Table 8-1 Summary of mitigation measures

No.	Impact	Environmental safeguards	Responsibility	Timing
1	Soil and water quality	All site work is to be undertaken in accordance with the RAP.	Contractor	Pre and during construction
2	Soil and water quality	The site is to have security fence installed to prevent unauthorised public access including warning signs.	Crown Lands	Pre-construction
3	Soil and water quality	Soil and water management will be documented in the CEMP including details of erosion and sediment control. Stormwater and groundwater management details are to include: • Implement erosion and sediment controls in accordance with *Urban Stormwater Manual Volume 1 7 2* (Blue Book) and IECA Guidelines. • Install perimeter controls of contaminated area in the wetland. • Separation and diversion of uncontaminated stormwater away or through the site. • Management of stormwater and dewatering from the remediation areas which will include a sediment basin to allow treatment before discharge (if required). Discharge of water from the remediation or treatment areas will be avoided if possible, with water to be managed within the remediation areas by return to excavations where dewatering is no longer required, or used for dust suppression / moisture control of stockpiles and material to be placed in the containment cell. • Setup washdown bay that drains to sediment basin. • Remediation design to allow for flooding and expected climate change	Contractor	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		water level increases. • Considering impermeable barriers around groundwater inflow sections of excavations • Minimising inflow groundwater into sections of excavations, using temporary barriers (eg. sheet piling), if required. • Groundwater assessment and treatment details (prior to discharge into the environment). The CEMP is also to outline a procedure for the containment and management of sediment laden site water, dewatering and regular inspection, maintenance and cleaning of erosion and sediment controls.		
4	Soil and water quality	Floating, hydrocarbon booms with barrier silt curtains are to be placed in the wetland, encompassing all areas of excavation or potential run-off from the Proposal.	Contractor	Pre and during construction
5	Soil and water quality	Acid sulfate management is to be addressed as part of the CEMP, in accordance with the ASSMAC Guidelines (Ahern, C.R., Stone, Y. and Blunden, B. 1998). The ASSMAC should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.	Contractor	Pre-construction
6	Soil and water quality	Spill Management Procedures (SMP) for spills of fuels, oils or chemicals would be developed for inclusion in the CEMP. The SMP would include procedures for the capture and removal of spills, the location and maintenance of emergency spill equipment on site (e.g. spill kits), and 24 hour contact numbers for key agencies required in the case of an emergency response. All staff are to be made aware of the location of the spill kit and trained in its use.	Contractor	Pre-Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
7	Soil and water quality	A detailed WHS Management Plan is to be developed that outlines methods for minimising exposure of workers to COCs.	Contractor	Pre-Construction
8	Soil and water quality	Work areas are to be divided into two zones with dynamic boundaries as work progresses being defined as 'Contaminated' and 'Uncontaminated' and having strict protocols within and between these zones to minimise cross contamination	Contractor	Construction
9	Soil and water quality	Where possible, excavation of material within the PMF level is to be conducted outside of the historic flood times (i.e. conduct works between June and January).	Contractor	Construction
10	Soil and water quality	Stockpiled material would be located and stored away from drainage lines and clean water diversion drains would be installed to protect stockpiles from flowing waters. Stockpiles are to be managed in accordance with *Urban Stormwater Manual Volume 1 7 2 (Blue Book)* and IECA Guidelines.	Contractor	Construction
11	Soil and water quality	Machinery used to operate within the water in the wetland is to be thoroughly cleaned prior to entry onto the site and visibly inspected for leaks prior to entry into the water. Oil or grease present on machinery that has potential to enter the waterway is to be cleaned off using an absorbent cloth prior to entry into the water.	Contractor	Construction
12	Soil and water quality	Visual monitoring of water quality in the wetland (i.e. hydrocarbon spills/slicks) is to be undertaken to identify any potential spills. This is to be conducted on a daily basis and on an hourly basis when machinery is working within 10 metres of the water surface.	Contractor	Construction
13	Soil and water quality	Work would be suspended in periods of heavy rain and machinery would be removed from the flood zone during flood events.	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
14	Soil and water quality	Disturbance to soil and vegetation outside of the work area is to be minimised. Where the work area is not obvious (eg tailings area, stockpile areas and access roads), the work area is to be delineated with a visual indicator (e.g. tape).	Contractor	Construction
15	Soil and water quality	Vehicle and equipment movement would be confined to established designated work areas, roads, access tracks and compound site/ temporary materials stockpile area.	Contractor	Construction
16	Soil and water quality	A vehicle washdown bay would be provided for plant and equipment leaving the contaminated zone. This shall comprise of a hardstand area for pressure cleaning plant and equipment before leaving site. Wastewater from the washdown bay is to be directed to a controlled area.		
