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THOMPSON STANBURY ASSOCIATES

ABN: 79 943 737 368

24 February 2010

The General Manager
Bathurst Regional Council
Private Mail Bag 17
BATHURST
NSW 2795

Attention: Richard Denyer

Your reference: DA 2010/0286

Dear Sir,

PROPOSED BULKY GOODS RETAIL, FAST FOOD OUTLETS, SERVICE STATION & FIVE LOT SUBDIVISION
1 PAT O'LEARY DRIVE, KELSO

Reference is made to a meeting held on 3 February 2010 between the Roads & Traffic Authority, Bathurst Regional Council and representatives from Stevens Group and this Practice to discuss the abovementioned development and a subsequent letter from the Roads & Traffic Authority's Road Safety and Traffic Manager, Tony Hendry to Council dated 17 February 2010.

The abovementioned letter provided a number of items in relation to the proposed site and adjoining intersection layout. These items have been reviewed and where necessary, changes have been made to the architectural plans prepared by Andrews Neil Urban Design Group and the concept upgrade plans for the adjoining junction of Great Western Highway and Pat O'Leary Drive prepared by this Practice. Copies of the amended architectural and concept junction plans are attached to this correspondence.

This correspondence provides a review of the amended plans in direct response to those issues raised by the Roads & Traffic Authority in the abovementioned letter as follows:

- *The length of the left turn lane from the Great Western Highway into the service station in the proposed form is not acceptable to the RTA. There are safety concerns with the proximity of Pat O'Leary Drive to the proposed service station access. It is undesirable to have traffic entering and exiting the highway so close to the intersection of Pat O'Leary Drive, particularly considering that the intersections may be signalised in the future.*

Comment

The length of the left turn lane from the Great Western Highway into the service station has been increased from 30m to 40m, an increased of 33%. Table 4.8.3 of the RTA's Road Design Guide specifies that a vehicle is able to decelerate from 60km/h to 0km/h over such a distance (40m) incorporating a desirable maximum deceleration rate of $3.5m/s^2$. Vehicles are therefore projected to be capable accessing the service station via the proposed deceleration lane without the need to commence decelerating within the adjoining through Great Western Highway traffic lane.

The proposed service station ingress and egress driveways are separated by the existing western Pat O'Leary Drive kerb alignment by approximately 50m and 75m respectively. Such separations are anticipated to ensure that any influence of the proposed service station access driveways on the nearby operation of the junction of Great Western Highway and Pat O'Leary Drive is minimal, whether or not traffic signals are provided. This influence is further reduced by the provision of the abovementioned deceleration lane which allows motorists to access the site without impeding trailing through highway traffic. The proposed situation is common in urban and semi rural areas throughout NSW and indeed, within the Bathurst LGA.

- *The RTA is investigating options to upgrade the Great Western Highway through Kelso.*

Comment

Noted. See below comments in response to subsequent RTA items.

- *The RTA will require acquisition of some land for the above highway upgrading; this could be up to 6m from the highway frontage. In addition to Councils' requirement for a 10m building setback, the total setback would be 16m.*

Comment

The site plans have been amended to ensure that a total setback of 16m is provided.

- *The RTA may require land for the highway upgrade precinct on the north eastern side of Lot 5 DP 838537 adjacent to Lot 2 DP 838537; this will require a 20m setback from the property boundary near the proposed bulky goods.*

Comment

The site plans have been amended to provide a 20m setback as required.

- *The design for the Stage 1 intersection of Pat O'Leary Drive and the Great Western Highway will be required to cater for pedestrians. The proposed fast food outlets can be expected to generate a pedestrian desire line from the east of the site and the RTA will require safe pedestrian crossing of the highway to be incorporated into the design. The design of the right turn bay for the Stage 1 treatment will also be required to be improved to maximise the length of storage for the right turn lane.*

Comment

The concept junction upgrade plan has been amended to provide a pedestrian refuge and associated sign posting, kerb ramps and blister islands in accordance with RTA TDT 2002/10. In addition, a footpath is proposed to provide connectivity from the refuge to the various site components as necessary.

The INTANAL modelling contained within the traffic study indicated that the originally proposed right turn bay storage length was satisfactory. Notwithstanding this, the length of the right turn lane servicing Pat O'Leary Drive has been increased from 20m to 45m (125%).

- *The developer is to provide details to the RTA of the proposed intersection treatment with the Great Western Highway to cater for traffic from Stage 2 of the development, including pavement widening.*

Comment

The traffic study indicates that traffic signals will be required to adequately accommodate the additional traffic projected to be generated by the stage 2 development. The provision of traffic signals will only require minor alterations to the Stage 1 junction upgrade treatment including the provision of signalised pedestrian crossings, the deletion of the pedestrian refuge, the provision traffic signal posts and lanterns and detector loops. A concept junction upgrade plan has been prepared by this Practice and is attached to this correspondence for review.

- *There is inadequate separation of the service station traffic from the remainder of the site. The RTA will require physical controls rather than signage to prevent traffic other than service station traffic accessing the highway.*

Comment

The amended site plan incorporates a security boom gate which will provide for one-way only access for fuel tankers servicing the petrol station to the internal site access road connecting with Pat O'Leary Drive. No other vehicular access between the service station and the remainder of the site will be facilitated.

- *The largest vehicle for McDonalds shown on the turning path diagram is a rigid vehicle, however the traffic study dated January 2010 stipulates that a semi trailer will be used. Adequate turning paths for a semi trailer at least are to be incorporated into the design.*

Comment

The traffic study was somewhat unclear on this issue. The January 2010 traffic study stated that the largest vehicle expected to service the fast food restaurants (KFC and McDonalds) is a semi trailer. Whilst the KFC is expected to be serviced by a semi trailer, the largest vehicle expected to service the McDonalds is a large rigid. Accordingly, there is no requirement for the McDonalds to accommodate a semi trailer.

The site plans illustrate that a large rigid truck can service the McDonalds restaurant in a safe and efficient manner.

- *The turning paths for a semi trailer are shown in inappropriate locations in proximity to the bulky goods on the internal road network. All heavy vehicle movements associated with Stage 2 developments will be required to use the service vehicle lane at the rear of the site.*

Comment

The site plans have been amended to delete heavy vehicle swept turning paths from the passenger vehicle car parking areas. All servicing of the bulky goods buildings is proposed to be undertaken via the rear service lane.

- *There is concern with the proposed coach parking on a public road (Pat O'Leary Drive); all parking requirements generated by the development will be required to be contained in site.*

Comment

The coach parking component of the proposal has been deleted.

- *The western KFC access near the internal roundabout is too close to the roundabout and is required to be removed.*

Comment

The KFC restaurant has been redesigned to provide a single vehicular access directly to / from Pat O'Leary Drive. Accordingly, there will be no interaction between KFC traffic movements and internal development traffic movements.

It would be appreciated if the information contained within and attached to this correspondence could be incorporated within Council's ongoing assessment of the subject application.

Submitted for your consideration.

Yours faithfully,

David Thompson
Principal
Transport Planner

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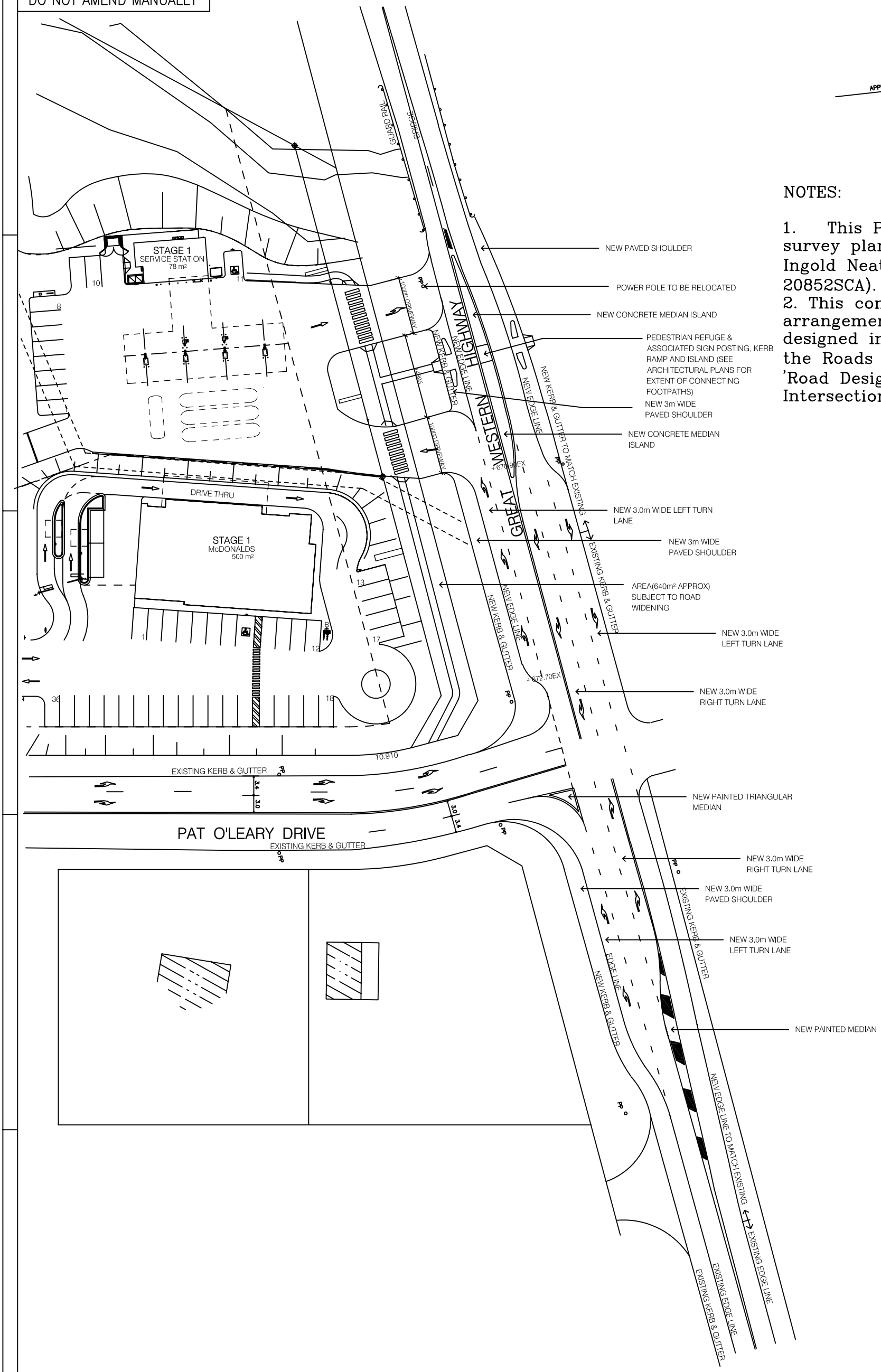
DO NOT AMEND MANUALLY



NOTES:

1. This Plan is based on survey plan prepared by Trehy Ingold Neate (File No. 20852SCA).
2. This concept intersection arrangement has been designed in accordance with the Roads & Traffic Authority's 'Road Design Guide' Section 4: Intersections at Grade.

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CONCEPT INTERSECTION LAYOUT
JUNCTION OF GREAT WESTERN HIGHWAY
& PAT O'LEARY DRIVE, KELSO
INTERIM (STAGE 1) JUNCTION ARRANGEMENT PRIOR TO
FUTURE WIDENING OF GREAT WESTERN HIGHWAY

SCALE: 1:350 @ A1	ISSUE A
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DATE: FEBRUARY 2010	SHEET 1

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THOMPSON STANBURY ASSOCIATES

ABN: 79 943 737 368

20 January 2010

The General Manager
Bathurst Regional Council
Private Mail Bag 17
BATHURST
NSW 2795

Attention:

Your reference: DA 2010/0286

Dear Sir,

PROPOSED BULKY GOODS RETAIL, FAST FOOD OUTLETS, SERVICE STATION & FIVE LOT SUBDIVISION
1 PAT O'LEARY DRIVE, KELSO

Reference is made to a letter from the Roads & Traffic Authority's Road Safety and Traffic Manager, Tony Hendry to Council dated 4 December 2009 and the minutes of the Regional Development Committee meeting held on 2 December 2009 in relation to the subject development proposal.

The abovementioned letter called for the original Development Application Traffic Impact Statement dated November 2009 prepared by this Practice to be updated to include traffic generated due to other approved developments on the road network and project traffic growth over a 10 year period.

Accordingly, an Amended Traffic Impact Statement has been prepared which incorporates additional traffic demands on Great Western Highway projected to be generated by the approved road / rail freight intermodal terminal to be located on the southern side of Great Western Highway to the east of the subject site. The additional traffic demands have been obtained from the Traffic Report prepared by Colston Budd Hunt & Kafes Pty. Ltd. dated December 2008 submitted in support of the approved development.

Further, this Practice has applied a conservative 3% per annum growth factor to the existing surveyed weekday evening peak hour traffic volumes to extrapolate future 2019 Highway traffic demands. An average annual increase of 3% equates to an increase in Highway traffic volumes of some 34% over 10 years. This is substantially greater than the historical increase in traffic demands experienced by the Highway as

published by the Roads & Traffic Authority *Traffic Volume Data Western Region* between 1996 and 2005. We also note with interest that a similar growth projection assessment was **not** undertaken or required in association with the more substantial intermodal project which was deemed of State Significance.

In addition, we note that the traffic generation rates projected in the Colston Budd Hunt & Kafes Pty. Ltd. report with respect to the fast food facilities reflects the influence of the existing passing trade along the Highway. Being that these uses have been approved and therefore assume that the generation rates utilised are the acceptable rates for these types of land uses.

Consequently, our Amended Traffic Statement incorporates slightly altered traffic generation over that provided in the original traffic statement assessment for the two proposed fast food outlets (which in hindsight overestimated the potential traffic generation of the site). This reduced traffic generation also takes into consideration the increased competition associated with the two fast food outlets approved to be provided within the intermodal site.

The following provides an extract of the conclusion of the Amended Traffic Impact Statement:

- *The on-site parking provisions are adequate to accommodate for projected demand given the floor space provided and Council requirements;*

- *The access arrangements and internal circulation proposed will provide for safe and efficient vehicular and pedestrian movements during peak times; and*

- *The existing surrounding road network is projected to operate with a good level of service;*

- *It is planned that Great Western Highway be upgraded in the near future to accommodate a four lane dual carriageway;*

- *The initial development (Stage 1) is estimated to generate in the order of 260 peak hour vehicle trips to and from the subject site; and*

- *The ultimate development (Stages 1 and 2) is estimated to generate a total of 598 peak hour vehicles trips to and from the subject site.*

Based on the above conclusions and the contents of this report and findings of this report, the following recommendations are made:

- *In order to ensure that the junction of Great Western Highway and Pat O'Leary Drive is capable of accommodating the additional traffic projected to be generated by the initial (Stage 1) development, the junction be upgraded to accommodate a 'CHR' rural T-junction layout in accordance with the concept design contained within* ***Appendix 5****;*

- *Upon the planned upgrade of the Highway to a four lane dual carriageway, the junction can be further upgraded to accommodate an expanded 'CHR' rural T-junction layout in accordance with the concept design contained within* ***Appendix 7****; and*

- *In order to ensure that the junction of Great Western Highway and Pat O'Leary Drive is capable of accommodating the additional traffic projected to be generated by the ultimate (combined Stages 1 and 2) development, consideration should be given to the provision of a more enhanced intersection control such as traffic signals.*

Incorporating the abovementioned recommendations, it is concluded that there are no traffic related reasons why the development proposal should not be supported.

A copy of the Amended Traffic Impact Statement dated January 2010 is attached to this correspondence.

The Roads & Traffic Authority's letter also indicates that investigative works are currently being assessed with respect to the planned widening of the Highway through Kelso to form a four lane divided carriageway. The original and amended traffic report provides comment and assessment on this planned upgrade. Further, the letter indicates that as part of this widening, the Authority is considering relocating the access to the Devro factory (located to the east of Pat O'Leary Drive) to a location with access onto Pat O'Leary Drive. It is understood that Council has received correspondence from Devro which states that they have no intention of altering their current access arrangements (which comprise a single combined ingress / egress driveway servicing the Highway) for which they have a Common Law right. It is therefore not considered reasonable that the subject project be burdened by a requirement to provide access to / from the Devro site.

In addition to the previously mentioned comments in relation to the general methodology of the development application traffic report, a number of other items were raised by the Regional Development Committee in relation to the proposed site layout. These items have been reviewed and where necessary, changes have been made to the architectural plans prepared by Andrews Neil Urban Design Group. Copies of the amended architectural plans are attached to this correspondence.

This correspondence provides a review of the amended plans in direct response to those issues raised by the Regional Development Committee as follows:

1. *The application proposes a 5 Lot subdivision, potentially with various landholders requiring free access through other landholder's Lots.*

Comment

Noted. A plan of subdivision illustrating the proposed right of carriageways was prepared to support the development application and submitted to Council.

2. *The proposal does not address traffic or access with the development on the northern side of the Great Western Highway with access opposite Pat O'Leary Drive.*

Comment

It is acknowledged that the vehicular access for the development on the northern side of the Highway is in an undesirable location with respect to any proposed traffic management for the Pat O'Leary Drive junction with the Highway. This location was however this was Council approved and appropriate cognisance would have been given to any future development of land within Pat O'Leary Drive. Accordingly, development of the subject land should not be precluded.

The proposed CHR intersection treatment at the junction of the Highway and Pat O'Leary Drive does not impact the accessibility of the existing development located on the northern side of the Highway in a negative manner as right turn access is still available. Conversely, the accessibility of the site is proposed to be improved through the implementation of the interim junction upgrading treatment which provides for a dedicated left turn lane servicing the subject development.

3. *Swept paths are not demonstrated for vehicles accessing the site, travelling through the site, or accessing loading docks.*

Comment

The architectural plans have been amended to illustrate the required heavy vehicle swept turning paths. It is reiterated that vehicles servicing the bulky goods outlets will do so via side loading activities whereby vehicles will be wholly contained within an indented bay such that trailing through service vehicles are able to manoeuvre throughout the periphery service road.

4. *The number of parking bays shown on Drawing No. 09159/DA/A/02 Revision A is less than the number stated in the traffic report.*

Comment

The amended traffic report and architectural plans are now consistent in terms of the proposed parking provision.

5. *Speed of vehicles through the site needs to be controlled by physical traffic calming means to enhance safety for pedestrians.*

Comment

The architectural plans have been amended to provide a series of raised thresholds throughout the site to govern vehicular speeds. These thresholds have primarily been combined with marked pedestrian crossings to maximise pedestrian safety.

6. *Pedestrian paths are provided in front of Bulky Goods A, B and C, however consideration should be given to provide pedestrian linkages between A and B, and between B and C.*

Comment

The architectural plans have been amended to provide the recommended additional pedestrian linkages.

7. *Consideration should be given to removing the service access roads between Bulky Goods stores A and B, and between B and C, to reduce service use of the public parking area and access roads.*

Comment

The architectural plans have been amended to delete the nominated service roads as recommended.

8. *The western KFC access is too close to the internal roundabout and should be closed.*

Comment

The architectural plans have been amended to convert the subject access driveway to ingress only to minimise the potential conflicts. Incorporating this reduced driveway function, it is not considered that the driveway will have any unreasonable impacts or influence on the operational of the nearby roundabout.

9. *The shape of the northern KFC egress suggests it is left out only.*

Comment

The western driveway kerb has been amended to provide a more standard return. The eastern driveway kerb return is required to be splayed to adequately accommodate the service vehicle egress movement. This has been highlighted on the amended architectural plans through the provision of heavy vehicle swept paths.

10. *It is unclear how the offset accesses between KFC and McDonalds will operate safely.*

Comment

It is not considered that the traffic volumes within the site access road will be substantial enough to result in any unreasonable conflict between the KFC and McDonalds access driveways. Further, the likelihood of motorists travelling between the two fast food outlets is considered to be low.

11. It is unclear what purpose the 'roundabout' inside McDonalds achieves.

Comment

The McDonalds parking area essentially forms a dead end aisle. The roundabout at the northern end of the parking area will suitably facilitate vehicular turnaround such that all vehicles can enter and exit the area in a forward direction. The inclusion and design of the roundabout was specifically nominated by McDonalds as it has been successfully implemented at other restaurant sites.

12. McDonalds parking bays 13-17 are accessed by travelling against the flow of vehicles exiting the drive through.

Comment

The amended architectural plans specifically nominate these spaces as staff only spaces. Any impacts on the accessibility of these spaces will therefore not impede or impact on customer parking space manoeuvrability or accessibility or indeed, the operation of the drive through.

13. The McDonalds service vehicles is required to reverse within the parking area and potentially encroach upon customer parking bays, this provides an unacceptable risk to public vehicles and pedestrians, service vehicles should enter and exit in a forward movement.

Comment

The service vehicle swept turning paths provided on the amended architectural plans illustrate that heavy vehicles are capable of accessing and vacating the loading dock without unreasonably encroaching on customer vehicle parking spaces.

The site layout is such that vehicles will be required to access the dock via a reverse manoeuvre. This is however a standard requirement and therefore not unusual for McDonalds sites. In any case, it is reasonable to expect that servicing of the restaurant will be undertaken during non-peak operational periods of the site to ensure that impacts on customer pedestrian and vehicular movements are minimised as much as is practicable.

14. The proposed painted median on the Great Western Highway opposite the service station access (Stage 1) is not adequate, a physical barrier needs to be proposed to prevent restricted turning movements.

Comment

The originally proposed painted median within Great Western Highway has been upgraded to incorporate a raised concrete median which extends across both the proposed service station access driveways to ensure that access movements are restricted to left in / left out, as recommended. The extent of the proposed physical barrier is illustrated within Appendix 5 of the Amended Traffic Impact Statement.

In any case, it is noted that the restricted access movements will be further facilitated upon the planned upgrading of the Highway to form a four lane divided carriageway.

15. *It will be necessary to provide bicycle access and secure parking at strategic locations within the site.*

Comment

The amended architectural plans provide for bicycle storage racks in strategic locations throughout the development site.

16. *All signage that regulates, warns, or guides traffic, including pedestrians, is to be manufactured and installed to relevant RTA Technical Directions or Standard, or AS1742 where no specific RTA standard exists.*

Comment

Noted. This could reasonably be imposed as a condition of consent.

17. *Kerb ramps should be installed where pedestrians are expected to cross the kerb, and be constructed in accordance with the RTA Technical Directions.*

Comment

Noted. This could reasonably be imposed as a condition of consent.

18. *Landscaping is to be of a type that does not create a hazard in itself through the dropping of slippery berries, nuts, or leaves, and be planted and maintained to prevent restricting driver and pedestrian sight lines.*

Comment

Noted. This could reasonably be imposed as a condition of consent.

19. *Advertising signage should be contained wholly within the site and not be a distraction to motorists or replicate a traffic signal through design or colour.*

Comment

Noted. This could reasonably be imposed as a condition of consent.

20. The parking and pedestrian areas should be lit to Australian Standard AS1158.

Comment

Noted. This could reasonably be imposed as a condition of consent.

21. Lighting of the site and/or signage should not be a distraction to drivers on public roads or attempting to negotiate the parking areas.

Comment

Noted. This could reasonably be imposed as a condition of consent.

It would be appreciated if the information contained within and attached to this correspondence could be incorporated within Council's ongoing assessment of the subject application.

Submitted for your consideration.

Yours faithfully,

David Thompson
Principal
Transport Planner

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AMENDED
TRAFFIC IMPACT STATEMENT
PROPOSED MIXED RETAIL DEVELOPMENT
LOTS 4 & 5 DP 838537
PAT O'LEARY DRIVE
KELSO

Ref: 09-056-2

JANUARY 2010

TABLE OF CONTENTS

APPENDICES

1. INTRODUCTION

Thompson Stanbury Associates has been engaged by Stevens Holding Pty. Limited to prepare a Traffic Impact Assessment Report to accompany a Development Application lodged with Bathurst Regional Council. The proposal involves a staged mixed retail development located on the south-western corner of the junction of Great Western Highway and Pat O'Leary Drive, Kelso. The development is proposed to initially comprise a service station and two fast food outlets but ultimately include four additional large bulky goods retail buildings.

The purpose of this report is to assess and document likely traffic impacts resulting from the staged proposal and to recommend, where appropriate, treatments to ameliorate such impacts. Particular consideration has been given to the following specific issues:

- The proposed access arrangements and its suitability with respect to existing traffic conditions;
- The proposed parking provision and its compliance, or otherwise, with Council requirements;
- The internal road layout and vehicle manoeuvrability; and
- Likely traffic generated by the development in accordance with generation rates established by the Roads & Traffic Authority and the impact of this additional traffic on the existing traffic network.

This report has been prepared with reference to the following documents:

- The Roads & Traffic Authority's *Guide to Traffic Generating Developments*;
- Bathurst Regional Council's *Off-Street Car Parking Code*;
- Australian Standard for *Parking Facilities Part 1: Off-Street Car Parking* (AS2890.1-2004); and
- Australian Standard for *Parking Facilities Part 2: Off-Street Commercial Vehicle Facilities* (AS2890.2-2002).

The report has been prepared pursuant to State Environmental Planning Policy (Infrastructure) 2007. The subject development is required to be referred to the Roads & Traffic Authority for assessment under this Instrument.

This report should be read in conjunction with amended site and architectural plans prepared by Andrews Neil Urban Design Group, reduced copies of which are attached as **Appendix 1**.

2. BACKGROUND

A development application was approved by Bathurst Regional Council (DA2004/0488) in 2004 for a mixed commercial / industrial development within the subject site incorporating the following components:

- 14,790m^2 of bulky goods floor space;
- 4,140m^2 of industrial floor space;
- A 700m^2 medical centre;
- An 800m^2 tavern; and
- A 200m^2 café.

All vehicular access to the site was approved via Pat O'Leary Drive.

This Practice prepared a Traffic Impact Assessment Report to accompany the previous application. This report projected that the development would generate 472 peak hour vehicle movements to and from the subject site (a majority of which were assessed to originate from the west or the greater Bathurst area).

Condition of the abovementioned Consent No. 57 required that the junction of Great Western Highway and Pat O'Leary Drive be upgraded to provide '*a minimum CHR type treatment providing a clear lane for through highway traffic but at the same time accommodating the needs for right turning vehicles*'.

INTANAL modelling of the junction of Great Western Highway and Pat O'Leary Drive contained within the previous Traffic Impact Assessment Report indicated that it would operate with a level of service 'B' representing good operation with spare capacity incorporating the above CHR treatment and the additional traffic projected to be generated by the previous development.

An initial Traffic Impact Statement was prepared by this Practice in November 2009 and lodged with the original application. Upon, review of the initial report, the Roads & Traffic Authority (via the Regional Development Committee) requested that the traffic report be updated to incorporate the approved but unconstructed major development to the east of the site and include an assessment of the likely medium term growth in traffic volumes along Great Western Highway.

In addition to the above, the Roads & Traffic Authority recommended a number of alterations to the architectural plans with respect to internal circulation and manoeuvring. The architectural plans prepared by Andrews Neil Urban Design Group have been amended and are contained (in reduced form) within **Appendix 1**. This report forms an amended Traffic Impact Statement providing the required additional information with respect to the approved but unconstructed major development to the east and the likely medium term growth in Highway traffic volumes as well as addressing the amended architectural plans.

3. SITE DETAILS

3.1 Site Location

The subject site is located on the south-western corner of the junction of Great Western Highway and Pat O'Leary Drive, approximately 2.5km east of the Bathurst town centre. This location is illustrated within a neighbourhood context by **Figure 1** overleaf (being an extract of Google Maps).

3.2 Site Description

The site is described as Lots 4 and 5 within DP 838537. Collectively the site forms an irregular shape having a frontage to Great Western Highway of approximately 100m. The site extends towards the south away from Great Western Highway adjoining Pat O'Leary Drive for approximately 140m before widening to provide a width of approximately 200m. From this point, the site extends further to the south away from Pat O'Leary Drive approximately 205m with an approximately uniform width providing the site with an area of approximately 5.5ha.

The site is relatively flat however it slopes towards the Great Western Highway from the south such that there is height differential of approximately 10m between the south-eastern corner and north-western corner of the site (over a horizontal distance of approximately 340m).

3.3 Existing Use

Lot 4 currently contains a small construction machinery hire business which is accessed off Pat O'Leary Drive whilst an unoccupied brick dwelling is located in the northern portion of Lot 5. The remainder of the site is undeveloped.

3.4 Surrounding Uses

Great Western Highway and the Western Railway Line immediately adjoin the subject site to the north and south respectively. In terms of land-use development, the allotments on the eastern side of Pat O'Leary Drive accommodate small industrial / business developments whilst a bulky goods retail outlet development occupies land on the northern side of Great Western Highway.

In the greater vicinity, land-use to the south of Great Western Highway generally comprises large industrial warehouse and factory type buildings whilst the residential area of Kelso is located on the northern side of the Highway.

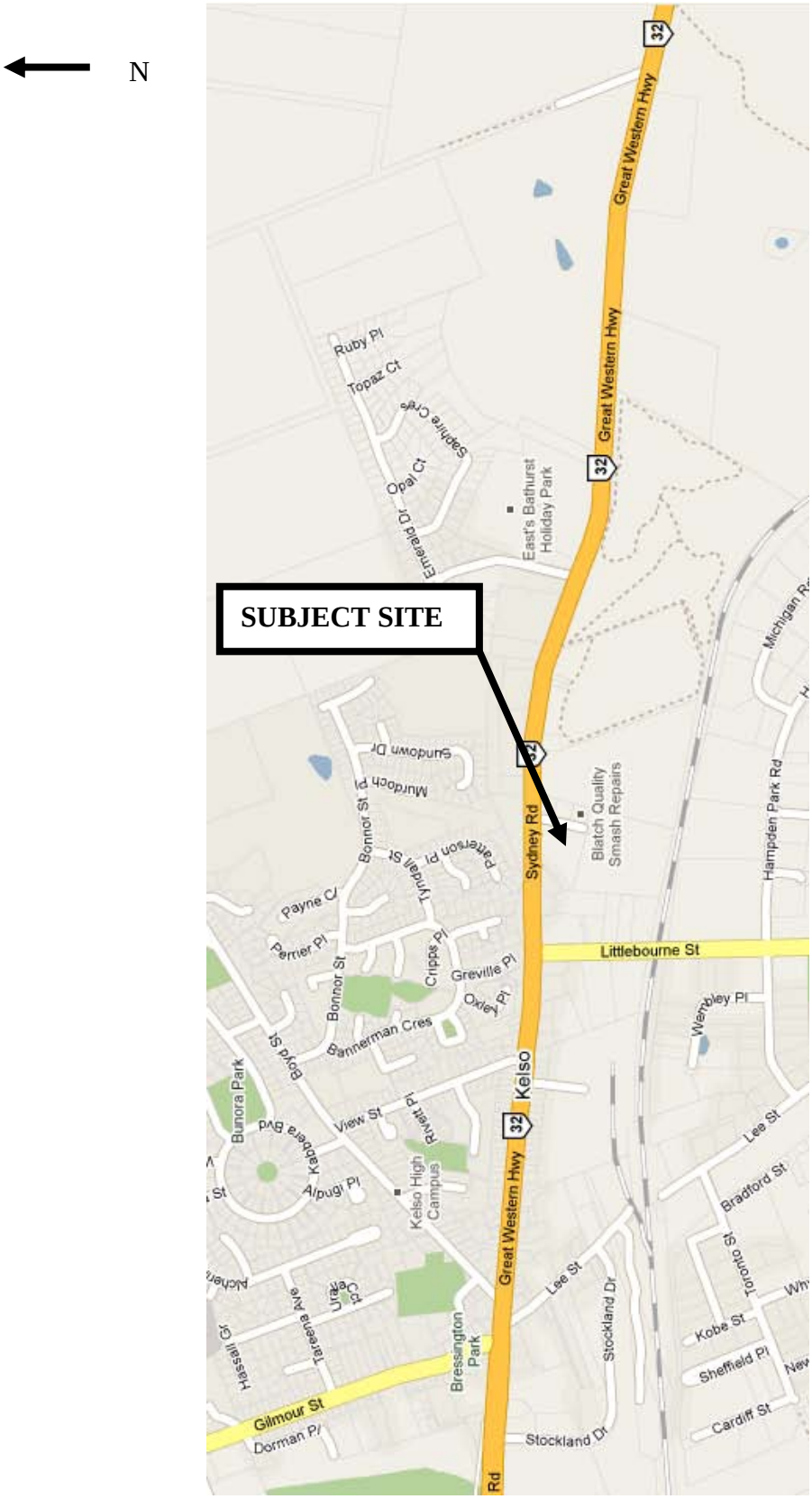


FIGURE 1 – SITE LOCATION

4. PROPOSED DEVELOPMENT

4.1 Built Form

The proposal requests consent for the subdivision of the site into five allotments and the development of the allotments in two separate stages as described in the following sub-sections.

4.1.1 Stage 1

Stage 1 is proposed to comprise a service station development in conjunction with two fast food restaurants comprising a McDonalds outlet and a KFC outlet.

The service station is proposed to be provided within the north-western corner of the site providing a single frontage to Great Western Highway. Vehicular access is proposed to / from the westbound Great Western Highway carriageway via separated ingress and egress driveways with the ingress driveway being supplemented via a left turn deceleration lane.

The service station is proposed to provide a large centrally located refuelling forecourt containing eight fuel bowsers in conjunction with a convenience store building located within the western portion of the allotment providing a floor area of $87m^2$. Vehicular parking for 7 passenger vehicles is proposed to be provided adjoining the convenience store building.

A one-way vehicular link from the service station to Pat O'Leary Drive (for fuel tanker vehicles only) is proposed via an east-west internal roadway servicing the remainder of the development (see below). No other vehicular links between the service station and the remainder of the development is proposed.

Stage 1 is also proposed to comprise two fast food restaurants comprising a McDonalds and a KFC outlet. The two fast food outlets are proposed to be separated by an internal roadway providing an east-west link through the site providing access to Pat O'Leary Drive.

The McDonalds outlet is proposed to be located within the north-eastern corner of the site comprising a floor area of $500m^2$, passenger vehicle parking for 36 cars in conjunction with a drive through facility.

The KFC outlet is proposed to be located to the south of the abovementioned internal access road comprising a floor area of $290m^2$, passenger vehicle parking for 33 cars in conjunction with a drive through facility.

4.1.2 Stage 2

Stage 2 is proposed to comprise the remainder of the total development site located to the south of the Stage 1 development. Stage 2 is proposed to contain four bulky goods retail buildings as follows:

- Bulky Goods Retail Building A providing a floor area 3,360m^2;
- Bulky Goods Retail Building B providing a floor area of 9,195m^2;
- Bulky Goods Retail Building C providing a floor area of 3,080m^2; and
- Bulky Goods Retail Building D providing a retail floor area of 966m^2 in conjunction with two small food outlets providing floor areas of 140m^2 each.

The scale of these food outlets contained within Building D is such that they are most likely to accommodate smaller scale food facilities such as a Subway restaurant or sandwich / café outlet.

Buildings A, B, C and D are proposed to be primarily positioned adjoining the eastern, southern, south-western and western site boundaries respectively. A central passenger vehicle parking area containing 352 spaces is proposed to be accessed via an extension of the existing Pat O'Leary Drive carriageway into the site in conjunction with a secondary link via the Stage 2 development site access roadway.

A periphery heavy vehicle service road is proposed to be located between the abovementioned buildings and the eastern, southern and western boundaries thereby separating heavy vehicle service movements from customer passenger vehicle and pedestrian movements as much as is practical.

5. ACCESS & INTERNAL CONSIDERATIONS

5.1 Access Arrangements

5.1.1 Stage 1

5.1.1.1 Service Station

Vehicular access to the service station is proposed to be provided to / from Great Western Highway westbound carriageway as follows:

- A 9m wide ingress only driveway located approximately 50m west of Pat O'Leary Drive; and

- An 11m wide egress only driveway located 20m west of the abovementioned ingress driveway.

The ingress driveway is proposed to be supplemented by the provision of a 30m long deceleration lane thereby minimising the likely impacts of vehicles accessing the site on trailing westbound vehicles within Great Western Highway. The egress driveway is proposed to be slightly splayed on approach to Great Western Highway to ensure that left out only movements are facilitated. This egress movement limitation will also be legally enforced by the proposed painted median treatment associated with recommended and planned upgrading works at the junction of the Highway with Pat O'Leary Drive and the Highway itself (discussed in subsequent sections of this report).

Further to the above Highway access driveways, a one-way vehicular link from the service station to Pat O'Leary Drive (for fuel tanker vehicles only) is proposed via an east-west internal roadway servicing the remainder of the development. No other vehicular links between the service station and the remainder of the development site are proposed.

The abovementioned driveway design characteristics suitably comply with the Roads & Traffic Authority minimum requirements as provided within its *Guide to Traffic Generating Developments* which specifies minimum 8m wide ingress and egress driveways separated by at least 10m. The proposed service station access arrangements to / from Great Western Highway are therefore considered to be satisfactory in terms of design.

5.1.1.2 Fast Food Restaurants

The McDonalds and KFC outlets are proposed to be serviced by an internal roadway which connects with Pat O'Leary Drive via a 14m wide combined ingress / egress driveway. Whilst this driveway is primarily proposed to accommodate passenger vehicles associated with the fast food outlet customers, it will also accommodate egress movements of fuel tankers associated with the service station in conjunction with ingress / egress movements of semi-trailers servicing the fast food restaurants.

The proposed combined access driveway width exceeds the minimum requirements for driveways on minor roads servicing vehicles up to the size of semi-trailers as provided by Figure 3.1 of AS2890.2-2002. Further, swept turning paths for such vehicles (also provided by AS2890.2-2002) have been overlaid on the architectural plans illustrating that the proposed driveway width can suitably accommodate ingress and egress movements in combination. The proposed Stage 1 fast food outlet access arrangements are therefore considered to be satisfactory in terms of design.

5.1.2 Stage 2

The Stage 2 development components are proposed to provide the following access arrangements:

- An 8m wide combined ingress / egress driveway is proposed to provide primary passenger vehicle access forming an extension of the existing Pat O'Leary Drive pavement; and

- A 7m wide ingress only driveway is proposed to be provided off Pat O'Leary Drive linking with the periphery service vehicle roadway.

