

Guidelines for Fire Safety Systems in Marinas



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Legislative Background

Schedule 10 of the *Planning Regulation 2017*, Part 17, Division 3, Table 4 identifies Queensland Fire and Rescue (QFR) as an advice agency for assessable development involving a marina.

Table 4 – Development application for operational work that is assessable development under section 28, if the application

- (a) is for tidal works; and
- (b) involves a marina, as defined under the *Transport Operations (Marine Pollution) Act 1995*, with more than 6 vessel berths.

Interpretation

Having regard to the location of the marina, the size of the marina in relation to the length and number of berths, the size of vessels that a berth could accommodate and finger configuration; the following guideline details the minimum required Fire Safety Installations.

The objective is that adequate fire protection should be provided to:

- Restrict fire growth and minimise damage at the berth of origin;
- Prevent fire spread to adjoining berths; and
- Suit QFR operational requirements.

Limitations

In relation to fire hydrant system design this guideline sets out the minimum requirements for fire fighting water flows and pressures. The fire hydrant system is designed to provide sufficient water to attack fires which produce a heat release rate of up to 5 MW.

Designers of these systems must ensure that where heat release rates exceed 5 MW further consideration needs to be given to the water supplies required to combat a fire for that particular marina design.






Definitions

Any definition that is applicable to marinas in this guideline will be of the same definition as used in Australian Standard 3962.

Fire Hydrants Systems - Acceptable Design Solutions

The following fire hydrant system design solutions have taken into account the particular location and environment which they are expected to operate in. Various design options are detailed below, they also include diagrams to provide further explanation of the fire hydrant system requirements. The diagrams are for illustrative purposes only and are therefore not to scale. An explanation of the symbols used has been provided here.

Diagram Symbol Legend

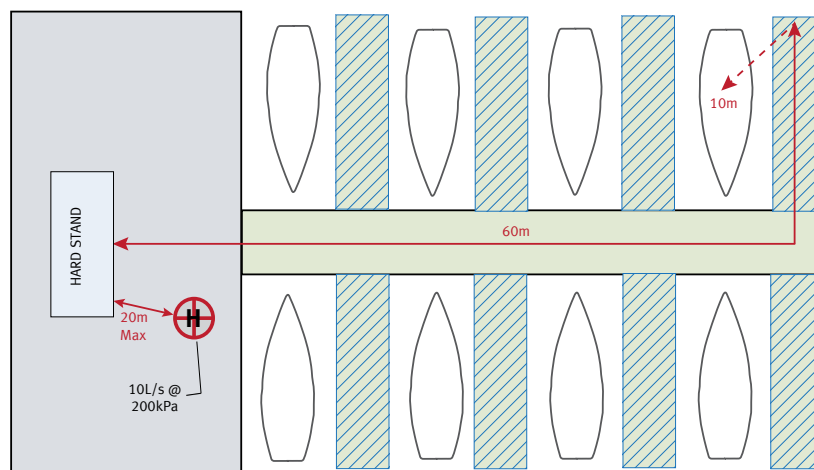
-  Lay Flat Hose
-  Permanent Pipework
-  Hose Stream
-  Single Outlet Hydrant
-  Dual Outlet Hydrant

1 Fire Hydrant System – Design Solution 1

For marina designs that allow for 60 m hose coverage from a Fire Service pumping appliance

(Diagram 1) QFR requires:

- A double-headed pillar hydrant (feed hydrant) to be installed within 20 m of hard standing and be located as close as practical to the entrance of each gangway preferably on the shoreline; and
- The main deck of each moored vessel is covered by a 10 m hose stream; and
- The fire main must be capable of supplying water at flow rates and pressures necessary to facilitate the operation of effective fire fighting jets via a Fire Service pumping appliance – minimum requirement 10 L/s with a residual pressure of 200 kPa (feed hydrant).



2 Fire Hydrant System – Design Solution 2

For marina designs that can achieve 60 m hose coverage from a Fire Service pumping appliance but the reticulated water supply cannot meet the minimum required flow and pressure of 10 L/s with a residual pressure of 200 kPa (Diagram 2) QFR requires:

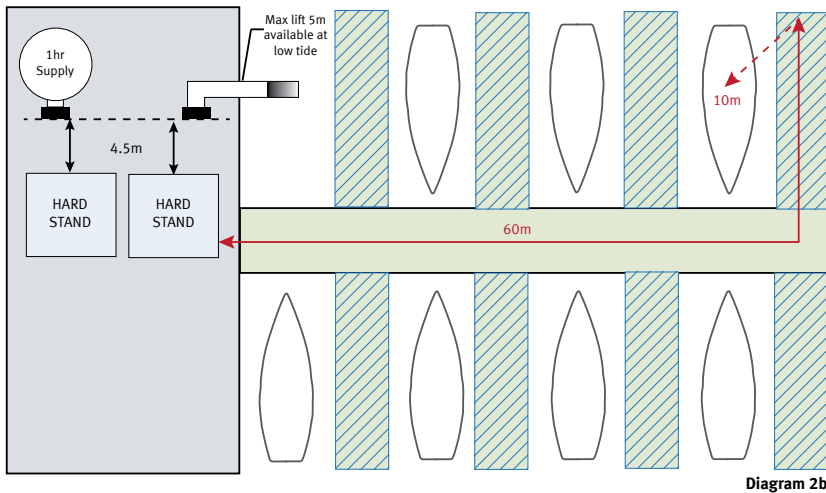
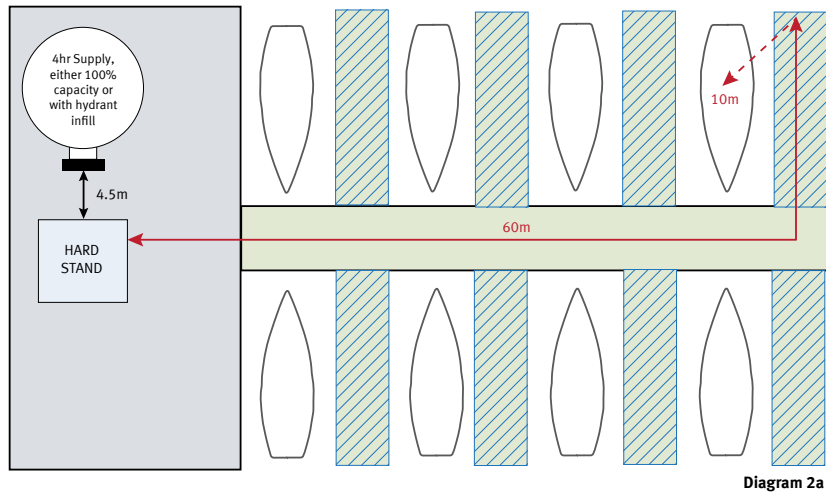
- A four hour tank supply with a fixed hard suction point; or
NOTE: Where a town main is capable of providing make-up supply to the on-site storage, the capacity of the on-site storage shall be such that a four hour supply is available based on the difference in flow rates between the fire hydrant system required flow rate and the make-up flow rate.
- A one hour tank supply with a fixed hard suction point; and
- Facilities that comprise fixed hard suction complete with foot valve and strainer to allow a QFR pumper to utilise the static water supply at all times including low tide. The maximum pump lift height is to be no greater than 5 m which is measured from the hard standing and the low tide level; and
- Hard standing is to be provided within 4.5 m of both suction points.

All suction and hose fittings must meet QFR operational requirements regarding the specifications for tank supply points:

- A hard suction point must be incorporated on all water storage tanks;
- The suction point must be fitted with a Female coupling (suction connection):
 - Type: British Coventry
 - Diameter: 125 mm female coupling
 - Thread size: 3 threads per inch
- This hard suction point is to be located adjacent to the tank;
- In order not to over tax a priming pump the maximum length of pipe work from water storage tank or static supply to the outlet in a booster cabinet must be no more than 15 m with a lift of no more than 5 m;
- The pipe should be of a type suitable to withstand pressures below atmospheric;
- Size of suction pipe from tank must be 150 mm;
- Connection between 150 mm suction pipe and 125 mm connection must not narrow to less

than 125 mm;

- Tank capacity and tank contents indicator as per Section 5 AS 2419.1
- To prevent fouling and to facilitate maintenance, suction pick-ups can be of the type that can be raised or lowered.



3 Fire Hydrant System – Design Solution 3

QFR requires a hydrant booster and cabinet assembly (Diagram 3) to be installed for marina designs where:

- The coverage exceeds the 60 m distances identified in diagrams 1 and 2; or
- Berth/s are provided to serve vessels greater than 15 m in length, and such berths are located greater than 30 m from the shoreline (measured along the walkway).

The booster assembly is to be constructed to the design provided in AS 2419.1. The feed hydrants within the booster assembly must provide a flow of 10 L/s with a residual pressure of 200 kPa.

Where the pressures and flows cannot be achieved refer to Fire Hydrant System – Design Solution 4.

