

**SITE SELECTION INVESTIGATION  
FOR  
MOLONGLO PETROL STATION  
VERSION 1**

**NOVEMBER 2013**



**CANBERRA**  
6A Thesiger Court  
Deakin ACT 2600  
Phone: (02) 6285 1022  
Fax: (02) 6285 2618

**SYDNEY**  
O: Level 7, 80 George Street  
Parramatta NSW 2150  
M: PO Box W67  
Parramatta Westfield NSW 2150  
Phone: (02) 9633 2273

ABN: 37 008 581 066  
ACN: 008 581 066  
Web: [www.indescocom.au](http://www.indescocom.au)  
Email: [indescocom.au](mailto:indescocom.au)

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Prepared by:	Anna Nagalingam	26 November 2013	
Reviewed by:	John Randall	26 November 2013	
Approved by:	Angus Gorman	26 November 2013	

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## ATTACHMENTS

Attachment A	Drawings
Attachment B	Photos
Attachment C	Correspondence with agencies / authorities

## EXECUTIVE SUMMARY

Indesco Pty Limited was engaged Knight Frank on behalf of the Land Development Agency (LDA) in October 2013 to prepare a preliminary investigation and Site Selection Report for six sites in Weston Creek. The six sites were nominated by the LDA and are referred to as Sites A-F in this report. This report will form part of a broader commercial feasibility study to assess the most suitable site for the development of a petrol station and Recycling Drop Off (RDOC) facility.

The sites are located in close proximity to Cotter Road, to the west of Tuggeranong. The proposed site is expected to have an area of approximately 3,000m<sup>2</sup>. This site investigation report identifies and maps the existing infrastructure at each of the nominated sites. An assessment is then made of the extent of works required to relocate or augment existing infrastructure to allow for servicing of the selected site. This study does not consider broader financial or commercial considerations that will contribute to the site selection process.

The investigation has concluded that most sites are encumbered by existing services or trees. Revised block boundaries and a variation to the zoning provisions within the Territory Plan will be required for all of the sites. In summary, the following conclusions were reached for each site:

- Site A: Potentially feasible location, subject to further investigation.
- Site B: Encumbered by significant existing infrastructure, determined to be unfeasible at this stage.
- Site C: Encumbered by existing infrastructure and difficult to provide vehicle access. Determined to be unfeasible at this stage.
- Site D: Potentially feasible location, subject to further investigation.
- Site E: Potentially feasible location, subject to further investigation. Significant infrastructure augmentation work required.
- Site F: Encumbered by existing trunk sewer main and vehicle access constraints. Determined to be unfeasible at this stage.

Sites A and D were determined to be the preferred options for the proposed development on the basis of the existing infrastructure related encumbrances. Site E was also included as an option at this stage. Conceptual services augmentation schemes were described for the proposed development.

Actew Water provided preliminary advice that the sewer and water supply networks at the preferred sites would have sufficient capacity for the proposed development.

Servicing costs were prepared as an input to the broader commercial feasibility study. A 30% contingency was then applied to these costs due to the conceptual nature of the service requirements. The opinion of probable costs for capital works was as follows:

- Site A \$178,000 to \$300,000
- Site D \$1,735,000 to \$2,489,000
- Site E \$2,830,000 to \$3,134,000

## SUMMARY OF RECOMMENDATIONS

A single preferred site was not selected at this stage. Broader commercial and planning considerations will need to be taken into account prior to determining the most suitable location. The report recommended that the following additional investigations are undertaken for the selected site.

### Site A

- Obtain or determine 100 Yr Annual Recurrence Interval (ARI) flood levels for the section of Weston Creek adjacent to the site.
- Investigate grading requirements for the site on the basis of driveway and flood levels.
- Determine revised block boundaries. Allow a minimum of 7m set back from the existing 750Ø trunk sewer main.
- Confirm sewer invert levels and grading requirements for the site.
- Undertake appropriate due diligence investigations including a tree survey, geotechnical, contamination and traffic studies.

### Site D

- Undertake planning for future residential development in close proximity to the site.
- Complete studies to upgrade Kirkpatrick Street to accommodate semi-articulated fuel vehicles.
- Complete studies to provide stormwater infrastructure to service the site.
- Confirm sewer invert levels to provide a service tie to the site.
- Investigate grading requirements for the site in the context of neighbouring land use.
- Investigate the status of contamination remediation works.
- Undertake appropriate due diligence investigations including geotechnical, contamination and traffic studies.

### Site E

- Undertake planning for future residential development in close proximity to the site.
- Complete studies to upgrade Kirkpatrick Street to accommodate semi-articulated fuel vehicles.
- Complete studies to provide sewer, water and stormwater infrastructure to service the site.
- Investigate the requirements of the existing Environmental Management Plan.
- Undertake appropriate due diligence investigations including a tree survey, geotechnical, contamination and traffic studies.

## 1. INTRODUCTION

Indesco Pty Limited was engaged by Knight Frank on behalf of the LDA in October 2013 to prepare a Site Selection Report for six potential sites in Weston Creek. The six sites to be investigated were nominated by the LDA and are shown in Figure 1 below. This report will form part of a broader commercial feasibility study to assess the most suitable site for the development of a petrol station. It is proposed that the site will also contain a Recycling Drop Off (RDOC) facility.

The aim of the report is to identify the existing infrastructure and site conditions. This report further provides an initial assessment of the capacity of the infrastructure to service the demands of the proposed development.

Indesco advises that this report is current for three months after date of issue as existing services and site conditions may be subject to change. It should be noted that information obtained from Dial Before You Dig enquiries and used for locating existing services is current for 30 days from 18 October 2013.

This report contains the following attachments:

Attachment A              Drawings

Attachment B              Photos

Attachment C              Correspondence



**Figure 1              Potential sites showing possible entry and exits (LDA, RFT 22974.110)**

## 2. LAND USE & PLANNING FRAMEWORK

The sites are located on Territory Land and will be assessed under the requirements of the Territory Plan. The site zoning under the Territory Plan, current land use and custodianship is summarised in the table below.

**Table 1: Current Land Use**

Site	Section	Block	Land Use Zone	Current Land Use	Lease Details
A	45	17	PRZ2: Restricted Access Recreation Zone	TaMS Depot	Unleased, TaMS administered
		18		Archery Range	Leased, Private Land
B	47	3	NUZ3: Hills, Ridges and Buffer Areas	Vacant land	Unleased, TaMS administered
C	47	3	NUZ3: Hills, Ridges and Buffer Areas	Holder Community Garden, temporary construction site office	Unleased, TaMS administered
D	(Proposed) Rural Block 1218		RZ1: Suburban CZ5: Mixed Use	Vacant land	Unleased, TaMS administered
E	Rural Block 1193		RZ1: Suburban	Vacant land	Unleased, TaMS administered
F	83	22	NUZ3: Hills, Ridges and Buffer Areas	Vacant land	Unleased, TaMS administered

The proposed development consisting of a petrol station and RDOC facility are not consistent with the current zoning provisions. A variation to the Territory Plan may be required.

A development model consisting of 3,000m<sup>2</sup> block, with a petrol station, small convenience store and a RDOC facility has been used as the basis for this investigation.

## 3. INVESTIGATION SCOPE

The following elements were investigated as part of this report:

- Establish the nature and configuration of any existing or proposed infrastructure;
- Identify the infrastructure requirements to service the potential sites;
- Develop concept schemes for the augmentation or upgrade required to existing or proposed infrastructure to ensure servicing of the potential sites;
- Prepare cost estimates for the servicing of the potential sites;
- Collaborate with the project team in the analysis of the sites and the identification of the most feasible option.

## 4. SITE DESCRIPTION AND LOCATION

The sites are located west of Tuggeranong Parkway in the district of Weston Creek. All six sites are in close proximity to Cotter Road, which is an arterial road linking South Canberra with the developing Molonglo region. The suburbs of Weston Creek and Holder are located directly to the south of Cotter Road. To the north of Cotter Road there is mixed development including some residential blocks, RSPCA animal shelter and the Australian Defence Force (ADF) Joint Service Staff College. The Molonglo River is located to the north of the potential sites.

The site locations are shown on the following drawings in Attachment A:

- Drawing 5286-00-001 Locality Plan
- Drawing 5286-01-001 Aerial Overlay Plan Sites A & B
- Drawing 5286-02-001 Aerial Overlay Plan Site C
- Drawing 5286-03-001 Aerial Overlay Plan Sites D
- Drawing 5286-04-001 Aerial Overlay Plan Sites E & F

Photographs of the sites are included in Attachment B.

### 4.1 SITE DESCRIPTION SITE A

Site A consists of 3,000m<sup>2</sup> at the southwest corner of the Streeton and Dixon Drive intersection, located across Blocks 17 and 18, Section 45, Holder. Block 17 is currently used as a TaMS Depot. Block 18 is currently used as an Archery Range by the Weston Valley Archery Club. Vehicle access is provided from Dixon Drive.

Site A is grassed and there are a number of established trees. Shared paths have been provided in the verges of Streeton and Dixon Drives. The shared path crosses through the site near the intersection of Streeton and Dixon Drives. Weston Creek flows through a concrete lined channel to the west of the site. There is a major gross pollutant trap (GPT) and spillway prior to the Dixon Drive underpass. Weston Creek continues under Dixon Drive and Cotter Road and conveys stormwater into Weston Creek Pond.

Adjacent to Site A, Streeton Drive is a four lane divided road with grassed verges and median. Dixon Drive is a two lane undivided road. Access to the TaMS Depot and Archery Range is provided from Dixon Drive.

