TECHNICAL STANDARD TS 35 31 26.60
FLOATING TYPE PRIVATE JETTIES ON WATERWAY BANKS
Document History and Distribution

CONTROLLED VERSION NO: 1
Issue Date: 04/10/2012
Issued By: Andrew Evans

[Uncontrolled unless numbered and dated (in red)]

Approved by:
Name: Marc Lon Ho Kee
Position: Manager Engineering and Maintenance Services
Knowledge Mgrs: Jeff Harrison, Pat Doyle, Dan Luscombe, Chris Braden

Version(s)

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Author(s)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4 Oct 2012</td>
<td>Martina Cusack</td>
<td>Document Creation</td>
</tr>
</tbody>
</table>

Distribution

<table>
<thead>
<tr>
<th>Version</th>
<th>Recipient(s)</th>
<th>Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final</td>
<td>G-MW Technical Standards web site</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

© Goulburn-Murray Water This document is the property of Goulburn-Murray Water. This document must not be copied or reproduced in any way whatsoever, and must not be passed on to any third party without the written authority from Goulburn-Murray Water.
# Table of Contents

## PART 1  GENERAL

1.01 INTRODUCTION ...................................................................................................................... 3
1.02 REFERENCES ......................................................................................................................... 3
1.03 DEFINITIONS .......................................................................................................................... 5

## PART 2  PRODUCTS

2.01 FLOATING TYPE PRIVATE JETTY CONSTRUCTION MATERIALS ........................................... 5

## PART 3  RISK ASSESSMENT OF STRUCTURE

3.01 RISK ASSESSMENT .................................................................................................................. 6
3.02 DESIGN FOR RISK .................................................................................................................. 7
3.03 ASSESSMENT BY THE CORPORATION AND INFORMATION TO BE PROVIDED .................. 7

## PART 4  DESIGN

4.01 PURPOSE .................................................................................................................................. 8
4.02 DESIGN STANDARDS .............................................................................................................. 8
4.03 LOCATION OF THE FLOATING TYPE PRIVATE JETTY ............................................................ 9
4.04 LOADING ON THE JETTY ....................................................................................................... 9
4.05 RISK ......................................................................................................................................... 9
4.06 TOPOGRAPHY .......................................................................................................................... 9
4.07 GEOTECHNICAL INVESTIGATIONS ............................................................................................ 9
4.08 GEOTECHNICAL TESTING ....................................................................................................... 9
4.09 SOIL PARAMETERS REQUIRED FOR DESIGN ......................................................................... 10
4.10 FLOOD LEVELS, FREEBOARD AND FETCH ........................................................................... 10
4.11 SCOUR PROTECTION ................................................................................................................ 11
4.12 ENVIRONMENTAL CONSIDERATIONS ................................................................................... 10
4.13 MAINTENANCE ........................................................................................................................ 11
4.14 SAFETY .................................................................................................................................... 12

## PART 5  EXECUTION

5.01 SATURATED AND INUNDATED GROUND CONDITIONS ......................................................... 12
5.02 COMPACTION .......................................................................................................................... 12
5.03 ROCK BEACHING .................................................................................................................... 12

## PART 6  OHS CONSIDERATIONS

6.01 OCCUPATIONAL HEALTH AND SAFETY .............................................................................. 12

## PART 7  RISK ASSESSMENT

7.01 ENVIRONMENTAL IMPACT .................................................................................................... 13
7.02 OHS & ENVIRONMENTAL RISK ASSESSMENT .................................................................... 13

## ANNEXURE 1 - DRAWINGS
PART 1  GENERAL

1.01  INTRODUCTION

A. PURPOSE

a) The proposed work under this Technical Standard consists of the construction of floating type private jetties on the Corporation’s public foreshore land by others.

B. GENERAL

a) This Technical Standard is not intended for use in Corporation contract documents.

b) This Technical Standard provides a guide to Proponents for the design and construction of floating type private jetties to a standard acceptable to the Corporation. Every application will be assessed on its merit for the particular site and proposed use.

c) The Corporation’s general preference is to avoid construction of new private infrastructure on public foreshore land. Potential Proponents should contact the Corporation to discuss proposals prior to commencement of any significant design work.

C. EXCLUSIONS

a) This Technical Standard does not cover fixed or transportable type private jetties, which are the subject of separate Technical Standards.

