CQ SOIL TESTING

Land Suitability Assessment for On-site Wastewater Treatment and Effluent Disposal

Proposed Residential Subdivision

SITE ADDRESS:	**Proposed Lots 1 - 5** Lot 51 (MCH567) Wilkinson Road, Tuan
Prepared for:	Warren Bolton
Job Number:	CQ27857
Issue Date:	8/04/2025

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Project:	Proposed Lots 1 and 2 Lot 51 (MCH567) Wilkinson Road, Tuan
Investigation Type:	**Wastewater Subdivision Investigation**
Job Number:	CQ27857
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Document Control

Version	Date	Author	Design Drawings	Reviewer	Reviewer Initials
A	8/04/2025	Q Rider	P Munro	Scott Walton	SWW

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Signed on behalf of Date: 8/04/2025

SCOTT WALTON
Laboratory Manager

Introduction

General

The purpose of this report is to evaluate and define suitable on-site sewerage treatments and disposal systems for household effluents in accordance with Australian Standard 1547 "On-site domestic-wastewater management". The Queensland Plumbing Wastewater Code has been used for reference purposes during the compiling of this report.

The field investigation was carried out on the 23rd March 2025. This report relates exclusively to the proposed subdivision at the address identified on Page 1 of this report. This document has been prepared for the express purpose stated above. This document does not cover any other elements related to construction on the site. The landholder's representatives were interviewed and all information included in this report relating to the building sizes, water source, occupants, users, the existing system and fixtures etc have been provided by the landholder's representative.

Objectives

Assess the suitability of the subject allotments for on-site wastewater treatment and disposal to be undertaken in a sustainable manner, taking into account the climatic, topographical, edaphic, and geohydrological characteristics prevalent on the sites;

- Identify any environmentally sensitive areas likely to be affected by wastewater treatment and disposal activities;
- Identify the level of treatment necessary and method of disposal considered most suitable for the site; and
- Identify and assess any potentially significant impacts on human health and the natural environment that may occur as a result of wastewater treatment and disposal options having regard to relevant legislative requirements.

Regulatory Requirements

A number of legislative requirements relate to on-site wastewater treatment and disposal systems under Queensland legislation, along with various other standards and guidelines that may place constraints on the suitability of the site for on-site wastewater disposal. Those relevant to the proposed development include:

- Sustainable Planning Act 2009;
- Environmental Protection Act 1994
- Environmental Protection (Water) Policy 1997;
- Plumbing and Drainage Act 2002;
- Standard Plumbing and Drainage Regulation 2003;
- AS/NZS 1547:2012 'On-site Domestic Wastewater Management';
- Department of Infrastructure and Planning 'Queensland Plumbing and Wastewater Code' 2011; and,
- Relevant local Council guidelines.

Site Evaluation

- The allotments are rural, located off Wilkinson Road (a sealed roads)
- The existing lot has an existing dwelling and sheds.
- The proposed effluent disposal areas fall to the northwest and are considered to have poor to fair drainage.
- The soil surface condition was wet to moist at the time of testing.
- Multiple watercourses were identified within the proposed boundary realignment.
- The proposed effluent disposal area exposed to sun and wind.
- The proposed effluent disposal site is grassed with scattered small to large -sized trees throughout.
- Surface water drainage from adjoining allotments may traverse this site/s.
- The weather conditions prior to testing were periods of wet to moist conditions.

The site is located in Tuan, a semi-rural suburb of The Fraser Coast.

The average annual rainfall in The Fraser Coast is approximately 1145 mm based on historical data from the Bureau of Metrology. Rainfall averages suggest a distinct wet and dry season, with the wet season generally occurring from December through to March and the dry season July to September.

Typical average daytime temperature ranges between 27.0 °C maximum and 15.3 °C minimum. However, summer maximum temperatures are known to reach 40.6 °C.

The rainfall data has been sourced from Bureau of Meteorology Retrieved 07-05-2024.

The investigation carried out at the site included machine augured boreholes up to 1500 mm depth and a series of permeability test pits (see Appendix 4). These test pits are located in the proposed effluent disposal area as shown on the attached site report.

