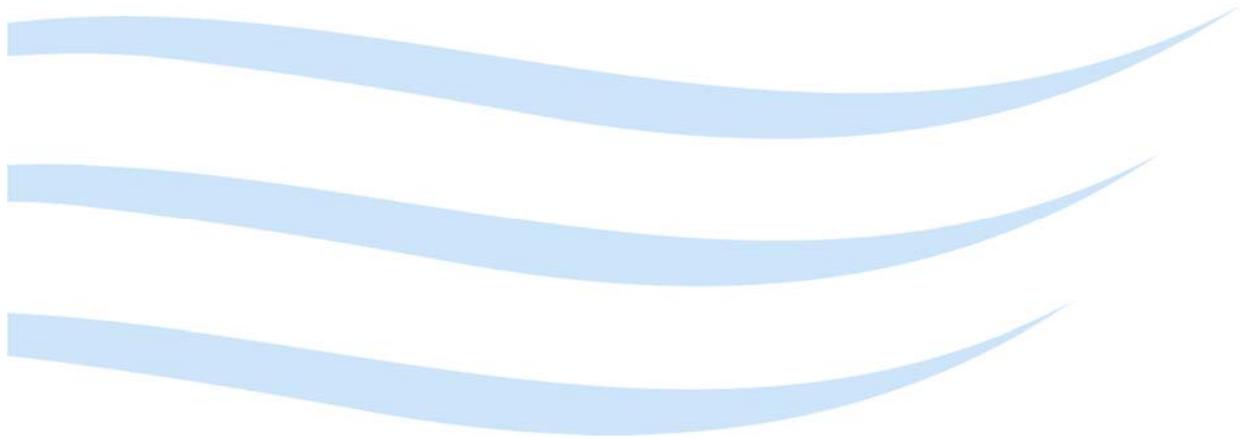


# Division 4 Permit Dam Works Code 2015



**A Code issued pursuant to section 301 of the *Water Management Act 1999* for the purposes of dam works and related matters for Division 4 permits under Part 8 of the *Water Management Act 1999*.**

**November 2015**

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Water and Environment



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## **PART I. INTRODUCTION**

### **1.1 Division 4 permit**

The *Water Management Act 1999* (the Act) provides for the sustainable management and allocation of Tasmania's water resources. Part 8 of the Act regulates dam works and provides for the issuing of dam works permits which authorise the undertaking of dam works.

Part 8 of the Act provides two pathways to obtaining a dam works permit. The first pathway provides for a Division 3 permit, obtained through an application and assessment process. The Division 3 permit pathway is not discussed further.

The second pathway provides for a Division 4 permit, with no application necessary. A person is entitled to a Division 4 permit if their dam works meet the criteria specified under section 159 of the Act. Under section 161 of the Act, a person entitled to a Division 4 permit is taken to have been issued with a permit after they have given notice of their intention to undertake dam works under section 160 of the Act.

### **1.2 Legal obligations**

A person undertaking dam works authorised by a Division 4 permit is entitled to some permit/approval exemptions under other Acts. For example, a permit or special permit is not required under Section 60A of the *Land Use Planning and Approvals Act 1993*.

However, holding a dam works permit does not absolve a permit holder from other legal obligations under the *Water Management Act 1999* or other Acts. For example, a person holding a dam works permit may need to:

- apply for an authority to take water into the dam, under the *Water Management Act 1999*;
- apply for a permit under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* if the dam works may impact on a matter of national environmental significance;
- apply for a permit under the *Aboriginal Relics Act 1975*, if the dam works are going to interfere with Aboriginal heritage;
- undertake action, under the *Weed Management Act 1999*, against declared weed species.

Off-site activities may also require authorisation under other legislation. This may include providing access to the site (e.g. development or upgrading of roads) or operating an off-site quarry (borrow pit). Dam works permit holders will need to ensure that all the appropriate authorisations for off-site activities have been obtained from the relevant agency or local council.

The limited examples of potential legal obligations set out above should not be taken to be an exhaustive list and provides guidance only. The onus is on dam works permit holders to make themselves aware of all obligations under the *Water Management Act 1999* or any other Act.

## **PART 2. DIVISION 4 PERMIT DAM WORKS CODE 2015 - OVERVIEW**

### **2.1 Purpose of this Code**

The purpose of the *Division 4 Permit Dam Works Code 2015* is to prescribe minimum design, construction and environmental standards that apply to dam works authorised under a Division 4 permit<sup>1</sup>.

