Shire of Denmark - Fire System Review

Fire Protection

Feasibility Report

Prepared for: Shire of Denmark

Attention: David King

Date: 23 October 2020

Prepared by: James O'Donnell

Ref: 301248398

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Revision

Revision	Date	Comment	Prepared By	Approved By
001	20.10.2020	Issued for Client Review	JOD	JOD
002	23.10.2020	Final Issue	JOD	JOD

Contents

1. Introduction

Stantec have been engaged by the Shire of Denmark to carry out a desktop study for the Fire Protection Services associated with a proposed Fire Services System installation at East River Road, Denmark WA.

The scope of this feasibility report is to review proposed lot subdivision on the preliminary plans which have been prepared for Landcorp and provide fire system requirements advice and preliminary costings to assist the Shire of Denmark.

This report is provided for review and endorsement by Shire of Denmark. We would welcome any comments or queries you may have on the information provided in this document so that it may be updated to suit.

1.1 Qualifications

The following qualifications apply to this report:

- Site investigation has not been carried out at this point.
- Only preliminary engineering calculations have been performed.
- Opinions of cost provided within this report are opinions of cost only, have not been verified with trade contractors and are provided for budget purposes only.
- Opinions of cost have allowed for works to be undertaken within normal business hours, assume no special access requirements or protective works and allow for the works to be fully completed including commissioning.
- Opinions of cost expressed are exclusive of GST, design consultancy and supervision/project management.

1.2 Preliminary Opinion of Costs

The following cost estimates are provided as order of magnitude estimates only.

1.2.1 Fire Protection Services

Item	Estimate
Professional Fees	$50,000
Builders / Site Works	$80,000
Backflow device (DCV)	$5,000
Fire System Booster	$10,000
Fire System Pumpsets	$50,000
Fire Water Storage Tanks**	$100,000
Inground Fire Pipework	$250,000
Preliminary Estimate	**$545,000 ex GST**

2. Background Information

2.1 Lot Subdivision

Stantec are of the understanding that Shire of Denmark have recently subdivided land at East River Road in Denmark into smaller allotments to allow for future sale or lease. The newly subdivided lots vary in size from 1500sqm and are provided to allow for future warehouse construction in the area.

It is anticipated that each lot would be provided with a building exceeding 500sqm and as a result require provision of a Fire Hydrant System for each separate lot in accordance with Building Code of Australia. It is understood that due to the low town mains flow and pressure in the area each separate lot would require fire pumps and tanks for fire hydrant fighting purposes.

2.2 Shared Fire System Infrastructure

From discussion with the Shire of Denmark it is proposed to provide Fire Hydrant System infrastructure including fire pumps and tanks to service all subdivided lots in lieu of standalone separate systems per lot. For this proposal infrastructure is to be provided by the Shire of Denmark with a shared agreement between lot titles provided for shared access and shared maintenance costs between lots.

This proposal would also require input and endorsement for Department of Fire & Emergency Services, Building Surveyor and input for a Legal Practitioner for title deeds.

