

Contaminated Land Preliminary Site Investigation

Proposed rezoning of 70 Manifold Rd, North Casino (Lot 21 DP601461)



This contaminated site investigation is a Stage 1 – Preliminary Investigation, in accordance with the Managing Land Contamination Planning Guidelines (DUAP & EPA, 1998).

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1. INTRODUCTION

North Coast Wastewater Solutions (NCWS) has been engaged by the property owner to undertake a Stage 1 Preliminary Contaminated Site Investigation in respect of 70 Manifold Rd, North Casino, Lot 21 DP601461.

The requirement for this investigation is triggered by the *Northern Rivers Regional Council's policy for the Management of Contaminated Land 2006*, as the land is zoned RU1 primary production and has been used for agricultural purposes.

In accordance with *SEPP (Resilience and Hazards) 2021*, this assessment was conducted to determine if land contamination has occurred from historical and current land use activities occurring on site and if the land is suitable for the proposed change of use from agricultural to residential.

This report has been written in accordance with the NSW EPA (2022) Guidelines for Consultants Reporting on Contaminated Sites.

1.1. Objectives

The key objectives of the preliminary site investigation are to:

- Identify any past or present potentially contaminating activities.
- Provide a preliminary assessment of site contamination.
- Identify potential contamination types.
- Assess the risk to human health and need for further detailed investigations.

1.2. Scope of Work

The scope of work for the Stage 1 Preliminary Contaminated Site Investigation has been developed in accordance with the *Managing Land Contamination Guidelines (DUA/EPA, 1998)* and *Northern Rivers Regional Council's Regional Policy for the Management of Contaminated Land (2006).*

- Undertake a detailed desktop investigation of current and past land uses and potentially contaminating activities.
- Undertake a site assessment of the investigation area and surrounding property to assess current site condition and contamination indicators.
- Develop a conceptual site model to assess the potential exposure risk for the proposed residential land use.

2. PROPOSED DEVELOPMENT & SITE IDENTIFICATION

This report has been prepared is support and inform a planning proposal/LEP amendment request to:

- Rezone the subject land from RU1 Primary Production to R5 Large Lot Residential in accordance with the provisions of the Richmond Valley Local Environmental Plan 2012;
- Amend the minimum lot size for subdivision to enable a minimum lot size of 7,500m² for • the land to be rezoned to R5.

The R5 zoning will allow future subdivision and construction of dwelling houses on the subject site.

The subject property is registered as Lot 21 DP601461 with street address of 70 Manifold Rd, North Casino. The property is an irregular shaped 9.68ha, RU1 primary production zoned property located in the Richmond Valley Council local government area.

The property is located on the northern side of Manifold Rd in the rural residential suburb of North Casino approximately 4km north of Casino township.

Table 1 – Site Identification		
Address	70 Manifold Rd, North Casino	
Title	Lot 21 DP601461	
Coordinates of Investigation Area	Latitude: -28.81444 Longitude: 153.07789	
Local Government Area	Richmond Valley Council	
Current land zoning	RU1 – Primary Production (LEP 2012).	
Property size	Approx 9.68ha	

Details of the subject property are presented in Table 1 below.

Figure 1 on the following page presents a location map of the subject property.



Figure 1 – Location map (source: SIX MAPS)

3. SITE CONDITION AND SURROUNDING ENVIRONMENT

3.1. Topography and Geology

The subject property has elevations ranging from 30-65mAHD with general slopes toward the south and southeast. The topography includes a gentle ridgeline and side slopes. The property is characterised by relatively mild slopes up to 10-15%. A drainage depression is located on the northern end of the property with more pronounced slope and convergent landform.

Stormwater run-on from upslope properties is possible. The property in the upslope catchment is semi-cleared and used for extensive livestock grazing.

The geological formation is the Grafton Formation. The geology is characterised by sandstone (lithic and quartz) with siltstone, claystone, coal. Soil types are generally sands and sandy clay loams overlying clays and claystone bedrock. The soils have low fertility, low water holding capacity and can be hard-setting and acidic.

3.2. Existing Buildings and Structures

An existing dwelling and garage/carport were identified on the southern end of the subject property access from Manifold Rd as shown in Figure 2 below.

