Superseded/repealed from 1 November 2021 – refer to https://www.dit.sa.gov.au/standards/home

## **Environment Handbook**





Government of South Australia

Department of Planning, Transport and Infrastructure

### Introduction

This Handbook provides guidance that will help Department of Planning, Transport and Infrastructure (DPTI) staff and contractors manage environmental risk during the construction, operation and maintenance of DPTI infrastructure. It outlines the controls and practices that are designed to protect the environment during works.

### Scope

The course aims to:

- provide you with the knowledge to identify environmental issues associated with your activities and best
  practice methods to minimise environmental impact
- outline relevant environmental legal obligations and DPTI requirements.

### Contents

Each of the following sections outlines the controls and practices that help identify and manage environmental risk. They also provide 'check' questions to help determine if environmental controls have been effective.



### Field Services Environmental Management System

The DPTI Field Services Environmental Management System (EMS) is a tool for managing the potential impacts of Field Services' maintenance and construction activities on the environment. The Field Services EMS assists in managing the Section's environmental performance, as well as integrating environmental management into the Section's daily operations and longer term planning.

For more information see the Field Services Environmental Management System Summary Sheet #12020847.

# Vegetation

Trees, shrubs, grasses and ground covers can be negatively impacted by work activities (such as trenching, shoulder sealing and cleaning of equipment). Native vegetation and regulated/significant trees are protected under Federal and state environment or biodiversity legislation.

#### **General guidance**

- Before starting work, Identify the location of any areas of vegetation to be protected and sight all vegetation removal approvals to ensure they have been obtained.
- Prevent vegetation damage by:
  - ensuring that vehicles use existing pathway, and vehicles are parked and materials are stored in a way that does not damage vegetation
  - setting up Tree Protection Zones using flagging, bunting or temporary fencing or other protective measures.
- Communicate any vegetation protection requirements to workers and site visitors.

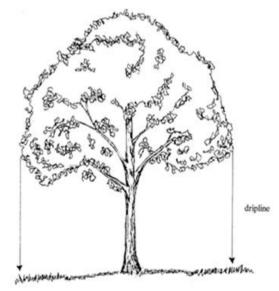
#### Check

- Have vegetation removal approvals been obtained?
- Does environment documentation have site specific requirements to protect vegetation?
- Are there processes in place to prevent works from damaging vegetation?
- Are there requirements to establish and protect a vegetation or Tree Protection



#### Working near trees

- Establish a tree protection zone (TPZ) for trees within the work site. Use the tree canopy drip line as a guide to establishing the protected area.
- The TPZ is established to prevent the following activities within the tree drip zone:
  - o parking vehicles
  - o washing down equipment
  - o preparing chemicals or concrete
  - o storing materials
  - placing fill or changing the soil level.
- If invasive works are unavoidable within the TPZ :
  - use non destructive digging (e.g. low pressure hydrovac) or hand dig around roots that are 50mm or larger in diameter
  - Horizontal directional drilling beneath trees, where practicable, 1 metre below ground level.



Above: The tree drip zone – establish the tree protection zone at the tree drip zone.

Left: Roots of a street tree (larger than 50mm diameter) which were correctly hand dug.

## Minimising weed and plant disease spread

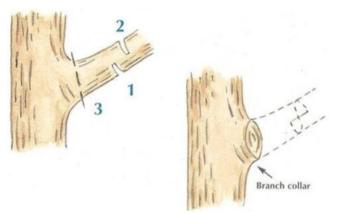
- Ensure that vehicles and equipment are free from soil, weeds and seeds.
- Take note if the site is subject to plant disease control measures.
- Avoid the use of machinery or vehicles outside the construction zone. Use designated parking areas and plant compounds.
- Store weed infested materials separately from clean materials. Clear or spray weeds before stockpiling topsoil.
- Check fill and construction materials for weeds and seeds before use.
- Control weeds from stockpiles 10-14 days before use. If material is weed infested, inform the Supervisor.
- Wash or brush down equipment and vehicles to remove soil and plant matter before leaving the site as this can carry weeds and soil diseases.
- Dispose of weeds and empty weed spray containers at a licensed waste depot.

