



Naracoorte Lucindale Council

# Naracoorte Drainage Review

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## Master Plan - Stage 1

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## Document History and Status

Rev	Description	Author	Rev'd	App'd	Date
A	Draft for comment	DH	GD		
B	Issues as Final	DH	GD		

# 1. Introduction

Tonkin Consulting were engaged by Naracoorte Lucindale Council to undertake a review of drainage throughout the town of Naracoorte. Council currently do not have records showing the location of stormwater infrastructure within the town. Furthermore, Council do not have a holistic plan for the future drainage requirements of the township.

A staged approach to developing a stormwater master plan was recommended, to provide Council with the best outcome and enable interim advice to be given on drainage within particular areas.

Stage 1 of this process involved field investigations and liaison with Council staff to develop a skeleton plan of the township drainage in its current condition. Information was also collected from Council staff on the locations where flooding has occurred in the past. Catchment areas were determined from 1:2500 topographical maps and information gathered on site. These catchment areas were used to identify other possible drainage problems in the town and to divide the town into a suitable number of smaller areas for future studies.

This report outlines the process followed in conducting this investigation, the findings of the study and recommendations for staging the subsequent detailed investigations.

## 2. Methodology

### 2.1 Data Collection

Given that Council do not have any accurate and thorough records of the stormwater drainage within the town, data on this infrastructure has been collected from field inspections and discussions with Council staff.

An initial preliminary map of the drainage network was produced following a brief site inspection with the Works Supervisor of Naracoorte Lucindale Council (Mr Tom Krieger). Using this information, a detailed site inspection was carried out and data on each asset within the network was collected electronically. Data was collected on the following infrastructure:

- Side entry pits, junction boxes and grated inlet pits
- Pipes and box culverts
- Creeks
- Open channels
- Basins
- Any other stormwater infrastructure evident on site.

All data was captured on a Pocket PC using GBM Mobile software developed by Exa-Min Technologies. Data was recorded as Nodes (side entry pits, junction boxes etc) and Drains (pipes, culverts, channels etc) overlaid on a map of the Digital Cadastral Database (DCDB).

Side entry pits lids were lifted where possible to accurately determine drain sizes and the layout of the drain network. Where side entry pits or junction box lids could not be lifted, assumptions have been made based on the location and size of adjacent infrastructure. Liaison with Council works staff has provided additional information and confirmed field investigations.

There are a number of locations where the exact layout of drains could not be determined from field inspections or discussions with Council. As such, the mapped network of drains is incomplete in these areas. However, sufficient information has been obtained of the whole drainage network for the purposes of this study. The exact layout of drains at these locations would be gathered when undertaking subsequent studies or detailed designs.

## 2.2 Catchment Areas

A total of twelve primary catchments were identified based on:

- Field observations of the town layout and land grades
- A review of contours on 1:2500 topographical maps (Department of Lands, 1988)
- Location of stormwater infrastructure.

These 12 catchments are amalgamations of a number of smaller catchments based on their location, fall of the land and type of stormwater drainage infrastructure.

It should be noted that the catchment contributing to the open channels on Caves Road, Pinkerton Road and Arthur Street forms part of a much larger catchment to the east of the town. The extent of this catchment has previously been determined in a study undertaken by Tonkin Consulting but is not shown in entirety on the attached plans.

In addition, the small catchment on the corner of Deviation Road and Moyhall Road contributes to a larger catchment to the west of the town and as such has not been included for subsequent stages of this study.

## 2.3 Mapping

Maps of the drainage infrastructure have been produced in MapInfo, which is a GIS based software. The maps show the location of all nodes and drains overlaid on the DCDB, with a legend that identifies various drain and node types and other mapped features.

Additional data gathered in the field (eg, drain and node dimensions, materials) has also been stored electronically and can be used to produce more detailed maps for subsequent investigations.

Boundaries of the twelve catchments have also been shown on these maps.

Maps have been produced at A0 (1:5000 scale) and A1 (5 sheets at 1:2500 scale) and form Appendix A.

## 2.4 Identification of Flooding Problems

Potential flooding problems within each catchment have been identified based on:

- Discussions with Council regarding historical flooding problems
- Review of catchments areas, contours and infrastructure layout
- Previous studies.

## 2.5 Priorities for Further Investigations

Priorities have been determined for each of the identified drainage problems, based on:

- Priorities indicated by Council
- Consequences of drainage non-performance
- Likely frequency of flooding.

## 3. Findings

### 3.1 Overview

Table 3.1 below summarises the findings of this investigation for each of the 12 identified catchments. Where Council and/or Tonkin Consulting have identified flooding problems, these issues have been documented in this section of the report.

**Table 3.1 Summary of Drainage Catchments in Naracoorte**

Catchment	Area (ha)	Stormwater Disposal	Discharge Location	Previous Study Conducted	Issues Noted By Council	Potential Problems Identified	Priority
1	33.9	Gravity & Pumping	Naracoorte Creek	Yes	Yes	Yes	High
2	51.2	Gravity	Naracoorte Creek	No	Yes	Yes	Medium
3	19.5	Gravity	Naracoorte Creek	No	No	No	Low
4	TBD*	Gravity & Pumping	Naracoorte Creek	Yes	Yes	Yes	High
5	12.6	Gravity	Soakage	No	No	Yes	Low
6	59.8	Gravity	Naracoorte Creek	No	Yes	Yes	High
7	77.3	Gravity	Basin	No	Yes	Yes	Medium
8	47.3	Gravity	Naracoorte Creek	Yes	No		Medium
9	62.3	Gravity	Naracoorte Creek	No	No		Low
10**	1.2	Gravity	Open Channel	No	No	No	None
11	5.1	Gravity	Naracoorte Creek	No	No	No	None
12	106.8	Gravity	Basins/ and open channel	No	Yes	Yes	Medium

\* Extent of Catchment 4 is to be determined as part of the detailed study

\*\* Catchment 10 contributes to a formed channel on Moyhall Road, which is part of large catchment to the west of Naracoorte. This catchment will not be further considered in detail in this study.



