Risk and Potential Impacts	Control Measures	Residual		
		Likelihood	Consequence	Risk Level
Groundwater				
Deterioration/contamination of groundwater quality caused by seepage of recycled leachate from the landfill cells and recycled leachate pond during their operation.	Recycled leachate will be managed through a hierarchy of minimising generation, effective capture and storage and removal. Recycled leachate head on the landfill liner will be maintained at a maximum of 300 mm in accordance with the Vic-BPEM guidelines, industry practice and typical landfill licensing conditions. The collected recycled leachate will be pumped into the recycled leachate pond for storage and evaporation. A site specific water management plan will be developed for the site. The water management plan will describe the maintenance and operation of the recycled leachate management infrastructure, the performance benchmarks for the recycled leachate pond and the appropriate escalation procedures for equipment malfunction, recycled leachate release, recycled leachate pond overfilling and extreme weather events. It will also include management measures appropriate to the scale and nature of the groundwater contamination risk, including: ■ A groundwater monitoring program ■ A contingency plan should groundwater monitoring indicate evidence of potential contamination. In addition to a liner and recycled leachate management system and surface water management measures in accordance with Vic-BPEM requirements and industry practice, the groundwater at the site is protected by a clayey soil layer. Subsequently, surface water and groundwater interaction at the site is expected to be minimal.	2	2	4 (Low)

Risk and Potential Impacts	Control Measures	Residual		
		Likelihood	Consequence	Risk Level
Deterioration/contamination of surface water or groundwater quality caused by on-site spills (such as hydrocarbons, saline, or other contaminated materials) during construction or operational activities.	Chemicals and fuels used for landfill construction and operations will be stored appropriately to minimise the risk of impact on the environment. The storage and handling of chemicals and fuels will be in accordance with the *Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007* and Australian Standard AS 1940 *The storage and handling of flammable and combustible liquids*. The following management measures will be implemented at the landfill site: ■ The quantity of chemicals and fuels stored will be kept to a minimum ■ Bunding of appropriate capacity will be provided for liquid storage areas ■ Appropriate contingency plans will be developed to manage spills or accidents ■ All refuelling of mobile plant will be undertaken in a designated bunded refuelling area ■ All chemicals will be stored as per manufacturers recommendations ■ Safety Data Sheets (SDS) will be maintained for all chemicals and fuels on site, with SDS made available to all personnel associated with the construction and operation of the landfill ■ In the event of a spill or leakage the contaminated soil will be excavated, stockpiled in a secure area and tested for the concentration of the chemical pending final disposal into an appropriately licensed landfill site by a licensed contractor, and ■ Empty chemical and fuel containers will be collected for recycling or disposal by an appropriately licensed contractor. Furthermore, the construction contractor shall be aware of the anticipated groundwater conditions and excavations shall be dewatered as necessary with the resulting water pumped to appropriate temporary storage facilities as required.	2	2	4 (Low)

Risk and Potential Impacts	Control Measures	Residual		
		Likelihood	Consequence	Risk Level
Septic system causing contamination of surface water and/or groundwater	The septic system to be installed at the Great Southern Landfill will be appropriate for the estimated volume of sewage waste generated at the landfill. Approval/s for the septic system will be obtained from the relevant authorities prior to installation. Approved temporary ablution facilities will be used during the landfill construction phase. These facilities will be serviced regularly as appropriate with waste material removed for disposal at an off-site licenced facility.	3	1	3 (Very Low)
Surface Water				
Emissions to surface water, including sediment, caused by managed stormwater during landfill construction and operation.	The design of the Great Southern Landfill and associated infrastructure, including the leachate pond, stormwater dam, retention pond, hardstand areas, road drainage and culverts have been designed for storm events. Furthermore a site-specific water management plan will be developed that will include surface water management, monitoring and contingency actions. The water management plan will detail management measures appropriate to the scale and nature of the risk, including: ■ Maintenance of the stormwater dam, drains and culverts on the site ■ Management of erosion ■ Response to extreme storm events. Surface water flows during construction will be managed by the construction contractor in accordance with the relevant specification. The construction contractor shall take precautions to prevent soil erosion from any land used or occupied during landfill construction and shall employ stormwater control measures to prevent contamination of surface waters. For example, the surface water collected from the construction area shall be diverted to the stormwater dam for use in construction activities and dust suppression. The construction contractor shall not discharge any water containing levels of sediment, salt, organic matter, hydrocarbons or other contaminants that are incompatible with the receiving water body without prior treatment and approval.	2	2	4 (Low)

