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CIVIL ENGINEERING & INFRASTRUCTURE ASSESSMENT REPORT

PLANNING PROPOSAL
MELROSE PARK
SOUTH PRECINCT
MELROSE PARK NSW

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1 INTRODUCTION

1.1 Introduction & Scope

Costin Roe Consulting Pty Ltd has been commissioned by COX Architecture on behalf of Holdmark Property Group to undertake a site conditions and infrastructure services assessment to assist in the preparation of a Planning Proposal for sites owned by the Holdmark Property Group. This will also assist in future zoning changes to allow for potential high density residential and associated permissible developments via a change from *IN1 General Industrial* to potentially a *R4 Residential*.

The information provided in this report is intended to inform the Master Planners of the opportunities and constraints associated with the civil engineering requirements and for the provision of infrastructure services to the precinct. The purpose of the report is also consider the Stormwater Management for the property and intended change in land use, and to confirm that a solution to meet Parramatta City Council's specific stormwater management objectives for stormwater quality and quantity.

The report provides the following information relating to services:

- A description and indicative capacity of existing service networks for Potable Water (drinking water), Wastewater (sewer), Power, Natural Gas; and Telecommunications;
- Indicative utility demands for the current development proposals where available;
- Current service infrastructure delivery programs from the primary utility suppliers where available; and
- Service infrastructure assets required onsite.

Civil engineering, stormwater management and flood planning considerations include:

- Management of stormwater quantity (on-site detention) and quality;
- Flood planning considerations including that relating to Parramatta River;
- External Stormwater Catchments and Overland Flow.

The site is located within the bounds of the Parramatta City Council LGA. Parramatta City Council policy applies and, in conjunction with NSW Government planning policies, has been used in the framework of this document.

The following overall yield is noted for the overall precinct, per Parramatta City Council structure plan:

- Residential: approximately 324,650 sqm or 3,855 units.
- Non-Residential: approximately 3000 sqm

Included in the overall precinct, is the proposed development areas (subject to this planning proposal) by Holdmark Property Group, which consist of the following yield:

- Residential: approximately 162,158 sqm or 1925 units.
- Non-Residential: approximately 1000 sqm

It should be noted that the above yields are indicative only and may be subject to further refinement during the course of the planning proposal and development approval process.

1.2 Site Description

The Melrose Park – Southern Precinct (The Site) is located on the southern side of Hope Street Site and bounded by Atkins Road on the west, Wharf Road on the east and The Parramatta River on the south as shown in **Figure 1.1**.

Figure 1.1 Locality Plan

The property comprises an area of approximately 24 Ha and is bound by existing residential development to the east of Wharf Road, Parramatta River and riparian land to the south and existing industrial development to the north and west.

The site is currently developed, with industrial improvements over the land in the form of several large single level warehouse buildings. The Melrose Park Public School is located on the north-east corner of the site between Hope Street, Wharf Road, Mary Street and Waratah Street.

The landform exhibits large flat areas through building envelopes and local falls surrounding the buildings. The site generally falls to the south from Hope Street to the Parramatta River. The levels vary between RL 18m AHD at on the north-east and north-west corners of The Site to RL 3m AHD at the south-western corner of the site,

near the Parramatta River riparian zone. Grades through The Site are generally in the order of 3-4% on average however locally steeper grades of up to 8% can be experienced through northern portions of the site.

A low point is present in Hope Street at RL 9.45m. A Council drainage line (825mm dia.), and associated 3.05m easement, conveys stormwater from the low point in the road, diagonally through the property to the western property boundary. The pipe and easement then head in a southerly distance adjacent to the boundary to the ultimate discharge point from the site (to Parramatta River) at the south-east corner of the development.

1.3 Proposed Application

The proposed application is to inform planners of the opportunities and constraints around potential future rezoning of the land from *IN1 General Industrial* to potentially a *R4 Residential*. This would allow for future development of the land as high density residential, commercial, retail, services and recreational activities. An indicative Masterplan Layout of the development site has been produced by COX Architecture which takes into consideration economic, social and engineering opportunities and constraints.

The proposed indicative built form layout is shown in **Figure 1.2** below.

Figure 1.2 Indicative Built Form Masterplan Layout

The indicative built form layout considers urban integration of public domain with surrounding infrastructure and intends to provide a space which invites people to live, work and play in its environment. A central avenue opens to a series of street scape and forecourt open areas leading to commercial and residential buildings. Recreation zones will be located adjacent to the Parramatta River and connection to surrounding

infrastructure such as public transport and the nearby business districts will be made in line with the over precinct plan. New road layouts link Mary Street to Atkins Road and cross streets with Hughes Street and Waratah Street.

The indicative built form for the overall precinct provides an overall estimated 3885 residential units. The precinct will allow for a mix of residential (approx. 324,650m2 GFA) and non-residential (approx. 3000m^2) uses.

The Holdmark Property Group, including Holdmark East and West land parcels (**Figure 1.1**) and indicative built form (**Figure 1.2**) provides an estimated 1,925 residential units over 162,160m2 GFA and 1000m^2 of non-residential uses.

2 INFRASTRUCTURE SERVICES

2.1 Services Introduction

An overview of the existing infrastructure network layouts is outlined in the following sections. Reference to **Appendix C** should be made for Dial-Before-You-Dig information for each service.

For the purpose of this report the following overall precinct yield has been considered:

- Residential: approximately 324,650 sqm or 3,855 units.
- Non-Residential: approximately 3000 sqm

It should be noted that the above yields are indicative only and may be subject to further refinement during the course of the development process.

As the final yields may vary (it may be more or less than the gross floor area currently proposed) from these estimates, a yield of 4000 units over an area of 337,200m^2 of apartment, dwelling or other areas has been adopted in the following demand and capacity assessment. As such the general strategy and demands for servicing of the structure plan should not vary considerably from the following initial assessment.

It is acknowledged that the Northern Precinct will also need to be serviced off some of the infrastructure which also services the Southern Precinct. This capacity assessment provides direct calculations for the Southern Precinct only and future capacity assessments will be required as part of individual development approvals for the different portions of land as development occurs.

2.2 Potable Water (drinking water)

Sydney Water is the servicing authority for potable water in the suburb of Melrose Park.

Several large diameter water mains are present in Hope Street including a 900mm and 1200mm Ductile Iron Cement (mortar) Lined (DICL) main and a 1200 SCL main.

Smaller diameter mains are located in surrounding streets. These include:

- 200mm CICL and 150mm uPVC water supply mains located on the western side of Waratah Street;
- 150mm uPVC water supply mains located on the eastern side of Wharf Road; and
- 100mm CICL in Hughes Avenue.

A disused 300 CICL main is also present on the eastern side of Hughes Avenue.

Potable Water Demand

Typical water demand rates for different land uses are provided in **Table 2.1** below.

Land Use	Design Criteria	Units	Potable Water Demand
Single Dwelling Residential (14 - 17 dwelling/net ha)	Max Day Demand	kL/dwelling/day	2.2
Town House (<30 units/net ha)	Max Day Demand	kL/unit/day	1.6
Multi/ high Rise Units	Max Day Demand	kL/N Floor Ha/day	33.5
Light Industrial	Max Day Demand	kL/N Ha/day	40
Medium Industrial	Max Day Demand	kL/N Ha/day	66
Suburban Commercial	Max Day Demand	kL/N Ha/day	40
City Rise Commercial/ shopping Centre	Max Daily Demand	kL/floor Ha/day	63

Table 2.1 Water Demand Unit Rates

Utilising the multi-unit rate of 33.5kL/ N Floor Ha/day over 4000 apartments with a GFA of 337,200m^2 of residential development a demand for the development can be calculated.

A demand in the order of 1130 kL/day is expected to be met to service the indicative built form layout.

Potable Water Capacity

The empirical guide to pipe servicing capacity, contained in the Water Supply Code of Australia (Sydney Water Version), was used to gain an understanding of the capacity of the existing water mains and their ability to service the development. This is shown in **Table 2.2** below.

Nominal Size of Main DN			Capacity of Main (single direction feed)			
DICL PN36	PVC PN16	PE PN16 PE80B & PE100	Residential (Lots – 500m^2)	Rural Residential (lots)	General/ Light Industrial (ha)	High Usage Industrial (ha)
100	100	125	40	-	-	-
150	150	180	160	125	23	-
200	200	250	400	290	52	10
250	250	315	650	470	84	24

Table 2.2 Empirical Sizing of Reticulation Mains

Using the empirical guidelines, the DN150mm water main in Waratah Street would have a capacity to service approximately 160 apartments. Utilising the two existing connections on Hope Street (expected to be 200mm each) a further 800 apartments would be able to be serviced. The 900mm and 1200mm mains in Hope Street would also provide significant capacity however these lines would also service a much greater contributing area.

It is noted the current information does not enable us to estimate the extent of other properties being serviced by the water main and further investigations will be required

in this regard. Confirmation of the capacity of the existing system will need to be confirmed via a Section 73 Application to Sydney Water performed by a Sydney Water qualified Quick Check agent. As part of this assessment specific volumetric rates and water pressures will be able to be provided by Sydney Water and assessed by a qualified hydraulic engineer.

Potable Water Supply

The strategy and design for the required extension of the system will need to be performed by a Sydney Water Service Coordinator.

A qualified Hydraulic Engineer shall design internal water and fire system water supply to service the proposed development sites. This will be investigated as part of the detailed design and assessed as part of future separate building development applications.

Given the location of the development is near the Parramatta City CBD, and the presence of major water mains in Hope Street, it is expected that infrastructure of sufficient capacity is available and accessible in the required timeframes for the development of the land.

Notwithstanding the further investigations and applications required with Sydney Water, it is considered that water supply will be able to be provided to the development site.

It should also be noted that rainwater reuse will be employed on this development for non-potable applications including toilet flushing and irrigation.

2.3 Wastewater (sewer)

Sydney Water is the servicing authority for sewage disposal in the suburb of Melrose Park.

Wastewater infrastructure is in the southern precinct. A 225mm CICL sewer main is located in 6 Hope Street property, running adjacent to the western boundary of the property 6 Hope Street (being the common boundary of 4 & 6 Hope Street) to the south. The sewer main increases to 300mm immediately to the south of the property and traverses two properties to the west to Sewer Pump Station SP0230.

Sewer infrastructure is also located on the western side of Hughes Avenue with a 225mm VC which also conveys wastewater to Sewer Pump Station SP0230.

A 225mm uPVC main services Melrose Park Public School with a main located on the corner of Hope Street and Wharf Road which conveys wastewater to the east of the Precinct.

Wastewater Service Demand

The design criteria used to forecast future sewer loadings are generally taken from the Sydney Water Area Planning Design Criteria Guide and are expressed as an Equivalent Population for a particular land use. The Average Dry Weather Flow (ADWF) per Equivalent Population (EP) is taken as 180 L/day or 0.0021 L/s (ADWF (L/s) = 0.0021 x EP). Alternatively, an estimate of the ADWF can be made based on 80% of the expected potable water demand.

Values for typical development types are summarised in **Table 2.3**.

Item	Units	Adopted Value	Source
Single Dwelling Residential	EP/dwelling	3.5	SWC Area Planning Design Criteria Guide
Medium Density Residential (townhouses up to 4 storeys)	EP/dwelling	3.0	SWC Area Planning Design Criteria Guide
High Density Unit Development (up to 200-400 Bedrooms/ Ha)	EP/Bedroom	0.275	SWC Area Planning Design Criteria Guide
Light Industrial	EP/ha	75	SWC Area Planning Design Criteria Guide
Heavy Industrial	EP/ha	150	SWC Area Planning Design Criteria Guide
Commercial	EP/ha	75	SWC Area Planning Design Criteria Guide
High Density Commercial	EP/ha	300 - 800	WSA 02-2002-2.2
Reserves	EP/ha	20	SWC Area Planning Design Criteria Guide

Table 2.3 Equivalent Population

An estimate of the Average Dry Weather Flow (ADWF) for the project has been calculated based on 80% of the expected 1130 kL/day demand. An ADWF of 904 kL/day or 10.46 L/s has been estimated for the development.

Note that the design of sewer mains will apply a peaking factor to the ADWF to get the Peak Daily Dry Weather Flow (PDWF) and include the peak (rainfall dependent) inflow and infiltration and the groundwater (non-rainfall) dependent infiltration. The peaking factor will vary depending on the size of the upstream catchment and would normally be within a range of 2 to 5, i.e. 23.5 – 58.5 L/s.

Wastewater Capacity

The existing DN225 and DN300 mains located in the precinct are expected to have a capacity in the order of 26 l/s and 45 l/s respectively.

Wastewater Removal

Connection of the site wastewater can be made into the existing mains and Sydney Water DBYD plan suggests several existing tap in points are available throughout the precinct.

The estimated capacity of the connecting main is above the required output from the development, as such it is expected that the existing main will be sufficient to cater for

the development. The extent of the upstream catchment being serviced by the main however is not known and confirmation of the proposed strategy will need to be performed in conjunction with Sydney Water via a Sydney Water Qualified Water Service Coordinator during project application stage.

Notwithstanding the further investigations and applications required with Sydney Water, it is considered that wastewater reticulation will be able to be provided to the development site.

2.4 Power

The DBYD information shows there are Endeavour Energy duct routes running along the northern and southern sides of Hope Street, and extending into the site boundary between existing buildings. A substation (No. 29023) is located toward the eastern end of the Hope Street property frontage.

The details, voltage and capacity of the above-mentioned cables are however unclear. Further checks and confirmation would need to be carried out by an accredited electrical consultant during the detailed design stage.

Typically, the service provider will require vertical clearances of 600mm to conduits and 500mm horizontal clearances. If contained in an easement, no works will be allowed including construction of buildings or structures. In the event that the proposed layouts require work within these clearance zones or across existing cable routes, then consideration to relocate the service will need to be made. This would need to be performed on a case by case basis by an accredited energy consultant.

Power Demand

A high-level estimate of the power demand for the Precinct has been estimated using average values for different land uses typically adopted by Integral Energy. These rates are generally considered to be reasonably conservative but are appropriate for preliminary estimation purposes.

Table 2.4 presents the unit rates applied to the power usage calculation and the estimated total power usage for the development.

Land Use	Rate (kW/unit/day)
Residential Dwelling (per dwelling)	5
Light Industrial, Employment, Town Centre, Village Centres, Schools (per m^2)	0.04

Table 2.4 Preliminary Power Usage Estimate

To give a reasonable estimate of the daily usage for a multi-unit development such as the proposed development, a diversity factor should be applied to the usage estimate to make allowance for the variation in usage across the development and the difference between a residential dwelling and unit. For this calculation, a typical diversity factor of 0.5 to 0.8 is applied to the sum of the total power usage presented in **Table 2.4**, giving a maximum demand estimate for the Precinct of approximately 11.5 – 18 MW per day for a total of 4000 apartments.

Power Capacity and Supply

To confirm capacity, further investigation and applications will be required with Endeavour Energy by a qualified electrical consultant. It should be noted that the demand for the proposed development can be compared to the existing light industrial use on the land. Applying a demand rate of 0.04 kW/m^2/day for the existing light industrial use over the precinct, a demand of 7 MW/day is calculated. This is lower than the expected demand of the proposed development and, subject to the detail site calculations and requirements, some amplification may be required to meet the expected demand range of the development.

Notwithstanding the further investigations and applications required with Endeavour Energy, it is considered that power supply will be able to be provided to the development site.

2.5 Power – High Voltage Transmission Towers

A high voltage transmission line is present on the western side of the 4 Hope Street property as shown on **Figure 2.1** below. The transmission towers traverse a north-south alignment between Parramatta River and Hope Street through the subject area in an easement of minimum dimensions of 33m (100 ft).

Any adjustments, alterations or disruption to the asset will need to be made at the full expense of the developer.

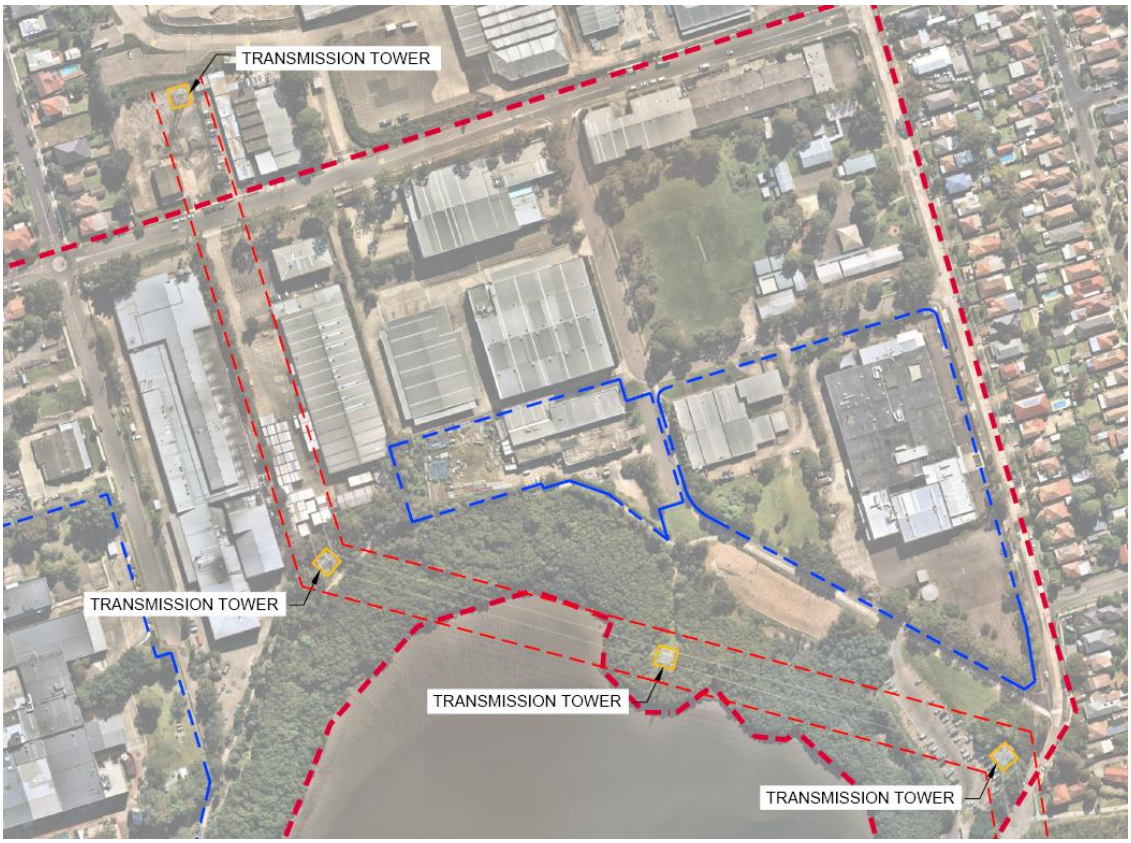


Figure 2.1 Location of High Voltage Transmission Tower and Easement

The expected requirements relating to the transmission lines (subject to confirmation from the asset authority) have been included below, as sourced from the *Transgrid Easement Guidelines – Third Part Development* document.

The above requirements will require confirmation from the authority, and this would need to be undertaken by a suitable electrical consultant. A site-specific assessment by the authority would be required as part of any development proposals within the zone of the easement, transmission towers or transmission lines with consideration to the following minimum criteria.

Prohibited Activities

Activities and encroachments that are typically prohibited within a Transmission Line (TL) Easement include, but are not limited to (Note 2), the following:

- The construction of buildings, substantial structures, or parts thereof.
- The installation of fixed plant or equipment.
- The storage of flammable materials, corrosive or explosive material.
- The placing of garbage, refuse or fallen timber.
- The planting of trees or shrubs capable of growing to a height exceeding 4 metres.
- The placing of obstructions within 20 metres of any part of a transmission line structure or supporting guywire.
- Public spaces or recreational areas which encourage people to spend time within or congregate within the easement.
- The parking or storage of flammable liquid carriers or containers.
- The installation of site construction offices, workshops or storage compounds.
- Flying of kites or wire-controlled model aircraft within the easement area.
- Flying of any manned aircraft or balloon within 60m of any structure, guy-wire or conductor.
- Flying of remote controlled or autonomous aerial devices (such as UAVs) within 60m of any structure, guy-wire or conductor.
- Placing any obstructions on access tracks or placed within the easement area that restricts access.
- Any vegetation maintenance (such as felling tall trees) where the vegetation could come within the Ordinary Persons Zone – refer to the WorkCover NSW 'Work Near Overhead Power Lines' - Code of Practice 2006'.
- Any substantial excavation within 15 metres of a pole or supporting guy-wire or guy foundation or within 20 metres of a tower
- The climbing of any structure (any development that encourages or facilitates climbing will not be permitted).
- Any change in ground levels that reduce clearances below that required in AS7000.
- The attachment of any fence, any signage, posters, or anything else, to a structure or guy-wire. Note: Interference to electricity infrastructure is an offence under the Electricity Supply Act 1995.
- The movement of any vehicle or plant between the tower legs, within 5m of a structure, guy-wire or between a guy-wire and the transmission pole. Note: Any damage to electricity infrastructure is an offence under the Electricity Supply Act

1995. The storage of anything whatsoever within the tower base or within 10m of any tower leg.

- Any structure whatsoever that during its construction or future maintenance will require an Accredited person to access. Note: The final structure may meet AS7000 clearances, but may be accessible (e.g. by EWP) by Ordinary Persons within the Ordinary Persons Zone.
- Any work that generates significant amounts of dust or smoke that can compromise the TL high voltage insulation.
- The erection of any structure in a location that could create an unsafe situation work area for TransGrid staff.
- Burning off or the lighting of fires.
- Any activity (including operation of mobile plant or equipment having a height when fully extended exceeding 4.3 metres) by persons not Accredited or not in accordance with the requirements of the WorkCover NSW 'Work Near Overhead Power Lines' Code of Practice 2006 that is within (Note 1): − 3m of an exposed 132kV overhead power line − 6m of an exposed 220kV or 330kV overhead power line − 8m of an exposed 500kV overhead power line Note: Distances quoted are to the design conductor position (i.e. maximum sag and blowout).

Permissible Activities

The following activities may possibly be approved with conditions and TransGrid's prior review and written consent. The proponent will be required to demonstrate (using an *Impact Assessment* process) that the risks associated with the activity have been satisfactorily mitigated.

- Temporary parking of caravans and other large vehicles in the outer 3m of the easement area, subject to a 4.3 metre height restriction and metallic parts being earthed.
- The erection of flagpoles, weathervanes, single post signs, outdoor lighting, subject to a 4.3 metre height restriction and metallic parts being earthed.
- The erection of non-electric agricultural fencing, yards and the like. Note: Fencing that exceeds 2.5 metres in height or that impedes access would not be approved.
- The erection of metallic fencing less than 2.5 metres in height providing that it is earthed, located more than 20 metres from any part of a transmission line structure or supporting guy and greater than 4 metres of the vertical projection of the overhead conductors.
- The erection of electric fencing provided that the height of the fencing does not exceed 2.5 metres and provided that the fence does not pass beneath the overhead conductors. Note: Approval may be given for a portable electric fence to pass underneath the conductors provided that it is supplied from a portable battery powered energiser that is located remotely from frequented areas. Where it is necessary for a permanent electric fence to pass beneath the overhead conductors, or where an extensive permanent electric fencing system is installed in proximity to a transmission line certain additional safety requirements will be required.
- The installation or use of irrigation equipment inside the easement. NOTE: An irrigation system will not be approved if it is capable of coming within 4 metres of the overhead conductors; exceeds 4.3 metres in height; consists of individual

sections of rigid or semi-rigid pipe exceeding 4.3 metres; is capable of projecting a solid jet of water to within 4 metres of any overhead conductors; requires fuel to be stored within the easement; and/or requires an outage of the transmission line for its operation.

- The installation of low voltage electricity, telephone, communication, water, sewerage, gas, whether overhead, underground or on the surface. Note: Services that do not maintain standard clearances to the overhead conductors that are within 15 metres from the easement centre-line, 20 metres from any part of a transmission line supporting structure or are metallic and within 30 metres of any part of a structure will not be approved. TransGrid may impose additional conditions or restrictions on proposed development.
- The installation of high voltage electricity services, subject to there being no practicable alternative and provided the standard clearances are maintained to the supporting structures. Note: Where extensive parallels are involved certain additional safety requirements may be imposed by TransGrid, depending on the particular case and engineering advice.
- Swimming pools, subject to TransGrid's strict compliance criteria. Note: Above ground pools will not be approved. In-ground pools will not be approved if there is a practicable alternative site clear of the easement area. If there is no practical alternative site, in-ground pools including coping will not be approved if it encroaches more than 4.5 metres, or is less than 30 metres away from a transmission line structure. A site-specific assessment by TransGrid is required.
- Detached garages, detached carports, detached sheds, detached stables, detached glass houses, caravans, site containers, portable tool sheds, pergolas and unroofed verandas attached to residences on the outer 3 meters of the easement only.
- Prefabricated metal (garden) sheds. TransGrid approved sheds must be earthed. Note: Sheds exceeding 2.5 metres in height, with a floor area exceeding 8m², encroaching more than of up to 3 metres or within 30 metres of any part of a transmission line structure will not be approved. Connection of electric power will not be approved.
- Single tennis courts. Note: Tennis courts that hinder access are for commercial use or do not provide adequate clearances shall not be approved.
- Subdivisions. See Appendix C requirements.
- Roads, carparks, cycleways, walking tracks and footpaths on the outer part of the easement or as a thoroughfare across the easement, subject to horizontal and vertical clearances. Restrictions and other conditions on consent may also apply. These will not be approved when located within: − 20 metres of any part of a transmission line structure − 10 metres of the centre-line of a transmission line 132kV and below − 17 metres of the centre-line of a transmission line above 132kV
  Note: Roads and pathways that cross the transmission line as a thoroughfare may be permitted. Where it is proposed that a road passes within 30 metres of a transmission structure or supporting guy, TransGrid may refuse consent or impose restrictions and other conditions on consent. Where a road passes within 30 metres of a transmission structure or supporting guy, the structure's earthing system may require modification for reasons including, but not limited to, preventing fault currents from entering utility services which may be buried in the road. The option

of raising conductors or relocation of structures, at the full cost to the proponent, may be considered.

- Excavation – subject to restriction criteria. Note: Substantial excavations located within 20 metres of any part of a steel tower or pole structure and exceeding a depth 3 metres will not be approved.

2.6 Natural Gas

Jemena is the servicing authority for gas supply adjacent to the site.

Gas infrastructure is available in the form of secondary high-pressure mains with 1050kPa capacity running along the Hope Street and Waratah Street property boundaries at a distance of 0.8-2.6 metres from the boundary line.

Natural Gas Demand

Jemena uses an energy demand of 20 gigajoules per year to estimate the average annual domestic usage of natural gas for residential dwellings. This usage rate typically equates to the utilisation of a natural gas hot water tank, cook top and heating point.

Table 2.5 presents the natural gas usage estimate for the project, assuming supply to residential units only. This estimate uses a conversion factor of 39.6 m^3 / GJ to convert the estimated energy usage into a volume of gas (Roarty, 2008).

Land Use	Number of Dwellings/ Units	Rate (GJ/dwelling/yr)	Conversion Rate (m3/GJ)	Usage (GJ/yr)	Usage (GJ/day)	Usage (m^3/day)
Residential Dwellings	4000	20	39.6	80,000	219	8672

Table 2.5 Natural Gas Usage Estimate

The estimated natural gas usage for 4000 residential apartments is approximately 8672 m^3/day.

It should be noted that this natural gas demand estimate excludes demands from commercial premises. Without details of the specific proposed land uses it is difficult to estimate a gas demand for these areas. To meet BASIX requirements, it is expected that the residential units will require a natural gas connection.