The site is lower than the Streeton Drive road reserve and slopes to the west with an average slope of 4%.

### 4.2 SITE DESCRIPTION SITE B

Site B consists of 3,000m<sup>2</sup> at the northwest corner of the Streeton and Dixon Drive intersection, located within Block 3, Section 47, Holder. The area is currently vacant land.

Site B is grassed and there are established trees along Streeton and Dixon Drives. Weston Creek flows through a concrete lined channel to the west of the site. This channel continues under Cotter Road and conveys stormwater into Weston Creek Pond. A stormwater culvert under Streeton Drive discharges overland flows through a headwall at the eastern boundary of the site. A open channel has been constructed across the site to convey these flows into Weston Creek.

To the west of Site B, a vehicle access from Dixon Drive provides access via a sealed internal road to the Holder Community Gardens in the north of Block 3. This track continues as a shared path along the western boundary and is used by cyclists and pedestrians to access the Cotter Road shared path network.

High voltage overhead power lines extend from the west and run parallel to Dixon Drive. These overhead power lines continue underground from the southwest corner of Block 3 and continue across the site.

Adjacent to Site B, Streeton Drive is a four lane divided road with grassed verges and median. Dixon Drive is a two lane undivided road.

The site slopes to the west with an average slope of 2.5%. The site is currently being used for construction stockpiles associated with Streeton Drive intersection upgrades.

#### 4.3 SITE DESCRIPTION SITE C

Site C consists of 3,000m<sup>2</sup> at the southwest corner of the Streeton Drive and Cotter Road intersection, located within Block 3, Section 47, Holder. The area is currently occupied by the Holder Community Gardens and a temporary construction site office.

Open areas within Site C are grassed, although the majority of the site consists of the temporary construction site office. In this area the topsoil has been removed. There are rows of tree plantings around the community gardens and along Streeton Drive. Weston Creek flows through a concrete lined channel to the west of the site. This channel continues under Cotter Road and conveys stormwater into Weston Creek Pond.

To the south of Site C, a vehicle access from Dixon Drive provides access via a sealed internal road to the Holder Community Gardens. This track continues as a shared path along the western boundary and is used by cyclists and pedestrians to access the Cotter Road shared path network. A second temporary access from Cotter Road provides vehicle access to the temporary construction site office.

Adjacent to Site C, Streeton Drive and Cotter Road are four lane divided roads with grassed verges and median. Two bridges have been constructed across Weston Creek for the Cotter Road carriageways. The shared paths within each verge connect under the bridge, linking the subject site with Weston Creek Pond.

The site slopes to the west with an average slope of 3.0%.

#### 4.4 SITE DESCRIPTION SITE D

Site D consists of 3,000m<sup>2</sup> with frontage to Kirkpatrick Street within Rural Block 1218, Weston Creek. The area is currently vacant land. Site D is grassed and there are no trees. The site overlooks Weston Creek Pond. The block slopes moderately southwest towards the pond. with an average slope of 6%

A RSPCA animal shelter is located on the northern side of Kirkpatrick Street, opposite the subject site. It is understood that this facility will be relocated to Symonston within the next 3 years. This area is proposed to become part of a future residential area.

Kirkpatrick Street is a two lane undivided road. The road does not have kerb or gutter and has been designed for low levels of traffic. The southern verge of Kirkpatrick Street is currently used as an informal car park with 90° parking.

#### 4.5 SITE DESCRIPTION SITE E

Site E consists of 3,000m<sup>2</sup> with frontage to Kirkpatrick Street within Rural Block 1193, Weston Creek. The site is situated between the ADF Joint Service Staff College and Tuggeranong Parkway. It is understood that the ADF Joint Service Staff College lease their site and that there is another 10 years remaining on this lease. Site E is currently registered as vacant land although it appears that livestock (horses) graze on the site.

Site E is grassed and there is a copse of established trees. There are also smaller shrubs scattered across the site. Stock fencing exists around the perimeter of the site. Security fencing is provided along the shared boundary with the ADF Joint Service Staff College. It is understood that the area will become part of a future residential area.

Kirkpatrick Street is a two lane undivided road. Adjacent to the subject site the road does not have kerb or gutter and has been designed for low levels of traffic. Kirkpatrick Street ends adjacent to the site and an unsealed turning head is provided.

Cotter Road is approximately 5m higher than Kirkpatrick Street. A grassed embankment is located between the roads. The site slopes to the northwest with an average slope of 8%.

#### 4.6 SITE DESCRIPTION SITE F

Site F consists of 3,000m<sup>2</sup> with frontage to Cotter Road, within Block 22, Section 83, Weston. The site is situated between McConchie Circuit and Tuggeranong Parkway. The area is currently vacant land. Stock fencing has been provided along Cotter Road. Site F is grassed and there numerous established trees and shrubs.

Adjacent to Site F, Cotter Road is a four lane divided road with grassed verges. The southern verge falls steeply to the south. The site slopes to the northeast with an average slope of 5%.

### 5. EXISTING SITE SERVICING

#### 5.1 GENERAL

The location and size of existing services are based on work as executed documentation and electronic files provided by TaMS, Telstra, ActewAGL, Actew Water, ACTPLA and other pertinent authorities, and are shown on the following drawings within Attachment A:

- Drawing 5286-01-002 Existing Services Plan Sites A & B
- Drawing 5286-02-002 Existing Services Plan Site C
- Drawing 5286-03-002 Existing Services Plan Sites D
- Drawing 5286-04-002 Existing Services Plan Sites E & F

Whilst every effort has been made to ensure the completeness and accuracy of this information, neither is guaranteed by Indesco. Consequently proposals regarding further servicing of the site, whilst based on sound engineering principles and judgement, are subject to the completeness and accuracy of the available information regarding the existing services.

The existing services in the vicinity of the site are represented in an indicative format and the drawings are prepared solely for the purposes of this report and for the use of the LDA.

## 5.2 EXISTING SITE SERVICING SITE A

### 5.2.1 Stormwater Drainage

Stormwater infrastructure in close proximity to the site comprises the following:

- A 300Ø stormwater main is located in the western verge of Streeton Drive. This main slopes to the north, increasing to 375Ø after Dixon Drive and connecting into 2x1,050Ø mains that cross under Unwin Street and connect to Weston Creek via an open channel in Block 3.
- Weston Creek is located to the west of the site. In this area, Weston Creek consists of a concrete lined channel. Culverts have been provided under Dixon Drive and Cotter Road.
- Stormwater mains are located in the southern verge of Dixon Drive. This main slopes to the west, crossing under Dixon Drive and discharges into Weston Creek. The diameter of this main is not shown on existing records. This main is presumed to be 300Ø however; further interrogation of Work As Executed (WAE) records would be required to progress the design for this site.

### 5.2.2 Overland Flow

A detailed analysis of stormwater overland flows was not carried out as part of this investigation. Based on a site inspection and a review of surface contours the site does not appear to be situated on an overland flow path. The site is lower than Streeton Drive, if stormwater did overtop the kerb it would cross the subject site as sheet flow.

Based on design drawings of the Streeton and Dixon Drive intersection, (the intersection is currently under construction) all roads surrounding the subject site appear well graded and no trapped low points were identified.

100 Yr Annual Recurrence Interval (ARI) flood levels have been requested for the section of Weston Creek adjacent to the subject site. Inquiries have revealed that the 100 Yr ARI flood level in the upper Weston Creek pond is approximately RL551.9. Site A is approximately RL554 at the lowest point.

### 5.2.3 Sewer

Sewer infrastructure in close proximity to the site comprises the following:

- A 150Ø sewer main is located in along the southern boundary of Block 17. This main slopes to the west, continuing in the southern verge of Dixon Drive and connects into a 375Ø main to the west of Weston Creek.
- The 375Ø sewer main continues to the north along the western side of Weston Creek, increasing in size to 525Ø before connecting in the main outfall sewer at the Weston Creek Odour Control facility.
- A 750Ø sewer main is located in the western verge of Streeton Drive. This main crosses through Block 17 near the intersection with Dixon Drive and continues north towards the main outfall sewer.
- The abandoned 1,875 Ø Tuggeranong Sewer Tunnel crosses through the western side of Blocks 17 and 18 on a north-south alignment.

### 5.2.4 Water Supply

Water supply infrastructure in close proximity to the site comprises the following:

- A 150Ø water main extends from the west in the northern verge of Dixon Drive. This main crosses into the southern verge of Dixon Drive before the intersection with Streeton Drive and continues south in the median of Streeton Drive.
- Fire hydrants on this main are spaced at 70-80 m intervals.
- A separate 150Ø water main is located in the eastern verge of Streeton Drive.

- Parallel 450Ø and 750Ø trunk water mains are located within Block 3, Section 47 (to the north of Dixon Drive) on an east-west alignment.

### 5.2.5 Natural Gas Supply

Natural gas infrastructure in close proximity to the site comprises the following:

- A 110mm 210kPa gas main is located in the western verge of Streeton Drive. This main continues east into Dixon Drive for approximately 30m before crossing Dixon Drive and continuing on a north-south alignment.

### 5.2.6 Electricity Supply

Electrical infrastructure in close proximity to the site comprises the following:

- High voltage underground cables are located in the southern verge of Dixon Drive, crossing through the corner of Block 17 near the intersection with Streeton Drive.
- Streetlights and underground cables are located in the western verge of Streeton Drive and the northern verge of Dixon Drive.

