Case study: Land planning and buffer zone alternatives for a privately owned landfill site

Johan Goosen - Golder

Dirk van Niekerk - The Waste Group

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Outline

- Current operations and challenges / clients brief (DvN)
- Common issues with landfills and buffer zones (EB)
- Plans for expansion to include a hazardous cell (EB)
- Waste to energy opportunity (DvN)
- New direction (JG)
- Closing remarks (JG)
- Questions and Answers

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Current operations and challenges (DvN)

- Who is The Waste Group (overview, accreditation and principles):
  - the 5x R's principle i.e. rethink, reuse, reduce, recycle, remove
  - ISO 14001(Environmental), ISO 18000 (OHSAS), ISO 9000 (Process and System)
- How waste is recycled by "pickers"
- The pitfalls of conventional landfill site management principles:
  - Inefficient use of airspace
  - Methane gas (Carbon no-no) produced mainly by organic waste decomposing
  - Sterilisation of valuable productive land because of "buffer zones"
  - Nuisance to the neighbours – dust and odour, windblown litter causes
  - Wrong geological choices from the past
- Client needs and brief
  - Saving of airspace / implementing more sustainable solutions
  - Masterplan - Consideration of other land uses on the same site
  - Additional income streams

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Common issues with landfills and buffer zones

a) Landfills

- Landfill siting requirements:
- Geology – dolomites vs. clayey material
- Geohydrology – importance of aquifers and ground water use in the area
- Visual
- Public acceptability
- Reactive planning in terms of adjacent land use

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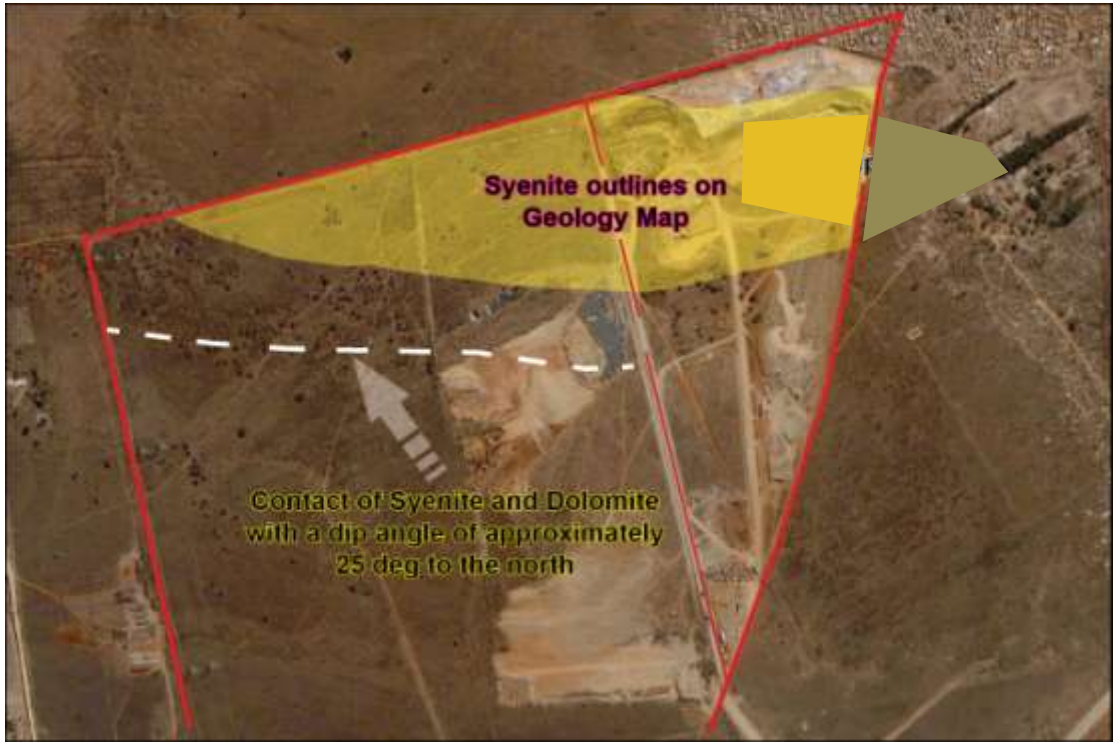
Common issues with landfills and buffer zones

b) Buffer zones

- Buffer stipulated in permit/license
- Landfill owners responsibility to manage servitudes
- In general inadequate development planning concerning landfills
- Informal or formal development allowed in buffer zones – public pressure to close landfill