Natural Gas Capacity and Supply

The existing DN250 main will have a carrying capacity in the order of 300-500m^3/hour or 7,200-12,000m^3/day. Confirmation of sufficient capacity for gas supply will be required by a specific application to Jemena.

Notwithstanding the further investigations and applications required with Jemena, it is considered that gas supply will be able to be provided to the development site if required. We would expect this to be on an as- needed basis for individual precinct sections.

2.7 Telecommunications

Existing local telecommunications services and optic fibre routes are located in proximity to the development.

Optus fibre optic cables run along both the northern and southern sides of Hope Street and the Hope Street property frontage.

At the time of writing we have not received a response from NBN Co or other telecommunication providers including Telstra.

We expect that the existing local cable network would not have the capacity to service the proposed development and that new underground cabling would be required to suit the project requirements. Normally this would be completed on a project by project basis.

Demand and capacity calculations have not been provided for telecommunications as these are not readily quantifiable like the other services provided. The requirements for telecommunications would need to be formalised via a Telstra Smart Community (or similar) registration.

Notwithstanding the further investigations and applications required with Telstra, it is considered that telecommunication infrastructure will be able to be provided to the development site.

2.8 High Pressure Oil

A high-pressure oil or petroleum pipeline is shown to be present in proximity to the development. The pipeline is operated by Viva Energy Australia and is described as the Gore Bay Pipeline containing either oil or petroleum.

The pipeline is located on the southern side of Hope Street and traverses the northern precinct boundary between Atkins Street and Waratah Street. At the intersection of Hope Street and Waratah Street, the pipeline heads in a southerly direction along the western side of Waratah Street to The Parramatta River and to the east of the development precinct.

The approximate alignment of the pipeline is shown in **Figure 2.2** below based on the DBYD plans from Viva Energy in **Appendix B**.

Figure 2.2. Approximate Alignment of Oil Pipeline

Discussions with Viva Energy (refer **Appendix B**) have been made on the requirements relating to the pipeline. Viva advise that the measurement length associated with the pipeline is defined as 100m. This measurement is based on the radius of the 4.7kW/m^2 radiation contour for a full-bore rupture, as per Australian Standard AS2885.1.

Viva have advised that as part of the detail design and further future development applications on the site that a Safety Management Study (SMS) shall be undertaken in accordance with AS2885 to ensure the safety of the surrounding environment and people regarding the maintenance, operation and integrity of the pipeline. Additional control measures shall be implemented until it is demonstrated that the risk from a loss of containment involving rupture is as low as reasonably practicable.

Reference to **Appendix D** can be made for Viva Energy's *Third-Party Development Guideline* for further details on the Viva Energy Requirements. The process and general requirements for the SMS, as outlined by Viva in their correspondence and meeting held with Cityplan and Parramatta Council, are summarised below:

- Complete a risk assessment to include consequence models of the worst-case scenarios of potential adverse impacts to the site associated with proximity to pipeline.
- Prepare a material and finishes plan as part of any conditions, to the satisfaction of the Responsible Authority, that:
    - Confirms that buildings to be constructed or existing buildings to be occupied withstand the radiation contour identified by the risk assessment report and how this will be achieved: and
    - Details the window type (including laminated glass) and method of fixing for the building to demonstrate that shattering of glass will be prevented

- Prepare to the satisfaction of the Responsible Authority, an Emergency Evacuation plan which demonstrates that all excavations are to the rear of the site.
- All new entries/exits from the road into the property & any new utilities that may cross the pipeline will be designed and constructed in consultation with Viva energy
- The landowner must at no cost to Viva Energy Australia Pty Ltd, carry out the works (whether or not within the pipeline easement) for the development to meet the requirements of:
  - Australian Standard AS2885 Pipelines – Gas and Liquid Petroleum;
  - NSW Pipelines Act ; and
  - NSW Pipeline Regulations 2007.

The general minimum clearances of non-sensitive structures (not including buildings or items identified in the SMS) and other services from the pipeline (per the requirements of the pipeline licensing authority Viva Energy) are as follows:

(a) 0.5 m to buried equipment or structures less than 1.5 m wide and crossing the pipeline;
(b) 0.5 m to buried equipment or structures greater than 1.5 m wide and crossing the pipeline;
(c) 1.0 m to buried equipment or structures laid parallel to the pipeline; and
(d) 3.0 m to any building and the extremity of the pipeline (measured horizontally).

These clearances would need to be confirmed as part of the required Safety Management Study as discussed above. It is to be recognised that sensitive structures and uses such as school, retail, childcare, residential buildings and other similar uses within the 100m measurement zone as defined by Viva will require further consideration and confirmation through the SMS assessment process.

A material and finishes plan may also be prepared to confirm that buildings within this measurement length are able to withstand the radiation contour, and include an Emergency Evacuation plan.

Any construction activity within a 6m distance from the pipeline will require written approval prior to commencing works. This also includes any new entries and exits from the road into the property, and any new utilities that may cross the pipeline.

3 EROSION AND SEDIMENT CONTROL

3.1 Background

During the construction phase of the development, an Erosion and Sediment Control Program will be implemented to minimise water quality impacts. A detailed Erosion and Sediment Control Program will be employed throughout the construction works and a concept for this will be defined during the Development Application stage of the development site. The Erosion and Sediment Control Program will be defined based on normal engineering guidelines including The Landcom publication, Managing Urban Stormwater: Soils and Construction (The Blue Book) and the requirements of Parramatta City Council. It is expected that the program will include measure such as temporary sediment basins, silt fences, cut-off drains for polluted stormwater and diversion channels for clean stormwater run-off.

The following sections provide information to identify controls and procedures that will be incorporated into the Erosion and Sediment Control program at Development Application Stage.

3.2 Pre-Construction

The following minimum requirements are to be met prior to commencement of construction:

- Protection of downstream receiving waters. The proximity to Parramatta River will require additional considerations to ensure that receiving waters are protected.
- Sediment fences are to be constructed on the upstream edges of the designated buffer strips and at the base of fill embankments.
- Areas for plant and construction material storage are to be designated along with associated drains and spillage holding ponds.
- Diversion banks are to be created at the upstream boundaries of construction activities to ensure upstream runoff is diverted around any exposed areas. Catch drains are to be created at the downstream boundary of construction activities.
- Silt fences and/or sandbags are to be placed along the catch drains to slow flow, reduce scour and capture some sediment from runoff.
- Construction of temporary sediment basins.
- Site personnel are to be educated to the sediment and erosion control measures implemented on site.

3.3 During Construction

The following minimum requirements are to be met during construction:

- Progressive re-vegetation of filled areas and filled batters.
- Construction activities are to be confined to the necessary construction areas.
- The provision of a construction exit (truck shaker) to minimise the tracking of debris from tyres of vehicles leaving the site onto public roads. Only one construction exit will be nominated to limit the movement of construction equipment.
- Topsoil and temporary stockpile location will be nominated to coincide with areas already disturbed. A sediment fence is to be constructed around the downstream side of the stockpile and a diversion drain at the upstream side if required.
- Regular inspection and maintenance of silt fences, sediment basins and other erosion control measures are to be made. These should be undertaken weekly, monthly and following major rainfall events. Following rainfall events greater than 50mm inspection of erosion control measures and removal of collected material should be undertaken. Replacement of any damaged measures should be performed immediately.

3.4 Post Construction

The following minimum requirements are to be met post construction:

- The contractor/ developer will be responsible for the maintenance of erosion and sediment control devices from the possession of the site until the site is accepted "Off Maintenance" or until stabilisation has occurred to the satisfaction of the superintendent and council.
    - Key stormwater areas requiring maintenance for operational phase of the project following construction are piped stormwater system, bio-retention areas, field inlet pit inserts and rainwater tanks.

4 STORMWATER DRAINAGE

4.1 Site Drainage

4.1.1 Existing Drainage System

As part of the existing industrial/ commercial developments on the property, an extensive in-ground drainage system is present. This system comprises grated inlet pits, sealed junction pits, down pipe connections and in-ground pipes which convey stormwater from buildings, car parks, hardstand areas and other extensive paved areas to the legal point of discharge and Parramatta River. It is expected that the majority of house drainage will be made redundant as part of the new precinct redevelopment.

Several council drainage lines and associated easements are present on The Site. The indicative layout of existing drainage lines, as provided in a Flood Application Enquiry ((6 September 2016) to Parramatta City Council, can be seen in **Figure 4.1** below, and also in **Appendix F**. The existing drainage lines vary in diameter from 525mm to 1050mm and are generally located along pre-existing low points and gullies drainage urbanised drainage paths to Parramatta Rive.

The indicative built form suggests that relocation of some of these drainage lines will be required to suit the proposed layout. The relocation of drainage routes would be done utilising proposed transport and access routes (new public roads, pedestrian pathways etc). The exact routes would form part of future detailed development application as and concept stormwater management designs.

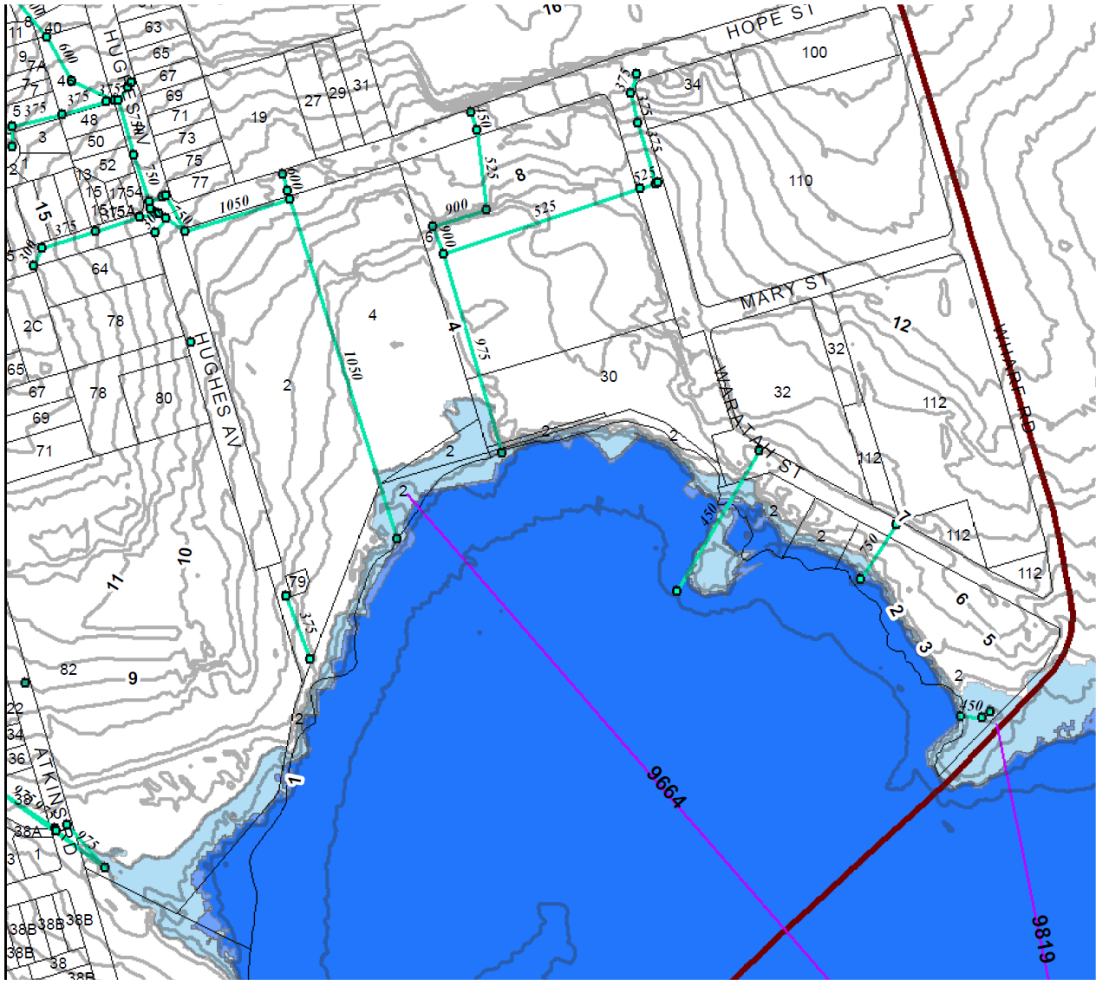


Figure 4.1 Council Drainage Infrastructure (Source: Parramatta City Council 2016)

4.1.2 Proposed Drainage System

As per general engineering practice and the guidelines of Parramatta City Council, the proposed stormwater drainage system for the development will comprise a minor and major system to safely and efficiently convey collected stormwater run-off from the development to the legal point of discharge. Details of the proposed system for the development will be defined during the Development Application Stage of the project.

The minor system will consist of a piped drainage system designed to accommodate the 1 in 20-year ARI storm event (Q20). This results in the piped system being able to convey all stormwater runoff up to and including the Q20 event. The major system has been designed to cater for storms up to and including the 1 in 100-year ARI storm event (Q100). This major system employs overland flow paths to safely convey excess run-off from the site.

As part of the new development, the council drainage and easements from the low point in Hope Street will need to be considered. Realignment of a portion of the drainage line will be required to suit the new building layout over the site. Consideration to overland flow from the low point will also be required. These two items have been shown indicatively on our concept stormwater management sketch, **Co13248.01-SK01** found

in **Appendix A**, which shows the indicative routes of main stormwater lines and provision of overland flows.

The future design of the stormwater system for the site should be based on the following documents:

- Runoff from buildings will generally be designed in accordance with AS 3500.3 National Plumbing and Drainage Code Part 3 – Stormwater Drainage.
- Overall site runoff and stormwater management will generally be designed in accordance with the Institution of Engineers, Australia publication "Australian Rainfall and Runoff" (1988 Edition), Volumes 1 and 2 (AR&R).
- Design recurrence intervals for major and minor storms will be in accordance with Part 3 of Development Control Plan 2011.
- On-site detention, water quality measures and flooding requirements will be in accordance with Version 4 of the Upper Parramatta River Catchment Trust On-site Detention Handbook; and
- Stormwater harvesting is based on the requirement of LCC Part 7 of Development Control Plan 2008 and the NSW Department of Environment and Conservation document *Managing Urban Stormwater: Harvesting and Reuse*.

Water quality and re-use are to be considered in the design, throughout new paved areas, to ensure that any increase in stormwater pollution are mitigated, Councils Water Quality Objectives are met and that the demand on potable water resources is reduced.

It is noted that development of Holdmark sites can be completed without relying on other sites or overall precinct measures. Overall objectives set out in this project can be achieved for the individual Holdmark parcels on an individual basis.

The means to which these objectives are achieved can broadly be summaries as follows:

- ***Water Quantity***
  Parramatta City Council requires water quantity management, or stormwater detention, to be provided to limit the runoff discharged from private property into the underground piped drainage system to pre-developed flow and to assist in mitigating the increased stormwater runoff generated by development.

  On-site detention will be required to be provided for the redevelopment works, in accordance with Upper Parramatta River Catchment Trust On-site Detention Handbook.

  The site is contained within the Upper Parramatta River Catchment and as per Council requirements calculation of the site storage requirement (SSR), i.e. the detention storage, and permissible site discharge (PSD) is required to be made using Version 4 of the Upper Parramatta River Catchment Trust On-site Detention guidelines.

The basic PSD and SSR rates as required of the Upper Parramatta River Catchment Trust are shown in **Table 4.1**. below:

Basic OSD Requirements		% impervious surface	
		100%	85-100%
PSD (l/s/ha)	Primary Outlet	40	As per UPRCT OSD Guidelines
	Secondary Outlet	150	
Provided PSD (l/s)	Primary Outlet	162	
	Secondary Outlet	608	
SSR (m^3/ha)		455	
Storage Required for 21.3 Ha (m^3)		9750	

Table 4.1. Basic Detention SSR and PSD Requirements and detention size

Detention systems totalling a storage volume in the order of 9750m^3 would be required for the development site. It is expected that due to the size of the development that the detention systems for the development would be dispersed across The Site at strategic locations, relating to the catchment breakdown and discharge locations from The Site. Reference to drawing **Co13248.01-SK01** shows a possible arrangement for the system based on a series of detention systems.

- ***Water Quality***

  Parramatta City Council have nominated, in Part 3 of their DCP 2011, the requirements for stormwater quality to be performed on a catchment wide basis. These are presented in terms of annual percentage pollutant reductions on a developed catchment and are as follows:

Gross Pollutants	90%
Total Suspended Solids	85%
Total Phosphorus	60%
Total Nitrogen	45%
Total Hydrocarbons	No visible oil for flows up to 50% of the one-year ARI peak flow.

  Roof, hardstand, car parking, roads and other extensive paved areas are required to be treated by the Stormwater Treatment Measures (STM's). The STM's shall be sized for the whole catchment area of the development. The STM's for the development shall be based on a treatment train approach to ensure that all the objectives above are met in line with the principles of Water Sensitive Urban Design (WSUD) considerations.

  Stormwater quality objectives will be met via a treatment train which comprises a combination of proprietary and WSUD measures. A treatment solution, whereby a bio-retention filtration system is used would require approximately 2600m^2 of filtration area to meet the required pollution reduction targets.

  Reference to **Appendix B** shows the indicative location and configuration of the stormwater management plan for the development.

The final solution would need to be confirmed on individual development application and detail MUSIC modelling at development approval time. The measures would need to be able to be integrated into the overall public domain and recreation zones prior to discharge to the Parramatta River.

4.1.3 Legal Point of Discharge

There are currently 5 discharge points to the Parramatta River. The legal point of discharge from the precinct will be located in conjunction with the existing site, council inter-allotment drainage lines and discharge locations to Parramatta River. The existing discharge locations can be seen in **Figure 4.1**.

If a new outlet is required, then it the design of the new outlet structure will be assessed in accordance with the NSW Office of Water Document *Controlled Activities: Guidelines for Outlet Structures.*

A legal point of discharge for the site will be made to the Parramatta River frontage. The point of discharge is expected to match the discharge locations which are currently present along the river bank; however, the final locations would require integration into the broader stormwater management strategy for the development.

Stormwater outlets will consist of reinforced concrete pipes and 'natural' energy dissipaters. The outlets will be aligned with the river to remove the potential for bank scour and shall include rip rap energy dissipaters constructed in accordance with the *Outlet Structures Guidelines* as published by the Department of Water & Energy and The Blue Book. This is shown figuratively below in **Figure 4.2** below.

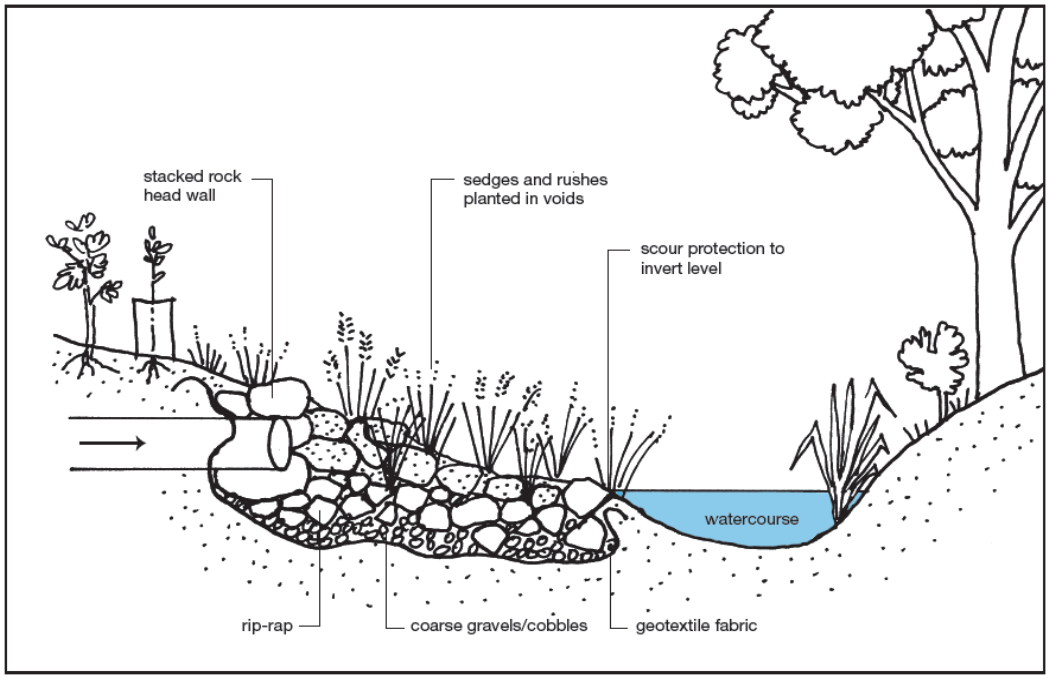


Figure 4.2 Outlet Structure Components

4.2 Flooding

A Flood Enquiry Application was made to Parramatta City Council. The information contained in the response includes council data on flood levels and drainage infrastructure contained in their database files. The council application shows that there are two council drainage pipes which pass through the site. The information does not show the specific flood level adjacent to the site. An estimate of the 1 in 100-year flood level of 1.5m has been made based on interpolating flood level contours shown on the flood map. It is noted that council is in the process of updating their *Floodplain Risk Management Strategy* which may change the flood levels from what has been currently provided.

The flood enquiry information shows the site will be clear of the PMF flood event extent.

The defined the Flood Planning Levels (FPL) for the site based on the 1 in 100 year ARI storm flood level plus 500mm freeboard, allowing for the development to be sited above the 1 in 100 year ARI flood level. The FPL for the development varies depending on where it is in relation to the Parramatta River and local overland flow paths. The estimated FPL for the Southern Precinct based on flooding relating to the Parramatta River is RL 2.0m AHD.

Reference to **Appendix F** can be made for the council flood information, Council Reference: FL/89/2016 dated 6 September 2016.

Consideration to flood level changes in relation to climate change will be required. Sea level rise in relation to climate change is expected to be approximately 300mm by 2050. Given the distance upstream this is expected to have minimal effect on the reported flood level. Increased runoff may play a larger role in the flood level following climate change however a detailed flood assessment will be required to confirm this change. Future development and detailed flood assessment should be considered for the land as part of ongoing assessment processes for the site. This information is also expected to form part of Councils impending *Floodplain Risk Management Strategy* and confirmation from council should be made on this item.

5 CONCLUSION

This Site Conditions & Infrastructure Services Assessment Report has been prepared to provide planners of the constraints and opportunities relating to Civil Engineering items for preparation of the Planning Proposal and the potential for future rezoning of the *Subject Land – Southern Precinct* located at Melrose Park, NSW. The future rezoning will be a change from the current *IN1 General Industrial* to potentially a *R4 Residential.* This would allow for future development of the land as residential, commercial, retail, services and recreational activities.

An overview of services and engineering considerations has been provided to assist in the stage one due diligence and planning application process for future development of the precinct.

All major services can be seen to be near the precinct and Holdmark development parcels. Generally, all essential services are located directly adjacent to the site, and there is scope to either extend or upgrade these services to facilitate the proposed development. The servicing for the site would be completed at no cost to Government and would not impinge on the services of existing landowners.

A stormwater management strategy has been shown in this report to be achievable. Management of stormwater quantity and quality can be achieved, allowing for the specific requirements of Parramatta City Council and NSW Government requirements.

Accordingly, based on the site conditions of the land and the availability of infrastructure services to the land, it is concluded that the precinct (when considering the redevelopment of both north and south precincts) can be adequately serviced by essential urban services.

Further, that development of the Holdmark sites can be made without reliance on other parts of the precinct being delivered, subject to future site specific assessments and authority consultation and requirements.

6 REFERENCES

Managing Urban Stormwater: Harvesting and Reuse – 2006 (NSW DEC);

Managing Urban Stormwater: Source Control – 1998 (NSW EPA);

Managing Urban Stormwater: Treatment Techniques – 1997 (NSW EPA);

Managing Urban Stormwater: Soils & Construction – 2004(LANDCOM);

Part 3, Development Control Plan (2011), Parramatta City Council

On-site Stormwater Detention Handbook (Fourth Edition 2005), Upper Parramatta River Catchment Trust; and

Water Sensitive Urban Design – "Technical Guidelines for Western Sydney" by URS Australia Pty Ltd, May 2004

7 APPENDICES

Appendix A – Proposed Development Layout

Appendix B – Drawings by Costin Roe Consulting

Appendix C – Dial Before You Dig Information

Appendix D – Viva Energy's Third Party Development Guidelines

Appendix E – Existing Site Survey

Appendix F – Council Flood Information

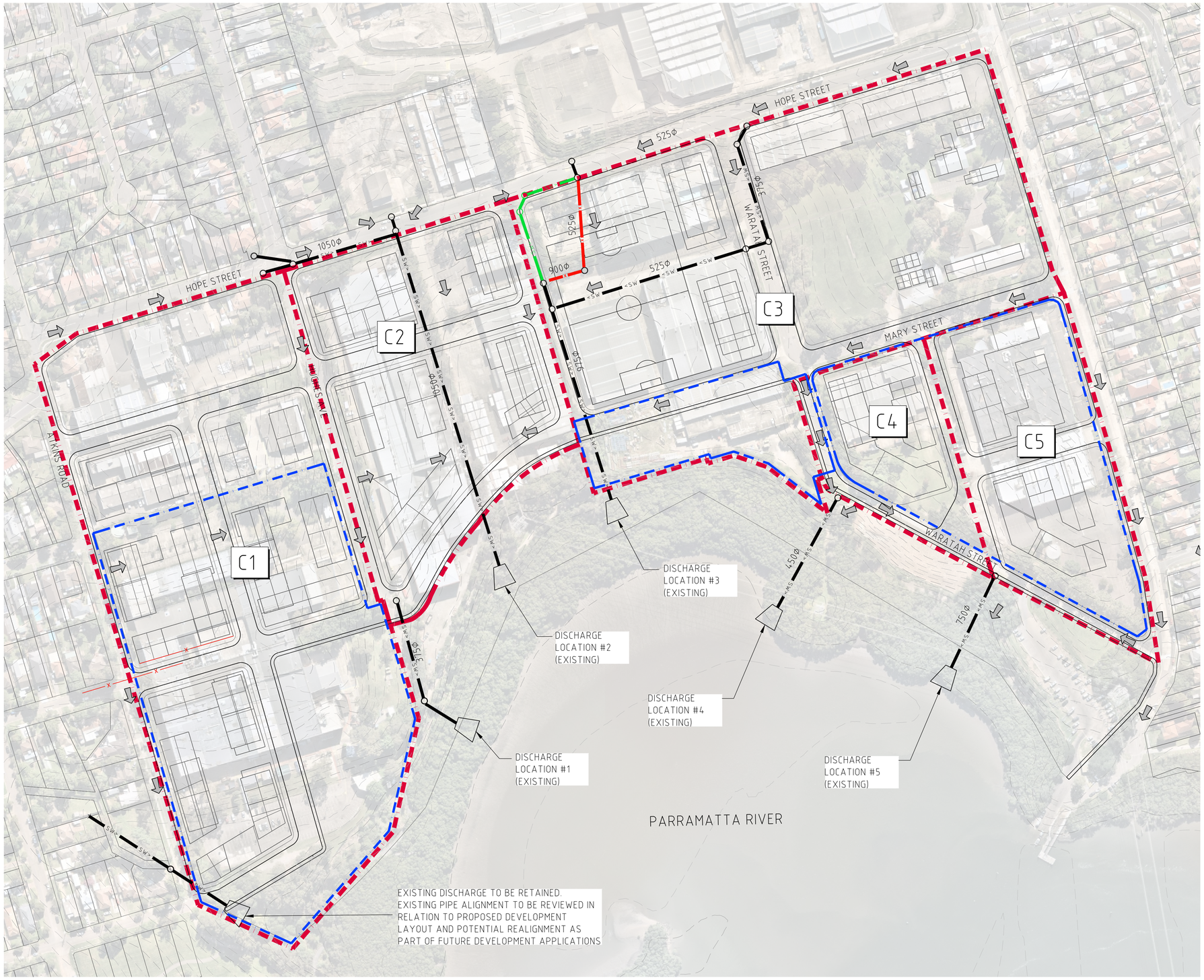
Appendix A

Proposed Development Layout


ATKINS ROAD
HUGHES AVENUE
WHARF ROAD
HOPE STREET
HOPE STREET
WARATAH STREET
MARY STREET
BORONIA STREET
MASSEY STREET
HUGHES AVENUE
WHARF ROAD
WARATAH STREET
ANDREW STREET
TRUMPER STREET
ATKINS ROAD
SAUNDERS ROAD
PARRAMATTA RIVER
0
50
100
200m

Appendix B

Drawing by Costin Roe Consulting



LEGEND:

- OVERLAND FLOW PATH
- PROPERTY BOUNDARY
- CATCHMENT BOUNDARY
- COUNCIL PIT & DRAINAGE LINE (EXISTING)
- COUNCIL PIT & DRAINAGE LINE (TO BE MADE REDUNDANT)
- PIT & DRAINAGE LINE PROPOSED
- HOLDMARK SITE BOUNDARY

STORMWATER MANAGEMENT SCHEDULE

CATCHMENT	AREA(Ha)	OSD STORAGE (M^3)	BIO-RETENTION (M^2)
C1	8.3	3500	1100
C2	3.8	1600	500
C3	8.3	3500	1100
C4	1.3	550	200
C5	2.5	1000	350
TOTAL: =	24.2 Ha	10150 m^3	3250 m^2

WATER QUALITY TARGETS

POLLUTANT	ANNUAL PERCENTAGE REDUCTION
GROSS POLLUTANTS	90%
TOTAL SUSPENDED SOLIDS	85%
TOTAL PHOSPHORUS	60%
TOTAL NITROGEN	45%
TOTAL HYDROCARBONS	90%

FLOOD PLANNING NOTE:

ALL BUILDINGS TO BE SET AT A MINIMUM LEVEL OF THE 1 IN 100YR ARI FLOOD PLUS 500mm FREEBOARD. FREEBOARD TO BE SET TO LOCAL OVERLAND FLOW PATH & PARRAMATTA RIVER FLOOD EVENTS.

