



# INFRASTRUCTURE SERVICES ASSESSMENT

NORTHERN CORRECTIONAL  
FACILITY – ASHLEY SITE

---

**PREPARED FOR**

DEPARTMENT OF JUSTICE



# TABLE OF CONTENTS

|                                     |    |
|-------------------------------------|----|
| Appendix A - Concept Drawings ..... | 2  |
| 1. Executive Summary .....          | 3  |
| 2. Water Supply .....               | 5  |
| 3. Sewer Service .....              | 6  |
| 4. Stormwater .....                 | 7  |
| 5. Road Junction .....              | 8  |
| 6. Electricity Supply .....         | 8  |
| 7. Telecommunications .....         | 9  |
| 8. Gas Supply .....                 | 11 |
| 9. References .....                 | 11 |

## Appendix A - Concept Drawings

- C00 - General Arrangement & Sewer Rising Main Profile
- C01 - General Arrangement & Water Main Profile
- C02 - General Arrangement & Road Junction

| Issuing Office: 117 Harrington Street, Hobart 7000 |            |  |            |           |         |           |          |
|--|------------|--|------------|-----------|---------|-----------|----------|
| JMG Project No. J220884CS                          |            |  |            |           |         |           |          |
| Document Issue Status                              |            |  |            |           |         |           |          |
| Ver.   | Issue Date | Description                                  | Originator |           | Checked |           | Approved |
| 0  | 10/03/2023 | Draft for Client Review                      | GLA        |           | CCH     |           | CCH      |
| 1  | 07/06/2023 | Updated following review & TasNetworks input | GLA        |           | CCH     |           | CCH      |
| 2  | 05/07/2023 | Revised following DoJ review                 | GLA        |           | CCH     |           | CCH      |
| 3  | 10/08/2023 | Final Issue                                  | GLA        |           | CCH     |           | CCH      |
| 4  | 11/09/2023 | Minor Revisions                              | GLA        | <i>JA</i> | CCH     | <i>JA</i> | CCH      |

## CONDITIONS OF USE OF THIS DOCUMENT

- Copyright © All rights reserved. This document and its intellectual content remain the intellectual property of JOHNSTONE McGEE & GANDY PTY LTD (JMG). ABN 76 473 834 852 ACN 009 547 139
- The recipient client is licensed to use this document for its commissioned purpose subject to authorisation per 3. below. Unlicensed use is prohibited. Unlicensed parties may not copy, reproduce or retransmit this document or any part of this document without JMG's prior written permission. Amendment of this document is prohibited by any party other than JMG.
- This document must be signed "Approved" by JMG to authorise it for use. JMG accept no liability whatsoever for unauthorised or unlicensed use.
- Electronic files must be scanned and verified *virus free* by the receiver. JMG accept no responsibility for loss or damage caused by the use of files containing viruses.
- This document must only be reproduced and/or distributed in full colour. JMG accepts no liability arising from failure to comply with this requirement.

## LIMITATIONS & DISCLAIMERS

- This report presents information and opinions which are to the best of our knowledge accurate. JMG accepts no responsibility to any purchaser, prospective purchaser, or mortgagee of the property who relies in any way on this report.
- JMG have no pecuniary interests in the property or sale of the property.
- This report presents information provided by others. JMG do not claim to have checked, and accept no responsibility for, the accuracy of such information.

# 1. Executive Summary

The Tasmanian Government has committed to build a new correctional facility in the north of the State with the Ashley Youth Detention Centre (AYDC) site announced as the only location now being considered for the project.

This feasibility report assesses the site infrastructure requirements, in terms of external connections for water, sewer, stormwater, power, and communications, plus road junction requirements (as recommended in the Traffic Impact Assessment carried out by Midson Traffic Pty Ltd), as necessary to service the Northern Correctional Facility (NCF).

JMG have previously reviewed the Birralee Road site, as the prior nominated site for the correctional facility, from a similar viewpoint, i.e., to assess services infrastructure upgrading requirements. In terms of briefing criteria, such as predicted loads, and levels of resilience and redundancy of services to the site, we have generally adopted the same requirements as identified in that report, in the absence of any further information.

Initial discussions have been held with the stakeholder authorities, TasNetworks, TasWater, Department of State Growth and Telstra, to contribute to this report.

