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# Engineering Services Report

## 'North Byron Parklands' Proposed Infrastructure Upgrades

## Tweed Valley Way and Jones Road Yelgun

For North Byron Parklands

16 November 2017


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| | | | |

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This report is certified for issue by:

Samuel Ide RPEQ 12231

Date Certified: 16 November 2017

*This report has been prepared for North Byron Parklands for the purpose of accompanying a development application to the NSW State Government for permanent project approval. This report must only be used by North Byron Parklands for this purpose and must not be used or relied upon by any other person for any other purpose.*

*The assessment, conclusions or recommendations in this report are based on conditions encountered and information received at the time of preparing the report and may not be relied upon as site conditions or operations vary over time.*

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# 1. Introduction

The 'North Byron Parklands' is a cultural events facility located at Tweed Valley Way and Jones Road, Yelgun. The site currently operates as a purpose built venue for a range of music and arts events under a temporary project approval which was due to terminate at the end of 2017 prior to receiving an extension to operate under the temporary approval up until 31st August 2019. The holding company of North Byron Parklands, Billinudgel Property Pty Ltd, is subsequently seeking to obtain a permanent development approval via the NSW State Government under which to operate the site.

Westera Partners Pty Ltd were commissioned by North Byron Parklands to prepare a civil engineering report outlining the proposed infrastructure upgrades associated with the development application. The infrastructure upgrades generally relate to road and car parking improvements, water and sewer servicing, stormwater drainage and the installation of permanent administrative and performance facilities.

# 2. Site Description

## 2.1 Location and Land Use

The development site is located at Tweed Valley Way and Jones Road, Yelgun. Part of the proposal involves land dedication of part of the existing site to the NSW National Parks & Wildlife Service (NPWS) to form part of the adjacent Billinudgel Nature Reserve (BNR). Following the subdivision, the site is proposed to be formally known as Lot 1 on DP1145020, Lot 402 & 403 on DP755687, Lot 12 on 848618, Lot 12 on DP875112, Lot 14 on DP875112, Lot 30 on DP880376, Lot 107 on DP1001878, Lot 312 on 1163830, & proposed Lots A, Lot B, Lot C, Lot D, & Lot E as described on the 'SSD Application Area' prepared by Planners North. The total site area is approximately 229.34 Ha. Access to Wooyung Road is achieved via Lot 21 on DP1169952.

The site is bound by Tweed Valley Way to the west, the BNR centrally and to the south east, and properties to the north and northeast consisting of agricultural land primarily utilised for grazing and sugar cane cultivation. The northern site boundary forms part of the administrative boundary for Byron Shire Council (BSC). Adjoining properties to the north form part of Tweed Shire Council (TSC). Refer to Figure 1 for an indicative site location.

A shallow ridge containing Jones Road runs east west through the centre of the site. The southern portion of the site is located on the Billinudgel and Yelgun Creek floodplain, whilst a majority of the northern portion is located within the Crabbe's Creek floodplain. The BNR adjoining the site is classified as an eco-wetland under the *State Environmental Planning Policy No. 14 – Coastal Wetlands (SEPP14)*. A significant portion of the site north of Jones Road adjoining the BNR thus forms part of a BSC mapped Wildlife Corridor and is land subject to rehabilitation.

The site currently operates under a temporary approval as a cultural events facility, and hosts a number of arts and cultural events including two major Australian music festivals annually: 'Splendour in the Grass' and 'The Falls Music and Arts Festival'. The majority of the site thus consists of infrastructure designed to accommodate these events. Access to the site is currently obtained via three gated entry's (gates B, C, & D) adjoining Tweed Valley Way, a gated entry (gate A) adjoining Jones Road, and a gated entry (gate E) adjoining an emergency access road at the northern site boundary, which runs north through the adjoining property and terminates at Wooyung Road. Refer to Appendix A for a detailed Site Infrastructure Plan prepared by North Byron Parklands. Further explanation of existing infrastructure is provided in Section 3.

The proposed development application area forms part of the total site area and is illustrated in the attached Locality Plans included in Appendix A.

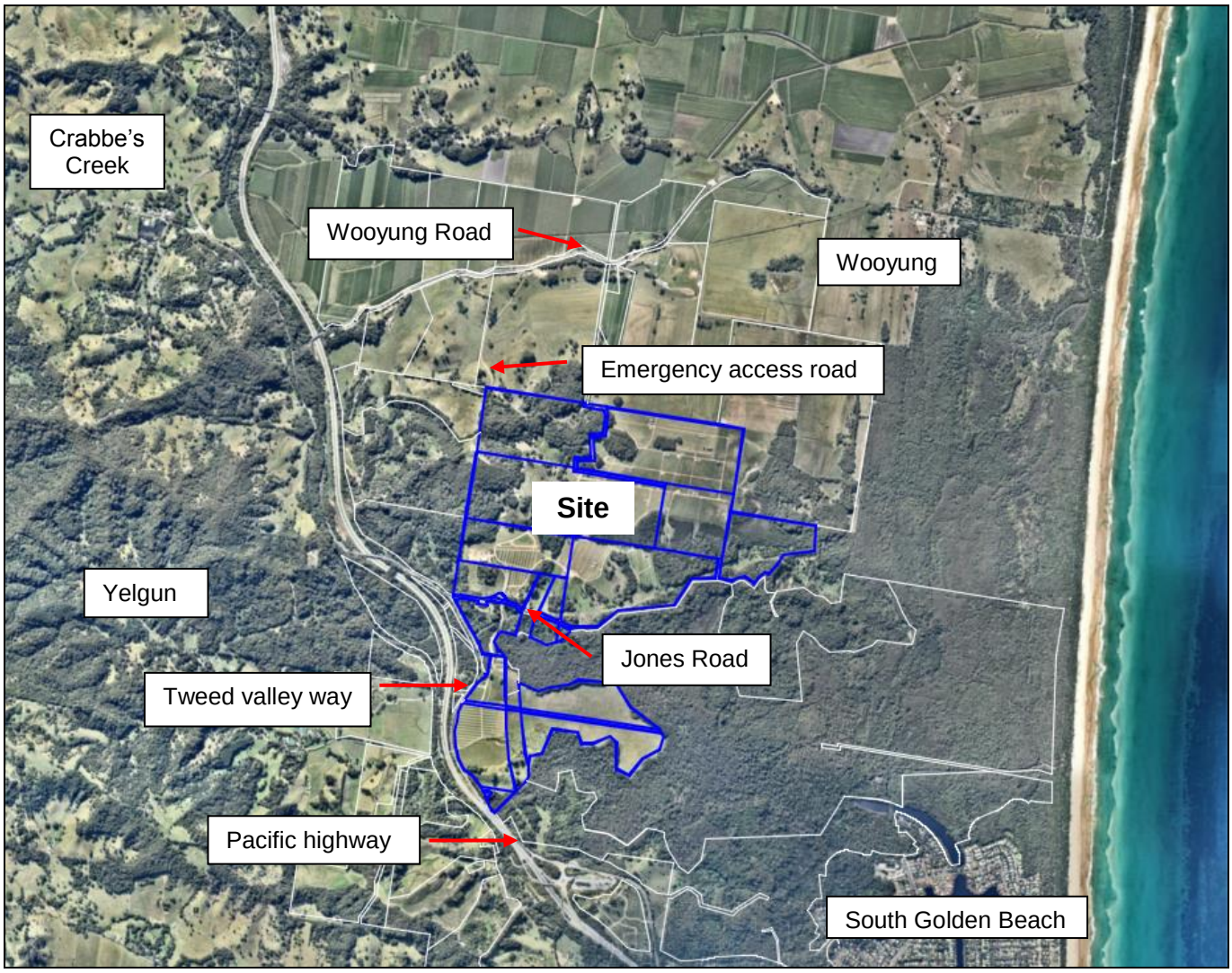



**Figure 1:** Indicative Site Locality (Nearmap, 2017)

## 2.2 Supplementary Information

The site currently operates under a temporary project approval (Major project 09_0028) issued by the NSW Department of Planning Environment (DP & E). As part of the approval, the site is conditioned to operate in accordance with an Environmental Assessment Report (dated September 2010) prepared by S J CONNELLY CPP PTY LTD. Numerous reports have been prepared to support the new Environmental Assessment Report including Flood Risk Management Plan, Noise, Water and Sewer Assessments and Traffic. References to these reports are made where appropriate throughout the engineering report.

# 3. Proposed Infrastructure Upgrades

Infrastructure upgrades associated with the proposed development application can be grouped into the following areas:

- Tweed Valley Way and southern site access works
- Southeast carpark works
- 'Transport hub' works
- Amphitheatre works
- 'Easy Street' works
- Permanent structures and facilities

These works are described in the following section. Further to these specific areas, general infrastructure upgrades relating to road and car parking improvements, water and sewer servicing and stormwater drainage are proposed across the site.

