

APPENDIX F

SERVICING & INFRASTRUCTURE REPORT



Athol Street
Port Hedland
Servicing and Infrastructure Report
October 2015



Athol Street Port Hedland

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1. INTRODUCTION

The following report has been prepared by Cossill & Webley Pty Ltd (CW) with inputs from Wood & Grieve for the Power and Communications sections and summarises the results of a preliminary assessment of the engineering aspects of the proposed urban development of Lots 1731, 1444, 556, 511 and 340 Athol Street, Port Hedland.

The Site is identified by the red boundary presented below in Figure 1.



Figure 1 - Site Plan (RPS 2012)

2. SITE DESCRIPTION

The Site is approximately 42 hectares in area, located to the east of the Port Hedland Town Centre Area and it abuts the Pretty Pool tidal creek and mudflat area.

The Site is bound by Cooke Point Drive to the west, Athol Street to the north, and Pretty Pool Creek to the south. The Site contains two sewer pump stations, one on Athol Street and the other on Cooke Point Drive. An aerial photo of the site is presented in Figure 2 below.



Figure 2 – Aerial Photography (Nearmap 2015)

2.1 Geology and Landform

GHD have completed a geotechnical report for the site (GHD, East Port Hedland Development, July 2012). This report has identified that the site has near surface tidal silt and mud deposits overlying older marine mud layers. It is understood that the site will be required to be filled to achieve minimum flood levels. The fill and the new loading across the site is expected to result in consolidation of the mud layers in the order of 300-500mm and it has been recommended that pre-loading be carried out to consolidate the material prior to final civil and house construction.

Following earthworks a site classification of S-D or M-D is anticipated. Figure 3 presents the geology across the Site.

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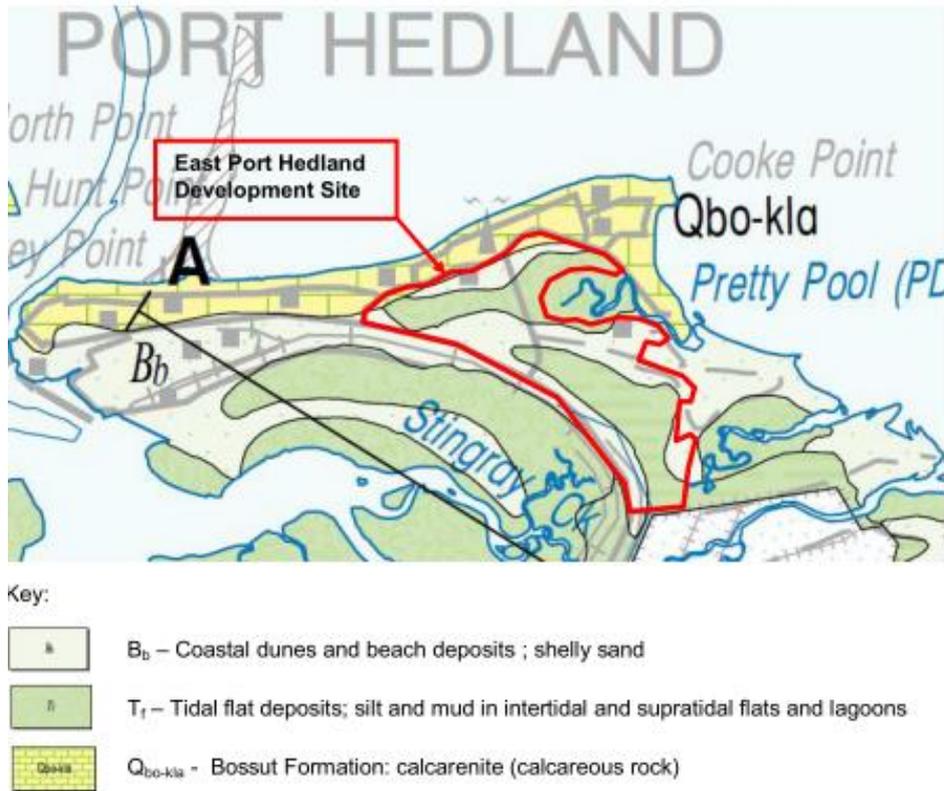


Figure 3 - Geotechnical Information (GHD-2012)

The majority of the site ranges in elevation between RL3.0 to RL4.0m, however around the extremities of the site the existing level peaks at approximately RL17.5m at the rifle range hill. Existing Surface information is presented below in Figure 4.



