

**Submission of Jill and Wayne Randle, resident landowners at 62 Harts Road**

After much further research and reflection, we continue to oppose CLS's application for the consents CRC175344 and CRC175345. All concerns raised in our previous correspondence remain valid.

I spent 50 years as a physiotherapist with an ongoing interest in neurophysiology, while Wayne was a Scientist with the Ministry of Health and then ESR.

We're passionate to preserve the healthy, peaceful environment which we, along with our children, grandchildren and pet animals have enjoyed for 37 years. We are equally concerned for our many neighbours, including the beautiful horses and cattle in the paddock next door. Should animals have the right to be included as (hyper) 'sensitive receptors'?

Our main concerns are

- Operational issues including risk of fire and fire-fighting issues
- Air contaminant health risks, both short and long term
- Water quality
- General effects on us and our community

**OPERATIONAL ISSUES**

1. The mediation process on 31<sup>st</sup> October last year and subsequent site visits while helpful, did little to allay our misgivings. We wish to thank Mr Wylie and his colleague for their courteous manner during site visits. I enjoyed our little chat about home composting and the worm farm I planned to make with our grandsons – Phil said his 7-year old son would love that. It was also good to have the anaerobic compost removed before Christmas, albeit as a result of Arbitration. This has certainly decreased the unpleasant odours – for now.
2. We are totally in accord with the concept of commercial composting of raw materials which would otherwise go to landfill. However, it can only be considered environmentally friendly if Very Best Practice is followed at every step of the process from site and raw material selection, transportation and storage, - through to mature compost fit for purpose.  
This appeared to be the case when we visited Living Earth and Parish Road in Oxford. In both cases genuine pride was evident. We do appreciate that the costs associated with the Living Earth infrastructure are unrealistic for CLS, but aspects of the set-up at Parish road are comparing apples with apples: it is an open windrow operation directly on the ground. However, the site is 40 metres above water level and the ground is engineered to oblige stormwater to drain into a big pond. Because there is no bore, 160 thousand litres of water are stored on site. *green waste only*
3. The manner in which CLS set up what we perceive as a clandestine operation makes establishing trust a challenge. Sure there are now management plans

with suggested mitigating procedures to address some of our concerns, but it has felt like too little, too late, with more questions than answers.

4. How could operators with such a wealth of pertinent experience fail to tick at least most of the boxes for best practice during set-up? And while the suggested mitigating procedures if rigorously followed are a step in the right direction, in many instances they don't go nearly far enough. For example, how on earth does a 'filter membrane' which by definition means it's permeable, protect potable water for humans or stock?

Wayne: -

Good morning. I shall consider the issue of trust first.

5. CLS has applied for a discharge permit for the discharge of contaminants into air from a composting operation, and a discharge permit for the discharge of contaminants to land that may enter water, as a result of composting and stockpiling of compost on land.
6. In their application to Ecan CLS state that they have been operating a composting operation at Diversion Rd Eyreton since September 2016. This is some months before they applied for the above consents. Given that they have been operating a composting operation at Kaianga for the past 20 years, ignorance of the rules is not an excuse for the oversight.
7. Best practice guidelines around the world stress the importance of establishing early dialogue with the regulatory authorities and those residents living close to the proposed composting site.  
In this regard CLS were missing in action on both counts. Rather than being proactive they seem to prefer to be reactive when the need arises.  
Establishing a composting operation in a pine plantation out of sight, out of mind, then seeking the appropriate consents and finally consulting with the local community. One can't help wondering if it all wasn't part of plan, a variation on the saying "possession is nine tenths of the law".
8. In the AEE 'Assessment of environment effects' from Loe Pearce & Associates Ltd there is an attachment of an analysis of leachate sample taken on 27 July 2016. It is not clear if the leachate sample originated from their operation at Kaianga or from Diversion Rd. This raises the question that if the leachate sample came from Diversion Rd when did the operation actually start?  
If the leachate sample came from Kaianga then I would consider it irrelevant as some of the input materials used at Diversion Rd are not the same as at Kaianga.
9. The Management Plan has changed dramatically from the first AEE to the second. In the first plan it states that the pile/windrows should be piled up 4.5m high and 7 metres wide at the base, and "experience has shown that they

need only be turned every 4 weeks". Windrows that size are really pushing the limits.

