Number	Compone	Matter	Aspect	Potential Impacts	Consequence	Likelihood	Outcome	Management Control
1	Hydrology	Sandy Creek	Surface water quality	Increased nutrient load entering Sandy Creek	Moderate	Possible	Med	Bio-retention basins and pre/post construction monitoring of water quality in Sandy Creek
2	Hydrology	Sandy Creek	Surface water flow rates	Increased stormwater runoff to Sandy Creek	Moderate	Possible	Med	Stormwater detention basins to mitigate post-developed flows to pre-developed levels
3	Hydrology	Sandy Creek	Erosion	Increased erosion within receiving waters of Sandy Creek	Moderate	Possible	Med	Basin and Stormwater outlets to be designed to ensure velocities and bed shear stresses are not worsesned as a consequence of development
4	Hydrology	Sandy Creek	Flooding	Increased flood levels and volumes to Sandy Creek	Moderate	Possible	Med	Use of detention basins to mitigate post-developed flood levels to pre-developed conditions
5	Hydrology	Sandy creek	Groundwater depth	Decrease of groundwater recharge on 2CRU affecting water table levels and baseflow to Sandy Creek	Minimal	Remote	Negligible	Retention basins and pre/post allowing for recharge to groundwater. Groundwater baseflow contribution potentially limited. Groundwater is salty (i.e. naturally low environmental value)
6	Hydrology	Sandy creek	Groundwater contamination	Contamination of Sandy Creek through groundwater	Moderate	Remote	Very low	Incident control measures during construction, geographially further remote from activities
7	Hydrology	Casuarina Coasta	Groundwater depth	Decrease of groundwater recharge on 2CRU affecting water table levels and vegetation health on the reserve	Moderate	Possible	Very low	Groundwater found deeper in the top of the reserve at lower at the foothill. Reinfiltration of groundwater through unlines surface water retention ponds will compensate for any loss in groundwater recharge
8	Hydrology	Casuarina Coasta	Groundwater contamination	Contamination migrating off-site to Casuarina Coastal Reserve	Moderate	Unlikely	Low	Incident control measures during construction. No activities on the reserve itself. During site use, activities requiring chemical manage under licence.
9	Hydrology	2CRU	Groundwater depth	Decrease of groundwater recharge on 2CRU affecting water table levels and vegetation health on the reserve	Moderate	Unlikely	Low	Groundwater found deeper in the top of the reserve at lower at the foothill. Residential nature of the proposed development optimises the use of natural areas. Reinfiltration of groundwater through unlines surface water retention ponds will compensate for any loss in groundwater recharge
10	Hydrology	2CRU	Groundwater contamination	Groundwater contamination during construction and site use	Minor	Possible	Low	Incident control measures during construction. Rapid remediaton preventing further migration. Sewage connected to sewer main (i.e. no septic systems)
11	Hydrology	Muirhead North	Acid Sulphate Soils	Expose Acid-sulphate Soils during construction in south-eastern corner of Muirhead North	Moderate	Unlikely	Low	Acid Sulphate Soil testing to be done in south-eastern corner of Muirhead North. Acid Sulphate Soil Management Plan to be prepared if acid sulphate soils are detected.
12	Noise and	Noise	Traffic (operation)	Increase noise levels from traffic as a result of project	Moderate	Unlikely	Low	Speed limits, road design, noise barriers, low noise asphalt, façade upgrades and public transport options.
13	Noise and	Noise	Traffic (operation)	Noise levels could cause sleep disturbance	Minor	Unlikely	Very low	Screening such as noise barriers, façade upgrades to dwellings near Lee Point Road
14	Noise and	Vibration	Traffic (operation)	Perception of heavy vehicles	Minor	Unlikely	Very low	Road design, avoid speed bumps
15	Noise and	Noise	Plant (construction)	Could cause community complaints	Moderate	Possible	Medium	Communicate with impacted noise sensitive receivers and notify them in advance via letterbox drop and provide them with a contact number.