The proposed infrastructure upgrades are to be staged and works are to be completed in accordance with the State Significant Development Environmental Impact Statement (SSD EIS).

## 3.1 Tweed Valley Way and Southern Site Access Works

Site access at Tweed Valley Way is currently obtained at three locations (gates B, C, & D). Gate B is utilised for public transport vehicle access, Gate C is utilised for primary access, and Gate D is utilised for secondary access during larger events. A sealed spine road adjoins gates B & C and runs north toward the event area. There is an existing parking area adjoining gates C & D that consists of turfed parking bays and unsealed aisles that is currently utilised for day parking during large events. A pedestrian access path adjoins the parking area and runs north adjacent to the existing spine road.

Works are proposed internally in order to facilitate access and ease congestion and traffic management requirements during large events. During large events, access would be split between Gates C & D to minimise congestion on Tweed Valley Way. This will reduce congestion at Gate C and allows for substantially more queuing space internal to the site as a result of opening Gate D. A sealed parking area for buses and taxis, a 'loop' road, and modifications to the existing pedestrian access path are proposed east of the existing parking area. Two new internal roundabouts are proposed adjacent to Gates C & D in order to ease congestion, promote free flowing traffic and reduce traffic management resource requirements.

## 3.2 South-East Carpark Works

The south east portion of the site currently consists of vacant land. Approximately 5000 new car parking spaces are proposed to be constructed in this area.

The parking area shall consist of a sealed loop road and parking aisles with turfed parking bays, and is to be utilised for day parking during medium and large events. Several parking bays for shuttles shall be provided along the length of the proposed loop road. New bus/shuttle shelters are proposed adjacent to each parking bay. These are intended to allow the continuous transport of patrons to the event area in the northern portion of the site. A minimum 30m buffer shall be maintained to the existing SEPP14 mapped line or vegetation line (which forms part of the BNR) for rehabilitation purposes.

### 3.3 Transport Hub Works

The 'transport hub' describes the area of the site at which traffic is primarily redirected during major events. The area consists of the following:

- Resource centre consisting of an unsealed yard utilised for the storage of equipment and materials.
- Service road running south from the resource centre and terminating at Jones Road (Gate A)
- Car parking area consisting of unsealed parking aisles and turfed parking bays utilised as a staff and guest parking area during major events.
- Unsealed roads utilised to access the camping area to the northeast.
- Unsealed road utilised as a shuttle/bus turnaround area.

Significant roadworks are proposed within the transport hub in order to ease congestion, promote free flowing traffic, increase transport pickup/drop off capabilities and improve durability of existing infrastructure. The Gate A entry is to be modified to achieve greater trafficability for buses and to separate the bus entry/exit traffic from the cars entering and exiting the carpark and camper areas.

### 3.4 Amphitheatre Works

The 'amphitheatre' describes the area of the site that is currently utilised as the primary performance area during large events. It consists of a relatively level area (on which temporary staging is erected) bound by steep topography to the west, north, and east. The amphitheatre is predominantly grassed, with several hardstand paths utilised by patrons as well as amenities buildings to the north and west.

The southwestern slope of the amphitheatre, which is significantly steeper than the northern and eastern slope, is proposed to be flattened to a trafficable slope and terraced via maximum 600 high rock retaining walls in order to allow seating for patrons and promote ease of access during larger events.

### 3.5 'Easy Street' Works

'Easy Street', also referred to as the 'northern access road' refers to a two-way emergency access road which runs north from the northern property boundary through the adjoining property, terminating at Wooyung Road.

The existing road is currently unsealed. The intersection at Wooyung Road is substandard for the proposed level of traffic to be utilising the driveway. It is proposed to widen and bitumen seal 'easy street' along its entirety & on its existing alignment. The proposed carriageway width is to be 7.0m. A standard T-intersection shall be provided at Wooyung Road at a new location & the internal road shall be realigned as required to tie into the new intersection.

### 3.6 Permanent Structures and Facilities

The following permanent structures & facilities are proposed as part of the development.

- **Conference Centre, Administration Building, Associated Accommodation & Golden View Bar**
    - A new conference centre including accommodation buildings is proposed adjacent of the existing reservoir in the northwest portion of the site. A new bar facility is proposed at the northern end of the existing amphitheatre.
- **Amenity Pods**

- New amenities blocks intended for patron use are proposed at various locations at the northern portion of the site.

- **Bus Commuter Stops**
  - New bus shelters are proposed within the south east carpark and transport hub in order to accommodate the transport of patrons between parking areas & the event area.

### 3.7 Security Fencing

Approximately 4.15km of permanent security fencing is proposed. The palisade fencing shall be 2.20m high and form an approximate perimeter along the southern, western, & northern boundaries of the event area on the portion of the site north of Jones Road, & shall run adjacent to vegetated areas where possible. Fencing shall be designed with gates at appropriate spacing's for fauna passage in non-event times.

## 4. Roadworks

The proposed infrastructure upgrades involve significant internal and external roadworks. All external roadworks are to be designed and constructed in accordance with AUSTROADS, The Northern Rivers Local Government Deign and Construction (DRDC) Manuals and TSC or BSC standards (dependent on where the work is proposed).

### 4.1 External Roadworks

Within Wooyung Road, a standard T intersection is proposed approximately 100m east of the existing intersection location in order to allow adequate site distance and improve the intersection geometry. A minor road widening may be required on the opposite side of Wooyung Road in order to accommodate overtaking in the event of queueing. An auxiliary lane within Wooyung Road is not considered necessary.

At Jones Road, the existing intersection at gate A will undergo minor roadworks in order to accommodate the regrading and consequent realignment of the existing service vehicle road to be more suitable for buses.

### 4.2 Internal Roadworks

Internal road realignments are required at the southern site access, the transport hub, and 'easy street'.

The southern site access works will involve the construction of two bitumen sealed roundabouts, parking areas, and a loop road. The proposed south east carpark will involve the construction of a bitumen sealed loop road, parking aisles, and parking bays for shuttles and buses. New signage and line marking shall be provided as necessary.

At the transport hub, the majority of the existing service road extending from Jones Road is unsealed. The portion that is sealed adjacent to Gate A is steep and is subject to potholing. The existing service road shall be realigned at a flatter grade and sealed along its entirety. The road is proposed to extend north of the existing resource centre, and a new intersection is proposed at the existing spine road in order to disassociate service vehicles with traffic utilising the existing staff/guest carpark and campground access road. In order to promote through traffic for service vehicles at the proposed intersection, a third lane is proposed within the existing spine road, which will result in a road widening along its southern side. The existing shuttle and bus turnaround area is proposed to be realigned and resealed. New line marking shall be provided as necessary. A pedestrian access path is proposed along the length of the existing road currently utilised to access the campgrounds during major events.

At Wooyung Road, the internal realignment shall ensure that existing structures are preserved as significant excavation is proposed in order to maintain a trafficable grade. The existing access to Wooyung Road appears to be utilised as a driveway for the existing dwelling. This access shall therefore be retained for private use, and as a result of the proposed earthworks shall be realigned internally to maintain access to the existing dwelling. The full length of 'Easy Street' shall be sealed, with sections in disrepair made good.

The site contains a network of unsealed roads which are utilised by patrons to access parking and camping areas during major events. Many of these roads are in disrepair and located within the Crabbe's Creek floodplain in the northern portion of the site, and the Billinudgel and Yelgun Creek floodplain within the southern portion of the site. All existing roads within the site are proposed to eventually be sealed in entirety in order to limit erosion, reduce the need for ongoing maintenance, reduce dust emissions during major events, and improve vehicle manoeuvrability. The sealing of existing roads would be undertaken on a staged, as-needs basis.

## 5. Stormwater Drainage

Stormwater drainage associated with proposed infrastructure upgrades shall be designed in accordance with the strategy developed for the original development application.

A stormwater management plan (dated June 2010) prepared by Ardill Payne and Partners found that no measureable increase in runoff volumes and pollutant concentrations would occur as a result of the proposal. The report states that this could be achieved by utilising a system of rainwater reuse tanks for all permanent structures and grassed/vegetated swales to direct stormwater to existing site drainage infrastructure, which consists of a network of surface agricultural drains that discharge to Yelgun and Billinudgel Creeks. An integrated water cycle management plan (dated July 2010) prepared by Gilbert and Sutherland further supports a management strategy incorporating water sensitive urban design principles.

Existing stormwater drains and channels adjacent to internal roads and within parking areas shall be maintained. New open drains shall be constructed adjacent to proposed roads and within proposed parking areas. Stormwater runoff shall be directed to existing drains present on site in accordance with the stormwater management plan.