SITE WATER QUALITY TREATMENT TRAIN

THIS SITE IS EFFECTIVE IN REDUCING THE POLLUTANT OF PHOSPHORUS, NITROGEN, SUSPENDED SOLIDS AND GROSS POLLUTANTS FROM STORMWATER RUNOFF PRIOR TO DISCHARGING FROM THE SITE

PLAN SHOWING INDICATIVE STORMWATER CONCEPT

APPROXIMATELY 1:1500

15m 0 15 30 45 60 75 90 105 120 135 150m

SCALE 1:1500 @ A1 SIZE SHEET

FOR INFORMATION

ISSUED FOR INFORMATION	27.04.20	A
AMENDMENTS	DATE	ISSUE

ARCHITECT

CLIENT

HOLDMARK

2/2-4 Giffnock Avenue
MAQUARIE PARK
NSW, 2113, Australia

Tel (02) 9889 5540

PROJECT

REZONING APPLICATION
MELROSE PARK, NSW, 2114

CONSULT AUSTRALIA

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MW	DM			A1	AS SHOWN	C013248.01 - SK01

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 446
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
CONCEPT STORMWATER PLAN

DRAWING No C013248.01 - SK01

ISSUE A

Appendix C

Dial Before You Dig Information

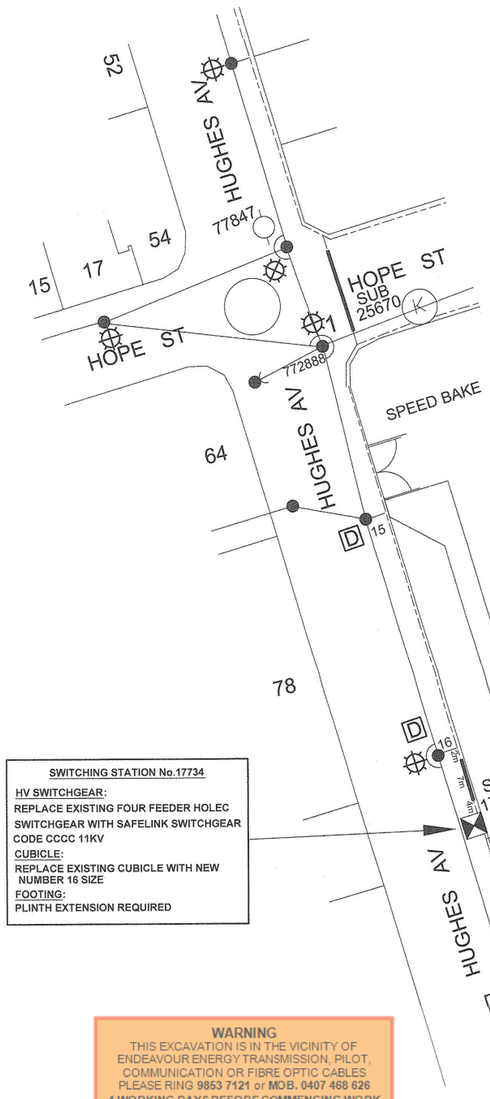
UBD : 212- M2

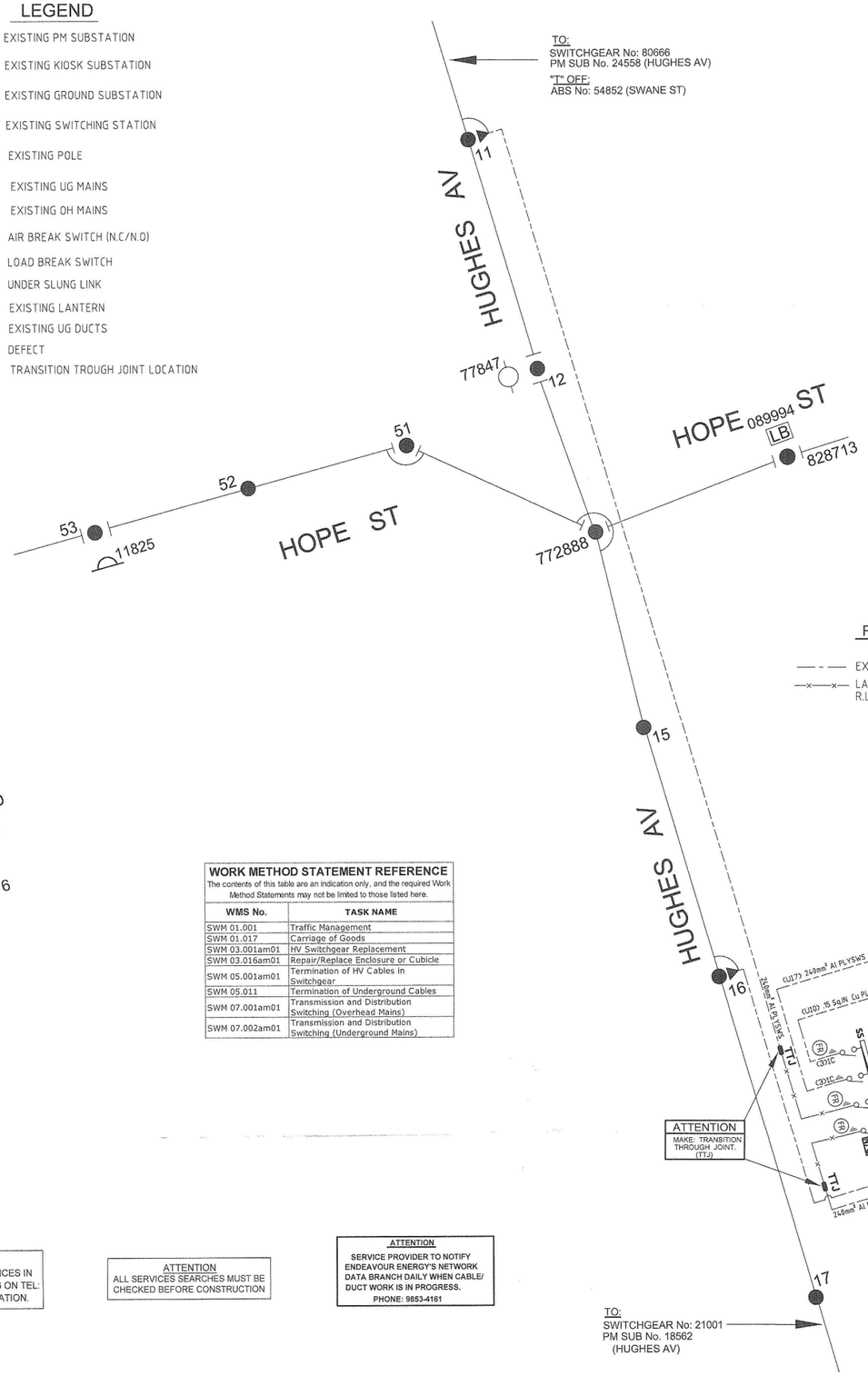
LEGEND

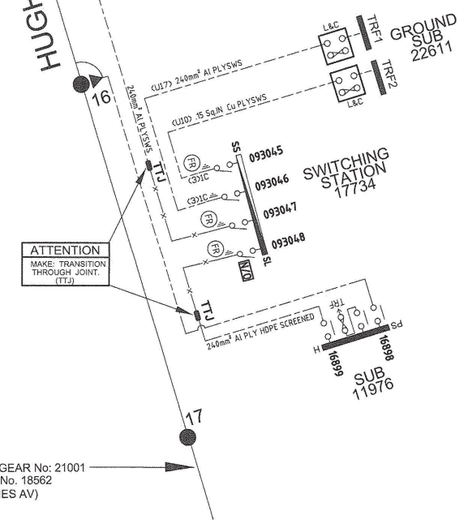
- EXISTING PM SUBSTATION
- EXISTING KIOSK SUBSTATION
- EXISTING GROUND SUBSTATION
- SS EXISTING SWITCHING STATION
- EXISTING POLE
- EXISTING UG MAINS
- EXISTING OH MAINS
- AIR BREAK SWITCH (N.C/N.O)
- LB LOAD BREAK SWITCH
- UNDER SLUNG LINK
- EXISTING LANTERN
- EXISTING UG DUCTS
- D DEFECT
- TTJ TRANSITION TROUGH JOINT LOCATION

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ENDEAVOUR ENERGY'S NETWORK STANDARDS.
2. ALL CONSTRUCTION WORKS MUST COMPLY WITH ENDEAVOUR ENERGY'S RELEVANT STANDARDS AND INSTRUCTIONS SUCH AS, BUT NOT LIMITED TO:
   MDI 0003 (BARE OVERHEAD DISTRIBUTION LINES),
   MDI 0001 (AERIAL BUNDLE CABLE)
   SDI 100 (DISTRIBUTION EARTHING DESIGN CONSTRUCT & TEST)
3. ENDEAVOUR ENERGY'S NETWORK ASSET OPERATIONS HAS PREPARED THIS DESIGN TO SHOW THE EXISTING SERVICES & ENVIRONMENTAL ISSUES AS ACCURATELY AS POSSIBLE AT THE TIME THE DESIGN WAS CARRIED OUT.
   THE CONSTRUCTORS OF THIS PROJECT SHOULD VERIFY ON SITE THE EXACT LOCATION OF ALL SERVICES & PERMANENT SURVEY MARKS REGARDLESS OF WHETHER THEY APPEAR ON THIS PLAN OR NOT.
4. ALL REDUNDANT ENDEAVOUR ENERGY ASSETS TO BE RETURNED TO THE NEAREST ENDEAVOUR ENERGY DEPOT.







ENDEAVOUR ENERGY CONTACT
Name: Chris Garde Phone: (02) 9853 4629

WORKS COMPLETED

CONSTRUCTED BY		
WORKS COMPLETED	NAME	
SIGNED		DATE
INSPECTED BY	NAME	
SIGNED		DATE

IMPORTANT

(3) RECORD OF EQUIPMENT DEFECT WITHIN THE WORK AREA OF THIS PROJECT HAS BEEN IDENTIFIED DURING THE DESIGN PROCESS.

PLEASE RE-CHECK ELLIPSE JUST PRIOR TO COMMENCEMENT OF CONSTRUCTION.

FINAL H.V. CIRCUIT
(NOT TO SCALE)

- EXISTING UNDERGROUND CABLE
- LAY 240 mm² Al. 3C 11kV XLPE CABLE
  R.L.= 14m C.L.= 18m

DEFECTS IN IMMEDIATE AREA

ASSET NO.	PLANT NO.	WORK ORDER	DESCRIPTION
15	PL750747	02833322	REPLACE POLE CAP
16	PL563944	02833325	REPLACE POLE CAP
17	PL563939	02833329	REPLACE POLE CAP

SWITCHING STATION No.17734

HV SWITCHGEAR:
REPLACE EXISTING FOUR FEEDER HOLEC SWITCHGEAR WITH SAFELINK SWITCHGEAR CODE CCCC 11KV
CUBICLE:
REPLACE EXISTING CUBICLE WITH NEW NUMBER 16 SIZE
FOOTING:
PLINTH EXTENSION REQUIRED

WORK METHOD STATEMENT REFERENCE

The contents of this table are an indication only, and the required Work Method Statements may not be limited to those listed here.

WMS No.	TASK NAME
SWM 01.001	Traffic Management
SWM 01.017	Carriage of Goods
SWM 03.001am01	HV Switchgear Replacement
SWM 03.016am01	Repair/Replace Enclosure or Cubicle
SWM 05.001am01	Termination of HV Cables in Switchgear
SWM 05.011	Termination of Underground Cables
SWM 07.001am01	Transmission and Distribution Switching (Overhead Mains)
SWM 07.002am01	Transmission and Distribution Switching (Underground Mains)

OPERATIONAL LIMITATIONS

UNLESS APPROVED OTHERWISE, INTERRUPTIONS TO ANY CUSTOMER'S SUPPLY MUST BE AVOIDED.
THE FOLLOWING ALTERNATIVES SHOULD BE CONSIDERED:
- MOBILE GENERATORS OR SUBSTATIONS
- LIVE LINE WORK
- DESIGN ALTERNATIVES
- WORK PRACTICES / STANDARDS
- LOW VOLTAGE PARALLELS

THE COST IS TO BE FUNDED BY THE CUSTOMER / DEVELOPER

WARNING
THIS EXCAVATION IS IN THE VICINITY OF ENDEAVOUR ENERGY TRANSMISSION, PILOT, COMMUNICATION OR FIBRE OPTIC CABLES
PLEASE RING **9853 7121** or **MOB. 0407 468 626**
4 WORKING DAYS BEFORE COMMENCING WORK

DESIGN COMPLIANCE
This design complies with Endeavour Energy's relevant standards as current at this time and as listed on the Endeavour Energy's Network Standard Products Internet site. These standards include, but are not limited to:
GS10: General Terms and Conditions
SDI: Substation Design Instruction
ESS: Environmental Management Standard
SAD0001: Design Drawing Standard
MDI: Mains Construction Instruction
MMI: Mains Maintenance Instruction
MDI: Mains Design Instruction
SMI: Substation Maintenance Instruction
PDI: Protection Design Instruction
Additionally, where relevant, the design complies with guidelines published by ENA and other relevant Australian Standards.
Signed: WC
Name - WALTER CASTRO
Date - 3/2/12
Service Provider No. 3192

ENDEAVOUR ENERGY WARNING
The information shown on the approximate location of underground cables relative to fixtures existing when the cables were laid, and has been prepared for Endeavour's own use. Endeavour Energy has taken reasonable steps to ensure that the information is as accurate as practicable, but will not accept no liability for inaccuracies in the information shown on such plans from any cause whatsoever arising.
Persons intending to excavate are expected to exercise all due care in the vicinity of the area indicated and will be held responsible for damage caused to Endeavour Energy's Property
All electrical apparatus shall be considered as live until proved de-energised. Contact with live electrical apparatus will cause severe injury or death
Those excavating near Endeavour Energy's cables should be aware that ASBESTOS OR ASBESTOS - CONTAINING MATERIAL MAY BE PRESENT in Endeavour Energy's underground assets and that Organo-Chloride Pesticides(OCP) may be present in some sub-transmission trenches

WARNING
LIVE ENDEAVOUR ENERGY CABLES & OTHER SERVICES IN THIS AREA. PLEASE CONTACT DIAL BEFORE YOU DIG ON TEL: 1100 FOR SEARCHES TWO DAYS PRIOR TO EXCAVATION.

ATTENTION
ALL SERVICES SEARCHES MUST BE CHECKED BEFORE CONSTRUCTION

ATTENTION
SERVICE PROVIDER TO NOTIFY ENDEAVOUR ENERGY'S NETWORK DATA BRANCH DAILY WHEN CABLE/ DUCT WORK IS IN PROGRESS.
PHONE: 9853-4161

RENEWAL & MAINTENANCE PROGRAM: 2010-2011
SWITCHGEAR REPLACEMENT
ITEM No: DSNH0012
SWITCHING STATION No.17734

DSNH0012

AMENDMENTS	
A	

REFERENCE DRAWING'S		WORK ORDERS		CAP / SAMP No.	DS003NH
SS 17734	RYDALMERE1 - D/15	GENERAL		AM PROJ. No.	DSNH0012
PM 11976	RYDALMERE2 - R/10	OVERHEAD		HV SWITCHING	
		UNDERGROUND		UBD/PENGUIN REF	212-M2
		SUBSTATIONS		GIS MAP No	0052
				HV OP DIAGRAM	RYDALMERE1 & 2
				LOCAL GOV AREA	PARRAMATTA C.C.

ORIGINAL SCALE 1:500 — DO NOT SCALE DIMENSIONS IN METRES

DRAWN WC — DATE 3-2-12 — CH'D — DESIGN WC

HUGHES AV
ERMINGTON
DSNH0012
REFURBISH SWITCHING STATION 17734

Endeavour Energy

A1 **360762**

SHEET No 1 OF 1 SHEETS

13469

Issue Date: 15/08/2016, DBYD Sequence No: 54945145

1 256 875 N

306 750 E

WARATAH ST.

MARY STREET

WHARF ROAD

WARATAH STREET

ANDREW ST.

PUBLIC RESERVE

PARRAMATTA RIVER

PUBLIC RESERVE

BOUNDARY

S.C.C. P.C.C.

S.C.C.

SUB 23491

SUB 21581

CONS. MAINS

3 x R74
R58
U06

STJ (U06 to 3x U49) 0,5 COV.

STJ (874) 1,0 COV.

STJ (874) 1,0 COV.

STJ (U06 to 3x U40) 0,7 COV.

STJ (U25 to U37A) 0,6 COV. 22-7-87 FB 6218

SE (U37) (N15) FB 6218

SE (Z85) FB 6218

U25

(N15) U37 Z85 U37

U37 Z85 N

U37 (N15)

U37 U37 A N

U37 Z85 U37 N (N15)

U37 Z85 U37 (N15)

3xR60 R30

STJ (3x U40 to U37N) 0,7 COV. 1,5 PL.

STJ (3x U51 to U37A) 0,7 COV. 0,9 PL. 16-11-81

STJ (3x U48 to 3x U51)

U68 3xR60 R30 3xU40

U37 Z85 U37 (N15)

STJ (Z85) 1,7 COV. 0,2 PL.

STJ (U37) (N15) 0,6 COV.

STJ (U37N) 0,8 PL.

U37 Z85 U37 (N15)

U37 Z85 U37 (N15)

U37 Z85 U37 (N15)

U37 Z85 U37 (N15)

STJ (U37N) 0,5 PL.

SE (U37) (N15) 0,5 PL.

0,5 COV

0,8 COV

3,5 COV

NOTES:
1. CABLES 0,6 FROM PROPERTY LINE. 0,6 COVER UNLESS OTHERWISE SHOWN.
2. LENGTHS IN METRES.

CABLE LEGEND		DUCT LEGEND	
SL	STREET LIGHT CONDUCTOR	B	50 PVC CONDUIT
SC	SERVICE CABLE	C	100 PVC CONDUIT
		D	125 PVC CONDUIT
		E	100 FIBRO CONDUIT
		F	140 FIBRO CONDUIT

CABLE SCHEDULE

CODE	TYPE	CODE	TYPE
U12	150 mm 11 kV AL PLYSWS	T28	50 mm L.V PVC PVC
U13	185 mm 11 kV AL XLPE	T38	150 mm LV AL XLPE
U17	240 mm 11 kV AL PLYSWS	T43	185 mm LV AL XLPE
U18	.4 SQ IN 11 kV AL PLYSWS	T52	240 mm LV AL XLPE
U24	350 mm 11 kV AL PLYSWS	T57	240 mm LV AL PLYSWS
U35	300mm² 11kV AL SCREENED PLYSWPVC	T64	.4 SQ IN LV AL PLYSWS
U37	300mm² 11kV AL SCREENED PAPVC	R58	.3 SQ. IN. LV AL POLYPVC
U40	185mm² 11kV CU SCREENED PLYPVC (SINGLE)	R74	.5 SQ. IN. LV AL POLYPVC
U51	.15 SQ. IN. 11kV CU PLYPVC (SINGLE)	R30	.15 SQ. IN. LV CU PVCPVC
U48	.06 SQ. IN. 11kV CU PLYPVC (SINGLE)	R60	.3 SQ. IN. LV CU PLYPVC
U06	95mm² 11kV AL PLYSWS		
Z85	30 PAIR (60 CORE) COMM. CABLE		
U49	95mm² 11kV CU PLYPVC (SINGLE)		
U39	300mm² 11kV AL SCREENED PLYSWPVC		

NOTE: FOR EXISTING S.C.C. CABLE RECORDS REFER TO S.C.C. SHT. 0052-6-1-3 (PARRAMATTA).

WARNING
THIS EXCAVATION IS IN THE VICINITY OF ENDEAVOUR ENERGY TRANSMISSION, PILOT, COMMUNICATION OR FIBRE OPTIC CABLES
PLEASE RING 9853 7121 or MOB. 0407 468 626
4 WORKING DAYS BEFORE COMMENCING WORK

ENDEAVOUR ENERGY WARNING

This plan shows the approximate location of underground cables relative to fixtures existing when the cables were laid, and has been prepared solely for Endeavour's own use. Endeavour Energy has taken all reasonable steps to ensure that the information is as accurate as possible but will accept no liability for inaccuracies in the information shown on such plans from any cause whatsoever arising.

Persons excavating are expected to exercise all due care in the vicinity where cables are indicated and will be held responsible for any damage caused to Endeavour Energy's Property

All Electrical apparatus shall be considered as live until proved de-energised. Contact with live electrical apparatus will cause severe injury or death

Those excavating near Endeavour Energy's cables should be aware that ASBESTOS OR ASBESTOS - CONTAINING MATERIAL MAY BE PRESENT in Endeavour Energy's underground assets and that Organo-Chloride Pesticides(OCP) may be present in some sub-transmission trenches

1 250 563 N

G218	MARY STREET	BDO.		
F.B.	LOCATION	CH'D	DATE	
	AMENDMENTS			

THE PROSPECT COUNTY COUNCIL

U.G. RETICULATION
ERMINGTON

DRAWN	B.D.O.	SCALE 1:500	DATE 22-3-88
CHECKED	J.M.V.		
CO-ORD D'SERV.	0052-6-1-3-2		Pa.

Issue Date: 15/08/2016, DBYD Sequence No: 54945145

1 257 188N

306 375E

HUGHES

SWANE STREET

AVENUE

HOPE STREET

PRIVATE ROAD

SUB 24353

SUB 25670

SUB 23603

SW.STN. 7445

NOTES:
1. CABLES 0.6 FROM PROPERTY LINE, 0.6 COVER UNLESS OTHERWISE SHOWN.
2. LENGTHS IN METRES.

CABLE LEGEND	
SL	STREET LIGHT CONNECTION
SC	SERVICE CABLE

DUCT LEGEND	
B	50 PVC CONDUIT
C	100 PVC CONDUIT
D	125 PVC CONDUIT
E	100 FIBRO CONDUIT
F	140 FIBRO CONDUIT
G	150mm FIBRO CONDUIT

CABLE SCHEDULE

CODE	TYPE	CODE	TYPE
U12	150 mm 11 kV AL PLYSWS	T28	50 mm L.V PVC/PVC
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U17	240 mm 11 kV AL PLYSWS	T43	185 mm L.V AL XLPE
U18	.4 SQ IN 11 kV AL PLYSWS	T52	240 mm L.V AL XLPE
U24	300 mm 11 kV AL PLYSWS	T57	240 mm L.V AL PLYSWS
U06	95mm² 11kV AL PLYSWS	T64	.4 SQ IN L.V AL PLYSWS
U10	.15 SQ IN. 11kV CU PLYSWS	R44	185mm² L.V AL PLYPVC
U27	.5 SQ. IN. 11kV AL PAPVC	R59	.3 SQ IN. L.V CU PLY
U37	300mm² 11kV AL SCREENED PAPVC	R69	300mm² L.V AL POLYPVC
U40	185mm² 11kV CU SCREENED PVCPVC(SINGLE)	R75	.5 SQ IN. L.V CU PLYPVC
U49	95mm² 11kV CU PAPER (SINGLE)	T76	.5 SQ. IN. L.V AL PAPVC
U50	.15 SQ. IN. 11kV CU PLY (SINGLE)	T78	.3 SQ. IN. L.V AL PLYSWS
U53	.3 SQ. IN. 11kV CU PLYPVC (SINGLE)	T80	.5 SQ. IN. L.V CU PLYSWS
Z05	4 CORE PILOT CABLE		
U25	300mm² 11kV AL PLYSWPVC		

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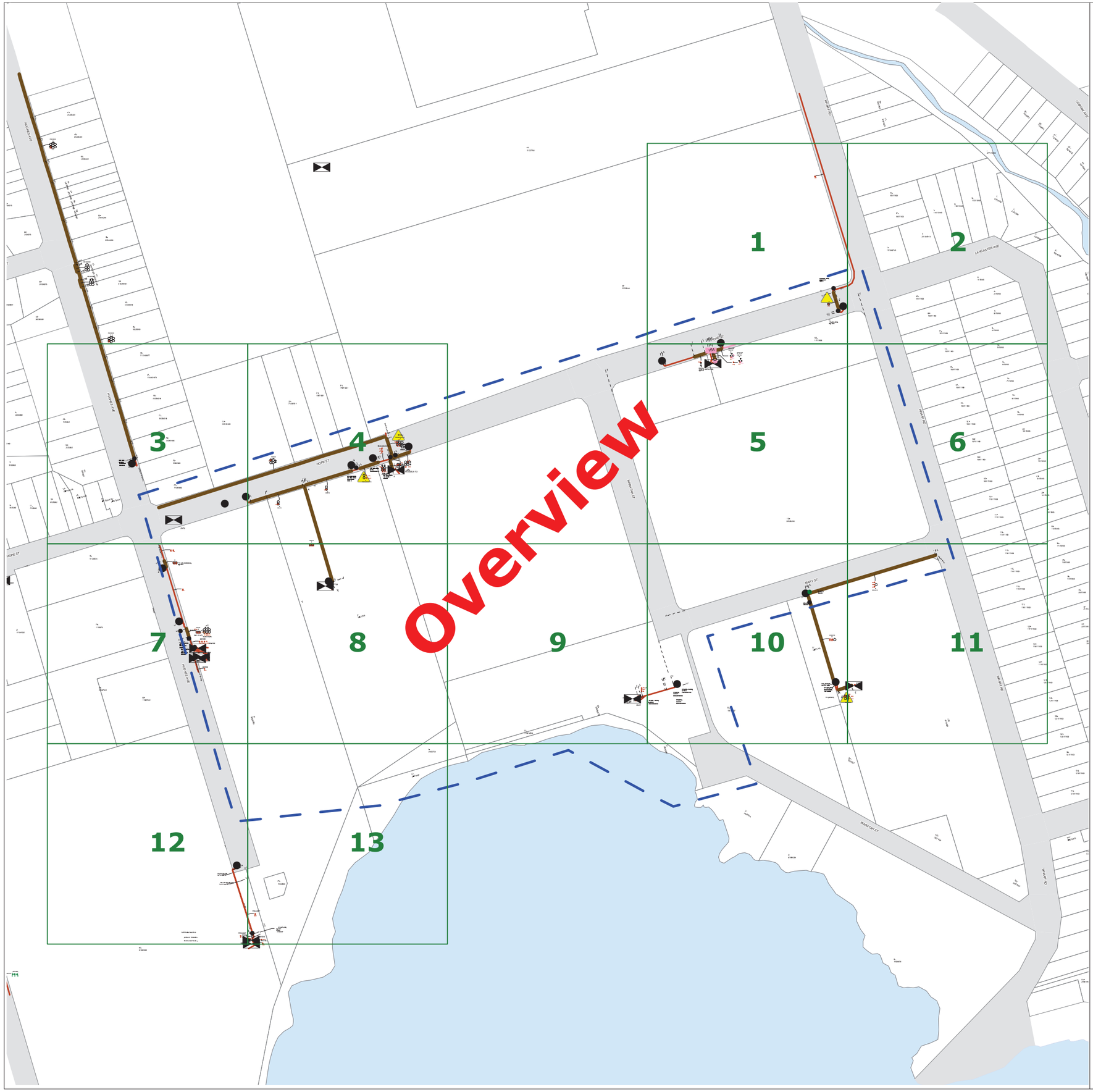
7654 HOPE STREET — B.D.O. 5-1-90
F.S. LOCATION — CH'D DATE
AMENDMENTS

THE PROSPECT COUNTY COUNCIL

U.G. RETICULATION
ERMINGTON

DRAWN	B.D.O.	SCALE 1:500	DATE 23-3-88
CHECKED	J.M.V.		
CO-ORD D'SERV.	Sheet B	0052-6-1-1-3	Pa.



