

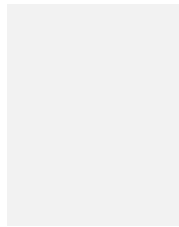
NORTH HEAD SANCTUARY

Utilities Advice Report

02 JUNE 2023



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COX ARCHITECTS NORTH HEAD SANCTUARY

Utilities Advice Report

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REVISIONS

| Revision | Date | Description | Prepared by | Approved by |
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| 01 | 31/03/2023 | Draft Report | AZ | GI |
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1 EXECUTIVE SUMMARY

Arcadis has been engaged by Cox Architects to undertake a due diligence investigation of the existing utilities to inform Harbour Trust in relation to the master planning of the North Head Sanctuary (NHS) site. This report provides summary of the review of existing services alignment, high level demand and capacity analyses and any requirements of extension or upgrade of the utilities.

Table 1 below is provided to summarise the findings of this investigation.

A column “Level of Impact” is provided to highlight the risks and the associated impact that these could have on site developable area and capital expenditure during site development. The level of impact is determined by the following assumptions:

Risks:

- Financial input
- Non-financial material thresholds have also been adopted, defined as any issue investigated in this report that has the potential to have an adverse effect on the development.

Where there is insufficient information to make an assessment in this report, this has also been identified as a material issue.

The risk levels are described as follows:











- Low  – normally build into the cost or program of the project as contingency,
- Medium  – reduce project profit and may cause change in plans and
- High  – potential “showstopper” for the project.
- Opportunities 

Table 1 Summary

| Item | Key Issue | Level of Impact | Mitigation/Issue Management Strategy |
|--------------|--|---|--|
| Water | Sydney Water watermain assets are available and adequate for the site current use. Increase of the water demand may require upgrades of the internal system. | High  | If there is an increase in population proposed, a formal application to Sydney Water will be required to determine development impact on the services. |
| | Condition of site underground pipes unknown. | | Condition assessment of underground pipes recommended. Significant upgrades to pipeline may be required within the site. |
| | Site potable water and hydrant plants aged and deteriorated. | | Replacement/upgrades of the water tanks and pumps are recommended. |
| | . | | |
| Sewer | Sydney Water sewer assets are available and adequate for the site current use and will likely support moderate increase | Medium  | Condition assessment / CCTV of underground pipes recommended. If there is an increase in population proposed: |

| Item | Key Issue | Level of Impact | Mitigation/Issue Management Strategy |
|---------------------------|--|---|--|
| | <p>of site population and sewer flow, subject to Sydney Water confirmation and approval.</p> <p>Increase of the site population may require upgrades of the internal system.</p> <p>Condition of underground pipes unknown.</p> | | <ul style="list-style-type: none"> a formal application to Sydney Water will be required to determine development impact on the services. Further investigation of the existing infrastructure will be required to confirm adequacy and areas for upgrade. |
| Electricity | <p>The site is connected to Ausgrid electrical service. Information gathered from Ausgrid, site electrician and drawings received do not align.</p> <p>There are 3 distribution substations onsite with supply adequate for its current use but increase in power supply may require upgrade of the service.</p> | <p>Medium</p>  | <p>Further investigation / technical review particularly in the North Fort area is recommended to confirm clashing information of existing power assets.</p> <p>Discussion with Ausgrid is recommended to confirm infrastructure replacements and upgrades.</p> |
| Telecommunications | <p>Telstra and NBN services are available in the immediate vicinity of the development site.</p> | <p>Low</p>  | <p>Discussion with Telstra and NBN on impacts to infrastructure due to further site development.</p> |
| Gas | <p>The site is currently serviced by Jemena gas.</p> | <p>Low</p>  | <p>Discussion with Jemena on impacts to infrastructure due to further site development.</p> <p>Assessment of government policy on gas supply required.</p> |
| Stormwater | <p>Future development may impact on stormwater discharges to national park.</p> | <p>Low</p>  | <p>A development layout is required to determine the impact on the service and its modification if required.</p> |

Complete details of existing services infrastructure and predicted amplifications to the site is elaborated in detail further within the report. Individual services plans are provided in **Appendix A**.

Following this initial investigation, an in-depth feasibility study will be required to be undertaken for each service to determine the concept of servicing strategy.

2 PROJECT OVERVIEW

The purpose of this due diligence investigation report is to provide a summary of the key servicing, utility and infrastructure risks and opportunities which have the potential to impact the servicing of the North Head Sanctuary development site.

This initial investigation has been conducted as a site visit and a desktop study with focuses on a Before You Dig Australia (BYDA) enquiry, provided utility diagrams and an opinion of the risks and constraints presented by the existing utility services. *It is not intended to be a comprehensive investigation into the viability of the land for development.*

The objectives of the desktop study are listed below:

The findings of a Before You Dig Australia (BYDA) search are presented, in order to identify existing utility service assets – for **potable water, sewer, electricity, gas and telecommunications**– within and around the proposed development site. This report also specifies the relevant owner and authority for each utility and provides preliminary advice on the feasibility of connecting to existing utilities to service the site.

Review **proposed development options** and identify potential impact on the existing utilities.

Recommendations are presented for further investigation and action, should investigations into this particular site continue.

This report has been prepared based on the following sources:

- BYDA enquiry, lodged on 02/03/2023;
- Site Plans for all services [*NH.NS.Services.Site Plan.20210511*], dated 11/05/2021 Rev A
- Water Supply Options Report by Epicentre dated 13/10/2021 Rev B
- NHS Draft Concept from May 2021
- NHS Master Planning, by Cox 2022
- SIX Maps online data from NSW Land and Property Information (LPI)
- Google Maps
- Northern Beaches Council GIS mapping

Arcadis has relied on the above source data to inform this report and is not responsible for any inaccuracy in the source data and information studied and used for developing this report.

3 SITE DESCRIPTION

The land to which this report applies (herein referred to as ‘the development site’) is shown in below in **Figure 1**. Arcadis has undertaken research using information currently available within the public domain to prepare this report.

The site is bounded by National Parks and Wildlife Services (NPWS) roads (North Head Scenic Drive and Bluefish Road, Manly) and NPWS land.

Within the site there are several landmarks including The Barracks Precinct and is adjacent to the Wastewater treatment facility, Quarantine Station and Australian Institute of Police Management.

The site area is approximately 73.75 ha and is currently occupied with 8 residential dwellings. Lot 2764 DP752038 are currently in private ownership.

Key site data is summarised in **Table 2**.

Table 2 Key Data for North Head Sanctuary

| NHS Development Site | |
|----------------------------|---|
| LGA | Northern Beaches Local Government Area |
| Street Address | North Head Scenic Dr Manly NSW 2095 |
| Lot number and DP | Lot 2764 DP752038 |
| Current land zoning | SP1 – Management Plan North Head School of Artillery C2 – Environmental Management |

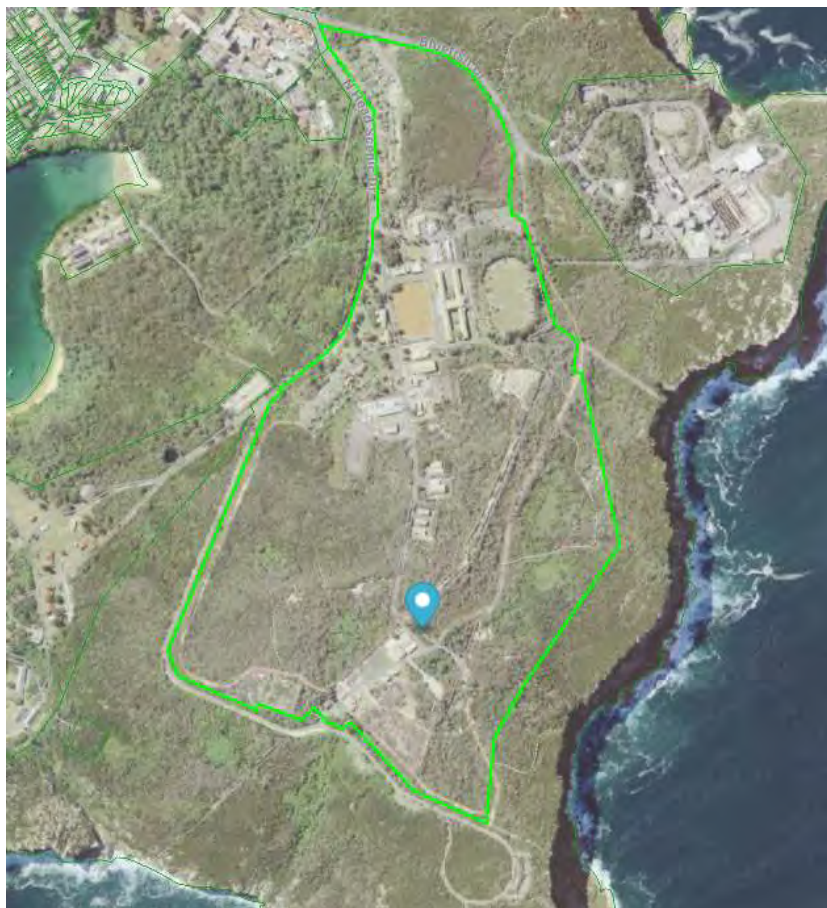


Figure 1: Site Location (Six Maps)

4 EXISTING UTILITIES AND SERVICES

Arcadis has investigated the in-ground utilities and services located in the vicinity of the development site. As part of these investigations Arcadis has completed a Before You Dig Australia (BYDA) and Site Plans review. The following sections summarise the findings of these investigations. The responses to our BYDA enquiry have been included in **Appendix A**.

Site Plans dated 11/05/2021 Rev A shows the existing hydraulic, fire, sewer, electrical, gas, communications and stormwater services within the site and have been used to inform this report.

Future services connections to the site will depend on extent and type of development, yield, and service requirements.

4.1 Potable Water

Sydney Water assets run along the northern boundary of the site. Internal system comprises of potable water reticulation and fire hydrant systems. The description of water systems is provided below.

Sydney Water Assets (external)

Based on the results of the BYDA the following Sydney Water owned watermain assets are located in the vicinity of the development site as shown in Figure 2:

- Ø100mm cast iron cement lined (CICL) main located in north end of Bluefish Road. The Hydraulic Plan indicates 80mm CICL connection to the development site from this water main with the water meter located at the entry to Artillery Drive.
- 2 x Ø 200mm CICL/DICL mains in north end of Bluefish Road leading to a Sydney Water water reservoir within the Sydney Water wastewater treatment plant located north-east from the development site (dark blue lines).
- Ø150mm oPVC / DICL mains located in north end of Scenic Drive.
- Ø150mm CICL main from Darley Road that crosses Manly Hospital.



Figure 2: Sydney Water-owned watermain assets

Domestic Water Supply

Based on the Sydney Water pressure and flow conditions provided in *Water Supply Options Report* by Epicentre dated 13/10/2021 Rev B, the pressure and flow are considered to be insufficient; therefore, the tanks and pumps are provided to service the site.

As per the *Hydraulic Site Plan* marked up in **Error! Reference source not found.** below, there is a combined Ø110mm HDPE connection for potable water and hydrant system (dark blue), which runs from the water meter at Artillery Drive through the pump station (near the existing residential houses), along Gunner Road and up to the potable water tower and the fire hydrant tank.

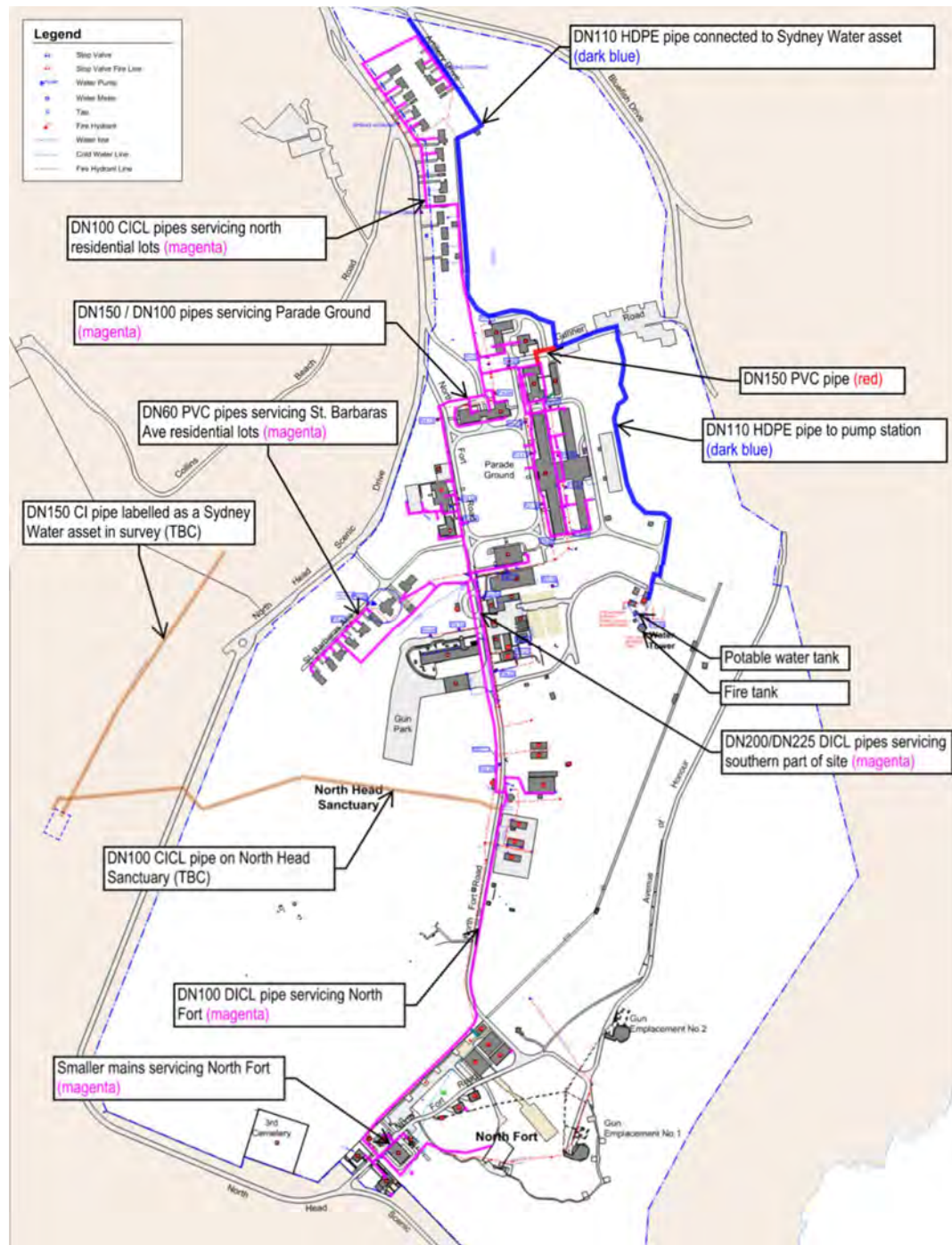


Figure 3: Domestic Water Supply as per NHS Draft Concept from May 2021

Then, potable water system is distributed (assumed by gravity) to service the buildings (magenta).

Summary of Spare Capacity and Upgrade Potential

Sydney Water capacity:

The current connection to the Sydney Water watermain is sufficient for the site's current condition.

If demand is increased, it is likely the current connection can support moderate growth, subject to Sydney Water requirements. A Feasibility Application or Section 73 application can confirm any modification to Sydney Water asset if the demand is to be increased.

Internal capacity:

The following items, identified on the Hydraulic Plan, are unclear and recommended to be confirmed:

- A Ø100mm CICL potable water main running from North Fort Road to the west and is connected to a Ø150mm CI, labelled as Sydney Water main, however not identified on BYDA drawings. This main may be serviced by the Ø150mm CICL main from Darley Road and Manly Hospital as shown in Figure 2 (to be confirmed).
- Interconnection from the combined potable water/fire line to potable water distribution system noted in Gunner Road (red) is to be confirmed. The separation of the combined and distribution system should be maintained in accordance with current Australian Standards.
- Location and size of potable water main from the potable water tank to the distribution system (magenta) is to be confirmed.

Sizes of the private mains appear to be suitable based on its current capacity, noting there are some buildings (e.g. Barracks) not being utilized since the 1980's. Anecdotal evidence from Harbour Trust suggests the site could previously reach 500-1000 of residents. However, it should be noted that reuse of existing buildings and upgrading them to the current standards will likely cause increase in the water demands. Generally, it is assumed that the potable water system will likely support a moderate increase (from existing) in future water demand, subject to further detailed investigation.

It was also noted by Harbour Trust that the pressure in the potable water system drops during bushfire events, further investigation including review of any interconnections to fire system is recommended.

As the existing condition of underground pipework is unknown, there are major risks of leaking or pipe failure if there is an increase in pressure to the system as noted in the *Water Supply Options Report*. Assessment of the existing in-ground watermains through spot checks / test holes is recommended to confirm the existing condition of the pipes and upgrades/replacements as required. Any galvanized iron (GI) pipes within potable water system is to be replaced in accordance with AS3500.

Based on the *Water Supply Options Report* options to upgrade/modify the water tank and pumps are recommended.

Fire Hydrant Supply

The fire system is shown on Figure 4. The size and material of mains has not been fully identified in the *Fire Services Site Plan*, but Ø75mm asbestos pipes have been noted in several areas.

Summary of Spare Capacity and Upgrade Potential

A condition assessment of the existing in-ground firefighting watermains is required to confirm the existing condition of the pipes. Like the domestic water system, there are major risks of leaking or pipe failure if there is an increase in pressure to the system as per recommendations from the *Water Supply Options Report*, and upgrades to the existing mains may be required if they are assessed to be in poor condition.

Asbestos pipes and any Ø75mm main are recommended to be upgraded to meet current standards. The proposed system is proposed to be investigated to comply with the current BCA and operation requirements must meet the current codes.

Water Supply Options Report recommends to update the system and satisfy the current standards by modifying and upgrading the current tank, fire booster and pumps arrangement.

North Head Sanctuary

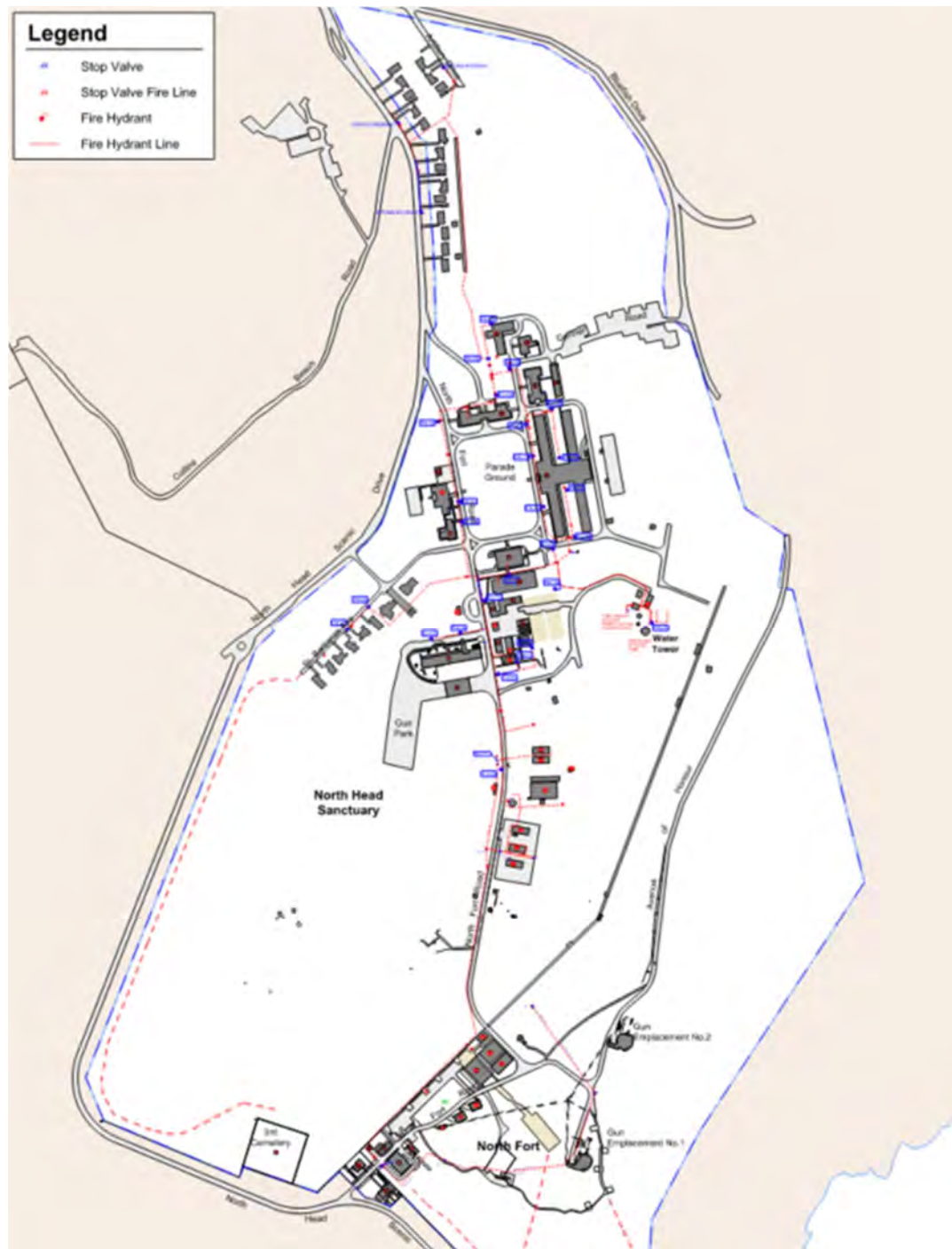


Figure 4: Fire Supply as per NHS Draft Concept from May 2021

4.2 Sewer

Sydney Water assets run along the northern part of western boundary and traverse the site. An internal private sewer includes gravity and pressure systems servicing the site. The description of assets is provided below.

Sydney Water Assets (external)

Based on the results of the BYDA the following Sydney Water-owned sewer assets are in and within the vicinity of the development site as shown in Figure 5:

- Ø225mm VC sewer pipe which the site is connected to.
- The following assets are traversing north of the site.
 - Ø3600mm unlined borehole access tunnel crossing Bluefish Road terminating at the wastewater treatment plant.
 - 6570mm x 6570mm unlined rock sewer terminating at the wastewater treatment plant.
 - 4191mm x 2667mm sandstone concrete oviform
 - Ø4400mm RC pipe (gravity outfall) connected to the oviform.
- The North Head Quarantine Station southwest of the site utilises a Ø150mm private sewer main connected to 600mm x 900mm concrete sewer.

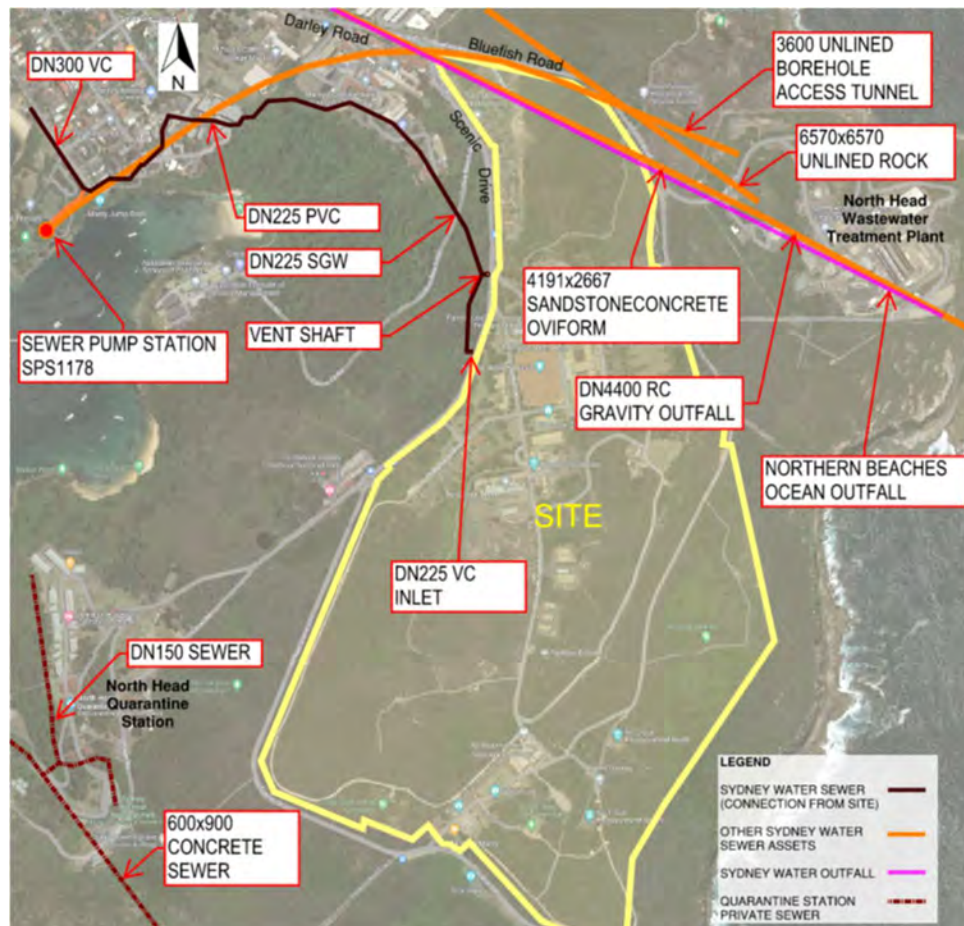


Figure 5: Sydney Water-owned sewer assets

Internal Sewer

Based on the sewer service diagrams acquired from Sydney Water (refer to Appendix C), it is assumed that the site has three connections to Sydney Water's Ø225mm sewer. The location of these connections is demonstrated in Figure 6 below.

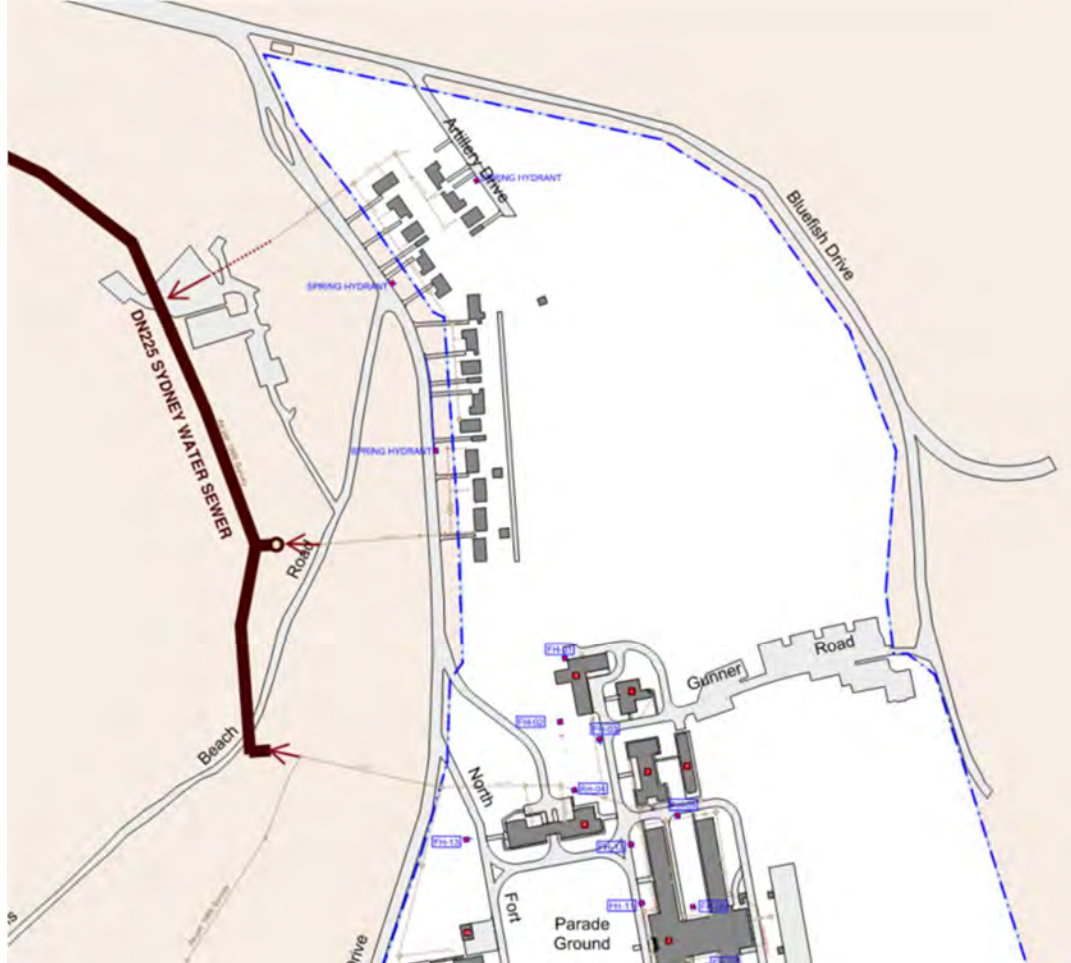


Figure 5: Assumption of private sewer discharging to Sydney Water-owned sewer at three points

The *Sewer Site Plan* provided shows the existing buildings connected to private sewer pits and sewer mains.

The North Fort Precinct (south) utilises a pressure sewer system with Ø75mm pipes while the Artillery Barracks and the rest of the Precinct uses gravity mains with sizes ranging from Ø100mm / Ø150mm / Ø225mm.

Size of some gravity sewer pipes have not been identified and some are shown as Ø32mm, which is unusually small.

Summary of Spare Capacity and Upgrade Potential

Sydney Water capacity:

Should any existing buildings change their use resulting in additional sewer discharge, the system may tap into the existing Ø225mm main. As the average grade of the existing Ø225mm sewer is 0.80%, our assumption is this asset may accommodate 2,650 EP based on the Sewerage Code of Australia WSA 02-2002-2.2 Table 4.4 Maximum equivalent population (EP) for Reticulation Sewers. Liaison with Sydney Water is recommended to confirm this information.

If an upgrade to the existing Ø225mm pipe is required to accommodate a larger proposed equivalent population (EP), a Feasibility or Section 73 Application must be lodged with Sydney Water to confirm viable servicing options.

Internal capacity:

Further investigation is required for the pressure sewer system / pump-out of the North Fort Precinct prior to comment on its capacity as the details are still unknown. The pump-out system may be retrofitted if required.

The rest of the private sewer system is drained via gravity with typical Ø100mm / Ø150mm pipes. It is likely the current pipe sizes can accommodate moderate increase in demand subject to further investigation. A Feasibility Application or Section 73 application can confirm any modification to Sydney Water asset if the demand is to be increased.

The Ø32mm pipes noted on the survey must be confirmed together with all the other pipes wherein their sizes have not been identified.

As the *Sewer Site Plans* are based on a 1965 survey, a sewer condition assessment (CCTV inspection) is recommended to confirm condition of all private sewer mains and if they are up to current WSA and Sydney Water standards.

4.3 Electrical

Ausgrid owns existing electrical infrastructure in the vicinity of the site as shown in Figure 6 with overhead cables and services.

The site is currently supplied by HV feeders and substations connected at the North Head Zone substation. There are no transmissions in the area. There is one HV distributor crossing the site between Artillery Drive and Scenic Drive.

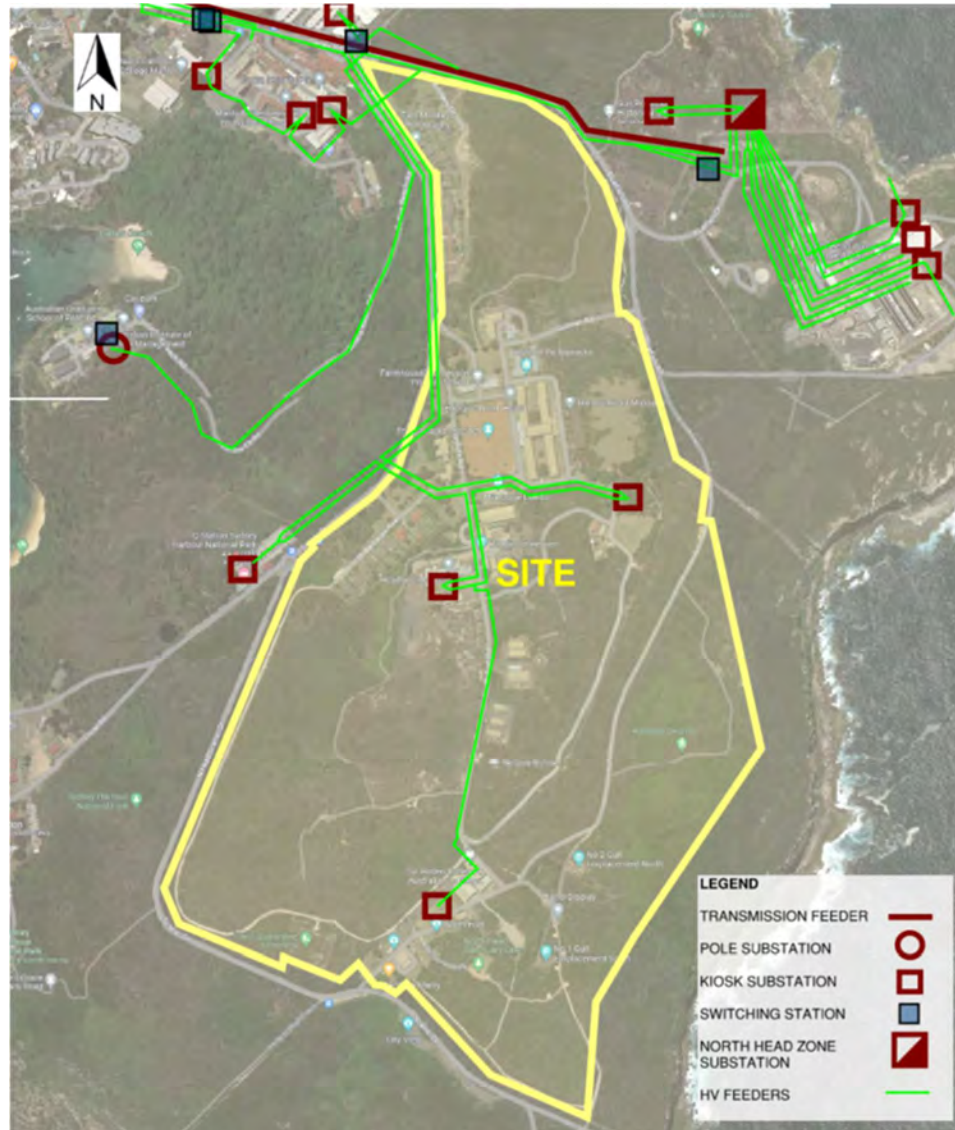


Figure 6: Ausgrid services layout

The site has 3 substations and one Ausgrid street supply from nearby substation S015071 Darley North Head.

S015071 Darley North Head Distributor 2 is an Ausgrid LV street distributor, supplying the Comms Antenna near the main gate, dwellings in Scenic Drive and Artillery Drive. There is an additional supply at the end of Artillery Drive.

North Head Sanctuary

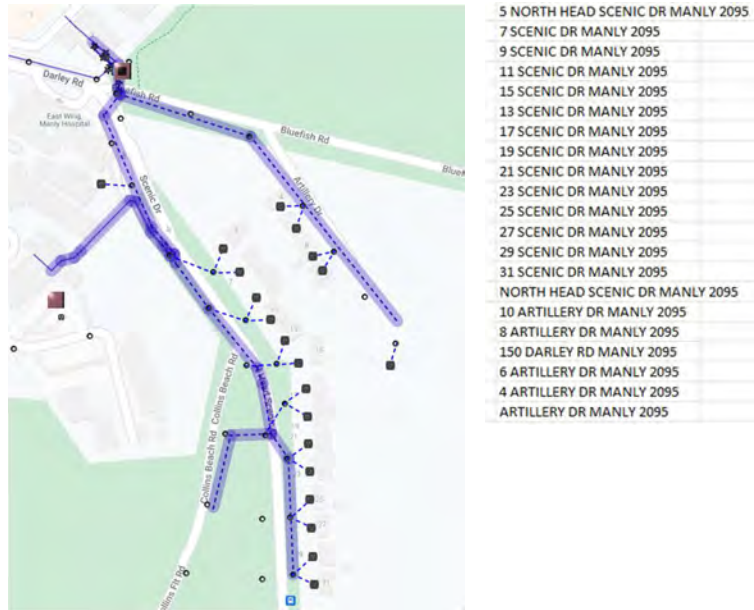


Figure 7: Darley North Head Distributor and the properties supplied

The supply to the northern part of the site is from S17016 The Barracks. This is an 800kVA L Type kiosk with a fused distributor set to 800A. There are two spare 400A Panels.

The 800A panel with an 800A fuse with an LV cable to Main Switchboard No. 1 NH (located Building 9 behind Bld 1) which is rated at 630AMP. The SPD on this board is set at 630A. Ausgrid lists the Maximum Demand has this load at less than 400A. The site Electrician provided Maximum demand recorded in June 2021 (note no use of Bld 5 at time of recording) was measured at 111AMPs per phase at 10min intervals.

Bld 5 in operation would add additional 30AMPs per phase; and additional to this load an Event Switchboard after recording and has a capacity of 300AMPs per phase that is used currently once a year however will still need to be allowed for in your design.

The supply to the central part of the site is from S17018 Harbour Trust. This is an 600kVA L Type kiosk with a 800A panel with a 630A Fuse. There are two spare 400A Panels.

The 800A panel with a 630A fuse has a LV cable to Main Switchboard No. 2 NH (located at r.h.s. of Building 61) rated at 630AMP. The SPD on this board is set at 630A. Ausgrid lists the Maximum Demand has this load at less than 200A.

The electrician notes that the load has not been recorded however an estimate of load would be as follows:

Bld 16 – currently operating at full scale commercial kitchen and is limited to 100AMP supply that they are using to the capacity.

Bld 17 – Gymnasium has a 200A supply as previously used for large film crews and when used is at full demand.