1.02  REFERENCES

A. The publications listed below form a part of this Technical Standard to the extent referenced.

B. The publications are referred to in the text by basic designation only. Where no date is given for reference standards, the latest edition available shall be used.

C. AUSTRALIAN STANDARDS

- AS 1111:2000 – ISO metric hexagon bolts and screws – Product grade C
- AS 1170.0:2002 - Structural design actions, general principles.
- AS 1170.1:2002 - Structural design actions, permanent, imposed and other actions
- AS 1170.2:2011 - Structural design actions, wind actions
- AS 1170.4:2007 - Minimum design loads on structures, earthquake loads
- AS 1214:1983 – Hot-dip galvanised coatings on threaded fasteners
- AS 1379:2000 – Specification and supply of concrete
- AS 1428.1:2009 - Design for access and mobility
- AS 1559:1997 - Hot-dip galvanised steel bolts with associated nuts and washers for tower construction
- AS 1684.1:1999 - Residential timber framed construction, design criteria
- AS 1720.1:2010 - Timber structures, design methods
- AS 1726:1993 - Geotechnical site investigations.
- AS 2159:2009 - Piling, design and installation
- AS 2416.2:2010 - Water safety signage.
- AS 2758.1:1998 – Aggregates and rock for engineering purposes – concrete aggregates
- AS 3600:2009 - Concrete structures
- AS 4100:1998 - Steel structures
- AS 4671:2003 - Steel reinforcement bars for concrete
- AS 4680:2006 – Hot-dip galvanised (zinc) coatings on fabricated ferrous articles
- AS 4791:2006 – Hot-dip galvanised (zinc) coatings on ferrous open sections, applied by an in-line process
- AS 4792:2006 - Hot-dip galvanised (zinc) coatings on ferrous hollow sections, applied by a continuous or a specialised process
- AS 4855:2007 – Welding consumables: Covered electrodes for manual metal arc welding of non-alloy and fine grain steels

D. LEGISLATION

- Occupational Health and Safety Act 2004
- Occupational Health and Safety Regulations 2007
- Occupational Health and Safety Plant Regulations 1995
- EPA Publication No 275 “Construction techniques for sediment pollution control”
- EPA Publication N. 480 “Environmental guidelines for major construction sites”
E. CORPORATION TECHNICAL STANDARDS

- TS 35 42 37 - Rock armouring of waterway banks
- TS 35 42 37.15 - Supply of rock products for rock armouring, rock beaching and rock spalls
- TS 35 44 10 - Placement of rock armouring

1.03 DEFINITIONS

A. Goulburn-Murray Water is referred to as the “Corporation” in this Technical Standard.

PART 2 PRODUCTS

2.01 FLOATING TYPE PRIVATE JETTY CONSTRUCTION MATERIALS

A. Jetties may be constructed in concrete, timber, steel, plastic and other proprietary materials and shall be aesthetically and professionally completed. Minimalist unobtrusive infrastructure is preferred, with a small footprint and negligible impact on the environment.

B. STEEL

a) Steel is a suitable material for use in the construction of jetties, particularly where design loads are high. However, it is vulnerable to corrosion and it is necessary to consider appropriate systems to protect and maintain the steel members, including methods for installation and connection of steel members to prevent damage to pre-applied protection systems.

b) Consideration should be given to the selection of steel members to allow ease of application and maintenance of protection systems and not simply based on the most efficient size or shape with regard to strength.

c) Further advice regarding protection systems for steel structures and elements and the selection of steel members is given in AS 4997.

d) Steel structures and elements shall generally comply with the design and performance requirements of AS4100. Minimum sizes of steel members and connections shall generally comply with AS 4997.

e) Requirements for stainless steel shall generally comply with AS 4997.

C. CONCRETE

a) The deterioration of concrete is predominately caused by the corrosion of steel reinforcement and can be minimised by designing durable concrete structures and limiting concrete crack widths. Crack widths shall be limited by designing structures with low stresses in the reinforcement. Maximum allowable reinforcement stresses shall generally comply with AS 4997.

b) Care shall be taken by designers in specifying high strength concrete (concrete with a characteristic compressive strength above 50 MPa) in order to improve durability. Further advice regarding the use of high strength concrete is given in AS 4997.
c) Concrete structures and elements shall generally comply with the design and performance requirements of AS3600.

d) Requirements for concrete, reinforcement and prestressing steel shall generally comply with AS 4997.

e) Exposure classifications for concrete elements and minimum requirements for cover to reinforcement shall be determined generally in accordance with AS 4997.

