

Briefing Note

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From: Rob Karelse
Date: 25 August 2022
Subject: **Cooljarloo West 2022 Drilling Program NVCP Clearing Principle Assessment**

Purpose

The purpose of this document is to support the submission of a Native Vegetation Clearing Permit (NVCP) under Part V of the *Environmental Protection Act 1986* (EP Act) (WA) for the Cooljarloo West (CLW) 2022 Exploration Drilling Program. It includes an assessment of proposed clearing sites at CLW against the 10 Clearing Principles as defined under Schedule 5 of the EP Act.

Outcomes

The proposed 2022 Exploration Drilling Program at CLW will not result in any serious variance to the Clearing Principles defined under Schedule 5 of the EP Act 1986. It is expected that significant flora taxa and any associated habitat impacted by the drilling program will respond in a similar manner to previous exploration activities, provided that clearing practices as stipulated under the Tronox Exploration Environmental Management Plan (EMP) (Tronox Management Pty Ltd, 2019) are adhered to.

Recommendations

It is recommended that the 2022 Exploration Drilling Program is undertaken in accordance with the controls and recommendations provided in the 2022 Cooljarloo Exploration Area Environmental Assessment Report prepared by Umwelt (Umwelt, 2022) and the Tronox EMP (Tronox Management Pty Ltd, 2019).

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1.0 Introduction

Tronox Management Pty Ltd (Tronox) propose to undertake an exploration drilling program in 2022 at the site known as Cooljarloo West (CLW). The 2022 exploration drilling program will involve a number of drill lines and access tracks of which the vegetation clearing required totals 1.068 ha. This area is calculated based on a polyline shapefile of drill lines and access tracks provided by Tronox, with a 1.5 metre buffer applied to the line. The drilling program includes approximately 3.52 km of drilling lines and access tracks and a clearing width of 3 metres. The following measures will be applied to mitigate impacts to native vegetation:

- Existing access tracks and firebreaks have been used to reduce the required clearing area.
- Vegetation clearing will be completed using a raised blade and no topsoil will be stockpiled.
- Large trees and dense patches of vegetation will be avoided.

Additionally, Umwelt undertook an assessment of the potential impacts of the 2022 exploration drilling program which was informed by field surveys completed in 2021 and a desktop review of available ecological data within the area collected during previous surveys by both Umwelt and Tronox (Umwelt, 2022).

2.0 Regulatory Context

This assessment against Clearing Principles has been prepared to support an application for a Native Vegetation Clearing Permit (NVCP) (Area) under Part V of the EP Act 1986. This assessment against Clearing Principles has been undertaken with consideration for the relevant regulatory requirements relating to NVCP Applications outlined in:

- *The Environmental Protection Act 1986*
- *The Environmental Protection (Clearing of native Vegetation) Regulations 2004*
- *A Guide to the Assessment of Application to Clear Native Vegetation (DWER, 2014)*
- *Procedure: Native Vegetation Clearing Permit (DWER, 2021b)*

