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20 May 2020

Enquiries: Oliver Walsh / Ian Harris
Project No: 40416

Landcom
c/o APP
7/116 Miller Street
North Sydney NSW 2060

Attention: Peter Alevizos

Dear Peter

RE: Kellyville & Bella Vista Station Precincts
State Significant Development Application
Response to The Hills Shire Council queries

We refer to the enclosed letter from The Hills Shire Council regarding the State Significant Development (SSD) applications for the Kellyville and Bella Vista Station Precincts. Included in the letter are several queries that relate to the Stormwater Management Plans prepared by Stantec.

The intent of this letter is to respond to Council's queries. Please refer to the itemised responses in the table overleaf.

Feel free to contact the undersigned should you have any queries.

Yours sincerely

Stantec Australia Pty Ltd

Oliver Walsh
Associate

Item	Heading	Council Comment / Query	Stantec Response
Water Management			
1	Orderly Development	The SSDAs need to consider orderly development in relation to the required stormwater drainage network and flood levels. It is acknowledged that staged development is proposed, however further progression of the SSDAs and future Development Applications need to consider the management of stormwater and flooding with consideration to proposed filling of the land.	Please refer to Section 9 – 'Development Staging' of the amended Stormwater Management Plans for details. Generally, while staging for the developments is indicatively shown in the SSD applications, no physical works are proposed. Future development applications will include more detailed staging and works boundaries, which will dictate both stormwater management and flooding requirements.
2	Soil Contamination	Due to potential soil contamination, future development applications must include conditions that all soil is to be tested to determine suitability for re-use.	Noted.
3	Flood Planning Levels	Both SSDAs consider a flood planning level of 500mm above the 100 year Average Recurrence Interval (ARI) overland flow levels. A flood planning level against the 100 year ARI levels in Elizabeth Macarthur Creek was not specified. The justification given was that the developable land can be filled up to, or above the 100 year ARI level. Nevertheless, a freeboard of 500mm from the 100 year ARI in Elizabeth Macarthur Creek should be adhered to.	Please refer to Sections 4.3 to 4.5 in the amended Stormwater Management Plans for details. Sydney Water's Elizabeth Macarthur Creek (EMC) Trunk Drainage Report, which is appended to the Stormwater Management Plans, includes detailed 100 year flood levels in EMC that will form the basis of future designs.

4	On-Site Detention	The SSDAs propose that on-site detention is not required due to the minimal change in flood levels expected as a result of the proposed development with predicted 90%-100% imperviousness. The minimal impact was stated to be approximately 20mm at the most impacted location. Further submission should be made which details and/or models how the determination of 20mm was calculated. Without review of this information Council is unable to support this claim. Regardless of flood impact, to reduce erosive impact and instability within the waterway corridor as a result of the proposed developments increased imperviousness, on-site detention ought to be considered.	Please refer to Section 6 – 'Stormwater Quantity' in the amended Stormwater Management Plan. Additional details are provided regarding the assumptions made in both the Rouse Hill Flood Study and the EMC Trunk Drainage Report. In summary, the Rouse Hill Flood Study, on which the EMC Trunk Drainage Report was based, made allowance for future development within the study area. The average percentage impervious of the entire Rouse Hill study area (which is much larger than the sites) is 66%. The reference to a 20mm impact in the previous reports was erroneous and has been removed from the amended reports. In addition to the above, please refer to the below additional evidence that on-site detention is not required: - Please refer to the enclosed NRT stormwater catchment plans. Roads recently constructed by Northwest Rapid Transit (NRT) make allowance for the future development lots to be 90 to 100% impervious (i.e. allowance has been made for stormwater runoff from future private development to discharge to the public stormwater network un-detained). - Please refer to the enclosed Sydney Water specification for 'Stormwater connection to natural waterways – Rouse Hill Development Area'. Sydney Water have advised through (1) a Feasibility Application and (2) in response to the initial SSD applications that this specification is applicable to the developments. The specification does not include a requirement for detention prior to discharge to EMC.
5	Gross Pollutant Traps	The SSDA's propose Gross Pollutant Traps (GPTs) at multiple locations along Elizabeth Macarthur Creek to treat stormwater before being discharged to the watercourse. The likely number and locations needs to be demonstrated. Additionally, confirmation with respect to the asset owner of the GPTs and responsibility for the ongoing management and maintenance is required.	Please refer to Section 7.4.4 – 'Gross Pollutant Traps' and Appendix F – 'Concept Stormwater Management Plans' of the amended Stormwater Management Plans for details. Drawings have been updated to show the indicative number and location of GPTs. GPTs are intended to be located within public roads and maintained by Council. This is consistent with the location of GPTs recently installed by NRT.

6	Tree Pits	Both SSDAs propose tree pits. Consideration should be given to their design, location and number permitted with conditions likely to be recommended as part of future development applications. Additionally, review of the submitted documentation in support of the SSDAs found that there is inconsistency across the documentation in regard to the proposed spacing of tree pits. The Stormwater Management Plans submitted in support of the SSDAs nominate the modelling details of the proposed tree pits. The details presented indicate a filter area greater than the surface area which cannot be the case. All numbers used in the modelling of Water Sensitive Urban Design measures need to be reviewed and amended as necessary.	Please refer to Section 7.4.1 – 'Tree Pits' in the amended Stormwater Management Plans for details. Urban design, landscape architecture and engineering have aligned goals of maximising the number and location of tree pits within public roads. The specific number and locations would be determined with future more detailed design of physical works. This will be affected by road geometry, future superlot access, parking, bus bays and pedestrian crossings, among other infrastructure. The inconsistency across various documents has been clarified in the Stormwater Management Plans. A conservatively low number of tree pits has been calculated for the purposes of stormwater quality (MUSIC) modelling only. This number is not commensurate with the actual number of tree pits proposed, which will be in accordance with landscape and urban design reporting. The filter and surface areas of tree pits were erroneous and have been updated in MUSIC modelling and the Stormwater Management Plans.
7	Stormwater Re-Use	Further iterations of the proposals will need to provide a water balance for the proposed stormwater re-use for the irrigation of district open space. It is acknowledged that a 1300L tank is proposed and modelled for the Bella Vista precinct. For Bella Vista more specifically, the Stormwater Management Plan needs to address potential groundwater influences and constraints in relation to the proposed WSUD measures. The Kellyville Station Precinct Stormwater Management Plan (SMP) proposes that the neighbourhood park between Blocks C and D is to be connected to a rainwater re-use tank for irrigation purposes. This is not supported and this rainwater tank and re-use system is to be removed from the MUSIC model for the precinct and the pollution reduction achievements re- calculated.	Please refer to Section 7.4.3 – 'Rainwater Re-use' in the amended Stormwater Management Plans, and MUSIC modelling for details of water balance calculations. Groundwater influences on storage tanks would be assessed and controlled in future design stages. It is noted that this will be somewhat dictated by future earthworks design. The rainwater re-use tank within the Kellyville Station Precinct has not been removed from reporting as (1) while small, the proposed public reserve serves a significant community benefit, (2) increased watering of the park will assist in mitigating the urban heat island effect, (3) it will increase security of water supply for irrigation and (4) it will reduce the cost of potable/recycled water usage from Sydney Water's network.
8	Riparian Assessment	A riparian assessment for the Bella Vista precinct should be submitted, similar to that provided for Kellyville. Further progression of the Kellyville precinct SSDA and future Development Applications ought to comply with mitigation measures specified in the riparian assessment completed by EcoLogical Australia in support of the Kellyville precinct SSDA.	Please refer to other consultants' reporting for details.

9	Stormwater Harvesting	It is noted that, without further information, Council will not accept ownership or management responsibility of any assets associated with Sydney Water's (conceptual) regional stormwater harvesting pipeline or related drainage infrastructure.	The regional stormwater harvesting pipeline and related drainage infrastructure is not the subject of the SSD applications and its status is unknown.

THE HILLS Sydney's Garden Shire

THE HILLS SHIRE COUNCIL
3 Columbia Court, Norwest NSW 2153
PO Box 7064, Norwest 2153
ABN 25 034 494 656 | DX 9966 Norwest

26 November 2019

Director – Key Sites Assessments
Department of Planning, Industry and Environment
GPO Box 39
SYDNEY NSW 2001

Our Ref: FP215
Your Ref: SSD-10344
SSD-10343

Dear Sir/Madam,

STATE SIGNIFICANT DEVELOPMENT APPLICATIONS – BELLA VISTA AND KELLYVILLE

Thank you for the opportunity to provide feedback on the State Significant Development Applications (SSDAs) for Government-owned land within the Bella Vista and Kellyville Precincts. The following comments are provided on behalf of Council:

- ***Approval Pathway for Future Applications***

The current SSDA applications seek consent for a concept master plan, urban design guidelines and Stage 1 subdivision of public open space lots. Future applications will be required to facilitate further subdivision and the detailed design and construction of buildings, open space, public domain areas and associated civil infrastructure and works.

Under Schedule 2 of State Environmental Planning Policy (State and Regional Development) 2011, the following types of development are identified as State Significant Development within the Bella Vista and Kellyville Precincts:

(a) a principal subdivision establishing major lots or public domain areas, or
(b) the creation of new roadways and associated works.

It is noted that the Department exhibited changes to State and Regional Development SEPP in 2018 to include an additional criterion to allow development in the Precincts that has a capital investment value of more than $30 million to be considered State Significant (these amendments have not been finalised to date). Council made a submission on this draft SEPP raising concern that the changes would allow future built form applications to be assessed as State Significant Development, overriding established local assessment and approval processes. Council recommended that State Significant Development within the Precincts continue to be limited to principal subdivision and the creation of roads only.

The Environmental Planning and Assessment Act 1979 permits a consent authority, in assessing a concept SSDA, to determine the future stages of development that are to be assessed by Council and that cease to be State Significant. Landcom has requested that the criteria for future applications to be considered State Significant include:

- a principal subdivision establishing major lots or public domain areas, or
- the creation of new roadways and associated works, or
- **has a capital investment value of more than $30 million.**

It is acknowledged that Landcom's concept SSDAs seek to serve as the primary guiding policy for future development with the Precincts in lieu of the preparation of a site specific DCP. It is important that future applications are assessed against the framework set by the concept SSDAs as well as Council's DCP to ensure high quality development outcomes and a standard of liveability consistent with other high density locations throughout the Shire.

Accordingly, it is recommended that the criteria for State Significant Development continue to be limited to principal subdivision and the creation of roads, excluding development of individual sites regardless of the capital investment value. This approach will also ensure that future applications are able to be assessed through the established local assessment and approval process, including consideration by the Sydney Central City Planning Panel and Council's Design Review Panel which comprise of members with suitable local knowledge and expertise.

- ***Infrastructure***

Delivery Mechanism

Throughout the SSDAs, it is indicated that Landcom intends to submit a letter of offer to Council setting out its calculated infrastructure obligations and mechanisms to meet those obligations (by way of a Voluntary Planning Agreement). Council has not yet received this letter of offer, which makes it difficult to comment on the reasonableness of the infrastructure provision being proposed as part of the SSDAs.

It is critical that a mechanism to secure the funding and delivery of infrastructure required to support proposed development within the Precincts be established at the concept development application stage. This should be a critical outcome of any SSDA approval. It is expected that Landcom (and/or other developers within the Precinct) will be responsible for the full costs of the provision of new infrastructure required to support the development.

No approval should be granted prior to a mechanism being established between Landcom and Council. It is noted that a separate or joint agreement may also be required to include other agencies with respect to the provision of State infrastructure such as the school or regional road upgrades.

Bella Vista Community Facility

Clarification is required regarding the proposed location and size of the Bella Vista Community Facility and Landcom's offer with respect to delivery. A plaza / community centre is shown on Drawing A_0301 (Rev. B) within the Bella Vista Urban Design Guidelines which has a lot size of 3,575m^2. However, within Figure 3.3.1 of the Bella Vista Urban Design Report this lot has an area of 3,310m^2 and a GFA entitlement of 2,180m^2 which would not be sufficient to accommodate a 4,000m^2 facility as suggested elsewhere in the SSDA material.

While a formal infrastructure offer is yet to be submitted by Landcom, details of this propose facility should be clearly and consistently represented within the guidelines and drawings that may be approved as part of the SSDA.

Embellishment of Caddies Creek Reserve

The Social Infrastructure Assessment prepared by Elton Consulting (August 2019) identifies that the future population within the Bella Vista and Kellyville Precincts would generate demand for an extension to Caddies Creek Sporting Complex with four new playing fields and associated amenities. The EIS Reports submitted with the SSDAs identify this demand will be addressed through the provision of 10ha of open space "land" at Caddies Creek. As noted in Council's previous SEARs submissions, the demand generated by the future population on land within the Bella Vista and Kellyville Precincts will fully utilise any capacity created by the provision of four new

playing fields at Caddies Creek. Accordingly, it is expected that the full cost of embellishment of this facility will be funded by Landcom and secured through a mechanism which addresses local infrastructure as part of the current SSDAs.

It is noted that the land component of this facility is proposed to be funded through the draft Special Infrastructure Contribution Levy for the North West Growth Area – if this were not to occur, it is expected that development within the Bella Vista and Kellyville Precincts would also be responsible for the full cost of any land acquisition associated with the expansion of Caddies Creek Reserve.

Creek Crossings

Clarification is required regarding which creek crossings are proposed to be funded and/or delivered as part of the subject SSDAs. The Urban Design Guidelines indicate a new pedestrian bridge connecting Lewis Jones Drive Reserve to the proposed Neighbourhood Park in Kellyville Precinct and another bridge connecting Sandstock Way in the Balmoral Road Release Area to a new local road opposite Byles Place in Bella Vista Precinct.

These crossings are considered to be fundamental outcomes associated with development within the Precincts as they will encourage sustainable travel, improve connectivity and create genuine TOD outcomes. It is anticipated that clarification will be provided by way of Landcom's formal infrastructure offer however this should also be clarified within the Urban Design Guidelines proposed to be approved as part of the SSDA.

Urban Plazas

Clarification is required regarding the responsibility for embellishment of the proposed plaza and ongoing maintenance obligations and arrangements where these remain in private ownership.

Concern is raised with respect to the 'divided' nature of the Kellyville Town Centre plaza / park (KV1). There would be greater benefit in consolidating this space to improve its function, useability and amenity. Potential overshadowing issues could also be addressed by reducing the building bulk and height surrounding the park. It is noted that the Social Infrastructure Assessment prepared by Elton Consulting identifies a desirable size of 3,000m^2 for local parks. Consolidating the plaza within the Kellyville town centre would more closely align with this guideline.

Schools

Concern is raised that the future population will generate demand for an additional high school which has not been identified in the proposed SSDAs. Based on standard benchmarks, approximately one new high school is required to service every 4,500 new dwellings (noting that up to 5,600 dwellings are proposed as part of the current proposals on the Government land only). The Social Infrastructure Assessment prepared by Elton Consulting notes that NSW Department of Education has identified 'some' capacity in existing high schools to 'help' accommodate the demand from the proposed development. These statements do not provide sufficient comfort or certainty that the future population can be adequately serviced by existing high schools in the area. The Bella Vista and Kellyville Precincts are an ideal location for a new high school being Government owned land in a highly accessible location along the metro corridor where substantial growth will be occurring.

It is also noted there are inconsistencies throughout the material with respect to the size of the proposed primary school, with the Elton report identifying demand for a 1.5ha site and the proposed plans indicating an area of approximately 1ha. Clarification should be provided in this regard.

Kellyville Neighbourhood Park

References to KV2 'Neighbourhood Park' should be amended to 'Local Urban Park (High Density Areas)' to reflect Council's hierarchy within the recently adopted Recreation Strategy.

- ***Master Plans & Urban Design Guidelines***

Level of Detail
As the concept approval will effectively constitute a site specific DCP (in satisfaction of Clause 8.5 of The Hills LEP 2012), the Urban Design Guidelines should include sufficient detail to guide the final built form outcome. The guidelines need to have a level of detail equivalent to a DCP and should be expanded to provide guidance on additional matters such as:

- Unit mix and apartment size - future apartment development should comply with Council's housing mix and diversity criteria, as specified within Clause 7.12 of LEP 2012;
- Common and private open space; and
- Character objectives and controls.

Plans for Approval
For clarity, it is recommended that the GFA and yield ranges for each lot be included on the 'Plans for Approval' for the Bella Vista Precinct, as is the case for the Kellyville Precinct.

Setbacks
Landcom is seeking to vary the minimum setback controls for residential flat buildings under The Hills LEP 2012 from 5 metres to the following:

Town Centre / Main Streets
- Podium: 0-2m
- Upper storeys: further 3m

Residential Areas / Local Streets
- Podium: 2-5m
- Upper storeys: further 3m (Kellyville) or 5m from the boundary (Bella Vista)

The SSDA material justifies these variations on the basis of the intended urban character of the precincts, the presence of landscaped verges along streets, desire for increased passive surveillance for streets and greater opportunity for varied street walls leading to more interesting streetscapes.

Landcom's justification is not considered reasonable. The minimum setbacks within The Hills LEP 2012 were set as a result of detailed precinct planning completed by the NSW Government and already vary substantially from Council's typical front setback requirements for apartment buildings of 10 metres. The reduced setback within the LEP already acknowledges the urban character of these areas, whilst continuing to allow reasonable space for deep soil planting and larger tree species, providing a green and leafy character, increased urban tree canopy and increased privacy for future residents. Greater setbacks would also enhance solar access to streets and reduce wind impacts which are highly desirable from an amenity perspective in high density areas.

It is also considered inappropriate to vary the requirements as part of a master plan approval, without any detailed concepts for individual buildings to justify the variation. It is noted that there would remain scope for variation to setbacks to be considered on a case-by-case basis as part of future built form applications for individual buildings. This would allow for consideration of variations having regard to the detailed design of individual buildings and specific opportunities and constraints afforded by individual sites.

An approach could be applied within the Bella Vista and Kellyville Precincts consistent with Council's adopted DCP controls for other station precincts (Showground and Castle Hill North) where a setback of 3 metres can be applied where apartment developments proposed a 'terrace edge'.

Mix of Housing Typologies
The proposed mix of medium and higher density housing is considered a positive outcome. Whilst the proposed GFA ranges will go some way to securing the provision of medium density forms such as terraces, it is considered this could be further secured by specifying a minimum percentage of terrace style housing for certain sites.

Street Profiles
The street profiles for the Bella Vista Precinct should be included within Section 02 'Street Hierarchy, Public Domain, Street Interface and Street Setbacks' of the Bella Vista Urban Design Guidelines. Care should also be taken to ensure the design of new streets will present a uniform and logical profile with the existing streets already constructed by NRT.

All streets profiles should include a 2.5m shared path on at least one side to facilitate both pedestrian and cycle movements throughout the precincts.

Building Envelopes
Clarification should be provided of whether the proposed building envelopes are inclusive of plant and lift overruns. These features should not protrude about the maximum permissible building height unless fully integrated into the design of an architectural roof feature in accordance with Clause 5.6 of The Hills LEP 2012.

Building Lengths
Concern is raised with respect to the visual bulk of buildings which in some cases exceed 65 metres in length. It is recommended that a control be applied within both Precincts which is consistent with the adopted DCP controls for other station precincts (Showground and Castle Hill North) and imposes a maximum building length of 65 metres.

Retail Laneways
Care should be taken to ensure that laneways are appropriately activated to avoid these becoming dormant / unsafe spaces.

Wind
Given the density and foot traffic expected for these precincts, it is recommended that wind controls be included in the Urban Design Guidelines to require buildings of 8 or more storeys to be subject to wind tunnel testing and demonstrate the following:

- In open areas to which people have access, the annual maximum gust speed should not exceed 23 metres per second;
- In walkways, pedestrian transit areas, streets where pedestrians do not general stop, sit, stand, window shop and the like, annual maximum gust speed should not exceed 16 metres per second;
- In areas where pedestrians are involved in stationary short-exposure activities such as window shopping, standing or sitting (including areas such as bus stops, public open space and private open space), the annual maximum gust speed should not exceed 13 metres per second;
- In areas for stationary long-exposure activity, such as outdoor dining, the annual maximum gust speed should not exceed 10 metres per second; and
- The report is to be prepared by a suitably qualified engineer.

These controls are consistent with adopted DCP controls for other station precincts (Showground and Castle Hill North).

Overshadowing
No detailed overshadowing analysis has been provided for the Bella Vista Precinct. This should be submitted for review.

Urban Tree Canopy
The provision of street trees is not considered sufficient (e.g. spacing of 15 metres). Trees should be spaced a maximum of 10 metres apart with large canopy species to support the 'Garden Shire' character and minimise environmental heat impacts.

Car Parking
Concern is raised with respect to the proposed parking rates (0.6 – 1.4 spaces per unit, 1 visitor space per 10 units and 1 space per 145m^2 of commercial gross floor area). It is recommended that parking rates for residential flat buildings be included within the Urban Design Guidelines which are consistent with Council's housing diversity provision (1 space per apartment and 1 visitor space per 5 apartments). It is further recommended that parking rates be considered for commercial uses which are more in line with current requirements within the Shire (Council's current 'Commercial Centres' rate is 1 space per 40m^2).

Subdivision
The SSDA includes the subdivision of the proposed public domain areas but does not include any physical works. The mechanism for the embellishment of these spaces which are being created needs to be clarified as part of this process, especially as it is the development itself which drives the need for these public domain areas.

The subdivision plan should be prepared by a registered surveyor. If plans created by an architect are relied upon it should be more clearly dimensioned with respect to the areas/boundaries proposed.

Ownership of the two 'riparian breakaway spaces' in Kellyville should be clarified regarding Council or Sydney Water ownership.

- ***Water Management***

Orderly Development
The SSDAs need to consider orderly development in relation to the required stormwater drainage network and flood levels. It is acknowledged that staged development is proposed, however further progression of the SSDAs and future Development Applications need to consider the management of stormwater and flooding with consideration to proposed filling of the land.

Soil Contamination
Due to potential soil contamination, future development applications must include conditions that all soil is to be tested to determine suitability for re-use.

Flood Planning Levels
Both SSDAs consider a flood planning level of 500mm above the 100 year Average Recurrence Interval (ARI) overland flow levels. A flood planning level against the 100 year ARI levels in Elizabeth Macarthur Creek was not specified. The justification given was that the developable land can be filled up to, or above the 100 year ARI level. Nevertheless, a freeboard of 500mm from the 100 year ARI in Elizabeth Macarthur Creek should be adhered to.

On-Site Detention
The SSDAs propose that on-site detention is not required due to the minimal change in flood levels expected as a result of the proposed development with predicted 90%-100% imperviousness. The minimal impact was stated to be approximately 20mm at the most impacted location. Further submission should be made which details and/or models how the determination of 20mm was calculated. Without review of this information Council is unable to support this claim. Regardless of flood impact, to reduce erosive impact and instability within the waterway corridor as a result of the proposed developments increased imperviousness, on-site detention ought to be considered.

Gross Pollutant Traps
The SSDA's propose Gross Pollutant Traps (GPTs) at multiple locations along Elizabeth Macarthur Creek to treat stormwater before being discharged to the watercourse. The likely number and locations needs to be demonstrated. Additionally, confirmation with respect to the asset owner of the GPTs and responsibility for the ongoing management and maintenance is required.

Tree Pits
Both SSDAs propose tree pits. Consideration should be given to their design, location and number permitted with conditions likely to be recommended as part of future development applications. Additionally, review of the submitted documentation in support of the SSDAs found that there is inconsistency across the documentation in regard to the proposed spacing of tree pits.

The Stormwater Management Plans submitted in support of the SSDAs nominate the modelling details of the proposed tree pits. The details presented indicate a filter area greater than the surface area which cannot be the case. All numbers used in the modelling of Water Sensitive Urban Design measures need to be reviewed and amended as necessary.

Stormwater Re-Use
Further iterations of the proposals will need to provide a water balance for the proposed stormwater re-use for the irrigation of district open space. It is acknowledged that a 1300L tank is proposed and modelled for the Bella Vista precinct. For Bella Vista more specifically, the Stormwater Management Plan needs to address potential groundwater influences and constraints in relation to the proposed WSUD measures.

The Kellyville Station Precinct Stormwater Management Plan (SMP) proposes that the neighbourhood park between Blocks C and D is to be connected to a rainwater re-use tank for irrigation purposes. This is not supported and this rainwater tank and re-use system is to be removed from the MUSIC model for the precinct and the pollution reduction achievements re-calculated.

Riparian Assessment
A riparian assessment for the Bella Vista precinct should be submitted, similar to that provided for Kellyville. Further progression of the Kellyville precinct SSDA and future Development Applications ought to comply with mitigation measures specified in the riparian assessment completed by EcoLogical Australia in support of the Kellyville precinct SSDA.

Stormwater Harvesting
It is noted that, without further information, Council will not accept ownership or management responsibility of any assets associated with Sydney Water's (conceptual) regional stormwater harvesting pipeline or related drainage infrastructure.

- ***Traffic and Transport***

Connectivity with Private / Other Government Land
The SSDAs should outline how the proposed road network/layout could integrate with any future road network on the land not included as part of the current proposals. These could be shown as 'potential future connections'. Additionally, clarification is needed of which roads are proposed to be provided as part of the current SSDAs. The 'Plans for Approval' and various figures throughout the documentation show certain roads on land outside of the red SSDA boundary which is not within Landcom's control.

Road Hierarchy
It is unclear what road types are being proposed, as such a clear road hierarchy needs to be developed. Any public road should comprise of a verge width of 3.5m, except where a wider verge is necessary for a bike path. Narrower 1m verge may be appropriate next to Elizabeth McArthur Creek dependent on stormwater elements installed along this road edge.

Intersections

Median strips along Mawson Avenue and Celebration Drive should be considered. Both roads are 20m wide punctuated by many east-west local roads which have the potential to affect access through the precinct.

The amount of additional land which may be required to facilitate identified intersection upgrades has not been specified. Land-take in association with upgrades at the intersections of Old Windsor Road and Celebration Drive and Samantha Riley Drive and Decora Drive should be accounted for in plans.

- ***Biodiversity***

The proposed developments in Bella Vista and Kellyville Precincts will impact on 1.57ha and 2.05ha respectively of Cumberland Plain Woodland, of which 0.42ha and 1.85ha respectively meets the criteria for listing under the *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act). Clearing of this woodland may result in serious and irreversible impact.

Within the Kellyville Precinct, it is not clear that the proposal has been designed to attempt to avoid impacts to Cumberland Plain Woodland or minimise its impact, with 98% of the Cumberland Plain Woodland present within the study area to be impacted.

Before approval, consideration should be given to exploring options to retain additional Cumberland Plain Woodland or if the proposal does not change, mitigating the loss of Cumberland Plain Woodland via offsets in the Blacktown or Hills Shire LGA. Additional offsets may be required to address indirect impacts such as increases in sedimentation or change in surface flow of water and evidence of this should be demonstrated in the BDAR.

- ***Waste Servicing***

All future roads must be able to accommodate Council's standard 12.5m long Heavy Rigid Vehicle (AS2890.2) to circulate the road network. Waste collection is unlikely to be supported in narrow laneways (less than 10 metres total reservation width). This requirement should be included as a control within the Urban Design Guidelines.

A control should also be included within the Urban Design Guidelines that where roads terminate, a cul-de-sac turning head with a minimum diameter of 19 metres must be provided to enable efficient waste collection with no reversing. A further control should be included that all developments should provide for on-site waste collection either at grade or via a basement and waste collection vehicles must be able to enter and exit the site in a forward direction.

Should you wish to discuss any of the matters raised within this letter further, please do not hesitate to contact Nicholas Carlton, Manager – Forward Planning on 9843 0416.

Yours faithfully

Michael Edgar
GENERAL MANAGER

EXHIBIT 2 - NRT STORMWATER CATCHMENT PLANS - KELLYVILLE

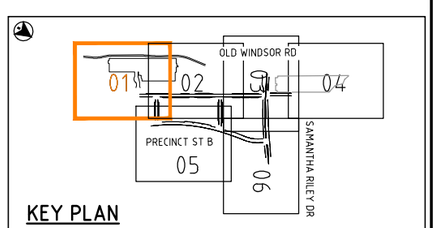
LEGEND

- BOUNDARY (PROJECT SITE)
- BOUNDARY (TEMPORARY AREA)
- BOUNDARY (AIR SPACE)
- LMA BOUNDARY
- RAIL ALIGNMENT (OVERHEAD)
- ROAD CONTROL LINE
- RW — RETAINING WALL
- FORMATION DRAINAGE PIT
- SCOUR PROTECTION
- DRAINAGE CATCHMENT BOUNDARY
- A04/5 0.0607ha — DRAINAGE CATCHMENTS AREA
- A04/5* — CONTINUATION OF CATCHMENT AREA UNDERNEATH VIADUCT
- OVER LAND FLOW PATH
- IMP = 95% — FRACTION IMPERVIOUS

NOTES

1. FOR DRAINAGE GENERAL NOTES REFER TO DRAWING NWRLOTS-NRT-KVE-CW-DRG-461311 TO 461316.
2. ALL CATCHMENT IMPERVIOUSNESS ADOPTED FOR THE DESIGN IS 95% UNO.

KEY PLAN



APPROVED FOR CONSTRUCTION

REV	BY	DATE	DESCRIPTION	APPD
00	MH	28/10/16	DESIGN LOT 1004 - APPROVED FOR CONSTRUCTION	GT

SCALES: 1:500 FULL SIZE A1

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING

INDEPENDENT CERTIFIER CERTIFICATE: NWRLOTS-OIC-KVE-CE-CER-000001

CLIENT: NSW GOVERNMENT Transport for NSW

SERVICE PROVIDERS: northwest rapid transit — caring for life's journeys

DRAWN	M.HOFFMAN
DESIGNED	J.TOTH
DRG CHECK	A.T.WILSON
DESIGN CHECK	G.THOMAS
APPROVED	N.MCNALLY 08/09/16

NORTH WEST RAIL LINK

KELLYVILLE STATION
DRAINAGE
DRAINAGE CATCHMENT PLAN
SHEET 1

STATUS: FOR CONSTRUCTION | SHEET 1 OF 6 | ©

DRG No NWRLOTS-NRT-KVE-DR-DRG-461771 | NWRL REV 00

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing.

Cad File: C:\PRINT\NWRLOTS-NRT-KVE-DR-DRG-461771.dwg Plot Date: 28/10/16 - 11:05 100mm AT FULL SIZE

EXHIBIT 2 - NRT STORMWATER CATCHMENT PLANS - KELLYVILLE

LEGEND

- BOUNDARY (PROJECT SITE)
- BOUNDARY (TEMPORARY AREA)
- BOUNDARY (AIR SPACE)
- LMA BOUNDARY
- RAIL ALIGNMENT (OVERHEAD)
- ROAD CONTROL LINE
- RW — RW — RETAINING WALL
- FORMATION DRAINAGE PIT
- SCOUR PROTECTION
- DRAINAGE CATCHMENT BOUNDARY
- A04/5 0.0607ha — DRAINAGE CATCHMENTS AREA
- A04/5* — CONTINUATION OF CATCHMENT AREA UNDERNEATH VIADUCT
- OVER LAND FLOW PATH
- IMP = 95% — FRACTION IMPERVIOUS

JOINS DRAWING NWRLOTS-NRT-KVE-DR-DRG-461771

JOINS DRAWING NWRLOTS-NRT-KVE-DR-DRG-461773

C01/1 0.1385ha (IMP=10%)

B13/1 0.3417ha (IMP=30%)

C01/2 0.0387ha (IMP=40%)

C01/3 0.0558ha (IMP=40%)

C02/1 0.0280ha

D02/1 0.0160ha

D03/1 0.0323ha

B08/1 0.0267ha

B09A/1 0.2354ha

B10/1 0.0180ha

B11/1 0.0183ha

B12/1 0.0186ha

B14/1 0.0650ha

B15/1 0.0340ha

B16/1 0.0325ha

B16/2 0.0168ha

B07/5 0.0286ha

B07/8 0.0109ha

B07/9 0.0073ha

B13/4 0.0095ha

B07/7 0.0317ha

B07/11 0.0551ha

B16/3 0.0021ha

D04/1 0.0757ha

B06/2 0.0570ha

B06/3 0.0344ha

B06/4 0.0267ha

B06/5 0.0219ha

B07/12 0.0232ha

B07/13 0.0375ha

B13/6 0.0383ha

D06/2 0.0386ha

D06/3 0.0366ha

B01/8 0.0140ha

B13/7 0.0185ha

B01/3 0.0326ha

B01/4 0.0424ha

B01/5 0.0365ha

B01/6 0.0447ha

B01/7 0.0301ha

D06/1 0.0387ha

D07/1 0.0384ha

B05/1 0.0494ha

B01/10 0.0390ha

B01/9 0.0084ha

PRECINCT STREET F

300

200

100

PRECINCT STREET A

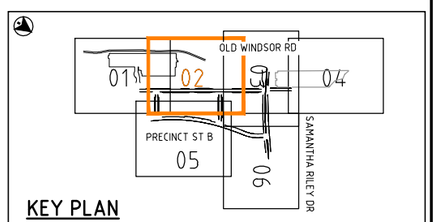
PRECINCT STREET D

JOINS DRAWING NWRLOTS-NRT-KVE-DR-DRG-461775

PRECINCT STREET F

NOTES

1. FOR DRAINAGE GENERAL NOTES REFER TO DRAWING NWRLOTS-NRT-KVE-CW-DRG-461311 TO 461316.
2. ALL CATCHMENT IMPERVIOUSNESS ADOPTED FOR THE DESIGN IS 95% UNO.



KEY PLAN

APPROVED FOR CONSTRUCTION

REV	BY	DATE	DESCRIPTION	APPD
00	MH	28/10/16	DESIGN LOT 1004 - APPROVED FOR CONSTRUCTION	GT

SCALES: 1:500 FULL SIZE A1 (5 0 5 10 15m)

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING

INDEPENDENT CERTIFIER CERTIFICATE: NWRLOTS-OIC-KVE-CE-CER-000001

CLIENT: NSW GOVERNMENT Transport for NSW

SERVICE PROVIDERS: northwest rapid transit — caring for life's journeys

DRAWN M.HOEFMAN

DESIGNED J.TOTH

DRG CHECK A.T.WILSON

DESIGN CHECK G.THOMAS

APPROVED N.MCNALLY 08/09/16

NORTH WEST RAIL LINK

KELLYVILLE STATION

DRAINAGE

DRAINAGE CATCHMENT PLAN

SHEET 2

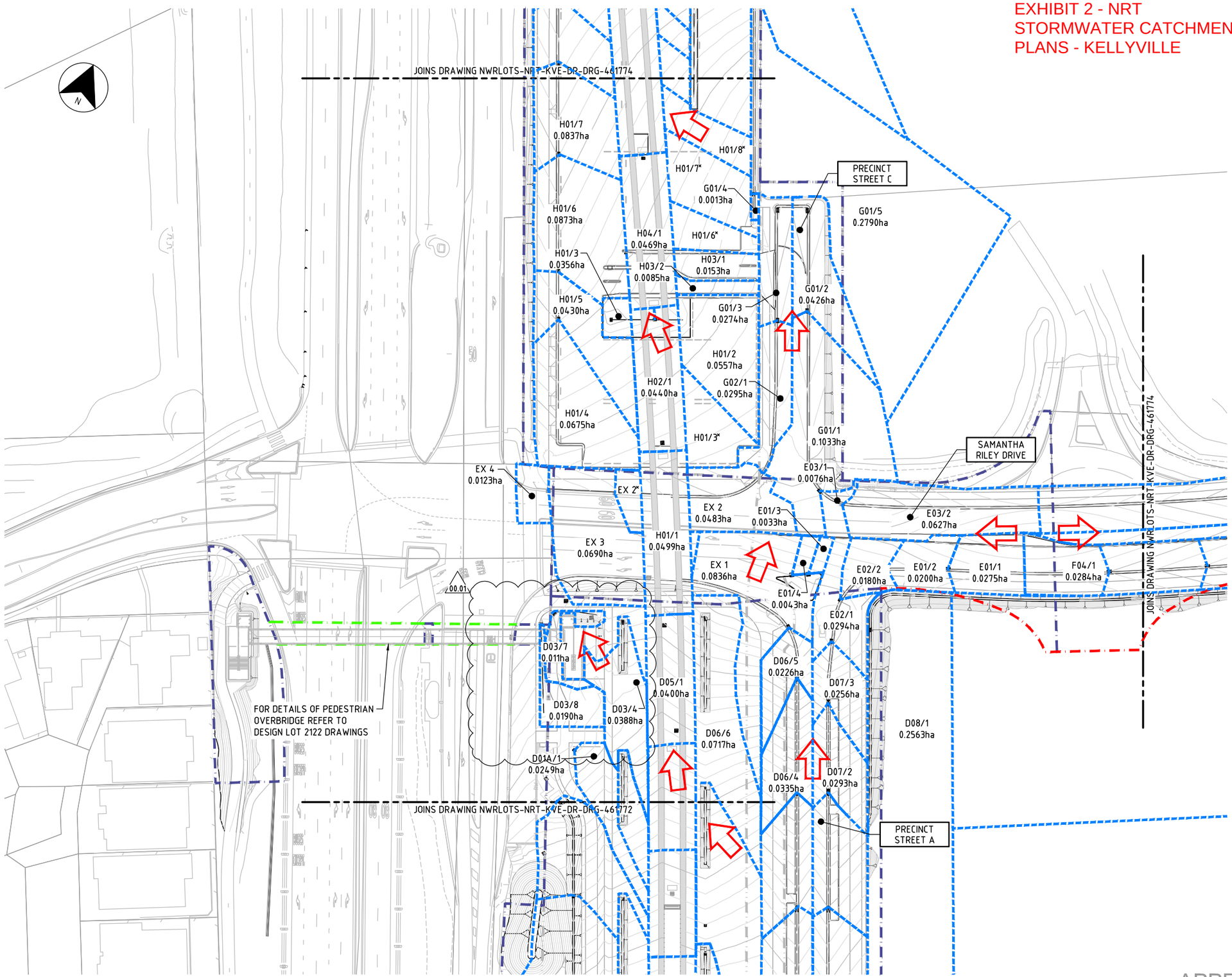
STATUS: FOR CONSTRUCTION | SHEET 2 OF 6 | ©

DRG No NWRLOTS-NRT-KVE-DR-DRG-461772 | NWRL REV 00

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing.

Cad File: C:\PRINT\NWRLOTS-NRT-KVE-DR-DRG-461772.dwg Plot Date: 28/10/16 - 11:06 100mm AT FULL SIZE

EXHIBIT 2 - NRT STORMWATER CATCHMENT PLANS - KELLYVILLE

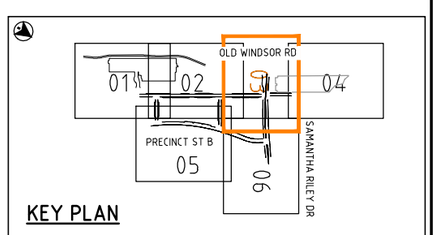


LEGEND

- BOUNDARY (PROJECT SITE)
- BOUNDARY (TEMPORARY AREA)
- BOUNDARY (AIR SPACE)
- LMA BOUNDARY
- RAIL ALIGNMENT (OVERHEAD)
- ROAD CONTROL LINE
- RW — RW — RETAINING WALL
- FORMATION DRAINAGE PIT
- SCOUR PROTECTION
- DRAINAGE CATCHMENT BOUNDARY
- A04/5 0.0607ha — DRAINAGE CATCHMENTS AREA
- A04/5* — CONTINUATION OF CATCHMENT AREA UNDERNEATH VIADUCT
- OVER LAND FLOW PATH
- IMP = 95% — FRACTION IMPERVIOUS

NOTES

1. FOR DRAINAGE GENERAL NOTES REFER TO DRAWING NWRLOTS-NRT-KVE-CW-DRG-461311 TO 461316.
2. ALL CATCHMENT IMPERVIOUSNESS ADOPTED FOR THE DESIGN IS 95% UNO.



KEY PLAN

APPROVED FOR CONSTRUCTION

REV	BY	DATE	DESCRIPTION	APPD
00	MH	28/10/16	DESIGN LOT 1004 - APPROVED FOR CONSTRUCTION	GT
00.01	PA	03/02/17	DESIGN LOT 1004 - MINOR CHANGES TO FINAL DESIGN - ECC-490418	GT

SCALES: 5 0 5 10 15m — 1:500 FULL SIZE A1

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING

INDEPENDENT CERTIFIER CERTIFICATE: NWRLOTS-OIC-KVE-CE-CER-000001

CLIENT: NSW GOVERNMENT Transport for NSW

SERVICE PROVIDERS: northwest rapid transit — caring for life's journeys

DRAWN P.MCAROLE
DESIGNED J.TOTH
DRG CHECK A.BRISCOE
DESIGN CHECK G.THOMAS
APPROVED P.FINNEGAN 07/02/17

NORTH WEST RAIL LINK

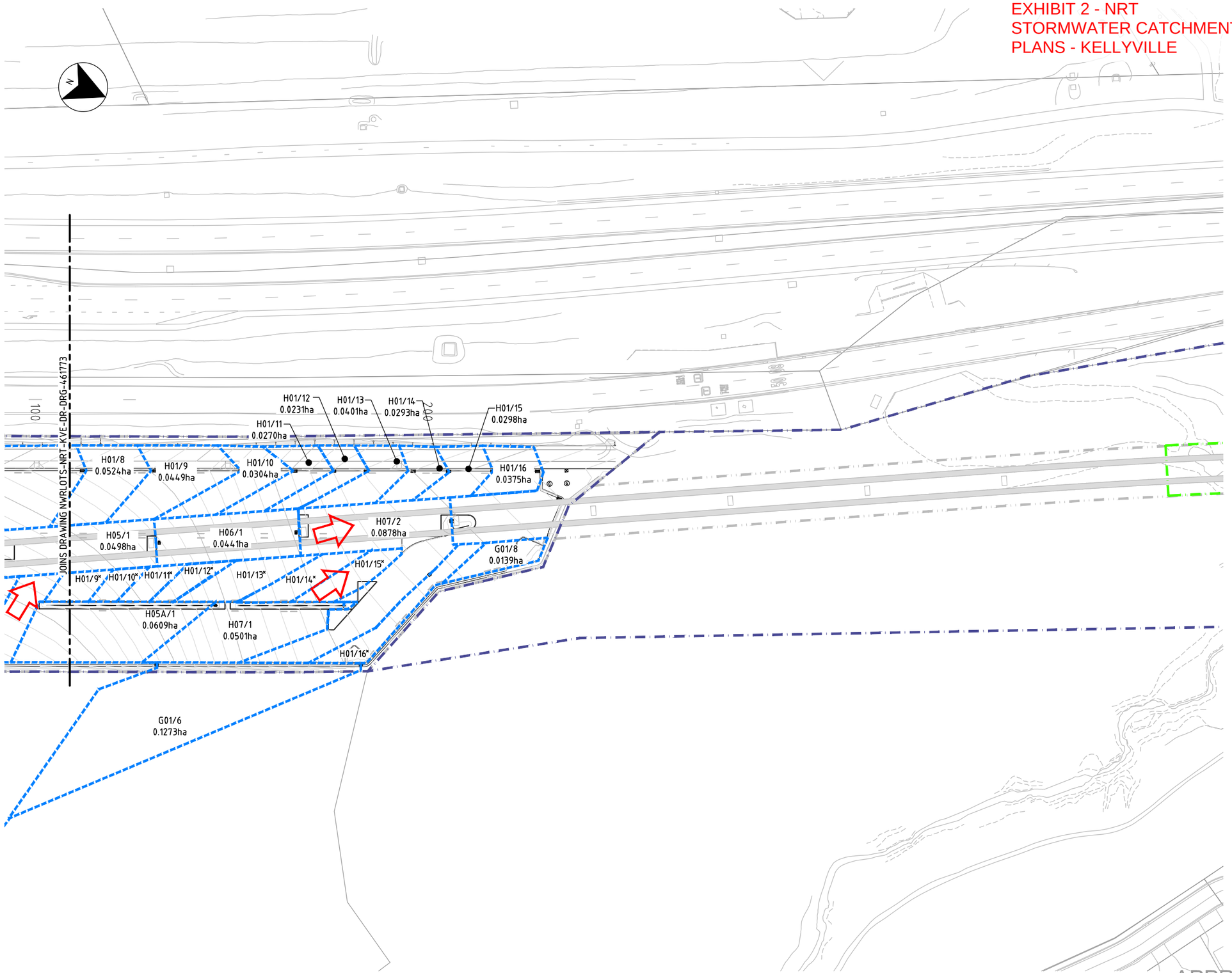
KELLYVILLE STATION
DRAINAGE
DRAINAGE CATCHMENT PLAN
SHEET 3

STATUS: FOR CONSTRUCTION | SHEET 3 OF 6 | ©

DRG No NWRLOTS-NRT-KVE-DR-DRG-461773 | NWRL REV 00.01

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing.

EXHIBIT 2 - NRT STORMWATER CATCHMENT PLANS - KELLYVILLE

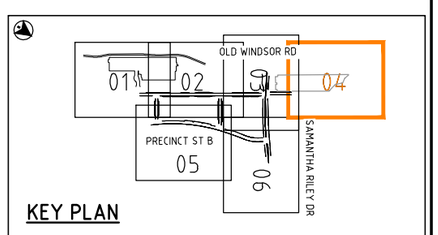


LEGEND

- BOUNDARY (PROJECT SITE)
- BOUNDARY (TEMPORARY AREA)
- BOUNDARY (AIR SPACE)
- LMA BOUNDARY
- RAIL ALIGNMENT (OVERHEAD)
- ROAD CONTROL LINE
- RW — RW — RETAINING WALL
- FORMATION DRAINAGE PIT
- SCOUR PROTECTION
- DRAINAGE CATCHMENT BOUNDARY
- A04/5 0.0607ha — DRAINAGE CATCHMENTS AREA
- A04/5ˣ — CONTINUATION OF CATCHMENT AREA UNDERNEATH VIADUCT
- OVER LAND FLOW PATH
- IMP = 95% — FRACTION IMPERVIOUS

NOTES

1. FOR DRAINAGE GENERAL NOTES REFER TO DRAWING NWRLOTS-NRT-KVE-CW-DRG-461311 TO 461316.
2. ALL CATCHMENT IMPERVIOUSNESS ADOPTED FOR THE DESIGN IS 95% UNO.



KEY PLAN

APPROVED FOR CONSTRUCTION

REV	BY	DATE	DESCRIPTION	APPD
00	MH	28/10/16	DESIGN LOT 1004 - APPROVED FOR CONSTRUCTION	GT

SCALES: 5 0 5 10 15m — 1:500 FULL SIZE A1

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING

INDEPENDENT CERTIFIER CERTIFICATE: NWRLOTS-OIC-KVE-CE-CER-000001

CLIENT: NSW GOVERNMENT Transport for NSW

SERVICE PROVIDERS: northwest rapid transit — caring for life's journeys

DRAWN M.HOEFMAN
DESIGNED J.TOTH
DRG CHECK A.T.WILSON
DESIGN CHECK G.THOMAS
APPROVED N.MCNALLY 08/09/16

NORTH WEST RAIL LINK

KELLYVILLE STATION
DRAINAGE
DRAINAGE CATCHMENT PLAN
SHEET 4

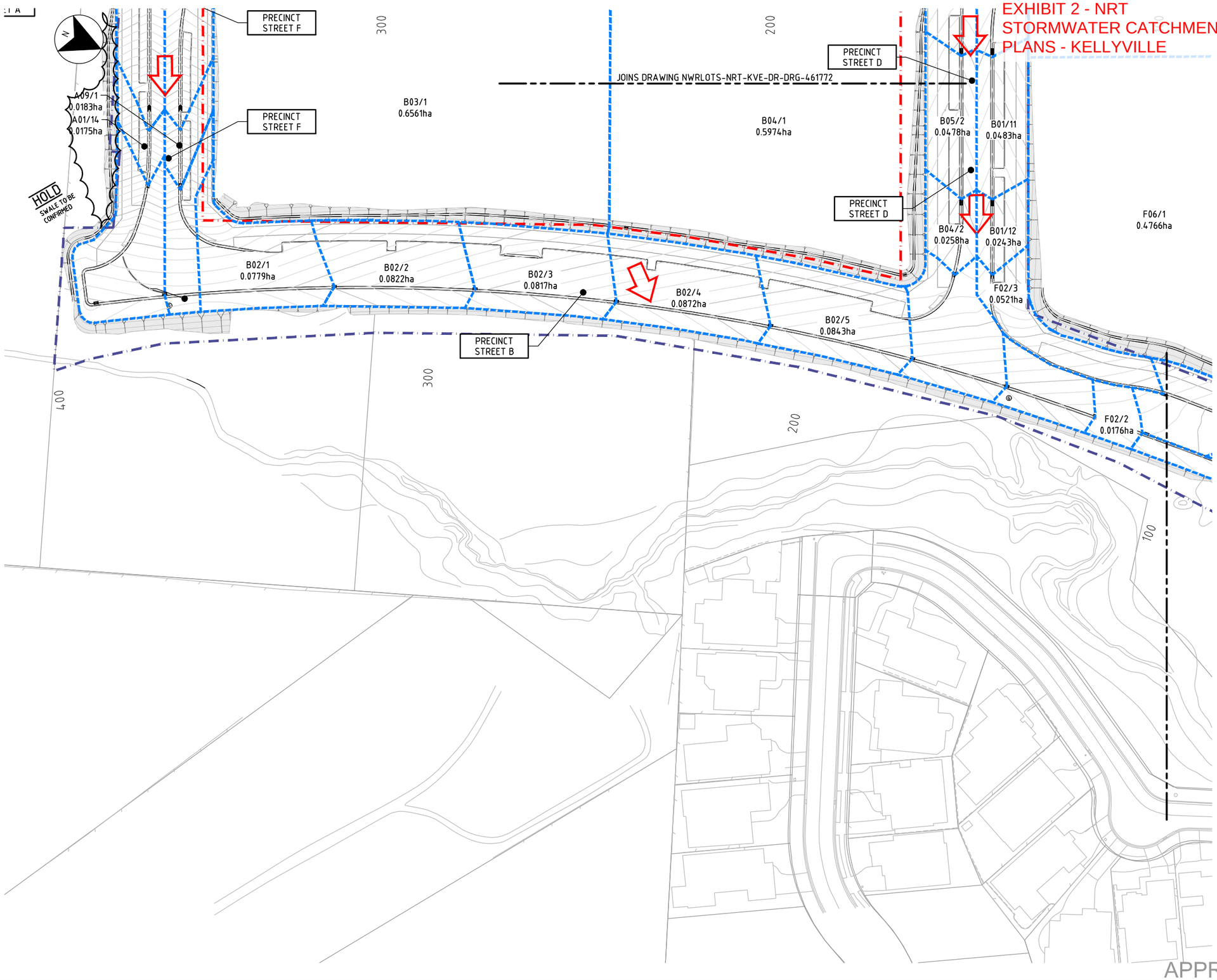
STATUS: FOR CONSTRUCTION | SHEET 4 OF 6 | ©

DRG No NWRLOTS-NRT-KVE-DR-DRG-461774 | NWRL REV 00

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing.

100mm AT FULL SIZE Plot Date: 28/10/16 - 11:07 Cad File: C:\PRINT\NWRLOTS-NRT-KVE-DR-DRG-461774.dwg

EXHIBIT 2 - NRT STORMWATER CATCHMENT PLANS - KELLYVILLE

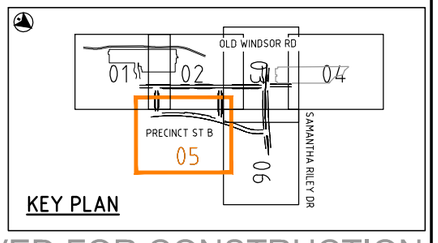


LEGEND

- BOUNDARY (PROJECT SITE)
- BOUNDARY (TEMPORARY AREA)
- BOUNDARY (AIR SPACE)
- LMA BOUNDARY
- RAIL ALIGNMENT (OVERHEAD)
- ROAD CONTROL LINE
- RETAINING WALL (RW — RW)
- FORMATION DRAINAGE PIT
- SCOUR PROTECTION
- DRAINAGE CATCHMENT BOUNDARY
- A04/5 0.0607ha — DRAINAGE CATCHMENTS AREA
- A04/5* — CONTINUATION OF CATCHMENT AREA UNDERNEATH VIADUCT
- OVER LAND FLOW PATH
- IMP = 95% — FRACTION IMPERVIOUS

NOTES

1. FOR DRAINAGE GENERAL NOTES REFER TO DRAWING NWRLOTS-NRT-KVE-CW-DRG-461311 TO 461316.
2. ALL CATCHMENT IMPERVIOUSNESS ADOPTED FOR THE DESIGN IS 95% UNO.



