Selected scheduled premises

Publication 1659* June 2017

* This publication replaces Section 3 of *Works approval application* guideline (publication 1307.10)

Prompt sheets

Contents

Authorised and published by Environment Protection Authority Victoria
200 Victoria Street, Carlton VIC 3053
W epa.vic.gov.au | T 1300 372 842 (1300 EPA VIC)

Selected scheduled premises prompt sheets

Introduction

This publication has been developed as supporting reference material for you. It consists of the following information by most scheduled categories listed in the *Environment Protection (Scheduled Premises) Regulations 2017*:

- common operational activities
- key potential environmental impacts
- examples of best practice for pollution controls of key impacts.

When to use

You can use the prompt sheet(s) relevant to your proposal to ensure that key environmental impacts are addressed in the application and to know what constitutes best practice.

General pollution control measures

The following minimum pollution control measures apply to most applications and are not repeated in the prompt sheets for simplicity. The prompt sheets will outline additional pollution control in these areas where required by the scheduled premises:

Best practice can only be broadly defined at this scale of resolution.

Energy

- identifying the source(s), quantity and purpose of energy used at a site, and implementing energy-saving measures.

Noise

- engineering to reduce noise generation or enclosure of noisy areas and/or activities.

Stormwater protection

- preventing process wastewater and/or contaminated stormwater running to surface water or drains without treatment
- segregating, collecting and treating contaminated stormwater run-off to the qualities suitable for discharging to surface water or drains.

Land and groundwater

- storing wastes and chemicals in bunded areas, designed to meet the requirements in the *Bunding Guidelines* (EPA publication 347).

What is not included

This publication doesn't cover every scheduled premises category.

Scheduled premises	Reason
A02 Other waste treatment	This publication does include a prompt sheet on A02 e-waste reprocessing facilities, however, as the A02 category involves a wide range of treatment and disposal processes, all other types of A02 scheduled premises will be assessed on a case by case basis.
A05 Landfill	Refer to the Best Practice Environmental Management: Siting, Design, Operation and Rehabilitation of Landfills (EPA publication 788)as it provides comprehensive information of best practice landfill design.
A06 Land disposal	This type of premises will be assessed on a case by case as it may involve different types of waste streams (eg. effluent and/or biosolids).
A08 Waste to energy	Common activities are related to A01, A02, A07 and A08 premises and are assessed under these types of works approvals. Refer to the Energy from waste guideline (EPA publication 1559) for best practice and energy recovery efficiency information.

Selected scheduled premises

C01 Extractive industry and mining	EPA's assessment of potential environmental impact and best practice focus on wastewater discharges on a case-by-case basis. This includes wastewater minimisation, characterisation, treatment and monitoring.
L02 Contaminated sites – onsite soil containment	Depending on a proposal, this type of premises will be assessed on a case-by-case basis using the Landfill BPEM.
L04 Contaminated sites – long-term management	This type of premises has soil or groundwater contamination and is managed through notices under the EP Act and is exempted from a works approval and licence.

Waste treatment, disposal and recycling

A01 PIW MANAGEMENT (storage, handling, treatment)

Storage, treatment, reprocessing, containment or disposal facilities handling any prescribed industrial waste not generated at the premises.

Schedule A01 activities involve a broad range of wastes of widely different chemical compositions and can be in the form of solids, sludges or liquids.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls Levels of PIW handling and treatment are highly variable, therefore, pollution control measures listed below cannot be specific.	
• receiving, storing and handling PIWs ▪ loading and unloading PIW ▪ storing and containing PIW ▪ consolidating PIW (from small packaged into bulk or semi-bulk) ▪ consolidating and storing hazardous materials • treatment ▪ reprocessing PIW ▪ recycling PIW (sorting, deconstruction, chemical reaction, redistillation) ▪ treating PIW (e.g., conversion from category B to Class C waste hazard classification) ▪ destroying PIW • disposal ▪ disposal of PIW to appropriate destination ▪ transporting to final destination	***Energy*** • high energy consumption from inefficient equipment or systems • excess CO_2 emissions from inefficient/old pump systems. ***Air*** • from storing, handling, and treating waste, point source and fugitive emissions of: ▪ dust ▪ offensive odour and VOCs ▪ acid gases ▪ toxic or nuisance vapour and aerosols ▪ bio-hazardous materials. ***Noise*** • noise emissions from equipment and discharge points. ***Water, land and groundwater*** • generating wastewater from processing areas • seepage of contaminants to groundwater from processing equipment and storage of waste • discharging contaminants to land and stormwater. ***Waste*** • producing residual PIW and/or industrial wastes from treatment process • bulk transport of PIW.	***Separation distance*** • ensuring an appropriate separation distance of at least 500 metres (EPA publication 1518). ***Energy*** • identifying the source(s), quantity and purpose of energy used at a site, and implement energy-saving measures. ***Air*** • installing facilities treating odorous waste in a building with both point source and fugitive emission capture and treatment • capturing and treating air emissions from processing activities (e.g. storage, handling, treatment, etc.). Examples of treatment are: ▪ cyclone (dust) ▪ quench system (reduces temperature to avoid dioxin reformation) ▪ fabric filters/baghouse (remove dust) ▪ heat exchangers (temperature, energy efficiency) ▪ dry and wet scrubbers (scrubbing gases) ▪ carbon or lime injection system (removes particulates and acidic gases) ▪ venturi systems (scrubbing gases) ▪ biofilters (odour) – (refer to D02 for recommended biofilter design) ▪ water or chemical curtains (odour) ▪ RTO (odour + VOCs) ▪ carbon beds (odour + VOCs) ▪ high-efficiency particulate air (HEPA) filters • installing air emissions discharge and monitoring points. ***Land and groundwater*** • ongoing monitoring to ensure no impacts on land and groundwater from the site activities.	***Water/wastewater*** • capturing and storing rainwater from the roofs of the PIW buildings • segregating and collecting uncontaminated run-off • reusing and recycling captured water • installing triple interceptor trap with shut-off valve or first flush interceptor to capture contaminated stormwater. ***Waste*** ***Incoming waste storage, handling and treatment*** • constructing waste storage and processing on a secure area (i.e. hard stand, impermeable base) in an enclosed building • storing contaminated soil or PIW in a building with concrete bays and ventilation system • segregating waste by form and type (using waste codes etc.) ***Specific requirements:*** • incineration or thermal desorption must comply with the EU standard for operations and emission control requirements • medical, clinical and biomedical waste must be stored in refrigerated environment at less than 4°C • storing dangerous goods in accordance with WorkSafe requirements, e.g. ▪ AS1940 Storage and Handling of Dangerous Goods ▪ AS3833 Storage and Handling of Mixed Classes of Dangerous Goods. • storing PCB wastes separately in a secure and bunded area. ***Residual waste produced onsite (PIW and/or industrial waste)*** • implementing waste minimisation program • storing waste in a secured area (e.g. PIW is stored in enclosed buildings, stockpiles, sheds vessels) • segregating and storing dangerous goods in accordance with WorkSafe requirements as specified above.

Selected scheduled premises

A02 E-WASTE REPROCESSING (note other premises covered by A02 are not addressed in this table) **Premises with the capacity to reprocess more than 500 tonnes of specified electronic waste per year.**		
Common operational activities	**Potential environmental impacts**	**Examples of best practice for pollution controls**
• receiving a diverse range of used electronic products • storing e-waste and processed e-waste materials • consolidating and concentrating e-waste materials through a physical process • separation of components (raw materials) through manual and mechanical techniques, such as dismantling; shredding; spinning; smashing	***Air*** • offsite impact to air quality (fugitive emissions and dust) • emissions from fire caused by unintended combustion of electronic waste material ***Water*** • discharging contaminated stormwater to drains and/or surface water. ***Land and groundwater*** • seepage of contaminants to groundwater from processing equipment and storage areas • contaminating land around materials storage areas. ***Management*** • issues arise when waste that cannot be processed at the premises is received, for example, stockpiling can occur, which increases risks of leachate and fire. Whether whole e-waste; residual wastes; materials intended for further recycling; or products for use as a raw material in another process, all pose a significant risk to the environment. ***Noise*** • noise emission from transport and processing equipment. ***Energy*** • high energy consumption from inefficient equipment or systems.	***Air*** • adopting processing standards for e-waste (Australian Standard AS5377: 2013). • installing a dust collection system that reduces within requirement levels environmental emission and worker exposure to hazardous emissions and particulate matter. • Storing all equipment and components, including plastic fractions and metal from reprocessing under cover or in a way that avoids exposure to the weather and emissions to the environment. • reprocessing is carried out in an enclosed building • adopting a fire management plan and appropriate fire suppression equipment for the facility • installing an emergency shut-off system ***Water*** • storing materials and waste in a bunded area which is designed in accordance with the Bunding Guidelines (EPA publication 347) to keep contact water separate from clean stormwater • weatherproof coverings • measures to prevent potentially hazardous material entering stormwater drainage. • trade waste agreement to discharge to sewer or other measures • collecting and treating contaminated stormwater prior to discharge. ***Land and groundwater*** • constructing waste storage and processing on a secure area (i.e. hard stand, impermeable base) in an enclosed building ***Management*** • waste that can be processed at the premises is accepted, otherwise temporarily stored safely and moved off site as soon as practicable. • a tracking system in place to monitor waste coming into and out of your site to avoid unnecessary stockpiling of waste • both accepted e-waste and processed e-waste materials, including all components such as plastic fines, handled and stored with due care in order to prevent environmental emissions of hazardous substances. ***Noise*** • reprocessing is carried out in an enclosed building ***Energy*** • identifying the source(s), quantity and purpose of energy used at a site, and implement energy-saving measures

Selected scheduled premises

A03 SEWAGE TREATMENT
Premises on or from which sewage (including sullage) effluent, exceeding a design or actual flow rate of 5,000 litres per day, is treated, discharged or deposited.

Schedule A03 activities are contacted at a wide range of scales with varying degrees of automation.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls Pollution controls may vary depending on the design and the extent of automation.

• inlet structure to move coarse materials
  ▪ screens
  ▪ grit removal
  ▪ disposal of screenings and grit
• raw sewage balancing/buffer tank
• primary clarifier (for trickling filters)
• biological treatment (bioreactor)
  ▪ activated sludge
  ▪ trickling filter
  ▪ sequence batch reactor
  ▪ intermittently decanted extended aeration (idea)
  ▪ biological nutrient removal
  ▪ membrane biological reactors
  ▪ aerated lagoons
  ▪ facultative lagoons
• secondary clarifier
• chemical treatment for phosphorus removal
• disinfection
  ▪ chlorination
  ▪ UV irradiation
  ▪ maturation lagoon
• biosolids (sludge) management
  ▪ anaerobic/aerobic digester
  ▪ sludge thickeners (centrifuge, belt press etc)
  ▪ sludge drying beds
  ▪ solar sludge dryers
  ▪ reuse/disposal of biosolids
• Class A treatment
  ▪ micro/ultra filtration
  ▪ chlorine/UV disinfection
• discharge of treated sewage to inland waters or ocean outfalls, or
• reuse of treated sewage for irrigation and/or domestic third pipe system
	Air
	• emitting odour from all stages of treatment, particularly inlet structure, bioreactors and biosolids management.
	Water
	• discharging treated sewage to surface waters and ocean outfalls.
	Land and groundwater
	• reusing treated sewage on land. High application rate may result in over-irrigation and application of high-nutrient load to land, potentially causing soil degradation.
	Waste
	• disposing of screenings and grit
	• applying biosolids on land.
		Separation distance
		• ensuring an appropriate separation distance (section 11 of EPA publication 1518)
		Air
		• enclosing odour emitting treatment components, e.g.
		  ▪ inlet structure
		  ▪ bioreactor
		  ▪ biosolids treatment
		• collecting and treating odorous ventilation air by biofilters (refer to D02 for recommended biofilter design)
		• managing sewer catchment to minimise shock loads and toxicants that might compromise the biological treatment process, causing plant upsets which could lead to odour emissions and reduced treatment efficiency
		• providing covers to anaerobic treatment ponds with recovery of gas for electricity generation
		• installing sealed sludge digester so as to use methane gas for electricity generation.
		Water
		• using minimum secondary standard treatment to achieve Class C effluent quality as specified in Table 1 of the EPA publication 464 for reusing on land
		• treating sewage to the quality suitable for discharging to surface water in accordance with Tables A1 to A6 of SEPP (WoV)
		• regularly monitoring treatment components
		• installing bypass storage basins that can be used to contain surge flows after rainfall or provide a buffer storage during plant breakdown
		• using reclaimed water to replace potable water for parks, market gardens, open space irrigation.
		Land and groundwater
		• reusing treated wastewater sustainably on land in accordance with EPA publication 464
		• where appropriate, monitoring soil and groundwater in irrigated land.
		Waste
		• reusing sludge/biosolids in accordance with EPA publication 943
		disposing of solid wastes (for example, screening and grit) to landfill.