### 5.2.7 Telecommunications Services

Telecommunications plant is located as follows:

- Telstra fibre optic cables are located in the western verge of Streeton Drive.
- Telstra fibre optic cables service the TaMS depot from the western verge of Streeton Drive, crossing across Blocks 17 and 18.
- Transact cables are located in the southern verge of Dixon Drive.
- ICON cables are located in the northern verge of Dixon Drive and within Block 3, Section 47.

### 5.2.8 Vehicle Access

There is no existing vehicle access to the site. Access could be provided from Dixon and Streeton Drives. Two driveways would be required to allow fuel delivery vehicles to enter and exit in a forward motion.

### 5.2.9 Pedestrian Access

A recently constructed shared path appears to be located within the northern boundary of the site (refer to photos in Attachment B). The path is not currently shown in mapping data and has not been included in the drawings at this stage.

### 5.3 EXISTING SITE SERVICING SITE B

#### 5.3.1 Stormwater Drainage

Stormwater infrastructure in close proximity to the site comprises the following:

- A 375Ø stormwater main is located in the western verge of Streeton Drive. This main slopes to the north and connects into 2x1,050Ø mains that cross under Unwin Street.
- From the north, a separate 375Ø stormwater main in the western verge of Streeton Drive also connects into the 2x1,050Ø mains.
- The 2x1,050Ø mains discharge into the site via headwall. An open channel runs across the site, conveying flows into Weston Creek to the west of the site.
- A single 1,050Ø culvert is provided under the access road along the western boundary of the site. This culvert connects to the open channel and discharges into Weston Creek.
- Weston Creek is located to the west of the site. In this area, Weston Creek consists of a concrete lined channel. Culverts have been provided under Dixon Drive and Cotter Road.

#### 5.3.2 Overland Flow

A detailed analysis of stormwater overland flows was not carried out as part of this investigation. Based on a site inspection and an assessment of site contour plans it is apparent that the site is situated within an overland flow path. Stormwater infrastructure including a drainage swale and headwall directs overland flows directly to the north of Site B and into Weston Creek.

100 Yr Annual Recurrence Interval (ARI) flood levels have been requested for the section of Weston Creek adjacent to the subject site. Inquiries have revealed that the 100 Yr ARI flood level in the upper Weston Creek pond is approximately RL551.9. Site B is approximately RL554 at its lowest point. Additional studies would be required to predict peak flows within the open channel within Block 3.

#### 5.3.3 Sewer

Sewer infrastructure in close proximity to the site comprises the following:

- A 750Ø sewer main is located through the eastern half of the block. This main slopes to the north towards the main outfall sewer.
- The abandoned 1,875 Ø Tuggeranong Sewer Tunnel crosses through the western side of Block 3 on a north-south alignment.

#### 5.3.4 Water Supply

Water supply infrastructure in close proximity to the site comprises the following:

- A 150Ø water main is located in the northern verge of Dixon Drive.
- A 100Ø water main crosses through the site, commencing in the northern verge of Dixon Drive and continuing to the northern verge of Cotter Road.
- Parallel 450Ø and 750Ø trunk water mains are located within the site on a east-west alignment.

### 5.3.5 Natural Gas Supply

Natural gas infrastructure in close proximity to the site comprises the following:

- A 160mm 210kPa gas main is located within the site, between Dixon Drive and Cotter Road.
- A junction on this main within Block 3 continues east across Streeton Drive and along the northern verge of Unwin Street.

### 5.3.6 Electricity Supply

Electrical infrastructure in close proximity to the site comprises the following:

- High voltage underground cables are located across the southern portion and inside the western boundary of Block 3.
- Streetlights and underground cables are located in the western verge of Streeton Drive and the northern verge of Dixon Drive.

### 5.3.7 Telecommunications Services

Telecommunications plant is located as follows:

- Telstra, AAPT and Transact fibre optic cables are located between 10 and 20m inside the eastern boundary of Block 3 between Dixon Drive and Cotter Road.
- Telstra and ICON fibre optic cables are located approximately 10m inside the southern boundary of Block 3 between Streeton Drive and Weston Creek.
- A Transact cable is located approximately 40m inside the southern boundary of Block 3 between Streeton Drive and Weston Creek.
- ICON cables are located in the western verge of Streeton Drive.

### 5.3.8 Vehicle Access

There is no existing vehicle access to the site. A driveway is located in the southwest corner of Block 3. Access could be provided from Dixon and Streeton Drives. Two driveways would be required to allow fuel delivery vehicles to enter and exit in a forward motion.

## 5.4 EXISTING SITE SERVICING SITE C

### 5.4.1 Stormwater Drainage

Stormwater infrastructure in close proximity to the site comprises the following:

- Weston Creek is located to the west of the site. In this area, Weston Creek consists of a concrete lined channel. Culverts have been provided under Cotter Road. To the north of Cotter Road, Weston Creek becomes Weston Pond prior to feeding the Molonglo River.
- A 300Ø stormwater main is located in the western verge of Streeton Drive. This main slopes to the south, increasing to 375Ø and connecting into 2x1,050Ø mains that cross under Unwin Street and connect to Weston Creek via an open channel to the south of Site C.
- 2x450Ø stormwater mains are located in Cotter Road extending from the east. These mains increase to a 600Ø main after the intersection with Streeton Drive. This stormwater main discharges into Weston Creek on the northern side of Cotter Road.

### 5.4.2 Overland Flow

A detailed analysis of stormwater overland flows was not carried out as part of this investigation. Based on a site inspection and a review of surface contours the site does not appear to be situated on an overland flow path. All roads surrounding the subject site appear well graded and no trapped low points were identified.

100 Yr Annual Recurrence Interval (ARI) flood levels have been requested for the section of Weston Creek adjacent to the subject site. Inquiries have revealed that the 100 Yr ARI flood level in the upper Weston Creek pond is approximately RL551.9. Site C is approximately RL555 at the lowest point.

### 5.4.3 Sewer

Sewer infrastructure in close proximity to the site comprises the following:

- A 750Ø sewer main is located to the west of the site. This main slopes to the north towards the main outfall sewer.
- The abandoned 1,875 Ø Tuggeranong Sewer Tunnel crosses through the western side of Block 3 on a north-south alignment.

### 5.4.4 Water Supply

Water supply infrastructure in close proximity to the site comprises the following:

- A 100Ø water main crosses through the site, commencing in the northern verge of Dixon Drive and continuing to the northern verge of Cotter Road.

### 5.4.5 Natural Gas Supply

Natural gas infrastructure in close proximity to the site comprises the following:

- A 160mm 210kPa gas main is located within the site, between Dixon Drive and Cotter Road.
- A junction on this main within Block 3 continues east across Streeton Drive and along the northern verge of Unwin Street.

#### 5.4.6 Electricity Supply

Electrical infrastructure in close proximity to the site comprises the following:

- High voltage underground cables are located across the southern portion of Block 3.
- High voltage underground cables are located within the southern verge of Cotter Road and within the western boundary of Block 3.
- High voltage underground cables continue from the southern verge of Cotter Road terminating in the northeast corner of Block 3.
- Streetlights and underground cables are located in the western verge of Streeton Drive.

#### 5.4.7 Telecommunications Services

Telecommunications plant is located as follows:

- Telstra, AAPT and Transact fibre optic cables are located between 10 and 20m inside the eastern boundary of Block 3 between Dixon Drive and Cotter Road.
- ICON cables are located in the western verge of Streeton Drive.

#### 5.4.8 Vehicle Access

There is a temporary vehicle access to the site from Cotter Road to service the temporary construction site office. Permanent access from either Streeton Drive or Cotter Road would be difficult due to the sites proximity to the Cotter Road and Streeton Drive intersection. A traffic study would be required to determine the impact of these accesses on intersection performance.

Other encumbrances to a vehicle access from Cotter Road include:

- There is a 1-2m level difference between the site and Cotter Road.
- An interchange of shared paths accessing Cotter Road, Weston Creek Pond and Streeton Drive is located within the southern verge of Cotter Road.

## 5.5 EXISTING SITE SERVICING SITE D

### 5.5.1 Stormwater Drainage

There is no stormwater infrastructure in close proximity to the site. Kerb and gutter has not been provided along Kirkpatrick Street adjacent to the subject site. However, an open concrete invert (OCI) drain is provided opposite the RSPCA, along the length of the 90° angle parking area. This drain falls to the west and terminates in a grassed verge. Stormwater from this catchment will continue as sheet flow towards the Weston Creek Pond.

### 5.5.2 Overland Flow

A detailed analysis of stormwater overland flows was not carried out as part of this investigation. Based on a site inspection and a review of surface contours the site does not appear to be situated on an overland flow path. All roads surrounding the subject site appear well graded and no trapped low points were identified.

### 5.5.3 Sewer

Sewer infrastructure in close proximity to the site comprises the following:

- A 150Ø sewer main is located in the northern verge of Kirkpatrick Street and extends west.

### 5.5.4 Water Supply

Water supply infrastructure in close proximity to the site comprises the following:

- A 300Ø water main is located in the southern verge of Kirkpatrick Street.
- Fire hydrants on this main are spaced at 50-60 m intervals.
- A 100Ø water main is located in the northern verge of Kirkpatrick Street.

### 5.5.5 Natural Gas Supply

There is no natural gas infrastructure in close proximity to the site. The closest natural gas service comprises the following:

- A 110mm 210kPa gas main is located in the northern verge of Cotter Road.

### 5.5.6 Electricity Supply

Electrical infrastructure in close proximity to the site comprises the following:

- High voltage overhead cables are located in the northern verge of Kirkpatrick Street.