KEY PLAN

APPROVED FOR CONSTRUCTION

REV	BY	DATE	DESCRIPTION	APPD
00	MH	28/10/16	DESIGN LOT 1004 - APPROVED FOR CONSTRUCTION	GT

SCALES: 5 0 5 10 15m — 1:500 FULL SIZE A1

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING

INDEPENDENT CERTIFIER CERTIFICATE: NWRLOTS-OIC-KVE-CE-CER-000001

CLIENT: NSW GOVERNMENT Transport for NSW

SERVICE PROVIDERS: northwest rapid transit — caring for life's journeys

DRAWN M.HOFFMAN
DESIGNED J.TOTH
DRG CHECK A.T.WILSON
DESIGN CHECK G.THOMAS
APPROVED N.MCNALLY 08/09/16

NORTH WEST RAIL LINK

KELLYVILLE STATION
DRAINAGE
DRAINAGE CATCHMENT PLAN
SHEET 5

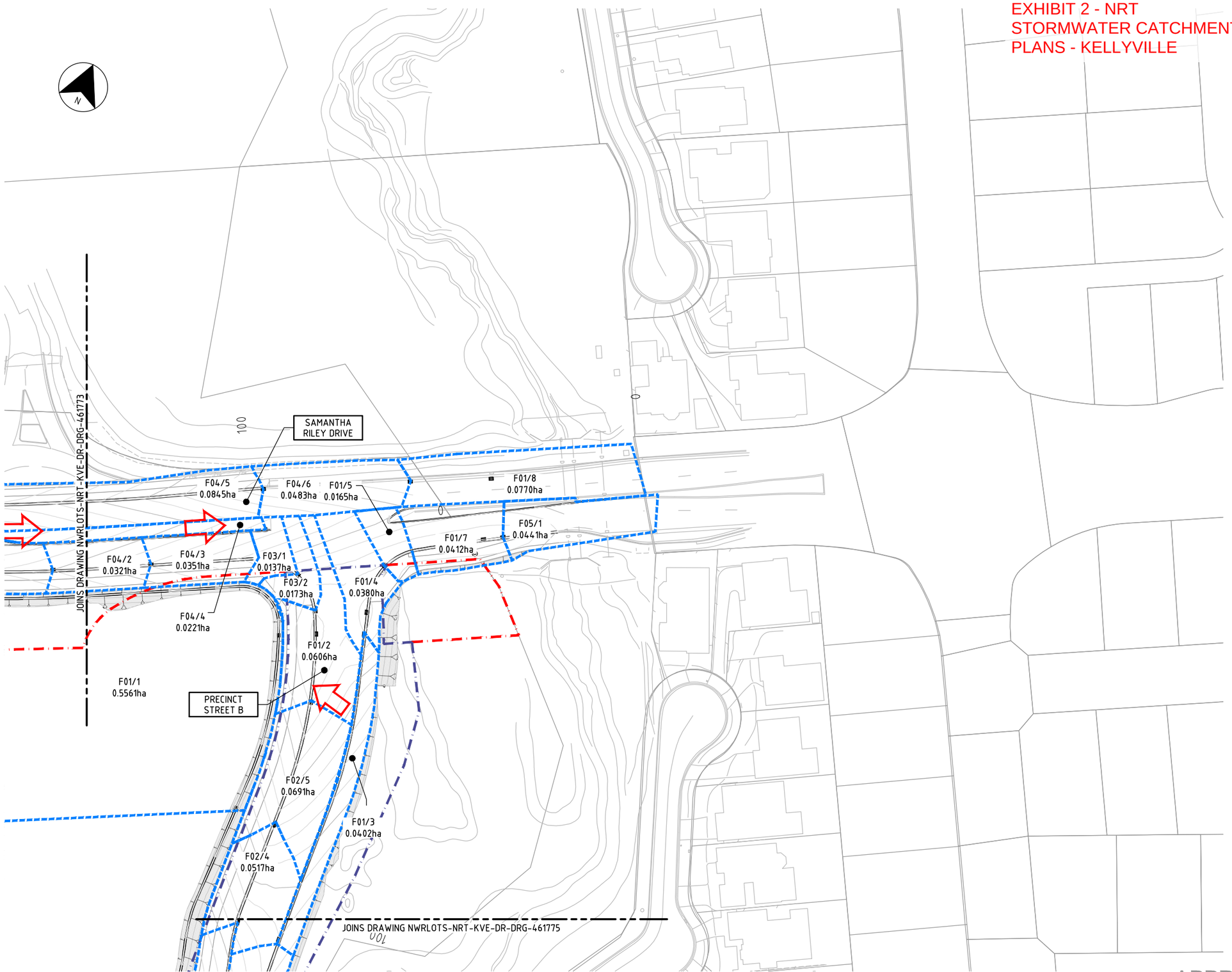
STATUS: FOR CONSTRUCTION | SHEET 5 OF 6 | ©

DRG No NWRLOTS-NRT-KVE-DR-DRG-461775 | NWRL REV 00

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing.

100mm AT FULL SIZE Plot Date: 28/10/16 - 11:07 Cad File: C:\PRINT\NWRLOTS-NRT-KVE-DR-DRG-461775.dwg

EXHIBIT 2 - NRT STORMWATER CATCHMENT PLANS - KELLYVILLE

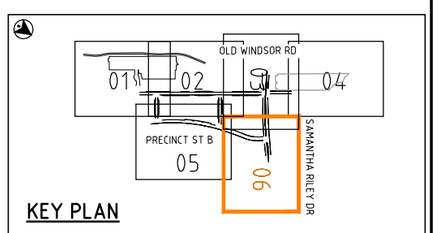


LEGEND

- BOUNDARY (PROJECT SITE)
- BOUNDARY (TEMPORARY AREA)
- BOUNDARY (AIR SPACE)
- LMA BOUNDARY
- RAIL ALIGNMENT (OVERHEAD)
- ROAD CONTROL LINE
- RW — RW — RETAINING WALL
- FORMATION DRAINAGE PIT
- SCOUR PROTECTION
- DRAINAGE CATCHMENT BOUNDARY
- A04/5 0.0607ha — DRAINAGE CATCHMENTS AREA
- A04/5* — CONTINUATION OF CATCHMENT AREA UNDERNEATH VIADUCT
- OVER LAND FLOW PATH
- IMP = 95% — FRACTION IMPERVIOUS

NOTES

1. FOR DRAINAGE GENERAL NOTES REFER TO DRAWING NWRLOTS-NRT-KVE-CW-DRG-461311 TO 461316.
2. ALL CATCHMENT IMPERVIOUSNESS ADOPTED FOR THE DESIGN IS 95% UNO.



KEY PLAN

APPROVED FOR CONSTRUCTION

REV	BY	DATE	DESCRIPTION	APPD
00	MH	28/10/16	DESIGN LOT 1004 - APPROVED FOR CONSTRUCTION	GT

SCALES: 5 0 5 10 15m — 1:500 FULL SIZE A1

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING

INDEPENDENT CERTIFIER CERTIFICATE: NWRLOTS-OIC-KVE-CE-CER-000001

CLIENT: NSW GOVERNMENT Transport for NSW

The information shown on this drawing is for the purposes of the North West Rail Link (NWRL) Project only. No warranty is given or implied as to its suitability for any other purpose. The Service Providers accept no liability arising from the use of this drawing and the information shown thereon for any purpose other than the North West Rail Link (NWRL) Project.

SERVICE PROVIDERS: northwest rapid transit — caring for life's journeys

DRAWN M.HOFFMAN
DESIGNED J.TOTH
DRG CHECK A.T.WILSON
DESIGN CHECK G.THOMAS
APPROVED N.MCNALLY 08/09/16

NORTH WEST RAIL LINK

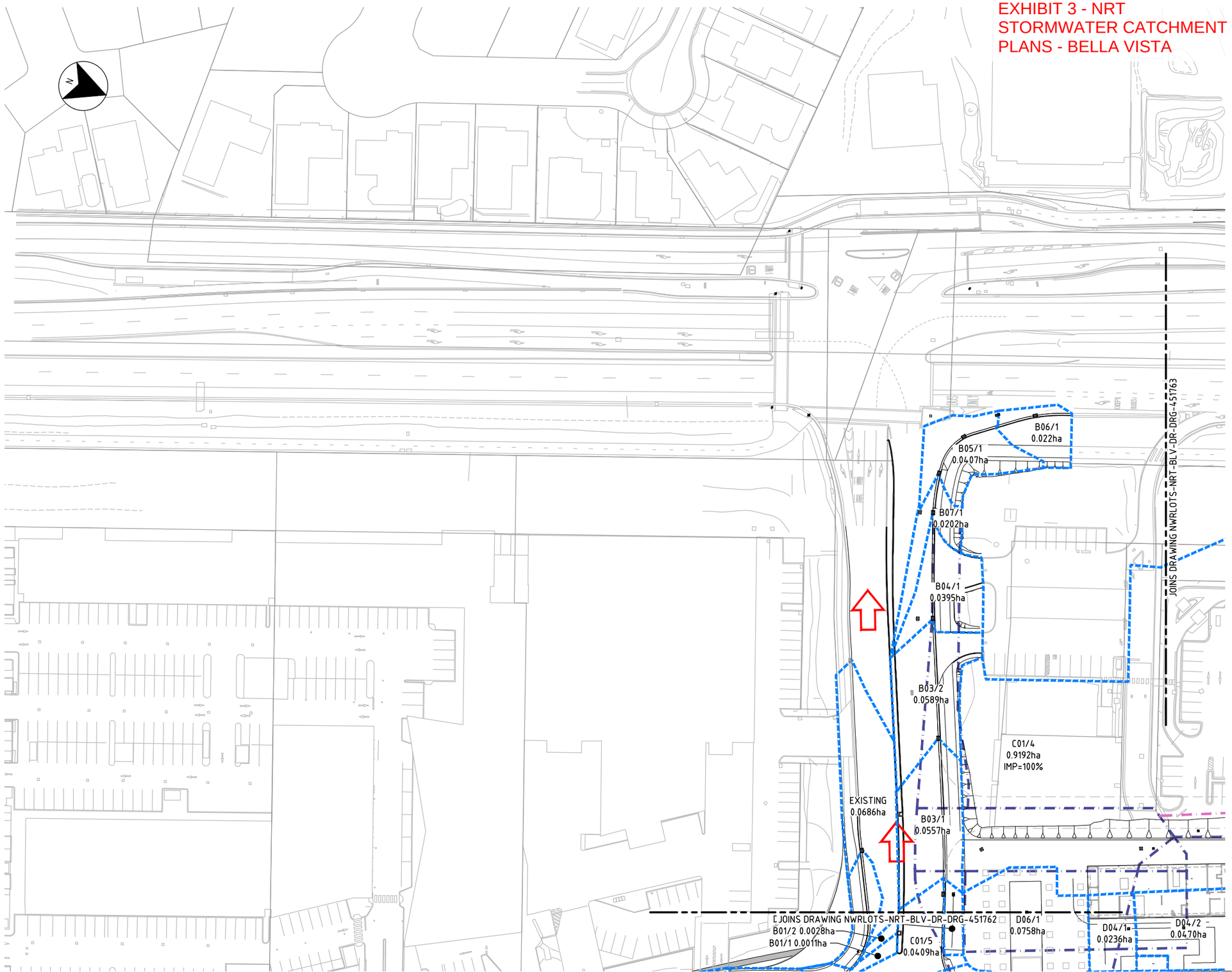
KELLYVILLE STATION
DRAINAGE
DRAINAGE CATCHMENT PLAN
SHEET 6

STATUS: FOR CONSTRUCTION | SHEET 6 OF 6 | ©

DRG No NWRLOTS-NRT-KVE-DR-DRG-461776 | NWRL REV 00

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing.

EXHIBIT 3 - NRT STORMWATER CATCHMENT PLANS - BELLA VISTA

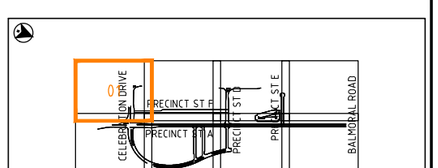


LEGEND

- PROJECT SITE BOUNDARY
- PROJECT SITE TEMPORARY BOUNDARY
- BOUNDARY (AIR SPACE)
- RAIL ALIGNMENT
- RETAINING WALL
- FORMATION DRAINAGE PIT
- SCOUR PROTECTION
- DRAINAGE CATCHMENT BOUNDARY
- A04/5 0.0607ha — DRAINAGE CATCHMENTS AREA
- OVER LAND FLOW PATH
- IMP = 95% — FRACTION IMPERVIOUS

NOTES

1. FOR DRAINAGE GENERAL NOTES REFER TO DRAWING NWRLOTS-NRT-BLV-CW-DRG-451711.
2. ALL CATCHMENT IMPERVIOUSNESS ADOPTED FOR THE DESIGN IS 90% UNO.



KEY PLAN

APPROVED FOR CONSTRUCTION

REV	BY	DATE	DESCRIPTION	APPD
00	AB	12/09/16	DESIGN LOT 1104 - APPROVED FOR CONSTRUCTION	GT

SCALES: 1:500 FULL SIZE A1 (5 0 5 10 15m)

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING

INDEPENDENT CERTIFIER CERTIFICATE: NWRLOTS-OIC-BLV-CE-CER-000001

CLIENT: NSW GOVERNMENT Transport for NSW

SERVICE PROVIDERS: northwest rapid transit — caring for life's journeys

DRAWN A.BLACK
DESIGNED N.CUMMINGS
DRG CHECK A.T.WILSON
DESIGN CHECK G.THOMAS
APPROVED D.C.KEOGH 29/07/16

NORTH WEST RAIL LINK

BELLA VISTA STATION
DRAINAGE
DRAINAGE CATCHMENT PLAN
SHEET 1

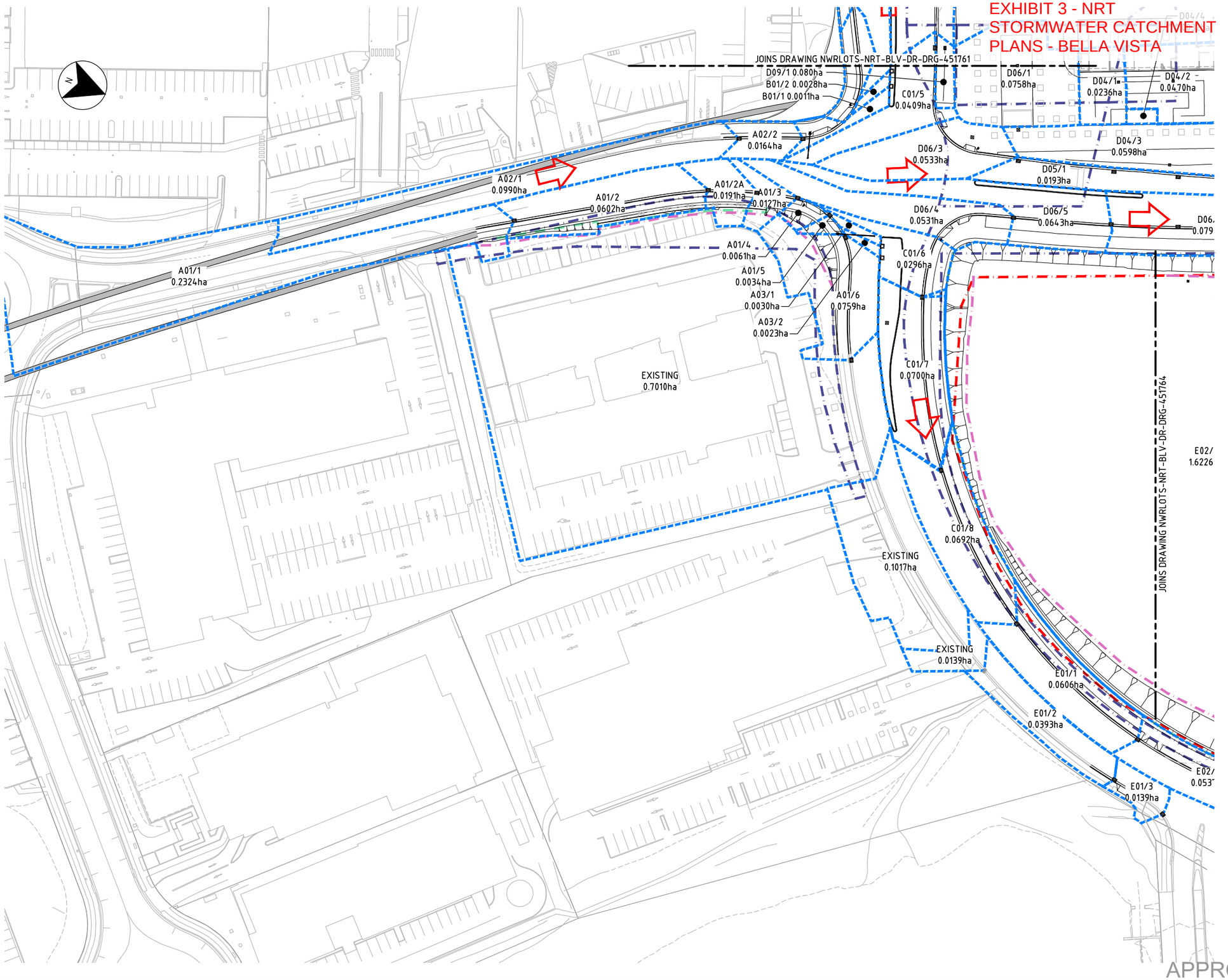
STATUS: FOR CONSTRUCTION | SHEET 1 OF 8 | ©

DRG No NWRLOTS-NRT-BLV-DR-DRG-451761 | NWRL REV 00

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing.

Cad File: C:\PRINT\NWRLOTS-NRT-BLV-DR-DRG-451761.dwg Plot Date: 12/09/16 - 17:47 100mm AT FULL SIZE

EXHIBIT 3 - NRT STORMWATER CATCHMENT PLANS - BELLA VISTA

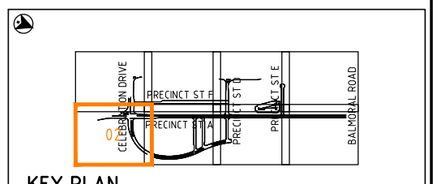


LEGEND

- PROJECT SITE BOUNDARY
- PROJECT SITE TEMPORARY BOUNDARY
- BOUNDARY (AIR SPACE)
- RAIL ALIGNMENT
- RETAINING WALL
- FORMATION DRAINAGE PIT
- SCOUR PROTECTION
- DRAINAGE CATCHMENT BOUNDARY
- A04/5 0.0607ha — DRAINAGE CATCHMENTS AREA
- OVER LAND FLOW PATH
- IMP = 95% — FRACTION IMPERVIOUS

NOTES

1. FOR DRAINAGE GENERAL NOTES REFER TO DRAWING NWRLOTS-NRT-BLV-CW-DRG-451711.
2. ALL CATCHMENT IMPERVIOUSNESS ADOPTED FOR THE DESIGN IS 90% UNO.



KEY PLAN

APPROVED FOR CONSTRUCTION

REV	BY	DATE	DESCRIPTION	APPD
00	AB	12/09/16	DESIGN LOT 1104 - APPROVED FOR CONSTRUCTION	GT

SCALES: 5 0 5 10 15m — 1:500 FULL SIZE A1

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING

INDEPENDENT CERTIFIER CERTIFICATE: NWRLOTS-OIC-BLV-CE-CER-000001

CLIENT: NSW GOVERNMENT Transport for NSW

SERVICE PROVIDERS: northwest rapid transit — caring for life's journeys

DRAWN A.BLACK
DESIGNED N.CUMMINGS
DRG CHECK A.T.WILSON
DESIGN CHECK G.THOMAS
APPROVED D.C.KEOGH 29/07/16

NORTH WEST RAIL LINK

BELLA VISTA STATION
DRAINAGE
DRAINAGE CATCHMENT PLAN
SHEET 2

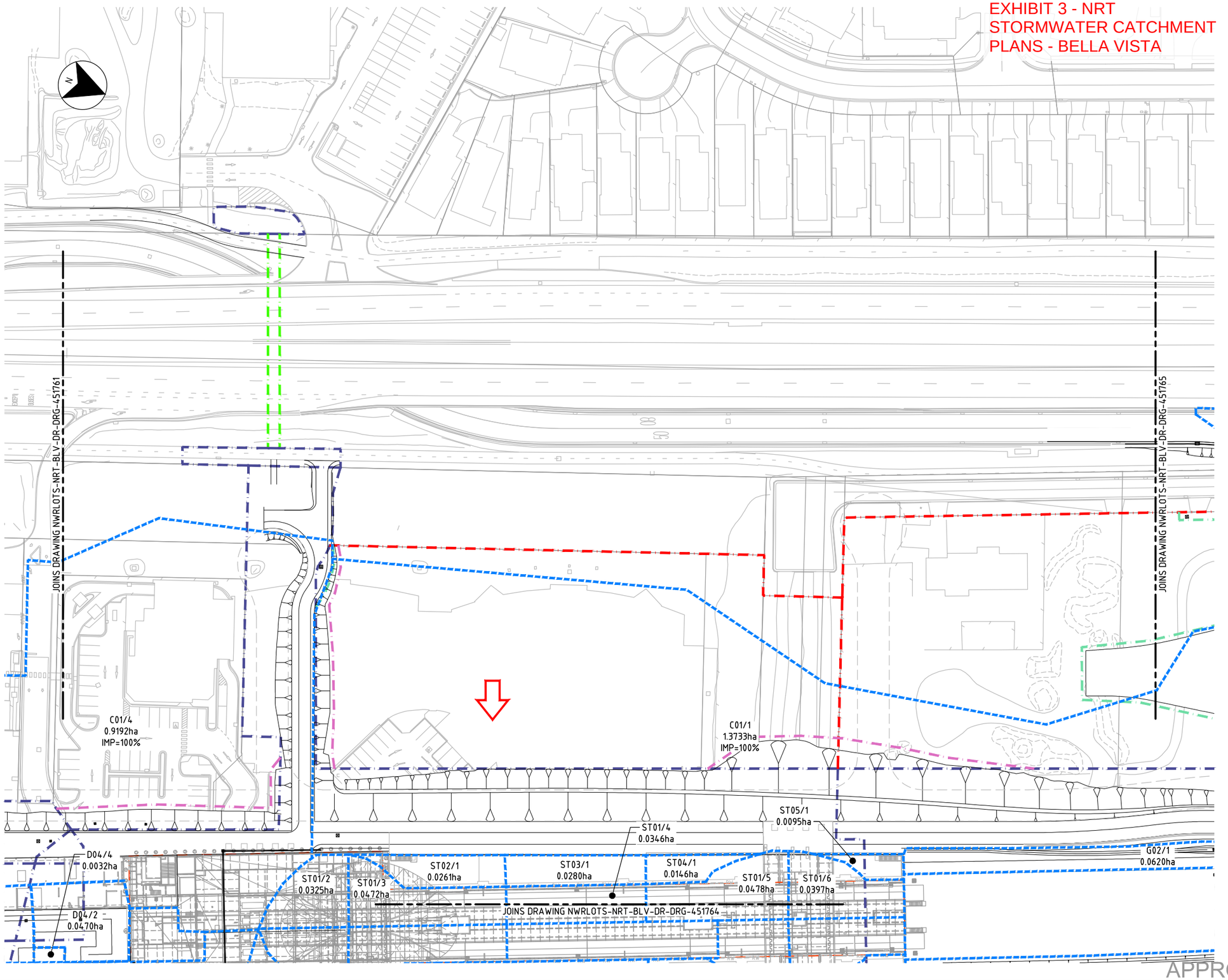
STATUS: FOR CONSTRUCTION | SHEET 2 OF 8 | ©

DRG No NWRLOTS-NRT-BLV-DR-DRG-451762 | NWRL REV 00

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing.

100mm AT FULL SIZE Plot Date: 12/09/16 - 17:48 Cad File: C:\PRINT\NWRLOTS-NRT-BLV-DR-DRG-451762.dwg

EXHIBIT 3 - NRT STORMWATER CATCHMENT PLANS - BELLA VISTA

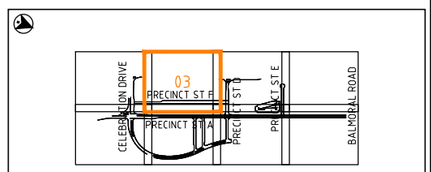


LEGEND

- PROJECT SITE BOUNDARY
- PROJECT SITE TEMPORARY BOUNDARY
- BOUNDARY (AIR SPACE)
- RAIL ALIGNMENT
- RETAINING WALL (RW — RW)
- FORMATION DRAINAGE PIT
- SCOUR PROTECTION
- DRAINAGE CATCHMENT BOUNDARY
- A04/5 0.0607ha — DRAINAGE CATCHMENTS AREA
- OVER LAND FLOW PATH
- IMP = 95% — FRACTION IMPERVIOUS

NOTES

1. FOR DRAINAGE GENERAL NOTES REFER TO DRAWING NWRLOTS-NRT-BLV-CW-DRG-451711.
2. ALL CATCHMENT IMPERVIOUSNESS ADOPTED FOR THE DESIGN IS 90% UNO.



KEY PLAN

APPROVED FOR CONSTRUCTION

REV	BY	DATE	DESCRIPTION	APPD
00	AB	12/09/16	DESIGN LOT 1104 - APPROVED FOR CONSTRUCTION	GT

SCALES: 5 0 5 10 15m — 1:500 FULL SIZE A1

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING

INDEPENDENT CERTIFIER CERTIFICATE: NWRLOTS-OIC-BLV-CE-CER-000001

CLIENT: NSW GOVERNMENT Transport for NSW

SERVICE PROVIDERS: northwest rapid transit — caring for life's journeys

DRAWN	A.BLACK
DESIGNED	N.CUMMINGS
DRG CHECK	A.T.WILSON
DESIGN CHECK	G.THOMAS
APPROVED	D.C.KEOGH 29/07/16

NORTH WEST RAIL LINK

BELLA VISTA STATION
DRAINAGE
DRAINAGE CATCHMENT PLAN
SHEET 3

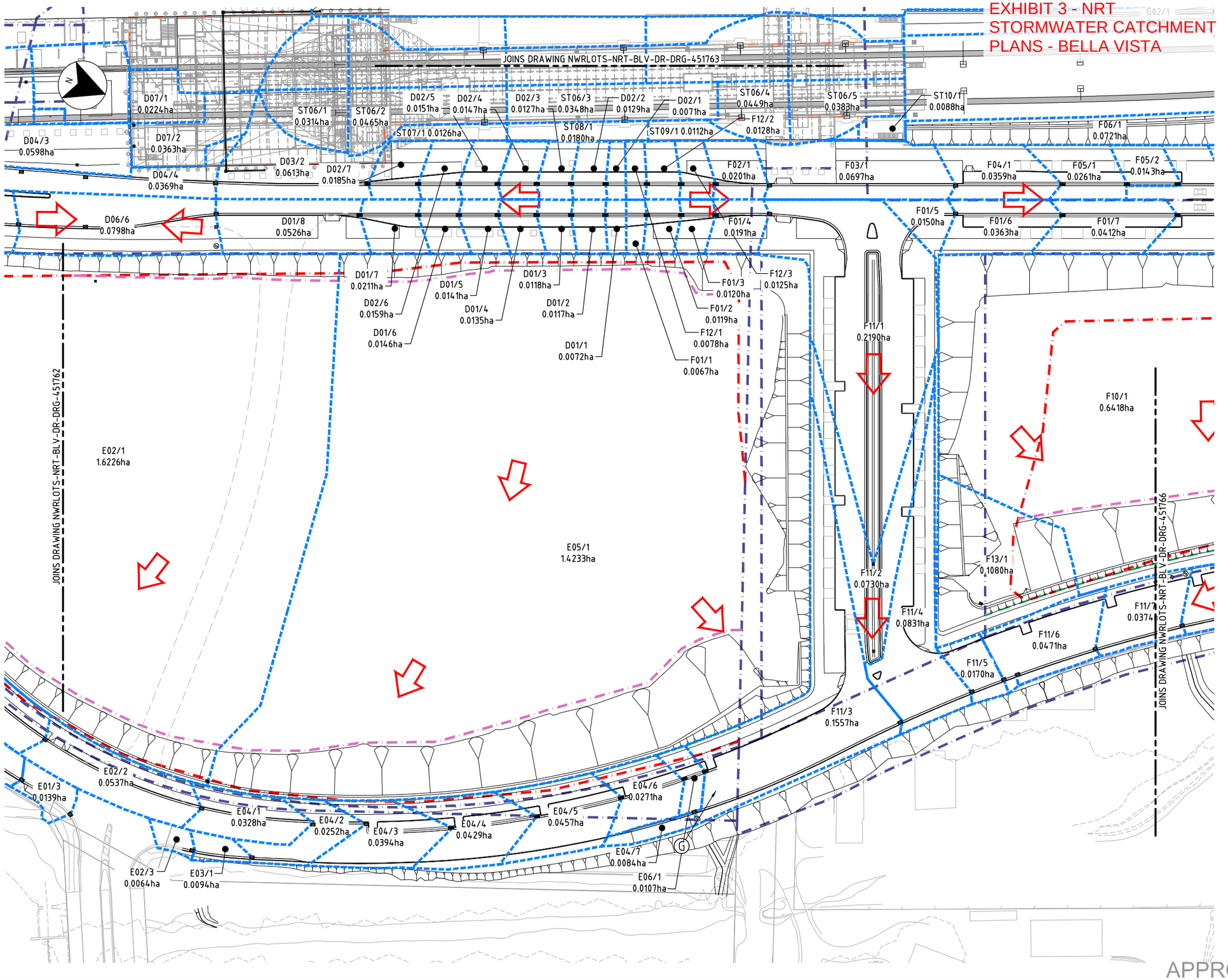
STATUS: FOR CONSTRUCTION | SHEET 3 OF 8 | ©

DRG No NWRLOTS-NRT-BLV-DR-DRG-451763 | NWRL REV 00

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing.

100mm AT FULL SIZE Plot Date: 12/09/16 - 17:48 Cad File: C:\PRINT\NWRLOTS-NRT-BLV-DR-DRG-451763.dwg

EXHIBIT 3 - NRT STORMWATER CATCHMENT PLANS - BELLA VISTA

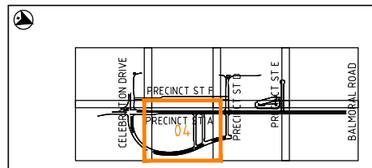


LEGEND

- PROJECT SITE BOUNDARY
- PROJECT SITE TEMPORARY BOUNDARY
- BOUNDARY (AIR SPACE)
- RAIL ALIGNMENT
- RETAINING WALL
- FORMATION DRAINAGE PIT
- SCOUR PROTECTION
- DRAINAGE CATCHMENT BOUNDARY
- A04/5 0.0607ha — DRAINAGE CATCHMENTS AREA
- OVER LAND FLOW PATH
- IMP = 95% — FRACTION IMPERVIOUS

NOTES

1. FOR DRAINAGE GENERAL NOTES REFER TO DRAWING NWRLOTS-NRT-BLV-CW-DRG-451711.
2. ALL CATCHMENT IMPERVIOUSNESS ADOPTED FOR THE DESIGN IS 90% UNO.



KEY PLAN

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REV	BY	DATE	DESCRIPTION	APPD
00	AB	12/09/16	DESIGN LOT 1104 - APPROVED FOR CONSTRUCTION	GT

SCALES: 5 0 5 10 15m — 1:500 FULL SIZE A1

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING

INDEPENDENT CERTIFIER CERTIFICATE: NWRLOTS-OIC-BLV-CE-CER-000001

CLIENT: NSW GOVERNMENT Transport for NSW

SERVICE PROVIDERS: northwest rapid transit — caring for life's journeys

DRAWN A.BLACK
DESIGNED N.CUMMINGS
DRG CHECK A.T.WILSON
DESIGN CHECK G.THOMAS
APPROVED D.C.KEOGH 29/07/16

NORTH WEST RAIL LINK

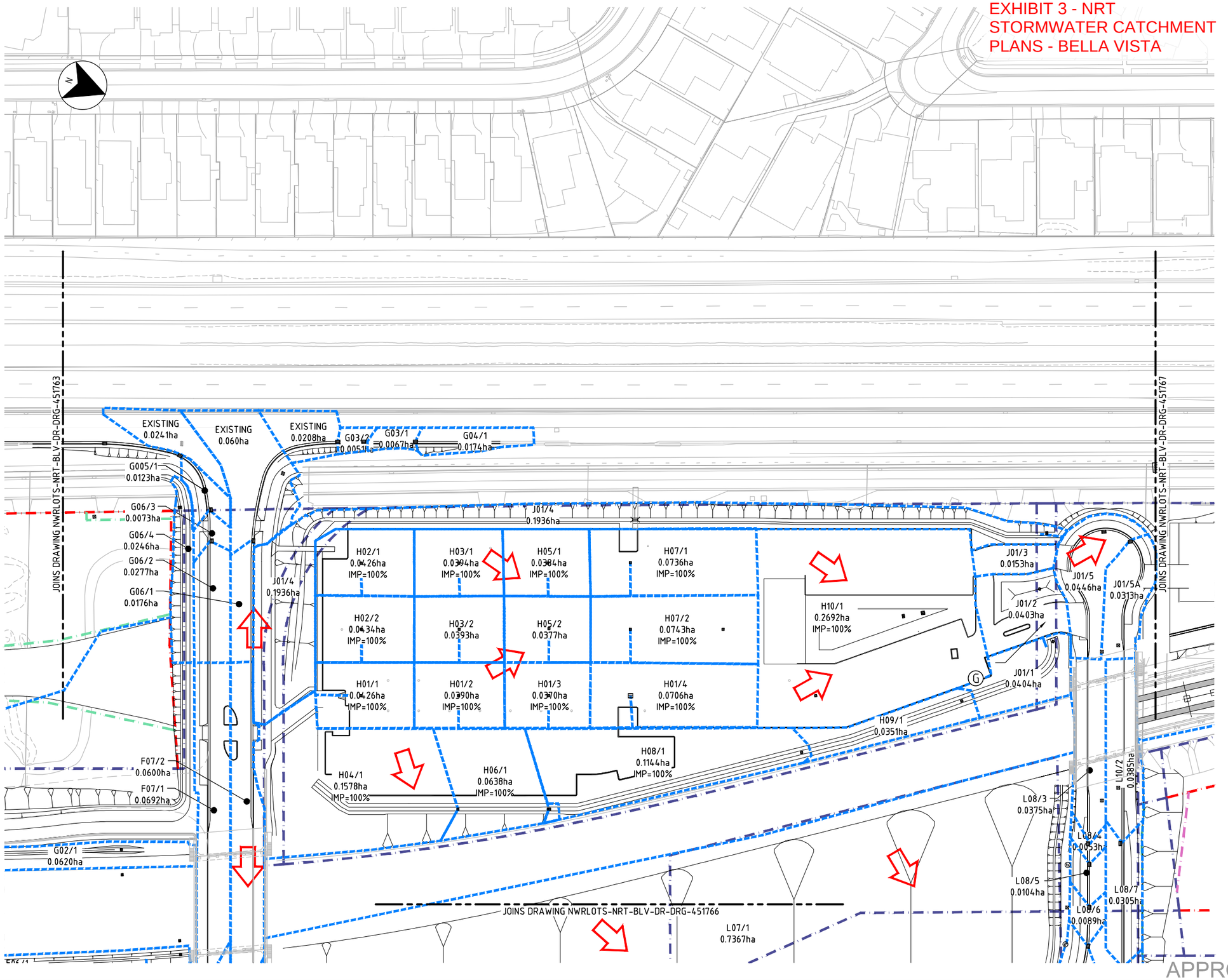
BELLA VISTA STATION
DRAINAGE
DRAINAGE CATCHMENT PLAN
SHEET 4

STATUS: FOR CONSTRUCTION | SHEET 4 OF 8 | ©

DRG No NWRLOTS-NRT-BLV-DR-DRG-451764 | NWRL REV 00

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing.

EXHIBIT 3 - NRT STORMWATER CATCHMENT PLANS - BELLA VISTA



LEGEND

- PROJECT SITE BOUNDARY
- PROJECT SITE TEMPORARY BOUNDARY
- BOUNDARY (AIR SPACE)
- RAIL ALIGNMENT
- RETAINING WALL
- FORMATION DRAINAGE PIT
- SCOUR PROTECTION
- DRAINAGE CATCHMENT BOUNDARY
- A04/5 0.0607ha — DRAINAGE CATCHMENTS AREA
- OVER LAND FLOW PATH
- IMP = 95% — FRACTION IMPERVIOUS

NOTES

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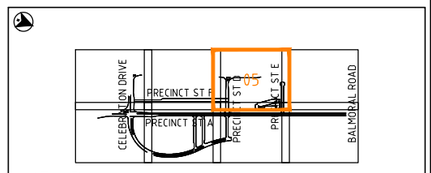

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NORTH WEST RAIL LINK

BELLA VISTA STATION
DRAINAGE
DRAINAGE CATCHMENT PLAN
SHEET 5

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EXHIBIT 3 - NRT
STORMWATER CATCHMENT
PLANS - BELLA VISTA

JOINS DRAWING NWRLOTS-NRT-BLV-DR-DRG-451765

G02/1
0.0620ha

F05/2
0.0143ha

F01/8
0.0489ha

F01/9
0.0511ha

L01/1
0.0623ha

L01/2
0.0218ha

L02/1
0.0336ha

L01/3
0.0181ha

L03/1
0.0357ha

L01/4
0.0353ha

L04/1
0.0344ha

L01/5
0.0350ha

L05/1
0.0350ha

L01/6
0.0346ha

L06/1
0.0195ha

L01/7
0.0278ha

L06/2
0.0094ha

L01/8
0.0557ha

L01/9
0.0862ha

L07/1
0.7367ha

0.0305ha

F08/1
0.0659ha

F01/10
0.0430ha

F10/1
0.6418ha

F09/1
0.0241ha

F01/11
0.0362ha

F01/12
0.0141ha

F01/13
0.0108ha

TO BATTER DRAIN 0.0526ha

F10/3
0.0526ha

F1
0.03 ha

JOINS DRAWING NWRLOTS-NRT-BLV-DR-DRG-451764

JOINS DRAWING NWRLOTS-NRT-BLV-DR-DRG-451768

LEGEND

- PROJECT SITE BOUNDARY
- PROJECT SITE TEMPORARY BOUNDARY
- BOUNDARY (AIR SPACE)
- RAIL ALIGNMENT
- RETAINING WALL (RW — RW)
- FORMATION DRAINAGE PIT
- SCOUR PROTECTION
- DRAINAGE CATCHMENT BOUNDARY
- A04/5 0.0607ha — DRAINAGE CATCHMENTS AREA
- OVER LAND FLOW PATH
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NOTES

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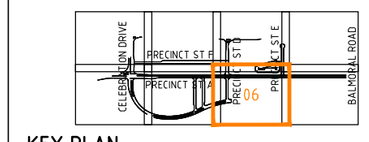

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SCALES: 5 0 5 10 15m — 1:500 FULL SIZE A1

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DESIGN CHECK G.THOMAS
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NORTH WEST RAIL LINK
BELLA VISTA STATION
DRAINAGE
DRAINAGE CATCHMENT PLAN
SHEET 6

STATUS: FOR CONSTRUCTION | SHEET 6 OF 8 | ©

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A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing.

Cad File: C:\PRINT\NWRLOTS-NRT-BLV-DR-DRG-451766.dwg Plot Date: 12/09/16 - 17:51 100mm AT FULL SIZE

EXHIBIT 3 - NRT STORMWATER CATCHMENT PLANS - BELLA VISTA

LEGEND

- PROJECT SITE BOUNDARY
- PROJECT SITE TEMPORARY BOUNDARY
- BOUNDARY (AIR SPACE)
- RAIL ALIGNMENT
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- DRAINAGE CATCHMENT BOUNDARY
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- OVER LAND FLOW PATH
- IMP = 95% — FRACTION IMPERVIOUS

J01/5A 0.0313ha

JOINS DRAWING NWRLOTS-NRT-BLV-DR-DRG-451765

L10/2 0.0385ha

L08/7 0.0305ha

M01/1 0.4149ha

M04/1 0.5266ha

M07/1 0.9735ha

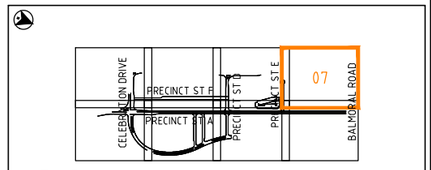
NWRL DOWN MAIN

NWRL UP MAIN

JOINS DRAWING NWRLOTS-NRT-BLV-DR-DRG-451768

NOTES

1. FOR DRAINAGE GENERAL NOTES REFER TO DRAWING NWRLOTS-NRT-BLV-CW-DRG-451711.
2. ALL CATCHMENT IMPERVIOUSNESS ADOPTED FOR THE DESIGN IS 90% UNO.



KEY PLAN

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00	AB	12/09/16	DESIGN LOT 1104 - APPROVED FOR CONSTRUCTION	GT

SCALES: 5 0 5 10 15m — 1:500 FULL SIZE A1

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APPROVED D.C.KEOGH 29/07/16

NORTH WEST RAIL LINK

BELLA VISTA STATION
DRAINAGE
DRAINAGE CATCHMENT PLAN
SHEET 7

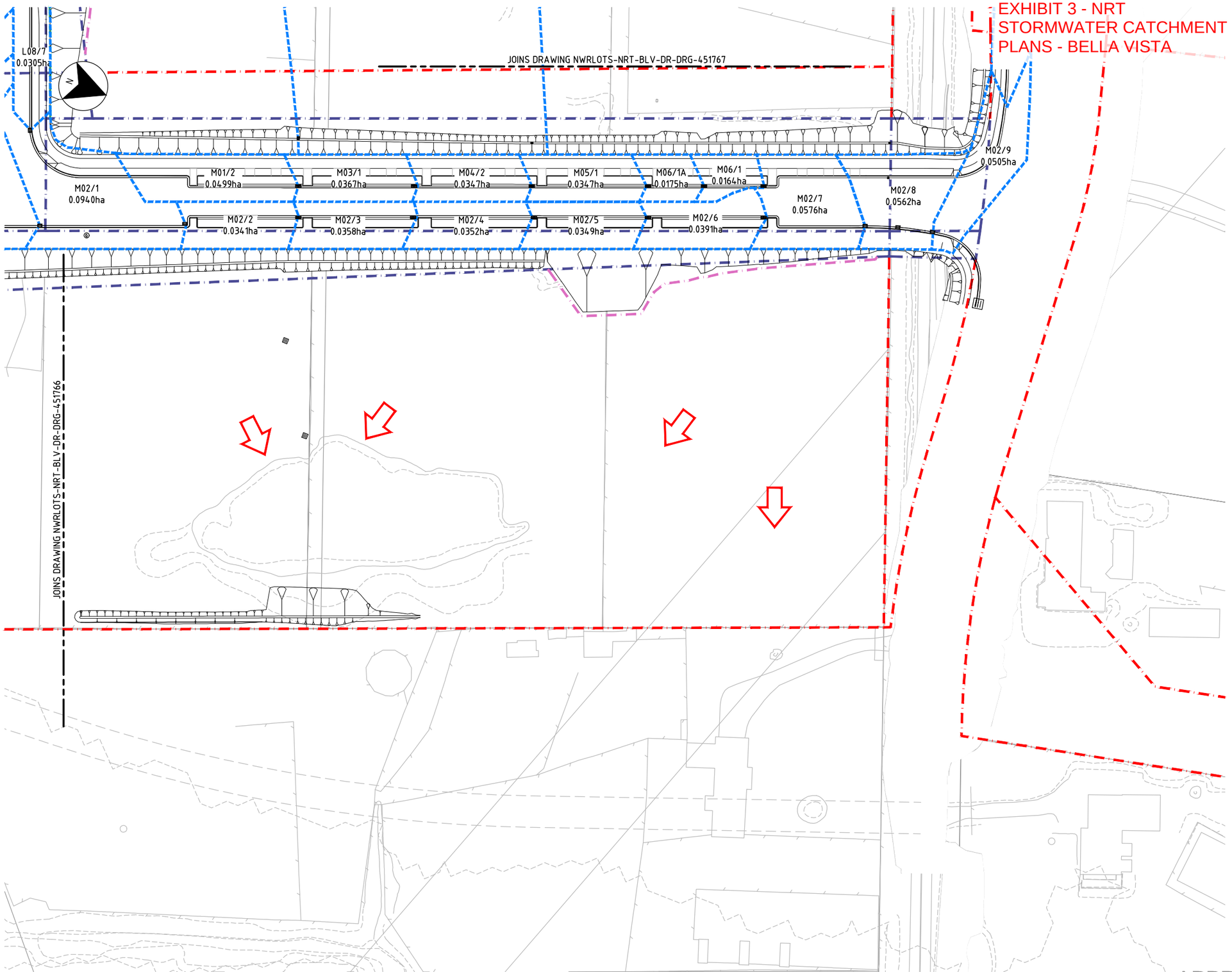
STATUS: FOR CONSTRUCTION | SHEET 7 OF 8 | ©

DRG No NWRLOTS-NRT-BLV-DR-DRG-451767 | NWRL REV 00

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing.

Cad File: C:\PRINT\NWRLOTS-NRT-BLV-DR-DRG-451767.dwg Plot Date: 12/09/16 - 17:51 100mm AT FULL SIZE

EXHIBIT 3 - NRT
STORMWATER CATCHMENT
PLANS - BELLA VISTA



LEGEND

- PROJECT SITE BOUNDARY
- PROJECT SITE TEMPORARY BOUNDARY
- BOUNDARY (AIR SPACE)
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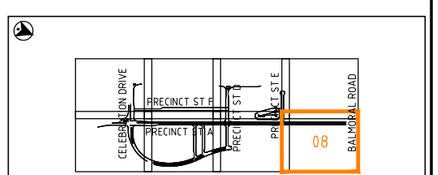

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REV	BY	DATE	DESCRIPTION	APPD
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SCALES: 1:500 — 5 0 5 10 15m — FULL SIZE A1

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DESIGN CHECK G.THOMAS
APPROVED D.C.KEOGH 29/07/16

NORTH WEST RAIL LINK

BELLA VISTA STATION
DRAINAGE
DRAINAGE CATCHMENT PLAN
SHEET 8

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Stormwater connections to natural waterways

Rouse Hill Development Area

Sydney WATER

Overview

What

This guide explains what you need to do when building a stormwater connection into Sydney Water's natural open channel waterways in the Rouse Hill Development Area (RHDA). We allow stormwater connections that ensure:

- stable transition from a constructed drainage system to the natural waterway
- sustainable water quality management
- restoration of vegetation following construction.

Who

This guide applies to owners and developers proposing to build a stormwater pipe connecting to a waterway owned or managed by Sydney Water in the RHDA. This applies to connection proposals for residential, commercial, industrial and other government agencies (e.g. Roads and Maritime Services) developments.

Why

Construction of stormwater connections to natural waterways affects the waterway and the riparian corridor. This guide ensures that owners and developers design and construct stormwater connections to a safe and sustainable standard by:

- minimising the number of uncontrolled stormwater discharges
- ensuring new stormwater connections cause minimal environmental impact to the waterway and its water quality
- restoring and maintaining disturbed waterfront and riparian vegetation following construction activities.

Contents

1. Introduction

Building a stormwater connection to natural waterways affects both the waterway and riparian corridor. Before construction can commence, you need to design a suitable connection point, considering the:

- type of development
- quality of stormwater discharge
- outlet headwall.

You must renew any existing land and vegetation that may be affected by the work, to restore the integrity of the riparian corridor.

This guide helps ensure that stormwater connections to a Sydney Water natural waterway are designed and constructed to a safe and sustainable standard.

2. Approval requirements

Connecting to any waterway

To construct a stormwater connection to **any natural waterway**, you need approval from the NSW Office of Water, as this is considered a 'controlled activity' under the *Water Management Act 2000*.

To gain approval from NSW Office of Water, you must meet their requirements, including:

- *Guidelines for outlet structures on waterfront land*
- *Guidelines for vegetation management plans on waterfront land*
- *Guidelines for riparian corridors and waterfront land*

Before disturbing any land within 200 metres of **any natural waterway**, you also need to consider Aboriginal heritage matters in accordance with Part 6 of the *National Parks and Wildlife Act 1974*. Additional due diligence assessments and/or permits from the Office of Environment and Heritage may be required. This is required if Aboriginal objects will be or are likely to be harmed by any activity associated with the proposed connection works.

Connecting to a Sydney Water waterway

To construct a stormwater connection to **a Sydney Water owned natural waterway**, you also need approval from Sydney Water. This guide specifically addresses our additional requirements. It supplements NSW Office of Water guidelines by providing more detail for stormwater connections within the Rouse Hill Development Area. It does not replace them.

To gain our approval for your stormwater connection, lodge your application through a Water Servicing Coordinator.

The application must demonstrate that the proposed stormwater connection meets our design requirements (see Section 3). Once we are satisfied with the design, you may start construction. We will issue a Compliance Certificate once construction is complete and the land is appropriately restored (see Section 4).

For submission requirements, please refer to Section 0.

If you need to enter Sydney Water land to inspect or do work, you must get permission from our Land and Waterways team. Make your enquiries to stormwater@sydneywater.com.au.

All costs involved in design, construction and approvals are the responsibility of the person proposing the development, unless otherwise agreed.

3. Stormwater connection design

Point of connection

The owner or developer wanting to connect their stormwater drainage system to the natural waterway must contact the local council and Sydney Water to check if there are existing connection points available. If there is an existing council stormwater connection and the new line can practically connect to it, then you must use the existing connection.

If a stormwater connection does not currently exist or is not available, you must liaise with council and Sydney Water to agree on a connection point. You must prepare a broad catchment plan to identify the most ideal locations to connect to the natural waterway. The plan must consider the:

- land contours
- location of road infrastructure
- intended land use.

The proposed connection must be able to effectively service both the intended development and other future developments within the adjacent and/ or upstream area, and must not hinder overall future land management.

Drainage system

Our requirements for the drainage system vary depending on the type of development it is intended to support.

Requirements for residential subdivisions - single and dual occupancy lots

- You must minimise the number of discharge points in the drainage system, for example a single combined large outlet rather than multiple smaller outlets.
- Pipe dimensions must be between 600 mm and 1,350 mm depending on what is appropriate to the broad catchment plan and land use of surrounding developments.
- You must allow for a future Gross Pollution Trap (GPT) to be installed later, upstream of the pipe outlet to protect the health of the waterway.
    - The GPT must be outside of the riparian vegetation corridor and have safe, low impact access for vehicles.
    - The preferred invert level drop from the inflow pipe to the outlet flow through the GPT is 600 mm (with a minimum of 300 mm).
    - The preferred invert level drop from the outlet pipe to the normal level of the waterway is 450 mm on a 1.0% grade (with a minimum of 200 mm on a 0.5% grade).

Requirements for all other developments

- Stormwater run-off from the site must be of appropriate quality and quantity before it enters the natural waterway. Sites must establish their own stormwater quality improvement device(s) that meets the following specified water quality outcomes:

Pollutant	Pollutant load reduction objective (%)[1]
Gross pollutants (>5 mm)	90
Total suspended solids	85
Total phosphorus	65
Total nitrogen	45

- You must register the private infrastructure and its importance on the land title. This ensures the current or future land owner services the installed stormwater quality improvement device(s) and does not remove, alter or impede its function. We will provide a formal agreement under the *Conveyancing Act 1919,* which sets out the ongoing responsibilities of the land owner.

Outlet headwall

The pipe outlet headwall must meet our requirements to ensure the output flow does not adversely impact the waterway and the headwall is safe and stable (see Section 5 – Design drawings, for more information).

Design and position

1. Outlet angle is to be no greater than 30 degrees in the direction of the channel flow.
2. Setback of the end of the pipe must be:
    a. at least three times the bank height from the toe of the bank on the **same** side of the channel
    b. at least 10 times the pipe diameter from the toe of the bank on the **opposite** side of the channel, if there is only one pipe
    c. at least 13 times the largest pipe diameter from the toe of the bank on the **opposite** side of the channel, if there are multiple pipes.
3. The cover over the pipe must be a minimum of 300 mm.
4. A maximum of one metre of the pipe can be exposed.
5. Place the headwall so as to avoid vertical drops of over 900 mm.
6. For locations where the vertical fall is greater than 900 mm and where rock batters are steeper than 1H:1V, you must install monowills balltube fencing with band and knee rails.

Material composition

- The headwall foundation must sit on a geotextile fabric of Bidim A44 or approved equivalent.
- There must be a 100 mm thick layer of coarse granular material, such as crushed recycled terracotta 10–40 mm Ø (not blue metal) on the geotextile fabric.

[1] Pollutant removal design criteria adopted from *Western Sydney Growth Centres – Stormwater Guidance For Precinct Planning* (Prepared by DEC Nov 2006)

- Stacked rock rip rap is to be a mixture of hard sandstone rocks to fill voids during placement. It should be made up of:
    - 70% large rocks of regular dimension suitable for neat interlocking stacks (typically 200 kg to 500 kg and 0.75–1.2 m x 0.5 m x 0.25–0.45 m)
    - 15% medium rocks (typically the size of a soccer ball)
    - 15% small rocks (typically the size of a closed fist)
    - hand-compacted growing medium for voids less than 200 mm Ø. This should not be over compacted.
- All rock batters steeper than 2H:1V require to be rock armoured.
- All non-rock batters are to be no steeper than 3H:1V.

Asset ownership

Once construction is completed to Sydney Water's specifications, details of ownership and maintenance are as follows:

- The serviced property owner or council is responsible for newly constructed pipelines (including all concrete structures) and stormwater quality improvement devices up until the point of discharge (once the developer has formally handed over the asset).
- Sydney Water will maintain the condition of the rock head wall.
- Sydney Water will maintain the condition of the rock rip rap.
- Sydney Water will maintain headwall fences.

4. Land and vegetation restoration

Sydney Water owns and manages land within the riparian corridor surrounding its natural waterways. Stormwater connections affect this land, so you must rehabilitate the vegetation to restore the integrity of the riparian corridor[2]. There are specific requirements to manage the vegetation.

Soil and earthworks

- You must stockpile excavated soil from works as separate layers to use in site restoration later (refer to Section 5: Soil horizons – Montage):
    - Top soil – about 300 mm
    - Sub-soil – about 700 mm
    - C-horizon (clay/shale/sandstone) – remainder.
- Return the layers of soil, in the same order as you excavated them. There will likely be extra soil, due to the space taken up by the new pipe. Only soil from the C-horizon should be removed from the site.
- Do not import soil into the trunk drainage corridor.
- Top soil must be free of large debris or contaminants. Spread it evenly to match the natural surface level.
- Use coconut matting (or similar products) to stabilise the topsoil.

Revegetation

Revegetation must be appropriate to the site's native ecological communities. Native ecological communities within the RHDA include:

- Cumberland Plain Woodlands (CPW)
- River-Flat Eucalyptus Forest on Coastal Floodplains (RFEFCF)
- Shale Sandstone Transitional Forests (SSTF)
- Swamp Oak Floodplain Forest (SWFF)

To determine the ecological communities that are native to your site, email the Land and Waterways team at stormwater@sydneywater.com.au.

