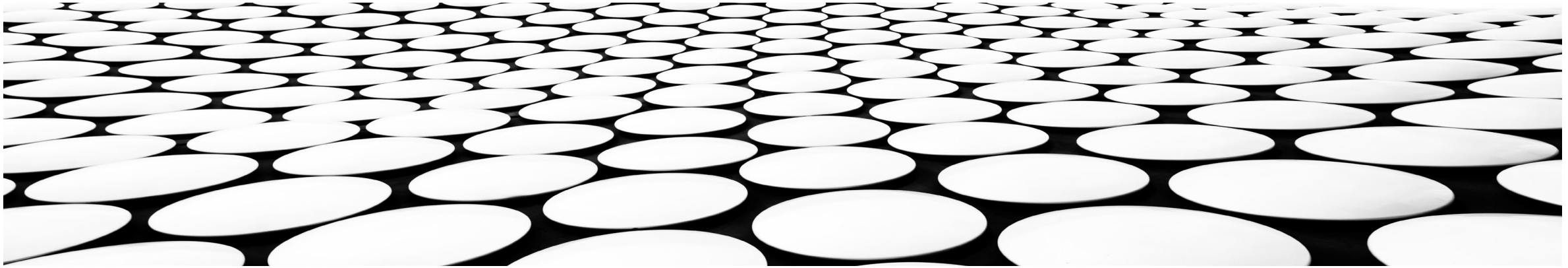
RISK ASSESSMENT EDUCATION RESOURCE

MINING SAFETY AND HEALTH ADVISORY COMMITTEE

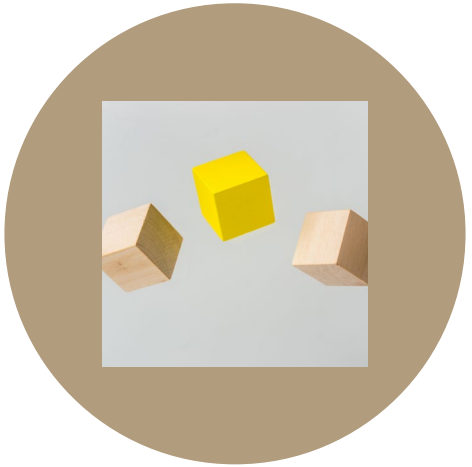
CARMEL BOFINGER

12 JULY 2023



DEVELOPMENT OF RISK ASSESSMENT EDUCATION RESOURCE

WHY?



HOW?

WHY?

- Recognition that the quality of risk assessments is variable
  - Risk assessment have become routine
  - Done because we “have to”
  - A good quality risk assessment takes some planning and resources
  - Information from risk assessment not used effectively

- Recognition that many hazards will be similar across different sites – particularly major hazards
  - We can use that similarity as a starting point for a good risk assessment
  - Similar - but need to take into account different site conditions, processes, manager and worker experience

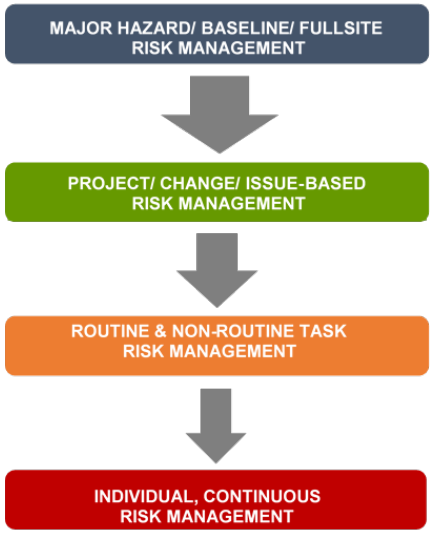
- The Resource aims to provide
  - Information on how to complete a risk assessment that enables good decisions about risk
  - Examples of templates that can be customised for sites
  - Example of the total process for one major hazard – vehicle interactions

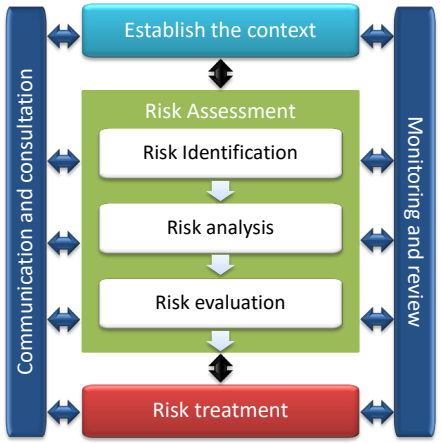
HOW?