D. TIMBER

a) Timber is often used in small craft facilities such as jetties due to its ease of workability. The deterioration of timber is usually by rot or attack by living organisms. Timber durability is dependant predominantly upon the species chosen in the design. Further advice regarding the use of timber is given in AS 4997.

b) Timber jetty structures and elements shall generally comply with the design and performance requirements of AS 1720.1.

c) Requirements for timber shall generally comply with AS 4997. Hardwood timbers shall be either durability class 1 or class 2 in accordance with AS 1720.1.

E. PLASTICS

a) Care should be taken in selecting pontoons to ensure that the material has sufficient strength and resilience to cope with the likely loading as well as boat impact over the design life and does not degrade in sunlight or due to chemical spills or aquatic growth.

PART 3 RISK ASSESSMENT OF STRUCTURE

3.01 RISK ASSESSMENT

A. The Proponent shall assess the risk of the structure with consideration being given in the design of the structure and its elements to firstly identify, then minimise or remove risks to future users of the structure. The risk assessment shall be undertaken in accordance with the guidelines in Annexure 1.

B. Examples of potential risks to users include, but are not limited to the following:

   a) Tripping.
   b) Slipping.
   c) Falling.
   d) Pinch spots.
   e) Sinking.
   f) Inadequate safety and rescue equipment.
   g) Inadequate egress points from the water.
3.02 DESIGN FOR RISK

A. The design of all structures to be used in a workplace, during operation, construction and maintenance, shall take into consideration occupational health and safety requirements in accordance with the Occupational Health and Safety Act 2004.

B. The use of jetties is only permitted during daylight hours.

C. No temporary or permanent additional structures are permitted on jetties.

D. All jetties are to be single level only.

3.03 ASSESSMENT BY THE CORPORATION AND INFORMATION TO BE PROVIDED

A. ASSESSMENT

   a) The Corporation will assess applications according to the following structure classification:

      i. **Classification “A” Structures - Standard Corporation Drawings**

         - The Proponent shall submit a design which will be assessed by a Corporation assessor, be in accordance with the standard drawings in Annexure 2 and be certified by a civil/structural engineer registered as a Building Practitioner of Victoria.

         - Non-standard arrangements will be considered Classification “B” structures.

      ii. **Classification “B” Structures- Non-standard Drawings**

         - The Proponent shall submit a full design including construction drawings and calculations that has been certified by a civil/structural engineer registered as a Building Practitioner of Victoria.

         - The design will be assessed by a Corporation assessor and possibly by a third party structural engineer.

B. INFORMATION TO BE PROVIDED TO THE CORPORATION

   a) In applying to construct a floating type private jetty on a Corporation foreshore, the Proponent shall include the following:

      i. Photo of site and site plan, including topographical and water depth contours (to mAHD), existing structures and features.

      ii. Design of jetty, including the type and layout of the proposed jetty.

      iii. Required geotechnical investigations/report.

      iv. Crown Allotment number or copy of title.

      v. Use and purpose of the jetty.

      vi. Construction methodology.
vii. Risk assessment complying with Annexure 1, which may be audited.

PART 4 DESIGN

4.01 PURPOSE

A. The designer shall consider the purpose of the floating type private jetty as part of the protection of the lake foreshore as well as its use for land and water access and activities.

B. The design of the jetty structure shall take into account, as appropriate, stability, strength, serviceability, durability, safety, construction, operation and maintenance.

4.02 DESIGN STANDARDS

A. Floating type private jetties that are proposed to be constructed on Corporation waterways shall be designed and constructed to the following performance standards:

a) Design Life

i. Design life is the period of time for which a structure or an element of the structure remains fit for use for its' intended purpose with appropriate maintenance.

ii. The designer, in consultation with the proponent, shall determine an appropriate maintenance regime consistent with the adopted design and materials that will achieve the design life. Particular care should be taken when considering design life and maintenance regimes for inaccessible elements of the jetty. Such elements should have a design life (with no maintenance) equal to the design life of the jetty.

iii. At the end of its' design life, the jetty should have adequate strength to resist ultimate loads and be serviceable, but may have reached a stage where further deterioration will result in inadequate structural capacity.

