

Figure 2-4 Proposed Shared Path Along Naas Road Plan and Section View

## 2.7. Electrical Works

New low voltages cables have been designed for the proposed bore pump, pump house, picnic area and the booster assembly. The electrical works drawing is provided in **Appendix A**. An application for electricity network connection form has been submitted to Evoenergy.

## 2.8. Lookout Landscape Works

TCCS/IFCW has engaged Envirolinks Design to prepare the concept landscape plans for the proposed new Tharwa lookout area. A copy of the landscape plans are provided in **Appendix A**.



Figure 2-5 Landscape Indicative Perspectives



## 4. Tree Assessment

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MYLEK Consulting has undertaken a tree assessment for the proposed works on 28 August 2018. The proposed works have been moved 35m south from the original design location to avoid the existing hollow-bearing trees within Block 5 Section 1 Tharwa. Further tree assessment was undertaken on 21 October 2018 to cover the revised works area. A copy of the tree assessment is provided in **Appendix D**.

The following recommendations have been considered during the design of the water supply infrastructure:

- The proposed construction works will likely come within the tree protection zones of some of the trees on site. Works around the trees will involve installation of tanks and construction of a rising main from a bore to the tanks. Work will be restricted to one side of the trees. In some cases, trees may need to be removed to accommodate the work.
- The remainder of this TMP is for the management of trees during construction works, and draws on recommendations set out in the ACT Tree Protection Act 2005, the Tree Protection (Guidelines for Tree Management Plans) Determination 2007, the TCCS Landscape Management and Protection Plan (LMPP) and AS 4970-2009 Protection of Trees on Development Sites.
- Where recommended in the tree assessment data sheet, ensure any existing deadwood is removed by a qualified arborist prior to construction to ensure safety of construction workers. Any recommended treatments must be carried out by a qualified arborist. It is also recommended that a qualified arborist oversee all works within TPZs and monitor the health of the effected trees to ensure minimal harm occurs.

A total of 27 trees and large shrubs will be removed as part of the project (refer to **Appendix H**). Urban Treescapes (TCCS) has been consulted regarding removal of existing trees as part of the works. Urban Treescapes supported the proposed works and advised that a tree protection fence should be installed at the edge of the construction site to prevent machinery and storage of materials causing any possible damage to the trees being retained.

Details of the tree protection fence are shown in the Landscape Management Protection Plans in **Appendix A**.

## 5. ESO & Assessment of Environmental Effects

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The proposed works will be undertaken in Block 5 Section 1 Tharwa, which is zoned as NUZ4: River Corridor under the Territory Plan. An application to the ACT Conservator of Flora and Fauna for an Environmental Significance Opinion (ESO) is required for works undertaken in the river corridor.

SMEC has engaged NGH Environmental to prepare the Preliminary Environmental Assessment and Environmental Significance Opinion submission in October 2018. A copy of the assessment and ESO report is provided in **Appendix E**.

### 5.1. Preliminary Environmental Assessment

The preliminary biodiversity assessment of the proposed installation of new water tanks and a fire-fighting water main at (part) Block 5 Section 1, Tharwa found that the site is in a partly disturbed condition that retains a native tree canopy, albeit of predominantly younger/regrowth trees, with a high modified understorey, consisting primarily of introduced exotic species, including numerous invasive weed varieties.

The desktop assessment noted that there is some potential for a number of listed threatened species and ecological communities to occur in the area. However, the site survey noted that the habitat conditions at the site were of minimal value, and consequently, there is considered to be little potential for any of these threatened entities to occur at the site.

Based on this conclusion, the proposed development is not considered likely to result in impacts to any listed threatened species. Consequently, there is no obvious reason to undertake an EPBC Referral to the DoEE for this project. Similarly, an ACT EIS is also not considered to be triggered based on potential impacts to species and communities, however, an EIS is required because of the location of the works within the Pd: Special Purpose Reserve overlay zone.

Future development of the site has the potential to result in some minor impacts to common native fauna, including mainly native (and common) birds, as a consequence of the removal of some of the trees at the site, and potentially reptiles as a consequence of impacts to the small areas of rocky habitats. Recommended mitigation measures are provided below to avoid or reduce the extent of these impacts.

Given the low potential for the development to result in any unacceptable ecological impacts, there are no specific recommendations believed necessary to protect any biodiversity matter of conservation significance.

Notwithstanding this, some general management and mitigation measures are recommended, including:

- Removal of any bush rock to be undertaken in the presence of a fauna spotter to capture and relocate any fauna (reptiles) outside of the impact area.
- Protection of any trees (proposed to be retained in any future development applications) in accordance with applicable ACT Tree Protection Guidelines.
- Establishment of sediment and erosion controls (in accordance with best practice) to prevent impacts of earthworks on Murrumbidgee River.
- Establishment of appropriate weed management measures to ensure that weeds are not spread from the works area.

### 5.2. Environmental Significance Opinion

An Environmental Significance Opinion approval was granted on 26 October 2018. The Conservator of Flora and Fauna advised that the proposed works are not likely to have a significant adverse

environmental impact. A copy of the Environmental Significance Opinion and Statement of Reasons for the decision is provided in **Appendix E**.

## 6. Preliminary Contamination Assessment

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SMEC has undertaken contaminated land search for Block 5 Section 1 and Block 14 Section 8 Tharwa on 20 September 2018. The Environment Protection Authority (EPA) records indicate that neither block is recorded on the EPA's contaminated sites management database or geographic information system. A copy of the contaminated land search letters is provided in **Appendix G**.

## 7. Heritage Assessment

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ACT Heritage advises that a heritage inspection of Block 5 Section 1 Tharwa is required to assess any potential heritage impacts from the proposed works. SMEC has engaged Navin Officer Heritage Consultants Pty Ltd to prepare the Heritage Assessment for Block 5 Section 1 Tharwa. A copy of the heritage assessment is provided in **Appendix F**.

### 7.1. Field Survey Observations

The study area is located on low to moderate gradient mid- and basal slopes adjacent to a flat terrace above the Murrumbidgee River.

No Aboriginal or Historic sites or artefacts were identified during the survey of the study area.

The study area is heavily covered with thick native grasses and sparse Eucalypts. Visibility of the ground surface was very low at the time of survey, with 1% ground exposure and an average of 30% visibility within exposures. Soils were characterized by greyish brown angular gravelly silt with outcropping granite boulders (tors) throughout the study area.

Disturbances within the study area include heavy earthworks associated with the construction of Naas Road (western edge of the study area), clearance of vegetation for farming, planting of Eucalypt trees (evidenced by weed matting at the bases of trunks). Some of the granite boulders adjacent to the flat terrace are gathered in positions that suggest they have been moved from their original outcropping locations. There has also been extensive wombat burrowing across the study area.

There is very little topsoil across the study area, which is common for eroded landscapes in the Canberra area, especially those in rural settings that have been subject to heavy grazing historically.

From a landscape perspective the study area has a predicted moderate to low potential for subsurface archaeological deposits associated with Aboriginal occupation, given the moderate gradient, loss of upper soil profile, and previous ground disturbances. In addition, there are topographic features nearby that are predicted to be of much higher utility to Aboriginal people, such as the flat river terraces directly east of the study area.

No known Aboriginal or historic sites will be directly impacted by the proposal.

There is a risk of indirect (visual) impacts from the development, if construction is unsympathetic to the rural landscape character associated with Tharwa village and its surrounds.

The following sites are included on the ACT Heritage Register have the potential to be indirectly (visually) impacted by the development:

- Tharwa Bridge
- St Edmunds Anglican Church

In addition, the rural character of the Lanyon Landscape Bowl Area and the Murrumbidgee River Corridor should be considered.

### 7.2. Mitigation

The client (SMEC) is clearly aware of the potential of these indirect impacts and has selected the current site to minimise visual impact from the street and residents. The inground construction of the tanks is not anticipated to obstruct, detract, or impact the rural pastoral character of the surrounding landscape. Furthermore, once constructed the firefighting infrastructure will serve the purpose of minimizing the impacts of structural fires and bushfires, protecting the character of Tharwa Village, as well as the surrounding pastoral landscape.

### 7.3. Recommendations

- Subsurface impacts, heavy machinery, and imported fill should be limited to the current boundaries of the study area.
- During construction, the terrace flats immediately east of the study area should not be used for stockpiling or as a laydown area for construction vehicles, as this area has heightened sensitivity in regard to Aboriginal cultural heritage. This was of particular concern to the RAO's present during field survey.
- An Unanticipated Discovery Plan, which provides a protocol to be followed in the event that previously unrecorded heritage sites/artefacts are revealed during construction works, should be adopted and implemented as necessary.
- A copy of the finalised version of this report should be provided to the ACT Heritage
- One copy of the finalised version this report should be provided to each of the ACT RAOs.

## 8. Cost Opinion and Construction Timing

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The estimated construction costs for the proposed water supply infrastructure project is approximately \$950,000.

Construction of the proposed water supply infrastructure works is expected to be completed by June 2019.

## Appendix A DESIGN DRAWINGS

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## Appendix B STATEMENT AGAINST CRITERIA

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## Appendix C SURVEY

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## Appendix D TREE ASSESSMENT

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## Appendix E ENVIRONMENTAL ASSESSMENT & ESO

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## Appendix F HERITAGE ASSESSMENT

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## Appendix G CONTAMINATION ASSESSMENT

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## Appendix H CORRESPONDENCE

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Member of the Surbana Jurong Group

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**From:** Hunter, Jason  
**Sent:** Thursday, 21 March 2019 10:17 AM  
**To:** Horton, Richard  
**Cc:** Azzopardi, Adam; Moore, AlisonM (ACTPLA)  
**Subject:** RE: Tharwa - Markups

UNCLASSIFIED

Hi Richard

I have made contact with Property Group and have secured a HOLD for Saturday 6 April 2019 from 8am-2pm.

Regards

Jason

**Jason Hunter** | Senior Project Manager | Infrastructure Delivery  
Member Australian Institute of Project Management  
Phone: 02 6205 3603 | Mob: [REDACTED] | Email: [jason.hunter@act.gov.au](mailto:jason.hunter@act.gov.au)  
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**From:** Horton, Richard  
**Sent:** Friday, 1 March 2019 9:39 AM  
**To:** Hunter, Jason <[Jason.Hunter@act.gov.au](mailto:Jason.Hunter@act.gov.au)>  
**Cc:** Azzopardi, Adam <[Adam.Azzopardi@act.gov.au](mailto:Adam.Azzopardi@act.gov.au)>; Moore, AlisonM (ACTPLA) <[AlisonM.Moore@act.gov.au](mailto:AlisonM.Moore@act.gov.au)>  
**Subject:** RE: Tharwa - Markups

Hi Jason,

Thank you for the update on project progress and for sending through the revised drawings.

We note the changes made to incorporate the shared path access and the change to the orientation of the proposed pump house building. These updates address some of the issues raised previously by EPSDD, however there are a number of concerns that remain for your consideration that we believe will help to resolve the intent of the proposal.

Please see comments below specifically in regards to further design consideration for the proposal:

- The proposed building design, materials and finishes for the new pump house building/picnic area need to respond to Tharwa Village Design Guidelines in order to achieve the desired character for new buildings in Tharwa Village. In order to achieve this the following should be addressed:
  - The proposed roof design should incorporate the following:
    - Eaves and gables at the roof ends to provide a traditional rural character;
    - Inset upright posts for eaves at the picnic area roof end;

- Traditional corrugated profile for the roof cladding.
- The proposed wall finishes and/or cladding for the pump house building, doors and other external fixtures should be of a traditional rural character.
- The proposed picnic area may include a ceiling provided as part of the building design (raked or flat), and consideration should also be given to the inclusion of lighting for public safety and amenity.
- All proposed garden beds and landscaping surrounding the pump house building should be constructed as part of the current project.
- As noted previously, the proposed pump house building and associated infrastructure is located with the NUZ4 River Corridor Zone and adjacent to the estimated 1:100 flood zone for the Murrumbidgee River. Given this location, the revised development application should provide further detail on the following:
  - Detailed information on the source and total amount of fill to be used in project construction.
  - An erosion and sediment control plan to be implemented in project delivery.
  - Risk and hazard mitigation measures for proposed on-site diesel storage and use.
- As advised previously, consultation is recommended with EPSDD Heritage Branch and Parks and Conservation Service regarding opportunities for the inclusion of locally relevant directional and/or interpretive signage as part of the pump house/picnic area building design.
- We notice on the provided section drawings that the proposed water storage tanks are at different levels, with one sitting higher than the proposed finished ground level. Can you please confirm how safety and access will be applied in this situation?

For consideration in regard to the above comments, the Tharwa Design Guidelines are included on pages 67-72 of the Tharwa Village Plan, which is available from the EPSDD website at:

[https://www.planning.act.gov.au/\\_data/assets/pdf\\_file/0006/1244715/Tharwa-Village-Plan-ACCESS.pdf](https://www.planning.act.gov.au/_data/assets/pdf_file/0006/1244715/Tharwa-Village-Plan-ACCESS.pdf)

We would be happy to discuss these comments further or assist with detailed design updates, as required.

Best regards,

Richard

**Richard Horton | Senior Policy Officer**

Phone: 02 6207 3728 | Email: [richard.horton@act.gov.au](mailto:richard.horton@act.gov.au)

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---

**From:** Hunter, Jason

**Sent:** Friday, 22 February 2019 10:28 AM

**To:** Horton, Richard <[Richard.Horton@act.gov.au](mailto:Richard.Horton@act.gov.au)>; Azzopardi, Adam <[Adam.Azzopardi@act.gov.au](mailto:Adam.Azzopardi@act.gov.au)>

**Subject:** FW: Tharwa - Markups

UNCLASSIFIED

Hi Richard

Please find attached updated drawings for Tharwa including the shared path connection and the rearranged building and tank location.

We currently have an Advisory note in circulation for the Minister, to advise on the progress to date and the upcoming information session proposed with the community. No date has been confirmed regarding the date. I am awaiting confirmation from our comms area and also discuss this with you prior.

Additional landscaping will be included between the building and shared path to soften the impact to the street. This will be included once I have endorsement from you.

As discussed the design of the shared path will be included in our documentation, however I am unable to construct within my current budget. If additional budget can be provided by EPSDD then I could include this in the works.

Also I am preparing a formal response to the representations and your submission which will accompany the revised drawings as part of the resubmission. I will also provide this prior to resubmitting.

Happy to discuss.

Regards

Jason

**Jason Hunter** | Senior Project Manager | Infrastructure Delivery

Member Australian Institute of Project Management

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**From:** Amal BEEHARRY [REDACTED]  
**Sent:** Wednesday, 20 February 2019 2:39 PM  
**To:** Hunter, Jason <[Jason.Hunter@act.gov.au](mailto:Jason.Hunter@act.gov.au)>; Thomas, Stephen (ACTPS) <[Stephen.Thomas@act.gov.au](mailto:Stephen.Thomas@act.gov.au)>  
**Cc:** Fran LIAO <[Fran.Liao@smec.com](mailto:Fran.Liao@smec.com)>  
**Subject:** Tharwa - Markups

Hi Jason, Stephen, pls refer attachments for draft sketch showing proposed shared path alignment and pump house building updated to reflect traditional roof.

Appreciate any feedback / markups so we can proceed with the design.

Thank you.

**Amal Beeharry**

Senior Engineer

SMEC (Member of the Surbana Jurong Group)



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**From:** Horton, Richard  
**Sent:** Wednesday, 10 April 2019 11:23 AM  
**To:** Moore, AlisonM (ACTPLA)  
**Subject:** FW: Tharwa NPWS Fire Fighting - Community Information Session outcomes  
**Attachments:** 190408\_CIS\_Site suggestions.pdf; 3002648-003\_[03].pdf; 3002648-004\_[01].pdf; 3002648-005\_[03].pdf; Tharwa - Opt1.jpg; Tharwa - Opt3.jpg; Tharwa - Opt2.jpg

Hi Alison,

Please see below.

Cheers,

Richard

---

**From:** Hunter, Jason  
**Sent:** Wednesday, 10 April 2019 10:13 AM  
**To:** Horton, Richard <Richard.Horton@act.gov.au>  
**Cc:** Azzopardi, Adam <Adam.Azzopardi@act.gov.au>  
**Subject:** Tharwa NPWS Fire Fighting - Community Information Session outcomes

UNCLASSIFIED

Hi Richard

As discussed the Community Information Session for the Tharwa Non Potable Water Supply for Fire Fighting was held last Saturday 6 April 2019.

The attached drawings were presented to the community as information for discussion. (3002648-003-005)

- It was held at the School Hall (Tharwa Community Hall) between 9:00am-11:00am
- I was assisted by Amal (SMEC) and Lavinia C. (TCCS\_CW)
- Seven people attended the session

The session provided opportunity for individuals from the community to have their say and seek clarification on the scope and status of the project.

The key messages received from the community attendees were as follows:

- Request to investigate other locations for the proposed infrastructure including currently leased sites – I have attached sites identified in discussion.
- Further investigation on the 'reality' around the safety of the currently proposed location – re traffic volumes and speed issues
- Concern regarding the cost to develop in the current location
- Concern that the proposed infrastructure does not allow residents to individually protect themselves from the risk of fire
- Request to be advised a contact for ACT Government to acquire land above the General Store to locate the proposed infrastructure.
- Request contact to follow-up on releasing leased land back to ACT Government.

The key messages provided to the community in attendance included:

- The current design and its location is currently under assessment by EPSDD (DA Process)
- That we are not currently 'wed' to the current design or its location and the info session was an opportunity to confirm the communities preferences and concerns
- The current location has been supported by ACT Environment, Heritage ACT and ACT Fire and Rescue and the RFS.
- That the current design meets all the project objectives and will deliver against the project outcomes;
- That the current design meets all relevant Australian Standards and requirements of ACT Fire and Rescue and RFS.
- The current location was determined by both Hydrologists and Engineers as the preferred location for bore and respective infrastructure.
- ACT Fire and Rescue and RFS both support the current location

Next step:

- Undertake a desktop study and establish 'pros' and 'cons' of the three identified locations (see attached) including Block 13 Section 8 Tharwa
- Provide contact to the community for the release of Leased land back to ACT Government. (Block 8 Section 13 Tharwa)
- Prepare options for discussion with the community in approximately 4-5 weeks
- The consultant team is putting together a desktop 'pros' and 'cons' investigation of the three identified sites which will inform our next discussion with the community.
- An email will be sent to ESA, ACT Fire and Rescue and RFS seeking their reasons for support of the current location.

The community expressed concern about the infrastructure in the current location specifically in relation to the following:

- Traffic speed and risk in placing the infrastructure on the corner;
- The risk of having large tankers backing onto the Naas road during an emergency
- The desire for individuals to stay and protect their own homes during a bushfire event
- access to a supply of non-potable water to enable individuals to protect their own homes in preparation and during bushfires
- The risk of having diesel storage in the river corridor.

Attached are three schematic options to place the infrastructure in and around the existing NPWS for fire-fighting up near the General store and existing sheds.

We are currently having conversations with the ESA (ACTFR/RFS). Placing the infrastructure in and around the existing infrastructure will be more favourable with the community and also enables the project to include a gravity fed standpipe for use when there is no electricity or fuel available to use the pumps. This is also favoured by the community.

Can you advise who Kevin can contact to discuss the possibility of releasing a parcel of land back to government?

Happy to discuss further if need be.

Regards

Jason

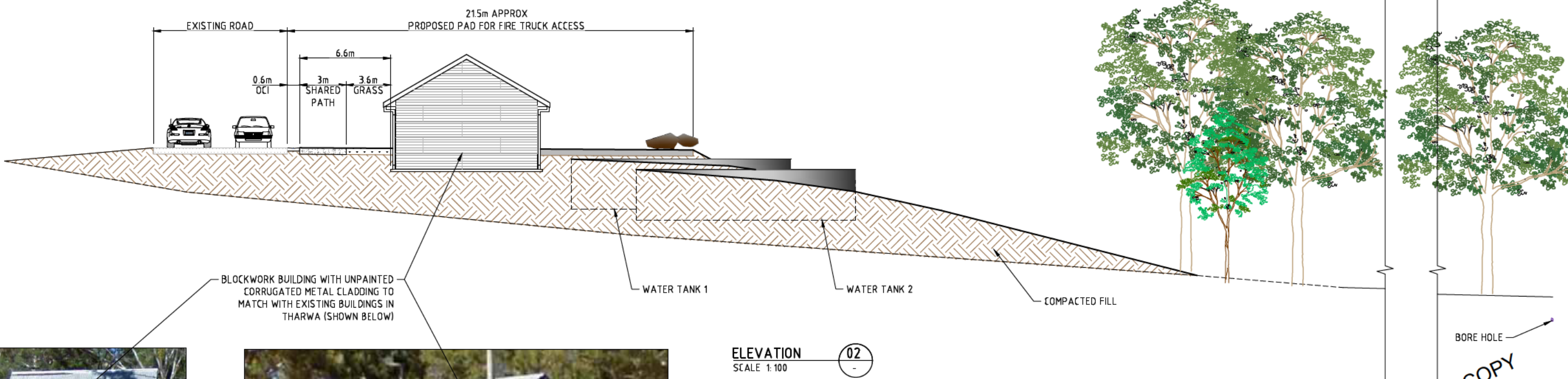
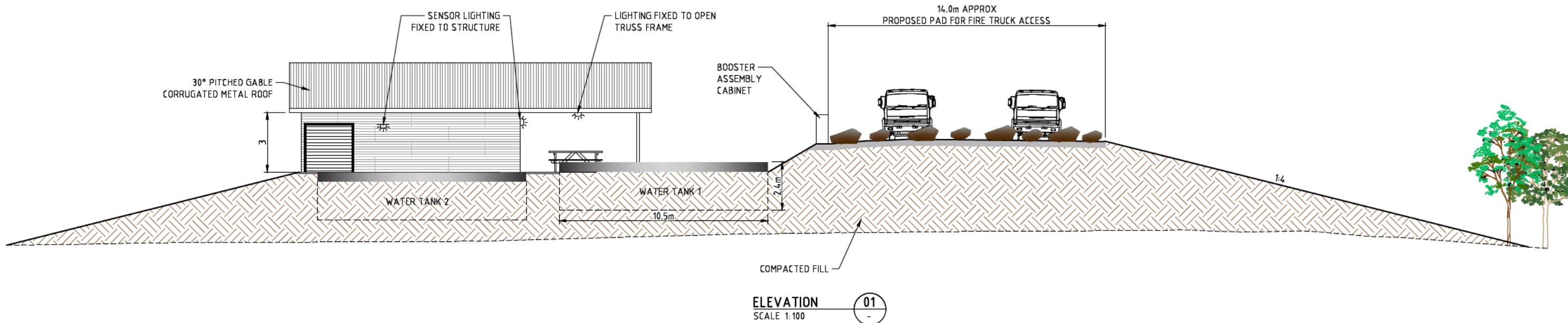
Phone: 02 6205 3603 | Mob: [REDACTED] | Email: [jason.hunter@act.gov.au](mailto:jason.hunter@act.gov.au)  
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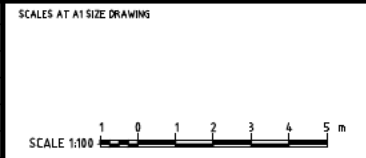
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REFER TO DRAWING 3002648-001 FOR NOTES AND LEGEND

