# Hume 6 – HU6 Data Centre

# Infrastructure Report



**17th October 2024**

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# Revision Schedule

| Revision No. | Date | Description | Prepared by | Quality Reviewer | Independent Reviewer | Project Manager Final Approval |
|---|---|---|---|---|---|---|
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| B | 17.10.24 | DA Issue | CG | JMB | SS | JMB |

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# 1. INTRODUCTION

CDC Data Centres have engaged a full design team for the proposed development located at 62 Sawmill Circuit, Hume, ACT 2620.

The purpose of this report is to provide TCCS with information to support the construction of a new Data Centre. The report also identifies opportunities for utility infrastructure provision for future development of the sites.

This report is based on the following sources of information:

- Dial Before You Dig information.
- Publicly available information

At the time of this report being produced, the proposed development is being submitted for DA application. Limitations of this report are as follows:

- No calculations were performed to check system capacities.
- No taking or testing of material samples was carried out.
- All information provided by others; particularly verbal information has been taken at face value.
- No testing for or advice is provided with respect to asbestos, microbiological or other contaminates.
- No detailed survey and detailed authority information is available.
- No formal discussions with Authorities (feedback only available through a formal submission)

# 2. SITE INFORMATION

The proposed project site is located at 62 Sawmill Circuit, Hume, ACT 2620. The total site area of the development is approximability 0.98ha.

The image below indicates the site and surrounding industrial area.




**Figure 1: Site Location Plan (Source: Nearmaps 2024)**

## 2.1 Topography

The pre-development site is currently vacant. Nearmaps imagery shown in Figure 1 above indicates the site was previously developed for industrial storage use and has since been returned to its previous state as observed from google maps.




**Figure 2: Site Location Plan (Source: Googlemaps 2024)**

The local topography around the site shows that the site primarily falls from South to North and is relatively flat along the transverse plain (East-West). The high point of the site is located along the southwestern boundary at a level of RL 622.08m AHD and the low point located along the northwestern boundary at a level of RL 619.65 m AHD this is an average slope of approximately 2.64%.  The survey was conducted before the site was returned to its original state.

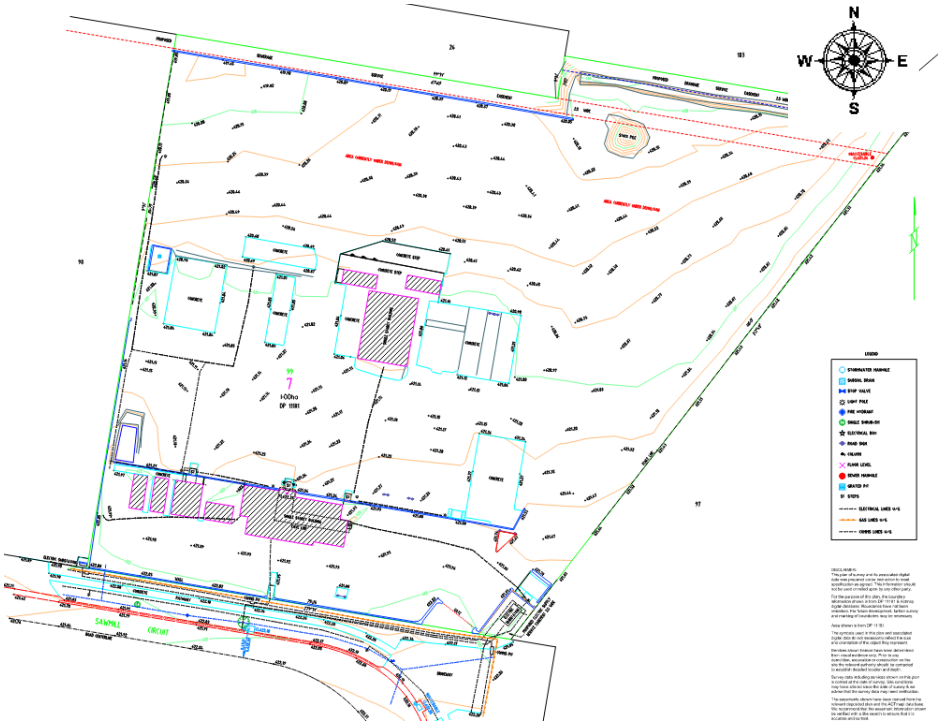



**Figure 3: Site Site Topography (Survey: Veris Canberra JULY 2020)**

# 3. PROPOSED DEVELOPMENT

## 3.1 Site Context

The site is within the Hume industrial park. The proposed development includes the construction of a new data centre including data halls, technical space, external hardstand areas housing chiller units, generator units, external landscaped zones, two new carparking areas and an internal access road which spans between Sawmill Road and the neighbouring development.

## 3.2 Overview

The proposed development will contribute to the number of Data Centre building within the local area and hopefully encourage economic growth by accelerating likewise developments that utilize unwanted space.

## 3.3 Description of proposed development

The development proposed is a singular Data Centre that is of 6 previously constructed in the local area. The centre proposed for this stage will comprise of Data Halls, loading bays, office space, chiller units and generators (x4). This is to be facilitated with the construction of new carriageways, parking and above ground link-bridges between the new Hume 6 and previously constructed CDC data centres.

The overall site is bound by:

- Sawmill Circuit South side of the site
- Previous CDC developed data centre to the North
- Existing industrial warehouse to the East
- Existing industrial warehouse to the West

| Property Title | Hume 6 Data Centre |
|---|---|
| Address | 62 Sawmill Circuit, Hume, ACT 2620 |
| Number of storeys | 2 |
| Building Description | Data centre and Office |
| ABCB Climate Zone | Zone 7 |
| NCC Building Class | Class 7b (data storage) and Class 5 (office) |

**Table 1:** Climate zone map and location of development (abcb.gov.au)




**Figure 4:** Climate zone map and location of development (abcb.gov.au)

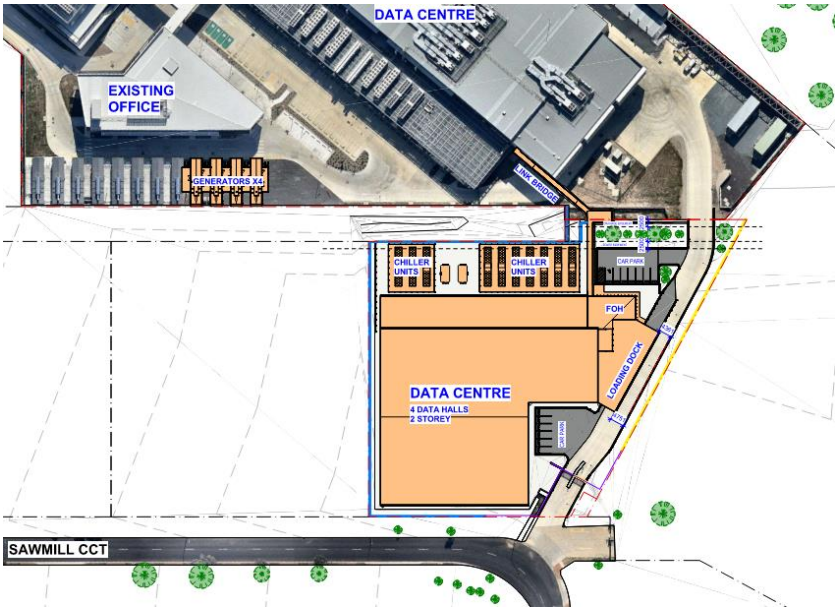



**Figure 2:** Site Plan - Source: EJE Architecture (Dated 20 September 2024)




**Figure 6:** GA ground floor plan - Source: EJE Architecture (Dated September 2024)



**Figure 7:** GA first floor plan - Source: EJE Architecture (Dated September 2024)

# 4. ELECTRICAL SERVICES

## 4.1 High Voltage Network

### 4.1.1 Existing Supply Authority Network

Evo Energy supply the Hume Campus at 11kV, terminating into 2 off 11kV switching stations [#S11368 and S11369] on the NE corner of the Hume 2 campus.