Revegetation also depends on where it is within the riparian corridor – toe, middle or upper zones. Please see Section 5 - Appropriate revegetation – plan and section elevation, for more information.

Species selection and the required density of ground, mid-storey and canopy cover is determined using the tables in Section 6 – Prescribed vegetation tables.

To support long-term vegetation growth:

- remove weeds or exotic grass (eg kikuyu or other turf varieties) with appropriate herbicide
- manually remove perennial weeds
- spread clean mulch around the areas of revegetation to reduce weed infestation

[2] Subject to appropriate approvals / assessments as stated in Section 2

- install plant guards in areas where the new vegetation will be susceptible to weed intrusion
- apply fertilizer and soil conditioning material (eg pellets), considering the topsoil condition and soil fertility.

Bushfire protection measures

The NSW Rural Fire Service (RFS) require building set back distances – Asset Protection Zones (APZ) – wholly within all development properties on bushfire prone land. APZ requirements are outlined in the RFS document *Planning for Bush Fire Protection 2006*.

If you cannot provide a full APZ because of 'acceptable exceptional circumstances' (detailed in the *Planning for Bush Fire Protection 2006*), RFS may require additional protection measures. An APZ is always the responsibility of the landowner.

Sydney Water maintains Hazard Reduction Zones (HRZ) on the adjoining trunk drainage corridor. HRZs reduce bushfire risk to adjoining properties, by creating a buffer zone in a fuel reduced state. An **HRZ is not a substitute to an APZ** requirement from the RFS and does not absolve the developer's responsibility to implement an APZ within their own development boundary.

If there is an HRZ in a Sydney Water trunk drainage corridor, we will advise you how wide it is, as it may vary depending on the site parameters. Revegetation species are restricted within the HRZ – see Section 6 for a table of prescribed species for revegetation.

Maintenance

After landscaping and establishment, you must maintain the works for the next 12 months to ensure native plants survive and grow. This includes watering, if there is inadequate rain, fixing damaged or dead plants and managing weeds.

You will need to contact Sydney Water to gain access to sites.

Inspections and final handover

The developer or its contractor must organise a site inspection with a Sydney Water representative when restoration work is complete, and at the end of the mandatory maintenance period. If we are satisfied with the work, we will issue a Compliance Certificate.

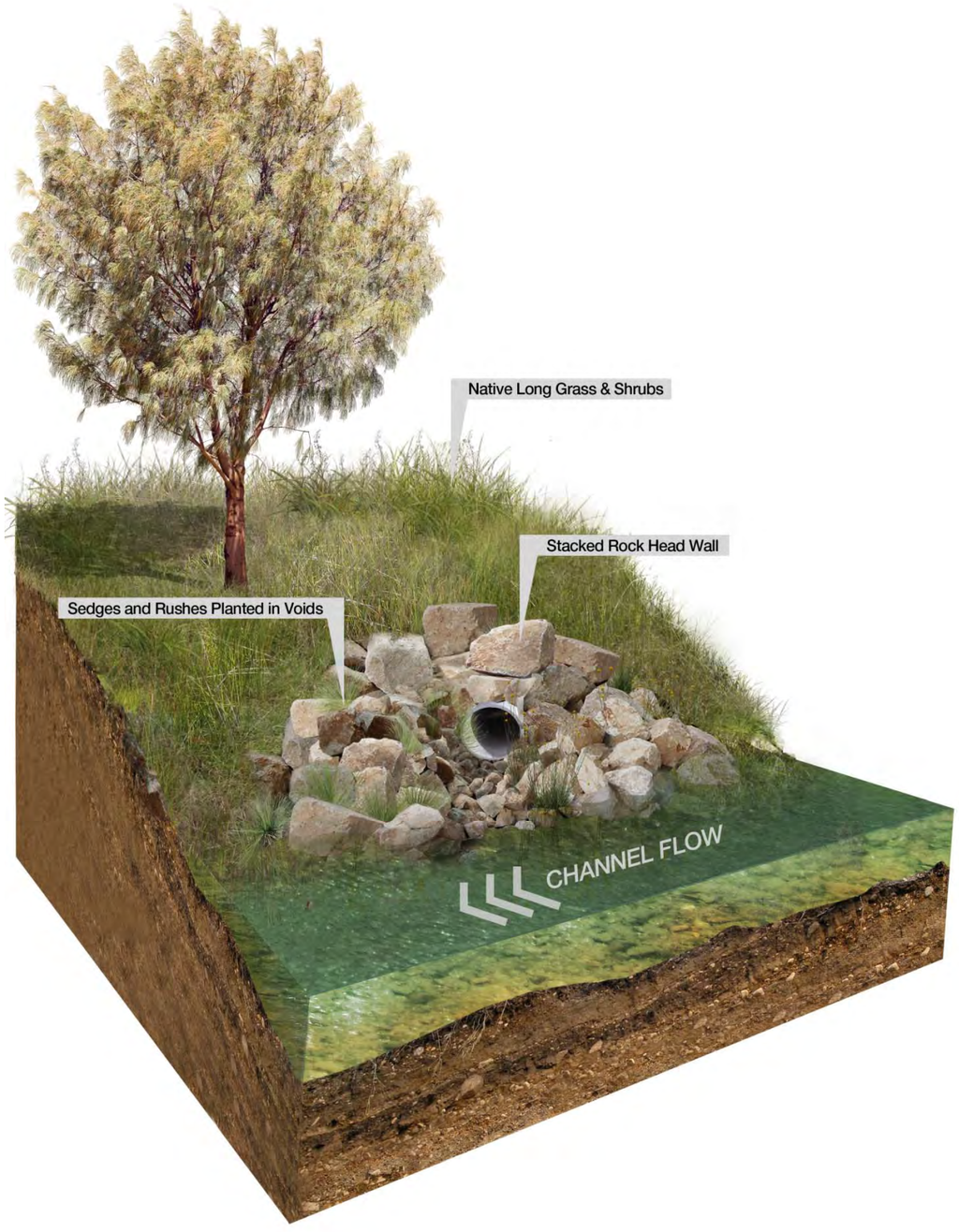
5. Submission requirements

You must submit the following documents.

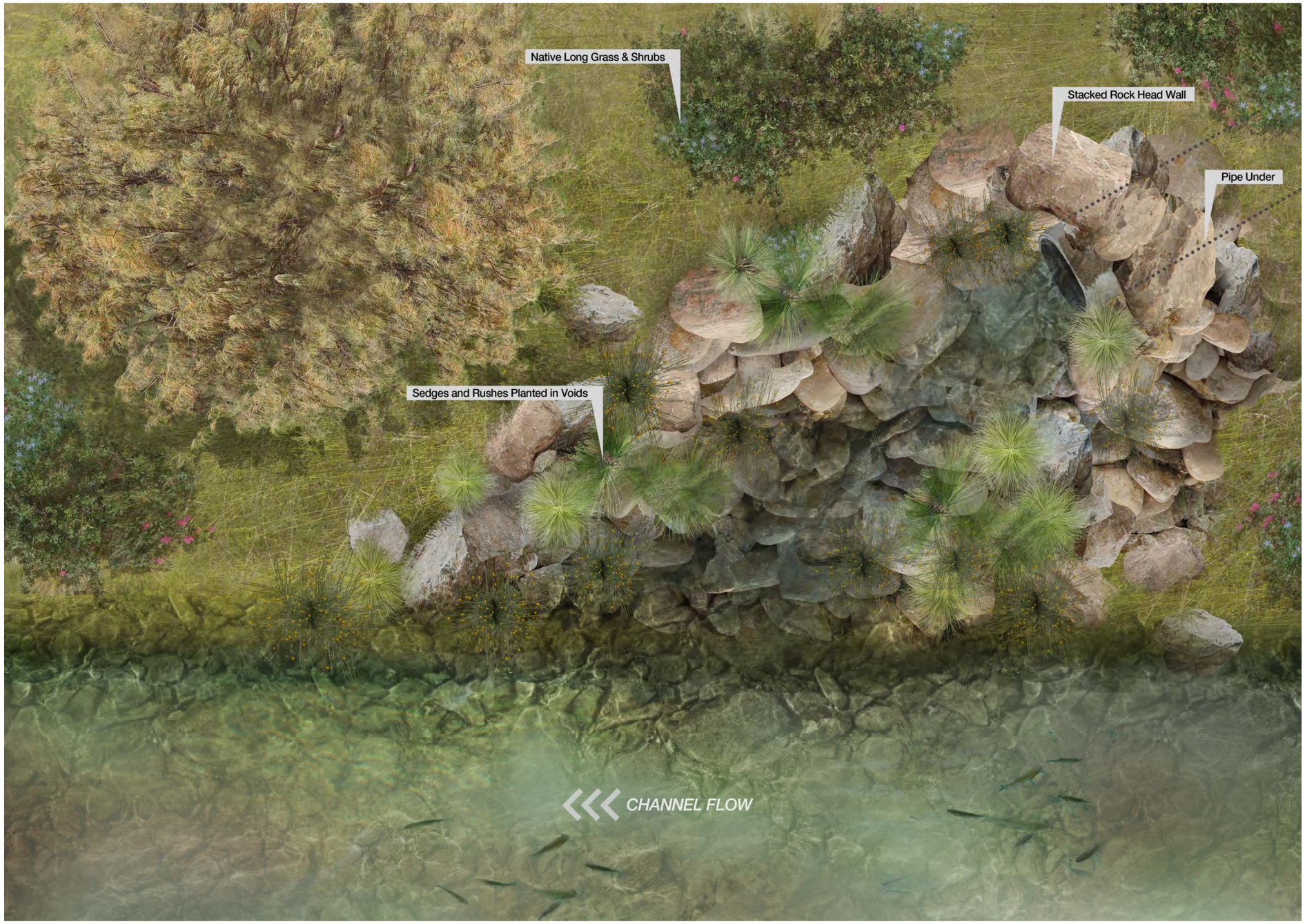
- **A CAD plan and long-section** clearly showing (as per Section 3):
    - connection up to the waterway/basin
    - disturbed area (cross-hatched) and quantified (m2)
    - compliance with stormwater connection design requirements (pipe dimensions, invert level drops, grades)
    - compliance with outlet headwall design (e.g. material composition) and positioning (e.g. setback, angle)
- **Vegetation Management Plan** clearly stating (as per Section 4)**:**
    - how soil works will be conducted – demonstrating understanding of requirements set out in guideline
    - which plants will be used, at what densities and at what locations (plan required to indicate toe, middle and upper regions)
    - who will be maintaining the re-vegetated areas for 12 months – providing a quote by a subcontractor for the re-vegetation work and maintenance costs

6. Design drawings

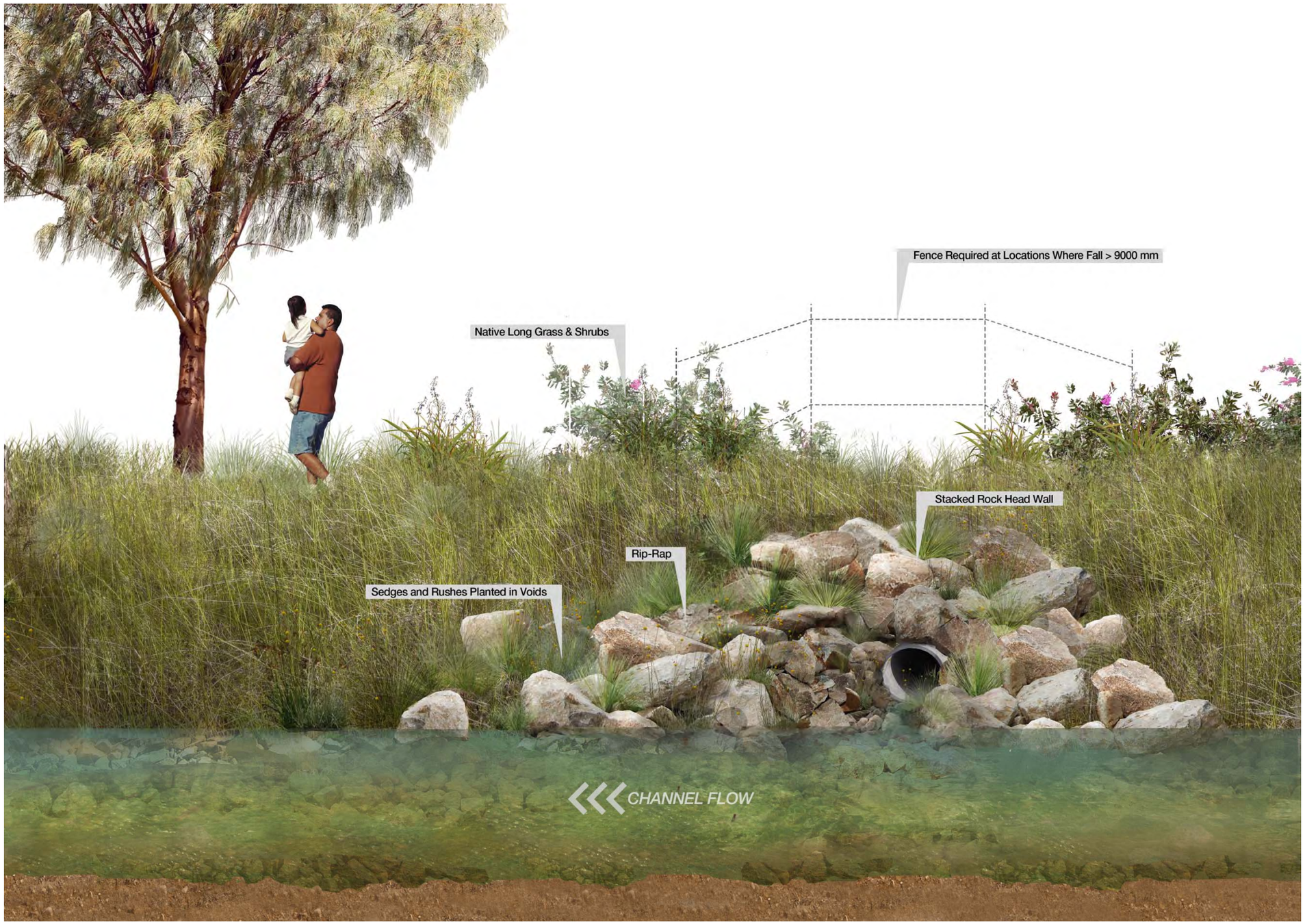
Headwall setback from creek channel – montage



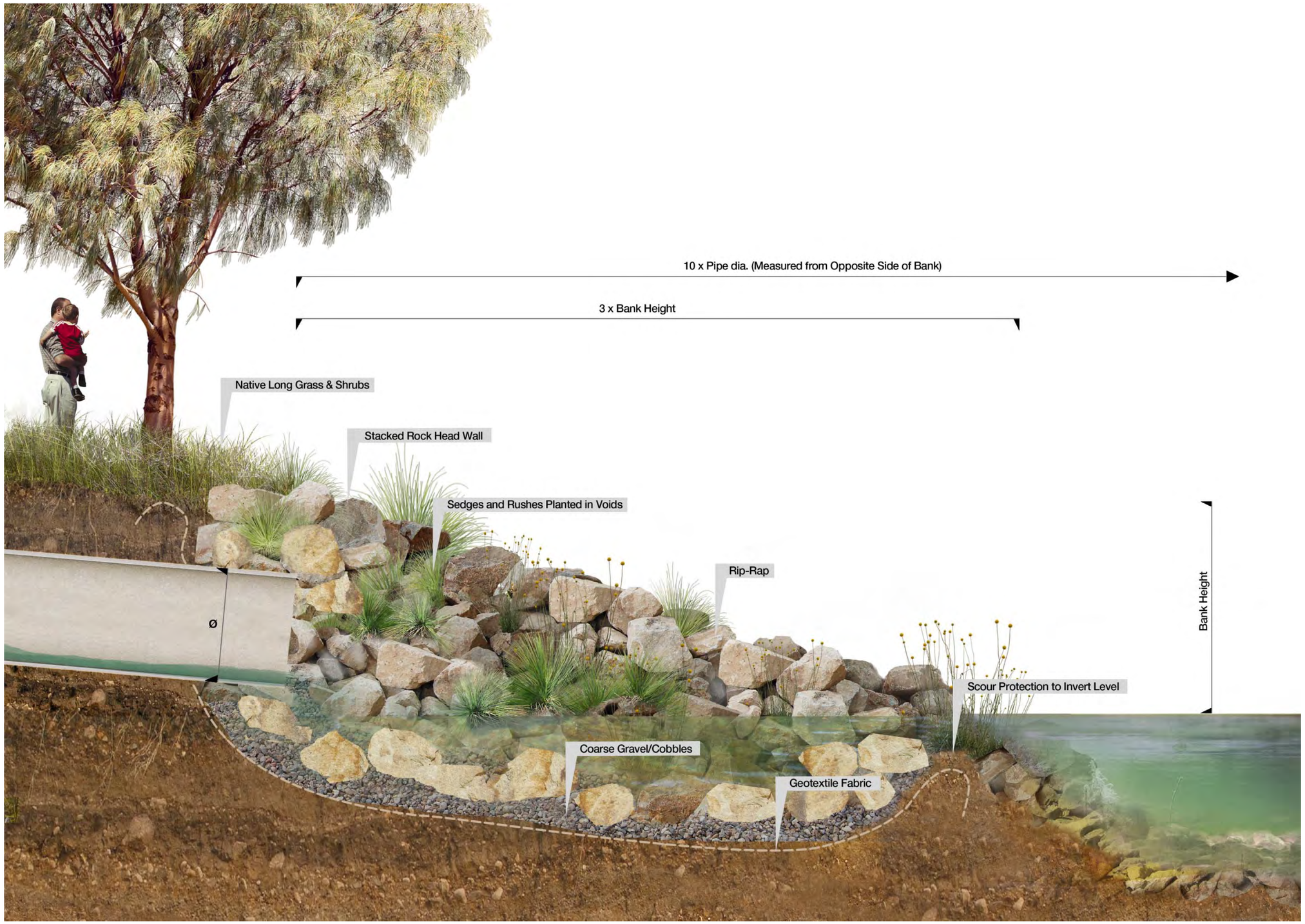
Headwall setback from creek channel – plan



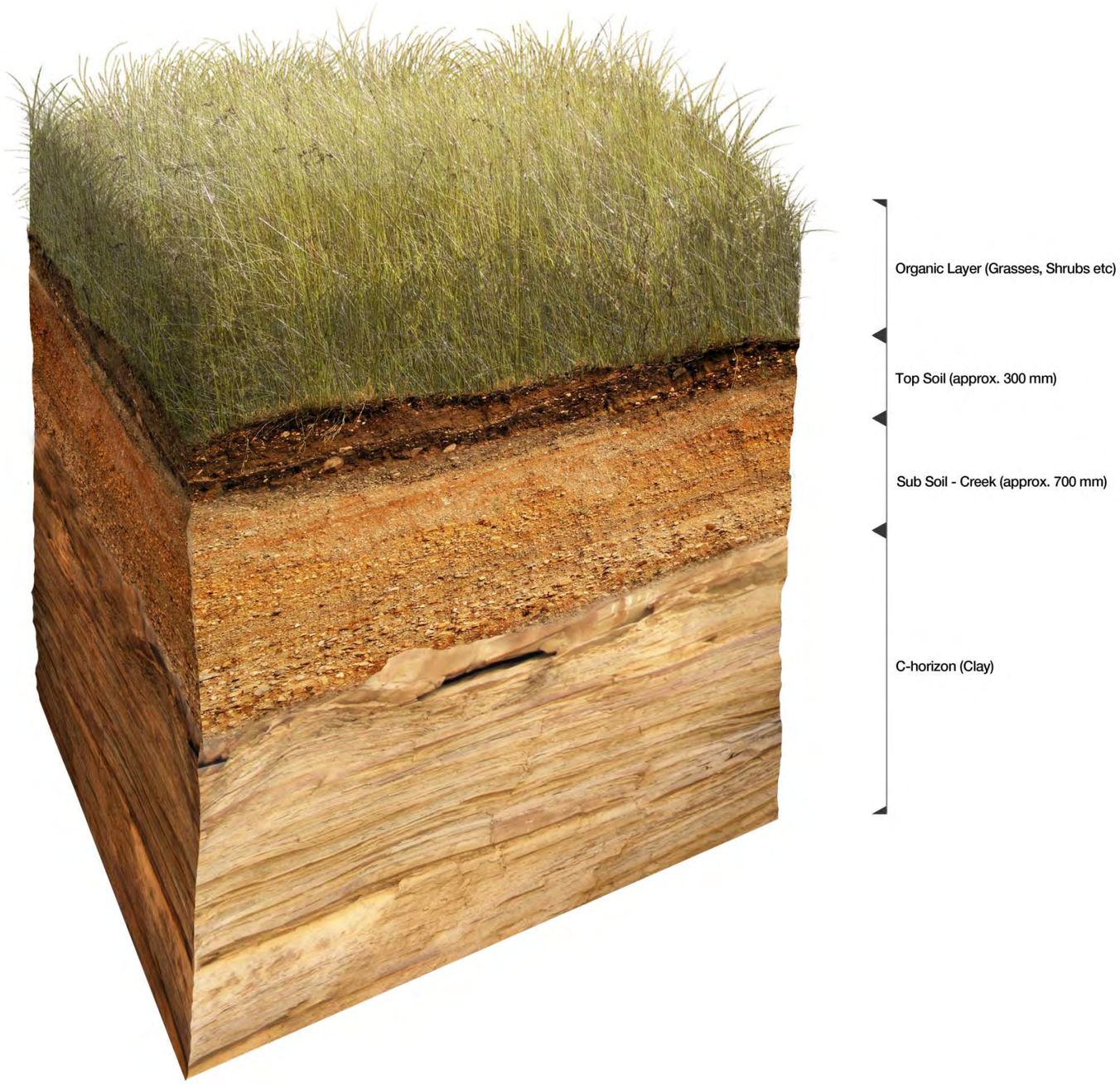
Headwall setback from creek channel – elevation



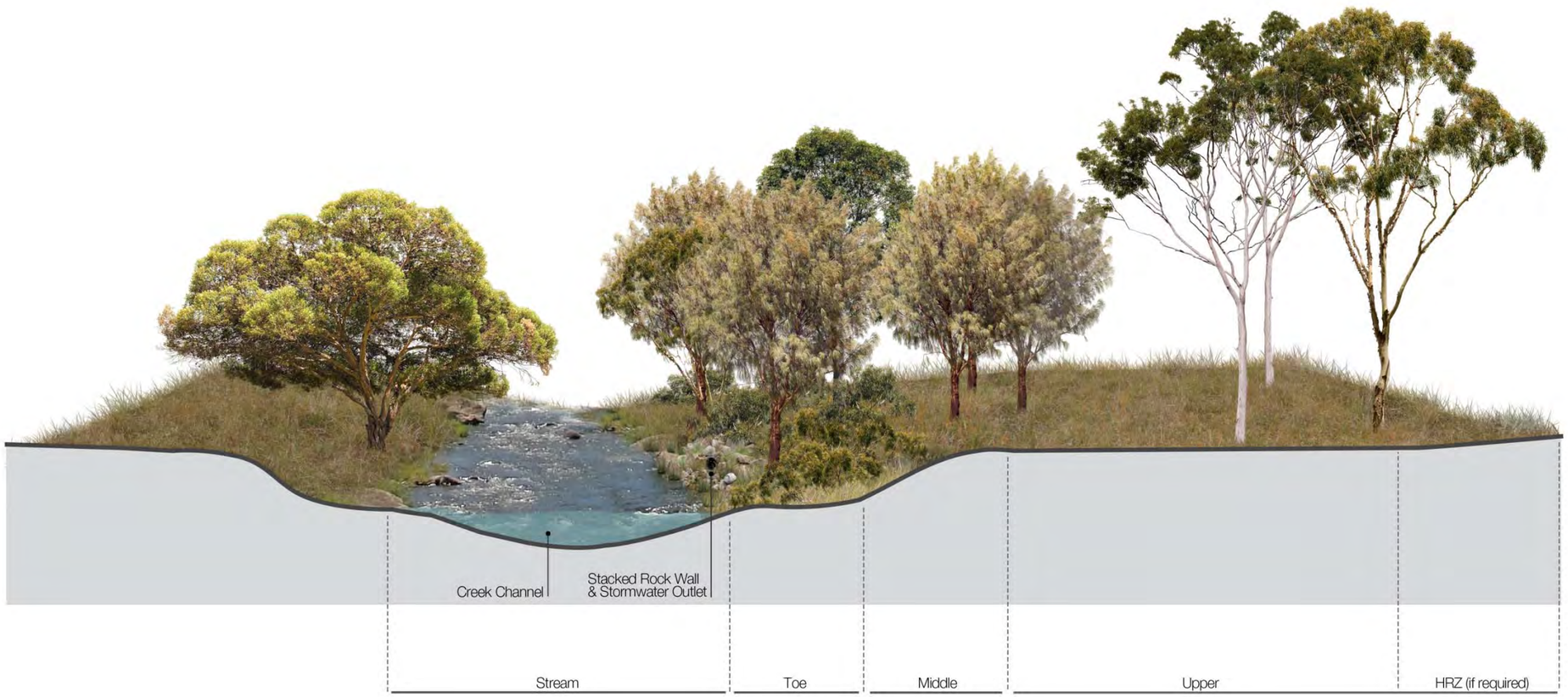
Headwall setback from creek channel – section

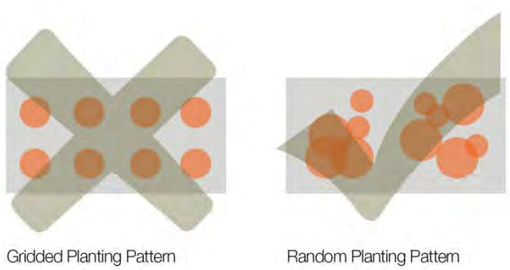


Soil horizons – montage



Appropriate revegetation – plan and section elevation





7. Prescribed vegetation tables

Cumberland Plain Woodland (CPW)

CPW	Toe		Middle		Upper		HRZ	
Type of cover	***Species***	***Density***	***Species***	***Density***	***Species***	***Density***	***Species***	***Density***
Canopy	Nil	N/A	Eucalyptus crebra Eucalyptus eugenioides Eucalyptus tereticornis Eucalyptus punctata Acacia implexa	1 per 50 m^2	Eucalyptus crebra Eucalyptus eugenioides Eucalyptus tereticornis Eucalyptus punctata Acacia implexa	1 per 10 m^2	Eucalyptus crebra Eucalyptus eugenioides Eucalyptus tereticornis Eucalyptus punctata Acacia implexa	1 per 100 m^2
Mid-storey	Acacia implexa Bursaria spinosa Indigofera australis	1 per 10 m^2	Acacia implexa Bursaria spinulosa Daviesia ulicifolia Dillwynia sieberi Indigofera australis Exocarpus cupressiformis Pultenaea microphylla	1 per 10 m^2	Acacia implexa Bursaria spinulosa Daviesia ulicifolia Dillwynia sieberi Indigofera australis Exocarpus cupressiformis Pultenaea microphylla	1 per 10 m^2	Daviesia ulicifolia Dillwynia sieberi Indigofera australis Pultenaea microphylla	1 per 10 m^2
Low & ground	Ajuga australis Aristida ramosa Arthropodium milleflorum Asperula conferta Austrodanthonia tenuior Bossiaea prostrata Brachycome multifida Carex inversa Centella asiatica Chorizema parviflorum Chrysocephalum apiculatum Commelina cyanea Cymbopogon refractus Dianella longifolia Dichondra repens Dodonaea viscosa subsp. cuneata Einadia hastata Geranium solanderi var. solanderi Glycine clandestina Goodenia hederacea subsp. hederacea Hardenbergia violacea Hypericum gramineum Juncus usitatus Lomandra filiformis subsp. filiformis Microlaena stipoides var. stipoides Plectranthus parviflorus Poa labillardieri var. labillardieri Ranunculus lappaceus Stackhousia viminea Themeda australis Wahlenbergia gracilis	5 per m^2	Ajuga australis Aristida ramosa Arthropodium milleflorum Asperula conferta Austrodanthonia tenuior Bossiaea prostrata Brachycome multifida Carex inversa Centella asiatica Chrysocephalum apiculatum Clematis glycinoides var. glycinoides Commelina cyanea Cymbopogon refractus Dianella longifolia Dichondra repens Dodonaea viscosa subsp. cuneata Einadia hastata Geranium solanderi var. solanderi Glycine clandestina Goodenia hederacea subsp. hederacea Hardenbergia violacea Hypericum gramineum Juncus usitatus Lomandra filiformis subsp. filiformis Microlaena stipoides var. stipoides Plectranthus parviflorus Poa labillardieri var. labillardieri Ranunculus lappaceus Stackhousia viminea Themeda australis Wahlenbergia gracilis	4 per m^2	Ajuga australis Aristida ramosa Arthropodium milleflorum Asperula conferta Austrodanthonia tenuior Bossiaea prostrata Brachycome multifida Carex inversa Centella asiatica Chrysocephalum apiculatum Clematis glycinoides var. glycinoides Commelina cyanea Cymbopogon refractus Dianella longifolia Dichondra repens Dodonaea viscosa subsp. cuneata Einadia hastata Geranium solanderi var. solanderi Glycine clandestina Goodenia hederacea subsp. hederacea Hardenbergia violacea Hypericum gramineum Juncus usitatus Lomandra filiformis subsp. filiformis Microlaena stipoides var. stipoides Plectranthus parviflorus Poa labillardieri var. labillardieri Ranunculus lappaceus Stackhousia viminea Themeda australis Wahlenbergia gracilis	3 per m^2	Ajuga australis Aristida ramosa Arthropodium milleflorum Asperula conferta Austrodanthonia tenuior Bossiaea prostrata Brachycome multifida Carex inversa Centella asiatica Chrysocephalum apiculatum Clematis glycinoides var. glycinoides Commelina cyanea Cymbopogon refractus Dianella longifolia Dichondra repens Dodonaea viscosa subsp. cuneata Einadia hastata Geranium solanderi var. solanderi Glycine clandestina Goodenia hederacea subsp. hederacea Hardenbergia violacea Hypericum gramineum Juncus usitatus Lomandra filiformis subsp. filiformis Microlaena stipoides var. stipoides Plectranthus parviflorus Poa labillardieri var. labillardieri Ranunculus lappaceus Stackhousia viminea Themeda australis Wahlenbergia gracilis	3 per m^2

River-Flat Eucalyptus Forest on Coastal Floodplains (RFEFCF)

RFEFCF	Toe		Middle		Upper		HRZ	
Type of cover	***Species***	***Density***	***Species***	***Density***	***Species***	***Density***	***Species***	***Density***
Canopy	Nil	N/A	Angophora floribunda Angophora subvelutina Eucalyptus amplifolia Eucalyptus baueriana Eucalyptus botryoides Eucalyptus moluccana Eucalyptus tereticornis Acmena smithii Casuarina cunninghamiana subsp. cunninghamiana Casuarina glauca Melaleuca decora Melaleuca styphelioides Tristaniopsis laurina	1 per 50 m^2	Angophora floribunda Angophora subvelutina Eucalyptus amplifolia Eucalyptus baueriana Eucalyptus botryoides Eucalyptus moluccana Eucalyptus tereticornis Acmena smithii Casuarina cunninghamiana subsp. cunninghamiana Casuarina glauca Melaleuca decora Melaleuca styphelioides Tristaniopsis laurina	1 per 10 m^2	Angophora floribunda Angophora subvelutina Eucalyptus amplifolia Eucalyptus baueriana Eucalyptus botryoides Eucalyptus moluccana Eucalyptus tereticornis Acmena smithii Casuarina cunninghamiana subsp. cunninghamiana Casuarina glauca Melaleuca decora Melaleuca styphelioides Tristaniopsis laurina	1 per 100 m^2
Mid-storey	Nil	N/A	Acacia floribunda Acacia parramattensis Backhousia myrtifolia Breynia oblongifolia Bursaria spinosa Melaleuca linariifolia Ozothamnus diosmifolius	1 per 10 m^2	Acacia floribunda Acacia parramattensis Backhousia myrtifolia Breynia oblongifolia Bursaria spinosa Melaleuca linariifolia Ozothamnus diosmifolius	1 per 10 m^2	Breynia oblongifolia Melaleuca linariifolia Ozothamnus diosmifolius	1 per 10 m^2
Low & Ground	Adiantum aethiopicum Alisma plantago-aquatica Aristida vagans Bolboschoenus caldwellii Centella asiatica Centipeda cunninghamii Commelina cyanea Cymbopogon refractus Cyperus trinervis Dichelachne micrantha Dichondra repens Doodia aspera Einadia hastata Geranium solanderi Hardenbergia violacea Helichrysum diosmifolius Hydrocotyle peduncularis Imperata cylindrica var. major Lomandra filiformis Lomandra longifolia Lomandra multiflora subsp. multiflora Microlaena stipoides var. stipoides Pteridium esculentum Viola hederacea Wahlenbergia gracilis	5 per m^2	Aristida vagans Centella asiatica Centipeda cunninghamii Clematis aristata Commelina cyanea Cymbopogon refractus Dichelachne micrantha Dichondra repens Digitaria parviflora Doodia aspera Einadia hastata Geranium solanderi Glycine clandestina Hardenbergia violacea Helichrysum diosmifolius Hydrocotyle peduncularis Imperata cylindrica var. major Lomandra filiformis Lomandra longifolia Lomandra multiflora subsp. multiflora Microlaena stipoides var. stipoides Pandorea pandorana Themeda australis Viola hederacea Wahlenbergia gracilis	4 per m^2	Aristida vagans Centella asiatica Centipeda cunninghamii Clematis aristata Commelina cyanea Cymbopogon refractus Dichelachne micrantha Dichondra repens Digitaria parviflora Doodia aspera Einadia hastata Geranium solanderi Glycine clandestina Hardenbergia violacea Helichrysum diosmifolius Hydrocotyle peduncularis Imperata cylindrica var. major Lomandra filiformis Lomandra longifolia Lomandra multiflora subsp. multiflora Microlaena stipoides var. stipoides Pandorea pandorana Themeda australis Viola hederacea Wahlenbergia gracilis	3 per m^2	Aristida vagans Centella asiatica Centipeda cunninghamii Clematis aristata Commelina cyanea Cymbopogon refractus Dichelachne micrantha Dichondra repens Digitaria parviflora Doodia aspera Einadia hastata Geranium solanderi Glycine clandestina Hardenbergia violacea Helichrysum diosmifolius Hydrocotyle peduncularis Imperata cylindrica var. major Lomandra filiformis Lomandra longifolia Lomandra multiflora subsp. multiflora Microlaena stipoides var. stipoides Pandorea pandorana Themeda australis Viola hederacea Wahlenbergia gracilis	3 per m^2

Shale-Sandstone Transition Forest (SSTF)

SSTF	Toe		Middle		Upper		HRZ	
Type of cover	***Species***	***Density***	***Species***	***Density***	***Species***	***Density***	***Species***	***Density***
Canopy	Nil	N/A	Acacia implexa Allocasuarina littoralis Allocasuarina torulosa Angophora bakeri Angophora costata Angophora floribunda Corymbia gummifera Eucalyptus crebra Eucalyptus eugenioides Eucalyptus fibrosa	1 per 50 m^2	Acacia implexa Allocasuarina littoralis Allocasuarina torulosa Angophora bakeri Angophora costata Angophora floribunda Corymbia gummifera Eucalyptus crebra Eucalyptus eugenioides Eucalyptus fibrosa	1 per 10 m^2	Acacia implexa Allocasuarina littoralis Allocasuarina torulosa Angophora bakeri Angophora costata Angophora floribunda Corymbia gummifera Eucalyptus crebra Eucalyptus eugenioides Eucalyptus fibrosa	1 per 100 m^2
Mid-storey	Nil	N/A	Acacia falcata Banksia spinulosa Bossiaea obcordata Breynia oblongifolia Bursaria spinosa Calytrix tetragona Daviesia ulicifolia Exocarpos cuppressiformis Grevillea mucronulata Hakea sericea Hibbertia obtusifolia Indigofera australis Kunzea ambigua Leptospermum trinervium Melaleuca thymifolia Ozothamnus diosmifolius Persoonia linearis Pimelea linifolia Pultenaea flexilis	1 per 10 m^2	Acacia falcata Banksia spinulosa Bossiaea obcordata Breynia oblongifolia Bursaria spinosa Calytrix tetragona Daviesia ulicifolia Dodonaea triquetra Exocarpos cuppressiformis Grevillea mucronulata Hakea sericea Hibbertia obtusifolia Indigofera australis Kunzea ambigua Melaleuca thymifolia Ozothamnus diosmifolius Persoonia linearis Pimelea linifolia Pultenaea flexilis	1 per 10 m^2	Baeckea virgata Bossiaea obcordata Breynia oblongifolia Calytrix tetragona Daviesia ulicifolia Dillwynia phylicoides Dodonaea triquetra Grevillea mucronulata Hibbertia obtusifolia Indigofera australis Leucopogon lanceolatus Melaleuca thymifolia Ozothamnus diosmifolius Persoonia linearis Pimelea linifolia Pultenaea flexilis Pultenaea villosa	1 per 10 m^2
Low & Ground	Aristida vagans Bossiaea prostrata Brunoniella australis Cymbopogon refractus Dianella revoluta var. revoluta Dichondra repens Echinopogon caespitosus var. caespitosus Einadia hastata Gompholobium grandiflorum Lepidosperma laterale Lomandra longifolia Lomandra multiflora subsp. multiflora Microlaeana stipoides Poa labillardieri Poa sieberiana Pomax umbellata Scaevola aemula Themeda australis	5 per m^2	Aristida vagans Bossiaea prostrata Brunoniella australis Cymbopogon refractus Dianella revoluta var. revoluta Dichondra repens Echinopogon caespitosus var. caespitosus Einadia hastata Gompholobium grandiflorum Hardenbergia violacea Lepidosperma laterale Lomandra longifolia Microlaeana stipoides Poa labillardieri Poa sieberiana Pomax umbellata Scaevola aemula Themeda australis	4 per m^2	Aristida vagans Bossiaea prostrata Brunoniella australis Cymbopogon refractus Dianella revoluta var. revoluta Dichondra repens Echinopogon caespitosus var. caespitosus Einadia hastata Gompholobium grandiflorum Hardenbergia violacea Lepidosperma laterale Lomandra longifolia Microlaeana stipoides Poa labillardieri Poa sieberiana Pomax umbellata Scaevola aemula Themeda australis	3 per m^2	Aristida vagans Bossiaea prostrata Brunoniella australis Cymbopogon refractus Dianella revoluta var. revoluta Dichondra repens Echinopogon caespitosus var. caespitosus Einadia hastata Gompholobium grandiflorum Hardenbergia violacea Lepidosperma laterale Lomandra longifolia Microlaeana stipoides Poa labillardieri Poa sieberiana Pomax umbellata Scaevola aemula Themeda australis	3 per m^2

Sydney Turpentine Ironbark Forest (STIF)

STIF	Toe		Middle		Upper		HRZ	
Type of cover	***Species***	***Density***	***Species***	***Density***	***Species***	***Density***	***Species***	***Density***
Canopy	Nil	N/A	Angophora costata Angophora floribunda Corymbia gummifera Eucalyptus globoidea Eucalyptus resinifera Eucalyptus paniculata Syncarpia glomulifer	1 per 50 m^2	Angophora costata Angophora floribunda Corymbia gummifera Eucalyptus globoidea Eucalyptus resinifera Eucalyptus paniculata Syncarpia glomulifer	1 per 10 m^2	Angophora costata Angophora floribunda Corymbia gummifera Eucalyptus globoidea Eucalyptus resinifera Eucalyptus paniculata Syncarpia glomulifer	1 per 100 m^2
Mid-storey	Nil	N/A	Acacia longifolia Acacia parramattensis Allocasuarina torulosa Breynia oblongifolia Bursaria spinosa Daviesia ulicifolia Elaeocarpus reticulatus Exocarpos cupressiformis Indigofera australis Kunzea ambigua Leucopogon juniperinus Ozothamnus diosmifolius Polyscias sambucifolius Rapanea variabilis Zieria smithii	1 per 10 m^2	Acacia longifolia Acacia parramattensis Allocasuarina torulosa Breynia oblongifolia Bursaria spinosa Daviesia ulicifolia Elaeocarpus reticulatus Exocarpos cupressiformis Indigofera australis Kunzea ambigua Leucopogon juniperinus Ozothamnus diosmifolius Polyscias sambucifolius Rapanea variabilis Zieria smithii	1 per 10 m^2	Breynia oblongifolia Daviesia ulicifolia Dodonaea triquetra Indigofera australis Leucopogon juniperinus Ozothamnus diosmifolius Polyscias sambucifolius Rapanea variabilis Zieria smithii	1 per 10 m^2
Low & Ground	Aristida vagans Arthropodium milleflorum Centella asiatica Commelina cyanea Dianella caerulea Dianella longifolia Dichondra repens Echinopogon caespitosus Glycine clandestina Imperata cylindrica Lepidosperma laterale Lomandra longifolia Lomandra multiflora subsp. multiflora Microlaena stipoides Panicum simile Poa affinis	5 per m^2	Aristida vagans Arthropodium milleflorum Billardiera scandens Clematis aristata Commelina cyanea Dianella caerulea Dichondra repens Echinopogon caespitosus Glycine clandestina Hardenbergia violacea Hibbertia dentata Imperata cylindrica Kennedia rubicunda Lepidosperma laterale Lomandra longifolia Microlaena stipoides Pandorea pandorana Poa affinis Pomax umbellate Smilax glyciphylla Themeda australis	4 per m^2	Aristida vagans Arthropodium milleflorum Billardiera scandens Clematis aristata Commelina cyanea Dianella caerulea Dichondra repens Echinopogon caespitosus Glycine clandestina Hardenbergia violacea Hibbertia dentata Imperata cylindrica Kennedia rubicunda Lepidosperma laterale Lomandra longifolia Microlaena stipoides Pandorea pandorana Poa affinis Pomax umbellata Smilax glyciphylla Themeda australis	3 per m^2	Aristida vagans Arthropodium milleflorum Billardiera scandens Clematis aristata Commelina cyanea Dianella caerulea Dichondra repens Echinopogon caespitosus Glycine clandestina Hardenbergia violacea Hibbertia dentata Imperata cylindrica Kennedia rubicunda Lepidosperma laterale Lomandra longifolia Microlaena stipoides Pandorea pandorana Poa affinis Pomax umbellata Smilax glyciphylla Themeda australis	3 per m^2

Swamp-Oak Floodplain Forest (SOFF)

SOFF	Toe		Middle		Upper		HRZ	
Type of cover	***Species***	***Density***	***Species***	***Density***	***Species***	***Density***	***Species***	***Density***
Canopy	Nil	N/A	Casuarina glauca Acmena smithii Alphitonia excelsa Callistemon salignus Melaleuca styphelioides	1 per 50 m^2	Casuarina glauca Acmena smithii Alphitonia excelsa Callistemon salignus Melaleuca styphelioides	1 per 10 m^2	Acmena smithii Alphitonia excelsa	1 per 100 m^2
Mid-storey	Nil	N/A	Glochidion ferdinandi Melaleuca ericifolia Melaleuca quinquenervia Melaleuca styphelioides Myoporum acuminatum	1 per 10 m^2	Glochidion ferdinandi Melaleuca ericifolia Melaleuca quinquenervia Melaleuca styphelioides Myoporum acuminatum	1 per 10 m^2	Glochidion ferdinandi Melaleuca ericifolia Melaleuca quinquenervia Melaleuca styphelioides Myoporum acuminatum	1 per 10 m^2
Low & Ground	Alternanthera denticulata Baumea juncea Blechnum indicum Carex appressa Centella asiatica Commelina cyanea Dianella caerulea Entolasia marginata Gahnia clarkei Hypolepis muelleri Imperata cylindrica Isolepis inundata Juncus planifolius Juncus usitatus Lobelia alata Lomandra longifolia Oplismenus imbecillis Persicaria decipiens Persicaria strigosa Viola banksii	5 per m^2	Blechnum indicum Carex appressa Centella asiatica Commelina cyanea Dianella caerulea Entolasia marginata Gahnia clarkei Hypolepis muelleri Imperata cylindrica Juncus planifolius Juncus usitatus Lobelia alata Lomandra longifolia Oplismenus imbecillis Parsonsia straminea Smilax australis Stephania japonica Viola banksii	4 per m^2	Blechnum indicum Carex appressa Centella asiatica Commelina cyanea Dianella caerulea Entolasia marginata Gahnia clarkei Hypolepis muelleri Imperata cylindrica Juncus planifolius Juncus usitatus Lobelia alata Lomandra longifolia Oplismenus imbecillis Parsonsia straminea Smilax australis Stephania japonica Viola banksii	3 per m^2	Blechnum indicum Carex appressa Centella asiatica Commelina cyanea Dianella caerulea Entolasia marginata Gahnia clarkei Hypolepis muelleri Imperata cylindrica Juncus planifolius Juncus usitatus Lobelia alata Oplismenus imbecillis Parsonsia straminea Smilax australis Stephania japonica Viola banksii	3 per m^2

References

NSW National Parks and Wildlife Services, 2002. *The Native Vegetation of the Cumberland Plain*. NSW National Parks and Wildlife Service, Hurstville.

NSW Scientific Committee endangered ecological community listings - final determinations for *Cumberland Plain Woodland, Shale Sandstone Transition Forest, River-flat Eucalypt Forest, Sydney Turpentine Ironbark Forest & Swamp Oak Floodplain Forest*

Travers Ecology 2013. *Vegetation Mapping Project within Sydney Water Trunk Drainage Land Rouse Hill*. Prepared for Sydney Water.

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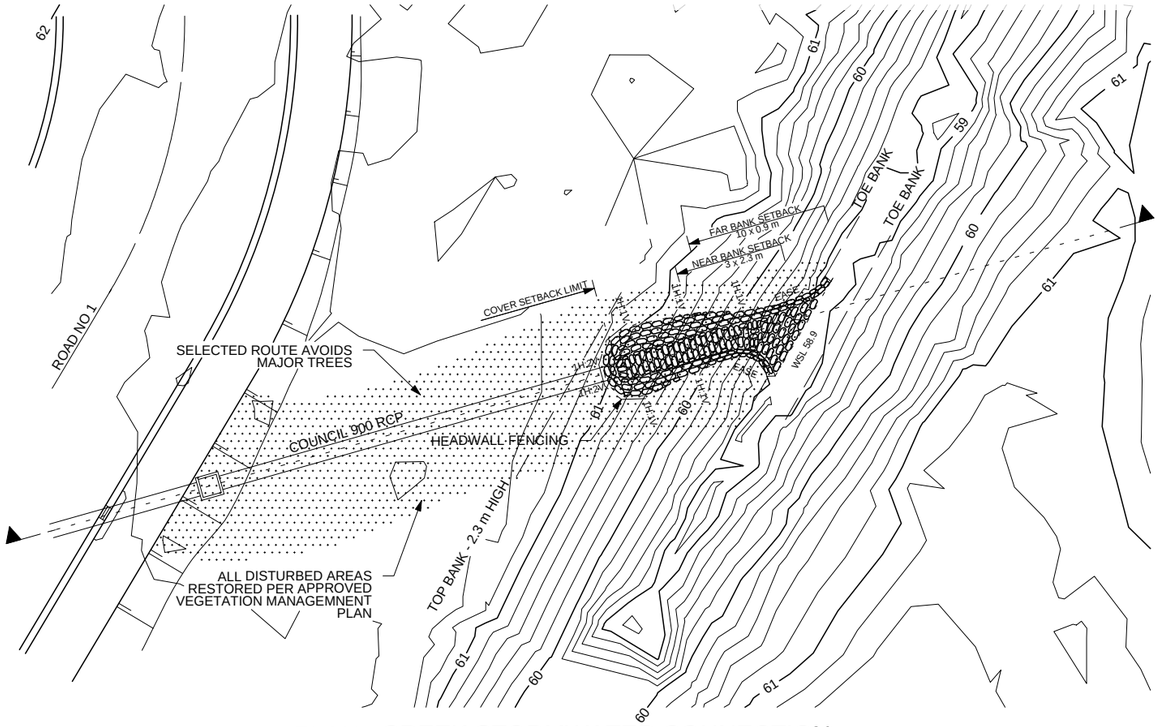
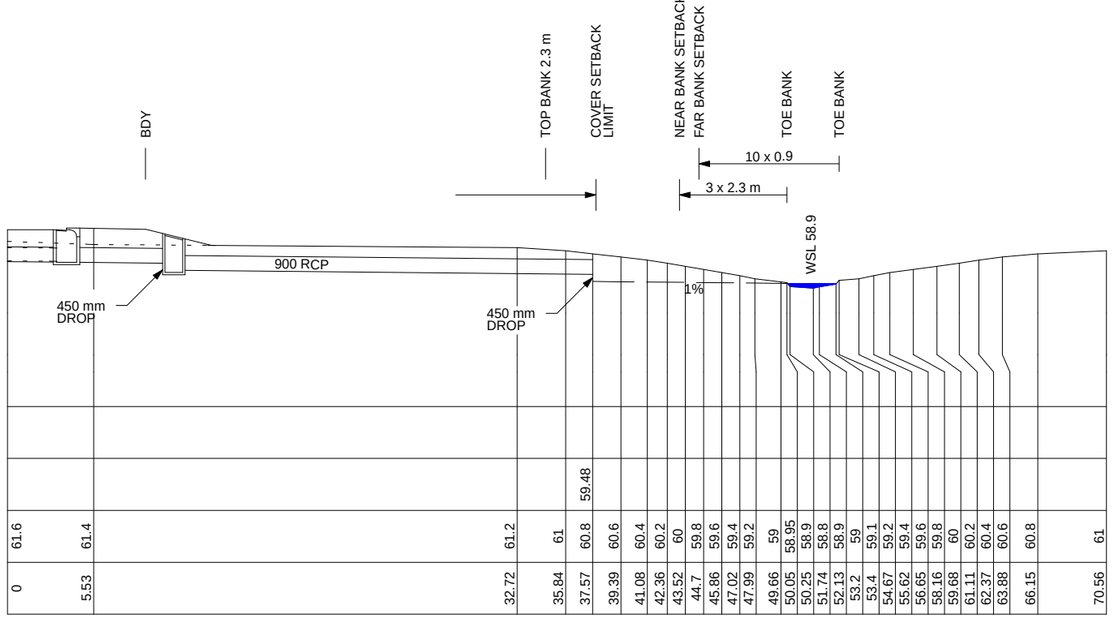
Natural Asset Operation Manager list assembled from site visits and contractors monthly reports.

