NSW DEPARTMENT OF
PRIMARY INDUSTRIES

Guidelines for the development of controlled environment horticulture - Readers' Note

This document is part of a larger publication. The remaining parts and full version of the publication can be found at:

http://www.dpi.nsw.gov.au/agriculture/horticulture/greenhouse

Updated versions of this document can also be found at the above web address.

6 ENVIRONMENTAL IMPACTS AND HOW TO MANAGE THEM

Natural resource protection should be a priority in any development proposal, and separation distances or other strategies should be used if necessary to ensure that nutrient and sediment contamination of watercourses, wetlands and drinking water catchments does not occur.

Topography and vegetative cover dictate the potential risk of pollutants entering the water catchment. Artificial wetland systems or other containment measures can be used to manage nutrients and sediments. Vegetated buffer zones (for example, grassed swales) help reduce the risk by filtering the surface run-off water. The nutrient filtering capacity of buffer zones is increased with greater vegetative cover and distance.

Effective operation and management of a CEH farm will significantly reduce the potential for environmental problems and provide protection for natural resources. An Environmental Management Plan (EMP) is frequently required to be submitted with the DA for approval. An EMP is a formal way of specifying operational and management standards and practices. It includes strategies and practices which minimise environmental risks and details contingency actions for managing environmental problems that may arise.

These guidelines are based on an *outcomes approach* to addressing potential impacts. It is not the intention of this document to specify rigid limits, minimum setbacks or other inflexible management strategies as these may not be feasible, appropriate, effective or necessary in all situations.

The appropriate selection and combination of a range of strategies including setbacks, landscaping, land-forming, structures and barriers, farm layout and design, use of natural topography and vegetative screening should be used to mitigate potential impacts such as aesthetics, odour, noise, light, dust, waste and traffic.

6.1 THE ENVIRONMENTAL MANAGEMENT PLAN

Outline

The EMP should be based on an environmental management system (EMS) approach even if there is no intention of seeking certification in the short term. An EMS applies well-recognised management principles that are of benefit in their own right. Starting with a plan that is based on an EMS means that the EMP can more readily be certified in the future if justified by business needs.

An EMS approach involves specifying plan objectives, identifying the tasks that need to be carried out, carrying out these tasks, checking performance, and providing a regular review, with a philosophy of continual improvement of the system and operations.

Environment management has potential impacts on product quality and OH&S matters. While this section focuses on the requirements of an EMP, environmental management should be integrated with other business plans. For that reason development and review of the plan could include agents or buyers, especially if there are benefits for quality assurance of products.

To make planning for environmental management easier, an EMP may be split into a number of separate management plans depending on the development's scale, complexity or the environmental sensitivity of the location. Other plans that can be part of an overall EMP include:

- stormwater management
- erosion control
- monitoring
- revegetation

These plans could have separate components covering the construction and operational phases. Such plans may not be applicable in all cases.

Plan objective

Apply best practice to CEH to minimise environmental impacts associated with farm operations and management and comply with legislative requirements.

Performance criteria

- An EMP is developed and implemented. It includes strategies and measures

for minimising environmental risks and contingency actions for managing environmental problems that may arise on the farm.

- The EMP is submitted with the DA for approval.

Best practice guidelines

- The EMP is site-specific and is prepared to meet the objectives, criteria and best practice guidelines of the elements identified in these Guidelines.
- A generic EMP that is acceptable to the appropriate regulatory authority may be used as a template for development of the farm's site-specific EMP.
- The EMP is agreed between the grower and their agent or buyer (if appropriate).
- Where any element is not addressed in the EMP lodged with the DA, the applicant must explain why it is not considered relevant or applicable.
- The EMP is maintained and updated as required by the farm manager and is available for inspection by the appropriate regulatory authority.
- The EMP is reviewed annually by the farm manager (in cooperation with their agent or buyer if appropriate).
- To help determine whether the EMP is effective, neighbours may need to be enlisted to keep a diary of environmental events that are deemed unacceptable. Try to ensure that a range of compass directions and distances from the farm are represented to allow assessment of the direction and dilution of the impact.
- An EMP and associated records should be kept in a way that can be audited so that environmental stewardship can be proven.
- The following components could be included in the EMP, depending on the size of the CEH operation and its operating environment:
  - contact details, description of the farm and operations and an environmental management policy statement
  - overall objectives and specific, measurable and time-bounded targets for each identified risk event
  - a list of risk events identified using risk management principles
  - day-to-day best practice management strategies to minimise the potential for risk events
  - details of the responsibilities of employees and operator
  - details of monitoring systems for assessing environmental performance
  - procedures to ensure regular and accurate recording of data
  - procedures for responding to complaints
  - provision for auditing of performance against EMP objectives
  - appropriate adjustment to be made in light of performance findings
  - provision for post-incident investigation
  - review of emergency actions carried out
  - environmental training undertaken by staff.

Information on environment management plans and systems can be obtained from NSW DPI and the Rural Industries Research and Development Corporation.

6.2 VISUAL IMPACTS, GARDENS AND SURROUNDS

Outline

Greenhouses and supporting farm infrastructure can be a visual intrusion on the landscape that may be offensive to the aesthetic values of some people. Many land use conflicts are associated with visual cues. Noise, odour and dust complaints often follow a sudden visual change in the landscape.

Making sure that the farm is maintained in a tidy condition not only improves visual amenity, but helps with the control of other problems like pests, disease and odour. Well-maintained gardens and surrounds demonstrate good intentions and indicate to others that you are professional in what you are doing. Controlling weeds and cleaning up rubbish around the property will make pest and disease management easier and cheaper.

The site should be planted with suitable trees and shrubs to allow the benefit of prevailing cooling breezes, form windbreaks, and improve the visual aesthetics of the area.

With the use of local provenance tree and shrub species, an effective screen can be grown within a couple of years. The use of advanced trees is

extremely costly for large areas, but the use of a few mature specimens coupled with tube stock will create a fuller screen in a shorter period.

The use of artificial materials is undesirable in the long term but can serve to soften the look of new developments while natural vegetation is grown to sufficient height and thickness to adequately screen the development.

Objective

Make sure that the planning, design, operation and management minimise the visual impact of the farm, and use vegetation to reduce the impact of noise, dust, light and odour on surrounding properties.

Performance criteria

- Vegetative screens and windbreaks are planted within 3 months of construction or installation of controlled environment structures.
- Development is screened from public roads and lands and neighbouring properties within 3 years.
- An EMP developed and implemented that includes strategies and measures for minimising visual impact from the farm and for providing and maintaining vegetation.

Best practice guidelines

- Use the natural topography and terrain of the site as well as landscaping and land-forming and existing vegetative cover to maximise visual screening.
  - Keep existing vegetation wherever practical.
  - Replace removed vegetation as soon as possible.
  - Prevent a direct line of sight between the development and neighbouring dwellings.
- Establish a vegetative screen around the production area or the perimeter of the property, or both.
  - For a windbreak, use at least a 3 row vegetative barrier.
  - For a visual screen, use at least a 1 row vegetative barrier.
  - Include fire breaks if required.
- Link vegetative screens to existing vegetation in the area if possible.
  - Provide access for native animals to existing vegetation corridors and windbreaks.
- Use appropriate species of plants – check with the local Council about preferred species.
  - Use local provenance species where possible.
  - Use a mixture of species.
  - Use a mixture of trees and shrubs.
  - Use evergreen species.
  - Do not use environmental weed species such as camphor laurel, privet and oleander.
  - Avoid establishing plants which are hosts to key crop pests and diseases.
  - Replace dead trees and shrubs and fill gaps which may occur in vegetative screens.
- The mature height of the tall species should be sufficient to intercept a direct line of sight from a neighbouring dwelling or roadway (measured 2 metres above the natural ground level) and the highest point of the structure.
- Topography will have an influence but in general the mature height of the screening species should be at least as high as the highest point of the development.
- Artificial screening materials, such as shade cloth, could be used for temporarily screening the development while vegetation grows; timber fencing, for example, could be a suitable option in its own right.
- Any land clearing and tree removal must be in accordance with local and regional plans, policies and legislation.
- Strategically clear trees for a distance of 2 to 2.5 times the mature height of the trees around greenhouses to allow for ventilation, minimise shading and provide some fire protection. For trees to the north-east and the north-west, a distance of up to 4 times the

Under the *Native Vegetation Act 2003* (NSW), approval is required for removal of trees or other native vegetation in some local government areas.

mature height may be needed to minimise shading. Topography may have an effect.

- Install appropriate erosion control barriers before removing any vegetation.
- Maintain buildings and farm (including grassed surrounds, drains, fences, dams and roads) in a functional and tidy condition at all times
- Keep machinery and equipment in buildings when not in use.
  - Keep grassed areas mown and tidy.
- Control weeds.
- Establish low maintenance, attractive gardens.
- Maintain banks of dams and manage nutrient levels in stored water to minimise algal growth.

6.3 LANDSCAPING AND LAND-FORMING

Outline

Landscaping and land-forming can play an important part in softening the visual impacts of controlled environment structures and can reduce other impacts such as noise, dust and light. Typically these approaches would be more expensive than screening, but may enhance the appearance in the short and long term.

Mounding to raise the ground level at a particular viewpoint is one type of land-forming used and is often combined with vegetation to screen a development when natural topography is insufficient. Earth mounds are also effective noise barriers. Mounds should not generally exceed two metres in height above the natural ground level.

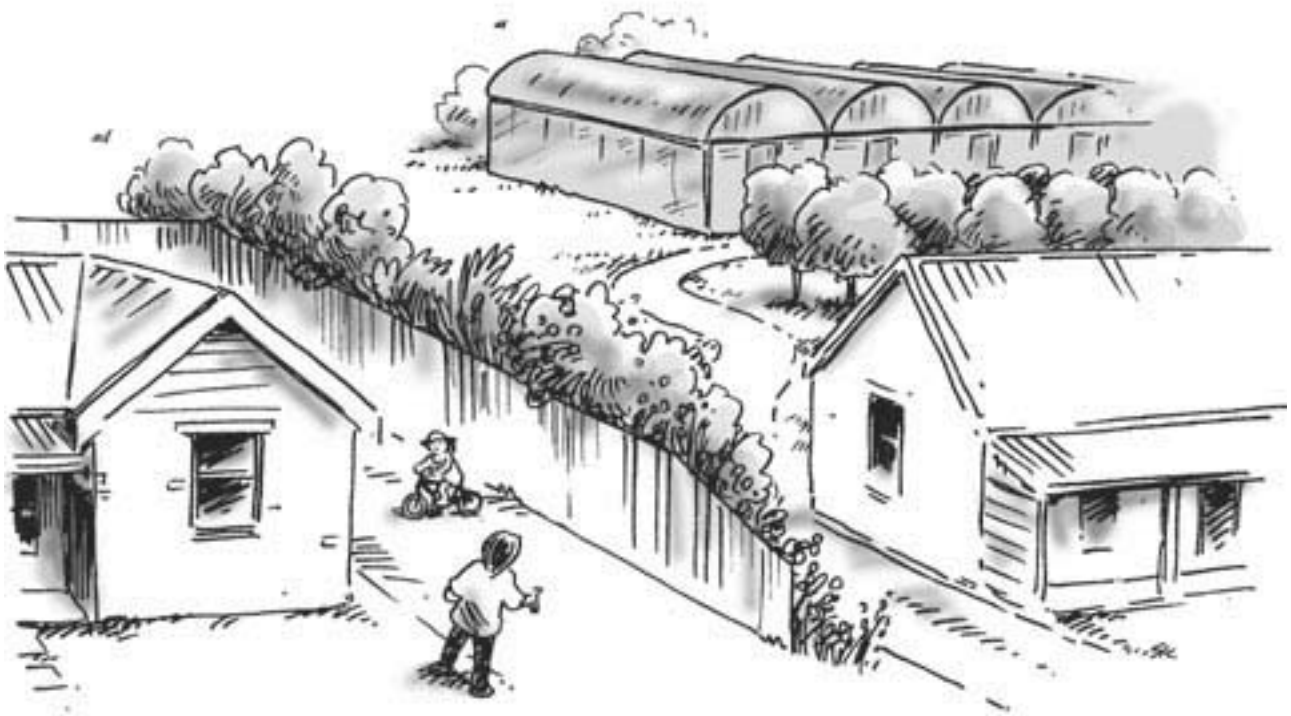
The owner and the builder are responsible for controlling soil erosion and preventing sediment from the development site being washed into stormwater drains or other waters. Erosion and sediment control guidance notes are available from DIPNR and the DEC.