3.0 Assessment of Proposed Clearing Sites against Clearing Principles

Clearing principle	Clearing Assessment	Outcome
<p>(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.</p>	<p>The proposed clearing area subject to this NVCP application totals 1.068 ha of Native Vegetation comprising six Vegetation Types (VTs) of which all are considered to be in Very Good or better condition. The VTs identified in the clearing area and extents of their clearing are:</p> <ul style="list-style-type: none"> <p>VT 1 (Local Conservation Significance¹ – Moderate): Low Open Heathland to Mid Closed Heathland of <i>Acacia lasiocarpa</i> var. <i>lasiocarpa</i>, <i>Banksia telmatiaea</i>, <i>Melaleuca seriata</i>, <i>Hakea obliqua</i> subsp. <i>parviflora</i>, <i>Regelia ciliata</i> and/or <i>Verticordia densiflora</i> var. <i>densiflora</i>, often with Mid Isolated Clumps of Shrubs to Mid Sparse Shrubland of <i>Melaleuca raphiophylla</i> on white-grey to grey-brown sand, sandy loam or sandy clay in broad damp depressions on flat to gently undulating plains. (0.4075 ha)</p> <p>VT 5 (Local Conservation Significance¹ – High): Low Heathland to Mid Closed Heathland of <i>Banksia telmatiaea</i>, <i>Hakea obliqua</i> subsp. <i>parviflora</i>, <i>Melaleuca seriata</i> and/or <i>Regelia ciliata</i> on white-grey to grey-brown sand, sandy loam, sandy clay or clay loam in broad damp depressions on flat to gently undulating plains. (0.0396 ha)</p> <p>VT 6 (Local Conservation Significance¹ – Very high): Low Isolated Clumps of Trees to Low Woodland of <i>Banksia attenuata</i>, <i>Banksia menziesii</i> and/or <i>Banksia ilicifolia</i> over Low Sparse Shrubland to Mid Closed Shrubland of <i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>, <i>Banksia telmatiaea</i>, <i>Beaufortia squarrosa</i>, <i>Hypocalymma angustifolium</i>, <i>Jacksonia nutans</i> and/or <i>Melaleuca seriata</i> over Low Isolated Clumps of Sedges to Mid Sedgeland of <i>Anarthria laevis</i> and/or Low Isolated Clumps of Rushes of <i>Chordifex sinuosus</i> on white-grey to grey-brown sand in damp depressions. (0.0458 ha)</p> <p>VT 9b (Local Conservation Significance¹ – Very High): Low Woodland to Mid Open Forest of <i>Eucalyptus rudis</i> subsp. <i>rudis</i> over Low Isolated Clumps of Trees to Low Closed Forest of <i>Melaleuca raphiophylla</i>, often with Tall Sparse Shrubland to Tall Shrubland of <i>Acacia saligna</i> subsp. <i>lindleyi</i>, over Low Isolated Clumps of Forbs to Low Closed Forbland of <i>*Galium murale</i>, <i>*Hypochaeris glabra</i>, <i>*Lysimachia arvensis</i> and <i>Trachymene pilosa</i> on grey to grey-black sand, sandy loam, sandy clay or clayey sand in wetlands, broad shallow basins/depressions and drainage lines. (0.4746 ha)</p> <p>VT 17 (Local Conservation Significance¹ – Moderate): Low Isolated Clumps of Trees to Low Open Forest of <i>Banksia attenuata</i>, <i>Banksia menziesii</i> and <i>Eucalyptus todtiana</i> over Mid Isolated Clumps of Shrubs to Mid Shrubland of <i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>, <i>Eremaea pauciflora</i>, <i>Jacksonia floribunda</i>, <i>Jacksonia nutans</i>, <i>Stirlingia latifolia</i> and <i>Xanthorrhoea preissii</i> over Low Isolated Clumps of Shrubs to Low Shrubland of <i>Bossiaea eriocarpa</i>, <i>Dasyopogon obliquifolius</i>, <i>Eremaea asterocarpa</i> subsp. <i>asterocarpa</i>, <i>Eremaea pauciflora</i>, <i>Hibbertia crassifolia</i>, <i>Hibbertia hypericoides</i>, <i>Jacksonia nutans</i>, <i>Melaleuca clavifolia</i>, <i>Patersonia occidentalis</i> var. <i>occidentalis</i> and <i>Petrophile linearis</i> over Low Isolated Clumps of Sedges to Mid Open Sedgeland of <i>Mesomelaena pseudostygia</i> on white or grey sand on undulating plains and low dunes. (0.079 ha)</p> 	<p>The proposed clearing is considered not to be at variance to this principle.</p>