8. Definitions

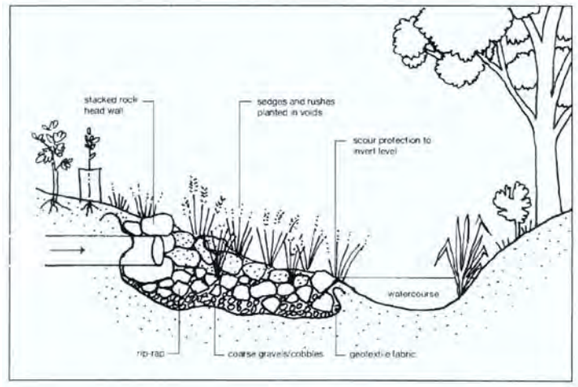
Term	Definition
Broad catchment plan	Mapping of the area showing various land features that will affect direction of run-off – this will determine the most ideal location for connection
Controlled activities	Developments and activities that are carried out in or near a river, lake or estuary (as defined by the Water Management Act 2000)
Natural waterway	A course of water carrying the flow of a river, lake or estuary
Riparian corridor	The transition zone between the land and waterway (as defined by NSW Office of Water)
Trunk drainage corridor	The boundary of Sydney Water ownership for the natural waterway



PLAN - CREEK STORMWATER CONNECTION
1:200



LONGSECTION - CREEK STORMWATER CONNECTION
1:200 NATURAL



LONGSECTION - CREEK STORMWATER CONNECTION
NOT TO SCALE

DESIGN	CONSIDERATION	CRITERIA
HEADWALL LOCATION	LOCATE THE HEADWALL CLOSE TO THE CREEK BUT NOT TOO CLOSE TO KEEP THE DISTURBANCE TO THE RIPARIAN CORRIDOR VEGETATION AND ROCK COVERAGE FOOTPRINT AS SMALL AS POSSIBLE TO MAKE SMOOTH BATTER TRANSITIONS TO THE EXISTING GROUND AND BANK LEVELS TO REDUCE FLOW TURBULENCE AGAINST THE OPPOSING CREEK BANK	COVER OVER PIPE • 450 mm DESIRABLE MINIMUM • 300 mm CONSTRAINED MINIMUM SETBACK FROM CREEK NEAR BANK • 3x THE BANK HEIGHT SETBACK FROM FAR BANK • 10x PIPE DIAMETER (SINGLE PIPE) • 13x PIPE DIAMETER (LARGEST OF MULTIPLE)
INVERT LEVEL	THE PIPE INVERT LEVEL IS ABOVE THE WATER LEVEL IN THE CREEK TO MAKE IT LESS LIKELY FOR THE PIPE TO BECOME BLOCKED WITH SILT OVER TIME – ESPECIALLY FOR SMALLER PIPES LESS THAN 600 mm DIAMETER	VERTICAL DROP FROM PIPE INVERT TO WATER LEVEL • 1.0% GRADE PLUS 450 mm DESIRABLE • 0.5% GRADE PLUS 200 mm MINIMUM VERTICAL DROP AT LOCATION OF FUTURE GPT • 600 mm DESIRABLE • 300 mm MINIMUM
ENTRY ANGLE	THE PIPELINE POINTS DOWNSTREAM TO ASSIST THE FLOW ENTRY AND REDUCE TURBULENCE AGAINST THE BANKS	30 DEGREES PREFERRED ANGLE 45 DEGREES ACCEPTABLE ANGLE CONSIDER ADDITIONAL ROCK ARMOURING OF OPPOSITE BANK FOR HIGHER ANGLES APPROACHING 90 DEGREES
INSPECTION	**CONSIDERATION**	**CRITERIA**
GEOFABRIC	PLACE HEAVY DUTY GEOFABRIC OVER EXCAVATED EARTH FACES TO PROTECT THE EARTH FROM FLOWING WATER	BIDIM A44 OR APPROVED EQUIVALENT OVER ALL CUT EARTH FACES UNDER THE ROCKS
COARSE GRAVEL	PLACE A LAYER OF COARSE GRANULAR MATERIAL OVER THE GEOFABRIC TO PROTECT THE GEOFRABRIC FROM TEARING AND TWISTING DURING THE PLACEMENT OF LARGE ROCKS AND HOLD THE GEOFABRIC EVENLY AGAINST THE EARTH FACE	PLACE 100 mm THICK LAYER OF COARSE GRANULAR MATERIAL OVER THE GEOFABRIC USE INERT 'LOW ENVIRONMENTAL IMPACT' MATERIAL SUCH AS CRUSHED RECYCLED TERRA COTTA (10 mm – 40 mm) DO NOT USE NATURAL RIVER STONE, BLUE METAL OR SIMILAR
ROCK FOR HEADWALL	INSTALL A NEAT INTERLOCKING HEADWALL MATRIX OF HARD SANDSTONE ROCKS TO HOLD DOWN THE END PIPE SECURELY AND RETAIN THE EARTH ABOUT THE PIPE	PROVIDE MIXTURE HARD SANDSTONE ROCK SIZES – BY VOLUME • APPROXIMATELY 70% LARGE o GENERALLY TOO BIG FOR TWO STRONG PEOPLE TO LIFT TYPICALLY 200 kg – 500 kg o REGULAR SHAPE ABOUT 1.20 m - 0.75 m x 0.50 m x 0.45 m - 0.25 m • APPROXIMATELY 15% MEDIUM o ABOUT 'SOCCER BALL' SIZE • APPROXIMATELY 15% SMALL o ABOUT 'CLOSED FIST' SIZE ROCK BATTERS UP TO 1H:2V STEEP ACCEPTABLE A MAXIMUM OF 1 m OF THE TOP OF THE PIPE CAN BE EXPOSED
ROCK FOR BED AND SIDE BATTERS	INSTALL A NEAT INTERLOCKING MATRIX OF HARD SANDSTONE ROCKS OVER THE CHANNEL BATTERS AND BASE SMOOTHLY BETWEEN THE PIPE INVERT TO THE WATER LEVEL IN THE CREEK TO SPREAD WATER FLOWS ENTERING THE CREEK AND SUPPORT AND PROTECT THE CHANNEL SIDE BATTERS	PROVIDE MIXTURE HARD SANDSTONE ROCK SIZES A HIGHER PROPORTION OF MEDIUM AND SMALL SIZED ROCKS ACCEPTABLE MINIMUM 50% LARGE ROCKS REQUIRED ALL BATTERS STEEPER THAN 2H:1V TO BE ROCK ARMOURED ALL NON ROCK BATTERS TO BE NO STEEPER THAN 3H:1V AND REVEGETATED
ROCKS CONNECT WITH THE WATER IN CREEK	THE ROCK CHANNEL EXTENDS INTO THE LOW WATER IN THE CREEK TO CUSHION WATER ENTERING THE CREEK AND REDUCE EROSION	ROCK TO EXTEND TO A MINIMUM 200 mm BELOW THE CREEK (LOW) WATER LEVEL
SOIL AND VEGETATION	PLACE SOIL INTO THE ROCK MATRIX TO SUPPORT VEGETATION PLANTINGS	USE STOCKPILED LOCAL SOIL STRIPPED DURING THE PIPELINE CONSTRUCTION IF ADDITIONAL SOIL REQUIRED TO BE IMPORTED MUST COMPLY WITH AS 4419 FILL ROCK VOIDS WITH TOPSOIL FOR PLANTINGS INSTALL TOPSOIL ON ALL EARTH BATTERS FOR PLANTING AND PROTECT WITH JUTE MATTING REFER SEPARATE APPROVED VEGETATION MANAGEMENT PLAN FOR PLANTING AND REHABILITATION REQUIREMENTS
FENCING	INSTALL FENCING TO STEEP BATTER AREAS TO REDUCE FALL HAZARD	INSTALL MONOWILLS BALLTUBE FENCING WITH HAND AND KNEE RAILS OR APPROVED EQUIVALENT ALONG ROCK BATTERS STEEPER THAN 1:H:1V

BAR SCALE (m)
0 1 2 3 4 5 6 7 8 9 10 15 20

REVISION	REVISION DESCRIPTION	DATE
1	ORIGINAL ISSUE	JULY 2014

Sydney WATER
SYDNEY WATER CORPORATION

STANDARD DRAWINGS FOR STORMWATER CONNECTIONS

STORMWATER CONNECTIONS TO NATURAL WATERWAYS

SCALE AS SHOWN

STW-1108

Kellyville Station Precinct

Utility Servicing Report

Prepared on behalf of Landcom

Date: 17 May 2020

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Stantec

Revision

Revision	Date	Comment	Prepared By	Approved By
1	26 June 2019	Initial SSDA Issue	OKW	OKW
2	22 August 2019	Initial SSDA Issue (Lot numbers amended)	OKW	OKW
3	6 September 2019	Initial SSDA Issue (Site definition amended)	OKW	OKW
4	10 April 2020	Revised SSDA Issue (Yield updated)	OKW	OKW
5	17 May 2020	Revised SSDA Issue (Figure 2.2 Updated)	OKW	OKW

Note: Revisions 1 - 3 by Wood & Grieve Engineers now part of Stantec

Executive Summary

This utility servicing report is intended to support the State Significant Development application for the portion of the Kellyville Station Precinct that is either owned by or under the control of Sydney Metro. While the State Significant Development application includes only a portion of the Kellyville Station Precinct, the utility servicing strategy incorporates the entire Precinct to ensure that a coordinated strategy is developed.

The purpose of this report is to provide preliminary advice regarding utility infrastructure requirements, including the following:

- Wastewater (sewer);
- Potable water;
- Recycled water;
- Electricity;
- Gas; and
- Communications.

Liaison has occurred with the utility authorities to assess:

- Existing infrastructure proximate to the proposed development;
- The capacity of existing infrastructure to service the proposed development; and
- Infrastructure upgrades required to service the proposed development.

Sydney Water have confirmed that the development is capable of being serviced with sewer, water and recycled water via extension of existing infrastructure proximate to the site.

Endeavour Energy have confirmed that the development is capable of being serviced with power infrastructure via installation of feeders from the Parklea Zone Substation. The Parklea Zone Substation is located at the intersection of Old Windsor Road and Sunnyholt Road and is proximate to the site.

Jemena Gas have confirmed that the development is capable of being serviced with gas infrastructure via extension of existing infrastructure proximate to the site.

NBN Co are the Wholesale Provider of Last Resort for telecommunications. As the Wholesale Provider of Last Resort, NBN Co have a legislative obligation to service the development under the Communications Act.

While the infrastructure servicing advice provided by the utility authorities is preliminary only and subject to change, it indicates that the development is capable of being serviced with all essential services.

Contents

1. Introduction

Stantec Australia Pty Ltd has been engaged by Landcom ('the Proponent') to prepare a Utility Servicing Report for the Kellyville Station Precinct ('the Site'). The report is intended to support the State Significant Development (SSD) application for the portion of the Site that is owned by or under the control of Sydney Metro.

The Site includes both government and non-government owned lands. While the SSD application covers only land owned or controlled by Sydney Metro, consideration has been given to the broader precinct to ensure that a coordinated utility servicing strategy is developed.

The purpose of this report is to provide preliminary advice regarding utility infrastructure requirements to service the development of the Site, including the following:

- Wastewater (sewer);
- Potable water;
- Recycled water;
- Electricity;
- Gas; and
- Communications.

Liaison has occurred with the utility authorities to assess:

- Existing infrastructure proximate to the proposed development;
- The capacity of existing infrastructure to service the proposed development; and
- Infrastructure upgrades required to service the proposed development.

Information provided hereunder is preliminary. The utility infrastructure servicing strategy may change due to a variety of factors beyond the control of the Proponent.

2. Site Characteristics

The Kellyville Station Precinct ('the Site') is shown in **Figure 2.1** below and is bounded by:

- Old Windsor Road to the west;
- Samantha Riley Drive to the north;
- Memorial Avenue to the south; and
- Elizabeth Macarthur Creek to the east.

The Site is in The Hills Shire Council local government area.

The portion of the Site that forms part of the SSD application, including the legal description, is shown in **Figure 2.2** on page 3.

While the SSD application includes only a portion of the Site, consideration has been given to utility servicing of the entire Site to ensure that a coordinated strategy is developed. The portion of the Site that is subject of the SSD application is 18.8 Ha and the area considered in the utility servicing strategy is 22 Ha.

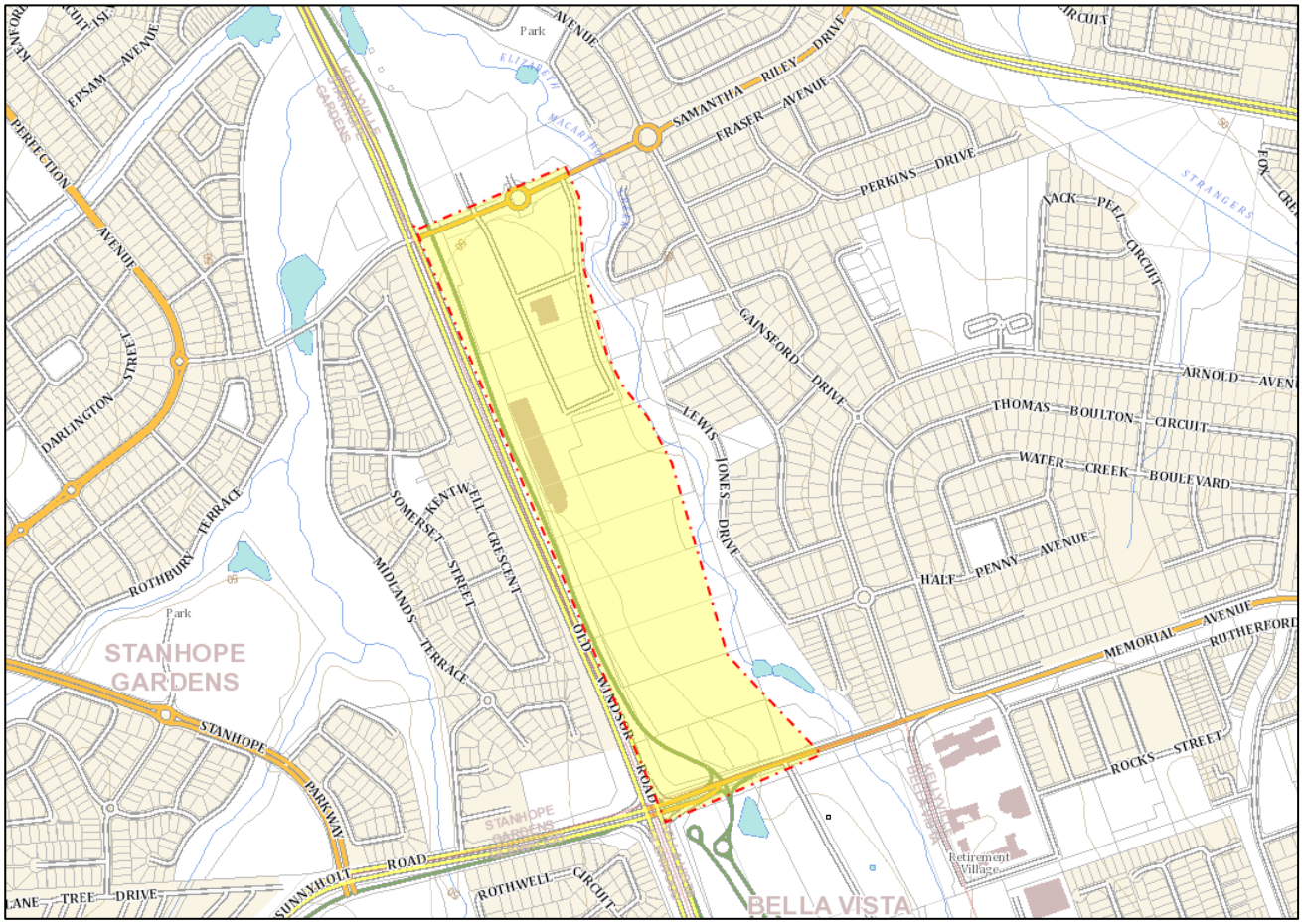


Figure 2.1 - Kellyville Project Site (the Site)

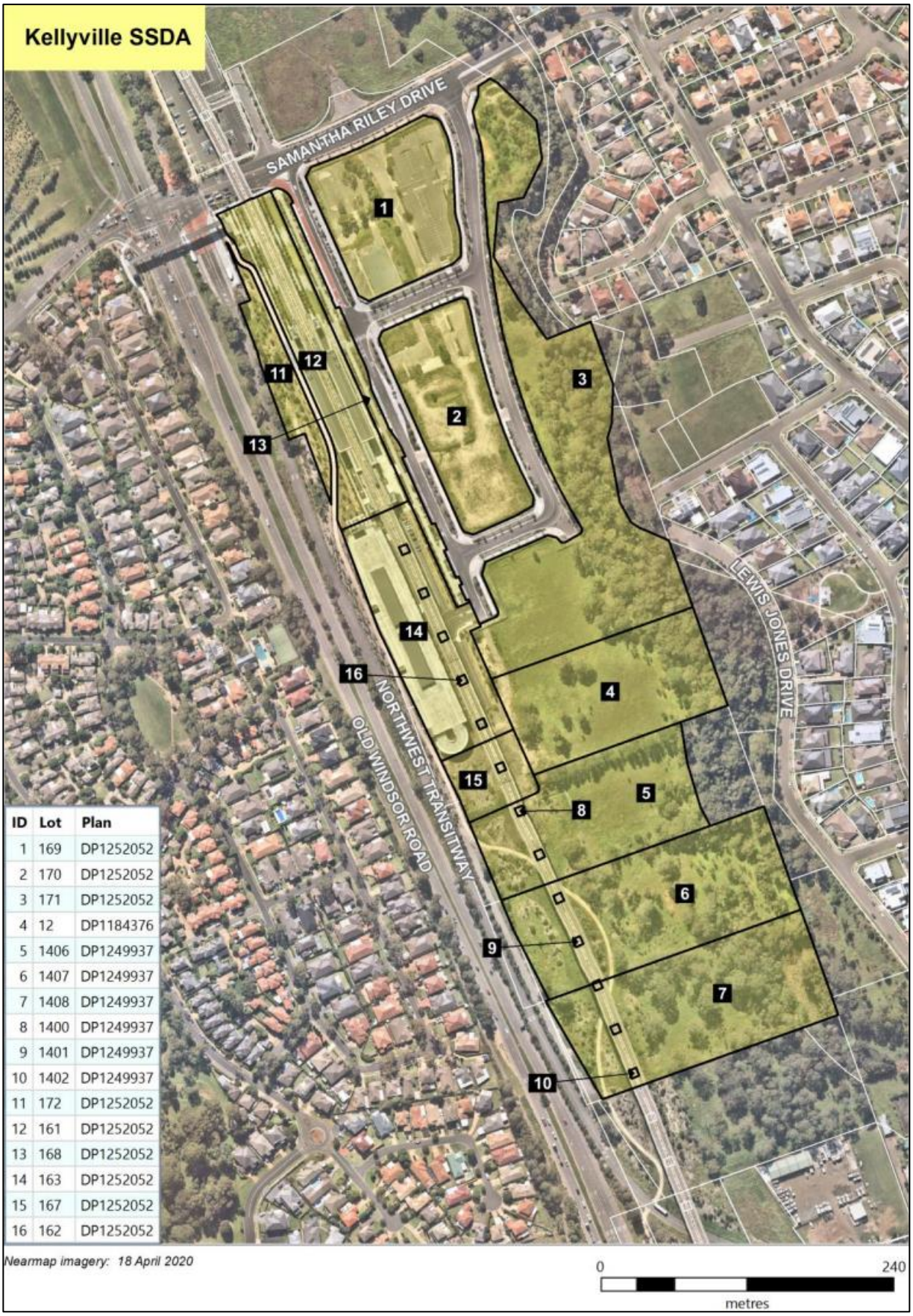


Figure 2.2 - Portion of the Site that is subject of the SSD application

3. Proposed Development

3.1 Sydney Metro Northwest Places Overview

The NSW Government and Sydney Metro have finalised the first stages of Australia's biggest public transport project that have seen the commencement of new metro services in Sydney's northwest in May 2019.

Under the Sydney Metro Northwest (SMNW) Places program, Landcom and Sydney Metro are working collaboratively with the Department of Planning and Environment, local councils, other government organisations and key stakeholders to develop the long-term vision and delivery program to guide the redevelopment and urban renewal of surplus government owned or controlled land around new SMNW station precincts.

SMNW Places will deliver vibrant and integrated precincts surrounding the new Bella Vista and Kellyville metro stations that will facilitate the renewal and delivery of a greater supply and diversity of housing, new employment opportunities and new public and community facilities.

3.2 Kellyville Station Precinct Overview

The Kellyville Station Precinct forms part of a network of eight station precincts along the corridor of the NSW Government's $8.4 billion SMNW. The Precinct was identified by the NSW Government as a Priority Precinct to support and drive the urban renewal of rural residential land into a new urban environment.

The Kellyville Station Precinct is envisaged to provide 1,000 new jobs and, in conjunction with the adjacent Bella Vista Station Precinct, up to 8,400 new homes shared between the precincts.

3.3 Concept SSD Application Scope

Development consent is sought for a concept development application pursuant to section 4.22(1) of the Environmental Planning and Assessment Act 1979 (EP&A Act) that sets out the concept proposal for a portion of the Site that comprises the following components:

- A land use strategy that identifies the overall allocation, quantum and location of land uses across a portion of the Site, including:
  - Residential dwellings comprising residential flat buildings and terraces;
  - Non-residential land uses including retail and commercial;
  - Public open space including public domain and parks; and
  - Community facilities.
- Urban Design Guidelines that includes built form design principles, guidelines and controls, including maximum building heights and street wall setbacks and heights;
- Allocation of maximum gross floor area (GFA) across a portion of the Site for each development block and for specific land uses, including allowable GFA transferred from roads and open space to identified development lots pursuant to clause 8.3 of The Hills Local Environmental Plan 2012 (Council's LEP);
- Street hierarchy and layout, including the identification of pedestrian and vehicular movement and access arrangements, and the indicative location and configuration of new streets and intersection connections to the existing road network; and
- Identification of criteria or thresholds for subsequent development stages to be assessed as State Significant Development pursuant to section 4.37 of the EP&A Act.

The concept SSD application does not seek development consent for any physical works. All development set out in the concept proposal will be subject to a separate approval pathway.

3.4 Utility Servicing Scope

While the SSD application includes only the portion of the Site that is owned or controlled by Sydney Metro, the utility servicing strategy makes allowance for the Site in its entirety. This includes land that is not owned or controlled by Sydney Metro. Further to this, the development yield for the Site is less than the maximum yield permissible by Council's LEP. The utility servicing strategy makes allowance for the maximum permissible yield under Council's LEP to allow for future development flexibility. A comparison of the yield in the three scenarios is included in **Table 3.1.**

Development Type	**Yield**		
	Included in SSD application	Included in the Site	Permissible under Council's LEP
Dwellings	1,910	1,910 + ~367 = ~2,277	3,488
Retail / Commercial / Community / School	10,736 m² GFA	10,736 + 0 = 10,736 m² GFA	22,940 m²

Table 3.1 - Yield Scenarios

The yield permissible under Council's LEP has been used as the basis for the utility servicing strategy presented hereunder.

4. Wastewater (Sewer)

4.1 Existing Infrastructure

The Site is in Sydney Water's Area of Operations for sewer infrastructure.

Information regarding existing Sydney Water infrastructure proximate to the Site has been sourced from Dial Before You Dig, Sydney Water's Hydra tool and directly from Sydney Water and is included in **Appendix A.**

Existing infrastructure is summarised below:

- 525mm diameter Glass-Reinforced Plastic (GRP) carrier. Details of the carrier are summarised below:
  - The carrier is located to the east of Elizabeth Macarthur Creek, between the creek and existing roads/residential development;
  - The depth of the carrier varies along the Site frontage. Depth beneath existing is generally between 3.5m and 4.5m;
  - There are several access chambers with stubs extending to the west to service future development;
  - The carrier discharges to an existing DN900 Reinforced-Concrete Plastic-Lined main to the north of the Site, and ultimately to the Rouse Hill Recycling Plant.
- 250mm diameter Polyethylene (PE) reticulation extending from the DN525 trunk main into the Site. This main appears to be installed primarily to service the recently constructed Kellyville Station.

No other infrastructure exists in the vicinity of the Site that would either affect development or serve as suitable receiving infrastructure.

4.2 Authority Liaison

A Feasibility Application was lodged with Sydney Water on 16 January 2019 (Sydney Water Case Number 175809) and a response was received on 14 May 2019. A copy of the Feasibility Application is included in **Appendix B** copy of Sydney Water's response is included in **Appendix C**.

The Feasibility Application includes both the Kellyville Station Precinct and the Bella Vista Station Precinct to ensure that a combined utility servicing strategy is developed for both precincts.

4.3 Supply

Sydney Water advised the following regarding general sewer, potable water and recycled water servicing:

- The information supplied with the Feasibility Application is very similar to the information previously utilised to create Sydney Water's scheme plans;
- It appears that both the Kellyville & Bella Vista Station Precincts will have customised servicing arrangements with unique demand and discharge levels and patterns. Sydney Water may need to refresh their current scheme plans once further details regarding the developments are known; and
- Proposed zoning, Floor Space Ratio and building heights are consistent with current zoning, which has been used to develop current scheme plans.

Sydney Water advised the following regarding sewer servicing:

- The proposed development is within a known high-growth area along the North West Metro line;
- A wastewater scheme has not been created but an assessment of the carrier (as referenced in Section 4.1) has been undertaken. Lead-ins will need to be sized from the carrier for each sub-catchment; and
- The developer must construct waste water main extensions (lead-ins) to service the developments.

Based on the above advice, lead-ins must be installed from the existing carrier proximate to the Site (adjacent to Elizabeth Macarthur Creek). Reticulation will also be necessary along proposed and existing roads to service each allotment.

5. Potable Water

5.1 Existing Infrastructure

The Site is in Sydney Water's Area of Operations for potable infrastructure.

Information regarding existing Sydney Water infrastructure proximate to the Site has been sourced from Dial Before You Dig, Sydney Water's Hydra tool and directly from Sydney Water and is included in **Appendix A**.

Existing infrastructure is summarised below:

- 200mm diameter Ductile-Iron Cement-Line (DICL) reticulation on Samantha Riley Drive (north of the Site);
- 200mm diameter DICL reticulation extending from the Samantha Riley Drive main into roads constructed by Northwest Rapid Transit. At the time of this reporting, the mains are not yet shown on Dial Before You Dig records;
- 900mm diameter Steel Cement Lined (SCL) trunk main and 100mm diameter DICL reticulation in the Old Windsor Road reserve (west of the Site). Both assets are in the eastern verge to the south of Heywood Glen and in the western verge to the north of Heywood Glen;
- 300mm DICL trunk main in the northern verge of Memorial Drive (south of the Site).

There are numerous other reticulation assets to the east of Elizabeth Macarthur Creek that could potentially be utilised to reinforce supply to localised portions of the Site if necessary. These are too numerous to exhaustively list here, however they include 200mm diameter DICL reticulation in Colonial Street.

5.2 Authority Liaison

A Feasibility Application was lodged with Sydney Water on 16 January 2019 (Sydney Water Case Number 175809) and a response was received on 14 May 2019. A copy of the Feasibility Application is included in **Appendix B** and a copy of Sydney Water's response is included in **Appendix C**.

The Feasibility Application includes both the Kellyville Station Precinct and the Bella Vista Station Precinct to ensure that a combined utility servicing strategy is developed for both precincts.

5.3 Supply

Sydney Water advised the following regarding general sewer, potable water and recycled water servicing:

- The information supplied with the Feasibility Application is very similar to the information previously utilised to create Sydney Water's scheme plans;
- It appears that both the Kellyville & Bella Vista Station Precincts will have customised servicing arrangements with unique demand and discharge levels and patterns. Sydney Water may need to refresh their current scheme plans once further details regarding the developments are known; and
- Proposed zoning, Floor Space Ratio and building heights are consistent with current zoning, which has been used to develop current scheme plans.

Sydney Water advised the following regarding potable water servicing:

- Drinking (potable) water scheme plans were created based on predicted development types at the time the Metro rail project was instigated (circa 2015); and
- Drinking water mains extensions must be constructed to service the proposed development.

Based on the above advice, reticulation must be extended along proposed roads from existing infrastructure proximate to and within the Site. Reticulation must be extended to provide a service to each allotment.

6. Recycled Water

6.1 Existing Infrastructure

The Site is in Sydney Water's Area of Operations for recycled water infrastructure.

Information regarding existing Sydney Water infrastructure proximate to the Site has been sourced from Dial Before You Dig, Sydney Water's Hydra tool and directly from Sydney Water and is included in **Appendix A**.

Existing infrastructure is summarised below:

- 150mm diameter Unplasticised Polyvinyl Chloride (uPVC) reticulation on Samantha Riley Drive (north of the Site);
- 150mm diameter uPVC reticulation extending from the Samantha Riley Drive main into roads constructed by Northwest Rapid Transit. At the time of this reporting, the mains are not yet shown on Dial Before You Dig records;
- 450mm diameter GRP trunk main in the Old Windsor Road reserve (west of the Site). The main is located in the eastern verge to the south of Heywood Glen and in the western verge to the north of Heywood Glen;
- 600mm diameter DICL trunk main in the western verge of the Old Windsor Road reserve (west of the Site).
- 250mm diameter uPVC reticulation in the northern verge of Memorial Drive (south of the Site).

There are numerous other reticulation assets to the east of Elizabeth Macarthur Creek that could potentially be utilised to reinforce supply to localised portions of the Site if necessary. There are numerous other reticulation assets to the east of Elizabeth Macarthur Creek that could potentially be utilised to reinforce supply to localised portions of the Site if necessary. These are too numerous to exhaustively list here, however they include 200mm diameter uPVC reticulation in Colonial Street.

6.2 Authority Liaison

A Feasibility Application was lodged with Sydney Water on 16 January 2019 (Sydney Water Case Number 175809) and a response was received on 14 May 2019. A copy of the Feasibility Application is included in **Appendix B** copy of Sydney Water's response is included in **Appendix C**.

The Feasibility Application includes both the Kellyville Station Precinct and the Bella Vista Station Precinct to ensure that a combined utility servicing strategy is developed for both precincts.

6.3 Supply

Sydney Water advised the following regarding general sewer, potable water and recycled water servicing:

- The information supplied with the Feasibility Application is very similar to the information previously utilised to create Sydney Water's scheme plans;
- It appears that both the Kellyville & Bella Vista Station Precincts will have customised servicing arrangements with unique demand and discharge levels and patterns. Sydney Water may need to refresh their current scheme plans once further details regarding the developments are known; and
- Proposed zoning, Floor Space Ratio and building heights are consistent with current zoning, which has been used to develop current scheme plans.

Sydney Water advised the following regarding recycled water servicing:

- Recycled water scheme plans were created based on predicted development types at the time the Metro rail project was instigated (circa 2015); and
- Recycled water mains extensions must be constructed to service the proposed development.

Based on the above advice, reticulation must be extended along proposed roads from existing infrastructure proximate to and within the Site. Reticulation must be extended to provide a service to each allotment.

7. Power

7.1 Existing Infrastructure

The Site is in Endeavour Energy's franchise area. The Site is classified by Endeavour Energy as being in the North region.

Information regarding existing Endeavour Energy infrastructure proximate to the Site has been sourced from Dial Before You Dig and Endeavour Energy software and is included in **Appendix D**.

There are several zone substations proximate to the Site. The zone substations are shown in **Figure 7.1** and are described below:

- The Parklea Zone Substation located 180m from the Site at the intersection of Old Windsor Road and Sunnyholt Road / Memorial Avenue;
- The Bella Vista Zone Substation located approximately 1.4km south of the intersection of Old Windsor Road and Celebration Drive; and
- The Kellyville Zone Substation located approximately 2.7km north-east of the intersection of Old Windsor Road and Samantha Riley Drive.

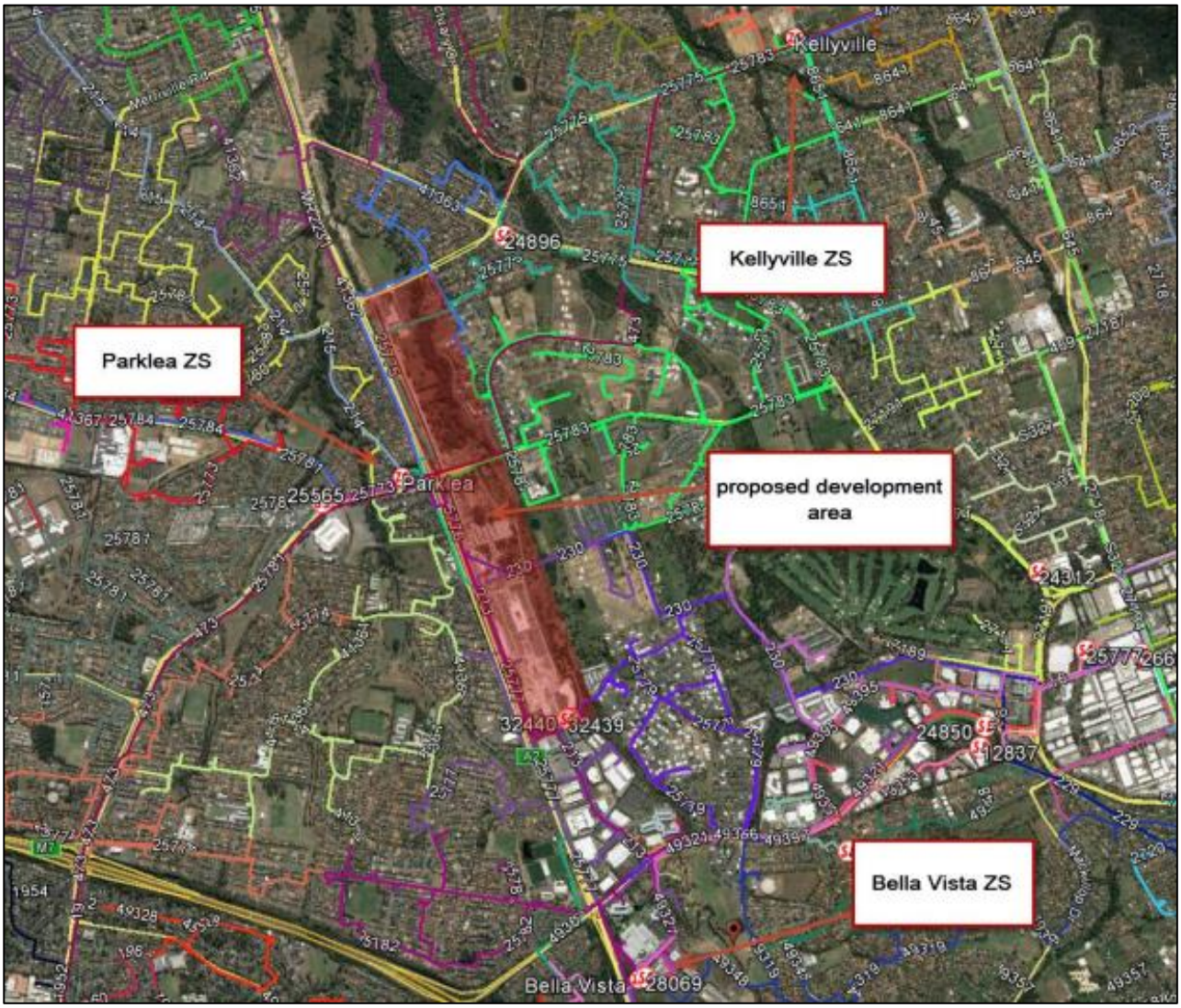


Figure 7.1 - Endeavour Energy zone substations proximate to the Site

7.2 Authority Liaison

A Technical Review Request was lodged with Endeavour Energy on 20 November 2018 and a response was received on 18 December 2018 (Endeavour Energy Reference ENL3223). A copy of the Technical Review Request is included in **Appendix E** and Endeavour Energy's response is included in **Appendix F**.

The Technical Review Request includes both the Kellyville Station Precinct and the Bella Vista Station Precinct to ensure that a combined utility servicing strategy is developed for both precincts.

7.3 Demand

Based on the yield included in Section 3, power demand has been estimated by Endeavour Energy based on an allowance of 3.5kVA per dwelling for residential development, and 0.1kVA per m² for non-residential development. Estimated maximum power demands are shown in **Table 7.1**.

Precinct	Land Use	Estimated Maximum Demand
Kellyville	Residential	12,208 kVA
	Retail	1,433 kVA
	Commercial	610 kVA
	Community	252 kVA
	TOTAL	14.5 MVA
Bella Vista	Residential	17,199 kVA
	Retail	4,426 kVA
	Commercial	22,376 kVA
	Community	431 kVA
	TOTAL	44.4 MVA

Table 7.1 - Estimated Power Demand

It is noted that the original Technical Review Request used an allowance of 4kVA per dwelling for residential development. Endeavour Energy subsequently amended this to 3.5kVA per residential development in accordance with current industry standard.

7.4 Supply

Endeavour Energy advised that development of both the Kellyville and Bella Vista Station Precincts has previously been considered in network planning.

Endeavour Energy advised the following regarding the capacity of zone substations proximate to the Site:

- The Parklea Zone Substation has capacity to service both the Kellyville and Bella Vista Station Precincts and is ideally located to do so;
- The Bella Vista Zone Substation has capacity to service the initial stages of the Bella Vista Station Precinct. This is not further considered in this report; and

- The Kellyville Zone Substation is not intended to service the Kellyville or Bella Vista Station Precincts and has not been considered further.

Endeavour Energy advised that they are not aware of any other major works occurring in the area that would affect servicing of the Site and they do not envisage any risks that could delay implementation of the works.

Endeavour Energy advised that the following works would be required to facilitate the proposed development:

- 22kV / 11kV autotransformers are likely required to interconnect between Parklea and Bella Vista Zone Substations. It is noted that land would need to be allocated to these autotransformers, however the land required to facilitate the autotransformers is insignificant in the context of the proposed development;
- 2x 22kV feeders extending from the Parklea Zone Substation to the Site. Each 22kV feeder has capacity to supply up to 9MVA;
- Typical underground power, substations and street-lighting. This would be reticulated through the proposed road network to service the proposed development.

8. Gas

8.1 Existing Infrastructure

The Site is in Jemena Gas' Distribution Area.

Information regarding existing Jemena Gas infrastructure proximate to the Site has been sourced from Dial Before You Dig and Jemena Gas and is included in **Appendix G**.

Existing infrastructure is summarised below:

- 200mm diameter steel 1,050kPa high-pressure/secondary main in the western verge of Old Windsor Road (west of the Site);
- 160mm diameter PE 210kPa distribution main in the northern verge of Memorial Drive (south of the Site);
- 50mm diameter nylon and 110mm diameter PE 210kPa distribution mains in Samantha Riley Drive (north of the site).
- A combination of 32mm diameter nylon, 50mm diameter nylon and 110mm diameter PE 210kPa distribution mains reticulating in existing roads within the northern portion of the Site.

8.2 Authority Liaison

A gas supply request was lodged with Jemena Gas on 18 March 2019 and a response was received on 28 March 2019. A copy of the request information is included in **Appendix H** and a copy of Jemena Gas' response is included in **Appendix I.**

The gas supply request includes both the Kellyville Station Precinct and the Bella Vista Station Precinct to ensure that a combined utility servicing strategy is developed for both precincts.

8.3 Supply

Jemena Gas advised that a formal offer for supply can only be made once construction is imminent and a head contractor has been appointed to deliver public infrastructure.

Jemena Gas provided the following preliminary advice:

- Up to 600 dwellings and commercial area could be serviced via connection to existing gas infrastructure in the northern part of the Site;
- An additional 850 dwellings could be serviced by providing an additional inter-connection through the intersection of Samantha Riley Drive and Macquarie Avenue approximately to existing infrastructure approximately 160m east of the Site;
- The remaining development (as outlined in Section 3.4) could be serviced via connection of the existing 110mm PE main within the Site to the existing 160mm PE main in Memorial Drive.

9. Telecommunications

9.1 Existing Infrastructure

The Site is in NBN Co's supply area.

NBN Co's online services indicate that communications services are available at the Site, as indicated in **Figure 9.1**

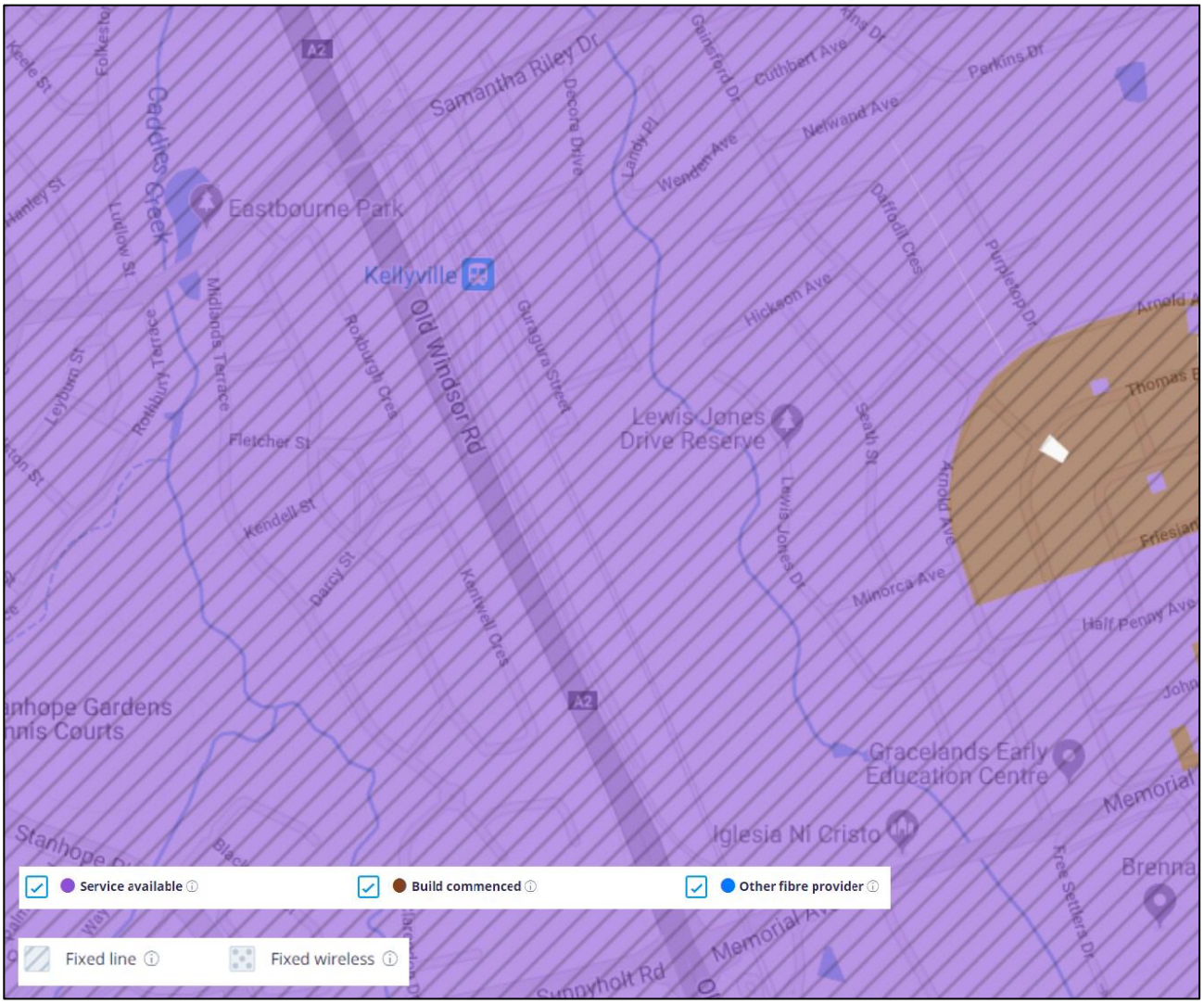


Figure 9.1 - NBN service map

9.2 Supply

The Communications Act stipulates that NBN Co are the Wholesale Provider of Last Resort for developments in excess of 100 dwellings. Recent amendments to the Communications Act have encouraged competition within the wholesale sector; as such it may be possible to provide communications services through an alternate provider in the future if desired.

Appendix A - Existing Wastewater, Potable & Recycled Water Infrastructure

Guide to reading Sydney Water DBYD Plans

February 2015

Asset Information

Legend

Sewer

Sewer Main (with flow arrow & size type text) — 225 PVC
Disused Main
Rising Main
Maintenance Hole (with upstream depth to invert) — 1.7
Sub-surface chamber
Maintenance Hole with Overflow chamber
Ventshalft EDUCT — VSE
Ventshaft INDUCT — VS
Property Connection Point (with chainage to downstream MH) — 10.5
Concrete Encased Section — Concrete Encased
Terminal Maintenance Shaft — TMS
Maintenance Shaft — MS
Rodding Point — RP
Lamphole
Vertical — VERT
Pumping Station — SP0882
Sewer Rehabilitation

Pressure Sewer

Pressure Sewer Main
Pump Unit (Alarm, Electrical Cable, Pump Unit) — A
Property Valve Boundary Assembly
Stop Valve
Reducer / Taper
Flushing Point — FP

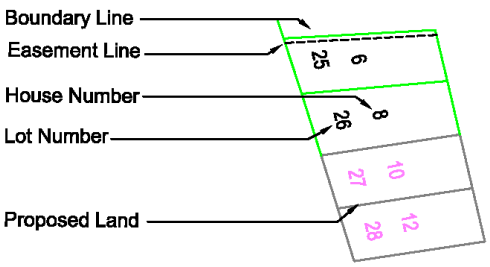
Vacuum Sewer

Pressure Sewer Main
Division Valve
Vacuum Chamber
Clean Out Point

Stormwater

Stormwater Pipe
Stormwater Channel
Stormwater Gully
Stormwater Maintenance Hole

Property Details



Sydney Water Heritage Site (please call **132 092** and ask for the **Heritage Unit**)

Water

WaterMain - Potable (with size type text) — 200 PVC
Disconnected Main - Potable
Proposed Main - Potable
Water Main - Recycled
Special Supply Conditions - Potable
Special Supply Conditions - Recycled
Restrained Joints - Potable
Restrained Joints - Recycled
Hydrant
Maintenance Hole
Stop Valve
Stop Vale with By-pass
Stop Valve with Tapers
Closed Stop Valve
Air Valve
Valve
Scour
Reducer / Taper
Vertical Bends
Reservoir
Recycled Water is shown as per Potable above. Colour as indicated

Private Mains

Potable Water Main
Recycled Water Main
Sewer Main
Symbols for Private Mains shown grey

Asset Information

Pipe Types

ABS	Acrylonitrile Butadiene Styrene	**AC**	Asbestos Cement
BRICK	Brick	**CI**	Cast Iron
CICL	Cast Iron Cement Lined	**CONC**	Concrete
COPPER	Copper	**DI**	Ductile Iron
DICL	Ductile Iron Cement (mortar) Lined	**DIPL**	Ductile Iron Polymeric Lined
EW	Earthenware	**FIBG**	Fibreglass
FL BAR	Forged Locking Bar	**GI**	Galvanised Iron
GRP	Glass Reinforced Plastics	**HDPE**	High Density Polyethylene
MS	Mild Steel	**MSCL**	Mild Steel Cement Lined
PE	Polyethylene	**PC**	Polymer Concrete
PP	Polypropylene	**PVC**	Polyvinylchloride
PVC - M	Polyvinylchloride, Modified	**PVC - O**	Polyvinylchloride, Oriented
PVC - U	Polyvinylchloride, Unplasticised	**RC**	Reinforced Concrete
RC-PL	Reinforced Concrete Plastics Lined	**S**	Steel
SCL	Steel Cement (mortar) Lined	**SCL IBL**	Steel Cement Lined Internal Bitumen Lined
SGW	Salt Glazed Ware	**SPL**	Steel Polymeric Lined
SS	Stainless Steel	**STONE**	Stone
VC	Vitrified Clay	**WI**	Wrought Iron
WS	Woodstave		

Further Information

Please consult the Dial Before You Dig enquiries page on the Sydney Water website

For general enquiries please call the Customer Contact Centre on **132 092**

In an emergency, or to notify Sydney Water of damage or threats to its structures, call 13 20 90 (24 hours, 7 days)

A0

PROJECT : Kellyvile & Bella Vista Station Precinct Master Planning
PROJECT NUMBER : 40416
SKETCH TITLE: Sydney Water Dial Before You Dig
AUTHOR : OKW
DATE : 20/03/19

WOOD & GRIEVE ENGINEERS

DBYD Address:
n/a Old Windsor Road
Kellyville NSW 2155

DBYD Job No: 15960778

DBYD Sequence No: 81410848

No warranty is given that the information shown is complete or accurate.

SYDNEY WATER CORPORATION

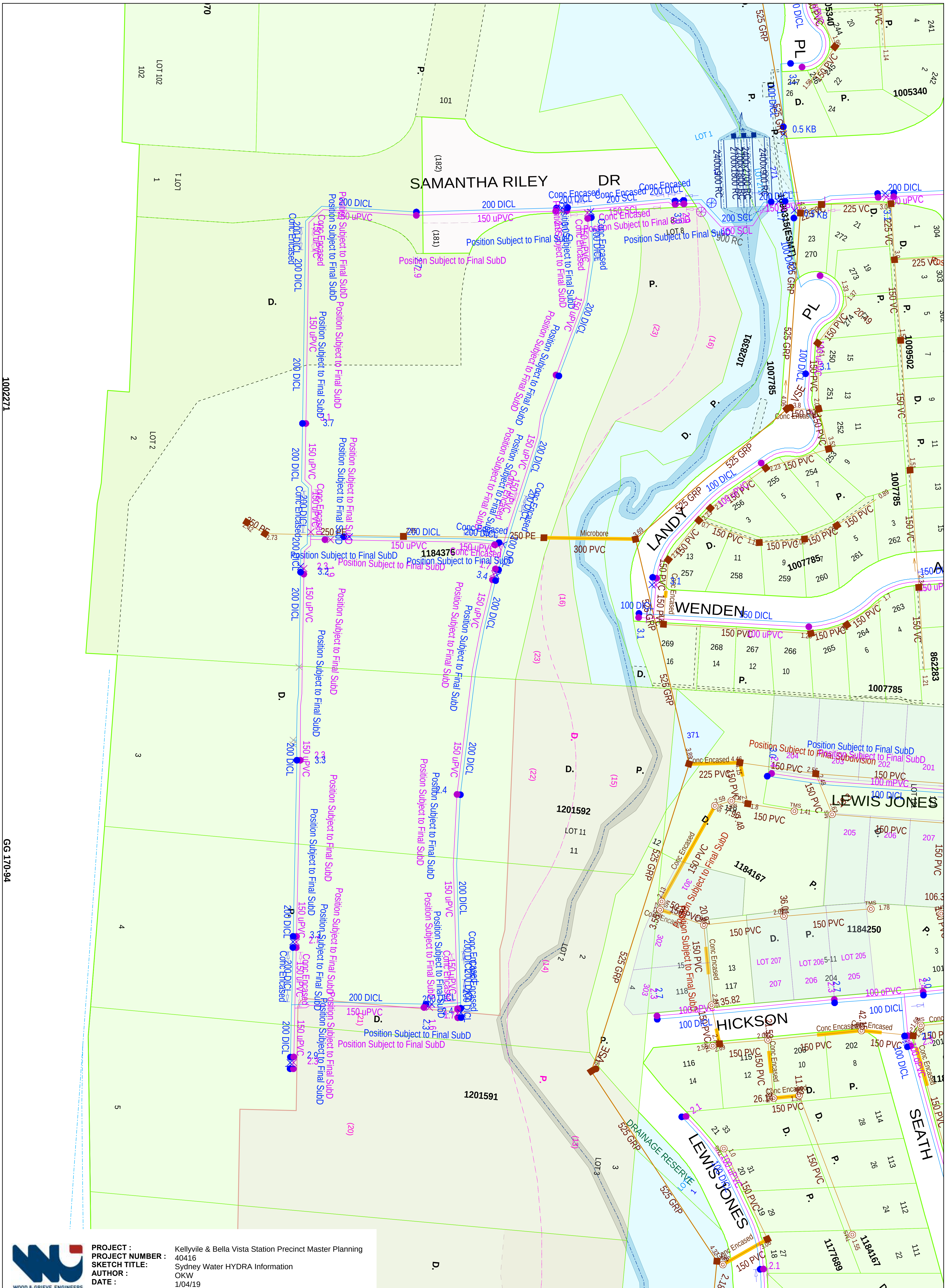
Scale: 1:2000

Date of Production: 20/03/2019

Plan 1 of 1

N

0m 30m 60m 90m 120m 150m


SAMANTHA RILEY DR
LANDY
WENDEN
LEWIS JONES
HICKSON
SEATH
PL
DRAINAGE RESERVE
Position Subject to Final SubD
Microbore
300 PVC
250 PE
525 GRP
200 DICL
150 uPVC
Conc Encased
1184376
1201592
1201591
1184167
1184250
1007785
1028391
1009502
1005340
862283
1177689
1002271
GG 170-94

PROJECT : Kellyvile & Bella Vista Station Precinct Master Planning
PROJECT NUMBER : 40416
SKETCH TITLE: Sydney Water HYDRA Information
AUTHOR : OKW
DATE : 1/04/19

Produced By: Kellyville Station
Date: 01/04/2019

Map:149 Grid:G6 Edition:Sydney UBD Edition 41
CMA Sheet: 9167-83-13
MGA Zone 56 (m) Central Co-ord: 308787 6267747

Scale: 1:1500
Plot Theme: None
Plot Request: None

Page

Appendix B - Sydney Water Feasibility Application

ROSE ATKINS RIMMER
(Infrastructure) Pty Ltd
WATER RELATED INFRASTRUCTURE
DESIGN & MANAGEMENT
LICENSED WATER SERVICING COORDINATOR

142 Sunnyholt Road, Blacktown 2148
PO Box 6745 Blacktown DC 2148

Phone: (02) 9853 0200
Fax: (02) 9671 7399
Email : rar@rari.com.au

A.B.N. 54 094 707 276

11 January 2019

Sydney Water Corporation
PO Box 399
PARRAMATTA NSW 2124

Feasibility Application (Case Number 175809) – Kellyville and Bella Vista Station Precincts

Two of the major precincts of the Sydney Metro Northwest are Bella Vista and Kellyville. Landcom is responsible for the part delivery of positive urban transformation communities on the land surrounding the Bella Vista and Kellyville Station Precincts. Accordingly, Rose Atkins Rimmer (Infrastructure) Pty Ltd has been engaged to lodge a Feasibility Application on behalf of Landcom for the proposed development of the Kellyville and Bella Vista Station Precincts.

The key objective of Landcom is to accelerate the project to ensure the release of development parcels for housing supply in line with agreed timeframes. The current approach focuses on undertaking enabling works and selling super lots to the private sector in a staged approach, whilst facilitating interim precinct activation between the opening of the Sydney Metro Northwest and when the first few developments are occupied. The purpose of this Feasibility Application is to seek advice on Sydney Water on the potential requirements for the servicing of the proposed development and to initiate the commencement of this government related major infrastructure project in accordance with Sydney Water's processes.

To accompany this Feasibility Application, we have attempted to provide accurate information regarding the proposed development in the form of the following supporting documentation:

- Property address – attached land tenure information (Excel Spreadsheet and land ownership plans
- Proposed land use and development description – attached concept masterplan and associated Growth Intelligence Template (completed based on maximum yield scenario)
- Proposed development staging and timing – refer to the attached Growth Intelligence Template to assist in demand forecasting

Please note that there are restrictions in completing the eDeveloper Application Entry and hydra download and we have not been able to enter the development details in full. As such please see below information that should be considered with this Feasibility Application.

Please see below information to be considered with this application.

- Number of residential units (maximum yield scenario) – 8,402
- Commercial Area – 679,825 m^2

The Developer and their representatives would welcome the opportunity to meet with Sydney Water to discuss this project further. As such we kindly request that Sydney Water advise the key personnel for their project team so that RAR can assist in coordinating meeting attendance and liaise with Sydney Water to obtain further information as the project progresses.

If you require any further information to be able to complete the Sydney Water assessment, please do not hesitate to contact our office.