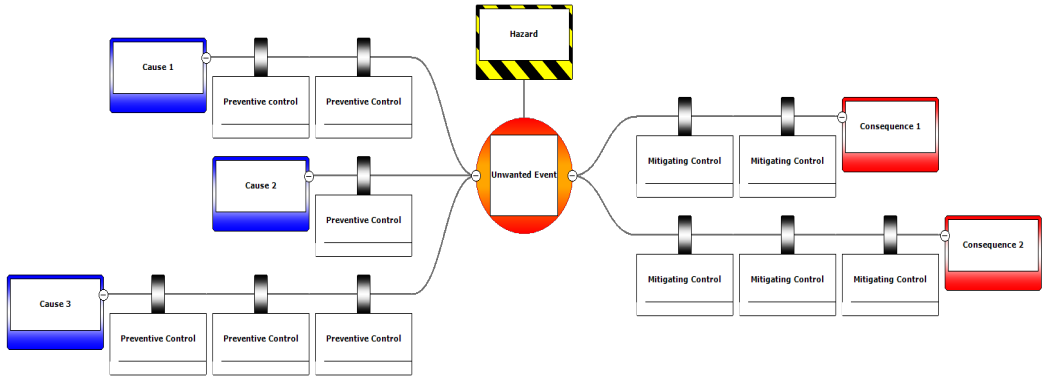
- Following from discussions with MSHAC - initial scope to develop a “resource” that could be used as a starting point and to guide the completion of effective risk assessments
- MISHC contracted to develop draft – June 2022
- Further discussions, input and work to finalise the resource
- Input from many companies and RSHQ through MSHAC eg templates, completed risk assessments, information on controls etc

CONTENT

- The starting points for all risk assessments
  - Why?
  - What?
  - Who?
  - How?
- Steps common to any risk assessment
  - Setting the scope
  - Completing the risk assessment
- Focusses on WRAC and bowtie
- Major hazards and critical control
- Uses vehicle interactions as the worked example







USE OF RISK ASSESSMENT EDUCATION RESOURCE

WHAT TO DO

WHAT NOT TO DO

Remember the resource is a starting point

WHAT TO DO

- Templates and materials need to be customised for your operation

- Include the good practice steps – and avoid poor practice – when planning and completing a risk assessment

- Consider the information included in the worked example – vehicles interactions

  - How does the scope need to be modified?
  - Where does this issue sit in the site risk register?
  - Does the level of risk indicate that further analysis is needed to ensure the risk is managed – Is it a major hazard?
  - Has consideration been given to the careful identification of the controls – the things that make a difference to the risk?
  - Are the controls present and effective?

TEMPLATES – RISK REGISTER

- Risk Identification
  - Work area
  - Hazard or risk element
  - Unwanted event
- Risk Analysis
  - Maximum foreseeable consequence – is this a major hazard?
  - Current controls and control effectiveness
  - Likelihood, consequence and current risk rating (considering the current controls)
- Risk Evaluation
  - Risk acceptability
- Risk Treatment
  - Actions to be taken

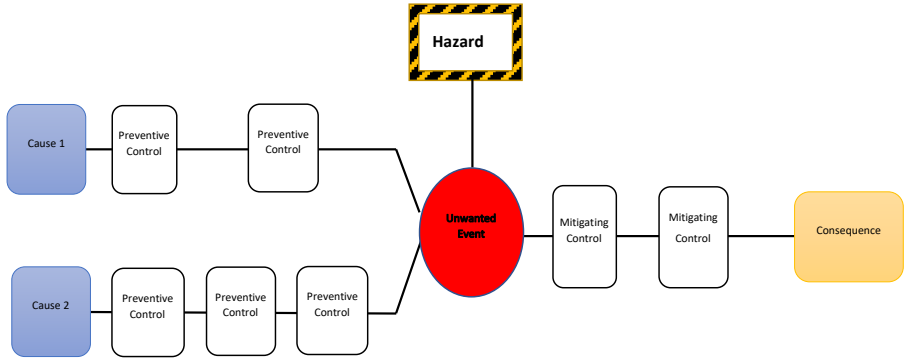
Columns can be modified or added as required