Dwelling/Occupancy

- CQ Soil Testing have assumed that the dwellings shall be 4 bedrooms or less for the purposes of calculating the water usage per dwelling.
- CQ Soil Testing have assumed that the water source shall be tank/bore/dam supply.
- CQ Soil Testing have assumed that standard water fixtures shall be installed in each dwelling: 200 litres/person/day AS 1547:2012.
- CQ Soil Testing have assumed that a spa bath shall not be installed in the dwelling/s.
- CQ Soil Testing have assumed that a food waste disposal unit shall not be installed in the dwelling/s.

Adopted usage per day per dwelling	**1200 litre**
Adopted dwelling surface area	**300 sqm**

Soil Evaluation

The borelogs carried out at the site (refer attached Site Plan for localities) indicate that the soil profile of natural sandy silts and silty sands which is underlain by clayey soil and weathered rock. See detailed logs. The clay soils encountered typically had a low permeability rate and the majority of soils encountered (within the effluent disposal zone) were determined to be a Soil Category 6 resulting in a Design Load Rate of 5.0 mm/day.

Groundwater was not encountered during the field investigation.
Weathered rock was encountered during the field investigation.

Whilst every effort has been made to ensure that the borelogs carried out at the subject allotment are indicative of the soil profile over the site any discrepancy between the profile detailed in the borelogs and that observed during construction shall be referred to CQ Soil Testing for immediate attention.

The Queensland Plumbing and Wastewater Code and AS 1547 suggests that the use of a primary-treated effluent disposal system will be satisfactory provided;

- Sufficient permeable surface soil overlying rock is present over the disposal area, not less than 1.2 metres depth.
- A suitable soil category material (as per AS 1547) and minimum required depth is encountered.
- A minimum set-back distance of 50m is obtained.
- Acceptable permeability rates are obtained.

For the purposes of this report, an Advanced Secondary Treatment System and a more conservative sizing using sub-surface disposal has been chosen.

Table 1 - Determination of Soil Category

Soil Category BH10	Soil Texture	Structure	Indicative Permeability	Indicative Drainage Class
3 (00-300 mm)	Loam	Weakly Structured	0.5 – 1.5 m/day	Moderately Well Drained
6 (300-600mm)	Medium Clay	Moderately Structured	<0.06 m/day	Very Poorly Drained
5 (600-1500 mm)	Light Clay	Weakly Structured	< 0.06 m/day	Poorly Drained

Table 2 – Permeability test results and conclusions

Test No.	Soil Permeability	Test hole depth	Recommended Design Loading Rate
PT BH1	<0.06	500 mm	
PT BH10	<0.06	500 mm	
PT BH21	<0.06	500 mm	
PT BH31	<0.06	500 mm	
PT BH41	<0.06	500 mm	
Average	**<0.06**		**5.0 (mm/day)**

Permeability testing aids in the design of an "On-site domestic–wastewater management system". CQ Soil Testing carries out a permeability testing in accordance with Appendix 4.1F of the Australian Standard 1547.

Investigation Detail and Findings

The investigation carried out at the site included machine augured boreholes up to 1500 mm depth and a series of permeability test pits (see attached logs). These test pits are located in the proposed effluent disposal area as shown on the attached site report.

CQ Soil testing have determined that the allotment/s identified have sufficient area to allow for the disposal of effluent via:

- **Sub-Surface disposal of treated effluent (advanced secondary treatment) on proposed lots 1-5 (assuming 1200 L per day/5 mm DLR per day = 240 m^2)**

Attached Site Plans indicate the land availability for a house site and effluent disposal area on the reconfigured allotments.

The proposed reconfigured lots off Lot 51 Wilkinson Road, Tuan have sufficient area each for a 4 bedroom dwelling and effluent disposal via advanced secondary treatment in accordance with the requirements of the Queensland Plumbing and Wastewater Code.