Risk and Potential Impacts	Control Measures	Residual		
		Likelihood	Consequence	Risk Level
Air				
Emission of landfill gas adversely impacting air quality and therefore the health of site workers, the community and fauna.	A Site Management Plan (SMP) for the landfill facility will be implemented. The SMP will include landfill gas management, monitoring and contingency actions and will detail management measures appropriate to the scale and nature of the landfill gas risk, including: ■ Progressive installation of an appropriate landfill gas collection system ■ Progressive capping of cells to limit gas escape ■ Regular review of the landfill gas management system design as waste is placed to optimise the quality and volume of gas generated together with the opportunity for power generation ■ Provide adequate condensate collection and drainage points in the landfill gas collection systems to avoid blockage by water vapour ■ Use of vertical and/or horizontal landfill gas extraction wells ■ Install vertical wells with care to avoid penetrating the basal landfill liner ■ Strategically locate the landfill gas management systems to minimise the potential for damage caused by settlement, vandalism, animals, natural processes or operational machinery ■ Conduct scheduled monitoring and maintenance of gas extraction wells ■ Modifications to the gas collection system design after the construction phase will be recorded and maintained at the landfill site.	3	1	3 (Very Low)
Emission of landfill gas introducing an explosion risk due to generation of methane.		1	4	4 (Low)
Emission of landfill gas contributing to greenhouse gas emissions (from methane and carbon dioxide).		3	1	3 (Very Low)
Emission of carbon dioxide from plant and machinery during landfill construction and operations.	All plant and equipment shall have appropriate emission control devices and be maintained regularly to achieve optimum performance. All plant and machinery will be inspected daily as part of normal pre-start procedures. Inspections will include checking of mufflers, exhaust systems and fuel and oil lines and reservoirs.	3	1	3 (Very Low)
Dust emissions caused by vehicle movement during construction works potentially adversely impacting air quality and therefore the health of site workers and fauna, and dust deposition to flora.	Alkina will maintain a suitable buffer from the landfill facility to the site boundary. Furthermore, various construction and operational management plans will be developed and implemented as part of the SMP. These management plans will include dust management and contingency actions	3	1	3 (Very Low)

Risk and Potential Impacts	Control Measures	Residual		
		Likelihood	Consequence	Risk Level
Dust emissions caused by wind blowing from the active tipping face potentially adversely impacting air quality and therefore the health of site workers and fauna, and dust deposition to flora.	detailing the management measures appropriate to the scale and nature of the dust risk, including: ■ Covering/sealing all vehicles carrying waste ■ Only removing vehicle covers in the vicinity of the tipping face of the active cell ■ Sealing the landfill entry road from Great Southern Highway to the landfill site with bitumen ■ Using water trucks to supress dust on unsealed roads, exposed stockpiles and the active landfill cell(s) when required ■ Directing vehicles entering and leaving the site to pass over a mud shaker to remove dust from the tyres and underbody of the vehicle ■ Only operating vehicles on designated roads and tracks ■ Restricting the speed of vehicles accessing the site to 50 km/h on Entry roads and 30 km/h within the landfill facility ■ Monitoring exposed and disturbed areas for dust emissions ■ Maintaining a complaints register detailing dust emissions complaints and actions.	3	1	3 (Very Low)
Dust emissions caused by progressive construction activities of new landfill cells, including development of borrow areas, potentially adversely impacting air quality and therefore the health of site workers and fauna, and dust deposition to flora.		3	1	3 (Very Low)
Dust emissions caused by spillage of waste and debris from trucks during transport and tipping potentially adversely impacting air quality and therefore the health of site workers and fauna, and dust deposition to flora.		3	1	3 (Very Low)
Dust emissions caused by soil removal/clearing works during construction potentially adversely impacting air quality and therefore the health of site workers and fauna, and dust deposition to flora.		3	1	3 (Very Low)
Dust emissions caused by grading works potentially adversely impacting air quality and therefore the health of site workers and fauna, and dust deposition to flora.		3	1	3 (Very Low)