Selected scheduled premises

A04 INDUSTRIAL WASTEWATER TREATMENT

Premises on or from which industrial waste water effluent not generated at the premises, exceeding a design or actual flow rate of 5,000 litres per day, is discharged or deposited.

Schedule A04 activities are conducted at a wide range of scales with varying degrees of automation.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls Pollution controls may vary depending on the design and the extent of automation.

• inlet structure
  ▪ screens
  ▪ grit removal
  ▪ disposal of screenings and grit
• raw wastewater balancing/buffer tank
• primary clarifier (for trickling filters)
• biological treatment (bioreactor)
  ▪ activated sludge
  ▪ trickling filter
  ▪ sequence batch reactor
  ▪ intermittently decanted extended aeration (idea)
  ▪ biological nutrient removal (bnr)
  ▪ membrane biological reactors (mbr)
  ▪ aerated lagoons
  ▪ facultative lagoons
• secondary clarifier
• treatment for heavy metals removal
• sludge management
  ▪ anaerobic/aerobic digester
  ▪ sludge thickeners (centrifuge, belt press etc)
  ▪ sludge drying beds
  ▪ solar sludge dryers
  ▪ reuse/disposal of sludge
• discharge of treated wastewater to inland waters or ocean outfalls
• reuse of treated wastewater for irrigation and/or other purposes
	Air
	• emitting odour from:
	  ▪ all stages of treatment, particularly inlet structure, bioreactors and biosolids management and
	  ▪ plant upset.
	Water
	• discharging treated sewage to surface waters and ocean outfalls.
	Land and groundwater
	• reusing treated wastewater on land. High application rate may result in over irrigation and application of nutrients to land, potentially causing soil degradation.
	Waste
	• disposing screenings, grit and sludge.
		Separation distance
		• ensuring an appropriate separation distance (section 11 of EPA publication 1518).
		Air
		• enclosing odour emitting treatment components
		  ▪ inlet structure
		  ▪ bioreactor
		  ▪ sludge treatment
		• collecting and treating odorous ventilation air by biofilter (refer to D02 for recommended biofilter design).
		Water
		• using minimum secondary standard treatment to the quality fit for the intended reuse in accordance with EPA publications IWRG632 and 464,
		• managing wastewater generation to minimise shock loads and toxicants that might compromise the biological treatment process to, causing plant upsets which could lead to odour emissions and reduced treatment efficiency.
		• regularly monitoring treatment components
		• providing covers to anaerobic treatment ponds with recovery of gas for electricity generation
		• installing bypass storage basins to provide a buffer storage during plant breakdown
		• using reclaimed water to replace potable water for parks, market gardens, and/or open space irrigation
		• installing a sealed sludge digester to use methane gas for electricity generation.
		Land and groundwater
		• reusing treated wastewater sustainably on land in accordance with EPA publications IWRG632 and/or 464, or discharging to sewer
		• where appropriate, monitoring soil and groundwater in irrigated land.
		Waste
		• disposing screenings, grit and sludge to landfill, or
		• reusing selected quality of sludge/biosolids in accordance with EPA publication 943.

Selected scheduled premises

A07 ORGANIC WASTE PROCESSING

Premises on which organic waste is processed by aerobic or anaerobic biological conversion and which—(a) accept more than 100 tonnes or 200 cubic metres of organic waste in any month; or (b) accept more than 70 tonnes or 140 cubic metres of organic waste in any month and produce more than 50 tonnes of pasteurised material, compost or digestate in any month.

Schedule A07 activities involve a broad range of wastes with widely different chemical composition.

Common operational activities	Potential environmental impacts	Industrial common practice for pollution controls
		Pollution control required will vary according to waste types being composted. Refer to EPA 1588, *Designing, constructing and operating composting facilities* for further details on requirements for management of composting operations.
• waste characterisation and transport • waste acceptance, and pre-treatment storage • pre-processing, decontamination, chipping • mixing and preparation • pasteurisation, treatment • maturation, curing • batching, loading • leachate management • fire management	***Air*** • offensive odour emissions from raw organic materials, composting process, product, contact water, machinery and turning/aeration • air emissions from: ▪ aerobic treatment: carbon dioxide, ▪ anaerobic treatment: methane • bioaerosol emissions during the movement or agitation of materials at any stage of the operation • dust emissions from storage, grinding, mixing, screening and transport of composting materials • emissions from fire caused by unintended combustion of composting material **Noise** • noise emissions from mobile and fixed machinery, and transport vehicles. **Water** • generating contact water (excessive moisture in feedstock) during waste acceptance, and pre-treatment storage • generating contaminated stormwater and leachate during decay of material, through flow after rain events. **Land and groundwater** • contaminating groundwater with leachate (nitrates and phosphates) during batching and loading • spreading **Waste** • litter from vehicles, screening, shredding, chipping, and	**Separation distance** • ensuring an appropriate separation distance: ▪ large composting facilities (over 36,000 tonnes) ▪ small to medium composting facilities (less than 36,000 tonnes/year) • ensuring an appropriate separation distance from compost facility to surface waters of at least 100 metres • ensuring an appropriate separation distance from processing windrows and finished product storage to irrigation channels of at least 60 metres. **Air** • capturing and treating air emissions from in- vessel composting using secondary control equipment (e. g. thermal regenerative oxidation, biofilter (refer to D02 for recommended biofilter design) • installing secondary treatment (e.g. biofilter) to treat air emissions from the liquid waste storage area to prevent any venting of odorous air directly to the atmosphere • constructing access roads with hard stand, ideally completely impervious (asphalt, concrete) • using mixing pits for blending liquid and solid wastes • installing silt traps prior to leachate dams and ensuring that they are aerated so that aerobic conditions are maintained. • installing shelters, covers or water spray system for unloading area to minimise dust emissions • creating a homogenous compost recipe incorporating best practice parameters listed in table 3.2 (Guide to Best Practice at Resource Recovery Centres) (i.e. moisture, oxygen, temperature, carbon/nitrogen ratio and pH) • complying with processing and product standards for compost (Australian Standard AS4554: 2012) **Noise** • restricting hours of operation appropriate to zoning and during week days only • installing mufflers on mobile equipment • enclosing noisy equipment • using noise attenuation systems around noisy machinery, mobile chipper, screen, loaders and specialty turners. **Water** • installing a mixing pit to adjust moisture content of incoming waste streams to prevent run-off

	unloading • carrying waste, weeds or pathogens offsite through vermin, birds and wind	• installing sumps and shut-off valves in liquid mixing pit to ensure that no liquid waste is pumped in to the leachate ponds and trucked offsite • designing leachate collection dam with sufficient capacity to cope with run-off during a one-in-20-year storm event and during 9th decile (90th percentile) wet year • installing silt traps prior to the inlet of the leachate collection dam. **Land and groundwater** • installing a leachate collection dam which is constructed with an impermeable lining before reuse in waste blending or disposal to sewer or land (EPA publications IWRG632 and /or 464) • constructing hard stands for active process areas (for example, material receiving area and composting pad, which are drained drains towards leachate collection dam. **Waste** • manually picking out litter during screening, shredding, chipping • decontaminating and chipping putrescible waste within 24 hours of receiving to prevent odour generation (Guide to Best Practice at Resource Recovery Centres) • designing the facility to allow processing of odorous feedstocks as soon as possible and not longer than three days • reducing the addition of water to compensate for particularly high moisture content green waste • removing hard waste within seven days at most (Guide to Best Practice at Resource Recovery Centres) • storing ‘‘product’’ on hard stand, impervious area with associated run-off infrastructure to prevent eutrophication of soil/water in contact with concentrated product • ensuring no material remaining in the liquid mixing pit after blending to avoid anaerobic conditions • designing compost facility to allow treatment of material within no more than three days, preferable within 24 hours. **Others** • covering windrows immediately for insect, birds and rodent control • pest control (baiting, insecticides). **Recommended composting pad design** • ensuring slope from the composting pad is towards leachate dam to capture leachate • providing cut-off drains, bunding and hard standing to keep contact water separate from clean stormwater, and to minimise groundwater intrusion • composting pad should be sealed using suitable, stable, low-permeability (1 x 10-9m/s) construction material such as concrete or low permeable clay, that is able to support the weight of the material and machinery • planting a few metres of grass/turfed as a sediment filter between the pad and the pond • designing windrows and piles between 1.5 and 3 metres high

Selected scheduled premises

A09 WASTE TYRE STORAGE

Premises with more than 40 tonnes or 5000 EPU of waste tyres at any time.

Schedule A09 activities involve a range of uses that involve an aspect of waste tyre storage.

Common operational activities

- receiving, storing and handling waste tyres
  - loading and unloading waste tyres or tyre-derived product
  - storing and containing waste tyres or tyre-derived product
  - consolidating waste tyres (from individual tyres into bulk or semi-bulk)
- processing
  - shredding, cutting or grinding waste tyre or tyre-derived product
  - recycling waste tyres or tyre-derived product (sorting, reprocessing)

Potential environmental impacts

Energy

- high energy consumption from inefficient equipment or systems

Air

- dust emissions from storage, processing and transport of waste tyres and tyre-derived product
- emissions from fire caused by unintended combustion of waste tyres and tyre-derived product

Noise

- noise emissions from transport and processing equipment

Water, land and groundwater

- seepage of contaminants to groundwater from processing equipment and storage areas
- discharge of contaminated fire water to land and stormwater in the event of a fire

Waste

- producing residual industrial wastes from treatment process

Industrial common practice for pollution controls

Energy

- identifying the source(s), quantity and purpose of energy used at a site, and implement energy-saving measures

Air

- constructing access roads with impervious surfaces (e.g. asphalt, concrete)

Noise

- installing noise attenuation systems for noisy machinery or mobile equipment

Land and groundwater

- constructing hard stands for active process and storage areas (i.e. material loading and unloading and storage areas), or in an enclosed building

Water/wastewater

- install bund walls or catchment pits to contain contaminated water, including run-off from fire fighting activities

Waste

Incoming waste storage, handling and processing

- segregating waste types and whole tyres from processed product

Residual waste produced onsite (PIW and/or industrial waste)

- storing waste in separated areas to minimise potential fire fuel loads and maintain access paths
- segregating and storing dangerous goods in accordance with WorkSafe requirements in AS1940 and AS3833.

Specific requirements: Fire management

- Storage of waste tyres in accordance with the *Victorian Fire Services Guideline for the New or Used Tyres*

Primary industry and allied operations

B01 ANIMAL INDUSTRIES
Premises upon which are situated piggeries, cattle feedlots, sheep feedlots, goat feedlots, goat dairies or dairy freestalls, where more than 5000 animals are confined for the purposes of agricultural production.