The dwelling is of timber construction with metal roofing and is likely to have been constructed between 1920-1950. The garage/carport was constructed in the 1970s with timber frame and metal sheet cladding.

Other structures including a shed, cattle yards and stables/chicken coops previously located north of the dwelling had recently been demolished. These structures appear to have been constructed in the 1960s and 1970s. Traces of demolished materials including bricks, concrete, timber, steel wire and electrical conduits were identified on the subject property.

3.3. Services

The existing dwelling is serviced by electricity through overhead powerlines. Existing water supply is from rainwater tanks connected to the dwelling and shed.

The existing dwelling is serviced by an existing on-site sewage management system (OSSM) located on the west and southwest side of the dwelling. There absorption pits were observed to be failing with effluent discharging above ground.

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Figure 2 – Plan of existing and recently demolished buildings (source: RVC Intramaps)

3.4. Groundwater

NORTH COAST

SOLUTIONS

A search of the Bureau of Meteorology (BOM) Australian Groundwater Explorer identified there are no recorded bores or wells on the subject property or within 250m of the site investigation area. The groundwater table is expected to be relatively deep in this location based on drill records of other bores in similar landscape. No groundwater has been used on the property so there is no opportunity for potential contaminants from groundwater use.

3.5. Surface Water

Stormwater runoff generally flows south or southeast across the subject property into



drainage gullies and dams. The upslope catchment includes part of the neighbouring property at 90 Manifold Rd, North Casino that is used for extensive livestock grazing and residential purposes.

Minor stormwater run-on from upslope livestock grazing areas and previous sheds/cattle yards has potential to be transported across the subject property and there is minor potential for contaminant transfer to occur if contaminants are present.

The large dam on the subject property was recently removed however there are several dams on neighbouring properties. Water quality in these dams was observed to be good with no signs of contamination.

3.6. Surrounding Land Use

Table 2 – Surrounding land use		
Site Boundary	Land Use	
North	Cattle grazing, Rural residential, Heavily vegetated	
East	Cattle grazing, Rural residential	
South	Cattle grazing, Rural residential, Manifold Rd, Large	
	Lot residential	
West	Cattle grazing	

The surrounding land uses are presented below in Table 2.

3.7. Site Condition

The site was inspected on 30 October 2023. Table 3 below presents the findings from the site condition assessment. Site photographs are presented in Appendix A.

Site Feature	Description
Topography	The subject property is characterised by a gentle ridgeline with slopes generally with south or south eastern fall. The slope and ground elevation across the property range from 10-15% and 30-65mAHD respectively. There is opportunity for upslope stormwater run-on from the subject property and neighbouring property at 90 Manifold Rd, North Casino.
Conditions at site boundary	The subject property is accessed from Manifold Rd. The property is fully fenced with barb wire livestock fencing. There is very low opportunity and no signs of unauthorised access into the property.
Visible signs of contamination	No bare patches, staining or discolouration of surface observed.
Visible signs of plant stress	None observed in investigation area. Vegetation is healthy pasture grass species.
Presence of drums, wastes and fill material	General waste associated with the recent demolition of sheds, stables/coop and cattle yards was observed on the subject property. The wastes included brick and concrete rubbles, timber, steel wire, poly pipe and electrical conduit. The waste was thoroughly inspected and there

Table 3 – Site Condition Assessment



	were no visual signs of any asbestos containing material.
Odours	No odours detected.
Condition of	The dwelling, garage/carport and driveway were in good condition and
buildings and	well maintained. Paint coatings were in good condition.
roads	
Quality of surface	Water in farm dams adjoining subject property was observed be good
water	quality with no signs of contamination.
Flood potential	No flood potential on subject property.
Sensitive local	There are no sensitive local environments within 500m of the
environment	investigation area.



4. SITE HISTORY

4.1. Current and Historic Land Use

The property was cleared prior to 1958 and has been used for residential purposes and cattle grazing (dairy or beef) since that time. The property is known as 'Gilead' and was originally part of a larger landholding as shown in the 1963 parish map show in Figure 3 below.

Review of the historical aerial imagery identified the land had potentially been pasture improved or cropped in the 1970's and 1990's.