#### **Phytophthora**

- Rroot rot disease that occurs in high rainfall areas
- Stay on formed areas or keep to defined access tracks
- Work in dry conditions and avoid low lying wet areas
- Always clean down before leaving known infected areas

#### Pruning

- Always use a clean saw to cut branches.
- If there is a risk the branch may tear or split, remove most of the branch first. The remaining stub is then removed with a final cut.
- A final cut shall be made as close as possible to the branch collar without cutting into the branch collar or leaving a protruding stub.
- Refer to below diagrams of indicative locations for branch pruning



#### **Unexpected vegetation find**

- Stop work if unexpectedly identifying native remnant or heritage vegetation.
- Make the site safe without further disturbing the vegetation. This may involve restricting site access through barricading or signage.
- Escalate to supervisor or DPTI Environment Officer for further advice.
- Consult with subject matter experts as needed

#### **More information**

See **DPTI Vegetation Removal Policy** 

See <u>Weed Control Handbook & Buffel Grass Hygiene</u>

See DPTI Phytophthora (dieback) Control Environmental Instruction

The following Australian Standards apply to tree management practices:

- AS 4970-2009 Protection of Trees on Development Sites
- AS 4373-2007 Pruning of Amenity Trees.

### Fauna

It is important to prevent harm to wildlife by avoiding contact with animals and safeguarding their habitats from damage. Native wildlife is protected under Federal and state government environment or wildlife regulations.

#### Working near wildlife

- Avoid impact to and working in areas of vegetation.
- Establish no go zones to prevent vehicles and pedestrians disturbing wildlife or damaging habitats such as rocks and logs.
- Avoid works during times that may disturb wildlife (e.g. nesting birds).
- Do not approach, feed or attempt to remove wildlife.
- Avoid leaving an open excavation as it might trap wildlife. Where that is not possible provide an escape route (e.g. a dirt ramp inside the excavation).
- Keep the work site tidy and litter free.
- Workers should avoid bringing pets onto the site.
- Communicate information about wildlife and associated requirements to workers and site visitors.

#### Check

- Have locations with significant wildlife been identified?
- Have the requirements of working near wildlife been communicated to workers and site visitors?

#### **Unexpected wildlife finds**

Finding wildlife may occur when it is least expected. This may include nesting birds, a hibernating reptile or resting nocturnal mammals.

- Stop work if unexpectedly encountering wildlife
- Make the site safe without further disturbing the animals or damaging its habitat. This may involve restricting site access through barricading or signage.
- Escalate to supervisor for further advice or consult with your DPTI Environment officer.
- Consult with subject matter experts as needed.
- Engage with stakeholders as required.

- Is there a process for responding to unexpected wildlife finds?
- Are workers inducted and familiar with this process?



#### Injured wildlife

- If you do encounter wildlife, try to prevent stress to the animal by:
  - avoiding getting too close
  - minimising loud noises
  - preventing people from crowding the animal.
- Contact the nearest vet or wildlife rescue to report the injured or sick animal. Follow their instructions about how you should respond.

#### Wildlife rescue contacts

South Australia
 <u>RSPCA SA</u> 08 8231 6931

 <u>Fauna Rescue of South Australia</u> 08 8289 0896



## Water

Contaminated water or sediment is prohibited from entering waterways by state environment protection regulations. Prevent water pollution by containing sources, safeguarding drains and entrances to waterways

#### Soil Erosion and Drainage Management Plans

- Part of a Contractor's Environmental Management Plan for major projects or stand alone for smaller jobs
- Outlines measures to control erosion and sediment
- Documents site conditions, impacts, risks, control measures, their location and maintenance schedules.

Prepared in accordance with a range of guidelines including <u>EPA's Stormwater Pollution Prevention</u> Code of Practice for State and Local Government

- Are erosion and sediment controls installed and operating correctly?
- □ Is the waste water and sediment being disposed to a licensed facility?





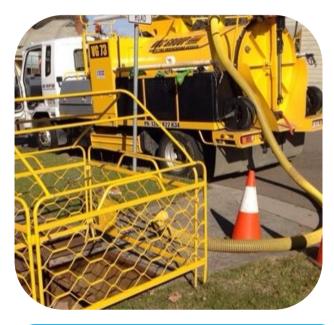


Non destructive digging with correct use of soil bund and vacuum truck

#### **Construction slurry**

Work activities such as horizontal directional drilling, non-destructive digging and concrete cutting generate slurry or sludge residue which may contain contaminants.

