

Remediation (NZ) Ltd

Trading as **Revital Fertilisers**

Organic Production Protocols

Greenwaste Composting & Vermiculture



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1. COMPOST PRODUCTION

1.1. Objectives and Aims

The goal of the Remediation (NZ) Ltd Organic Waste Centres is to produce premium quality organic soil fertiliser. This is prepared through removing a waste product from the environment and converting it into a high quality soil enhancer. The REVITAL products improve and enhance the soil by providing not only 100% plant available nutrients but also more importantly a high-density inoculation of beneficial soil microbes which promotes soil sustainability.

1.2. The Greenwaste production process

1.2.1. Acceptance of incoming greenwaste

All green waste is collected at either a refuse transfer station or brought directly to the site. The site manager inspects greenwaste delivered to ensure it is not contaminated.

Materials specifically excluded are

- Treated timber
- Food scraps
- Household refuse

Any unsuitable material to be separated from the greenwaste (if possible) and sent directly to the appropriate disposal site

- Cleanfill
- Refuse Transfer Station

All transport companies are to be made aware of our organic status and as such are pro-actively involved in preventing cross contamination (see transport of organic material section 4.1.2).

1.2.2. Shredding:

Once accepted the green waste is then shredded on site in order to increase the surface area and allow the compost process to be more effective and efficient.

1.2.3. Blending of Raw Materials:

Once shredded and any further contamination removed the shredded mulch may be blended with “organic” approved materials to assist the composting process.

All input materials to the process must comply with the relevant “Organic Certifiers” process for improving inputs (for example Bio-Gro NZ standards for inputs Module 3.1)

Currently approved inputs used on Remediation (NZ) Ltd sites include

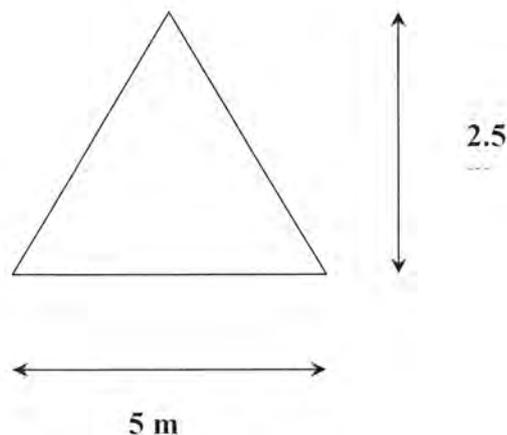
- Broiler chicken manure *All of the companies that supply the chicken manure must verify that a strict regime is in place to monitor the quality of the litter, and that it is GE free and the chickens have not had growth hormones. However this product must be windrow composted for at least 15 days, at a minimum temperature of 56 deg C*
- Bark fines *As above must be organic and free of contaminants as proven by the supplier*

Note:

Any inputs not listed as already approved will need to be independently approved by the certifying agent before use (Refer flow chart Appendix 2 “inputs approval procedures”).

The shredded green waste is then mixed with any **Certified Inputs** at the required ratio’s, with either an excavator or a front end loader and then carted out to form a windrow.

An ideal windrow size should be as follows:



Water may need to be added at this stage. The completed windrow is then **numbered** and is entered onto a chart for monitoring purposes (refer example windrow monitoring sheet & plan Appendix 1).

1.2.4. Windrow monitoring and operational procedure

Temperature testing of the windrows begins four to nine days after they have been formed. When the temperature reaches between 60-70 degrees Celsius the windrow is turned from the outside to the middle with a digger (preferably from existing ground level, however on some sites with room constraints and the size of finished windrows they may need to be turned from on top of the pile).

Once put into windrows the composting process goes through 3 phases

- Primary compost, which is the fresh greenwaste. This material will generate the highest heat, meaning it needs more monitoring to ensure the rows do not become too dry, too hot or even too cold, causing anaerobic conditions (generally up to 8 weeks). These windrows will require turning more frequently to prevent anaerobic conditions, and this is generally weekly.
- Tertiary Compost, which is generally the material which has gone through 6 to 8 weeks primary composting. This material does not generate as much heat as primary compost, and is therefore monitored and turned less frequently
- Finished compost, the material has generally gone through a minimum of 14 weeks of primary and tertiary composting and is now ready for screening. This material is stockpiled into large windrows to minimise rainwater infiltration, and screened based on demands

The composting process allows aeration, deodorising and correctly balancing the C: N ratio, the pH and salinity.