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DRAFTER	B. DONNAN
DRAFTING CHECK	K. CURLEY
DESIGNER	M. WATSON
DESIGN CHECK	F. LIAO
PROJECT MANAGER	A. BEEHARRY
PROJECT DIRECTOR	P. EVANS



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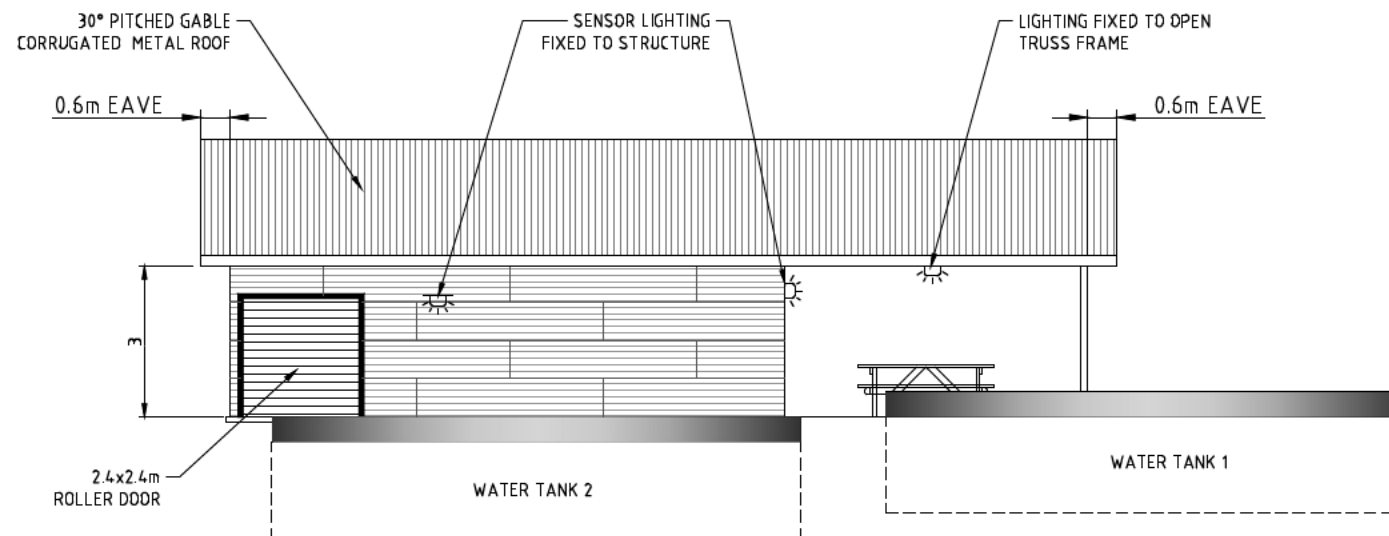
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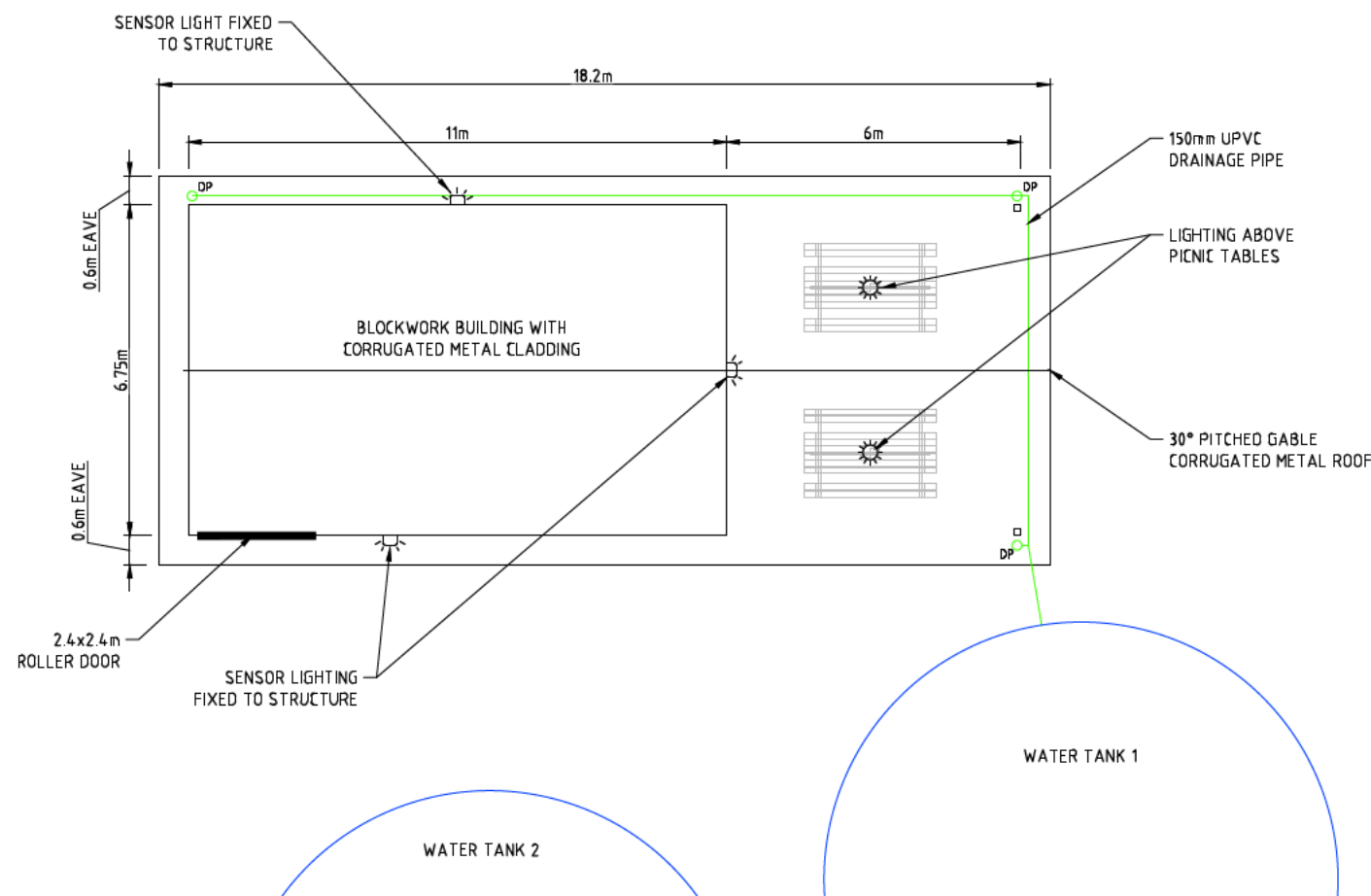
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 NON POTABLE WATER FOR FIRE FIGHTING PURPOSES  
 TYPICAL SECTIONS  
 SHEET 1

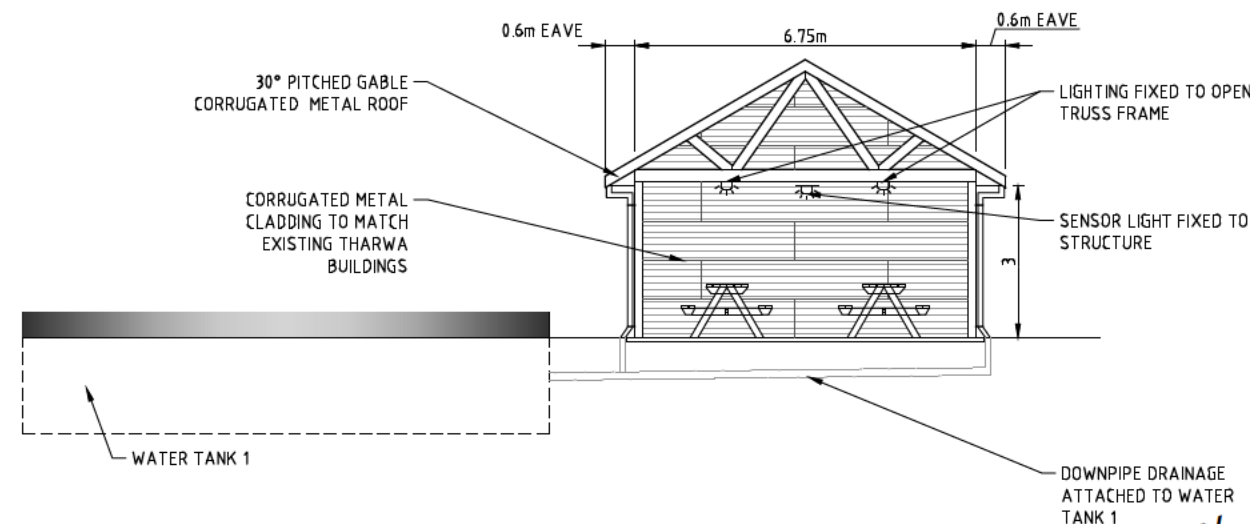
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SHED - ELEVATION LOOKING SOUTH  
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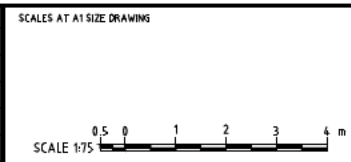
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**DEVELOPMENT APPLICATION**

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02	05/11/2018	DEVELOPMENT APPLICATION APPROVAL	WVR001	AB	DRAFTING CHECK <i>K. CURLEY</i>
03	19/11/2018	DESIGN REVISED	WVR002	AB	DESIGNER <i>M. WATSON</i>
					DESIGN CHECK <i>F. LIAO</i>
					PROJECT MANAGER <i>A. BEEHARRY</i>
					PROJECT DIRECTOR <i>P. EVANS</i>

**REVISION IN PROGRESS**



DESIGNER

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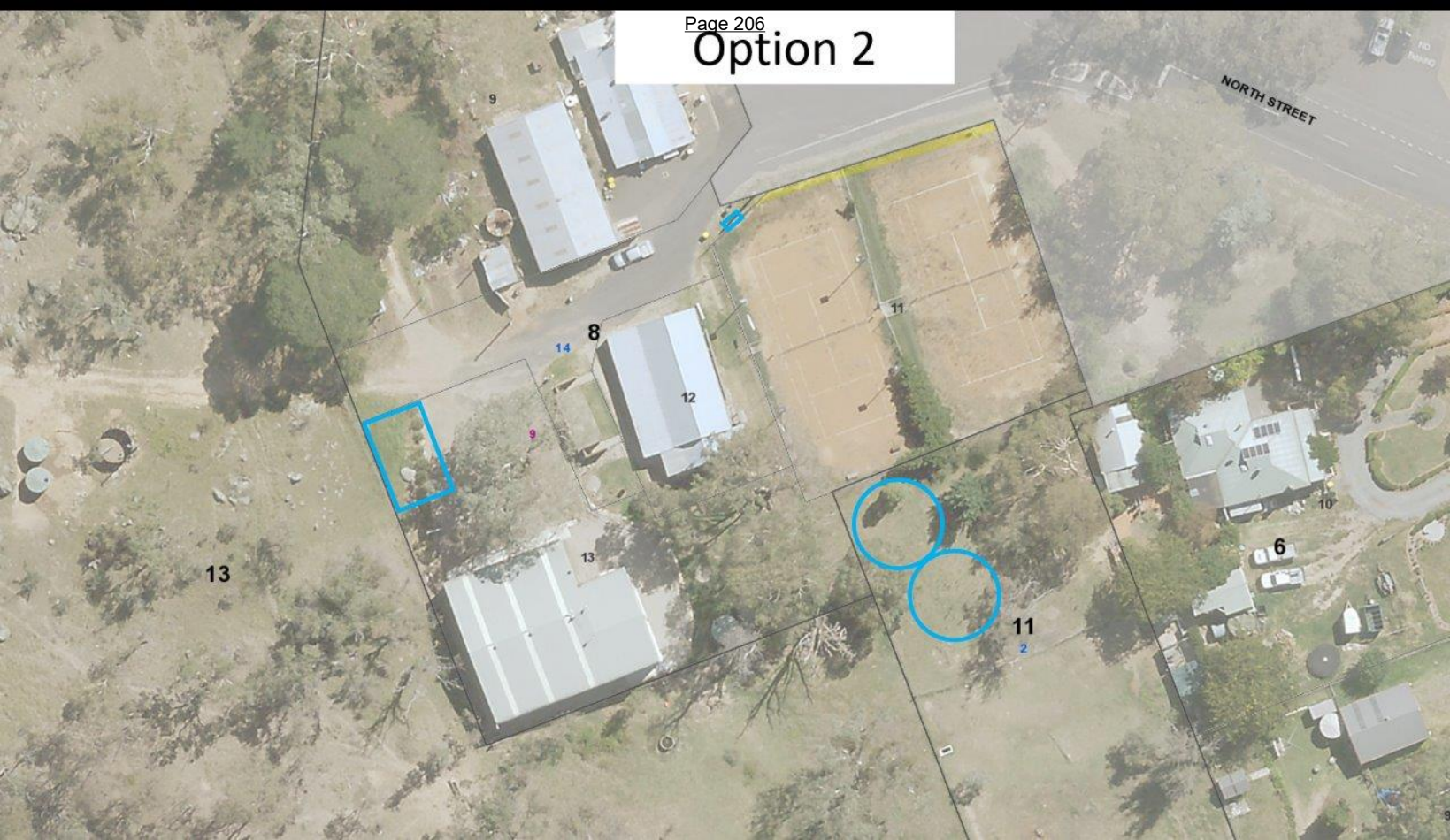
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PROJECT TITLE NEW THARWA LOOKOUT INCLUDING NON POTABLE WATER FOR FIRE FIGHTING PURPOSES		REVISION 03	
TYPICAL SECTIONS SHEET 2		PROJECT / DRAWING No. 3002648-005	
SCALE AS SHOWN	PHASE DA	PROJECT / DRAWING No. 3002648-005	REVISION 03

# Option 1



# Option 2



NORTH STREET

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# Option 3



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**From:** Horton, Richard  
**Sent:** Thursday, 11 April 2019 1:50 PM  
**To:** Hunter, Jason  
**Cc:** Azzopardi, Adam; Moore, AlisonM (ACTPLA)  
**Subject:** RE: Tharwa NPWS Fire Fighting - Community Information Session outcomes

Hi Jason,

Thanks for the update on the outcomes of the Community Information Session for Tharwa Non Potable Water Supply for Fire Fighting on Saturday 6 April 2019.

Engagement with the local community is supported to assist to inform site selection for the placement of infrastructure. As advised previously, a primary consideration in site selection should be placement of infrastructure to meet operational firefighting and access requirements, and further engagement with ESA is recommended.

Enquiries regarding possible release of leased land to ACT Government should be directed to Sharon Harmer in EPSDD, Rural Leasing (6207 1790). Please note that enquiries regarding current lease arrangements should be pursued by the current leaseholder.

We look forward to an update on further options assessment, prior to final site selection and resubmission of the revised development application.

Best regards,

Richard

**Richard Horton | Senior Policy Officer | Strategic Planning and Policy**

Phone: 02 6207 3728 | Email: [richard.horton@act.gov.au](mailto:richard.horton@act.gov.au)

**Planning, Land and Building Policy | Environment, Planning and Sustainable Development Directorate | ACT Government**

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**From:** Hunter, Jason  
**Sent:** Wednesday, 10 April 2019 10:13 AM  
**To:** Horton, Richard <[Richard.Horton@act.gov.au](mailto:Richard.Horton@act.gov.au)>  
**Cc:** Azzopardi, Adam <[Adam.Azzopardi@act.gov.au](mailto:Adam.Azzopardi@act.gov.au)>  
**Subject:** Tharwa NPWS Fire Fighting - Community Information Session outcomes

**UNCLASSIFIED**

Hi Richard

As discussed the Community Information Session for the Tharwa Non Potable Water Supply for Fire Fighting was held last Saturday 6 April 2019.

The attached drawings were presented to the community as information for discussion. (3002648-003-005)

- It was held at the School Hall (Tharwa Community Hall) between 9:00am-11:00am
- I was assisted by Amal (SMEC) and Lavinia C. (TCCS\_CW)

- Seven people attended the session

The session provided opportunity for individuals from the community to have their say and seek clarification on the scope and status of the project.

The key messages received from the community attendees were as follows:

- Request to investigate other locations for the proposed infrastructure including currently leased sites – I have attached sites identified in discussion.
- Further investigation on the 'reality' around the safety of the currently proposed location – re traffic volumes and speed issues
- Concern regarding the cost to develop in the current location
- Concern that the proposed infrastructure does not allow residents to individually protect themselves from the risk of fire
- Request to be advised a contact for ACT Government to acquire land above the General Store to locate the proposed infrastructure.
- Request contact to follow-up on releasing leased land back to ACT Government.

The key messages provided to the community in attendance included:

- The current design and its location is currently under assessment by EPSDD (DA Process)
- That we are not currently 'wed' to the current design or its location and the info session was an opportunity to confirm the communities preferences and concerns
- The current location has been supported by ACT Environment, Heritage ACT and ACT Fire and Rescue and the RFS.
- That the current design meets all the project objectives and will deliver against the project outcomes;
- That the current design meets all relevant Australian Standards and requirements of ACT Fire and Rescue and RFS.
- The current location was determined by both Hydrologists and Engineers as the preferred location for bore and respective infrastructure.
- ACT Fire and Rescue and RFS both support the current location

Next step:

- Undertake a desktop study and establish 'pros' and 'cons' of the three identified locations (see attached) including Block 13 Section 8 Tharwa
- Provide contact to the community for the release of Leased land back to ACT Government. (Block 8 Section 13 Tharwa)
- Prepare options for discussion with the community in approximately 4-5 weeks
- The consultant team is putting together a desktop 'pros' and 'cons' investigation of the three identified sites which will inform out next discussion with the community.
- An email will be sent to ESA, ACT Fire and Rescue and RFS seeking their reasons for support of the current location.

The community expressed concern about the infrastructure in the current location specifically in relation to the following:

- Traffic speed and risk in placing the infrastructure on the corner;
- The risk of having large tankers backing onto the Naas road during an emergency
- The desire for individuals to stay and protect their own homes during a bushfire event
- access to a supply of non-potable water to enable individuals to protect their own homes in preparation and during bushfires
- The risk of having diesel storage in the river corridor.

Attached are three schematic options to place the infrastructure in and around the existing NPWS for fire-fighting up near the General store and existing sheds.

We are currently having conversations with the ESA (ACTFR/RFS). Placing the infrastructure in and around the existing infrastructure will be more favourable with the community and also enables the project to include a gravity fed standpipe for use when there is no electricity or fuel available to use the pumps. This is also favoured by the community.

Can you advise who Kevin can contact to discuss the possibility of releasing a parcel of land back to government?

Happy to discuss further if need be.

Regards

Jason

**Jason Hunter** | Senior Project Manager | Infrastructure Delivery

Member Australian Institute of Project Management

Phone: 02 6205 3603 | Mob: [REDACTED] | Email: [jason.hunter@act.gov.au](mailto:jason.hunter@act.gov.au)

Infrastructure Delivery | Transport Canberra and City Services Directorate | ACT Government

490 Northbourne Avenue Dickson | GPO Box 158 Canberra ACT 2602 | [www.act.gov.au](http://www.act.gov.au)



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---

**From:** Azzopardi, Adam  
**Sent:** Wednesday, 5 June 2019 10:05 AM  
**To:** Moore, AlisonM (ACTPLA); Horton, Richard  
**Subject:** FW: Tharwa - site locations pros / cons [SEC=UNCLASSIFIED]  
**Attachments:** Tharwa - Option A.jpg; Tharwa - Option A Land Take.jpg.png

Hi Ali and Richard

We may need to discuss following my conversation with Sharon this morning.

Regards

Adam

---

**From:** Harmer, Sharon  
**Sent:** Wednesday, 5 June 2019 9:55 AM  
**To:** Azzopardi, Adam <Adam.Azzopardi@act.gov.au>  
**Subject:** FW: Tharwa - site locations pros / cons [SEC=UNCLASSIFIED]

FYI

Sharon Harmer | Assistant Manager | Leasing Services  
**Phone 02 6207 1790** | Fax 02 6207 8265  
**Planning Delivery Division** | ACTPLA | Environment, Planning and Sustainable Development Directorate | **ACT Government**  
Dame Pattie Menzies House, Challis Street, Dickson | GPO Box 158 Canberra ACT 2601 | [www.actpla.act.gov.au](http://www.actpla.act.gov.au)

---

**From:** Hunter, Jason  
**Sent:** Monday, 13 May 2019 12:55 PM  
**To:** Harmer, Sharon <[Sharon.Harmer@act.gov.au](mailto:Sharon.Harmer@act.gov.au)>  
**Subject:** FW: Tharwa - site locations pros / cons

UNCLASSIFIED

Hi Sharon

Please see attached aerial photo of approximate area of work being explored on Block 8 Section 13 Tharwa.

Regards

Jason

**Jason Hunter** | Senior Project Manager | Infrastructure Delivery  
Member Australian Institute of Project Management  
**Phone: 02 6205 3603** | **Mob:** [REDACTED] | Email: [jason.hunter@act.gov.au](mailto:jason.hunter@act.gov.au)  
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490 Northbourne Avenue Dickson | GPO Box 158 Canberra ACT 2602 | [www.act.gov.au](http://www.act.gov.au)



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---

**From:** Amal BEEHARRY [REDACTED]  
**Sent:** Thursday, 2 May 2019 4:18 PM  
**To:** Hunter, Jason <[Jason.Hunter@act.gov.au](mailto:Jason.Hunter@act.gov.au)>  
**Subject:** Re: Tharwa - site locations pros / cons

Hi Jason, pls find attached sketches as requested. Points to note:

- Based on existing site levels, the tanks may be exposed to an extent, with minimum of 1m cut into the existing ground. Fill batter is assumed to be 1 (v): 3 (h) between and around the tanks. The total area required for the tank site is approximately 345m<sup>2</sup>.
- 4m wide access track is proposed for construction and maintenance access. The total area of the access track is approximately 126m<sup>2</sup>.
- Pls note the above areas may vary due to cut/fill extents, rock outcrop, geotech and/or any latent site conditions.
- Assume no box gum woodland within the works area.

Impact on existing infrastructure:

- The existing river water pipes will need to be removed and relocated.
- The existing electrical overhead cables will need to be removed and relocated to underground.
- The existing abandoned steel tank will need to be removed and disposed.