### **2.2 Authority of this Code**

Pursuant to Section 301 of the *Water Management Act 1999*, a code of practice may be issued in respect of dam works and related matters. This Code has been issued under section 301(1)(b) for the purposes of dam works authorised under a Division 4 permit.

This Code is administered by the Department for Primary Industries, Parks, Water and Environment on behalf of the Minister for Primary Industries and Water.

### **2.3 Application of this Code**

This Code applies to all dam works, including constructing a new dam and repairing, modifying or removing an existing dam, that are authorised under a Division 4 permit.

### **2.4 Format**

Part 3 of the Code, *Planning*, prescribes requirements for site investigations and planning that must be undertaken in relation to all dam works authorised under a Division 4 permit.

Part 4 of the Code, *Design Standards*, prescribes minimum design standards that apply to all dam works, with the exception of removal of an existing dam, authorised under a Division 4 permit.

Part 5 of the Code, *Minimum Construction Standards*, prescribes minimum construction standards that apply to all dam works, with the exception of removal of an existing dam, authorised under a Division 4 permit.

Part 6 of the Code, *Repair or Modification of an Existing Dam*, prescribes additional requirements that apply when repairing or modifying an existing dam authorised under a Division 4 permit.

Part 7 of the Code, *Removal of an Existing Dam*, prescribes additional requirements that apply when removing an existing dam authorised under a Division 4 permit.

Part 8 of the Code, *Environmental Standards*, prescribes environmental standards that apply to all dam works authorised under a Division 4 permit.

### **2.5 Compliance requirements**

This Code prescribes standards that apply to dam works authorised under a Division 4 permit. The *Water Management (Division 4 Permit Conditions) Order 2015* specifies that compliance with this Code is a condition of a Division 4 permit. Under the Act, non-compliance with dam works permit conditions is a breach of the permit and the holder is liable to enforcement action.

Dam works permit holders should ensure that staff, contractors and their employees are familiar with, and observe, those aspects of this Code applicable to dam works undertaken.

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<sup>1</sup> Section 138 of the Act defines a Division 4 permit as a permit taken under section 161 to have been issued.

## PART 3. PLANNING

### 3.1 Site investigations

Before construction starts the landowner must make a thorough investigation of the site to establish the nature of the foundation and to locate sufficient suitable clay material to use in the embankment.

### 3.2 Site planning

Before commencing dam works, permit holders must prepare a dam works site plan that accurately shows the:

- location of the dam wall, or proposed dam wall; and
- siting of the proposed dam works construction footprint<sup>2</sup>; and
- inundation area at full supply level (FSL) and maximum flood level (MFL)<sup>3</sup>; and
- contours of the land; and
- mapped<sup>4</sup>, or otherwise known, significant features<sup>5</sup>.

**Note:** the basis of a site plan may be produced on LISTMAP by:

1. entering the following URL into your web browser -  
<http://maps.thelist.tas.gov.au/listmap/app/list/map?bookmarkId=99801#.Vkqd8bQWVjl.email> ;
2. selecting 'Tools' > 'Drawing Tools' > 'Add an Area on the Map' (at the top left of LISTmap), then using the selected tool to draw the proposed inundation and dam works footprint on the map; or alternatively
  - a. importing a shape file of the dam/inundation footprint; or
  - b. simply drawing the dam/inundation footprint on a hard copy of a printed map.
3. Identifying any known significant features not available on the LISTmap dam layer.

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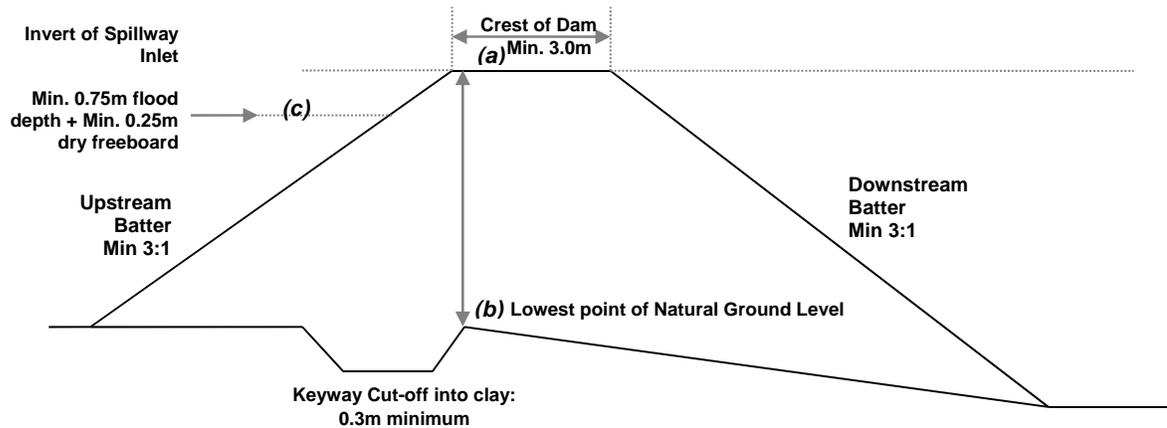
<sup>2</sup> **dam works construction footprint** means the area of land in and around the dam site, to be affected by construction activities such as machinery movement, borrow pits, stockpiles, and vegetation clearance.