Plans for expansion to include a hazardous cell, and associated requirements

- Hazardous sites and geology
- More stringent liner requirements
- Enlarged buffer zones
- The need for appropriately located hazardous disposal sites
- Stakeholder engagement needs



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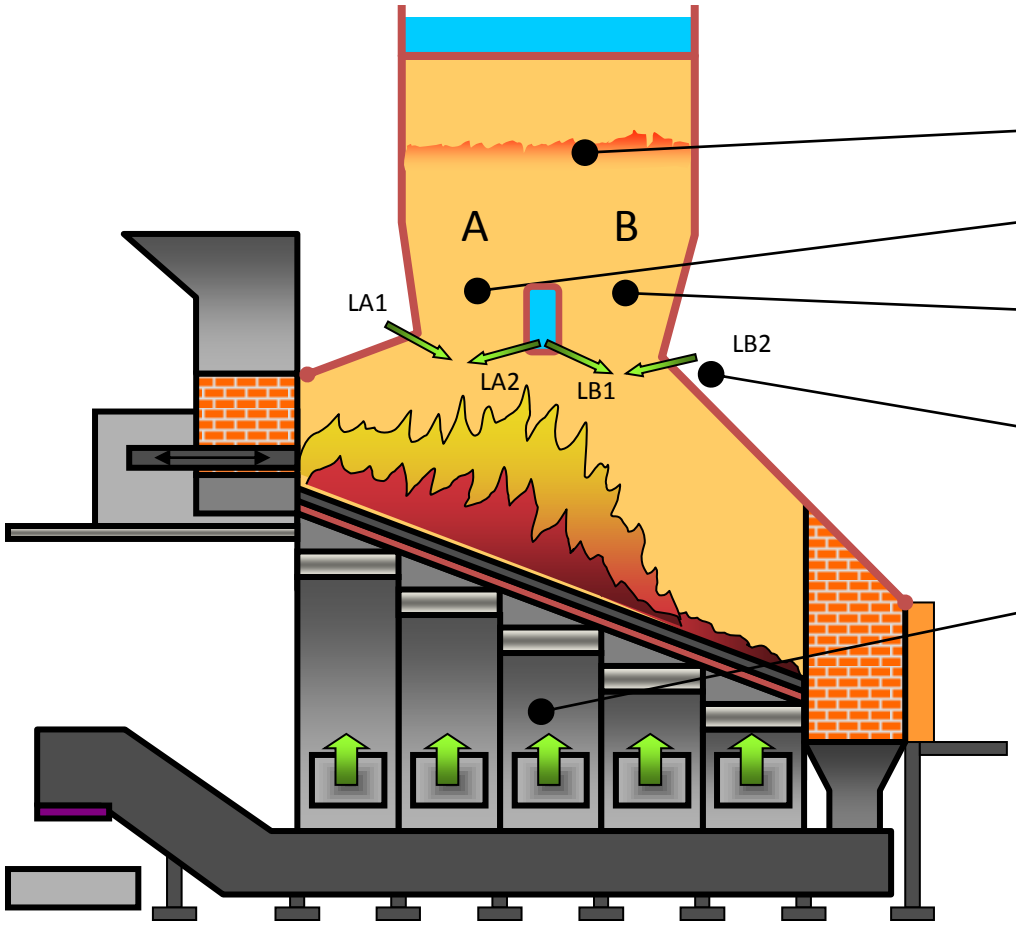
Waste to Energy Opportunity



defined flame end

temperature
in Zone A + B controlled
(approx. 1000°C ± 50K)