**Amal Beeharry**

Senior Engineer  
 SMEC (Member of the Surbana Jurong Group)

---

**From:** Hunter, Jason <[Jason.Hunter@act.gov.au](mailto:Jason.Hunter@act.gov.au)>  
**Sent:** Wednesday, 1 May 2019 3:56 PM  
**To:** Amal BEEHARRY [REDACTED]  
**Subject:** RE: Tharwa - site locations pros / cons

UNCLASSIFIED

Hi Amal

Can Option A illustrate the proposed layout of the two new tanks and the other infrastructure?

Regards

Jason

**Jason Hunter** | Senior Project Manager | Infrastructure Delivery  
 Member Australian Institute of Project Management

Phone: 02 6205 3603 | Mob: [REDACTED] Email: [jason.hunter@act.gov.au](mailto:jason.hunter@act.gov.au)  
Infrastructure Delivery | Transport Canberra and City Services Directorate | ACT Government  
490 Northbourne Avenue Dickson | GPO Box 158 Canberra ACT 2602 | [www.act.gov.au](http://www.act.gov.au)



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---

**From:** Amal BEEHARRY [REDACTED]  
**Sent:** Wednesday, 1 May 2019 9:17 AM  
**To:** Hunter, Jason <[Jason.Hunter@act.gov.au](mailto:Jason.Hunter@act.gov.au)>; Thomas, Stephen (ACTPS) <[Stephen.Thomas@act.gov.au](mailto:Stephen.Thomas@act.gov.au)>  
**Cc:** Fran LIAO <[Fran.Liao@smec.com](mailto:Fran.Liao@smec.com)>  
**Subject:** Tharwa - site locations pros / cons

Hi Jason, pls refer attachment for Tharwa - site locations pros / cons.

Awaiting your advice to progress any further work.

**Amal Beeharry**

Senior Engineer

M [REDACTED] T + [REDACTED] E [REDACTED]  
Suite 2, Level 1, 243 Northbourne Avenue, Lyneham, ACT, 2602, Australia

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# Option A

NORTH STREET

Booster

4m Wide Access  
Area = 126m<sup>2</sup>

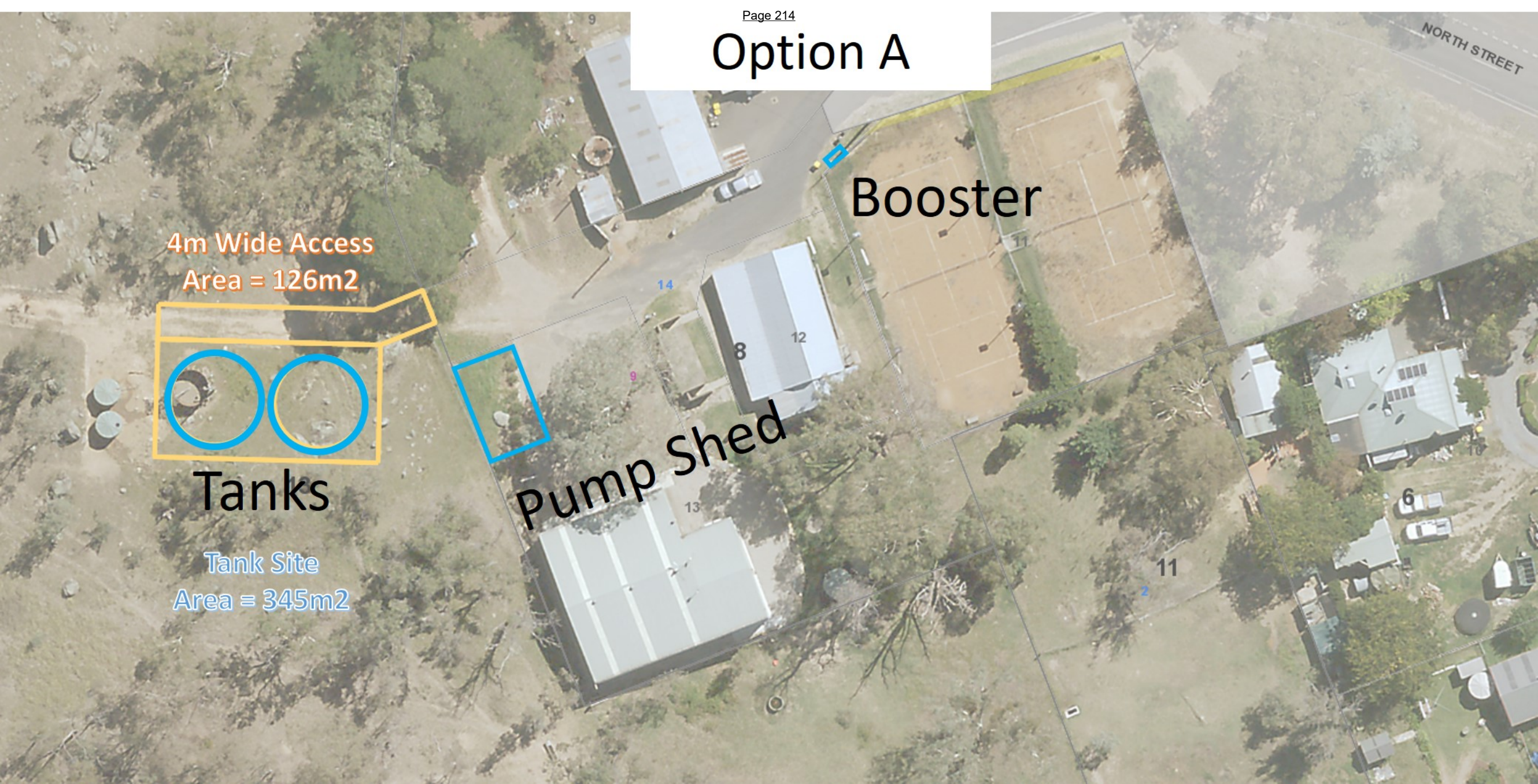


Tanks

Tank Site  
Area = 345m<sup>2</sup>



Pump Shed





---

**From:** Azzopardi, Adam  
**Sent:** Wednesday, 5 June 2019 2:54 PM  
**To:** Moore, AlisonM (ACTPLA); Horton, Richard  
**Subject:** FW: Tharwa - site locations pros / cons [SEC=UNCLASSIFIED]  
**Attachments:** image002.png

Subsequent response for your information

**From:** [REDACTED]  
**Sent:** Wednesday, 5 June 2019 11:35 AM  
**To:** Harmer, Sharon <Sharon.Harmer@act.gov.au>  
**Cc:** [REDACTED] Hunter, Jason <Jason.Hunter@act.gov.au>; Azzopardi, Adam <Adam.Azzopardi@act.gov.au>  
**Subject:** Re: FW: Tharwa - site locations pros / cons [SEC=UNCLASSIFIED]

Thanks Sharon

I assume that we should discuss those processes with the project manager - this doesn't seem to me to be our responsibility to undertake - but that's not your issue.

Given that no compensation seems to be available we would have to see how far [REDACTED] community spirit extends but that seems to be a big ask to me. Is there any other options for a land swap or something?

[REDACTED]

On Wed, 5 Jun. 2019, 11:04 am Harmer, Sharon, <[Sharon.Harmer@act.gov.au](mailto:Sharon.Harmer@act.gov.au)> wrote:

Hi [REDACTED]

I refer to recent emails regarding the supply of non potable water for fire fighting purposes in the Tharwa Village.

The emails suggest that the Tharwa community's preferred location for two water tanks is on a portion of Block 8 Section 13 Tharwa.

As you are aware, Block 8 Section 13 Tharwa is currently held under a rural lease. In order for the tanks to be located at the preferred location, an application for a surrender of the required land will need to be submitted to Leasing Services.

In order for a partial surrender application to be assessed, the following will be required:

- a registered surveyor is engaged to prepare a new survey of the area to remain in lease;
  
- once surveyed, a formal application is submitted requesting the surrender of a portion of Block 8 Section 13 Tharwa. The application will need to include:
  - a survey of the area to remain in lease;
  - reasons as to why the surrender of land is required;
  - the lease preparation fee; and
  - a statement from the lessee acknowledging that no compensation will be payable from EPSDD upon surrender of the land.
  
- the application will also need to include:
  - confirmation from TCCS that they support the application and accept custodianship of the land following the surrender;
  - confirmation as to who will be responsible for the following:
    - fencing the new lease boundaries;
    - removing and relocating existing river water pipes;
    - removing and relocating electrical overhead cables; and
    - removing and disposing of the existing abandoned steel tank.

If you have any queries in relation to the partial surrender, please contact me on 6207 1790. However, given that this project is being coordinated by TCCS, any queries in relation to the project and who is responsible for specific aspects of the project should be directed to Jason Hunter, Infrastructure Delivery, TCCS, on 6205 3603.

Regards

Sharon Harmer | Assistant Manager | Leasing Services

Phone 02 6207 1790 | Fax 02 6207 8265

Planning Delivery Division | ACTPLA | Environment, Planning and Sustainable Development Directorate | ACT Government

Dame Pattie Menzies House, Challis Street, Dickson | GPO Box 158 Canberra ACT 2601 | [www.actpla.act.gov.au](http://www.actpla.act.gov.au)

**From:** [REDACTED]

**Sent:** Monday, 27 May 2019 1:14 PM

**To:** Hunter, Jason <[Jason.Hunter@act.gov.au](mailto:Jason.Hunter@act.gov.au)>; Harmer, Sharon <[Sharon.Harmer@act.gov.au](mailto:Sharon.Harmer@act.gov.au)>

**Cc:** [REDACTED]

**Subject:** Re: FW: Tharwa - site locations pros / cons

Hi Jason, Sharon,

Ron has expressed interest in this discussion and sorting something out relating to his leases. What is the logical way for the next step to take this forward?

Cheers

█

On Thu, May 2, 2019 at 4:31 PM Hunter, Jason <[Jason.Hunter@act.gov.au](mailto:Jason.Hunter@act.gov.au)> wrote:

UNCLASSIFIED

Hi █

Please find attached concept layout for the area above the General Store behind the existing shed.

They sit quite well in this location.

Just thought if you're having conversations with █ etc you can use this to talk to.

I will forward this Sharon H from EPSDD to illustrate the area that is needed to be surrendered by the Lessee if this becomes a viable option.

Regards

Jason

**Jason Hunter** | Senior Project Manager | Infrastructure Delivery

Member Australian Institute of Project Management

Phone: 02 6205 3603 | Mob: [REDACTED] | Email: [jason.hunter@act.gov.au](mailto:jason.hunter@act.gov.au)  
Infrastructure Delivery | Transport Canberra and City Services Directorate | ACT Government  
490 Northbourne Avenue Dickson | GPO Box 158 Canberra ACT 2602 | [www.act.gov.au](http://www.act.gov.au)



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**From:** Amal BEEHARRY [REDACTED]  
**Sent:** Thursday, 2 May 2019 4:18 PM  
**To:** Hunter, Jason <[Jason.Hunter@act.gov.au](mailto:Jason.Hunter@act.gov.au)>  
**Subject:** Re: Tharwa - site locations pros / cons

Hi Jason, pls find attached sketches as requested. Points to note:

- Based on existing site levels, the tanks may be exposed to an extent, with minimum of 1m cut into the existing ground. Fill batter is assumed to be 1 (v): 3 (h) between and around the tanks. The total area required for the tank site is approximately 345m<sup>2</sup>.
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Impact on existing infrastructure:

- The existing river water pipes will need to be removed and relocated.
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- The existing abandoned steel tank will need to be removed and disposed.

**Amal Beeharry**

Senior Engineer  
SMEC (Member of the Surbana Jurong Group)

M [REDACTED] T [REDACTED]

---

**From:** Hunter, Jason <[Jason.Hunter@act.gov.au](mailto:Jason.Hunter@act.gov.au)>

**Sent:** Wednesday, 1 May 2019 3:56 PM

**To:** Amal BEEHARRY [REDACTED]

**Subject:** RE: Tharwa - site locations pros / cons

UNCLASSIFIED

Hi Amal

Can Option A illustrate the proposed layout of the two new tanks and the other infrastructure?

Regards

Jason

**Jason Hunter** | Senior Project Manager | Infrastructure Delivery

Member Australian Institute of Project Management

Phone: 02 6205 3603 | Mob: [REDACTED] | Email: [jason.hunter@act.gov.au](mailto:jason.hunter@act.gov.au)

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---

**From:** Amal BEEHARRY [REDACTED]  
**Sent:** Wednesday, 1 May 2019 9:17 AM  
**To:** Hunter, Jason <[Jason.Hunter@act.gov.au](mailto:Jason.Hunter@act.gov.au)>; Thomas, Stephen (ACTPS) <[Stephen.Thomas@act.gov.au](mailto:Stephen.Thomas@act.gov.au)>  
**Cc:** Fran LIAO <[Fran.Liao@smec.com](mailto:Fran.Liao@smec.com)>  
**Subject:** Tharwa - site locations pros / cons

Hi Jason, pls refer attachment for Tharwa - site locations pros / cons.

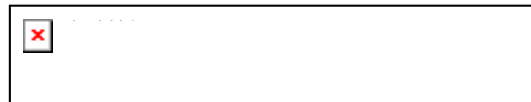
Awaiting your advice to progress any further work.

**Amal Beeharry**

Senior Engineer

M [REDACTED] T [REDACTED] E [REDACTED]  
Suite 2, Level 1, 243 Northbourne Avenue, Lyneham, ACT, 2602, Australia

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**From:** Moore, AlisonM (ACTPLA)  
**Sent:** Friday, 9 August 2019 10:35 AM  
**To:** Murphy, Joe  
**Subject:** Tharwa firefighting infrastructure - TCCS project lead

UNCLASSIFIED

Hi Joe,

As discussed, the Tharwa firefighting infrastructure project is being delivered through the Urban team within the Infrastructure Delivery Branch at TCCS.

Urban team manager is Diana Hill (x76911), the Executive Branch Manager is Jeremy Smith (x72738).

Let me know if you need anything further.

Cheers

Ali

Alison Moore | Senior Director | Strategic Planning and Policy

**Phone 02 6207 2693**

**Planning, Land and Building Policy Division** | Environment, Planning and Sustainable Development Directorate |

**ACT Government**

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## Application for Environmental Impact Assessment Processes - Submission confirmation

Your submission has been successful. Please keep a copy of this receipt for your records.

Date and time

Reference code

11 Oct 2018 3:38:05 PM

V5TDZ4

Access Canberra  
ABN: 68 367 113 536

GPO Box 158  
Canberra ACT 2601

Phone: (02) 6207 1923  
Email: [epdcustomerservices@act.gov.au](mailto:epdcustomerservices@act.gov.au)

## Type of application

Type of application \*

Application for Environmental Significance Opinion

Have you attended a pre-application meeting or received written pre-application advice in relation to the proposal that is the subject of this application? \*

Yes

No

Project name \*

Improving Tharwa Fire Fighting Water Supply

Project description \*

SMEC has been engaged by ACT Transport Canberra and City Services (TCCS) to prepare design and documentation for the proposed firefighting water supply infrastructure in Tharwa. The site works are located partly within the Tharwa Road corridor/reserve, and also partly extend into Block 5 Section 1, Tharwa. The project includes design of the following elements: • A new bore pump and DN80 rising main to pump water from the recently constructed bore to two new water tanks in Tharwa. • The total capacity of the two concrete tanks would be 376KL. Each tank is 10.5m diameter and 2.4m high. The tanks will be constructed inground. • A new booster assembly and two pumps next to the water tanks. • New DN150 pipe from the tanks to the General Store along North Street. A total of five (5) hydrants is proposed along North Street/Nass Road. • A new lookout area is proposed east of Naas Road to allow fire trucks to turn, park and fill up. • Fire trucks can fill up via two new inground hydrants on the lookout area.

Lease/site details

Site 1

Suburb \*

THARWA

Section \*

1

Block \*

5

Address line 1

Address line 2

Suburb

THARWA

State

ACT

Postcode

2620

Land Use Zone/s applicable to this site \*

NUZ4: RIVER CORRIDOR; Pd: Special Purpose Res

## Applicant details

Are you applying as: \*

a company/department/government agency

Name of company/department/government agency \*

Position held in company/department/government agency \*

SMEC

Senior Engineer

Enter an ABN or ACN: \*

ABN (Australian Business Number)

ACN (Australian Company Number)

47065475149

## Contact person

Title

Given name \*

Family name \*

Miss

Jie

Liao

## Postal address

Address line 1 \*

Oracle Building, Suite 2, Level 1

Address line 2

243 Northbourne Avenue

Suburb \*

State \*

Postcode \*

Lyneham

ACT

2602

Enter at least one phone number: \*

Home phone number

Work phone number

Mobile number

62341936

Email \*

fran.liao@smec.com

## Lessee (property owners) or land custodian (Government) details

Lessee/land custodian 1

Same as applicant

Is the lessee/land custodian a company? \*

 Yes No

Title

Given name \*

Family name \*

Mr

Daniel

Iglesias

Address line 1 \*

GPO Box 158

Address line 2

Suburb \*

Canberra

State \*

ACT

Postcode \*

2601

Enter at least one phone number: \*

Home phone number

Work phone number

Mobile number

62076997

Email \*

Daniel.Iglesias@act.gov.au

# Environmental Significance Opinion

Identify the item(s) for opinion under Schedule 4 of the *Planning and Development Act 2007* (<http://www.legislation.act.gov.au/a/2007-24/>). \*

- Section 4.2 Item 3 (c)
- Section 4.2 Item 3 (d)
- Section 4.2 Item 11
- Section 4.3 Item 1
- Section 4.3 Item 2 (a)
- Section 4.3 Item 2 (b)
- Section 4.3 Item 3
- Section 4.3 Item 6
- Section 4.3 Item 7

## Prescribed entities

Have you had any meetings/discussions with relevant prescribed entities? \*

- Yes  No

Entity 1		
Entity *		
<input type="text" value="Conservator of Flora and Fauna"/>		
Dates of meeting *		
<input type="text" value="02/10/2018"/>		
<b>Entity contact</b>		
Title	Given name *	Family name *
<input type="text" value="Ms"/>	<input type="text" value="Helen"/>	<input type="text" value="Mckeown"/>
Enter at least one phone number: *		
Home phone number	Work phone number	Mobile number
<input type="text"/>	<input type="text" value="62072247"/>	<input type="text"/>
Email *		
<input type="text" value="helen.mckeown@act.gov.au"/>		

## *Environment Protection and Biodiversity Conservation Act 1999* (EPBC)

Does the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* affect your proposal? \*

- Yes  No

## Supporting documents

Attach lessee/land custodian authorisation

([http://www.planning.act.gov.au/\\_\\_data/assets/pdf\\_file/0006/898422/LETTER\\_OF\\_AUTHORISATION.pdf](http://www.planning.act.gov.au/__data/assets/pdf_file/0006/898422/LETTER_OF_AUTHORISATION.pdf)).

20181008\_ESO\_B5\_S1\_Tharwa\_Signed.pdf

Attach all required documentation. \*

18-584\_Tharwa\_PEA\_SMEC\_111018\_final.pdf

SMEC\_Tharwa\_ESO\_Report\_111018\_final.pdf

Is your documentation larger than 10MB? \*

Yes  No

## Conflict of interest declaration

Does the applicant or lessee have any association with EPSDD staff? \*

Yes  No

## Applicant declaration

Please tick the relevant boxes

- I/we declare that this application is accompanied by all of the required information and or documents and understand that the documentation provided via electronic lodgement will be considered to be the relevant documentation associated with this application; and understand that the information submitted with this application form will undergo a documentation check. \*
- I/we declare that this application will be considered lodged once the relevant application fees have been paid; \*
- I/we hereby acknowledge that the lessee may authorise ACT Government officers to access the subject property(s) for the purpose of evaluating the proposal; \*
- I/we declare that all the information given on this form and its attachments is true and complete; \*
- I/we declare that I/we have the appropriate delegation or authority to apply on behalf of the company, organisation or Government agency. \*



**LETTER OF AUTHORISATION  
FOR ENVIRONMENTAL IMPACT ASSESSMENT PROCESSES**  
FOR APPLICANTS TO OBTAIN PERMISSION FROM THE LESSEE/S TO LODGE AN APPLICATION WITH THE ACT GOVERNMENT.

**LEASE/SITE DETAILS (Please Print)**

If more than one lease/site please attach the following details for each additional lease/site on a separate sheet

Block  Section  Suburb   
 Unit No.  Street Address

This application relates to: (please tick the applicable box below)

- Environmental Significance Opinion (ESO)       EIS scoping document       S211 exemption from EIS

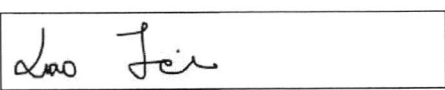
**LESSEE(S) DECLARATION** all lessees/land custodians must authorise the lodgement of this application. In doing so the lessee/land custodian gives authority to the applicant to negotiate any dealings in relation to the application through to its determination. If more than two lessees please provide details of each additional lessee on a separate sheet

- I/we declare that I am/we are the lessee(s) of the land described above;
- I/we have been made aware of the declaration clauses; and
- I/we declare that all the information given on this form is true and complete.
- I/we the undersigned, declare that this application is accompanied by all of the required information and or documents and understand that the documentation provided via electronic lodgment will be considered to be the relevant documentation associated with this application; and understand that the information submitted with this application form will undergo a documentation check.
- I/we understand that this application will be considered lodged once the relevant application fees have been paid;
- I/we the undersigned (lessee) appoint the applicant whose name and signature appear below to act on my/our behalf in relation to this application. This authorises the applicant to pay for all application fees, bonds, and securities, liaise with the planning and land authority when required, alter amend or provide further information as necessary and receive any communications relating to this application;
- I/we declare that all the information given on this form and its attachments is true and complete;
- If signing on behalf of a company, organisation or Government agency:
- I/we the undersigned, declare I/we have the appropriate delegation or authority to sign on behalf of the company, organisation or Government agency

Print Name  Signature  Date   
 Print Name  Signature  Date

**APPLICANT DECLARATION**

- I/we declare that all information given on this form and its attachment is true and correct.
- If signing on behalf of a organisation or Government agency:- I/we the undersigned declare I/we have the appropriate delegation or authority to sign on behalf of the organisation or Government Agency.

Applicant Name  Organisation Name   
 Signature  Date

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or call 13 22 81 for opening hours and location details.

---

**From:** Fran LIAO <Fran.Liao@smec.com>  
**Sent:** Thursday, 18 October 2018 9:35 AM  
**To:** McKeown, Helen  
**Cc:** Sam Patmore; Amal BEEHARRY  
**Subject:** RE: Improving Tharwa Fire Fighting Water Supply - ESO Application V5TDZ4 [SEC=UNCLASSIFIED]  
**Attachments:** 3002648-011\_draft.pdf

Hi Helen,

Sorry for the late response as I am waiting for updated tree assessment and flora & fauna assessment for the revised works area prior to writing back to you.

