





# NON-BINDING EXPRESSION OF INTEREST

Expression of interest title	f Clarifier Hood Assembly Rebuild
Number	2021-2022-0522
Date	11 <sup>th</sup> February 2022



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# 1. Request

# 1.1. Invitation

Muswellbrook Shire Council (MSC) invites Non-binding Expression of Interest (EOI) from interested parties for the procurement of <u>Clarifier Hood Assembly.</u>

A more detailed brief of the extent of services required by Council is set out in Scope at section 3.

EOI Closing Time and Lodgement Details			
EOI Closing Date:	4 March 2022		
EOI Closing Time:	4:00 pm		
EOI Lodgement Instructions:	<ol> <li>Via <u>https://www.vendorpanel.com.au/muswellbrook/tenders;</u></li> <li>Hard copy to Tender Box at Muswellbrook Shire Council, 60- 82 Bridge Street, Muswellbrook;</li> <li>Via email to: procurement@muswellbrook.nsw.gov.au.</li> </ol>		
EOI Registration:	Please register your intention to submit a quotation to procurement@muswellbrook.nsw.gov.au.		
EOI Questions:	Via email only to <u>procurement@muswellbrook.nsw.gov.au</u> . Any questions and answers will be emailed to all registered participants.		

If you have any general enquiry, please contact us using the details below.

Council Contact & Enquiries				
Name:	Prapti Shrestha			
Email:	procurement@muswellbrook.nsw.gov.au			



# 2. Non-binding EOI

### 2.1. Submissions and Outcomes

Council reserves the right to use the non-binding Expression of Interest process in a number of different ways to advance the project. This includes, but is not limited to:

- information gathering to inform Council's procurement strategy;
- developing a subsequent open tender or request for proposal;
- dealing directly with one or more respondents; and
- inviting one or more respondents to further develop their submission into a selective request for tender or request for proposal.

It is important to note that, although this is a non-binding Expression of Interest process, submissions should contain sufficient detail and evidence that enables the assessment panel to make an informed decision that may lead to a select tender or request for proposal process with one or more respondents

### 2.2. Terms and Conditions

Interested parties who have not submitted a non-binding EOI may be ineligible to participate in any subsequent process. Muswellbrook Shire Council unconditionally reserves the right to selectively negotiate with a shortlist of respondents, to recall EOI or to stop the project. Muswellbrook Shire Council is not liable for any expense or loss that may be incurred by a respondent in preparation of its response.

No contract shall exist until Muswellbrook Shire Council and the respondent have executed a deed in writing that incorporates the outcomes of subsequent negotiations and agreed terms (if at all).

Muswellbrook Shire Council may seek clarification from a respondent to this EOI request. Any discussions entered into with a respondent by Muswellbrook Shire Council will be at Muswellbrook Shire Council's sole discretion and purpose.

Muswellbrook Shire Council unconditionally reserves the right to accept or reject any submission regardless of compliance or non-compliance with the conditions of this EOI.

Muswellbrook Shire Council reserves the right not to enter into a commercial arrangement.

### 2.3. Lodging of Non-binding EOI submissions

Applicants are encouraged to lodge applications through the Vendorpanel platform at: <u>https://www.vendorpanel.com.au/muswellbrook/tenders;</u>

Applications may also be lodged in the physical tender box at:



Muswellbrook Shire Council 60-82 Bridge Street Muswellbrook NSW 2333

And clearly marked "2021-2022- 0512"

Or

Via email to: procurement@muswellbrook.nsw.gov.au

# 4. Non-binding EOI

Each EOI respondent is required to provide us details of design and fabrication as listed out in the scope of work in section 3.3. and 3.4. Additional information may be sought by MSC to assist in understanding or clarifying the submission.

Submissions shall be lodged in accordance with these requirements by no later than 4:00pm, Friday, 4 March, 2022. Submissions received after the specified date may not be considered.

All potential respondents are requested to register their intention to respond via email to <u>procurement@muswellbrook.nsw.gov.au</u>.