### 5.5.7 Telecommunications Services

Telecommunications plant is located as follows:

- Telstra copper and fibre optic cables are located in the northern verge of Kirkpatrick Street.

### 5.5.8 Vehicle Access

There is no existing vehicle access to the site. Access could be provided from Kirkpatrick Street. Two driveways would be required to allow fuel delivery vehicles to enter and exit in a forward motion.

## 5.6 EXISTING SITE SERVICING SITE E

### 5.6.1 Stormwater Drainage

There is limited stormwater infrastructure in close proximity to the site. The stormwater infrastructure comprises the following:

- A series of stormwater culverts convey stormwater under Cotter Road. Stormwater is then discharged via headwalls and directed as overland flow to the north, towards the Molonglo River.
- A culvert has been provided under Kirkpatrick Street. This culvert discharges into an open channel within the ADF Joint Service Staff College which continues for approximately 50 m before being supplanted by sheet flow.

### 5.6.2 Overland Flow

A detailed analysis of stormwater overland flows was not carried out as part of this investigation. Based on a site inspection and a review of surface contours the site does not appear to be situated on an overland flow path. The site slopes to the east, stormwater is directed towards a drainage swale located parallel to Tuggeranong Parkway. This swale conveys overland flows to the north, towards the Molonglo River.

### 5.6.3 Sewer

There is no sewer infrastructure in close proximity to the site. The closest sewer infrastructure comprises the following:

- A 1,050Ø trunk sewer main is located approximately 300m north of the site (not shown on drawings).
- A 1,676Ø trunk sewer main is located on the southern side of Cotter Road.

### 5.6.4 Water Supply

Water supply infrastructure in close proximity to the site comprises the following:

- A rural water service was installed to supply horse troughs in Block 1193. This service is not shown on DBYD records; however, Actew Water has confirmed that it was installed in the year 2000.
- A 150Ø water main is located in the northern verge of Kirkpatrick Street to supply water service to the ADF Joint Service Staff College (not shown on drawings).

### 5.6.5 Natural Gas Supply

There is no natural gas infrastructure in close proximity to the site. The closest natural gas service comprises the following:

- A 110mm 210kPa gas main is located in the intersection of Kirkpatrick Street and Cotter Road.

### 5.6.6 Electricity Supply

Electrical infrastructure in close proximity to the site comprises the following:

- High voltage underground cables are located outside the southern boundary of the site. These cables are located on an east-west alignment.
- Streetlights and underground cables are located in the median of Cotter Road

### 5.6.7 Telecommunications Services

Telecommunications plant is located as follows:

- Telstra copper and fibre optic cables are located inside the southern boundary of the site and extend east-west.
- AAPT, ICON and Transact fibre optic cables are located outside the southern boundary of the site.

### 5.6.8 Vehicle Access

There is no existing vehicle access to the site. Access could be provided from Kirkpatrick Street. Two driveways would be required to allow fuel delivery vehicles to enter and exit in a forward motion. There is a 5m level difference between the site and Cotter Road. A direct access from Cotter Road would not be possible without significant access ramps.

Similarly, access from the Tuggeranong Parkway on ramp to the east of the site would require lengthy access ramps to provide sufficient sight distance of vehicles merging on to the Tuggeranong Parkway.

## 5.7 EXISTING SITE SERVICING SITE F

### 5.7.1 Stormwater Drainage

There is limited stormwater infrastructure in close proximity to the site. The stormwater infrastructure comprises the following:

- Stormwater culverts convey stormwater under Cotter Road. Stormwater is then directed as overland flow to the north, towards the Molonglo River.

### 5.7.2 Overland Flow

A detailed analysis of stormwater overland flows was not carried out as part of this investigation. Based on a site inspection and a review of surface contours the site does not appear to be situated on an overland flow path. The site slopes to the east. Stormwater is directed under Cotter Road via culverts.

### 5.7.3 Sewer

Sewer infrastructure in close proximity to the site comprises the following:

- A 1,676Ø trunk sewer main passes through the site on an east-west alignment.

### 5.7.4 Water Supply

There is no water supply infrastructure in close proximity to the site. The closest water supply infrastructure comprises the following:

- A 100Ø water main is located in McConchie Circuit.

### 5.7.5 Natural Gas Supply

There is no natural gas infrastructure in close proximity to the site. The closest natural gas service comprises the following:

- A 32mm 210kPa gas main is located in McConchie Circuit.

### 5.7.6 Electricity Supply

Electrical infrastructure in close proximity to the site comprises the following:

- Streetlights and underground cables are located in the median of Cotter Road

### 5.7.7 Telecommunications Services

Telecommunications plant is located as follows:

- A Telstra cable from Kirkpatrick Street passes under Cotter Road and terminates in the southern verge of Cotter Road near the subject site.

### 5.7.8 Vehicle Access

There is no existing vehicle access to the site. Access could be provided from westbound lanes in Cotter Road. Additional entrance and exit lanes would be required to allow vehicles to safely slow down prior to entering the site. Two driveways would be required to allow fuel delivery vehicles to enter and exit in a forward motion.

Access from eastbound lanes in Cotter Road would be difficult to achieve due to the proximity to existing major intersections and high traffic volumes. A traffic study would be required to determine the potential impact of this scenario.

## 6. SPECIALIST INVESTIGATIONS

### 6.1 TREE ASSESSMENT

A tree assessment was not undertaken as part of this investigation. All sites except Site D have existing trees that may impact on the proposed development. Removal of trees may pose additional risks to the project depending on the quality and status of the trees. It is recommended that a detailed tree survey and assessment is undertaken to fully assess the removal risk.

### 6.2 HERITAGE ASSESSMENT

A heritage assessment was not completed as part of this investigation. However, reference was made to the ACT Heritage Register located on the ACT Government Environment and Sustainable Development website ([http://www.environment.act.gov.au/heritage/heritage\\_register](http://www.environment.act.gov.au/heritage/heritage_register)).

The register indicates that the Canberra Main Outfall Sewer has heritage significance. This listing is relevant to Site F which is located within Block 22, Section 83. The listing refers to Block 17, Section 83; however, Block 17 has since been retired and is replaced by Block 22. The listing specifically refers to the Ventilator Shaft #4, which is located near the southern boundary of Site F. The shaft is described as being constructed from brick, 6m high and square in cross section. A 10m boundary is required around this structure.

No other listings were provided in relation to the subject sites.

### 6.3 CONTAMINATION ASSESSMENT

A contamination investigation was not commissioned as part of this investigation. However, reference was made to the ACT Contaminated Sites Register, administered by the ACT Government Environment and Sustainable Development Directorate. The search results for selected sites are summarised below.

#### 6.3.1 Site A

Block 17 Section 45, Holder was not recorded on the EPA's contaminated sites management database. However, the EPA is aware that hazardous materials such as pesticides, herbicides and fuel have been stored on the block. Further investigations may be required prior to the release of this land.

Similarly, Block 18, Section 45, Holder was not recorded on the EPA's contaminated sites management database. However, the EPA is aware that pesticides and herbicides may have been used on the block. Further investigations may be required prior to the release of this land.

#### 6.3.2 Site D

A Phase 1 Environmental Site Assessment report (SMEC, February 2009) has previously been prepared for an area including Site D. This report recommended remedial works and validation sampling prior to the site being suitable for residential development. No subsequent reports or validation results were available.

It is recommended that the status of any remedial works and the specific nature of the suspected contamination is investigated.

#### 6.3.3 Site E

Remediation activities have been undertaken on the site, which was a former pine plantation. A Site Audit statement was prepared in November 2009. The works and report were subsequently endorsed by the EPA, with the area being suitable for residential uses subject to the implementation and compliance with an environmental management plan. The specific details of this plan were not referenced. It is recommended that a copy of the environmental management plan is obtained from the current leaseholders.

## 6.4 GEOTECHNICAL INVESTIGATION

Geotechnical investigations were not commissioned as part of this investigation. It is recommended that appropriate studies are undertaken in conjunction with more detailed site layouts and designs.

## 6.5 ASBESTOS AND HAZARDOUS MATERIALS SURVEY & MANAGEMENT PLANS

Asbestos or Hazardous Materials Surveys and Management Plans were not commissioned as part of this investigation. The subject sites do not contain existing structures.

## 6.6 TRAFFIC STUDIES

### 6.6.1 General

Traffic studies have previously been completed by others in close proximity to the subject sites as follows:

- Cotter Rd/Streeton Dr: North Weston (Non-Government) School Traffic and Parking Study, SMEC, August 2009.
- Cotter Rd/Kirkpatrick St: Report for Molonglo Infrastructure Stage 1C, Final Sketch Plans, GHD, November 2010.

SIDRA Intersection analyses were undertaken to provide an understanding of the current traffic operations. SIDRA Intersection is a traffic engineering micro-analytical traffic evaluation tool used for intersection design and analysis. It is used for the analysis of intersection capacity, level of service and performance.

This package provides several useful indicators to determine the level of intersection performance. These are known as Level of Service (LoS), Degree of Saturation (DoS), Average Delay (seconds) and Maximum Queue Length (metres). The LoS criteria for intersections are also shown in the table below.

**Table 2: Level of Service criteria for intersections**

Level of Service	Average delay (seconds per vehicle)	Traffic signals and roundabout	Give Way and Stop signs
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and 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	Greater than 71	Unsatisfactory with excessive queuing	Unsatisfactory with excessive queuing; requires other control mode

Source: RMS Guide to Traffic Generating Developments

### 6.6.2 Cotter Road and Streeton Drive

Results of the studies concluded that the Cotter Road and Streeton Drive intersection was operating at LoS D. With a proposed upgrade of this intersection, the performance was anticipated to improve to LoS C. The current queuing distance was estimated to be 250m along the northbound Streeton Drive lanes.