- Before work starts, locate drains and entrances to waterways, including likely downslope areas from the work.
- Place silt socks at the source and entrance to drains or waterways, and then at various points between the work activity and the drain.
- Make sure drilling holes are large enough to accommodate any back flush.
- Always use Vacuum trucks with EPA waste transport certificate permit to manage slurry or contaminated water.



#### Check

- Have entrances to drains and waterways been identified?
- Are adequate controls in place to protect drains and waterways?
- Is pumping equipment being used to contain slurry and contaminated water?
- Has the waste been removed, and has the site been left clean?

#### **Materials storage**

- Only store liquid or solid materials if it's essential to do so, manage them to prevent environment impacts such as run off and dust.
- Avoid stockpiling materials at the base of trees within the tree protection zone (TPZ).
- If materials are to be stockpiled for long periods:
  - cover loose material such as soil with a tarp or similar to contain it and prevent dust
  - install sediment fencing or similar control if material is likely to be stored for two or more days
  - identify entrances to waterways or stormwater drains and ensure they are protected by controls such as silt socks.
- Contain liquid or solid chemicals within bunded storage.
- To prevent soil and watercourse contamination, the bunded storage area must be of adequate volume to contain the product volume.

- □ Is it essential to store materials on site?
- Are controls in place to prevent dust or sediment pollution?
- Are materials being stockpiled within the TPZ?
- Are chemicals stored within a sufficient bund?



### Concrete cutting and wash downs

- Before work starts, locate drains and entrances to waterways, including likely downslope areas from the cutting work.
- Place silt socks at source and drains and waterways.
- Place silt socks directly adjacent to the concrete that is to be cut (make sure the bund is large enough to contain slurry).
- Monitor the silt socks during cutting.
- If slurry escapes, stop work immediately until it is contained and cleaned up.
- Always have adequate silt socks, sand bags or a spill kit on hand for managing unexpected releases.
- Never wash concrete slurry straight into the gutter.
- Clean up sediment. If appropriate, reuse on site as fill material or disposed off site to a licenced waste facility.



#### **Open excavation and trenching**

- Before work starts, locate drains and entrances to waterways, including likely downslope areas from the excavation
- Place silt socks at drains hard against the kerb and positioned at approximately a 45° angle.



Correctly placed silt socks

- Have entrances to drains and waterways been identified?
- Are adequate controls in place to protect drains and waterways?

#### Vehicle wash down

Prevent the spread of diseases, pests and weeds to other regional and rural locations, by cleaning vehicles and machinery before they leave the site.

- If there isn't a wash down bay available, choose a site more than 30m from waterways or drains.
- Construct a bund to contain runoff water from machinery cleaning.
- Dispose of debris, slurry and any remaining water to a waste disposal facility permitted to accept this waste.
- Vehicles may need to be sprayed with disinfectant if in quarantine areas.
- As a minimum, make sure vehicles have been cleaned of any clumps of soil, mud and plant material, and
- Confirm the site is clear of debris, slurry and water before leaving.

#### **Managing spills**

Spills may occur when operating and refuelling machinery, storing materials, dewatering assets, or from construction activities such as horizontal directional drilling.

- Identify the spill material. You may need to refer to the Safety Data Sheet or container packaging.
- Control the source of the spill, such as shutting down machinery and closing valves.
- Contain the spill to as small an area as possible using absorbant material, bunds, soil and/or silt socks.
- Protect entrances to waterways, and areas of significance (such as vegetation).
- For further information consult with a DPTI Environment officer for more information.

#### Check

- Are vehicles or plant inspected to ensure they are clean of soil, debris, etc?
- Have workers been trained to manage spills?
- Is there a spills kit available?

#### **More information**

See DPTI <u>Protecting Waterways Manual</u> See <u>EPA's Stormwater Pollution Prevention Code of</u> Practice for State and Local Government



Cable plough cleaned prior to leaving site



Containing drilling mud during horizontal directional drilling

# **Noise and Vibration**

Excessive noise and vibration can create community disturbance and result in public complaints, and noise should be restricted to the appropriate hours. The Environment Protection Act regulates construction and industrial noise.

#### While on site

Site noise and vibration thresholds will vary depending on the location and background ambient noise. Residential locations are generally quieter than industrial sites.

