URBAN LAND DEVELOPMENT AUTHORITY

Reference: 105547
Residential Development
Bowen Street,
Roma

Infrastructure Report

October 2011

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TABLE OF CONTENTS

		Page
1.	**Background**	
1.1	Introduction	4
1.2	Locality Plan and Concept Layout	4
2.	**Roads**	
2.1	Carriageway Widths	5
2.1.1	Collector Streets	5
2.1.2	Access Streets	6
2.1.3	Access Place / Laneways	6
2.2	Access points	7
2.3	Services	7
3.	**Water supply**	
3.1	Existing Reticulation System	7
3.2	Proposed Reticulation Layout	8
3.3	Existing Infrastructure	8
3.4	Headwork's fees and charges	8
4.	**Sewerage**	
4.1	Existing Reticulation System	9
4.2	Proposed Reticulation Layout	9
4.3	Augmentation of Existing Infrastructure	10
4.4	Headwork's fees and charges	11
5.	**Stormwater Drainage**	
5.1	Existing Drainage Infrastructure	11
5.2	Proposed Layout	12
5.3	Inter-allotment Drainage	12
5.4	Augmentation of Existing Infrastructure	12
6.	**Preliminary Cost Estimate**	14

Appendices

Appendix A	Proposed Lot Layout
Appendix B	Contour Plan
Appendix C	Proposed Carriageway Widths and Type Section
Appendix D	(Deleted)
Appendix E	Proposed Lot Access Point Location Plan
Appendix F	Existing Water Reticulation Layout Plan
Appendix G	Preliminary Water Reticulation Concept Plan
Appendix H	Water Supply Headwork's Charges
Appendix I	Existing Sewer Reticulation Layout Plans
Appendix J	Preliminary Sewer Reticulation Concept Plans
Appendix K	Deleted
Appendix L	Sewerage Headwork's Charges
Appendix M	Preliminary Stormwater Drainage Concept Plan
Appendix N	Preliminary Estimates

1. Background

1.1 Introduction

Baker Rossow Consulting Engineers has been engaged by the Urban Land Development Authority (ULDA) to prepare a report on a proposed residential development site bounded by Bowen, McDowell and Cottell Streets in Roma.

The site is locally known as "hospital hill" as it is located adjacent to the existing Roma Hospital and is positioned on possibly the highest point within the township of Roma.

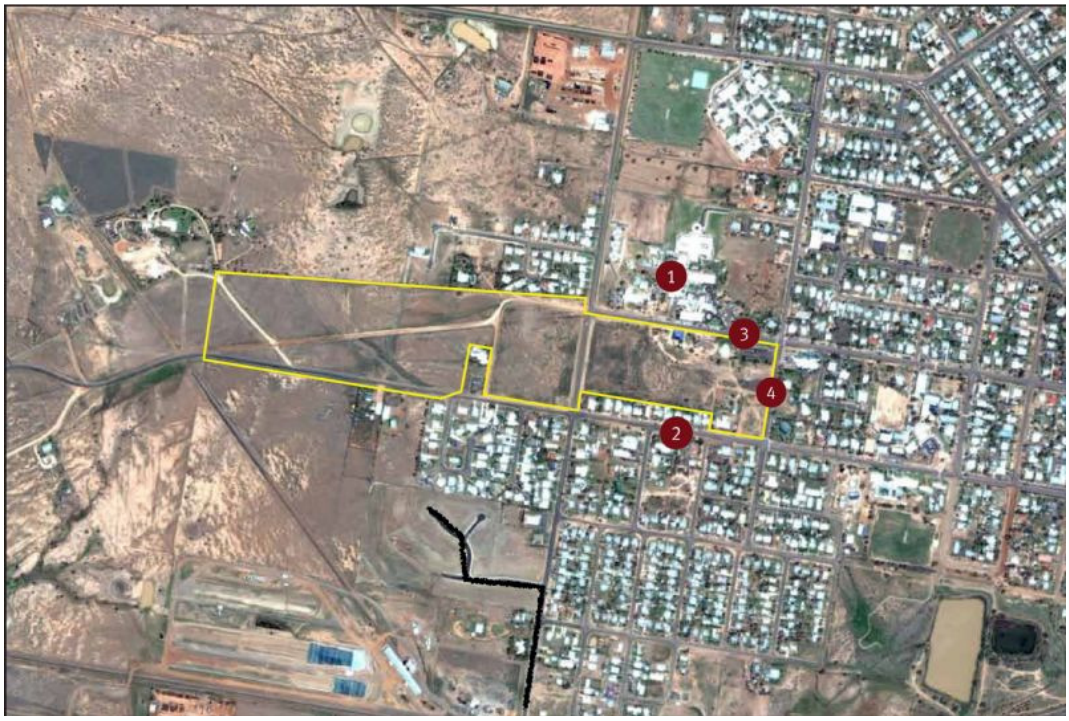
This report is intended to form part of an overall concept plan for the future development of this site which will be carried out in stages. This report in conjunction with reports by other specialist consultants will form the basis of the future development of this site.

1.2 Locality Plan

The site is located to the west of the Town Centre in close proximity to existing services such as hospitals and schools and within walking distance of the Town Centre (approximately 1.5 – 2.0 kms to the east).

A concept lot layout for the developed area has been prepared by Lat 27 showing the general arrangement of proposed allotments within this development. This report is based on the plans provided to this office on 7 September 2010.

The proposed lot layout takes into account the general topography of the area and facilitates drainage and other infrastructure works being constructed in a logical and orderly sequence. Reference should be made to Appendix A for the proposed lot layout referred to above and Appendix B for a detailed contour plan showing the existing infrastructure and topography of the subject land. Also included is a copy of Council's infrastructure plan.



Locality Plan (Courtesy of ULDA)

1. Roma Hospital 2. Bowen Street 3. McDowall Street 4. Cottell Street

Yellow Line: Urban Development Area Boundary

2. Roads

2.1 Carriageway Widths

The site is surrounded by an existing road network consisting of Bowen Street to the south, McDowell Street to the north and Cottell Street to the east. The western end of the subject land fronts undeveloped pasture. Existing streets crossing the site are Currey Street running through the site in a north – south direction and Hanley Street also running in a north south direction.

The existing streets are a mix of widths and standard of construction with some sections kerbed and sealed to full width varying to others which are gravel formation with other sections consisting of unsealed dry weather roads only.

As part of this proposal it will be necessary to upgrade sections of existing road frontages to a higher standard in conjunction with construction of new internal roads to serve the proposed development.

Where kerb alignments are set, it is proposed to maintain these for the frontages of the subject land external to the site, which is generally Council's preference in these circumstances.

It will be noted from the plan included in Appendix C that it is proposed to use a mix of carriageway widths which have been dictated by traffic volumes and associated location within the estate, and the function that they are intended to provide.

The carriageway widths have also been set in conjunction with giving consideration to facilitating vehicle movements, and expected traffic flows within and passing through the site. Reference has been made to the traffic report prepared by the TTM Group for this site and publications such as the ULDA Residential 30 Guidelines, Queensland Streets together with various " Austroads" publications where applicable.

It is generally intended that pavements will be constructed as flexible pavements for collector and access streets with rigid pavements being utilised for access place situations.

2.1.1 Collector Streets

Reference should be made to Appendix C for the proposed carriageway widths and typical cross section intended to be utilised for this type of road. It will be noted that the main east west road proposed to pass through the centre of the site has been set with a carriageway width of 7.5m kerb to kerb. A typical cross section for this arrangement is attached within this Appendix. It is proposed that this main east west connection will be designed with a swale drain on the uphill side of the road in accordance with general design principles for containing the 100 year ARI.

Collector streets will typically be two way cross fall and surfacing is intended to be of asphaltic concrete (AC) due to the noise reduction factor and superior ride characteristics offered by this form of wearing course.

It is envisaged that the internal (east–west) road will become the main collector street for this development. The primary purpose of collector streets is to move higher volumes of traffic safely and efficiently through the development to the point of destination.

The road width of the collector roads is 7.5m and in the case of the main east west collector through the estate, has been maintained for the full length of this street to provide

opportunities to develop a boulevard with appropriate plantings along the entire length of this road.

It is envisaged that this could become a focal point of the development which would blend in with the areas set aside for parkland, as this road fronts all three major parkland areas in this estate. (Reference should be made to the Landscape & Public Realm Concept Report by Lat 27 for further details on proposed landscape features.)

Such an arrangement would also lend itself to encouraging residents to engage in walking and other passive recreational activities considered beneficial to the health of individuals, and minimise the reliance on the use of motor transport as a means of travel within the development.

It should also be noted that Currey Street is a designated “over dimensional” vehicle route, and as such traffic utilising this section of road will regularly consist of a mix of vehicles not normally compatible or desirable for inclusion in residential areas.

2.1.2 Access Streets

Access streets generally branch off of the main collector streets discussed above. It is intended that access streets will serve as connections between more heavily trafficked roads and are of a lower order. As such the width of these streets has been set at 5.5m which is consistent with Residential 30 Guidelines.

These roads primarily serve to provide access to dwellings fronting the street, and to allow vehicles to enter onto collector streets either within or abutting the development. It is not envisaged that these streets will carry major traffic flows and to this end they will be designed with various devices to discourage the use of these streets for “rat running” by the travelling public if deemed necessary.

Access streets will typically be crowned and once again surfacing is intended to be of AC due to the noise reduction factor and superior ride characteristics offered by this form of wearing course.

Reference should be made to Appendix C for the proposed carriageway widths and typical cross section intended to be utilised for this type of road.

2.1.3 Access Places

Access places are intended to be utilised at the rear of villas and courtyard type dwellings in laneway situations. It is envisaged that these driveways will be of concrete construction and be constructed with an inverted crown for drainage purposes.

All access to these allotments will be from the rear laneway and not directly from the adjoining street frontage. Vehicle speeds are expected to be significantly lower in these locations which will be achieved through the minimisation of length of road and width as appropriate.

Also due to the area available for traffic it is proposed to have these streets as one way systems to minimise traffic congestion / conflicts that may result from a two way system. Entry and exit points will need to be signed accordingly and devices installed to discourage opposing traffic entering the site.

Turning templates over entries and exits have been used to determine the geometry of the access points and have been set to suit a large heavy vehicle (garbage truck). It is envisaged that wheelie bins will need to be collected from the rear of these dwellings as external access to the front of the allotments for wheelie bin movements may not be available due to the narrow allotments in these areas (pending finalisation of architectural details). Because the access streets will be a one way system, wheelie bins will need to be placed on one side only of the access way for collection.

It is considered generally undesirable for wheelie bins to be stored and collected from the front of residences on these narrow lots as the potential for a reduction in amenity could develop if not properly maintained.

The final geometry of these access points will be determined during the detail design phase.

Reference should be made to Appendix C for the proposed carriageway widths and typical cross section intended to be utilised for this type of road. Some limited provision for planting at the property / laneway boundary is envisaged to assist in softening the appearance of the access.

2.2 Access points

Access points have generally been located to avoid on street infrastructure installations where applicable (such as gully inlet pits) and generally positioned adjacent to the zero setback boundaries where these exist.

Reference should be made to Appendix E for the suggested location of the proposed driveway access points for each allotment. Some of these access points may require relocation depending on the final form of dwellings to be located on the subject sites.

2.3 Services

Services are to be generally located at common boundaries between allotments and positioned so as not to interfere with driveway access to allotments. Where access to allotments is from a rear laneway, the allotment services shall be positioned at the front of each allotment on a common boundary for ease of location.

Easements will not be generally required over sewer mains located within the allotments. However, should the detailed design require roofwater drainage or water reticulation to be constructed through privately owned land, easements in favour of the Local Authority will be required for maintenance access. Easements would be typically 2-3m in width.

3. Water supply

3.1 Existing Reticulation System

The existing water supply system layout is shown on the drawing contained in Appendix F of this report.