Bld 49 – currently used as infant school has a demand of approx. 50AMPs

Bld 44 & 46 – have just been leased – the maximum demand for each of these buildings approx. 40AMPs per phase with air conditioning.

Bld 18, 19 – would have a demand of approx. 30AMPs per phase

This switchboard supplies the St Barbara's Avenue houses and would have a demand of approx. 80-100AMPs per phase

The remainder of the buildings are either vacant or use only lights and power.

The supply to the southern part of the site is from S17137 North Fort. This is a 400kVA J Type kiosk with a 400A fused distributor panel with a 200A fuse. There are two spare 400A Panels. Ausgrid lists the Maximum Demand has this load at less than 200A. The Main Switchboard is situated near the substation and has the SPD is set at 337A. The electrician identifies the demand as 15AMPs per phase as currently two of the three buildings are vacant. Supply was installed for large film event circa 2020.

The site services plan shows a cable running south from this board to a Distribution Board identified by the electrician as Main Switchboard No. 1 NF (supplies all buildings except Bld 238, 239 & 225) rated at 100AMP. The SPD on this board is set at 100A. The existing 100AMP supply is at capacity due to café load of 63 AMPs per phase. (Has been recently power locked).

Summary of Spare Capacity and Upgrade Potential

Information provided below is based on the Ausgrid Preliminary Enquiry Response Letter dated 17/03/2023 in **Appendix D**.

S015071 Darley North Head Distributor 2 – Likely to have some additional capacity.

S17016 The Barracks

- Supply limited to 630A by MSB & SPD (Service Protection Device) for the existing arrangements. Current demand is less than 400A
- Spare Capacity likely to be 250A plus – to be confirmed by electrician & load diversity
- Current substation transformer is 800kVA with 800/400/400 panel and service is connected to the 800A panel with 800A fuse
- Substation Transformer may be upgraded to 1000kVA, LV switchgear may be upgraded to 1600A/400A/400A panel with 1600A panel fused at 1600A with a supply of 1,400A (nonfirm) rated. This upgrade would require a MSB upgrade.
- If load more than this is required, an additional kiosk or chamber substation could be considered.
- Total Power Available now is 630A. (includes the 250A spare capacity)
- Power Available with MSB Upgrade is 800A
- Power available with Substation upgrade is 1400A

S17018 Harbour Trust

- Supply limited to 630A by MSB & SPD (Service Protection Device) for the existing arrangements. Current demand is less than 200A
- Spare Capacity likely to be 430A plus – to be confirmed by electrician & load diversity. There is PV connected to this distributor.
- Current substation transformer is 600kVA with 800/400/400 panel and service is connected to the 800A panel with 630A fuse
- Substation Transformer may be upgraded to 1000kVA, LV switchgear may be upgraded to 1600A/400A/400A panel with 1600A panel fused at 1600A with a supply of 1,400A (nonfirm) rated. This upgrade would require a MSB upgrade.
- Total Power Available now is 630A. (includes the 430A spare capacity)
- Power Available with MSB Upgrade is 630A
- Power Available with MSB Upgrade & Ausgrid Fuse increased 800A
- Power available with Substation upgrade is 1400A

S17137 North Fort

- Supply limited to 200A by LV fuse in substation with MSB (400A) & SPD (337A) for the existing arrangements. Current demand is less than 200A
- Spare Capacity limited to 100A minus the building load for buildings 238, 239 & 225.
- South Distribution Board – other buildings Supply limited to 100A by MSB & SPD (Service Protection Device)
- Current substation transformer is 400kVA with 400/400/400 panel and service is connected to the 400A panel with 200A fuse

- Substation Transformer is at maximum of a J Type (cannot be upgraded). Consider replacing with an L Type if more power is required.
- For MSB (north) some spare capacity due to the buildings. Could get up to 300A if fuse in substation is changed. Assuming 100A load to DB in south.
- For MSB/DB (South) – At capacity. 100A. If more load is required say for the café then require new upgraded MSB and SPD and fuse in substation. As the 400A fuse appears to be shared (as Ausgrid lists only one supply cable) the sharing between sites must be considered.
- It may be possible to request connection to a second 400A panel. To do this Ausgrid must give permission and it will be necessary to show how the supplies are separated due to a physical distance. The substation has a nonfirm rating of 638A.
- Total Power Available now is 200A. (100A spare capacity)
- Power Available with MSB Upgrade & Ausgrid Fuse increased 400A

Substation can't be upgraded. MSB upgrades include ensuring that the service mains from the substation are the correct size and that cables and equipment downstream of the substation are fit for purpose.

Arcadis recommends that a formal application for connection is submitted to Ausgrid for increased supply once the extent of the development is known. Ausgrid will provide advice on making the connection according to the specified load.

The above advice relies on the information provided by Ausgrid and the electrician. As some of it differs this being based on the site services electrical plan, further investigation is required. This advice assumes that the assets are in good condition and do not require replacement. Depending on the age and condition of the MSBs an assessment of fit for purpose should be carried out as part of the design process and upgrades to current standards considered.

4.4 Gas

A BYDA inquiry identified the following Jemena gas services in proximity to the site and is presented in Figure 8:

- Ø110mm nylon (NY) 210 kPa gas main along Darley Road.
- Ø32mm nylon (NY) 210 kPa gas main connected to the Ø110mm main from Scenic Drive and ends on the kerb (Scenic Drive) west of the site.



Figure 8: Jemena services layout

As per the *Gas Site Plan*, the private gas lines (pipe sizes and materials not fully identified) servicing the site connects to the Jemena main on Darley Road and travels along Scenic Drive. There are gas pits located within / near Buildings 1, 2, 3, 6 (opposite side of North Fort Road), 16 (opposite side of North Fort Road), 18, 44 & 46 in the Artillery Barracks Precinct.

There is no indicated gas line in the North Fort Precinct.

Government-owned projects in general no longer favour gas networks to reduce high emissions through the NSW Net Zero Plan, but if the existing system is to be reused or upgraded, a condition assessment of the existing pipework must be undertaken to confirm if mains are suitable. Additional connections will depend on extent and type of the development, yield and service requirements. Arcadis recommends that a formal application for connection is to be submitted to Jemena to confirm the viability of new connections.

4.5 Telecommunications

A BYDA enquiry indicates that Telstra, Optus and NBN Co. own existing underground telecommunication assets within the vicinity, with Telstra and NBN services available directly within the site as presented in Figure 10.

Existing NBN coverage is shown in Figure 9. The area shown in magenta represents the area with existing NBN infrastructure. The area shown in brown colour represents the area where NBN has started to upgrade/install their infrastructure. Finally, the area shown in white does not have existing or planned NBN infrastructure.

Further details regarding the existing broadband technologies available for the precinct are as follows:

- 1) Existing Rental Houses (North Head Scenic Drive - north)
 - a. Currently connected to the NBN via Fibre to the Curb (FTTC)
 - i. Maximum broadband access speed limited to 100Mbps (but typically limited to 50Mbps depending on the quality of the existing copper network)
 - b. Can be upgraded to Fibre to the Premises (FTTP)
 - i. Maximum broadband access speed can be increased to up to 1000Mbps
 - ii. No infrastructure costs for residents to upgrade to FTTP (subject to lock in contracts with service providers)
- 2) Gatehouse (and surrounding buildings)
 - a. Currently not connected to the NBN network
 - b. Access to broadband internet is via Telstra ADSL
 - i. Maximum broadband access speed limited to 8Mbps (depending on the area and the quality of the existing copper, the average speed will be 1.5Mbps)
 - c. There is no NBN infrastructure connecting the building to the NBN.
 - d. New pit and pipe network need to be implemented and connected to the existing NBN network running across North Head Scenic Drive.
 - e. Telstra MDF is located in this building. Connectivity to all surrounding buildings is likely to originate from this MDF.
 - f. The following buildings are connected to the same Telstra Network and subject to the same limitations (and likely to be connected from the MDF at Building 6):
 - i. Building 1 (Barracks), Buildings 2,3,4,5,43,44,46,16,17,18,19,20,21,40,41,42,48,49,61
- 3) Existing Rental Houses (St. Barbaras Av)
 - a. Currently not connected to the NBN network
 - b. Access to broadband internet is via Telstra ADSL
 - i. Maximum broadband access speed limited to 8Mbps (depending on the area and the quality of the existing copper, the average speed will be 1.5Mbps)
 - c. There is no NBN infrastructure connecting the building to the NBN.
 - d. New pit and pipe network need to be implemented and connected to the existing NBN network running across North Head Scenic Drive.

North Head Sanctuary

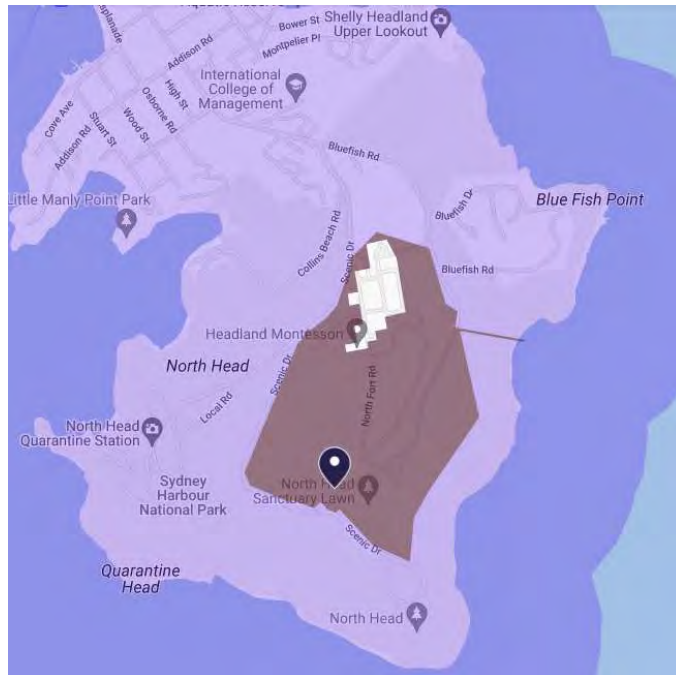


Figure 9: NBN coverage services layout

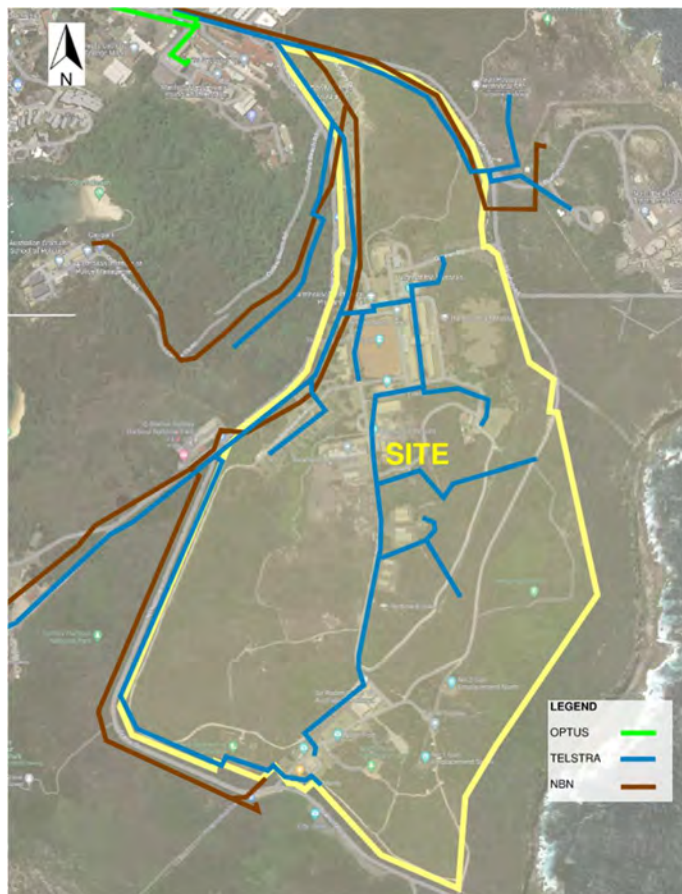


Figure 10: Telecommunication services layout

4.6 Other Assets (Stormwater)

Information of the existing stormwater infrastructure within the site has been obtained from the topographical survey (NH.SA.00-Survey-All-20140312.v2019) and the services masterplan documents (NH.00-Services-Masterplan-Draft-20210510). As noted previously a request has also been sent to NPWS for additional information.

The site has a crest located southeast of the North Head Army Barracks as shown in the figure below in the blue polygon. This crest drains in all directions towards the ocean through NPWS land. There are several flat areas which have been developed which include the North Head Army Barracks and North Head Wastewater Treatment Plant which will likely have some drainage infrastructure.

The existing drainage infrastructure includes a system of kerb inlet pits which collect road runoff, a grated pits, pipes and open drains which collect surface runoff, water quality treatment devices (Humeceptor), storage tanks, detention basins and irrigation delivery lines. Further investigation and information is required to assess the current drainage infrastructure.

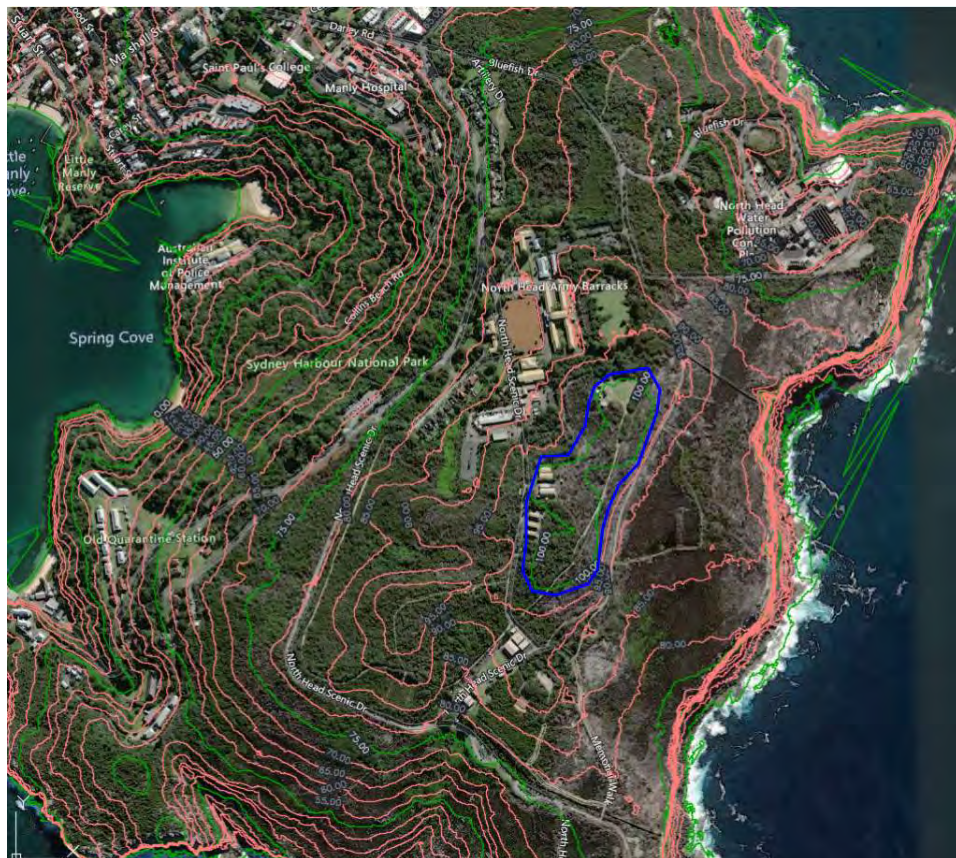


Figure 11: Contour LiDAR Map – data Google Maps and NSW Government

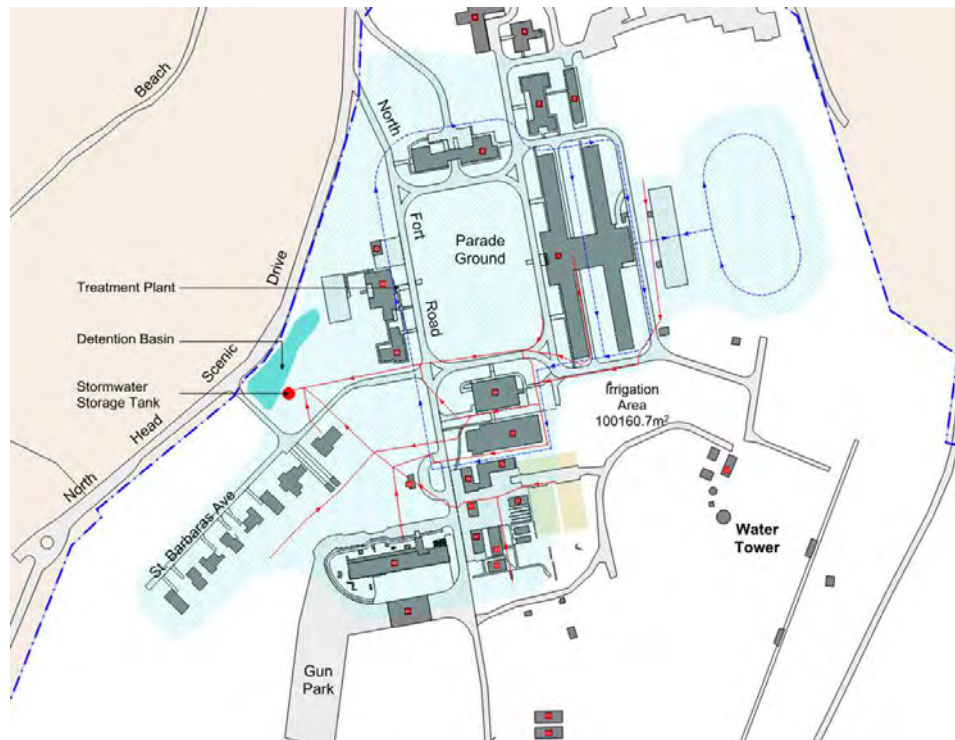


Figure 12: Plan of existing drainage infrastructure in the north of the site – NH.00-Services-Master-Plan-Draft-20210510

The site appears to have 2 main points of discharge, to the west and to the south. The eastern discharge point has a treatment train that improves the water quality and reduces the flow. There is a stormwater storage tank that retains rainwater which is used for irrigation. This stormwater storage tank will then overflow to the detention basin which will detain flows before discharging to the east of North Head Scenic Drive.

The south portion of the site has stormwater storage tanks that feed into an irrigation system. There appears to be no other treatment of the stormwater before it discharges to the south under North Head Scenic Drive.

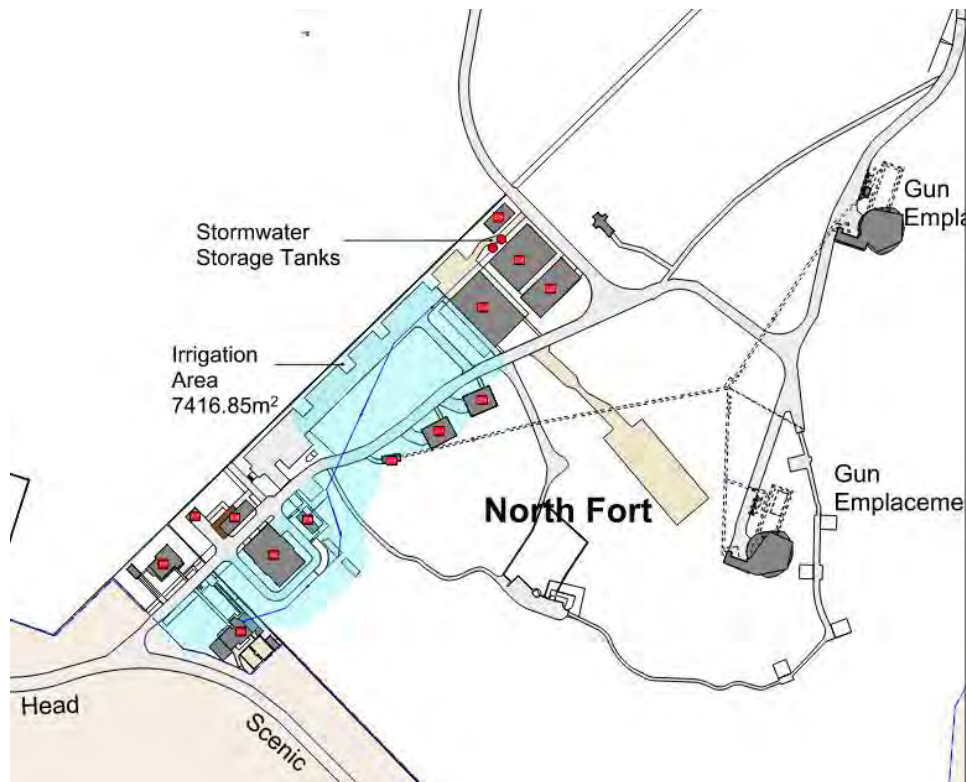


Figure 13: Plan of existing drainage infrastructure in the south of the site – NH.00-Services-Master-Plan-Draft-20210510

Development Controls

The following section outlines the development controls relevant to stormwater infrastructure for any proposed development. Additional erosion and sediment controls will also apply throughout the construction period.

National Parks and Wildlife Service

Given that the site discharges stormwater to the NPWS land, approval of any proposed development will be sought from NPWS. Guidance on this matter is provided in the NSW National Parks and Wildlife Service's *Guidelines for developments adjoining land managed by the Office of Environment and Heritage* (2020). Relevant extracts from these guidelines are provided in the **Appendix B**.

Regarding stormwater runoff, the guidelines recommend:

- Development proposals for areas adjacent to NPWS land should incorporate stormwater detention and water quality systems (with appropriately managed buffer areas) within the development site.
- Water sensitive urban design (WSUD) principles should be applied to developments in catchments upstream from wetlands.
- Stormwater should be diverted to council stormwater systems or to infiltration and subsurface discharge systems within the development site.
- The discharge of stormwater to NPWS land, where the quantity and quality of stormwater differs from natural levels, must be avoided.

Approval may be granted to allow the discharge of stormwater where it cannot be avoided. In requesting approval developments are required to meet the following stormwater management standards:

- No increase in pre-development peak flow from rainfall events with a 1 in 5 year and 1 in 100-year recurrence interval
- No increase in the natural annual average load of nutrients and sediments

- No increase in the natural average annual runoff volume.

Based on discussions with NPWS, “pre-development” refers to the existing site conditions i.e. current conditions and not those prior to any historical development of the site. To achieve these stormwater management standards on-site detention, water quality treatment, stormwater infiltration and/or stormwater reuse may be required.

NPWS are expected to request an assessment identifying the current site conditions and consideration of any potential changes in stormwater runoff quantity or quality. This assessment is to cover all stages of the development from pre-construction site preparation works, through to construction of all stages of works and lastly the post-construction stage before and after any proposed stabilisation works. Ongoing consultation with NPWS is recommended throughout the design of the redevelopment.

It should be noted that to achieve water quality requirements to current standards can be difficult depending on the type of development. For example, roads create a large amount of pollution and most treatment trains are designed to treat frequent storm events in order to meet a reduction percentage rather than complete pollutant removal.

Compliance with NPWS Guidelines

Based on the available information it is hard to determine if the current stormwater treatment complies with the regulatory guidelines for either water quantity discharge or water quality treatment. The northern portion of the site does have a detention basin which is likely to detain flows however without more details and modelling it cannot be confirmed if it is detaining stormwater outflows to pre-development levels. Additionally, while the legend suggests that there is a ‘Humeceptor’ treatment device located on the site, it does not show its location. It is therefore not possible to determine whether pollutant reduction requirements are being met.

The southern portion of the site appears to have no treatment for either discharge or water quality and therefore likely does not comply with NPWS guidelines.

Proposed Stormwater Strategy

The North Head Draft Concept dated May 2021 does not appear to propose any additional hard stand areas. As a result, if existing water quality and quantity treatment measures are deemed compliant by NPWS, stormwater works will be limited to repairing/maintaining existing infrastructure and connecting to new infrastructure. In general, the following stormwater management principles should be considered:

- Liaison with NPWS to confirm requirements
- Obtain additional information on existing infrastructure and assess if the system meets the requirements
- Maintaining existing and creating adequate overland flow paths
- Maximising pervious areas
- Providing additional stormwater quality and quantity treatment measures

<https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Parks-reserves-and-protected-areas/Development-guidelines/developments-adjacent-npws-lands-200362.pdf>

5 CONCLUSION

Based on the information gathered in Section 4, next steps below are recommended for all utilities:

1. Further investigation required

It is recommended that a general investigation of underground assets through potholing or invasive investigation (CCTV) is done to provide more accurate information on all infrastructure including current condition, pipe materials, sizes and locations.

It was also noted that there was a large fluctuation of demand throughout the course of existence of the site, and it is recommended to determine the site's proposed growth and additional demand to confirm if the current infrastructure can support the growth or upgrade as required.

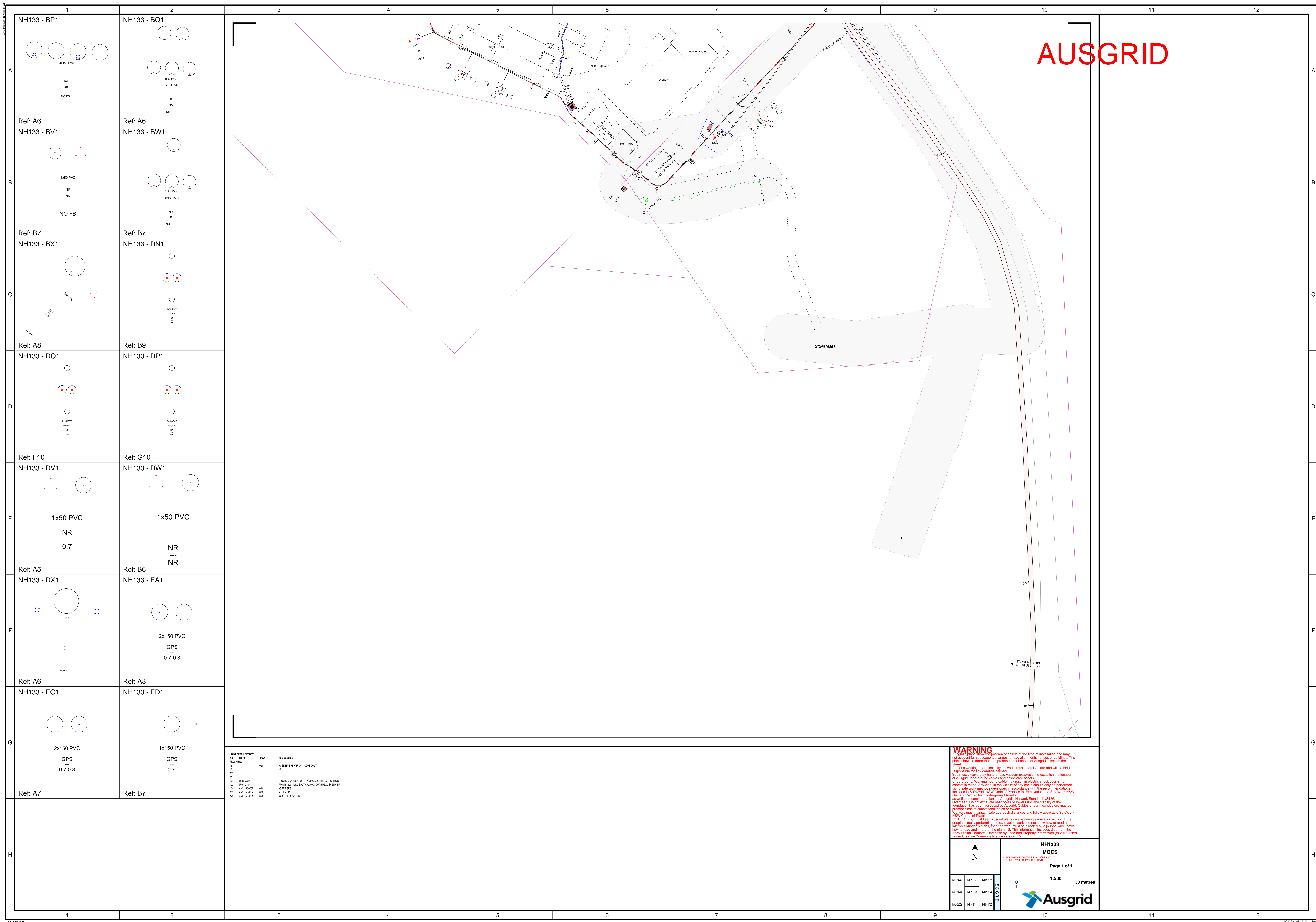
2. Engaging with utility authorities

Once the overall demand has been identified, this may be used to start engagement with authorities to establish their requirements.


APPENDIX A: BEFORE YOU DIG AUSTRALIA (BYDA)

SYDNEY WATER (WATER & SEWER)





NH133 - BC1



NR
--
NR

NO FB

LAID ABOVE 33KW

Ref: A7

AUSGRID

| JOINT DETAIL REPORT | | | |
|---------------------|---------|-------|--|
| No. | Sta-Pnt | PIDCr | Joint Location |
| Map: NH33 | | | |
| 11 | | | NA |
| 12 | 1830-37 | /0.00 | 3.8 S OF POLE PD29 3.7 TO 4.5 W OF SAME POLE |
| 13 | | | NA |
| 36 | | | NA |
| 37 | 1830-74 | /0.30 | CLUT END AT BASE OF POLE |

WARNING

August plans show the position of assets at the time of installation and may not reflect changes to road alignments, ferries or buildings. The plans show no more than the presence or absence of Augusted assets in the area.

Persons working near electricity networks must exercise care and be held responsible for their own actions.

You must evacuate by hand or use vacuum excavation to establish the location of underground services. Do not use any other method to excavate the Underground. Working near a cable may result in electric shock even if it is not live. Do not touch any underground cables or conductors. Do not use safe work methods developed in accordance with the recommendations in the following documents:

- *Safe Work Method Statement for the Excavation of the Underground* NSW Government for Work Near Underground Assets.
- *Safe Work Method Statement for the Excavation of the Underground* NSW Government.

Overhead: Do not exceed nine poles or towers within the study boundary. Do not exceed 100 metres between poles or towers. Do not exceed the present code to substations, poles or towers.

Underground: Do not use safe access roads and follow applicable Safe Work NSW Codes of Practice.

Excavation: Do not excavate during excavation works. If people actively performing the excavation works do not know how to read and interpret Augusted plans, then the work must be directed by a person who knows how to read and interpret Augusted plans.

NSW total and regional boundaries by State and Territory Information (2016), <http://www.statelibrary.nsw.gov.au>