10. The potential for spontaneous combustion is high due to the insulating properties of that mass of compost. The heat produced by chemical and biological processes within the heap can't escape and as a rule of thumb with every 10°C rise in temperature the rate of reaction doubles so you have a system with a positive feedback loop which means that it will become unstable. The other down side of such a large heap especially if it is only being turned once every 4 weeks is lack of air flow which will result in anaerobic conditions. If either occur it will cause a big stink! ( ). Another point, with a temperature probe 1m long how to you monitor accurately the internal temperature of the window.

I do note that in the latest AEE the windrows are now smaller and the turning rate has gone from once every 4 weeks to weekly.

11. I also note when their 'small number of issues occurred mid 2016' a management plan had to be drawn up. In today's climate not to have had a management plan that would have covered how to cope with these minor incidents is incredible.

12. The underhand way CLS went about establishing the operation, the lack of consultation with the local community, the deficient management plan and the lack of ownership of the fires at Kaianga lead us to have serious doubts that the current arrangements at Diversion Road are adequate. We concur with previous submitters in regard to fire risk and fire fighting issues at the Diversion Road site. Our considered view was in our submission to ECAN 26/10/17. We would also like to supply the following reference.

Fires At Composting Facilities: Causes And ... - Semantic Scholar

<https://pdfs.semanticscholar.org/8b0a/fbac048374c163911958887df4a0f603923e.pdf>

Jill

## HEALTH RISKS FROM AIR CONTAMINANTS

### • ODOURS

1. Light, gaseous and sometimes intense but transient in nature, 'odour' is difficult to measure. Objectivity is as elusive as the odour itself (Sheridan 2005). It is a stretch of the imagination (in our view) that taking a series of sniffs at various spot locations for 10 minutes can provide scientifically reliable data. (Albeit we concede that this is one method of accepted practice) And due to habituation it would seem unlikely that on-site personnel could objectively evaluate typical site odour at the boundaries, one suggested mitigative procedure. (Pellegrino 2017; Sudeshna 2011). Mr Wylie has suggested that this will occur 3 times during the day with one person

responsible. Ms Dwyer suggests that this occur at commencement of shifts. How can one person commence duty with an untainted nose 3 times a day?

2. Habituation (defined by the Cambridge English Dictionary) "is the process of people or animals becoming used to something, so that they no longer find it unpleasant or think it is a threat". Recent scientific studies support the notion that olfactory habituation is odor-specific. To quote "*Habituation is a specific form of implicit learning in which repeated exposure to an unreinforced stimulus results in a decreased behavioral response. By filtering out such constant sensory input, habituation enhances an animal's ability to focus its cognitive resources on novel or salient features of the environment*" (Sudeshna 2011).
3. This would appear to debunk an argument in the review of the Beca AEE by Golder and Associates (6/11/17) the site being described as "*suitable because of less sensitive receiving environment than that surrounding Silver Fern Farms bio-blend site or current CLS site in Belfast*"....because it has "*significant levels of intensive pig farming and dairy effluent spreading activity*". The Applicant also states (likely as advised by 'experts') "*the human receptors in the area are rural workers or residents for whom odours from organic waste can be commonplace, so they are not sensitive to odours of number this nature*"
4. We would also respectfully refer the Applicant, Beca and Golder & Associates to the NZ Ministry's Good practice guide for Industry regarding air 2016: - *People living in and visiting rural areas generally have a high tolerance for rural activities and their associated effects. Although these people can be desensitised to rural activities, they may still be sensitive to other types of activities (eg, industrial activities )*  
Pig and dairy effluent are rural; compost is industrial.
5. Let us be clear that we 'country yokels' do not have desensitised olfactory organs. Rather they may be extremely well -tuned to differentiate between rural and industrial odours. Conversely, city dwellers may only become alert to fumes and dust to which they are normally exposed when their olfactory senses encounter an air mixture in which the offending substances are absent. (Kadohisa et al 2006; Linster et al 2006; Pelligrino et al 2017; Sudeshna et al 2011)
6. Our neighbour uses pig effluent as a fertiliser on his farm, of which 2 paddocks are adjacent to 2 of our boundaries. **Once a year** a paddock will be sprayed for 3 to 4 consecutive days and this typical rural smell is usually gone by lunchtime. If a problem arises he can stop immediately to resolve it. This person has been a good, considerate neighbour for 37 years. On his decision to spread pig effluent some time ago, all possible "sensitive receptors" were invited to advise said neighbour ahead of a planned 'special event'. When we

