Phase	Theme	Environmental Factors	Environmental values and sensitivities	Main activity	Sub activity	Environmental Impact	Potential Environmental Direct Impact (Pathway)	Potential Environmental Impact (receptor)	Assumptions	Likelihood	Consequence	Inherent risk	Mitigation and management	Likelihood	Consequence	Residual risk
Site establishment	Land	Landforms	Culturally important features	Land clearing	Clearing areas of existing vegetation	Disturbance to culturally important/ significant features	Land	Direct impact to landforms that are of cultural significance/ importance	Lot 2303 is relatively flat with no distinct cultural features or landforms (Section 5.4). An interim report was undertaken by Wallis Heritage Consulting in September 2020 and found no cultural sites of significance on Lot2303.	C	3	Moderate (4)	> Flagging and boundary markers to be implemented to retain clearing within marked disturbance footprint. > GAC provide cultural heritage education to all employees and contractors, including detail of how to identify features and protect these for inspection. > If a heritage site or artefact is discovered during clearing activities, all works will cease immediately, and notification provided toy GAC and the Heritage Branch under the Heritage Act 2011 (NT) provisions. > A Construction Environmental Management Plan (CEMP) is to be implemented detailing any further Management measures and the process for reporting and actioning potential culturally significant features.	D	1	Low (1)
Site establishment	Land	Terrestrial Environmental Quality	Characteristic of soils, including chemical, physical, biological and aesthetic qualities	Land clearing and excavations	Clearing areas of existing vegetation	Exposure/ disturbance of contaminated land from offsite irrigation of treated effluent water	Land and waterways	Disturbance and movement of contaminated soil	Studies undertaken by Greencap (2020) found the risk of significant exposure from chemicals of concern is considered low. The near surface soil testing and analysis indicated all potential contaminants of concern in surface soils were reported below adopted guideline values. A total of 16 soil bores were dug and soil analysed for TRH, phenols, heavy metals, nutrients, hydrocarbons, pesticides and herbicides.	D	2	Low (5)	> Any soils identifiewd as potentially contaminated will not be scraped up and used elsewhere. > There will be no Project activities area to disturb soils within the effluent irrigation areas. > Sediment and erosion controls will be implemented as per the Project ESCP.	D	1	Low (1)
Site establishment	Land	Terrestrial Environmental Quality	Characteristic of soils, including chemical, physical, biological and aesthetic qualities	Land clearing and excavations	Clearing areas of existing vegetation	Exposure of ASS	Land and waterways	Excavation and land clearing causing exposure to potential ASSs and impacting quality of soils and waterways	Geotechnical studies were undertaken by Construction Sciences (2020) on Lot 2303 to determine suitability for construction of the power station. The study completed acid sulfate screening via pH field and fox and chromium Suite. The results indicate the presence of PASS across all investigation locations finding that the soils in the Project area are moderately acidic. The report indicated that the soils are non-dispersive and have a medium potential to erode.	C	3	Moderate (4)	> If ASS is encountered, works will cease, and ASS management measures will be incorporated prior to works continuing. > Sediment and erosion controls will be implemented as per the Project ESCP. > Minimise clearing and limit both the spatial extent of exposed earth and period of exposure.	D	1	Low (1)
Site establishment	Land	Terrestrial Environmental Quality	Characteristic of soils, including chemical, physical, biological and aesthetic qualities	Land clearing	Clearing areas of existing vegetation	Soil erosion causing loss of topsoil	Land and waterways	Direct impact to soil quality with the loss of top soil during overland flows and potential sedimentation of the downstream catchment.	Geotechnical Investigation carried out on site in 2020 conducted Emerson Class tests on nine (9) predominant near surface soil samples. Given the consistency of near surface material, all of the test results returned an Emerson Class Number of 5. This indicates that the soils across the site are non-dispersive. They also indicate the soils have a medium potential for erosion and high a potential to cause environmental harm if disturbed. Given the medium potential to erode, it is recommended that all general erosion and sediment controls are put in place during the construction	B	3	High (1)	> All site preparation will be undertaken in accordance with Land Clearing Guidelines (DENR, 2019). > An Erosion and Sediment Control plan is to be included in the contractors Construction Environment Management Plan (CEMP) and include measures to prevent erosion, sedimentation and pooling during site preparation and permanently for operations. The plan must include control measures that minimise the level of surface erosion and sedimentation from exposed ground and trenching. > Drains will be installed across the site to divert clean surface water to stable land areas and away from the site where soil is exposed. > Swales with rock check dams and then outlets to the grassed paddock to the south will be used as a filter buffer. > Part of the site preparation, construction and operation phases, all erosion and sediment control infrastructure should be regularly checked during the wet season for effectiveness and integrity and remediated where systems fail.	C	3	Moderate (4)
Site establishment	Land	Terrestrial Environmental Quality	Characteristic of soils, including chemical, physical, biological and aesthetic qualities	Site preparation	Vehicular movement/ traffic	Compaction of soils	Land	Compaction of soils will degrade soil quality and lead to less infiltration and greater runoff velocities with potential to cause erosion and sedimentation.		B	2	Moderate (2)	> The site will be proof rolled in order to compact loose soil. This will assist with ground stability and mitigate soil dispersal. > Sediment and erosion controls will be implemented as per the Project ESCP. > Flagging and boundary markers to be implemented to prevent vehicle access and compaction outside the project footprint.	B	1	Low (3)
Site establishment	Land	Terrestrial Environmental Quality	Characteristic of soils, including chemical, physical, biological and aesthetic qualities	Site preparation	Vehicular movement/ traffic	Increase in land instability through the creation of wheel ruts during wet weather and pooling onsite	Land and waterways	Direct impact to soil quality and integrity and downstream waterways through erosion		C	2	Low (6)	> The site will be proof rolled in order to compact loose soil. > Sediment and erosion controls will be implemented as per the Project ESCP; > Clean fill will be selected for foundations or footings, voids created by the removal vegetation, wheel ruts created in wet weather or if existing soils are below subgrade level. > All structural fill will be inspected and tested. > All access roads will be maintained regularly to prevent deterioration.	D	2	Low (5)
Site establishment	Land	Terrestrial Environmental Quality	Characteristic of soils, including chemical, physical, biological and aesthetic qualities	Excavation	Creating stockpiles from excavated material or stripping	Soil erosion of stockpiles during rainfall events	Land and waterways	Direct impact to soil quality and integrity and downstream waterways through erosion of stockpiled soil		C	3	Moderate (4)	> An Erosion and Sediment Control plan is to be included in the contractors Construction Environment Management Plan (CEMP) and include measures to prevent erosion, sedimentation and pooling during site preparation and permanently for operations. The plan will include bunding around stockpiled soil during seasonal work. All stockpiles will be temporary and will be removed from site where required.	D	2	Low (5)
Site establishment	Land	Terrestrial Environmental Quality	Characteristic of soils, including chemical, physical, biological and aesthetic qualities	Storage and handling of hydrocarbons and other hazardous chemicals	Storage and handling of hydrocarbons and other hazardous chemicals	Hydrocarbon spills during refuelling or rupture to machinery hydraulic lines	Land and waterways	Direct impact to soil quality and indirect impact to waterways through overland flows.		C	3	Moderate (4)	> Spills will be cleaned immediately. > All vehicles, plant and equipment will be maintained in good working order (e.g. regular servicing) and operated as intended. > Any refuelling trucks will carry a spill kit capable of containing any spills. > Appropriate spill response equipment will be located at all refuelling and liquid chemical storage locations including containment and recovery equipment. > In the event of a spill, work will be shut down at the spill site. > Material contaminated as a result of a spill (e.g. soil or solid absorbent) must be removed (i.e. excavated or cleaned up) and placed in an appropriate container or taken off site to prevent further contamination. > An accredited chemical waste contractor will be engaged to dispose of the material and to provide copies of Waste Transport Certificates and Certificates of Disposal for each consignment. > All hazardous chemicals and fuels will be stored away from drainage lines, away from non- compatible chemicals and appropriately bunded.	D	2	Low (5)
Site establishment	Land	Terrestrial Environmental Quality	Characteristic of soils, including chemical, physical, biological and aesthetic qualities	Storage and handling of hydrocarbons and other hazardous chemicals	Storage and handling of hydrocarbons and other hazardous chemicals	Significant hydrocarbon spills from storage areas on site	Land and waterways	Direct impact to soil quality and indirect impact to waterways through overland flows.		C	4	High (3)	> Spills will be cleaned immediately. > All vehicles, plant and equipment will be maintained in good working order (e.g. regular servicing) and operated as intended. > Any refuelling trucks will carry a spill kit capable of containing any spills. > Appropriate spill response equipment will be located at all refuelling and liquid chemical storage locations including containment and recovery equipment. > In the event of a spill, work will be shut down at the spill site. > Material contaminated as a result of a spill (e.g. soil or solid absorbent) must be removed (i.e. excavated or cleaned up) and placed in an appropriate container or taken off site to prevent further contamination. > An accredited chemical waste contractor will be engaged to dispose of the material and to provide copies of Waste Transport Certificates and Certificates of Disposal for each consignment. > All hazardous chemicals and fuels will be stored away from drainage lines, away from non- compatible chemicals and appropriately bunded.	D	2	Low (5)
Site establishment	Land	Terrestrial Ecosystems	Sensitive or significant vegetation, vegetation that provides important ecological function, ionic or culturally important plants and vegetation	Site preparation	Vehicular movement/ traffic	Dust generation impacting remaining sensitive, significant, endemic or threatened vegetation	Air	Direct and potentially cumulative impact to surrounding ecosystem function.	Desktop searches found no threatened or sensitive flora species records occurring within 15 km of the project area. The field ecological reconnaissance survey assessed the likelihood of threatened flora species occuring within the Project area. Based on habitat preference and number of local records, all species within the 50 km buffer were considered unlikely to be found within the Project area.	D	2	Low (5)	> Speed limit restrictions will be implemented on site to reduce dust generation. > A water cart will be used to wet frequently used access tracks. > All access tracks will be maintained and the main access to the site will be compacted with gravel. > Sediment and erosion controls will be implemented as per the Project ESCP.	D	2	Low (5)
Site establishment	Land	Terrestrial Ecosystems	Sensitive or significant vegetation, vegetation that provides important ecological function, listed threatened species, locally endemic species or species with a restricted habitat, ionic or culturally important plants and vegetation	Site preparation	Use of machinery, equipment, vehicles and activities causing spark.	Combustion from ignition sources such as machinery, equipment, welding or smoking impacting on native vegetation, threatened species and habitat.	Land	Direct and potentially cumulative impact to surrounding ecosystem function, viability and habitat. Loss of species that use surrounding habitat. Loss of habitat.	Fire management is undertaken by the GAC through the Djurrubu Rangers to prevent late season wildfires and to maintain species diversity through controlled low intensity early dry season reduction burns.	C	4	High (3)	> Fire prevention equipment such as reels and extinguishers will be provided and validated in specified areas on site. Smoking and hot works will only be permitted in designated areas, clear of any flammable material or vegetation. > A firebreak of 25m on the internal side of the project area's boundary fence line will be established during site preparation and maintained during operations. > Emergency contact numbers will be given to all contractors during site induction and displayed once common areas are established.	D	3	Low (8)
Site establishment	Land	Terrestrial Ecosystems	Listed threatened species and their habitat	Land clearing	Clearing areas of existing vegetation	Disturbance to sensitive NT and MNES fauna species and their habitat	Land	Direct and cumulative impact to protect sensitive NT and MNES terrestrial fauna species and their habitat	The desktop component of the ecological assessment identified 11 species as having the potential to occur at the Project area (considered possible or likely). Two listed fauna speces were recorded in the Project area during the field surveys being the Partridge Pigeon and Black-fotted Tree-rat.	A	3	High (2)	> Djurrubu Rangers or suitable ecologist to be used as spotters to check for wildlife during clearing process. > Voluntary compensatory actions to address the loss of potential habitat for Black-footed Tree-rats by working with the Djurrubu Rangers to reduce frequency of burning improve habitat in a 295 ha target area adjacent to the north and east of the Project area and improve habitat quality in the area (refer to Figure 6 3). > A fauna spotter-catcher will be employed for the vegetation clearing phase. > Boundaries will remain within existing fence line and surveyed markers along road easements. > Progressive clearing will be undertaken working form the southern boundary to the north with fences lifted to allow appropriate escape points for fleeing fauna. > Overspill of lighting will be minimised during project activities. > A fauna register will be maintained and interactions will be recorded and reported. > Fire breaks will be maintained and speed limits implemented.	B	1	Low (3)

Phase	Theme	Environmental Factors	Environmental values and sensitivities	Main activity	Sub activity	Environmental Impact	Potential Environmental Direct Impact (Pathway)	Potential Environmental Impact (receptor)	Assumptions	Likelihood	Consequence	Inherent risk	Mitigation and management	Likelihood	Consequence	Residual risk
Site establishment	Land	Terrestrial Ecosystems	Listed threatened species and their habitat	Land clearing	Clearing areas of existing vegetation	Over clearing of known habitat for threatened species beyond the approved proposal footprint	Land	Direct and cumulative impact to protect sensitive NT and MNES terrestrial fauna species and their habitat		C	3	Moderate (4)	> All disturbances will be minimised where possible and kept within the site boundary, Lot 2303 and approved disturbance footprint. > Voluntary compensatory actions to address the loss of potential habitat for Black-footed Tree-rats by working with the Djurrubu Rangers to reduce frequency of burning improve habitat in a 295 ha target area adjacent to the north and east of the Project area and improve habitat quality in the area (refer to Figure 6 3). > Clearing will be kept within surveyed area, to approved construction drawings. > Boundaries will remain within existing fence line and surveyed markers along road easements. > Boundaries will remain within existing fence line and established markers.	D	2	Low (5)
Site establishment	Land	Terrestrial Ecosystems	Listed threatened species and their habitat	Land clearing	Clearing areas of existing vegetation	Loss of habitat suitable foraging and sheltering	Land	Direct and cumulative impact to protect sensitive NT and MNES terrestrial fauna species and their habitat	The site could be potentially used by threatened species for foraging and sheltering. Six species were focus during a field survey in which the black footed tree rat was idenitified on numerous occasions. The remaining five species were not recorded though expected to potentially occur. Three of these were bird species, two small mammals and a reptile. Although the yellow-spotted monitor is expected to occur in the grasslands in the southern proportion of Lot 2303. Large extents of the same Eucalyptus woodlands expands beyond Lot 2303.	A	2	Moderate (3)	> All disturbances will be minimised where possible and kept within the site boundary, Lot 2303 and approved disturbance footprint. > Clearing will be kept within surveyed area, to approved construction drawings. > Boundaries will remain within existing fence line and surveyed markers along road easements. > Progressive clearing will be undertaken working form the southern boundary to the north. > A 25m width vegetation buffer will remain to the southern portion of the project area. > This buffer and other areas with remaining vegetation will become a no-go area and included in site inductions. > Overspill of lighting will be minimised during project activities. > A weed management plan will be established.	A	1	Moderate (1)