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4 WORKING DAYS BEFORE COMMENCING WORK

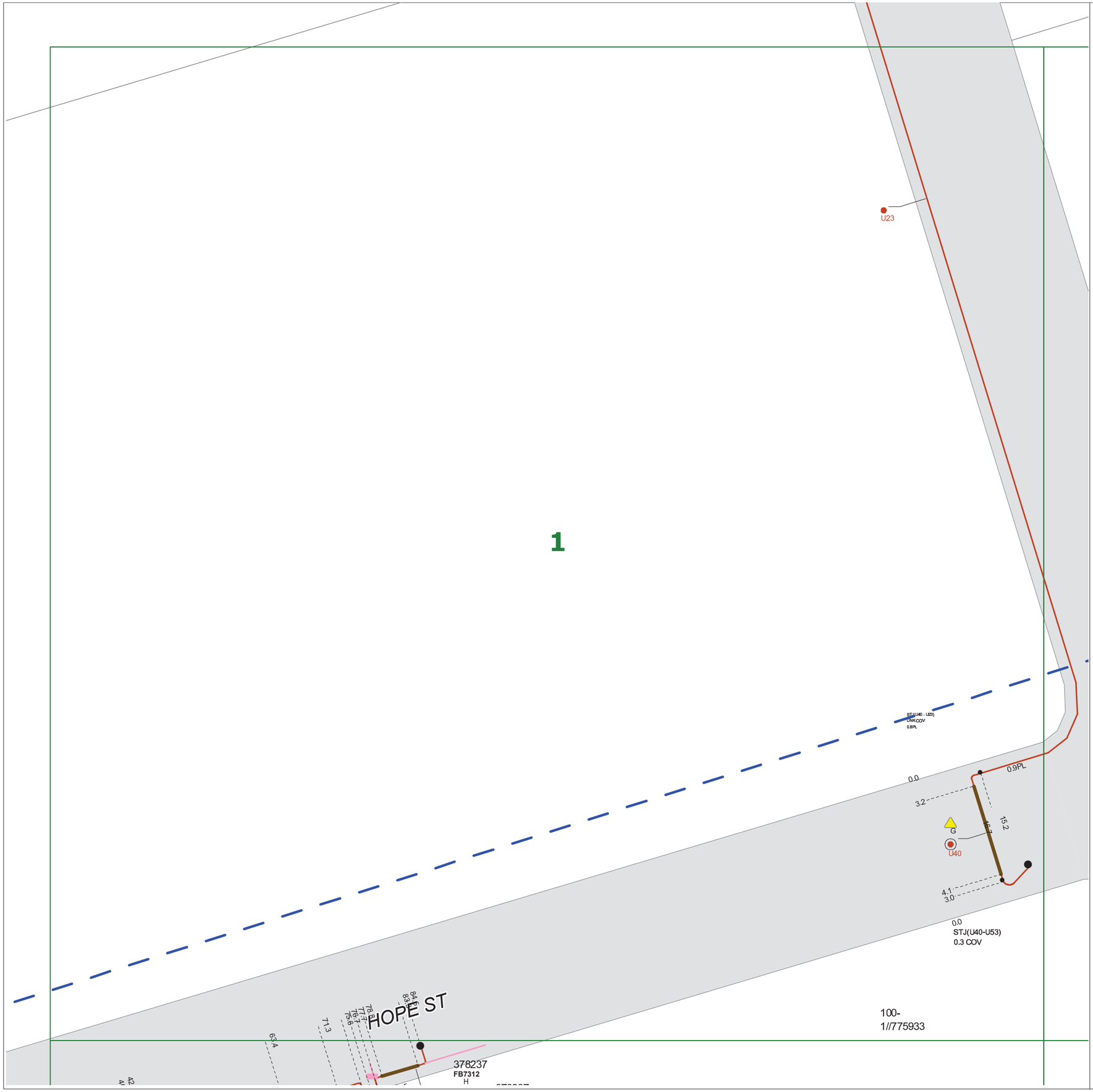
LEGEND

- Street light column (or)
- Padmount substation
- Overground pillar (O.G.Box) (or)
- Underground pit
- Duct run
- Cable run
- Typical duct section
- Asbestos warning

N

NOT TO SCALE

DBYD Sequence No.:	54945145
Issued Date:	15/08/2016



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LEGEND

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- Padmount substation
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4 WORKING DAYS BEFORE COMMENCING WORK

LEGEND

- Street light column (or)
- Padmount substation
- Overground pillar (O.G.Box) (or)
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LEGEND

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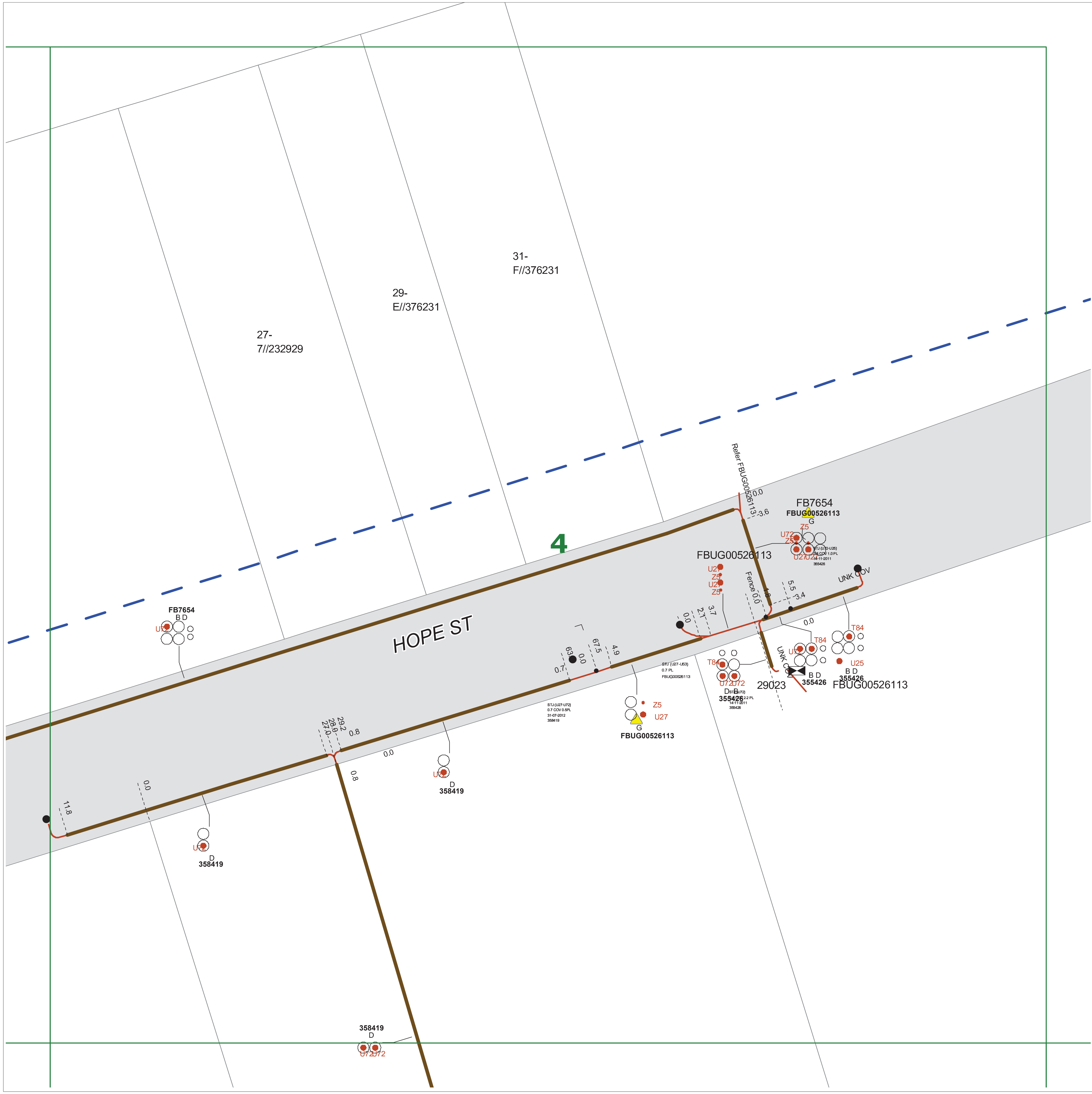

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LEGEND

- or : Street light column
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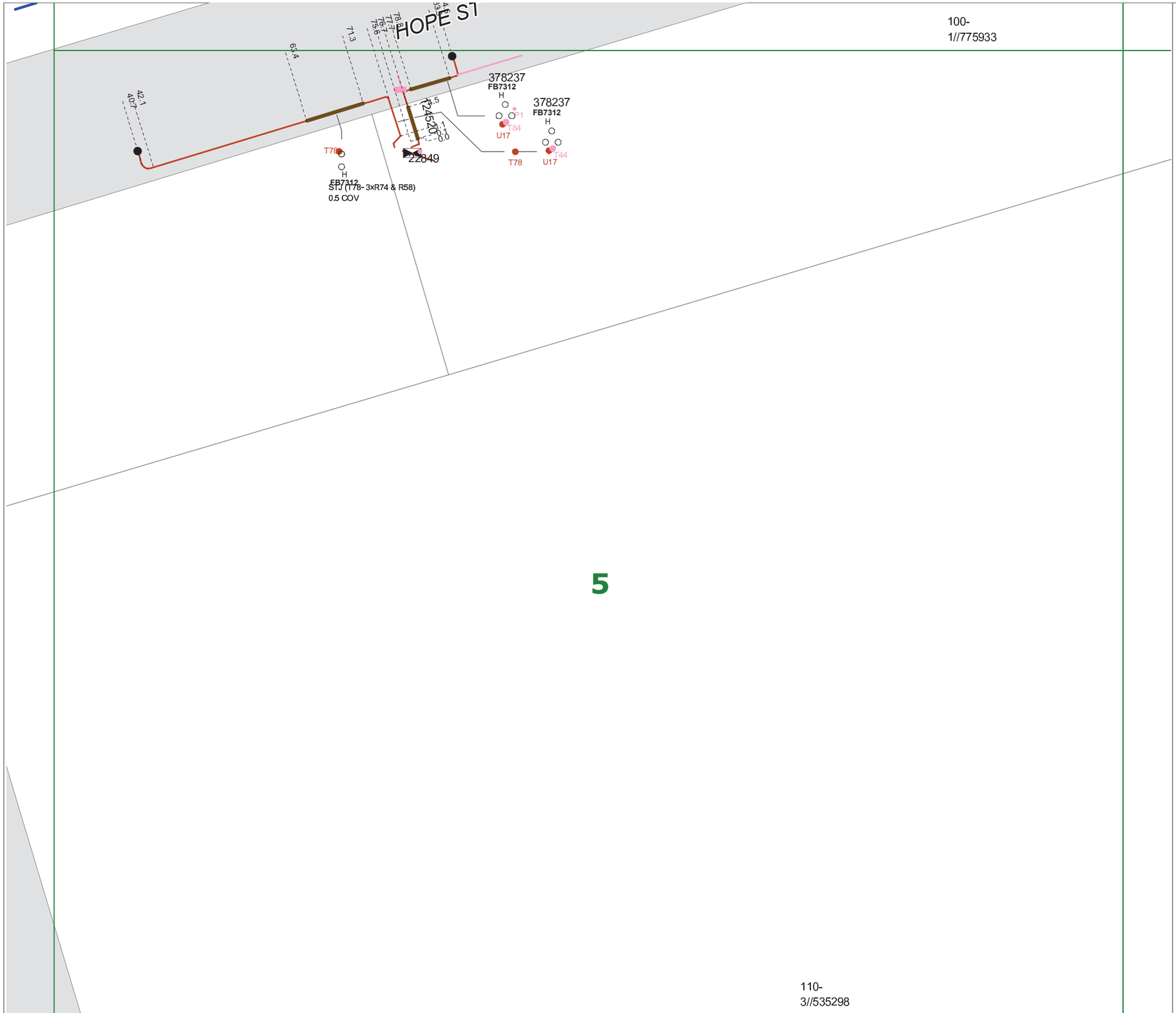

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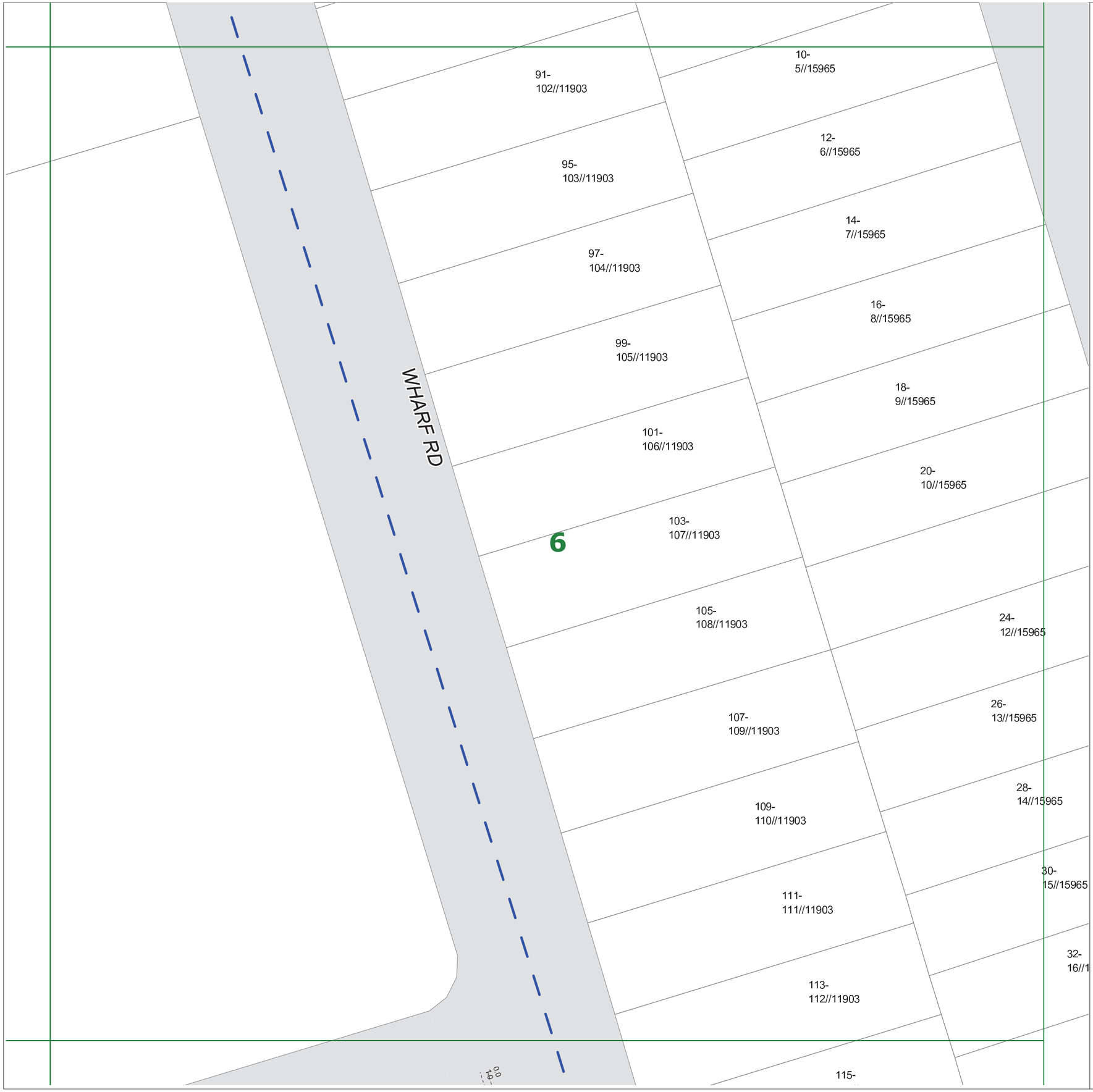

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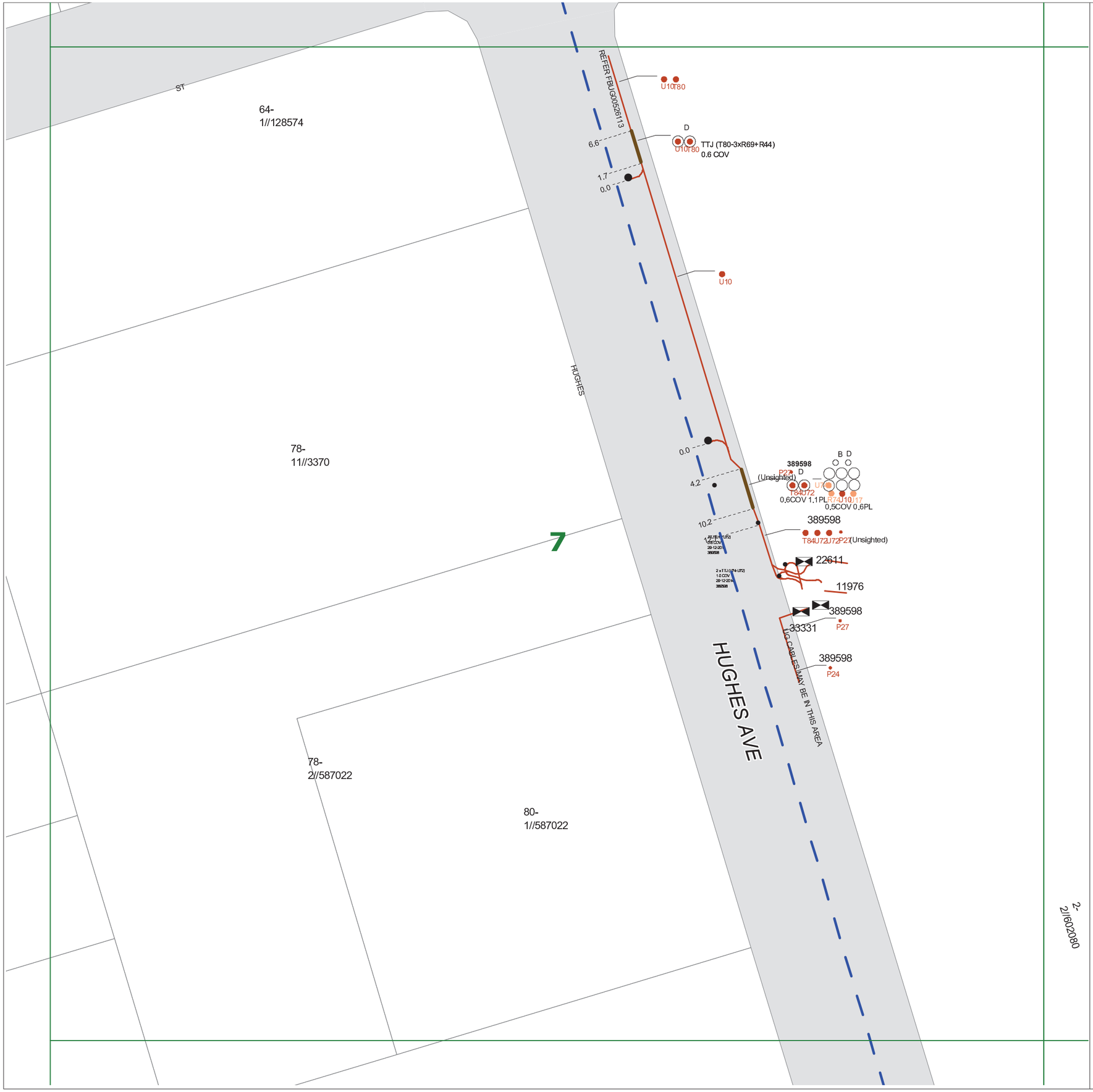

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PLEASE RING **9853 7121** or **MOB. 0407 468 626**
4 WORKING DAYS BEFORE COMMENCING WORK

LEGEND

- Street light column
- Padmount substation
- Overground pillar (O.G.Box)
- Underground pit
- Duct run
- Cable run
- Typical duct section
- Asbestos warning

N

NOT TO SCALE

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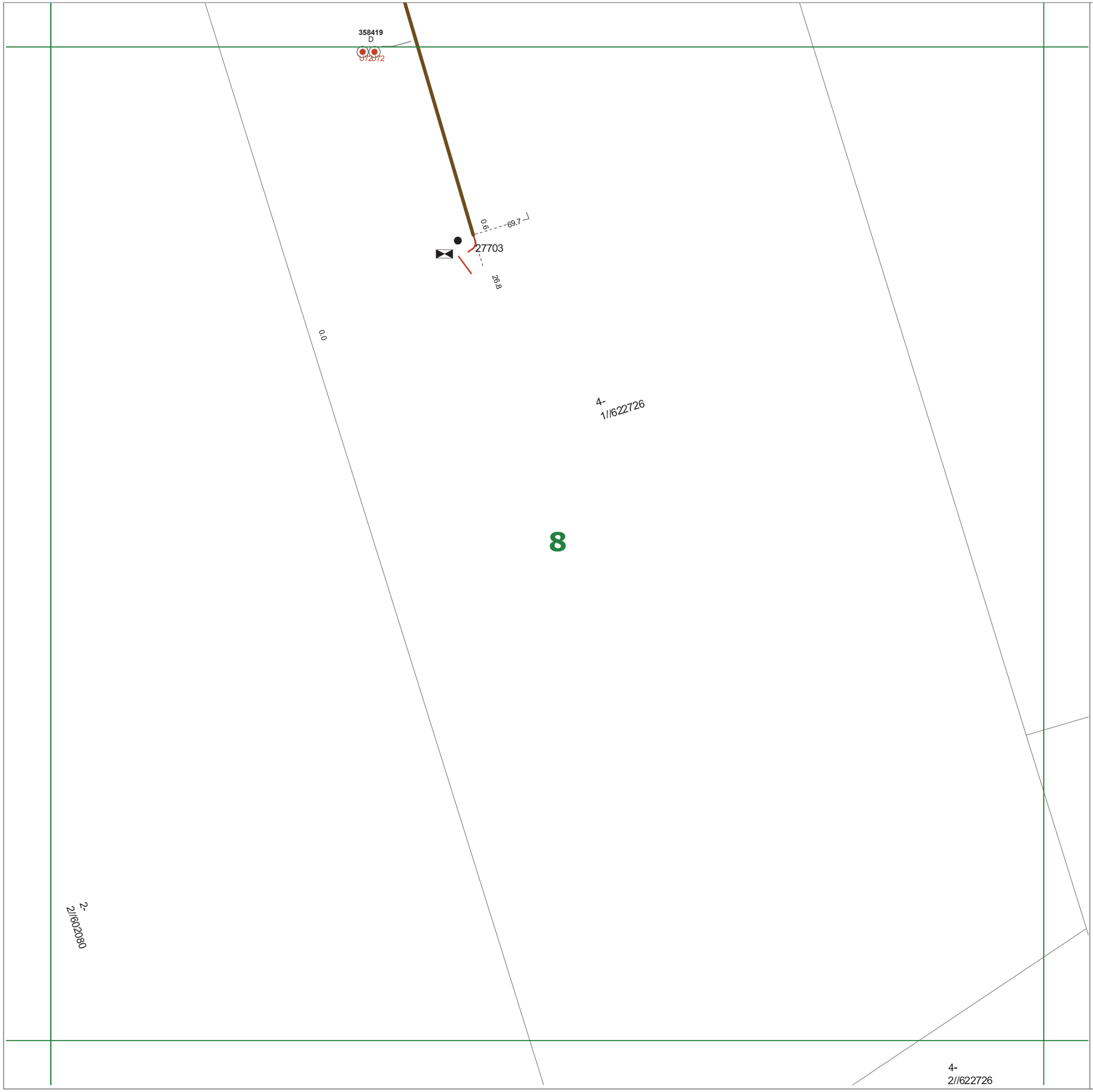