iv. Floating type private jetties shall be designed and constructed for a minimum design life of 50 years.

b) Minimise Public Risk

i. All jetties are for private use, but must be accessible to the Corporation at all times.

ii. The proponent, designer and constructor shall consider the operational risk posed by the jetty during its design, construction, use and maintenance, and demonstrate that risks have been minimised.

iii. A detailed engineering design and certification of the jetty is required.

c) Standards and Legislation

i. Floating type private jetties shall be designed and constructed to AS 4997 and other relevant current Australian Standards and Legislation as listed in Sec 1.02.
4.03 LOCATION OF THE FLOATING TYPE PRIVATE JETTY

A. The designer shall consider Corporation access to the jetty, site conditions, constructability and the likely loading conditions on the jetty.

B. Some of the forces the designer shall consider include water flow / currents, debris impact, thermal movement, boat wash and berthing forces on the jetty structure.

4.04 LOADING ON THE JETTY

A. The designer shall consider the use and location of the jetty to determine the worst likely loading cases. The designer shall refer to AS 1170 for loading design.

4.05 RISK

A. The designer shall mitigate the risk and consequence of failure of the jetty, including damage to the buoyancy elements of the jetty. The risk of failure shall determine the level of design information required.

B. The designer shall consider the access to and on the jetty and include fall protection in accordance with the risk assessment for the jetty and AS 1657 if required.

C. One safe form of personnel access to the water is also to be provided, subject to the outcome of the risk assessment. Ladders or steps with hand rails may be considered in accordance with AS1657.

D. Appropriate signage shall be installed in accordance with AS 2156.1 and NZS 8690.

4.06 TOPOGRAPHY

A. The designer shall consider the surrounding topography as the slope above and below the jetty may influence the likelihood of failure.

B. The bathymetry at the location of the proposed jetty will determine its’ extent i.e. it’s length from the shore to achieve 0.75-1m depth of water at full supply level.

C. The topography will determine the access conditions. Consideration should be given in the design to access for disabled persons in accordance with AS 1428.1.

4.07 GEOTECHNICAL INVESTIGATIONS

A. Detailed site specific geotechnical investigations shall be carried out in accordance with AS1726 for each structure classification, to determine the following design parameters:

   a) Substrata type.
   b) Effect of any drainage discharge onto surrounding site.
   c) Nature of existing ground material.
   d) Foundation and embankment strength parameters.
   e) Water measurement depths.
   f) Effects of any excavations and filling.
g) Location of existing or proposed adjacent structures.

h) Ground movement.

i) Global stability.

B. Geotechnical testing shall be in accordance with AS 1726 and AS 1289.

4.08 SOIL PARAMETERS REQUIRED FOR DESIGN

A. Geotechnical investigations shall be used to determine the internal friction angle (Φ), cohesion factor (c), skin friction and bearing capacity.

4.09 FLOOD LEVELS, FREEBOARD AND FETCH

A. The designer shall consider the normal operating level, the high water level, the 1 in 100 year flood level and the deck height of the jetty to determine the risk and likelihood of hydrostatic forces and inundation.

B. If inundation is likely, the jetty shall be designed to withstand uplift, inundation and submergence.

C. The designer shall consider the wave fetch and the type of boats using the jetty and determine an appropriate amount of freeboard on the jetty, which should be appropriate for the type of boats expected to utilise the jetty. However, it is recognised that this may also be limited by the topography and bathymetry at the location and the requirement to minimise fall hazards, particularly when the storage is drawn down from time to time and the type of boats proposed.

D. The designer shall consider the impact of waves on the jetty structure and the associated dynamic loads from vessels tied to it.

4.10 PONTOONS

A. Pontoons shall be stable under the most adverse combination of dead and live loads applied to the pontoon deck. Under such loads, unless permitted otherwise, the following requirements shall be met:

   (a) Minimum freeboard (measured from the top of the flotation system) under a live loading of 3kPa should be at least 25% of the diameter of a cylindrical float and 5% of the moulded depth (minimum 50mm) for a rectilinear float.

   (c) The pontoon chine shall not emerge.

   (d) The angle of tilt shall not exceed 15 degrees.

B. Any restraint from adjacent piles or moored vessels shall not be taken into account in calculations for pontoon stability. Pontoons composed of a number of compartments shall be designed so that the stability requirements above are met with a single compartment flooded.

