CITY OF ALBANY

MCKAIL NORTH
OUTLINE DEVELOPMENT PLAN

ENDORSEMENT OF OUTLINE DEVELOPMENT PLAN

The Western Australian Planning Commission resolved on 11.8.2015 to endorse the Outline Development Plan for Lots 1-10, 12, 13, 66, 300, 507 & 526 Lancaster Road dated April 2015, as a guide for subdivision within the locality.

Signed for and on behalf of the Western Australian Planning Commission

an officer of the Commission duly authorised by the Commission pursuant to section 24 of the *Planning and Development Act 2005* for that purpose in the presence of

M. Wieclaw — Witness

18 August 2015 — Date

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May 2015

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ATTACHMENTS

Attachment I: 360 Environmental – Urban Development / Land Capability Assessment
Attachment II: Wood & Grieve Engineers – Engineering Services Report
Attachment III: Herring Storer Acoustics – Acoustic Assessment & Guidelines – Lots 507, 526 & 300 Lancaster Road, McKail
Attachment IV: Wood & Grieve Engineers – Local Water Management Strategy
Attachment V: McKail North ODP – Road Upgrading Program
Attachment VI McKail North ODP - Quiet House Design Guidelines

1.0 INTRODUCTION

1.1 The Subject Land

The subject land comprises some 69.5736 ha and 16 lots to the northwest of the Albany Central Area on the urban development front.

Lot details are provided below:

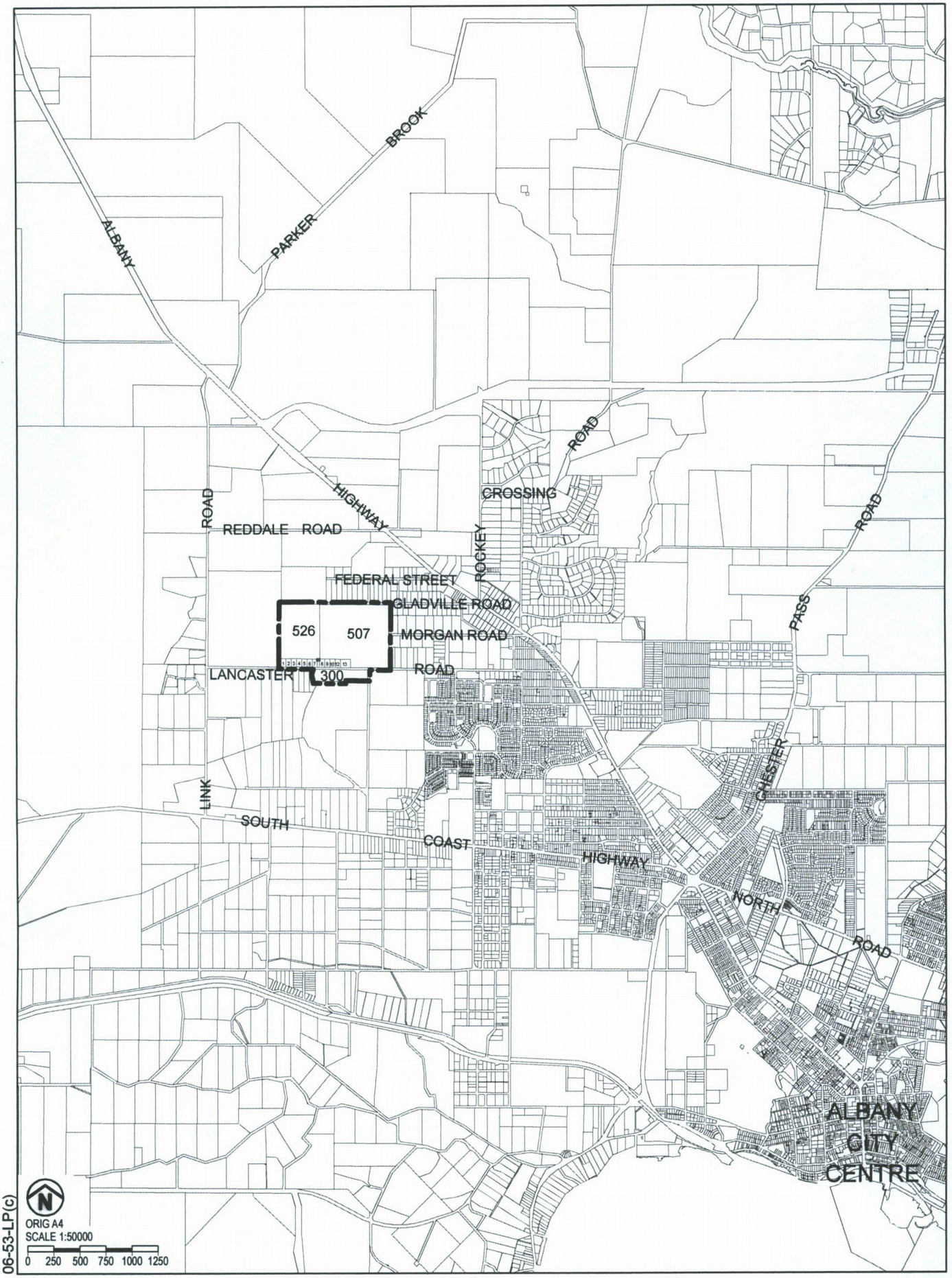
Lot No	Road	Area
1	Lancaster	4062m²
2	" "	4047m²
3	" "	4047m²
4	" "	4047m²
5	" "	4047m²
6	" "	4047m²
7	" "	4029m²
8	" "	4029m²
9	" "	4047m²
10	" "	4047m²
12	" "	4047m²
13	" "	8105m²
66	" "	1655m²
300	Lancaster	5.2416ha
507	" "	38.0473ha
526	" "	19.447ha
	Total 16 Lots	68.1609ha

1.2 Location & Current Use

The subject land is located within the developing McKail locality as shown on the following plan. As noted, the land comprises the next front/stage for development in the area, which itself comprises one of the main urban development areas in the greater Albany area.

Located on the urban fringe, the land is surrounded by a mix of uses and activities some of which create both short and longer term impacts on the land. These are analysed and responses proposed in subsequent sections of this report.

In terms of current landuse, Lots 1-10, 12 & 13 are larger 'Special Residential' sized lots (≈4000m² with Lot 13 ≈8000m²) and each accommodate a single dwelling and associated outbuildings.



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LOCATION PLAN

Lots 1 - 10, 12, 13, 66, 300,
507 & 526 Lancaster Road
McKail, City of Albany

Lot 66 is a vacant Public Right of Way and presents as a 20m wide unconstructed road reserve section giving access to Lot 526.

Lot 507 accommodates an older small dwelling and rural improvements in the south adjacent to Lancaster Road. Lot 526 is vacant while Lot 300 accommodates a small stable building and associated stalls.

Lots 300, 507 & 526 are cleared pasture and are used for livestock grazing purposes.

1.3 Objective

The purpose of the Outline Development Plan (ODP) is to depict the form and structure for the development of the land and to define the prerequisites of that development.

The subject land is situated on the leading edge of the residential development front north of the now complete McKail Local Structure Plan. It is identified for short term future Urban (Residential) Development to meet the needs of the growing community. The Outline Development Plan therefore focuses on residential subdivision and development issues, only considering commercial and other development/issues where they may support that urban/residential development.

The project objective is for the site to be made available for residential development in a form which is compatible with the existing and future development of the locality as well as with wider spatial planning for the Albany City and region.

1.4 Local Planning Scheme No. 1

The site is under the Future Urban Zone having been rezoned to the Residential Development Zone in 2009 under Town Planning Scheme No. 3.

The Future Urban zone allows for the ODP to guide staged development of the land over the multiple lots involved whilst accommodation identified site issues and ensuring development is adequately serviced and provisioned.

This ODP was commenced and substantially completed under the provisions of Town Planning Scheme No. 3 as a result, the controls of the Residential Development zone follow:

The ODP is to be prepared and approved having regard to:

a) *the major road systems under the Scheme;*
b) *topographic conditions;*
c) *land holdings adjacent to or in the vicinity of the subject land;*
d) *the necessity of providing civic and public facilities;*
e) *preservation of the environment.*

And shall show:

a) *the location and width of the distributor road system proposed;*
b) *the approximate location and quantity of shopping, civic and public facilities proposed together with an analysis of the factors used in determination of such facilities;*
c) *the distribution of the recreation and open space areas proposed;*
d) *the population and residential densities proposed;*
e) *the physical condition of the land having regard to the need for deep sewerage and/or main drainage.*

New Local Planning Scheme No. 1 includes provisions to grandfather ODPs completed and substantially completed under previously operational schemes. In addition the provisions for Structure Plans (and ODPs) within Scheme No. 1 are similar to that for Scheme No. 3 particularly that they should cover the following:

- *The area to which the Structure Plan applies;*
- *In relation to the Future Urban zone the proposed residential density code that will apply to the Structure Plan Area;*
- *Key opportunities and constraints of the area including landform, topography, hydrology, landscape, vegetation, soils, conservation and heritage values, ownership, land use, roads and public transport, and services;*
- *The planning context for the Structure Plan Area including the regional and neighbourhood structure, relevant strategies, Scheme provisions and policies and where appropriate, indicating how the Proposed Structure Plan is to be integrated into the surrounding area;*
- *Proposed major land uses, in particular, residential areas, public open space, school sites, civic and community uses, commercial uses (including the location and hierarchy of commercial centres), mixed use, industrial and mixed business uses;*

- *The proposed indicative lot pattern and general location of any major buildings;*
- *Estimates of future lots, dwellings, population, employment and retail floor space;*
- *Provision for major infrastructure, including main drainage, sewerage, water supply and other key infrastructure services;*
- *The proposed road network and hierarchy including connectivity between proposed/future and existing developments, public transport services and bicycle and pedestrian networks; and*
- *The timeframe and staging of subdivision and development, and the method of implementation, including any proposals for funding by development contributions.*

Details as appropriate relating to:

i) vehicular access and parking

ii) the location, orientation and design of buildings and the spaces between buildings

iii) conservation areas

iv) heritage places, and

v) Special development control areas.

1.5 Surrounding Landuse

Large rural grazing lots (27ha & 64ha) are located to the west. While currently zoned rural they are identified for compatible rural residential uses and development within the Albany Local Planning Strategy.

To the south west are existing rural small holdings with some potential for rural residential redevelopment. Such uses are compatible with future urban development.

South of the subject land is rural residential development. This then merges into the Water Corp Waste Water Treatment Plant Buffer. The southmost portion of Lot 300 is affected by the Waste Water Treatment buffer which spills out of Water Corp owned land in this area.

To the Southeast is the Albany Harness Racing Track/Paceway. As discussed in subsequent sections of this report, noise impacts from the harness racing activity is confined to within 75m from the boundary of the trotting track. Further southeast is the existing McKail Local Structure Plan area which the final stage is undergoing final planning for subdivision and development.

Residential densities established in the area are to the R20 coding with lots sizes predominantly in the 600m²-700m² size range. This area of the McKail locality is one of the major urban growth fronts in the region which, along with Oyster Harbour, is meeting the bulk of local demand for lot supply.

Further to the east and south east are the Lakeside North and Le Grande Residential areas.

To the east is the existing Special Residential zoned larger residential lots that run through to Albany Highway. Lots are generally sized between 2000m² and 4000m² and are identified for residential (infill) within future strategies. To the north is Lot 124 similarly zoned Future Urban.

Further north is a large (25 ha) recreation reserve accommodating the upper reaches of the southern branch of Parker Brook. The reserve is almost totally vegetated apart from the eastern most quarter which accommodates the Attwell Park Speedway.

The impact of the Speedway use is discussed in subsequent sections and necessary planning and management responses are included within the Outline Development Plan.

2.0 PLANNING POLICY CONTEXT

2.1 State and Regional Planning Strategies

Lower Great Southern Strategy

This strategy has been endorsed and sets out objectives and principles for regional planning issues. One objective pertinent to this application is to encourage development around existing nodal settlements and ensure policies provide a presumption in favour of consolidating settlement and supporting frontal growth. Another is to encourage the provision of adequate and appropriate infrastructure to support development. Urban consolidation of the Albany Urban Area is furthered by this Outline Development Plan.

State Planning Strategy (SPS)

The State Planning Strategy was adopted in June 2014 and provides the broad framework for planning at regional and local level as well as key policy statements on topics of state-wide significance.

The Annual Review (2005) of the Country Land Development Program was issued in January 2006 and featured The Sanctuary Residential estate adjacent to the subject land as development area ALB 40. Further west on Lancaster Road, major development sites are identified (ALB 24, 26, 49-52 and 68). It reports that the water distribution mains to McKail are planned for upgrading by 2007 (now complete). Clearly the development front is set to overtake the subject land unless land in the subject area is bought on-stream. As a key tenet of the State Planning Strategy is to encourage efficiency in infrastructure provision as a component of developing sustainable urban settlements across the state, is it important this land be bought on-stream so it is not leapfrogged by the development front.

2.2 Local Planning Strategies

The McKail Local Structure Plan was prepared in April 1999 by Ayton Taylor Burrell and has since that time facilitated development of approximately 226 hectares between Lancaster Road and South Coast Highway bringing the development front up to the subject land.

The McKail Local Structure Plan area is now almost totally developed/subdivided with only a single stage remaining (approx 30 lots) before residential development will be up to the subject land.

In the City of Albany Local Planning Strategy (Albany Local Planning Strategy) 2010 the site is designated as future urban with a short term development priority coding. A buffer around the Timewell Road Water Treatment Plant is indicated and affects only the southern most portion of the site south of Lancaster Road.

The site is also affected by requirements for a noise buffer around the speedway on the eastern most portion of The Recreation Reserve, and the need for noise attenuation measures for all habitable structures on the majority of the site.

Albany Local Planning Strategy calls for noise monitoring to be undertaken at the Speedway should urban development be considered around the activity. This has been completed and is used to identify suitable noise attenuation measures for all habitable buildings constructed on the majority of the site.

3.0 PLANNING

3.1 Planning Context

The planning and landuse context sets the suitability of the land for residential development. These issues include:

- The advance of the development front to immediately adjoin the site;
- The identification of the site as a short term development priority within Albany Local Planning Strategy;
- The availability of necessary infrastructure services;
- The completion of a study identifying areas compromised by existing and potential offsite impacts and the complementary nature of all other surrounding land uses.

3.2 Surrounding Landuse

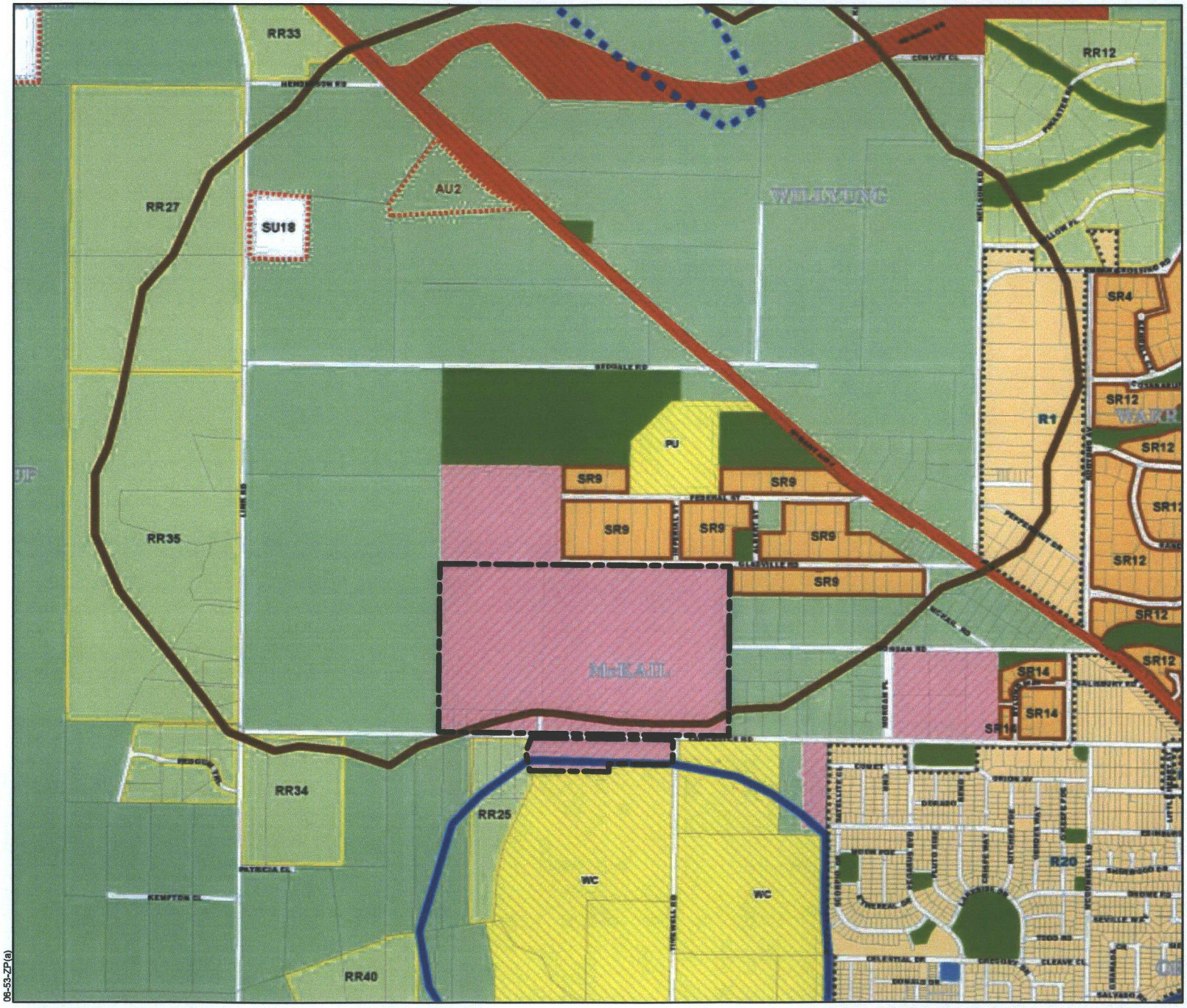
As outlined above, urban development of the land is complementary to existing grazing to the north and west, can be planned to be complementary to the existing residential development to the east (and make use of road connections provided) and has no impact on the continuation of rural retreat uses to the south.

There is potential impact from the adjacent Attwell Park Speedway and potential impact from the WWTP located on Timewell Road, over 500m to the south west.

Both of these potential impacts have been assessed and management measures adopted.

In the instance of the Speedway, subdivision design & construction, dwelling construction and buffers are provided. In the instance of the possible extension of the WWTP buffer, an area is depicted to the south of Lot 300 within which residential buildings and other sensitive uses will be precluded as is required by the existing memorial on the title of Lot 300.

The ODP will need to depict these areas and provide responses to accommodate associated limitations.



Local Planning Scheme No. 1
McKail, City of Albany

LEGEND

- Water Corporation Waste Water Treatment Plant Odour Buffer Special Control Area
- Albany Speedway Noise Special Control Area
- Albany Airport Special Control Area
- R Code Boundary

RESERVES

- Major Road
- Parks & Recreation
- Public Use

RESERVES

- Regional Centre
- Residential
- Special Residential
- Rural Residential
- Future Urban
- General Agriculture
- Special Use
- Additional Use
- WC — Water Corporation
- PU — Public Utility
- Subject Land

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3.3 Site Characteristics

As mentioned previously, the site is predominantly open pasture, historically used for grazing and rural residential purposes. Only isolated paddock trees remain. These uses can continue and be displaced as residential development proceeds. There are no issues concerning areas of remnant vegetation and development of the subject land.

The site has a central low ridge on a generally east west alignment. The land slopes down to north, north east and south from this central spine. Slopes are flat across the site with the only area of any note is a small section in the mid south where gentle slopes up to 8%-10% exist.

Although occupying a low ridge, the flat nature of the site ensures it is not of any noted landscape of visual impact concern.

3.4 Landform, Soils and Construction Issues - General

This site accommodates the locally common gravely yellow duplex soils with a small area of sandy duplexes in the south of Lots 507 & 526. Landform is described as broad crests and slopes. This landform and soil type is the same as that existing within elevated portions of The Sanctuary and Lakeside North development areas immediately east.

This soil type is generally noted as having the following features with the corresponding management factor/response noted when assessed against fully serviced residential development:

Land Quality	Broad Crests	Slopes	
Water Erosion Risk	V Low	Mod	Managed through conventional subdivision/development process
Wind Erosion Risk	Mod	Low	Managed through conventional subdivision/development process
Water Pollution Risk O.F	Mod	Mod	Managed through conventional subdivision/development process
Water Pollution Risk S.D	Low	High	Managed through conventional subdivision/development process; minimise unsewered Development.
Ease of Excavation	Low	Mod	Where possible, reduce cut/recontouring
Flood Risk	Nil	Low	Acceptable rating
Foundation Soundness	Fair	Good	Acceptable rating
Slope Instability	Nil	Nil	Acceptable rating
Soil Absorption Ability	V Low	High	May complicate infiltration based stormwater management. Addressed through detailed drainage design.
Soil workability	Poor	Fair	See ease of excavation
Nutrient Retention Ability	M High	Low	Acceptable rating; minimise unsewered lots.

SITE CHARACTERISTICS & SURROUNDING LANDUSE

Lots 1 - 10, 12, 13, 66, 300, 507 & 526 Lancaster Road McKail, City of Albany

RECREATION
SPEEDWAY
123 WESTERN POWER SUBSTATION
300 Reserve 23290 COUNTRY MUSIC CLUB
EXISTING RURAL / GRAZING
FEDERAL (SEALED) STREET
SPECIAL RESIDENTIAL
7452 Reserve 36571
(GRAVEL) GLADVILLE ROAD (SEALED)
526 19.447ha
507 38.095ha
EXISTING RURAL / GRAZING
SPECIAL RESIDENTIAL
4.8%
6.8%
2%
0.40ha
0.80ha
SPEEDWAY NOISE SCA
Noise Buffer
LANCASTER ROAD (SEALED)
CHURCH
SPEEDWAY NOISE SCA
300 6.606ha
7.4%
3.7%
75m Paceway
RURAL RESIDENTIAL
WWTP
TIMEWELL (SEALED) ROAD
1 TROTTING TRACK / PACEWAY
RESIDENTIAL

06-53-SC(c)
ORIG A3
SCALE 1:5000
0 25 50 75 100 125

LEGEND

- Subject Land
- Existing Vegetation
- Existing Buildings
- Existing Dams
- Drainage
- Low Ridge
- Slope
- Road Access
- Telstra
- Sewer (rising main
- Western Power
- WP Distribution / Transmission Line
- Proposed Grasmere UG Cable Route
- Water
- Easement
- Speedway Noise SCA
- 75m Paceway Boundary Setback
- Waste Water Treatment Plant Buffer

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These general characteristics and construction issues as well as the more detailed analysis below and in Attachment I will be reviewed by site specific assessment at the time of development to meet civil engineering and earthworks requirements to provide for site development.

Urban Development Land Capability Assessment – Detailed (360 Environmental)

360 Environmental was commissioned to undertake an Urban Development Land Capability Assessment (LCA) for a 150 hectare site located over Lots 300, 507, 526 and 1918 Lancaster Road. Lot 124 Gladville Road and 123 Link Road, McKail in the City of Albany.

This assessment is included as Attachment I to the ODP. The Executive Summary is reproduced below;

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360 ENVIRONMENTAL URBAN DEVELOPMENT LAND CAPABILITY ASSESSMENT.

Executive Summary

The 150 hectare site is proposed for an urban residential development with lot sizes ranging from 400 to 600square metres. The development will be serviced by reticulated water and sewer by the Water Corporation.

This LCA has been prepared to assess the current capability of the site and the suitability of the proposed development. The site is currently used for the purposes of grazing.

The LCA involved a thorough desktop assessment of available information regarding geology, surface hydrology, groundwater, soils, vegetation, flood risk, climate and surrounding land-uses. Field reconnaissance, including soil logging, was undertaken to confirm soil types, land units and information on groundwater levels.

From field and desktop investigations, the site is generally suitable for urban development. The site can be divided into two main areas – the higher slopes and the lower-lying depressions. In summary:

- *The high slopes are best suited for the residential component of the development. However management will be required during construction to prevent topsoil erosion and engineering solutions should be sought to ensure drainage of excess stormwater.*
- *The lower-lying areas are best suited for public open space as these areas are more environmentally sensitive and have slightly elevated risks of waterlogging, flooding and acid sulphate soils.*

Consultation with the City of Albany, Water Corporation and Main Roads WA will be required to develop an agreement on land uses in the defined buffers of the speedway, the Albany Wastewater Treatment Plant and the proposed Ring Road (Link Road).

3.5 Access & Infrastructure

Wood & Grieve Engineers have undertaken a review of existing servicing available to the land as follows. A full copy of the servicing report is appended as Attachment II.

WOOD & GRIEVE ENGINEERS ENGINEERING SERVICES REPORT

Summary of Existing Services

Sewer Reticulation

No gravity sewer reticulation exists within the development area, however the Timewell Road pressure main runs along the development area's eastern boundary between Lancaster Road and Gladville Road.

The Timewell Road pressure main will need to be catered for within the proposed development layout.

Water Reticulation

No water reticulation exists within the development area. The following Water Reticulation exists in adjacent road reserves:

- *100 AC within Federal Street;*
- *100 P within Gladville Road;*
- *100 P within ? Road;*
- *58 AC within Morgan Road;*
- *200 CI within Lancaster Road between the development's eastern boundary and approximately Lot 300 / Lot 254 adjoining boundary;*
- *100 AC within Lancaster Road between approximately Lot 300 / Lot 254 adjoining boundary and approximately Lot 14 / Lot 15 adjoining boundary;*
- *100 P within Lancaster Road between approximately Lot 14 / Lot 15 adjoining boundary and Link Road;*
- *100P within Link Road between Lancaster Road and Lot 201 / 59 adjoining boundary.*

It is expected that none of the above existing Water Reticulation will negatively impact upon the proposed development layout.

Western Power

Significant Western Power assets exist within the development area. They are broken down into two categories, as follows:

- *Transmission Line: the Mt Barker to Albany 132kV Transmission Line runs parallel along Reddale Road's southern road reserve boundary. Preliminary Western Power advice suggests that the overhead transmission line is required to remain in its current state and a 15 metre wide development buffer / easement, either side of its centreline, be incorporated into the development layout. No services, traffic or pedestrian traffic will be allowed within the 30m buffer zone.*

- *Please note however, that this transmission line is outside of the immediate development area and should not impact negatively upon the development of the lots within this servicing report.*
- *Distribution Lines: various overhead distribution lines run within the development area. Preliminary Western Power advice suggests that these existing lines will require to be undergrounded as part of development. It is our understanding that these lines can be subject to re-alignment to suit proposed road reserves, within reason, however this will require to be confirmed at time of subdivision.*

Telstra

No Telstra reticulation exists within the development area, however is located within the adjacent road reserves servicing existing landholdings in the area. Refer dial before you dig information within Appendix B, for location of the above.

Roads & Drainage Infrastructure

No roads & drainage infrastructure exists within the development area. The following exists in adjacent road reserves:

- *Lancaster Road fronting the development area contains two coat seal road in good condition with associated open drains.*
- *Gladville Road fronting the development area contains two coat seal road in good condition with associated open drains to approximately Lot 507's driveway, with the remaining portion being unsealed laterite gravel pavement in good condition with associated open drains.*
- *Federal Street to Lot 124 contains two coat seal road in good condition with associated open drains.*

Albany Highway is the Major Arterial Road which currently provides the main access from the study area to the Albany town centre.

Link Road, the future MRWA Ring Road, is to the west of the development area.

3.6 Social & Community Services

The main social and community services that are considered within larger scale urban expansion projects are:

- Child care
- Infant health
- Medical services
- Primary Schools
- High Schools
- Parkland
- Public Transport
- Convenience retailing

Putting the subject land into context:

- With the gross area represented it is possible that around 650 - 700 residential lots could be achieved.
- This area will form one of the four main development fronts in the City.
- With established lot take-up rates, full development is not likely to be realised until the extreme long term.

With the longer term potential lot yield and associated longer term potential population base, the following thresholds are realised:

USE/ACTIVITY	THRESHOLD	NOTES
Primary School	Approx 30% - 50%	Subject land is on what will be the outer fringe of the urban area for the long term. Residential development is not planned to significantly extend from this development cell. As a result, thresholds here are unlikely to be supported by significant additional populations from surrounding land. A primary school site has been included.
Secondary School	Less than 10%	Added threshold for existing service.
Tafe/RIT	Approx 1%	Added threshold for existing service.
Local shopping	Approx 1000m² NLA (say 5000m² land area required)	Sufficient NLA generated for a local shopping node.
Neighbourhood Shopping Centre	Approx 10%	Added threshold existing service at the Future Orana Neighbourhood Centre.
District Shopping Centre	Less than 5%	Added threshold for existing and planned services.
Neighbourhood Community Centre	Less than 30%	Added threshold for existing service at the Future Orana Neighbourhood Centre. Within the Local Shopping/Activity Node, sites suitable for longer term conversion for local community use (child care, local medical etc.).

Department of Education, Asset Services identify that a Primary School Site is required to service the wider McKail North and surrounding areas (generally west of Albany Highway). Preliminary Planning identified the site noted within Councils Conceptual District Structure Plan as being suitable however, the current structure planning process provides for the identification of a location within the subject land better related to the ODP road and neighbourhood structure.

A 3.5ha future primary school site is identified and has been approved by the Department of Education (DOE). The site is co-located with the consolidated and largest active Public Open Space area of 3ha which can accommodate the playing field.

In accord with DOE policy, following the determination of need, at the time of subdivision, development within the study area and the wider catchment area will be required to contribute to the acquisition of the identified site.

4.0 OUTLINE DEVELOPMENT PLAN

The Outline Development Plan is confined to Lots 1-10, 12, 13, 66, 300, 507 & 526 as per Future Urban Zoning, agreed northern boundaries and the extent of the urban development area adopted by the Albany Local Planning Strategy.

While a separate ODP will be submitted for Lot 124 Federal Street to the north, this plan provides for and integrates with the plans for the subject land in terms of design philosophy, access and servicing, public open space and lot layout.

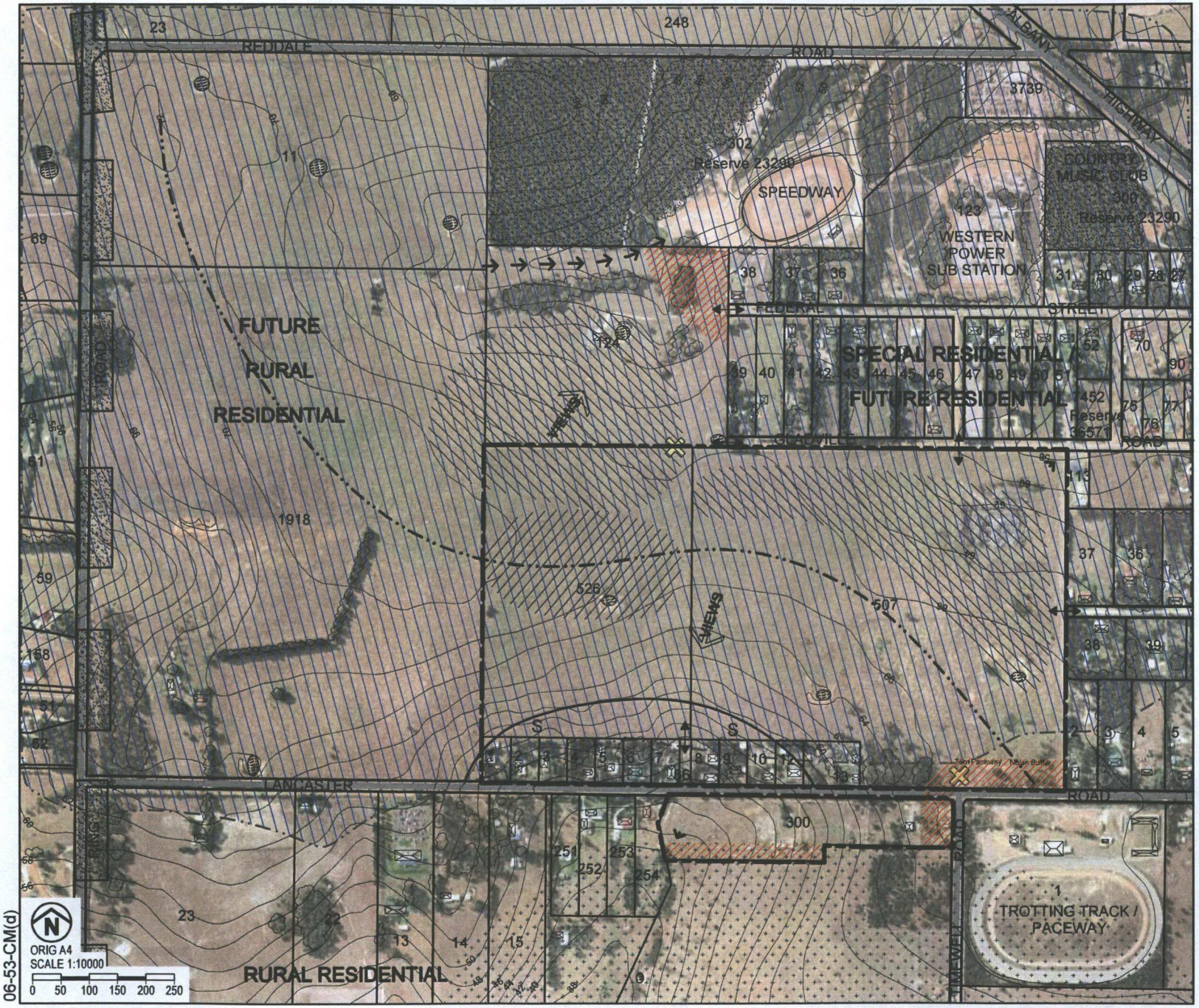
A draft ODP layout was prepared for the rezoning of the subject land and this is used as the basis for the current plan subject to the additional issues included in the discussion below.

4.1 Opportunities & Constraints

The following figure depicts the primary opportunities and constraints to residential development.

Opportunities:

- Adjacent to; and forms a rounding out of residential development front in the area.
- Earmarked as suitable for short term development in existing and proposed strategies.
- Adopted Local Structure Plans exist for land in the south east.
- Can be generally serviced by extension. No leapfrogging required.
- Can interface with existing adjoining residential development.
- Neighbourhood shopping and services existing or planned within the wider area.
- Adjacent to local connector roads which may provide future public transport alignments.
- Generally flat or gently sloping site requiring minimum earthworks.
- Northern drainage line presents opportunity for linear open space linking to recreation reserve in the north.
- Flat, cleared central ridge provides opportunity for centrally located open space for informal active uses.
- Frontage and access to local roads provides for a modified grid layout in accord with liveable neighbourhoods objectives.
- Site qualities are well known by local construction and building enterprises. The site does not present any unusual or unique construction issues.



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OPPORTUNITIES AND CONSTRAINTS

Lots 1 - 10, 12, 13, 66, 300, 507 & 526 Lancaster Road McKail, City of Albany

LEGEND

- Subject Land
- Existing Building
- Dam/Soak
- Existing Vegetation
- Significant Vegetation / Reserve
- Ridge Line
- Views
- Drainage Opportunities
- Speedway Buffer / SCA
- Waste Water Treatment Plant Buffer
- Existing Major Roads / Access Opportunity
- Proposed Ring Road
- Flat Accessible Centrally Located Land
- Northern Flank (solar design)
- Sensitive Uses Restricted (noise / odour)
- Development Conditional (noise)
- Potential Local Nodes (major road junctions)
- Other Available Road Connections
- S — Landform Unit: Broad Crests - Gravelly Soils; Slopes - Sands

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Constraints:

- Need to manage/protect identified buffer to the trotting track/paceway while this use continues to create the need for the buffer.
- Need to continue residential lot frontage to Lancaster Road.
- Need to extend/connect in to existing services.
- Need to provide acceptable landuse option, planning and construction responses to accommodate impacts of adjoining speedway activity.

4.2 Planning Context/Neighbourhood Context

Neighbourhood context is depicted on the following figure. The subject land forms the outer edge of the developing McKail neighbourhood which includes McKail Lake, the nearby Local Centre and proposed Primary School.

This context shows there is clearly the scale for a possible local activity centre on the subject land. In contrast, the extent of urban and future urban land does not appear to provide the threshold or continued growth to support a further Neighbourhood Centre.

The land represents the extent of this northern urban neighbourhood as any development further west of the subject land is designated for rural residential development due to the constraints of the Link Road alignment of the Albany Ring Road and any associated buffer, the existing Timewell Road WWTP and buffer along with any extensions to the plant and possible buffer expansions; the existing and future of the trotting track/paceway and the Speedway and its buffer.

As a result, the ODP area will form an outlying local neighbourhood supporting the future Orana Neighbourhood Centre located to the south east.

4.3 Urban Structure

The structure includes the following characteristics:

- One possible local activity centre maximising the 400m walkability within the subject land as well as the existing otherwise unserviced, adjoining residential development.

LOCAL AND NEIGHBOURHOOD CONTEXT

REDDALE ROAD
FUTURE RURAL RESIDENTIAL
SPEEDWAY
WESTERN POWER SUB STATION
ALBANY COUNTRY MUSIC CLUB
EXISTING SPECIAL RESIDENTIAL
EXISTING SPECIAL RESIDENTIAL
FUTURE URBAN
ROAD
FUTURE RURAL RESIDENTIAL
EXISTING SPECIAL RESIDENTIAL
Possible Future Primary School
FUTURE URBAN
POTENTIAL LOCAL CENTRE
FUTURE URBAN
LANCASTER ROAD
FUTURE URBAN
LOCAL CENTRE
EXISTING RURAL RESIDENTIAL
LINK ROAD
TROTTING TRACK / PACEWAY
EXISTING RESIDENTIAL
EXISTING RESIDENTIAL
HIGHWAY
DROME ROAD
EXISTING RESIDENTIAL
North Albany Senior High School
WATER CORPORATION
WASTE WATER TREATMENT PLANT
TIMEWELL ROAD
EXISTING RESIDENTIAL
LOCAL CENTRE
FUTURE NEIGHBOURHOOD CENTRE
Great Southern Institute of Technology
FUTURE URBAN
Government Offices
EXISTING RURAL RESIDENTIAL
Future Primary School
RESIDENTIAL DEVELOPMENT
MIXED BUSINESS
EXISTING SPECIAL RESIDENTIAL
EXISTING RESIDENTIAL
SOUTH COAST HIGHWAY
LOCAL CENTRE
FUTURE URBAN
Lockyer Primary School
EXISTING RESIDENTIAL
EXISTING RESIDENTIAL
FUTURE URBAN

06-53-LNC(f)

LEGEND

- Subject Land
- Major Road
- Local Distributors
- Existing / Potential POS
- Existing & Proposed Educational Institutions
- WWTP Special Control Area & Buffer
- City of Albany Speedway Noise Special Control Area & Buffer
- Indicative Local Centre Catchments
- Indicative Neighborhood Centre Catchments
- Indicative Local Access Roads
- Trotting Track Buffer

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- The possible local activity centre is provided with adjacent supporting density development (R30) to act as a community focus and includes incidental urban open space suitable as a small square.
- The positioning of the local activity centre assists retail function and viability by locating for exposure and accessibility, on relatively busy local streets likely to be served by public transport.
- An interconnected street network focussed on the possible local activity centre with strong links in between and then on to the existing local centre to the east (Touristville).
- Connection to and providing for integration with neighbouring future special residential and rural residential development while the speedway and its buffer and the WWTP buffer provide hard edges to development in the north and south.
- Layout enhances local identity by providing a possible local activity centre as well as incidental amenity parkland with density development.
- Layout has a high level of internal connectivity and excellent internal linkages. Excluding roads identified by the Albany Traffic Model, the layout mitigates the detrimental effects of through traffic.
- The structure maximises perimeter block development to create uniform street frontage. Parkland is fronted and lanes are laid out such that passive surveillance will be readily achieved.
- Block layout maximises north-south and east-west lot orientations to maximise the potential for solar design. Where Local Development Plans (LDPs) are required for the smaller lots, they can ensure opportunities for solar design on smaller lots is taken further. For instance, LDPs may require driveways on northern boundaries of east-west lots, that any zero lot lines are kept to southern boundaries and that private open space/outdoor entertainment areas are positioned toward the north.
- Council's district structure plan does not identify employment centres in the area or propose a job target. In addition, the general zoning precludes all but residential base uses. As a result landuse mix and employment opportunities are restricted to the identified non residential land located at the possible future local activity centre. Larger scale activity and employment centres are conveniently located off site, and will be readily accessed by future resident populations.

- The urban structure provides for density targets and a mix of housing. Density development is placed around amenity and activity nodes; areas that also have higher levels of accessibility. Single residential development is provided for in other areas with a view to providing effective residential sites that maximise the effective use of the valuable land resource.
- The layout maximises an open urban structure which enhances community safety and will facilitate a sense of local ownership.
- The layout provides well distributed parkland that contributes to legibility and a character for the area. As recommended, the larger open space areas are located at the periphery of the neighbourhood to not compromise the viability of the urban areas and so that drainage can be integrated and made a feature.
- The urban structure allows for the consolidation of a large Public Open Space area suitable for active/formal use within the north east quadrant of the site. This area, at 3.0ha, comprises 2.79ha from the Unrestricted POS allocation in the form of a District Public Open Space allocation along with 0.21ha of contiguous Restricted POS which will accommodate a landscaped compensating basin integrated within and complementary to the larger area.
- In accord with Liveable Neighbourhoods' objectives, the future Primary School Site of 3.5ha is co-located adjacent to the public open space of 3ha to permit the sharing of facilities over a combined area.
- The structure plan avoids flood prone and otherwise constrained land, provides for floodways and provides the use of artificial water bodies as features within the two large peripheral open space areas.
- Street and lot layout provides for efficient provision of services. The main utility corridor along the eastern boundary of the site is protected within an over width road reserve.

4.4 Landuse & Layout

Whilst it is recognised there is limited scope for non- residential activities to be accommodated within the Future Urban zone, Liveable Neighbourhoods demonstrates that demand should be generated for a possible local activity centre.

A location for this possible future local activity centre is identified in what will be an early stage of development. Development of the centre is likely to be staged until development brings the population thresholds necessary to make it viable, and development of the centre is provided for via a review of the Albany Activity Centres Strategy. In the mean time those areas outside the 75m trotting track buffer may be utilised for low and medium density residential within specifically designed buildings suitable for future adaption to a medium term retail/commercial use.

As has occurred with other examples of staged development, the residential units mentioned above may take the form of two storey development designed such that the ground floor converts to a retail/commercial tenancy and the upper level either a separate self contained 2+ bedroom apartment, office space or store supporting the downstairs use. Local Development Plans are required and will address this adaptive use. Additional discussion is provided in Section 4.7.

In accord with the key location and design parameters identified in Liveable Neighbourhoods:

- The possible local activity centre is strategically positioned so that the larger part of the catchment is "behind" the centre, ie the centre is located such that vehicular and non vehicular traffic will pass it when moving to major local destinations (Lancaster Road, Albany Hwy, City Centre and other employment areas).
- The possible local activity centre location can include a number of activities to provide a regular destination. Activities/sites include POS (small urban park), local scale retail and commercial sites, medium density sites and single residential sites outside the 75m trotting track buffer suitable for home based businesses.
- The location is at an intersection with good future through traffic levels.
- The location provides for buildings to abut and address fronted streets. The main building should be at least a two level landmark building to assist in providing a sense of place and a location statement for the neighbourhood.
- The location provides for up to 1000m^2 NLA retail floor space within the two adjacent lots of approx 4000m^2 each, with provision for on street and near street parking.

The future primary school site is well located being on the main north south connector which also supports the possible local activity centre approx 180m to the south.

OUTLINE DEVELOPMENT PLAN

Lots 1 - 10, 12, 13, 66, 300, 507 & 526 Lancaster Road McKail, City of Albany

PLAN DETAILS

06-53-ODP(t)Photo

ALL AREAS AND DIMENSIONS ARE SUBJECT TO SURVEY

SPEEDWAY AREA

FEDERAL STREET

GLADVILLE ROAD

LANCASTER ROAD

TIMEWELL ROAD

124 15.588ha

526 19.447ha

507 38.095ha

300 Reserve 23290

7452 Reserve 36571

3.50ha FUTURE PRIMARY SCHOOL SITE

1:1602ha

300 5.241ha

POSSIBLE FUTURE ROAD WIDENING

SPEEDWAY NOISE SCA

75m Paceway Noise Buffer

Possible Local Centre 1 5238m²

Possible Local Centre 2 2753m²

WWTP

LEGEND

- Subject Land
- 3477m² — Public Open Space & I.D. No.
- Residential Cell (R20)
- Residential Cell (R30)
- Possible Local Activities Centre Site
- Landscaped Basin in POS
- D — Local Development Plan Required For Cell
- 390m² / 5 — Approximate Lot Area and Lot Yeild For Cell
- WWTP Special Control Area & Buffer
- Albany Speedway Noise Special Control Area (Refer LPS No. 1 cl 6.5)
- 75m Paceway Boundary Setback
- Building Envelope Pending Future Assessment

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ENDORSEMENT OF OUTLINE DEVELOPMENT PLAN

Signed for and on behalf of the City of Albany

Signature — CHIEF EXECUTIVE OFFICER — Position — 3.9.15 — Date

Signed for and on behalf of the Western Australian Planning Commission

Signature — Planning Manager — Position — 24.8.15 — Date

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This separation permits density development between these two significant landuses and maximises resident populations within the local centre walkability catchment whist at the same time ensuring that the future Primary School site is not that distant as to be divorced from this local centre.

Strong east west links are provided by the main east west road in the centre of the ODP as well as existing Gladville Road (and its future extension) north of the study area.

The identified location will provide accessibility and convenience for a future school catchment in the long term. Notionally, that catchment would extend from north of Reddale Road south to existing and future residential areas south of Lancaster Road, from the Ring Road Buffer and its associated rural residential development in the west, east across to Albany Highway and residential and special residential areas further east.

Existing Lots 1 –10, 12 and 13 Lancaster Road

Lots 1 to 10, 12 & 13 Lancaster Road are a limited number of historically created lots of approx 4000m^2 each. They accommodate single dwellings and associated residential improvements and front Lancaster Road.

The Plan provides for the future landowner development of these lots by maintaining direct access to Lancaster Road and by providing alternate access with the future road to the northern boundaries of these lots.

Subdivision of these lots will only be considered where lots can be connected to full urban residential services such as reticulated water and deep sewer. Once connected to these services, these lots can then be developed to the Residential R20 density.

4.5 Constraints Management

Waste Water Treatment Plant Buffer

Local Planning Scheme No. 1 (LPS 1) includes a revised buffer as a Special Control Area. This revised buffer has been prepared by the Water Corporation to provide for the upgrade of the existing facilities including additional treatment ponds north of the existing ponds.

The revised buffer impacts on the southern most portion of Lot 300 in a band some 45m wide. This area is the subject of an existing Section 70a Notification advising that the identified area may be the subject of odours from time to time and that dwellings are not permitted within this area.

As a result and in accord with the proposed Special Control Area conditions, the Outline Development Plan restricts sensitive residential uses in this area by providing for lots with space for dwellings and other habitable buildings outside of this area. Lots in this area are therefore large which allows the 'Buffer Area" to form extended undeveloped yardspace retained as a building exclusion area. Local Development Plans are also required for this area and these will also act as an additional protection against development in the identified exclusion area.

Attwell Park Speedway

Council has an existing policy, and Special Control Area in LPS 1, dealing with Speedway Noise & Buffer issues. This policy includes the subject land and is advisory in nature. The extent of the SCA is shown on the ODP map. The policy measures :

- Advise that noise levels in excess of the provisions contained in the Environmental Protection (Noise) Regulations 1997 may be experienced.
- Encourage residents to consider quiet house design measures and refers them to the relevant Australian standard.
- Advise that zoning certificates provided on land transfer will identify the relationship between the subject land and the speedway.
- Indicate the noise levels to be achieved as per the relevant Australian Standard.

In the rezoning of the land from the Rural zone to the Future Urban zone, detailed acoustic assessments and management guidelines were prepared for Lot 124 (to the north) and also for Lot 526, 507 & 300. The assessments for the subject land are included as Attachment III.

From this assessment and following the management guidelines, it has been determined that all new habitable dwellings constructed within the Special Control Area as identified on the ODP map will be required to incorporate additional special design and construction measures to meet accepted noise standards, including those within Council's Speedway Buffer Policy.

Should the first stage of development of the site be the construction and completion of all habitable dwellings within the three separate areas identified as Q1, Q2 & Q3 adjacent to the northern boundary of the site, then the balance of the site outside the Q areas may be constructed without additional noise specific construction standards. In the Q1, Q2 and Q3 areas, Quiet Housing Design Guidelines, have been prepared. These also include the requirement for title level notification on lots created. The Quiet Housing Design Guidelines and performance standards are included in Attachment VI. However should the land be developed from Lancaster Road either in a northerly or southerly direction as proposed in Section 5.1 Staging , all new dwellings and other habitable buildings within the Special Control Area will be required to be constructed to the additional noise attenuation standards as stated in the previous paragraph.

Harness Racing Trotting Track/Paceway

An acoustic assessment undertaken subsequent to those in Attachment III (for adjoining Lot 55) shows that acceptable noise levels are met outside a 75m setback from the boundary of the trotting track. Development of sensitive residential uses can only occur outside this 75m setback as shown on the ODP map.

Other Noted Issues (Section 4.1)

Infrastructure extensions to service the subject land can be efficiently achieved and will generally direct staging in a uniform manner from the south east and east.

With regards provision of deep sewerage connections, the site is broken into discrete catchments for which Water Corp advise there are numerous effective options for management.

