

17. Hazard and risk

This section of the EIS identifies the potential hazards and risks that may relate to the construction and operation of the Project, including hazards and risks posed to the Project and those posed by the Project.

A hazard is a source of potential harm. A risk is the chance of something happening that will have an impact on Project objectives. These objectives cover aspects of the Project including the protection of health and safety, environmental and social values, and the infrastructure itself and economic viability of the Project. A risk is usually described in terms of a combination of the probability that an event will occur or the frequency with which it is likely to occur, and the severity of the consequences.

Without analysing hazards and the risks to which they give rise, it is not generally possible to determine how serious such a risk might be, and what should be done to manage or reduce it.

17.1 Hazard identification

In order to assess the risks to the Project, it is necessary to identify as completely as possible, all relevant hazards. For the Project, hazards present during construction and operating phases have been identified in the preceding chapters and are considered here under the following classifications:

- construction and maintenance activities
- hazardous materials
- traffic
- natural events
- wildlife
- disease vectors
- traffic
- actions by members of the public.

17.1.1 Construction and maintenance activities

Project construction hazards include the usual issues relating to large civil Projects including use of large, heavy equipment, excavations and bulk earthworks, and the use of hazardous materials such as fuel and explosives. These hazards are all well understood by Project construction managers and the construction workforce, and are not expected to result in unusual levels of risk for this Project if properly managed. The use of hazardous materials is discussed in Section 4.12.1.1. Members of the public will be excluded from construction areas.

Operations and maintenance activities involve working with large volumes of water and water flows, maintenance and repair of the channel, pipelines and other structures including the use of heavy equipment, and also the use of pesticides. SunWater is experienced in all these types of activities and the management of the risks that they involve, and these hazards are not expected to result in any unusual levels of risk in these circumstances. The use of pesticides is discussed in Section 17.1.2. The channel will be fenced along its length to prevent access by members of the public and signage will be erected to warn them of the channel hazard.

17.1.2 Hazardous materials

Hazardous materials to be used during the construction phase are likely to be limited to diesel fuel, lubricating and hydraulic oils, and explosives. There is the potential for leaks and spills of fuels and oils to contaminate land, surface waters or groundwater. Fire is also possible but not considered likely. The need to use explosives is not considered likely. The rate of use of hazardous materials and the maximum quantities stored at any time can not be estimated until detailed construction programs have been prepared.

Although their use is considered unlikely, explosives may be needed for channel excavation in a limited area with surface rock. There is therefore the potential for accidental explosions during transport or storage of explosives, uncontrolled explosions during use, and injury to the public, Project personnel or the environment from blast overpressure, flyrock or inappropriate use of explosives in certain areas. The exposure of the public is likely to be extremely small because of the significant separation distances between areas where blasting might be needed and any residential area.

Once construction of the Project is complete, the use of significant quantities of dangerous goods will be minimal. Such goods are expected to be limited to the use of pesticides to control weeds and water-borne species that need to be controlled along the alignment and in the channel, pipelines and storages.

Aquatic biocides containing acrolein are used by SunWater to prevent the growth and spread of aquatic plants that would cause operational problems in the system. Acrolein is a Class 6.1 toxic substance, with a range of potential health effects (Section 18.2). It is toxic and highly irritating by inhalation and is very toxic to aquatic life. The lethal concentration (LC50/96 hour) values for fish are less than 1 mg/L. When released into water, this material will biodegrade to a moderate extent and is expected to quickly evaporate. When released into water, it is expected to have a half-life between one and 10 days. Acrolein is not expected to significantly bioaccumulate (JT Baker 2009).

Pesticides including herbicides and aquatic biocides containing acrolein will only be applied by trained personnel in accordance with approved methods and at approved dose rates.