All stormwater drainage works shall be designed and constructed in accordance with The NRDC Manuals and TSC or BSC standards (dependent on where the work is proposed).

## 6. Flooding

Under the temporary project approval the site is conditioned to operate in accordance with the Flood Risk Management Plan (dated June 2011) prepared by Molino Stewart. As part of this permanent approval application, a new flood risk management plan has been prepared by Molino Steward dated November 2017.

According to the plan, significant portions of the site are flood prone. The southern portion of the site is located within the Billinudgel and Yelgun Creek floodplains (which form part of the wider Marshall's Creek floodplain), whilst a majority of the northern portion of the site is located within the Crabbe's Creek floodplain. Several infrastructure upgrades are affected by flooding. Refer to Figure 2 for an extract from the Flood Risk Management Plan showing the extent of inundation during a 100year flood event.

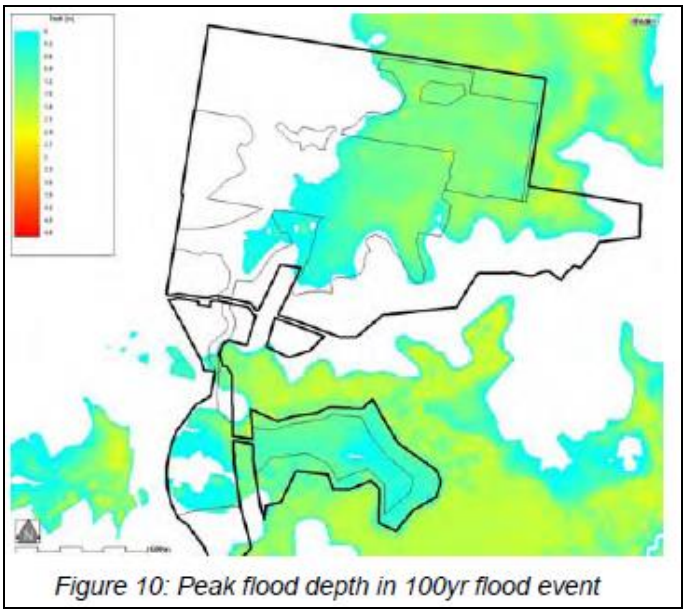



**Figure 2:** Extract from Flood Risk Management Report (Molino Stewart, 2017)

The report has identified that the proposed southeast car park, a significant portion of the event area, and parts of the spine road are expected to be inundated during 1 in 100 year event. Under the temporary approval, the spine road which runs through the centre of the site is conditioned to be set above the 1 in 100 year flood level. Proposed works shall ensure the Spine Road & Easy Street are constructed above the 100 year flood level in entirety.

## 7. Sewer and Water Infrastructure

There is no existing water or sewerage reticulation services available to the site. The Integrated Water Cycle Management Plan (IWCMP) (dated July 2010) prepared by Gilbert and Sutherland outlines a strategy adopted under the temporary project approval for potable water supply and wastewater treatment. New reports have been prepared as part of this permanent approval application outlining the proposed method for sewer disposal and water supply.

### 7.1 Sewer

The site is conditioned under the approval to provide on-site wastewater treatment and engage a liquid waste contractor to dispose of sewage and trade waste during major events. There is an existing grey water treatment facility on site. Ultimately, it is proposed to expand on-site wastewater treatment capabilities by constructing additional grey water tanks and by diverting greywater from amenities and permanent structures to the treatment facility via a pumped solution. The proposed sewer treatment and disposal system is documented in the Wastewater Mangement Plan by Whitehead & Associates dated 16 October 2017. The proposed On-Site Sewage Management System (OSMS) is summarised as follows in accordance with the executive summary of the Wastewater Management Plan:

- Ongoing use of batch style dry compost toilets in dedicated amenities blocks for the festival precinct.
- A mix of micro flush compost toilets (Centrex 2000) at conference accommodation and associated day-spa and flushing toilets at the conference centre.
- Festival kitchen sullage to be collected and trucked offsite to Ballina or Byron Bay STPs (692kL/annum).

- Collection of compost seep, hand basin and shower greywater, urinal water, and conference centre kitchen sullage in a series of pump-wells (EONE 2014IP), and pumping to a master treatment system located approximately at the footprint of the existing temporary holding tanks.
- Reuse of existing 920kL storage tanks and installation of an additional 920kL storage capacity.
- Construction of a custom reed bed treatment system of 354m$^2$ area capable of treating 31kL/day to a secondary standard, with chorine disinfection. The treatment system consists of four parallel treatment trains for ease of constructability and reliability.
- The treated effluent to be applied to the land over 32,440m$^2$ via surface spray irrigation using travelator irrigators, with backup short term application area of existing 24 Intermittently Dosed Sand Filter Beds (IDSFB).

The intent is for the upgraded OSMS to be progressively implemented as budget allows, with the fully upgraded system to be operational prior to opening the proposed conference centre. The proposed OSMS is indicated below in Figure 3.

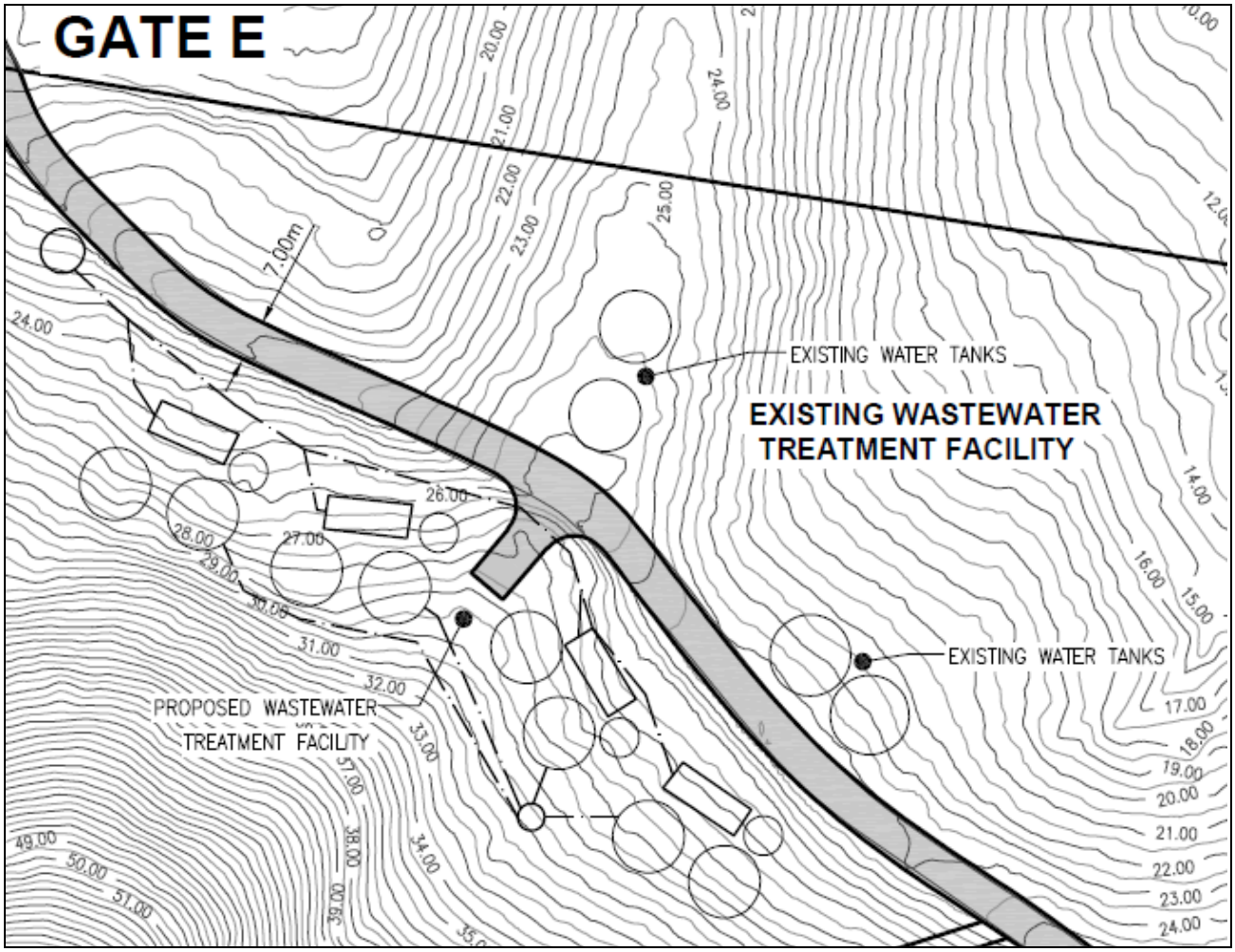



**Figure 3:** Proposed OSMS location as shown on the attached engineering plans and within the Wastewater Management Plan by Whitehead & Associates dated 16 October 2017.