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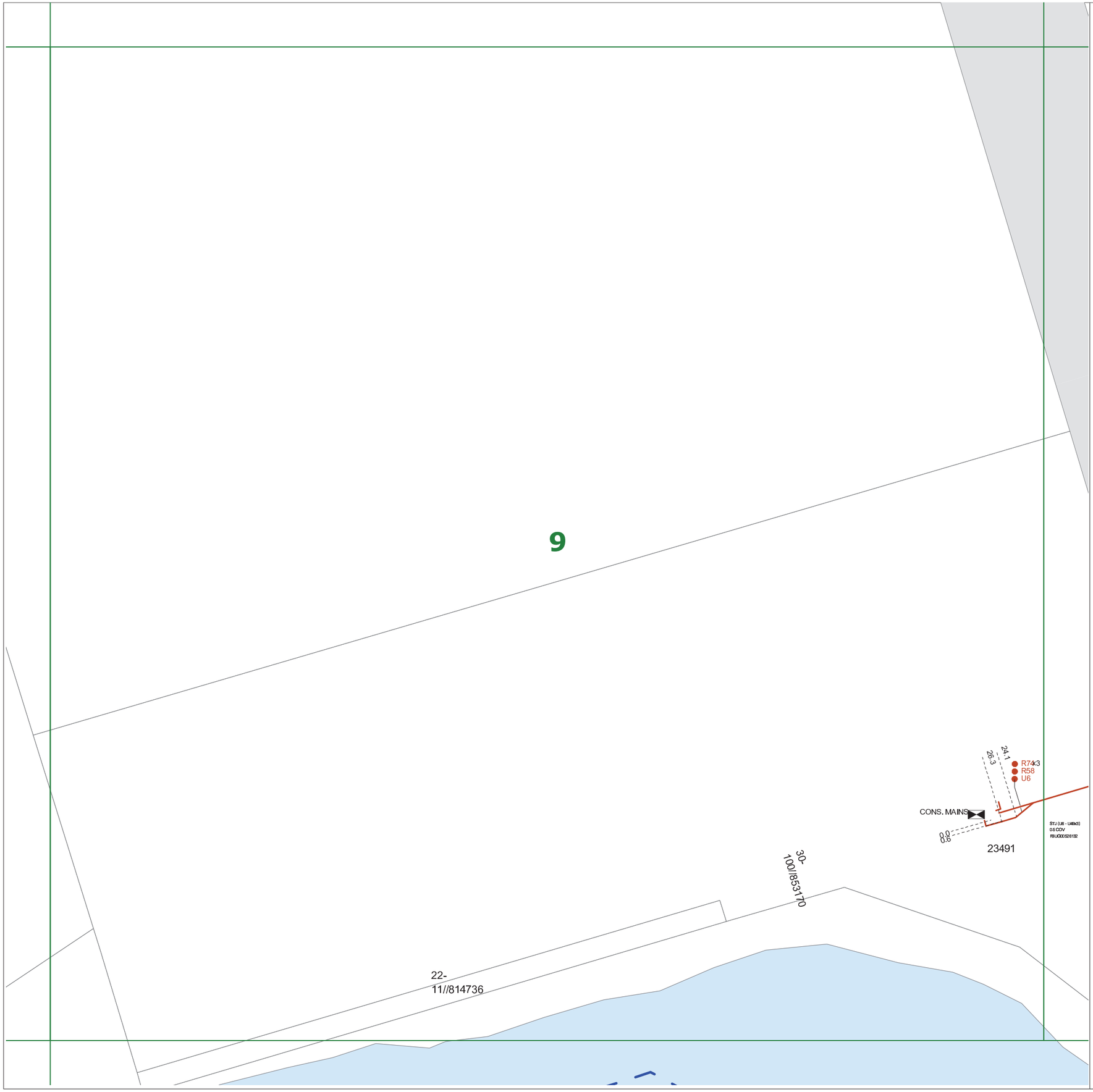

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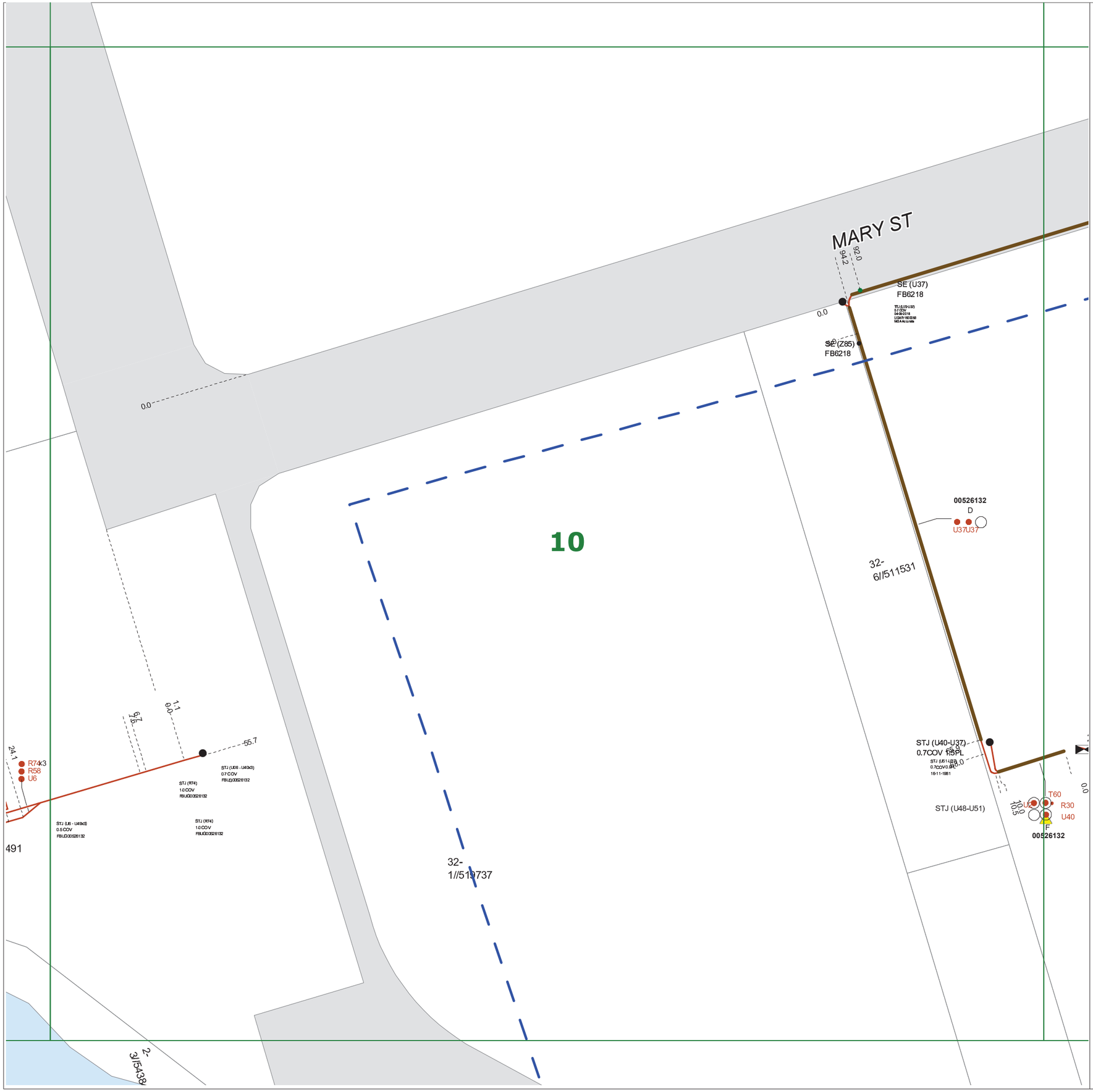

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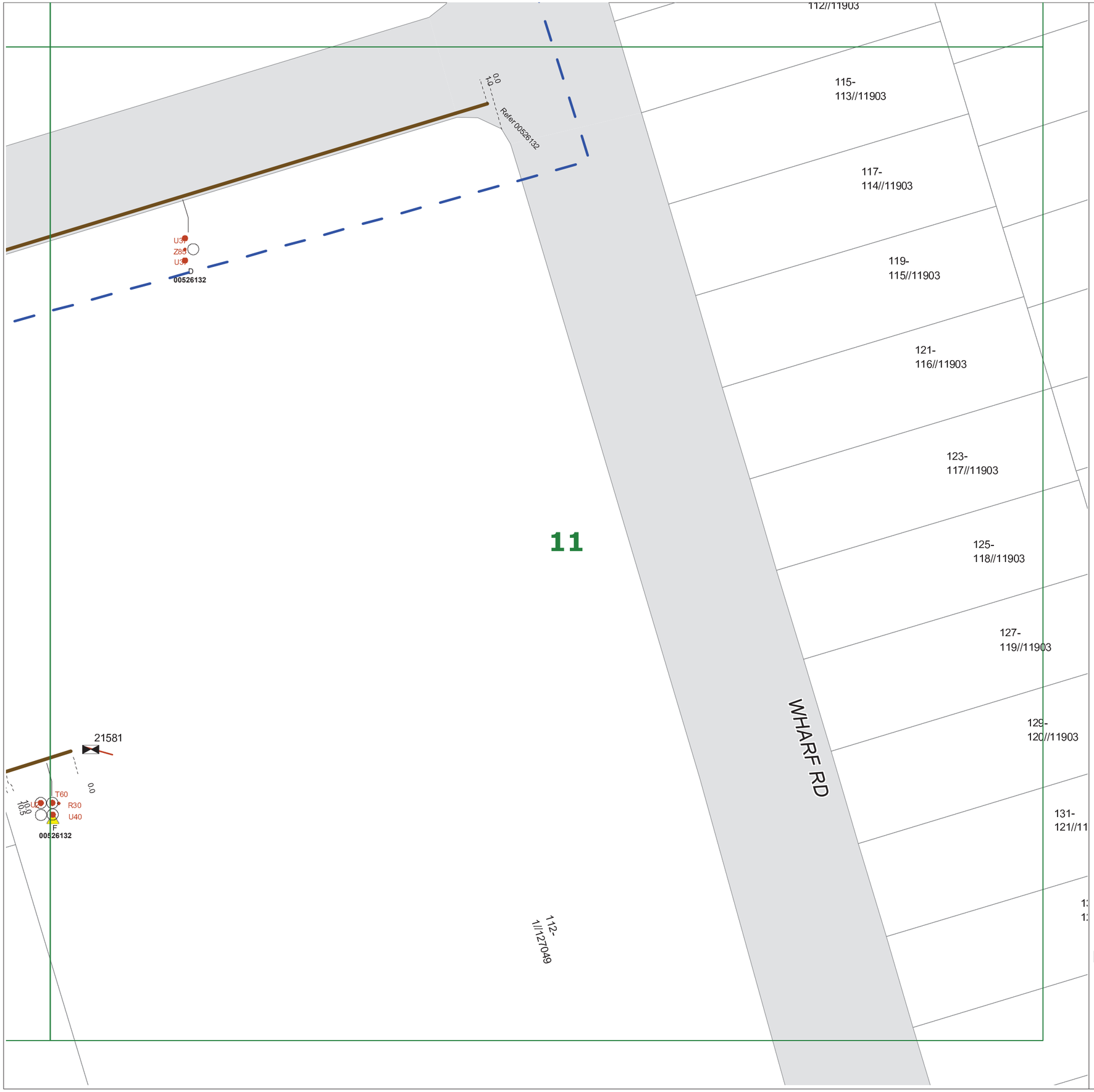

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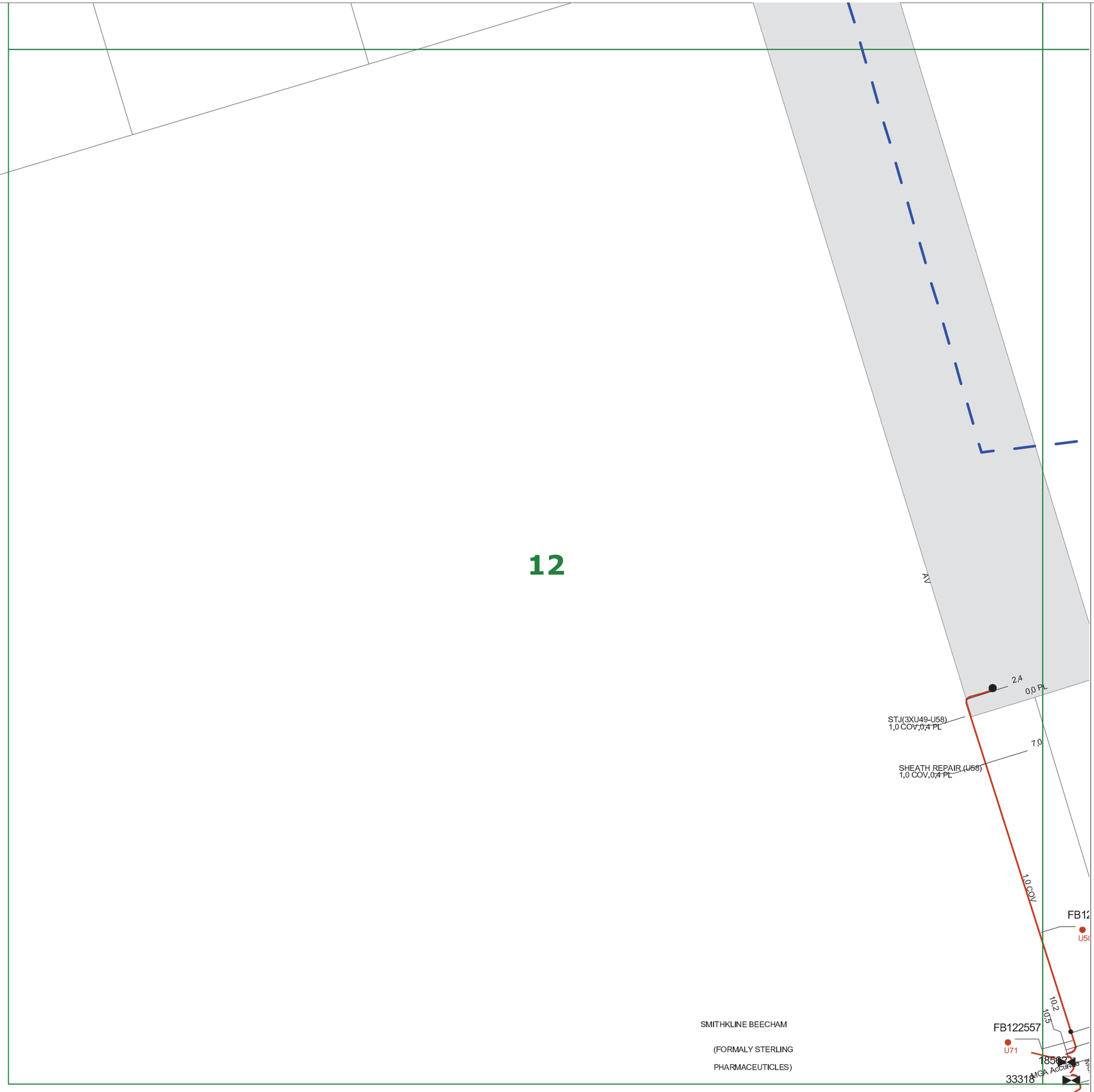

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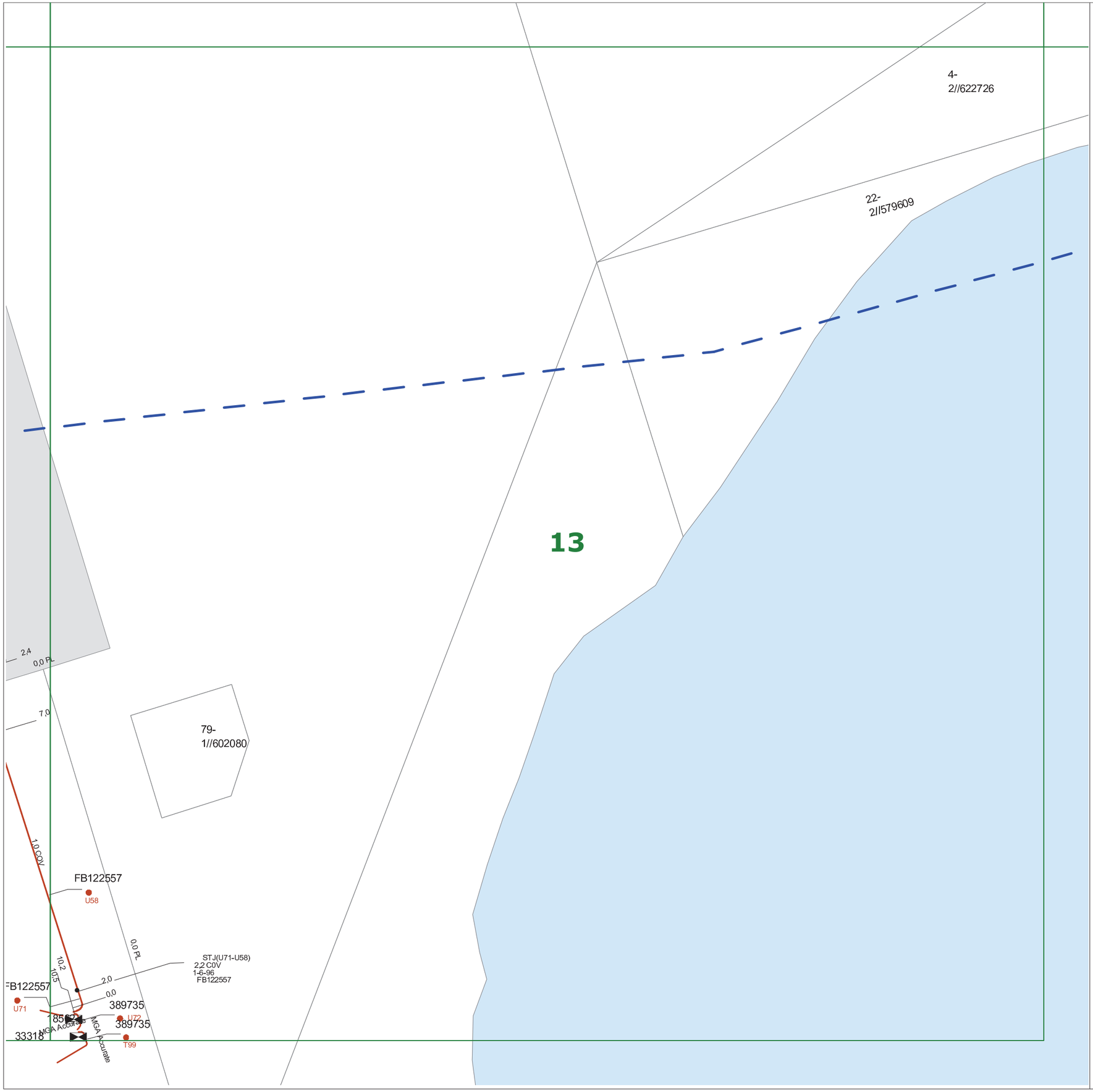

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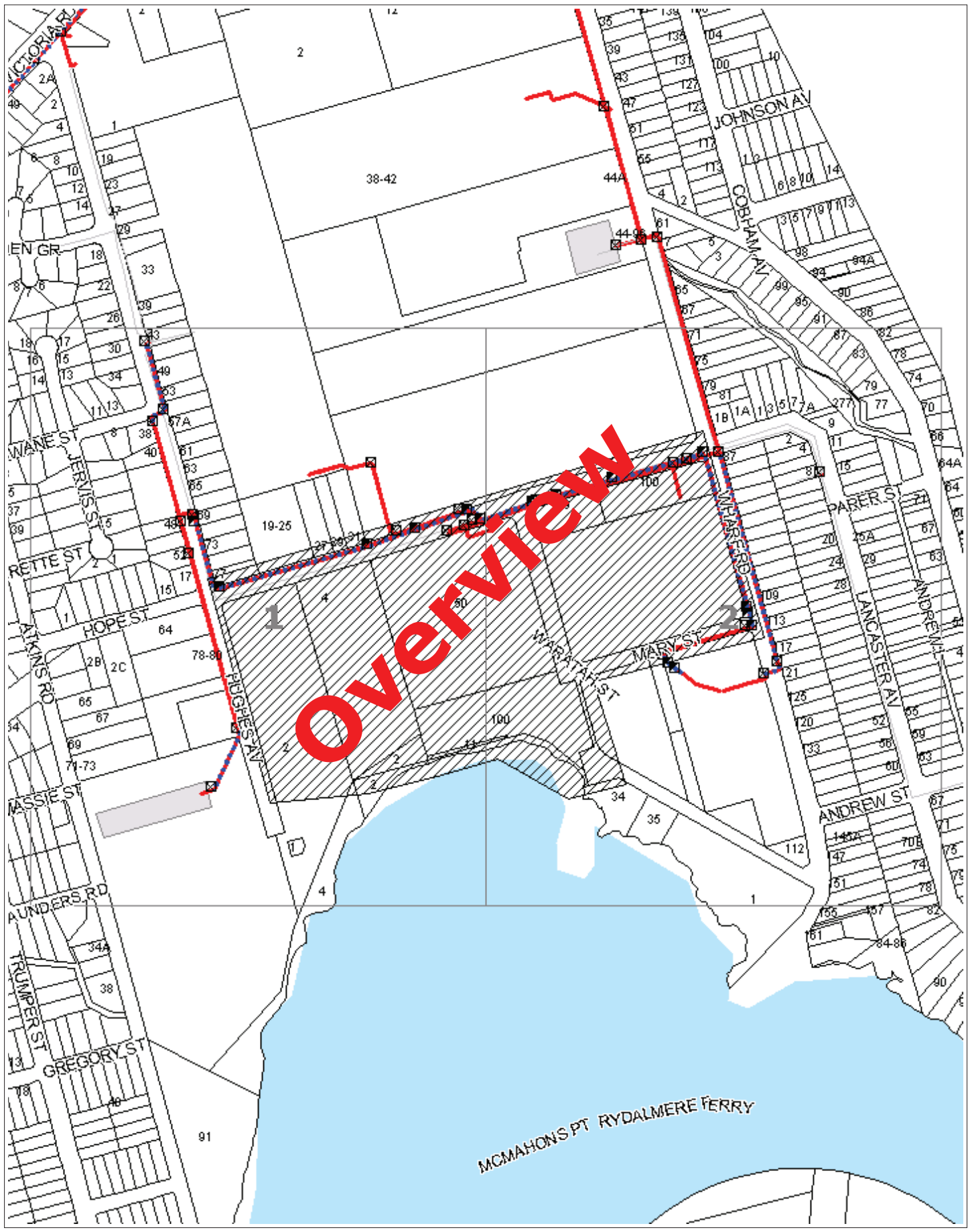
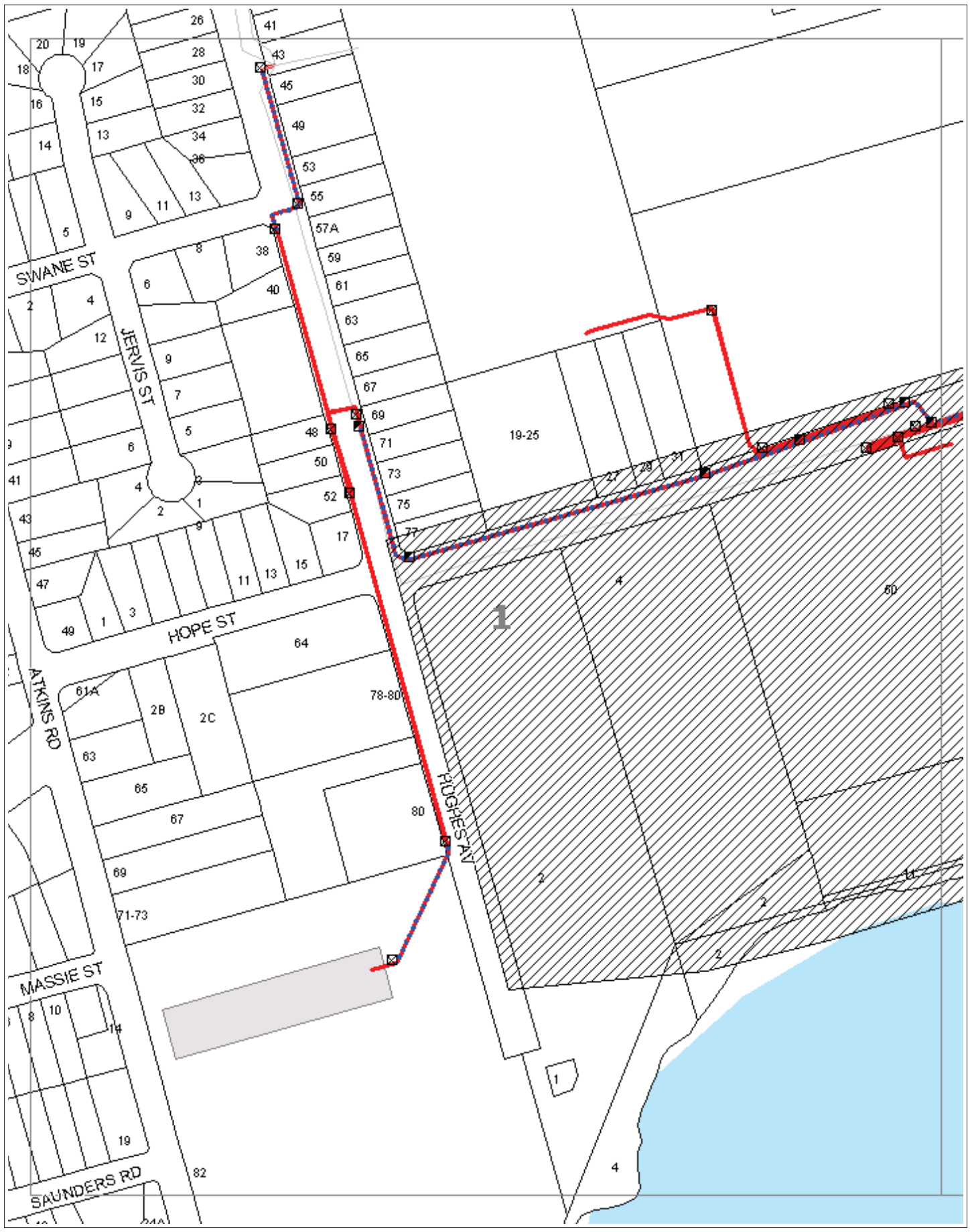


Sequence Number: 54945147

Date Generated: 15/08/2016

For all Optus DBYD plan enquiries –
Email: Fibre.Locations@optus.net.au
For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208



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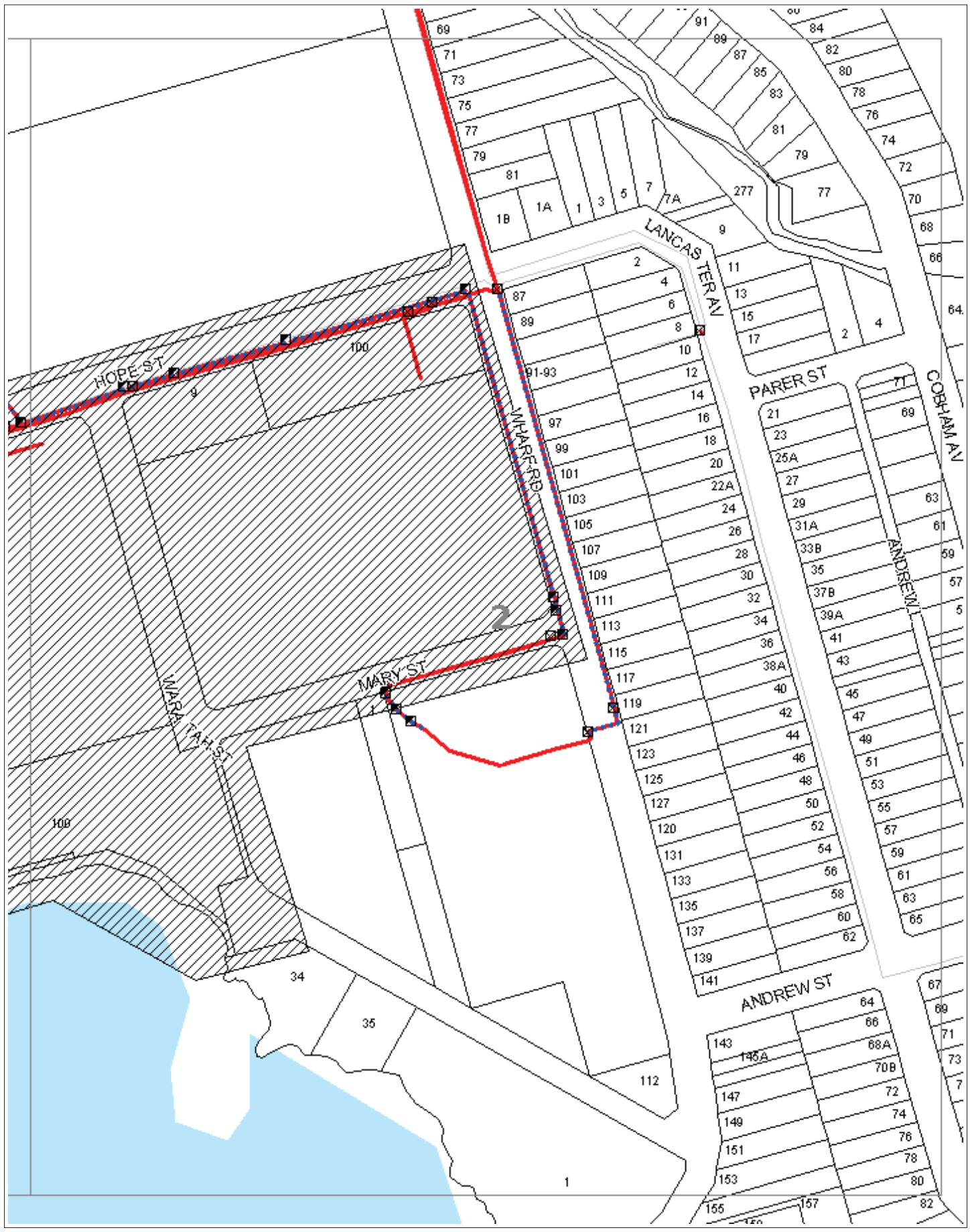

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A3

HOPE ST

HUGHES AVE

WARATAH ST

LANCASTER RD

WHARF ST

PARER RD

Position Subject to Final Subdivision

Location Subject To Final Subdivision

SP0230

DBYD Address:
6 Hope Street
Melrose Park NSW 2114

DBYD Job No: 11098876

DBYD Sequence No: 54945149

Scale: 1:2000

Date of Production: 15/08/2016

Plan 1 of 1

N

0m 10m 20m 30m 40m 50m

JOINT DETAIL REPORT

No.	Bk-Pg	Pit/Cvr	Joint Location
Map: PA613			
1	1588-41	0,50/0,80	3,0 E OF CHAIN WIRE FENCE

WARNING

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 WorkCover Code of Practice for Excavation and WorkCover 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 WorkCover Codes of Practice.
NOTE: 1. You must keep Ausgrid plans on site during excavation works. If the people actually performing the excavation works do not know how to read and interpret Ausgrid's plans, then the work must be directed by a person who knows how to read and interpret the plans. 2. This information includes data from the NSW Digital Cadastral Database by Land and Property Information (c) 2016, used under Creative Commons licence version 4.0.