Furthermore Council has relatively recently carried out a water reticulation network analysis for the township of Roma. Investigation with Council has revealed that a subsequent report is now being prepared giving further detail, and as such the subject land is understood to be included in the scope of the new report.

At the time of writing, the final report has not been finalised by the Local Authority. However, results of preliminary analysis carried out by Council's Consultant reveal that some augmentation to the existing water network external to this site is likely to be required. It is currently unknown to what extent any upgrade works will be required to existing reservoirs, pump stations and trunk mains. Further analysis is to be carried out in conjunction with the Developer's water consultant, in order to determine the requirements for upgrade to external water supply networks, as a result of this development.

It will be required that the solution achieve a "non-worsening" effect to existing customers. In addition, water network analysis will be required in order to ensure adequate peak demands are met, and to achieve minimum flows and pressures in new mains for fire fighting purposes.

3.2 Proposed Reticulation Layout

The proposed layout for water reticulation to this site is provided in Appendix G of this report.

The potable supply will draw from Council mains in the immediate area to service the proposed allotments. This will be a conventional system as commonly seen in residential developments.

Generally the water reticulation system for the town supply can be constructed with minimal dead end lines apart from two lines located at cul-de-sacs at the eastern end of the site. The advantage of minimisation of dead end lines is that most of the "town water" mains become "ring" mains which have obvious advantages insofar as delivery is concerned.

It is likely that 150mm diameter mains will be required for fire fighting and general household supply and linking back into the existing system at regular intervals to become a ring main system with 100mm mains supplying cul-de-sacs and the shorter north south streets. Final sizing may be subject to variation, pending the outcome of the network analysis.

3.3 Existing Infrastructure

Council Officers have advised that the existing infrastructure consists of 150mm diameter mains located through and around the perimeter of the site.

No trunk mains exist in the area and until such time as the network analysis is completed there are no plans for Council installed trunk mains to be provided to this area in the foreseeable future. As such it would be of little advantage to install any mains in this development larger than 150mm diameter as the supply to the site is limited to the delivery capacity of the existing external system.

3.4 Headwork's fees and charges

Maranoa Regional Council's website was accessed to obtain the current head works charges for water supply which stands at $1,819.00 (GST free) per lot. Refer Appendix H for the extract from Council's fees and charges register.

4. Sewerage

4.1 Existing Reticulation System

Details pertaining to the location of the existing sewer reticulation system in the area of the subject land is shown on the drawing contained with Appendix I of this report.

The existing area currently serviced by the reticulated system is mostly limited to the eastern side of Currey Street due to the topography of the area. It may not be possible to service a large extent of the subject land to the west of Currey Street without pumping or implementation of other options or strategies to manage the flow generated within this catchment.

Council has recently undertaken a network analysis of the existing sewer system. Preliminary results from this study show that portions of the existing system are currently working well beyond theoretical capacity. Council officers indicated that the existing reticulation system downstream from the subject land is also in a poor state of repair. Whilst no surcharging of manholes had been noted to date, the system is likely to struggle to cater for any significant additional load, without surcharging the downstream network.

Further to the provision of this information a copy of the network model data has been provided to ULDA, in order to have additional investigation carried out by the Developer's water and sewer consultant. The final concepts for connection to the existing system, location, nature and timing for the installation of sewer pump stations will hinge upon the results and advice of the consultant's study, and negotiations between the ULDA and Local Authority.

4.2 Proposed Reticulation Layout

A preliminary sewerage reticulation layout has been prepared for this site and is included in Appendix J as mentioned above. The system is essentially a conventional gravity system utilising "smart" sewers where appropriate, discharging into either existing mains servicing the site, or to a purpose built sewage pumping station constructed as part of the development to lift effluent from the land on the western side of Currey Street to a suitable point of connection to Council's existing system.

Council has indicated that a suitable point of connection could be the sewer manhole at the corner of McDowell and Cottell Streets.

Further investigation may be required on this last point as it is understood that the capacity of Council reticulation infrastructure may be insufficient to cater for the additional flows downstream of the site without augmentation of the existing system (See below).

A possible solution to this issue would be to install holding tanks of sufficient capacity to allow peak flows to be attenuated and discharged at a controlled rate that will not overload the existing system downstream. Pumping could be timed to occur outside of existing peak flows in the system when additional capacity becomes available. Such a system could be staged with additional holding tanks being installed to allow for increases in flows as each subsequent stage of the development comes on line.

A pump station of capacity suitable for this purpose has been costed and details are included in Appendix J of this report.

Holding tanks would be additional and would need to be sized for staging. Alternatively the developer may wish to construct one tank at the outset of sufficient capacity to cater for the fully developed catchment.

It will be necessary to obtain a more refined estimate of the abovementioned costs after the detail design for the system is undertaken.

4.3 Augmentation to Existing Infrastructure

As mentioned elsewhere in this report the site is essentially split into two zones for the purpose of sewering the site. The area to the east of Currey Street could be connected back into Council's existing gravity system, and a small portion of the site immediately adjacent to and to the west of Currey Street could also be gravity sewered. However the balance of the land to the west of Currey Street could not be gravity sewered, and as such would need to be serviced by a pump station.

This does not in itself present any significant engineering problem on site. However the existing downstream Council network from the point of connection to the gravity system that the developed site would need to discharge to, does not have sufficient capacity to cater for the anticipated loadings likely to be generated from the fully developed site.

It would not be unreasonable to assume that if the site were to be sewered by a system similar to that described above, then upgrading of the existing Council infrastructure would be required as part of the proposal.

In light of the above, the capacity of the system downstream of the site would need to be reviewed once the network analysis has been completed, and an assessment made as to the actual extent of any augmentation required (if any).

One option would be to duplicate the main from the corner of McDowell and Cottell Streets to the Major Street pumping station, however this may not be the most cost effective solution. This would entail construction of an estimated 2.2km of new sewer main through some of the most developed parts of Roma.

(Major Street is located approximately 2.2km east of the site, crossing McDowell Street in a north south direction).

Additional cost would be incurred over a "greenfield" project due to the associated cost of road reinstatement, footpath reinstatement, service relocation, traffic control, conflicts with existing services which can't be relocated and the risk of "unknowns" causing costs to escalate.

Without the benefit of detailed survey and service pickup, including potholing of services to check for depths and hence potential conflicts, it is not possible to accurately quantify the cost entailed in duplication of the existing sewer. Even in a greenfield development the cost of constructing a 225mm diameter sewer main with manholes is expected to be in excess of $500,000 over this distance without reinstatements and relocation of services, which could easily double the cost.

Additional survey and investigation would be required if this option were to be adopted.

An amount could be set aside for infrastructure works, but until such time as Council is able to quantify the extent of any augmentation required, this remains a moot point.

As mentioned in Section 4.1 the advice received at officer level indicates that the existing sewage treatment plant appears to have excess capacity which could be utilised for this development.

4.4 Headwork's fees and charges

Maranoa Regional Council's website was accessed to obtain the current sewerage head works charge which stands at $1,819.00 (GST free) per lot (which is the same as the water supply head works charge). Refer Appendix L for the extract from Council's fees and charges register.

5. Stormwater Drainage

5.1 Existing Drainage Infrastructure

As mentioned elsewhere in this report the site falls into two catchments. The eastern catchment falls in a north easterly direction to the corner of Cottell and McDowell Streets, whilst the western catchment falls generally to the north discharging into broad, shallow drainage depression leading away from the site. Up to six dams are constructed across this watercourse along its length. An easement will be required downstream of the overflow of the detention basin.

Ultimately both catchments discharge runoff back through Roma in an easterly direction ultimately terminating at Bungil Creek. The eastern catchment runoff is conveyed via a system of underground and surface drainage whilst runoff from the western catchment is predominantly conveyed by surface drainage.

Existing stormwater drainage in the area of the proposed development is somewhat limited and in most parts confined to surface drainage contained within the road reserve or private property.

Some minor underground drainage exists in the more developed areas to the east but is not considered to be of sufficient capacity to cater for any significant development on this site without augmentation.

The drainage infrastructure in the area is not new and has probably been installed over the years, mainly as relief drainage. The site is well elevated and above recorded flood levels.

5.2 Proposed Stormwater Drainage Layout

Reference should be made to the detailed report by BMT WBM in respect to the stormwater management strategy to be adopted for this site.

At this preliminary stage, storm runoff exceeding any on site attenuation available from water tanks or other storage devices that may be adopted at lot level, is proposed to be collected within parks located at the eastern and western ends of the site along the northern side of McDowell Street. The form that these collection points will assume will be determined as part of the detail design phase. However is envisaged to be either surface storage (detention) basins with a minimum effective storage capacity of 2ML or underground tanks of similar capacity (ref Bligh Tanner Report Table 11, P21). An easement will be required to be negotiated with the land owner downstream of the outlet for the detention basin.

Furthermore as the south west corner of the site falls away from the drainage depression existing on the northern side of the western catchment, bulk earthworks will need to be undertaken in that area to ensure that runoff from this area is captured insofar as possible and conveyed back to the storage basin for reuse. The extent of the required earthworks will be determined during the detail design phase for the stages located in that vicinity.

Consideration must be given to the footprint required for storage within the parks, particularly in relation to the potential for other infrastructure to be located within the western most parkland (refer Section 4.4 above).

Although Council's register of fees and charges makes reference to a stormwater head works charge of $1,213.00 (GST Free) as it is intended that the proposed system will limit post development flows to pre-development levels it is considered that any charges associated with this particular charge could be waived or substantially reduced.

5.3 Inter-allotment Drainage

As per usual practice, allotments which fall to the street will be provided with kerb adapters for connection to roofwater downpipes and overflows from any rainwater tanks etc. The infrastructure for underground inter-allotment drainage will be directed into mains provided for this purpose generally located within the road reserve.

5.4 Augmentation to Existing Infrastructure

As mentioned previously herein, the existing stormwater drainage infrastructure in the area is not of a sufficient standard to cater for the fully developed catchment. As such measures will need to be put in place to cater for the increase in impervious area and consequent increase in run off generated by the development.

The development will proceed in stages. As part of the construction process and to minimise initial outlays associated with the management of runoff from the site (exceeding that which is captured for reuse), it is envisaged that the detention basin / storage tank in the eastern catchment will not be constructed until Stage 4.

Stage 4 is the first stage that will be developed in the eastern catchment. Reassignment of the sequence of staging could further defer this expenditure if necessary, which may be advantageous for funding purposes.

The intention in managing excess runoff generated by this site is to limit discharges so that for each individual stage and each subsequent stage, a "no worsen effect" on downstream properties is achieved. That is the post development flows for each stage, and ultimately the fully developed catchment, does not exceed the rate of discharge currently emitted from the site in its undeveloped form.

Adopting this strategy will allow the existing stormwater drainage infrastructure to remain without having to augment those systems, or cause nuisance or inconvenience to downstream property owners.

For storm events where the capacity of the system to attenuate the flow has been exceeded, the following is proposed. In the area to the west of Currey Street it is proposed to discharge runoff to the existing drainage depression to the north of the site as currently occurs.

Whilst this is not a clearly defined watercourse nonetheless it appears to be locally recognised as such due to the presence of rural type earth dams constructed along the downstream invert of the channel (See screen captures below).

Downstream area for flows exceeding system capacity discharging to existing watercourse (along line of dams – western catchment)

Downstream view of drainage depression from Bowen Street – western catchment.

In the area to the east of Currey Street it is proposed to attenuate flows within the site as far as possible recognising that there will always be a storm event that exceeds the capacity of the system.

6.0 Preliminary Cost Estimate

Preliminary cost estimates for the civil work component for the fully developed site, based on the details and assumptions as set out above have been derived and are contained herein.

Estimates have been made as to the extent of various items to arrive at a very preliminary schedule of quantities to which has been applied current commercial rates for similar work.

It must be appreciated that until such time as a detailed design for the site has been prepared, and accurate quantities are available for such items as earthworks, paving materials, pipes and fittings etc. such estimates are to be utilised solely for budget purposes.

