Appendix A

Risk Assessment

ID	THEME	ENVIRON-MENTAL FACTOR	Environmental Objective	POTENTIAL IMPACT (How the Project interacts with assets, values, uses and location. Include clear description of the cause)	CONSEQUENCE (Clearly understand what is the final impact. Describe whether it is construction, operation or decommissioning)	EXISTING CONTROL MEASURES	INITIAL RISK RATING			ADDITIONAL CONTROL MEASURES	RESIDUAL RISK RATING		
							C	L	RR		C	L	RR
1. Land													
1.1.1		1.1 Landforms	Conserve the variety and integrity of distinctive physical landforms.	1.1.1 Stockpiling of soil, vegetation and road base material during construction leads to alteration of landforms via erosion and sedimentation.	1.1.1.1 Landscape function is degraded as vegetation stockpiles facilitate erosion and sedimentation. 1.1.1.2 Erosion of the landscape and build up of sediments in low-lying areas, drainage pathways and waterways.	Soil handling activities will primarily be conducted during the dry season, eliminating the impacts of significant rain events on soil handling and stockpiling activities. Buffer zones of 20 metres will be maintained between stockpiles and and around draining lines. All stockpiles are managed and handled in accordance with the Erosion Sediment Control Plan. Stockpiles are positioned on flat ground, and not in close proximity to natural vegetation (buffer of 20 metres). Green waste stockpiles are kept at a maximum height of 2 metres prior to the onset of wet season to reduce risk of debris being blown away or disturbed during extreme weather events. The toe of soil and road base material stockpiles is bunded prior to the onset of the wet season to prevent soil movement during wet weather events.	**3 - Moderate**	**3 – Possible**	**9 - Medium**	Contractors will adhere to Section 21 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 2.16.2 and 16.4.4 of the Standard Specification for Roadworks ver 4.2	**3 - Moderate**	**1 – Rare**	**3 - Low**
1.1.2				1.1.2 Vehicles accessing water resources (natural water bodies and bore locations) causing land and bank erosion on tracks accessing water points.	1.1.2.1 Erosion of the landscape and build up of sediments in low-lying areas, drainage pathways and waterways. Decline in surface water quality due to track erosion.	Construction and water resource management activities will primarily be conducted during the dry season, eliminating the impacts of significant rain events on vehicular access routes and minimising the potential of access track erosion and its consequences. Assessment of each natural water body source point will be assessed for suitability of access. Vehicles will use new and existing tracks only. Driving through waterways with unmarked tracks or tracks without construction controls will not be permitted. New and existing tracks will be gravel laid prior to use by water trucks to prevent erosion. Tracks and turnarounds will be set well back from waterholes and creeks to protect bank integrity and keep sensitive riparian vegetation undisturbed.	**3 - Moderate**	**2 – Unlikely**	**6 - Medium**	Contractors will adhere to Section 23.4 and Section 24.2 of the DIPL Standard Specification for Environmental Management ver 2.0	**3 - Moderate**	**1 – Rare**	**3 - Low**
1.1.3				1.1.3 The creation of gravel pits during construction leads to alteration of landforms via erosion and sedimentation.	1.1.3.1 Landscape function is degraded and surrounding habitats are fragmented, damaged and/or lost.	Gravel pit excavations will primarily be conducted during the dry season, eliminating the impacts of significant rain events on gravel handling and stockpiling activities. All bare ground earthworks are stabilised (by vehicular compaction) to progressively return the soil to a stable, non-eroding condition equal to or better than the existing condition. Toe of soil and gravel stockpiles will be bunded prior to the onset of the wet season to prevent soil movement during wet weather events.	**3 - Moderate**	**3 – Possible**	**9 - Medium**	Contractors will adhere to Section 19 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 4 of the Standard Specification for Roadworks ver 4.2 A gravel pit management plan will be developed by the contractor that will outline controls for erosion and sediment control, and progressive rehabilitation.	**3 - Moderate**	**1 – Rare**	**3 - Low**
1.2.1		1.2 Terrestrial environmental quality		1.2.1 Vegetation clearing of the project area leads to exposed soils, land degradation and soil erosion.	1.2.1.1 Soils are destabilised and eroded by wind and water. Erosion leads to changed landforms and sedimentation.	Vegetation clearing activities will be conducted during the dry season, eliminating the impacts of rain and wind events on vegetation stockpiling and exposed ground surfaces. All earthwork formations, stockpiles and roads will be sprayed with water (or other suitable liquids) for dust suppression. Dust generating activities will be stopped if they cannot be adequately controlled by water or dust suppressants. Materials transported to and from the site are covered and loaded in a manner that will prevent dust generation and spillage of materials. A Traffic Management Plan will be developed and implemented prior to project initiation. Soil erosion measures as specified in 1.1.2 will be implemented. Erosion and sediment control measures comply with the following requirements: a.) Early installation of all drainage erosion and sediment control measures. b.) Control measures will be in place prior to the commencement of works c.) All erosion and sediment control measures are to be installed and maintained in good working order. d.) Any runoff from the site will comply with the requirements of the DEPWS Guidelines and relevant legislation. e.) Contractor daily site inspections will consist of visual assessment of erosion and sediment control structures to verify their condition and effectiveness. Records of inspections will be kept and made available upon request. f.) Control measure will be inspected throughout the duration of works and particularly following each rain event. g.) Control measures will be rearrange and reposition as required to maintain their efficiency. h.) Sediment collected by control measures will be handled and disposed of in a manner approved by the Superintendent. i.) All temporary control measures will be removed following rehabilitation or when otherwise no longer required.	**3 - Moderate**	**3 – Possible**	**9 - Medium**	Contractors will adhere to Section 6 of the DIPL Standard Specification for Environmental Management ver 2.0. An approved Erosion and Sediment Control Plan (ESCP) to be implemented during construction. Contractors will adhere to Section 3 of the Standard Specification for Roadworks ver 4.2.	**3 - Moderate**	**2 – Unlikely**	**6 - Medium**