- Directly engage with the property owner before any works commences.
- Discourage noisy behaviour such as shouting, whistling and loud radios.
- Avoid dragging or dropping materials and equipment.
- Use toolbox meetings to communicate noise and vibration requirements and ensure site visitors are made aware on arrival.

#### **Operating Machinery**

- Operate equipment efficiently and avoid leaving plant idling when not in use.
- Regularly inspect and maintain plant, including mufflers to ensure good working order.
- Promptly replace or repair equipment that becomes noisy.
- Select machinery that generates low noise and vibration levels (e.g. electric equipment rather than diesel).
- Use shielding around plant to limit noise emissions if required.
- Locate noisy plant such as diesel generators away from potential noise affected neighbours.
- Use broadband/directional reversing beepers

#### When planning night works

- Where possible, works that generate noise and vibration in residential areas should be limited to daytime construction hours.
- Construction activities should be limited to:
  - 7am 7pm Monday to Saturday
  - 9am 7pm Sundays & Public Holidays.
- Engage with affected community or neighbours when planning works outside of these hours.
- Works outside these hours are considered works at night and require a Night Works Management Plan (NWMP), approved by DPTI in advance of the works occuring.

#### Check

- □ Is there NWMP for late works?
- Are workers aware of site noise requirements?
- Does the site visitor induction include noise requirements?
- Are noise controls adequate and do they fulfil permit conditions?]
- Have residents and other sensitive receivers received notification in advance of night works?

#### **More information**

See <u>Management of Noise and Vibration:</u> <u>Construction and Maintenance Activities:</u> <u>Environmental Instruction 21.7</u>.

# **Air Pollution**

Dust and fumes should be prevented from leaving the worksite as they can adversely impact our communities and the environment. The Environment Protection Act regulates air quality.

#### **Dust from work sites**

- Minimise soil disturbance as it can create a dust hazard.
- Dampening the soil will help to prevent dust escaping the worksite.
- Only stockpile material if there is no alternative to do so. If the material is to remain on site, cover stockpiles with a tarpaulin or similar.
- When transporting material, cover loads to prevent dust while in transit.
- Select equipment for concrete cutting that suppresses dust using water or extraction
- Ensure the surrounding community has been informed of the works and any likely air pollution impacts.

#### Fumes from plant and vehicles

- Plant and vehicles are not to be left idling unless for operational purposes.
- Do not operate plant and vehicles that have excessively smoky exhausts.
- All plant and vehicles are to be regularly maintained as specified by the manufacturer.

#### Check

- □ Is the vehicle/plant idling for extended periods when not required?
- Are vehicle/plant regularly maintained as specified by the manufacturer?



#### Check

- Have dust suppression controls been implemented?
- Has the community been informed of works and any likely impacts on the air?

#### **More information**

Additional information about preventing air pollution can be found in Environmental Protection Authority (EPA) guidelines.



## Waste Management

Effective waste management will reduce the amount of waste that reaches landfill and avoid environmental damage while minimising disposal costs. Some waste management activities are highly regulated under the Environment Protection Act.

#### Solid construction waste

Civil works such as trenching and concrete works generate waste like asphalt planings, soil, concrete, bricks, timber and asphalt. This waste is categorised as solid construction and demolition waste. When managed correctly it can be readily recycled.

- Avoid contaminating construction and demolition waste with litter or general rubbish.
- Some recyclers may accept mixed loads of construction demolition waste. If not, sort waste material into separate types to make it suitable for recycling.
- Dispose to a construction demolition waste recycler who is licensed to accept and process this waste.
- Before transporting waste, confirm operating hours of the waste disposal facility.
- Retain waste disposal dockets for verification.

#### Check

- Are the workers organised to separate their waste? – There might be skips or bays at the depot
- Check waste disposal dockets they will confirm that waste is disposed to a licensed facility.
- Check the reuse classification for surplus soil to determine disposal options. Reuse on site is preferable but not always possible

#### **Construction slurries (liquid waste)**

Liquid waste from work activities such as horizontal directional drilling, non-destructive digging and concrete cutting may contain contaminants and must be disposed of correctly.

- Use environment protection authority (EPA) permitted vehicles such as vacuum trucks to transport liquid waste.
- Dispose to a facility licensed to accept this waste.
- Where available, dispose to a reuse facility that is approved by the EPA or operating under an approved environment management plan.

