VACUUM EXCAVATION

THE VAC GROUP has Australia and New Zealand's LARGEST PURPOSE BUILT FLEET of Vacuum Excavators (100+) in many varied sizes and configurations.

The Cost of VAC-Ex Explained!

TRUE COST OF VACUUM EXCAVATION

Major cost drivers
- Onsite Cost Factors
- Logistics
- Disposal

- On site Cost Factors
  - Productivity, excavation rate (Equipment & Operator impacts) Note Australia; Air effective in 5% of cases
  - Spoil Generation Factor (SGF)

- Logistics
  - Getting to & from site.
  - Distance to disposal facilities
  - Congestion of roadways

- Disposal
  - Disposal Facility Location
  - Disposal Cost

- Typical Breakdown of HYDRO Excavation costs

	Major City	Regional City
SITE EXCAVATION	20%	30%
DISPOSAL	55%	30%
LOGISTICS	25%	40%

- Clearly a solution overcoming both Logistics and Disposal (Averaging 75% of costs) will have the major impact in reducing costs.

DISPOSAL – THE ROADBLOCK to VAC-EX

- **ISSUES are**
  1. **Cost**
  2. **Off site time related to disposal (Logistics)**

1. COST of disposal

- **Controlled by third parties and Government levies.**
- **Varies from Location to Location**
- **Disposal Facility numbers are diminishing**
- **Located further and further away from City Centre**

2. LOGISTICS – Current industry strategy is LARGER TRUCKS

- **Advantages**
  1. **ACTUAL - longer time working on site – less dump runs**
  2. **PERCEIVED - Higher horsepower units with *claimed* higher productivity from larger hoses (only true if excavating within the boom radius)**

- **Disadvantages**
  1. **High Capital outlay**
  2. **Limited access due to width, length, height and weight in many streets and lanes**
  3. **Often are extremely overloaded (if full) due to heavy Tare weights. Often have load sensors that prevent overloading. This is often at 25 to 30% of the trucks volume.**
  4. **Do not carry sufficient water to fill tanks**
  5. **Generally unable to capitalise on productivity gain due to hose size reduction to reach site.**
  6. **VAC can but will not build trucks with large diameter hoses as we can not mitigate the OH&S risks associated with large diameter hoses. (Trench collapse)**
  7. **Does not resolve the disposal cost or travel distance to disposal facilities.**

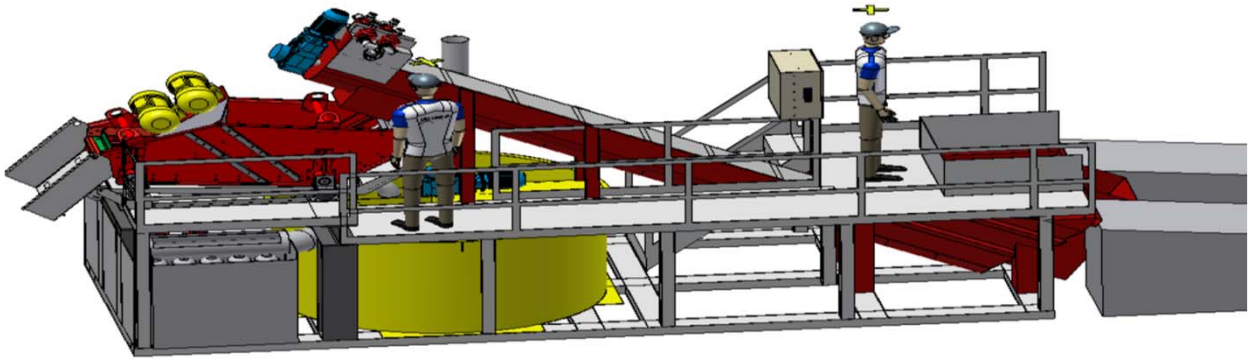
VAC's SOLUTION

SOIL TRANSFER – Fixed and mobile solutions that separate Spoil (slurry) back into Water and Soil

- **By-products are re-usable or able to be onsold - bypassing the waste stream.**
- **Any remaining by-product is easily and inexpensively disposed of as a solid waste.**
- **Remaining by-products are easily and inexpensively loaded and transported.**
- **Environmentally sustainable with reduced GHG emissions.**
- **Reduction in truck movements on all ready congested roadways**
- **EPA assistance due the diversion of material out of the waste stream**

On Site mobile Soil Transfer facilities have a small footprint and are designed to

- **Resolve the Disposal cost issue**
- **Resolve the logistics issue**
    1. **Achieve the savings and manoeuvrability of small trucks**
    2. **Exceed the performance and on site times of larger trucks**
    3. **Reduces travel and off docket costs with truck park up on or near site**