**NH1334
MOCS**

INFORMATION ON THIS PLAN ONLY VALID
FOR 30 DAYS FROM ISSUE DATE

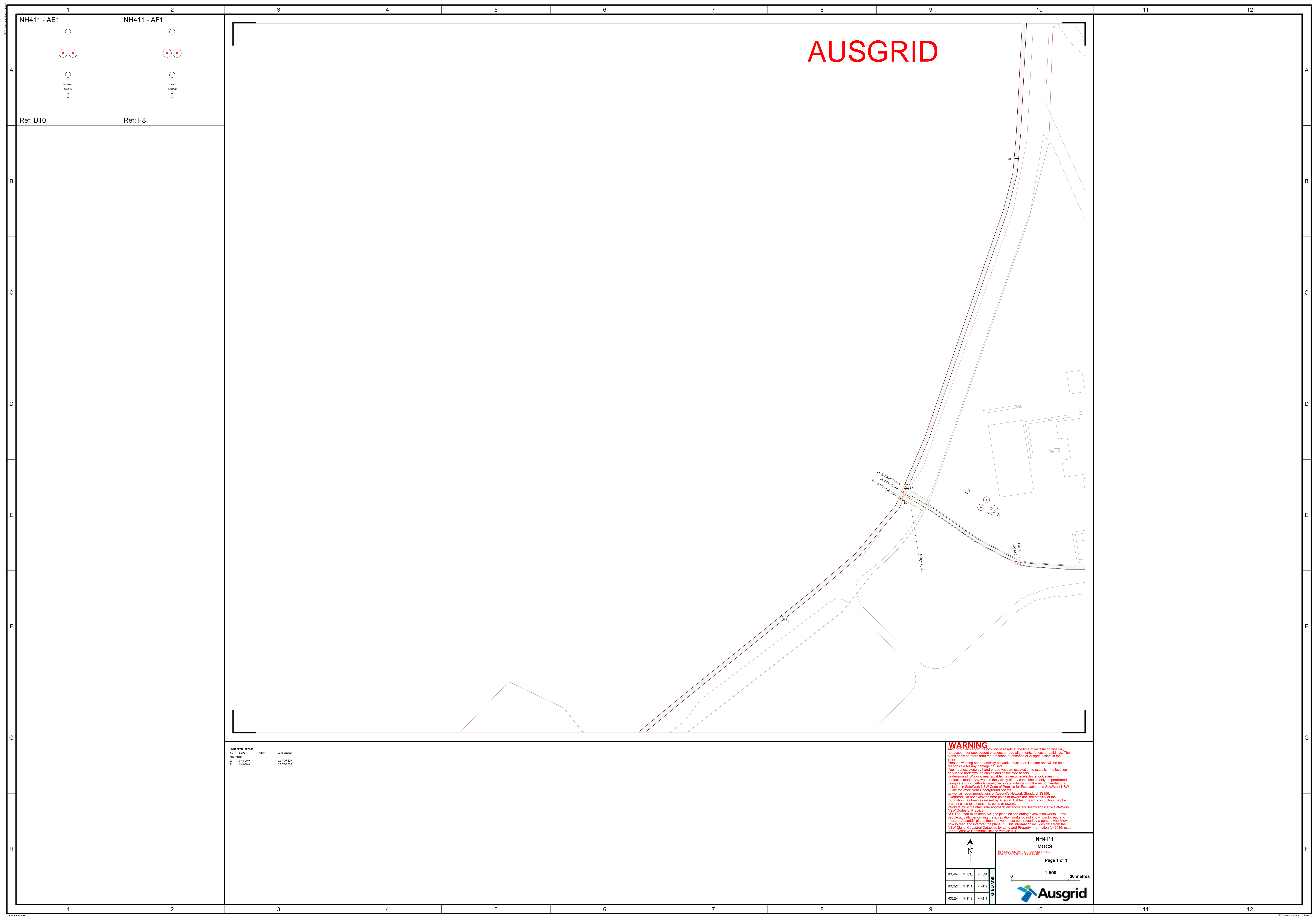
Page 1 of 1

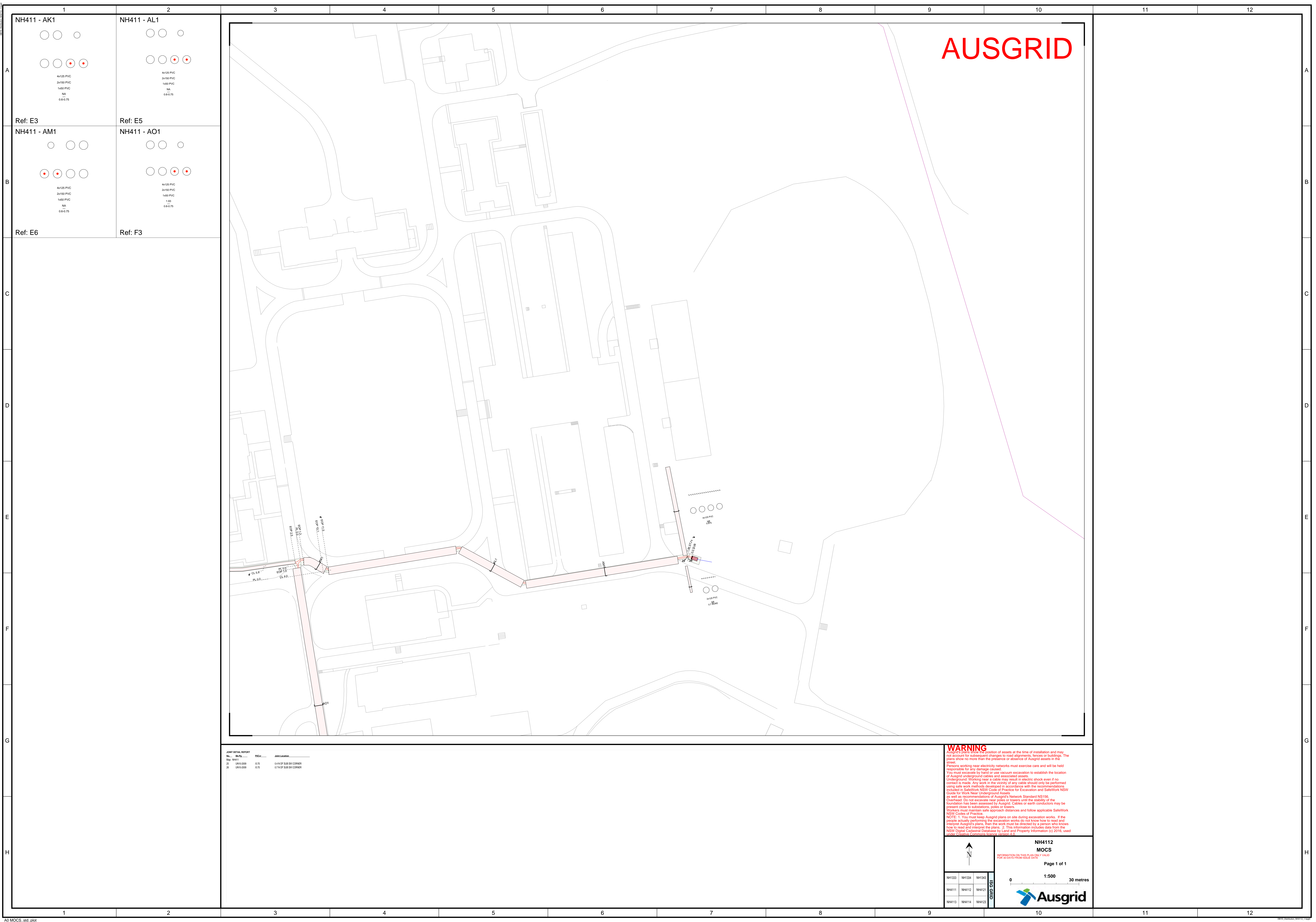
0 1:500 30 metres

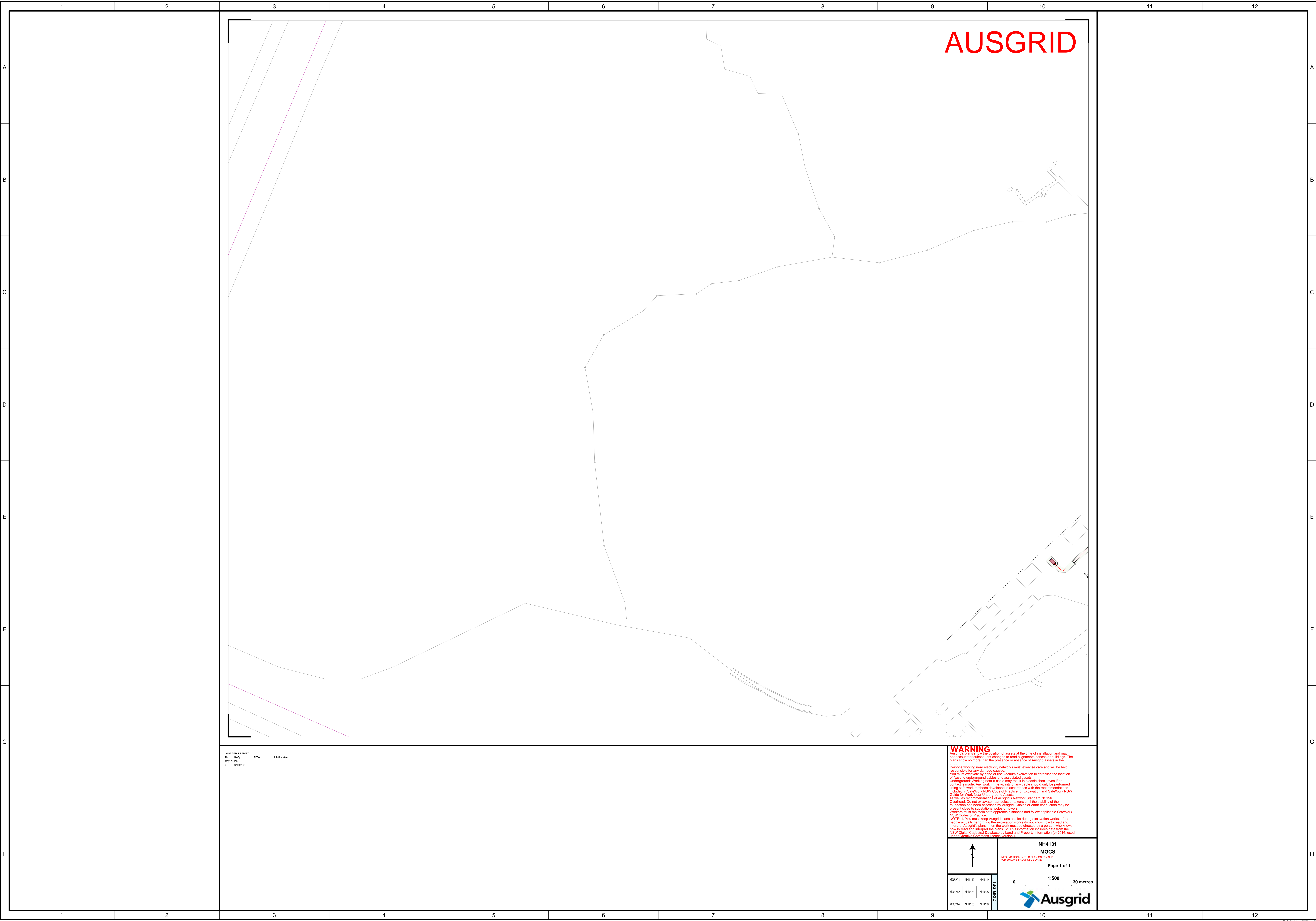
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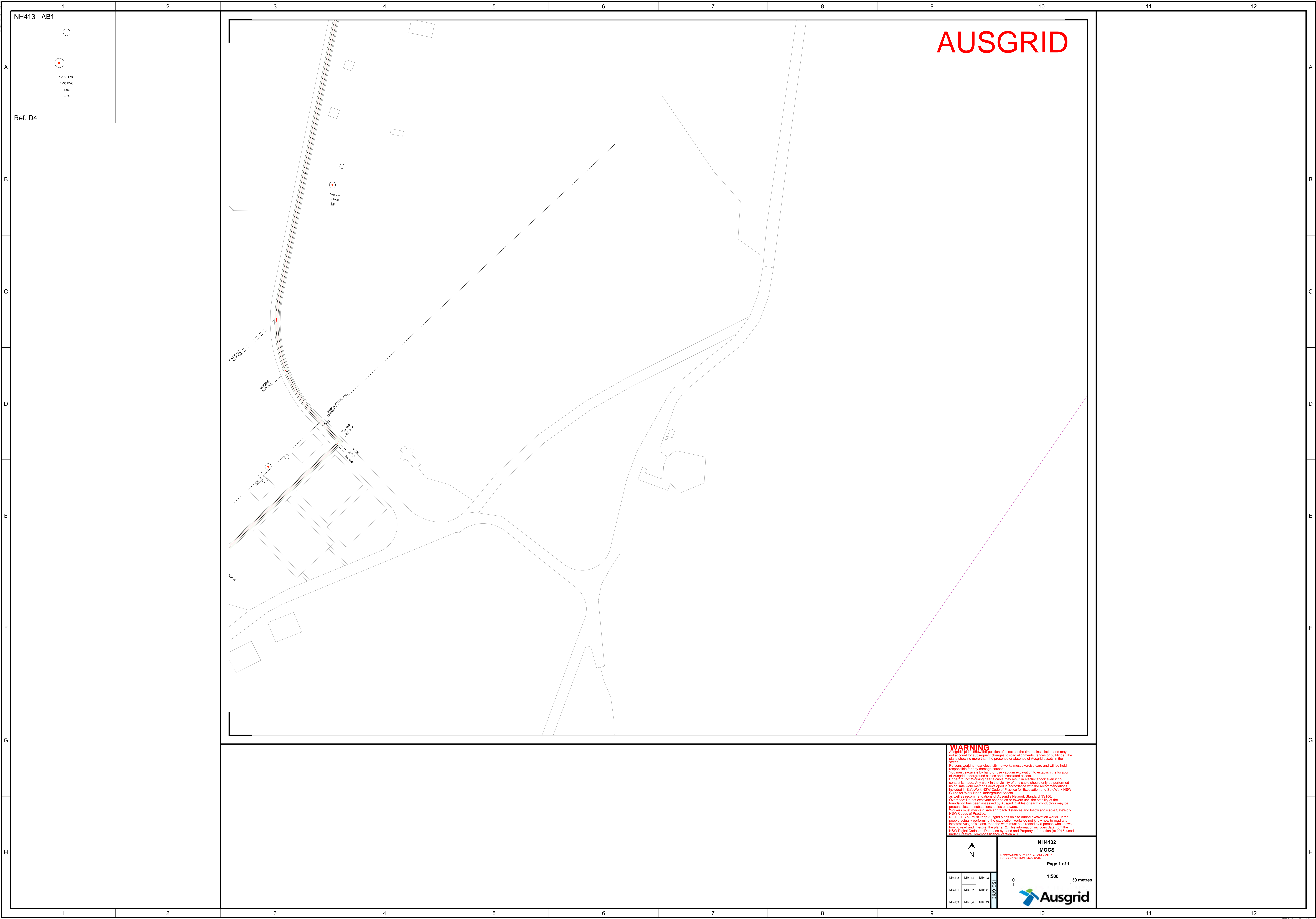
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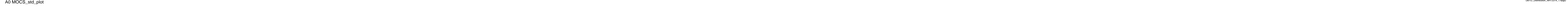
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| NH1333 | NH1334 | NH1343 |
| NH4111 | NH4112 | NH4121 |

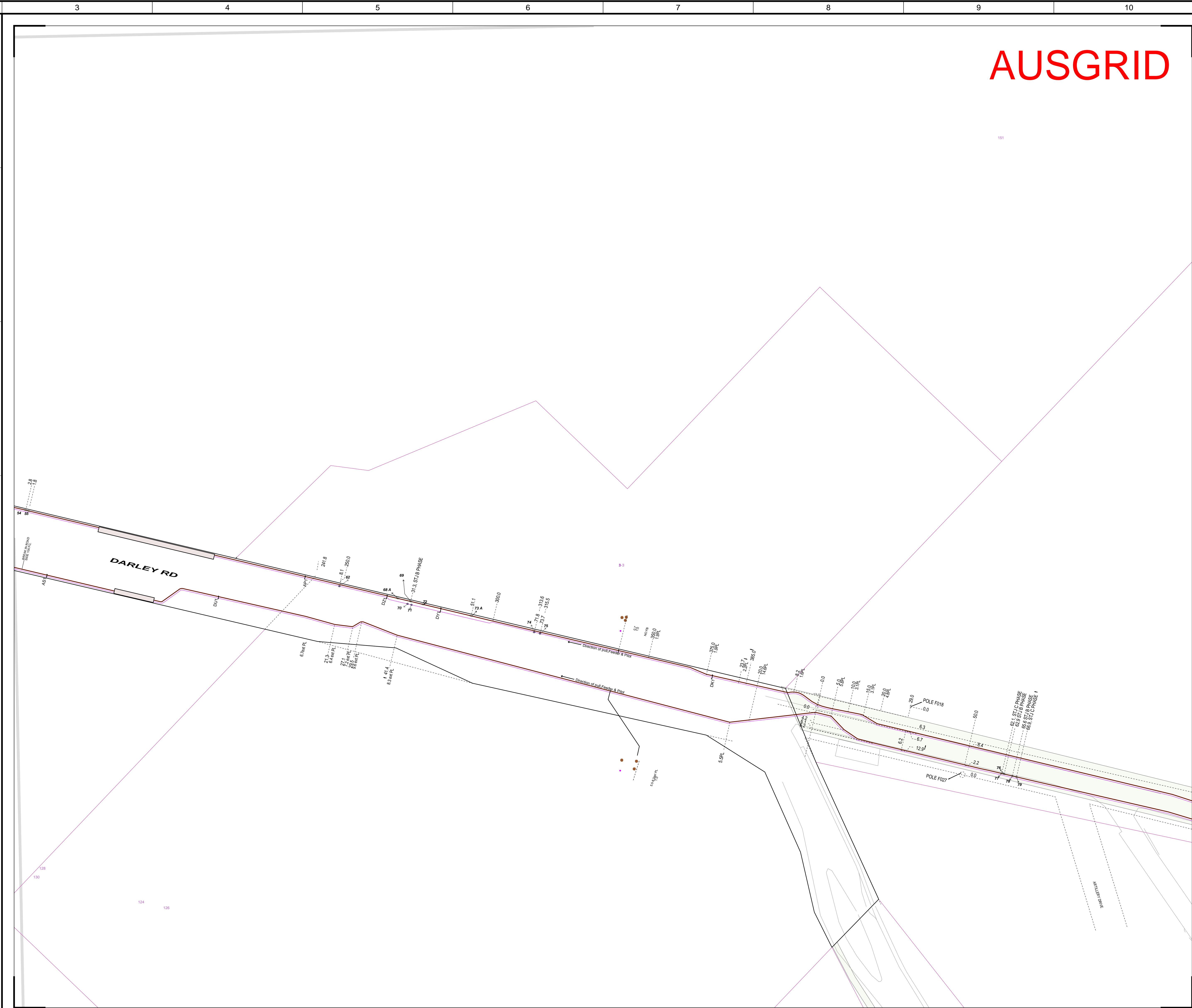




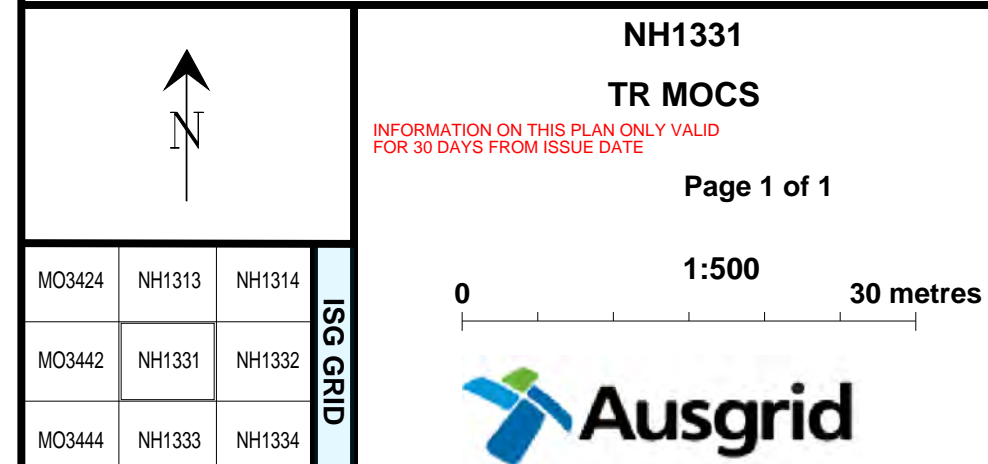






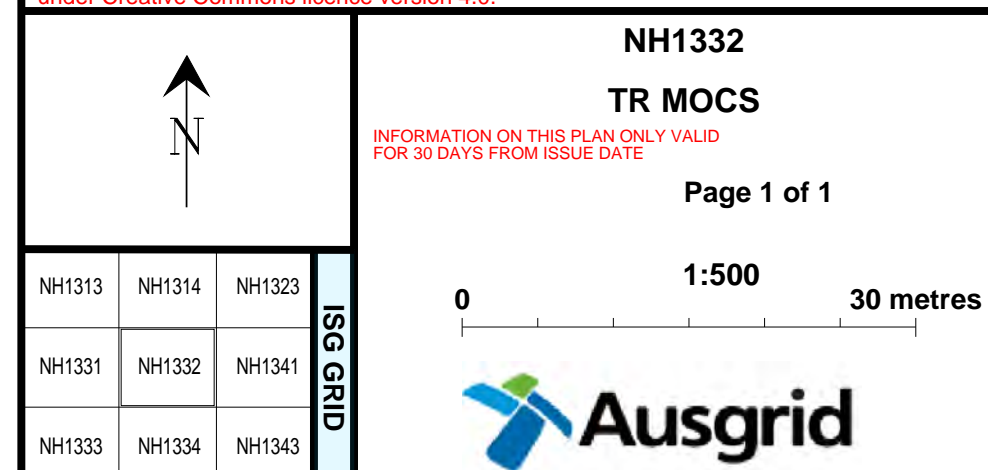


| JOINT DETAIL REPORT | | P/NOM | Joint Location |
|---------------------|---------|-----------|--------------------------------|
| No. | Rev | | |
| Map: NPH303 | | | |
| 54 | | | SERVING REPAIR ON BLUE PHASE |
| 55 | | | SERVING REPAIR ON YELLOW PHASE |
| 56 | | | IN RT 1, MA TREFO |
| 57 | | | IN RT 1, MA |
| 58 | | | IN RT 1, MA |
| 59 | | | IN RT 1, MA |
| 60 | | 0.0781, 0 | IN RT 1, MA |
| 61 | | 0.0781, 0 | IN RT 1, MA |
| 62 | 1894-T | 0.4508, 0 | NA |
| 63 | | | IN RT 2, NA |
| 64 | | | IN RT 2, NA |
| 65 | | | IN RT 2, NA |
| 66 | | 0.7374, 0 | IN RT 2, NA |
| 67 | | | IN RT 2, NA TREFO |
| 68 | 1545-43 | 0.5507, 0 | NA |
| 69 | | 1.0602, 0 | NA, ST B PHASE |
| 70 | 1894-10 | 1.2505, 0 | NA |
| 71 | 1894-10 | 1.1107, 0 | NA |
| 72 | | 1.0602, 0 | NA, ST B PHASE |
| 73 | 1545-43 | 1.8602, 0 | NA |
| 74 | 1894-9 | 1.8502, 0 | NA |
| 75 | 1894-9 | 1.0602, 0 | NA |
| 76 | 1546-05 | 2.4005, 0 | NA, ST B PHASE |
| 77 | 1546-05 | 2.4005, 0 | NA, ST C PHASE |
| 78 | 1546-05 | 2.4005, 0 | NA, ST B PHASE |
| 79 | 1546-05 | 1.9606, 0 | NA, ST C PHASE |

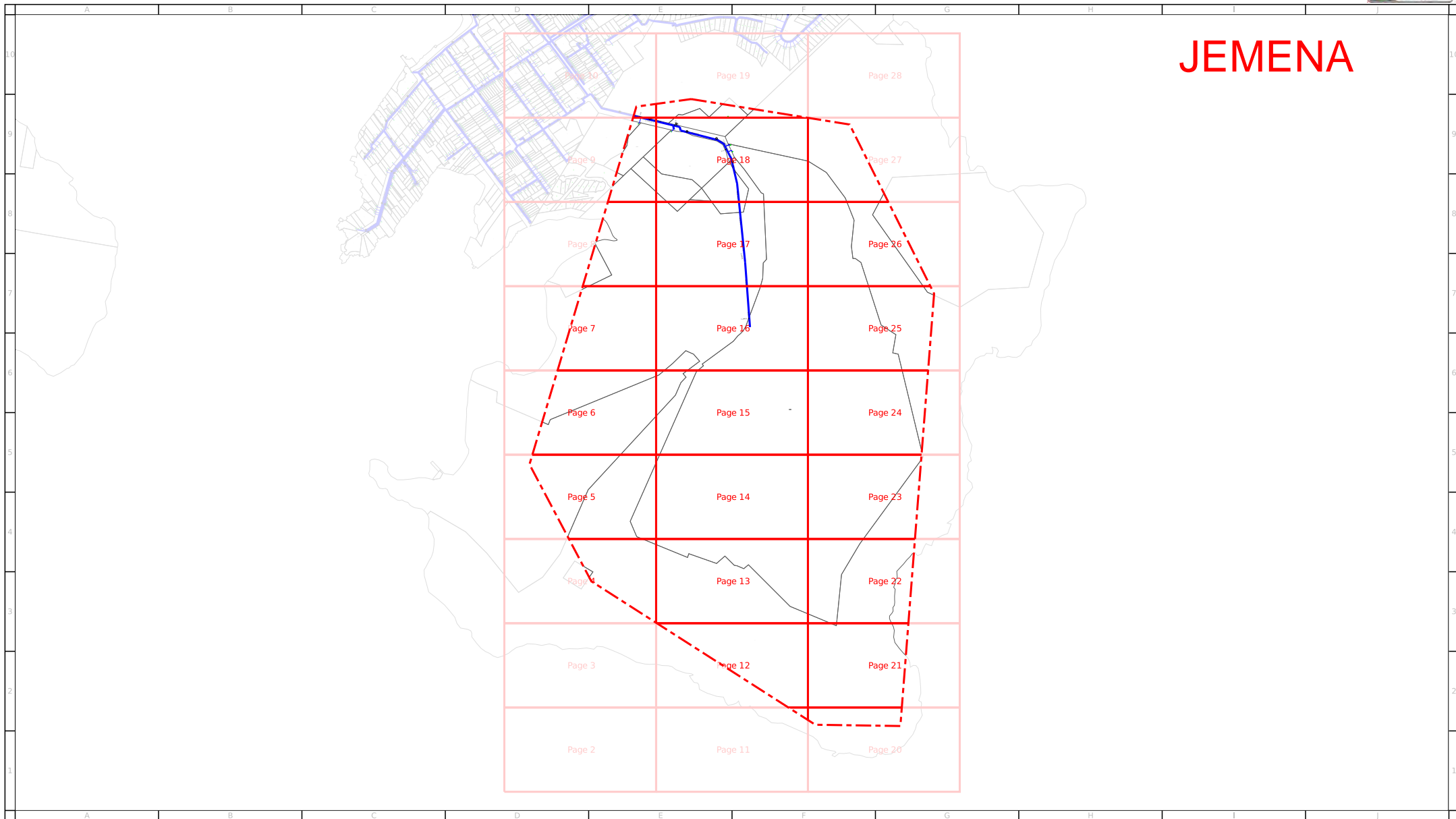
[illegible]

WARNING
Aisled plans show the position of assets in the time of installation and may be used for substation changes to avoid alignment, fences or buildings. The plans show no more than the presence or absence of Aisled plans in the ground.
Persons working near electrically neutral must exercise care and will be held responsible for any damage.
You must excavate by hand or use vacuum excavation wherever available the location of underground cables and pipes.
Underground Working near a cable may result in electric shock even if no fault is found. Any work near a cable must be done in accordance with the safe work methods developed in accordance with the recommendations of the National Institute for Occupational Safety and Health (NIOSH) and the NIOSH Guide for Work Near Underground Assets.
Communication: Use the communication system, Standard NIOSH 1556.
Overhead: Do not excavate near poles or towers until the stability of the structure has been determined. Poles or earth conductors may be present close to substations, poles or towers.
Safety: Use the safety approach directions and follow applicable SafeWork NSW Codes of Practice.
NOTE 1: You must mark Aisled plans on the excavation work site. If the plans are not marked, you must not work on the site. Do not read and interpret Aisled plans, then the work must be directed by a person who knows the location and interpretation of the plans.
NIOSH Occupational Safety and Health and Property Information (C) 2016.

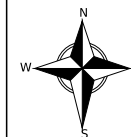
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| 82 | 7/00 | IN PT 3 NA |
| 83 | 7/00 | IN PT 3 MR Repair on Yellow Phase |
| 84 | 7/00 | IN PT 3 NA |
| 85 | 7/00 | IN PT 3 MR |
| 86 | 7/00 | IN PT 3 NA |
| 87 | 7/00 | IN PT 4 NA TRESPD |
| 88 | 7/00 | IN PT 4 NA |
| 89 | 7/00 | IN PT 4 NA |
| 90 | 7/00 | IN PT 4 NA |
| 91 | 7/00 | IN PT 4 NA |
| 92 | 7/00 | IN PT 4 MR |
| 93 | 7/00 | IN PT 4 NA |
| 94 | 1537-03 | 7/80 NA |
| 96 | 1537-03 | 7/80 NA |



JEMENA



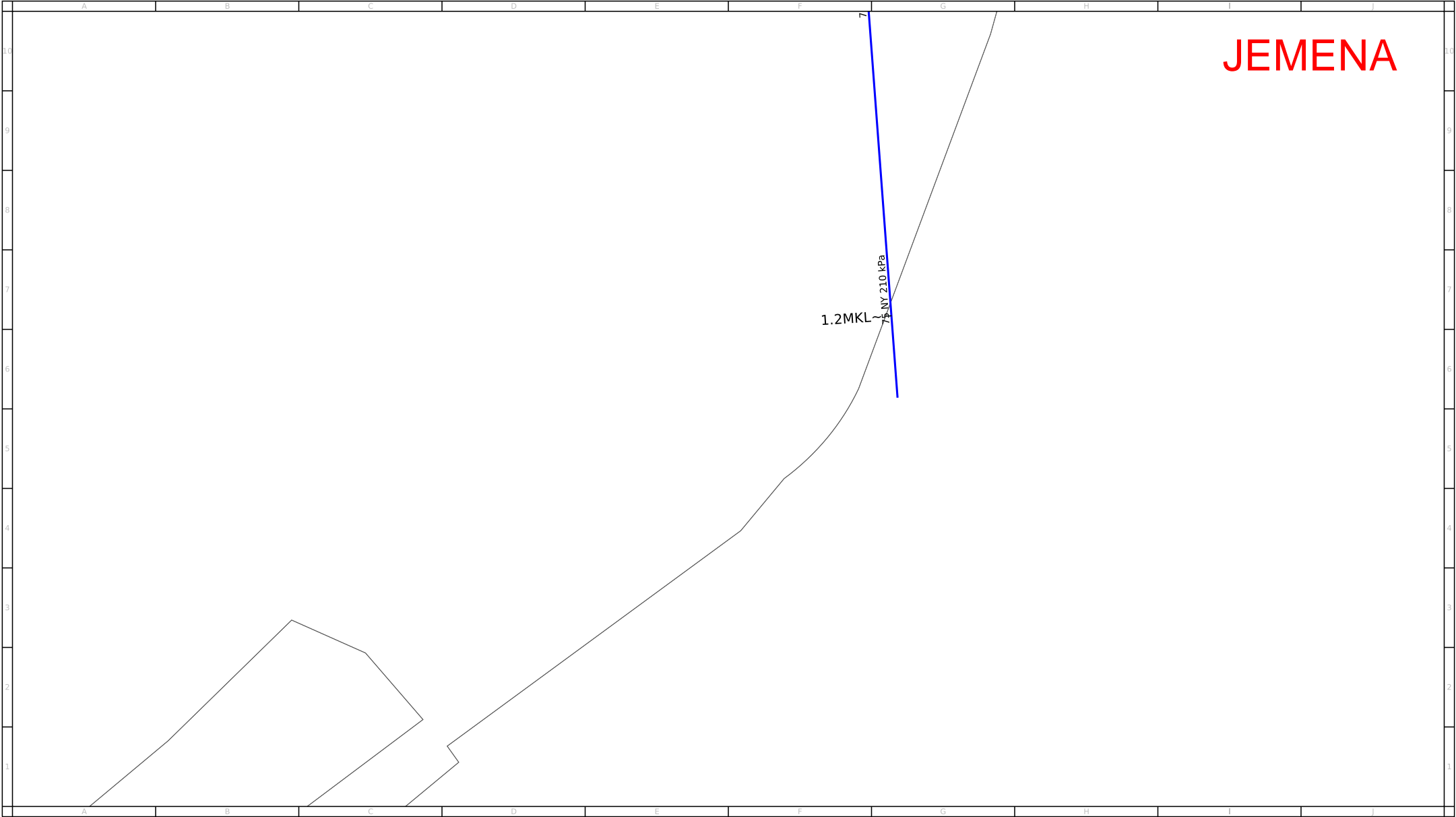
For legend details, please refer to the Coversheet attachment provided as part of this DBYD response.



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Issue Date: 27/02/2023
 DBYD Seq No: 221671626
 DBYD Job No: 33700463
 Overview Page:

WARNING: This is a representation of Jemena Gas Networks underground assets only and may not indicate all assets in the area. It must not be used for the purpose of exact asset location in order to undertake any type of excavation. Please read all conditions and information on the attached information sheet. This extract is subject to those conditions. The information contained on this plan is only valid for 28 days from the date of issue.



For legend details, please refer to the Coversheet attachment provided as part of this DBYD response.



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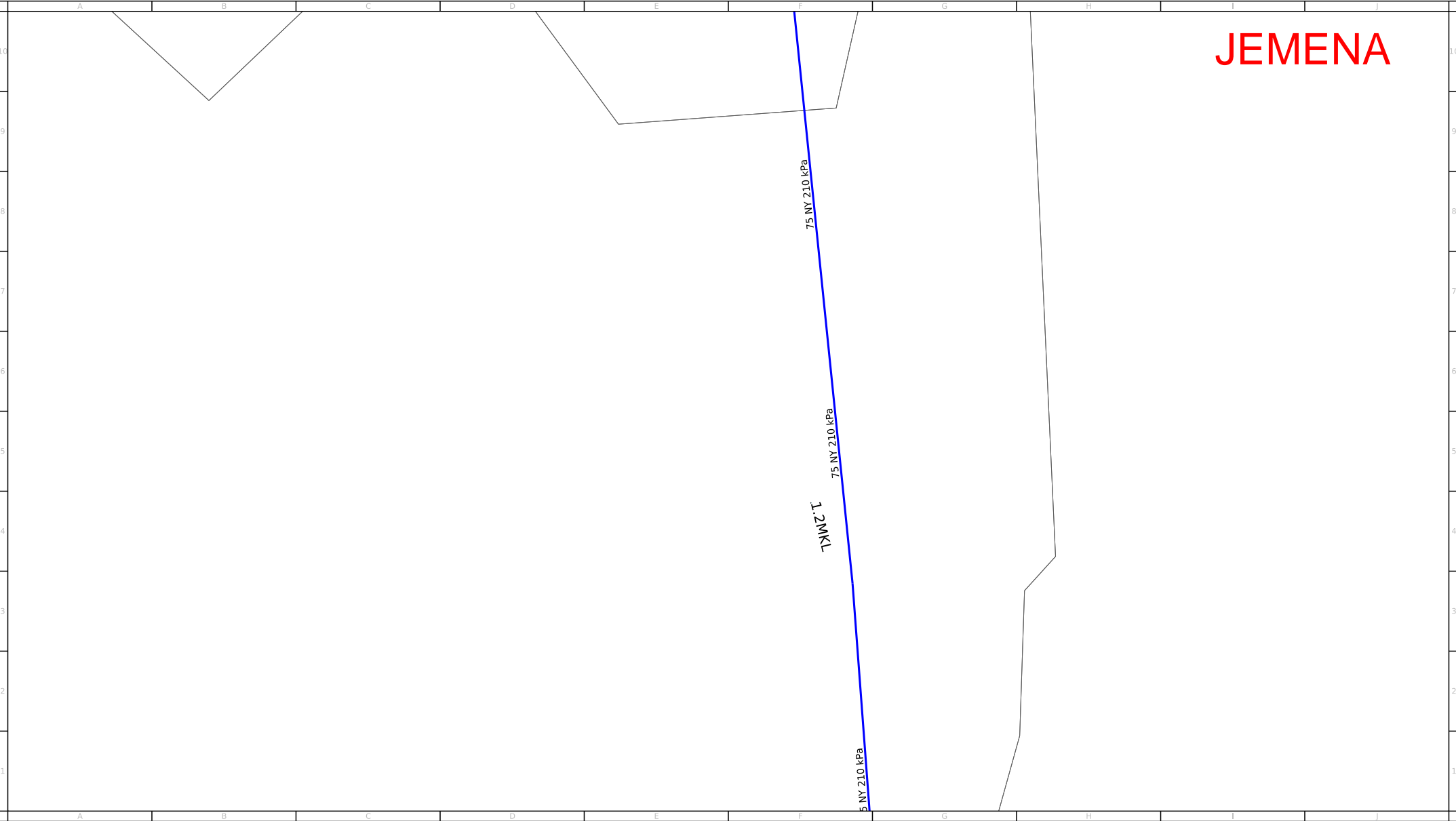
Issue Date: 27/02/2023
DBYD Seq No: 221671626
DBYD Job No: 33700463

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WARNING: This is a representation of Jemena Gas Networks underground assets only and may not indicate all assets in the area. It must not be used for the purpose of exact asset location in order to undertake any type of excavation. This plan is diagrammatic only, and distances scaled from this plan may not be accurate. Please read all conditions and information on the attached information sheet. This extract is subject to those conditions. The information contained on this plan is only valid for 28 days from the date of issue.



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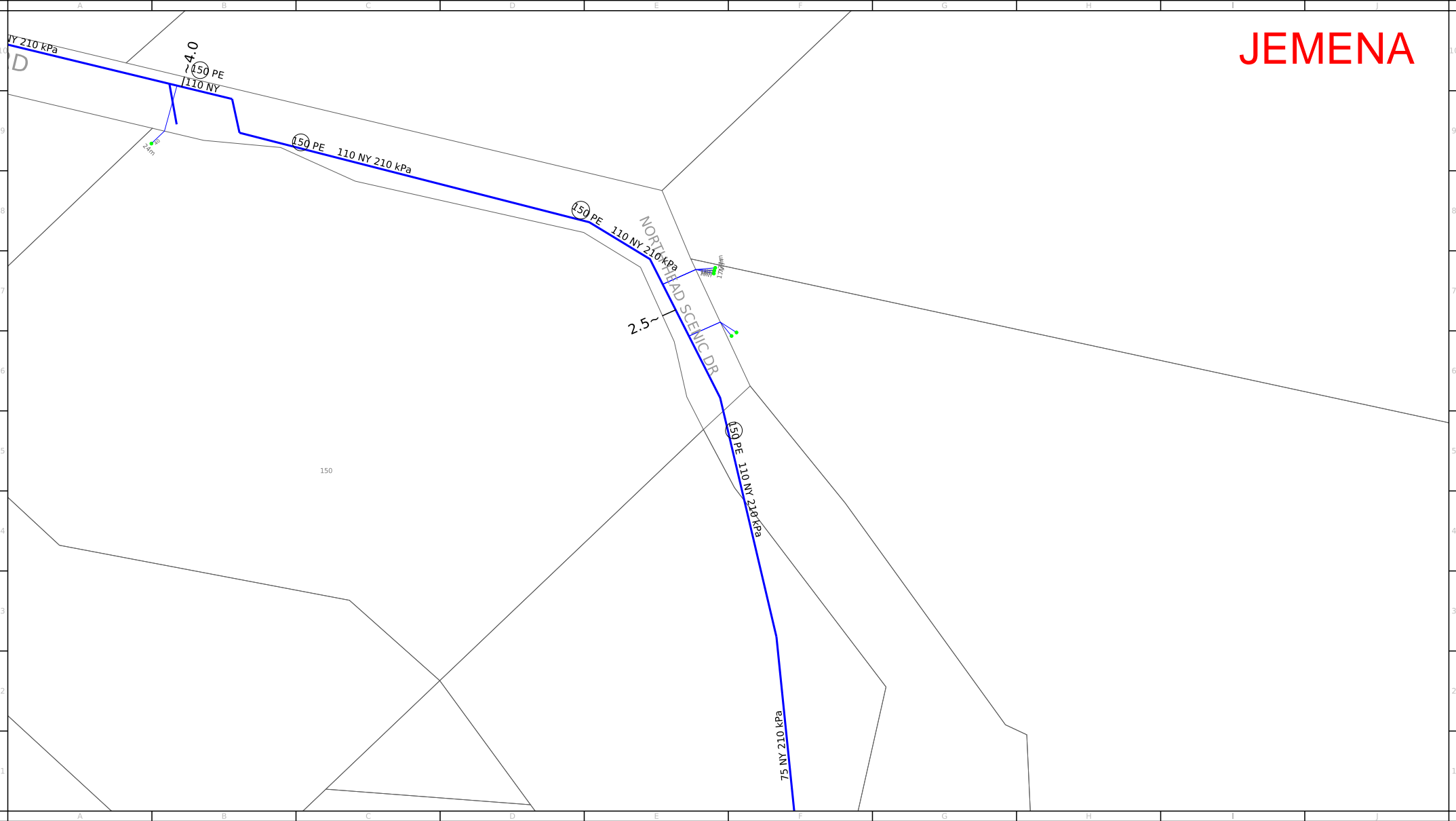
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JEMENA



For legend details, please refer to the Coversheet attachment provided as part of this DBYD response.