An additional previous study in the Flood Mapping of Naracoorte Creek has been conducted. This will be reviewed in conjunction with future studies of those catchments that discharge into the creek.

### 3.2 Catchment 1

The following issues have been identified in this catchment:

- Insufficient capacity of pump stations on Gum Avenue and Field Street, resulting in flooding of adjacent properties during significant events.
- Stormwater discharge to reserve on the corner of Park Terrace and Stewart Terrace may cause overflow over Stewart Terrace in a large storm event, flooding the road and adding to the problems at the Gum Avenue and Field Street.

### 3.3 Catchment 2

The following issues have been identified in this catchment:

- Flooding of roads, footpaths and possibly properties at the intersection of Cameron Street and Freeling Street.

### 3.4 Catchment 3

Catchment 3 has been included as requiring low priority attention, despite no problems being identified. Council has indicated that this area may have future development and therefore a study should be done prior to this development.

### 3.5 Catchment 4

The following issues have been identified in this catchment:

- Flooding of the open channel on Caves Road, due to minimal grade on the channel and a large catchment area.
- Insufficient capacity of the pipe installed along a section of Caves Road, increasing problems in the open channel upstream.
- Insufficient capacity of pump station on Smith Street.

### 3.6 Catchment 5

The following issues have been identified in this catchment:

- Soakage pit unlikely to accommodate a large storm event
- Insufficient infrastructure to capture a large storm event.

### 3.7 Catchment 6

The following issues have been identified in this catchment:

- History of flooding at the junction of Roland Street with Hinckley Street
- "Bubble up pit" at the intersection of Roland Street and Porter Street adding to flooding problems at Hinckley Street
- Reported overflow across Smith Street in town centre, possibly caused by small diameter pipes on Smith Street and a large upstream catchment.

The proposed upgrade of the Smith Street/ McRae Street intersection for traffic management purposes is also a consideration determining the priority of the detailed catchment study. Any required stormwater upgrade works at this location should ideally be undertaken in conjunction with the intersection upgrade.

### 3.8 Catchment 7

The following issues have been identified in this catchment:

- Stormwater discharge to Memorial Oval is likely to cause flooding of the reserve in a large storm event
- "Bubble up pits" and discharge of stormwater to water tables in two locations increase surface flows elsewhere in the catchment.

Stormwater issues on Memorial Oval are a particular concern for Council at this time as a portion of this land is to be used for residential development in the near future.

### 3.9 Catchment 8

The following issues have been identified in this catchment:

- Relatively small diameter pipes along Butler Terrace and McCoy Street with minimal grade along some sections, which may cause flooding due to the reasonably large catchment area
- Possible flooding at the junction of Cedar Avenue and Jenkins Terrace.

A previous study has been conducted in part of this catchment with detailed design documentation prepared. This documentation will be review as part of the study and amended if required.

### 3.10 Catchment 9

The following issues have been identified in this catchment:

- Potential flooding across driveways (industrial only) in large storm event, due to small capacity pipes beneath most driveways
- Flow restriction for stormwater in channel along Deviation Road as it enters small diameter pipe at Smith Street
- Minimal formation of channel along Deviation Road, immediately south of Smith Street.

### 3.11 Catchment 11

We recommend that a further study be conducted in this catchment to complete the town's master plan.

### 3.12 Catchment 12

The following issues have been identified in this catchment:

- Regular flooding over Gordon Street at the end of Schinckel Road
- Lack of stormwater infrastructure around Cedar Avenue, Greive Avenue and Schinckel Road
- "Bubble Up" pits at the intersection of Cedar Avenue and Schinckel Road
- Possible flooding along Aitchison Avenue due to small capacity culvert beneath Gordon Street.

Catchment 12 discharges from the two stormwater basins and an open channel and contributes to the catchment to the west of the township. It is likely that Catchment 10 contributes to the same catchment. Given that this catchment lies outside the Naracoorte township, it is not proposed that a study be conducted on this area, unless Council has plans for future development of the area.

## 4. Recommendations

We recommend that further detailed studies of individual catchment area be conducted in the following order:

**Table 4.1 Subsequent Study Priority Order**

Study Order	Catchment Number	Catchment Description
1	1	Field Ave / Gum Av precinct
1	4	Gare Swamp precinct
1	6	Town centre precinct
4	7	Caves Road precinct
4	12	Cedar Av, Grieve Av and Schinckel Rd precinct
6	2	Cameron St/ Freeling St precinct
7	8	McCoy St and Butler Tce
8	5	Tafe precinct
9	9	Deviation Road precinct
10	3	Northern river, including Bates St
11	11	Wheeler Court precinct

Some studies in the initial phase have an equivalent priority order and can be conducted simultaneously or in an order preferred by Council.

It is further recommended that a review of the Flood Mapping of Naracoorte Creek should be undertaken following completion of the above reports.

# Appendix A

## Maps