1.2.4.1. Primary Compost

Temperatures in the primary compost will be taken weekly from three randomly chosen sites at the front, middle and end of each windrow. These sites can be selected from either the top or sides of the windrow.

When the temperature in a windrow reaches between 60 and 70 degrees it needs to be turned immediately to prevent the rows becoming anaerobic. All temperatures need to be recorded (refer Appendix 1 "sample windrow monitoring form").

1.2.4.2. Tertiary Compost

Temperatures for this part of the process can be reduced to fortnightly, at the same locations as 1.2.4.1 and records still need to be kept

1.2.4.2.1. Chicken Manure Additive

During the Tertiary Composting process chicken manure (as an approved Input) may be added to either

- Increase temperatures and/or
- Create an end product with very high plant available nutrients.

(This is not always an option on some sites due the low C:N ratio which will create odour while composting).

To ensure the chicken manure has been properly "Sterilised" it needs either

1. Been further composted for a minimum of 5 weeks
 - a. at temperatures of between 57 and 60 deg C
 - b. Windrows must be monitored weekly (to ensure temperatures do not exceed 70 deg C)
 - c. Windrows need to be turned frequently to prevent over heating (this is generally weekly, but will depend on the monitoring results above)

OR

2. The formation of a "static pile" of Bio-Gro approved compost and chicken manure at the Bio-Gro "customer site" for
 - a. A minimum of 3 weeks, before spreading (no turning required).

- b. A cover should be applied to reduce excess moisture retention from rain events.
- c. The Revital contract spreader will ensure that before the product is spread it has met 2(a) above, and the spreading records will be filed as part of the completed order;
 - i. If Revital are not spreading a particular order, then the Grower or Contract Spreader to advise RNZ when this is to be done and gain clearance before spreading proceeds. This will be noted on the completed order.

Note: Additives (as recommended by a Revital consultant) are still able to be blended in prior to spreading

2. VERMICULTURE PROCEDURE

2.1. Objectives and aims

Remediation (NZ) Ltd have developed the process using earthworms as an important process of converting waste products known as vermiculture. The goal of the Vermiculture Centre(s) is to produce a premium quality organic soil fertiliser. This is prepared through removing a waste product from the environment and converting it into a high quality soil enhancer. The REVITAL brand products improve and enhance the soil by providing not only 100% plant available nutrients but also more importantly a high-density inoculation of beneficial soil microbes, which promotes soil sustainability.

2.1.1. Acceptance of incoming greenwaste and other inputs

All green waste is collected at either a refuse transfer station or brought directly to the site. The site foreman or kiosk operator is to inspect each load that is delivered to ensure it is not contaminated.

Materials specifically excluded are

- Treated timber
- Household refuse

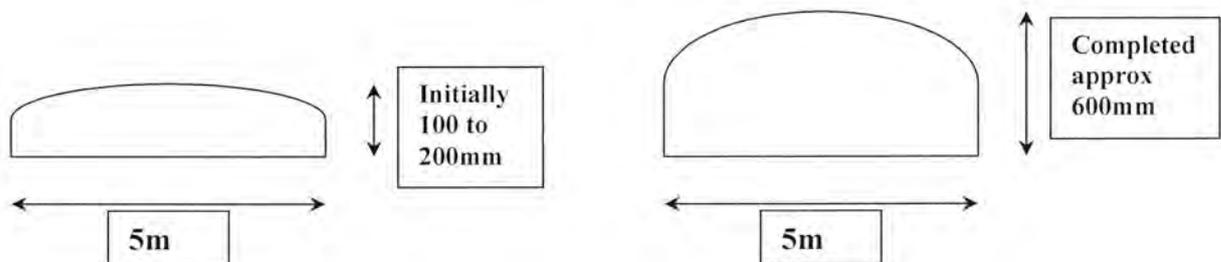
Any unsuitable material to be separated from the greenwaste (if possible) and sent directly to the appropriate disposal site

- Cleanfill
- Refuse Transfer Station

All transport companies are to be made aware of our organic status and as such are pro-actively involved in preventing cross contamination (see transport of organic material section 4.1.2).