As mentioned on the phone last week, we have updated the design to move the proposed works 25m south of the original location to avoid impact on the existing hollow-bearing trees. The extent of the works will be at least 5m away from the dead hollow-bearing tree Please refer to the attached pdf plan for the new works area.

However, we will undertake further environmental assessment and tree assessment to ensure there is no other hollow-bearing trees within the revised works area.

Regards,

**Fran Liao**

Senior Engineer - Water Resources  
SMEC (Member of the Surbana Jurong Group)  
T +61 2 6234 1936

---

**From:** McKeown, Helen [mailto:Helen.McKeown@act.gov.au]  
**Sent:** Thursday, 18 October 2018 9:09 AM  
**To:** Fran LIAO <Fran.Liao@smec.com>  
**Subject:** FW: Improving Tharwa Fire Fighting Water Supply - ESO Application V5TDZ4 [SEC=UNCLASSIFIED]

Fran

Could I please have a response to my question below? The ESO has been formally referred to the Conservator and in order for the Conservator to provide the ESO, I need an answer

Regards

Helen McKeown | Conservator Liaison

Phone 02 6207 2247 |

Environment | Environment and Planning | ACT Government

Dame Pattie Menzies House, Challis Street, Dickson | GPO Box 158 Canberra ACT 2601 | [www.environment.act.gov.au](http://www.environment.act.gov.au)

---

**From:** McKeown, Helen  
**Sent:** Friday, 12 October 2018 12:03 PM  
**To:** 'Fran LIAO' <[Fran.Liao@smec.com](mailto:Fran.Liao@smec.com)>  
**Subject:** RE: Improving Tharwa Fire Fighting Water Supply - ESO Application V5TDZ4 [SEC=UNCLASSIFIED]

Fran

Could you please provide an explanation as to why the works are located where they are and why things couldn't be sited to avoid the hollow bearing remnant tree? Hollow bearing trees are extremely important in the landscape and I need an explanation as to why it can't be avoided.

Regards

Helen McKeown | Conservator Liaison

Phone 02 6207 2247 |

Environment | Environment and Planning | ACT Government

Dame Pattie Menzies House, Challis Street, Dickson | GPO Box 158 Canberra ACT 2601 | [www.environment.act.gov.au](http://www.environment.act.gov.au)

---

**From:** Fran LIAO [<mailto:Fran.Liao@smec.com>]

**Sent:** Thursday, 11 October 2018 3:52 PM

**To:** McKeown, Helen <[Helen.McKeown@act.gov.au](mailto:Helen.McKeown@act.gov.au)>

**Cc:** Hunter, Jason <[Jason.Hunter@act.gov.au](mailto:Jason.Hunter@act.gov.au)>; Thomas, Stephen (ACTPS) <[Stephen.Thomas@act.gov.au](mailto:Stephen.Thomas@act.gov.au)>; Amal BEEHARRY <[Amal.Beeharry@smec.com](mailto:Amal.Beeharry@smec.com)>; Sam Patmore <[sam.p@nghenvironmental.com.au](mailto:sam.p@nghenvironmental.com.au)>

**Subject:** Improving Tharwa Fire Fighting Water Supply - ESO Application V5TDZ4

Hi Helen,

Further to our phone conversation on 2 October 2018, I've lodged an ESO application online. I have attached a copy of the environmental report and ESO report in this email for your information.

As mentioned before, we have a tight program and much appreciated if you can prioritise this application.

Please do not hesitate to contact me should you require further clarifications on the proposed works.

Regards,

**Fran Liao**

Senior Engineer - Water Resources

T +61 2 6234 1936

E [Fran.Liao@smec.com](mailto:Fran.Liao@smec.com)

**Local People, Global Experience**

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			DRAFTING CHECK	K. CURLEY	
			DESIGNER	F. LIAO	
			DESIGN CHECK		
	PROJECT MANAGER	A. BEEHARRY			
	PROJECT DIRECTOR				
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		PROJECT TITLE WATER TANK DETAILS		SCALE AS SHOWN PHASE DESIGN	
		PROJECT / DRAWING No. 3002648-011		REVISION 0	

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**From:** EPD, Customer Services  
**Sent:** Thursday, 18 October 2018 8:51 AM  
**To:** McKeown, Helen  
**Cc:** HeritageReferrals  
**Subject:** REFERRAL-EACT-201800053-ESO-5/1 THARWA-01 [SEC=UNCLASSIFIED]  
**Attachments:** 1 - ESO Application Documents.obr

**ESO proposal number:** 201800053

**Location:** 5/1 THARWA

**Description:** Improving Tharwa Fire Fighting Water Supply

Pursuant to Section 138AA of the Planning and Development Act 2007 the proponent of a development proposal requests that you consider the abovementioned application and provide any written advice no later than 5 working days after the date of this notice (25/10/2018).

Kind Regards,

Jenna McAlpin | Customer Services Officer | Environment, Planning & Land Shopfront

Phone: 02 6207 1923 | Email: [epdcustomerservices@act.gov.au](mailto:epdcustomerservices@act.gov.au)

**Customer Coordination | Access Canberra | ACT Government**

GPO Box 158, Canberra City ACT 2601 | [www.act.gov.au/accessCBR](http://www.act.gov.au/accessCBR)



---

**From:** HeritageReferrals  
**Sent:** Thursday, 18 October 2018 2:32 PM  
**To:** EPD, Customer Services  
**Cc:** McKeown, Helen  
**Subject:** RE: REFERRAL-EACT-201800053-ESO-5/1 THARWA-01 [SEC=UNCLASSIFIED]

Hello Customer Services,

Thank you for the email, and while the applicant is not seeking an ESO from the ACT Heritage Council, please note that:

- The proposed work area may contain Aboriginal places and objects subject to *Heritage Act 2004* provisions. A heritage inspection of the locality – by a qualified archaeologist and Representative Aboriginal Organisations – is required to evaluate potential heritage effects of the proposal, and the need for any Heritage Act approvals.

As context to this request, I note that:

- The Murrumbidgee River is a known cultural pathway and song line, and the low level crossing at Tharwa (as reflected in the adjacent bridge location) has been used for thousands of years by Aboriginal people moving between the ACT and the bogong moth areas in the highlands;
- Tharwa continued to be a significant Aboriginal camping place in historic times, with the Cuppacumbalong property being one of the main Aboriginal camping places from the 1840s into the 1890s. Large Aboriginal gatherings at Tharwa in 1889 and at South Lanyon in the early 1900s reflect this continued Aboriginal presence and use;
- GML (2015) undertook a heritage assessment of Tharwa to inform the ACT Government's Master plan process, which identified that the area has Aboriginal archaeological potential which needs further investigation and RAO consultation; and
- No heritage assessment has been undertaken of the proposed work area to date, but for reasons set out above, ACT Heritage considers that the locality has potential to contain Aboriginal places and objects.

Please also note that the adjacent Tharwa Bridge is registered on the ACT Heritage Register, however, works are unlikely to diminish its heritage significance and this is not a heritage consideration for the proposal.

Should the applicant have any questions on the above advice, I am happy to be contacted directly.

Regards,  
Meaghan

**Meaghan Russell** | Team Leader (Advice)  
Phone: 13 22 81 | Email: [meaghan.russell@act.gov.au](mailto:meaghan.russell@act.gov.au)  
**ACT Heritage | Environment, Planning and Sustainable Development Directorate | ACT Government**  
Dame Pattie Menzies House 16 Challis Street Dickson | GPO Box 158 Canberra ACT 2601  
[www.environment.act.gov.au](http://www.environment.act.gov.au)



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---

**From:** EPD, Customer Services  
**Sent:** Thursday, 18 October 2018 8:51 AM  
**To:** McKeown, Helen <[Helen.McKeown@act.gov.au](mailto:Helen.McKeown@act.gov.au)>

**Cc:** HeritageReferrals <Heritagereferrals@act.gov.au>

**Subject:** REFERRAL-EACT-201800053-ESO-5/1 THARWA-01 [SEC=UNCLASSIFIED]

**ESO proposal number:** 201800053

**Location:** 5/1 THARWA

**Description:** Improving Tharwa Fire Fighting Water Supply

Pursuant to Section 138AA of the Planning and Development Act 2007 the proponent of a development proposal requests that you consider the abovementioned application and provide any written advice no later than 5 working days after the date of this notice (25/10/2018).

Kind Regards,

Jenna McAlpin | Customer Services Officer | Environment, Planning & Land Shopfront

Phone: 02 6207 1923 | Email: [epdcustomerservices@act.gov.au](mailto:epdcustomerservices@act.gov.au)

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---

**From:** McKeown, Helen  
**Sent:** Friday, 26 October 2018 9:22 AM  
**To:** EPD, Customer Services  
**Cc:** EPD Impact  
**Subject:** RE: REFERRAL-EACT-201800053-ESO-5/1 THARWA-01 [SEC=UNCLASSIFIED]  
**Attachments:** 20181026092932141.pdf; 20181026092954695.pdf

Please find attached the Environmental Significance Opinion from the Conservator of Flora and Fauna for the installation of the firefighting water supply at Tharwa.

Regards

Helen McKeown | Conservator Liaison

Phone 02 6207 2247 |

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Dame Pattie Menzies House, Challis Street, Dickson | GPO Box 158 Canberra ACT 2601 | [www.environment.act.gov.au](http://www.environment.act.gov.au)

---

**From:** EPD, Customer Services  
**Sent:** Thursday, 18 October 2018 8:51 AM  
**To:** McKeown, Helen <Helen.McKeown@act.gov.au>  
**Cc:** HeritageReferrals <Heritagereferrals@act.gov.au>  
**Subject:** REFERRAL-EACT-201800053-ESO-5/1 THARWA-01 [SEC=UNCLASSIFIED]

**ESO proposal number:** 201800053

**Location:** 5/1 THARWA

**Description:** Improving Tharwa Fire Fighting Water Supply

Pursuant to Section 138AA of the Planning and Development Act 2007 the proponent of a development proposal requests that you consider the abovementioned application and provide any written advice no later than 5 working days after the date of this notice (25/10/2018).

Kind Regards,

Jenna McAlpin | Customer Services Officer | Environment, Planning & Land Shopfront

Phone: 02 6207 1923 | Email: [epdcustomerservices@act.gov.au](mailto:epdcustomerservices@act.gov.au)

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**ACT**  
Government

Environment, Planning and  
Sustainable Development

Mr Ben Ponton  
Chief Planning Executive  
ACT Planning and Land Authority  
Dame Pattie Menzies Building  
DICKSON ACT 2602

Dear Mr Ponton

This is to advise of my decision, under s.138AB(4) of the *Planning and Development Act 2007*, on the request for an Environmental Significance Opinion for the installation of firefighting water supply infrastructure at Tharwa. The proposal is not likely to have a significant adverse environmental impact.

Please find attached the Environmental Significance Opinion and a Statement of Reasons for the decision.

Yours sincerely

Ian Walker  
Conservator of Flora and Fauna

26 October 2018

---

## **ENVIRONMENTAL SIGNIFICANCE OPINION**

In accordance with section 138AB(4) of the *Planning and Development Act 2007* (the Act), I provide the following environmental significance opinion:

### **APPLICANT**

SMEC, as represented by Jie Liao, Senior Engineer.

### **APPLICATION and DEVELOPMENT PROPOSAL**

The applicant has applied under section 138AA of the Act to the Conservator of Flora and Fauna for an environmental significance opinion to the effect that the development proposal set out in the submission is not likely to have a significant adverse environmental impact (the application).

The development proposal is for the installation of firefighting water supply infrastructure at the village of Tharwa as described in the submission.

### **LOCATION**

Block 5 Section 1 Tharwa

### **MATTERS TO WHICH THIS OPINION APPLIES**

This opinion applies only the development proposal as described in the application.

### **OPINION**

Provided the works are undertaken in the manner consistent with the documentation submitted, they are unlikely to cause a significant adverse environmental impact.

Attached is a Statement of Reasons for the decision.



Ian Walker  
Conservator of Flora and Fauna

26 October 2018

## STATEMENT OF REASONS REASONS FOR THE DECISION

The proposed development is a proposal mentioned in Schedule 4 of the *Planning and Development Act 2007* – Development proposal for an activity requiring an EIS Schedule 4, being:

*Part 4.3, item 3 proposal for development on land reserved under s 315 for the purpose of a wilderness area, national park, nature reserve or special purpose reserve.*

Some of the works will be within the area of Special Purpose Reserve identified as the Tharwa Bridge Recreation Area in the Murrumbidgee River Corridor Management Plan.

The proponent wants the application for the development approval assessed in the merit track on the grounds that the proposal is not likely to have a significant adverse environmental impact, and has applied to the Conservator of Flora and Fauna to that effect.

### **Meaning of *significant* adverse environmental impact**

An adverse environmental impact is ***significant*** if—

- (a) the environmental function, system, value or entity that might be adversely impacted by a proposed development is significant; or
- (b) the cumulative or incremental effect of a proposed development might contribute to a substantial adverse impact on an environmental function, system, value or entity.

In deciding whether an adverse environmental impact is ***significant***, the following matters must be taken into account:

- (a) the kind, size, frequency, intensity, scope and length of time of the impact;
- (b) the sensitivity, resilience and rarity of the environmental function, system, value or entity likely to be affected.

In deciding whether a development proposal is likely to have a significant adverse environmental impact it does not matter whether the adverse environmental impact is likely to occur on the site of the development or elsewhere.

It has been determined that the proposal is unlikely to have a significant environmental impact, based on the documentation submitted, known values of the site, and provided the works and ongoing management are carried out in accordance with the conditions attached to this ESO.

### **Project description**

The construction of

- two in ground concrete water tanks with a capacity of 188 kl each,
- a new bore pump and DN80 rising main to pump water from the bore that was recently constructed in Block 5 Section 1 Tharwa,
- a new booster assembly and two pumps next to the water tanks,
- a new DN150 pipe from the tanks to the General Store along North Street,
- the construction of a new lookout / truck turnaround area to the east of Naas Road, and
- installation of five hydrants along North Street/Nass Road.

The site works are located partly within the Naas Road and North Street road reserves, extending into Block 5 Section 1 Tharwa which is a special purpose reserve, part of the Tharwa Recreation Reserve.

### **Documentation Submitted**

- Environmental Significance Opinion Submission Report, Tharwa Fire-fighting Infrastructure (October 2018);
- Supporting documentation – Preliminary Environmental Assessment (ngh environmental 23 October 2018);
- Form 1M.

### ***Natural conservation values present***

Although located partly within the river corridor, the works area extends only about 20 m into the river corridor zone from the adjoining road corridor and is located approximately 130 m west of the top of the bank of the river channel.

The special purpose reserve has been modified with large cleared areas of pasture improved and regularly mown grasses to allow for recreational users. Small clumps or stands of mostly large mature native trees are scattered along the floodplain zone, as well as fringing riparian vegetation along the river's edge. These provide important foraging, breeding and shelter for native fauna, and provide important opportunities for fauna movements through the landscape.

The site of the works has low natural flora diversity with the native species component of the vegetation being mainly the existing tree cover. The tree species includes Blakely's Red Gum as the dominant species with a few immature Yellow Box (*Eucalyptus melliodora*) and a single immature Kurrajong (*Brachychiton populneus*).

The shrub layer is generally in a disturbed and modified condition and supports a mix of native species, including some regenerating Blakely's Red Gum and Wattles (primarily *Acacia dealbata*). There are numerous weed species including a large dense thicket of Blackberry (*Rubus fruticosus* agg.), Plums (*Prunus* sp.), Robinia

(*Robinia* sp.), Hawthorn (*Cratageus* sp.) and Privet (*Ligustrum* sp.). The groundcover is in a highly modified condition and almost completely dominated by exotic grass species, mainly Phalaris (*Phalaris aquatica*).

The report notes that only a small number of common native and introduced birds were observed during the brief site inspection. The species observed included European Starlings, Indian Mynas and Noisy Miners which are aggressive territorial species.

### **Impact on the Reserve**

Tharwa Recreation Reserve is a low key recreation area consisting of an area of mown exotic grasses accessible from a carpark that is accessed under the western end of Tharwa Bridge. The works within the recreation area are on the edge of the reserve close to Naas Road and not close to any park benches or the existing public toilet block, which is more than 50 m to the north of the works. There will be some visual impact on the reserve but this is outweighed by the increased protection afforded to Tharwa Village by the installation of a reliable source of water for fighting wild fires.

No existing amenities in the reserve will be impacted by the works.

### **Potentially Significant Environmental Impacts**

The documentation submitted describes the vegetation and wildlife values of the site accurately. The proponent has moved the location of the works 25m south of its original location in order to retain dead (stag) trees for their local habitat elements.

The site does lie within a nationally important wildlife corridor that runs along the Murrumbidgee and connects alpine areas with woodlands on the south western slopes. However, even if all the trees were removed as proposed strong north-south connections would still remain in the Tharwa area.

The pipeline route chosen should avoid significant impact.

It has been determined that if the works are undertaken in a manner consistent with the above conditions attached to the ESO, they are unlikely to cause a significant adverse environmental impact.

---

**From:** English, Terri-Ann  
**Sent:** Monday, 12 November 2018 1:55 PM  
**To:** 'fran.liao@smec.com'  
**Subject:** ESO for Block 5, Section 1 Tharwa – Improving Fire Fighting Water Supply [SEC=UNCLASSIFIED]

Hi Jie

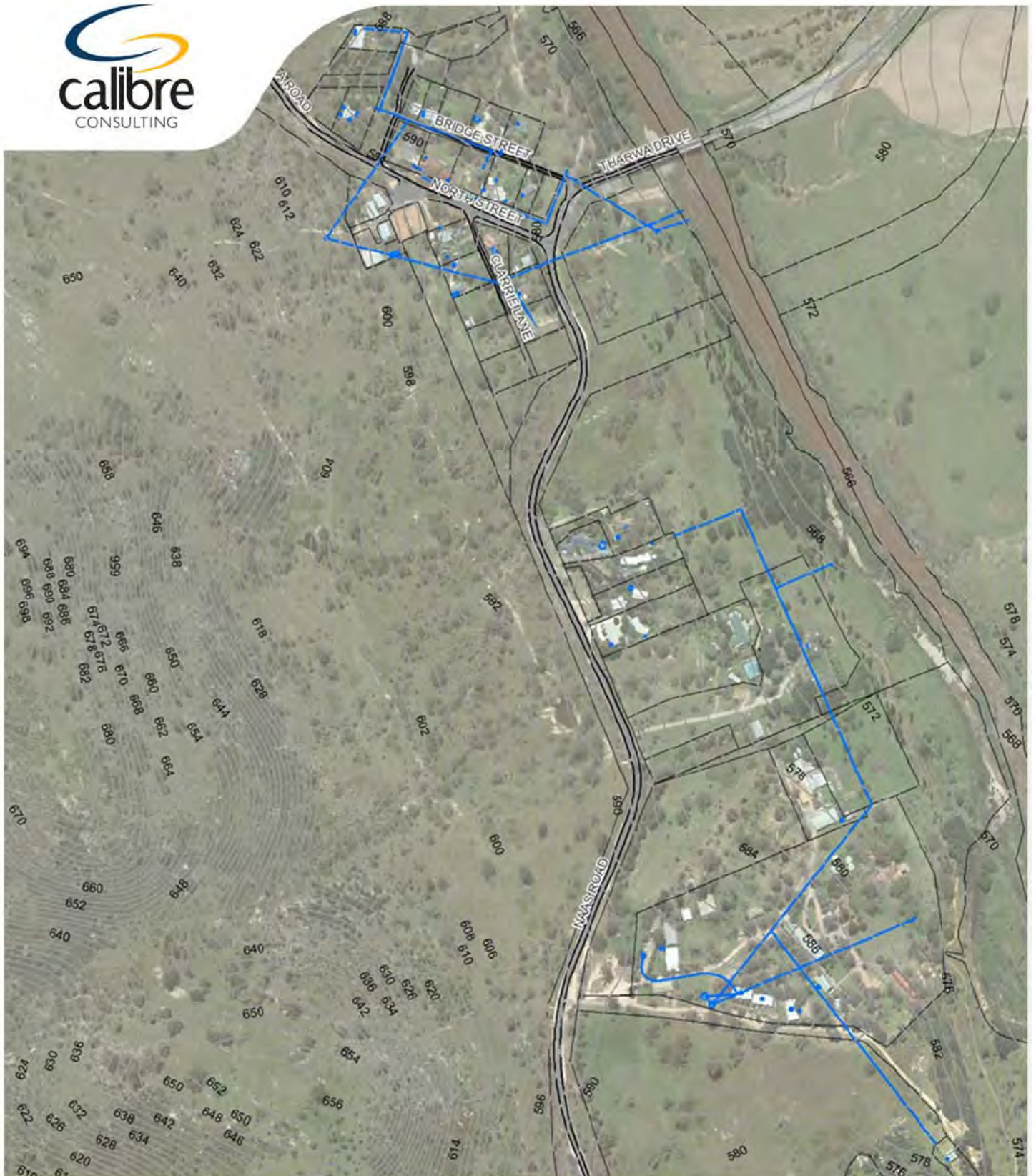
This email is just to inform you that the ESO for Block 5, Section 1 Tharwa – Improving Fire Fighting Water Supply, has been notified on the Legislation Register - <https://www.legislation.act.gov.au/ni/2018-620/>

If you have any questions please feel free to give me a call.

Kind regards,  
Terri

Terri-Ann English  
0262071780

Impact Assessment | Environment, Planning and Sustainable Development Directorate | ACT Government  
Level 1, South Building, Dame Pattie Menzies House, 16 Challis Street, Dickson | GPO Box 158 Canberra ACT 2601 | [www.environment.act.gov.au](http://www.environment.act.gov.au)



# Tharwa Non-Potable Water Supply Options Final Report

Prepared by Calibre Consulting  
Prepared for EPD

08/07/15

C12176.001  
Final  
Civil

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**GPO Box 261**  
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**Ph: (02) 6211 7100**  
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C12176.001

Issue	Date	Issue Details	Author	Checked	Approved
0	14/05/15	DRAFT REPORT	FL	CPL	CPL
1	08/07/15	FINAL REPORT	FL	CPL	CPL

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# 1 INTRODUCTION

The Environment and Planning Directorate (EPD) has engaged Calibre Consulting to undertake a non-potable water supply options study to meet the fire fighting and/or domestic demands for Tharwa Rural Village (including Cuppacumbalong). The study area, as shown in **Figure 1-1**, is bounded by part Block 4 Section 27 to the north, part Block 8 Section 13 to the west, Block 4 Section 12 to the south and the river corridor to the east.

