

GENERAL NOTES

CONTEXT

- THESE DRAWINGS PROVIDE GUIDANCE FOR THE DESIGN OF FILTERS IN NEW EMBANKMENTS (FOR LEVEE BANKS AND RETARDING BASINS). THEY DO NOT PROVIDE GUIDANCE ON ANY OTHER DESIGN CONSIDERATIONS SUCH AS FOR EMBANKMENT STABILITY AND HYDRAULIC DESIGN.
- THESE DRAWINGS ARE INTENDED FOR USE BY DESIGNERS SERVICING THE LAND DEVELOPMENT INDUSTRY. THEY ARE NOT TO BE USED AS STANDARD DRAWINGS FOR USE DURING CONSTRUCTION. THEY ARE INTENDED TO BE USED AS A GUIDANCE DOCUMENT AND ADAPTED BY THE DESIGNER WITH CONSIDERATION TO SITE SPECIFIC CONDITIONS.
- THESE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH THE MELBOURNE WATER GUIDELINES FOR THE DESIGN AND ASSESSMENT OF FLOOD RETARDING BASINS AND THE MELBOURNE WATER LAND DEVELOPMENT MANUAL. THEY SUPERSEDE PREVIOUS MELBOURNE WATER DRAWINGS 7251/4/322 AND 7251/8/321 (FOR USE IN EMBANKMENTS).

DESIGN CRITERIA

- FULL HEIGHT FILTER PROTECTION IS TO BE PROVIDED ON ALL RETARDING BASIN EMBANKMENTS WHICH HAVE A HAZARD/CONSEQUENCE CATEGORY OF SIGNIFICANT OR HIGHER AND AN EMBANKMENT HEIGHT GREATER THAN 3m, AS DEFINED IN THE ANCOLD GUIDELINES. FULL FILTER PROTECTION ENCOMPASSES THE PROVISION OF A CHIMNEY FILTER AND FILTER BLANKET FOR THE ENTIRE LENGTH OF THE EMBANKMENT FROM ABUTMENT TO ABUTMENT, AND WITH CHIMNEY FILTER EXTENDING THE FULL HEIGHT OF THE EMBANKMENT.
- IRRESPECTIVE OF THE ASSIGNED ANCOLD HAZARD/ CONSEQUENCE CATEGORY FULL FILTER PROTECTION IS TO BE PROVIDED FOR EMBANKMENTS CONSTRUCTED WITH DISPERSIVE OR ERODIBLE SOILS - AS DEFINED UNDER DEFINITIONS SUB-SECTION OF THESE GENERAL NOTES.
- FOR EMBANKMENTS REQUIRING FULL FILTER PROTECTION, THE FILTER DIAPHRAGM IS TO BE INCORPORATED INTO THE CHIMNEY FILTER ZONE AND THE FILTER PROTECTION IS TO EXTEND BELOW THE CONDUIT, CONSISTENT WITH THE REQUIREMENTS FOR A FILTER DIAPHRAGM.
- WHERE OTHER PENETRATIONS (SUCH AS CONCRETE SPILLWAY OR OTHER CONCRETE STRUCTURES) ARE SPECIFIED TO BE CONSTRUCTED THROUGH THE EMBANKMENT, FILTER PROTECTION SHOULD ALSO BE PROVIDED ADJACENT TO THE STRUCTURE IRRESPECTIVE OF THE ASSIGNED ANCOLD HAZARD / CONSEQUENCE CATEGORY.
- AUTHORISATION WILL BE REQUIRED FROM MELBOURNE WATER FOR ANY DEVIATION AWAY FROM THE PRINCIPLES OUTLINED IN THESE GUIDANCE DRAWINGS.

MATERIALS

- FOR GRADATION AND DURABILITY DESIGN OF FILTER MATERIAL REFER TO SECTIONS 9.2.4 AND 9.5 OF GEOTECHNICAL ENGINEERING OF DAMS (FELL, MACGREGOR, STAPLEDON & BELL, 2005).
- REINFORCED CONCRETE PIPES TO BE RUBBER-RING JOINT TYPE WITHIN THE EMBANKMENT FOOTPRINT.
- GEOTEXTILES ARE NOT TO BE USED FOR FILTER PROTECTION.

SPECIFICATION AND CONSTRUCTION

- DESIGNER TO SPECIFY METHODOLOGY OF PLACEMENT OF CHIMNEY FILTERS AS EITHER TRENCH OR FILTER FIRST METHOD. REFER TO DEFINITIONS SUB-SECTION OF THESE GENERAL NOTES.
- PLACE CHIMNEY FILTERS AND FILTER DIAPHRAGMS CLEAR OF CONDUIT JOINTS TO PREVENT TRANSPORTATION OF FILTER MATERIAL INTO CONDUIT.
- AVOID CONSTRUCTING IN COMPRESSIBLE SOIL FOUNDATIONS DUE TO POSSIBILITY OF JOINT SEPARATION OF CONDUIT PIPES.
- CONSTRUCT PORTION OF FILTER DIAPHRAGM BELOW THE PROPOSED CONDUIT ALIGNMENT PRIOR TO INSTALLATION OF THE CONDUIT
- POTENTIAL FOR FLOATATION OF CONDUIT DURING CONSTRUCTION OF CONCRETE FOOTING/ENCASEMENT TO BE CONSIDERED.