### 7.2 Water

JED Civil prepared a report titled 'North Byron Parklands Drinking Water Supply' dated November 2017 for the purpose of accompanying the DA. The report recommends the following.

- Construct 4.3ML reservoir on hill adjacent to western boundary.
- A distribution network from the new reservoir as shown on the Jed Civil drawings and shown diagrammatically on the attached Westera Partners drawings.
- The water supply shall be augmented with imported water from the Byron Bay or Rous Water systems during the drier years when supply from collected rainwater alone would not be sufficient to supply the proposed development.
- Screened downpipe headers and first flush systems shall be installed on all roof rainwater collection systems.
- The current quality assurance program shall be enhanced due to the increase in patrons attending events and the consequence of an outbreak of gastro intestinal disease.

The site currently utilises imported potable water during events. The IWCMP identified that demand for the maximum proposed use of the site could be met via a reuse system incorporating surface water runoff capture and rainwater tanks for permanent structures. A potable water storage tank and treatment facility would be required as part of this proposal.

Ultimately, water reticulation infrastructure is available within Shara Boulevard, Ocean Shores, which is located approximately 3.4km south of the southern site access. A permanent water supply could be achieved via connecting to this infrastructure and extending new reticulation main up Brunswick Valley Way and Tweed Valley Way. Refer to Figure 1 for an indicative location and appendix D for a detailed infrastructure map. On site water reticulation infrastructure would be provided as part of this proposal. However the proposed development is intending to target self-sufficiency as much as possible and therefore does not propose to extend external water supply to the property.

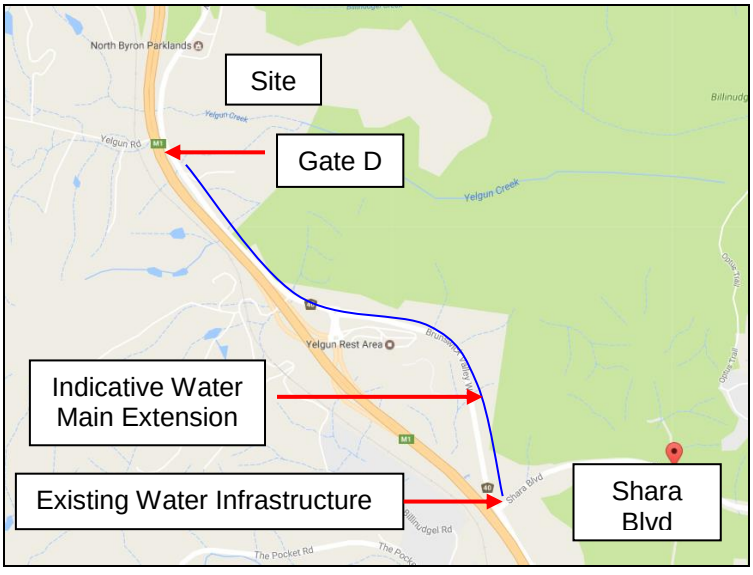



**Figure 4:** Indicative location of existing water reticulation infrastructure (Google Maps, 2017)

## 8. Earthworks

Filling and/or excavation will be involved as part of the following infrastructure upgrades:

- Roadworks

- Proposed roads and parking aisles and remediation works for existing roads and parking aisles will require excavation and the provision of new road base material as required.
- Significant excavation is proposed within the Wooyung Road verge and adjoining property in order to suit the proposed T intersection location and subsequent internal road realignment.
- Filling is proposed adjacent to gate A as part of the service road realignment.
- Filling as required in areas of internal roads in order to achieve the 1 in 100 year flood immunity level.

- Stormwater drainage works
  - Excavation is proposed for new open stormwater drains and modifications to existing open stormwater drains.
- Amphitheatre works
  - Significant excavation is required as part of the proposed terracing of the western face of the amphitheatre.

An acid sulphate soils assessment (dated June 2010) was prepared by EAL Consulting Services in order to investigate the presence of acid sulphate materials (ASM). The report identified the presence of ASM predominately within soils below 3.0m AHD. Excavation works in these areas (particularly within the south east carpark) would therefore likely involve the disturbance of ASM.

All excavation undertaken on site shall be carried out in accordance with a specific Acid Sulphate Management Plan (ASSMP) to be prepared as part of any future construction certificate works. Management measures are to include:

- Impervious bunding
- Application and mixing of lime onto the material spread within the bunding. The actual application rate is to be included in the ASSMP at construction certificate stage.
- Application of lime to trenches where groundwater may be encountered including testing and monitoring of water pH.
- Testing and monitoring to confirm ASM neutralisation and either reuse on site or dispose of off-site.

All earthworks shall be carried out in accordance with The NRDC Manuals and TSC or BSC standards (dependent on where the work is proposed).

## 9. Erosion and Sediment Control

Management of stormwater runoff during construction is necessary to avoid pollution of downstream waterways from sediment and gross pollutant loading. Impacts of inadequate erosion and sediment control downstream from the site include:

- traffic safety problems;
- blocked drains;
- local flooding problems;
- aesthetic pollution of drainage paths; and
- damage to local ecosystems.

Best practice erosion and sediment controls must be installed to minimise the discharge of sediment laden runoff during construction in accordance with the requirements of Landcom's 'Managing Urban Storwmater: Soils and Construction', Volume 1, 4th Edition, March 2004 (the "Blue Book"). Erosion and sediment control

plans shall be developed during detailed design phase and must be continually maintained and amended as required to minimise environmental harm.

Erosion and sediment control plans are based on three sets of control measures:

- drainage control;
- erosion control; and
- sediment control.

These control measures must be maintained in an effective operational condition. Defects in erosion and sediment control devices, such as sediment fences, are to be inspected and documented. Upon inspection, the contractor is to determine whether the device should be replaced or repaired. Documentation is to include how the damage was caused and what measures can be implemented to reduce the possibility of repeat occurrences. Any damage to either permanent or temporary water quality control structures or devices is to be immediately rectified at the contractor's expense.

Drainage paths are to be inspected to ensure the sediment fences are not being bypassed as a result of soil erosion. Sediment laden runoff shall be prevented from exiting the subject site through incorporating controls that include but are not limited to the following subject to preparation of a detailed erosion and sediment control plan as part of any future construction certificate.

- Sediment fencing at downslope of any stockpiles, batters or disturbed ground at perimeters and placed to not cause concentration of water.
- Coir logs, rock checks or similar to create ponding of water in drainage channels to promote capturing of large sediment particles.
- Drainage channels/swales to direct runoff to sediment control devices e.g. sediment basins.
- Sediment basins to receive and control runoff from disturbed areas including dewatering from trenches and excavations.
- Construction entry/exits.
- Surface stabilisation e.g. erosion control matting, soil binders etc

The preparation of an ESCP as part of this application is not considered beneficial given the works that are to be constructed will be staged as part of upgrade works planned over many years. Therefore ESCPs are to be prepared to align with staging of works at the construction certificate stage.

The effectiveness of the erosion and sediment control devices can be monitored by visual audits. All ESC measures are to be inspected:

- at least daily (when work is occurring on site) or weekly (when work is not occurring on site);
- within 24 hours of expected rain; and
- within 18 hours of a rainfall event (i.e. an event of sufficient intensity and duration to mobilise sediment on site).

## 9.1 Maintenance and Monitoring Requirements

Periodic maintenance and monitoring of stormwater devices proposed in this report is crucial to ensure effective operation and design life. All stormwater discharged off site is to comply with the water quality objectives of the Local Authority particularly including pH, turbidity and suspended solids.

Sediment accumulation on ESC devices is to be removed and disposed of to the satisfaction of the Local Authority.

## 10. Communications, Gas and Electricity

There is an existing Telstra fibre optic cable present on site. Additional Telstra infrastructure is available within Tweed Valley Way.

There are no gas services within proximity to the site.

An expansion to the existing electrical supply and distribution system is to be provided to the proposed conference centre. These works include the provision of power poles, electrical cables, and pad mount transformers and are to be confirmed in consultation with an electrical engineer.

## 11. Conclusions

This engineering services report outlines the proposed infrastructure upgrades associated with the application for a permanent development approval at North Byron Parklands.

Infrastructure upgrades associated with the proposed development application can be grouped into the following areas:

- Tweed Valley Way and southern site access works
- Southeast carpark works
- 'Transport hub' works
- Amphitheatre works
- 'Easy Street' works
- Permanent structures and facilities

Additionally, general infrastructure upgrades relating to road and car parking improvements, water and sewer servicing and stormwater drainage are proposed across the site.

Roadworks are proposed both internally and externally in order to ease congestion, provide new parking for patrons and transport vehicles, promote free flowing traffic and improve existing roads in disrepair.