Please direct all questions via email to <u>procurement@muswellbrook.nsw.gov.au</u>. Questions and responses will be emailed to all registered parties.



# 3. Scope

# 3.1. Background information

Muswellbrook Shire Council is located approximately 170km north-west of Sydney and covers an area of 3,400 square kilometres. Muswellbrook Shire is at the centre of the Upper Hunter Valley, situated 1.5 - 2 hours' drive from Newcastle, and 3 hours from Sydney. Council employs approximately 200 employees and provides a professional, deliberately diverse and expanding work environment. The Shire has a population in the order of 17,000 residents. Muswellbrook Shire was established on 1 July 1879 from the amalgamation of the Municipality of Muswellbrook with the adjacent Denman Shire.

Muswellbrook Shire Council intends to replace the clarifier hood Assembly with suitable design and material. The Water Treatment Plant was established in 1975 and had undergone various modification, resulted which whole structural integrity is compromised.

## 3.2. Project Details

The purpose of the project is to design, supply and install the clarifier assembly along with designing suitable foundation. Condition assessment report is attached for review.

## 3.3. Project Objectives

The following are the design constraints.

- a. Use of suitable material with metallurgy conformant with the chemicals used for water treatment.
- b. Concrete infrastructure in place must be integrated in the design
- c. Suitable foundations to hold the live and dead load
- d. Improve launder cleaning
- e. Improve options to clean under the Clarifier Hood.

### 3.4. Project Scope

Council requires the following services to be undertaken:

- a) <u>Design</u>
  - i. Survey and investigation required for preliminary design report
  - ii. Preliminary design options with analysis
  - iii. Preliminary cost estimate of each option
  - iv. Provide revisions as necessary
  - v. Design and consultation meeting with MSC staff
  - vi. Any number of site visit required.
  - vii. Final design after approval of the council
  - viii. Constructability review
  - ix. Design life minimum of 20 years.
  - x. safety in design register(SiD)



- i. Preliminaries
- ii. Fabrication off-site and supply on-site
- iii. Installation
- iv. Commissioning and third-party verification
- v. Warranties
- vi. Defect liability
- c) Close out and hand over
  - i. Provision of detailed manuals and drawings (both construction and as built)
  - ii. Necessary as built survey.
  - iii. Safety and operating procedures
  - iv. Training onsite to the council operators
  - v. Complete handover documents

### 3.5. Evaluation Criteria

Quotations will be assessed according to the following criteria:

- Price
- Experience and Capability
- Compliance to the scope of work

## 3.6. Contract type and term

This is a Lump Sum Quotation, exclusive of GST, NOT subject to "Rise and Fall", is required for the carrying out of the works described in the Specifications and shown on the drawings.



# 4. Information to be submitted in Proposal

## 4.1. Lump Sum

A price to complete the work necessary to satisfy the Project Scope as outlined in the Brief. A price schedule showing proposed team members, rates and hours allocated to the project.

# 4.2. A summary of relevant qualifications, experience, and capacity

The summary should include examples of completed projects which demonstrate appropriate experience, expertise, and capacity to undertake the project within the required timeframe and provide two referees for related work undertaken.

### 4.3. Response to the scope of work in 3.3 and 3.4

Please provide design and constraints to the scope of works in section 3.3 and 3.4

# 1. Response form

RESPONDENT INFORMATION				
Name/Trading Name				
Registered Name				
ABN				
Address of Registered Office				
Name of Contact person				
Position /Title				
Address				
Email				
Telephone No				

### **5.1. CONDITIONS OF OFFER**

Please provide details if your Expression of Interest is conditional or subject to further requirements from Council



# 5.2. SIGNED FOR AND ON BEHALF OF THE RESPONDENT

I warrant that in submitting this response, I have read and accept the conditions of the EOI.

Authorised Person Name	
Position	
Address	
Email	
Telephone No	
Signature of the Authorised Person	

# 5. Appendix

### Current site information.

Location: Water Treatment Plant, Scott Street Muswellbrook.