The location of the site is some distance away from existing authority services, particularly water and sewer, which would be capable of supporting the new facility of this size without significant upgrading and the associated costs. Connections to some existing infrastructure will require routing across Council or TasWater land.

Further studies including a detailed survey of the proposed pipeline routes are recommended to give more confidence to these preliminary investigations and concept designs.

In summary, there is significant services infrastructure works required to service such a substantial facility as outlined below:

## **Water Supply**

- Onsite storage tanks and pumpset for firefighting water.
- Onsite reservoir storage for backup potable water supply.
- New 150mm diameter water main from Deloraine via Meander Valley Road.

## **Sewer**

- New rising main from NCF to Deloraine Wastewater Treatment Plant and associated pump station.

## **Stormwater**

- Onsite detention and stormwater quality treatment.
- Maintain run-off into existing open drains.

## **Electricity Supply**

- Alterations to TasNetworks High Voltage (HV) power supply arrangements, for provision of primary and alternative power supplies.
- Establish new HV switching station, and 2 megavolt-amperes (MVA) substation onsite supplied from existing Meander Valley Road feeders, in addition to retaining the existing 1MVA substation.

## **Telecommunications**

- Establish fixed fibre primary connection to Networking Tasmania Network.
- Establish fixed fibre secondary connection to Networking Tasmania Network.
- Establish fixed fibre connection to National Broadband Network (NBN) network for contractor or other vendor direct internet connections.

## Road Junction

- Upgrade site entry to incorporate basic auxiliary right turn (BAR) and short auxiliary left turn (AUL(S)) minor movement treatments.

## Private Property/Easements

- Most services works will be within existing road reserves and will not require new easements. There will be some level of new easements needed across the racecourse property to connect to the existing wastewater treatment plant. Service authorities have the right under various acts to acquire service easements when necessary.

## 1.1 Site Description

|                                       |  |
|---------------------------------------|--|
| The site address:                     | 4260 Meander Valley Road, Deloraine<br>- 3km approximately east of Deloraine, south of the Bass Highway. |
| Property Identification Number (PID): | 6275320  |
| Certificate of Title (CT):            | 12/6765  |
| Area from Title                       | 39.66 ha   |
| Anticipated development area          | 15 ha  |
| Tenure type:                          | Crown Land   |
| Authority:                            | Department <i>for</i> Education, Children and Young People   |
| Owner:                                | The Crown  |

## 1.2 Intended Population

The ultimate development for the site is based on catering for up to 270 beds in an adult correctional facility, and a further 370 staff and other persons, for a total population of 640. This population is assumed to be split over several shifts, with the majority of other persons such as visitors, external professionals or other service providers present during the day shift only.

The number of persons is particularly relevant to the design of water and sewer infrastructure, as required to meet the TasWater supplements to the Water Services Association of Australia Sewer and Water design codes. While the total number is 640 persons, this translates into a design population of 460 equivalent persons over 24 hours. The sewer pump station will be required to cater for peak loading, however, the rising main can be designed on this equivalent persons basis in the absence of more detailed information about actual behaviour.

It is noted that the existing Ashley Youth Detention Centre functions are expected to be moved from the current site prior to Stage 1 of the correctional facility being commissioned. Stage 1 construction of the NCF will accommodate approximately 160-170 beds.

## 2. Water Supply

Water supply for the site needs to cater for the following:

- potable water use for drinking, cooking, basins, showers, health facilities
- laundry
- toilet flushing
- irrigation of landscaped areas
- providing a reliable supply for firefighting.

The Deloraine reservoir is located at a suitable height to provide gravity flow to the site, however, its long distance from the site means it would not be capable of supplying water at a sufficient flow rate required for firefighting purposes. Given the design population, it would also be unable to meet the supply demand at peak periods for domestic water supply.

For firefighting purposes, on site tanks and pumps are seen as the most reliable solution, which offer suitable redundancy in the system to allow for maintenance of the tanks and pumps and so allow adequate coverage at all times. Given that these fire water tanks operate effectively independent of the external supply once the tanks are filled, the demand on the potable water supply would be limited in a fire scenario.

Toilet flushing is a large demand for correctional facilities; however, this does not need to be done with potable water. Rainfall runoff from roof areas can be collected and stored in tanks to partially supply flushing water. A dual supply arrangement would be installed which uses potable water when stored rainwater has been exhausted. This reduces the demand for and cost of potable water and also reduces the potential stormwater runoff from the site.