Site establishment	Land	Terrestrial Ecosystems	Listed threatened species and their habitat	Land clearing	Clearing areas of existing vegetation	Threatened species altered behaviours and breeding cycles	Land	Direct and cumulative impact to protect sensitive NT and MNES terrestrial fauna species and their habitat		C	3	Moderate (4)	> Clearing will be undertaken outside of the months of August- September (breeding season of the Black-footed Tree-rat). > All disturbances will be minimised where possible and kept within the site boundary, Lot 2303 and approved disturbance footprint. > Clearing will be kept within surveyed area, to approved construction drawings and within the zoned Jabiru Town Plan. > Boundaries will remain within existing fence line and surveyed markers along road easements. > This buffer and other areas with remaining vegetation will become a no- go area and included in site inductions. > Overspill of lighting will be minimised during project activities. A weed management plan will be established	B	1	Low (3)
Site establishment	Land	Terrestrial Ecosystems	Listed migratory species and their habitat	Land clearing	Clearing areas of existing vegetation	Disturbance to migratory species and their habitat	Land	Direct and cumulative impact to migratory species and their habitat	Four migratory species are likely to occur within the project area. These include the red- rumped swallow, oriental cuckoo, barn swallow and yellow wagtail. Though Lot 2303 is unlikely to contain important habitat for the migratory species.	C	3	Moderate (4)	> All disturbances will be minimised where possible and kept within the site boundary, Lot 2303 and approved disturbance footprint. > Voluntary compensatory actions to address the loss of potential habitat for Black-footed Tree-rats by working with the Djurrubu Rangers to reduce frequency of burning improve habitat in a 295 ha target area adjacent to the north and east of the Project area and improve habitat quality in the area (refer to Figure 6 3). > Clearing will be kept within surveyed area, to approved construction drawings. > Boundaries will remain within existing fence line and surveyed markers along road easements. Overspill of lighting will be minimised during project activities. > An Erosion and Sediment Control plan is to be included in the contractors Construction Environment Management Plan (CEMP) and include measures to prevent erosion, sedimentation and pooling during site preparation and permanently for operations. > Chemical storage will be located away from drainage channels, appropriate bunding and spill response kits maintained. > A weed management plan will be established.	D	2	Low (5)
Site establishment	Land	Terrestrial Ecosystems	Locally endemic species or species with restricted habitat	Land clearing	Clearing areas of existing vegetation	Disturbance to locally endemic species or species with restricted habitat	Land	Direct and cumulative impact to locally endemic species or species with restricted habitat	Ecological studies were undertaken and determined no endemic or species with restricted habitat to occur on Lot 2303.	D	2	Low (5)	> All disturbances will be minimised where possible and kept within the site boundary, Lot 2303 and approved disturbance footprint. > Voluntary compensatory actions to address the loss of potential habitat for Black-footed Tree-rats by working with the Djurrubu Rangers to reduce frequency of burning improve habitat in a 295 ha target area adjacent to the north and east of the Project area and improve habitat quality in the area (refer to Figure 6 3). > Clearing will be kept within surveyed area, to approved construction drawings > Boundaries will remain within existing fence line and surveyed markers along road easements. > A fauna register will be maintained and interactions will be recorded and reported.	D	1	Low (1)
Site establishment	Land	Terrestrial Ecosystems	Listed threatened species and their habitat	Land clearing	Movement of vehicles and machinery within the project area and between sites	Change of preferred habitat from introduced and accidently spread weeds	Land	Cumulative impact as a result of inappropriate weed management or hygiene. Change of vegetation characteristics and function	A WoNS, Class A and multiple Class B weeds have been assessed to occur within 5 km of the project area.	C	4	High (3)	> All construction personnel will receive induction training in procedures for personal weed-control hygiene practices, such as removing seeds and mud from clothing and footwear. > All vehicles and construction equipment will be cleaned by the contractor prior to arrival in line with the Weed Management Branch Brochure 'How to keep your equipment and vehicles clean of weeds' to ensure equipment and people are weed free. > All vehicles arriving to site is to have a weed/ pest declaration form. > All movement of vehicles and equipment on site will be kept to cleared areas. > Cleared vegetation will be segregated with weed infested piles taken off site for correct disposal. > Any fill required for site preparation and construction will be clean of weed seeds and other organic material. > Any newly established declared weeds will be treated by a sub contractor and monitored seasonally until eradicated. > Class A or Weeds of National Significance species found on site will be reported to the Weed Management Branch immediately. > A weed management plan will be incorporated into the CEMP.	C	2	Low (6)
Site establishment	Land	Terrestrial Ecosystems	Existing conservation and management activities	Land clearing	Clearing areas of existing vegetation	Disturbance to existing conservation and management strategies	Land	Direct impact to existing conservation and management activities	Land clearing is within Jabiru Town boundaries and within the extent of the Town Plan	C	2	Low (6)	> All disturbances will kept within the site boundary, Lot 2303. > Clearing will be kept within surveyed area, to approved construction drawings. > Boundaries will remain within existing fence line and established markers. > Appropriate communication will be undertaken with key stakeholders for the life of the project.	D	1	Low (1)
Site establishment	Land	Terrestrial Ecosystems	Sensitive or significant vegetation, vegetation that provides important ecological function, ionic or culturally important plants and vegetation	Land clearing	Clearing areas of existing vegetation	Fragmentation and loss of vegetation diversity	Land	Direct impact to species communities and vegetation type within small range	Lot 2303 lies within a Eucalyptus Miniata, E. tetrodonta and Erythrophleum chlorostachys corridor. The extent of this corridor is relatively large, expanding to 2 km wide and numerous km in length (Figure 5-8) Clearing 10 ha is not expected to cause fragmentation as the site is surrounded by large extent of the same vegetation type. The site is disturbed already with a fence line, windblown rubbish, excavated stockpiles, pumping infrastructure and tracks through out. Further, approximately half of Lot 2303 has already been cleared for irrigation sprinklers for the effluent treatment ponds located on neighbouring Lot 2302.	C	3	Moderate (4)	> All disturbances will be minimised where possible and kept within the site boundary, Lot 2303 and approved disturbance footprint. > Voluntary compensatory actions to address the loss of potential habitat for Black-footed Tree-rats by working with the Djurrubu Rangers to reduce frequency of burning improve habitat in a 295 ha target area adjacent to the north and east of the Project area and improve habitat quality in the area (refer to Figure 6 3). > Clearing will be kept within surveyed area, to approved construction drawings. > Boundaries will remain within existing fence line and surveyed markers along road easements.	D	2	Low (5)
Site establishment	Land	Terrestrial Ecosystems	Listed threatened species and their habitat, Listed migratory species and their habitat	Site preparation	Machinery, vehicle and equipment use	Noise, light and vibration emissions from construction and operational activities	Land	Artificial light emitting from the site could attract fauna and alter foraging patterns, increase predation risks, disrupt biological clocks and disrupt dispersal movements impacting breeding and roosting regimes.	Potential sources of light pollution associated with the Project would be the afterhours security lighting and night time lighting needed in key operational areas.	A	2	Moderate (3)	> Noise from clearing and trenching will be kept to minimum intensity and expected to be short. > Noise shall be controlled by constructing during daytime hours and equipment serviced regularly. > The NT EPA Noise Management Framework Guideline (2018) will be followed through out site preparation activities. > Lighting will be used only for required operational areas, all light sources will be aimed towards specific work areas requiring light for safe construction and/or operation, with a low vertical angle, and light shields will be placed on large equipment to minimise light spill over. > Where possible, lighting will be the minimum wattage, whilst not compromising safety or OH&S requirements. > All vehicles, plant and equipment will be maintained in good working order (e.g. regular servicing) and operated as intended. > Compaction of soils and land clearing will be undertaken during the day.	D	2	Low (5)
Site establishment	Land	Terrestrial Ecosystems	Listed threatened species and their habitat	Site preparation	Vehicular movement/ traffic	Sensitive NT and MNES terrestrial fauna species interaction with vehicles	Land	Direct impact to sensitive fauna individuals resulting in direct fauna mortality and local reduction of populations.		C	2	Low (6)	> Speed limits will be introduced. > All fauna interactions with vehicles will be recorded. > Night time works/ driving will be avoided where possible.	D	2	Low (5)
Site establishment	Land	Terrestrial Ecosystems	Listed threatened species and their habitat	Site preparation	Waste management	Vermin introduction to site through poor waste management activities	Land	Direct impact to sensitive fauna species		C	2	Low (6)	> Waste will be managed through bins provided onsite and large skip bin for larger construction items. > Waste will be taken offsite to a waste facility in Darwin for correct disposal. > All waste will be managed appropriately to prevent scavengers and windblown rubbish. > Waste Management Plan to be incorporated into the CEMP.	D	2	Low (5)
Site establishment	Land	Terrestrial Ecosystems	Listed threatened species and their habitat	Site preparation	Excavation of footings and trenches for electrical cables	Sensitive NT and MNES terrestrial fauna species entrapment	Land	Direct impact to sensitive fauna species		C	2	Low (6)	> The time a trench or footings are open should be minimised and barricaded to prevent entry. > Trenches and footings should be checked each morning for trapped wildlife. > If an animal becomes trapped, call Wildcare NT (89 886 121) for assistance or guidance. > Cleared timber shall be stockpiled away from remaining vegetation and removed as soon as possible to prevent sheltering opportunities.	D	2	Low (5)

Phase	Theme	Environmental Factors	Environmental values and sensitivities	Main activity	Sub activity	Environmental Impact	Potential Environmental Direct Impact (Pathway)	Potential Environmental Impact (receptor)	Assumptions	Likelihood	Consequence	Inherent risk	Mitigation and management	Likelihood	Consequence	Residual risk
Site establishment	Water	Hydrological processes	The supply and quantity of water in surface water features to creeks and intermittent streams	Vegetation clearing	Clearing areas of existing vegetation	Increased surface flow regimes from loss of vegetation and diversion	Land, waterways	Direct impact to water levels to Baralil Creek, increasing surface runoff as a result of clearing 10ha vegetation.	There will be increased surface runoff caused by impervious solar panels and infrastructure. The site and access roads make up 0.33% of the Baralil Creek catchment and 0.09% of Gulungul and Baralil Creek catchments combined (Appendix B).	B	3	High (1)	> Minimise unnecessary disturbance and clearing, project design will locate infrastructure to minimise stormwater runoff. > Project design to ensure water diversion to vegetated areas and are maintained as close to natural flows as practicable.	C	2	Low (6)
Site establishment	Water	Hydrological processes	The supply and quantity of water in surface water features to creeks and intermittent streams	Vegetation clearing	Shaping and prepping areas for project	Placement of infrastructure domains obstructing/ altering natural flow paths.	Land, waterways	Direct impact to creek alignment and natural flow paths, altering flows and increasing potential for erosion	The project is not placed in the flow path of any major or minor drainage lines. The Lot is located within the western catchment of Baralil Creek and all surface flows reports to Baralil Creek.	B	3	High (1)	> Minimise unnecessary disturbance, project design will locate infrastructure to minimise stormwater runoff. > Project design to ensure water diversion to vegetated areas and are maintained as close to natural flows as practicable. > Sediment and erosion controls will be implemented as per the Project ESCP.	D	2	Low (5)
Site establishment	Water	Hydrological processes	The supply and quantity of water in surface water features to creeks and intermittent streams	Project planning	Site location	Site subject to seasonal flooding inundating critical infrastructure and stored chemicals.	Land, waterways	Site inundated during wet season events causing degradation of infrastructure and potential contamination from site to flooded areas.	Desktop flood study undertaken by Surface Water and Erosion Solutions (2020) indicate Lot 2303 is unlikely to be affected by flooding of Baralil Creek. Potential backup of water from Magela Creek, Gulungul and Baralil Creeks during high flows may reach the south eastern corner of the Lot. Conservatives estimates indicate probable maximum flood levels are unlikely to reach the average site level of 27m Australian Height Datum. There is a very low flood risk. (Appendix B)	D	3	Low (8)	> Project design to ensure water diversion to vegetated areas and are maintained as close to natural flows as practicable. > Sediment and erosion controls will be implemented as per the Project ESCP.	D	3	Low (8)
Site establishment	Water	Inland water environmental quality	The quality of water in surface water features including rivers, RAMSAR wetlands	Vegetation clearing	Clearing areas of existing vegetation	Build up of sedimentation in Baralil Creek changing water quality and creek characteristics and function	Land, waterways	Direct impact to Baralil Creek from overland flows increasing sedimentation and influencing water quality	Results of the erosion risk assessment determined two erosion risk slope classes as defined in the NT Land Suitability Guidelines (Northern Territory Government 2013). Erosion risk class C 3 has 71% of its surface slopes of 0.75% to 5% which makes them marginally suitable for development. The remainder, is classed as C2 which has surface slopes <0.75% making that area moderately suitable for development (Appendix B).	B	3	High (1)	> An ESCP is to be included in the contractors CEMP and include measures to prevent erosion, sedimentation and pooling during site preparation and permanently for operations. > The ESCP will include control measures that minimise the level of surface erosion and sedimentation from exposed ground. > Drains will be installed across the site to divert clean surface water to stable land areas and away from the site where soil is exposed. > Part of the site preparation, construction and operation phases, all erosion and sediment control infrastructure will be regularly checked during the wet season for effectiveness and integrity and remediated where systems fail.	D	2	Low (5)
Site establishment	Water	Inland water environmental quality	Culturally important water features	Vegetation clearing	Clearing areas of existing vegetation	Build up of sedimentation in Baralil Creek changing water quality, creek characteristics and function, impacting hunting and other cultural uses	Land, waterways	Impacts to hunting and other cultural uses due to reduced water quality and aesthetics	Results of the erosion risk assessment determined two erosion risk slope classes as defined in the NT Land Suitability Guidelines (Northern Territory Government 2013). Erosion risk class C 3 has 71% of its surface slopes of 0.75% to 5% which makes them marginally suitable for development. The remainder, is classed as C2 which has surface slopes <0.75% making that area moderately suitable for development (Appendix B)	B	3	High (1)	> An ESCP is to be included in the contractors CEMP and include measures to prevent erosion, sedimentation and pooling during site preparation and permanently for operations. > The ESCP will include control measures that minimise the level of surface erosion and sedimentation from exposed ground. > Drains will be installed across the site to divert clean surface water to stable land areas and away from the site where soil is exposed. > Part of the site preparation, construction and operation phases, all erosion and sediment control infrastructure will be regularly checked during the wet season for effectiveness and integrity and remediated where systems fail.	D	2	Low (5)