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1.2.2		1.2 Terrestrial environmental quality	Protect the quality and integrity of land and soils so that environmental values are supported and maintained	1.2.2 Stockpiling of soil and vegetative material (e.g. logs) during construction leads to spontaneous combustion or increased fuel fire load.	1.2.2.1 Fire leads to loss of vegetation, loss of habitat for fauna and a safety hazard for construction personnel.	Lighting of fires for clearing of vegetation or disposal of rubbish is prohibited at all times. Accidental fires are extinguished immediately if appropriate and safe to do. Stockpiled vegetation and mulch height is kept under 2.25 meters and will be turned over every 2 weeks following placement to reduce risk of pyrolysis and spontaneous combustion. A designated smoking area will be provided at the site office with butt disposal bins. Appropriate and sufficient firefighting equipment is accessible, sign posted and inspected and maintained in accordance with relevant Australian Standards. All potential sources of sparks, flame or heat which may generate fire will be identified and eliminated. The Contractor will establish protocols to ensure early detection and communication of fires to appropriate authorities, including fire awareness training for staff and sub-contractors in high fire risk areas.	**3 - Moderate**	**2 – Unlikely**	**6 - Medium**	Contractors will adhere to Section 26.5 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 4 of the Standard Specification for Roadworks ver 4.2..	**3 - Moderate**	**1 – Rare**	**3 - Low**
1.2.3		1.2 Terrestrial environmental quality		1.2.3 Soil contamination (e.g. surface soils) by oil, fuels and lubricant spills.	1.2.3.1 Soil are contaminated during construction with fuels and other chemicals used for the construction of the roads.	Chemicals and dangerous goods will be applied, stored, transported and handled in accordance with all relevant legislation, manufacturer's instructions and the relevant Safety Data Sheets. Temporary bunding will be applied when refueling or maintaining plant and equipment, mix cutting oil with bitumen, or any other activity which may result in the spillage of a chemical, fuel or lubricant on any environmentally sensitive area. Any water discharged from bunded areas will comply with applicable legislation and if required be appropriately treated prior to discharge. Spill clean-up and containment equipment and materials, appropriate for the type and quantities of chemicals used on site, will be kept on site at all times during the works and in a readily accessible location and when fuel operated machinery is being used and machinery operators will be trained in the use of the spill kit. All chemical spills will be reported to the Superintendent. All chemical spills will be cleaned up immediately. This may require the excavation of contaminated soil and appropriate remediation or disposal at waste disposal facility. If spills result in an environmental incident, that incident will be reported in accordance with reporting procedures and legislative requirements.Where appropriate, spills will also be reported to the NT Pollution Hotline, phone 1800 064 567. All site personnel will be trained in containment of materials, including appropriate storage of chemicals if materials must be on site whilst any works are conducted on site. All site personnel will be aware of the location of spill kits on sites.	**2 - Minor**	**2 – Unlikely**	**4 - Low**	'Contractors will adhere to Section 33.1 and 33.2 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 1.13.3 of the Standard Specification for Roadworks ver 4.2	**2 - Minor**	**2 – Unlikely**	**4 - Low**
1.2.4		1.2 Terrestrial environmental quality		1.2.4 Construction excavation activities expose acid sulphate soils to the air.	1.2.4.1 Potential acid sulphate soils, when exposed to the air, can create sulfuric acid, which can be mobilised by rainfall and damage can damage local flora and fauna and wash it in to waterways.	Eliminate risk by avoiding gravel pits in potential acid sulfate soil (ASS)-containing locations Although currently not expected to encounter acid sulfate soils (ASS), Project areas that are in close proximity to modelled 'high probability' ASS will be undertaken prior to commencement of gound disturbing works. If areas designated for excavations (gravel pits or road corridors) exhibit signs of the presence of ASS, sampling will confirm the absence before excavation continues. Where ASS risks are found, an Acid Sulphate Soils Management Plan will be developed prior to commencement of ground disturbing works. The closest 'high propbability' ASS areas (mapped on NR MAPS: DEPWS, 2021) are a). approximately 400 m south of Pirlangimpi Road (one location associated with a first order intermittent stream draining to the Bremer River), and b). 250m either side of the barge landing road in Pirlangimpu community.	**3 - Moderate**	**1 – Rare**	**3 - Low**	Contractors will adhere to Section 7 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 1.26 of the Standard Specification for Roadworks ver 4.2	**2 - Minor**	**1 – Rare**	**2 - Low**
1.2.5		1.2 Terrestrial environmental quality		1.2.5 New weed species are introduced and established, and/or existing weed species spread into new areas, as a result of movement of machinery and equipment.	1.2.5.1 Increased pressure on surrounding environment through competition with weeds for resources and fauna through habitat changes.	Control and/or eradication of weeds within the site will occur in accordance with the Weeds Management Act. A Weeds and Pest Management Plan will be developed and implemented during construction. This will ensure that no declared weeds are spread or introduced within the site for the duration of the works. The reuse of weed contaminated topsoil by surface spreading is not permitted. Where necessary, horticultural advice will be sought to determine whether the type and/or proportion of weed cover is significant for the topsoil to be deemed weed contaminated. Vehicles and plant will be steam cleaned or high pressure water cleaned to remove all earth/soil to prevent the spread of weeds and pest animals before entering site from declared areas of weed and pest infestation. Excavated earth and organic material will be collected and disposed of the by a method that will ensure that it does not infest any river, stream, wetland or property. If declared weeds are present within the work area, all vehicles and mechanical plant will be steam cleaned or high pressure water clean to remove earth and organic matter before leaving the designated infested area.	**4- Major**	**3 – Possible**	**12 - High**	Contractors will adhere to Section 8 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 1.13.3 of the Standard Specification for Roadworks ver 4.2	**4- Major**	**2 – Unlikely**	**8 - Medium**