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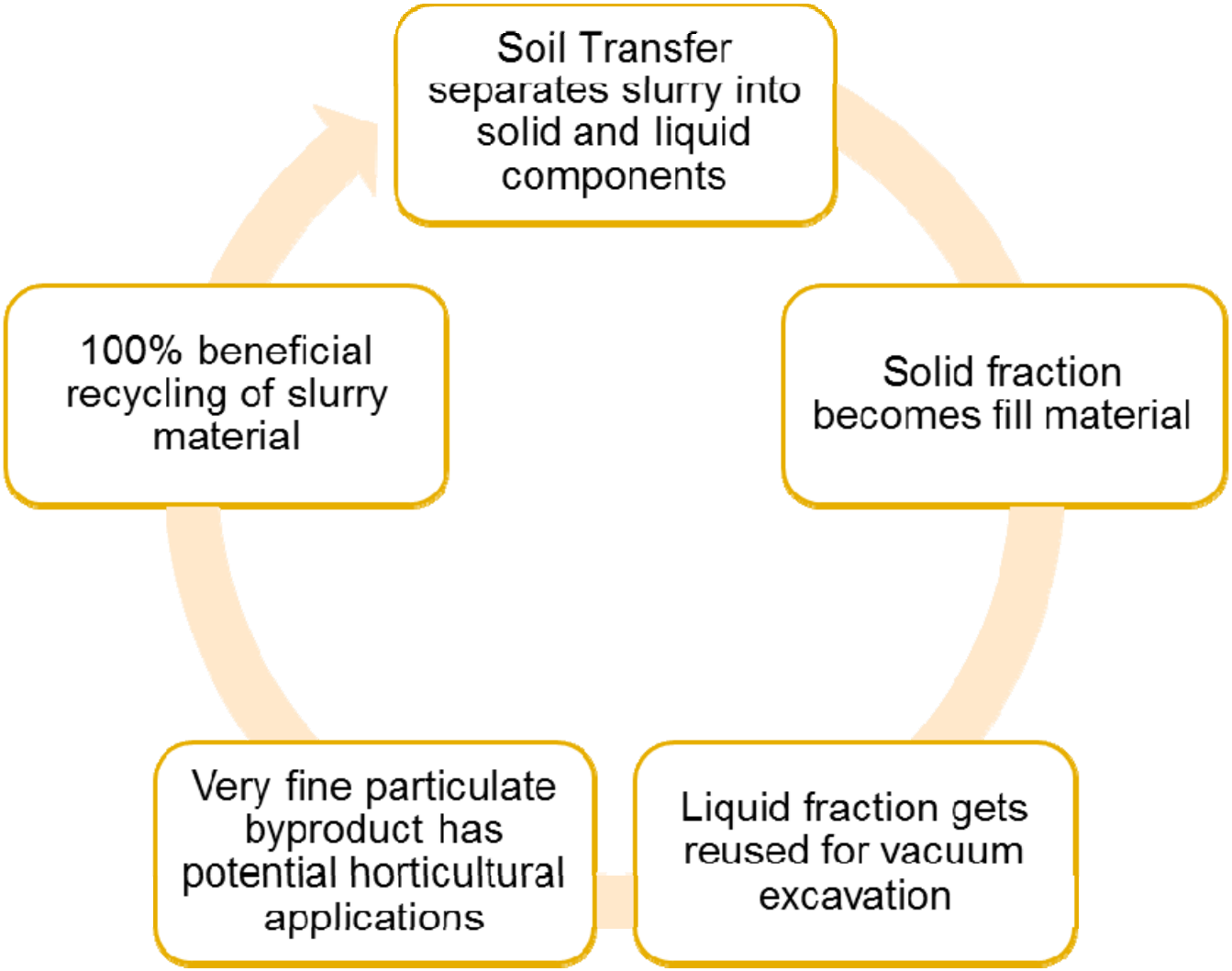

Closed Loop Process - 100% Beneficial Recycling

Assessment of impact of 1 Soil Transfer on fuel consumption per m3 of excavation for 10 trucks

System	Large Truck +350hp PTO Drive 6000 litre legal capacity	Medium Truck 200hp Auxillary drive 50 hp 3000 litre capacity	Medium Truck 200hp Auxillary drive 50 hp 3000 litre capacity + Soil Transfer
CYCLE TIMES			
Travel to site	2	2	0.5
DIGGING	4	2	8
Travel to and Dump	2	2	2
Travel to Depot	2	2	0.5
TOTAL Hours /day	10	8	11
Fuel Consumption L/Hr			
Driving	40	17	17
Digging	40	6	6
Fuel per day	400	114	99
Cubic meters dug	3	1.5	6
Liters of Fuel Used/m3 DUG	133	76	17
Volume over 220 working days	660	330	1320
Litre of fuel for equivalent volume of excavation	176,000	100,320	21,780
Fuel Consumption over 10 trucks per annum	1,760,000	1,003,200	217,800
Fuel Savings from Soil Transfer(Liters)	**1,542,200**	**785,400**	
CO2 Savings tonne/annum	**4,006**	**2,040**	
Fuel at $1-50 /L per annum	**$ 2,313,300**	**$ 1,178,100**	
Equivalent trucks to achieve equivalent volumes excavated	**20**	**40**	**10**

A SUSTAINABLE FUTURE

Full Electric Vehicles 120 KWH batteries.

- 20 KWH consumption Working – only draws energy as and when required versus IC engine always consuming
,
- 80 KWH consumption Driving
- 40% reduction in maintenance costs
- Controllability (Operates at set pressures and flows given nozzle and hose selection)

Soil Transfer as an enabler

- Switches the working to operating ratio from 20:80 to 80:20
- Opportunistic charging capabilities at Soil Transfer unit whilst dumping (90 min charge in 10 mins).
- Reduced capital costs for equivalent excavation