Secondary Air Content
40-60 % of Total Air

Primary Air Content
60-40% of Total Air

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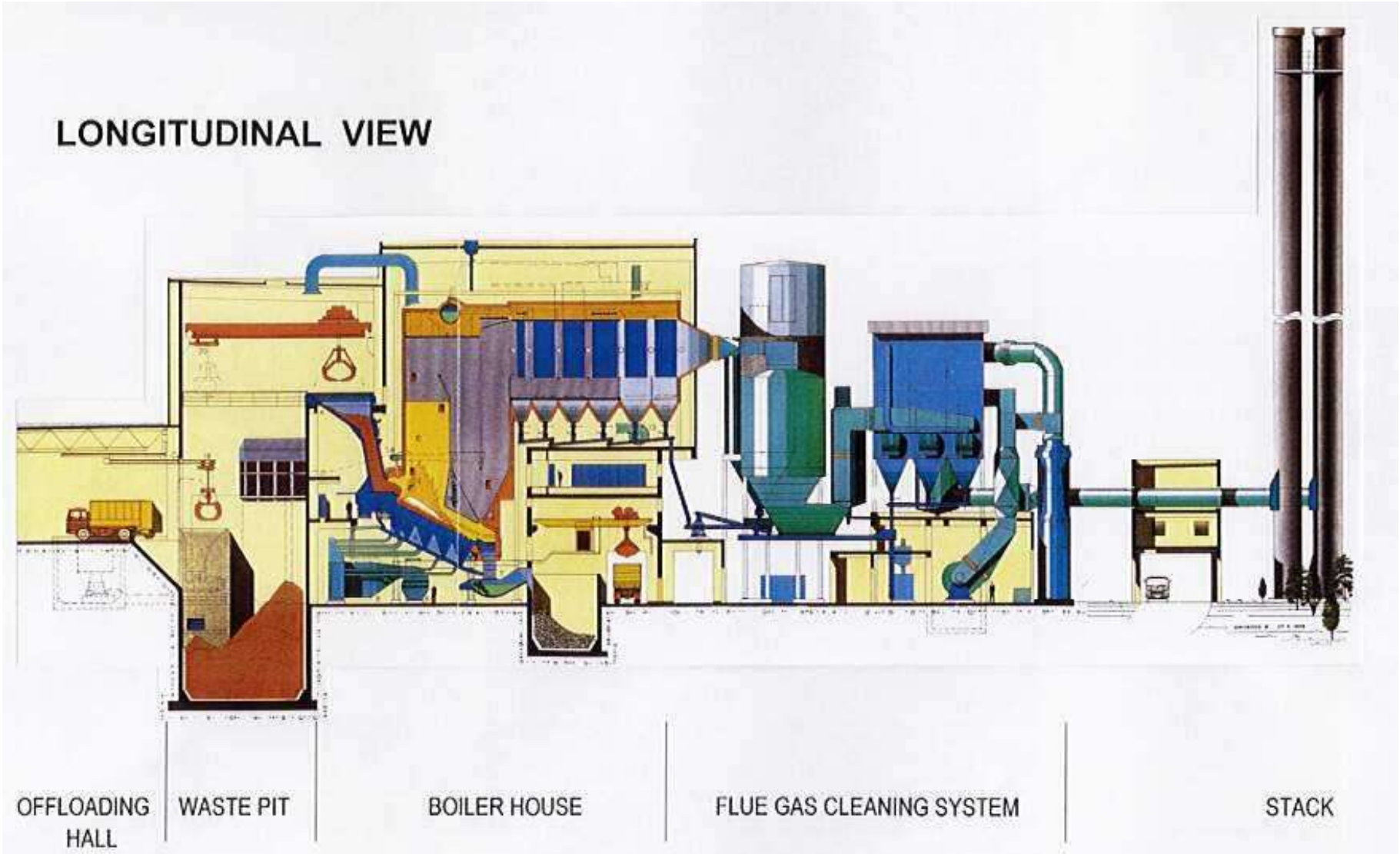
Waste to Energy Method (incineration vs pyrolysis)



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Waste to Energy Aesthetics

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A new direction

- Buffer zone issues
- Proposals for compatible buffer zone land uses
- Waste to energy opportunity
- Shift in focus from hazardous disposal to integrated waste management and land use

Contextual Analysis

- Public policies (planning & environmental)
- Roads & access options
- Existing and proposed adjacent land uses
- Geology
- Buffer zone implications (optimal use of land)