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1.2.6	1. Land	1.2 Terrestrial environmental quality		1.2.6 Through construction, volumes of construction waste will be generated and will require disposal.	1.2.6.1 Waste which is not disposed appropriately leads to degradation of the surrounding environment. This negatively impacts on terrestrial environmental quality (contamination and ecosystem degradation), aquatic ecosystems (contamination and degradation) and social aspects (visual amenity and potential degradation to hunting grounds).	Illegal dumping is strictly prohibited. All waste materials, including green waste food scraps and other putrescible wastes, construction waste, chemicals and effluent waste will be removed from the site and disposed of in an appropriate and timely manner. Waste materials will be recycled where practical. A Waste Management Register will be maintained to record the types, amounts and location of waste recycled, stockpiled and/or disposed of for the duration of the Project. Designated disposal areas (covered, do not discard into natural areas) will be applied. A waste management hierarchy will be applied when dealing with waste (avoid, reduce, reuse, recycle, recover, treat, dispose).	**2 - Minor**	**3 – Possible**	**6 - Medium**	Contractors will adhere to Section 33 and 34 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 1.9.2 of the Standard Specification for Roadworks ver 4.2	**2 - Minor**	**1 – Rare**	**2 - Low**
1.2.7		1.2 Terrestrial environmental quality		1.2.7 Construction personnel waste is released into the environment impacting on amenity and impacts on local fauna. Construction workers personal waste inappropriately disposed on site.	1.2.7.1 Waste which is not disposed appropriately leads to degradation of the surrounding environment. This negatively impacts terrestrial environmental quality (contamination and ecosystem degradation, Fauna attracted to waste on site leading to injury in proximity to construction activities), aquatic ecosystems (contamination and degradation) and social aspects (visual amenity and potential degradation to hunting grounds).	Illegal dumping is strictly prohibited. All waste materials, including green waste food scraps and other putrescible wastes, construction waste, chemicals and effluent waste will be removed from the site and disposed of in an appropriate and timely manner. Waste materials will be recycled where practical. A Waste Management Register will be maintained to record the types, amounts and location of waste recycled, stockpiled and/or disposed of for the duration of the Project. Designated disposal areas (covered, do not discard into natural areas) will be applied. A waste management hierarchy will be applied when dealing with waste (avoid, reduce, reuse, recycle, recover, treat, dispose).	**2 - Minor**	**4 – Likely**	**8 - Medium**	Contractors will adhere to Section 33 and 34 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 1.9.2 of the Standard Specification for Roadworks ver 4.2	**2 - Minor**	**2 – Unlikely**	**4 - Low**
1.3.0				1.3.0 Pest species are introduced and established.	1.3.0.1 Pest species cause increased competition with native species for some food types and habitat resources. Pest species also predate on native species. 1.3.0.2 Melville island is currently free of Cane Toads. Introduced Cane Toads cause mortality of a suite of fauna (including listed threatened species) from poisoning following predation.	A Weeds and Pest Management Plan will be developed and implemented during construction and decommissioning. Vehicles, plant and machinery will complete a weed hygiene declararion and undergo biosecurity checks prior to entering the Tiwi Islands. Vehicles and plant will be steam cleaned or high pressure water cleaned to remove all earth/soil to prevent the spread of weeds and pest animals before being transported to the island. Domestic pets are not permitted on site by construction personnel without written approval. If pets are approved, pets will be under control and safely secured at all times. All waste materials, including green waste, food scraps and other putrescible wastes, construction waste chemicals and effluent will be removed from the site and disposed of in an appropriate and timely manner.	**4- Major**	**3 – Possible**	**12 - High**	Contractors will adhere to Section 8 and 28 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 1.6.3 of the Standard Specification for Roadworks ver 4.2	**4- Major**	**2 – Unlikely**	**8 - Medium**
1.3.1				1.3.1 Construction and decommissioning activities (e.g. vehicle movements, digging) impact on biodiversity through loss and/or disturbance of threatened flora species	1.3.1.1 Direct (mortality) and indirect (Loss or disturbance of habitat) impacts to flora from vegetation clearing required for construction. 1.3.1.2 Impact on individual or population of flora (including listed threatened species) that will: - lead to a long-term decrease in the size of a population - reduce the area of occupancy of the species - fragment an existing population into two or more populations - adversely affect habitat critical to the survival of a species - disrupt the breeding cycle of a population - modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	Vegetation will not be destroyed, removed or cleared to an extent greater than is necessary for the execution of the works. Micro-siting of gravel pit extraction areas to avoid and minimise impacts to known populations of threatened flora species. Environmental risks will be minimised by following vegetation management strategies: a.) Excluding access to significant vegetation areas or areas with known significant populations of threatened species b.) Selecting appropriately sized clearing machinery and equipment c.) Minimising worksite area d.) Protecting vegetation driplines e.) Locating ancillary activities (e.g. stockpile sites, camps, parking locations, vehicle hardstands) within existing disturbed areas. f). Progressive rehabilitation of disturbed areas at the end of each season of constructions works	**3 - Moderate**	**2 – Unlikely**	**6 - Medium**	Contractors will adhere to Section 26 and 27 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 3 and 16.4.2 of the Standard Specification for Roadworks ver 4.2 Contractors will adhere to NT Land Clearing Guidelines (DENR, 2021) avoidance restrictions	**3 - Moderate**	**1 – Rare**	**3 - Low**