hosted our daughter's wedding ceremony and reception on our lawn we were assured that the slurry truck would give us a wide berth for a full month preceding the event.

7. Another typical rural smell would be smoke generated from burn-off or bonfires. Again, occasional, seasonal, and tolerable. And not really obnoxious/ sickening in nature. Typical rural smells certainly stop us hanging out the washing a few days in the year - not such a big deal.
8. Contrast this to the putrid, sickening smell of industrial origin, which all local residents and many quite distant to the CLS site have experienced over the past year. With no warning, day or night. The uncertainty is similar to the aftermath of the earthquakes when Cantabrians felt constantly on edge. Just as well we've only one daughter to marry off. But what about Open Homes? Over the next 35 years many properties will change hands. Should we have to cross our fingers for a fair wind not foul?
9. By a stroke of serendipity an 'experiment complete with control' occurred on 31<sup>st</sup> October last year. It was the day of the arbitration and due to sickness Wayne stayed home but kindly hung out the washing. At end of day it stank suspiciously of putrid compost. The hedonic tone emanating from the polar fleeces was right up there. Not to jump to conclusions I pondered what contaminant may have gone through the washing machine? Then the Eureka moment! A merino top from the same load was hanging inside, dry and sweet-smelling. We checked with neighbours for other possible odour sources, ascertained that the wind pattern that day included periods when our property was vulnerable to CLS discharge, and advised the Ecan hotline. We are 2 k's from Diversion Road and our prevailing wind pattern means the odour problem (though unpredictable and at times putrid) - to be fair - has not been very frequent. We do pity those who experience it often.
10. **DUST** (here defined as particles generally larger than 50 micrometres, potentially irritative but non-pathogenic)  
Dust emissions (from some composting processes or caused by the increased heavy truck traffic) may have some potential for a negative effect on residents a lot closer than us, especially those suffering from allergic rhinitis or asthma. Dust generated from increased heavy traffic on the unsealed Diversion Road may pose some nuisance risk for downwind residents.
11. **BIOAEROSOLS and PATHOGENS (aka 'organic dust')**  
The Good Practice Guide for Assessing and Managing Dust (Ministry for the Environment, 2016a) acknowledges that fugitive dust generated by activities such as construction, roading and excavation projects, and some industries can include small particles which stay suspended in the atmosphere for significant periods can fall within the respirable range, causing adverse health

effects. This smaller fraction of particulate matter includes particles 10 micrometres in diameter (PM10 known as ‘coarse particles’) and 2.5 micrometres in diameter (PM2.5 known as ‘fine particles’) *“The most important of the four World Health Organization guidelines is that for long-term exposure to PM2.5. It also follows that the least important is that for short-term exposure to PM10. Yet it is this guideline that is the basis for New Zealand’s standard for particulate matter”* (Wright 2015, in her commentary for the Government on *The state of air quality in NZ*)

12. Fine, invisible dust particles are more likely to penetrate deeply into the lungs while ultrafine particles can be absorbed directly into the blood stream. Pathogenic microorganisms may be hazardous at extremely low levels (Douwes 2004)

A 2014 WHO report notes that *“1 in 8 of global deaths are as a result of air pollution. This is often a by-product of unsustainable policies in sectors such as transport, energy, waste management and industry. In most cases healthier strategies will also be more economical in the long term”*.