16	Noise and	Noise	Plant (construction)	Noise levels could cause sleep disturbance	Moderate	Possible	Medium	Avoid night time construction works, Install temporary noise barriers and provide respite periods
17	Noise and	Vibration	Plant (construction)	Could cause human discomfort	Minor	Possible	Low	Use smaller plant near sensitive receivers
18	Noise and	Vibration	Plant (construction)	Could cause structural damage	Moderate	Unlikely	Low	Use smaller plant near sensitive structures
19	Air Quality	Dust	Traffic (operation)	Impacts to adjoining residents health	Moderate	Possible	Medium	Watering on haul road surfaces, prevent material being deposited/spilled on haul roads, speed limits, trafficable areas clearly marked
20	Air Quality	Dust	Traffic (operation)	Impacts to workers health	Moderate	Possible	Medium	Watering on haul road surfaces, prevent material being deposited/spilled on haul roads, speed limits, trafficable areas clearly marked
21	Air Quality	Dust	Traffic (operation)	Vegetation smothering	Minor	Possible	Low	Watering on haul road surfaces, prevent material being deposited/spilled on haul roads, speed limits, trafficable areas clearly marked
22	Air Quality	Dust	Traffic (operation)	Sedimentation of waterways	Moderate	Possible	Medium	Watering on haul road surfaces, prevent material being deposited/spilled on haul roads, speed limits, trafficable areas clearly marked, WSUD
23	Air Quality	Dust	Plant (construction)	Impacts to adjoining residents health	Moderate	Possible	Medium	Application of dust suppression before construction, reducing double handling of material, minimise fall distance between the fall distance of materials during loading and unloading, relocate/reschedule works during dusty periods if practical, plant travel on defined roads
24	Air Quality	Dust	Plant (construction)	Impacts to workes health	Moderate	Possible	Medium	Application of dust suppression before construction, reducing double handling of material, minimise fall distance between the fall distance of materials during loading and unloading, relocate/reschedule works during dusty periods if practical, plant travel on defined roads
25	Air Quality	Dust	Plant (construction)	Vegetation smothering	Minor	Possible	Low	Application of dust suppression before construction, reducing double handling of material, minimise fall distance between the fall distance of materials during loading and unloading, relocate/reschedule works during dusty periods if practical, plant travel on defined roads
26	Air Quality	Dust	Plant (construction)	Sedimentation of waterways	Moderate	Possible	Medium	Application of dust suppression before construction, reducing double handling of material, minimise fall distance between the fall distance of materials during loading and unloading, relocate/reschedule works during dusty periods if practical, plant travel on defined roads
27	Air Quality	Dust	Vegetation clearing	Impacts to adjoining residents health	Moderate	Possible	Medium	Limit the amount of excavation required to clear native vegetation, Undertake vegetation clearing during wetter periods if practical, notify adjoining residents when work is to be undertaken, spray down affected vegetation, retain cleared native vegetation on surface,
28	Air Quality	Dust	Vegetation clearing	Impacts to workers health	Moderate	Possible	Medium	Limit the amount of excavation required to clear native vegetation, Undertake vegetation clearing during wetter periods if practical, notify adjoining residents when work is to be undertaken, spray down affected vegetation, retain cleared native vegetation on surface,
29	Air Quality	Dust	Vegetation clearing	Vegetation smothering	Minor	Possible	Low	Limit the amount of excavation required to clear native vegetation, Undertake vegetation clearing during wetter periods if practical, notify adjoining residents when work is to be undertaken, spray down affected vegetation, retain cleared native vegetation on surface,
30	Air Quality	Dust	Vegetation clearing	Sedimentation of waterways	Moderate	Possible	Medium	Limit the amount of excavation required to clear native vegetation, Undertake vegetation clearing during dry periods if practical to avoid monsoonal rains, notify adjoining residents when work is to be undertaken, spray down affected vegetation, retain cleared native vegetation on surface,
31	Air Quality	Dust	Exposed areas	Impacts to adjoining residents health	Moderate	Possible	Medium	Minimise the area of disturbance (staged development), rehabilitate areas as soon as possible, stabilise areas likely to remain extended periods, water exposed areas during watering runs
32	Air Quality	Dust	Exposed areas	Impacts to workers health	Moderate	Possible	Medium	Minimise the area of disturbance (staged development), rehabilitate areas as soon as possible, stabilise areas likely to remain extended periods, water exposed areas during watering runs
33	Air Quality	Dust	Exposed areas	Vegetation smothering	Minor	Possible	Low	Minimise the area of disturbance (staged development), rehabilitate areas as soon as possible, stabilise areas likely to remain extended periods, water exposed areas during watering runs
34	Air Quality	Dust	Exposed areas	Sedimentation of waterways	Moderate	Possible	Medium	Minimise the area of disturbance (staged development), rehabilitate areas as soon as possible, stabilise areas likely to remain extended periods, water exposed areas during watering runs
35	Utilities	Sewerage	Surface and Ground Water	Sewer overflows from development caused by extreme weather events, including first flush and wet season influences	Moderate	Unlikely	Low	Muirhead SPS - capacity upgrade, adequate emergency storage Lyons SPS - Capacity upgrade to buffer the inadequate emergency storage. Leanyer STP proposed augmentation by PWC in next 5 years has allowed for development load.