Secondary access to the Stage 2 development components is also proposed via the previously presented Stage 1 driveway linking Pat O'Leary Drive with the internal east-west roadway located between the McDonalds and KFC outlets.

Access movements to / from the first of the abovementioned driveways (servicing the primary passenger vehicle parking area) form simple straight movements as this driveway essentially facilitates an extension of the existing Pat O'Leary Drive pavement. This driveway is therefore considered to be satisfactory in terms of suitably accommodating the likely vehicular swept path requirements in a safe and efficient manner.

The second of the abovementioned driveways accessing the periphery service roadway is proposed to be supplemented by an exclusive left turn lane within Pat O'Leary Drive to ensure that trailing southbound traffic movements (accessing the above first driveway) are not impacted upon by vehicles accessing the periphery roadway. In order to undertake an assessment of the suitability of the proposed service roadway driveway to accommodate the largest vehicles expected to service the site, swept turning paths for semi-trailers (provided by AS2890.2-2002) have been overlaid on the architectural plans. These paths indicate that such vehicles are capable of undertaking the required left turn ingress movements in a safe and efficient manner. The proposed access driveway servicing the periphery roadway is therefore considered to be satisfactory in terms of design.

5.2 Parking Provision

The following provides a summary of the proposed stage by stage parking provision:

Stage 1
Service Station - 7 spaces
McDonalds - 36 spaces
KFC - 33 spaces

Stage 2
Bulky Goods - 352 spaces

TOTAL - 432 spaces

Bathurst City Council provides locally sensitive parking requirements relevant to the subject development within its Development Control Plans for *Industrial Development* and *Off-Street Car Parking Code* in order to ensure that new developments provide adequate on-site parking as follows:

Service Stations
10 car spaces, plus 1 car space per employee

Refreshment Rooms
1 car space per 6.5m^2 of service area OR
1 car space per 6 seats

Shops (within industrially zoned land)
1 space per 50m^2

The following calculations are therefore provided for the staged development:

Stage 1

Service Station		10 + 1 employee	= 11 spaces
McDonalds		203m^2 / 6.5m^2	= 32 spaces
	Or	110 seats / 6 seats	= 19 spaces
KFC		122m^2 / 6.5m^2	= 19 spaces
	Or	82 seats / 6 seats	= 14 spaces
		TOTAL	= 62 spaces

Notes:
1. The service station is to accommodate a maximum of one staff member on-site at any one time

Stage 2
Bulky Goods 16,881m^2 / 50m^2 = 338 spaces

Notes:

1. The two small food outlets were considered to form ancillary uses to the greater bulky goods floor area and therefore the parking requirements for bulky goods retail floor space was applied to this outlets.

Each component and stage of the subject proposal therefore provides adequate parking in accordance with Council's relevant requirements, with the exception of the service station which provides a parking shortfall of 4 spaces. This shortfall is however minor in the context of the site and does not take into consideration the casual parking spaces available adjacent to the refuelling bowsers. In any case, the proposed service station parking complies with the recommendations provided by the Roads & Traffic Authority's *Guide to Traffic Generating Developments* which requires a rate of 5 spaces per $100m^2$ of the convenience store (equating to a requirement of 4 spaces). In consideration of this and the previous discussion, the site wide parking provision is anticipated to be satisfactory.

5.3 Internal Circulation & Servicing

5.3.1 Passenger Vehicles

5.3.1.1 Parking Area Dimensions

The staged passenger vehicle parking areas have been designed to form two-way parking aisles servicing adjoining 90 degree angled parking bays. These parking areas have been designed in accordance with the requirements of Council's Development Control Plan *Off-Street Car Parking Code* and AS2890.1-2004 providing the following minimum dimensions:

- Normal space width = 2.6m;
- Disabled space width = 3.2m;
- Parking space length = 5.4m;
- Parking aisle width = 6.6m;
- One-way roadway = 3.0m; and
- Two-way roadway = 6.0m.

In order to further investigate the suitability of the internal manoeuvrability associated with the internal passenger vehicle parking areas, the architectural plans have been assessed utilising B85 turning templates provided by AS2890.1–2004. It is however noted that AS2890.1–2004 states the following with regard to the use of templates to assess vehicle manoeuvring:

> *'Constant radius swept turning paths, based on the design vehicle's minimum turning circle are not suitable for determining the aisle width needed for manoeuvring into and out of parking spaces. Drivers can manoeuvre vehicles within smaller spaces than swept turning paths would suggest.'*

It would therefore appear that whilst the turning paths provided within AS2890.1–2004 can be utilised to provide a 'general indication' of the suitability or otherwise of internal parking and manoeuvring areas, vehicles can generally manoeuvre more efficiently than the paths indicate. Notwithstanding the above, the turning templates indicate that passenger vehicles are capable of manoeuvring into and out of all parking spaces within the parking areas.

5.3.1.2 Fast Food Restaurant Drive Through Facilities

The Stage 1 McDonalds and KFC outlets are proposed to provide drive through facilities. The McDonalds drive through is proposed to comprise two adjoining queue lanes which then merge to provide a single payment and food pick-up lane. The queue lanes are capable of accommodating at least 12 vehicles prior to the payment point. Queuing for an additional four vehicles is provided to the food pick-up point, after which two waiting bays are provided if required.

The KFC drive through is proposed to comprise a single queue lane capable of accommodating at least 6 vehicles prior to the order and payment point. Queuing for an additional four vehicles is provided to the food pick-up point.

The abovementioned drive through facility characteristics suitably comply with the minimum stipulations contained within the Section 5.8.1 of the Roads & Traffic Authority's *Guide to Traffic Generating Developments* publication. The drive through facilities are therefore anticipated to be suitably capable of accommodating the peak operational demand without unreasonably disrupting car parking operations or extending onto internal or external roadways.

5.3.2 Site Servicing

5.3.2.1 Stage 1 Service Station

The service station is proposed to be serviced by large (semi-trailer) fuel tankers and smaller rigid (up to medium rigid) trucks associated with the convenience store.

Fuel tankers are proposed to access the service station via the proposed Great Western Highway ingress driveway prior to travelling in a forward direction to access the refuelling point located to the east of the service station forecourt. Following the undertaking of the refuelling operations, the tankers are proposed to exit the service station via the tanker only access located within the south-eastern corner of the service station site prior to exiting the total development site via the Pat O'Leary Drive access driveway.

The application of swept turning paths for semi trailers on the architectural plans indicate that tanker site access and internal manoeuvring can be undertaken without unreasonable encroachment on roadway kerbing and / or parking areas. Further, the refuelling point is located such that this activity can be undertaken without impeding the normal operation of the service station with respect to customer vehicle site access, forecourt access, parking manoeuvrability or indeed site egress.

This Practice has also overlaid medium rigid vehicle (MRV) swept turning paths provided by AS2890.1-2004 on the architectural plans in order to assess the suitability of the required manoeuvring associated with the recessed loading dock area located to the immediate south-east of the convenience store. This assessment has indicated that such vehicles are capable of accessing the loading bay via a reverse manoeuvre from the internal circulation area between the refuelling forecourt and the convenience store in a safe and efficient manner. Following the undertaking of the unloading activities, these vehicles are capable of exiting the site in a simple forward manoeuvre via the Great Western Highway egress driveway.

5.3.2.2 Fast Food Restaurants

It is understood that the McDonalds and KFC outlets are proposed to be serviced vehicles up to the size of semi trailers. The McDonalds outlet is proposed to provide a recessed loading bay to the immediate south of the restaurant building. The application of swept turning paths for such vehicles on the plans indicates that these vehicles are capable of accessing the dock via a reverse manoeuvre without unreasonably encroaching on internal parking areas. The service vehicles are thence capable of exiting the dock via a simple forward manoeuvre prior to exiting the total development site via the Pat O'Leary Drive access driveway.

The KFC outlet is proposed to provide a loading bay to the immediate east of the restaurant building. This dock is proposed to be accessed via a circular forward manoeuvre whereby vehicles approach the dock via the roadway located to the south of the restaurant and traversing the drive through facility. Service vehicles will thence exit the dock via a simple forward manoeuvre through the parking area and exit the total development site via the Pat O'Leary Drive access driveway.

The overlaying of semi trailer swept turning paths on the site plans indicates that the above described manoeuvring associated with the servicing of the KFC outlet can be undertaken without any unreasonable encroachment on the adjoining parking areas. Whilst it is acknowledged that the service vehicles are required to traverse the drive through facility, appropriate priority signage and linemarking will be provided such that this manoeuvring does not unreasonably impede the drive through operation. In any case, it is envisaged that servicing of the KFC outlet will be undertaken outside of peak drive through operation in accordance with industry expectation.

5.3.2.3 Stage 2

The Stage 2 bulky goods retail buildings are proposed to be serviced by a one-way periphery service roadway adjoining the eastern, southern and western site boundaries. Vehicles servicing the bulky goods outlets will do so by parking adjoining the outlet docks and undertaking side load operations.

The periphery service road is proposed to provide a minimum width of 6.5m thereby allowing a service vehicle to pass one undertaking loading / unloading operations (complying with the two-way traffic width requirement of AS2890.2-2002). The periphery roadway is proposed to widen in curved sections to suitably accommodate turning movements. This is confirmed by the overlaying of swept paths of semi-trailers provided by AS2890.2-2002 on the site plans.

6. EXISTING TRAFFIC CONDITIONS

6.1 Traffic Functions and Conditions

The subject land is located on the south-western corner of the junction of Great Western Highway and Pat O'Leary Drive. Pat O'Leary Drive performs a commercial / industrial access function providing access between abutting allotments to the Highway, with which it forms a T-junction operating under major / minor give way control with the Highway forming the priority route. Access to the Highway from a bulky goods retail development is provided approximately opposite Pat O'Leary Drive.

Pat O'Leary Drive provides a standard industrial 11m wide industrial pavement within a 20m road reservation. Pat O'Leary Drive extends away from the Highway approximately 120m towards the subject site where it terminates without a formalised cul-de-sac providing an unsealed area for vehicular turnaround.

Great Western Highway with Mitchell Highway and Barrier Highway generally provides an east-west function between Sydney and Broken Hill and beyond. In a regional context, Great Western Highway provides connectivity between Bathurst and the Blue Mountains. It generally provides one through lane in each direction however overtaking lanes and exclusive turning lanes are provided a major junctions.

In the vicinity of the site, Great Western Highway generally provides a 13m wide pavement width providing one through lane in each direction in addition to a marked break down / parking lane on either side of the road. It is however noted that the pavement width narrows to approximately 8m to the west of Pat O'Leary Drive to accommodate a bridge over a creek which runs north-south along the western boundary of the site. Traffic flow along the Highway in the vicinity of the site is governed by a sign posted speed limit of 60km/h.

Further to the west of the site, the Highway widens on approach to its junction with Littlebourne Street, which operates under signalised traffic control, to accommodate exclusive turning lanes. Littlebourne Street provides a north-west / south-east connection between Great Western Highway, Bathurst and Oberon.

6.2 Existing Traffic Volumes

6.2.1 Historical AADT Volumes – Great Western Highway

The Roads & Traffic Authority provides Average Annual Daily Traffic (AADT) volumes within its occasional publication *Traffic Volume Data for Western Region* (2005). This publication provides historical traffic volume data for the Highway, the relevant counting stations being 99.709, east of Boyd Street, Bathurst and 99.921, 1.5km west of Glanmire Lane, Glanmire. The Boyd Street and Glanmire counting stations are located approximately 1km to the west and 6km to the east of the site respectively thereby serving to provide an indication of the historical traffic volumes utilising Great Western Highway. **Table 1** overleaf provides a summary of the AADT volume data provided by the Roads & Traffic Authority.

TABLE 1 ROADS & TRAFFIC AUTHORITY AADT VOLUMES GREAT WESTERN HIGHWAY, EAST OF BATHURST					
Year	**1992**	**1996**	**1999**	**2002**	**2005**
Station 99.709	14,024	19,491	18,801	19,713	20,422
Station 99.921	-	8,307	8,872	9,340	7,934

Table 1 indicates that whilst the Highway traffic volumes have increased steadily to the west of the site, they decreased to the east of the site between 2002 and 2005.

Traffic volumes to the west of the site are considerably greater than that to the east associated with the residential demands generated by the greater Kelso area. Whilst the subject site is located closest to the Boyd Street counting station, traffic volumes in the immediate vicinity of Pat O'Leary Drive and the subject site are likely to be mid-way between the two abovementioned stations as the only significant traffic inputs located between the site and the Glanmire station are the Raglan residential area and Bathurst airport.

This Practice commissioned 7 day 24 hour automatic traffic surveys of Great Western Highway in the immediate vicinity of the subject site in September 2003. These surveys provided a Highway AADT of approximately 13,500 vehicles. Allowing for a conservative 3% average annual increase in traffic flows, the Highway AADT could now be expected to be in the order of 16,000 vehicles.

6.2.2 Junction of Great Western Highway & Pat O'Leary Drive

Afternoon peak hour traffic volume surveys were undertaken by this Practice at the junction of Great Western Highway and Pat O'Leary Drive in order to obtain an accurate indication of the traffic conditions adjoining the subject site. Surveys were undertaken between 4pm and 5pm on 31 July 2009. **Figure 2** overleaf represents the peak hour volumes whilst full details are contained within **Appendix 2**.

FIGURE 2
JULY 2009 AFTERNOON PEAK HOUR TRAFFIC VOLUMES
JUNCTION OF GREAT WESTERN HIGHWAY & PAT O'LEARY DRIVE

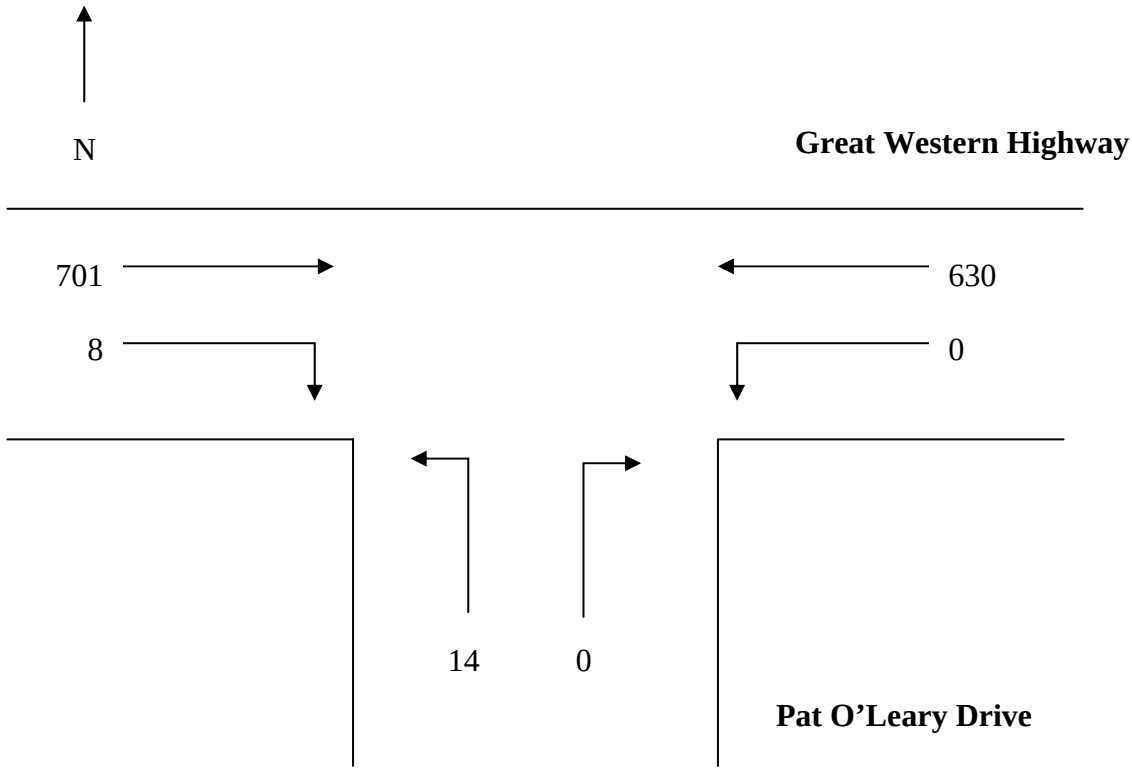


Figure 2 indicates that through traffic along Great Western Highway significantly dominates the junction profile with turning movements associated with Pat O'Leary Drive being very low. The through traffic movements along the Highway are only marginally tidal with eastbound volumes being slightly higher than westbound volumes during the evening peak period.

Whilst not illustrated within **Figure 2**, the traffic surveys also captured the volumes of vehicles entering and exiting the bulky goods development located to the north of the intersection. A total of 30 and 39 vehicles were surveyed to enter and exit the site to the north of the intersection during the survey period. These movements have been included as through movements in the above movement profile.

6.3 Future Traffic Volumes

The Roads & Traffic Authority has specifically requested that this Practice undertake an assessment of existing and projected conditions incorporating 10 years of traffic growth along the Highway. In order to undertake this assessment, this Practice has applied a conservative 3% per annum growth factor to the existing surveyed weekday evening peak hour traffic volumes. This equates to an increase of in Highway traffic volumes of some 34% over 10 years.

In addition, development consent has recently been granted for a road / rail freight intermodal terminal located on the southern side of Great Western Highway to the east of the subject site. The terminal is proposed to comprise the following components:

- An intermodal terminal and warehousing facilities providing a floor area of some 46,240m^2; and

- A mixture bulky goods / highway based uses including a service station and two fast food restaurants contained within a total floor area of approximately 11,770m^2.

The development is proposed to be contained within a large parcel of land located approximately opposite Ashworth Drive. Vehicular access to the site is proposed to be provided directly to / from the Highway via a number of driveways, one of which will form a new southern approach to the current intersection of the Highway and Ashworth Drive.

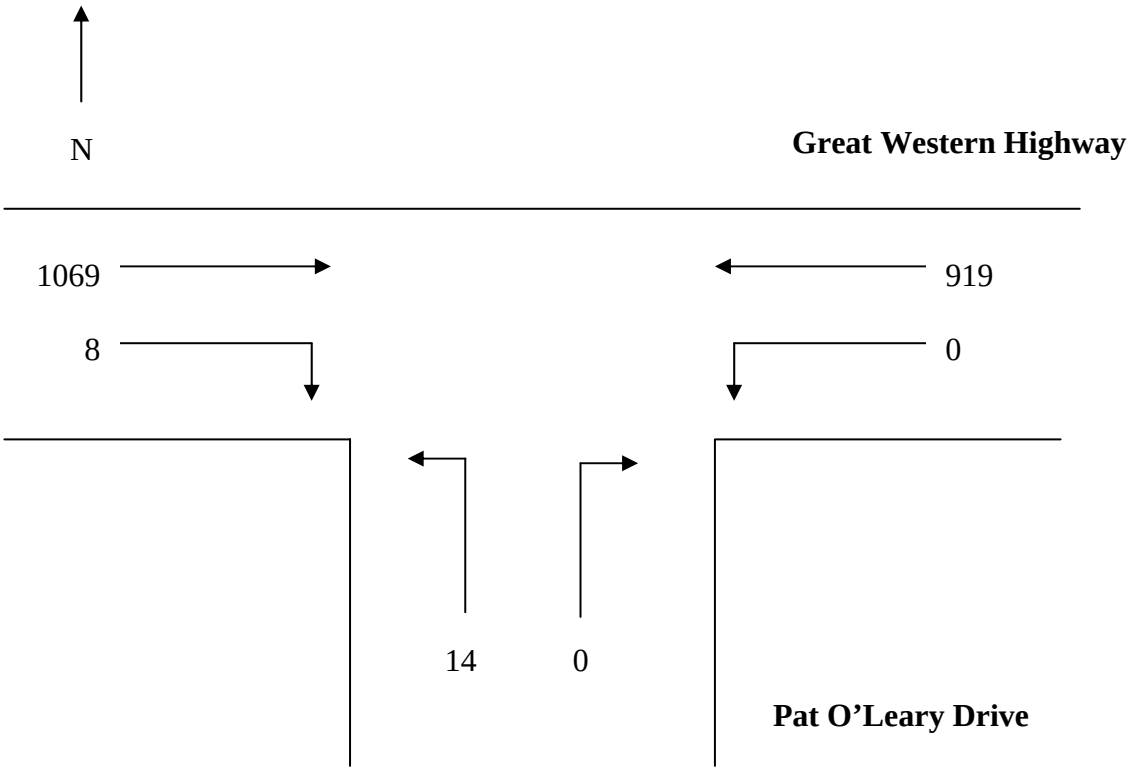
The Traffic Report for the intermodal prepared by Colston Budd Hunt & Kafes Pty. Ltd. dated December 2008 provided traffic generation estimates for the approved development. This report indicates that the intermodal development would generate the following additional traffic along Great Western Highway to the west of the site (past Pat O'Leary Drive) during the weekday evening peak period:

- 130 eastbound traffic movements; and

- 75 westbound traffic movements.

Figure 3 overleaf provides a graphical representation of the projected 2019 traffic volumes at the junction of Great Western Highway and Part O'Leary Drive incorporating 10 year traffic projections and the approved but not constructed intermodal facility located to the east of the site.

FIGURE 3
PROJECTED 2019 AFTERNOON PEAK HOUR TRAFFIC VOLUMES
JUNCTION OF GREAT WESTERN HIGHWAY & PAT O'LEARY DRIVE



6.4 Intersection Operation

In order to estimate the peak efficiency of the adjoining road network, an INTANAL analysis has been undertaken of the T-junction of Great Western Highway and Pat O'Leary Drive. INTANAL is an advanced analytical tool for evaluation of alternative intersection designs in terms of capacity, level of service, a wide range of performance measures including delay, queue length, and number of stops. Key indicators of INTANAL include level of service which is a summary indicator ranging from A to F with A representing optimum intersection performance, and degree of saturation which represents a ratio of the demand of an approach to its capacity.

INTANAL uses detailed analytical traffic models coupled with an iterative approximation method to provide estimates of the abovementioned key indicators of capacity and performance statistics. Other key indicators provided by INTANAL are average vehicle delay, the number of stops per hour and the degree of saturation. Degree of saturation is the ratio of the arrival rate of vehicles to the capacity of the approach. Degree of saturation is a useful and professionally accepted measure of intersection performance. For intersections controlled by a roundabout or give way or stop signs, a degree of saturation of 0.8 or less indicates satisfactory intersection operation. INTANAL provides analysis of the operating conditions that can be compared to the performance criteria set out in **Table 2** (adapted from the Roads & Traffic Authority's *Guide to Traffic Generating Developments*).

TABLE 2 LEVELS OF SERVICE CRITERIA FOR INTERSECTION			
Level of Service	**Average Delay per Vehicle (secs/veh)**	**Traffic Signals, Roundabout**	**Give Way & Stop Signs**
A	Less than 14	Good Operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & Spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode
F	> 70	Extra capacity required	Extreme delay, traffic signals or other major treatment required

The operating conditions have been modelled under two scenarios have been modelled as follows:

- The existing surveyed 2009 traffic volumes illustrated by **Figure 2**; and
- The projected 2019 traffic volumes incorporating the approved but not constructed major intermodal development located to the east of the site illustrated by **Figure 3**.

Table 3 provides a summary of the INTANAL output data whilst **Appendix 3** contains full details.

TABLE 3 - INTANAL OUTPUT AFTERNOON PEAK HOUR INTERSECTION PERFORMANCE JUNCTION OF GREAT WESTERN HOIGHWAY & PAT O'LEARY DRIVE		
	2009	**2019**
Average Vehicle Delay (sec/veh)	10.3	15.5
Number of Stops	17	33
Degree of Saturation	0.45	0.68
Level of Service	A	B

Table 2 indicates that the junction of Great Western Highway and Pat O'Leary Drive currently operates with a level of service 'A' during the afternoon peak period, representing good operation with spare capacity. Whilst the junction level of service is projected to reduce to 'B' incorporating 2019 traffic demands, such a level of service still represents good operation. In this regard, delays for turning vehicles were modelled to be minimal and accordingly movement queues are not projected to be greater than one vehicle.

7. PROJECTED TRAFFIC CONDITIONS

7.1 Traffic Generation

The Roads & Traffic Authority in their *Guide to Traffic Generating Developments* have established vehicular generation rates for a range of land-uses based on surveys of similar uses throughout the Sydney Metropolitan Area. The rates are derived from the average of all the survey locations and in this regard are not conductive to taking into consideration specific locational areas where the dependence on private motor vehicle use varies. The following subsections provide a discussion on the likely traffic generating capacity of the proposed development with reference to the Authority's *Guide to Traffic Generating Developments*.

7.1.1 Stage 1

7.1.1.1 Service Station

The Roads and Traffic Authority provide the following traffic generation rates for service stations:

Evening peak hour trips = 0.04 A(S) + 0.3 A(F)
OR
Evening peak hour trips = 0.66 A(F)

Where:
A(S) = area of the site (m^2)
A(F) = gross floor area of convenience store (m^2)

Applying the above formulae to the proposed serviced station incorporating a site area of 3,774m^2 and a convenience store of 140m^2, the following calculations are made:

(0.04 x 3,774) + (0.3 x 140) = 193 trips
OR
(0.66 x 140) = 93 trips

Whilst the difference between the two abovementioned traffic generation calculations is significant, the lower of the abovementioned traffic generation rates has been applied to the subject proposal for the following reasons:

- In order to take into consideration the likely mixed use trips associated with the subject proposal (in total);
- The likelihood that a significant portion of trips accessing the service station will form passing trade or existing through vehicular trips along the Highway;
- The restricted left in / left out access arrangements whereby the service station only efficiently services westbound Highway traffic movements; and

- The approved intermodal development to the east is to contain a service station as well.

7.1.1.2 Fast Food Restaurants

The Roads & Traffic Authority provides the following with respect to evening traffic generation rates for McDonalds and KFC outlets:

> *McDonalds*
> *Assume 180 vehicles per hour for average development*
> *For sensitivity test, assess effect of 230 vehicles per hour*
>
> *KFC*
> *Assume 100 vehicles per hour for average development*
> *For sensitivity test, assess effect of 120 vehicles per hour*

Considering that the approved intermodal development is to contain two similar fast food restaurants and that there is likely to be some mixed use trips associated with the subject proposal (in total), the lower of the abovementioned traffic generation rates have been applied, i.e. a total of 280 vehicles per hour.

The Roads & Traffic Authority indicates that a significant portion of trips accessing the outlets are likely to be passing trade or existing through vehicular trips along the Highway. The Authority estimate 35% and 50% passing trade for McDonalds and KFC outlets respectively. Accordingly, the fast food restaurants are projected to generate 167 peak hour vehicle movements.

7.1.2 Stage 2

Stage 2 primarily comprise bulky goods retail uses with the exception of two small lower order food outlets (comprising a total floor area of 280m^2) within Building D. These food outlets are most likely to be solely utilised by visitors to the bulky goods outlets and accordingly have been assumed to generate traffic to and from the development consistent with that of bulky goods floor area.

The Roads & Traffic Authority in their *Guide to Traffic Generating Developments* surveyed in 1990 a broad range of bulky goods retail stores including the use currently proposed. The Roads & Traffic Authority state that trip generation rates varied widely however, the average generation rate surveyed was 2.5 vehicles per hour per 100m² gross leasable floor area during the Thursday evening peak period. Therefore a Stage 2 peak hour trip generation of 422 movements are calculated based on the bulky goods floor area provision of 16,881m^2.

Accounting for a 20% reduction (recommended by the Roads & Traffic Authority for retail developments) in the above rates to provide for mixed use trips, the Stage 2 traffic generation is estimated to be 338 trips.

7.1.3 Discussion on Likely Traffic Generation

The previous discussion on the traffic generation of the proposed different components and stages of the development indicates that following weekday evening peak hour trip generation:

Stage 1

Service Station		= 93 trips
McDonalds		= 117 trips
KFC		= 50 trips
	Total	= 260 trips

Stage 2

Bulky Goods	= 338 trips

The total development is therefore projected to initially generate in the order of 260 peak hour trips increasing to a maximum of 598 incorporating the ultimate development yield (including Stages 1 and 2).

6.2 Trip Assignment

In order to gauge the impact of traffic to be generated by the proposed development on the surrounding road network it is necessary to determine the impact on intersection efficiency. The objective of this section is to distribute the traffic generated by the proposed development along major approach routes before it dissipates throughout the general road network.

Given the non-connectivity of Pat O'Leary Drive, it is assumed that all vehicles will access the site from Great Western Highway.

The restricted access arrangements provided to / from the service station are such that it will service westbound Highway traffic only. The service station may also cater for mixed use trips whereby motorists exiting the other development components may visit the service station during their exit trip. In any case, all movements accessing the service station will comprise left in movements from the Highway and all egress movements will comprise left turns to the Highway.

With regard to the remainder of the development components (accessed via Pat O'Leary Drive), it is normal practice to assume that the additional traffic projected to be generated by the proposed development will travel to and from the site proportionately with the existing directional traffic profile. In this regard, the existing traffic flow data contained within **Figure 2** indicates that east and westbound traffic volumes are reasonably similar during most periods of the day. Utilising this theory, it could be considered quite reasonable to assume that traffic generated to and from the site would be evenly distributed from the east and west along Great Western Highway.

However, a majority of residential areas within the greater Bathurst region are located to the west of the subject site. It is therefore expected that a majority of trips generated to the components of the subject site accessed via Pat O'Leary Drive will originate from the west along the Highway. Accordingly, for the purposes of this assessment, 65% of trips have been assumed to travel to the site from the west whilst the remaining 35% have been assumed to travel from the east.

7.3 Projected Traffic Volumes

Utilising the previously presented projected traffic generation and trip assignments, the projected traffic volumes have been extrapolated for the junction of Great Western Highway and Pat O'Leary Drive adjoining the subject site. **Figures 4** and **5** provide a graphical representation of the projected traffic 2009 and 2019 volumes respectively. Two scenarios have been provided being the initial development (Stage 1) and the ultimate development (Stages 1 and 2).

FIGURE 4
PROJECTED 2009 AFTERNOON PEAK HOUR TRAFFIC VOLUMES
JUNCTION OF GREAT WESTERN HIGHWAY & PAT O'LEARY DRIVE

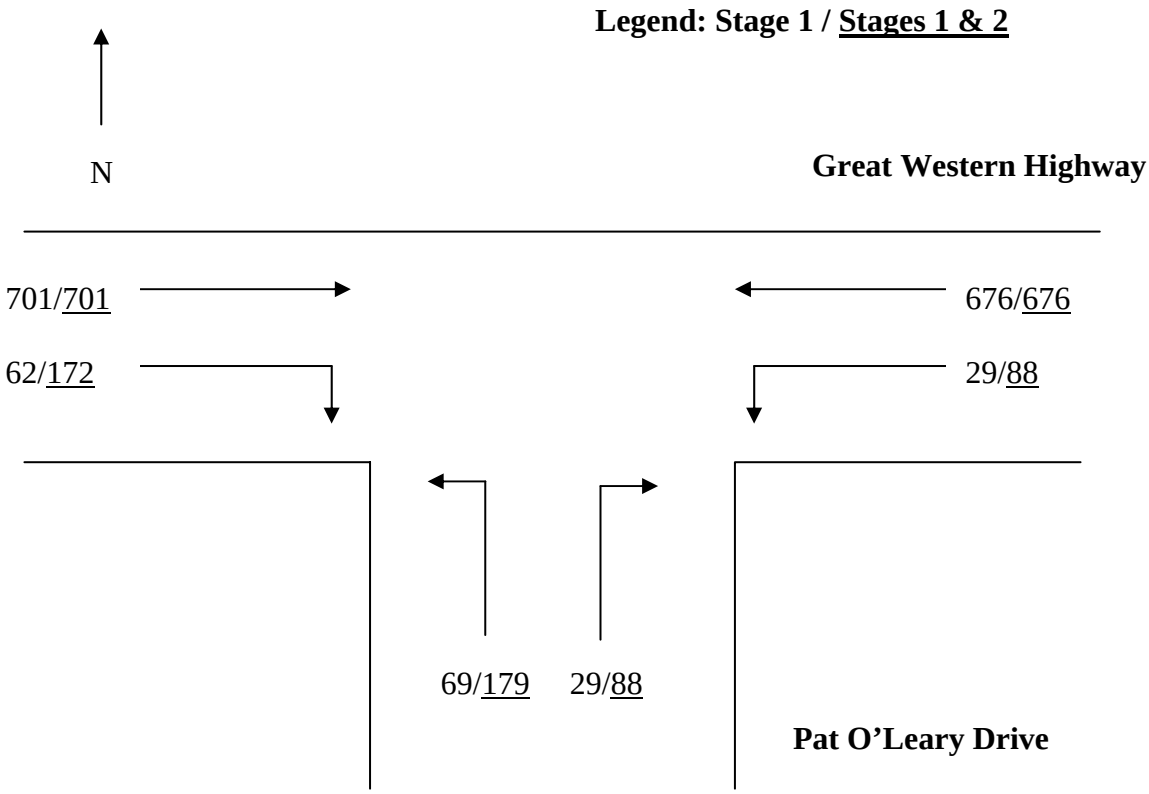
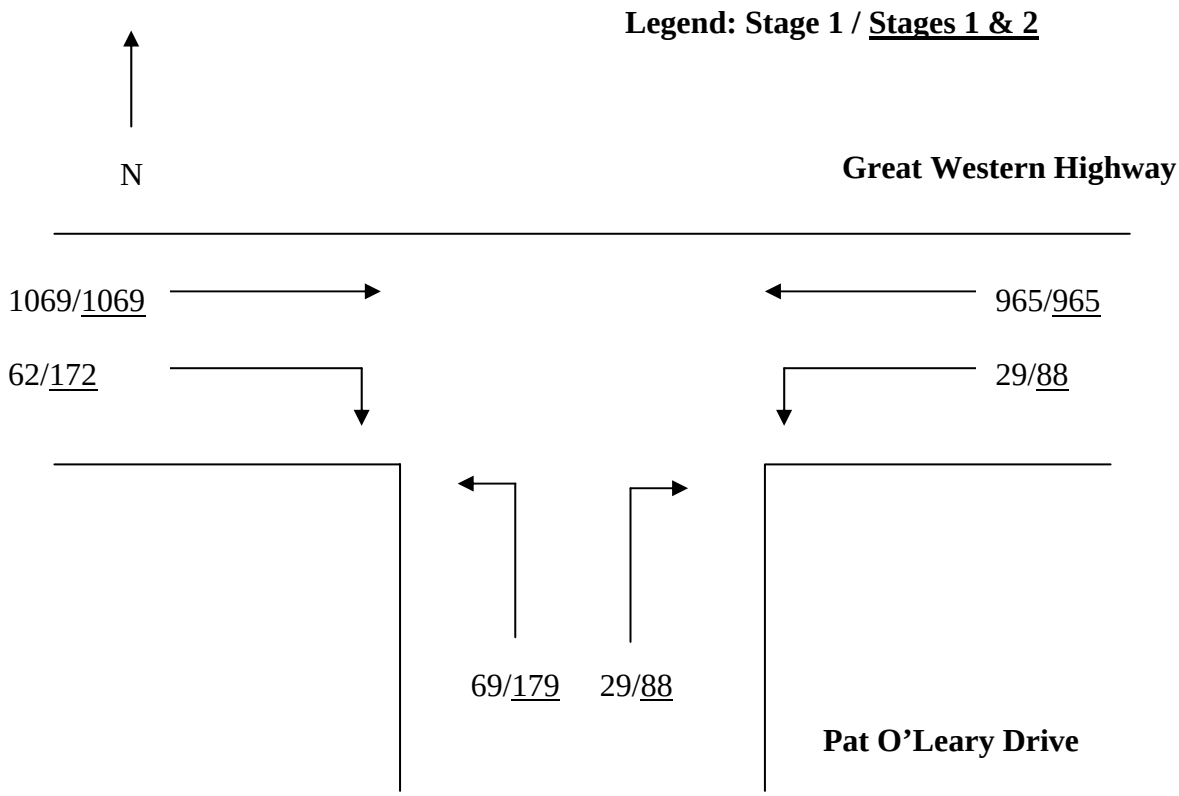


FIGURE 5
PROJECTED 2019 AFTERNOON PEAK HOUR TRAFFIC VOLUMES
JUNCTION OF GREAT WESTERN HIGHWAY & PAT O'LEARY DRIVE



7.4 Projected Intersection Efficiency

In order to undertake an assessment of the likely impact of the subject development on the adjoining road network, this Practice has undertaken a secondary INTANAL analysis of the junction of Great Western Highway and Pat O'Leary Drive utilising the volumes illustrated in **Figures 4** and **5**. **Table 4** below provides a summary of the most pertinent 2009 and 2019 results whilst full details are contained within **Appendix 4**.

TABLE 4 - PROJECTED INTERSECTION PERFORMANCE JUNCTION OF GREAT WESTERN HIGHWAY & PAT O'LEARY DRIVE EXISTING INTERSECTION LAYOUT				
	2009		**2019**	
	Stage 1	**Stages 1 & 2**	**Stage 1**	**Stages 1, & 2**
Average Vehicle Delay (sec/veh)	21.5	29.9	40.6	1007.2
Number of Stops	166	615	312	1105
Degree of Saturation	0.52	0.69	0.77	1.35
Level of Service	B	C	C	F

The INTANAL output indicates that the junction of Great Western Highway and Pat O'Leary Drive is likely to operate with a level of service B incorporating the Stage 1 development and level of service C incorporating the Stage 2 development incorporating 2009 traffic demands. Whilst the modelling output indicates that the junction will operate with a level of service B incorporating the Stage 1 development (representing good operation with spare capacity), it is likely that the additional right turn movements to Pat O'Leary Drive will have a notable impact on eastbound Highway traffic flow.

The intersection operation will deteriorate further incorporating the total development (Stages 1 and 2) with the intersection degree of saturation likely to approach 0.7, which generally indicates a level which approaches unsatisfactory conditions.

The subject junction is projected to operate with a level of service C incorporating the Stage 1 development based on 2019 traffic demands, further reducing to an unacceptable level of service F incorporating the total development.

