Lots 14, 28 & 29 Jeffreý Road, Glen Iris
Engineering Servicing Report

PREPARED FOR R&M BUNNY, R&J BUNNY
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1 Introduction

Calibre Professional Services Pty Ltd have been engaged to complete an investigation into the serviceability of Lots 14, 28 and 29 Jeffrey Road in Glen Iris. The subject land is shown below in Figure 1 and is bordered by Jeffrey Road to the north and a mix of residential and rural lots.

Figure 1 Calibre Subdivision Concept Plan

The 9.68 Ha is currently mixed zoned as “Urban” and “Special Purpose”. The majority of the land is low lying with a gradual slope from the south east corner to the north western boundary of the site. In order to facilitate the proposed development the site will require filling, roads, drainage, power and communication services.
2 Local Authority / Planning

The land is located within the City of Bunbury and is currently split zoned with Lots 28 and 29 being identified as “Special Purpose” and Lot 14 zoned as “Urban Development” under in the City’s Local Planning Scheme No. 8. As shown below in Figure 2.

Figure 2 City of Bunbury Local Planning Scheme No.8 Exert
3 Existing Site Conditions

The majority of the land is low lying and typical of the Southern Swan Coastal Plain. During the winter months water holds on the surface in the south east and north west areas of the site as a result of the high groundwater table. The site is sparsely vegetated, it is likely the area was cleared for pastoral land uses before development. The remaining trees are distributed relatively evenly over both lots, with the highest density in the south eastern corner. This can be observed in Figure 3 below. Clearing of these trees will be required to facilitate filling of the site, with the possible exception of those located within the proposed POS areas.

Figure 3 Lots 14, 28 & 29 NearMaps Aerial Showing Existing Vegetation
4 Hydrology / Groundwater

Extensive groundwater modelling has been undertaken for both nearby Riverlea Estate to the north west of the site and neighbouring Moorlands South to the south and west of the site. These have been extrapolated to lots 14, 28 and 29 Jeffrey Road. Figure 4 shows the groundwater contours that resulted. As shown below, the groundwater level slopes from a high of 4.75m AHD at the south-eastern extents of the site, to approximately 3.0m AHD in the north west. These levels will be the limiting factor in the determination of the final finished lot levels of the development.

Figure 4 Indicative Groundwater Contours
5 Geotechnical / Acid Sulphate Soils

From a review of the Bunbury-Burekup Sheet of the 1:50,000 Urban Geology Series maps the area is said to be underlain by sand from the weathering of Tamala Limestone, apart from the North West portion, which is underlain by Alluvium.

Galt Geotechnics completed a preliminary Geotechnical and Environmental study in June 2018. This study generally confirmed the geological mapping with deep sand being evident across the site. The exception of this was the North West corner where clayey soils were encountered. The recommendation of the Geotechnical study was that the site be largely classified as “Class A”, with the north western corner being determined as “Class S”. The report adds that the north Western portion can be improved to “Class A” with the placement of 1.4m of granular fill. Figure 5 below shows the site classifications graphically.

Figure 5  Geotechnical Site Classification – Galt Geotechnics Report
Acid Sulphate Soil risk mapping of the Swan Coastal Plain shows the North Western portion of the site, associated with the Preston River floodplain has moderate to high risk of ASS occurring within 3 m of soil surface. The balance of the site is unclassified, but is expected to be low consistent with surface geology mapping. This is shown in Figure 6 below. The geotechnical study completed by Galt confirmed the presence of ASS within the proposed development. As such, an ASS management plan will be required to manage the soils during construction.
Riley Consulting completed a traffic assessment over the structure plan area in June 2018. This report found that the structure plan area would increase local traffic flows by up to 1,062 vehicles per day and could generate just over 100 vehicle movements during peak periods. However, as noted in the report, no lane would experience an increase of more than 60 vehicles. Meaning that under WAPC guidelines the area can be considered to have no material traffic impact.

The proposed development access will be off Jeffrey Road. The existing condition of this road is poor, consisting of an approximately 5m wide two-coat seal with 1m shoulders. While the traffic report does not require any external upgrades, it is anticipated that a condition of development will be to widen the seal width to 6m in line with the City of Bunbury standards for the 254m frontage of Lots 14, 28 and 29. Subsequent discussions with the City of Bunbury revealed they have completed design upgrades for this section of Jeffrey Road, with construction anticipated to commence next year. As such, it is likely that these upgrades will be completed prior to the development of lots 14, 28 and 29.

As discussed above an intersection to Jeffrey Road will be required to facilitate connection to the City of Bunbury’s existing road network. This is anticipated to be minor, meaning no turning or deceleration lanes will be required. It will however need to accommodate a larger turning radius being the development access. The traffic report completed by Riley Consulting nominated a minimum 9m corner radius for this intersection.