<sup>3</sup> not required for removal of an existing dam;

<sup>4</sup> **mapped** means as mapped on LISTmap, Natural Values Atlas, CFEV and salinity mapping available at: <http://dpipwe.tas.gov.au/Documents/salinity-mapA0-web.pdf>

<sup>5</sup> **significant features** include water resources, contour lines, public and private assets, reserves, recorded threatened species, mapped or known threatened native vegetation communities, nests of a threatened species, significant habitat for a threatened species, mapped or known biosecurity risks including weeds, pests and diseases, landslide hazard areas, any trees to be cleared or harvested, potential/known acid sulfate soil areas, high conservation value freshwater-dependant ecosystems, potential/known saline soil areas, potential/known contaminated land, road or rail infrastructure or easements, electricity or gas infrastructure or easements, conservation covenants, heritage listed property, known aboriginal relics, caves, listed geoconservation sites.

## PART 4. DESIGN STANDARDS



Note: The cut-off trench is required to be taken down a minimum of 300 mm into impervious soil and backed filled with good quality clay that is thoroughly compacted.

**Figure 1. Dam Cross Section**

1. The **maximum height of the proposed dam wall** (i.e. height from Point (a) to Point (b) on Figure 1) must not exceed the height submitted in the Notice of Intention to Undertake Dam Works<sup>6</sup>.
2. The **minimum width of the crest of the proposed dam wall** must be 3.0 metres for dams with a wall height at or greater than 1.0 metre (location of crest is noted on Figure 1).
3. The **minimum upstream batter slope** must be 3:1 for dams with a wall height at or greater than 1.0 metre (location of batter is noted on Figure 1).
4. The **minimum downstream stream batter slope** must be 3:1 for dams with a wall height at or greater than 1.0 metre (location of batter is noted on Figure 1).
5. The **minimum spillway width** must be 3.0 metres for dams with a catchment area of up to 40 hectares.
6. The **minimum spillway flood depth** must be 0.75m for dams with a catchment area of up to 40 hectares.
7. The **minimum dry freeboard depth** must be 0.25m for dams with a fetch distance\* up to 0.7km (\*the distance from the dam wall to the upper most extent of the backup water).
8. The **minimum outlet pipe size** must be a nominal diameter of 150mm for all dams with a storage capacity at or greater than 10ML, with a valve to suit.

<sup>6</sup> Required under section 160 of the *Water Management Act 1999*.

## **PART 5. MINIMUM CONSTRUCTION STANDARDS**

### **5.1 Reference bench mark**

For dams with a capacity greater than 10 ML, before commencing dam works, permit holders must:

- (i) install a reference benchmark; and
- (ii) keep a record of the Reduced Level (metres) and the coordinates of the height datum reference until dam works are completed.

**Note:** The reference bench mark must be reported in the notice of completion of dam works<sup>7</sup>.

### **5.2 Clearing of the dam site**

The area to be covered by the embankment must be pegged out prior to commencement of works and this, and the area to be excavated, must be cleared and grubbed.

Topsoil must be heaped in areas outside the area to be covered by the embankment and all trees, scrub and roots removed. Topsoil must be placed in layers not exceeding 200 mm in depth and planted with grass if it is to be left for more than 6 months before being placed back onto the completed dam. This will conserve the integrity of the topsoil.

All saturated material in the embankment area must be pushed well clear of the site and not used in the embankment in its saturated state.

### **5.3 Foundation**

The base of the embankment must be stripped of all topsoil, silt, loose material, vegetable matter and then scarified over its whole area.