The Project also passes through a number of sites that have been identified as potentially contaminated (Section 6.4). While there is the potential for any contamination to be mobilised by development of the Project and thereby to present a health risk, activities comprising searches of registers, historical searches, site investigations, remediation comprising best industry practice and ongoing monitoring during construction, should be effective in eliminating any significant risks in this regard.

17.1.3 Traffic

The Project will generate significant increases in traffic during the construction phase. Section 14.2 provides details of expected traffic increases and impacts. Traffic in the Project area is a potential hazard both for construction personnel and for existing road users. In addition to construction vehicles, personnel will generate traffic during their daily trips between home, work camps or other accommodation and construction sites. The increased numbers of vehicle movements is expected to increase the risk of vehicle accidents, although, as identified in Chapter 14, such increases are not expected to be significant.

17.1.4 Natural events

Natural events might affect the construction and operation of the Project and might also have indirect consequences that may have the potential to affect the public or the environment.

Chapter 5 provides details of climatic extremes and hazards that might occur within the Project area. Cyclones, flooding and earthquakes have the potential to cause damage to the Project during both construction and operation while construction work has the potential to initiate bushfires. During construction, works in watercourses crossed by the Project might have an adverse but localised and short term effect on hydrology.

The potential for each type of natural event to occur is described below with a summary of the hazards detailed in Chapter 5.

Tropical cyclones

Tropical cyclones can pose a serious threat to Queensland communities, industry and infrastructure through the impact of heavy rain, flooding and wind damage. With the Project site located approximately 10 to 20 km inland from the North Queensland coastline, there is a strong possibility that the Project could be directly affected by passage of a tropical cyclone, and heavy rainfall and flooding associated with ex-cyclone systems is even more likely to affect the Project.

Flooding

The Project infrastructure commences near Burdekin River and ends near Don River, crossing approximately 20 named watercourses in between.

Chapter 8 shows that the river systems in the study area are prone to flooding during the annual wet season. Those associated with Burdekin River can be significant and extended while those associated with the more southerly watercourses tend to be short lived. The Surface Water Assessment report provides further details on flooding of the river systems and mitigation measures proposed to minimise the risk of erosion and delays during the construction phase.

Without appropriate engineering design there is potential at stream crossings for crossing structures such as siphons to be damaged as a result of lateral movement of stream meanders or movement of mobile bed loads, during periods of high flow. If the damage was severe, there would be potential for the channel to discharge to the stream. Various design features have been incorporated to reduce these risks to minimal levels.

Drought

The study area has a prolonged annual dry season and is more likely to suffer from drought than floods. While not currently drought declared, it is possible that drought conditions could re-occur with a risk to activities that require significant volumes of water during the construction phase. Should they occur, those activities will need to be reviewed to establish procedures that will place stringent limits on water usage. As the existing Elliot Channel is planned as the major course of construction water, and this is sourced from the Burdekin, this impact is significantly reduced.

Bushfire hazard

Rural Fire Service mapping (Section 5.6) indicates that the majority of the alignment is likely to vary from a low to medium bushfire risk with little if any of the development passing through an area of high fire risk. During the winter and spring period, measures should be put in place to ensure that site activities or activities external to the Project do not pose a potential fire risk.

Earthquakes and landslip

It is considered that the risk to the Project from an earthquake is extremely low.

Except for the section of the channel where it runs through Stokes Range, the Project site is generally flat and landslip is not a hazard. Where it passes through Stokes Range, the alignment is not considered particularly susceptible to landslip, but the design for the deep cutting in this area will need to include appropriate batter angles and slope protection to prevent localised slips occurring during construction and operation.

Climate change

None of the climate change factors identified will have any impact on construction within the relevant timescale of the Project development.

In the longer term, the principal hazards related to climate change (Chapter 5) that might affect Project operation include:

- an increase in the number of hot days (less pronounced in coastal areas and more pronounced inland)
- changes in rainfall is ranging from decreases of around 15% to possible increases of 5% and an increase in the number of dry days
- an increase in daily rainfall intensity and the number of dry days, with increases in summer and autumn, which would potentially increase erosion and flood frequencies
- an increase over time in average wind speed in most coastal areas
- a likely increase in fire weather risk in spring, summer and autumn, which will increasingly shift periods suitable for prescribed burning toward winter.