C. Pontoon decks shall be designed to have a positive fixing to the flotation unit. Such fixings shall be capable of supporting the deck in the event the pontoon turns over.
D. Consideration should be given to the “ride” of the pontoon together with its suitability for the proposed wave and wind climate. Factors such as weight, freeboard and form of restraint shall be considered in the pontoon design.

E. It is recommended that in stability calculations for concrete pontoons allowance is made for marine growth with a minimum buoyant weight on all submerged surfaces of 15 kg/m². Fibreglass pontoons are generally not affected by marine growth.

4.11 SCOUR PROTECTION

A. The designer shall consider and include provision for scour and erosion in the vicinity of the structure, which will include the analysis of the geomorphology of the area, water depths and the water current and fetch at the location and the proposed use of the jetty.

4.12 ENVIRONMENTAL CONSIDERATIONS

A. The design and construction of the jetty shall consider the environmental values at the location and mitigate against any damages to vegetation or aquatic habitat. Jetties which unacceptably impact environmental values will not be approved.

4.13 MAINTENANCE

A. The designer shall design a jetty to require minimum maintenance over its entire life.

B. The designer must consider the following in the design of the jetty:

a) Access to the various parts of the jetty for maintenance / repair work.

b) The ability to remove or contain waste materials during repairs.

c) The ability to undertake repair work in situ to achieve the required standard.

d) The future availability of replacement members or elements.

e) The future availability of skilled tradespersons to undertake the maintenance / repairs over the design life.

C. Access shall be maintained for maintenance vehicles.

D. During the design life of the jetty maintenance will need to be undertaken to ensure that the design life is achieved. Such maintenance activities would include:

a) Regular inspections.

b) Timely repairs.

c) Timely renewal of protection systems.

d) Timely replacement of worn-out components.

e) Keeping records of inspections carried out and maintenance performed.

E. For continued licensing, the jetty must be well maintained and be in a satisfactory condition. It must be inspected and certified as being fit for use, every five years, by a certified civil/structural engineer registered as a Building Practitioner of Victoria.
4.14 SAFETY

A. The designer shall design a jetty that is practical and safe to construct, use, maintain and dispose of over its entire life.

PART 5 EXECUTION

5.01 SATURATED AND INUNDATED GROUND CONDITIONS

A. The jetty will likely be constructed within the waterway and subject to saturated and inundated ground conditions, which will affect the method of construction. No cutting into the existing bank will be permitted.

B. The construction methodology provided with the application shall provide details on how the jetty is to be constructed and how it will mitigate against any negative impacts on the waterway. It should also consider the prevailing water levels. The Proponent will also be required to consult with the Corporation in regard to the timing of the construction works.

C. The Proponent will be required to consult with the Corporation in regard to the timing of the construction works.

5.02 COMPACTION

A. The Proponent will demonstrate that any fill is compacted to the required level of compaction.

B. Soil compaction and density tests shall be conducted for all fill in accordance with AS 1289.5. The Proponent shall be responsible for making good any subsidence.

5.03 ROCK BEACHING

A. Rock beaching shall be installed in accordance with the following Corporation Technical Standards:

a) TS 35 42 37 - Rock armouring of waterway banks.

b) TS 35 42 37.15 - Supply of rock products for rock armouring, rock beaching and rock spalls.

c) TS 35 44 10 - Placement of rock armouring.

PART 6 OHS CONSIDERATIONS

6.01 OCCUPATIONAL HEALTH AND SAFETY

A. The Proponent shall comply with the following safety standards and legislation, as updated and amended from time to time:

a) AS 4360 - Risk Management.


c) Occupational Health and Safety Plant Regulations 1995 and all relevant Codes and Practice.

PART 7 RISK ASSESSMENT

7.01 ENVIRONMENTAL IMPACT

A. The Proponent shall comply with the following environmental requirements, as updated and amended from time to time:

a) EPA Publication No. 275 “Construction Techniques for Sediment Pollution Control”.

b) EPA Publication No. 480 “Environmental Guidelines for Major Construction Sites”.

B. The Proponent shall assess the environmental risks associated with the proposed jetty in accordance with Annexure 1.
ANNEXURE 1 – RISK ASSESSMENT

A. METHOD OF UNDERTAKING RISK ASSESSMENT

The risk assessment shall be undertaken using the following method.

a) Identify all hazards associated with the Works.

b) Determine the level of risk.

c) Establish appropriate risk control measures.