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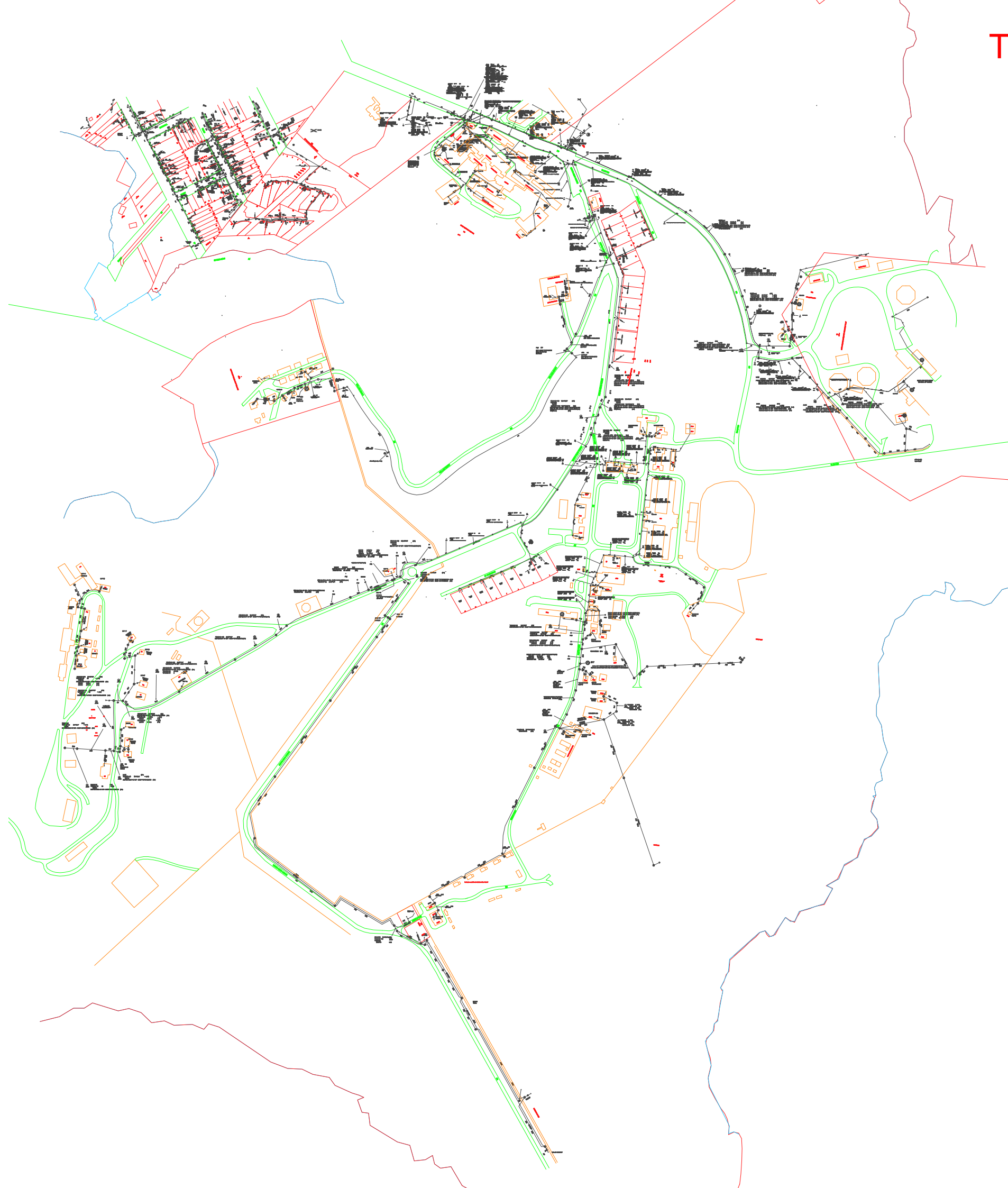
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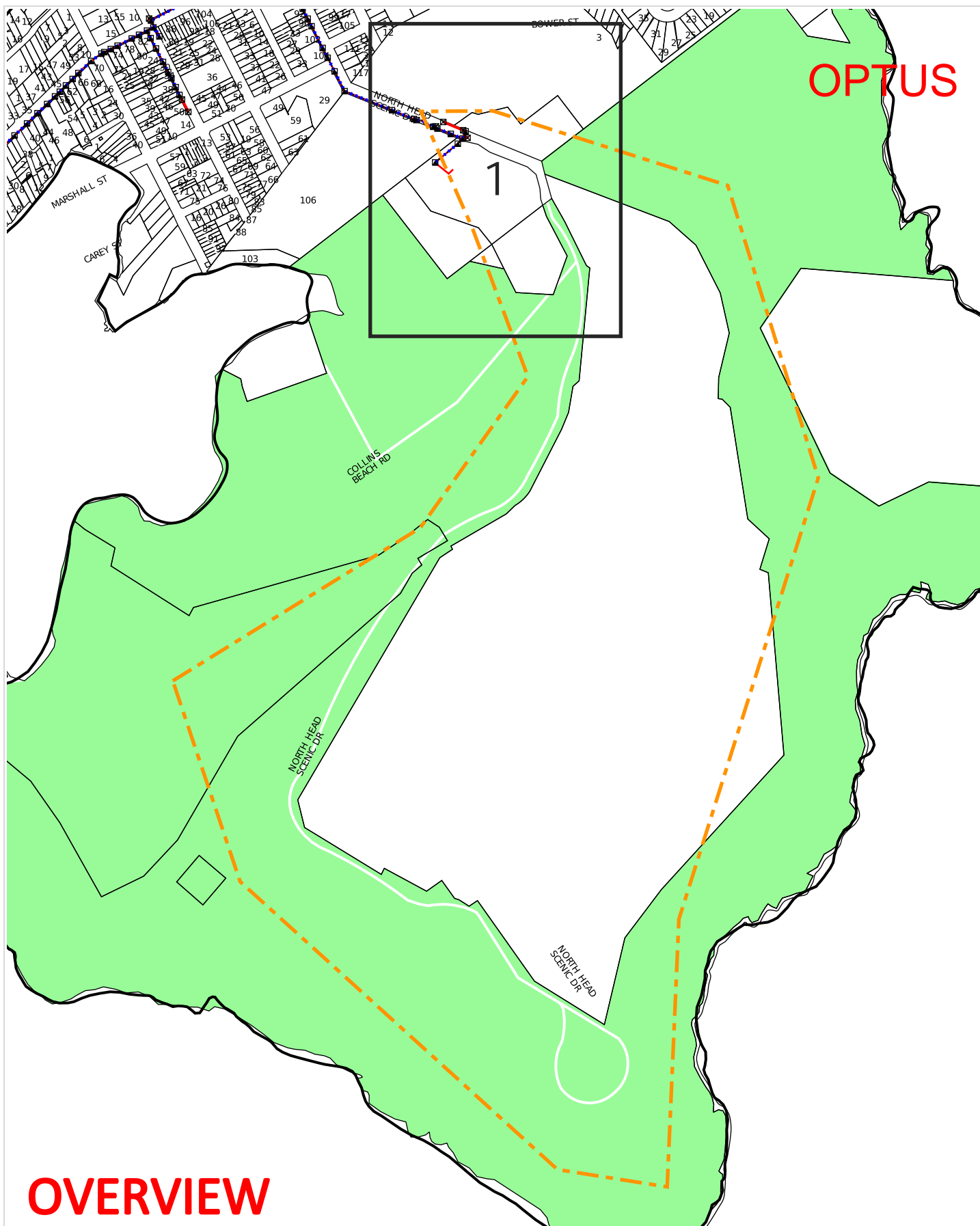
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DBYD Job No: 33700463

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WARNING: This is a representation of Jemena Gas Networks underground assets only and may not indicate all assets in the area. It must not be used for the purpose of exact asset location in order to undertake any type of excavation. This plan is diagrammatic only, and distances scaled from this plan may not be accurate. Please read all conditions and information on the attached information sheet. This extract is subject to those conditions. The information contained on this plan is only valid for 28 days from the date of issue.





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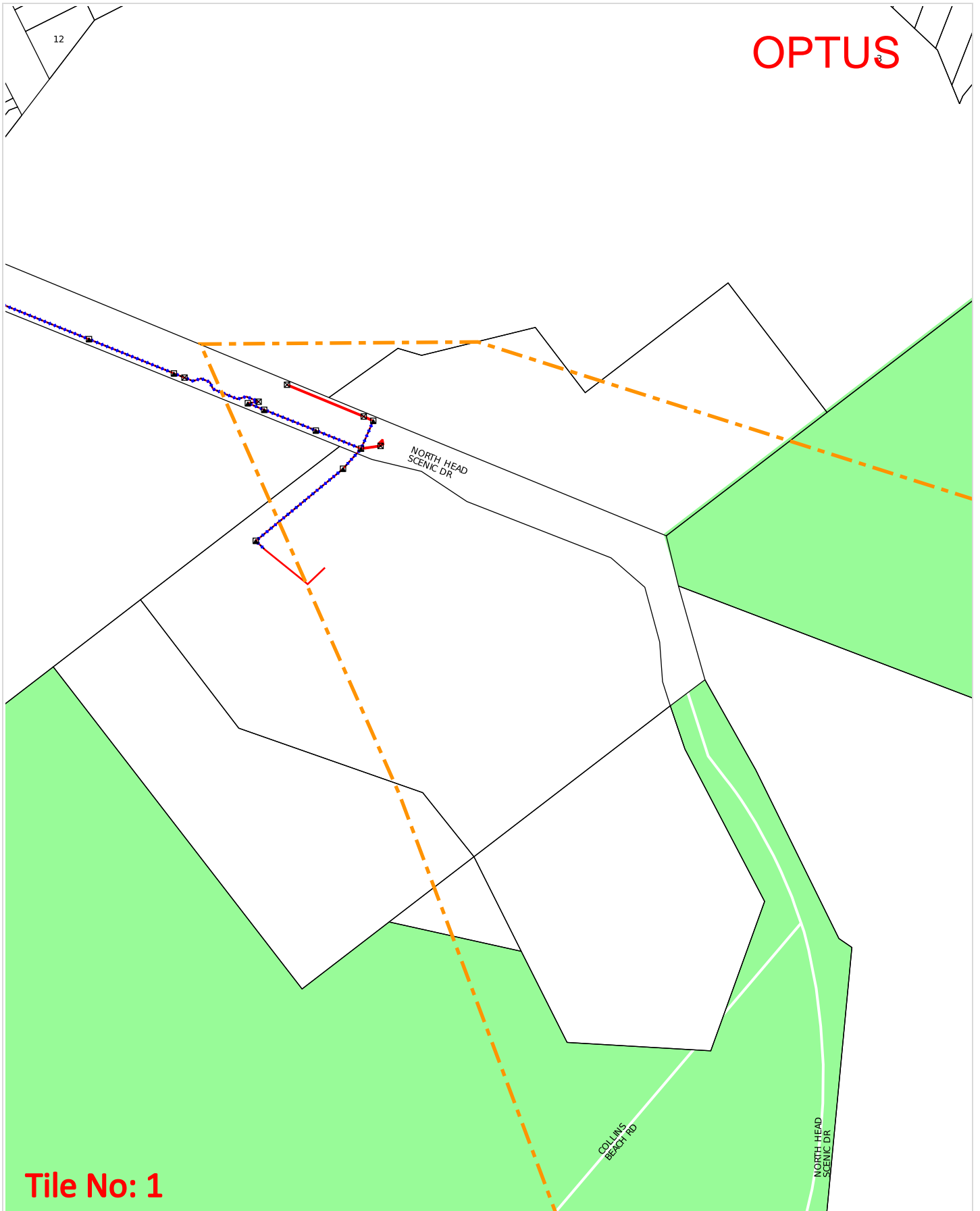
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To: Tom Summersby
Phone: Not Supplied
Fax: Not Supplied
Email: tom.summersby@arcadis.com

| | | |
|-----------------------------------|--|--|
| Dial before you dig Job #: | 33700463 |  DIAL BEFORE YOU DIG www.1100.com.au |
| Sequence # | 221671623 | |
| Issue Date: | 27/02/2023 | |
| Location: | 7 North Head Scenic Drive , Manly , NSW , 2095 | |

Indicative Plans

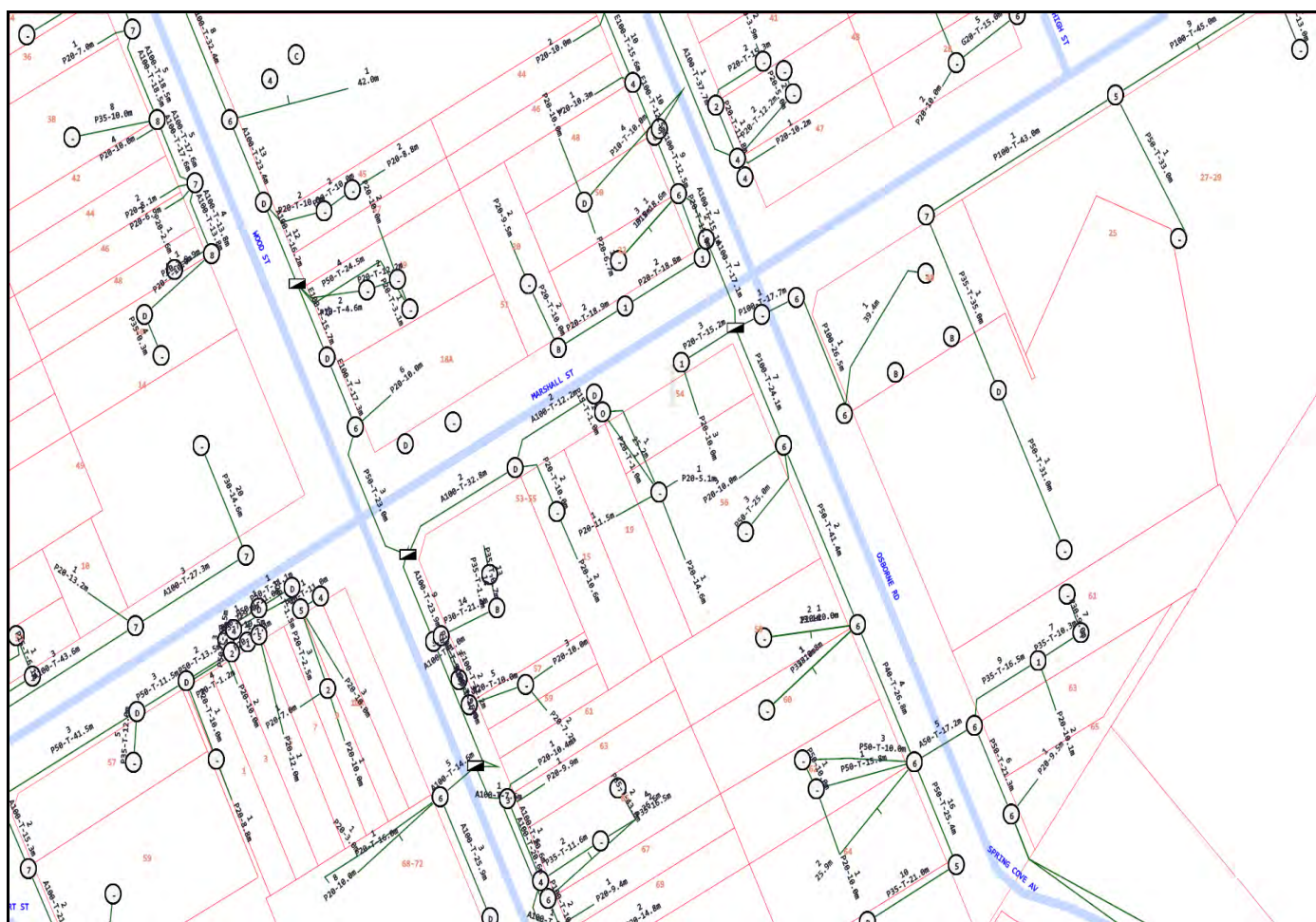
| | | | |
|----|----|----|----|
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| 3 | 15 | 27 | 39 |
| 4 | 16 | 28 | 40 |
| 5 | 17 | 29 | 41 |
| 6 | 18 | 30 | 42 |
| 7 | 19 | 31 | 43 |
| 8 | 20 | 32 | 44 |
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| 10 | 22 | 34 | 46 |
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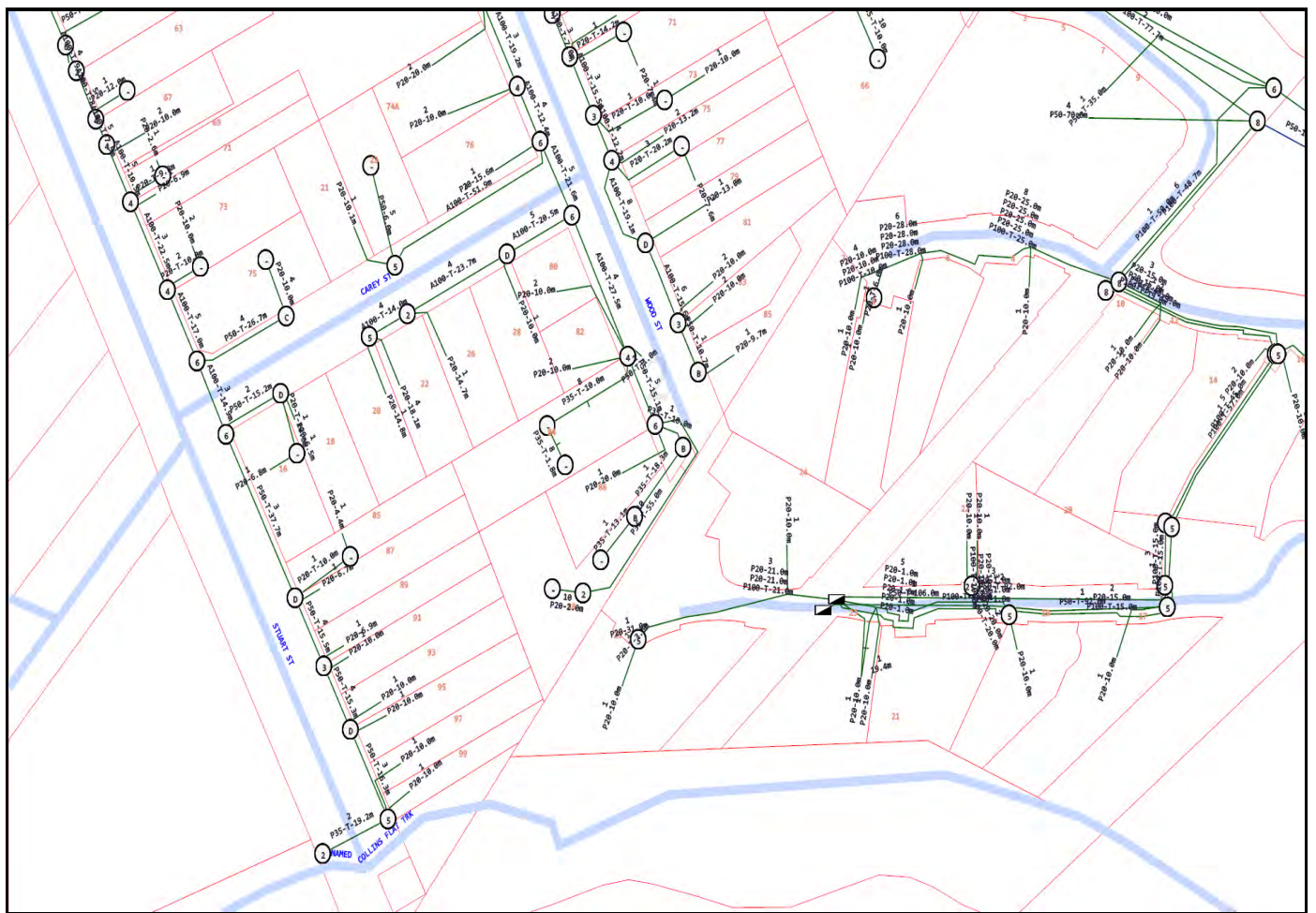


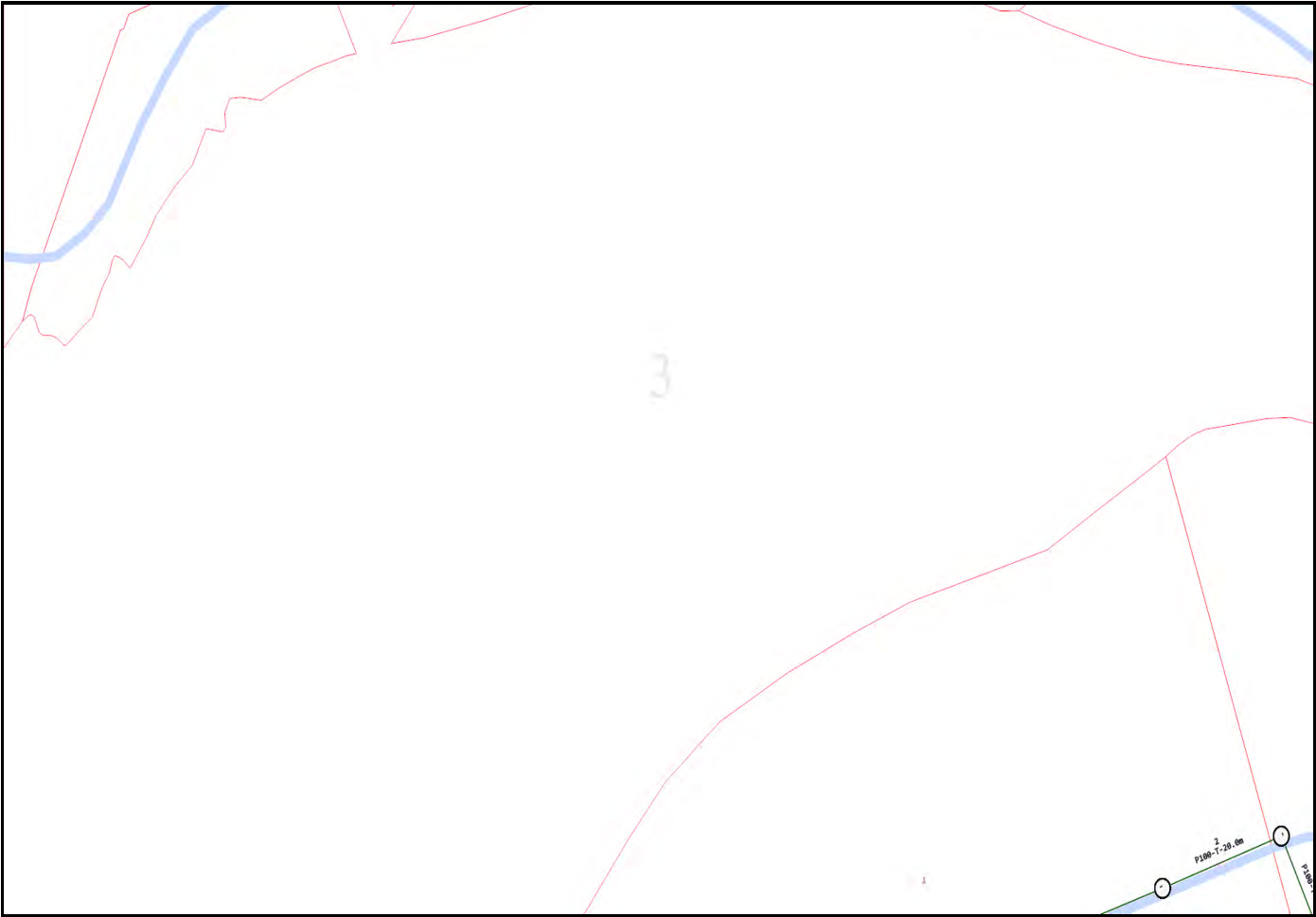
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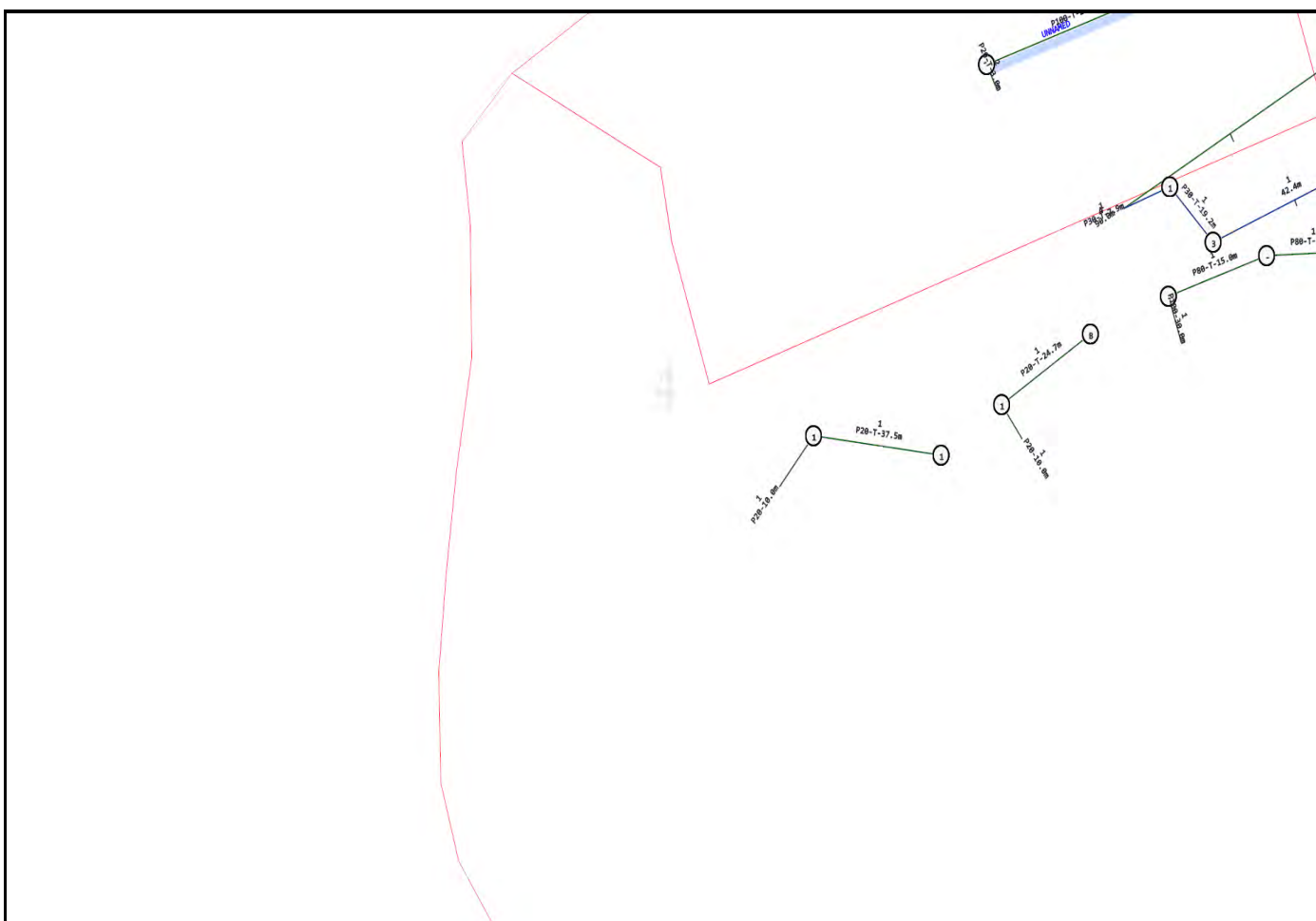


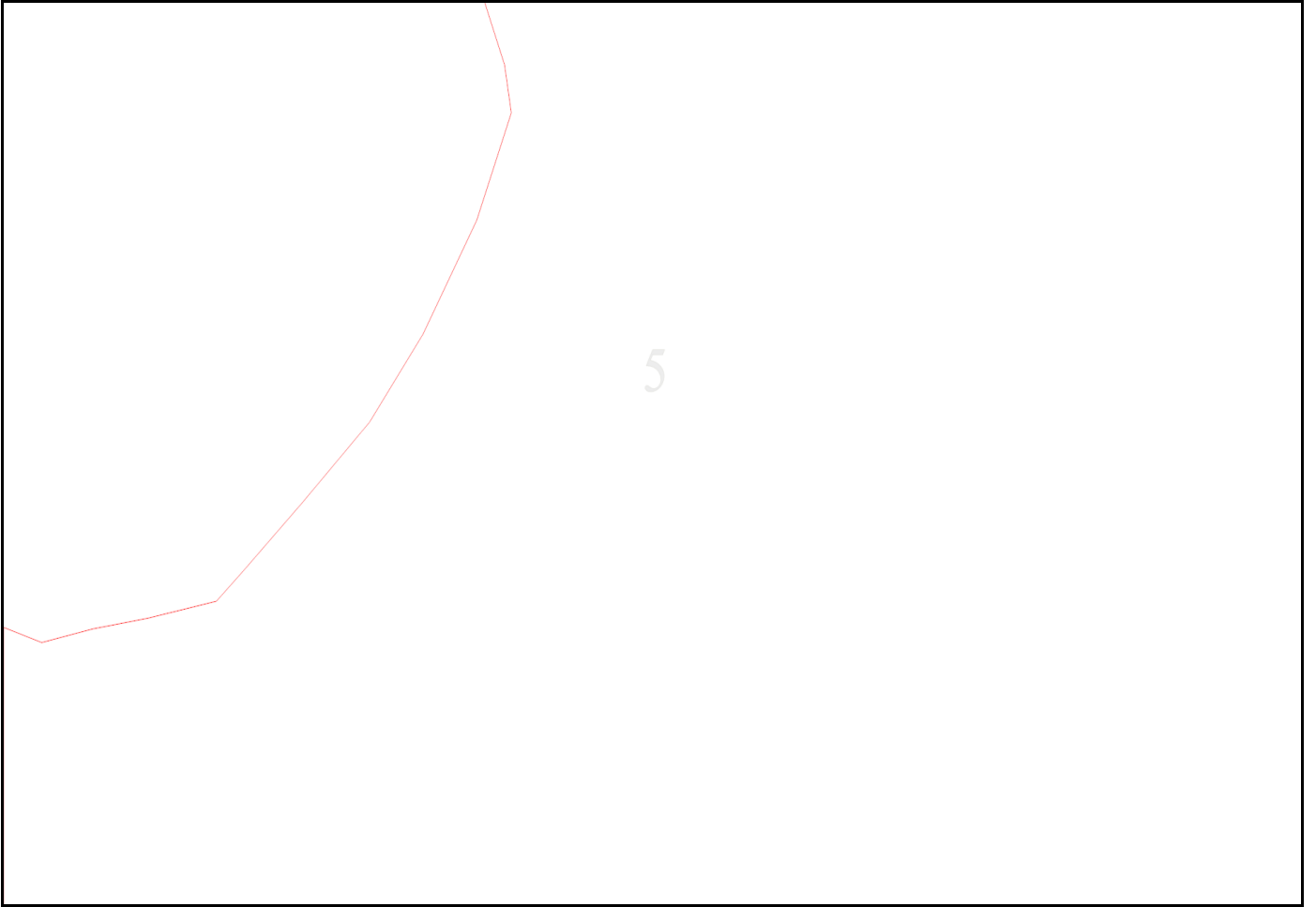
| | |
|--|---|
| | Parcel and the location |
| | Pit with size "5" |
| | Power Pit with size "2E". Valid PIT Size: e.g. 2E, 5E, 6E, 8E, 9E, E, null. |
| | Manhole |
| | Pillar |
| <p>2 PO – T- 25.0m P40 – 20.0m</p> | <p>Cable count of trench is 2. One "Other size" PVC conduit (PO) owned by Telstra (-T-), between pits of sizes, "5" and "9" are 25.0m apart. One 40mm PVC conduit (P40) owned by NBN, between pits of sizes, "5" and "9" are 20.0m apart.</p> |
| <p>2 10.0m</p> | 2 Direct buried cables between pits of sizes, "5" and "9" are 10.0m apart. |
| | Trench containing any INSERVICE/CONSTRUCTED (Copper/RF/Fibre) cables. |
| | Trench containing only DESIGNED/PLANNED (Copper/RF/Fibre/Power) cables. |
| | Trench containing any INSERVICE/CONSTRUCTED (Power) cables. |
| | Road and the street name "Broadway ST" |
| <p>Scale</p> | <p>0 20 40 60 Meters 1:2000 1 cm equals 20 m</p> |