Schedule B01 activities are conducted at a wide range of scales with different operational activities.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls Pollution controls may vary depending on the design and the extent of automation.
• raising animals (e.g. pigs, sheep and cattle) in paddocks and/or in open or covered pens • transferring animals to and from transport vehicles • cleaning out of animal wastes and dirt from pens • collecting and treating wastewater onsite • stockpiling or composting animal wastes onsite • reusing liquid waste and/or (composted) animal waste on land	**Air** • emitting odour from wastewater treatment system, and/or animal waste storage and treatment facility (composting). **Water** • discharging contaminated stormwater with animal waste to surface water. **Land and groundwater** • reusing treated wastewater on land. High application rate may result in over-irrigation and application of nutrients (animal wastes) to land, potentially causing soil degradation. **Waste** • handling animal carcasses and animal wastes.	***Separation distance*** • ensuring an appropriate separation distance of at least 500 metres for air emissions (EPA publication 1518) • if composting activity is proposed, refer to EPA publication 1588. ***Air*** • requiring more advanced compost facility instead of static piles if a facility is not meeting separation distance requirements • collecting and treating odorous emissions from the wastewater treatment facility. ***Water*** • preventing untreated process wastewater and contaminated stormwater running into surface waters, drains or land • collecting and treating process wastewater and contaminated stormwater • discharging wastewater to sewer or treating wastewater using minimum secondary standard treatment to a standard acceptable to EPA. • dry cleaning animal wastes in preference to hosing out. ***Land and groundwater and waste*** • rotating animals in paddocks for outdoor operations to ensure sustainable land use • if carcasses are buried onsite, burial pits must be constructed: • at least 2 metres depth between base level and groundwater • using compacted clay which has a thickness of at least 0.5 metres and a permeability of less than $1x10^{-9}$ m/s • if composting carcasses and/or animal wastes onsite, these wastes must be composted in a purpose-built facility, including hard standing and bunding (refer to A07 for design of composting pad) • reusing treated wastewater, liquid or solid by-product, and/or composted materials sustainably on land (EPA publications IWRG632) • monitoring soil on irrigated land and animals raised in paddocks. ***Waste*** ***Third party reuse and duty of care*** • assessing and managing environmental and health risks associated with the supply of treated wastewater, liquid or solid by-product, and/or composted materials • Providing recipients with a Duty of Care statement, including guidance on best management practices and applicable buffers.

Selected scheduled premises

B02 LIVESTOCK SALEYARDS OR HOLDING PENS **Livestock saleyards or holding pens which are designed to have a throughput of at least 10,000 animal units per year.**		
Common operational activities	**Potential environmental impacts**	**Examples of best practice for pollution controls** Pollution controls may vary depending on the design and the extent of automation.
• transferring animals to and from vehicles • holding animals in open or covered pens for sale • cleaning and storing animal wastes from pens • washing trucks • running food, toilet and shower facilities • operating an onsite wastewater treatment system, consisting of solids trap/screen, aerobic lagoons and storage pond • reusing wastewater to land or disposal to sewer	**Air** • emitting odour from animal holding pens, solid waste and wastewater treatment areas. **Noise** • emitting noise from trucks and animals. **Water** • generating wastewater from truck wash-down • discharging contaminated stormwater with animal waste to drains and/or surface water. **Land and groundwater** • reusing treated wastewater on land. High application rate may result in over-irrigation and application of nutrients (animal wastes) to land, potentially causing soil degradation.	***Separation distance/air*** • ensuring an appropriate separation distance of at least 500 metres (EPA publication 1518). ***Noise*** • enclosing noisy areas and/or activities with noise attenuation on the roof. ***Water*** • minimising wastewater generation • treating wastewater using minimum secondary standard treatment to achieve Class C wastewater effluent quality as specified in Table 1 of the EPA publication 464 • preventing wastes running to surface drains that run to surface waters • collecting stormwater for reuse, by putting roofs over building structures. ***Land and groundwater*** • reusing treated wastewater sustainably on land in accordance with EPA publication 464,or discharged to sewer • where appropriate, monitoring soil and groundwater in irrigated land • reducing land degradation by implementing a soft floor comprising of woodchip and shavings where waste is managed appropriately and recycled.

B03 FISH FARMS

Land based fish farms or other on-shore facilities for the cultivation of edible aquatic organisms with a design water flow rate of 0.2 or more megalitres per day.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls Pollution controls may vary depending on the design and the extent of automation.
• growing, harvesting and processing aquatic organisms inland and coastal (mariculture) • aquatic organisms include (but are not limited to) rainbow trout, brown trout, Chinook salmon, Atlantic salmon (inland) and abalone and finfish (mariculture) • rearing of fingerlings, yearlings and advanced yearlings of native fish for release in private dams • raising of Atlantic salmon for production of caviar • raising of rainbow trout for onsite fishing • aquaculture and ecological research • cleaning (gutting), freezing, smoking or cooking of caught fish (some sites) • composting aquatic waste including dead fish • disposing aquatic waste to landfill • treating wastewater from fish-processing activities • managing fish kills	**Air** • emitting offensive odours from fish kills. ***Water*** • polluting receiving waters with nutrients: ▪ ammonia ▪ suspended solids ▪ dissolved solids • discharging polluted water: ▪ with reduced dissolved oxygen concentrations ▪ of different temperature to receiving waters. ***Land and groundwater*** • reusing treated wastewater on land. High application rate may result in over irrigation and application of nutrients to land, potentially causing soil degradation. ***Waste*** • disposing of organic waste (e.g. fish kills) to land.	**Air** • putting in place an emergency plan to deal with fish kills. ***Water*** • containing sludge and sediment removed from ponds on the premises and not discharging it to surface waters (except where permitted by an EPA licence) • treating wastewater from fish processing activities (if applicable) to suitable standards for the receiving water • having only a single, defined water discharge point • locating a solid waste detention pond, free of fish, before the discharge point • measuring the flow of waste from upstream and discharge point • keeping records of the type, frequency and amounts of all feed and chemicals added to the fish and hatchery ponds, including veterinary, antibiotics and chemicals used for parasite and disease control. ***Land and groundwater*** • keeping fertiliser and feed in a weatherproof area • cleaning chemicals, decontamination chemicals • reusing wastewater and animal waste sustainably on land in accordance with EPA publications IWRG632. ***Waste*** • disposing solid wastes from fish processing, diseased or unwanted fish to an EPA-licensed premises allowing to accept this waste; or • composting wastes (e.g. fish pond sediments or fish kills) onsite in accordance with composting best practice (where applicable refer to A07 prompt sheet for the design of a composting facility).

Animal-derived by-products and food

D01 ABATTOIRS
Abattoirs, knackeries or poultry processing works which are designed to have a throughput of more than 200 tonnes per year.

Common operational activities

- receiving animals (for example, cattle and/or sheep)
- holding animals in semi-enclosed or open stockyards
- cleaning animal holding yards
- collecting and storing blood and other mixed animal material (MAM)
- (optional) rendering MAM and drying blood (requires an EPA D02 licence)
- collecting, storing and composting (optional) and disposing of paunch (rumen) contents, dead animals and/or manures
- collecting, treating and discharging wastewater to sewer or onsite (note: EPA D01 licence may not be required if wastewater is discharged to sewer or an EIP is approved by EPA)
- collecting, processing (optional) and transporting hides (cattle) and skins (sheep and goats)

Potential environmental impacts

Energy

- high energy consumption from inefficient refrigeration system.

Air

- fugitive odour emissions from animal holding yards, wastewater collection and treatment areas, solid waste storage and (optional) composting areas
- emissions from rendering plant (optional which requires an EPA D02 licence):
  - odour
  - smoke
- combustion emissions from a boiler:
  - CO_2
  - NOx
  - particulates.

Noise

- noise emissions from animal delivery, holding yards and fans .

Water

- run-off from wastewater irrigation area entering surface water
- discharging contaminated stormwater with animal waste to drains and/or surface water.

Land and groundwater

- reusing treated wastewater, biosolids or paunch waste on land. High application rate may result in over-irrigation and application of nutrients (animal wastes) to land, potentially causing soil degradation.

Waste

- handling of animal wastes (manures and paunch) and animal carcasses.

Examples of best practice for pollution controls

Separation distance

- ensuring an appropriate separation distance of at least 500 metres (EPA publication 1518)
- for onsite composting, refer to EPA publication 1588.

Energy/Water Use

- installing efficient refrigeration system.

Air

- collecting animal wastes and storing in an enclosed area
- enclosing odour-emitting wastewater treatment components
- processing materials for rendering or transporting them from site daily
- for rendering activity refer to D02 for the control of odour emissions.

Noise

- avoiding livestock delivery between 10 pm and 7 am
- engineering to reduce noise generation or enclosure of noisy areas and/or activities.

Water - Stormwater run-off management

- collecting stormwater for reuse, by putting roofs over building structures
- handling all solid and liquid wastes on sealed, free-draining areas
- preventing leachate (from onsite composting) or contaminated wastewater running to surface drains that run to surface waters
- transporting hides and skins in watertight bins on trucks fitted with drip catchment trays.

Wastewater:

- minimising wastewater generation
- collecting and treating process wastewater, using minimum secondary treatment to achieve Class C wastewater quality as specified in Table 1 of the EPA publications 464 and/or IWRG632
- collecting and securing transportation of blood, or dried onsite (EPA D02 licence required).

Land and groundwater

- reusing treated wastewater sustainably on land in accordance with EPA publications IWRG632 and/ or 464, or discharged to sewer
- where appropriate, monitoring soil and groundwater in irrigated land.

Waste

- properly storing, treating (optional) and disposing animal wastes
- designing adequate composting facility (refer to A07) for onsite composting of animal wastes.

Selected scheduled premises

D02 RENDERING

Rendering works, being works for the manufacture or extraction of substances derived from animals that are not suitable for human consumption and which are designed to have a throughput of more than 200 tonnes per year.

Common operational activities

- receiving and storing offal (e.g. mixed abattoir materials, whole animal carcases
- grinding raw materials and transferring materials to a surge bin
- producing edible and non-edible tallows/meals by rendering animal products in either high or low temperature cookers
- separation of tallows and solids using a press
- drying and grinding of rendering solids
- decanting (using a centrifuge) liquid stream from residual solids
- separation of water from tallow
- storage of tallow products
- blood drying
- packaging of meat meal and blood meal
- dispatching tallow and meal products.

Potential environmental impacts

Energy

- energy- and resource-intensive operation.

Air

- emitting offensive odour from raw material storage areas and process areas (the key issue for rendering facilities)
- combustion emissions from boilers:
  - CO_2
  - NOx
  - particulates.

Water

- discharging contaminated stormwater with nutrients, oil and grease to drains and/or surface water.

Land and groundwater

- discharging high-nutrient wastewater to land and waters
- reusing treated wastewater on land. High application rate may result in over-irrigation and application of nutrients, potentially causing soil degradation.

Examples of best practice for pollution controls

Pollution controls may vary depending on the design and the extent of automation.

Separation distance

- ensuring an appropriate separation distance of at least 1000 metres (EPA publication 1518).

Energy

- process efficiency
- heat recovery
- installing efficient motors and boilers
- optimising the site power factor.

Air

- fully enclosing raw material delivery bays
- fully enclosing storage rooms, rendering plant and milling plant in buildings
- collecting high odour concentration emissions from equipment (point sources)
- collecting full room ventilation air in raw material area, rendering plant and milling plant
- running rendering plant/building under negative pressure
- treating captured odorous air in a well-designed and maintained biofilter (see below for the recommended biofilter design) or other air treatment system that destroys odour to a sufficient level (<1,000ou under standard operation at the outlet of a biofilter after treatment).

Water

- capturing and treating contaminated stormwater run-off, processing wastewater, including 'stickwater' to standards:
  - acceptable by water authority for sewer discharge, or
  - for reuse on land using achieve minimum Class C wastewater effluent quality as specified in Table 1 of the EPA publication 464 and/or EPA publication IWRG632
- segregating rainwater and run-off water from process wastewater capturing areas.

