CHAPTER 3.9 COMMERCIAL HYDROPONIC DEVELOPMENT

1.0 INTRODUCTION

Interest in commercial hydroponic development is likely to increase as a result of efforts to attract this form of development to Wyong Shire. Wyong Shire possesses a number of advantages in terms of its proximity to markets and the availability of inexpensive land. Commercial hydroponic development also raises a number of planning issues, concerning the management of land use conflicts with urban release planning decisions, monitoring water quality, and visual impact management. The provisions of this Chapter also apply to undercover horticultural developments which employ crop protection technology because of the similar issues that these proposals raise.

1.1 Objectives of this Chapter

- To provide a framework for the assessment of commercial hydroponic and undercover horticultural development in Wyong Shire
- To set out Council's requirements with respect to the establishment and environmental performance of commercial hydroponic and undercover horticultural development

1.3 Relationship to other Chapters and Policies

This chapter is to be read in conjunction with other relevant Sections of this Development Control Plan, including, but not limited to:

- Chapter 2.1 – Housing and Ancillary Structures
- Chapter 3.2 – Floodplain Management
- Chapter 3.6 – Tree and Vegetation Management
- Section 4 – Subdivision
- Council's Council's Civil Works – Design Guideline and Construction Specification

1.4 Glossary

Note: Generally, the terms used in this Chapter have the same meaning as those terms are defined within the WLEP 2013). Where a term is defined within the WLEP 2013, it is not repeated here. The following additional terms are relevant to this Chapter:

commercial hydroponic development means the growing of plants within structures without soil, except for produce grown for personal consumption or enjoyment, where the area using crop protection technology occupies an area greater than 2,000m^2.

horticulture using crop protection technology means the growing of plants within sheds, greenhouses, poly houses or other synthetic structures where the area:

- occupies an area greater than 2,000m^2, or

- is in the opinion of the consent authority, likely to have the potential to cause a significant impact on water quality, and includes the growing of vegetables, flowers, ornamental plants and orcharding, except for produce grown for personal household consumption or enjoyment

- does not apply to soil based activities involving fruit and vegetable cropping or orcharding activities which require shade cloth or hail netting.

1.5 Suitable Locations for Commercial Hydroponics and Horticultural Development with Crop Protection Technology

Commercial Hydroponic Development will only be considered by Council where Horticulture is permissible with consent under WLEP 2013.

The selection of a suitable site for commercial hydroponic development is vital to ensure a profitable, long term operation with minimum impact on the natural and social environment.

Key areas which are highly suited to hydroponic production are shown on Figure 1 Some areas within the Wyong Valleys and Kulnura Plateau may also be suitable but have not been specifically identified.

The areas which are identified by this Chapter represent the primary locations where commercial hydroponic and undercover horticultural development is most likely to be considered suitable. These are shown on Figure 1.

The areas which have been identified for the promotion of hydroponic activities provide for a range of time frames to cater for a variety of grower expectations, ranging from those seeking long term security from competing land uses to those which seek short term security and anticipate making a capital gain from realising urban development potential on their investment in the future.

OBJECTIVE

- To identify a number of key locations where commercial hydroponic development is to be promoted to minimise the potential for land use conflicts to occur with urban release area planning and adjoining land uses

REQUIREMENT

Generally, for a site to be considered suitable for commercial hydroponic development the following attributes should be present:

a areas of land which will not be developed for residential, industrial or rural-residential purposes in the near future;

b land which is not constrained by natural hazards such as flooding, steep slopes or significant ecological values;

c land with a good aspect and sites which are sheltered from strong dry winds;

d proximity to major arterial roads for transport;

e land which can be serviced by town water or from other sources such as dams, ground water or roof runoff from sheds;

f areas which contain a suitable range of lot sizes for hydroponic production - a minimum suitable lot size for an operational hydroponic farm would need to be in excess of 2 hectares as areas for landscape screening, working areas and internal roads will also need to be provided.