**Project Location** 

















# Muswellbrook WTW Clarifier Hood

**Muswellbrook Shire Council** 

4 November 2021

→ The Power of Commitment



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Status	Revision	Author	Reviewer		Approved for issue		
Code			Name	Signature	Name	Signature	Date
S3	А	R Tucker	A Munoz		N Malcolm		04/11/2021

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- Appendix B As-built information
- Appendix C LASER scan data

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# 1. Introduction

The existing clarifier at Muswellbrook Water Treatment Plant (MWTP) was constructed in the mid 1970s, and was significantly modified in 1991, and again around 2016.

The clarifier incorporates a conical steel hood which encloses the internal flocculation contact zone.

The conical hood has partially collapsed which impairs the effectiveness of the plant and is likely to collapse further over time.

Muswellbrook Shire Council (MSC) wish to procure a replacement for the lower hood in order to improve treatment effectiveness and prevent further deterioration.

MSC engaged GHD to produce an engineering drawing of the Clarifier lower hood to enable procurement of a 'like-for like' replacement. This is reflected in the purchase order PO491456 of 19 November 2020.

GHD were engaged to inspect as-built drawings, and make site measurements in order to obtain the spatial requirements to produce the engineering drawing, however no dismantling of the structure or structural design was included in the scope.

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# 2. Assumptions

The following assumptions were adopted by GHD in delivery of this project:

- GHD will deliver engineering drawings of the subject components, which a fabricator can use to develop factory or shop drawings. GHD does not offer factory or shop drawings.
- GHD will specify dimensions for the subject component based on measurements of the existing components on site. Dimensions are of an accuracy commensurate with the measurement method and condition of the component. This is typically +/- 5 mm for easy to measure items, and +/- 10 mm where components are misshapen or coated with residue or otherwise difficult to measure accurately.
- No disassembly of components was undertaken, and so some internal components could not be fully
  measured on site. For such components, as-built drawings were used to estimate dimensions, and the
  resulting uncertainty noted on the Drawings. (noted that the clarifier has been modified several times over its
  life, and so, as-built dimensions may no longer be accurate).
- No structural analysis or design was undertaken. The hood components are specified on the Drawings with the same (or similar) metal thickness, foot supports, and component arrangement as the observed and estimated from the existing hood. We assume the hood is fabricated from stainless steel with a mixture of welded and bolted connections.
- Condition assessment of the existing hood components was not included in the scope, however this report includes comments based on visual observations.

# 3. Purpose of this Report

This report documents the methodology used by GHD to develop the engineering Drawing provided in Appendix A. It also describes the issues encountered in developing the Drawing, and the strategy adopted by GHD to address these issues.

# 3.1 Scope and limitations

This report has been prepared by GHD for Muswellbrook Shire Council and may only be used and relied on by Muswellbrook Shire Council for the purpose agreed between GHD and Muswellbrook Shire Council as set out in this report.

GHD otherwise disclaims responsibility to any person other than Muswellbrook Shire Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this Report are based on conditions encountered and information reviewed at the date of preparation of the Report. GHD has no responsibility or obligation to update this Report to account for events or changes occurring subsequent to the date that the Report was prepared. Specifically, this Report does not take into account the effects, implications and consequences of or responses to COVID-19, which is a highly dynamic situation and rapidly changing. These effects, implications, consequences of and responses to COVID-19 may have a material effect on the opinions, conclusions, recommendations, assumptions, qualifications and limitations in this Report, and the entire Report must be re-examined and revisited in light of COVID-19. Where this Report is relied on or used without obtaining this further advice from GHD, to the maximum extent permitted by law, GHD disclaims all liability and responsibility to any person in connection with, arising from or in respect of this Report whether such liability arises in contract, tort (including negligence) or under statute.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

# 3.2 Clarifier hood arrangement

The clarifier conical hood generally comprises an upper part, which incorporates the upper hood cone, launders, baffles, walkways and mechanical equipment, and a lower hood cone, which supports the upper part via five 'feet' bolted to concrete pads in the clarifier walls.