Land and groundwater (if wastewater is reused on land):

- reusing treated wastewater sustainably on land in accordance with EPA publications IWRG632 and/ or 464
- where appropriate, monitoring soil and groundwater in irrigated land.

Recommended biofilter design

- build above-ground construction set on an impervious, concrete slab (drained to the onsite wastewater system)
- build with plenum floor for free draining of leachate and adequately distributed airflow through the biomass so that a minimum of 30 seconds retention time is achieved at any point across the biomass)
- air emissions from the biofilter are neutral or have compost characteristics and are <1000 odour units
- build multiple cells with free capacity with provision for isolating individual cells for maintenance
- inlet ducting system with provision for isolating individual cells for maintenance
- install a spray mist humidification system to maintain near 100% relative humidity in the inlet stream
- install an irrigation system within the biofilter to ensure that the biomass is maintained above 80% relative humidity
- maintain inlet air temperature below 40oC.Consider pre-treating the collected air (e.g. using scrubber or condenser) if the inlet temperature is too high

D03 ANIMAL SKIN TANNING
Animal skin tanning or re-tanning works.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls

• operating a boiler
• receiving skins or salted hides
• air drying skins in a hanging shed
• salting skins
• soaking and washing skins
• treating skins with lime and sulphides to remove hair and flesh
• tanning with acidified chromium sulphate salts
• colouring of the skins
• evaporation of wastewater in a membrane-lined drying basin
• treating wastewater
• treating odorous air emissions using a biofilter
	Energy
	• energy-intensive process from using inefficient boiler and motors.
	Air
	• emitting offensive odours from tanning drums and general works area.
	Water
	• discharging contaminated stormwater with high nutrient and salt to drains and/or surface water
	• discharging salt wastewater to surface water.
	Land and groundwater
	• contaminating land and groundwater by leakage of wastewater from a discharge basin
	• discharging high-nutrient or salt wastewater to land, potentially causing soil degradation.
	Waste
	• generating and disposing of:
	  • solid wastes including hair, protein and fats
	  • chrome-contaminated waste
	  • high salt content waste
	• sludge from wastewater treatment plant.
		Separation distance
		• ensuring an appropriate separation distance of at least 1,000 metres (EPA publication 1518).
		Energy
		• implementing burner maintenance and tuning
		• installing efficient motors
		• optimising the site power factor.
		Air
		• using process control on tunning drums to reduce emissions of volatile compounds (particularly hydrogen sulphide and ammonia).
		Water, Land and groundwater
		• segregating wastewater streams to enable more efficient treatment of each stream
		• preventing contaminated run-off and process wastewater containing nutrients and salts entering stormwater drains, surface water or land.
		Waste
		• accepting green (untanned) hides
		• oxidising the sulphide-containing wastes
		• recycling the spent chrome wastes
		• using solid wastes for fertiliser.

D04 SEAFOOD PROCESSING Seafood processing works with a processing capacity of more than 200 tonnes per year of seafood.		
Common operational activities	**Potential environmental impacts**	**Examples of best practice for pollution controls**
• unloading of fish • grading of fish • cleaning plant and equipment • sterilisation and can cooling • thawing • precooking • cooling	***Air*** • emitting odour from all stages of treatment, particularly inlet structure, bioreactors and biosolids management. ***Water, land and groundwater*** • discharging treated wastewater to surface water • reusing treated wastewater on land. High application rate may result in over irrigation and application of high-nutrient load to land, potentially causing soil degradation.	***Separation distance*** • ensuring an appropriate separation distance of at least 500 metres (EPA publication 1518). ***Air*** • enclosing odour emitting treatment components such as inlet structure, bioreactor and biosolids treatment • treating odorous ventilation air by biofilter (refer to D02 for recommended biofilter design) • installing covers on anaerobic treatment ponds with recovery of gas for electricity generation • using a sealed sludge digester and using digester gas for electricity generation. ***Water, land and groundwater*** • treating sewage to the quality suitable for discharging to surface water in accordance with Tables A1 to A6 of SEPP (WoV); or • using minimum secondary standard treatment to achieve Class C effluent quality as specified in Table 1 of the EPA publication 464 and/or EPA publication IWRG632 for reusing on land • reusing treated wastewater sustainably on land in accordance with EPA publications IWRG632 and/ or 464 • regularly monitoring treatment components • installing bypass storage basins that can be used to contain surge flows or provide a buffer storage during plant breakdown.

D05 PET FOOD PROCESSING Pet food processing or pet food manufacturing works, which are designed to produce at least 200 tonnes per year of pet food.		
Common operational activities	**Potential environmental impacts**	**Examples of best practice for pollution controls**
• operating a boiler • operating an abattoir and rendering plant (see D01 and D02) • cooking of pet food ingredients • canning and packaging of pet food product • treating odorous air discharges using biofilters • wastewater treatment • disposing treated wastewater to sewer or land	***Energy*** • energy-intensive process from using inefficient boiler and motors. ***Air*** • emitting offensive odour from process • discharging smoke from poorly controlled rendering cookers. ***Water*** • discharging contaminated stormwater with nutrients to drains and/or surface water. ***Land and groundwater*** • reusing treated wastewater on land. High application rate may result in over irrigation and application of high-nutrient load to land, potentially causing soil degradation.	***Separation distance*** • ensuring an appropriate separation distance of at least 500 metres (EPA publication 1518). ***Energy*** • implementing burner maintenance and tuning • installing efficient motors • optimising the site power factor. ***Air*** • promptly processing raw materials • fully enclosing raw material delivery bays and rendering building • collecting and treating odorous air from raw material area and rendering building using a biofilter (refer to D02 for recommended biofilter design). ***Water, land and groundwater*** • capturing and treating wastewater to a standard acceptable by water authority for sewer discharge or for the intended reuse in accordance with EPA publications IWRG632 and/or 464 • where appropriate, monitoring soil and groundwater in irrigated land.

Selected scheduled premises

D06 FOOD PROCESSING

Food processing works, being works in which food is preserved, canned, bottled, or dried by means of fuel fired plant, and which are designed to produce at least 200 tonnes per year of food.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls
• operating a boiler • processing and canning fruit and vegetables • refining and packaging sugar • producing and packaging dried soups and drinks • producing natural sausage casings • manufacturing confection (chocolate) • dehydrating meat and poultry • manufacturing nut, fruit, seed and muesli products	***Energy*** • energy-intensive process from using inefficient boiler and motors. ***Air*** • emitting odours from cooking and drying processes • emitting smoke to atmosphere • combustion emissions from a boiler: ▪ CO_2 ▪ NOx ▪ particulates. ***Water*** • discharging wastewater to surface water • discharging cooling water to surface water. ***Land and groundwater*** • reusing treated wastewater on land. High application rate may result in over-irrigation and application of high-nutrient load to land causing soil degradation. ***Waste*** • dumping organic wastes (plant and animal) to land.	***Energy*** • implementing burner maintenance and tuning • installing efficient motors • optimising the site power factor ***Air*** • control of drying and heating processes to prevent smoke production • collecting and treating odorous emissions from cooking and drying process using biofilters (refer to D02 for recommended biofilter design) or scrubbers. ***Water*** • treating wastewater to remove BOD, nutrients and solids prior to discharging to surface water or reusing on land • using minimum secondary standard treatment to achieve Class C effluent quality as specified in Table 1 of the EPA publications 464 and/or IWRG632 for reusing on land • minimising entry of stormwater into processing water catchments • protecting stormwater from food and wastes. ***Land and groundwater*** • reusing wastewater in accordance with EPA publications IWRG632 and/or 464 • where appropriate, monitoring soil and groundwater in irrigated land. ***Waste*** • managing wastes to prevent generation of offensive odours • preventing dumping organic wastes to land.

D07 MILK PROCESSING

Milk processing or dairy product manufacturing works, which are designed to produce at least 200 tonnes per year of product(s).

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls
• producing milk powder by spray drying • producing cheese and dips • producing 'evaporated' and condensed milk • operating air filters or scrubbers to prevent air discharging milk powder • treating wastewater and discharge of treated wastewater to surface waters • storing and treating wastewater	***Energy*** • high energy consumption from process e.g. drying. ***Air*** • emitting: ▪ airborne milk powder particulates from the drying plant ▪ odour • emitting combustion residuals from boilers: ▪ CO_2 ▪ NOx ▪ particulates. ***Noise*** • emitting noise from spray dryer. ***Water*** • discharging contaminated stormwater with nutrients and solids to drains and/or surface water • generating wastewater. ***Land and groundwater*** • spilling of dairy products and wastewater, potentially causing soil degradation. ***Waste*** • generating and discharging condensate to surface water. • generating and discharging salt from cheese-making process.	***Separation distance*** • ensuring an appropriate separation distance of at least 100 metres when producing >200 t/y (EPA publication 1518). ***Energy*** • chemical recovery/renewable energy • installing efficient motors and boilers • optimising the site power factor • using **low** pressure reverse osmosis (RO) desalination plant. ***Air*** • installing odour control facility in wastewater treatment plant: ▪ enclosing odour-emitting treatment component ▪ collecting and treating odorous ventilation air by biofilter (refer to D02 for recommended biofilter design) • diverting exhaust air from the drying plant to fabric filter or vacuum system prior to its discharge. ***Noise*** • installing noise attenuation barriers around milk processing plant, particularly for the spray dryer. ***Water*** • segregating stormwater run-off from condensate and milk wastes • installing stormwater diversion system to segregate contaminated stormwater run-off • segregating high-strength saline wastewater for disposal by evaporation • monitoring of wastewater volume and quality. ***Land and groundwater*** • capturing and treating wastewater (to remove BOD, nutrients and solids) to the standards: ▪ acceptable to the relevant water authority for sewer discharge ▪ suitable for discharging to surface water in accordance with SEPP (WoV), or ▪ suitable for reuse onsite in accordance with EPA publication IWRG632 • where appropriate, treating condensate to the standards acceptable to the receiving surface water in accordance with SEPP (WoV) • providing spill containment device/measures. ***Waste*** • managing salt by evaporation or offsite treatment.

Selected scheduled premises

D08 EDIBLE OIL

Edible oil or fat processing works, where seed crushing, solvent extraction or edible oil or fat deodorising takes place, which are designed to produce at least 2000 tonnes per year of product(s).

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls
• recovering oil from plant seeds (typically use presses or solvent extraction units) • refining oil by addition of alkalis (sodium hydroxide or sodium carbonate), heating the oil to remove gums, clarification by centrifugation, bleaching using clay or activated carbon to remove colours and steam treatment to remove odours • producing vegetable oils from seeds using a combination of thermal, mechanical and chemical extraction methods • manufacturing oleo-chemical products from tallow and coconut oil • producing animal feedstock and vegetable meals • processing of edible oils and fats • operating a boiler	***Energy*** • energy-intensive process from using inefficient boiler and motors. ***Air*** • emitting: ▪ odour from processing equipment ▪ hexane from chemical extraction ▪ particulates from handling of seeds and crushed seed residues. ***Water*** • discharging contaminated stormwater to drains or surface water.	***Separation distance*** • ensuring an appropriate separation distance of at least 500 metres (EPA publication 1518). ***Energy*** • implementing burner maintenance and tuning • installing efficient motors • optimising the site power factor. ***Air*** • fully enclosing process buildings which are operating under negative pressure • collecting odour emissions from point sources and fugitive emissions from process buildings • treating the collected odorous air e.g. using biofilter (refer to D02 for recommended biofilter design) • filtering dust-bearing air discharges using fabric filters. ***Water*** • segregating clean stormwater from process areas • capturing and treating contaminated stormwater prior to discharge (e.g. triple interceptor) • locating oil storage tanks in bunded areas in accordance with EPA publication 347.