7.5 Junction Upgrade

The modelling output presented within Section 7.4 of this report suggests that some level of upgrading works to the junction of Great Western Highway and Pat O'Leary Drive are likely to be required to accommodate the staged development. In order to accommodate the initial development (Stage 1), the intersection is recommended to be upgraded to provide a type 'CHR' rural T-intersection layout in accordance with Figure 4.5.6 of the Roads & Traffic Authority's *Road Design Guide*.

A concept design of the junction upgrade has been prepared by this Practice and is attached as **Appendix 5** for reference. The concept design includes the following:

- A right turn bay within Great Western Highway servicing Pat O'Leary Drive;
- A left urn lane within Great Western Highway servicing Pat O'Leary Drive;
- Exclusive left and right turn lanes within Pat O'Leary Drive on approach to the Highway; and
- A left turn lane within Great Western Highway servicing the existing commercial development located to the north of the subject junction.

The upgrading works can largely be undertaken within the existing Great Western Highway pavement.

In order to obtain an indication of the likely performance of the junction of Great Western Highway and Pat O'Leary Drive incorporating the recommended junction upgrading treatment, a further INTANAL analysis was undertaken. Once again, the junction has been modelled to incorporate the initial development (Stage 1) and ultimate development (Stages 1 and 2) incorporating both existing 2009 and projected 2019 traffic demands. **Table 5** provides a summary of the most pertinent results whilst **Appendix 6** contains full details.

TABLE 5 - PROJECTED INTERSECTION PERFORMANCE JUNCTION OF GREAT WESTERN HIGHWAY & PAT O'LEARY DRIVE RECOMMENDED CHANNELISED INTERSECTION TREATMENT				
	2009		**2019**	
	Stage 1	**Stages 1 & 2**	**Stage 1**	**Stages 1 & 2**
Average Vehicle Delay (sec/veh)	18.4	24.8	31.0	55.7
Number of Stops	23	175	35	267
Degree of Saturation	0.20	0.53	0.31	0.81
Level of Service	B	B	C	D

Table 5 indicates that the junction of Great Western Highway and Pat O'Leary Drive incorporating the recommended junction upgrade is capable of accommodating the additional traffic projected to be generated by the initial development (Stage 1) based on 2009 traffic demands. The INTANAL output indicates that the junction is projected to operate with a level of service B and a degree of saturation of 0.2, representing good operating conditions with spare capacity. The movement queue lengths are not expected to be greater than one vehicle thereby suggesting that the turning bays will ensure that impacts on through Highway traffic will be minimal incorporating the Stage 1 development.

Similarly, the INTANAL analysis suggests that the upgraded intersection will continue to operate with a level of service B incorporating the total development (Stages 1 and 2) based on 2009 traffic demands. Some increase in the degree in saturation, number of stops and average vehicle delay is envisaged however the movement queue lengths are not expected to greater than one vehicle thereby indicating good operation.

Table 5 indicates that the upgraded intersection will operate with a level of service C incorporating the additional traffic projected to be generated by the Stage 1 development incorporating the future 2019 traffic demands. **Table 2** indicates this represents satisfactory operation, and the average vehicular delay and intersection degree of saturation are acceptable suggesting satisfactory operation.

Table 5 indicates that the junction level of service is projected to decline to level of service D incorporating the ultimate development (Stages 1 and 2) and the future 2019 traffic demands. It is therefore considered most likely that a further intersection upgrade would be required to accommodate the ultimate development by the year 2019. In this regard, it is understood from discussions with Roads & Traffic Authority officers that the subject section of Great Western Highway is planned to be upgraded to form a four lane divided carriageway. These route upgrading works would allow a further embellishment of the intersection design to provide additional capacity.

A concept design of the likely layout of the junction of the Highway and Pat O'Leary Drive has been prepared by this Practice and is attached as **Appendix 7** for reference. The timing of these works is further understood to be within a 3 to 5 year time period thereby suggesting that these works would be complete by the time Stage 2 of the subject development is operational.

In order to undertake an assessment of the likely operation of the junction of Great Western Highway and Pat O'Leary Drive incorporating the future Great Western Highway alignment and the subject development, a further INTANAL analysis has been undertaken. Once again, the junction has been modelled to incorporate the Stage 1 development and ultimate development (Stages 1 and 2) and the existing 2009 and projected 2019 traffic demands. **Table 6** below provides a summary of the most pertinent results whilst **Appendix 8** contains full details.

TABLE 6 - PROJECTED INTERSECTION PERFORMANCE JUNCTION OF GREAT WESTERN HIGHWAY & PAT O'LEARY DRIVE FUTURE DUAL CARRIAGEWAY GREAT WESTERN HIGHWAY

	2009		**2019**	
	Stage 1	**Stages 1 & 2**	**Stage 1**	**Stages 1 & 2**
Average Vehicle Delay (sec/veh)	16.3	21.9	26.0	41.1
Number of Stops	21	172	29	249
Degree of Saturation	0.14	0.52	0.27	0.96
Level of Service	B	B	B	C

Table 6 indicates that the future dual carriageway alignment of Great Western Highway and associated improvements to the Pat O'Leary Drive junction results in the adjoining intersection operating with a level of service B under the initial (Stage 1) and ultimate (Stages 1 and 2) development proposals incorporating existing 2009 traffic demands. This represents good intersection operation with spare capacity. Accordingly, the adjoining junction of Great Western Highway and Pat O'Leary Drive is capable of accommodating the additional traffic projected to be generated by the ultimate proposed development incorporating the future Highway upgrading works based on 2009 traffic demands.

The subject junction is projected to continue to operate with a level of service B incorporating the Stage 1 development and the future 2019 traffic demands. The average vehicle delay and degree of saturation are projected to be low thereby indicating that the Stage 1 development is capable of being accommodated without any further intersection upgrade works.

The additional traffic projected to be generated by the ultimate development (Stages 1 and 2) is projected to however result in a level of service C based on future 2019 traffic demands. Whilst this level of service is considered to be satisfactory, the junction degree of saturation is projected to approach 1.0 thereby suggesting that a more enhanced intersection control, such as traffic signals, would be required. The INTANAL output contained within **Appendix 8** indicates that the subject junction would operate with a level of service A under traffic signal control incorporating the ultimate (Stages 1 and 2) development and future 2019 traffic demands. Such an intersection treatment is therefore recommended to accommodate the ultimate development.

7.6 General Discussion on Likely Traffic Impact

The general impact of the development is likely to be two fold; the impact of the projected additional traffic generated by the subject development on existing traffic movements and likely impact of the development on surrounding land-uses. With regard to the external impact of the proposal, whilst significant additional traffic is projected to be accommodated within Pat O'Leary Drive, the recommended upgrade of the junction of Great Western Highway and Pat O'Leary Drive and the future upgrading works along the Highway itself will result in improved accessibility between the two streets.

The presented intersection modelling indicates that the adjoining junction is capable of accommodating the additional Stage 1 traffic incorporating the proposed and planned intersection and Highway upgrades. Further, it is noted that the operation of the traffic signals at the junction of the Highway and Littlebourne Street approximately 400m to the west of the site punctuates eastbound Highway traffic movements. The traffic signals provide regular and extended gaps in the eastbound Highway traffic flow thereby assisting vehicles wishing to egress Pat O'Leary Drive via a right turn.

Similar to the above, as a general rule it is noted that single lane rural traffic flow generally results in vehicle platooning such that vehicles often travel in groups a result of vehicles being caught behind slower vehicles. The limited overtaking facilities on approach to Pat O'Leary Drive from the east and recent observations from the site indicate that westbound Highway traffic flow is generally platooned rather than randomly dispersed.

Such traffic flow in conjunction with the extended gaps provided in the eastbound traffic flow as a result of the operation of the signals at Littlebourne Street provide good conditions for vehicles exiting Pat O'Leary Drive. In this regard, and with reference to the previously presented intersection modelling, this Practice is of the opinion that the adjoining junction of the Highway and Pat O'Leary Drive is capable of accommodating the additional traffic projected to be generated by the proposed Stage 1 development incorporating the recommended and planned infrastructure upgrades.

Whilst it is noted that the existing commercial development on the northern side of the Highway currently provides an access driveway approximately opposite Pat O'Leary Drive, the recommended and planned intersection treatments are not expected to affect the site accessibility. Rather, the recommended and planned intersection treatment will formalise the existing junction thereby resulting in increased driver awareness of turning movements at the subject junction thereby resulting in less likelihood of conflict. Considering this and the above discussion on the future operation of the junction of the Highway and Pat O'Leary Drive, this Practice is satisfied that the surrounding road network is capable of accommodating the additional traffic projected to be generated by the Stage 1 proposal incorporating the recommended and planned infrastructure upgrades.

The ultimate development (Stages 1 and 2) is likely to require the installation of a more enhanced intersection control such as traffic signals by 2019. Consideration could also be given to the inclusion of the existing industrial development access driveway into the signal operation via the creation of a fourth northern intersection approach.

7. CONCLUSION AND RECOMMENDATIONS

This Traffic Impact Assessment Report details our assessment of the traffic generation, access and safety considerations associated with the proposed mixed retail development to be located on the south-western corner of the junction of Great Western Highway and Pat O'Leary Drive, Kelso. Having regard to the contents of this report the following conclusions are made:

- The on-site parking provisions are adequate to accommodate for projected demand given the floor space provided and Council requirements;
- The access arrangements and internal circulation proposed will provide for safe and efficient vehicular and pedestrian movements during peak times; and
- The existing surrounding road network is projected to operate with a good level of service;
- It is planned that Great Western Highway be upgraded in the near future to accommodate a four lane dual carriageway;
- The initial development (Stage 1) is estimated to generate in the order of 260 peak hour vehicle trips to and from the subject site; and
- The ultimate development (Stages 1 and 2) is estimated to generate a total of 598 peak hour vehicles trips to and from the subject site.

Based on the above conclusions and the contents of this report and findings of this report, the following recommendations are made:

- In order to ensure that the junction of Great Western Highway and Pat O'Leary Drive is capable of accommodating the additional traffic projected to be generated by the initial (Stage 1) development, the junction be upgraded to accommodate a 'CHR' rural T-junction layout in accordance with the concept design contained within **Appendix 5**;
- Upon the planned upgrade of the Highway to a four lane dual carriageway, the junction can be further upgraded to accommodate an expanded 'CHR' rural T-junction layout in accordance with the concept design contained within **Appendix 7**; and
- In order to ensure that the junction of Great Western Highway and Pat O'Leary Drive is capable of accommodating the additional traffic projected to be generated by the ultimate (Stages 1 and 2) development, consideration should be given to the provision of a more enhanced intersection control such as traffic signals.

Incorporating the abovementioned recommendations, it is concluded that there are no traffic related reasons why the development proposal should not be supported.

APPENDIX 1

SCHEDULE		CARPARKING		
AREAS OF BUILDINGS		REQUIRED	CODE	PROVIDED
BULKY RETAIL A	3,835m²			
BULKY RETAIL B	9,235m²			
BULKY RETAIL C	2,490m²			
BULKY RETAIL D	1,075m²			
	140m²			
	140m²			
TOTAL AREA	16,915m²	338	1 per 50m² GFA	352
McDONALDS	500m²			36
KFC	290m²			33
SERVICE STATION	87m²	11	10 + 1 STAFF	7

LEGEND

BICYCLE RACK

LOADING ZONE

DA EDITION

1:500@A1

0 25m

C	21.01.10	RE-ISSUED FOR DA SUBMISSION
B	17.12.09	DA ISSUES ADDRESSED AND PLAN RE-ISSUED
A	27.10.09	ISSUED FOR DA SUBMISSION
REV	DATE	NOTATION/AMENDMENT

DO NOT SCALE DRAWINGS. CHECK ALL DIMENSIONS ON SITE.

FIGURED DIMENSIONS TAKE PRECEDENCE.

STEVENSGROUP

URBAN DESIGN STUDIO

Architecture
Andrews Neil UDG Pty Ltd
19-21 WATT ST
PO BOX 1476 GOSFORD NSW 2250
TELEPHONE: 02 43 24 3633
FACSIMILE: 02 43 24 3771
EMAIL: info@andrewsneil.com.au
Nominated Architect: Andrew Dickson
(NSW Reg. No. 7657)

PROJECT
STEVENS HOLDINGS
PROPOSED SERVICE CENTRE

LOCATION
LOTS 4 & 5
DP 838537
PAT O'LEARY DRIVE, KELSO

CLIENT
STEVENSGROUP
SUITE 2, 257-259 CENTRAL COAST HWY
P.O.BOX 3171 ERINA NSW 2250
TELEPHONE: 02 43 65 3351
FACSIMILE: 02 43 65 3750

TITLE:
SITE PLAN - LAYOUT

DATE OCTOBER 2009	DRAWN BY	PROJECT No	STAGE
SCALE 1:500@A1	SM	09159	DA
PLOT DATE	CHECK BY	DRAWING No	REVISION
21.01.10		09159/DA/A/02	C

SCHEDULE		CARPARKING		
AREAS OF BUILDINGS		REQUIRED	CODE	PROVIDED
BULKY RETAIL A	3,835m²			
BULKY RETAIL B	9,235m²			
BULKY RETAIL C	2,490m²			
BULKY RETAIL D	1,075m²			
	140m²			
	140m²			
TOTAL AREA	16,915m²	338	1 per 50m² GFA	352
McDONALDS	500m²			36
KFC	290m²			33
SERVICE STATION	87m²	11	10 + 1 STAFF	7

LEGEND

BICYCLE RACK

LOADING ZONE

5 ARTICULATED 19M

DA EDITION

1:500@A1

0 25m

A	21.01.10	ISSUED FOR DA SUBMISSION
REV	DATE	NOTATION/AMENDMENT

DO NOT SCALE DRAWINGS. CHECK ALL DIMENSIONS ON SITE.

FIGURED DIMENSIONS TAKE PRECEDENCE.

Architecture
Andrews Neil UDG Pty Ltd
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EMAIL: info@andrewsneil.com.au
Nominated Architect: Andrew Dickson
(NSW Reg. No. 7657)

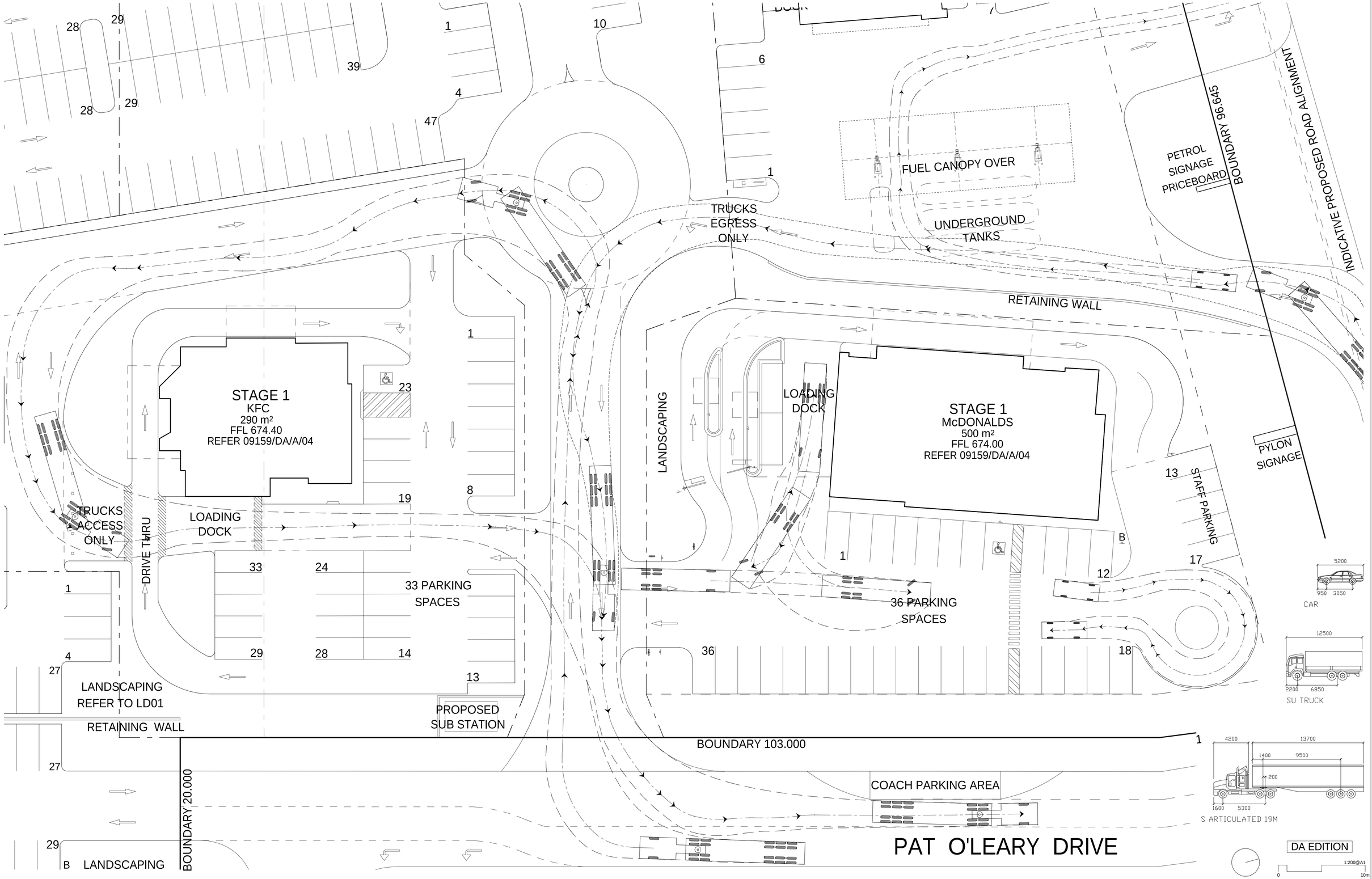
PROJECT
STEVENS HOLDINGS
PROPOSED SERVICE CENTRE

LOCATION
LOTS 4 & 5
DP 838537
PAT O'LEARY DRIVE, KELSO

CLIENT
STEVENSGROUP
SUITE 2, 257-259 CENTRAL COAST HWY
P.O.BOX 3171 ERINA NSW 2250
TELEPHONE: 02 43 65 3351
FACSIMILE: 02 43 65 3750

TITLE:
SITE LAYOUT - TRUCK SWEPT PATHS

DATE	OCTOBER 2009	DRAWN BY	PROJECT No	STAGE
SCALE	1:500@A1	SM	09159	DA
PLOT DATE		CHECK BY	DRAWING No	REVISION
	21.01.10		09159/DA/A/10	A



STEVENSGROUP

URBAN DESIGN GROUP

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FACSIMILE: 02 43 24 3771
EMAIL: info@andrewsneil.com.au
Nominated Architect: Andrew Dickson
(NSW Reg. No. 7657)

REV	DATE	NOTATION/AMENDMENT
A	21.01.10	ISSUED FOR DA SUBMISSION

DO NOT SCALE DRAWINGS. CHECK ALL DIMENSIONS ON SITE.
FIGURED DIMENSIONS TAKE PRECEDENCE.

PROJECT
STEVENS HOLDINGS
PROPOSED SERVICE CENTRE

LOCATION
LOTS 4 & 5
DP 838537
PAT O'LEARY DRIVE, KELSO

CLIENT
STEVENSGROUP
SUITE 2, 257-259 CENTRAL COAST HWY
P.O.BOX 3171 ERINA NSW 2250
TELEPHONE: 02 43 65 3351
FACSIMILE: 02 43 65 3750

TITLE:
STAGE 1 - TRUCK SWEPT PATHS

DATE OCTOBER 2009	DRAWN BY	PROJECT No	STAGE
SCALE 1:200@A1	SM	09159	DA
PLOT DATE	CHECK BY	DRAWING No	REVISION
21.01.10		09159/DA/A/09	A

APPENDIX 2

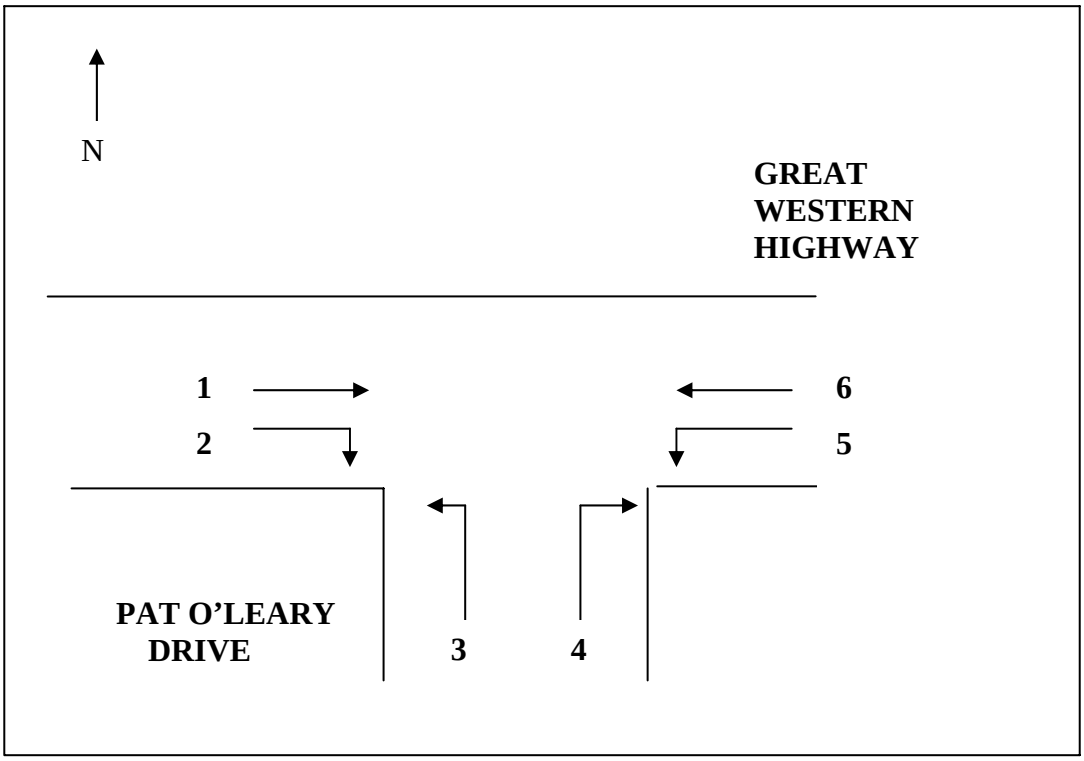
TRAFFIC COUNTS AT: **Great Western Highway & Pat O'Leary Drive, Kelso**

DATE: **31st July, 2009**

TIME: **4.00pm – 5.00pm**

WEATHER: **Fine**

Time	Direction of Vehicular Traffic										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
4.00 – 4.15pm	99	3	5	0	0	170	7	5	5	2	2
4.15 – 4.30pm	182	0	0	0	0	153	5	0	3	7	1
4.30 – 4.45pm	188	3	5	0	0	146	4	0	3	9	0
4.45 – 5.00pm	191	2	4	0	0	138	3	0	4	8	1
TOTAL	**660**	**8**	**14**	**0**	**0**	**607**	**19**	**5**	**15**	**26**	**4**



Other Movements

7. Right turn out of Bulky Goods Development
8. Through movement from Bulky Goods Development to Pat O'Leary Drive
9. Left turn out of Bulky Goods Development
10. Left turn into Bulky Goods Development
11. Right turn into Bulky Goods Development

APPENDIX 3

INTANAL DATA FILE
GREPAT10

INTANAL Program Version: 3.19 Date: 11-MAR-00 Time: 22:38:07
Registered User Name. - THOMPSON STANBURY ASSOCIATES
Registered User No. - 1050

GREAT WESTERN & PAT O'LEARY
PROJECTED CONDITIONS - TABLE 3 - 2009

VOLUME DATA SCREEN

	AM					PM PEAK				
	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn
1L										
1T	701	1830	AB	0.44						
1R	8	49	B	0.18						
2L	14	231	S	0.06						
2T										
2R	0		C							
3L	1	41	A	0.02						
3T	630	1748	A	0.41						
3R										
4L										
4T										
4R										

A	Min	ELT	H%PM	L/S	PD-L	PD-R	Sign	Hold	LKph
1	5	4.0	15	0'		0			
2	5	4.0	5		0	0	G	N	25
3	5	4.0	15	0'	0				25
4									

File = GREPAT10
Type = T2

PLATOON DATA			PEDESTRIAN VOLUME				WALK-CLEARANCE	
App	P%AM	P%PM	P%B	P#AM	P#PM	P#B	Walk	Clear
1	R0	R0	R0	0	0	0	0	0
2	R0	R0	R0	0	0	0	0	0
3	R0	R0	R0	0	0	0	0	0
4	R0	R0	R0	0	0	0	0	0

LANES DATA SCREEN

	Approach 1			Approach 2			Approach 3			Approach 4		
	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
Type	0	1	0		2	0	0	1	0			
T2												

Lane	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat
1	TR	9999	1850	L	30	1750	LT	9999	1750			
2				R	9999	1850						
3												
4												
5												
6												
7												
8												

	No Parking	No Parking	No Parking	No Parking
	PM	PM	PM	PM
Apprch	0	0	0	
Depart	0	0	0	

	Roundabout			Roundabout			Roundabout			Roundabout		
TCS#	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth
0	1	1	4	1	1	4	1	1	4			

File = GREPAT10

DELAY - STOPS - CYCLE LENGTH - PHASE SPLITS DATA SCREEN

PM PEAK

Phse	PT%o	CLo	Yo
A	63.7	78	0.60
B	31.1		
C	5.1		
D	Peds	@ CLm=	140
E	Delo	DSm=	0.65
F	0	Ym=	0.60
G		Delaym=	4.47

Seq	ABC		
	Signals	Signs	Round
Delo	3.7	0.1	1.2
Stpo	610	17	14
D/So	0.71	0.45	0.60
L/So	A	A	A

File = GREPAT10

Required Bays

A	RHT Lanes Length	No.	LHT Lanes Length	No.
1	10	1		
2			10	1
3				
4				

Press <F8> for Warning Messages

SIGNS DELAY - STOPS DATA SCREEN

File = GREPAT10 TCS = 0 Type = T2
PM Peak NormalSIgns

A	M	DS	Total Entry Capac	Delay Geom Rate	Delay Geom Sec/V	Delay Rate	Gap Accept	Delay Total Rate	Delay Averge Sec/V	Queued Veh's	Queue Length Metres	Stops Total Hour
1	L											
1	T	0.45		0.0	0.2	0.0		0.0	0.2	1	6	17
1	R	0.45		0.0	7.3	0.0	3.3	0.0	8.6	1	6	1
2	L	0.04	383	0.0	4.4	0.0	6.0	0.0	10.3	1	6	1
2	T											
2	R											
3	L			0.0	4.3			0.0	4.3			
3	T											
3	R											
4	L											
4	T											
4	R											
TOT		0.45		0.1	0.3	0.0		0.1	0.5			17

TOTal Average Delay = (Seconds Delay) / (Vehicles on Movements with Delay)

END OF FILE

INTANAL DATA FILE

GREPAT20

INTANAL Program Version: 3.19 Date: 29-JAN-00 Time: 16:48:36
Registered User Name. - THOMPSON STANBURY ASSOCIATES
Registered User No. - 1050

GREAT WESTERN & PAT O'LEARY
2019 - TABLE 3

VOLUME DATA SCREEN

	AM					PM PEAK				
	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn
1L										
1T	1069	1837	AB	0.67						
1R	8	49	B	0.18						
2L	14	129	S	0.12						
2T										
2R	0		C							
3L	1	41	A	0.02						
3T	919	1748	A	0.60						
3R										
4L										
4T										
4R										

	A	Min	ELT	H%PM		L/S	PD-L	PD-R	Sign	Hold	LKph
	1	5	4.0	15		0'		0			
	2	5	4.0	5			0	0	G	N	25
	3	5	4.0	15		0'	0				25
	4										

File = GREPAT20
Type = T2

PLATOON DATA			PEDESTRIAN VOLUME			WALK-CLEARANCE	
App	P%AM	P%PM	P%B	P#AM	P#PM	P#B	Walk	Clear
1	R0	R0	R0	0	0	0	0	0
2	R0	R0	R0	0	0	0	0	0
3	R0	R0	R0	0	0	0	0	0
4	R0	R0	R0	0	0	0	0	0

LANES DATA SCREEN

	Approach 1			Approach 2			Approach 3			Approach 4		
	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
Type	0	1	0		2	0	0	1	0			
T2												

Lane	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat
1	TR	9999	1850	L	30	1750	LT	9999	1750			
2				R	9999	1850						
3												
4												
5												
6												
7												
8												

	No Parking	No Parking	No Parking	No Parking
	PM	PM	PM	PM
Apprch	0	0	0	
Depart	0	0	0	

	Roundabout			Roundabout			Roundabout			Roundabout		
TCS#	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth
0	1	1	4	1	1	4	1	1	4			

File = GREPAT20

DELAY - STOPS - CYCLE LENGTH - PHASE SPLITS DATA SCREEN

PM PEAK

Phse	PT%o	CLo	Yo
A	73.0	140	0.79
B	24.2		
C	2.9		

D	Peds	@ CLm=	140
E	Delo	DSm=	0.86
F	0	Ym=	0.79
G		Delaym=	7.81

Seq	ABC		
	Signals	Signs	Round
Delo	7.8	0.2	7.5
Stpo	955	33	1368
D/So	0.86	0.68	0.90
L/So	A	B	B

File = GREPAT20

Required Bays

	A RHT Lanes Length	No.	LHT Lanes Length	No.
1	10	1		
2			10	1
3				
4				

Press <F8> for Warning Messages

SIGNS DELAY - STOPS DATA SCREEN

File = GREPAT20 TCS = 0 Type = T2
PM Peak NormalSIgns

A	M	DS	Total Entry Capac	Delay Geom Rate	Delay Geom Sec/V	Delay Rate	Gap Accept	Delay Total Rate	Delay Averge Sec/V	Queued Veh's	Queue Length Metres	Stops Total Hour
1	L											
1	T	0.68		0.1	0.2	0.0		0.1	0.2	1	6	32
1	R	0.68		0.0	9.0	0.0	3.3	0.0	11.3	1	6	1
2	L	0.06	248	0.0	4.5	0.0	6.0	0.1	15.5	1	6	1
2	T											
2	R											
3	L			0.0	4.3			0.0	4.3			
3	T											
3	R											
4	L											
4	T											
4	R											
TOT		0.68		0.1	0.3	0.1		0.2	0.5			33

TOTal Average Delay = (Seconds Delay) / (Vehicles on Movements with Delay)

END OF FILE

APPENDIX 4

INTANAL DATA FILE
GREPAT51

INTANAL Program Version: 3.19 Date: 10-MAR-00 Time: 16:06:57
Registered User Name. - THOMPSON STANBURY ASSOCIATES
Registered User No. - 1050

GREAT WESTERN & PAT O'LEARY
PROJECTED CONDITIONS - TABLE 4 – 2009 STAGE 1

VOLUME DATA SCREEN

						PM PEAK									
AM	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn
1L															
1T	701	1700	AB	0.47											
1R	62	150	B	0.47											
2L	69	1750	BC	0.04											
2T															
2R	29	1850	C	0.02											
3L	29	73	A	0.45											
3T	676	1679	A	0.46											
3R															
4L															
4T															
4R															

A	Min	ELT	H%PM	L/S	PD-L	PD-R	Sign	Hold	LKph
1	5	4.0	15	0'		0			
2	5	4.0	5		0	0	G	N	25
3	5	4.0	15	0'	0				25
4									

File = GREPAT51
Type = T2

PLATOON DATA			PEDESTRIAN VOLUME			WALK-CLEARANCE	
App	P%AM	P%PM	P%B	P#AM	P#PM	P#B	Walk	Clear
1	R0	R0	R0	0	0	0	0	0
2	R0	R0	R0	0	0	0	0	0
3	R0	R0	R0	0	0	0	0	0
4	R0	R0	R0	0	0	0	0	0

LANES DATA SCREEN

	Approach 1			Approach 2			Approach 3			Approach 4		
	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
Type	0	1	0		2	0	0	1	0			
T2												

Lane	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat
1	TR	9999	1850	L	30	1750	LT	9999	1750			
2				R	9999	1850						
3												
4												
5												
6												
7												
8												

	No Parking	No Parking	No Parking	No Parking
	PM	PM	PM	PM
Apprch	0	0	0	
Depart	0	0	0	

	Roundabout			Roundabout			Roundabout			Roundabout		
TCS#	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth
0	1	1	4	1	1	4	1	1	4			

File = GREPAT51

DELAY - STOPS - CYCLE LENGTH - PHASE SPLITS DATA SCREEN

	PM PEAK	
Phse	PT%o	CLo Yo
A	46.3	140 0.97
B	47.3	
C	6.4	
D	Peds	@ CLm= 140
E	Delo	DSm= 1.07
F	0	Ym= 0.97
G		Delaym= 42.28

Seq	ABC		
	Signals	Signs	Round
Delo	42.3	0.8	2.0
Stpo	1653	166	90
D/So	1.07	0.52	0.61
L/So	F	B	A

File = GREPAT51

Required Bays

A	RHT Lanes Length	No.	LHT Lanes Length	No.
1	15	1		
2	10	1	13	1
3			10	1
4				

SIGNS DELAY - STOPS DATA SCREEN

File = GREPAT51 TCS = 0 Type = T2
PM Peak NormalSIgns

A	M	DS	Total Entry Capac	Delay Geom Rate	Delay Geom Sec/V	Delay Rate	Gap Accept	Delay Total Rate	Delay Averge Sec/V	Queued Veh's	Queue Length Metres	Stops Total Hour
1	L											
1	T	0.52		0.1	0.7	0.1		0.2	0.9	1	6	140
1	R	0.52		0.1	7.4	0.0	3.3	0.2	9.1	1	6	6
2	L	0.20	357	0.1	4.8	0.2	6.0	0.3	12.6	1	6	15
2	T											
2	R	0.17	178	0.0	5.7	0.1	4.0	0.2	21.5	1	6	5
3	L			0.0	4.3			0.0	4.3			
3	T											
3	R											
4	L											
4	T											
4	R											
TOT		0.52		0.5	1.7	0.4		0.8	3.0			166

TOTal Average Delay = (Seconds Delay) / (Vehicles on Movements with Delay)

END OF FILE

INTANAL DATA FILE
GREPAT52
INTANAL Program Version: 3.19 Date: 10-MAR-00 Time: 16:08:17
Registered User Name. - THOMPSON STANBURY ASSOCIATES
Registered User No. - 1050
GREAT WESTERN & PAT O'LEARY
PROJECTED CONDITIONS - TABLE 4 – 2009 STAGES 1&2

VOLUME DATA SCREEN

	AM					PM PEAK				
	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn
1L										
1T	701	1485	AB	0.54						
1R	172	365	B	0.54						
2L	179	1332	BC	0.14						
2T										
2R	88	608	C	0.15						
3L	88	201	A	0.50						
3T	676	1549	A	0.50						
3R										
4L										
4T										
4R										

A	Min	ELT	H%PM	L/S	PD-L	PD-R	Sign	Hold	LKph
1	5	4.0	15	0'		0			
2	5	4.0	5		0	0	G	N	25
3	5	4.0	15	0'	0				25
4									

File = GREPAT52
Type = T2

PLATOON DATA			PEDESTRIAN VOLUME			WALK-CLEARANCE	
App	P%AM	P%PM	P%B	P#AM	P#PM	P#B	Walk	Clear
1	R0	R0	R0	0	0	0	0	0
2	R0	R0	R0	0	0	0	0	0
3	R0	R0	R0	0	0	0	0	0
4	R0	R0	R0	0	0	0	0	0

LANES DATA SCREEN

	Approach 1			Approach 2			Approach 3			Approach 4		
	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
Type	0	1	0		2	0	0	1	0			
T2												

Lane	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat
1	TR	9999	1850	L	30	1750	LT	9999	1750			
2				R	9999	1850						
3												
4												
5												
6												
7												
8												

	No Parking	No Parking	No Parking	No Parking
	PM	PM	PM	PM
Apprch	0	0	0	
Depart	0	0	0	

	Roundabout			Roundabout			Roundabout			Roundabout		
TCS#	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth
0	1	1	4	1	1	4	1	1	4			

File = GREPAT52

DELAY - STOPS - CYCLE LENGTH - PHASE SPLITS DATA SCREEN

PM PEAK

Phse	PT%o	CLo	Yo
A	41.3	140	1.20
B	44.3		
C	14.4		
D	Peds	@ CLm=	140
E	Delo	DSm=	1.31
F	0	Ym=	1.20
G		Delaym=	137.11

Seq	ABC		
	Signals	Signs	Round
Delo	137.1	2.9	3.6
Stpo	3683	615	297
D/So	1.31	0.69	0.68
L/So	F	C	A

File = GREPAT52

Required Bays

A	RHT Lanes Length	No.	LHT Lanes Length	No.
1	29	1		
2	14	1	23	1
3			10	1
4				

SIGNS DELAY - STOPS DATA SCREEN

File = GREPAT52 TCS = 0 Type = T2
PM Peak NormalSIgns

A	M	DS	Total Entry Capac	Delay Geom Rate	Delay Geom Sec/V	Delay Rate	Gap Accept	Delay Total Rate	Delay Averge Sec/V	Queued Veh's	Queue Length Metres	Stops Total Hour
1	L											
1	T	0.69		0.4	1.7	0.2		0.6	2.6	1	6	411
1	R	0.69		0.4	7.5	0.1	3.3	0.5	9.8	1	6	50
2	L	0.53	357	0.3	5.7	0.6	6.0	0.9	17.5	1	6	99
2	T											
2	R	0.59	155	0.2	6.6	0.6	4.0	0.8	29.9	1	6	55
3	L			0.1	4.3			0.1	4.3			
3	T											
3	R											
4	L											
4	T											
4	R											
TOT		0.69		1.4	3.6	1.5		2.9	7.6			615

TOTal Average Delay = (Seconds Delay) / (Vehicles on Movements with Delay)

END OF FILE

INTANAL DATA FILE
GREPAT53

INTANAL Program Version: 3.19 Date: 10-MAR-00 Time: 16:09:26
Registered User Name. - THOMPSON STANBURY ASSOCIATES
Registered User No. - 1050
GREAT WESTERN & PAT O'LEARY
PROJECTED CONDITIONS - TABLE 4 – 2019 STAGE 1

VOLUME DATA SCREEN

	AM					PM PEAK				
	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn
1L										
1T	1069	1749	AB	0.70						
1R	62	111	B	0.64						
2L	69	1750	BC	0.04						
2T										
2R	29	1850	C	0.02						
3L	29	73	A	0.45						
3T	965	1699	A	0.65						
3R										
4L										
4T										
4R										

A	Min	ELT	H%PM	L/S	PD-L	PD-R	Sign	Hold	LKph
1	5	4.0	15	0'		0			
2	5	4.0	5		0	0	G	N	25
3	5	4.0	15	0'	0				25
4									

File = GREPAT53
Type = T2

PLATOON DATA			PEDESTRIAN VOLUME			WALK-CLEARANCE	
App	P%AM	P%PM	P%B	P#AM	P#PM	P#B	Walk	Clear
1	R0	R0	R0	0	0	0	0	0
2	R0	R0	R0	0	0	0	0	0
3	R0	R0	R0	0	0	0	0	0
4	R0	R0	R0	0	0	0	0	0

LANES DATA SCREEN

	Approach 1			Approach 2			Approach 3			Approach 4		
	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
Type	0	1	0		2	0	0	1	0			
T2												

Lane	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat
1	TR	9999	1850	L	30	1750	LT	9999	1750			
2				R	9999	1850						
3												
4												
5												
6												
7												
8												

	No Parking	No Parking	No Parking	No Parking
	PM	PM	PM	PM
Apprch	0	0	0	
Depart	0	0	0	

	Roundabout			Roundabout			Roundabout			Roundabout		
TCS#	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth
0	1	1	4	1	1	4	1	1	4			

File = GREPAT53

DELAY - STOPS - CYCLE LENGTH - PHASE SPLITS DATA SCREEN

PM PEAK

Phse	PT%o	CLo	Yo
A	47.3	140	1.35
B	46.3		
C	6.4		
D	Peds	@ CLm=	140
E	Delo	DSm=	1.47
F	0	Ym=	1.35
G		Delaym=	264.77

Seq	ABC		
	Signals	Signs	Round
Delo	264.8	1.4	4.4
Stpo	5891	312	314
D/So	1.47	0.77	0.92
L/So	F	C	A

File = GREPAT53

Required Bays Check Roundabout Data.