These estimates may vary over time as unit costs for materials and labour vary, and the influence and availability of similar commercial work for civil contractors servicing the area are taken into account.

Updated construction estimates for the relevant Development Stages are included in the appendix

It is apparent that Stage 1 will incur significant expense due to the need to provide extensive infrastructure over and above that which is normally required to service a development of this nature.

It should also be noted that the cost of electrical supply to the development is not included.

Infrastructure necessary for the supply of electricity to the site will need to be designed by experienced electrical engineers and costed based on the requirements of that design.

Reference should be made to Appendix N of this report for a copy of the preliminary estimate for each stage of the development. The estimates should be read in conjunction with the relevant sections of this document, parts of which contain additional information / costs that may affect the cost of development pending the outcome of decisions in respect the final form of development infrastructure.

Appendix A
Proposed Lot Layout

CONCEPTUAL STAGING PLAN

	Revisions	Date
B	Stages 4 & 8 DA	Oct 11
A	Original issue	

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client **URBAN LAND DEVELOPMENT AUTHORITY**

project **PROPOSED URBAN RESIDENTIAL DEVELOPMENT BOWEN STREET, ROMA**

title **CONCEPTUAL STAGING PLAN**

Survey	Drawn	Design	J/M	Examined	Certified
–	BDR	EGA	EGA	/ /	FOR BAKER ROSSOW CONSULTING ENGINEERS
–	NOV 10	NOV 10	NOV 10		

SCALE A (1: 2000 AT A1)
0 20 40 60 80 100 M
– BAR SCALES –

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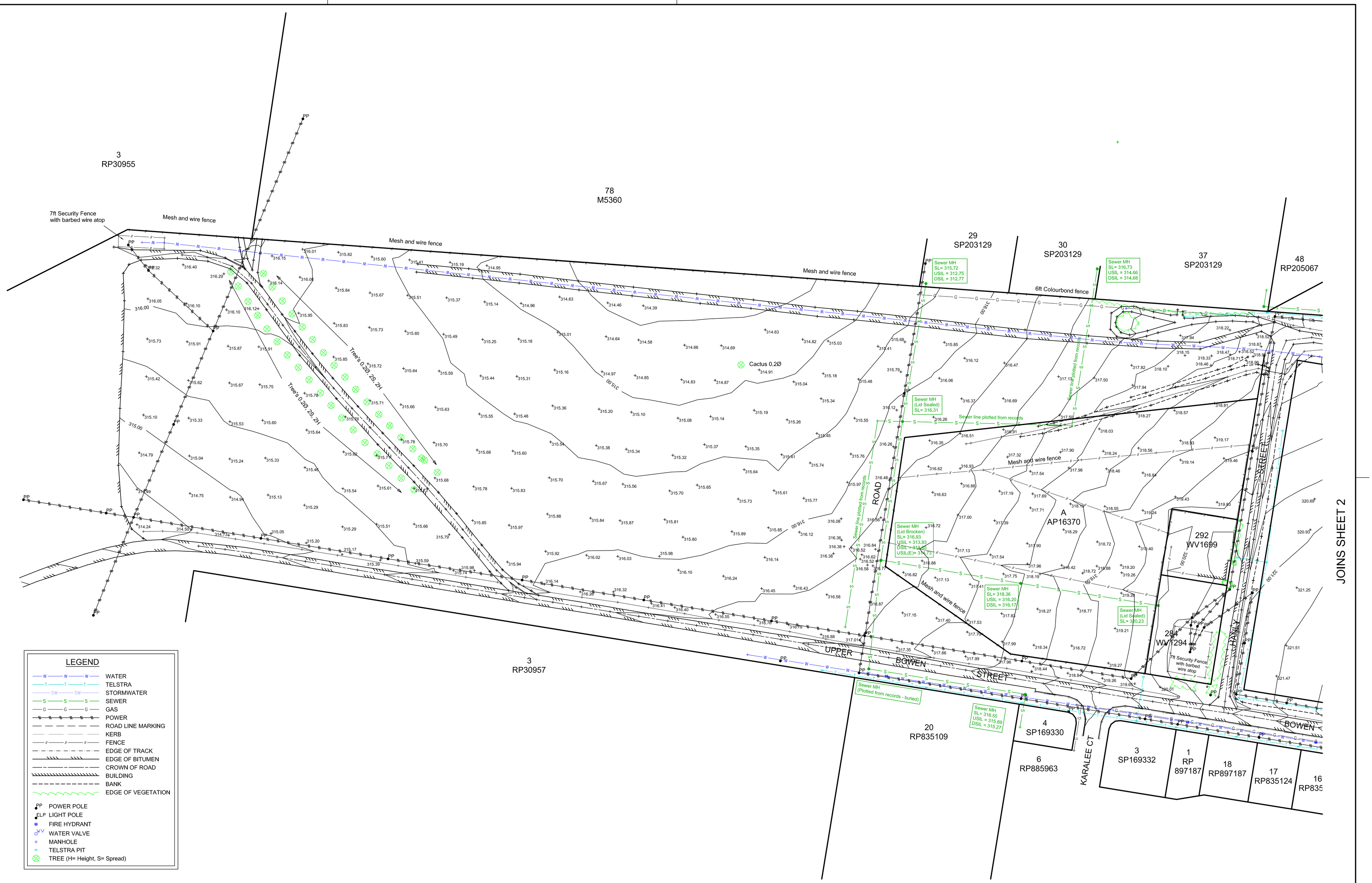
DIMENSIONS
THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, EXISTING SERVICES AND OTHER ITEMS NECESSARY TO COMPLETE THE WORKS BEFORE COMMENCING ANY WORK ON SITE. IF ANY DOUBT EXISTS THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY BEFORE PROCEEDING WITH ANY WORK.

JOB No. 105547

No. of plans
Plan No. P1
A B

Appendix B
Contour Plan



ORIGINAL SIZE A1

HEDGES GEOMEASURE

LICENSED & ENGINEERING SURVEYORS
LAND & PROPERTY DEVELOPMENT
GEOGRAPHIC INFORMATION MANAGEMENT
PETROLEUM INFRASTRUCTURE SURVEY & DESIGN

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PLAN DETAILS

COUNCIL :	MARANOA REGIONAL COUNCIL
MAP REF :	8644-14341
LOCALITY :	ROMA
PARISH :	ROMA
LOCALITY :	WALDEGRAVE

N

0 25 50 75 100

SCALE 1: 1000

LEVEL DATUM :	RL 319.535 AHD	CONTOUR INTERVAL :	0.5 (metres)
LEVEL AUTHORITY :	OPM85030	INSTRUCTION :	37748-1-1
CO-ORD DATUM :	MGA94 Zone 55	PLOT :	37748_2D

NO.	REVISION	STAFF	CHECK	DATE
A	INITIAL DRAFT	TJL	JDM	13/08/10

PROJECT

CONTOUR & DETAIL SURVEY

BOWEN STREET, ROMA

PROPOSED ROMA URBAN DEVELOPMENT AREA

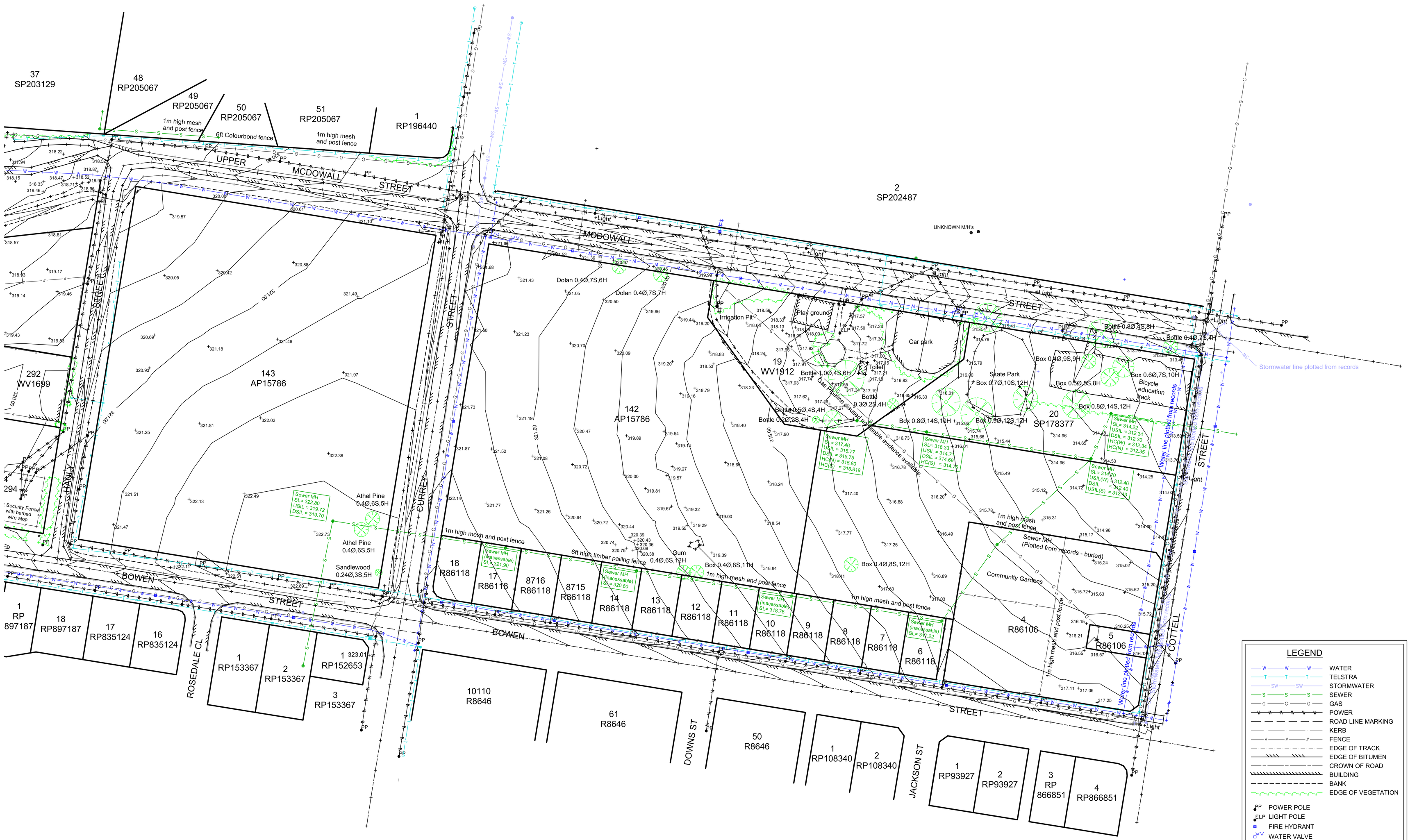
DRAWING 37748_2D

DATE 13/08/2010

SHEET 1 OF 2

REV. A

ABBREVIATED TITLE



LEGEND

- WATER
- TELSTRA
- STORMWATER
- SEWER
- GAS
- POWER
- ROAD LINE MARKING
- KERB
- FENCE
- EDGE OF TRACK
- EDGE OF BITUMEN
- CROWN OF ROAD
- BUILDING
- BANK
- EDGE OF VEGETATION
- PP POWER POLE
- LP LIGHT POLE
- FIRE HYDRANT
- WV WATER VALVE
- MANHOLE
- TELSTRA PIT
- TREE (H= Height, S= Spread)

ORIGINAL SIZE A1

HEDGES GEOMEASURE

LICENSED & ENGINEERING SURVEYORS
LAND & PROPERTY DEVELOPMENT
GEOGRAPHIC INFORMATION MANAGEMENT
PETROLEUM INFRASTRUCTURE SURVEY & DESIGN

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Coolum (07) 5471 7144
Adelaide (08) 8364 1000

