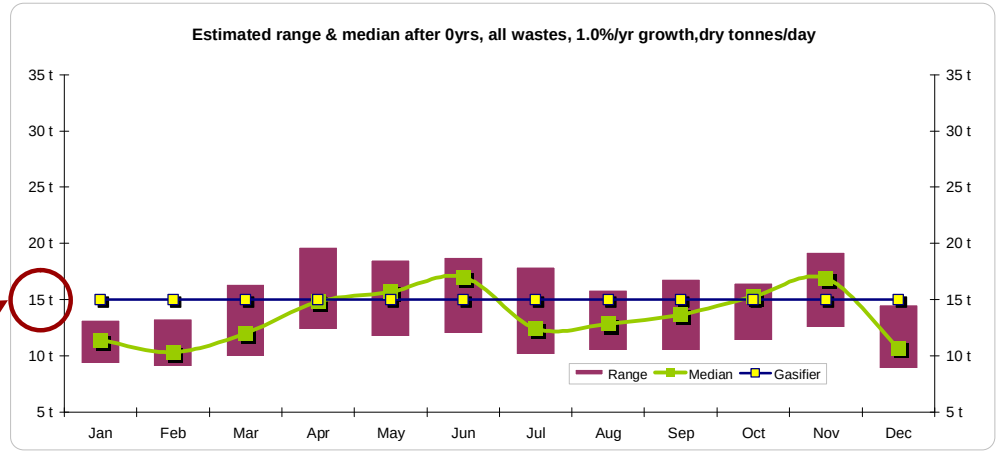


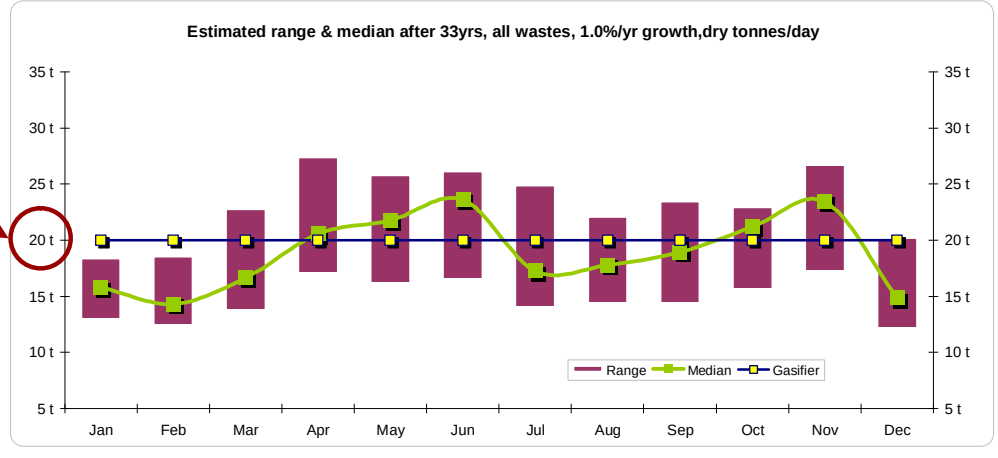
C

D

Plant Size

- Waste
  - Waste meets MoE targets (≈350kg/person/yr)
  - Current: 3,400 t/yr Township, 6,500 t/yr combined
  - Affected by recycling changes
- Population growth
  - From ≈0.3% to ≈1.7% per annum
  - Buildout estimated at ≈25,000 or ≈1%pa growth
- Approach: adapt & phase
  - Multiple smaller units
  - Expand/adapt, as/when needed
  - Just-in-time is cheaper, less risk





Key Findings – Recommended Option

- Combined Esquimalt wastes
  - Township-only is possible but marginal
- Financial
  - Cost: Initial: ≈$16m; Buildout: ≈$21m
    Payments: ≈$4.1m/yr (O&M: ≈1.7m/yr)
  - Savings: ≈$226m total net, 30 years
    ≈$360/home/yr (1st 10 yrs)
- Environmental & resources
  - Diversion: ≈9,000t/yr (buildout)
  - Energy: ≈528,000 mwh thermal (life cycle)
  - GHGs: ≈4,500t/yr (buildout)
    ≈12% of community GHGs, ≈4½x corporate
  - Sequestered: ≈3,500 tco_2e/yr (buildout)

Conclusions & Recommendations

- Viable, environmentally beneficial
  - Likely 10-15 tonnes/day & upwards
- Next steps
  - Community engagement
  - Township only or entire community wastes
  - Site/location preference
  - Key mitigation aspects
    - Statutory, supply, testing, performance guarantee
    - Grants, funding & revenues
    - Procurement workshop
    - Design, phasing & plan