Figure 3 – Parish map

4.2. Historical Land Use Investigations

Potentially contaminating prior land uses have been determined from review of records from the following sources.

- NSW Department of Primary Industries: Cattle dip site locator
- NSW EPA: POEO Licenses Public Register
- NSW EPA: Contaminated Land Record of Notices
- Review of historic aerial photographs



4.2.1. Cattle Tick Dip Sites

A review of NSW Department of Primary Industries: Cattle dip site locator and Richmond Valley Council Intramaps identified no dip sites within 500m of the subject property. The closest dip site is shown in Figure 4 below.

There is no opportunity for run-on from this dip site. However, cattle treated at the dip site may have transported minor amounts of chemical to the subject property.



Figure 4 – Dip sites in relation to investigation area

4.2.2. POEO Licenses Public Register

The suburb of 'North Casino' returned 0 results in the public POEO Licenses, application and notices register.

4.2.3. Contaminated Land Record of Notices

A search of the NSW EPA Contaminated Land Records was undertaken for all notice types, which include:

• Preliminary Investigation Order



- Declaration of Significant Contaminated Land
- Approved Voluntary Management Proposal
- Management Order
- On-going Maintenance Order
- Repeal, Revocation and Variation Notice
- Site Audit Statement
- Notice of Completion or Withdrawal of Approved VMP

The suburb of 'North Casino' returned 0 results in the Contaminated Land Records register.

4.2.4. Review of historical aerial photographs

Table 4 contains a summary review of historic aerial photographs for the subject property and surrounding land. Aerial imagery was sourced from NSW Spatial Services. Copies of aerial photographs are presented below.

Year	Description
1958	Land cleared prior to 1958. The existing dwelling is present on the property with what appear to be minor outbuildings to the north east of the dwelling.
1971	Pasture improvement or cropping in paddocks around dwelling. Stables/coops/cattle yard structures built north of dwelling.
1979	Garage/carport and large shed on western boundary constructed. Large dam constructed in middle of property. Dwelling and driveway constructed on western neighbouring property.
1987	No significant change on subject property. Dwelling constructed on south eastern neighbouring property.
1991	Pasture improvement or ryegrass in paddocks around dwelling.
1997	Pasture improvement or ryegrass in paddocks around dwelling.

Table 4 – Summary of review of historic aerial photographs





Figure 5 – Aerial image – 1958





Figure 6 – Aerial image – 1971





Figure 7 – Aerial image – 1979





Figure 8 – Aerial image – 1987





Figure 9 – Aerial image – 1991





Figure 10 – Aerial image – 1997

4.3. Summary of Site History

Below is a summary and findings from the site history search:

- No cattle tick dip sites within 500m of subject property. No possibility of run-on from dip sites to subject property. Minor transport of chemicals on treated animals possible.
- The POEO Licenses, application and notices register search returned no sites of concern
- The NSW Contaminated Land Register search returned no sites of concern
- The review of historical aerial photographs indicates that the site has been used for livestock grazing and residential purposes since at least 1958 to current day. There was some evidence of potential cropping or pasture improvement in the 1970s and 1990s. Several structures constructed north of the existing dwelling in around the 1960s or 1970s have recently been demolished. The farm dam has been removed.

5. CONCEPTUAL SITE MODEL

5.1. Regional and local geology, hydrogeology and hydrology

Table 5 below summarises the local geology, soil and physical parameters of the site.

Table 5 – Local geology and physical parameters		
Site Feature	Description	
Local geology records	The geological formation is the Grafton Formation The geology is characterised by sandstone (lithic and quartz) with siltstone, claystone, coal. Soil types are generally sands and sandy clay loams overlying clays and claystone bedrock. The soils have low fertility, low water holding capacity and can be hard-setting and acidic. The soils are highly typical and consistent with the 'Namoona' soil description of Morand Soil Landscapes 2001.	
Surface water (storage, flow paths, quality)	The subject property includes a gentle ridgeline and side slopes generally with fall to the south and southeast. Stormwater run-on from upslope properties is possible. The property in the upslope catchment is semi-cleared and used for extensive livestock grazing. There are no surface water bodies on the subject property. The closest surface water is a farm dams on both the east and west neighbouring properties and water quality is good with no signs of contamination.	
Groundwater information (depths, recharge, aquifer type, flow, storage, quality)	Groundwater is expected to be deep >20m in the investigation area based on depths of other local bores. There are no registered groundwater bores within 500m of the investigation area and no potential for groundwater use on the property.	

