ENVIRONMENTAL ASSESSMENT

Newcastle Gas Storage Facility Project

Major Project Application Number 10-0133

Volume 2: Appendices 1 – 4

May 2011

CR 6023_8_v3

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WorleyParsons
resources & energy

AGL

EcoNomics

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Newcastle Gas Storage Facility Project

Water and Wastewater Servicing Summary

401010-00648 – 401010-00648-WW-REP-002

February 2011

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Appendix 1 Water and Sewer Load Calculations

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Calculation Sheet

Customer: Confidential
Project Number: 401010-00648
Project Title: Proposed Tomago Gas Storage Facility
Calculation Title: Water Demands & Wastewater Load Calculations
Phase: Pre-Feasibility

LOW WATER USE OPTION

Water Demands

	Equivalent Tenements (ET)	Average [1] Annual Demand (kL)	Average [2] [3] Day Demand (kL/day)	Peak Day [4] Factor	Peak Day [3] Demand (kL/day)	Peak Hour [4] Factor	Peak Hour [3] Demand (kL/day)	Extreme [4] Day Factor	Extreme [3] Hour Demand (kL/day)	95th [4] Percentile Factor	95th [3] Percentile Peak Day Demand (kL/day)	95th [3] Percentile Peak Hour Demand (kL/day)
Industrial												
Evaporative Load		3,731.43	24.88	1.20	29.85	1.30	38.81	1.15	34.33	1.14	28.36	36.87
Blow-Down Load		1,178.35	7.86	1.20	9.43	1.30	12.25	1.15	10.84	1.14	8.96	11.64
Amenities [5]	20.00	5,400.00	14.79	2.25	33.29	1.66	55.26	1.15	38.28	1.80	26.63	44.21
Unaccounted Water (15%)		1,546.47	7.13	1.00	7.13	1.00	7.13	1.00	7.13	1.00	7.13	7.13
Totals		**11,856.24**	**54.66**	**5.65**	**79.69**	**5.26**	**113.45**	**4.45**	**90.58**	**5.08**	**71.07**	**99.84**

Wastewater Loads

	Equivalent Tenements (ET)	Average [6] Dry Weather Flow (L/s)	Peak to [6] Average Flow Ratio	Peak Dry [6] Weather Flow (L/s)	Storm [6] Allowance (SA)	Peak Wet [6] Weather Flow (L/s)
Industrial						
Blow-Down Load		0.09	2.00	0.18	0.00	0.18
Amenities [5]	20.00	0.22	4.00	0.88	1.16	2.04
Totals		**0.31**	**6.00**	**1.06**	**1.16**	**2.22**

Notes:

1. Average Annual Demand based on an assumed 150 days plant operation per year.
2. Average Day Demand based on an assumed constant demand of 3.8gpm (evaporative load) and 1.2gpm (blow-down load) for a duration of 24 hours per day.
3. Average Day, Peak Day, Peak Hour, Extreme Day, 95th Percentile Peak Day & 95th Percentile Peak Demands Calculated in accordance with Section 2.2 of the Pre-Publication Draft Hunter Water Edition of the Water Supply Code of Australia.
4. Peak Day, Peak Hour, Extreme Day & 95th Percentile Factors based on Table HW 2.1 of the Pre-Publication Draft Hunter Water Edition of the Water Supply Code of Australia.
5. Amenities demands based on an assumed ongoing administration & operations loading of 20ET
6. Average Dry Weather Flow, Peak to Average Flow Ratio, Peak Dry Weather Flow, Storm Allowance & Peak Wet Weather Flow calculated in accordance with Section 3.2 of the Pre-Publication Draft Hunter Water Edition of the Sewerage Code of Australia.
7. Average Dry Weather Flow based on an assumed constant blow down load of 1.2gpm for a duration of 24 hours per day.