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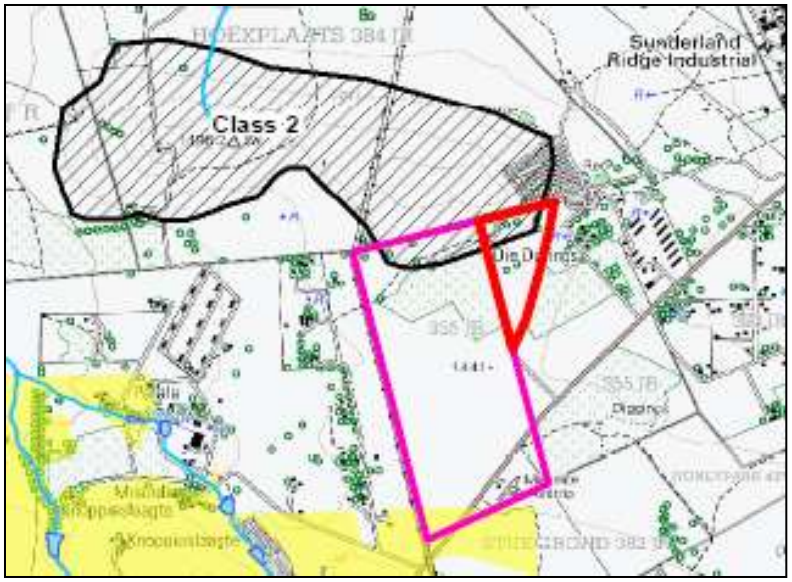
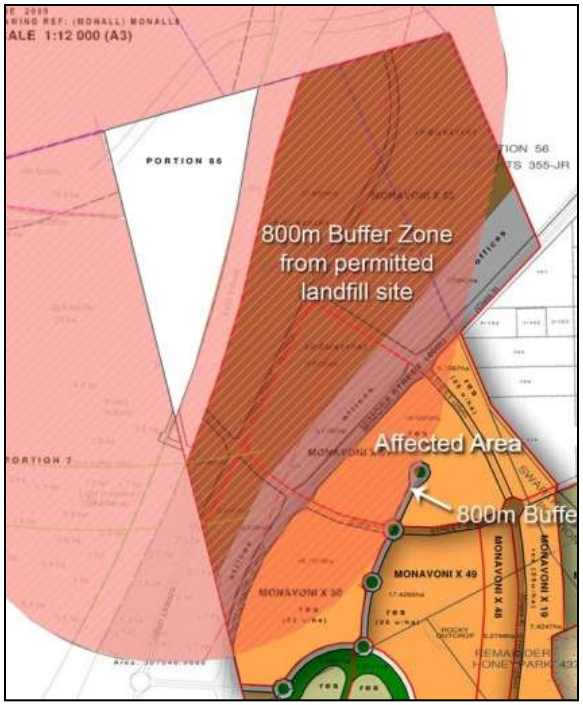
Roads & Access



Environmental Policies

Planning policies

Adjacent Ownership & Land-use



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A new direction (2 – land-use schedule)

Integrated Environmental Waste Management Centre (IEWMC)

- MRF (materials recovery facility)
- Rubber Processing Facility
- Plastic Processing Facility
- Pyrolysis plant (Waste to Energy)
- Building Rubble Processing Facility
- Composting Facility
- E-Waste Processing Facility
- Recycling Buyback Centre (Glass, Aluminum, paper, Plastic)
- HH Cell / GLB+ Cell Extension
- Metal Recovery Facility
- Public Dumping Facility
- Salvage Facility (car wrecks)