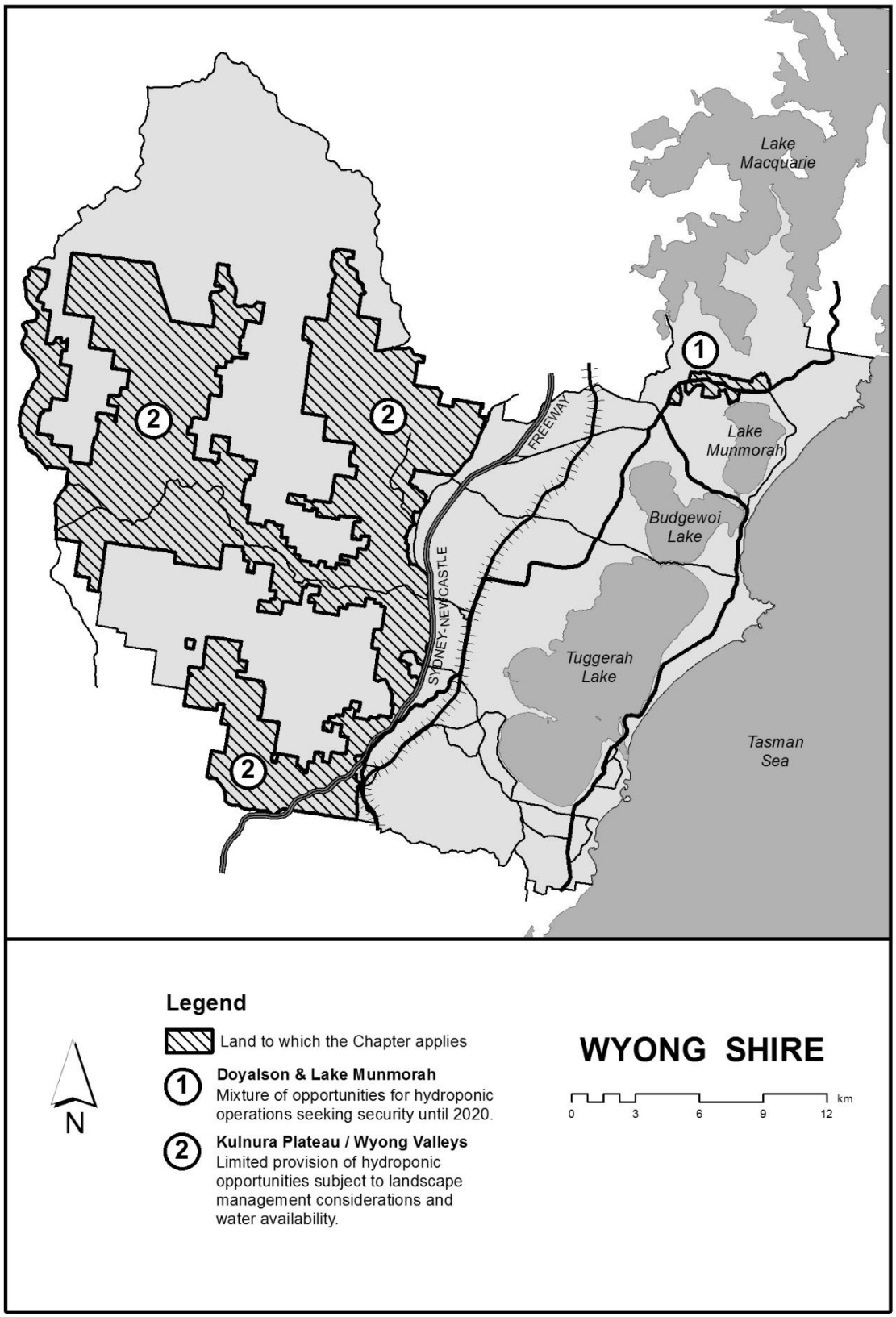


Figure 1 Areas suitable for hydroponic production

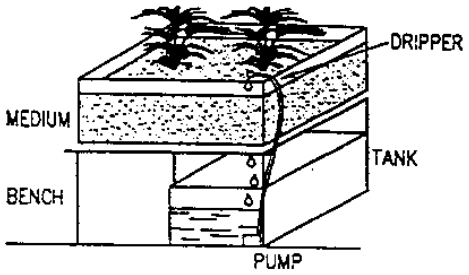
2.0 DEVELOPMENT REQUIREMENTS

2.1 Water Quality and Water Supply

Most commercial hydroponic operations have a closed drainage system which recycles water draining from irrigated plant beds. Recycled water from hydroponic operations contains high levels of residual nutrients, and is not suitable for discharge into natural drainage systems. Many operations recycle this water a number of times and there is no off site drainage. The escape of drainage waters with high nutrient levels represents a potential pollution problem for downstream lands. At the end of the nutrient recycling process, a concentrated nutrient solution is often produced. This material should not be spread over lawns but should be transferred to a nutrient recycling facility or treated using appropriate technologies.