Objective

Make sure that the planning, design, operation and management minimise the visual impact of the farm, and use landscaping and mounding to reduce the impact of noise and light on surrounding properties.

Performance criteria

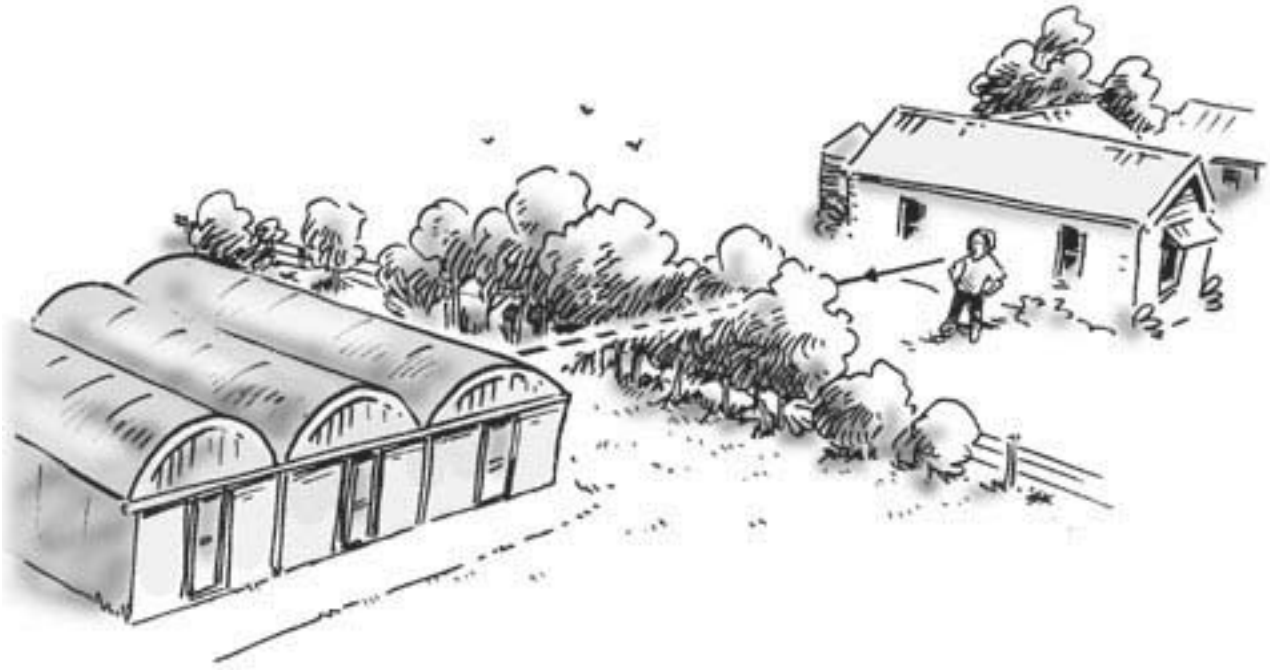
- Landscaping and land-forming reduces the visibility of the development from neighbouring sensitive areas.
- An EMP is developed and implemented that includes strategies and measures for minimising visual impact from the farm and for providing and maintaining landscaping.
- An Erosion and Sediment Control Plan (ESC) is prepared and submitted with the DA and meets the requirements of the DIPNR guidelines *Preparing an Erosion and Sediment Control Plan* (1997).



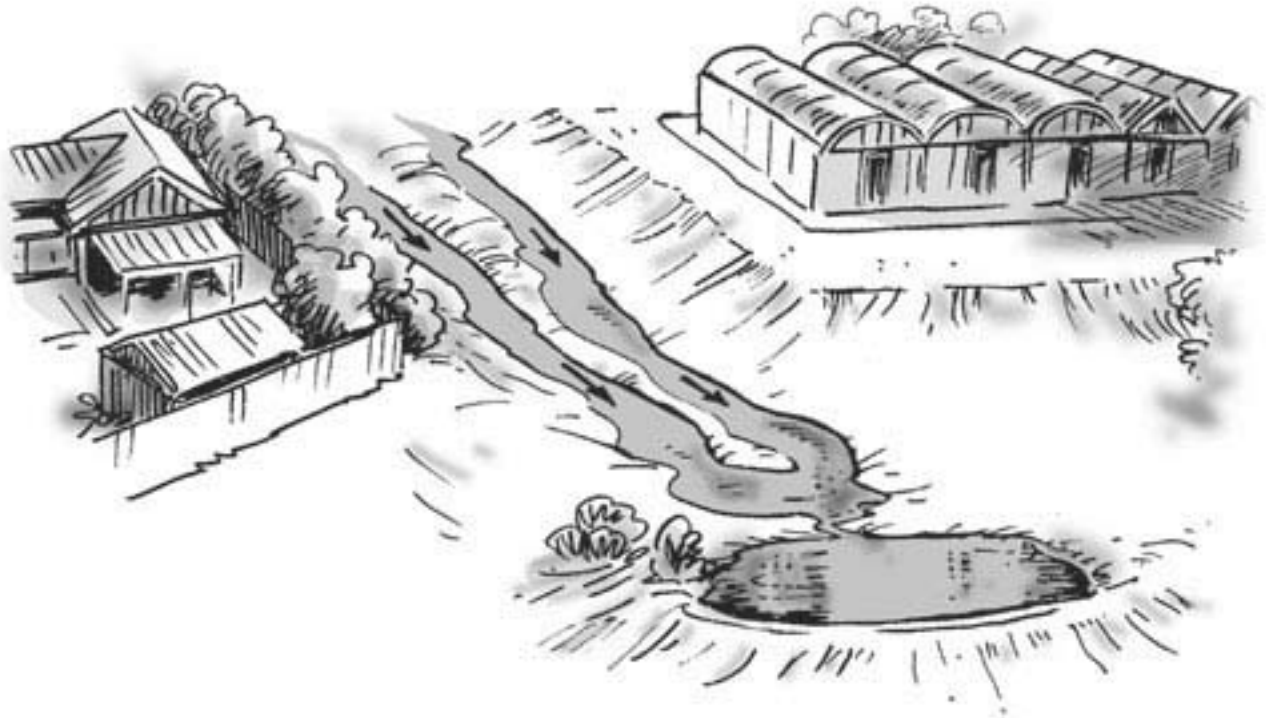
Gardens and vegetative screens can be used to address potential visual or odour problems.

Best practice guidelines

- Prepare and submit an Erosion and Sediment Control Plan with the development application.
- Make sure that a complete landscaping plan which ensures long-term effectiveness is prepared and approved before beginning any work.
  - The impact of surface water run-off and drainage are considered in the plan.
- Use earth mounds to a height of about 2 metres if the combination of natural topography and tree planting cannot effectively screen the farm.
- Design landscaping to blend in with existing topography.



Screening trees should be tall enough to intercept a direct line of sight (measured 2 m above the ground) from a neighbouring dwelling.



Use mounding and land-forming to address potential problems with site run-off and noise.

- Establish vegetation or use mulch on exposed ground as soon as possible.
- Use organic or artificial mulches to minimise soil erosion.
- Undertake earthworks during low wind conditions and dampen worked areas and access tracks to minimise dust.

6.4 WATER MANAGEMENT AND IRRIGATION

Outline

Irrigation management

CEH farms are very water efficient, but, because they are intensive systems, an enterprise will use a significant volume of water for irrigation, cooling, cleaning and other activities.

Good irrigation practices not only increase water use efficiency, but also reduce the cost of water and fertilisers. The volume of wastewater can also be reduced. Ensure that surface water, groundwater and soil are used in a sustainable manner and protected from contamination and degradation.

In addition, adoption of more efficient and environmentally sustainable farming practices reduces the potential for land use conflict. Hydroponic growing systems are very intensive but use less water per unit of production than soil-based production.

Rainwater from greenhouse roofs is a source of high quality water and could be used for irrigation. If feasible, use recycled water from municipal wastewater treatment facilities. This will reduce demand for water from other sources such as town water supplies.

Wastewater

Wastewater is the water that drains away from the production area. Unused nutrient solution from hydroponic systems is wastewater. Run-off resulting from excess irrigation is also wastewater.

Wastewater or 'run-off' usually contains a high level of nutrients, some sediments and sometimes chemicals. The two key nutrient pollutants found in wastewater are phosphorus and nitrogen.

Nutrients and sediments in wastewater can affect the environment and irrigation equipment and damage crops. In natural watercourses, relatively low levels of nitrates and phosphates can lead to algal blooms which can kill fish. Sediments can also harm aquatic life.

Stormwater and surface run-off

Stormwater is clean run-off from buildings and structures and should be kept separate from other wastewater on the farm. Hard impervious surfaces such as sealed roads reduce infiltration and increase run-off volumes. Exposed soil increases the risk of erosion and sediment movement from stormwater.

Groundwater

Water usage from surface and groundwater resources must be within the sustainable yield so that the integrity of the water resource and the ecosystems it supports are not compromised.

Groundwater may be impacted upon by a variety of land uses. Clearing of vegetation, irrigation and fertiliser use (including organic fertilisers) are all activities which can potentially have an impact.

Soil production

When crops are grown directly in soil, the moisture content of the soil needs to be monitored and irrigation closely controlled. There should be no run-off from irrigated areas.

Objective

Make sure that the planning, design, operation and management make the most efficient use of water possible and protect surface water, groundwater and soil from contamination and degradation.

Performance criteria

- Best environmental management practice is applied in planning, design, development, operation and management of the farm so that water use efficiency is maximised and water quality is maintained.
- If required, a licence is obtained from DIPNR for the use of surface or groundwater in the operation of the farm.
- Sediment and nutrients are prevented from entering stormwater drains or other waters as required under the *Protection of the Environment Operations Act 1997* (NSW).
- An Erosion and Sediment Control Plan (ESC) is submitted with the development application. The plan meets the requirements of the DIPNR guidelines *Preparing an Erosion and Sediment Control Plan* (1997).

- An EMP, including an irrigation and drainage management plan (IDMP), is developed and implemented that includes strategies and measures for minimising contamination and degradation of surface water, groundwater and soil from the farm and contingency actions for managing problems that may arise.