17	Soil and water quality	A shaker grid will be provided for plant and equipment leaving the uncontaminated zone to remove soil d from vehicle tyres. Where material is inadvertently transported onto pavement surfaces (e.g. Hillside Drive, via truck tires) is to be assessed and removed as required. Material spilled from trucks onto any roads is to be removed immediately.	Contractor	Construction
18	Soil and water quality	Erosion and sediment control devices would be maintained and monitored daily during construction and left in situ until the site has been stabilised.	Contractor	Construction
19	Soil and water quality	Disturbed areas are to be stabilised progressively, where practicable, during the works.	Contractor	Construction
20	Soil and water quality	Where previously unidentified contaminants (e.g. asbestos, drums containing chemicals, staining) are identified during works by observation of any unusual physical/sensory characteristics, work is to cease, the area isolated and	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		appropriate advice sought from the Project Manager/Superintendent.		
21	Soil and water quality	The refuelling of plant and maintenance of machinery would be undertaken in an impervious, bunded area, above the probable maximum flood level. Drip trays are also to be used when refuelling.	Contractor	Construction
22	Soil and water quality	All fuels, chemicals, and liquids would be managed as to prevent potential impact on the surface and groundwater. Machinery fuel and soil treatment reagents are to be stored in an impervious, bunded area (with 110 per cent capacity of the largest container) within the compound site, when not being used.	Contractor	Construction
23	Soil and water quality	Plant and equipment would be inspected regularly to ensure there are no leakages of fuel, oil and hydraulic fluid.	Contractor	Construction
24	Soil and water quality	Vehicle wash downs are not to occur onsite, apart from the removal of contaminants prior to machinery leaving site. Wash downs are to take place in a designated area with appropriate controls to prevent hydrocarbon contamination.	Contractor	Construction
25	Soil and water quality	All erosion and sediment control structures are to be removed once the site has been stabilised.	Contractor	Post-construction
26	Soil and water quality	Ongoing monitoring of the containment cell including groundwater and surface water is to be carried out, as required by the EPA and other relevant regulatory authorities.	Crown Lands	Post-construction
27	Soil and water quality	The containment cell is to be managed in accordance with the RAP and any additional requirements identified through ongoing monitoring.	Crown Lands	Post-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
28	Air Quality	Provide the community with a well-publicised contact point to report any dust concerns to both the contractor and landowner.	Crown Lands	Pre- Construction
29	Air Quality	A detailed dust monitoring plan will be developed as part of the Site CEMP.	Crown Lands	Pre- Construction
30	Air Quality	Site workers are to wear appropriate personal protective equipment to satisfy WorkCover requirements and minimise exposure to dust and associated contaminants.	Contractor	Construction
31	Air Quality	Dust monitoring is to be carried out at three locations in total, including the: • Westella Motel • Stepping Stones Pre School • Residence at the intersection of the Pacific Highway and Hillside Drive, adjacent to the site. Monitoring will be undertaken using real-time dust monitors in accordance with DEC's "Approved Method for the Sampling and Analysis of Air Pollutants in NSW" guidelines. Real-time dust monitoring results are to be displayed and trigger values set to alarm the contractor when the following criteria is met: 24-hour average PM10=50 µg/m3 Works are to cease immediately if dust plumes from site activities are visible at nearby sensitive receptors. Dust mitigation measures are to be revised if the incremental dust deposition levels exceed the relevant dust criteria. If mitigation measures cannot achieve the relevant criteria, all dust-creating work must cease until conditions improve to a	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		point that the criteria can be met.		