The lower conical hood is divided radially into equal 5 segments which are bolted to each other at the edges via flanges. Each segment has a support 'foot' which bears on a concrete pad and is bolted to it with a single threaded rod/anchor. One of the lower hood segments houses an access port with a removable flange to provide maintenance access to the internal clarifier space.

# 3.3 Documentation provided by MSC

In order to understand the context of the clarifier component arrangement, GHD inspected as-built drawings and clarifier related documents provided by MSC, including those noted below:

Copies of key Drawings are included in Appendix B and noted in Table 3.1.

#### Table 3.1 Key Drawings and documentation provided by MSC

Number	Description
1	Original (pre-modification) clarifier sketch, with high mounted impeller. 4915-001
2	Clarifier modification Drawing, change from high mounted impeller to low level impeller. drawing number and date not legible
3	Gutteridge Haskins & Davey 'Preliminary' drawings for clarifier modification from low-mounted impeller, to high mounted impeller (similar to original Infilco Accellator intent): 82186-2 and 82186-15 dated 1984.
4	Extracts from D&C Specification (GHD) 2016 including sketches of the previous clarifier hood, and proposed modified hood. Also an extract from Infilco Degrement Accellator clarifier/separator catalogue.

# 4. Site Inspection and measurements

A GHD engineer attended MWTP site on 2 December 2020 to collect data and take site measurements of the clarifier hood. MSC had the clarifier emptied to facilitate this work. The GHD engineer did not enter the clarifier confined space due to WHS considerations, however MSC provided operatives to take measurements by hand as directed by GHD, and take photos inside the clarifier hood.

#### **Observations:**

- The clarified hood upper cone appears to be mostly undamaged and in working order.
- The clarifier hood lower cone shows evidence of partial structural failure including apparent bending / contortion of the lower hood, movement of some support feet despite these being bolted to the concrete pads, implying that some of the hold-down bolts have sheared off. Refer Figure 4.1.



Figure 4.1 Site photos showing partial structural collapse of the lower hood.

 Part of the lower hood appears to have moved horizontally relative to the upper hood as witnessed by an observed 'step' between the two components at one location. Refer Figure 4.2.

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Figure 4.2 Site photos showing step between lower and upper hood

- From inside the hood, over-head was observed a horizontal disc which incorporates 10 vertical deflector fins. The disc is heavily coated with lime, and the holes and fixings to the upper structures appear to have rustedout, and all the fixings are gone. The disc appears to be made from 5 segments, connected together at the edges with bolted flanges.
- It is not clear how this disc component is supported (as all the edge fixings are missing) and the As-built drawings do not show this detail clearly. (Refer Figure 6.1). However, we consider two options are likely:
  - The disc appears to be supported at its perimeter by an edge flange, which can be seen through the gap between the disc and the hood. This flange may bear on the top flange of the lower hood cone. Since the lower cone has shifted horizontally relative to the upper cone, this support is likely compromised and may deteriorate further.
  - The disc also appears to be attached to a vertical cylinder above, which in turn is supported by the upper hood cone. Again, the As-built drawings do not show this detail clearly.



Figure 4.3 Horizontal disc with baffle/deflector plates

# 5. Laser Scan

During the site inspection the measurement of most dimensions of the clarifier hood cone(s) were able to be made accurately by tape measure. However, some measurements were found to be difficult to record due to access and height considerations. These dimensions included the exact height and diameter of the junction of the upper and lower hood cones which is several metres above the floor of the clarifier and could not be reached safely without specialised access equipment which was not available. These measurements were estimated as best as could be achieved safely, however it was considered that a better measurement was required to obtain the required accuracy.

As a result, Monteath & Powys conducted a 3D LASER scan of the insider of the Clarifier (outside the hood) on 13 Jan 2021, from which they produced a 3D point cloud model. Monteath & Powys were requested to interrogate the model to extract particular dimensions.