Such potential changes in climate are unlikely to have a significant effect on Project operation given the conservative parameters incorporated into the Project design, although it may affect the availability of water on a regional basis or the viability of the industries that will be using it (for reasons unrelated to the water supply itself). The capacity of Burdekin Falls Dam is the main buffer to these impacts.

17.1.5 Wildlife

During construction it is likely that construction personnel will come in contact with potentially dangerous wildlife from time to time, in particular venomous snakes and spiders, potentially dangerous insects such as ticks, and other natural hazards. Section 7.1.2 provides details regarding the fauna species present in the Project area.

17.1.6 Disease vectors

Ross River Fever is a viral disease spread by mosquitoes and is present in the Project area. Outbreaks of Dengue Fever, also transmitted by mosquitoes, occur in the region from time to time. The Project has the potential to increase the risk of mosquito-borne diseases during both construction and operation phases by increasing the habitat suitable for mosquito breeding as a result of potentially increased areas of stagnant water. The increase in irrigated areas has the potential to increase the incidence of Ross River Fever, which is known to correlate positively with the intensity of irrigation within a region (University of Sydney 2009a).

17.1.7 Actions by members of the public

Large infrastructure Projects have the potential to cause some disaffected individuals or groups to protest or take direct action against the work. The Project has generated very little adverse comment from the affected communities and there has been no indication of any potential for action being taken against it based on responses to Project communications. No credible hazard of this sort is foreseen, but the Queensland Police Service will be consulted as part of pre-construction risk assessment to confirm that no threats are likely to arise.

However, there is always the possibility of individuals acting inappropriately by accessing construction sites or potentially dangerous sections of the Project during operation and placing themselves at risk, or interfering with and damaging Project infrastructure. The whole length of the channel will be fenced to reduce the ease with which it can be accessed. Most infrastructure will be extremely robust and will be designed to prevent opportunistic damage by vandals, including security fencing around significant items of above ground infrastructure.

17.2 Risk assessment

17.2.1 Basis for assessment

In this section, the risks arising from the hazards identified in the previous section are analysed to identify those that require special management and mitigation measures. Risks are analysed in regard to the three Project phases covering construction, operation and eventual decommissioning of the Project.

The risk assessment method used corresponds generally to the Australian Standard AS/NZS 4360:2004 Risk Management.

The following broad descriptions of likelihood or frequency have been used:

- almost certain — occurring several times each year
- likely — typically occurring each year
- possible — potential to occur once in 10 years
- unlikely — potential to occur once in 100 years
- rare — potential to occur less than once in 100 years.

The consequences of any adverse event are characterised using the following terminology:

- catastrophic — one or more fatalities or serious permanent injury to a number of people; serious, non-reversible off-site environmental harm
- major — incapacitating injury or long term health problems; serious off-site environmental impacts involving significant cost to remediate
- moderate — serious injury or health impacts; significant off-site environmental impact, can be remediated without involving excessive cost
- minor — injury or illness requiring medical treatment; significant on-site environmental impact but with minor off-site impact, can be remediated without involving excessive cost
- insignificant — first aid injury; minor on-site environmental impact, small area easily remediated.

The following sections detail activities and situations relevant to each phase of the Project that could involve significant hazards (that is, hazards that are considered realistic and non-trivial and that could therefore give rise to real risks to the public, Project personnel, or the environment). Table 17.1 has been used to evaluate the risk arising from hazards considered to be significant and to identify the nature of the action needed to limit the risk to acceptable levels.