Site establishment	Water	Inland water environmental quality	The quality of water in surface water features including intermittent streams, floodplains, drainage lines, billabongs	Vegetation clearing	Clearing areas of existing vegetation	Change in water aesthetics from suspended solids	Land, waterways, wetlands	Direct impact to Baralil Creek from overland flows increasing sedimentation and influencing water quality	Results of the erosion risk assessment determined two erosion risk slope classes as defined in the NT Land Suitability Guidelines (Northern Territory Government 2013). Erosion risk class C 3 has 71% of its surface slopes of 0.75% to 5% which makes them marginally suitable for development. The remainder, is classed as C2 which has surface slopes <0.75% making that area moderately suitable for development (Appendix B).	B	3	High (1)	> An Erosion and Sediment Control plan is to be included in the contractors Construction Environment Management Plan (CEMP) and include measures to prevent erosion, sedimentation and pooling during site preparation and permanently for operations. > The ESCP plan will include control measures that minimise the level of surface erosion and sedimentation from exposed ground. > Drains will be installed across the site to divert clean surface water to stable land areas and away from the site where soil is exposed. > Part of the site preparation, construction and operation phases, all erosion and sediment control infrastructure will be regularly checked during the wet season for effectiveness and integrity and remediated where systems fail.	D	2	Low (5)
Site establishment	Water	Inland water environmental quality	The quality of water in surface water features including intermittent streams, floodplains, drainage lines, billabongs	Site preparation	Machinery, vehicle and equipment use	Accidental release of pollutants causes degradation of instream habitat including water in downstream aquatic habitat.	Land, waterways, wetlands	Direct impact to aquatic ecosystems, threatened species, health of biota, habitats supporting the lifecycle of aquatic biota, species of social and cultural importance, integrity of aquatic ecosystems, biological function and provision of refuge.		C	3	Moderate (4)	> Spills will be cleaned immediately. > All vehicles, plant and equipment will be maintained in good working order (e.g. regular servicing) and operated as intended. > Any refuelling trucks will carry a spill kit capable of containing any spills. > Appropriate spill response equipment will be located at all refuelling and liquid chemical storage locations including containment and recovery equipment. > In the event of a spill, work will be shut down at the spill site. > Material contaminated as a result of a spill (e.g. soil or solid absorbent) must be removed (i.e. excavated or cleaned up) and placed in an appropriate container or taken off site to prevent further contamination. > An accredited chemical waste contractor will be engaged to dispose of the material and will provide copies of Waste Transport Certificates and Certificates of Disposal for each consignment. > All hazardous chemicals and fuels will be stored away from drainage lines, away from non- compatible chemicals and appropriately bunded.	D	2	Low (5)
Site establishment	Water	Aquatic ecosystems	Threatened species, the habitat that supports the lifecycle of aquatic biota, the health of the biota in inland waterways	Vegetation clearing	Clearing areas of existing vegetation	Hydrocarbon spills impacting threatened aquatic fauna and flora and their habitat	Land, waterways	Direct impact to aquatic ecosystems, threatened species, health of biota, habitats supporting the lifecycle of aquatic biota, species of social and cultural importance, integrity of aquatic ecosystems, biological function and provision of refuge.		C	3	Moderate (4)	> All vehicles, plant and equipment will be maintained in good working order (e.g. regular servicing) and operated as intended. > Any refuelling trucks will carry a spill kit capable of containing any spills. > Appropriate spill response equipment will be located at all refuelling and liquid chemical storage locations including containment and recovery equipment. In the event of a spill, work will be shut down at the spill site. > Material contaminated as a result of a spill (e.g. soil or solid absorbent) must be removed (i.e. excavated or cleaned up) and placed in an appropriate container to prevent further contamination. > An accredited chemical waste contractor will be engaged to dispose of the material and to provide copies of Waste Transport Certificates and Certificates of Disposal for each consignment.	D	2	Low (5)
Site establishment	Water	Aquatic ecosystems	Ramsar wetlands, integrity of aquatic ecosystems and the ecological services they provide	Site preparation	Machinery, vehicle and equipment use	Hydrocarbon spills impacting Ramsar wetlands sites	Land, waterways, wetlands	Direct impact to aquatic ecosystems, threatened species, health of biota, habitats supporting the lifecycle of aquatic biota, species of social and cultural importance, integrity of aquatic ecosystems, biological function and provision of refuge.		C	3	Moderate (4)	> All vehicles, plant and equipment will be maintained in good working order and operated as intended. > Any refuelling trucks will carry a spill kit capable of containing any spills. > Appropriate spill response equipment will be located at all refuelling and liquid chemical storage locations including containment and recovery equipment. In the event of a spill, work will be shut down at the spill site. > Material contaminated as a result of a spill (e.g. soil or solid absorbent) must be removed (i.e. excavated or cleaned up) and placed in an appropriate container to prevent further contamination. > An accredited chemical waste contractor will be engaged to dispose of the material and to provide copies of Waste Transport Certificates and Certificates of Disposal for each consignment.	D	2	Low (5)
Site establishment	Water	Aquatic ecosystems	Biological and functional diversity, provision of refuge	Vegetation clearing	Shaping and prepping areas for project	Mortality of aquatic fauna due to changed water regimes and water quality.	Land, waterways	Direct impact to aquatic ecosystems, threatened species, health of biota, habitats supporting the lifecycle of aquatic biota, species of social and cultural importance, integrity of aquatic ecosystems, biological function and provision of refuge.		B	3	High (1)	> Project design to ensure water diversion to vegetated areas and are maintained as close to natural flows as practicable. > An ESCP is to be included in the contractors CEMP and include measures to prevent erosion, sedimentation and pooling during site preparation and permanently for operations. > The ESCP will include control measures that minimise the level of surface erosion and sedimentation from exposed ground. > Drains will be installed across the site to divert clean surface water to stable land areas and away from the site where soil is exposed. > Part of the site preparation, construction and operation phases, all erosion and sediment control infrastructure will be regularly checked during the wet season for effectiveness and integrity and remediated where systems fail.	D	3	Low (8)

Phase	Theme	Environmental Factors	Environmental values and sensitivities	Main activity	Sub activity	Environmental Impact	Potential Environmental Direct Impact (Pathway)	Potential Environmental Impact (receptor)	Assumptions	Inherent risk			Mitigation and management	Residual risk		
										Likelihood	Consequence			Likelihood	Consequence	
Site establishment	Water	Aquatic ecosystems	Ramsar wetlands, integrity of aquatic ecosystems and the ecological services they provide, biological and functional diversity, provision of refuge	Vegetation clearing	Clearing areas of existing vegetation and Machinery, vehicle and equipment use	Disturbance to sites of conservation significance through sedimentation or hydrocarbon spills.	Land, waterways	Direct and cumulative long term impact to SOCS and indirect impacts to species that this area of refuge. Impact has the potential to influence water quality and change flow paths.	The closest SOCS is roughly 5 lineal km from the project areas within the Alligator River Floodplains (Section 5.4.1.3). The Alligator River floodplain extend along the major rivers (Wildman, and West, South and East Alligator) and seasonal creeks (notably Magela, Nourlangie and Murgenella) in the region.	D	2	Low (5)	> Project design to ensure water diversion to vegetated areas and are maintained as close to natural flows as practicable. > An ESCP is to be included in the contractors CEMP and include measures to prevent erosion, sedimentation and pooling during site preparation and permanently for operations. > The plan will include control measures that minimise the level of surface erosion and sedimentation from exposed ground. > Drains will be installed across the site to divert clean surface water to stable land areas and away from the site where soil is exposed. > Part of the site preparation, construction and operation phases, all erosion and sediment control infrastructure will be regularly checked during the wet season for effectiveness and integrity and remediated where systems fail.	D	2	Low (5)
Site establishment	Water	Inland water environmental quality	The quality of water in surface water features including intermittent streams, floodplains, drainage lines, billabongs	Site preparation	Machinery, vehicle and equipment use	Change in water chemistry from contaminants such as hydrocarbon spills	Land, waterways	Direct impact to aquatic ecosystems, threatened species, health of biota, habitats supporting the lifecycle of aquatic biota, species of social and cultural importance, integrity of aquatic ecosystems, biological function and provision of refuge.		C	3	Moderate (4)	> All vehicles, plant and equipment will be maintained in good working order and operated as intended. > Any refuelling trucks will carry a spill kit capable of containing any spills. > Appropriate spill response equipment will be located at all refuelling and liquid chemical storage locations including containment and recovery equipment. In the event of a spill, work will be shut down at the spill site. > Material contaminated as a result of a spill (e.g. soil or solid absorbent) must be removed (i.e. excavated or cleaned up) and placed in an appropriate container to prevent further contamination. > An accredited chemical waste contractor will be engaged to dispose of the material and to provide copies of Waste Transport Certificates and Certificates of Disposal for each consignment.	D	2	Low (5)
Site establishment	Water	Inland water environmental quality	The quality of water in surface water features including intermittent streams, floodplains, drainage lines, billabongs	Vegetation clearing	Shaping and prepping areas for project	Mortality of aquatic fauna due to changed water regimes and water quality.	Land, waterways	Direct impact to creek alignment and natural flow paths, altering flows and potentially reducing seasonal inflows		C	3	Moderate (4)	> Project design to ensure water diversion to vegetated areas and are maintained as close to natural flows as practicable. > An ESCP is to be included in the contractorsCEMP and include measures to prevent erosion, sedimentation and pooling during site preparation and permanently for operations. > The ESCP will include control measures that minimise the level of surface erosion and sedimentation from exposed ground. > Drains will be installed across the site to divert clean surface water to stable land areas and away from the site where soil is exposed. > Part of the site preparation, construction and operation phases, all erosion and sediment control infrastructure will be regularly checked during the wet season for effectiveness and integrity and remediated where systems fail.	D	3	Low (8)
Site establishment	Water	Inland water environmental quality	The quality of water in surface water features including intermittent streams, floodplains, drainage lines, billabongs	Site preparation	Machinery, vehicle and equipment use	Change in aesthetics from contaminants such as hydrocarbon spills and sedimentation	Land, waterways	Impacts to hunting and other cultural uses due to reduced water quality and aesthetics		D	3	Low (8)	> All vehicles, plant and equipment will be maintained in good working order and operated as intended. > Any refuelling trucks will carry a spill kit capable of containing any spills. > Appropriate spill response equipment will be located at all refuelling and liquid chemical storage locations including containment and recovery equipment. In the event of a spill, work will be shut down at the spill site. > Material contaminated as a result of a spill (e.g. soil or solid absorbent) must be removed (i.e. excavated or cleaned up) and placed in an appropriate container to prevent further contamination. > An accredited chemical waste contractor will be engaged to dispose of the material and to provide copies of Waste Transport Certificates and Certificates of Disposal for each consignment. > Project design to ensure water diversion to vegetated areas and are maintained as close to natural flows as practicable. > An ESCP is to be included in the contractors CEMP and include measures to prevent erosion, sedimentation and pooling during site preparation and permanently for operations.	D	2	Low (5)
Site establishment	Water	Inland water environmental quality	The quality of groundwater features including aquifers and water tables	Site preparation	Machinery, vehicle and equipment use	Contamination of shallow localised ground water from hydrocarbon spills	Land, waterways	Long term impact to ground water quality and potential function and aquifer features.		D	4	Moderate (6)	> All vehicles, plant and equipment will be maintained in good working order and operated as intended. > Any refuelling trucks will carry a spill kit capable of containing any spills. > Appropriate spill response equipment will be located at all refuelling and liquid chemical storage locations including containment and recovery equipment. In the event of a spill, work will be shut down at the spill site. > Material contaminated as a result of a spill (e.g. soil or solid absorbent) must be removed (i.e. excavated or cleaned up) and placed in an appropriate container to prevent further contamination.	D	3	Low (8)
Site establishment	Air	Air quality	The chemical, physical and biological characteristics of air	Site preparation	Stockpile of soils from excavations or stripping	Dust generation from stockpiled soil	Air	Impacts of dust affecting air quality of terrestrial ecosystem health and function	No stockpiled soil will be left on site	D	2	Low (5)	> The use of a water truck will be used to supress dust generation on site. > An ESCP is to be included in the contractors Construction Environment Management Plan (CEMP) and include measures to prevent erosion (including wind erosion). > Stockpiled soil will be appropriately stabilised to minimise dust generation	D	2	Low (5)
Site establishment	Air	Air quality	The chemical, physical and biological characteristics of air	Vegetation clearing	Machinery, vehicle and equipment use	Dust emissions from vehicular movement	Air	Impacts of dust affecting air quality of terrestrial ecosystem health and function		A	3	High (2)	> Speed limit restrictions will be implemented on site to reduce dust generation. > A water cart will be used to wet frequently used access tracks. > Compacted fine crushed rock with minimal fines used to line frequently used on site roads. > All access tracks will be maintained and the main access to the site will be compacted with gravel. > Progressively rehabilitate area not required for construction or operation, such as temporary access tracks. > All disturbances will be minimised where possible and kept within the site boundary, Lot 2303 and approved disturbance footprint. > Clearing will be kept within surveyed area, to approved construction drawings. > Boundaries will remain within existing fence line and surveyed markers along road easements.	D	2	Low (5)
Site establishment	Air	Atmospheric processes	A contribution to the NTs greenhouse gas emissions.	Vegetation clearing	Machinery, vehicle and generator use	Greenhouse gas emissions from land clearing activities.	Air	Impacts to atmosphere contaminate levels adding to the greenhouse gas emissions		A	2	Moderate (3)	> All disturbances will be minimised where possible and kept within the site boundary, Lot 2303 and approved disturbance footprint. > The Project detailed design is to limit the clearing extent and maximise retention of vegetation within the Project area. > Boundaries will remain within existing fence line and surveyed markers along road easements. > Onsite burning of any material will not be undertaken without appropriate permits and/or supervision by local fire authorities. > Reuse of cleared vegetation on site to be utilised, where possible, to reduce offsite transportation, burning or decomposition (e.g. chipping for erosion control, salvaging for fauna hollows, salvage for local woodworking or cultural purposes etc.).	D	2	Low (5)
Site establishment	Air	Atmospheric processes	A contribution to the NTs greenhouse gas emissions.	Vegetation clearing	Machinery, vehicle and generator use	Diesel particulated, gaseous emission (including greenhouse gas emissions) via energy production from machinery, vehicles and generators.	Air	Impacts to atmosphere contaminate levels adding to the greenhouse gas emissions		A	2	Moderate (3)	> Commissioning tests to be undertaken to check particulate and gaseous emissions of diesel generators are in line with manufacturer's specifications and relevant standards > All vehicles, plant and equipment will be maintained in good working order (e.g. regular servicing) and operated as intended with appropriate emission control equipment. Selection of energy efficient equipment and vehicles will be preferred where practical, with a life cycle perspective. > Employee inductions to include vehicle operating instructions to reduce fuel consumption (e.g. no prolonged engine idling). > Plant equipment to be switched off when not in operation for periods of more than 30 minutes.	D	2	Low (5)

Jabiru Hybrid Power Station Referral

Phase	Theme	Environmental Factors	Environmental values and sensitivities	Main activity	Sub activity	Environmental Impact	Potential Environmental Direct Impact (Pathway)	Potential Environmental Impact (receptor)	Assumptions	Likelihood	Consequence	Inherent risk	Mitigation and management	Likelihood	Consequence	Residual risk