Figure 4 - Elevation 1m Contours (CLE 2014)

2.2 Groundwater

Groundwater levels have not been reviewed for this development. As the parcel of land is within a narrow peninsula it is anticipated the prevailing groundwater level will closely correspond to tidal movements.

2.3 Acid Sulphate Soils

A desk top review of the Department of Environmental Regulation mapping has been completed as part of the LWMS and this indicates the northern half of the site having a low to moderate risk of ASS and the southern half of the site having a moderate to high risk of ASS within 3m of the natural surface. An Acid Sulphate Soils and Dewatering Management Plan will need to be prepared for the site.

3. EARTHWORKS

The landform through the area is generally at levels of RL6.0m+ along Athol Street and fall sharply into the site and then gradually grade from RL4.0m to RL3.0m closer to Pretty Pool Creek.

There are a number of large trees lining Athol Street which have historical value as well as aesthetic value. It is recommended that that design and construction techniques consider these trees to minimise the impact where possible.

A minimum earthworks pad level of RL6.4m has been recommended for the site to achieve sufficient freeboard to tidal storm surge events. Minimum fill levels have also been nominated by the Water Corporation in regard to sewer reticulation design (refer section 7.0). It is anticipated the site will be filled with locally sourced material and will achieve an M class site.

4. ROADWORKS & FOOTPATHS

The existing roads bordering the development area are Cooke Point Drive (to the west) which currently exists as an unkerbed road and levels in the vicinity of RL4.0m and Athol Street (to the north) which varies in level from RL4.0m to RL10m (east to west). It is not anticipated that major changes will be made to either road as part of the subdivision apart from minor regrading near the intersection to achieve appropriate grades and drainage.

The subdivisional roads are anticipated to be kerbed with a typical cross section between 6 and 7m in width. A path layout will typically include a path to every road with paths on both sides of the major roads within the development area. Geotechnical advice will be sought to determine pavement thicknesses and profile.

5. DRAINAGE

The existing drainage network surrounding the area consists of un-kerbed roads, kerb breaks in roads and piped outlets that discharge into the development area (at various locations) from both Athol Street and Cooke Point Drive. The current flow route from these outlets to Pretty Pool Creek is via overland flow paths that have been created by storm events over a number of years.

It is proposed that the main drainage network through the subdivision will utilize the road network to collect and transfer stormwater runoff into drains beside the roads. The typical discharge structure will likely consist of a kerb break and stone pitching to allow water to safely discharge into the open drains. The open drains are proposed to typically have batter slopes of 1:6 which could be increased to 1:3 in places or substituted with a retaining wall depending on landscaping considerations. The open drains are proposed to have longitudinal grades in the order

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of 1:500 to 1:1000 to minimize erosion potential. A number of drop structures are proposed particularly in the eastern portion of the site to safely dissipate energy where surface elevations would normally dictate steeper drain grades.

Limited areas of pipes drainage are proposed, the extent of this network will be installed primarily to extend the existing piped network in Athol Street and Cooke Point Drive into the open drain network.

Detailed stormwater management information is contained within the LWMS. Due to the intense rain events experienced in the Pilbara area and the limited capacity of the local soil types to allow for infiltration it is proposed that only limited lot infiltration of stormwater will be achieved.

Within the open drain network a series of vee notch (or similar) weirs are proposed. The function of these weirs will be to detain rather than retain any stormwater flows. These structures will reduce the peak flows into Pretty Pool Creek and reduce potential sediment inflow. It is not intended there be any standing bodies of water within the subdivision area due to limited infiltration capacity, creation of soft/muddy areas within drains and potential to encourage mosquito breeding habitat

6. WATER RETICULATION

Potable water infrastructure in the vicinity of the Site is readily available in both Athol Street and Cooke Point Road. The Water Corporation has advised that a new 300mm diameter water main is planned for Cooke Point Drive. The existing infrastructure surrounding the site is shown in Figure 5. Water within the site will connect to the existing infrastructure and will be sized and located according to Water Corporation requirements.