A	RHT Lanes		LHT Lanes	
	Length	No.	Length	No.
1	24	1		
2	10	1	22	1
3			10	1
4				

SIGNS DELAY - STOPS DATA SCREEN

File = GREPAT53 TCS = 0 Type = T2
PM Peak NormalSIgns

A	M	DS	Total Entry Capac	Delay Geom Rate	Delay Geom Sec/V	Delay Rate	Gap Accept	Delay Total Rate	Delay Averge Sec/V	Queued Veh's	Queue Length Metres	Stops Total Hour
1	L											
1	T	0.77		0.3	0.8	0.1		0.4	1.0	1	6	270
1	R	0.77		0.2	9.3	0.1	3.3	0.2	12.0	1	6	8
2	L	0.31	231	0.1	5.1	0.3	6.0	0.4	20.7	1	6	22
2	T											
2	R	0.38	78	0.1	6.1	0.3	4.0	0.3	40.6	1	6	12
3	L			0.0	4.3			0.0	4.3			
3	T											
3	R											
4	L											
4	T											
4	R											
TOT		0.77		0.6	1.6	0.7		1.4	3.5			312

TOTal Average Delay = (Seconds Delay) / (Vehicles on Movements with Delay)

END OF FILE

INTANAL DATA FILE

GREPAT54

INTANAL Program Version: 3.19 Date: 11-MAR-00 Time: 22:11:13
Registered User Name. - THOMPSON STANBURY ASSOCIATES
Registered User No. - 1050

GREAT WESTERN & PAT O'LEARY

PROJECTED CONDITIONS - TABLE 4 – 2019 STAGES 1&2

VOLUME DATA SCREEN

	AM					PM PEAK				
	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn
1L										
1T	1069	1593	AB	0.77						
1R	172	257	B	0.77						
2L	179	1332	BC	0.14						
2T										
2R	88	608	C	0.15						
3L	88	146	A	0.69						
3T	965	1604	A	0.69						
3R										
4L										
4T										
4R										

A	Min	ELT	H%PM	L/S	PD-L	PD-R	Sign	Hold	LKph
1	5	4.0	15	0'		0			
2	5	4.0	5		0	0	G	N	25
3	5	4.0	15	0'	0				25
4									

File = GREPAT54
Type = T2

PLATOON DATA			PEDESTRIAN VOLUME			WALK-CLEARANCE	
App	P%AM	P%PM	P%B	P#AM	P#PM	P#B	Walk	Clear
1	R0	R0	R0	0	0	0	0	0
2	R0	R0	R0	0	0	0	0	0
3	R0	R0	R0	0	0	0	0	0
4	R0	R0	R0	0	0	0	0	0

LANES DATA SCREEN

	Approach 1			Approach 2			Approach 3			Approach 4		
	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
Type	0	1	0		2	0	0	1	0			
T2												

Lane	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat
1	TR	9999	1850	L	30	1750	LT	9999	1750			
2				R	9999	1850						
3												
4												
5												
6												
7												
8												

	No Parking	No Parking	No Parking	No Parking
	PM	PM	PM	PM
Apprch	0	0	0	
Depart	0	0	0	

	Roundabout			Roundabout			Roundabout			Roundabout		
TCS#	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth
0	1	1	4	1	1	4	1	1	4			

File = GREPAT54

DELAY - STOPS - CYCLE LENGTH - PHASE SPLITS DATA SCREEN

PM PEAK

Phse	PT%o	CLo	Yo
A	42.1	140	1.61
B	46.5		
C	11.4		
D	Peds	@ CLm=	140
E	Delo	DSm=	1.77
F	0	Ym=	1.61
G		Delaym=	434.58

Seq	ABC		
	Signals	Signs	Round
Delo	434.6	29.8	16.8
Stpo	8595	1105	1101
D/So	1.77	1.35	0.98
L/So	F	F	C

File = GREPAT54

Required Bays Check Roundabout Data.

A	RHT Lanes		LHT Lanes	
	Length	No.	Length	No.
1	54	1		
2	27	1	46	1
3			10	1
4				

SIGNS DELAY - STOPS DATA SCREEN

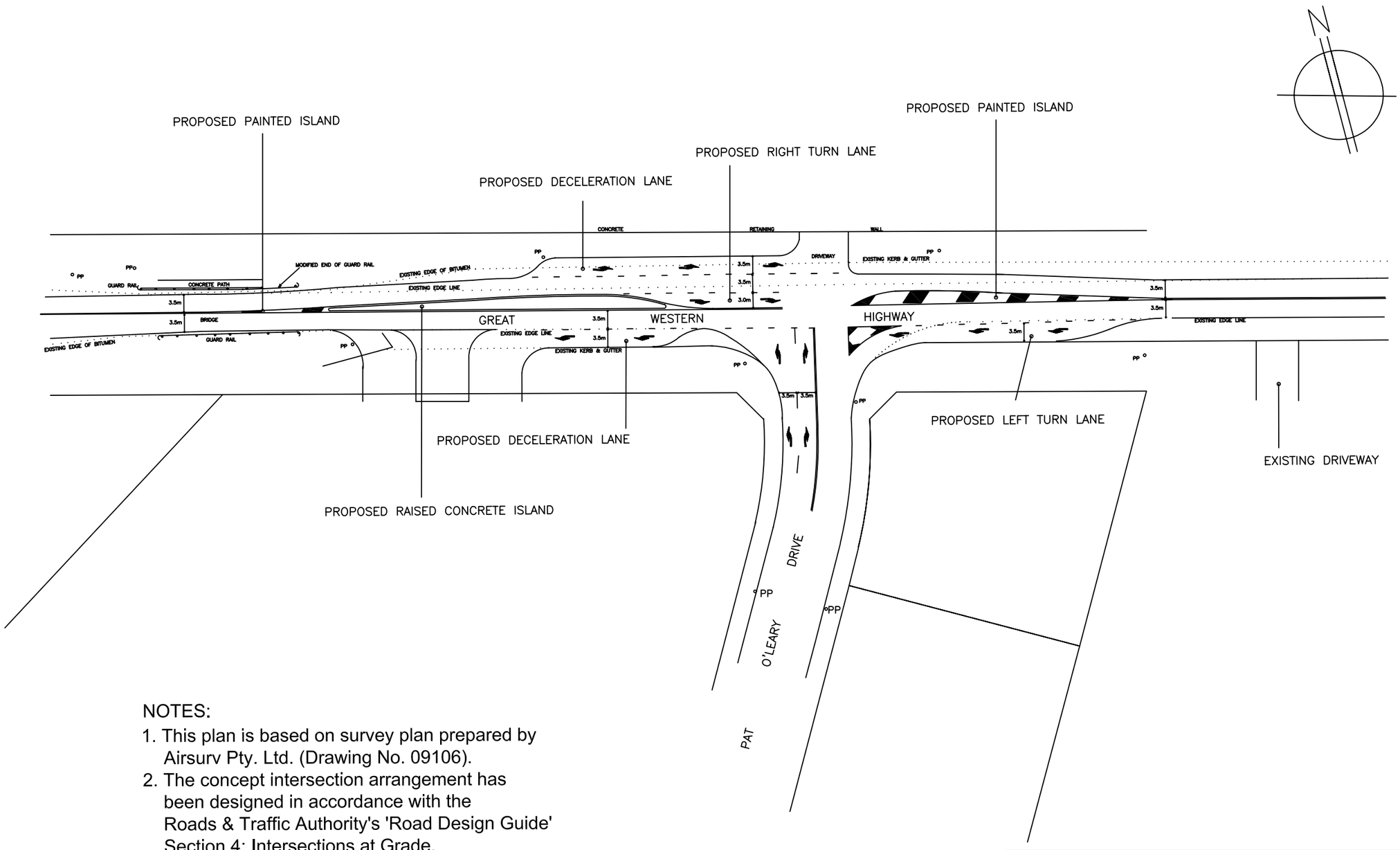
File = GREPAT54 TCS = 0 Type = T2
PM Peak NormalSIgns

A	M	DS	Total Entry Capac	Delay Geom Rate	Delay Geom Sec/V	Delay Rate	Gap Accept	Delay Total Rate	Delay Averge Sec/V	Queued Veh's	Queue Length Metres	Stops Total Hour
1	L											
1	T	0.99		0.7	2.1	0.3		1.0	3.0	1	6	789
1	R	0.99		0.5	9.4	0.2	3.3	0.7	13.3	1	6	64
2	L	0.81	231	0.3	6.4	1.8	6.0	2.2	41.3	2	11	153
2	T											
2	R	1.35	68	0.2	8.0	25.5	4.0	25.7	1007.2	27	188	99
3	L			0.1	4.3			0.1	4.3			
3	T											
3	R											
4	L											
4	T											
4	R											
TOT		1.35		1.9	3.8	27.9		29.8	59.3			1105

TOTal Average Delay = (Seconds Delay) / (Vehicles on Movements with Delay)

END OF FILE

APPENDIX 5



NOTES:

1. This plan is based on survey plan prepared by Airsurv Pty. Ltd. (Drawing No. 09106).
2. The concept intersection arrangement has been designed in accordance with the Roads & Traffic Authority's 'Road Design Guide' Section 4: Intersections at Grade.

PROPOSED INTERIM JUNCTION ARRANGEMENT PRIOR TO RTA WIDENING

THOMPSON STANBURY ASSOCIATES

Transport Planning, Town Planning and Environmental Consultants

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Correspondence: 75 Gindurra Avenue CASTLE HILL 2154
Telephone: (02)8850–2788 Facsimile: (02)8850–2799
Internet: www.thompsonstanbury.com.au

THOMPSON STANBURY ASSOCIATES

CONCEPT DESIGN OF PROPOSED NEW TURNING LANES AT EXISTING JUNCTION OF GREAT WESTERN HIGHWAY & PAT O'LEARY DRIVE KELSO

SCALE: 1:400 @ A1

03-113-4

SUPERSEDES SHEET/ISSUE -

DATE: JULY 2009

ISSUE A

SHEET 1

APPENDIX 6

INTANAL DATA FILE
GREPAT61

INTANAL Program Version: 3.19 Date: 10-MAR-00 Time: 19:19:09
Registered User Name. - THOMPSON STANBURY ASSOCIATES
Registered User No. - 1050

GREAT WESTERN & PAT O'LEARY
PROJECTED CONDITIONS - TABLE 5 – 2009 STAGE 1

VOLUME DATA SCREEN

						PM PEAK									
AM	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn
1L															
1T	701	1900	AB	0.42											
1R	62	1850	B	0.04											
2L	69	1750	BC	0.04											
2T															
2R	29	1850	C	0.02											
3L	29	1750	A	0.02											
3T	676	1900	A	0.41											
3R															
4L															
4T															
4R															

A	Min	ELT	H%PM	L/S	PD-L	PD-R	Sign	Hold	LKph
1	5	4.0	15	0'		0			
2	5	4.0	5		0	0	G	N	25
3	5	4.0	15	0'	0				25
4									

File = GREPAT61
Type = T2

PLATOON DATA			PEDESTRIAN VOLUME			WALK-CLEARANCE	
App	P%AM	P%PM	P%B	P#AM	P#PM	P#B	Walk	Clear
1	R0	R0	R0	0	0	0	0	0
2	R0	R0	R0	0	0	0	0	0
3	R0	R0	R0	0	0	0	0	0
4	R0	R0	R0	0	0	0	0	0

LANES DATA SCREEN

	Approach 1			Approach 2			Approach 3			Approach 4		
	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
Type	0	2	0		2	0	0	2	0			
T2												

Lane	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat
1	T	9999	1900	L	50	1750	L	50	1750			
2	R	20	1850	R	9999	1850	T	9999	1900			
3												
4												
5												
6												
7												
8												

	No Parking	No Parking	No Parking	No Parking
	PM	PM	PM	PM
Apprch	0	0	0	
Depart	0	0	0	

	Roundabout			Roundabout			Roundabout			Roundabout		
TCS#	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth
0	1	1	4	1	1	4	1	1	4			

File = GREPAT61

DELAY - STOPS - CYCLE LENGTH - PHASE SPLITS DATA SCREEN

PM PEAK

Phse	PT%o	CLo	Yo
A	78.2	87	0.48
B	11.5		
C	10.3		

D	Peds	@ CLm=	140
E	Delo	DSm=	0.52
F	0	Ym=	0.47
G		Delaym=	5.22

Seq	ABC		
	Signals	Signs	Round
Delo	4.5	0.6	2.0
Stpo	653	23	90
D/So	0.56	0.20	0.61
L/So	A	B	A

File = GREPAT61

Required Bays

A	RHT Lanes		LHT Lanes	
	Length	No.	Length	No.
1	14	1		
2	10	1	13	1
3			10	1
4				

SIGNS DELAY - STOPS DATA SCREEN

File = GREPAT61 TCS = 0 Type = T2
PM Peak NormalSIgns

A	M	DS	Total Entry Capac	Delay Geom Rate	Delay Geom Sec/V	Delay Rate	Gap Accept	Delay Total Rate	Delay Averge Sec/V	Queued Veh's	Queue Length Metres	Stops Total Hour
1	L											
1	T											
1	R	0.07		0.1	5.5	0.0	3.3	0.1	7.2	1	6	5
2	L	0.20	357	0.1	4.8	0.2	6.0	0.3	12.6	1	6	15
2	T											
2	R	0.11	272	0.0	5.7	0.1	4.0	0.2	18.4	1	6	3
3	L			0.0	4.3			0.0	4.3			
3	T											
3	R											
4	L											
4	T											
4	R											
TOT		0.20		0.3	5.1	0.3		0.6	10.2			23

TOTal Average Delay = (Seconds Delay) / (Vehicles on Movements with Delay)

END OF FILE

INTANAL DATA FILE
GREPAT62

INTANAL Program Version: 3.19 Date: 10-MAR-00 Time: 19:20:21
Registered User Name. - THOMPSON STANBURY ASSOCIATES
Registered User No. - 1050

GREAT WESTERN & PAT O'LEARY
PROJECTED CONDITIONS - TABLE 5 – 2009 STAGES 1&2

VOLUME DATA SCREEN

						PM PEAK									
AM	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn
1L															
1T	701	1900	AB	0.42											
1R	172	1850	B	0.11											
2L	179	1750	BC	0.11											
2T															
2R	88	1850	C	0.05											
3L	88	1750	A	0.06											
3T	676	1900	A	0.41											
3R															
4L															
4T															
4R															

A	Min	ELT	H%PM	L/S	PD-L	PD-R	Sign	Hold	LKph
1	5	4.0	15	0'		0			
2	5	4.0	5		0	0	G	N	25
3	5	4.0	15	0'	0				25
4									

File = GREPAT62
Type = T2

PLATOON DATA			PEDESTRIAN VOLUME			WALK-CLEARANCE	
App	P%AM	P%PM	P%B	P#AM	P#PM	P#B	Walk	Clear
1	R0	R0	R0	0	0	0	0	0
2	R0	R0	R0	0	0	0	0	0
3	R0	R0	R0	0	0	0	0	0
4	R0	R0	R0	0	0	0	0	0

LANES DATA SCREEN

	Approach 1			Approach 2			Approach 3			Approach 4		
	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
Type	0	2	0		2	0	0	2	0			
T2												

Lane	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat
1	T	9999	1900	L	50	1750	L	50	1750			
2	R	20	1850	R	9999	1850	T	9999	1900			
3												
4												
5												
6												
7												
8												

	No Parking	No Parking	No Parking	No Parking
	PM	PM	PM	PM
Apprch	0	0	0	
Depart	0	0	0	

	Roundabout			Roundabout			Roundabout			Roundabout		
TCS#	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth
0	1	1	4	1	1	4	1	1	4			

File = GREPAT62

DELAY - STOPS - CYCLE LENGTH - PHASE SPLITS DATA SCREEN

PM PEAK

Phse	PT%o	CLo	Yo
A	60.7	51	0.59
B	21.7		
C	17.6		
D	Peds	@ CLm=	140
E	Delo	DSm=	0.88
F	0	Ym=	0.80
G		Delaym=	20.51

Seq	ABC		
	Signals	Signs	Round
Delo	8.8	2.1	3.6
Stpo	1379	175	297
D/So	0.77	0.53	0.68
L/So	B	B	A

File = GREPAT62

Required Bays

A	RHT Lanes		LHT Lanes	
	Length	No.	Length	No.
1	27	1		
2	14	1	21	1
3			10	1
4				

SIGNS DELAY - STOPS DATA SCREEN

File = GREPAT62 TCS = 0 Type = T2
PM Peak NormalSIgns

A	M	DS	Total Entry Capac	Delay Geom Rate	Delay Geom Sec/V	Delay Rate	Gap Accept	Delay Total Rate	Delay Averge Sec/V	Queued Veh's	Queue Length Metres	Stops Total Hour
1	L											
1	T											
1	R	0.20		0.3	5.8	0.1	3.3	0.4	7.9	1	6	40
2	L	0.53	357	0.3	5.7	0.6	6.0	0.9	17.5	1	6	99
2	T											
2	R	0.39	238	0.2	6.3	0.5	4.0	0.6	24.8	1	6	36
3	L			0.1	4.3			0.1	4.3			
3	T											
3	R											
4	L											
4	T											
4	R											
TOT		0.53		0.9	5.6	1.2		2.1	13.1			175

TOTal Average Delay = (Seconds Delay) / (Vehicles on Movements with Delay)

END OF FILE

INTANAL DATA FILE

GREPAT63

INTANAL Program Version: 3.19 Date: 10-MAR-00 Time: 19:21:33
Registered User Name. - THOMPSON STANBURY ASSOCIATES
Registered User No. - 1050

GREAT WESTERN & PAT O'LEARY

PROJECTED CONDITIONS - TABLE 5 – 2019 STAGE 1

VOLUME DATA SCREEN

	AM					PM PEAK				
	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn
1L										
1T	1069	1891	AB	0.65						
1R	62	1850	B	0.04						
2L	69	1750	BC	0.04						
2T										
2R	29	1850	C	0.02						
3L	29	1750	A	0.02						
3T	965	1900	A	0.58						
3R										
4L										
4T										
4R										

A	Min	ELT	H%PM	L/S	PD-L	PD-R	Sign	Hold	LKph
1	5	4.0	15	0'		0			
2	5	4.0	5		0	0	G	N	25
3	5	4.0	15	0'	0				25
4									

File = GREPAT63
Type = T2

PLATOON DATA			PEDESTRIAN VOLUME			WALK-CLEARANCE	
App	P%AM	P%PM	P%B	P#AM	P#PM	P#B	Walk	Clear
1	R0	R0	R0	0	0	0	0	0
2	R0	R0	R0	0	0	0	0	0
3	R0	R0	R0	0	0	0	0	0
4	R0	R0	R0	0	0	0	0	0

LANES DATA SCREEN

	Approach 1			Approach 2			Approach 3			Approach 4		
	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
Type	0	2	0		2	0	0	2	0			
T2												

Lane	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat
1	T	9999	1900	L	50	1750	L	50	1750			
2	R	20	1850	R	9999	1850	T	9999	1900			
3												
4												
5												
6												
7												
8												

	No Parking	No Parking	No Parking	No Parking
	PM	PM	PM	PM
Apprch	0	0	0	
Depart	0	0	0	

	Roundabout			Roundabout			Roundabout			Roundabout		
TCS#	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth
0	1	1	4	1	1	4	1	1	4			

File = GREPAT63

DELAY - STOPS - CYCLE LENGTH - PHASE SPLITS DATA SCREEN

PM PEAK

Phse	PT%o	CLo	Yo
A	84.0	122	0.65
B	8.6		
C	7.4		
D	Peds	@ CLm=	140
E	Delo	DSm=	0.75
F	0	Ym=	0.69
G		Delaym=	7.26

Seq	ABC		
	Signals	Signs	Round
Delo	6.9	0.9	4.4
Stpo	960	35	314
D/So	0.73	0.31	0.92
L/So	A	C	A

File = GREPAT63

Required Bays Check Roundabout Data.

A	RHT Lanes		LHT Lanes	
	Length	No.	Length	No.
1	23	1		
2	10	1	22	1
3			10	1
4				

SIGNS DELAY - STOPS DATA SCREEN

File = GREPAT63 TCS = 0 Type = T2
PM Peak NormalSIgns

A	M	DS	Total Entry Capac	Delay Geom Rate	Delay Geom Sec/V	Delay Rate	Gap Accept	Delay Total Rate	Delay Averge Sec/V	Queued Veh's	Queue Length Metres	Stops Total Hour
1	L											
1	T											
1	R	0.09		0.1	5.5	0.1	3.3	0.2	8.2	1	6	6
2	L	0.31	231	0.1	5.1	0.3	6.0	0.4	20.7	1	6	22
2	T											
2	R	0.20	153	0.0	5.9	0.2	4.0	0.3	31.0	1	6	6
3	L			0.0	4.3			0.0	4.3			
3	T											
3	R											
4	L											
4	T											
4	R											
TOT		0.31		0.3	5.2	0.6		0.9	15.3			35

TOTal Average Delay = (Seconds Delay) / (Vehicles on Movements with Delay)

END OF FILE

INTANAL DATA FILE

GREPAT64

INTANAL Program Version: 3.19 Date: 10-MAR-00 Time: 19:23:18
Registered User Name. - THOMPSON STANBURY ASSOCIATES
Registered User No. - 1050

GREAT WESTERN & PAT O'LEARY

PROJECTED CONDITIONS - TABLE 5 – 2019 STAGES 1&2

VOLUME DATA SCREEN

	PM PEAK													
AM	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn
1L															
1T	1069	1636	AB	0.75											
1R	172	961	B	0.21											
2L	179	1750	BC	0.11											
2T															
2R	88	1850	C	0.05											
3L	88	1750	A	0.06											
3T	965	1900	A	0.58											
3R															
4L															
4T															
4R															

A	Min	ELT	H%PM	L/S	PD-L	PD-R	Sign	Hold	LKph
1	5	4.0	15	0'		0			
2	5	4.0	5		0	0	G	N	25
3	5	4.0	15	0'	0				25
4									

File = GREPAT64
Type = T2

PLATOON DATA			PEDESTRIAN VOLUME			WALK-CLEARANCE	
App	P%AM	P%PM	P%B	P#AM	P#PM	P#B	Walk	Clear
1	R0	R0	R0	0	0	0	0	0
2	R0	R0	R0	0	0	0	0	0
3	R0	R0	R0	0	0	0	0	0
4	R0	R0	R0	0	0	0	0	0

LANES DATA SCREEN

	Approach 1			Approach 2			Approach 3			Approach 4		
	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
Type	0	2	0		2	0	0	2	0			
T2												

Lane	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat
1	T	9999	1900	L	50	1750	L	50	1750			
2	R	20	1850	R	9999	1850	T	9999	1900			
3												
4												
5												
6												
7												
8												

	No Parking	No Parking	No Parking	No Parking
	PM	PM	PM	PM
Apprch	0	0	0	
Depart	0	0	0	

	Roundabout			Roundabout			Roundabout			Roundabout		
TCS#	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth
0	1	1	4	1	1	4	1	1	4			

File = GREPAT64

DELAY - STOPS - CYCLE LENGTH - PHASE SPLITS DATA SCREEN

PM PEAK

Phse	PT%o	CLo	Yo
A	65.1	97	0.84
B	25.6		
C	9.3		
D	Peds	@ CLm=	140
E	Delo	DSm=	1.10
F	0	Ym=	1.00
G		Delaym=	95.83

Seq	ABC		
	Signals	Signs	Round
Delo	28.7	4.2	16.8
Stpo	2434	267	1101
D/So	0.96	0.81	0.98
L/So	F	D	C

File = GREPAT64

Required Bays Check Roundabout Data.

A	RHT Lanes Length	No.	LHT Lanes Length	No.
1	45	1		
2	23	1	38	1
3			10	1
4				

SIGNS DELAY - STOPS DATA SCREEN

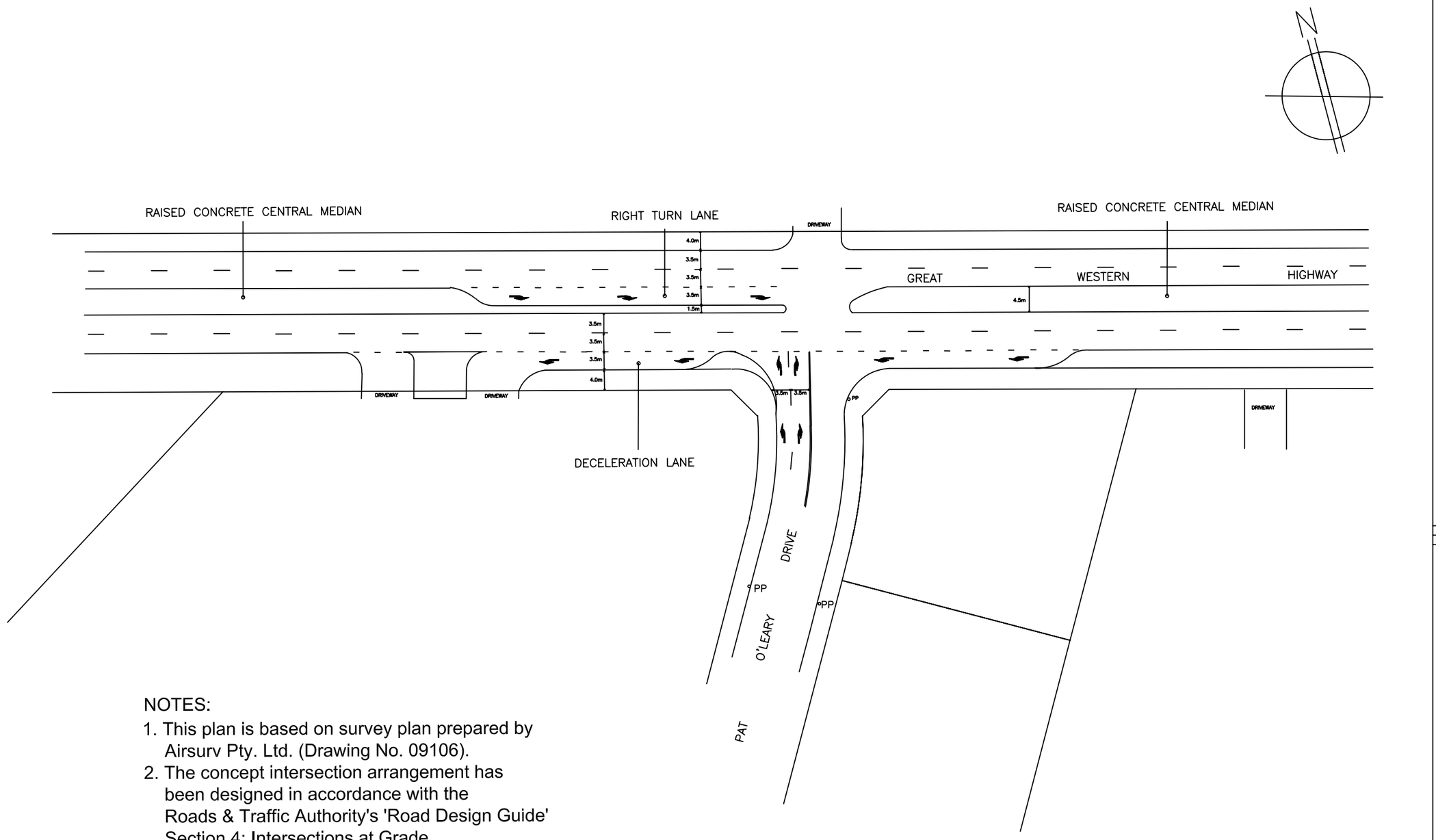
File = GREPAT64 TCS = 0 Type = T2
PM Peak NormalSIgns

A	M	DS	Total Entry Capac	Delay Geom Rate	Delay Geom Sec/V	Delay Rate	Gap Accept	Delay Total Rate	Delay Averge Sec/V	Queued Veh's	Queue Length Metres	Stops Total Hour
1	L											
1	T											
1	R	0.26		0.3	5.9	0.2	3.3	0.5	9.4	1	6	51
2	L	0.81	231	0.3	6.4	1.8	6.0	2.2	41.3	2	11	153
2	T											
2	R	0.69	133	0.2	6.9	1.2	4.0	1.4	55.7	1	8	64
3	L			0.1	4.3			0.1	4.3			
3	T											
3	R											
4	L											
4	T											
4	R											
TOT		0.81		1.0	5.9	3.3		4.2	26.2			267

TOTal Average Delay = (Seconds Delay) / (Vehicles on Movements with Delay)

END OF FILE

APPENDIX 7



NOTES:

1. This plan is based on survey plan prepared by Airsurv Pty. Ltd. (Drawing No. 09106).
2. The concept intersection arrangement has been designed in accordance with the Roads & Traffic Authority's 'Road Design Guide' Section 4: Intersections at Grade.

LIKELY FUTURE JUNCTION ARRANGEMENT
INCORPORATING PROPOSED RTA WIDENING

THOMPSON STANBURY ASSOCIATES
Transport Planning, Town Planning
and Environmental Consultants

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THOMPSON STANBURY ASSOCIATES

CONCEPT DESIGN OF ANTICPATED ULTIMATE
INTERSECTION ARRANGEMENT
JUNCTION OF GREAT WESTERN HIGHWAY &
PAT O'LEARY DRIVE
KELSO

SCALE: 1:400 @ A1		ISSUE A
03-113-5	SUPERSEDES SHEET/ISSUE -	
DATE: JULY 2009		SHEET 1

APPENDIX 8

INTANAL DATA FILE
GREPAT71

INTANAL Program Version: 3.19 Date: 10-MAR-00 Time: 19:34:34
Registered User Name. - THOMPSON STANBURY ASSOCIATES
Registered User No. - 1050

GREAT WESTERN & PAT O'LEARY
PROJECTED CONDITIONS - TABLE 6 – 2009 STAGE 1

VOLUME DATA SCREEN

	AM					PM PEAK				
	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn
1L										
1T	701	3800	AB	0.21						
1R	62	1850	B	0.04						
2L	69	1750	BC	0.04						
2T										
2R	29	1850	C	0.02						
3L	29	1750	A	0.02						
3T	676	3800	A	0.20						
3R										
4L										
4T										
4R										

A	Min	ELT	H%PM	L/S	PD-L	PD-R	Sign	Hold	LKph
1	5	4.0	15	0'		0			
2	5	4.0	5		0	0	G	N	25
3	5	4.0	15	0'	0				25
4									

File = GREPAT71
Type = T2

PLATOON DATA			PEDESTRIAN VOLUME			WALK-CLEARANCE	
App	P%AM	P%PM	P%B	P#AM	P#PM	P#B	Walk	Clear
1	R0	R0	R0	0	0	0	0	0
2	R0	R0	R0	0	0	0	0	0
3	R0	R0	R0	0	0	0	0	0
4	R0	R0	R0	0	0	0	0	0

LANES DATA SCREEN

	Approach 1			Approach 2			Approach 3			Approach 4		
	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
Type	0	3	0		2	0	0	3	0			
T2												

Lane	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat
1	T	9999	1900	L	50	1750	L	50	1750			
2	T	9999	1900	R	9999	1850	T	9999	1900			
3	R	50	1850				T	9999	1900			
4												
5												
6												
7												
8												

	No Parking	No Parking	No Parking	No Parking
	PM	PM	PM	PM
Apprch	0	0	0	
Depart	0	0	0	

	Roundabout			Roundabout			Roundabout			Roundabout		
TCS#	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth
0	1	1	4	1	1	4	1	1	4			

File = GREPAT71

DELAY - STOPS - CYCLE LENGTH - PHASE SPLITS DATA SCREEN

	PM PEAK	
Phse	PT%o	CLo Yo
A	70.3	74 0.26
B	17.6	
C	12.2	
D	Peds	@ CLm= 140
E	Delo	DSm= 0.28
F	0	Ym= 0.26
G		Delaym= 5.25

Seq	ABC		
	Signals	Signs	Round
Delo	4.1	0.5	2.0
Stpo	616	21	90
D/So	0.32	0.14	0.61
L/So	A	B	A

File = GREPAT71

Required Bays

A	RHT Lanes		LHT Lanes	
	Length	No.	Length	No.
1	12	1		
2	10	1	10	1
3			10	1
4				

SIGNS DELAY - STOPS DATA SCREEN

File = GREPAT71 TCS = 0 Type = T2
PM Peak NormalSIgns

A	M	DS	Total Entry Capac	Delay Geom Rate	Delay Geom Sec/V	Delay Rate	Gap Accept	Delay Total Rate	Delay Averge Sec/V	Queued Veh's	Queue Length Metres	Stops Total Hour
1	L											
1	T											
1	R	0.11		0.1	5.6	0.1	4.3	0.2	8.8	1	6	8
2	L	0.12	588	0.1	4.6	0.1	6.0	0.2	7.5	1	6	9
2	T											
2	R	0.14	207	0.0	5.9	0.1	5.0	0.1	16.3	1	6	4
3	L			0.0	4.3			0.0	4.3			
3	T											
3	R											
4	L											
4	T											
4	R											
TOT		0.14		0.3	5.1	0.2		0.5	8.7			21

TOTal Average Delay = (Seconds Delay) / (Vehicles on Movements with Delay)

END OF FILE

INTANAL DATA FILE

GREPAT72

INTANAL Program Version: 3.19 Date: 10-MAR-00 Time: 19:35:38
Registered User Name. - THOMPSON STANBURY ASSOCIATES
Registered User No. - 1050

GREAT WESTERN & PAT O'LEARY

PROJECTED CONDITIONS - TABLE 6 – 2009 STAGES 1&2

VOLUME DATA SCREEN

						PM PEAK									
AM	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn
1L															
1T	701	3800	AB	0.21											
1R	172	1850	B	0.11											
2L	179	1750	BC	0.11											
2T															
2R	88	1850	C	0.05											
3L	88	1750	A	0.06											
3T	676	3800	A	0.20											
3R															
4L															
4T															
4R															

A	Min	ELT	H%PM	L/S	PD-L	PD-R	Sign	Hold	LKph
1	5	4.0	15	0'		0			
2	5	4.0	5		0	0	G	N	25
3	5	4.0	15	0'	0				25
4									

File = GREPAT72
Type = T2

PLATOON DATA			PEDESTRIAN VOLUME			WALK-CLEARANCE	
App	P%AM	P%PM	P%B	P#AM	P#PM	P#B	Walk	Clear
1	R0	R0	R0	0	0	0	0	0
2	R0	R0	R0	0	0	0	0	0
3	R0	R0	R0	0	0	0	0	0
4	R0	R0	R0	0	0	0	0	0

LANES DATA SCREEN

	Approach 1			Approach 2			Approach 3			Approach 4		
	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
Type	0	3	0		2	0	0	3	0			
T2												

Lane	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat
1	T	9999	1900	L	50	1750	L	50	1750			
2	T	9999	1900	R	9999	1850	T	9999	1900			
3	R	50	1850				T	9999	1900			
4												
5												
6												
7												
8												

	No Parking	No Parking	No Parking	No Parking
	PM	PM	PM	PM
Apprch	0	0	0	
Depart	0	0	0	

	Roundabout			Roundabout			Roundabout			Roundabout		
TCS#	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth
0	1	1	4	1	1	4	1	1	4			

File = GREPAT72

DELAY - STOPS - CYCLE LENGTH - PHASE SPLITS DATA SCREEN

PM PEAK

Phse	PT%o	CLo	Yo
A	49.0	43	0.37
B	30.1		
C	20.9		
D	Peds	@ CLm=	140
E	Delo	DSm=	0.51
F	0	Ym=	0.46
G		Delaym=	17.14

Seq	ABC		
	Signals	Signs	Round
Delo	7.1	1.7	3.6
Stpo	1212	172	297
D/So	0.52	0.52	0.68
L/So	A	B	A

File = GREPAT72

Required Bays

A	RHT Lanes		LHT Lanes	
	Length	No.	Length	No.
1	17	1		
2	10	1	12	1
3			10	1
4				

SIGNS DELAY - STOPS DATA SCREEN

File = GREPAT72 TCS = 0 Type = T2
PM Peak NormalSIgns

A	M	DS	Total Entry Capac	Delay Geom Rate	Delay Geom Sec/V	Delay Rate	Gap Accept	Delay Total Rate	Delay Averge Sec/V	Queued Veh's	Queue Length Metres	Stops Total Hour
1	L											
1	T											
1	R	0.32		0.3	6.0	0.3	4.3	0.6	10.7	1	6	64
2	L	0.32	588	0.3	5.1	0.2	6.0	0.5	8.9	1	6	60
2	T											
2	R	0.52	176	0.2	6.7	0.4	5.0	0.6	21.9	1	6	48
3	L			0.1	4.3			0.1	4.3			
3	T											
3	R											
4	L											
4	T											
4	R											
TOT		0.52		0.9	5.5	0.8		1.7	10.8			172

TOTal Average Delay = (Seconds Delay) / (Vehicles on Movements with Delay)

END OF FILE

INTANAL DATA FILE

GREPAT73

INTANAL Program Version: 3.19 Date: 10-MAR-00 Time: 19:36:48
Registered User Name. - THOMPSON STANBURY ASSOCIATES
Registered User No. - 1050

GREAT WESTERN & PAT O'LEARY

PROJECTED CONDITIONS - TABLE 6 – 2019 STAGE 1

VOLUME DATA SCREEN

						PM PEAK									
AM	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn
1L															
1T	1069	3800	AB	0.32											
1R	62	1850	B	0.04											
2L	69	1750	BC	0.04											
2T															
2R	29	1850	C	0.02											
3L	29	1750	A	0.02											
3T	965	3800	A	0.29											
3R															
4L															
4T															
4R															

A	Min	ELT	H%PM	L/S	PD-L	PD-R	Sign	Hold	LKph
1	5	4.0	15	0'		0			
2	5	4.0	5		0	0	G	N	25
3	5	4.0	15	0'	0				25
4									

File = GREPAT73
Type = T2

PLATOON DATA			PEDESTRIAN VOLUME			WALK-CLEARANCE	
App	P%AM	P%PM	P%B	P#AM	P#PM	P#B	Walk	Clear
1	R0	R0	R0	0	0	0	0	0
2	R0	R0	R0	0	0	0	0	0
3	R0	R0	R0	0	0	0	0	0
4	R0	R0	R0	0	0	0	0	0

LANES DATA SCREEN

	Approach 1			Approach 2			Approach 3			Approach 4		
	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
Type	0	3	0		2	0	0	3	0			
T2												

Lane	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat
1	T	9999	1900	L	50	1750	L	50	1750			
2	T	9999	1900	R	9999	1850	T	9999	1900			
3	R	50	1850				T	9999	1900			
4												
5												
6												
7												
8												

	No Parking	No Parking	No Parking	No Parking
	PM	PM	PM	PM
Apprch	0	0	0	
Depart	0	0	0	

	Roundabout			Roundabout			Roundabout			Roundabout		
TCS#	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth
0	1	1	4	1	1	4	1	1	4			

File = GREPAT73

DELAY - STOPS - CYCLE LENGTH - PHASE SPLITS DATA SCREEN

PM PEAK

Phse	PT%o	CLo	Yo
A	76.8	95	0.35
B	13.7		
C	9.5		
D	Peds	@ CLm=	140
E	Delo	DSm=	0.38
F	0	Ym=	0.35
G		Delaym=	5.93

Seq	ABC		
	Signals	Signs	Round
Delo	5.3	0.7	3.7
Stpo	760	29	299
D/So	0.40	0.27	0.92
L/So	A	B	A

File = GREPAT73

Required Bays Check Roundabout Data.