PLAN DETAILS

COUNCIL :	MARANOA REGIONAL COUNCIL
MAP REF :	8644-14341
LOCALITY :	ROMA
PARISH :	ROMA
LOCALITY :	WALDEGRAVE

N

0 25 50 75 100

SCALE 1: 1000

LEVEL DATUM :	RL 319.535 AHD	CONTOUR INTERVAL :	0.5 (metres)
LEVEL AUTHORITY :	OPM85030	INSTRUCTION :	37748-1-1
CO-ORD DATUM :	MGA94 Zone 55	PLOT :	37748_2D

NO.	REVISION	STAFF	CHECK	DATE
A	INITIAL DRAFT	TJL	JDM	13/08/10

PROJECT

CONTOUR & DETAIL SURVEY

BOWEN STREET, ROMA

PROPOSED ROMA URBAN DEVELOPMENT AREA

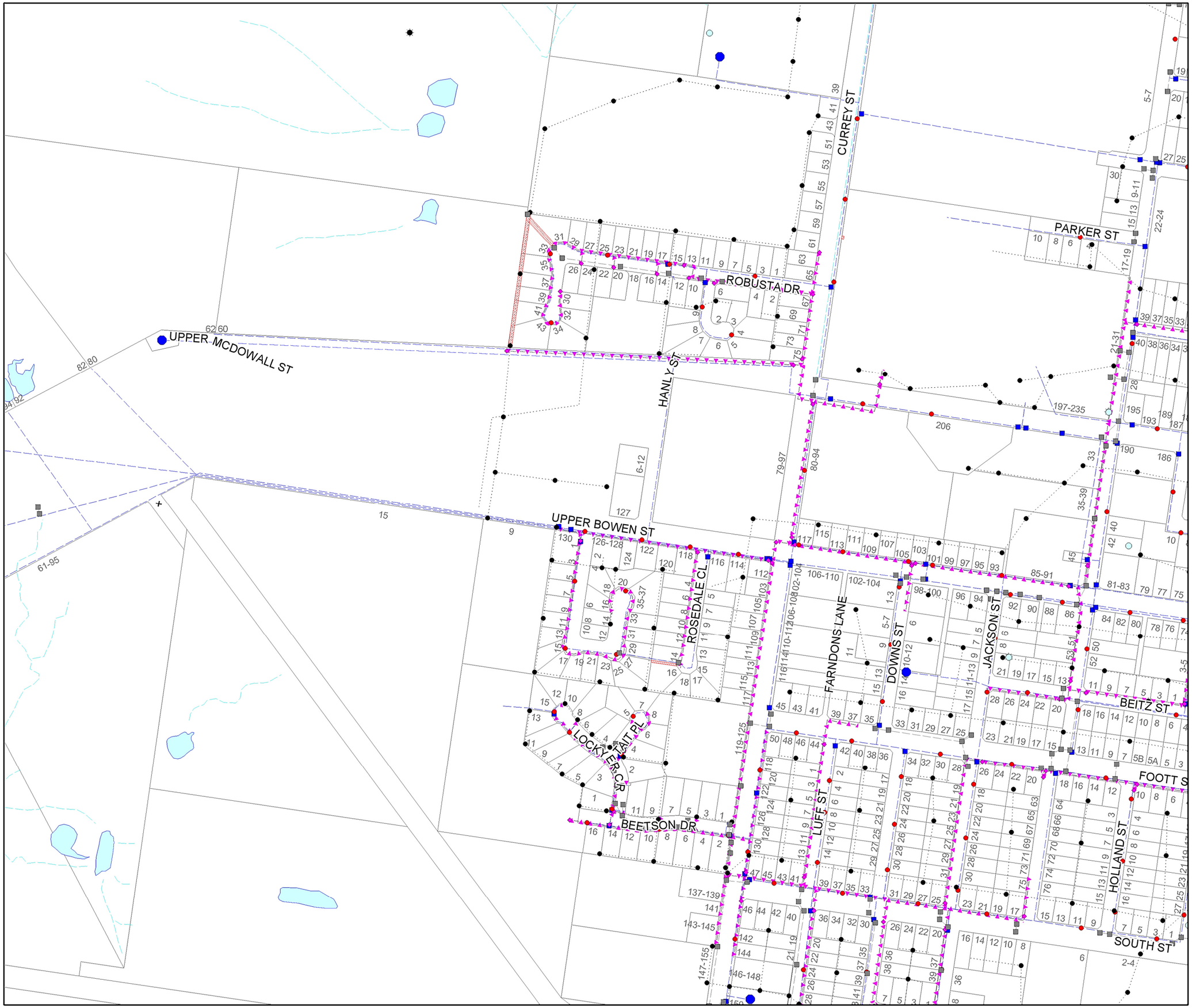
DRAWING 37748_2D

DATE 13/08/2010

SHEET 2 OF 2

REV. A

ABBREVIATED TITLE



LEGEND

N

Stormwater

- Drainage Pathway
- Dam
- Stormwater Main
- Stormwater Pit/Manhole

Sewer

- Manhole
- Sewer Main

Water

- Reservior
- Bore
- Booster
- Decomissioned Reservior
- Decomissioned Bore
- Tower
- Main
- Fire Hydrant
- Water Valve

Gas

- Gas Main
- Gas Valve

REV	AMENDMENTS	BY	CKD	APPR	DATE

maranoa REGIONAL COUNCIL

TITLE:

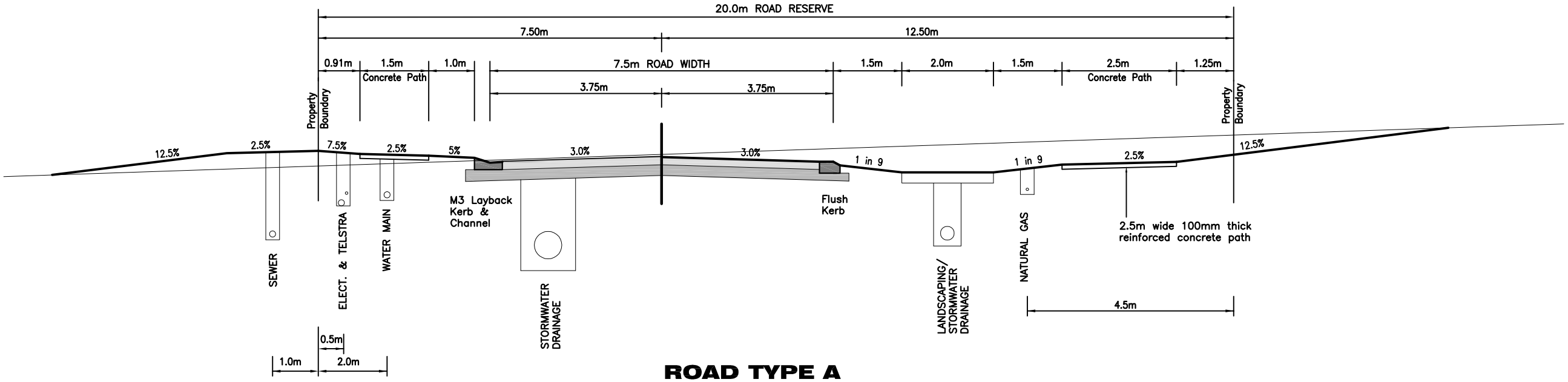
Job No. 4112706
Indicative Services Search

SCALE: 1 : 2500 (A3)

MAP: 4112706

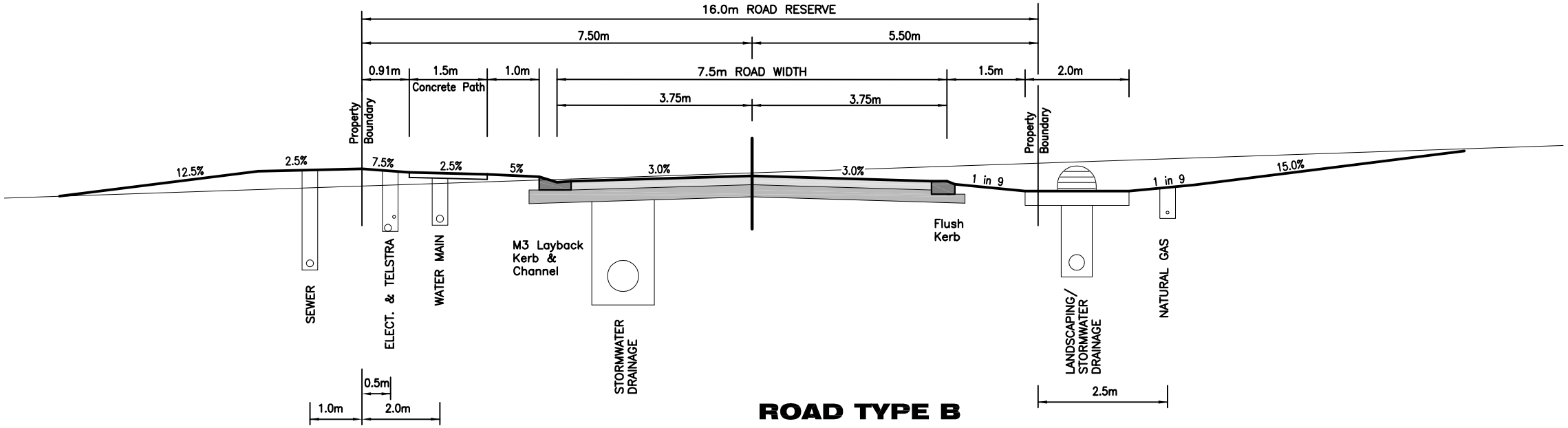
0m 50m 100m 150m 200m

Appendix C
Proposed Carriageway Widths and Type Section



ROAD TYPE A
TYPICAL CROSS SECTION
7.5m ROAD WIDTH: 20m ROAD RESERVE
SWALE DRAIN

Information shown on Type Cross Sections is nominal only.



ROAD TYPE B
TYPICAL CROSS SECTION
7.5m ROAD WIDTH: 16m ROAD RESERVE
SWALE DRAIN

Information shown on Type Cross Sections is nominal only.

	Revisions	Date
B	Stages 4 & 8 DA	Oct 11
A	Original issue	

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QUALITY ASSURED SUPPLIER
QUEENSLAND GOVERNMENT

client **URBAN LAND DEVELOPMENT AUTHORITY**

project **PROPOSED URBAN RESIDENTIAL DEVELOPMENT**
BOWEN STREET, ROMA

title **TYPICAL CROSS SECTIONS**

Survey	Drawn	Design	J/M	Examined	Certified
–	BDR	EGA	EGA	/ /	FOR BAKER ROSSOW CONSULTING ENGINEERS
–	NOV 10	NOV 10	NOV 10		