To allow a streetscape to develop on Lancaster Road, direct frontage is provided. This will compliment the direct lot frontage already provided within the residential areas to the south and east. In addition the plan shows the likely requirement for a roundabout at the intersection of Lancaster and Timewell Roads.

Although not finalised, Council is considering the need for a road widening to Lancaster Road. At this time it appears unlikely to be necessitated by flow rates, especially considering the western connection to Link Road/Ring Road. Even so, the plan provides for either option by showing development setbacks that would provide for a widening if required in the longer term.

4.6 Public Open Space

Policy requires the provision of 10% gross subdividable area (GSA) as Public Open Space (in land or in monetary contribution) for land that may be subdivided into 3 or more lots. . The monetary contribution is used to balance overprovision by other land holdings within the ODP area or undertake improvements to open space areas.

Under Liveable Neighbourhoods, Public Open Space provided as public parkland should:

- provide a balance between conservation and active and passive recreational uses in, neighbourhood and local open space;
- support legibility of the urban environment and the establishment of neighbourhood identity by incorporation of natural and cultural features and landmarks;
- incorporate, where possible, land for connected or linear open space for walking and cycling;
- provide for neighbourhood parks for active (informal play areas) and passive use ;
- provide for local parks in safe walking distance from all dwellings ;
- provide for the basic development of parks by the subdivider to a minimum standard to enhance residential amenity;
- take into account shared use of open space;
- incorporate drainage wherever practicable using contemporary urban water management principles; and
- accommodate water-sensitive urban design in public parkland areas where usability for recreational purposes has not been compromised or where conservation values are enhanced.

In this instance the range of size and location of public parkland provided covers these issues by:

- Providing for informal active and passive needs in the provision of larger more open areas of parkland for active use and smaller, highly detailed areas suitable for more passive and incidental use.
- Providing for legibility and a sense of place by positioning small local parks/urban squares as a site feature and linear POS down the minor valley (Areas 1 & 7).

- Providing neighbourhood and local parks in safe walking distance of dwellings is furthered by co-locating local parks at the Local Activity Centres.
- Providing for a minimum standard of development generally. Some noted areas may be the subject of a higher level of development to support surrounding density development (further explained below).
- Incorporating drainage devices as features where possible and incorporating water sensitive design approaches where suitable.

On the basis the ODP area forms in the region of 30% - 40% of the demand for a consolidated area of District Public Open Space, an area of up to 3ha is set aside for more active functions.

This area is set aside in the north east corner of the site, co-located with the future primary school site. This POS area is flat, will contain a drainage basin, and is accessible and sufficient to accommodate a full size primary school sports oval of over 80m by 120m (as shown) along with an associated informal activity area/s.

Regional Open Space is not provided as it cannot be supported by even the long term full development of the subject land. In addition long term development of surrounding land for the strategy identified activities (Rural Residential/Special Residential) do not support Regional Open Space Provision. No regional planning scheme or acquisition mechanism exists were such Regional Open Space can be equitability provided.

Similarly, district park provision can not be sustained by the single neighbourhood the ODP covers and development of the surrounding land to rural residential (very low densities) will not provide the equivalent thresholds required (a further 3 neighbourhoods) to make district open space sustainable, even in the long term.

The plan provides for parkland frontage and surveillance, most often with medium density development or cottage lots. Local Development Plans will be required as shown for instances where direct frontage/interface is provided or where laneway frontage to POS is provided.

Local Parks are provided within preferred thresholds in the area to provide for incidental use and sense of place functions.

POS 7 is provided as an incidental pocket park to support the possible Local Activity Centre (LAC). It is provided for integration in future Local Development Plan processes and may be relocated to within the possible LAC if an additional connection to Lancaster Road is necessary.

Neighbourhood parks of over 5000m² are provided as required so that the majority of residential lots have one within the walkable catchment. Also as recommended, most larger park areas are located toward the edge of the neighbourhood and include fully integrated and designed drainage management devices/features.

McKail North Outline Development Plan - Public Open Space & Restricted/Unrestricted POS Areas

PUBLIC OPEN SPACE SCHEDULE	Area (ha)	Sub Total (ha)	Total (ha)
Gross Site Area			**68.0437**
Deductions			
Local Centre	0.7991		
Primary School Site	3.5	**4.2991**	
Net Subdivisional Area (NSA)			**63.7446**
POS Required			
POS (10%) NSA			
Total POS Required			**6.37446**
Allowable Restricted & Unrestricted Areas			
80% Unrestricted	80%	5.0995	
20% Restricted	20%	1.2749	**6.3744**
Unrestricted POS on Plan			
Portion POS 1 - Neighbourhood Park	0.71		
POS 2 - Local Park - Linear	1.00		
POS 3 – Neighbourhood Park	0.42		
POS 4 - Local Park	0.30		
POS 5 – Neighbourhood Park	0.42		
POS 6 – Neighbourhood Park - Active	2.79		
POS 7 - Incidental Park	0.06		
		5.7 (89%)	
Restricted POS on Plan			
Portion POS 1 – Integrated Drainage	0.45		
Portion POS 6 – Integrated Drainage	0.21	**0.66 (10%)**	
POS Provision Total		**99%**	**6.36ha (144m2 Short)**

POS Balance and Cash in Lieu

To allow for the urban structure and POS allocations, cash in lieu (CIL) arrangements will be required to balance POS provision in accord with the ODP as outlined in the following table.

McKail North Outline Development Plan - Detailed Public Open Space Calculations 06-53-ODP(s)

Lot/s	Lot Area	Deductions	Net Subd Area	POS Req'd	POS on ODP	Lot by Lot +Over/- Under Provision
1-10, 12 & 13	5.2601ha		5.2601ha	@10% = 0.526ha	0	**5260m^2 under**
507	38.0473ha	7991m^2 Local Centre 3.5ha School Site Contribution Total- 4.2991ha	33.7959ha	@ 10% = = 3.38ha	Pt Area 2 – 4898m^2 Pt Area 3 – 470m^2 Pt Area 4 – 788m^2 Area 5 – 4200m^2 Area 6 – 3.0ha Area 7 – 600m^2 **Total- 4.0956ha**	**7267 m^2 over**
526	19.447ha	0	19.447ha	@ 10% = 1.9447ha	Pt Area 2 – 4505m^2 Pt Area 3 – 3724m^2 Pt Area 4 – 2211m^2 **Total- 1.044ha**	**9007m^2 under**
300	5.2416ha	0	5.2416ha	@ 10% 0.5241ha	Area 1- 1.16ha **Total- 1.16ha**	**6359m^2 over**
TOTAL – ALL LOTS	**67.9960ha**	**4.2991ha**	**63.6969ha**	**6.3696ha**	**6.3ha**	
					Total Under/Over Provision	**696m^2 under** (under provided by monetary contribution)

As a result Cash in Lieu will be required from the following lots to balance their areas of under provision:

Lot 526	9007m^2	Cash In Lieu Equivalent required
Lots 1-10, 12 & 13	5260m^2	Cash In Lieu Equivalent required

A proportion of the cash amounts in lieu of the above land areas are to be returned to Lots 300 & 507 to cover their over provision for approximately 0.6ha and 0.7ha respectively. Cash in Lieu arrangements will be managed as per the mechanisms established in sl53 of the Planning and Development Act 2005.

POS Development & Staging

Public Open Space will be developed to a minimum standard which should include full earthworks, basic reticulation of any landscaping , grassing of key areas, pathways that form part of the overall pedestrian and/or cycle network, and maintenance for two summers.

Development and landscaping will be provided in all POS areas to integrate the drainage features.

Council may request the WAPC to require the 3ha POS area to be ceded and landscaped in the first, or subsequent stage of subdivision. Generally, however, other POS areas will be provided with their respective development stage. POS improvement will occur at that development stage in accord with a landscape/POS plan.

Unless other arrangements are established, cash in lieu to be paid out in full at the earliest opportunity with the same occurring with compensating the overprovision of POS areas.

A Public Open Space development theme and standard for street furniture will be prescribed and approved within the initial landscape/POS plan prepared. Thereafter, this theme should be carried through the other landscape plans for the individual neighbourhood areas.

4.7 Special Design Considerations

The R30 Cottage/Townhouse Lots will generally be subject to Local Development Plans prepared by proponents at the time of subdivision. Based on Liveable Neighbourhoods guidance, it is proposed that these lots incorporate design features such as:

- Zero side setbacks
- Minimum frontages of around 12m with a maximum of 50% being garage/carport/parking frontage.
- Single residential cottage or split/two level townhouse design.
- Built on minimum front setbacks to maximise private rear yard space and provide a high level of surveillance to the road, footpath and open space.

In accord with Liveable Neighbourhoods, Local Development Plans should cover:

- Building Envelope – ground floor and upper floor setbacks, building envelopes, north boundary setback for solar access, nil setbacks.
- Parking – location (mandatory or desired).
- Vehicle Access Point – location of vehicle access point, particularly where laneway access is available.
- Fencing – heights, detailing, retaining walls, developer-provided fencing.
- Services – easements.
- Private Open Space – location of strategically important outdoor living areas.
- Studio Apartments – designed for independent occupation, laneway surveillance, etc.
- Landscaping – location of trees to be provided in the street or in lots.
- Noise-buffering – location and type of noise-buffering and/or attenuation measures.
- Ancillary dwellings and/or studio dwellings, home business or home workspace – potential location and size, parking provision and location.
- Encroachments – reciprocal rights-of-way, party walls.
- Variations from the Residential Design Codes.
- Mechanisms for expiry of or variations to Local Development Plans.

Cottage Lot (50% max garage/Carport Frontage to protect streetscape).

It is proposed to provide a rear laneway as shown for vehicular access for most R30 lots fronting and overlooking the local POS. Landscaping, uniform visually permeable fencing and a high level of design is proposed for these precincts.

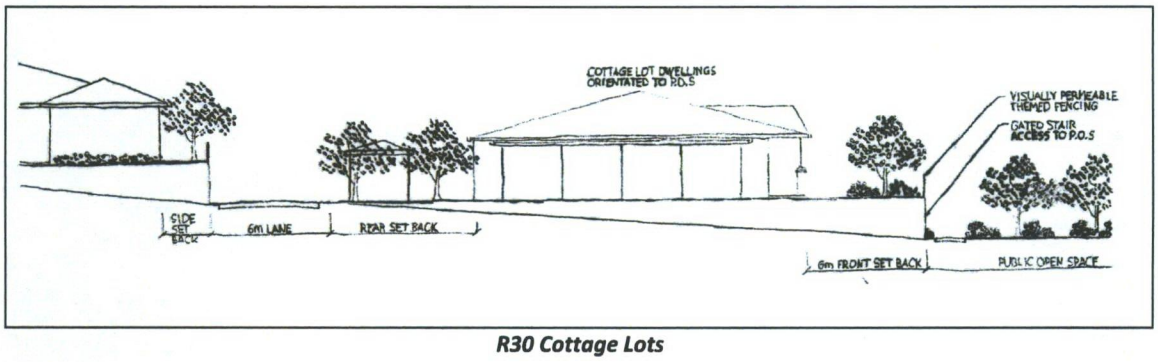
The following figure shows this notional layout incorporating:

- Retaining/build up over POS.
- Uniform permeable fencing and private access gates ensuring surveillance and direct lot connection.
- Footpaths within the open space at the front of lots to help define the public/private interface.

R30 Cottage Lot (surveillance to road & POS).

R30 Cottage Lot (fronting/Addressing POS)

- Local Development Plans to ensure orientations of living area windows/doors over the open space to also ensure passive surveillance, to ensure practical vehicular access from the laneway and cover its design and construction.
- Build-up and retaining where necessary of any R20 residential adjoining the laneway to overview the cottage lots immediately down slope.



R30 Cottage Lots

Adaptable Buildings

For the R30 lots which are located near the possible Local Activity Centre on Lancaster Road, consideration could be given to providing adaptable buildings that can be converted to a suitable mixed use after an initial period of Residential Use. This may take the form of buildings suitable for conversion in their entirety or buildings suitable for a ground floor conversion whilst retaining residential accommodation on a second level.

Laneways

Laneways are extensively provided to support access for the R30 cells. Laneways are also used as design features to provide individual lot access and road connections in areas without through traffic. From the Functional Road Hierarchy, these laneways will present as Access Places. Examples include linking lot access road culs de sac heads in the north west and in the east.

Laneways are to generally provide the primary vehicular access to lots by landowners to free the street frontage of private garaging and allowing it to be kept open for visitor parking and streetscape measures. Lanes are kept straight with open ends to maximise passive surveillance. There are a few instances where two lanes intersect and at that intersection the respective DAP will need to include at or around that intersection a studio over garage or other appropriate passive surveillance/activity generating measure.

Solar Orientation

Within the constraints of providing the local distributor road links to the north, the internal roads run on an east west alignment. This allows the long axis of most lots to be orientated within the preferred angles of north south and east west for solar design benefits. Further, the layout provides for detailed design to slightly increase depths of lots on the south side of the east west streets. The ODP meets solar access objectives given lot sizes are generally in excess of the minimums (~350m^2) when solar design and orientation can become a critical design consideration.

4.8 Servicing

Subsequent to their Engineering Services Report (Attachment II), Wood & Grieve Engineers have examined and assessed the ODP. They make the following recommendations for infrastructure servicing for the plan.

WOOD & GRIEVE ENGINEERS

McKail North ODP Engineering Services

Earthworks

The ODP will be subject to bulk earthworks (cut and fill) as required to ensure satisfactory flood routing via roadways and serviceability of lots for gravity sewers and stormwater drainage. Particular attention will be required in the south-western portion of the ODP, where steep natural grades of 6%+ occur, and along the central ridge, where the natural ground is generally flat for a significant area.

Roads

More detailed analysis will be required to inform detailed design and identify specific carriageway widths, locations of internal traffic calming devices, such as roundabouts, intersection treatments and the preparation of the Detailed Area Plans. However, it is anticipated that Lancaster Road will require upgrade to a similar standard to that fronting the Sanctuary Estate. Similarly, it is anticipated that Gladville Road fronting the development will require upgrade to an urban standard. The road layout will conform to the City of Albany Development Guidelines and should be in line with the City of Albany's road planning.

Pedestrian / Cycle

It is anticipated that Lancaster Road will require a 2m (minimum) dual use path, as per the Sanctuary Estate. The ODP will require an internal footpath network, conforming with City of Albany and Liveable Neighbourhoods requirements.

Stormwater Management Strategy *(From Attachment IV LWMS)*

Flood Protection

Appendix 5 of Attachment IV displays the expected pattern in a major storm event. The design criteria for flood routing are as follows:

* *In events greater than the 1 in 1 year event, the capacity of the lot drainage infrastructure is exceeded.*
* *In events greater than the 1 in 5 year event, the capacity of the City's piped drainage system is reached.*
* *In events greater than the 1 in 10 year event, the detention basins will fill to capacity.*
* *In major events greater than the 1 in 10 year event, overland flow will occur over most of the catchment and will be managed within the kerbed road network.*

The southern catchment flood path (outside the development) will sheet flow runoff along the existing drainage path along the low lying areas at the rear of rural properties. There are no known flooding issues in this area. It is likely that additional fill (within the development) may be required for properties along Lancaster Road for flood protection due to the steep upstream runoff.

The northern catchment flood path (outside the development) will be directed along the Gladville Road before continuing north along the reserve; eventually crossing Albany Highway and linking with Willyung Creek.

1 in 10 Year Storm Event

Detention basins will form part of the treatment infrastructure to aid in the stripping of coarse sediments and uptake of nutrients, prior to discharging to the downstream environment. Basins A and B will attenuate the majority of the developed catchment.

All basins will be designed in accordance with the City of Albany's requirements, such that the maximum discharge is equivalent to the 1 in 10 year pre-development peak flow, with a storage volume large enough to detain the 1 in 10 year post-development event. Please note that due to the treatment from bioretention basins in Catchment B, the level of treatment required in Basin B is less than in Basin A. Typical details of Basin A are shown in Appendix 7. Basin B will be more simplified with the main design criteria to release the flows at the pre-development rate.

To simplify the strategy, the sizing of the detention basins does not subtract upstream storage volumes available from rainwater tanks and bioretention basins on the road reserves. This may be revised during the UWMP.

1 in 5 Year Storm Event

The development's piped drainage network will be designed in accordance with industry standard practice and the City of Albany's guidelines, where all piped drains can convey a "minor" 1 in 5 year post-development storm event over its respective catchment. All bioretention basins will have capacity to store the 1 in 1 year event and convey the 1 in 5 year event to detention basins. The detention basins will be designed to discharge the 1 in 5 year event at the predevelopment peak flow rate.

An open drain in Catchment A may assist with course sediment removal and reduce the velocities of the flow by installing riffles. The option to include a „living stream was considered, however the steep grades do not permit this to be a suitable option due to potential erosion issues, space requirements, and feasibility.

The key elements of the design are:

* *All roads will be sealed and fully kerbed.*
* *Flushed kerbing will be used where runoff to bioretention basins are required.*
* *Pipe size will be minimum Ø300mm RCP.*
* *Pits (manholes and gullys) will be placed at strategic locations, generally at a maximum spacing of 70m.*
* *The road crossfall will generally be crowned, with one-way crossfall to the higher side of the road in areas requiring additional flood direction control.*
* *Verges will be designed to prevent flooding of adjoining lots in high flow events.*

1 in 1 Year Storm Event

Regardless of the use of rainwater tanks, it can be reasonably assumed that for a majority of rainfall events up to the 1 in 1 year event, the runoff will be contained within the lots through infiltration within the lawns and gardens.

Where gentle grades permit (1 – 4%) bioretention basins (or otherwise known as raingardens) are proposed to collect runoff from road reserves. "Gaps" in the roadside kerb will channel runoff into the basins. Vegetation and filter media are designed to specifically treat pollutants and retard infiltration. Subsoil pipes then collect the filtered water to gully drainage pits. During large storm events runoff is designed to overflow to the raised gullys. The interaction of the bioretention basins with the surrounding services and footpaths will be subject to detailed designed and discussed in the UWMP. See Appendix 7 for details of the bioretention basins.

In Catchment B there may be an option to install infiltration basins in two of the POS areas for the 1 in 1 year event. These may be used as alternative, or in combination with the bioretention basins to infiltrate flows upstream at source. It should be noted that it is DoW's preference that bioretention basins are the preferred means of treatment.

Sewer Reticulation

Preliminary Water Corporation advice suggests that the proposed ODP area can be serviced by three (3) long-term interim wastewater pumping station(s) (WWPS). Two (2) being located along Albany Highway, outside of the ODP area, whilst one (1) will be located within Lot 300. The final location of all three (3) WWPS' will be required to be negotiated and agreed upon with the Water Corporation closer to the detailed design phase of the project, as a feasibility study should be undertaken to ascertain the most efficient location of the WWPS' to service the ODP area as well as abide by Water Corporation long-term planning.

Internally, the ODP will be serviced by a reticulated sewer network of varying sizes, as per standard Water Corporation servicing guidelines and requirements.

Water Reticulation

Preliminary Water Corporation advice suggests the proposed ODP area will require to be serviced by a 250mm extension along Lancaster Road, connecting to Albany Highway approximately 1,700m east of the ODP's eastern boundary.

The ODP will be serviced internally by a reticulated water network of varying sizes, as per standard Water Corporation servicing guidelines and requirements.

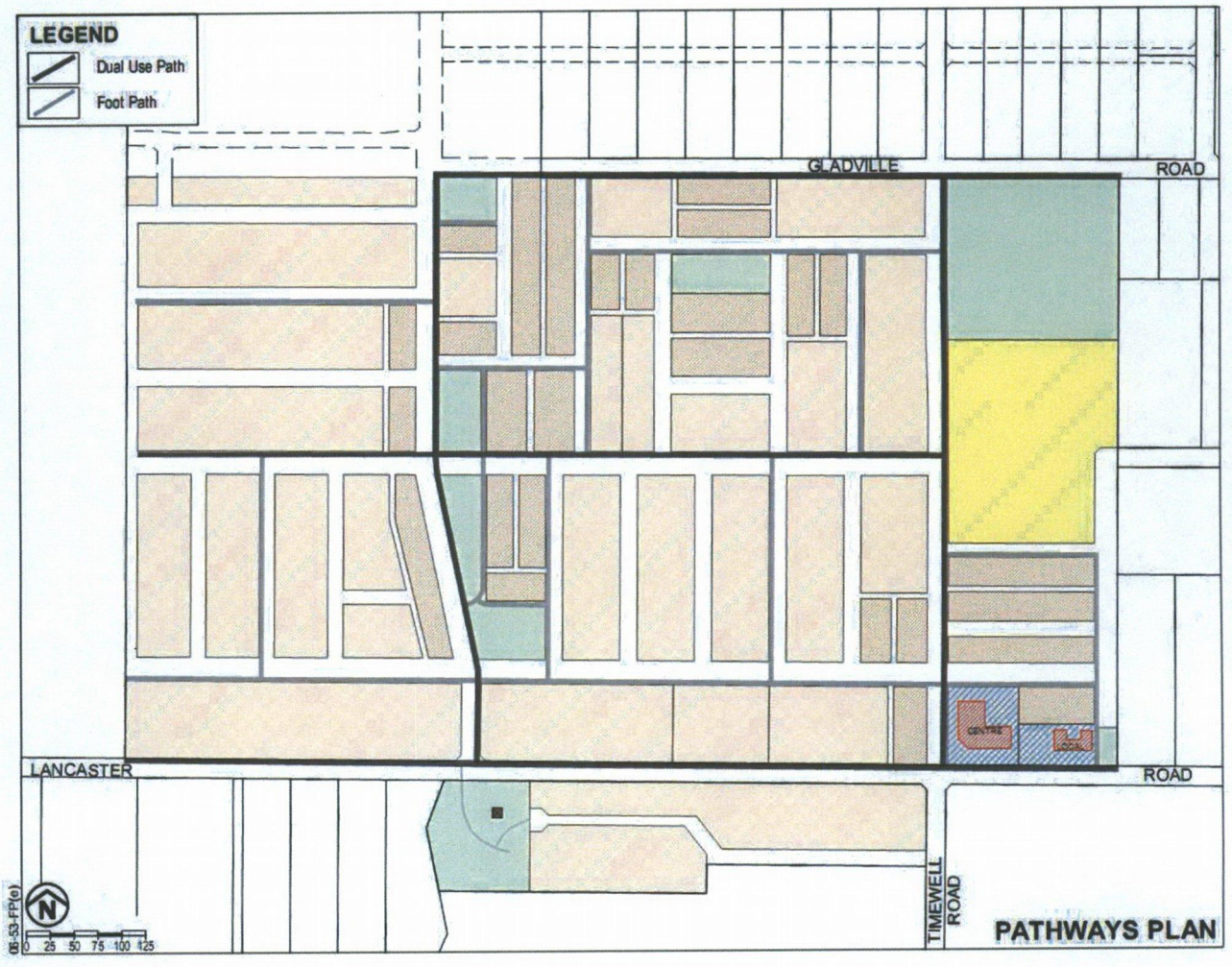
Underground Power & Telstra

Preliminary Western Power advice suggests no external upgrades or network reinforcing will be required to service the ODP. All underground power will be designed as per standard Western Power requirements. Telstra will be designed and installed as part of the development.

In addition to this:

- A Local Water Management Strategy (LWMS) has been prepared and endorsed by Council and the Dept of Water to outline and guide water management for the development (Attachment IV). This strategy has informed the plan by quantifying basin location and sizes. It also provides the surety that basins can be effectively integrated and designed into the open space areas. The LWMS, whilst advocating the use of individual domestic rainwater tanks for non potable and garden requirements, acknowledges that the policing of installation and function is problematic. As a result, the LWMS does not include their use in runoff and basin calculations.
- Given the additional and specific demands that will be placed on local roads over the longer term with staged development, a Road Upgrading Program is provided as Attachment V. This program provides for contributions to or upgrading of local roads on an equitable basis in line with staging and in accord with developer contribution policy.
- In addition to the engineering recommendations for an extension to the Dual Use Path on Lancaster Road, a Pathways Plan follows. This shows and expands the Dual Use Path network to link major public open space areas, the local centre/node and the future school site. This network includes Gladville Road, Lancaster Road, both main north-south links and the central east-west connector. Footpaths are also shown which will combine with local roads and laneways to fill in this network and provide links through to the local public open space areas.

Pathways Plan



5.0 DEVELOPMENT APPROVAL

5.1 General

Development of the ODP area shall generally be in accordance with the Outline Development Plan map, the provisions of this part and the relevant provisions of Local Planning Scheme 1 (LPS1). Where there is a conflict between the provisons of this part and the LPS 1, the provisions of this part shall apply.

5.2 Staging

Given Albany's relatively slow lot development rates (compared to the metropolitan and southwest growth zones) and the fact that this area is one of three development fronts in the greater Albany area, it is anticipated that full development may only be achieved in the longer term.

With this noted, the area benefits from a unique mix of large existing lots with a concentrated ownership, an appropriate zoning, few physical constraints to development, a plan that minimises usual cross boundary and coordination issues as well as existing ownership regime that has development experience and intentions. These issues couple to ensure that impediments to development are few when compared to many other development areas in the City. These are mainly restricted to regulatory approval requirements, staging and servicing issues as well as market readiness and sales considerations.

As there is reasonable availability of other infrastructure services, staging is most likely to be directed by the provision of deep sewer services. As a result, development will occur from the designated sewer catchments noted in the report with the southern catchment served by the Lot 300 pump station being the likely first. Development will then likely proceed north filling out this catchment.

If supported by the Albany Activity Centre Strategy, an objective is to get the area of the possible Local Activity Centre and its supporting residential cell in place early on in the development cycle and as soon as there is supporting population. Given this, work should commence in early stages to integrate the site within the Albany Activity Centres Strategy and stage use for Local Activity Centre functions accordingly.

5.3 Development Approval

With regards the approval process the following apply:

- Local Planning Scheme and Zoning

All land is under the Future Urban Zone. As a result zoning is not an impediment to the approval of this Outline Development Plan.

- Outline Development Plan Adoption

The ODP has been prepared for adoption by the WAPC and City of Albany. This plan forms the basis for the preparation of detailed subdivision designs and approval of subdivision applications on a stage by stage basis.

- Subdivision Application and Approval

Subdivision applications will be prepared and lodged based on the requirements of the adopted ODP and further informed by the detailed assessment of the subject stage of development. Subdivision applications will include definition of areas requiring Local Development Plans and/or Public Open Space plans and the framework, issues and objective of those plans.

- Local Development Plans /Other

As conditions of subdivision, Local Development Plans /landscape or Public Open Space plans/other will be prepared as necessary. Where these require title level control (reciprocal access etc), the completion of these plans as conditions of subdivision allow seamless incorporation of the title controls onto survey diagrams.

- Development

In exercising its ongoing development and land use approval functions, Council will apply the Residential Design Codes, any Local Development Plan requirements, the requirements of LPS 1 and in particular the provisions of the Speedway SCA, the Speedway Policy and the Guidelines.

5.4 Land Use

Clause 5.5.3 of Local Planning Scheme No. 1 outlines that land uses are restricted on Future Residential zoned land unless a Structure Plan has been prepared and adopted. As a part of this process, a Permissibility Table follows identifying land use permissibility within the overall Outline Development Plan Area.

Regarding the Possible Local Activity Centre, the following uses may be considered following completion and adoption of a Local Development Plan and assessment of the site for inclusion as a Local Activity Centre into the Albany Activity Centres Strategy. Prior to this assessment the site can be used for no purpose other than its current lawful use of grazing.

The symbols used and the interpretation of the Permissibility Tables are outlined in cl 4.3 & cl4.4 of the Scheme, ie;

'P' *Means that the use is permitted by the Scheme providing the use complies with the relevant development standards and the requirements of the Scheme;*

'D' *Means that the use is not permitted unless the Local Government has exercised its discretion by granting planning approval.*

'A' *Means that the use is not permitted unless the Local Government has exercised its discretion by granting planning approval after giving special notice in accordance with clause 9.4.*

'X' *Means a use that is not permitted by the Scheme.*

McKail North Outline Development Plan
Permissibility Table –

Land Use	Residential Cells	Possible Local Activity Centre
Aged or Dependent Persons' Dwellings	D	X
Aged Persons' Village	D	X
Amusement Parlour	X	D
Ancillary Accommodation	D	X
Bed and Breakfast/Farmstay	A	X
Boarding/Guest/Lodging House	A	X
Car Park	X	D
Caretakers Dwelling	X	D
Chalet/Cottage Units	A	X
Child Care Premises	A	D
Civic Use	X	D
Club Premises	X	D
Community Purpose	D	D
Consulting Rooms	A	P
Convenience Store	X	P
Display Home	P	X
Dry Cleaning Premises	X	D
Educational Establishment	A	X
Exhibition Centre	X	D
Family Day Care	D	X
Fast Food Outlet	X	D
Grouped Dwelling	D	X
Holiday Accommodation	D	X
Home Business	A	X
Home Occupation	D	X
Home Office	P	X
Industry – Cottage	A	P
Industry – Service	X	D
Lunch Bar	X	P
Market	X	D
Medical Centre	X	P
Multiple Dwelling	D	X
Nursing Home	A	X
Office	X	D
Place of Worship	A	X
Public Utility	A	A
Recreation – Private	A	X
Residential Building	A	X
Restaurant	X	D
Service Station	X	D
Shop	X	P
Single Bedroom Dwelling	D	X
Single House	P	X
Storage	X	D
Tavern	X	A
Telecommunications Infrastructure	D	D
Veterinary Centre	X	D

5.5 Possible Local Activity Centre

The uses noted for the possible local activity centre may only be considered for the site following the completion and adoption of a Local Development Plan and assessment under the Albany Activity Centres Strategy as a local centre (specifically regarding location, retail and commercial activities and floor space).

Subdivision, use or development of the Possible Local Activity Centre for residential purposes shall not be approved until a specific acoustic assessment of the impacts from the trotting track has verified that those parts of the site within 75m of the trotting track boundary are suitable for sensitive uses including habitable dwellings. If such an assessment finds in the affirmative, a Local Development Plan that provides for any specific building and design requirements of the acoustic assessment and which provides adaptive buildings suitable for modification and reuse for possible future Local Activity Centre functions and shall be prepared and adopted by Council.

5.6 Residential Density

Under the Residential Design Codes, areas are identified either R20 or R30. General requirements of the Codes at March 2015 are:

1 R-Code	2 Dwelling type	3 Minimum site area per dwelling (m^2) ◆	4 Minimum lot area/rear battleaxe (m^2) ▼	5 Minimum frontage (m) ▼	6 Open space		7 Minimum setbacks (m)		
					min total (% of site)	min outdoor living (m^2)	primary street	secondary street ●	other/ rear
R20	Single house or grouped dwelling	Min 350 Av 450	450	10	50	30	6	1.5	*
	Multiple dwelling	450	-	20	-	-	6	1.5	*
R30	Single house or grouped dwelling	Min 260 Av 300	410	-	45	24	4	1.5	*

Legend
- ◆ subject to variations permitted under clause 5.1.1 C1.4
- ▼ only applies to **single houses**
- ● **secondary street**: includes **communal street**, private **street**, **right-of-way** as **street**
- \- indicated not applicable
- * see Tables 2a and 2b and clause 5.1.3

Av. average **site** area

In addition, Local Development Plans are required for cells marked "D". These plans are required as the cell has one or more special design requirement such as a rear laneway, adjoining/fronting Public Open Space, building envelope requirements, or similar.

5.7 Design

Local Planning Scheme No. 1 Special Control Area No. 6 (Attwell Park Speedway) covers the majority of the ODP area. The SCA provides for design advice in dwelling construction and the application of memorials to the titles of new lots created ensuring landowners are made aware of the presence and possible impacts of the speedway.

This SCA and the detailed acoustic assessment in Attachment III have lead to the preparation of the Guidelines in Attachment VI. The Guidelines apply should the site be developed adjacent to the Gladville Street boundary in the first and subsequent stages to present a solid built buffer to the speedway along the site's northern boundary. These guidelines specifically identify the areas requiring additional design and construction requirements and identifies deemed to comply and performance measures necessary to meet residential acoustic standards.

Should the first stage of development of the site be the construction and completion of all habitable dwellings within the three separate areas identified as Q1, Q2 & Q3 adjacent to the northern boundary of the site as shown on the Acoustic Buffer Plan in Attachment VI, then the balance of the site outside the Q areas may be constructed without additional noise specific construction standards. In the Q1, Q2 and Q3 areas, Quiet Housing Design Guidelines have been prepared. These also include the requirement for title level notification on lots created. The Quiet Housing Design Guidelines and performance standards are included in Attachment VI. However should the land be developed from Lancaster Road either in a northerly or southerly direction as proposed in Section 5.1 Staging, all new dwellings and other habitable buildings within the Special Control Area will be required to be constructed to the additional noise attenuation standards as stated in Council's Speedway Buffer Policy.

Local Development Plans prepared as a condition of subdivision approval for the identified residential cells are required to deal with one or more special design requirement such as a rear laneway, adjoining/fronting Public Open Space, have building envelope requirements or similar.

5.8 Infrastructure

Full urban servicing for all new lots created within the ODP area will be required at the time of subdivision. This includes but is not limited to:

- Reticulated potable water supplies.
- Telecommunications connections.
- Underground electrical power.
- Deep sewerage services.
- Stormwater drainage and management.

5.9 Hydrology & Site Conditions

Under the recommendations of the Local Water Management Strategy, an Urban Water Management Plan will be required at the time of subdivision on a subdivisional catchment basis.

Prior to commencement of works, a pre- works geotechnical report is to be prepared certifying that the land is capable of development and outlining, if required, how the land should be remediated.

Where any improvement works are required, a further report is to be prepared certifying works have been completed in accord with the previous recommendations.

5.10 School Site and Public Open Space

The school site is indentified on the plan for future acquisition in accord with current Department of Education planning.

Public Open Space allocations are shown on the plan. Generally, areas should be ceded on a stage by stage basis generally in accord with the Plan and POS Schedule.

A Public Open Space development theme and standard for street furniture will be prescribed and approved within the initial basic landscape/POS plan prepared. There after unless further modified, this theme should be carried through the other landscape plans for the individual neighbourhood areas.

Public Open Space will be developed to a minimum standard which should include full earthworks, basic reticulation of any optional landscaping (if required), grassing of key areas, pathways that form part of the overall pedestrian and/or cycle network, and maintenance for two summers.

Development and landscaping will be provided in all areas of POS to integrate the drainage features.

Cash in Lieu will be required from the following lots to balance their areas of under provision, ie:

Lot 526	9007m2	Cash In Lieu Equivalent required
Lots 1-10 & 12	4400m2	Cash In Lieu Equivalent required
Lot 13	800m2	Cash In Lieu Equivalent required

Part of the cash amounts in lieu of the above land areas are to be returned to Lots 300 & 507 to cover their over provision for approximately 0.6ha and 0.7ha respectively. Cash in Lieu arrangements will be managed as per the mechanisms established in sl53 of the Planning and Development Act 2005.

5.11 Movement Systems

Paths (including DUPs) are to be provided on a stage by stage basis generally as shown on the Pathways Plan.

Roads are to be designed and constructed to Urban/Residential Road Standards per Councils Subdivision Development Standards incorporating lighting, signage, kerbing, drainage and verge treatment. Any special parking provision, surface treatment and the like will be provided for and approved within Local Development Plans.

5.12 Road Upgrading

The Attachment V Road Upgrading Program outlines the manner in which contributions are to be made at the time of subdivision to offsite sections of the main access roads and to the fronted sections of existing roads.

Contributions to offsite sections of main access roads are to be provided on a per lot basis at the time of subdivision or development, while the upgrading of fronted road sections is to occur at the time of development or subdivision.

6.0 CONCLUSION

The Outline Development Plan (ODP) has been prepared to provide for residential based subdivision and development of the ODP area drawing on contemporary design philosophies and planning principles. The ODP will guide the subdivision and development of the subject land and shows integration across existing lot boundaries.

The ODP is intended for adoption by Council and the Western Australian Planning Commission as a guide for detailed design, subdivision and future development.

The Western Australian Planning Commission on the advice of the DOP and Council will apply the relevant components of the ODP as conditions of subdivision with the final stage of implementation being conditions of planning and building approval for the individual lots created.

OUTLINE DEVELOPMENT PLAN

Lots 1 - 10, 12, 13, 66, 300, 507 & 526 Lancaster Road
McKail, City of Albany

PLAN DETAILS

06-53-ODP(t)Photo

ALL AREAS AND DIMENSIONS ARE SUBJECT TO SURVEY

SPEED WAY AREA

FEDERAL STREET

GLADVILLE ROAD

LANCASTER ROAD

TIMEWELL ROAD

124
15.588ha

526
19.447ha

507
38.095ha

300
Reserve 23290

7452
Reserve
36571

3.50ha
FUTURE
PRIMARY SCHOOL SITE

POSSIBLE FUTURE ROAD WIDENING

SPEEDWAY NOISE SCA

75m Paceway Noise Buffer

Possible Local Centre 1 2338m²

Possible Local Centre 2 2753m²

WWTP

75m Paceway

LEGEND

- Subject Land
- 3477m² — Public Open Space & I.D. No.
- Residential Cell (R20)
- Residential Cell (R30)
- Possible Local Activities Centre Site
- Landscaped Basin in POS
- D — Local Development Plan Required For Cell
- 390m² / 5 — Approximate Lot Area and Lot Yeild For Cell
- WWTP Special Control Area & Buffer
- Albany Speedway Noise Special Control Area (Refer LPS No. 1 cl 6.5)
- 75m Paceway Boundary Setback
- Building Envelope Pending Future Assessment

ORIG A3
SCALE 1:5000
0 25 50 75 100 125

ENDORSEMENT OF OUTLINE DEVELOPMENT PLAN

Signed for and on behalf of the City of Albany

Signature — CHIEF EXECUTIVE OFFICER — 39.15
Position — Date

Signed for and on behalf of the Western Australian Planning Commission

Signature — Planning Manager — 24.8.15
Position — Date

AYTON BAESJOU
PLANNING
11 Duke Street
Albany WA 6330
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Attachment I:

360 Environmental

Urban Development / Land Capability Assessment

Lots 300, 507, 526 & 1918 Lancaster Road, Lot 124 Gladville Road & Lot123 Link Road McKail

Urban Development Land Capability Assessment

Revision History

Document Control report Reference	Revision	Preparer	Reviewed by	Submitted to Client	
				Copies	Date
A101-AD	A INTERNAL DRAFT	TC	TS (02/05/07)		
A101-AD	B CLIENT DRAFT	TC		1 HC 1 CD	11/05/07
A101-AD	1 FINAL				

Executive Summary

360 Environmental was commissioned to undertake an Urban Development Land Capability Assessment (LCA) for a 150 hectare site located over Lots 300, 507, 526 and 1918 Lancaster Road, Lot 124 Gladville Road and 123 Link Road, McKail in the City of Albany.

The 150 hectare site is proposed for an urban residential development with lot sizes ranging from 400 to 600 square meters. The development will be serviced by reticulated water and sewer by the Water Corporation.

This LCA has been prepared to assess the current capability of the site and the suitability of the proposed development. The site is currently used for the purposes of grazing.

The LCA involved a thorough desktop assessment of available information regarding geology, surface hydrology, groundwater, soils, vegetation, flood risk, climate and surrounding land-uses. Field reconnaissance, including soil logging, was undertaken to confirm soil types, land units and information on groundwater levels.

From field and desktop investigations, the site is generally suitable for urban development. The site can be divided into two main areas – the higher slopes and the lower-lying depressions (see Figure 5). In summary:

- The high slopes are best suited for the residential component of the development. However management will be required during construction to prevent topsoil erosion and engineering solutions should be sought to ensure drainage of excess stormwater.
- The lower-lying areas are best suited for public open space as these areas are more environmentally sensitive and have slightly elevated risks of waterlogging, flooding and acid sulfate soils.

Consultation with the City of Albany, Water Corporation and Main Roads WA will be required to develop an agreement on land uses in the defined buffers of the speedway, the Albany Wastewater Treatment Plant and the proposed Ring Road (Link Road).

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1. INTRODUCTION

1.1. Background

360 Environmental was commissioned by Ayton Taylor Burrell to undertake an Urban Development Land Capability Assessment (LCA) for a 150 hectare site located over Lots 300, 507, 526 and 1918 Lancaster Road and Lot 124 Gladville Road and 123 Link Road, McKail in the City of Albany (Figure 1). A residential subdivision is proposed for the site. This LCA has been prepared to assess the current capability of the site and the suitability of the proposed development. The site is currently used for the purposes of grazing. It is understood that the development will consist of 400 – 600 square meter lot sizes and that the lots will be serviced by reticulated water and sewer from Water Corporation.

1.2. Objectives

The objective of the LCA is to provide an understanding of the land constraints associated with the site in the context of the proposed development, particularly focusing on drainage potential.

1.3. Scope of Work

The scope of work undertaken for this investigation was in accordance with 360 Environmental proposal A101-AC, dated 1 March 2007, and included the following:

- A desktop review of available site information to provide details with the development area, including geology, surface hydrology, groundwater, soils, vegetation, flood risk, climate, aerial photography and surrounding land-uses.
- Field reconnaissance investigations soil logging to determine soil types, land units, and information on groundwater levels; and
- Development of Land Capability Report.

1.4. Report Format

The remainder of this report comprises the following components:

- Section 2: Site Description
- Section 3: Background Assessment
- Section 4: Field Investigations
- Section5: Land Capability Assessment
- Section 6: Conclusions and Recommendations
- Section 7: Limitations
- Section 8: References

2. SITE DESCRIPTION

2.1. Site Location and Features

The investigation site is located approximately seven kilometres northwest of the Albany city centre, in the City of Albany, approximately 400 km south of Perth (Figure 1).

The site comprises an area of approximately 150 hectares. And generally represents a ridge-like feature in the landscape. From approximately the centre of the site, the land gently slopes to the north, west, east and south. The site is cleared of most vegetation. Current site features are typical of smaller urban-fringe farms and include dams, fences, yards, sheds, house, stables, stock loading and unloading facilities and powerlines as shown in Figure 2.

The general study area is an irregular shape bounded by Lancaster, Gladville, Reddale and Link Road (the Albany Ring Road Reserve) (see Figure 1). A photographic record of the site, highlighting the features is provided in Appendix A.

2.2. Property Information

The site is currently a mixed zoned of Rural (Lots 300, 123 and1918) and Special Rural (Lots 507, 526 and 124) under the City of Albany Town Planning Scheme No. 3. Under the Albany Local Planning Strategy (City of Albany, 2006) the strategic future uses for the site are a range of residential, future residential and rural-residential uses.

The Record of Certificate of Title lists the following details for the site:

Address	Registered Location	Volume / Folio
Lot 300 Lancaster Rd	Lot 300 on Plan 42 541	2590-382
Lot 507 Lancaster Rd	Lot 507 on Plan 256 573	1302-687
Lot 526 Lancaster Rd	Lot 526 on Plan 230 467	1302-687
Lot 1918 Lancaster Rd	Lot 1918 on Plan 128 096	1205-551
Lot 123 Link Rd	Lot 123 on Diagram 100 098	2520-701
Lot 124 Gladville Rd	Lot 124 on Diagram 100 098	2520-702

2.3. Proposed Development and Planning

Ayton Taylor Burrell is developing a conceptual structure plan for the subdivision of the site, which is proposed for residential development (R20) with lots ranging in size from 400 to 600 m^2.

3. BACKGROUND ASSESSMENT

3.1. Climate

The City of Albany is characterised by a Mediterranean-type climate with cool, wet winters and warm summers. Albany's long-term average annual rainfall is approximately 766 mm, though there can be considerable variation in the total rainfall from year to year (BoM, 2007).

On average, approximately 72 per cent of the annual rainfall occurs between May and October (BoM, 2007). Although cold fronts are responsible for much of the recorded rainfall total, a moist onshore flow can occur in any season and bring showers or drizzle (BoM, 2007). Albany records rainfall on 178 days annually, on average, which equates to almost one day in every two (BoM, 2007).

July is the wettest month, with a long-term average of over 140 mm, whilst rain occurs on two days out of every three during an average winter (BoM, 2007). The driest month is February with a mean of about 23 mm and in summer it rains on average about one day in every four (BoM, 2007). Like other parts of southwest WA, winter rainfall has decreased in Albany during the latter half of the twentieth century (BoM, 2007).

Daily pan evaporation can range from zero on a cold, wet winter's day to around 15 mm on a hot, blustery summer's day (BoM, 2007). Within an area such as Albany, however, with its diverse topography, the average evaporation can vary significantly even over short distances (BoM, 2007).

3.2. Geology

The site geology is a deeply weathered mantle over siltstone over granitic rocks of the Albany Sandplain Zone.

Gozzard (1989) indicates the site is dominated by permeable sands (pale grey, fine to course, angular to sub-rounded quartz, loose moderately sorted, occasional pebbles of laterite). The area along the western boundary of the site is dominated by siltstone (brown and yellowish-brown, variably clayey and sandy) (Gozzard, 1989).

3.3. Geomorphology

The site lies within the Albany Sand Plain, a gently undulating plain dissected by a number of short rivers flowing south with eocene marine sediments overlying Proterozoic granitic and metamorphic rocks. Soils are sandy duplex soils, often alkaline and sodic, with some sands and gravels (DAF, 2007). Denuded slopes of tertiary sediments appear along western boundary of the site (Gozzard, 1989).

Figure 3 illustrates the undulating nature of the site.

3.4. Soils

Based on available Department of Agriculture mapping, the site appears to be comprised of two major soils groups. The Dempster Crest Phase soils dominate the majority of the site, while the Minor Valleys S7 slope phase soils are present along the lower-lying southern boundaries of Lots 507 and 526 and most of Lot 300.

The Dempster Crest Phase soils are largely comprised of duplex sandy gravels, grey deep sandy duplexes, pale deep sands and shallow gravels (DAF, 2007).

The Minor Valleys S7 slope phase soils are comprised of pale deep sands and grey deep sandy duplexes (DAF, 2007).

Field sampling confirmed this, highlighting the dominance of grey to brown very fine grained sands and silts with shallow gravels over the site.

3.5. Catchments

There are two surface water catchments over the site. The southwest of the site drains in a south-westerly direction to Five Mile Creek. While the northwest drains in a north-westerly direction to Willyuny Creek.

The Five Mile Creek catchment is an upper sub-catchment of the Torbay watershed. The Torbay catchment has been the subject of a comprehensive restoration plan for many years. Willyuny Creek is an upper tributary of the King River.

The site forms the upper-most reaches of these catchments, see Figure 6.

3.6. Vegetation

The site is located in the Menzies Subdistrict of the South West Botanical Province (Beard, 1980), which is generally characterized by low-forest mosaic with Jarrah-Marri-*Allocasuarina*, scrub-heath with *Scaviola*, *Balga* and *Acacia*, reed swamps and *Melaleuca*, *Agonis juniperina* and swamp Yate along river beds.

The site is largely cleared with the exception of a few remnant pockets of vegetation in the southeast, southwest and northeast, largely consisting of Sheoak (*Allocasaurina sp.*) and Jarrah (*Eucalyptus marginata*). There were no occurrences of *Agonis juniperina* (also known as *Taxandria juniperina)* noted on the site (see Appendix A, Plates 11 – 13).

A search of the DEC Clearing Permit System (CPS) (DEC, 2007b) indicates that there have been no clearing permits lodged for the site, or in the immediate vicinity of the site. The nearest clearing permit indicated on the CPS was granted for the Albany Ring Road (Menang Drive) development, approximately 1 km north of the site (Clearing Permit 739/1).

3.7. Waterlogging Risk

Based on available maps from the Department of Agriculture, the majority of the site has a low waterlogging risk. There is a medium-low waterlogging risk along the lower-lying southern boundaries of Lots 507, 526 and 300 (DAF, 2007), see Appendix C.

3.8. Acid Sulfate Soils

The Western Australian Planning Commission *Bulletin Number 64 – Acid Sulfate Soils Risk* mapping indicates the site has a low to no risk of actual acid sulfate soils (AASS) and potential acid sulfate soils (PASS) occurring generally at depths greater than 3 m.

The nearest identified area of high risk of acid sulfate soils is Lake McKail, approximately 1.2 km east of the site. There is an area of moderate to low risk ASS approximately 50 m south of the site at the headwater of Five Mile Creek (DEC, 2007).

3.9. Environmentally Sensitive Areas

The Minister for the Environment has made the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005* under section 51B of the *Environmental Protection Act 1986* (EP Act). The Notice declares areas which are considered environmentally sensitive areas (ESAs) for the purposes of the clearing of native vegetation provisions in the EP Act.

A search of the Department of Environment and Conservation's (DEC) database indicates there are no recognised ESAs present on the site, or within a 3 km radius of the site (DEC, 2007a).

4. FIELD INVESTIGATIONS

A field visit was undertaken on the property on the 19th April 2007 by experienced environmental scientists. The site characteristics, soils and the presence of remnant vegetation were recorded.

4.1. Site Characteristics

There are six land parcels that comprise the site, with 4 land owners. Each land owner had a unique use of their land, these uses are summarized below.

Address	Dominant Land Use	Land Characteristics
Lot 300 Lancaster Rd	Horse stables and yards	Stables, yards, sheds, manure storage
Lot 507 Lancaster Rd	Horse yards and cattle grazing	Yards, evidence of an easement (water?), power lines, sand stockpiles, dams
Lot 526 Lancaster Rd	Cattle grazing	Dams
Lot 1918 Lancaster Rd	Cattle grazing, residence	Residence, dams, powerlines, sheds, tree belts (2)
Lot 123 Link Rd	Cattle grazing	Dams, powerlines
Lot 124 Gladville Rd	Mixed use of grazing and storage yards.	Storage yard (salvage), vegetable garden, large shed, power lines.