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1.3.2		1.3 Terrestrial ecosystems	Protect terrestrial habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning	1.3.2 Construction and decommissioning activities impact on biodiversity through loss and/or disturbance of threatened fauna species	1.3.2.1 Direct (mortality) and indirect (Loss or disturbance of potential foraging, sheltering and breeding habitat) impacts to fauna from vegetation clearing and increased traffic volumes required for construction. 1.3.2.2 Impact on individual or population of fauna (including listed threatened species) that: - leads to a long-term decrease in population size; reduces area of occupancy of the species; fragments an existing population; adversely affects habitat critical to the survival of a species; disrupts the breeding cycle of a population; modifies, destroys, removes, isolates or decreases the availability or quality of habitat to the extent that the species declines.	A pre-clearance survey will be conducted prior to the clearing and development of the site by a qualified ecologist to identify, protect and translocate any native wildlife animals within the site. Should a threatened species be identified onsite, all works the immediate area will be stopped, the Superintendent will be notified, and the most appropriate course of action will be determined and documented. During clearing activities, a qualified snake handler will be present to relocate any snakes found in the project area A qualified ecologist to be on hand to inspect excavations each morning and remove any fauna trapped in trenches/pits etc. Environmental risks will be minimised by following vegetation management strategies: a.) Excluding access to significant vegetation areas or areas with known significant populations of threatened species b.) Selecting appropriately sized clearing machinery and equipment c.) Minimising worksite area d.) Protecting vegetation driplines e.) Locating ancillary activities (e.g. stockpile sites, camps, parking locations, vehicle hardstands) within existing disturbed areas. f). Progressive rehabilitation of disturbed areas at the end of each season of constructions works	**3 - Moderate**	**2 – Unlikely**	**6 - Medium**	Contractors will adhere to Section 26 and 27 of the DIPL Standard Specification for Environmental Management ver 2.0 Contractors will adhere to Section 3 and 16.4.2 of the Standard Specification for Roadworks ver 4.2	**3 - Moderate**	**1 – Rare**	**3 - Low**
1.3.3				1.3.3 Over-extracting from waterholes and creeks impacting some fauna which depend on year-round waterholes	1.3.3.1 Direct (mortality) and indirect (Loss or disturbance of potential foraging, sheltering and breeding habitat) impacts to flora and fauna (including GDEs) from reduction in availability of surface water supply.	Water extraction should be limited or concentrated towards the early part of the dry season when water demand will be less and water supply is greater. Only 20% of flow or volume of a waterbody will be utilised in the Top End. No dams or bunds on a natural watercourse will be constructed. Where a standing water body is <500mm deep or extraction from a water body is likely to exceed 20%, an alternative water source will be sought. Any water to be extracted from groundwater bores (new and existing) or surface water bodies requires the explicit permission of the necessary stakeholders including Tiwi Land Council, DEPWS and relevant sacred sites authorities, among others.	**3 - Moderate**	**1 – Rare**	**3 - Low**	Contractors will adhere to Section 23 and 24 of the DIPL Standard Specification for Environmental Management ver 2.0	**3 - Moderate**	**1 – Rare**	**3 - Low**
1.3.4				1.3.4 Increased traffic volumnes for construction increase likelihood of fauna vehicle collisions	1.3.4.1 Impact on individual or population of fauna (including listed threatened species) that: - leads to a long-term decrease in the size of a population - disrupts the breeding cycle of a population	A CEMP will be developed that includes approproate speed limits on the roads within and surrounding the construction area. Contractor and workforce awareness of fauna vehicle collisions to encourage appropriate speeds and avoidance of night, diusk and dawn driving to reduce likelihood of this impact occuring.	**2 - Minor**	**3 – Possible**	**6 - Medium**		**2 - Minor**	**2 – Unlikely**	**4 - Low**
1.3.5				1.3.5 Lowering surface water levels by over-pumping can potentially cause springs and wetlands to dry up, and nearby streams to cease to flow	1.3.5.1 Direct (mortaily) or indirect (reduction in health or quailty of habitat) impacts to GDE ecosystems	'For this reason, it is important to concentrate the roadworks to the early periods in the dry when water demand will be less, and water supplies more. In general, an average wet season will replenish aquifers, waterholes, and creeks. Utilise construction water bores with a sustainable yield and monitor flow rates. Cease use if flow rate drops 20%.	**3 - Moderate**	**1 – Rare**	**3 - Low**	Contractors will adhere to Section 23 and 24 of the DIPL Standard Specification for Environmental Management ver 2.0	**3 - Moderate**	**1 – Rare**	**3 - Low**
1.3.6				1.3.6 Over-extraction of groundwater during the dry season may lower groundwater levels	1.3.6.1 Direct (mortality) and indirect (Loss or disturbance of potential habitat) impacts to GDEs from reduction in availability of surface water supply.	Water extraction to the early part of the dry season when water demand will be less and water supply is greater. Only 20% of flow or volume of a waterbody will be utilised in the Top End.	**3 - Moderate**	**1 – Rare**	**3 - Low**	Contractors will adhere to Section 23 and 24 of the DIPL Standard Specification for Environmental Management ver 2.0	**3 - Moderate**	**1 – Rare**	**3 - Low**

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1.3.7				1.3.7 Noise, dust and vibration generated during construction and decommissioning impact on native fauna and flora.	1.3.7.1 Direct (mortality) and indirect (Loss or disturbance of potential foraging, sheltering and breeding habitat) impact on flora and fauna from vegetation clearing, increased use of plant and machinery and higher traffic volumes during construction and decommissioning. 1.3.7.2 Impact on individual or population of fauna (including listed threatened species) that: - leads to a long-term decrease in population size; reduces area of occupancy of the species; fragments an existing population; adversely affects habitat critical to the survival of a species; disrupts the breeding cycle of a population; modifies, destroys, removes, isolates or decreases the availability or quality of habitat to the extent that the species declines.	Earthwork formations, stockpiles and roads will be sprayed with water or other suitable liquids for dust suppression. Dust generating activities which cannot be adequately controlled by water or other means will be stopped until adequate controls can be put in place. All materials transported on and/or off site will be suitably covered and loaded in a manner that will prevent dropping of materials. Exhaust systems of construction plant, vehicles and machinery will be maintained in accordance with manufacturer's specification and exhaust systems will be periodically inspected. Any equipment that is found to be defective will be decommissioned. A Traffic Management Plan will be developed and implemented prior to the commencement of construction and decommissioning activities. Where applicable the following measures will be applied to minimise the impact of noise: a.) Substitution by an alternative process b.) Restricting times when work is carried out c.) Screening or enclosures.	**3 - Moderate**	**2 – Unlikely**	**6 - Medium**	Contractors will adhere to Section 33 and 34 of the DIPL Standard Specification for Environmental Management ver 2.0	**3 - Moderate**	**1 – Rare**	**3 - Low**