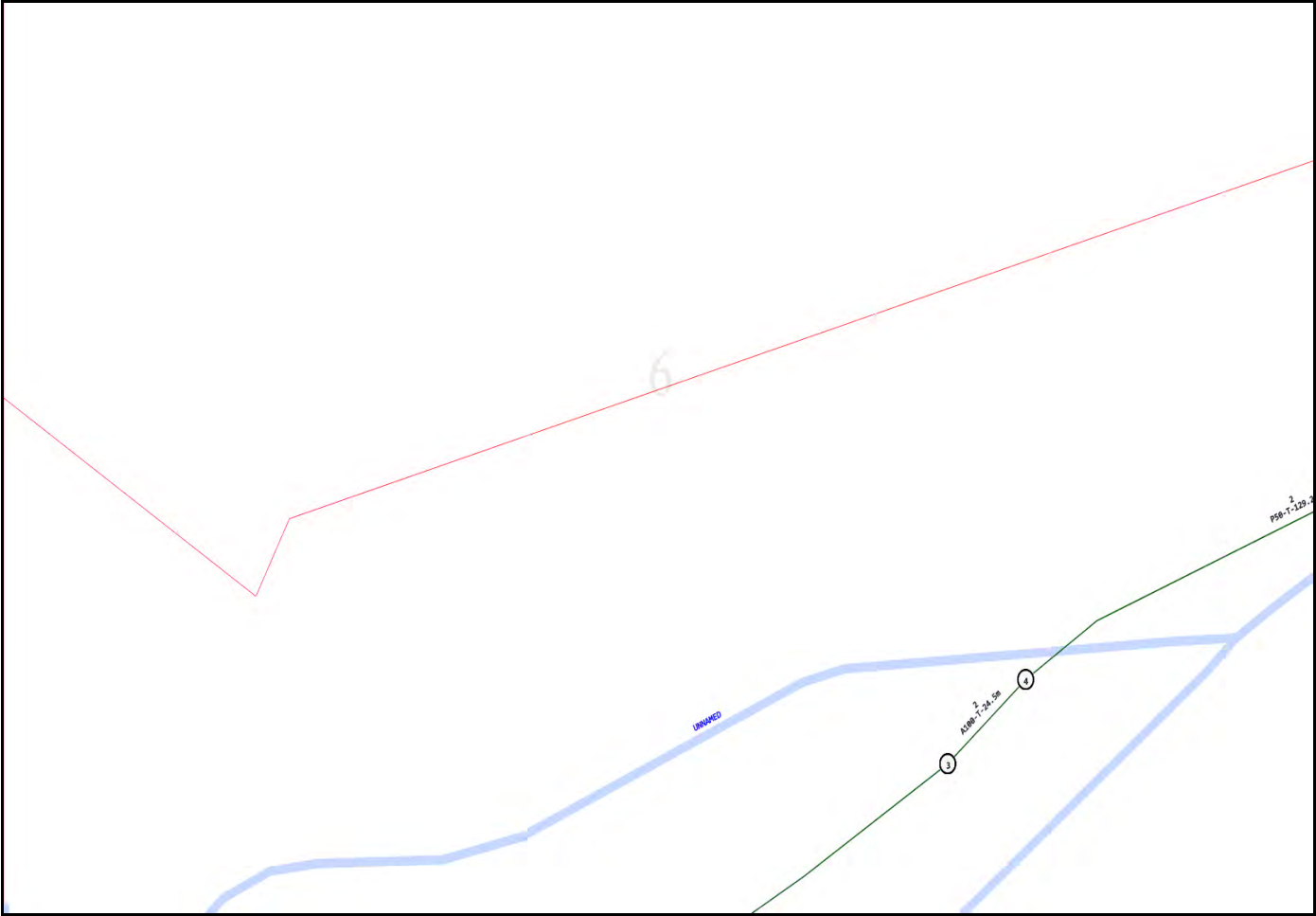


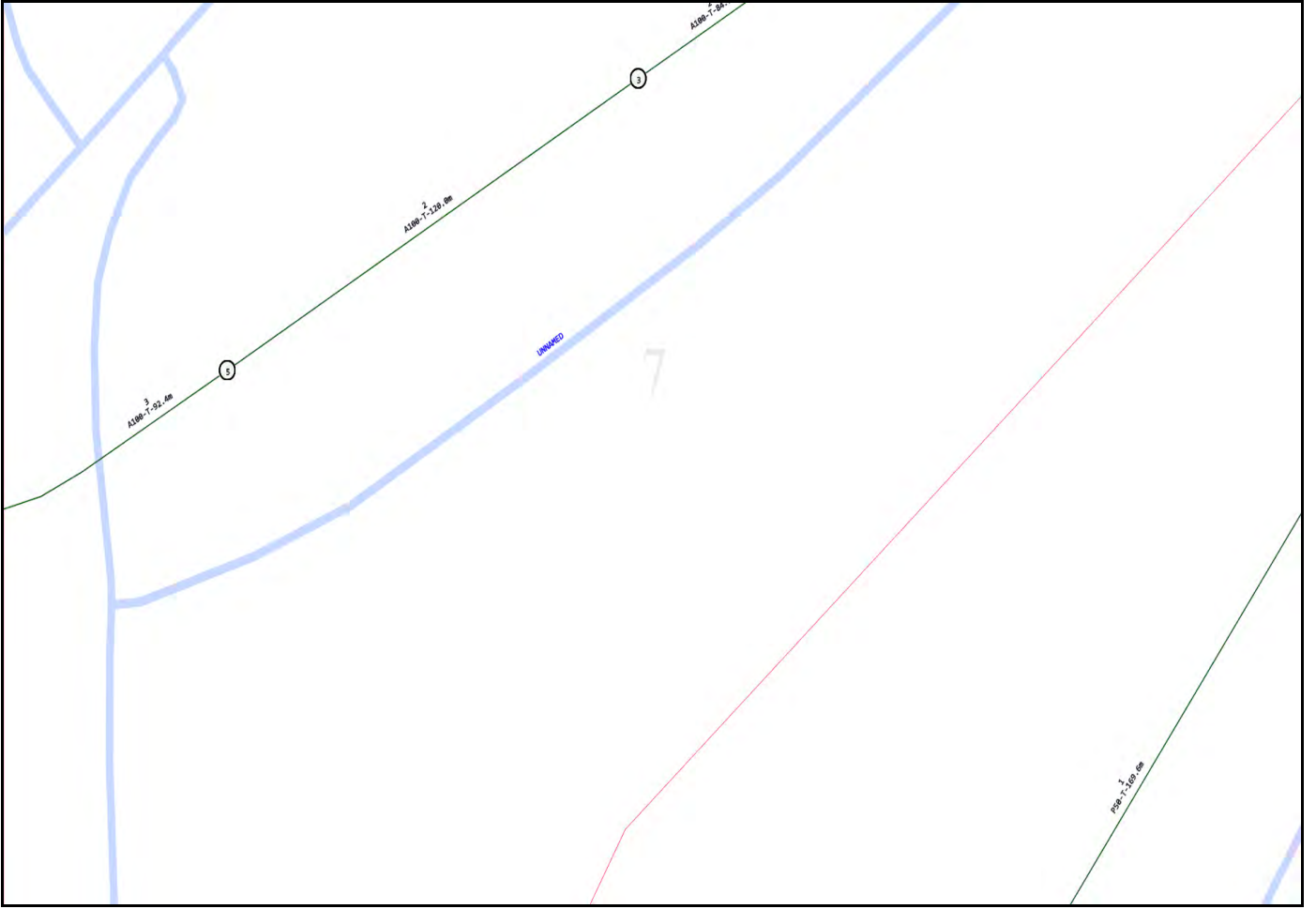


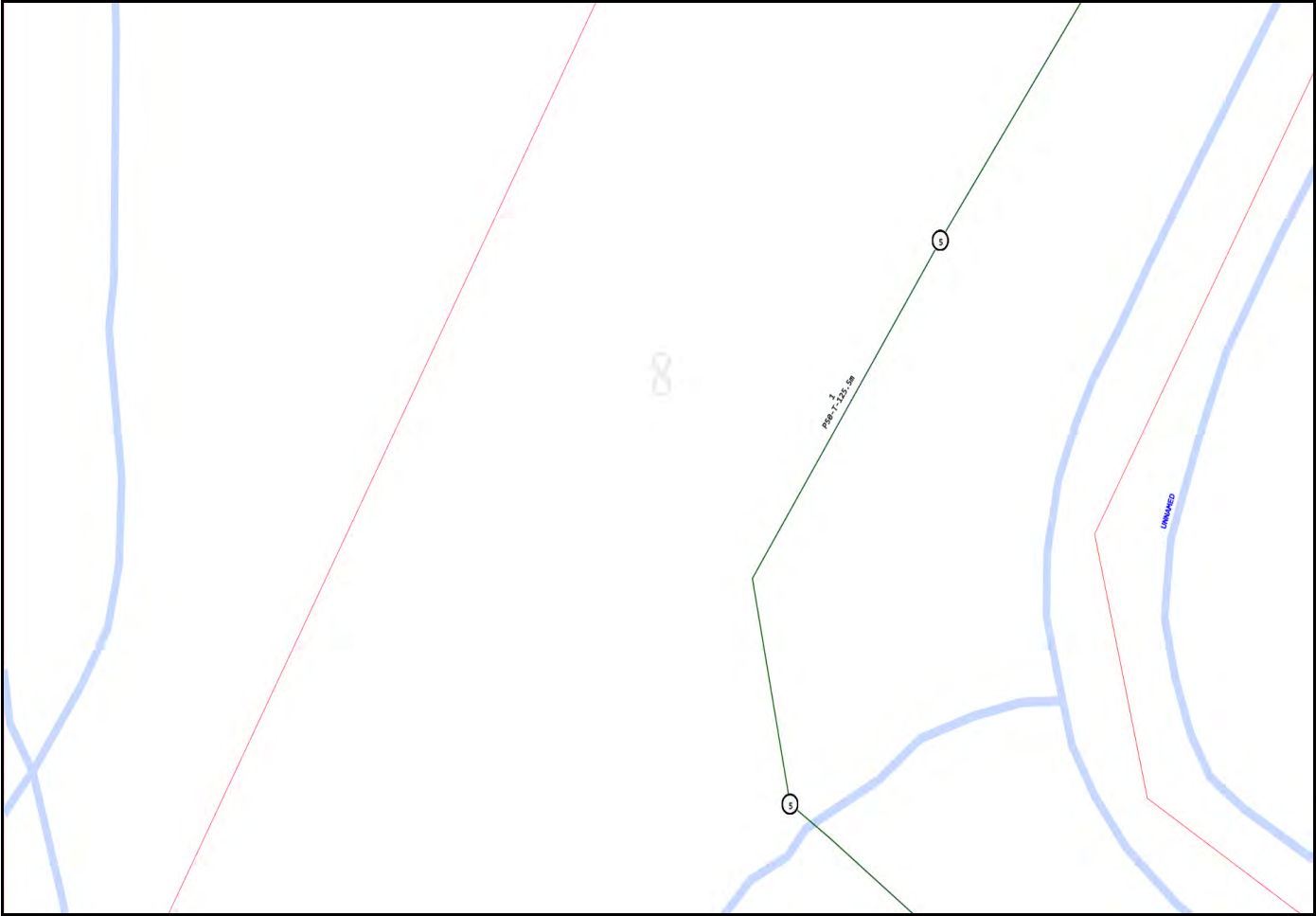


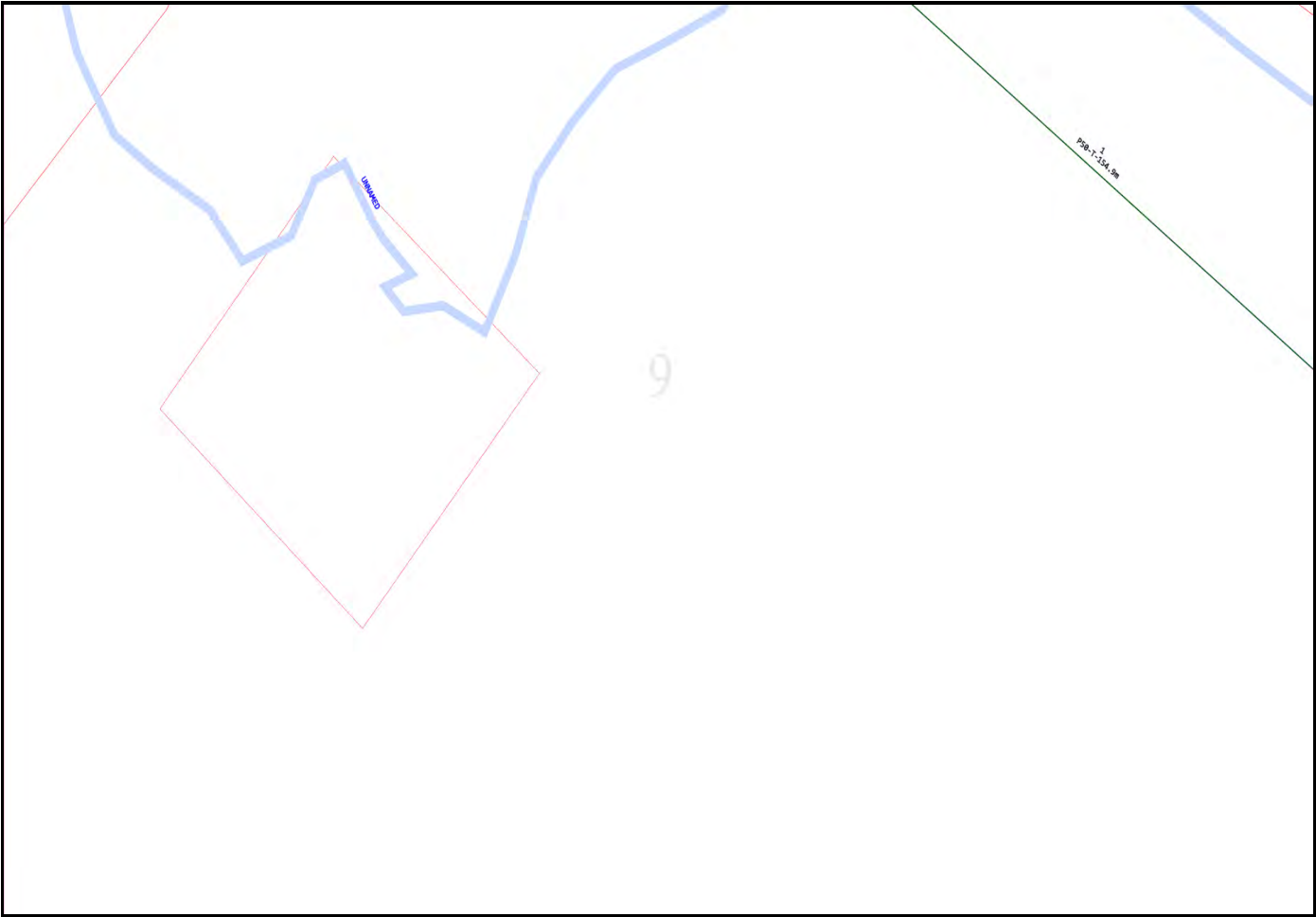


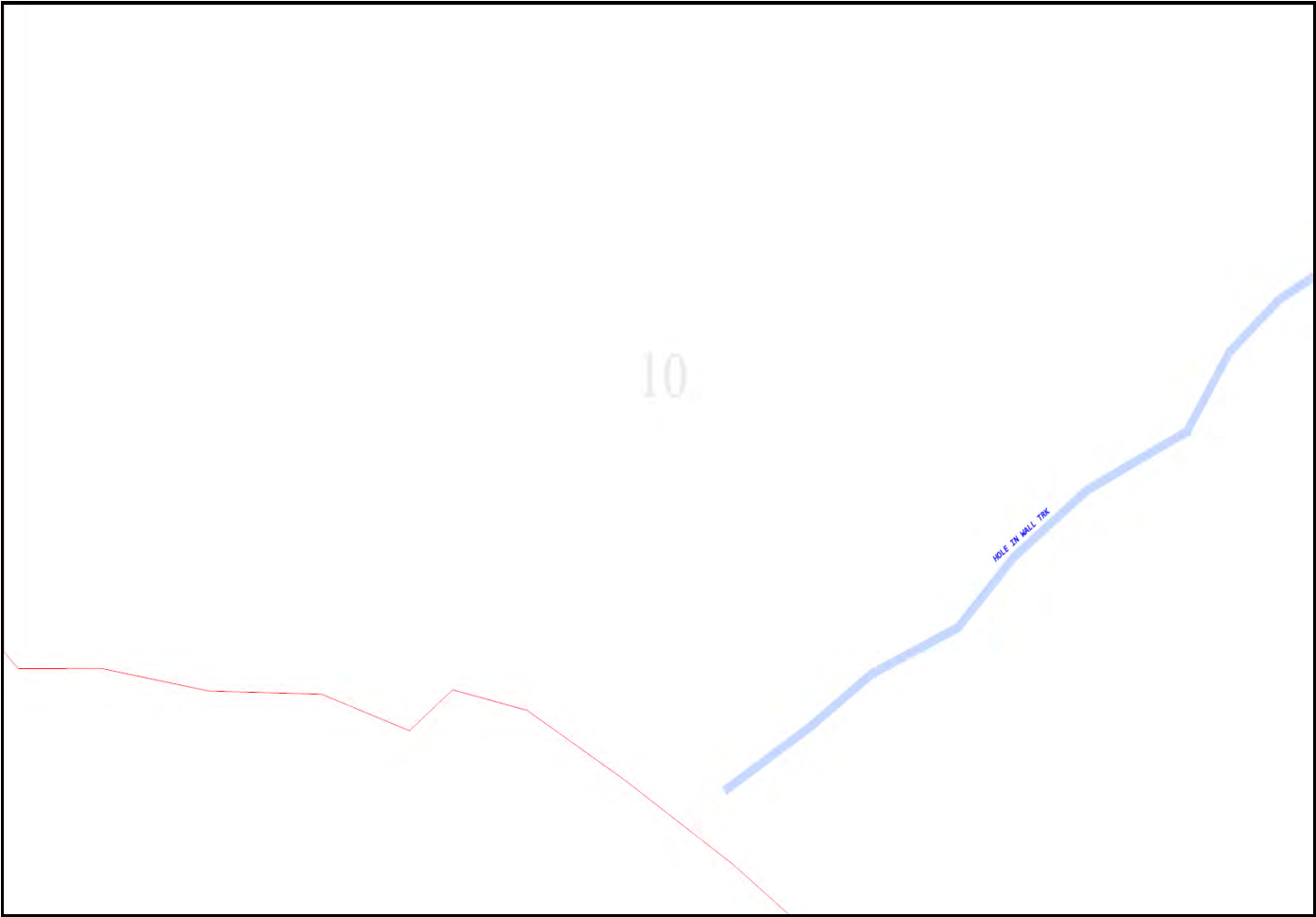


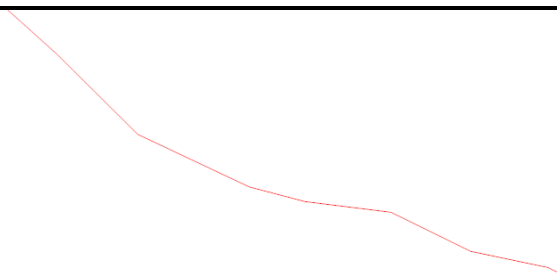


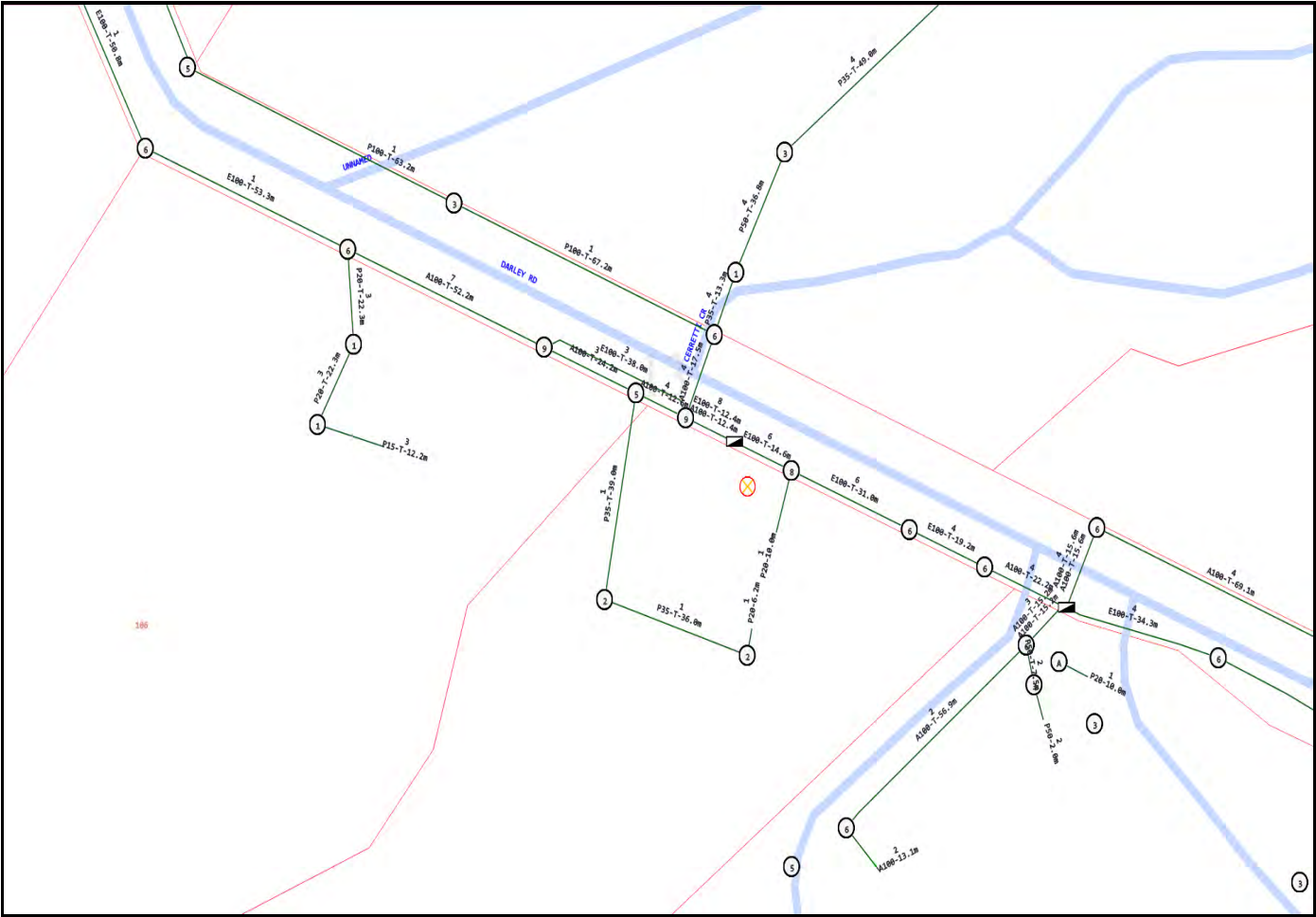


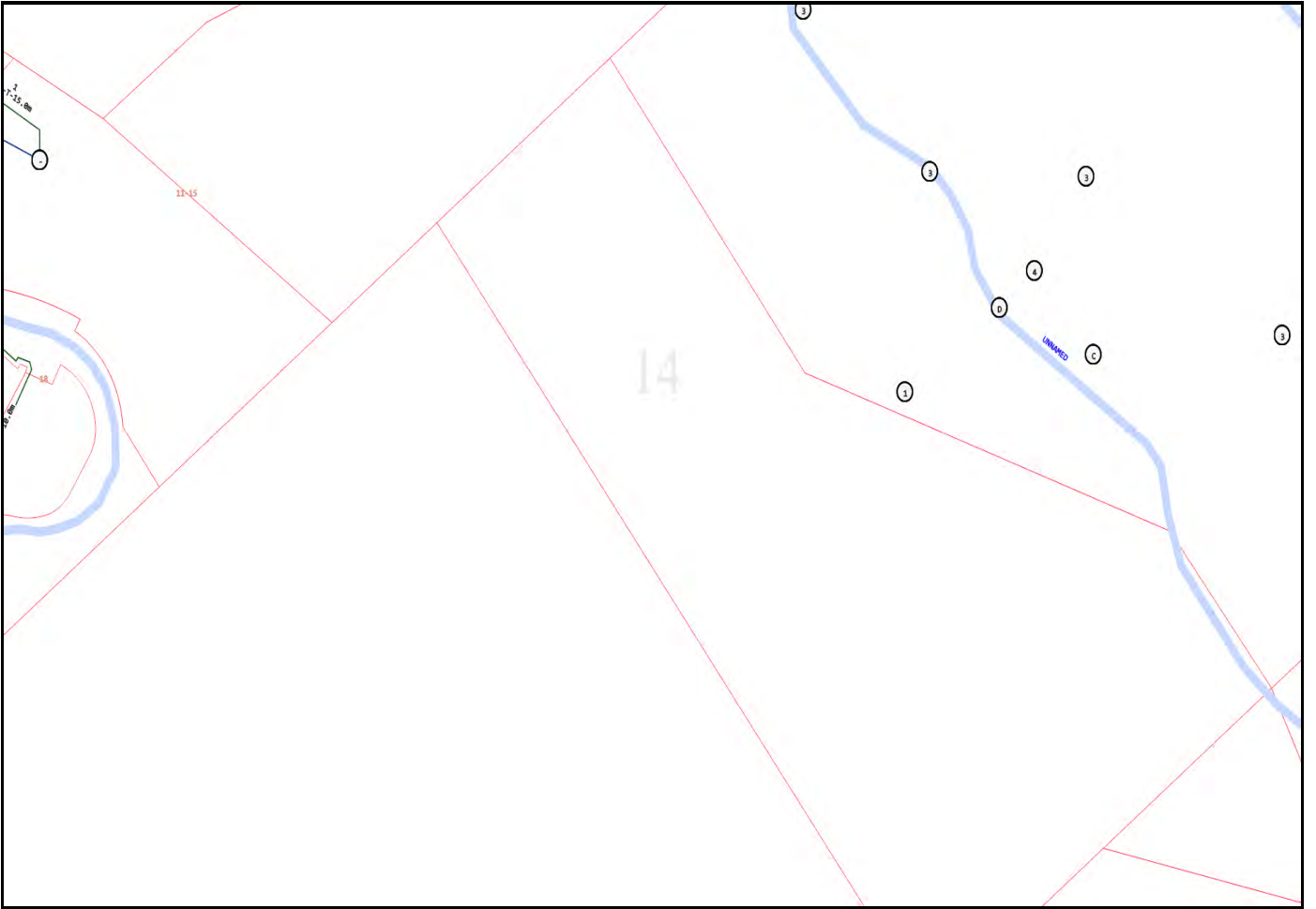


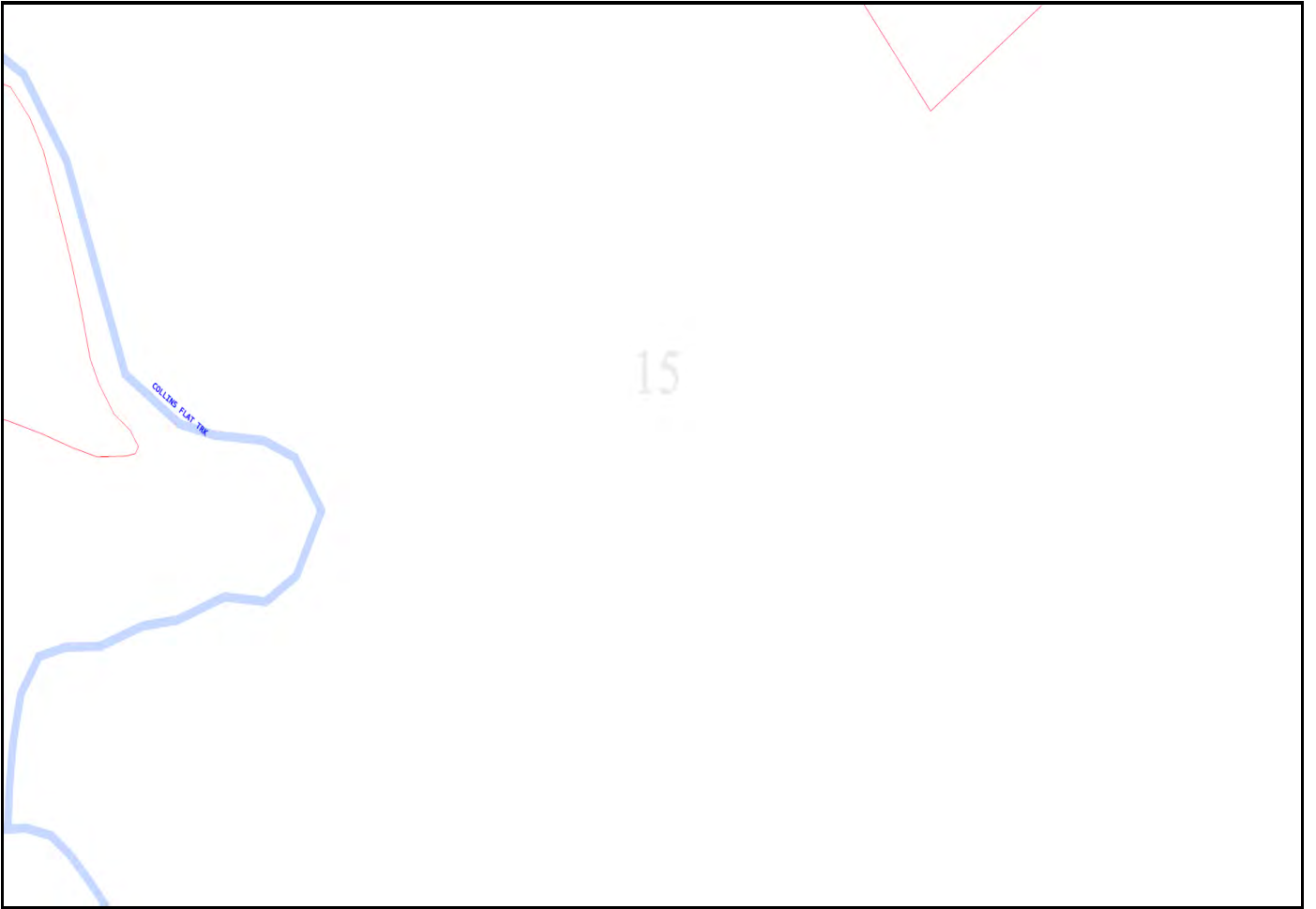


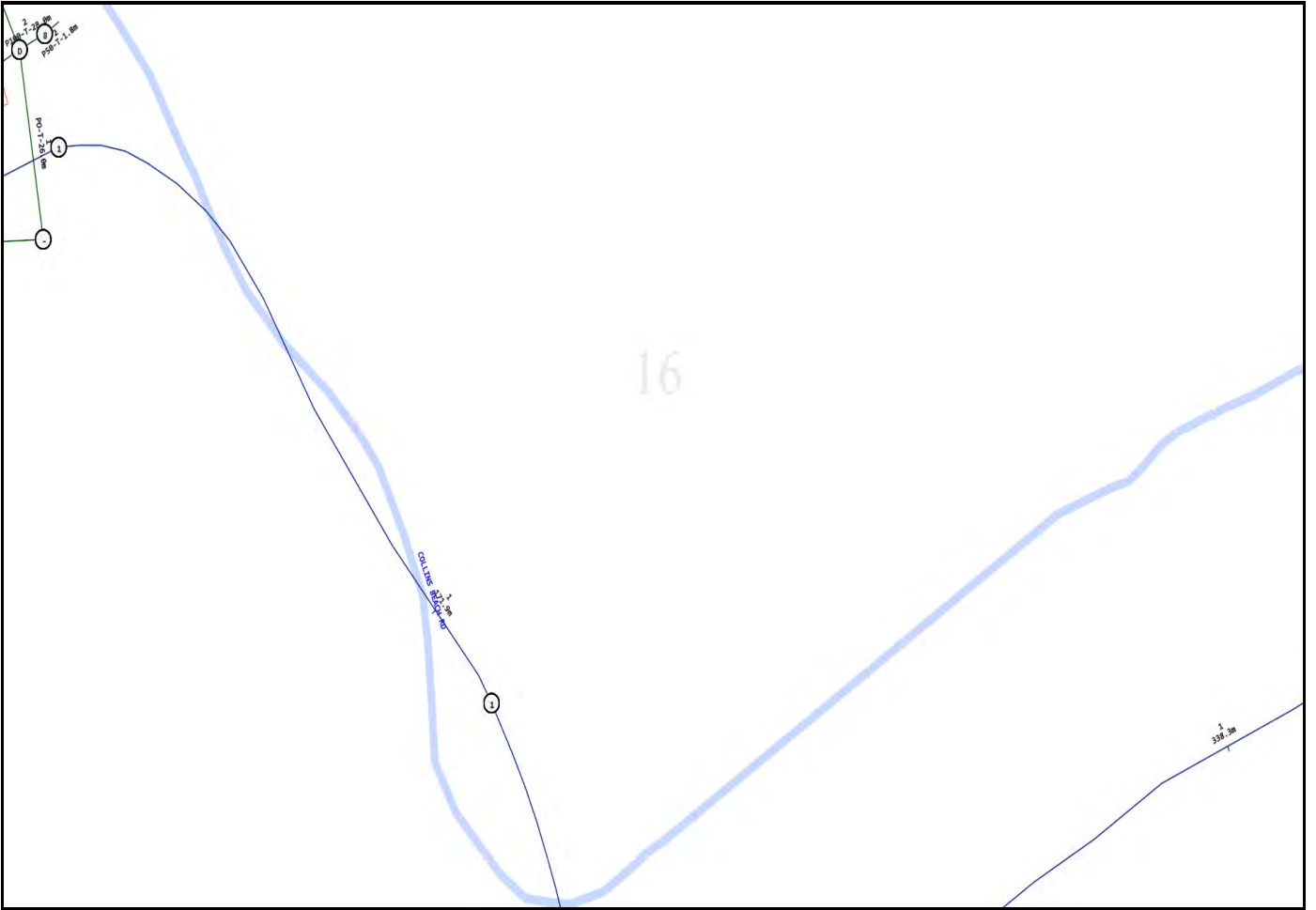


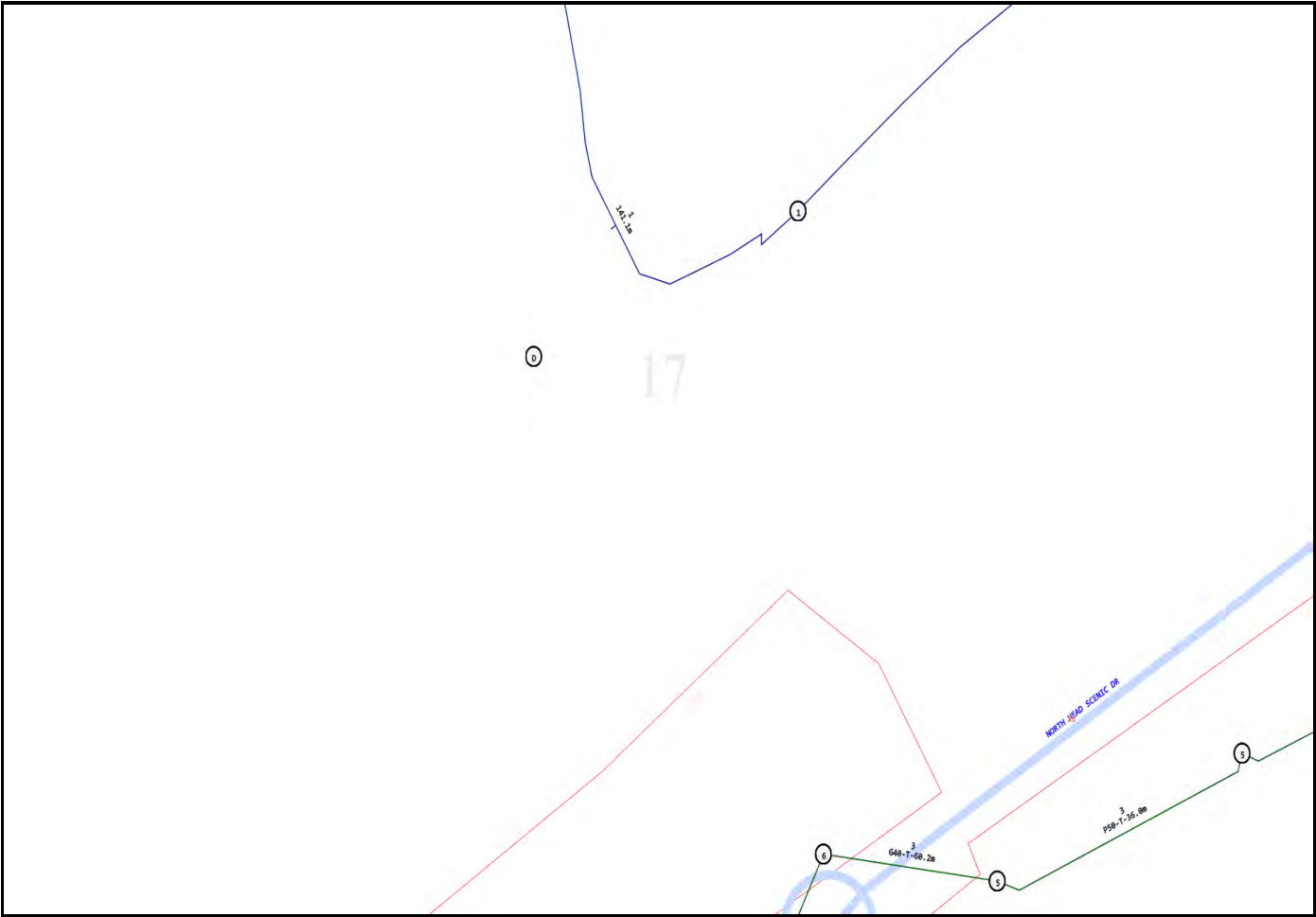


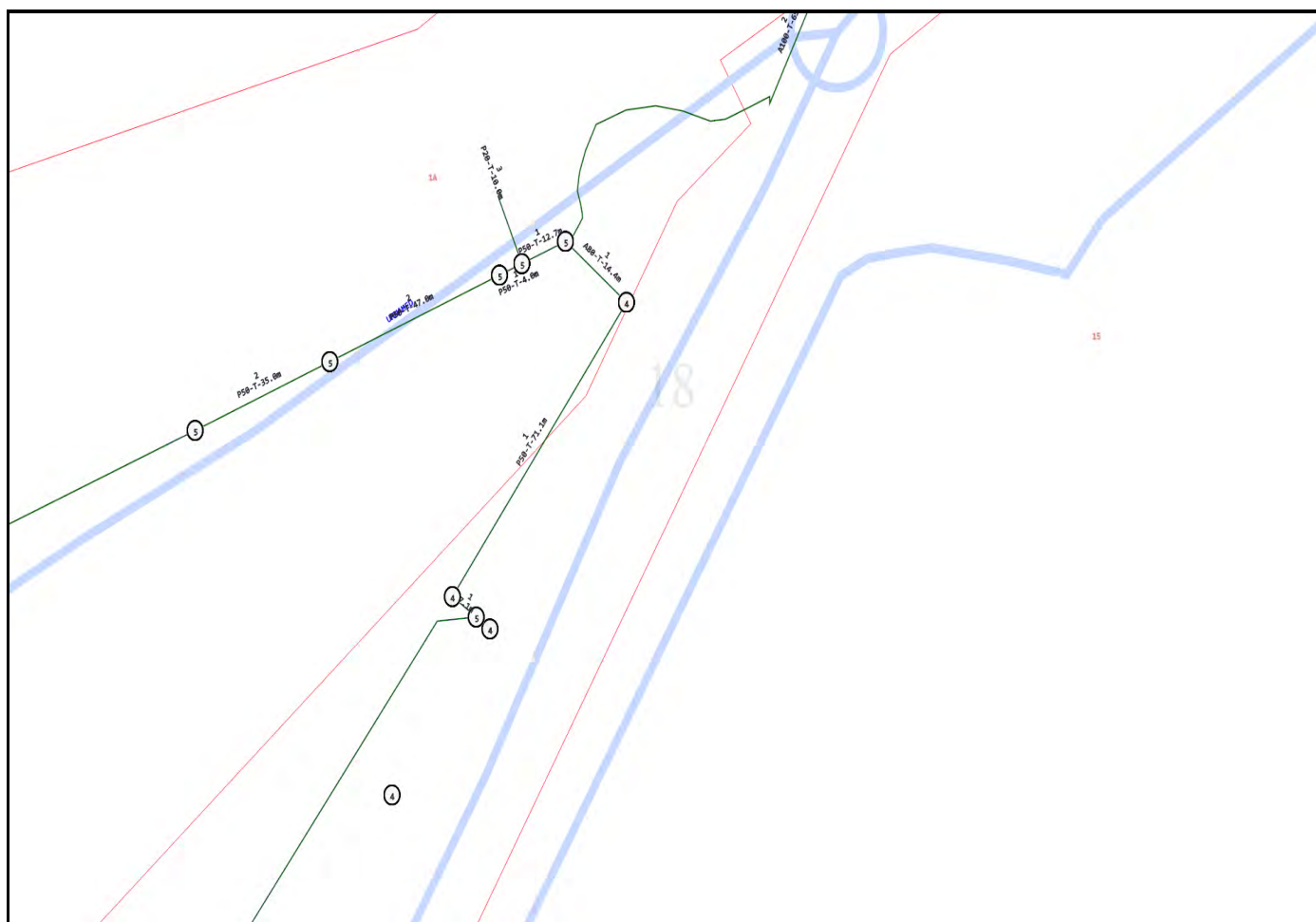