Clearing principle	Clearing Assessment	Outcome
	<ul style="list-style-type: none"> • VT 18 (Local Conservation Significance¹ – Moderate): Low Isolated Clumps of Trees to Low Open Forest of <i>Banksia attenuata</i> and <i>Banksia menziesii</i> over Mid Isolated Clumps of Shrubs to Mid Shrubland of <i>Allocasuarina humilis</i>, <i>Conospermum stoechadis</i> subsp. <i>stoechadis</i>, <i>Eremaea pauciflora</i>, <i>Hakea costata</i> and/or <i>Xanthorrhoea preissii</i> over Low Isolated Clumps of Shrubs to Low Closed Shrubland of <i>Bossiaea eriocarpa</i>, <i>Calothamnus sanguineus</i>, <i>Dasyopogon obliquifolius</i>, <i>Eremaea pauciflora</i>, <i>Hibbertia hypericoides</i>, <i>Jacksonia nutans</i> and/or <i>Melaleuca clavifolia</i> over Low Isolated Clumps of Sedges to Mid Open Sedgeland of <i>Mesomelaena pseudostygia</i> on grey to yellow-grey sand on undulating plains and low dunes or white-grey to grey-brown sand, sandy loam or sandy clay loam on simple slopes, open depressions or flats within undulating plains. (0.021 ha) <p>¹Conservation Significance Ratings are defined in Table B-1 of Umwelt (2022).</p> <p>Of these VTs, VTs 6 and 9b were rated as Very High significance to overall or regional conservation of taxa in the area (Umwelt, 2022). These VTs are locally restricted within the CLW Study Area (Umwelt, 2014), however are considered to be represented or likely represented within conservation reserves or Unallocated Crown Land (UCL) outside the CLW Study Area. The total area of VT 6 and 9b that have been mapped in the CLW Study Area is 622.47 ha, and the proposed clearing represents 0.0108% of the mapped area. Impacts are also minimised through the proposed method of raised blade clearing.</p> <p>Desktop reviews of available data indicated 118 significant flora taxa known to occur within the CLW area (Umwelt, 2022, Table 4-1) and an assessment of likelihood and significance of impact identified 11 of these taxa that may be impacted by the CLW exploration drilling program and are either listed Threatened taxa or are considered to be of High significance to the regional conservation status of the taxon. Impacts to significant flora taxa are further discussed under Principle (C).</p>	
<p>(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a significant habitat for fauna indigenous to Western Australia</p>	<p>No fauna habitat is expected to be significantly impacted in a local or regional context. There is a minimal extent of clearing within VTs intersected by the 2022 exploration drilling program in comparison to the remaining areas they occupy, and the proposed clearing is not expected to result in the fragmentation or degradation of these VTs or any fauna habitat they may provide.</p> <p>The majority of the vegetation surveyed at CLW is considered to be suitable foraging habitat for the Carnaby’s Cockatoo (Umwelt, 2022), and all areas, except for a portion of CLW_2022_22 and the entirety of CLW_2022_5, are currently mapped as “potential feeding habitat requiring further investigation” (DBCA, 2018a). Furthermore, CLW_2022_5 is contained within a confirmed breeding area for the Carnaby’s cockatoo which is approximately 5 km to the east of the remaining clearing sites (DBCA, 2018b) and confirmed Black Cockatoo roosting sites are mapped approximately 12 km to the northwest (DBCA, 2019b).</p> <p>Given the temporary nature and extent of clearing of these vegetation types in comparison to their remaining extent, it is not expected that clearing activities will result in the loss of significant habitat for the Carnaby’s Cockatoo. The method of clearing which involves avoiding large trees likely to support breeding or roosting habitat will also ensure that impacts to these habitat types are insignificant. Therefore, no significant fauna habitat is considered at risk of being impacted by the proposed clearing sites, including trees considered suitable roosting or nesting habitat for Carnaby’s Cockatoo.</p>	<p>The proposed clearing is considered not to be at variance to this principle.</p>