SCALE G (1: 50 AT A1)
0 0.5 1.0 1.5 2.0 2.5 M
– BAR SCALES –

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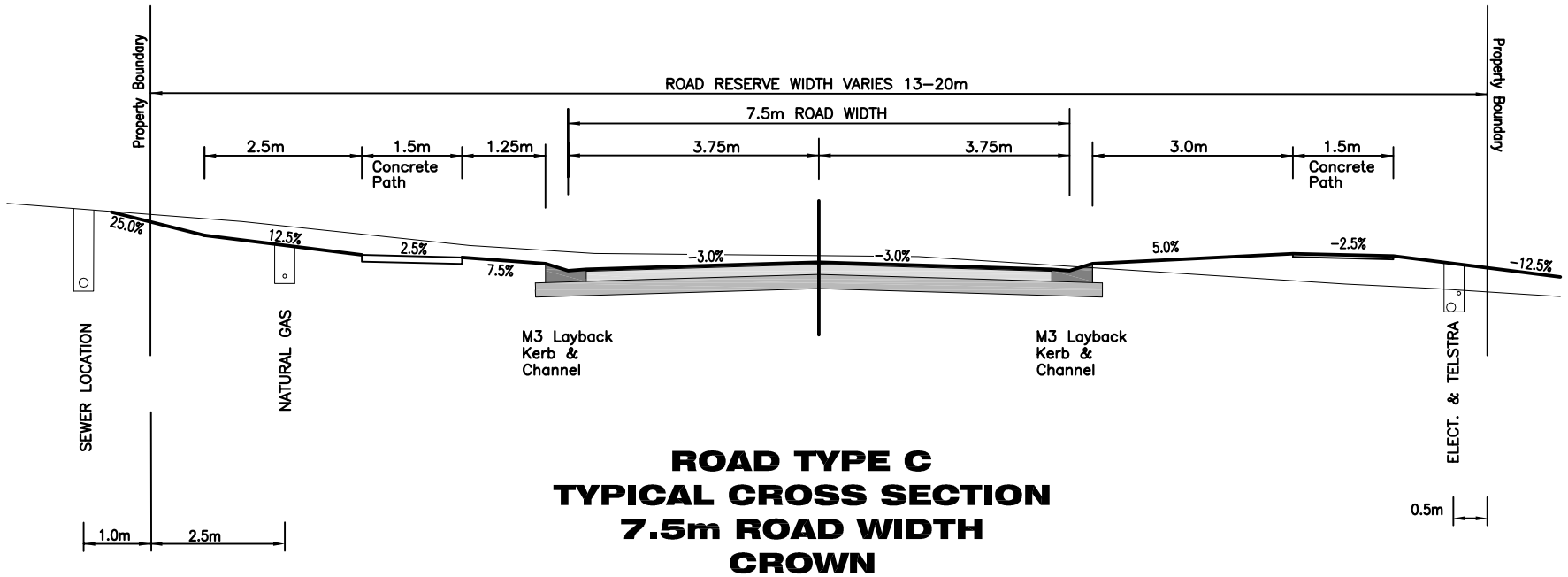
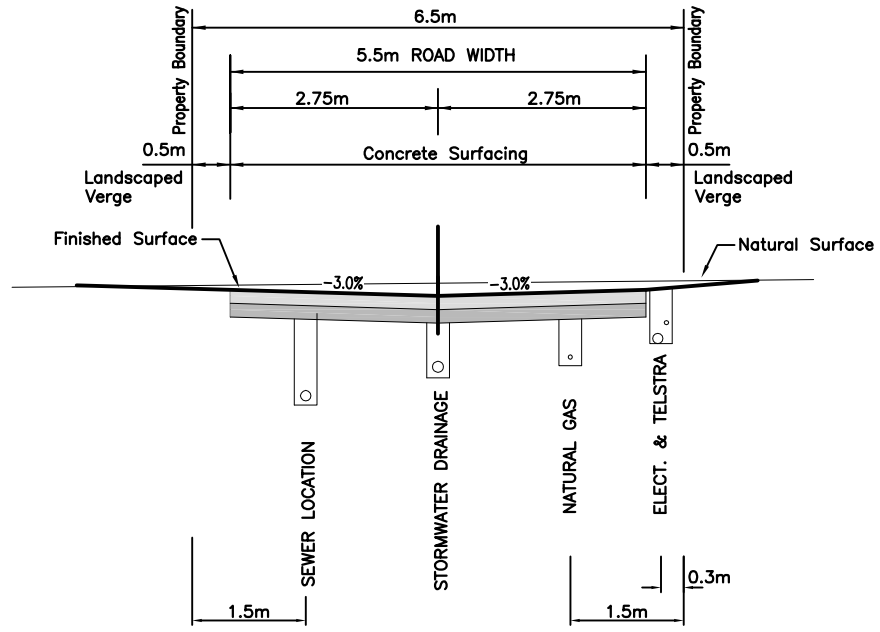
No. of plans
Plan No. **P2**
A B



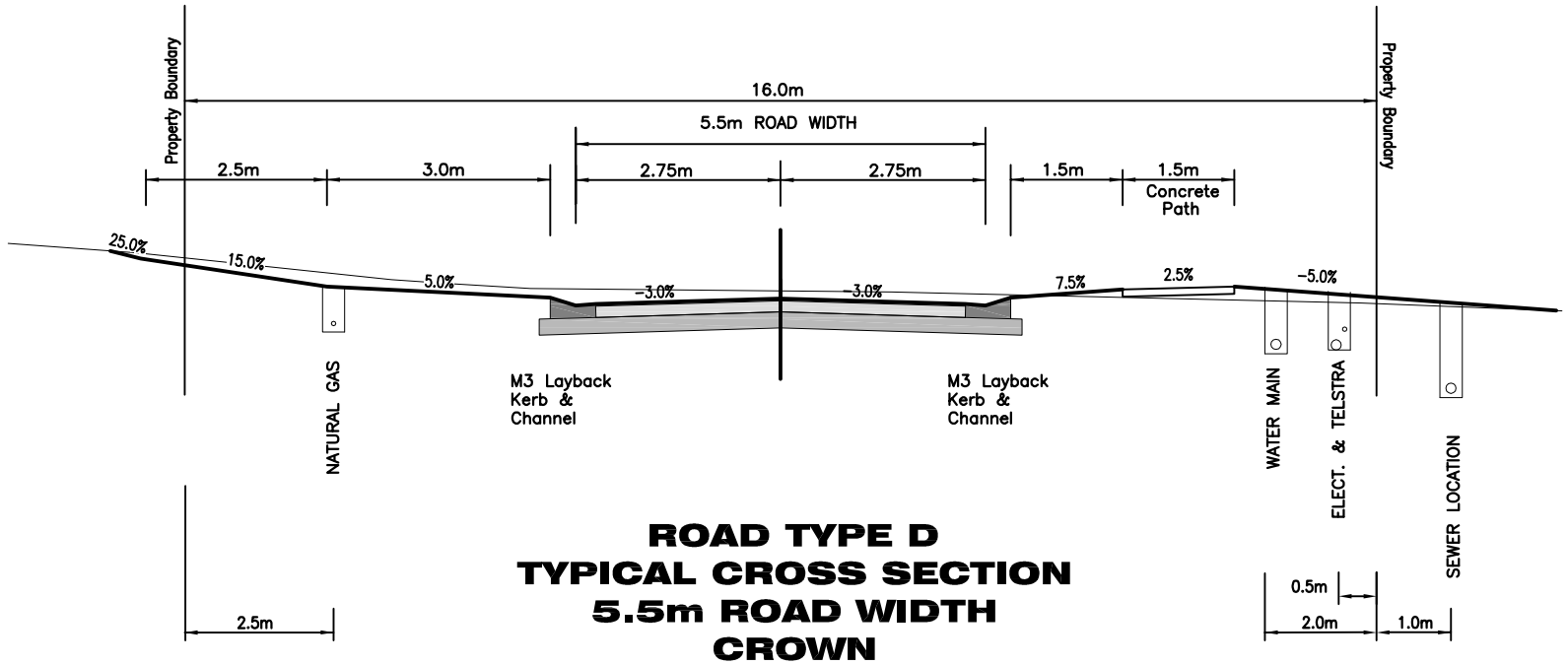
ROAD TYPE C
TYPICAL CROSS SECTION
7.5m ROAD WIDTH
CROWN

Information shown on Type Cross Sections is nominal only.



ROAD TYPE E
TYPICAL CROSS SECTION
5.5m ROAD WIDTH
INVERTED CROWN

Information shown on Type Cross Sections is nominal only.



ROAD TYPE D
TYPICAL CROSS SECTION
5.5m ROAD WIDTH
CROWN

Information shown on Type Cross Sections is nominal only.

Revisions	Date
B Stages 4 & 8 DA	Oct 11
A Original issue	

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QUEENSLAND GOVERNMENT

client: **URBAN LAND DEVELOPMENT AUTHORITY**

project: **PROPOSED URBAN RESIDENTIAL DEVELOPMENT BOWEN STREET, ROMA**

title: **TYPICAL CROSS SECTIONS**

Survey	Drawn	Design	J/M	Examined	Certified
–	BDR	EGA	EGA	/ /	FOR BAKER ROSSOW CONSULTING ENGINEERS
–	NOV 10	NOV 10	NOV 10		

SCALE G (1: 50 AT A1)
0 0.5 1.0 1.5 2.0 2.5 M
– BAR SCALES –

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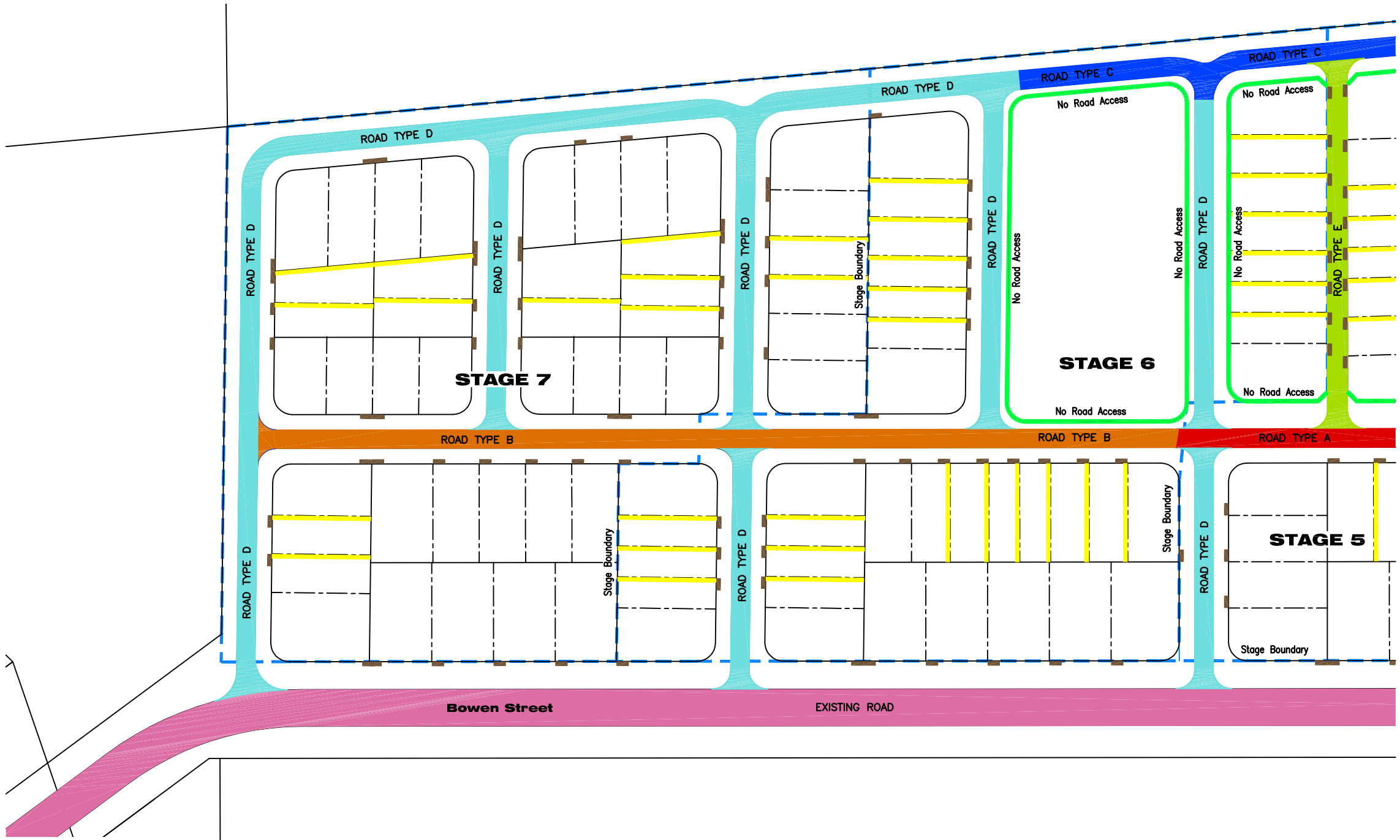
No. of plans
Plan No. P3
A B