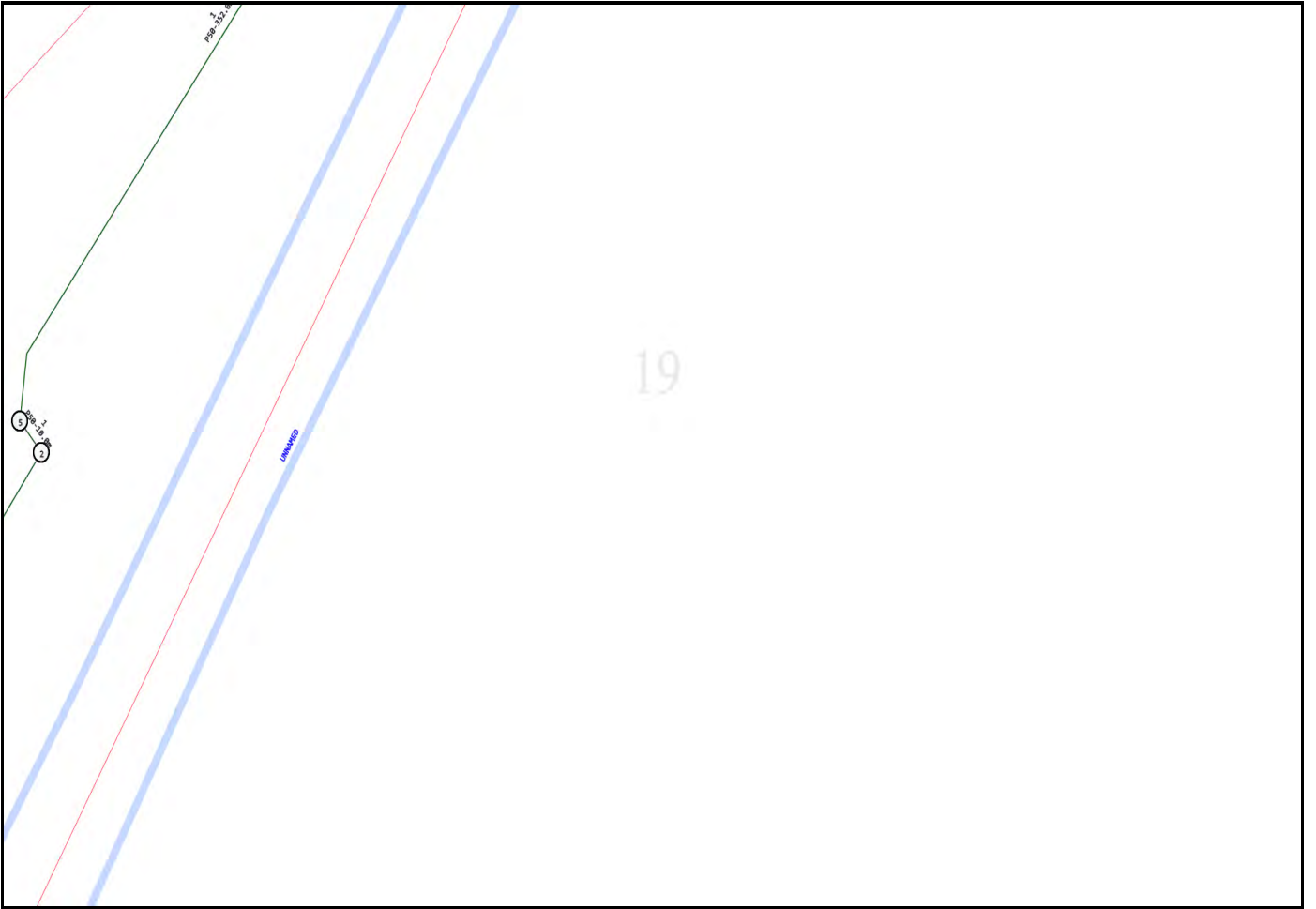


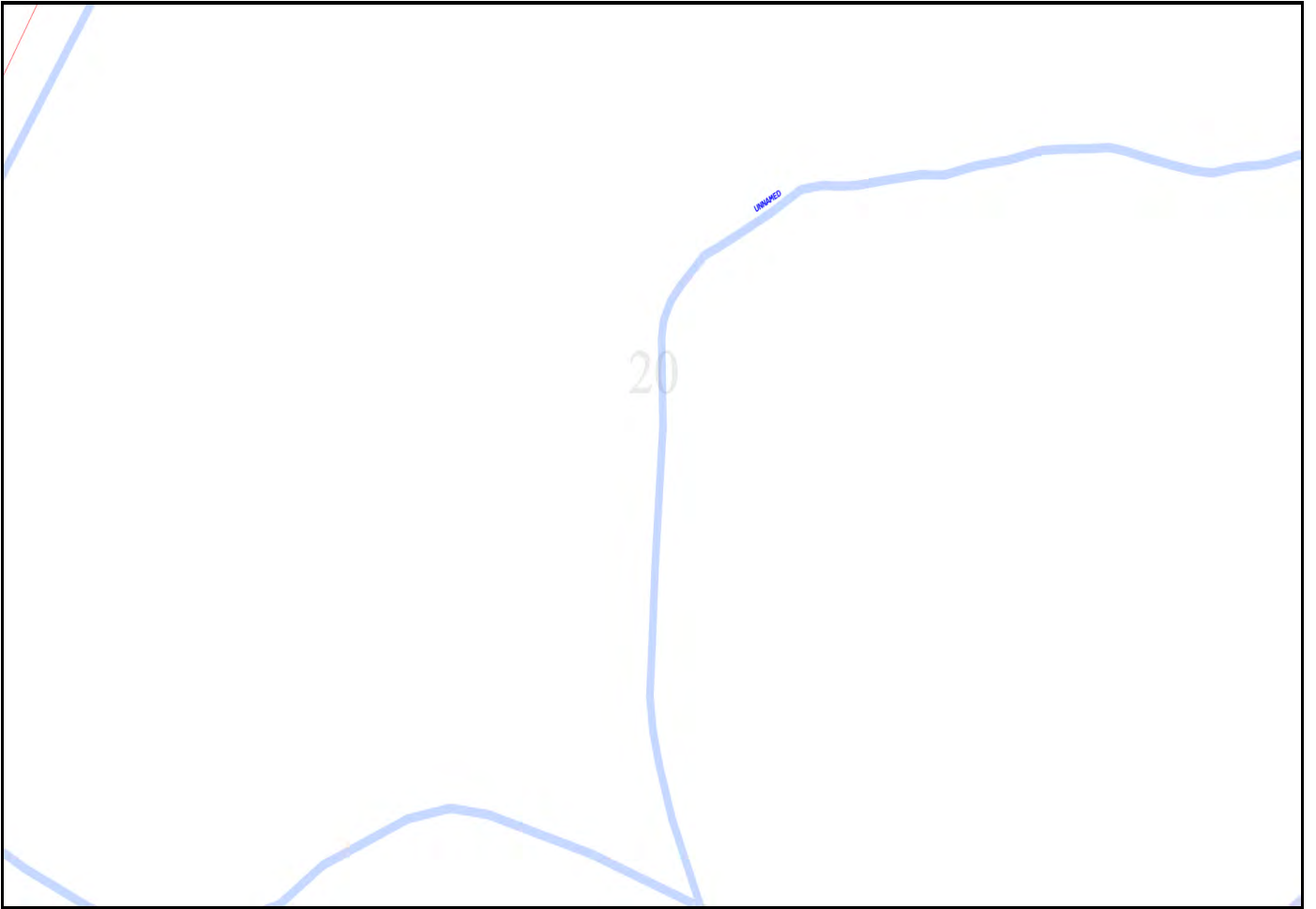


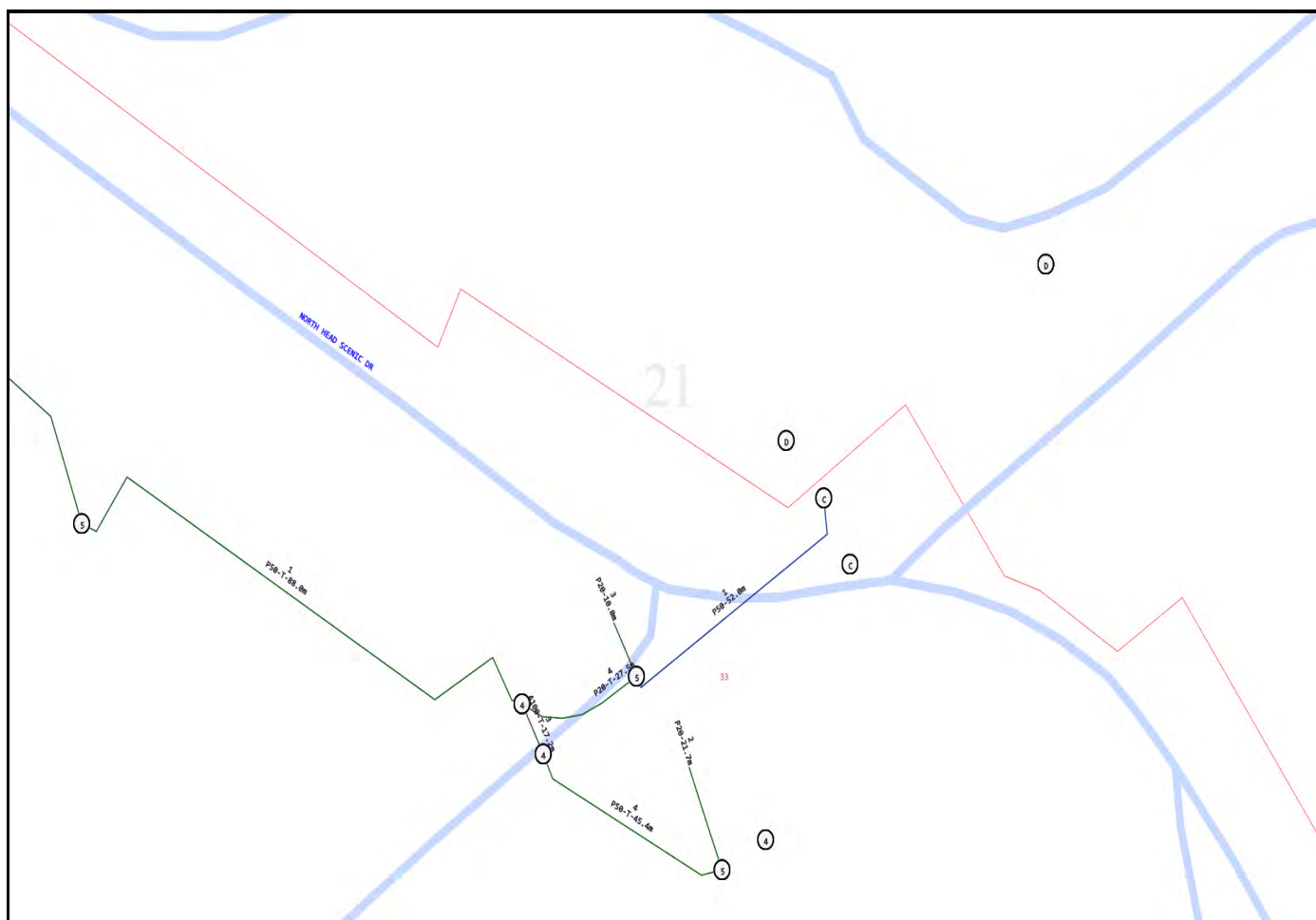


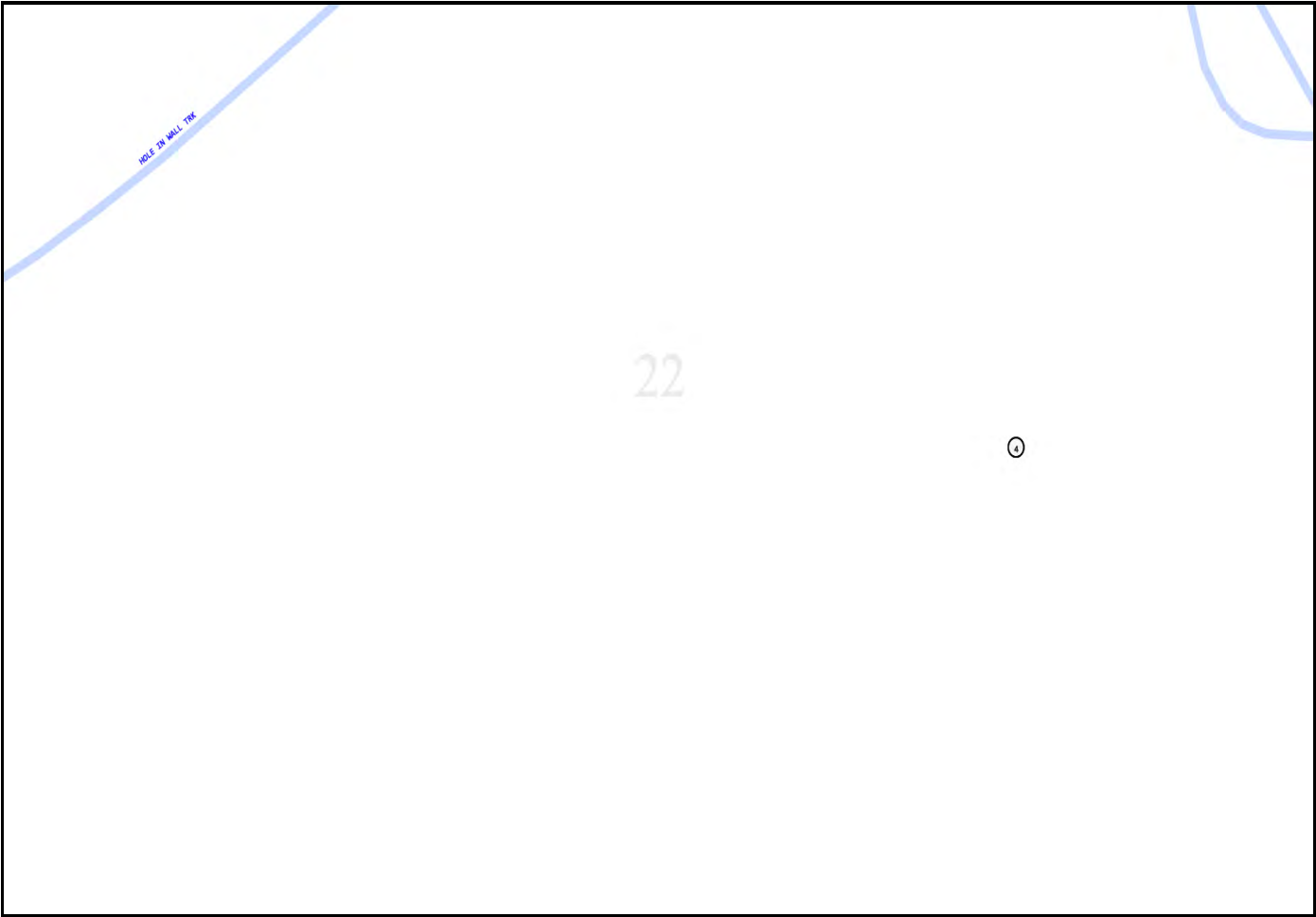




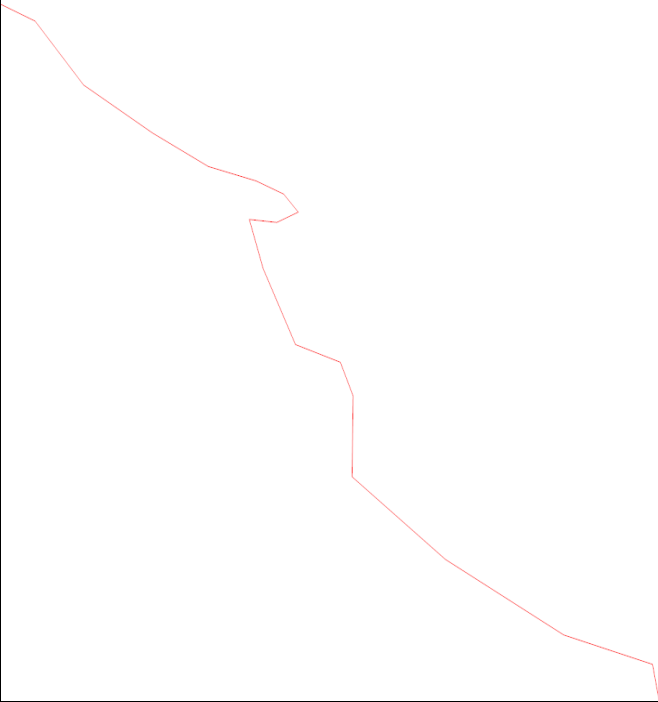






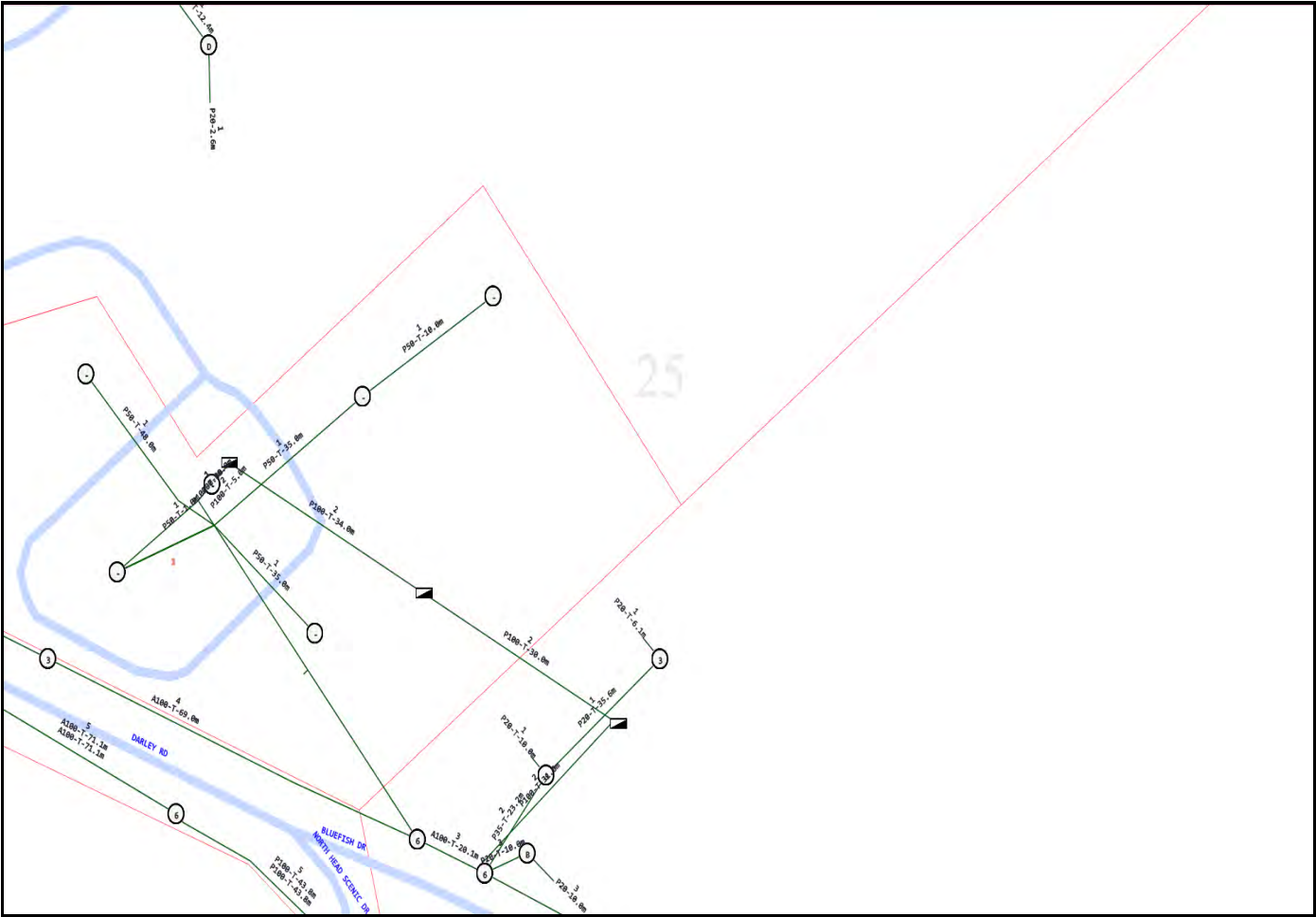


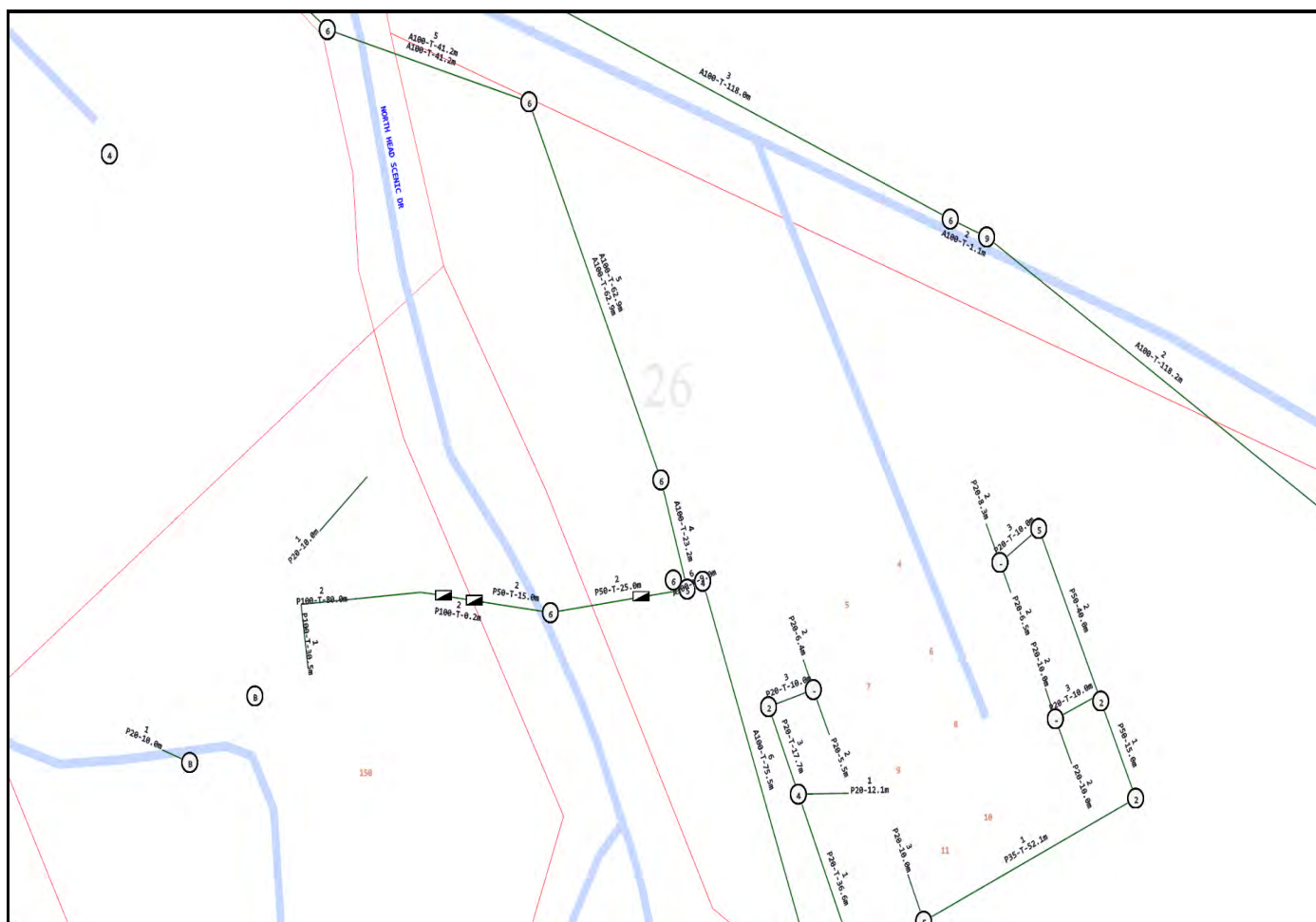
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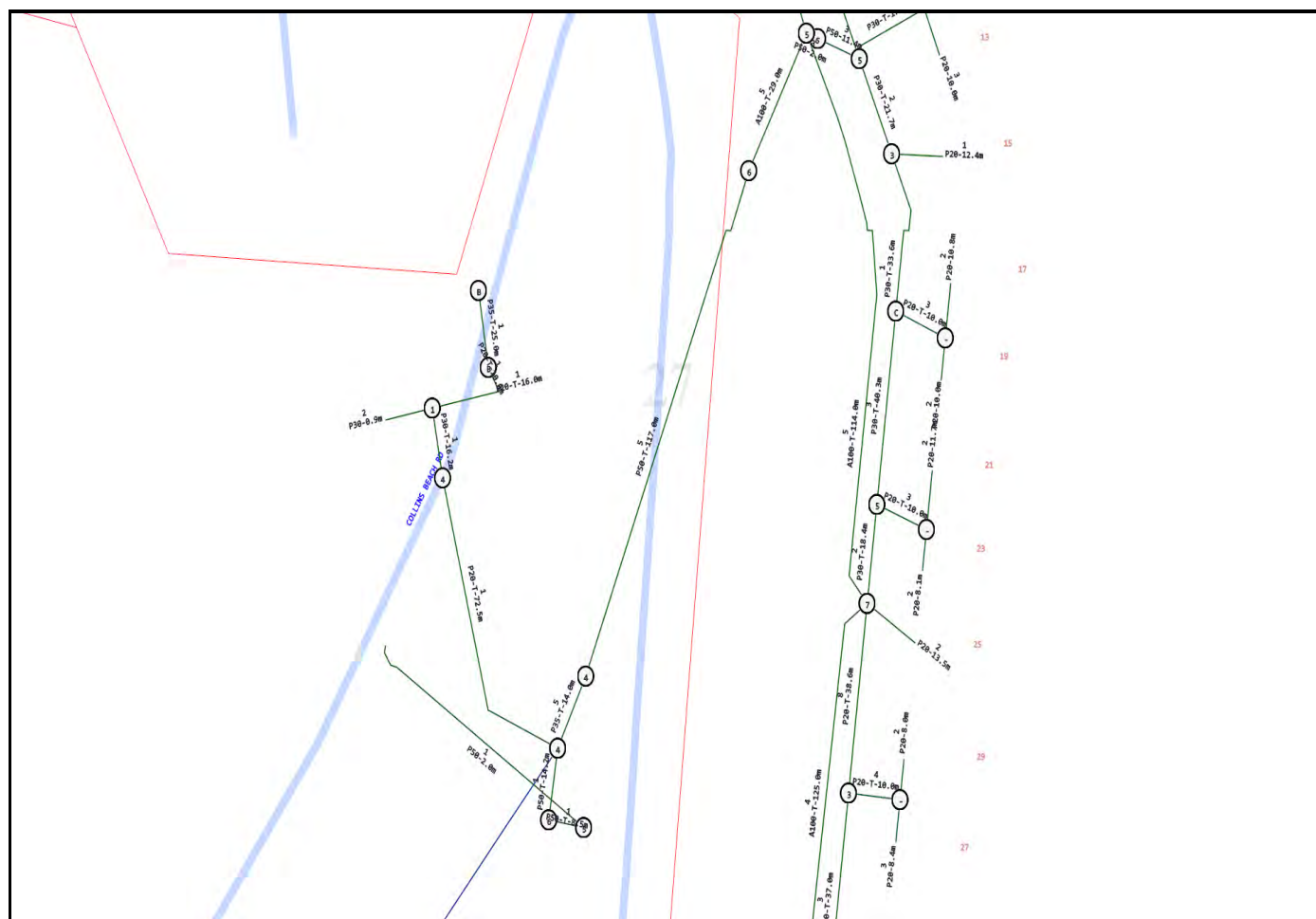


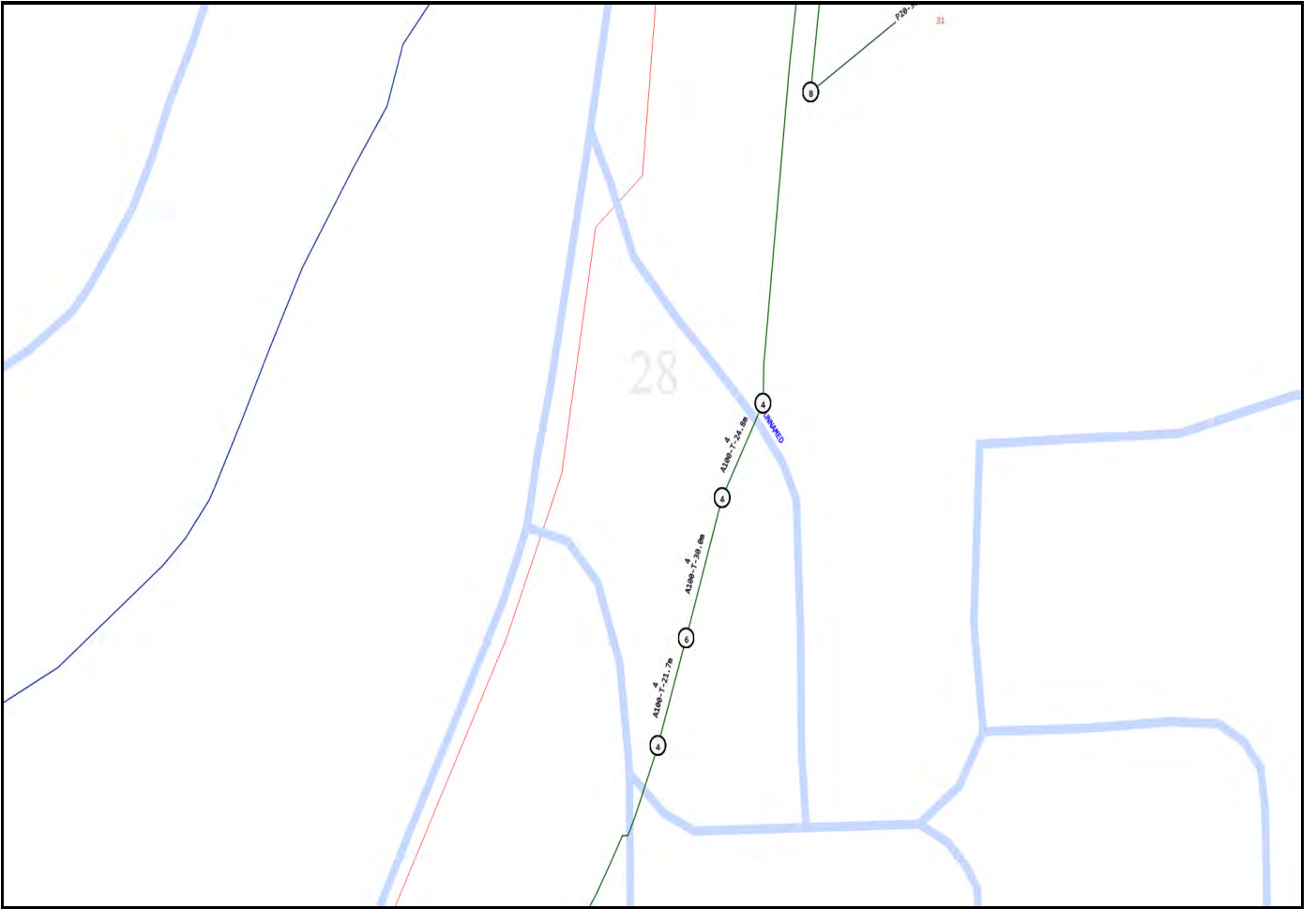
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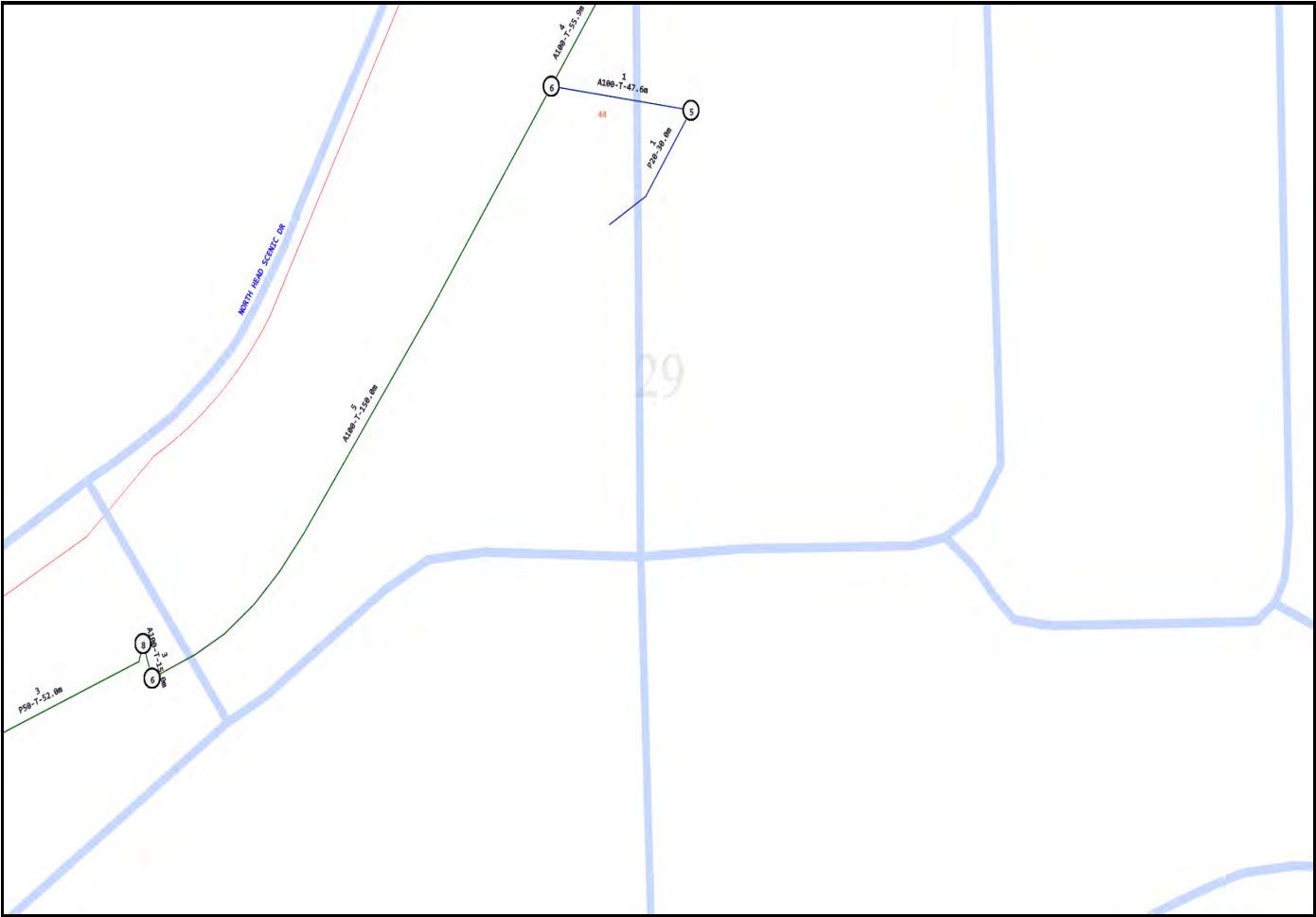