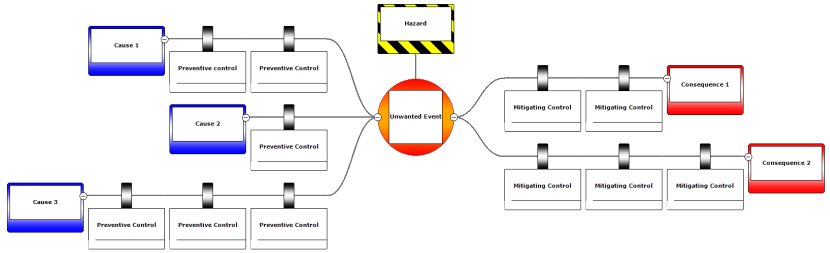
TEMPLATES – ISSUE/WORK PROCESS

- Risk Identification
  - Hazard/unwanted event
  - Consequence to be considered
  - Cause
- Risk Analysis
  - Current controls
  - Control effectiveness
  - Likelihood, consequence and current risk rating (considering the current controls)
- Risk Evaluation
  - Risk acceptability
- Risk Treatment
  - Actions to be taken

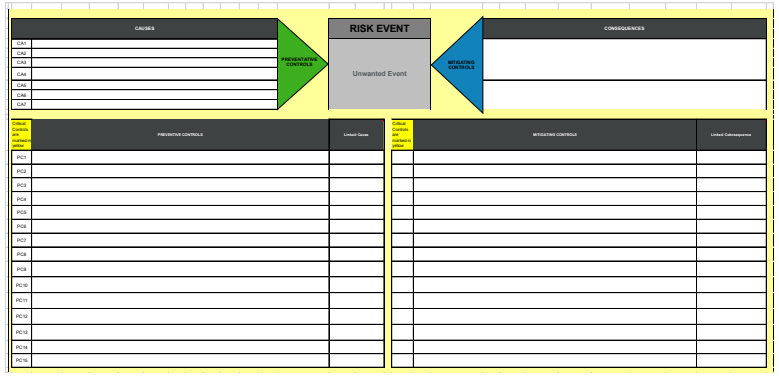
Columns can be modified or added as required

TEMPLATES – BOWTIE





- Bowties consider:
  - A single unwanted event
  - Causes of the event
  - Consequences of the event
- Focus on the controls
  - Prevent the unwanted event occurring
  - Mitigate the consequences should it occur



Need to define what is acceptable as a control

TEMPLATES – CRITICAL CONTROL PERFORMANCE

- ICMM based template
  - Objective of CC
  - Performance Specifications
  - Frontline Monitoring
  - Verification
  - Erosion factors
  - Stop criteria

Separates performance criteria and verification checks

- Site Template
  - Objective of CC
  - Good/Ideal performance
  - Erosion Factors
  - Support activities
  - Monitoring requirements
    - Supervisor
    - Management