- The hydrant booster cabinet must be installed within 8 m of hard standing; and

The hydrant system installed on the shoreline and along the marina should consist of:-

- A double-headed pillar hydrant (attack hydrant) must be installed and located as close as practical to the entrance of each gangway preferably on the shoreline; and
- Additional single outlet hydrants are to be provided at suitable locations to ensure that all parts of the marina are covered by a 30 m length of hose; and
- The main deck of each moored vessel is covered by a 10 m hose stream; and
- The hydrant installed at the end of a walkway is to be a dual outlet hydrant; and
- When boosted the two most hydraulically disadvantaged hydrants must achieve a flow of 5 L/s @ a residual pressure of 700 kPa.

Vehicular access and hard standing must be provided within 8 m of the booster assembly. Both must

have the load bearing capacity, unobstructed height and width to manoeuvre a fire appliance.

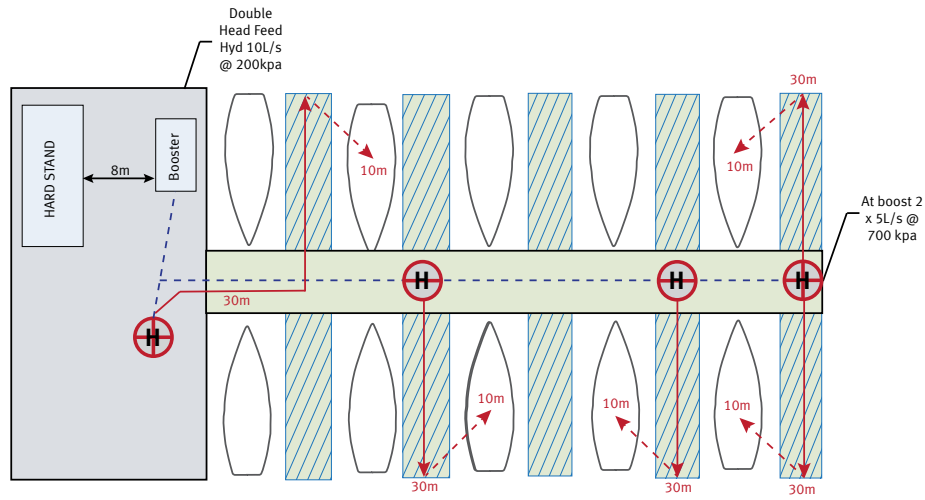


Diagram 3

4 Fire Hydrant System – Design Solution 4

For marina designs where a booster is required but the feed hydrants are unable to provide 10 L/s with a residual pressure of 200 kPa, QFR requires the following:-

- A four hour tank supply with a fixed hard suction point; or
NOTE: Where a town main is capable of providing make-up supply to the on-site storage, the capacity of the on-site storage shall be such that a four hour supply is available based on the difference in flow rates between the fire hydrant system required flow rate and the make-up flow rate.
- A one hour tank supply with a fixed hard suction point; and
- Facilities that comprise fixed hard suction complete with foot valve and strainer to allow a QFR pumper to utilise the static water supply at all times including low tide. The maximum pump lift height is to be no greater than 5 m which is measured from the hard standing and the low tide level; and
- Hard standing is to be provided within 4.5 m of both suction points.

All suction and hose fittings must meet QFR operational requirements regarding the specifications for tank supply points as detailed in Fire Hydrant System – Design Solution 2.