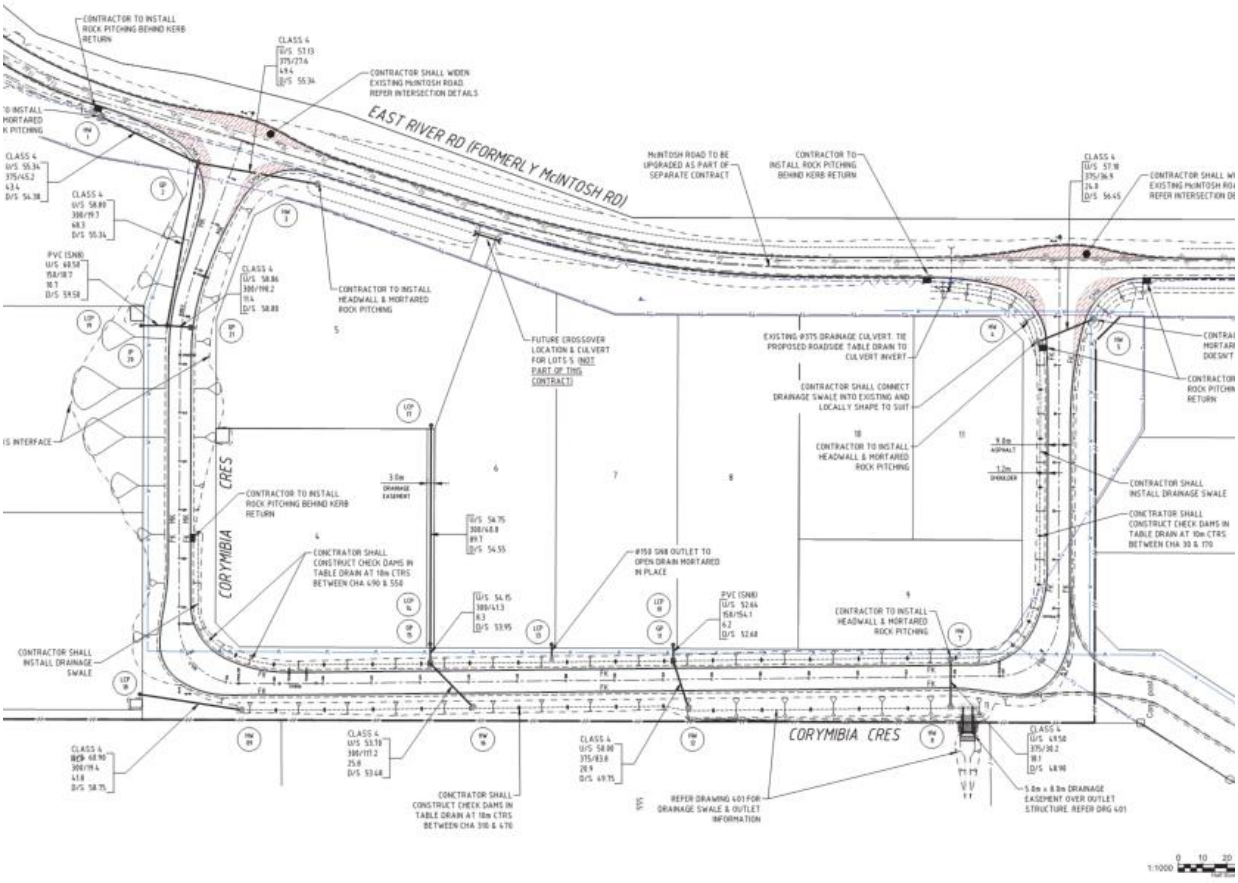


Image – Subdivided lots on East River Road.

2.3 Objectives

We understand the project objectives are:

- To provide Fire Services of high standard, comparable with other warehouse lot developments.
- To provide Fire Services that minimises capital cost (to suit budget constraints) without excessively compromising quality or ongoing maintenance costs
- To provide Fire Services necessary for each area that satisfies the requirements of the Building Code of Australia

2.4 Critical Issues

The following list itemises the critical issues for the project's fire services:

- Confirmation of incoming water supply performance characteristics to fill 144kL within 24 hours as per AS2419.
- Confirmation on shared Infrastructure agreement from Shire of Denmark.

2.5 Incoming Service Connection

The fire protection services feasibility study is based on the assumption that the incoming mains to the site will not be capable of supplying the required flow rate for the fire hydrant system. Full storage tanks for fire hydrants operating for 4 hours are proposed as part of this assessment.

We do note that under AS2419 Cl 5.2.4 (Tank fill time) Water supplied to fire hydrant system storage tanks shall be capable of refilling 50% of the required tank storage capacity in less than 24 hours.

3. Fire Hydrant System

3.1 Design Standards

- Fire services to comply with the Building Code of Australia (2019)
- Fire services to comply with all current statutory requirements and guidelines including Water Corporation and Department of Fire & Emergency Services.
- Fire Services to comply with current Australian Standards where applicable and particularly the following:

Standard	Year	Name	
AS 1851	2012	Routine Service of Fire Protection Systems and Equipment	
AS 2419.1	2005	Fire Hydrant Installations	Part 1: System Design Installation and Commissioning
AS 2441	2005	Installation of Fire Hose Reels	
AS 2941	2013	Fixed Fire Protection Installations – Pumpset Systems	
AS 3500.1	2003	Plumbing and Drainage	Part 1: Water Services

3.2 Design Criteria

3.2.1 Fire Hydrant System

The fire hydrant system is to be designed based on the following:

- Number of operating hydrants — 2 outlets
- Minimum flow rate – pumped — 5 L / s each
- Minimum residual pressure — 700 kPa
- Minimum flow rate – boosted — 10 L / s each
- Water Storage — 2 x Cylindrical Tanks

3.2.2 Fire Hose Reels

Fire hose reels are to be designed based on the following, supplied from the fire hydrant system:

- Protected areas — all warehouse
- Nominal Hose Diameter — 19 mm / 25 mm
- Minimum flow rate — 0.33 L / s each / 0.41 L/s each
- Minimum residual pressure — 220 kPa
- Number of operating hose reels — 2 most hydraulically disadvantaged

3.3 Authority Compliance Requirements

The following additional authorities and advisory bodies are identified as external stakeholders requiring input into the final design:

- Department of Fire & Emergency Services
- Water Corporation
- Shire of Denmark

3.4 Fire Protection Equipment Types

The following table provides an indicative representation of the types of fittings and equipment proposed, and the locations. The primary purpose of this table is to provide a visual indication of the appearance and does not include all specifications.

Equipment / Fitting Type	Proposed Location	Image
Duty / Standby Electric / Diesel Fire pumpsets	Housed within a Fire Pumproom 6.5m x 5m x 2.4m.	
Galvanised Steel Fire Water Storage Tanks	Adjacent Fire Pumproom and Booster Cabinet Dim 7.3m Dia x 4m H – Effective capacity per tank 144kL Total 288kL	
Exposed Pendent / Upright Sprinkler Head	In proximity to Fire Pumproom >10m from Electrical substation. 2m w x 1.6m h x .8m d Location to be discussed with Fire Brigade.	

Equipment / Fitting Type	Proposed Location	Image
Dual Head External Fire Hydrant	Located as required based on future building layouts. Allows Fire Brigade to utilize 2 x hose lengths (60m) to achieve coverage	
Fire Hose Reel	Located as required based on future building layouts. Allows for users to achieve coverage based on 36m hose.	

4. Probable Scope of Work

4.1 Included Works

The scope of fire services works to be documented as part of the Fire Services scope would comprise the following:

- Provision of “common Shared fire system” (fire hydrant system) throughout the site comprising the following:
  - Provision of fire hydrant ring main infrastructure for extension to each lot / building – as required
  - Provision of fire hose reel protection to all areas of the buildings – as required.
  - Fire Extinguishers to all areas of building – as required
  - Fire system pumps and tanks located by Shire of Denmark.
- Fire detection system – as required depending on building size.
  - Fire detection for general building fire alarm – as required.
  - Monitoring of fire system pumps / tank levels by fire detection system – as required.
  - Monitoring of all valves and alarm devices – as required.
- Occupant Warning System – as required depending on building size.
- Remote monitoring of Fire system and equipment – as required.

4.2 Excluded Works

The following works are excluded from the fire protection services design:

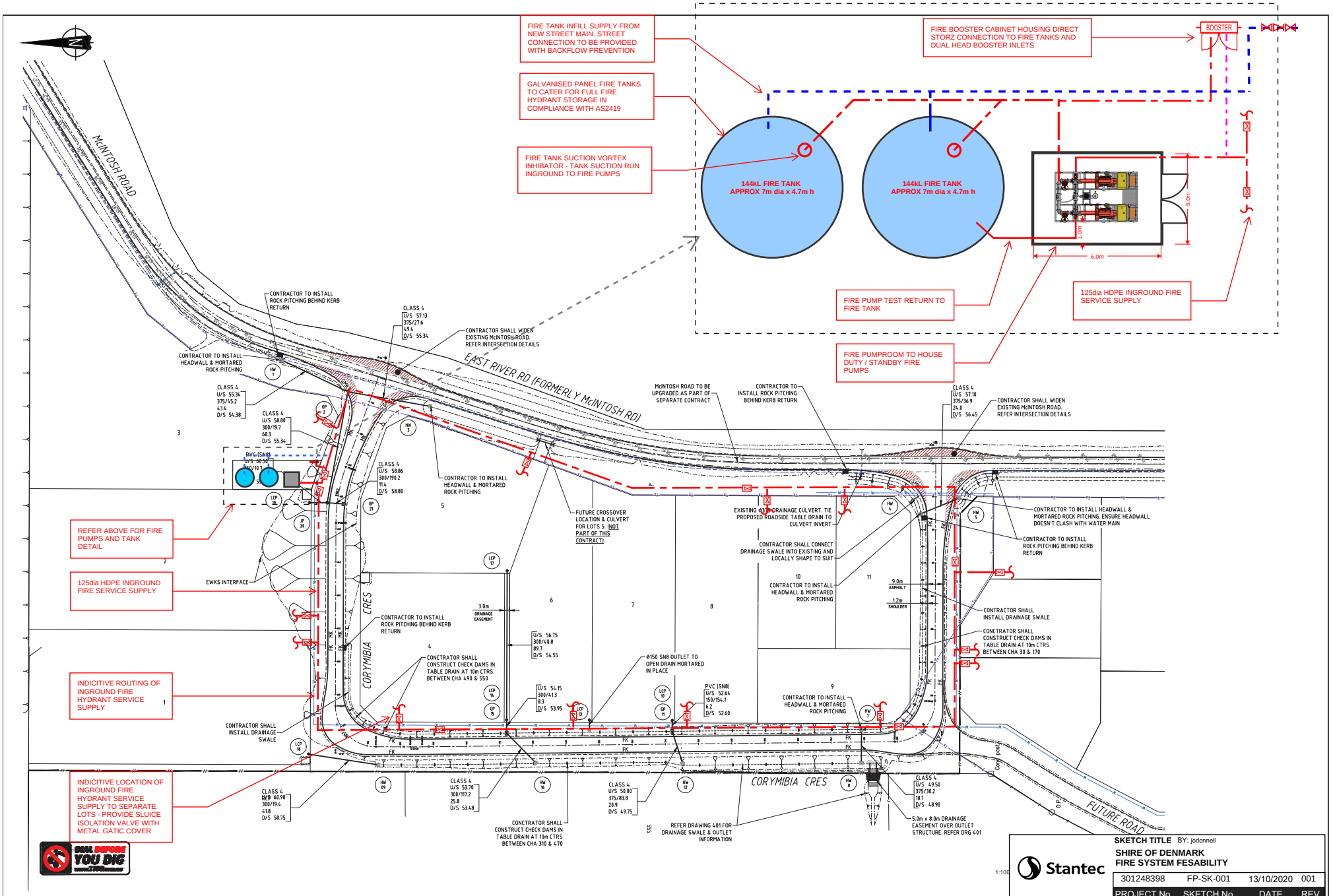
- Automatic Fire Sprinkler Suppression Systems – it is understood future building be of a scale to not require fire sprinklers in compliance with NCC.

4.3 Interfaces with Other Trades

The following interfaces with other trades and consultants will be required as part of the fire services documentation:

- Electrical Power supplies to fire systems, including:
  - Electric Fire Pump and Controller
  - Diesel Fire Pump Controller
  - System Jacking Pump
  - Fire Indicator Panel / Occupant Warning – as required.
- Concrete footing / plinths for tank structure and pumproom.
- Fire Pump Room Ventilation – by Mechanical
- System drainage provisions – by Hydraulics / Civil
- Signage to Fire Protection Services - by Architect

5. Preliminary Sketch



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SKETCH TITLE BY: jodonnell

SHIRE OF DENMARK
FIRE SYSTEM FESABILITY

301248398	FP-SK-001	13/10/2020	001
PROJECT No	SKETCH No	DATE	REV

PROJECT:

LOT 556 McINTOSH ROAD DENMARK

No.	DATE	REVISION	BY
C	13-02-2018	COUNCIL COMMENTS IMPLEMENTED. RE-ISSUED FOR APPROVAL	DPE
B	17-11-2017	ISSUED FOR TENDER	DPE
A	29-9-2016	ISSUED FOR APPROVAL	MEG

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TA1000 Pty Ltd ACN 070 091 168 as trustee for the Consulting Engineering Unit Trust trading as Porter Consulting Engineers ABN 78 826 396 385

CLIENT:

LANDCORP

DRAWING:

ROAD & DRAINAGE LAYOUT PLAN

STATUS: **FOR APPROVAL**

SCALE	1:1000
DATE	APR 2016
DESIGN	BIH
DRAWN	MEG
CHECK	
APP'D	
DRAWING No.	15-6-91/1/400
REV No.	C
ORIGINAL DRAWING SIZE	A1
FILE NAME	S:\ACTIVE PROJECTS\15-86-091\ACAD_STAGE 1\15691-1-400_LAY.dwg

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