The 3D model was provided to MSC in digital format, however Monteath & Powys also provided a pdf summary drawing and sketches in response to specific dimensional questions. The pdf deliverables are attached in Appendix B.

The GHD Clarifier hood Drawing is based on the dimensions indicated by the LASER 3D scan model, which have also been 'reality' checked against the site tape measurements.

#### Key results:

In response to the requested data on the exact height and diameter of the junction between the upper and lower hood components, the LASER scan indicates the following:

	Diameter top of lower hood cone	Height top of concrete footing to top of lower hood cone	Height bottom of steel foot to top of lower hood cone
Site tape measured		2.684 mm	
LASER scan	5,790 (+/- 10mm)	2.705 (+/- 5 mm)	2,695 (=/- 5mm)

Table 5.1Measurement comparisons

# 6. Horizontal disc component

As discussed in Section 4, the clarifier hood appears to be broadly divided into the lower hood cone (which has failed structurally) and the upper hood cone (which is largely undamaged) which incorporated the launders, baffles and machinery supports.

An additional component was observed which we nominate as horizontal disc component, located inside the hood at the junction of the lower and upper hood. Refer Figure 4.3, and Figure 6.1.

The disc incorporates vertical deflector fins and has a large hole in the centre 2470 mm dia in the centre (dimension taken from an old sketch provided by MSC).



Figure 6.1 Drawing extract showing circular horizontal disc component with deflector fins

It was not possible to inspect this horizontal disc from above, however an old photo (presumably taken prior to the 2016 modifications) partially shows the horizontal disc and a vertical cylindrical baffle component as they were at that time when the upper rotor was not fitted. The photo shows the circular hole in the centre. Refer Figure 6.2.



Figure 6.2 Pre 2016 photo showing clarifier internal components

In an email from Graham Chevis 09-02-2021 he advised the following:

"I have just been out having a look at the clarifier while it was not running. I just realised that the hood, launder channel and lime mixing zone separator are fabricated as one section (see pictures attached) if you look at the flanges lined up and the way the radial connections in between run. Makes it a larger job but doesn't really change the scope, just means we will have to replace more and reuse less unless we cut and weld or bolt the old sections onto the new hood."

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# 7. Conclusion

The engineering Drawings in Appendix A reflect the findings of our investigations, and can be used to source a new lower hood cone.

We note that some aspects of the internal features of the hood could not be observed or measured and remain uncertain. These aspects are noted on the Drawings.

The subject of uncertainty is mainly the details of the horizontal disc with deflector fins between the upper and lower hood cones, and how it connects to other components. We recommend that further investigation of these internal features be undertaken at the dis-assembly stage to measure dimensions, confirm arrangement details and potentially adjust the lower hood cone Drawings and fabrication details to suit.

For the purposes of this investigation, we assume that the horizontal disc component (with deflector fins) is not part of the lower cone hood, and therefore details of a replacement disc is not included in the Drawings. This approach assumes that the old disc can be re-installed in the new hood, however MSC may wish to consider procuring a new disc with deflector fins, but this is beyond the scope of the engagement.

# Appendices

# Appendix A Drawings



EXISTING UPPER CLARIFIER HOOD AND EQUIPMENT ABOVE TO BE RE-USED AFTER LOWER HOOD REPLACEMENT.

- LOWER CLARIFIER HOOD TO BE REPLACED REFER TO DRAWINGS W002 AND W003

- 5 x CONCRETE PADS EACH 300 X 250 WITH SINGLE DN25 BOLT ON PCD 10.211 M

LOWER CLARIFIER HOOD TO BE REPLACED REFER TO DRAWING W002 FOR

NB: ALL DIMENSIONS TO BE CONFIRMED ON SITE **REFER NOTE 4** 





SCALE 1 : 20

# CLARIFIER NTS



GHI GHD Tower, Level 3 24 Honeysuckle Drive Newcastle NSW 2300 Australia PO Box 5403 Hunter Rgn Mail Cent. NSW 2310 **T** 61 2 4979 9999 **F** 61 2 4979 9988 E ntlmail@ghd.com W www.ghd.com

