

# **SPIIRE DRAINAGE DESIGN NORTH SHEPPARTON**

## **PEER REVIEW**

**FOR THE**

**GREATER SHEPPARTON  
CITY COUNCIL**

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**REPORT PREPARED**

**BY**

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## 1. Introduction

Rural Works Pty Ltd (Rural Works) has been engaged by the Greater Shepparton City Council (COGS), to undertake a peer review of the design of the drainage solution prepared by Spiire including calculations, size and depth of the underground drainage and basin, to ensure that the design is adequate to cater for the proposal.

## 2. Project Scope

The review including the following:

- a) Catchment analysis, including:
  - i. Catchment area
  - ii. Coefficient of runoff
  - iii. Rainfall intensity
- b) The criteria, hydraulic volume, footprint and discharge rate design for the;
  - i. Upgraded Yakka Basin
  - ii. Upgraded Hawkins Basin
- c) Stormwater quality treatment
- d) Review of proposed underground drainage
- e) Review of estimated cost

## 3. Detailed Review

### 3.1. Overview

It is noted that the design is for two independent retention basins that are not interlinked. The design utilises the existing pump station for the Hawkins Basin and Basin and requires a new pump station for the Yakka Basin.

### 3.2. Catchment Analysis

The catchment area for both basins were independently reviewed. The catchment area review accorded with the Spiire areas within the allowable margin of error of 2%.

The coefficient of runoff used by Spiire for the residential area was 0.6. The IDM suggests a coefficient of runoff of 0.55. However the figure of 0.6 used by Spiire is acceptable as it permits future higher building density and a greater paved area within the residential lots.

The rainfall intensity values accord with the check figures allowable margin of error of 2%.

### 3.3. New/Extended Retention Basins Design

The required volume of the basins was independently checked. The checking volumes were less than that determined by Spiire. However the checking volumes did not allow for residual volume within the basin for Stormwater Quality Treatment. Hence the proposed volume is acceptable.

The discharge values accord with the check figures allowable margin of error of 3%.

The basin footprint is determined by the required volume to be stored in the basin and the batter slopes. As shown above, the basin volumes are accepted and the batter slope of 1 in 6 or 1 in 7 meet the IDM requirements (desirable slope of 1 in 8 and maximum slope of 1 in 5). Hence the basin footprints are accepted.

### **3.4. Stormwater Quality Treatment**

The MUSIC modelling has not been able to be checked as the Councils version was out of date at the time of the review and could not be used.

### **3.5. Review of Underground Drainage Design**

#### **3.5.1. Proposed Existing Underground Pipe Connections to the Basin**

It is noted that three existing pipe connections are shown entering the Hawkins Basin from South down Street. At least two of these need to be extended to ensure that they discharge at the basin floor, are beached and to not interrupt the basin batter.

The two existing pipe connections that are shown entering the Yakka Basin need to be further extended to ensure that they discharge at the basin floor, are beached and to not interrupt the basin batter.

The size of the existing pipe connections to both basins is not given.

#### **3.5.2. Proposed New Underground Pipe Connections to the Basin**

It is noted that the design of the underground pipe entries to the basin only cater for the section entering the basin. The connection from the areas to be developed is not included in the design or costed and is assume to be met by the developer.

All the proposed pipe connections are shown entering both basins need to be extended to ensure that they discharge at the basin floor, are beached and to not interrupt the basin batter.

The plans should to be amended to provide a new pit at the upstream side of all new unground drainage pipe connections to the proposed extended basins.

The overview plan – sheet one shows a proposed new connection to the proposed new supermarket that will front Ford Road. A connection pipe to the Yakka basin for this should be provided on the detail basin design plan.

It is noted that the pipe sizes for the connections to the basins are not given. Hydraulic analysis for the sizing the new pipes to the basin have not been provided, and hence have not been checked.

#### **3.5.3. Proposed New Underground Rising Main from the Basin**

It is noted that the design proposes to retain the existing pump station and outfall, and provide a new pump station and rising main from the Yakka Basin.

No details of the proposed new pump station and associated rising main are provided. Hence this component of the design could not be checked.

### **3.6. Review of Estimated Costs**

#### **3.6.1. Project Cost**

The original project costing provided in October 2016 only included lump sum values and did not include quantities or rates for the components of the project, hence the estimate could not be credibly checked.

### 3.6.2. Cost Apportionment

The apportionment of the basin cost is based on the area of the land contributing to the basin. This is an accepted method of apportionment, however it does not consider any works or stormwater treatment that may already exist on the contribution land.

No detailed costing for the Hawkins basin had been provided at the time of this report.

Review of Yakka Basin civil costs:

- An explanation is required for the vitiation in area of topsoil stripping and reinstatement. It is generally accepted that the floor and batters of the basin should be topsoiled.
- Clarification is required as to by the volume of material to be excavated is significantly more than the volume of the basin detailed in the hydraulic analysis.
- As the detailed drainage design had not been provided, the quantity of pipes and pits could not be reviewed.
- It is noted that the plans show 8 endwalls yet the estimate only has 5 endwalls.
- The cost of the pump station entry pit should be included.

Review of Yakka Basin landscape costs:

- It is noted that the design includes an asphalt path and a BBQ/picnic area between the two basins. Should a portion of those costs be included?
- As detailed plan had not been provided a detailed review of the quantities could not be undertaken.
- The design shows rock walls around the sediment ponds. These should be included
- The design and construction (assumed to be project management) of 5% appears to be low and would be expected to be in the order of 10%.

## 4. Conclusion

The design is generally in accordance with the IDM, Council and Industry Practice.

## 5. Recommendations

It is recommended that the items detailed in 3.5 and 3.6 above be addressed prior to the approval of final plans, estimates costs and apportionment.