Appendix 2 Correspondence

Hunter Water Corporation
ABN 46 228 513 446
Customer Enquiries 1300 657 657
enquiries@hunterwater.com.au

PO Box 5171
HRMC NSW 2310
36 Honeysuckle Drive
NEWCASTLE NSW 2300

27 May 2010 Ref:2010-236

Tomago Aluminium Pty Ltd
C/- Worley Parsons Services Pty Ltd
PO Box 668
Newcastle NSW 2300

Dear Sir/Madam

RE INDICATIVE REQUIREMENTS FOR PROPOSED DEVELOPMENT
Lot 105 DP 1125747, 5 Old Punt Road , Tomago

Hunter Water has considered your request for our requirements for the provision of water and sewer services to your proposed development.

As the development may be subject to rezoning and approval by Local Council, any information at this point is indicative only and maybe subject to significant change prior to your development proceeding. These indicative requirements are not commitments by Hunter Water. Once zoning has been approved and the decision is made to proceed with the development application you will need to lodge an Application under Section 49 with Hunter Water.

On receipt of the Section 49 Application Hunter Water will forward a **Notice of Formal Requirements**. You will need to comply with each of the requirements for the issue of a Section 50 compliance certificate.

Hunter Water's Indicative Requirements provide general information on water and sewer issues relevant to the proposed development. The information provided is based on Hunter Water's knowledge of its system performance and other potential development in the area at the present time. As you will appreciate there could be significant change by the time the development proceeds to the lodging of a Development Application and therefore these indicative requirements maybe different to the Notice of Formal Requirements provided in the future. Hunter Water's Indicative Requirements for the provision of water and sewerage facilities to land subject to the preliminary enquiry at are as follows:

Water Supply
Three different scenarios for the additional water demand from this development have been assessed.

Low Demand – 12,593 KL/yr

Medium Demand – 38,124 KL/yr

High Demand – 136,210 KL/yr

The RL at the point of connection is approximately 7m.

The proposed development is located in the Newcastle Water Supply System. The development can be serviced from the 150mm PVC-M watermain in Old Punt Road, Tomago. For the Medium and High Water use options, security of supply needs to be considered. An additional 2 connection points are available to the East of the development site and could potential be security of supply connection points. These include the 150mm

DICL watermain in McIntyre Road and the 150mm PVC-M watermain East of Mcintyre Rd. It should be noted that these are currently landlocked by existing developments. Connection to these points would require easements to be acquired. All costs associated with the easement acquisition will be met by the developer.

For this development (estimated to be an additional 20ET), Hunter Water's watermain system has been analysed for three different water use options (High, Medium and low). The results indicate that there is sufficient capacity to supply the development under Peak Day Demands to meet the 20m minimum pressure requirement and the additional Fire Fighting demands to meet the 15m minimum requirement from the 150mm PVC-M watermain for all three water use options. Any required extension of mains would be done under a major works contract arrangement with Hunter Water at the developer's cost.

Depending on connection points to Hunter Water's watermain system, there may be a requirement to pay a reimbursement to the developer who has previously laid watermains which may service the proposed development.

Sewer
The proposed development is currently remote from any reticulated wastewater services. The Connection point for this development is Raymond Terrace WWTW .To service this development a pumping station and rising main to Raymond Terrace WWTW will be required. The developer needs to prepare a combined servicing strategy in conjunction with other developers in the Tomago area to connect to Raymond Terrace WWTW.

Wastewater Treatment
The nearest wastewater treatment facility is Raymond Terrace WWTW. Raymond Terrace WWTW has sufficient capacity to cater for the proposed development

Review of Evironmental Factors
Prior to providing final approval of designs (*if required*), Hunter Water may require a Review of Environmental Factors (REF) to be submitted (refer Section 1 of Hunter Water's Water and Sewer Design Manual). A REF considers the likely impacts a development may have on the environment. At all times, methods for preventing or reducing adverse environmental impacts should be considered and where appropriate, incorporated into the project design. Hunter Water, where appropriate, may make a determination in accordance with the EP& A Act 1979.

Special Areas
The site is within special areas as defined in Hunter Water Special Areas.

The following are Hunter Water's initial comments:

1. The site is in close proximity (approx 350m) to Hunter Water's drinking water extraction bores;
2. The groundwater flow in this area is complex. Hunter Water has looked at a few groundwater maps of this area and they do not all agree. I would suggest that there may be insufficient piezometers in this area to accurately determine the direction of groundwater flow beneath the proposed development.
3. There would be a requirement to demonstrate that there would be no effect on the aquifer (from human waste, stormwater runoff, emissions) at this site.