# NOTES:

- THE LOWER HOOD TO BE REPLACED COMPRISES 5 SUB-COMPONENTS: 1. (EXCLUDING FIXINGS)
- 4x IDENTICAL LOWER HOOD CONE SEGMENTS, NUMBERED 1 4 ON W001. 1x LOWER HOOD CONE SEGMENT INCORPORATING THE ACCESS HATCH
- AND 2-PART COVER, NUMBERED 5. ON W001 AND W002.
- 2x SLUDGE WELL COVER PLATES.
- CONTRACTOR TO REMOVE ALL COMPONENTS ABOVE LINE OF SEPARATION 2. TO GAIN ACCESS TO FAILED LOWER HOOD. ONCE REMOVED INSTALLATION OF NEW LOWER HOOD SEGMENTS CAN BE COMPLETED BEFORE RE-INSTALLATION OF COMPONENTS ABOVE THE LINE OF SEPARATION.
- NUMBERED LOWER CLARIFIER HOOD SEGMENTS ON W001 REFER TO THE 3. SEQUENCE FOR EASE OF INSTALLATION AROUND EXISTING CONCRETE WING WALLS THAT HOUSE THE SLUDGE WELLS AND INDICATE THE TYPE OF SEGMENTS AS PER NOTE 1.
- SOME INTERNAL DIMENSIONS AND COMPONENT ARRANGEMENTS WERE 4. NOT ABLE TO BE INSPECTED OR MEASURED DUE TO ACCESS CONSTRAINTS. THESE DETAILS ARE ILLUSTRATED BASED ON AVAILABLE INFORMATION WHICH MAY BE OBSOLETE, AND SHOULD BE CHECKED PRIOR TO FINAL FABRICATION OF REPLACEMENT COMPONENTS.
- THE INSTALLER SHALL CONSIDER THE POTENTIAL CORROSION EFFECTS OF 5. CONNECTION OF DISSIMILAR METALS AND INCORPORATE ISOLATION OF DISSIMILAR MATERIALS WHERE APPROPRIATE.

# PRELIMINARY

Original Size	Drawing No:	12538287-W001	Rev: B
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Plot Date: 3 November 2021 - 5:03 PM Plotted By: Chris Graham

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2. ALL COMPONENTS FABRICATED FROM STAINLESS STEEL 303 MIN 6mm THK UNO. FIX WITH M16 316SS NUT, BOLTS AND WASHERS.

3. THE INSTALLER SHALL CONSIDER THE POTENTIAL CORROSION EFFECTS OF CONNECTION OF DISSIMILAR METALS AND INCORPORATE ISOLATION OF DISSIMILAR MATERIALS WHERE APPROPRIATE.

SOME INTERNAL DIMENSIONS AND COMPONENT ARRANGEMENTS WERE NOT ABLE TO BE INSPECTED OR MEASURED DUE TO ACCESS CONSTRAINTS. THESE DETAILS ARE ILLUSTRATED BASED ON AVAILABLE INFORMATION WHICH MAY BE OBSOLETE, AND SHOULD BE CHECKED PRIOR TO FINAL FABRICATION OF REPLACEMENT COMPONENTS.



# WELDED JOINT: CONICAL SEGMENT TO VERTICAL SKIRT

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This document may only be used by GHD's client (and any other person who GHD has agreed can use this document)	Approved AMS (Project Director) Date -		Title	ACCESS HATCH SECTION AND DETAILS
for the purpose for which it was prepared and must not be used by any other person or for any other purpose.	Scale AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	Original Size	Drawing No: 12538287-W003 Rev: B

# Appendix B As-built information







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![](_page_34_Picture_4.jpeg)

## **MWTP** Clarifier

Extract from D&C specification

![](_page_35_Figure_2.jpeg)

![](_page_36_Figure_0.jpeg)

Arrangement At Clarifier ~ Muswellbrook Water Works.