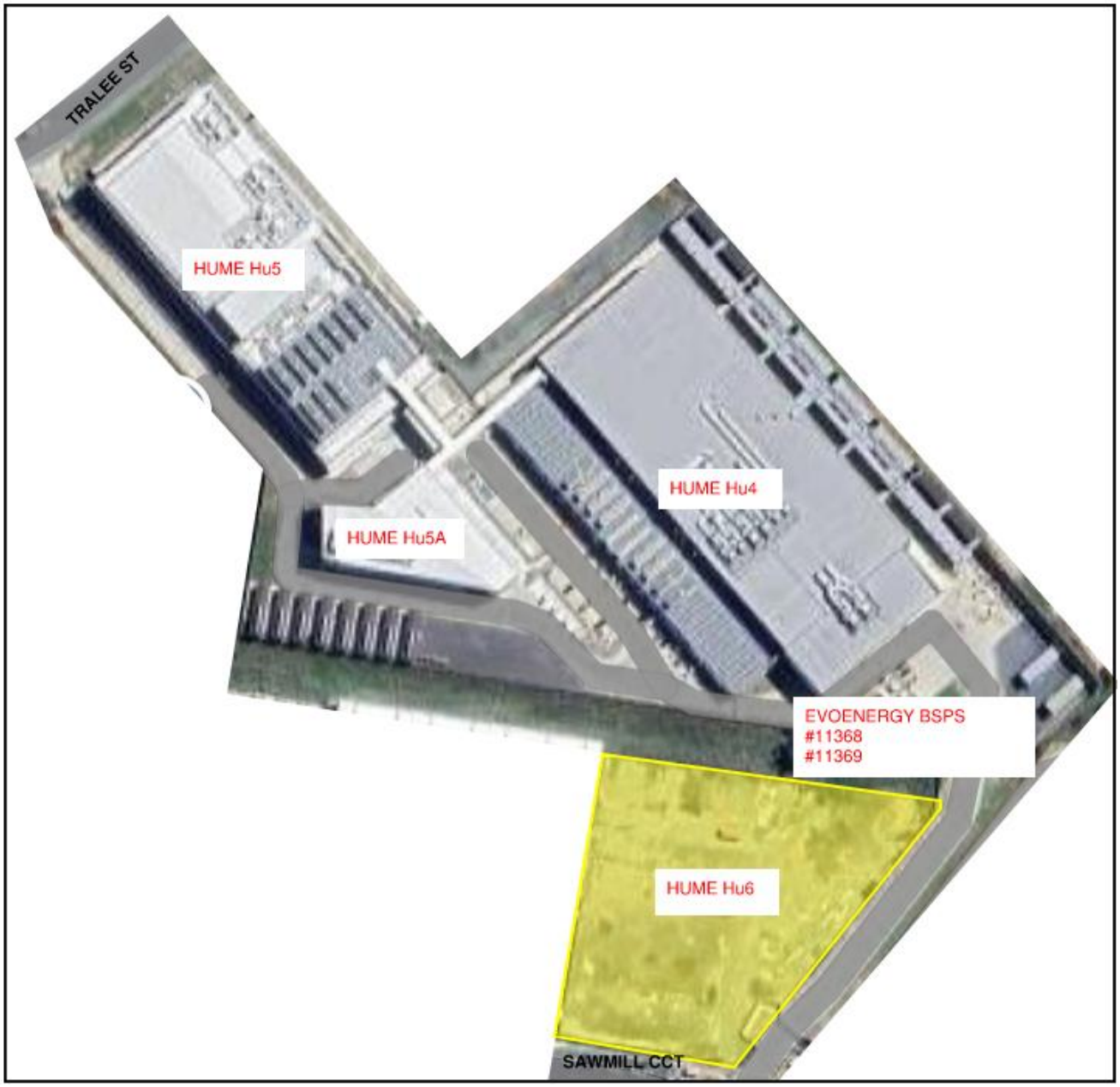



**Figure 8** – Evo Energy Bulk Supply points [BSP's]

## 4.2 Maximum Power Demand

The calculated demand for the Hu6 development is circa 20MVA.

## 4.3 Proposed Supply Arrangement to New Development

4 off 11kV Utility supplies shall be provided to Hu6 from the 2 existing EvoEnergy switching stations located on the Hume 2 campus which also supply Hu4 and hu5 [Evo Energy switching stations #S11368 and S11369.

Conduits and pit infrastructure to service Hu6 were installed during the construction of Hu5 and can be located adjacent to the site footprint

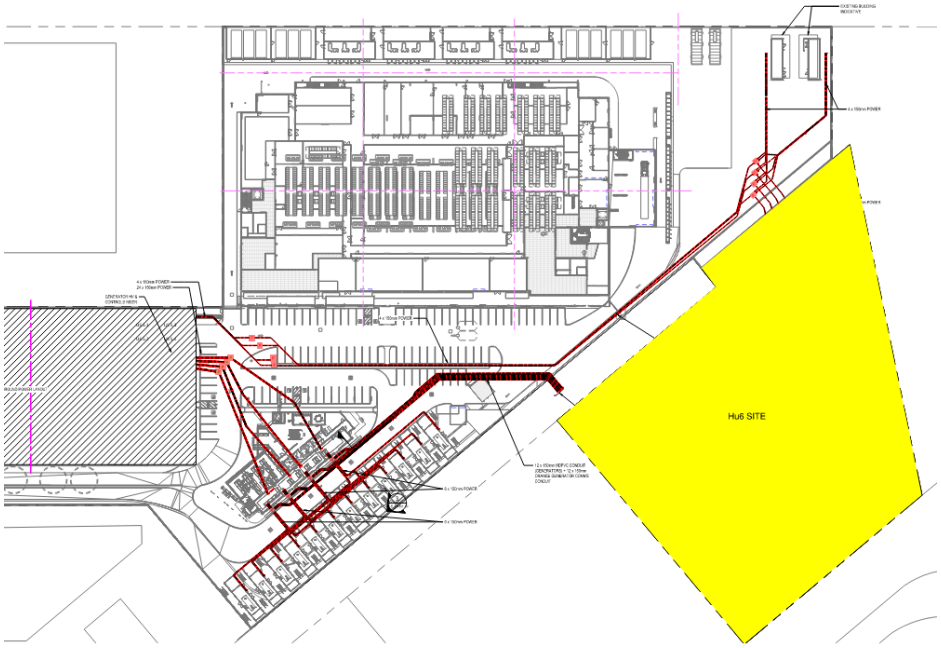



**Figure 9** – Existing Conduits linking BSP's to Hu6 Site

Standby power to the Hu6 site shall be provided by the 11kV generators that formed part of the Hu5 build on the campus.

## 4.4 Street and Area Lighting

Street lighting to the site shall be in accordance with AS1158.