Table 17.1 Risk matrix

		CONSEQUENCE				
		A	B	C	D	E
		Catastrophic	Major	Moderate	Minor	Insignificant
		1	Almost certain	E	E	E
2	Likely	E	E	H	H	M
3	Possible	E	E	H	M	L
4	Unlikely	E	H	M	L	L
5	Rare	H	M	M	L	L

E — Extreme: Requires immediate action to reduce level of risk. Project not to proceed without detailed risk assessment and senior management approval

H — High: Requires specific measures and management action to reduce level of risk before proceeding

M — Medium: Can generally be managed with standard systems and procedures

L — Low: Normally managed through normal compliance with legislation, codes of practice, guidelines, standards

It should be noted that no activity is ever likely to be classified as **Zero** risk, as almost every activity is associated with some level of risk, even if very small. Similarly, **Extreme** or **High** levels of risk should not be taken to imply that the activity should not be undertaken, but as indicators of the need for controls to reduce those risks to acceptable levels. Thus, risks assessed as **Extreme** or **High** risks typically need specific measures to be applied to reduce the residual risk to **Medium** or **Low** which can normally be handled by standard systems and procedures. **Medium** and **Low** risk events have generally not been reassessed to estimate what improvements these standard systems might produce.

In addition to this assessment, cumulative risks to the surrounding land uses are considered in Chapter 19.

A summary of the risks and mitigation measures is given in Table 17.2 at the end of this section.

17.2.2 Construction risks

Hazardous materials and explosives

Small spills of hazardous materials such as fuel and oil may periodically occur, generating minor localised impacts that will be readily remediated. It is considered possible that a spill giving rise to moderate impacts could occur. It is not likely that more serious consequences will arise, as the maximum quantities of hazardous materials transported to the site daily will be limited. Impacts would typically be limited to localised soil contamination, or possibly the contamination of surface water with a limited quantity of oil or fuel.

The maximum assessed risk is therefore **High**. Specific measures are required in the form of specifications for the storage and handling of hazardous materials, the management of construction equipment during Project construction, and the implementation of emergency procedures. These are specified in the environmental management plan (Chapter 20) and are expected to reduce the frequency and the consequences of spills to give no more than a **Medium** residual risk.

Accidents caused by explosives causing a moderate level of injury to the public or Project personnel are considered at most unlikely (as the need to use explosives is considered unlikely), and the chances of a catastrophic accident are likely to be at most rare. The risk is therefore still **High** overall, and requires special procedures to be implemented for the transport, storage and use of explosives for the Project in the unlikely event that they are required. Site- and Project-specific procedures will be required in addition to compliance with relevant legislation, standards and codes of practice to reduce the residual risk to **Medium**.

General construction activities

Accidents resulting in injuries to workers from construction activities potentially cover the full range of consequences from minor first aid injuries, expected to be likely, to fatalities, which are expected to be rare. The risks are therefore likely to range between **Moderate** and **High**. A full OHS management program to protect worker health and safety will be implemented as part of the Project. The potential for serious injury to a member of the public should be no more than rare, and the risk is therefore **Medium**. Exclusion of the public from construction areas and other security and warning measures should be sufficient to further mitigate this risk.

Contaminated sites

Any contaminated sites along the Project alignment might pose a risk to construction personnel, and possibly to the public and the environment. A study has been undertaken to identify potential contaminated sites and appropriate remediation will be completed where necessary to protect human health and the environment. The types of sites identified were typical of a rural environment. Exposure to contaminants and moderate health or environmental effects is therefore considered unlikely, and the risk is assessed as **Medium**. Procedures to monitor the construction works for previously unidentified contaminated sites will be implemented, and appropriate remediation measures will be implemented for each site to prevent exposure to contaminants or release to the environment. No further specific measures are considered necessary to further reduce the assessed risk.