It is understood that the Cotter Road and Streeton Drive intersection is currently being upgraded. The queuing distance in this lane after the intersection upgrade was estimated to be 89m. These distances confirm that a vehicle access to Site C would be affected by the Cotter Road intersection, making access to the site difficult.

### 6.6.3 Streeton Drive and Unwin Place/Dixon Drive

The Streeton Drive and Unwin Place/Dixon Drive intersection was analysed to be performing at LoS A. This intersection is also currently being upgraded. An indicative intersection footprint is shown in Drawing 5286-01-003 Proposed Services (refer to Attachment A).

### 6.6.4 Cotter Road and Kirkpatrick Street

The Cotter Road and Kirkpatrick Street intersection has recently been upgraded. The intersection is signalised with left turning slip lanes. Results of the studies concluded that this intersection is operating at an average LoS B. SIDRA results were also included for the incorporation of pedestrian traffic which showed poorer intersection performance. However, it is suggested that a review of pedestrian signal phasing could alleviate some of these delays.

The report then discusses another upgrade of this intersection and models intersection performance in the year 2031. Traffic forecasts were obtained from previous studies in relation to the Molonglo Valley development. The intersection performance was predicted to operate at an average LoS B.

Additional traffic generation in Kirkpatrick Street was included in this analysis, although the levels applied appear to be associated with the recently constructed park and ride facility. Additional traffic studies would be required if the North Weston area was developed into a residential area as proposed.

## 7. SUMMARY OF EXISTING CONSTRAINTS

The existing infrastructure encumbrances to the proposed development are summarised below.

**Table 3: Existing Constraints**

Site	Major constraints	Minor constraints	Vehicle access options
A	Nil	<ul style="list-style-type: none"> <li>- Existing trees.</li> <li>- Existing land use.</li> <li>- Trunk sewer main across corner of site: adjust site boundaries accordingly.</li> <li>- Site re-grading and retaining wall would be required.</li> <li>- Relocate Telstra Fibre Optic cable.</li> <li>- A recently constructed Shared path on the site would require relocation.</li> </ul>	<ul style="list-style-type: none"> <li>- Dual access from Streeton and Dixon Dr.</li> <li>- Potential for median break in Streeton Dr.</li> </ul>
B	<ul style="list-style-type: none"> <li>- Electrical and telecommunications services across the site.</li> <li>- Stormwater channel and overland flow path across the site.</li> <li>- Trunk water and sewer mains across the site.</li> </ul>	<ul style="list-style-type: none"> <li>- Existing trees.</li> <li>- Existing land use.</li> </ul>	<ul style="list-style-type: none"> <li>- Dual access from Streeton and Dixon Dr.</li> </ul>
C	<ul style="list-style-type: none"> <li>- Telecommunications services across the site.</li> <li>- Trunk sewer mains to the west of the site.</li> <li>- Vehicle access constraints.</li> </ul>	<ul style="list-style-type: none"> <li>- Existing trees.</li> <li>- Existing land use.</li> <li>- Relocated gas main.</li> </ul>	<ul style="list-style-type: none"> <li>- Access not possible from Cotter Rd.</li> <li>- Access difficult from Streeton Dr due to proximity to intersection.</li> </ul>
D	Nil	<ul style="list-style-type: none"> <li>- Hydraulic infrastructure: no stormwater infrastructure in close proximity.</li> <li>- Site re-grading and retaining wall would be required.</li> </ul>	<ul style="list-style-type: none"> <li>- Access from Kirkpatrick St. Upgrade of street would be required.</li> <li>- Additional traffic studies would be required.</li> </ul>

Site	Major constraints	Minor constraints	Vehicle access options
E	<ul style="list-style-type: none"> <li>- Hydraulic infrastructure: no stormwater, water, sewer infrastructure in close proximity.</li> <li>- Location/levels: Site approximately 5m below Cotter Rd level.</li> </ul>	<ul style="list-style-type: none"> <li>- Existing trees.</li> </ul>	<ul style="list-style-type: none"> <li>- Access from Kirkpatrick St. Upgrade of street would be required.</li> <li>- Additional traffic studies would be required.</li> </ul>
F	<ul style="list-style-type: none"> <li>- Trunk sewer main: will restrict site dimensions/locations.</li> <li>- Vehicle access constraints.</li> </ul>	<ul style="list-style-type: none"> <li>- Heritage zone: may restrict servicing.</li> <li>- Existing trees.</li> </ul>	<ul style="list-style-type: none"> <li>- Access from Cotter Rd. Slip lanes/intersection upgrade required.</li> </ul>

## 8. PROPOSED SITE SERVICING

Sites A and D were determined to be the preferred options for the proposed development on the basis of the existing infrastructure related encumbrances. Commercial and planning related factors were considered outside the scope of this report, on this basis Site E was not excluded at this stage.

Further investigation of Sites B, C and F was not undertaken due to the limitations presented by existing constraints. Site B is significantly encumbered by existing underground high voltage and fibre optic cables, as well as trunk sewer and water mains. Relocating these services would be a considerable exercise and would require suitable alternative alignments, of which none were immediately apparent.

Site C is also constrained by some of the same telecommunications cables and the trunk sewer main would constrain the depth of the site. A relocation exercise would be less extensive in this instance. Providing vehicle access to Site C would be a major constraint due to the sites proximity the Cotter Road and Streeton Drive intersection.

Site F is constrained by the presence of a trunk sewer main. Providing vehicle access to Site C would be a major constraint, slip lanes would be required from Cotter Road due to the high volume of traffic flow. Access would not be possible from eastbound lanes.

The following recommendations form a preliminary discussion of conceptual site servicing requirements. Concept schemes have been prepared for the augmentation of existing infrastructure for the preferred sites

The location and size of proposed services are based on existing infrastructure and concept designs. These are shown on the following drawings (refer to Attachment A):

- Drawing 5286-01-003 Proposed Services Plan Site A
- Drawing 5286-03-003 Proposed Services Plan Sites D
- Drawing 5286-04-002 Proposed Services Plan Site E

A comprehensive topographical survey of the sites has not been undertaken. Whilst every effort has been made to ensure the completeness and accuracy of the following information, neither is guaranteed by Indesco. Proposals regarding servicing of the site, whilst based on sound engineering principles and judgment, are subject to the completeness and accuracy of the available information regarding the existing services.

The proposed and existing services have been represented in an indicative format only. The drawings have been prepared for Knight Frank and the LDA for the purposes of this report to the LDA.

### 8.1 STORMWATER DRAINAGE

Environmental standards for stormwater drainage systems within Petrol Stations require that potentially contaminated water is treated on site prior to discharge. A stormwater tie will be required for run-off from non-contaminated areas and treated stormwater.

#### 8.1.1 Site A

Stormwater mains are located in close proximity to site A. A service tie could be provided from the 300Ø main in Dixon Drive.

#### 8.1.2 Site D

There are no stormwater mains in close proximity to the site.

Stormwater drainage will need to be designed in conjunction with a detailed stormwater catchment study. This will include consideration for future development of the area and any augmentation scheme should be designed in conjunction with a North Weston Estate Development Plan.

The provision of a stormwater main within the verge of Kirkpatrick Street discharging to the North Weston Pond is recommended. From Site D, this extension is approximately 250m. However, an additional extension (approximately 150m) would be required to service roadside sumps as part of the proposed upgrade of Kirkpatrick Street.

### 8.1.3 Site E

There are no stormwater mains in close proximity to the site.

Stormwater drainage will need to be designed in conjunction with a detailed stormwater catchment study. This will include consideration for future development of the area and any augmentation scheme should be designed in conjunction with a North Weston Estate Development Plan.

## 8.2 WATER SUPPLY

### 8.2.1 Site A

Water mains are located in close proximity to site A. A service tie could be provided from the 150Ø main in Dixon Drive.

Actew Water has advised that there is sufficient capacity within the water supply network to service the proposed development (refer to Attachment C). Additional fire hydrants would be required adjacent to the subject site.

### 8.2.2 Site D

Water mains are located in close proximity to site D. A service tie could be provided from the 300Ø main in Kirkpatrick Street.

Actew Water has advised that there is sufficient capacity within the water supply network to service the proposed development (refer to Attachment C). Additional fire hydrants would be required adjacent to the subject site.

### 8.2.3 Site E

Water mains are located in Kirkpatrick Street, near the entrance to the ADF Joint Service Staff College. This main would need to be extended to service Site E by approximately 350m. The existing tie and service meter would also need to be removed.

Actew Water has advised that there is sufficient capacity within the water supply network to service the proposed development (refer to Attachment C). However, the water quality would be impacted by the long 'dead end' main. It is noted that Site E is within a future residential area. If the water supply infrastructure was installed as part of the residential development, a network of 'looped' water mains would be required.

Additional fire hydrants would be required as part of the mains extension and adjacent to the subject site.

## 8.3 SEWER

### 8.3.1 Site A

Sewer mains are located within Block 17 and in close proximity to site A. A service tie could be provided from the manhole within Block 17. Additional survey was recommended to confirm the level of this asset.

Actew Water has advised that there is sufficient capacity within the sewer network to service the proposed development (refer to Attachment C).

### 8.3.2 Site D

Sewer mains are located in close proximity to site D. A service tie could be provided to from the 150Ø main in Kirkpatrick Street. The location of the mains connection will depend on the extent of re-grading completed within the site and clearances to the existing main.