Heavy industry
Light Industry
Commercial
Residential

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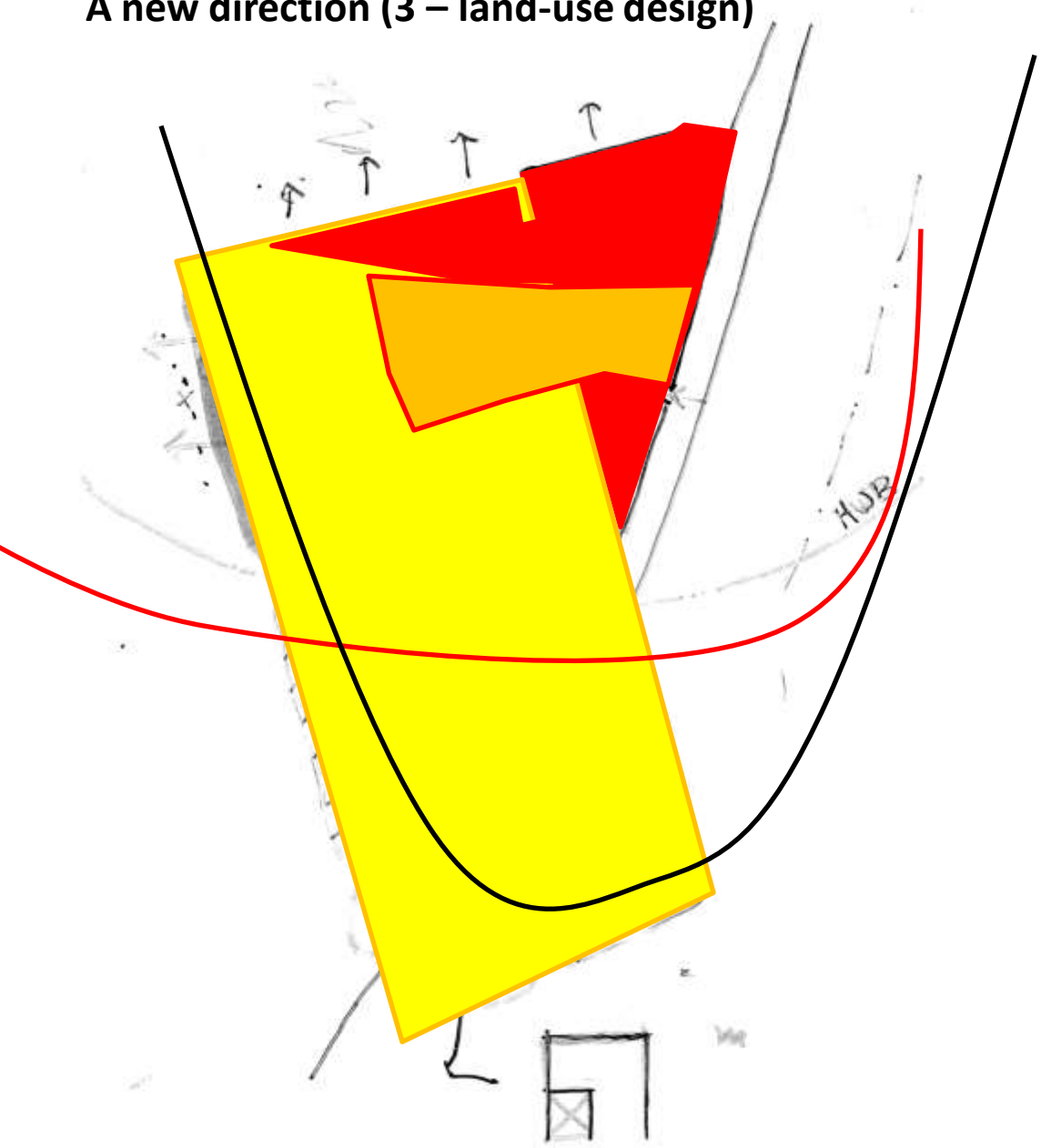
A new direction (3 – land-use design)



- Align HH facility to geology
- Optimise GLB facility for maximum land usage
- Align entire facility to adjacent uses
- IEWMC adress sustainability, waste reduction, saving of airspace and job creation