Natural events

The only natural events that appear likely to result in a credible risk for the Project and the public are floods (which may result from a tropical cyclone). Construction works at river crossings or in floodplains during flood periods may cause increased risk of flooding upstream and/or downstream of the crossing on the natural stream, albeit at a localised level. Construction works and equipment may also be damaged. Continuous monitoring of weather conditions and forecasts during construction should provide adequate warning of possible flood conditions, and it is considered unlikely that any Project personnel or members of the public would be put at serious risk. Timing of works to undertake construction outside of periods of high flood risk should limit the risk to property, Project personnel and members of the public along the potentially affected streams. It is considered that an event resulting in a minor consequence (for example, a medically treated injury) would be possible, and an event resulting in a moderate consequence (for example a serious injury) would be unlikely. The assessed risk is therefore **Medium**. Standard design and construction practices should be sufficient to manage the risk involved. No further specific measures are considered necessary to further reduce the assessed risk.

Wildlife

It is almost certain that construction workers will be exposed to dangerous wildlife such as snakes during the construction phase, but the consequences of most encounters will be insignificant. An event with a moderate consequence (for example a snake bite resulting in a serious health impact) is considered possible. The assessed risk is therefore **High**, and specific programs will be required to minimise exposure of construction workers to dangerous wildlife, and to provide training and resources to ensure that any incident is correctly handled. These should reduce both the frequency of exposure and the consequences of being bitten and to limit the residual risk to **Medium**.

Disease vectors

There will potentially be an increase in the areas of water providing habitat suitable for mosquito breeding during construction, although compared to naturally occurring habitat the increase will probably not be large in most areas, depending on rainfall patterns and the time of year. However, an increase in the number of cases of Ross River Fever (RRF) must be considered at least possible, and perhaps likely. Population growth in the region, partly as a result of the Project, will result in a larger number of people being exposed to the hazard. There is also the possibility of outbreaks of Dengue Fever, although these are generally only intermittent. The health effects are generally serious but not permanent, and assessed risk is therefore **High**. Specific procedures will be implemented during construction to minimise the creation of potential breeding habitat and to implement additional control measures where

the creation of habitat can not be avoided. Regular inspections in accordance with the environmental management plan will be used to identify any potential breeding habitat and initiate treatment or elimination. This will entail not just emptying sediment control basins but ensuring waste tyres or any other small containers that can capture and hold water are emptied or placed in a position where they cannot capture water. Similar actions will be undertaken at the construction camp along with measures to protect staff from biting insects (screens, 'zappers', educational information etc). Should the health of the workforce show any increase in the incidence of mosquito-borne diseases, SunWater will respond immediately to ameliorate workplace conditions.

Existing community health programs delivered through the regional hospitals and medical centres and Queensland Health are expected to provide adequate monitoring of the surrounding population to detect any increase in incidence of RRF and to initiate eradication programs. Outbreaks of Dengue Fever are closely monitored by Queensland Health and local government, and programs to control them are well developed. These measures should be sufficient to make any significant increase in the incidence of RRF or Dengue Fever in the area during construction unlikely, and the residual risk of any increase is therefore assessed as **Medium**.

Traffic

An increase in the risk of accidents resulting in minor injuries is considered likely, and for major injuries is considered unlikely. The risk is therefore assessed as **High**, requiring specific actions to limit the risk. These will be addressed in the Traffic Management Plan and will include awareness programs on changing traffic conditions, traffic-related accident risks and good driving habits for both the construction workforce and communities in the construction area, and monitoring of statistics to identify any evidence of inappropriate behaviour. These measures are expected to limit the increase in the frequency of accidents resulting in injuries, and limit the residual risk to **Medium**.

17.2.3 Operation risk

Hazardous materials

Spills of hazardous materials such as fuel and oil will be most unlikely during the operations phase. However, there is a risk from the inappropriate or excessive use of pesticides for both weed control along the channel and for control of aquatic pest species, or from accidental spills of these materials. It is considered unlikely that an event resulting in more than moderate health risks or environmental harm would occur, and the risk is assessed as **Medium**. Standard procedures and codes of practice will be followed to minimise the risk to health and the environment from pesticide use during operation.