4.2. Soil Results

Using a manual 50 mm hand auger, soils were extracted from the ground to either the refusal layer or to 1 m below the surface, which ever occurred first. 12 locations throughout the site were sampled. Figure 4 indicates the sampling locations on the site, Figure 7 includes a

photographic display of the soils and Appendix B shows the soil borelogs and detailed descriptions of soils encountered. In most instances, the hand auger met the refusal layer within 50 cm of the surface. The refusal layer in all instances was laterite gravely sand.

The soils that overlay the gravel layer were very fine grained (silts and very fine sands) that were either grey or brown in colour. Slightly larger –grained Sands were recorded in only one borehole. Generally, there was organic matter only in

Generally the depth to the gravel layer was shallow. In some places throughout the site, laterite (coffee rock or moss rock) was clearly visible on the surface.

The water table was not observed at any of the boreholes, with most surface soils being dry and some being moist.

4.3. Vegetation

During the field investigations the site was observed as predominately cleared with the exception of a few remnant pockets of remnant vegetation in the southeast, southwest and northeast, largely consisting of Jarrah (*Eucalyptus marginata*) and sheoak (*Allocasurina sp.*) (see Appendix A, Plates 11 – 13). There was a shelter belt of planted Eucalypts on Lot 1918.

5. LAND CAPABILITY ASSESSMENT

5.1. Background

Land capability assessments (LCA) provide the consideration of soil and land attributes necessary when planning new developments. LCAs also allow the identification of opportunities to remediate any degraded lands.

Guidance for this LCA has primarily been sought through the Department of Agriculture's *Land Evaluation Standards for Land Resource Mapping* (van Gool et al., 2005).

The focus of this LCA is on the assessment of the land qualities relevant for drainage and waterlogging. The development will be connected to reticulated sewer, accordingly a review of the use of septic tanks is not required (van Gool et al., 2005).

5.1.1. Background Data

A desktop review of currently available information was undertaken prior to the field visit to determine the key features and natural attributes of the site. The desktop survey results are detailed in Section 3 of this report.

A field visit was undertaken on 19th April 2007. The field survey results are detailed in Section 4 of this report.

5.2. Land Capability Assessment

The criteria used as part of the LCA were determined based on the assessment of land qualities suggested by van Gool et al., (2005). The land qualities assessed as part of this investigation are:

- Waterlogging and inundation risk;
- Flood hazard;
- Land stability;
- Water erosion hazard; and
- Acid sulfate soil risk.

5.2.1. Waterlogging and Inundation Risk

Waterlogging refers to excess water in soils (saturated soils) while inundation refers to water ponding on the surface. Waterlogged and inundated soils are problematic for urban developments as excess water can affect building foundations, stunts vegetation growth and reduces amenity. Waterlogging and inundation risk is a function of rainfall, landscape and soil type, particularly soil permeability.

Albany has a high average annual rainfall (> 600 mm) (BoM, 2007). The landform of the site is characterised as gently undulating crests, upper and mid-slopes ranging from 20 – 200 m long and from 0 to 6 % slope. There are some laterite crests on the site, however much of the site consists of slopes with only a few slight depressions. Generally the landscape lowpoints occur on neighbouring properties.

Numerous dams throughout the site suggest these slopes generate sufficient run-off. The soils of the site recorded (Gozzard, 1989 and DAF, 2007) are largely duplex sandy gravels and shallow gravels. These soils were confirmed during the field investigations. Gozzard (1989) describes these soils as having medium to high permeability.

During the field visit the soils were recorded as generally dry and dusty there were no visible signs of waterlogging or inundation. This was despite significant rainfall on the three previous days (3.4, 19 and 0.2 mm) (BoM, 2007). The dry and dusty nature of the soils soon after significant rains indicates that waterlogging is unlikely to be a significant factor at the site.

Based on these site characteristics, and using the Table 3 matrix (see Tables) the waterlogging and inundation risk for the site is assessed as Nil.

5.2.2. Flood Hazard

Flood hazard refers to the risk of temporary covering of land by moving flood waters derived from overflowing streams and/or runoff from adjacent slopes. Flood hazard is largely determined by the proximity of the land to major rivers or estuaries.

The site is not adjacent to any streams, rivers or estuaries. There is limited 1:100 year flood mapping for the south coast with available mapping not covering the site (M Papalia 2007, pers comm.., 2 May). However, the site is located in the upper most reaches of two adjoining catchments (Five Mile Creek and Wilyung Creek catchments) therefore the site is not expected to be in the 1:100 year flood zone.

Based on these characteristics and using the Table 5 matrix, the flood hazard for the site has been assessed as "Nil".

This correlates with the DAF Flood Hazard mappings which indicates the flood hazard of the site is low (see Appendix C).

5.2.3. Land Instability Hazard

Land instability hazard refers to the potential for rapid movement of a large volume of soil, includes the example of mass movement through slope failure. An assessment of land stability determines whether the

land is suitable for building foundations. The assessment of land instability is based on landform, slope, soil depth and waterlogging risk.

The landform of the site is characterised as gently undulating crests, upper and mid-slopes ranging from 20 – 200 m long and from 0 to 6 % slope. The soils of the site recorded (Gozzard, 1989 and DAF, 2007) are largely duplex sandy gravels and shallow gravels. The waterlogging risk of the site has been assessed as "Nil" (see section 5.2.1).

Based on these characteristics and using the Table 6 and 7 matrices, the land instability hazard for the site has been assessed as "Nil".

5.2.4. Water Erosion Hazard

Water erosion hazard is the inherent susceptibility of the land to the loss of soil as a result of water movement across the surface (van Gool, 2005). In some areas soil erosion and is a major source of water pollution including siltation and eutrophication, particularly in high rainfall areas. The water erosion hazard rating is a function of slope, soil depth, soil type, rainfall, soil permeability and landuse.

Albany has a high average annual rainfall (> 600 mm) (BoM, 2007). The landform of the site is characterised as gently undulating crests, upper and mid-slopes ranging from 20 – 200 m long and from 0 to 6 % slope. The soils of the site recorded (Gozzard, 1989 and DAF, 2007) are largely duplex sandy gravels and shallow gravels. These soils were confirmed during the field investigations. Gozzard (1989) describes these soils as having medium to high permeability. The proposed land use is residential.

During soil sampling, it was noted that the soils appeared to be very loose with little structure and were easily dispersed by the wind when the hand auger was unloaded. Further, there were signs of soil erosion in a few places on the site that were unvegetated. It appeared that the vegetation cover across the site stabilised the soil preventing erosion.

Information from DAF indicates the water erosion hazard of the site has a low risk (see Appendix C). However, given the undulating nature of the site and the observed occurrences of very fine grained silts and sands in the topsoil it is likely that the risk of water erosion will be significantly increased if the vegetation cover is removed from the site.

In consultation with the site drainage engineer, a Management Plan should be developed to manage potential soil displacement by stormwater during the construction phase of the project, when the topsoils are exposed.

5.2.5. Overall Land Capability

The overall capability of the site to sustain an urban development is a function of the individual land qualities assessed above. Overall the site is capable of sustaining an urban development, however there are a few restrictions, as summarised in the table below.

Land Quality	Level Determined (by this study)	Degree of Constraint
Waterlogging inundation risk	Nil	Low
Flood hazard	Nil	Low
Land instability risk	Nil	Low
Water erosion hazard	Low to Moderate (when unvegetated)	Medium (while unvegetated)
Acid Sulfate Soil risk	Low	Low

Site drainage potential and water erosion hazard are assessed as having a medium constraint on development, however these constraints are easily corrected through appropriate sustainable engineering design and construction management. Accordingly, these factors should not preclude the development of the site for residential purposes.

5.3. Land Assessment Discussion

5.3.1. Topsoils and Stormwater Management

One factor that will require management during the development of the site is the possible water erosion of topsoils, particularly during construction when the soils are exposed. Given the past and current agricultural use of the site, the topsoils may have elevated levels of nutrients, which, if were to enter a watercourse could adversely affect the water quality.

360 Environmental recommends the development of a site Stormwater Management Plan in consultation with the site drainage engineer. The Stormwater Management Plan should consider incorporation of the following principles:

- Protection of water quality by the implementation of best management practice and the design of structural and non-structural controls at or near source of stormwater.
- Protect infrastructure from flooding and inundation by considering a site design that ensures the safe passage of excess runoff from large rainfall events to existing water courses.
- Minimising runoff by slowing the migration of stormwater from the catchment to ensure retention and infiltration of rainfall within property boundaries and maximising the use on site. This could include the use of non-kerbed roads, retaining/using of large canopy trees over sealed surfaces and maximising the amount of permeable surfaces in the catchment.
- Maximise local infiltration to reduce potential concerns with local water quality and flooding though the use of vegetated swales, buffers and filter strips.
- Make the most of natural drainage by retaining natural channels where possible, retaining and restoring riparian vegetation to

improve water quality though bio-filtration, and protection of natural ecosystems.

- Minimising the changes to the natural water balance which will help to avoid nutrient export from site, reduce midge problems and protect groundwater resources, though retaining of vegetation and the recharge of groundwater by stormwater infiltration.

- Integrate stormwater treatment into landscape through incorporation of natural drainage systems, and water sensitive urban design of streetscapes and lots.

5.3.2. Lower-lying Areas

Another are that will require management during the development of the site are the lower-lying area of the site – Lot 300, the southern boundary of Lot 526, the western boundary of Lot 1918 and the northern boundary of Lot 124 (Figure 5).

These portions of the site are lower-lying and therefore have slightly elevated risks of waterlogging, flooding and acid sulfate soils when compared to the rest of the site. These portions of the site are very close to the tributaries of the Five Mile Creek and Wilyung Creek, therefore are more sensitive environments. Retaining the present vegetation is these portions of the site and also additional revegetation would improve the environment and the amenity of the areas. Taking into account the remainder of the site, these lower-lying areas would best be suited as public open space.

5.3.3. Buffers

The site is located in close proximity to the Albany speedway and Albany trotting track. These facilities are recognised as potential noise sources.

The site is located in the existing Albany Speedway Noise buffer (City of Albany, 2006a) (Appendix D). This poses constraints as housing will need to be designed to avoid obtrusive noises effecting residents. At the

time of this report, 360 Environmental is unaware of any noise monitoring or modelling for the trotting complex. The City of Albany advises that should a buffer be necessary for the trotting track, it will be modelled on the speedway policy and approach (City of Albany, 2006a).

The site is also located in the vicinity of Water Corporation's Albany Wastewater Treatment Plant (WWTP). The WWTP is located on Timewell Road, McKail approximately 800 m south of Lancaster Road. The WWTP has a nominal odour buffer of 500 m. Lot 300 Lancaster Road is affected by this odour buffer.

The western fringe of Lots 1918 and 124 borders Link Road. In the future, Link Road will form part of the Albany Ring Road – a major trucking route to the Albany Port. Traffic using Link Road is expected to increase once developed into the Ring Road. A buffer between Link Road and the fringe of the residential development is recommended to improve the amenity of future residents.

The north of the site is approximately 2 km from Albany airport and while the site is not included in the Albany Airport Noise Buffer (City of Albany, 2006b), the site may still be within a flight path.

Consultation with the City of Albany, Water Corporation and Main Roads WA will be required to develop an agreement on land uses in these defined buffers.

5.3.4. Catchment Management

The site is located in a catchment prone to eutrophication and sedimentation. 360 Environmental recommends implementing strategies to prevent sandy soils and runoff containing excessive nutrients from entering the Five Mile and Wilyung Creeks and their tributaries.

6. CONCLUSIONS AND RECOMMENDATIONS

The LCA was undertaken for Lots 300, 507, 526 and 1918 Lancaster Road, 124 Gladville Road and 123 Link Road, McKail, to provide an understanding of the land constraints associated with the proposed residential development and to assist in the next phase of works. The following conclusions and recommendations are made.

6.1. Land Capability

From field and desktop investigations, the site is generally suitable for urban development. The site can be divided into two main areas – the higher slopes and the lower-lying depressions (see Figure 5). In summary:

- The high slopes are best suited for the residential component of the development. However management will be required during construction to prevent topsoil erosion and engineering solutions should be sought to ensure drainage of excess stormwater.
- The lower-lying areas are best suited for public open space as these areas are more environmentally sensitive and have slightly elevated risks of waterlogging, flooding and acid sulfate soils.

6.2. Acid Sulfate Soils (ASS)

Current guidelines do not require any further investigations into ASS on the site (DEC, 2003 – 2006).

6.3. Environmental Factors and Site Development

Based on the available information as described in this assessment, it is concluded that land capability factors are unlikely to be a significant constraint to the proposed development of the site, provided best practice environmental planning is undertaken, approvals are sought in a timely manner and recommendations for management of environmental issues are implemented.

7. LIMITATIONS

This report is produced strictly in accordance with the scope of services set out in the contract or otherwise agreed in accordance with the contract. 360 Environmental makes no representations or warranties in relation to the nature and quality of soil and water other than the visual observation and analytical data in this report.

In the preparation of this report, 360 Environmental has relied upon documents, information, data and analyses ("client's information") provided by the client and other individuals and entities. In most cases where client's information has been relied upon, such reliance has been indicated in this report. Unless expressly set out in this report, 360 Environmental has not verified that the client's information is accurate, exhaustive or current and the validity and accuracy of any aspect of the report including, or based upon, any part of the client's information is contingent upon the accuracy, exhaustiveness and currency of the client's information. 360 Environmental shall not be liable to the client or any other person in connection with any invalid or inaccurate aspect of this report where that invalidity or inaccuracy arose because the client's information was not accurate, exhaustive and current or arose because of any information or condition that was concealed, withheld, misrepresented, or otherwise not fully disclosed or available to 360 Environmental.

Aspects of this report, including the opinions, conclusions and recommendations it contains, are based on the results of the investigation, sampling and testing set out in the contract and otherwise in accordance with normal practices and standards. The investigation, sampling and testing are designed to produce results that represent a reasonable interpretation of the general conditions of the site that is the subject of this report. However, due to the characteristics of the site, including natural variations in site conditions, the results of the investigation, sampling and testing may not accurately represent the actual state of the whole site at all points.

It is important to recognise that site conditions, including the extent and concentration of contaminants, can change with time. This is particularly relevant if this report, including the data, opinions, conclusions and recommendations it contains, are to be used a considerable time after it was prepared. In these circumstances, further investigation of the site may be necessary.

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TABLES

Tables for assessing waterlogging / inundation risk

Table 1. Landscape types

Landform Code	Landform Types
A	Water
B	Salt lake, Swamp, Stream channel, Poorly drained depression
C	Poorly drained flat, Poorly drained floodplain, Gilgai depressions, Salt scald
D	Hill slope scald, Hill slope seep
E	Footslopes (<3%)
F	Beach, Well-drained closed depression, Well-drained floodplain, Well-drained flat, Upland plain, Swale, Low rise <2m, Well-drained depression
G	Landslip, Rock outcrop, Well-drained footslopes <3%
H	Very gently sloping (1-3% gradients) slopes (<200 m long), Long 1-3% slopes, >200 m long capable of generating their own run-off.
I	3-5% slopes, Crests and upper slopes <3%, Rise > 2m
J	Blowout, High foredune, Cliff/breakway, Low foredune, Ridge crest, Upper, mid or lower slopes with gentle gradients (5-10%), Upper, mid or lower slopes with moderate (10-15%), Upper, mid or lower slopes with moderate gradients (15-30%), Upper, mid or lower slopes with steep gradients (>30%)

(Based on van Gool et. al., 2005)

Table 2. Common Hydraulic Conductivity Units

Profile permeability class	Hydraulic Conductivity (mm/h)	Examples (general guide only)
Very slow	<1	Duplex, gradational or clay soils with impermeable mottled and/or gleyed poorly structured clay soils and/or an extensive impermeable pan or bedrock.
Slow	1-5	Duplex, gradational or clay soils with slowly permeable, poorly structured clays and/or a slightly permeable pan or bedrock.
Moderately slow	5-20	Duplex, gradational or moderately structured loams or clays, or soils where permeability is slightly increased by gravel or sand.
Moderate	20-65	Duplex, gradational or well structured loams or clays, or soils where permeability is increased by a large amount of gravel or sand
Moderately rapid	65-130	Similar to above, but includes well structured loams, deep sandy gradational soils or deep sands over an impermeable layer at several metres.
Rapid	130-250	Deep sands (e.g. sandplain with fine or medium sand and some clay at depth).
Very rapid	> 250	Deep coarse sands (e.g. sand dunes with minimal profile development).

(Based on van Gool et. al., 2005)

Table 3. Assessing waterlogging/inundation risk ratings in high rainfall districts using soil permeability and landform.

Landform Code (see Table 1)	Waterlogging / Inundation Risk					
	Nil	Very Low	Low	Moderate	High	Very High
A	-	-	-	-	-	Very slow to Rapid (see Table 2)
B	-	-	-	-	Rapid to Very rapid	Very slow to Moderately Rapid
C	-	-	-	Moderate to Very rapid	Slow to Moderately slow	Very slow
D				Moderately slow to very rapid	Very slow to slow	-
E			Moderately slow to Very rapid	Very slow to slow		
F	Rapid to very rapid	Moderate to Moderately rapid	Very slow to Moderately slow	-	-	-
G	Moderately rapid to Very rapid	Moderately slow to Moderate	Very slow to Slow	-	-	-
H	Moderately slow to Very rapid	Very slow to Slow		-	-	-
I	Very slow to Very rapid	-	-	-	-	-
J	Very slow to Very rapid	-	-	-	-	-

(Based on van Gool et. al., 2005)

Table for assessing flood hazard risk

Table 5. Hazard ratings for Flooding

	Flood Hazard Rating			
	Nil	Low	Moderate	High
Flood Frequency return interval (years)	> 100	> 10 <100	2 - 10	1
Landform	Flats above the flood limits and all other elevated areas	Floodplains consisting of the high terraces of major rivers. Ill-defined drainage pathways associated with minor creeks and streams in low rainfall areas	Well-drained drainage depressions. Lower terraces of major rivers.	Stream channels, poorly drained drainage depressions and the immediate margins of major rivers.

(Based on van Gool et. al., 2005)

Tables for assessing land instability hazard

Table 6. Land Instability Scores

	Land Instability Score					
	0	1	2	3	6	10
Slope (%)	< 10	-	10 – 15	15 – 27	> 27	-
Soil Depth (cm)	> 150	100 – 150	< 100	-	-	-
Waterlogging	Nil	Very low to Low	Moderate	High to Very high	-	-
Landform	All other landforms	-	-	-	-	Beach, Blowout, High foredune, Landslip, Stream channel

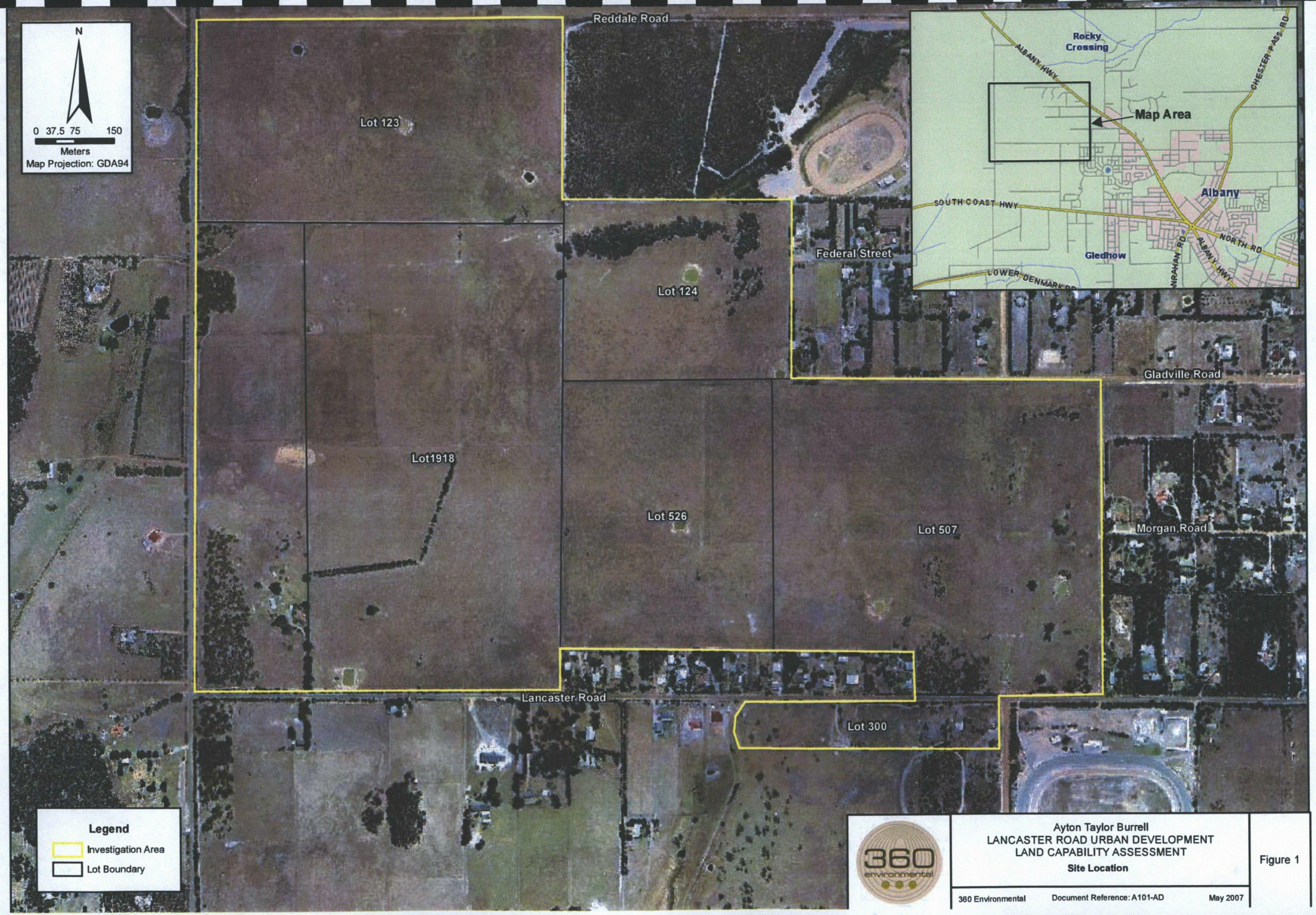
(Based on van Gool et. al., 2005)

Table 7. Land Instability Ratings

	Land Instability Rating				
	Nil	Very Low	Low	Moderate	High
Total Score (from Table 6)	< 3	3 – 4	5 - 6	7 - 9	> 9

(Based on van Gool et. al., 2005)

FIGURES



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LAND CAPABILITY ASSESSMENT
Site Location

Figure 1

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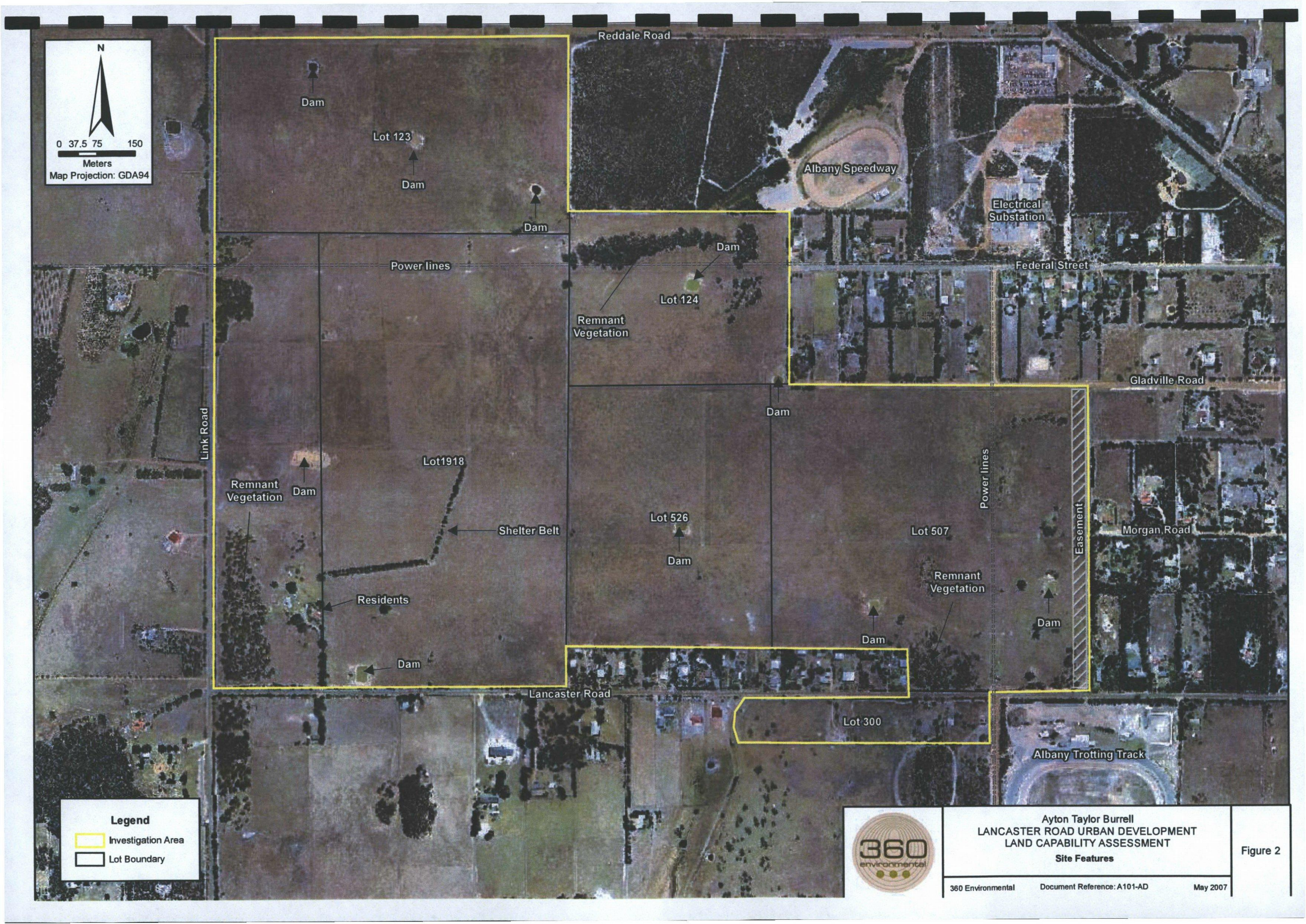
N
0 37.5 75 150
Meters
Map Projection: GDA94
Reddale Road
Dam
Lot 123
Dam
Dam
Albany Speedway
Electrical Substation
Power lines
Dam
Lot 124
Remnant Vegetation
Federal Street
Gladville Road
Dam
Link Road
Lot1918
Remnant Vegetation
Dam
Shelter Belt
Lot 526
Dam
Lot 507
Power lines
Easement
Morgan Road
Residents
Remnant Vegetation
Dam
Dam
Dam
Lancaster Road
Lot 300
Albany Trotting Track
Legend
Investigation Area
Lot Boundary
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LAND CAPABILITY ASSESSMENT
Site Features
Figure 2
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May 2007

Investigation Area From The North East

Investigation Area From The North West

Investigation Area From The South East

Investigation Area From The South West

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Site Visualisation

Figure 3

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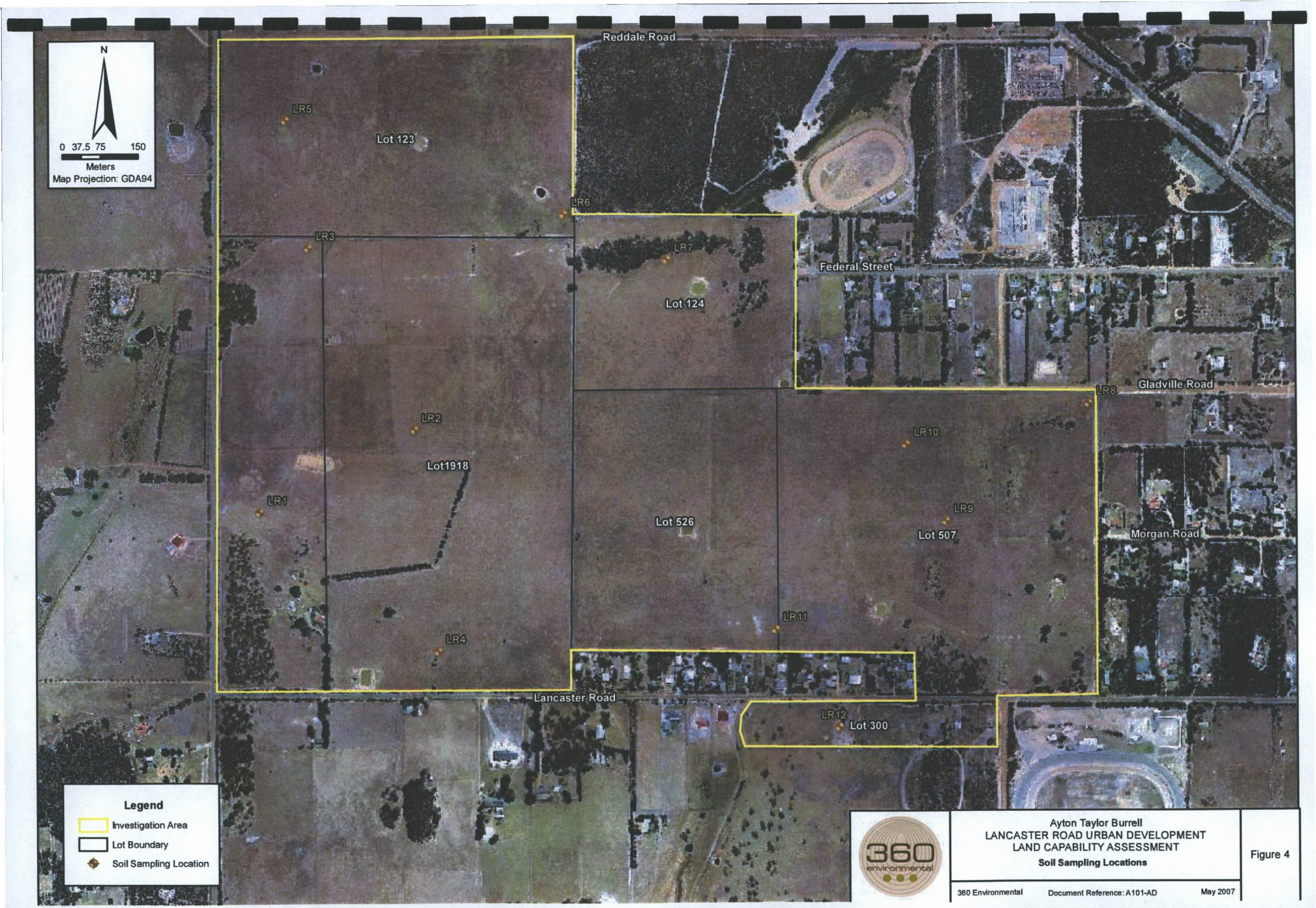
N
0 37.5 75 150
Meters
Map Projection: GDA94
Reddale Road
LR5
Lot 123
LR6
LR3
LR7
Federal Street
Lot 124
Gladville Road
LR8
LR2
LR10
Lot1918
LR1
LR9
Lot 526
Lot 507
Morgan Road
LR11
LR4
Lancaster Road
LR12
Lot 300
Legend
Investigation Area
Lot Boundary
Soil Sampling Location
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LAND CAPABILITY ASSESSMENT
Soil Sampling Locations
Figure 4
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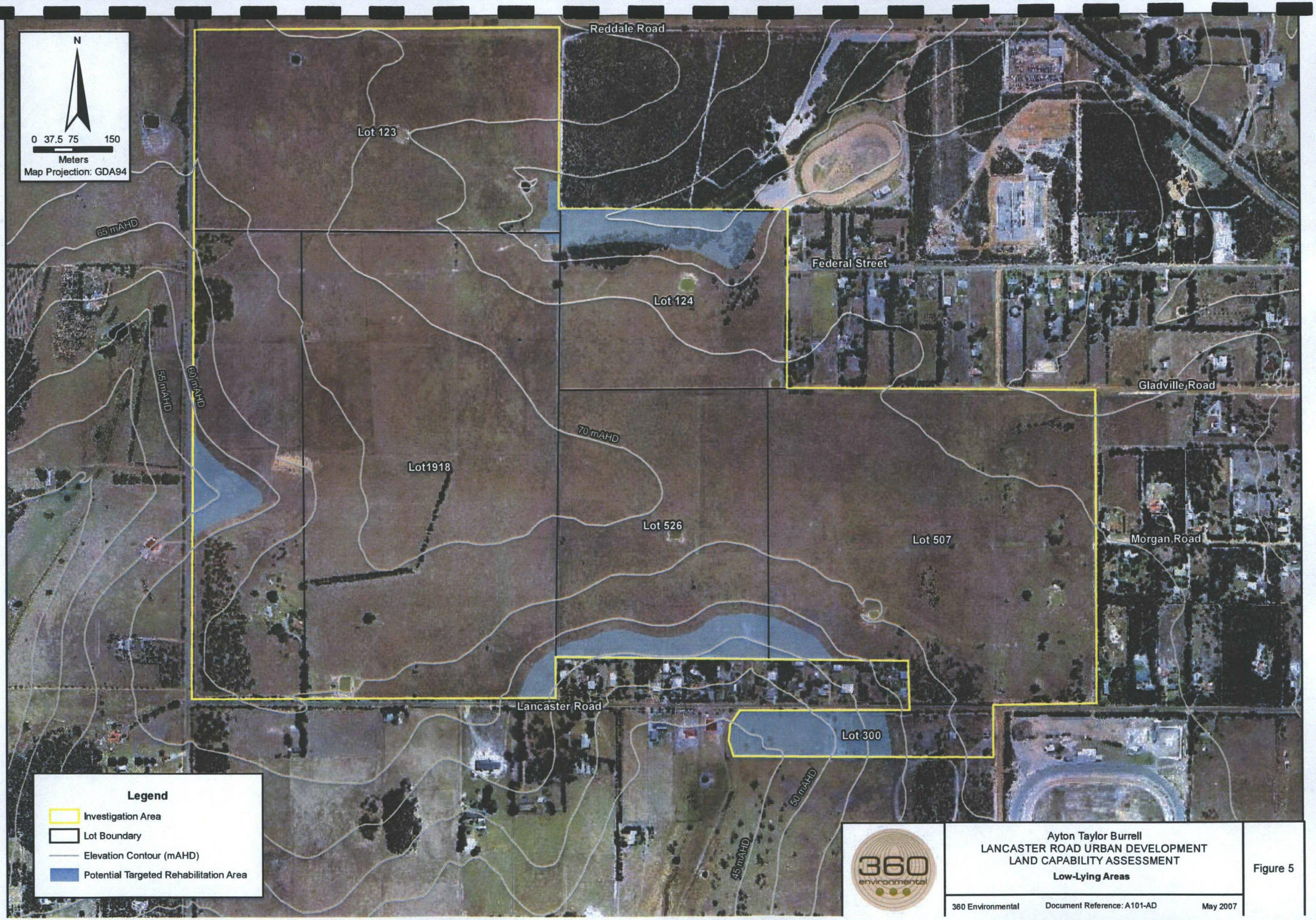
Document Reference: A101-AD
May 2007



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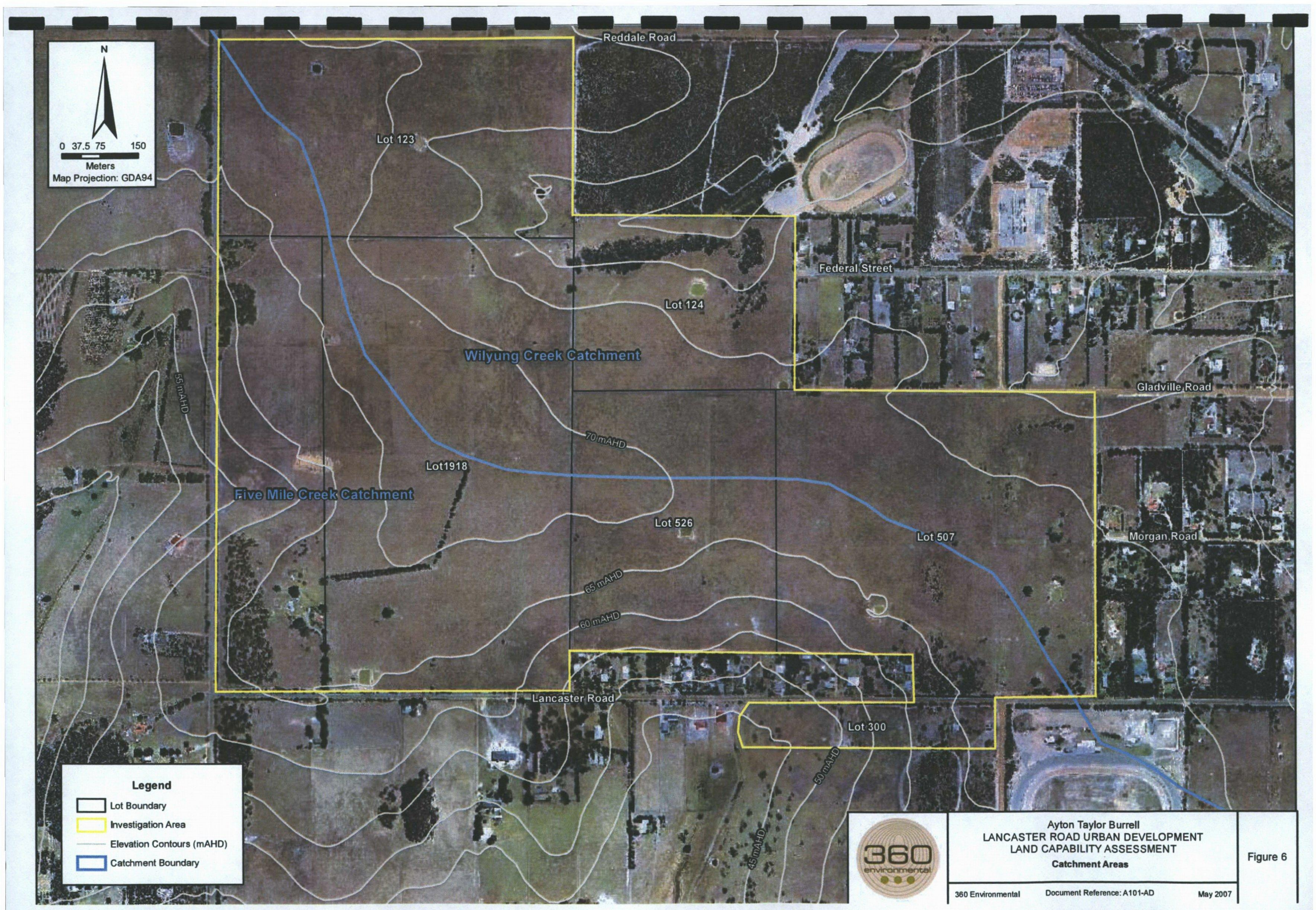
LANCASTER ROAD URBAN DEVELOPMENT
LAND CAPABILITY ASSESSMENT
Low-Lying Areas

Figure 5

360 Environmental | Document Reference: A101-AD | May 2007



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LANCASTER ROAD URBAN DEVELOPMENT
LAND CAPABILITY ASSESSMENT
Catchment Areas

Figure 6

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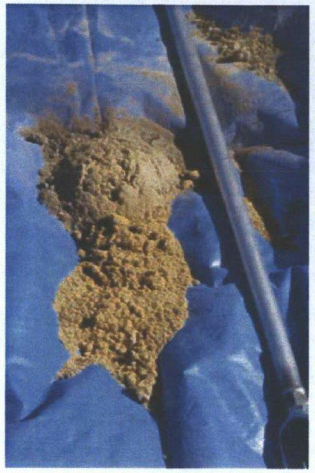
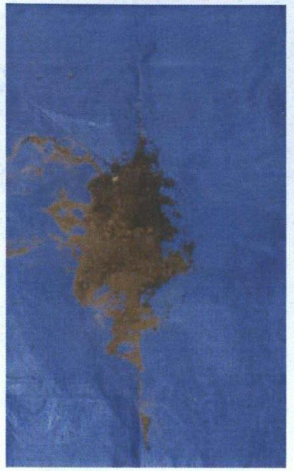
LR 1



LR 3

LR 5



LR 7

LR 9

LR 12

LR 2

LR 4

LR 6

LR 8

LR 10

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LAND CAPABILITY ASSESSMENT
Soil Boreholes

Figure 7

360 Environmental | Document Reference: A101-AD | May 2007

APPENDICES

APPENDIX A
Photographic Record from Field Investigation

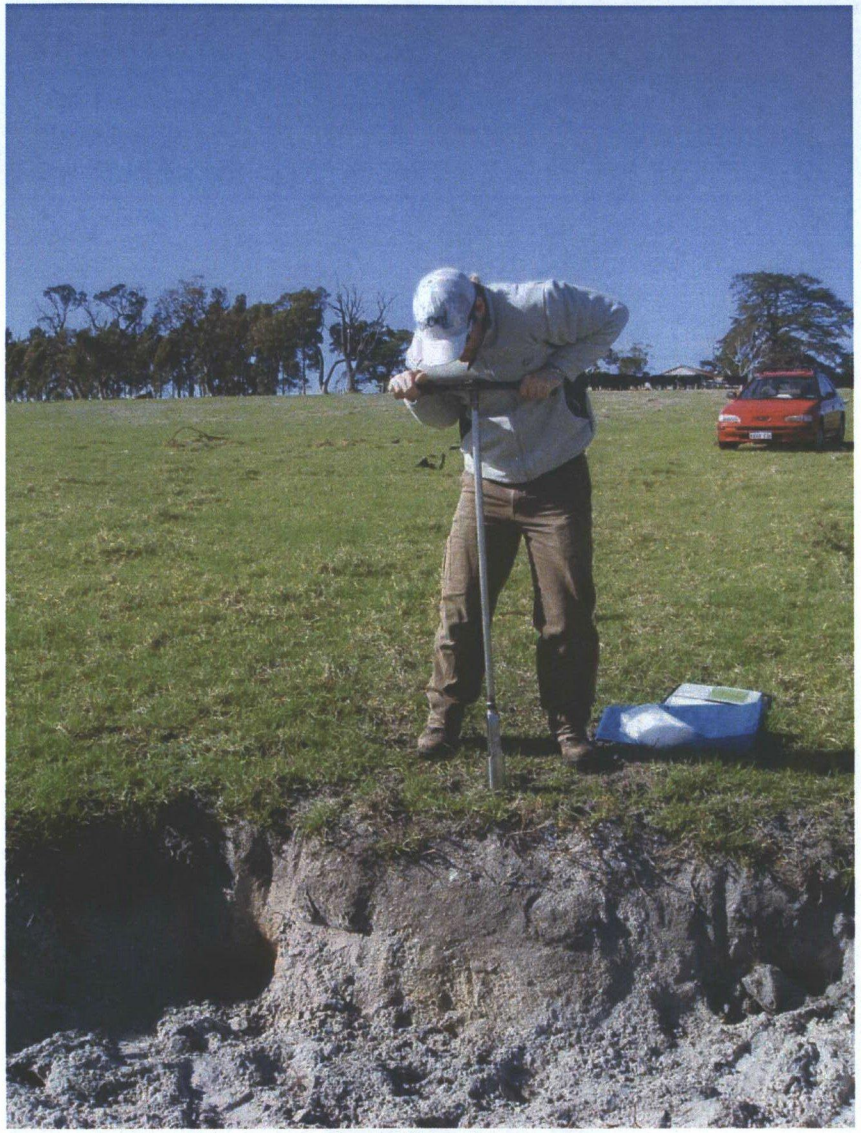


Plate 1: Soil Sampling Site LR 1 (Lot 1918).
Note: typical site groundcover and isolated erosion

Plate 2: Soil Sampling Site LR 3 (Lot 1918)
Note: typical site groundcover and powerlines.

Plate 3: Lot 124 Gladville Road Landuse

Plate 4: Lot 124 Gladville Road Landuse

Plate 5: Imported fill on Lot 507 Lancaster Rd

Plate 6: Imported fill on Lot 507 Lancaster Rd

.