Open stormwater drains and channels are proposed adjacent to all new roads and within new parking areas. Existing stormwater drainage drains and channels are to be maintained or modified as required.

A majority of the northern portion of the site is contained within the Crabbe's Creek floodplain and the south east portion of the site is contained within the Billinudgel and Yelgun Creek floodplains. The proposed spine shall achieve immunity to the 1 in 100 year flood level as defined in the Flood Risk Management Report by Molino Stewart.

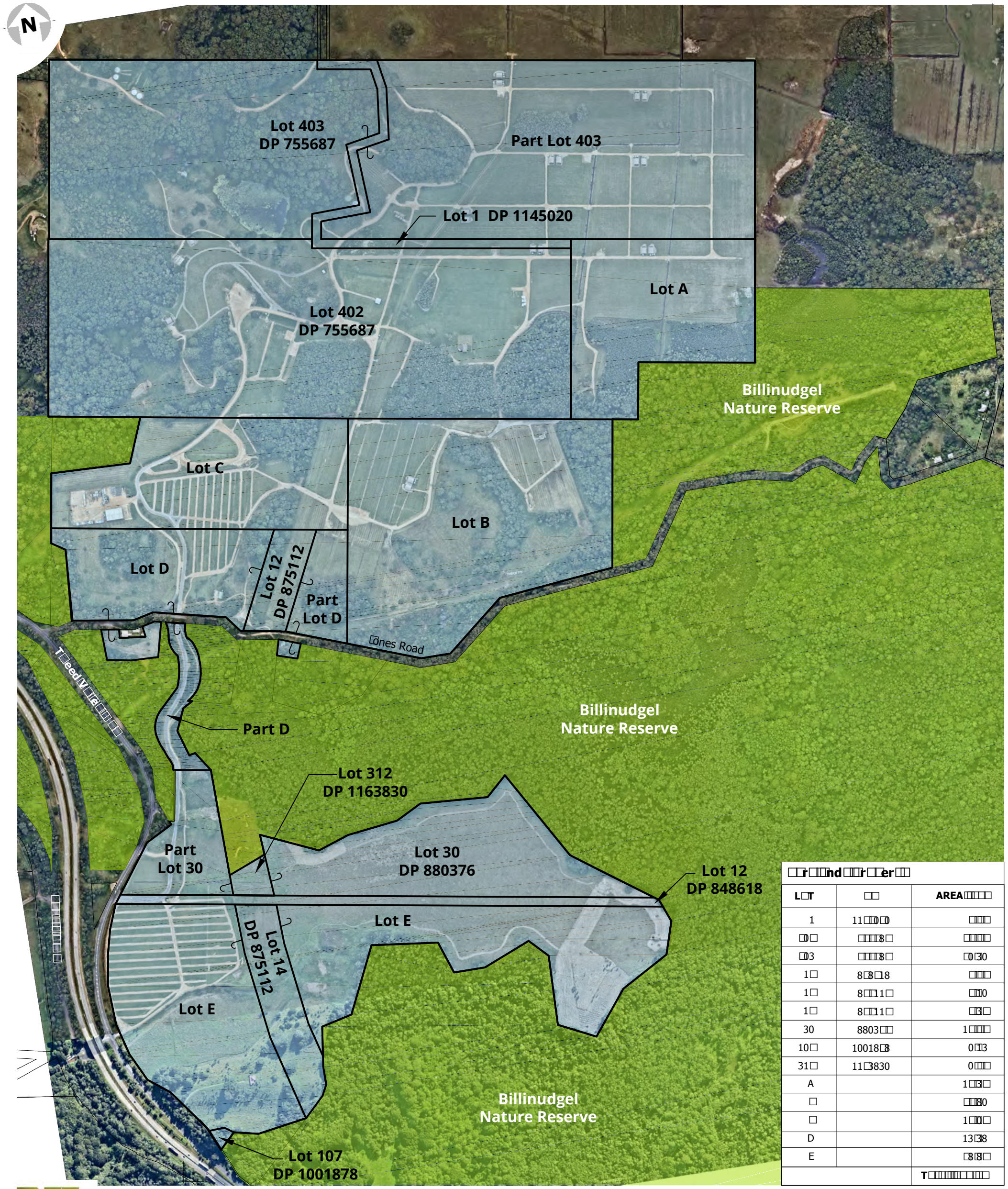
There are no existing water and sewerage reticulation services available to the site. The site is currently conditioned to provide on-site wastewater treatment and transport sewage and trade waste off site during major events. On-site wastewater treatment capabilities are to be expanded by upgrading the existing grey water treatment facility. The site currently imports potable water imported during major events as a means of water supply. New on site water reticulation infrastructure is proposed to collect rainwater runoff from roofs and pump to a new 4.3ML reservoir and then gravity feed to the various uses.

Proposed infrastructure upgrades will involve significant filling and excavation. An acid sulphate soils assessment prepared by EAL Consulting Services determined the presence of acid sulphate materials on site. Any proposed excavation works shall be undertaken in accordance with a detailed ASSMP to be prepared at construction certificate stage to align with the specific stage of upgrade works..

Final details regarding proposed infrastructure upgrades can be addressed during the detailed design stage.

# 12. Appendices

**Appendix A – Existing Site Infrastructure and Site Locality Maps**

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| 1 | 8 11 | 3 |
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| A | | 1 3 |
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**Legend**

Property boundaries

Residue Parklands Site

Extent of proposed expansion of the linud el Nature Reserve

North Byron Parklands

0 160m

1:8000 (@ A3)

Date September 2017

Author SJC

Reference 1287.169

IMPORTANT NOTE |
Cadastral information is subject to survey. The alignment of the aerial photograph and vectorial overlays is approximate only.