### **5.4 Keyway**

A keyway of at least 2.5 metres wide must be excavated under the centre section of the embankment. The keyway must be at least 0.3 metres in depth into impervious soil or solid rock and backfilled with the appropriate quality clay, then thoroughly compacted. The keyway must extend for the entire length of the embankment including the hillside flanks, and must continue to the height of the embankment.

### **5.5 Rock**

If rock is encountered under the embankment, appropriate measures must be taken to cut off seepage through the rock/soil interface and to prevent seepage in the rock joints coming into contact with the embankment soil. Such measures might involve the use of bentonite and a mortar or shotcrete blanket over the rock.

### **5.6 Outlet pipe materials and installation**

The preferred outlet pipe material is High Density Polyethylene (HDPE) with a nominal pressure rating of at least PN 6.3.

If steel pipes are to be used they must be treated to resist corrosion.

Steel or concrete pipes may require more careful installation and testing.

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<sup>7</sup> Required under section 164ZB of the *Water Management Act 1999*.

When installing outlet pipes, the following procedures must be followed:

- (i) a separate trench must be dug at natural ground level, not through any formed embankment, for the pipe to lay in;
- (ii) HDPE pipe lengths are to be joined by either fusion welding or, if they need to be disassembled, the pipe can be joined by Vitaulic joints (or depending on the application, a mixture of both);
- (iii) the installation of baffle plates affixed to HDPE pipe must be constructed from HDPE material and each baffle plate must be at least 600 mm x 600 mm in dimension and 20 mm thick;
- (iv) baffle plates must be placed over the length of the pipe at regular intervals, with a minimum of two baffle plates installed;
- (v) clay must be hand-tamped with an appropriate hand held tamping machine such as a Wacker Packer, up to slightly above the top of the installed pipe so as not to damage or crush the pipe during embankment construction;
- (vi) the intake end of the outlet pipe must be fitted with a screen and encased in a concrete anchor block;
- (vii) the discharge end of the outlet pipe must be fitted with a valve to suit.

### **5.7 Borrow pits**

When rock is exposed in the excavation area, no attempt should be made to excavate into the rock. All exposed areas of gravel, jointed rock or other porous material in the storage area and under the embankment must be covered with at least 300 mm of compacted clay to ensure water tightness.

### **5.8 Embankment compaction**

For dams with a wall height at or greater than 3.0 metres compaction must be undertaken with a tamper foot roller (sheeps foot roller) and compaction to be undertaken as follows:

- (i) all fill material for the embankment is to be placed in layers (or lifts) no greater than 150 mm thick;
- (ii) the largest size particle should not be greater than one third the height of the lift, that is, 50 mm;
- (iii) each layer should be thoroughly compacted before the next layer is placed, with a minimum of 6 passes per layer required;
- (iv) the minimum compaction effort is to be at 95% standard maximum dry density (MDD), with an average of 98% MDD being achieved; or standard Proctor (non-structural fill) as in context to modified Proctor (structural fill) as per Australian Standard: *AS1289 Methods of Testing Soil for Engineering Purposes*;
- (v) the material forming the embankment should be placed with sufficient moisture to ensure proper compaction; the moisture content is to be within the range of -1% to +3% of optimum moisture content (OMC). If the material is too dry, water should be added to achieve the OMC. If the material is too wet, it should be spread and mixed;
- (vi) before each additional 150 mm lift is added to the embankment, the preceding lift should be scarified to ensure that the two lifts are properly joined so that no natural paths for seepage are present;

- (vii) a wheeled scraper or truck may be used for placing the clay on the dam site and spread with the blade of a bulldozer and then compacted using a tamper foot roller (sheeps foot roller). Machinery with crawler tracks or tyres are not suitable and are not to be used for achieving the required compaction effort.

### **5.9 Settlement of the embankment**

An allowance of 5% of the height of the embankment is provided to allow settlement of the embankment overtime. For example, if the permitted height of the dam is 5.0 metres, the embankment may be built to 5.25 metres (+5%) to allow for settlement.

### **5.10 Vegetation**

Topsoil is to be spread over the exposed surfaces of the completed embankment to a depth of at least 150 mm and sown with pasture grass to establish a good cover as soon as possible.

### **5.11 Spillway**

The spillway must preferably be cut in solid material (preferably rock) that will resist erosion. The spillway discharge must be channelled away from the embankment.