2. Water													
2.1.1		2.1 Hydrological processes	Protect the hydrological regimes of groundwater and surface water so that the environmental values including ecological health, land uses and the welfare and amenity of people are maintained.	2.1.1 Changes to local hydrology pathways and processes due to placement of construction materials, equipment and final road built form.	2.1.1.1 Reduced water flow and changes to flow patterns leads to direct (mortality) and indirect (Loss or disturbance of potential foraging, sheltering and breeding habitat) impacts on flora and fauna	The Project area does not intersect any waterbodies. Buffers and no-go areas will be applied to permanent and intermittent drainage areas. Tracks and turnarounds will be set well back from waterholes and creeks to protect bank integrity and keep sensitive riparian vegetation undisturbed.	**3 - Moderate**	**1 – Rare**	**3 - Low**	Contractors will adhere to Section 23 and 24 of the DIPL Standard Specification for Environmental Management ver 2.0	**3 - Moderate**	**1 – Rare**	**3 - Low**
2.1.2				2.1.2 Over-extraction of surface water	2.1.2.1 Creek ceases to flow or waterhole dries up, or hydrology altered. If surface water body is in connection with underlying aquifer, groundwater tables nearby may be lowered causing bores to fork.	Only 20% of flow or volume of a waterbody should be utilised in the Top End. Do not construct dams or bunds on a natural watercourse. Where a standing water body is <500mm deep or extraction from a water body is likely to exceed 20%, an alternative water source should be sought, or if none are available, consult the Departments Environmental Services Branch for guidance.	**2 - Minor**	**2 – Unlikely**	**4 - Low**	Contractors will adhere to Section 23 and 24 of the DIPL Standard Specification for Environmental Management ver 2.0	**2 - Minor**	**1 – Rare**	**2 - Low**
2.1.3				2.1.3 Reduced flows in creek due to water extraction for dust suppression.	2.1.3.1 Reduced water flow and changes to flow patterns affects the health of native flora and fauna.	Only 20% of flow or volume of a waterbody should be utilised in the Top End. Do not construct dams or bunds on a natural watercourse. Streams are either spring fed or ephemeral.	**2 - Minor**	**2 – Unlikely**	**4 - Low**	'Contractors will adhere to Section 23 and 24 of the DIPL Standard Specification for Environmental Management ver 2.0	**2 - Minor**	**1 – Rare**	**2 - Low**
2.1.4				2.1.4 Degrading river banks and edges of waterbodies from traffic and use of plant.	2.1.4.1 Erosion and destabilisation of banks and surrounding areas. Degradation of local vegetation and fauna. Degradation of water quality from siltation.	Protect the banks and beds of any waterhole or river used for water extraction. Existing access tracks to surface water soures should be used. Keep vehicles away from the edge as much as possible by setting turnarounds away from water source and running layflat. Any damage incurred in the course of water extraction should be immediately repaired and the area rehabilitated. Access tracks should be prepared in order to prevent erosion and degradation.	**2 - Minor**	**2 – Unlikely**	**4 - Low**	Contractors will adhere to Section 21 - 24 of the DIPL Standard Specification for Environmental Management ver 2.0	**2 - Minor**	**1 – Rare**	**2 - Low**
2.1.5				2.1.5 Degrading water quality	2.1.5.1 Use and storage of fuels, lubricants near water bodies.	No fuels, lubricants or equipment other than pumping equipment are permitted to enter or remain at the water body. Non-permeable bunding in accordance with AS 1940 is to be provided around pump and generator equipment.	**3 - Moderate**	**1 – Rare**	**3 - Low**	Contractors will adhere to Section 21 - 24 of the DIPL Standard Specification for Environmental Management ver 2.0	**3 - Moderate**	**1 – Rare**	**3 - Low**
2.1.6				2.1.6 Groundwater extraction may cause a decline in local groundwater levels. Pumping a bore causes a cone of depression to form around the bore which decreases away from the bore.	2.1.6.1 Death or desctruction native flora	For this reason, it is important to concentrate the roadworks to the early periods in the dry when water demand will be less, and water supplies more. In general, an average wet season will replenish aquifers, waterholes, and creeks. Utilise construction water bores with a sustainable yield and monitor flow rates. Cease use if flow rate drops 20%.	**3 - Moderate**	**1 – Rare**	**3 - Low**	Contractors will adhere to Section 23 of the DIPL Standard Specification for Environmental Management ver 2.0	**3 - Moderate**	**1 – Rare**	**3 - Low**

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2.1.7	2. Water			2.1.7 Over-extraction of water	2.1.7.1 Over-extraction of groundwater during the dry season may lower groundwater levels in some places, potentially jeopardising the health of groundwater dependent ecosystems.	For this reason, it is important to concentrate the roadworks to the early periods in the dry when water demand will be less, and water supplies more. In general, an average wet season will replenish aquifers, waterholes, and creeks. Utilise construction water bores with a sustainable yield and monitor flow rates. Cease use if flow rate drops 20%.	**3 - Moderate**	**1 – Rare**	**3 - Low**	Contractors will adhere to Section 21 - 24 of the DIPL Standard Specification for Environmental Management ver 2.0	**3 - Moderate**	**1 – Rare**	**3 - Low**
2.2.1		2.2 Inland water environmental quality	Protect the quality of groundwater and surface water so that environmental values inclduing ecological health, land uses and the welfare and amenity of people are maintained.	2.2.1 Decline in water quality as a result of accidental releases of hydrocarbon or other hazardous chemicals enter adjacent waterways.	2.2.1.1 Decline in the health of inland environmental water quality as a result declined water quality.	All control measures listed in 1.2.3.1 will be employed with the addition of the below: Discharge of chemical, fuel or lubricant, or any waste material or imported fill near or into waterways will be strictly prohibited Chemical and other dangerous goods storge areas will be located greater than 50 metres of natural or built drainage lines, flood prone areas, or on slopes steeper than 1:10. Temporary bunding will be applied when refuelling or maintaining plant and equipment, mix cutting oil with bitumen, or any other activity which may result in the spillage of a chemical, fuel or lubricant on any location with direct drainage to a waterway or environmentally sensitive area. Any water discharged from bunded areas will comply with applicable legislation and if required be appropriately treated prior to discharge. Liquid paint materials or other hazardous materials will not be disposed of by flushing down any sewer, stormwater system or natural waterway. Records of all water quality checks, discharges and any remedial actions will be kept. All chemical spills will be reported to the Superintendent. Where appropriate, spills will also be reported to the NT Pollution Hotline, phone 1800 064 567.	**3 - Moderate**	**1 – Rare**	**3 - Low**	Contractors will adhere to Section 19 and 33 of the DIPL Standard Specification for Environmental Management ver 2.0	**3 - Moderate**	**1 – Rare**	**3 - Low**