32	Air Quality	During strong southerly or south-easterly winds, dust generating activities will cease or employ high level management (eg. continual spraying, or full enclosure). Where possible, high dust risk activities will be scheduled during low wind or northerly directional wind.	Contractor	Construction
33	Air Quality	Stockpiles or areas that may generate dust are to be managed to suppress dust emissions (i.e. through application of water sprays or covering/re-vegetating).	Contractor	Construction
34	Air Quality	Specific routes for haulage and access would be designated and vehicle speeds would be limited to 15 km/hr.	Contractor	Construction
35	Air Quality	All trucks carrying soil to or from the site are to be covered. Haulage within the site will be managed via either a retractable cover, dust control spray or allowing a reasonable space between the top of the load and top of the trailer.	Contractor	Construction
36	Air Quality	If significant dust generation is observed from a particular activity, water carts would be used to suppress dust.	Contractor	Construction
37	Air Quality	Construction areas and stockpiles would be pre-watered before they are disturbed and watering would continue during any activities where fugitive dust may be produced.	Contractor	Construction
38	Air Quality	Existing vegetation would be retained where possible and cleared areas and stockpiles would be revegetated as soon as practicable with fast growing species for rapid coverage to temporarily or permanently stabilise soil.	Contractor	Construction and Post-construction
39	Air Quality	Water sprays are to be used where soil is mixed/sifted as part of the treatment process.	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
40	Air Quality	Works are not to be carried out during strong winds or in weather conditions where high levels of dust or air borne particulates are likely (dry, windy).	Contractor	Construction
41	Air Quality	Vehicles transporting waste or other materials offsite that may produce odours or dust are to be covered during transportation.	Contractor	Construction
42	Air Quality	All construction plant, equipment, vehicles and machinery would be maintained in accordance with manufacturer's specifications in order to meet the requirements of the Protection of the Environment Operations Act, 1997 and associated regulations.	Contractor	Construction
43	Air Quality	Vehicles and operating equipment used on site are to be switched off when not operating in order to minimise exhaust emissions from vehicles and other equipment operating.	Contractor	Construction
44	Air Quality	Vegetation or other materials are not to be burnt on site.	Contractor	Construction
45	Air Quality	All air quality complaints must be addressed within 24 hours.	Contractor	Construction
46	Noise and Vibration	A noise monitoring plan would be developed as part of the CEMP.	Contractor	Pre- Construction
47	Noise and Vibration	Community consultation is to be carried out including: ◗ Informing potentially noise affected neighbours about the nature of the construction stages and the duration of noisier activities. ◗ Keeping potentially noise affected neighbours up to date on progress. ◗ Providing contact details on a site board at the front of the site, and maintaining a complaints register. ◗ Asking about any concerns that potentially noise affected neighbours may have	Crown Lands	Pre-Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		and discuss possible solutions. Providing a copy of the CEMP including noise management details, if requested.		
48	Noise and Vibration	Construction activities would be scheduled during the recommended construction hours (i.e. 7am to 6pm Monday to Friday. 8am to 1pm Saturdays).	Contractor	Construction
49	Noise and Vibration	All site workers would be informed during the site induction and regular toolbox about the potential for noise impacts on local residents and encouraged to take all practical and reasonable measures to minimise noise during the course of their activities.	Contractor	Construction
50	Noise and Vibration	All equipment would be inspected during routine plant checks to ensure they are in good working order. Machines found to produce excessive noise compared to normal industry expectations would be removed from the site or stood down until repairs or modifications can be made.	Contractor	Construction
51	Noise and Vibration	Use alternatives to 'beeper' style movement alarms on the equipment most commonly used onsite (e.g. broadband style 'quacker' alarms). Arrange the work site to minimise the use of movement alarms on vehicles and mobile plant.	Contractor	Construction
52	Noise and Vibration	Use radio communication as opposed to 'horn beep' communication between machinery where practicable.	Contractor	Construction
53	Noise and Vibration	Locate noisy plant away from potentially noise affected neighbours or behind barriers, such as sheds.	Contractor	Construction
54	Noise and Vibration	As far as possible noise mitigation measures will be applied such as minimising materials dropping heights into or out of trucks, locating noise sources so as to avoid direct line of sight with noise receivers and facing ventilation or exhaust	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		openings away from noise receivers.		