AS4282 shall be adhered to with establishing the requirements for the control of obtrusive effects from the outdoor lighting.

## 4.5 Telecommunications

### 4.5.1 General

The Hu6 site shall be provided with four off communications Point-Of Entry [POE] pits [3 off existing and 1 off new].

Hu6 building will have a minimum of two diverse pathways for communication lead-ins.

### 4.5.2 Carrier Mobile Base Stations

The site has no carrier mobile base stations that will require relocation.

# 5. HYDRAULIC SERVICES

## 5.1 Sewer

### 5.1.1 Existing Sewer Drainage

Through analysis of the ICON generated Dial Before You Dig (DBYD) survey information, the site currently hosts an ICON Water 150mm Vitrified Clay Sewer main reticulating east to west across the northern boundary. The sewer main is within a 2.5m easement. A junction currently exists and is currently located between the external chiller. Icon Water will need to be notified of the structures built over and next to the existing sewer asset. Construction will not be able to commence until "In Principle Support" is provided by ICON Water.

### 5.1.2 Authority Coordination

Cooridnation with ICON water will be required for approved water and sewer connections and to determine the requirments of building over and adjacent the sewer easement.

### 5.1.3 Design Criteria

**Table 1: Hydraulic Services Design Criteria**

| Item | Design Criteria |
|---|---|
| Sanitary Design | • AS/NZS 3500.2-2021 – Sanitary Drainage<br>• ICON Water Standards and Guidelines |

### 5.1.4 Proposed Sewer Drainage

It is proposed to serve the HU6 building with in-ground drainage using drainage principles. The building will drain to the existing junction connection in the north of site. This connection is pending acceptance from ICON water. The sewer is approximately 3.490m deeper than the underside of ground floor slab. Based on preliminary calculations the authority sewer should be deep enough to gravity drain the building. The proposed developments sewer documentation can be seen on the Hydraulic Services Design Documentation in Appendix A.

### 5.1.5 Estimated Sewer Demand Calculation

The site hydraulic demand assumptions have been calculated using the expected population data provided by the client. We estimate the total development sewer demand to be approximately 1470L/day.

We note that there will be uncommon occurrences where the sections of mechanical pre-action sprinkler pipework may be drained after an emergency. These loads have been considered independently from the daily expected discharge. The drain down discharge will remain under the 2 L/s limit for Icon Water sewer infrastructure.

During commissioning and maintenance of the mechanical systems, approximately once per year, it is expected the mechanical system will be drained down over a 24hr period. The drain down discharge will remain under the 2 L/s limit for Sydney Water sewer infrastructure. These loads have been considered independently.

| **Estimated Sewer discharge per day** | |
|---|---|
| EC5 Population | 35 |
| Estimated Sewer per person per day | 42 L |
| **Sewerage Load per day** | **1470 L** |

| **Seweage Estimation per person per day (8hr work day)** | | |
|---|---|---|
| Fixture | Litres per use | Number of Uses |
| Toilet Flush | 6 L | 3 |
| Urinal Flush | 1 L | 2 |
| Basin Hand Wash | 2 L | 5 |
| Kitchen Sink | 4 L | 3 |
| **Estimated Sewer per person per day** | | **42 L** |

## 5.2 Potable Water

### 5.2.1 Existing Water Supply

Through analysis of the Dial Before You Dig (DBYD) survey information, there is evidence of a DN 150 ICON Water reticulating within Sawmill Crescent. Through coordination with A-Plus Plumbing, a physical mains test was conducted with results indicating that 17l/s at 350 kPa was achieved at max flow conditions. The project team are yet to receive the theoretical model from ICON water which will provide the pressure and flow results for the required 95% occurrences.

### 5.2.2 Authority Coordination

Cooridnation with ICON water will be required for approved water and sewer connections and to determine the requirments of building over and adjacent the sewer easement.

### 5.2.3 Design Criteria

| Item | Design Criteria |
|---|---|
| Potable Water | • AS/NZS 3500.1-2021 – Water Services<br>• ICON Water Standards and Guidelines |
| Non-Potable water | • AS/NZS 3500.1-2021 – Water Services<br>• ICON Water Standards and Guidelines |

### 5.2.4 Proposed Water Supply

Due to the nature of the business, we expect the potable water flow probable simultaneous demand (PSD) to be approximately 0.9L/S during regular operation and 5l/s during system commissioning there is sufficient capacity in the existing potable water network to service the proposed development although this will be confirmed by the authority.

The development proposes to use rainwater to service irrigation, toilet flushing automatic trap primers and maintenance hose taps. The anticipated flow rate for the non-potable system is 0.4l/s which will offset the potable demand.

It is expected the development will require a DN150mm supply to the fire pump room and main building facilities. The hydrant system and sprinklers system will be supplied by the available water main in Sawmill CIrcuit, although it is anticipated that both systems will need to be supported by fire water storage tanks.

The proposed developments water supply documentation can be seen on the Hydraulic Services Design Documentation in Appendix A

### 5.2.5 Estimated Potable Water Demand Calculation

The site potable water demand assumptions have been calculated based on loading units provided with AS3500.1, Barrie Smith and demonstrated in the table below. to implementing rainwater re-use for toilet flushing and selecting waterless urinals, the potable water demand is greatly reduced.

We note that during commissioning and maintenance of the mechanical systems, approximately once per year, it is expected the mechanical system will be filled with potable water at a rate of up to 5 L/s for approximately 10hrs. These loads have been considered independently from normal daily demand.

| Potable Water Calculation Loading Units | | | | | |
|---|---|---|---|---|---|
| BUILDING | BASINS | SHOWERS | KITCHENETTE SINK | HOSE TAPS | LOADING UNITS |
| Hume 6 Data Centre | 2 | 1 | 1 | 8 | 39 |
| | | | | **TOTAL LOADING UNITS** | **39** |
| | | | | **TOTAL PSFR** | **0.44 L/s** |

*Note: PSFR = Probable Simulatenous Flow Rate, calculated by the Barrie Smith book*

*Note: Potable Average Demand calculated based on fixtures supplied by potable system. Cleaners sinks not included due to typically being used out-of-hours.*

# 6. CIVIL AND STORMWTAER SERVICES

The civil and stormwater services in the following sections provides information regarding existing infrastructure and design polices appliable to the development.

## 6.1 External Stormwater Catchments

The surrounding area has been investigated to determine the likely impact of existing external stormwater catchments on the proposed site. The site is currently surrounded by industrial developments and roadway, so it is believed that no external catchments other than the flooding discussed in following sections impact the development site.

## 6.2 Existing Stormwater Infrastructure

Through review of survey information and ACT map Utility Infrastructure mapping, it has been determined that the site does not contain pit and pipe infrastructure within the site boundary.

The ACTmapi online portal indicates formalised drainage surrounding the proposed development site which has been identified in the figure below. The map illustrates a pit and pipe network along Sawmill Cct, which connects into the wider network in sawmill circuit. A grassed swale with stormwater pipe and sumps were identified along the invert to the north of site which will discharge into a culvert beneath Tralee Street.




**Figure 8: External Stormwater Infrastructure**

It is assumed through overall site grading; overland flow is directed toward the northern boundary of the site into the open channel grassed swale then directed toward the west.

## 6.3 Stormwater Drainage Design Requirements

Design requirements for stormwater management on the site have been set out in Transport Canberra & City Services (TCCS) Stormwater Municipal Infrastructure Standards 08 (MIS-08 2021). These requirements are summarised in the sections below.