2.1.2. Vermiculture Production Process

Once the input materials have been transported to the “Vermiculture Site”, they are fed into small windrows ready for processing by the worms to form worm casting (Vermicast). A typical windrow is as follows



The process involves an extended period of standard aerobic composting conditions over a minimum of 35-40 days. The temperatures for worm processing are a lot lower than that of Greenwaste composting and should range between 20° – 30° Celsius. The process is

- The windrows are covered with mats to retain moisture and reduce the effects of wind.
- During the natural vermiculture process the worms will aerate the windrows, however approximately every 30 days the windrows will need to be manually aerated, to ensure the whole windrow is digested and that the environment is kept aerobic. *Anaerobic conditions will kill the worms and enhance pathogen production, so this must be avoided.*

The worms act as a catalyst in this environment. The digestion of the soil provides an aerated environment as well as increases the soil surface area. This larger surface area allows virucidal enzymes, actinomycetes, and a host of critical bacteria to have access to more compost at any given time. With a correct time period in this process the compost can be completely turned over ensuring maximum pathogenic degradation.

- The period range for this procedure is 80-120 days to obtain total pathogenic mitigation. This is a time frame that can be altered to suit the waste line to ensure total disinfection.
- The beds (Vermicast) are harvested on a four monthly basis. *A base of at least 50mm remains to ensure no topsoil/clay is collected, eliminating the potential for contamination.*
- The Vermicast is then prepared for sale by drying it and either mixing, selling as is, bagging or making it into liquid Vermicast products (refer section 4 for finished product distribution)

3. SCREENING

GREENWASTE COMPOST

After a minimum of four to six months the final compost product is screened using a variety of screens either owned or hired.

Before any product is screened the screen must be

- Cleaned to ensure it is free of any contaminants
- The finished stockpile areas are contaminant free (i.e. weeds, stones etc)

The screened product is then put into a curing windrow in readiness for sale, and should be labelled as such.

VERMICAST

The Vermicast is harvested from the beds at a minimum 4-6 months. The product is dried then screened and prepared for sales. *The same quality procedures are used as for greenwaste compost.*

4. FINISHED PRODUCTS

4.1. Packaging

Once ready for sale the finished compost/vermicast may be sold / packaged in a number of ways including

- Bagging as a natural compost/vermicast
- Bagging with additives to form alternative products such as “organic” and “non organic” potting mixes
- Sold bulk by the trailer or truck load either natural as above or with additives to form alternative products
- Converted to a liquid which is a liquefied Vermicast solution This is done by
 - Vermicast is mixed with only rainwater in an appropriate tank, over a 48 hour period, then pumped through a series of aerated pressure tanks and finally through a 40 micron filter in a dedicated system. The remaining solids after decantation are reutilised on the worm windrows. The tanks are then cleaned with collected rainwater, prior to each batching.
- All certified products must be accompanied by a dispatch form (a sample dispatch form shown as Appendix 4)

4.1.1. Bagging

Bagging plants on various sites range from semi automated to hand bagging.

When bagging any product the operator must ensure

- The bagging plant is cleaned before use
- Any manual equipment such as spades are also cleaned before use
- Only products certified for sale as “organic” are packaged into “certified organic” bags.
- All organic certified bags/logos must be approved by the certifier before use.

- Any non organic bagging such as potting mixes using fertilizers, to be kept well clear of the “organic” products and labelled as such

4.1.2. Transport of Organic Material and Products

Bulk products are sold in various forms from

1. Domestic car trailer
2. Small landscapers truck
3. Large truck and trailer haulage companies
4. Bulk spreaders/tractors

When loading a “certified organic” product all vehicles/trailers must be checked to ensure the vehicle is washed and free of any contaminants.

Large transporting companies certified to carry “Organic products” must supply a transporters declaration (refer example shown as Appendix 5) and the procedures that company has undertaken to ensure when their trucks arrive on site they have been cleaned, ready for pickup.

4.1.3. Blending of Certified Organic products

Remediation (NZ) Ltd may choose to add organically certified additives to enhance the quality of the final product and meet certain customer requirements.

All of these additive products need to be certified organic by the appropriate consenting organisation.

Before sourcing ingredients for customised mixes from organically certified suppliers, staff must:

- Have a copy of their current certificate on file.
- Check the Organic Certifiers website “Inputs list” to validate the certificate.

- Ensure that the order form used specifies that the certified product is ordered and received, and that a copy of the producer's certification or certifier approval for any restricted inputs is included.
- Remediation (NZ) Ltd must supply copies of current certificates for all ingredients of such mixes to their clients.
- Refer Appendix 2 for the flowchart of "approvals for Organic additives"

It is Remediation (NZ) Ltd responsibility to ensure that all mixes and fertilisers supplied are compliant with the relevant certifiers Standards and only comprise Inputs which have current certification or other written approval

4.2. Non Organic Certified Storage

Some clients request "non-organic" additives to be blended with the compost before it is delivered.