Best practice guidelines

Irrigation management

- Adopt water efficient hydroponic growing systems where possible.
  - Use recirculating hydroponic systems where feasible.
- Collect roof water for irrigation.
- Use moisture monitoring, irrigation budgeting and irrigation scheduling for best effect.
- Make sure the irrigation system covers the production area uniformly.
- Make sure the irrigation system is appropriate to the needs of the crop.
- Make sure that the application rate of water does not exceed the infiltration rate of the soil or growing media.

Wastewater management

- Plan and implement a 'closed-system' farm.
  - Contain all wastewater on-site for treatment before reuse or disposal.
- Reuse water wherever possible.
  - Use a wastewater treatment system such as detention ponds and artificial wetlands to reduce nutrient levels in the water before recycling or disposal.
  - Make sure pathogens and nutrients are managed before recycling.
  - Make sure recycled water does not contain chemical residues.
- Use a waste disposal contractor to remove wastewater that can not be managed on-site.
- Develop and implement an irrigation and drainage management plan (IDMP) for the property.
- Keep wastewater from the production area separate from stormwater.
- Use swales and diversion banks to direct clean surface run-off away from wastewater retention ponds.
- Make sure retention ponds are of adequate size for the volume of wastewater.

Keep run-off water on-farm for treatment and reuse.

- Make sure natural resources are protected by providing reasonable separation distances or containment devices.
  - Use vegetated buffer strips around greenhouses, sheds and disposal areas to catch and filter pollutants.
- Do not locate the wastewater collection in a flood-prone area.
- Design and manage wastewater storage to ensure adequate capacity for storage during wet weather.
- Maintain and operate on-site household wastewater systems (septic tanks and aerated wastewater treatment units) to prevent nutrients getting into streams or groundwater.

Stormwater and surface run-off

- Install silt traps and sediment fences before disturbing soils.
  - Maintain sediment controls such as sediment traps, sediment barriers and silt fences.
- Maintain vegetative cover and stabilise soils on the whole property.
  - Stabilise disturbed areas as soon as possible.
  - Establish and maintain vegetation or ground covering on all exposed sites.
  - Install vegetation buffer strips between production areas and all sensitive sites and boundaries.
- Actively control erosion problems and include preventative measures.
- Use diversion banks and swales to manage the flow of surface water across the property.
- Minimise the area covered in hard surfaces which increase run-off.
- Keep stormwater separate from wastewater to prevent flushing dirty water into waterways during storms.
- Collect roof run-off (rainwater) for irrigation.
  - Make sure the management system for greenhouse roof run-off can handle high rainfall events.
- Direct clean stormwater to municipal stormwater drainage if available and permitted by authorities if not using on-site.
- Clean up spills of chemicals, fertilisers and other potential pollutants promptly.

Groundwater

- Obtain a licence from DIPNR for the use of groundwater in the operation of the farm.
- Adhere to ground water sharing plans.
- Adopt closed hydroponic production systems where practical to minimise potential impact on groundwater.
- Contain wastewater on farm and prevent its entry into groundwater.
- Locate nutrient and chemical storage areas on an impervious base material to protect groundwater from potential contamination.
  - Chemicals should be stored in bunded and roofed areas.

Soil production

- Use soil moisture monitoring and irrigation budgeting to optimise irrigation.
- Make sure the irrigation system covers the production area uniformly.
- Ensure the application rate of water does not exceed the infiltration rate of the soil.
- Ensure irrigation system is appropriate to the needs of the crop.
- Store organic fertilisers under covers to reduce leaching of nutrients into the soil.
- Establish and maintain deep rooted vegetation (such as trees) around production areas to remove excess water in the soil profile.

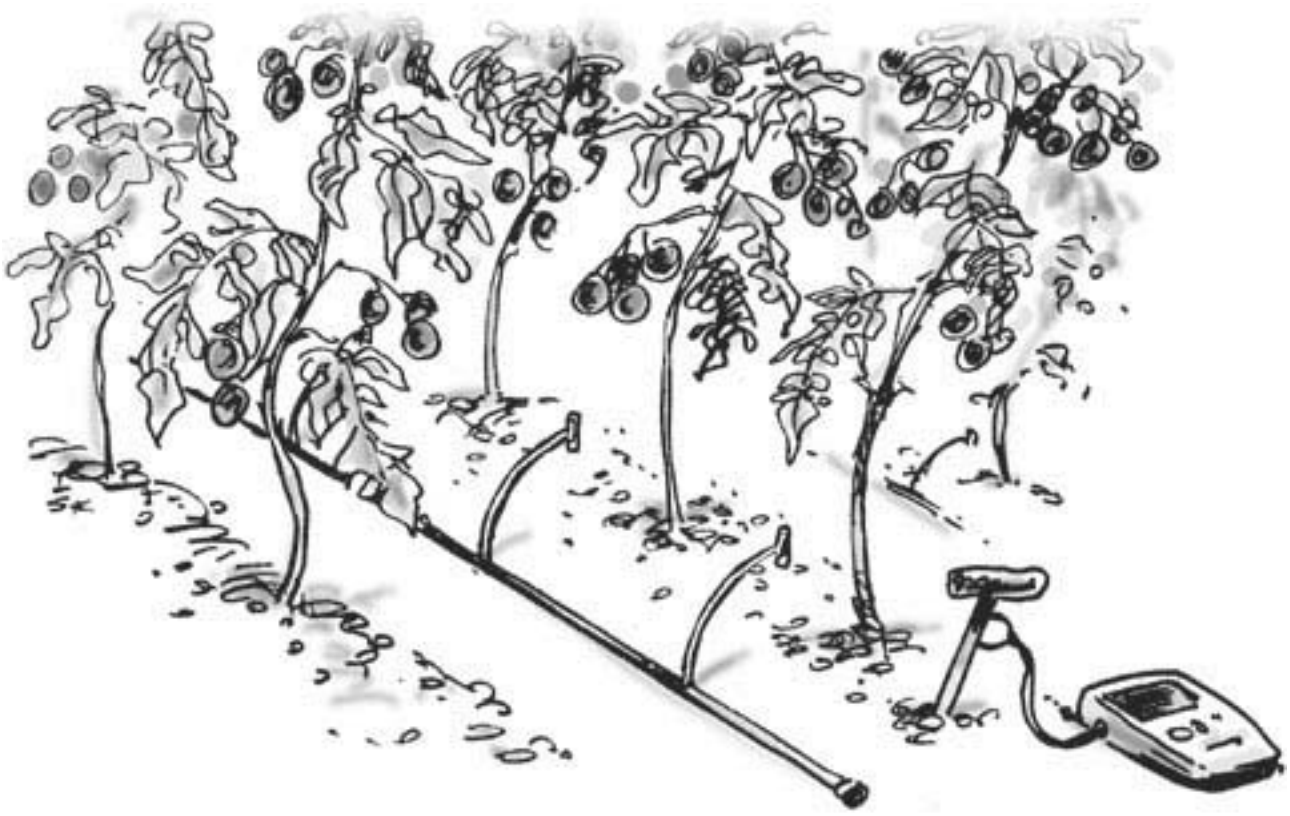
Under the *Protection of the Environment Operations Act 1997* (NSW), it is an offence to pollute waterways.

6.5 NOISE

Outline

Noise is generated by various agricultural activities. Noise generated from a controlled environment horticulture farm may adversely affect nearby sensitive land users. Noise may be continuous or intermittent. Typical sources of noise from CEH enterprises include ventilation fans, pumps, boilers, heaters, mowers, vehicles and alarms.

The transmission of noise and resulting impact are affected by many factors, including atmospheric conditions, topography and noise barriers. Residents are more sensitive to noise in the evening and night when background noise



Use moisture probes and other equipment to optimise irrigation.

levels are lower and the potential for sleep disturbance is greater.

The intensity of sound is measured in decibels (dB). Some typical noise levels are listed in Table 3.

As a guide, the level of noise is reduced by 6 dB every time the distance is doubled. For example, if a machine produces 100 dB of noise measured at 1 metre, the sound level at 2 metres will be 94 dB. At four metres it will be 88 dB, and so on, assuming no noise barriers are installed.

Sound is measured on a logarithmic scale so multiple noises do not simply add together. Table 4 provides a guide.

For example, if you have several ventilation fans (60 dB each) operating at the same time, because the difference between them is less than 1 dB, the total noise level will be 63 dB (60 + 3 dB). However, if a boiler (90 dB) and a fan (60 dB) operate at the same time, the total noise level will be 90 dB (because the difference between the boiler and the fan is more than 10 dB).

Noise can be reduced over distance and with various sound-absorbing materials. Sound-absorbing materials are porous and include wool, mineral wools, glass fibre, felt and polyurethane foams. Thicker absorbing materials stop a wider frequency of noises.

Barrier materials such as wood, glass, concrete and soil can be used to deflect noise. A noise barrier must not have any gaps. Trees and other vegetation assist in blocking some noise. Trenches can also act as barriers. Denser materials will reduce noise transmission more than lighter materials.

Noise barriers that are airtight or closer to the source of the noise are more effective.

Table 3. Typical noise levels

	Noise level in decibels (dB) at 1 metre
Leaves rustling	30
Background noise in rural area	40
Background noise in urban area	40– 0
Living room television or radio	50–60
Normal conversation	65
Ventilation fans and pumps	60– 0
Small tractors, trucks	0–90
Mower	95
Boilers, generators, compressors	90–100
Chainsaw	110

Table 4. Accumulation of noise levels

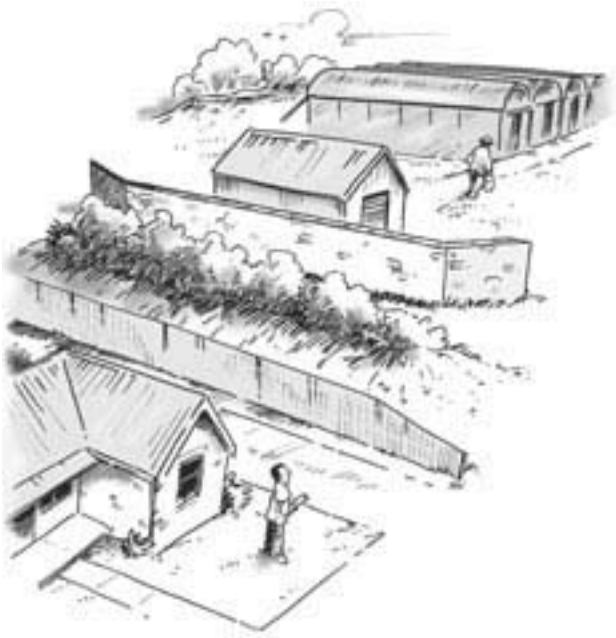
Difference between loudest and second loudest noises (in decibels)	Number of decibels added to loudest noise to determine total noise level
0–1 dB	Add 3 dB to loudest noise
2–3 dB	Add 2 dB to loudest noise
4–9 dB	Add 1 dB to loudest noise
> 10 dB	The loudest noise is the total noise level.

Objective

Ensure that noise levels generated by the farm and associated activities do not have unacceptable impacts on nearby sensitive land users.

Performance criteria

- Noise levels generated by the farm and associated activities do not exceed the requirements of the *NSW Industrial Noise Policy* (NSW EPA 2000).
- An EMP is developed and implemented that includes strategies and measures for minimising noise and vibration generation and reducing the transmission of noise to neighbouring areas, and contingency actions for managing problems that may arise.



Noise barriers can be used to address potential problems with noisy equipment and machinery.