Tharwa consists of 20 existing residential dwellings, a pre and primary school, local store, community facility (hall), fire shed, Cuppacumbalong, the Artisan Precinct and Outward Bound.

## 1.1 Background

Calibre Consulting was engaged by EPD in January 2013 to undertake an Infrastructure Capacity Review for Tharwa, which included two phases, namely:

- Phase 1 – Document the existing infrastructure, associated utilities capacity and pavement assessment in the Tharwa study area including carrying out a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis. As part of Phase 1, a bushfire assessment was also undertaken.
- Phase 2 – Examine realistic options to upgrade the existing infrastructure in Tharwa to facilitate growth in tourism and recreation in and around the village. As part of Phase 2, a Stakeholder workshop will be held.

Phase 1 was completed in July 2013 and the report summarised the outcomes of the SWOT analysis for the existing utilities services and the road infrastructure in Tharwa Rural Village. One of the weaknesses identified in the report is that the existing water supply system does not provide sufficient water to meet the current bush fire protection requirements.

Phase 2 is on hold until EPD finalises the Tharwa Rural Village Plan.

EPD undertook further consultation with ACT Fire and Rescue (ACT F&R) in February 2015 and received interim water supply recommendations for Tharwa. ACT F&R advised that:

- 1) The existing water supply infrastructure within the village is insufficient and does not meet the minimum standards required in the ACT for fire fighting.
- 2) Tharwa does not meet the bushfire management standard for water supply in a rural village as detailed in the ACT planning legislation.
- 3) It is recommended that a water supply system be established that meets the requirements of (1) AS 2419 for effective fire response and (2) ACT F&R fire fighting standards.

As a result of the advice received from ACT F&R listed above, EPD has asked Calibre Consulting to investigate non-potable water supply options to meet the existing and future fire fighting and/or domestic demands for Tharwa. The outcome of this study will be used to inform the draft Tharwa Rural Village Plan and confirm the scope of the Phase 2 study.

## 1.2 Scope Of Works

The proposed scope of works includes:

- Review background reports and information.
- Undertake consultation with [REDACTED], EPD, TAMS, EPA and ACT F&R to confirm the existing water network condition and requirements for the new non-potable water supply system.

- Investigate non-potable water supply infrastructure for three options:
  - a) Option 1 – Structural fires and bushfires, with fire fighting provision only. No services to residences;
  - b) Option 2 – Domestic supply to existing local residences plus future development of up to 5 dwellings. No provision for fire fighting.
  - c) Option 3 – Options 1 and 2.
- Determine water demand for each option.
- Determine location and size of the non-potable water supply network for each option.
- Determine location and size of the new reservoir(s) for each option.
- Calculate water extraction volume requirements from the Murrumbidgee River and/or groundwater.
- Undertake risk assessment on issues such as water quality, water extraction limit, non-potable water charges, reporting, monitoring procedures etc.
- Prepare preliminary cost estimates (capital, maintenance and operation costs) for non-potable water network for each option.
- Prepare a draft and final report (including GIS drawings) to document the outcome of the study.

## 1.3 Drawings

The following drawings have been prepared as part of the Non-Potable Water Supply Options study and should be read in conjunction with the report.

Table 1-1: Drawing Schedule

Drawing No.	Description
C12176 – 012, 013 and 014	Existing Services Plans
C12176.1 – F002	Option 1 Fire Fighting Only
C12176.1 – F003	Option 2 Resident Only
C12176.1 – F004	Option 3 Fire Fighting + Resident

The above drawings are attached in **Appendix A**.



Figure 1-1: Study Area and Location of Existing Water Network

## 2 STAKEHOLDER CONSULTATION

### 2.1 Consultation with Existing Water Network Owner

As indicated in the Phase 1 report, [REDACTED] and the ACT Parks and Conservation Service (PCS) (under TAMS) own and operate the two existing river pumps in Tharwa.

Consultation with [REDACTED] and Mr Brett McNamara (PCS) was undertaken on 13 April 2015. The following comments from [REDACTED] and Mr McNamara have been recorded as follows:

- Both river pumps are aged and need regular maintenance;
- [REDACTED] water pump is used to fill up the existing tank within the village.
- TAMS's pump is only used as a backup to [REDACTED] pump;
- River water in the tank is used by the existing residents, school and public toilets for non-potable indoor and outdoor uses.
- The existing pipe network and water tank are aged and leak;
- The existing non-potable water charge is \$380 per year per household, which is paid to [REDACTED];
- Water flows better on the east side of the river (opposite to the existing intake points); and
- Water quality for non-potable indoor and outdoor uses is considered by the residents to be generally satisfactory.

A copy of the meeting notes is attached in **Appendix B**.

### 2.2 Consultation with Government Agencies

Consultation was undertaken with EPD Water Regulation and ACT F&R via emails, phone calls and meetings.

The following advice was received from EPD Water Regulation Department:

- [REDACTED] has a licence to extract 12ML and TAMS can extract 6ML of water from the Murrumbidgee River per year.
- Outward Bound has a licence to extract 30ML of bore water per year.
- There is 464ML per year of groundwater available for allocation in the Upper Murrumbidgee water management area.
- The historical river flows (from year 1974 to 2014) and water quality data at Angle Crossing have been provided for this study.
- The minimum environmental flow for the Murrumbidgee River should be determined based on the Water Resources Environmental Flow Guidelines 2013.

The following advice has been received from ACT F&R:

- The water pipe network should be designed to comply with the feed fire hydrant type specified in Table 2.2 of AS2419.1-2005. As per Table 2.2, the minimum required flow rate is 10 L/s and the minimum required residual pressure (kpa) should be 200, or 20m water head.
- Suitable connection for fire fighting purposes will be made available at appropriate locations within the Inner Asset Protection Zone of the village, and away from adjacent structures. Further consultation with ACTF&R is required to determine the number and location of connections required.

- All aboveground fittings such as gate or ball valves, pipes and tanks are adequate for water flow and should be metal rather than plastic for fire protection.
- Hard stand should be provided at water filling stations for fire appliance connection/access.
- ACTF&R fire fighters do not carry a hard suction hose, therefore, one of sufficient length is to be provided at each connection to enable relay pumping.

## 3 DESIGN STANDARDS

### 3.1 River Intake and Pump System

Based on the advice from [REDACTED] and TAMS, it is recommended that river water could be pumped from the east side of the Murrumbidgee River to the proposed water tank via a rising main, as the east side of the river appears to have more consistent river flows than the west side of the river.

A rising main from the proposed pump to the proposed tank has been sized based on AS2200-2006 Design Charts for Water Supply and Sewerage.

QMAX pumping systems has been consulted to determine the size and model of the pump system and filtration unit for water treatment. The following parameters / assumptions have been used to assess the required pump head:

- Pump flow – assume the pump will operate 22 hours per day to fill up the new tank, allowing 2 hours in any day for pump maintenance;
- Extraction level – assume to be at RL569 (water surface), east side of the river. This level was determined using the 1 metre contour interval (year 2004) provided by EPD;
- Tank level – water will be pumped from the river to the new storage tank. The tank level is determined based on the minimum residual head required by ICON Water's Water Supply and Sewerage Standard (WSSS) and AS2419.1-2005 (refer to Section 3.3 for more information).
- Rising main length – measured from the river intake to the proposed tank location. The pipe alignment has been determined to minimise the length from the river intake to the proposed tank, which will reduce the head loss in the pipe thus reducing the pumping head and energy consumption. This alignment also runs along unleased land and allows the tank to be sited near the existing track.
- Pump efficiency – this varies for different pump suppliers/brands.
- Impeller diameter – for the same flow rate and efficiency, the bigger the diameter, the greater the pumping head that can be achieved.

Details of the rising main calculation and the proposed water pump for each option are attached in **Appendix D**.

### 3.2 Water Tank Size and Demands

The proposed water tank size for each option has been determined based on the Uriarra Village non-potable water design consumption data (Uriarra Village is appropriate to use in a limited comparison to Tharwa due to its similar rural characteristics).

- Based on the Single Residential Waterways Calculator provided by EPD, the potable water usage for a typical Tharwa residence is approximately 564 L per dwelling per day, assuming:
  - There are 4 bedrooms in a house;
  - Water rating for all house appliances (e.g. shower head, dishwasher, washing machine and toilets) is 3 stars;
  - Site area is 2,100 m<sup>2</sup> (average size of all residence, except the large size blocks e.g. Cuppacumbalong and Outward Bound)
  - Average rainwater tank size of 75kL (based on the information provided by the Tharwa residents).
  - Roof area of 420m<sup>2</sup>, approximately 20% of the site area.
  - Rainwater will be used for toilet, garden and laundry.

Residential non-potable water demands for toilets, laundry and garden in Uriarra Village was designed for 600 L per dwelling per day, which is slightly higher than the above calculated value. For the purposes of this investigation, the conservative number of **600 L per dwelling per day** has been adopted.

- House Sprinkler for 1 hr flow rate is 4L/s. There is no existing sprinkler system in Tharwa village and this is not proposed in this report. However, should the existing and future residences propose to retrofit or install a new sprinkler system, the proposed water tank has been designed to allow for water supply to house sprinkler.
- Fire fighting flow rate for 4hrs is 25L/s (Type F6), as per the ICON Water's WSSS.

### 3.3 Water Pipe Network

Water from the new tank(s) will be distributed to the proposed fire hydrants and/or the existing residents via a gravity pipe network.

The non-potable water supply options investigation study is based on ICON Water Standards (WSSS). The design criteria used in this study are described below:

- Peak hour demand (PHD) = maximum hourly rate times block/site area. The maximum hourly rate for different land use types is obtained from Table 2-1 in WSSS. The "PHD" for Tharwa ranges from 0.9 L/s/ha for Outward Bound (other institutional) to 1.9 L/s/ha for the pre and primary school.
- Fire flow demand (FD) – based on a minimum flow rate for various fire risk categories specified in Table 2-2 in WSSS. The fire category for Tharwa Rural Village ranges from:
  - F4 at the pre and primary school (60L/s);
  - F5 for local store (45L/s);
  - F6 for low density residential areas, Cuppacumbalong and Outward Bound (25L/s).
- Further to consultation with ACT F&R on 22 April 2015, the water pipe network should be designed to comply with the feed fire hydrant type specified in Table 2.2 of AS2419.1-2005. As per Table 2.2, the minimum required flow rate is 10 L/s and the minimum required residual pressure (kpa) should be 200, or 20m water head.

The proposed water reticulation system design is based on providing a minimum pressure requirement of 20 metres head during peak hour demand as per the ICON Water's Standard and a minimum of 20 metres head during fire flow conditions, concurrently with peak hour demand as per AS2419.1-2005.

The proposed non-potable water network for each option was setup and analysed using the WaterGem Model.

## 4 NON-POTABLE WATER DEMAND AND TANK SIZE

The non-potable water demand and storage size for each option for Tharwa has been determined using data from Uriarra Village, which has some similarities as a rural village development. The table below summarises the tank size for each option. Detailed calculations are attached in **Appendix C**.

Table 4-1: Water Tank Size for Options 1, 2 and 3

Types	Option 1	Option 2	Option 3
	Demand	Demand	Demand
Residential, Store, School Cuppacumbalong and the artisan precinct and Outward Bound (total of 53 buildings)	-	31,800L/day Or 12ML/year	31,800L/day Or 12ML/year
House Sprinkler for 1 hr flow at 4L/s	14,400L	-	14,400L
Fire Fighting for 4hrs at 25L/s (Type F6)	360,000L	-	360,000L
Total Volume (litres)	374,400L	-	406,000L
Required Tank Size (kL)	380kL	32kL	406kL
Each Tank Size Recommended (kL)*	240kL	26kL	240kL
No. of Tanks**	2	2	2
Tank Diameter(m)*	11.51m	3.83m	11.51m
Tank Height(m)*	2.3m	2.3m	2.3m

\*Tank size and dimension based on available standard tank sizes provided by Heritage Tanks Australia Pty Ltd. Refer to **Appendix E** for the quote provided by Heritage Tanks.

\*\*Two Tanks have been allowed for to provide redundancy in the system for maintenance.

## 5 NON POTABLE WATER SOURCE

### 5.1 Overview

Tharwa residents are currently using water from the Murrumbidgee River for toilet flushing, laundry and gardening. Outward Bound uses bore water for non-potable indoor and outdoor consumption. Rainwater is used as drinking water and backup for non-potable consumption.

██████████ advised that river water has been a reliable non-potable water source except in the summer months. He also added that no complaint has been received on the water quality (except during low river flow periods).

The residents of Outward Bound and TAMS have advised that groundwater is more reliable than river water, due to the large availability of groundwater within the catchment. However, the residents advised that groundwater contains a high concentration of calcium and salts, which can clog up household irrigation systems.

Based on the information above, river water is considered to be the best source of non-potable water with groundwater to be accessed as the backup supply.

### 5.2 Water Extraction from Murrumbidgee River

In order to determine the amount of water that can be extracted from the Murrumbidgee River, the following tasks have been undertaken:

- Determine the 50<sup>th</sup> percentile river flow at Angle Crossing for year 1975 to 2014: 50<sup>th</sup> percentile means 50 percent of the time the river exceeded this flow.
- Determine the environmental flow (80<sup>th</sup> percentile river flow) at Angle Crossing for Year 1975 to 2014.
- Determine the dry, median and wet year for detailed water extraction analysis.
- Determine the number of days water can be extracted from the river (i.e. when river flow is greater than the environmental flow) and the amount of water that can be extracted for each option.
- Preliminary investigation based on the above has been undertaken using excel spreadsheet.

#### 5.2.1 Historical River Flows at Angle Crossing

The table below shows the 50<sup>th</sup> percentile river flow for year 1975 to 2014 at Angle Crossing. The results show that 1982 was the dry year, 2013 the median year and 1978 the wet year.

Table 5-1: Historical River Flows at Angle Crossing from Year 1975 to 2014

Year	50 Percentile River Flow (ML/day)
1975	990.4
1976	461.6
1977	327.2
<b>WET YEAR - 1978</b>	<b>1311.0</b>
1979	346.3
1980	108.6
1981	212.7

Year	50 Percentile River Flow (ML/day)
<b>DRY YEAR - 1982</b>	<b>41.9</b>
1983	486.6
1984	680.6
1985	257.4
1986	285.2
1987	170.8
1988	832.0
1989	1209.4
1990	660.6
1991	280.7
1992	838.0
1993	517.6
1994	145.8
1995	431.1
1996	263.5
1997	111.5
1998	219.4
1999	157.6
2000	146.5
2001	244.2
2002	182.2
2003	110.2
2004	66.5
2005	125.4
2006	53.9
2007	222.6
2008	107.3
2009	56.3
2010	343.4
2011	494.0
2012	762.7
<b>MEDIAN YEAR - 2013</b>	<b>279.0</b>
2014	435.3

## 5.2.2 Water Extraction from River

The environmental flow (80<sup>th</sup> percentile river flow) at Angle Crossing for Year 1975 to 2014 is 65.8 ML/day, which is calculated using the Microsoft Excel percentile formula from the 40 years of data. The environmental flow is utilised in an excel spreadsheet to undertake the following daily water balance analysis for Options 2 and 3:

- 1) When the average daily river flow is more or equivalent to the daily environmental flow, calculate the balance flow that can be extracted for non-potable water uses and number of days that water can be extracted from the river.
- 2) When the balance flow is more or equivalent to the non-potable residential demand (i.e. 0.032ML/day), extract 0.032ML/day from the river. Otherwise, extract the available flow from the river (i.e. less than 0.032ML/day).
- 3) Calculate the volume of backup water required when full demand cannot be supplied by the river.

Note: Option 1 is not shown here because it is a static water supply for fire fighting only, and will not require regular top up (unless stored water is used for fire fighting or flushing).

Detailed results are summarised for the average river flow per month, number of day water can be extracted from the river, volume of river water extraction, and volume of backup water supply required for the dry, median and wet year are shown below in Table 5-2, Table 5-3 and Table 5-4.

Table 5-2: Options 2 & 3 – Summary of River Flow, Water Extracted from River and Backup Supply for Dry Year to Meet 12 ML/year Demand

Dry Year - 1982				
Month	Av. Flow (ML)	No. of Day Supply from River	Volume from River (ML)	Backup Supply (ML)
Jan	133.9	21	0.7	0.3
Feb	22.9	0	0.0	0.9
Mar	63.8	12	0.4	0.6
Apr	65.9	9	0.3	0.7
May	35.3	0	0.0	1.0
Jun	62.0	12	0.4	0.6
Jul	68.8	12	0.4	0.6
Aug	62.5	8	0.3	0.7
Sep	29.6	0	0.0	1.0
Oct	44.9	7	0.2	0.8
Nov	5.7	0	0.0	1.0
Dec	11.2	0	0.0	1.0
<b>TOTAL</b>		<b>81</b>	<b>3</b>	<b>9</b>

Table 5-3: Options 2 & 3 – Summary of River Flow, Water Extracted from River and Backup Supply for Median Year to Meet 12 ML/year Demand

Median Year - 2013				
Month	Av. Flow (ML)	No. of Day from River	Volume from River (ML)	Backup Supply (ML)
Jan	217.2	31	1	0
Feb	288.7	28	1	0
Mar	302.9	31	1	0
Apr	107.4	30	1	0

Median Year - 2013				
May	140.6	31	1	0
Jun	823.5	30	1	0
Jul	612.2	31	1	0
Aug	618.4	31	1	0
Sep	2325.6	30	1	0
Oct	642.2	31	1	0
Nov	680.3	30	1	0
Dec	217.8	31	1	0
<b>TOTAL</b>		<b>365</b>	<b>12</b>	<b>0</b>

Table 5-4: Options 2 & 3 – Summary of River Flow, Water Extracted from River and Backup Supply for Wet Year to Meet 12 ML/year Demand

Wet Year				
Month	Av. Flow (ML)	No. of Day from River	Volume from River (ML)	Backup Supply (ML)
Jan	106.3	17	0.5	0.4
Feb	116.1	11	0.4	0.5
Mar	4864.2	14	0.4	0.5
Apr	1864.2	30	1.0	0.0
May	2583.7	31	1.0	0.0
Jun	13902.1	30	1.0	0.0
Jul	4677.7	31	1.0	0.0
Aug	1639.4	31	1.0	0.0
Sep	5920.3	30	1.0	0.0
Oct	1678.4	31	1.0	0.0
Nov	1660.4	30	1.0	0.0
Dec	845.7	31	1.0	0.0
<b>TOTAL</b>		<b>317</b>	<b>10</b>	<b>2</b>

Table 5-2 shows that backup water will be required to supply non-potable water demand from the Tharwa residences every month during the dry year.

Table 5-3 shows that no backup water will be required to supply non-potable water to the existing residents in a median year.

Table 5-4 shows that in a wet year, backup water supply will not be required during the wet months (April to December). However, even during a 'wet year', a backup supply could be required from January to March, due to low river flows in summer periods.

Refer to **Section 5.2.3** for more discussion on the volume extraction from the river for each option.

### 5.2.3 Volume Extraction from River

#### Option 1 – Fire Fighting Only

The total volume of non-potable water required for fire fighting is **0.38ML**, assuming that 1 day storage needs to be provided at all times and provision of water extraction from the river once per year. This volume will vary depending on whether the water in the tank may need to be turned out, should water quality be an issue for fire fighting uses after storing in the tank for a long period.

Option 1 only requires water supply for fire fighting only. Therefore, water does not need to be extracted from the river every day. Based on the advice from [REDACTED] and ACT Fire & Rescue, Tharwa has not experienced any major structural fire events in the past. Therefore, a provision of water extraction for once per year (in summer period as worst case scenario) has been allowed for in Option 1.

In this case, the total volume of water extraction from the river is **0.38ML/year**. If fire happens on a hot summer day and the river flow is low, the tank cannot be replenished from the river. A secondary water supply will be required.

#### Option 2 – Residents Only

The total volume of non-potable water required for 33 local residents (including existing and new development) is 0.032ML/day or **12 ML/year**, assuming that this daily demand storage volume is replenished every day. It is noted that 12ML/year is the current licence limit for [REDACTED].

The table below summarises the total volume of water that can be extracted from the river for non-potable residential demands during the dry, median and wet year and is a summary of Table 5-2, Table 5-3 and Table 5-4.

Table 5-5: Option 2 – Water Extraction Volume from River and Backup Supply

Water Source	Dry Year - 1982	Median Year – 2013	Wet Year – 1978
	Volume (ML/year)	Volume (ML/year)	Volume (ML/year)
River	3	12	10
Backup Supply	9	0	2
Total	12	12	12

The results show that only 25% of water can be extracted from the river for the dry year of 1982. In the median year of 2013, no water backup was required, due to good river flows in both the summer and winter periods. Adequate water can be extracted from the river during a median year and wet periods. Therefore, it is noted that even during a 'wet year', dry months can occur and require a backup water supply as evidenced from analysis of the wet year 1978.

More water can be extracted in the median year than the wet year, due to more river flows in January and February in the median year.

#### Option 3 – Fire Fighting + Residents

The total volume of non-potable water required for fire fighting and local residents is 12 ML/year plus 0.38ML for fire fighting storage. It is assumed that 1 day storage needs to be provided at all times and provision of water extraction from the river once per year. The total volume of water extraction from the river is **12.38ML/year**.

The volume of water extraction from the river is similar to Option 2 above, except that extra water supply will be required for an allowance of once per year for fire fighting. If fire happens on a hot summer day and the river flow is low, emergency supply will be required from a backup supply.

## 5.2.4 Back Up Water Supply

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As discussed above, an alternative water source will be required as a backup supply for each option. Water can be supplied via trucking water from town or from a groundwater bore. For Options 2 and 3, up to three trucks per day (10kL per truck) will be required to supply non-potable residential water demands. For Options 1 and 3, up to 405 kL would be required in the case of a fire and the tank is emptied. Consideration will need to be given to the economics and water quality of the backup supply, given drier years will require significant periods of backup supply (284 days in the dry year of 1982).

## 5.2.5 Discussion

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Based on the results described above, water extracted from the Murrumbidgee River can meet most of the non-potable water demands for all three options. A secondary water supply will also be required as a backup source during the summer period and unexpected low flow periods in order to maintain the environmental river flows and ensure security of supply.

Further investigation should be undertaken for the following in the concept design stage:

- Monitor flow, level and water quality at the proposed river intake point and bore location.
- Undertake detailed daily water balance modelling to investigate the reliability of river water in terms of volume.
- Undertake detailed groundwater flow study to determine water flow direction, groundwater table and assess impact of new boreholes on the aquifer.

## 6 PROPOSED NON-POTABLE WATER SUPPLY INFRASTRUCTURE

### 6.1 Overview

The extraction point for the proposed non-potable water supply network to supply Tharwa is a location to the east side of the Murrumbidgee River. The extraction point for the current system is poorly located on the west side of the river.