Clearing principle	Clearing Assessment	Outcome
<p>(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora</p>	<p>Of the 118 significant flora taxa are known to occur within the CLW area, a desktop assessment of likelihood and significance of impact identified 11 taxa that are either listed Threatened Taxa or are Priority Taxa considered to be of High regional significance that could potentially be impacted by the 2022 exploration drilling program (Umwelt, 2022, p. 20). There will be a Low level of local impacts on the preferred habitat (VTs) of these taxa, noting that the habitat of <i>Caladenia denticulata</i> subsp. <i>albicans</i> (P1) and <i>Poranthera asybosca</i> could not be assessed as their preferred habitat requires verification (Umwelt, 2022, pp. 106-107).</p> <p>The 2022 exploration drilling program is not located in the vicinity of known locations of <i>Caladenia denticulata</i> subsp. <i>albicans</i> (P1), and no potential individuals of were located in fruit. It is considered unlikely that this taxa occurs in proposed clearing areas subject to this NVCP application. Provided that the proposed drilling occurs outside of the period when plants will be present, any plants potentially occurring in areas to be impacted are also less likely to be affected by drilling activities (Umwelt, 2022, p. 106).</p> <p>No Threatened taxa were recorded during surveys of proposed clearing sites and the 2022 exploration drilling program is therefore not expected to impact any Threatened flora. A total of 11 Priority flora taxa were recorded during surveys and none of which are likely to be of high regional significance (listed below). Impacts to these Priority-listed species will be temporary and all significant flora taxa are likely to re-establish on cleared drill lines and access tracks given that the vegetation will not be completely removed.</p> <ul style="list-style-type: none"> • <i>Arnocrinum gracillimum</i> (P3) • <i>Babingtonia urbana</i> (P3) • <i>Beaufortia bicolor</i> (P3) • <i>Chordifex reseminans</i> (P2) • <i>Conostephium magnum</i> (P4) • <i>Grevillea</i> sp. <i>Cooljarloo</i> (B.J. Keighery 28 B) (P1) • <i>Isopogon panduratus</i> subsp. <i>Palustris</i> (P3) • <i>Poranthera asybosca</i>* (P1) • <i>Schoenus pennisetis</i> (P4) • <i>Stylidium hymanocraspedum</i> (P3) • <i>Verticordia lindleyi</i> subsp. <i>lindleyi</i> (P4) <p>*Based on DBCA records, <i>Poranthera asybosca</i> (P1), is known from a single population just north of Eneabba (WAHerb, 1998–) and was initially classified as of High Regional Significance. However, Umwelt have recently recorded this species within the wider</p>	<p>The proposed clearing is considered not likely to be at variance to this principle.</p>