Plate 7: Landuses on Lot 300 Lancaster Rd

Plate 8: Landuses on Lot 300 Lancaster Rd

Plate 9: Landuses on Lot 300 Lancaster Rd

Plate 10: Landuse on Lot 507 Lancaster Rd

Plate 11: Vegetation pocket on Lot 507 Lancaster Rd

Plate 12: Vegetation pocket on Lot 1918 Lancaster Rd

Plate 13: Vegetation pocket on Lot 1918 Lancaster Rd

Plate 14: Signs of erosion on Lot 1918 Lancaster Rd (western boundary)

APPENDIX B
Soil Borelogs

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 1918 - Western Section

Borehole Number: LR1
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 574382
Northing: 6128661

Drilling and Sampling Information									Material and Substance		
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condition	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR1-1	-			**ML** SILT, light grey, some organics	D	
					LR1-2	-	0.5		**ML** SILT, light grey	M	
					LR1-3	-					
							1.0		**ML** SILT, light grey with a trave of laterite gravel to 20mm		
									End of Log		

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 1916 - Central Ridge

Borehole Number: LR2
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 574693
Northing: 6128826

Drilling and Sampling Information								Material and Substance			
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condition	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR2-1	-			**OL** ORGANIC SILT, dark brown with organics	D	
					LR2-2	-			**ML** SILT, brownSILT, brown with a trace of laterite gravel to 20mm		
									End of Log		
							0.5				
							1.0				

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 1918 - Northern Boundary

Borehole Number: LR3
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 574480
Northing: 6129190

Drilling and Sampling Information							Material and Substance			
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condition	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR3-1	-			**ML** SILT, light brown, some organics	D	
									ML SILT, light brown with a trace of laterite gravel to 20mm	M	
					LR3-2	-					
									End of Log		
							0.5				
							1.0				

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 1916 - Southern Boundary

Borehole Number: LR4
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 574740
Northing: 6128381

Drilling and Sampling Information								Material and Substance			
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condition	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR4-1	-			OL ORGANIC SILT, dark brown with organics	M	
					LR4-2	-			OL ORGANIC SILT, dark brown with trace of gravel to 20mm		
							0.5		End of Log		
							1.0				

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 124 Link Road

Borehole Number: LR5
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 574435
Northing: 6129444

Drilling and Sampling Information								Material and Substance			
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condtion	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR5-1	-			**ML** SILT, light grey, some organics	D	
									SM Silty SAND, fine grained, brown		
					LR5-2	-	0.5		**SM** Silty SAND, fine grained, light grey	M	
					LR5-3	-					
							1.0		End of Log		

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 124 Link Road

Borehole Number: LR6
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 574992
Northing: 6129256

Drilling and Sampling Information							Material and Substance			
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condition	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR6-1	-			**ML** SILT, light brown, some organics	D	
									ML SILT, light brown with a trace of laterite gravel to 20mm	M	
					LR6-2	-					
									End of Log		
							0.5				
							1.0				

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 123 Gladville

Borehole Number: LR7
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 575196
Northing: 6129165

Drilling and Sampling Information							Material and Substance		
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condition	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR7-1	-			OL ORGANIC SILT, dark brown with organics		
									OL ORGANIC SILT, dark brown with trace of gravel to 20mm	M	
					LR7-2	-					
									End of Log		
							0.5				
							1.0				

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 507 Lancaster Road - Northern Boundary

Borehole Number: LR8
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 576056
Northing: 6428872

Drilling and Sampling Information								Material and Substance		
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condtion	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR8-1	-			OL ORGANIC SILT, dark brown with organics	D	
					LR8-2	-			OL ORGANIC SILT, light brown with trace of gravel to 15mm		
									End of Log		
							0.5				
							1.0				

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 507 Lancaster Road, Central Section

Borehole Number: LR9
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 575749
Northing: 6128639

Drilling and Sampling Information								Material and Substance			
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condition	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR9-1	-			**ML** SILT, dark brown, some organics	D	
									ML SILT, light brown with a trace of laterite gravel to 20mm		
					LR9-2	-					
									End of Log		
							0.5				
							1.0				

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 526 Lancaster Road, Central Section

Borehole Number: LR10
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 575670
Northing: 6128793

Drilling and Sampling Information							Material and Substance			
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condition	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR10-1	-			**ML** SILT, brown, some organics	D	
									ML SILT, light brown with a trace of laterite gravel to 20mm		
					LR10-2	-					
									End of Log		
							0.5				
							1.0				

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 526 Lancaster Road - Southern Section

Borehole Number: LR11
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 575409
Northing: 6128423

Drilling and Sampling Information								Material and Substance		
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condition	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR11-1	-			OL ORGANIC SILT, dark brown with trace of gravel to 20mm and organics	D	
									End of Log		
							0.5				
							1.0				

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 300 Lancaster Road

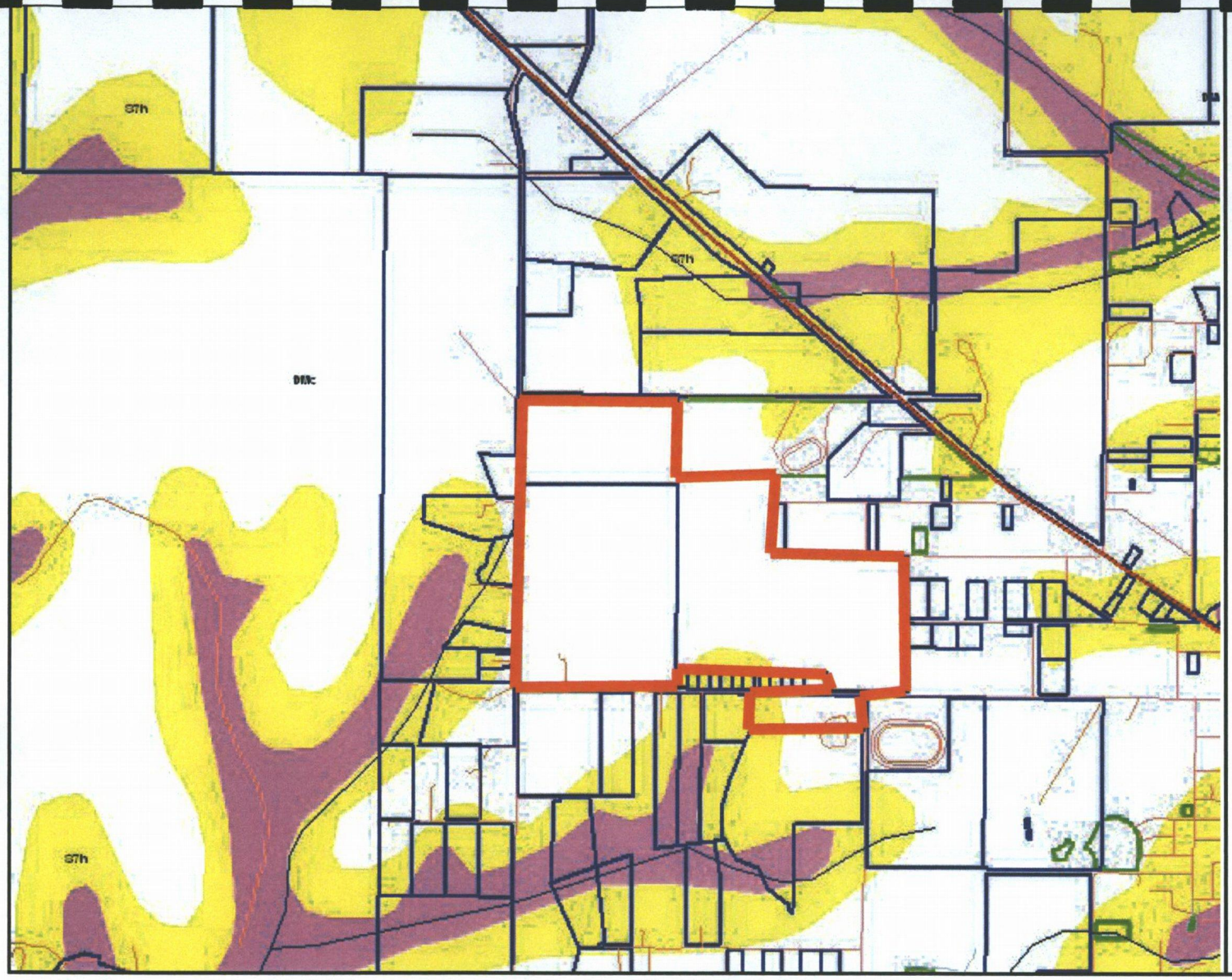
Borehole Number: LR12
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 575535
Northing: 6128226

Drilling and Sampling Information							Material and Substance			
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condition	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR12-1	-			**ML** SILT, dark brown, some organics	D	
									ML SILT, light grey		
					LR12-2	-					
									ML SILT, light grey with a trave of laterite gravel to 15mm		
					LR12-3	-					
							0.5		End of Log		
							1.0				

APPENDIX C
Department of Agriculture and Food Soil Landscape Maps



Lancaster Rd McKail Waterlog Risk

Cities and Towns
Hydrology
Roads - Detailed
Shires

- Properties
- Reserves
- Forests
- VCL

Subsystems

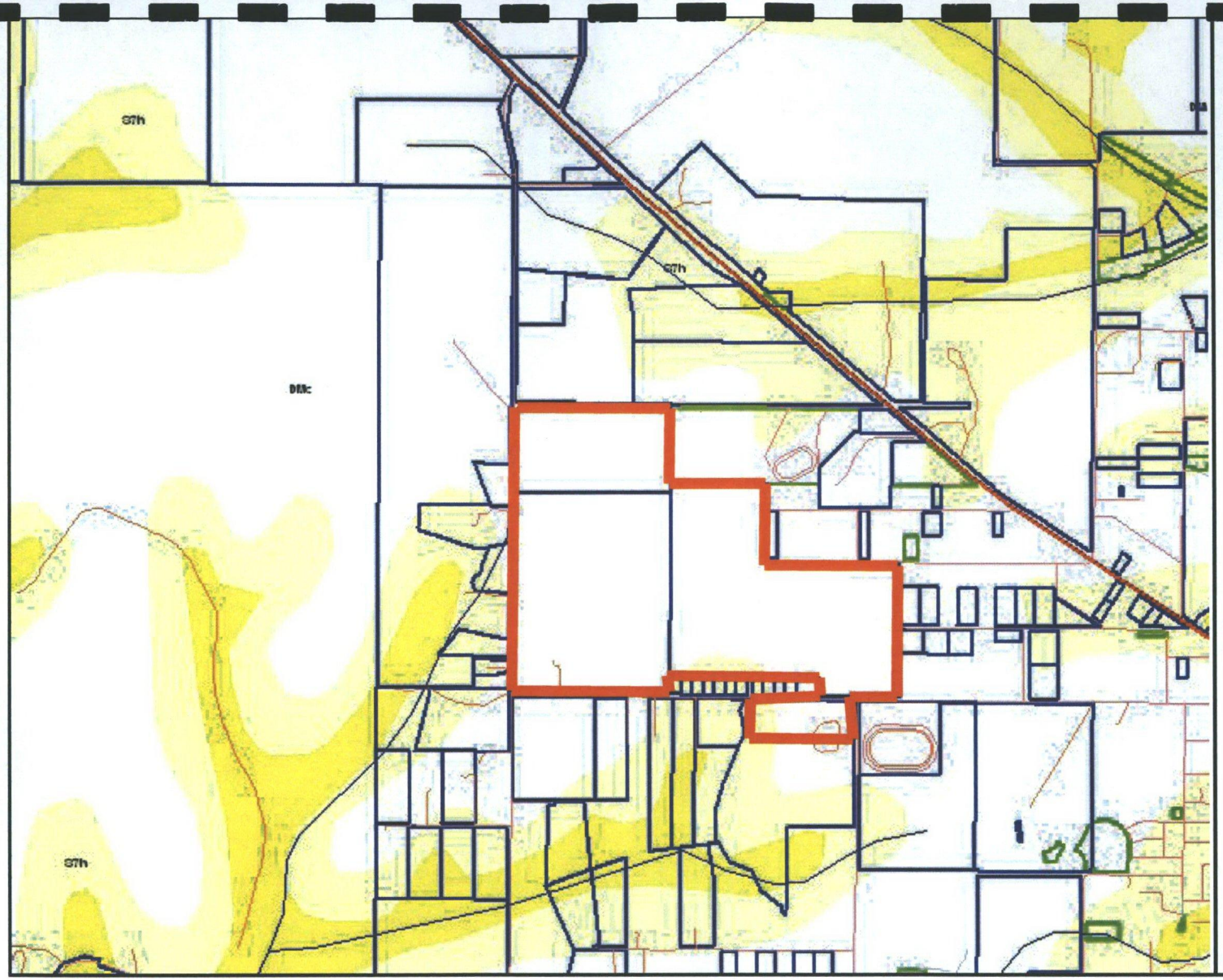
- 0-2% Moderate to very high hazard
- 3-9% Moderate to very high hazard
- 10-29% Moderate to very high hazard
- 30-49% Moderate to very high hazard
- 50-69% Moderate to very high hazard
- 70-100% Moderate to very high hazard

Department of Agriculture and Food
Government of Western Australia

1 Km

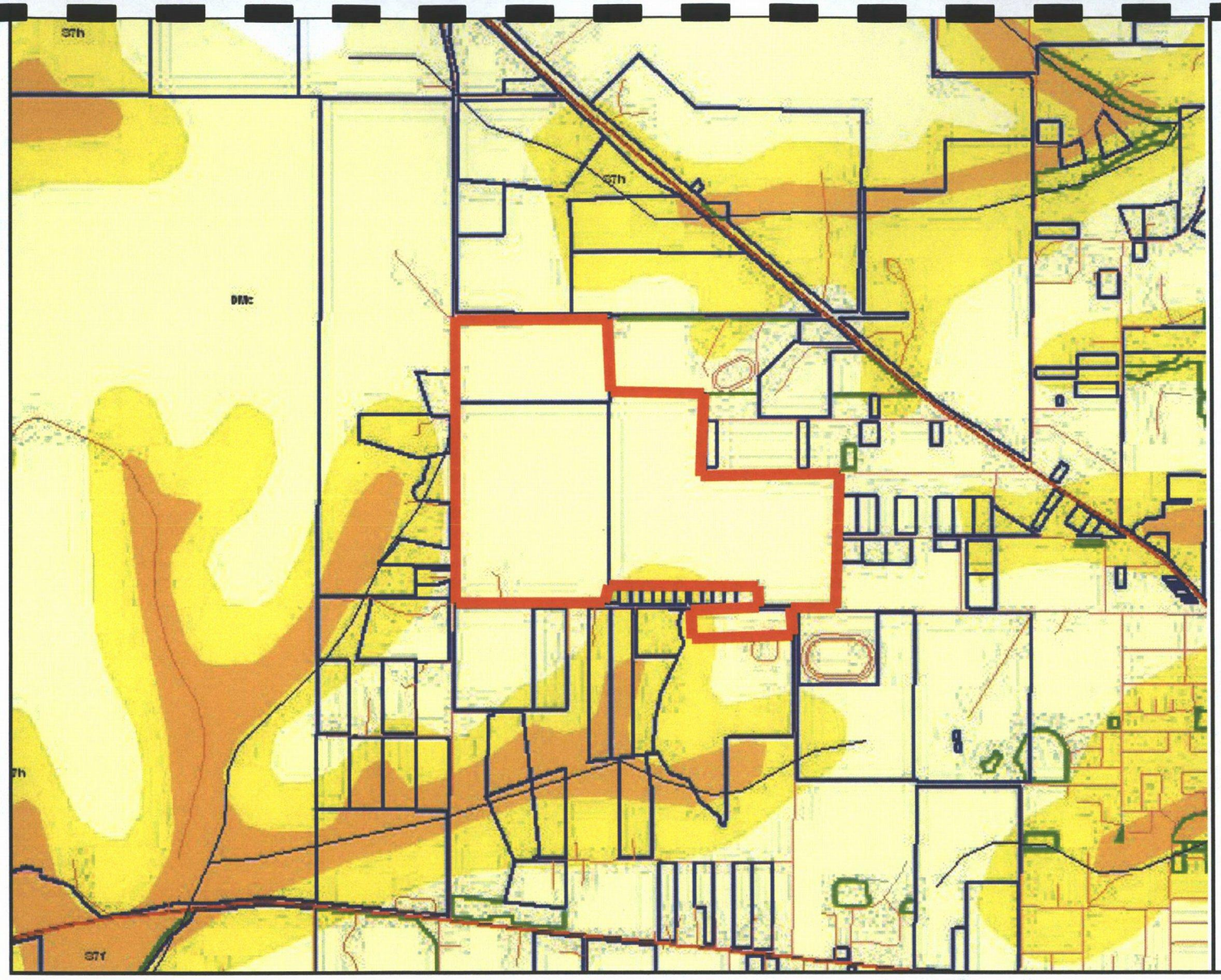
This plan is suitable for information only. The Department of Agriculture WA accepts no liability for any error whatsoever.

Produced by 202.72.133.154 at 09:43 on 3/4/2007



This plan is suitable for information only. The Department of Agriculture WA accepts no liability for any error whatsoever.

Produced by 202.72.133.154 at 09:46 on 3/4/2007



Lancaster Rd McKail Water Erosion Risk

Cities and Towns
Hydrology
Roads - Detailed
Shires

- Properties
- Reserves
- Forests
- VCL

Subsystems

- 0-2% High to extreme hazard
- 3-9% High to extreme hazard
- 10-29% High to extreme hazard
- 30-49% High to extreme hazard
- 50-69% High to extreme hazard
- 70-100% High to extreme hazard
- Insufficient information

Department of Agriculture and Food
Government of Western Australia

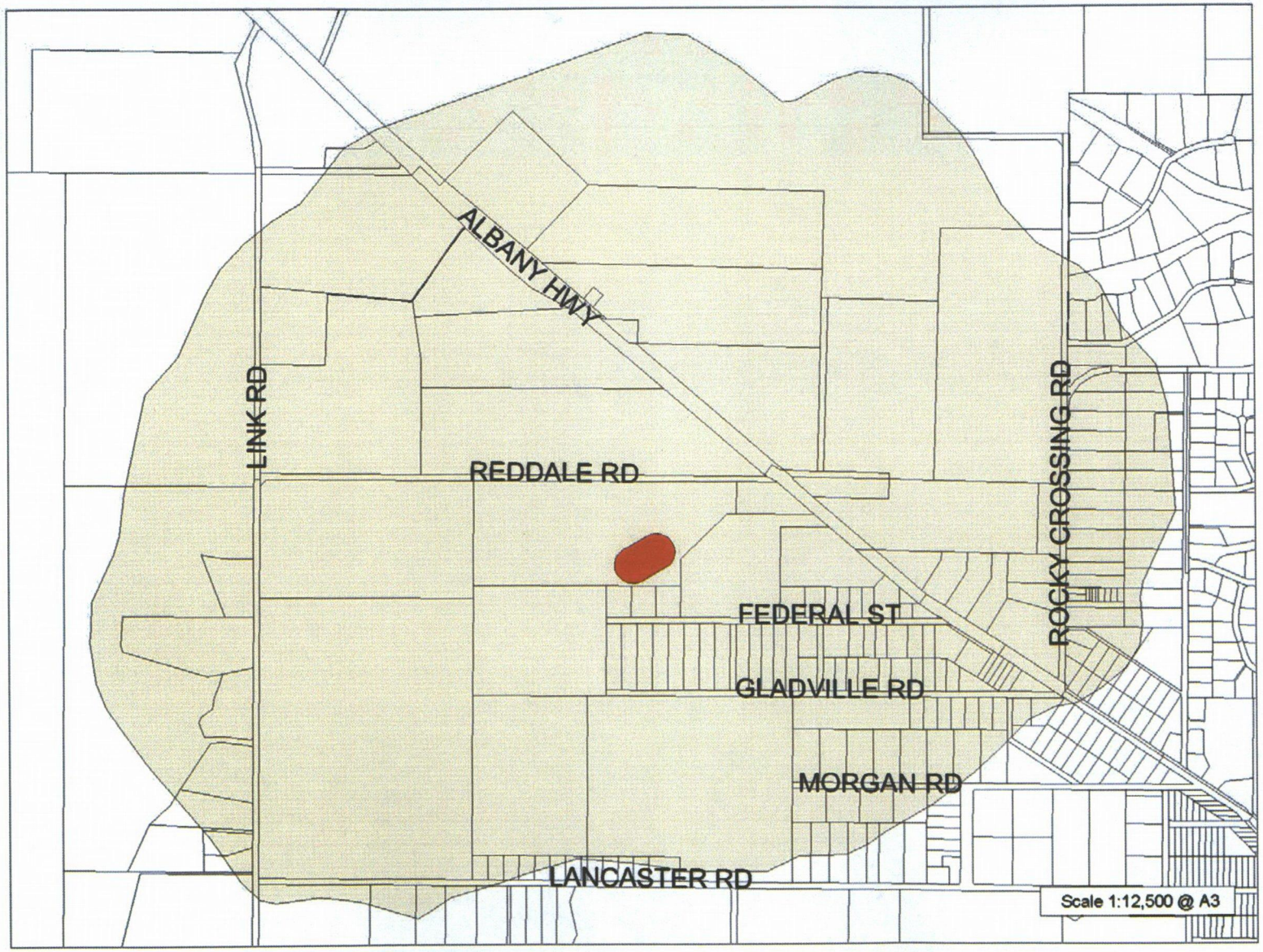
1 Km

This plan is suitable for information only. The Department of Agriculture WA accepts no liability for any error whatsoever.

Produced by 360 Environmental at 15:59 on 11/4/2007

APPENDIX D
Albany Speedway Noise Buffer Area

Albany Speedway Noise Buffer



Legend

- Noise Buffer Area
- Speedway

A+ CITY OF Albany

N

Map No. 1

Attachment II:

Wood & Grieve Engineers

Engineering Services Report

WOOD & GRIEVE ENGINEERS

Lots 1 - 10, 12, 13, 66, 300, 507 & 526 Lancaster Road and Lot 124 Federal Street, McKail
Preliminary Engineering Services Report

for

Ayton Baesjou Planning
Attention: Nick Ayton

3 August 2010
Revision No. 2

Revision List
Revision 1, 16/06/2010:- Updated information for wastewater planning
Revision 2, 3/08/2010:- Updated information for town planning

Prepared by Travis Demeza & Alan Millar Project Number: 19539-ALB-C
1st Floor, The Terrace Centre, 96-102 Stirling Terrace, Albany, Western Australia 6330
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2.1 Generic Site Information 1
2.2 Existing Services 2

3. Infrastructure Requirements 4
3.1 Bulk Earthworks 4
3.2 Drainage & Groundwater 4
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3.4 Wastewater Reticulation 4
3.5 Roadwork 5
3.6 Footpaths 5
3.7 Gas Reticulation 5
3.8 Telstra 5
3.9 Power 5
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APPENDIX A
FIGURE 1 Location Plan
FIGURE 2 Aerial Photograph
FIGURE 3 Wastewater Reticulation Services
FIGURE 4 Water Reticulation Servicing
FIGURE 5 Catchments and Drainage

APPENDIX B Dial Before You Dig Information

APPENDIX C Site Photos

1. Introduction

This Preliminary Engineering Services Report has been established by Wood & Grieve Engineers, on behalf of Ayton Baesjou Planning, to support the submission of an Outline Development Plan for the development of Lots 1 – 10, 12, 13, 66, 300, 507 & 526 Lancaster Road and Lot 124 Federal Street, McKail. This report outlines and summarises the proposed development area, discusses the surrounding existing services, and highlights critical items that need to be incorporated / accommodated when establishing a future development layout plan.

It is important to note the limitations of this report. No detailed design or in-depth authority liaison was performed in establishing the report, its outcomes or recommendations. A more in-depth level of investigation and authority liaison cannot be performed until a confirmed layout is established and key development requirements are finalised.

2. Development Area Characteristics

2.1 Generic Site Information

The proposed Outline Development Plan covers approximately 85.1Ha (Figure 1, Appendix A). The area is currently zoned residential development, and has 17 privately owned land holdings. The area is bound by the Albany Speedway to the north, existing residential housing to the east, Lancaster Road, Albany Trotting Track and rural residential development to the south and cleared, pastoral land to the west.

The development area consists of the following land holdings:

- Lot 1 -10, 12 & 13 - fronts Lancaster Road, and vary in size between 0.40 and 0.80 hectares. These lots are occupied by existing dwellings and a series of sheds in good condition and contain varying remnant vegetation. Refer to Figure 2, Appendix A, for an aerial photo.

- Lot 507- fronts Lancaster Road and Gladville Road. This lot is occupied by an existing dwelling and a series of sheds in good condition and contains sparse remnant vegetation, having been cleared for agricultural purposes. Several man-made dams are situated throughout the lot. Refer to Figure 2, Appendix A, for an aerial photo.

- Lot 526 - west of Lot 507. This lot is unoccupied and contains sparse remnant vegetation, having been cleared for agricultural purposes. A man-made dam is situated within the lot. Refer to Figure 2, Appendix A, for an aerial photo.

- Lot 124 - fronts Federal Street. This lot is occupied by an existing dwelling and a series of sheds in good condition and contains isolated remnant vegetation, having been cleared for agricultural purposes. A man-made dam is situated near the existing dwelling within the lot. Refer to Figure 2, Appendix A, for an aerial photo.

- Lot 300 - fronts the southern side of Lancaster Road. This lot is occupied by several existing dwellings and sheds in good condition and contains sparse vegetation, having been cleared for agricultural purposes. Refer to Figure 2, Appendix A, for an aerial photo.

The development area elevation varies from approximately 43m AHD in the south west of Lot 300 to 69m AHD west of Lot 526.

No detailed geotechnical work has been undertaken over the development area to confirm underlying soil conditions. However, from visual inspection it is predicted that the majority of the study area will have an organic topsoil layer, above a silty sand profile of varying thickness (thinner in the higher elevations) above a silty clay to clay layer, with high elevated areas being subject to underlying by coffee rock (ironstone). It is expected that these underlying impermeable layers will result in a perched groundwater table existing across the site during the winter months and after extended periods of rain during the summer months.

2.2 Existing Services

Existing services within, and adjacent to, the development area are as follows:

Wastewater Reticulation

No gravity reticulation exists within the development area, except for the Timewell Road pressure main which runs along the development area's eastern boundary between Lancaster Road and Gladville Road.

The Timewell Road 375mm dia pressure main will need to be catered for within the proposed development layout.

Refer Figure 3, Appendix A, and Dial Before You Dig information in Appendix B, for location of the above.

Water Reticulation

No water reticulation exists within the development area. The following Water Reticulation exists in adjacent road reserves:

- 100 AC within Federal Street;
- 100 PVC within Gladville Road;
- 100 PVC within Imperial Street;
- 58 AC within Morgan Road;
- 200 CI within Lancaster Road between the development's eastern boundary and approximately Lot 300 / Lot 254 adjoining boundary;
- 100 AC within Lancaster Road between approximately Lot 300 / Lot 254 adjoining boundary and approximately Lot 14 / Lot 15 adjoining boundary;
- 100 PVC within Lancaster Road between approximately Lot 14 / Lot 15 adjoining boundary and Link Road;
- 100PVC within Link Road between Lancaster Road and Lot 201 / 59 adjoining boundary.

It is expected that none of the above existing Water Reticulation will negatively impact upon the proposed development layout.

Refer Figure 4, Appendix A, and dial before you dig information within Appendix B, for location of the above.

Western Power

Significant Western Power assets exist within the development area. They are broken down into two categories, as follows:

- *Transmission Line*: the Mt Barker to Albany 132kV Transmission Line runs parallel along Reddale Road's southern road reserve boundary. Preliminary Western Power advice suggests that the overhead transmission line is required to remain in its current state and a 15 metre wide development buffer / easement either side of its centreline be incorporated into the development layout. No services, traffic or pedestrian traffic will be allowed within the 30m buffer zone.

  Please note that this transmission line is outside of the immediate development area and should not negatively impact upon the development of the lots within this servicing report.

- *Distribution Lines*: various overhead distribution lines run within the development area. Preliminary Western Power advice suggests that these existing lines will require to be undergrounded as part of development. It is our understanding that these lines can be subject to re-alignment to suit proposed road reserves, within reason, however this will require to be confirmed at time of subdivision.

Refer Dial Before you Dig information within Appendix B, for location of the above.

Telstra

No Telstra reticulation exists within the development area, however exists within the adjacent road reserves servicing landholdings in the area.

Refer Dial Before you Dig information within Appendix B, for location of the above.

Roads & Drainage Infrastructure

No roads & drainage infrastructure exists within the development area. The following exists in adjacent road reserves:

- Lancaster Road fronting the development area contains two coat seal road in good condition with associated open drains.

- Gladville Road fronting the development area contains two coat seal road in good condition with associated open drains to approximately Lot 507's driveway, with the remaining portion being unsealed laterite gravel pavement in good condition with associated open drains.

- Federal Street to Lot 124 contains two coat seal road in good condition with associated open drains.

Albany Highway is the Major Arterial Road which currently provides the main access from the study area to the Albany town centre.

Link Road, the future MRWA Ring Road, is to the west of the development area.

3. Infrastructure Requirements

3.1 Bulk Earthworks

The existing contours over the study area indicate that Lot 507 is relatively flat in the centre. The land then falls to the north east (-1.8%), and south west (-4.0%). To the west from Lot 507 to Lot 526 the land rises gradually (+0.5%).

It is recommended that proposed roads, buildings and other moisture sensitive infrastructure items are kept away from the naturally occurring gully or low lying areas. If needed, a minimum separation of 1m between the undersides of any moisture sensitive infrastructure should be allowed to the highest winter groundwater level, with a greater separation allowed if infiltration of stormwater is required.

3.2 Drainage & Groundwater

Due to the expected nature of the underlying soils (silty sands over clays / rock) and natural slope, it is assumed that for much of the site a perched groundwater table will be present, and the level will fluctuate with the seasons and be dependent upon soil strata. As such, late-winter geotechnical testing should be undertaken to confirm groundwater levels so that development potential can be accurately established.

The development area forms part of two larger surface water catchments. The southwest of the site drains to Five Mile Creek, and the northwest drains to Willyung Creek.

As shown in Figure 5, Appendix A it is proposed that the site be divided into a 5 sub-catchment areas. Even though the gully lines are generally not established creeklines or streams, there is opportunity to ensure these natural drainage contours are conserved and enhanced as much as possible and incorporated into the subdivision design to assist in drainage attenuation and treatment of stormwater.

Figure 5 shows nominal locations of possible drainage corridors that could incorporate attenuation structures (basins), and which could be included into the sites public open space requirements.

Protecting and enhancing existing drainage lines are in accordance with the current application of sensitive urban water management practises. Good management of stormwater is essential to avoid potential erosion and flooding issues downstream, as well as to prevent nutrient export into lower catchment water bodies.

3.3 Water Reticulation

Refer to Section 2.2 and Figure 4 for the extent of existing water reticulation adjacent the development area.

A preliminary discussion with the Water Corporation has established that the proposed water main upgrade as shown in Figure 4, Appendix A, will be required to service the development area. The main will most likely be a 250P main along Lancaster Road, dependent on final projected housing numbers. The long term plan is to connect this main with a 250P main coming up from the South Coast Highway along Clydesdale Road.

3.4 Wastewater Reticulation

Presently there is no reticulated wastewater serving the development area. Refer to Section 2.2 and Figure 3 for the existing wastewater reticulation adjacent to the development area.

Recent changes to the long term wastewater planning were discussed with the Water Corporation on the 15 June 2010. Refer to Figure 3, Appendix A. The main changes consist of two interim Type 40 pump stations along Albany Highway. Gravitating wastewater flows from the development to these pump stations may be the preferred option, however a feasibility study will be required at a later stage to confirm this.

3.5 Roadwork

Currently the development area is well serviced by the surrounding road network.

A full internal road hierarchy design and traffic analysis will be undertaken as part of the subdivision process, once a development layout has been established.

Main Roads WA is proposing to construct the Albany Ring Road west of the development area. They have proposed that a 100m noise buffer be provided to properties fronting the future Ring Road. Although this will not affect the development area directly, it may affect the long term structure plan for surrounding undeveloped lots.

3.6 Footpaths

A full pedestrian and cycleway network study will be undertaken when establishing the detailed development plan. Typically, it is preferable to have combination of road side footpaths, to accommodate recreational movements, as well as a more major cycleway network to allow for commuter traffic.

3.7 Gas Reticulation

There is currently no gas reticulation servicing this area, however with a development of this size, it would be economical to discuss the proposal with an appropriate gas supplier to establish whether the supply could be extended, or it not, whether it would be appropriate to include a gas farm as part of the development. A gas farm usually takes the form of a number of large commercial gas cylinders located on there own individual lot, the size of which is determined by the number to tanks required. The location and size of a required gas farm can be confirmed during the preparation of the detailed development layout once the size of the development is established.

3.8 Telstra

At present, there are optic fibre cables that run along Reddale Road and Albany Highway, with local cables along Lancaster Road and Federal Street.

As such, it is assumed that no major Telstra headworks will be required to service the development. Typical common trenching with power will be required throughout the development area as development proceeds.

3.9 Power

Preliminary advice from Western Power has suggested that no network reinforcement or upgrades will be required to service the development as there is the Mt Barker to Albany 132kV overhead transmission line which runs parallel along Reddale Road's southern road reserve boundary. Existing overhead distribution lines within the development site will need to be relocated underground.

3.10 Acid Sulphate Soils (ASS)

A review of the WAPC Planning Bulletin No. 64 highlights that the development area has been identified as being of 'no known risk of Acid Sulphate Soils (ASS) within 3m of natural soil surface (or deeper)'. As such, it is not anticipated that ASS be detrimental to infrastructure installation or remediation throughout the development area. However, this will require confirmation prior to the detailed design phase of the development.

3.11 Geotechnical Investigation

It is recommended that two levels of geotechnical investigations are undertaken for this development.

The first level is to allow a broad scale land capability assessment to be established, identifying developable areas. This would be undertaken now as part of the structure plan development phase. Please refer to the 360 Environmental Report attached to the main report.

The second level is a more detailed investigation undertaken on individual lots at the time of actual subdivision. This investigation is to provide advice in relation to such items as:

- Soil profiles;
- Suitability of in-situ soils for re-use in earthworks;
- Groundwater Levels;
- Occurrence of Acid Sulfate Soil;
- Pavement design parameters.

WOOD & GRIEVE ENGINEERS

4. Summary

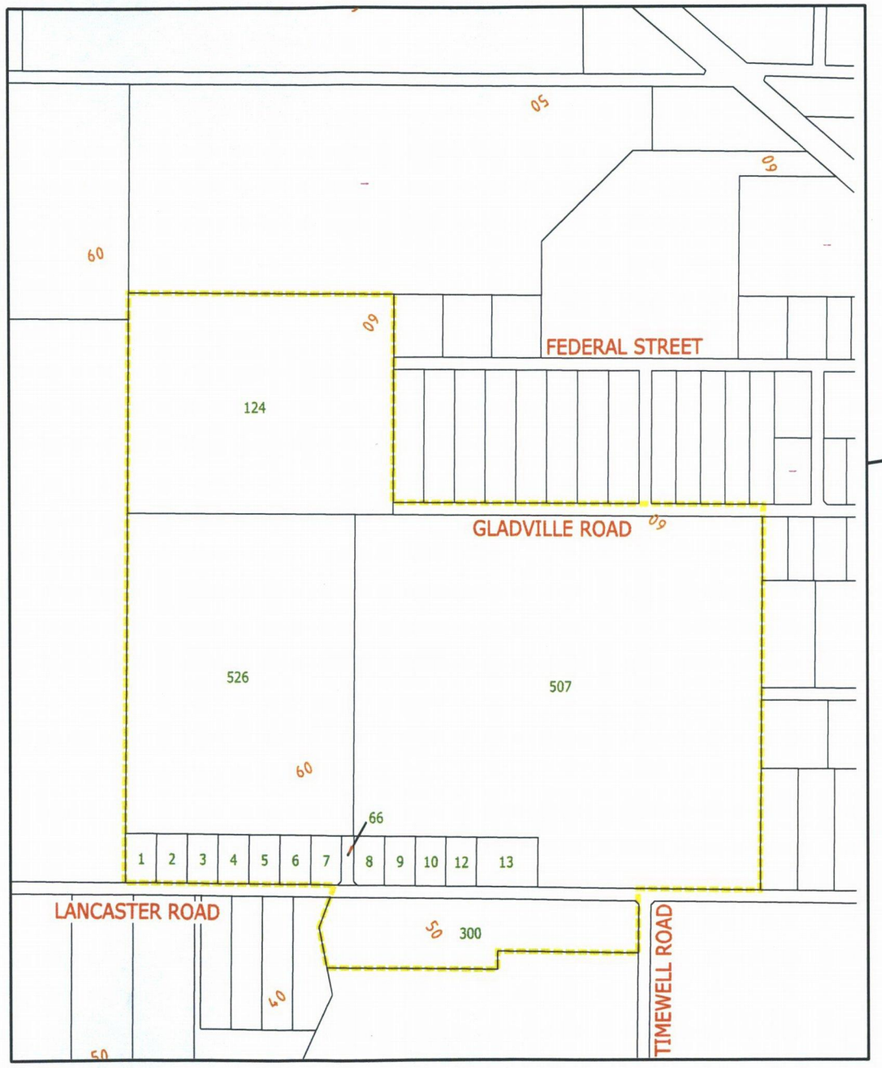
The purpose of this Preliminary Engineering Services Report was to provide Ayton Baesjou Planning with broad scale information on the existing and proposed engineering servicing requirements that could be utilised when establishing an outline development plan and development layout for the area bounded by Lots 1 – 10, 12, 13, 66, 300, 507 & 526 Lancaster Road and Lot 124 Federal Street, McKail.

WOOD & GRIEVE ENGINEERS

Appendix A

Figures 1 - 5

REV.	DESCRIPTION	DRAWN	VERIFIED	APPROVED
A	ORIGINAL ISSUE	RFF	AJM	TJD 08/06/10



PLAN
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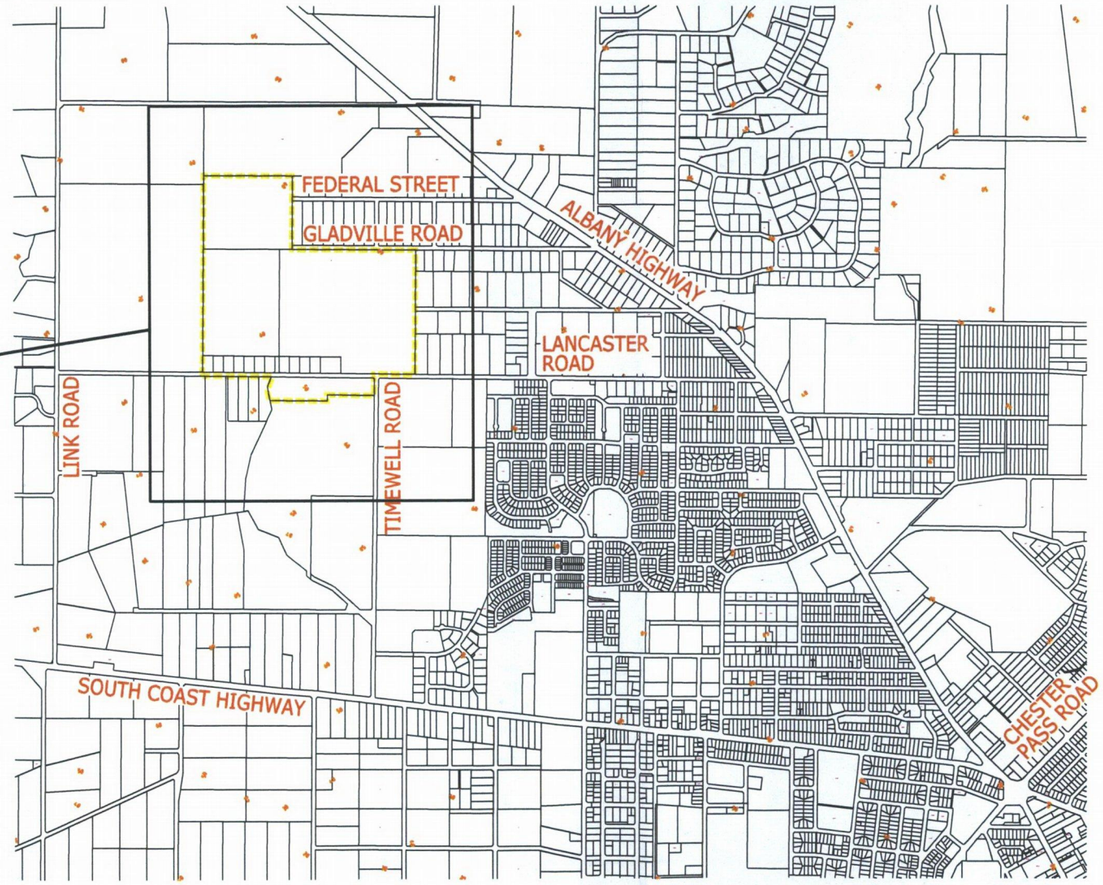

PLAN
SCALE 1:15000 @ A1

WOOD & GRIEVE ENGINEERS
Wood & Grieve Pty Ltd
A.C.N. 008 808 798
Level 1, The Terrace Centre
96-102 Stirling Terrace
Albany, Western Australia 6330
Facsimile 08 98 421 340
Telephone 08 98 423 700
Email albany@wga.com.au
Web www.wga.com.au
ALBANY
PERTH
MELBOURNE
SYDNEY
BRISBANE
BUSSELTON

CLIENT: AYTON BAESJOU PLANNING

PROJECT: LANCASTER ROAD AND FEDERAL STREET

TITLE: FIGURE 1 - LOCATION PLAN

DESIGNED:	ALAN MILLAR		DRAWN:	RHYS FIANDER	
VERIFIED:	TRAVIS DEMEZA	08 / 06 / 10	WAPC No.:	N/A	DATUM: A.H.D.
APPROVED FOR TENDER:	N/A	/ /	DRAWING No.	19539-ALB-C / F1	REV. A
APPROVED FOR CONSTRUCTION:	N/A	/ /			

REV.	DESCRIPTION	DRAWN	VERIFIED	APPROVED
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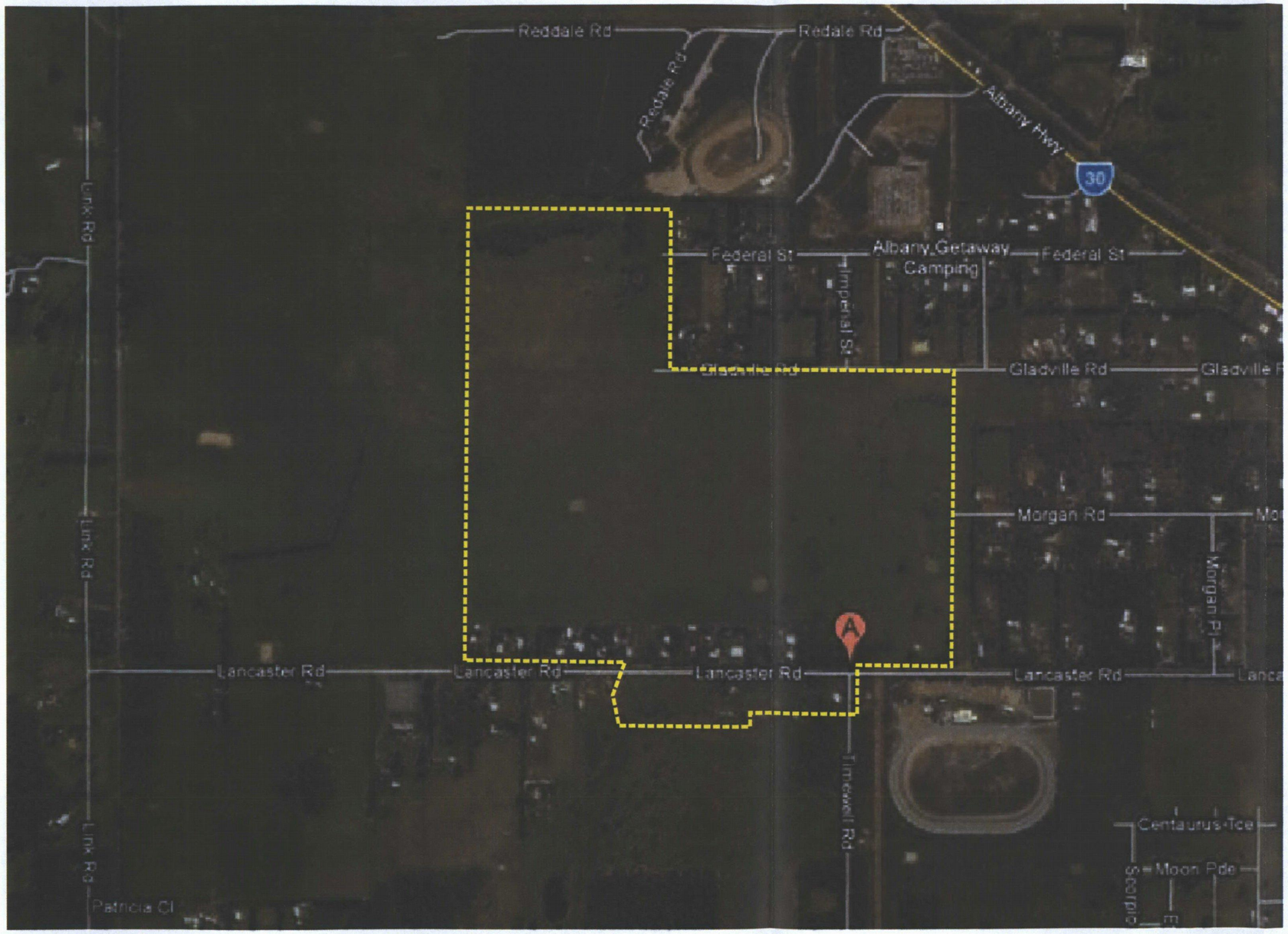

PLAN
SCALE 1:5000 @ A1

SCALE BAR 1:5000 @ ORIGINAL SHEET SIZE A1
0 50 100 150 200 250 500 750

WOOD & GRIEVE ENGINEERS

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BUSSELTON

CLIENT: AYTON BAESJOU PLANNING

PROJECT: LANCASTER ROAD AND FEDERAL STREET

TITLE: FIGURE 2 - AERIAL PHOTOGRAPH

DESIGNED:	ALAN MILLAR		DRAWN:	RHYS FIANDER	
VERIFIED:	TRAVIS DEMEZA	06 / 06 / 10	WAPC No.:	N / A	DATUM: A.H.D.
APPROVED FOR TENDER:	N / A	/ /	DRAWING No.	19539-ALB-C / F2	REV. A
APPROVED FOR CONSTRUCTION:	N / A	/ /			

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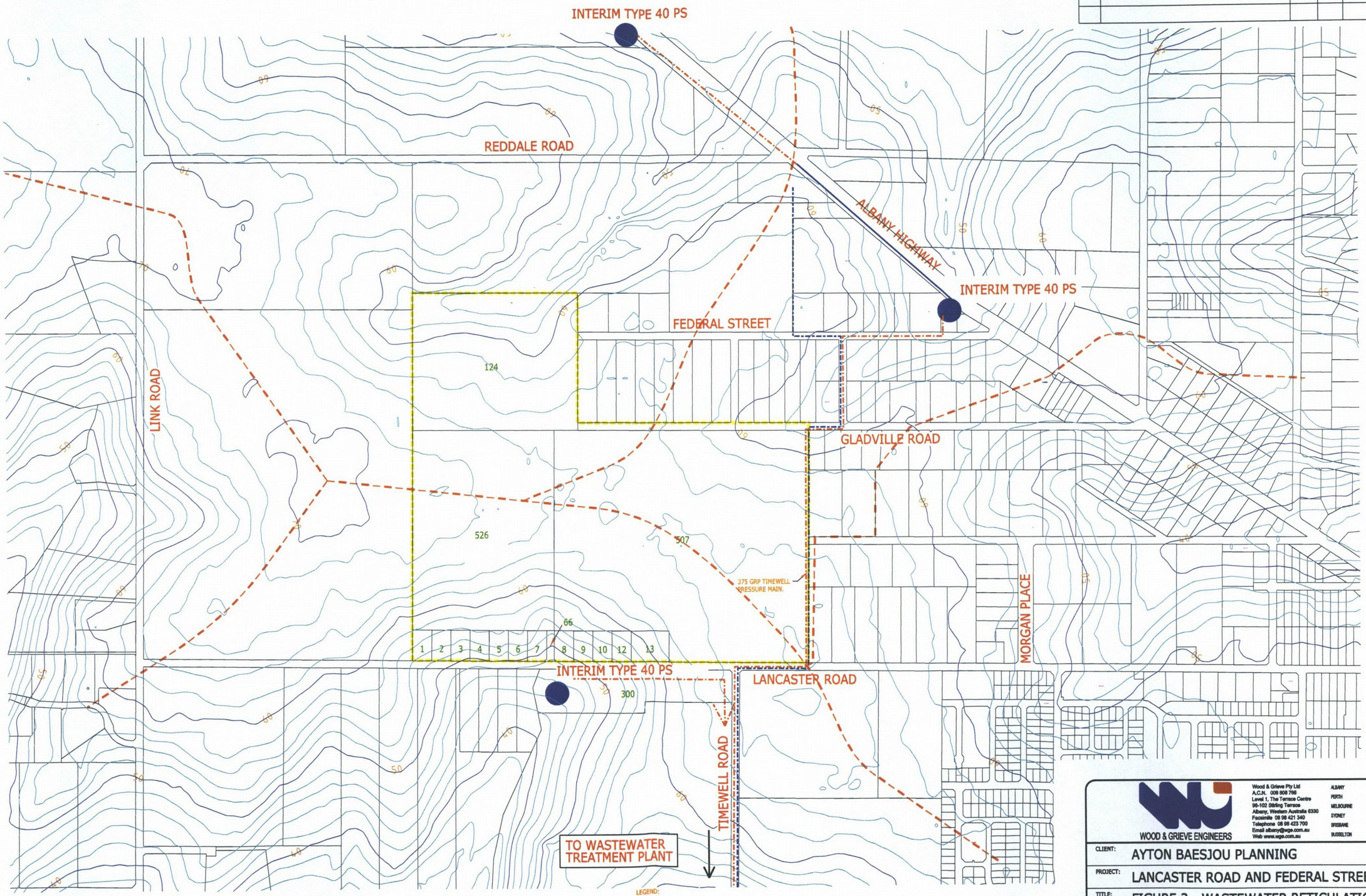

PLAN
SCALE 1:5000 @ A1

0 50 100 150 200 250 500 750
SCALE BAR 1:5000 @ ORIGINAL SHEET SIZE A1

WOOD & GRIEVE ENGINEERS
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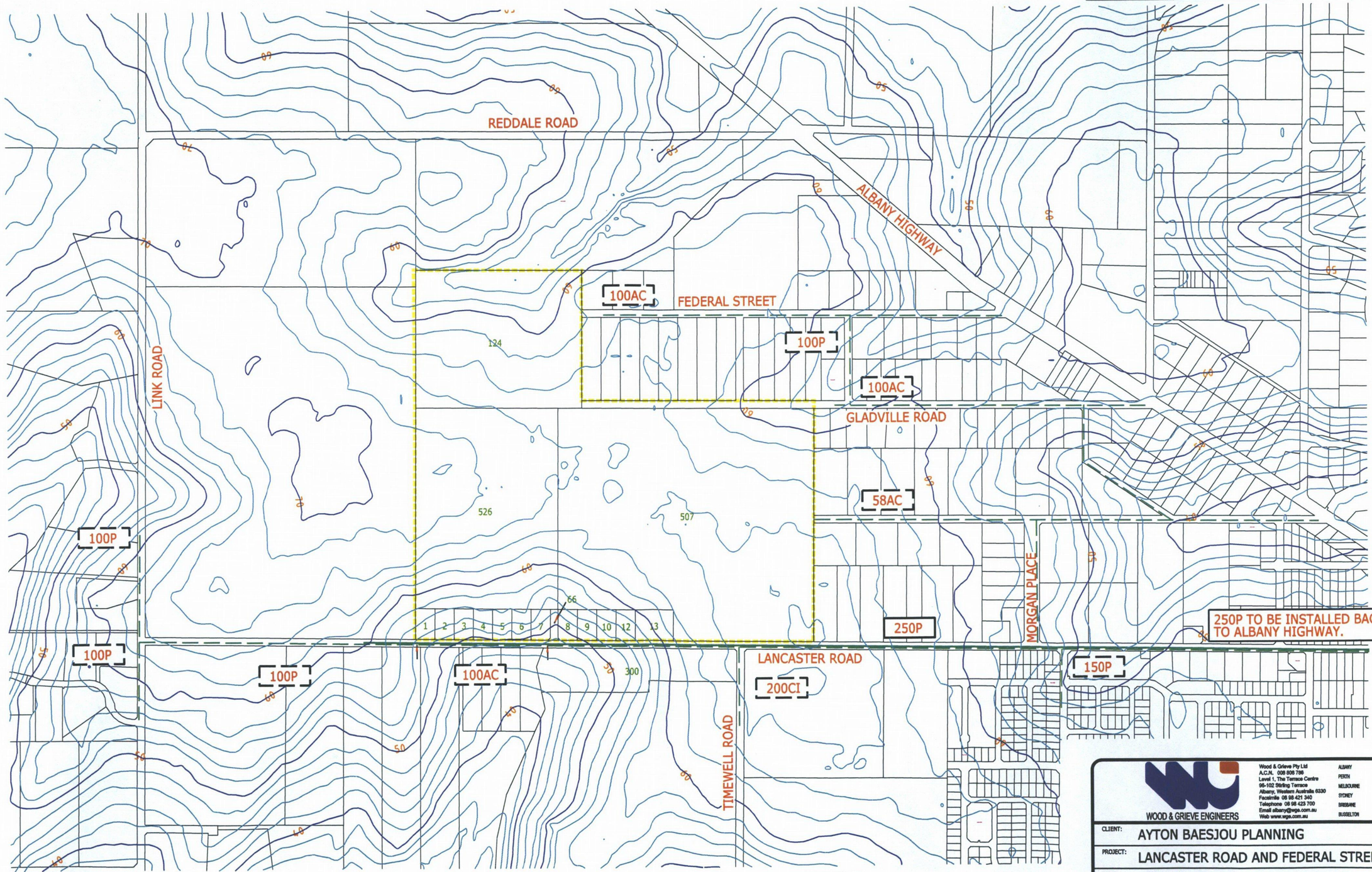
Web www.wge.com.au
ALBANY
PERTH
MELBOURNE
SYDNEY
BRISBANE
BUSSELTON

CLIENT:	AYTON BAESJOU PLANNING
PROJECT:	LANCASTER ROAD AND FEDERAL STREET
TITLE:	FIGURE 3 - WASTEWATER RETICULATION SERVICES

DESIGNED:	ALAN MILLAR	DRAWN:	RHYS FIANDER
VERIFIED:	TRAVIS DEMEZA 08 / 06 / 10	WAPC No.:	N / A
APPROVED FOR TENDER:	N/A / /	DATUM:	A.H.D.
APPROVED FOR CONSTRUCTION:	N/A / /	DRAWING No.	19539-ALB-C / F3
		REV.	A

REV.	DESCRIPTION	DRAWN	VERIFIED	APPROVED
A	ORIGINAL ISSUE	RFF	AJM	TJD 08/06/10



PLAN
SCALE 1:5000 @ A1

SCALE BAR 1:5000 @ ORIGINAL SHEET SIZE A1
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WOOD & GRIEVE ENGINEERS
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BUSSELTON