Risk and Potential Impacts	Control Measures	Residual		
		Likelihood	Consequence	Risk Level
Dust emissions caused by material loading/unloading potentially adversely impacting air quality and therefore the health of site workers and fauna, and dust deposition to flora.		3	1	3 (Very Low)
Dust emissions caused by stockpiling activities and wind erosion of stockpiles of capping materials potentially adversely impacting air quality and therefore the health of site workers and fauna, and dust deposition to flora.		3	1	3 (Very Low)
Odour				
Emission of odour from waste adversely impacting air quality and therefore the health/comfort of the local community and native fauna.	The landfill site is located 1.9 km from the nearest sensitive receptor (residence), which combined with the intervening landform and vegetation provides a considerable buffer minimising the risk of odour impacting the amenity of the surrounding environment.	3	1	3 (Very Low)
Emission of odour from leachate pond adversely impacting air quality and the health/comfort of the local community and native fauna.	Furthermore, a Landfill Management Plan and Landfill Gas Management Plan will be developed for the landfill facility that will include odour management, monitoring and contingency actions. The Landfill Management Plan and/or Landfill Gas Management Plan will detail management measures appropriate to the scale and nature of the odour risk, including: ■ Daily covering of active landfill cell with 300 mm thick soil cover or alternative cover materials ■ Progressive covering of waste to limit oxygen availability and aerobic decomposition ■ Immediate burial of odorous waste loads ■ Development and implementation of a landfill gas collection system ■ Effective collection and management of leachate ■ Progressive capping of landfill cells to contain landfill gas ■ Monitoring landfill gas at the gas extraction wells and the site boundary, and ■ Maintenance of on-site buffers.	3	1	3 (Very Low)

Risk and Potential Impacts	Control Measures	Residual		
		Likelihood	Consequence	Risk Level
Noise				
Generation of noise due to landfill construction works, including activities at proposed borrow areas (such as operation of vehicles and other equipment) adversely impacting sensitive offsite receptors and native fauna.	Acoustical treatment measures incorporated during landfill construction and operation, together with the distance to the nearest sensitive receptors, will minimise the impact of noise levels to acceptable limits or below. Management plans will be developed for the construction and operation phases of the landfill facility, which will include noise management, monitoring and contingency actions. The management plans will detail management measures appropriate to the scale and nature of the noise risk, including: ■ Compliance with relevant sections of the *Environmental Protection Act 1986* and the *Environmental Protection (Noise) Regulations 1997*. ■ Identifying and managing the operating hours of noise intensive machinery ■ Restricting construction working hours ■ Implementing buffer zones or bund walls to provide acoustic screening where predicted noise impact would be above the guideline thresholds ■ Training staff in the effective operation of plant and equipment ■ Maintaining equipment and its noise control instruments as per manufacturer's recommendations. ■ Maintaining a complaints register.	2	1	2 (Very Low)
Generation of noise due to landfill operational activities (such as operation of vehicles and other equipment) adversely impacting sensitive offsite receptors and native fauna.		2	1	2 (Very Low)
Light				
Light pollution that intrudes on an otherwise natural or low-light setting.	The landfill site is located in a remote rural area (approximately 1.9 km from the nearest residence), which combined with the intervening landform and vegetation provides a considerable buffer minimising any impacts from light emissions, although activities associated with the construction and operation of the landfill are not expected to generate any adverse light emissions.	2	1	2 (Very Low)