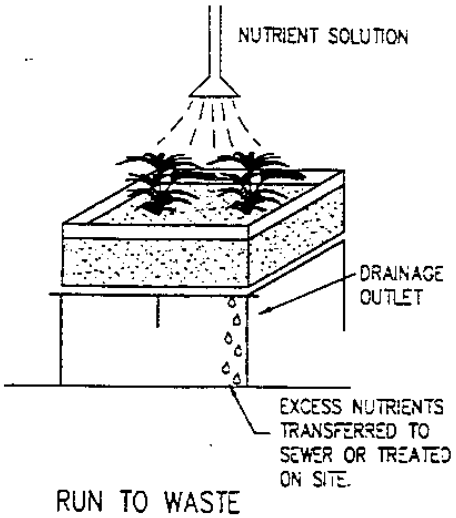
Hydroponic systems are generally of two types:

a Recirculating (closed) method of solution dispensation, where the solution is applied from the top of the bed, and excess nutrient solution drains through the substrate and is collected in a pond which is then re-used.



CLOSED

b Open (also called a "run to waste") method of solution dispensation. Under this system, excess solution runs through the substrate out of the system. Spent solution is then purified through filtering before being recycled in the system or is treated before disposal.



RUN TO WASTE

Run to waste systems are often less water efficient and may generate large volumes of nutrient enriched solution which requires treatment or disposal. Opportunities exist for the treatment of water by using processes such as reverse osmosis, ozone filters, nutrient stripping ponds and artificial wetland treatment systems (non-interacting with groundwater). Open systems can be managed efficiently; however 'open' hydroponic systems will be required to contain and treat wastewater which is generated by the proposed activity.

Water quality and water quantity have an important effect upon the viability of hydroponic operations. Dam or bore water is generally unsuitable for hydroponic growing due to higher water treatment costs, but may be suitable for other types of horticultural activities which use protective cropping technology. Dam water can often cause fungal disease, bacteria, pesticide and residue problems and is often avoided by the industry. High quality groundwater exists in the Kulnura Plateau and would be suitable for hydroponic uses providing water resource management concerns are addressed.

Hydroponic operations should also contain composting and green waste storage areas.

OBJECTIVE

- To ensure that surface and ground water resources are not adversely impacted by hydroponic development activity

REQUIREMENTS

a No discharge of wastewater or grey water reservoirs onto downstream lands will be permitted.

b Roofwater collection dams are to remain separate from grey water reservoirs.

c All commercial hydroponic operations are to have drainage systems installed which do not interact with soil and groundwater.

d Local drainage patterns are to be maintained and drainage lines should be located to catch stormwater. Stormwater should be directed to a suitable dam or water trap to prevent the direct discharge or leakage of stormwater from the site. Downstream effects on sensitive areas, such as wetlands from changes to natural water flows or existing retention areas should also be investigated.

e Artificial wetlands may be used to remove nutrient loads from wastewater and should be differentiated from natural wetlands. Landholders may elect to install recycling and water treatment systems including artificial wetlands for the treatment of spent solution. Mini wetlands, nutrient stripping ponds, reed beds or macrophyte plants that absorb nitrogen and phosphorus can also be used.

f Drainage lines and dams are to be installed before the erection of any structures.

g Structural soil conservation works are required to control surface runoff.

h Development applications for commercial hydroponic activities should seek to provide information to Council in the form of a water balance model if extraction from surface or ground water resources is proposed to be conducted.

i On site sewage management systems for site residences will need to satisfy Council's requirements.

j Composting and green waste storage areas provided on-site should be bunded in order to ensure that they drain into grey water reservoirs.

k Where there is connection to Council's water and sewerage system, works are to be in accordance with Council's Council's Civil Works – Design Guideline and Construction Specification.

2.2 Noise and Odour

Some hydroponic activities generate a substantial amount of plant residue after harvesting. These materials may be recycled, and mixed with soil and reused for growing new crops. Alternatively, this material may be disposed off-site or composted on-site using worm farms. Noise generated by ventilation fans, coolrooms and generators will also need to be considered and greater separation distances from dwellings may be required to prevent land use conflicts.