55	Noise and Vibration	The idling of machinery and equipment when not in use for prolonged periods of time is to be minimised.	Contractor	Construction
56	Noise and Vibration	Time awareness for vibration intensive activities should be implemented through scheduling these activities during the least sensitive time periods and sequencing operations so that vibration intensive activities do not occur simultaneously.	Contractor	Construction
57	Biodiversity	As part of job-site induction prior to arrival on-site, awareness of ecology related issues would be provided for relevant staff.	Contractor	Pre-construction
58	Biodiversity	The Vegetation Management Plan is to include details of weed management to prevent the spread of introduced species and declared noxious plants recorded within the study area.	Contractor	Pre-construction
59	Biodiversity	The extent of clearing is to be clearly marked prior to clearing works commencing.	Contractor	Pre-construction
60	Biodiversity	Where possible, time the remediation works during the dry season and to avoid the common fauna breeding season (e.g. Black-necked Stork in Spring) in order to reduce the impact on local fauna		
61	Biodiversity	An inspection of the works area for fauna is to be completed immediately prior to commencement of the proposed works (each day), by a site staff member. Should injured fauna be found on the site, local wildlife care groups and/or veterinarians are to be contacted immediately.	Contractor	Construction
62	Biodiversity	Establish sediment barriers to avoid contamination flowing into the downstream wetland areas, monitor and maintain	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
63	Biodiversity	Conduct an inspection of any hollow bearing trees before or immediately after falling. Should injured fauna be found, local wildlife care groups and/or veterinarians are to be contacted immediately	Contractor	Construction
64	Biodiversity	Remove only the wetland vegetation (dead and alive) that is necessary to achieve the remediation outcomes agreed	Contractor	Construction
65	Biodiversity	Retain fallen timber and the weed-seed-free vegetation waste on-site for habitat or mulched for revegetation and landscaping work	Contractor	Construction
66	Biodiversity	Provide a fertile topsoil surface at the completion of the remediation works by importing certified clean and appropriate soils.	Contractor	Construction
67	Biodiversity	Revegetate to reduce the amount of exposed/bare ground in order to restore similar-to-local conditions	Contractor	Construction
68	Biodiversity	Implement a water quality monitoring program prior to the commencement of remediation works (parameters will be determined following initial water quality data collection and analysis). Undertake water quality testing weekly during remediation, and monthly for two years after completion (or as directed by the approval authority). Include water monitoring at two other downstream locations, including the estuary and the downstream wetland	Contractor	Construction
69	Biodiversity	Complete weed hygiene procedures prior to plant and machinery entering the site to reduce the risk of new weed species being introduced.	Contractor	Construction
70	Aboriginal heritage	The Coffs Harbour and District Local Aboriginal Land Council (CHDLALC) is to be consulted prior to earth disturbance activities adjacent to the property's northern boundary (where the current dwelling and entry points to the property are located) as the LALC believe the area holds strong potential to contain potential	Crown Lands	Pre-Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		archaeological deposits (PAD.		
71	Aboriginal heritage	The area of the PAD would be covered in geofabric and sub base (or similar material) to avoid disturbing the ground surface of the area.	Contractor	Construction
72	Aboriginal heritage	If Aboriginal heritage items are uncovered during the works, all works in the vicinity of the find must cease and the Project Manager contacted immediately. The Coffs Harbour and District Local Aboriginal Land Council (CHDLALC), as the local authority for cultural heritage in this area, is then to be contacted. Works in the vicinity of the find must not recommence until clearance has been received from CHDLALC, the Cultural Heritage Division of OEH and the Project Manager.	Contractor	Construction
73	Aboriginal heritage	Should human remains be found all works in the vicinity of the find must cease and NSW Police contacted. Works in the vicinity of the find must not recommence until clearance from the Police and OEH.	Contractor	Construction
74	Non-Aboriginal heritage	If any items defined as relics under the NSW Heritage Act 1977 are uncovered during the works, all works must cease in the vicinity of the find and the Project Manager contacted immediately.	Contractor	Construction
75	Traffic and access	A detailed Traffic Management Plan would be prepared and appended to the CEMP, which would include such measures to provide safe access points to work areas from the adjacent road network, temporary speed restrictions when necessary, adequate sight distances and prominent warning signage.	Contractor	Pre-construction
76	Traffic and access	Residents in the vicinity of the access tracks must be consulted in regard to access issues.	Crown Lands	Pre-construction
77	Traffic and access	No machinery or vehicles are to park along Hillside Drive overnight.	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
78	Traffic and access	Vehicle access is to be maintained to all driveways along Hillside Drive.	Contractor	Construction
79	Traffic and access	Access tracks are to be stabilised or rehabilitated following completion of the works.	Contractor	Construction
80	Visual Amenity	Prior to the commencement of Proposal, nearby affected visual receptors (residents) would be notified and informed of the range of activities to be conducted and likely visual impacts.	Crown Lands	Pre-Construction