ISG GRID

PA6113	PA6114	PA6123
PA6131	PA6132	PA6141
PA6133	PA6134	PA6143

GRID

212M2	212N2	212P2
212M3	212N3	212P3
212M4	212N4	212P4

PA6132GMLA0

Distribution - 54945144

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

15 Aug 2016

Page 1 of 1

1:502

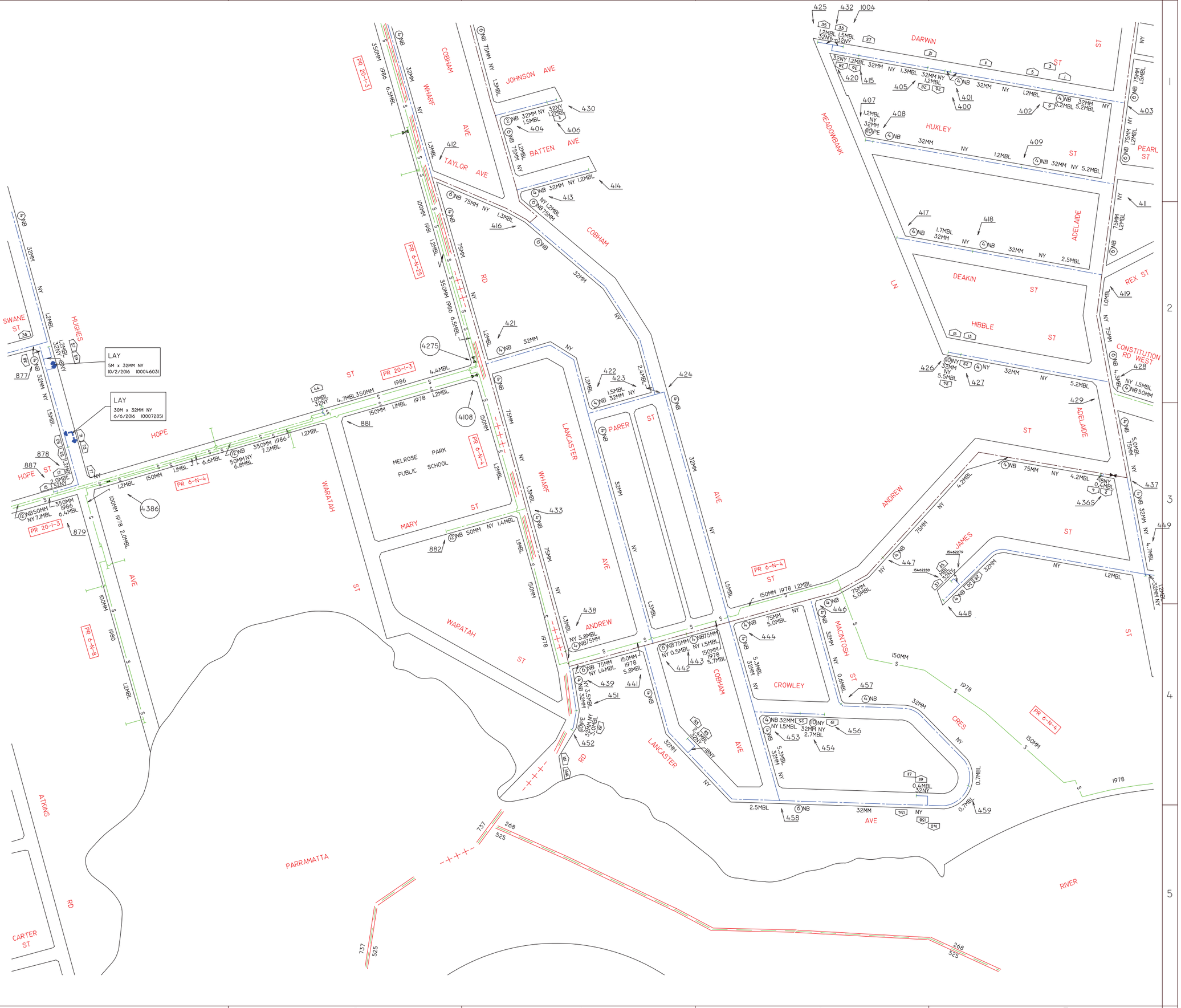
0 — 30 metres

N

Ausgrid

A0 MOCS_std_plot

N_54945144_PA6132GMLA0_1.hpgl2



PARRAMATTA 6A

SCALE 1:2000

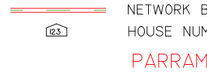
50 0 50 100 150 200

THIS MAP UPDATED ON 06/06/2016
THIS PLAN IS DIAGRAMATIC ONLY. DISTANCES SCALED FROM THIS PLAN MAY NOT BE ACCURATE.

DATE ALTERED:..... BY:.....

P2D	P3C	P3D
P5B	P6A	P6B
P5D	P6C	P6D

ADJOINING MAPS



NETWORK AREA

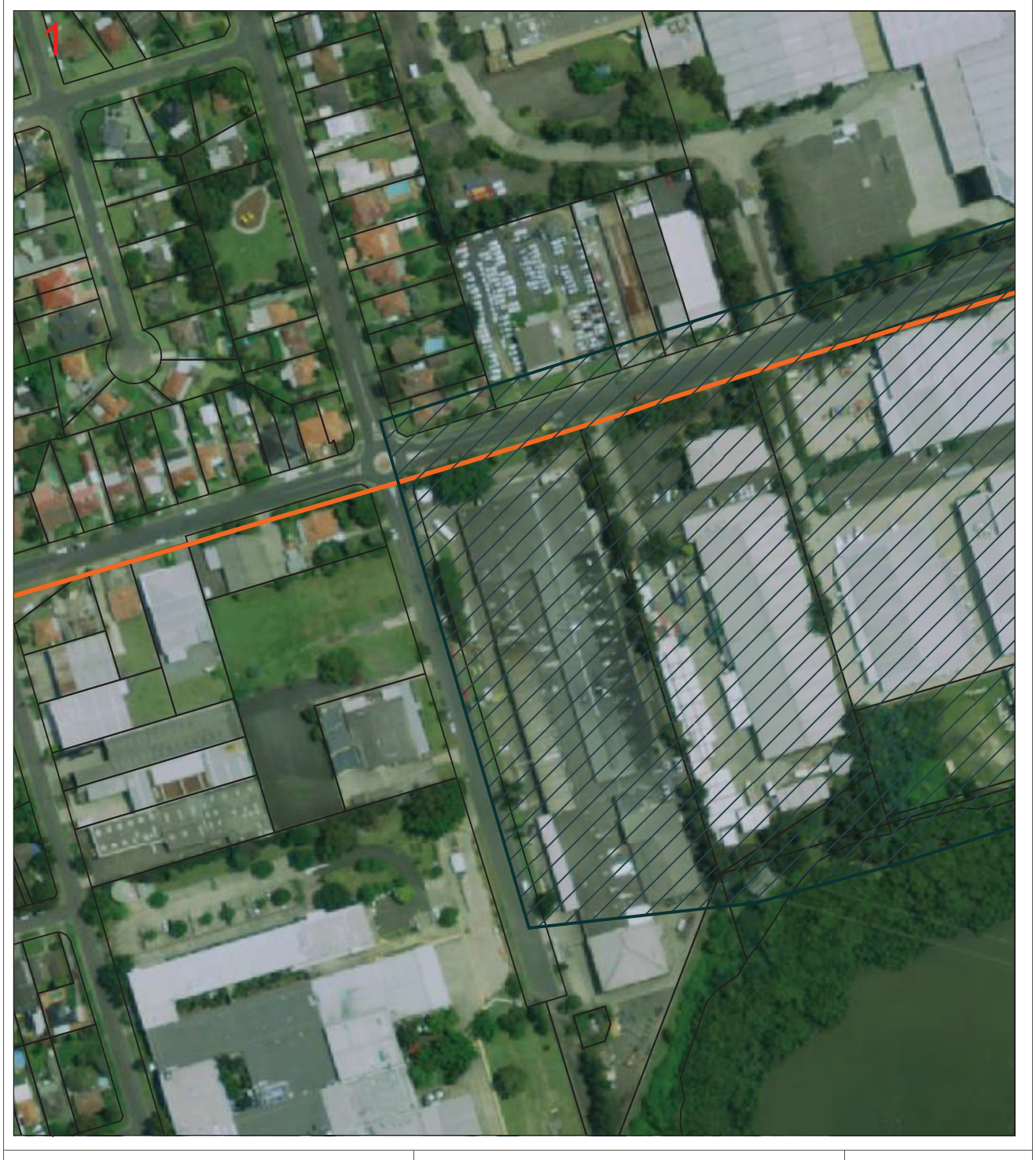
MUNICIPALITY AREA

Jemena

KEY

	MAX ALLOWABLE OPERATING PRESSURE	
T	TRUNK PIPELINE	7000 kPa
P	PRIMARY MAIN	3500 kPa
S	SECONDARY MAIN	1050 kPa
400	NETWORK MAIN	400 kPa
	NETWORK MAIN	300 kPa
	NETWORK MAIN	210 kPa
100	NETWORK MAIN	100 kPa
30	NETWORK MAIN	30 kPa
	NETWORK MAIN	7 kPa
	NETWORK MAIN	2 kPa
	PROPOSED MAINS	
PR 11-2 3	STEEL MAIN PROJECT NUMBER	
P	PRESSURE MONITORING STATION	
	VALVE	
	SYSTEM PRESSURE REGULATOR	
S	SIPHON	
123	NETWORK NODE	
123S	NETWORK VALVE NODE	
098	VALVE NUMBER	
6NB	6 INCH CAST IRON MAIN	
150MM	150MM STEEL MAIN	
110MM PE/NY	110MM POLYETHYLENE/NYLON MAIN	
6NB 50MM NY	50MM NYLON INSERTED INTO 6NB MAIN CAST IRON MAIN	
1.2MBL	DISTANCE IN METRES OF MAIN FROM BOUNDARY LINE	
1957	YEAR LAID	
	MUNICIPALITY BOUNDARY	
	NETWORK BOUNDARY	
123	HOUSE NUMBER	

PARRAMATTA 6A



DBYD Sequence Number:
54945150
Activity Type: Planning & Design
Start Date: 18/08/2016

Location:
6 Hope Street
Melrose Park 2114

Contact:
Costin Roe Consulting - Mr Mark Wilson
0249697070
0421847808

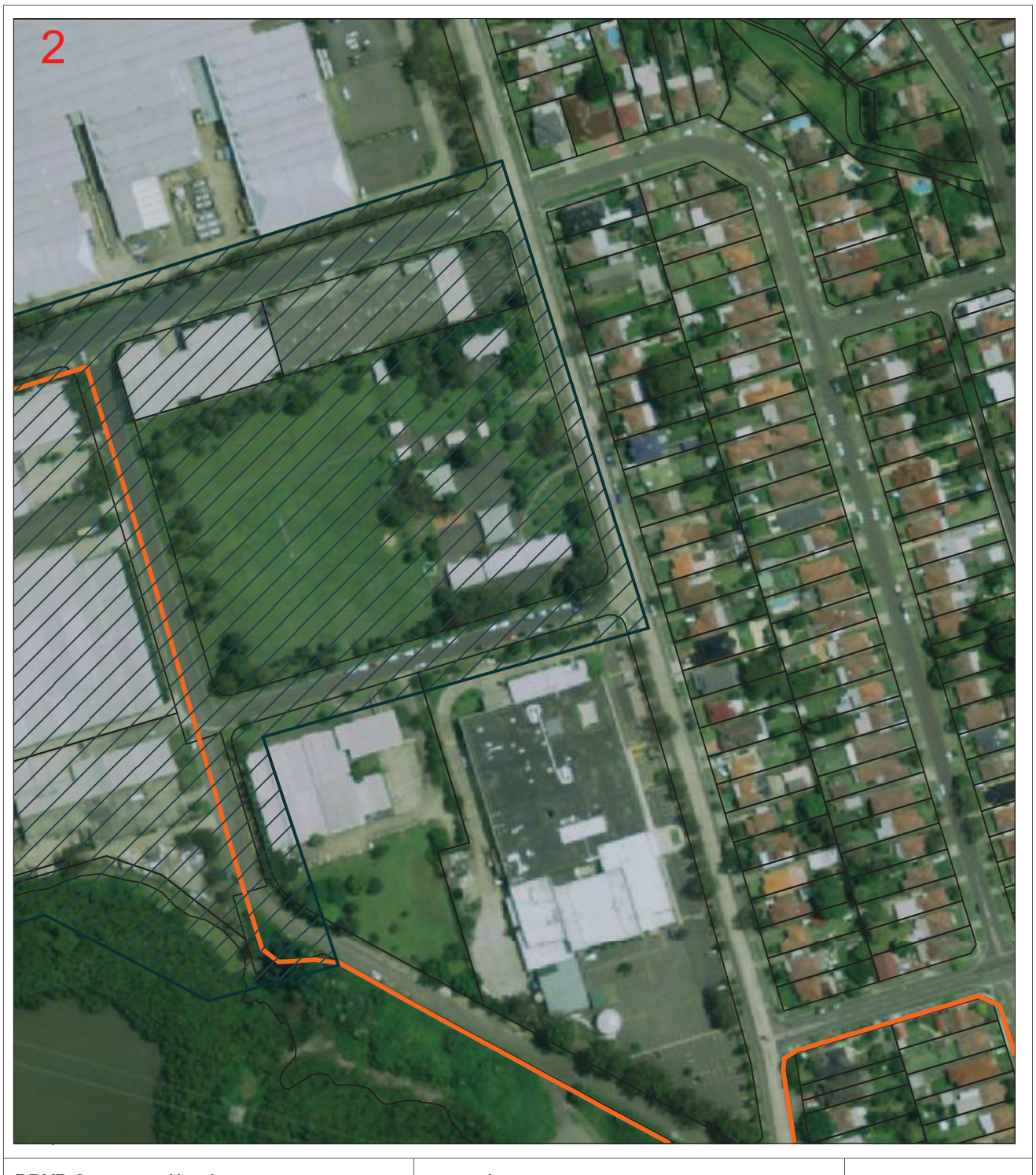
Legend:

- Gore Bay Pipeline
- Mascot JUHI Pipeline
- Silverwater Pipeline
- Property Boundary

N

Scale: 1: 2000

0 0.01km



DBYD Sequence Number:
54945150
Activity Type: Planning & Design
Start Date: 18/08/2016

Location:
6 Hope Street
Melrose Park 2114

Contact:
Costin Roe Consulting - Mr Mark Wilson
0249697070
0421847808

Legend:

- Gore Bay Pipeline
- Mascot JUHI Pipeline
- Silverwater Pipeline
- Property Boundary

N

Scale: 1: 2000

0 0.01km

Appendix D

Viva Energy's Third Party Development Guideline

Summary	This document provides guidance for designing and executing major third party developments or land zoning changes in proximity to Viva Energy Licenced Pipelines.

Third Party Design and Construction Guideline

1. Scope

This document provides technical guidance to Third Party Developers seeking to engage with Viva Energy for the purposes of managing proposed planning, development or land zoning changes in close proximity to Viva Energy pipelines.

The guideline covers significant developments / major works, **BUT IS NOT LIMITTED TO**:

- Changes to Land Zoning,
- Near Roadway / Railway construction,
- New Residential or Commercial Developments
- Significant changes to infrastructure corridors
- Significant civil / geotechnical alternations

If a conflict, contradiction, or ambiguity is identified within this guideline, Viva Energy shall be contacted.

This procedure **DOES NOT COVER**:

- Assessment of the adequacy of third party development designs to appropriate industry standards, other than those concerning pipelines,
- Other minor works that are covered by Viva Energy Right of Way permit requirements, and
- Any commercial, legal, or business considerations relating to the Third Party Development

2. References

References are listed by not limited to those below:

Viva Energy	
PIP-001-P	Pipeline Right of Way Procedure
PIP-001-F	Pipeline Right of Way Permit
PIP-004-W	Conditions for Working Near Pipelines (VIC)
PIP-005-W	Land Use Near Pipelines (VIC)
PIP-053-W	Land Use Near Pipelines (NSW)
PIP-055-W	Conditions for Working Near Pipelines (NSW)
PIP-076-C	Pipelines Third Party Checklist
PIP-P003	Excavation, Trenching and Backfill Procedure
PIP-P003-1	Excavation Form
Industry	
API RP 1102	Steel Pipelines Crossing Railroads and Highways
AS 2832.1	Cathodic Protection of Metals – Pipes and Cables
AS 2885.1	Pipelines – Gas and Liquid Petroleum – Design and Construction
AS 2885.2	Pipelines – Gas and Liquid Petroleum - Welding
AS 2885.3	Pipelines – Gas and Liquid Petroleum – Operation and maintenance
Legislation	
VIC Pipelines Act	Victorian Pipelines Act 2005
VIC Pipelines Regulation	Victorian Pipelines Regulation 2007
NSW Pipelines Act	New South Wales Pipelines Act 1967
NSW Pipelines Regulation	New South Wales Pipelines Regulation 2013

3. Definitions Table

ALARP	A risk management concept whereby the cost of further risk reduction measures for a particular risk is grossly disproportionate to the benefit gained from the reduced risk that would result
Area of Influence	The area or environment that could affect or could be affected by the pipeline – generally a minimum distance equal to the measurement length of the pipeline.
High Voltage	Electrical services with potentials exceeding 1,000Vac or 1,500Vdc
Licensee	A person / organisation that is the holder of a pipeline licence issued under the relevant Pipelines Act for the construction and operation of that pipeline (in this case: Viva Energy)
Major Works	Works that have been assessed and determined to represent a significant risk to the pipeline operation and / or integrity, or represent a significant change from the original land use or location zoning, or potentially alter the ability of conduct routine inspection and maintenance on the pipeline, or potentially alter the design criteria of the pipeline at that location (e.g. depth of cover, physical protection, loadings, etc.)
May	An optional statement
Measurement Length	The radius of the 4.7 kW/m^2 radiation contour for a full bore rupture, calculated in accordance with AS 2885.1
Minor Works	Works that have been assessed and determined to not represent a significant risk to the pipeline operation and / or integrity, or represent a significant change from the original land use or location zoning.
Pipeline	Transmission pipeline owned and / or operated by Viva Energy
Right of Way	Legal rights allowing Viva Energy to enter or cross another party's property to install, inspect, operate and maintain pipeline equipment located on or that crosses through the property. This extends along, across above and below the pipeline easement.
Shall	A Mandatory requirement of the standard
Should	A recommendation of the standard
Third Party	A Developer, Town Planner, Landowner, Occupier or similar independent person or organisation seeking to develop the environment within the area of influence of a Viva Energy Pipeline
Third Party Contractor	Contractors engaged by a Third Party to perform activities in relation to the development and not the pipeline
Viva Energy Inspector	Personnel engaged to provide assurance to Viva Energy that activities undertaken by the Third Party Contractor are in accordance with conditions / controls specified by Viva Energy

4. Abbreviations

AHD	Australian Height Datum
ALARP	As Low As Reasonably Practicable
DBYD	Dial Before You Dig
DEDJTR	Department of Economic Development, Jobs, Transport and Resources
DI	New South Wales Department of Industry, Skills and Regional Development
DN	Nominal Diameter (of pipe)
EMP	Environmental Management Plan
ESV	Energy Safe Victoria
GDA	Geocentric Datum of Australia
HDD	Horizontal Directional Drilling
HV	High Voltage
ITP	Inspection and Test Plan
JHA	Job Hazard Analysis
JSA	Job Safety Analysis
MGA	Mapping Grid of Australia
NDD	Non Destructive Digging
NDE	Non Destructive Examination
NDE	Non Destructive Examination
NDT	Non Destructive Testing
PEP	Project Execution Plan
QAQC	Quality Control Quality Assurance
ROW	Right of Way
SMS	Safety Management Study
SWMS	Safe Work Method Statement
WHS	Work Health and Safety

5. Compliance Requirements

5.1. Regulatory and Legal Requirements

All Viva Energy high pressure pipelines are operated under appropriate State based pipeline legislation concerning the design, construction, operation and maintenance of high pressure oil and gas pipelines. The following table outlines the appropriate legislation applicable to each state:

State	Legislation	Regulator Authority
Victoria	Pipelines Act 2005 Pipelines Regulation 2007	Energy Safe Victoria (as delegated by the DEDJTR)
New South Wales	Pipelines Act 1967 Pipelines Regulation 2013	Department of Industry

It is an offence under the above Acts to obstruct, dig or interfere with the pipeline operation with severe penalties applicable for any offence.

Whilst the Acts may reference a 3m exclusion zone around the pipeline for the purposes of building, the area of influence of the pipeline is significantly larger due to the societal risks associated from a pipeline failure. Any unauthorised development, construction or disturbance along the pipeline corridor that has the potential to interfere with the operation and / or maintenance of the pipeline may result in demolition orders with costs awarded against the third party.

The Acts reference the requirement to operate and maintain the pipelines in accordance with the accepted industry standard covering the design, construction, operation and management of oil and gas pipelines – AS 2885.

As per AS 2885.3-2012 section 7.5.5, any change of land use near the pipeline requires the Licensee to conduct the pipeline's Safety Management Study (SMS) to assess the impact and advise the developer of the impact identified as a result of the change in land use. The standard requires that pipelines are maintained such that the threats to the pipeline, and threats from the pipeline to the surrounding society and environment are managed such that risks are are managed to an acceptable level. This includes demonstrating that threats and associated risks from any developments within proximity to the pipeline are mitigated.

Where a threat to the pipeline results in an unacceptable risk, Viva Energy shall undertake remedial actions to further reduce the risk to ALARP, or eliminate the threat where appropriate. Where a threat from a third party development presents an unacceptable risk, Viva Energy reserves the right to refuse the development request.

Viva Energy elects to assess threats and associated risks to the pipeline in accordance with the methodology outlined in **AS 2885.1-2012** as detailed below:

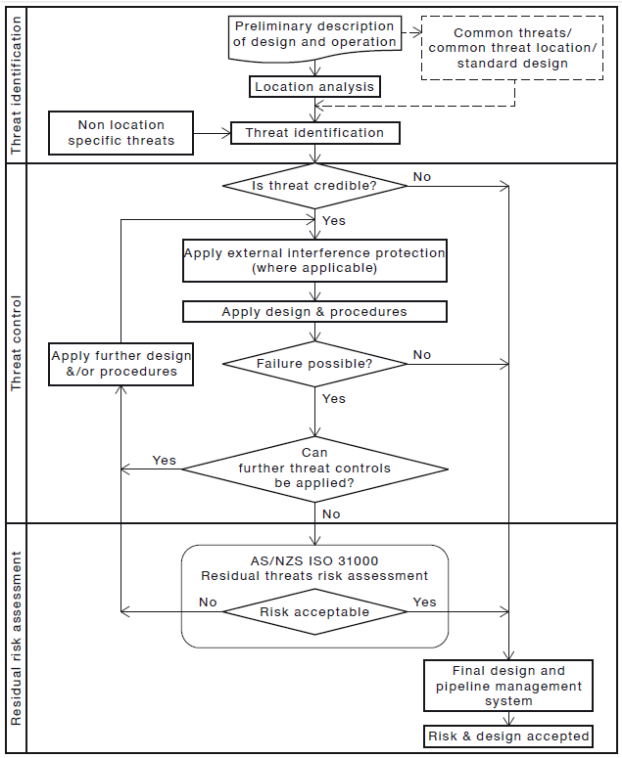


Figure 1: Pipeline Safety Management Study Process (AS 2885.1-2012 Figure 2.3.1)

5.2. Viva Energy Requirements

Viva Energy have defined third party work processes and procedures to manage the control of works around their pipelines, PIP-001-P. The procedure ensures Viva Energy Australia maintains and protects the integrity of pipelines under its operational control while enabling third party work to be carried out safely.