Precinct	Local Authority	Planning Status	Planning/DA Ref	Lot reference	CN	OVERVIEW	Total potential YIELD	Total potential DWELLINGS	Total Potential LOTS	gfa comm/retail	Employment /Job creation	Existing yield	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34	2034-35	2035-36	2036-37	2037-38	2038-39	2039-40	2040-41	2041-42	2042-onward	Multiple developers in area (shared	Additional dev details	Comments/data source
Insert precinct	*LGA area*	*insert planning stage*	*if no DA ref insert when expected*	*Insert Lot No*	*insert CN if you have one*	*Insert high level overview of dev, i.e. land prep works or dwelling construction*	*Insert ultimate yield expected*	*insert ultimate dwelling no expected*	*insert no lots expected*	*insert gfa m2*	*Insert value*	*Insert existing yield if applicable*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*Insert no to be completed each year*	*continue as necessary*	*Yes/No*	*Name*	***Insert any comments re data source or confidences in data. Insert info re critical dates i.e. section 73***
SUM TOTAL	The Hills Shire Council	for SSDA	N/A	See attached	N/A	High density residential		8402																																	
						Commercial				295250							NOTE THAT DWELLINGS REPORTED IN TOTAL NUMBER AND COMMERCIAL/RETAIL REPORTED IN SQ.M OF GFA																								
KV1.1	The Hills Shire Council	for SSDA	N/A		N/A	High density residential		586									586																								
			N/A		N/A	Commercial				12985							12985																								
KV1.2			N/A		N/A	High density residential		197									197																								
			N/A		N/A	Commercial				5785							5785																								
KV1.3			N/A		N/A	High density residential		347									347																								
			N/A		N/A	Commercial				350							350																								
KV2.1			N/A		N/A	High density residential		167										17	17	17	17	17	17	17	17	17	17														
KV2.2			N/A		N/A	High density residential		414										41	41	41	41	41	41	41	41	41	41														
			N/A		N/A	Commercial				615								62	62	62	62	62	62	62	62	62	62														
KV2.3			N/A		N/A	High density residential		563										56	56	56	56	56	56	56	56	56	56														
			N/A		N/A	Commercial				610								61	61	61	61	61	61	61	61	61	61														
KV2.4			N/A		N/A	High density residential		409										41	41	41	41	41	41	41	41	41	41														
			N/A		N/A	Comercial				920								92	92	92	92	92	92	92	92	92	92														
KV2.5			N/A		N/A	High density residential		510										51	51	51	51	51	51	51	51	51	51														
KV2.6			N/A		N/A	Commercial				985								99	99	99	99	99	99	99	99	99	99														
KV2.7			N/A		N/A	High density residential		260										26	26	26	26	26	26	26	26	26	26														
			N/A		N/A	Commercial				690								69	69	69	69	69	69	69	69	69	69														
KV2.8			N/A		N/A	High density residential		35										4	4	4	4	4	4	4	4	4	4														
																	NOTE THAT DWELLINGS REPORTED IN TOTAL NUMBER AND COMMERCIAL/RETAIL REPORTED IN SQ.M OF GFA																								
BV3.1	The Hills Shire Council	for SSDA	N/A			High density residential		154										15	15	15	15	15	15	15	15	15	15														
BV3.2			N/A			High density residential		234										23	23	23	23	23	23	23	23	23	23														
BV3.3			N/A			High density residential		208										21	21	21	21	21	21	21	21	21	21														
BV3.4			N/A			High density residential		128										13	13	13	13	13	13	13	13	13	13														
BV3.5			N/A			High density residential		465										47	47	47	47	47	47	47	47	47	47														
BV3.6			N/A			High density residential		29										3	3	3	3	3	3	3	3	3	3														
BV3.7			N/A			Commercial				2735								274	274	274	274	274	274	274	274	274	274														
BV3.8			N/A			High density residential		119										12	12	12	12	12	12	12	12	12	12														
						Commercial				785								79	79	79	79	79	79	79	79	79	79														
BV3.9			N/A			High density residential		264										26	26	26	26	26	26	26	26	26	26														
BV3.10			N/A			High density residential		235										24	24	24	24	24	24	24	24	24	24														
BV4.1			N/A			High density residential		367										37	37	37	37	37	37	37	37	37	37														
BV4.2			N/A			High density residential		321										32	32	32	32	32	32	32	32	32	32														
BV4.3			N/A			High density residential		189										19	19	19	19	19	19	19	19	19	19														
BV4.4			N/A			High density residential		162										16	16	16	16	16	16	16	16	16	16														
						Commercial				750								75	75	75	75	75	75	75	75	75	75														
BV4.5			N/A			High density residential		134										13	13	13	13	13	13	13	13	13	13														
BV4.7			N/A			High density residential		349										35	35	35	35	35	35	35	35	35	35														
						Commercial				1690								169	169	169	169	169	169	169	169	169	169														
BV4.8			N/A			High density residential		479										48	48	48	48	48	48	48	48	48	48														
						Commercial				2770								277	277	277	277	277	277	277	277	277	277														
BV4.9			N/A			High density residential		215										22	22	22	22	22	22	22	22	22	22														
						Commercial				795								80	80	80	80	80	80	80	80	80	80														
BV5.1			N/A			Commercial				38360								1918	1918	1918	1918	1918	1918	1918	1918	1918	1918	1918	1918	1918	1918	1918	1918	1918	1918	1918	1918				
BV5.2			N/A			Commercial				56345								2817	2817	2817	2817	2817	2817	2817	2817	2817	2817	2817	2817	2817	2817	2817	2817	2817	2817	2817	2817				
BV5.3			N/A			Commercial				62555								3128	3128	3128	3128	3128	3128	3128	3128	3128	3128	3128	3128	3128	3128	3128	3128	3128	3128	3128	3128				
BV5.4			N/A			Commercial				40160							40160																								
BV5.5			N/A			Commercial				38050							38050																								
BV5.6			N/A			High density residential		414									414																								
						Commercial				23635							23635																								
BV5.7			N/A			High density residential		448									448																								
						Commercial				3690							3690																								
																	NOTE THAT DWELLINGS REPORTED IN TOTAL NUMBER AND COMMERCIAL/RETAIL REPORTED IN SQ.M OF GFA																								
						High density residential																																			
						Medium density																																			
						Low density																																			
						Commercial (for ex)																																			

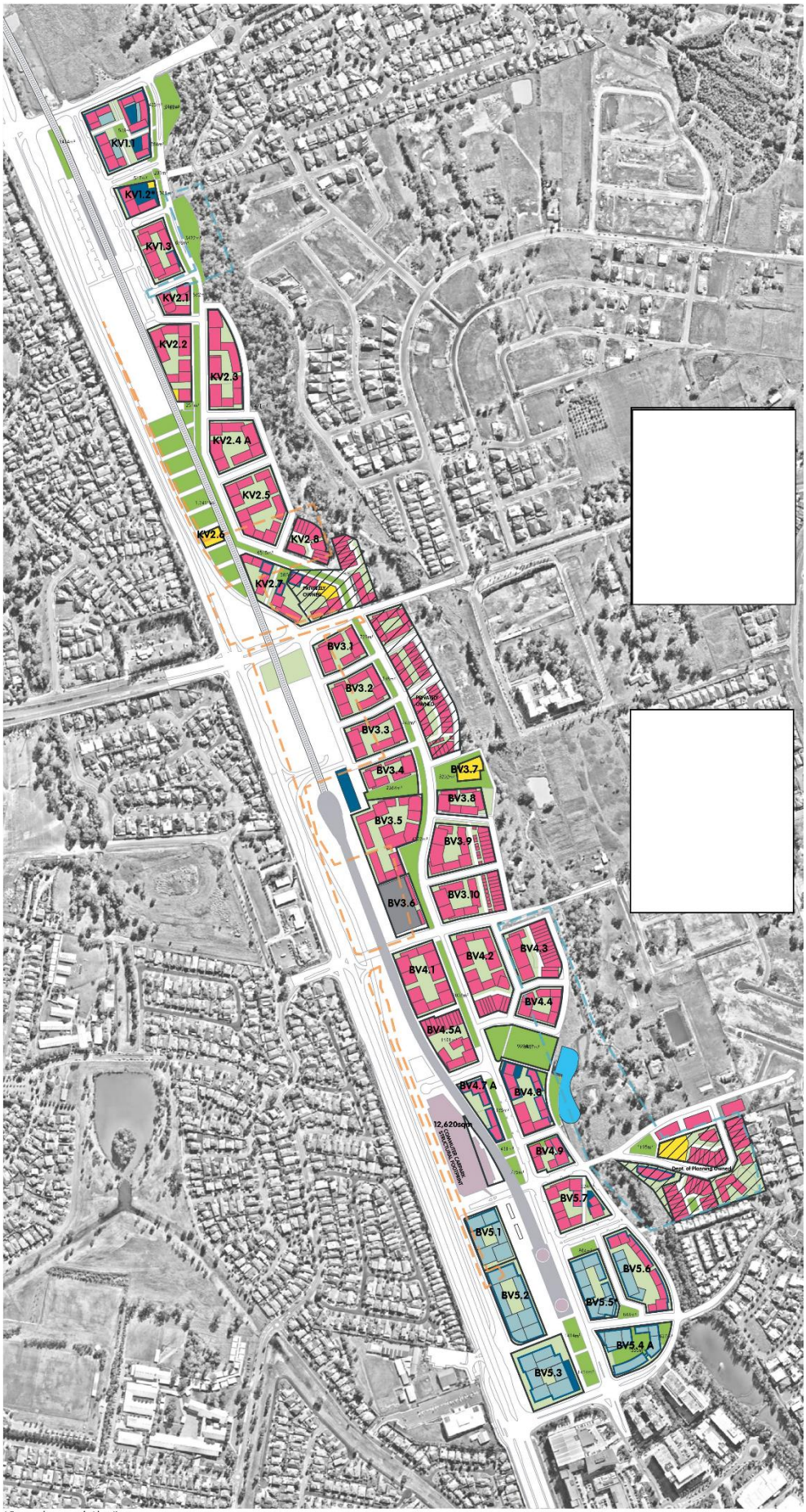
2016 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042

Notes

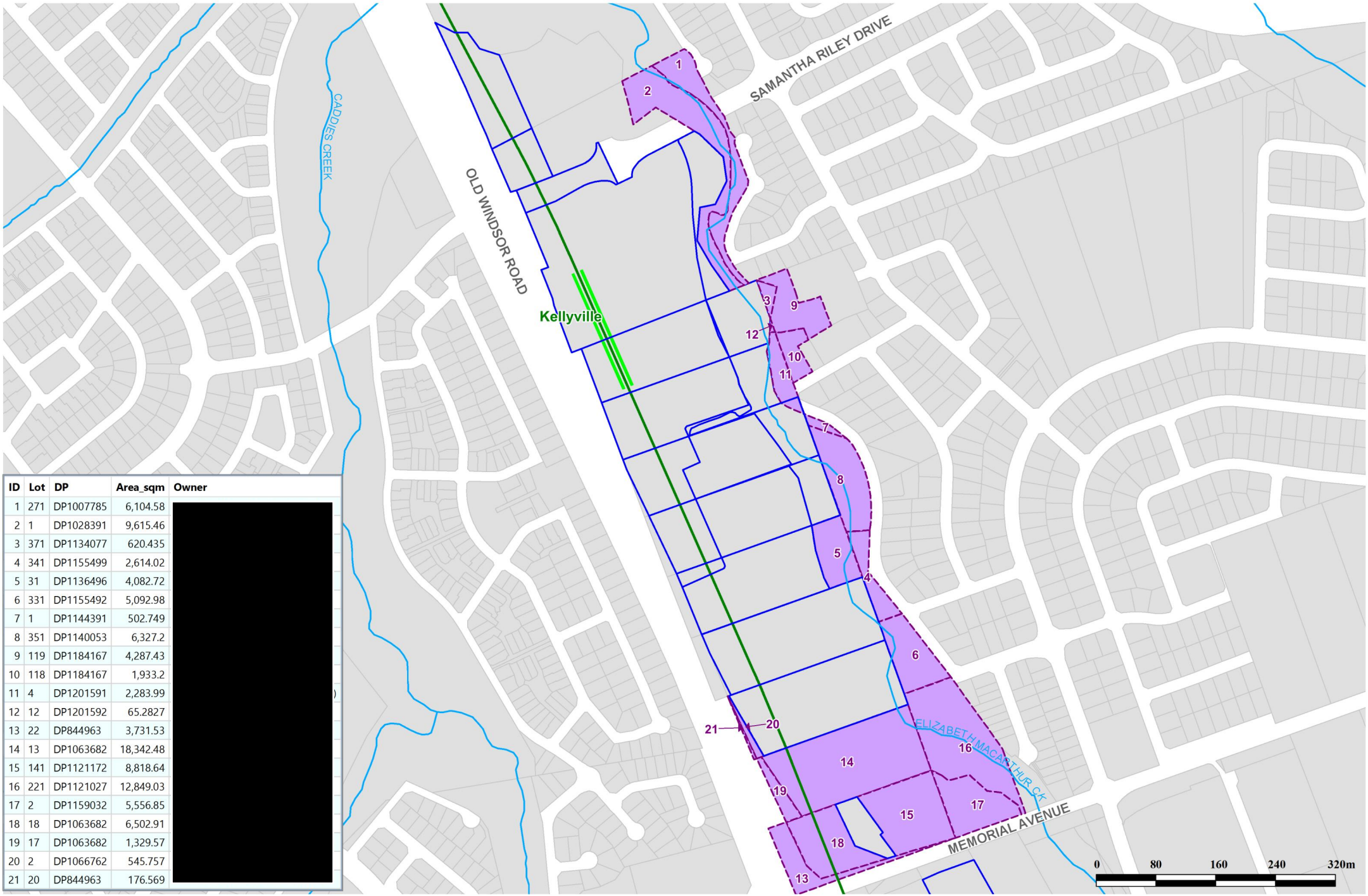
Please provide as much detail as possible specifica
Information is assumed to be approximate and no
Whilst it is appreciated that developer MAY NOT b
Please detail the planning or zoning stage the deve
It is critical to show staging so that we can see no
of dwellings/occupancy per year and what we can
service short term/long term. Please insert

Totals

Cumulative Totals



* Proposed supermarket location



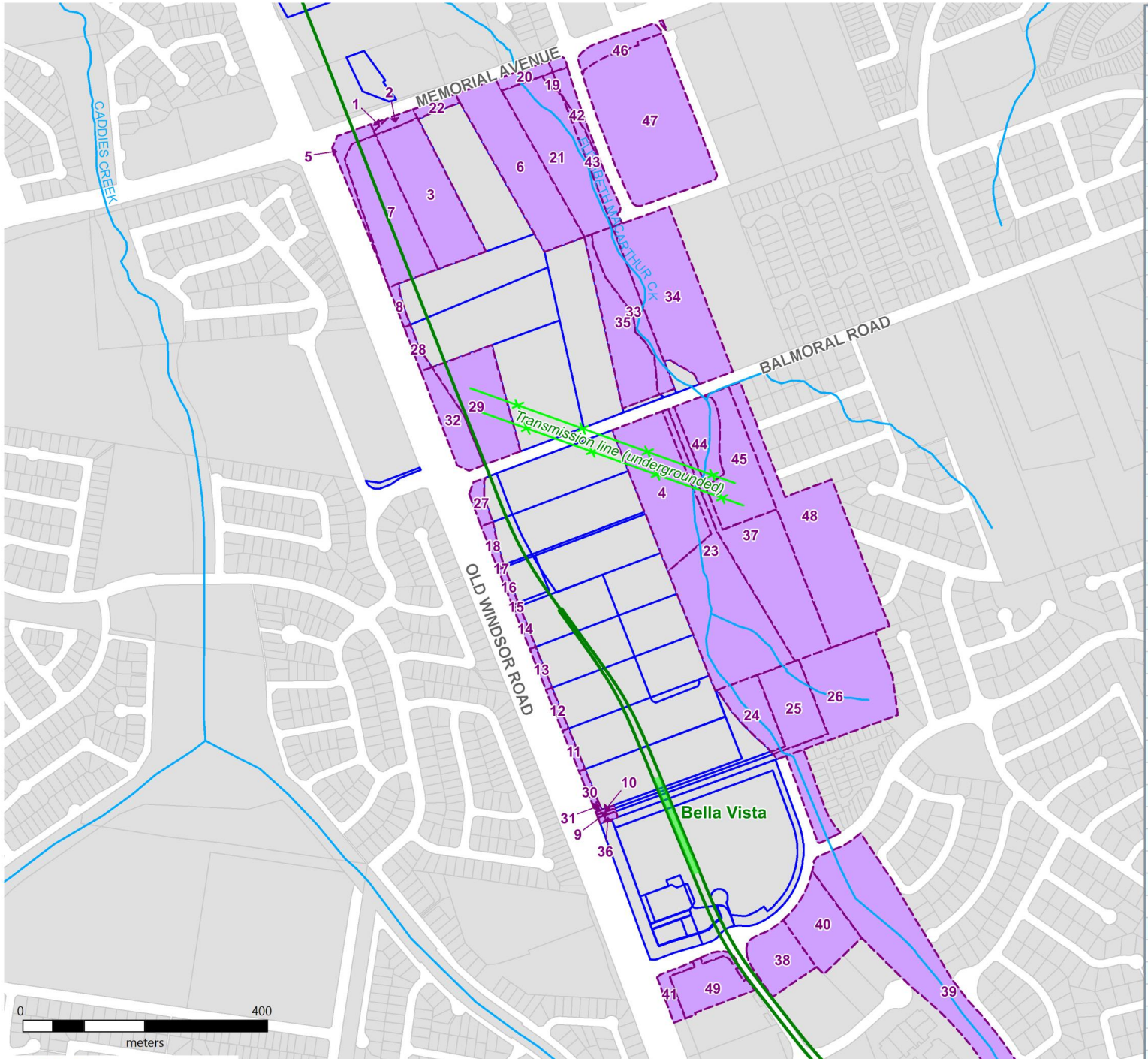
ID	Lot	DP	Area_sqm	Owner
1	271	DP1007785	6,104.58	[redacted]
2	1	DP1028391	9,615.46	
3	371	DP1134077	620.435	
4	341	DP1155499	2,614.02	
5	31	DP1136496	4,082.72	
6	331	DP1155492	5,092.98	
7	1	DP1144391	502.749	
8	351	DP1140053	6,327.2	
9	119	DP1184167	4,287.43	
10	118	DP1184167	1,933.2	
11	4	DP1201591	2,283.99	
12	12	DP1201592	65.2827	
13	22	DP844963	3,731.53	
14	13	DP1063682	18,342.48	
15	141	DP1121172	8,818.64	
16	221	DP1121027	12,849.03	
17	2	DP1159032	5,556.85	
18	18	DP1063682	6,502.91	
19	17	DP1063682	1,329.57	
20	2	DP1066762	545.757	
21	20	DP844963	176.569	

UrbanGrowth NSW

Kellyville

SMNW alignment
SMNW station

Land owner
TfNSW
(adjacent)



ID	Lot	DP	Area_sqm	Owner
1	26	DP844963	180.204	[redacted]
2	25	DP844963	1,146.87	
3	10	DP844963	18,909.21	
4	1	DP552746	20,242.24	
5	27	DP844963	2,931.39	
6	2	DP241547	20,244.19	
7	11	DP844963	17,342.09	
8	48	DP1071715	866.407	
9	62	DP1071715	155.313	
10	61	DP1071715	156.208	
11	59	DP1071715	764.92	
12	58	DP1071715	744.294	
13	57	DP1071715	723.155	
14	56	DP1071715	723.415	
15	55	DP1071715	60.5941	
16	54	DP1071715	642.959	
17	53	DP1071715	39.449	
18	52	DP1071715	1,083.28	
19	3	DP1180837	460.762	
20	2	DP1180837	1,795.51	
21	1	DP1180837	17,979.09	
22	47	DP1071715	1,192.05	
23	2	DP552746	29,278.12	
24	22	DP1184373	6,304.45	
25	23	DP1184373	9,520.87	
26	24	DP1184373	18,995.16	
27	2	DP1076043	1,567.06	
28	49	DP1071715	983.125	
29	33	DP1071715	14,123.8	
30	91	DP1076211	706.075	
31	102	DP1084481	54.0796	
32	50	DP1071715	6,119.05	
33	5	DP1203920	7,842.72	
34	4	DP1203920	26,884.12	
35	6	DP1203920	11,754.44	
36	63	DP1071715	312.118	
37	3	DP552746	22,407.36	
38		SP74252	8,003.07	
39	7095	DP1073130	43,612.39	
40		SP76186	10,171.6	
41	1	DP270392	2,702.95	
42	402	DP1125136	2,113.32	
43	403	DP1125136	3,686.68	
44	21	DP1170934	6,943.48	
45	20	DP1170934	13,299.71	
46	101	DP1163410	3,949.39	
47	100	DP1163410	36,579.07	
48	12	DP17213	29,889.86	
49		SP72801	7,884.95	

UrbanGrowth NSW

Bella Vista

SMNW alignment
SMNW station

Land owner
TfNSW
(adjacent)

Appendix C - Sydney Water Response to Feasibility Application

Case Number: 175809

14 May 2019

LANDCOM
c/- Rose Atkins Rimmer

FEASIBILITY LETTER

ROUSE HILL DEVELOPMENT AREA - Stage 3 Service Area

Developer:	**LANDCOM**
Your reference:	**4/25564**
Development:	**27 Old Windsor Rd, Kellyville**
Development Description:	**Mixed residential and commercial development being delivered as part of the Kellyville and Bella Vista Station Precinct project.**
Your application date:	**16 January 2019**

Dear Applicant

This Feasibility Letter (Letter) is a guide only. It provides general information about what Sydney Water's requirements could be if you applied to us for a Section 73 Certificate (Certificate) for your proposed development. **The information is accurate at today's date only.**

If you obtain development consent for that development from your consent authority (this is usually your local Council) they will require you to apply to us for a Section 73 Certificate. You will need to submit a new application (and pay another application fee) to us for that Certificate by using your current or another Water Servicing Coordinator (Coordinator).

Sydney Water will then send you either a:

- Notice of Requirements (Notice) and Developer Works Deed (Deed); or
- Certificate.

These documents will be the definitive statement of Sydney Water's requirements.

There may be changes in Sydney Water's requirements between the issue dates of this Letter and the Notice or Certificate. The changes may be:

1. Developer Charges

(a) Adjustment of charges due to the Consumer Price Index (CPI);
(b) Adjustment of charges because of a scheduled review by the Independent Pricing and Review Tribunal (IPART). After that review and registration of the new charges, Sydney Water has to apply those charges; or
(c) If there is rezoning of any land within the development proposal, then new charges will apply.

2. **Changing the Proposed Development**

- If you change your proposed development, e.g. the development description or the plan/ site layout, after today, the requirements in this Letter could change when you submit your new application; and

- if you decide to do your development in stages then you must submit a new application (and pay another application fee) for each stage.

No warranties or assurances can be given about the suitability of this document or any of its provisions for any specific transaction. It does not constitute an approval from Sydney Water and to the extent that it is able, Sydney Water limits its liability to the reissue of this Letter or the return of your application fee. You should rely on your own independent professional advice.

What You Must Do To Get A Section 73 Certificate in the Future

To get a Section 73 Certificate in the future you must do the following things. You can also find out about this process by visiting www.sydneywater.com.au > Plumbing, building & developing > Developing > Land Development.

1. **Obtain Development Consent from the consent authority for your development proposal.**

2. **Engage a Water Servicing Coordinator (Coordinator).**

   You must engage your current or another authorised Coordinator to manage the design and construction of works that you must provide, at your cost, to service your development. If you wish to engage another Coordinator (at any point in this process) you must write and tell Sydney Water.

   For a list of authorised Coordinators, either visit www.sydneywater.com.au > Plumbing, building & developing > Developing > Providers > Lists or call **13 20 92.**

   The Coordinator will be your point of contact with Sydney Water. They can answer most questions that you might have about the process and developer charges and can give you a quote or information about costs for services/works (including Sydney Water costs).

3. **Developer Works Deed**

   After the Coordinator has submitted your new application, they will receive the Sydney Water Notice and Developer Works Deed. You and your accredited Developer Infrastructure Providers (Providers) will need to sign and lodge both copies of the Deed with your nominated Coordinator. After Sydney Water has signed the documents, one copy will be returned to the Coordinator.

   The Deed sets out for this project:

   - your responsibilities;
   - Sydney Water's responsibilities; and
   - the Provider's responsibilities.

   You must do all the things that we ask you to do in that Deed. This is because your development does not have water, recycled water, sewer and storm water services and you must construct and pay for the following works extensions under this Deed to provide these services.

   Note: The Coordinator must be fully authorised by us for the whole time of the agreement.

4. **Drinking Water, Recycled Water, Sewer and Stormwater Works**

   - Information supplied with your application is very similar to that which was used to create the scheme plans and we will need to confirm in more detail, when known, building heights, densities etc in the proposed precincts to ensure the scheme plans are still

appropriate.

- Based our understanding of information supplied, it appears that these precincts will have customised servicing arrangements with unique demand and discharge levels and patterns. A refresh of our existing scheme plans may be required once further details are known.
- Zoning, FSR and building heights are consistent with the current zoning on the Planning website. And scheme plans have been developed in conjunction with this information https://www.planningportal.nsw.gov.au/find-a-property/4053327__101__DP1084481

4.1 Drinking Water

Your development must have a frontage to a water main that is the right size and can be used for connection.

Sydney Water has assessed your application and found that:
The proposed development is within a known high growth area along the North West Metro line.

- Drinking water and recycled water scheme plans have been created based on predicted development types, at the time the Metro rail project was instigated circa 2015.

- You must construct drinking water main extensions to serve your development. They must comply with the standards for Dual Water Reticulation Systems talked about in section 4.2.1 below.

- A service connection and property service must be provided for your development off the drinking water mains to be constructed.
  They must comply with the standards for Dual Water Reticulation Systems talked about in section 4.2.1 below.

4.2 Recycled Water

Your development must have a frontage to a recycled water main that is the right size and can be used for connection.

Sydney Water has assessed your application and found that:
The proposed development is within a known high growth area along the North West Metro line.

- Drinking water and recycled water scheme plans have been created based on predicted development types, at the time the Metro rail project was instigated circa 2015.

- You must construct recycled water main extensions to serve your development. They must comply with the standards for Dual Water Reticulation Systems talked about in section 4.2.1 below.

- A service connection and property service must be provided for your development off the recycled water mains to be constructed.

They must comply with the standards for Dual Water Reticulation Systems talked about in section 4.2.1 below.

4.2.1 Sydney Water's Standards for Dual Water Reticulation

Your development is in an area where both drinking and recycled water systems are available. The drinking and recycled water works required above must comply with the standards for Dual Water Reticulation Systems that are set down in the Water Supply Code of Australia (Sydney Water Edition) (the Code).

These standards require that service connections and property services be provided for both drinking and recycled water for your development. The installation of these services must either be carried out or supervised by a licensed plumber. It must meet the:

(a) Administrative requirements of the Plumbing Code of Australia; and Technical requirements of the Dual Water Drawings Set within the Code.

4.3 Sewer

Your development must have a sewer main that is the right size and can be used for connection. That sewer must also have a connection point within your development's boundaries.

Sydney Water has assessed your application and found that:
The proposed development is within a known high growth area along the North West Metro line.

- A wastewater scheme plan has not been created but an assessment of the Carrier has been undertaken. Lead-ins will need to be sized from the Carrier for each sub-catchment.

- **You must construct waste water main extensions to serve your development**. The terms of the Deed define this extension as 'Major Works'.

4.4 Stormwater Connection

Any stormwater design is to be carried out according to the current guidelines title "Stormwater connections to natural waterways in the Rouse Hill Development Area" dated 31 July 2014. Copies of the stormwater plans are to be attached in the eDeveloper system.

Stormwater drawings below 1 in 100-year flood limit are to be drawn in AutoCad format and given to the Water Servicing Coordinator. Water Servicing Coordinator is required to transfer these drawings on to the Sydney Water template, prior to submit as design drawings. No works within the 100-year flood level are to be carried out without Sydney Water approval and the payment of the appropriate bond money.

Landscaping / Road Work

Any filling carried out as part of the development will need to be contained wholly within the boundaries of the proposed lots and roads, and not encroach onto the 100-year flood boundary or Sydney Water land. Also, any fill will need to be stabilised in such a way so as to prevent any collapse or intrusion onto the trunk drainage lands over time. Details of the work adjacent to the Creek are to be submitted to ensure that these requirements are met.

- Minor batter spill into the trunk drainage corridor is acceptable
    - desirable maximum spill 1.5 metres @ 3H:1V
    - absolute maximum spill 2.0 metres @ 3H:1V for short occasional isolated sections

Vegetation Management Plan

All the disturbed area below the 100-year flood limits and within Sydney Water land are to be revegetated according to the current guidelines. A site-specific Vegetation Management Plan is to be prepared according to the guidelines in the “Stormwater connections to waterways in the Rouse Hill Development Area” and submitted to Sydney Water for approval. Toe, Middle and Upper zones are to be identified within the disturbed area and the specific plants that are proposed on each zone and its density are to be tabulated in the Vegetation Management Plan.

The restoration work is to be according to the approved Vegetation Management Plan and need to maintain for a minimum period of 12 months. Bond money is required for connection, revegetation and maintenance.

Bond Money

Bond money is required for revegetation of the disturb land and maintaining this revegetation for a period of 12 months. Proponent is required to identify the extent of the land to be disturbed within Sydney Water land or within 100-year flood limit to carry out any stormwater connection or sewer work. Estimated cost for the revegetation and 12 months period of maintenance are to be provided in the Vegetation Management Plan in order to determine the required bond money.

Bond money also would be required for the stormwater connection if the application is not associated with Section 73 application or Section 73 Certificate is required prior to submit the Work As Constructed drawings.

The bond money would be refunded to the proponent only after the satisfactory completion of maintaining the revegetated plants for a period of 12 months.

If the proposed development requires enter into the trunk drainage land for sewer works then this Vegetation Management Plan should cover both the stormwater and sewer work.

Water Sensitive Urban Design

Stormwater discharge form the site is to be treated to meet the target as specified in the “Stormwater connections to waterways in the Rouse Hill Development Area”.

Funding of works

Under Sydney Water's 'Funding of infrastructure to service growth' policy we may agree to contribute towards a portion of the cost of the works you are required to build. This is done either by Sydney Waters Schedule of Rates or via the Procurement process. Your Water Service Coordinator can advise you in relation to this policy, the likelihood of Sydney Water sharing a portion of the cost and the process you need to satisfy Sydney Water's probity requirements.

If you do choose to request a quote through the Schedule of Rates for Sydney Water's contribution you will avoid going through the full procurement process. Your WSC can advise you of this option.

The funding assessment will be made at the detailed design stage, prior to any construction works commencing. A firm commitment would not be made by Sydney Water until we:

- Have reviewed the detailed design and;
- Have reviewed the detailed construction quotations needed to meet our probity requirements and;
- Come to an agreement on the amount.

5. Ancillary Matters

5.1 Asset adjustments

If any Sydney Water drinking water main, recycled water main, sewer or stormwater asset constructed or under construction is found, after the issue of this Notice, to require adjustment or deviation as a result of your development; then this work must be undertaken in conjunction with the abovementioned water, recycled water, sewer and storm water extension. If this happens, you will need to do this work as well as the extension we have detailed above at your cost. The work must meet the conditions of this Notice and you will need to complete it **before we can issue the Certificate**. Sydney Water will need to see the completed designs for the work and we will require you to lodge a security. The security will be refunded once the work is completed.

5.2 Entry onto neighbouring property

If you need to enter a neighbouring property, you must have the written permission of the relevant property owners and tenants. You must use Sydney Water's **Permission to Enter** form(s) for this. You can get copies of these forms from your Coordinator or the Sydney Water website. Your Coordinator can also negotiate on your behalf. Please make sure that you address all the items on the form(s) including payment of compensation and whether there are other ways of designing and constructing that could avoid or reduce their impacts. You will be responsible for all costs of mediation involved in resolving any disputes. Please allow enough time for entry issues to be resolved.

5.3 Costs

Construction of these **future** works will require you to pay project management, survey, design and construction costs **directly to your suppliers**. Additional costs payable to Sydney Water may include:

- water main shutdown and disinfection;
- connection of new water mains to Sydney Water system(s);
- design and construction audit fees;
- contract administration, Operations Area Charge & Customer Redress prior to project finalisation;
- creation or alteration of easements etc; and
- water usage charges where water has been supplied for building activity purposes prior to disinfection of a newly constructed water main.

Note: Payment for any Goods and Services (including Customer Redress) provided by Sydney Water will be required prior to the issue of the Section 73 Certificate or release of the Bank Guarantee or Cash Bond.

Your Coordinator can tell you about these costs.

6. **Developer Charges**

Development Servicing Plan (DSP)	**Basis of Calculation**	**Charge ($) for Applicable Period** **(14/05/19-30/06/19)**
Rouse Hill Recycled	Residential Development Density > 156 lots/dwellings per ha band 8402 lots/dwellings @ $951 = $7990302 less Credit of $0 for previous use	$7,990,302.00
Rouse Hill Recycled	Commercial Area 295250 sqm @ $71695 per ha = $2116794 less Credit of $0 for previous payment/use	$2,116,794.00
DEVELOPER CHARGES TOTAL:		**$10,107,096.00**

DSP charges are a contribution towards the cost of systems (e.g. pipelines and treatment plants) which will serve your development. Sydney Water has no power to change these costs because they are decided by IPART. If you want more information visit the IPART website www.IPART.nsw.gov.au. If there is a dispute, the cost of arbitration will be shared

equally by you and Sydney Water (see *IPART Act 1992, Section 31*).

The amounts shown above are an estimate of charges that would be applicable, as of today's date, to your development had you obtained Development Approval for your proposal. **No Payments can be accepted for these estimates.** Should you obtain Development Approval for this proposal and apply for a Section 73 Certificate in the future, then Sydney Water will advise you of the DSP charges applicable to your Development.

6. **Approval of your Building Plans**

You must have your building plans approved **before the Certificate can be issued. Building construction work MUST NOT commence until Sydney Water has granted approval.** Approval is needed because construction/building works may affect Sydney Water's assets (e.g. water and sewer mains).

Your Coordinator can tell you about the approval process including:

- Your provision, if required, of a "Services Protection Report" (also known as a "pegout"). This is needed to check whether the building and engineering plans show accurately where Sydney Water's assets are located in relation to your proposed building work. Your Coordinator will then either approve the plans or make requirements to protect those assets before approving the plans;
- Possible requirements;
- Costs; and
- Timeframes.

You can also find information about this process (including technical specifications) if you either:

- Visit www.sydneywater.com.au > Plumbing, building & developing > Building > Building over or next to assets. Here you can find Sydney Water's *Technical guidelines - Building over and adjacent to pipe assets;* or
- Call 13 20 92.

Notes:

- **The Certificate will not be issued until the plans have been approved and, if required, Sydney Water's assets are altered or deviated;**
- **You can only remove, deviate or replace any of Sydney Water's pipes using temporary pipework if you have written approval from Sydney Water's Urban Growth Business. You must engage your Coordinator to arrange this approval; and**
- **You must obtain our written approval before you do any work on Sydney Water's systems. Sydney Water will take action to have work stopped on the site if you do not have that approval. We will apply Section 44 of the *Sydney Water Act 1994.***

7. **Special Requirements**

Multi-level individual metering requirements

Your development must either allow for or provide individual metering. This means that you must:

1. comply at all times and in all respects with the requirements of Sydney Water's "*Multi-level Individual Metering Guide*" (version 6 dated 1 July 2015);

2. provide and install plumbing and space for individual metering in accordance with Sydney Water's "*Multi-level Individual Metering Guide*";

3. if and when you implement a strata/ stratum plan (or strata/ stratum subdivide) you must:

    a. engage an Accredited Metering Supplier ("**AMS**") to provide individual metering in accordance with the "*Multi-level Individual Metering Guide"* and meet the cost of the meters and metering system;

    b. transfer the meters and metering system to Sydney Water once the Testing Certificate has been issued by Sydney Water to the AMS and the AMS has confirmed that payment for the meters and metering system has been paid in full.

Before the Section 73 Certificate can be issued, you will be required to sign an undertaking to show that you understand and accept these metering requirements and associated costs.

Visit www.sydneywater.com.au > Plumbing, Building & Developing > Plumbing > Meters & metered standpipes to see the *Multi-level individual metering guide* and find out more.

OTHER THINGS YOU NEED TO DO:

Shown below are other things you need to do that are NOT a requirement for the Certificate. They may well be a requirement of Sydney Water in the future because of the impact of your development on our assets. You must read them before you go any further.

Disused Sewerage Service Sealing

Please do not forget that you must pay to disconnect all disused private sewerage services and seal them at the point of connection to a Sydney Water sewer main. This work must meet Sydney Water's standards in the Plumbing Code of Australia (the Code) and be done by a licensed drainer. The licensed drainer must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Soffit Requirements

Please be aware that floor levels must be able to meet Sydney Water's soffit requirements for property connection and drainage.

Requirements for Business Customers for Commercial and Industrial Property Developments

If this property is to be developed for Industrial or Commercial operations, it may need to meet the following requirements:

Trade Wastewater Requirements

If this development is going to generate trade wastewater, the property owner must submit an application requesting permission to discharge trade wastewater to Sydney Water's sewerage system. You must wait for approval of this permit before any business activities can commence.

The permit application should be emailed to Sydney Water's Business Customer Services at businesscustomers@sydneywater.com.au

It is illegal to discharge Trade Wastewater into the Sydney Water sewerage system without permission.

A **Boundary Trap** is required for all developments that discharge trade wastewater where arrestors and special units are installed for trade wastewater pre-treatment.

If the property development is for Industrial operations, the wastewater may discharge into a sewerage area that is subject to wastewater reuse. Find out from Business Customer Services if this is applicable to your development.

Backflow Prevention Requirements

Backflow is when there is unintentional flow of water in the wrong direction from a potentially polluted source into the drinking water supply.

All properties connected to Sydney Water's supply must install a testable **Backflow Prevention Containment Device** appropriate to the property's hazard rating. Property with a high or medium hazard rating must have the backflow prevention containment device tested annually. Properties identified as having a low hazard rating must install a non-testable device, as a minimum.

Separate hydrant and sprinkler fire services on non-residential properties, require the installation of a testable double check detector assembly. The device is to be located at the boundary of the property.

Before you install a backflow prevention device:

1. Get your hydraulic consultant or plumber to check the available water pressure versus the property's required pressure and flow requirements.
2. Conduct a site assessment to confirm the hazard rating of the property and its services. Contact PIAS at NSW Fair Trading on **1300 889 099**.

For installation you will need to engage a licensed plumber with backflow accreditation who can be found on the Sydney Water website:
http://www.sydneywater.com.au/Plumbing/BackflowPrevention/

Water Efficiency Recommendations

Water is our most precious resource and every customer can play a role in its conservation. By working together with Sydney Water, business customers are able to reduce their water consumption. This will help your business save money, improve productivity and protect the environment.

Some water efficiency measures that can be easily implemented in your business are:

- Install water efficiency fixtures to help increase your water efficiency, refer to WELS (Water Efficiency Labelling and Standards (WELS) Scheme, http:// www.waterrating.gov.au/
- Consider installing rainwater tanks to capture rainwater runoff, and reusing it, where cost effective. Refer to http://www.sydneywater.com.au/Water4Life/InYourBusiness/ RWTCalculator.cfm
- Install water-monitoring devices on your meter to identify water usage patterns and leaks.
- Develop a water efficiency plan for your business.

It is cheaper to install water efficiency appliances while you are developing than retrofitting them later.

Contingency Plan Recommendations

Under Sydney Water's customer contract Sydney Water aims to provide Business Customers with a continuous supply of clean water at a minimum pressure of 15meters head at the main tap. This is equivalent to 146.8kpa or 21.29psi to meet reasonable business usage needs.

Sometimes Sydney Water may need to interrupt, postpone or limit the supply of water services to your property for maintenance or other reasons. These interruptions can be planned or unplanned.

Water supply is critical to some businesses and Sydney Water will treat vulnerable customers, such as hospitals, as a high priority.

Have you thought about a **contingency plan** for your business? Your Business Customer Representative will help you to develop a plan that is tailored to your business and minimises productivity losses in the event of a water service disruption.

For further information please visit the Sydney Water website at: http:// www.sydneywater.com.au/OurSystemsandOperations/TradeWaste/ or contact Business Customer Services on **1300 985 227** or businesscustomers@sydneywater.com.au

Fire Fighting

Your firefighting service must be drawn from the recycled water system.
Definition of fire fighting systems is the responsibility of the developer and is not part of the Section 73 process. It is recommended that a consultant should advise the developer regarding the fire fighting flow of the development and the ability of Sydney Water's system to provide that flow in an emergency. Sydney Water's Operating Licence directs that Sydney Water's mains are only required to provide domestic supply at a minimum pressure of 15 m head.

A report supplying modelled pressures called the Statement of Available pressure can be purchased on-line through Sydney Water Tap in™ and may be of some assistance when defining the fire fighting system. The Statement of Available pressure, may advise flow limits that relate to system capacity or diameter of the main and pressure limits according to pressure management initiatives. If mains are required for fire fighting purposes, the mains shall be arranged through the water main extension process and not the Section 73 process.

Large Water Service Connections (Dual Water)

A drinking water main and a recycled water main will be available, once you have completed your drinking and recycled water main construction to serve your development. The size of your development means that you will need dual water connections larger than the standard domestic 20 mm size.

To get approval for your connection, you will need to lodge an application with Sydney Water Tap in™. You, or your hydraulic consultant, may need to supply the following:

- A plan of the hydraulic layout;
- A list of all the fixtures/fittings within the property;
- A copy of the fireflow pressure inquiry issued by Sydney Water;
- A pump application form (if a pump is required);
- All pump details (if a pump is required).

You will have to pay an application fee.

The service connection will need to meet with:

Administrative requirements of the Plumbing Code of Australia; and
Technical requirements of the Dual Water Drawings Set within the Code.

Sydney Water does not consider whether a water main is adequate for fire fighting purposes for your development. We cannot guarantee that this water supply will meet your Council's fire fighting requirements. The Council and your hydraulic consultant can help.

Disused Water Service Sealing

You must pay to disconnect all disused private water services and seal them at the point of connection to a Sydney Water water main. This work must meet Sydney Water's standards in the Plumbing Code of Australia (the Code) and be done by a licensed plumber. The licensed plumber must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Other fees and requirements
The requirements in this Advice Letter relate to your future Certificate application only. Sydney Water may be involved with other aspects of your development and there may be other fees or requirements. These include:

- construction/building plan approval fees;
- plumbing and drainage inspection costs;
- the installation of backflow prevention devices;
- trade waste requirements;
- large water connections and
- council fire fighting requirements. (It will help you to know what the fire fighting requirements are for your development as soon as possible. Your hydraulic consultant can help you here.)

No warranties or assurances can be given about the suitability of this document or any of its provisions for any specific transaction. It does not constitute an approval from Sydney Water and to the extent that it is able, Sydney Water limits its liability to the reissue of this Letter or the return of your application fee. You should rely on your own independent professional advice.

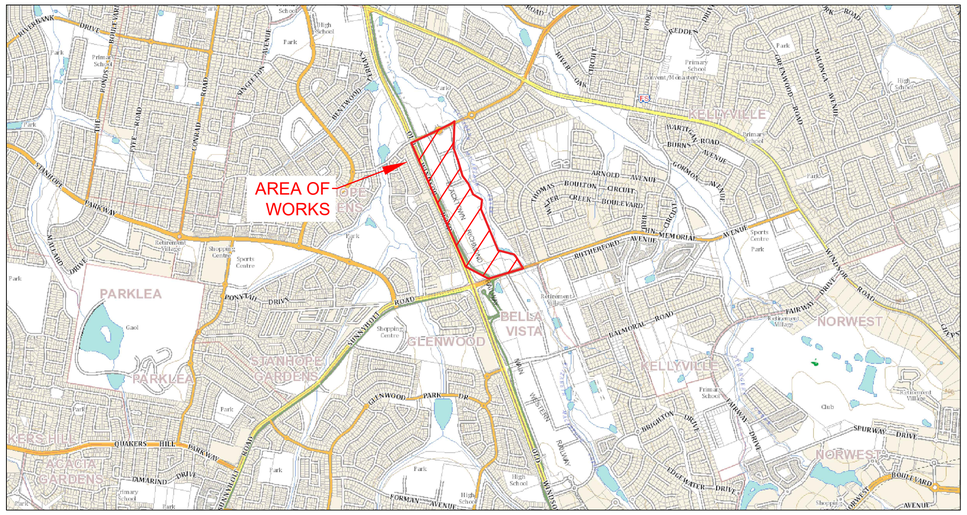
END

Appendix D - Existing Electrical Infrastructure

KELLYVILLE STATION PRECINCT

EXISTING POWER INFRASTRUCTURE

KELLYVILLE & BELLA VISTA STATION PRECINCT



LOCALITY PLAN
NTS

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AMENDMENTS
ORIGINAL ISSUE
DRAFT No. 01

DESCRIPTION	DATE	REV
EXISTING HV ELECTRICAL NETWORK DETAILS	09/04/2019	A
ADDITION OF RECENT HV RELOCATION WORKS	17/04/2019	B

pomelo CONSULTING
www.pomelo.com.au Accreditation No. 3851
Email: client.service@pomelo.com.au
Post: Suite 105A, 203-233 New South Head Road
Edgecliff NSW 2027
Phone: 1300 312 865

TEMPLATE VERSION No. 5.0

REFERENCE DRAWING'S		WORK ORDERS		CAP / SAMP No.	
		GENERAL		AM PROJ. No.	
		OVERHEAD		HV SWITCHING	
		UNDERGROUND		UBD/PENGUIN REF	
		SUBSTATIONS		GIS MAP No	
				HV OP DIAGRAM	
				LOCAL GOV AREA	THE HILLS SHIRE

ORIGINAL SCALE	AS SHOWN
DRAWN	A.T.
DATE	17/04/2019
CH'D	H.C.

DO NOT SCALE
DIMENSIONS IN METRES
DESIGN H.C.

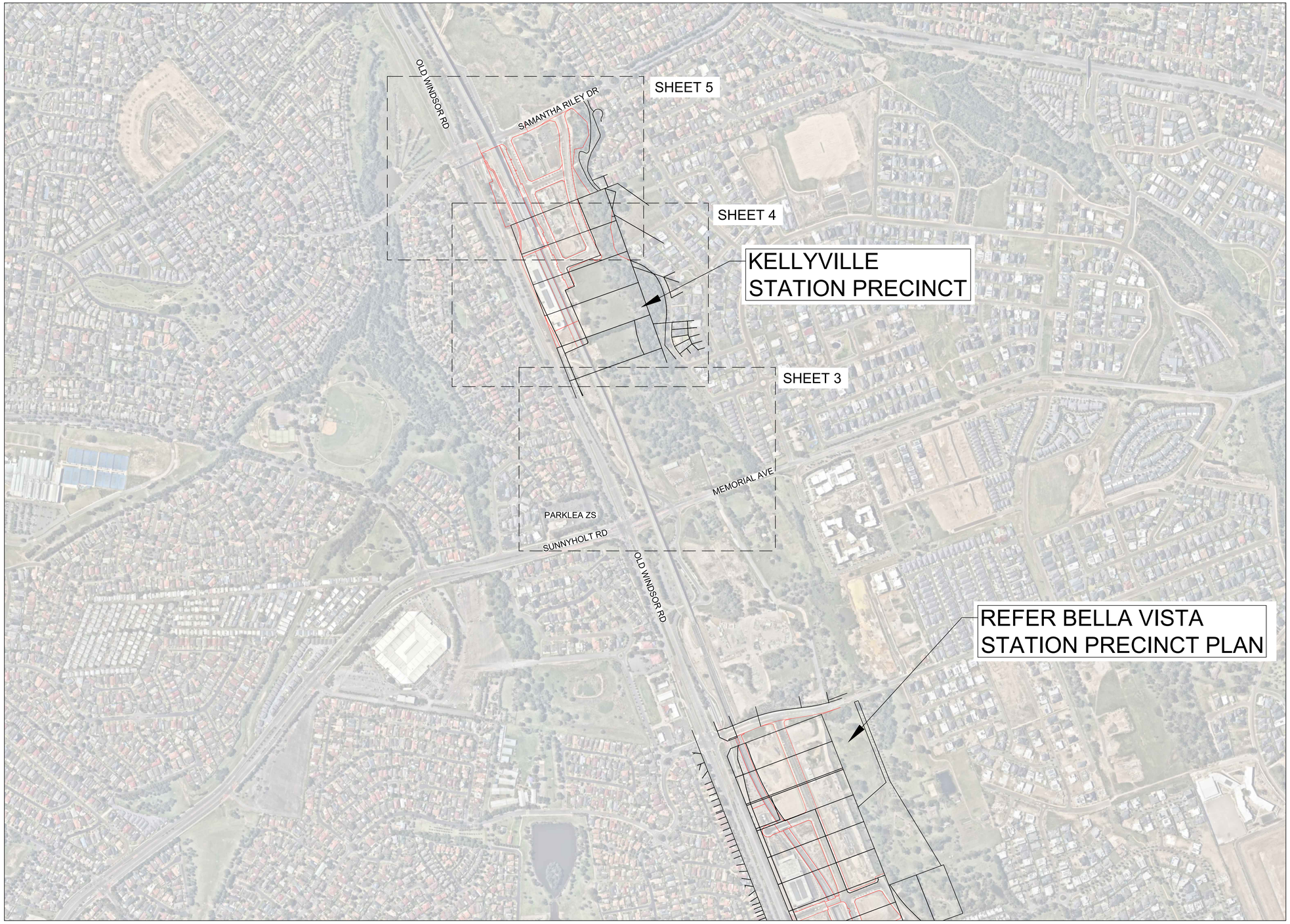
TITLE PAGE
PRECINCT WIDE MASTER PLAN - ELECTRICAL
KELLYVILLE STATION PRECINCT
EXISTING POWER INFRASTRUCTURE
BELLA VISTA & KELLYVILLE STATION PRECINCTS

Endeavour Energy

A1 | 18025-EL-02 | A

SHEET No 1 OF 5 SHEETS

74518



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AMENDMENTS

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		UNDERGROUND		GIS MAP No	
		SUBSTATIONS		HV OP DIAGRAM	
				LOCAL GOV AREA	THE HILLS SHIRE

ORIGINAL SCALE	AS SHOWN
DRAWN	A.T.
DATE	17/04/2019
CH'D	H.C.
DESIGN	H.C.

DO NOT SCALE
DIMENSIONS IN METRES

KEY PLAN
PRECINCT WIDE MASTER PLAN - ELECTRICAL
KELLYVILLE STATION PRECINCT
EXISTING POWER INFRASTRUCTURE
BELLA VISTA & KELLYVILLE STATION PRECINCTS

Endeavour Energy

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SHEET No 2 OF 5 SHEETS

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LEGEND

	OH LINE	UG CABLE
EXISTING TRANSMISSION MAINS		
22kV FEEDER 25777		
22kV FEEDER 25779		
22kV FEEDER 25776		
22kV FEEDER 25782		
22kV FEEDER 25775		
22kV FEEDER 25783		
22kV FEEDER MR2231		
OTHER 22kV FEEDERS		

SCALE 1 : 1000

0 20 40 60 80 100 METRES

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		UNDERGROUND		GIS MAP No	
		SUBSTATIONS		HV OP DIAGRAM	
				LOCAL GOV AREA	THE HILLS SHIRE

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DATE	17/04/2019
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DIMENSIONS IN METRES

DESIGN H.C.

SITE PLAN SHEET
PRECINCT WIDE MASTER PLAN - ELECTRICAL
KELLYVILLE STATION PRECINCT
EXISTING POWER INFRASTRUCTURE
BELLA VISTA & KELLYVILLE STATION PRECINCTS

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SHEET No 3 OF 5 SHEETS

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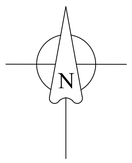

LEGEND

	OH LINE	UG CABLE
EXISTING TRANSMISSION MAINS		
22kV FEEDER 25777		
22kV FEEDER 25779		
22kV FEEDER 25776		
22kV FEEDER 25782		
22kV FEEDER 25775		
22kV FEEDER 25783		
22kV FEEDER MR2231		
OTHER 22kV FEEDERS		

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ORIGINAL SCALE	AS SHOWN
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DO NOT SCALE
DIMENSIONS IN METRES

SITE PLAN SHEET
PRECINCT WIDE MASTER PLAN - ELECTRICAL
KELLYVILLE STATION PRECINCT
EXISTING POWER INFRASTRUCTURE
BELLA VISTA & KELLYVILLE STATION PRECINCTS

Endeavour Energy

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SHEET No 4 OF 5 SHEETS

74518

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LEGEND

	OH LINE	UG CABLE
EXISTING TRANSMISSION MAINS		
22kV FEEDER 25777		
22kV FEEDER 25779		
22kV FEEDER 25776		
22kV FEEDER 25782		
22kV FEEDER 25775		
22kV FEEDER 25783		
22kV FEEDER MR2231		
OTHER 22kV FEEDERS		

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DATE	17/04/2019		
CH'D	H.C.	DESIGN	H.C.