Best practice guidelines

- Ensure noise levels generated by the farm and associated activities (including vehicle movements on the farm) meet the requirements of the *NSW Industrial Noise Policy* (NSW EPA 2000). If vehicles are on a public road, the *Environmental Criteria for Road Traffic Noise* (NSW EPA 1999) apply.
- Address noise and vibration from both the construction and the operational phases of the development in the EMP.
- Plan and implement sufficient setbacks or other noise mitigation devices to ensure noise transmission to nearby areas is minimised.
  - Enclose pumps, boilers, heaters and other noise-producing equipment inside sound-insulated sheds or casings which include both absorbing materials and barrier materials.
  - Use landscaping, mounding, barriers and vegetation to absorb and deflect noise.
- Use existing buildings and structures as noise barriers.
- Site all mechanical equipment such as fans away from sensitive land users.
- Use fans and other equipment with low decibel (noise) ratings.
- Fit all vehicles and tractors with effective mufflers.
- Schedule mowing and other outdoor maintenance activities for reasonable hours of the day, where possible.
  - Do not leave tractors or mowers idling for long periods near neighbouring sensitive users.
- Minimise the need for heavy vehicles to reverse.
- Mount pumps and other equipment on rubber pads and avoid fastening vibrating equipment directly to walls of metal sheds.
- Use hydroponic production systems, which avoid the need for cultivating soil.
- Have deliveries, transport of produce and major vehicle movements scheduled for reasonable hours of the day, where possible.

6.6 PESTICIDES AND OTHER CHEMICALS

Outline

Controlled environment horticulture substantially reduces the use of pesticides. When pesticides are required, less toxic products can be used. Field production and low technology greenhouse systems are likely to require a greater use of pesticides.

The use and storage of agricultural chemicals are associated with potential risks for users, consumers, the community and the environment. Anyone who uses or plans to use pesticides must undertake chemical application training. The SMARTtrain® chemical training program offers courses ranging from basic awareness of chemicals through to management of pesticide programs. Training can be undertaken through NSW DPI and TAFE colleges. Some private training organisations also offer courses such as ChemCert®.

Using pesticides correctly minimises the potential for pesticides to contaminate adjoining properties. Under the *Pesticides Act 1999* (NSW), it is an offence to use a pesticide in a way that 'causes injury or likely injury to another person, damage or likely damage to another person's property or harm to a non-target animal or non-target plant'.

Only registered products can be used. The way a pesticide is used must be in accordance with the directions on the label. The label specifies the situations where use is permitted. It also specifies the rate of product to be used and what health and safety requirements must be followed.

A record of pesticide use must be made within 24 hours of use. This record must be retained for at least 5 years. The record needs to identify who applied the pesticide, what pesticide was applied, when it was applied, how it was applied and where it was applied and, if more than one area is treated, the order of treatment. The record also needs to identify what pesticide was applied and how much was applied. If the pesticide is applied outdoors by spray equipment, an estimate of wind speed and wind direction is needed.

Pesticides include insecticides, fungicides, herbicides, fumigants, bactericides, rodenticides, baits, lures, repellents and pesticides used on animals to control external parasites.

Contact the Department of Environment and Conservation (DEC) for more information on pesticide use records.

Objective

Minimise the risk to public health, property and the environment from chemical use and prevent the movement of agricultural chemicals onto non-target areas.

Performance criteria

- Best environmental management practice is applied in planning, design, development, operation and management of the farm so that pesticide use is minimised.
- Pesticide use meets the requirements of the *Pesticides Act 1999* (NSW) and associated regulations such as the *Pesticides Amendment (Records) Regulation 2001* and the *Pesticides Amendment (User training) Regulation* (administered by the DEC).
- Storage, transport and use of chemicals meet the requirements for protection of the health and safety of workers and visitors to the farm and meet the Hazardous Substances requirements of the *Occupational Health and Safety Act 2000* (NSW) and the associated regulation – *Occupational Health and Safety Regulation 2001* (administered by WorkCover NSW).

Best practice guidelines

- Any person applying pesticides on the farm has successfully completed the SMARTtrain® (or other appropriate chemical training program) to a suitable level and their accreditation is current.
- All chemicals are stored, mixed, applied or disposed of in accordance with the instructions on the relevant label or permit and the Workcover New South Wales *Code of practice for the safe use and storage of chemicals (including pesticides and herbicides) in agriculture* (Workcover NSW 1998).
  - Wear appropriate personal protective equipment when using pesticides or other chemicals.
  - Store pesticides safely in a locked shed.
  - All pesticide applications are recorded within 24 hours and the records are kept for at least 5 years.

  - Pesticides are only used when weather conditions are suitable.
- A copy of the current Material Safety Data Sheet (MSDS) for each and every pesticide or other chemical being used or stored on the farm is available and readily accessible.
- The target pest, disease or weed has been correctly identified and an appropriate chemical is being used.
- Adopt high technology controlled environment horticulture systems where possible to minimise pesticide use.
  - Install insect screening on structures if feasible.
- Keep spray application equipment clean and well maintained.
  - Replace spray nozzles regularly.
  - Calibrate spray equipment routinely.
- Implement quarantine and hygiene protocols for staff and visitors.
- Establish a buffer zone around outdoor production areas if chemicals are likely to be used.
  - Vegetative buffer zones can assist in trapping spray droplets that may miss the target area. Buffer zones should be located between the production area and neighbouring properties or sensitive areas.
  - For open field production, a vegetative buffer should be at least 30 metres wide and at least 1.5 times the height of the spray release. The vegetation should be sufficiently open to allow the spray to penetrate and should include several narrow leaf species, such as *Casuarina* species.

6.7 SOLID WASTES

Outline

Greenhouse hydroponic horticulture is an intensive activity and therefore will generate more waste products per area than other less intensive systems. However, waste materials are readily contained and easy to manage.

Waste materials generated include crop residues, used growing media, plastic, and packaging. The key aim should be to maintain a tidy property. Redundant equipment is also considered waste.

Crop residues

A significant volume of crop residues can be generated in a controlled environment horticulture farm. This is particularly the case when hydroponic systems are used because the plant residues are not incorporated into the soil. Pruned leaves and stems as well as rejected produce such as unsaleable and damaged fruit are all waste products. Keep green waste in a lidded bin or suitable container away from the cropping area to minimise the potential spread of pests and diseases into crops.

Used growing media is also a waste product. Depending on the type of media used, it may be replaced with each new crop or used for several crops before disposal. Organic growing media can be incorporated with crop residues for management and disposal. Inorganic media should be managed in a similar manner to plastic and packaging waste.

Plastics

Plastics are commonly used in most industries. In controlled environment horticulture, polythene coverings, crop support strings, bags for growing media, tray liners, weed matting and redundant irrigation tubing are likely to be the main sources of plastic waste.

The performance of plastic coverings declines over time, reducing crop yields. The useful life of coverings depends on type and quality. The manufacturer's specifications and warranty should be used as a guide to useful life expectancy. All plastic covering materials need to be replaced before they visibly start to break down, such as when discolouration is apparent.

Packaging

Packaging of farm inputs such as fertiliser bags as well as discarded produce packaging such as polystyrene boxes are another form of waste which may be generated on some farms.

Old machinery and equipment

Old machinery and redundant equipment are also waste. Some parts may be reused or recycled.

Objective

Make sure that the planning, design, operation and management of the farm make the most efficient use of resources. Recycle and reuse waste where possible and dispose of waste materials regularly and appropriately.

Performance criteria

- Best environmental management practice is applied in planning, design, development, operation and management of the farm so that wastes are minimised and the farm is kept in a neat and tidy manner.
- An EMP is developed and implemented that includes strategies and measures for minimising waste and contingency actions for managing waste including a nutrient management plan, a crop residue management plan and a management plan for the disposal of plastic and used growing media.
- Management and disposal systems for crop residue and used growing media are designed and operated so that odour generation and the likelihood of pest and disease transmission are minimised.

Best practice guidelines

- Shred plant material to reduce the volume.
- Store crop residues and used media away from the production area.
- Contract a waste collection service to remove waste regularly.
  - Separate collections may be possible for organic (crop residues and organic growing media) and other materials (plastics and packaging).
  - Do not burn or bury plastic wastes on the farm.
- Compost green waste on-site for use on the farm or later removal.
  - Do not store or compost green waste upwind from neighbouring houses as odour can be generated.
  - Do not store or compost greenwaste near water courses.
  - Prevent the leaching of nutrients from the compost.
  - Combine organic growing media with crop residues for composting.
- Store waste materials neatly and out of sight or in a lidded bin until disposal.
  - Prevent fragments from blowing away.
  - Do not try to remove old greenhouse covering materials during strong winds.
- Store old machinery and equipment neatly and out of sight.
  - Contract a waste collection service to remove old machinery of no further use.
  - Keep an inventory of any parts saved for recycling.
- Control weeds and pests, which can thrive in 'junk piles'.

6.8 ODOURS

Outline

Some horticultural activities can result in the production of odours. Application of organic

Keep the farm clean and tidy and store waste materials neatly and out of sight. Use lidded bins.

fertilisers, particularly manures, is common in market garden operations, soil-based greenhouse operations and organic farms. The application of processed manures such as pelletised poultry manure in the horticultural enterprise and in the garden can cause unpleasant odours in an area for several days. In some circumstances, the composting of green waste may produce odour. Wet and poorly drained areas can also result in odour.

The potential nuisance of odour from horticultural activities is often closely associated with a visual stimulus. Installing visual barriers such as vegetative screens will help to reduce odour complaints.

Under the Protection of the Environment Operations Act, the occupier of a property must not cause air pollution (including odour) through a failure to maintain or operate equipment, to carry out maintenance work, or to deal with materials in a proper and efficient manner.

Objective

Make sure that the planning, design, operation and management of the farm minimise the generation of odours.

Performance criteria

- Best environmental management practice is applied in planning, design, development, operation and management of the farm so that odours are minimised.

Fragrant gardens can be used alongside boundaries to reduce potential odour problems.

- An EMP is developed and implemented that includes strategies and measures for minimising odour and contingency actions for managing odour.
- Management systems for crop residues, used growing media, run-off water and water storage are designed and operated so that odour is minimised.

Best practice guidelines

- Plan and implement a sufficient setback around production areas if odorous fertilisers are likely to be used.
- Establish a vegetative screen around the production area, the waste storage area and/or the property perimeter.
- Store odorous materials neatly and out of sight in a lidded bin or container or in a closed shed.
- Use a less odorous fertiliser or composted manure.
- Do not apply organic fertilisers such as manures during strong winds.
- Locate composting facilities away from and downwind to neighbouring sensitive land users, if possible.
- Establish fragrant gardens near to neighbouring sensitive land users to neutralise potential odours.
- Make sure wastewater is properly managed to avoid formation of stagnant pools.
- Reduce potential for dust (which can carry odour).
  - Vegetative screens can assist in trapping dust particles that may carry odour.
- Manage waste materials in a proper and efficient manner. (See section 6.7.)

6.9 LIGHT

The use of artificial light and/or reflective materials to optimise growing conditions or to provide specialised growing conditions for crops can create a distraction and a nuisance for sensitive land users. Security lights may also disrupt neighbours.

Objective

Make sure that the planning, design, operation and management of the farm minimise any light impact on the amenity of nearby sensitive land users.