Combines performance criteria and verification checks

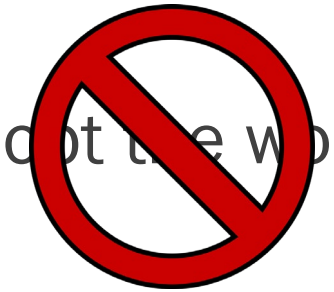
WHAT NOT TO DO

DO NOT

Simply copy the templates

Consider what is appropriate for your operation

DO NOT

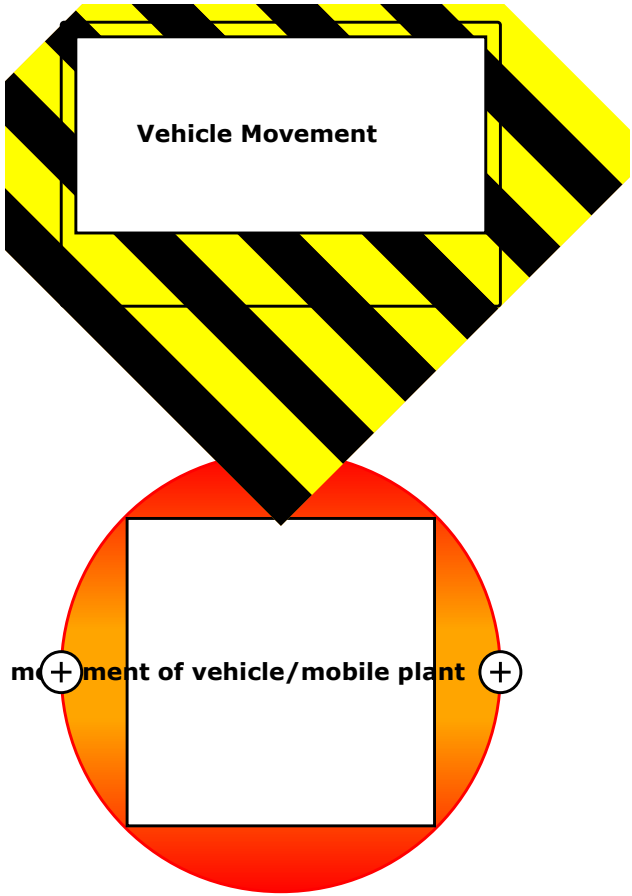


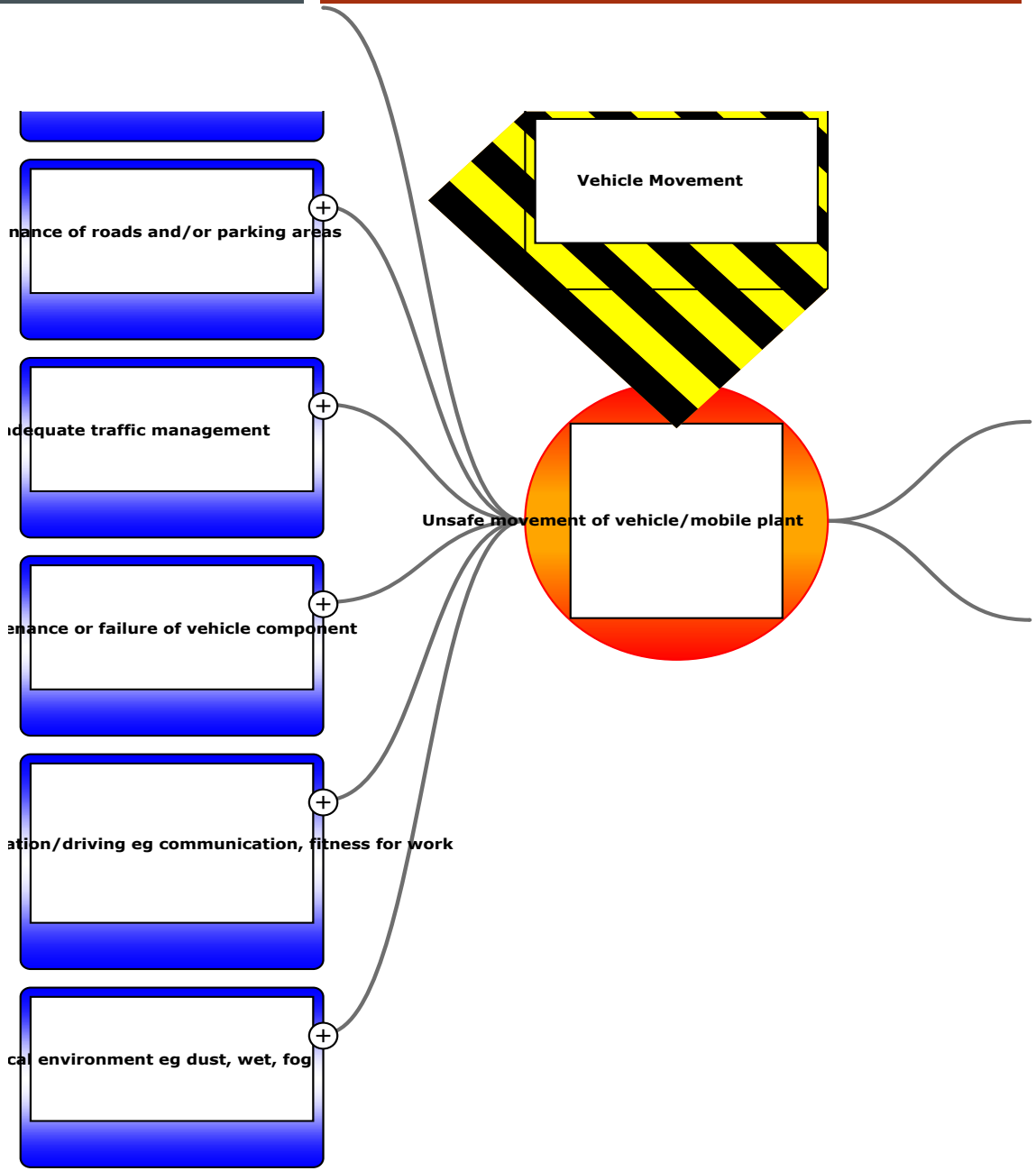
Simply adopt the worked example

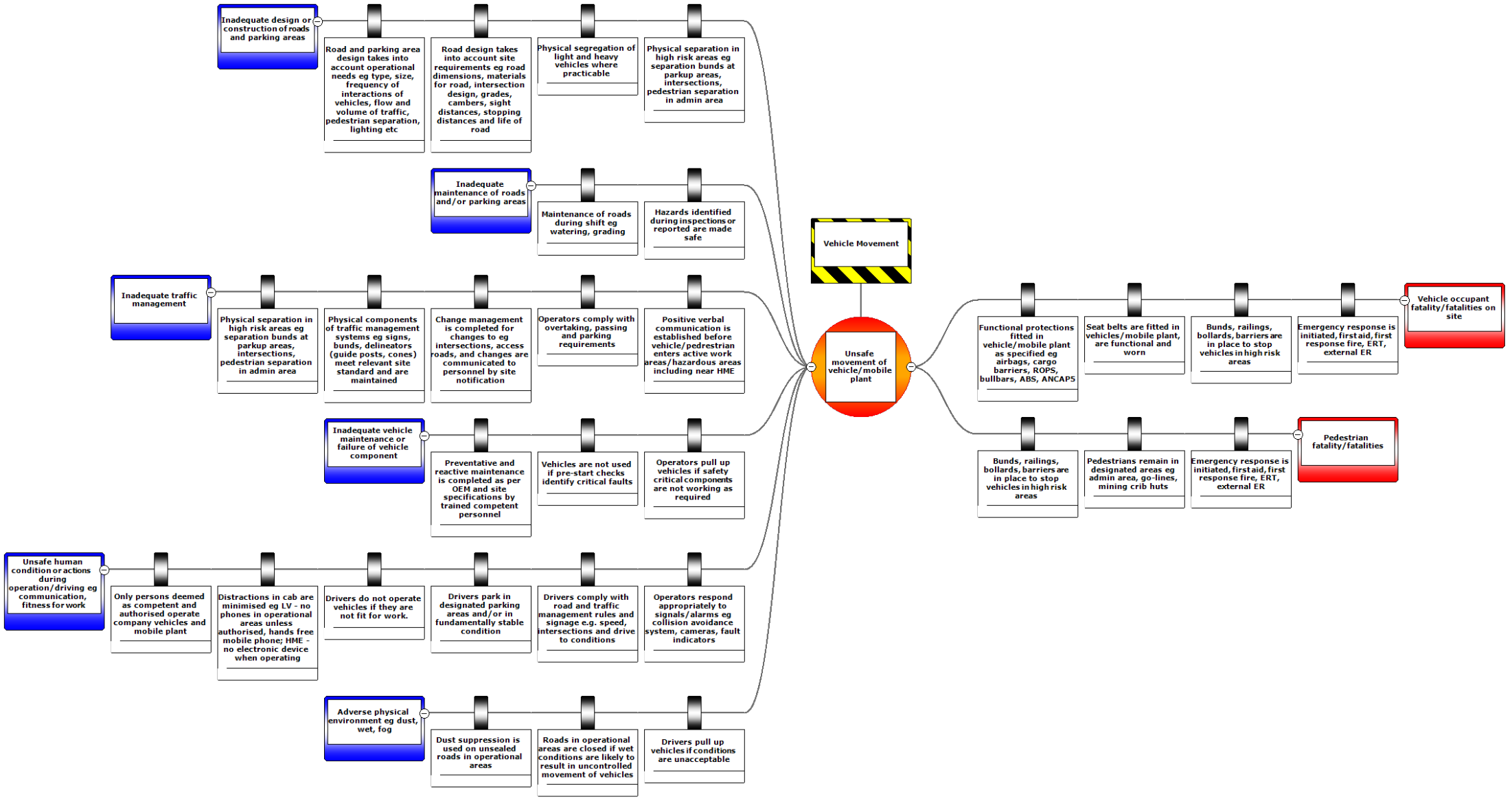
Consider what is appropriate for your operation