The following separation distances shall apply (extract of Queensland Plumbing and Wastewater Code):

Table 3 - Setback distances for subsurface land application area for greywater treatment plant or an on-site sewage treatment plant (QLD Plumbing & Wastewater Code Version 1:2019)

Feature	Horizontal separation distance ①		
	Up slope	Down slope	Level
Property boundaries, pedestrian paths, walkways, recreation areas, retaining wall, and footings for buildings and other structures.	2	4	2
Inground swimming pools	6	6	6
Inground potable water *tank* not exposed to primary effluent	6	6	6
Inground potable water *tank* exposed to primary effluent	15	15	15

① Distances are given in metres and are measured from the edge of trench/bed excavation or subsurface irrigation distribution pipework to the nearest point of the feature

Table 4- Setback distances for on-site sewage facilities and greywater use facilities – Protection of surface water and groundwater (QLD Plumbing & Wastewater Code Version 1:2019)

Feature	Separation distance ①		
For onsite – see Table 2.1 in AS 1546.3	**Advanced Secondary**	**Secondary**	**Primary**
For *greywater* – see Table 2.1 in AS 1546.4	**Level 1 and Level 2**	**Level 3**	**Untreated**
Top of bank of permanent water course	10	30	50
Top of bank of intermittent water course			
Top of bank of a lake, bay, or estuary			
Open stormwater drainage channel or drain			
Bore or a dam			
Unsaturated soil depth to a permanent water table (vertically)	0.3	0.6	1.2

① Distances are given in metres and are measured from the edge of the irrigated wetted area to any point of the feature
② Note: Primary effluent typically has a (BOD^5) (Biochemical Oxygen Demand) of between 120 – 240 mg/L and Total Suspended Solids of between 65 – 180 mg/L.

Facility Installation, Operation and Maintenance

The wastewater treatment plant shall be installed in accordance with the manufacturer's recommendations.

All pipework shall be installed by a licensed plumber in accordance with AS3500.

Construction and installation of disposal systems shall be in accordance with AS1547.

The system designer shall provide Occupier Guidelines and Maintenance Guidelines as part of the design of the system.

Future Construction

Future Dwellings:
a) Any future dwelling/s on proposed lots must be able to be provided with an on-site wastewater treatment system and effluent disposal area that is in accordance with AS/NZS 1547:2000 On-site domestic-wastewater management.
b) The developer must provide to Council, prior to the endorsement of the Plan of Subdivision, the following:

> *A geotechnical report (soil test) prepared by a suitably qualified geotechnical professional demonstrating that the lot is suitable to accommodate an on-site wastewater treatment system and effluent disposal area that is in accordance with AS/NZS 1547:2000 On-site domestic-wastewater management.*

Conclusion

The option listed in this report is not exhaustive, and other effluent disposal systems may work satisfactorily on these allotments. The eventual developer of the allotment/s shall commission a licensed designer to carry out a detailed site and soil evaluation once the proposed dwelling position is known.

If you should have any queries regarding this report, please do not hesitate to contact the undersigned at your convenience.

Yours faithfully

SCOTT WALTON
Laboratory Manager

Soil Logs

BOREHOLE 1

Depth (m)	Visual Class'n Symbol	Visual Description of Material
0.0 0.7	SM	Silty SAND, fine to coarse grained, low plasticity fines, dark grey-brown w/depth, D-M-M w/depth, MD. ***CAT 2 Sandy Loam – weakly structured***
0.7 1.5	CI	Sandy CLAY, medium plasticity, fine to coarse grained, grey/orangey brown/reddish brown mottled, D-M, ST. ***CAT 5 Light Clay – weakly structured***

Borehole terminated at 1.5 m

MOISTURE CONDITION	CONSISTENCY	RELATIVE DENSITY
D – Dry	VS – Very Soft	VL – Very Loose
M – Moist	S – Soft	L – Loose
W – Wet	F – Firm	MD – Med Dense
	ST – Stiff	D – Dense
	V/ST – Very Stiff	VD – Very Dense
	H – Hard	

Allowable Bearing Pressure calculated using the guidelines in "Determination of Allowable Bearing Pressure under Small Structures" by MI Stockwell (NZ Engineering June 1997)

DCP test results are to be used as a guide only to relative density and consistency of soils. Changes in moisture contents or the presence of coarse grained material can greatly influence the outcome of this test.