Performance criteria

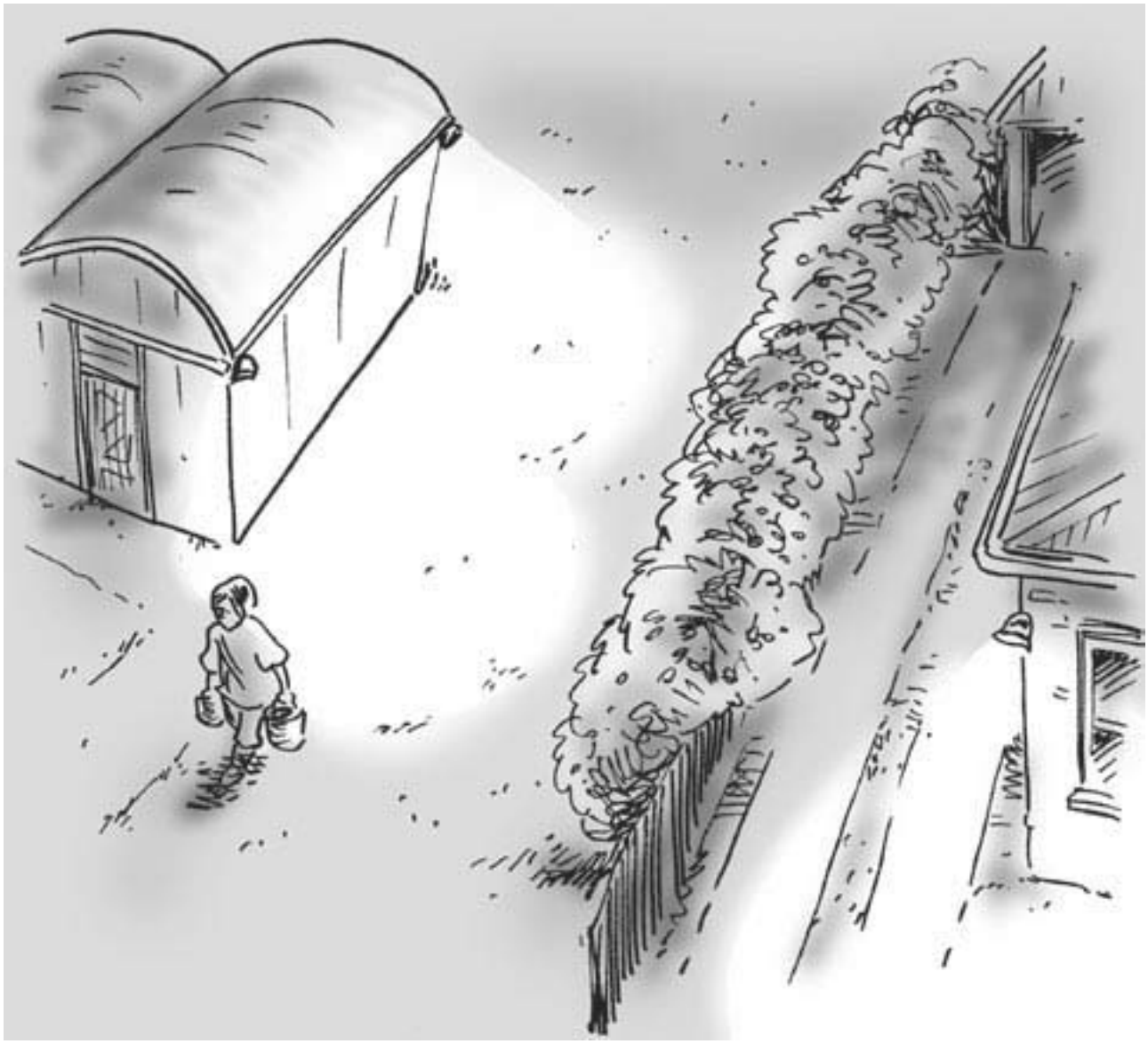
- Lighting of the farm is designed to avoid illumination of neighbouring sensitive land.
- An EMP is developed and implemented that includes strategies and measures for minimising lighting and contingency actions for managing stray light.

Best practice guidelines

- Site greenhouses and sheds so that natural landforms prevent a direct line of sight to neighbouring sensitive land users.
- Site sheds which may be in use at night so that doors face away from sensitive land users.
- Use landscaping, mounding and vegetation to intercept line of sight.
- Lighting used for security is angled or shielded so that it does not directly illuminate any nearby sensitive land.
- Sensors for security lights are appropriately directed.
- Black-out curtains are installed and maintained in greenhouses where artificial lighting is to be used.

6.10 DUST

Vehicle movement, fertiliser spreading and wind blowing across bare soil can lead to dust contamination. Dust can affect crop quality and require an additional washing treatment before sale for some produce. In some circumstances, dust can increase the incidence of crop pests. Dust may also create problems with farm equipment and is unpleasant in residences. Dust



Direct security lights so as not to intrude on neighbouring property.

can carry odour and may be associated with allergies and respiratory ailments.

Objective

Make sure that the planning, design, operation and management of the farm minimise the generation of dust that may affect sensitive land users.

Performance criteria

- An EMP is developed and implemented that includes strategies and measures for minimising dust and contingency actions for managing dust problems that may arise.

Best practice guidelines

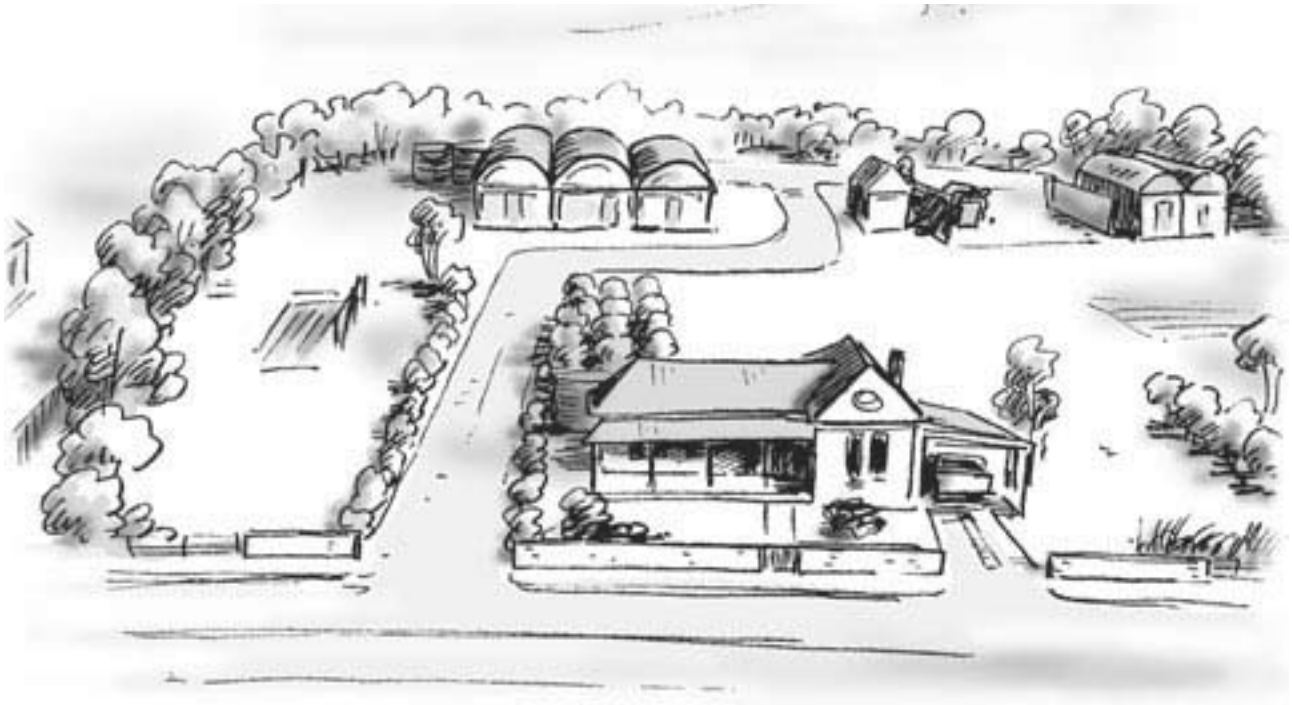
- Site operational areas to permit sufficient setbacks from boundaries and neighbouring sensitive land users.
- Use windbreaks to protect gravel roadways and open fields from wind erosion.
- Line driveways and internal gravel roads with trees and shrubs.
- Surfacing roadways with gravel, road base or other material to reduce dust.
- Moderate vehicle speeds on unsealed roads.
- Locate roadways towards the centre of the property instead of adjacent to boundaries.
- Install water sprinklers along roadways for use during dry, windy conditions.
- Establish and maintain appropriate vegetation around buildings and all exposed areas.
- Do not cultivate soil, spread manure or mow during strong winds.

6.11 PESTS

Residential gardens as well as neighbouring commercial crops may contribute to insect pest and disease problems on a property. Crop pests result in economic loss and, potentially, the need to apply pesticides more frequently.

Co-operative pest management programs can be developed in a local area to benefit everyone.

Community pests such as mosquitoes can be increased by dams and wetland systems on a property.



Locate roadways towards the centre of the farm and use vegetative screens to minimise potential dust and noise problems.

Objective

Minimise the health and disease risk to crops by keeping pest levels to a minimum and minimise the opportunities for community pests to breed on the property.

Performance criteria

- Pest exclusion is factored into design criteria for construction of new greenhouses.
- An EMP is developed and implemented that includes strategies and measures for managing pest infestations and contingency actions for pest problems that may arise.

Best practice guidelines

- Implement quarantine and hygiene protocols for staff and visitors.
- Establish native vegetation areas to increase habitat for beneficial animals and insects.
- Use windbreaks to reduce the opportunity for pests to be carried onto the property.
- Install insect screening on greenhouses, if feasible.
- Pesticide use must meet the requirements of the *Pesticides Act 1999* and associated regulations.
- Design and manage dams and other wet areas to minimise pests such as mosquitoes.
- Develop co-operative pest management programs in a local area for key pests.
- Notify NSW DPI if nearby perennial crops (such as orchards) have been abandoned and need removing.

6.12 TRAFFIC

Outline

A thriving rural business will result in an increase in the number and frequency of vehicles coming to and leaving a property. The movement of vehicles and accommodating farm vehicles onsite can impact on the amenity and safety of the public and neighbours. Potential problems of noise, dust, light and odour can be associated with traffic movement. An increase in traffic can also add to congestion on local roads.

Objective

Provide appropriate access to the property and make sure that the movement and accommodation of vehicles on the property minimise any impact on the amenity of nearby sensitive land users.

Performance criteria

- Access to the site is appropriate for the size and type of vehicles which will be entering and leaving.
- Access to the site is located to minimise noise impacts on neighbouring sensitive land users
- Adequate area is provided within the site to accommodate all service vehicle movements and for parking of vehicles within the property.
- An EMP is developed and implemented that includes strategies and measures for minimising traffic impacts and contingency actions for specific situations that may arise.

Best practice guidelines

- Provide appropriate and safe access to the property from adjoining roads to minimise interference with passing traffic.
- Provide an onsite parking area for employees, if applicable.
- Maintain road surfaces for all-weather access.
- Plan the farm layout to make sure adequate space is available for turning vehicles around, including delivery trucks.
  - Minimise the need for large vehicles to reverse.
- Centralise farm structures to make most efficient use of transport: for example, locate the packing shed near greenhouses.
- Schedule deliveries to minimise the impact by spacing arrival and departure times and reducing frequency.
  - When practical, operate deliveries within reasonable day time hours.
- Minimise dust.