Exposure to contaminants released from any contaminated sites not already identified and fully remediated during construction and potentially leading to a moderate health or environmental impact is considered at most unlikely and the risk is assessed as **Medium**. Systematic testing of the delivered water for any potential contaminants from sites remediated during construction will provide a suitable check that no significant risk remains.

No further specific measures are considered necessary to further reduce the assessed risk for either of these two hazards.

Natural events

The only natural events that appear likely to result in a credible risk for the Project and the public during operation are tropical cyclones and other extreme weather leading to floods. These may lead to structures being damaged or impacts on the hydrology of watercourses crossed by the Project and surrounding areas. Appropriate design should strictly limit the consequences of any but rare rain events to moderate impacts. The assessed risk is therefore **Medium**. This might increase to High as a result of as-yet uncertain climate change effects but these are not expected to be at a level of concern in the short term. Standard design and operating practices should be sufficient to manage the risks involved, and if necessary future modifications to specific sections of the Project can be made to address confirmed changes in climate.

Wildlife

Wildlife is not expected to be a significant risk issue during operation of the Project.

Disease vectors

There is the potential for an increase in the areas of water providing habitat suitable for mosquito breeding during operation of the Project as a result of the associated increase in irrigated areas, off-line storages and stagnant water bodies. An increase in the number of cases of RRF must be considered at least possible, and perhaps likely, since it is now endemic in the area and population growth in the region, partly as a result of the Project, will result in a larger number of people being exposed to the hazard. Dengue Fever outbreaks are sporadic and their spread is generally associated with mosquitoes breeding in small volumes of water in containers and similar receptacles in a human habitation situation. The health effects are generally serious but not permanent (a moderate consequence), and assessed risk is therefore **High**. This disease is already present in the area, and programs exist to minimise potential breeding habitat and control mosquito numbers. Education programs are in place and will particularly benefit new residents to the area. Existing health services have appropriate monitoring programs in place to identify any increase in the incidence of RRF or Dengue Fever and to initiate additional control measures.

Traffic

Following construction the amount of Project-related traffic will be negligible in relation to overall traffic volumes, and there is no significant risk of increased traffic accidents associated with the Project.

17.2.4 Decommissioning

The 'life' of the Project is expected to be approximately 80–100 years. Decommissioning of the system at the end of its life is expected to involve:

- removal of the channel bank to fill the channel, reinstating the natural surface where possible, including the removal of fencing and access tracks
- removal of infrastructure such as pump stations for salvage and reuse where possible
- 'cutting' of balancing storages to allow any local runoff to drain naturally.

Buried pipelines would be left in place.

Risks during decommissioning activities are expected to be minimal.

17.3 Risk mitigation

The following is a summary of the actions to mitigate risks identified as being significant in the preceding sections. Further details are presented in the EMP (Chapter 20):

- prepare and implement an Emergency Management Plan that details how emergency situations will be handled during construction and operation, who is responsible for each task, and how the emergency services will be involved (Section 17.4)
- transport, store and handle all hazardous materials in accordance with relevant legislation, standards and guidelines. Ensure that storages are properly secured and located outside flood-prone areas with no uncontrolled migration path available to any watercourse
- ensure that appropriate safety exclusion zones are set up around construction sites where explosives are being used, to prevent injury to the public and landowners
- ensure that any previously unidentified contaminated sites that might be discovered during construction are suitably treated to prevent risk to human health, the environment or water quality
- during construction and operation of the Project, monitor weather conditions such as tropical cyclones and major rain-bearing systems, continuously reassess the risk to the Project, the public and other assets and infrastructure, and provide warnings of hazards where appropriate
- time construction works to minimise the risk of impacts from floods on the Project or surrounding land uses
- during the life of the Project, monitor climate change indicators and update risk assessments for climate-related issues, in particular changes in extreme rainfall events
- provide Project personnel with relevant training and equipment to avoid contact with dangerous wildlife, and to deal with the risk of snakebite
- provide Project personnel with relevant awareness training regarding the prevention of mosquito borne diseases. Minimise the creation of mosquito breeding habitat during construction and implement control programs if there is evidence of an increase in rates of infection. Follow the relevant Queensland Health guidelines for preventing mosquito-borne diseases
- implement the Traffic Management Plan and provide awareness training for Project personnel regarding the risk of traffic-related accidents and good driving practices. Monitor statistics to assess whether inappropriate practices are increasing. Provide surrounding communities with information regarding changes in Project-related traffic
- ensure that all affected communities and other stakeholders continue to be kept informed regarding the progress of the Project, and respond to all communications
- ensure that the Project is made safe by fencing all open channels. Keep all infrastructure secure to prevent malicious damage and vandalism.