B. Risks shall be classified using the risk calculator below:

<table>
<thead>
<tr>
<th>Likelihood of harm</th>
<th>Extreme</th>
<th>Severe</th>
<th>Major</th>
<th>Moderate</th>
<th>Minor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than 75% likelihood of occurring</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>50% to 75% likelihood of occurring</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>20% - 50% likelihood of occurring</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>5% to 20% likelihood of occurring</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Less than 5% likelihood of occurring</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
</tr>
</tbody>
</table>
A primary goal shall be to eliminate High and Medium risks associated with the jetty and should be a major focus of the Risk Assessment. Proponents should detail risk control measures which adequately address all identified High and Medium risks. When determining risk control strategies, the hierarchy of controls summarised below should be considered:

1. Eliminate the Hazard
2. Substitute the risk with a lower consequence risk
3. Isolate the risk
4. Engineer the risk out
5. Administrative Controls
6. Personal Protective Equipment
ANNEXURE 2 – DRAWINGS
GENERAL WORKS

(1) These drawings shall be read in conjunction with OPA Technical Standard No. 3 E 71 32.4.

(2) Noted otherwise, all dimensions are in millimeters.

(3) These drawings shall not be used for final, set-out work for the project. The proponent shall refer to the site details indicated on the drawings or in the PDA:

(4) During construction the proponent is to ensure that the piles are placed at the right locations.

(5) Any damage to existing services shall be reported to the proponent as required to keep the works and excavations safe at all times.

(6) Any structural steel, tubing, and pipes shall be in accordance with the relevant Australian Standards and Local Authority Standards for the following lines:

(7) All materials and equipment shall be in accordance with the relevant and current Australian Standards and with the by-laws and ordinances of the relevant building authorities.

REINFORCEMENT

(1) Bar lap lengths shall be sufficient to develop the full strength of the reinforcement. Bar laps in millimeters are to be as shown below:

(2) The symbol "+" denotes grade 35 bar; the symbol "-" denotes grade 25 bar.

FOOTINGS

(1) The footings shall be present for all excavations for building foundations, and footing soil tests must be carried out and the foundation material shall be approved by the proponent before placing reinforcement and prior to:

(2) All excavations shall be maintained free of water by provision of sump drains, or drainage to suitably designed sumps for removal by pumping or manual means.

(3) All excavations shall be inspected and approved by the proponent, SO as to ensure design assumptions are met.

(4) The foundation material on site shall have minimum characteristics as listed below:

CONECT

(1) All workmanship and materials shall be in accordance with AS 3300.

(2) Concrete shall be from an approved source and comply with the requirements of the following standards, unless noted otherwise:

(3) Concrete shall be supplied on a performance basis and have the following characteristics:

MATCAT

(1) The concrete mix design, including proportions of additives and admixtures, replacement materials, shall be approved by the certifying engineer prior to the placement of any concrete. Calcium chloride shall not be used in any mix. Fly ash shall not be used as a cement replacement but may be added for workability to a maximum of 5% of cement content.

(2) The finisher shall be a good homogeneous mix, completely filling the formwork thoroughly without crevasses or skips in the concrete.

(3) All forms, exposed edges, and corner corners shall be charred or painted with a protective agent.

(4) The concrete mix design, including proportions of additives and admixtures, replacement materials, shall be approved by the certifying engineer prior to the placement of any concrete. Calcium chloride shall not be used in any mix. Fly ash shall not be used as a cement replacement but may be added for workability to a maximum of 5% of cement content.

(5) Concrete shall be supplied on a performance basis and have the following characteristics:

(6) All structural steel, tubing, and pipes shall be in accordance with the relevant Australian Standards and Local Authority Standards for the following lines:

(7) All materials and equipment shall be in accordance with the relevant and current Australian Standards and with the by-laws and ordinances of the relevant building authorities.
TIMBER
T1  ALL TIMBER WORKMANSHIP SHALL BE IN ACCORDANCE WITH AS 1720.
T2  ALL TIMBER SHALL BE DESIGNED AUSTRALIAN HARDWOOD AND SHALL
     COMPLY TO REQUIREMENTS OF AS 1782.
T3  ALL TIMBER SHALL HAVE A MINIMUM STRESS GRADE OF F23.
T4  ALL TIMBER SHALL BE OF CLASS 1 OR 2 OR THE NATURAL DURABILITY
     CLASSIFICATION OF HEAVYWOOD IN ACCORDANCE WITH AS 1782.
     • REDGUM, RED EUCALYPTUS SEQUOIADENDRON
     • REDGUM, RED EUCALYPTUS LEAVED EUCALYPTUS FIBROSA
     • REDGUM, GREY EUCALYPTUS PARCIFLORA
     • GREY EUCALYPTUS (LEAVED)
     • TALLFERNWOOD
     • TALLPOINTE
     • HIBA

T5  ENDS OF ALL TIMBERS SHALL BE GIVEN A COAT OF PETROLEUM JELLY, OR
     EQUIVALENTLY, WITHIN 48 HOURS AFTER CUTTING.

T6  ALL EXPOSED END GRAINS IF INSULATED WILL BE TREATED AND DRY TIMBER TO THEIR
     CONTACT SURFACES SHALL BE COATED WITH A HEAVY COAT OF PTFE ON
     TIMBER PROTECTIVE EMULSION AFTER CUTTING/DRILLING.

T7  ALL HOLES FOR JOINTS SHALL BE TRULY BORED AND ALL JOINTS CUT TO FIT
     EXACTLY AND TIGHTLY. HOLES SHALL NOT BE MORE THAN 10 PER CENT GREATER
     IN DIAMETER THAN THE BOLTS.

T8  ALL BOLTS, NUTS AND WASHERS SHALL BE NOT CHLOR IN ASSOCIATION
     WITH AS 1782.

T9  ALL BOLTS, NUTS AND WASHERS SHALL BE NOT CHLOR IN ASSOCIATION
     WITH AS 1782.

T10  ALL NUTS OR BOLTS ON EXPOSED SURFACES SHALL BE RECEIVED
     BELOW THE SURFACE.

STEEL WORK
S1  ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 1100
     AND AS 1552.

S2  UNLESS SHOWN OTHERWISE, ALL STEEL COMPONENTS SHALL BE IN
     ACCORDANCE WITH AS 1552.

S3  ALL BOLTS TO BE STRENGTH GRADE A 4.4 TO AS 1101.
     BOLTS TO BE STRENGTH GRADE A 4.4 TO AS 1101.
     TIGHTENED USING A STANDARD WRENCH TO A TIGHTENING TORQUE.
     ALL BOLTS SHALL BE OF
     SUCH LENGTH THAT AT LEAST ONE FULL THREAD IS EXPOSED BEYOND THE
     BOLT AFTER THE BOLT HAS BEEN TIGHTENED.

S4  ALL NUTS TO BE CATEGORY SPF WELD, CONFORM TO AS 4084
     AND WELDING ELECTRODES TO AS 9613.
     WASHERS SHALL BE PERFORMED
     BY AN EXPERIENCED OPERATOR. THE INSPECTION TESTING OF ALL WASHERS
     SHALL BE QUITED OUT IN ACCORDANCE WITH AS 1552.

S5  NOT CHLOR, GALVANIZING SHALL BE IN ACCORDANCE WITH RELEVANT
     AUSTRALIAN STANDARDS, ASW, ASSA, ASSAB, AS 1782.
     REPAIRING/REPAINT OF DAMAGED GALVANIZED SURFACES IS SITE WELDS
     TO BE PATENTED WITH 2 COATS OF APPROVED LINING PAINT.

S6  APPROPRIATE CORROSION RESISTANT FITTINGS AND FITTINGS TO BE USED.

PLATES
P1  ALL PLATES SHALL COMPLY WITH AS 1720.

P2  ONE TEST PLATE SHOULD BE DRIVEN AWAY FROM BANK.

P3  LEAVE PLATE IN THE NORMAL POSITION BEFORE TESTING, MAX TEST LOAD 1300.
     TESTING PROCEDURE IN ACCORDANCE WITH SECTION 8 OF AS 1720.

P4  LEAVE PLATE A MINIMUM 300MM ABOVE HIGH WATER LEVEL.

P5  MINIMUM LENGTH OF BOLTED PLATE BELOW ANNUAL PROPOSED SEALEVEL BEHAVING
     ASY 3m BUT NOT LESS THAN 1.2m. ALL PLATES TO BE INSTALLED THROUGH A SHALLOW
     AND SUFFICIENTLY NOTching OVER THE EXTENDED HARD STRUT. THE PLATE TOES
     SHALL BE TAKEN CLEAVAGE GALVANIZED.