SITE PLAN SHEET
PRECINCT WIDE MASTER PLAN - ELECTRICAL
KELLYVILLE STATION PRECINCT
EXISTING POWER INFRASTRUCTURE
BELLA VISTA & KELLYVILLE STATION PRECINCTS

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SHEET No 5 OF 5 SHEETS

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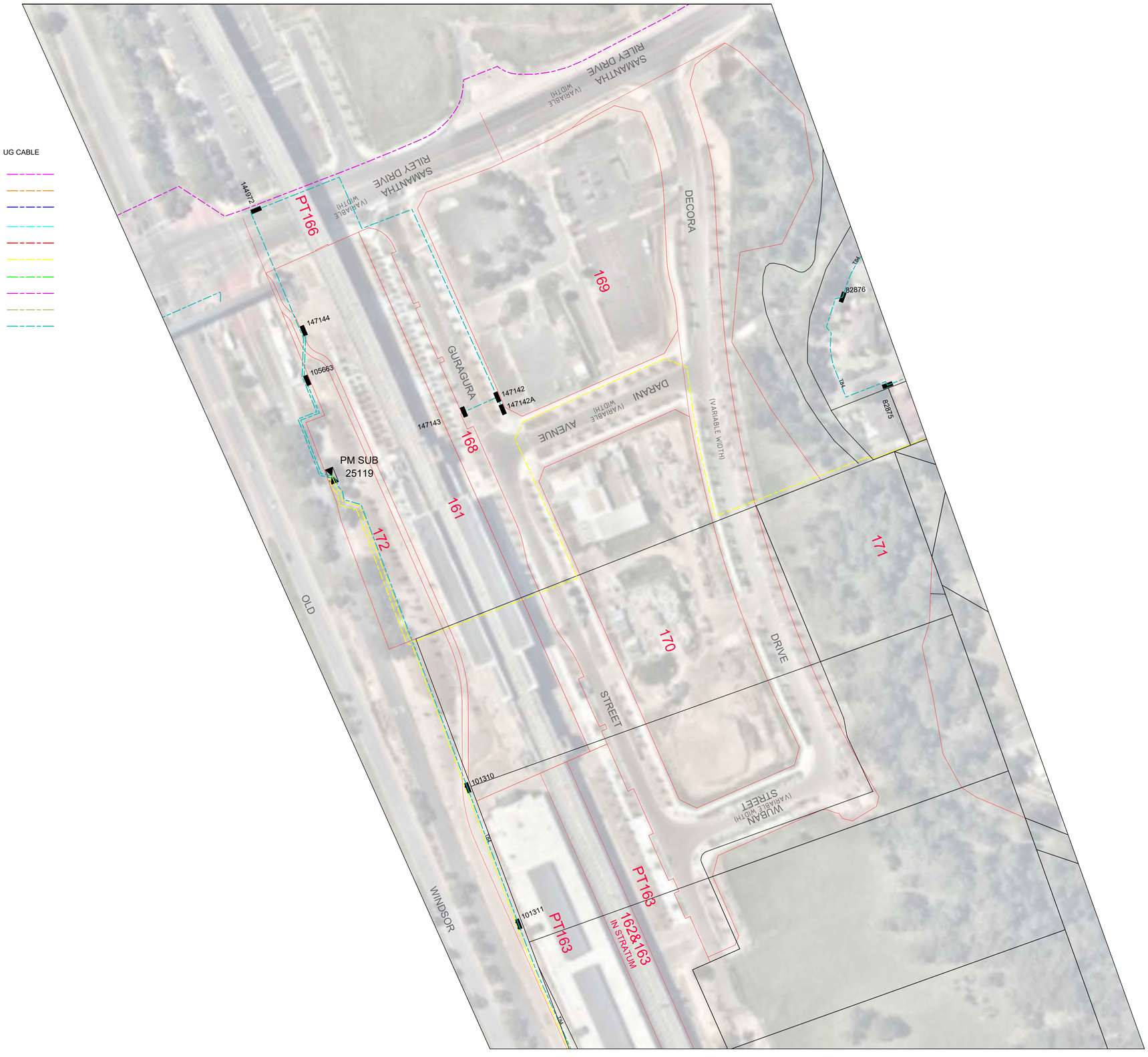

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AMENDMENTS
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EXISTING HV & LV ELECTRICAL NETWORK DETAILS	09/04/2019	A
ADDITION OF RECENT HV & LV RELOCATION WORKS	17/04/2019	B

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				LOCAL GOV AREA	THE HILLS SHIRE

ORIGINAL SCALE	AS SHOWN
DRAWN	A.T.
DATE	17/04/2019
CH'D	H.C.
DESIGN	H.C.

DO NOT SCALE
DIMENSIONS IN METRES

SITE PLAN SHEET
PRECINCT WIDE MASTER PLAN - ELECTRICAL
KELLYVILLE STATION PRECINCT
EXISTING POWER INFRASTRUCTURE (HV & LV)
BELLA VISTA & KELLYVILLE STATION PRECINCTS

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SHEET No 1 OF 1 SHEETS

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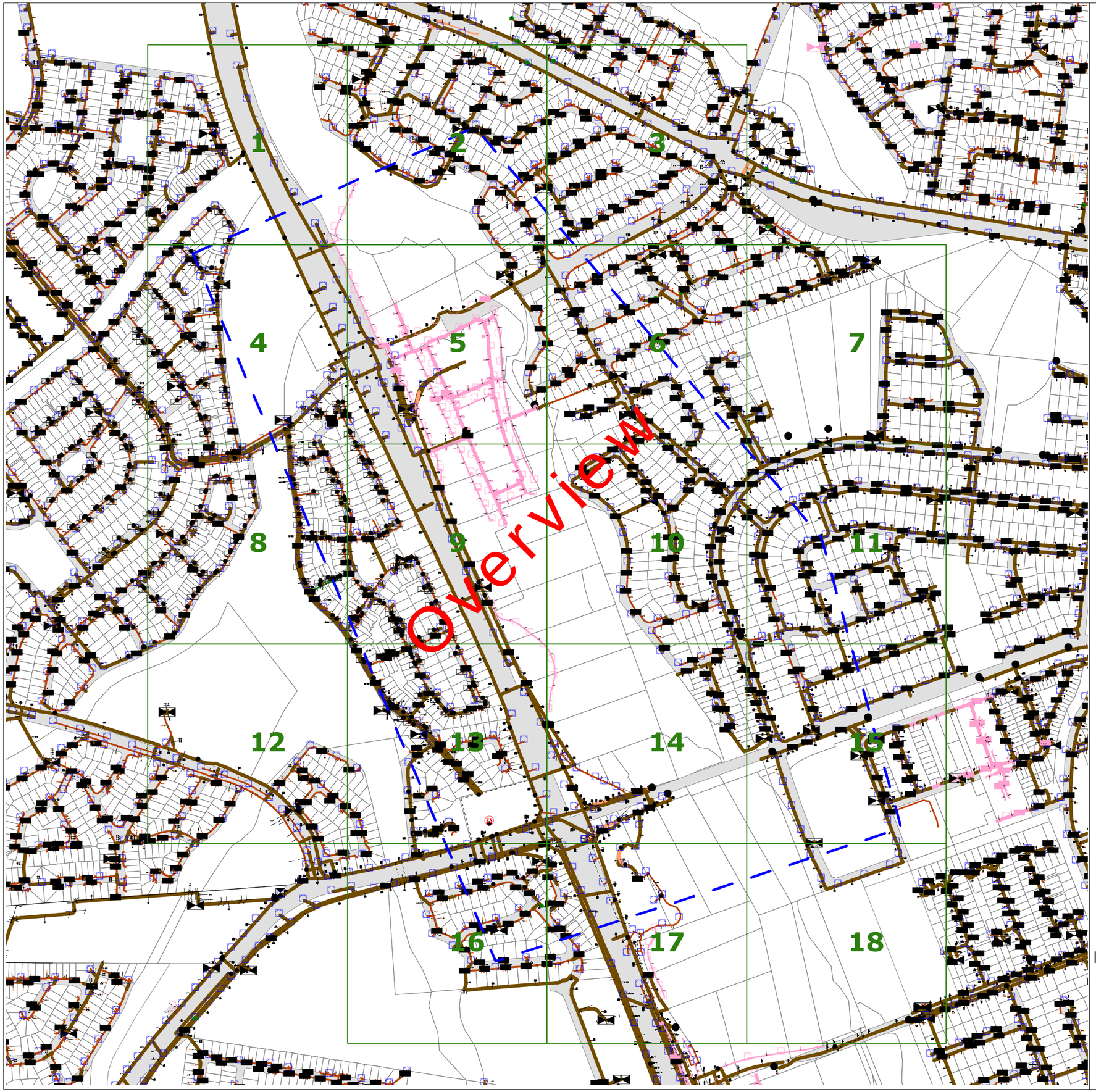

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WARNING

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Issued Date:	20/03/2019

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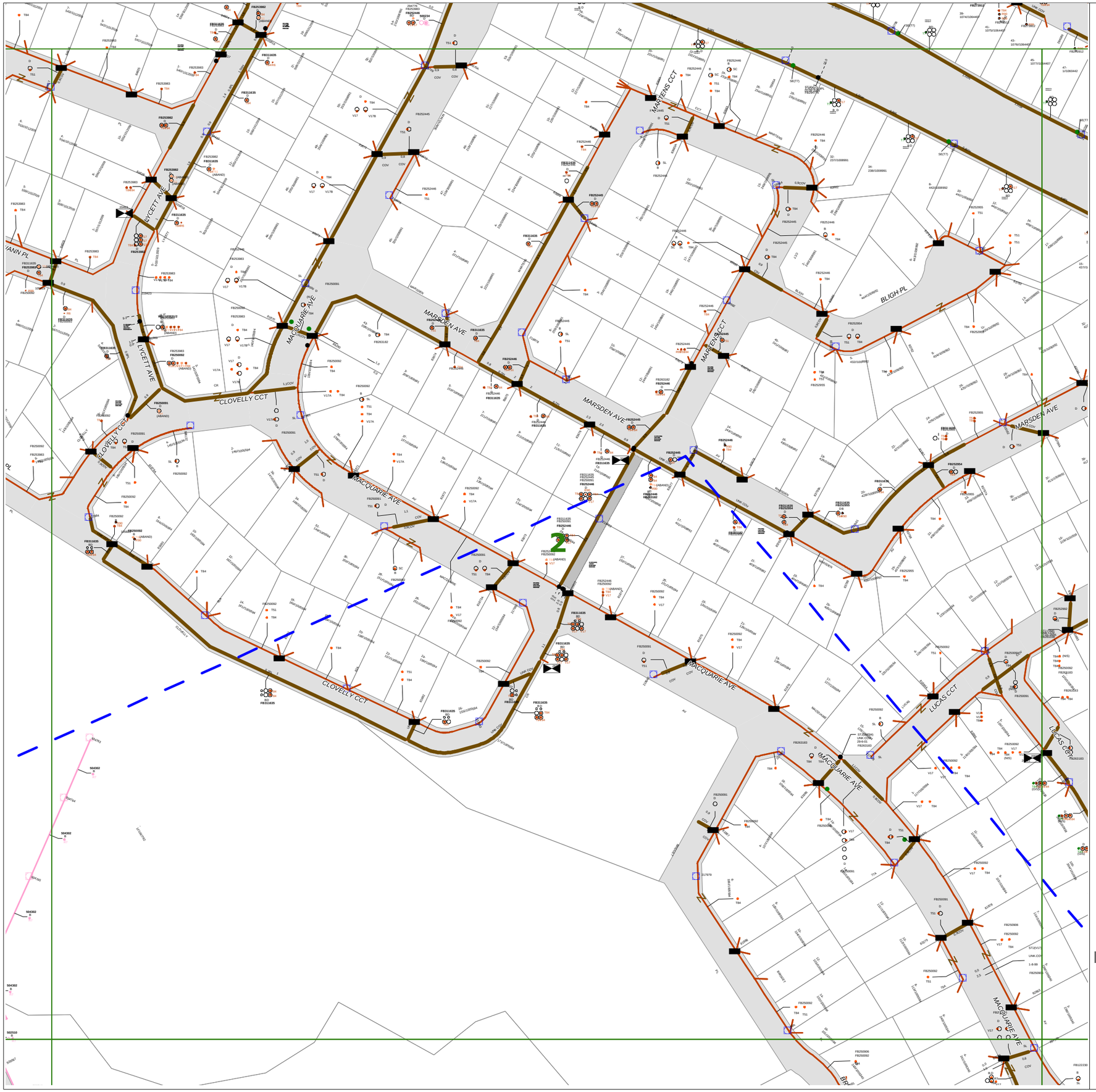

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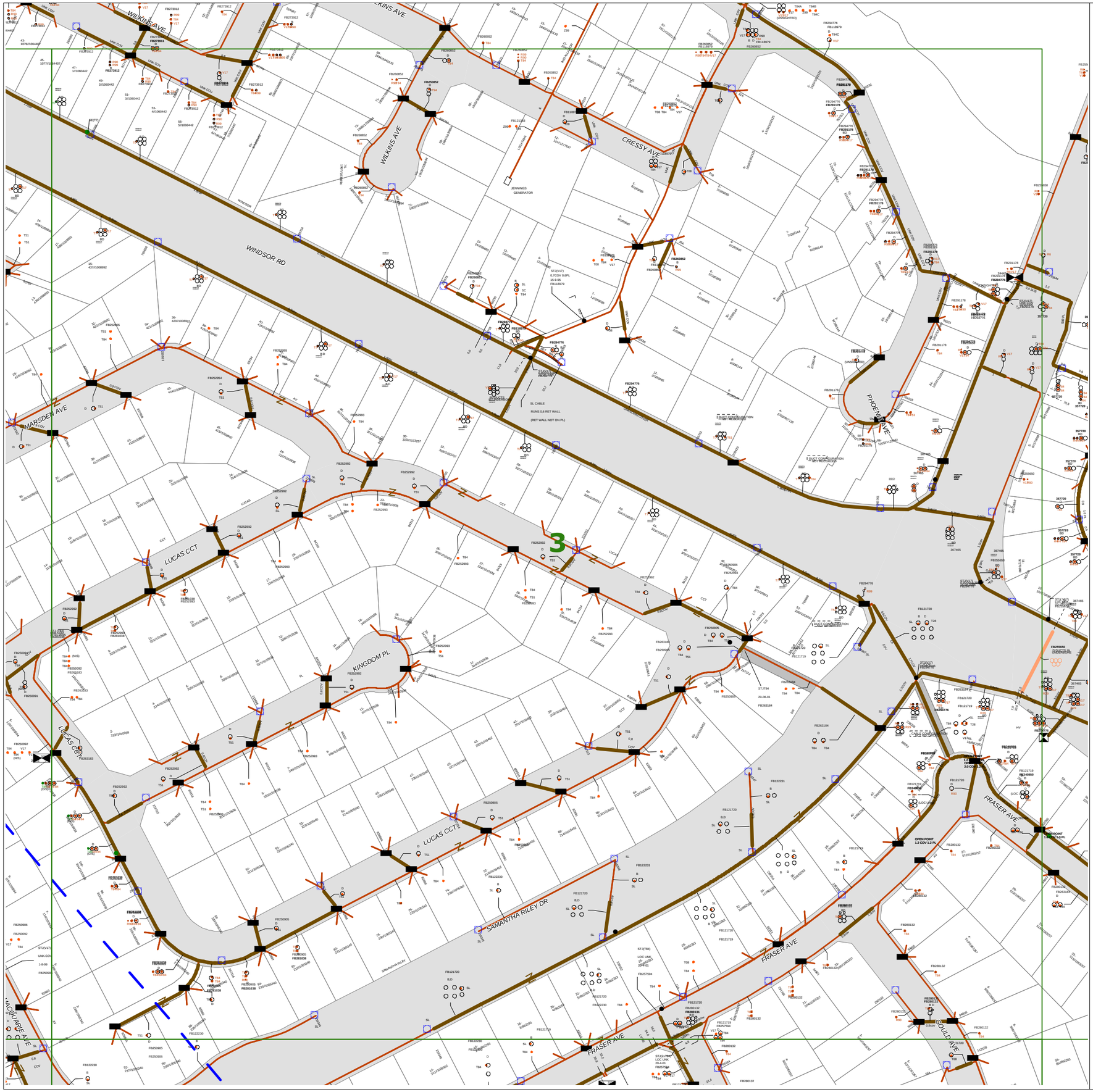

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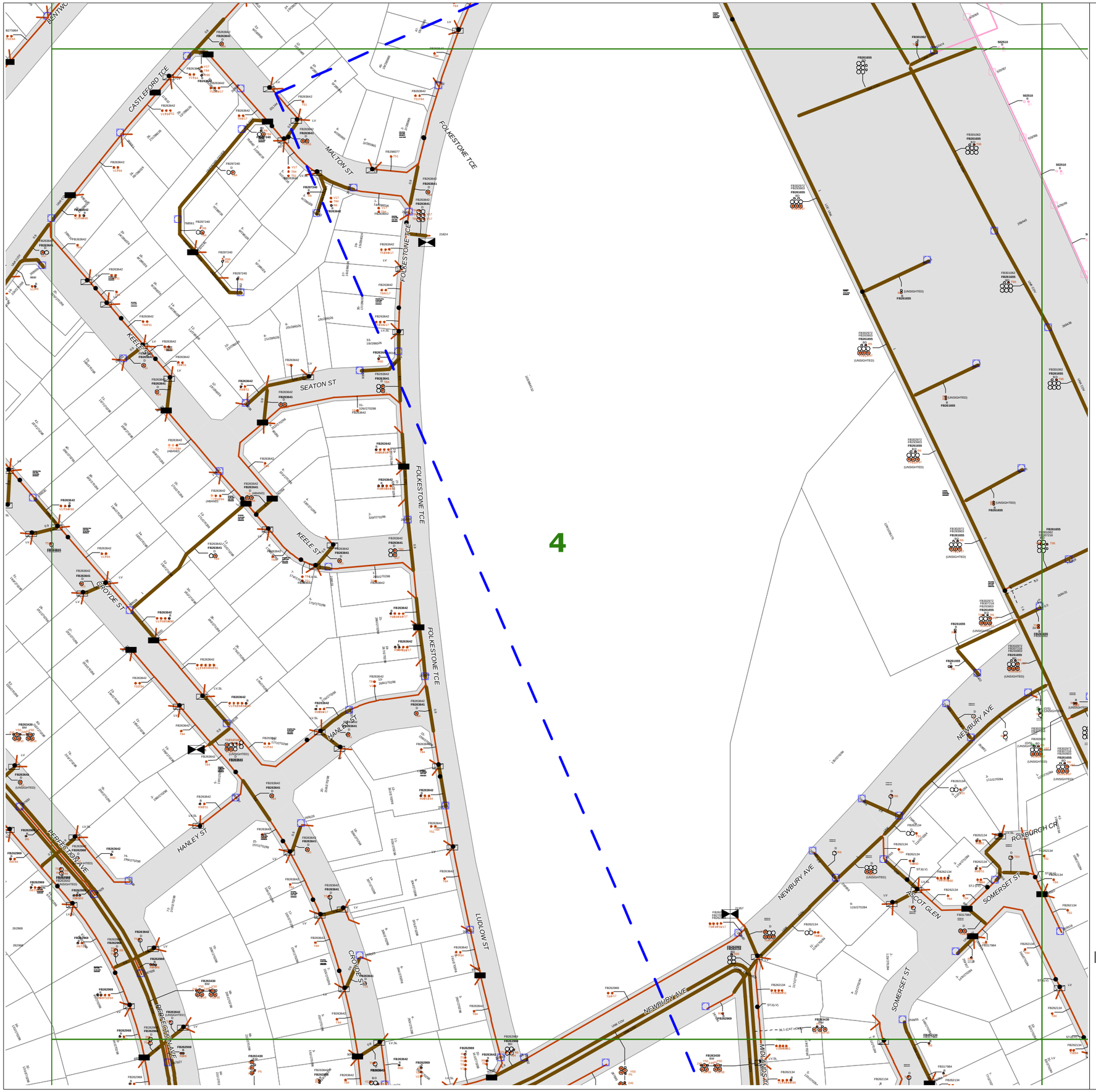

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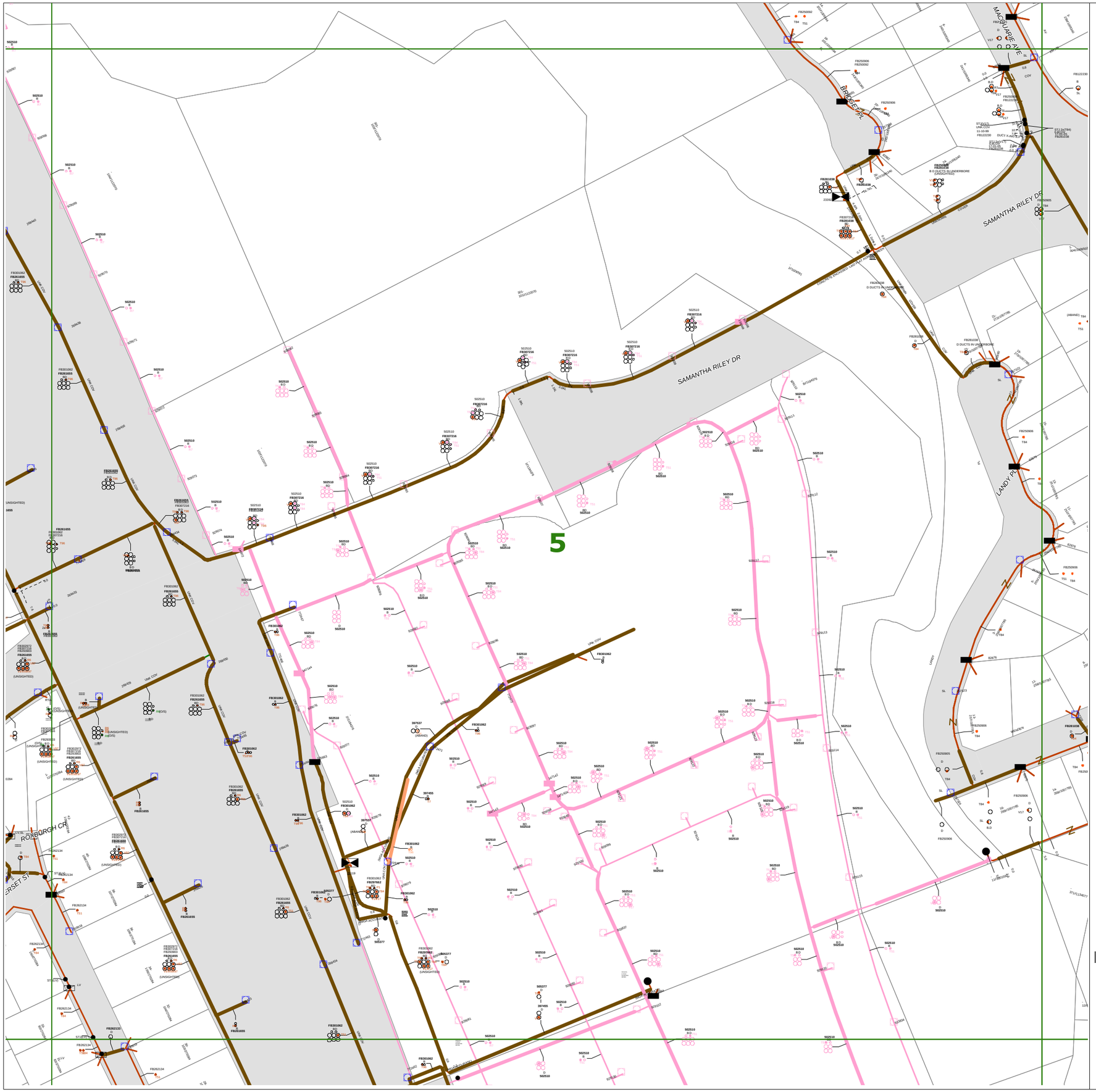

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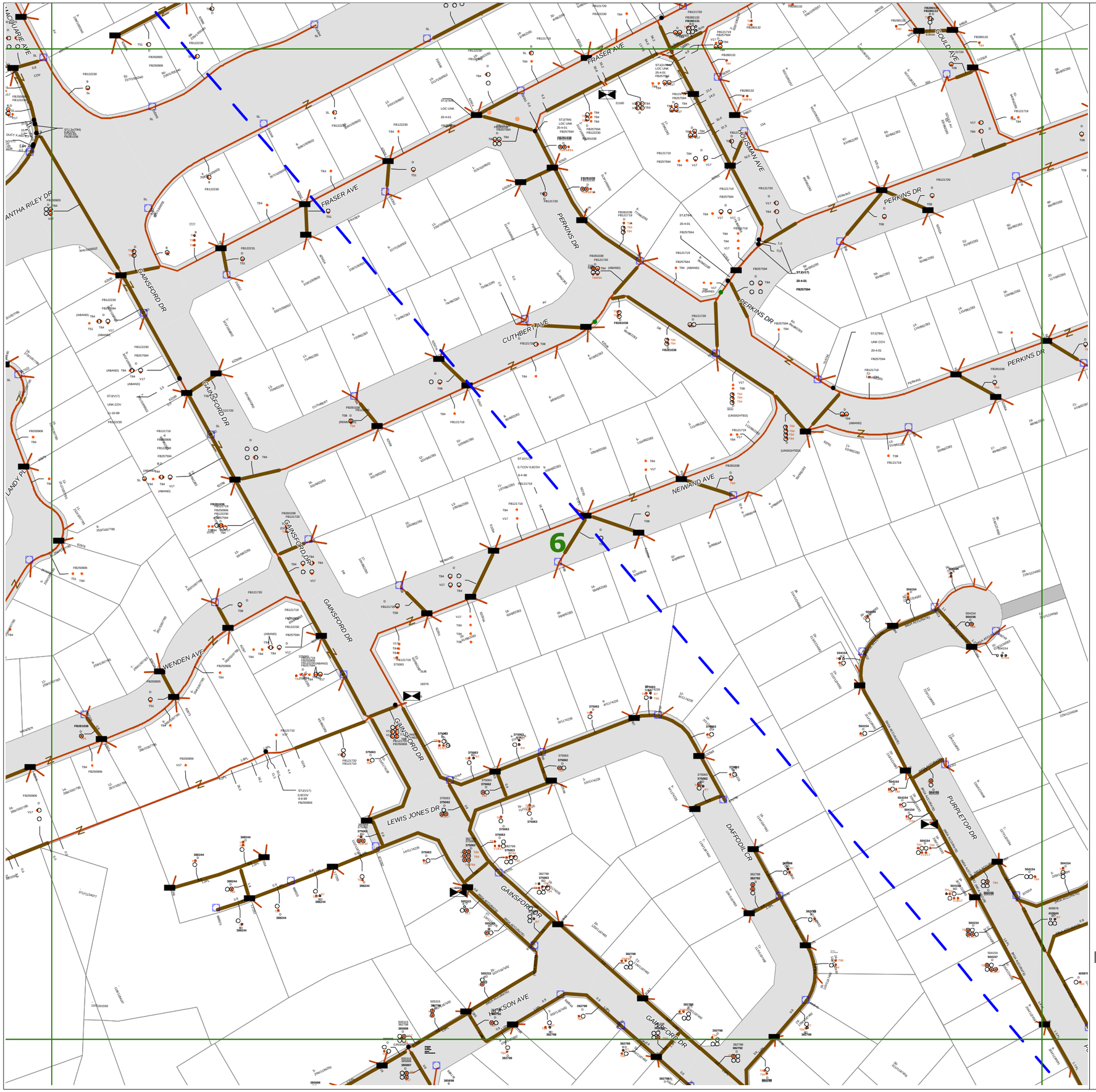

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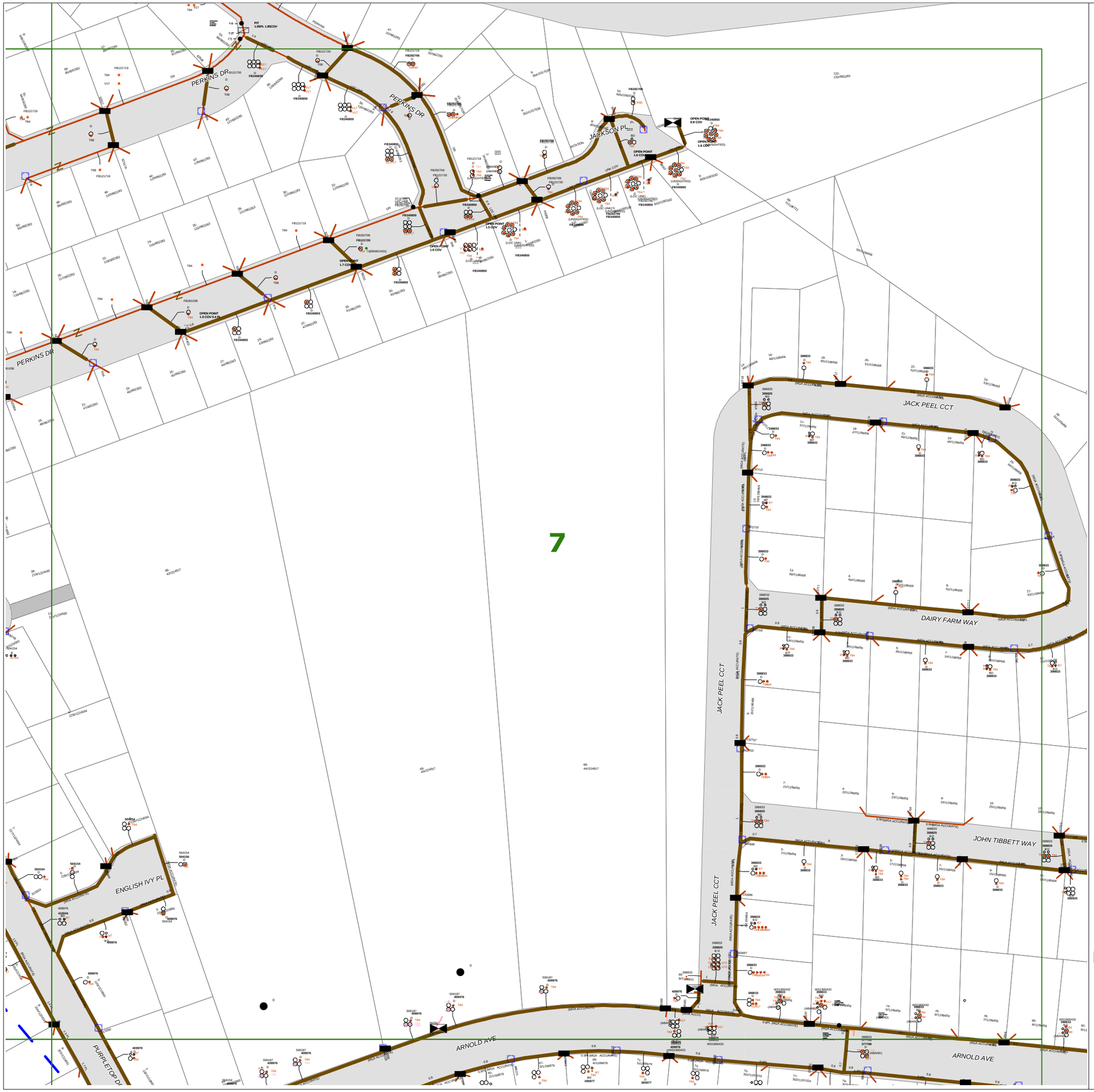

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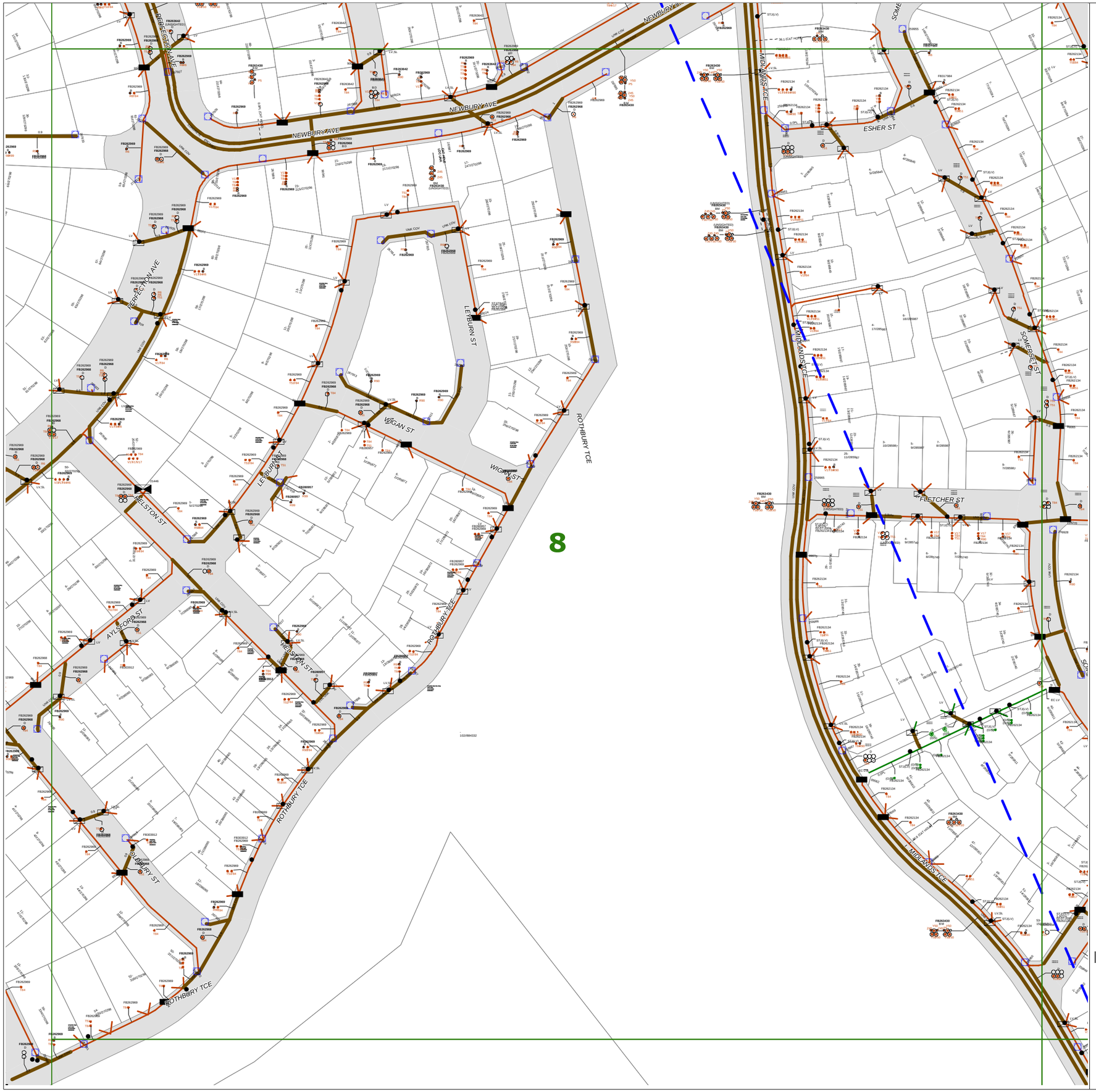

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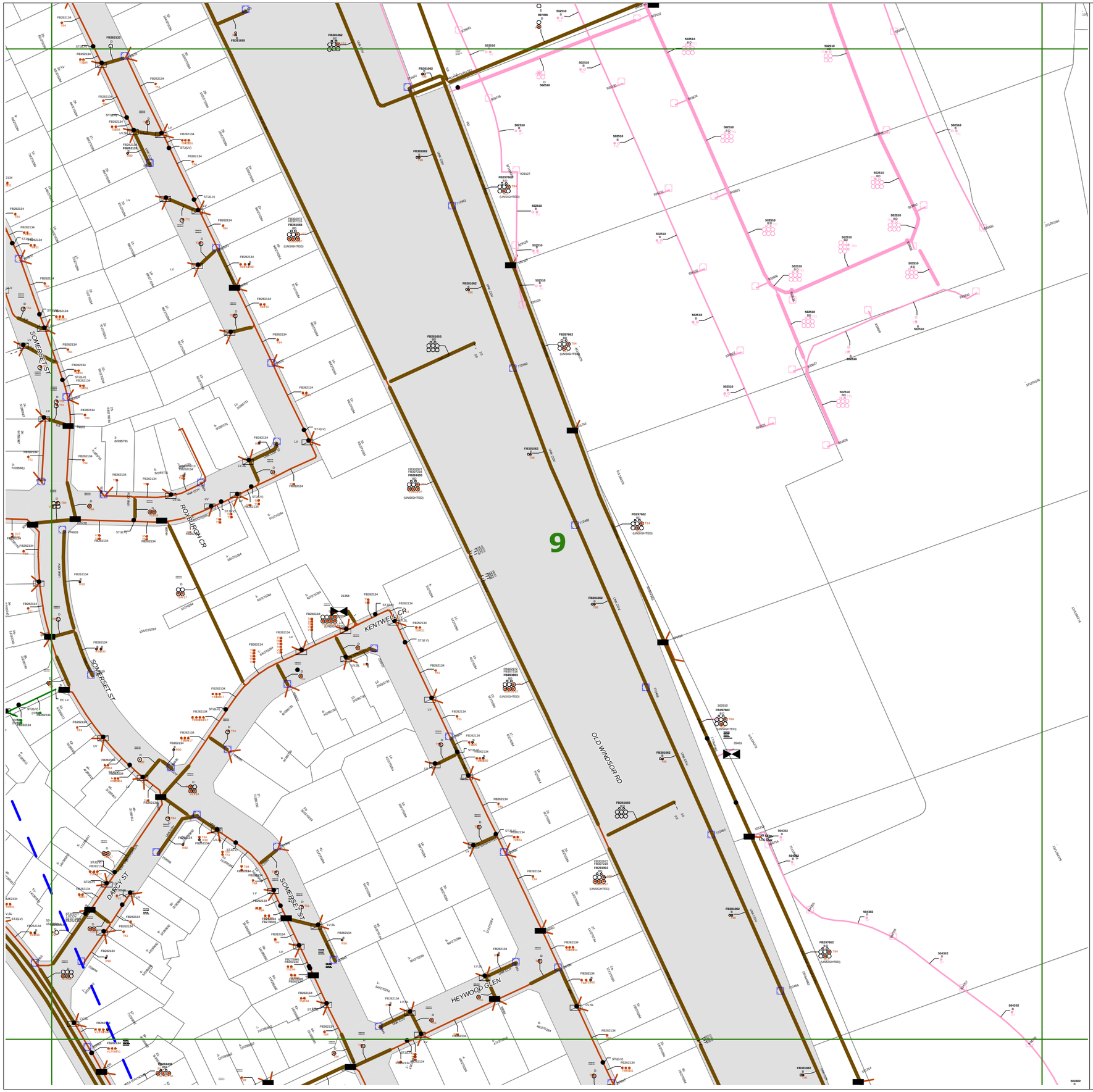

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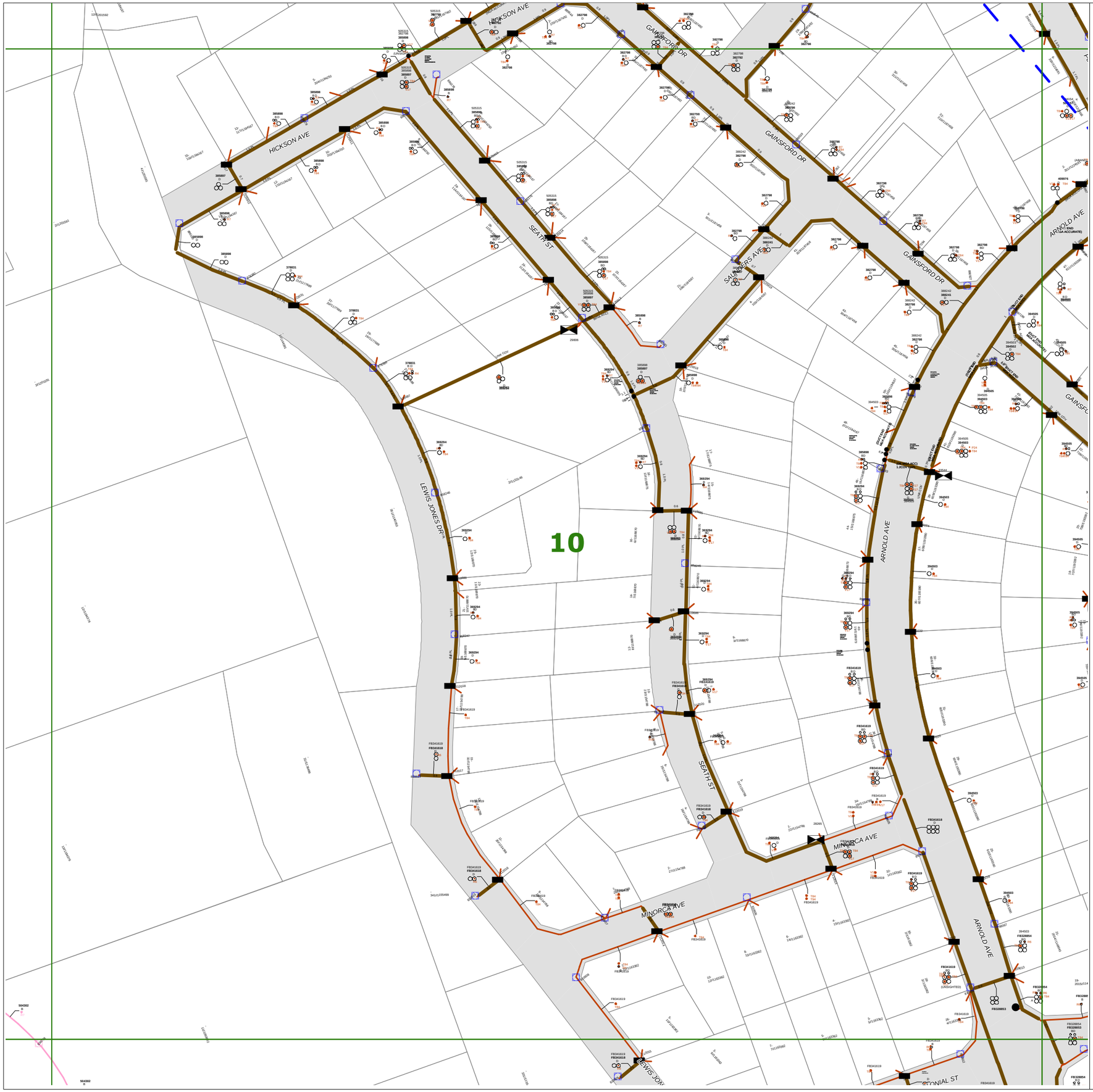

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LEGEND

- Street light column
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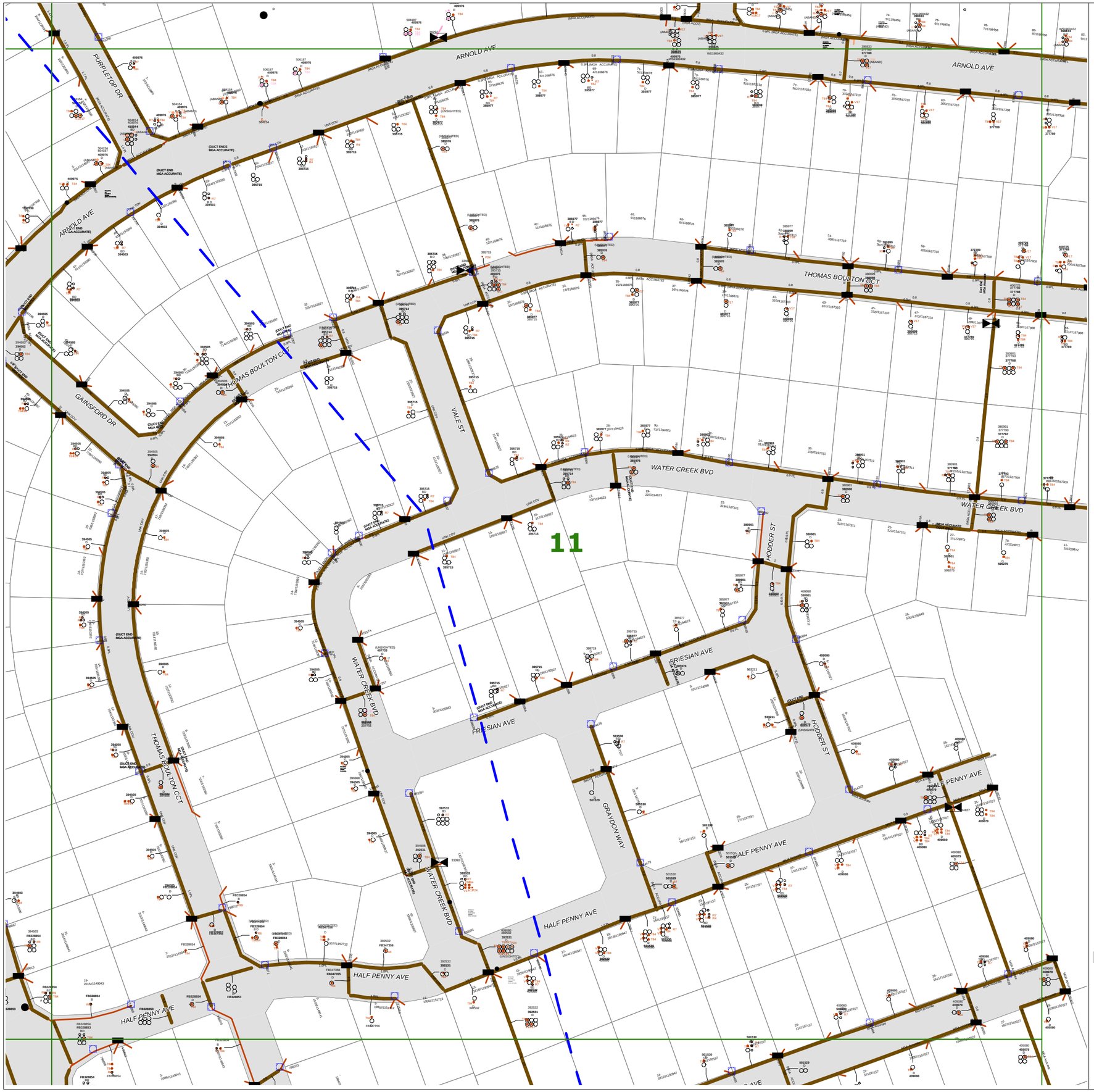

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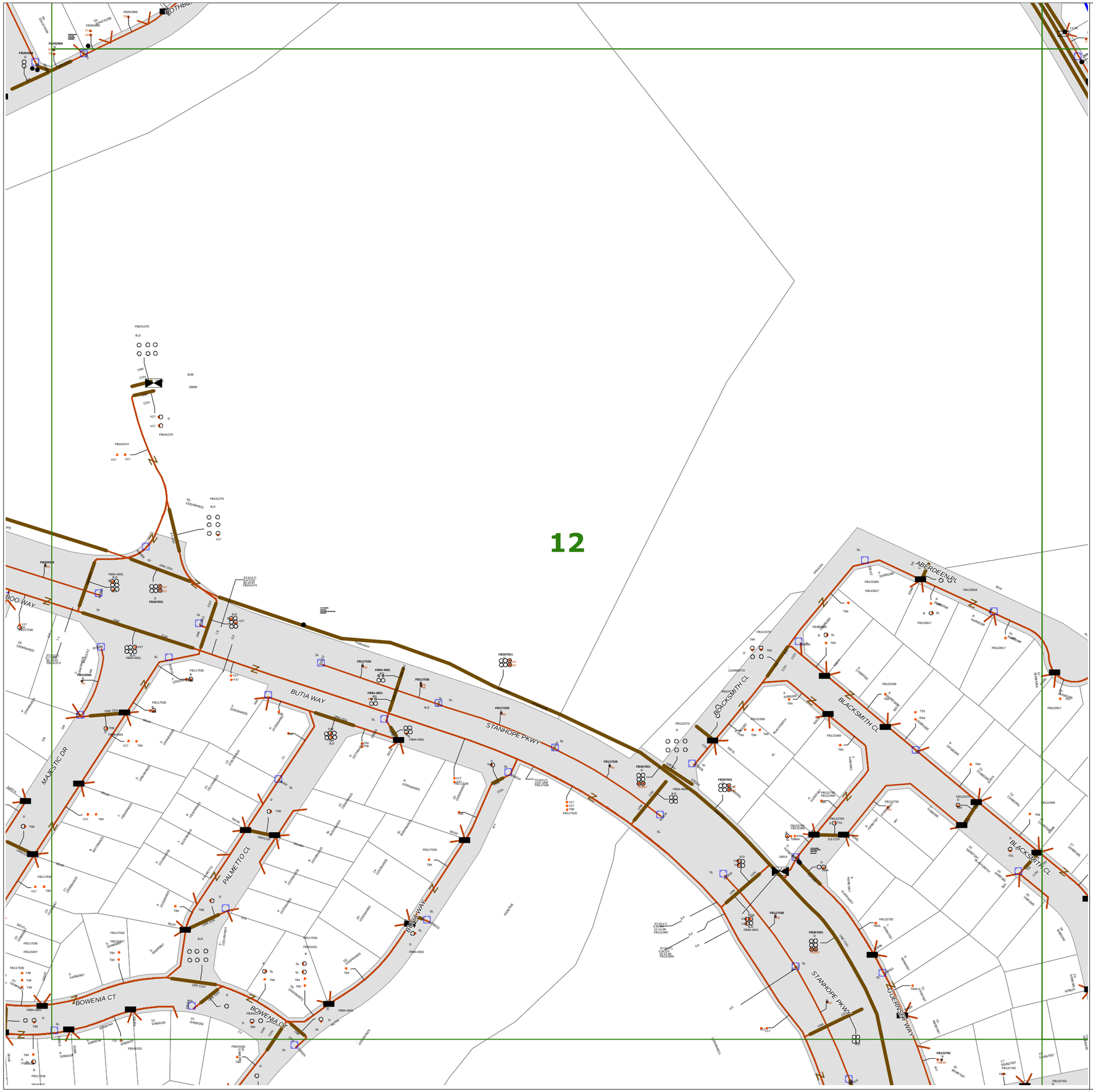

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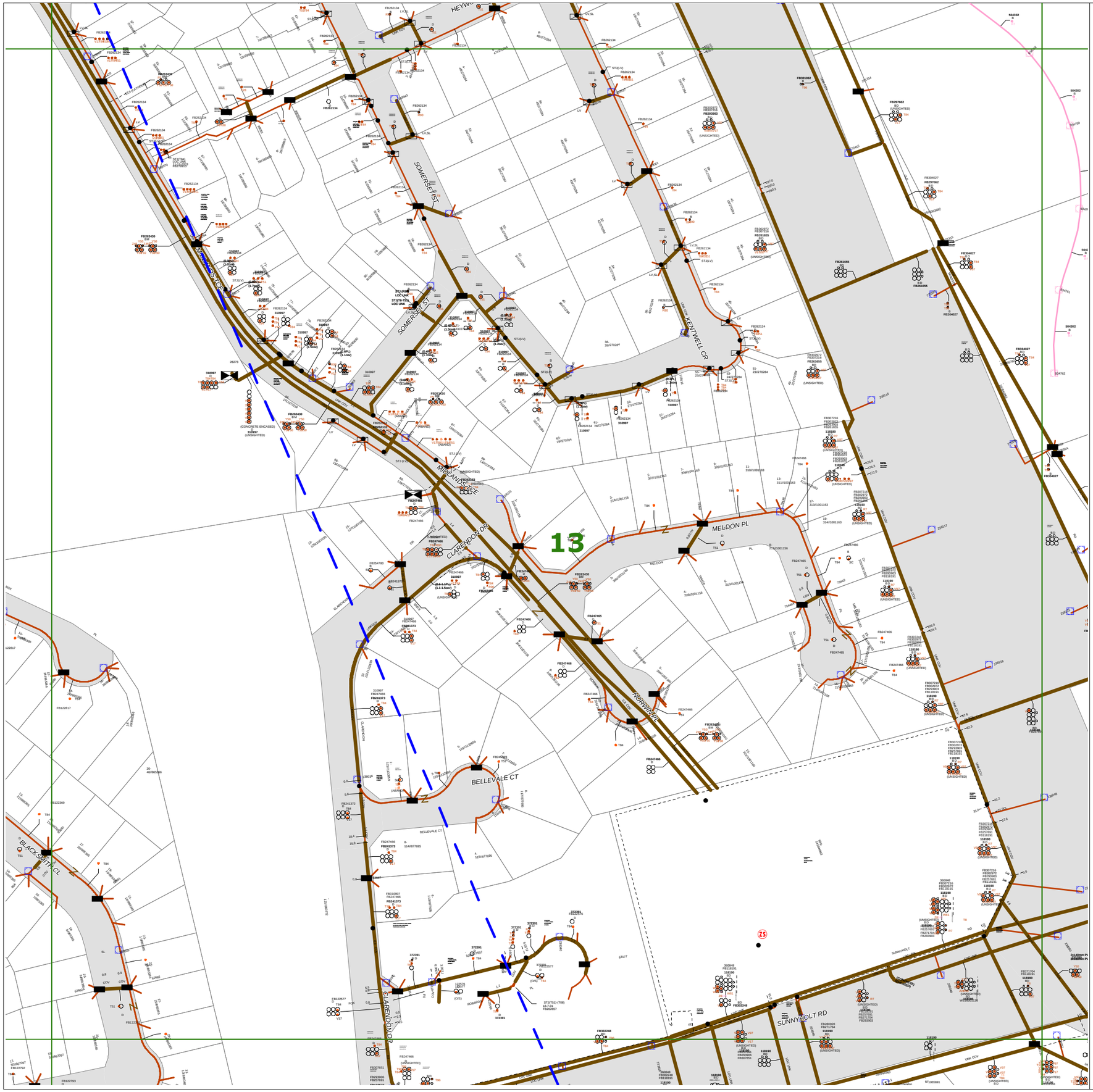

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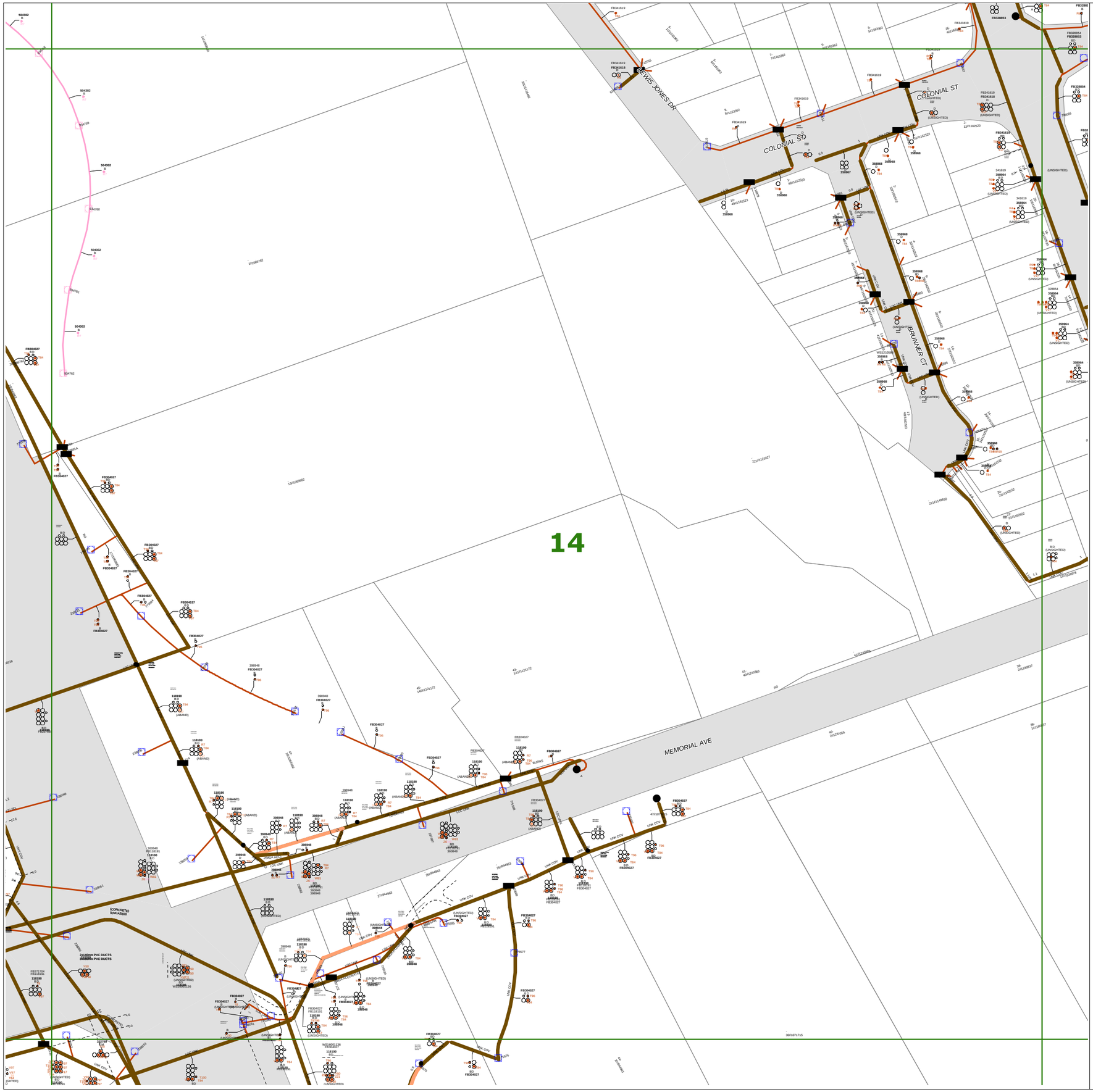