A	RHT Lanes		LHT Lanes	
	Length	No.	Length	No.
1	15	1		
2	10	1	14	1
3			10	1
4				

SIGNS DELAY - STOPS DATA SCREEN

File = GREPAT73 TCS = 0 Type = T2
PM Peak NormalSIgns

A	M	DS	Total Entry Capac	Delay Geom Rate	Delay Geom Sec/V	Delay Rate	Gap Accept	Delay Total Rate	Delay Averge Sec/V	Queued Veh's	Queue Length Metres	Stops Total Hour
1	L											
1	T											
1	R	0.15		0.1	5.6	0.1	4.3	0.2	11.1	1	6	10
2	L	0.15	475	0.1	4.7	0.1	6.0	0.2	9.3	1	6	11
2	T											
2	R	0.27	113	0.1	6.2	0.2	5.0	0.2	26.0	1	6	8
3	L			0.0	4.3			0.0	4.3			
3	T											
3	R											
4	L											
4	T											
4	R											
TOT		0.27		0.3	5.2	0.4		0.7	11.6			29

TOTal Average Delay = (Seconds Delay) / (Vehicles on Movements with Delay)

END OF FILE

INTANAL DATA FILE

GREPAT74

INTANAL Program Version: 3.19 Date: 11-MAR-00 Time: 22:12:29
Registered User Name. - THOMPSON STANBURY ASSOCIATES
Registered User No. - 1050

GREAT WESTERN & PAT O'LEARY

PROJECTED CONDITIONS - TABLE 6 – 2019 STAGES 1&2

VOLUME DATA SCREEN

					PM PEAK										
AM	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn	Vol	Sat	Phse	Yval	Utrn
1L															
1T	1069	3800	AB	0.32											
1R	172	1850	B	0.11											
2L	179	1750	BC	0.11											
2T															
2R	88	1850	C	0.05											
3L	88	1750	A	0.06											
3T	965	3800	A	0.29											
3R															
4L															
4T															
4R															

A	Min	ELT	H%PM	L/S	PD-L	PD-R	Sign	Hold	LKph
1	5	4.0	15	0'		0			
2	5	4.0	5		0	0	G	N	25
3	5	4.0	15	0'	0				25
4									

File = GREPAT74
Type = T2

PLATOON DATA			PEDESTRIAN VOLUME			WALK-CLEARANCE	
App	P%AM	P%PM	P%B	P#AM	P#PM	P#B	Walk	Clear
1	R0	R0	R0	0	0	0	0	0
2	R0	R0	R0	0	0	0	0	0
3	R0	R0	R0	0	0	0	0	0
4	R0	R0	R0	0	0	0	0	0

LANES DATA SCREEN

	Approach 1			Approach 2			Approach 3			Approach 4		
	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade	Down	Lanes	Grade
Type	0	3	0		2	0	0	3	0			
T2												

Lane	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat	Type	Lngth	Sat
1	T	9999	1900	L	50	1750	L	50	1750			
2	T	9999	1900	R	9999	1850	T	9999	1900			
3	R	50	1850				T	9999	1900			
4												
5												
6												
7												
8												

	No Parking			No Parking			No Parking			No Parking		
	PM			PM			PM			PM		
Apprch	0			0			0					
Depart	0			0			0					
	Roundabout			Roundabout			Roundabout			Roundabout		
TCS#	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth	Ent	Cir	Wdth
0	1	1	4	1	1	4	1	1	4			

File = GREPAT74

DELAY - STOPS - CYCLE LENGTH - PHASE SPLITS DATA SCREEN

PM PEAK

Phse	PT%o	CLo	Yo
A	57.8	55	0.45
B	25.8		
C	16.4		
D	Peds	@ CLm=	140
E	Delo	DSm=	0.60
F	0	Ym=	0.55
G		Delaym=	20.53

Seq	ABC		
	Signals	Signs	Round
Delo	9.3	2.6	12.5
Stpo	1497	249	1008
D/So	0.58	0.96	0.98
L/So	A	C	B

File = GREPAT74

Required Bays Check Roundabout Data.

A	RHT Lanes		LHT Lanes	
	Length	No.	Length	No.
1	22	1		
2	12	1	17	1
3			10	1
4				

SIGNALS DEGREE of SATURATION - DELAY - STOPS - GREEN TIMES DATA SCREEN

File = GREPAT74 TCS = 0 Type = T2
PM Peak Signals Normal

A	M	DS	Green Time	Delay Geom Rate	Delay Geom Sec/V	Delay U/form Rate	Delay O/flow Rate	Delay Total Rate	Delay Averge Sec/V	Queued Veh's Cycle	Queue Length Metres	Stops Total Hour
1	L											
1	T	0.42	42	0.7	2.0	0.8		1.5	4.3	4	18	386
1	R	0.58	10	0.4	7.0	1.1		1.5	27.4	2	18	163
2	L	0.31	19	0.3	6.0	0.7		1.0	19.0	2	12	123
2	T											
2	R	0.55	5	0.2	7.4	0.6		0.8	31.3	1	12	79
3	L	0.11	28	0.2	5.5	0.2		0.4	12.7	1	6	48
3	T	0.58	28	1.2	4.0	2.9		4.2	13.5	8	30	698
3	R											
4	L											
4	T											
4	R											
TOT		0.58	55	2.9	3.6	6.3		9.3	11.4			1497

TOTal Delay Average Sec/V = (Seconds Delay) / (All Vehicles on all Movements)

SIGNS DELAY - STOPS DATA SCREEN

File = GREPAT74 TCS = 0 Type = T2
PM Peak NormalSIgns

A	M	DS	Total Entry Capac	Delay Geom Rate	Delay Geom Sec/V	Delay Rate	Gap Accept	Delay Total Rate	Delay Averge Sec/V	Queued Veh's	Queue Length Metres	Stops Total Hour
1	L											
1	T											
1	R	0.44		0.3	6.2	0.5	4.3	0.8	14.7	1	6	86
2	L	0.40	475	0.3	5.3	0.3	6.0	0.6	11.6	1	6	74
2	T											
2	R	0.96	96	0.2	7.7	0.9	5.0	1.0	41.1	1	6	88
3	L			0.1	4.3			0.1	4.3			
3	T											
3	R											
4	L											
4	T											
4	R											
TOT		0.96		0.9	5.8	1.6		2.6	16.1			249

TOTal Average Delay = (Seconds Delay) / (Vehicles on Movements with Delay)

END OF FILE

ENVIRONMENTAL EARTH SCIENCES
THE KNOW AND THE HOW

REPORT NO. 107134 V1.1

DETAILED SITE INVESTIGATION OF LOTS 4 AND 5 IN DP838537, CORNER OF GREAT WESTERN HIGHWAY AND PAT O'LEARY DRIVE, KELSO, NSW

ENVIRONMENTAL EARTH SCIENCES NSW
REPORT TO MAGNET MART PTY LTD
12 FEBRUARY 2008

SYSTEM CERTIFICATION ISO 9001:2000 SGS

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EXECUTIVE SUMMARY

Environmental Earth Sciences NSW undertook a preliminary environmental site investigation of Lots 4 and 5 in DP838537 on the corner of Pat O'Leary Drive and the Great Western Highway, Kelso, NSW in 2005. At the owners request, we were asked to further evaluate the potential sources of contamination identified in the preliminary site investigation.

This detailed intrusive site investigation was conducted on 17 and 18 January 2008 and comprised drilling eighteen boreholes across the site (predominantly within the Clarke's plant hire yard), collection of fifteen surface soil samples from across the greenfield area of the site and one within the soil bund beneath the diesel above ground storage tank. Soil samples were also collected from five fill stockpiles located to the south of the Clarke's plant hire yard.

Selected soil samples were then analysed for the potential chemicals of concern identified in the preliminary site investigation. These included heavy metals, pesticides (organochlorine and organophosphate), petroleum hydrocarbons, benzene, toluene, ethylbenzene and xylene(BTEX) and polycyclic aromatic hydrocarbons (PAHS).

Laboratory results revealed that petroleum impacted soil beneath the diesel tank at levels that should be remediated (excavated and disposed offsite or excavated, bioremediated and reused onsite) prior to it being deemed suitable for commercial, industrial or residential landuse. Concentrations of chemicals of concern were below the guidelines for commercial, industrial and residential landuse in all other soil samples analysed.

If disposed off site, soil beneath the diesel tank is classified as industrial waste and soil across the remainder of the site (including stockpiled fill material) can be classified as solid waste for waste disposal purposes. Soil must be disposed of to a facility licensed to accept the waste to be disposed.

A brief remedial action plan will need to be compiled for the remediation and following remediation, validation sampling and a validation report will required to demonstrate that the remediation has successfully been undertaken and that the site is suitable for commercial, industrial and residential landuse.

This executive summary is not a stand alone document but should be read in conjunction with the formal report, documentation sections, tables, figures and appendices as referred to in the index to the report and must not be released to any third party or copied in part without all the material included in this report for any reason.

Thank you for the opportunity to undertake this work, should you have any queries please do not hesitate to contact us on (02) 9922 1777.

Project Manager
Matthew Clutterham
Senior Soil Scientist

Internal Reviewer
Colin McKay
Senior Soil Scientist

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FIGURES

TABLES OF RESULTS

APPENDICES

1 INTRODUCTION

1.1 Background

Environmental Earth Sciences NSW undertook a preliminary site investigation of Lots 4 and 5 in DP838537 on the corner of the Great Western Highway and Pat O'Leary Drive, Kelso, NSW on 5 April 2005. This report revealed that there was potential for the site to have been impacted by chemicals of concern (CoC) to human health and the environment resulting from past use of the site as an orchard and from the current operation of an equipment hire facility which utilised fuel storage tanks on site. A slight potential for CoCs was seen to exist in fill material and stockpiled soil of unknown origin.

Following the results of this report Environmental Earth Sciences NSW were requested by Magnet Mart Pty Ltd on 21 December 2007 to undertake an intrusive site investigation of the site to further identify whether CoCs existed in soil on site and to establish the sites suitability for use under varying landuses.

Best professional judgement was used to extrapolate between sampling points investigated as part of this assessment. However, even under ideal circumstances actual conditions may vary from those inferred to exist. The actual interface between materials and variation of soil quality may be more abrupt or gradual than the report indicates.

Environmental Earth Sciences NSW is not responsible for variations due to alterations of site conditions or chemistry since the time of inspection.

This study was conducted according to Environmental Earth Sciences NSW proposal number PO107247, dated 20 December 2007 and written instruction to proceed received from Paul Donaghue care of Magnet Mart Pty Ltd on 21 December 2007.

1.2 Scope of work

Environmental Earth Sciences NSW undertook the following limited scope of works:

- investigate soil at 33 locations across the site. Boreholes were drilled at nineteen of these locations and surface samples were collected in the remaining samples. Boreholes were drilled until refusal was met, half a metre into natural underlying material or to a maximum depth of 2.1 metres);
- sampled five soil stockpiles;
- select soil samples were analysed for petroleum hydrocarbons, benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine and organophosphate pesticides (OCPs and OPPs) and heavy metals; and
- prepare this report on soil contamination at the site and detailing the sites suitability for various landuses.

2 SITE IDENTIFICATION

TABLE 1 SITE DETAILS

Item	Details
Address	Corner of Pat O'Leary Drive and the Great Western Highway, Kelso, NSW
Lot and Deposited plan	Lots 4 and 5 in DP 838537
Site Area	Approximately 5.8 hectares
Local Government Authority	Bathurst Regional Council
Parish	Kelso
County	Roxburgh
Locality and site Map	Refer to Figure 1

The area of investigation consists of a rectangular shaped block fronting the Great Western Highway (northern boundary). The site also fronts Pat O'Leary Drive (eastern boundary) from which access is gained.

3 SITE CHARACTERISTICS

3.1 Topography and drainage

The site is located within a midslope environment with a general slope to the west north-west. Slope was estimated to be <5%. A drainage line enters the property at the approximate centre point of the southern boundary and flows to the north before veering due west (near the fill stockpiles) and exiting the site at the western boundary.

In addition, Raglan Creek enters the property from the north and traverses the northern western corner of the site, exiting in the northern portion of the western boundary. As such, Raglan Creek forms the northern portion of the western boundary.

Regional landform has been described as undulating to rolling hills with elevations of 650-850m and local relief from 30-70m. Slopes are characteristically 6-10% and generally range from 400-800m in length. Drainage depression slopes are from 4-7% but range from 1-9%. Erosional channels drain north into the major streams at 500-1000m apart. The drainage pattern is described as convergent (Kovac & Lawrie, 1990)

3.2 Geology and soil

The local geological unit consists of Bathurst Granite of the Carboniferous aged Bathurst Batholith. Bathurst Granite is comprised of coarse grained, porphyritic biotite granite. (Australia 1:250 000 Geological Series, Bathurst Sheet).

The site has been identified in the *Soil Landscape of Bathurst 1:250 000 Sheet* as located in the Bathurst Soil Landscape. A soil landscape is an area of land that has recognizable and specifiable soils and topographies. The dominant soils of the Bathurst Soil Landscape are non-calcic brown soils with yellow solodic soils on the lower slopes and in drainage lines. Also occurring are sands and mottled solodic soils (Kovac & Lawrie, 1990).

3.3 Local hydrogeology

A groundwater bore search conducted by the Department Infrastructure Planning & Natural Resources (DIPNR) provided details of eleven registered groundwater bores within the area. Four bores were located within 1000m of the site and of these only four recorded water bearing zones. Summary of the details for these six bores are presented in Table 1, with full records provided within Appendix A.

Water bearing zones are confined within the Bathurst Granite geological unit and encountered at depths greater then 8m (Table 1). Standing water level was recorded between 4.0-12.0m suggesting that groundwater in the vicinity of the site is under slight confining pressure.

3.4 Relevant local sensitive environment

Groundwater is expected to flow within the fissures of the underlying granite towards the Macquarie River located approximately 2.5 kilometres west of the site. Raglan creek which forms part of the sites western boundary flows into the Macquarie River.

TABLE 2 DIPNR GROUNDWATER REGISTERED BORES

Bore ID	Distance from site	Intended use	Final depth	Water bearing zones (m)	Standing water level	Soil stratigraphy (m)
GW055870	900m SW	domestic	30.50	16.80-16.80 20.70-20.70 23.20-23.20	no details found	0-0.30 topsoil 0.30-3.66 clay 3.66-6.10 gravel 6.10-15.54 granite decomposed 15.54-30.48 granite water supply
GW057119	900m S	domestic	46.30m	18.60-39.00	4.60	0-0.60 topsoil 0.60-7.30 clay 7.30-39.00 granite decomposed/ water supply 39.00-46.30 granite
GW801440	1000m west	domestic, stock	15.24	8.00-16.00	4.00	0-0.30 topsoil 0.30-0.90 topsoil, black 0.90-2.13 clay, brown 2.13-4.57 sandy clay, yellow 4.57-15.24 sand & gravel
GW80004	600m SSW	recreation	47.20	22.90-27.40 28.30-28.70 34.10-34.40 37.80-38.10	12.10	0-3.60 granite fill 3.60-27.40 decomposed granite 27.40-47.20 red granite rock

4 PREVIOUS INVESTIGATIONS

Environmental Earth Sciences NSW undertook a preliminary environmental investigation of the site in 2005. This investigation revealed that there was a potential for chemicals of potential concern (COCs) to human health or the environment to exist in site soil as a result of the previous orchards, plant hire facility and imported fill of unknown origin stockpiled and used for levelling.

As such it was recommended an intrusive site investigation be undertaken to further evaluate the presence or absence of COCs and the sites suitability for future use.

5 SITE HISTORY

Historical information was researched in Environmental Earth Sciences NSW 2005 report (Reference 2) from land titles information and aerial photographs. In summary, land use on the site has been primarily agricultural, with some orchards having operated on the site between around 1964 until at least 1984. However, small scale agriculture continued on the southern half of the site until at least 1996. In addition, light commercial activities (currently Clarkes Plant Hire) have been operating on a portion of the north of the site since at least 1984.

6 FIELD PROGRAM

Based on the recommendations presented in our 2005 preliminary site investigation report, we were requested to carry out an intrusive site investigation in December 2007. This investigation involved a site inspection and soil sampling which is detailed in the following sections.

6.1 Site inspection

A site walk over was conducted on 17 January 2008 and it was noted that the site had two types of land use. In the north eastern corner of the site, Clark's plant hire was active while the rest of the site existed as a vacant green field. The whole site sloped generally towards Raglan Creek in the north west corner of the site.

In Clark's hire yard there had been some cut and fill on the eastern boundary. This has lowered the yard approximately 1.5m next to the road. The southern area of the yard was a carpark, to the north of which was an office, workshop and toilet. To the north of the building was the gravel hardstand which contained the stored equipment, two shipping containers, empty drums and a rubbish collection area. Wash bays were observed on the eastern boundary, behind the shed. These drained into the soil. Stormwater runoff appeared to flow towards the creek.

Two above ground fuel storage tanks were also noted on site, one contained unleaded fuel and was installed on a concrete stand while the second tank contained diesel and was located on loose gravel. The volume of these tanks and how full they were at the time of inspection was unknown however they both appeared to still be in use. Located between the two tanks was an intermediate bulk container (IBC) that was being used to store waste oil. Hydrocarbon staining and odour was observed at the base of these tanks.

The rest of the site existed as a green field. Vegetation on the site appeared healthy at the time of inspection. Furrows in the ground indicated the field had been tilled in the past. In recent times sheep had been allowed access to the site as there were sheep droppings over much of the vacant area of the site.

To the south of Clark's hire yard there were five stockpiles of imported and locally derived fill. All had vegetation growing on them and as such displayed no signs of phytotoxicity. Most of the green field soil appeared compacted as sampling was difficult.

6.2 Soil sampling program

For the purpose of the detailed site investigation the site was divided up into two sections the Clark's hire yard and the green field both having different potentials to have been impacted by COCs.

The field investigation was undertaken on 17 and 18 January 2008. It involved drilling 11 deep boreholes on a grid basis in the Clarkes hire yard. An additional two boreholes were drilled to target the area surrounding the above ground tanks and the waste oil collection area.

In the green field area of the site, 15 surface samples were collected on a grid basis and five boreholes were drilled between 1.2 and 2.1 metres below ground surface.

The six soil samples were also collected from the six fill stockpiles to the south of the Clarkes hire yard.

Samples were collected using Environmental Earth Sciences Geoprobe equipped soil sampling rig or by using a shovel or hand auger (for surface samples).

The position of the boreholes and surface sampling locations are shown on Figures 2 and 3 which also indicate the approximate locations of site buildings, operational areas and infrastructure. Boreholes varied from 0.8 to 2.1 metres depth below ground surface

All boreholes were logged by an experienced field scientist and a total of 38 soil samples were collected from the boreholes at selected horizons. A soil description including pH, texture, odour and other notable characteristics was recorded for soil types encountered at each location. Borehole logs are presented in Appendix A.

Samples were placed into glass jars, labelled with the borehole number, depth of discrete sample collection, site reference and date before being placed in a cooler with ice. All sample equipment was decontaminated (where required) between holes.

Sampling was undertaken in accordance with Environmental & Earth Sciences (2005) *Soil, gas and groundwater sampling manual* (Reference 3).

6.3 Site stratigraphy

The majority of the site was covered in bare soil, grass and gravel except for the southern portion of the Clarkes hire yard which was paved in concrete. A thin layer of fill material or disturbed natural soil existed beneath the surface across the majority of the plant hire yard. It ranged in thickness from 0.1 to 0.4 metres thick. The fill comprised sandy clay with blue metal, bricks, concrete and wood chips. Beneath the fill was the natural soil profile comprising sandy clay and silty clay with calcium, quartz, orthoclase and manganese nodules. No odour was observed in any of these boreholes.

Soil across the greenfield section of the site comprised a natural sandy clay profile with quartz, amphibole, orthoclase, and manganese nodules.

No groundwater was intersected in any of the locations investigated to the depth tested.

7 APPLICATION OF RELEVANT GUIDELINES

A range of threshold guidelines have been derived (both locally and worldwide) covering concentrations of contaminants in soils.

Environmental Earth Sciences NSW refer to the NSW EPA (2006) *Contaminated sites: guidelines for the NSW site auditor scheme* (Reference 7) and the NSW EPA (1995) *Contaminated sites: sampling design guidelines* (Reference 10) as the recommended guidelines for contaminant level thresholds, sample selection and site coverage.

As this site will probably continue to be used for commercial/industrial landuse is considered that concentrations listed in the fourth column of Table 3 in this report are most applicable. Results will however also be compared to the guidelines for residential landuse (column one of Table 3).

For substances not listed in Reference 7 (i.e. benzene, toluene, ethyl benzene, xylene, TPH C_6-C_9 and C_{10}-C_{40}), the guidelines in the NSW EPA (1994) *Contaminated sites: guidelines for assessing service station sites* (Reference 8) are used which are presented in Table 4.

Soil requiring removal from site (if any) such as that requiring remediation or where stockpiled fill is removed from site, it will have to be classified in accordance with the NSW EPA (1997) *Environmental guidelines: Assessment, Classification and management of liquid and non-liquid wastes*.

TABLE 3 HEALTH BASED SOIL INVESTIGATION LEVELS (REFERENCE 7)

Substance	Health-based Soil Investigation Levels (mg/kg)			
	Standard Residential	High Density Residential	Parks & Open Spaces	Commercial & Industrial
Aldrin + Dieldrin	10	40	20	50
Arsenic (total)	100	400	200	500
Benzo (a) pyrene	1	4	2	5
Beryllium	20	80	40	100
Boron	3 000	12 000	6 000	15 000
Cadmium	20	80	40	100
Chlordane	50	200	100	250
Chromium (III)	12%	48%	24%	60%
Chromium (VI)	100	400	200	500
Cobalt	100	400	200	500
Copper	1 000	4 000	2 000	5 000
Cyanides (complexed)	500	2 000	1 000	2 500
DDT+DDD+DDE	200	800	400	1 000
Heptachlor	10	40	20	50
Lead	300	1 200	600	1 500
Manganese	1 500	6 000	3 000	7 500
Methyl mercury	10	40	20	50
Mercury (inorganic)	15	60	30	75
Nickel	600	2 400	600	3 000
Total PAH	20	80	40	100
PCBs (total)	10	40	20	50
Phenol	8 500	34 000	17 000	42 500
TPH $>C_{16}$-C_{35} aromatics	90	360	180	450
TPH $>C_{16}$-C_{35} aliphatics	5 600	22 400	11 200	28 000
TPH $>C_{35}$	56 000	224 000	112 000	280 000
Zinc	7 000	28 000	14 000	35 000

Notes:

1 Guidelines taken from NSW EPA (2006) Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (Reference 7)

2 Shading indicates most applicable criteria

TABLE 4 SOIL THRESHOLDS FOR SENSITIVE LAND USE (REFERENCE 8)

Analytes	Threshold concentrations	Sources
	(mg/kg dry wt)	
TPH: C_6-C_9	65[d]	-
TPH: C_{10}-C_{40}	1 000[e]	-
Benzene	1	ANZECC/NHMRC 1992
Toluene	1.4[g]/130[h]	Netherlands 1994
Ethyl benzene	3.1[i]/50[j]	Netherlands 1994
Total Xylene	14[k]/25[j]	Netherlands 1994
Total Lead	300	ANZECC/NHMRC 1992
Benzo(a)pyrene	1	ANZECC/NHMRC 1992
Total PAHs	20	ANZECC/NHMRC 1992

Notes:

1 [d] The TPH C6-C9 threshold concentration, i.e. 65 mg/kg, applies to soil containing 10% natural organic matter. This concentration has been calculated assuming the following:
2 that there has been a fresh spill of fuel
3 that the aromatic content of the petrol is 30%
4 that the resultant BTEX soils concentrations are at their lower thresholds.
5 The TPH C6-C9 concentrations above the relevant threshold may indicate that BTEX concentrations are above their thresholds. This threshold concentration should be interpreted as only an approximate potential indicator of contamination.
6 [e] The TPH C10-C40 threshold concentration is based on a consideration both of the Netherlands Intervention level for the TPH C10-C40 range and on commonly reported analytical detection limits. The Netherlands intervention value is 5,000 mg/kg dry weight.
7 g The toluene threshold concentration is the Netherlands MPC to protect terrestrial organisms in soil. This value was obtained by applying a US EPA assessment factors to terrestrial chronic No Observed Effect Concentration (NOEC) data. The MPC is an' indicative' value (Van de Plassche et al. 1993, Van de Plassche and Bockting 1993)
8 h Human health and ecological based protection level for toluene the threshold concentration presented here is the Netherlands intervention value for the protection of terrestrial organisms. Other considerations such as odours and the protection of groundwater may require a lower remediation criterion
9 I The ethyl benzene threshold concentration is the Netherlands MPC for the protection of terrestrial organisms in soil. No terrestrial ecotoxicological data could be found for use in the Netherlands criteria derivation. Therefore, equilibrium partitioning has been applied to the MPC for water to obtain estimates of the MPC for soil. The MPC for water has been derived from aquatic ecotoxicological data (Van de Plassche et al. 1993, Van de Plassche and Bockting 1993)
10 j Human health based protection level for ethyl benzene or total xylenes as shown. The threshold concentration presented here is the Netherlands intervention value. Other considerations such as odours and the protection of groundwater may require a lower remediation criterion
11 k The xylene threshold concentration is the Netherlands MPC for the protection of terrestrial organisms in soil. No terrestrial ecotoxicological data could be found for use in the Netherlands criteria derivation. Therefore, equilibrium partitioning has been applied to the MPC for water to obtain estimates of the MPC for soil. The MPC for water has been derived from aquatic ecotoxicological data. The concentration shown applies to total xylenes and is based on the arithmetic average of the individual xylene MPCs. (Van de Plassche et al. 1993, Van de Plassche and Bockting 1993)

TABLE 5 NSW EPA (1999) LANDFILL DISPOSAL CRITERIA

	Maximum values of total *concentration* for classification without TCLP		
	Inert waste	**Solid waste**	**Industrial Waste**
Chemical	**Total Concentration**	**Total Concentration**	**Total Concentration**
Benzene	1	10	40
Lead	10	100	400
PAHs (total)	200	200	800
TPH fraction $C_6 – C_9$	650	650	2600
TPH fraction $C_{10} – C_{36}$	5000	10000	40000
Phenol (non halogenated)	28.8	288	1152
Toluene	28.8	288	1152
Xylenes (total)	100	1000	4000

Notes:

1. totals concentrations expressed as mg/kg on a dry weight basis;
2. N/A = not applicable as classification based on total concentration (TC), or in the case of total PAH based on the levels of benzo(a)pyrene;
3. - = no waste criteria; and
4. where waste classifications exceed the industrial waste criteria, the waste is classified as hazardous.

8 LABORATORY ANALYSIS

8.1 Basis for selection of laboratory samples

Visual observations, the presence of odour (if any), stratigraphy and the location relative to potentially contaminating site infrastructure were taken into account in order to select soil samples for analysis.

Discrete soil samples from the greenfield portion of the site having a similar texture and from similar stratigraphic position and location on the site were composited for heavy metal and pesticide analysis. The following samples were composited:

- BHe3 and BHe8 – Comp 1
- BHe9 and BHe16 – Comp 2
- BHe15 and BHe20 – Comp 3
- BHe19 and BHe18 – Comp 4
- BHe17 and BHe21 – Comp 5
- BHe22 and BHe23 – Comp 6
- BHe24 and BHe27 – Comp 7
- BHe25 and BHe26 – Comp 8
- BHe29 and BHe30 – Comp 9
- BHe28 and BHe31 – Comp 10

All analyses (including one field blind duplicate) conducted for this project were undertaken by the National Measurement Institute (NMI) and Sydney analytical Laboratories (SAL). Laboratory transcripts are presented in Appendix B.

8.2 Analyses undertaken

Eleven discrete soil samples, ten composite samples and five stockpile samples were analysed for heavy metals (copper, lead, zinc, cadmium, chromium, nickel, arsenic and mercury). Ten composite samples were also analysed for pesticides (organophosphate and organochlorine) and five stockpile samples were analysed for petroleum hydrocarbons. Twelve soil samples (including one bund sample beneath the diesel tank) were analysed for a selection of petroleum hydrocarbons (TPH); benzene, toluene, ethylbenzene and xylene (BTEX); polycyclic aromatic hydrocarbons (PAH) and pesticides (organochlorine and organophosphate).

8.3 Laboratory results

The results of soil inorganic and organic analysis are summarised in Tables 6 and 7 respectively. The concentrations of analytes are compared in the tables to the selected site criteria. Laboratory transcripts are provided in Appendix B.

9 DISCUSSION OF RESULTS

9.1 Soil

Results of the investigation revealed slightly elevated concentrations of organochlorine pesticides in soil beneath the greenfield area of the site where orchards were formerly located. Concentrations of pesticides in the soil samples analysed across the entire site were below the guidelines for commercial, industrial and residential landuse.

Concentrations of petroleum hydrocarbons were identified in two locations beneath Clarke's plant hire (BHe7 0-0.3m and BHe33 0-0.2m) however were below the adopted site criteria for commercial, industrial and residential landuse.

Concentrations of petroleum hydrocarbons within the soil bund beneath the above ground diesel tank in the Clarke's plant hire yard were above the adopted site criteria. As such this soil should be excavated and the excavation validated and backfilled with clean validated material prior to the site being deemed suitable for future commercial, industrial or residential landuse. Following excavation, this soil could be bioremediated on site before being used to backfill the excavation or it could be disposed of as industrial waste at a landfill licensed to accept this category of waste.

All other concentrations or organic compounds and heavy metals analysed in the soil samples collected (including the fill material stockpiled on site) were below the adopted site criteria for commercial, industrial and residential landuse. As such, following the remediation of the impacted soil beneath the above ground tank the site would be suitable for continued commercial or industrial use and if all fuel storage tanks were removed the site would be suitable for residential landuse (so long as these landuses are within the sites zoning).

9.2 Waste classification

As stated in the previous section, the soil beneath the above ground diesel tank is classified as industrial waste for waste disposal purposes.

All other fill materials tested to date, including the stockpiled fill material is currently classified as solid waste for waste disposal purposes. This classification may be reduced to inert waste following additional laboratory procedures (TCLP analysis).

All soil to be disposed of offsite must be disposed of at a landfill licensed to accept the waste category to be disposed.

10 CONCLUSION AND RECOMMENDATIONS

Environmental Earth Sciences NSW undertook a preliminary environmental site investigation of Lots 4 and 5 in DP838537 on the corner of Pat O'Leary Drive and the Great Western Highway, Kelso, NSW in 2005. At the owners request, we were asked to further evaluate the potential sources of contamination identified in the preliminary site investigation.

This detailed site investigation comprised soil sampling across the site on 17 and 18 January 2008. Selected soil samples were then submitted for analysis for the potential chemicals of concern identified in the preliminary site investigation. Results revealed that petroleum

impacted soil beneath the diesel tank should be remediated prior to it being deemed suitable for commercial, industrial or residential landuse. Concentrations of chemicals of concern were below the guidelines for commercial, industrial and residential landuse in all other soil samples analysed.

Environmental Earth Sciences NSW can provide a price to manage the remediation of petroleum hydrocarbon impacted soil beneath the above ground diesel (including a brief remedial action plan) tank if required. We can also provide a validation letter following successful remediation, stating that the site is suitable for commercial, industrial and residential landuse.

11 LIMITATIONS

This report has been prepared by Environmental Earth Sciences NSW ABN 109 404 006 in response to and subject to the following limitations:

1. The specific instructions received from Magnet Mart Pty Ltd;
2. The specific scope of works set out in PO107247 issued by Environmental Earth Sciences NSW for and on behalf of Magnet Mart Pty Ltd, a copy of the scope of works is provided in Section 1.2;
3. May not be relied upon by any third party not named in this report for any purpose except with the prior written consent of Environmental Earth Sciences NSW (which consent may or may not be given at the discretion of Environmental Earth Sciences NSW);
4. This report comprises the formal report, documentation sections, tables, figures and appendices as referred to in the index to this report and must not be released to any third party or copied in part without all the material included in this report for any reason;
5. The report only relates to the site referred to in the scope of works being located at Lots 4 and 5 in DP838537 on the corner of Pat O'Leary Drive and the Great Western Highway, Kelso, New South Wales ("the site");
6. The report relates to the site as at the date of the report as conditions may change thereafter due to natural processes and/or site activities;
7. No warranty or guarantee is made in regard to any other use than as specified in the scope of works and only applies to the depth tested and reported in this report;
8. Fill, soil, groundwater and rock to the depth tested on the site may be fit for the use specified in this report. Unless it is expressly stated in this report, the fill, soil and/or rock may not be suitable for classification as clean fill if deposited off site; and
9. The general limitations which are attached to this report.

12 REFERENCES

1. Geological Society of NSW — 1:250 000 Geological Series, Bathurst New South Wales Sheet 155-8.
2. Environmental Earth Sciences NSW (2005) — *Preliminary site investigation of Lots 4 and 5 in DP 838537, corner of Great Western Highway and Pat O'Leary Drive, Kelso, New South Wales*;

3. Environmental & Earth Sciences Pty Ltd (2005) — Soil, gas and groundwater sampling manual;
4. Kovac, M & Lawrie, J A (1990) — *Soil landscapes of the Bathurst 1:250 000 sheet*, Soil Conservation Service of NSW, Sydney.
5. National Environment Protection Council (1999) — National Environment Protection (Assessment of Site Contamination) Measure (NEPM);
6. National Environmental Health Forum (NEHF) (1996) — Health-based soil investigation levels;
7. NSW Department of Environment and Conservation (2006) — Contaminated sites: guidelines for the NSW site auditor scheme;
8. NSW Environment Protection Authority (1994) — Contaminated sites: guidelines for assessing service station sites;
9. NSW Environment Protection Authority (1997) — Contaminated sites: guidelines for consultants reporting on contaminated sites;
10. NSW Environmental Protection Authority (1995) — Contaminated sites: sampling design guidelines; and
11. Standards Australia AS 4482.1 (1997) — Guide to the sampling and investigation of potentially contaminated soil.

13 GLOSSARY OF TERMS

The following descriptions are of terms used in the text of this report.

Borehole an uncased well drill hole.