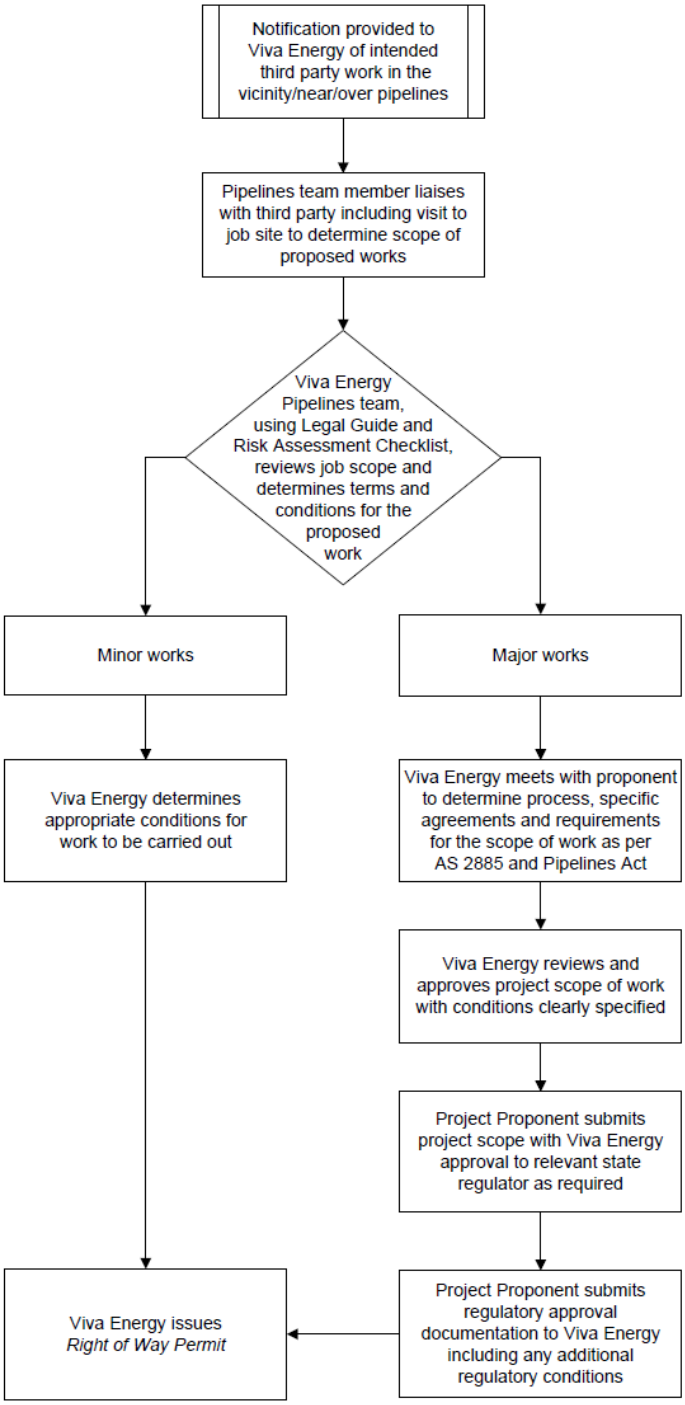


Figure 2: Viva Energy Third Party Works Process Flow (PIP-076-P)

6. Roles and Responsibilities

6.1. Third Party

The Third Party shall be responsible for the followings, **but not limited to**:

- Providing all necessary design information, specifications, calculations and materials requested by Viva Energy in order to allow Viva Energy to conduct appropriate risk-based reviews of the proposed third party design to ensure all risks to the pipeline are controlled and foreseen,
- Designating a design co-ordinator to liaise with Viva Energy or their delegates to discuss any technical queries or issues that arise during the review of the proposed design,
- Assigning a Contractor to perform any / all agreed execution works in accordance with the controls or limitations implemented by Viva Energy,
- Ensuring all industry codes, standards, Regulations and Viva Energy's' requirements are complied with during both design and execution of any approved works.
- The Third Party shall review this guideline at the planning phase of any third party development proposal, and shall be implemented to ensure that third party developments can be planned, reviewed and executed in a timely manner.
- Third party shall Prove the location of the pipeline using NDD to Viva specification PIP-P003

Any work within **3 meter** of the pipeline or deemed high risk to the pipeline undertaken by a Third Party Contractor shall be supervised by a Viva Energy Inspector. Viva Energy may elect to define a separation distance greater than 3 meters to account for future planned pipeline works and maintenance access.

Where a Viva Energy Inspector identifies a non-compliance to an agreed control, the Third Party Contractor shall take immediate steps to rectify the non-compliance provided it is safe to do so. For any significant non-compliances, **all works relating to that non-compliance shall cease until recommencement approval has been granted by Viva Energy**.

6.2. Viva Energy

Where specified by Viva Energy, some integrity-related work shall be actioned by a Viva Energy appointed Contractor. **This works may include but not limited to**:

- Pipeline Recoating,
- Relocation of Pipeline Cathodic Protection Test Points,
- Grouting and repair of Cased crossings,
- Pipeline NDT and surveys, and
- Any works directly related to the integrity of the pipeline
- Pipeline cut out and reinforcement
- Pipeline Relocation

7. Design Guidelines

7.1. Overview

The objective of this section is to define minimum design requirements for any major third party development in proximity of Viva Energy pipelines.

The Third Party shall review these requirements at the planning phase of any third party development proposal, and shall be implemented to ensure that third party developments can be planned, reviewed and executed in a timely manner.

Where a design condition cannot be adopted, the issue should be raised to Viva Energy for consideration and possible alternative solutions. Viva Energy reserves the right to reject alternative solutions.

All Third Party designs that directly affect the pipeline shall be approved by Viva Energy.

7.2. Project Execution Plan

All third party development proposals shall include a Project Execution Plan, detailing the following (where applicable):

Requirements	Details

Project Details	• Details of the proposed construction works and staging,
	• Drawings,
	• Proposed Work schedule,
	• **Safe Work method statements (SWMS) in order to confirm risks to the pipeline are incorporated,**
	• Inspection and Test Plans (ITP),
	• Quality Control / Quality Assurance (QA/QC) Documentation,
	• Specifications of any proposed / installed structures, crossings, services, etc.,
	• List and specification of all proposed equipment to be used for the construction works, particularly
	  ○ Excavator size and bucket configurations,
	  ○ Construction vehicles (weight and type),
	  ○ Lifting Equipment,
	  ○ Vibration Compactors,
	  ○ Borers / Augers,
	  ○ HDD Equipment.
	  ○ Specific location of any pipeline crossings in MGA94 and AHD

Work Schedule	• Project schedule or work breakdown structure detailing what activities and milestones are planned for the project. • Any critical milestones dates / objectives should be displayed

Contact Lists	• List of all contractors engaged to perform the work
	• Should include:
	  ○ Company,
	  ○ Key personnel Names, Roles, email and phone numbers

Requirements	Details
Drawings	• All drawings relating to the development, not just those directly affecting the pipeline • Drawings should be sufficiently detailed and accurate to proposed "For Construction" details • Drawings to be provided in DWG format • All engineering and design that may affect the integrity of the pipeline
Safe Work Method Statements	• All task safe work method statements (SWMS) relating to works that affect the pipeline • SWMS shall include controls as listed in this document for the appropriate task / job step

Inspection & Test Plans	• ITPs for activities, works or construction deliverables that affect the pipeline (as per construction requirements of this document),
	• Shall include:
	  ○ Inspection or test requirements
	  ○ acceptance criteria
	  ○ Responsibility for performing, witnessing, approving, etc. as appropriate

Specifications	• Specifications, standards and engineering details for items affecting the pipeline as appropriate, • Should include references to appropriate standards

Equipment Lists	• List of all equipment likely to be engaged for the work, including
	  ○ Excavators,
	  ○ Borers and HDD Equipment,
	  ○ Construction vehicles,
	  ○ Vibration rollers / compactors,
	  ○ Cranes and lifting equipment

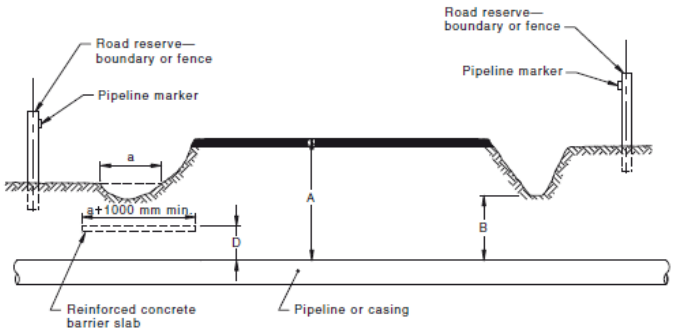
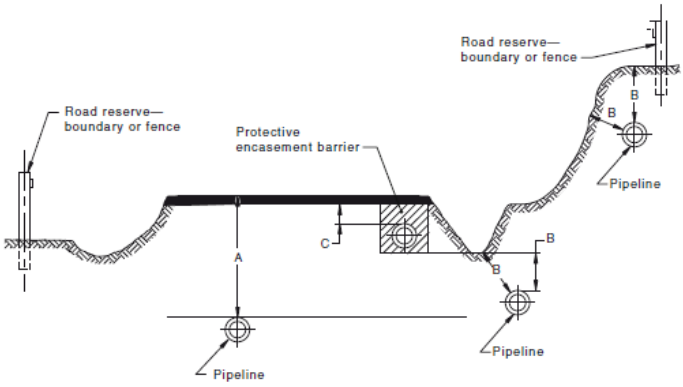
7.3. Roadway / Highway

Requirements	Details
Plot Plan	A drawing showing: • The proposed roadway plot plan and elevation profile, • Information has been generated based on actual site surveys, • Data provided in a MGA94 datum (horizontal) and AHD (vertical) format, • Stated accuracy of the GPS co-ordinates. The Plot plan shall provide details including:

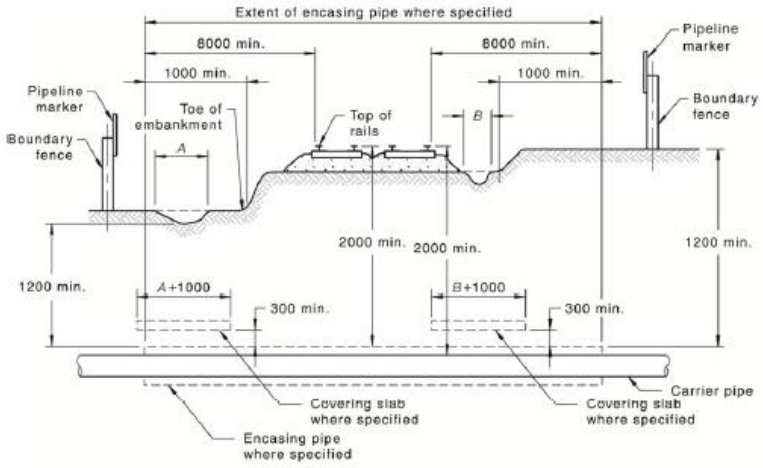
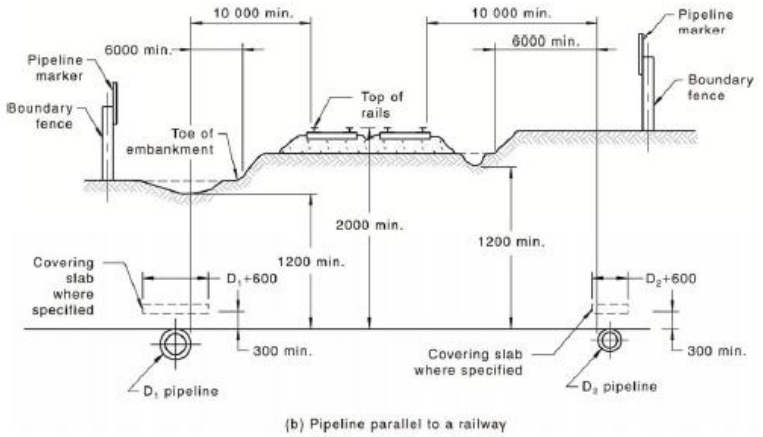
	• The position of Lip of Curb (LOC) and Back of Curb (BOC), • Associated drainage and traffic signalling systems, • Any structures (poles, pits, etc.), • Current configuration, as well as the proposed One. The route of the pipeline shall be overlaid onto the drawing, with measurement intervals of sufficient close-ness to ensure details of any change in direction accurately plotted.
Geotechnical Report	A Geotechnical soil report shall be provided, detailing: • Proposed breakdown of road bases, USCS soil classification of subgrade
Design	The roadway design shall be compliant with all road authorities and their associated design specifications. The following pipeline separation conditions shall apply to the design: • Minimum separation distance 1200mm of between the top of the pipeline and the road surface – subject to Viva Energy Approval, • The roadway crossing should cross the pipeline at close to 90°, but shall not be less than 30°, • Roads over pipeline bends should be avoided, • Where roadways run parallel to the pipeline, a minimum clearance of 1,000mm shall be maintained between the edge of the roadway and the pipeline, and • Design drawings should include details as shown in the Figure below: • Maximum depth of soil removal above the pipeline,

7.4. Railway

Requirements	Details
Plot Plan	A drawing showing: • The proposed roadway plot plan and elevation profile, • Information has been generated based on actual site surveys, • Data provided in a MGA94 datum (horizontal) and AHD (vertical) format,

	 (a) Uncased and cased pipeline crossing a road  (b) Pipeline parallel to a road NOTES: 1 Dimensions A, B and C shall be not less than those determined by the external interference design (see Clause 5.5). 2 Where separation by burial is a selected physical measure, dimension A shall be not less than 1200 mm and dimension B shall comply with Table 5.5.2. 3 Where separation by barrier is a selected physical measure, dimension C and dimension D shall be not less than 300 mm without approval by the authority responsible for the road, and the operating authority. 4 Dimension A should be established in consultation with the authority responsible for the road, but shall not be less than 1000 mm.
Temporary Road Crossings	All temporary road crossing shall be approved by Viva Energy. Where a temporary road crossing is required: • Depth of cover checks shall be made on the pipeline at the proposed temporary road crossing location, • Viva Energy shall undertake appropriate road loading calculations to confirm the adequacy of the crossing.
Casings / Cased Crossings	Where a proposed roadway / highway is likely to affect a casing, Viva Energy shall assess the casing on a case by case basis.
Requirements	**Details**
	• Stated accuracy of the GPS co-ordinates. The Plot plan shall provide details including: • The position of ballast and rails, • Associated drainage and traffic signalling systems, • Any structures (poles, pits, etc.), • Current configuration, as well as the proposed one.

Requirements	Details
	The route of the pipeline shall be overlaid onto the drawing, with measurement intervals of sufficient close-ness to ensure details of any change in direction accurately plotted.
Geotechnical Report	A Geotechnical soil report shall be provided, detailing: • Proposed breakdown of ground bases
Design	The Railway design shall be compliant with all railway authorities and their associated design specifications. Details of any high-voltage cabling and signalling infrastructure shall be provided. The effect any electrified rail systems have on the pipeline Cathodic protection systems shall undergo the process defined by the State Electrolysis Committee, with associated testing requirements. The following pipeline separation conditions shall apply to the design: • Minimum separation distance of 2,000mm between the top of the pipeline and the top of rails – subject to approval by Viva Energy, • The crossing should cross the pipeline at close to 90°, but shall not be less than 30°, • Railways running parallel to the pipeline shall maintain a 10,000mm clearance from the pipeline (pipe to closest rail), • No rails shall be permitted over the top of pipeline bends • Maximum depth of soil removal above the pipeline, • Design drawings should include details as shown in the Figure below:

Requirements	Details
	 (a) Pipeline crossing a railway  (b) Pipeline parallel to a railway DIMENSIONS IN MILLIMETRES
Casings / Cased Crossings	Where a proposed railway is likely to affect a casing, Viva Energy shall assess the casing on a case by case basis.

7.5. Utility or Service Crossings

Requirements	Details
Plot Plan	A drawing showing: • The proposed plot plan and elevation profile, • Information has been generated based on actual site surveys, • Data provided in a MGA94 datum (horizontal) and AHD (vertical) format, • Stated accuracy of the GPS co-ordinates.

Requirements	Details
	The Plot plan shall provide details including: • The direction and alignment of the proposed change, • Current configuration, as well as the proposed One. Route of the pipeline shall be overlaid onto the drawing, with measurement intervals of sufficient close-ness to ensure details of any change in direction accurately plotted.
High Voltage Power	Sufficient information shall be provided to assess fault to earth current effects. Power poles installed by vertical boring shall include the following minimum clearances: • 3,000mm (including foundation footings), or • Greater than 3,000mm if deemed required by Viva Energy for access / maintenance requirements.
Services with Cathodic Protection (CP) Systems	Asset crossings that shall have CP systems shall detail the following: • Location of the nearest proposed or existing CP system
Vertical Boring / Service Pole Installation	Services installed by vertical boring shall include the following minimum clearances: • 3,000mm (including foundation footings), or • Greater than 3,000mm if deemed required by Viva Energy for access / maintenance requirements.
Horizontal Directional Drilling	Where services are designed for installation using horizontal directional drilling, the following requirements shall apply: • For perpendicular service crossings a minimum clearance of the pipeline diameter plus 500mm shall be maintained between the Viva Energy pipeline the service crossing – subject to approval by Viva Energy (considering access and maintenance), • For parallel services, a minimum clearance of the pipeline diameter plus 5,000mm shall be maintained – subject to approval by Viva Energy (considering access and maintenance), • Non-metallic service crossings (i.e. services that are difficult to detect with utility location wands) shall be fitted with a tracer wire extending the full width of the pipeline easement

7.6. Change in Location Zoning

Requirement	Details
Change in Location Zoning	• Where the development is likely to result in a change in population class / zoning, allowances shall be made to conduct appropriate risk reviews of the pipeline in that location • The third party shall provide details of the proposed changes in location zoning as well as any details of current or future sensitive areas such as: ○ Schools / Childcare

Requirement	Details
	○ Hospitals / Medical Centres ○ High Population density areas (such as shopping centres) ○ Centres with limited free access (aged-care facilities, jails and remand centres, high-security areas, etc.) ○ Parkland

7.7. Vegetation

Requirement	Details
Vegetation	• No vegetation shall be placed within 3,000mm of the pipeline • Vegetation shall not block free passage or line of sight along the pipeline route
Tree Planting	No trees or shrubs are to be planted closer than two-thirds of the mature height from 3,000mm of the pipeline. Specifically, the following tree specifies are not to be planted within 6,000mm of the pipeline: • Cinnamomum (Camphor Laurel), • Erythrina Species (Coral Trees), • Eucalyptus Species (Gums, Stringy Barks, etc.), • Ficus Species (Fig Trees), • Grevillea Robusta (Silky Oak), • Jacaranda Mimosifolia (Jacaranda Tree), • Plantinus Species (Plane Trees), • Populus Species (Poplar Tree), • Salix Species (Willow Trees), • Schinus Molle (Pepper Trees).

7.8. Placement of Material / Landscaping

Requirement	Details
Soil Burden	• No soil stockpiling within 3m of the pipeline without Viva Energy Approval • Landscaping shall be kept level along the pipeline easement • Soil shall be clean and free of ash, chemicals and contamination

8. Construction Guidelines

8.1. Overview

The objective of this section is to define minimum construction / site controls for any major third party development in proximity of Viva Energy pipelines.

The Third Party shall review these requirements at the planning phase of any third party development proposal, and shall incorporate them in appropriate safe work method statements / ITPs to ensure that works can be undertaken safely in the vicinity of the pipeline.

All Third Party construction works shall be approved and supervised by a Viva Energy Inspector in accordance with the Viva Energy Right of Way conditions.

8.2. Preparation Works

Requirements	Details
Preparation Works	• A Dial Before You Dig (DBYD) Enquiry covering the full extent of the proposed excavation shall be submitted and response from Viva Energy received. • Suitable traffic management and vehicle impact barriers (e.g. water-filled barriers) shall be installed and maintained at all possible vehicle approaches to the pipeline trench. • The trench shall be suitably fenced and secured to prevent any unauthorised access and interference by third parties, including members of the public. • The pipeline shall be delineated to prevent unauthorised activities occurring near the pipeline. • All approved crossings shall be clearly marked out on site
Line Location	• All projects will require pipeline proving by NDD and will require GPR location prior to any excavation to confirm the location. • Pot-holing of the pipeline shall be carried out in accordance with the requirements of this section, with a Viva representative present to confirm depth of cover
Pipeline Exposure Protection	• Where the pipeline is exposed in a public accessible area, temporary fencing shall be installed around the exposed area to prevent unauthorised access to the pipeline • Where the pipeline is exposed and at risk of vehicle impacts (e.g. excavated alongside a roadway), suitable water filled barriers shall be installed alongside the area exposed to vehicle impacts and the barriers contents checked and maintained throughout the exposure until backfill

8.3. Ground Disturbance

Requirements	Details
Non Destructive Digging	All Non Destructive Digging shall be undertaken in accordance with the requirements of PIP-P003.

Requirements	Details
	Where pot-holing the pipeline is to be done by Third Party Contractors, the works shall be witnessed by a Viva Energy representative or Inspector, and an Excavation Form, PIP-P003-1, completed.
Mechanical Excavation	Mechanical excavators shall be less than the maximum gross weight specified by Viva Energy
Rock Breaking	No rock breaking shall be conducted within 3,000mm of the pipeline without Viva Energy approval.
Directional Drilling	The following tasks shall be included in any directional drilling activity • Excavate an observation shaft 1,000mm ahead of the pipeline, to a depth of 1,000mm below the bottom of the pipe. • A Steel plate shall be positioned in the upstream observation pit in front of pipeline to protect the pipeline from accidental drill head damage • The Viva Energy Inspector shall confirm that the drill head does not breach the shaft as the drill head is tracked passed the pipeline.
Vibration Compacting	• No Vibration equipment shall be used within 3,000mm horizontal distance of the pipeline, subject to Viva Energy Approval

8.4. Lifting Operations

Requirement	Details
Exposed Pipeline	• No lifting shall occur over any exposed sections of pipelines
Buried Pipeline	• Ground Penetrating Radar and Line Locating shall be undertaken to verify the underground pipeline within the work area. • Lift plan to completed and approved by Viva Energy ,no lifting shall occur over the pipeline easement without Viva Energy Approval.

8.5. Blasting

Requirement	Details
Blasting	No blasting shall be undertaken within 1,000m of the pipeline without approval by Viva Energy and required Regulatory bodies

CONTROLLER USE ONLY		
Issue date	Document changes made and approved by owner	MoC # if change to procedure/process
02-Aug-2016	New document created – Rev0	n/a
Owner:	James Mozafari, Senior Pipeline Engineer	
Next review:	TBA	

Third Party Project Governance Guideline

Summary	This document provides guidance for third parties wanting to develop, change the land usage or proposing zoning changes in proximity to Viva Energy Licenced Pipelines.

1. Scope

This document provides guidance for Third Party Companies seeking to engage with Viva Energy for the purpose of managing proposed planning, development or land zoning changes in close proximity to Viva Energy pipelines.

The guideline covers Third Party project- governance, roles and responsibilities, process and deliverables for each stage of projects for the following activities, **BUT IS NOT LIMITED TO**:

- Changes in Land Use,
- New Roadway / Railway construction,
- New Residential or Commercial Developments
- Significant changes to infrastructure corridors
- Significant civil / geotechnical alternations
- Pipeline and utility crossings, Tunnelling, HDD, etc.

2. Third party project Governance

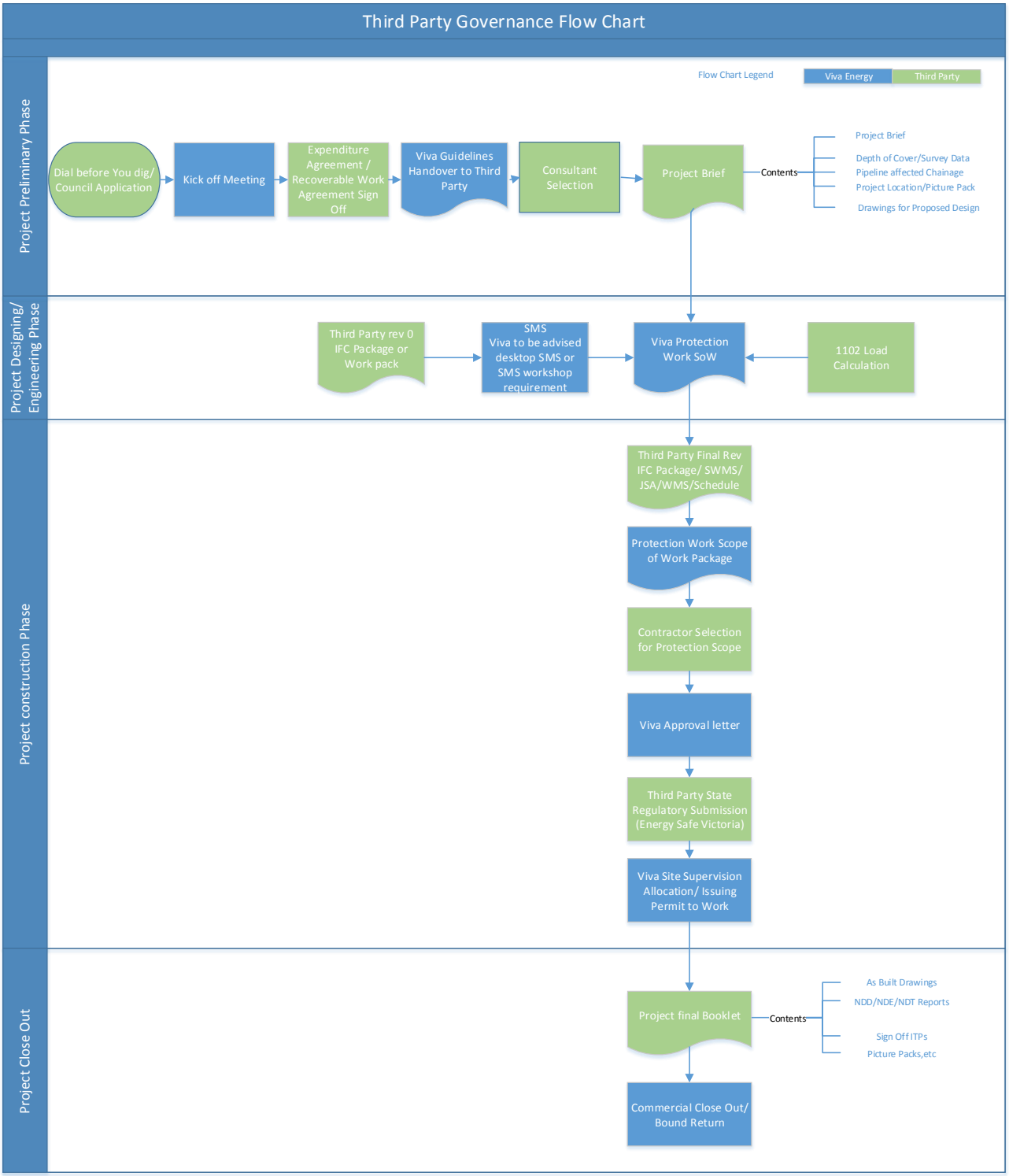
Viva Energy encourages third party companies to submit DBYD enquiries and contact Viva Energy at an early stage of their project to avoid changes to their design and impact on the projects' schedule and cost.

The steps and processes identified in the Flow Chart shall be followed for all Third Parties seeking Viva Energy approval for any work in proximity of Viva Energy pipelines.

The following needs to be considered in conjunction with the process flow chart, (section 3):

- No construction or physical activity is allowed prior to execution of Recoverable Work Agreement(RWA), and Viva Energy permit to work is obtained
- Third Parties **shall directly** engage a consultant and a principal contractor from Viva Energy approved vendor list, to deliver Viva Energy engineering requirements, with the execution of protection works managed under Viva Energy Australia's Permit to Work System.
- Third Parties are **only** allowed to engage Viva Energy approved consultant, contractors and sub-contractors to undertake protection work around Viva Energy pipelines.
- Viva Energy will appoint a third party site inspector to oversee the protection works and the Third Party works to assure conditions of the permit are met.
- The time frame for Viva Energy review process in Table 1 is indicative and subject to receiving completed engineering package from Third Party appointed consultant.
- To avoid miscommunication and delay to project, a focal point of contact to be appointed by Third Party.
- Any changes to the Third Parties proposed design during Viva Energy review, will require additional time for Viva Energy to review the design packs. Design changes may also cause potential cost and schedule impacts to The Third party's project

3. Third Party Governance Flow Chart



4. Deliverables, Time frame and Responsibilities

Deliverables, Time Frame, Responsibilities																		
	Preliminary Phase						Designing Phase				Construction Phase						Close Out Phase	
Deliverables /Task	DBYD	Kick off Meeting	Expenditure &RWA Sign Off	Viva Guideline Handover	Consultant selection	Project Brief	Third Party IFC /Work Pack rev0	SMS	Load Calculation	Viva Protection SoW	Final IFC/JSA/ WMS/WP	Protection Work WP	Contractor selection	Viva Approval letter	State Regulatory Submission	Permit to Work/Site Supervision	Final Booklet	Commercial Close Out
Viva Energy		✓		✓				✓		✓ *4-6 Weeks				✓ 1 Week		✓ *4 Weeks		✓
Proponent	✓		✓		✓	✓	✓		✓		✓	✓	✓		✓		✓	

Note:

- **The Viva review process time frame is indicative and subject to receiving all completed engineering package, information and date from proponent/consultant, and also subject to complexity of each project.**

Third Party Project Governance Guideline

USE ONLY		
Issue date	Document changes made and approved by owner	MoC # if change to procedure/process
20/12/2016	New document created	n/a
Owner:	James Mozafari, Senior Pipeline Engineer	
Next review:	TBA	

Viva Energy Australia Pty Ltd
ABN 46 004 610 459
Level 16, 720 Bourke St
Docklands Vic 3008
www.vivaenergy.com.au

DBYD Enquiry Response

DANGER	**High Pressure Oil Pipeline is in the vicinity of your proposed works**

With reference to your DBYD enquiry, the information you have provided indicates your proposed work at this location has the potential to damage our assets.

