



**Legend**

Drilling Point	Existing Track - Other	Envelope	Minor Road	Coastline
Drilling Line	New Track	Highway	Tenements - Live	

Government of Western Australia  
Department of Mines, Industry Regulation and Safety

Scale: 1:123,899

0 1,250 2,500 Metres

Latitude/Longitude  
GEOCENTRIC DATUM OF AUSTRALIA 1994

06/06/2023, 04:28 PM

**TRONOX MINING AUSTRALIA Limited**  
Programme of Work: 118972

## Information Note

**By :** Toni Munro, Environmental Approval Principal

**Date:** 15 September 2023

**Subject: Osprey Deposit 2023 Drilling Program: Clearing Principle Assessment**

### 1.0 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 *Osprey Deposit 2023 Exploration Drilling Program*. It includes an assessment of proposed clearing sites at the Osprey Deposit against the 10 Clearing Principles as defined under Schedule 5 of the EP Act.

Tronox is applying the disturb 0.75 hectares of remnant native vegetation for the purpose of exploratory drilling.

### 2.0 Assessed Outcomes

The proposed *Osprey Deposit 2023 Exploration Drilling Program* 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.

### 3.0 Guidance

The 2023 Exploration Drilling Program is to be 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).

### 4.0 Background

Tronox Management Pty Ltd (Tronox) propose to undertake an exploration drilling program in 2023/24 at the site known as the Osprey Deposit. The 2023/4 exploration drilling program will involve a number of drill lines and access tracks of which the vegetation disturbance required totals **0.75 hectares** and a clearing width of up to 2.7 metres.

Exploration drilling can be undertaken with minimal vegetation disturbance, due to the type of drilling proposed. Unlike exploration for to support hard rock mining at depth, mineral sands exploration is less intrusive and more shallow. Large drill pads and laydown areas are typically not required. Each exploratory hole can be easily be accommodated within the width of the track of 2.7 m. Plates 1 and 2 are examples of minimised vegetation disturbance that is possible for mineral sands exploration.

## 5.0 Regulatory Context

Tronox has applied for a Program of Works under the *Mining Act 1978* to achieve approvals to undertake the *Osprey Deposit 2023 Exploration Drilling Program* (Application 118972). DMIRS has advised that the program will also require a Native Vegetation Clearing Permit pursuant to the *Environmental Protection Act 1986*.

This document has been prepared to support the Native Vegetation Clearing Permit application.

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)

## 6.0 Surveys and Vegetation Assessment

The proposed vegetation disturbance is located within a large study area called the Cooljarloo West Study Area. This study area has been the subject of various desktop and field assessments over the past 10 years. The results of these larger studies have been used in the development of this document:

- Umwelt. (2014). *Cooljarloo West Titanium Minerals Project Flora and Vegetation Assessment*.
- Umwelt. (2022). *Cooljarloo Exploration Area Environmental Assessment*.

Noting that the study area in these two studies was large. The area proposed in this application is a small fraction (0.75 hectares) of that outlined in the reports.

## 7.0 Avoidance and Mitigations Measures

The following measures will be applied by Tronox to mitigate impacts to native vegetation from implementation of the *Osprey Deposit 2023 Exploration Drilling Program*:

- Existing access tracks and firebreaks will be used to reduce the required clearing area.
- No ground disturbance proposed, vegetation will be driven over by vehicles, not removed from the ground;
- Vegetation clearing will be completed using a raised blade and no topsoil will be stockpiled;
- No tree removal.
- Temporary disturbance only.
- Where clearing is required (i.e. in areas of dense thicket or woodland), clearing approximately 3 metres width via loader with a raised blade/bucket avoiding disturbance of topsoil;
- The vegetation will be left to regrow after the program has been completed;



**Plate 1.** Example of minimal impact drill line. Trees have been avoided, vegetation on the track remains in-situ, minimal topsoil disturbance



**Plate 2.** Example of minimal impact drill line. Trees have been avoided, vegetation on the track remains in-situ, minimal topsoil disturbance, track limited to width of standard road vehicle.



## 8.0 Vegetation Types

The vegetation types identified by the Umwelt studies (2014 and 2022) that intersect the *Osprey Deposit 2023 Exploration Drilling Program* are outlined below.