The alignment of the proposed rising main is expected to follow North Street to the location of the existing water tank, albeit at RL 614m for options 1, 2 & 3. The rising main alignment has been selected based on the following criteria:

- Minimise the pipe length, which reduces the head loss in the pipe, thus reducing the pump head requirement.
- Run along the existing open space and road verge to minimise impact on the existing road and outside the leased/residential area.

It is assumed that [REDACTED] pump house will be replaced with a new pump house. The proposed water tank location is selected to minimise impact on the existing trees and to be close to the existing access track.

Water from the proposed tank will be gravity reticulated in the proposed pipe network throughout Tharwa, Cuppacumbalong, the Artisan Precinct and Outward Bound.

For each of the three options below, a hydrant spacing of 90m is required as per ACT F&R's advice. However, the proposed pipe diameter, head requirement and reservoir sizes vary as follows:

### 6.2 Option 1 – Fire Fighting Only

The proposed size of the rising main is 100mm diameter with a head requirement of 49m. The minimum storage volume of the water tank at RL 614 (which is 8m higher than the existing water tank) is 380kL. The size of the proposed gravity main varies from 100mm to 225mm diameter. The minimum fire flow head is 20m, which complies with AS2419.1-2005.

### 6.3 Option 2 – Residents Only

Due to option 2 being non-potable water supply to residents only (i.e. excludes fire fighting), the pipe sizes and reservoir size are greatly reduced. For instance, the proposed size of the rising main has been calculated to be 40mm diameter with a head of 51m and the minimum storage volume of the proposed tank is 32kL. The tank is also proposed to be set at RL 614 to be able to gravity supply all development in Tharwa. The pipe sizes range from 32mm to 150mm. The minimum maximum hour demand pressure head is 20m which complies with ICON Water WSSS.

### 6.4 Option 3 – Fire Fighting + Residents

Option 3 is a combination of Options 1 and 2. For this particular option, the proposed size of the rising main is 125mm diameter at a head of 47m. Similarly, the proposed tank should be at RL 614 with a minimum storage volume of 405kL. The gravity fed pipe diameter varies from 100mm to 225mm, which is similar to option 1 above.

The above information is summarised in the table below:

Table 6-1 Summary of the Proposed Non-Potable Water Supply Infrastructure for Tharwa

Infrastructure	Option 1	Option 2	Option 3
Rising Main (diameter, mm)	100	40	125
Pump Head (m)	49	51	47
Pump Flow (L/s)	4.8	0.5	5.6
Gravity pipe min. diameter (mm)	100	20	100
Gravity pipe max. diameter (mm)	225	150	225

## 7 COST ESTIMATES

### 7.1 Non-Potable Water Charges and Reporting

Table 7-1 shows the fees associated with water abstraction under the *Water Resources Act 2007*. EPD Water Regulation advised that:

- The fees are the same for both surface water and groundwater abstraction.
- The fees are charged to the licence holder, not each end user.
- The fees are subject to annual Consumer Price Index (CPI) increases.
- A separate fee may be charged under the *Utilities Act 2000*.
- The licence holder is required to report monthly metered water usage data to the Environment Protection Authority.

Table 7-1 Fees for Surface and Groundwater Abstraction

Items	Fee (1 July 2015 to 30 June 2016)	Comment
Water access entitlement	\$726.20 per megalitre	One off fee
Application fee for a licence to take water	\$160.30 per licence	One off fee
Annual administration fee for a licence to take water	\$415.70 per licence	Annual fee
Water abstraction charge	\$0.27 per kilolitre	Annual fee
Utilities Regulation charge	\$1000 per licence	Annual fee

The Utilities Regulation charge was calculated based on the Inner North Reticulation Network (INRN) operated by TAMS. The INRN charge is expected to be approximately \$2000 per year for double the amount of non-potable water required to supply Tharwa. The Tharwa Utilities Regulation charge needs to be checked with the Independent Competition and Regulatory Commission.

## 7.2 Infrastructure Costs

Calibre Consulting's opinion of costs for the proposed infrastructure was estimated based on similar recent local projects.

The opinion of costs includes:

- Direct costs, with an average 15% preliminaries inclusive of site preparation, mobilisation and demobilisation; materials, construction and installation, commissioning and testing;
- Contingency of 30% for non-potable water supply network, including cost risks on site conditions, engineering design issues, accuracy of data, change of standard/redesign, community/stakeholders and excluding impact from weather, political issues, environmental and heritage issues, land and property issues;
- Water Access Charge  
For all options, the adopted water access entitlement rate set by EPD is \$726.20/ML. Based on 0.38 ML, 12 ML and 12.38 ML for Option 1, 2 and 3 respectively, the water access charge has been determined accordingly.
- Capital costs  
A detailed breakdown of the infrastructure costs has been determined using standard pay items from the ACT Specifications. Where some quantities could not be accurately calculated, a PS (Provisional Sum) has been allowed. The total value of the PS amounts to \$420,000.

Other assumptions include a contingency of 30% of the capital costs, which allows for some inclusions and exclusions as mentioned above. Further, the cost estimates for the proposed tanks are based on estimates provided by Heritage Tanks Australia and for the proposed pumps, filtration units and pump house based on estimates provided by Qmax.

- Water Charge  
The annual water charge fee is based on the water access charge plus the annual administration fee for a licence to take water of \$415.70 plus the utilities regulation charge of \$1,000 per licence and the water abstraction charge of \$0.27/kL. The volume for Options 1, 2, 3 is 0.38 ML, 12 ML and 12.38 ML respectively.
- Maintenance Costs  
The maintenance costs for the proposed infrastructure have been calculated at 1.5% of the capital costs.
- Energy Costs  
The energy cost is \$0.20/kwh, based on ActewAGL's ACT standard retail electricity supply schedule of charges from 1 July 2014. For Options 1, 2 and 3, the energy consumption has been calculated at 121 kWh, 6,023 kWh and 6,050 kWh respectively.
- The applicable GST rate (10%).
- All costs in Year 2015\$.

The opinion of cost excludes:

- Approvals fee;
- Concept design, development application, detailed design and documentation;
- Project management and coordination with other consultants and contactors;
- Community Consultation; and
- Supervision, operational costs (labour) or works by Services Authorities (e.g. TAMS).

Rates are based on assumed consistent and standard ground conditions. All rates are subject to review following geotechnical investigation and interpretation and further engineering feasibility investigations.

A summary of the cost estimate for each non-potable water supply option is shown in **Table 7-2** below. Details of the costs estimates are shown in **Appendix E**.

Table 7-2 Preliminary Cost Estimates for Non-Potable Water Supply Options

Pay Items	Option 1	Option 2	Option 3
Water Access Charge (One off Fee)	\$436	\$8,875	\$9,151
Capital Costs (One off Fee)	\$2,409,464	\$2,037,378	\$2,416,185
Water Charge (\$/year)	\$1,621	\$4,656	\$4,861
Maintenance Costs (\$/year)	\$36,142	\$30,561	\$36,243
Energy Costs (\$/year)	\$25	\$1,205	\$1,210
Subtotal	\$2,447,585	\$2,082,674	\$2,467,547
GST	\$244,758	\$208,267	\$246,755
<b>TOTAL</b>	<b>\$2,692,343</b>	<b>\$2,290,941</b>	<b>\$2,714,302</b>

Table 7-2 above shows that Option 2 is the lowest cost (i.e. \$2,290,941). However, this has not allowed for fire fighting supply. The cost estimates for Options 1 and 3 are similar, due to the same size of gravity pipe network, pump system and water tanks and slight difference in rising main size.

Option 3 is more feasible than Option 2 in terms of providing residential non-potable supply as well as for fire fighting.

## 8 ASSESSMENT OF PROJECT RISKS AND ISSUES

A preliminary risk assessment has been undertaken to identify the key risks associated with the proposed non-potable water supply scheme. Each risk or issue has been evaluated based on its likelihood and consequence. Measures have been recommended to mitigate or manage the risk/issue.

### 8.1 River Water Quality

#### Typical Values in Australian Guidelines

ACT Health advised that river water for non-potable water use should be assessed against Option 2 in Table A3.6 of the Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) Stormwater Harvesting and Reuse. The guidelines indicate that for dual reticulation, i.e. indoor and outdoor use, the following water quality criteria should be met:

- Turbidity < 25 NTU (maximum)
- Turbidity < 10 NTU (95<sup>th</sup> percentile)
- Turbidity < 2 NTU (target)
- E. coli < 1/100mL

### Turbidity Values in Murrumbidgee River

EPD Water Regulation has provided the water quality data for Murrumbidgee River at Angle Crossing, from year 1980 to 2014. The water quality data includes acidity (pH), conductivity, turbidity and total phosphorus. The turbidity values are summarised as follow:

- Turbidity Maximum = 630 NTU
- Turbidity 95th percentile = 39

There is no E.coli data available. However, ACT Health recommended that river water should be disinfected (via UV or Chlorine) to minimise potential disease caused by organisms or pathogens contained in the water. Further testing will be required at the inlet points to confirm the disinfection requirements and to determine associated costs.

### Treatment of River Water

In general, the river water turbidity does not meet the Stormwater Harvesting and Reuse guidelines. A filtration unit is proposed to be installed and costed to protect the proposed pump unit and improve pumping efficiency.

## 8.2 Bore Water Quality

EPD Water Regulation provided the bore water quality data for the Australian Outward Bound bore. The groundwater was sampled on 20 May 2008 and results are shown on **Table 8-1**. The bore water quality data does not include turbidity or E. coli value. Therefore, the Stormwater Harvesting and Reuse guidelines cannot be used to assess adequacy of groundwater being used for non-potable indoor and outdoor uses.

Based on the previous consultation with the existing Tharwa residents, it is noted that bore water has caused blockages in pipes, fittings and house appliances. Therefore, the Australian Drinking Water Guidelines (ADWG) Version 3.1 has been used to assess the water hardness.

Table 8-1 shows comparison of the ADWG trigger value and Outward Bound bore water quality data. The table shows that bore water in Outward Bound has high sulphate, total dissolved solids and total hardness, which will cause pipe blockages, decrease water availability and may even damage pipes, fittings and house appliances resulting in leaks.

Table 8-1 Bore Water Quality Assessment

Characteristics	Unit	ADWG Trigger	Tharwa Bore Water	Compliance (Y/N)	Comments
pH	pH units	6.5 – 8.5	7	Y	
Fluoride	mg/L	<= 1.5	1.5	Y	
Bromide	mg/L	-	0.2	-	
Chloride	mg/L	<= 250	78	Y	
Nitrite	mg/L N	<= 3	0.05	Y	
Sulphate	mg/L SO <sub>4</sub>	<= 250	290	N	Diarrhoea may be associated with the ingestion of water containing high levels of sulphate.
Phosphate	mg/L P	-	0.2	-	
Nitrate	mg/L N	50-100	1.4	Y	

Characteristics	Unit	ADWG Trigger	Tharwa Bore Water	Compliance (Y/N)	Comments
Conductivity	uS/cm	-	1000	-	
T.Diss Solids	mg/L	<= 600	720	N	'Fair' quality. Minor impact on build-up of scale in pipes, fittings and household appliances.
Diss Calcium	mg/L	-	91	-	
Diss Magnesium	mg/L	-	27	-	
Diss Sodium	mg/L	<= 180	75	Y	
Diss Potassium	mg/L	-	2.3	-	
Diss Iron	mg/L	<= 0.3	0.01	Y	
Diss Manganese	mg/L	<= 0.1	0.001	Y	
Total Hardness	mg/L	<= 200	338.4	N	Increased scaling problems. Treatment will be required to reduce water hardness.

### Treatment of Bore Water

Hardness in bore water can be reduced by using lime softening. However, this is not normally used for Australian drinking water. Instead, sodium hexametaphosphate has been used to reduce scale build-up, but does not reduce hardness.

Further investigation should be undertaken to test bore water and assess appropriate treatment required for non-potable indoor and outdoor uses. This treatment is not currently included in the cost estimates.

## 8.3 Asset Ownership and Operation

The existing non-potable pump and pipe network in Tharwa Village is owned by [REDACTED], TAMS and the Australian Outward Bound.

The proposed non-potable water network is proposed to be owned, operated and maintained by an appropriate government agency or service authority to ensure that:

- The system is run by appropriately skilled and knowledgeable people.
- The non-potable water supply to the end users is reliable and secure.
- The water charges applied on the end users are transparent and fair.
- The water abstraction, usage and water quality data is monitored and reported to EPA.

ICON Water has been consulted and the advice received is that they are not responsible for non-potable water supply to Tharwa Village.

Both ICON Water and TAMS advised that further consultation will be required to discuss the operation and management of the non-potable water network.

## 8.4 Other Issues

Further investigations will be required to address the following issues:

### River Water Abstraction

- Water quality sampling and testing will be required in Murrumbidgee River, upstream and downstream of the existing Tharwa Bridge.
- Detailed survey will be required to obtain the bathymetry data for Murrumbidgee River, upstream and downstream of the existing Tharwa Bridge.
- Detailed water balance modelling will be required to confirm the amount of river water available for extraction, especially during summer periods.
- Investigate the cost effective river intake options to source water from the east side of the lake (e.g. flexible pipe intake with float, a wet well with submersible pump and pipe under the river, above ground pipe with access bridge, etc.)
- Disinfection options need to be investigated.
- Consultation with local residents needs to take place during the design phase.

### Bore Water Abstraction

- Detailed groundwater study (including test pits) will be required to determine the existing groundwater table within the study area and impact of groundwater extraction on the river and environment.
- New bore locations and depths need to be confirmed during the design phase.
- Bore water treatment options need to be investigated during the design phase.

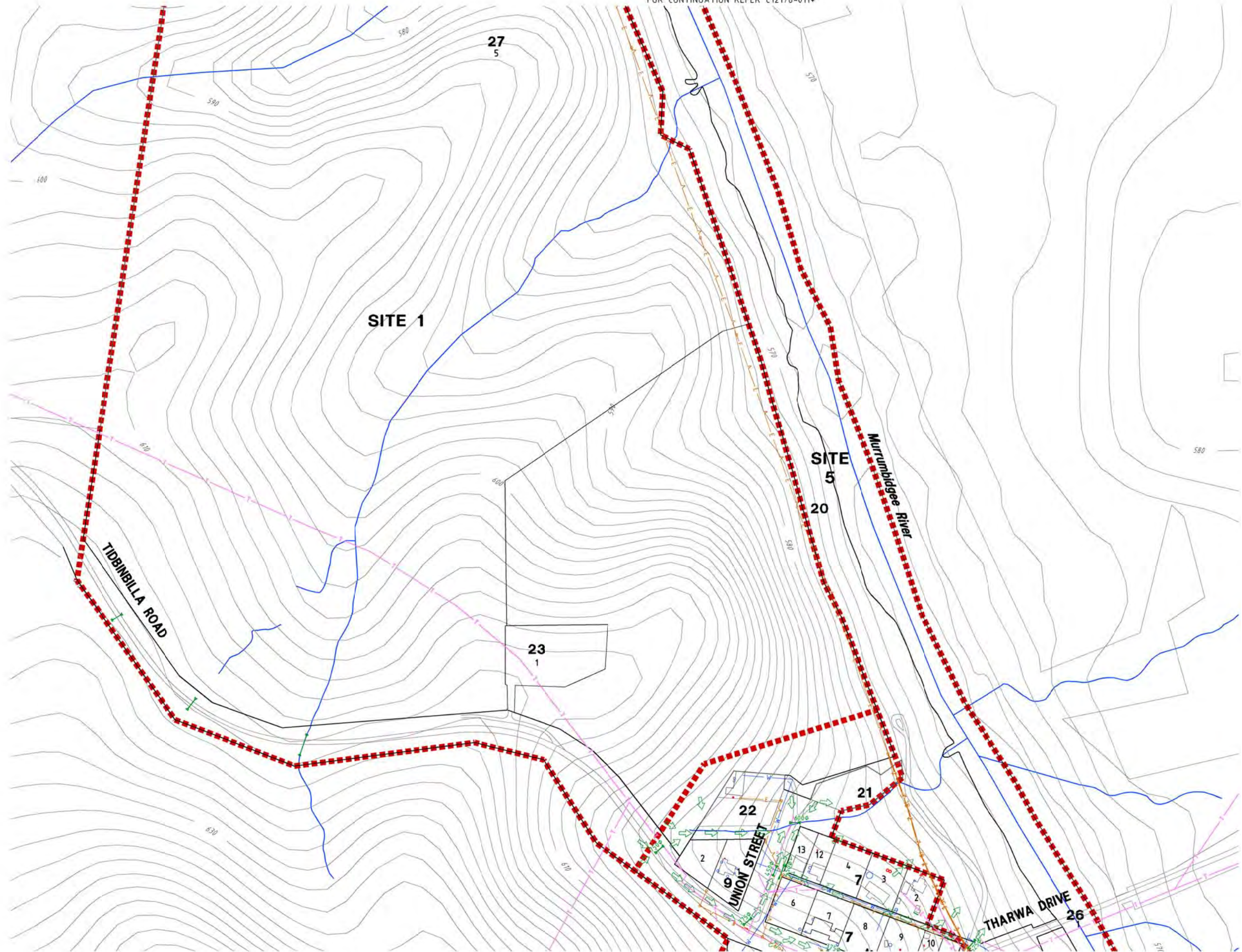
### Non-Potable Water Supply Infrastructure

- Geotechnical investigation, survey, potholing services and tree assessment are to be undertaken during the concept design phase.
- Depending on the owner of the proposed infrastructure, the design standards or requirements may be altered to suit.

## APPENDICES

## **APPENDIX A DRAWINGS**

FOR CONTINUATION REFER C12176-011+

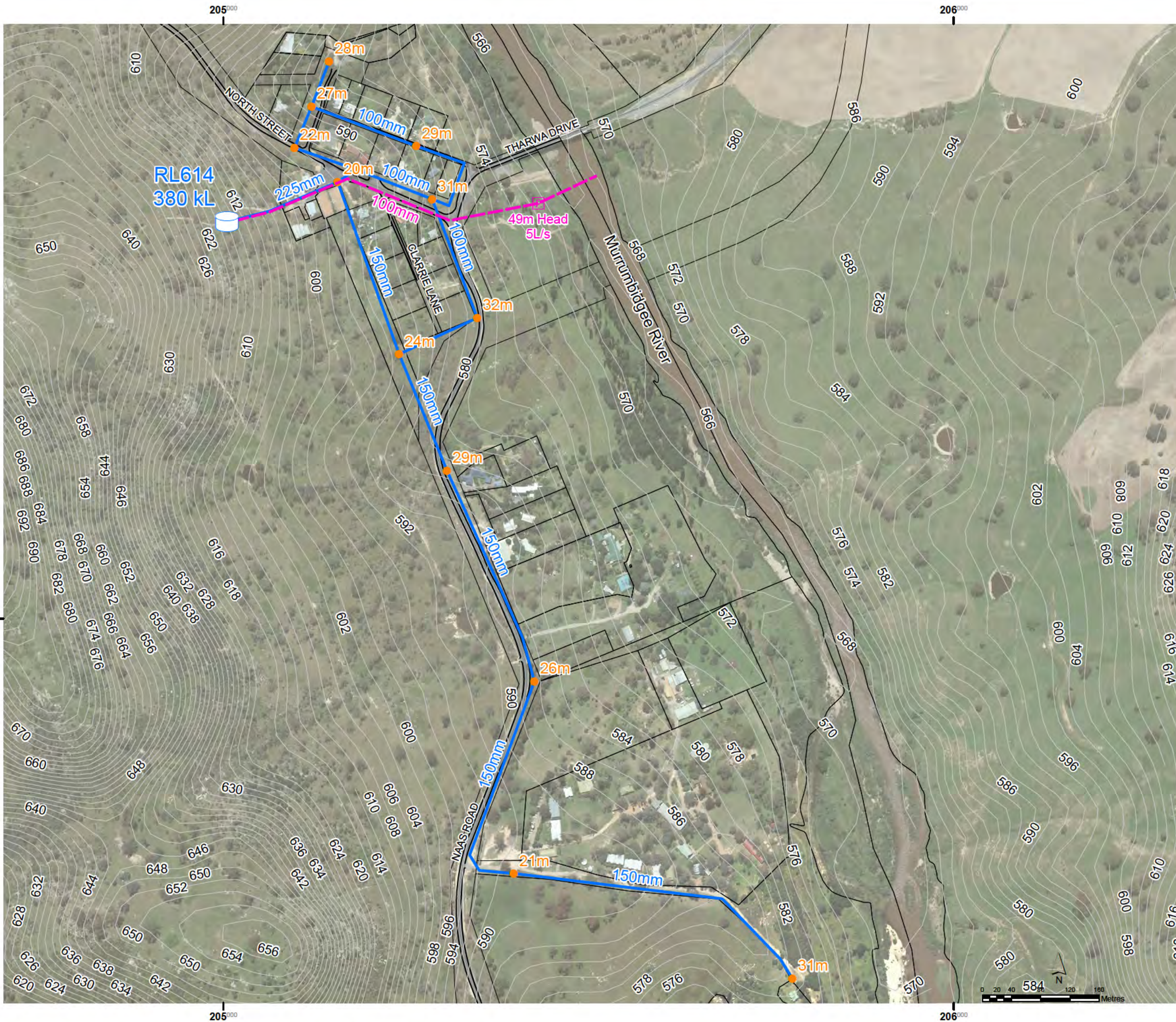


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- Legend
- Reservoir Option 1
  - Pump
  - RisingMain\_Option1
  - Minimum Pressure @ Fire Flow
  - Water Pipe Option 1