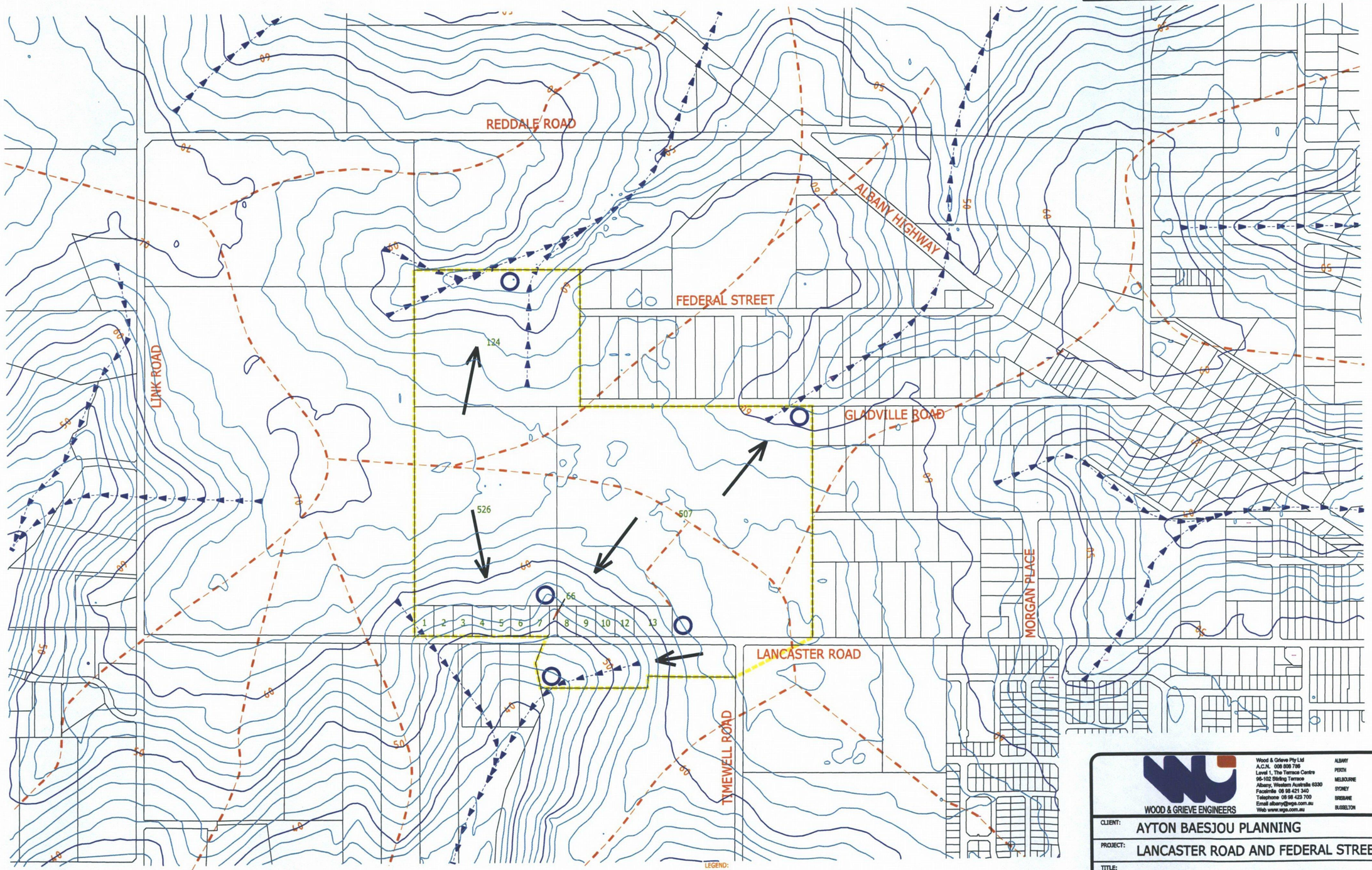
CLIENT: AYTON BAESJOU PLANNING

PROJECT: LANCASTER ROAD AND FEDERAL STREET

TITLE: FIGURE 4 - WATER RETICULATION SERVICING

DESIGNED: ALAN MILLAR		DRAWN: RHYS FIANDER	
VERIFIED: TRAVIS DEMEZA	08 / 06 / 10	WAPC No.: N/A	DATUM: A.H.D.
APPROVED FOR TENDER: N/A	/ /	DRAWING No. 19539-ALB-C / F4	REV. A
APPROVED FOR CONSTRUCTION: N/A	/ /		

REV.	DESCRIPTION	DRAWN	VERIFIED	APPROVED
A	ORIGINAL ISSUE	RFF	AJM	TJD 08/06/10



PLAN
SCALE 1:5000 @ A1

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BRISBANE
BUSSELTON

CLIENT: AYTON BAESJOU PLANNING

PROJECT: LANCASTER ROAD AND FEDERAL STREET

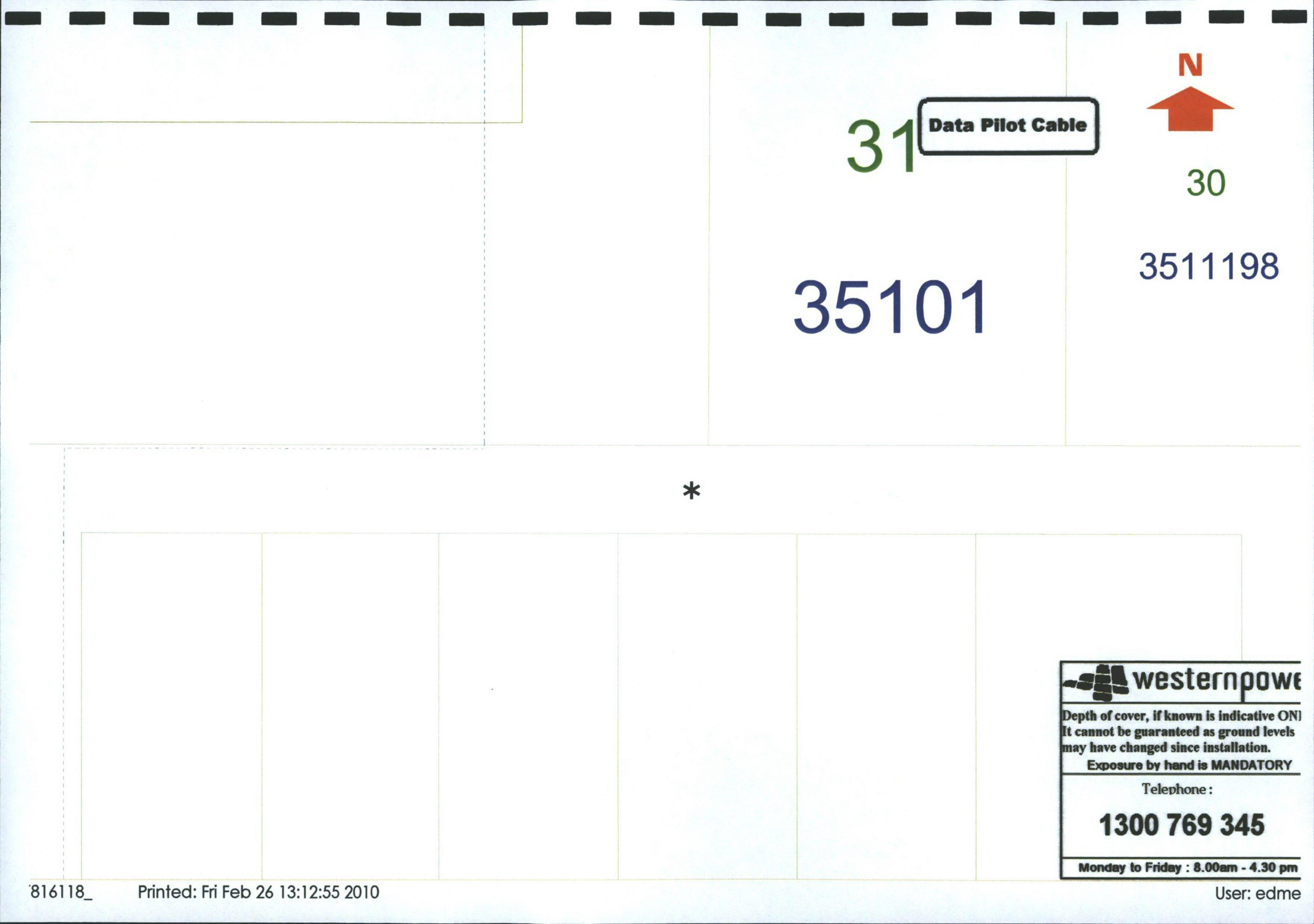
TITLE: FIGURE 5 - CATCHMENTS AND DRAINAGE

DESIGNED:	ALAN MILLAR	DRAWN:	RHYS FIANDER
VERIFIED:	TRAVIS DEMEZA 08 / 06 / 10	WAPC No.:	N/A DATUM: A.H.D.
APPROVED FOR TENDER:	N/A / /	DRAWING No.	19539-ALB-C / F5 REV. A
APPROVED FOR CONSTRUCTION:	N/A / /		

WOOD & GRIEVE ENGINEERS

Appendix B

Dial Before You Dig Information



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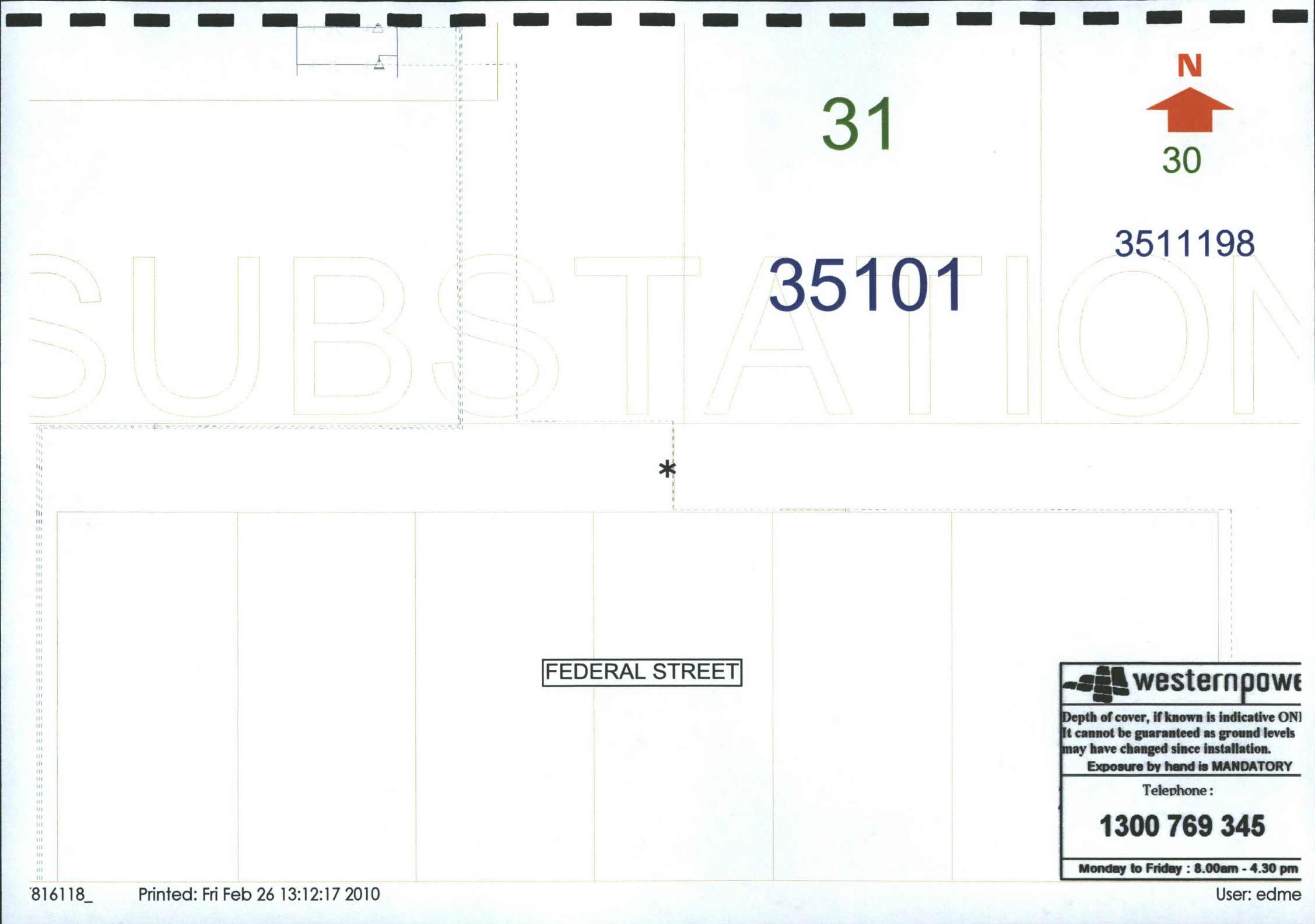

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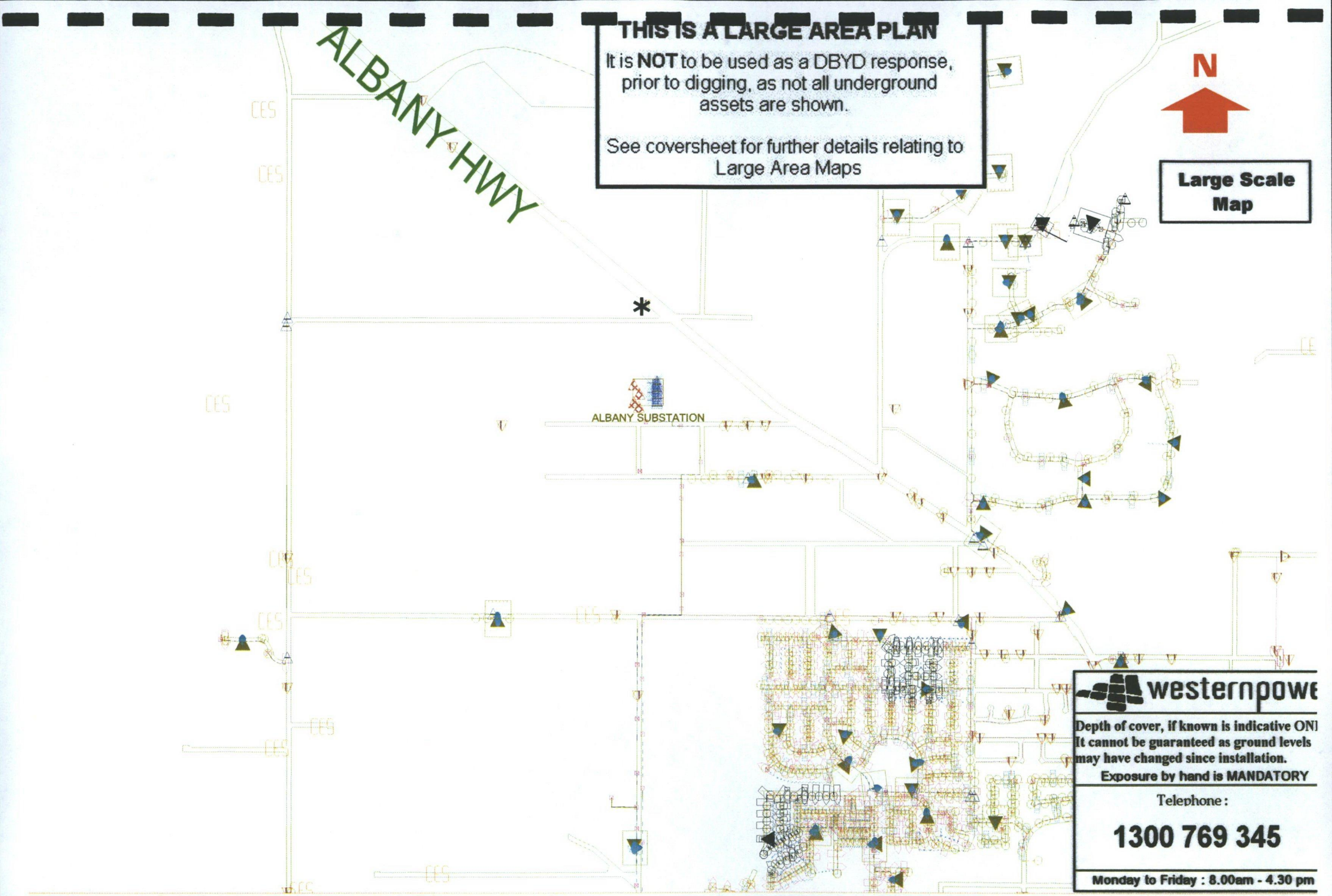

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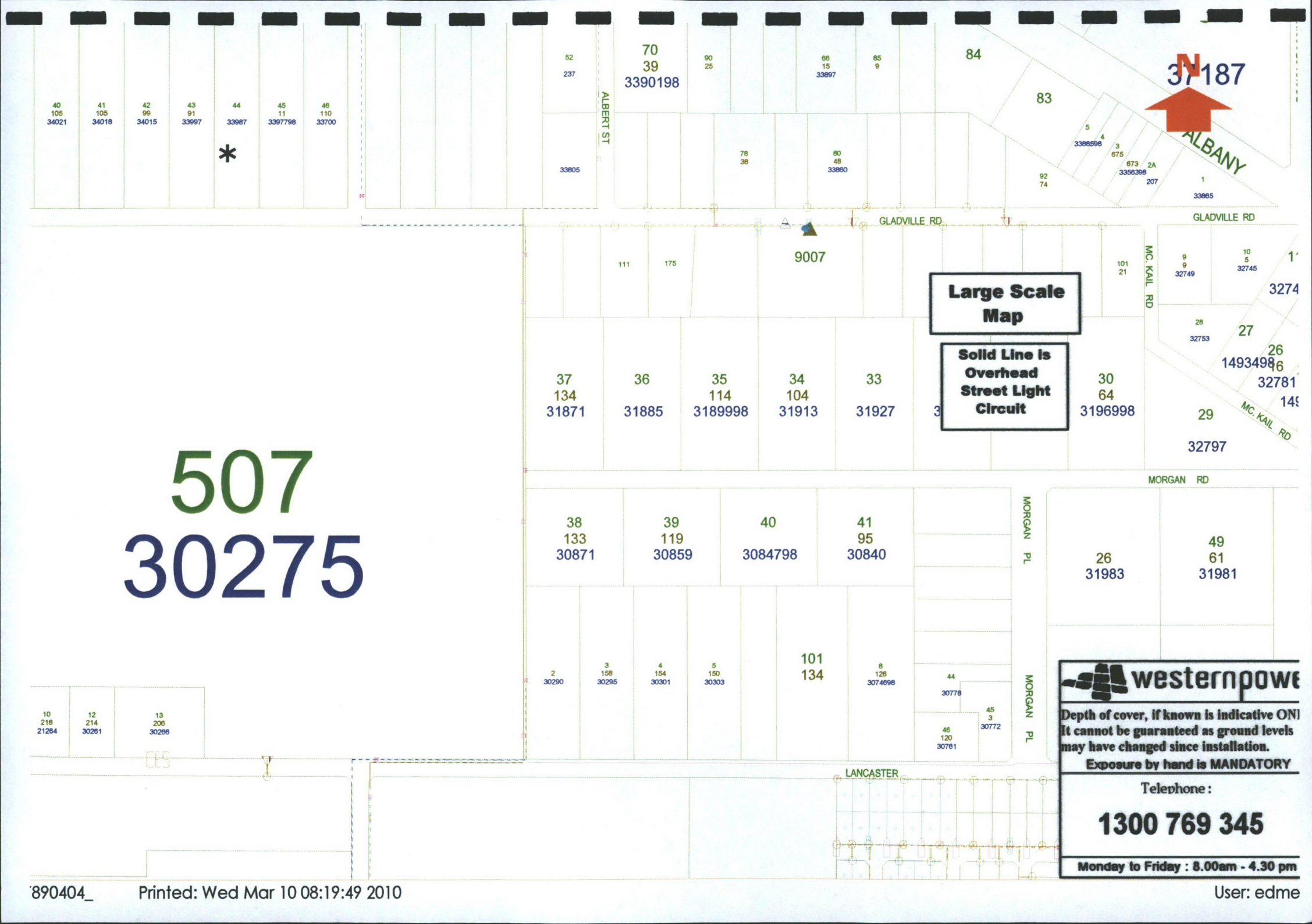

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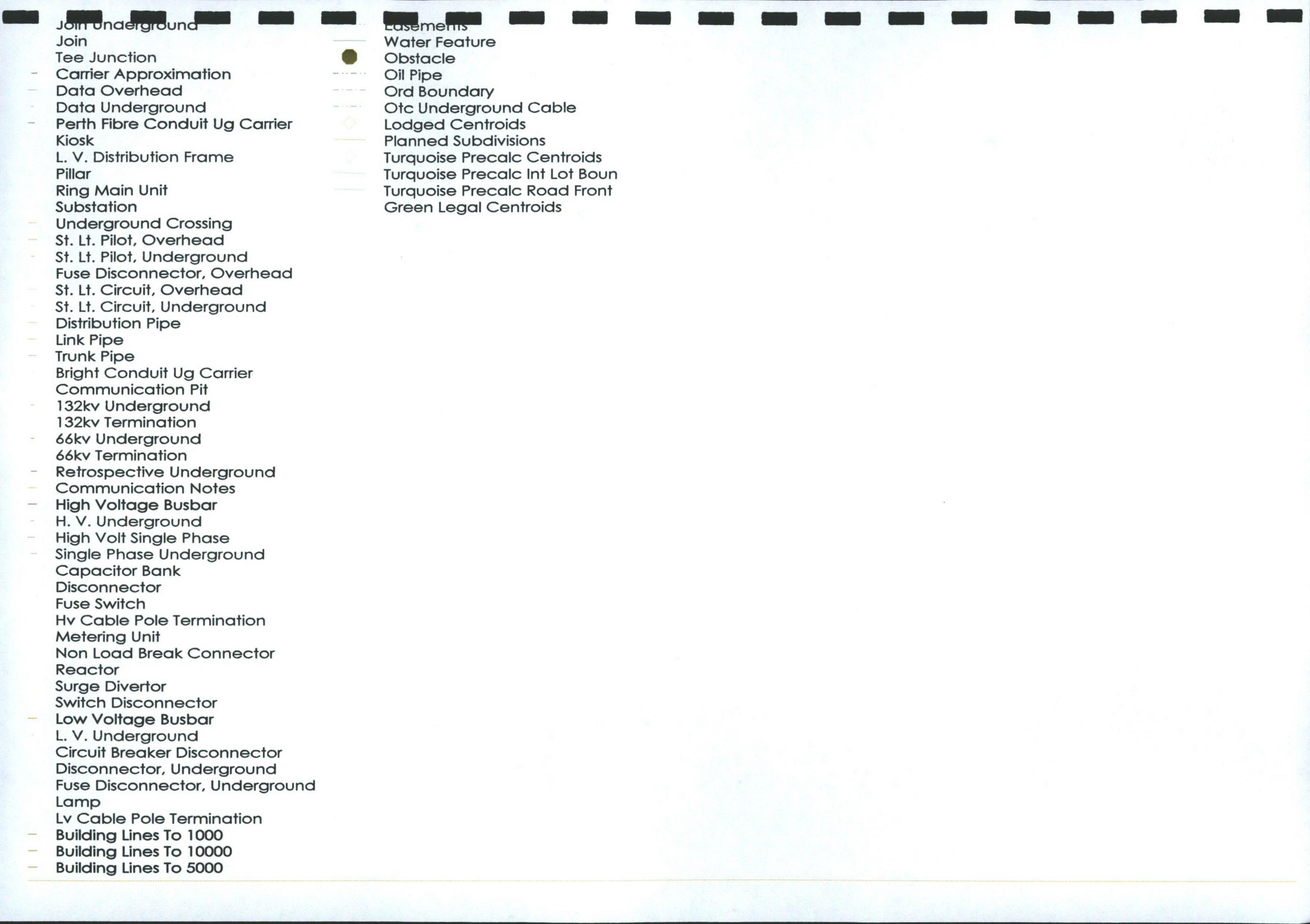

Join Underground
Join
Tee Junction
Carrier Approximation
Data Overhead
Data Underground
Perth Fibre Conduit Ug Carrier
Kiosk
L. V. Distribution Frame
Pillar
Ring Main Unit
Substation
Underground Crossing
St. Lt. Pilot, Overhead
St. Lt. Pilot, Underground
Fuse Disconnector, Overhead
St. Lt. Circuit, Overhead
St. Lt. Circuit, Underground
Distribution Pipe
Link Pipe
Trunk Pipe
Bright Conduit Ug Carrier
Communication Pit
132kv Underground
132kv Termination
66kv Underground
66kv Termination
Retrospective Underground
Communication Notes
High Voltage Busbar
H. V. Underground
High Volt Single Phase
Single Phase Underground
Capacitor Bank
Disconnector
Fuse Switch
Hv Cable Pole Termination
Metering Unit
Non Load Break Connector
Reactor
Surge Divertor
Switch Disconnector
Low Voltage Busbar
L. V. Underground
Circuit Breaker Disconnector
Disconnector, Underground
Fuse Disconnector, Underground
Lamp
Lv Cable Pole Termination
Building Lines To 1000
Building Lines To 10000
Building Lines To 5000
Easements
Water Feature
Obstacle
Oil Pipe
Ord Boundary
Otc Underground Cable
Lodged Centroids
Planned Subdivisions
Turquoise Precalc Centroids
Turquoise Precalc Int Lot Boun
Turquoise Precalc Road Front
Green Legal Centroids

PO Box 378 Abottsford VIC 3067 Phone: 1100 Fax: 1300 652 077 www.1100.com.au	**DIAL BEFORE YOU DIG** **Utility Notification**	DIAL BEFORE YOU DIG www.1100.com.au

Please be advised the person below has requested information about underground assets in your area of interest. You are requested to respond within 2 working days and reference both the Sequence number and Job number.

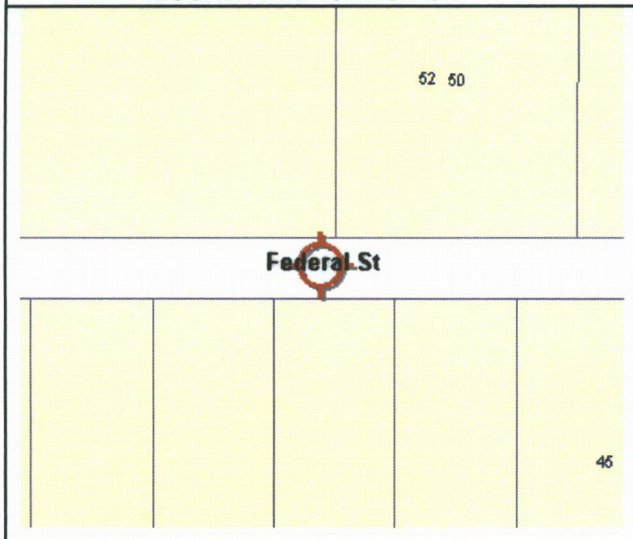
To:	Water Corp Info Services	**Sequence No:**	17816117
Utility:	80850	**Start Date:**	2/03/2010
Enquiry Date:	25/02/2010 2:22:40 PM	**Priority Type:**	Normal - Web

Caller Details

Customer Id:	672063	**Phone:**	0898423700
Contact:	Mrs Alicia Bain	**Mobile:**	Not Supplied
Company:	Wood & Grieve Enigneers	**Fax:**	0898421340
Address:	11 Duke St Albany Wa 6330	**Email:**	alicia.bain@wge.com.au

Location Details

LOCALITY INDICATION ONLY



Address:	Federal St Mckail WA 6330
Intersection:	Not Supplied
Side of Street:	Not Supplied
Distance:	Not Supplied
Activity Code:	15 - Mechanical Excavation
Location Type:	Both Private Property & Road Reserve
For Planning:	No
Traffic Affected:	No
GPS X Coord:	117.832744
GPS Y Coord:	-34.977353
Parcel ID:	

Map Ref: TRAVELLERS 4D2

Additional work site information:

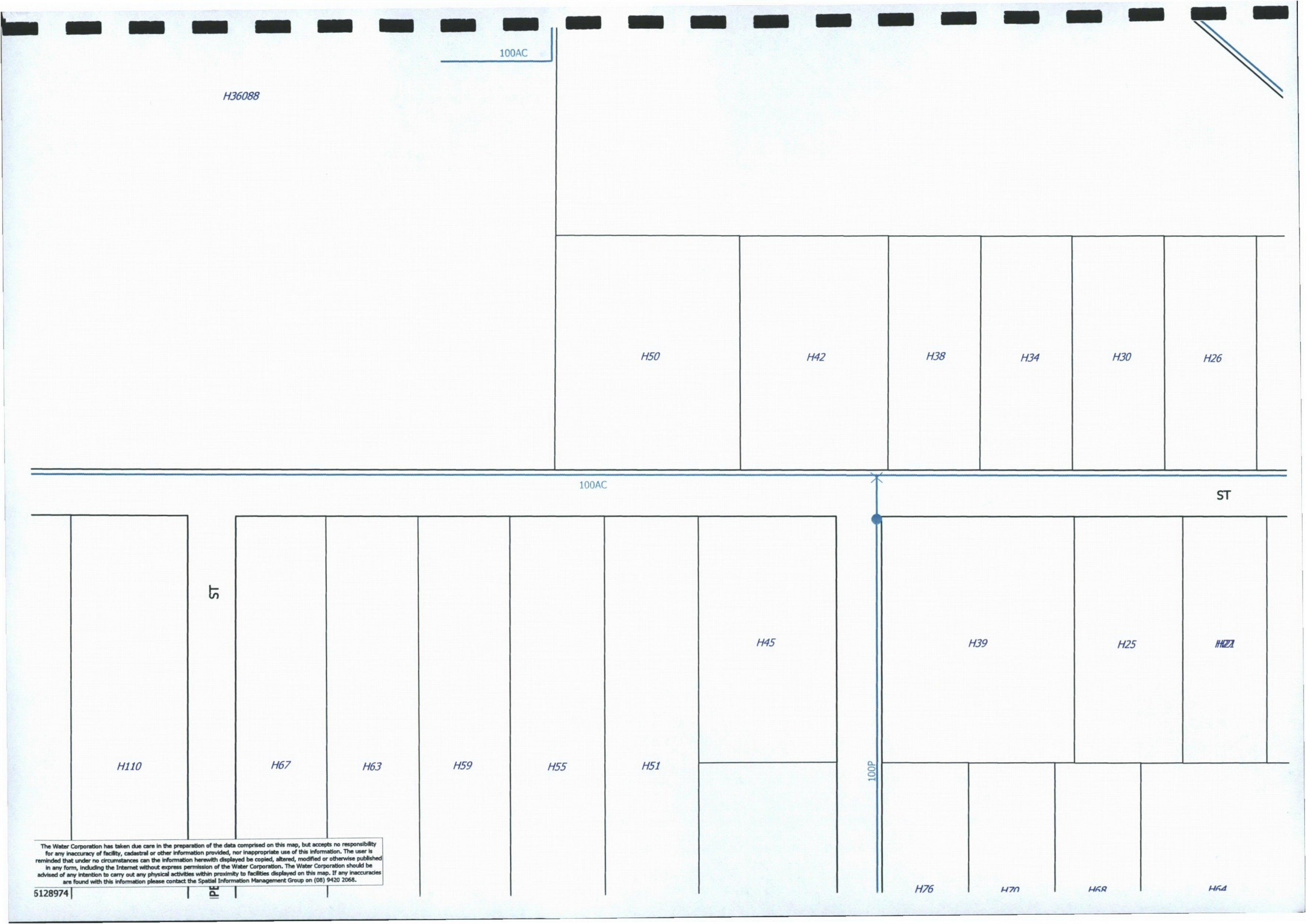
DBYD Message: Visit our new Web site - www.1100.com.au

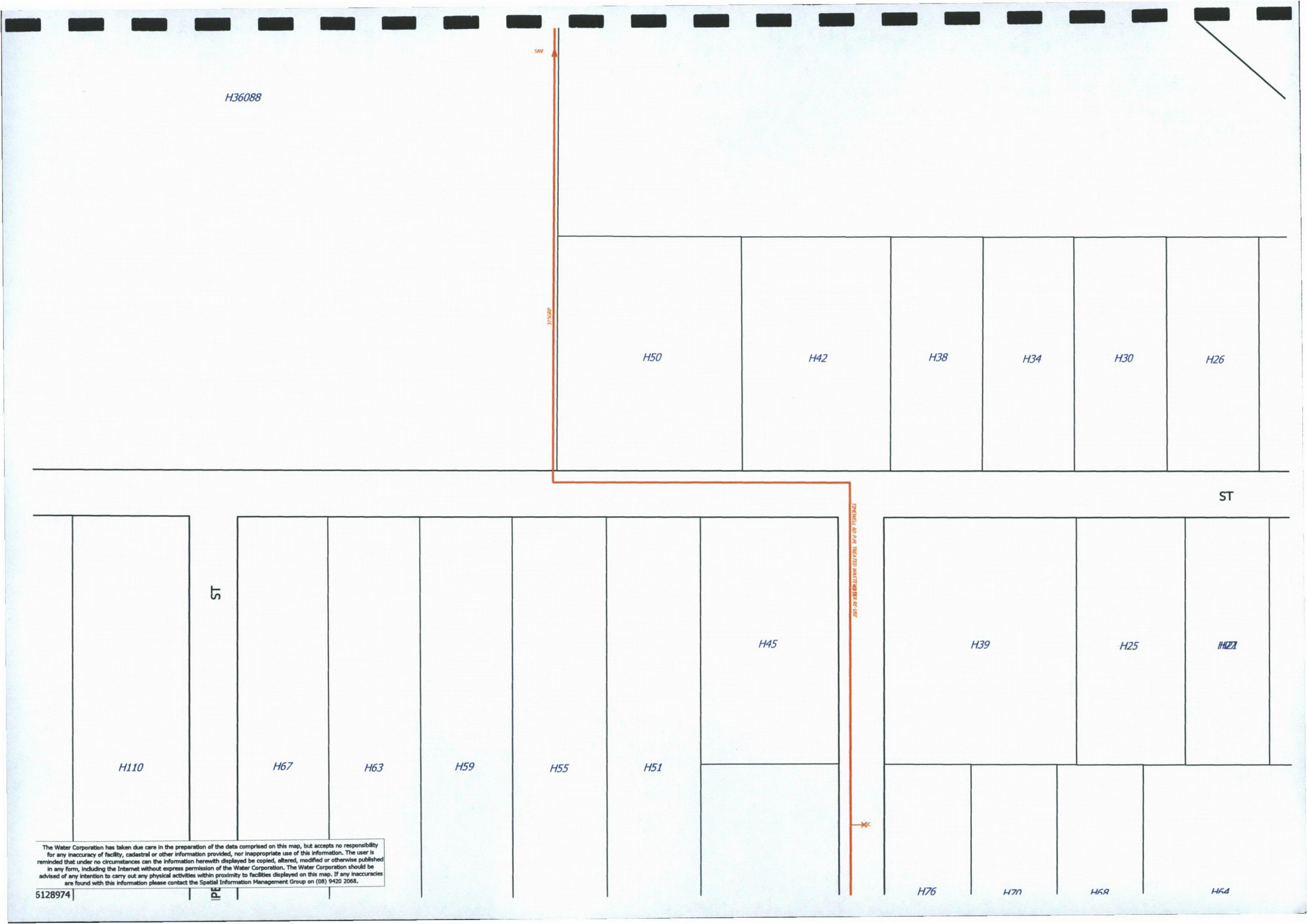
END OF TRANSMISSION

Job No: 3821390

WATER CORPORATION
ABN 28 003 434 917

Refer to the attached maps, the disclaimers and the information sheets.
The attached information is only valid for 30 days. If unused after 30 days, please make a new request.





PO Box 378
Abottsford VIC 3067
Phone: 1100
Fax: 1300 652 077
www.1100.com.au

DIAL BEFORE YOU DIG
Utility Notification

Please be advised the person below has requested information about underground assets in your area of interest. You are requested to respond within 2 working days and reference both the Sequence number and Job number.

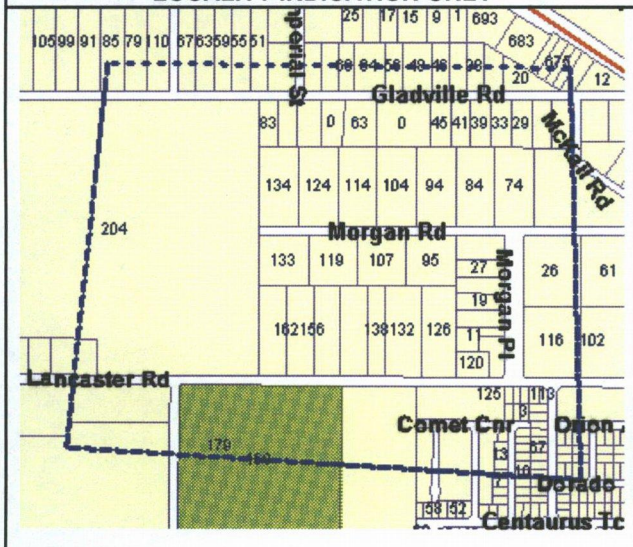
To:	Water Corp Info Services	**Sequence No:**	17890402
Utility:	80850	**Start Date:**	11/03/2010
Enquiry Date:	8/03/2010 3:00:03 PM	**Priority Type:**	Normal - Web

Caller Details

Customer Id:	672063	**Phone:**	0898423700
Contact:	Mrs Alicia Bain	**Mobile:**	Not Supplied
Company:	Wood & Grieve Enigneers	**Fax:**	0898421340
Address:	11 Duke St Albany Wa 6330	**Email:**	alicia.bain@wge.com.au

Location Details

LOCALITY INDICATION ONLY



Address:	Lancaster Rd Mckail WA 6330
Intersection:	Not Supplied
Side of Street:	Not Supplied
Distance:	Not Supplied
Activity Code:	15 - Mechanical Excavation
Location Type:	Both Private Property & Road Reserve
For Planning:	No
Traffic Affected:	No
GPS X Coord:	
GPS Y Coord:	
Parcel ID:	

Map Ref: TRAVELLERS 4D2

Additional work site information:

DBYD Message: Visit our new Web site - www.1100.com.au

END OF TRANSMISSION

Job No: 3838444

WATER CORPORATION
ABN 28 003 434 917

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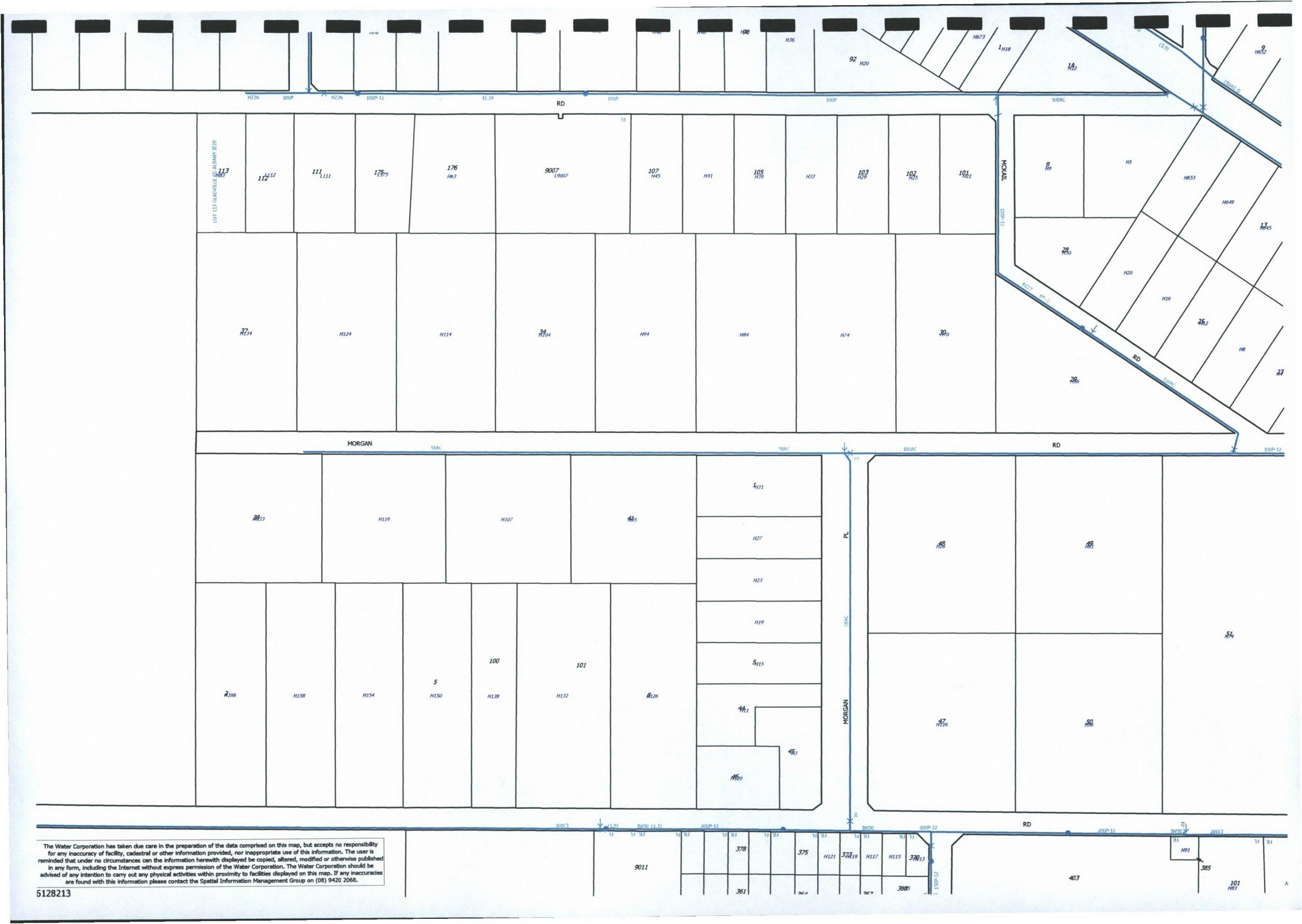

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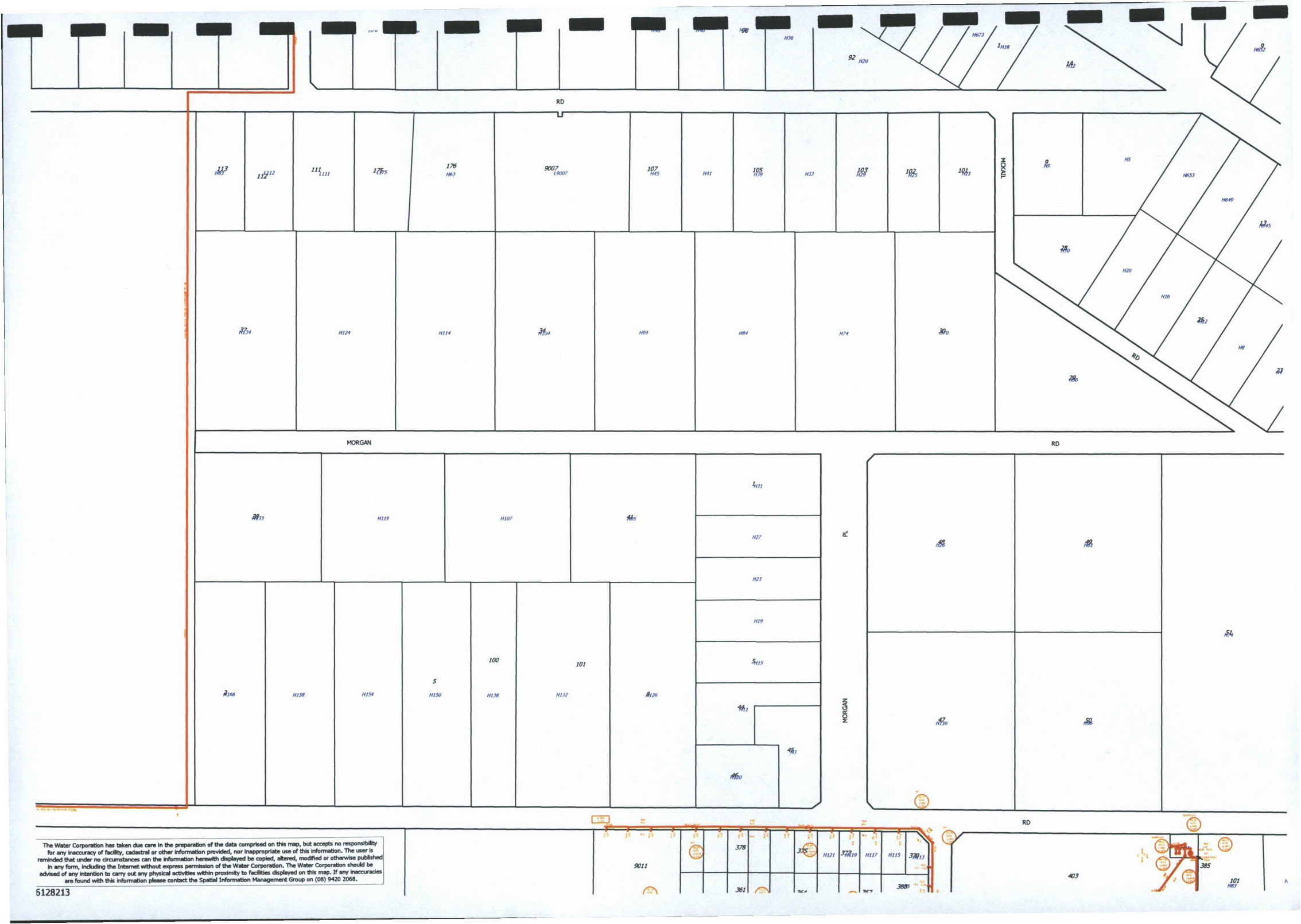


6128213

PO Box 378 Abottsford VIC 3067 Phone: 1100 Fax: 1300 652 077 www.1100.com.au	**DIAL BEFORE YOU DIG** **Utility Notification**	DIAL BEFORE YOU DIG www.1100.com.au

Please be advised the person below has requested information about underground assets in your area of interest. You are requested to respond within 2 working days and reference both the Sequence number and Job number.

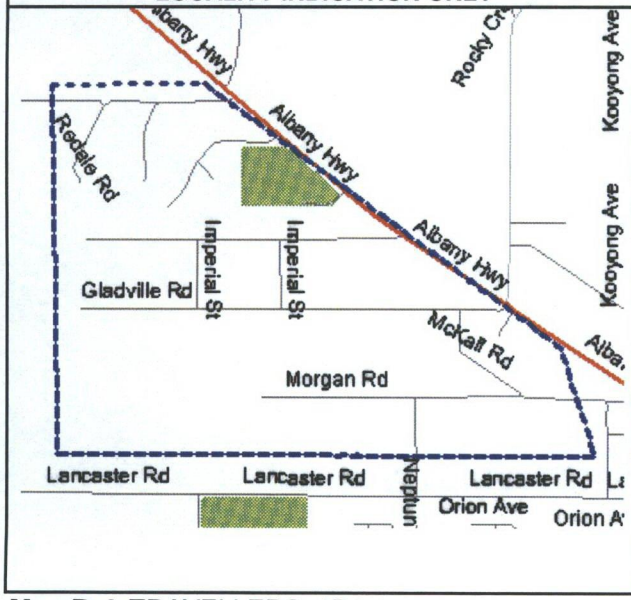
To:	Water Corp Info Services	**Sequence No:**	17890247
Utility:	80850	**Start Date:**	11/03/2010
Enquiry Date:	8/03/2010 2:49:20 PM	**Priority Type:**	Normal - Web

Caller Details

Customer Id:	672063	**Phone:**	0898423700
Contact:	Mrs Alicia Bain	**Mobile:**	Not Supplied
Company:	Wood & Grieve Enigneers	**Fax:**	0898421340
Address:	11 Duke St Albany Wa 6330	**Email:**	alicia.bain@wge.com.au

Location Details

LOCALITY INDICATION ONLY



Address:	Federal St Mckail WA 6330
Intersection:	Not Supplied
Side of Street:	Not Supplied
Distance:	Not Supplied
Activity Code:	15 - Mechanical Excavation
Location Type:	Both Private Property & Road Reserve
For Planning:	No
Traffic Affected:	No
GPS X Coord:	
GPS Y Coord:	
Parcel ID:	

Map Ref: TRAVELLERS 4D2

Additional work site information:

DBYD Message: Visit our new Web site - www.1100.com.au

END OF TRANSMISSION

Job No: 3838407

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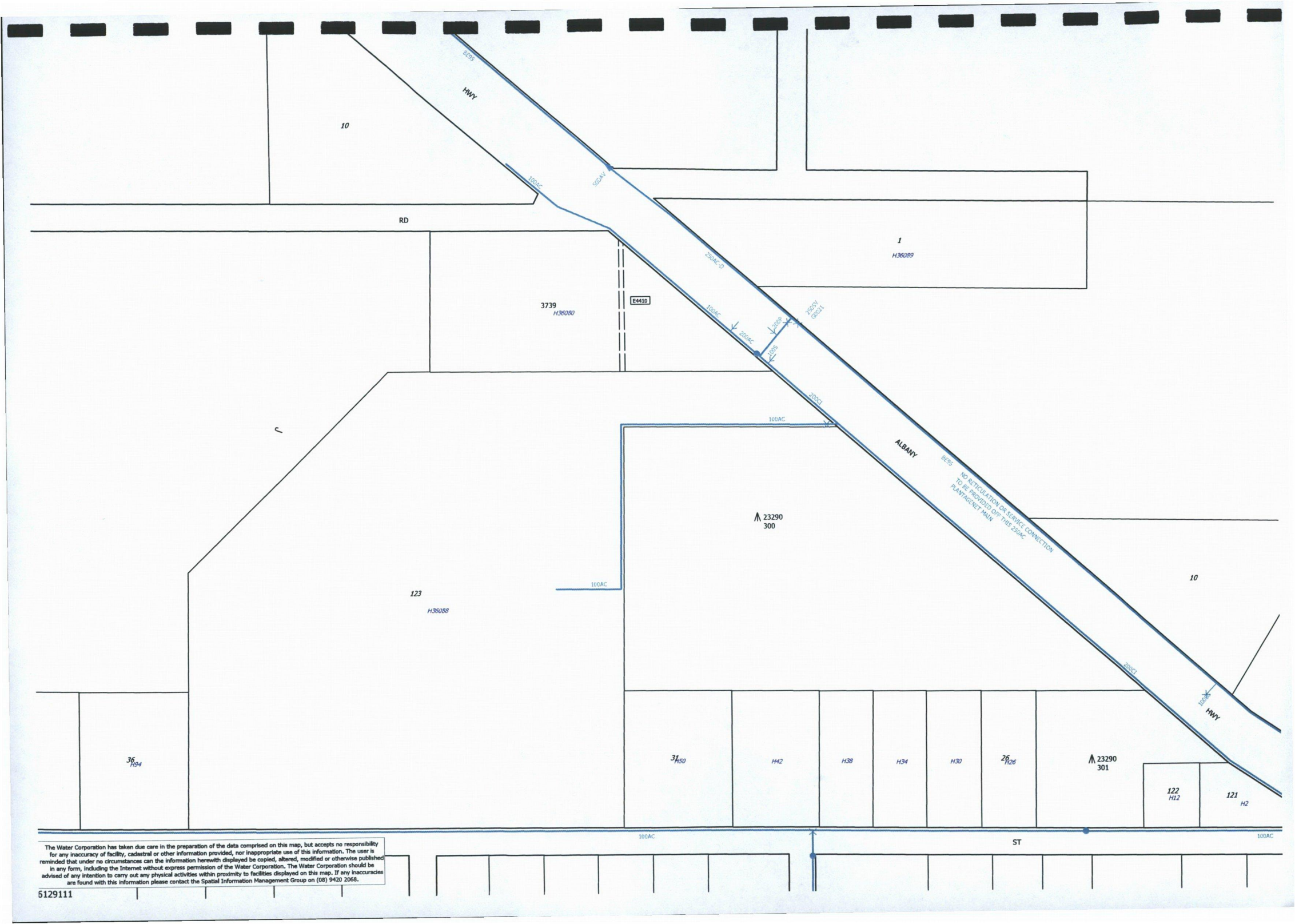
ABN 28 003 434 917

Refer to the attached maps, the disclaimers and the information sheets.
The attached information is only valid for 30 days. If unused after 30 days, please make a new request.