OBJECTIVE

- To ensure that commercial hydroponic development has minimal adverse impact on the amenity of surrounding areas by way of noise and odour

REQUIREMENTS

a If on-site composting occurs or green waste storage areas are to be developed, issues such as odour shall be considered and appropriate separation distances nominated from adjoining residences.

b Dominant wind directions may also need to be considered in locating green waste storage areas away from nearby residences or considering the impact of noise from ventilation fans on adjoining dwellings.

2.3 Visual Impacts

Greenhouse and hydroponic sheds may have adverse visual impacts on landscape quality. Many sites where hydroponic activities are sited occur in highly visible locations which adjoin major roads. Development in visually prominent locations will be required to outline the types of landscape treatment measures to reduce visual impacts.

OBJECTIVE

- To manage the visual impacts of hydroponic development

REQUIREMENTS

a A Landscape Report and Visual Assessment is to be submitted with any commercial hydroponic proposal where it is considered by Council that the site is a visually significant location.

b Dense landscape treatment measures or landscape mounding measures are required to screen greenhouse structures. The initial planting will be required to be advanced trees.

c Greenhouse structures are to be set back a minimum of 30 metres from the front boundary of any road and 10 metres from any side boundary. Council may require greater setback distances for commercial hydroponic operations which occur in visually prominent locations like those properties which front the Pacific Highway and other main roads.

d Maintenance of natural airflows should be considered around sheds when planning a tree or a shrub planting program.

e Use materials and colours which compliment the features of the landscape in visually exposed locations.

f Vegetation should be retained and massed plantings established to enable effective screening of lightly coloured and reflective structures, such as igloos and shade houses.

2.4 Cut and Fill Impacts

To provide optimum ground level conditions for the irrigation of plantation beds, hydroponic activities typically have to modify ground levels to attain a slight fall in ground levels. Sites having slopes ranging from 2-8% usually define the limits of hydroponic development potential. Sites having slopes in excess of 8% are generally not favoured by the industry, as more extensive earthworks involving cut and fill are required to be undertaken which increases development costs.

OBJECTIVE

- To minimise the extent of cut and fill impacts and ensure appropriate sites are selected for developments

REQUIREMENTS

a Commercial hydroponic operations shall not be established on slopes which require extensive cut and fill works.

b Where cut and fill is necessary an Erosion and Sedimentation Control Plan shall be submitted.

2.5 Mine Subsidence

Hydroponic structures, including the hydroponic system, can be significantly affected by mine subsidence. Specific subsidence design requirements may need to be satisfied for structures, including greenhouses, sheds, cool rooms, growing trays and water reticulation systems. The hydroponic system must be designed to maintain production whilst the effects of mine subsidence are being experienced and be readily returned to normal operation upon completion of subsidence.

OBJECTIVE

- To ensure that mine subsidence risks and impacts are assessed

REQUIREMENT

All surface improvements, including additions or modifications, or subsidence associated with hydroponic or undercover horticultural development in a Mine Subsidence District must be submitted to the Mine Subsidence Board for approval.

2.6 Flooding

Hydroponic development must consider the potential impacts that flood behaviour may have on the development.

OBJECTIVE

- To ensure flooding and drainage issues are effectively managed

REQUIREMENT

Where land is subject to flood related development controls, all proposals must comply with Chapter 3.3 – Floodplain Management.

2.7 Existing Vegetation

OBJECTIVE

- To protect native vegetation and biodiversity

REQUIREMENTS

Council shall not grant consent to a development application for commercial hydroponic development involving the removal of existing vegetation unless it has made an assessment under Council's Chapter 3.6 - Tree and Vegetation Management and having considered:

a whether any species present are listed in Council's "Significant Species Schedule" attached to that plan, and any proposed measures for their conservation;

b the condition, maturity and useful life expectancy of remnant trees and native vegetation to be retained;

c impacts on scenic and visual amenity of the area;

d the existing and or potential ability for the vegetation to support wildlife habitat, (whether or not presently threatened or endangered) either as an island or part of a larger wildlife corridor;

e the need for bushfire hazard reduction;

f impacts on water quality and likelihood of soil erosion, siltation of streams, farm dams and other water bodies;

g the need for retaining vegetation by providing:

  i buffer zones for landscape to roads and adjoining properties, for the protection of aesthetic qualities, core habitats and as a wind breaks;

  ii filter and protection strips to natural drainage lines, watercourses, streams or constructed drainage channels;

  iii streambank and soil stabilisation;

  iv riparian habitat strips;

v wildlife and other green corridors connecting remnant patches of vegetation; and

vi exclusion zones for preserving vulnerable and or significant vegetation and species.