36	Utilities	Sewerage	Security	Disruption of existing sewerage service with the provision of sewerage to the development	Major	Unlikely	Low	Muirhead SPS - capacity upgrade, adequate emergency storage Lyons SPS - Capacity upgrade to buffer the inadequate emergency storage. Leanyer STP proposed augmentation by PWC in next 5 years has allowed for development load.
37	Utilities	Sewerage	Capacity	Inadequate capacity and/or treatment of wastewater treatment facilities	Minor	Unlikely	Low	PWC have advised that the Leanyer STP will be due for augmentation in the next 5 years. PWC future planning has accounted for projected loads from the development.
38	Utilities	Potable Water	Security of supply	Disruption of existing potable water supply with the provision of reticulated water to the development	Major	Remote	Low	Existing network - adequate. Ultimate network - proposed new break of head tank and booster pump station to service a small elevated area within the site.
39	Utilities	Potable Water	Source water availability	Inadequate source water capacity	Minor	Unlikely	Low	The proposed development is located within the Casuarina Water Supply Zone (WSZ), where water is supplied by the Marrara and Casuarina Reservoirs. Source water is obtained from the Darwin River Dam, which offers a secure water supply. There is low risk of inadequate supply from this catchment.
40	Utilities	Potable Water	Water quality	Groundwater seepage/contamination	Minor	Unlikely	Low	No dry weather overflows in sewerage network
41	Utilities	Potable Water	Capacity	Inadequate capacity and/or treatment of water treatment facilities	Minor	Unlikely	Low	PWC have not identified or advised of any deficiency in regard to the provision of treated water within the supply network.
42	Traffic	Transport	Future Road Capacity	Traffic growth over a long period of time may result in the road network being unable to accommodate with the traffic demand.	Moderate	Remote	Very Low	The traffic analysis shows that the road network is able to accommodate the traffic demand 10 years after the completion of the development. However if additional developments are to be proposed within the area a separate traffic assessment is required to determine its impacts.
43	Traffic	Transport	Road Safety	Increased frequency of road accidents.	Moderate	Unlikely	Low	Check that the design of roads and intersection follow the relevant standards and guidelines.
44	Traffic	Transport	Accessibility	Inconvenience for drivers.	Minor	Unlikely	Very Low	Multiple Site accesses are available and are conveniently located.
45	Traffic	Transport	Wayfinding	Poor wayfinding and longer travel times for drivers.	Minor	Possible	Low	Ensure appropriate wayfinding and signage strategies are implemented.
46	Traffic	Transport	Cyclist Safety	Increased risk of accidents and deters cyclists from riding due to perceived hazards.	Major	Unlikely	Medium	Dedicated cycling infrastructure has been proposed along Lee Point Road.
47	Traffic	Transport	Pedestrian Safety	Increased risk of accidents.	Major	Unlikely	Medium	Ensure that safe pedestrian infrastructure such as crossings and good quality paths are provided.
48	Traffic	Transport	Peak Period Traffic	Poor road network operation leading to increased congestion.	Moderate	Remote	Very Low	The traffic analysis shows that the road network is able to accommodate the peak period traffic without issues. If required, traffic management measures may also be implemented to reduce congestion at critical intersections and redistribute traffic into non-congested roads.