### 6.3.1 Stormwater Conveyance

Section 2 'Design Flow' of the MIS-08 (2021), states that the following design storm Average Recurrence Intervals (ARI)'s should be allowed for when designing the Stormwater runoff conveyance systems for the development. The site has been considered an Industrial area.

| Design Parameter | Annual Exceedance Probability (AEP) | Conveyance Method |
|---|---|---|
| Minor Drainage System | 10% | In Ground (Piped) |
| Major Drainage System | 1% | Overland |

**Table 2: Stormwater Drainage Serviceability**

### 6.3.2 On-Site Detention Requirements

The MIS-08 (2021) refers to 'Waterways: WSUD General Code and ACT Practice Guidelines for Water Sensitive Urban Design (WSUD General Code 2018)' section 5.22 'On-site detention' states that 'on site detention needs to be considered for:

- Developments greater than 2000m$^2$
- Developments within existing urban areas that increase impervious area by 100m$^2$
- Estate development plans

On-site detention systems shall be provided for all new developments. The "Waterways: WSUD… "states that OSD and OSR systems should be designed to restrict the rate of stormwater discharge to the permissible rate of discharge for the site, for all design storm events up to and including the 100-Year ARI (1% ARI) event (2-to-100-year events must be considered), post development discharge shall not exceed predevelopment discharge. Additionally, it is stated that the outflow from the storage to the existing municipal stormwater system is limited to a predetermined flow rate, which is usually the flow rate before redevelopment. Furthermore, only a maximum of 30% of the stormwater runoff is allowed to bypass the onsite detention systems.

In addition, the OSD system should provide sufficient storage to ensure peak flow rates at any point within the downstream system do not increase because of the development during the design storm event.

### 6.3.3 Stormwater Specification Requirements

#### 6.3.3.1 Drainage in Urban Areas- Minor System

- Kerb and gutter shall be provided on both sides of all roads except where the relevant Development Control Plan advises otherwise.
- Kerb inlets shall be provided at locations such that the flow in the gutter does not exceed the specified limits.
- Inter-allotment drainage shall be provided at the lowest point of all allotments together with the creation of an easement over all downstream pipework to the legal point of discharge.
- Full piped drainage from all kerb inlets and other inlet shall be provided to the boundary of the subdivision, or approved point of discharge, unless otherwise approved.

- The minor drainage system shall be capable of controlling flows from frequent run-off events up to and including the required ARI's.
- The roadway flow width shall not exceed 0.45 metres at bus stops, pedestrian ramps and kerb returns; and 2.5 metres at other locations. The widths mentioned above shall be measured from invert of the kerb and gutter.
- The product of depth and velocity in the kerb and gutter should not exceed 0.6$m^2$/s to reduce hazard for pedestrians within the roadway.
- The water surface level for inlets pits shall be 0.15 metres below the invert of gutter or 0.15 metres below the underside of the lid for junction pits.

#### 6.3.3.2 Drainage in Urban Areas- Major System

- An overland flow system shall be provided for run-off in excess of the capacity of the pipe system, such that the design flow is carried through the subdivision or development clear of, and with the required freeboard to allotments.
- Overland flow paths will not be permitted within urban allotments, unless otherwise approved.
- Overland flow paths shall not be located in private property.
- Total flows shall be contained within the road reserve.
- Flow depths in roadways shall not exceed 200mm.
- A minimum freeboard of 500mm shall be provided between the 100-year flood level and habitable floor levels.
- Where a road is in fill, a freeboard of 100mm shall be provided between the 100-year flood level and the lowest point in the footpath.
- For open channels, a minimum freeboard of 500mm shall be provided between the 100-year flood level and floor levels.

#### 6.3.3.3 Drainage Reserves/ Easements

With reference to the ACT development control plan "MIS-08" (2021) it is understood that where natural open channel or similar overland flow path exists in a proposed development, a drainage reserve shall be provided to contain the design flow within the actual drainage reserve area. The design and construction of the drainage reserve shall be in accordance with the relevant DCP, and the minimum width shall be 5.0 metres.

#### 6.3.3.4 Depth of Pipe Cover

Depth of cover to the conduit obvert shall be as follows: -

- Public system not subject to vehicle loads- 450mm
- Public system subject to vehicle loads- 600mm
- Private system not subject to vehicle loads- 300mm
- Private system subject to vehicle loads- 600mm

If it is not practical to provide for the minimum cover requirements specified above, then at least 50mm thick granular overlay shall be provided over the obvert of the conduit with a 150mm thick reinforced concrete slab constructed over it or conduit is to be mass concrete surrounded.

#### 6.3.3.5 Pipe Class

The appropriate class of pipe to be used shall depend on the minimum cover provided and the loading onto the pipe in accordance with AS3725-1989, loads on buried concrete pipes.

#### 6.3.3.6 Kerb & Gutter design

There are multiple requirements under the ACT government standards for kerbs and gutters. Kerb and gutter shall be constructed in the following circumstances:

- The proposed works includes the reconstruction or construction of an existing road or new road for access
- Kerb and gutter along an existing paved carriageway servicing the development is in an unsatisfactory condition or at unacceptable or non-standard levels. For example, kerb height is more than 150mm or less than 150mm
- Kerb and gutter along an existing paved carriageway servicing the development does not exist
- Kerb and gutter along the property frontage is in an unsatisfactory condition or at unacceptable or non-standard levels
- Kerb and gutter along the property frontage does not exist
- The construction of kerb and gutter provides protection to the property/s from the inflow of stormwater off a public road or reserve
- The construction of kerb and gutter would prevent the likely erosion of the road shoulder as a result of vehicular and/ or pedestrian traffic outside the proposed development
- Kerb and gutter are to be reconstructed as part of the footway and/ or carriageway reconstruction

#### 6.3.3.7 Pipelines

- Pipe sizes shall be sufficient to cater for the run-off capacity of the attached system. Stormwater pipes shall be designed in accordance with the requirements of AS/NZS 3500.3. The minimum diameter of any pipe used for stormwater drainage shall be 100mm and comply with the following minimum longitudinal grades shall be used as per Section 7 of AS/NZS 3500.3.

#### 6.3.3.8 Stormwater Drainage Pits

Standard pits are to be constructed in accordance with Council's current standards. Non-standard structures are to be constructed as detailed on the plan. Precast pits are to be installed as per the manufacturer's specifications.

Gully pits, junction boxes, inlet sumps and similar structures are to be in accordance with Engineering Drawings, except where directed by Council's Engineer or the Accredited Certifier. All pits are to have streamlined inverts and shall be benched with a smooth finish using a steel float. Saddle pits over existing stormwater lines shall have pit inverts formed by using quarter pipe sections. Concrete headwalls shall be either Precast or constructed in-situ.

All road drainage pits shall be constructed with fully welded skirted grates. The type of grate shall be approved by Council prior to ordering.