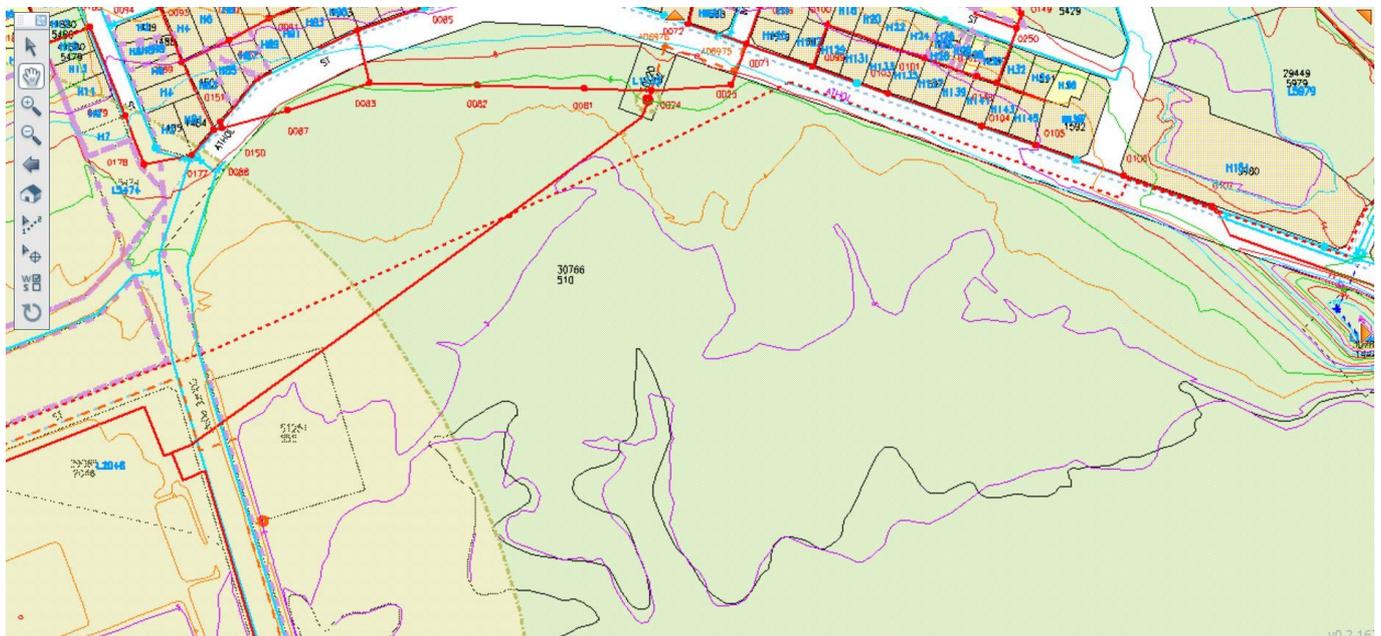


Figure 5 – Location of Existing Water Infrastructure (Water Corporation 2015)

7. SEWER RETICULATION

The Water Corporation's existing and planned sewer reticulation is presented below in Figure 6. A new pump station has recently been completed in Cooke Point Road and this Pump Station receives the effluent that was formerly treated at the Port Hedland Waste Water Treatment Plant (now closed) and pumps it to the South

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Street Zone substation on the corner of McKay & Wilson St Port Hedland. The 3 Transformers within the Zone substation are rated at a total of 24MVA.

The existing parcel of land (subject Development) does not appear to have an existing Horizon Power point of connection. The Horizon Power Network in shown in Figure 6.