Clearing principle	Clearing Assessment	Outcome
	<p>Tronox Dongara Study Area, and several areas between Eneabba and Jurien. Additionally, the recording of this species in a common, widespread VT by this current survey provides some indication that this species may potentially be somewhat common and widespread in the CLW Study Area (Umwelt, 2022).</p>	
<p>(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community</p>	<p>A review of the EPBC Act Protected Matters Search Tool database for the CLW Study Area (DAWE, 2021) indicates that the ‘Banksia Woodlands of the Swan Coastal Plain’ TEC (Endangered) and the Tuart (<i>Eucalyptus gomphocephala</i>) Woodlands and Forests of the Swan Coastal Plain TEC (Critically Endangered) are likely to occur in the CLW Area.</p> <p>Further desktop and field assessment has found that the EPBC-listed TEC ‘Banksia Woodlands of the Swan Coastal Plain’ (Endangered) is represented by VTs 17, 18 and a single occurrence of VT 6 intersected by drill line CLW_2022_07. As a result, a total of 0.55 ha of this TEC is intersected by the proposed clearing sites at CLW (Umwelt, 2022, Table 4-11).</p> <p>However, the TEC is known to be widespread at both CLW and other exploration sites within the area with over 22,000 ha having been mapped as either VT 17 or 18 at CLW alone. Additionally, it is also considered that the method of clearing, where vegetation is generally driven over rather than cleared and the majority of large trees (including Banksia species) are avoided, results in a short-term impact only (Umwelt, 2022). Therefore, no patches of the TEC are being completely removed, and the short-term impact does not result in fragmentation or permanent reduction of the TEC, which are the primary threats to this TEC (TSSC, 2016). No VTs mapped within the Cooljarloo West Study Area were found to represent The Tuart (<i>Eucalyptus gomphocephala</i>) Woodlands and Forests of the Swan Coastal Plain TEC (Critically Endangered) and no other TECs or DBCA-classified PECs are known to occur in the CLW area (Umwelt, 2022).</p>	<p>The proposed clearing is considered as may be at variance to this principle.</p>
<p>(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared</p>	<p>The 2022 CLW Drilling Program vegetation clearing subject to this NVCP application intersects two Vegetation System Associations (VSAs) as defined by (Shepherd et al., 2002), being Bassendean 1030 and Le Sueur 1031 (DPIRD, 2019a). The Bassendean 1030 and Le Sueur 1031 vegetation system associations have 69.1 % and 32.6 % of their pre-European extent remaining respectively (DBCA, 2019a), with the proposed CLW clearing activities only temporarily reducing their extent by a small amount (0.975 ha and 0.092 ha, respectively) (Umwelt, 2022).</p> <p>As discussed previously, the VTs mapped during field surveys that are locally restricted within the CLW Study Area (VT6 and 9b) are considered to be represented or likely represented within conservation reserves or Unallocated Crown Land (UCL) outside the CLW Study Area. As a result, the level of local impact to VTs or VSAs is considered to be Low, with only a very small area to be temporarily cleared.</p>	<p>The proposed clearing is considered not to be at variance to this principle.</p>
<p>(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment</p>	<p>The nearest mapped permanent watercourses are:</p> <ul style="list-style-type: none"> • Nambung River (Major River) – 20 km to the northwest (Landgate, 2022) • Moore River (Major River) – 40 km to the south (Landgate, 2022) 	<p>The proposed clearing is considered as may be at</p>

Clearing principle	Clearing Assessment	Outcome
<p>associated with a watercourse or wetland</p>	<p>The proposed clearing sites also intersect the following areas mapped as permanent wetlands:</p> <ul style="list-style-type: none"> • 0.5218 ha of Lancelin Defence Training Area – Directory of Important Wetlands (DBCA, 2018c) • 0.5218 ha of Palusplain Wetland – Geomorphic Wetlands of Cervantes South (DBCA, 2017) <p>Lancelin Defence Training Area is registered within the Directory of Important Wetlands under Criteria 1 and 2 and is classified as an A5, B14 and B10 wetland type (See DCCEEW, 2021, for more) with a current extent of 9,930.41 ha of which 0.0053% is proposed for clearing for this Project. The Geomorphic Wetland Types of Cervantes South have not yet been evaluated for conservation significance however, there is 20,221.05 ha of Palusplain wetlands mapped within Cervantes South and 0.0026 % is proposed for clearing at CLW.</p> <p>The proposed clearing is considered minimal in comparison to the remaining extent of these wetlands and is unlikely to cause any impacts on surface or ground water hydrology, with no surface water present at the time of survey and exploration activities to be completed during the summer months (discussed further under Principle (I)).</p> <p>The wetland vegetation intersected by the proposed clearing sites primarily contain low shrubland vegetation and are only likely to be seasonally moist, with surface water generally unlikely to be present. VTs 1 and 5, although not restricted vegetation types, are known to occur in damp depressions that are considered to be wetland areas. VTs 6 and 9b also occur in damp depressions and are also considered to be wetland areas. Several proposed exploration drill lines and access intersect these VTs, but the impact of the 2022 exploration drilling program is not considered likely to be significant (Umwelt, 2022).</p>	<p>variance to this principle.</p>
<p>(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation</p>	<p>The Department of Primary Industries and Regional Development (DPIRD) classifies the generalised agricultural land use in the CLW area as “Live Stock – Grazing” (DPIRD, 2018a). DPIRD mapping of land use capability (DPIRD, 2018b) indicates:</p> <ul style="list-style-type: none"> • 0.415 ha of the proposed clearing intersects “>70% of land has low capability for Grazing” (0.00027% in the Shire) • 0.627 ha of the proposed clearing intersects “50-70% of land has low capability for Grazing” (0.0004% in the Shire) • 0.025 ha of the proposed clearing intersects “50-70% of land has moderate to high capability for Grazing” (0.00002% in the Shire) <p>As a result, it is not expected that the proposed clearing will result in any appreciable degradation of existing land use capability given the primarily low capability for Grazing and minimal extent of clearing in comparison to the remaining land within the Shire of Dandaragin.</p> <p>Soil quality mapped by DPIRD within the CLW area has identified the primary soil risks of concern as wind erosion, waterlogging, and subsurface acidity. The small extent of proposed clearing in comparison to the vegetation remaining undisturbed within the CLW area as well as the nature of the clearing method (where vegetation is generally driven over rather than cleared, and the</p>	<p>The proposed clearing is considered not to be at variance to this principle.</p>