2.2.2				2.2.2 the creation of gravel pits during construction results in impacts to groundwater flows and water quality.	2.2.2.1 Loss of habitat and declined health of native flora and fauna.	An Erosion and Sediment Control Plan (ESCP) will be developed and implemented during construction and decommissioning Effective precautions will be taken to prevent erosion of soil from all lands used or occupied by the Contractor. Erosion and sediment control measures will comply with the following requirements: a.) Early installation of all drainage erosion and sediment control measures. b.) Control measures will be in place prior to the commencement of works c.) All erosion and sediment control measures are to be installed and maintained in good working order. d.) Any runoff from the site will comply with the requirements of the DENR Guidelines and relevant legislation. e.) Contractor daily site inspections will consist of visual assessment of erosion and sediment control structures to verify their condition and effectiveness. Records of inspections will be kept and made available upon request. f.) Control measure will be inspected throughout the duration of works and particularly following each rain event. g.) Control measures will be rearrange and reposition as required to maintain their efficiency. h.) Sediment collected by control measures will be handled and disposed of in a manner approved by the Superintendent. i.) All temporary control measures will be removed following rehabilitation or when otherwise no longer required.	**3 - Moderate**	**1 – Rare**	**3 - Low**	Contractors will adhere to Section 19 and 24 of the DIPL Standard Specification for Environmental Management ver 2.0	**3 - Moderate**	**1 – Rare**	**3 - Low**
2.2.3				2.2.3 Vegetation clearing and disturbance of the project area leads to exposed soils and sedimentation of waterways.	2.2.3.1 Exposed soils are destablilised and eroded by water. This causes sedimentation in waterways. Whilst the soils in the project area are predominantly vertosols (which are unlikely to erode given its high clay content and low position in the landscape) sheet erosion can occur when groundcover is removed.	An Erosion and Sediment Control Plan (ESCP) will be developed and implemented during construction and decommissioning.	**3 - Moderate**	**1 – Rare**	**3 - Low**	Contractors will adhere to Section 6, 19, 21 and 26 of the DIPL Standard Specification for Environmental Management ver 2.0	**3 - Moderate**	**1 – Rare**	**3 - Low**
2.2.4				2.2.4 Construction of creek crossing leads to changes in water quality	2.2.4.1 Loss of habitat for native fauna and flora and decline in native fauna and flora health.	No creek crossings occur	**3 - Moderate**	**1 – Rare**	**3 - Low**	Contractors will adhere to Section 23 and 24 of the DIPL Standard Specification for Environmental Management ver 2.0	**3 - Moderate**	**1 – Rare**	**3 - Low**
2.2.5				2.2.5 Water diversion during construction leads to changes to water quality.	2.2.5.1 Loss of habitat for native fauna and flora and decline in native fauna and flora health.	No water diversion to occur	**3 - Moderate**	**1 – Rare**	**3 - Low**	Contractors will adhere to Section 23 and 24 of the DIPL Standard Specification for Environmental Management ver 2.0	**3 - Moderate**	**1 – Rare**	**3 - Low**
3. Air													

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3.1.1	3. Air	3.1 Air quality	Protect the air quality and minimise emissions and their impact so that environmental values are maintained.	3.1.1 Air pollution as a result of dust generated by the movement of construction vehicles and equipment on unsealed roads.	3.1.1.1 Dust reduces visibility and impacts on road safety for both road users and construction personnel.	Earthwork formations, stockpiles and roads will be sprayed with water or other suitable liquids for dust suppression. Dust generating activities which cannot be adequately controlled by water or other means will be stopped until adequate controls can be put in place. All materials transported on and/or off site will be suitably covered and loaded in a manner that will prevent dropping of materials. Exhaust systems of construction plant, vehicles and machinery will be maintained in accordance with manufacturer's specification and undertaking periodic visual checks of exhaust systems' emissions. A Traffic Management Plan will be developed and implemented prior to the commencement of construction and decommissioning activities.	**2 - Minor**	**3 – Possible**	**6 - Medium**	Contractors will adhere to Section 30 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 1.13.3 of the Standard Specification for Roadworks ver 4.2.	**2 - Minor**	**2 – Unlikely**	**4 - Low**
3.1.2				3.1.2 Air pollution as a result of dust generated as a result of vegetation clearance and topsoil excavation.	3.1.2.1 Loss of habitat and decline in health of native fauna and flora.	Earthwork formations, stockpiles and roads will be sprayed with water or other suitable liquids for dust suppression. Dust generating activities which cannot be adequately controlled by water or other means will be stopped until adequate controls can be put in place. All materials transported on and/or off site will be suitably covered and loaded in a manner that will prevent dropping of materials. A Traffic Management Plan will be developed and implemented prior to the commencement of construction and decommissioning activities.	**2 - Minor**	**2 – Unlikely**	**4 - Low**	Contractors will adhere to Section 30 of the DIPL Standard Specification for Environmental Management ver 2.0	**2 - Minor**	**2 – Unlikely**	**4 - Low**
3.2.1		3.2 Atmospheric processes	Minimise greenhouse gas emissions so as to contribute to the NT governments aspirational target of achieving net zero greenhouse gas emissions by 2050.	3.2.1 Reduced visibility as a result of vehicle and equipment exhaust emissions.	3.2.1.1 Reduced visibility impacts on road safety for both road users and construction personnel.	A Traffic Management Plan will be developed and implemented prior to the commencement of construction and decommissioning activities. Exhaust systems of construction plant, vehicles and machinery will be maintained in accordance with manufacturer's specification and undertaking periodic visual checks of exhaust systems' emissions.	**2 - Minor**	**2 – Unlikely**	**4 - Low**	Contractors will adhere to Section 30 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 1.13.3 of the Standard Specification for Roadworks ver 4.2	**2 - Minor**	**2 – Unlikely**	**4 - Low**