LEGEND

- ROAD TYPE A – 7.5m WIDTH CROWNED ROAD WITH SWALE (20m RESERVE)
- ROAD TYPE B – 7.5m WIDTH CROWNED ROAD WITH SWALE (16m RESERVE)
- ROAD TYPE C – 7.5m WIDTH CROWNED ROAD WITH VERGE
- ROAD TYPE D – 5.5m WIDTH CROWNED ROAD WITH VERGE
- ROAD TYPE E – 5.5m WIDTH INVERTED CROWN – CONCRETE
- EXISTING ROAD – TO BE WIDENED IF REQUIRED
- ACCESS DRIVEWAY LOCATION
- NO ROAD ACCESS
- ZERO SETBACK
- PROPOSED STAGE BOUNDARY



CONCEPTUAL LAYOUT PLAN
ROAD TYPES

Joins Plan P5

	Revisions	Date
B	Stages 4 & 8 DA	Oct 11
A	Original issue	

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client: **URBAN LAND DEVELOPMENT AUTHORITY**

project: **PROPOSED URBAN RESIDENTIAL DEVELOPMENT BOWEN STREET, ROMA**

title: **CONCEPTUAL LAYOUT PLAN ROAD TYPES (SHEET 1 OF 3)**

Survey	Drawn	Design	J/M	Examined	Certified
–	BDR	EGA	EGA	/ /	FOR BAKER ROSSOW CONSULTING ENGINEERS
–	NOV 10	NOV 10	NOV 10		

SCALE J (1: 750 AT A1)
– BAR SCALES –

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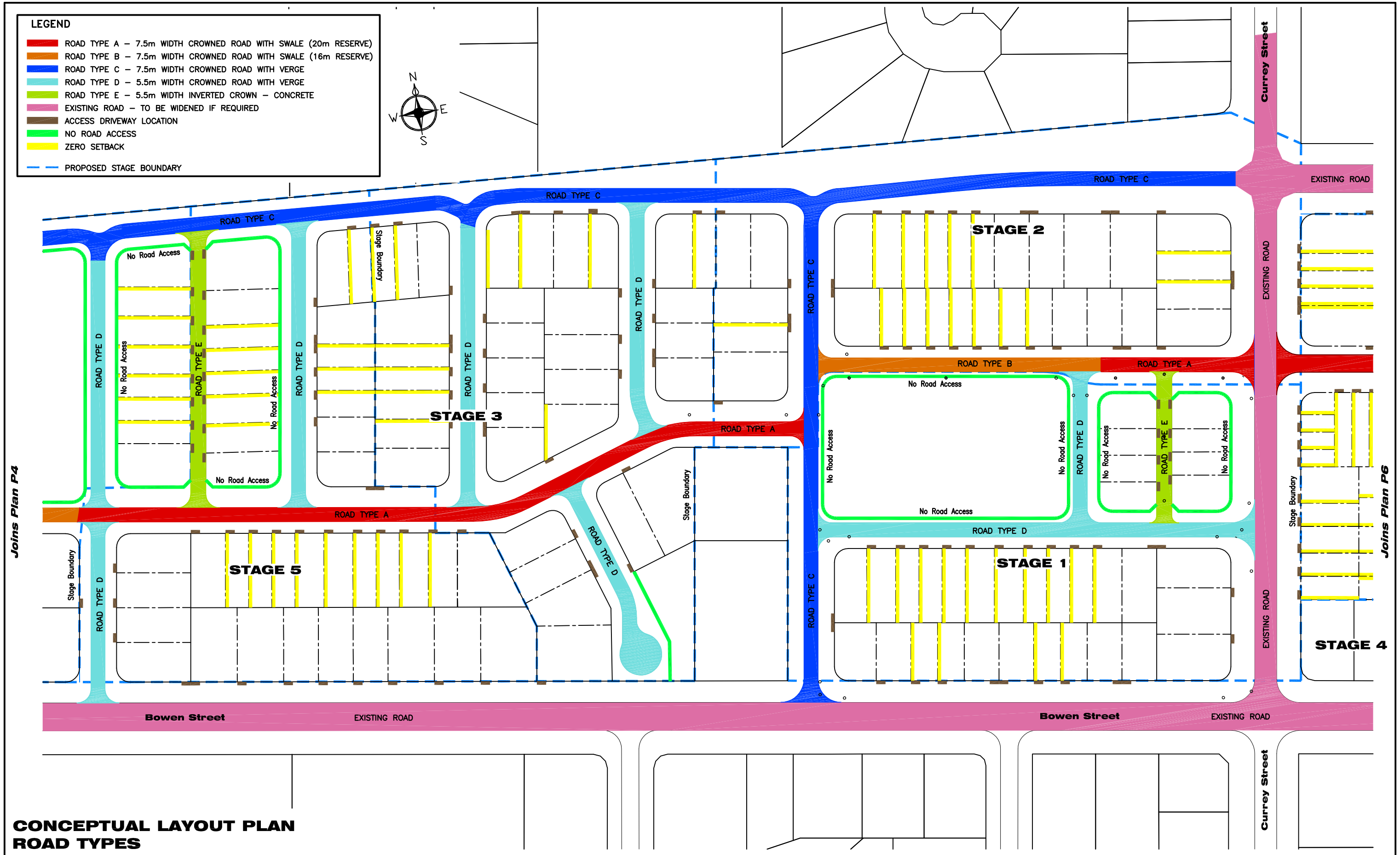
JOB No. 105547

No. of plans

Plan No. P4

A B



CONCEPTUAL LAYOUT PLAN
ROAD TYPES

Revisions	Date
B Stages 4 & 8 DA	Oct 11
A Original issue	

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QUEENSLAND GOVERNMENT

client: **URBAN LAND DEVELOPMENT AUTHORITY**

project: **PROPOSED URBAN RESIDENTIAL DEVELOPMENT BOWEN STREET, ROMA**

title: **CONCEPTUAL LAYOUT PLAN ROAD TYPES (SHEET 2 OF 3)**

Survey	Drawn	Design	J/M	Examined	Certified
–	BDR	EGA	EGA	/ /	FOR BAKER ROSSOW CONSULTING ENGINEERS
–	NOV 10	NOV 10	NOV 10		

SCALE J (1: 750 AT A1)
– BAR SCALES –

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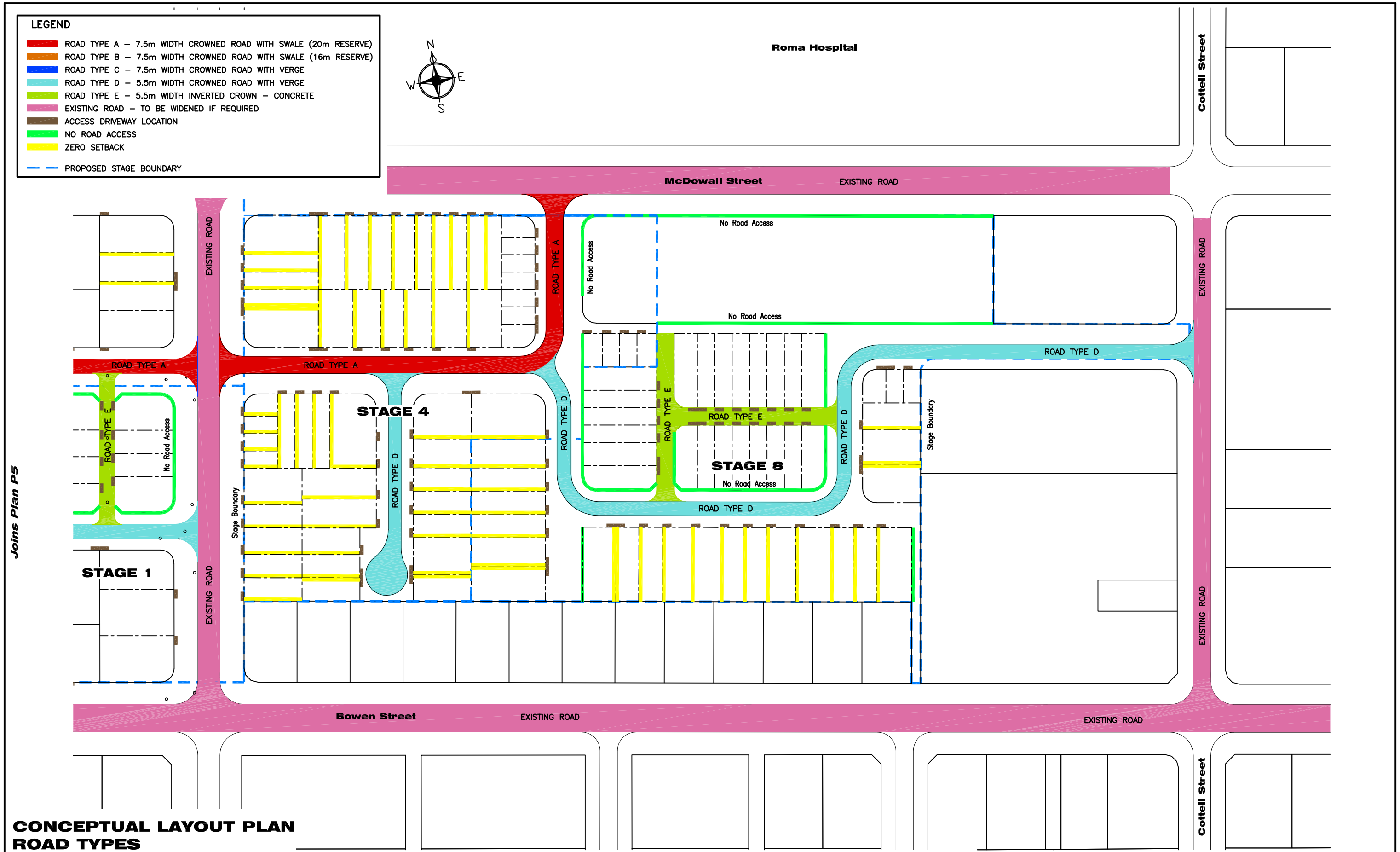
No. of plans
Plan No. P5
A B



CONCEPTUAL LAYOUT PLAN
ROAD TYPES

Revisions	Date
B Stages 4 & 8 DA	Oct 11
A Original issue	

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QUEENSLAND GOVERNMENT

client **URBAN LAND DEVELOPMENT AUTHORITY**

project **PROPOSED URBAN RESIDENTIAL DEVELOPMENT BOWEN STREET, ROMA**

title **CONCEPTUAL LAYOUT PLAN ROAD TYPES (SHEET 3 OF 3)**

Survey	Drawn	Design	J/M	Examined	Certified
–	BDR	EGA	EGA	/ /	FOR BAKER ROSSOW CONSULTING ENGINEERS
–	NOV 10	NOV 10	NOV 10		