Non-organic additives need to

- Have a separate storage area, to prevent contamination
- Have a separate blending area (this may not always be practical, so a cleaning protocol is required to ensure machinery and mixing pads are cleaned before mixing any certified blends - refer machinery and mixing pad cleaning 4.3)

4.3. Machinery Cleaning and Wash down Procedures

All machinery used for organically certified products /blends must be cleaned and checked using the following procedures

- Any machinery is thoroughly washed with a high-pressure hose to prevent cross contamination.
- The mixing pad to be checked and/or cleaned under supervision of either the Site Manager or Foreman, before any blending is done
- The digger or loader is used for turning windrows, will generally be used for this sole purpose. However from time to time these machines (acting as a backup) may have to load trucks or blend products. They are to follow the strict cleaning procedures as shown above.
- All transport vehicles are checked (refer item 4.1.2).

5. FINISHED PRODUCT TESTING & QUALITY CONTROL

5.1. Testing

A large sample batch is taken randomly from ten different sites throughout the finished windrows (either Compost or Vermicast) annually and sent for testing. The samples are to be tested for:

- Nutrients
- Heavy metals
- Multi-residue
- Acidic herbicide test including clopyralid (clopyralid only required if grass clippings is an input source)
- Carbon/nitrogen ratio.

Sampling & Results

- All samples must be representative eg a composite sample of 10 individual samples taken from the last 3 windows is to be tested.
- The samples must be tested by an ISO 17025 accredited laboratory.
- Test results must be forwarded to the companies “organic certifier”, and they will advise on what action should be taken.

Should there be any elevated contaminant levels found in the compost or vermicast, a further monitoring process will be required either monthly or quarterly to determine the extent or the cause of the contaminant.

These samples are taken before the Compost/Vermicast is screened.

A Soil food web analysis is also done to ensure that the compost/vermicast has been processed properly and has an active microbial activity

5.2. Plant Toxicity and weed test

Each Windrow requires a plant toxicity test to ensure the finished product is:

- Weed free
- The finished product is tested as a growing media

The plant test is done by growing 10 radish's in a glass house environment, and must obtain a minimum of 80% success with no weed growth

6. Vermin, Pest and Weed Control

Each site will have its unique problems with pests and vermin (generally of a very minor nature)

Each site must ensure that any rodent control, such as chemical baits and spray will not affect the Companies Organic certification.

If the Operator is not sure they are to check the certifier's website or request technical advice before proceeding. (An example of this was with the MAF "Asian gypsy moth spray" in Hamilton)

Only chemicals approved for use on site will be stored on site. Operators should try 'grubbing' and burning (flame burner) for weed maintenance were possible.

7. Organic integrity

All procedures are well documented and followed vigorously. The Site Manager ensures organic integrity is taken very seriously and the overall aim is to prevent potential contamination and uphold the Companies Organic certifications.

An organic protocol induction/training process is undertaken on all employees to ensure that standards are kept high in the company.