Area	Vegetation Type
0.45 ha	VT 1 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.
0.05 ha	VT 5 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.
0.03 ha	VT 6 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.
0.21 ha	VT 17 Low Isolated Clumps of Trees to Low Open Forest of <i>Banksia attenuata</i> , <i>Banksia menziesii</i> and <i>Eucalyptus tottiana</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
0.01 ha	VT 18 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.

## 9.0 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 0.75 ha of Native Vegetation comprising five 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"> <li> <p><b>VT 1 (Local Conservation Significance<sup>1</sup> – Moderate):</b> 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.</p> </li> <li> <p><b>VT 5 (Local Conservation Significance<sup>1</sup> – High):</b> 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.</p> </li> <li> <p><b>VT 6 (Local Conservation Significance<sup>1</sup> – Very high):</b> 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.</p> </li> <li> <p><b>VT 17 (Local Conservation Significance<sup>1</sup> – Moderate):</b> 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.</p> </li> <li> <p><b>VT 18 (Local Conservation Significance<sup>1</sup> – Moderate):</b> 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.</p> </li> </ul>	<p>The proposed clearing is considered <b>not to be at variance</b> to this principle.</p>

Clearing principle	Clearing Assessment	Outcome
	<p><sup>1</sup>Conservation Significance Ratings are defined in Table B-1 of Umwelt (2022).</p> <p>Of these VTs, VT 6 was rated as Very High significance to overall or regional conservation of taxa in the area (Umwelt, 2022). This VT is to date considered locally restricted within the Cooljarloo West Study Area (Umwelt, 2014) due to studies that have been undertaken in that area. However is considered likely represented within conservation reserves or Unallocated Crown Land (UCL) outside the Cooljarloo West Study Area which have not t date been surveyed. The total area of VT 6 that have been mapped in the Cooljarloo West Study Area is 338 ha, and the proposed clearing (0.03 ha) represents 0.008% of the mapped area. Impacts are also minimised through the proposed method of raised blade clearing.</p>	
<p><b>(b)</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>The majority of the vegetation surveyed during the Cooljarloo West Study Area is considered to be suitable foraging habitat for the Carnaby's Cockatoo (Umwelt, 2022).</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>Include an assessment along the lines of substantial habitat present in the local area. This vegetation proposed for clearing doesn't represent a refuge or significant clump in an area otherwise devoid of habitat.</p>	<p>The proposed clearing is considered <b>not to be at variance</b> to this principle.</p>
<p><b>(c)</b> Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora</p>	<p>A desktop assessment was undertaken. Of the 118 significant flora taxa are known to occur within the greater Cooljarloo area, the 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 proposed drilling program (Umwelt, 2022). 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 by a desktop review as their preferred habitat requires field verification (Umwelt, 2022).</p> <p>The 2023 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 during field work. 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>Field surveys were undertaken in spring 2021. No Threatened taxa were recorded during field surveys of proposed clearing sites and the 2023 exploration drilling program is therefore not expected to impact any Threatened flora.</p>	<p>The proposed clearing is considered <b>not likely to be at variance</b> to this principle.</p>

Clearing principle	Clearing Assessment	Outcome
	<p>A total of 7 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"> <li>• <i>Poranthera asybosca</i><sup>+</sup> (P1)</li> <li>• <i>Chordifex reseminans</i> (P2)</li> <li>• <i>Isopogon panduratus</i> subsp. <i>Palustris</i> (P3)</li> <li>• <i>Babingtonia urbana</i> (P3)</li> <li>• <i>Verticordia lindleyi</i> subsp. <i>lindleyi</i> (P4)</li> <li>• <i>Schoenus pennisetis</i> (P4)</li> <li>• <i>Conostephium magnum</i> (P4)</li> </ul> <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 Tronox Dongara Study Area, Cooljarloo West 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 (Umwelt, 2022).</p>	