#### Check

- □ Are EPA transport certificates available?
- Check waste disposal dockets they will confirm that liquid waste is disposed to a licensed facility.
- If this material is being reused, confirm it is to a reuse facility approved by the EPA or Council and operating under an environment management plan?



Reuse of crushed concrete on batters at Bald Hills freeway interchange, Mt Barker



#### Fuels, oils & chemicals

All fuels, oils, liquid wastes and other hazardous substances should be stored in a fully contained area.

- Dispense fuel and oil on sealed areas (where possible).
- Clean up spills immediately.
- Only take the smallest quantities of liquid over water (bridge sites).
- Conduct regular plant / machine inspections to avoid leaks and breakage of hydraulic hoses.



#### **Packaging waste**

Packaging waste will typically consist of:

- cardboard and paper (boxes)
- plastic (shrink wrap, pallets, plastic bags)
- polystyrene (packaging)
- o metal (straps)
- o timber (pallets, boxes, frames)
- Avoid disposing of packaging waste to landfill.
- Where possible, incorporate into existing recycling streams (such as cardboard boxes into paper and cardboard recycling).
- For large volumes of packaging, source a bulk recycling bin through the waste service provider.
- Plastics and polystyrene may require separate bins that can be arranged through a waste management company.
- Return pallets and cable drums to logistics company, supplier or manufacturer.

#### Check

Are there bins available to allow recycling of packaging?



Packaging waste being collected for being recycling

# Contamination

Works should have the minimum possible impact on the condition of the land, as soil contamination affects the environment, worker health and the community.

Contaminants include metals, voltile organic compounds, hydrocarbons, asbestos and herbicides/pesticides. They may be found in soils, surface water and groundwater.

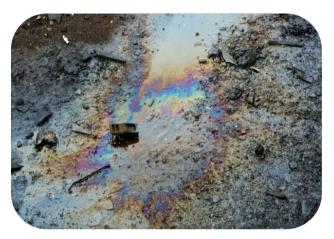
#### **Contaminated Soil**

*Contamination may have been caused by previous potentially contaminating activities (PCAs) at the site.* 

- Assess sites for nearby sources of contaminated land such as heavy industry, rail lines, power plants, petrol stations and gas works. Areas of known soil contamination should also be highlighted in the environment documentation or similar site specific documentation.
- While excavating soil, be alert for the indications of soil contamination:
  - the smell of kerosene, diesel or other chemicals
  - oozing or seepage from the soil
  - o oily staining or sheens on the soil
  - o unnatural soil discolouration
  - o imported fill, rubble or buried waste
  - suspected asbestos containing material
- If contaminated soil is suspected:
  - o stop work
  - restrict access to the site
  - o prevent material from leaving the site
  - seek specialist advice as the material may require treatment before it can be disposed from the site.

#### Check

- Is there a process to identify soil contamination?
- Do workers know what to do if they encounter contaminated soil?



Soil polluted with diesel or similar chemical, leaves a rainbow sheen



Vegetation that has been impacted by a spill or soil contamination



Asbestos containing material (ACM) mixed through dumped construction demolition waste

#### Waste soil and aggregates

No material can be taken off site unless you have followed the DPTI Guides (linked below) or it has been tested and classified for disposal.

When more than 100t of material needs to be moved off site:

- risk assessments required
- testing, analysis and classification routinely required
- classification determines reuse

#### **More information**

See DPTI <u>Guide for the Re-use or Disposal of Surplus</u> Soil

See DPTI Recycled Materials for Road Pavements





## Soil contamination management requirements

- A contamination assessment should be done prior to site works.
- May have different soil classifications within the one site.
- Follow instructions / plans provided by Environment Officer or Site Contamination Consultant.
- Waste Transporter must have a Licence to transport contaminated soil.
- Fill in a Waste Transport Certificate electronically (EPA Wastetracker).
- Provide details to waste facility receiving soil
  - Project e.g. Fullarton Road Widening
  - Soil from "Area 3"
  - Project financial details to charge to.
- Once contamination is identified, specific requirements for classification, separation, storage, stockpiling and transport of contaminated materials may be required for construction.