P6  TIMBER FIE PLATES TO HAVE 150MM HS GALVANIZED PRESSURIZED METAL
     MULTI-HAL PLATES.

P7  TIMBER PLATE TOPS TO BE FITTED WITH GALVANIZED M.S. ANTI-SPLIT RINGS
     FORCE IT.
CHECKER 6MM CHECKER PLATE COVER FOR GAP.
NON SLIP DECKING 75 x 15
8 STEFFNER PLATE TEK SCREWED TO
DECK.

2-100 x 8 EQUAL ANGLE, 2-M12 CHEMSECT TO SF1 EACH SIDE OF DECKING.

3-L12 TRENCH MESH TOP & BOTTOM

Erosion Protection
Necessary to Lake Bed in Accordance with GMW TS0089R0

MAXIMUM WIDTH = 2 METRES

WALKWAY TO JETTY
ROLLER CONNECTION

SECTION A-A

Scale 1:20
8MM 90° ANGLE PLATES WITH 4-M12 STAINLESS STEEL BOLT & ROLLER TO MANUFACTURES SPECIFICATIONS.

GANGWAY TO JETTY
CONNECTION DETAIL

Scale 1:10

MAXIMUM WIDTH = 1.2 METRE

DECKING 75 x 20

BEARER 75 x 40

CENTRE BEAR 125 x 50

SECTION C-C

Scale 9:20

DURABLE NON-SLIP DECKING SUITABLE FOR 300kg UDL.

(205 LITRE FLOATS SECURED WITH 9 MM GRADE 11 BOLTS CARRIED UP THROUGH BEARERS
100 x 40 BATTENS IN PAIRS SPACED APPROX 300mm APART AS LOADING POINTS FOR DRAG)

MAXIMUM LENGTH = 6 METRES

WALKWAY TO JETTY

CONDITIONS OF USE:
1. DRAWING TO BE READ IN CONJUNCTION WITH GOLUBURN MURRAY WATER TECHNICAL STANDARD N. 75 35 31 26.60
2. SINGLE LEVEL ONLY
3. NO ADDITIONAL STRUCTURES TEMPORARY OR PERMANENT PERMITTED ON JETTY.
4. ALL FENCING TO BE TEMPORARY
5. HANDRILLS & LADDER SUBJECT TO GMW RISK ASSESSMENT AND TO CONFORM TO AS1657.
6. JETTY LICENSE NUMBER TO BE DISPLAYED BOTH SIDES WITH 150mm HIGH LETTERS COMPLIING WITH AS1174.2

PLAN OF FLOATING JETTY

Scale 1:50

WALKWAY TO JETTY

Checker 6mm checker plate cover for gap.

Non slip decking 75 x 15

8 stiffener plate tek screwed to deck.

2-100 x 8 equal angle, 2-M12 chemsect to SF1 each side of decking.

3-L12 trench mesh top & bottom

Erosion protection

Necessary to lake bed in accordance with GMW TS0089R0

Maximum width = 2 metres

Walkway to jetty

Roller connection

Section A-A

Scale 1:20

8mm 90° angle plates with 4-M12 stainless steel bolt & roller to manufactures specifications.

Gangway to jetty

Connection detail

Scale 1:10

Maximum width = 1.2 metre

Decking 75 x 20

Bearer 75 x 40

Centre bearer 125 x 50

Section C-C

Scale 9:20

Durable non-slip decking suitable for 300kg UDL.

(205 litre floats secured with 9mm grade 11 bolts carried up through bearers.
100 x 40 battens in pairs spaced approx 300mm apart as loading points for dragging.

Maximum length = 6 metres

Walkway to jetty

Conditions of use:
1. Drawing to be read in conjunction with Goulburn Murray Water Technical Standard No. 75 35 31 26.60
2. Single level only
3. No additional structures temporary or permanent permitted on jetty.
4. All fencing to be temporary
5. Handrails & ladder subject to GMW risk assessment and to conform to AS1657.
6. Jetty license number to be displayed both sides with 150mm high letters complying with AS1174.2

Plan of floating jetty

Scale 1:50
END OF TS 35 31 26.60