The minimum internal dimensions of pits are tabulated below:

**TABLE 8.2**

**MINIMUM INTERNAL DIMENSIONS FOR STORMWATER AND INLET PITS**

| Depth to invert of outlet | Minimum internal dimensions mm | | |
|---|---|---|---|
| | Rectangular | | Circular |
| | Width | Length | Diameter |
| ≤600 | 450 | 450 | 600 |
| >600 ≤900 | 600 | 600 | 900 |
| >900 ≤1200 | 600 | 900 | 1 000 |
| > 1 200 | 900 | 900 | 1 000 |

**Table 3.1 AS 3500**

### 6.3.3.9 Stormwater Pipe Cover

Cover of stormwater pipes in roads is to be in accordance with that prescribed by the manufacturer and shall be a minimum of 450mm below gutter level (current Australian Standard or Concrete Pipe Association of Australia “Concrete Pipe Guide”).

## 6.3.4 OSD

- The OSD proposed for the site shall be in accordance with “Municipal Infrastructure Standards 08” (Sept 2021), design shall be prepared by a suitably qualified and experienced professional engineer registered, with the National Engineering Register in Civil Engineering, specialising in stormwater design. The designs shall be in accordance with Australian Standards AS3500.3.
- The following general requirements apply in the design of OSD systems:
  - On site stormwater detention should, generally be incorporated into the lowest point of the proposed development and can possibly be a car park or an open space area or even roof top areas where no underground storage is possible.
  - As much as possible of the site area is to drain through the OSD system(s) with an absolute minimum of 85%.
  - All systems shall use a minimum of two flow control measures. The 1.20-year orifice shall be designed to convey flows up to said event. All flows exceeding the 5%AEP are designed to be controlled by a designed weir. Flows up to the 1% AEP are therefore controlled using the weir. . For more detailed information see Council’s WSUD Standard Drawing A(BS) 175M.
  - Maximum ponding depths shall be as follows:
    - Pedestrian Areas 50 mm
    - Driveways and Parking 200 mm
    - Gardens 600 mm
- In all cases, safety issues shall be addressed with provision of warning signs (including Confined Space Entry signs), and if necessary, safety fencing.
  - Provision shall be made for flows greater than the 100-year ARI flow through the structure via an overflow spillway and/or overland flow path
  - The invert of the below ground storage tank shall be graded at a minimum of 2% toward the outlet. Above ground systems shall be graded at a minimum of 1% toward the outlet.

- At least the 1 in 1.5 ARI year storm shall be underground or in low nuisance areas such as passive landscaped or paved entertainment area. All storage within the rear yard or private courtyard for residential development shall be 100% below ground.

### 6.3.5 Stormwater Quality

The MIS-08 (2021) – Section 11.1 Pollutant reduction targets states that the post-development stormwater runoff quality shall be improved to achieve the following reduction targets when compared to pre-development levels. These values are illustrated in the figure below.

## 11 DESIGN CRITERIA

Water quality standard: Refer to *ACT Waterways: WSUD General Code.*

Design load: The design loads for a catchment shall be determined using the methods listed in **Methods and models.**

Calibration: Where possible, calibration against actual data shall be undertaken.

Documentation: Each element of the stormwater system contributing to water treatment in thecatchment shall have its design performance provided in terms of:

> Mean annual load reduction of TSS, TP and TN;
> Percentage reduction due to the element; and
> Contribution to total stormwater system treatment train for the catchment.

## 11.1 Pollutant reduction targets

Requirement: The water quality targets shown in **Table 8- 31 Pollutant reduction targets** shall apply to all urban development. The targets are total values to be achieved from a development / redevelopment siteor from a regional catchment outlet. They may be achieved by a single treatment measure or by a numberof measures in a treatment train.

**Table 8- 31 Pollutant reduction targets**

| Pollutant | Development or redevelopment sites | Regional or catchment-wide |
|---|---|---|
| **Reduction in gross pollutant export load** | 90% | 90% |
| **Reduction in average annual suspended solids (SS) exportload** | 60% | 85% |
| **Reduction in average annual total phosphorus (TP) exportload** | 45% | 70% |
| **Reduction in average annual total nitrogen (TN) export load** | 40% | 60% |

**Figure 9 – Section 11.1 of the MIS-08 (2021)**

The pollutant reduction targets can be summarised below.

- 90% reduction in the gross pollutant urban load
- 60% reduction in the average annual suspended solids (SS) export load
- 45% reduction in the average annual total phosphorous (TP) export load
- 40% reduction in the average annual total nitrogen (TN) export load.

Water quality modelling undertaken to support development proposals within the Precincts shall utilise MUSIC Version 5 (or later) and adopt the appropriate modelling parameters.

- Gross pollutant traps are to be provided prior to discharge to any of the Precinct's water quality devices or riparian corridors.

## 6.4 Stormwater Conveyance

This section of the report discusses the systems proposed to allow for stormwater to be conveyed across the site to the legal point of discharge.

As discussed in Section 5.1 of this report council have set serviceability requirements for the stormwater conveyance network such that minor flows are conveyed through piped drainage, and major flows are discharged via controlled overland flow.

### 6.4.1 Roof Drainage

The drainage system will be designed in accordance with AS3500.3-2021 to convey the minor design storm runoff from the roof to the in-ground drainage system. For storm events exceeding the design storm event, flows will surcharge the roof drainage system and discharge onto the surrounding ground where it will then be conveyed to the surrounding ground drainage within the site or where it will then convey through the inground pits to the stormwater network within the site.

Detailed roof drainage design will be completed by the Hydraulic Engineer consultant.

### 6.4.2 Surface Drainage

The surface areas will be drained through a variety of methods, discussed below, in accordance with AS3500.3:2021 and Council's stormwater drainage guidelines. The in-ground drainage has been designed to meet the following criteria: -

- The minor (pipes) drainage system must be designed to convey stormwater runoff for storm events up to, and including, the 10% Average Exceedance Probability (AEP) storm event.
- The major (overland) drainage system must be designed to convey stormwater runoff for storm events up to, and including, the 1% Average Exceedance Probability (AEP) storm event.

Surface runoff from the access road and surrounding landscaped areas will be directed to stormwater inlet structures using the design topography of these elements. The inlet structures have been designed to adequately convey the surface runoff into the in-ground drainage network.

The runoff will then be conveyed below-ground across the site to the legal point of discharge using gravity and the geometric falls of the pipe system.

## 6.5 Proposed Site Stormwater Design

The total development site area is 1Ha. Roof areas shall be captured via a downpipe system and discharged to the proposed below-ground stormwater network. Surface flows shall be captured via a pit and pipe network and shall eventually discharge into the proposed council connection point along the eastern boundary of the site.

### 6.5.1 DRAINS Input Parameters

A DRAINS model has been prepared to verify the site stormwater drainage system. DRAINS is a runoff routing software program which assesses stormwater drainage hydraulics based on catchment hydrology input from various sources including the Bureau of Meteorology (BoM) and the Australian Rainfall and Runoff (ARR) Datahub.

The parameters used in the DRAINS model are as follows: -

- *Soil Type – Normal* *3.0*
- *Paved (Impervious) Area Depression Storage* *1mm*
- *Supplementary Area Depression Storage* *1mm*
- *Grassed (Pervious) Area Depression Storage* *5mm*
- *Antecedent Moisture Condition* *3.0*
- *Minimum Pit Blocage (Sag Pits)* *0.5*

- *Minimum Pit Blocage (On-Grade Pits)* *0.2*
- *Minimum Pit Freeboard* *150mm*
- *Minimum Fall Across Pits* *20mm*

The DRAINS model has been prepared to confirm that the proposed stormwater pit and pipe network is adequately sized to capture and convey the 10% AEP storm. Overland flow paths have been adequately sized to convey the 1% AEP storm flows safely across the site in a north-westerly direction.