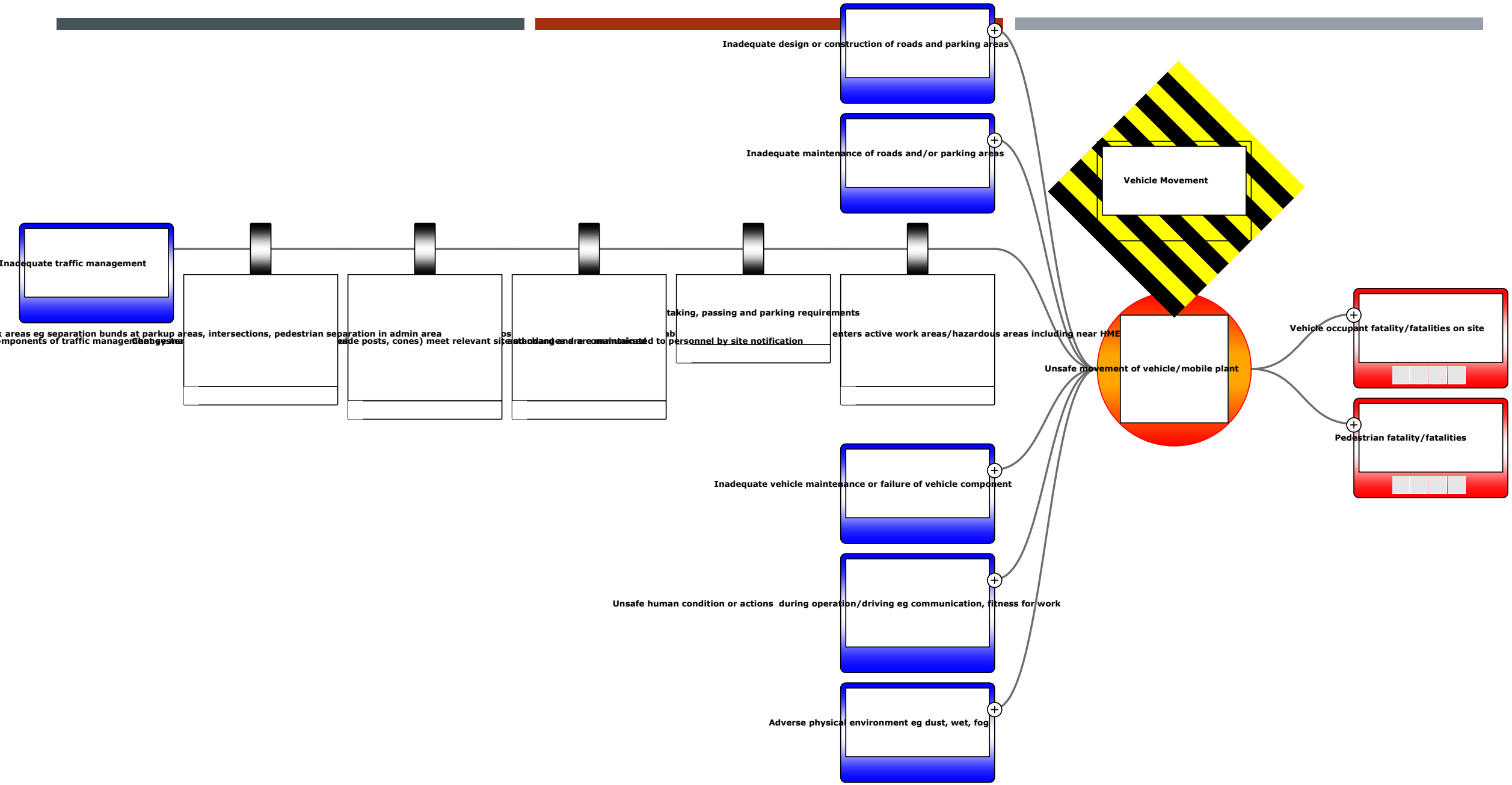
Work area	Hazard	Unwanted event	Maximum foreseeable consequence						Controls	Control effectiveness	Likelihood rating	Consequence rating	Risk rating	Risk acceptability	Actions to be taken
			Health and safety	Environment	Community	Reputation	Legal	Financial							
Surface and underground operations	Vehicle or mobile plant interactions	Mobile equipment/vehicle collision, rollover or impacts person	5						Training, competence and behaviour management system provides trained and competent workers						
									Fitness for work program and fatigue management ensure drivers are fit for work						
									Traffic management system is in place and complied with e.g. signage, speed, direction, right of way, overtaking rules						
									LV and HV roadway separation is used						
									Roads are built and maintained according to specification						