SPECIFICATION AND CONSTRUCTION (continued)

- SELECT BORROW LOCATIONS TO AVOID EXPOSING POTENTIAL SEEPAGE PATHWAYS THROUGH THE FOUNDATION MATERIAL.
- THE DESIGNER TO DEFINE COMPACTION SPECIFICATION FOR FILTER MATERIAL. 'METHODS TYPE' SPECIFICATION IS PREFERRED OVER 'STANDARDS' SPECIFICATION. REFER TO DEFINITIONS SUB-SECTION OF THESE GENERAL NOTES.
- IN THE EVENT THAT A 'STANDARDS' SPECIFICATION IS ADOPTED, AS A GUIDE A MINIMUM RELATIVE DENSITY OF 70% WITH A MAXIMUM RELATIVE DENSITY OF 80% CAN BE TARGETED, WITH THE LATTER TO AVOID PARTICLE BREAK-DOWN. TRIALS MAY BE UNDERTAKEN EARLY IN CONSTRUCTION TO ESTABLISH THE METHOD REQUIRED TO ACHIEVE THIS LEVEL OF COMPACTION. THE CONTRACTOR SHALL PROVIDE EVIDENCE THAT THE METHOD EMPLOYED ACHIEVES THE SPECIFIED STANDARD.
- FILTER MATERIALS SHALL BE THOROUGHLY MOISTENED AT THE TIME OF COMPACTION AND THE MOISTURE CONTENT SHALL BE UNIFORM THROUGHOUT EACH LIFT.
- THE CONTRACTOR SHALL BE REQUIRED TO ENSURE APPROPRIATE CONTROLS FOR MATERIALS HANDLING AND PLACEMENT OF FILTER MATERIALS ARE IN PLACE TO PREVENT CONTAMINATION AND SEGREGATION OF FILTER MATERIAL DURING CONSTRUCTION.
- THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE A QUALITY CONTROL TESTING AND ACCEPTANCE PROGRAM FOR ALL EMBANKMENT MATERIALS TO CONFIRM THAT THE MATERIALS USED IN THE WORKS MEET THE REQUIREMENTS OF THE SPECIFICATION.
- THE CONTRACTOR SHALL BE REQUIRED TO SUBMIT RESULTS OF THE GRADING AND DURABILITY TESTS UNDERTAKEN ON FILTER MATERIAL AND DEMONSTRATE THAT THEY MEET THE REQUIREMENTS OF THE SPECIFICATION.
- THE RECORDS FOR MATERIAL PLACEMENT AND COMPACTION SHALL SHOW COMPLIANCE OF EACH LIFT AND SHALL INCLUDE:
 - FOR EMBANKMENT FILL ZONES SURROUNDING CONDUIT: THE DENSITY RESULTS, MOISTURE CONTENT AND CONFIRMATION OF LIFT THICKNESS.
 - FOR FILTER ZONES: THE RECORDS PROVIDING CONFIRMATION OF THE FILTER EXTENT, LIFT THICKNESS AND NUMBER OF COVERAGES OF COMPACTION PLANT.
 - SIGN OFF BY THE SUPERINTENDENT TO CONFIRM ACCEPTANCE AND APPROVAL OF EACH LIFT.