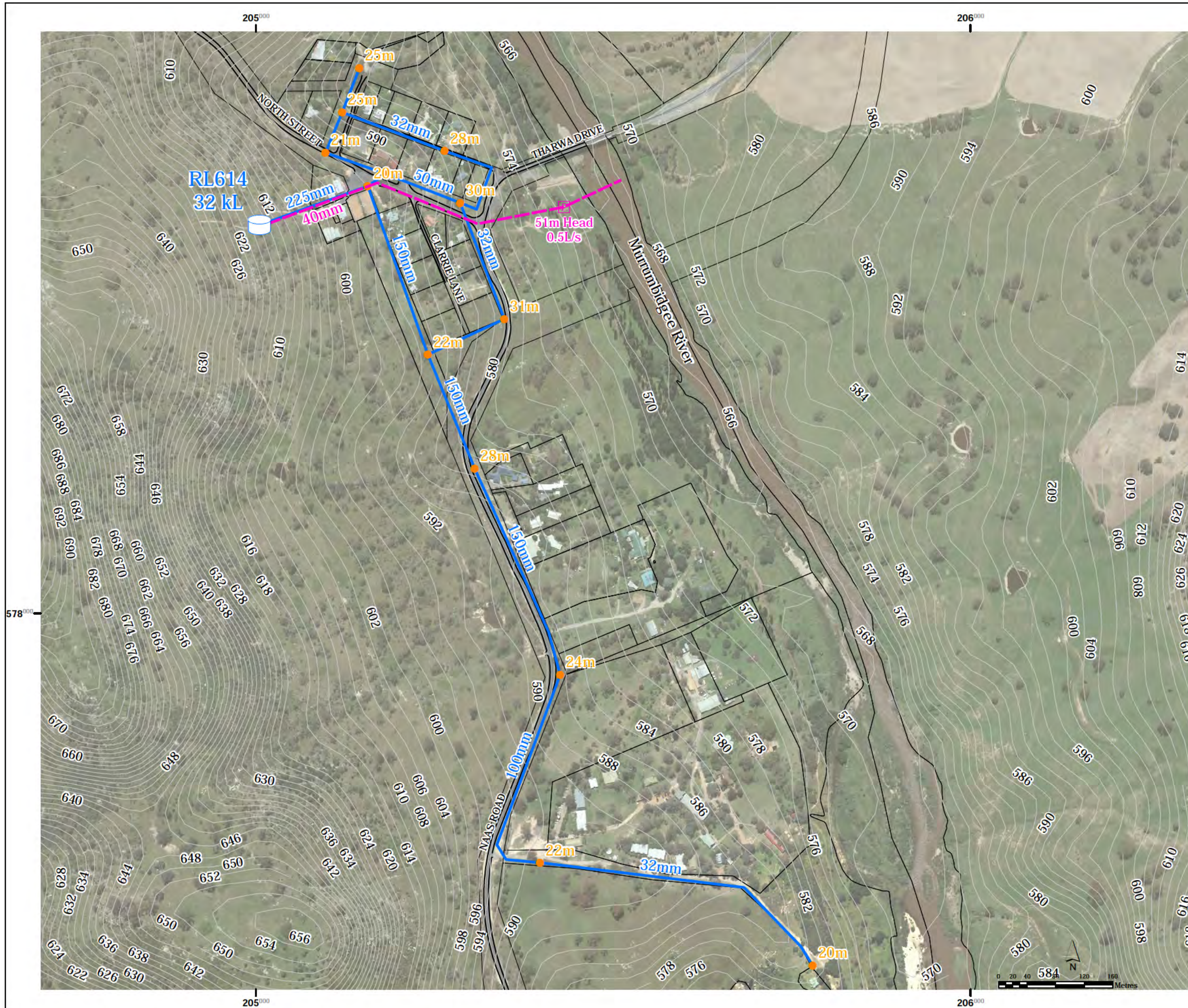
Details		
Issue	Amendment	Date
A	DRAFT REPORT	14 MAY 15
B	FINAL REPORT	30 JUN 15

Project  
**THARWA NON-POTABLE WATER OPTIONS**

Drawing Title  
**OPTION 1 - FIRE FIGHTING ONLY**

Scale 1: 5,000 @ A3  
 Drawn FL  
 Checked CPL  
 Job No. C12176.1  
 Figure F001\_OP1

Issue **B**



- Legend
- Reservoir\_Option2
  - Pump
  - RisingMain
  - Minimum Pressure @ Peak Hour
  - Water Pipe Option2

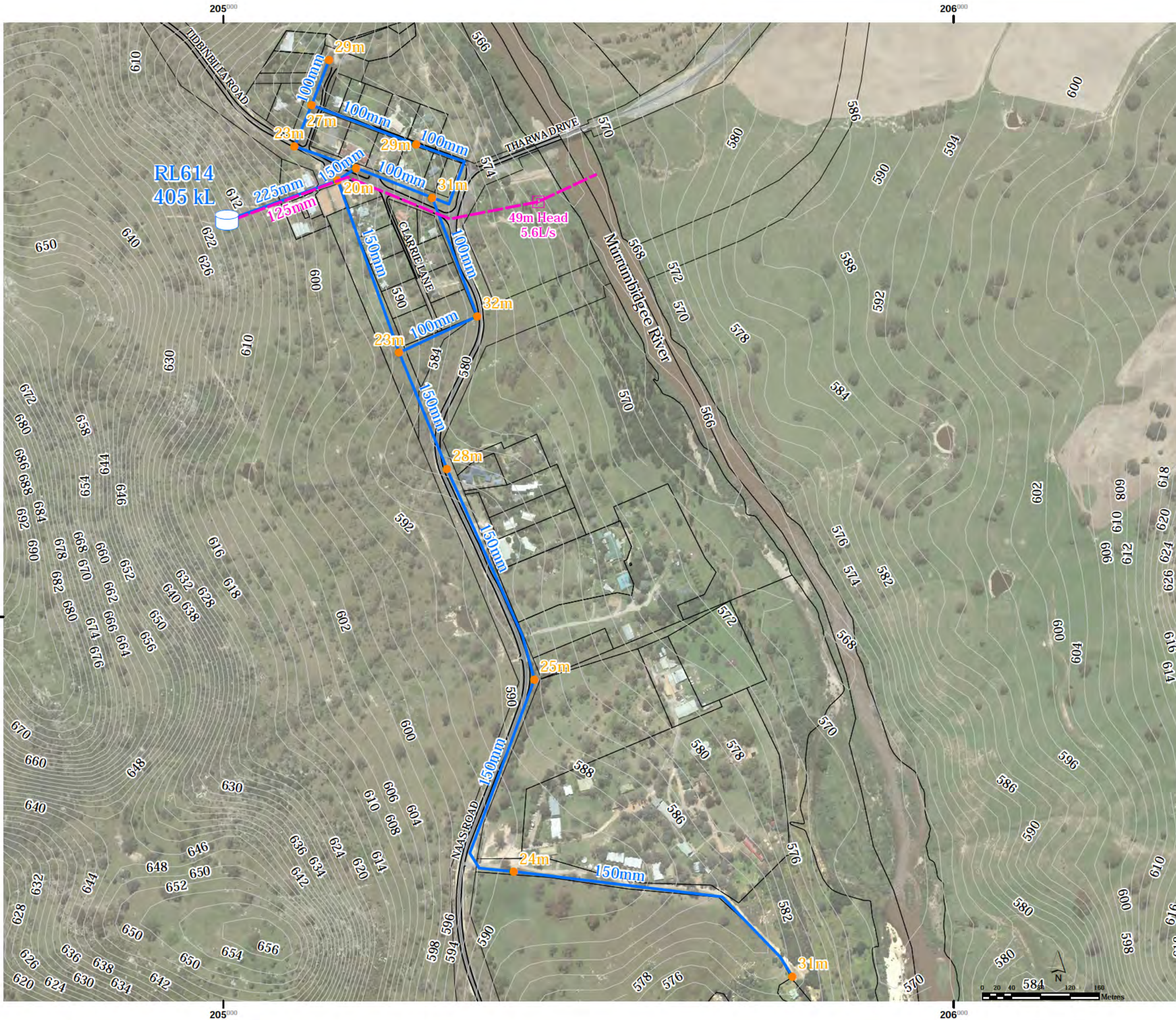
Details		
Issue	Amendment	Date
A	DRAFT REPORT	14 MAY 15
B	FINAL REPORT	30 JUN 15

Project  
**THARWA NON-POTABLE WATER OPTIONS**

Drawing Title  
**OPTION 2 - RESIDENTS ONLY**

Scale 1: 5,000 @ A3  
 Drawn FL  
 Checked CPL  
 Job No. C12176.1  
 Figure F002\_OP2

Issue **B**



- Legend
- Reservoir Option3
  - Pump
  - RisingMain
  - Minimum Pressure @ Fire Flow
  - Water Pipe Option3

Details		
Issue	Amendment	Date
A	DRAFT REPORT	14 MAY 15
B	FINAL REPORT	30 JUN 15

Project  
**THARWA NON-POTABLE WATER OPTIONS**

Drawing Title  
**OPTION 3 - FIRE FIGHTING + RESIDENTS**

Scale 1: 5,000 @ A3  
 Drawn FL  
 Checked CPL  
 Job No. C12176.1  
 Figure F003\_OP3

Issue **B**

## **APPENDIX B CONSULTATION CORRESPONDENCE**



Level 6, 121 Marcus Clarke St, Canberra ACT 2601  
 GPO Box 261, Canberra City, ACT 2601  
 Phone 02 6211 7100 Fax 02 6211 7199

**Calibre Consulting (ACT) Pty Lt**  
 ABN 36 109 434 540  
 calibreconsulting.co

## NOTES OF MEETING

Date **14-Apr-15**

Contact [REDACTED]

Firm [REDACTED]

Cc **James Bennette**

Present **James Bennette**

Project **Tharwa Rural Village**

Job No **C12176**

Author **Fran Liao**

Notes Main objectives of the meeting was to discuss the following:

- The existing condition of the pipes and pump operated by [REDACTED] in Tharwa (i.e. Pump 1).
- Management and Maintenance of the existing system
- Observation of river level fluctuation in the past
- Any recommended intake point and bore pump locations

[REDACTED] advised that:

- TAMS pump (Pump 2) is only used as backup
- Pump 1 currently supply non-potable water to the school and toilet
- The current non-potable water charge is \$190 per half year per house (i.e. \$380/per/house)
- No water charge to the church, fire fighting & hall
- Expense up to \$2,500 everytime to repair the pump when it broke down
- Water charge cannot cover the maintenance fee
- River has been been dried up three times in his life
- Water flows better on the east side of the river
- No bushfire or house fire happened before in Tharwa



## NOTES OF MEETING

Date **13-Apr-15**

*Contact* **Brett McNamara**

*Firm* **TAMS**

*Cc* **James Bennett**

*Present* **James Bennett**

*Project* **Tharwa Rural Village**

*Job No* **C12176**

*Author* **Fran Liao**

- Notes* Main objectives of the meeting was to discuss the following:
- The existing condition of the pipes and pump operated by TAMS in Tharwa (i.e. Pump 2).
  - The operational requirements for the existing pump
  - Observation of river level fluctuation in the past
  - Any recommended intake point and bore pump locations
  - Ongoing management / maintenance ownership of the new system
- Brett advised that:
- TAMS needs to maintain/repair Pump 2 nearly every three months
  - The pump and pipe network is aged
  - Climate change should be considered in designing the new river intake system
  - East side of the river tends to have better river flows
  - The new non-potable water supply system needs to supply the school and toilets, which are currently serviced by TAMS pump system
  - Bore water is more reliable than river water
  - New bore location is to be determined via detailed groundwater study
  - Town water supply should be considered for long viability
  - A cost benefit analysis should be undertaken to assess water supply options
  - Ongoing management / maintenance of the new system should be discussed between EPD and TAMS

## Fran Liao

---

**From:** Jones, Pat <Pat.Jones@act.gov.au>  
**Sent:** Monday, 30 March 2015 2:13 PM  
**To:** Fran Liao; Bennett, JamesP  
**Cc:** Barr, Conrad; Canham, Phil; Talbot, Brian; McGregor, Rob; White, Christopher; Azzopardi, Adam  
**Subject:** RE: Tharwa water report further request

Hi James and Fran

Hopefully I can clarify a few issues in this email before we answer the questions posed.

It is not appropriate to compare Uriarra water supply capabilities with Tharwa, as the water tank at Uriarra is designed to supply daily water supplies as well as maintain a minimum water capability for fire fighting purposes. The dwellings at Uriarra are also protected by domestic sprinklers. We have worked closely with ACTEW to ensure inflows and outputs from this tank never compromise fire fighting capabilities.

The Tharwa situation is different as this tank will be solely for fire fighting capabilities. That is the premise we have been working from. Other points to note include:

- We have used the same flow rate methodology with both precincts when recommending our water capacities;
- The initial figures provided were based on the Tharwa precinct only and should now be disregarded;
- With the recent addition of other properties taking the total number of dwellings to 44 we have had to revise our figures.

Based on the table provided below by Fran, ACTF&R are happy to accept 380kL as the minimum fire fighting storage size for Tharwa and Cuppacumbalong Precinct as long as the following points (provided in our initial advice) are still considered:

- The water supply is a dedicated fire fighting water supply
- Above ground tanks are manufactured of concrete or metal and raised tanks are to have the stand protected. Outlets are to be provided with adequate shielding for the protection of fire-fighters.
- All above ground pipes and fittings are to be metal, and associated pumps are to be shielded.

- Suitable connection for fire fighting purposes is made available at appropriate locations within the Inner Asset Protection Zone of the village, and away from adjacent structures. Further consultation with ACTF&R will be required to determine number and location of connections required.
- Gate or ball valves and pipes are adequate for water flow and metal rather than plastic.
- Hard stand is provided for fire appliance access.
- As ACTF&R pumpers do not carry hard suction, adequate hard suction hose is to be provided at each connection to enable relay pumping.

Regards

**Pat Jones** FIFireE

Superintendent

ACT Fire & Rescue



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<http://www.mindhealthconnect.org.au/>

---

**From:** Fran Liao [mailto:Fran.Liao@calibreconsulting.co]

**Sent:** Monday, 30 March 2015 12:09 PM

**To:** Bennett, JamesP; Jones, Pat

**Cc:** Barr, Conrad; Canham, Phil; Talbot, Brian; McGregor, Rob; White, Christopher; Azzopardi, Adam

**Subject:** RE: Tharwa water report further request

Hi James and Pat,

Please find attached the revised sketch plan showing all existing properties in Tharwa Village and Cuppacumbalong Precinct.

The table below summarises the firefighting demand for Tharwa Village and Uriarra Village using the NSW Planning for Bush Fire (PBF) and ACT Fire Brigade / ACTEW Water guidelines. The PBF guidelines is considered to be static supply requirements while the ACT Fire Brigade / ACTEW Water standards is considered to be flow basis requirements.

The table shows that the minimum storage size required for Uriarra Village is 1000kL based on PBF guidelines and only 380kL using ACT Fire Brigade standards. I understand that minimum tank size of 380kL was adopted and approved for Uriarra Village.

Should we adopt the Uriarra Village firefighting water storage requirements, the minimum tank size for Tharwa Village should be **380kL** (refer to tables below for detailed calculations). Similar to Uriarra Village, firefighting water will be stored and distributed to each properties via a pipe network. The pipe network will be designed/sized based on fire risk category of each property. The existing properties are Type F6 (25l/s), except for local store owned by [REDACTED] to be Type F5 (45l/s).

Can you please advise whether 380kL can be adopted as the minimum firefighting storage size for Tharwa and Cuppacumbalong Precinct?

**Table 1: Firefighting Demand for Tharwa and Uriarra Village Using NSW and ACT Fire Guidelines.**

Fire Fighting Demand	Tharwa Village (44 buildings)	Uriarra Village (100 lots)	Comment
NSW Planning for Bush Fire (Static Supply)	440 kL	1000 kL	Based on 10kL p
ACT Fire Brigade (Flow Basis)	380 kL	380 kL	Based on House and Fire Fighting

**Table 2: Tharwa Village Firefighting Storage Calculation Based on ACT Fire Brigade Guidelines**

Tharwa Village Fire Fighting Storage Calculation	
Types	Total Demand (L/lot)
House Sprinkler for 1 hr flow at 4L/s	14,400
Fire Fighting for 4hrs at 25L/s (Type F6)	360,000
<b>Total</b>	<b>374,400</b>
<b>Total (kL)</b>	<b>374.4</b>
<b>Rounded (kL)</b>	<b>380</b>

Thanks,



**Fran Liao**  
Engineer - Urban Development

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**From:** Bennett, JamesP [<mailto:JamesP.Bennett@act.gov.au>]  
**Sent:** Monday, 30 March 2015 10:26 AM  
**To:** Jones, Pat; Fran Liao  
**Cc:** Barr, Conrad; Canham, Phil; Talbot, Brian; McGregor, Rob; White, Christopher; Azzopardi, Adam  
**Subject:** RE: Tharwa water report further request

Hi Pat

EPD recently engaged Calibre Consulting to undertake a water supply options study for Tharwa. In this project we have defined the project area as both the Tharwa village AND the Cuppacumbalong area. This is where the additional buildings come from. The attached map only shows the buildings in the Cuppacumbalong precinct which are additional to your original calculations in the interim report that looked at the Tharwa Village only. The map used in your report shows the 14 Class 1A residential and 5 Class 9b Assembly buildings.

Combining these two maps, we get:

Tharwa:

- 14 Class 1a residential
- 5 Class 9b Assembly buildings (community facilities)

Cuppacumbalong:

- 14 community facilities

- 11 class 1a residential

Total:

- 25 Class 1a residential
- 19 community facilities (including pre and primary school)
- = 44 buildings total

Fran, are you able to please provide a single map that includes the buildings in Tharwa and Cuppacumbalong (total 44 buildings)?

Pat, thanks for confirming that number. I just looked back at the ACT F&R interim report and emails with Rob and Chris and while we have discussed the required flow rate, calculations for flow rate haven't been included in the interim report. The report only has calculations for the static water requirement. As I am a little confused at the moment, could you please clarify whether the minimum water storage capacity is to be calculated on the static water requirement or a flow based requirement?

It seems to me a little strange that Tharwa and Cuppacumbalong, with 44 buildings, have a higher water requirement (440 KL) than Uriarra which has 100 lots and only a 375KL requirement? Happy to have this explained to me.

Thanks  
James

---

**From:** Jones, Pat  
**Sent:** Monday, 30 March 2015 9:52 AM  
**To:** Bennett, JamesP; [Fran.Liao@calibreconsulting.co](mailto:Fran.Liao@calibreconsulting.co)  
**Cc:** Barr, Conrad; Canham, Phil; Talbot, Brian; McGregor, Rob; White, Christopher  
**Subject:** FW: Tharwa water report further request

Hi James and Fran

I was wondering if you were able to provide a more detailed map relating to this revised project scope, and specifically where the additional 14 community facilities and 11 class 1a structures are located? (These figures are above our initial assessment brief made on 2 February 2015).

At this stage we are still seeking compliance with the other interim recommendations made in the report dated 2 February.

We will endeavour to finalise our advice in relation to the quantity of water required ASAP.

James, I can also confirm as per our discussion that the Uriarra figures are consistent with what we have been advised.

Cheers

**Pat Jones** FIFireE  
Superintendent  
ACT Fire & Rescue



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<http://www.mindhealthconnect.org.au/>

---

**From:** Brandreth, Ian  
**Sent:** Thursday, 26 March 2015 12:23 PM  
**To:** Jones, Pat; Talbot, Brian  
**Subject:** FW: Tharwa water report further request

FYI

Ian Brandreth  
Station Officer  
ACT Fire & Rescue  
Fire Safety Section



Fairbairn Business Park  
9 Amberly Avenue Majura, ACT, 2609  
PO Box 158, Canberra City, 2600

Fax. 6207 8387  
Phone. 6207 8376  
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---

**From:** Fran Liao [<mailto:Fran.Liao@calibreconsulting.co>]  
**Sent:** Thursday, 26 March 2015 12:01 PM  
**To:** Brandreth, Ian  
**Cc:** Bennett, JamesP  
**Subject:** FW: Tharwa water report further request

Hi Ian,

Can you please respond to my email below while Rob is away?

Thanks,



**Fran Liao**  
Engineer - Urban Development

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**From:** Fran Liao  
**Sent:** Thursday, 26 March 2015 11:58 AM  
**To:** 'McGregor, Rob'  
**Cc:** Bennett, JamesP  
**Subject:** RE: Tharwa water report further request [Filed 26 Mar 2015 11:58]

Hi Rob,

Calibre Consulting has been engaged by EPD to investigate non-potable water supply options for Tharwa, including areas south of the village.

The Tharwa Village interim water supply report indicates that a new 180kL storage (should be 190kL, summation error in the report) will be required for firefighting water supply for the existing 19 properties within the main Tharwa Village. The size of the water storage was determined based on Table 4.2 in Planning for Bushfire (PBP).

We have updated the water requirement calculation to include the existing properties located south of the village (refer to attached image for location of these properties). There are 11 residential (class 1a) properties and 14 Class 9b assembly buildings located east of Naas Road. A minimum of 250kL water storage will be required for firefighting water supply for these properties.

Therefore, a total of **440kL** storage will be required to supply firefight water to Tharwa, in accordance with NSW PBP's requirements.

For comparison, I did another calculation using Uriarra Village's firefighting water supply requirements below. The minimum storage size is **375kL**.

- House Sprinkler for 1 hr flow at 4L/s
- Fire Fighting for 4hrs at 25L/s (Type F6)

Can you please review the calculation shown on the attached plan and provide comments on which storage size should be used for further investigation?

Please do not hesitate to contact me should you require further clarifications on the above.

Regards,



**Fran Liao**  
Engineer - Urban Development

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**From:** McGregor, Rob [<mailto:rob.mcgregor@act.gov.au>]  
**Sent:** Tuesday, 10 February 2015 9:25 AM  
**To:** Bennett, JamesP  
**Subject:** FW: Tharwa water report further request

Hi James

ACTF&Rs plan B if the water supply at Tharwa is not improved, is how we would deal with a fire now

- A structure fire within the village would require the two closest and available Pumpers to respond. Other ancillary appliances would also respond. Water tankers are an option to supply water
- A grass fire in the vicinity would require water tanker response by both ACTF&R and RFS with possible Pumper attendance for structure protection
- Plan B in a major bush fire event could be to evacuate all residents, allow the fire front to pass and then start fire fighting. This is not ideal but without a reliable suitable water supply, it is putting the life of residents and firefighters before property protection

#### Notes

- The present static water supply is not suitable for ACTF&R Pumpers, tankers can use it
- The reliability of the existing static system is unknown
- The closest hydrant supply is at Banks approximately 5kms away
- During a major fire event tankers may not be available to supply water
- The existing structures in the village are venerable to all forms of attack from bushfire (ember, radiant heat, direct flame contact & wind)
- The fire station being constructed on the intersection of Tharwa Drive and Drakeford Drive will improve response times to Tharwa

#### Regards

*Rob McGregor*

Station Officer

ACT Fire and Rescue

Community Resilience/Regulatory Compliance

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---

**From:** Bennett, JamesP  
**Sent:** Thursday, 5 February 2015 4:47 PM  
**To:** McGregor, Rob  
**Cc:** White, Christopher; Barr, Conrad; Jones, Pat; Azzopardi, Adam  
**Subject:** RE: Tharwa water report further request

Hi Rob

As a further point, could you please also include in the report what your plan B option is if water is not available in Tharwa, i.e. trucking in water from Tuggeranong, and how viable this option is.

Thanks  
James

---

**From:** Bennett, JamesP  
**Sent:** Thursday, 5 February 2015 4:31 PM  
**To:** McGregor, Rob

**Cc:** White, Christopher; Barr, Conrad; Jones, Pat; Azzopardi, Adam  
**Subject:** Tharwa water report further request

Hi Rob

Further to our discussion, please see the information below and in the attached report.