### 6.5.2 Calculated Existing Site Runoff

As discussed in the Stormwater Management plan (ref 301351663): the development area will have one legal point of discharge which is located along the northern boundary of the site within the drainage easement. A headwall outlet will be required for output to the grassed swale. Refer to Figure 9 below for further clarification.

Pre-Development Rates that we will design to are the following:

| ARI Rainfall Event | Predevelopment Discharge ($m^3/s$) |
|---|---|
| 10 year | 0.206 |
| 20 year | 0.269 |
| 50 year | 0.334 |
| 100 year | 0.402 |

**Table 4: Pre-Development runoff from DRAINS**

### 6.5.3 Stormwater Runoff Generated

The site will introduce approximately 1Ha of impervious pavement to the catchment runoff. Table 1 below nominates the generated runoff within the proposed area. This will need to be managed via the constructed pit and pipe network, in addition to temporary sediment and erosion management measures, such as the temporary sediment basin.

A DRAINS model has been prepared to verify the site stormwater discharge rate for the pre- development state. In addition, the model has also been developed for the post development state with OSD and an orifice installed to understand required stormwater volumes to achieve site discharge rates. DRAINS is a runoff routing software program which assesses stormwater drainage hydraulics based on catchment hydrology input from various sources including the Bureau of Meteorology (BoM) and the Australian Rainfall and Runoff (ARR) Datahub.

### 6.5.4 Stormwater On-Site Detention Tank (OSD) and Discharge

Hydraulic modelling in DRAINS software has been used to determine the required on-site detention so as to restrict discharge from the development site back to predevelopment discharge rates for all storm events from the 10-year ARI event up to the 100-year ARI event.

The OSD tank incorporates an overflow weir in combination with a 300mm orifice outlet pipe set at RL 618.29. The overflow weir is situated at the downstream outlet of the OSD tank with dimensions 900x900 set at RL 619.23. The output pipe is a 375mm diameter stormwater pipe with invert set within the sump at invert (RL 618.143). The detention volume is set out within the table below.

| | Minimum Detention Volume Provided in Modelling ($m^3$) | Orifice Plate Diameter (mm) |
|---|---|---|
| OSD Tank | 90 | 300 |

**On-Site Detention Tank Specifications**

DRAINS modelling results show that the tank indicated above adequately restricts discharge back to predevelopment conditions. Results have been summarised in the table below.

| ARI Rainfall Event | Predevelopment Discharge ($m^3/s$) | OSD Tank Discharge ($m^3/s$) | Post Bypass discharge (m3/s) | Total Site Peak Discharge ($m^3/s$) |
|---|---|---|---|---|
| 10 year | 0.206 | 0.144 | 0.018 | 0.162 |
| 100 year | 0.401 | 0.350 | 0.034 | 0.384 |

**Pre-Development vs. Post Development Flows**

### 6.5.5 Proposed Stormwater Quality Management

In order to demonstrate that the proposed treatment train meets the required reduction targets, a pollutant reduction model has been generated using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Software program Version 6.3 by eWater CRC. Pollutant export rates are currently only available for Total Suspended Solids (TSS), Total Nitrogen (TN), Total Phosphorus (TP) and Gross Pollutants (GP). Therefore, only quantitative modelling for TSS, TN, TP & GN has been undertaken using MUSIC.

Modelling has only been undertaken on the post-development proposal with SQID's installed so as to demonstrate the percentage reduction for each pollutant type.

The proposed treatment train includes the following:

- Atlan Filter Cartridges (or approved equivalent) proposed within the On-Site Detention Tanks
- SPEL Stormsacks (or approved equivalent) proposed within the stormwater inlet pits
- Rainwater re-use tank

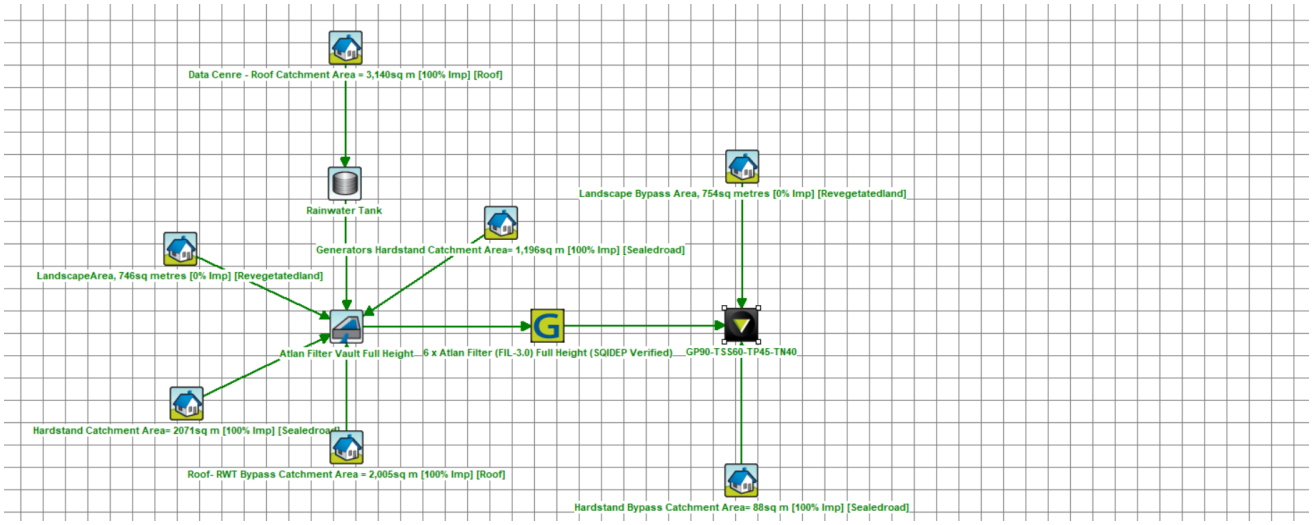
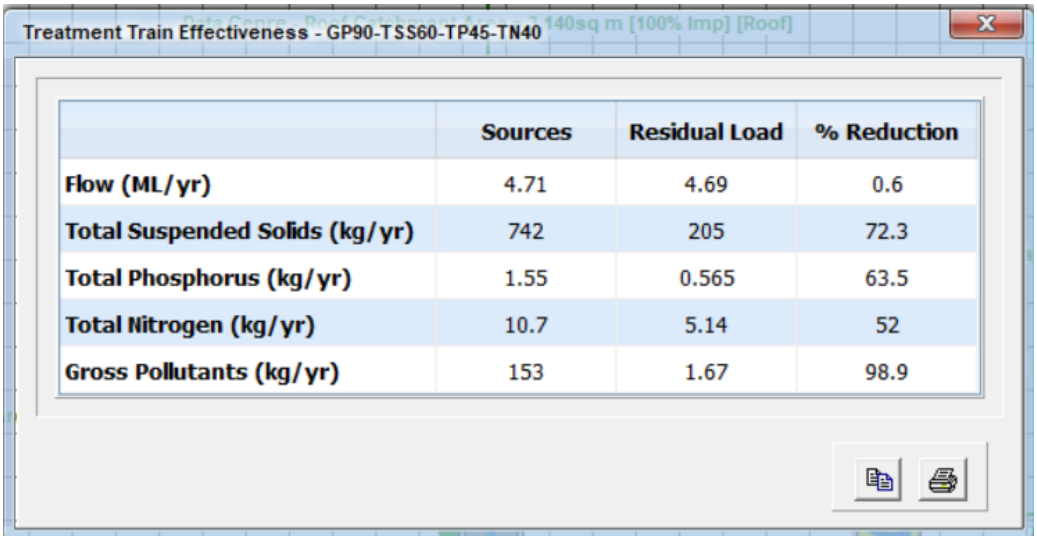