Actew Water has advised that there is sufficient capacity within the sewer network to service the proposed development (refer to Attachment C).

It is noted that the future residential area is planned to drain west as part of a different sewer network. A connection to this network may be more appropriate, depending on the timing of the residential development.

### 8.3.3 Site E

Sewer mains are located to the north of the site. A sewer main extension would be required from the ADF Joint Service Staff College main prior to the connection with the 1,050Ø Woden Valley trunk sewer main. The extension would be approximately 280m in length through Rural Block 1193. Additional manholes would be required as part of the mains extension.

Actew Water has advised that there is sufficient capacity within the sewer network to service the proposed development (refer to Attachment C).

It is noted that Site E is within a future residential area. Depending on the timing of this development, an extension of the sewer network on the basis of the residential development may be more appropriate.

## 8.4 ELECTRICITY SUPPLY

High Voltage electrical infrastructure (either overhead or underground) is located in close proximity to all 3 sites. A distribution box would be required. The provision of an ActewAGL service to the subject site would be subject to the requirements of the development and negotiations between the developer and service provider.

## 8.5 TELECOMMUNICATIONS

Telecommunications infrastructure is located in close proximity to all 3 sites. The provision of telecommunications services to the subject site would be subject to the service provider's assessment of the commercial viability of the development and subsequent negotiations between the developer and respective service providers.

## 8.6 NATURAL GAS SUPPLY

Natural Gas infrastructure is located in close proximity to Site A. Mains extensions from the Kirkpatrick Street and Cotter Road intersection would be required prior to the provision of service ties to Parts D or E.

The provision of natural gas services to the subject site would be subject to the service provider's assessment of the commercial viability of the development and subsequent negotiations between the developer and respective service providers.

## 8.7 BOUNDARIES & EASEMENTS

All sites would require new block boundaries to be created and change of proposed land use. The position of the block boundary would then determine where easements may be required.

Internal roads will be required for the proposed residential developments around Sites D and E. It is recommended that planning is completed to the extent that any services infrastructure for Site D or E could then be provided within future road reserves.

## 8.8 TRAFFIC IMPACTS

Traffic studies would be required in association with detailed development proposals. It is assumed that an upgrade to Kirkpatrick Street would be required in association with the development of either Site D or E. This would include the widening of Kirkpatrick Street to accommodate fuel delivery vehicles and the provision of kerb and gutter.

Internal roads will be required for the proposed residential developments around Sites D and E. It is recommended that planning is completed to the extent that any upgrade to Kirkpatrick Street could incorporate future intersections and traffic growth.

## 9. SITE SERVICING COSTS

### 9.1 GENERAL

An opinion of probable costs to service the preferred sites has been prepared to assist with the selection of the preferred site. The actual cost of servicing the site will be subject to negotiations with developer and relevant service providers. Depending on the timing of the proposed residential developments around Sites D and E, some costs may be shared across the development projects.

### 9.2 ALLOCATION OF FUNDING SOURCES

The responsibility for funding the works as necessary to service the preferred site will be allocated between the LDA, relevant service providers, the developer of the site and potentially the developer of the future residential areas.

### 9.3 OPINION OF PROBABLE COSTS

The following tables represent estimated costs that will be required to provide the services to Sites A, D or E, as recommended in this report. The cost estimate includes the professional consulting fees which involves design documentation and construction phase services. Construction costs include supply of all plant, labour and materials, payments of all authority fees necessary to complete the proposed works, inclusive of GST. The costs are based on the following assumptions:

- Costs as at November 2013;
- Servicing options are based on conceptual engineering design only;
- An allowance for incidental costs, in the range of 5 to 10% of the value of the works;
- A 30% contingency has been allowed due to the preliminary nature of the estimate;
- A provision for GST has been applied to all costs;
- Works will be designed as one project;
- Works will be undertaken by a pre-qualified contractor under a single package;
- Overhead costs including OH&S requirements, WAE drawings, authority fees (excluding DA fees) and audit testing are included in the unit rates;
- Costs associated with obtaining Development Approval (DA) have not been included due to the conceptual nature of the development proposal.
- Preliminaries including clearing of the site, site establishment, temporary fencing, temporary traffic management, survey set-out and control and staging costs are included within the Preliminaries item;
- Clearing of the site includes general costs and does not include consideration for specific tree management plans or the undertaking of tree assessments.
- Landscaping is limited to the restoration of disturbed areas;
- Flood studies will be available for Weston Creek and North Weston Pond. No additional studies or augmentation schemes have been included;

- Professional fees include site servicing design and approvals, tender and construction phase services;
- An average cost of these professional services, ranging from 17.5 to 20% of the total value of the works;
- Provision of shared paths adjacent to the subject site to meet current requirements;
- Provision of 2 industrial vehicle accesses;
- ACTPLA Budget Estimating Guide for Civil Engineering Works, April 2009;
- Australian Bureau of Statistics Price Index 3101: Roads and Bridges NSW; and
- Tendered rates received over the past 12 months for similar work.

The probable costs outlined below do not represent a quotation or offer to undertake the work, but Indesco's estimation of the likely costs for the development. Should any aspect of the above or the qualifications not be understood please contact Indesco Pty Limited.

### 9.3.1 Site A

**Table 4: Site Servicing – Site A**

Item	Probable Costs
<b>Preliminaries</b> <ul style="list-style-type: none"> <li>- Clearing of the site, site establishment, temporary fencing, temporary traffic management, survey set-out and control and staging costs</li> </ul>	\$15,000 to \$17,000
<b>Earthworks</b> <ul style="list-style-type: none"> <li>- Regrading of site</li> <li>- Average 0.5 to 1.0m imported fill across site</li> <li>- Including OH&amp;S, WAE, fees and audit testing</li> </ul>	\$52,000 to \$105,000
<b>Driveways</b> <ul style="list-style-type: none"> <li>- Construction of 2 HD2 driveway</li> <li>- Including OH&amp;S, WAE, fees and audit testing</li> </ul>	\$15,000
<b>Footpaths</b> <ul style="list-style-type: none"> <li>- Provide 2.0m wide shared path in verges</li> <li>- Including OH&amp;S, WAE and fees</li> </ul>	\$10,000
<b>Stormwater</b> <ul style="list-style-type: none"> <li>- Provide 1 100Ø stormwater tie from existing sump</li> <li>- Including OH&amp;S, WAE, fees and audit testing.</li> </ul>	\$1,000
<b>Sewer</b> <ul style="list-style-type: none"> <li>- Provide 1 150Ø tie from existing manhole</li> <li>- Including OH&amp;S, WAE, fees and audit testing.</li> </ul>	\$1,000
<b>Water</b> <ul style="list-style-type: none"> <li>- Provide 1 water tie</li> <li>- Provide 1 or 2 high capacity fire hydrant</li> <li>- Including OH&amp;S, WAE, fees and audit testing.</li> </ul>	\$4,000 to \$8,000
<b>Verges &amp; Reinstatement</b> <ul style="list-style-type: none"> <li>- Reinstatement of verges following construction of services including grassing and consolidation.</li> <li>- Including OH&amp;S, and WAE.</li> </ul>	\$1,000
<b>Sub Total</b>	<b>\$101,000 to \$160,000</b>

Item	Probable Costs
<b>Incidentals – 5 to 10%</b>	\$5,000 to \$15,000
<b>Detailed design and superintendence – 17.5 to 20%</b> - Including survey, landscape architecture, site servicing design and approvals, tender and construction phase services.	\$19,000 to \$35,000
<b>Contingency – 30%</b>	\$37,000 to \$63,000
<b>GST – 10%</b>	\$16,000 to \$27,000
<b>Total (Incl. GST)</b>	<b>\$178,000 to \$300,000</b>

### 9.3.2 Site D

**Table 5: Site Servicing – Site D**

Item	Probable Costs
<b>Preliminaries</b> - Clearing of the site, site establishment, temporary fencing, temporary traffic management, survey set-out and control and staging costs	\$48,000 to \$64,000
<b>Earthworks</b> - Regrading of site - Average 2.5 to 4.0m imported fill across site - Retaining wall along 1 boundary - Including OH&S, WAE, fees and audit testing	\$377,000 to \$534,000
<b>Road works</b> - Upgrade Kirkpatrick Street between existing intersection and site - 7.0m wide 2 lane road with 1 tee intersection - Kerb, gutter and stormwater drainage - Including OH&S, WAE, fees and audit testing	\$528,000 to \$691,000
<b>Driveways</b> - Construction of 2 HD2 driveway - Including OH&S, WAE, fees and audit testing	\$15,000
<b>Footpaths</b> - Provide 2.0m wide shared path in verge - Including OH&S, WAE and fees	\$7,000
<b>Stormwater</b> - Provide 1 100Ø stormwater tie from new sump (ref: Road works) - Extend 300 Ø main up to 50m - Including OH&S, WAE, fees and audit testing.	\$1,000 to \$10,000
<b>Sewer</b> - 150Ø main 10m across road during road upgrade - Provide 1 150Ø tie from existing manhole - Including OH&S, WAE, fees and audit testing.	\$2,500