Clay Soil material composed of particles finer than 0.002 mm. When used as a soil texture group such soils contain at least 35% clay

Composite sample bulking and thorough mixing of soil samples collected from more than one sampling location to form a single soil sample for chemical analysis.

Discrete sample samples collected from different locations and depths that will not be composited but analysed individually.

Heavy Metals heavy metals comprise all metallic elements whose atomic mass exceeds that of calcium (20) and for the purpose of this report include lead (Pb), copper (Cu), Zinc (Zn), cadmium (Cd), chromium (Cr), nickel (Ni), arsenic (As) and Mercury (Hg).

Mottled masses, blobs or blotches of sub-dominant colours with varying value/chroma (colour grades) in the soil matrix.

Organics chemical compounds comprising atoms of carbon, hydrogen and others (commonly oxygen, nitrogen, phosphorous, sulphur). Opposite is inorganic, referring to chemical species not containing carbon.

Organochlorine pesticides synthetic organic chemicals which are persistent and may bioaccumulate along the food chain.

pH logarithmic index for the concentration of hydrogen ions in an aqueous solution, which is used as a measure of acidity. The activity of hydrogen ions is of great importance in many reactions involving dissolved substances. Therefore the pH value determines the solubility of many elements.

Phytotoxicity toxic concentration of a substance that is associated with symptoms of toxicity or reduced vigour, growth, and production of a plant.

Representative Sample sample that is assumed not to be significantly different than the population of samples available. In many investigations samples are often collected to represent the worst case situation.

Texture is the size of particles in the soil. Texture is divided into six groups, depending on the amount of coarse sand, fine sand, silt and clay in the soil.

Topsoil part of the soil profile, typically the A1 horizon, containing material which is usually darker, more fertile and better structured than the underlying layers.

GENERAL LIMITATIONS

Scope of services

The work presented in this report is Environmental Earth Sciences response to the specific scope of works requested by, planned with and approved by the client. It cannot be relied on by any other third party for any purpose except with our prior written consent. Client may distribute this report to other parties and in doing so warrants that the report is suitable for the purpose it was intended for. However, any party wishing to rely on this report should contact us to determine the suitability of this report for their specific purpose.

Problems with interpretation by others

Advice and interpretation is provided on the basis that subsequent work will be undertaken by Environmental Earth Sciences NSW. This will identify variances, maintain consistency in how data is interpreted, conduct additional tests that may be necessary and recommend solutions to problems encountered on site. Other parties may misinterpret our work and we cannot be responsible for how the information in this report is used. If further data is collect4ed or comes to light we reserve the right to alter their conclusions.

Data should not be separated from the report

A report is provided inclusive of all documentation sections, limitations, tables, figures and appendices and should not be provided or copied in part without all supporting documentation for any reason, because misinterpretation may occur.

Obtain regulatory approval

The investigation and remediation of contaminated sites is a field in which legislation and interpretation of legislation is changing rapidly. Our interpretation of the investigation findings should not be taken to be that of any other party. When approval from a statutory authority is required for a project, that approval should be directly sought by the client.

Subsurface conditions change

Understanding an environmental study will reduce exposure to the risk of the presence of contaminated soil and or groundwater. However, contaminants may be present in areas that were not investigated, or may migrate to other areas. Analysis cannot cover every type of contaminant that could possibly by present. When combined with field observations, field measurements and professional judgement, this approach increases the probability of identifying contaminated soil and or groundwater. Under no circumstances can it be considered that these findings represent the actual condition of the site at all points.

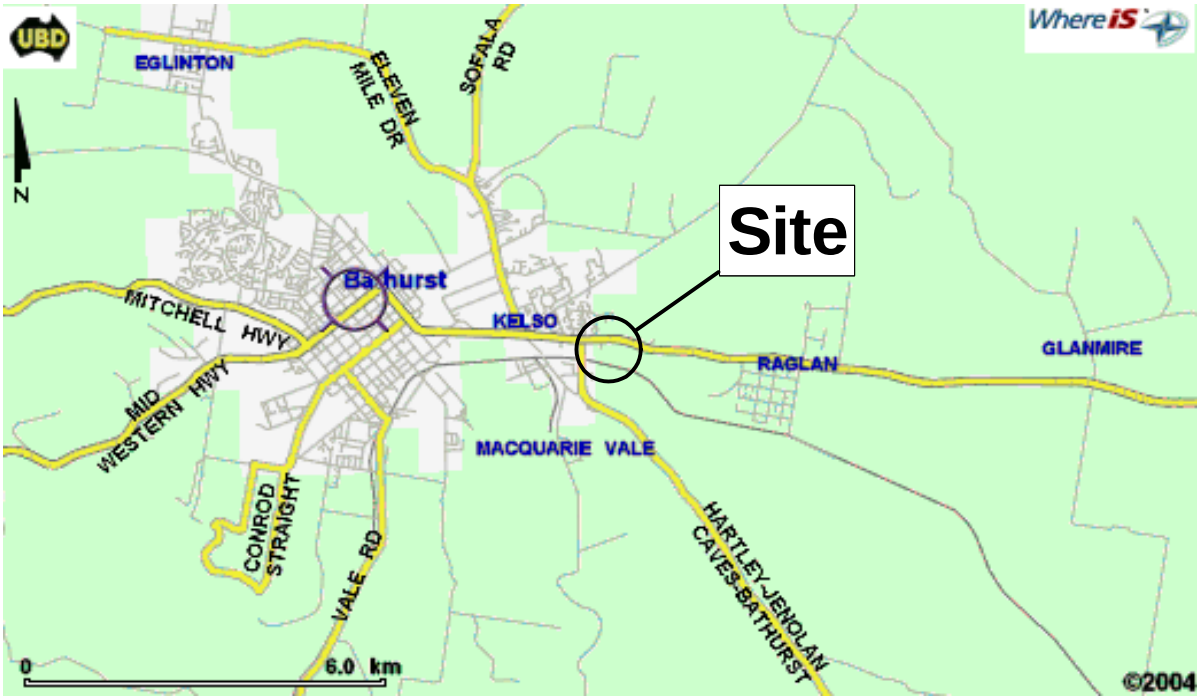
Environmental studies identify actual sub-surface conditions only at those points where samples are taken, when they are taken. Actual conditions between sampling locations differ from those inferred because no professional, no matter how qualified, and no sub-surface exploration program, no matter how comprehensive, can reveal what is hidden below the ground surface. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from that predicted. Nothing can be done to prevent the unanticipated. However, steps can be taken to help minimize the impact. For this reason, site owners should retain our services.

Limit of liability

This study has been carried out to a particular scope of works at a specified site and should not be used for any other purpose. This report is provided on the condition that Environmental Earth Sciences NSW disclaims all liability to any person or entity other than the client in respect of anything done or omitted to be done and of the consequence of anything done or omitted to be done by any such person in reliance, whether in whole or in part, on the contents of this report. Furthermore, Environmental Earth Sciences NSW disclaims all liability in respect of anything done or omitted to be done and of the consequence of anything done or omitted to be done by the client, or any such person in reliance, whether in whole or any part of the contents of this report of all matters not stated in the brief outlined in Environmental Earth sciences NSW's proposal number and according to Environmental Earth Sciences general terms and conditions and special terms and conditions for contaminated sites.

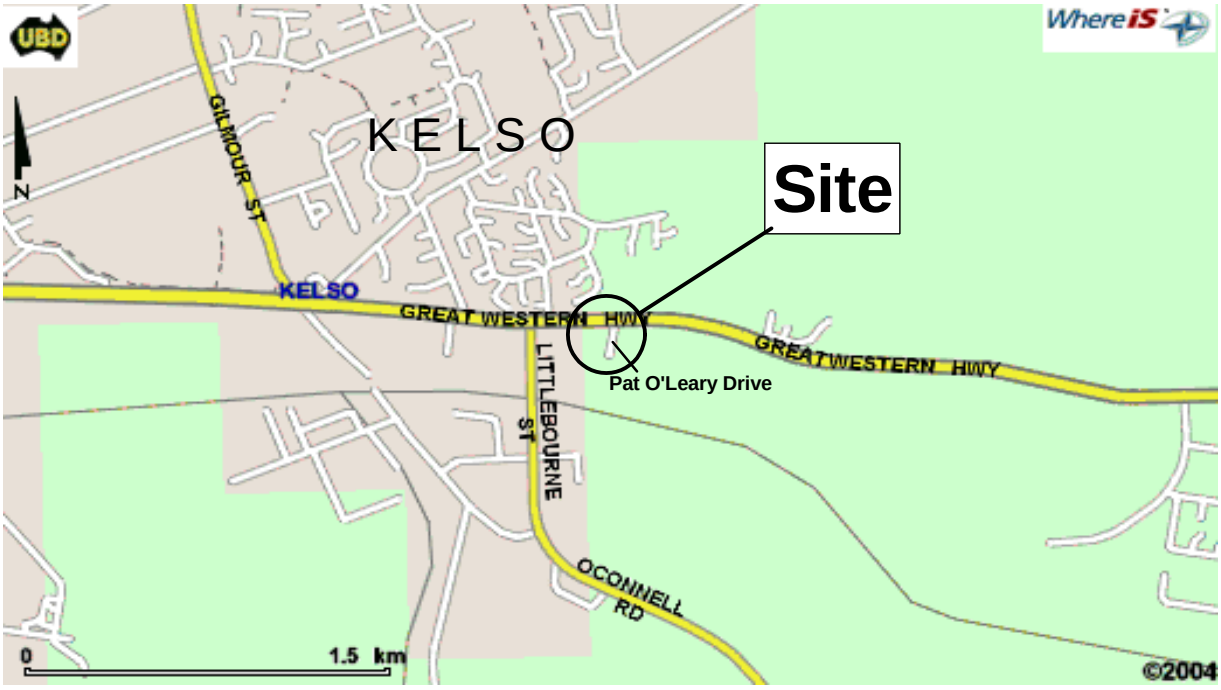
To the maximum extent permitted by law, we exclude all liability of whatever nature, whether in contract, tort or otherwise, for the acts, omissions or default, whether negligent or otherwise for any loss or damage whatsoever that may arise in any way in connection with the supply of services. Under circumstances where liability cannot be excluded, such liability is limited to the value of the purchased service.

FIGURES



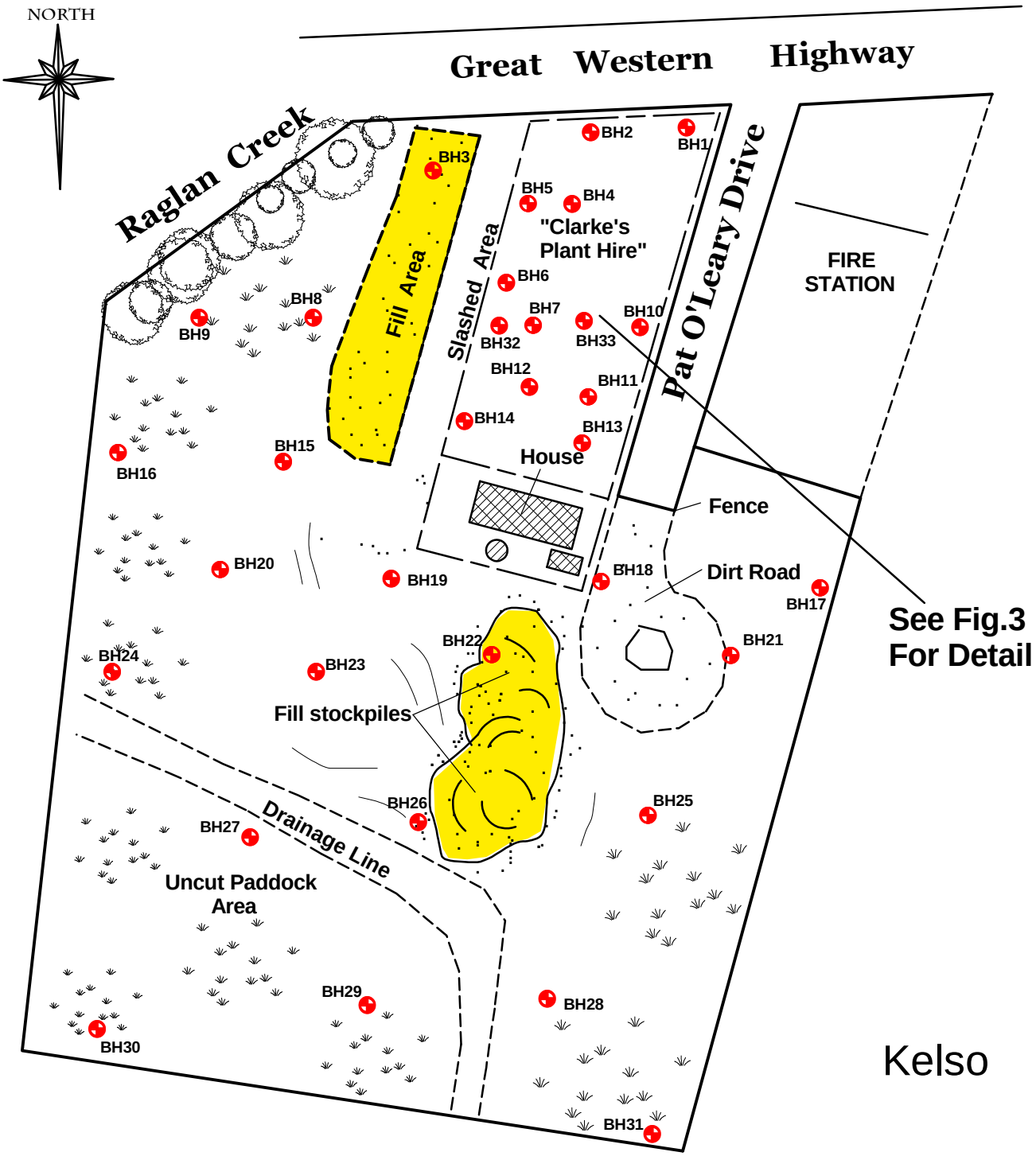
Regional Locality Plan

Reference: Sensis sites.com "Where Is" on line.



Site Location: Kelso,NSW

ENVIRONMENTAL EARTH SCIENCES THE KNOW AND THE HOW	Title: Site Locality Plan	
	Location: Lots 4&5, DP.838537 Cnr. Great Western Hwy. & Pat O'Leary Drive, Kelso, Bathurst, NSW	
Client: Magnet Mart		Job number: 107134
Drawn by: TRJ	Scale: As shown	Source: Sensis site
Proj Man: MC	Date: 1 Feb 2008	Figure 1



Major Site Features

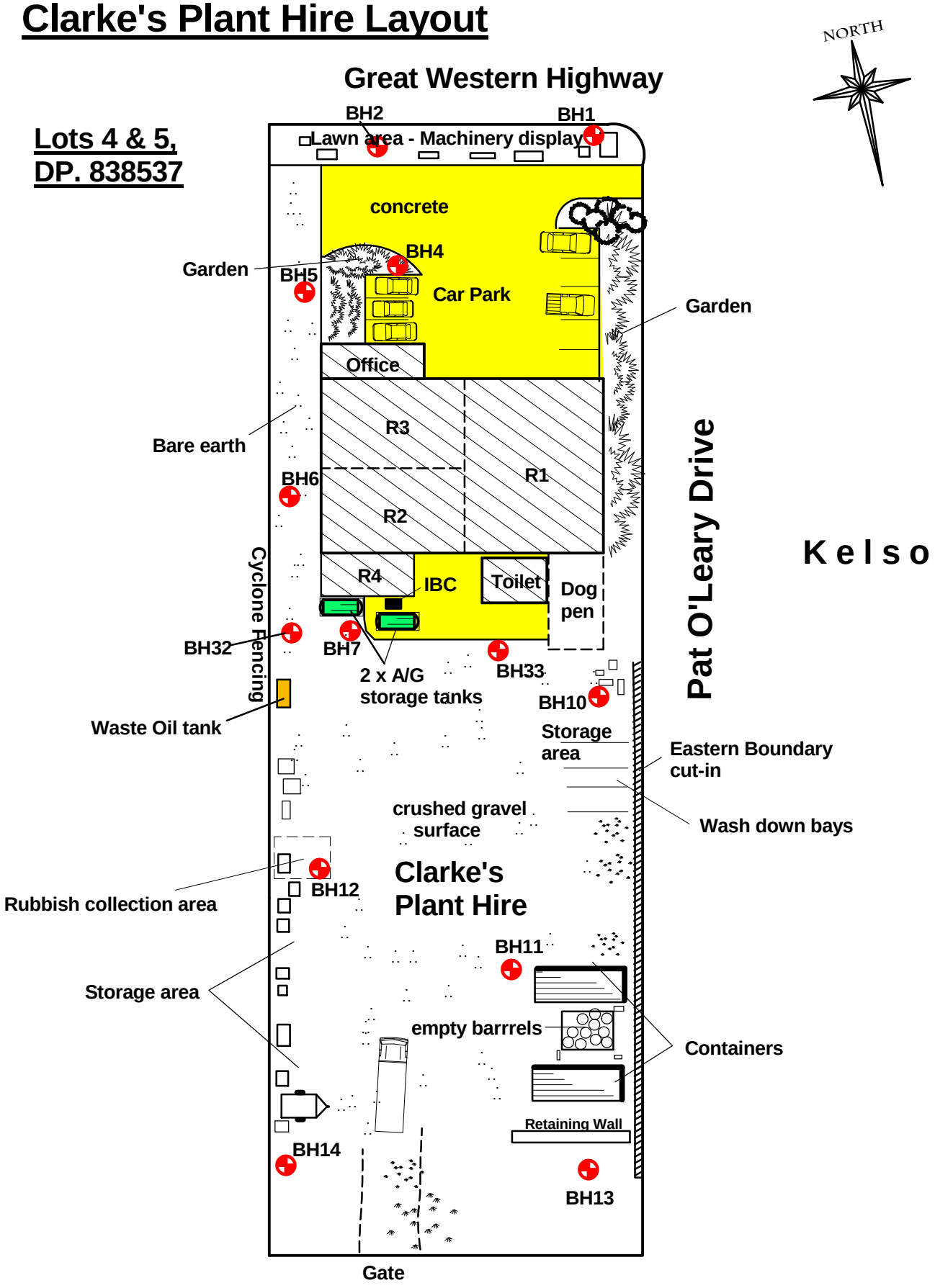
Legend:

- Borehole locations by Environmental Earth Sciences (2008)

Schematic Only - Not to scale

ENVIRONMENTAL EARTH SCIENCES THE KNOW AND THE HOW	Title: Major Site Features	
	Location: Lots 4 & 5, DP.638537 Cnr. Great Western Hwy. & Pat O'Leary Drive, Kelso, Bathurst, NSW	
Client: Magnet Mart		Job number: 107134
Drawn by: TRJ	Scale: Schematic	Source: Field Invest.
Proj Man: MC	Date: 1 Feb 2008	Figure 2

Clarke's Plant Hire Layout



Schematic Only - Not to scale

ENVIRONMENTAL EARTH SCIENCES THE KNOW AND THE HOW	Title: Clarke's Plant Hire Layout	
	Location: Lots 4&5, DP.838537 Cnr. Great Western Hwy. & Pat O'Leary Drive, Kelso,Bathurst,NSW	
Client: Magnet Mart		Job number: 107134
Drawn by: TRJ	Scale: Schematic	Source: Field Invest.
Proj Man: MC	Date: 1 Feb 2008	Figure 3

TABLES

TABLE 6 INORGANIC SOIL RESULTS

Sample	Depth (m)	Cu	Pb	Zn	Cd	Cr	Ni	As	Hg	Waste Classification
Comp 1	-	10.0	16	62	<1	30	12	7	<0.01	Solid
Comp 2	-	14.0	16	48	<1	38	12	6	<0.01	Solid
Comp 3	-	16.0	14	42	<1	24	10	6	<0.01	Solid
Comp 4	-	16.0	20	44	<1	26	10	6	<0.01	Solid
Comp 5	-	12.0	18	94	<1	40	20	8	<0.01	Solid
Comp 6	-	20	18	52	<1	30	12	7	<0.01	Solid
Comp 7	-	16.0	14	26	<1	40	6	6	<0.01	Solid
Comp 8	-	12.0	20	41	<1	28	10	6	<0.01	Solid
Comp 9	-	30.0	20	36	<1	38	10	5	<0.01	Solid
Comp 10	-	28.0	14	30	<1	32	8	4	<0.01	Solid
SP1/1	-	7.0	10.0	30	<0.5	16	9.0	3.0	<0.005	Solid
SP2/1	-	11.0	9.0	22	<0.5	11	5.0	2.5	0.005	Solid
SP3/1	-	9.0	10.0	50	<0.5	14	8.0	3.5	<0.005	Solid
SP4/1	-	5.0	13.0	33	<0.5	9.0	3.0	3.0	<0.005	Solid
SP5/1	-	9.0	14.0	38	<0.5	13	6.0	4.0	<0.005	Solid
BHe32	0-0.1	9.0	13.0	45	<0.5	14	12.0	4.0	<0.005	Solid
BHe7	0-0.3	16.0	36.0	140	<0.5	17	10.0	5.0	<0.005	Solid
BHe33	0-0.2	9.0	12.0	55	<0.5	13	11.0	4.5	<0.005	Solid
BHe33	0.8-1.0	5.0	10.0	21	<0.5	16	7.0	3.0	<0.005	Solid
BHe13	0-0.1	11.0	13.0	68	<0.5	18	16.0	4.5	<0.005	Solid
BHe14	0-0.2	7.0	16.0	45	<0.5	12	4.0	4.0	<0.005	Solid
BHe5	0.8-1.0	6.0	11.0	15	<0.5	9.0	3.0	2.0	<0.005	Solid
BHe4	0.1-0.2	9.0	10.0	45	<0.5	11	5.0	3.0	<0.005	Solid
BHe10	0.1-0.3	13.0	44.0	59	<0.5	16	11.0	3.5	<0.005	Solid
BHe12	0.15-0.25	7.0	15.0	59	<0.5	13	5.0	3.5	<0.005	Solid
BHe1	0-0.25	8.0	12.0	33	<0.5	11	4.0	4.0	<0.05	Solid
Site criteria		1000	300	7000	20	100	600	100	10	
Waste Classification without TCLP										
Inert		-	10	-	2	10	4	10	0.4	
Solid		-	100	-	20	100	40	100	4	

Notes:
Concentrations in mg/kg
All composite results have been multiplied by 2 (the number of discrete samples making up each composite)

TABLE 7 ORGANIC SOIL RESULTS

SAMPLE REFERENCE	Comp 1	Comp 2	Comp 3	Comp 4	Comp 5	Comp 6	Comp 7	Comp 8	Comp 9	Comp 10	SP1.1	SP2.1	SP3.1	SP4.1	SP5.1	Site Criteria	Solid Waste Classification Limits
Depth (metres)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Heptachlor	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	10	-
DDD+DDT+DDE	0.068	ND	ND	0.032	0.102	0.306	0.332	0.556	2.656	0.8	-	-	-	-	-	200	50
Total organophosphate pesticides	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons																	
TPH C_6 - C_9	-	-	-	-	-	-	-	-	-	-	<25	<25	<25	<25	<25	65	650
TPH C_{10} - C_{14}	-	-	-	-	-	-	-	-	-	-	<50	<50	<50	<50	<50	-	-
TPH C_{15} - C_{28}	-	-	-	-	-	-	-	-	-	-	<100	<100	<100	<100	<100	-	-
TPH C_{29} - C_{36}	-	-	-	-	-	-	-	-	-	-	<100	<100	<100	<100	<100	-	-
TPH C_{10}-C_{36}	-	-	-	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	1000	10000

Notes:
Concentrations in mg/kg
ND = non detectable
All composite results have been multiplied by 2 (the number of discrete samples making up each composite)

TABLE 7 (CONTINUED) ORGANIC SOIL RESULTS

SAMPLE REFERENCE	BHe32	BHe7	BHe33	BHe33	BHe13	BHe14	BHe5	BHe4	BHe10	BHe12	BHe	Bund	Site Criteria	Solid waste classification
Depth (metres)	**0-0.1**	**0-0.3**	**0-0.2**	**0.8-1.0**	**0-0.1**	**0-0.2**	**0.8-1.0**	**0.1-0.2**	**0.1-0.3**	**0.15-0.25**	**0-0.25**	**-**		
Poly Aromatic Hydrocarbons														
Benzo(a)pyrene	<1	<1	<1	<1	-	-	<1	<1	<1	<1	<1	<1	1	0.08
Total PAHs	ND	ND	ND	ND	-	-	ND	ND	ND	ND	ND	ND	20	200
Heptachlor	ND	-	-	-	ND	ND	-	-	-	-	-	-	10	-
DDD+DDT+DDE	ND	-	-	-	ND	ND	-	-	-	-	-	-	200	-
Total organophosphate pesticides	ND	-	-	-	ND	ND	-	-	-	-	-	-	-	-
BTEX														
Benzene	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	<0.5	1	10
Toluene	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	<0.5	130	288
Ethyl Benzene	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	<0.5	50	600
Total Xylene	ND	ND	ND	ND	-	-	-	-	-	-	-	ND	25	1000
Total Petroleum Hydrocarbons														
TPH C_6 - C_9	<25	<25	<25	<25	-	-	<25	<25	<25	<25	-	<25	65	650
TPH C_{10} - C_{14}	<50	140	<50	<50	-	-	<50	<50	<50	<50	-	390	-	
TPH C_{15} - C_{28}	<100	1800	1400	<100	-	-	<100	<100	<100	<100	-	17000	-	
TPH C_{29} - C_{36}	<100	<100	<100	<100	-	-	<100	<100	<100	<100	-	<100	-	
TPH C_{16} – C_{35} Aliphatic	-	2500	2500	-	-	-	-	-	-	-	-	**24000**	5600	10000
TPH C_{16} – C_{35} Aromatic	-	<100	<100	-	-	-	-	-	-	-	-	**800**	90	

Notes:
Concentrations in mg/kg
ND = non detectable

TABLE 8 SURFACE SAMPLE DESCRIPTIONS

Sample	Fill/ Natural	Density	Colour	Soil type	Features	Moisture	pH
Bhe3	Natural	Stiff	Brown	Sandy clay	20% pebbles and roots	Dry	-
Bhe8	Natural	Stiff-very stiff	Brown with orange black mottles	Sandy clay	20% gravel	Dry	-
Bhe9	Natural	Hard	Brown	Sandy clay	30% pebbles	Dry	-
Bhe15	Disturbed natural	Firm	Brown	Sandy clay	5% quartz and orthoclase	Dry	7
Bhe16	Natural	Very stiff	Brown with red mottles	Sandy clay	Quartz fragments	Dry	-
Bhe17	Fill	Dense	Orange/ pink/ brown	Sandy clay	<15% fine gravel	Dry	-
Bhe18	Natural	Very stiff	Brown with orange mottles	Clay	-	Dry	-
Bhe19	Natural	Very stiff	Brown with orange mottles	Clay	Manganese (Mn)/ Charcoal nodules	Dry	-
Bhe20	Natural	Medium density	Dark brown	Clay	-	Dry	-
BH21e	Natural	Soft	Red brown	Sandy clay	5% quartz, orthoclase and Mn nodules	Dry	7
Bhe23	Natural	Very dense	Light/dark brown	Clay	<5% gravel and Mn nodules	Dry	-
Bhe23	Disturbed natural	Soft	Grey/ brown	Sandy clay	Roots and orthoclase	Dry	6.5
Bhe24	Disturbed natural	Soft	Brown	Sandy clay	Roots and orthoclase	Dry	6.5
Bhe25	Natural	Stiff	Red brown	Clay	5% quartz	Dry	-
Bhe26	Natural	Soft	Light brown	Sandy clay	-	Dry	-
Bhe27	Natural	Stiff	Grey brown	Clay	<5% quartz gravel	Dry	-
Bhe28	Natural	Soft	Yellow brown	Clay	<5% quartz gravel	Dry	-
Bhe29	Natural	Stiff	Red brown	Clay	5% quartz	Dry	-
Bhe30	Natural	Soft	Yellow brown	Clay	<5% quartz gravel	Dry	-
Bhe31	Disturbed natural	Soft	Brown	Sandy clay	Roots and 5% orthoclase	Dry	6

TABLE 9 STOCKPILE SAMPLE DESCRIPTIONS

Stockpile	Fill/ Natural	Density	Colour	Soil type	Features	Moisture	pH
SP1-1	Fill	Firm	Brown	Sandy Clay	Quartz gravel (10%) basalt road metal (20%)	Dry	6
SP1-2	Fill	Firm	Brown	Sandy Clay	Basalt road metal (20%)	Dry	6
SP2-1	Fill	Soft	Brown	Sandy Clay	<5% Basalt road metal	Dry	5.5
SP2-2	Fill	Soft	Brown/ Grey	Sandy Clay	Concrete cobbles <5%	Dry	5
SP2-3	Fill	Soft	Brown/ Grey	Sandy Clay	Concrete cobbles <5%	Dry	6
SP3	Fill	Soft	Brown	Sandy Clay	Vegetation growing (10%), 5% bitumen	Dry	6.5
SP4-1	Fill	Soft	Dark Brown	Sandy Clay	Vegetation (30%) Quartz gravel (5%)	Dry	7.5
SP4-2	Fill	Soft	Red Brown	Sandy Clay	Concrete cobbles (20%) Vegetation (10%), Quartz gravel (10%)	Dry	6.5
SP5-1	Fill	Soft	Brown	Sandy Clay	Concrete cobbles (50%), growing vegetation	Dry	7
SP5-2	Fill	Soft	Brown/ Grey	Sandy Clay	Concrete gravel through to boulders (50%), wood fragments, metal rods	Dry	6
SP6	Fill	Very loose	Light grey	Sandy Clay	20% gravel	Dry	Fill

N.B. No odour was recorded at any location

APPENDIX A GEOLOGICAL BORELOGS

LOCATION: Pat O'Leary Drive	JOB No. 107134	BOREHOLE LOG: BHe1	LOGGED BY:
EASTING:	DRILL TYPE: Pushtube/SF Auger		A. McFarlane
NORTHING:	DATE STARTED: 17/01/2008	CLIENT: Magnet Mart	APPROVED:
ELEVATION: 1.954 mAHD	DATE FINISHED: 17/01/2008		

Sample: Disturbed; Undisturbed
Moisture: M =Moist D =Dry W =Wet
Groundwater: Water strike; SWL during drilling

PAGE #: 1/1

Depth metres	STRATIGRAPHY	GRAPHIC LOG	SAMPLES Type	Moisture	pH	PID (ppm)	COMMENTS
0	Fill, medium density, light brown, fine grained sandy clay, brick and blue metal gravel			D	7		No odour throughout
.2							
.4	Natural, medium density, dark brown, silty sandy clay with 5% quartz (<1mm)			D	6		
.6							
.8	Natural, medium dsensity, brown, fine sandy clay with 5% quartz gravel			D	6.5		
1	1.1 becoming red						
1.2	Natural, medium density, light brown/ red fine sandy clay with 5% quartz and Mn nodules						
1.4							
1.6							
1.8				D	6		
2	End of hole @ 2.0m target depth						
2.2							
2.4							
2.6							
2.8							
3							
3.2							
3.4							
3.6							
3.8							
4							

ENVIRONMENTAL EARTH SCIENCES
THE KNOW AND THE HOW

LOCATION: Pat O'Leary Drive	JOB No. 107134	BOREHOLE LOG: BHe2	LOGGED BY:
EASTING:	DRILL TYPE: Pushtube/SF Auger		A. McFarlane
NORTHING:	DATE STARTED: 17/01/2008	CLIENT: Magnet Mart	APPROVED:
ELEVATION: 1.954 mAHD	DATE FINISHED: 17/01/2008		

Sample: Disturbed; Undisturbed
Moisture: M =Moist D =Dry W =Wet
Groundwater: Water strike; SWL during drilling

PAGE #: 1 / 1

Depth metres	STRATIGRAPHY	GRAPHIC LOG	SAMPLES Type	Moisture	pH	PID (ppm)	COMMENTS
0	Fill, soft, dark brown, sandy clay with organic matter and blue metal			DM	8		No odour throughout
.2	Fill, soft, brown, sandy clay with quartz and orthoclase			DM	7.5		
.4	Crushed concrete						
.6	Natural, medium density, brown grading to yellow/ red sandy clay with quartz and roots			D	8		
.8							
1	Natural, soft, dark brown, sandy clay with quartz			DM	7.5		
	End of hole @ 1.0m target depth						
1.2							
1.4							
1.6							
1.8							
2							
2.2							
2.4							
2.6							
2.8							
3							
3.2							
3.4							
3.6							
3.8							
4							

ENVIRONMENTAL EARTH SCIENCES
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LOCATION: Pat O'Leary Drive	JOB No. 107134	BOREHOLE LOG: BHe4	LOGGED BY:
EASTING:	DRILL TYPE: Pushtube/SF Auger		A. McFarlane
NORTHING:	DATE STARTED: 17/01/2008	CLIENT: Magnet Mart	APPROVED:
ELEVATION: 1.954 mAHD	DATE FINISHED: 17/01/2008		

Sample
Disturbed
Undisturbed
Moisture
M =Moist D =Dry W =Wet

Groundwater
Water strike
SWL during drilling

PAGE #: 1 / 1

Depth metres	STRATIGRAPHY	GRAPHIC LOG	SAMPLES Type	Moisture	pH	PID (ppm)	COMMENTS
0	Fill, wood chips						No odour throughout
.2	Disturbed natural, soft, dark brown, silty clay with charcoal and quartz			DM			
.4	Natural, soft, dark brown, clay with 20% quartz 0.4 Decreasing quartz %			DM	8.5		
.6	Natural, soft, dark brown, sandy clay (medium grained) with 5% quartz						
.8	0.8 Grading to red brown						
1	End of hole @ 0.8m target depth						
1.2							
1.4							
1.6							
1.8							
2							
2.2							
2.4							
2.6							
2.8							
3							
3.2							
3.4							
3.6							
3.8							
4							

ENVIRONMENTAL EARTH SCIENCES
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LOCATION: Pat O'Leary Drive	JOB No. 107134	BOREHOLE LOG: BHe4	LOGGED BY:
EASTING:	DRILL TYPE: Pushtube/SF Auger		A. McFarlane
NORTHING:	DATE STARTED: 17/01/2008	CLIENT: Magnet Mart	APPROVED:
ELEVATION: 1.954 mAHD	DATE FINISHED: 17/01/2008		

Sample
Disturbed
Undisturbed
Moisture
M =Moist D =Dry W =Wet

Groundwater
Water strike
SWL during drilling

PAGE #: 1 / 1

Depth metres	STRATIGRAPHY	GRAPHIC LOG	SAMPLES Type	Moisture	pH	PID (ppm)	COMMENTS
0	Fill, wood chips						No odour throughout
.2	Disturbed natural, soft, dark brown, silty clay with charcoal and quartz			DM			
.4	Natural, soft, dark brown, clay with 20% quartz 0.4 Decreasing quartz %			DM	8.5		
.6	Natural, soft, dark brown, sandy clay (medium grained) with 5% quartz						
.8	0.8 Grading to red brown						
1	End of hole @ 0.8m target depth						
1.2							
1.4							
1.6							
1.8							
2							
2.2							
2.4							
2.6							
2.8							
3							
3.2							
3.4							
3.6							
3.8							
4							

ENVIRONMENTAL EARTH SCIENCES
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LOCATION: Pat O'Leary Drive	JOB No. 107134	BOREHOLE LOG: BHe6	LOGGED BY:
EASTING:	DRILL TYPE: Pushtube/SF Auger		A. McFarlane
NORTHING:	DATE STARTED: 17/01/2008	CLIENT: Magnet Mart	APPROVED:
ELEVATION: 1.954 mAHD	DATE FINISHED: 17/01/2008		

Sample: Disturbed; Undisturbed
Moisture: M =Moist D =Dry W =Wet
Groundwater: Water strike; SWL during drilling

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Depth metres	STRATIGRAPHY	GRAPHIC LOG	SAMPLES Type	Moisture	pH	PID (ppm)	COMMENTS
0	Fill, firm, brown, sandy clay with blue metal gravel			D	8.5		No odour throughout
.2	Natural, hard, red brown, clay with yellow nodules, quartz pieces and Mn nodules and feldspars			D	6.5		No groundwater encountered throughout
.4							
.6	Natural, firm, dark brown, clay with quartz <2mm, 5% roots and orthoclase			D	4.5		
.8							
1	decreasing quartz content <5%			D	5		
1.2	End of hole @ 1.1m target depth						
1.4							
1.6							
1.8							
2							
2.2							
2.4							
2.6							
2.8							
3							
3.2							
3.4							
3.6							
3.8							
4							

ENVIRONMENTAL EARTH SCIENCES
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LOCATION: Pat O'Leary Drive	JOB No. 107134	BOREHOLE LOG: BHe7	LOGGED BY:
EASTING:	DRILL TYPE: Pushtube/SF Auger		M.Rendell
NORTHING:	DATE STARTED: 17/01/2008	CLIENT: Magnet Mart	APPROVED:
ELEVATION: 1.954 mAHD	DATE FINISHED: 17/01/2008		

Sample: Disturbed; Undisturbed

Moisture: M =Moist D =Dry W =Wet

Groundwater: Water strike; SWL during drilling

PAGE #: 1/1

Depth metres	STRATIGRAPHY	GRAPHIC LOG	SAMPLES Type	Moisture	pH	PID (ppm)	COMMENTS
0	Fill, firm, brown, sandy clay with blue metal gravel			D	7.5		1.7m from the waste storage tank
.2							
.4	Fill, soft, light brown, sandy clay			D	6.5		No groundwater encountered throughout
.6							
.8	Natural, firm, brown, sandy clay with brown-reddish mottles, orthoclase and manganese nodules						
1				DM	6		
1.2	End of hole @ 1.2m target depth						
1.4							
1.6							
1.8							
2							
2.2							
2.4							
2.6							
2.8							
3							
3.2							
3.4							
3.6							
3.8							
4							

ENVIRONMENTAL EARTH SCIENCES
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LOCATION: Pat O'Leary Drive	JOB No. 107134	BOREHOLE LOG: BHe10	LOGGED BY:
EASTING:	DRILL TYPE: Pushtube/SF Auger		M.Rendell
NORTHING:	DATE STARTED: 17/01/2008	CLIENT: Magnet Mart	APPROVED:
ELEVATION: 1.954 mAHD	DATE FINISHED: 17/01/2008		