Remediation (NZ) Ltd

RW-P-751-001-B

Organic Production Protocols Greenwaste Composting & Vermiculture

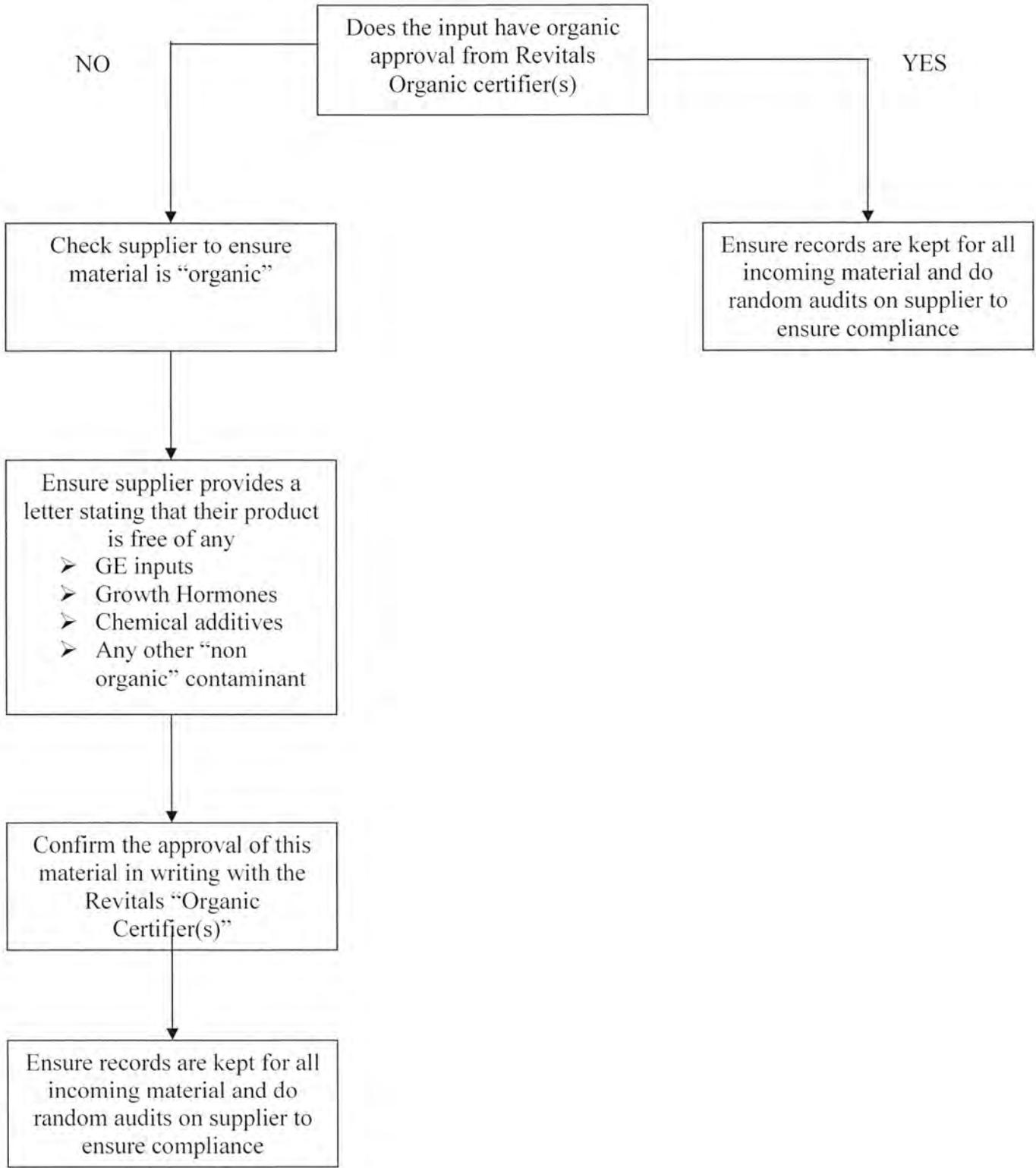
Remediation (NZ) Ltd

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APPENDIX 1 Sample Windrow monitoring form