13. There is strong evidence of health risks to those working on-site in the waste industry but significantly less informed evidence regarding the effects of community exposure to such bioaerosols, partly because of challenges to testing (e.g. Williams 2017). Health risks have therefore historically been considered insignificant beyond a very small radius to the operation. However, in the last decade more sophisticated methods of measuring bioaerosols have evolved some of which suggest that the dispersal can (depending on atmospheric conditions) extend significantly further. Fischer (2008) observed that, *in normal wind conditions and as a function of the site ...concentrations of thermophilic actinomycetes and thermotolerant fungi at a distance of 600–1400 m from the site were 1–2 orders of size greater than the background* (See also Soseby et al 2006, pp644-645; Fewkes 2015). Also, upwind measurements may be unreliable as controls for background noise (Fewkes, p 90). The Golder report quotes Carol Fewkes as stating that *“most pathogens are inactivated at a temperature greater than 55 degrees”*. Her research also found that those pathogens that do survive may travel a significant distance and recommended a substantial buffer zone between composting facilities and residences. (Fewkes 2015, pp46, 71, 90, 97-98, 108-109).

14. Long-term exposure to low concentrations of air pollutants may have more negative consequences on health than short-term exposure, especially for the very young, the elderly or those whose health is already compromised e.g. suppressed immune system. (Rutledge et al, 2011).  
The department of environmental health at Harvard report stage of life studies on the health impacts of short or long term exposure to low level air contaminants, including a 2017 paper which linked premature deaths to same (Dominici 2017).

15. The burden of ambient particulate matter pollution on health is significant at relatively low concentrations; there is no safe lower limit. Health benefits will result from any reduction in concentrations. (Kelly 2015)

#### 16. Animal/ farm stock Health

Pity the unfortunate livestock obliged to graze within the minimal buffer zone of 250 metres recommended for humans. All animals are vulnerable to health risks from proximity to industrial composting operations and many evaluations of human hazards have included animal studies (Rushton 2003). There is significant international data to verify this, but to our knowledge no NZ studies. Nevertheless, not only is every preceding argument relevant to farm animal health and well-being as well as the human animal, but they sure bump up the number of nearby sensitive receptors.

17. Roger Blowey (2008), a UK veterinarian with an impressive CV including research and text books to his name, recounts potential animal health issues from bio aerosols: *"Although much of the following refers specifically to Aspergillus fumigatus, it should be remembered that a wide range of other organisms, yeasts and moulds, and toxic material such as bacterial endotoxins and mycotoxins are emitted in bio aerosols from composting green waste"*.

He gives the example of *Aspergillus fumigatus*, a fungal infection that can cause a range of diseases in cattle, pigs, sheep, poultry and man. This disease may cause abortion in late pregnant cows, pneumonia in young calves, mastitis and less commonly digestive and other disorders. Blowey states that *"there is so much concern over the potential animal health and welfare issues associated with accidental ingestion of mycotoxins, that many farmers routinely incorporate supplements in the feed to counteract these effects"*.