Site establishment	People	Communities and economy	Resources including water supply and food sources, transport networks and mobility, infrastructure and services, Aboriginal rights and interests	Site preparation	Staffing	Pressure on resource requirements such as food, water, accommodation and fuel.	Community	Depletion of essential resources to the community and visitors	Workforce during site preparation is expected to be minimal.	D	3	Low (8)	> Water onsite will be sourced from the main water supply. > The main activity during site preparation for water usage is dust suppression. > Continual consultation with the key stakeholders (including community organisations) though all phases of the Project.	D	2	Low (5)
Site establishment	People	Communities and economy	Transport networks and mobility	Site preparation	Traffic and road use	Increased traffic on local roads during site preparation may lead to Increased risk of traffic incidents and disruption to community amenity.	Community and land	Impacts to other road users and degradation of road infrastructure from use	The proposed works is in an industrial area of the Jabiru Township. There are no residential areas surrounding or close to Lot 2303. Vehicles and equipment coming from Darwin will bypass the town and continue on the Arnhem Highway, Whites Road and then to El Sherana Road. It is unlikely there will be high volumes of traffic during the site preparation phase.	A	2	Moderate (3)	> Driver awareness training of risks will be provided (e.g. via induction or toolbox talks) to all workers accessing the site during construction. > Traffic management plan to be implemented to manage any disruption to road access during construction > Heavy vehicles accessing the Project will be staggered during the day to minimise traffic impacts; and > Ensure roads accessed by the public remain in a safe and trafficable condition as a result of any construction works or traffic.	C	2	Low (6)
Site establishment	People	Communities and economy	Jobs and businesses including tourism, education, Aboriginal rights and interests	Site preparation	Enhance community and the economy	Opportunities for suppliers and businesses in the NT region to support the construction and operation of the Project.	Community and businesses	Opportunities for suppliers and businesses in the NT region to support the construction and operation of the Project.		A	3	High (2)	> Ensure procurement prioritises projects for local businesses where possible. > Local industry will be prioritised over interstate resources.	D	3	Low (8)
Site establishment	People	Communities and economy	Jobs and businesses including tourism, education, Aboriginal rights and interests	Site preparation	Enhance community and the economy	Local and regional areas do not benefit as expected from project.	Community and businesses	Low or no economic growth due to lack of employment and business		D	3	Low (8)	> Continual consultation with the key stakeholders though all phases of the project. > Company to set obligations, and targets to support local businesses where possible. > Local industry will be prioritised over interstate resources.	D	2	Low (5)
Site establishment	People	Communities and economy	Infrastructure and services	Site preparation	Site preparation, installation and operation of hybrid power station	Lack of critical infrastructure to help support the future of Jabiru.	Community	Community aspirations to achieve their goal of becoming sustainable	To oversee the future of Jabiru township, a Masterplan was established by the GAC on behalf of the Mirarr people to transition the town from mining to an Aboriginal-led tourism and services hub. Strategic planning is in progress to ensure continuation of government and community services for the West Arnhem region, improved tourism visitation to KNP and to promote Jabiru as an internationally renowned sustainable tourism and services hub.	A	3	High (2)	> Ensure there is suitable funding, engage in routine community engagement and feedback, adherence to the management plan, continued support.	D	3	Low (8)
Site establishment	People	Communities and economy	Amenity (noise considerations)	Site preparation	Use of machinery, equipment and vehicles	Noise and vibration of construction activities impacting the township.	People, air	Disturbance to neighbouring community, residents and businesses that are able to hear construction noise and machinery	The project area is located within the industrial area of the township, away from residential properties.	B	3	High (1)	> Noise from clearing and trenching will be kept to minimum intensity and expected to be short. > Noise shall be controlled by constructing during daytime hours and equipment serviced regularly.> The NT EPA Noise Management Framework Guideline (2018) will be followed through out site preparation activities.	C	2	Low (6)
Site establishment	People	Communities and economy	Aesthetics and Amenity (visual considerations)	Site preparation	Use of machinery, equipment and vehicles	Aesthetics impacted by visible dust emission from the project.	Air	Localised impacts to the health of all employees from dust generation		B	2	Moderate (2)	> Speed limit restrictions will be implemented on site to reduce dust generation. > A water cart will be used to wet frequently used access tracks where possible. > All access tracks will be maintained and the main access to the site will be compacted with gravel.	D	1	Low (1)
Site establishment	People	Communities and economy	Aesthetics and Amenity (visual considerations)	Site preparation	Clearing areas of existing vegetation	Aesthetics of clearing native vegetation.	People	Impact to the visual amenity of the area caused by clearing a large extent of native vegetation	The proposed site is surrounded by previous disturbances such as the Jabiru Waste Disposal Facility and a waste water treatment and irrigation facility. The proposed site will be secured with no public access.	C	2	Low (6)	> Continual consultation with the key stakeholders though all phases of the project. > All disturbances will be minimised and kept within the site boundary, Lot 2303. > Clearing will be kept within surveyed area and to approved construction drawings. > Boundaries will remain within existing fence line and established markers.	D	2	Low (5)
Site establishment	People	Communities and economy	Aesthetics and Amenity (visual considerations)	Waste Management	Waste generation	Poor waste management and waste generation	Land	Impact to the visual amenity of the area caused by wind blown, mishandled, illegally disposed rubbish to land and water		B	2	Moderate (2)	> Solid waste will be transported to Darwin to an accredited waste management facility. > General and construction waste will be disposed of in skip bins on site and taken to Darwin. > All waste storage areas will be secure as to not allow rubbish to become windblown. > All empty drums and oily rags will be taken to Darwin for correct disposal. > All drums with oily residue will be segregated from general waste, appropriately stored and bunded until taken off site.	D	1	Low (1)
Site establishment	People	Communities and economy	Social relationships, aboriginal rights, interests, including right to access, lifestyle, mental health and well being	Site design, planning, preparation, construction and operation	Stakeholder engagement	No communication or inclusion with key stakeholders straining social relationships.	Community	Loss of trust due to exclusion with the project process with DCM which can put long term strain on social relationships with key stakeholders. This could impact future proposed works.	To oversee the future of Jabiru township, a Masterplan was established by the GAC on behalf of the Mirarr people to transition the town from mining to an Aboriginal-led tourism and services hub. Strategic planning is in progress to ensure continuation of government and community services for the West Arnhem region, improved tourism visitation to KNP and to promote Jabiru as an internationally renowned sustainable tourism and services hub.	C	4	High (3)	> Establish routine engagement and feedback with community and key stakeholders at all phases of the project. > Establish transparency and open communication to ensure inclusion and support from stakeholders and community.	D	1	Low (1)
Site establishment	People	Communities and economy	Social relationships, aboriginal rights, interests, including right to access, job and business including tourism, education	Site design, planning, preparation, construction and operation	Stakeholder engagement	No inclusion of ranger groups or Traditional Owners during site visits and surveys straining social relationships.	Community	Lack of inclusion of ranger and research groups can put long term strain on social relationship with DCM. This could impact future proposed works.	The Djurru Rangers were involved in camera trapping of the black footed tree rat. Connect Environmental, undertaking the ecological studies, were accompanied by the rangers.	C	4	High (3)	> Establish routine engagement and feedback with key stakeholders and community groups at all phases of the project. > Establish transparency and open communication to ensure inclusion and support from stakeholders and community. > Include ranger groups on research projects associated with the project.	D	2	Low (5)
Site establishment	People	Communities and economy	Aesthetics, agriculture, fisheries and industry, amenity (visual considerations)	Site security	Unauthorised access	Introduction of weeds	Land	Direct impact to terrestrial ecosystems, threatened species, health of biota, habitats supporting the lifecycle of biota, species of social and cultural importance, integrity of ecosystems, biological function and provision of refuge.		C	3	Moderate (4)	> Construction and no unauthorised access signs will be installed at the entry of the site. > A permanent fence will replace the existing boundary fence in sections that are damaged. > Regular interval warning signage along the fence line will prevent access. > The site will have workers present during the day and secured with locks when works are complete each day. > Any newly established declared weeds will be treated by a sub contractor and monitored seasonally until eradicated. > Class A or Weeds of National Significance species found on site will be reported to the Weed Management Branch immediately. > A weed management plan will be incorporated into the CEMP.	D	2	Low (5)
Site establishment	People	Cultural and heritage	scared sites, cultural heritage items and places, historic heritage and places important or significant country	Site preparation	Use of machinery, equipment and vehicles	Cultural heritage sites damaged by dust generation	Air	Impact of dust degrading cultural sites and artifacts,	One known heritage site is located 200 m away from proposed works. This is located towards the south western corner of the waste disposal facility.	B	2	Moderate (2)	> Speed limit restrictions will be implemented on site to reduce dust generation. > A water cart will be used to wet frequently used access tracks where possible. > All access tracks will be maintained and the main access to the site will be compacted with gravel.	D	2	Low (5)
Site establishment	People	Cultural and heritage	scared sites, cultural heritage items and places, historic heritage and places important or significant country	Site preparation	Clearing areas of existing vegetation	Accidental disturbance to identified and unidentified cultural and archaeological heritage sites.	Community	Impact to sites of cultural significance protected for their cultural importance.	Existing boundary fence (surrounding Lot 2303) and locked gates prevent unauthorised access. A historic culturally modified tree was found during an archaeological survey (Appendix E) to the south western corner of the landfill site. This is approximately 200m away from proposed works and maintains a no-go zone of 20m. No heritage sites are recorded along El Sherana Road easement	D	4	Moderate (6)	> If a heritage site or artefact is discovered during clearing activities, all works will cease immediately, and notification provided toy GAC and the Heritage Branch under the Heritage Act 2011 (NT) provisions. > Cultural heritage awareness training will be provided to all personnel during site inductions.	D	2	Low (5)
Site establishment	People	Cultural and heritage	scared sites, cultural heritage items and places, historic heritage and places important or significant country	Site security	Unauthorised access	Unauthorised access damaging cultural and archaeological heritage sites.	Community	Impact to sites of cultural significance protected for their cultural importance.	Existing boundary fence (surrounding Lot 2303) and locked gates prevent unauthorised access. A historic culturally modified tree was found during an archaeological survey (Appendix E) to the south western corner of the landfill site. This is approximately 200m away from proposed works and maintains a no-go zone of 20m. No heritage sites are recorded along El Sherana Road easement	D	2	Low (5)	> If a heritage site or artefact is discovered during clearing activities, all works will cease immediately, and notification provided toy GAC and the Heritage Branch under the Heritage Act 2011 (NT) provisions. > Cultural heritage awareness training will be provided to all personnel during site inductions.> No-Go Zones shall be established prior to clearing activities of existing cultural heritage sites.	D	2	Low (5)
Site establishment	People	Human health	Air quality	Site preparation	Clearing areas of existing vegetation	Dust emissions effect the community	Community	Localised impacts to the health of public and employees from dust generation	The project area is located within the industrial area of the township, 2km away from residential properties.	C	2	Low (6)	> Speed limit restrictions on site, use water cart to wet frequently used access tracks where possible. > The main access to the site will be compacted with gravel. > The NT EPA Noise Management Framework Guideline will be followed through out site preparation activities.	D	2	Low (5)
Site establishment	People	Human health	Air quality	Site preparation	Clearing areas of existing vegetation	Noise emissions effect the community	Community	Localised impacts to the health of public and employees from noise generation	The project area is located within the industrial area of the township, 2km away from residential properties.	C	2	Low (6)	> Noise from clearing and trenching will be kept to minimum intensity and expected to be short. > Noise shall be controlled by constructing during daytime hours and equipment serviced regularly.. > The NT EPA Noise Management Framework Guideline will be followed through out site preparation activities.	D	2	Low (5)

Phase	Theme	Environmental Factors	Environmental values and sensitivities	Main activity	Sub activity	Environmental Impact	Potential Environmental Direct Impact (Pathway)	Potential Environmental Impact (receptor)	Assumptions	Likelihood	Consequence	Inherent risk	Mitigation and management	Likelihood	Consequence	Residual risk
Site establishment	People	Human health	Weather	Weather	Working in all environmental conditions	Lightning strike to personnel or infrastructure	Community and employees	Direct impact to staff causing injury or death or indirect impact to interrupted power supply		C	5	High (6)	> Lightning management such as the protection of machinery and equipment and safety of personnel should be addressed in the contractors Safety Management Plan. > This will include earthing to buildings and equipment and stop work response for an encroaching storm. > Climatic conditions will be monitored to allow for sufficient warning and preparedness before major meteorological events.	C	2	Low (6)
Site establishment	People	Human health	Site security	Site security	Unauthorised access	Unauthorised access causing injury or fatality	People	Potential direct injury or death to trespassers	Existing boundary fence (surrounding Lot 2303) and locked gates prevent unauthorised access.	D	5	High (5)	> Construction and no unauthorised access signs will be installed at the entry of the site. > A permanent fence will replace the existing boundary fence in sections that are damaged. > Regular interval warning signage along the fence line will prevent access. > The site will have workers present during the day and secured with locks when works are complete each day.	D	1	Low (1)
Construction	Land	Landforms	Culturally important features	Construction activities	Clearing areas of existing vegetation	Disturbance to culturally important/ significant features	Land	Direct impact to landforms that are of cultural significance/ importance	Lot 2303 is relatively flat with no distinct cultural features or landforms (Section 5.4). An interim report was undertaken by Wallis Heritage Consulting in September 2020 and found no cultural sites of significance on Lot2303.	D	2	Low (5)	> Remain within visible disturbance footprint. > GAC provide cultural heritage aspect of inductions for all employees and contractors. > If a heritage site or artefact is discovered during clearing activities, all works will cease immediately, and notification provided toy GAC and the Heritage Branch under the Heritage Act 2011 (NT) provisionsC.	D	1	Low (1)
Construction	Land	Terrestrial Environmental Quality	Characteristic of soils, including chemical, physical, biological and aesthetic qualities	Excavations	Trenching/ footings	Exposure/ disturbance of contaminated land from offsite irrigation of treated effluent water	Land and waterways	Disturbance and movement of contaminated soil	Studies undertaken by Greencap (2020) found the risk of significant exposure from chemicals of concern is considered low. The near surface soil testing and analysis indicated all potential contaminants of concern in surface soils were reported below adopted guideline values. A total of 16 soil bores were dug and soil analysed for TRH, phenols, heavy metals, nutrients, hydrocarbons, pesticides and herbicides	D	2	Low (5)	> Contaminated soils will not be scraped up and used elsewhere. There will be no Project activities area to disturb soils within the effluent irrigation areas. Sediment and erosion controls will be implemented.	D	1	Low (1)