Contact the local council or the Roads and Traffic Authority for further information. (Also see 'Road Access' in section 5.1.)

6.13 COMMUNITY LIAISON AND COMPLAINT MANAGEMENT

Outline

Liaison between the property owner/ manager and neighbours can be helpful in communicating information for the purposes of avoiding and managing complaints. Open lines of communication help in identifying problems, verifying complaints and successfully applying relevant and feasible remedies to minimise the

impact of the farm on neighbouring sensitive land users.

Objective

Maintain systematic communication between the farm and neighbouring sensitive land users to minimise environmental complaints.

Performance criteria

- An EMP is developed and implemented. It includes strategies and measures for minimising environmental impacts and contingency actions for managing community liaison and complaints about environmental impacts or problems that may arise on the farm.
- The EMP is submitted with the DA.

Best practice guidelines

- Inform neighbouring sensitive land users of unusual events or problems that may affect their amenity.
  - Identify the timeframe of the impact.
  - Identify the mitigation strategies that have been initiated.
- When a complaint is made, gather relevant evidence and identify and implement strategies to remedy the problem.
  - Record full details of the complaints received, results of investigations and corrective actions in a complaints register.
  - Inform the complainant of the outcome of the investigation and any actions taken to avoid recurrence of the problem.
- Record significant operation activities on the farm, particularly any activities that have a potential environmental impact.
  - Note weather conditions and prevailing wind directions at the time of the activity.
- Participate in and cooperate with the mediation process in cases of dispute.

Mediation services are available for free from the Dispute Resolution Services section of the Community Justice Centre. The Land and Environment Court may also provide mediation services in an attempt to resolve a matter brought before them.

7 LEGISLATION AFFECTING CONTROLLED ENVIRONMENT HORTICULTURE

Copies of the following legislation are available from the NSW Parliamentary Counsel's Office website at www.legislation.nsw.gov.au. Contact the responsible authority or your legal advisor for details and interpretation of how the legislation relates to CEH.

The operation of new and existing CEH farms is regulated through legislation, the terms and conditions attached to the development consent and any associated licences or approvals. If you do not comply with these terms and conditions you will be liable to prosecution under the relevant legislation. The major pieces of legislation that a new or existing CEH farm must follow are described below, under the appropriate authority.

7.1 DEPARTMENT OF INFRASTRUCTURE, PLANNING AND NATURAL RESOURCES

The Department of Infrastructure, Planning and Natural Resources (DIPNR) incorporates the departments previously known as Land and Water Conservation and Planning NSW. It is responsible for:

- land-use planning issues for the State, and administers legislation regarding these issues, including the *Environmental Planning and Assessment Act 1979* (NSW). The Major Development Assessment Branch of Department of Infrastructure, Planning and Natural Resources (phone: 02 9762 8166) can provide guidelines for preparing an Environmental Impact Statement (EIS) if the proposal is classed as a designated development.
- sustainable management of the State's natural resources (soil, water, vegetation and coastline). Total catchment management principles are used to help ensure productive land, clean water and a diversity of vegetation and wildlife within catchments.
- administering water licences, regulating works on land adjacent to rivers and regulating the clearing of native vegetation.

Contact details

For further information on infrastructure, land use and transport planning, contact DIPNR, 20 Lee Street, GPO Box 3927, Sydney 2001. Phone (02) 9762 8000 (switch), phone (02) 9762 8044 (inquiries), fax (02) 9762 8713, email: information@dipnr.nsw.gov.au, web: www.dipnr.nsw.gov.au.

Information on planning requirements is also being made available on the Internet at www.iplan.nsw.gov.au. In time it will be possible to click on any land allotment and display the full set of planning instruments that relate to that land.

For further information on natural resources management, contact DIPNR, 23–33 Bridge Street, GPO Box 39, Sydney 2001. phone (02) 9228 6111 (switch), phone (02) 9228 6415 (information), fax (02) 9228 6455, e-mail: information@dipnr.nsw.gov.au, web: www.dipnr.nsw.gov.au.

Environmental Planning and Assessment Act

The *Environment Planning and Assessment Act 1979* (EP&A Act) (NSW) provides for a hierarchy of environmental planning instruments, which include State Environment Planning Policies (SEPPs), Regional Environment Plans (REPs) and Local Environment Plans (LEPs). The Act also provides the framework for local government zoning, assessment requirements, development control plans and development consent provisions. It is the major legislation governing development and the first port of call for potential developers.

It is an offence under the EP&A Act to undertake without consent a development or activity that requires consent. It is also an offence to breach any of the terms or conditions of the development consent. The relevant consent authority, usually local government, enforces the development consent, but any person may bring proceedings in the Land and Environment Court for an order to restrain breaches of this Act.

Water Management Act

The *Water Management Act 2000* (NSW) provides for the integrated and sustainable management of the State's waters. All provisions of the Act apply in regions where water sharing plans have commenced. Where water sharing

plans have not commenced, licences and approvals continue to be dealt with by the *Rivers and Foreshores Improvement Act and Water Act*.

Water Act

The *Water Act 1912* (NSW) regulates water extraction from rivers and groundwater bores and the construction of water supply works, such as dams and weirs.

Rivers and Foreshores Improvement Act

The *Rivers and Foreshores Improvement Act 1948* (NSW) regulates other works in river channels and on adjacent land within 40 metres of the top bank.

Native Vegetation Act

The *Native Vegetation Act 2003* (NSW) regulates clearing of vegetation in accordance with State standards and targets and Catchment Action Plans developed by Catchment Management Authorities.

7.2 DEPARTMENT OF ENVIRONMENT AND CONSERVATION

The Department of Environment and Conservation (DEC) incorporates the former Environment Protection Authority, NSW National Parks and Wildlife Service, Resource NSW, and the Royal Botanic Gardens and Domain Trust. The DEC is responsible for:

- protecting the environment and administering a number of Acts to control waste and pollution of the environment. The DEC is responsible for administering environment protection licences and notices under the *Protection of the Environment Operations Act 1997* (NSW). DEC can provide advice on these issues and related legislation.
- protecting cultural heritage and fauna and flora, particularly in relation to threatened species issues. DEC can also provide advice on these issues and related legislation.

Contact details

For further information on the *Pesticides Act 1999* (NSW) and *Protection of the Environment Operations Act* (PoEO Act) (NSW) and their implementation, contact Department of Environment and Conservation, 59-61 Goulburn Street, PO Box A290, Sydney South 1232. Phone (02) 9995 5000 (switchboard), Phone 131 555 (information & publications), Fax (02) 9995 5999, E-mail: info@epa.nsw.gov.au, web: www.dec.nsw.gov.au. (or regional offices).

For further information on the protection of cultural heritage and fauna and flora contact Department of Environment and Conservation, 43 Bridge Street, PO Box 1967, Hurstville 2220. Phone (02) 9585 6444 (switch), Phone (02) 9253 4600 (information), Fax: (02) 9585 6555, E-mail: info@npws.nsw.gov.au, Web: www.dec.nsw.gov.au. (or regional offices)

Protection of the Environment Operations Act

The *Protection of the Environment Operations Act 1997* (PoEO Act) (NSW) aims to protect, enhance and restore the environment having regard to the need to maintain ecologically sustainable development. It also aims to reduce risks to human health and to prevent the degrading of the environment. It controls the environmental impact of existing and future human activities through a system of licences and environment protection notices. The DEC administers this Act, but local councils are also empowered under this Act to control the environmental impacts of some farms.

The forms of pollution regulated by this Act include:

- **Air pollution.** Air pollution includes the emission of any impurities into the air (such as smoke, dust, fumes, odours and gases). It is an offence under the Act if an occupier of premises causes air pollution because of failure to maintain or operate plant or to deal with materials in a proper and efficient manner. Previous sections of these Guidelines outline best practices for managing odour, dust and pesticides.
- **Noise pollution.** Noise generated during farming operations may adversely affect nearby sensitive neighbours. The *NSW Industrial Noise Policy* (EPA 2000) and *Environmental Criteria for Road Traffic Noise* (EPA 1999) have been developed as a framework for the regulation of premises. They are used by the appropriate regulatory authority (DEC or councils) in setting permissible noise emission levels for individual operations. It is an offence under the Act if noise is emitted from premises because of the occupier's failure to maintain or operate plant, or to deal with materials, in a proper and efficient manner. Notices

or directions may also be issued in certain circumstances requiring noise emissions to cease or to be reduced. Previous sections of these Guidelines outline best practices for managing noise.

- **Disposal of waste.** It is an offence under the PoEO Act to dispose of waste in a manner that harms or is likely to harm the environment. It is also an offence to transport waste to an unlawful waste facility, or to permit the disposal of waste at such a facility. Previous sections of these Guidelines outline best practice for waste management.
- **Water pollution.** The PoEO Act makes it an offence to pollute waters. However, it is a defence if the pollution was regulated by an environment protection licence and the licence conditions relating to that pollution were not contravened. All environment protection licences are issued and administered by the DEC. Previous sections of these Guidelines outline best practice for minimising surface and groundwater impacts.

Scheduled activities (designated developments)

Many designated developments under the EP&A Act are classed as scheduled activities under the PoEO Act, and thus may require an environment protection licence under the PoEO Act. A single integrated environment protection licence will be issued to regulate all forms of pollution that may arise from carrying out the development and its associated activities.

The licence will be issued, and its implementation monitored, by the DEC. Licences are issued with conditions. Examples of conditions that can be attached to a licence include emission limits, monitoring and reporting of emissions, providing certification of compliance with the licence, and undertaking mandatory environmental audit programs, pollution studies and pollution reduction programs. The DEC must review the licence at least once every 3 years, and must give public notice of its intention to do so.

Non-scheduled activities (non-designated and designated developments)

In general, local councils will be responsible for regulating pollution from all non-scheduled activities (except where an activity is carried on by a public authority). That is, the local council will be the appropriate regulatory authority (ARA) for the purposes of the PoEO Act. If a development or its associated activities are likely to cause water pollution, an environment protection licence from the DEC may be required, and the DEC will be the ARA for such premises. So that there is only a single regulatory authority dealing with the farm, the DEC will use this licence to regulate all environmental impacts from the activity.

Pollution from activities can be regulated through:

- planning instruments (for example, an LEP) and development consent conditions
- issuing notices under the PoEO Act, such as
  - clean-up notices: issued when a 'pollution incident' has occurred or is likely to occur. A pollution incident does not include an incident involving only the emission of noise or odour (Note that if a clean-up notice is issued, a fee is payable.)
  - prevention notices: can be issued when an activity is being conducted in an 'environmentally unsatisfactory manner'
  - compliance cost notices: enable the regulatory authority to recover the costs of ensuring compliance with clean-up and prevention notices
  - noise control notices: used to prohibit activity, or the use of an article, which causes noise emissions above a level specified in the notice when measured at any specified point.

Duty to notify pollution incidents

There is a **duty to notify** the appropriate regulatory authority (broadly, the DEC or the local council) of pollution incidents where material harm to the environment is caused or threatened. Material harm includes actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial or that may result in actual or potential loss or property damage of an amount over $10,000. Failure to do so is an offence. However, any notification is not admissible in evidence against the person for an offence or for the imposition of a penalty. The duty to notify applies to the person carrying on the activity, an employee carrying on the activity (if the employer cannot be notified), and the occupier of premises where the incident occurs.

Any person may bring proceedings in the Land and Environment Court for an order to remedy or restrain a breach of the PoEO Act or the regulations.