General

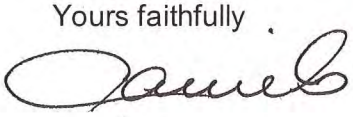
It is a requirement of Hunter Water that application for a Section 50 "Notice of Requirements" be made for specific development proposals. Hunter Water would then formally assess the development, determine system capacity and nominate actual connection points to water and sewer. The Notice of Requirements would also nominate a number of actions to be completed by the developer. Completion of all actions in the Notice of Requirements triggers release of the Section 50 Compliance Certificate for the development.

The completion of Hunter Water's requirements (usually works and payment of fees) is best achieved prior to issue of Subdivision Certificate by Council or private certifier for other associated construction works. To this end Hunter Water requests that Council continue to include appropriate wording in its development consent conditions to reflect our needs.

Our Sales and Business Development team is available at short notice to discuss with the Department or the development community their water and sewer servicing needs and I would encourage open communication between all stakeholders.

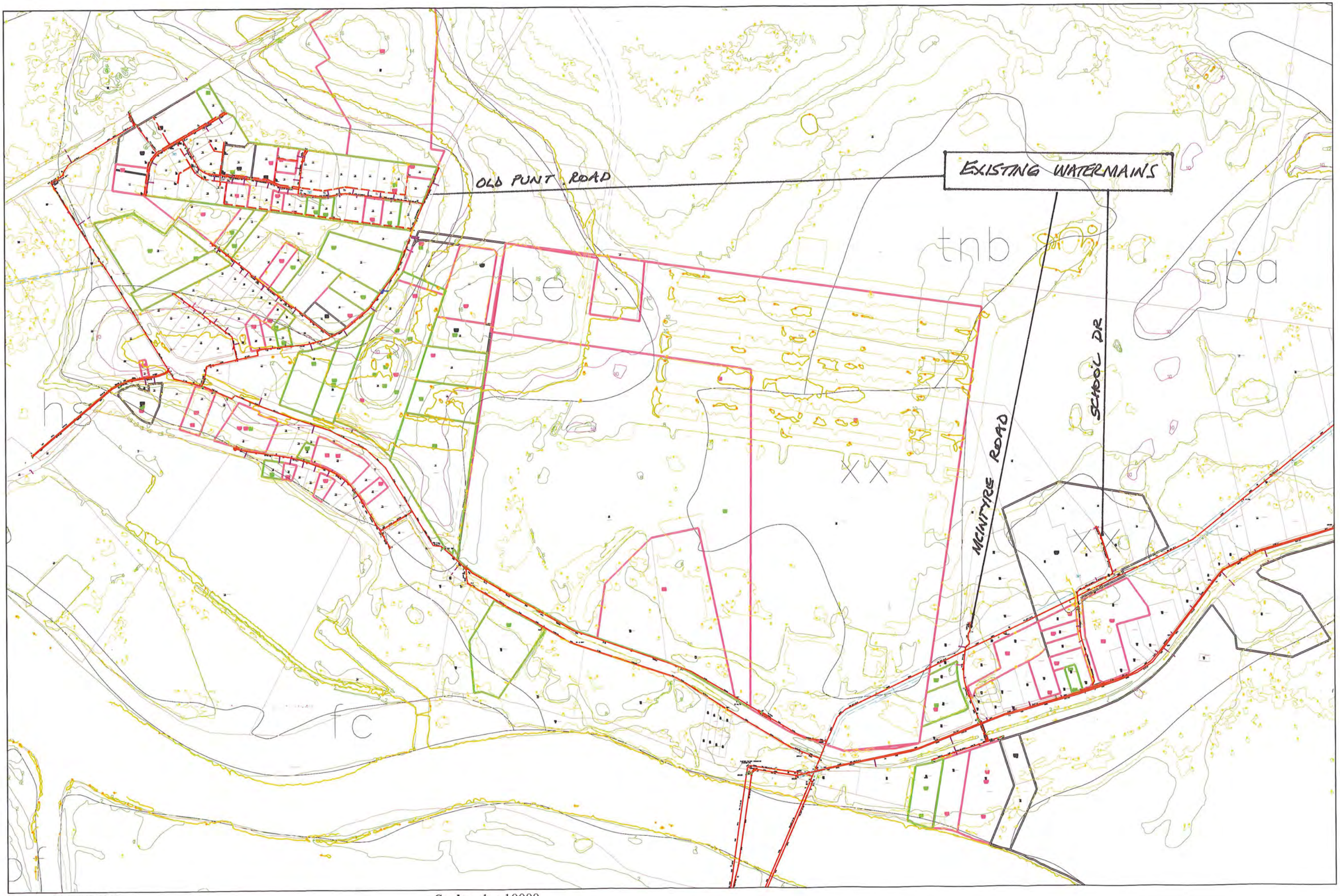
Should you require further clarification or assistance please contact the enquiries officer listed below. These indicative requirements are not commitments by Hunter Water and maybe subject to significant change prior to this development proceeding.