Item	Probable Costs
<b>Water</b> - Provide 1 water tie - Provide 1 or 2 high capacity fire hydrant - Including OH&S, WAE, fees and audit testing.	\$4,000 to \$8,000
<b>Verges &amp; Reinstatement</b> - Reinstatement of verges following construction of services including grassing and consolidation. - Including OH&S, and WAE.	\$1,000
<b>Sub Total</b>	<b>\$983,000 to \$1,319,000</b>
<b>Incidentals – 5 to 10%</b>	\$49,000 to \$132,000
<b>Detailed design and superintendence – 17.5 to 20%</b> - Including survey, landscape architecture, site servicing design and approvals, tender and construction phase services.	\$181,000 to \$290,000
<b>Contingency – 30%</b>	\$364,000 to \$522,000
<b>GST – 10%</b>	\$158,000 to \$226,000
<b>Total (Incl. GST)</b>	<b>\$1,735,000 to \$2,489,000</b>

### 9.3.3 Site E

**Table 6: Site Servicing – Site E**

Item	Probable Costs
<b>Preliminaries</b> - Clearing of the site, site establishment, temporary fencing, temporary traffic management, survey set-out and control and staging costs	\$45,000 to \$47,000
<b>Earthworks</b> - Regrading of site - Average 0.5 to 1.0m imported fill across site - Including OH&S, WAE, fees and audit testing	\$52,000 to \$105,000
<b>Road works</b> - Upgrade Kirkpatrick Street between existing intersection and site - 7.0m wide 2 lane road with 1 tee intersection - Kerb, gutter and stormwater drainage - Including OH&S, WAE, fees and audit testing	\$1,263,000
<b>Driveways</b> - Construction of 2 HD2 driveway - Including OH&S, WAE, fees and audit testing	\$15,000
<b>Footpaths</b> - Provide 2.0m wide shared path in verge - Including OH&S, WAE and fees	\$7,000

Item	Probable Costs
<b>Stormwater</b> - Provide 1 100Ø stormwater tie - Undertake catchment study - Install small GPT - 300 Ø main 10 to 20m - Including OH&S, WAE, fees and audit testing.	\$89,000 to \$91,000
<b>Sewer</b> - 150Ø main 280m including manholes - Provide 1 150Ø tie from existing manhole - Including OH&S, WAE, fees and audit testing.	\$53,000
<b>Water</b> - 150Ø main 350m including valves - Provide 1 water tie - Provide 6 high capacity fire hydrants - Including OH&S, WAE, fees and audit testing.	\$79,000
<b>Verges &amp; Reinstatement</b> - Reinstatement of verges following construction of services including grassing and consolidation. - Including OH&S, and WAE.	\$1,000
<b>Sub Total</b>	<b>\$1,604,000 to \$1,661,000</b>
<b>Incidentals – 5 to 10%</b>	\$80,000 to \$166,000
<b>Detailed design and superintendence – 17.5 to 20%</b> - Including survey, landscape architecture, site servicing design and approvals, tender and construction phase services.	\$295,000 to \$365,000
<b>Contingency – 30%</b>	\$594,000 to \$657,000
<b>GST – 10%</b>	\$257,000 to \$285,000
<b>Total (Incl. GST)</b>	<b>\$2,830,000 to \$3,134,000</b>

## 10. RECOMMENDATIONS

Based on the investigations carried out to date it is recommended that the following additional investigations are undertaken for the preferred sites. It is recognised that broader commercial and planning considerations will need to be taken into account prior to determining the most suitable location for the preferred development.

### 10.1.1 Site A

- Obtain or determine 100 Yr Annual Recurrence Interval (ARI) flood levels for the section of Weston Creek adjacent to the site.
- Investigate grading requirements for the site on the basis of driveway and flood levels.
- Determine revised block boundaries. Allow a minimum of 7m set back from the existing 750Ø trunk sewer main.
- Confirm sewer invert levels and grading requirements for the site.
- Undertake appropriate due diligence investigations including a tree survey, geotechnical, contamination and traffic studies.

### 10.1.2 Site D

- Undertake planning for future residential development in close proximity to the site.
- Complete studies to upgrade Kirkpatrick Street to accommodate semi-articulated fuel vehicles.
- Complete studies to provide stormwater infrastructure to service the site.
- Confirm sewer invert levels to provide a service tie to the site.
- Investigate grading requirements for the site in the context of neighbouring land use.
- Investigate the status of contamination remediation works.
- Undertake appropriate due diligence investigations including geotechnical, contamination and traffic studies.

### 10.1.3 Site E

- Undertake planning for future residential development in close proximity to the site.
- Complete studies to upgrade Kirkpatrick Street to accommodate semi-articulated fuel vehicles.
- Complete studies to provide sewer, water and stormwater infrastructure to service the site.
- Investigate the requirements of the existing Environmental Management Plan.
- Undertake appropriate due diligence investigations including a tree survey, geotechnical, contamination and traffic studies.

## 11. DRAWINGS

Drawings provided in Attachment A of this report include:

- Drawing 5286-00-001 Locality Plan
- Drawing 5286-01-001 Aerial Overlay Plan Sites A & B
- Drawing 5286-01-002 Existing Services Plan Sites A & B
- Drawing 5286-02-001 Aerial Overlay Plan Site C
- Drawing 5286-02-002 Existing Services Plan Site C
- Drawing 5286-03-001 Aerial Overlay Plan Site D
- Drawing 5286-03-002 Existing Services Plan Site D
- Drawing 5286-04-001 Aerial Overlay Plan Sites E & F
- Drawing 5286-04-002 Existing Services Plan Sites E & F
- Drawing 5286-01-003 Proposed Services Plan Site A
- Drawing 5286-03-003 Proposed Services Plan Site D
- Drawing 5286-04-003 Proposed Services Plan Site E

These drawings are to be read in conjunction with this report. The plans are based upon work as executed information and other information supplied by authorities. All services are to be confirmed on site. The existing services in the vicinity of the site are represented in an indicative format. The plans were prepared solely for the purposes of this report and for the use of the client.

**Attachment A**

**Attachment B**



**Site A (looking south)**



**Site A (looking southeast)**



**Site A (looking south)**



**Site A (looking southeast)**



**Weston Creek and Dixon Drive (looking north)**



**Weston Creek and Cotter Road (looking north)**



**Site B (looking east)**



**Site C (looking east)**



**Site D and Weston Creek Pond (looking west)**



**Kirkpatrick Street adjacent to Site D (looking east)**



**Site E (looking north)**



**Kirkpatrick Street and Cotter Road adjacent to Site E (looking west)**



**Site F and Cotter Road (looking east)**



**Heritage listed ventilation structure adjacent to Site F (looking east)**

**Attachment C**

## **Anna Nagalingam**

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**From:** Wansink, Michael [Michael.Wansink@actewagl.com.au]  
**Sent:** Friday, 8 November 2013 1:46 PM  
**To:** Anna Nagalingam  
**Subject:** RE: Site Servicing Inquiry - North Weston

**>| MailToFile Info:** >  
**Arch. d.d.:** 8/11/2013 2:15:00 PM  
**Arch. nr.:** 2309

Anna,

### Site A

This site needs to be considered in context with the Streeton Drive road works which are currently underway. Dixon Drive is being moved north to meet with Unwin Place. This may dictate the ultimate location and layout of the service station site.

Proximity to the adjacent 750mm diameter trunk sewer must also be considered. ACTEW Water requires a minimum setback of seven metres from the boundary of the site to the centreline of this sewer.

Servicing of this site appears feasible.

A water supply connection to the main in Dixon Drive is acceptable but please note that this main is currently being relocated.

Additional hydrants may be required to ensure fire coverage.

A sewer connection to the main in the adjacent depot should be possible. Note that there is no accurate WAE record of this main and it is recommended to survey the main to determine invert levels and confirm viability of the connection.

### Site D

Provision of a water service should be relatively straight forward.

With the suggested fill on site (up to five metres?) the installation of a sewer tie across Kirkpatrick Street should be achievable but please note that the sewer is not particularly deep (approx 1.70m) and clashes with other services may occur. If a direct connection across the road is unachievable then you may have to "chase" the sewer down the hill to make a connection further to the west. Connection to a manhole is preferred.

Another option for the sewer would be to consider the site in the context of the master plan for this precinct. As a future residential area, the sewers would drain to west. This option could also reduce the amount of fill required to develop the site.

### Site E

Block 1193 has an existing water service. This was installed in May 2000 to supply horse troughs. The connection and meter are near the entrance to the Joint Services Staff College. The service (privately owned beyond the meter) then proceeds along Kirkpatrick Street to the block. This service would require disconnection if development of the site goes ahead.

The installation of a new water main along Kirkpatrick Street to the site is possible however it should be noted that a long dead end main with only one service connected at the end could result in poor water quality. This may be alleviated if the main is "looped" in the future when the area is further developed.

Installation of a sewer within the Joint Services Staff College will not be accepted.

A sewer extension around the college would be required. This will be approximately 280m long. Connection will be to the sewer from the College just upstream of its connection with the 1050mm diameter Woden Valley Trunk Sewer.

Regards

**Michael Wansink**  
Manager  
Hydraulic Asset Acceptance  
ACTEW Water  
**Telephone:** 02 6242 1499  
**Faxsimile:** 02 6242 1459  
12 Hoskins Street Mitchell ACT 2911  
[www.actew.com.au](http://www.actew.com.au)

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**From:** Anna Nagalingam [mailto:[Anna.Nagalingam@indesco.com.au](mailto:Anna.Nagalingam@indesco.com.au)]  
**Sent:** Tuesday, 5 November 2013 5:20 PM  
**To:** Wansink, Michael  
**Subject:** Site Servicing Inquiry - North Weston

Hi Michael,

We have been engaged by the LDA to undertake a preliminary site selection study for a fuel station on or close to Cotter Road in North Weston. At this stage we have been tasked with looking at 3 possible sites as follows. Please find attached a sketch of the site locations. Could you please provide comment on the ability of the water and sewer networks to accommodate the proposed development.