Soil Logs

BOREHOLE 2		
Depth (m)	**Visual Class'n Symbol**	**Visual Description of Material**
0.0 0.2	SM	Silty SAND, fine to coarse grained, low plasticity fines, dark grey-brown w/depth, D-M-M w/depth, MD. ***CAT 2 Sandy Loam – weakly structured***
0.2 0.6	SC	Clayey SAND, fine to coarse grained, low plasticity fines, brown/orangey brown mottled, M, MD. ***CAT 3 Loam – weakly structured***
0.6 1.5	CI	Sandy CLAY, medium plasticity, fine to coarse grained, grey/orangey brown/reddish brown mottled, D-M, ST. ***CAT 5 Light Clay – weakly structured***
Borehole terminated at 1.5 m		

MOISTURE CONDITION	CONSISTENCY	RELATIVE DENSITY
D – Dry	VS – Very Soft	VL – Very Loose
M – Moist	S – Soft	L – Loose
W – Wet	F – Firm	MD – Med Dense
	ST – Stiff	D – Dense
	V/ST – Very Stiff	VD – Very Dense
	H – Hard	

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Soil Logs

BOREHOLE 3		
Depth (m)	**Visual Class'n Symbol**	**Visual Description of Material**
0.0 0.2	SM	Silty SAND, fine to coarse grained, low plasticity fines, dark grey-brown w/depth, D-M-M w/depth, MD. ***CAT 2 Sandy Loam – weakly structured***
0.2 0.8	SC	Clayey SAND, fine to coarse grained, low plasticity fines, brown/orangey brown mottled, M, MD. ***CAT 3 Loam – weakly structured***
0.8 1.5	CI	Sandy CLAY, medium plasticity, fine to coarse grained, grey/orangey brown/reddish brown mottled, D-M, ST. ***CAT 5 Light Clay – weakly structured***
Borehole terminated at 1.5 m		

MOISTURE CONDITION	CONSISTENCY	RELATIVE DENSITY
D – Dry	VS – Very Soft	VL – Very Loose
M – Moist	S – Soft	L – Loose
W – Wet	F – Firm	MD – Med Dense
	ST – Stiff	D – Dense
	V/ST – Very Stiff	VD – Very Dense
	H – Hard	

Allowable Bearing Pressure calculated using the guidelines in "Determination of Allowable Bearing Pressure under Small Structures" by MI Stockwell (NZ Engineering June 1997)

DCP test results are to be used as a guide only to relative density and consistency of soils. Changes in moisture contents or the presence of coarse grained material can greatly influence the outcome of this test.

Soil Logs

BOREHOLE 4		
Depth (m)	**Visual Class'n Symbol**	**Visual Description of Material**
0.0 0.2	SM	Silty SAND, fine to coarse grained, low plasticity fines, dark grey-brown w/depth, D-M-M w/depth, MD. ***CAT 2 Sandy Loam – weakly structured***
0.2 0.4	CL	Sandy Silty CLAY, low plasticity, fine to coarse grained, dark brown, M, S-ST w/depth. ***CAT 4 Clay Loam – weakly structured***
0.4 1.0	CI	Sandy CLAY, medium plasticity, fine to coarse grained, grey/orangey brown/reddish brown mottled, D-M, ST. ***CAT 5 Light Clay – weakly structured***
1.0 1.5	SM	Gravelly Silty SAND, fine to coarse grained, low plasticity fines, grey, D-M, MD. ***CAT 2 Sandy Loam – weakly structured***

Borehole terminated at 1.5 m

MOISTURE CONDITION	CONSISTENCY	RELATIVE DENSITY
D – Dry	VS – Very Soft	VL – Very Loose
M – Moist	S – Soft	L – Loose
W – Wet	F – Firm	MD – Med Dense
	ST – Stiff	D – Dense
	V/ST – Very Stiff	VD – Very Dense
	H – Hard	

Allowable Bearing Pressure calculated using the guidelines in "Determination of Allowable Bearing Pressure under Small Structures" by MI Stockwell (NZ Engineering June 1997)

DCP test results are to be used as a guide only to relative density and consistency of soils. Changes in moisture contents or the presence of coarse grained material can greatly influence the outcome of this test.