Risk and Potential Impacts	Control Measures	Residual		
		Likelihood	Consequence	Risk Level
Flora				
Disturbance to and/or clearing of vegetation as a result of construction activities.	The landfill has been specifically located to minimise clearing of any remnant bushland on the project site. Limited clearing is required for a strip of bushland near the site entry and isolated trees. Topsoil to a depth of 200 mm shall be removed from the landfill development area and stockpiled for future use (soil from cropping and non-cropping areas will be stockpiled separately). Topsoil will be deposited in rows no higher than 3 m and no wider than 15 m to aid the preservation of soil microbes. Despite the low risk of adverse impact to native vegetation the management plans for the construction and operation phases of the landfill facility will include vegetation management, measures appropriate to the scale and nature of the native vegetation risk, including a weed management strategy.	3	1	3 (Very Low)
Introduction of weeds as a result of increased vehicle movement on site during construction works.		3	1	3 (Very Low)
Introduction of weeds as a result of increased vehicle movement on site during operational activities		2	3	6 (Moderate)
Fauna				
Disturbance to and/or clearing of native vegetation as a result of construction works resulting in the reduction of fauna habitat.	As the area has already been cleared for productive farmland, no substantive vegetation habitat exists (there will be minimal clearing required, limited to scattered trees with little to no habitat value). Regardless, construction and operational management plans will be developed which will include fauna management measures appropriate to the scale and nature of the fauna risk.	3	1	3 (Very Low)
Disease vectors and vermin (including flies, mosquitoes, mice, rats, cats, foxes and birds) emanating from the landfill due to following practices, potentially posing a risk to public health: ■ Exposed food wastes ■ Windblown food waste ■ Access to voids in the waste mass due to poor cover or compaction ■ Still waters at the landfill.	A Landfill Management Plan will be developed for the landfill facility that will include vermin management, monitoring and contingency actions. The Landfill Management Plan will detail management measures appropriate to the scale and nature of the vermin risk, including: ■ Cover waste at the end of every day with 300 mm thick cover material and alternative cover systems on the working face only ■ Check areas previously covered regularly and apply more cover where required ■ Cover/seal waste delivery trucks ■ Inspect trucks for spilled waste before they depart the tipping face ■ Bury odorous or decayed waste promptly ■ Monitor site fencing and waste transport routes to remove waste deposits	3	2	6 (Moderate)

Risk and Potential Impacts	Control Measures	Residual		
		Likelihood	Consequence	Risk Level
	■ Maintain sufficient gradient for stormwater runoff to minimise the accumulation of standing water ■ Only water bodies required for fire, sedimentation and leachate control will be permitted on site ■ Maintain site fencing to keep larger animals away from the site ■ Utilise scare devices and traps, when required, subject to approvals ■ Engage pest exterminators to minimise infestations of vermin, subject to appropriate approvals ■ Utilise bird control measures such as anti-perch strips on buildings, acoustic bird scaring devices and other techniques, as required, and ■ Inform neighbouring land users of the process to register vermin or bird complaints. Investigate and action any complaints as they arise.			
Waste				
Windblown litter beyond the landfill boundary causing visual amenity impacts due to: ■ Uncovered vehicles transporting waste into the facility ■ Waste tipping operations ■ Exposed surfaces of the landfill ■ Poor cover and/or compaction of the waste ■ Fauna disturbance	A Waste Acceptance Manual for the landfill will be implemented. The manual will be used by landfill personnel as a reference for the day to day operations concerning receipt and management of waste at the landfill. Furthermore, a Landfill Management Plan will be developed for the landfill facility that will include litter management, monitoring and contingency actions. The Landfill Management Plan will detail management measures appropriate to the scale and nature of the litter risk, including: ■ Using enclosed/sealed trailers to transport waste ■ Construction of a 1.8 m high fence around the site perimeter ■ Erection of portable litter screens downwind of the active face ■ Operating one active tipping face at any time ■ Minimising the surface area of the tipping face ■ Compacting waste immediately following placement ■ Watering the active face on dry and windy days or when required ■ Daily cover of the active tipping area ■ Prompt covering and capping of completed cells ■ Conducting regular litter patrols around the active cell fence and site fence to collect windblown litter ■ Maintaining a complaints register.	2	1	2 (Very Low)