5.2. Potential Contaminants of Concern (COCs)

The property has previously been used for livestock grazing and residential purposes. Livestock grazing typically includes low volume spot application of herbicides and pesticides. Livestock treatment chemicals are likely to have been applied in the race and crush of the cattle yards.

There was some evidence of pasture improvement or potential cropping of paddocks that had been undertaken in the past. These activities typically involve more extensive use of fertilisers and potentially pesticides and herbicides.

The existing dwelling, garage/carport and recently demolished structures may have contained asbestos containing materials, lead paint or under slab termite treatments.

There are no cattle tick dip sites within 500m of the subject property. Due to the topography, there is no opportunity for transport of contaminants from the dip site to the subject property through natural drainage paths. If contaminating activities occurred in the investigation area these would have occurred by top-down spills or broadcast spreading over the surface. The most likely potentially affected media would be the top 0-150mm of soil.

Table 6 below presents the potential contaminants associated with agricultural activities (Schedule 1, NRRC, 2007) and building works.

Potential Contaminating Activities	Potential Contaminant Sources	Target Contaminants
Agricultural activities	Fertiliser (Calcium phosphate, calcium sulfate, nitrates, ammonium sulfate, carbonates, potassium, copper, magnesium, molybdenum, boron, cadmium)	Metals (silver, arsenic, lead, cadmium, chromium, copper, manganese, nickel, selenium, zinc, mercury, iron, aluminium, beryllium, boron, cobalt)
	Fungicides (Carbamates, copper sulphate, copper chloride, sulfur, chromium, zinc)	Pesticides (Hexachlorobenzene, Alpha BHC, Lindane, Heptachlor, Aldrin, Beta BHC, Delta BHC, Heptachlor epoxide, o,p'-DDE,
	Herbicides (Ammonium thiocyanate, carbamates, arsenic, organochlorines, organophosphates, mercury, triazines)	Alpha Endosultan, Gamma Chlordane, Alpha Chlordane, trans-Nonachlor, p,p'-DDE, Dieldrin, Endrin, o,p'-DDD, o,p'-
	Pesticides (Arsenic, lead, organochlorines, organophosphates, sodium tetraborate, carbamates, sulfur, synthetic pyrethroids Xylene, kerosene, methyl isobutyl ketone, amyl acetate, chlorinated solvents)	p,p'-DDT, Endosulfan sulphate, Endrin Aldehyde, Methoxychlor, Endrin Ketone, Isodrin, Mirex, Dichlorvos, Dimethoate, Diazinon, Fenitrothion, Malathion, Chlorpyrifos, Parathion-ethy, Bromophos Ethyl, Methidathion,
Building works	Lead-based paints, asbestos, under slab termite treatments.	Ethion, Azinphos-methyl)

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Overall, the likelihood of land contamination across the subject property from agricultural land use and existing and previous buildings is considered to be *low*. However, individual sampling will be required from within each future building envelope at subdivision development stage to confirm contaminant levels are below the NEPM health investigation guidelines.

The recommended sampling and analysis for individual lots and building envelopes at subdivision development stage is a health investigation level soil assessment for **metals and pesticides (organochlorines and organophosphates)**. Future building envelopes located in areas where previous buildings had been demolished or material form these buildings has been spread should also be comprehensively visually assessed for traces of asbestos. If asbestos is observed the soil may also need to be tested for asbestos contamination.

5.3. Sensitive Receptors

The future land use at the site is <u>Class A Residential</u> in accordance with the National Environment Protection (Assessment of Site Contamination) Amendment Measure (NEPM) 2013 (No.1), Schedule B1. This land use presents the highest opportunities for soil contact. Sensitive



receptors have been identified within the vicinity of the site and include future residents, workers, visitors and wildlife.

5.4. Potential exposure pathways

The potential contaminants of concern from agricultural activities and building works can enter the environment and soil through deposition, spills, airborne transfer, surface runoff, soil leaching and intentional spreading/spraying.