The traffic report classified the main North-South development road as a Type A Access Street, while the rest of the internal roads are Type D Access Streets. The internal road network will be of a similar standard to those within the nearby Riverlea Estate. Being a 6m wide 25mm asphalt seal with kerbing both sides as shown in Figure 7 below. The Geotechnical investigation recommended a subgrade CBR of 12 be used for the pavement design. Consequently, it is likely that the pavement will consist of a 150mm limestone subbase and 100mm gravel base course.

We anticipate that 2m wide concrete footpaths will be required throughout the development in order to provide connectivity to the existing path network. The traffic assessment recommends the Type A Access Street have footpaths to both sides, while the Type D roads possess a footpath on one side only.
7 Stormwater Management

Calibre completed a Local Water Management Strategy (LWMS) over Lot 14, 28 and 29 Jeffrey Road in July 2018. Therefore, the stormwater management for the proposed development will follow the requirements stipulated in the LWMS. The outlet for the development will be via two individual 300Dia RCP's under Jeffrey Road, which ultimately discharge into the Preston River further downstream via a series of existing constructed drains culverts and wetlands. The eastern culvert is existing, while the other is programmed for construction in 2019 by the City of Bunbury.

The 63% AEP storm event will be managed through a combination of roadside Bioretention gardens and swales. All lots will be required to provide 1m3 of storage for every 65m2 of roof area, with excess flows being directed to the road drainage network. The post development 20% AEP storm will ultimately be conveyed by a pit and pipe drainage system to two detention basins, one in the southern POS and a larger basin in the north western POS area. As discussed in the LWMS, the north western basin cannot be constructed until further drainage studies have been completed to support approval to fill within the Preston River floodplain. In the interim, detention of stormwater will occur in the POS area at current elevations. This concept is shown in Figure 8. The outflows will be detained to pre-development rates by utilising a temporary an orifice plate onto the upstream end of the existing Jeffrey Rd culvert.

Figure 8    Interim North Western Basin Concept
The 1% AEP event will be conveyed through the subdivision via a combination of the piped drainage and overland flow through the road reserves ensuring protection of private property. The southern basin will outlet to the north western basin via a throttled outlet to the road drainage network. These basins will be sized to detain the external catchment inflows and post development runoff to predevelopment levels in both the 20% and 1% AEP storm events. This will be true in both the ultimate and interim basin arrangements. An overview of the stormwater management concept can be seen below in Figure 9.

Figure 9  Ultimate Drainage Concept
8 Earthworks

From a review of the available contours over Lots 14, 28 and 29 it is apparent that the site generally slopes from an RL 6m the south east to an RL of 3m in the north west. The site is relatively flat, with a sand dune traversing through the centre of the site. A resource enhancement wetland exists within the southern portion of the site within a trapped low. This is depicted in the site LiDAR digital terrain model shown in Figure 10 below. Surface ponding is present in three areas as shown in Figure 4.

A preliminary earthwork concept was developed by Calibre to tie into the surrounding lots and the existing Jeffrey Road formation, provide sewer serviceability and achieve the required separation to the groundwater levels discussed above in section 4. From this, the approximate fill level is expected to be RL 6m in the south-eastern corner terracing generally in a north-westerly direction to a finished lot level of approximately RL 4.8m adjacent the proposed intersection with Jeffrey Road. This will be reviewed and refined during the detailed design phase.

Figure 10   Lots 14, 28 & 29 LiDAR Digital Terrain Model
9 Sewer

Current Water Corporation catchment planning for the area has the majority of the proposed development in the Glen Iris Pumpstation 2 catchment, with the balance accounted for in the Styx Lane Pumpstation 3 catchment. The Glen Iris PS is located on Vittoria Road close to its intersection with the Australind Bypass. An exert from the planning map is shown in Figure 11 below. As is shown below, the planning has not been updated to reflect the removal of the Glen Iris relief floodway and therefore the area is currently zoned public purpose. Consequently, there is currently no allowance for future wastewater flows from Lots 28 and 29.

![Figure 11: Water Corporation Bunbury-SD089 & Glen Iris-SD250 Wastewater Planning Exert](image)

The rezoning of Lots 28 and 29 as per the Calibre subdivision concept in Figure 1 would yield 4.24Ha of R30 and 0.34Ha of R40. The sewer design flows generated from this would equate to 1.729L/s. Conforming to the current catchment boundaries would involve extending the gravity sewer from Access Chamber 0268 south along Vittoria Road and then west along Jeffrey Road to the proposed developments northern boundary, a total length of 530m. However, the existing invert level of -0.09m AHD does not provide sufficient depth to service the proposed development, with the existing Jeffrey Road levels resulting in insufficient cover over the pipe before it reaches the development. Therefore, this wastewater servicing option is impracticable.