**Sources | Aerial Photography:** earmap (July 2017) | **Cadastre:** Ardill Payne (2009) updated 2017 |

Prepared by

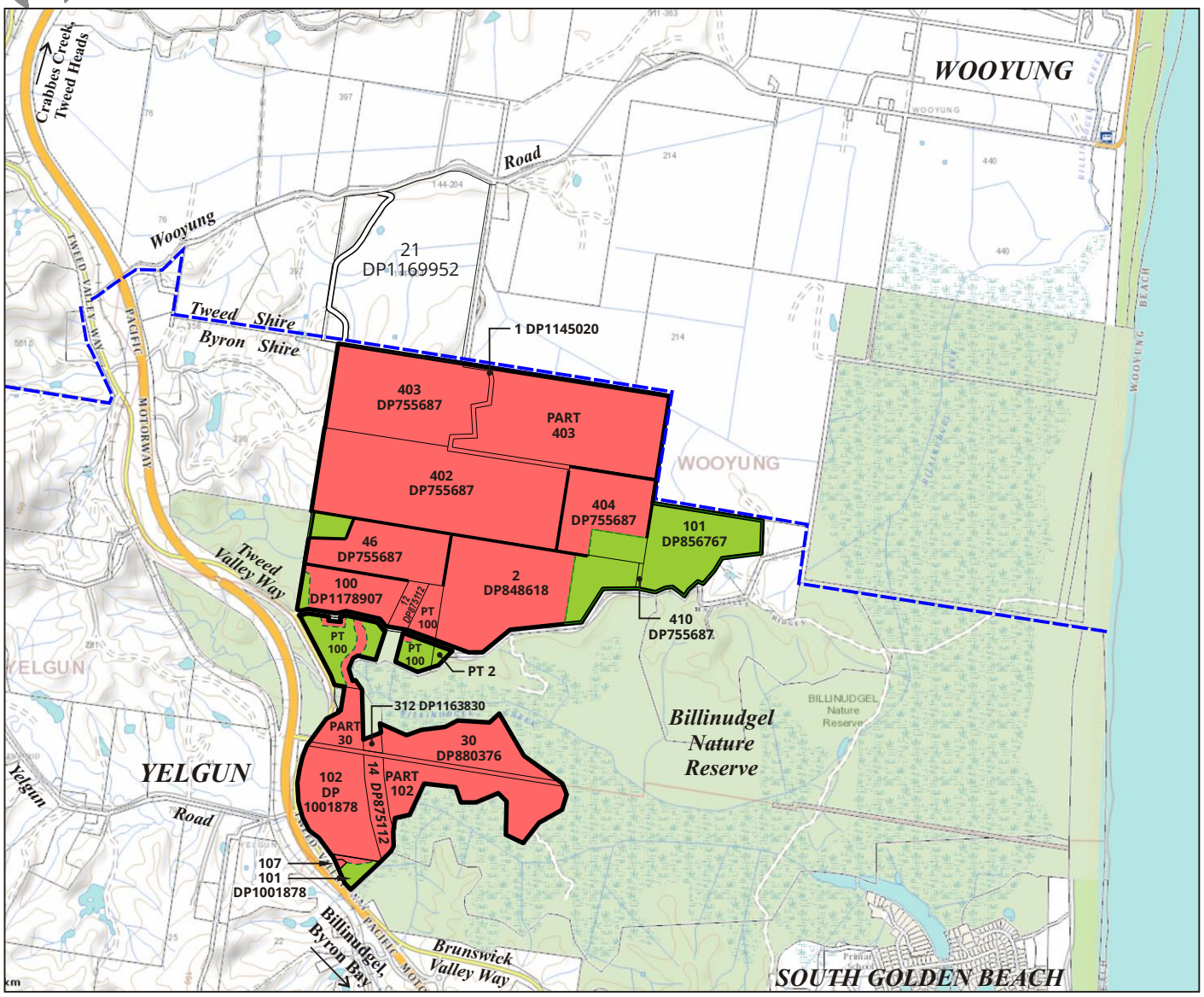
Ori inally esi n team ink

pdated Planners North

Plan |

# SSD Application Area

**North Byron Parklands | Tweed Valley Way & Jones Road**



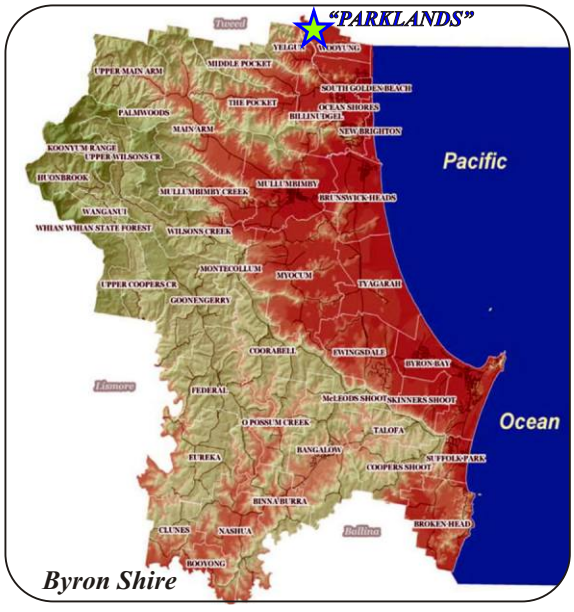

0 1km

1:30 000 @ A4

**Legend**

- The current Site
- Land dedicated to NPWS
- Residual Parklands site
- Shire Boundary

Note: Boundaries shown are the existing cadastral boundaries as at September 2017.




North Byron Parklands

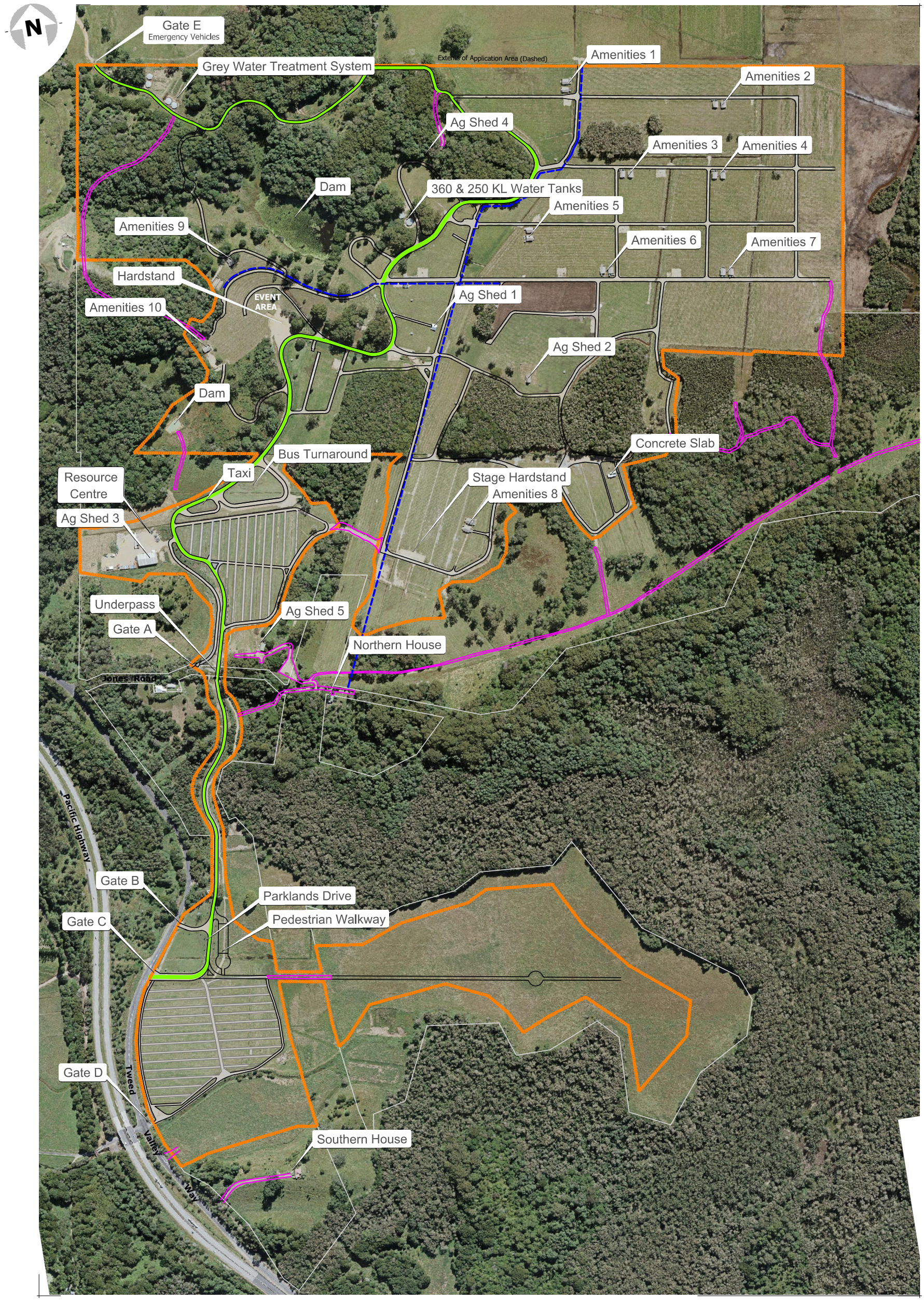
| | |
|---|---|
| Date | Sept. 2017 |
| Author | Planners North |
| Reference | 1287.1694 |

**Prepared by**
Planners North

**Sources** | **Locality Map:** NSW LPI SIX Web Site, viewed July 2017 | Byron Shire Map: Byron Shire Website, viewed July 2017 |

Plan |
# Site Locality Plan

**North Byron Parklands| Tweed Valley Way & Jones Road**




**Legend:**

The Site | Extents of Application Area (Dashed)

Event laneway | Farm access | Parklands Drive | Telstra Optic Fibre Route

North Byron Parklands

0 160m

1:8000 (@ A3)

Date October 2015

Author SJC

Reference 1287-167

IMPORTANT NOTE |
Cadastral information is subject to survey. The alignment of the aerial photograph and vectorial overlays is approximate only. This plan is conceptual only and subject to detailed survey and design.