### **5.12 Initial filling**

Where practical, a dam must be filled at a rate of not more than 0.3 metres depth per day.

## **PART 6. REPAIR OR MODIFICATION OF AN EXISTING DAM**

In addition to the requirements of Parts 3, 4 and 5 of this Code, where dam works consist of repair or modification of a dam, the following requirements must be complied with:

- (i) all new material used in the new dam works must be similar to that of the existing dam;
- (ii) all top soil in and around the site of the proposed new works must be removed prior to commencing new works;
- (iii) the surface areas of the existing dam where works will be undertaken must be scarified and prepared so that the new and existing materials are laid down and joined without forming any laminations;
- (iv) the laying down and compaction effect of the new material is to be undertaken as per embankment compaction requirements of Section 5.8 of this Code.

## **PART 7. REMOVAL OF AN EXISTING DAM**

Where dam works consist of the removal of a dam, the following requirements must be complied with:

- (i) the dam must be dewatered prior to embankment removal;
- (ii) the inundation area is to be dry and able to take machinery traffic before works commence;
- (iii) all silt and fine materials laying on the bottom of the inundation area must be removed or stripped away and stockpiled;
- (iv) top soil must be stripped away from the surface of the embankment and stockpiled;
- (v) embankment material must be placed back within the inundation area and treated as per embankment compaction requirements of Section 5.8 of this Code;
- (vi) topsoil must be spread over the final compacted material to a depth of at least 150 mm and sown with pasture grass to establish a good cover as soon as possible.

## **PART 8. ENVIRONMENTAL STANDARDS**

### **8.1 Sediment and erosion control**

If dam works are within 100 metres of any downhill:

- watercourse; or
- public or private asset (e.g. road, house or drain); or
- known threatened species listed under the *Threatened Species Protection Act 1995*; or
- threatened vegetation communities, conservation covenant or reserved land under the *Nature Conservation Act 2002*

the following actions must be undertaken to minimise sediment movement from the site:

- (i) prior to commencement of works, a *Sediment And Erosion Control Plan* must be prepared in accordance with *Guidelines for the Developing a Sediment and Erosion Control Plan for Dam Works Sites* (available at [http://dpiwwe.tas.gov.au/Documents/Guidelines-for-Sediment-and-Erosion-Control\\_Dam-Works.pdf](http://dpiwwe.tas.gov.au/Documents/Guidelines-for-Sediment-and-Erosion-Control_Dam-Works.pdf));
- (ii) the *Sediment and Erosion Control Plan* must be implemented in full.

### **8.2 Eagle nests**

If dam works are within 500 metres of, or within 1000 metres line of sight of, a recorded eagle's nest, the dam works must not be carried out between 1 June and 31 March without prior written approval from the Department in accordance with *Directions for Obtaining Written Approval for Dam Works Within the Vicinity of a Known Eagle Nest* available at <http://dpiwwe.tas.gov.au/Documents/DamNearEagleNest.pdf>.

## **PART 9. OTHER OBLIGATIONS OF DAM WORKS PERMIT HOLDERS**

In undertaking any dam works, Division 4 permit holders must also be aware of their obligations under the:

- *Water Management Regulations 2009*; and
- *Water Management (Safety of Dams) Regulations 2015*; and
- *Water Management (Division 4 Permit Conditions) Order 2015*.

### **9.1 Conditions of a Division 4 permit**

Section 164A of the *Water Management Act 1999* states that a Division 4 permit is subject to conditions determined by the Minister in an order. The *Water Management (Division 4 Permit Conditions) Order 2015* prescribe the conditions for a Division 4 permit.

### **9.2 Dam safety**

The *Water Management (Safety of Dams) Regulations 2015* prescribes the activities and required levels of competency in relation to the safety of dams that must be undertaken for dam works undertaken under a Division 4 permit.

### **9.3 Keeping of records and information**

In accordance with the requirements set out in the *Water Management Regulations 2009*, a person who is, or has been entitled to, a Division 4 permit must keep the following records and information for a period of 5 years, commencing on the day on which the dam works are completed:

- (i) any surveys that relate to the dam works;
- (ii) any design plans in relation to the dam works;
- (iii) any reports, in relation to the dam works, that are obtained by the person;
- (iv) any other information, contained in a document (including an electronic document) that has been prepared or obtained by the person and is relevant in determining whether the person was entitled to a Division 4 permit in relation to the dam works.

Any relevant records and information must be provided to an authorised officer when requested.