Construction	Land	Terrestrial Environmental Quality	Characteristic of soils, including chemical, physical, biological and aesthetic qualities	Excavations	Trenching/ footings	Exposure of ASS	Land and waterways	Excavation and land clearing causing exposure to potential ASSs and impacting quality of soils and waterways	Geotechnical studies were undertaken by Construction Sciences (2020) on Lot 2303 to determine suitability for construction of the power station.	D	2	Low (5)	> Soils were assessed to be modily acidic in nature and classified as non- Acid Sulphate Soils.	D	1	Low (1)
Construction	Land	Terrestrial Environmental Quality	Characteristic of soils, including chemical, physical, biological and aesthetic qualities	Construction activities	Exposed cleared areas	Soil erosion causing loss of topsoil	Land and waterways	Direct impact to soil quality with the loss of top soil during overland flows	Emerson Class tests were carried out on nine (9) predominant near surface soil samples as requested by the client. Given the consistency of near surface material, all of the test results returned an Emerson Class Number of 5. This indicates that the soils across the site are non-dispersive. They also indicate the soils have a medium potential for erosion and high a potential to cause environmental harm if disturbed. Given the medium potential to erode, it is recommended that all general erosion and sediment controls are put in place during the construction	B	3	High (1)	> All site preparation will be undertaken in accordance with Land Clearing Guidelines (DENR, 2019). > An Erosion and Sediment Control plan is to be included in the contractors Construction Environment Management Plan (CEMP) and include measures to prevent erosion, sedimentation and pooling during site preparation and permanently for operations. > The plan will include control measures that minimise the level of surface erosion and sedimentation from exposed ground and excavations. > Drains will be installed across the site to divert clean surface water to stable land areas and away from the site where soil is exposed. Swales with rock check dams and then outlets to the grassed paddock to the south will be used as a filter buffer. > Part of the site preparation, construction and operation phases, all erosion and sediment control infrastructure should be regularly checked during the wet season for effectiveness and integrity and remediated where systems fail.	D	2	Low (5)
Construction	Land	Terrestrial Environmental Quality	Characteristic of soils, including chemical, physical, biological and aesthetic qualities	Construction activities	Vehicular movement/ traffic	Compaction of soils	Land	Compaction of soils will degrade soil quality		B	2	Moderate (2)	> The site will be proof rolled in order to compact loose soil. This will assist with ground stability and mitigate soil dispersal.	B	1	Low (3)
Construction	Land	Terrestrial Environmental Quality	Characteristic of soils, including chemical, physical, biological and aesthetic qualities	Construction activities	Vehicular movement/ traffic	Increase in land instability through the creation of wheel ruts during wet weather	Land and waterways	Direct impact to soil quality and integrity and downstream waterways through erosion		C	2	Low (6)	> The site will be proof rolled in order to compact loose soil. Clean fill will be selected for foundations or footings, voids created by the removal vegetation, wheel ruts created in wet weather or if existing soils are below subgrade level. All structural fill will be inspected and tested. All access roads will be maintained regularly to prevent deterioration.	D	2	Low (5)
Construction	Land	Terrestrial Environmental Quality	Characteristic of soils, including chemical, physical, biological and aesthetic qualities	Excavations	Creating stockpiles from excavated material	Soil erosion of stockpiles during rainfall events	Land and waterways	Direct impact to soil quality and integrity and downstream waterways through erosion of stockpiled soil		C	3	Moderate (4)	> An Erosion and Sediment Control plan is to be included in the contractors Construction Environment Management Plan (CEMP) and include measures to prevent erosion, sedimentation and pooling during site preparation and permanently for operations. The plan will include bunding around stockpiled soil during seasonal work. There will be no permanent stockpiles.	D	2	Low (5)
Construction	Land	Terrestrial Environmental Quality	Characteristic of soils, including chemical, physical, biological and aesthetic qualities	Handling of hydrocarbons and other hazardous chemicals	Handling of hydrocarbons and other hazardous chemicals	Hydrocarbon spills during refuelling or rupture to machinery hydraulic lines	Land and waterways	Direct impact to soil quality and indirect impact to waterways through overland flows.		C	3	Moderate (4)	> Spills will be cleaned immediately. > All vehicles, plant and equipment will be maintained in good working order (e.g. regular servicing) and operated as intended. > Any refuelling trucks will carry a spill kit capable of containing any spills. > Appropriate spill response equipment will be located at all refuelling and liquid chemical storage locations including containment and recovery equipment. In the event of a spill, work will be shut down at the spill site. Material contaminated as a result of a spill (e.g. soil or solid absorbent) must be removed (i.e. excavated or cleaned up) and placed in an appropriate container or taken off site to prevent further contamination. > An accredited chemical waste contractor will be engaged to dispose of the material and to provide copies of Waste Transport Certificates and Certificates of Disposal for each consignment. > All hazardous chemicals and fuels will be stored away from drainage lines, away from non- compatible chemicals and appropriately bunded.	D	2	Low (5)
Construction	Land	Terrestrial Environmental Quality	Characteristic of soils, including chemical, physical, biological and aesthetic qualities	Storage of hydrocarbons and other hazardous chemicals	Storage of hydrocarbons and other hazardous chemicals	Significant hydrocarbon spills from storage areas on site	Land and waterways	Direct impact to soil quality and indirect impact to waterways through overland flows.		C	4	High (3)	> Spills will be cleaned immediately. > All vehicles, plant and equipment will be maintained in good working order (e.g. regular servicing) and operated as intended. > Any refuelling trucks will carry a spill kit capable of containing any spills. > Appropriate spill response equipment will be located at all refuelling and liquid chemical storage locations including containment and recovery equipment. > In the event of a spill, work will be shut down at the spill site. > Material contaminated as a result of a spill (e.g. soil or solid absorbent) must be removed (i.e. excavated or cleaned up) and placed in an appropriate container or taken off site to prevent further contamination. > An accredited chemical waste contractor will be engaged to dispose of the material and to provide copies of Waste Transport Certificates and Certificates of Disposal for each consignment. > All hazardous chemicals and fuels will be stored away from drainage lines, away from non- compatible chemicals and appropriately bunded.	D	2	Low (5)
Construction	Land	Terrestrial Ecosystems	Sensitive or significant vegetation, vegetation that provides important ecological function, ionic or culturally important plants and vegetation	Construction activities	Vehicular movement/ traffic	Dust generation impacting remaining sensitive, significant, endemic or threatened vegetation	Air	Direct and potentially cumulative impact to surrounding ecosystem function.	An ecological survey found no threatened or sensitive flora species to occur within 15 km of the project area.	D	2	Low (5)	> Speed limit restrictions will be implemented on site to reduce dust generation. A water cart will be used to wet frequently used access tracks where possible. All access tracks will be maintained and the main access to the site will be compacted with gravel.	D	2	Low (5)
Construction	Land	Terrestrial Ecosystems	Sensitive or significant vegetation, vegetation that provides important ecological function, listed threatened species, locally endemic species or species with a restricted habitat, ionic or culturally	Construction activities	Use of machinery, equipment, vehicles and activities causing spark.	Combustion from ignition sources such as machinery, equipment, welding or smoking impacting on native vegetation, threatened species and habitat.	Land	Direct and potentially cumulative impact to surrounding ecosystem function, viability and habitat. Loss of species that use surrounding habitat. Loss of habitat.	Fire management is undertaken by the GAC through the Djurrubu Rangers to prevent late season wildfires and to maintain species diversity through controlled low intensity early dry season reduction burns.	C	4	High (3)	> Fire prevention equipment such as reels and extinguishers will be provided and validated in specified areas on site. Smoking and hot works will only be permitted in designated areas, clear of any flammable material or vegetation. A firebreak of 25m on the internal side of the project area's boundary fence line will be established during site preparation and maintained during operations. Emergency contact numbers will be given to all contractors during site induction and displayed once common areas are established.	D	3	Low (8)
Construction	Land	Terrestrial Ecosystems	Listed threatened species and their habitat	Construction activities	Vehicular movement/ traffic	Disturbance to sensitive NT and MNES fauna species and their habitat	Land	Direct and cumulative impact to protect sensitive NT and MNES terrestrial fauna species and their habitat		C	2	Low (6)	> All clearing will have been completed during the site preparation phase. > All vehicles will remain on established roads and within the allocated speed limit. > No- Go areas will be established for remaining vegetation and visibly marked or protected.	C	2	Low (6)
Construction	Land	Terrestrial Ecosystems	Locally endemic species or species with restricted habitat	Construction activities	Clearing areas of existing vegetation	Threatened terrestrial fauna species interaction with vehicles resulting in direct fauna mortality	Land	Direct and cumulative impact to locally endemic species		C	3	Moderate (4)	> Speed limits will be introduced on site, all fauna observations will be recorded in a fauna register. > Any interactions with any fauna species will be reported to the HSE advisor and site supervisor, all interactions will become an environmental incident and will be reported and investigated.	D	2	Low (5)

Phase	Theme	Environmental Factors	Environmental values and sensitivities	Main activity	Sub activity	Environmental Impact	Potential Environmental Direct Impact (Pathway)	Potential Environmental Impact (receptor)	Assumptions	Mitigation and management				Likelihood	Consequence	Residual risk
										Likelihood	Consequence	Inherent risk				
Construction	Land	Terrestrial Ecosystems	Listed threatened species and their habitat	Construction activities	Movement of vehicles and machinery within the project area and between sites	Change of preferred habitat from introduced and accidently spread weeds	Land	Cumulative impact as a result of no appropriate weed management or hygiene. Change of vegetation characteristics and function	A WoNS, Class A and multiple Class B weeds have been assessed to occur within 5 km of the project area.	C	4	High (3)	> All construction personnel will receive induction training in procedures for personal weed-control hygiene practices, such as removing seeds and mud from clothing and footwear. > All vehicles and construction equipment will be cleaned by the contractor prior to arrival in line with the Weed Management Branch Brochure 'How to keep your equipment and vehicles clean of weeds' to ensure equipment and people are weed free. > All vehicles arriving to site is to have a weed/ pest declaration form. > All movement of vehicles and equipment on site will be kept to cleared areas. > Cleared vegetation will be segregated with weed infested piles taken off site for correct disposal. > Any fill required for site preparation and construction will be clean of weed seeds and other organic material. > Any newly established declared weeds will be treated by a sub contractor and monitored seasonally until eradicated. > Class A or Weeds of National Significance species found on site will be reported to the Weed Management Branch immediately. > A weed management plan will be incorporated into the CEMP.	C	2	Low (6)
Construction	Land	Terrestrial Ecosystems	Listed threatened species and their habitat, Listed migratory species and their habitat	Construction activities	Machinery, vehicle and equipment use	Noise, light and vibration	Land	Artificial light emitting from the site could attract fauna and alter foraging patterns, increase predation risks, disrupt biological clocks and disrupt dispersal movements impacting breeding and roosting regimes.	Potential sources of light pollution associated with the Project would be the afterhours security lighting and night time lighting needed in key operational areas.	A	2	Moderate (3)	> Noise from clearing and trenching will be kept to minimum intensity and expected to be short. > Noise shall be controlled by constructing during daytime hours and equipment serviced regularly. > The NT EPA Noise Management Framework Guideline will be followed through out site preparation activities. > Lighting will be used only for required operational areas, all light sources will be aimed towards specific work areas requiring light for safe construction and/or operation, with a low vertical angle, and light shields will be placed on large equipment to minimise light spill over. > Where possible, lighting will be the minimum wattage, whilst not compromising safety or OH&S requirements. > All vehicles, plant and equipment will be maintained in good working order (e.g. regular servicing) and operated as intended. > Compaction of soils and land clearing will be undertaken during the day.	C	1	Low (2)
Construction	Land	Terrestrial Ecosystems	Listed threatened species and their habitat	Construction activities	Waste management	Vermin introduction to site through poor waste management activities	Land	Direct impact to sensitive fauna species		D	2	Low (5)	> Waste will be managed through bins provided onsite and large skip bin for larger construction items. Waste will be taken offsite to a waste facility in Darwin for correct disposal.	D	2	Low (5)
Construction	Land	Terrestrial Ecosystems	Listed threatened species and their habitat	Construction activities	Excavation of footings and trenches for electrical cables	Sensitive NT and MNES terrestrial fauna species entrapment	Land	Direct impact to sensitive fauna species		C	2	Low (6)	> The time a trench or footings are open should be minimised and barricaded to prevent entry. > Trenches and footings should be checked each morning for trapped wildlife. > If an animal becomes trapped, call Wildcare NT (89 886 121) for assistance or guidance. > Cleared timber shall be stockpiled away from remaining vegetation and removed as soon as possible to prevent sheltering opportunities.	D	2	Low (5)
Construction	Water	Hydrological processes	The supply and quantity of water in surface water features to creeks and intermittent streams	Cleared vegetation	Exposed cleared areas	Increased surface flow regimes from loss of vegetation and diversion	Land, waterways	Direct impact to water levels to Baralil Creek, increasing surface runoff as a result of clearing 10ha vegetation.	There will be increased surface runoff caused by impervious solar panels and infrastructure. The site and access roads make up 0.33% of the Baralil Creek catchment and 0.09% of Gulungul and Baralil Creek catchments combined (Appendix B).	B	3	High (1)	> Minimise unnecessary disturbance, project design will locate infrastructure to minimise stormwater runoff. Project design to ensure water diversion to vegetated areas and are maintained as close to natural flows as practicable.	C	2	Low (6)
Construction	Water	Hydrological processes	The supply and quantity of water in surface water features to creeks and intermittent streams	Construction activities	Construction of infrastructure	Placement of infrastructure domains obstructing/ altering natural flow paths.	Land, waterways	Direct impact to creek alignment and natural flow paths, altering flows and increasing potential for erosion.		B	3	High (1)	> Minimise unnecessary disturbance, project design will locate infrastructure to minimise stormwater runoff. Project design to ensure water diversion to vegetated areas and are maintained as close to natural flows as practicable	D	2	Low (5)
Construction	Water	Hydrological processes	The supply and quantity of water in surface water features to creeks and intermittent streams	Construction activities	Location of project area and infrastructure	Site subject to seasonal flooding inundating critical infrastructure and stored chemicals.	Land, waterways	Site inundated during wet season events causing degradation of infrastructure and potential contamination from site to flooded areas.	Desktop flood study undertaken by Surface Water and Erosion Solutions (2020) indicate Lot 2303 is unlikely to be affected by flooding of Baralil Creek. Potential backup of water from Magela Creek, Gulungul and Baralil Creeks during high flows may reach the south eastern corner of the Lot. Conservatives estimates indicate probable maximum flood levels are unlikely to reach the average site level of 27m Australian Height Datum. There is a very low flood risk. (Appendix B)	D	3	Low (8)	> Project design to ensure water diversion to vegetated areas and are maintained as close to natural flows as practicable	D	3	Low (8)