49	Traffic	Transport	Traffic Speeds	Higher speed increases the risk and severity of accidents.	Moderate	Possible	Medium	Check that the speed limit is suitable to the surrounding environment. This may require lowering the speed limit for residential access roads and areas where a school is located.
50	Traffic	Transport	Heavy Vehicles Access	Poor accessibility for HV and increased risk of collision with traffic and other objects.	Major	Unlikely	Medium	Ensure road and intersection geometry is capable of accommodate heavy vehicle turning movements.
51	Traffic	Transport	Public Transport	Over-reliance on vehicular transport.	Moderate	Unlikely	Low	Explore potential opportunities to extend bus service to the 2CRU Site.
52	Traffic	Transport	Construction	Road improvements on existing roads may lead to delays, congestion and overall inconvenience for drivers.	Moderate	Unlikely	Low	A construction traffic management plan should be implemented during upgrades of existing roads. This includes providing alternate routes or the construction of a temporary road to bypass the construction area.
53	Social and	Social	Social Infrastructure	Oversupply of housing, impact on housing market	Moderate	Possible	Medium	Align staging and development with growth rates per Darwin Regional Land Use Plan (or updated policies and projections)
54	Social and	Social	Social Infrastructure	Over-supply of tourist accommodation	Minor	Unlikely	Very Low	Staged delivery of tourist accommodation facilities to coincide with demand / take-up of initial stages. Provision of a range of accommodation to align with market expectations.
55	Social and	Social	Social Infrastructure	Low / slow occupation of accommodation facilities	Minor	Possible	Low	Staged delivery of tourist accommodation facilities to coincide with demand / take-up of initial stages. Provision of a range of accommodation to align with market expectations.
56	Social and	Social	Workforce	Inadequate suitably trained persons within the Darwin Region to supply skills.	Moderate	Unlikely	Low	Provision of appropriate training opportunities for local market. Importation of skills as a last resort.
57	Social and	Social	Workforce	Shortfall of skilled workers elsewhere due to construction works at Lee Point	Moderate	Unlikely	Low	Ensure staging and timing of construction aligns with anticipated population and housing growth rates for the Darwin Region
58	Social and	Social	Workforce	Shortage of workers to provide services in community, commercial and accommodation facilities	Moderate	Unlikely	Low	Development in accordance with projected commercial, accommodation and social infrastructure demand based on population projections, to ensure service provision doesn't exceed demand created by population.
59	Social and	Social	Social Infrastructure	Increase use of Buffalo Creek Boat Ramp.	Moderate	Unlikely	Low	Ramp has recently been upgraded and access is limited by tidal movement. Continual monitoring required upon occupation to determine impact on use patterns.
60	Social and	Social	Social Infrastructure	Increase visitation to Casuarina Coastal Reserve	Moderate	Almost Cert	Very High	Monetary and spatial (land) contributions by DHA to increase size and improve visitor facilities within the reserve.
61	Social and	Social	Social Infrastructure	Shortfall of social services	Major	Possible	High	Ensure adequate serviced land is available for community and social infrastructure in accordance with needs analysis.
62	Social and	Social	Social Infrastructure	Increase traffic impacts – Lee point Road	Moderate	Likely	High	Undertake road upgrades in accordance with Traffic Impact Assessment
63	Social and	Social	Amenity and Safety	Adverse amenity impacts during construction	Moderate	Possible	Medium	All construction and development works in accordance with a detailed Construction Environment Management Plan (CEMP). Establishment of a complaints register to monitor and respond to complaints
64	Social and	Social	Amenity and Safety	Adverse amenity impacts from modified landform / built form	Moderate	Unlikely	Low	Ensure appropriate compliance with design and layout requirements of NT Planning Scheme, including minimum lot sizes, setbacks, building heights, landscaping and open space, to ensure visual amenity is maximised.
65	Social and	Social	Amenity and Safety	Appearance of land	Minor	Possible	Low	Compliance with EMP regarding construction site appearance.
66	Social and	Social	Amenity and Safety	Prevention of unlawful access, use and dumping	Minor	Possible	Low	Removal of all unauthorised materials. On-site security to ensure no further illegal access, use or dumping.