**Figure 11: MUSIC Model Treatment Train**




| | Sources | Residual Load | % Reduction |
|---|---|---|---|
| Flow (ML/yr) | 4.71 | 4.69 | 0.6 |
| Total Suspended Solids (kg/yr) | 742 | 205 | 72.3 |
| Total Phosphorus (kg/yr) | 1.55 | 0.565 | 63.5 |
| Total Nitrogen (kg/yr) | 10.7 | 5.14 | 52 |
| Gross Pollutants (kg/yr) | 153 | 1.67 | 98.9 |

**Figure 12: MUSIC Modelling Result**

| Pollutant/Issue | Target | Reduction | Target Achieved |
|---|---|---|---|
| TSS | 60% | 72 | YES |
| Phosphorus | 45% | 63.5 | YES |
| Nitrogen | 40% | 52 | YES |
| Gross Pollutants | 90% | 99 | YES |

**Table 4: MUSIC Results vs. Site Targets**

### 6.5.6 Rainwater Tank

A Rainwater Tank is a water storage system designed to be installed on an industrial/ business development to capture rainfall from roofs. These tanks can provide water for non-potable uses such as, toilet flushing, vehicle washing, irrigation, and industrial wash down. Due to the industrial nature of the development, limited reuse availability exists within the facility.

The RWT has been proposed to meet the WSUD General Code (2017) request for water conservation and comply with the requirements which state within the WSUD General Code, OSR needs to be considered for:

- Developments greater than 2000m$^2$
- Developments within existing urban areas that increase impervious area by 100m$^2$

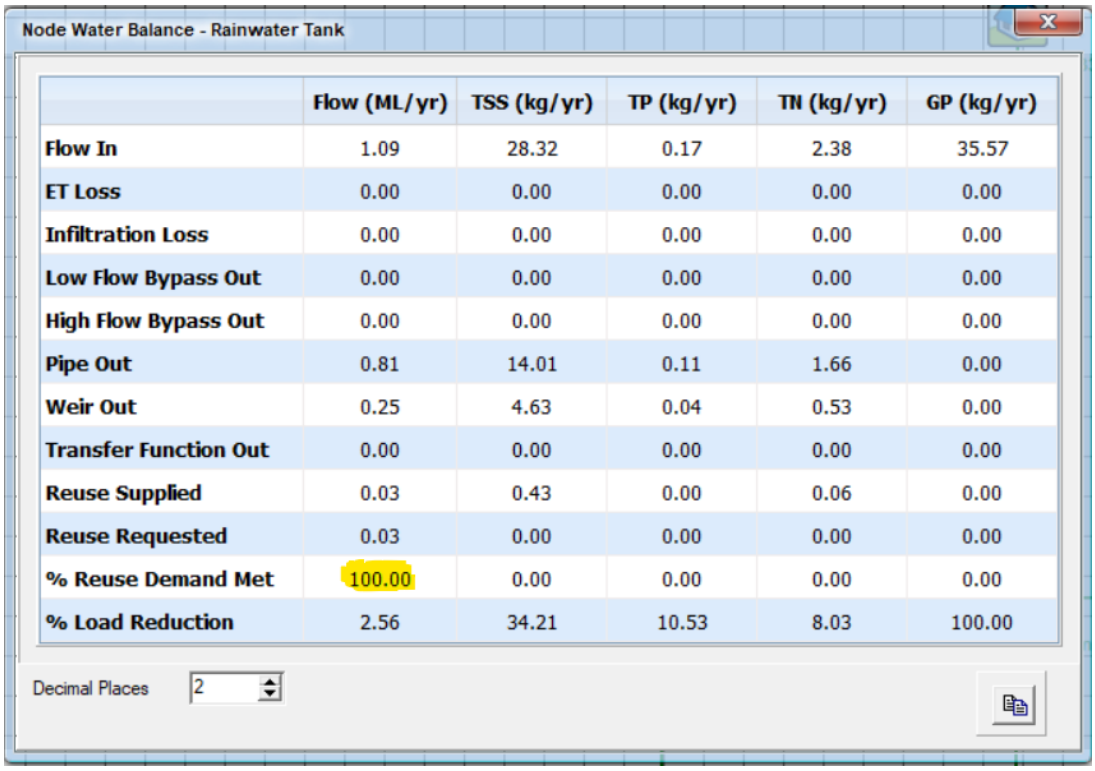
The proposed rainwater tank shall be incorporated into the stormwater drainage system and will collect run-off from 3,140m$^2$ of impervious area in the development and will be minimum 28m$^3$ in size. The tank will retain and reuse rainwater for landscape irrigation and toilet flushing. Due to the development's limited opportunities to reuse harvested water, the recycled water storage volume has been sized based on the maximum demand over the course of a full year (eg could service the facility without a significant rainfall event occurring within one year).

Guidance from ACT technical specification - *MITS09D Irrigation,* gives a water re-use irrigation demand 0.287l KL/year per m$^2$. It is confirmed that no irrigation water re-use will be implemented for this development.

The Total Recycle Water Demand for this site were further calculated (refer to Appendix E of SWMP) and are summarized below:

| **Table 4: Recycle Water Demand Rates** Landscape Irrigation Recycle Water Demand | | | Recycled Water Demand | | |
|---|---|---|---|---|---|
| Total | Area ($m^2$) | Water Demand (kL/year) per $m^2$ | Total | Total HU6 Population | Water Demand (kL/year) |
| | 0 | 0.287 | | 10 | 27.7 |

A MUSIC catchment plan showing the catchment areas and reuse has been prepared and incorporated into Appendix A of the SWMP.




| | Flow (ML/yr) | TSS (kg/yr) | TP (kg/yr) | TN (kg/yr) | GP (kg/yr) |
|---|---|---|---|---|---|
| Flow In | 1.09 | 28.32 | 0.17 | 2.38 | 35.57 |
| ET Loss | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Infiltration Loss | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Low Flow Bypass Out | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| High Flow Bypass Out | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pipe Out | 0.81 | 14.01 | 0.11 | 1.66 | 0.00 |
| Weir Out | 0.25 | 4.63 | 0.04 | 0.53 | 0.00 |
| Transfer Function Out | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Reuse Supplied | 0.03 | 0.43 | 0.00 | 0.06 | 0.00 |
| Reuse Requested | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 |
| % Reuse Demand Met | 100.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| % Load Reduction | 2.56 | 34.21 | 10.53 | 8.03 | 100.00 |

**Figure 4: MUSIC Model and Results**

## 6.6 Cut and Fill

The development is to comply with MIS-02 (2019). The controls of earthworks are as follows:

- Development applications are to illustrate where it is necessary to cut and/ or fill land and provide justification for the proposed changes to the land levels.
- Proposals requiring significant moving and filling of earth will be considered if they contribute to the overall quality of the development and the urban design outcomes for the area. A Validation Report will be required to be submitted to Council prior to the placement of imported fill on site. All fill shall comply with the Department of Natural Resources (now OEH)- "Site Investigation for Urban Salinity" and the DECC (now OEH) Contaminated Sites Guidelines- "Guidelines for the NSW Site Auditor Scheme (2nd Edition)- Soil Investigation Levels for Urban Development Sites in NSW".
- No earthworks shall be undertaken whereby excavation exceeds 500mm or fill exceeds 500mm from the present surface level of the property without approval from Council.
- On sloping sites, site disturbance is to be minimised by use of split level or pier foundation housing designs. Council will consider greater cut for basement garages.