D09 BEVERAGE MANUFACTURING **Beverage manufacturing or processing works except for—(a) wineries that process less than300 tonnes per year of grapes and discharge or deposit waste solely to land; and(b) other types of beverage manufacturing or processing works with a production capacity of less than 300 kilolitres per year and that discharge or deposit waste solely to land.**		
Common operational activities	**Potential environmental impacts**	**Examples of best practice for pollution controls**
• sorting fruit or vegetables • washing fruit or vegetables • truck wash-down • water purification • pasteurisation • juicing and pressing • processing • cleaning plant and equipment • cooling • operating a boiler	***Air*** • emitting odour from all stages of wastewater treatment, particularly inlet structure, bioreactors and biosolids management. ***Water*** • reusing treated wastewater on land. High application rate may result in over-irrigation and application of high-nutrient load to land causing soil degradation • discharging treated wastewater to surface water. ***Waste*** • Generating screenings and grit.	***Air*** • enclosing odour-emitting treatment components such as inlet structure, bioreactor and biosolids treatment • treating odorous ventilation air by biofilter (refer to D02 for recommended biofilter design). ***Water, land and groundwater*** • using minimum secondary standard treatment to achieve Class C effluent quality as specified in Table 1 of the EPA publications 464 and/or IWRG632 • regular monitoring of treatment components • installation of bypass storage basins that can be used to contain surge flows or provide a buffer storage during plant breakdown • reusing treated wastewater sustainably on land in accordance with EPA publication 464 and or IWRG632. ***Waste*** • providing covers to anaerobic treatment ponds with recovery of gas for electricity generation • using a sealed sludge digester with use of gas for electricity generation • disposing screenings and grit to a landfill.

Textiles

E01 TEXTILES

Textile manufacturing and processing works including carpet manufacturing, wool scouring, textile bleaching, textile dyeing and textile finishing works.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls
• manufacturing textile products, including dyeing, coating, printing and finishing • using 'stenters' (a type of dryer) for coating of the fabric • using an infra-red oven to dry and cure fabric coatings • using laminating ovens to attach plastic acrylic	***Energy*** • energy-intensive process from using inefficient boiler and motors. ***Air*** • emitting: ▪ volatile compounds, including formaldehyde ▪ odour, including ammonia. ***Water*** • discharging contaminated stormwater to drains and/or surface water • discharging wastewater high in salt/dyes to sewer.	***Separation distance*** • ensuring an appropriate separation distance of at least 250 metres EPA publication 1518. ***Energy*** • implementing burner maintenance and tuning • installing efficient motors • optimising the site power factor. ***Air*** • minimising odour emissions from selective use of chemical additives for fabric treatment • minimising the volatile content of fabric to be heated • minimising emissions of formaldehyde coming from laminators • using VOCs as lubricant • controlling emission such as products from combustion or partial products of combustions (CO, VOC, odour) from laminators. ***Water*** • locating chemical storage tanks in bunded areas in accordance with EPA publication 347 • loading and unloading chemicals in a bunded area constructed in accordance with EPA publication 347.

Wood and wood derivatives

F01 TIMBER PRESERVATIONS
Timber preserving works.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls
• preservative treatment of timber or timber products • formulating and impregnating wood with chemicals to protect against weather, fire, fungi, insects and marine borers • most common treatment processes are pressure treatments. Typical steps include: ▪ placing wood in a pressure vessel for treatment ▪ removing moisture from the wood in the vessel using suction ▪ pressurising vessel to impregnate wood with the treatment chemicals and solvent ▪ releasing pressure, removing chemicals and impregnated wood from vessel ▪ air drying wood on a drip pad which collects solvents for reuse • air drying treated wood to bring the moisture content down to around the fibre saturation point to produce unseasoned timber. Further drying will produce a redried, seasoned product	***Noise*** • emitting noise from forklift activities. ***Land and groundwater*** • discharging chemicals and solvents to land, surface water and groundwater from vacuum and pressure valves, and transfer pumps • sludge from the base of storage tanks and contaminated sawdust • contaminated rainwater accumulated in bunds.	***Separation distance*** • ensuring an appropriate separation distance of at least 100 metres when processing >10,000 m^3/y (EPA publication 1518). ***Noise*** • engineering to reduce noise generation or enclosure of noisy areas and/or activities: installation of noise baffles around noise sources, particularly elevated sources • utilising mufflers in mobile plant. ***Land and groundwater*** • management and best practice considerations for: ▪ preservation delivery, storage, blending and transfer areas for chemicals ▪ treatment areas with secure bunds ▪ storage areas for treated wood ▪ avoid underground storage tanks and pipelines ▪ secure drainage system ▪ waste storage and disposal area • monitoring and maintaining filters on recovery of solution process step • cleaning dip tank and plant bunded area regularly • locating plant in bunded area which is designed in accordance with EPA publication 347.

Selected scheduled premises

F02 FIBREBOARD

Fibreboard, particle board, or plywood works, being works in which wood, wood products or other cellulose materials are processed to form fibreboard, particle board or plywood.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls
• manufacturing particle board and medium-density fibreboard (MDF) • debarking and chipping of pine logs and pulping of woodchips to form the wood fibres • impregnation of wood fibres with urea-formaldehyde resin • heating of layers of impregnated wood fibres in steam-heated plates under pressure to form sheets of MDF • sanding of the formed sheets to provide sheets ready for market • operating a wastewater treatment plant • drying of chips	***Energy*** • energy-intensive process (dryer) ***Air*** • emitting: ▪ odour from treatment of pine and use of urea-formaldehyde resin ▪ formaldehyde (from the resin) to air ▪ smoke ▪ particulates from dryer ▪ airborne particulates to air from sawing and sanding of the formed sheets • combustion emissions of: ▪ CO_2 ▪ NOx ▪ particulates. ***Noise*** • noise emissions from wood chipping and elevated exhaust vents. ***Water*** • discharging contaminated stormwater from log storage area and chipping area to drains.	***Separation distance*** • ensuring an appropriate separation distance of at least 250 metres (EPA publication 1518). ***Air*** • monitoring the formaldehyde to fibre ratio and formaldehyde emissions to air • installing dryer emissions control, for example: ▪ fabric filters (baghouses) ▪ cyclones • removing airborne particulates from the sawing and sanding area and through cyclones or bag filters before discharge • managing operational controls to prevent fires in fibre and dust-handling ducts. ***Noise*** • engineering to reduce noise generation or enclosure of noisy areas and/or activities: installation of noise baffles around noise sources, particularly elevated sources. ***Water*** • segregating and treating stormwater run-off from the timber and woodchip storage yard prior to discharging • treating wastewater using aerated wastewater treatment ponds prior to discharging to sewer. ***Waste/Energy*** • recovering and reusing sander dust in onsite combustion – waste to energy.

F03 PAPER PULP MILLS

Paper pulp mills being works in which wood, wood products, waste paper or other cellulose materials are processed to form pulp, paper or cardboard.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls
• debarking and chipping of wood • pulping Kraft (or sulphate) of wood chips • mechanical pulping of wood chips • pulping of post-consumer paper and cardboard • chemical recovery boiler (Kraft mills) • lime kiln (Kraft mills) • bleaching or brightening of fibre using chlorine compounds or peroxides • screening and washing pulp • forming paper • treating wastewater • storing bulk chemical • steam boiler • producing turpentine and tall oil, which are by-products of Kraft pulping of softwoods (pine) • disposing fibre and wood chip rejects and other solid wastes to landfill	***Energy*** • very large energy users: ▪ natural gas ▪ electricity ▪ black liquor/recovery boiler. ***Air*** • emitting particulates from pulping, chipping and operation of the recovery boiler (carryover of chemical particulates) and lime kilns • emitting odour from: ▪ particularly Kraft mills from which the main odours are from reduced sulfur compounds ▪ pressure relief valves. ***Noise*** • noise emissions from equipment. ***Water*** • discharging contaminated stormwater (e.g. by timber and woodchip) to drains. ***Waste*** • generating solid waste of fibre screening rejects • generating PIW e.g. sodium sulphate (salt cake) waste.	***Separation distance*** • ensuring an appropriate separation distance of at least (EPA publication 1518): ▪ 100 metres when using semi-processed materials ▪ 250 metres when using cellulose and rans ▪ 5,000 metres when using sulfur-containing material ▪ case by case when using other methods. ***Energy*** • chemical recovery/renewable energy • installing efficient motors and boilers • optimising the site power factor. ***Air*** • collecting and diverting air discharged from storage tanks and pulping and chemical processing equipment to either heat destruction units or air scrubbers • using cyclones to capture particle emissions • installing alkaline air scrubbers for Kraft odour control. These can be supplemented by 'polishing' the final emissions through activated carbon filters ***Noise*** • engineering to reduce noise generation or enclosure of noisy areas and/or activities: fitting baffles to noisy vacuum pump exhausts. ***Water*** • capturing and treating stormwater run-off that may be contaminated by wood extractives (timber and woodchip yard) • recovering and reusing process water within the pulp and paper mill to minimise water uses. ***Waste*** • segregating and reducing the volumes of wastes required for landfilling • reusing bark ,fibre and salt cake from chemical recovery process, where applicable.

Chemicals including petroleum

G01 CHEMICAL WORKS

Chemical works (i) where products are manufactured by any chemical process, and which are designed to produce at least 2000 tonnes per year of chemical products; or (ii) where acrylic compounds, herbicides, insecticides or pesticides are manufactured by any chemical process.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls
• operating boiler • receiving and storing bulk raw materials, both solid and liquid • reaction (including polymerisation) of chemicals in enclosed vessels, some of which are pressurised • conversion of chemicals using heat or catalysts • solvent extraction systems • bulk storage of intermediates and products • product outloading bays (bulk or containerised) • controlled burning of waste materials – thermal oxidation or incineration • treatment of wastewater prior to discharge • treating air emissions using scrubbers, adsorption canisters or thermal oxidiser	***Energy*** • energy-intensive process (boiler and large motors) ***Air*** • emissions of: ▪ odorous and toxic chemicals ▪ particulates • combustion emissions from a boiler: ▪ CO_2 ▪ NOx ▪ particulates. • emissions during emergency events, e.g. ▪ runaway reactions ▪ fire ▪ emergency pressure relief ▪ operation of emergency discharge flare. ***Water*** • discharging contaminated stormwater processing areas to drains. ***Land and groundwater*** • seepage of chemicals from storage areas, potentially causing contamination of land. ***Waste*** • generating a wide range of wastes	***Separation distance*** • ensuring an appropriate separation distance on a case-by-case basis as specified in EPA publication 1518. ***Energy*** • chemical recovery/renewable energy • installing efficient motors and boilers • optimising the site power factor. ***Air*** • using vapour recovery systems for bulk liquid tank venting (diurnal 'breathing') and gases displaced during tank filling • using efficient vapour treatment, e.g. ▪ thermal oxidiser ▪ carbon canister adsorption units ▪ chemical scrubbers • using fabric filters (baghouses) to remove particulates • having contingency plans to deal with emergency events. ***Water*** • excluding rainwater and run-off water from process areas • installing stormwater protection, isolation and treatment infrastructure. ***Land and groundwater*** • segregating incompatible chemicals during storage • bunding and tertiary containment systems • storing chemical and waste in a bunded area which is designed in accordance with EPA publication 347. ***Waste*** • improving production efficiency and quality control • identifying and implementing waste reuse opportunities.