	In-scope	Out-of-scope
People	All people in vehicles/mobile plant or pedestrians: • Site personnel • Site employed contractors and sub-contractors • Visitors to site • Escorted delivery drivers or other delivery drivers to operational areas	• Delivery drivers to non-operational areas
Locations	All areas on the mine lease: • Underground operations • Surface mining operations • Travel roads • Processing plant • Other surface areas e.g. – workshops – warehouses – offices	• Public travel roads • Interactions with rail network • Travel for exploration will be covered by remote and isolated work risk assessments
Equipment/ plant	All mobile plant and vehicles on the mine lease, operational areas and processing plant e.g. • Light/medium vehicles (LMV) • Heavy vehicles (HME/HV) • Ancillary equipment e.g. trailers, lighting plants, drill rigs, sleds/skids • Cranes moving to and from position of lifting • Forklifts • EWP moving to area of operation. Safety critical components including e.g. • Brakes • Steering • Lights • Windscreen and wipers • Flashing lights/Whips on LV • 2 way radio—handheld and in vehicle	• Cranes during lifting operations (covered by separate risk assessment) • Delivery vehicles condition when not accessing operational areas • Tyres and rims will be included in separate risk assessment


Vehicle Movement
movement of vehicle/mobile plant


Vehicle Movement
nance of roads and/or parking areas
dequate traffic management
enance or failure of vehicle component
ation/driving eg communication, fitness for work
cal environment eg dust, wet, fog
Unsafe movement of vehicle/mobile plant


Inadequate design or construction of roads and parking areas
Road and parking area design takes into account operational needs eg type, size, frequency of interactions of vehicles, flow and volume of traffic, pedestrian separation, lighting etc
Road design takes into account site requirements eg road dimensions, materials for road, intersection design, grades, cambers, sight distances, stopping distances and life of road
Physical segregation of light and heavy vehicles where practicable
Physical separation in high risk areas eg separation bunds at parkup areas, intersections, pedestrian separation in admin area
Inadequate maintenance of roads and/or parking areas
Maintenance of roads during shift eg watering, grading
Hazards identified during inspections or reported are made safe
Inadequate traffic management
Physical separation in high risk areas eg separation bunds at parkup areas, intersections, pedestrian separation in admin area
Physical components of traffic management systems eg signs, bunds, delineators (guide posts, cones) meet relevant site standard and are maintained
Change management is completed for changes to eg intersections, access roads, and changes are communicated to personnel by site notification
Operators comply with overtaking, passing and parking requirements
Positive verbal communication is established before vehicle/pedestrian enters active work areas/hazardous areas including near HME
Inadequate vehicle maintenance or failure of vehicle component
Preventative and reactive maintenance is completed as per OEM and site specifications by trained competent personnel
Vehicles are not used if pre-start checks identify critical faults
Operators pull up vehicles if safety critical components are not working as required
Unsafe human condition or actions during operation/driving eg communication, fitness for work
Only persons deemed as competent and authorised operate company vehicles and mobile plant
Distractions in cab are minimised eg LV - no phones in operational areas unless authorised, hands free mobile phone; HME - no electronic device when operating
Drivers do not operate vehicles if they are not fit for work.
Drivers park in designated parking areas and/or in fundamentally stable condition
Drivers comply with road and traffic management rules and signage e.g. speed, intersections and drive to conditions
Operators respond appropriately to signals/alarms eg collision avoidance system, cameras, fault indicators
Adverse physical environment eg dust, wet, fog
Dust suppression is used on unsealed roads in operational areas
Roads in operational areas are closed if wet conditions are likely to result in uncontrolled movement of vehicles
Drivers pull up vehicles if conditions are unacceptable
Vehicle Movement
Unsafe movement of vehicle/mobile plant
Functional protections fitted in vehicle/mobile plant as specified eg airbags, cargo barriers, ROPS, bullbars, ABS, ANCAP5
Seat belts are fitted in vehicles/mobile plant, are functional and worn
Bunds, railings, bollards, barriers are in place to stop vehicles in high risk areas
Emergency response is initiated, first aid, first response fire, ERT, external ER
Vehicle occupant fatality/fatalities on site
Bunds, railings, bollards, barriers are in place to stop vehicles in high risk areas
Pedestrians remain in designated areas eg admin area, go-lines, mining crib huts
Emergency response is initiated, first aid, first response fire, ERT, external ER
Pedestrian fatality/fatalities