Soil Logs

BOREHOLE 5		
Depth (m)	**Visual Class'n Symbol**	**Visual Description of Material**
0.0 0.2	SM	Silty SAND, fine to coarse grained, low plasticity fines, dark grey-brown w/depth, D-M-M w/depth, MD. ***CAT 2 Sandy Loam – weakly structured***
0.2 0.4	CL	Sandy Silty CLAY, low plasticity, fine to coarse grained, dark brown, M, S-ST w/depth. ***CAT 4 Clay Loam – weakly structured***
0.4 1.5	CI	Sandy CLAY, medium plasticity, fine to coarse grained, grey, D-M, VST-H w/depth. ***CAT 5 Light Clay – weakly structured***
Borehole terminated at 1.5 m		

MOISTURE CONDITION	CONSISTENCY	RELATIVE DENSITY
D – Dry	VS – Very Soft	VL – Very Loose
M – Moist	S – Soft	L – Loose
W – Wet	F – Firm	MD – Med Dense
	ST – Stiff	D – Dense
	V/ST – Very Stiff	VD – Very Dense
	H – Hard	

Allowable Bearing Pressure calculated using the guidelines in "Determination of Allowable Bearing Pressure under Small Structures" by MI Stockwell (NZ Engineering June 1997)

DCP test results are to be used as a guide only to relative density and consistency of soils. Changes in moisture contents or the presence of coarse grained material can greatly influence the outcome of this test.

Soil Logs

BOREHOLE 6

Depth (m)	Visual Class'n Symbol	Visual Description of Material
0.0 0.7	SM	Silty SAND, fine to coarse grained, low plasticity fines, dark grey-brown w/depth, D-M-M w/depth, MD. ***CAT 2 Sandy Loam – weakly structured***
0.7 1.5	CI	Sandy CLAY, medium plasticity, fine to coarse grained, grey/orangey brown/reddish brown mottled, D-M, ST. ***CAT 5 Light Clay – weakly structured***

Borehole terminated at 1.5 m

MOISTURE CONDITION	CONSISTENCY	RELATIVE DENSITY
D – Dry	VS – Very Soft	VL – Very Loose
M – Moist	S – Soft	L – Loose
W – Wet	F – Firm	MD – Med Dense
	ST – Stiff	D – Dense
	V/ST – Very Stiff	VD – Very Dense
	H – Hard	

Allowable Bearing Pressure calculated using the guidelines in "Determination of Allowable Bearing Pressure under Small Structures" by MI Stockwell (NZ Engineering June 1997)

DCP test results are to be used as a guide only to relative density and consistency of soils. Changes in moisture contents or the presence of coarse grained material can greatly influence the outcome of this test.