Clearing principle	Clearing Assessment	Outcome
<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>Desktop and field assessment have found that the EPBC-listed TEC 'Banksia Woodlands of the Swan Coastal Plain' (Endangered) is represented by VTs 17, 18 and VT 6. As a result, a total of 0.25 ha of this TEC is intersected by the proposed disturbance sites (Umwelt, 2022).</p> <p>The TEC is known to be widespread at the Cooljarloo West exploration area 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).</p> <p>No other TECs or DBCA-classified PECs are known to occur in the area (Umwelt, 2022).</p>	<p>The proposed clearing is considered as <b>may be at variance</b> 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 2023 Drilling Program vegetation clearing subject to this NVCP application intersects one Vegetation System Association (VSA) as defined by (Shepherd et al., 2002), being Bassendean 1030. The Bassendean 1030 vegetation system association has 69.1% of their pre-European extent remaining respectively (DBCA, 2019a), with the proposed clearing activities only temporarily reducing their extent by a small amount (0.75 ha).</p> <p>As discussed previously, the VTs mapped during field surveys that are locally restricted within the application Area (VT6 ) is considered to be well represented or likely represented within conservation reserves or Unallocated Crown Land (UCL) outside the application 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 <b>not to be at variance</b> to this principle.</p>
<p>(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland</p>	<p>The nearest mapped permanent watercourses are:</p> <ul style="list-style-type: none"> <li>• Nambung River (Major River) – 20 km to the northeast (Landgate, 2022)</li> <li>• Moore River (Major River) – 40 km to the south (Landgate, 2022)</li> </ul> <p>The proposed clearing sites are largely located within the boundary of or immediately adjacent to a wetland area listed in the Directory of Important Wetlands (DBCA, 2018c). This area is known as "Lancelin Defence Training Area". It 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 &lt; 0.005% is proposed for temporary disturbance for this application (0.75 ha).</p>	<p>The proposed clearing is considered <b>as may be at variance</b> to this principle.</p>

Clearing principle	Clearing Assessment	Outcome
	<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 <b>Principle (I)</b>).</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. VT 6 also occur in damp depressions and is also considered to be wetland area. Several proposed exploration drill lines and access intersect these VTs, but the impact of the exploration drilling program is not considered likely to be significant (Umwelt, 2022).</p> <p>The exploration drill program is proposed to be undertaken in the dry season, which will avoid interactions with surface water. Drill holes are backfilled immediately prior to departure from site.</p>	
<p><b>(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation</b></p>	<p>Soil quality mapped by DPIRD within the greater Cooljarloo West 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 area as well as the nature of the clearing method (where vegetation is generally driven over rather than cleared, and the 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.</p>	<p>The proposed clearing is considered <b>as not to be at variance</b> to this principle.</p>
<p><b>(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.</b></p>	<p>There are no conservation areas which may be impacted by the proposed drilling program. An ESA is recognised in the application area due to the Lancelin Defence Area wetland, see Principle (f).</p> <p>With the temporary nature and minimal extent of clearing activities, indirect impacts to adjacent or nearby conservation areas are considered unlikely.</p> <p>Conservation areas in proximity to application area include:</p> <ul style="list-style-type: none"> <li>• Wongonderrah Nature Reserve – approximately 4.4 km North of the application area</li> <li>• Unnamed Nature Reserve (Reserve No. 40916) – approximately. 4 km south of the application area</li> <li>• Unnamed Conservation Park (Reserve No. 41986) – approximately 5 km east of the application area</li> </ul>	<p>The proposed clearing is considered <b>as may be at variance</b> to this principle.</p>

Clearing principle	Clearing Assessment	Outcome
<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 application are encompassed within the Gingin Proclaimed Groundwater Areas under the <i>Rights in Water and Irrigation (RIWI) Act 1914</i>:</p> <p>The nearest Surface Water Areas proclaimed under the RIWI Act 1914 are:</p> <ul style="list-style-type: none"> <li>• Hill River and Tributaries Catchment Surface Water Area 15 km to the north</li> <li>• Moore River and certain Tributaries Surface Water Area 27 km to the south</li> </ul> <p>As discussed under <b>Principle (f)</b>, 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 2023 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 <b>not to be at variance</b> to this principle.</p>
<p>(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding</p>	<p>The majority of the area proposed for clearing is mapped as “&lt;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 &amp; Pathan, 2013, p. 91).</p> <p>Floodplain mapping is not available for the 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, 2022a).</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 <b>not to be at variance</b> to this principle.</p>

## 10.0 References

- Bureau of Meteorology (BOM). (2022a). *Climate Data Online: Monthly climate statistics (Site number 009037)*. Retrieved August 2022 from [Database] [http://www.bom.gov.au/climate/averages/tables/cw\\_009037.shtml](http://www.bom.gov.au/climate/averages/tables/cw_009037.shtml)
- Bureau of Meteorology (BOM). (2022b). *Groundwater Dependent Ecosystems Atlas*. Retrieved August 2022 from [Database] <http://www.bom.gov.au/water/groundwater/gde/map.shtml>
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