Table 17.2 Summary of the risks and mitigation measures

Issue	Specific hazard	Likelihood*	Consequence	Risk rating	Mitigation measures	Likelihood	Consequence	Risk rating with mitigation strategies
Construction								
Hazardous materials	Spills of fuel, oil. Soil, surface water contamination.	2	E	H	Specifications for storage and handling of hazardous goods, management of construction equipment.	3	E	M
		3	C			3	D	
Hazardous materials	Accidents involving transport, storage and use of explosives.	4	C	H	Special site- and Project-specific procedures for transport, storage and use of explosives, including use of qualified operators.	4	C	M
		5	A			5	B	
Hazardous materials	Contaminants released from previously unidentified and unremediated contaminated sites affect worker or public health or impact environment.	4	C	M	Procedures to monitor for unidentified sites and suitable remediation.	4	C	M
Construction activities	Use of heavy machinery, excavations, earthworks	1	E	M	Implement a comprehensive OHS management program	2	E	M
		5	A	H		5	A	H
Natural events	Flooding (from cyclone or other rain event); increased risk of flooding upstream and/or downstream. Damage to construction works, equipment. Risk to construction workers and/or public.	3	D	M	Standard design and construction practices. Monitor weather and flood warnings.	3	D	M
		4	C			4	C	
Wildlife	Bites and stings from wildlife such as snakes, insects. Potentially serious health effects.	3	C	H	Training and equipment to avoid exposure, handle incidents.	4	C	M

Issue	Specific hazard	Likelihood*	Consequence	Risk rating	Mitigation measures	Likelihood	Consequence	Risk rating with mitigation strategies
Disease vectors	Increase in habitat for mosquitoes potentially carrying Ross River Fever, and increase in incidence of RRF in workers and public.	3	C	H	Specific procedures to inspect regularly, monitor health or workforce,	4	C	M
Traffic	Increase in accidents involving workforce and public from increased construction traffic	2 4	C B	H	Awareness programs. Monitoring to detect inappropriate behaviour.	4	C	M
Operation								
Hazardous materials	Inappropriate or excessive use or spills of pesticides.	4	C	M	Standard procedures for handling pesticides.	4	C	M
Hazardous materials	Contaminants released from previously unidentified and unremediated contaminated sites affect public health or impact environment.	4	C	M	Systematic testing of water quality to check for unexpected problems.	4	C	M
Natural events	Floods; damage to structures, increased flooding of watercourses crossed by channel. May be exacerbated by climate change factors.	4	C	M	Standard design and operating practices.	4	C	
Disease vectors	Increase in habitat for mosquitoes potentially carrying Ross River Fever, and increase in incidence of RRF in public.	2	C	H	Support existing programs in area to monitor and control incidence of RRF	4	C	

*where two categories are given, they represent the different levels of likelihood associated with a different level of consequence