81	Visual Amenity	The Vegetation Management Plan (as an appendices to the CEMP) is to be developed that will document the proposed landscaping of the remediated site (with consideration of visual screening for neighbours, vegetation species selection, a five year maintenance program and weed control).	Contractor	Pre- Construction
82	Visual Amenity	Disturbance to soil and vegetation outside of the work area is to be minimised.	Contractor	Construction
83	Visual Amenity	Vehicle and equipment movement would be confined to established designated roads, access tracks and compound site/ temporary materials stockpile area.	Contractor	Construction
84	Visual Amenity	Work areas are to be stabilised progressively during the works.	Contractor	Construction
85	Visual Amenity	The finished levels of the containment cell and excavation are would be as consistent as possible with the surrounding landscape	Contractor	Construction
86	Visual Amenity	Rehabilitation and seeding works are undertaken as soon as possible following completion of the proposed works. The rehabilitation is to be consistent with the surrounding vegetation communities.	Contractor	Post- construction

No.	Impact	Environmental safeguards	Responsibility	Timing
87	Visual Amenity	All erosion and sediment control structures, compounds, stockpiles and the perimeter fence are to be removed once the site has been rehabilitated.	Contractor	Post-construction
88	Visual Amenity	Working areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day.	Contractor	Demolition
89	Socio-economic	Where possible, construction workers would be sourced locally to minimise the number of workers needing to relocate to the area.	Contractor	Construction
90	Socio-economic	Where possible, construction materials would be sourced from local industries and manufacturers.	Contractor	Construction
91	Socio-economic	In the extreme event where contaminated material spills from the site containment structures, the following will be undertaken: • notification to EPA of environmental spill, • notification to Bellingen Shire Council who have authority to preclude access to waterways • installation of temporary signage (pre-printed) to preclude access to selected parts of Urunga Lagoon and Station Creek • monitoring of water quality at Urunga Lagoon • reopening access once test results show water quality is safe for recreational use under the appropriate guidelines	Crown Lands	Pre and during Construction
92	Demand on resources	Procurement must endeavour to use materials and products with a recycled content where that material or product is cost and performance effective.	Contractor	Construction
93	Demand on	Excavated material must be reused on-site for fill wherever feasible.	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
	resources			
94	Waste management	Resource management hierarchy principles are to be followed including: • Avoid unnecessary resource consumption as a priority. • Resource recovery (including reuse of materials, reprocessing, recycling and energy recovery). • Disposal.	Contractor	Planning phase
95	Waste management	The PM shall ensure that waste arising from the works is removed and disposed of in accordance with the requirements of the NSW EPA and WorkCover Authority, together with the relevant legislative requirements, namely: • Work Health and Safety Act, 2011 and Regulations, 2011. • Contaminated Land Management Act, 1997 and Regulations, 2008. • Protection of the Environment Operations Act, 1997 and Regulations, 2008. • EPA's Waste Classification Guidelines 2008.	Contractor	Planning phase
96	Waste management	Excess materials must be disposed of according to the following (in order): • Reuse onsite. • Removal by a contractor for reuse or sale (where approved). • Disposal at an approved materials recycling or waste disposal facility. As otherwise provided for by the relevant waste legislation.	Contractor	Planning phase and Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
97	Waste management	Site inductions must include appropriate waste management actions.	Contractor	Pre- construction
98	Waste management	Disposal of materials would not be permitted on any land on or around the site, except at approved locations.	Contractor	Construction
99	Waste management	Working areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day.	Contractor	Construction
100	Waste management	The site is to have security fence installed to prevent unauthorised public access including warning signs.	Contractor	Construction
101	Waste management	Waste material is not to be left on site once the works have been completed, apart from the residual contaminated soil and water outside of the remediation area..	Contractor	Construction
102	Waste management	Garbage receptacles must be provided and recycling of materials encouraged. Rubbish would be transported to an appropriate waste disposal facility.	Contractor	Construction
103	Waste management	Toilet facilities must be provided for workers.	Contractor	Construction
104	Waste management	Waste is not to be burnt on site.	Contractor	Construction
105	Hazards and risks	Store dangerous goods in an appropriately bunded area	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
106	Hazards and risks	Keep and maintain spill control kits at appropriate locations and ensure all staff are trained in their use	Contractor	Construction
107	Hazards and risks	Use a specific refuelling vehicle equipped with an approved fuel dispenser, for refuelling	Contractor	Construction
108	Hazards and risks	Maintain a register of dangerous goods on site	Contractor	Construction
109	Hazards and risks	If available, use a safe alternative to the dangerous good	Contractor	Construction
110	Hazards and risks	Ensure that bushfire management procedures are addressed in the CEMP	Contractor	Construction
111	Hazards and risks	Prepare and implement a WHS Plan	Contractor	Construction