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	<p>majority of large trees are avoided) results in a short-term impact only, suggesting that the clearing is unlikely to exacerbate any of the soil risks identified. The proportion of each soil risk classification within the proposed clearing area of 1.068 ha is detailed below:</p>																																																	
	<table border="1"> <thead> <tr> <th data-bbox="401 423 1409 462">Soil Risk Quality</th> <th data-bbox="1409 423 1730 462">% Proposed Clearing Area</th> </tr> </thead> <tbody> <tr> <td colspan="2" data-bbox="401 462 1730 501">Wind Erosion (DPIRD, 2019h)</td> </tr> <tr> <td data-bbox="401 501 1409 540">>70% of map unit has a high to extreme wind erosion risk</td> <td data-bbox="1409 501 1730 540">78%</td> </tr> <tr> <td data-bbox="401 540 1409 579">30-50% of map unit has a high to extreme wind erosion risk</td> <td data-bbox="1409 540 1730 579">22%</td> </tr> <tr> <td colspan="2" data-bbox="401 579 1730 618">Flood Risk (DPIRD, 2019b)</td> </tr> <tr> <td data-bbox="401 618 1409 657">3-10% of the map unit has a moderate to high flood risk</td> <td data-bbox="1409 618 1730 657">17%</td> </tr> <tr> <td data-bbox="401 657 1409 696"><3% of the map unit has a moderate to high flood risk</td> <td data-bbox="1409 657 1730 696">83%</td> </tr> <tr> <td colspan="2" data-bbox="401 696 1730 735">Waterlogging (DPIRD, 2019g)</td> </tr> <tr> <td data-bbox="401 735 1409 774">50-70% of map unit has a moderate to very high waterlogging risk</td> <td data-bbox="1409 735 1730 774">59%</td> </tr> <tr> <td data-bbox="401 774 1409 813">10-30% of map unit has a moderate to very high waterlogging risk</td> <td data-bbox="1409 774 1730 813">15%</td> </tr> <tr> <td data-bbox="401 813 1409 852">3-10% of map unit has a moderate to very high waterlogging risk</td> <td data-bbox="1409 813 1730 852">24%</td> </tr> <tr> <td data-bbox="401 852 1409 891"><3% of map unit has a moderate to very high waterlogging risk</td> <td data-bbox="1409 852 1730 891">2%</td> </tr> <tr> <td colspan="2" data-bbox="401 891 1730 930">Water Erosion (DPIRD, 2019f)</td> </tr> <tr> <td data-bbox="401 930 1409 969">3-10% of map unit has a high to extreme water erosion risk</td> <td data-bbox="1409 930 1730 969">17%</td> </tr> <tr> <td data-bbox="401 969 1409 1008"><3% of map unit has a high to extreme water erosion risk</td> <td data-bbox="1409 969 1730 1008">83%</td> </tr> <tr> <td colspan="2" data-bbox="401 1008 1730 1047">Subsurface Acidity (DPIRD, 2019e)</td> </tr> <tr> <td data-bbox="401 1047 1409 1086">>70% of map unit has a high subsurface acidification risk or is presently acid</td> <td data-bbox="1409 1047 1730 1086">100%</td> </tr> <tr> <td colspan="2" data-bbox="401 1086 1730 1125">Phosphorous Export (DPIRD, 2019c)</td> </tr> <tr> <td data-bbox="401 1125 1409 1164">>70% of map unit has a high to extreme phosphorus export risk</td> <td data-bbox="1409 1125 1730 1164">24%</td> </tr> <tr> <td data-bbox="401 1164 1409 1203">30-50% of map