The fuel station will occupy approx. 3,000m<sup>2</sup> and will include a recycling drop of centre and small convenience store.

#### **Site A**

Cnr Dixon & Streeton Drives, (Blocks 17,18 Section 45 Holder).

There is a 150Ø sewer main and maintenance hole within the TaMS Depot (Block 17), would it be possible to provide a tie from this point?

There is a 150Ø water main in the southern verge of Dixon Drive. Hydrants currently spaced 70-80m.

#### **Site D**

Kirkpatrick Street (Rural Block 1218, Weston Creek)

This area has been designated as a future residential area within the North Weston Concept Plan (RZ1). Service ties are a little conceptual as we have no road layouts at this point, although the site could possibly be serviced directly from Kirkpatrick St.

Re-grading will be required to meet on site drainage structures and some form of retaining wall would be included at the back of the block.

There is a 150Ø sewer main in the northern verge of Kirkpatrick St.

There is a 300Ø water main in the southern verge of Kirkpatrick St. Hydrants currently spaced 50-60m.

#### **Site E**

Kirkpatrick Street (Rural Block 1193, Weston Creek)

This area has been designated as a future residential area within the North Weston Concept Plan (RZ1). There is no nearby infrastructure. I have assumed the following:

Sewer main extension ~120m from within Joint Staff College (Rural Block 1212).

Water main extension ~350m along Kirkpatrick St.

Kind regards,

**Anna Nagalingam**

**Project Manager**

6A Thesiger Court  
Deakin ACT 2600  
Tel: (02) 6285 1022  
Fax: (02) 6285 2618  
[www.indesco.com.au](http://www.indesco.com.au)

**Attachment D**



**ACT**  
Government

Environment and  
Sustainable Development

File Ref: New file

Ms Anna Nagalingam  
Indesco Pty Ltd  
6A Thesiger Court  
Deakin ACT 2600

**RE: CONTAMINATED LAND SEARCH**

Dear Ms Nagalingam

Thank you for your search form request of 14/11/2013 enquiring about:

**Block 17 Section 45 Holder Weston Creek**

Records held by the Environment Protection Authority (EPA) for the above block(s) indicate the following:

The block is not recorded on the EPA's contaminated sites management database and geographic information system.

The EPA is aware that hazardous materials are located, or were located, on the block associated with the operation, or former operation, of an ACT Parks Depot. This is likely to have included the storage and use of pesticides/herbicides and refuelling facilities for vehicles and equipment. Details of the current operational status of the Depot are not recorded by the EPA.

The ANZECC 1992, Guidelines for the Assessment and Management of Contaminated Sites and the ACT Contaminated Sites Environment Protection Policy, November 2009 list fuel storage facilities and pest control activities as activities associated with land contamination.

The EPA has not issued any environment protection orders under sections 91C (1), 91D (1) or 125 (4) of the Environment Protection Act 1997 (the Act) over the site and as a result the site is not recorded on the Register of contaminated sites under section 21(A) of the Act.

The information detailed above only relates to records held by the EPA and may not represent the actual condition of the site.

At present the EPA has no information on contamination of the above block(s) other than as detailed above. However, this does not absolutely rule out the possibility of contamination and should not be interpreted as a warranty that there is no contamination.

I appreciate that this does not absolutely rule out the existence of contamination of the soils. If you or your clients wish to be completely sure you, or they, should arrange to conduct independent tests.

Yours sincerely



Des Clayton  
Project Officer  
Environment Protection and Water Regulation

21/11/2013



**ACT**  
Government

Environment and  
Sustainable Development

*File Ref: New file*

Ms Anna Nagalingam  
Indesco Pty Ltd  
6A Thesiger Court  
Deakin ACT 2600

**RE: CONTAMINATED LAND SEARCH**

Dear Ms Nagalingam

Thank you for your search form request of 14/11/2013 enquiring about:

**Block 18 Section 45 Holder Weston Creek**

Records held by the Environment Protection Authority (EPA) for the above block(s) indicate the following:

The block is not recorded on the EPA's contaminated sites management database or geographic information system.

EPA records indicate that the site is currently occupied by public playing fields. Whilst there is no recorded information on potential site contamination public playing fields have been associated in the past with site contamination due to the application of certain chemicals for the control of weeds and pests and the placement of uncontrolled fill during the establishment of the fields. The storage of herbicides/pesticides may also have been undertaken at the site for the above purpose.

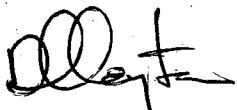
The EPA has not issued any environment protection orders under sections 91C (1), 91D (1) or 125 (4) of the Environment Protection Act 1997 (the Act) over the sites and as a result the sites are not recorded on the Register of contaminated sites under section 21(A) of the Act.

The information detailed above only relates to records held by the EPA and may not represent the actual condition of the site.

At present EPA has no information on contamination of the above block(s) other than as detailed above. However, this does not absolutely rule out the possibility of contamination and should not be interpreted as a warranty that there is no contamination.

I appreciate that this does not absolutely rule out the existence of contamination of the soils. If you or your clients wish to be completely sure you, or they, should arrange to conduct independent tests.

Yours sincerely



Des Claytoh  
Project Officer  
Environment Protection and Water Regulation

21/11/2013



**ACT**

Government

---

Environment and  
Sustainable Development

File Ref: 05/6199

Ms Anna Nagalingam  
Indesco Pty Ltd  
6A Thesiger Court  
Deakin ACT 2600

**RE: CONTAMINATED LAND SEARCH**

Dear Ms Nagalingam

Thank you for your search form request of 14/11/2013 enquiring about:

**Block 1193 Section 0 - Weston Creek**

Records held by the Environment Protection Authority (EPA) for the above block(s) indicate the following:

The block is not recorded on the EPA's contaminated sites management database or geographic information system.

The EPA reviewed a report titled "Final Phase 1 Environmental Site Assessment Report for the precinct of North Weston in Weston Creek" (Project Number 3002156) by SMEC Australia Pty Ltd dated February 2009. The EPA has assessed the report and endorses the consultant's findings that on the basis of the studies remedial works and validation sampling must be undertaken by a suitably qualified environmental consultant within the areas of the site identified prior to it being suitable for its intended residential development.

The ANZECC 1992, Guidelines for the Assessment and Management of Contaminated Sites and the Contaminated Sites Environment Protection Policy, 2009 (CSEPP) list rural activities as past activities associated with land contamination which may pose a risk to human health and the environment.

The EPA has not issued any environment protection orders under sections 91C (1), 91D (1) or 125 (4) of the Environment Protection Act 1997 (the Act) over the site and as a result the site is not recorded on the Register of contaminated sites under section 21(A) of the Act.

The information detailed above only relates to records held by the EPA and may not represent the actual condition of the site.

At present the EPA has no information on contamination of the above block(s) other than as detailed above. However, this does not absolutely rule out the possibility of contamination and should not be interpreted as a warranty that there is no contamination.

I appreciate that this does not absolutely rule out the existence of contamination of the soils. If you or your clients wish to be completely sure you, or they, should arrange to conduct independent tests.

Yours sincerely



Des Clayton  
Project Officer  
Environment Protection and Water Regulation

21/11/2013



Environment and  
Sustainable Development

File Ref: 05/6199

Ms Anna Nagalingam  
Indesco Pty Ltd  
6A Thesiger Court  
Deakin ACT 2600

**RE: CONTAMINATED LAND SEARCH**

Dear Ms Nagalingam

Thank you for your search form request of 21/11/2013 enquiring about:

**Block 1218 Section 0 - Weston Creek**

Records held by the Environment Protection Authority (EPA) for the above block(s) indicate the following:

Block 1218 Weston Creek was formerly known as Block 1204 Weston Creek.

A statutory environmental audit (contaminated land) under the Environment Protection Act 1997 relating to the environmental assessment and remediation of Block 1204 was undertaken in 2009.

The Environment Protection Authority (EPA) reviewed the Site Audit Statement (Site Audit Statement No. ACT19) dated 27 November 2009 and Site Audit Report titled "Site Audit - Block 1204 - Former Pine Plantation Weston Creek" dated November 2009 by Mr Christopher Jewell of C. M. Jewell and Associates Pty Ltd, an approved site Auditor, under the Environment Protection Act 1997.

The audit found the site to be suitable for the "uses permitted by its zoning being RZ1 Residential RZ4 Residential, CZ5 Commercial and Pd Special Purpose Reserve as detailed in the ACT Territory Plan 2008 (dated October 2009)".

The EPA endorsed the Site Audit Statement in December 2009 for the beneficial uses identified subject to the implementation and compliance with an environmental management plan.

The EPA has not issued any environment protection orders under sections 91C (1), 91D (1) or 125 (4) of the Environment Protection Act 1997 (the Act) over the sites and as a result the sites are not recorded on the Register of contaminated sites under section 21(A) of the Act.

The information detailed above only relates to records held by the EPA and may not represent the actual condition of the site.

At present the EPA has no information on contamination of the above block(s) other than as detailed above. However, this does not absolutely rule out the possibility of contamination and should not be interpreted as a warranty that there is no contamination.

I appreciate that this does not absolutely rule out the existence of contamination of the soils. If you or your clients wish to be completely sure you, or they, should arrange to conduct independent tests.

Yours sincerely



Des Clayton  
Project Officer  
Environment Protection and Water Regulation

21/11/2013