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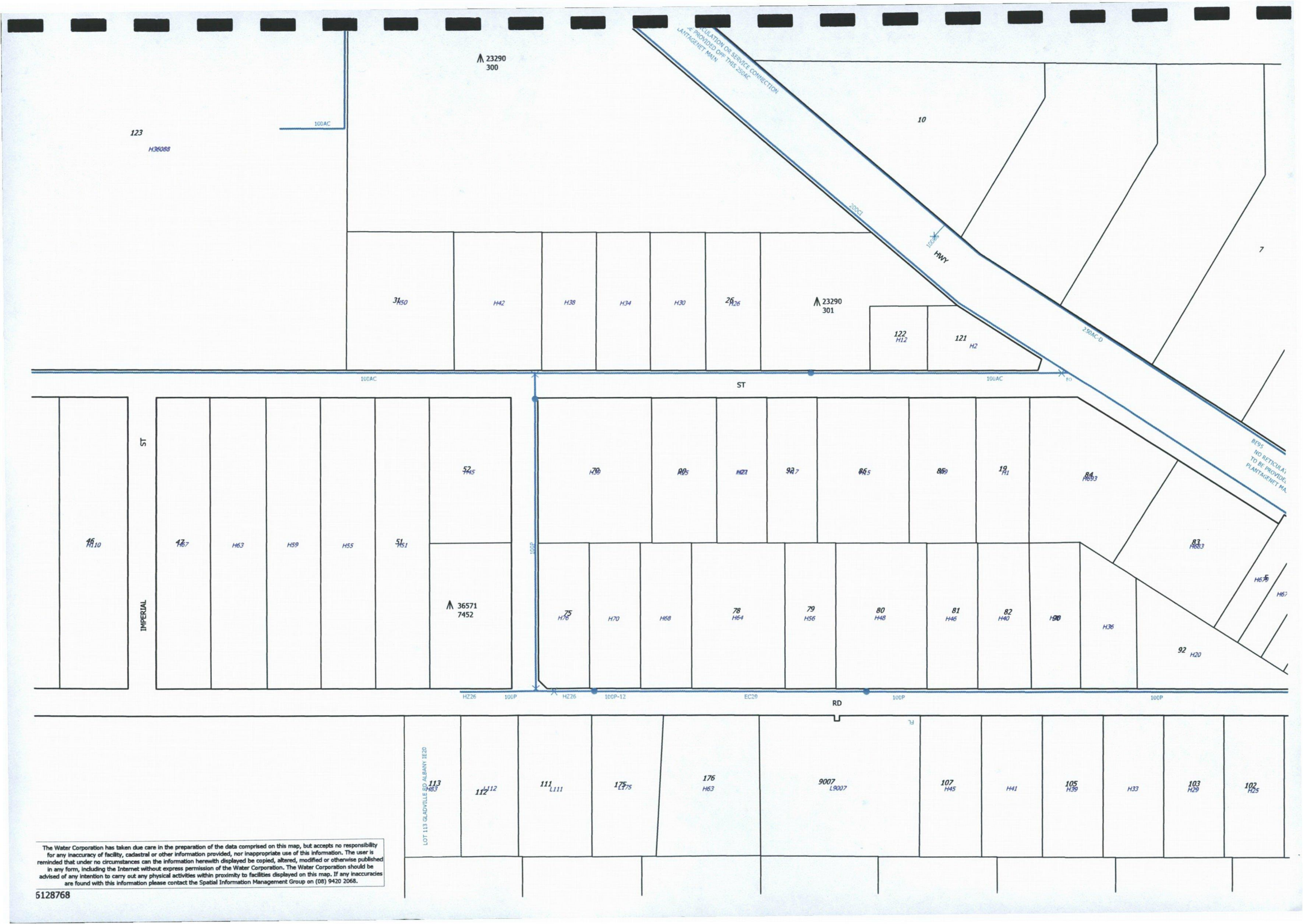

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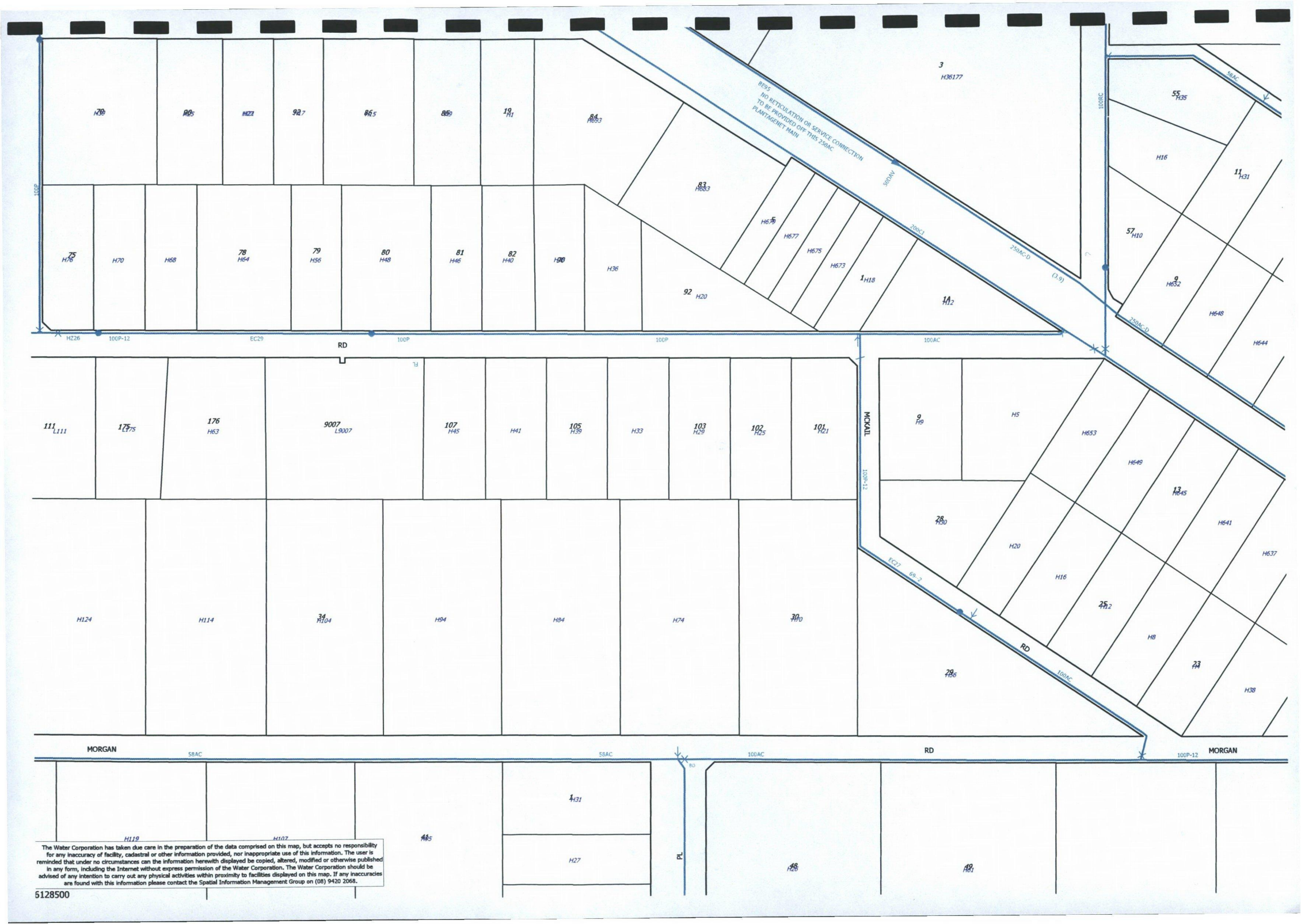

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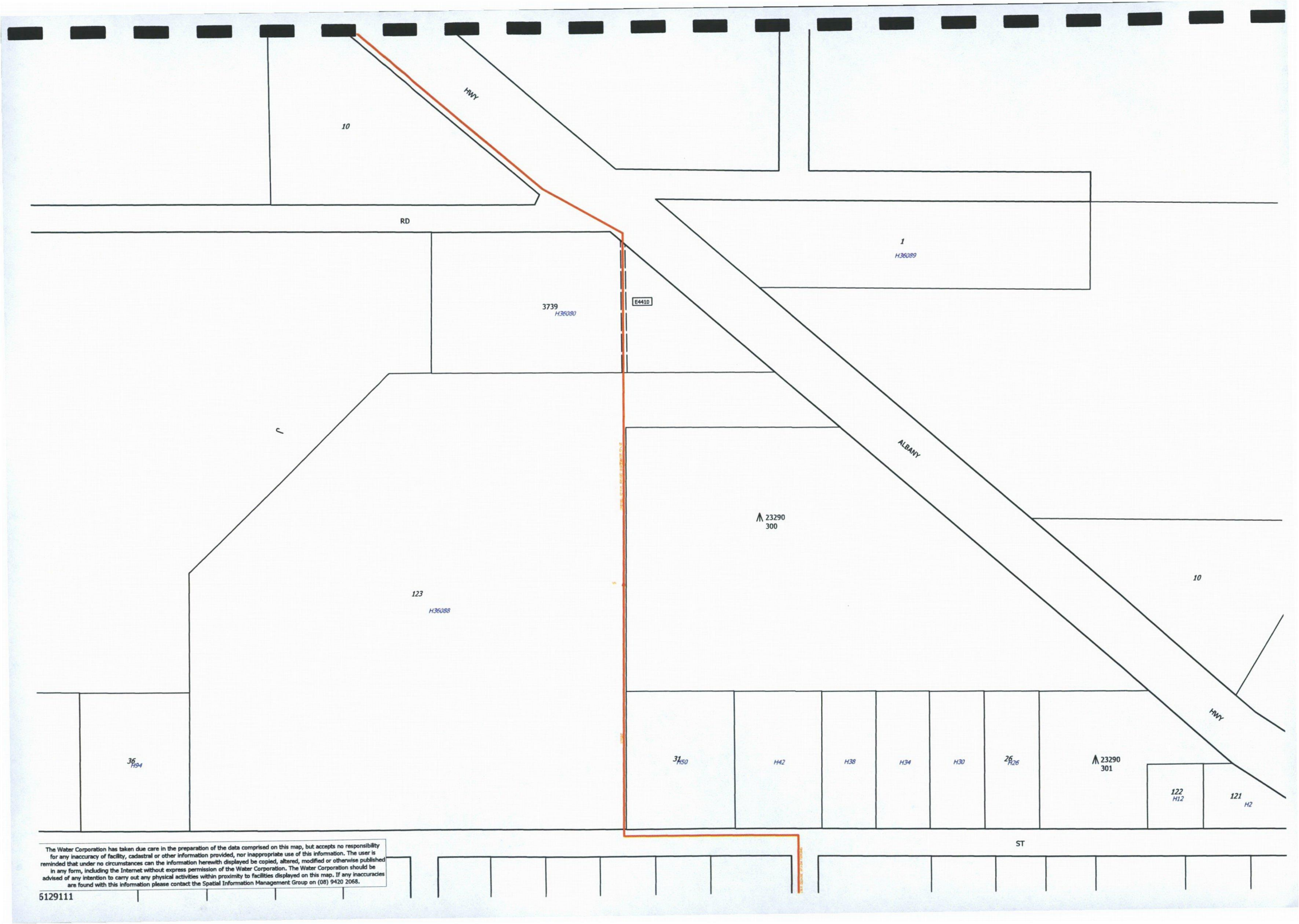

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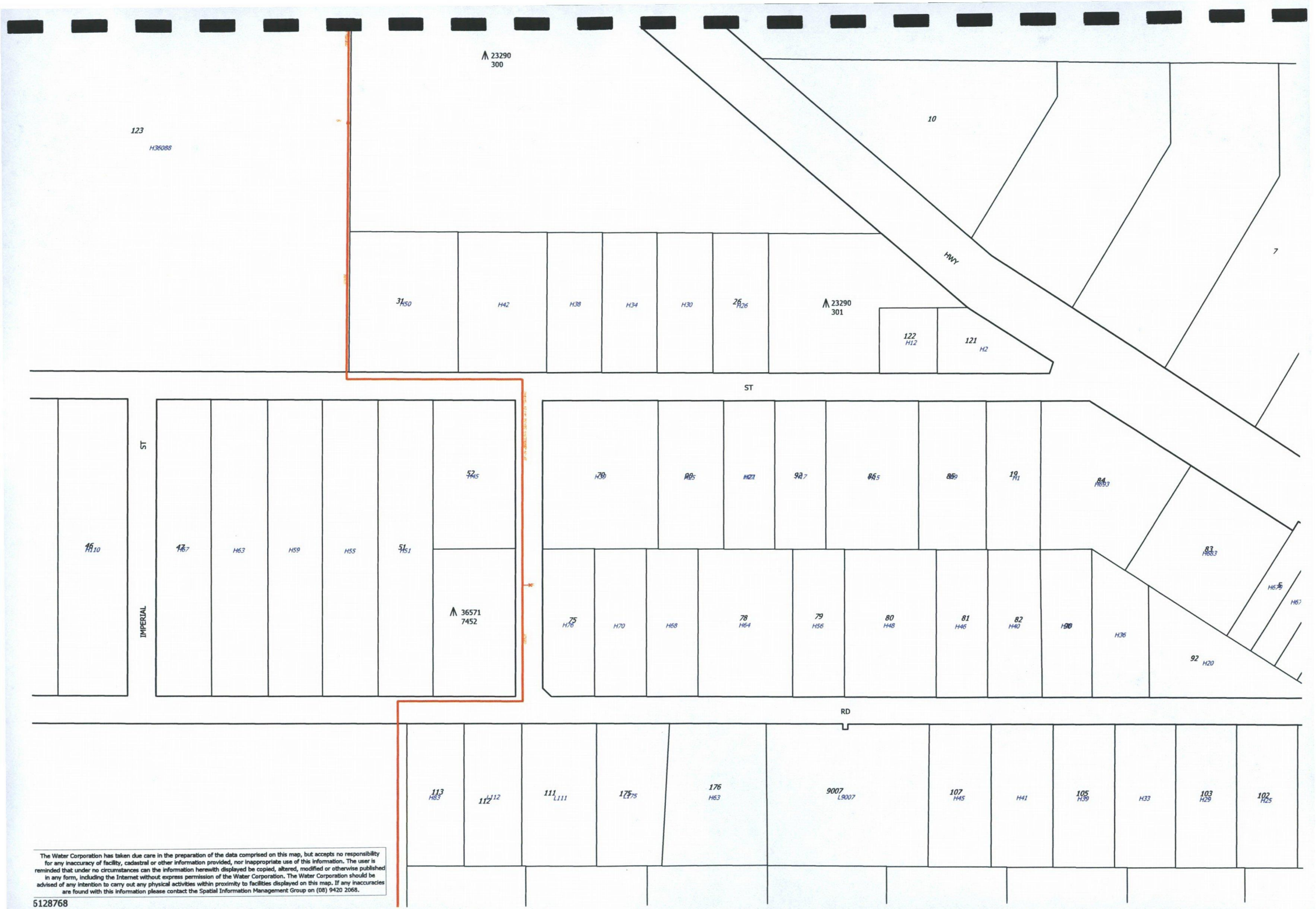
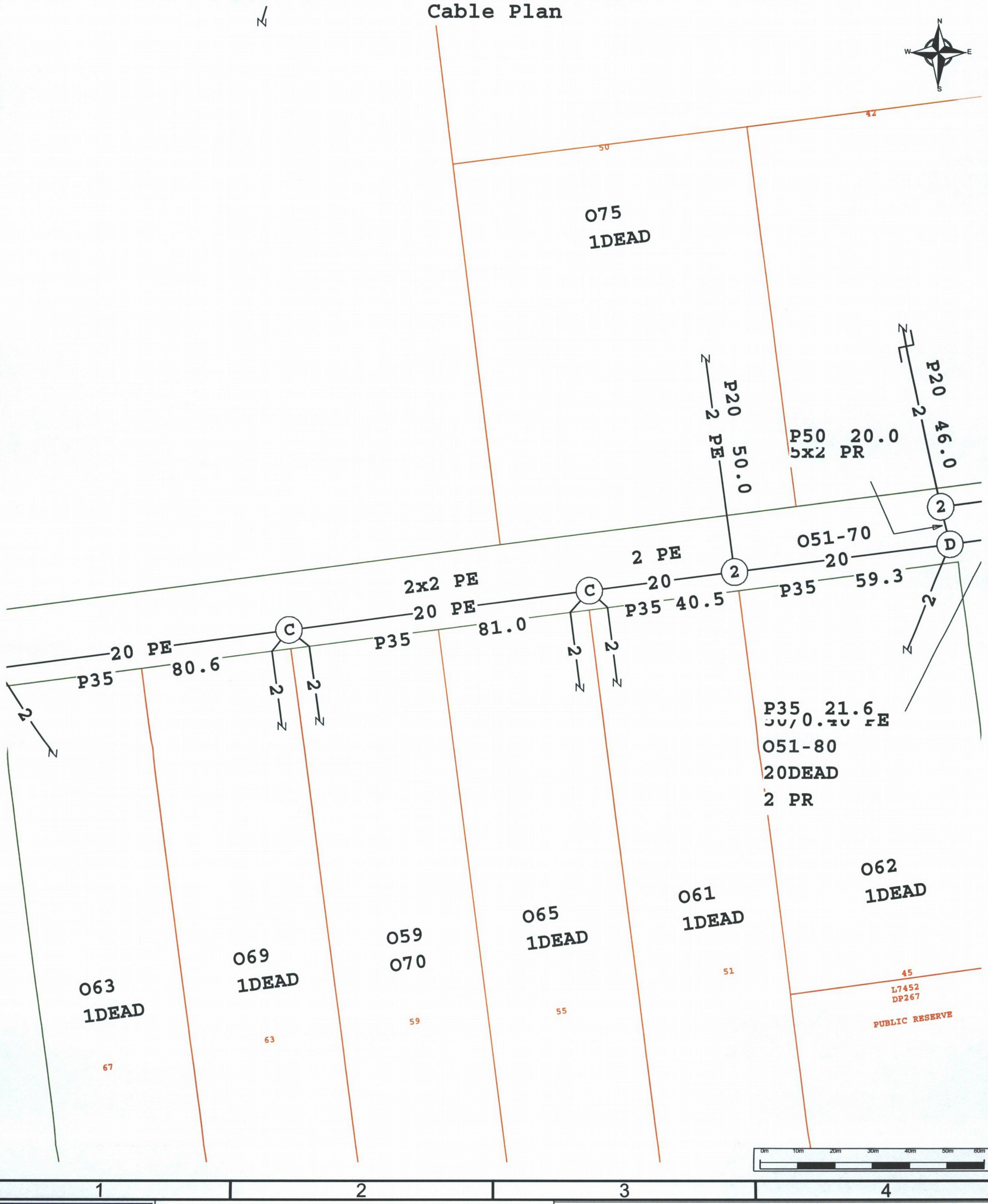


5128768

Cable Plan



Telstra	For all Telstra DBYD plan enquiries - email - Telstra.Plans@team.telstra.com For urgent onsite contact only - ph 1800 653 935 (bus hrs)	Sequence Number: 17816121 Exchange Area: ALNY
TELSTRA CORPORATION LIMITED A.C.N. 051 775 556		
Generated On 25/02/2010 14:55:39		

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

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

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

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


959 956/1700
ALYB
ALYG
ALYS
EARTH
WARNING - ELECTRICITY
Vacant
Vacant
Vacant
U/RD
EXTN.

WAGAS NETWORKS

WA GAS NETWORKS
UNDERGROUND ASSET DETAILS

WestNetEnergy
WestNet Energy Services Pty Ltd
ABN 25 134 997 809
PO Box 3006
Success, WA, 6964

NO WA GAS NETWORKS ASSETS RECORDED

Mrs Alicia Bain
Wood & Grieve Enigneers
11 Duke St
Albany
Wa, 6330

Job No: **3821390**
Sequence No: **17816120**
Date of Issue: 25/02/2010
Phone: 0898423700
Mobile: Not Supplied
Fax: 0898421340

DBYD Utility Registration Name: 70852 - WA Gas Networks
DBYD Location: Federal St, Mckail, WA, 6330

Our records indicate that there are NO WA Gas Networks underground Assets/Pipes present in the vicinity of the above enquiry, however please read all the information and conditions below.

ATTENTION: The response for this inquiry has been interpreted from details in the PICTURE LOCATION ONLY

Any information provided is valid only for 30 days from the date of issue.

If the work operations extend beyond this period, or if the designs are altered in any way, you are requested to re-submit your proposal for re-assessment. Care has been taken to ensure that the locations of gas mains shown are accurate, however, some variations from records do exist and complete accuracy cannot be guaranteed. Should you discover a gas pipe/asset within the scope of your enquiry, then you must contact WestNet Energy immediately on one of the numbers below.

WARNING. It is essential that ALL these documents be handed to the principal contractor carrying out the work. A photocopy may be taken for office records. All documents must be on site at the time of excavations. The information provided is to be used as guide only and does not absolve third parties in their "Duty of Care" obligations to take additional precautions where the work has the potential to impact on gas assets and the safety of people.

General mains and services enquiries between 8am to 4pm weekdays, please call – (08) 9499 5272
After hours or weekends, please call – 13 13 52

IN THE EVENT OF A GAS EMERGENCY CALL 13 13 52
Extinguish all sources of ignition and keep the area clear of all persons. Any attempt by third parties to repair damaged gas mains or services may result in prosecution under the *Energy Operators (Powers) Act 1979.*

Document No.: GDW WI 1050 RF 0004
Revision: 1
Review Due: 17/10/2010

WOOD & GRIEVE ENGINEERS

Appendix C

Site Photos

PHOTO 1
Federal Street, looking west

PHOTO 2
Federal Street cul-de-sac, looking west

PHOTO 3
Lot 124, looking south-west from Federal Street

PHOTO 4
Unsealed Gladville Road, looking west

PHOTO 5
Lot 507, looking south-west from Gladville Road

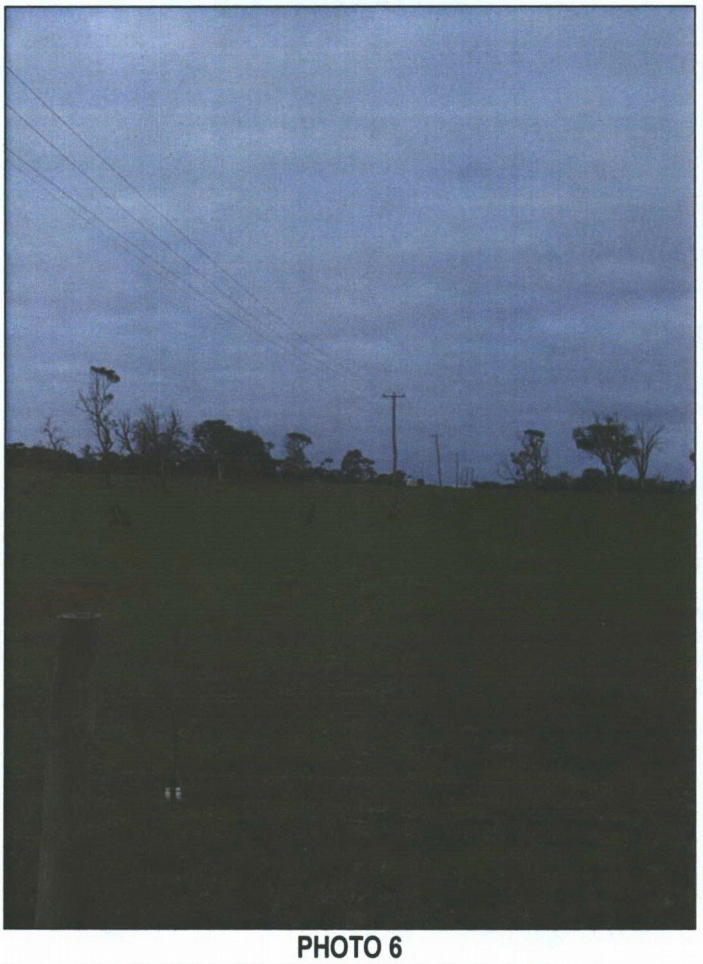


PHOTO 6
Lot 507, looking south from Gladville Road

PHOTO 7
Gladville Road unsealed cul-de-sac, looking west

PHOTO 8
Lot 507 / 526, looking south-west from Gladville Road cul-de-sac

PHOTO 9
Unsealed Gladville Road, looking east

PHOTO 10
Sealed Gladville Road, looking east

PHOTO 11
Sealed Gladville Road, looking west

PHOTO 12
Lancaster Road, approaching Timewell Road, looking west

PHOTO 13
Lot 507, looking north

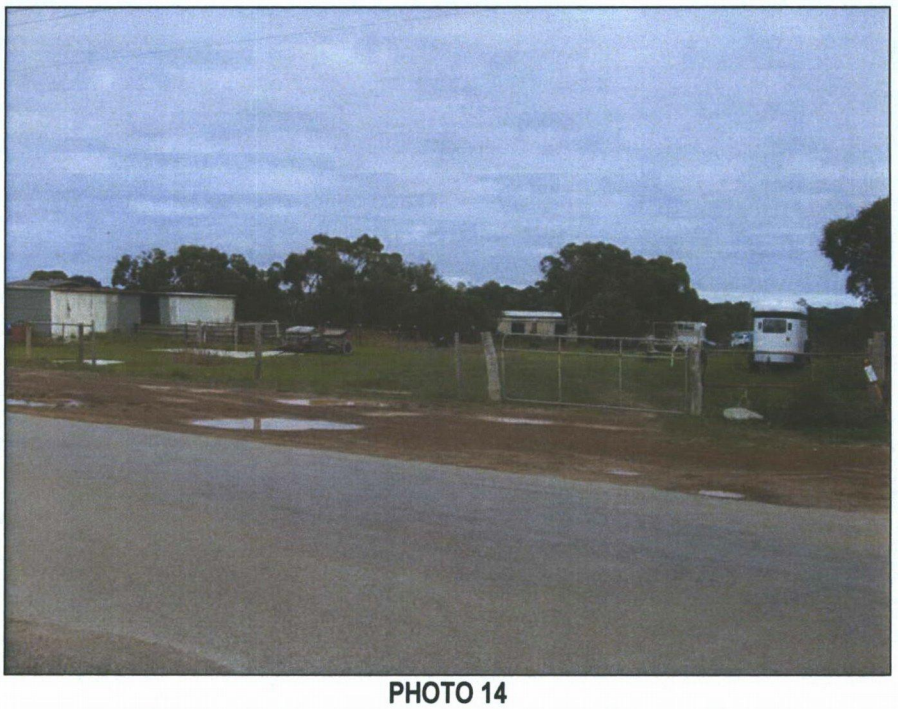


PHOTO 14
Lot 300 from Timewell Road Intersection, looking south-west

PHOTO 15
Lancaster Road sag, looking west

PHOTO 16
Lancaster Road, looking east from sag

PHOTO 17
Lot 526, looking north-east

PHOTO 18
Lancaster Road sag, looking east

Attachment III:

Herring Storer Acoustics

Acoustic Assessment & Guidelines

Lots 507, 526 & 300 Lancaster Road, McKail

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RESIDENTIAL DEVELOPMENT LANCASTER ROAD, NORTH McKAIL

ACOUSTIC ASSESSMENT

FOR

AYTON TAYLOR BURRELL

BY

HERRING STORER ACOUSTICS

JANUARY 2009

OUR REFERENCE: 9493-4-08181

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ACOUSTIC ASSESSMENT
LANCASTER ROAD, NORTH McKAIL

Job No: 08181

Document Reference: 9493-4-08181

FOR

AYTON TAYLOR BURRELL

DOCUMENT INFORMATION			
Author:	Paul Daly	Checked By:	Rebecca Donovan
Date of Issue :	16/09/08		

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2	DRAFT	30.01.09	PLD	RD
3	FINAL	18.02.09	PLD	TR

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1	3	Ayton Taylor Burrell – Bert Quayle		✓
1	4	Ayton Taylor Burrell – Bert Quayle		✓

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Figure A2 – Detailed Map

B Noise Contour Plot

C City of Albany "Speedway Noise Buffer Area Policy"

1. INTRODUCTION

Herring Storer Acoustics was commissioned by Ayton Taylor Burrell to carry out a noise impact assessment for a proposed residential development located on Lancaster Road, North McKail (see Figure A1 and A2 in Appendix A for Study Area). The site is adjacent to the Albany Speedway.

The site falls within the City of Albany's "Speedway Noise Buffer Area Policy". It has been recommended by the Environmental Protection Authority that an acoustic assessment be completed, with regard to noise emissions from the speedway and subsequent immissions at the residential development. Appendix C provides a copy of the "Speedway Noise Buffer Area Policy".

The objective of this study was to detail a suitable combination of buffer distance and mandatory acoustic insulation/quiet house design parameters. Additionally, noise impact from the nearby Harness Racing Track and proposed Ring Road were required at the development site.

The proposed residential area of concern is located on the west and southern quadrants from the speedway and includes the following lots:

- Lots 300, 507, 526 and 1918 Lancaster Road
- Lot 123 Link Road

2. SUMMARY

From the City of Albany's "Speedway Noise Buffer Area Policy" the acoustic criteria are:

- Common areas 55 dB(A)
- Living areas 45 dB(A)
- Sleeping areas 40 dB(A)

We note that the above noise levels are "maximum" L_{Aeq} recorded over a short period of time during a race.

Based on the criteria there are a number of combination of buffer distances and combinations of quiet house requirements that can be used. These being:

1 A buffer zone of 700 metres with no "Quiet House design" requirements.

2 A buffer zone of 400-500 metres with "Quiet House design" which allows bedrooms to face the speedway; and

3 A buffer zone of 200-300 metres with "Quiet House design' with bedrooms on the side of the house opposite the speedway, but with living areas facing the speedway.

Noise contours from the speedway emissions show that the development lots as per this assessment have a maximum noise level ranging from 65 to 67 dB(A) at the boundaries facing the speedway.

Two buffer zones particular to each lot, have been indentified and are shown in Appendix B, Figure B2. The buffer zones have been classified into two areas, A1 and A2. Design guidelines for each zone have been developed and are detailed in section 5.

The noise amelioration is only required to the first row of residences and the first floor of the second row, as these houses provide an adequate barrier between the speedway and the other residences.

Given the number of speedway events held each year, the use of double glazing is not a recommendation of the mandatory acoustic guidelines. However, it is recommended that the single glazing be installed such that it can be upgraded to a double glazed window system if desired by the occupant. This can be achieved by either:

- Installing the windows slightly forward in the reveal to allow a secondary sliding window to be installed, or
- Selecting frames that allow for the installation of a second operable window to be installed, such as a Capral window frame or equivalent.

Alternatively, it is understood that 6.5mm laminated glass (VLAM Hush) can achieve the same noise reduction as 10.38mm laminate glass. The use of this 6.5mm laminated glass allows the installation of standard window frames and the option to upgrade the glass.

3. CRITERIA

The City of Albany's "Speedway Noise Buffer Area Policy" cites the following internal noise levels as the acoustic criteria:

- Common areas 55 dB(A)
- Living areas 45 dB(A)
- Sleeping areas 40 dB(A)

We note that the above noise levels are "maximum" L_{Aeq} recorded over a short period of time during a race.

A copy of the "Speedway Noise Buffer Area Policy" is attached in Appendix C.

4. ACOUSTIC ASSESSMENT

4.1 SPEEDWAY

From previous measurements and observations on site, as noted by the DEC, noise received at a location is dominated by noise emissions from one vehicle and not the accumulative effect of all vehicles racing. Therefore, the noise model was modified to reflect this noise propagation, by running varies scenarios using a single car located at various locations around the track, then combining the results to provide a 'maximum' contour.

From file data, it was determined that the sound power level of a single Late Model V8 car at maximum engine speed was 129 dB(A), which can be compared to a sound power level of a single Sprint Car at maximum engine speed was 132 dB(A). This sound power level correlates to that stated by the DEC. The resultant contours relate to the noise emissions from Sprint Cars.

Using the sprint car noise levels, modelling was carried out with the environmental noise modelling computer program SoundPlan. SoundPlan uses the theoretical sound power levels determined from measured sound pressure levels to calculate the noise level received at a specific location.

The calculations used the following input data:

a) Ground contours;

b) Sound power levels of 132 dB(A) per car with 10 vehicles in a race.

Weather conditions for the modelling were as stipulated within the Environmental Protection Authority's "*Draft Guidance for Assessment of Environmental Factors No. 8 – Environmental Noise*" for the day and night periods were as listed in Table 1.

TABLE 1 – WEATHER CONDITIONS

Condition	Day Period
Temperature	15 °C
Relative Humidity	50%
Pasquil Stability Class	F
Wind Speed	3m/s*

* From sources, towards receivers.

Appendix B, Figure 1 shows the resultant noise contour plot.

Additionally, single point receiver noise levels were calculated for each boundary location (facing speedway) for the residential lots. Noise level results are shown in Table 2.

TABLE 2 – NOISE LEVELS AT BOUNDARY LOCATION – RESIDENTIAL LOTS

Residential Lot	Exterior Noise Level
Lot 123 Link Road	66
Lot 1918 Lancaster Road	65
Lot 300 Lancaster Road	56
Lot 507 Lancaster Road	67
Lot 526 Lancaster Road	66

Additional to the single point receivers and contour plot, noise reduction calculations were carried out to determine the noise reduction that is achieved by various glazing thickness. This reduction was then used to determine the maximum external noise level allowable to still comply with the internal criteria. Calculations were carried out for the following glazing thickness:

- 4mm float glass;
- 6mm float glass;
- 6.38mm laminated glass;
- 6.5mm laminated glass; and
- 10.38mm laminated glass.

The noise reductions achieved by the above glazing and the corresponding maximum external noise level to achieve compliance with the acoustic criteria is listed in Table 3.

TABLE 3 – MAXIMUM EXTERNAL NOISE LEVELS

Glazing	Noise Reduction	Maximum External Noise Level (dB(A))		
		Common	Living	Bedrooms
4mm float glass	20	75	65	60
6mm float glass	23	78	68	63
6.38mm laminated glass	26	81	71	66
6.5mm laminated glass	28	83	73	68
10.38mm laminated glass	28	83	73	68

4.2 HARNESS RACING TRACK

The Albany Harness racing track is approximately 145 metres from the southern boundary of Lot 507 of the proposed development.

Assessment of noise emissions from harness racing events have been based on file data from previous studies for similar tracks. Measured noise levels from events at a harness race meet are dominated by the public announcement system.

From file data of a larger track, noise levels for periods of track events range from 44 – 48 dB(A) at 90 metres.

Calculating noise attenuation for distance, the expected noise level at the boundary of Lot 507 would be 40 – 44 dB(A).

Information for operation times of harness racing has events for Friday Nights and Sundays throughout December to April.

Based on the operational times and the noise levels at the boundary of the development, emissions from harness racing would exceed the regulatory criteria (Environmental Protection (Noise) Regulations 1997) on nearby premises of Lots 300 and 507. The impact however, would be minimal on future residential developments and likely to only exceed at the first row of housing. Therefore, "Quiet House" Design would not be recommended and standard construction achieving the criteria outlined for internal noise levels in Section 3 would be acceptable.

It is therefore recommended, that prior to sub-division, noise emissions of the Albany Harness Racing Track, at the boundary of Lots 300 and 507, be confirmed.

4.3 PROPOSED RING ROAD

We understand that at this time, the Ring Road does not exist and is only proposed. Although we have no information on timing of the Ring Road, we believe that the development of the road would be after the sub-division development. Therefore, with the development of the road, noise mitigation measures would be included with the design of the road to comply with Main Roads "Noise Level Objectives". The Main Roads "Noise Level Objectives" are:

- $L_{Aeq16hr}$ of 60 dB(A)
- L_{Aeq8hr} of 55 dB(A)

Additionally, we believe that this assessment should be undertaken at the sub-division stage when lot layouts are known.

5. DESIGN GUIDELINES

Noise contours at the boundary location (facing speedway) for any of the proposed residential development lots (with the exception of lot 300) range from 65 to 67 dB(A). Based on these noise levels, design guidelines have been detailed below. Dependent on the location of residential housing these guidelines are for the first row of housing, and housing first floor of the second row, facing the speedway. Noise levels after this will be reduced both from the barrier effect and distance attenuation.

Note: Lot 300 is 1000 metres from the speedway, therefore it is outside any buffer zone and it requires no noise amelioration in the design.

5.1 AREA A1 - (NOISE CONTOUR LINE 67 dB(A))

For the scenario with bedroom and/or common areas facing the Speedway, the required buffer zones using 6.38mm or 10.38mm laminated glass are the 66 and 68 dB(A) noise contours, respectively, as shown on the contour plot attached in Appendix B.

Incorporated with the above buffer zone, the following recommendations are provided:

- Where possible, residences are orientated such that garages are located on the side facing the Speedway;
- Front doors facing the speedway, entrance lobbies are incorporated in the design, such that they provide a buffer space between the entrance and the remainder of the residence;
- Double brick or concrete construction;
- Casement windows (with winders) in timber or commercial steel frames and compressible seals;
- Using the 68 dB(A) contour as the buffer zone, glazing to be either 10.38mm or 6.5mm (VLAM Hush) laminated glass to bedrooms facing or exposed to the Speedway;
- Using the 66 dB(A) contour as the buffer zone, glazing to be 6.38mm laminated glass to bedrooms facing or exposed to the Speedway;
- Cantilevered sliding doors to facing or exposed to the speedway are acceptable, provided they had interlocking meeting stiles such as for the Capral 889. Double sliding doors with meeting stiles that butt together are not allowed;
- Eaves to be enclosed using 9mm thick compressed cement sheeting or equivalent;
- Roofs are to be colourbond with minimum 50mm anticon, with ceilings on the top floor to be minimum 2 layer 13mm thick plasterboard to bedrooms and walk in robes, and 1 layer 13mm thick plasterboard to all other spaces, and R3 insulation laid over the top; and

- Recessed light fittings in bedroom ceilings to the top storey are to be acoustically rated.

Dwellings within the "Quiet House" buffer zone would be deemed to comply if the above design guidelines are adhered to.

Alternative constructions are acceptable providing that they comply with the Quiet House Guidelines and are supported by an Acoustic Report by a qualified Acoustic Engineer stating that the design and construction of the dwellings adequately attenuates noise emissions from the Speedway provided it achieves compliance with the City of Albany's "Speedway Noise Buffer Area policy".

Notification of speedway noise levels and the "Quiet House" design guideline will be placed on the Certificate of Title for the specific lots.

5.2 AREA A2 - (NOISE CONTOUR LINE 66 dB(A))

- Residences to be located on southern portion of lot.
- Where possible, bedrooms are located on the opposite side of the dwelling away from the Speedway
- Laundry and Bathrooms are preferably located on the same side as the Speedway.
- Double brick or concrete construction.
- Casement windows (with winders) in timber or commercial steel frames and compressible seals.
- For bedrooms facing or exposed to the speedway, glazing to be minimum 6.38mm thick laminated glass.
- Roofs are to be colourbond with minimum 50mm anticon, with ceilings on the top floor to be minimum 1 layer 13mm thick plasterboard to bedrooms and walk in robes.
- Installing the windows slightly forward in the reveal to allow a secondary sliding window to be installed or select frames that allow for the installation of a second operable window to be installed within the frame, such as a Capral window frame or equivalent.

APPENDIX A

STUDY AREA

Figure A1 – Overall Map

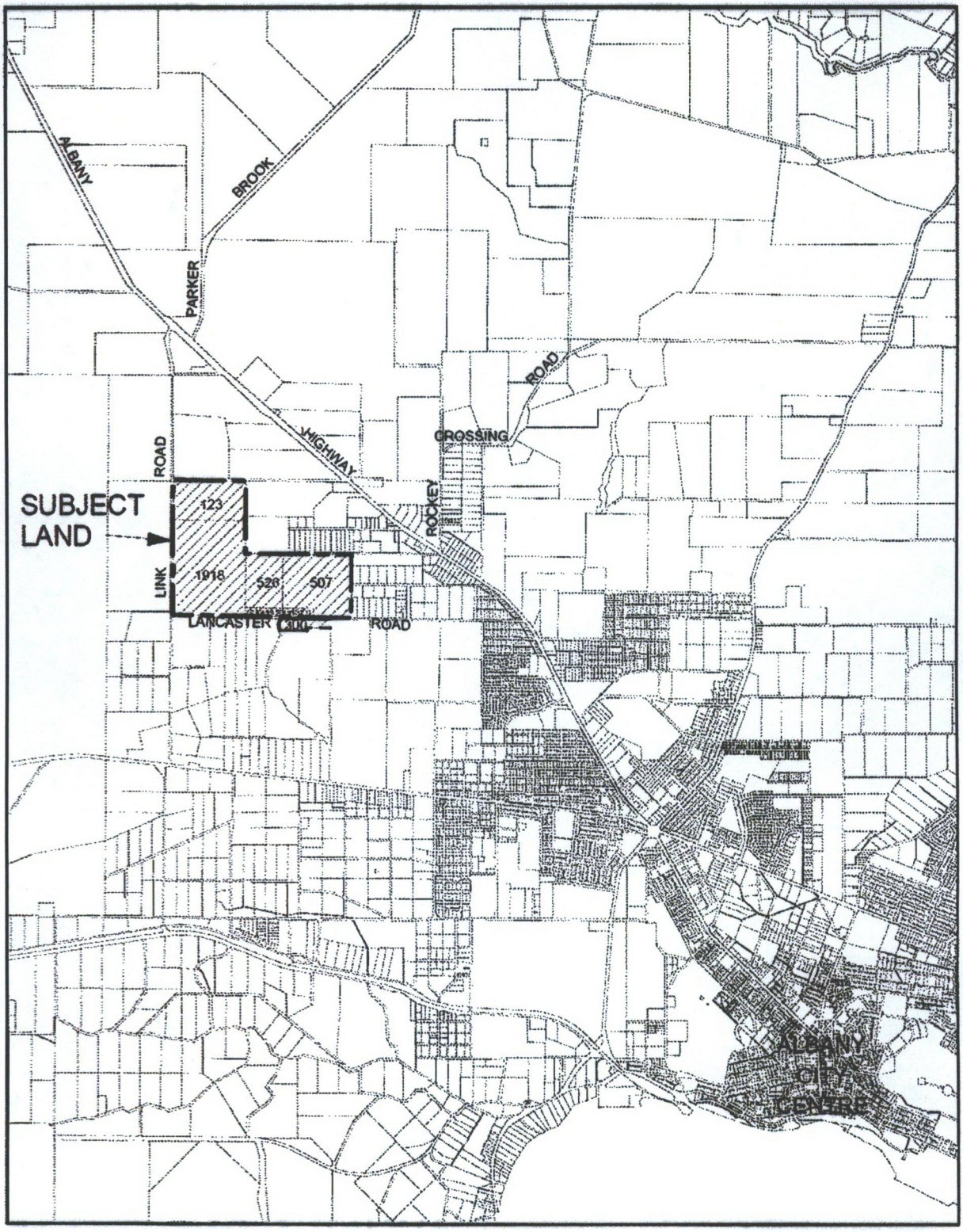
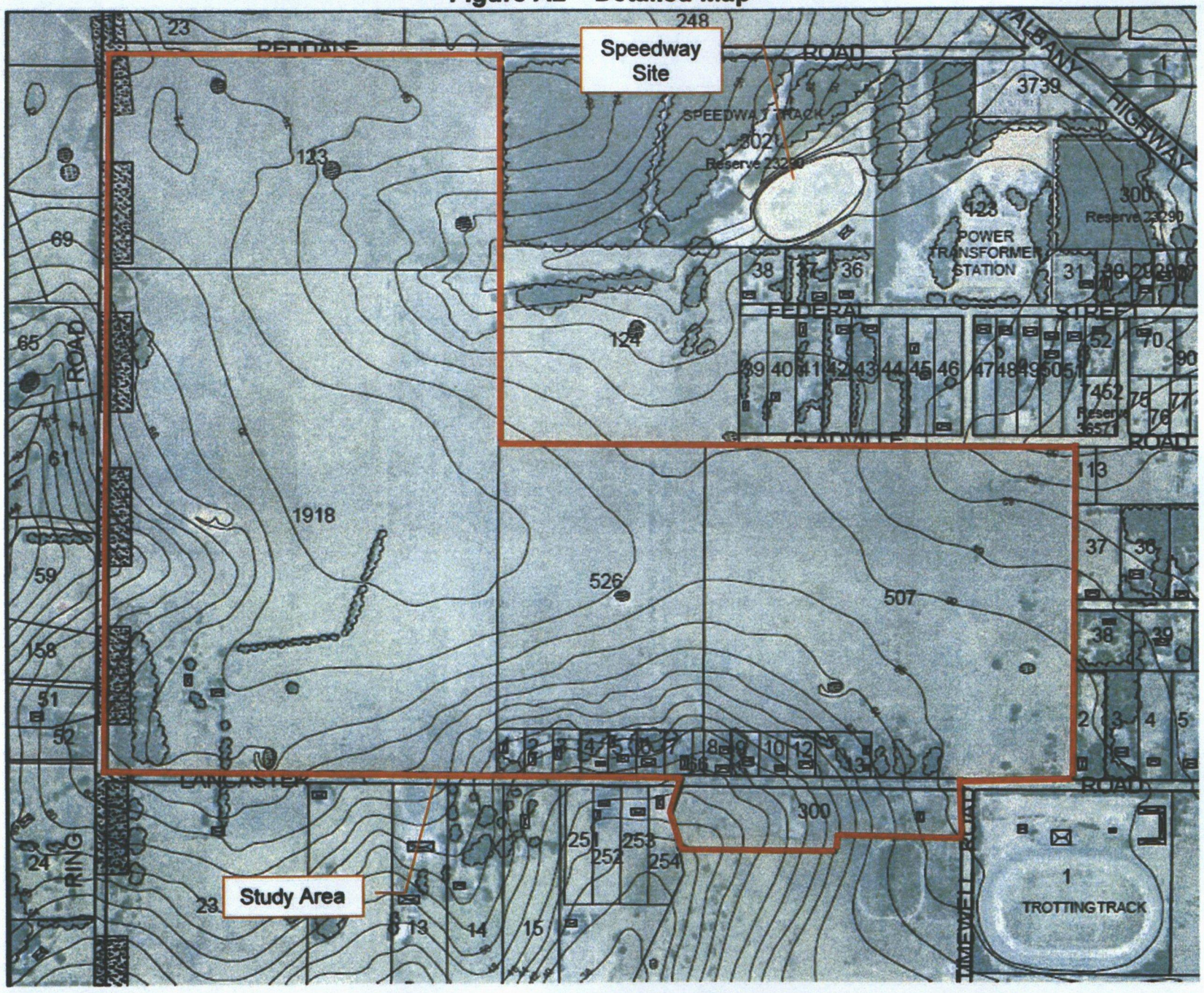
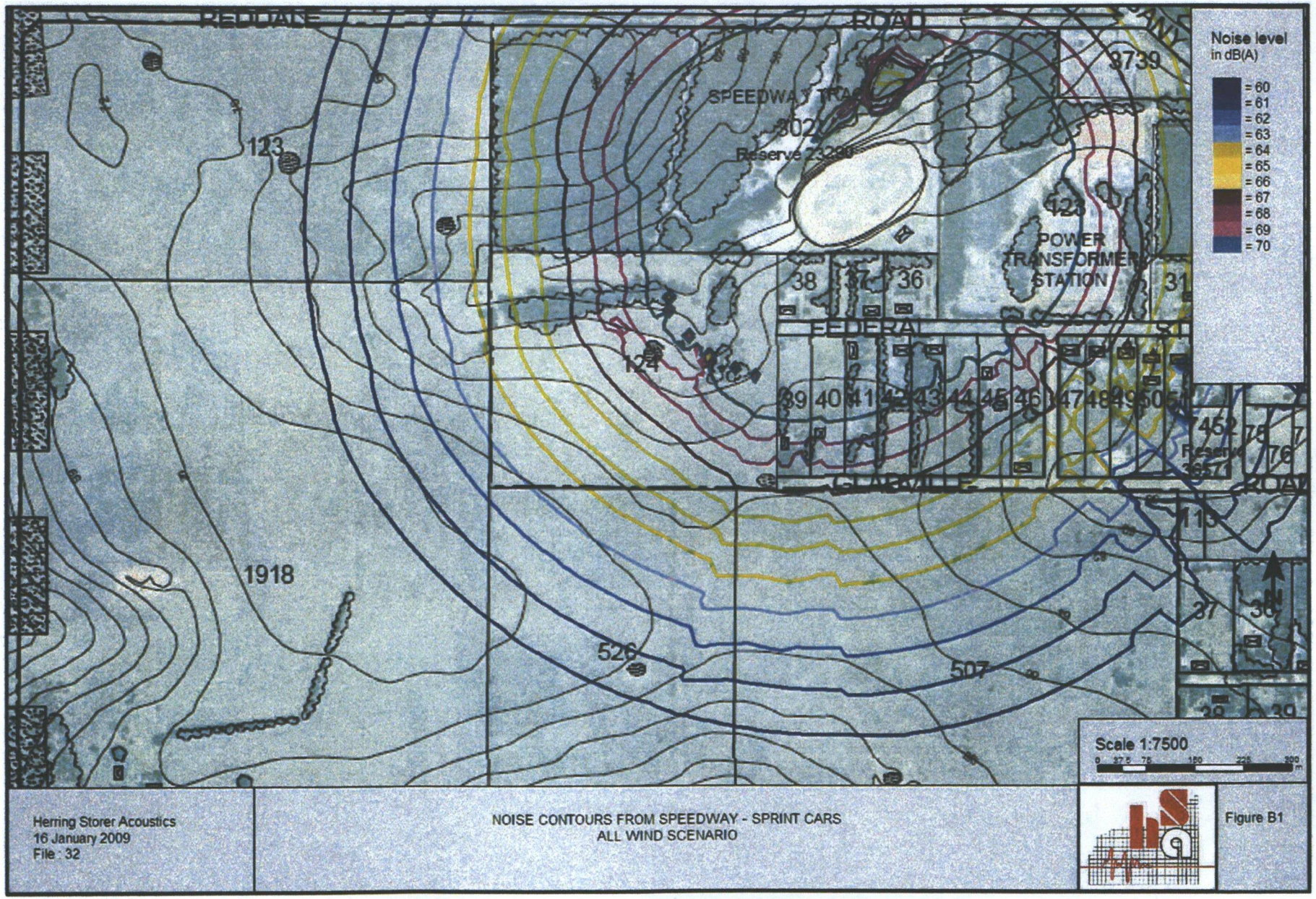