18. In Scotland at least one supermarket chain won't accept beef or beef products (presumably including milk) from animals who have grazed on land adjacent to commercial composting facilities. When will other countries follow suit?
19. Many publications (up to and including 2017) recommend that there is need for much more research to determine the optimal buffer between windrow composting operations and residential dwellings (e.g. Douglas 2016, Wery 2017). Might we not expect that at very least some baseline and ongoing measurements of organic dust on site and well beyond the boundaries be taken?
- Potential health effects of bioaerosol exposures are diverse including infectious diseases, acute toxic effects, allergies and cancer. Methods to assess bioaerosol exposures are available (Douwes et al 2003). The evidence base on health effects of bioaerosol emissions from composting*

*facilities is still limited, although there is sufficient evidence to support a precautionary approach for regulatory purposes (Pearson et al, 2015)*

## REFERENCES FOR HEALTH RISKS FROM AIR CONTAMINANTS

Blowey, 2008: Report on animal health implications of planning application for composing of green waste. [www.compostaction.org.uk/wp-content/.../Final-Mr-Blowey-Veterinary-report.doc](http://www.compostaction.org.uk/wp-content/.../Final-Mr-Blowey-Veterinary-report.doc)

Dominici, 2017: Short-term exposure to low levels of air pollution linked with premature deaths...  
<https://www.hsph.harvard.edu/news/press-releases/air-pollution-premature-death-u-s-seniors>

Douglas et al, 2016: Sensitivity of predicted bioaerosol exposure from open windrow composting facilities to DMS dispersion model parameters  
<https://www.ncbi.nlm.nih.gov/pubmed/27743831>

Douwes et al 2004: Bioaerosol health effects and exposure assessment: progress and prospects <https://doi.org/10.1093/annhyg/meg032>

Fewkes, 2015: Bioaerosols associated with industrial green waste composting facilities and optimal microbiological indicators  
[https://eprints.qul.edu.au/83087/4/Fewkes\\_Thesis.pdf](https://eprints.qul.edu.au/83087/4/Fewkes_Thesis.pdf)

Fischer et al, 2008: Analysis of airborne microorganisms, MVOC and odour in the surrounding of composting facilities and implications for future investigations. *Int. J. Hyg. Environ. Health*. <https://www.ncbi.nlm.nih.gov/pubmed/17936684>

Kadohisa et al, 2006: Olfactory cortical adaptation facilitates detection of odors against background, *Journal of Neurophysiology* Volume 95, Issue 3, March 2006, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2292127>

Kelly et al, 2015: Air pollution and public health: emerging hazards and improving understanding of risk, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4516868/>

Linster et al, 2006: Synaptic adaptation and odor-background segmentation, *Neurobiology of Learning and Memory* 87 (2007) 352–360, Dept of Neurobiology and Behavior, Cornell University <https://www.sciencedirect.com>

Pearson et al, 2015, Exposures and Health outcomes in Relation to Bioaerosol Emissions from Composting Facilities: A Systematic Review  
<https://www.ncbi.nlm.nih.gov/pubmed/25825807>

Pelligrino et al, 2017: Habituation and adaptation to odours in humans  
<https://www.researchgate.net/publication/316029169>

Rushton, 2003: Health hazards and waste management  
<https://doi.org/10.1093/bmb/ldg034>

Rutledge et al, 2011: Air Pollution  
<https://www.nationalgeographic.org/encyclopedia/air-pollution/>



Sheridan, 2005: Odour, Bioaerosols, Dispersion modelling and Abatement-A brief introduction to the basic essentials!!!

[www.cre.ie/docs/odour\\_monitoring\\_ire\\_bioaerosols](http://www.cre.ie/docs/odour_monitoring_ire_bioaerosols)

Soseby et al, 2006: Pathogens in animal wastes and the impacts of waste management practices on their survival, transport and fate

<https://www.researchgate.net/publication/265568682>

Sudeshna et al, 2011: Plasticity of local GABAergic interneurons drives olfactory habituation, Proceedings National Academy of Sciences, US

<https://doi.org/10.1073/pnas.1106411108>

Wery, 2014: Bioaerosols from composting facilities – a review

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3983499/>

Williams et al 2017: The challenges, uncertainties and opportunities of bioaerosol dispersion modelling from open composting facilities,