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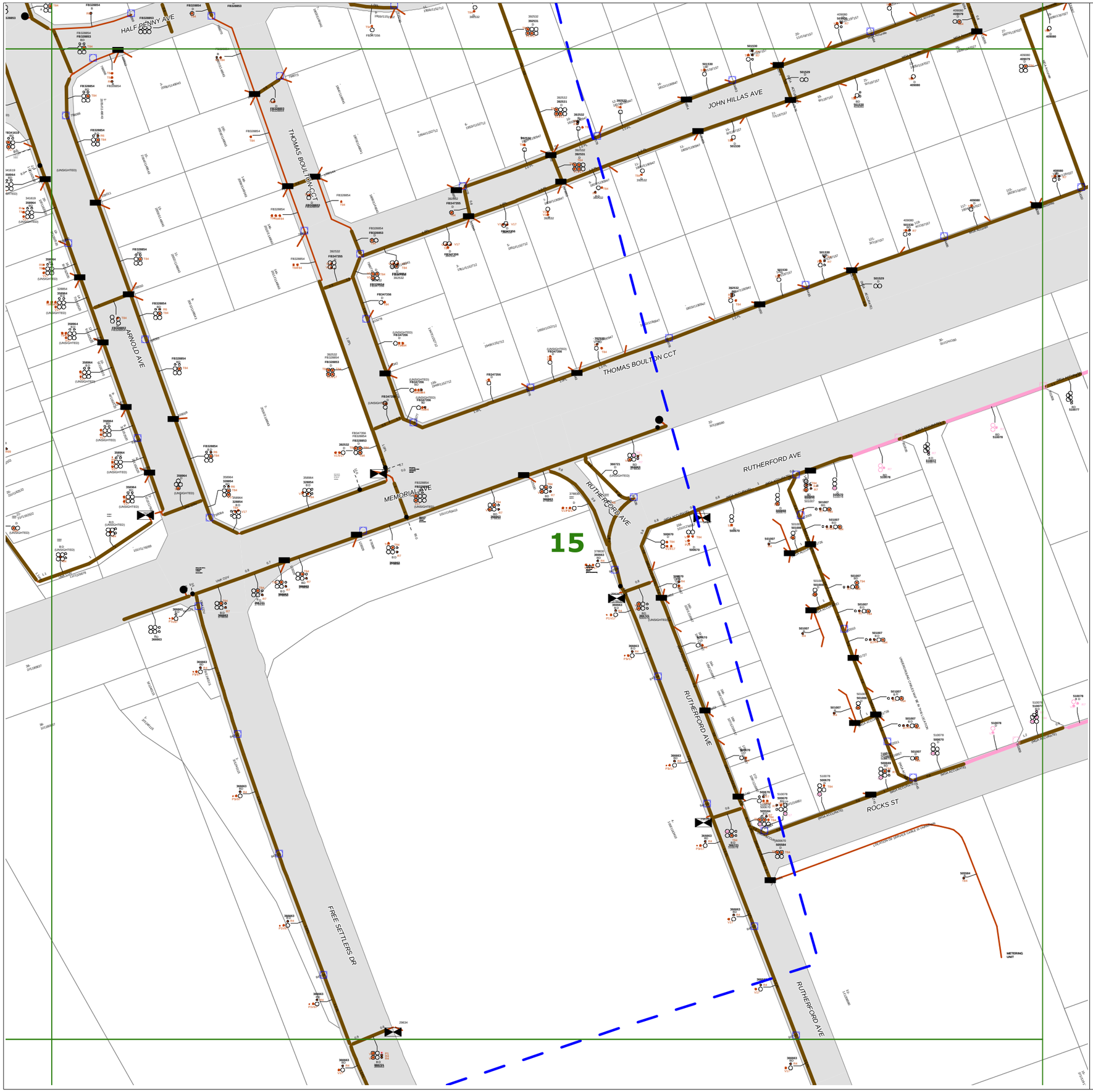

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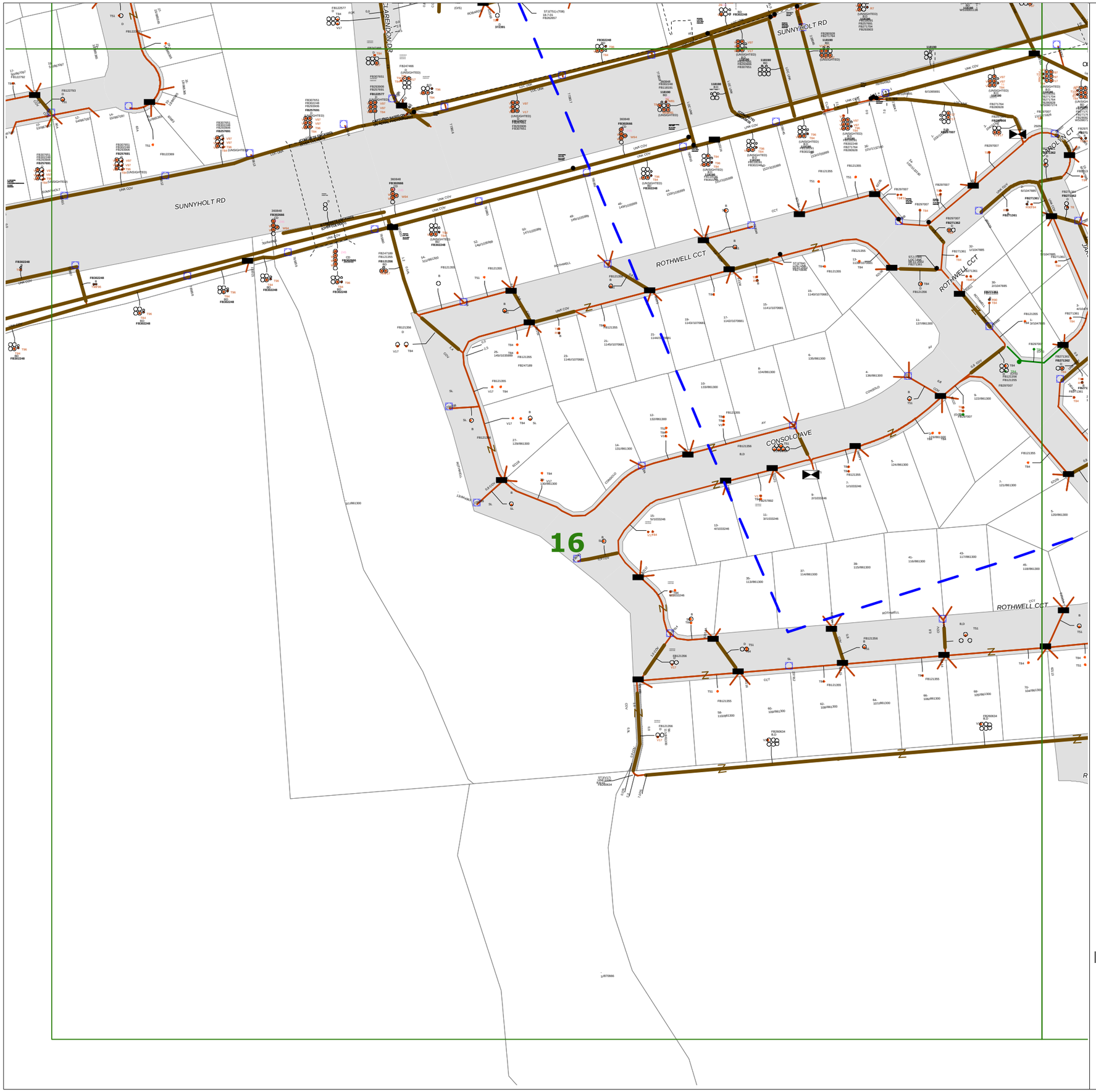

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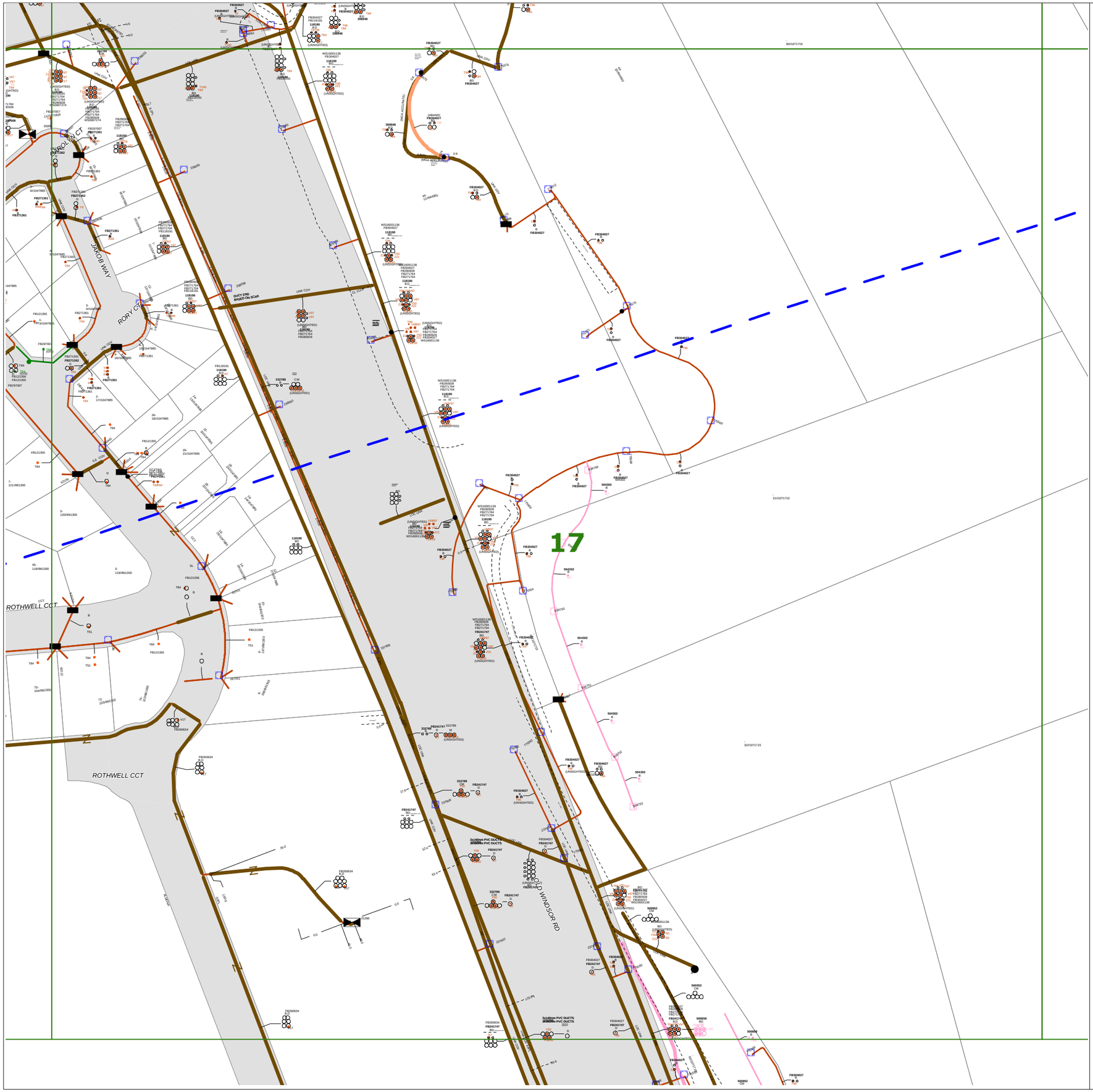

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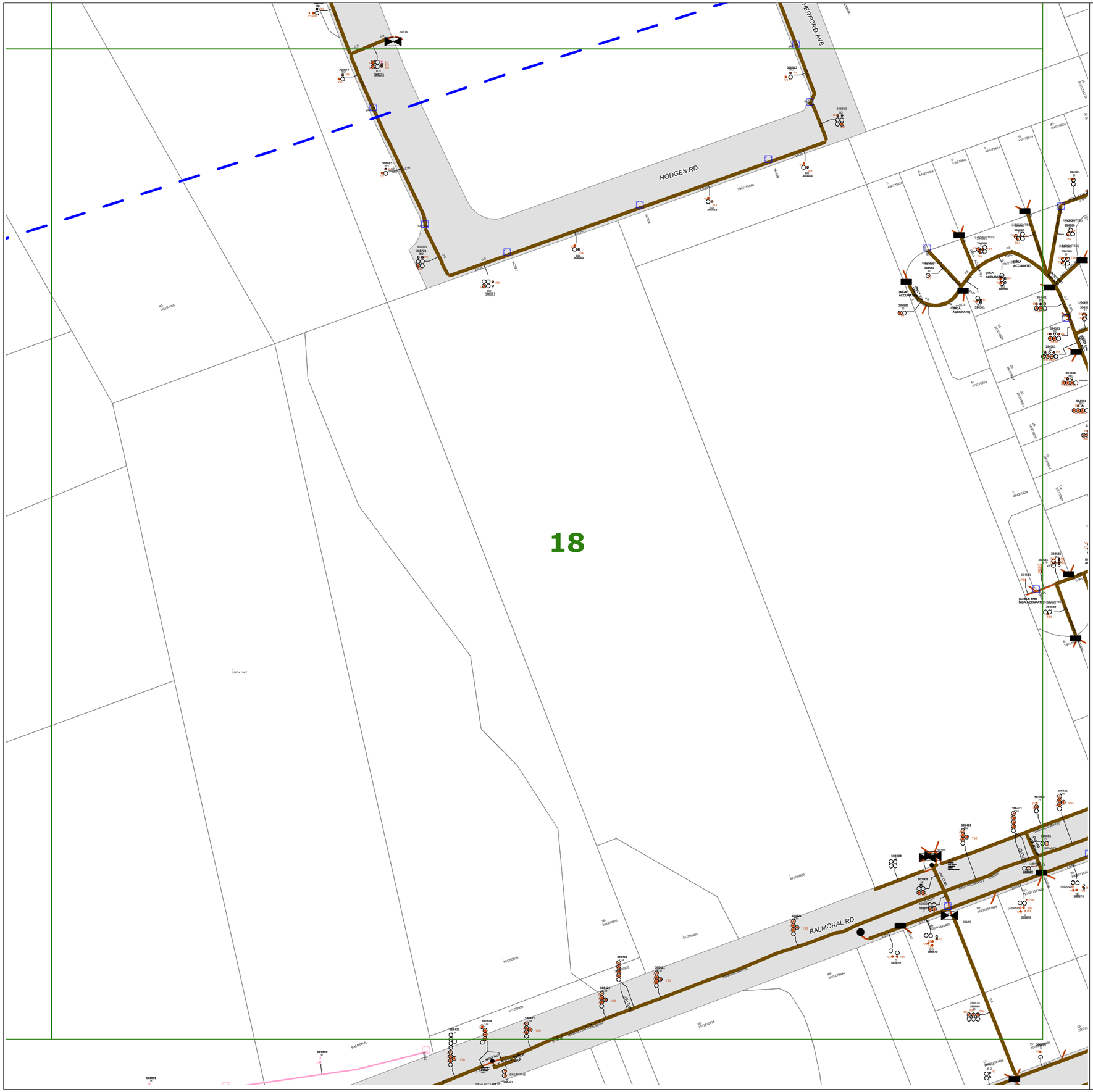

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Appendix E - Technical Review Request to Endeavour Energy

20 November 2018

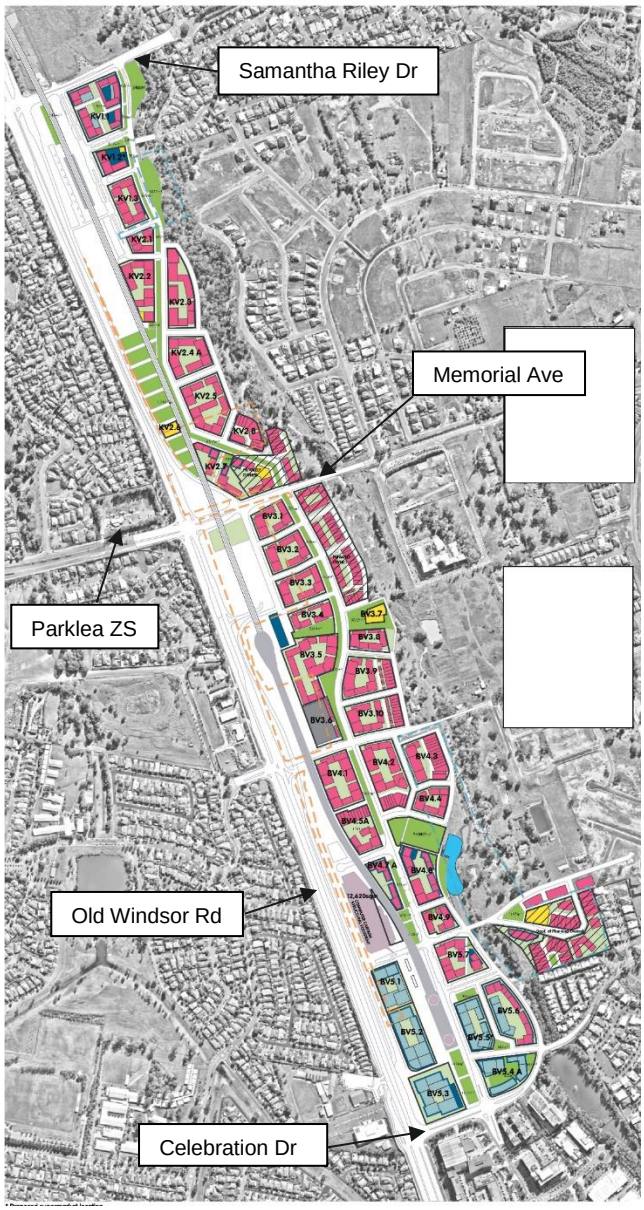
Endeavour Energy
Network Connections
PO Box 811
Seven Hills NSW 1730

Dear Sir/ Madam,

Re: Kellyville and Bella Vista Station Precincts – Supply Enquiry

The North West Rail Link (NWRL) is a priority railway transport infrastructure project for the NSW Government. Once complete, the 23km rail link will run from Epping to Cudgegong Road at Rouse Hill. New Stations will be built along the rail link at Cherrybrook, Castle Hill, Showground, Norwest, Bella Vista, Kellyville, Rouse Hill and Cudgegong Road. The NWRL Corridor Strategy area (the Corridor) encompasses eight precincts located around the NWRL stations. As part of the Corridor Strategy, Structure Plans have been developed for each station and its surrounds, which include projections for residential and employment growth to 2036.

Pomelo Consulting has been engaged to prepare and submit a Technical Enquiry relating to the Kellyville and Bella Vista stations precincts within the NWRL corridor. The context map on below indicates the location of two station precincts, stretching approximately 2.2km.



Kellyville and Bella Vista Precincts

Please refer to enclosed Appendix A for the electrical demand assessment for the Kellyville and Bella Vista precincts. It is noted that the development details provided in the assessment have been based on the current master plan (copy enclosed) developed for Kellyville and Bella Vista precincts.

There is a maximum of 8400 dwellings permitted by the LEP across the two precincts. A separate electrical demand assessment has been prepared to cover this scenario and included in Appendix B for your consideration. While this is a theoretical scenario, we would like to seek Endeavour Energy's advice on electrical infrastructure that would be required to establish to service the two precincts under this scenario.

It is anticipated that Endeavour Energy will be able to advise on:

- available capacity of the existing Zone substations (Kellyville, Parklea and Bella Vista) to service the Kellyville and Bella Vista stations precinct,
- details of any existing HV feeders in the vicinity of the development area which may have spare capacity to potentially supply the first stage of the development,
- details of Planned major network upgrade works in the vicinity of the development area that Landcom should be aware of,
- at what stage the new electricity infrastructure assets (such as new HV feeder from existing zone substations/ new zone substation/ upgrade to transmission infrastructure to service the increased load on the existing and/or new zone substations) will required to support the continual development of Kellyville and Bella Vista station precincts,
- risks that Endeavour Energy are aware of that could delay the implementation new electricity infrastructure assets which could then potentially delay the delivery of the project or influence the viability of development through direct cost or development delays,
- potential actions that Landcom could take to minimise time delays and improve delivery of electricity infrastructure assets required to service Kellyville and Bella Vista stations precinct.

The advice seek from Endeavour Energy is intended to assist Landcom in identifying development priorities, managing risks, managing industry and stakeholder expectations and considering demand management or infrastructure staging to maximise the value of up-front infrastructure costs.

Please contact me know if you require any further information.

Kind regards,
Hasika Caldera
Senior Electrical Engineer
M: 0142 153 998
hasika@pomelo.com.au

Cont'd on next page

Appendix A: Electrical Demand Assessment (Based on Current Master Plan)

Between Bella Vista and Kellyville station, there is approximately 34ha of Developable Government Owned Land (DGL). The forecasts shown in the following tables have then been developed using the projected yield estimates of population, dwellings, retail, commercial and other uses to determine demands for the electricity infrastructure.

Kellyville Station Precinct												
Super Lot No	Site Area (sqm)	Approximate Yield Dwellings	Estimated GFA (sqm)				Estimated Maximum Demand (KVA)					Anticipated Project Completion
			Residential	Retail	Commercial	Community	Residential	Retail	Commercial	Community	Total per Super Lot	
KV1.1	10,631	449	35,950	6,885	6,100	-	1,796	689	610	-	3,095	Mid-2022
KV1.2	3,512	151	12,095	5,355	-	430	604	536	-	43	1,183	Mid-2022
KV1.3	5,835	266	21,665	350	-	-	1,064	35	-	-	1,099	Mid-2022
KV2.1	2,567	128	10,240	-	-	-	512	-	-	-	512	Occupation of buildings will occur over a 10 - 12 year timeframe from 2022
KV2.2	7,241	317	25,375	-	-	615	1,268	-	-	62	1,330	
KV2.3	8,796	431	34,500	610	-	-	1,724	61	-	-	1,785	
KV2.4	7,228	313	25,045	435	-	485	1,252	44	-	49	1,344	
KV2.5	9,938	391	31,290	-	-	-	1,564	-	-	-	1,564	
KV2.6	1,125	-	-	-	-	985	-	-	-	99	99	
KV2.7	6,215	199	15,935	690	-	-	796	69	-	-	865	
KV2.8	3,430	27	4,125	-	-	-	108	-	-	-	108	
Totals	**66,518**	**2,672**	**216,220**	**14,325**	**6,100**	**2,515**	**10,688**	**1,433**	**610**	**252**		
							10.7MVA	1.4MVA	0.6MVA	0.3MVA	**13.0MVA**	

Bella Vista Station Precinct												
Super Lot No	Site Area (sqm)	Approximate Yield Dwellings	Estimated GFA (sqm)				Estimated Maximum Demand (KVA)					Anticipated Project Completion
			Residential	Retail	Commercial	Community	Residential	Retail	Commercial	Community	Total per Super Lot	
BV3.1	4,970	118	9,430	-	-	-	472	-	-	-	472	Occupation of buildings will occur over a 10 - 15 year timeframe from 2022
BV3.2	6,265	179	14,320	-	-	-	715	-	-	-	716	
BV3.3	6,178	159	12,750	-	-	-	636	-	-	-	636	
BV3.4	4,055	98	7,895	-	-	-	392	-	-	-	392	
BV3.5	12,596	356	28,510	-	-	-	1424	-	-	-	1,424	
BV3.6	5,960	22	1,460	-	-	-	88	-	-	-	88	
BV3.7	5,831	-	-	360	-	2,375	-	36	-	238	274	
BV3.8	3,978	91	7,180	785	-	-	364	78.5	-	-	443	
BV3.9	8,240	202	18,060	-	-	-	808	-	-	-	808	
BV3.10	7,786	180	16,415	-	-	-	720	-	-	-	720	
BV4.1	9,060	281	22,455	-	-	-	1,124	-	-	-	1,124	
BV4.2	10,326	246	20,710	-	-	-	984	-	-	-	984	
BV4.3	7,100	145	13,680	-	-	-	580	-	-	-	580	
BV4.4	4,379	124	9,915	750	-	-	496	75	-	-	571	
BV4.5	4,964	103	9,515	-	-	-	412	-	-	-	412	
BV4.7	3,854	267	21,365	1,690	-	-	1,068	169	-	-	1,237	
BV4.8	7,662	367	29,325	2,770	-	-	1,468	277	-	-	1,745	
BV4.9	3,480	165	13,235	795	-	-	660	79.5	-	-	740	
BV5.1	6,134	-	-	3,520	34,840	-	-	352	3,484	-	3,836	Occupation of buildings will occur over a 20 - 25 year timeframe from 2022
BV5.2	9,038	-	-	6,890	49,455	-	-	689	4,946	-	5,635	
BV5.3	10,585	-	-	12,520	50,035	-	-	1,252	5,004	-	6,256	
BV5.4	7,396	-	-	1,620	38,540	-	-	162	3,854	-	4,016	Mid-2022
BV5.5	6,703	-	-	5,460	32,590	-	-	546	3,259	-	3,805	Mid-2022
BV5.6	9,713	317	25,320	5,340	18,295	-	1,268	534	1,830	-	3,632	Mid-2022
BV5.7	6,887	343	27,470	1,760	-	1,930	1,372	176	-	193	1,741	Mid-2022
Totals	**173,140**	**3763**	**309,010**	**44,260**	**223,755**	**4,305**	15,052	4,426	22,376	431		
							15.0MVA	4.4MVA	22.4MVA	0.4MVA	**42.3MVA**	

- Gross Floor Area (GFA): Total floor area, minus common circulation, basement, plant rooms, lift towers, car parking plus terraces and balconies
- Approx. Yield: Average 80sqm per dwelling, excluding private land
- Electrical Demand Assessment has been based on:
  - Residential BASIX compliant dwellings (incl. Single Detached; Townhouse; 3-6 Storey Apartment; 7-12 Storey Apartment): 4kVA/ dwelling
  - Non-Residential spaces (incl. Commercial, Retail, Industrial): 0.1 kVA/ sqm

Appendix B: Electrical Demand Assessment (Based on maximum number of dwellings permitted by the LEP – Theoretical Scenario)

Between Bella Vista and Kellyville station, there is approximately 34ha of Developable Government Owned Land (DGL). The forecasts shown in the following tables have then been developed using the maximum number of dwellings permitted by the LEP and projected yield estimates of retail, commercial and other uses to determine demands for the electricity infrastructure.

Kellyville Station Precinct												
Super Lot No	Site Area (sqm)	Approximate Yield Dwellings	Estimated GFA (sqm)				Estimated Maximum Demand (KVA)					Anticipated Project Completion
			Residential	Retail	Commercial	Community	Residential	Retail	Commercial	Community	Total per Super Lot	
KV1.1	10,631	586	46,880	6,885	6,100	-	2,344	689	610	-	3,643	Mid-2022
KV1.2	3,512	197	15,760	5,355	-	430	788	536	-	43	1,367	Mid-2022
KV1.3	5,835	347	27,760	350	-	-	1,388	35	-	-	1,423	Mid-2022
KV2.1	2,567	167	13,360	-	-	-	668	-	-	-	668	Occupation of buildings will occur over a 10 - 12 year timeframe from 2022
KV2.2	7,241	414	33,120	-	-	615	1,656	-	-	62	1,718	
KV2.3	8,796	563	45,040	610	-	-	2,252	61	-	-	2,313	
KV2.4	7,228	409	32,720	435	-	485	1,636	44	-	49	1,728	
KV2.5	9,938	510	40,800	-	-	-	2,040	-	-	-	2,040	
KV2.6	1,125	-	-	-	-	985	-	-	-	99	99	
KV2.7	6,215	260	20,800	690	-	-	1,040	69	-	-	1,109	
KV2.8	3,430	35	5,320	-	-	-	140	-	-	-	140	
Totals	**66,518**	**2,672**	**216,220**	**14,325**	**6,100**	**2,515**	**13,952**	**1,433**	**610**	**252**		
							14.0MVA	1.4MVA	0.6MVA	0.3MVA	**16.2MVA**	

Bella Vista Station Precinct												
Super Lot No	Site Area (sqm)	Approximate Yield Dwellings	Estimated GFA (sqm)				Estimated Maximum Demand (KVA)					Anticipated Project Completion
			Residential	Retail	Commercial	Community	Residential	Retail	Commercial	Community	Total per Super Lot	
BV3.1	4,970	154	12,320	-	-	-	616	-	-	-	616	Occupation of buildings will occur over a 10 - 15 year timeframe from 2022
BV3.2	6,265	234	18,720	-	-	-	936	-	-	-	936	
BV3.3	6,178	208	16,640	-	-	-	832	-	-	-	832	
BV3.4	4,055	128	10,240	-	-	-	512	-	-	-	512	
BV3.5	12,596	465	37,200	-	-	-	1,860	-	-	-	1,860	
BV3.6	5,960	29	1,885	-	-	-	116	-	-	-	116	
BV3.7	5,831	-	-	360	-	2,375	-	36	-	238	274	
BV3.8	3,978	119	9,520	785	-	-	476	78.5	-	-	555	
BV3.9	8,240	264	21,120	-	-	-	1,056	-	-	-	1,056	
BV3.10	7,786	235	21,150	-	-	-	940	-	-	-	940	
BV4.1	9,060	367	29,360	-	-	-	1,468	-	-	-	1,468	
BV4.2	10,326	321	25,680	-	-	-	1,284	-	-	-	1,284	
BV4.3	7,100	189	17,010	-	-	-	756	-	-	-	756	
BV4.4	4,379	162	12,960	750	-	-	648	75	-	-	723	
BV4.5	4,964	134	12,060	-	-	-	536	-	-	-	536	
BV4.7	3,854	349	27,920	1,690	-	-	1,396	169	-	-	1,565	
BV4.8	7,662	479	38,320	2,770	-	-	1,916	277	-	-	2,193	
BV4.9	3,480	215	17,200	795	-	-	860	79.5	-	-	940	
BV5.1	6,134	-	-	3,520	34,840	-	-	352	3,484	-	3,836	Occupation of buildings will occur over a 20 - 25 year timeframe from 2022
BV5.2	9,038	-	-	6,890	49,455	-	-	689	4,946	-	5,635	
BV5.3	10,585	-	-	12,520	50,035	-	-	1,252	5,004	-	6,256	
BV5.4	7,396	-	-	1,620	38,540	-	-	162	3,854	-	4,016	Mid-2022
BV5.5	6,703	-	-	5,460	32,590	-	-	546	3,259	-	3,805	Mid-2022
BV5.6	9,713	414	33,120	5,340	18,295	-	1,656	534	1,830	-	4,020	Mid-2022
BV5.7	6,887	448	35,840	1,760	-	1,930	1,792	176	-	193	2,161	Mid-2022
Totals	**173,140**	**3763**	**309,010**	**44,260**	**223,755**	**4,305**	19,656	4,426	22,376	431		
							19.7MVA	4.4MVA	22.4MVA	0.4MVA	**46.9MVA**	

- Gross Floor Area (GFA): Total floor area, minus common circulation, basement, plant rooms, lift towers, car parking plus terraces and balconies
- Approx. Yield: Average 80sqm per dwelling, excluding private land
- Electrical Demand Assessment has been based on:
  - Residential BASIX compliant dwellings (incl. Single Detached; Townhouse; 3-6 Storey Apartment; 7-12 Storey Apartment): 4kVA/ dwelling
  - Non-Residential spaces (incl. Commercial, Retail, Industrial): 0.1 kVA/ sqm

Appendix F - Endeavour Energy Response to Technical Review Request

18 December 2018

Endeavour Energy Ref: ENL3223 – 2014/02306/001

Pomelo Consulting Pty Ltd
Suite 105A, 203-233 New South Head Road
EDGECLIFF NSW 2027

Attention: Kym Thomas

TECHINCAL REVIEW REQUEST

ENL3223 – Old Windsor Road, KELLYVILLE(Kellyville and Bella Vista Station Precincts)

Thank you for your enquiry application and the payment of fees to facilitate the enquiry request at the above location. Your application has been registered under ENL3223. Please quote this reference number on all future correspondence.

Your enquiry wishes to determine the following criteria:

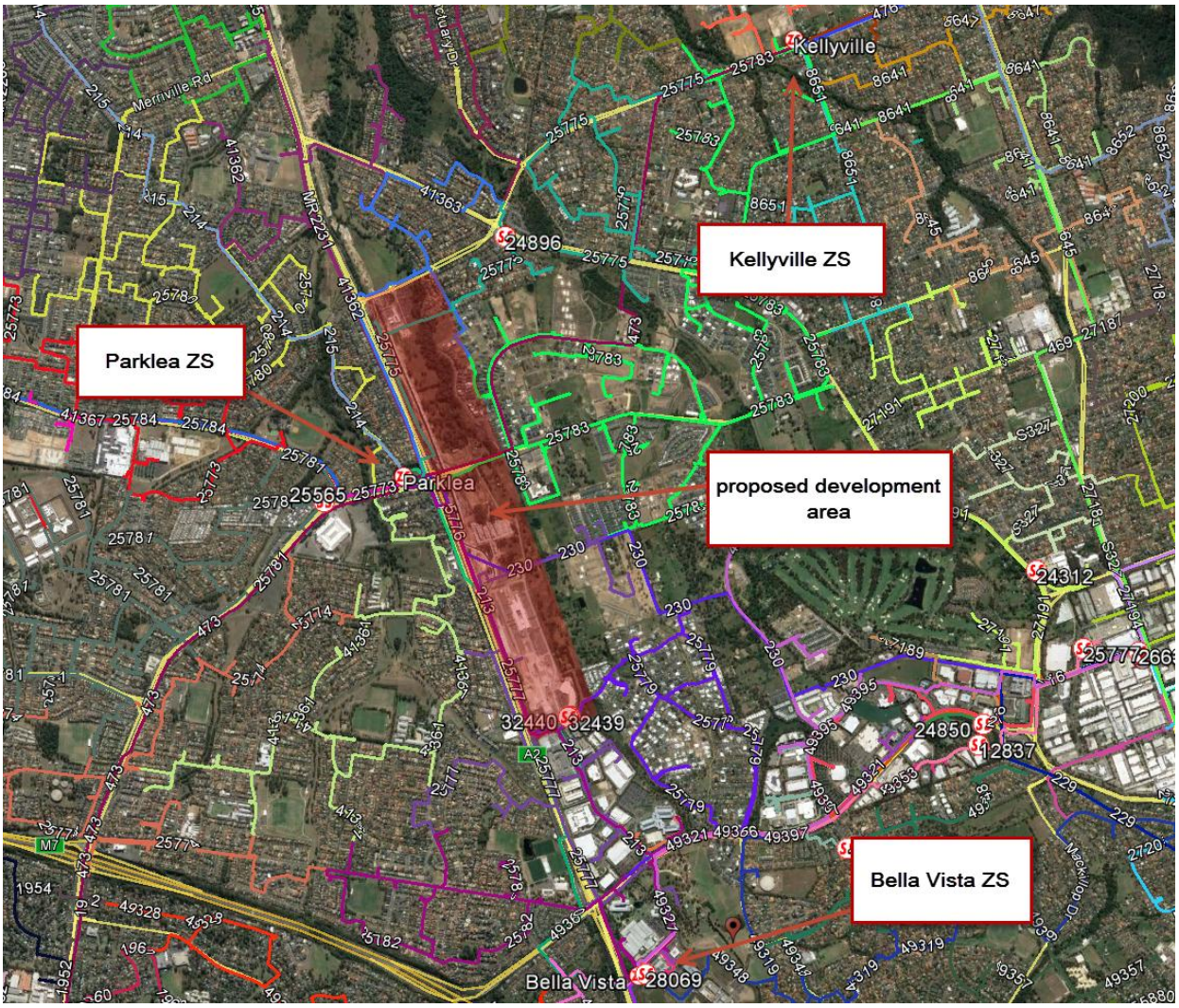
- available capacity of the existing Zone substations (Kellyville, Parklea and Bella Vista) to service the Kellyville and Bella Vista stations precinct,
- details of any existing HV feeders in the vicinity of the development area which may have spare capacity to potentially supply the first stage of the development,
- details of Planned major network upgrade works in the vicinity of the development area that Landcom should be aware of,
- at what stage the new electricity infrastructure assets (such as new HV feeder from existing zone substations/ new zone substation/ upgrade to transmission infrastructure to service the increased load on the existing and/or new zone substations) will required to support the continual development of Kellyville and Bella Vista station precincts,
- risks that Endeavour Energy are aware of that could delay the implementation new electricity infrastructure assets which could then potentially delay the delivery of the project or influence the viability of development through direct cost or development delays,
- potential actions that Landcom could take to minimise time delays and improve delivery of electricity infrastructure assets required to service Kellyville and Bella Vista stations precinct.

The estimated electrical maximum demand for Bella Vista and Kellyville Stations has been calculated based on 8400 residential dwellings and 295,260sqm of retail/commercial/community areas as per applied 'theoretical scenario' maximum demand estimated GFA totals and approximate yield dwelling totals. The Endeavour Energy maximum demands have been based on a general demand of 100VA/sqm for commercial area and an ADMD of 3.5kVA for residential dwellings. The estimated electrical maximum demand is assessed at 58.96MVA.

The proposed area of the North West Rail Link(NWRL) is situated East of Windsor Rd between Samantha Riley Dr and Celebration Dr. There are a few Zone Substations in close proximity to this area. Parklea Zone Substation is located on the Western side of Windsor Rd approximately 180m away from Memorial Ave and Windsor Rd intersection. Parklea Zone Substation supplies a 22kV network and is in an ideal location to supply this area. Parklea ZS has a low load factor and has capacity. The NWRL has been considered in the forecasting of Parklea Zone Substation capacity. As a 22kV feeder can supply up to 9MVA, total of 7 22kV feeders would be required to supply the total load with cross feeder interconnections.

Bella Vista Zone Substation is located approximately 1.36km south of intersection Windsor Rd and Celebration Dr. Bella Vista Zone Substation supplies an 11kV network and currently has capacity. There are two existing 11kV feeders from Bella Vista Zone Substation to Celebration Dr which were used for boring machines. These feeders have been proposed as abandoned under CAP project ARP3060(not yet constructed) but could be utilised to supply the area. Each 11kV feeder can supply up to 4.5MVA.

Kellyville Zone Substation focuses on areas more north of its location and won't be assessed in this enquiry.



Stage 1 load consists of KV1.1, KV1.2, KV1.3, BV5.4, BV5.5, BV5.6 and BV5.7. As per 'theoretical scenario' maximum demand values, the load would be assessed at 124,655qm for retail/commercial/community areas and 1992 residential dwellings totalling 19.44MVA. At 22kV, at least 3 feeders would be required. The two existing 11kV feeders from Bella Vista supplying boring machine may also be able to supply part of stage 1 meaning only 1 feeder from Parklea would be necessary. It is possible that some offloading could occur at Parklea Zone Substation to free a 22kV feeder, otherwise installing a new feeder is viable as the site 180m to Parklea Zone Substation.

There are no other known major works occurring in the area. As mentioned above, NWRL has been covered in the forecasting of the area. Endeavour Energy also do not envisage any risks that could delay the implementation of works however provide a few things to note that could prevent delay. Possible 22kV/11kV autotransformers are likely required to interconnect between Parklea and Bella Vista Zone Substation feeders. Consideration needs to be placed on location of these assets. Consideration is also required with relation to the general CAP

application process. Please allow 1 year as a guide for a certified design and depending on scope and latent site conditions, 6 months or greater to commission assets. It is ideal to submit CAP applications early to avoid tight timeframes later. Please also consider creation of easements including signed creation of easement forms and property tenure bonds. If any new lighting is required or removal of existing lighting is required, council should be consulted and Notification of Change in Charges(NOCC) will need to be signed. If any new transformers are required, consideration on delivery times is necessary. Please allow 10-12 weeks for the ordering process.

Please note this enquiry is only a preliminary assessment and does not guarantee supply availability or final conditions of supply.

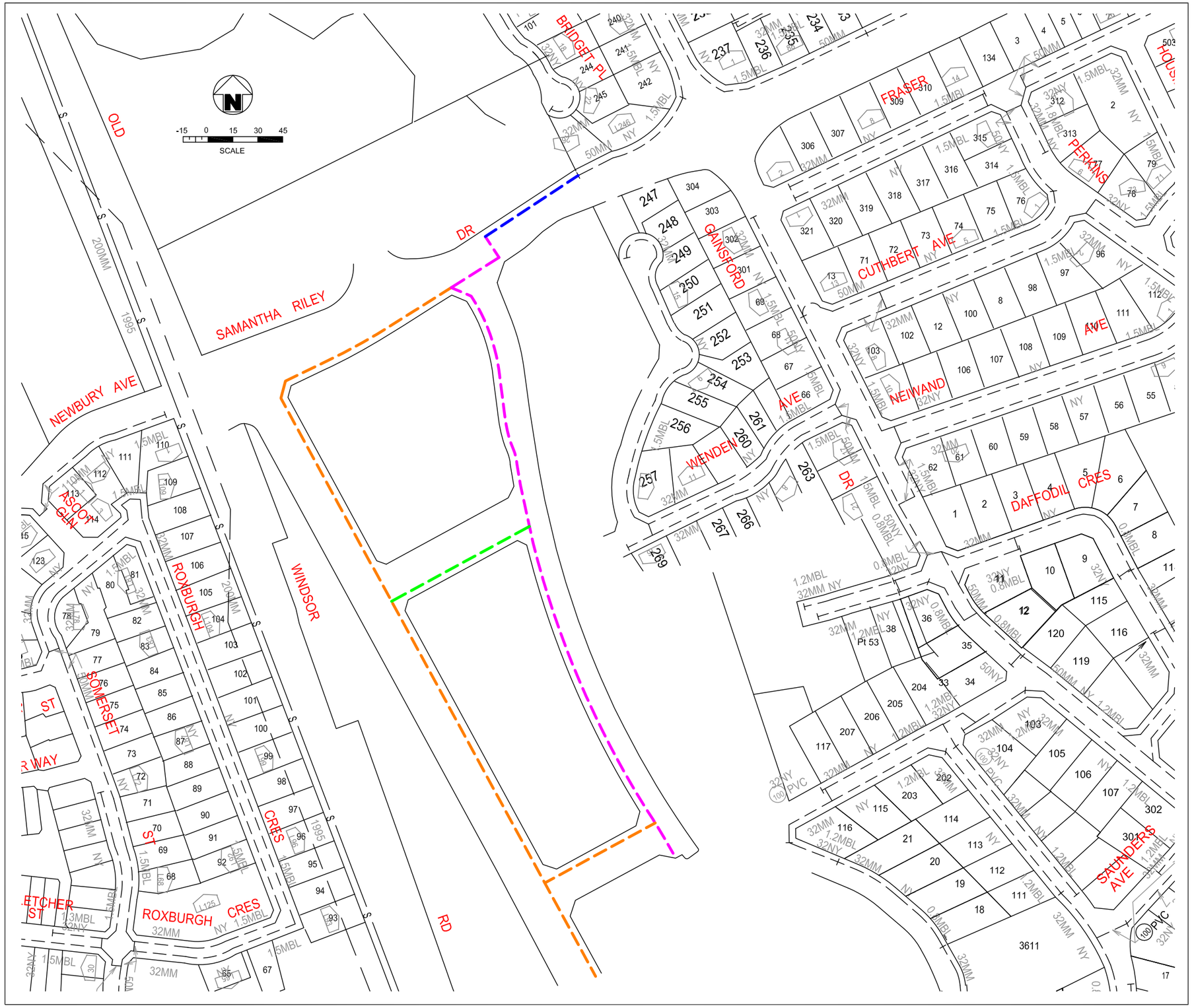
Should you have any enquiries regarding your application including establishment of a meeting with Endeavour Energy Capacity Planning Group, please contact me.

M Grimwood

Regards,
Matt Grimwood
Contestable Works Project Manager
Network Connections
T : 98537916
E : matthew.grimwood@endeavourenergy.com.au

Endeavour Energy

Appendix G - Existing Gas Infrastructure

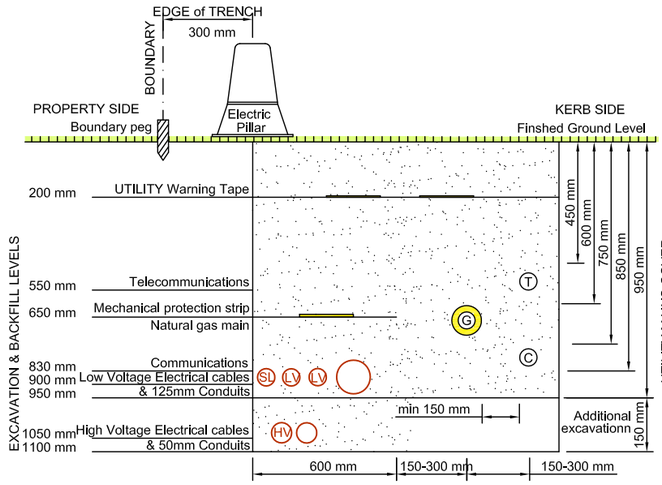


LEGEND:

MATERIAL		LENGTH (m)
	PROPOSED 32mm NY SHARED TRENCH	600
	PROPOSED 50mm NY SHARED TRENCH	95
	PROPOSED 50mm NY JEMENA TRENCH	70
	PROPOSED 110mm PE SHARED TRENCH	430
	MAINS STUB (1m EACH)	-
	EXISTING MEDIUM PRESSURE GAS MAIN	-
S S S	EXISTING SECONDARY GAS MAIN	-

PRELIMINARY ISSUE ONLY

NOT FOR CONSTRUCTION



TYPICAL SHARED TRENCH DETAIL
REFER TO NS 130 (NTS)

JEMENA ROAD CROSSING CONDUIT SPECIFICATIONS

PIPE SIZES (OD mm)		CONDUIT DIAMETER (OD mm)	DEPTH OF COVER (mm)	TYPE (for all sizes)
Nylon Pipe Polyethylene Pipe (PE)	32, 50 & 75 40 & 63	100	750	Rigid PVC Pipe Smooth or Ribbed Exterior Smooth Bore Blue/Grey in colour
Nylon Pipe Polyethylene Pipe (PE)	110 110	150	750	
Polyethylene Pipe (PE)	160	225	750	

MINIMUM SEPERATION BETWEEN SERVICES & NATURAL GAS MAINS

Nylon or Polyethylene Gas Mains	Telecommunication cables and/or conduits	Protected Low Voltage Electricity Cables	Protected High Voltage Electricity Cables
Gas Mains up to 75mm Diameter	150mm	150mm	300mm
Gas Mains of 110mm Diameter or larger	300mm	300mm	300mm

300 kPa

MAIN MAP

RO7D	RO8C
-	-

REV	PARTICULARS	CHKD	DATE	CAD	APPR
-	-	--	--	--	--
-	-	--	--	--	--
-	-	--	--	--	--
-	-	--	--	--	--
0	PROPOSED DRAWING	--	28/07/16	PJ	--

PROPOSED ROUTE OF JEMENA GAS MAIN AT NRT - KELLYVILLE PRECINCT, STAGE 1 MUNICIPALITY OF BAULKHAM HILLS

ENGINEER	APPROVED	OFFICER	CHECKED	DRAWN	DATE	SCALE	SIZE	DRAWING NO.	REV
--	--	--	--	PJ	28/07/2016	N.T.S.	A3	10013685	0

G:\SOP\NDS_CAD\MISC\NEW ESTATE\10013685\10013685.DWG

Network Protection

High Pressure - Assets Affected

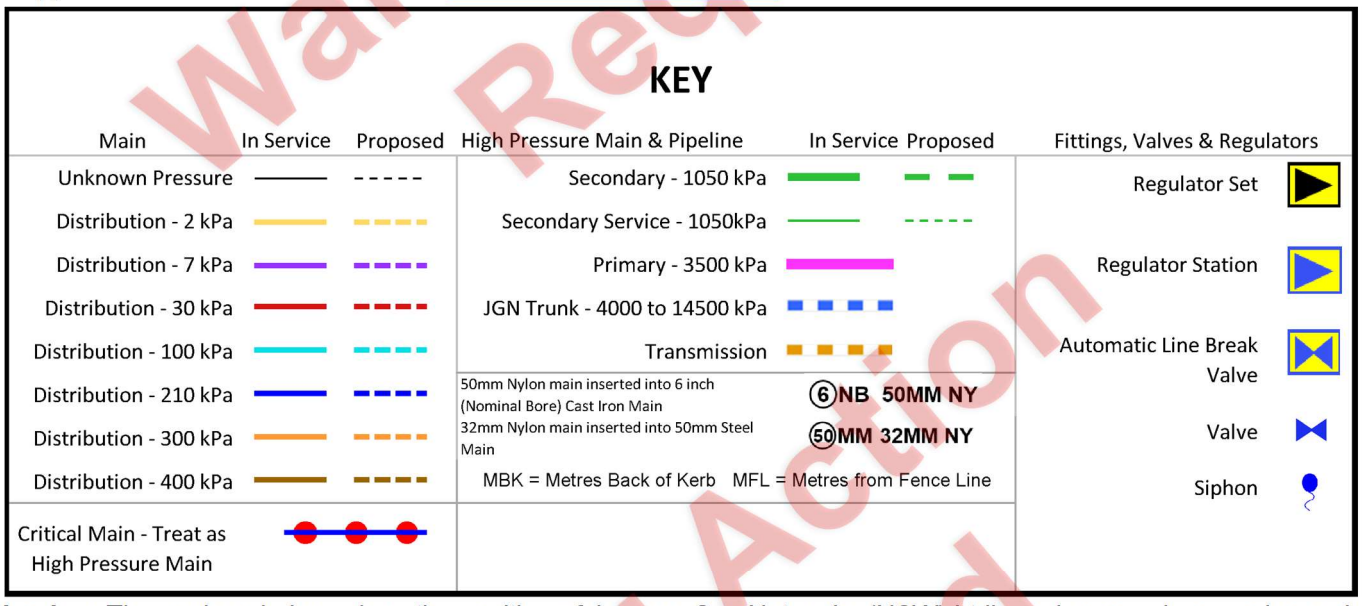
In reply to your enquiry, there are **High Pressure Gas Mains** in the vicinity of your intended work, as generally illustrated on the attached map. There may also be other mains or services at the location, as discussed in the warning below. For an explanation of the map, please see the key below.
The following excavations guidelines apply:

Excavation Guidelines:

Prior to **any** excavations in this area, you ***must*** contact the High Pressure Response Coordinator on **1300 665 380**. ***(Appointments will be coordinated with availability of a Jemena Representative)*** to arrange a survey. For all works in the vicinity of High Pressure Gas Mains you must arrange for a Jemena Representative to attend and supervise all excavations. Charges apply for attendance of any works outside the hours of 7am to 4pm, Monday to Friday ("**Standard Business Hours**") and for any attendance during Standard Business Hours that is longer than 2 hours.