## 6.7 Erosion and Sediment Management

The development is to comply with MIS-00 (2019) controls of erosion and sedimentation is to be as follows:

- All developments, where the site is disturbed, shall provide Erosion and Sedimentation Control in accordance with the requirements of the Department of Water and Energy, the Environment Protection Authority and Council.
- Soil and Water Management plans shall be prepared in accordance with the Department of Environment and Conservation Guidelines, "Managing Urban Stormwater- Soil and Conservation – Volume 1 " 4th Edition (2004) and form part of the engineering drawings.
- Topsoil stockpiles shall be located outside hazard areas such as drainage depressions. Where site regrading or filling is to be undertaken, surface water shall be directed away from the face of batters and stockpiles.

Sediment and erosion control devices may include, but are not limited to the below list:

- Temporary Construction Exit
- Diversion Channels/ Banks
- Level Spreader
- Straw Bale Barrier
- Filter Bank
- Sediment Traps
- Filter Dams
- Sediment Basins

# Appendix A ICON WATER PRESSURE AND FLOW

# 360 DEGREE FIRE

## Hydrant/Sprinkler Flow Test Report

| | |
|---|---|
| Client Name: | Aplus Plumbing |
| Location: | 62 Sawmill CCT Hume |
| Site Number: | |
| Site Contact: | |
| Log Book Number: | |

| | |
|---|---|
| Date of Flow Test: | 10/10/2024 |
| Year of Installation: | |
| Head Height (m): | |

### Hydrant

| | Hg" | Flow LPM | Suction kPa | Discharge kPa | Net Total Head | Installation kPa | Current (Amp) |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| System Duty Demand | | | |
|---|---|---|---|
| Flow | | Pressure | |
| 600 | LPM | 350 | kPa |
| 0 | LPM | 0 | kPa |
| 0 | LPM | 0 | kPa |
| 0 | LPM | 0 | kPa |

### Diesel Pump

| | Hg" | Flow LPM | Suction kPa | Discharge kPa | Net Total Head | Installation kPa | RPM | Intake Manifold Temp |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
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### Towns Main

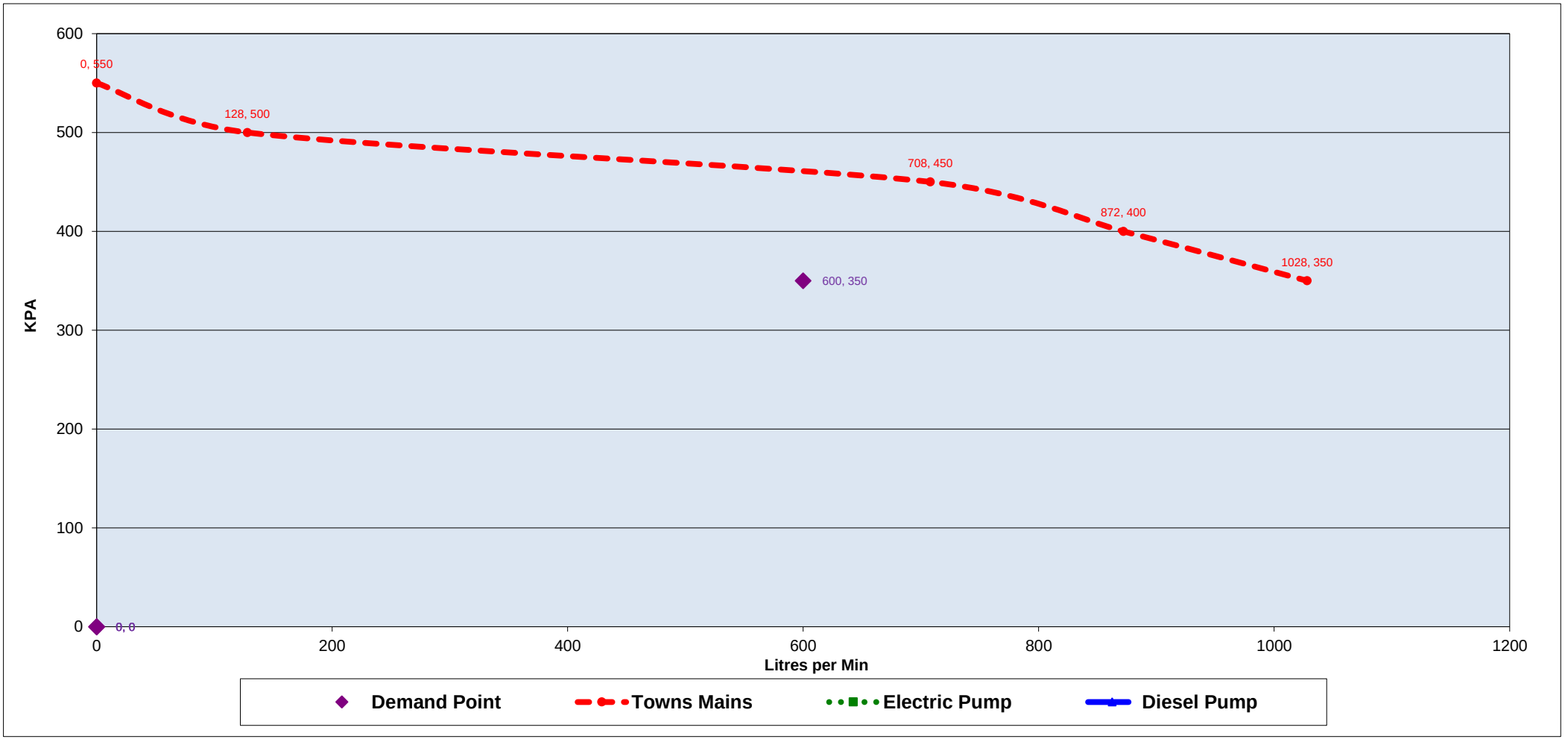
| | | | Towns Main #1 | | Towns Main #2 | | Combined Main | |
|---|---|---|---|---|---|---|---|---|
| | Hg" | Flow LPM | Towns Main kPa | Installation kPa | Towns Main kPa | Installation kPa | Comb Main kPa | Installation kPa |
| | | 0 | | 550 | | | | |
| | | 128 | | **500** | | | | |
| | | 708 | | 450 | | | | |
| | | 872 | | 400 | | | | |
| | | 1028 | | 350 | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

COMMENTS

# 360 DEGREE FIRE

## Hydrant/Sprinkler Flow Test Report

| | | | |
|---|---|---|---|
| **Client Name:** | Aplus Plumbing | **Date of Flow Test:** | 10/10/2024 |
| **Location:** | 62 Sawmill CCT Hume | **Year of Installation:** | |
| **Site Number:** | | **Head Height (m):** | |
| **Site Contact:** | | | |
| **Log Book Number:** | | | |




**Flow Test Result:** ☑ PASS ☐ FAIL

**Tester Name:** Jack Stewart

**Date:** 10/10/2024

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Tel +61 2 9496 7700



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