67	Social and	Economic	Economic/Business Developme	Low / slow take-up of commercial land by private sector	Moderate	Unlikely	Low	Ensure the appropriate provision of serviced commercial land, designed and located to cater for end use. Provide commercial land in accordance with needs analysis (ie avoid over supply)
68	Social and	Economic	Economic/Business Developme	Impact on viability of nearby commercial areas by proposed centre facilities	Moderate	Unlikely	Low	Provide commercial land in accordance with needs analysis (ie avoid over supply), which considers the current and future provision of commercial and centre-type facilities (including the planned Muirhead centre)
69	Social and	Economic	Economic/Business Developme	Over-supply of commercial land	Moderate	Unlikely	Low	Provide commercial land in accordance with needs analysis. Update needs analysis and consult with retail sector during subdivision design. Provide accommodation in accordance with tourist accommodation demand analysis.
70	Social and	Economic	Economic/Business Developme	Commercial land remains vacant after sale	Moderate	Possible	Medium	Contractual provisions regarding commencement of construction (ie within specified time after settlement)
71	Biodiversi	Biodiversity	Vegetation clearance	Extinction of local Black-footed Tree-rat population due to a critical level of habitat loss.	Moderate	Possible	Low	Protect 21.8 ha area of Monsoon vine thicket and Low Eucalyptus Woodland and transfer to NT Parks and Wildlife Conservation (CN) as part of Casuarina Coastal Reserve.
72	Biodiversi	Biodiversity	Vegetation clearance	Loss of a sensitive vegetation type (monsoon rainforest and vine thicket).	Minor	Possible	Low	Survey and peg site boundaries prior to construction.
73	Biodiversi	Biodiversity	Vegetation clearance	Loss of habitat and flora species.	Minor	Likely	Medium	Salvage, and relocate Darwin Cycad plants for use in landscaping Open Space areas and parkland.
74	Biodiversi	Biodiversity	Direct Mortailiy	Loss of individual Darwin Cycads due to land-clearing activities.	Minor	Likely	Medium	Ongoing management of relocated Darwin Cycad plants.
75	Biodiversi	Biodiversity	Direct mortality		Moderate	Unlikely	Very Low	Ongoing management of relocated Darwin Cycad plants.
76	Biodiversi	Biodiversity	Direct mortality		Moderate	Unlikely	Very Low	Fence the boundary of adjoining Muirhead North site with mesh to prevent any Black-footed Tree-rats from entering the site.
77	Biodiversi	Biodiversity	Direct mortality	Loss of individual Black-footed Tree-rats due to land-clearing activities.	Moderate	Unlikely	Very Low	Remove habitat in a staged manner, working from Lee Point Road towards the Casuarina Coastal Reserve, to give fauna an opportunity to relocate at their own accord.
78	Biodiversi	Biodiversity	Habitat fragmentation		Minor	Possible	Low	Protect 21.8 ha area of Monsoon vine thicket and Low Eucalyptus Woodland and transfer to NT Parks and Wildlife Conservation (CN) as part of Casuarina Coastal Reserve.
79	Biodiversi	Biodiversity	Habitat fragmentation	Increased isolation of native vegetation adjoining the project site.	Minor	Possible	Low	Use native canopy species in landscaping where practical.
80	Biodiversi	Biodiversity	Edge effects	Reduced quality of a sensitive vegetation type (monsoon rainforest and vine thicket) due to increased exposure.	Minor	Likely	Medium	Protect 21.8 ha area of Monsoon vine thicket and Low Eucalyptus Woodland and transfer to NT Parks and Wildlife Conservation (CN) as part of Casuarina Coastal Reserve.
81	Biodiversi	Biodiversity	Water quality impacts	Reduced threatened and migratory shorebird roosting and feeding habitat quality due to reduced surface water quality in Sandy Creek from onsite contaminants.	Moderate	Unlikely	Low	Erosion and Sediment Control Plan (ESCP) will be implemented prevent erosion and remediate areas where erosion is an issue (Appendix D).