Photographs

Image 3

Image 4

Photographs

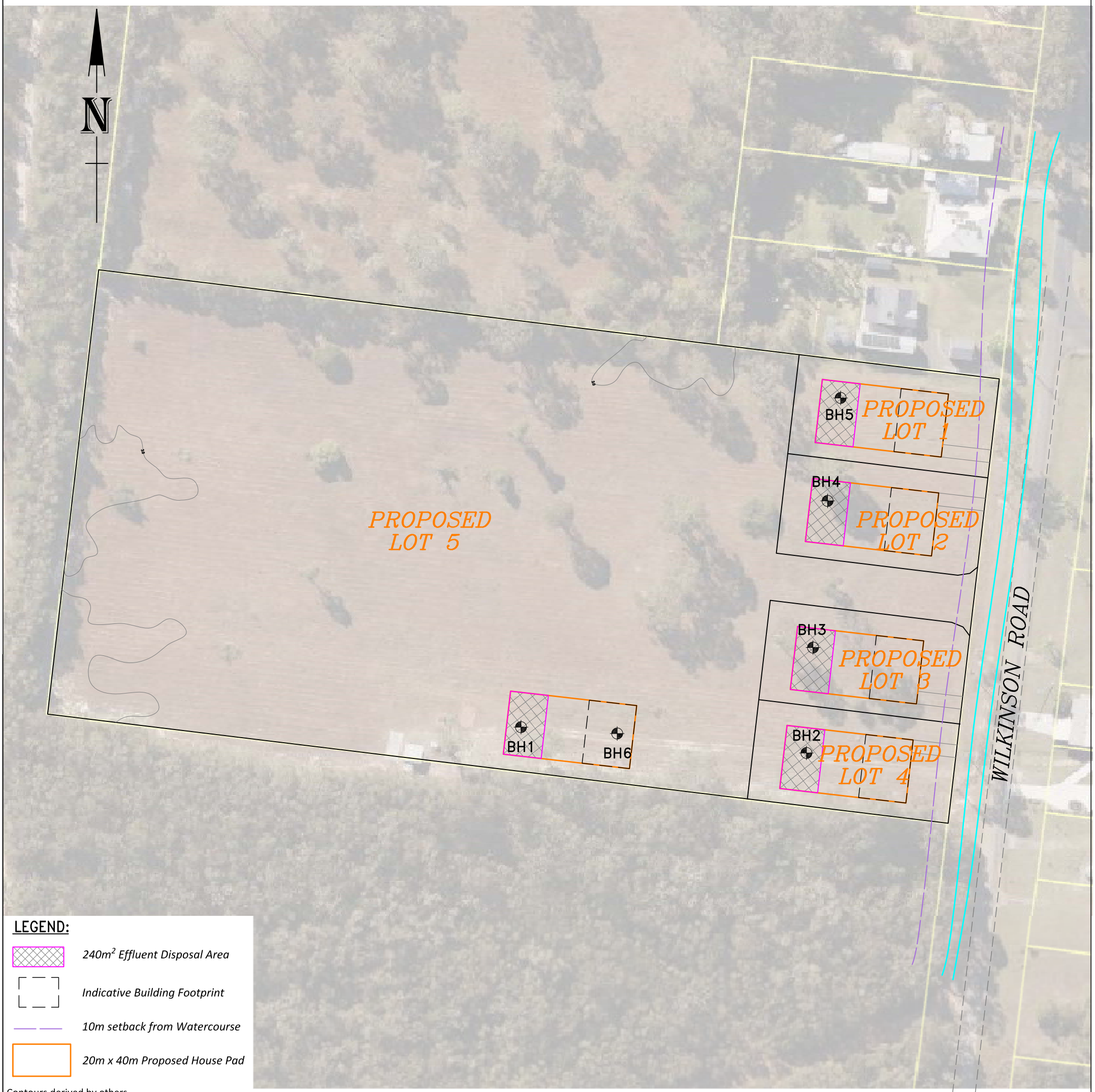
Image 5

Image 6

Photographs

Image 7

Image 8



LEGEND:

- *240m² Effluent Disposal Area*
- *Indicative Building Footprint*
- *10m setback from Watercourse*
- *20m x 40m Proposed House Pad*

Contours derived by others.
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Services shown are indicative only and are to be confirmed onsite prior to construction.

NOT FOR CONSTRUCTION

SERVICES LEGEND:

E	*Electricity Pit*	T	*Telecom Turret*
S	*Storm water pit*	T	*Telecom Pit*
H	*Fire Hydrant*	G	*Gully Pit*
K	*Kerb Adapter*	S	*Sewer Manhole*
W	*Water Meter*	—S—	*Sewerage Line*
	Street Light	—E—	*U/G Power Line*

—T—	*U/G Telecom Line*
—W—	*U/G Water Line*
—SW—	*U/G Stormwater Line*
—OHP—	*Overhead Power*
HC	*Sewer House Connection*
	Stormwater Gully Pit

SITE LEGEND & NOTES:

- 10.000 — *RL 10.000 is assumed as datum level (ie Not AHD)*
- 9.2 — *Existing Contour*
- 9.820 — *Denotes Surveyed RL*

Field Technician: Q.R. *Date:* 02.04.2025

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Project:
PROPOSED LOT 1–5 WILKINSON ROAD
TUAN, QLD

For:
W BOLTON

Title: ALLOTMENT RECONFIGURATION

Scale:	1:1250 (A3)	*Date:*	APR '25
Sheet:	1 of 1	*Drawn:*	C.T.
Job No:	CQ27857	*Rev:*	A