<https://dspace.lib.cranfield.ac.uk/bitstream/handle/1826/12532/>

Wright 2015: The state of air quality in New Zealand, Commentary

[www.pce.parliament.nz/media/1256/the-state-of-air-quality-in-new-zealand-web5.pdf](http://www.pce.parliament.nz/media/1256/the-state-of-air-quality-in-new-zealand-web5.pdf)

<http://www.mfe.govt.nz/sites/default/files/media/Air/good-practice-guide-industry.pdf>

[http://healthywa.wa.gov.au/Articles/F\\_I/Health-effects-of-dust](http://healthywa.wa.gov.au/Articles/F_I/Health-effects-of-dust)

M17 monitoring of particulate matter in ambient air around waste, Environment UK 2013 <https://www.gov.uk/government/uploads>

NOTE: Detection and discrimination of odors generally, if not always, occurs against an odorous background. On any given inhalation, olfactory receptor neurons will be activated by features of both the target odorant and features of background stimuli. To identify a target odorant against a background therefore, the olfactory system must be capable of grouping a subset of features into an odor object distinct from the background. Copyright © 2006 The American Physiological Society.

Wayne

## **Water Quality**

The 2007 Ministry for the Environment report “State of the Environment” stated that 39% of the groundwaters in NZ that were monitored either exceeded or had higher than the normal nitrate levels, and 5% had water that was unsafe for infants to drink. The report also stated that once a waterway was contaminated they were difficult to clean up.

Canterbury has 13.8% of the total number of cows in NZ second to Waikato on 23%. Canterbury has the highest stocking rate at 3.37 /ha.

When one looks at the number of consents to discharge effluent issued by Ecan you can see just how many farms have converted to dairy. The rate of conversion has slowed down from the height of 2012. Never- the- less the total number is increasing.

The white gold has lost some of its sheen.

According to David Ashby Waimakariri zone chair, *'while there are a small number of dairy farms in Waimakariri, the concentration of these in the Eyre area has raised concerns'*.

*"With 80 per cent of dairy development occurring in this area, which feeds into Silverstream, we have an issue with nitrate levels already but another concern is what will happen to those levels in the future."*

A further quote from David in an article *"Is water quality improving in Waimakariri?"*

*"The Eyre management area which feeds into Silverstream has serious issues and will likely require significant reductions in nitrate levels."*

He has an issue, and so do we have an issue, with a high potential nitrate loading of ground water. The same water that feeds the Silverstream we drink.

Ngai Tahu alone will have 5 new farms in the catchment by 2020.

We don't need any more nitrate in our groundwater.

Let's look at what information we have already on the nitrate levels in the vicinity of proposed CLS composting operation.

In the Section 42A report there are 4 wells with quality data for nitrate concentrations.

One of the wells M35/0197 500m west of the site recorded a nitrate level of 7.1mg/l in 1979.

How valid that data is today is debatable.

The other three wells,

M35/8558 690m east of the site recorded level of 10.00mg/l in 2015,

M35/1090 1090m north west of the site recorded 9.4 2015,

M36/12018 1450m to the southwest of the site recorded a level of 4.0mg/l in 2015.

Looking east from the CLS site to the wells that could be used to trend nitrate levels, there is only one , the well in Diversion Rd. The well M35/12018 is a deep well 138m compared to the other wells that are all under 24m. This well is also close to the Waimakariri River and will be getting seepage from the river so it can be ignored.

In an ECAN review of nitrate levels in Canterbury groundwater by Carl Hanson in 2002, a trend analysis on nitrate data from 255 wells was carried out. He found that in shallow unconfined groundwater that is not diluted by surface water nitrate levels commonly fluctuated on a seasonal cycle. Concentrations were higher in the Winter and Spring and lower in Autumn.

Long term increasing trends were identified in 43 wells and 21 wells showed trends towards decreasing concentrations. The increasing trends had slopes ranging from 0.01 to 1mg/l/y. Median slope was 0.2mg/l/y.