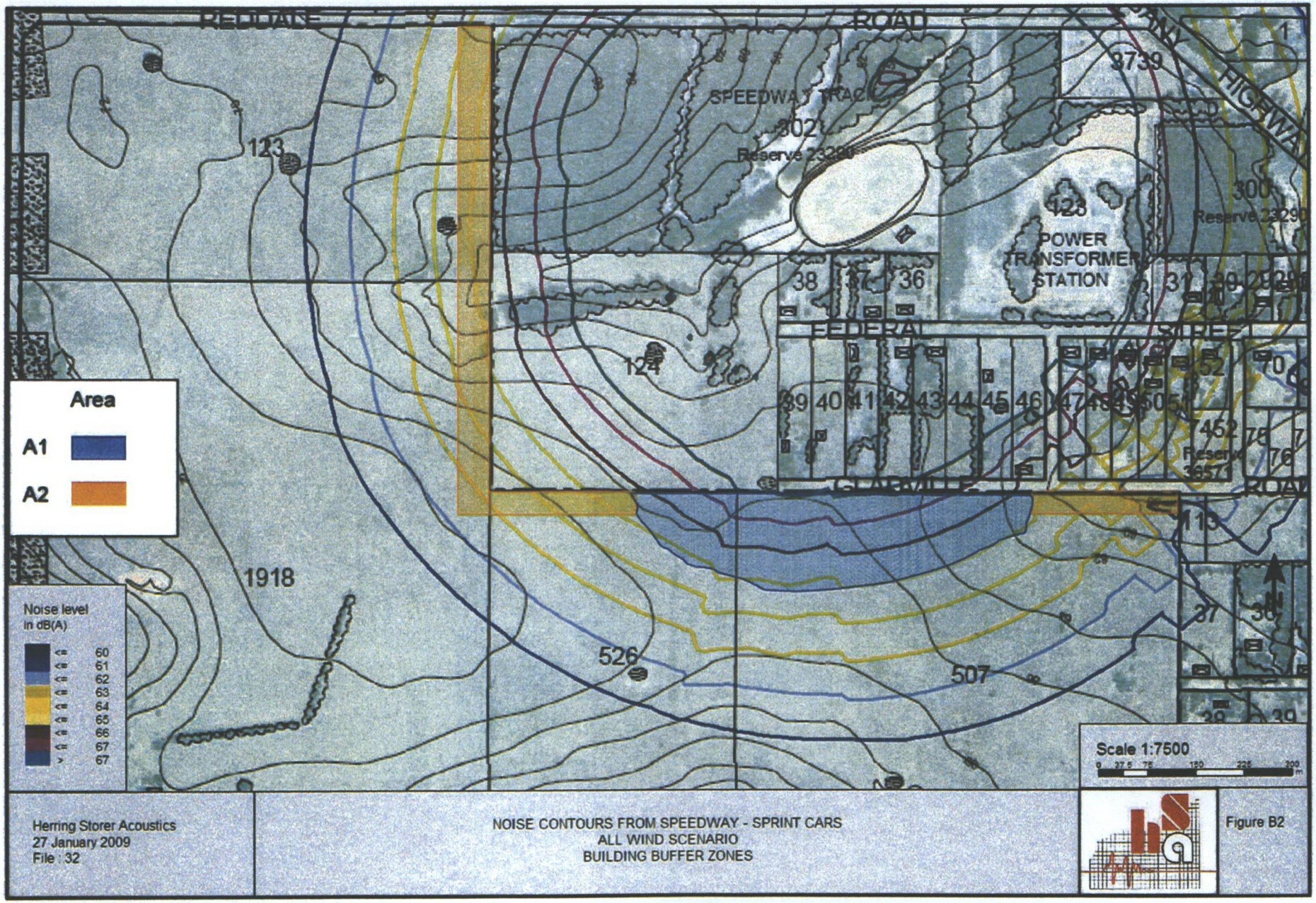
Figure A2 – Detailed Map



APPENDIX B

NOISE CONTOUR PLOT


Noise level in dB(A)
= 60
= 61
= 62
= 63
= 64
= 65
= 66
= 67
= 68
= 69
= 70
SPEEDWAY TRACK
Reserve 23280
POWER TRANSFORMER STATION
FEDERAL ST
GLADVILLE ROAD
123
124
1918
526
507
3739
3021
452
Scale 1:7500
Herring Storer Acoustics
16 January 2009
File : 32
NOISE CONTOURS FROM SPEEDWAY - SPRINT CARS
ALL WIND SCENARIO
Figure B1


REDGATE
ROAD
SPEEDWAY TRACK
3021
Reserve 23290
123
124
1918
526
507
3739
POWER
TRANSFORMER
STATION
FEDERAL
STREET
GLADSTONE
ROAD
Area
A1
A2
Noise level
in dB(A)
60
61
62
63
64
65
66
67
> 67
Scale 1:7500
0 37.5 75 150 225 300 m
Herring Storer Acoustics
27 January 2009
File : 32
NOISE CONTOURS FROM SPEEDWAY - SPRINT CARS
ALL WIND SCENARIO
BUILDING BUFFER ZONES
Figure B2

APPENDIX C

CITY of ALBANY
"SPEEDWAY NOISE BUFFER AREA POLICY"

CITY OF ALBANY
SPEEDWAY NOISE BUFFER AREA POLICY

OBJECTIVE

The objectives of the policy are to:

- allow for the ongoing operations of the speedway at Atwell Park and encourage the operators to incorporate additional noise attenuation measures to reduce noise impacts into adjoining residential developments.
- acknowledge and recognise existing approved residential developments within the buffer area.
- ensure that new developments incorporate measures to advise purchasers within the buffer area of the speedway operations and noise generated during their events.

POLICIES

1.1 For existing dwellings, additions/alterations to an existing dwelling or the replacement of an existing dwelling, noise attenuation measures are not mandatory within the buffer area (Map No. 1). Whilst it is expected that those premises will experience noise levels in excess of the provisions contained in the *Environmental Protection (Noise) Regulations 1997* from periodic speedway activity, Council will not seek to modify the 'as existing' conditions.

1.2 Residents are encouraged to consider the following information and methods of noise attenuation in planning the construction of new residences within the buffer area:

- the AS/NZS 2107:2000 Standard 'Acoustics – Recommended design sound levels and reverberation times for building interiors' recommends the following maximum internal noise levels (L_{Aeq}):
  - common areas 55dB(A)
  - living areas 45dB(A)
  - sleeping areas 40dB(A)
- the following techniques known as 'quiet house' design and construction methods/materials should be considered to achieve practical reduction in internal noise levels in new residences:
  - locating habitable rooms such as bedrooms on the opposite side of dwelling to speedway.
  - locating non-habitable rooms such as laundries/bathrooms on same side of dwelling as speedway.
  - protect main entrance from speedway noise.
  - insulation of the dwelling including enclosed eaves, insulate roof spaces or double brick construction.
- the erection of internal property fences between the speedway and dwelling so that it that forms a continuous and solid barrier (recommended density is a minimum of 10kg/m^2).

1.3 Upon the transfer of land within the buffer area, a notation shall be provided on the zoning certificate issued by the City advising of the relationship of the land to the speedway and of this Policy.

ADDITIONAL INFORMATION

1. *For the purpose of this Policy, an existing dwelling is defined as a dwelling either constructed, under construction or approved for construction at the time of adoption of this Policy*

2. *The information used to formulate this Policy was prepared by Herring Storer Acoustics (Acoustic Consultants).*

3. *The Herring Storer Acoustics report for the speedway contains some recommendations on future works at the speedway including the construction of barrier fencing that would reduce the impact of noise from the speedway and hence buffer zone required. The report recommends that upon completion of these works, additional modelling will need to be undertaken to redefine the buffer zone boundary shown in this Policy. The City has agreed to consider ways of assisting the speedway club to undertake these modifications.*

4. *For information purposes, the approximate density of some commonly used construction materials are:*

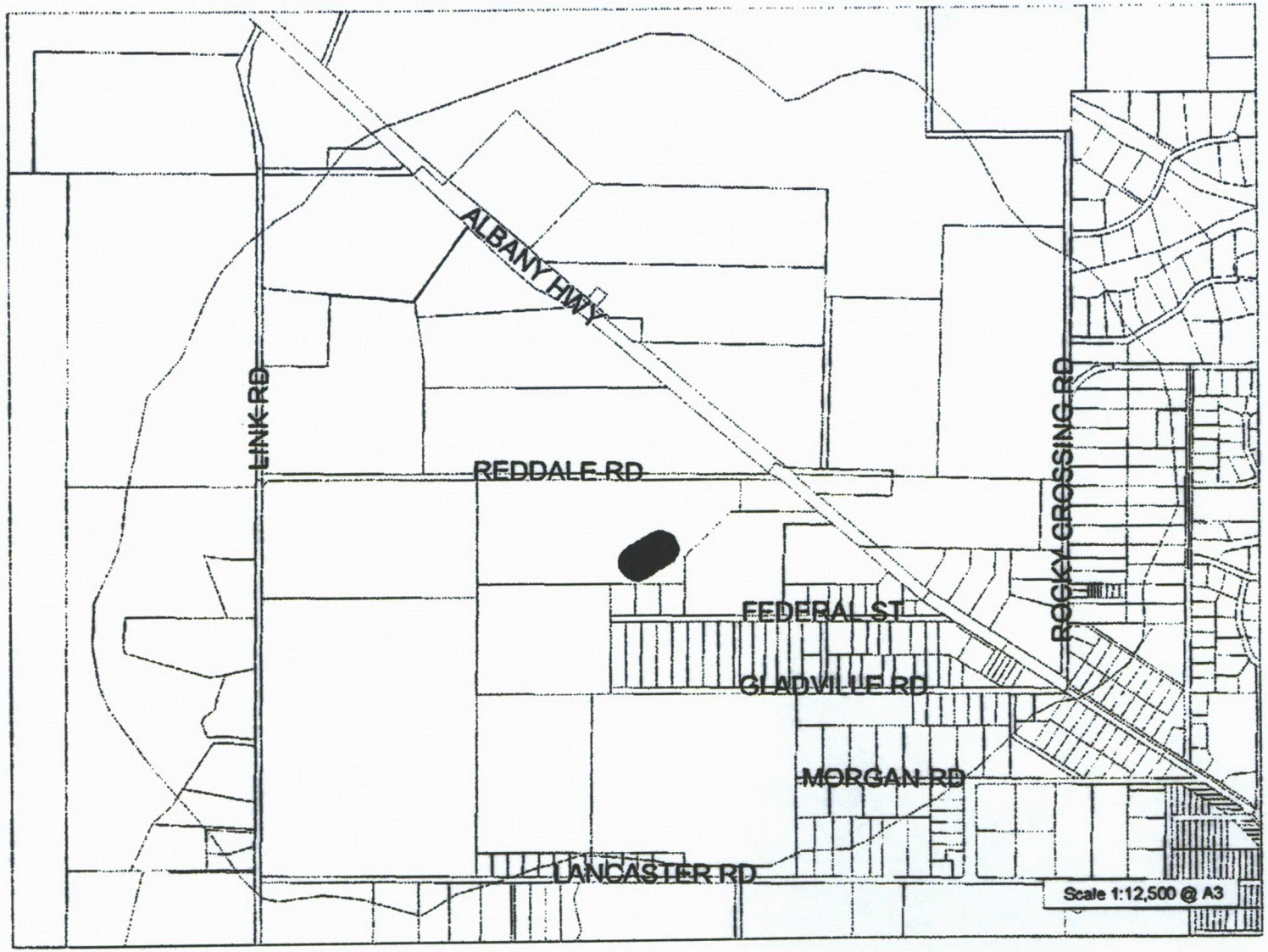
6mm compressed cement fence sheeting	*11kg/m²*
common brick	*180kg/m²*
200mm limestone blocks	*350kg/m²*
100mm concrete	*260kg/m²*

5. *Preliminary discussion with Council Officers is encouraged for any application likely to be affected by this Policy.*

Policy Status

Draft Policy Adopted for Advertising (October 2003 - Item 11.3.2 DS)
Final Policy Adopted (October 2004 – Item 11.3.3 DS)

Albany Speedway Noise Buffer



Legend

- Noise Buffer Area
- Speedway

City of Albany

N

Map No. 1

Attachment IV:

Wood & Grieve Engineers
Local Water Management Strategy

CELEBRATING 50 YEARS

WOOD & GRIEVE ENGINEERS

Lots 1 – 10, 12, 13, 66, 300, 507 & 526 Lancaster Road Local Water Management Strategy

for

Department of Water
Attn: Karen McKeough

19 December 2011

Revision -01

Prepared by Alan Millar Reviewed by Travis Demeza Project Number: 19539–ALB-C-LWMS

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Revision

REVISION	DATE	COMMENT	APPROVED BY
0	28/11/11	Initial submission	Travis Demeza
1	19/12/11	Revised following discussions with DoW	Travis Demeza

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1. Executive Summary

This LWMS has been prepared by Wood & Grieve Engineers (WGE) as part of the residential planning for Lots 300, 507 and 526. The objective of this report is to support the subdivision for WAPC conditions, by demonstrating 'best management practices' for water use and management at a local level.

The subdivision consists of approximately 700 residential lots of mixed R20 and R30 densities. The subdivision occupies 70 ha of existing cleared rural land, located on Lancaster Road in McKail, approximately 7km northwest of the Albany CBD.

A summary of the design objectives and the actions used to achieve these objectives is shown in Table 1.

Design Objective	Design Action
Water Quantity 1. Maintaining the existing water balance across the site. 2. Retention of stormwater above that occurring in the natural environment.	Detention basins will be placed to store surface water runoff for the 1 in 10 year event while releasing the flows at the 1 in 10 year pre-development rate. The basins will also be designed to release the 1in 5 year event at the pre-development rate, and retain the 1 in 1 year event. Bioretention basins (rain gardens) will be strategically placed to retain and filter the 1 in 1 year event. Subsoil pipes will connect part of the filtered water to the piped drainage network.
Protection of Property 3. Identification and accommodation for flood prevention.	Flood routing will generally be directed within the road reserves. Additional fill will be placed in areas requiring greater flood protection.
Water Quality 4. Enhancing coarse sediment removal and nutrient stripping.	Bioretention basins will consist of vegetation and filter media to remove a majority of the pollutants. An open drain (with riffles) in Catchment A may assist with course sediment removal.
Water Conservation 5. Encouragement of on-site use and source control.	Rainwater tanks are recommended to retain water runoff at source. This is unlikely to be monitored or enforced by the City of Albany, and therefore would need to be encouraged by the Developer.

TABLE 1: Design Elements

2. Background

An outline development plan (ODP) has been prepared by Ayton Baesjou Planning, and this plan forms the basis for this report (see Appendix 1).

A Land Capability report has been prepared by 360 Environmental dated 11 May 2011. The recommendations were that the "site is generally suitable for urban development". There were no significant environmental constraints identified restricting the development.

3. Proposed Development

The proposed subdivision is located in the suburb of McKail, approximately 7km northwest from the Albany CBD. The land mainly consists of cleared farm land and is currently zoned residential development (see Appendix 2).

The subdivision occupies an area of approximately 70 ha and consists of 509 R20 lots, 236 R30 lots, and two local activity centres. The POS areas consist of two sports fields and six parks. Two of the parks consist of landscaped detention basins. Currently Lots 1 – 10, 12 and 13 contain existing dwellings, which will be able to subdivide as part of the ODP.

Future subdivisions are expected to occur to the west, and Lot 124 to the northwest.

4. Design Criteria

The agreed stormwater design criteria by the City of Albany (CoA) and Department of Water (DoW) are as follows:

- Flood protection for the 1 in 100 year event.
- Water quality treatment and retention of the 1 in 1 year event.
- Pipe work and infrastructure to convey the 1 in 5 year event.
- Attenuation of the 1 in 10 year event while discharging at the 1 in 10 year event pre-development flow rate.

The design criterion is in accordance with the 'City of Albany Subdivision and Development Guidelines' (2009) and are congruent with stormwater management objectives outlined in DoW's Stormwater Management Manual (2007).

5. Pre-development Environment

5.1 Topography

A ridge crosses Lots 526 and 507 creating two main catchments. The northern catchment forms part of the Willyung Creek catchment and flows gradually in a north-east direction at a grade of approximately 2%. The southern catchment forms part of the Five Mile Creek catchment, and has a steeper average grade of approximately 4%. The southern catchment forms a valley through Lot 66, which directs runoff through a culvert crossing Lancaster Road. Due to the steep grades at the bottom of the catchment, additional fill within the lots is likely to be required to assist with flood routing and protection of properties. Management of the existing properties will be considered in detail as part of the Urban Water Management Plan (UWMP).

The gentle grades along the dividing ridge and northern catchment create ideal conditions for bioretention runoff controls such as swales and raingardens. These are discussed in Section 7.

5.2 Landuse

A majority of the site is cleared and is used for small scale farming, and therefore includes dams, fences and sheds. Twelve rural properties exist along the northern side of Lancaster Road. This is shown in the aerial photo in Appendix 2.

5.3 Geotechnical

Preliminary hand auger test results have been carried out by 360 Environmental. This information is included in Appendix 3. The results indicate generally grey silty sands overlying laterite gravelly sands.

The infiltration rates for these soils are considered to be low and unsuitable for soakwells. However, where lots require general fill, these areas may be suitable for soakwells.

5.4 Environmental

360 Environmental did not indicate any significant land capability factors. The report indicated management for topsoil erosion during construction, and potential risks of waterlogging, flooding and acid sulphate soils (ASS) in the low lying areas.

The WAPC Planning Bulletin 64 identifies the area as being "no known risk of ASS occurring within 3m of natural soil surface", and therefore under the WAPC guidelines, no further ASS investigations is required.

5.5 Surface Water and Groundwater

Three dams (approximately 20m in diameter) on the southern half of the development suggest that there is moderate surface water runoff, particularly due to the steep grades on this side of the development. Appendix 4 shows the current surface water plan. The surrounding road network currently controls the surface water runoff via open drains.

No groundwater was reached during the hand augering by 360 Environmental. However due to the underlying laterite gravelly layer, it is expected that perched groundwater may occur during the wetter winter periods.

Following a meeting on 29 July 2011 at the DoW office in Albany, it was agreed between WGE, Aurora Environmental and DoW that the need for surface water and groundwater monitoring was not required due to its predictable nature.

6. Water Initiatives

6.1 Water Efficiency Measures

It is recommended that all properties install rainwater tanks to retain the 1 in 1 year event for potable water supply and/or grey water reuse. It is proposed that the Developer includes the need for water tanks as part of the development guidelines, as well as water efficient gardens to capture and control runoff. It should be noted that it is difficult for the City of Albany to monitor the use of raintanks, and therefore these volumes are not included in the drainage calculations.

A potable water supply service will be provided to the development.

6.2 Stormwater Reuse

It is a requirement by the DoW and City of Albany that scheme water is not to be used for the irrigation of POS areas. Stormwater reuse options will be considered in more detail in design. This will likely require further assistance from landscapers and specialists in water reuse schemes.

6.3 Wastewater Management

Wastewater will connect to a gravity sewer piped network, and treated at the nearby wastewater treatment plant located on Timewell Road.

7. Stormwater Management Strategy

7.1 Flood Protection

Appendix 5 displays the expected pattern in a major storm event. The design criteria for flood routing are as follows:

- In events greater than the 1 in 1 year event, the capacity of the lot drainage infrastructure (ie. rainwater tanks and bioretention basins) is exceeded.
- In events greater than the 1 in 5 year event, the capacity of the City's piped drainage system is reached.
- In events greater than the 1 in 10 year event, the detention basins will fill to capacity.
- In major events greater than the 1 in 10 year event, overland flow will occur over most of the catchment and will be managed within the kerbed road network.

The southern catchment flood path (outside the development) will sheet flow runoff along the existing drainage path along the low lying areas at the rear of rural properties. There are no known flooding issues in this area. It is likely that additional fill (within the development) may be required for properties along Lancaster Road for flood protection due to the steep upstream runoff.

The northern catchment flood path (outside the development) will be directed along the Gladville Road before continuing north along the reserve; eventually crossing Albany Highway and linking with Willyung Creek.

7.2 1 in 10 Year Storm Event

Detention basins will form part of the treatment infrastructure to aid in the stripping of coarse sediments and uptake of nutrients, prior to discharging to the downstream environment. Basins A and B will attenuate the majority of the developed catchment. All basins will be designed in accordance with the City of Albany's requirements, such that the maximum discharge is equivalent to the 1 in 10 year pre-development peak flow, with a storage volume large enough to detain the 1 in 10 year post-development event. Please note that due to the treatment from bioretention basins in Catchment B, the level of treatment required in Basin B is less than in Basin A. Typical details of Basin A are shown in Appendix 7. Basin B will be more simplified with the main design criteria to release the flows at the pre-development rate.

To simplify the strategy, the sizing of the detention basins does not subtract upstream storage volumes available from rainwater tanks and bioretention basins on the road reserves. This may be revised during the UWMP.

7.3 1 in 5 Year Storm Event

The development's piped drainage network will be designed in accordance with industry standard practice and the City of Albany's guidelines, where all piped drains can convey a "minor" 1 in 5 year post-development storm event over its respective catchment. All bioretention basins will have capacity to store the 1 in 1 year event and convey the 1 in 5 year event to detention basins. The detention basins will be designed to discharge the 1 in 5 year event at the pre-development peak flow rate.

An open drain in Catchment A may assist with course sediment removal and reduce the velocities of the flow by installing riffles. The option to include a 'living stream' was considered, however the steep grades do not permit this to be a suitable option due to potential erosion issues, space requirements, and feasibility.

The key elements of the design are:

- All roads will be sealed and fully kerbed.
- Flushed kerbing will be used where runoff to bioretention basins are required.
- Pipe size will be minimum Ø300mm RCP.
- Pits (manholes and gullys) will be placed at strategic locations, generally at a maximum spacing of 70m.
- The road crossfall will generally be crowned, with one-way crossfall to the higher side of the road in areas requiring additional flood direction control.
- Verges will be designed to prevent flooding of adjoining lots in high flow events.

7.4 1 in 1 Year Storm Event

Regardless of the use of rainwater tanks, it can be reasonably assumed that for a majority of rainfall events up to the 1 in 1 year event, the runoff will be contained within the lots through infiltration within the lawns and gardens.

Where gentle grades permit (1 – 4%) bioretention basins (or otherwise known as raingardens) are proposed to collect runoff from road reserves. "Gaps" in the roadside kerb will channel runoff into the basins. Vegetation and filter media are designed to specifically treat pollutants and retard infiltration. Subsoil pipes then collect the filtered water to gully drainage pits. During large storm events runoff is designed to overflow to the raised gullys. The interaction of the bioretention basins with the surrounding services and footpaths will be subject to detailed designed and discussed in the UWMP. See Appendix 7 for details of the bioretention basins.

In Catchment B there may be an option to install infiltration basins in two of the POS areas for the 1 in 1 year event. These may be used as alternative, or in combination with the bioretention basins to infiltrate flows upstream at source. It should be noted that it is DoW's preference that bioretention basins are the preferred means of treatment.

8. Next Stage

Full detailed design documentation and an "Urban Water Management Plan" will be required prior to construction and the associated clearance of Department of Water WAPC conditions of subdivision.

9. Monitoring

Following a meeting on 29 July 2011 at the DoW office in Albany, it was agreed between WGE, Aurora Environmental and DoW that the need for surface water and groundwater monitoring was not required due to its predictable nature.

10. Implementation

10.1 Developers Commitments

The Developer will be responsible for all development maintenance works, and maintenance of vegetation and erosion during the 12 month defects liability period. Once lapsed, the City of Albany will be responsible for all maintenance and upkeep of the roads and drainage network. It should be noted that the anticipated infrastructure is of low maintenance.

10.2 Funding

All design, construction and handover costs for the development will be funded by the private developer.

Ongoing maintenance past the 12 month defects period will be funded by the City of Albany through rated properties.

11. Conclusion

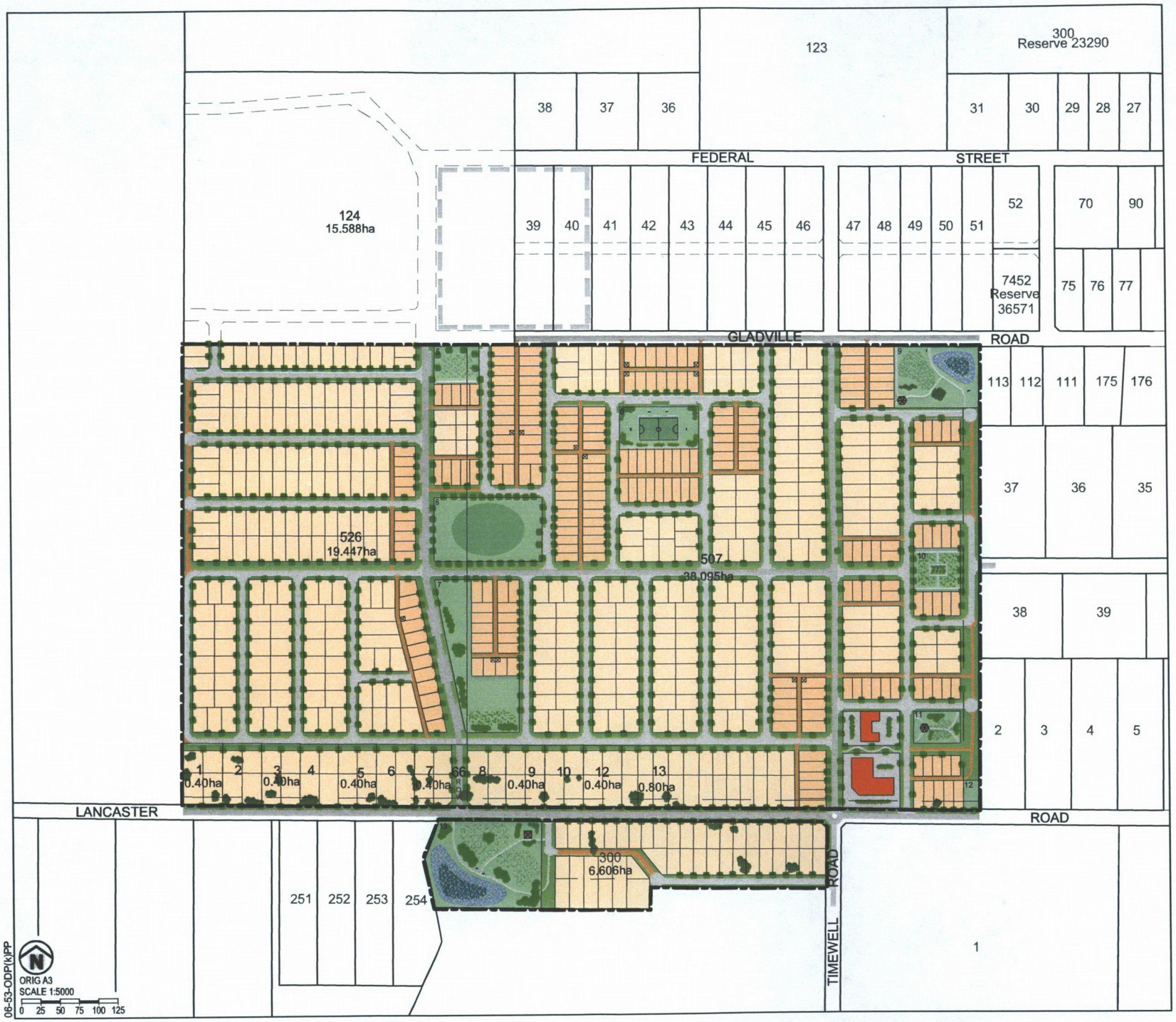
It is our opinion that the proposed development will not have a significant effect on the existing on-site or downstream catchment, and with the utilisation of the quantity and quality treatment measures proposed above, the surrounding environment and properties should not be adversely affected.

Appendix 1

Outline Development Plan

OUTLINE DEVELOPMENT PLAN

Lots 1 - 10, 12, 13, 66, 300, 507 & 526 Lancaster Road
McKail, City of Albany



LEGEND

- Subject Land
- Public Open Space & I.D.
- Residential Cell (R20)
- Residential Cell (R30)
- Local Activities Centre Site (Interim Use Permitted Subject to DAP)
- Landscaped Basin
- Potential Future PSS (City of Albany District Structure Plan)

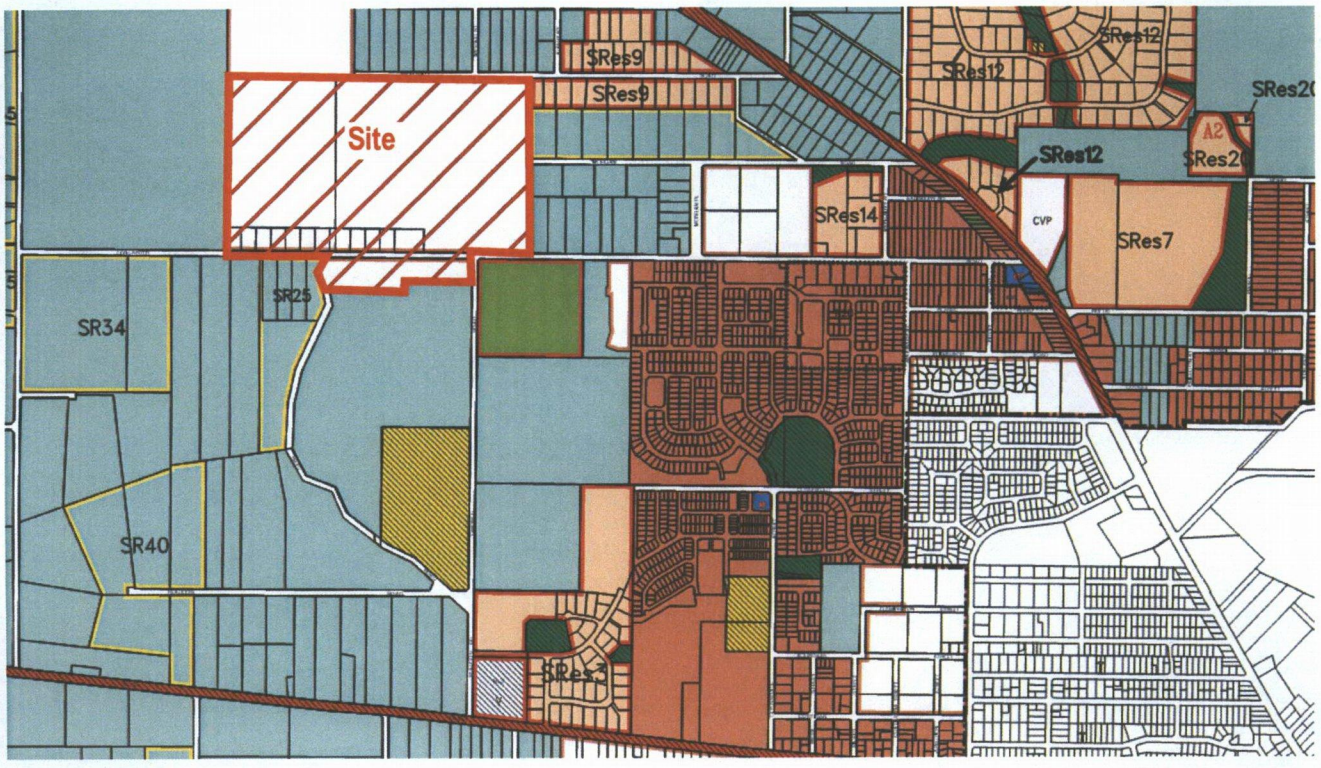
06-53-ODP(k)PP

ORIG A3
SCALE 1:5000
0 25 50 75 100 125

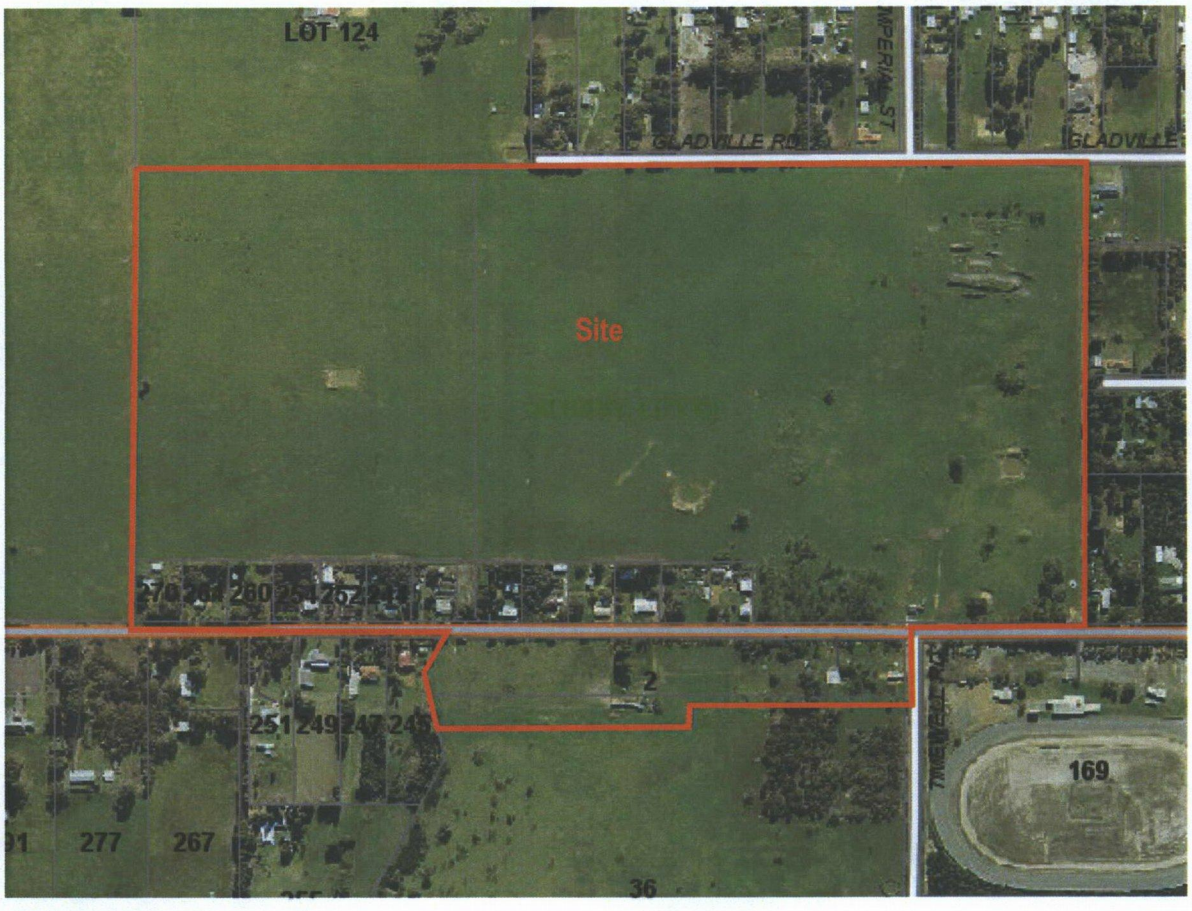
AYTON BAESJOU PLANNING
11 Duke Street
Albany WA 6330
Ph 9842 2304 Fax 9842 8494

Appendix 2

Albany Town Planning Scheme and Aerial Photo



Albany Local Planning Strategy
Town Planning Scheme No.3

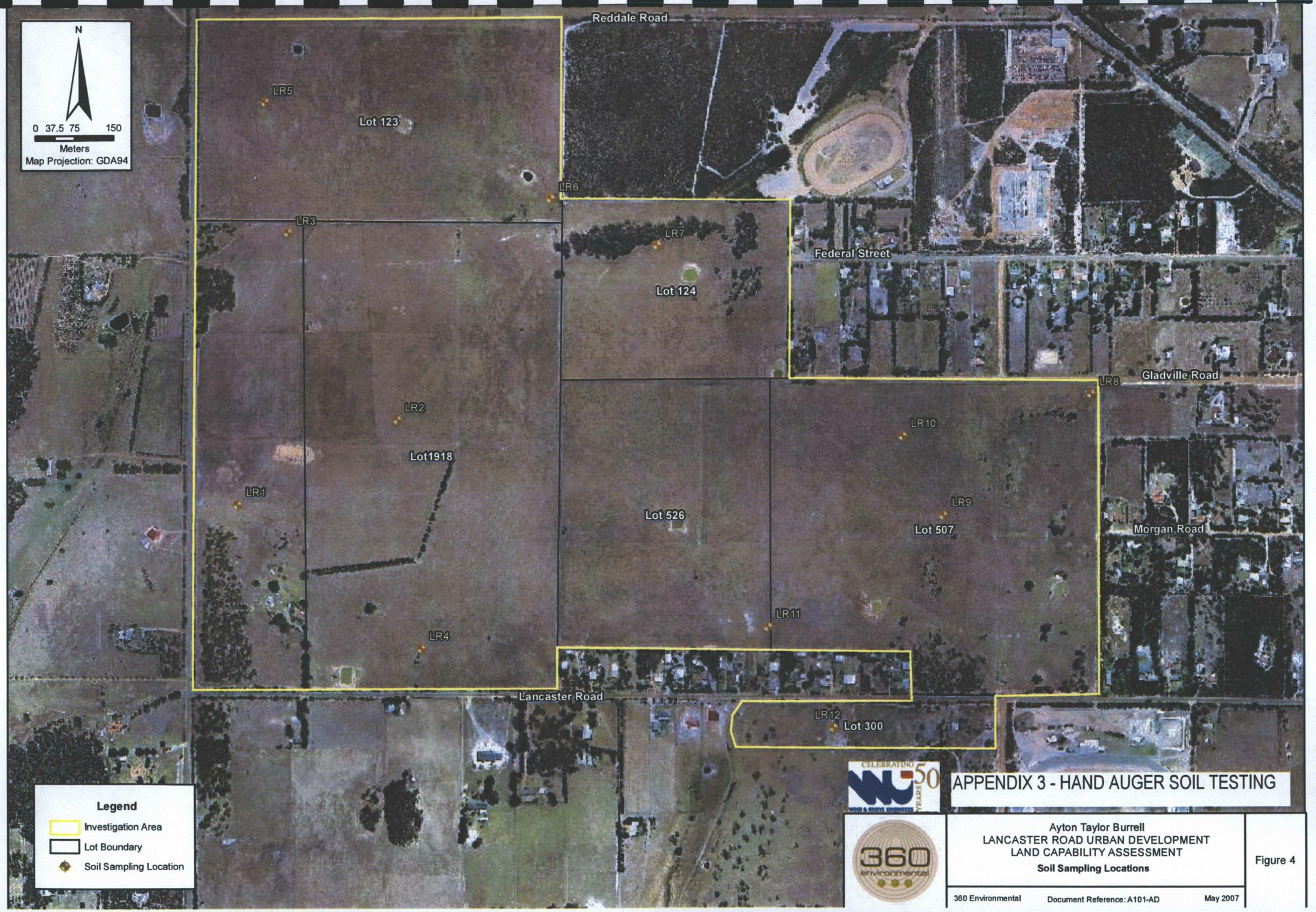


Aerial Photo
Source: Landgate

CELEBRATING 50 YEARS
WOOD & GRIEVE ENGINEERS

Appendix 3

Hand Auger Soil Testing



APPENDIX 3 - HAND AUGER SOIL TESTING

Ayton Taylor Burrell
LANCASTER ROAD URBAN DEVELOPMENT
LAND CAPABILITY ASSESSMENT
Soil Sampling Locations

Figure 4

360 Environmental | Document Reference: A101-AD | May 2007

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 1918 - Western Section

Borehole Number: LR1
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 574382
Northing: 6128661

Drilling and Sampling Information								Material and Substance		
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condition	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR1-1	-			**ML** SILT, light grey, some organics		
										D	
					LR1-2	-	0.5		**ML** SILT, light grey		
					LR1-3	-				M	
									ML SILT, light grey with a trave of laterite gravel to 20mm		
							1.0		End of Log		

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 1916 - Central Ridge

Borehole Number: LR2
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 574693
Northing: 6128826

Drilling and Sampling Information							Material and Substance				
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condition	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR2-1	-			**OL** ORGANIC SILT, dark brown with organics	D	
					LR2-2	-			**ML** SILT, brownSILT, brown with a trace of laterite gravel to 20mm		
									End of Log		
							0.5				
							1.0				

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 1918 - Northern Boundary

Borehole Number: LR3
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 574480
Northing: 6129190

Drilling and Sampling Information							Material and Substance			
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condtion	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR3-1	-			**ML** SILT, light brown, some organics	D	
									ML SILT, light brown with a trace of laterite gravel to 20mm	M	
					LR3-2	-					
									End of Log		
							0.5				
							1.0				

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 1916 - Southern Boundary

Borehole Number: LR4
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 574740
Northing: 6128381

Drilling and Sampling Information								Material and Substance		
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condition	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR4-1	-			OL ORGANIC SILT, dark brown with organics	M	
					LR4-2	-			OL ORGANIC SILT, dark brown with trace of gravel to 20mm		
									End of Log		
							0.5				
							1.0				

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 124 Link Road

Borehole Number: LR5
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 574435
Northing: 6129444

Drilling and Sampling Information							Material and Substance			
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condition	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR5-1	-			**ML** SILT, light grey, some organics	D	
									SM Silty SAND, fine grained, brown		
					LR5-2	-	0.5		**SM** Silty SAND, fine grained, light grey	M	
					LR5-3	-					
							1.0		End of Log		

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 124 Link Road

Borehole Number: LR6
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 574992
Northing: 6129256

Drilling and Sampling Information							Material and Substance			
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condition	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR6-1	-			**ML** SILT, light brown, some organics	D	
									ML SILT, light brown with a trace of laterite gravel to 20mm	M	
					LR6-2	-					
							0.5		End of Log		
							1.0				

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 123 Gladville

Borehole Number: LR7
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 575196
Northing: 6129165

Drilling and Sampling Information								Material and Substance		
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condtion	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR7-1	-			OL ORGANIC SILT, dark brown with organics		
									OL ORGANIC SILT, dark brown with trace of gravel to 20mm	M	
					LR7-2	-					
									End of Log		
							0.5				
							1.0				

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 507 Lancaster Road - Northern Boundary

Borehole Number: LR8
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 576056
Northing: 6428872

Drilling and Sampling Information								Material and Substance		
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condition	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR8-1	-			OL ORGANIC SILT, dark brown with organics	D	
					LR8-2	-			OL ORGANIC SILT, light brown with trace of gravel to 15mm		
									End of Log		
							0.5				
							1.0				

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 507 Lancaster Road, Central Section

Borehole Number: LR9
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 575749
Northing: 6128639

Drilling and Sampling Information							Material and Substance				
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condition	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR9-1	-			**ML** SILT, dark brown, some organics	D	
					LR9-2	-			**ML** SILT, light brown with a trace of laterite gravel to 20mm		
									End of Log		
							0.5				
							1.0				

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 526 Lancaster Road, Central Section

Borehole Number: LR10
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 575670
Northing: 6128793

Drilling and Sampling Information								Material and Substance		
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condtion	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR10-1	-			**ML** SILT, brown, some organics	D	
									ML SILT, light brown with a trace of laterite gravel to 20mm		
					LR10-2	-					
									End of Log		
							0.5				
							1.0				

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 526 Lancaster Road - Southern Section

Borehole Number: LR11
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 575409
Northing: 6128423

Drilling and Sampling Information								Material and Substance		
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condtion	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR11-1	-			**OL** ORGANIC SILT, dark brown with trace of gravel to 20mm and organics	D	
							0.5		End of Log		
							1.0				

Client: Ayton Taylor Burrell
Project: Urban Development Land Capability Assessment
360 Job Number: A101
Borehole Location: Lot 300 Lancaster Road

Borehole Number: LR12
Sheet: 1 of 1
Date: 19/4/07
Logged By: TC

Drill Model: Hand Auger
Hole Diameter: 50mm

Easting: 575535
Northing: 6128226

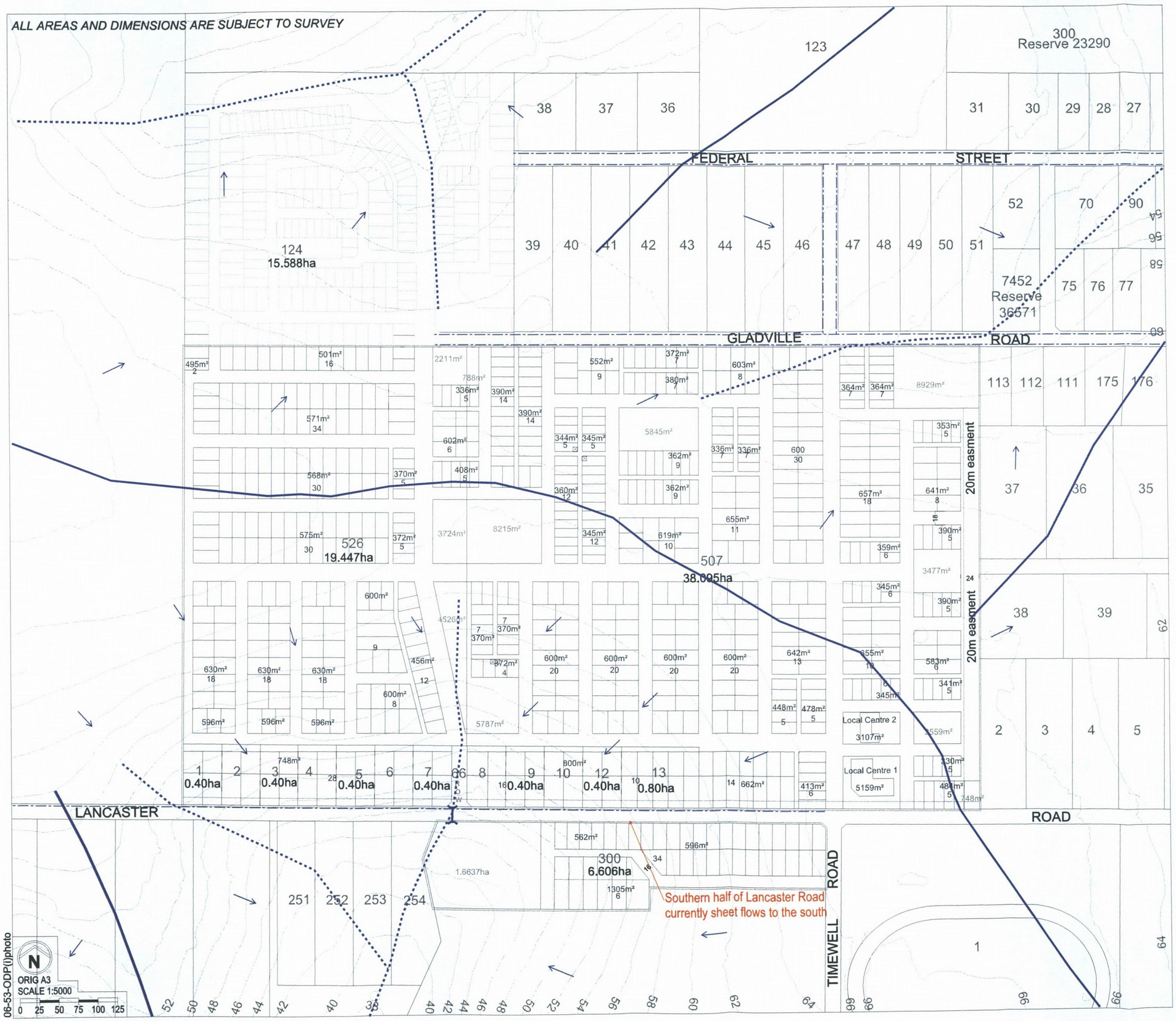
Drilling and Sampling Information								Material and Substance		
Penetration				Water	Analytical Soil Samples	PID Readings (ppm)	Depth (m)	Graphical Log	Lithologic Description	Moisture Condition	Structure and additional observations
1	2	3	4								
							0.0		Ground Surface		
					LR12-1	-			**ML** SILT, dark brown, some organics	D	
					LR12-2	-			**ML** SILT, light grey		
					LR12-3	-			**ML** SILT, light grey with a trave of laterite gravel to 15mm		
							0.5		End of Log		
							1.0				