Laundry is also a large user of water, and stored rainwater can also be used in a laundry provided it has a backup potable supply with alternate systems being clearly labelled as potable or non-potable.

In view of the restricted flow available for potable water, and the long length to the associated water reticulation network, it is considered that on site reservoir(s) should also be considered for potable water. These reservoirs/tanks should be designed to allow for three full days of supply to cover potential operational issues with the network (noting that in the event of a water reticulation problem that water could be trucked to the site in such an emergency). Limiting the water storage to three days average demand volume in covered reservoirs/tanks will avoid the necessity for top up chlorination or other treatment.

With on-site storage provided for both domestic and firefighting, the effective water supply demand can be reduced, as the demand can be averaged over 24 hours rather than having to cater for peak periods, with a resultant impact to reduce the required supply reticulation.

A TasWater design requirement is that there be no more than 5m of head loss per 1,000m of reticulation pipework for up to and including 150mm diameter pipes. This results in the need to provide a 150mm diameter water supply pipe from the existing network. The closest section of the Deloraine water reticulation is only 100mm diameter, so this will need to be replaced to the point where the 150mm main exists, adjacent to the Deloraine Police Station. Fortunately, although this section of road is fully sealed, it is reasonably wide and reconstruction along the road shoulder will be possible without excessive traffic impact. Once clear of the urban area, the pipeline can run along the roadside, i.e., Meander Valley Road, however, due to the terrain, there will be a need for several road crossings to avoid cut or fill batters in areas of limited width.

Meander Valley Road remains a Department of State Growth (DSG) asset, so their support will be necessary for the installation of services within the road reserve corridor. At this point in time, DSG has confirmed that it has no current plans to widen or otherwise undertake works apart from periodic maintenance resealing.

The water main will require air and scour valves along the route to facilitate charging and cleaning, which will be located in the road reserve and scours will be directed to drain to local watercourses (as they are typically located at low spots in the terrain). Scouring of watermains is a rare event, occurring at less than annual intervals unless local repairs are necessary. Typically, in urban locations fire hydrants would be provided at 90m spacing along the line, however, this may be increased to 500m spacings in rural areas, along with isolation valves also at 500m spacing. The hydrants may be used to relieve built up air and avoid the need for air valves at those locations.

The site is classified as commercial and would therefore require the following design considerations (with reference to TasWater standards):

- Minimum DN150 water supply pipeline.
- Demand based on 270 inmates plus 370 staff and others, but design for total 460 equivalent persons (averaged over 24 hours).
- Each person assumed to be 0.5 Equivalent Tenements (ET) as per TasWater requirements, total 230 ET.
- Average Day (AD) Demand of 685 L/ET/day, total 156 kL/day.
- Peak Day (PD) Demand of 2.25xAD, total 351 kL/day.
- Peak Hour (PH) Demand of 2xPD, equivalent to 702 kL/day or 8.13 L/s.
- Mean Day Max Month (MDMM) of 1.5xAD, total 234 kL/day.
- Minimum required pressure at highest point of land 22m with a demand at Peak Hour (8.13 L/s).
- TasWater supply reservoir (Deloraine Reservoir) modelled at 1/3 full (approx. 320m elevation).
- Closest water supply is from the DN150 AC pipeline at 2 Meander Valley Road.

### 3. Sewer Service

Discussions with TasWater have indicated that the Deloraine sewer treatment plant has adequate capacity to cater for the loads contributed by the correctional facility. Given the number of persons on the site, it is considered that local wastewater treatment on site is not feasible.

To make connection to the plant, TasWater have advised that the sewer main will need to extend all the way to their treatment plant, and not just to the closest point of the sewer network. It will be possible to use a shared trench with the water and other buried services for much of the route, however, the sewer will need to divert to reach the existing treatment plant located inside the racecourse.

It is not possible to reticulate by gravity all the way to the treatment plant, so a sewer pumpstation will be required on site to pump to the treatment plant via a rising main. As for the water main mentioned above, the rising sewer main will require air valves and scour valves to enable charging and draining for maintenance and repair works. While these sewer air valves will typically be located in the vicinity of water main air valves, it is noted that sewer air valves are considerably taller and may require roadside barriers to protect them from traffic. The sewer scour valves are only used in very rare events and the discharge would typically be collected in a tanker truck for disposal at the wastewater treatment plant.