unit has a high to extreme phosphorus export risk</td> <td data-bbox="1409 1164 1730 1203">74%</td> </tr> <tr> <td data-bbox="401 1203 1409 1242">10-30% of map unit has a high to extreme phosphorus export risk</td> <td data-bbox="1409 1203 1730 1242">2%</td> </tr> <tr> <td colspan="2" data-bbox="401 1242 1730 1281">Salinity Risk (DPIRD, 2019d)</td> </tr> <tr> <td data-bbox="401 1281 1409 1320">3-10% of map unit has a moderate to high salinity risk or is presently saline</td> <td data-bbox="1409 1281 1730 1320">59%</td> </tr> <tr> <td data-bbox="401 1320 1409 1359"><3% of map unit has a moderate to high salinity risk or is presently saline</td> <td data-bbox="1409 1320 1730 1359">41%</td> </tr> </tbody> </table>		Soil Risk Quality	% Proposed Clearing Area	Wind Erosion (DPIRD, 2019h)		>70% of map unit has a high to extreme wind erosion risk	78%	30-50% of map unit has a high to extreme wind erosion risk	22%	Flood Risk (DPIRD, 2019b)		3-10% of the map unit has a moderate to high flood risk	17%	<3% of the map unit has a moderate to high flood risk	83%	Waterlogging (DPIRD, 2019g)		50-70% of map unit has a moderate to very high waterlogging risk	59%	10-30% of map unit has a moderate to very high waterlogging risk	15%	3-10% of map unit has a moderate to very high waterlogging risk	24%	<3% of map unit has a moderate to very high waterlogging risk	2%	Water Erosion (DPIRD, 2019f)		3-10% of map unit has a high to extreme water erosion risk	17%	<3% of map unit has a high to extreme water erosion risk	83%	Subsurface Acidity (DPIRD, 2019e)		>70% of map unit has a high subsurface acidification risk or is presently acid	100%	Phosphorous Export (DPIRD, 2019c)		>70% of map unit has a high to extreme phosphorus export risk	24%	30-50% of map unit has a high to extreme phosphorus export risk	74%	10-30% of map unit has a high to extreme phosphorus export risk	2%	Salinity Risk (DPIRD, 2019d)		3-10% of map unit has a moderate to high salinity risk or is presently saline	59%	<3% of map unit has a moderate to high salinity risk or is presently saline	41%
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	>70% of map unit has a high subsurface acidification risk or is presently acid		100%																																															
	Phosphorous Export (DPIRD, 2019c)																																																	
	>70% of map unit has a high to extreme phosphorus export risk		24%																																															
	30-50% of map unit has a high to extreme phosphorus export risk		74%																																															
	10-30% of map unit has a high to extreme phosphorus export risk		2%																																															
	Salinity Risk (DPIRD, 2019d)																																																	
	3-10% of map unit has a moderate to high salinity risk or is presently saline		59%																																															
<3% of map unit has a moderate to high salinity risk or is presently saline	41%																																																	