In accordance with clause 34(5) of the Gas Supply (Safety and Network Management) Regulation 2013 (NSW), you should be informed that all excavation, (including pot-holing by hand to confirm the location of pipes) should be performed in accordance with "***Work Near Underground Assets Guideline"*** *published in 2007 by the Work Cover Authority.*

A copy of this Guideline is available at: www.workcover.nsw.gov.au



Warning: The enclosed plans show the position of Jemena Gas Networks (NSW) Ltd's underground gas mains and installations in public gazetted roads only. **Individual customers' services and services belonging to other third parties are not included** on these plans. These plans have been prepared solely for the use of Jemena Gas Networks (NSW) Ltd and Jemena Asset Management Pty Ltd (together "**Jemena**") and any reliance placed on these plans by you is entirely at your own risk. The plans may show the position of underground mains and installations relative to fences, buildings etc., as they existed at the time the mains etc were installed. The plans may not have been updated to take account of any subsequent change in the location or style of those features since the time at which the plans were initially prepared. Jemena makes no warranty as to the accuracy or completeness of the enclosed plans and does not assume any duty of care to you nor any responsibility for the accuracy, adequacy, suitability or completeness of the plans or for any error, omission, lack of detail, transmission failure or corruption in the information provided. Jemena does not accept any responsibility for any loss that you or anyone else may suffer in connection with the provision of these plans, however that loss may arise (including whether or not arising from the negligence of Jemena, its employees, agents, officers or contractors). The recipient of these plans must use their own care and diligence in carrying out their works and must carry out further surveys to locate services at their work site. Persons excavating or carrying out other earthworks will be held responsible for any damage caused to Jemena's underground mains and equipment. Jemena advises that you may be required to carry out potholing by hand if required by a Jemena Representative to confirm the location of Jemena's main and installations. This must also be performed by you under the supervision of a Jemena Representative and be carried out in accordance with the Working Near Underground Assets Guideline published in 2007 by Work Cover Authority

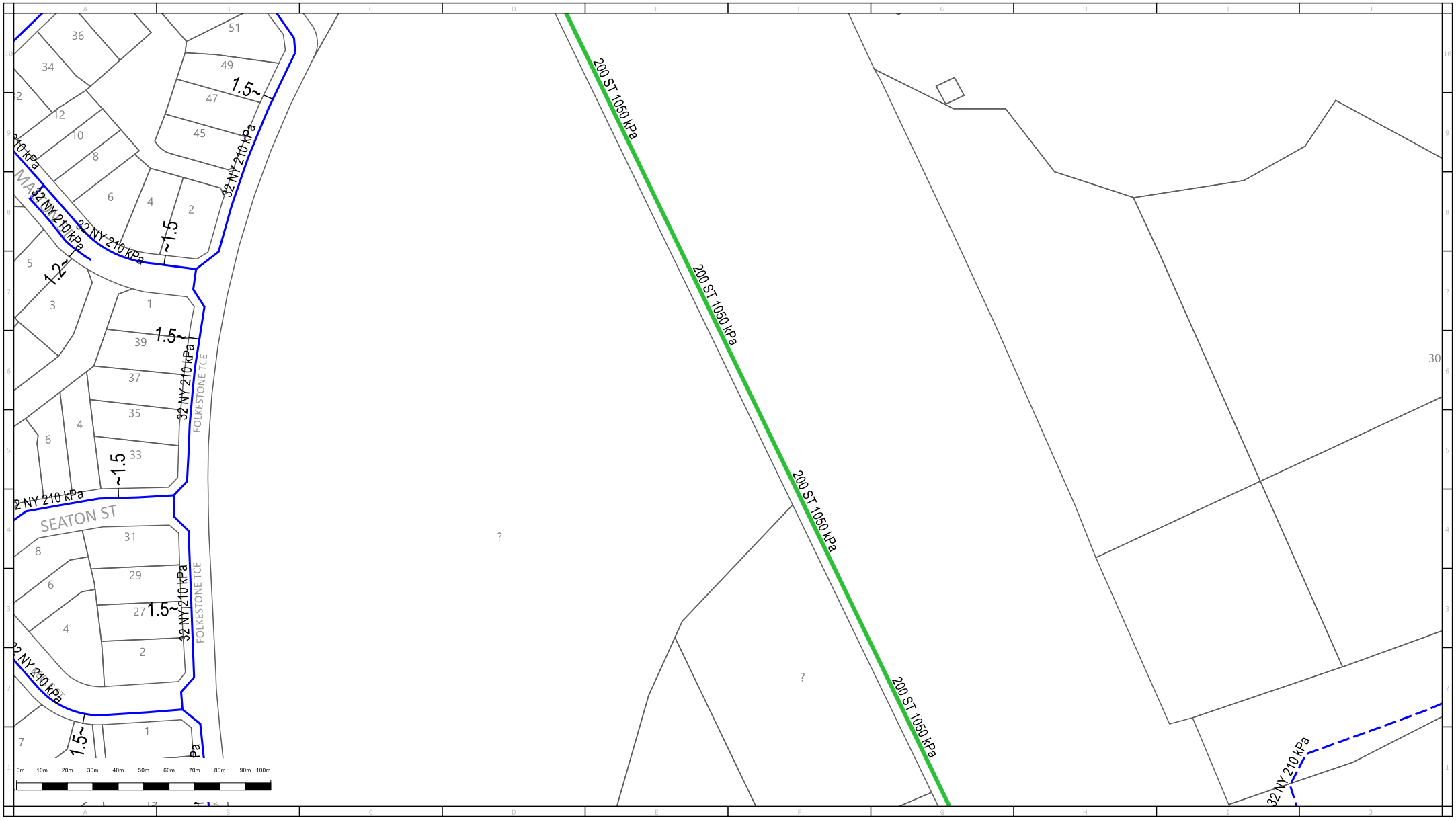
In case of Emergency Phone 131 909 (24 hours)

Admin
1300 880 906

Jemena Asset Management Pty Ltd ABN 53 086 013 461
for and on behalf of Jemena Gas Networks (NSW) Ltd ABN 87 003 004 322

DBYD Authority: Jemena Gas Networks (NSW)

DBYD Location: Old Windsor Road Kellyville NSW, 2155



Jemena
ABN 87 003 004 322

Main	In Service	Proposed
Unknown Pressure		
Distribution - 2 kPa		
Distribution - 7 kPa		
Distribution - 30 kPa		
Distribution - 100 kPa		
Distribution - 210 kPa		

Main	In Service	Proposed
Distribution - 300 kPa		
Distribution - 400 kPa		
Critical Main - Treat as High Pressure Main		

High Pressure Main & Pipeline	In Service	Proposed
Secondary - 1050 kPa		
Secondary Service		
Primary - 3500 kPa		
JGN Trunk - 7000 kPa		
Transmission		

Fittings, Valves & Regulators

Siphon
Valve
Distance in metres of Main from Boundary Line ~ 1.5
MBK = Metres Back of Kerb
MFL = Metres from Fence Line
Regulator Set
Regulator Station
Automatic Line Break Valve

N W E S

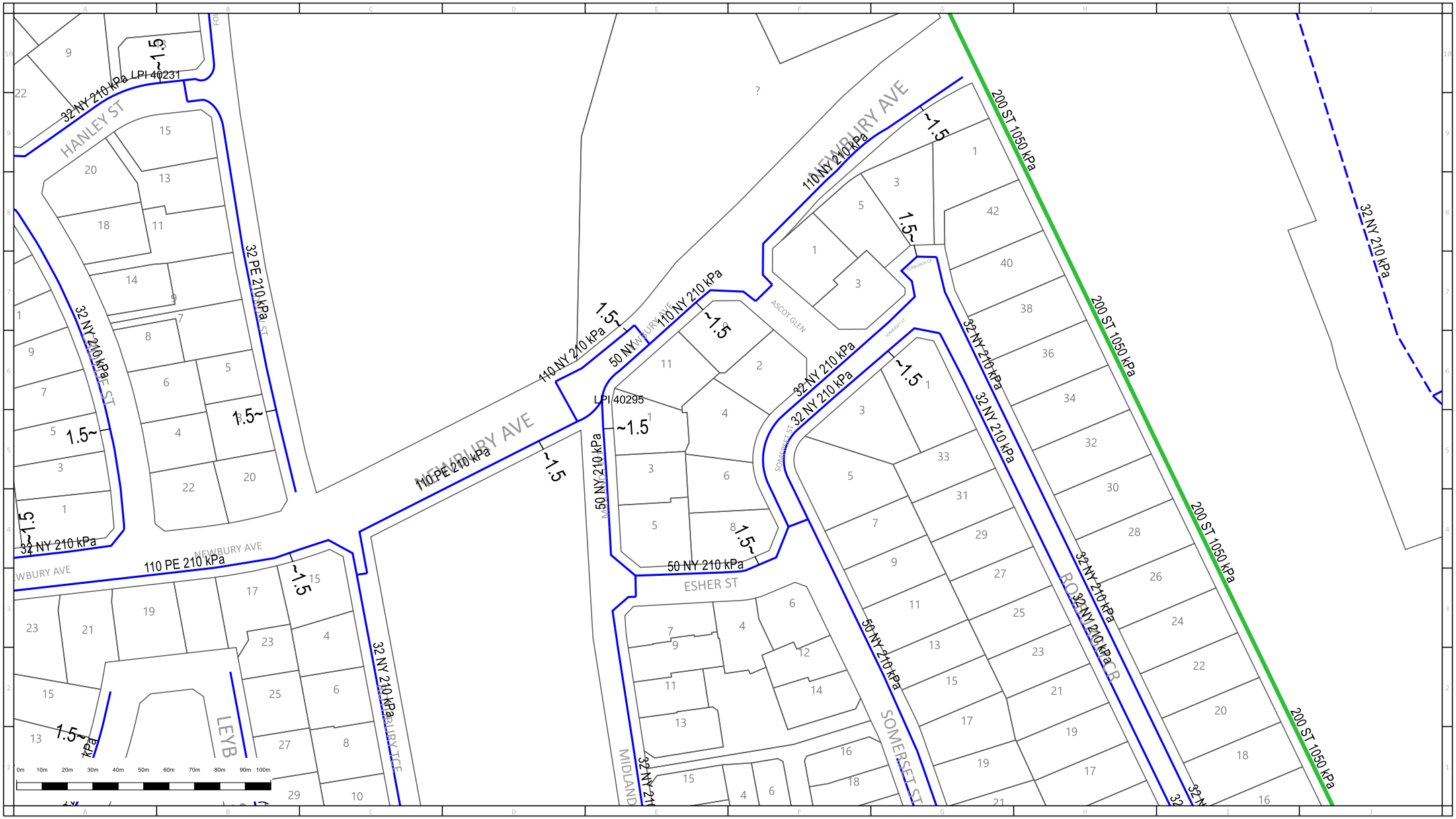
Scale: 1:2000

Issue Date: 20/03/2019
DBYD Seq No: 81410846
DBYD Job No: 15960778

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

DBYD Authority: Jemena Gas Networks (NSW)

DBYD Location: Old Windsor Road Kellyville NSW, 2155



Jemena
ABN 87 003 004 322

Main	In Service	Proposed
Unknown Pressure		
Distribution - 2 kPa		
Distribution - 7 kPa		
Distribution - 30 kPa		
Distribution - 100 kPa		
Distribution - 210 kPa		

Main	In Service	Proposed
Distribution - 300 kPa		
Distribution - 400 kPa		
Critical Main - Treat as High Pressure Main		

High Pressure Main & Pipeline	In Service	Proposed
Secondary - 1050 kPa		
Secondary Service		
Primary - 3500 kPa		
JGN Trunk - 7000 kPa		
Transmission		

Fittings, Valves & Regulators

Siphon
Valve
Distance in metres of Main from Boundary Line ~1.5
MBK = Metres Back of Kerb
MFL = Metres from Fence Line
Regulator Set
Regulator Station
Automatic Line Break Valve

N W E S

Scale: 1:2000

Issue Date: 20/03/2019
DBYD Seq No: 81410846
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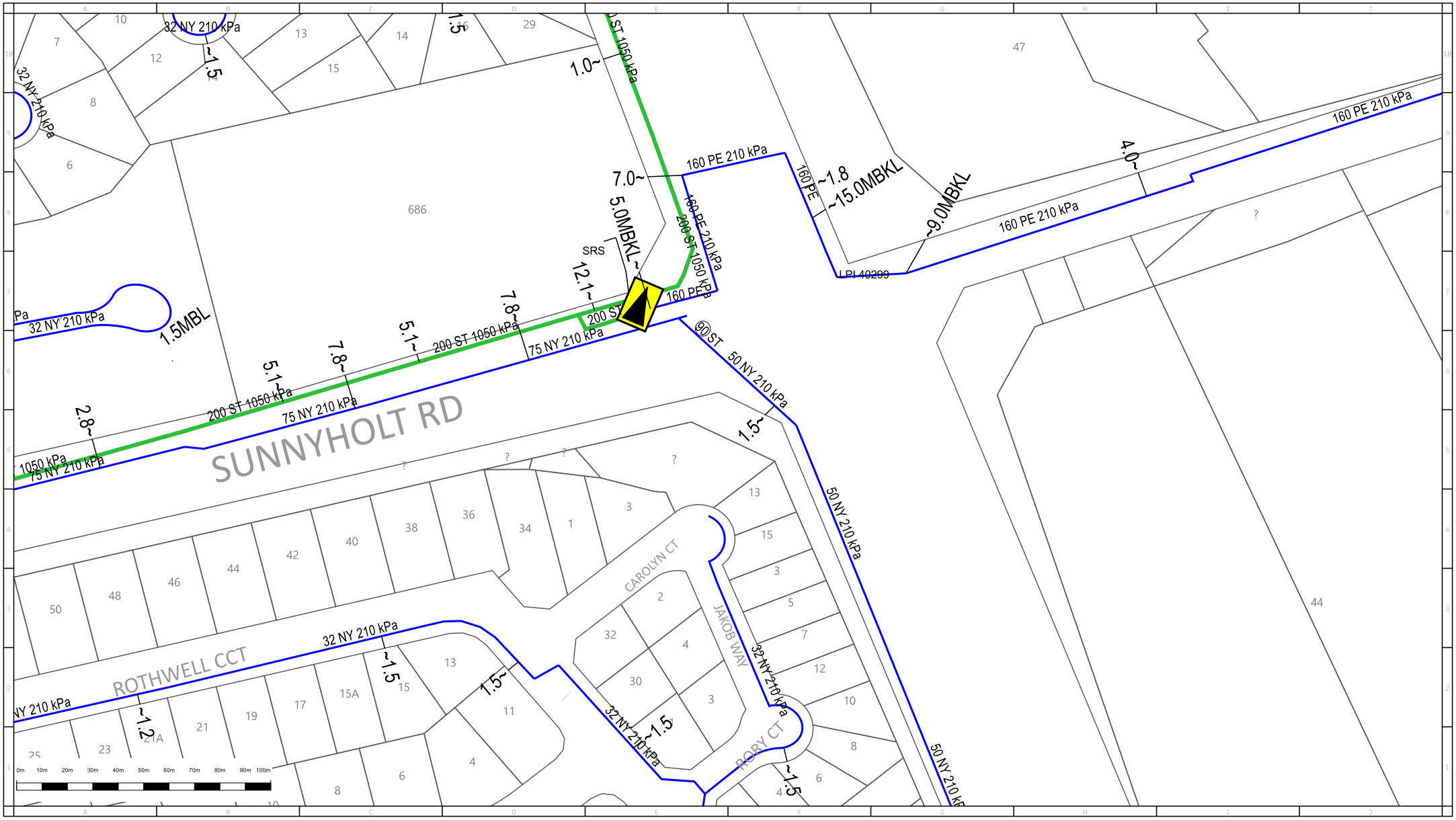
WARNING: This is a representation of Jemena Gas Networks underground assets only and may not indicate all assets in the area. It must not be used for the purpose of exact asset location in order to undertake any type of excavation. This plan is diagramatic only, and distances scaled from this plan may not be accurate. Please read all conditions and information on the attached information sheet. This extract is subject to those conditions. The information contained on this plan is only valid for 28 days from the date of issue.

DBYD Authority: Jemena Gas Networks (NSW)

DBYD Location: Old Windsor Road Kellyville NSW, 2155



Jemena
ABN 87 003 004 322

Main	In Service	Proposed
Unknown Pressure		
Distribution - 2 kPa		
Distribution - 7 kPa		
Distribution - 30 kPa		
Distribution - 100 kPa		
Distribution - 210 kPa		

Main	In Service	Proposed
Distribution - 300 kPa		
Distribution - 400 kPa		
Critical Main - Treat as High Pressure Main		

High Pressure Main & Pipeline	In Service	Proposed
Secondary - 1050 kPa		
Secondary Service		
Primary - 3500 kPa		
JGN Trunk - 7000 kPa		
Transmission		

Fittings, Valves & Regulators

Siphon
Valve
Distance in metres of Main from Boundary Line ~ 1.5
MBK = Metres Back of Kerb
MFL = Metres from Fence Line
Regulator Set
Regulator Station
Automatic Line Break Valve

N W E S

Scale: 1:2000

Issue Date: 20/03/2019
DBYD Seq No: 81410846
DBYD Job No: 15960778

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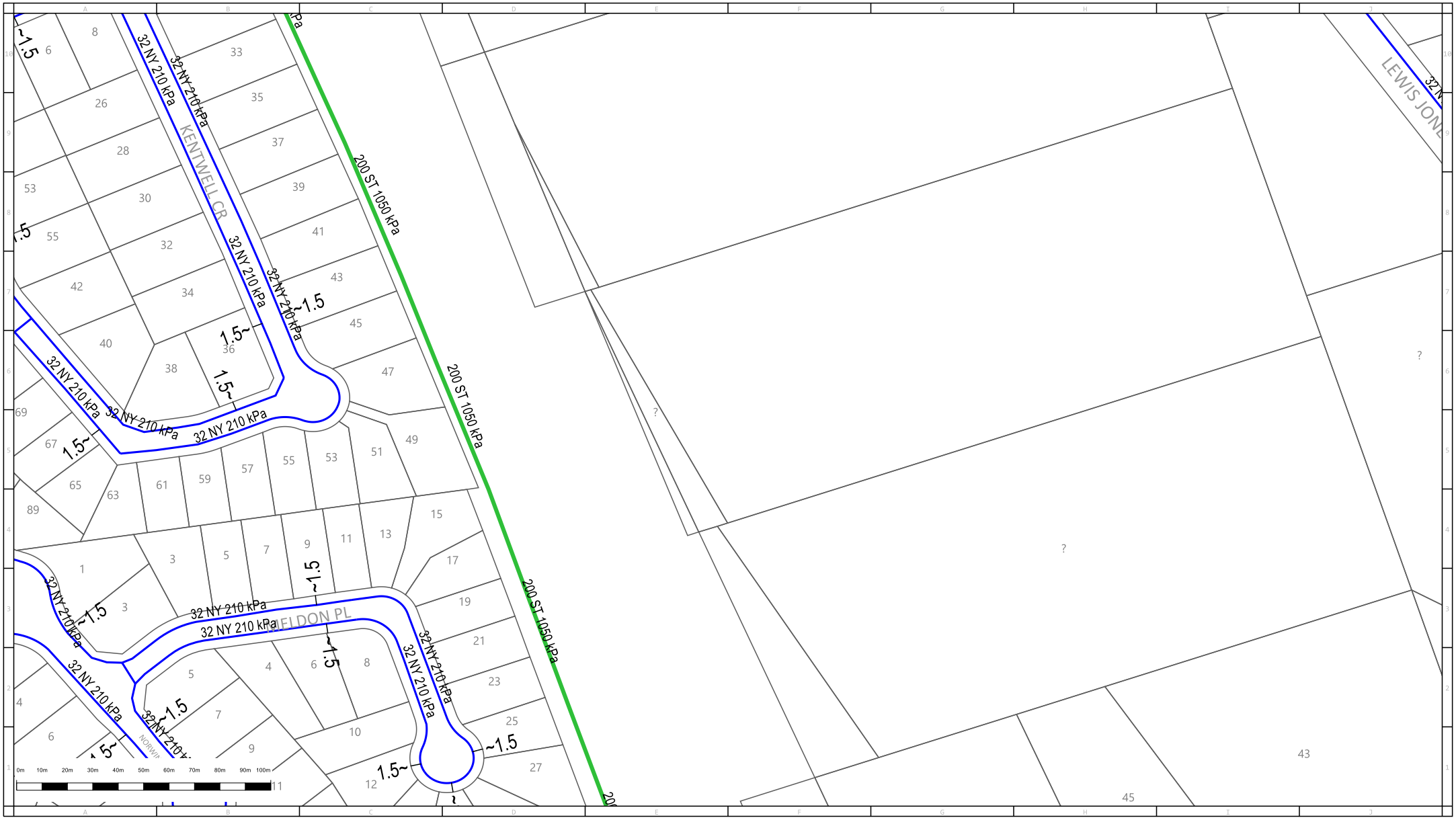

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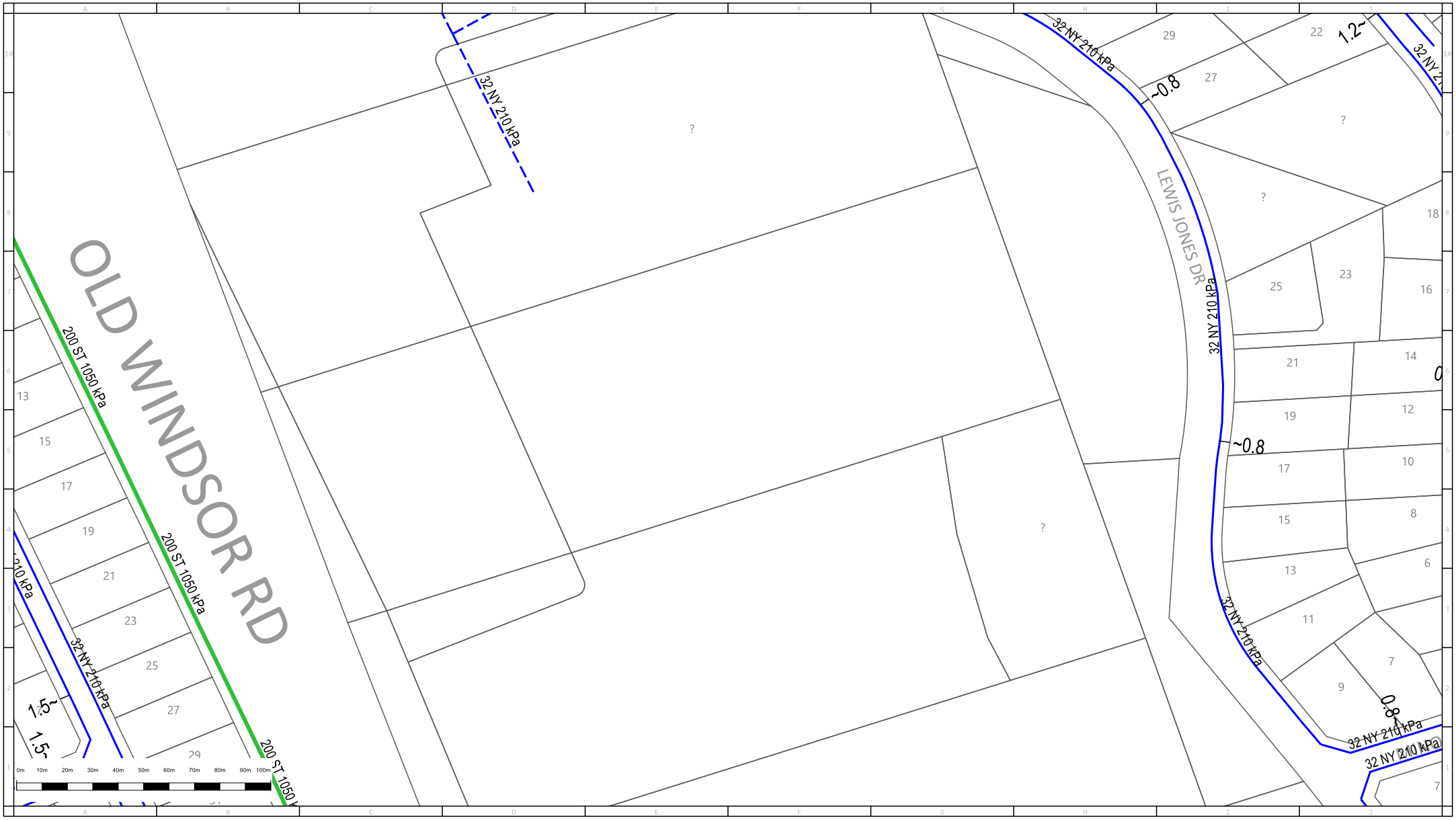

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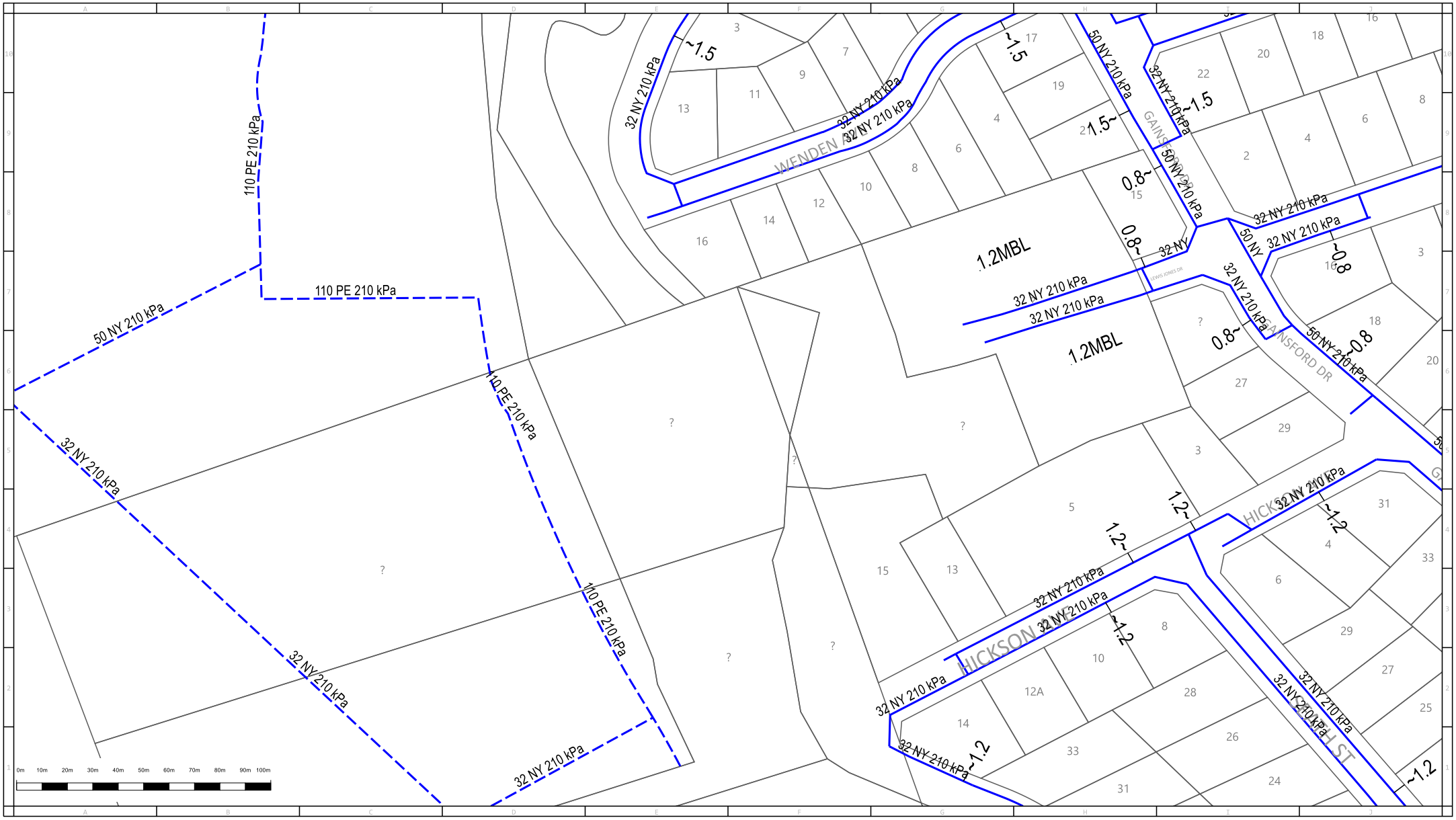

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Fittings, Valves & Regulators: Siphon, Valve, Distance in metres of Main from Boundary Line ~1.5, MBK = Metres Back of Kerb, MFL = Metres from Fence Line, Regulator Set, Regulator Station, Automatic Line Break Valve

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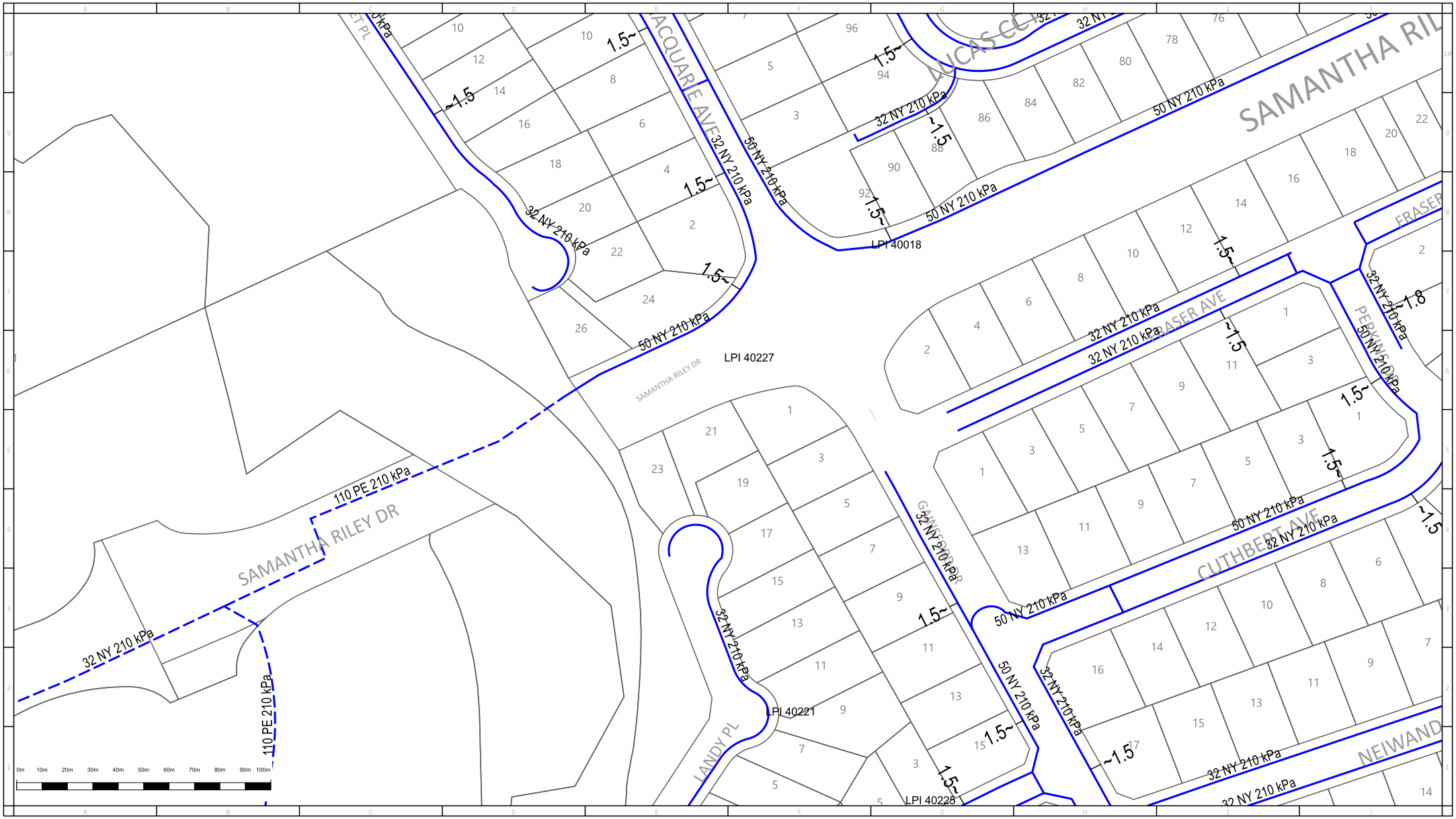

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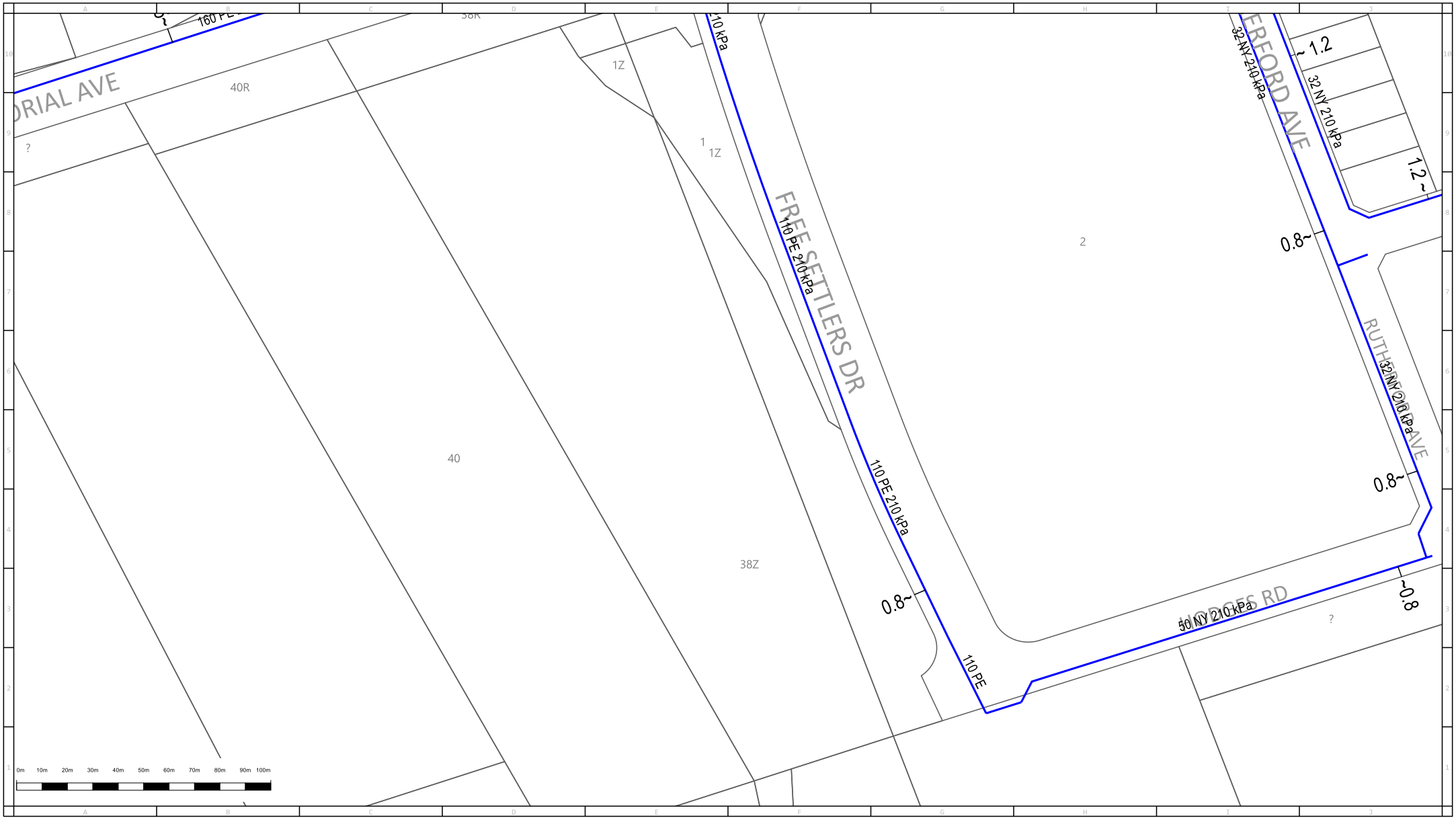

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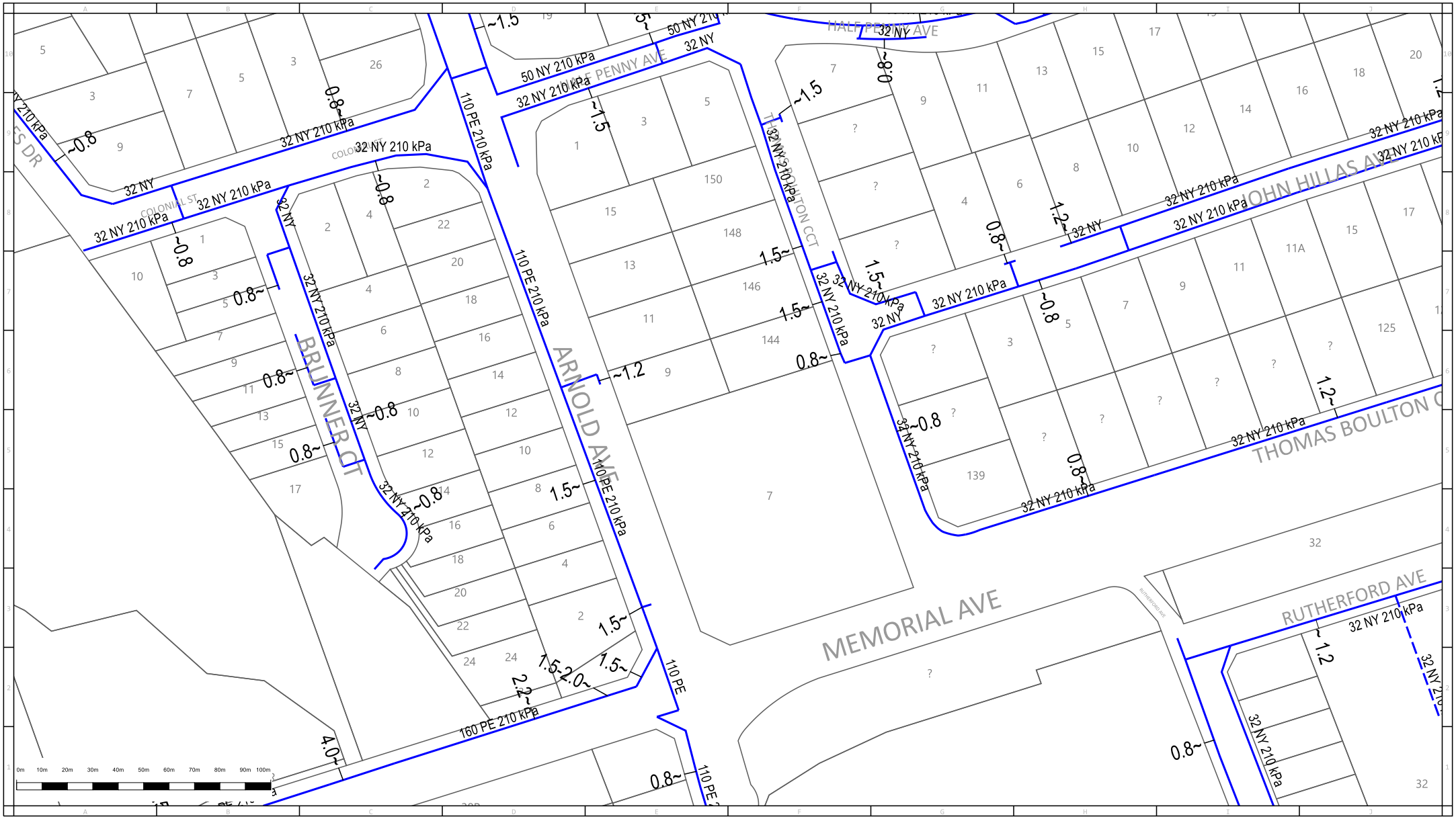

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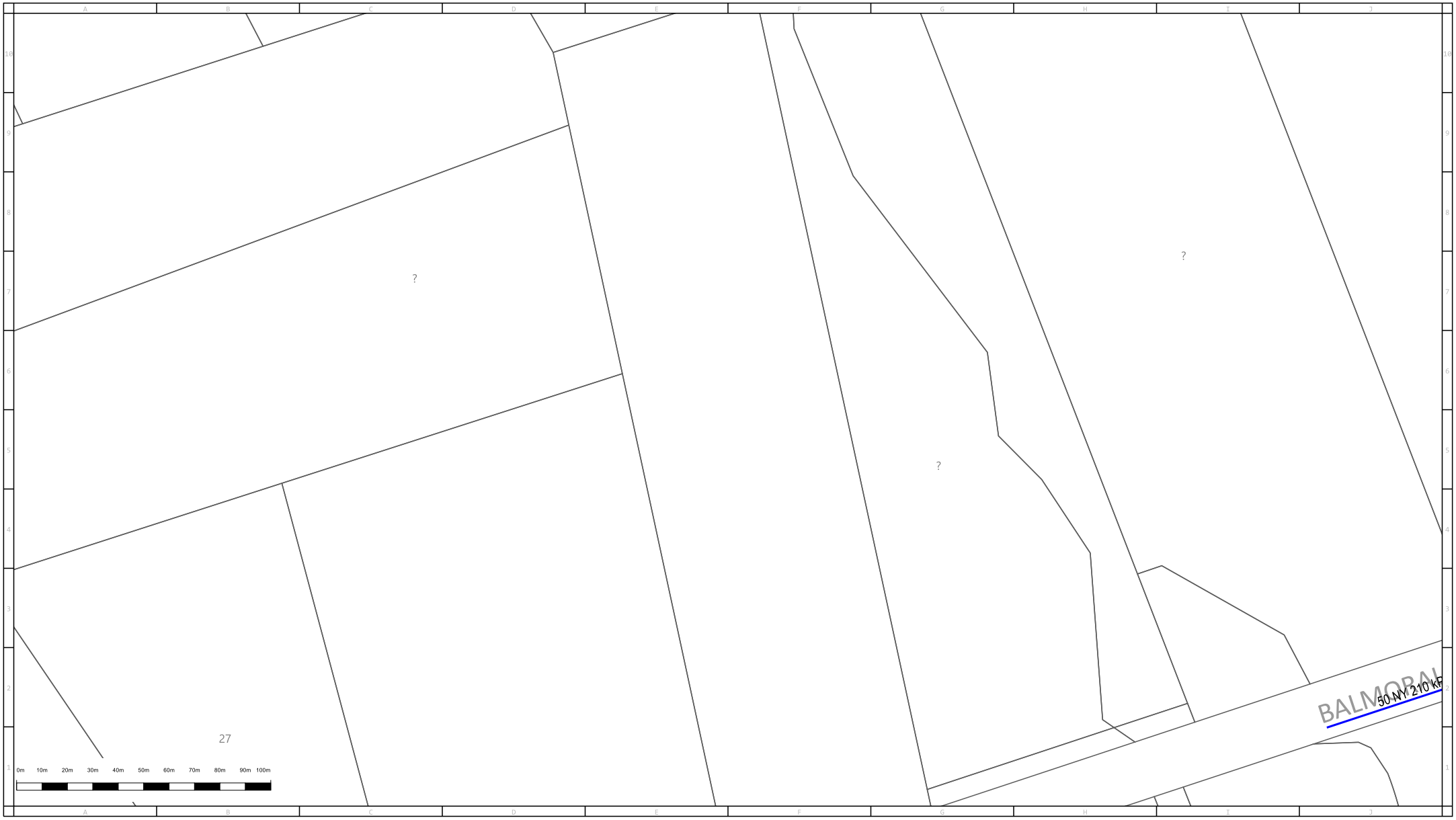

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Appendix H – Gas Supply Request to Jemena Gas

Oliver Walsh

From: Oliver Walsh
Sent: Monday, 18 March 2019 10:16 AM
To: Neale Hilton [redacted]
Cc: [redacted]
Subject: Kellyville & Bella Vista Station Precincts Master Planning - Gas Supply
Attachments: Preliminary Development Layout.pdf; Gas Supply Information_19.03.18.xlsx

Hi Neale

As discussed in our telecom, WGE on behalf of Landcom seek advice regarding gas servicing of the development of the Kellyville & Bella Vista Station Precincts. The advice will inform utility infrastructure reporting to support 2x State Significant Development Applications, one for the Kellyville area and the other for the Bella Vista area.

Details are broadly as follows:

- Area = 34 Ha.
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- Max Commercial Yield = 300,000 m² Gross Floor Area.
- Location = Area bounded by Old Windsor Road, Elizabeth Macarthur Creek, Samantha Riley Drive, & Celebration Drive.

Please find attached the following:

- PDF showing indicative development layout.
- Spreadsheet showing total dwelling and commercial yield. Note that KV and BV reference numbers correspond to the PDF.

We understand that a commercial offer will not be made by Jemena until the development formally proceeds, however we seek preliminary advice regarding:

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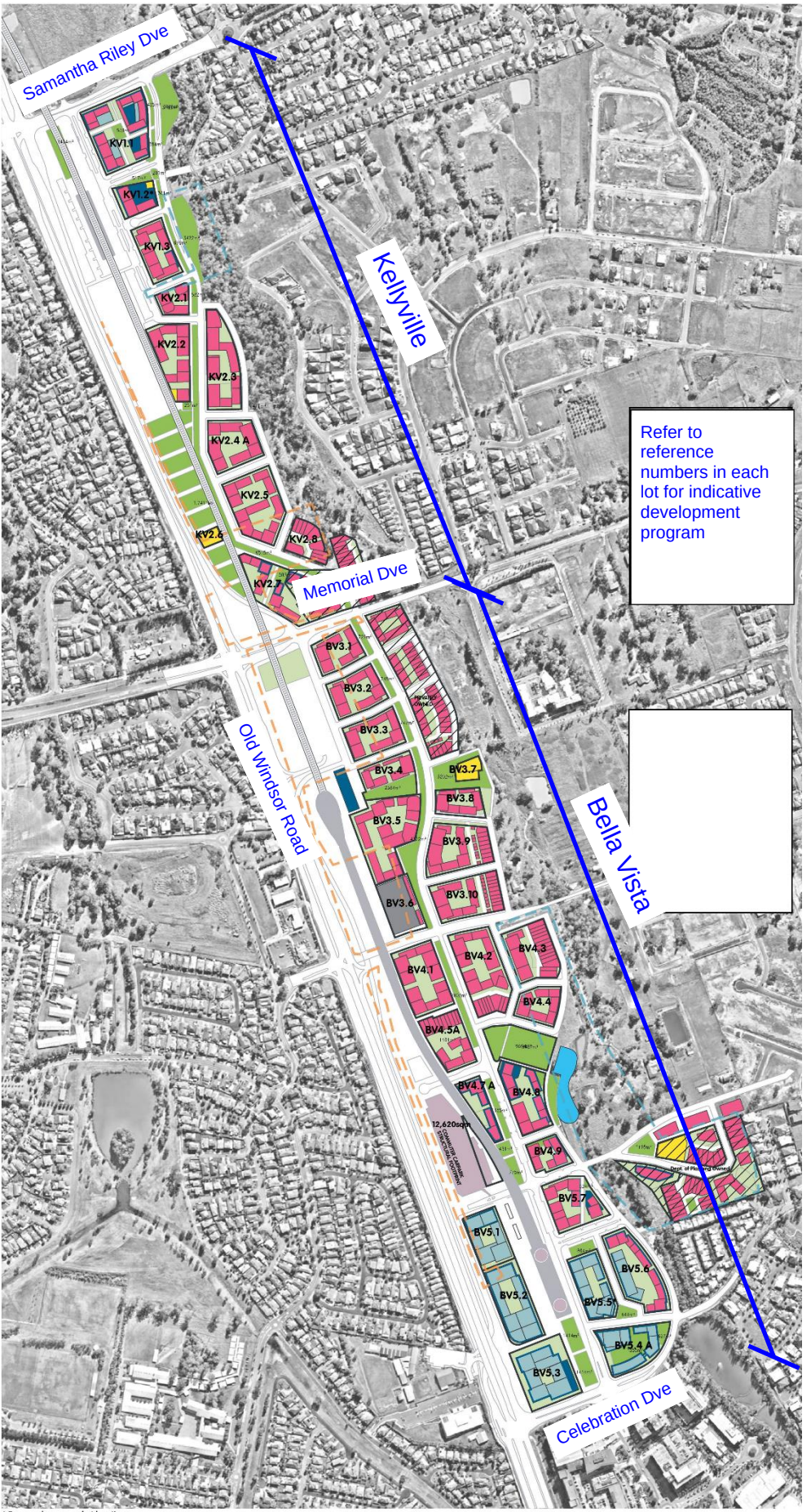
The information provided is the maximum yield scenario. As urban design progresses over the coming months the yield may reduce, however for now please provide advice on the basis of the attached. Please provide separate advice regarding Kellyville and Bella Vista if possible.

Thanks and regards



* Proposed supermarket location

										INDICATIVE DEVELOPMENT PROGRAMME																						
	Developer	Address	Precinct (Refer PDF for lot references)	Local Authority	Planning Status	Lot reference	OVERVIEW	Total potential DWELLINGS	Total Potential Commecial Gross Floor Area (m²)	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34	2034-35	2035-36	2036-37	2037-38	2038-39	2039-40	2040-41	2041-42	2042-onwards
Kellyville & Bella Vista	Landcom	Kellyville and Bella Vista	SUM TOTAL	The Hills Shire Council	for SSDA	See attached	High density residential	8,402																									
							Commercial		295,250																									
Kellyville	Landcom	Kellyville	KV1.1	The Hills Shire Council	for SSDA		High density residential	586						586																			
							Commercial		12,985					12,985																			
			KV1.2				High density residential	197						197																			
							Commercial		5,785					5,785																			
			KV1.3				High density residential	347						347																			
							Commercial		350					350																			
			KV2.1				High density residential	167							17	17	17	17	17	17	17	17	17	17										
			KV2.2				High density residential	414							41	41	41	41	41	41	41	41	41	41										
							Commercial		615						62	62	62	62	62	62	62	62	62	62										
			KV2.3				High density residential	563							56	56	56	56	56	56	56	56	56	56										
							Commercial		610						61	61	61	61	61	61	61	61	61	61										
			KV2.4				High density residential	409							41	41	41	41	41	41	41	41	41	41										
							Comercial		920						92	92	92	92	92	92	92	92	92	92										
			KV2.5				High density residential	510							51	51	51	51	51	51	51	51	51	51										
			KV2.6				Commercial		985						99	99	99	99	99	99	99	99	99	99										
			KV2.7				High density residential	260							26	26	26	26	26	26	26	26	26	26										
							Commercial		690						69	69	69	69	69	69	69	69	69	69										
			KV2.8				High density residential	35							4	4	4	4	4	4	4	4	4	4										
Bella Vista	Landcom	Bella Vista	BV3.1	The Hills Shire Council	for SSDA		High density residential	154							15	15	15	15	15	15	15	15	15	15										
			BV3.2				High density residential	234							23	23	23	23	23	23	23	23	23	23										
			BV3.3				High density residential	208							21	21	21	21	21	21	21	21	21	21										
			BV3.4				High density residential	128							13	13	13	13	13	13	13	13	13	13										
			BV3.5				High density residential	465							47	47	47	47	47	47	47	47	47	47										
			BV3.6				High density residential	29							3	3	3	3	3	3	3	3	3	3										
			BV3.7				Commercial		2,735						274	274	274	274	274	274	274	274	274	274										
			BV3.8				High density residential	119							12	12	12	12	12	12	12	12	12	12										
							Commercial		785						79	79	79	79	79	79	79	79	79	79										
			BV3.9				High density residential	264							26	26	26	26	26	26	26	26	26	26										
			BV3.10				High density residential	235							24	24	24	24	24	24	24	24	24	24										
			BV4.1				High density residential	367							37	37	37	37	37	37	37	37	37	37										
			BV4.2				High density residential	321							32	32	32	32	32	32	32	32	32	32										
			BV4.3				High density residential	189							19	19	19	19	19	19	19	19	19	19										
			BV4.4				High density residential	162							16	16	16	16	16	16	16	16	16	16										
							Commercial		750						75	75	75	75	75	75	75	75	75	75										
			BV4.5				High density residential	134							13	13	13	13	13	13	13	13	13	13										
			BV4.7				High density residential	349							35	35	35	35	35	35	35	35	35	35										
							Commercial		1,690						169	169	169	169	169	169	169	169	169	169										
			BV4.8				High density residential	479							48	48	48	48	48	48	48	48	48	48										
							Commercial		2,770						277	277	277	277	277	277	277	277	277	277										
			BV4.9				High density residential	215							22	22	22	22	22	22	22	22	22	22										
							Commercial		795						80	80	80	80	80	80	80	80	80	80										
			BV5.1				Commercial		38,360						1,918	1,918	1,918	1,918	1,918	1,918	1,918	1,918	1,918	1,918	1,918	1,918	1,918	1,918	1,918	1,918	1,918	1,918	1,918	1,918
			BV5.2				Commercial		56,345						2,817	2,817	2,817	2,817	2,817	2,817	2,817	2,817	2,817	2,817	2,817	2,817	2,817	2,817	2,817	2,817	2,817	2,817	2,817	2,817
			BV5.3				Commercial		62,555						3,128	3,128	3,128	3,128	3,128	3,128	3,128	3,128	3,128	3,128	3,128	3,128	3,128	3,128	3,128	3,128	3,128	3,128	3,128	3,128
			BV5.4				Commercial		40,160					40,160																			
			BV5.5				Commercial		38,050					38,050																			
			BV5.6				High density residential	414						414																			
							Commercial		23,635					23,635																			
			BV5.7				High density residential	448						448																			
							Commercial		3,690					3,690																			

Appendix I – Jemena Gas Response to Gas Supply Request

Oliver Walsh

From: Neale Hilton [redacted]
Sent: Thursday, 28 March 2019 8:15 AM
To: Oliver Walsh
Subject: RE: Kellyville & Bella Vista Station Precincts Master Planning - Gas Supply
Attachments: Kellyville Station NRT 10013685.pdf; Bella Vista Station NRT 100116199.pdf

Oliver
Jemena has conducted a desktop analysis of this proposal from your supplied information.

Kellyville NRT Station

An initial 600 dwellings and Commercial can be supplied for KV1 based on the attached plan 10013685. A further 850 dwellings could be supplied with an additional inter-connection through the Samantha Riley Drv and Macquarie Ave intersection.

Once the development allows for the 110mm feeder to connect to the existing 160mm PE in Memorial Ave the entire Kellyville development proposal can be supported (>3500 Dwellings).

Bella Vista NRT Station

The existing network can supply up to 1000 dwellings from the South (along Lexington Dr) based on attached plan 10016199.
Once the 110mm is laid up to and connects to the existing 160mm PE in Memorial drive, the entire development proposal for Bella Vista Station can be supplied (>5000 Dwellings).

Jemena requests that a Developer supplied Trench format is adopted during the design and construction process to reduce costs and promote coordination. Formal offer for supply can be made once construction is imminent and Head Contractor has been appointed by Landcom.

From: Oliver Walsh [redacted]
Sent: Monday, 18 March 2019 10:16 AM
To: Neale Hilton [redacted]
Cc: Ian Harris [redacted] Renata Tracey [redacted] Anthony Chua [redacted]
Subject: Kellyville & Bella Vista Station Precincts Master Planning - Gas Supply

Hi Neale

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Thanks and regards

[redacted]

Design with
community in mind

Level 6, Building B
207 Pacific Highway
St Leonards NSW 2065
Tel +61 2 8484 7000

For more information please visit www.stantec.com

Stantec