**Sources | Aerial Photography:** AMM Pty Ltd (Captured April 2015) **| Cadastre:** Ardill Payne (2009) |

Prepared by

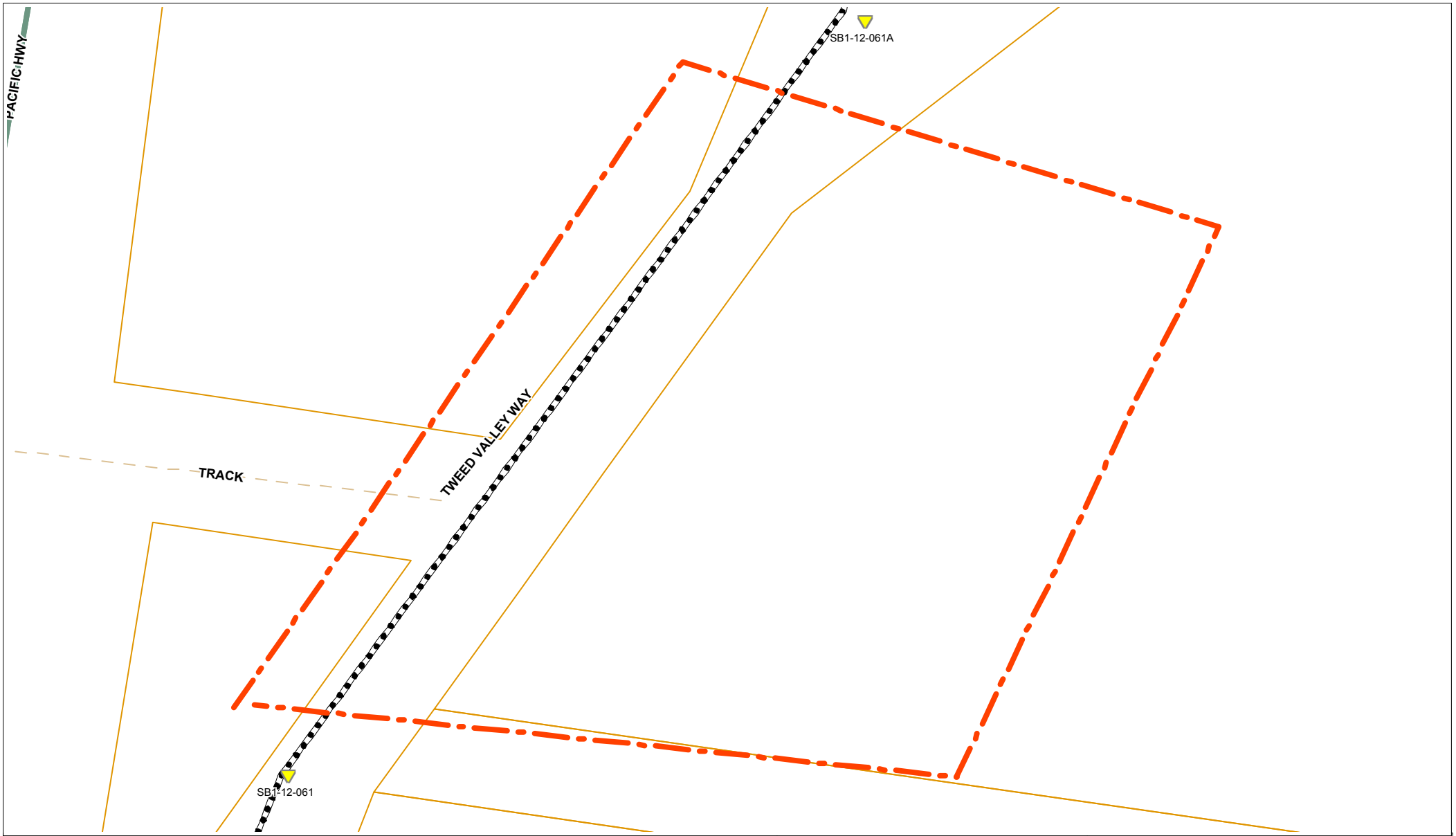
Planners North

Plan |

# Site Infrastructure

**North Byron Parklands | Tweed Valley Way & Jones Road**

# Appendix B – Dial Before You Dig Information




Sequence Number: 58506855

Date: 30/01/2017

*DISCLAIMER: THIS DRAWING SHOULD NOT BE SCALED TO LOCATE CABLES. NO WARRANTY IS GIVEN THAT THE INFORMATION IS ACCURATE OR COMPLETE. IF YOU REQUIRE INFORMATION REGARDING LOCATING THE CABLE PLEASE CALL NEXTGEN. THIS DOCUMENT HAS BEEN PREPARED SOLELY FOR DIAL BEFORE YOU DIG USE. THIS PLAN CONTAINS COMMERCIALLY SENSITIVE INFORMATION AND IS TO BE TREATED ACCORDINGLY. NO SUCH INFORMATION IS TO BE PASSED ONTO OTHER PARTIES WITHOUT WRITTEN CONSENT FROM NEXTGEN PTY LTD.*

nextgen GROUP

## LEGEND

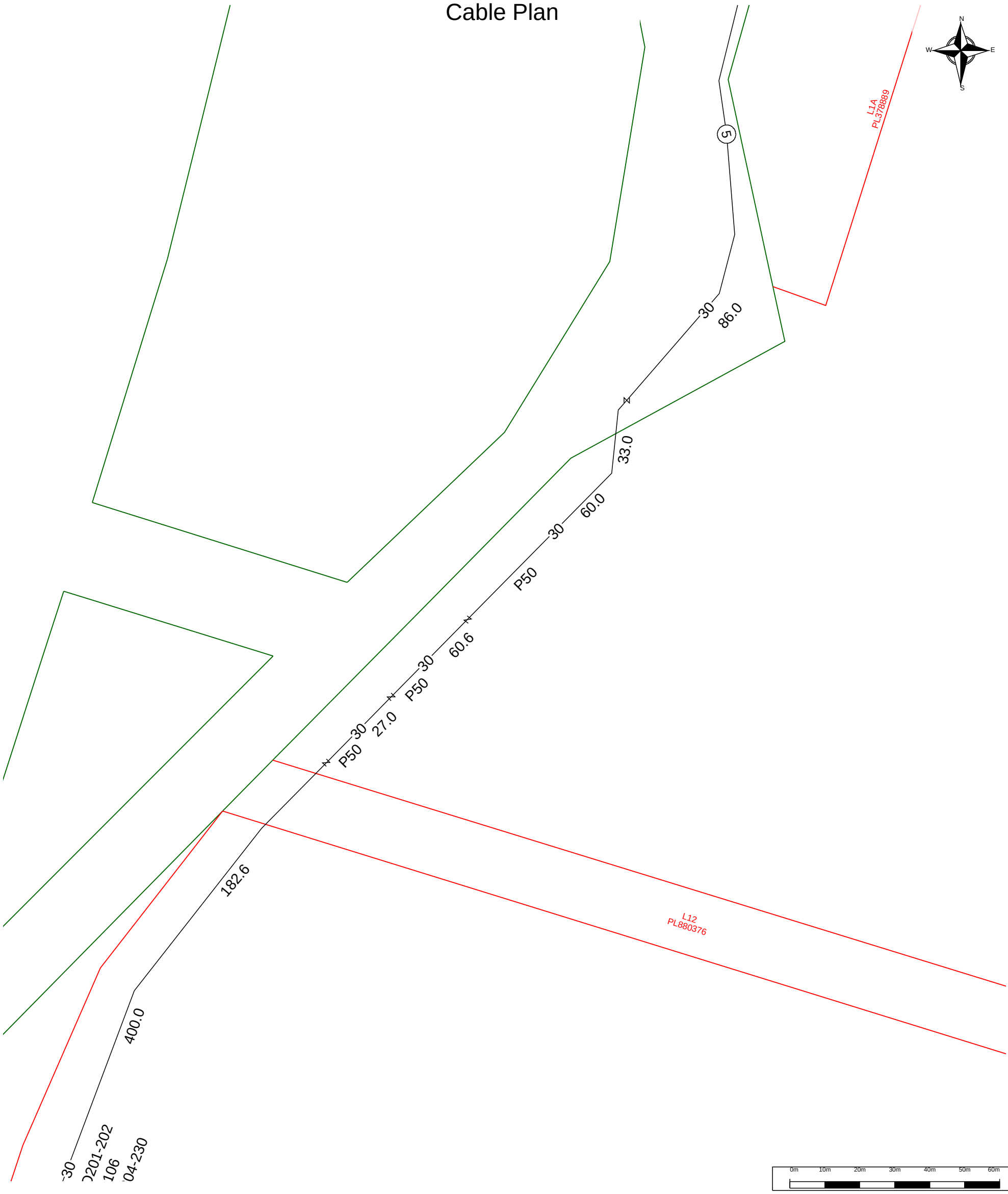
**Digsite**

- Point
- Line
- Area

**Assets**

- Cable
- 3rd Party Duct
- Marker Post

# Cable Plan




Telstra

**For all Telstra DBYD plan enquiries -**
**email - Telstra.Plans@team.telstra.com**
**For urgent onsite contact only - ph 1800 653 935 (bus h**

Sequence Number: 58506857

Please read Duty of Care prior to any excavating

TELSTRA CORPORATION LIMITED A.C.N. 051 775 556

Generated On 30/01/2017 16:17:04

The above plan must be viewed in conjunction with the Mains Cable Plan on the following page