Alternatively, the Styx Lane Pumpstation via an extension of the gravity sewer could serve the development from AE3179 on the corner of Jeffrey Road and Barker Boulevard. The existing invert level of 0.44m AHD provides sufficient depth to service Lots 14, 28 and 29. Calibre (formerly TME) completed the design of the Styx Lane PS in 2012, including the catchment planning for this pumpstation. The pumping flow rate for this station is 9.4L/s while the ultimate inflow to the station based on the old planning information was calculated as 6.876L/s. As such, there appears to be capacity to increase the inflow to the pumpstation by 1.729L/s without exceeding the pumping rate. Calibre has previously received advice from the Water Corporation’s wastewater planning team that the proposed amendments to the catchment boundaries are possible. However, they stated that “At a time where the land is rezoned and taking into account other potential development demands, the Corporation will assess the proposal to give a more timely account of connection capacity into the pump station.”
Based on the calculated design flows and the existing Corporation infrastructure it is anticipated that all sewers will be 150mm Dia. An overview of the sewer concept is shown in Figure 12 below. The development of Lot 14 Jeffrey Road, which is already with the Styx Lane PS catchment, will be also be connected via the proposed gravity sewers.

Figure 12  Sewer Concept
10 Water

The current licensee for potable water supply for the area is Aqwest. Therefore, they will be the service provider for water to the subdivision. Two Aqwest water mains exist on the northern side of Jeffrey Road and extend the full frontage of the subject lots. A 100mm AC and a 250mm BB water main. It is anticipated that the internal subdivision reticulation will consist of a 150mm Dia PVC ring main linking the north south roads via connect to the 250mm BB main. The remaining internal roads will be served by 100mm Dia PVC mains. However, these assumptions will require further discussions with Aqwest at design phase. A water supply concept is shown below in Figure 13.
11 Power

Significant Western power infrastructure exists within the Jeffrey Road reserve, including high voltage underground cable and low voltage distribution overheads on the northern side of the reserve. There is also a transmission line running along the southern side of Jeffrey Road for the full frontage of Lots 14, 28 and 29. A review of Western Power’s Network Capacity Mapping Tool shows there is 5,000 to 10,000 kVA remaining capacity in the area. This is shown in Figure 14 below. It’s anticipated that there is sufficient capacity to serve the proposed development of 103 residential lots and a 3425sqm Group Housing site, with each residential dwelling demanding 4.7kVA.

In order to supply power to the development we will be required to connect to the HV cable on the north side of the Jeffrey Road and extend the HV cable in to the development to a switchgear site. Typically, a single 630kVA TX can serve up to 90 houses so it is likely that two will be required for the proposed development. This will be confirmed once a detailed LV design has been undertaken.

Due to the exiting 132kV transmission line on the southern side of Jeffrey Road the lots that front this road will require an easement across their frontage. Typically, the WP Transmission Line easement width is 9m either side of the centre line of the pole. These poles are approximately 7m from the road reserve southern boundary so it is likely that the required easement will intrude into the lots 2m.

Figure 14  Western Power Network Capacity Mapping Tool
12 Communications

Both Telstra and NBN have active infrastructure running along the northern side of Jeffrey Road. A review of the NBN mapping (Figure 15) shows the area is serviced and consequently we do not foresee any issues extending the service into the development. Other than the NBN deployment charge for the connection of the lots with fibre, the standard residential construction cost for pit and pipe would apply to this development. With the fibre extending from the existing NBN network through this development. However, the connection will be subject to NBN approval at the time of development.

![NBN Co Network Mapping Tool](image)

Figure 16   NBN Co Network Mapping Tool

13 Gas

The current provider of reticulated gas for the proposed development area is Atco Gas Australia. They currently have a 160PE 2.7 MP gas main running along the full frontage of Lots 14, 28 and 29 on the northern side of Jeffrey Road. As such, no major Headworks costs are anticipated in providing reticulated gas to the subdivision. This will need to be confirmed with Atco at the time of subdivision detailed design.

14 Summary

No constraints have been identified that would be considered critical to the servicing and development of the proposed site within the scope of this report. Detailed earthworks design and modelling will be required to confirm stormwater storage volumes required will be achievable within the POS areas.

It is recommended that discussions with utility providers and the City of Bunbury be progressed to confirm the servicing concepts developed and detailed in this report prior to detailed design being undertaken.
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