Pesticides Act

The *Pesticides Act 1999* (NSW) aims to reduce the risks associated with the use of pesticides to human health, the environment, property, industry and trade by controlling and regulating the use of pesticides in NSW. The Act empowers the DEC to enforce the proper use of all pesticides in NSW after the point of sale. The Act also provides regulation-making powers.

The Pesticides Amendment (Records) Regulation 2001 sets the requirements for record keeping of pesticide use. The Pesticides Amendment (User Training) Regulation sets the training standards. Both regulations apply to commercial users of pesticides (including farmers). There are also provisions to regulate foodstuffs that contain prohibited residues of pesticides. For further information, contact the DEC.

National Parks and Wildlife Act

The *National Parks and Wildlife Act 1974* (NSW) specifies that consent is required from the DEC to destroy Aboriginal artefacts, relics or places. It also addresses protection of fauna, native plants, threatened species, populations and ecological communities.

Threatened Species Conservation Act

The *Threatened Species Conservation Act 1995* (NSW) aims to conserve threatened species, populations and ecological communities. The Act requires a licence to be obtained from the DEC to pick or harm a threatened species, population or ecological community. The Act may also require, through the EP&A Act, an assessment of the potential impacts on threatened species for development approval.

Road and Rail Transport (Dangerous Goods) Act

The *Road and Rail Transport (Dangerous Goods) Act 1997* (NSW) sets out requirements for the transport of dangerous goods (including pesticides and other chemicals) on roads. WorkCover NSW regulates the off-road handling of dangerous goods.

7.3 LOCAL COUNCILS

Local councils are responsible for the management, improvement and development of the resources of their area and are responsible for administering some regulatory systems. Local councils are also regulatory authorities under the *Protection of the Environment Operations Act 1997* (NSW). Local Council planning systems operate under the *Environmental Planning and Assessment Act 1979* (NSW) and operating procedures of Councils are subject to the *Local Government Act 1993* (NSW).

The local council is a valuable first point of contact for both new and existing CEH farms. Councils can provide information on:

- any planning controls that apply to a particular parcel of land
- any additional information that you would need to supply with your Development Application
- development consent conditions.

Local Government Act

The Local Government Act 1993 (LG Act) (NSW) requires local councils to provide for the current and future needs of local communities and manage local resources according to the principles of ecologically sustainable development.

Under the LG Act councils may abate a public nuisance. A public nuisance is one that materially interferes with public health, safety, property, enjoyment or comfort.

The LG Act enables councils, in certain circumstances, to issue an Order to a person to do or refrain from doing things in or on a premise. Examples of orders that may be issued include:

- To repair or make structural alterations to a building where the building is erected in a catchment district and causes or is likely to cause pollution of the water supply.
- To do things necessary to control the flow of surface water across land where other land is being damaged or likely to be damaged.
- To ensure that land is, or premises are, placed or kept in safe and healthy conditions when they are not in a clean or sanitary condition.
- To store, treat, process, collect, remove, dispose of or destroy waste in the manner specified in the order when waste present or generated on the land is not being dealt with satisfactorily.
- To comply with an approval when an approval has not been complied with.
- Not to conduct, or to cease conducting, an activity.

Failure to comply with an order is an offence under the Act.

7.4 NSW DEPARTMENT OF PRIMARY INDUSTRIES

NSW Department of Primary Industries incorporates the former NSW Agriculture, NSW Fisheries, State Forests of NSW and NSW Department of Mineral Resources.

NSW DPI delivers agricultural research, extension, education and regulation and is responsible for administering a number of Acts affecting agricultural producers.

NSW DPI has Agricultural Environment Officers located around the State who can provide advice on the development assessment process, convene a planning focus meeting for you if required, and provide advice on how to manage the ongoing environment regulations associated with CEH farming. Horticultural advisory officers are also available to provide advice on horticulture and development including options for design of greenhouses.

Contact details

NSW DPI, 161 Kite Street, Private Bag 21, Orange 2800. Phone (02) 6391 3100 (switchboard),
email: nsw.agriculture@dpi.nsw.gov.au,
web: www.dpi.nsw.gov.au. (or regional offices).

National Centre for Greenhouse Horticulture, NSW DPI, Locked Bag 26 Gosford 2250. Phone (02) 4348 1900.

Plant Disease Act

The *Plants Diseases Act 1974* (NSW) (Regulation 1996) aims to prevent the spread of plant pests and diseases.

Noxious Weeds Act

The *Noxious Weeds Act 1993* (NSW) is administered by the NSW DPI and local councils. It relates to identifying and controlling noxious weeds in each NSW council area. Weeds are categorised according to associated problems, with the land occupier being responsible for control of weeds or prevention of their spread.

7.5 NSW WORKCOVER AUTHORITY

WorkCover is responsible for ensuring health, safety and welfare in the workplace and administration and advice on the NSW Workers Compensation scheme and injury management requirements.

Contact details

WorkCover NSW, Telephone: 02 4321 5000, fax: 02 4325 4145. For address, telephone or fax details of all WorkCover offices: http://www.workcover.nsw.gov.au/ContactUs/default.htm

Occupational Health and Safety Act

The *Occupational Health and Safety Act 2000* (NSW) (OH&S Act) aims to protect workers in the workplace, and there are many regulations under this Act, including the *Occupational Health and Safety Regulation 2001*, which consolidates regulations relating specific hazards including plant and machinery, hazardous substances and noise, and lays down requirements for consultation with workers relating to meeting OH&S obligations.

7.6 SYDNEY CATCHMENT AUTHORITY

The Sydney Catchment Authority (SCA) is responsible for supplying bulk water and for ensuring that Sydney's catchment areas are managed and protected to promote water quality, protection of public health and safety and protection of the environment. They are empowered under the *Sydney Water Catchment Management Act 1998* (NSW). The Authority may have input into the granting of some licences.

Contact details

Sydney Catchment Authority, Level 2, 311 High Street, PO Box 323, Penrith 2751. Phone: (02) 4725 2100, fax: (02) 4732 3666,
email: hotline@sca.nsw.gov.au,
web: www.sca.nsw.gov.au. (or field offices).

7.7 NSW DEPARTMENT OF HEALTH

NSW Health is responsible for the administration of the *Public Health Act 1991* (NSW) – 'an Act relating to the maintenance of proper standards of health for the public and for other purposes'.

The Public Health Act provides power to make certain orders and give directions during a state of emergency and at times in regard to the disinfection or destruction of items and the closure of water supplies and premises.

The Public Health Act and advice on issues relating to the public health and protection of the safety of food, water and air is administered by Environmental Health Officers located in Public Health Units of the local Area Health Service.

Contact details

Phone: 02 9391 9000;
email: nswhealth@doh.health.nsw.gov.au

To contact your local Public Health Unit go to the website www.health.nsw.gov.au and look under 'Find your Local Health Service'.

8 GLOSSARY

Applicant

Any person or company submitting a DA for land-use approval (also called proponent or developer).

Appropriate regulatory authority (ARA)

The authority responsible for development consent approval, other approvals or licences under environmental legislation and/or for regulating or providing advice on development and operational issues – for example, the local council, DIPNR or the DEC.

Approved, approval

Having been approved, in writing, by the consent authority.

Bunded

Surrounded by a small artificial embankment.

Closed system

A production system, such as hydroponics, in which all wastewater is contained.

Conditional consent

Approval of a DA by a consent authority subject to one or more binding conditions.

Consent authority

Authority responsible for approving a DA (usually the local Council or DIPNR).

Composting

Breaking down of organic matter by microbial action.

Controlled Environment Horticulture (CEH)

The production of horticultural crops within, under or sheltered by artificial structures and/or systems which provide modified growing conditions and a means to manipulate growing conditions for optimal production. Greenhouses and hydroponic systems are the basis of controlled environment horticulture. Controlled environment horticulture encompasses a number of commonly used terms including 'greenhouse horticulture', 'hydroponics' and 'protected cropping'.

Controlled Environment Structure (CES)

An artificial structure and/or system which is used to provide modified growing conditions and as a means to manipulate growing conditions for optimal production. A controlled environment structure may be a greenhouse, a shadehouse, a screenhouse or a hydroponic system.

Cost-benefit analysis

A decision tool which presents the relative cost of a development or purchase compared to the relative benefit to the enterprise.

Council

The Council responsible in the Local Government Area in which the land to be developed exists.

Covering material

A transparent or partially transparent material used to cover a greenhouse structure and includes glass, plastic sheeting (polycarbonate, acrylic [polymethyl methacrylate] and fibreglass) and plastic films (polythene [polyethylene], EVA [ethyl vinyl acetate] and PVC [poly vinyl chloride]). A covering material may be tinted or coloured.

Designated development

A development with the potential for significant environmental effects, and therefore requiring an Environmental Impact Statement (EIS) to accompany the Development Application. Criteria for designated developments are specified in the *Environmental Planning and Assessment Act 1979* (NSW). Many designated developments will also require a licence from the Department of Environment and Conservation.

Development Application (DA)

Application to a consent authority for approval to develop or alter land use.

Development Control Plan (DCP)

Council guidelines for development often with prescriptive measures for setbacks.

Environmental Impact Statement (EIS)

A detailed assessment of the potential environmental impacts of a proposed development. The EIS is submitted as part of the Development Application. An EIS is necessary for designated developments, and may be required for non-designated developments.

Environmental Management Plan (EMP)

A plan developed by the applicant explaining how they will manage the environmental impact of their operations. Preferably based on an environmental management system (EMS) approach.

Environmental Management System (EMS)

A system developed using a plan, do, check and act approach with a philosophy of continual improvement of the system and operation to manage environmental impact of operations.

Erosion and Sediment Control Plan (ESC)

A plan developed by the applicant explaining how they will manage potential erosion and sediments during construction and operation of the development.

Fan

An item of equipment used to draw air in or through a controlled environment structure or expel air from a controlled environment structure.

Evaporative cooler

An item of equipment used to cool the air in a controlled environment structure using the process of evaporation of moisture.

Fogging system

A system of nozzles (producing water droplets of less than ten (10) microns in diameter) used in a controlled environment structure to:

(i) cool the air, and/or

(ii) increase the relative humidity of air.

Greenhouse

A protective structure covered in a transparent or partially transparent material to enclose an area for the propagation and cultivation of plants which is of sufficient size for persons to work within the structure; includes the descriptive terms greenhouse, glasshouse, polyhouse, igloo, hothouse and tunnel house.

Low Technology Greenhouse

A greenhouse that

i) is less than 3 metres in total height and typically, does not have vertical walls

ii) does not have automated environmental control

iii) may have a heating system

Medium Technology Greenhouse

A greenhouse that

i) typically has vertical walls and a gutter or eave height less than four (4) metres from the ground

ii) has passive roof or wall ventilation (except where non-passive cooling systems are installed)

iii) may have some automation of environmental control

iv) may have a heating system

v) may have a non-passive cooling system (including but not limited to fans and evaporative cooling pads) installed as the means of air cooling.

High Technology Greenhouse

A greenhouse that

i) typically has vertical walls and a gutter or eave height equal to or greater than four (4) metres from the ground

ii) a passive roof ventilation area equal to or greater than 25% of floor area (except where non-passive cooling systems are installed)

iii) has automated environmental control including a heating system

iv) has a non-passive cooling system (including but not limited to fans and evaporative cooling pads) installed as the means of air cooling except where passive cooling systems are installed.