![](_page_37_Figure_0.jpeg)

Extract from Infilco Accellator Clarifier separator Catalogue

# Appendix C LASER scan data

![](_page_39_Figure_0.jpeg)

![](_page_39_Figure_1.jpeg)

1. DATE OF S 2. SURVEY IS 3. SURVEY IS	SURVEY 13/01/21 BASED ON AN ASSUMED C BASED ON AN ASSUMED LI	OORDINATE SYSTEM EVEL DATUM			F	PLAN	VIE
05	ълс	PLANNING PROJECT MANAGEMENT SURVEYING 3D SPATIAL	Surveyed	Drafted	Checked	Client	
OF	IVI X7		MR	TP	LT		
		monteathpowys.com.au (bil )50 14001 Leterreral )50 14001 Leterreral )50 14001 Leterreral )50				Title	
HE CLIENT MMISSIONED.	Monteath	P (02) 4926 1388	R	EGISTERED SURVEYO	R		
PURPOSE NAPPROVAL	& Powys	NEWCASTLE PS 559134 EMS 709938 OHS 709944	@A3:	NOT TO SCALE	Original Size		
POWYS PTY LTD.	L	NEWCASTLE SYDNEY GUNNEDAH MUSWELLBROOK	DO NOT	SCALE	A3	CAD File:	200737

IMPORTANT NOTES: 1. ESTIMATED ACCURACY OF SURVEY

#### a. POINT CLOUD +/- 5mm

- b. MODELLED PARTS +/-3mm
- 2. DELIVERABLES INCLUDE; a. THIS PLAN IN PDF FORMAT
  - b. POINT CLOUD IN .LAS, LGS AND RECAP FORMATS
     i. 200737A Point Cloud (0.005).LAS

  - 200737A Point Cloud (0.005).RCP
- III. 200737A Point Cloud (0.005).LGS SURVEY COMPLETED USING LASER SCANNING METHODS.
- 3. SURVEY UNDERTAKEN FROM UPPER WALKWAYS, SOME MOVEMENT AND VIBRATION WAS DETECTED IN THE WALKWAYS. THIS MAY IMPACT ON THE FINAL SURVEY ACCURACY.
- SURVEY UNDERTAKEN FOLLOWING CLEANING OF CLARIFIER. IT IS NOTED THAT A SIGNIFICANT BUILD UP OF FILM/DIRT WAS PRESENT ON ALL NORMALLY SUBMERGED SURFACES. 5.
- 6.
- PRESENT ON ALL NORMALLY SUBMERGED SURFACES. CLARIFIER IS A CONFINED SPACE, ALL SURVEY WORK UNDERTAKEN FROM WALKWAYS ABOVE CONFINED SPACE. SOME DATA SHADOW EXIST DUE TO RESTRICTED ACCESS. LASER SCANNING IS A LINE OF SIGHT TOOL, ANY DIRT, DEBRIS OR OTHER OBSTRUCTIONS ONSITE WILL BE RECORDED IN THE POINT CLOUD AND MAY IMPACT ON THE ACCURACY OF THE FINAL MODEL. DIMENSIONS OR 3D MODELLED COMPONENTS CREATED USING A BEST FIT METHODS, LOCAL DISCREPANCIES AND IRREGULARITIES MAY EXIST. DIMENSIONS OF 3D MODELLED STRUCTURAL PARTS MUST BE CONFIRMED ONSITE PRIOR TO FINAL DESIGN OR CONSTRUCTION. THE DONN'T CONDUCTION SURVEYS DELEMENTS AND MUST BE DEFERENCE DONE TO FINAL DESIGN OR CONSTRUCTION. 4.
- 5.