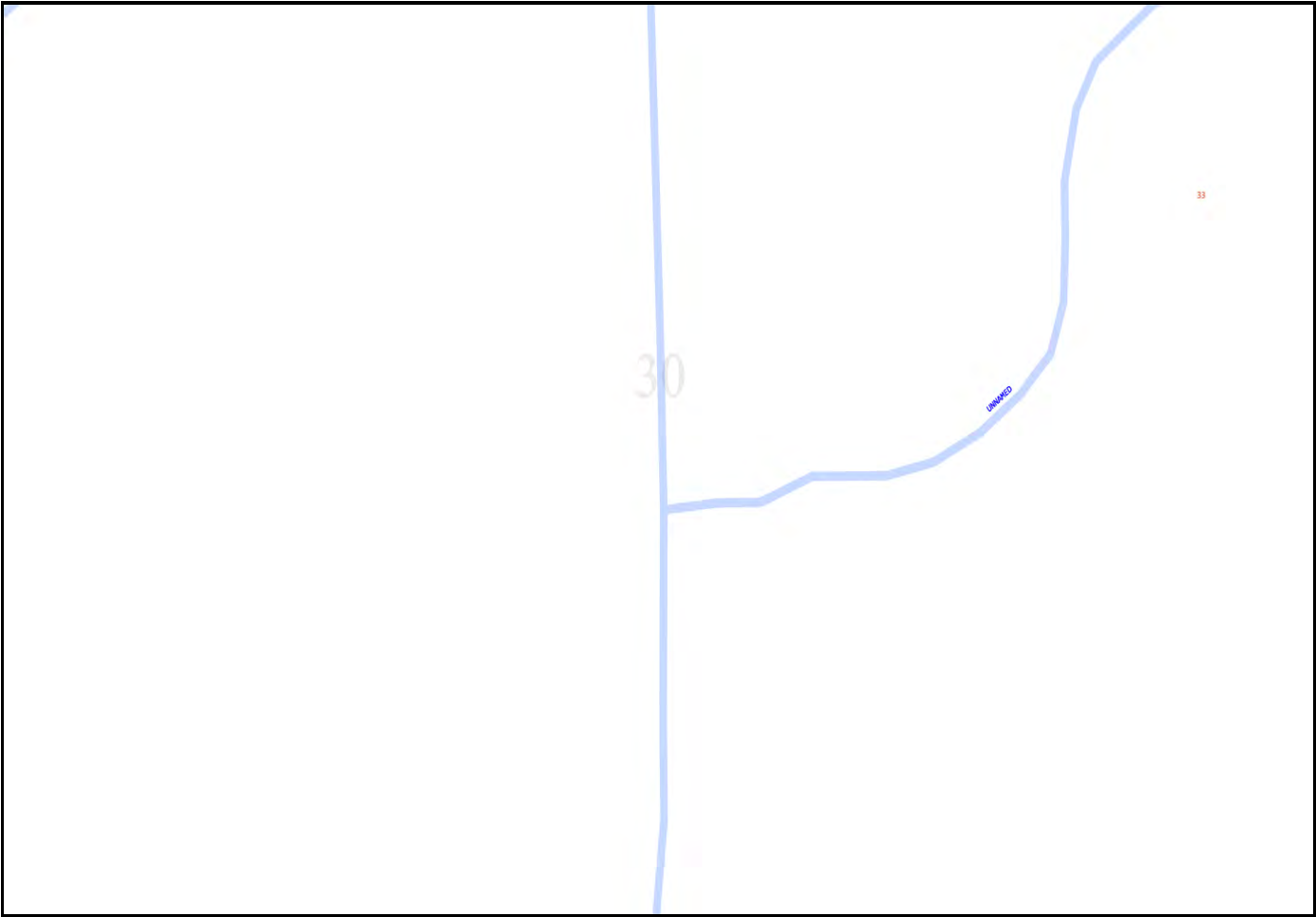


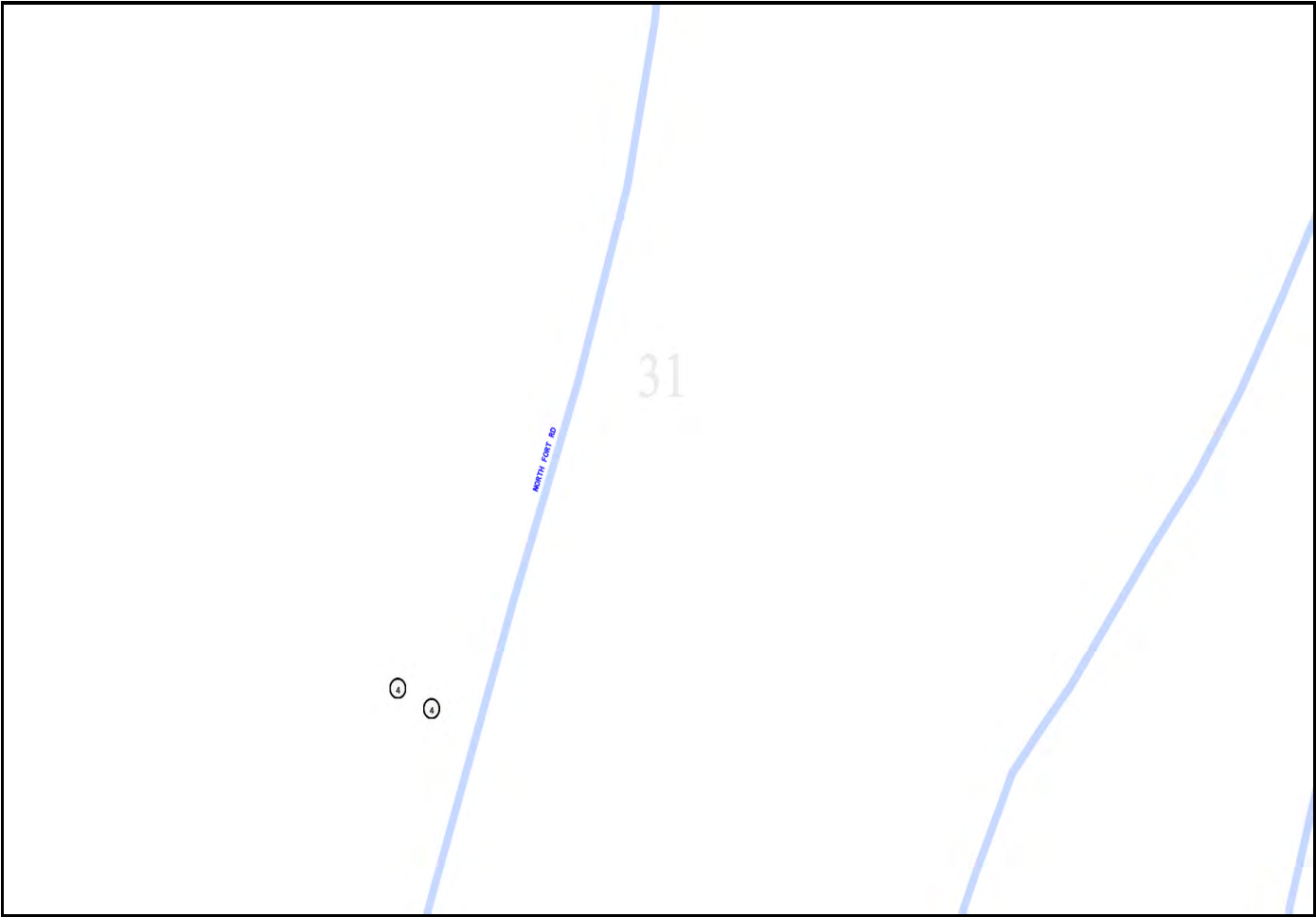


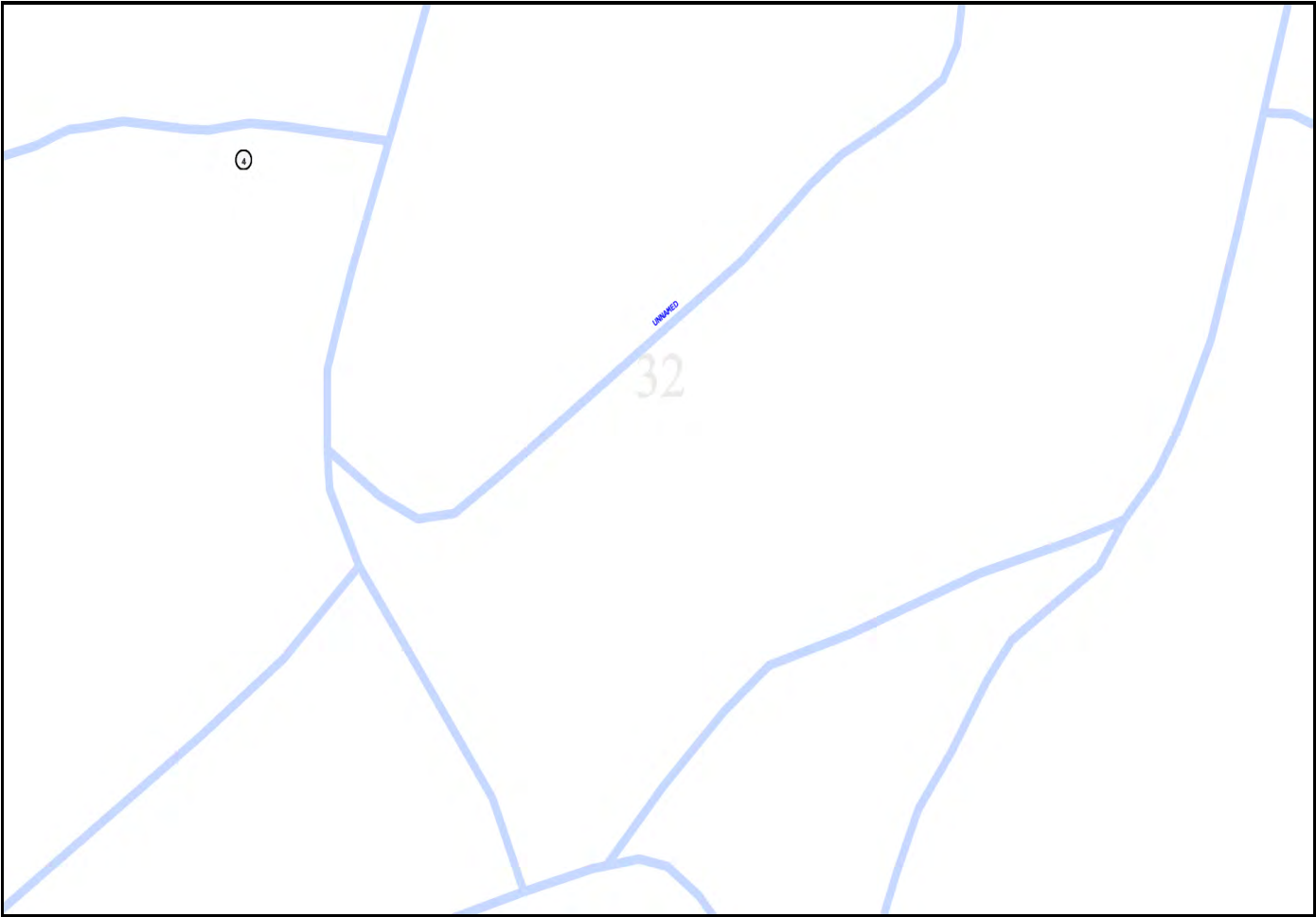


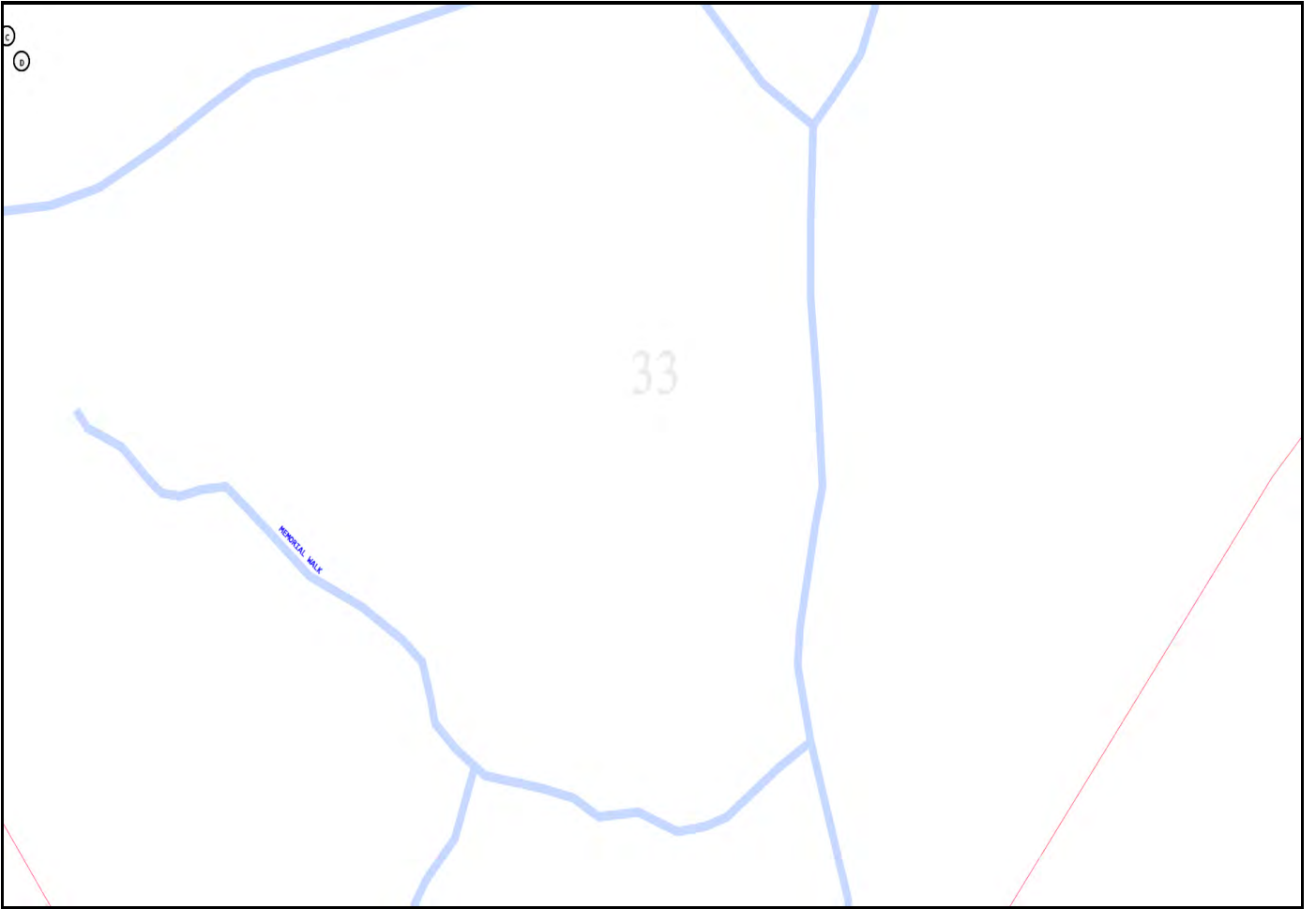


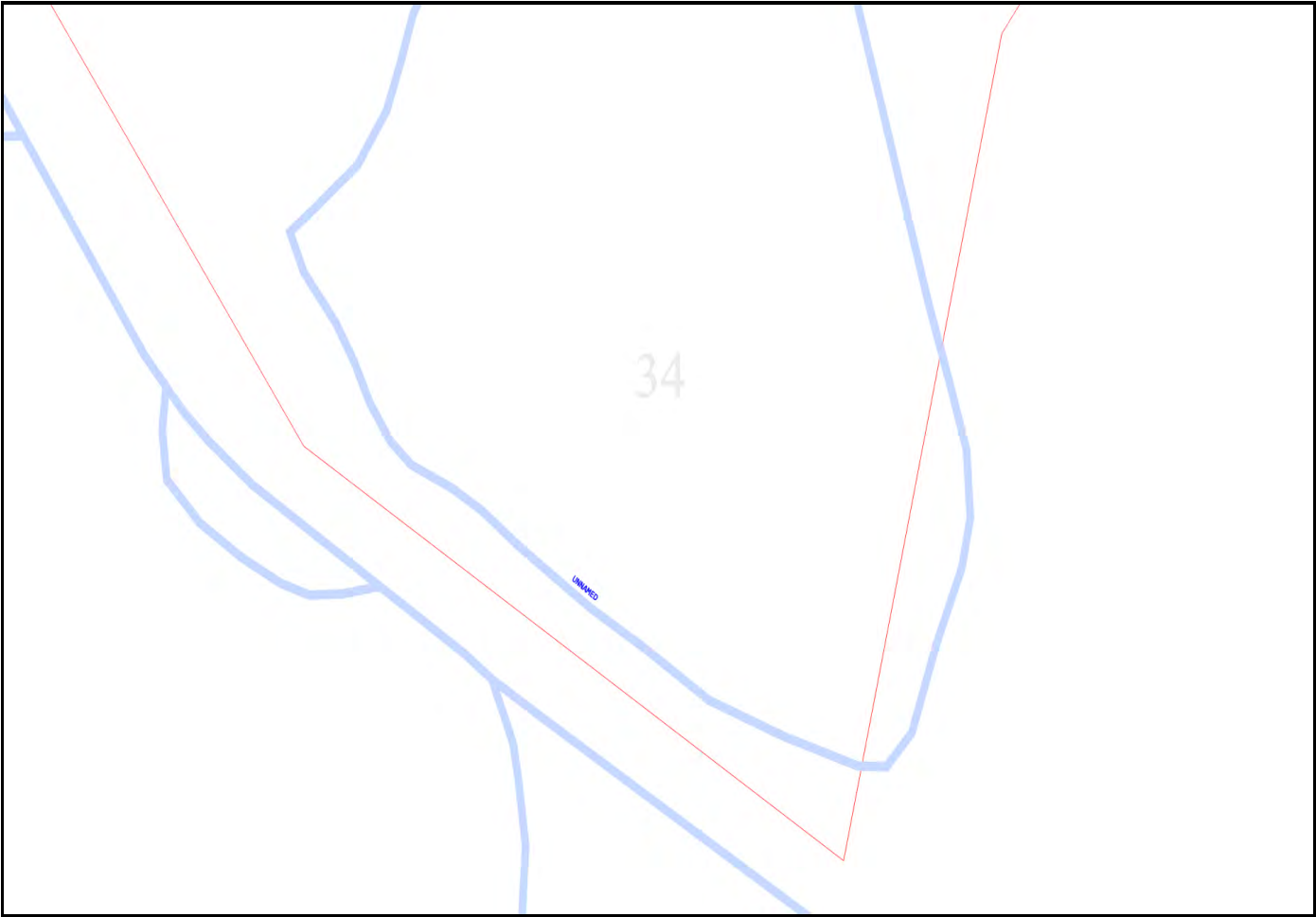


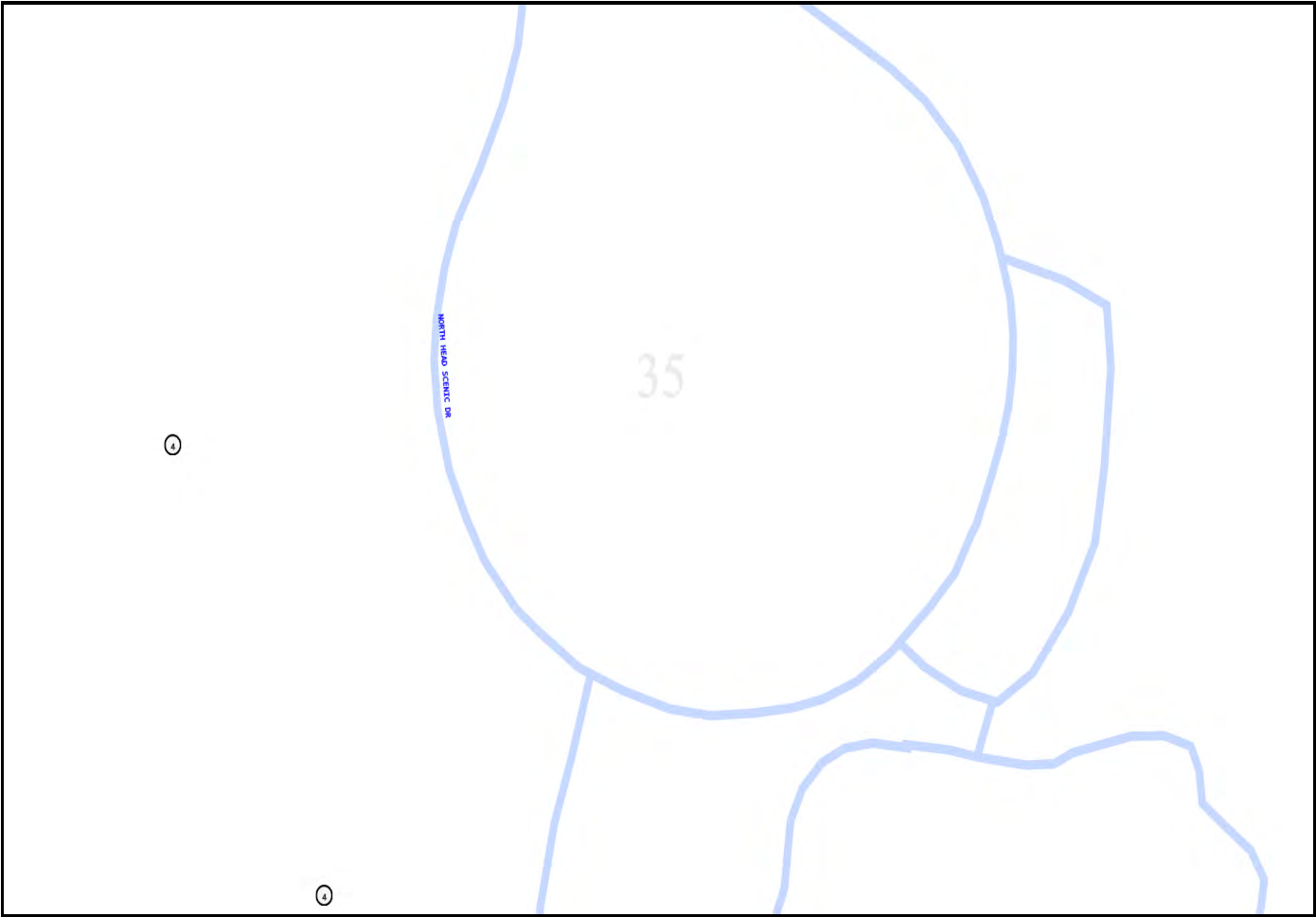








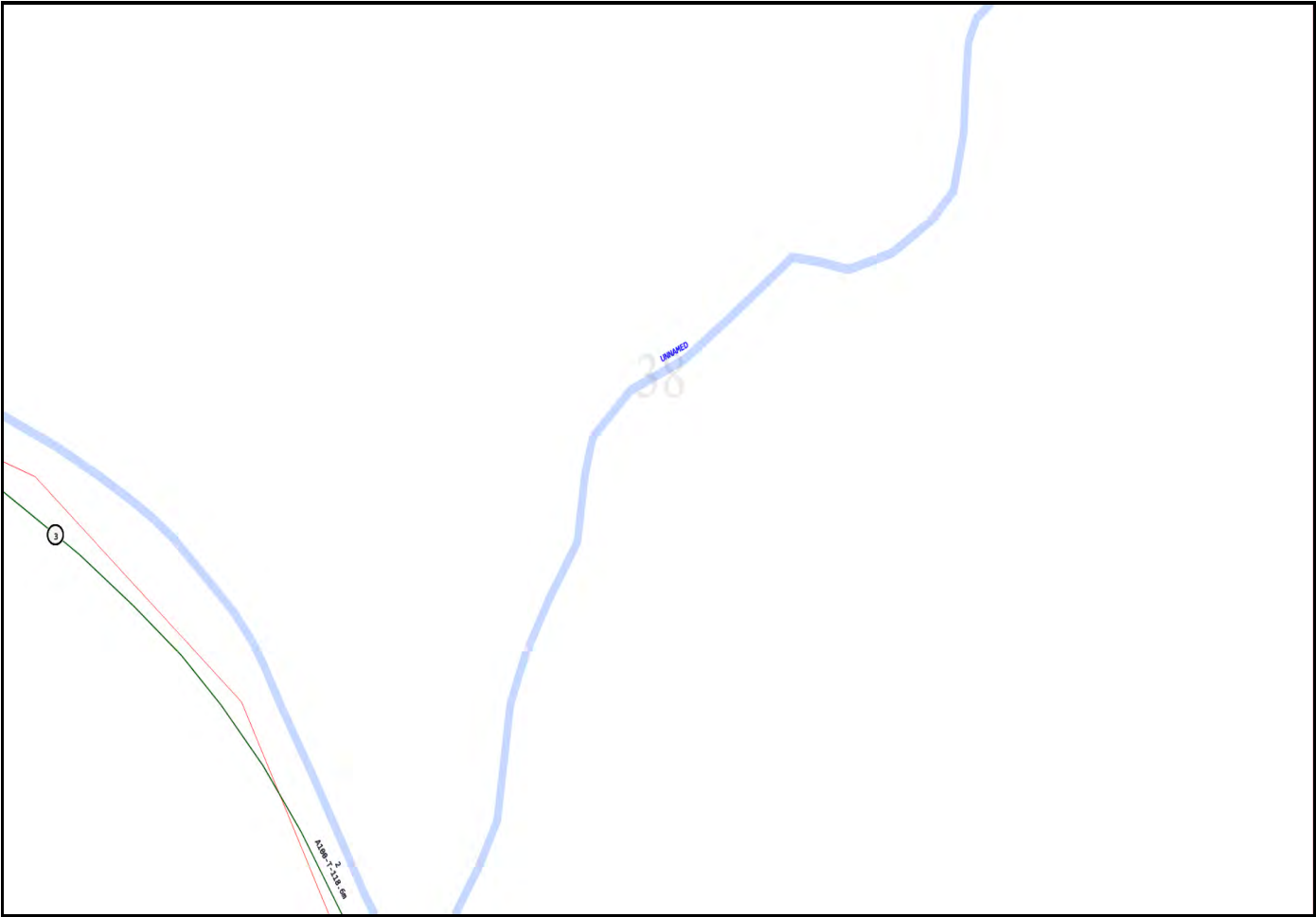


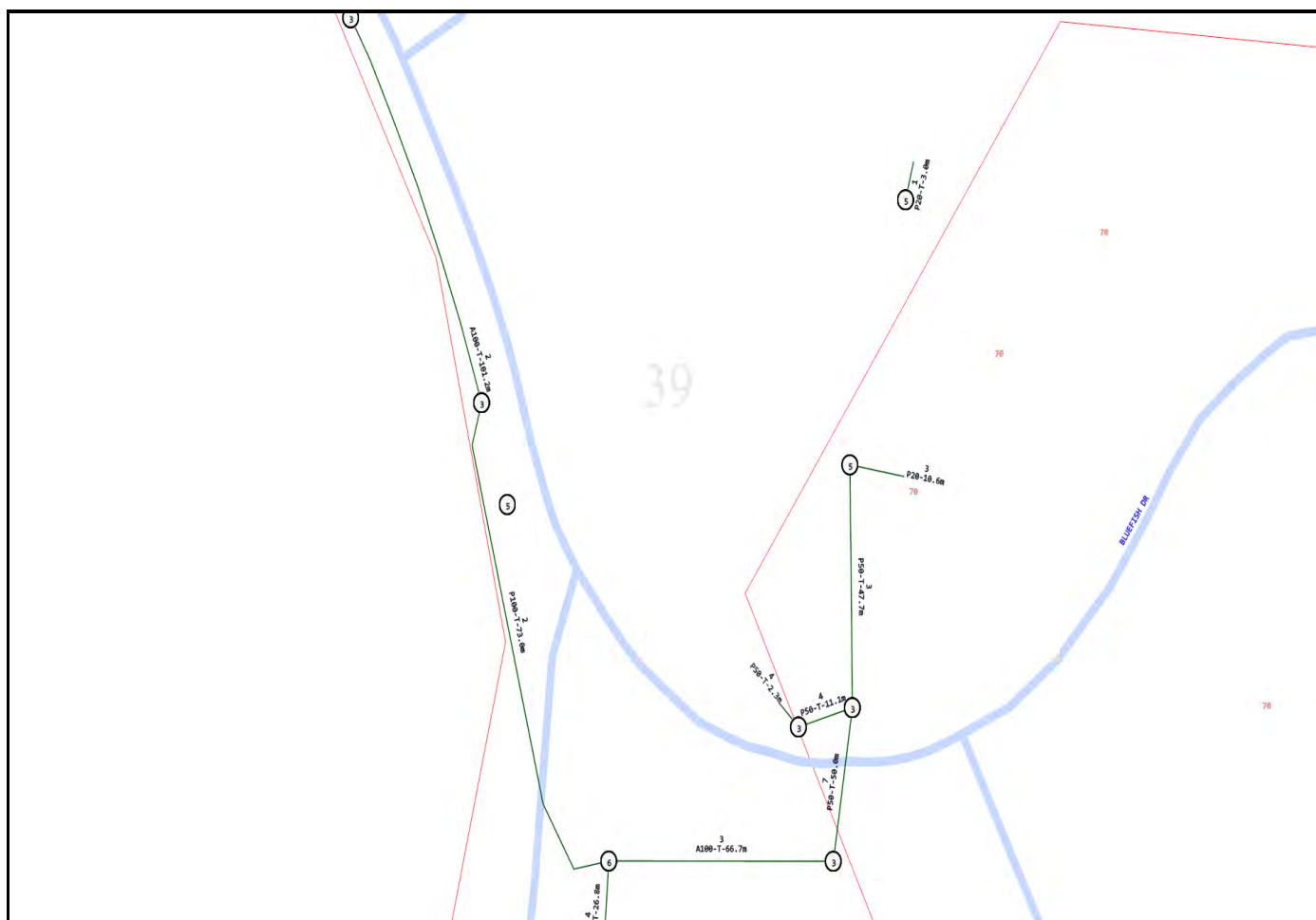


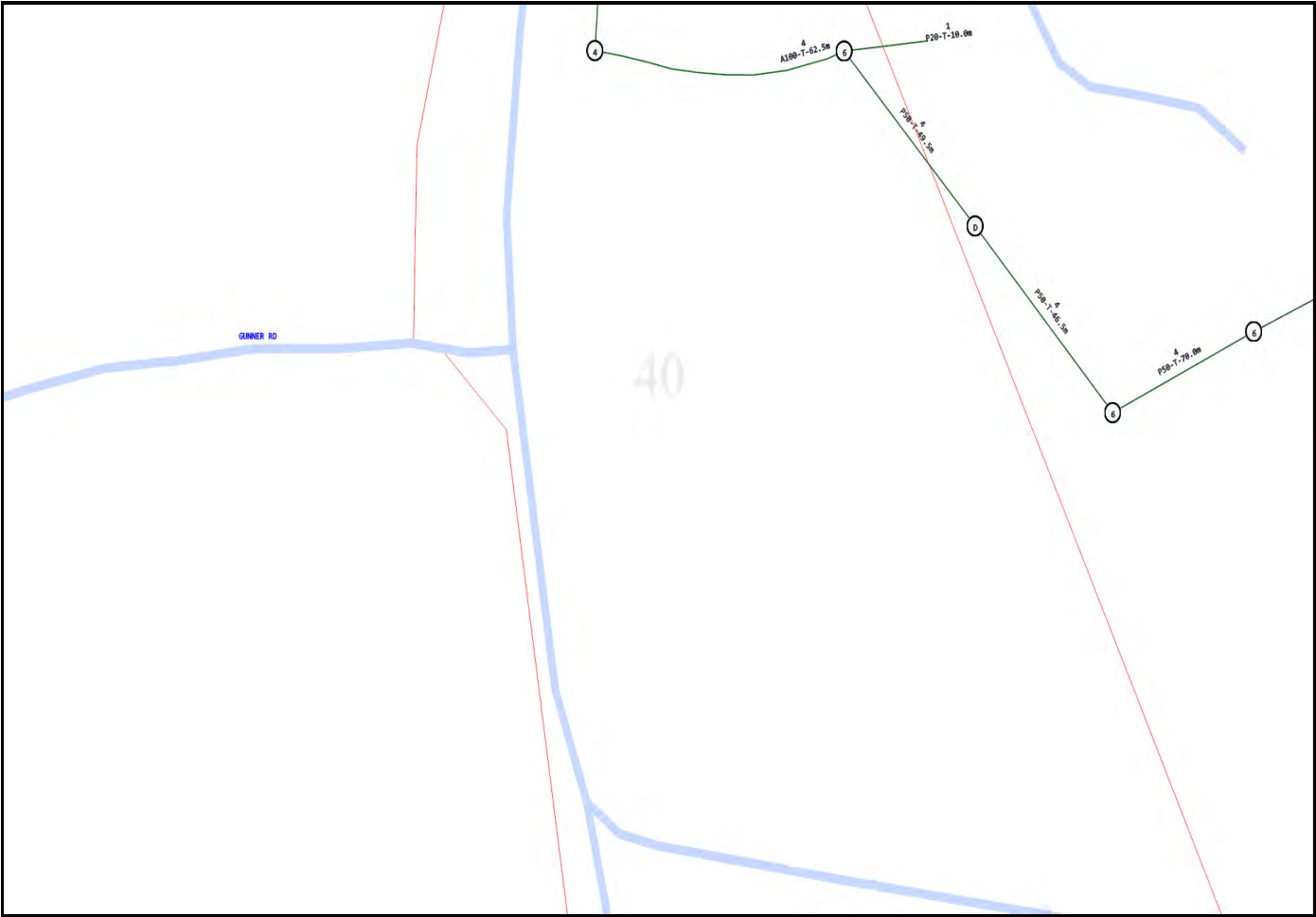


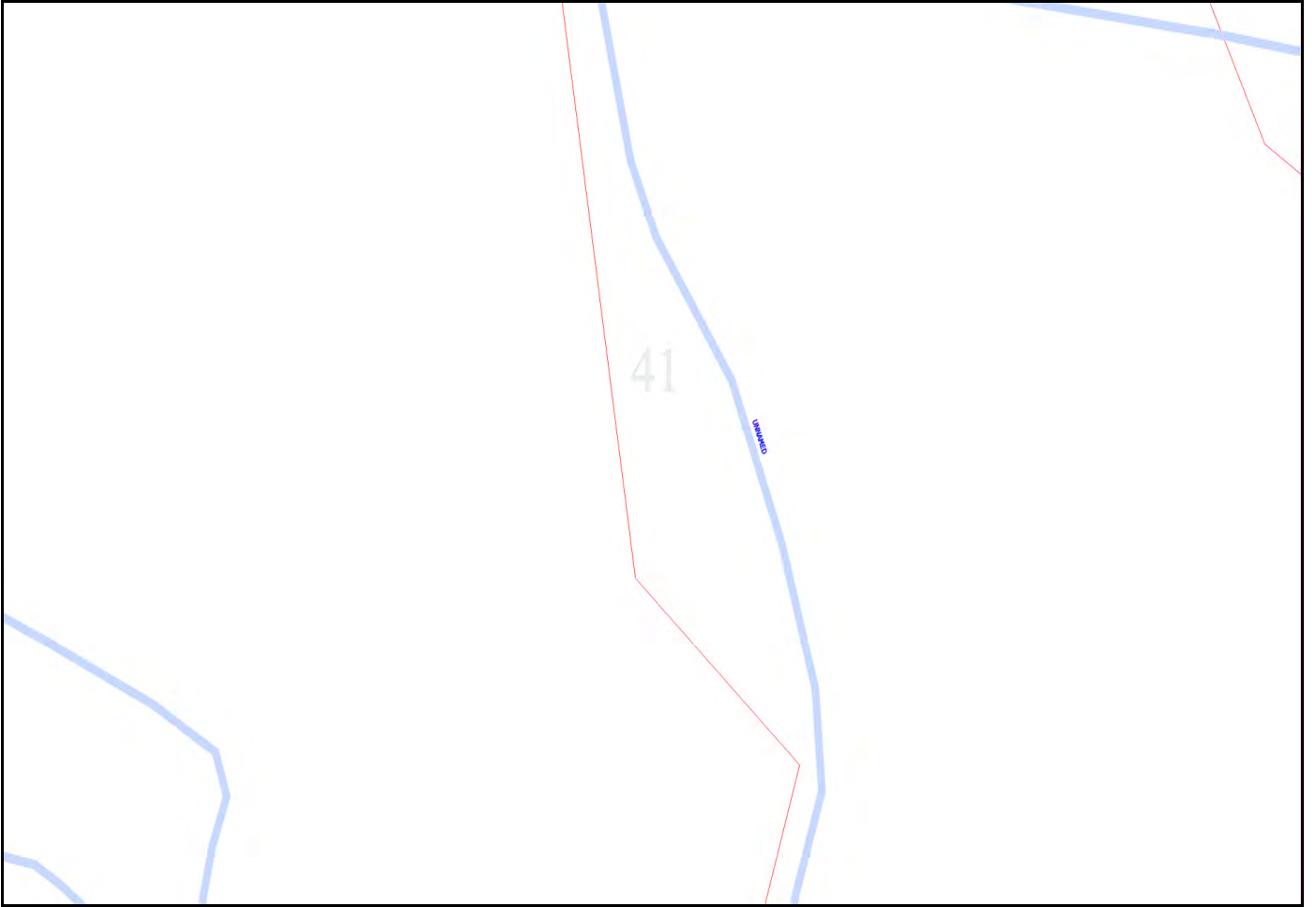
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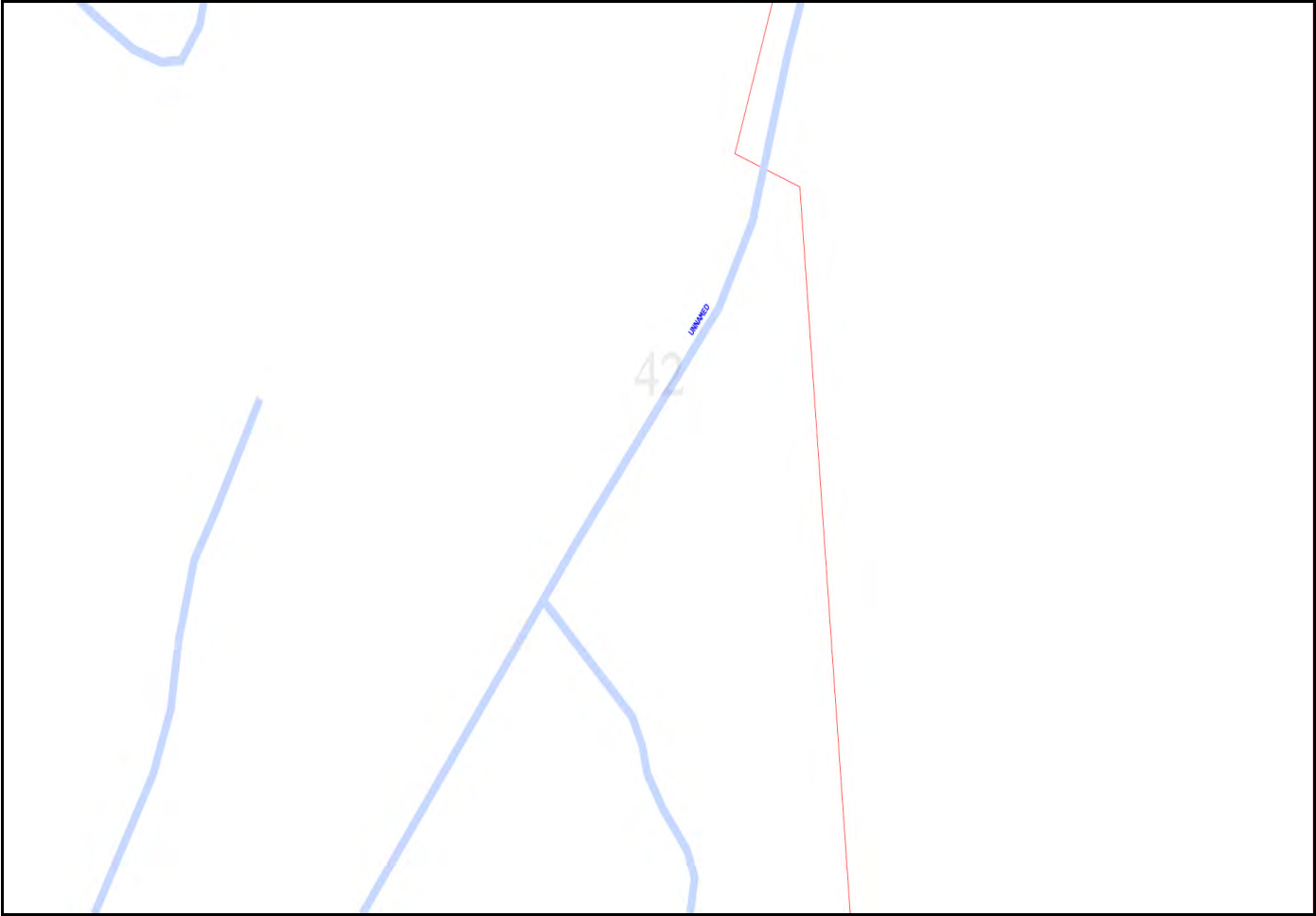
UNSW