Potential contamination exposure pathways for future residents include:

- Incidental ingestion of soil particles
- Inhalation of dust particles
- Consumption of home-grown fruit and vegetables and livestock
- Consumption of soil adhering to home-grown fruit and vegetables
- Dermal contact with soil and dust

Figure 11 below presents a conceptual site model of the potential exposure pathways.



Figure 11 – Conceptual site model example (source: NZ Community and Public Health)

6. CONCLUSION AND RECOMMENDATIONS

This report comprises a Stage 1 Preliminary Contaminated Site Investigation in respect of 70 Manifold Rd, North Casino, Lot 21 DP601461.

The objective of this investigation is to support a planning proposal to rezone the land to an R5 – Large Lot Residential Zone and to determine if the site is appropriate for residential purposes and has not been contaminated from current or prior land uses.

The investigations consisted of a site history review and site condition assessment to assess historical and current land uses.

The property has previously been used for agricultural activities (livestock grazing) and residential purposes since at least 1958 but likely back several decades earlier than this. Chemical usage for extensive grazing operations is most likely to have only occurred sporadically in small amounts (e.g. weed control, pest control) for general property maintenance. Livestock treatment chemicals are likely to have been applied in the race and crush of the cattle yards.

There was some evidence of potential pasture improvement or cropping of paddocks that had been undertaken in the past. These activities typically involve more extensive use of fertilisers and potentially pesticides and herbicides.

The existing dwelling, garage/carport and recently demolished structures may have contained asbestos containing materials, lead paint or under slab termite treatments.

There is only further grazing land upslope of the investigation area and no potential for stormwater run-on from other contamination sources. No visible contamination indicators were identified within or surrounding the Investigation Area at the time of site inspection. There were no cattle dip sites within 500m of the subject property.

The likelihood of contamination and risk of harm to end users in terms of land contamination across the subject property is considered **low**, however individual sampling will be required from within each future building envelope at subdivision development stage to confirm contaminant levels are below the NEPM health investigation guidelines.

The recommended sampling and analysis for individual lots and building envelopes at subdivision development stage is a health investigation level soil assessment for **metals and pesticides (organochlorines and organophosphates)**. Future building envelopes located in areas where previous buildings had been demolished or material form these buildings has been spread should also be comprehensively visually assessed for traces of asbestos. If asbestos is observed the soil may also need to be tested for asbestos contamination.

The subject property is considered suitable for the proposed rezoning to R5 Large Lot Residential with soil sampling of individual lots to be undertaken at subdivision stage to confirm the land within the building envelopes has contaminant levels below the NEPM health investigation levels.



7. REFERENCES

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The NSW Department of Environment and Conservation, (2005). Guidelines for Assessing Former Orchards and Market Gardens.



8. APPENDICES

8.1. Appendix A – Site Photos



Existing dwelling



Existing garage/carport





Subject property – looking north



Subject property – looking east





Subject property – looking north



Subject property - looking west





Subject property – looking south



Subject property - looking east towards gully/dam





Minor rubble from demolition of structures



Burn pile of materials from recent demolition of structures

Project consultant	Samuel Curran	
Qualifications	Bachelor of Civil Engineering (First Class Honours) – USQ, 2015	
Relevant experience	 Over 10 years' experience in water, wastewater and environmental engineering, development and environmental assessment and reporting. Project management, field assessment and preparation of reports for preliminary contaminated land assessments, on-site wastewater feasibility assessments, water quality sampling programs and acid sulfate soil management plans. Development of site inspection plans, soil sampling programs and collection of soil samples for varied residential and commercial projects and interpretation of analysis results in accordance with NSW EPA and DPUA Guidelines 	
Insurance – Public Liability	Insurer: QBE Insurance (Australia) Limited Sum insured: \$10,000,000 Policy number: 118U748243BPK Period: 10 March 2024 to 10 March 2025	
Insurance – Professional Indemnity	Insurer: DUAL Australia Pty Ltd Limit of indemnity: \$1,000,000 Policy number: S0B/30961/000/24/N Period: 10 March 2024 to 10 March 2025	

8.2. Appendix B – Consultant Qualifications and Insurance