Appendix 4

Surface Water Plan

OUTLINE DEVELOPMENT PLAN

Lots 1 - 10, 12, 13, 66, 300, 507 & 526 Lancaster Road
McKail, City of Albany



Legend

- Catchment Boundary
- Main Ridge Lines
- Main Valley Lines
- Surface Runoff Direction
- Culvert Crossing
- Open Drain

APPENDIX 4
SURFACE WATER PLAN

11 Duke Street
Albany WA 6330
Ph 9842 2304 Fax 9842 8494

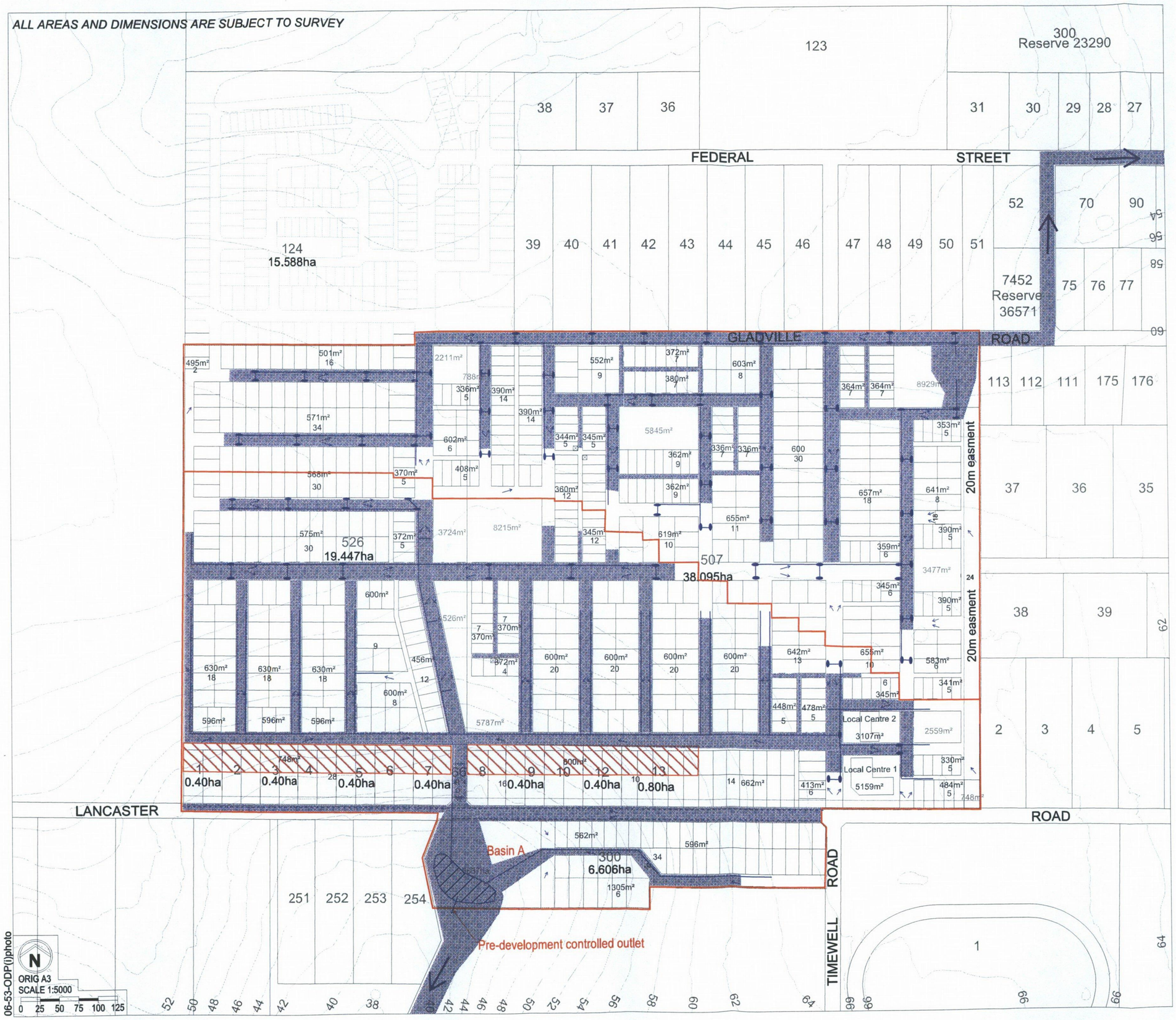
Appendix 5

Flood Plan

ALL AREAS AND DIMENSIONS ARE SUBJECT TO SURVEY

OUTLINE DEVELOPMENT PLAN

Lots 1 - 10, 12, 13, 66, 300, 507 & 526 Lancaster Road
McKail, City of Albany



Legend

- Catchment Boundary
- Drainage Pipe
- Rainwater Garden
- Detention Basin
- Runoff Direction
- Lot Fill
- Existing Open Swale
- Flood Route Direction
- 1 in 100 Year Flood Area

APPENDIX 5
Flood Plan

CELEBRATING 50 YEARS
11 Duke Street
Albany WA 6330
Ph 9842 2304 Fax 9842 8494

Appendix 6

Stormwater Event Plan

ALL AREAS AND DIMENSIONS ARE SUBJECT TO SURVEY

OUTLINE DEVELOPMENT PLAN

Lots 1 - 10, 12, 13, 66, 300, 507 & 526 Lancaster Road McKail, City of Albany

Basin A
Catchment area = 421,900m²
Runoff Cy = 0.56
Pre-Development Q = 1.417m³/s
Post-Development Q = 2.853m³/s
Base Area = 1,890m²
Depth = 1.0m
Batter = 1: 6
Freeboard = 300mm
Surface Area (Incl Freeboard) = 3,280m²

Basin B
Catchment area = 283,100m²
Runoff Cy = 0.58
Pre-Development Q = 1.020m³/s
Post-Development Q = 1.332m³/s
Base Area = 1,230m²
Depth = 1.0m
Batter = 1: 6
Freeboard = 300mm
Surface Area (Incl Freeboard) = 2,390m²

123
300 Reserve 23290
6
31 30 29 28 27
FEDERAL STREET
52
70 90
54 56 58
124 15.588ha
39 40 41 42 43 44 45 46 47 48 49 50 51
7452 Reserve 36571
75 76 77
60
GLADVILLE ROAD
113 112 111 175 176
Basin B
20m easment
37 36 35
526 19.447ha
507 38.095ha
24
38 39
62
2 3 4 5
LANCASTER ROAD
Local Centre 2
Local Centre 1
0.40ha 0.40ha 0.40ha 0.40ha 0.80ha
Basin A
.6637ha
300 6.606ha
TIMEWELL ROAD
1
64
Southern half of Lancaster sheet flows to the south
Pre-development controlled outlet
251 252 253 254
52 50 48 46 44 42 40 38 40 42 44 46 48 50 52 54 56 58 60 62 64
99 66 99 99

Legend
- Catchment Boundary
- Drainage Pipe
- Rainwater Garden
- Detention Basin
- Runoff Direction
- Lot Fill
- Existing Open Swale
- Open Rock Pitched Drain
- *Infiltration Basin

*Infiltration basins may be used in the POS areas as alternative option or in addition to rainwater gardens.

1 Year ARI Event
- Runoff from lots retained onsite
- Runoff from road reserves retained within rainwater gardens where grades permit (ie 1% to 4%), or retained within basins

5 Year ARI Event
- Runoff is conveyed via the piped drainage network to detention basins and released at the pre-development flow rate

10 Year ARI Event
- Runoff is conveyed via the road network to the detention basins which discharge at the pre-development flow rate.

100 Year ARI Event
- All runoff is flood routed via the drainage network.

N
ORIG A3
SCALE 1:5000
0 25 50 75 100 125

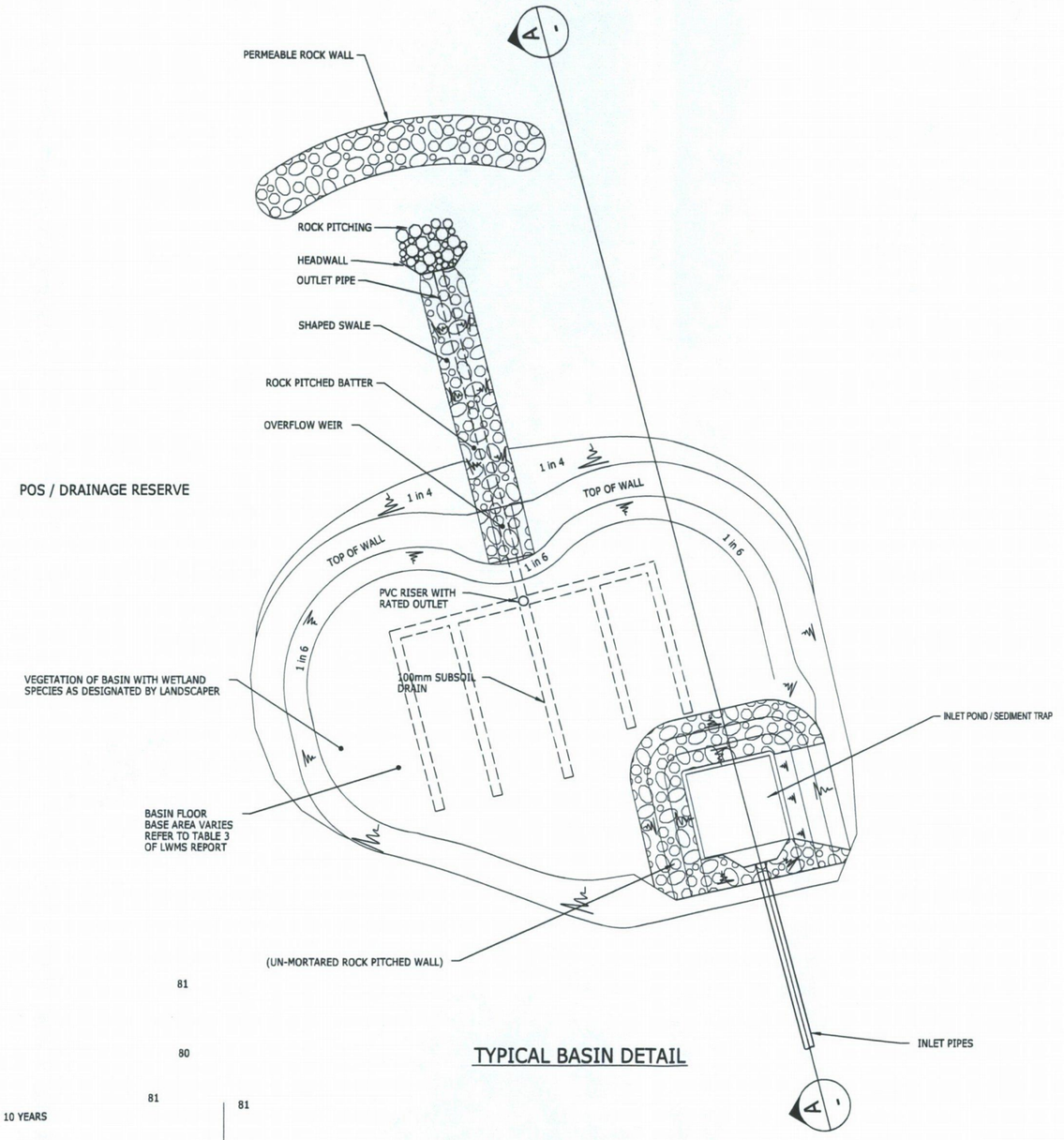
06-53-ODP(i)photo

APPENDIX 6
STORMWATER EVENT PLAN

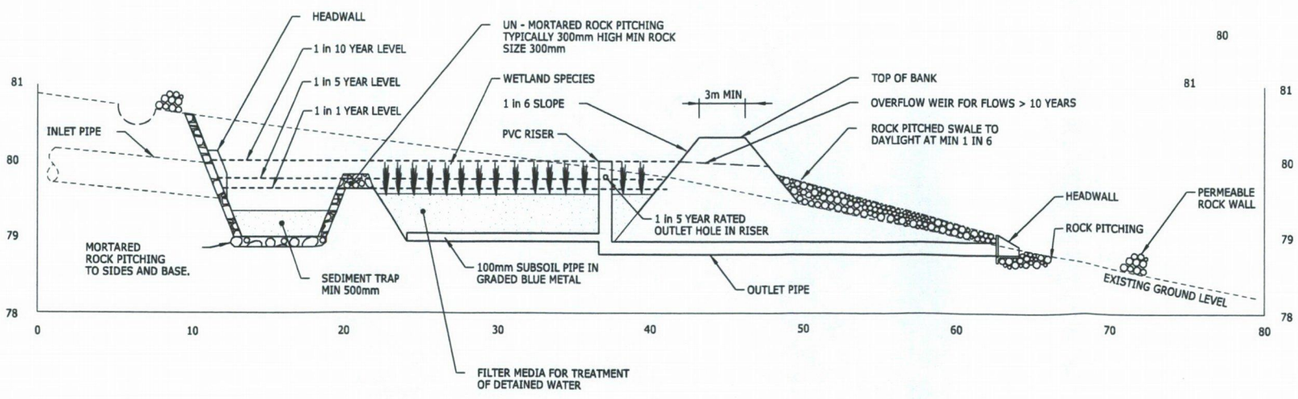
CELEBRATING 50 YEARS
WOOD & GRIEVE ENGINEERS
11 Duke Street
Albany WA 6330
Ph 9842 2304 Fax 9842 8494

Appendix 7

Drainage Details

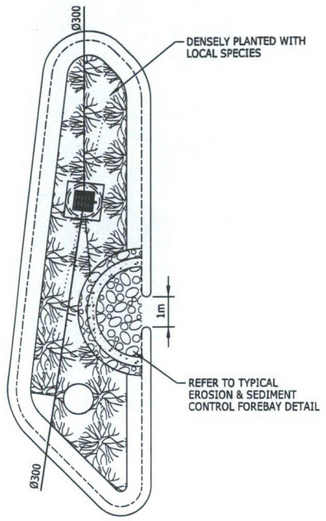


TYPICAL BASIN DETAIL



SECTION A - A
NTS VE 5:1

APPENDIX 7
DRAINAGE DETAILS (1 of 2)



BIO-RETENTION BASIN
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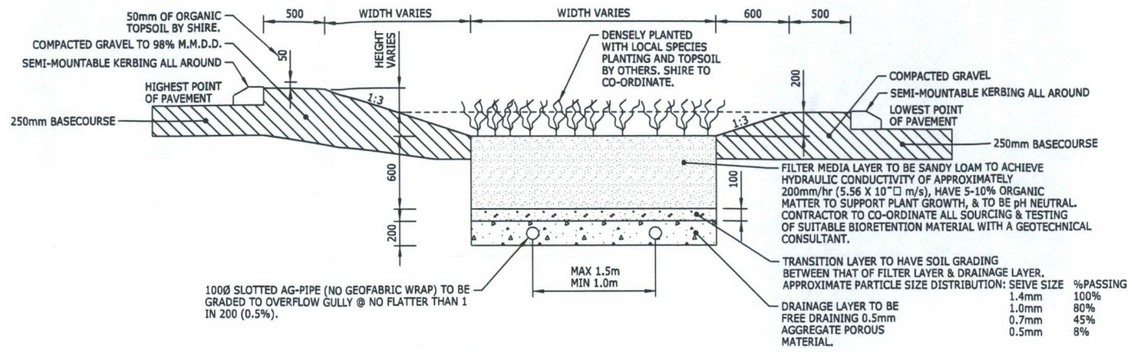
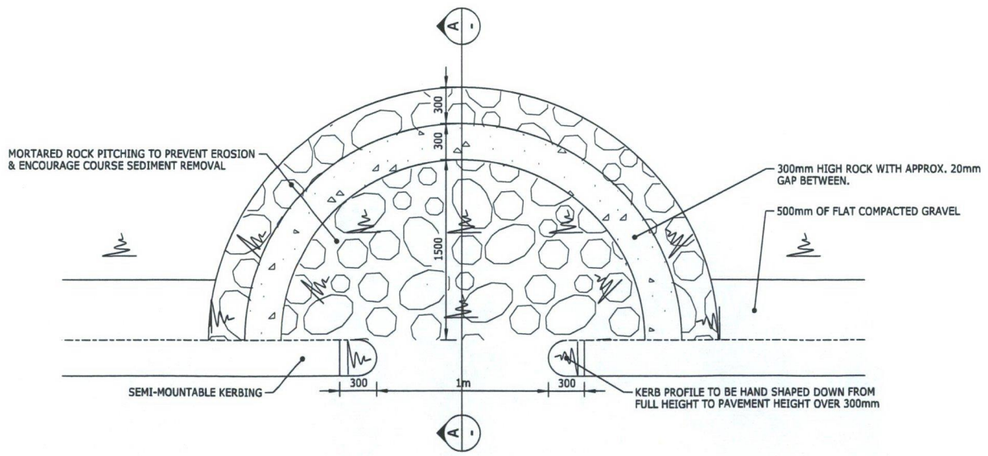


TYPICAL BIORETENTION BASIN SECTION
N.T.S.



TYPICAL EROSION & SEDIMENT CONTROL FOREBAY PLAN
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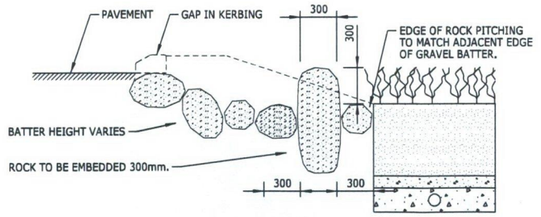


SECTION A-A
N.T.S.

APPENDIX 7
DRAINAGE DETAILS (2 of 2)

CELEBRATING 50 YEARS
WOOD & GRIEVE ENGINEERS

Appendix 8

Basin Calculations

Catchment Flow Calculator - Basin A & B

Estimation by Rational Method - 1987 Australian Rainfall and Runoff

Job : Lots 300,507 Lancaster Road LWMS ***Client : Vegate Pty Ltd*** ***By : Alan Millar***
Job # : 19539-ALB-C ***Date : 04/11/11***

Location Albany

Wood & Grieve Engineers 1st Floor, The Terrace Centre, 96-102 Stirling Terrace, Albany WA 6330

Pre-Development Runoff Calculations

Catchment	Time of Concentration (Rural) =0.76xA^(0.38)						Intensity							Runoff Co-efficients							Discharge (Q) (m³/s)						
	Area	Area	Length	Slope	TOC	TOC Used	1	2	5	10	20	50	100	(Frequency Factors (Cy/C10))							1	2	5	10	20	50	100
	(m2)	(km2)	(km)	(m/km)	(min)	(min)	(mm/hr)	(mm/hr)	(mm/hr)	(mm/hr)	(mm/hr)	(mm/hr)	(mm/hr)	1	2	5	10	20	50	100	(m³/s)	(m³/s)	(m³/s)	(m³/s)	(m³/s)	(m³/s)	(m³/s)
														0.8	*0.85*	*0.95*	*1*	*1.05*	*1.15*	*1.2*							
Basin A	421903	0.421903			32.85	31	20.4	26.7	34.7	40.3	47.9	59.1	68.5	0.24	0.26	0.29	0.3	0.32	0.35	0.36	0.573	0.799	1.161	1.417	1.771	2.391	2.891
Basin B	283078	0.283078			28.23	28	21.6	28.4	37.1	43.2	51.6	63.7	74.0	0.24	0.26	0.29	0.3	0.32	0.35	0.36	0.409	0.570	0.833	1.020	1.278	1.731	2.097

Post-development Runoff Calculations

Catchment	Time of Concentration (Urban) = 58.5*L / A^(0.1)*S^(0.2)						Intensity							Runoff Co-efficients							Discharge (Q)						
	Area	Area	Length	Slope	TOC	TOC Used	1	2	5	10	20	50	100	(Frequency Factors (Cy/C10))							1	2	5	10	20	50	100
	(m2)	(km2)	(km)	(m/km)	(min)	(min)	(mm/hr)	(mm/hr)	(mm/hr)	(mm/hr)	(mm/hr)	(mm/hr)	(mm/hr)	1	2	5	10	20	50	100	(m³/s)	(m³/s)	(m³/s)	(m³/s)	(m³/s)	(m³/s)	(m³/s)
														0.8	*0.85*	*0.95*	*1*	*1.05*	*1.15*	*1.2*							
Basin A	421903	0.421903	0.9	32	28.70	28	21.6	28.4	37.1	43.2	51.6	63.7	74.0	0.45	0.48	0.53	0.56	0.59	0.65	0.68	1.143	1.596	2.331	2.853	3.575	4.841	5.865
Basin B	283078	0.283078	1.16	9.5	49.08	49	15.3	19.9	25.3	29.0	34.1	41.4	47.5	0.47	0.50	0.55	0.58	0.61	0.67	0.70	0.564	0.779	1.106	1.332	1.645	2.189	2.620

Post-Development Catchment Characteristics

	Basin A		Basin B			
Surface Type	**Area**	**C_{10}**	**Area**	**C_{10}**		
Lots R20	203557	0.6	100906	0.6		
Lots R30	31873	0.72	56944	0.72		
POS	47248	0.3	24750	0.3		
Local Centre	8266	0.6				
Road Reserve	116859	0.56	93178	0.56		
Lancaster Road	14100	0.56				
Gladville Road			7300	0.56		
Total	**421903**	**0.56**	**283078**	**0.58**		
	Equivalent C_{10}		**Equivalent C_{10}**			

CELEBRATING 50 YEARS WOOD & GRIEVE ENGINEERS

APPENDIX 8
BASIN CALCULATIONS (1 of 3)

RAINFALL DISCHARGE / BASIN VOLUME ESTIMATE

Estimation by Rational Method - 1987 Australian Rainfall and Runoff

A

Job : Lots 300, 507 Lancaster Road L *Client : Vegate Pty Ltd* *Catchment : Basin A*
Job # : 19539-ALB-C *Date : 04/11/11*
By : Alan Millar

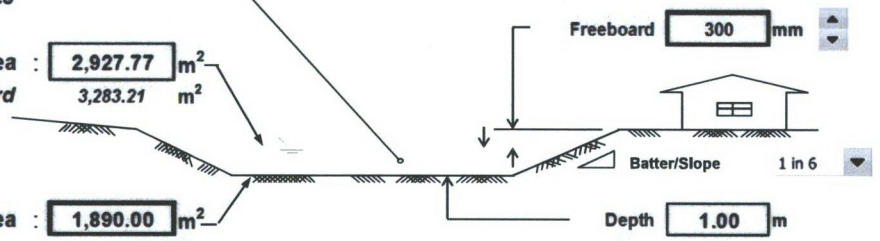
Wood & Grieve ENGINEERS 16 Altona Street, West Perth WA 6005

Design Rainfall Intensity
Location : Albany **Duration** : 28 minutes
Storm Event : 10 year **Intensity** : 43.2 mm/hr

Catchment Details **Area** : 421,903 m^2
Run-off Coefficient : 0.56
Flow Rate : 2837.9 L/s

Outflow Details **Soil Type** : Fine Sand
Soakage Rate : 0.0001 m/s → 0.189 m^3/s (Total Soakage)
Outlet : 1.417 m^3/s

Storage Details **Volume** : 2,379.74 m^3
at 16 minutes
Surface Area : 2,927.77 m^2
inc. freeboard 3,283.21 m^2
Base Area : 1,890.00 m^2



Current base area, depth and batter slopes can hold a Volume of :	2390.03	m3
The Volume required to store a 10 year storm is :	2,379.74	m3
Does the proposed basin hold the design storm ?	Yes	

Note: Volume Calculated is based on a circular base and top shape.
It is the volume between the RL of the outlet and the RL of the overflow point.

APPENDIX 8
BASIN CALCULATIONS (2 OF 3)

RAINFALL DISCHARGE / BASIN VOLUME ESTIMATE

Estimation by Rational Method - 1987 Australian Rainfall and Runoff

Job : Lots 300, 507 Lancaster Road L *Client : Vegate Pty Ltd* *Catchment : Basin B*
Job # : 19539-ALB-C *Date : 09/11/11*
By : Alan Millar

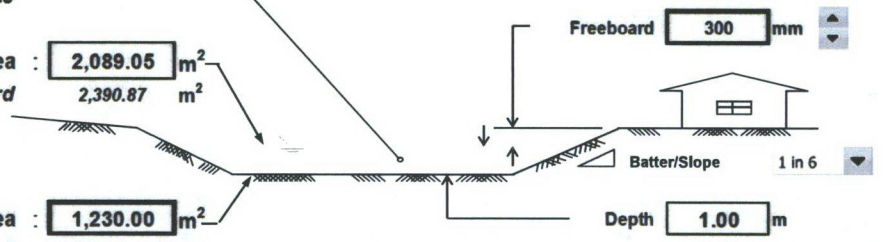
Wood & Grieve ENGINEERS 16 Altona Street, West Perth WA 6005

Design Rainfall Intensity
Location : Albany **Duration** : 49 minutes
Storm Event : 10 year **Intensity** : 29.0 mm/hr

Catchment Details **Area** : 283,078 m^2
Run-off Coefficient : 0.58
Flow Rate : 1323.6 L/s

Outflow Details **Soil Type** : Fine Sand
Soakage Rate : 0.0001 m/s → 0.123 m^3/s (Total Soakage)
Outlet : 1.02 m^3/s

Storage Details **Volume** : 1,628.84 m^3
at 15 minutes
Surface Area : 2,089.05 m^2
inc. freeboard 2,390.87 m^2
Base Area : 1,230.00 m^2



Current base area, depth and batter slopes can hold a Volume of :	1640.67	m3
The Volume required to store a 10 year storm is :	1,628.84	m3
Does the proposed basin hold the design storm ?	Yes	

Note: Volume Calculated is based on a circular base and top shape.
It is the volume between the RL of the outlet and the RL of the overflow point.

CELEBRATING 50 YEARS WOOD & GRIEVE ENGINEERS

APPENDIX 8
BASIN CALCULATIONS (3 of 3)

Appendix 9

Local Water Management Strategy Checklist

Appendix 2 Local water management strategy checklist

Local water management strategy item	Deliverable	☑	Notes
Executive summary			
Summary of the development design strategy, outlining how the design objectives are proposed to be met	Table 1: Design elements and requirements for best management practices and critical control points	✓	
Introduction			
Total water-cycle management – principles and objectives Planning background Previous studies		✓	
Proposed development			
Structure plan, zoning and land use Key landscape features Previous land use	Site context plan Structure plan	✓ ✓	*Outline development plan (ODP) shown in Appendix 1*
Landscape – proposed public open space areas, public open space credits, water source, bore(s), lake details, irrigation areas (if applicable)	Landscape plan	✓	*POS areas shown in ODP. Landscape plans are required for the POS areas at the subdivision stage.*
Design criteria			
Agreed design objectives and source of objectives		✓	
Pre-development environment			
Existing information and more detailed assessments (monitoring). How do the site characteristics affect the design?		❑	*No monitoring required*
Site conditions – existing topography/contours, aerial photo underlay, major physical features	Site condition plan	✓	*Contours shown on ODP*
Geotechnical – topography, soils including acid sulfate soils and infiltration capacity, test pit locations	Geotechnical plan	✓	*Hand auger testing by 360 Environmental*
Environmental – areas of significant flora and fauna, wetlands and buffers, waterways and buffers, contaminated sites	Environmental plan plus supporting data where appropriate	✓	*None identified by 360 Environmental*
Surface water – topography, 100-year floodways and flood fringe areas, water quality of flows entering and leaving (if applicable)	Surface-water plan	✓	*Appendix 4*
Groundwater – topography, pre-development groundwater levels and water quality, test bore locations	Groundwater plan plus site investigations	❑	*N/A*

Local water management strategy item	Deliverable	☑	Notes
Water sustainability initiatives			
Water efficiency measures – private and public open spaces including method of enforcement		✓	
Water supply (fit-for-purpose) strategy, agreed actions and implementation		✓	
Wastewater management		✓	
Stormwater management strategy			
Flood protection – peak flow rates, volumes and top water levels at control points, 100-year flowpaths and100-year detention storage areas	100-year-event plan Long section of critical points	✓ ❑	*Appendix 5*
Manage serviceability – storage and retention required for the critical 5-year ARI storm events Minor roads should be passable in the 5-year ARI event	5-year-event plan	✓	*Appendix 6*
Protect ecology – detention areas for the 1-year 1-hour ARI event, areas for water quality treatment and types of agreed structural and non-structural best management practices and treatment trains (including indicative locations). Protection of waterways, wetlands (and their buffers), remnant vegetation and ecological linkages	1-year-event plan Typical cross sections	✓ ❑	*Appendix 6*
Groundwater management strategy			
Post-development groundwater levels, existing and likely final surface levels, outlet controls, and subsoil drain areas/exclusion zones	Groundwater/subsoil plan	❑	*N/A*
Actions to address acid sulfate soils or contamination		❑	
The next stage – subdivision and urban water management plans			
Content and coverage of future urban water management plans to be completed at subdivision. Include areas where further investigations are required before detailed design.		✓	
Monitoring			
Recommended future monitoring plan including timing, frequency, locations and parameters, together with arrangements for ongoing actions		✓	*N/A*
Implementation			
Developer commitments		✓	
Roles, responsibilities, funding for		✓	

Local water management strategy item	Deliverable	☑	Notes
implementation			
Review		❑	

Attachment V:

McKail North ODP
Road Upgrading Program

AYTON BAESJOU
PLANNING

ABN: 15 061 140 172

11 Duke Street
Albany WA 6330
Ph 9842 2304 Fax 9842 8494

McKail North Outline Development Plan
Road Upgrading Program

Background

In recognition of the additional loads placed on the local road system and given current road construction standards are insufficient for these additional loads, a road upgrading program will provide contributions for upgrading to be made via the development of the ODP area.

In accord with development contribution policy and the principle of "beneficiary pays", the benefits of off site road upgrading will accrue to both existing residents/road users and the residents of the ODP area. As a result, the policy outlines that it is only reasonable and necessary that the development provide for road upgrading in proportion to the level of development proposed and only at the time the development makes that upgrading necessary.

Nothing in this limits a subdividers ability to claim back from Council or a subsequent subdivider, a contribution for an upgrading made in respect of a section of road fronted or contributed to buy the subdivider for which council obtains additional contributions or works outside of this program. For instance, where contributions are made to cover the upgrading of an offsite section of road and Council subsequently gains actual construction of the road by a fronting landowner, it is fair that a proportion of the original contribution be reclaimed.

Within the ODP area there are a number of existing lots with subdivision potential that have and benefit from direct subdivisional access to Lancaster Road. Given these lots benefit from being able to immediately subdivide off the existing road and do not forego the opportunity cost of providing their own road reserves, it is considered fair that these lots carry a higher responsibility to the construction/upgrading than an "in common" per lot contribution that applies to lots that do not use this road for primary access.

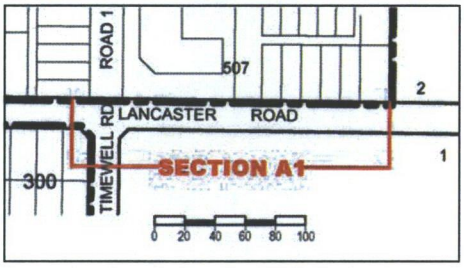
As the need for contributions or upgrades can only arise following the development of lots which access a particular section of road, it is unreasonable to have upgrade or contributions providing for sections of road in advance of the lots being created which will actually use that road. As a result, upgrade of fronted sections of roads can only become necessary when lots are developed or subdivisional roads are provided which direct subdivisional traffic onto the affected portions of road.

The principle behind contributions to off site sections of Lancaster and Gladville Roads is that a per lot contribution should be provided as lots are staged and developed and provisions for this are made within this program.

Part A - Fronted Sections of Lancaster Road

Section A1.

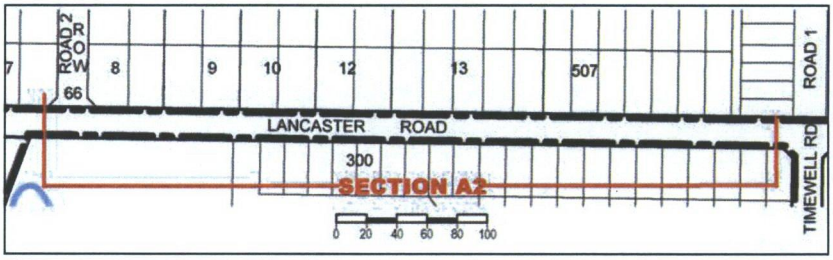
From eastern boundary of the site to the eastern entry road & includes intersection upgrade.



Section of road to be upgraded (in works or kind) to a standard similar to The Sanctuary Estate. Upgrading to be completed as a part of the first stage that provides initial site access via Road 1.

Section A2.

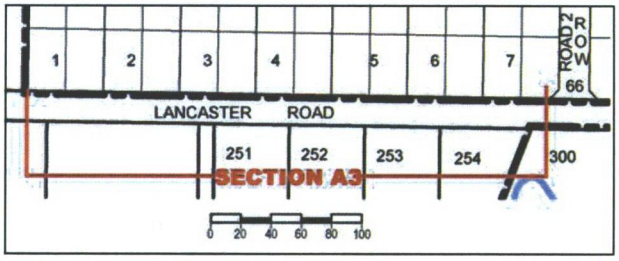
From eastern entry road (Road 1.) to western entry road (Road 2.)



Section of road to be upgraded (in works or kind) to a standard similar to The Sanctuary Estate. Upgrading to be completed as lots accessing the road are developed or as staging includes lots directly accessing Road 2.

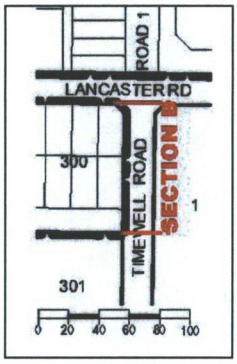
Section A3.

From western entry road to the western boundary of the ODP Area.



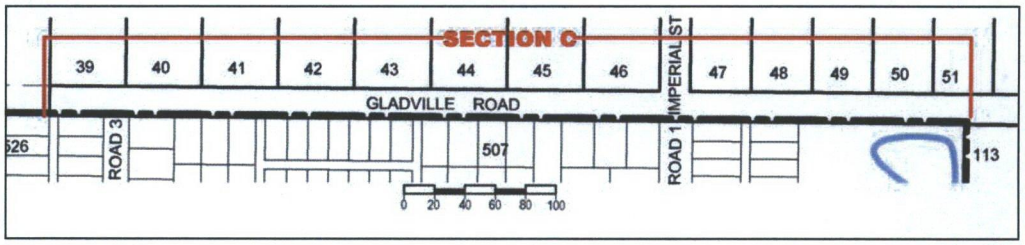
Section of road to be upgraded (in works or kind) to a standard similar to The Sanctuary Estate. Upgrading to be completed as lots accessing the road are developed.

Part B – Fronted Sections of Timewell Road



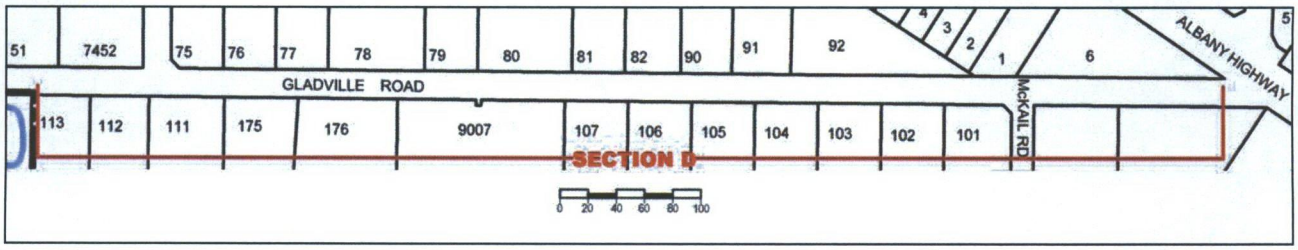
Section B road to be upgraded (in works or kind) to a U4 standard.
Upgrading to be completed as lots accessing the road are developed or as staging includes those lots directly abutting that road.

Part C – Fronted Sections of Gladville Road



Section C road to be upgraded (in works or kind) to a U4 standard.
Upgrading to be completed as staging brings on lots fronting the road or as development brings on stages of lots utilizing the northern section of access Road 1 or access Road 3.

Part D - Contribution to Offsite Sections of Gladville Road



This contribution applies to the section of Gladville Road running from the western boundary of the ODP area to the eastern end of the road- shown as Section E.
The upgrade level will be from the existing rural seal to a U4 standard.

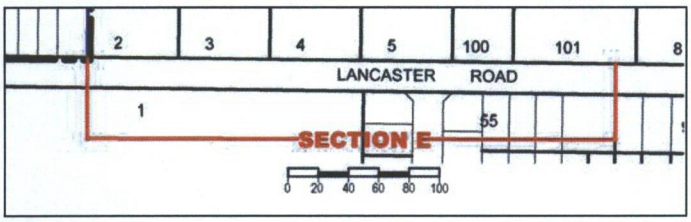
This contribution is to be based on a per lot rate of estimated upgrade costs.
The per lot rate is to be established on the basis of the number of lots in the ODP area versus the existing lots accessing the road and the additional traffic that will be generated by the future development of other development sites accessing this road (ie, Lot 124).

In this instance:

ODP Area =	725 Lots
Existing Lots using road =	22 Lots
Future Lot 124 development =	223 lots
Future Special Residential Lots =	33 Lots
Total =	1003 Lots

As a result the ODP area has an exposure of 72.3% to the upgrade cost.
On a per lot basis, each lot will be responsible for 0.10% of the estimated upgrade cost of this section of road to a U4 standard.

Part E – Contribution to Offsite Sections of Lancaster Road



This contribution applies to provide for the upgrading of the section of Lancaster Road between the ODP Area easterly to the end of the urban road standard (currently the western end of The Sanctuary Estate shown as Section D) to a standard similar to The Sanctuary Estate.

This contribution is to be based on a per lot rate of estimated upgrade costs.
The per lot rate is to be established on the basis of the number of lots in the ODP area and their traffic generation rate versus the existing traffic use of the road.

In this instance:

ODP Area =	725 Lots at 8vpd =	5800vpd
Existing Use=	175 Lot equivalent =	1400vpd
Total =	900 Lots equivalent =	7200vpd

As a result the ODP area has an exposure of 80.5% to the upgrade cost.
On a per lot basis, each lot within the ODP area will be responsible for 0.11% of the estimated upgrade cost of this section of road.

Estimated upgrade costs are to be determined by agreement at the time of subdivision and are to be paid at the time of clearance request.

Attachment VI:

Quiet House Design Guidelines

McKail North Outline Development Plan - Quiet House Design Guidelines

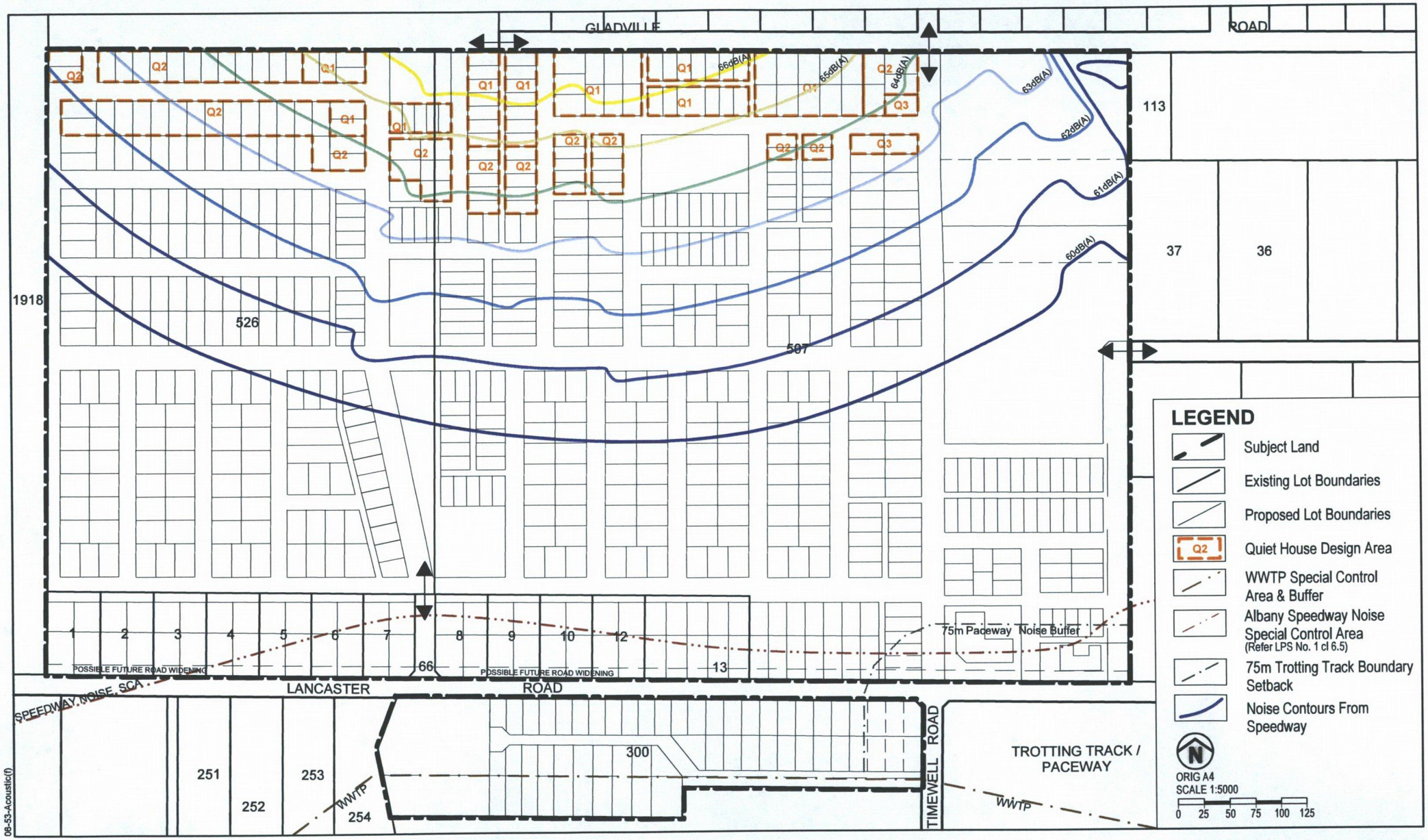
Application:

These design guidelines apply to residential development on lots located within areas marked as Q1, Q2, or Q3 on the following Acoustic Buffer Plan (06-53-Acoustic (f)).

The Design Guidelines include Performance Standards/Design Principles and Deemed to Comply measures.

Deemed to Comply provisions provide a straight forward path to development approval. Where a proposal complies with these measures no further assessment/measures are required.

If the development in design and/or construction can not or does not meet the deemed to comply measures, the applicant must seek approval from Council based on the performance measures and include supporting information as necessary.



AYTON BAESJOU
PLANNING
11 Duke Street
Albany WA 6330
Ph 9842 2304 Fax 9842 8494

ACOUSTIC BUFFER PLAN

Lots 1 - 10, 12, 13, 66, 300,
507 & 526 Lancaster Road
McKail, City of Albany

Q1 Areas -

Performance Standards

(Development demonstrates to council's satisfaction, compliance with the following)

1. Construction/methods are supported by an acoustic report by a qualified acoustic engineer referencing AS2107 stating that the design and construction of the dwelling/s adequately attenuates noise emissions from the speedway and achieves compliance with the City of Albany Speedway Noise Buffer Policy.

And

2. Title notifications are required noting the presence of the speedway and that these design guidelines apply.

Deemed to Comply

(Development complies with the following requirements)

a. Residences are oriented such that garages are located on the side facing the speedway.
b. Where front doors face the speedway, entrance lobbies are incorporated in the design such that they provide a buffer space between the entrance and the remainder of the residence.
c. Bedrooms are located on the opposite side of the dwelling, away from the Speedway and living spaces, kitchens, laundry and bathrooms should be located on the same side as the Speedway.
d. Double brick or concrete construction required.
e. Casement windows (with winders) in timber or commercial section metal frames incorporating compressible seals.
f. Glazing to be either 10.38mm or 6.5mm (VLAM Hush) laminated glass to any bedrooms facing or exposed to the speedway.
g. Cantilevered sliding doors facing or exposed to the speedway are acceptable providing they have interlocking meeting stiles (ie, Capral 889). Double sliding doors that utilise stiles that simply butt together are not acceptable.
h. Eaves are to be enclosed using min. 9mm thick compressed cement sheeting or equivalent.
i. Rooves are to be colourbond with a min. 50mm anticon. Ceilings on the top floor to be min. 2 layer of 13mm thick plasterboard to bedrooms and walk in robes, and 1 layer 13mm thick plasterboard to all other spaces, all with R3 insulation laid over.
j. Any recessed light fittings in bedroom ceilings to the top storey are to be acoustically rated.

Title notifications are required noting the presence of the speedway and that these design guidelines apply.

Q2 Areas -

Performance Standards

(Development demonstrates to council's satisfaction, compliance with the following)

1. Construction/methods are supported by an acoustic report by a qualified acoustic engineer referencing AS2107 stating that the design and construction of the dwelling/s adequately attenuates noise emissions from the speedway and achieves compliance with the City of Albany Speedway Noise Buffer Policy.

And

2. Title notifications are required noting the presence of the speedway and that these design guidelines apply.

Deemed to Comply

(Development complies with the following requirements)

1. Residences are oriented such that garages are located on the side facing the speedway.
2. Where front doors face the speedway, entrance lobbies are incorporated in the design such that they provide a buffer space between the entrance and the remainder of the residence.
3. Bedrooms are located on the opposite side of the dwelling, away from the Speedway and living spaces, kitchens, laundry and bathrooms should be located on the same side as the Speedway.
4. Double brick or concrete construction required.
5. Casement windows (with winders) in timber or commercial section metal frames incorporating compressible seals.
6. Glazing to be 6.38mm laminated glass to any bedrooms facing or exposed to the speedway.
7. Cantilevered sliding doors facing or exposed to the speedway are acceptable providing they have interlocking meeting stiles (ie, Capral 889). Double sliding doors that utilise stiles that simply butt together are not acceptable.
8. Eaves are to be enclosed using min. 9mm thick compressed cement sheeting or equivalent.
9. Rooves are to be colourbond with a min. 50mm anticon. Ceilings on the top floor to be min. 2 layer of 13mm thick plasterboard to bedrooms and walk in robes, and 1 layer 13mm thick plasterboard to all other spaces, all with R3 insulation laid over the top.
10. Any recessed light fittings in bedroom ceilings to the top storey are to be acoustically rated.

Title notifications are required noting the presence of the speedway and that these design guidelines apply.

Q3 Areas -

Performance Standards

(Development demonstrates to council's satisfaction, compliance with the following)

1. Construction/methods are supported by and acoustic report by a qualified acoustic engineer referencing AS2107 stating that the design and construction of the dwelling/s adequately attenuates noise emissions from the speedway and achieves compliance with the City of Albany Speedway Noise Buffer Policy.

And

2. Title notifications are required noting the presence of the speedway and that these design guidelines apply.

Deemed to Comply

(Development complies with the following requirements)

1. Residences are oriented such that bedrooms are located on the opposite side of the dwelling to the speedway.
2. Bedrooms are located on the opposite side of the dwelling, away from the noise source and living spaces, kitchens, laundry and bathrooms should be located on the same side as the noise source.
3. Double brick or concrete construction required.
4. Casement windows (with winders) in timber or commercial section metal frames incorporating compressible seals.
5. Glazing to be 6.38mm laminated glass to any bedrooms facing or exposed to the speedway.
6. Rooves are to be colourbond with a min. 50mm anticon. Ceilings on the top floor to be min. 2 layer of 13mm thick plasterboard to bedrooms and walk in robes.
7. Windows to be installed forward in the reveal to allow a secondary optional sliding window to be installed in the future or the use of frames that allow for the installation of a second operable window to be installed within the frame (ie Capral).

Title notifications are required noting the presence of the speedway and that these design guidelines apply.