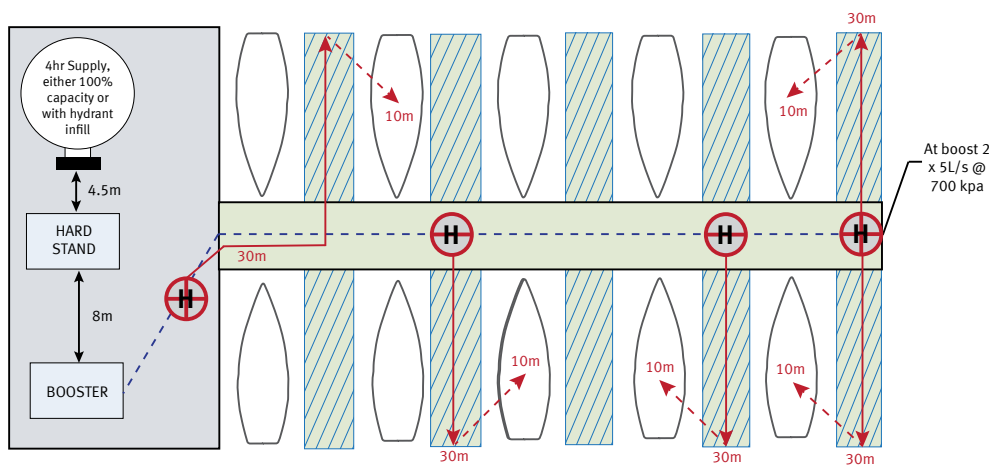
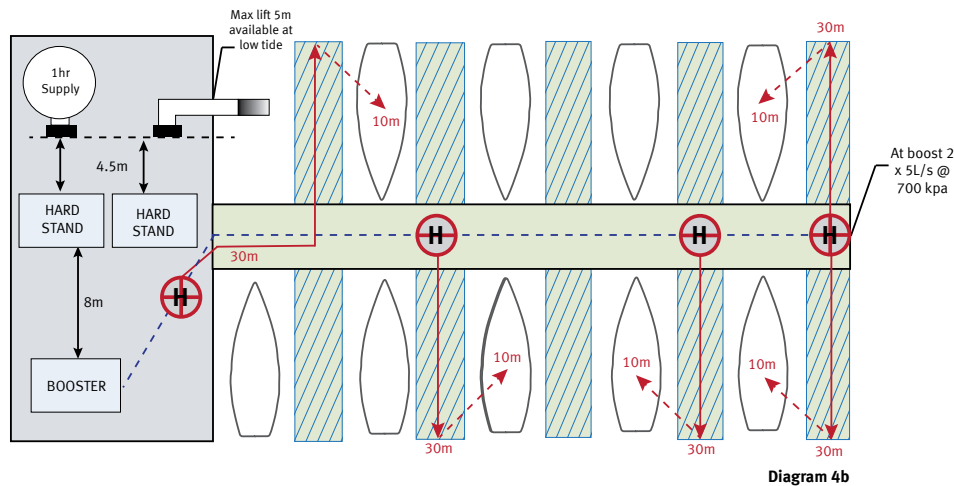


Diagram 4a



Recommendation:

Marking of hydrant location should be a consideration in the development of the hydrant system. This may be achieved by placing blue cats eyes at the edge of the walkway adjacent to the hydrants.

Fire Hose Reels

QFR requires fire hose reels which comply with AS 1221 to be provided and located so that:

- No part of a berth is beyond the reach of the nozzle end of two fully extended reels; and
- The maximum length of hose on any reel is 36 m; and
- At least one reel is located on the shoreline side of the first berth on each main walkway, at the seaward end of each walkway, and at each intersection of each secondary walkway and main walkway; and
- Additional hose reels are spaced along each walkway that provides berth facilities, and be spaced so that the nozzle from two hose reels are capable of serving each berth; and
- The two most hydraulically disadvantaged reels (operated simultaneously) each provide a minimum water flow rate of 0.63 L/s at a running pressure of not less than 275 kPa.

Where the required flow rate and running pressure cannot be achieved at all times from the normal water supply, a booster pump should be provided which:

- Is self-priming; and
- Has the capacity to supply water at a minimum rate of 1.26 L/s at the required running pressure; and
- Operates automatically upon the flow of water through any hose reel.

Protection for fire hose reels from aggressive environments should be considered as per AS 1221. *These hose reel provisions are in line with those in AS 3962.*

Fire Alarms

- A manually activated electric fire alarm that is audible throughout the marina and is distinguishable from any other signal should be provided. This alarm should be interfaced with any installed fire alarm monitoring system and have a battery back-up system as an integral component.
- Sounders should be installed at each hose reel or at any other location that is deemed suitable so that the warning signal is audible throughout the marina.
- Manual Call Points (MCPs) to activate the alarm system should be located adjacent to each fire hose reel and at the shore entrance to each walkway of the marina. Each MCP to have a sign advising: "Not connected to fire brigade. In the event of fire DIAL 000".
- The system should also activate an alarm at any shore based marina management office.

Maintenance of Equipment

All installed fire safety installations must be protected from aggressive environments and be maintained in accordance with the requirements of Queensland Development Code MP 6.1, other than the flow and pressure performance requirements for fire hydrant systems which should be maintained in accordance with the requirements indicated in this guideline.

Fire Procedures

All staff should receive adequate instruction in the use of fire fighting equipment and the procedures to be followed in the event of a fire.

Water Supply

The pipe work for the water supply of the fire hydrant system should be in line with the requirements of Clause 6.3 of AS 3962. The fire main shall be tested to 1350 kPa unassisted or 1700 kPa if fed by a hydrant booster.

Occupation

Marinas should not allow for vessels to berth until all of the installations in this guideline have been installed, tested and approved. AS 3962 has been considered in the development of these guidelines.