SCALE J (1: 750 AT A1)
– BAR SCALES –
0 10 20 30 40M

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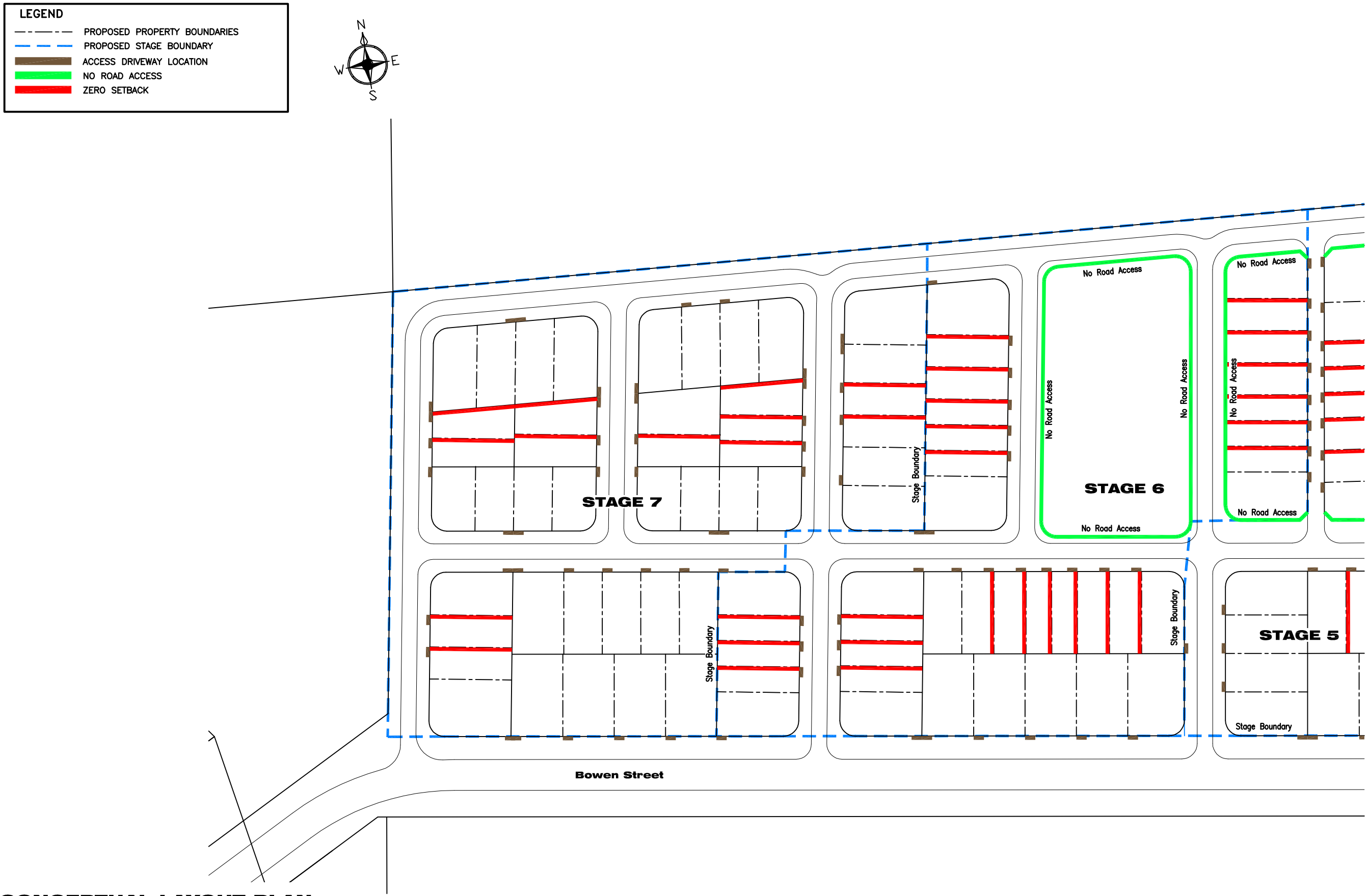
JOB No. 105547

No. of plans
Plan No. P6
A B

Appendix D
(Deleted)

Appendix E
Proposed Lot Access Point Location Plan



CONCEPTUAL LAYOUT PLAN
LOT ACCESS LOCATIONS

	Revisions	Date
B	Stages 4 & 8 DA	Oct 11
A	Original issue	

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QUEENSLAND GOVERNMENT

client **URBAN LAND DEVELOPMENT AUTHORITY**

project **PROPOSED URBAN RESIDENTIAL DEVELOPMENT BOWEN STREET, ROMA**

title **CONCEPTUAL LAYOUT PLAN LOT ACCESS LOCATIONS (SHEET 1 OF 3)**

Survey	Drawn	Design	J/M	Examined	Certified
–	BDR	EGA	EGA	/ /	FOR BAKER ROSSOW CONSULTING ENGINEERS
–	NOV 10	NOV 10	NOV 10		

SCALE J (1: 750 AT A1)
– BAR SCALES –

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No. of plans
Plan No. P8
A B

CONCEPTUAL LAYOUT PLAN
LOT ACCESS LOCATIONS

	Revisions	Date
B	Stages 4 & 8 DA	Oct 11
A	Original issue	

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QUALITY ASSURED SUPPLIER
QUEENSLAND GOVERNMENT

client: **URBAN LAND DEVELOPMENT AUTHORITY**

project: **PROPOSED URBAN RESIDENTIAL DEVELOPMENT**
BOWEN STREET, ROMA

title: **CONCEPTUAL LAYOUT PLAN**
LOT ACCESS LOCATIONS (SHEET 2 OF 3)

Survey	Drawn	Design	J/M	Examined	Certified
–	BDR	EGA	EGA	/ /	FOR BAKER ROSSOW CONSULTING ENGINEERS
–	NOV 10	NOV 10	NOV 10		

0 10 20 30 40M
SCALE J (1: 750 AT A1)
– BAR SCALES –

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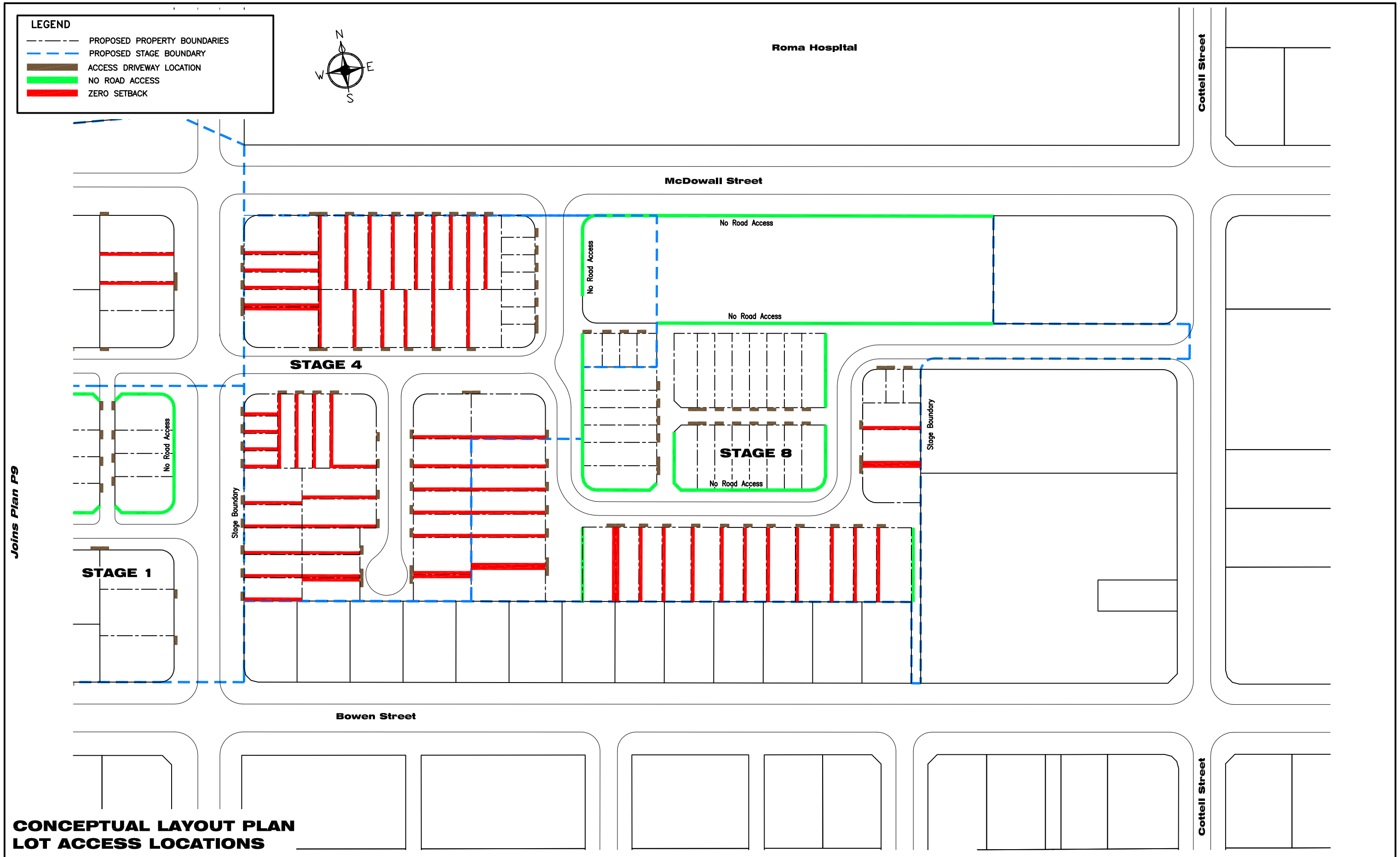
JOB No. 105547

No. of plans
Plan No. P9
A B



CONCEPTUAL LAYOUT PLAN
LOT ACCESS LOCATIONS

	Revisions	Date
B	Stages 4 & 8 DA	Oct 11
A	Original issue	

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QUEENSLAND GOVERNMENT

client **URBAN LAND DEVELOPMENT AUTHORITY**

project **PROPOSED URBAN RESIDENTIAL DEVELOPMENT BOWEN STREET, ROMA**

title **CONCEPTUAL LAYOUT PLAN LOT ACCESS LOCATIONS (SHEET 3 OF 3)**

Survey	Drawn	Design	J/M	Examined	Certified
–	BDR	EGA	EGA	/ /	FOR BAKER ROSSOW CONSULTING ENGINEERS
–	NOV 10	NOV 10	NOV 10		

SCALE J (1: 750 AT A1)
– BAR SCALES –
0 10 20 30 40M

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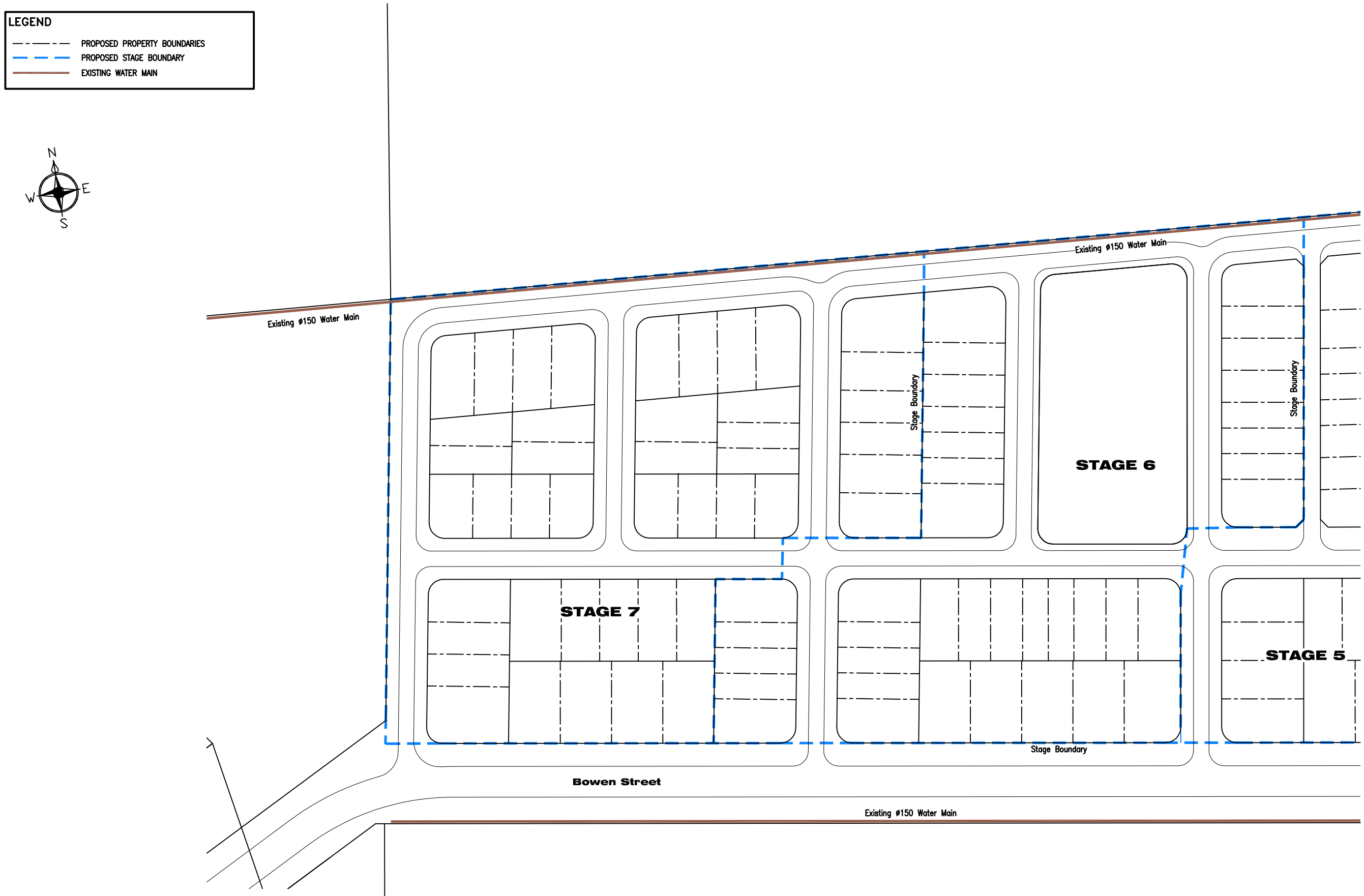
JOB No. 105547