G02 COAL PROCESSING

Coal processing works, being works in which coal is converted to gaseous, liquid or solid products.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls
• operating boiler • manufacturing briquettes from brown coal • drying and pulverising coal • producing high quality carbon for use in barbeque fuel or industrial applications	***Energy*** • energy-intensive process (boiler and large motors). ***Air*** • emitting: ▪ dust from receiving, drying and pressing coal, as well as briquette handling ▪ odour ▪ VOCs ▪ GHG from burning coal and by-products. ***Water*** • discharging contaminated stormwater to drains • discharging treated wastewater to sewer, surface water or using on land • discharging brown coal sludge, usually to mine.	***Separation distance*** • ensuring an appropriate separation distance (EPA publication 1518). ***Energy*** • using waste heat to dry coal • chemical recovery/renewable energy • installing efficient motors and boilers • optimising the site power factor. ***Air*** • using best available dust and particulate (PM_{10}) capture e.g. ▪ fabric filters ▪ wet scrubbers for particles ▪ electrostatic precipitators (used when process is hot) ▪ cyclones. ***Water*** • preventing contamination of stormwater • capturing and treating contaminated stormwater prior to discharge • capturing and treating wastewater to a standard: ▪ acceptable to the relevant water authority for sewer discharge ▪ suitable for discharging to surface water in accordance with SEPP (WoV) ▪ suitable for reuse onsite in accordance with EPA publication IWRG632;or ▪ suitable for reusing on land in accordance with EPA publication 464.

G03 OIL AND GAS REFINING

Oil or gas refinery works, being works in which crude oil or gas is refined or hydrocarbon fractions are produced.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls
• operating boiler • compressing natural gas • refining natural gas • processing of crude oil to produce petroleum products including petrol, diesel and aviation fuel • storing and transferring crude oil • destroying volatile waste materials using a thermal oxidiser • treating wastewater • operating a waste disposal or emergency flare adding odorant (stenchant), such as mercaptan, to natural gas	***Energy*** • energy-intensive process (boiler and large motors) ***Air*** • emitting: ▪ odorous and toxic chemicals ▪ smoke. ***Noise*** • noise emissions from various process areas such as fan or compressors ***Water*** • discharging contaminated stormwater with hydrocarbons to drains • generating condensate (liquid hydrocarbons) from the refinement of natural gas. ***Land and groundwater*** • contaminating land with hydrocarbons. ***Waste*** • concentration of naturally occurring radioactive materials (NORMs) at some points in the system.	***Separation distance*** • ensuring an appropriate separation distance of at least 2000 metres (EPA publication 1518). ***Energy*** • using waste heat to dry coal • chemical recovery/renewable energy • installing efficient motors and boilers • optimising the site power factor. ***Air*** • minimising fugitive emissions to air through a leak detection and repair system. Examples are: an electronic air sampler or soapy water spray • capturing and treating volatile emissions from gas compressor plant • minimising sulfur emissions. ***Noise*** • engineering to reduce noise generation or enclosing noisy areas and/or activities: noise suppression on gas compressor stations. ***Water*** • installing stormwater protection, isolation and treatment infrastructure • removing oil in wastewater and stormwater discharged from the premises. ***Land and groundwater*** • storing chemicals and wastes in a bunded area which is designed in accordance with EPA publication 347 • installation of bunding • installing tertiary containment systems. ***Waste*** • minimising reliance on emergency flare for disposal of process wastes except under emergency conditions • minimising the quantity of volatile wastes requiring disposal by flare.

G04 BULK STORAGE **Bulk storage facilities which have a total design capacity of more than 1.0 mega litres (in tanks exceeding 10,000 litres capacity) and which store compounds of carbon (including petroleum products or oil) which— (i) contain at least one carbon to carbon bond, as well as derivatives of methane; and (ii) are liquid at standard temperature and pressure; or (iii) contain any substance classified as a Class 3 indicator.**		
Common operational activities	**Potential environmental impacts**	**Examples of best practice for pollution controls**

• storing bulk petroleum hydrocarbon
• storing packaged petroleum products
• storing bulk chemicals
	Air
	• emitting
	  ▪ VOC
	  ▪ toxic and odorous chemicals.
	Water
	• discharging contaminated stormwater with hydrocarbons to drains
	Land and groundwater
	• land and groundwater contamination.
		Separation distance
		• Storage of petroleum products or crude oil in tanks (EPA publication 1518) – ensuring appropriate separation distance of at least:
		  ▪ 100 metres for floating roof
		  ▪ 250 metres for fixed roof.
		Air
		• installing a vapour emission control system on tanks and road tanker filling stations
		• minimising fugitive emissions to air through a leak detection and repair system
		• installing a combustor to destroy the volatile emissions
		• installing carbon beds to remove organic vapours from discharge air stream.
		Water
		• installing stormwater protection, isolation and treatment infrastructure.
		Land and groundwater
		• installing bunding (EPA publication 347)
		• installing tertiary containment systems such as tank overfill preservation systems

Selected scheduled premises

G05 CONTAINER WASHING **Premises receiving bulk transport containers for the purpose of internal washing or cleansing where the containers have contained (i) prescribed industrial waste; or (ii) any material that is classified as dangerous goods under the *Dangerous Goods Act 1985*** **Common operational activities**	**Potential environmental impacts**	**Examples of best practice for pollution controls** Pollution controls may vary depending on the design and the extent of automation.
• receiving bulk containers for washing • stockpiling containers onsite • draining residues from containers • storing drained PIW residues • washing of used PIW containers • washing of food grade and chemical road tankers and ISO tanks • collecting washwater • treating and discharging washwater to sewer	***Air*** • emissions of ▪ volatile wastes (such as benzene) ▪ odour. ***Water*** • contaminating stormwater. ***Land and groundwater*** • contaminating land. ***Waste*** • storing, consolidating and disposing PIW • contaminating oils with PCBs.	***Air*** • minimising volatile waste and odour emissions e.g. using carbon absorption. ***Water*** • treating washwater using oil interceptor • containing spray drift from high pressure washing jets using screens or walls around the wash area. ***Land and groundwater*** • sealing of area where containers are cleaned • containing washwater in bunded area. ***Waste*** • bunding of area where PIW is stored • segregating different types of PIW • storing PCBs in accordance with the EPA publication IWRG 643 • minimising stockpiles of containers onsite.

Non-metallic minerals

H01 CEMENT

Cement works in which (i) clays or limestone materials are used in either a furnace or a kiln in the production of cement clinker; or (ii) cement clinker or clays or limestone or like materials are ground.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls
• operating a rotary kiln that heats the raw material to produce 'clinker'. The kiln exhausts hot air and combustion products via a large chimney stack ▪ raw materials: limestone is the primary raw material, with clay, shale, iron ore and bauxite, used as secondary raw materials. These are stored onsite and may require grinding before use. Fly ash (precipitator ash, usually from coal-fired power station boiler furnaces) may also be used. ▪ fuel types: manufacturing cement using a range of fuels and raw materials. For example: • traditional fuels: gas, oil or pulverised coal • supplementary fuels:waste oil, carbon fuel with high calorific value, used tyres, foundry sand and tallow, solvent-based fuel • cement can also be made from blast furnace slag. This is used in place of clinker • the clinker is ground in rotating ball mills to produce the cement powder • crushing of clinker and/or blast furnace slag to make cement	***Energy*** • large energy users. ***Air*** • CO_2 emissions from: ▪ heating calcium carbonate (limestone) to produce calcium oxide (lime) and carbon dioxide emissions (main source) ▪ burning the fuel (Note: the high temperature (1,400°C) and long residence time in the kiln destroy organic compounds. The long residence time and alkaline environment means that emissions of dioxins and furans are usually low) • emissions of natural gas combustion products: ▪ CO_2 ▪ CO ▪ NOx ▪ SO_2 • emission of particulates • minor emission of fluorine compounds • direct GHG emissions from cement process e.g. CO_2 from limestone conversion. ***Water*** • impacting local stream with cooling water • contamination of stormwater run-off.	***Separation distance*** • ensuring an appropriate separation distance (EPA publication 1518): ▪ cement manufacturing: • 250 metres <5,000 t/y • 500 metres >5,000 to 150,000 t/y • 1,000 metres >150,000 t/y ▪ cement clinker grinding: • 250 metres <150,000 t/y • 500 metres >150,000 t/y. ***Energy*** • recovering heat (to heat the raw materials) from the hot clinker as it emerges from the kiln. ***Air*** • using technologies to reduce CO_2 emissions (this is an industry-wide problem) • using a precalciner which de-carbonates (removes the carbon dioxide from) the limestone before it enters the main kiln • capturing dust carried in the exhaust gases using fabric filters (baghouses) or electrostatic precipitators. Note that if electrostatic precipitators are used, visible emissions can be more regular than properly used fabric filters (baghouses) or wet scrubbers • use of alternative supplementary fuels (e.g. tyres) – may require air emissions control • an alkaline environment minimises metal discharges. ***Water*** • capturing site stormwater run-off to allow solid settlement prior to its discharge. ***Waste*** • using a dry process kiln, i.e. uses raw materials in a dry form rather than in a slurry.

H02 BITUMEN (ASPHALT) BATCHING

Bitumen or asphalt batching works which are designed to have a throughput of at least 100 tonnes per week.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls
• receiving and storing bulk solid raw materials, usually in open storage bins • receiving and storing the bulk liquid (bitumen) in heated vessels • receiving and storing bulk fuel (distillate or gas) for process heating • using mobile plant to transfer solid materials into the process feed system • mixing the bulk solid materials in ‘‘pug mill’’ followed by introduction to the mixture of the liquid bitumen • discharging the mixed product ‘‘hot mix asphalt’’ into a storage bin or directly into despatch vehicles • discharging the stored product into despatch vehicles • capturing process emissions and product transfer (outloading) fumes	***Air*** • emitting: ▪ particulates and odours from process and outloading activities ▪ particulates from raw materials storage and handling areas. ***Noise*** • noise emissions ***Water*** • discharging contaminated stormwater around materials storage and handling areas. ***Land and groundwater*** • contaminating land around materials storage and handling areas.	***Separation distance*** • ensuring an appropriate separation distance of at least 500 metres (EPA publication 1518). ***Air*** • installing vapour capture systems for bulk liquid tank venting (diurnal ‘breathing’) and gases displaced during tank filling • capturing and treat out loading vapour using carbon canister adsorption units, thermal oxidiser or similar • treating process air emissions using fabric filters (baghouses). • protecting raw material and handling areas from wind to control fugitive emissions • water sprays raw material and handling areas to control fugitive emissions • cleaning roadways to control fugitive emissions ***Noise*** • engineering to reduce noise generation or enclosure of noisy areas and/or activities ***Water*** • excluding rainwater and run-off water from process areas • installing stormwater protection, isolation and treatment infrastructure. ***Land and groundwater*** • installing bunding and tertiary containment systems for bulk liquid storage and plant areas

H03 CERAMICS

Ceramic works, being works in which bricks, tiles, pipes, pottery goods or refractories are processed in dryers or kilns, which are designed to produce at least 10,000 tonnes per year of ceramic product(s).

Schedule H03 activities produce a broad range of wastes of widely different chemical composition.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls
• grinding quarried clay • mixing clay and additives with water in a pug mill • forming (pressing or extrusion) pugged clay • drying formed products using warm exhaust gases from the cooling zone of the kiln • firing formed product in natural gas-fired kilns • cooling the products • storing, loading and transporting the products	***Energy*** • large energy users from all process. ***Air*** • emissions of: ▪ particulates ▪ gaseous fluorine compounds ▪ gaseous chlorine compounds ▪ natural gas combustion products: • CO_2, CO, NOx, SO_2 • damaging vegetation and impacting animals from fluoride emissions. ***Noise*** • noise emissions from motors and mobile plant. ***Water*** • discharging contaminated stormwater run-off (with high solid content). ***Land and groundwater*** • contaminating land around materials storage areas.	***Separation distance*** • ensuring an appropriate separation distance as per EPA publication 1518. ***Energy*** • combustion efficiency • chemical recovery/renewable energy • installing efficient motors and boilers • optimising the site power factor. ***Air*** • capturing particulate matter • installing energy efficiency kilns to reduce natural gas combustion products • using limestone dry scrubbers to reduce fluoride emissions. ***Noise*** • engineering to reduce noise generation or enclosure of noisy areas and/or activities. ***Water*** • protecting stormwater from clay residues • capturing site stormwater and settling solids prior to discharge. ***Land and groundwater*** • storing additives in secure and bunded areas which are designed in accordance with EPA publication 347.