The rising sewer main needs to meet various design criteria including achieving adequate velocity for self-cleaning, and maximum velocity to limit head loss and hence electrical load of the pump station. For long mains such as that required for this project, long detention times within the pipe can lead to septicity which will necessitate chemical addition at either the pump station, or treatment at air valves to minimise odour problems.

It is noted that TasWater have future intentions (currently unfunded and unprogrammed) to close the existing Deloraine Wastewater Treatment Plant and pump the incoming sewage to the east for treatment elsewhere (possibly Longford). The pipe size required for the NCF to pump to the treatment plant will be much smaller than that required to pump all of Deloraine's sewage to the east.

Should this rerouting of the sewer to the east occur, the sewer rising main from the NCF will need to be connected into the new municipal sewer rising main, with the existing NCF sewer rising main to the west being abandoned at this time. The redirection of the sewer rising main may also require a control system that is compatible with the TasWater network.

The site is assumed to be levelled to approximately 250m elevation with sewer drains falling to a pump set elevation of approximately 245m elevation. The nominated TasWater discharge location is at an estimated level of 230m elevation, however, there is a high point of around 259m elevation along the sewer rising main route. A pump station would therefore be required to provide sufficient pressure to clear the high point.

The pump station and sewer rising main will require the following design considerations:

- Flow based on 270 inmates and 370 staff and others, but design for total 460 equivalent persons (averaged over 24 hours).
- Each person assumed to be 0.75 Equivalent Tenements (ET) as per TasWater requirements, total 345 ET.
- Developed site area that could feed into the sewerage system assumed 15Ha.
- Average Dry Weather Flow (ADWF) at 450L/ET/day, total 1.8L/s.
- Peak Dry Weather Flow (PDWF) 6.7L/s.
- Design Flow inclusive of ground water and rainwater infiltration 14.0L/s.
- Rising main length approximately 4550m.

The sewer rising main will therefore have the following design attributes:

- 4550m long OD180 PE100 PN16 rising main.
- Air valves and odour control required at high points and discharge to TasWater system at Deloraine wastewater treatment plant.
- Scour valves required at low points.

Refer to Appendix A for the concept design for the water and sewer rising mains.

## 4. Stormwater

There is no municipal piped stormwater system serving the site. The existing runoff discharges to several open drains which eventually leave the site and cross under both the TasRail corridor and the Bass Highway before running through private property to the Meander River. It is assumed that there will be a significant increase in impervious surfaces from the NCF (roofs, hardstands, roads, car parks, etc.) as compared to the current Ashley Youth Detention Centre areas.

Under the relevant planning scheme, there are requirements for on-site detention to limit post development flows to the predevelopment level unless there is existing capacity in the downstream reticulation for the increased runoff for a 5% Annual Exceedance Probability (AEP) event. It is noted that there are culverts under both the TasRail railway formation and under the Bass Highway, otherwise the downstream infrastructure comprises open drains which probably have adequate capacity. There is potential for capturing roof stormwater for reuse in either toilet flushing, irrigation, or other non-potable use. Depending on storage volume, this storage could act to restrict flows in some events, however, in major events such as 5% AEP, the tanks would possibly be full and hence overflow would be effectively

unrestricted. Separate detention for the 5% AEP event could be provided in open detention basins and vegetated swales which would satisfy the Planning Scheme requirements.

Other than possible TasRail or State Growth culvert upgrades being required (unlikely if onsite detention is provided), it is considered that there would be little off site stormwater expenditure required.

In addition to the planning scheme requirements, the project has opportunities to maximise sustainability initiatives with stormwater retention likely to be an important aspect. On-site works are expected to comprise rainwater capture and reuse, detention and stormwater quality treatment. Given the area available, a nature-based stormwater quality treatment approach is possible and would offer low maintenance requirements.

## 5. Road Junction

A Traffic Impact Assessment (TIA) has been carried out for the project by Midson Traffic Pty Ltd. This assessment has recommended junction improvements at the entry to the site.