In the Bushfire Risk Assessment for Tharwa Village (attached report) from Graham Swain of Australian Bushfire Protection Planners, he makes a number of recommendations (see page 52 and 53).

Specifically he recommends disconnecting Cuppacumbalong from the Outward Bound Supply and connecting it to the Village water supply.

I understand this would change your calculations of the required level of water supply as your initial report focussed on the northern village only and did not include Cuppacumbalong or Outward Bound.

Can you please confirm:

- what the new calculation for the Tharwa water supply would be if Cuppacumbalong is to be included
- and whether you have any concerns on Graham's suggestion of disconnecting Cuppacumbalong from the Outward Bound Supply.

We would like to move as quickly as possible on this to proceed on getting the consultants to investigate infrastructure design options and provide costings.

Thanks  
James

**James Bennett | Policy Officer**

Phone: 6205 4877 | Email: [JamesP.Bennett@act.gov.au](mailto:JamesP.Bennett@act.gov.au)

**Strategic Planning** | Environment and Planning Directorate | ACT Government

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## Fran Liao

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**From:** Bennett, JamesP <JamesP.Bennett@act.gov.au>  
**Sent:** Monday, 16 March 2015 9:54 AM  
**To:** Fran Liao  
**Subject:** FW: Tharwa water data request

Hi Fran

I am back at work today and just wanted to check in and see how everything is going with the project and whether you need any more information from us.

Please let me know.

Thanks  
James

---

**From:** Cox, James  
**Sent:** Wednesday, 11 March 2015 2:33 PM  
**To:** peter.lewis@calibreconsulting.co; Fran Liao  
**Cc:** Bennett, JamesP; Azzopardi, Adam  
**Subject:** FW: Tharwa water data request

Peter and Fran,

In response to Calibre request please find attached information provided by our Water Regulation people together with responses in the body of the email below.

Regards,  
James C

---

**From:** Chester, Heath  
**Sent:** Tuesday, 10 March 2015 4:21 PM  
**To:** Bennett, JamesP; Azzopardi, Adam; Cox, James  
**Subject:** FW: Tharwa water data request

James, Adam and James

Data and answers provided

Cheers Heath

---

**From:** Bennett, JamesP  
**Sent:** Thursday, 5 March 2015 10:17 AM  
**To:** Chester, Heath  
**Cc:** Azzopardi, Adam; Cox, James  
**Subject:** Tharwa water data request

Hi Heath

We have recently engaged Calibre Consulting to undertake a study into non-potable water supply options for the Tharwa village as part of a broader master planning process.

Calibre have indicated that they require certain information that I am trying to chase up for them.

Are you able to provide any information on the following? Or direct me to who might have any relevant information?

Information required by the Consultants:

- Murrumbidgee River survey data for investigation of new river intake or pump out points – i.e. shape/depth of the river near Tharwa bridge – **no data available**
- Existing river water extraction data and licence limit within and upstream of the site provided by EPD based on current licences –i.e. how much water can be taken out at Tharwa?

██████████ is currently licensed to extract 12ML of surface water from the Murrumbidgee River (WU58).

Outward Bound is currently licensed to extract 32ML of groundwater (WU704).

██████████ (Block 1188 Tuggeranong) is currently licensed to extract 4ML of groundwater (WU307).

██████████ (Block 237 Paddys River) is currently licensed to extract 30ML of groundwater (WU302).

TAMS (Namadgi National Park Visitors Centre) (Block 362 & 363 Paddys River) is currently licensed to extract 3ML of groundwater (WU369).

TAMS (Tharwa Primary School and Tharwa Recreation Area) (Block 7 Section 7 and Block 5 Section 1 Paddys River) is currently licensed to extract 6ML of surface water from the Murrumbidgee River (WU120).

██████████ (Block 336 Paddys River) is currently licensed to extract 25ML of surface water from the Murrumbidgee River (WU401)

- Minimum river flows required to be maintained – i.e. environmental flows for Murrumbidgee see [Environmental Flow Guidelines](http://www.legislation.act.gov.au/di/2013-44/default.asp) – practically this will not be an issue for such a small extraction pump.
- Existing bore water extraction data within the Outward Bound site – e.g. average flow, daily/annual yield, licence limit – **no data available**
- Advise availability of groundwater for extra extraction within the site - **there is currently 464ML of groundwater available for allocation in the Upper Murrumbidgee water management area**
- River and bore water quality data within and adjacent the study area (Tharwa/Cuppacumbalong and Murrumbidgee River) [River quality attached](#) - bore quality already sent to JP earlier
- Did the Bulk Water group who did the work on the Cotter Dam do any water quality testing that is available? [ACTEW will hold this data if available](#)

If you could please send any information to me and CC James Cox and Adam Azzopardi that would be great.

Thank you very much for your help  
James

**James Bennett | Policy Officer**

Phone: 6205 4877 | Email: [JamesP.Bennett@act.gov.au](mailto:JamesP.Bennett@act.gov.au)

**Strategic Planning** | Environment and Planning Directorate | ACT Government

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 calibreconsulting.co

## NOTES OF CONVERSATION

Date **23-Apr-15**

*Contact* **Adrian Sarrant**

*Firm* **ACT Health**

*Cc* **James Bennett**

*Project* **Tharwa Rural Village**

*Author* **Fran Liao**

*Job No* **C12176**

*Notes* Adrian advised that:

1. The Australian Guidelines for Water Recycling - Stormwater Harvesting and Reuse Guidelines Table A3.6 should be used to assess whether the river water or bore water are suitable for non-potable indoor and outdoor uses in Tharwa.
2. According to the guidelines, river/bore water quality should meet Turbidity < 25 NTU and and E.coli < 1/100mL for dual reticulation with indoor and outdoor use. Filtration and disinfection may be required to the river/bore water.
3. Amanda Brown in ACTEW Water can be contacted for Murrumbidgee River water quality data at Angle Crossing.



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## NOTES OF MEETING

Date **22-Apr-15**

*Contact* **Pat Jones**

*Firm* **ACT Fire & Rescue**

*Cc*

*Present* **James Bennett, Brian Talbot, Rob McGregor, Chris White, Wayne Shaw, Pat Jones**

*Project* **Tharwa Rural Village**

*Job No* **C12176**

*Author* **Fran Liao**

*Notes* Pat Jones advised that:

- A fire station is located within 7 mins driving distance to Uriarra Village and thus it's considered to be defensible.
- A fire station is located within 30 mins driving distance to Tharwa Village.
- Therefore, the fire fighting requirements adopted in Uriarra Village cannot be used for Tharwa Village.
- In general, 6 heavy tankers are required to supply 1 rural bush fire.
- Each house in Uriarra Village has sprinkler system installed. No sprinkler system in the existing Tharwa Village houses. The sprinkler retrofitting cost for each house would be approximately \$30,000.
- TAMS needs to agree to maintain the APZ zone and the proposed fire trail recommended by the study.
- Feed fire hydrant, minimum 10 L/s and minimum 20m head can be adopted for Tharwa Village fire fighting network design.



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## NOTES OF CONVERSATION

Date **01-May-15**

*Contact* **Nabin Dahal**

*Firm* **ICON WATER**

*Cc*

*Project* **Tharwa Rural Village**

*Job No* **c12176**

*Author* **Fran Liao**

*Notes* Phone call at 10:23am:

Nabin Dahal advised that 25L/s for Fire Category F6 was required/advised by ACT Fire Brigade. It is assumed one hydrant will be operated at a time, at 90m interval.

## Fran Liao

---

**From:** Parsons, Brett <Brett.Parsons@iconwater.com.au>  
**Sent:** Monday, 4 May 2015 1:04 PM  
**To:** Fran Liao  
**Cc:** Bennett, JamesP; Elliott, Tim; Webber, Simon; Dahal, Nabin; Wansink, Michael; Szlapinski, Peter; Grant, Andrew; Morey, Teresa  
**Subject:** RE: Tharwa Non-Potable Water Supply Options

Fran,

Thanks for the information.

Ownership of non-potable networks was discussed at the latest senior ACT water group meeting. It was confirmed that at the present time Icon Water is not the utility responsible for non-potable water supply.

Regarding an option to operate and manage a non-potable system, at this stage Icon Water cannot provide any further information.

Regards,

**Brett Parsons**  
Manager Asset Acceptance and Protection



GPO Box 366 Canberra ACT 2601  
T 02 6175 2416 M [REDACTED]  
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**From:** Fran Liao [mailto:Fran.Liao@calibreconsulting.co]  
**Sent:** Monday, 4 May 2015 11:48 AM  
**To:** Parsons, Brett  
**Cc:** Bennett, JamesP  
**Subject:** Tharwa Non-Potable Water Supply Options

Hi Brett,

EPD has engaged Calibre to investigate the Non-Potable Water Supply Options for Tharwa Village. Three demand options were investigated:

- Option 1 – Fire Fighting Only
- Option 2 – Resident Non Potable Supply Only
- Option 3 – Combination of Options 1 and 2

The main source of non-potable water will be from Murrumbidgee River. River water will be pumped to a new storage tank and gravitate to the each house. The network was designed based on ICON Water standards and comments

from ACT Fire & Rescue. The network sketch plan for each option can be downloaded via this link: <https://brownconsulting.sharefile.com/d-s010f5c95ec74509b>.

As discussed on the phone, can you please advise ICON Water's requirements on the proposed scheme if:

1. ICON Water will be the owner of the asset; or
2. ICON Water will be operator of the asset.

We only need some preliminary advice from ICON at this stage to scope the next phase of the study. Please do not hesitate to contact me should you require further information on the above.

Regards,



**Fran Liao**  
Engineer - Urban Development

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\*\*\*\*\*

## Fran Liao

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**From:** Bennett, JamesP <JamesP.Bennett@act.gov.au>  
**Sent:** Tuesday, 5 May 2015 11:59 AM  
**To:** Fran Liao  
**Subject:** RE: RE: Tharwa Water Extraction Fees and Charges

Hi Fran

Just had a further conversation with Sara and she said that they just charge the licence holder the fees, and it is up to the licence holder on how they want to recoup costs from each end user. Whether that is individual meters or a flat service fee is up to them.

In the new North Canberra Stormwater Reticulation project, TAMS are the licence holder and are providing water to a number of end users. The end users are individually metered and charged for usage. I am not sure of the actual charge amount, but will try and chase some info up for you.

Thanks  
James

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**From:** Bennett, JamesP  
**Sent:** Tuesday, 5 May 2015 10:48 AM  
**To:** 'Fran Liao'  
**Subject:** FW: RE: Tharwa Water Extraction Fees and Charges

Hi Fran

Please see the response below from the EPD Water Regulation team.

I think it covers off on all of your questions, but please let me know if you need more info.

Thanks  
James

---

**From:** McIntyre, Sara  
**Sent:** Tuesday, 5 May 2015 10:35 AM  
**To:** Bennett, JamesP  
**Subject:** RE: Tharwa Water Extraction Fees and Charges

Hi James,

The fees associated with water abstraction under the Water Resources Act are:

- Grant of a water access entitlement - \$726.20 per megalitre (this is a one-off fee)
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- Annual administration fee for a licence to take water - \$415.70 (this is an annual fee)
- Water abstraction charge – \$0.27 per kilolitre (this is payable for the actual volume of water used in a financial year)

Just some further points on the fees:

- These fees are the same for surface water and groundwater abstraction.
- The fees are charged to the licence holder, not each end user.

- The fees are subject to CPI increases. The amounts above will apply from 1 July 2015 to 30 June 2016.
- There may also be other fees under the Utilities Act. This Act is administered by Construction Services.

The licence holder will be required to report monthly metered water usage data to the Environment Protection Authority.

Please contact me if you require any further information.

Kind regards,

**Sara McIntyre** | Environment Protection Officer

Phone: 02 6207 2144 | Fax: 02 6207 6084 | email: [sara.mcintyre@act.gov.au](mailto:sara.mcintyre@act.gov.au)

Environment Protection and Water Regulation | Access Canberra | ACT Government

Level 2 North, Dame Pattie Menzies House | 16 Challis Street Dickson | GPO BOX 158 | CANBERRA ACT 2601 |

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-----Original Message-----

From: Bennett, JamesP

Sent: Monday, 4 May 2015 4:34 PM

To: Chesham, Ronald

Cc: Fran Liao

Subject: Tharwa Water Extraction Fees and Charges

Hi Ron

Please see the email below from Fran Liao from Calibre Consulting.

If you could please provide answers to her three questions or direct me where to go, that would be great.

Thanks

James

-----Original Message-----

From: Fran Liao [<mailto:Fran.Liao@calibreconsulting.co>]

Sent: Monday, 4 May 2015 12:25 PM

To: Bennett, JamesP

Subject: RE: C12176.1 Tharwa Non Potable Water Supply Options Draft Report - JB comments (A10622122)

Hi James,

Can you please ask the Water Regulator to provide information on the following?

1. All fees associated with Water Extraction from Murrumbidgee River and groundwater bore.
2. Non potable water charges to residents (if there is any standard charges recommended by ACT Government).
3. Any reporting procedures required for extracting water from river and groundwater.

Thanks,

Fran Liao | Engineer - Urban Development Calibre Consulting (ACT) Pty Ltd

t. 02 6211 7100 | f. 02 6211 7199

e. [Fran.Liao@calibreconsulting.co](mailto:Fran.Liao@calibreconsulting.co)

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## Fran Liao

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**From:** Bennett, JamesP <JamesP.Bennett@act.gov.au>  
**Sent:** Wednesday, 6 May 2015 10:20 AM  
**To:** Fran Liao  
**Subject:** FW: RE: Tharwa Water Extraction Fees and Charges

Hi Fran

Please see the email from Jennie Gilles below.

The Utilities Regulation fee for the Inner North Reticulation Network is budgeted for about \$2,000, although the fee is not finalised yet. The inner north network uses about twice as much water as the proposed Tharwa network, so we can assume that the Tharwa fee will be less than this.

TAMS operate the inner north network under an exemption, but are still required to pay the fee above as a non-licensed utility as per Jennie's first sentence.

Hope this helps  
James

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**From:** Gilles, Jennie  
**Sent:** Tuesday, 5 May 2015 6:13 PM  
**To:** Bennett, JamesP  
**Subject:** RE: RE: Tharwa Water Extraction Fees and Charges

Hi James

Utilities Technical Regulation (EPD/ACCESS) is able to charge non-licensed utilities a fee for regulation under the *Utilities Act 2000*. Part 5 was recently amended.

My understanding is that the fees are related to the volume of water supplied. Utilities Regulation hasn't yet calculated a fee for the Inner North Reticulation Network. Suggest you speak with Sachie Terasaki (x 7 0446) who can let you know the details. **Budget for approx \$2000.**

If your question relates to the price of the water (charged by TAMS) it is \$3.32/kilolitre plus the Water Abstraction Charge at \$0.26 = \$3.58/kilolitre. This price was recommended by the Independent Competition and Regulatory Commission and approved by Cabinet for a five-year trial period.

Cheers

Jennie

Jennifer Gilles

Manager, Urban Waterways Program

**Phone 02 6207 2141** | Mobile [REDACTED]

**Environment Division** | Environment and Planning Directorate | **ACT Government**

Dame Pattie Menzies House, Challis Street, Dickson | GPO Box 158 Canberra ACT 2601 | [www.environment.act.gov.au](http://www.environment.act.gov.au)

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**From:** Bennett, JamesP  
**Sent:** Tuesday, 5 May 2015 4:43 PM  
**To:** Gilles, Jennie  
**Subject:** FW: RE: Tharwa Water Extraction Fees and Charges

Hi Jennie

I am chasing up some info for Fran on fee/charges for water distribution licences under the Utilities ACT. I've found the ICON charges of approx. \$796,000 but was wondering if there was something more comparable for the Tharwa scenario. If TAMS were to own/operate the pump, would they be charged a licence fee or would they be given an exemption?

How does it work for the North Canberra Stormwater Reticulation project?

Please see email chain below for background.

Thanks for your help  
James

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**From:** Fran Liao [<mailto:Fran.Liao@calibreconsulting.co>]  
**Sent:** Tuesday, 5 May 2015 4:08 PM  
**To:** Bennett, JamesP  
**Subject:** RE: RE: Tharwa Water Extraction Fees and Charges

Hi James,

I cannot find any information on the fee/charges for water distribution licence under Utilities ACT. It refers to ICRC charges, which only specifies charges for ICON Water.

Regards,



**Fran Liao**  
Engineer - Urban Development

**Calibre Consulting (ACT) Pty Ltd**  
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## **APPENDIX C WATER DEMAND AND EXTRACTION CALCULATION**

This spread sheet is an online tool for individuals, designers and developers to gauge possible methods of reducing mains water consumption on detached dwellings. Please enter ALL the relevant information for your dwelling before using the reduction percentage.

**Percentage Reduction = 58%**

<b>4</b>	
Number of bedrooms in the house	<b>4</b>
What is the water rating of the shower head?	3 Star ▼
What is the water rating of the clothes washing machine?	3 Star ▼
What is the water rating of the dishwasher?	3 Star ▼
What is the water rating of the toilet?	3 Star ▼

Please enter ALL your household information

A minimum rating of 3 Star is now required in the ACT on all water fittings.

If no dishwasher is installed, then use the 3 Star rating.

<b>Site information</b>	
Site area (m <sup>2</sup> )?	<b>2100</b>
Roof area (including house and garage or carport) (m <sup>2</sup> )?	<b>420</b>

<b>Rain water tank information</b>	
Is there going to be a water tank installed?	Yes ▼
What is the size of the tank (L)?	<b>75000</b>
What is the approx. roof area flowing into the tank (m <sup>2</sup> )?	<b>420</b>
What will be the use for the water in the tank?	Garden, Toilet and Laundry ▼

<b>Grey Water information</b>	
What type of grey water system is installed?	None ▼
What is the size of the grey water storage tank (L)?	<b>0</b>
Where will the grey water be collected from?	▼
What will be the use for the grey water?	▼

<b>Pool, Spa or Pond information</b>	
Is there going to be a pool, spa, or pond?	No ▼
Is there going to be a cover on the pool or spa?	No ▼
Average depth of the pool, spa or pond (m)?	<b>0</b>
Average length of the pool, spa or pond (m)?	<b>0</b>
Average width of the pool, spa or pond (m)?	<b>0</b>
The volume of the pool, spa or pond is (L)	<b>0</b>

Potable water usage with reductions (L/day)      Pre 2003 potable water usage (L/day)

Total water use (L/day)	564	1344
-------------------------	-----	------

111	188
60	122
38	56
123	123

Total indoor water use (L/day)	332	490
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Minimum Private Open Space = ( 60% of block area - 50m <sup>2</sup> )	560	560
	294	294

Total Outdoor water use (L/day)	854	854
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Tank and grey water use (L/day)	622	
---------------------------------	-----	--

Pool and Spa water usage (L/day)	0	0
----------------------------------	---	---

Option 1 - Structural Fire	Demand Based on Uriarra Village Ass
Types	Total Demand (L/lot)
House Sprinkler for 1 hr flow at 4L/s	14,400
Fire Fighting for 4hrs at 25L/s (Type F6)	360,000
Total	374,400
Total (kL)	374.4
<b>Rounded (kL)</b>	<b>380</b>

Option 2 - Residential Non-Potable	Existing (Based on Uriarra Village Demand)			Existing + Growth (Based on Uriarra Village Demand)		
Types	No. of Dwellings/Buildings	Static Demand (L/lot)	Total Demand (L/lot)	No. of Dwellings/Buildings	Static Demand (L/lot)	Total Demand (L/lot)
Residential* (Village)	14	600	8,400	19	600	11,400
Residential** (Naas Road)	11	600	6,600	15	600	9,000
Pre & Primary School	2	600	1,200	2	600	1,200
Community facilities	17	600	10,200	17	600	10,200
Total			26,400			31,800
Total (kL)			26.4			31.8
<b>Rounded (kL)</b>			<b>27</b>			<b>32</b>

\* block size 1000-2500m<sup>2</sup>, 20kL Rainwater Tank for each block

\*\* block size 2200-5300m<sup>2</sup>, 20kL Rainwater Tank for each block

Option 3 - Residential Non-Potable +Fire	Existing (Based on Uriarra Village Demand)	Existing + Growth (Based on Uriarra Village Demand)
Types		
Residential	15,000	20,400
Pre & Primary School	6,600	9,000
Community facilities	1,200	1,200
House Sprinkler for 1 hr flow at 4L/s	14,400	14,400
Fire Fighting for 4hrs at 25L/s (Type F6)	360,000	360,000
Total	397,200	405,000
Total (kL)	397.2	405
<b>Rounded (kL)</b>	<b>400</b>	<b>405</b>

Drought Year 1982				
Month	Av. Flow (ML)	No. of Day from River	Volume from River (ML)	Volume from Bore (ML)
Jan	133.9	21	0.7	0.3
Feb	22.9	0	0.0	0.9
Mar	63.8	12	0.4	0.6
Apr	65.9	9	0.3	0.7
May	35.3	0	0.0	1.0
Jun	62.0	12	0.4	0.6
Jul	68.8	12	0.4	0.6
Aug	62.5	8	0.3	0.7
Sep	29.6	0	0.0	1.0
Oct	44.9	7	0.2	0.8
Nov	5.7	0	0.0	1.0
Dec	11.2	0	0.0	1.0
<b>TOTAL</b>			<b>3</b>	<b>9</b>
Median 2013				
Month	Av. Flow (ML)	No. of Day from River	Volume from River (ML)	Volume from Bore (ML)
Jan	217.2	31	1	0
Feb	288.7	28	1	0
Mar	302.9	31	1	0
Apr	107.4	30	1	0
May	140.6	31	1	0
Jun	823.5	30	1	0
Jul	612.2	31	1	0
Aug	618.4	31	1	0
Sep	2325.6	30	1	0
Oct	642.2	31	1	0
Nov	680.3	30	1	0
Dec	217.8	31	1	0
<b>TOTAL</b>			<b>12</b>	<b>0</b>
Wet Year 1978				
Month	Av. Flow (ML)	No. of Day from River	Volume from River (ML)	Volume from Bore (ML)
Jan	106.3	17	0.5	0.4
Feb	116.1	11	0.4	0.5
Mar	4864.2	14	0.4	0.5
Apr	1864.2	30	1.0	0.0
May	2583.7	31	1.0	0.0
Jun	13902.1	30	1.0	0.0
Jul	4677.7	31	1.0	0.0
Aug	1639.4	31	1.0	0.0
Sep	5920.3	30	1.0	0.0
Oct	1678.4	31	1.0	0.0
Nov	1660.4	30	1.0	0.0
Dec	845.7	31	1.0	0.0
<b>TOTAL</b>			<b>10</b>	<b>2</b>

## **Appendix D    RISING MAIN CALCULATION AND PUMP CURVES**