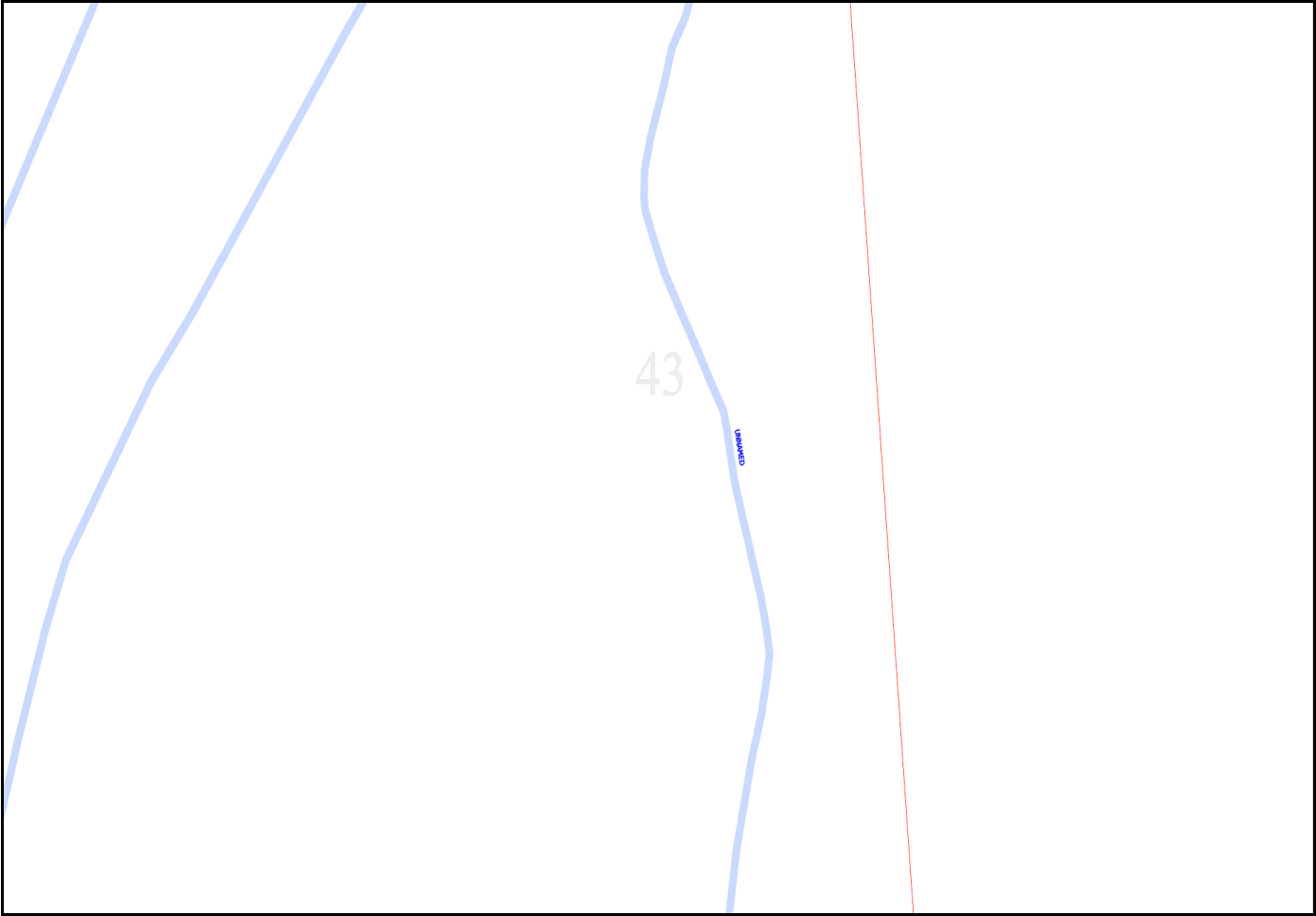


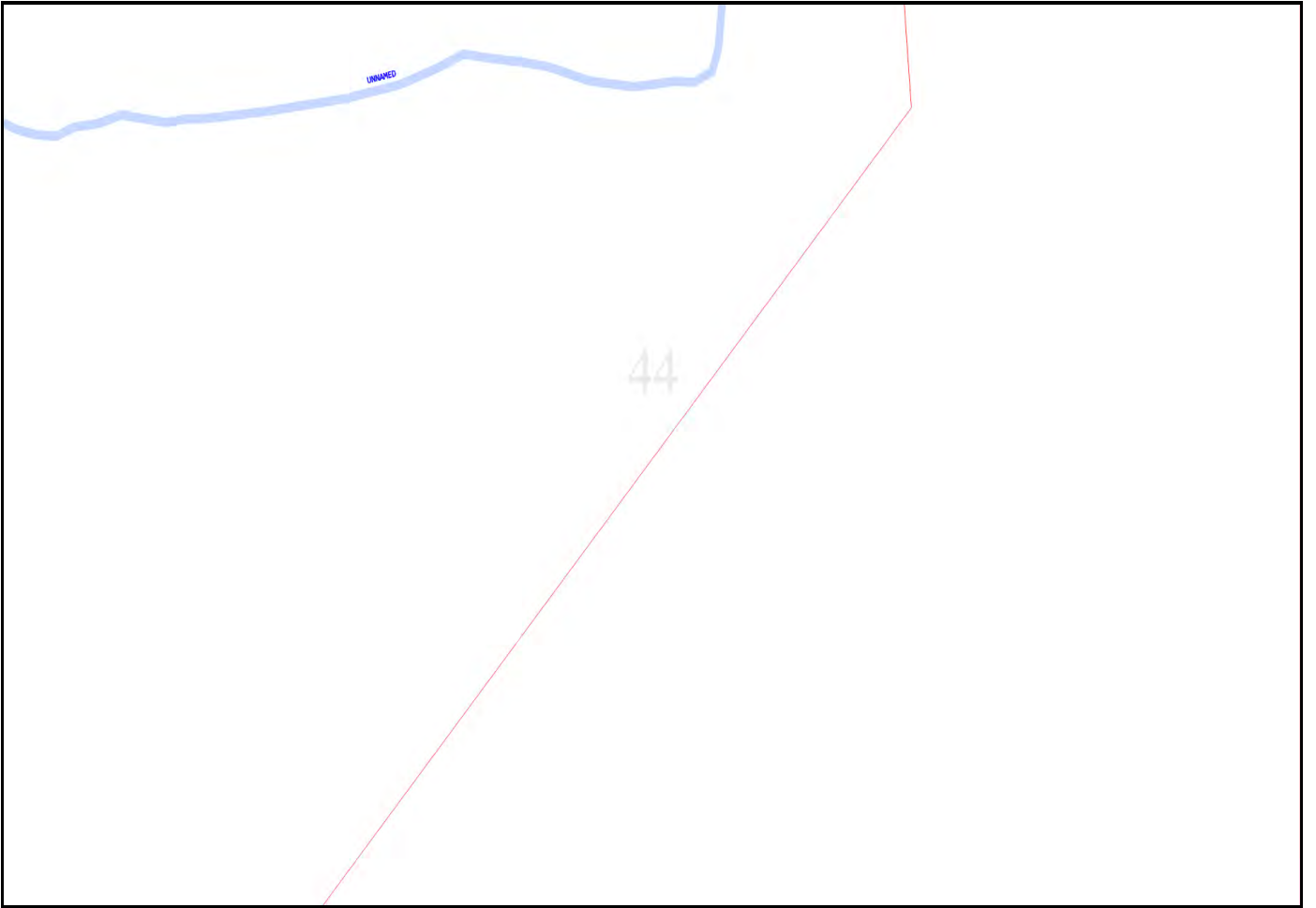










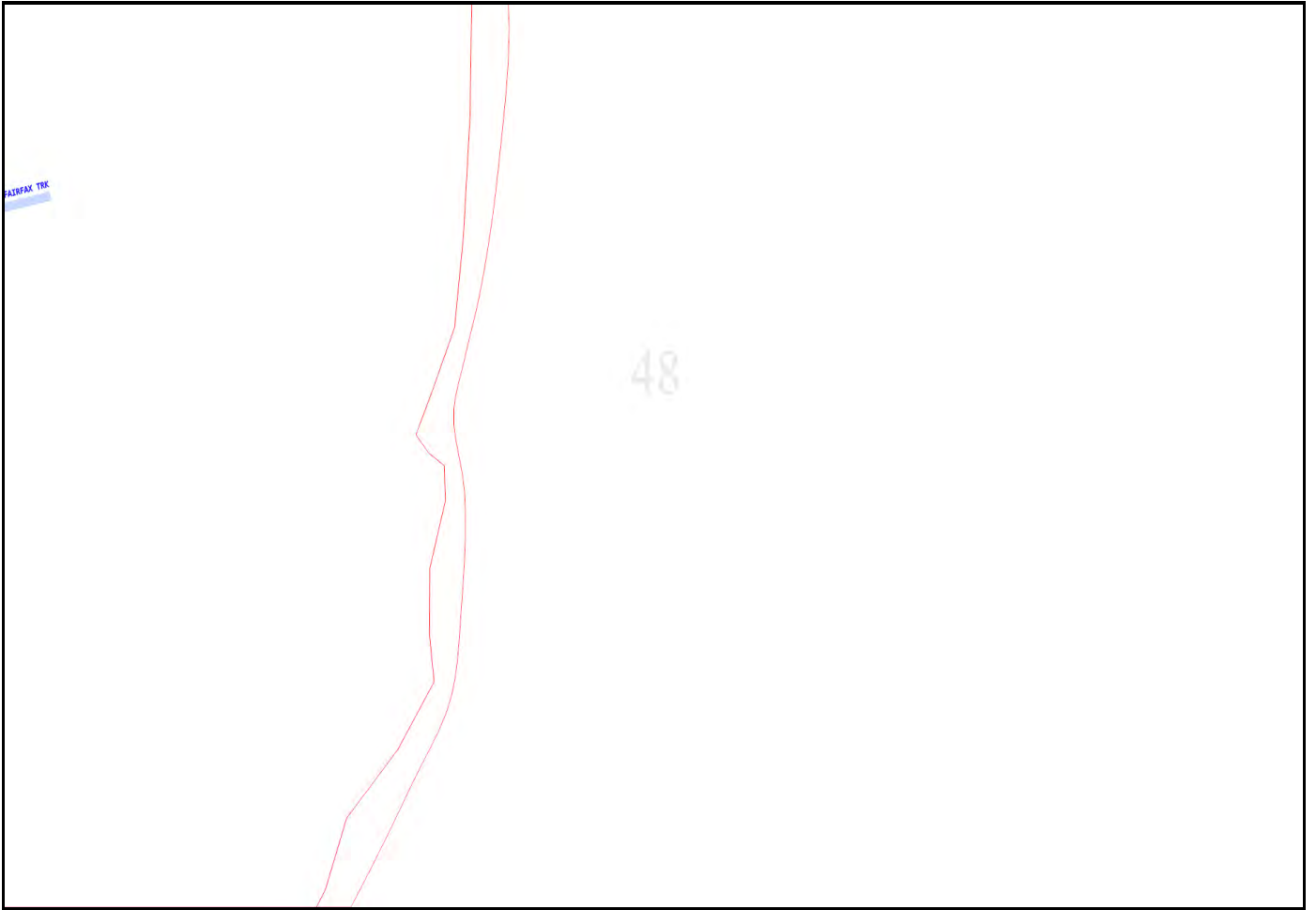




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Emergency Contacts

You must immediately report any damage to the **nbn™** network that you are/become aware of. Notification may be by telephone - 1800 626 329.

APPENDIX B: DEVELOPMENTS ADJACENT NPWS LANDS EXTRACT



NSW NATIONAL PARKS & WILDLIFE SERVICE

Developments adjacent to National Parks and Wildlife Service lands

**Guidelines for consent and planning
authorities**



after construction. In some cases, it will be necessary to prepare detailed sediment and erosion control plans (soil and water management plans) for the proposed development.

As general erosion and sediment control measures, NPWS recommends that:

- clearance of native vegetation is kept to a minimum
- areas of retained vegetation are fenced off during construction
- areas of bare soil and stockpiles are managed to prevent erosion during the construction process
- disturbed areas are rehabilitated and appropriately stabilised as soon as possible following construction (this includes removal of control measures, such as sediment fences, when they are no longer required).

To prevent sediment moving from an adjacent property onto NPWS land, and to avoid and minimise erosion risks, NPWS also recommends that appropriate controls should be applied in accordance with the following guidance documents:

- *Erosion and sediment control on unsealed roads* (OEH 2012)⁶
- *Managing Urban Stormwater – Soils and Construction, Volume I* (Landcom 2004)⁷
- *Managing Urban Stormwater – Soils and Construction, Volume II* (DECC 2008)⁸
- *A Resource Guide for Local Councils: Erosion and Sediment Control* (DEC 2006).⁹

Erosion and sediment control is an appropriate response for smaller scale developments with short term disturbance. Land and water management (such as sediment basins and flocculation) may be required where longer periods of disturbance or larger or steeper areas of land will be disturbed.

2.2 Stormwater runoff

Aim

Nutrient levels are minimised, and stormwater flow regimes and patterns mimic natural levels before reaching NPWS land, to ensure no detrimental change to hydrological regimes.

Risks to NPWS land

The discharge of stormwater to NPWS land poses a threat to the values of land and downstream environments by:

- dispersing litter and pest species (especially weeds)
- altering nutrient composition and pollutant levels, which can damage native vegetation and aquatic ecosystems, reduce water recreation safety and promote weed growth
- causing potential erosion and sedimentation in watercourses, particularly where new developments have led to an increased volume and concentration of flow

⁶ www.environment.nsw.gov.au/Stormwater/ESCtrlUnsealedRds.htm

⁷ www.environment.nsw.gov.au/research-and-publications/publications-search/managing-urban-stormwater-soils-and-construction-volume-1-4th-edition

⁸ www.environment.nsw.gov.au/topics/water/water-quality/all-publications

⁹ www.environment.nsw.gov.au/research-and-publications/publications-search/resource-guide-for-local-councils-erosion-and-sediment-control

- impacting on Aboriginal sites, which are frequently located close to watercourses, and historic heritage.

These potential impacts, which are also cumulative, have a range of implications for the management of NPWS land. They pose serious risks to the protection of park values and assets, and catchment ecological health.

These risks are recognised in provisions in the National Parks and Wildlife Regulation 2019 which requires the consent of NPWS to discharge stormwater into a park (for example, where a development proposes new infrastructure that alters stormwater flows and directs them into a park).

Developments which increase or interrupt natural flows can significantly impact the habitat for threatened species which use downstream riparian or wetland areas. Under the State Environmental Planning Policy (Coastal Management) 2018 development proximate coastal wetlands and littoral rainforest must not significantly impact the hydrological integrity of these areas, or the quantity and quality of surface and groundwater flows entering or leaving such sites.

Potential stormwater impacts of development should also be considered closely where development sites are proximate Ramsar wetlands. Ramsar wetlands are identified as having international importance due to various factors, including their hydrology. Impacts to this hydrological functioning, such as through changes to nutrient levels or stormwater flow patterns, has the potential to affect the ecological character of these internationally significant wetlands.

Recommended approach

- Development proposals for areas adjacent to NPWS land should incorporate stormwater detention and water quality systems (with appropriately managed buffer areas) **within** the development site.
- Water sensitive urban design (WSUD) principles should be applied to developments in catchments upstream from wetlands.¹⁰
- Stormwater should be diverted to council stormwater systems or to infiltration and subsurface discharge systems **within** the development site.
- The discharge of stormwater to NPWS land, where the quantity and quality of stormwater differs from natural levels, must be avoided.

Infrastructure associated with stormwater treatment must **not** be located on NPWS land and any stormwater outlets should disperse the flow at pre-development levels. Landowners and development proponents are responsible for ensuring that all tanks, storage areas and associated infrastructure are appropriately sized and maintained to ensure that there is no unauthorised overflow onto NPWS land.

MUSIC software modelling is commonly used to estimate pollutant loads resulting from developments and different treatment options. Online tools such as the eWater Toolkit¹¹, employ MUSIC software to project runoff quantity and quality post development. Such tools allow assessing authorities to ensure WSUD principles are applied and potential impacts resulting from changes to stormwater discharge to park are avoided. It is recognised that councils commonly require a percentage decrease of pollutant levels immediately downstream of a development relative to the 'no treatment' (post development) option. However, given the potential for pollutants to significantly impact park values, NPWS

¹⁰ <https://www.hccrems.com.au/wp-content/uploads/2016/02/wsud-for-catchments-above-wetlands-final.pdf>

¹¹ <https://toolkit.ewater.org.au/>

recommends that developments proximate to parks should not result in any net increase in pollutant levels discharged to NPWS land.

NPWS acknowledges that in some limited and exceptional cases it may not be possible to avoid the discharge of stormwater from development sites onto NPWS land. In these cases, NPWS may be willing to grant an approval to allow the discharge of stormwater onto NPWS land. Such an approval will only be granted where it can be clearly shown to be in the best overall interests of the environment (for example, by addressing existing impacts from unmanaged stormwater). The final decision rests solely with NPWS.

Any person seeking approval to discharge stormwater onto NPWS land should provide a written request to the relevant NPWS Area Manager containing detailed information on the proposal which should include:

- current stormwater flows (volume and quality) emanating from the nearby property into NPWS land, including existing undeveloped and developed areas
- current stormwater management arrangements (if any)
- identification of any existing impacts on the land as a result of stormwater from the property (including erosion, sedimentation, weeds and tree dieback)
- proposed changes to stormwater related to the development where the following stormwater management standards should be met:
 - for subdivisions, multi-unit dwellings, commercial and industrial development:
 - no increase in pre-development peak flows from rainfall events with a 1 in 5 year and 1 in 100 year recurrence interval
 - no increase in the natural annual average load of nutrients and sediments
 - no increase in the natural average annual runoff volume.
 - for single residential dwellings or small developments on highly constrained lots:
 - standard local council discharge requirements and best practice stormwater treatment to reduce nutrient and sediment loads and average annual runoff volumes to pre-development levels.
- likely impacts from those changes to NPWS land
- clear explanation of the reasons why stormwater discharge is considered unavoidable
- an explanation of the overall environmental benefits to NPWS land from the proposed stormwater management system.

In considering any requests to allow stormwater discharge, NPWS may also require the proponent to submit an environmental impact assessment to meet relevant requirements of Part 5 of the *Environmental Planning and Assessment Act 1979*.

Councils and other planning authorities should **not** grant approvals that involve the discharge of stormwater to NPWS land or include conditions requiring such an outcome from NPWS.

The Environmental Protection Authority has developed a *Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions*.¹² The framework assists in assessing land-use decisions that have the potential to change the health of a waterway and the principles can also be applied to waterways that flow through park and are likely to be impacted by upstream development.

¹² <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Water/Water-quality/risk-based-framework-waterway-health-strategic-land-use-planning-170205.pdf>

Where new stormwater infrastructure may discharge into marine parks or aquatic reserves, planning authorities should consult with the Department of Primary Industries.

2.3 Wastewater

Aim

There are no adverse impacts on NPWS land due to wastewater from nearby development.

Risks to NPWS land

Some new developments, particularly in remote or rural areas, do not have access to mains sewerage systems. In these cases, other options for sewage disposal are required, including septic tanks and composting toilets. Some developments (such as horticultural or turf industries) may propose to undertake effluent irrigation or the discharge of other types of wastewater into the environment.

If wastewater disposal systems are not designed, installed, operated and maintained correctly they can pose significant risks to NPWS land. These risks are similar to the risks from stormwater runoff, although the degree of risk is relatively greater given the nature of waste products involved and the potential impacts to the ecosystem and human health.

Recommended approach

In considering proposals involving wastewater disposal, including sewage management, consent authorities should ensure that disposal systems will be designed and operated to the highest standards. This will require consideration of compliance measures that will be used to ensure ongoing satisfactory operation of the systems.

Except for facilities that are directly related to the provision of park visitor or management facilities, wastewater management infrastructure must **not** be located on NPWS land. Also (with the same exception), there must be no discharge of wastewater to NPWS land, including nutrient or pathogen export from effluent disposal areas.

- As well as any current Office of Local Government guidelines, planning authorities should refer to the Environmental Protection Authority's water quality¹³ guidelines when considering wastewater management.

2.4 Pests, weeds and edge effects

Aim

Adjoining or nearby development does not:

- lead to increased impacts from invasive species (weeds and pests), domestic pets and stock
- facilitate unmanaged visitation, including informal tracks, resulting in negative impacts on cultural or natural heritage values
- lead to impacts associated with changes to the nature of the vegetation surrounding the park

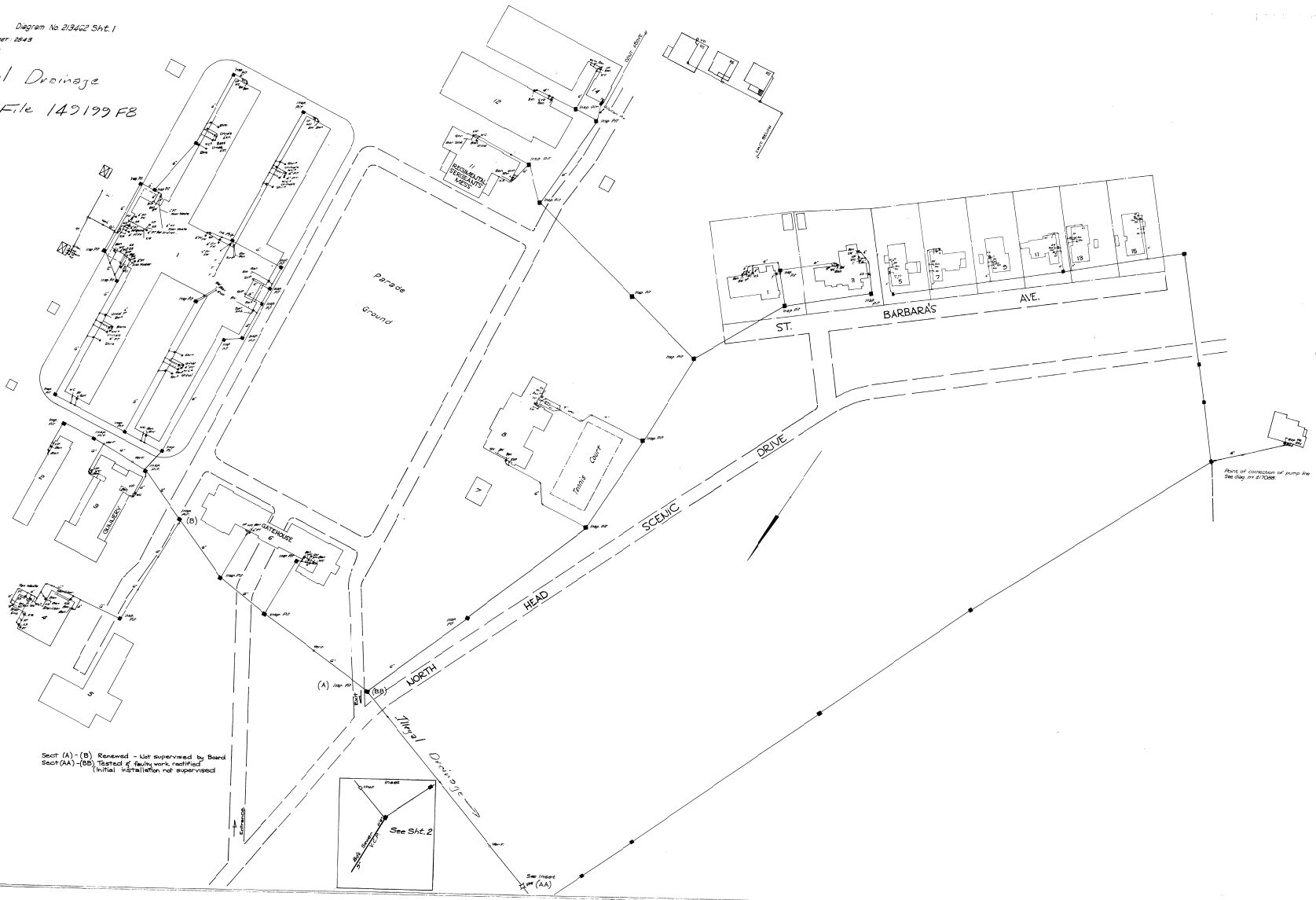
¹³ www.environment.nsw.gov.au/topics/water/water-quality

APPENDIX C: SEWER SERVICE DIAGRAM

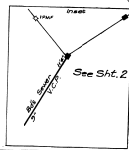
NO 5
SHT 1
Sheet 1 of 2

Municipality of Manly Diagram No 219462 Sht. 1
Drawn Sheet 2243
S.T.A.

Illegal Drainage
See File 149199 F8



Sect (A)-(B) Renewed - Not supervised by Board
Sect (AA)-(BB) Tested if faulty work rectified
(Initial installation not supervised)



See inset
(AA)

NO SCALE
213462 Sht.2
SHT 2

Municipality of MANLY
Detail Sheets 2543, 5278
B.R.R.

Diagram No. (604621)
213462 Sht.2

Illegal Drainage
See File 149199F8



137438-2
 Solved

SEWERAGE SERVICE DIAGRAM

Municipality of Manly

No. 137438 Sheet No 2

| | | | |
|---------------------------|--------------------------|-------------------|--------------------------|
| SYMBOLS AND ABBREVIATIONS | | | |
| □ Boundary Trap | ■ R.V. Reflux Valve | I.P. Induct Pipe | Bas. Basin |
| □ Pit | — Cleaning Eye | M.F. Mica Flap | Shr. Shower |
| □ G.I. Grease Interceptor | ○ Vert. Vertical Pipe | T. Tube | W.I.P. Wrought Iron Pipe |
| □ Gully | ○ V.P. Vent. Pipe | K.S. Kitchen Sink | C.I.P. Cast Iron Pipe |
| □ F.T. P. Trap | ○ S.V.P. Soil Vent. Pipe | W.C. Water Closet | F.W. Floor Waste |
| □ R.S. Reflux Sink | ○ D.C.C. Down Cast Cowl | B.W. Bath Waste | W.M. Washing Machine |

Scale: 40 Feet To An Inch

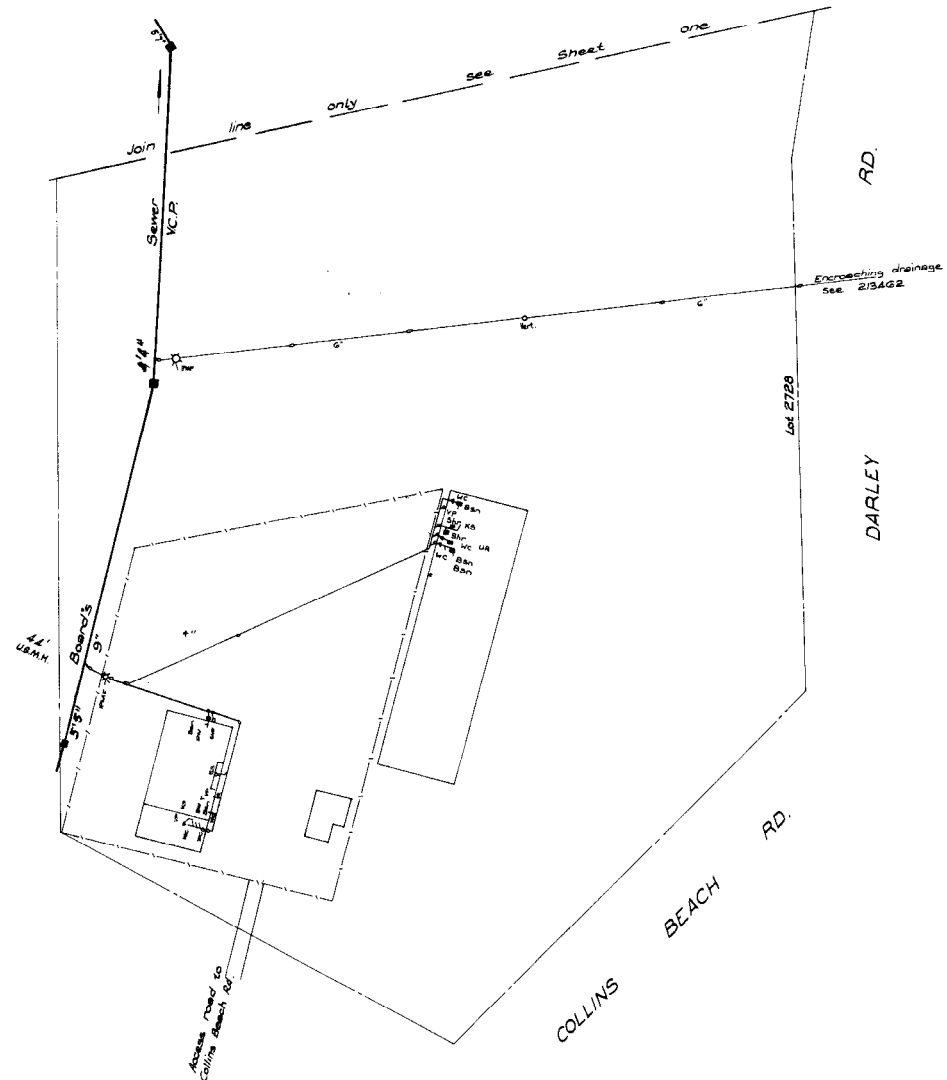
SEWER AVAILABLE

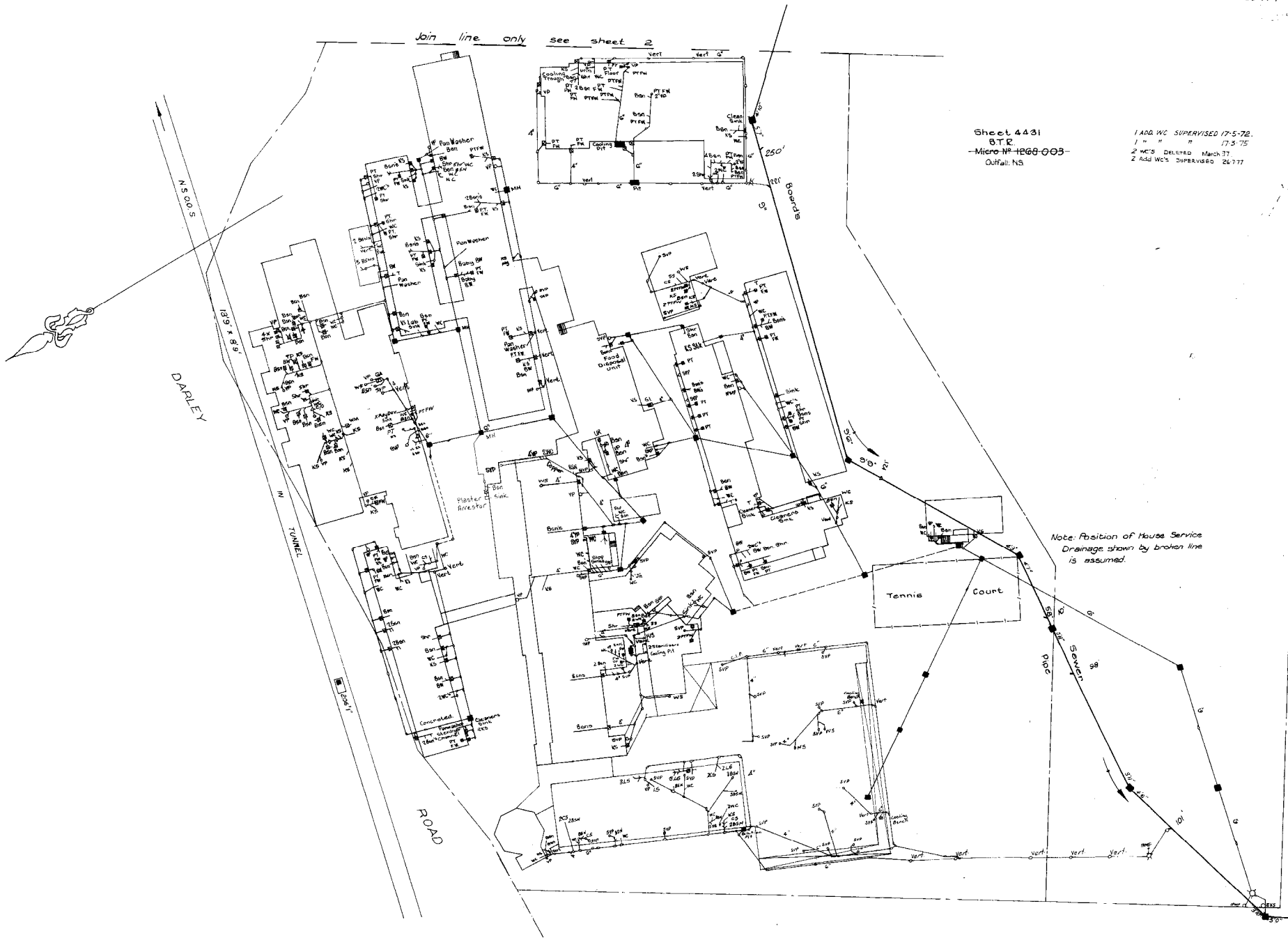
When the sewer is not available and a special inspection is involved the Board accepts no responsibility for the suitability of the drainage in relation to the eventual position of the Board's Sewer

S.R.S. 5278

B.T.R.

Outfall: N.S.





Sheet 4431
STP
-Micro N° 1266-003-
Outfall: NS

1 Add WC SUPERVISED 17-5-72.
1 " " " 17-3-75
2 WCs DELETED March 77.
2 Add WCs SUPERVISED 26-7-77

Note: Position of House Service
Drainage shown by broken line
is assumed.

SC 1001-50
137438-1

APPENDIX D: AUSGRID RESPONSE LETTER

Preliminary Enquiry – Response Letter



17/03/23

Webform ref: 1775250

Arcadis Australia Pacific
Attention: Cathy Lean
Via email: Cathy.Lean@arcadis.com

Premises address: **NORTH HEAD SANCTUARY NORTH HEAD SCENIC DRIVE, MANLY**
Ausgrid AE Reference: **700008338**

Dear Cathy,

I refer to your preliminary enquiry regarding the electricity connection at the above address and provide the following information.

- ☐ North Head Sanctuary, Lot 2764 DP 752038, is reticulated via:
 - LV street reticulation on the northern side of the site; and
 - three dedicated kiosk substations, including S17016, S17018 & S17137.
- ☐ The configuration of each dedicated distribution substation is summarised as follows.

Summary of Distribution Substation S17016 'The Barracks'

| | |
|----------------------------------|-----------------------|
| Date of Commission: | 20/07/2007 |
| Substation Type: | L Type Kiosk |
| Load Cycle: | Commercial/Industrial |
| Substation Rating: | 1169A |
| 11kV Fuse Size: | B&S OQFRN - 80A |
| RMI Model: | ABB SDAF3 |
| Transformer Size: | 800kVA |
| LV Board Configuration: | 800/400/400 |
| Distributor No.1 Fuse Size: | 800amps |
| Busbar Maximum Demand Indicator: | Less than 400amps |

Summary of Distribution Substation S17018 'Harbour Trust'

| | |
|----------------------------------|-----------------------|
| Date of Commission: | 21/10/2009 |
| Substation Type: | L Type Kiosk |
| Load Cycle: | Commercial/Industrial |
| Substation Rating: | 924A |
| 11kV Fuse Size: | SIBA 300.20.93 - 80A |
| RMI Model: | Schneider RM6 |
| Transformer Size: | 600kVA |
| LV Board Configuration: | 800/400/400 |
| Distributor No.1 Fuse Size: | 630amps |
| Busbar Maximum Demand Indicator: | Less than 200amps |

Summary of Distribution Substation S17137 'North Fort'

| | |
|----------------------------------|-----------------------|
| Date of Commission: | 21/10/2009 |
| Substation Type: | J Type Kiosk |
| Load Cycle: | Commercial/Industrial |
| Substation Rating: | 638A |
| 11kV Fuse Size: | OQFRN - 40A |
| RMI Model: | ABB SDAF3 |
| Transformer Size: | 400kVA |
| LV Board Configuration: | 400/400/400 |
| Distributor No.1 Fuse Size: | 200amps |
| Busbar Maximum Demand Indicator: | Less than 100amps |

- ☐ Ausgrid does not provide maximum demand readings for customer supplies. You will need to engage the services of electrically qualified persons to undertake the load study.
- ☐ Meter data for load study purpose can be requested via Ausgrid website. Limited by Ausgrid's Privacy Policy, meter data can not be provided within a Preliminary Enquiry unless authorisation from the NMI account holder is provided. Please refer to Ausgrid's [Request meter data webpage](#) for details.
*Note: a copy of Ausgrid GIS & System Diagram relevant to this site is attached for reference. L Type Kiosk Substations are upgradable. Limited by the kiosk housing of J Type Kiosk Substations, the maximum transformer size can be accommodated in J Type Kiosk is 400kVA.

It should be noted that the above advise is based on Ausgrid's polices and network status as of today and are subject to change.

Connections to the Ausgrid network are governed by a set of laws and rules referred to as the National Energy Customer Framework (NECF). Included in the NECF is the National Electricity Rules (NER). Under these rules, a binding contract may only be formed after a connection application is lodged and Ausgrid has made a connection offer in response to that application. Accordingly, to make arrangements for the electricity connection of the development to the Ausgrid network you should lodge a completed connection application.

Should you require any further information please contact me.

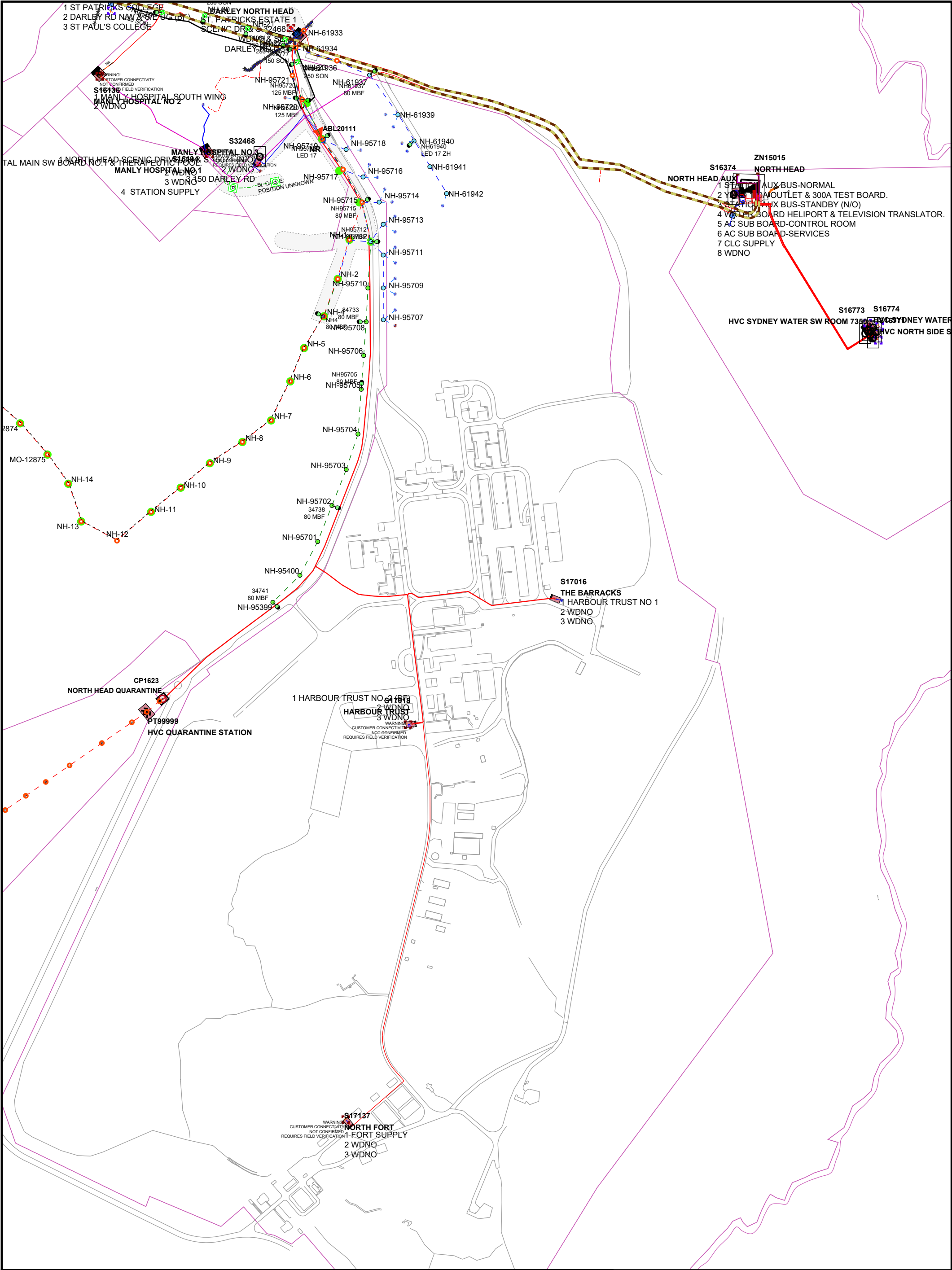
Yours sincerely,

Shanming Zhou

Ausgrid

Direct Telephone Number: 0294778357

Email: SZhou@ausgrid.com.au



Ausgrid's plans show the position of assets at the time of installation and may not account for subsequent changes to road alignments, fences or buildings. The plans show no more than the presence or absence of Ausgrid assets in the street.
Persons working near electricity networks must exercise care and will be held responsible for any damage caused. You must excavate by hand or use vacuum excavation to establish the location of Ausgrid underground cables and associated assets.
Underground: Working near a cable may result in electric shock even if no contact is made. Any work in the vicinity of any cable should only be performed using safe work methods developed in accordance with the recommendations included in SafeWork NSW Code of Practice for Excavation and SafeWork NSW Guide for Work Near Underground Assets as well as recommendations of Ausgrid's Network Standard NS156.
Overhead: Do not excavate near poles or towers until the stability of the foundation has been assessed by Ausgrid. Cables or earth conductors may be present close to substations, poles or towers.
Workers must maintain safe approach distances and follow applicable SafeWork NSW Codes of Practice. NOTE: You must keep this plan on site during excavation works and have on site a person trained to read this plan.

DATE
17 Mar 23
SCALE
1:4000