Construction	Water	Inland water environmental quality	The quality of water in surface water features including rivers, RAMSAR wetlands	Cleared vegetation	Exposed cleared areas	Build up of sedimentation in Baralil Creek changing water quality and creek characteristics and function	Land, waterways	Direct impact to Baralil Creek from overland flows increasing sedimentation and influencing water quality	Results of the erosion risk assessment determined two erosion risk slope classes as defined in the NT Land Suitability Guidelines (Northern Territory Government 2013). Erosion risk class C 3 has 71% of its surface slopes of 0.75% to 5% which makes them marginally suitable for development. The remainder, is classed as C2 which has surface slopes <0.75% making that area moderately suitable for development (Appendix B).	B	3	High (1)	> An Erosion and Sediment Control plan is to be included in the contractors Construction Environment Management Plan (CEMP) and include measures to prevent erosion, sedimentation and pooling during site preparation and permanently for operations. > The plan will include control measures that minimise the level of surface erosion and sedimentation from exposed ground. > Drains will be installed across the site to divert clean surface water to stable land areas and away from the site where soil is exposed. > Part of the site preparation, construction and operation phases, all erosion and sediment control infrastructure will be regularly checked during the wet season for effectiveness and integrity and remediated where systems fail.	D	2	Low (5)
Construction	Water	Inland water environmental quality	Culturally important water features	Cleared vegetation	Exposed cleared areas	Build up of sedimentation in Baralil Creek changing water quality, creek characteristics and function, impacting hunting and other cultural uses	Land, waterways	Impacts to hunting and other cultural uses due to reduced water quality and aesthetics	Results of the erosion risk assessment determined two erosion risk slope classes as defined in the NT Land Suitability Guidelines (Northern Territory Government 2013). Erosion risk class C 3 has 71% of its surface slopes of 0.75% to 5% which makes them marginally suitable for development. The remainder, is classed as C2 which has surface slopes <0.75% making that area moderately suitable for development (Appendix B)	B	3	High (1)	> An Erosion and Sediment Control plan is to be included in the contractors Construction Environment Management Plan (CEMP) and include measures to prevent erosion, sedimentation and pooling during site preparation and permanently for operations. > The plan will include control measures that minimise the level of surface erosion and sedimentation from exposed ground. > Drains will be installed across the site to divert clean surface water to stable land areas and away from the site where soil is exposed. > Part of the site preparation, construction and operation phases, all erosion and sediment control infrastructure will be regularly checked during the wet season for effectiveness and integrity and remediated where systems fail.	D	2	Low (5)
Construction	Water	Inland water environmental quality	The quality of water in surface water features including intermittent streams, floodplains, drainage lines, billabongs	Cleared vegetation	Exposed cleared areas	Change in water aesthetics from suspended solids	Land, waterways, wetlands	Direct impact to Baralil Creek from overland flows increasing sedimentation and influencing water quality	Results of the erosion risk assessment determined two erosion risk slope classes as defined in the NT Land Suitability Guidelines (Northern Territory Government 2013). Erosion risk class C 3 has 71% of its surface slopes of 0.75% to 5% which makes them marginally suitable for development. The remainder, is classed as C2 which has surface slopes <0.75% making that area moderately suitable for development (Appendix B).	B	3	High (1)	> An Erosion and Sediment Control plan is to be included in the contractors Construction Environment Management Plan (CEMP) and include measures to prevent erosion, sedimentation and pooling during site preparation and permanently for operations. > The plan will include control measures that minimise the level of surface erosion and sedimentation from exposed ground. > Drains will be installed across the site to divert clean surface water to stable land areas and away from the site where soil is exposed. Part of the site preparation, construction and operation phases, all erosion and sediment control infrastructure will be regularly checked during the wet season for effectiveness and integrity and remediated where systems fail.	D	2	Low (5)
Construction	Water	Inland water environmental quality	The quality of water in surface water features including intermittent streams, floodplains, drainage lines, billabongs	Construction activities	Machinery, vehicle and equipment use	Accidental release of pollutants causes degradation of instream habitat including water in downstream aquatic habitat.	Land, waterways, wetlands	Direct impact to aquatic ecosystems, threatened species, health of biota, habitats supporting the lifecycle of aquatic biota, species of social and cultural importance, integrity of aquatic ecosystems, biological function and provision of refuge.		C	3	Moderate (4)	> Spills will be cleaned immediately. All vehicles, plant and equipment will be maintained in good working order (e.g. regular servicing) and operated as intended. > Any refuelling trucks will carry a spill kit capable of containing any spills. > Appropriate spill response equipment will be located at all refuelling and liquid chemical storage locations including containment and recovery equipment. > In the event of a spill, work will be shut down at the spill site. > Material contaminated as a result of a spill (e.g. soil or solid absorbent) must be removed (i.e. excavated or cleaned up) and placed in an appropriate container or taken off site to prevent further contamination. > An accredited chemical waste contractor will be engaged to dispose of the material and to provide copies of Waste Transport Certificates and Certificates of Disposal for each consignment. > All hazardous chemicals and fuels will be stored away from drainage lines, away from non- compatible chemicals and appropriately bunded.	D	2	Low (5)
Construction	Water	Aquatic ecosystems	Threatened species, the habitat that supports the lifecycle of aquatic biota, the health of the biota in inland waterways	Construction activities	Machinery, vehicle and equipment use	Hydrocarbon spills impacting threatened aquatic fauna and flora and their habitat	Land, waterways	Direct impact to aquatic ecosystems, threatened species, health of biota, habitats supporting the lifecycle of aquatic biota, species of social and cultural importance, integrity of aquatic ecosystems, biological function and provision of refuge.		C	3	Moderate (4)	> All vehicles, plant and equipment will be maintained in good working order (e.g. regular servicing) and operated as intended. Any refuelling trucks will carry a spill kit capable of containing any spills. > Appropriate spill response equipment will be located at all refuelling and liquid chemical storage locations including containment and recovery equipment. > In the event of a spill, work will be shut down at the spill site. Material contaminated as a result of a spill (e.g. soil or solid absorbent) must be removed (i.e. excavated or cleaned up) and placed in an appropriate container to prevent further contamination. > An accredited chemical waste contractor will be engaged to dispose of the material and to provide copies of Waste Transport Certificates and Certificates of Disposal for each consignment.	D	2	Low (5)

Phase	Theme	Environmental Factors	Environmental values and sensitivities	Main activity	Sub activity	Environmental Impact	Potential Environmental Direct Impact (Pathway)	Potential Environmental Impact (receptor)	Assumptions	Likelihood	Consequence	Inherent risk	Mitigation and management	Likelihood	Consequence	Residual risk
Construction	Water	Aquatic ecosystems	Ramsar wetlands, integrity of aquatic ecosystems and the ecological services they provide	Construction activities	Machinery, vehicle and equipment use	Hydrocarbon spills impacting Ramsar wetlands sites	Land, waterways, wetlands	Direct impact to aquatic ecosystems, threatened species, health of biota, habitats supporting the lifecycle of aquatic biota, species of social and cultural importance, integrity of aquatic ecosystems, biological function and provision of refuge.		C	3	Moderate (4)	> All vehicles, plant and equipment will be maintained in good working order (e.g. regular servicing) and operated as intended. Any refuelling trucks will carry a spill kit capable of containing any spills. > Appropriate spill response equipment will be located at all refuelling and liquid chemical storage locations including containment and recovery equipment. In the event of a spill, work will be shut down at the spill site. Material contaminated as a result of a spill (e.g. soil or solid absorbent) must be removed (i.e. excavated or cleaned up) and placed in an appropriate container to prevent further contamination. > An accredited chemical waste contractor will be engaged to dispose of the material and to provide copies of Waste Transport Certificates and Certificates of Disposal for each consignment.	D	2	Low (5)
Construction	Water	Aquatic ecosystems	Ramsar wetlands, integrity of aquatic ecosystems and the ecological services they provide, biological and functional diversity, provision of refuge	Cleared vegetation	Cleared areas of vegetation. Machinery, vehicle and equipment use	Disturbance to sites of conservation significance through sedimentation or hydrocarbon spills.	Land, waterways	Direct and cumulative long term impact to SOCS and indirect impacts to species that this area of refuge. Impact has the potential to influence water quality and change flow paths.	The closest SOCS is roughly 5 lineal km from the project areas within the Alligator River Floodplains (Section 5.4.1.3). The Alligator River floodplain extend along the major rivers (Wildman, and West, South and East Alligator) and seasonal creeks (notably Magela, Nourlangie and Murgenella) in the region.	D	2	Low (5)	> Project design to ensure water diversion to vegetated areas and are maintained as close to natural flows as practicable. > An Erosion and Sediment Control plan is to be included in the contractors Construction Environment Management Plan (CEMP) and include measures to prevent erosion, sedimentation and pooling during site preparation and permanently for operations. > The plan will include control measures that minimise the level of surface erosion and sedimentation from exposed ground. > Drains will be installed across the site to divert clean surface water to stable land areas and away from the site where soil is exposed. > Part of the site preparation, construction and operation phases, all erosion and sediment control infrastructure will be regularly checked during the wet season for effectiveness and integrity and remediated where systems fail.	D	2	Low (5)
Construction	Water	Inland water environmental quality	The quality of water in surface water features including intermittent streams, floodplains, drainage lines, billabongs	Cleared vegetation	Exposed cleared areas	Mortality of aquatic fauna due to changed water regimes and water quality.	Land, waterways	Direct impact to creek alignment and natural flow paths, altering flows and potentially reducing seasonal inflows		C	3	Moderate (4)	> Project design to ensure water diversion to vegetated areas and are maintained as close to natural flows as practicable. > An Erosion and Sediment Control plan is to be included in the contractors Construction Environment Management Plan (CEMP) and include measures to prevent erosion, sedimentation and pooling during site preparation and permanently for operations. > The plan will include control measures that minimise the level of surface erosion and sedimentation from exposed ground. > Drains will be installed across the site to divert clean surface water to stable land areas and away from the site where soil is exposed. > Part of the site preparation, construction and operation phases, all erosion and sediment control infrastructure will be regularly checked during the wet season for effectiveness and integrity and remediated where systems fail.	D	3	Low (8)
Construction	Water	Inland water environmental quality	The quality of groundwater features including aquifers and water tables	Construction activities	Machinery, vehicle and equipment use. Storage areas	Contamination of shallow localised ground water from hydrocarbon spills	Land, waterways	Long term impact to ground water quality and potential function and aquifer features.		D	4	Moderate (6)	> All vehicles, plant and equipment will be maintained in good working order (e.g. regular servicing) and operated as intended. > Any refuelling trucks will carry a spill kit capable of containing any spills. > Appropriate spill response equipment will be located at all refuelling and liquid chemical storage locations including containment and recovery equipment. > In the event of a spill, work will be shut down at the spill site. > Material contaminated as a result of a spill (e.g. soil or solid absorbent) must be removed (i.e. excavated or cleaned up) and placed in an appropriate container to prevent further contamination. > An accredited chemical waste contractor will be engaged to dispose of the material and to provide copies of Waste Transport Certificates and Certificates of Disposal for each consignment.	D	3	Low (8)
Construction	Air	Air quality	The chemical, physical and biological characteristics of air	Excavations	Creating stockpiles from excavated material	Dust generation from stockpiled soil	Air	Impacts of dust affecting air quality of terrestrial ecosystem health and function	No stockpiled soil will be left on site	D	2	Low (5)	> The use of a water truck will be used to supress dust generation on site. > An ESCP is to be included in the contractors Construction Environment Management Plan (CEMP) and include measures to prevent erosion (including wind erosion). > Stockpiled soil will be appropriately stabilised to minimise dust generation	D	2	Low (5)
Construction	Air	Air quality	The chemical, physical and biological characteristics of air	Construction activities	Machinery, vehicle and equipment use	Dust emissions from vehicular movement	Air	Impacts of dust affecting air quality of terrestrial ecosystem health and function		A	3	High (2)	> Speed limit restrictions on site, use water cart to wet frequently used access tracks where possible. > The main access to the site will be compacted with gravel.	D	2	Low (5)
Construction	Air	Atmospheric processes	A contribution to the NTs greenhouse gas emissions.	Construction activities	Machinery, vehicle and equipment use	Greenhouse gas emissions from construction activities.	Air	Impacts to atmosphere contaminate levels adding to the greenhouse gas emissions, contributing to the greenhouse effect and global warming.		A	2	Moderate (3)	> Commissioning tests to be undertaken to check particulate and gaseous emissions of diesel generators are in line with manufacturer's specifications and relevant standards > All vehicles, plant and equipment will be maintained in good working order (e.g. regular servicing) and operated as intended with appropriate emission control equipment. Selection of energy efficient equipment and vehicles will be preferred where practical, with a life cycle perspective. > Employee inductions to include vehicle operating instructions to reduce fuel consumption (e.g. no prolonged engine idling). > Plant equipment to be switched off when not in operation for periods of more than 30 minutes.	B	1	Low (3)

Phase	Theme	Environmental Factors	Environmental values and sensitivities	Main activity	Sub activity	Environmental Impact	Potential Environmental Direct Impact (Pathway)	Potential Environmental Impact (receptor)	Assumptions	Likelihood	Consequer	Inherent risk	Mitigation and management	Likelihood	Consequer	Residual risk
Construction	People	Communities and economy	Resources including water supply and food sources, transport networks and mobility, infrastructure and services, Aboriginal rights and interests	Construction activities	Staffing	Pressure on resource requirements such as food, water, accommodation and fuel.	Community	Depletion of essential resources to the community and visitors		D	3	Low (8)	> Water onsite will be sourced from the main water supply and used for general amenities and dust suppression. Local businesses will benefit from the presence of workers temporarily residing in the township. Communication with local businesses will be maintained.	D	2	Low (5)
Construction	People	Communities and economy	Transport networks and mobility	Construction activities	Traffic and road use	Increased traffic on local roads during construction may lead to Increased risk of traffic incidents and disruption to community amenity.	Community and land	Impacts to other road users and degradation of road infrastructure from use		A	2	Moderate (3)	> The proposed works is in an industrial area of the Jabiru Township. There are no residential areas surrounding or close to Lot 2303. Vehicles and equipment coming from Darwin will bypass the town and continue on the Arnhem Highway, Whites Road and then to El Sherana Road. It is unlikely there will be high volumes of traffic during the site preparation phase.	C	2	Low (6)
Construction	People	Communities and economy	Jobs and businesses including tourism, education, Aboriginal rights and interests	Construction activities	Enhance community and the economy	Opportunities for suppliers and businesses in the NT region to support the construction and operation of the Project.	Community and businesses	Opportunities for suppliers and businesses in the NT region to support the construction and operation of the Project.		A	3	High (2)	> Ensure procurement prioritises projects for local businesses where possible. Local industry will be prioritised over interstate resources. > Frequent consultation with the Jabiru community and key stakeholders to ensure inclusion into the Jabirus growth	D	3	Low (8)