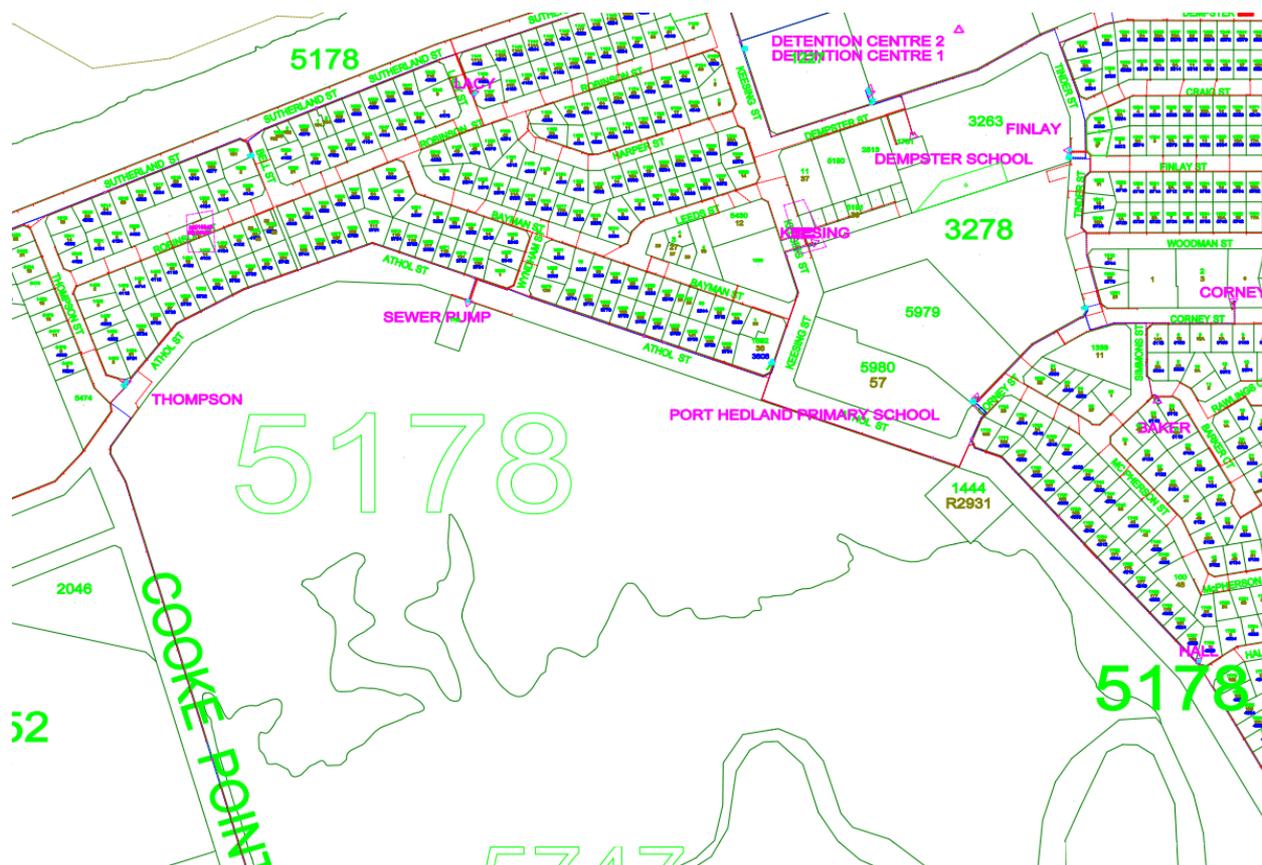


Figure 7 – Existing Power Infrastructure (Horizon Power DFIS Map 2015)

8.2 Horizon Power Methodology

Horizon Power's Underground Distribution Scheme (UDS) policy details that all new land developments are provided with an authority point of connection via an underground power service. New residential subdivisions are provided with a minimum load allocation of 10kVA per lot. Where the lot is intended to be utilised as Mixed Use (commercial ground level and residential on top) the load allocation is increased to cater for the higher use to 20kVA per lot.

The power distribution system is reticulated via the provision of High Voltage Switchgears (RMU) at 11-33KV, with Transformers stepping the voltage down to 415Volts. Low voltage cables are then installed to distribution pillars located to service two property's with high load connections (>315A) fed direct from a Transformer within the site.

The Developer is the applicant of the Electricity Infrastructure works and pays and installs the required distribution infrastructure which is then handed over to Horizon Power at the completion of works. All land developments with the Horizon Power North West Interconnected system are treated as full cost.

The above ground equipment consisting of Transformers / Switchgears and pillar units are required to be located

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above the 1 in 100 year flood levels. Parts of the development site are within a flood prone area.