h the effectiveness of measures proposed to mitigate any potential adverse impact including supplementary planting which may be proposed;

i any comments made by a relevant government agency; and

j whether the vegetation is affected by the provisions of any other Act, regulation or State Environmental Planning Policy applying to the land.

2.8 Traffic and Road Impacts

OBJECTIVE

- To minimise the impact of vehicular movements on surrounding properties and other road users

REQUIREMENTS

a Council shall assess potential traffic impacts having considered:

i estimated average and maximum hourly, daily and weekly truck movements; indicate proposed truck types and sizes; indicate if trucks will arrive or leave in convoy or queue to enter the site or need to wait outside;

ii proposed truck routes;

iii physical condition of the roads;

iv measures to prevent dust generation; and

v identify any road safety or sight distance constraints for turning traffic into or from the farm access road.

b Internal access roads should be of all weather design and have adequate turning areas for large articulated vehicles where required.

2.9 Lot Size and Shape

OBJECTIVE

- To ensure that new development occurs on appropriately sized and shaped lots

REQUIREMENTS

a An assessment must be conducted to confirm that the site which is proposed to be used for hydroponic production is of sufficient size to accommodate the facility and should be in excess of 2 hectares in size to allow adequate areas to be provided for landscape treatment, vehicle manoeuvring, boundary setbacks and production areas.

b Encourage boundary adjustments between land owners in order to improve the viability of hydroponic proposals, without encouraging additional entitlements for subdivisions.

c The fragmentation of land which is within hydroponic areas will not be permitted, however, development proposals which involve the leasing of land to a variety of tenants as part of integrated hydroponic developments may be considered.

2.10 Rural Workers' Dwellings

Rural workers' dwellings for commercial hydroponics and other forms of undercover horticulture will not be permitted within urban release areas. The establishment of rural workers' dwellings can generate situations where short term operations are abandoned and properties are over-capitalised due to the erection of additional dwellings within future urban release areas. Additional dwellings within urban release areas can create pressures for subdivision causing further fragmentation.

2.11 Disposal of Plastics

Most hydroponic developments rely on plastic covering and this needs to be replaced every five years and will require disposal.

OBJECTIVE

- To ensure appropriate disposal of waste materials

REQUIREMENT

Plastic covering should not be left on site and Council should be approached concerning recycling options for this material.

3.0 APPLICATION AND CONSULTATION PROCEDURES

3.1 Accompanying Documentation

Applicants are advised to first discuss their proposal with Council's Development Assessment Unit to determine the level of documentation which is required. The figure below (Figure 2) shows an indicative example of a layout outlining features of a well designed commercial hydroponic development.

a The following should be used as a guide to determine the level of information required. However, not all matters outlined will be applicable to every proposal, conversely additional information may be required which has not been listed:

i a clear and detailed site plan indicating the location of **all proposed site works and features** including:

- location of dwellings, site office, sheds, storage areas for equipment fuel, pesticides and fertilisers;
- greenhouse sheds and areas for future expansion;
- nutrient detention ponds and water storages;
- location and extent of any existing native vegetation to be removed including a detailed description of species;

- employment numbers;
- hours of operation (construction, harvesting, transport, maintenance, etc.);
- topographic features and landscape;
- consideration of visual impact on land within the line of sight of the proposed development.
- consumption of town water after considering rainwater capture and water recycling must be estimated;
- transport, access, loading and unloading requirements;
- water management plan; and
- waste disposal arrangements.

ii details of the materials of construction of all sheds or igloos are to be submitted;

iii details of engineering calculations for water consumption to enable contribution charges to be calculated;

iv previous site development history;

v existing watercourses and extent of flooding over the subject property; and

vi location of any existing service easements.

b The Mine Subsidence Board must be contacted early in the planning process to determine specific design criteria to address mine subsidence issues.