H04 MINERAL WOOL **Mineral wool or ceramic fibre works.**		
Common operational activities	**Potential environmental impacts**	**Examples of best practice for pollution controls**
• producing fibres by the melting of slag (mineral wool) or ceramic • conversing binders to turn the fibres into 'felted' slabs usually known in the insulation industry as 'batts' • adding binders that may contain phenol and/or formaldehyde, and are formulated with hydrocarbon solvents	***Energy*** • large energy users from all process e.g. melting alumina and silica mixtures used in fibre making. ***Air*** • dust and particle (PM10 and PM2.5) emissions from fibre manufacturing • emissions from binders that include formaldehyde and VOC • combustion emissions from baking ovens and furnaces • dust and particle fallout from operations. ***Water, land and groundwater*** • discharging contaminated stormwater with fibres to drains • discharging residual VOCs and phenol and formaldehyde. ***Land and groundwater*** • contaminating land around materials storage areas.	***Separation distance*** • ensuring an appropriate separation distance as per EPA publication 1518. ***Energy*** • chemical recovery/renewable energy • installing efficient motors and boilers • optimising the site power factor. ***Air*** • removing dust and fibre using wet electrostatic precipitators. Process conditions (high temperature) may prevent the use of fabric filter dust collectors ('baghouses'). ***Water, land and groundwater*** • collecting and treating contaminated stormwater prior to discharge • handling solid waste (off-cuts and off-spec product) to prevent water and land contamination e.g. waste reuse options • storing chemical and waste in a bunded area which is designed in accordance with EPA publication 347. ***Waste*** • reusing or reprocessing off-spec products.

H05 GLASSWORKS (1st of 2 parts of H05) Premises on which glass is manufactured by the melting of raw materials (see table below for glass reprocessing).		
Common operational activities	**Potential environmental impacts**	**Examples of best practice for pollution controls**
• receiving and storing bulk raw materials such as silica sand, sodium carbonate, lime, magnesium oxide and aluminium oxide • receiving and storing cullet (broken glass) for recycling • heating raw materials in a furnace • forming of the glass products in moulds • heat annealing of the products to reduce internal stresses treating the product with compressed gas or spray coating to strengthen or improve chemical resistance of glass	***Energy*** • very large energy users from all process e.g. melt baths. ***Air*** • emitting: ▪ dust ▪ MBTC (monobutyltin trichloride) used as a surface coating to strengthen bottles ▪ selenium when used for adjustment of glass colour. • combustion emissions from furnaces. ***Water*** • generating emulsified oily wastewater • discharging contaminating stormwater to drains. ***Land and groundwater*** • contaminating land around materials storage areas.	***Separation distance*** • ensuring an appropriate separation distance of at least 500 metres (EPA publication 1518). ***Energy*** • increasing burner efficiency • recovering heat for using in other site applications • increasing motor efficiency. ***Air*** • scrubbing exhaust gases from glass treatment and coating (including silvering) areas • capturing and combusting paint fumes from the mirror painting area in an afterburner. ***Water*** • protecting surface drainage from oily and particulate wastes • collecting and treating oily wastewater and contaminated stormwater prior to discharge. ***Land and groundwater*** • storing chemicals (e.g. liquid treatment and glass-coating chemicals) and waste in a bunded area which is designed in accordance with EPA publication 347 • fully enclosing bulk material and cullet stores.

H05 GLASS REPROCESSING (2nd of 2 parts of H05) **Premises with the capacity to reprocess more than 10 000 tonnes of glass waste per year.**		
Common operational activities	**Potential environmental impacts**	**Examples of best practice for pollution controls**
• receiving and storing glass fines or cullet (broken glass) • sorting, crushing and grinding glass into glass fines or glass cullet • processing glass fines or cullet • beneficiation, such as separating glass based on colour	***Air*** • emitting dust and fugitive emissions from reprocessing, storage and transport • odour from the processing and storage of glass fines • emissions from fire caused by unintended combustion of residual paper and plastic material ***Water*** • discharging contaminated stormwater to drains and/or surface water. ***Land and groundwater*** • seepage of contaminants to groundwater from processing equipment and storage areas • contaminating land around materials storage areas. ***Noise*** • noise emissions from reprocessing equipment	***Air*** • reprocessing is carried out in an enclosed building • cover or spray stockpiles to minimise dust • installing a dust collection system that reduces within requirement levels environmental emission and worker exposure to hazardous emissions and particulate matter. • adopting a fire management plan and appropriate fire suppression equipment for the facility ***Water*** • storing materials and waste in a bunded area which is designed in accordance with EPA publication 347 to keep contact water separate from clean stormwater • weatherproof coverings • measures to prevent potentially hazardous material entering stormwater drainage. • trade waste agreement to discharge to sewer or other measures • collecting and treating contaminated stormwater prior to discharge. ***Land and groundwater*** • constructing waste storage and processing on a secure area (i.e. hard stand, impermeable base) in an enclosed building ***Noise*** • reprocessing in an enclosed area ***Separation distance*** • ensuring an appropriate separation distance of at least 500 metres (EPA publication 1518). ***Management*** • waste that can be processed at the premises is accepted, otherwise temporarily stored safely and moved off site as soon as practicable. • a tracking system in place to monitor waste coming into and out of your site to avoid unnecessary stockpiling of waste

Metal and engineering

I01 PRIMARY METALLURGICAL

Primary metallurgical work, being works in which ores or ore concentrates are processed or smelted to produce metal.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls
• operating an aluminium smelter, and ingot mill used to alloy and cast aluminium • operating a fabrication plant to produce rolled aluminium sheet • manufacturing carbon anodes from baked pitch • storing PIW containing e.g. spend pot liner	***Energy*** • very large energy users from all process e.g. smelting operation, aluminium production. ***Air*** • emitting : ▪ SO_2 from the consumption of anodes and carbon bake (anode manufacture) ▪ PAHs from anode manufacture ▪ fluoride from furnaces in the 'pot house' • legacy contamination of spent pot liner disposed to private landfill – potential for emission of cyanide and fluoride. ***Waste*** • generating PCB-containing waste.	***Separation distance*** • ensuring an appropriate separation distance of at least (EPA publication 1518): ▪ 500 metres <1,0 00,000 t/y, or ▪ 1,000 metres >1,000,000 t/y. ***Energy*** • process efficiency • heat recovery • using alternative fuels • chemical recovery/renewable energy • installing efficient motors and boilers • optimising the site power factor. ***Air*** • enclosing carbon anode bake house • discharging SO_2 by tall stacks • capturing fluoride in pot room exhaust gas by dry scrubbing • filtering exhaust air from spend pot liner storehouse • using incoming alumina to capture SO_2 and fluoride • reprocessing spent pot liner into carbon base fuel and material recovery ***Waste*** • storing PCB separately in a secure and bunded area • recovering dross from process • recovering refractory material (silica, alumina) from conversion of carbon waste (spent pot lining (SPL)/anode) for fuel.

Selected scheduled premises

I02 METAL MELTING

Metal melting works, being works in which any metal melting is performed in furnaces, having a total design rate of at least 10 tonnes per hour for ferrous foundries, or two tonnes per hour for non-ferrous foundries.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls
• melting aluminium in a gas-fired furnace to make electricity cables • recovering aluminium from scrap and dross (a by-product of aluminium production) • manufacturing non-ferrous (copper, lead, tin, lead, nickel and zinc) solders and components for the building industry • melting, using an electric arc furnace, and recycling of scrap metal • producing iron castings for the automotive industry • recycling used lead acid batteries by lead smelting, refining and casting	***Energy*** • very large energy users (for metal melting). ***Air*** • emitting: ▪ odour ▪ smoke emission ▪ particulates ▪ fluorene discharge to air (from aluminium melting) • metal fume emissions • generating foundry (casting) sands. ***Noise*** • noise and vibration emissions.	***Separation distance*** • ensuring an appropriate separation distance of at least (EPA publication 1518): ▪ 500 metres <1,0 00,000 t/y, or ▪ 1,000 metres >1,000,000 t/y. ***Energy*** • optimising furnace efficiency • recovering heat • using renewable energy • installing efficient motors and boilers • optimising the site power factor. ***Air*** • capturing fugitive emissions from electric melting furnaces • removing particulates, smoke and odours from air emissions with scrubbers • removing smoke and odours from air emissions with water scrubber • enclosing furnace houses and casting areas • capturing particulates in air discharge with baghouse (fabric filter). ***Noise*** • engineering to reduce noise generation or enclosure of noisy areas and/or activities. ***Waste*** • reusing of foundry sands • recovering chemicals.

I03 METAL GALVANISING

Metal galvanising works which are designed to have a throughput of at least 5,000 tonnes per year of steel.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls
• hot-dip galvanising (dipping steel objects in a 'kettle' of molten zinc, sometimes with added lead) • using ammonium chloride as a flux to assist with the formation of the zinc-steel alloy at the interface of the steel and zinc (in some cases) • using sulfuric or hydrochloric acid pickling to clean the steel before galvanising (some plants)	***Energy*** • moderate energy users from all process (molten metal baths). ***Air*** • emitting: ▪ metal fume e.g. lead ▪ odour ▪ smoke ▪ particulates. ***Noise*** • noise and vibration emissions. ***Water*** • high TDS wastewater not suited to trade waste • discharging contaminated stormwater to drains. ***Land and groundwater*** impacts of grills/leaks from acid baths.	***Separation distance*** • ensuring an appropriate separation distance of at least (EPA publication 1518): ▪ 500 metres <1,0 00,000 t/y, or ▪ 1,000 metres >1,000,000 t/y. ***Energy*** • covering baths to minimise e heat loss. ***Air*** • installing fume hood over the kettle • removing particulates, smoke and odours from air emissions with scrubbers • removing smoke and odours from air emissions with water scrubber • capturing particulates in air discharge with baghouse (fabric filter). ***Noise*** • engineering to reduce noise generation or enclosure of noisy areas and/or activities. ***Water*** • removing high TDS from wastewater prior to discharging to sewer • capturing and treating contaminated stormwater run-off prior to discharge. ***Land and groundwater*** • enclosing galvanising and steel treatment areas.

I04 METAL FINISHING

Metal finishing works, including electroplating of metal or plastic, anodising, electroforming or printed circuit board manufacturing.

Common operational activities

- coating of ferrous or non-ferrous base materials by a variety of common metals, involving three major steps:
  - cleaning and preparation of the metal
  - coating or plating process where metal ions are attached to the surface by a bond
  - protective coating to seal the finish
- electroplating – metal ions supplied by the dissolution of metal from anodes, are reduced, resulting in metal depositing onto the work pieces (cathodes) while in either acid, alkaline, or neutral solutions
- anodising – is an electrochemical process which converts the metal surface to a coating of an insoluble oxide. Aluminium is the most frequently anodised material. The formation of the oxide on the work pieces are made in dilute sulfuric or chromic acid solutions
- manufacturing of printed circuit board – involves the formation of a circuit pattern of conductive metal (usually copper) on non-conductive board materials such as plastic or glass

Potential environmental impacts

Energy

- moderate energy users from all process (molten metal baths).

Air

- emitting:
  - metal fume
  - odour
  - particulates.

Noise

- emitting noise and vibrations.

Water

- material inputs using acid/alkaline solutions, heavy metal-bearing solutions, and cyanide-bearing solutions.
- discharging contaminated stormwater to drains.

Waste

- generating wastewater containing acid/alkaline, cyanide, and metal wastes
- generating solid/hazardous waste containing metal and reactive wastes.

Land and groundwater

- leaking underground infrastructure (pipes, tanks), and compromised bunding and baths.

Examples of best practice for pollution controls

Energy

- covering baths to minimise heat lose.