No. of plans
Plan No. P10
A B

Appendix F
Existing Water Reticulation Layout Plan



CONCEPTUAL LAYOUT PLAN
EXISTING WATER RETICULATION

Revisions		Date
B	Stages 4 & 8 DA	Oct 11
A	Original issue	

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QUALITY ASSURED SUPPLIER
QUEENSLAND GOVERNMENT

client **URBAN LAND DEVELOPMENT AUTHORITY**

project **PROPOSED URBAN RESIDENTIAL DEVELOPMENT BOWEN STREET, ROMA**

title **CONCEPTUAL LAYOUT PLAN EXISTING WATER RETICULATION (SHEET 1 OF 3)**

Survey	Drawn	Design	J/M	Examined	Certified
–	BDR	EGA	EGA	/ /	FOR BAKER ROSSOW CONSULTING ENGINEERS
–	NOV 10	NOV 10	NOV 10		

SCALE J (1: 750 AT A1)
– BAR SCALES –

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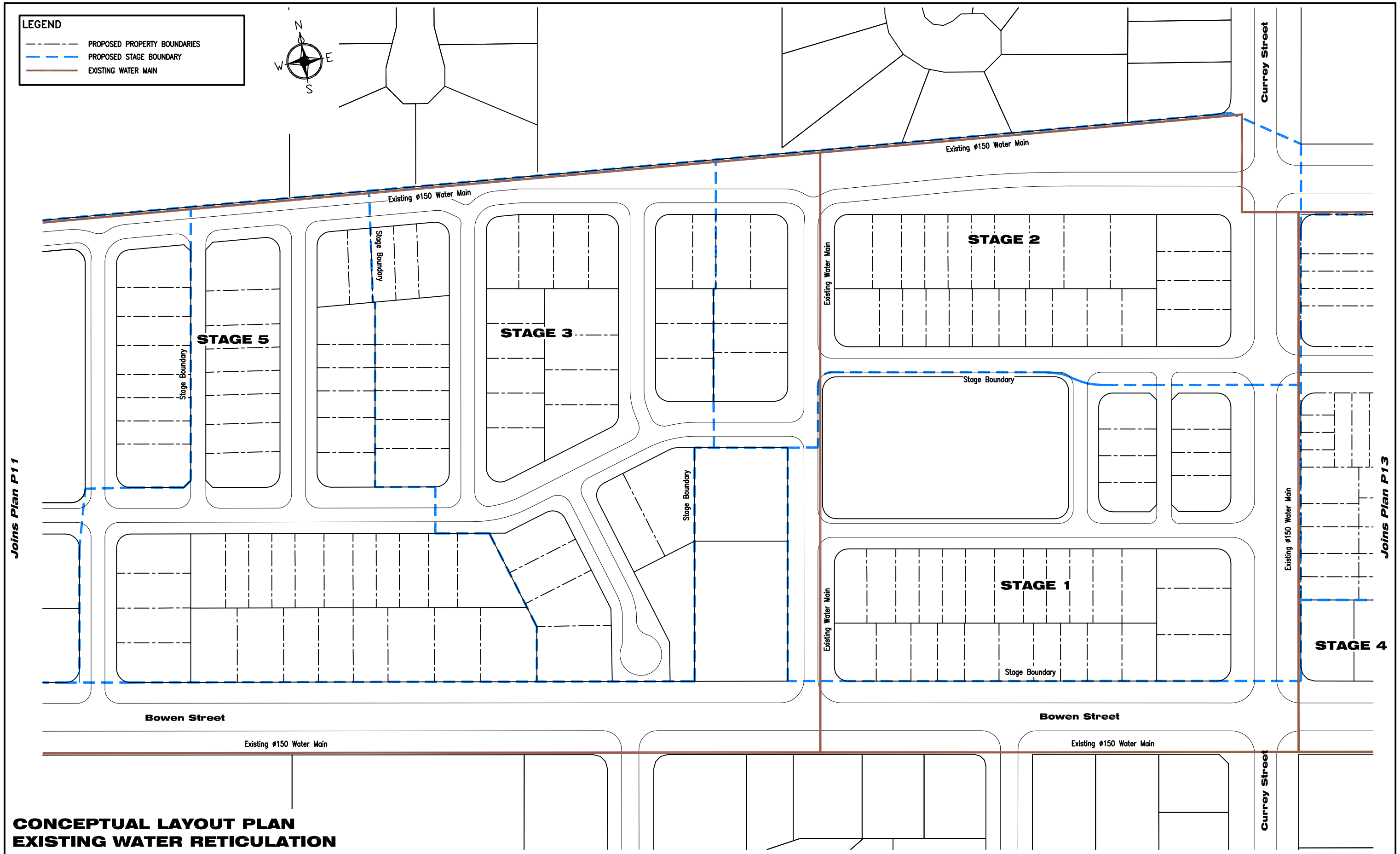
JOB No. 105547

No. of plans

Plan No. P11

A B



CONCEPTUAL LAYOUT PLAN
EXISTING WATER RETICULATION

Revisions	Date
B Stages 4 & 8 DA	Oct 11
A Original issue	

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QUALITY ASSURED SUPPLIER
QUEENSLAND GOVERNMENT

client **URBAN LAND DEVELOPMENT AUTHORITY**

project **PROPOSED URBAN RESIDENTIAL DEVELOPMENT BOWEN STREET, ROMA**

title **CONCEPTUAL LAYOUT PLAN EXISTING WATER RETICULATION (SHEET 2 OF 3)**

Survey	Drawn	Design	J/M	Examined	Certified
–	BDR	EGA	EGA	/ /	FOR BAKER ROSSOW CONSULTING ENGINEERS
–	NOV 10	NOV 10	NOV 10		

SCALE J (1: 750 AT A1)
– BAR SCALES –
0 10 20 30 40M

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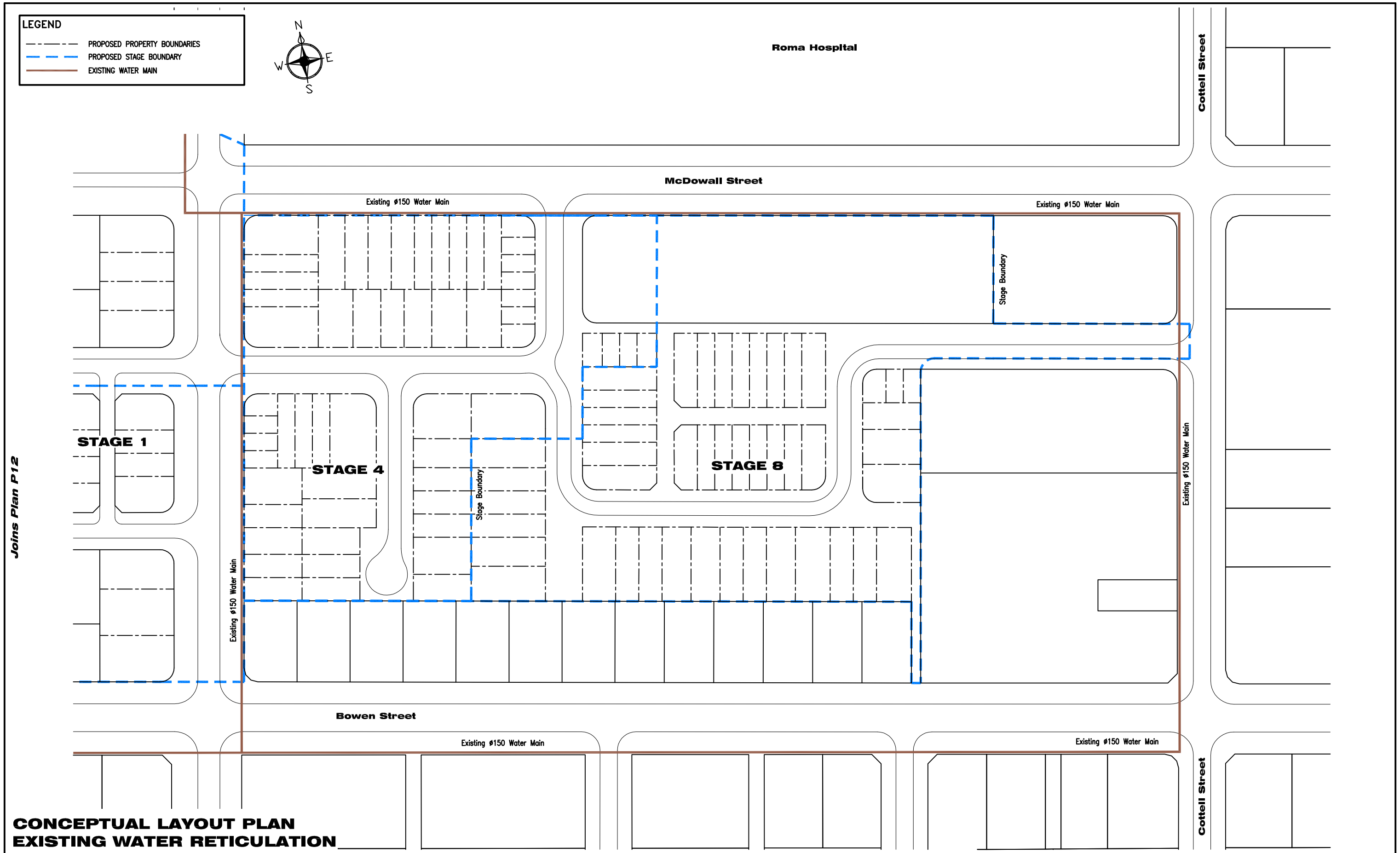
JOB No. 105547

No. of plans

Plan No. P12

A B



CONCEPTUAL LAYOUT PLAN
EXISTING WATER RETICULATION

Revisions		Date
B	Stages 4 & 8 DA	Oct 11
A	Original issue	

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BOWEN STREET, ROMA

title **CONCEPTUAL LAYOUT PLAN**
EXISTING WATER RETICULATION (SHEET 3 OF 3)

Survey	Drawn	Design	J/M	Examined	Certified
–	BDR	EGA	EGA	/ /	FOR BAKER ROSSOW CONSULTING ENGINEERS
–	NOV 10	NOV 10	NOV 10		

SCALE J (1: 750 AT A1)
0 10 20 30 40M
– BAR SCALES –

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JOB No. 105547

No. of plans
Plan No. P13
A B

Appendix G
Preliminary Water Reticulation Concept Plan