LIMITATIONS

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DEFINITIONS

- CHIMNEY FILTER:** A VERTICAL OR INCLINED FILTER ZONE TYPICALLY LOCATED NEAR THE CENTRE OF THE EMBANKMENT. FOR A ZONED EMBANKMENT, THE CHIMNEY FILTER IS LOCATED IMMEDIATELY DOWNSTREAM OF THE CORE ZONE. ITS PRIMARY DESIGN FUNCTION IS TO PREVENT INTERNAL EROSION AND PIPING DEVELOPING THROUGH THE EMBANKMENT DUE TO CONCENTRATED SEEPAGE THROUGH CRACKS OR OTHER DEFECTS THROUGH THE CORE ZONE OF EMBANKMENT DAMS. REFER TO DRAWING 7251/11/002.
- CONDUIT:** ANY PIPELINE REGARDLESS OF WHETHER IT CARRIES WATER UNDER PRESSURE OR THROUGH GRAVITY, OR ANY OTHER UTILITY CONDUIT.
- DISPERSIVE SOILS:** CATEGORISED AS D1 OR D2 PIN HOLE EROSION CLASSIFICATION (WHEN TESTED IN ACCORDANCE WITH AS1289.3.8.3) OR CATEGORISED AS EMERSON CLASS 1 OR 2 (WHEN TESTED IN ACCORDANCE WITH AS 289.3.2.1)
- ERODIBLE SOILS:** SOILS WITH A PLASTICITY INDEX OF LESS THAN 7 (PI<7).
- FILTER BLANKET:** A HORIZONTAL OR NEAR HORIZONTAL, CONTINUOUS LAYER OF FILTER MATERIAL THAT CONNECTS TO THE CHIMNEY FILTER. ITS DESIGN FUNCTION IS TO PREVENT EROSION OF MATERIAL FROM THE EMBANKMENT INTO THE FOUNDATION AND FROM THE FOUNDATION INTO THE EMBANKMENT, AND TO ALLOW SEEPAGE FLOW TO EXIT THE EMBANKMENT. REFER TO DRAWING 7251/11/002
- FILTER DIAPHRAGM:** A FILTER SURROUNDING THE DOWNSTREAM END OF A CONDUIT THROUGH AN EMBANKMENT. ITS PRIMARY DESIGN FUNCTION IS TO PREVENT INTERNAL EROSION AND PIPING DEVELOPING ALONG THE OUTSIDE OF THE CONDUIT. REFER TO DRAWINGS 7251/11/003 AND 7251/11/004.
- FILTER DRAIN:** A HORIZONTAL OR NEAR HORIZONTAL, CONTINUOUS LAYER OF FILTER MATERIAL THAT SURROUNDS THE CONDUIT AND CONCRETE FOOTING AND CONNECTS TO THE FILTER DIAPHRAGM. ITS PRIMARY DESIGN FUNCTION IS TO PREVENT INTERNAL EROSION AND PIPING DEVELOPMENT ALONG THE OUTSIDE OF THE CONDUIT AND TO ALLOW SEEPAGE FLOW TO EXIT THE EMBANKMENT.
- FILTER FIRST METHOD:** CONSTRUCTION TECHNIQUE FOR CHIMNEY FILTERS WHERE FILTER MATERIAL IS PLACED PRIOR TO SURROUNDING FILL TO CONTROL THE THICKNESS OF THE FILTER ZONE AND REDUCE POTENTIAL FOR CONTAMINATION OF FILTER MATERIAL.
- FULL FILTER PROTECTION:** CHIMNEY FILTER AND FILTER BLANKET ARE PROVIDED FOR THE ENTIRE LENGTH OF THE EMBANKMENT FROM ABUTMENT TO ABUTMENT, AND WITH THE CHIMNEY FILTER EXTENDING THE FULL HEIGHT OF THE EMBANKMENT.
- HAZARD CATEGORY:** AS DEFINED IN THE ANCOLD GUIDELINES ON ASSESSMENT OF THE CONSEQUENCES OF DAM FAILURE (2000), HAZARD CATEGORY CLASSIFIES DAMS BASED ON THE CONSEQUENCE OF THE DAM FAILURE. AT THE TIME OF DEVELOPMENT OF THIS DOCUMENT, ANCOLD HAD PRODUCED DRAFT GUIDELINES ON CONSEQUENCE CATEGORIES FOR DAMS WHICH WILL SUPERSEDE THE GUIDELINES ON ASSESSMENT OF THE CONSEQUENCES OF DAM FAILURE (2000). THE NEW GUIDELINES USE THE TERM CONSEQUENCE CATEGORY IN PLACE OF HAZARD CATEGORY.
- METHODS TYPE SPECIFICATION:** ACCEPTABLE SIZE AND SPEED OF COMPACTION EQUIPMENT AND NUMBER OF PASSES AND LIFT SIZES ARE SPECIFIED BY THE DESIGNER BASED ON WHAT HAS BEEN SUCCESSFUL IN PREVIOUS PROJECTS.
- PIPING:** THE INTERNAL EROSION MECHANISM WHICH RESULTS IN A CONTINUOUS VOID FROM UPSTREAM TO DOWNSTREAM WITHIN THE EMBANKMENT.
- STANDARDS SPECIFICATION:** END-RESULT OF COMPACTION IS SPECIFIED WITH THE CONTRACTOR TO DETERMINE THE METHODOLOGY TO ACHIEVE THE REQUIRED STANDARD.
- TRENCH METHOD:** CONSTRUCTION TECHNIQUE FOR CHIMNEY FILTERS WHERE EMBANKMENT FILL IS PLACED ON TOP OF FILTER MATERIAL UP TO A DEPTH OF APPROXIMATELY 1.5M AND A TRENCH IS EXCAVATED THROUGH THE EMBANKMENT FILL AND THE TRENCH THEN BACKFILLED WITH FILTER MATERIAL.
- ABUTMENT:** THE PART OF A VALLEY OR GORGE AGAINST WHICH AN EMBANKMENT IS CONSTRUCTED.

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