Construction	People	Communities and economy	Jobs and businesses including tourism, education, Aboriginal rights and interests	Construction activities	Enhance community and the economy	Local and regional areas do not benefit as expected from project.	Community and businesses	No economic growth due to lack of employment and business		D	3	Low (8)	> Continual consultation with the key stakeholders though all phases of the project. > Company to set obligations, and targets to support local businesses. > Local industry will be prioritised over interstate resources.	D	1	Low (1)
Construction	People	Communities and economy	Amenity (noise considerations)	Construction activities	Use of machinery, equipment and vehicles	Noise and vibration of construction activities impacting the township.	People, air	Disturbance to neighbouring community, residents and businesses that are able to hear construction noise and machinery	The project area is located within the industrial area of the township, away from residential properties.	D	2	Low (5)	> Noise from clearing and trenching will be kept to minimum intensity and expected to be short. > Equipment and vehicles will be maintained in good working condition to maximise fuel efficiency > Noise shall be controlled by constructing during daytime hours and equipment serviced regularly.. > The NT EPA Noise Management Framework Guideline will be followed through out site preparation activities. > Commissioning tests to be undertaken to check noise outputs of diesel generators are in line with manufacturer's specifications and relevant standards.	D	2	Low (5)
Construction	People	Communities and economy	Aesthetics and Amenity (visual considerations)	Construction activities	Use of machinery, equipment and vehicles	Aesthetics impacted by visible dust emission from the project.	Air	Localised impacts to the health of all employees from dust generation		B	2	Moderate (2)	> Speed limit restrictions will be implemented on site to reduce dust generation. > A water cart will be used to wet frequently used access tracks where possible. > All access tracks will be maintained and the main access to the site will be compacted with gravel.	D	2	Low (5)
Construction	People	Communities and economy	Aesthetics and Amenity (visual considerations)	Construction activities	Cleared areas of vegetation	Aesthetics of clearing 10 ha of native vegetation.	People	Impact to the visual amenity of the area caused by clearing a large extent of native vegetation	The proposed site is surrounded by previous disturbances such as the Jabiru Waste Disposal Facility and a waste water treatment and irrigation facility. The proposed site will be secured with no public access.	C	2	Low (6)	> Continual consultation with the key stakeholders though all phases of the project. > All disturbances will be minimised where possible and kept within the site boundary, Lot 2303. > Clearing will be kept within surveyed area and to approved construction drawings. > Boundaries will remain within existing fence line and established markers.	D	2	Low (5)
Construction	People	Communities and economy	Aesthetics and Amenity (visual considerations)	Waste Management	Waste generation	Poor waste management with strew waste through out project area	Land	Impact to the visual amenity of the area caused by wind blown, mishandled, illegally disposed rubbish to land and water		B	2	Moderate (2)	> Solid waste will be transported up to Darwin to an accredited waste management facility. > General and construction waste will be disposed of in skip bins on site and taken to Darwin. > All waste storage areas will be secure as to not allow rubbish to become windblown. > All empty drums and oily rags will be taken to Darwin for correct disposal. > All drums with oily residue will be segregated from general waste, appropriately stored and bunded until taken off site.	D	1	Low (1)
Construction	People	Communities and economy	Social relationships, aboriginal rights, interests, including right to access, lifestyle, mental health and well being	Site design, planning, preparation, construction and operation	Stakeholder engagement	No communication or inclusion with key stakeholders straining social relationships.	Community	Loss of trust due to exclusion with the project process with DCM which can put long term strain on social relationships with key stakeholders. This could impact future proposed works.		C	4	High (3)	> Establish routine engagement and feedback with community and key stakeholders at all phases of the project. > Establish transparency and open communication to ensure inclusion and support from stakeholders and community.	D	1	Low (1)
Construction	People	Communities and economy	Social relationships, aboriginal rights, interests, including right to access, job and business including tourism, education	Site design, planning, preparation, construction and operation	Stakeholder engagement	No inclusion of ranger groups or Traditional Owners during site visits and surveys straining social relationships.	Community	Lack of inclusion of ranger and research groups can put long term strain on social relationships with DCM. This could impact future proposed works.		C	4	High (3)	> Establish routine engagement and feedback with key stakeholders and community groups at all phases of the project. > Establish transparency and open communication to ensure inclusion and support from stakeholders and community. > Include ranger groups on research projects associated with the project.	D	2	Low (5)
Construction	People	Communities and economy	Aesthetics, agriculture, fisheries and industry, amenity (visual considerations)	Site security	Unauthorised access	Introduction of weeds	Land	Direct impact to terrestrial ecosystems, threatened species, health of biota, habitats supporting the lifecycle of biota, species of social and cultural importance, integrity of ecosystems, biological function and provision of refuge.		C	3	Moderate (4)	> Construction and no unauthorised access signs will be installed at the entry of the site. > A permanent fence will replace the existing boundary fence in sections that are damaged. > Regular interval warning signage along the fence line will prevent access. > The site will have workers present during the day and secured with locks when works are complete each day.	D	2	Low (5)
Construction	People	Cultural and heritage	scared sites, cultural heritage items and places, historic heritage and places important or significant country	Construction activities	Use of machinery, equipment and vehicles	Cultural heritage sites damaged by dust generation	Air	Impact of dust degrading cultural sites and artifacts,	One known heritage site is located 200 m away from proposed works. This is located towards the south western corner of the waste disposal facility.	D	2	Low (5)	> Speed limit restrictions will be implemented on site to reduce dust generation. > A water cart will be used to wet frequently used access tracks where possible. > All access tracks will be maintained and the main access to the site will be compacted with gravel.	D	2	Low (5)
Construction	People	Cultural and heritage	scared sites, cultural heritage items and places, historic heritage and places important or significant country	Construction activities	Vehicular and machinery movement	Accidental disturbance to identified and unidentified cultural and archaeological heritage sites.	Community	Impact to sites of cultural significance protected for their cultural importance.	A cultural heritage survey has been undertaken by the Gundjeihmi Aboriginal Corporation (GAC) and AAPA certificate was obtained. No cultural or archaeological heritage places were found on Lot 2303. Existing boundary fence (surrounding Lot 2303) and locked gates prevent unauthorised access. A historic culturally modified tree was found during an archaeological survey (Appendix E) to the south western corner of the landfill site. This is approximately 200m away from proposed works and maintains a no- go zone of 20m. No heritage sites are recorded along El Sherana Road easement	D	2	Low (5)	> If a heritage site or artefact is discovered during clearing activities, all works will cease immediately, and notification provided toy GAC and the Heritage Branch under the Heritage Act 2011 (NT) provisions.	D	2	Low (5)
Construction	People	Cultural and heritage	scared sites, cultural heritage items and places, historic heritage and places important or significant country	Site security	Unauthorised access	Unauthorised access damaging cultural and archaeological heritage sites.	Community	Impact to sites of cultural significance protected for their cultural importance.	Existing boundary fence (surrounding Lot 2303) and locked gates prevent unauthorised access. A historic culturally modified tree was found during an archaeological survey (Appendix E) to the south western corner of the landfill site. This is approximately 200m away from proposed works and maintains a no-go zone of 20m. No heritage sites are recorded along El Sherana Road easement	D	2	Low (5)	> If a heritage site or artefact is discovered during clearing activities, all works will cease immediately, and notification provided toy GAC and the Heritage Branch under the Heritage Act 2011 (NT) provisions.	D	2	Low (5)
Construction	People	Human health	Air quality	Site preparation	Clearing areas of existing vegetation	Noise effect the community	Community	Localised impacts to the health of public and employees from noise generation	The project area is located within the industrial area of the township, 2km away from residential properties.	C	2	Low (6)	> Noise from clearing and trenching will be kept to minimum intensity and expected to be short. > Noise shall be controlled by constructing during daytime hours and equipment serviced regularly. > The NT EPA Noise Management Framework Guideline will be followed through out site preparation activities.	D	2	Low (5)
Construction	People	Human health	Air quality	Site preparation	Clearing areas of existing vegetation	Dust emissions effect the community	Community	Localised impacts to the health of public and employees from dust generation	The project area is located within the industrial area of the township, 2km away from residential properties.	C	2	Low (6)	> Speed limit restrictions on site, use water cart to wet frequently used access tracks where possible. > The main access to the site will be compacted with gravel.	D	2	Low (5)
Construction	People	Human health	Weather	Weather	Working in all environmental conditions	Lightning strike to personnel or infrastructure	Community and employees	Direct impact to staff causing injury or death or indirect impact to interrupted power supply		C	5	High (6)	> Lightning management such as the protection of machinery and equipment and safety of personnel should be addressed in the contractors Safety Management Plan. > This will include earthing to buildings and equipment and stop work response for an encroaching storm.	C	2	Low (6)
Construction	People	Human health	Site security	Site security	Unauthorised access during construction	Unauthorised access causing injury or fatality	People	Potential direct injury or death to trespassers	Existing boundary fence (surrounding Lot 2303) and locked gates prevent unauthorised access.	D	5	High (5)	> Construction and no unauthorised access signs will be installed at the entry of the site. > A permanent fence will replace the existing boundary fence in sections that are damaged. > Regular interval warning signage along the fence line will prevent access. > The site will have workers present during the day and secured with locks when works are complete each day.	D	1	Low (1)

Phase	Theme	Environmental Factors	Environmental values and sensitivities	Main activity	Sub activity	Environmental Impact	Potential Environmental Direct Impact (Pathway)	Potential Environmental Impact (receptor)	Assumptions	Mitigation and management							
										Likelihood	Consequer	Inherent risk		Likelihood	Consequer	Residual risk	
Operations and maintenance	Land	Terrestrial Environmental Quality	Characteristic of soils, including chemical, physical, biological and	Site visits from maintenance personnel	Vehicular movement/ traffic	Compaction of soils through driving off established roads	Land	Compaction of soils will degrade soil quality		D	2	Low (5)	> All vehicles visiting site will remain on established roads	D	2	Low (5)	
Operations and maintenance	Land	Terrestrial Environmental Quality	Characteristic of soils, including chemical, physical, biological and aesthetic qualities	Site visits from maintenance personnel	Vehicular movement/ traffic	Increase in land instability through the creation of wheel ruts during wet weather	Land and waterways	Direct impact to soil quality and integrity and downstream waterways through erosion		D	2	Low (5)	> All access roads will be maintained regularly to prevent deterioration.	D	2	Low (5)	
Operations and maintenance	Land	Terrestrial Environmental Quality	Characteristic of soils, including chemical, physical, biological and aesthetic qualities	Exposed cleared areas	Overland flows	Soil erosion causing loss of topsoil	Land and waterways	Direct impact to soil quality with the loss of top soil during overland flows	Emerson Class tests were carried out on nine (9) predominant near surface soil samples as requested by the client. Given the consistency of near surface material, all of the test results returned an Emerson Class Number of 5. This indicates that the soils across the site are non-dispersive. They also indicate the soils have a medium potential for erosion and high a potential to cause environmental harm if disturbed. Given the medium potential to erode, it is recommended that all general erosion and sediment controls are put in place during the construction	B	3	High (1)	> All site preparation will be undertaken in accordance with Land Clearing Guidelines (DENR, 2019). > An ESCP is to be included in the contractors Construction Environment Management Plan (CEMP) and include measures to prevent erosion, sedimentation and pooling during site preparation and permanently for operations. > The ESCP will include control measures that minimise the level of surface erosion and sedimentation from exposed ground and excavations. > Drains will be installed across the site to divert clean surface water to stable land areas and away from the site where soil is exposed. > Swales with rock check dams and then outlets to the grassed paddock to the south will be used as a filter buffer. > Part of the site preparation, construction and operation phases, all erosion and sediment control infrastructure should be regularly checked during the wet season for effectiveness and integrity and remediated where systems fail.	D	2	Low (5)	
Operations and maintenance	Land	Terrestrial Environmental Quality	Characteristic of soils, including chemical, physical, biological and aesthetic qualities	Diesel generator	Storage of bulk diesel for generator for long term use	Significant hydrocarbon spills from storage area on site	Land and waterways	Direct impact to soil quality and indirect impact to waterways through overland flows.		C	4	High (3)	> Refuelling of bulk storage areas will be undertaken by a qualified external contractor. > Appropriate spill response equipment will be located at all refuelling and liquid chemical storage locations including containment and recovery equipment. > Storage area will be appropriately bunded as per Australian Standards. > In the event of a spill, work will be shut down at the spill site and spills cleaned immediately. > Material contaminated as a result of a spill (e.g. soil or solid absorbent) must be removed (i.e. excavated or cleaned up) and placed in an appropriate container or taken off site to prevent further contamination. > An accredited chemical waste contractor will be engaged to dispose of the material and to provide copies of Waste Transport Certificates and Certificates of Disposal for each consignment.	D	3	Low (8)	
Operations and maintenance	Land	Terrestrial Ecosystems	Sensitive or significant vegetation, vegetation that provides important ecological function, ionic or culturally important	Site visits from personnel	Vehicular movement/ traffic	Dust generation impacting remaining sensitive, significant, endemic or threatened vegetation	Air	Direct and potentially cumulative impact to surrounding ecosystem function.	An ecological survey found no threatened or sensitive flora species to occur within 15 km of the project area.	D	2	Low (5)	> Speed limit restrictions will be implemented on site to reduce dust generation. > A water cart will be used to wet frequently used access tracks where possible. > All access tracks will be maintained and the main access to the site will be compacted with gravel.	D	2	Low (5)	
Operations and maintenance	Land	Terrestrial Ecosystems	Sensitive or significant vegetation, vegetation that provides important ecological function, listed threatened species, locally endemic species or species with a restricted habitat, ionic or culturally	Operation of hybrid power station	Fault of equipment or accidental ignition	Combustion from vehicles, equipment or maintenance work impacting on native vegetation, threatened species and habitat.	Land	Direct and potentially cumulative impact to surrounding ecosystem function, viability and habitat. Loss of species that use surrounding habitat. Loss of habitat.	Fire management is undertaken by the GAC through the Djurrubu Rangers to prevent late season wildfires and to maintain species diversity through controlled low intensity early dry season reduction burns.	C	4	High (3)	> Fire prevention equipment such as reels and extinguishers will be provided and validated in specified areas on site. > A firebreak of 25m on the internal side of the project area's boundary fence line will be established during site preparation and maintained during operations.	D	3	Low (8)	