The TIA has examined various options for the location of the junction, based on available site distance and potential separation distance from other accesses. The resulting recommendation is to provide a Basic Auxiliary Right (BAR) treatment for the minor right turn movement into the site, with an Auxiliary Lane Left (Short) AUL(S) for the dominant left turn movement into the site.

Alternate possible locations for the access do not materially alter the cost of the junction treatment, however, there will be additional costs within the property irrespective of whether the existing access is used or not. For the new location options, internal works will be from existing paddock condition whereas the existing access road would need to be widened and possibly reconstructed to achieve acceptable widths and service life.

Note that the turning movements for large vehicles into and out from the site will require large radius curves which may result in an overly wide entry. This entry arrangement can possibly be improved by the provision of a central traffic island but will be subject to turning vehicle paths.

Upgraded lighting will be required in accordance with Australian road lighting standards to suit the new road junction arrangement.

## 6. Electricity Supply

The Ashley Youth Detention Centre site is presently served by a 1000 kilovolt-amperes (kVA) kiosk substation, fed via the TasNetworks 22kV aerial feeder from Meander Valley Road, and the access road into the site.

Based on the load assessment for the previously identified site, the predicted maximum demand is approximately 2.5MVA.

Preliminary discussions were held with TasNetworks to assess the implications of a load of this magnitude on the local network. The brief to TasNetworks was to provide two separate points of supply for redundancy purposes, with a demand of 2.5MVA.

TasNetworks subsequently prepared a Connection Capability Report which assesses the impact of the additional requested load on the local Deloraine and surrounding network and determines the extent of upgrading required for a primary and secondary backup electricity supply to the site. The technical assessment considers thermal and voltage constraints on the



HV aerial feeders, load transfer capability, supply reliability, protection requirements, and other such performance considerations.

In summary, TasNetworks put forward the following preferred upgrade supply arrangement:

- Install new poles and HV switches to allow a loop-in loop-out connection from the existing Meander Valley Road feeders (HA 85002 from Railton, HA 67082 from Hadspen) at the road junction to a new TasNetworks switching station.
- Establish a new customer side switching station, adjacent to the TasNetworks switching station, to form multiple outgoing supplies to substations on the facility site.
- Remove the existing aerials along the access road and replace with a section of underground HV cable to connect to the existing site substation.
- Provide for a further HV cable connection to supply a second substation on the facility site.
- Upgrading of voltage regulation on the TasNetworks side at Kimberley.

The primary supply source will be taken from the Railton feeder side (Deloraine), and backup supply from the Hadspen feeder side, with automatic changeover from the Railton feeder to the Hadspen feeder in the event of a supply failure or similar.

Note that the switching stations are required to be located as close as possible to the Meander Valley Road reserve.

## 7. Telecommunications

The site is currently served via a fixed wireless NBN connection and a new Networking Tasmania government connection which has recently been installed via the TasNetworks fibre optic network (refer Figure 1 below for fibre route).

Briefings with the Department of Justice's (DoJ) information technology staff have indicated that the site will require the following communications connections:

- Primary Connection - fixed fibre connection to the government's Networking Tasmania Network.
- Secondary Connection - existing connection to Networking Tasmania communication network.
- Non-government (contractor or other vendor) NBN connection - fixed fibre connection to the NBN communication network (i.e., security, building management system (BMS), and other control systems).

It is proposed that the NCF project will require installation of a new Networking Tasmania connection, via the Telstra fibre optic network which will be utilised for the Primary Connection. The Telstra connection is preferred by the Department as it allows for a level of in-built redundancy that is not offered by the existing TasNetworks system.



Figure 1 - Existing Networks Tasmania fibre route to Ashley Youth Detention Centre

Note that fixed wireless services are not considered to be suitable for a correctional facility application. Ground fibre optic services are preferred in terms of available bandwidth (for performance and speed), reliability, and low latency (i.e., high data volume with minimal delay) requirements.

There is currently no Telstra fibre network installed along Meander Valley Road. A new fibre optic cable will be required to the site, installed from the nearest fibre access point (4.3km approximately) through a route that can be shared with the proposed NBN connection.

The secondary communication connection will be via the recently installed TasNetworks connection to AYDC from the Bass Highway. The existing fibre installation will need to be re-routed to connect to the new NCF main communications room.

The non-government services shall be connected to a new fixed fibre NBN connection to the site. The new NBN connection shall be delivered to the site via the proposed new Telstra fibre optic cabling for the primary communications connection.