3.2.2				3.2.2 Reduced visibility as a result of dust generated by the movement of vehicles and equipment.	3.2.2.1 Reduced visibility impacts on road safety for both road users and construction personnel.	A Traffic Management Plan will be developed and implemented prior to the commencement of construction and decommissioning activities. Exhaust systems of construction plant, vehicles and machinery will be maintained in accordance with manufacturer's specification and undertaking periodic visual checks of exhaust systems' emissions.	**2 - Minor**	**2 – Unlikely**	**4 - Low**	Contractors will adhere to Section 30 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 1.13.6 and 2.18.2 of the Standard Specification for Roadworks ver 4.2	**2 - Minor**	**2 – Unlikely**	**4 - Low**
4. People													
4.1.1		4.1 Communities and economy	Enhance communities and the economy and foster resilience to a changing climate, for the welfare, amenity and benefit of current and future generations of Territorians	4.1.1 Unexpected early termination of the Project due to delays, weather or other unexpected issues.	4.1.1.1 Project is not completed resulting in access issues and economic losses for the local community.	Works are undertaken during the dry season only 'Open communication with contractors is facilitated. Weather forecasts are monitoried and where possible works are scheduled or rescheduled around inclement weather. Road diversions are in place to maintain access.	**3 - Moderate**	**2 – Unlikely**	**6 - Medium**	Contractors will adhere to Section 2.6 of the Standard Specification for Roadworks ver 4.2	**3 - Moderate**	**1 – Rare**	**3 - Low**
4.1.2				4.1.2 Access and traffic flows to adjacent areas are restricted and/or delayed during construction.	4.1.2.1 Disruption to daily activities of local residents, landowners and users due to inability to gain access into and out of sites adjacent to the roadworks.	A Traffic Management Plan will be developed and implemented prior to the commencement of construction and decommissioning activities.	**2 - Minor**	**3 – Possible**	**6 - Medium**	Contractors will adhere to Section 29 of the DIPL Standard Specification for Environmental Management ver 2.0	**2 - Minor**	**2 – Unlikely**	**4 - Low**
4.1.3				4.1.3 Water supplies to communities are in short supply as a result of groundwater extraction and surface water extraction	4.1.3.1 Community health and wellbeing is affected as result of water supply shortages	Use of existing bores requires the permission of the current owner/user. Bores within 2km of existing community borefileds run by the PWC are strictly out of bounds unless special permission is granted	**3 - Moderate**	**1 – Rare**	**3 - Low**	Contractors will adhere to Section 23 of the DIPL Standard Specification for Environmental Management ver 2.0	**3 - Moderate**	**1 – Rare**	**3 - Low**
4.1.4				4.1.4 Bore pumping impacts water quality and water quality of community production bores	4.1.4.1 Local businesses and industries suffer financial loss as result of water supply shortages	Use of existing bores requires the permission of the current owner/user. Bores within 2km of existing community borefileds run by the PWC are strictly out of bounds unless special permission is granted	**3 - Moderate**	**1 – Rare**	**3 - Low**	Contractors will adhere to Section 23 and 24 of the DIPL Standard Specification for Environmental Management ver 2.0	**3 - Moderate**	**1 – Rare**	**3 - Low**

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4.2.1		5.2 Culture and heritage	Protect sacred sites, culture and heritage.	4.2.1 Known indigenous cultural heritage sites are disturbed or damaged during road construction, operation and/or decommissioning.	4.2.1.1 Loss, disruption and/or damage of indigenous heritage.	Sites or areas which must be avoided or protected during works will be identified on a site map. The map will be made available to all relevant personnel during the works. Where practicable temporary protection fencing is installed and maintained around known or suspected indigenous cultural heritage sites. An AAPA Authority Certificate will be obtained and the following will be adhered to: - All works are confined to the 'subject' land identified on the certificate. - All activities conducted by the Contractor are covered in the 'Purpose of Use' on the certificate - All conditions on the certificate are adhered to. - All contractors, employees and sub-contractors are aware of the conditions of the certificate. - Should any item be encountered which might be an artefact of heritage value or any relic, artefact or material which might be of Aboriginal origin, cease all construction work that might affect the item and protect the item from damage or disturbance. Notify the Superintendent immediately, who will then arrange for appropriate specialists and community representatives to inspect the site. - Ensure that all personnel working on site have received training regarding their responsibilities regarding cultural heritage and are made aware of any sites/areas which must be avoided or protected including Sacred Sites identified on the AAPA Authority Certificates.	**4- Major**	**2 – Unlikely**	**8 - Medium**	'Contractors will adhere to Section 14 and 15 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 1.26 and 1.4.1 of the Standard Specification for Roadworks ver 4.2	**4- Major**	**2 – Unlikely**	**8 - Medium**
4.2.2				4.2.2 Unknown indigenous cultural heritage sites are disturbed or damaged during road construction, operation and/or decommissioning.	4.2.2.1 Loss of indigenous heritage.	Should any item be encountered which might be an artefact of heritage value or any relic, artefact or material which might be of Aboriginal or Torres Strait Islander origin, all construction work that might affect the item will cease and will protect the item from damage or disturbance. The Superintendent will be notified immediately, who will then arrange for appropriate specialists and community representatives to inspect the site.	**4- Major**	**3 – Possible**	**12 - High**	'Contractors will adhere to Section 14 and 15 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 1.26 and 1.4.1 of the Standard Specification for Roadworks ver 4.2	**4- Major**	**2 – Unlikely**	**8 - Medium**