We have data from two other wells on Harrs Rd, both about 2000m downstream from the CLS site

Our own well sample taken on 8 February 2018 returned a nitrate concentration of 10.4mg/l and our next-door neighbour who had a sample taken on the same day returned a concentration of 11.2mg/l. Furthermore our neighbour's well was measured in Oct 2015 and the concentration then was 11.0mg/g. Neglecting seasonal variations the nitrate levels are trending upwards at 0.066mg/l/y.

The well M35/0197 that had a nitrate level in 1979 if it trended upwards with a slope of 0.066mg/l in 2018 the nitrate level would be 9.5mg/l. If we could find it we could confirm our trend. Unfortunately ECan list the well as buried.

The nitrate levels in the three wells we do possibly indicate an area down stream of the site that is compromised in water quality and it would not take much to push the nitrate levels over the NZ drinking water standard for nitrate nitrogen 11.3mg/l. In the USA the EPA has set the standard for drinking water at 10mg/l.

If we have an area downstream from the CLS site that is compromised and the next question to ask is how far does that area extend down gradient. There a number of other wells in Harrs and Clothiers Rd that could be affected.

Given that there could be a sizeable number of wells used for drinking water down gradient that could be compromised, the appropriate action for those upstream must be to reduce their input into the aquifer, and any new enterprise must be carefully scrutinised for its potential to contaminate the groundwater at all.

The composting method used by CLS does pose a risk to groundwater low or otherwise. Were a consent to be granted this risk could be mitigated by totally containing the leachate, and what I mean by leachate is any water that has come in contact with any compost and composting materials. The best practice guidelines advocate total collection of both leachate and stormwater and have been alluded to by previous submitters.

Mr Wylie's proposal to replace the filter cloth with an impervious membrane and to collect the leachate is a big step forward.

We note that CLS is proposing to use a bed of sawdust/bark to absorb the leachate generated in the active plies if a consent is given. I quote here from Mr Loe's evidence *"The composting material that is being processed for the first 20 weeks will be sitting on sawdust/bark layer 500 mm deep, which extends out from the base of the window by 500 mm. This layer will absorb any run-off or moisture generated from these windrows, and the bed material is incorporated into the window when it is turned, further recovering any moisture and nutrients that may have left the windrow. A bed of fresh sawdust/bark is laid under the windrow when it is turned"*.

We have misgivings about this option of adding the sawdust to the windrow. Just one turn will markedly alter the C:N ratio. You will be adding a further 2.0m<sup>3</sup> per meter of windrow and this will completely alter the dynamics of the heap, and slowing the composting process down due the relatively lower N concentration. If as proposed, this process could be repeated a number of times, the issue will be compounded.

In 2000 the Waimakariri District Council came up with a scheme to collect all the partially treated sewerage from Rangiora and the Eastern Districts and pump it past our place to a site further west for disposal to land. The council had bought land just west of, and were also leasing land north of the property of which CLS leases 9ha.

The council commissioned a site investigation as to the suitability of the land for the disposal of the waste water.

Landcare carried out a soil survey of the area.

They dug a number of pits to determine the soil type over the site. A total of fourteen.

The block west of the CLS contained two soil types, Darnely to the north of the paper road and Lismore south of the road. The paper road is the south boundary of the CLS site. The soil on the top half of the block are the same as that of the CLS site next door.

On the Lismore soil on the leased block corner of South Eyre and Diversion Rd the water was between 0.5 and 2m BGL. Water was not found above 3m in any of the other pits.

They found that Darnley soil had a high surface infiltrate rate and well-developed clay enriched horizons at depths of 0.3m or greater. They claimed that the subsoil infiltrate rate whilst half that of the Lismore soil, would not present an impediment to drainage.

*"There appears to be little difficulty with water infiltration characteristics at this site".  
"Ponding shouldn't be an issue".*

We are on Darnley / Lismore soil and don't have an issue with ponding.

A study of septic tank discharges to groundwater in the Oxford (Hughes) region show contaminants can move through our alluvial aquifers in discrete preferred channels at velocities of up to 200m/day.