- DIMENSIONS OF 3D MODELLED STRUCTURAL PARTS MUST BE CONFIRMED ONSITE PRIOR TO FINAL DESIGN OR CONSTRUCTION.
   THE POINT CLOUD IS THE FINAL SURVEY DELIVERABLE AND MUST BE REFERENCED PRIOR TO FINAL DESIGN
   ADDITIONAL MODELLING, DATA EXTRACTION AND CLASH ANALYSIS IS AVAILABLE ON REQUEST.
   THIS PLAN MUST REMAIN UNALTERED AS ISSUED BY MONTEATH AND POWYS. ALTERING ANY PART OF THIS PLAN DESTROYS THE INTEGRITY OF THE PLAN. ANY REVISIONS REQUESTED MUST BE ISSUED BY MONTEATH AND POWYS.
   THESE NOTES FORM AN INTEGRAL PART OF THIS PLAN. REPRODUCTION OF THIS PLAN OR ANY PART OF THIS PLAN WITHOUT THESE NOTES BEING INCLUDED IN FULL WILL RENDER THE INFORMATION SHOWN ON SUCH REPRODUCTION INVALID AND NOT SUITABLE FOR USE.

	No	REVISION	SVY	DFT	СНК	DATE	HAS BEEN OBTAINED FROM MONTEATH & POWYS PTY L
Ť.	1	ISSUE TO CLIENT	MR	TP	LT	19/01/21	USE OF THE DOCUMENT FOR ANY OTHER PURPOSE IS NOT PERMITTED UNLESS PRIOR WRITTEN APPROVAL
							THIS DOCUMENT MAY ONLY BE USED BY THE CLIENT FOR THE PURPOSE FOR WHICH IT WAS COMMISSIONED.
							CONDITIONS OF USE.
] م							MONTEATH & POWYS PTY LTD.
							COPYRIGHT NOTICE

![](_page_39_Figure_26.jpeg)

3D VIEW

LOOKING EAST

![](_page_39_Picture_27.jpeg)

3D VIEW

SURVEY INFORMATION:

#### DATE OF ISSUE: 19/02/21 PROJECT No.: 20/0737 PROJECT NAME: MUSWELLBROOK WATER TREATMENT WORKS CLARIFIER CLIENT: GHD MARK UP SHOWING: DIAMETER CALCULATION OF TOP HOOD

Monteath & Powys

DATE OF SURVEY: 13/01/21 SURVEYOR: M.RICHARDSON CHECKED BY: L.TURNER REF: 200737A\_01.PDF

![](_page_40_Picture_3.jpeg)

Cadd

![](_page_40_Figure_4.jpeg)

#### NOTES:

- 1. ONLY INFORMATION SHOWN IN RED IS BY MONTEATH AND POWYS.
- 2. DIAMETER CALCULATED USING A BEST FIT CIRCLE THROUGH THE SURVEY POINTS PICKED OUT OF THE SCAN DATA.
- 3. O DENOTES LOCATION OF SURVEY POINT USED FOR DIAMETER CALCUALTION.
- 4. NUMBERS REPRESENT POINT ID, VALUES IN BRACKETS REPRESENT RADIAL ERROR FROM BEST FIT CIRLCE.
- 5. LARGE AMOUNTS OF "BUILD UP" ALONG THE LIP OF THE TOP HOOD HAVE AFFECTED THE ACCURACY LOCATING THE EDGE OF THE TOP HOOD. ALL EFFORTS HAVE BEEN MADE TO MINIMISE THIS.
- THIS "BUILD UP" HAS ALSO DISQUALIFIED SOME AREAS OF THE HOOD FROM BEING INCLUDED IN THE DIAMETER CALCULATIONS; IN PARTICULAR THE NORTH WEST AND SOUTH WEST QUADRANTS.
- ACCURACY OF CALCULATED DIAMETER = +/-5mm.
- 8. CENTRE OF BEST FIT CIRCLE ADOPTED FOR RL. DUE TO DEFORMATION THE RL VARIES LOCALLY THROUGHOUT THE PICK POINTS ALONG THE BOTTOM EDGE OF THE TOP HOOD.
- 9. ACCURACY OF CALCULATED CENTRE RL = +/-10mm.
- 10. DRAWING NOT TO SCALE
- 11. LINEWORK NOT ACCURATE; PROVIDED FOR VISUAL REFERENCE ONLY.

![](_page_41_Picture_0.jpeg)

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