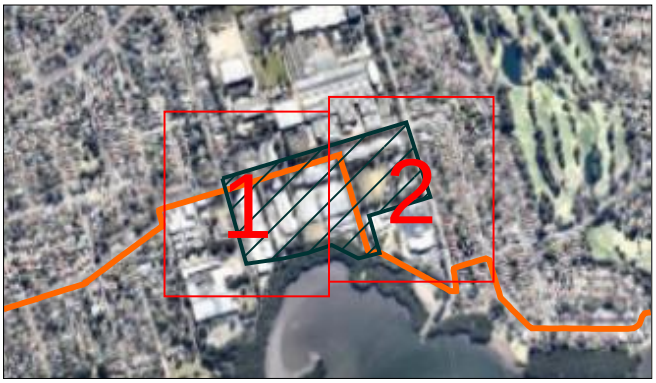
DO NOT PROCEED - Contact the Viva Energy Pipelines Coordinator with further detail of the proposed dig and location. A Viva Energy Right Of Way Clearance Permit is required.

Attached for your reference is our 'Conditions for Works near High Pressure Pipelines in NSW' and 'Land Use Planning, Development & Subdivision near High Pressure Pipelines in NSW'.

WARNINGS:

If your proposed work changes, resubmit your DBYD Enquiry and /or contact the Viva Energy Australia Pipelines Coordinator on the number provided below. A permit is required for any works in close proximity to the pipelines

The attached extract from our Geographical Information System shows the approximate location of the Pipeline and is not to be used to make measurements from or infer potential for impact.



Overview Map **Scale: 1:** 15500

Note: Penalties apply for a person excavating, boring or opening any ground within six (6) meters of a Hydrocarbon Pipeline without authorisation of the asset owner in accordance with the NSW Pipelines Regulations 2013 and AS2885.3-2012 Section 7.5.

Primary Contact: Viva Energy NSW Pipelines Surveillance Supervisor

Name:	Tony Carnovale
Mobile:	0423 603 895
Email:	tonycarnovale@cceng.com.au

Secondary contact: Viva Energy Maintenance Supervisor

Name:	David Kelly
Mobile:	0418 386 762
Email:	d.kelly@vivaenergy.com.au

DBYD Sequence Number:
54945150
Activity Type: Planning & Design
Start Date: 18/08/2016

Location:
6 Hope Street
Melrose Park 2114

Contact:
Costin Roe Consulting - Mr Mark Wilson
0249697070
0421847808

Legend:

- Gore Bay Pipeline
- Mascot JUHI Pipeline
- Silverwater Pipeline
- Property Boundary

N

VIVA EnergyAustralia

Scale: 1: 2000

0 0.01km

DBYD Sequence Number:
54945150
Activity Type: Planning & Design
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Scale: 1: 2000

0 0.01km

18 July 2016

Conditions for Works near Viva Energy Australia Pty Ltd owned and operated High Pressure Pipelines in New South Wales

Introduction

Viva Energy Australia Pty Ltd (Viva Energy) on behalf of itself and as operator of The JUHI pipeline operates a number of high pressure licensed pipelines in NSW. These pipelines contain either crude oil, or refined petroleum products like diesel, petrol or aviation fuel.

As the operating pressure can be as high as 9600 kPa damage to the pipelines may result in a potentially hazardous situation in terms of fire and/or explosion, and may lead to substantial environmental impact. Damage could also result in disruption of crude oil supply to refineries, or fuel supply to airports, service stations and other customers. The costs of such damage could result in the liability for payment of costs by the Authority, Principal or Developer responsible.

The requirements below have been put in place by Viva Energy to minimise the risk of damage to the pipelines.

In addition to complying with the requirements set out in these conditions and in the document “Land Use Planning, Development & Subdivision near Viva Energy owned and operated High Pressure Pipelines in New South Wales”, Viva Energy may require that anyone who proposes to carry out works in the vicinity of the pipelines:

(a) grants an easement to Viva Energy which contains provisions to ensure that the pipeline will be adequately protected both during and after the works and that Viva Energy will continue to have rights to access the pipeline; and/or

(b) enter into an agreement with Viva Energy in relation to the proposed work, which may include indemnities by the authority or developer in respect of any damage to the pipelines arising from the works and provision for recovery of Viva Energy costs in relation to any works which it is required to carry out to protect the pipeline.

Pipeline warning/danger signs

`High Pressure Pipeline' warning / danger signs are placed strategically along the pipeline routes within the vicinity of the pipeline. These signs do not give the exact location of the pipeline. The phone numbers on the signs vary according to the pipeline:

Viva Energy - Pipelines - (The Shell Company of Australia) Emergency 02 9897 8704.

(Please note that Viva Energy is in the process of changing signs from The Shell Company of Australia to Viva Energy).

Viva Energy Australia Right of Way Works Permit

Any works within three (3) metres of a licensed pipeline requires a Viva Energy Right of Way (ROW) permit. The ROW permits are obtained from the Pipeline Inspectors.

Notification of Intent

For proposed works within the vicinity of a pipeline, detailed submissions at the concept stage are to be made to Viva Energy, Pipeline Manager,

C/o Linda Busbridge - Pipeline Officer by letter or email: linda.busbridge@vivaenergy.com.au

A person must not, without the prior approval of the licensee, damage or occupy any land used for the construction or operation of a pipeline if the damage or occupation would result in interference to the construction or operation of the pipeline or the licensee's lawful access to the pipeline or the site of the proposed pipeline.

As per NSW Pipelines Regulations 2013 Division 6.27 – Penalties and demolition orders apply to contravention.

Installation and construction

Submissions including preliminary drawings and scope of work at concept stage (Including but not limited to Service Crossings) are to be made to Viva Energy, Pipeline Manager,

C/o Linda Busbridge - Pipeline Officer by letter or E-mail: linda.busbridge@vivaenergy.com.au

Approval from the Pipeline regulator may also be required.

Location proving

To ensure that the pipeline is not damaged, HAND EXCAVATED proving must be carried out - in the presence of a Pipeline Inspector - to determine the exact location of the pipeline prior to commencement of detail design and/or construction.

72 hours minimum prior notice of intention to prove dig and/or commence construction shall be given to arrange for a Pipeline Inspector to be on site during the location proving. Contact with an inspector can be made on the following numbers.

No charge is made for this service (unless substantial on-site time for the Pipeline Inspector is required).

Viva Energy Pipelines Maintenance Supervisor

Name:	David Kelly
Phone:	M 0418 386 762 PH (03) 8823 3732
Email:	D.Kelly@vivaenergy.com.au

Viva Energy Pipelines Coordinator

Name:	Creagh de Brabander
Phone:	M 0420 241 294 PH (03) 8823 3750
Email:	Creagh.de-brabander@vivaenergy.com.au

NO MECHANICAL EQUIPMENT is to be used within a horizontal distance of 1.0 m of the proven pipeline location unless approved by the Pipeline Inspector.

Accidental damage

Should any accidental damage be made to the pipeline and/or coating - even of a minor nature – Viva Energy Australia must be notified on the above numbers to enable inspection and subsequent repair.

Minimum pipeline clearance requirements

The MINIMUM clearances from the pipeline (per the pipeline licensing authority) are as follows:

(a) 0.5 m to buried equipment or structures less than 1.5 m wide and crossing the pipeline;

(b) 0.5 m to buried equipment or structures greater than 1.5 m wide and crossing the pipeline;

(c) 1.0 m to buried equipment or structures laid parallel to the pipeline; and

(d) 3.0 m to any building* and the extremity of the pipeline (measured horizontally).

Note: A person must not, without the prior approval of the licensee, damage or occupy any land used for the construction or operation of a pipeline if the damage or occupation would result in interference to the construction or operation of the pipeline or the licensee's lawful access to the pipeline or the site of the proposed pipeline.

As per NSW Pipelines Regulations 2013 Division 6.27 – Penalties and demolition orders apply to contravention

Excavation within 400 mm of the pipeline is to be backfilled with well compacted good quality packing sand.

Boring works

Where construction is to bore under or over the pipeline, hand excavation 1.0 m adjacent to the pipeline must first be made on the side from which the bore will approach. The above stated minimum clearance is to be confirmed with the Pipeline Inspector once the bore breaks through to this excavation.

Use of explosives

Conditions applying when blasting in the vicinity of the pipeline are as follows:

(a) No explosives are to be used within 30.0 m of the proven location.

(b) Persons using explosives must be licensed under the applicable dangerous goods regulations.

(c) Heavy coir or other approved matting must be used to cover the explosives area.

(d) "Cordtex" or other detonating type fuses shall not cross the pipeline if less than 0.5 m cover exists.

(e) Carriers containing explosives must not be left within 5.0 m of the pipeline during blasting.

(f) No blasting is to proceed within the limits of clauses (b) and (c) above until approval is given by Pipeline personnel.

(g) Blasting methods must be arranged to limit ground vibrations to less than 20 mm/s peak particle velocity at any point on the pipeline.

Nick Adams

Pipelines Manager

Viva Energy Australia Pty Ltd

18 July 2016

Land Use Planning, Development and Subdivision near Viva Energy Australia owned and operated High Pressure Pipelines in New South Wales

Introduction

Viva Energy Australia on behalf of itself and as operator of The JUHI pipeline operate a number of high pressure licensed pipelines in NSW. These pipelines contain either crude oil, or refined petroleum products like diesel, petrol, or aviation fuel.

Although being buried and constructed from high strength steel, damage to the pipeline may occur through unauthorised third party excavation. The purpose of this communication is to raise or to reinforce the awareness of the presence of the pipelines and to identify constraints with respect to the use of the land on and near the pipeline.

In addition to complying with the requirements set out in these conditions and in the document "Conditions for Works near Viva Energy Australia owned and operated High Pressure Pipelines in N.S.W.", Viva Energy Australia may require that anyone who proposes to carry out works in the vicinity of the pipeline:

a) grants an easement to Viva Energy Australia which contains provisions to ensure that the pipeline will be adequately protected both during and after the development and that Viva Energy Australia will continue to have rights to access the pipeline; and/or

b) enter into an agreement with Viva Energy Australia in relation to the proposed development, which may include indemnities by the authority or developer in respect of any damage to the pipelines arising from the development and provision for recovery of Viva Energy Australia costs in relation to any works which it is required to carry out to protect the pipeline.

Pipeline route and easements

The routes of pipelines are shown on a series of maps. The majority of the pipelines within the metropolitan area are within road reserves. The pipeline route outside of the metropolitan area when originally laid was predominantly through rural and semi-rural private property. Where practical the route was within existing pipeline corridors. Easements were created through this land. Over the years, the lands around the pipelines have gradually been developed with new roads, residential and industrial subdivisions, etc. reducing the extent of rural and semi-rural areas and increasing the urban and industrial areas.

The easement width varies along the route of the pipelines. It should be noted the pipeline is not necessarily located centrally and can be anywhere within the easement.

Constraints

To ensure land use planning, development and subdivision does not jeopardise the integrity of the pipeline the safety of the public and the environment, it is critical that land use planners, property and service designers, developers, owners and operators, construction organisations, etc. and the general public take into account the presence of the pipeline in their intended activities.

It is important that any planning, development or changes near the pipeline are advised to Viva Energy Australia in the concept stages such that the work will not interfere with the pipeline and vice versa.

The work may require additional protection in the form of concrete slab cover, increasing the depth or varying the route of the pipeline. The cost of these changes would be borne by those initiating the work.

Various constraints are applied to ensure access is maintained, buildings are prevented, vegetation and addition of fill is restricted, power and telegraph poles, fencing and agricultural activities are controlled. These are detailed below.

Access to the pipeline

In order to maintain security & safe operation of the pipelines, regular patrol of the route is required under section 7.4 of AS2885.3-2012 in compliance with applicable pipelines legislation and as a condition of the pipeline licence.

To meet these requirements, the easement or pipeline route must be able to be accessed and traversed by pipeline personnel (and authorised contractors) at any time without delay.

Where gates are to be locked, access is usually achieved by adding a Viva Energy Australia padlock into the chain.

Prohibition of buildings near the pipeline

Under Division 6.27 of the N.S.W. Pipelines Regulations 2013, a person must not without the prior approval of the licensee, damage or occupy any land used for the construction or operation of a pipeline if the damage or occupation would result in interference to the construction or operation of the pipeline or the licensee's lawful access to the pipeline or the site of the proposed pipelines.

Clearance is also required to allow access for patrol and maintenance activities - in particular excavation of the pipeline. In practice, a clearance distance of 6.0 metres is more appropriate.

Vegetation on and near the pipeline

Vegetation is to be restricted to allow free passage along the pipeline route and to prevent root damage to the pipeline anti-corrosion coating. Accordingly, trees and shrubs are not to be planted on the easement and to prevent future damage to root systems during excavation for pipeline maintenance should not be planted closer than two-thirds of the mature height from the edge of the easement. Where no easement exists a minimum distance of 3.0m but preferably 6.0m either side of the pipeline should be substituted for easement.

Specifically, the following tree species are not to be planted within 6.0m of the pipeline:

Cinnamomum (Camphor Laurel), Erythrina Species (Coral Trees), Eucalyptus Species (Gums, Stringy Barks, etc.), Ficus Species (Fig Trees), Grevillea Robusta (Silky Oak), Jacaranda Mimosifolia (Jacaranda Tree), Plantinus Species (Plane Trees), Populus Species (Poplar Tree), Salix Species (Willow Trees), Schinus Molle (Pepper Trees).

Addition of fill on or near the pipeline

It is preferred that fill is not added on or near the pipeline as this increased depth increases the cost of excavation and the poor stability of the fill increases the risk of cave-in during excavation. The depth of fill shall not exceed 1.0m. If fill must be added, the depth and quality is to be advised prior to placement for agreement by Viva Energy Australia. Any landscaping shall be level within the easement or a minimum of 3.0m (but preferably 6.0m) either side of the pipeline to permit excavating equipment to operate without having to destroy the adjacent landscaping.

The addition of fill on or near the pipeline shall only be clean, preferably the same as the natural soil in that area and must not contain ash or chemicals - so as to not change the natural soil resistivity or affect the pipeline steel or anti-corrosion coating material.

Power and telegraph poles, fencing and agricultural activities

Proposed new or replacement power and telegraph poles (including strainer anchors and earth systems) and fencing across or along the easement or pipeline route are to be advised to Viva Energy Australia prior to commencement to prevent damage to the pipeline by pole hole augers or pole drivers. Poles are to be placed once the exact pipeline location has been marked by Viva Energy Australia and the required minimum clearance of 3.0m has been achieved. Fencing along the easement/pipeline route shall be a minimum of 3.0m from the pipeline.

Agricultural activities such as deep ripping and the installation of drainage systems are not permitted on the pipeline easement or when no easement exists a minimum of 3.0m (but preferably 6.0m) either side of the pipeline. Such works adjacent are to be advised to Viva Energy Australia prior to commencement to allow marking out the prohibited area.

Contact

Viva Energy Pipelines Maintenance Supervisor

Name:	David Kelly
Phone:	M 0418 386 762 PH (03) 8823 3732
Email:	D.Kelly@vivaenergy.com.au

Viva Energy Pipelines Coordinator

Name:	Creagh de Brabander
Phone:	M 0420 241 294 PH (03) 8823 3750
Email:	Creagh.de-brabander@vivaenergy.com.au

Nick Adams
Operations Manager
Viva Energy Australia Pty Ltd

Subject: RE: Pipeline Blast Zone for Development [ref:_00D90vvFg._5006F1J4nOy:ref]

Hi Isabella
The measurement length for the pipeline is 100m, this being said it does not mean you are unable to develop the property.

Safety Concerns - The proximity of a Development to the Pipeline creates various safety issues that need to be addressed in your application.
Generally, for works near high-pressure pipelines, Viva Energy requires from the Applicant and at the Applicant's cost:

- cooperation with Viva Energy (as the owner and operator of the Pipeline);
- to undertake a Safety Management Study (SMS) (In accordance with Australian Standard AS2885 for Pipelines), of the proposed development to outline the precise requirements needed to ensure that the maintenance and operation of the Pipeline, integrity of the Pipeline and safety to the surrounding environment and people are safeguarded.

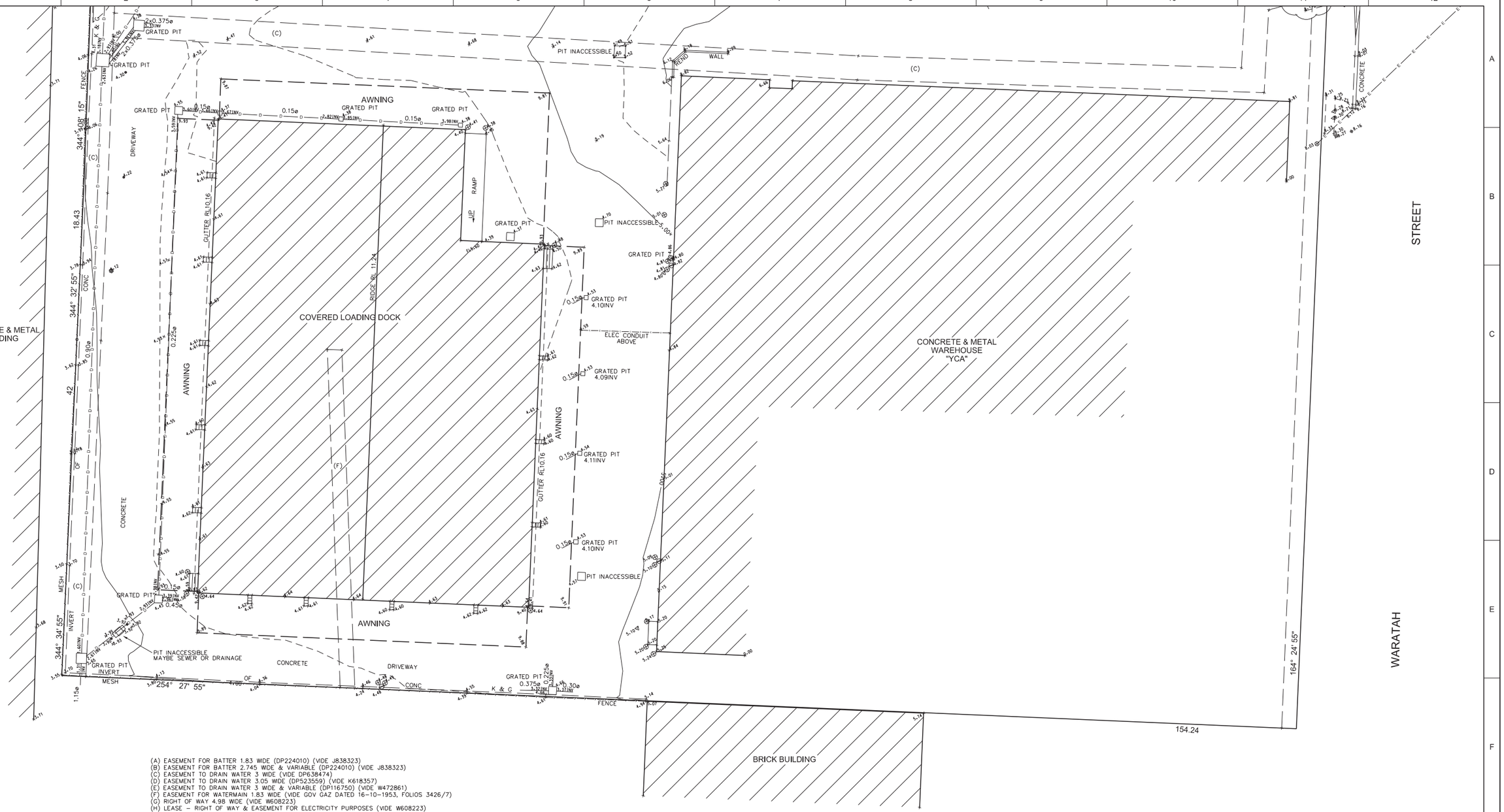
Viva Energy would expect the developer to

- complete a risk assessment to include consequence models of the worst case scenarios of potential adverse impacts to the site associated with proximity to pipeline.
- prepare a material and finishes plan as part of any conditions, to the satisfaction of the Responsible Authority, that:
    i. confirms that buildings to be constructed or existing buildings to be occupied withstand the radiation contour identified by the risk assessment report and how this will be achieved: and
    ii. details the window type (including laminated glass) and method of fixing for the building to demonstrate that shattering of glass will be prevented
- prepare to the satisfaction of the Responsible Authority, an Emergency Evacuation plan which demonstrates that all excavations are to the rear of the site.
- All new entries/exits from the road into the property & any new utilities that may cross the pipeline will be designed and constructed in consultation with Viva energy
- The land owner must at no cost to Viva Energy Australia Pty Ltd, carry out the works (whether or not within the pipeline easement) for the development to meet the requirements of:
    i. Australian Standard AS2885 Pipelines – Gas and Liquid Petroleum;
    ii. NSW Pipelines Act ; and
    iii. NSW Pipeline Regulations 2007.

Regards
Linda Busbridge

Appendix E

Existing Site Survey



(A) EASEMENT FOR BATTER 1.83 WIDE (DP224010) (VIDE J838323)
(B) EASEMENT FOR BATTER 2.745 WIDE & VARIABLE (DP224010) (VIDE J838323)
(C) EASEMENT TO DRAIN WATER 3 WIDE (VIDE DP638474)
(D) EASEMENT TO DRAIN WATER 3.05 WIDE (DP523559) (VIDE K618357)
(E) EASEMENT TO DRAIN WATER 3 WIDE & VARIABLE (DP116750) (VIDE W472861)
(F) EASEMENT FOR WATERMAIN 1.83 WIDE (VIDE GOV GAZ DATED 16-10-1953, FOLIOS 3426/7)
(G) RIGHT OF WAY 4.98 WIDE (VIDE W608223)
(H) LEASE – RIGHT OF WAY & EASEMENT FOR ELECTRICITY PURPOSES (VIDE W608223)

—— D —— D —— SUBSURFACE DRAINAGE LINE

0.3ø — TRUNK DIAMETER
6SP — TREE SPREAD
4H — TREE HEIGHT

1.BOUNDARIES HAVE NOT BEEN SURVEYED
2.SITE AREA 2.546ha BY TITLE DIMENSIONS

IMPORTANT NOTE:
This plan is prepared for from a combination of field survey and existing records for the purpose of designing new constructions on the land and should not be used for any other purpose.
The title boundaries shown hereon were not marked by the author at the time of survey and have been determined by plan dimensions only and not by field measurement.

A services search of the area surveyed above has not been undertaken.
Visible services shown hereon have been located where possible by field survey.
Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.
This note is an Integral part of this plan.

LEGEND:
SEWER MANHOLE, UNCLASS SEWER, SEWER VENT, SEWER LAMP HOLE, TELSTRA PIT 1.0x1.0, UNCLASS TELSTRA, TWIN TELSTRA PIT, TELSTRA PIT, SIGN, UNCLASS ELECTRICITY, POWER POLE, LIGHT POLE, ELECTRICITY PIT, UNCLASS SERVICE, UNCLASS WATER, WATER METER, STOP VALVE, TAP, HYDRANT, GULLY PIT, JUNCTION BOX, GRATED PIT, DRAINAGE MANHOLE, STATE SURVEY MARK, SURVEY MARK, GAS PIT, GAS MARKER POST, UNCLASS GAS, TRAFFIC CONTROL SIGNAL, TRAFFIC JUNCTION BOX, TRAFFIC SIGNAL PIT, BOLLARD

REVISION	DATE	DESCRIPTION	CCAD REF	APPROVED
00	15-01-2010	ORIGINAL ISSUE	114194AE	CWH

SCALE: HORZ. 1:200 VERT.
CONTOUR INTERVAL: MAJOR 1.0 MINOR 0.5
HORIZONTAL ORIGIN
COORD. SYSTEM: ISG
MARK ADOPTED: COORDINATES: E N
VERTICAL DATUM
DATUM: AHD
BM ADOPTED: PM 33895 RL: 16.683
B1

SURVEYED S.W. | DRAWN LT. | CHECKED | PASSED

HARD & FORESTER
HARD & FORESTER
23–25 Frederick Street
PO Box 175
Rockdale NSW 2216
DX11116 Kogarah
t: (02) 9597 9700
f: (02) 9599 2146
e: survey@hardforester.com.au
w: www.hardforester.com.au
Consulting Surveyors
Hard & Forester Pty Ltd ABN 67 003 541 349

PROJECT:
PROJECT
PLAN SHOWING LEVELS, DETAIL &CONTOURS OVER No.6 HOPE STREET ERMINGTON

CLIENT: GOODMAN PROPERTY SERVICES

SHEET 1 OF 2
DRAWING NUMBER: 114194001
REV: 00

REDUCED LEVELS 20.123
LABELS – FENCES KERBS SERVICE DESCRIPTION ETC
HOUSE DESCRIPTION DP NUMBERS PARK NAMES
STREET NAMES LAKES RIVERS
NOTES FOR LARGE AREAS
FOR 1:100 SCALE

HOPE

HIGH PRESSURE OIL PIPIELINE BURIED IN ROAD

STREET

ELECTRICAL BOX
TRANSFORMER
CONCRETE
KERB
GUTTER
71° 44' 15"
74° 10' 35"
89° 13' 3.16
119° 18' 3.16
149° 23' 3.16
104.7
43.865
160.866
101.32
BRICK BUILDING
GENERATOR
SPRINKLER PUMP ROOM
BITUMEN CARPARK
DRIVEWAY
FENCE
CONCRETE HARDSTAND
DRAINAGE PIT INACCESSIBLE
GUTTER RL 19.43
GRASS
PATH
RETAINING WALL
GRATED PIT
LAWN
CONCRETE FOOTING
FOOTPATH
No6 HOPE STREET
COMPUTERSHARE
2 STOREY CONC PANEL BUILDING
CONCRETE HEADWALL
TOP RETAINING WALL
BOTTOM RETAINING WALL
RL 21.55
GARDEN
(STORMWATER DETENTION TANK BELOW 2.2 WIDE)
VEGETATION
5.00
GUTTER RL 19.45
BBQ AREA
BLOCK WALL
SHED
EDGE
BITUMEN CARPARK
CHANNEL
RAMP UP
BOTTOM RETAINING WALL
CONCRETE HARDSTAND
WARATAH
STREET
HIGH PRESSURE OIL PIPIELINE BURIED IN ROAD

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LEGEND:
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HARD & FORESTER
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e: survey@hardforester.com.au
w: www.hardforester.com.au
Consulting Surveyors
Hard & Forester Pty Ltd ABN 67 003 541 349

SURVEYED	DRAWN	CHECKED	PASSED
S.W.	LT.		

PROJECT:
PROJECT
PLAN SHOWING LEVELS, DETAIL &CONTOURS OVER No.6 HOPE STREET ERMINGTON
CLIENT: GOODMAN PROPERTY SERVICES

SHEET 2 OF 2	
DRAWING NUMBER	REV
114194001	00

REDUCED LEVELS 20.123
LABELS – FENCES KERBS SERVICE DESCRIPTION ETC
HOUSE DESCRIPTION DP NUMBERS PARK NAMES
STREET NAMES LAKES RIVERS
NOTES FOR LARGE AREAS
FOR 1:100 SCALE