Note: Structures such as igloos and sheds which are associated with these types of agricultural production are defined as buildings under the Building Code of Australia, 1993. Accordingly, a Construction Certificate must also be obtained before any work proceeds. This can be obtained by making application to Council or alternatively opportunities may exist for these to be issued by private certifiers.

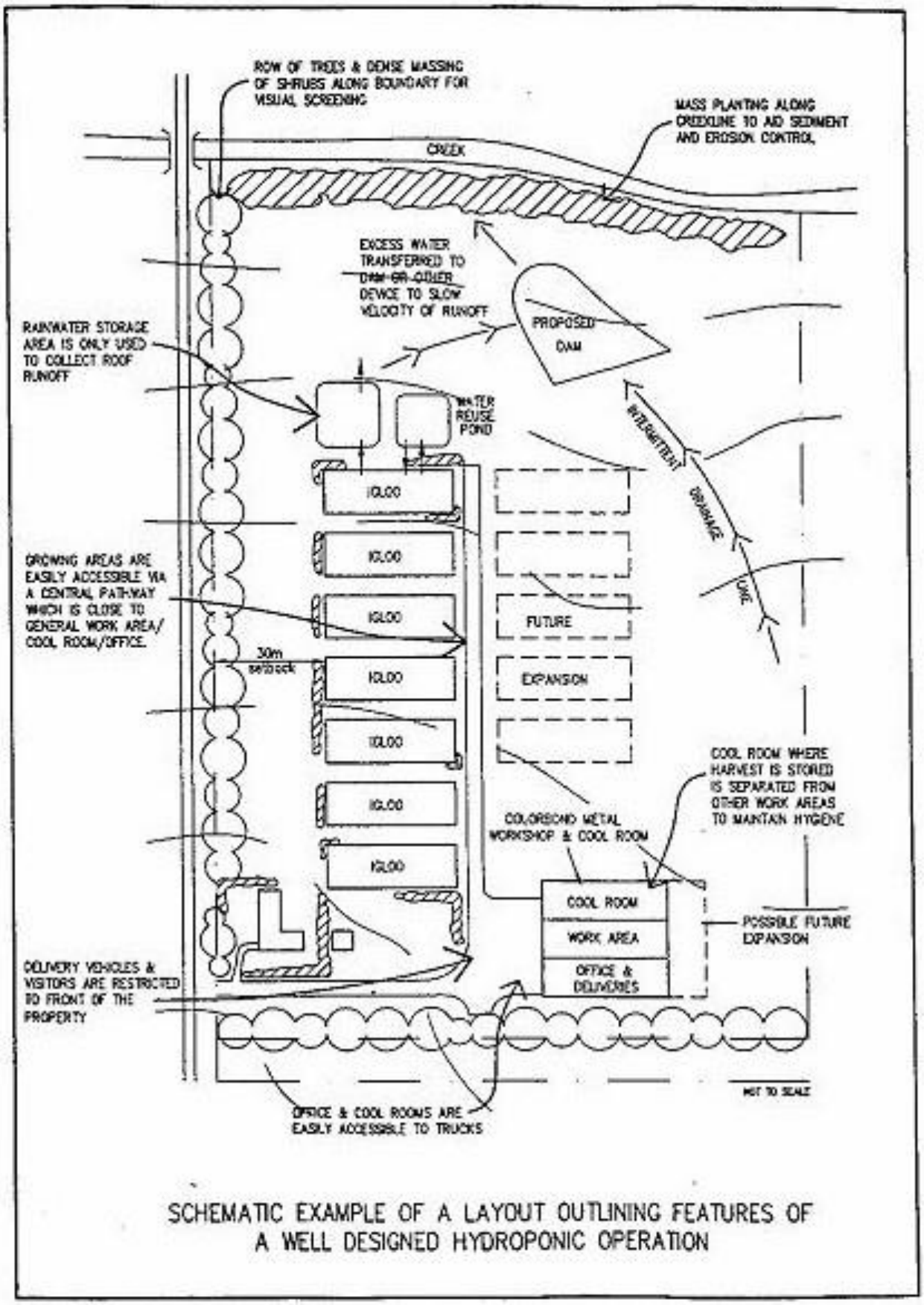


Figure 2 Site layout principles diagram