Sample: Disturbed; Undisturbed
Moisture: M =Moist D =Dry W =Wet
Groundwater: Water strike; SWL during drilling

PAGE #: 1/1

Depth metres	STRATIGRAPHY	GRAPHIC LOG	SAMPLES Type	Moisture	pH	PID (ppm)	COMMENTS
0	Fill, firm, dark brown, sandy clay			D	6.5		No odour throughout
.2	Natural, firm, brown-grey, sandy clay with quartz and orthclase fine nodules and reddish-grey mottling						Profile uniform apart from fill layer
.4				DM	6		
.6	Decreasing quartz and orthoclase						No groundwater encountered throughout
.8							
1	End of hole @ 1.0m target depth						
1.2							
1.4							
1.6							
1.8							
2							
2.2							
2.4							
2.6							
2.8							
3							
3.2							
3.4							
3.6							
3.8							
4							

ENVIRONMENTAL EARTH SCIENCES
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LOCATION: Pat O'Leary Drive	JOB No. 107134	BOREHOLE LOG: BHe11	LOGGED BY:
EASTING:	DRILL TYPE: Pushtube/SF Auger		A.McFarlene
NORTHING:	DATE STARTED: 18/01/2008	CLIENT: Magnet Mart	APPROVED:
ELEVATION: 1.954 mAHD	DATE FINISHED: 18/01/2008		

Sample: Disturbed; Undisturbed
Moisture: M =Moist D =Dry W =Wet
Groundwater: Water strike; SWL during drilling

Depth metres	STRATIGRAPHY	GRAPHIC LOG	SAMPLES Type	Moisture	pH	PID (ppm)	COMMENTS
0	Fill, firm, loose, brown, sandy clay with blue metal gravel (10%)			D	8		No odour throughout
.2	Natural, firm, red-brown, sandy clay, with 30% quartz, orthoclase and hornblend						No groundwater encountered throughout
.4				DM	7		
.6	Black nodules possibly Maganese						
.8	Grading to red with decreasing quartz composition (10%)			D	7.5		
1	Increasing sand content						
	End of hole @ 1.0m target depth						
1.2							
1.4							
1.6							
1.8							
2							
2.2							
2.4							
2.6							
2.8							
3							
3.2							
3.4							
3.6							
3.8							
4							

LOCATION: Pat O'Leary Drive	JOB No. 107134	BOREHOLE LOG: BHe12	LOGGED BY:
EASTING:	DRILL TYPE: Pushtube/SF Auger		A.McFarlene
NORTHING:	DATE STARTED: 17/01/2008	CLIENT: Magnet Mart	APPROVED:
ELEVATION: 1.954 mAHD	DATE FINISHED: 17/01/2008		

Sample: Disturbed; Undisturbed
Moisture: M =Moist D =Dry W =Wet
Groundwater: Water strike; SWL during drilling

PAGE #: 1/1

Depth metres	STRATIGRAPHY	GRAPHIC LOG	SAMPLES Type	Moisture	pH	PID (ppm)	COMMENTS
0	Fill, firm, brown, sandy clay			D	7		No odour throughout
.2	Reworked natural, firm, brown, sandy clay with orange mottles			D	7		No groundwater encountered throughout
.4	Natural, firm, Red-brown, sandy clay with orthoclase and quartz nodules			DM	7		
.6	Natural, firm, grey brown, sandy clay with orthoclase						
.8				S	7.5		
1	End of hole @ 1.0m target depth						
1.2							
1.4							
1.6							
1.8							
2							
2.2							
2.4							
2.6							
2.8							
3							
3.2							
3.4							
3.6							
3.8							
4							

LOCATION: Pat O'Leary Drive	JOB No. 107134	BOREHOLE LOG: BHe13	LOGGED BY:
EASTING:	DRILL TYPE: Pushtube/SF Auger		M.Rendell
NORTHING:	DATE STARTED: 18/01/2008	CLIENT: Magnet Mart	APPROVED:
ELEVATION: 1.954 mAHD	DATE FINISHED: 18/01/2008		

Sample: Disturbed; Undisturbed

Moisture: M =Moist D =Dry W =Wet

Groundwater: Water strike; SWL during drilling

PAGE #: 1 / 1

Depth metres	STRATIGRAPHY	GRAPHIC LOG	SAMPLES Type	Moisture	pH	PID (ppm)	COMMENTS
0	Fill, firm, loose, brown, sandy clay			D	7.5		No odour throughout
.2	Natural, soft to firm, red-brown, clay with quartz and orthoclase cystals (<5%)			DM	7		No groundwater encountered throughout
.4	Grading to orange-brown with manganese nodules			DM	6		
.6							
.8	Natural, soft to firm, grey, clay with decreasing quartz content						
1				S			
1.2	End of hole @ 1.1m target depth						
1.4							
1.6							
1.8							
2							
2.2							
2.4							
2.6							
2.8							
3							
3.2							
3.4							
3.6							
3.8							
4							

ENVIRONMENTAL EARTH SCIENCES
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LOCATION: Pat O'Leary Drive	JOB No. 107134	BOREHOLE LOG: BHe14	LOGGED BY:
EASTING:	DRILL TYPE: Pushtube/SF Auger		M.Rendell
NORTHING:	DATE STARTED: 18/01/2008	CLIENT: Magnet Mart	APPROVED:
ELEVATION: 1.954 mAHD	DATE FINISHED: 18/01/2008		

Sample: Disturbed; Undisturbed
Moisture: M =Moist D =Dry W =Wet
Groundwater: Water strike; SWL during drilling

PAGE #: 1/1

Depth metres	STRATIGRAPHY	GRAPHIC LOG	SAMPLES Type	Moisture	pH	PID (ppm)	COMMENTS
0	Natural (reworked), soft, brown, sandy clay with quartz blue metal and brick fragments			D	6.5		No odour throughout
.2							No groundwater encountered throughout
.4							
.6	Natural, firm, red-brown, clay with increasing quartz and orthoclase with depth						
.8	Grading to grey-yellow-brown, clay with Black nodules and Ca plus Na feldspar			DM	6.5		
1	End of hole @ 1.0m target depth						
1.2							
1.4							
1.6							
1.8							
2							
2.2							
2.4							
2.6							
2.8							
3							
3.2							
3.4							
3.6							
3.8							
4							

ENVIRONMENTAL EARTH SCIENCES
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LOCATION: Pat O'Leary Drive	JOB No. 107134	BOREHOLE LOG: BHe15	LOGGED BY:
EASTING:	DRILL TYPE: Pushtube/SF Auger		M.Rendell
NORTHING:	DATE STARTED: 18/01/2008	CLIENT: Magnet Mart	APPROVED:
ELEVATION: 1.954 mAHD	DATE FINISHED: 18/01/2008		

Sample: Disturbed; Undisturbed
Moisture: M =Moist D =Dry W =Wet
Groundwater: Water strike; SWL during drilling

PAGE #: 1/1

Depth metres	STRATIGRAPHY	GRAPHIC LOG	SAMPLES Type	Moisture	pH	PID (ppm)	COMMENTS
0	Natural (disturbed), firm, brown, sandy clay with quartz and orthoclase			D	7		No odour throughout
.6	Natural, firm, brown, sandy clay with quartz gravel and orthoclase (40%) Quartz size decreasing with depth						
.8				D	7		
1	Natural, firm, loose, red-brown, sandy clay with orthoclase and quartz nodules (40%) and black manganese nodules <5%						
1.2							Plastic and Glass encountered
1.4							No groundwater encountered throughout
1.6	End of hole @ 1.5m push tube refusal						
1.8							
2							
2.2							
2.4							
2.6							
2.8							
3							
3.2							
3.4							
3.6							
3.8							
4							

ENVIRONMENTAL EARTH SCIENCES
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LOCATION: Pat O'Leary Drive	JOB No. 107134	BOREHOLE LOG: BHe21	LOGGED BY:
EASTING:	DRILL TYPE: Pushtube/SF Auger		A.McFarlene
NORTHING:	DATE STARTED: 18/01/2008	CLIENT: Magnet Mart	APPROVED:
ELEVATION: 1.954 mAHD	DATE FINISHED: 18/01/2008		

Sample
Disturbed
Undisturbed
Moisture
M =Moist D =Dry W =Wet

Groundwater
Water strike
SWL during drilling

PAGE #: 1/1

Depth metres	STRATIGRAPHY	GRAPHIC LOG	SAMPLES Type	Moisture	pH	PID (ppm)	COMMENTS
0	Natural, soft, red-brown, sandy clay with orthoclase, quartz and manganese nodules			D	7		No odour throughout No groundwater encountered throughout
.2							
.4							
.6							
.8	Natural, soft, light brown-grey, silty clay with sparse manganese nodules						
1							
1.2	Becoming pale grey, firm			D	6.5		
1.4	End of hole @ 1.4m push tube refusal						
1.6							
1.8							
2							
2.2							
2.4							
2.6							
2.8							
3							
3.2							
3.4							
3.6							
3.8							
4							

ENVIRONMENTAL EARTH SCIENCES
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LOCATION: Pat O'Leary Drive	JOB No. 107134	BOREHOLE LOG: BHe23	LOGGED BY:
EASTING:	DRILL TYPE: Pushtube/SF Auger		A.McFarlene
NORTHING:	DATE STARTED: 18/01/2008	CLIENT: Magnet Mart	APPROVED:
ELEVATION: 1.954 mAHD	DATE FINISHED: 18/01/2008		

Sample: Disturbed; Undisturbed
Moisture: M =Moist D =Dry W =Wet
Groundwater: Water strike; SWL during drilling

PAGE #: 1/1

Depth metres	STRATIGRAPHY	GRAPHIC LOG	SAMPLES Type	Moisture	pH		COMMENTS
0	Natural (reworked), soft, grey-brown, sandy clay with plant roots and orthoclase nodules			D	6		No odour throughout
.2	Natural (reworked), soft, grey-brown, sandy clay with orthoclase and manganese nodules						No groundwater encountered throughout
.4				D	6		
.6							
.8	Natural, firm, light brown, sandy clay with plant roots, Ca feldspar and orthoclase nodules						
1				D	6		
1.2							
1.4							
1.6	End of log @1.5m, push tube refusal						
1.8							
2							
2.2							
2.4							
2.6							
2.8							
3							
3.2							
3.4							
3.6							
3.8							
4							

ENVIRONMENTAL EARTH SCIENCES
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LOCATION: Pat O'Leary Drive	JOB No. 107134	BOREHOLE LOG: BHe24	LOGGED BY:
EASTING:	DRILL TYPE: Pushtube/SF Auger		M.Rendell
NORTHING:	DATE STARTED: 18/01/2008	CLIENT: Magnet Mart	APPROVED:
ELEVATION: 1.954 mAHD	DATE FINISHED: 18/01/2008		

Sample: Disturbed; Undisturbed
Moisture: M =Moist D =Dry W =Wet
Groundwater: Water strike; SWL during drilling

PAGE #: 1/1

Depth metres	STRATIGRAPHY	GRAPHIC LOG	SAMPLES Type	Moisture	pH	PID (ppm)	COMMENTS
0	Natural (reworked), soft, brown, sandy clay with plant roots and orthoclase nodules			D	6.5		No odour throughout
.2	Natural, soft, brown, sandy clay with orthoclase nodules			D	6.5		No groundwater encountered throughout
.4							
.6	Natural, firm, brown, sandy clay with orthoclase nodules						
.8	Grading to red			DM	7.5		
1	Grading to yellow-brown with Manganese nodules						
1.2	Natural, firm, yellow-brown, sandy clay with decreasing quartz content and red-black nodules			D	7		
1.4							
1.6							
1.8	Natural, firm, yellow-brown, sandy clay with quartz, orthoclase and amphibole crystals Grey nodules increasing to black			D	6.5		
2							
2.2	End of hole @2.1m push tube refusal						
2.4							
2.6							
2.8							
3							
3.2							
3.4							
3.6							
3.8							
4							

ENVIRONMENTAL EARTH SCIENCES
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LOCATION: Pat O'Leary Drive	JOB No. 107134	BOREHOLE LOG: BHe31	LOGGED BY:
EASTING:	DRILL TYPE: Pushtube/SF Auger		A.McFarlene
NORTHING:	DATE STARTED: 18/01/2008	CLIENT: Magnet Mart	APPROVED:
ELEVATION: 1.954 mAHD	DATE FINISHED: 18/01/2008		

Sample: Disturbed; Undisturbed
Moisture: M =Moist D =Dry W =Wet
Groundwater: Water strike; SWL during drilling

PAGE #: 1/1

Depth metres	STRATIGRAPHY	GRAPHIC LOG	SAMPLES Type	Moisture	pH	PID (ppm)	COMMENTS
0	Natural (reworked), soft, brown, sandy clay with plant roots and sparse orthoclase crystals			D	6		No odour throughout
.2	Natural, firm, brown, sandy clay with orthoclase and Calcium feldspar						No groundwater encountered throughout
.4							
.6				D	6		
.8							
1				D	6		
1.2	End of hole @ 1.2m push tube refusal						
1.4							
1.6							
1.8							
2							
2.2							
2.4							
2.6							
2.8							
3							
3.2							
3.4							
3.6							
3.8							
4							

ENVIRONMENTAL EARTH SCIENCES
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LOCATION: Pat O'Leary Drive	JOB No. 107134	BOREHOLE LOG: BHe32	LOGGED BY:
EASTING:	DRILL TYPE: Pushtube/SF Auger		M.Rendell
NORTHING:	DATE STARTED: 17/01/2008	CLIENT: Magnet Mart	APPROVED:
ELEVATION: 1.954 mAHD	DATE FINISHED: 17/01/2008		

Sample: Disturbed; Undisturbed
Moisture: M =Moist D =Dry W =Wet
Groundwater: Water strike; SWL during drilling

PAGE #: 1 / 1

Depth metres	STRATIGRAPHY	GRAPHIC LOG	SAMPLES Type	Moisture	pH	PID (ppm)	COMMENTS
0	Fill, firm, brown, sandy clay			DM	8.5		No odour throughout
.2	Reworked natural, firm, light-brown, sandy clay with quartz and orthoclase			D	6		Downgradient of wash station
.4							
.6	Natural, firm, Red-brown, sandy clay with orthoclase and quartz nodules			M	6.5		No groundwater encountered throughout
.8							
1	Natural, firm, grey brown, sandy clay with orthoclase			M	6.5		
	End of hole @ 1.0m target depth						
1.2							
1.4							
1.6							
1.8							
2							
2.2							
2.4							
2.6							
2.8							
3							
3.2							
3.4							
3.6							
3.8							
4							

ENVIRONMENTAL EARTH SCIENCES
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LOCATION: Pat O'Leary Drive	JOB No. 107134	BOREHOLE LOG: BHe33	LOGGED BY:
EASTING:	DRILL TYPE: Pushtube/SF Auger		M.Rendell
NORTHING:	DATE STARTED: 17/01/2008	CLIENT: Magnet Mart	APPROVED:
ELEVATION: 1.954 mAHD	DATE FINISHED: 17/01/2008		

Sample: Disturbed; Undisturbed
Moisture: M =Moist D =Dry W =Wet
Groundwater: Water strike; SWL during drilling

PAGE #: 1/1

Depth metres	STRATIGRAPHY	GRAPHIC LOG	SAMPLES Type	Moisture	pH	PID (ppm)	COMMENTS
0	Fill, firm, brown, sandy clay with blue metal fragments			D	7		No odour throughout
.2	Fill, hard,very dense, Quartz band			D	7		No groundwater encountered throughout
.4	Natural, firm, brownish-yellow, sandy clay with orthoclase and quartz nodules			DM	7.5		
.6							
.8	Streak of dark material (plant root)						
1	End of hole @ 1.0m target depth						
1.2							
1.4							
1.6							
1.8							
2							
2.2							
2.4							
2.6							
2.8							
3							
3.2							
3.4							
3.6							
3.8							
4							

APPENDIX B LABORATORY TRANSCRIPTS AND CHAIN OF CUSTODY FORMS

REPORT OF ANALYSIS

Client	: Environmental & Earth Sciences (NSW)	Job No.	: ENVI10/080122
	The Coal Loader Balls Head Road	Quote No.	: QT-00043
	Waverton NSW 2060	Order No.	:
		Date Sampled	:
		Date Received	: 22-JAN-2008
Attention	: MATT CLUTTERHAM	Sampled By	: CLIENT
Project Name	:		
Your Client Services Manager	: BRIAN WOODWARD	Phone	: (02) 94490151

Lab Reg No.	Sample Ref	Sample Description
N08/002360	BHE5	SOIL BATHURST JOB 107134 (0.8-1.0M)
N08/002361	BHE4	SOIL BATHURST JOB 107134 (01-0.2M)
N08/002362	BHE10	SOIL BATHURST JOB 107134 (0.1-0.3M)
N08/002363	BHE12	SOIL BATHURST JOB 107134 (0.15-0.25M)

Lab Reg No.		N08/002360	N08/002361	N08/002362	N08/002363	
Sample Reference	Units	BHE5	BHE4	BHE10	BHE12	Method
Poly Aromatic Hydrocarbons						
Naphthalene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Acenaphthylene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Acenaphthene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Fluorene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Phenanthrene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Anthracene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Fluoranthene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Pyrene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Benz(a)anthracene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Chrysene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Benzo(b)&(k)fluoranthene	mg/kg	< 2	< 2	< 2	< 2	NGCMS_1111
Benzo(a)pyrene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Indeno(1,2,3-cd)pyrene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Dibenz(ah)anthracene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Benzo(ghi)perylene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Total Petroleum Hydrocarbons						
TPH C6 - C9	mg/kg	< 25	< 25	< 25	< 25	NGCMS_1121
TPH C10 - C14	mg/kg	< 50	< 50	< 50	< 50	NGCMS_1112
TPH C15 - C28	mg/kg	< 100	< 100	< 100	< 100	NGCMS_1112
TPH C29 - C36	mg/kg	< 100	< 100	< 100	< 100	NGCMS_1112
Surrogate						
Surrogate semivolatile Rec.	%	105	105	112	108	
Surrogate volatile Rec	%	103	104	104	105	
Dates						
Date extracted		24-JAN-2008	24-JAN-2008	24-JAN-2008	24-JAN-2008	
Date analysed		25-JAN-2008	25-JAN-2008	25-JAN-2008	25-JAN-2008	

REPORT OF ANALYSIS

Report No. RN660816

Lab Reg No.		N08/002360	N08/002361	N08/002362	N08/002363	
Sample Reference	Units	BHE5	BHE4	BHE10	BHE12	Method

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Lab Reg No.		N08/002360	N08/002361	N08/002362	N08/002363	
Sample Reference	Units	BHE5	BHE4	BHE10	BHE12	Method
Trace Elements						
Total Solids	%	83.1	69.9	91.1	88.5	NT2_49

Deborah Yen, Analyst
Inorganics - NSW
Accreditation No. 198

30-JAN-2008

REPORT OF ANALYSIS

Client	: Environmental & Earth Sciences (NSW)	Job No.	: ENVI10/080122
	The Coal Loader Balls Head Road	Quote No.	: QT-00043
	Waverton NSW 2060	Order No.	:
		Date Sampled	:
		Date Received	: 22-JAN-2008
Attention	: MATT CLUTTERHAM	Sampled By	: CLIENT
Project Name	:		
Your Client Services Manager	: BRIAN WOODWARD	Phone	: (02) 94490151

Lab Reg No.	Sample Ref	Sample Description
N08/002366	BHE	SOIL BATHURST JOB 107134 (0-0.25M)

Lab Reg No.		N08/002366				
Sample Reference	Units	BHE				Method
Poly Aromatic Hydrocarbons						
Naphthalene	mg/kg	< 1				NGCMS_1111
Acenaphthylene	mg/kg	< 1				NGCMS_1111
Acenaphthene	mg/kg	< 1				NGCMS_1111
Fluorene	mg/kg	< 1				NGCMS_1111
Phenanthrene	mg/kg	< 1				NGCMS_1111
Anthracene	mg/kg	< 1				NGCMS_1111
Fluoranthene	mg/kg	< 1				NGCMS_1111
Pyrene	mg/kg	< 1				NGCMS_1111
Benz(a)anthracene	mg/kg	< 1				NGCMS_1111
Chrysene	mg/kg	< 1				NGCMS_1111
Benzo(b)&(k)fluoranthene	mg/kg	< 2				NGCMS_1111
Benzo(a)pyrene	mg/kg	< 1				NGCMS_1111
Indeno(1,2,3-cd)pyrene	mg/kg	< 1				NGCMS_1111
Dibenz(ah)anthracene	mg/kg	< 1				NGCMS_1111
Benzo(ghi)perylene	mg/kg	< 1				NGCMS_1111
Total Petroleum Hydrocarbons						
TPH C6 - C9	mg/kg	< 25				NGCMS_1121
TPH C10 - C14	mg/kg	< 50				NGCMS_1112
TPH C15 - C28	mg/kg	< 100				NGCMS_1112
TPH C29 - C36	mg/kg	< 100				NGCMS_1112
Surrogate						
Surrogate semivolatile Rec.	%	107				
Surrogate volatile Rec	%	106				
Dates						
Date extracted		24-JAN-2008				
Date analysed		25-JAN-2008				

REPORT OF ANALYSIS

Report No. RN660816

Lab Reg No.		N08/002366				
Sample Reference	Units	BHE				Method

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Lab Reg No.		N08/002366				
Sample Reference	Units	BHE				Method
Trace Elements						
Total Solids	%	93.6				NT2_49

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All results are expressed on a dry weight basis.

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This Report supersedes reports: RN660636 RN660669

REPORT OF ANALYSIS

Client	: Environmental & Earth Sciences (NSW) The Coal Loader Balls Head Road Waverton NSW 2060	Job No. Quote No. Order No. Date Sampled Date Received	: ENVI10/080122 : QT-00043 : : : 22-JAN-2008
Attention	: MATT CLUTTERHAM	Sampled By	: CLIENT
Project Name	:		
Your Client Services Manager	: BRIAN WOODWARD	Phone	: (02) 94490151

Lab Reg No.	Sample Ref	Sample Description
N08/002355	BHE7	SOIL BATHURST JOB 107134 (0-0.3M)
N08/002356	BHE33	SOIL BATHURST JOB 107134 (0-0.2M)
N08/002357	BHE33	SOIL BATHURST JOB 107134 (0.8-1.0M)
N08/002364	FD1	SOIL BATHURST JOB 107134

Lab Reg No.		N08/002355	N08/002356	N08/002357	N08/002364	
Sample Reference	Units	BHE7	BHE33	BHE33	FD1	Method
Poly Aromatic Hydrocarbons						
Naphthalene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Acenaphthylene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Acenaphthene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Fluorene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Phenanthrene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Anthracene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Fluoranthene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Pyrene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Benz(a)anthracene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Chrysene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Benzo(b)&(k)fluoranthene	mg/kg	< 2	< 2	< 2	< 2	NGCMS_1111
Benzo(a)pyrene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Indeno(1,2,3-cd)pyrene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Dibenz(ah)anthracene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
Benzo(ghi)perylene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1111
BTEX						
Benzene	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	NGCMS_1121
Toluene	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	NGCMS_1121
Ethyl Benzene	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	NGCMS_1121
m, p - Xylene	mg/kg	< 1	< 1	< 1	< 1	NGCMS_1121
o - Xylene	mg/kg	< 0.5	< 0.5	< 0.5	< 1	NGCMS_1121
Total Petroleum Hydrocarbons						
TPH C6 - C9	mg/kg	< 25	< 25	< 25	< 25	NGCMS_1121
TPH C10 - C14	mg/kg	140	< 50	< 50	100	NGCMS_1112
TPH C15 - C28	mg/kg	1800	1400	< 100	1400	NGCMS_1112
TPH C29 - C36	mg/kg	< 100	< 100	< 100	< 100	NGCMS_1112
Surrogate						
Surrogate semivolatile Rec.	%	104	107	107	105	

REPORT OF ANALYSIS

Lab Reg No.		N08/002355	N08/002356	N08/002357	N08/002364	
Sample Reference	Units	BHE7	BHE33	BHE33	FD1	Method
Surrogate						
Surrogate volatile Rec	%	103	102	104	103	
Dates						
Date extracted		24-JAN-2008	24-JAN-2008	24-JAN-2008	24-JAN-2008	
Date analysed		25-JAN-2008	25-JAN-2008	25-JAN-2008	25-JAN-2008	

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Lab Reg No.		N08/002355	N08/002356	N08/002357	N08/002364	
Sample Reference	Units	BHE7	BHE33	BHE33	FD1	Method
Trace Elements						
Total Solids	%	93.2	95.1	93.1	96.7	NT2_49

Deborah Yen, Analyst
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Accreditation No. 198

30-JAN-2008

REPORT OF ANALYSIS

Client	: Environmental & Earth Sciences (NSW)	Job No.	: ENVI10/080122
	The Coal Loader Balls Head Road	Quote No.	: QT-00043
	Waverton NSW 2060	Order No.	:
		Date Sampled	:
		Date Received	: 22-JAN-2008
Attention	: MATT CLUTTERHAM	Sampled By	: CLIENT
Project Name	:		
Your Client Services Manager	: BRIAN WOODWARD	Phone	: (02) 94490151

Lab Reg No.	Sample Ref	Sample Description
N08/002367	BUND	SOIL BATHURST JOB 107134

Lab Reg No.		N08/002367				
Sample Reference	Units	BUND				Method
Poly Aromatic Hydrocarbons						
Naphthalene	mg/kg	< 1				NGCMS_1111
Acenaphthylene	mg/kg	< 1				NGCMS_1111
Acenaphthene	mg/kg	< 1				NGCMS_1111
Fluorene	mg/kg	< 1				NGCMS_1111
Phenanthrene	mg/kg	< 1				NGCMS_1111
Anthracene	mg/kg	< 1				NGCMS_1111
Fluoranthene	mg/kg	< 1				NGCMS_1111
Pyrene	mg/kg	< 1				NGCMS_1111
Benz(a)anthracene	mg/kg	< 1				NGCMS_1111
Chrysene	mg/kg	< 1				NGCMS_1111
Benzo(b)&(k)fluoranthene	mg/kg	< 2				NGCMS_1111
Benzo(a)pyrene	mg/kg	< 1				NGCMS_1111
Indeno(1,2,3-cd)pyrene	mg/kg	< 1				NGCMS_1111
Dibenz(ah)anthracene	mg/kg	< 1				NGCMS_1111
Benzo(ghi)perylene	mg/kg	< 1				NGCMS_1111
BTEX						
Benzene	mg/kg	< 0.5				NGCMS_1121
Toluene	mg/kg	< 0.5				NGCMS_1121
Ethyl Benzene	mg/kg	< 0.5				NGCMS_1121
m, p - Xylene	mg/kg	< 0.5				NGCMS_1121
o - Xylene	mg/kg	< 0.5				NGCMS_1121
Total Petroleum Hydrocarbons						
TPH C6 - C9	mg/kg	< 25				NGCMS_1121
TPH C10 - C14	mg/kg	390				NGCMS_1112
TPH C15 - C28	mg/kg	17000				NGCMS_1112
TPH C29 - C36	mg/kg	< 100				NGCMS_1112
Surrogate						
Surrogate semivolatile Rec.	%	147				
Surrogate volatile Rec	%	102				
Dates						
Date extracted		24-JAN-2008				

REPORT OF ANALYSIS

Lab Reg No.		N08/002367				
Sample Reference	Units	BUND				Method
Dates						
Date analysed		25-JAN-2008				

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Lab Reg No.		N08/002367				
Sample Reference	Units	BUND				Method
Trace Elements						
Total Solids	%	95.3				NT2_49

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30-JAN-2008

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This Report supersedes reports: RN660636 RN660669

REPORT OF ANALYSIS

Client	: Environmental & Earth Sciences (NSW)	Job No.	: ENVI10/080122
	The Coal Loader Balls Head Road	Quote No.	: QT-00043
	Waverton NSW 2060	Order No.	:
		Date Sampled	:
		Date Received	: 22-JAN-2008
Attention	: MATT CLUTTERHAM	Sampled By	: CLIENT
Project Name	:		
Your Client Services Manager	: BRIAN WOODWARD	Phone	: (02) 94490151

Lab Reg No.	Sample Ref	Sample Description
N08/002349	SP1.1	SOIL BATHURST JOB 107134
N08/002350	SP2.1	SOIL BATHURST JOB 107134
N08/002351	SP3.1	SOIL BATHURST JOB 107134
N08/002352	SP4.1	SOIL BATHURST JOB 107134

Lab Reg No.		N08/002349	N08/002350	N08/002351	N08/002352	
Sample Reference	Units	SP1.1	SP2.1	SP3.1	SP4.1	Method
Total Petroleum Hydrocarbons						
TPH C6 - C9	mg/kg	< 25	< 25	< 25	< 25	NGCMS_1121
TPH C10 - C14	mg/kg	< 50	< 50	< 50	< 50	NGCMS_1112
TPH C15 - C28	mg/kg	< 100	< 100	< 100	< 100	NGCMS_1112
TPH C29 - C36	mg/kg	< 100	< 100	< 100	< 100	NGCMS_1112
Surrogate						
Surrogate volatile Rec	%	101	102	101	104	
Dates						
Date extracted		24-JAN-2008	24-JAN-2008	24-JAN-2008	24-JAN-2008	
Date analysed		25-JAN-2008	25-JAN-2008	25-JAN-2008	25-JAN-2008	

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Lab Reg No.		N08/002349	N08/002350	N08/002351	N08/002352	
Sample Reference	Units	SP1.1	SP2.1	SP3.1	SP4.1	Method
Trace Elements						
Total Solids	%	91.5	93.9	91.6	93.2	NT2_49

REPORT OF ANALYSIS

Report No. RN660813

Lab Reg No.		N08/002349	N08/002350	N08/002351	N08/002352	
Sample Reference	Units	SP1.1	SP2.1	SP3.1	SP4.1	Method

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30-JAN-2008

REPORT OF ANALYSIS

Client	: Environmental & Earth Sciences (NSW)	Job No.	: ENVI10/080122
	The Coal Loader Balls Head Road	Quote No.	: QT-00043
	Waverton NSW 2060	Order No.	:
		Date Sampled	:
		Date Received	: 22-JAN-2008
Attention	: MATT CLUTTERHAM	Sampled By	: CLIENT
Project Name	:		
Your Client Services Manager	: BRIAN WOODWARD	Phone	: (02) 94490151

Lab Reg No.	Sample Ref	Sample Description
N08/002353	SP5.1	SOIL BATHURST JOB 107134

Lab Reg No.		N08/002353				
Sample Reference	Units	SP5.1				Method
Total Petroleum Hydrocarbons						
TPH C6 - C9	mg/kg	< 25				NGCMS_1121
TPH C10 - C14	mg/kg	< 50				NGCMS_1112
TPH C15 - C28	mg/kg	< 100				NGCMS_1112
TPH C29 - C36	mg/kg	< 100				NGCMS_1112
Surrogate						
Surrogate volatile Rec	%	104				
Dates						
Date extracted		24-JAN-2008				
Date analysed		25-JAN-2008				

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30-JAN-2008

Lab Reg No.		N08/002353				
Sample Reference	Units	SP5.1				Method
Trace Elements						
Total Solids	%	94.1				NT2_49

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REPORT OF ANALYSIS

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This Report supersedes reports: RN660636 RN660669

REPORT OF ANALYSIS

Client	: Environmental & Earth Sciences (NSW)	Job No.	: ENVI10/080122
	The Coal Loader Balls Head Road	Quote No.	: QT-00043
	Waverton NSW 2060	Order No.	:
		Date Sampled	:
		Date Received	: 22-JAN-2008
Attention	: MATT CLUTTERHAM	Sampled By	: CLIENT
Project Name	:		
Your Client Services Manager	: BRIAN WOODWARD	Phone	: (02) 94490151

Lab Reg No.	Sample Ref	Sample Description
N08/002339	COMP1	SOIL BATHURST JOB 107134
N08/002340	COMP2	SOIL BATHURST JOB 107134
N08/002341	COMP3	SOIL BATHURST JOB 107134
N08/002342	COMP4	SOIL BATHURST JOB 107134

Lab Reg No.		N08/002339	N08/002340	N08/002341	N08/002342	
Sample Reference	Units	COMP1	COMP2	COMP3	COMP4	Method
Organochlorine (OC) Pesticides						
HCB	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Heptachlor	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Heptachlor epoxide	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Aldrin	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
gamma-BHC (Lindane)	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
alpha-BHC	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
beta-BHC	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
delta-BHC	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
trans-Chlordane	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
cis-Chlordane	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Oxychlordane	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Dieldrin	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
pp-DDE	mg/kg	0.034	< 0.01	< 0.01	0.016	NR_19
pp-DDD	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
pp-DDT	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Endrin	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Endrin Aldehyde	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Endrin Ketone	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
alpha-Endosulfan	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
beta-Endosulfan	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Endosulfan Sulfate	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Methoxychlor	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Organophosphate (OP) Pesticides						
Dichlorvos	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Demeton-S-Methyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Diazinon	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Dimethoate	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Chlorpyrifos	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19

REPORT OF ANALYSIS

Lab Reg No.		N08/002339	N08/002340	N08/002341	N08/002342	
Sample Reference	Units	COMP1	COMP2	COMP3	COMP4	Method
Organophosphate (OP) Pesticides						
Chlorpyrifos Methyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Malathion	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Fenthion	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Ethion	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Fenitrothion	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Chlorfenvinphos (E)	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Chlorfenvinphos (Z)	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Parathion (Ethyl)	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Parathion Methyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Pirimiphos Methyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Pirimiphos Ethyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Azinphos Methyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Azinphos Ethyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Surrogate						
Surrogate OC Rec.	%	113	112	114	117	NR_19
Surrogate OP Rec.	%	107	113	114	115	NR_19
Dates						
Date extracted		24-JAN-2008	24-JAN-2008	24-JAN-2008	24-JAN-2008	
Date analysed		25-JAN-2008	25-JAN-2008	25-JAN-2008	25-JAN-2008	

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Lab Reg No.		N08/002339	N08/002340	N08/002341	N08/002342	
Sample Reference	Units	COMP1	COMP2	COMP3	COMP4	Method
Trace Elements						
Total Solids	%	94.0	92.0	91.8	93.2	NT2_49

Deborah Yen, Analyst
Inorganics - NSW
Accreditation No. 198

30-JAN-2008

REPORT OF ANALYSIS

Client	: Environmental & Earth Sciences (NSW)	Job No.	: ENVI10/080122
	The Coal Loader Balls Head Road	Quote No.	: QT-00043
	Waverton NSW 2060	Order No.	:
		Date Sampled	:
		Date Received	: 22-JAN-2008
Attention	: MATT CLUTTERHAM	Sampled By	: CLIENT
Project Name	:		
Your Client Services Manager	: BRIAN WOODWARD	Phone	: (02) 94490151

Lab Reg No.	Sample Ref	Sample Description
N08/002343	COMP5	SOIL BATHURST JOB 107134
N08/002344	COMP6	SOIL BATHURST JOB 107134
N08/002345	COMP7	SOIL BATHURST JOB 107134
N08/002346	COMP8	SOIL BATHURST JOB 107134

Lab Reg No.		N08/002343	N08/002344	N08/002345	N08/002346	
Sample Reference	Units	COMP5	COMP6	COMP7	COMP8	Method
Organochlorine (OC) Pesticides						
HCB	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Heptachlor	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Heptachlor epoxide	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Aldrin	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
gamma-BHC (Lindane)	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
alpha-BHC	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
beta-BHC	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
delta-BHC	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
trans-Chlordane	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
cis-Chlordane	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Oxychlordane	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Dieldrin	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
pp-DDE	mg/kg	0.051	0.14	0.10	0.21	NR_19
pp-DDD	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
pp-DDT	mg/kg	< 0.01	0.014	0.066	0.068	NR_19
Endrin	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Endrin Aldehyde	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Endrin Ketone	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
alpha-Endosulfan	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
beta-Endosulfan	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Endosulfan Sulfate	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Methoxychlor	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Organophosphate (OP) Pesticides						
Dichlorvos	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Demeton-S-Methyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Diazinon	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Dimethoate	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Chlorpyrifos	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19

REPORT OF ANALYSIS

Lab Reg No.		N08/002343	N08/002344	N08/002345	N08/002346	
Sample Reference	Units	COMP5	COMP6	COMP7	COMP8	Method
Organophosphate (OP) Pesticides						
Chlorpyrifos Methyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Malathion	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Fenthion	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Ethion	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Fenitrothion	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Chlorfenvinphos (E)	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Chlorfenvinphos (Z)	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Parathion (Ethyl)	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Parathion Methyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Pirimiphos Methyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Pirimiphos Ethyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Azinphos Methyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Azinphos Ethyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Surrogate						
Surrogate OC Rec.	%	108	117	114	117	NR_19
Surrogate OP Rec.	%	108	115	113	116	NR_19
Dates						
Date extracted		24-JAN-2008	24-JAN-2008	24-JAN-2008	24-JAN-2008	
Date analysed		25-JAN-2008	25-JAN-2008	25-JAN-2008	25-JAN-2008	

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Lab Reg No.		N08/002343	N08/002344	N08/002345	N08/002346	
Sample Reference	Units	COMP5	COMP6	COMP7	COMP8	Method
Trace Elements						
Total Solids	%	95.1	93.4	96.4	95.0	NT2_49

Deborah Yen, Analyst
Inorganics - NSW
Accreditation No. 198

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REPORT OF ANALYSIS

Client	: Environmental & Earth Sciences (NSW)	Job No.	: ENVI10/080122
	The Coal Loader Balls Head Road	Quote No.	: QT-00043
	Waverton NSW 2060	Order No.	:
		Date Sampled	:
		Date Received	: 22-JAN-2008
Attention	: MATT CLUTTERHAM	Sampled By	: CLIENT
Project Name	:		
Your Client Services Manager	: BRIAN WOODWARD	Phone	: (02) 94490151