82	Biodiversi	Biodiversity	Water quality impacts		Moderate	Unlikely	Low	
83	Biodiversi	Biodiversity	Water quality impacts		Moderate	Unlikely	Low	Discharge flows into Sandy Creek will be maintained at pre-construction levels.
84	Biodiversi	Biodiversity	Water quality impacts	Reduced quality of riparian, wetland and aquatic habitat that receive water from the project area due to onsite contaminants.	Moderate	Unlikely	Low	Water Sensitive Urban Design (WSUD) initiatives that remove sediment, pollutants and contaminants from water run-off will be implemented (see Appendix E).
85	Biodiversi	Biodiversity	Groundwater	Impacts to groundwater dependent ecosystems (monsoon rainforest) due to reduced groundwater water quality from onsite contaminants.	Minor	Remote	Negligible	Construction spill management
86	Biodiversi	Biodiversity	Weed and pest invasion	Reduced quality of sensitive vegetation types (monsoon rainforest and vine thicket) due to weed infestation and/or proliferation.	Minor	Possible	Low	Weed infested areas will be removed during construction.
87	Biodiversi	Biodiversity	Weed and pest invasion		Minor	Unlikely	Very Low	Ensure all plant, equipment, vehicles and soil coming to and from site is treated for noxious weeds.
88	Biodiversi	Biodiversity	Weed and pest invasion		Minor	Unlikely	Very Low	Control Gamba Grass on site along the boundary that interfaces with the Casuarina Coastal Reserve.
89	Biodiversi	Biodiversity	Weed and pest invasion	Reduced habitat quality in surrounding areas due to the introduction and/or proliferation of weeds.	Minor	Unlikely	Very Low	Ongoing weed management within the expanded Casuarina Coastal Reserve will be the responsibility of the NT Government.
90	Biodiversi	Biodiversity	Human disturbance	Loss of shorebird roosting and feeding habitat due to disturbance by recreational beachgoers from increased use of Casuarina Beach.	Major	Unlikely	MEdium	Implement community awareness and engagement program involving pamphlets and public information sessions.
91	Biodiversi	Biodiversity	Human disturbance		Minor	Possible	Low	Construct well-defined access points to the beach located east of Sandy Creek to avoid disturbance to high tide roosting sites.
92	Biodiversi	Biodiversity	Human disturbance		Minor	Possible	Low	Provide one formal access point from the project site to Casuarina Beach, and rehabilitate all informal tracks between the project site and Casuarina Beach.
93	Biodiversi	Biodiversity	Human disturbance		Minor	Possible	Low	Install barrier fencing 100 metres on the western and eastern side of Sandy Creek.
94	Biodiversi	Biodiversity	Human disturbance	Reduced habitat quality in Casuarina Coastal Reserve due to increased human visitation.	Minor	Possible	Low	Install signage at beach access point from project site, as well as other access points off site, to inform beach users of the threat posed by human disturbance (walking, driving, motorbike riding) and dogs on roosting and feeding shorebirds.
95	Biodiversi	Biodiversity	Dust (during construction)	Reduced quality of sensitive vegetation types (monsoon rainforest and vine thicket), as well as vegetation in general, due smothering of vegetation.	Minor	Unlikely	Very Low	Dust control measures (e.g. water-trucks, protection of soil stock-piles) will be implemented during the dry season.
96	Biodiversi	Biodiversity	Domestic pets	Loss of shorebird roosting and feeding habitat due to disturbance by pet dogs from increased human use of Casuarina Beach.	Moderate	Possible	Low	Undertake an annual shorebird monitoring survey program lead by a local expert, supported by community volunteers.
97	Biodiversi	Heritage	Construction	Destruction of Aboriginal stone scatters.	Minor	Almost Cert	High	Apply for a work approval under Section 72 of the NT *Heritage Act* before carrying out any works within the area of the stone scatters
98	Biodiversi	Heritage	Post-construction		Minor	Unlikely	Very Low	Retain the Lee Point bunkers and Konfrontasi Cruciform.
99	Biodiversi	Heritage	Post-construction	Loss or degradation of Military history items	Minor	Possible	Low	Work with local NT Heritage Branch to develop signage and interpretation material of Lee Point Bunkers and Konfrontasi Cruciform.