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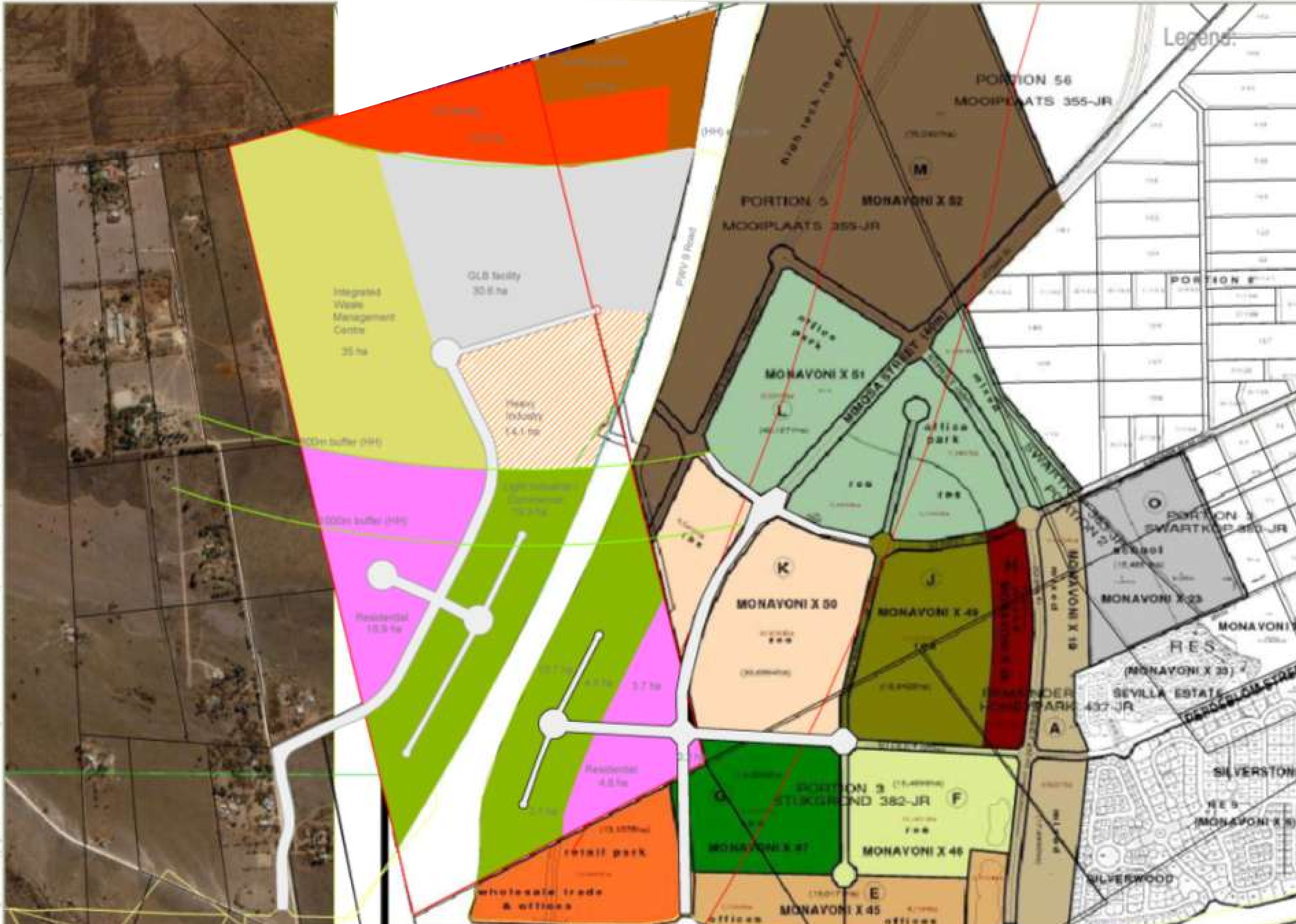
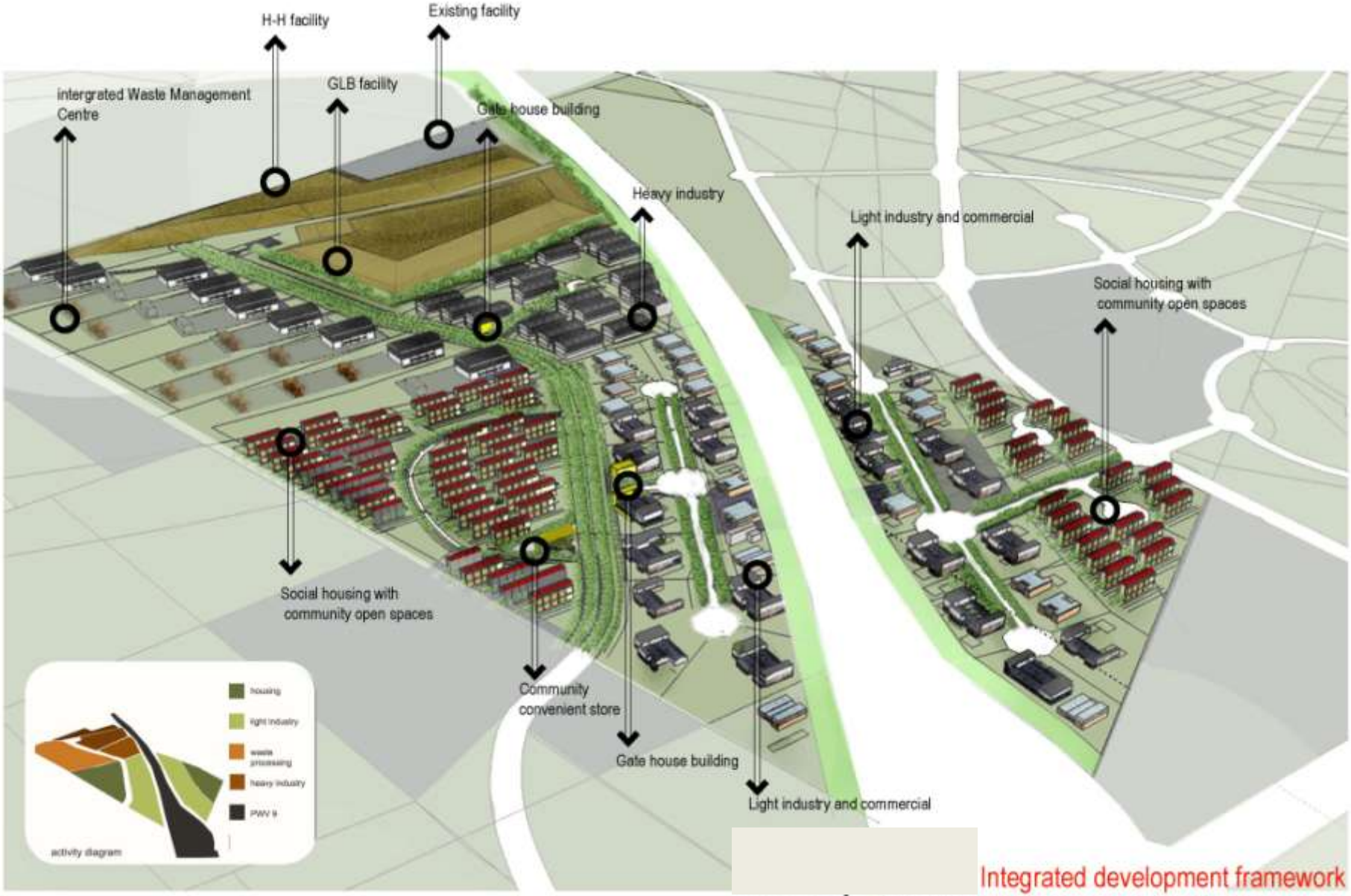