Air

- installing scrubbers/ filters to remove particulates, fumes and odours with rinse system.

Noise

- enclosing galvanising and steel treatment areas.

Water

- capturing and treating contaminated stormwater prior to discharge
- reducing contaminant build up with a decant or dummy bath and changing bath frequently
- rinsing water system design and operation
- reducing rinse water flow rates by focussing on technologies designed for continuous flow
- minimising or reuse wastewater flow rate from each rinse tank
- using drag-out reduction techniques
- rinsing and draining times on automatic lines or efficient operation on manual lines
- taking drag-out rate and evaporation measurements
- implementing flow control technologies
- ensuring rollover bunds at all doorways are integrated into floor.

Waste

- measuring drag-out /contaminant loading rates
- scheduling regular collection by waste contractors to avoid excessive waste accumulation.

Land and groundwater

- installing bunded areas undercover to store all chemicals and waste
- enclosing and bunding all metal finishing areas
- ensuring that floor to wall joins are sealed
- installing above-ground and elevated processing infrastructure (pipes, tanks) to enable regular inspection and maintenance
- installing hard plumbing overflow pipe to electroplating tanks
- installing spill containments or isolation drains and/or suitably impermeable membranes to prevent spill entering into stormwater.

Recommended bunding design

- installing primary concrete layer, impervious layer such as polyethylene
- installing secondary

I05 CAN AND DRUM COATING Can and rum coating works, in which surface coating is applied to metal before or after the metal is formed into cans, closures, coils or drums.		
Common operational activities	**Potential environmental impacts**	**Examples of best practice for pollution controls**

• manufacturing and coating of steel drums
• coating of steel and aluminium cans
	Air
	• emitting:
	  ▪ fumes from spray booth, containing VOCs and odour
	  ▪ vapours from oven used to cure freshly applied paint and lacquer, containing VOCs and odour
	• fugitive emission of VOCs and odour.
		Air
		• collecting and minimising VOC and odour by using thermal oxidiser
		• capturing paint overspray using spray booth fitted with filters in good condition
		• minimising paint overspray by using electrostatic spray guns
		• installing integrated afterburner on can-coating lines
		• using water-based inks where practicable
		• using gas for drying surfaces.

I06 VEHICLE ASSEMBLY **Vehicle assembly or sub-assembly works which are designed to produce at least 2,000 units per year.**		
Common operational activities	**Potential environmental impacts**	**Examples of best practice for pollution controls**
• operating boiler • manufacturing automotive vehicle engines • casting and assembling vehicle body panels and stamping operations • assembling heavy trucks • compressed air operation • spray painting	***Energy*** • moderate to high energy useage. ***Air*** • emitting: ▪ VOCs ▪ particulates ▪ CO ▪ odour ▪ respirable crystalline silica. ***Land and groundwater*** • discharging oily waters.	***Energy*** • optimising compressed air efficiency • chemical recovery/using renewable energy • installing efficient motors and boilers • optimising the site power factor. ***Air*** • destroying VOC emissions by using thermal oxidiser • capturing paint overspray with spray booth fitted with filters in good condition • minimising paint overspray by using electrostatic spray guns • enclosing grit blasting areas and treating exhaust air with filters. ***Land and groundwater*** • using water-based paints.

Printing

J01 PRINTING **Printing works emitting more than 100 kilograms per day of volatile organic compounds.**		
Common operational activities	**Potential environmental impacts**	**Examples of best practice for pollution controls**
• printing packaging products • producing printed polymer for banknotes • flexographic or rotogravure printing processes • solvent laminating • extrusion and printing of plastic film • storing solvents • drying printed film and materials in ovens • producing hot stamping foil • coating of can and drum	***Air*** • emitting: ▪ VOCs from both point and fugitive sources ▪ odour ▪ smoke	***Separation distance*** • ensuring an appropriate separation distance of at least 500 metres (EPA publication 1518). ***Air*** • covering tanks and baths holding solvent-based inks to prevent or minimise the emission of volatile solvents • closing all containers when not in use • collecting VOC emissions from process • destroying/treating VOCs (e.g. using RTO, afterburner, biofilters) prior to discharging it to atmosphere • regularly monitoring VOC emissions • use of solvent in accordance with EPA publication 940 • use of less smog-forming solvents (alcohols, aldehydes). ***Waste*** • tracking solvents used • tracking solvents in inks, resins and adhesives used to estimate VOCs emitted handling and storage of solvents within a bunded area as per EPA publication 347

Utilities

K01 POWER STATIONS

Premises which generate electrical power from the consumption of a fuel at a rated capacity of at least 5 megawatts of electrical power.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls

• burning of brown coal for steam generation
• generating electricity using steam-driven turbines
• hydraulic transport of ash to ash ponds
• disposing ash to landfill
• operating cooling water ponds
• operating cooling towers
• removing salt, minerals and oxygen from water used in raising steam or cooling turbine inlet air stream during hot weather.
• generating electricity by combustion of the following fuel types:
  ▪ brown coal
  ▪ landfill gas
  ▪ biogas from wastewater treatment plant
• natural gas
	Energy
	• large primary energy users.
	Air
	• causing degradation of regional air quality, including visibility due to emissions of:
	  ▪ particulates
	  ▪ NO_2
	  ▪ SOx
	  ▪ GHG
	  ▪ odour.
	Noise
	• emitting noise.
	Water
	• generating cooling tower purge water with high temperature
	• discharging cooling water to waters with mixing zones
	• generating saline wastewater from demineralisation plant and condensate polishing.
	Land and groundwater
	• potential seepage from large saline wastewater ponds of ash disposal.
	Waste
	• discharge of ash wastes to land
	• deposit of asbestos and solid inert waste to land.
		Energy
		• optimising operation of electrostatic precipitators
		• using natural gas for 'black starts' (starting a power station after complete shutdown)
		• optimising process and combustion efficiency
		• recovering heat
		• using combined cycle for gas turbines
		• optimising plant equipment for electrical efficiency.
		Air
		• minimising excess emissions during start-ups and shutdowns
		• continuous monitoring of air discharges
		• using low NOx burner technology
		• sequestering carbon
		• controlling particle emissions (baghouse, electrostatic precipitators).
		Noise
		• engineering to reduce noise generation or enclosure of noisy areas and/or activities: minimisation of noise from pressure relief valves.
		Water
		• segregating saline wastewater from other wastewaters
		• monitoring discharge process wastewater quality.
		Land and groundwater
		• impervious lining for ponds in ash disposal areas.
		Waste
		• considering ash reuse options.

K02 CARBON GEOSEQUESTRATION Premises which capture, separate, process or store waste carbon dioxide for the purpose of geological disposal.		
Common operational activities	**Potential environmental impacts**	**Examples of best practice for pollution controls**
• extracting CO_2 from discharge plumes using absorption techniques similar to acid gas control in the chemical and petroleum industries • compressing CO_2 rich streams for transport to injection site. CO_2 is usually compressed to pressures greater than 10 MPa and the fluid will be supercritical under these conditions • transporting CO_2 by pipeline from the collection premises to the injection/disposal site • injecting CO_2 into disposal geological formation which is most likely to be a saline aquifer or exhausted petroleum reservoir The depth of injection will be at least 1,000 metres • monitoring and verification that the injected fluid is remaining within the disposal formation and the CO_2 plume is behaving as predicted • monitoring can include seismic surveys, pressure and temperature measurements	***Air*** • leaking CO_2 from the formation used for the storage for CO_2 • increase in GHG emissions. ***Noise*** • emitting noise from compression activities. ***Land and groundwater*** • potentially contaminating aquifers.	***Site selection*** This premises are still in demonstrative/development phase. Site selection is a key parameter in where geological properties of storage location are very important. ***Air*** • selecting site with geological formation that has an adequate 'cap' to retain the stored fluid. • monitoring to ensure stability. ***Noise*** • engineering to reduce noise generation or enclosure of noisy areas and/or activities. ***Land and groundwater*** • assessing geological formation has adequate 'cap' to retain the stored fluid • monitoring techniques include: ▪ three-day and four-day (time lapse) seismic monitoring ▪ pressure and temperature measurements ▪ groundwater monitoring ▪ ambient gas measurements.

K04 WATER DESALINATION PLANTS

Premises at which salt is removed from water for potable or other uses what have a design capacity to process more than 1 megalitre per day of feed water.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls

• pre-treating:
  ▪ seawater lift pumps
  ▪ seawater/saline water course solids screen
  ▪ seawater disinfection (chlorination)
  ▪ coagulation/flocculation
  ▪ sand filtration
  ▪ carbon filtration
  ▪ Ion exchangers/softeners
  ▪ pH adjustments
  ▪ reverse osmosis (RO) (single pass to multiple passes)
• RO reject process
• RO permeate process
• post treatment:
  ▪ permeate disinfection
  ▪ potable water storage
• potable water distribution system
	Energy
	• very high energy consumption (dependent on permeate: reject water ratio).
	Air
	• emitting odour from seaweed and dead marine species.
	Water
	• over-chlorination
	• backwash water containing:
	  ▪ high suspended solids
	  ▪ high or low pH
	• adsorption chemicals from carbon filtration
	• regeneration containing high TDS (higher than seawater).
	Waste
	• fouled membrane generating large solid wastes
	• generating solid waste
	• accumulating seaweed.
		Energy
		• installing variable speed drives
		• using low-pressure reverse osmosis.
		Air
		• selecting proper location of the premises.
		Water
		• using low-pressure RO pumps
		• using high-recovery membranes
		• using multistage RO passes
		• using non-regenerable ion exchangers
		• using seawater to produce chlorine for disinfection
		• discharging reject water, which requires a mixing zone.
		Waste
		• extending life of membrane through proper design
		• composting seaweed.

Other

L01 GENERAL EMISSIONS TO AIR

Premises which discharge or emit, or from which it is proposed to discharge or emit, to the atmosphere any of the following (i) at least 100 kilograms per day of: volatile organic compounds; or particulates; or sulfur oxides; or nitrogen oxides; or other acid gases (excluding carbon dioxide); or (ii) at least 500 kilograms per day of carbon monoxide; or (iii) any quantity from any industrial plant or fuel-burning equipment of any substance classified as a Class 3 indicator.

This schedule category includes a very broad range of industry types.

Common operational activities	Potential environmental impacts	Examples of best practice for pollution controls
• painting, electroplating • foam and plastic product manufacture • adhesive and sealant manufacture • gas compression • pharmaceuticals manufacture • glass insulation manufacture • particle board product manufacture • sugar refining and packaging • fruit processing • may include operating boiler	***Energy*** • energy use varies with size. ***Air*** • emitting ▪ VOCs ▪ particulates ▪ benzene ▪ odorous chemicals ▪ formaldehyde.	***Separation distance*** • depending on industry types (EPA publication 1518). ***Energy*** • recovering heat • recovering chemicals/using renewable energy • installing efficient motors and boilers • optimising the site power factor. ***Air*** • using filters and cyclones to remove particulates • using scrubbers to remove volatile compounds • using thermal oxidisers or carbon absorption to destroy toxic organic compounds.

L03 TUNNEL VENTILATION SYSTEMS **Road tunnel and ventilation systems.**		
Common operational activities	**Potential environmental impacts**	**Examples of best practice for pollution controls**
• ventilating road tunnels and discharge via exhaust stacks • operating large fans • treating exhaust gas is generally not feasible (large volume at low pollutant concentrations) or necessary (adequate dilution is available from stacks and discharge velocity), although is done in limited cases internationally	***Air*** • emission of vehicle exhaust fumes (significantly diluted), comprising: ▪ VOCs ▪ particulates ▪ carbon monoxide ▪ nitrogen oxides ▪ benzene. ***Noise*** • noise emissions from ventilation equipment.	***Air*** • using electrostatic precipitators to remove. ***Noise*** • engineering to reduce noise generation or enclosure of noisy areas and/or activities.