Inadequate design or construction of roads and parking areas
Inadequate maintenance of roads and/or parking areas
Vehicle Movement
Inadequate traffic management
taking, passing and parking requirements
enters active work areas/hazardous areas including near HME
Unsafe movement of vehicle/mobile plant
Vehicle occupant fatality/fatalities on site
Pedestrian fatality/fatalities
Inadequate vehicle maintenance or failure of vehicle component
Unsafe human condition or actions during operation/driving eg communication, fitness for work
Adverse physical environment eg dust, wet, fog

IDENTIFIED CRITICAL CONTROLS

- Physical separation in high-risk areas—for example, separation bunds at parkup areas, intersections, pedestrian separation in admin area.
- Preventative and reactive maintenance is completed as per OEM and site specifications by trained competent personnel.
- Drivers comply with road and traffic management rules and signage—for example, speed, intersections and drive to conditions.
- Seat belts are fitted in vehicles/mobile plant and are functional and worn.
- Emergency response is initiated, first aid, first response fire, ERT, external ER.

CRITICAL CONTROL MONITORING AND VERIFICATION

- Need to understand what the control is meant to do – objective or intent
- Define what is the required performance – how should it act
- What are the things that negatively affect the performance of the control – erosion factors (sometimes called escalation factors)
- What is needed in the day to day running of the site to make sure the critical controls are working – front line monitoring processes eg routine inspections, planned maintenance, pre-start checks
- What extra is needed to re-assure us that the critical controls are present and working as we expect – verification processes

EXAMPLE PERFORMANCE CRITERIA

Performance specification	Frontline monitoring tasks			Verification activities		
	What are the planned tasks to address the performance specification? (frontline monitoring)	By Whom?	How often?	What activities are needed to verify the planned tasks are being done correctly – at the right time and to a set level of quality? (we do what we say)	By Whom?	How often?
• Notification of faults leading to unplanned maintenance to correct faults. • Maintenance completed before vehicles returned to service	• Pre-operational checks completed and faults logged through pre-start app or paper system – For HME – every shift – For LV – every day • Issues identified during operational activities eg breakdown or report from operator. • Maintenance responds when notified – addressing safety issues is prioritised. If not able to be fixed, equipment is placed out of service.	Crew Supervisor HME - Mining Maintenance Superintendent LV - Processing Maintenance Superintendent	Per shift Monthly	Report run to confirm that pre starts are being completed for HME. Check for one month of data. This allows coverage of 4 crews. Manager to have in field discussion (safety interaction) to: • Confirm that the HME operators can: – Explain the required process for pre-starts and what is required if fault identified during operation • Confirm that a LV operator can: – Explain the required process for pre-starts and what is required if fault identified during operation At least 10% of workers for each crew needs to be interviewed • Confirm % of closure of faults identified during pre-starts or during operation eg confirmation of breakdown work orders	Operations Manager	6-monthly

Control monitoring requirements		
Supervisor checks	Answer	Comments and actions
Night shift supervisor: Are all intersection lights and signs present, working and visible from 100m?	☐ Yes ☐ No ☐ Not applicable	
All supervisors: Review traffic reports (e.g. IVMS or camera footage) - Are drivers/ vehicles complying to intersection rules?	☐ Yes ☐ No ☐ Not applicable	
All supervisors: Can workers explain what intersections rules are and is their training up-to-date?	☐ Yes ☐ No ☐ Not applicable	
Manager verification questions	Answer	Comments and actions
Do inspection walk-through with supervisors - Are supervisors able to demonstrate correct daily inspection and reporting requirements.	☐ Yes ☐ No ☐ Not applicable	
Do intersection inspection with civil engineer – Is he/she able to describe how intersection compliance check is done and reported?	☐ Yes ☐ No ☐ Not applicable	
Is intersection maintenance up-to-date with no outstanding actions?	☐ Yes ☐ No ☐ Not applicable	
Check traffic reports across site to determine effectiveness of control. Is control effectiveness acceptable?	☐ Yes ☐ No ☐ Not applicable	Control effectiveness =

This resource was developed to assist companies and sites to complete effective risk assessments that provide information to make good decisions about risk management

Something needs to be done with the results of a risk assessment. It should not just be a paper exercise