One can't of course apply this the whole aquifer, but the fact that these channels exist makes modelling of flows difficult.

Results of this study could suggest somewhat higher velocity than that which Becca arrived at is possible.

Pattle Delamore in their assessment of the site used a ground flow velocity of 5m/day. This raises the possibility that the nitrates could be making their presence felt in our wells much sooner than the Beca model.

I have to stress that this was an initial investigation and a more detailed investigation would have been required if the sewerage scheme were to be adopted.

Hanson C R (2002) Nitrate concentrations in Canterbury groundwater-a review of existing data. ECan

Hughes B N The effects of septic tank effluent discharge on groundwater. MSc Thesis U of C.

Jill

## GENERAL EFFECTS ON US AND OUR COMMUNITY

CLS's actions (and inactions) have generated significant ongoing physical and mental stress to our community. Prior to the arrival of the CLS operation full-time farmers and smallholders alike were accustomed to a mostly pristine environment—Wayne and I planted a small olive grove on our 4 hectares and are living the good life, producing the good oil. (although – you may prefer to sink your money into golf!) Our property is a lifetime investment, and when we decide to downsize – we will need a fair price. Both our children lobby us to join them in ..... Auckland!

Every business guards it's bottom line. A large-scale industrial enterprise such as CLS propose, involving significant infrastructure and purchase of heavy machinery, will require huge financial investment. And yet we perceive a company who baulks at 200 k to provide a concrete pad to ensure their neighbours' water supply isn't further compromised. \$200.000 is barely a deposit on a modest house in Auckland.

We would refer you to Page 5, North Canterbury News Thursday 1<sup>st</sup> March where David Ayers, Mayor of Waimakariri states that *"water management is the biggest challenge facing the Waimakariri District Council over the next decade"..... "the Kaiapoi River ultimately bears the brunt of the district's stormwater"....., including "from Ohoka and Mandeville areas" via "the Ohoka Stream".* (The source of the south branch of the upper Kaiapoi River aka Silverstream is closeby on our neighbour's farm). Further, **Mr Ayers highlights the issue of rural drinking water, implying that it is at or near to crisis point.**

## IN CONCLUSION

The RMA provides guidelines whereby the environment (in the broad sense) is protected, while permitting well-managed public or private enterprise that is unlikely to compromise said environment.

We would point out that much of the literature refers to 'Green Waste Composting' operations, which Diversion Road is certainly not. Proposed components of add-ins magnify the risks.

Sections 2, 3 and 5 of the RMA are of particular pertinence to the resource consents being sought.

All sub sections of Section Two are implicated, and it is difficult to envisage how adverse 'effects' as defined in all sub sections of Section Three can or will be successfully achieved using past and current modus operandi in order that The Applicant would fulfil all obligations of Section Five.

Our view, after careful consideration of all information to hand is that CLS be advised to shift their operation to a site more suitable for purpose. Specifically it should have a much lower water table which would significantly reduce the infrastructure costs that we believe to be essential at Diversion Road. Good people with good intentions, can be ill-advised. Many entrepreneurs say they learned more from their mistakes than their successes.

However, should consents be granted we would suggest that the Gold Standard for open windrow composting operations is the only one that CLS should fly. Stringent conditions for ensuring best practice in open windrow composting operations should be set, including frequent ongoing monitoring of the Applicant's compliance by ECAN.

Furthermore, in our view the maximum duration of the consent should be to align with relevant impending legislation. For CLS to have some security, the 7 year duration to 30<sup>th</sup> June 2025 as recommended by Ms Wadsworth (Section 42a) with right of further 5 year renewals providing all conditions have been and are continuing to be met for the duration of each 5 year period, including attention to implementing relevant best practices in commercial composting which may evolve over time.

The above conditions would give the local community some assurance that CLS would walk the walk to become trustworthy neighbours who maintain the environment that we cherish.