- Has the site previously had a potentially contaminating activity (PCAs)?
- □ Is the soil, groundwater or surface water contaminated?
- Have you reviewed the risks outlined in the environmental impact assessment or contamination classification report?
- Are there any specific requirements for construction (testing, classification, stockpiling, transport and disposal)?
- Has WHS been considered (e.g. working with lead paint, asbestos, carcinogens, heavy metals)?

#### **Acid Sulphate Soils**

Acid sulphate soils (ASS) are frequently located along the Australian coastline. These soils and rocks can form sulphuric acid when exposed to the air.

- Refer to environment documentation for known locations of ASS in the project area.
- Avoid excavation at sites if the presence of ASS is known.
- Be alert for the presence of:
  - very clear sterile appearing water, often with a blue green tinge
  - dark clay soils or silts that are coloured with yellow flecks
  - no or dead vegetation
  - o coloured green algae in the water
  - strong egg odour.

Refer to the adjacent images for more information.

- If ASS is unearthed:
  - o stop work
  - o cover with water or soil
  - o contain run off from soil and water
  - seek specialist advice as the material may require treatment before it can be disposed from site.



Water affected by ASS is very clear with a blue green appearance



ASS will clod together to create a plate effect. It is water logged with a rotten odour

- Is there a process to identify the presence of ASS?
- Do workers know what to do if they encounter ASS?

# **Heritage and Culture**

Heritage items and locations are those aspects of the past that help to define our culture and should be preserved for future generations. The *Aboriginal Heritage Act 1988* protects all Aboriginal sites, objects and remains that are of significance to Aboriginal tradition, archaeology, anthropology and/or history. The Heritage Places Act 1993 protects state heritage places.

#### Aboriginal heritage

Aboriginal heritage includes objects and places with evidence of Aboriginal occupation or with special cultural significance. These include artefacts, shell middens, axe-grinding or tool sharpening grooves, scarred or carved trees, paintings, rock engraving, burial sites and story locations

- Refer to the environment documentation and to the <u>Roadside Significant Site database</u> for locations of known sites of Aboriginal heritage.
- Implement all controls and permit requirements to protect the site. These may include no go zones or the use of experienced spotters/monitors.
- Make all workers and site visitors aware of the requirements to protect the heritage site.
- Workers must be inducted and know what to do if they make an unexpected find.

It is an offence to damage or disturb an Aboriginal site or object without the approval of the Minister.

Monitoring may be required.

If artefacts, sites or bones are discovered **STOP WORK** in the immediate area and advise site supervisor.







- Is there a Cultural Heritage Management Plan for the site?
- Are their cultural or heritage approval constraints that apply to this site?
- Are workers aware of the requirements to protect the heritage site?

#### **Non-Aboriginal Heritage**

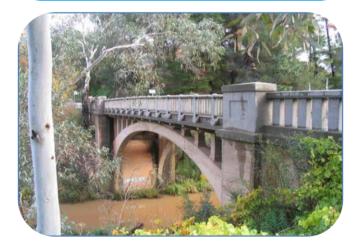
Heritage listed sites typically include buildings, trees, structures (such as bridges, culverts and walls) and heritage precincts.

- Refer to the environment documentation for details about known sites of European heritage.
- Sight permits before commencing work
- Implement all controls and permit requirements to protect the site. These may include no go zones or the use of vibration monitors.
- Make all workers and site visitors aware of the requirements to protect the heritage site.
- Workers must be inducted and know what to do if they make an unexpected find.





- Are appropriate controls implemented as required under permits and site specific environment documentation?
- Are heritage sites identified and protected?
- Have construction techniques been modified to minimise vibration impacts in close proximity to heritage items?





## Unexpected cultural heritage finds

- Stop work if unexpectedly finding a heritage item such as an Aboriginal artefact.
- Make the site safe without further disturbing the artefact. This may involve restricting site access through barricading or signage.
- Escalate to supervisor or DPTI Environment Officer for further advice.
- Consult with subject matter experts as needed
- Engage with stakeholders as required
- Make a note of what you have observed. This will be useful when reporting the incident.

#### Check

- Is there a process for responding to unexpected heritage finds?
- Are workers inducted and familiar with this process?

#### **More information**

See DPTI's Aboriginal Sites, Objects and Remains Flow Chart



Confirming bones excavated during works as non-Ancestral Remains



#### **More information**

#### See DPTI Environment Standards website

- Field Services Environmental Management Representative (EMR)
- DPTI Environment Officer
- DPTI website