Transformer and Switchgears are required to be placed 1mtr above the 1 in 100 year flood level and will be required to be raised appropriately. The substation sites should be strategically placed throughout the development to sit within the high areas and suitably retained in the instances they are raised.

Pillar units are required to be placed 200mm above the 1 in 100 year flood levels and localised raised garden beds maybe required in some instances. The use of Wall mounted pillars would also be investigated in instances where the lots were lying in low line areas.

8.3 Initial Conceptual Solutions

Based on the current maximum yield (689 residential lots & 59 mixed use lots) we have estimated the maximum demand load to be in the order of 8.07MVA which is based on the standard Horizon Power load allocation for the region. On this basis the development would require, in the order of 6 Authority owned Switchgears (RMU) and up to 15 Authority owned 630kVA MPS Transformers to reticulate the distribution system throughout the proposed development.

It is assumed that the HV connection for the Distribution equipment will initially come from the existing 22kV underground cables within Athol Street, with a new 400mm HV feeder run from Anderson Street Zone substation to the development to cater for the ultimate load.

The land requirements for an external district Transformer & RMU site is 4.5m long x 6.6m wide (Horizon Power Drawing DSM-3-02) and this is created as an extension of road reserve with a cut out in the lot. In the situation where a single Transformer only is required the site is 4.5m long x 3.8 wide (Horizon Power Drawing DSM-3-01).

The equipment must be installed to achieve a fire separation of 2mtrs to a residential building to avoid additional fire rating requirements. Low Voltage Cables extend from the Transformer(s) to mini pillars located to feed two residential lots.

Horizon Power also have a 2 metre metallic fence exclusion zone, therefore the substation sites are usually offset 2mtrs from the lot boundary to ensure the separation is met.

Lighting upgrades to the intersections created onto the existing road network will be required to achieve compliance to AS1158. The Internal road network would also require the installation of a residential lighting scheme to Horizon power requirements, lit to a category P level of lighting for compliance to AS1158.

Disclaimer: It should be noted that due to the dynamic nature of Horizon Power's network, Infrastructure requirements and connection points referred above may differ when applications are placed in the future. It is encouraged to undertake a planning study closer to the date of proposed load uptake to determine if the existing network has the capacity to take on the development load.

9. GAS SUPPLY

There is no reticulated gas within Port Hedland.

10. TELECOMMUNICATIONS

10.1 Existing Infrastructure

There is existing Telstra Infrastructure located within Athol Street. The existing Lot does not appear to be connected to Telstra's network.

10.2 Initial Conceptual Solution

The current communications legislation details developments of greater than 100 dwellings NBN are the Wholesale Provider of last resort, recent amendments to the Communications act has encouraged competition within the wholesale sector; as such the developer has the option to sign up with an alternative provider for a Broadband solution.

Should NBN be the chosen carrier Developers are required to install and fund a pit and pipe system to NBN requirements and then transfer ownership of the infrastructure to NBN via the execution of a Master Developer's agreement in exchange for the provision of data infrastructure within that pit and pipe.

A pit and pipe system is extended within the communications corridor inside the development area with communications pits strategically located to enable the connection of two lots from one pit. This pit and pipe system can be designed and installed at the same time as the other services to NBN specifications and handed over to NBN to reticulate their cabling as required. NBN will install small roadside cabinets in addition to the data cabling deployment to enable augmentation of the network.

NBN do not allow pits to be installed within driveways and as such all pits and cabinets are to be located within the verge inside the communications corridor away from driveway locations.

11. CONCLUSION

Our preliminary investigation of the Site confirms that no major headworks upgrades are required and services are readily available in close proximity to the development. There are existing services within the subdivision and these will need to be relocated or adjusted as part of the subdivision works. The timing for these remedial works will depend on Service Agency requirements and staging considerations.

From an engineering perspective, the site is suitable for urban development subject to appropriate treatment of the tidal mud layers and increasing the finished level to meet minimum required flood levels. It is recommended that an environmental investigation be undertaken on the site for ASS and further geotechnical works to validate extent of tidal mud deposits and confirm pre-loading requirements.

There is a significant amount of fill required to achieve the required site development levels and the identification of a suitable source of fill will be a key determinant for development.