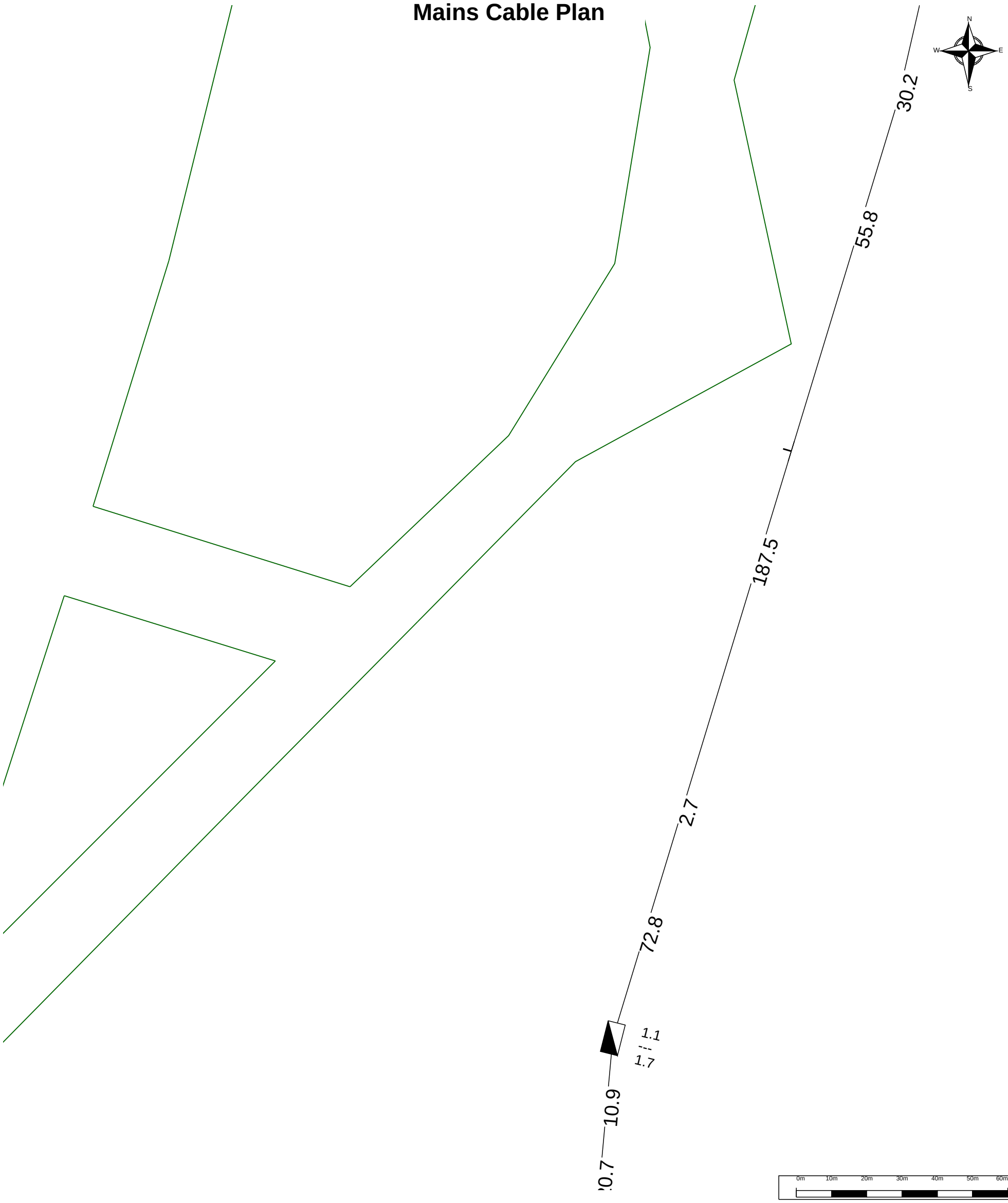
WARNING - Due to the nature of Telstra underground plant and the age of some cables and records, it is impossible to ascertain the precise location of all Telstra plant from Telstra's plans. The accuracy and/or completeness of the information supplied can not be guaranteed as property boundaries, depths and other natural landscape features may change over time, and accordingly the plans are indicative only. Telstra does not warrant or hold out that its plans are accurate and accepts no responsibility for any inaccuracy shown on the plans.

It is your responsibility to locate Telstra's underground plant by careful hand pot-holing prior to any excavation in the vicinity and to exercise due care during that excavation.

Please read and understand the information supplied in the duty of care statement attached with the Telstra plans. TELSTRA WILL SEEK COMPENSATION FOR LOSS CAUSED BY DAMAGE TO ITS PLANT.

Telstra plans and information supplied are valid for 60 days from the date of issue. If this timeframe has elapsed, please reapply for plans.

# Mains Cable Plan

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Generated On 30/01/2017 16:17:05

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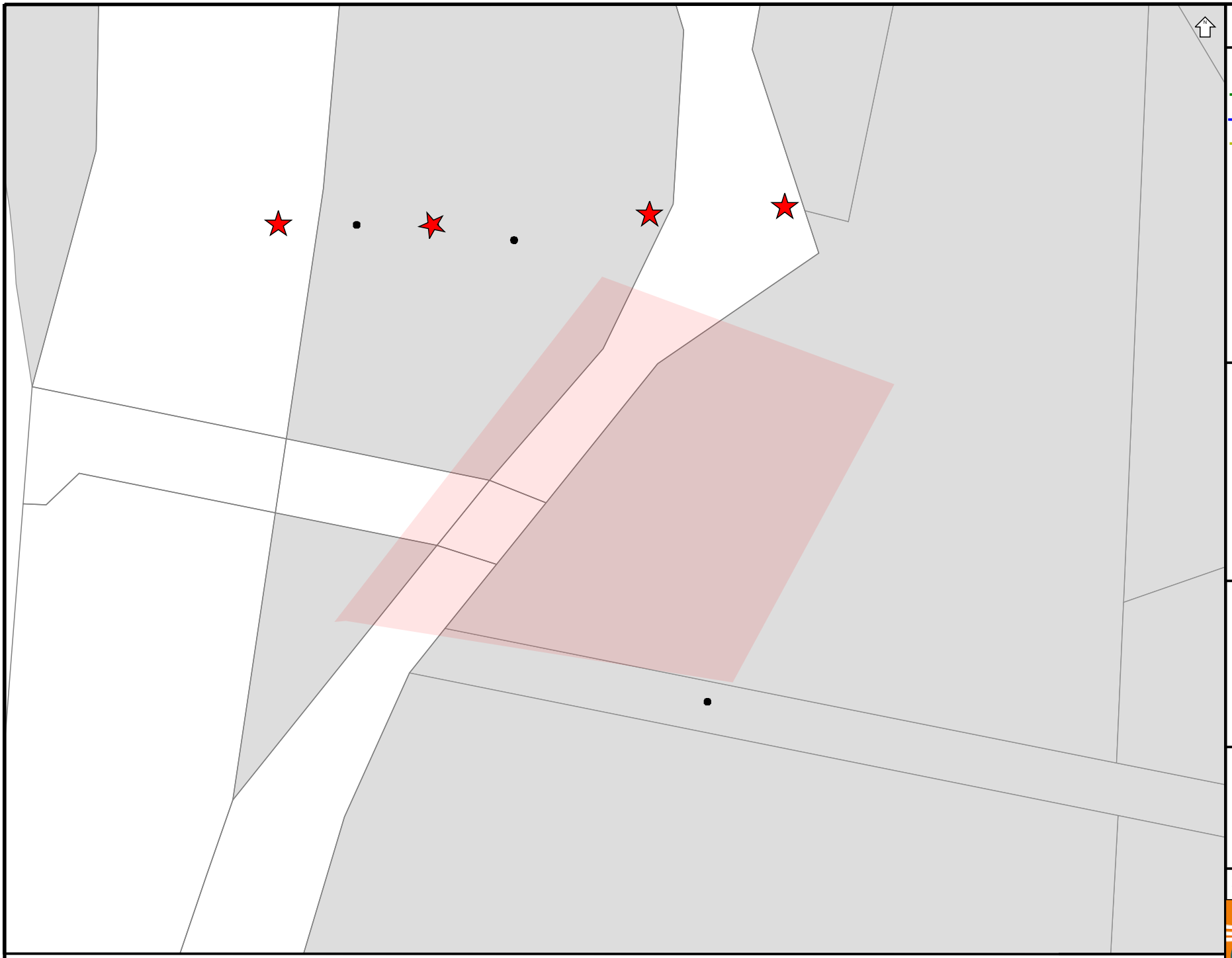

Overhead wires not shown
LOOK UP & LIVE!

## LEGEND

- LV Underground Cable
- HV Underground Cable
- Underground Pipe
- Underground Earth or Wires
- Ground Substation
- Pole
- Cubicle
- Pit
- Area of Interest

**Critical Assets**
Contact Essential Energy on 13 23 91

- Zone Substation
- Underground Cable
- Underground Fibre

**Proposed Works**

- Area of proposed works

Proposed assets are shown as orange symbols

THE INFORMATION ON THIS MAP MAY NOT BE ACCURATE.
If details are incorrect, please notify Essential Energy on 13 23 91
(or fax 1800 354 636)

ISSUE DATE: 30/01/2017

You must resubmit your request if you have not started work within 4 weeks of the 'Issue Date' above

A4 | SCALE: 1:1838

Job Number: 11796637 Sequence number: 58506856 Job location: 126 Tweed Valley Way, South Murwillumbah Map Centre: 153° 30' 54.9", -28° 28' 54.3"

essential energy

# Appendix C – Engineering Drawings

[Refer to EIS - Appendix C]