Lab Reg No.	Sample Ref	Sample Description
N08/002347	COMP9	SOIL BATHURST JOB 107134
N08/002348	COMP10	SOIL BATHURST JOB 107134
N08/002358	BHE13	SOIL BATHURST JOB 107134 (0-0.1M)
N08/002359	BHE14	SOIL BATHURST JOB 107134 (0-0.2M)

Lab Reg No.		N08/002347	N08/002348	N08/002358	N08/002359	
Sample Reference	Units	COMP9	COMP10	BHE13	BHE14	Method
Organochlorine (OC) Pesticides						
HCB	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Heptachlor	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Heptachlor epoxide	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Aldrin	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
gamma-BHC (Lindane)	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
alpha-BHC	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
beta-BHC	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
delta-BHC	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
trans-Chlordane	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
cis-Chlordane	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Oxychlordane	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Dieldrin	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
pp-DDE	mg/kg	1.0	0.27	< 0.01	< 0.01	NR_19
pp-DDD	mg/kg	0.018	< 0.01	< 0.01	< 0.01	NR_19
pp-DDT	mg/kg	0.31	0.13	< 0.01	< 0.01	NR_19
Endrin	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Endrin Aldehyde	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Endrin Ketone	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
alpha-Endosulfan	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
beta-Endosulfan	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Endosulfan Sulfate	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Methoxychlor	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	NR_19
Organophosphate (OP) Pesticides						
Dichlorvos	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Demeton-S-Methyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Diazinon	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Dimethoate	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Chlorpyrifos	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19

REPORT OF ANALYSIS

Lab Reg No.		N08/002347	N08/002348	N08/002358	N08/002359	
Sample Reference	Units	COMP9	COMP10	BHE13	BHE14	Method
Organophosphate (OP) Pesticides						
Chlorpyrifos Methyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Malathion	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Fenthion	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Ethion	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Fenitrothion	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Chlorfenvinphos (E)	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Chlorfenvinphos (Z)	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Parathion (Ethyl)	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Parathion Methyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Pirimiphos Methyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Pirimiphos Ethyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Azinphos Methyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Azinphos Ethyl	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	NR_19
Surrogate						
Surrogate OC Rec.	%	107	109	113	111	NR_19
Surrogate OP Rec.	%	112	112	117	116	NR_19
Dates						
Date extracted		24-JAN-2008	24-JAN-2008	24-JAN-2008	24-JAN-2008	
Date analysed		25-JAN-2008	25-JAN-2008	25-JAN-2008	25-JAN-2008	

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Lab Reg No.		N08/002347	N08/002348	N08/002358	N08/002359	
Sample Reference	Units	COMP9	COMP10	BHE13	BHE14	Method
Trace Elements						
Total Solids	%	94.5	95.4	94.4	92.1	NT2_49

Deborah Yen, Analyst
Inorganics - NSW
Accreditation No. 198

30-JAN-2008

REPORT OF ANALYSIS

Client	: Environmental & Earth Sciences (NSW)	Job No.	: ENVI10/080122
	The Coal Loader Balls Head Road	Quote No.	: QT-00043
	Waverton NSW 2060	Order No.	:
		Date Sampled	:
		Date Received	: 22-JAN-2008
Attention	: MATT CLUTTERHAM	Sampled By	: CLIENT
Project Name	:		
Your Client Services Manager	: BRIAN WOODWARD	Phone	: (02) 94490151

Lab Reg No.	Sample Ref	Sample Description
N08/002365	FD2	SOIL BATHURST JOB 107134

Lab Reg No.		N08/002365				
Sample Reference	Units	FD2				Method
Organochlorine (OC) Pesticides						
HCB	mg/kg	< 0.01				NR_19
Heptachlor	mg/kg	< 0.01				NR_19
Heptachlor epoxide	mg/kg	< 0.01				NR_19
Aldrin	mg/kg	< 0.01				NR_19
gamma-BHC (Lindane)	mg/kg	< 0.01				NR_19
alpha-BHC	mg/kg	< 0.01				NR_19
beta-BHC	mg/kg	< 0.01				NR_19
delta-BHC	mg/kg	< 0.01				NR_19
trans-Chlordane	mg/kg	< 0.01				NR_19
cis-Chlordane	mg/kg	< 0.01				NR_19
Oxychlordane	mg/kg	< 0.01				NR_19
Dieldrin	mg/kg	< 0.01				NR_19
pp-DDE	mg/kg	< 0.01				NR_19
pp-DDD	mg/kg	< 0.01				NR_19
pp-DDT	mg/kg	< 0.01				NR_19
Endrin	mg/kg	< 0.01				NR_19
Endrin Aldehyde	mg/kg	< 0.01				NR_19
Endrin Ketone	mg/kg	< 0.01				NR_19
alpha-Endosulfan	mg/kg	< 0.01				NR_19
beta-Endosulfan	mg/kg	< 0.01				NR_19
Endosulfan Sulfate	mg/kg	< 0.01				NR_19
Methoxychlor	mg/kg	< 0.01				NR_19
Organophosphate (OP) Pesticides						
Dichlorvos	mg/kg	< 0.1				NR_19
Demeton-S-Methyl	mg/kg	< 0.1				NR_19
Diazinon	mg/kg	< 0.1				NR_19
Dimethoate	mg/kg	< 0.1				NR_19
Chlorpyrifos	mg/kg	< 0.1				NR_19
Chlorpyrifos Methyl	mg/kg	< 0.1				NR_19
Malathion	mg/kg	< 0.1				NR_19
Fenthion	mg/kg	< 0.1				NR_19

REPORT OF ANALYSIS

Lab Reg No.		N08/002365				
Sample Reference	Units	FD2				Method
Organophosphate (OP) Pesticides						
Ethion	mg/kg	< 0.1				NR_19
Fenitrothion	mg/kg	< 0.1				NR_19
Chlorfenvinphos (E)	mg/kg	< 0.1				NR_19
Chlorfenvinphos (Z)	mg/kg	< 0.1				NR_19
Parathion (Ethyl)	mg/kg	< 0.1				NR_19
Parathion Methyl	mg/kg	< 0.1				NR_19
Pirimiphos Methyl	mg/kg	< 0.1				NR_19
Pirimiphos Ethyl	mg/kg	< 0.1				NR_19
Azinphos Methyl	mg/kg	< 0.1				NR_19
Azinphos Ethyl	mg/kg	< 0.1				NR_19
Surrogate						
Surrogate OC Rec.	%	111				NR_19
Surrogate OP Rec.	%	117				NR_19
Dates						
Date extracted		24-JAN-2008				
Date analysed		25-JAN-2008				

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Lab Reg No.		N08/002365				
Sample Reference	Units	FD2				Method
Trace Elements						
Total Solids	%	92.4				NT2_49

Deborah Yen, Analyst
Inorganics - NSW
Accreditation No. 198

30-JAN-2008

All results are expressed on a dry weight basis.

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This Report supersedes reports: RN660636 RN660669

REPORT OF ANALYSIS

Report No. RN660818

Client	: Environmental & Earth Sciences (NSW) The Coal Loader Balls Head Road Waverton NSW 2060	Job No. Quote No. Order No. Date Sampled Date Received	: ENVI10/080122 : QT-00043 : : : 22-JAN-2008
Attention	: MATT CLUTTERHAM	Sampled By	: CLIENT
Project Name	:		
Your Client Services Manager	: BRIAN WOODWARD	Phone	: (02) 94490151

Lab Reg No.	Sample Ref	Sample Description
N08/002354	BHE32	SOIL BATHURST JOB 107134 (0-0.1M)

Lab Reg No.		N08/002354				
Sample Reference	Units	BHE32				Method
Poly Aromatic Hydrocarbons						
Naphthalene	mg/kg	< 1				NGCMS_1111
Acenaphthylene	mg/kg	< 1				NGCMS_1111
Acenaphthene	mg/kg	< 1				NGCMS_1111
Fluorene	mg/kg	< 1				NGCMS_1111
Phenanthrene	mg/kg	< 1				NGCMS_1111
Anthracene	mg/kg	< 1				NGCMS_1111
Fluoranthene	mg/kg	< 1				NGCMS_1111
Pyrene	mg/kg	< 1				NGCMS_1111
Benz(a)anthracene	mg/kg	< 1				NGCMS_1111
Chrysene	mg/kg	< 1				NGCMS_1111
Benzo(b)&(k)fluoranthene	mg/kg	< 2				NGCMS_1111
Benzo(a)pyrene	mg/kg	< 1				NGCMS_1111
Indeno(1,2,3-cd)pyrene	mg/kg	< 1				NGCMS_1111
Dibenz(ah)anthracene	mg/kg	< 1				NGCMS_1111
Benzo(ghi)perylene	mg/kg	< 1				NGCMS_1111
Organochlorine (OC) Pesticides						
HCB	mg/kg	< 0.01				NR_19
Heptachlor	mg/kg	< 0.01				NR_19
Heptachlor epoxide	mg/kg	< 0.01				NR_19
Aldrin	mg/kg	< 0.01				NR_19
gamma-BHC (Lindane)	mg/kg	< 0.01				NR_19
alpha-BHC	mg/kg	< 0.01				NR_19
beta-BHC	mg/kg	< 0.01				NR_19
delta-BHC	mg/kg	< 0.01				NR_19
trans-Chlordane	mg/kg	< 0.01				NR_19
cis-Chlordane	mg/kg	< 0.01				NR_19
Oxychlordane	mg/kg	< 0.01				NR_19
Dieldrin	mg/kg	< 0.01				NR_19
pp-DDE	mg/kg	0.049				NR_19
pp-DDD	mg/kg	< 0.01				NR_19
pp-DDT	mg/kg	< 0.01				NR_19

REPORT OF ANALYSIS

Report No. RN660818

Lab Reg No.		N08/002354				
Sample Reference	Units	BHE32				Method
Organochlorine (OC) Pesticides						
Endrin	mg/kg	< 0.01				NR_19
Endrin Aldehyde	mg/kg	< 0.01				NR_19
Endrin Ketone	mg/kg	< 0.01				NR_19
alpha-Endosulfan	mg/kg	< 0.01				NR_19
beta-Endosulfan	mg/kg	< 0.01				NR_19
Endosulfan Sulfate	mg/kg	< 0.01				NR_19
Methoxychlor	mg/kg	< 0.01				NR_19
BTEX						
Benzene	mg/kg	< 0.5				NGCMS_1121
Toluene	mg/kg	< 0.5				NGCMS_1121
Ethyl Benzene	mg/kg	< 0.5				NGCMS_1121
m, p - Xylene	mg/kg	< 1				NGCMS_1121
o - Xylene	mg/kg	< 0.5				NGCMS_1121
Organophosphate (OP) Pesticides						
Dichlorvos	mg/kg	< 0.1				NR_19
Demeton-S-Methyl	mg/kg	< 0.1				NR_19
Diazinon	mg/kg	< 0.1				NR_19
Dimethoate	mg/kg	< 0.1				NR_19
Chlorpyrifos	mg/kg	< 0.1				NR_19
Chlorpyrifos Methyl	mg/kg	< 0.1				NR_19
Malathion	mg/kg	< 0.1				NR_19
Fenthion	mg/kg	< 0.1				NR_19
Ethion	mg/kg	< 0.1				NR_19
Fenitrothion	mg/kg	< 0.1				NR_19
Chlorfenvinphos (E)	mg/kg	< 0.1				NR_19
Chlorfenvinphos (Z)	mg/kg	< 0.1				NR_19
Parathion (Ethyl)	mg/kg	< 0.1				NR_19
Parathion Methyl	mg/kg	< 0.1				NR_19
Pirimiphos Methyl	mg/kg	< 0.1				NR_19
Pirimiphos Ethyl	mg/kg	< 0.1				NR_19
Azinphos Methyl	mg/kg	< 0.1				NR_19
Azinphos Ethyl	mg/kg	< 0.1				NR_19
Total Petroleum Hydrocarbons						
TPH C6 - C9	mg/kg	< 25				NGCMS_1121
TPH C10 - C14	mg/kg	< 50				NGCMS_1112
TPH C15 - C28	mg/kg	< 100				NGCMS_1112
TPH C29 - C36	mg/kg	< 100				NGCMS_1112
Surrogate						
Surrogate semivolatile Rec.	%	103				
Surrogate volatile Rec	%	100				
Surrogate OC Rec.	%	113				NR_19
Surrogate OP Rec.	%	112				NR_19
Dates						
Date extracted		24-JAN-2008				

REPORT OF ANALYSIS

Lab Reg No.		N08/002354				
Sample Reference	Units	BHE32				Method
Dates						
Date analysed		25-JAN-2008				

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Organics - NSW
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30-JAN-2008

Lab Reg No.		N08/002354				
Sample Reference	Units	BHE32				Method
Trace Elements						
Total Solids	%	92.9				NT2_49

Deborah Yen, Analyst
Inorganics - NSW
Accreditation No. 198

30-JAN-2008

All results are expressed on a dry weight basis.

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This Report supersedes reports: RN660636 RN660669

SYDNEY ANALYTICAL LABORATORIES

A.C.N. 003 614 695
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PROVISIONAL RESULTS ONLY

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ENVIRONMENTAL & EARTH SCIENCES
M. CUTTERHAM

No. of Samples 30
Type of Samples Soils
Client Order 107134

Ref No. SAL 20259
Date In 22/1/08
Date Required
Date Completed 8/2/08

Analysis		Cu	Pb	Zn	Cd	Cr (mg/kg)	Ni	As	Hg				
Sample No(s)													
COMP1		5.0	8.0	31	<0.5	15	6.0	3.5	<0.005				
COMP2		7.0	8.0	24		19	6.0	3.0					
COMP3		8.0	7.0	21		12	5.0	3.0					
COMP4		8.0	10	22		13	5.0	3.0					
COMP5		6.0	9.0	47		20	10	4.0					
COMP6		10	9.0	26		15	6.0	3.5					
COMP7		8.0	7.0	13		20	3.0	3.0					
COMP8		6.0	10	21		14	5.0	3.0					
COMP9		15	10	18		19	5.0	2.5					
COMP10		14	7.0	15		16	4.0	2.0					
SP1/1		7.0	10	30		16	9.0	3.0					
SP2/1		11	9.0	22		11	5.0	2.5	0.005				
SP3/1		9.0	10	50		14	8.0	3.5	<0.005				
SP4/1		5.0	13	33		9.0	3.0	3.0					
SP5/1		9.0	14	38		13	6.0	4.0					
BH82/0-0.1		9.0	13	45		14	12	4.0					
7/0-0.3		16	36	140		17	10	5.0					
38/0-0.2		9.0	12	55		13	11	4.5					
0.8-1.0		5.0	10	21		16	7.0	3.0					
13/0-0.1		11	13	68		18	16	4.5					
14/0-0.2		7.0	16	45		12	4.0	4.0					
5/0.8-1.0		6.0	11	15		9.0	3.0	2.0					
4/0.1-0.2		9.0	10	45		11	5.0	3.0					
10/0.1-0.3		13	44	59		16	11	3.5					
12/0.15-0.25		7.0	15	59		13	5.0	3.5					
BLANK		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.005				
BCSS-1		20	23	120	<0.5	92	58	11	0.11				

ALL ANALYSES ON SAMPLES AS RECEIVED

S1/Issue 2

Chief Chemist

SYDNEY ANALYTICAL LABORATORIES
A.C.N. 003 614 695
Phone: (02) 9838 8903
Fax: (02) 9838 8919

PROVISIONAL RESULTS ONLY

2x2
ENVIRONMENTAL & EARTH SCIENCES
M. CLUTTERHAM

No. of Samples 30
Type of Samples Soils
Client Order 107134

Ref No. SAL 20259
Date In 22/1/08
Date Required
Date Completed 8/2/08

Analysis		←				mg/kg			→			
Sample No(s)		Cu	Pb	Zn	Cd	Cr	Ni	As	Hg			
FD1		18	41	155	<0.5	18	10	5.0	<0.005			
FD2		8.0	15	40	↓	16	6.0	4.0	↓			
Bkellowarra		8.0	12	33	↓	11	4.0	4.0	↓			

ALL ANALYSES ON SAMPLES AS RECEIVED

Chief Chemist

Barker Ryan Stewart
Planning • Sustainability • Infrastructure • Development • Certification

CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN ASSESSMENT

PROPOSED SERVICE STATION, FAST FOOD OUTLETS & BULKY GOODS RETAIL DEVELOPMENT

1 PAT O'LEARY DRIVE
KELSO

December 2009
Our Ref: 20090268

Barker Ryan Stewart
Planning • Sustainability • Infrastructure • Development • Certification

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Attachment A – McDonalds Plan of Management
Figure 1: Air Photo of Site and Neighbouring Land

Project No.	20090074
Author	IS
Checked	IS
Approved	IS
Signature	

Rev No.	Status	Date	Comments
1	Draft for comment	22/12/09	
2	Final	23/12/09	

1.0 INTRODUCTION

1.1 Overview

The purpose of this report is to consider the potential crime risk caused by the proposed development at 1 Pat O'Leary Drive Kelso and to identify proactive and preventative building design measures to minimise opportunities for crime.

The report has been prepared in accordance with the Crime Prevention Through Environmental Design (CPTED) guidelines prepared by the NSW Police in conjunction with the Department of Planning.

CPTED is a crime prevention strategy that focuses on the planning, design and structure of cities and neighbourhoods.

There are four CPTED principles that need to be considered when designing developments.

- Surveillance;
- access control;
- territorial reinforcement; and
- space management.

The assessment of the development considers these principles to recommend preferred design outcomes.

1.2 Background

This report relates to Development Application 2010/0286 lodged by Stevens Group for a service station, fast food outlets and bulky goods retail premises.

The NSW police Force has reviewed DA 2010/0286 and made comment on the potential crime and safety impacts caused by the development.

The NSW Police Force has identified the site as High Crime Risk and has recommended Crime Prevention Through Environmental Design (CPTED) treatments to reduce the opportunities for crime.

This report addresses the issues raised by the NSW Police Force and confirms the proposed design treatments agreed to by the client.

2.0 DESCRIPTION OF PROPOSAL

The assessed DA plans have been prepared by Andrews Neil UDG (Ref: 09159 Dwg DA/A/00 to DA/A/08 and LD01).

Development consent is sought for a service station, fast food outlets and bulky goods retail premises.

The service station will be branded by a national operator and will include a canopy refuelling area, a small service station store and associated parking and manoeuvring areas.

The fast food outlets will include a McDonalds Restaurant at the corner of Pat O'Leary Drive and Great Western Highway. The McDonalds Restaurant will include a drive-thru zone and dedicated car parking area.

A KFC Restaurant will be located towards the middle of the site and can be accessed via internal driveways. The KFC outlet will also have a drive-thru zone and dedicated car parking area.

The service station, McDonalds and KFC outlets will operate 24 hours seven days a week.

Three large buildings will be positioned along the western, southern and eastern boundaries of the site. The large buildings will be used for bulky goods retail and include some small food outlets for use by customers and staff. The food outlets will trade during business hours and will not operate beyond closing times of the bulky goods retail outlet. Future bulky goods tenants are yet to be identified.

An at grade car park will be located in the centre of the site and surrounded by the bulky goods outlets.

Truck service lanes will be provided to the rear of the bulky goods outlets for loading and unloading.

Landscaping will be provided around the property perimeter and throughout the car park for shade.

Customer and accessible public toilets will be provided within each building.

3.0 LOCAL CONTEXT

The site area is 4.454ha and is irregular in shape.

The site has frontage to Great Western Highway and Pat O'Leary Drive.

The property description is Lots 4 & 5 DP 838537, No. 1 Pat O'Leary Drive Kelso.

The site is mostly vacant cleared land, apart from a machinery sales outlet (i.e. tractors, excavators) located near the site frontage and adjacent to Pat O'Leary Drive.

The site is gently undulating and slopes from the rear southern boundary to the front northern / Great Western Highway boundary.

A small creek forms the north-western boundary of the site.

Surrounding land uses include:

- To the north – Bathurst Pet Shop and residential dwellings located on the opposite side of the Great Western Highway.
- To the south – the Great Western Railway line forms the southern boundary of the site. Further south is an industrial estate comprising large warehouse style buildings and vacant land yet to be developed.
- To the east – industrial premises adjoin the site including Blatch Quality Smash Repairs and Devro-Teepak.
- To the west – assorted businesses including, Gold Country Transport, Great Western Motorcycles and Western Event Hire.

Figure 1: Air Photo of Site and Locality

4.0 ASSESSMENT OF PROPOSAL IN ACCORDANCE WITH CPTED PRINCIPLES

4.1 Surveillance

From a design perspective, 'deterrence' can be achieved by:

- clear sightlines between public and private places;
- effective lighting of public places; and
- landscaping that makes places attractive, but does not provide offenders with a place to hide or entrap victims.

Positive surveillance features of the development include:

- Clear sight lines are available across the central car park area;
- The car park will be clearly visible from the Great Western Highway and Pat O'Leary Drive.
- The landscaping design does not obstruct views across the site or provide areas for hiding and entrapment.
- The introduction of 24hour operations will ensure that the site remains active at all times and will promote passive surveillance of the site by staff and customers.

Table 1 lists potential 'surveillance' issues and recommended strategies to minimise crime risk.

Table 1: Surveillance issues and recommendations

Surveillance Issues	Recommendation
The area to the rear of the McDonalds restaurant is not overlooked from the restaurant and is not visible from Great Western Highway.	- The area shall be well lit at night in accordance with the Australian Standard for lighting in commercial areas. - Consideration should be given to the installation of Close Circuit TV (CCTV).
The rear and delivery sides of the KFC restaurant is not overlooked from the restaurant and is not visible from surrounding streets.	- The area shall be well lit at night in accordance with the Australian Standard for lighting in commercial areas. - Consideration should be given to the installation of Close Circuit TV (CCTV).
The pathway to the rear of the service station building is adjacent to the creek line and may be screened from view by existing and proposed landscaping.	- Minimise density of planting in this area to maintain clear sightlines. - Install sensor lighting. - Consideration should be given to the installation of Close Circuit TV (CCTV).
The truck delivery lanes to the rear of the	- Install sensor lighting.

bulky goods outlets will not be visible from the proposed buildings; car park or nearby roads.	➢ Prevent vehicle access to these areas by installing lockable barriers at designated areas to prevent car access out of standard business hours. The barriers should be locked by management at the close of each business day.
Positioning of CCTV cameras	➢ Position CCTV at places where the offender/s is most likely to have to pass or want to access, such as building entry/exit points, cash registers, rear storerooms or areas where high value items are kept. ➢ CCTV should be clearly visible to deter potential offenders. ➢ Placed at a height that captures a full view of the offenders face whilst not being obscured by other interferences. ➢ In areas where image capture will not be compromised by insufficient lighting
General Recommendations	➢ Lighting should be vandal resistant. ➢ Lighting should satisfy the relevant Australian Standard. ➢ Signs should be erected in areas which are restricted prohibited or under surveillance to discourage criminal or anti-social activity. ➢ Consider contracting a local security firm for regular inspections of the site. ➢ Minimise posters on shop windows (where possible) to ensure visibility to and from the car park is maintained. ➢ Ideally stand alone shelves within the service station store should be no more than 1.6 metres high thereby enabling clear visibility throughout the floor area by staff. ➢ Prune all trees and shrubs around buildings to enable clear visibility.

4.2 Access Control

Effective access control can be achieved by creating:

- landscapes and physical locations that channel and group pedestrians into areas
- public spaces which attract, rather than discourage people from gathering
- restricted access to internal areas or high-risk areas (like carparks or other visited areas). This is often achieved through the use of physical barriers.

Positive access control aspects of the design include:

- Access to the centre for pedestrians and motorists is clearly delineated from Great Western Highway and Pat O'Leary Drive.
- The entry to the service station, fast food outlets and bulky goods retail outlets are an attractive and safe environment for pedestrians and clearly visible from parking areas;
- All public toilets are located within the proposed buildings;
- The service station building faces the refuelling area for clear sightlines from the store to the refuelling area.

Table 2 lists potential 'access control' issues and recommended strategies to minimise crime risk.

Table 2: Access control issues and recommendations

Access Control Issues	Recommendations
The opportunity exists for offenders to hide at the rear of the service station building; and at the rear of the bulky goods outlets.	- Secure fencing should be constructed to prevent access from neighbouring properties. - Prevent vehicle access to the rear of the bulky goods buildings by installing lockable barriers at designated areas to prevent car access out of standard business hours. The barriers should be locked by management at the close of each business day. - These areas should be regularly inspected by the security contractor. - Install sensor lighting.
Ram raids	- Bollards, large rocks or planter boxes should be installed at the service station frontage and entries to the bulky goods outlets to prevent ram raids. - ATM's should be located within the buildings to minimise ram raid risk and use of explosives to access the ATM's.
Landscaping	- Avoid planting large trees adjacent to

	buildings to prevent use of ''natural ladders'' for access to roofs.
Service Station counter	➢ Consider installing an above counter barrier to prevent criminals from jumping the counter.
General Matters for Consideration	➢ Ensure all back and side doors and windows are kept secure. ➢ Predetermine and designate escape routes and safe areas for employees to move to when required. ➢ Ensure that staff members are aware of security and armed robbery procedures and what to do in the case of such an event. This routine should be regularly practiced as with any other type of emergency drill. ➢ Make use of signage and stickers promoting security measures such as: time delay locks, video surveillance and minimum cash held on premises.

4.3 Territorial Reinforcement

Territorial reinforcement can be achieved through:

- design that encourages people to gather in public space and to feel some responsibility for its use and condition;
- design with clear transitions and boundaries between public and private space;
- clear design cues on who is to use space and what it is to be used for.
- Care is needed to ensure that territorial reinforcement is not achieved by making public spaces private spaces, through gates and enclosures.

Positive territorial reinforcement aspects of the proposal include:

- Customers are naturally directed toward the entry of the service station, fast food outlets and shops.
- Vehicle access is clearly delineated.

Table 3: Territorial reinforcement issues and recommendations

Territorial Reinforcement Issues	Recommendations
Neighbouring land uses.	- Erect quality fencing to restrict access from neighbouring properties.
Way Finding	- Provide clear signage for pedestrians and motorists from the car park. - Clearly identify access to the shops. - Introduce a public address system to assist with security and management of emergencies.
Central Car Park	- Barriers should be installed to prevent access to the central car park area. - The barriers should be locked by management at the completion of trading for the bulky goods outlets.
General Recommendations	- Consider installation of a monitored security alarm system. - Prominently display any signs indicating the presence of a security system, the continual surveillance of the premises and any other security measures present. - Fully secure all external doors and windows with good quality locking devices. Make sure they are regularly maintained. All doors should be of solid construction and well fitted. - Consider installation of security bars, screens, grills or roller shutters to vulnerable windows and / or skylights, subject to BCA compliance.

4.4 Space Management

Space management strategies include:

- activity coordination;
- site cleanliness;
- rapid repair of vandalism and graffiti;
- the replacement of burned out pedestrian and car park lighting; and
- the removal or refurbishment of decayed physical elements.

Table 4 lists potential 'space management' issues and recommended strategies to minimise crime risk. The objective should be to minimise the perception of urban decay by maintaining clean and undamaged areas to minimise the fear of crime and avoidance behaviour.

Table 4: Space management issues and recommendations

Space Management Issues	Recommendations
Waste storage	- Garbage bins and waste storage receptacles should be regularly emptied to prevent overflowing rubbish.
Graffiti	- Remove graffiti as quickly as possible to minimise potential for cumulative graffiti and vandalism actions. - Install vandal resistant lighting where applicable.
Toilets	- Toilets should be regularly maintained and kept clean at all times. - Lighting should be consistent and even to maximise visibility. - Consider installing vandal proof mirrors.
Lighting Repair	- The management regime should ensure that lighting is repaired as soon as possible after any lighting failure or damage.
Cleanliness and Maintenance	- The management regime shall ensure that the site is kept clean and tidy at all times. - Clear all building perimeters including fences of rubbish and potential climbing aids. - Maintain well built and adequately secured boundary gates and fences.

5.0 CONCLUSION

Our assessment of the proposal in accordance with the CPTED principles confirms that the development can be managed to minimise the potential risk of crime and a re-design of the proposal is not required.

In our opinion the proposed 24hr trading is considered acceptable in this instance because it will maintain a constant flow of customers to the service station and McDonalds Restaurant for good passive surveillance.

The recommended strategies are summarised as follows:

- Maintain clear sight lines across the site.
- Clearly delineate public spaces from private areas.
- Maintain low level planting in appropriate locations to provide good visibility of the site from surrounding streets.
- Surveillance of pathways, and concealed areas should be maximised through a combination of CCTV and inspections by security contractors.
- The car park and external areas should be well lit at night. The car park should be secured after hours.
- Implementing an ongoing maintenance plan.

This report can be relied on as guide for security management across the site. It is anticipated that each business will also implement individual security management plans. For information purposes a Plan of Management prepared by McDonalds Australia is included as Attachment A.

ATTACHMENT A

McDONALDS AUSTRALIA – PLAN OF MANAGEMENT

Plan of Management

Proposed McDonald's Family Restaurant
Pat O'Leary Drive and Sydney Roads, Kelso, NSW

1 Introduction and Context

This Plan of Management for McDonald's Australia Limited has been prepared responsively to the following:

- Environmental Planning and Assessment Act 1979;
- NSW Police Safer by Design Principles;
- Building Code of Australia;
- Australia Standards;
- Site Plans; and

To counter the potential for crime offences, the crime prevention and security philosophy adopted by McDonald's Australia Limited and specifically as part of this proposal has taken into account the various security and crime prevention initiatives available.

The proposed McDonald's Family Restaurant recognises the need to ensure the safety and the security of customers, staff, residents and the greater community in which the restaurant resides. With this philosophy in mind, McDonald's places a high priority in crime prevention and security which is reinforced by standard operating procedures and regular staff training. The goal of this philosophy is to foster well-being within the area through the promotion of community safety, crime prevention and continuous review.

The security design of the proposed restaurant encapsulates the key ingredients of Crime Prevention through Environmental Design (CPTED) including:

- Increasing the perception of risk to criminals by increasing the possibility of detection, challenge and capture of lighting, CCTV coverage, etc
- Increasing the effort required to commit crime by increasing the time, energy or resources needed to be expended by installing high quality locking devices, barriers, door hardware, roller shutters, etc
- Reducing the potential rewards of crime by minimising, removing or concealing assets and valuables by additional physical security measures and introducing a security awareness programme for all employees; and
- Removing conditions that create confusion about required norms of behaviour such as erecting clearly defined signage, introducing access points and signage.

The policies and procedures outlined in this Plan of Management will help to make the premises a safe, efficient and pleasant environment in which to work and visit. Additionally, the safety and security issues addressed in this Plan of Management have been devised to ensure the quiet amenity of surrounding properties is maintained at all times during the operation of the premises. All staff are required to be familiar with this Plan of Management.

2 Safety and Security

2.1 Surveillance

2.1.1 CCTV Camera Systems

Closed Circuit Television (CCTV) will be provided on the site. The system will have automated recording technology, long video storage, video motion detection and advanced camera technology allowing greater video resolution and coverage.

As the restaurant car park will be accessible to pedestrians 24 hours a day, the CCTV system is designed to provide 24 hour surveillance of this area.

All cameras will record 24 hours a day and video images are retained for a period of 31 days prior to being overwritten. Due to the advanced automation of the new technology, monitoring and retrieval time is reduced which allows for efficient security reviews or actions where customers, residents and members of the public will best notice the security presence.

McDonald's can ensure that the coverage will be operated with due regard to the privacy and civil liberties of all persons within the development and in strict accordance with the Privacy and Personal Information Protection Act.

McDonald's employees and neighbouring residents will be encouraged to assist with passive surveillance of all areas of the development and in particular the car park, by providing efficient reporting systems for any security or safety concerns on a 24 hour basis.

2.1.2 Intruder Alarm System

McDonald's Kelso will install an extensive intruder alarm system including perimeter protection, movement detection and access control. The system will achieve an added sense of crime prevention and security. The system will allow monitoring of who is accessing what areas and a response to alarms and audit breaches of security in a timely and efficient manner.

All perimeter access points to the restaurant will include electronic detection measures to prevent unauthorised persons entering the development particularly after hours. The intruder system will be monitored 24 hours a day and security will be able to respond to alarms swiftly. The intruder alarm will be installed and monitored in accordance with Australian Standard 2201.

2.1.3 Lighting

Lighting is seen as a primary means to prevent crime. The proposed restaurant will take into account this key ingredient with perimeter lighting provided on site.

Perimeter lighting will be provided around the restaurant site to enable clear vision and designed in such a manner so as to prevent concealment and shadowing. The standard of lighting not only ***"reduces the fear of crime"*** in accordance with Australian Lighting Standards, but also serves to provide clear identification of the activity using the high technology CCTV cameras.

2.1.4 Clear Sightlines

The McDonald's restaurant will take account of the need to maximise clear sightlines. The design incorporates the maximum use of natural surveillance and the minimisation of obstructions such as physical barriers to ensure these clear sightlines.

The building design and external landscaping design has taken into account the need to reduce and indeed minimise potential concealment areas where would be offenders can loiter without detection.

2.1.5 Risk Assessment

Upon commissioning of the proposed McDonald's Family Restaurant in Kelso, McDonald's Australia will undertake a risk assessment to determine the need for security personnel at the site. As is standard McDonald's practice the risk assessment process will be continuous at this site.

2.1.6 Code of Conduct for Security Personnel (if applicable)

Any security personnel employed on the site will:

- possess a current security licence and have satisfactorily completed all relevant training associated with a crowd control licence;
- be licensed under the appropriate legislation relating to crowd control;
- conduct themselves in accordance with the industry code of practice;
- maintain a well kept, tidy and professional appearance and be at all times easily recognisable as "security personnel"; and
- be respectful of people and treat people in a dignified manner.

2.2 Access Control

The proposed development will utilise an intruder alarm system, access control and CCTV systems to monitor access within the restaurant and car park.

2.2.1 Signage

Clearly identifiable signage will be installed in and around the restaurant to indicate which areas are open to customers and members of the public and which areas are restricted.

2.3 Territorial Reinforcement

2.3.1 General

The security design and crime prevention strategy is aimed to foster a feeling of ownership with the employees, customers and residents.

The proposed restaurant has been designed to encourage people to meet, consume food and refreshments and assume ownership and responsibility for the restaurant.

2.3.2 Cleaning and Maintenance Staff

Cleaning staff are a crucial part of the overall security and safety system. Vandalism, graffiti and general untidiness (if any) will be attended to at once it has come to the management's attention and where possible within 24 hours. This is an indication of the high priority that is given to the general appearance of all the McDonald's restaurants.

2.3.3 Segregation

Where is it obviously required, segregation of areas between public and the "back of house" is implemented by means of physical barriers, signage, supervision and locking devices.

The restaurant will take account of the need to (as far as practical) encourage public gathering by designing areas that are clean, open and well lit and so creating a sense of well-being and safety.

During the extended hours of operation overt CCTV cameras will monitor the area and discourage people loitering in areas that will be clearly closed to the public.

2.4 Space Management

2.4.1 Toilets

Public toilets will be clearly sign posted indicating their location. The toilets will be located in areas, which maximise clear sightlines, in well lit areas that engender an overall sense of safety to the user, particularly the females, children and elderly. These facilities will only be available during the operational hours of the internal McDonald's restaurant.

2.4.2 Seating and Design

The restaurant will take account of the need to provide seating and other comforts for persons visiting the restaurant without interfering or disrupting pedestrian flows. This philosophy is designed to encourage increased use of common areas to reduce the potential for security breaches by natural surveillance.

2.4.3 Landscaping

Landscaping is to be maintained regularly with trees and shrubs trimmed away from doors and windows as relevant.

2.4.4 Ejection of Patrons

The following procedure will apply to all staff that are involved in the removal of a person from the premises who is intoxicated, drunk or disorderly:

- Verbal communication with the customer will occur;
- Security personnel and/or the duty manager will be instructed to contact the Police for assistance in removing any customers who exhibits ant-social behaviour;
- an Incident Report will be completed following any altercation and/or disturbance stating all the relevant information for reference purposes.

2.4.5 Money Handling

An independent security company will be employed to undertake all movement of cash to and from the premises. There will be no cash movements from the premises by staff at any stage. There will be no movement of monies from the premises at night.

4 Operational Procedures

4.1 Communication

Staff training days will be held on a regular basis to reinforce safety and security procedures for the restaurant. Employees will be encouraged to report any suspicious activity of persons in and around the area to the Duty Manager and/or the Local Police.

4.2 Incident Report

An Incident Report will be required to be completed on all incidents that necessitate action by an emergency service, fire brigade, police and maintenance called in after hours. The duty manager is also required to be informed.

All incidents including vandalism and graffiti will be recorded, together with the response time taken to repair or remove the property affected or offending material. The frequency of incidents together with the respective response will be included in the regular site performance reviews to ensure the maintenance of acceptable standards.

4.3 Telephones

Telephones are to be pre-programmed with the emergency number ‘000’ and the Local Area Command numbers for quick reference by staff.

4.4 Registering of Complaints

Any complaints received will be documented and followed up by Management.

4.5 Unloading/Loading of Service and Delivery Vehicles

The loading and unloading of service and delivery vehicles will occur within the designated loading dock. Loading and unloading times will be restricted to times that will limit any disturbance to patrons in the premises or the amenity of the surrounding area.

4.6 Noise Management

The duty manager will closely monitor the noise management procedures and will ensure that customers keep noise down upon entering and leaving the premises. If required, signs may be at the points of exit requesting customers leave quietly and in a prompt manner so as not to cause any disturbance to the surrounding neighbourhood.

5 Consultation and Assessment

McDonald's are committed to ongoing consultation with the residents, Police and Council to foster a better understanding of relevant security issues. McDonald's are also members of the Security & Allied Industry Federation which meets the NSWPOL, QPOL, VICPOL and AFP on a quarterly basis to discuss crime trends and other related issue.

6 Conclusion

On the information currently available in preparation of this report we believe at this time that the security risk treatments outlined will effectively maintain a safe environment within the proposed McDonald's Restaurant at Kelso.

McDonald's standard operating procedures have been specifically developed to support workplace safety, prevent crime and to respond to any public order incidents that may occur within this development or any other store.