Operations and maintenance	Land	Terrestrial Ecosystems	Listed threatened species and their habitat	Site visits from personnel	Movement of vehicles and machinery within the project area and between sites	Change of preferred habitat from introduced and accidently spread weeds	Land	Cumulative impact as a result of no appropriate weed management or hygiene. Change of vegetation characteristics and function	A WoNS, Class A and multiple Class B weeds have been assessed to occur within 5 km of the project area.	C	4	High (3)	> All vehicles and construction equipment will be cleaned by the contractor prior to arrival in line with the Weed Management Branch Brochure 'How to keep your equipment and vehicles clean of weeds' to ensure equipment and people are weed free. > All vehicles arriving to site is to have a weed/ pest declaration form. > All movement of vehicles and equipment on site will be kept to cleared areas. > Any newly established declared weeds will be treated by a sub contractor and monitored seasonally until eradicated. > Class A or Weeds of National Significance species found on site will be reported to the Weed Management Branch immediately. > A weed management plan will be incorporated into the CEMP.	D	2	Low (5)	
Operations and maintenance	Land	Terrestrial Ecosystems	Listed threatened species and their habitat, Listed migratory species and their habitat	Operation of hybrid power station	Use of generators	Noise and vibration from generators and light emission from buildings	Land	Artificial light emitting from the site could attract fauna and alter foraging patterns, increase predation risks, disrupt biological clocks and disrupt dispersal movements impacting breeding and roosting regimes.		A	2	Moderate (3)	> The NT EPA Noise Management Framework Guideline will be followed through out site preparation activities. Generators will be maintained in good working order and operated as intended. > Lighting will be used only for required operational areas, all light sources will be aimed towards specific work areas requiring light for safe operation, with a low vertical angle, and light shields will be placed on large equipment to minimise light spill over. > Where possible, lighting will be the minimum wattage, whilst not compromising safety or OH&S requirements.	C	2	Low (6)	
Operations and maintenance	Land	Terrestrial Ecosystems	Listed threatened species and their habitat	Operation of hybrid power station	Vehicular movement/ traffic	Fauna interaction with vehicles	Land	Direct impact to sensitive fauna individuals		D	2	Low (5)	> Speed limits will be introduced, all fauna interactions with vehicles will be recorded	D	2	Low (5)	
Operations and maintenance	Land	Terrestrial Ecosystems	Listed threatened species and their habitat	Operation of hybrid power station	Waste management	Vermin introduction to site through poor waste management activities	Land	Direct impact to sensitive fauna species		D	2	Low (5)	> All waste will be taken offsite to a waste facility in Darwin for correct disposal during the operational phase.	D	2	Low (5)	
Operations and maintenance	Water	Hydrological processes	The supply and quantity of water in surface water features to creeks and intermittent streams	Operation of hybrid power station	Clearing areas of existing vegetation	Increased surface flow regimes from loss of vegetation and diversion	Land, waterways	Direct impact to water levels to Baralil Creek, increasing surface runoff as a result of clearing 10ha vegetation.	There will be increased surface runoff caused by impervious solar panels and infrastructure. The site and access roads make up 0.33% of the Baralil Creek catchment and 0.09% of Gulungul and Baralil Creek catchments combined (Appendix B).	B	3	High (1)	> Minimise unnecessary disturbance, project design will locate infrastructure to minimise stormwater runoff. > Project design to ensure water diversion to vegetated areas and are maintained as close to natural flows as practicable.	C	2	Low (6)	
Operations and maintenance	Water	Hydrological processes	The supply and quantity of water in surface water features to creeks and intermittent streams	Operation of hybrid power station	Shaping and prepping areas for project	Placement of infrastructure domains obstructing/ altering natural flow paths.	Land, waterways	Direct impact to creek alignment and natural flow paths, altering flows and increasing potential for erosion		B	3	High (1)	> Minimise unnecessary disturbance, project design will locate infrastructure to minimise stormwater runoff. > Project design to ensure water diversion to vegetated areas and are maintained as close to natural flows as practicable	D	2	Low (5)	
Operations and maintenance	Water	Hydrological processes	The supply and quantity of water in surface water features to creeks and intermittent streams	Operation of hybrid power station	Site location	Site subject to seasonal flooding inundating critical infrastructure and stored chemicals.	Land, waterways	Site inundated during wet season events causing degradation of infrastructure and potential contamination from site to flooded areas.	Desktop flood study undertaken by Surface Water and Erosion Solutions (2020) indicate Lot 2303 is unlikely to be affected by flooding of Baralil Creek. Potential backup of water from Magela Creek, Gulungul and Baralil Creeks during high flows may reach the south eastern corner of the Lot. Conservatives estimates indicate probable maximum flood levels are unlikely to reach the average site level of 27m Australian Height Datum. There is a very low flood risk. (Appendix B)	D	2	Low (5)	> Project design to ensure water diversion to vegetated areas and are maintained as close to natural flows as practicable	D	2	Low (5)	
Operations and maintenance	Water	Inland water environmental quality	The quality of water in surface water features including rivers, RAMSAR wetlands	Cleared areas of vegetation	Overland flows	Build up of sedimentation in Baralil Creek changing water quality and creek characteristics and function	Land, waterways	Direct impact to Baralil Creek from overland flows increasing sedimentation and influencing water quality	Results of the erosion risk assessment determined two erosion risk slope classes as defined in the NT Land Suitability Guidelines (Northern Territory Government 2013). Erosion risk class C 3 has 71% of its surface slopes of 0.75% to 5% which makes them marginally suitable for development. The remainder, is classed as C2 which has surface slopes <0.75% making that area moderately suitable for development (Appendix B).	B	3	High (1)	> An ESCP is to be included in the contractors Construction Environment Management Plan (CEMP) and include measures to prevent erosion, sedimentation and pooling during site preparation and permanently for operations. > The ESCP will include control measures that minimise the level of surface erosion and sedimentation from exposed ground. > Drains will be installed across the site to divert clean surface water to stable land areas and away from the site where soil is exposed. > Part of the site preparation, construction and operation phases, all erosion and sediment control infrastructure will be regularly checked during the wet season for effectiveness and integrity and remediated where systems fail.	D	2	Low (5)	
Operations and maintenance	Water	Inland water environmental quality	Culturally important water features	Cleared areas of vegetation	Overland flows	Build up of sedimentation in Baralil Creek changing water quality, creek characteristics and function ultimately impacting hunting and other cultural uses	Land, waterways	Impacts to hunting and other cultural uses due to reduced water quality and aesthetics	Results of the erosion risk assessment determined two erosion risk slope classes as defined in the NT Land Suitability Guidelines (Northern Territory Government 2013). Erosion risk class C 3 has 71% of its surface slopes of 0.75% to 5% which makes them marginally suitable for development. The remainder, is classed as C2 which has surface slopes <0.75% making that area moderately suitable for development (Appendix B)	B	3	High (1)	> An ESCP is to be included in the contractors Construction Environment Management Plan (CEMP) and include measures to prevent erosion, sedimentation and pooling during site preparation and permanently for operations. > The ESCP will include control measures that minimise the level of surface erosion and sedimentation from exposed ground. > Drains will be installed across the site to divert clean surface water to stable land areas and away from the site where soil is exposed. > Part of the site preparation, construction and operation phases, all erosion and sediment control infrastructure will be regularly checked during the wet season for effectiveness and integrity and remediated where systems fail.	D	2	Low (5)	

Phase	Theme	Environmental Factors	Environmental values and sensitivities	Main activity	Sub activity	Environmental Impact	Potential Environmental Direct Impact (Pathway)	Potential Environmental Impact (receptor)	Assumptions	Likelihood	Consequence	Inherent risk	Mitigation and management	Likelihood	Consequence	Residual risk
Operations and maintenance	Water	Inland water environmental quality	The quality of water in surface water features including intermittent streams, floodplains, drainage lines, billabongs	Diesel generator	Storage of bulk diesel for generator for long term use	Accidental release of pollutants causes degradation of instream habitat including water in downstream aquatic habitat.	Land, waterways, wetlands	Direct impact to aquatic ecosystems, threatened species, health of biota, habitats supporting the lifecycle of aquatic biota, species of social and cultural importance, integrity of aquatic ecosystems, biological function and provision of refuge.		C	4	High (3)	> Refuelling of bulk storage areas will be undertaken by a qualified external contractor. > Appropriate spill response equipment will be located at all refuelling and liquid chemical storage locations including containment and recovery equipment. Storage area will be appropriately bunded as per Australian Standards. > In the event of a spill, work will be shut down at the spill site and spills cleaned immediately. > Material contaminated as a result of a spill (e.g. soil or solid absorbent) must be removed (i.e. excavated or cleaned up) and placed in an appropriate container or taken off site to prevent further contamination. > An accredited chemical waste contractor will be engaged to dispose of the material and to provide copies of Waste Transport Certificates and Certificates of Disposal for each consignment.	D	3	Low (8)
Operations and maintenance	Water	Aquatic ecosystems	Threatened species, the habitat that supports the lifecycle of aquatic biota, the health of the biota in inland waterways	Diesel generator	Storage of bulk diesel for generator for long term use	Hydrocarbon spills impacting threatened aquatic fauna and flora and their habitat	Land, waterways	Direct impact to aquatic ecosystems, threatened species, health of biota, habitats supporting the lifecycle of aquatic biota, species of social and cultural importance, integrity of aquatic ecosystems, biological function and provision of refuge.		C	4	High (3)	> Refuelling of bulk storage areas will be undertaken by a qualified external contractor. > Appropriate spill response equipment will be located at all refuelling and liquid chemical storage locations including containment and recovery equipment. Storage area will be appropriately bunded as per Australian Standards. > In the event of a spill, work will be shut down at the spill site and spills cleaned immediately. > Material contaminated as a result of a spill (e.g. soil or solid absorbent) must be removed (i.e. excavated or cleaned up) and placed in an appropriate container or taken off site to prevent further contamination. > An accredited chemical waste contractor will be engaged to dispose of the material and to provide copies of Waste Transport Certificates and Certificates of Disposal for each consignment.	D	3	Low (8)
Operations and maintenance	Water	Aquatic ecosystems	Ramsar wetlands, integrity of aquatic ecosystems and the ecological services they provide	Diesel generator	Storage of bulk diesel for generator for long term use	Hydrocarbon spills impacting Ramsar wetlands sites	Land, waterways, wetlands	Direct impact to aquatic ecosystems, threatened species, health of biota, habitats supporting the lifecycle of aquatic biota, species of social and cultural importance, integrity of aquatic ecosystems, biological function and provision of refuge.		C	4	High (3)	> Refuelling of bulk storage areas will be undertaken by a qualified external contractor. > Appropriate spill response equipment will be located at all refuelling and liquid chemical storage locations including containment and recovery equipment. Storage area will be appropriately bunded as per Australian Standards. > In the event of a spill, work will be shut down at the spill site and spills cleaned immediately. > Material contaminated as a result of a spill (e.g. soil or solid absorbent) must be removed (i.e. excavated or cleaned up) and placed in an appropriate container or taken off site to prevent further contamination. > An accredited chemical waste contractor will be engaged to dispose of the material and to provide copies of Waste Transport Certificates and Certificates of Disposal for each consignment.	D	3	Low (8)
Operations and maintenance	Water	Inland water environmental quality	The quality of groundwater features including aquifers and water tables	Diesel generator	Storage of bulk diesel for generator for long term use	Contamination of shallow localised ground water from hydrocarbon spills	Land, waterways	Long term impact to ground water quality and potential function and aquifer features.		C	3	Moderate (4)	> Refuelling of bulk storage areas will be undertaken by a qualified external contractor. > Appropriate spill response equipment will be located at all refuelling and liquid chemical storage locations including containment and recovery equipment. Storage area will be appropriately bunded as per Australian Standards. > In the event of a spill, work will be shut down at the spill site and spills cleaned immediately. > Material contaminated as a result of a spill (e.g. soil or solid absorbent) must be removed (i.e. excavated or cleaned up) and placed in an appropriate container or taken off site to prevent further contamination. > An accredited chemical waste contractor will be engaged to dispose of the material and to provide copies of Waste Transport Certificates and Certificates of Disposal for each consignment.	D	3	Low (8)
Operations and maintenance	Air	Air quality	The chemical, physical and biological characteristics of air	Operation and maintenance	Site visits from maintenance personnel	Dust emissions from vehicular movement	Air	Impacts of dust affecting air quality of terrestrial ecosystem health and function		C	2	Low (6)	> Speed limit restrictions on site. The main access to the site will be compacted with gravel.	D	2	Low (5)
Operations and maintenance	Air	Atmospheric processes	A contribution to the NTs greenhouse gas emissions.	Operation of hybrid power station	Use of diesel generators	Greenhouse gas emissions hybrid power station	Air	Impacts to atmosphere contaminate levels adding to the greenhouse gas emissions		A	2	Moderate (3)	> Generators will be maintained in good working order and operated as intended with appropriate emission control equipment. > Implementation of operating guidelines to promote efficient operation. > Procurement policies that require the selection of energy efficient equipment and vehicles. > During operation, any opportunity to reduce use of the diesel generators in favour of solar power generation will be implemented.	B	1	Low (3)
Operations and maintenance	People	Communities and economy	Jobs and businesses including tourism, education, Aboriginal rights and interests	Operation and maintenance	Enhance community and the economy	Lack of opportunities for suppliers in the NT region to support the construction and operation of the Project.	Community and businesses	Lack of opportunities for suppliers in the NT region to support the construction and operation of the Project.		A	2	Moderate (3)	> Continual consultation with the key stakeholders though all phases of the project. > Company to set obligations, and targets to support local businesses where possible. > Local industry will be prioritised over interstate resources.	C	1	Low (2)
Operations and maintenance	People	Communities and economy	Infrastructure and services, community aspirations	Operation of hybrid power station	Operation and contribution of sustainable power generation	Power consumption and infrastrucutre does not meet the needs of community and unable to meet Northern Territory Government emission target	Community	Community aspirations to achieve their goal of becoming sustainable	This Masterplan is being supported by the NT and Commonwealth governments through crucial funding of upgrades to critical infrastructure including new power supply for Jabiru.	A	3	High (2)	> Continual consultation with the key stakeholders in understanding critical power generation demands of the community and its economy. > Ensure adequate funding provided during and after the transition of Jabiru township to ensure power demands are met and do not compromise the growth of Jabiru community and economy.	C	2	Low (6)
Operations and maintenance	People	Human health	Weather	Weather	Working in all environmental conditions	Lightning strike to personnel or infrastructure	Community and employees	Direct impact to staff causing injury or death or indirect impact to interrupted power supply		C	5	High (6)	> Lightning management such as the protection of machinery and equipment and safety of personnel should be addressed in the contractors Safety Management Plan. > This will include earthing to buildings and equipment and stop work response for an encroaching storm.	C	2	Low (6)
Operations and maintenance	People	Human health	Site security	Site security	Unauthorised access	Unauthorised access causing injury or fatality	People	Potential direct injury or death to trespassers	Existing boundary fence (surrounding Lot 2303) and locked gates prevent unauthorised access.	D	5	High (5)	> No unauthorised access signs will be installed at the entry of the site. > A permanent fence will replace the existing boundary fence in sections that are damaged. > Regular interval warning signage along the fence line will prevent access. > The site will have workers present during the day and secured with locks when works are complete each day.	D	1	Low (1)