Greenhouse type

The classification of the greenhouse according to its basic shape. Types include gothic arch, gable, flat arch, raised dome, sawtooth, skillion, tunnel or igloo.

Glasshouse

A greenhouse of which the covering material is glass.

Growing medium

A substrate used in a hydroponic system or nursery pot and includes, but is not limited to materials such as sand, gravel, perlite, vermiculite, expanded clay pellets, Versarock®, pumice, scoria, expanded plastics, pine bark, sawdust, rockwool, compost and potting mix.

Head house

A non-growing work or storage area associated with greenhouse operations.

Heater

An item of equipment used to directly or indirectly heat the air or crop in a controlled environment structure.

Hydroponics

A soil-less method of plant production:

Water culture

A hydroponic system in which plant roots grow directly in nutrient solution. There is no substrate or growing medium used (except in the propagation of the plant).

Substrate culture

A hydroponic system in which plant roots grow in a growing medium.

Air culture

A hydroponic system in which plant roots grow in the air in a contained space and are kept moist with a mist of nutrient solution. There is no substrate or growing medium used. It is also called an aeroponic system.

Recirculated

A hydroponic system in which the nutrient solution is reused several times or continuously.

Flow-through or free drainage

A hydroponic system in which the nutrient solution is supplied to the plants, with excess solution draining away, not being immediately recirculated.

Land covenant

A legal restriction that has been placed on the title of a property.

Misting system

A low pressure system of irrigation nozzles (producing water droplets of greater than ten (10) microns in diameter) used in a controlled environment structure to:

(i) cool the air, and/or

(ii) increase the relative humidity of air, and/or

(iii) irrigate a crop.

Mounding

The use of landscaping or land forming to provide a raised soil barrier to inhibit noise and line-of-sight from a development.

Multispan

A greenhouse that is composed of several units joined under a common roof.

Netting

A protective structure used to exclude pest species such as birds, mammals or insects from a horticultural crop or to shelter a horticultural crop from hail.

Nutrient solution

A dilute solution of balanced nutrients used to irrigate plants in a hydroponic system.

Open system

A production system in which some or all of the wastewater enters the surrounding environment, for example as leachate through the soil profile.

Penalty notice

A monetary fine handed out for infringement of a planning rule or direction.

Pesticide

A product registered for use in the management of pests, diseases or weeds.

Polyhouse

A greenhouse of which the covering material is plastic and usually, but not limited to, a plastic film.

Protected cropping

A term that may be used to describe controlled environment horticulture. It is the production of horticultural crops within, under or sheltered by artificial structures to provide modified growing conditions and/or protection from pests and adverse weather. It does not necessarily involve controlling the growing environment, but rather modifing the growing environment.

Protected cropping structure

A structure used to provide modified growing conditions and/or protection from pests for horticultural crops and includes, but is not limited to, a greenhouse, glasshouse, shade house, shade cloth, windbreak, hydroponic growing system, row cover and netting.

Pump

An item of equipment used to move water and/or nutrient solution.

Risk assessment

An analysis of the risks (financial, environmental, health or otherwise) of a proposed development, purchase, sale or operational activity.

Row cover

A plastic or polyester fabric or film installed to cover a horticultural crop along individual rows. A row cover is less than one (1) metre in height.

Screen house

A protective cropping structure used for the propagation and cultivation of plants of which the covering material is woven or otherwise constructed insect screen to allow sunlight, moisture and air to pass through the gaps, but designed to exclude insects.

Shade house

A protective cropping structure used for the propagation and cultivation of plants of which the covering material is woven or otherwise constructed (shade cloth) to allow sunlight, moisture and air to pass through the gaps.

Sensitive land user

A person or people that may be sensitive to environmental impacts from a proposed or existing development, including those associated with residences, schools and hospitals.

Separation distance

A distance between adjoining land developments which is created for the purpose of mitigating the impacts of one or more of those developments, and in which the carrying out of certain development is restricted. Also referred to as a buffer zone.

Setback

A distance between a development and a property boundary, which is created for the purpose of mitigating the impacts of a development, and in which the carrying out of certain development is restricted.

Screening

The use of trees and shrubbery to minimise the visual impact of a development.

Spray drift

Droplets of an applied chemical carried in the air outside the target area.

Statement of Environmental Effects (SEE)

An assessment of the potential environmental impacts of a proposed development, submitted with the DA.

State of Environmental Planning Policies (SEPP)

Policies formulated by DIPNR that specify planning controls to deal with issues significant to the State.

Substrate

A growing medium used in a hydroponic system or nursery pot and includes, but is not limited to materials such as sand, gravel, perlite, vermiculite, expanded clay pellets, Versarock®, pumice, scoria, expanded plastics, pine bark, sawdust, rockwool, compost and potting mix.

Tank

An item of equipment used to hold water, nutrient solution or run-off liquids.

Temporary structure

A structure where approval is granted for a maximum number of years (for example, 5 years).

Wastewater

Water, other than stormwater, that is in excess of immediate needs.

Windbreaks:

Natural

The use of trees and shrubbery to reduce and deflect wind from a development or horticultural activity.

Artificial

The use of materials other than living trees and shrubbery to reduce and deflect wind from a development or horticultural activity.

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APPENDIX 1: ISSUES TO ADDRESS BEFORE SUBMITTING A DEVELOPMENT APPLICATION FOR A CONTROLLED ENVIRONMENT HORTICULTURE FARM IN NSW

1. BEFORE LAND PURCHASE

Consult with local Council

The first step in strategic planning for a new controlled environment horticulture (CEH) farm (or expansion of an existing one) is to consult with the local council to find out whether their strategic plan (Local Environmental Plan) includes provisions that are likely to encourage or constrain CEH in their local government area. This will help identify localities that are likely to be most appropriate for CEH farms in the medium to long-term. This step should be done prior to purchase of land.

The local Council can also provide advice on:

- the level of development assessment your proposal will need to undergo
- who the consent authority will be (either local council or Department of Infrastructure, Planning and Natural Resources - DIPNR)
- the type of information that will need to accompany your development application (DA)
- additional licences/approvals that you may need to obtain (such as water licences, approval to clear native vegetation).

Identify and evaluate potential properties

Individual properties can be identified once you have found an appropriate locality. Perform a preliminary evaluation as to their suitability based on practical, financial and environmental factors. (These are discussed in detail in section 5 of these Guidelines.) Issues to consider include:

- zoning and other provisions under environment planning instruments such as the local environmental plan (LEP)
- size and shape of land
- access to markets and services, including distance and suitability of roads for trucks
- water and power supply
- drainage and flooding issues
- topography and vegetation
- separation from residences and other sensitive land uses
- bushfire risk

Hold a planning focus meeting

For major developments where there are a large number of issues to be considered, a Planning Focus Meeting is recommended before the DA is submitted so that relevant parties can meet and discuss the proposal. A planning focus meeting is held on-site between:

- you (the proponent)
- your consultants
- representatives from the local council
- appropriate State Government agencies
- other potentially involved parties

This meeting will help the proponent identify the issues to be covered in the DA and will often save time and money.

It is also advisable to consult with your neighbours about the proposal and identify their potential concerns.

2. REQUIREMENTS FOR THE DA

The DA generally comprises a form from the consent authority (generally the local council) and a document which should provide a description of the proposal, an assessment of the likely impacts of the proposal on the environment and a justification for setting up the enterprise. This document is known as a Statement of Environmental Effects (SEE), or, for designated developments, an Environmental Impact Statement (EIS).

Before you submit your DA check that you have:

- completed and signed all appropriate sections of the DA form
- attached the required number of copies of associated documentation
  - locality maps
  - site and building plans which are drawn to an appropriate scale and show the direction of north

  - an environmental impact statement or statement of environmental effects
  - an environmental/farm management plan
- included payment for the DA fees

Environmental Impact Statement/Statement of Environmental Effects

The following outline provides a guide as to what needs to be included in an EIS/SEE. In either case the level of assessment should match the level of impact of the proposed enterprise.

Part A: Information about the location

Planning information

Have you provided information on the following?

- property title and ownership details
- whether the proposal is consistent with any relevant State Environmental Planning Policy (SEPP), Regional Environmental Plan (REP) or Local Environmental Plan (LEP) and zoning
- any approvals and licences required

Site and locality description

Have you included maps and plans that show the following?

- the general location of the property in relation to major towns and roads
- the property boundary, existing vegetation, streams and access roads, power lines and the boundaries of neighbouring properties
- the location of existing sheds and facilities, access roads, truck parking, loading and turning areas, highlighting any changes

Does your documentation briefly describe the following factors?

- soil type
- climatic conditions including wind strength and directions
- significant site features (e.g. treed areas, wetlands, watercourses)
- existing land uses on the site
- land use on surrounding properties (existing and potential) including distances to neighbouring houses and property boundaries
- topography, drainage and flooding pattern, vegetation, soil type and groundwater depth (particularly where there is on-site wastewater disposal)

Part B: Description of the proposal

Objective

- Have you included a brief statement outlining the reason for the proposed development (why you are doing it, what it will achieve in terms of economic and social and environmental benefit for the region?

Previous and existing operations

Have you briefly described the following?

- the history of horticultural operations and approvals on the site
- the current operations and facilities

Description of operations (farm management plan)

Have you briefly described the nature and scale of the proposed development and resultant operation, including the following?

- number and type of greenhouses, including associated structures (e.g. machinery, amenities etc)
- type of machinery to be used
- packing and processing facilities (if any)
- road access and proposed vehicle movements
- power supply
- total water requirements (including water for irrigation, cooling, cleaning, dust suppression and any other uses such as toilets)
- water source and storage (location and size of dams and tanks, water quality, monitoring and treatment options)
- heating, cooling and ventilation systems
- options to minimise energy use (e.g. cladding material, thermal screens)
- an outline of any construction to be undertaken (including any staging of development)
- emergency contingency plans (e.g. for power failure)
- projected life of the operation
- consideration of alternatives
- alarm and backup systems
- greenhouse design and materials to be used
- design of associated sheds and materials to be used

- elevation and visibility of greenhouses and associated sheds
- earthworks, including dam construction
- erosion and sediment control measures to achieve effective stormwater management during construction and operation
- number of employees
- wastewater management system
- water treatment system
- landscaping plan (type and number of trees, irrigation system etc)

Site and building plans

Have you included plans that clearly indicate the location of the following?

- existing and proposed greenhouses, sheds, buildings and facilities, (e.g. fertiliser stores, fuel tanks - differentiate between existing and proposed)
- any significant vegetation to be disturbed
- landscaping (for example, screening plants, mounds)
- water storage areas
- vehicle parking, loading and turning areas and access roads
- building plans, specifications

Part C: Assessment and Management of Environmental Issues

Identify potential environmental issues and proposed mitigation measures including the development of an environmental management plan (EMP). For more information on environmental impacts and how to manage them, refer section 6 of these Guidelines.

- impacts on native vegetation and if relevant, threatened species, populations and ecological communities
- list of all approvals and licences required
- economic and social effects
- bushfire protection
- surface, groundwater and soils
- odour
- noise
- dust
- light
- visual impacts and landscaping
- traffic
- pests
- chemical usage (spray drifts and spills)
- management of waste and nutrient reuse
- community liaison and compliant management

An EMP specifies operational and management standards and practices. It also develops strategies and measures for minimising environmental risks and sets out contingency actions for managing environmental problems that may arise. For further information on the content of the EMP refer to section 6.1 of these Guidelines.

- Have you developed an EMP that identifies potential environmental risks and proposes appropriate management?