Risk and Potential Impacts	Control Measures	Residual		
		Likelihood	Consequence	Risk Level
Mismanagement of refuse generated during construction activities.	All waste, including foodstuffs, shall be handled and disposed of in accordance with the relevant specification and applicable regulations. For example, separate labelled waste receptacles will be provided on site for temporary storage of waste types prior to removal for off-site reuse, recycling or disposal	2	1	2 (Very Low)
Visual Amenity				
Landfill landform visual impact to the surrounding area.	The landfill site is located in a remote rural area (approximately 1.9 km from the nearest residence), which combined with the intervening landform and vegetation provides a considerable buffer minimising impacts to visual and landscape amenity.	2	1	2 (Very Low)
Hazardous Materials				
Asbestos and other hazardous waste material causing health impacts to people or fauna.	A Waste Acceptance Manual for the landfill will be implemented. The manual will be used by landfill personnel as a reference for the day to day operations concerning receipt and management of hazardous waste at the landfill. For example, the acceptance and management of asbestos waste at the landfill will be undertaken in accordance with Asbestos Waste – Transport, Receipt and Disposal as detailed in the Waste Acceptance Manual.	2	2	4 (Low)
Fire				
Fire outbreak on site within the landfill cells or surrounding area, potentially impacting air quality, the health of site workers, the community and fauna, vegetation and public safety.	A Fire Management Plan (FMP) for the landfill facility will be developed which includes fire management, monitoring and contingency actions. The FMP details management measures appropriate to the scale and nature of the fire risk, including: ■ Fire prevention ■ Site firefighting infrastructure, including water tanks and stormwater dam ■ Fire response procedures ■ Firefighting equipment, such as a water truck ■ Storage of flammable materials ■ Maintenance of fire breaks.	2	2	4 (Low)

Risk and Potential Impacts	Control Measures	Residual		
		Likelihood	Consequence	Risk Level
Traffic				
An increased traffic flow within the area due to vehicles accessing the site.	A Landfill Management Plan will be developed that will include waste haulage vehicle management, monitoring and contingency actions. The plan will detail management measures appropriate to the scale and nature of the traffic risk, including: ■ Addressing the primary aspects of the haulage operation as they impact the Great Southern Highway, and motorists on the Highway including: ■ Vehicle and trailer type, size and general specifications including colour schemes ■ Haulage vehicle operating schedules and turnaround times ■ Driver rest and fatigue management procedures ■ Vehicle litter clean down procedures and overall cleaning schedules. ■ Upgrading the intersection of Great Southern Highway and the landfill entry road to provide a through lane for eastbound vehicles and an acceleration lane for road trains exiting the site to Perth. The intersection will be designed and constructed to Main Roads WA requirements.	2	2	4 (Low)

Likelihood		Consequence				
		Catastrophic	Major	Significant	Minor	Insignificant
		5	4	3	2	1
Almost certain	5	25 (VH)	20	15	10	5
Likely	4	20	16 (H)	12	8	4
Possible	3	15	12	9 (M)	6	3
Unlikely	2	10	8	6	4 (L)	2
Rare	1	5	4	3	2	1 (VL)
(VL) Very Low Risk	No additional controls necessary. Continue to monitor risk.					
(L) Low Risk	Consider additional controls to further reduce risk.					
(M) Moderate Risk	Controls must be implemented to reduce risk.					
(H) High Risk	Risk unacceptable; do not proceed without controls, minimum of 'engineering controls'.					
(VH) Very High Risk	Risk unacceptable; do not proceed without controls, elimination or substitution.					