Legend:
PORTION 56
MOOIPLAATS 355-JR
M
PORTION 5
MONAVONI X 52
MOOIPLAATS 355-JR
PWV 9 Road
GLB facility
30.6 ha
Integrated
Waste
Management
Centre
35 ha
Heavy
Industry
14.1 ha
office
park
MONAVONI X 51
MIMOSA STREET (40m)
office
park
res
res
L
PORTION 8
500m buffer (HH)
1000m buffer (HH)
K
MONAVONI X 50
J
MONAVONI X 49
O
school
MONAVONI X 23
RES
(MONAVONI X 33)
SEVILLA ESTATE
A
SILVERSTONE
Residential
15.9 ha
Residential
4.8 ha
3.7 ha
PORTION 3
STUKGROND 382-JR
G
F
MONAVONI X 47
MONAVONI X 46
res
retail park
wholesale trade
& offices
E
MONAVONI X 45
offices
offices
SILVERWOOD



Integrated development framework

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Closing remarks

•Few examples currently exist in South Africa in which mining, industries and waste facilities have successfully obtained closure, resulting in the re-integration of the land back to conventional land uses that have value to the surrounding community.

•The planning policies of local government rarely include any detail on mining, industries and waste facilities, or their planning. These land uses are simply referred to as “mining” or “industrial” and not addressed any further.

•Opportunities therefore exist to integrate local government planning and mine and waste facility planning in terms of overlapping land use needs, during the operational as well as closure phases.

•Old landfill methods & technology determined no-use buffer zone planning

•In our current context of carbon pollution, urban sprawl and all its impacts, we have no choice but to rethink, reuse and reduce (move to some use buffer zones).

•Town planning authorities and professionals must treat landfill as a basic service (not a nice to have) and integrate its placement and planning into the city fabric

•LA s as part of the Built Environment Professions – it is up to us!!

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Questions and Answers

Closing