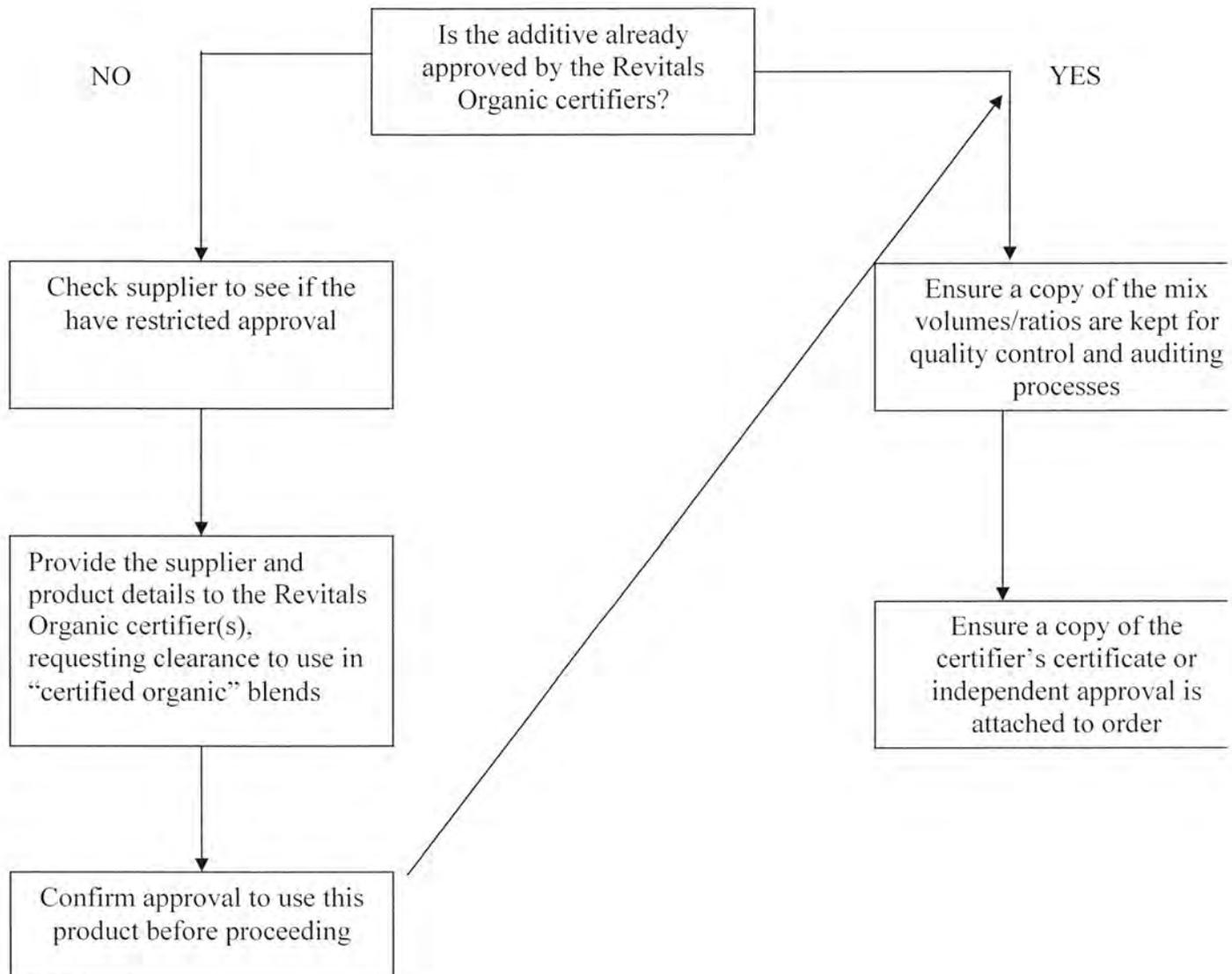
APPENDIX 2

**Organic Inputs
Approval
flowchart**



APPENDIX 3

**Organic additives
Approvals
flowchart**



APPENDIX 4 Sample dispatch form

Remediation (NZ) Ltd

**BRIXTON ORGANIC
CENTRE**

**DESPATCH
DOCKET #:**

Waitara Road
P.O. Box 8045
New Plymouth

DATE: ___/___/___
Ph / Fax:(06) 754 3161

“ORGANIC CERTIFICATION NO:

Bill To:	Ship To:

Phone:	
Mobile:	

Customer Order #	Order Date

Quantity	Description	Certification Number	Expiry date

Carrier	Truck Number

Delivery Instructions

Load Weight/Metreage

*We, the undersigned, are fully aware of the nature of this product and understand that no contamination with any other non-certified product/substance is permitted.
Loading Equipment and Cartage Unit were cleaned as per Revitals requirements.*

Driver's Name		Signature	
Loader's Name		Signature	
Despatch Inspector's Name		Signature	

APPENDIX 5 Sample Transport declaration

Company details

Remediation (NZ) Ltd
P.O. Box 8045
New Plymouth

Dear Sir

RE: PROTOCOL FOR TRANSPORT OF “ORGANIC CERTIFIED” PRODUCTS

[Company details] are bulk cartage contractors based in [town]

We specialize in cartage and have approx [list number of trucks and trailers], which are suitable for carrying organic products.

This includes [comment about truck design such as aluminium bodies, which are easy to clean, and also discharge with little residue]

We have also taken steps to ensure all drivers comply with the following rules when dealing with certified organic products

1. Any residue from previous loads must be cleaned out and using high pressure hoses, either at the previous site or the Organic Manufacturer’s site, and must be inspected by a member of the Revital staff
2. The driver must ensure they have the correct dispatch form including a copy of the Organic Certifiers Licence
3. Ensure the correct product is loaded for the customer and that the customer details are clearly outlined in the dispatch form
4. Deliver to the customer giving a copy of the dispatch form and the relevant Organic Licence

Clean out procedures form part of the [company] induction protocols, and is reminded to all staff at regular staff meetings

I hope this protocol is acceptable and we look forward to doing business with you

Yours Faithfully

[Company owner or someone with delegated responsibility]