Yours faithfully



Belinda Jones
Manager Business Operations

Enquiries:	Robert Daniels
Tel:	1300 657 657
Fax:	(02) 4979-9971



Date: 31/05/2010 **Scale:** 1 : 10000

Notes: Tomago

HUNTER WATER DOES NOT GUARANTEE THE ACCURACY OF THIS PLAN

Hunter Water Corporation
ABN 46 228 513 446
Customer Enquiries 1300 657 657
enquiries@hunterwater.com.au

PO Box 5171
HRMC NSW 2310
36 Honeysuckle Drive
NEWCASTLE NSW 2300

29 September 2010 Ref:2010-236

Worley Parsons Pty Limited
PO Box 668
Newcastle NSW 2300

Attention: Kate Beard

Dear Kate,

RE: HYDROSTATIC TEST - AGL LNG FACILITY TOMAGO

Thank you for your request for advice with regards to Hydrostatic testing of the steel tanks at the AGL LNG gas facility Tomago.

From a purely technical perspective, Hunter Water could supply raw water at a flow rate of up to 10ML/day from the combined pumping effort of Stations 2 and 20 (including allowance for some bores to be down for maintenance) at a maximum head of around 35mAHD at the nearest possible off take location from the Hunter Water pipe system (around 30m pressure). While the bore pumps could, in theory, push to more than 35m AHD, there would be significant operational risks associated with operating at this pressure. The nearest possible off take location to the AGL site would be at the location shown on the attached Google earth link.

In order to achieve sufficient pressure to part-fill the tank, Hunter Water would need to valve off a section of the bore field such that water would be delivered direct from the bore pumps via the isolated section of pipe work to the tank. Hunter Water is concerned that pressurising an isolated section of pipe work could end up putting more pressure on the pipe work than usual, especially if something went wrong. If, for example, a valve is shut between the bores and the tank without first turning off all the pumps then something would almost certainly break, be it a bore or the pipe work. While the pipes were originally designed to take substantially more pressure than AGL needs, the fact that it has never been operated at that pressure means that weaknesses due to aging could come to light that Hunter Water is not aware of. It is a common problem for Hunter Water when there is an increase in supply pressure to parts of the water reticulation network.

Given these risks Hunter Water is not convinced that it is a good idea to offer raw water supply for filling the tank. It would be a significant logistical exercise for Hunter Water to supply the water and it is unlikely that the value of water supplied would warrant the effort and risk exposure for the organisation.

When it comes to emptying the tank, Hunter Water advises that AGL would need to obtain the necessary approvals from DECCW (EPA and/or NOW) to discharge into the aquifer. While Hunter Water does not identify a risk to town water supply associated with the discharge of either raw or potable water (provided it has not been contaminated while in the tank) into the sand beds, Hunter Water cannot provide the approval to do so, no matter where the discharge point is located.

If you have any enquiries, please do not hesitate to contact Stephen Glynn on 4979 9525.

Regards,

Stephen Glynn
Account Executive Major Development
stephen.glynn@hunterwater.com.au
Tel: 02 4979 9525
Fax: 02 4979 9711