17.4 Emergency Management Plan

An Emergency Management Plan will be developed for Project construction in consultation with relevant stakeholders, in particular with each of the agencies of the Department of Emergency Services likely to be involved in any emergency: the Queensland Police Service, the Queensland Ambulance Service, the Queensland Fire and Rescue Service and the Rural Fire Service. The Whitsunday Regional Council and Burdekin Shire Council will also be consulted. The local Counter Disaster Plan and State Planning Policy (SPP) 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide, will be considered in developing the Emergency Management Plan, and Council will be advised of any implications for the plan that arise from the construction of the Project. In addition, the local health service providers will be consulted to ensure that provision of emergency health care is included in the procedures. SunWater will work with local health service providers to ensure that adequate resources are available in the local area to address the added demand that the Project is likely to generate. This aspect is discussed further in Chapter 16. The details can not be finalised until the detailed design is complete and details such as the location of camps have been decided.

A separate Emergency Management Plan will be prepared covering the operation of the Project. This will be developed in a similar manner to the construction Emergency Management Plan once design is complete and operating procedures have been prepared for the Project. The operating Emergency Management Plan will be revised regularly throughout the life of the Project and if necessary in response to any emergency situation where deficiencies are noted.

The Emergency Management Plans will address all relevant risks described in Chapter 17, and in the Project Risk Register maintained by SunWater, which will be updated throughout the Project.

The Emergency Management Plans will include:

- Emergency Response Procedures (ERPs)
- Emergency Exercises and Drills Guidelines
- Site Incident Management Team Guidelines.

The ERPs will identify the primary roles and responsibilities and include provision for regular audit and review, in particular following any incident to confirm that the plan operated as intended or to identify deficiencies.

The Site Incident Management Team will control any emergencies that have the potential to escalate and have a serious impact on the Project, the public or the environment. It will be aligned with existing SunWater management procedures.

The Emergency Response Procedures will include:

- communication procedures (internal and external)
- duties of Project staff in the event of an emergency.

These procedures will include responsibilities for communicating any emergency (such as the potential for flooding as a result of Project construction or operation, or spills of

dangerous goods into the Project or other watercourses) to potentially affected landowners and to the wider community, either directly or through the relevant emergency services.

Emergency plans to deal with fires and spills of dangerous goods, including the provision of appropriate equipment, sourcing fire water (if relevant) and training for Project personnel, will be prepared for all sites, including work camps, during construction. These plans and procedures will be reviewed regularly and practised in accordance with the commitments given in the Emergency Management Plan. These exercises would be expected to involve relevant emergency services agencies.

The Emergency Management Plan will include communication arrangements with police, fire and ambulance services in the region. Appropriately trained personnel will be present at each site, including construction sites and work camps, throughout the construction of the Project to provide first aid and other response to on-site emergencies. First aid response will be included in the site induction training program that will be provided to all staff members. Outside assistance will be called upon where necessary, including local ambulance and fire services.

SunWater's Environmental Management System (EMS) currently includes the following ERPs (which may or may not be specifically relevant to the project):

- Fish Deaths (ERP 1)
- Crop Disease (ERP 2)
- ERP Access Herbicide
- ERP Acrolein
- ERP Amicide
- ERP Brush-off
- ERP Bushfires
- ERP Cyclones
- ERP Diesel
- ERP Diquat
- ERP Emergency and Evacuation
- ERP Fuels
- ERP Hydraulic Oil
- ERP Lantana DP600
- ERP Paints
- ERP Reglone
- ERP Roundup
- ERP Sodium Hypochlorite.

Each ERP outlines key personnel and their contact details, emergency procedures, hazards and first aid procedures. Project specific ERPs will be developed.

17.5 Summary of risks and risk mitigation

The preceding assessment has indicated that, with the implementation of appropriate risk mitigation measures, the Project will not present a significant adverse risk to the Project employees, the general public or the natural environment during the construction, operation or decommissioning phases. Detailed measures will be presented in the final construction and operation EMPs for the Project.