4.3.1				4.3.1 Construction personnel are exposed to unexploded ordnance (UXO) during construction.	4.3.1.1 Human injury and/or fatality.	Should any item be encountered which might be a UXO, all construction work that might affect the item will cease and will protect the item from damage or disturbance. The Superintendent will be notified immediately, who will then contact police to arrange for appropriate specialists to inspect the site.	**4- Major**	**1 – Rare**	**4 - Low**	Contractors will follow Defence UXO policy on encountering any item	**4- Major**	**1 – Rare**	**4 - Low**
4.3.2				5.3.2 Noise generated during construction and decommissioning impacts on the physical and mental health of adjacent land users.	5.3.2.1 Impacts to mental and/or physical health of nearby land users and construction personnel.	A Traffic Management Plan will be developed and implemented prior to the commencement of construction and decommissioning activities. Access will be maintained to properties throughout construction.	**3 - Moderate**	**2 – Unlikely**	**6 - Medium**	Contractors will adhere to Section 4, 30 and 31 of the DIPL Standard Specification for Environmental Management ver 2.0	**3 - Moderate**	**1 – Rare**	**3 - Low**
4.3.3	5. People			5.3.3 Dust generated during construction and decommissioning causes physical and mental health impacts to adjacent land users.	5.3.3.1 Impacts to mental and/or physical health of nearby land users and construction personnel.	Earthwork formations, stockpiles and roads will be sprayed with water or other suitable liquids for dust suppression. Dust generating activities which cannot be adequately controlled by water or other means will be stopped until adequate controls can be put in place. All materials transported on and/or off site will be suitably covered and loaded in a manner that will prevent dropping of materials. A Traffic Management Plan will be developed and implemented prior to the commencement of construction and decommissioning activities. Where applicable the following measures will be applied to minimise the impact of noise: a.) Substitution by an alternative process. b.) Restricting times when work is carried out c.) Screening or enclosures.	**3 - Moderate**	**2 – Unlikely**	**6 - Medium**	Contractors will adhere to Section 4, 30 and 31 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 2.18.2 of the Standard Specification for Roadworks ver 4.2	**3 - Moderate**	**1 – Rare**	**3 - Low**
4.3.4				5.3.4 Increased numbers of mosquitos and biting insects (as a result of new breeding habitats water ponds created during construction and decommission activities) impacts on the mental and physical health of adjacent land users and construction site personnel.	5.3.4.1 Impacts to mental and/or physical health of nearby land users and construction personnel.	At the completion of construction and decommissioning, all areas where ponding of water is likely will be altered to ensure they are free draining.	**3 - Moderate**	**2 – Unlikely**	**6 - Medium**	Contractors will adhere to Section 28 of the DIPL Standard Specification for Environmental Management ver 2.0	**3 - Moderate**	**1 – Rare**	**3 - Low**
4.3.5		5.3 Human health	Protect the health of the Northern Territory	4.3.5 On-site accidental fires cause risk to health and safety of adjacent land users and on-site personnel.	4.3.5.1 Fire leads to loss of vegetation and loss of habitat for fauna. It is also poses safety hazard for construction personnel and nearby land users.	Lighting of fires for clearing of vegetation or disposal of rubbish will not be permitted under any circumstances. When fires are accidentally started, these will be extinguished immediately if appropriate and safe to do.	**3 - Moderate**	**1 – Rare**	**3 - Low**	Contractors will adhere to Section 18 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 3.1 of the Standard Specification for Roadworks ver 4.2	**3 - Moderate**	**1 – Rare**	**3 - Low**

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							C	L	RR		C	L	RR
4.3.6			population.	4.3.6 Compromised public access to on-site hazardous materials results in physical and mental health impacts on site visitors (authorised and unauthorised), construction personnel and adjacent land users.	4.3.6.1 Unauthorised access to fuel leading to health impacts.	Appropriate storage of hazardous material will be implemented. Site fencing and security will be implemented and monitored during construction and decommissioning.	**3 - Moderate**	**1 – Rare**	**3 - Low**	Contractors will adhere to Section 5 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 1.7 and 22.6.1 of the Standard Specification for Roadworks ver 4.2	**3 - Moderate**	**1 – Rare**	**3 - Low**
4.3.7				4.3.7 Impeded access for emergency services as a result of temporary road closures impacts the physical and mental health of site personnel and adjacent land users. Road closure or diversion.	4.3.7.1 Loss of life or further impact to human mental and physical health.	A Traffic Management Plan will be developed and implemented prior to the commencement of construction and decommissioning activities. Emergency management controls.	**4- Major**	**2 – Unlikely**	**8 - Medium**	Contractors will adhere to Section 5 and 29 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 22.7 of the Standard Specification for Roadworks ver 4.2	**4- Major**	**1 – Rare**	**4 - Low**
4.3.8				4.3.8 Unauthorised access during construction or decommission results in mental or physical injury to the perpetrator, site personnel or adjacent land users.	4.3.8.1 Human injury	Site fencing and security will be implemented and monitored during construction and decommissioning. The site will be locked up after completion of shifts as per the site protocols.	**3 - Moderate**	**1 – Rare**	**3 - Low**	Contractors will adhere to Section 5 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 2.22 of the Standard Specification for Roadworks ver 4.2	**3 - Moderate**	**1 – Rare**	**3 - Low**
4.3.9				4.3.9 Accidental damage to utilities or services during construction or decommissioning results in physical or mental injury to site personnel or adjacent land users.	4.3.9.1 Human injury or fatality.	Service utilities locations will be identified and communcated to contractors. Protection measures put in place to ensure services are not damaged.	**4- Major**	**2 – Unlikely**	**8 - Medium**	Contractors will adhere to Section 5 of the DIPL Standard Specification for Environmental Management ver 2.0. Contractors will adhere to Section 1.13.3 of the Standard Specification for Roadworks ver 4.2	**4- Major**	**1 – Rare**	**4 - Low**
4.3.10				4.3.10 Accidental damage to utilities during construction or decommissioning results in service delivery disruptions for adjacent land users.	4.3.10.1 Economic losses or inconvenience for local community.	Service utilities locations will be identified and communcated to contractors. Protection measures put in place to ensure services are not damaged.	**3 - Moderate**	**2 – Unlikely**	**6 - Medium**	Contractors will adhere to Section 1.13.3 of the Standard Specification for Roadworks ver 4.2	**3 - Moderate**	**1 – Rare**	**3 - Low**