Clearing principle	Clearing Assessment	Outcome
<p>(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.</p>	<p>Conservation areas in proximity to CLW include:</p> <ul style="list-style-type: none"> • Unnamed Conservation Park (Reserve No. 41986) – Approx. 5 km east of CLW_2022_22 • Unnamed Nature Reserve (Reserve No. 40916) – Approx. 1 km south of CLW_2022_5 • A number of small ESAs for declared Rare Flora – nearest is approx. 1.2 km northwest of CLW_2022_20 • Large ESA for a Registered National Estate – 4 km east of CLW_2022_6 <p>There are no gazetted environmental sensitive areas and no conservation reserves intersected by the clearing sites or which may be impacted by 2022 drilling program (DWER, 2021a). With the temporary nature and minimal extent of clearing activities, indirect impacts to adjacent or nearby conservation areas are considered unlikely.</p>	<p>The proposed clearing is considered not to be at variance to this principle.</p>
<p>(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.</p>	<p>The proposed clearing sites subject to this NVCP application are encompassed within two Groundwater Areas Proclaimed under the <i>Rights in Water and Irrigation (RIWI) Act 1914</i>:</p> <ul style="list-style-type: none"> • 0.919 ha within Jurien Proclaimed Groundwater Area (DWER, 2018a) • 0.148 ha within Gingin Proclaimed Groundwater Area (DWER, 2018a) <p>The nearest Surface Water Areas proclaimed under the RIWI Act 1914 are:</p> <ul style="list-style-type: none"> • Hill River and Tributaries Catchment Surface Water Area 15 km to the north (DWER, 2018b) • Moore River and certain Tributaries Surface Water Area 27 km to the south (DWER, 2018b) <p>As discussed under Principle (f), the wetland vegetation intersected by proposed clearing sites primarily contain low shrubland vegetation and are only likely to be seasonally moist, with surface water generally unlikely to be present. Field results indicate the 2022 exploration drilling program is unlikely to cause any significant impacts on surface or ground water hydrology provided that drilling is conducted during dry soil conditions where there is no risk of surface water being present in the intersected wetland areas. Ground disturbance will be limited to vehicle tracks that are unlikely to impede surface water flows, and vegetation will not be completely removed such that surface water could cause erosion or to cause any significant change to the hydrological regime (i.e. runoff or recharge). It is considered that the possible introduction of pollutants to surface water or ground water by machinery can also be appropriately managed by Tronox under their EMP (Umwelt, 2022).</p>	<p>The proposed clearing is considered not to be at variance to this principle.</p>

Clearing principle	Clearing Assessment	Outcome
<p>(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding</p>	<p>As discussed under Principle (g), a majority of the area proposed for clearing is mapped as “<3% of the map unit has a moderate to high flood risk” (DPIRD, 2019b) and all is mapped as either “70% of map unit has a moderate to very high waterlogging risk” or lower (DPIRD, 2019g). All sites also occur on the WA Soil Group “Pale Deep Sand” (DPIRD, 2019i) which has rapid to very rapid permeability and low soil water storage potential (Schoknecht & Pathan, 2013, p. 91).</p> <p>Floodplain mapping is not available for the CLW area and BOM rainfall data from the nearest monitoring station (ID: 009037) shows an annual mean rainfall of 537 mm over the past 52 years (BOM, 2022).</p> <p>Given the small extent of clearing area proposed, temporary nature of clearing activities and soil classification within the area, and planning exploration activities during summer when low rainfall is expected, it is considered that the proposed clearing activities subject to this NVCP application will not cause or exacerbate the incidence of flooding.</p>	<p>The proposed clearing is considered not to be at variance to this principle.</p>

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