The NBN and Telstra lead-in cabling may share the trenching route from Meander Valley Road into the site, but it is recommended (and preferred by both Telstra and NBN Co.) that the services do not share a fibre or pit and pipe installation.

## 8. Gas Supply

There is no reticulated gas in the vicinity of the site, so reticulated gas is not considered a viable option from a cost or lifecycle view. The other possibility for using gas would be by having a bulk tank(s) on site to provide a locally reticulated gas network within the site.

Traditionally gas has been used for processes requiring heat such as cooking, hot water and space heating, however with increasing pressure for action on climate change, it is considered better to focus on electrical energy for these processes, with heat pump hot water systems for example being increasingly adopted for their efficiency.

## 9. References

Northern Correctional Facility Traffic Impact Assessment - Midson Traffic Pty Ltd January 2023.

## **APPENDIX A**

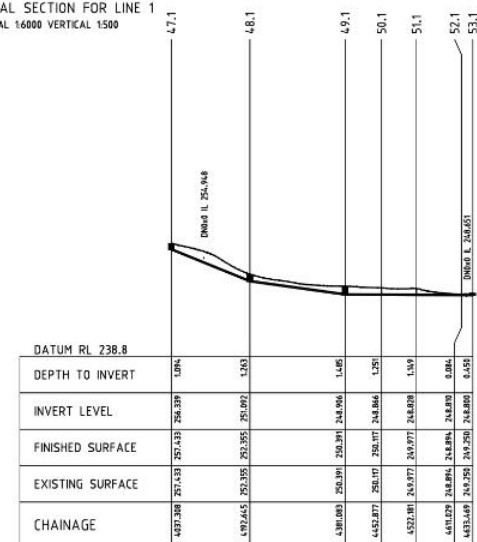
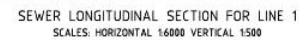
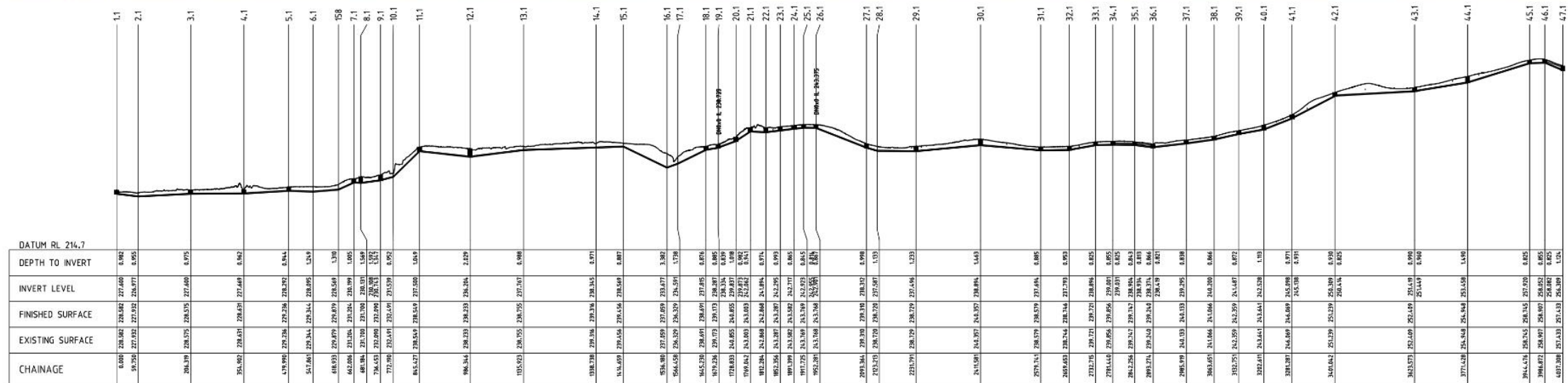
---

C00 - General Arrangement & Sewer Rising Main Profile

C01 - General Arrangement & Water Main Profile

C02 - General Arrangement & Road Junction















ACN 009 547 139 | ABN 76 473 834 852

**Proudly produced by JMG**

117 Harrington Street, Hobart (03) 6231 2555 | 49-51 Elizabeth Street, Launceston (03) 6334 5548

[www.jmg.net.au](http://www.jmg.net.au)

