Government of **Western Australia**
Department of **Mines, Industry Regulation and Safety**

WorkSafe
Western Australia
Mines Safety

Traffic management fundamentals audit – guide

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Introduction

This audit was updated in October 2022 to align with the Work Health and Safety legislation.

Mining operations are encouraged to use this audit to assess their business practices, and identify areas for improvement, to secure the health and safety of workers and workplaces.

The scope of the 'traffic management fundamentals' audit is designed to provide an efficient assessment of important traffic management fundamentals and to complement the suite of four 'mobile equipment' audits covering traffic management safety at mining operations.

The four 'traffic management and mobile equipment' audits are designed to cover in detail operating standards associated with the management of traffic and mobile equipment in mine operations. The four 'traffic management and mobile equipment' audits are:

- Part 1: Traffic management
- Part 2: Mining operations and mobile equipment selection
- Part 3: Surface and underground operations with site deliveries
- Part 4: Management of mobile equipment maintenance

The purpose of this audit is to assist with:

- Completing an assessment on a site in one day;
- Quickly evaluating a site's compliance in regard to minimum traffic management standards;
- Guiding the person conducting a business or undertaking (PCBU) on the priority for conducting a more detailed assessment using the other 'traffic management and mobile equipment' audits;
- Providing a basic traffic management audit for smaller sites with a low risk profile for traffic management.

The audit is divided into sections addressing:

1. Safe systems for traffic management (Systems)
2. Safe vehicles (Vehicles)
3. Ensuring workers are competent and fit for work (People).

Autonomous equipment operations are not covered in any of the above audits. Refer to the *Code of practice: Safe mobile autonomous mining in Western Australia* for further guidance.

Where the term "verify" is used in the 'Intent' of an audit point, it implies there is a regulatory requirement for compliance with the standard.

Where the term "ensure" is used, there is no mandatory requirement for compliance but the standard sets out a recommended practice, which, if followed, should minimise the risk of incidents.

List of abbreviations

AS	Australian Standard
AS/NZS	Australian and New Zealand Standard
HME	Heavy mobile equipment
LV	Light vehicle(s)
OEM	Original equipment manufacturer
r.	Regulation of the WHS(M)R
rr.	Regulations of the WHS(M)R
ROM	Run of mine
s.	Section of the WHSA
ss.	Sections of the WHSA
WHSA	*Work Health and Safety Act 2020*
WHS(M)R	Work Health and Safety (Mines) Regulations 2022

Supporting documentation

- Selected mining safety bulletins, mines safety significant incident reports, and safety alerts from:
  - Mines safety alerts, Department of Mines, Industry Regulation and Safety, Western Australia
  - Safety notices, Resources Safety & Health Queensland
  - Safety alerts and bulletins, New South Wales Resources Regulator)
- Australian and other standards
  - AS 1742.2 *Manual of uniform traffic control devices – Traffic control devices for general use*
  - AS/NZS 1906.1:2017 *Retroreflective materials and devices for road traffic control purposes – Retroreflective sheeting*
- Western Australia Main Roads “Road and Traffic Engineering Standards”
- Austroads
  - *Guide to Road Design*
  - *Guide to Road Safety*
- *Unsealed Roads Manual*: Australian Road Research Board 2020
- *Design of Surface Mine Haul Roads* (US Department of Interior, Bureau of Mines) information circular 8758, 1977:1-50
- *Haul Road Inspection handbook* (US Mine Safety and Health Administration)

1 Systems

To ensure there are safe systems for traffic management.

Point	Standard	Guideline
1.1	The operation has prepared and approved a traffic management system that includes policy(ies), plan(s), procedures and checklists etc.	**Intent:** To verify that rules have been developed for the safety of all vehicles, operators and pedestrians at the mine (based on a risk assessment). The traffic management system or associated documentation should: • be current and identify periods for review • have responsibilities clearly defined • include fitness for work requirements • include road design standards • include driving rules • include communication procedures • include traffic plans / schematics • include inspection checklists • include the management of restricted areas • include driving to off-site locations including off-site remote locations (journey management) • include standards for escorting vehicles on site • be regularly monitored and audited • include a change management process for any identified defects, and any document and traffic change. **Personnel:** Senior manager(s) **Method:** Review the traffic management plan documentation. If a substantial proportion of the above is available then compliance may be met subject to a commitment to comply with the audit recommendations. Refer to WHS(M)R rr. 34, 35, 36, 617 and 631 and schedule 19 Clause 4.

Point	Standard	Guideline
1.2	The traffic management plan sets out the standard design requirements for mine roads, open pit roads and other vehicle operating areas within the mine.	**Intent:** To verify that road design requirements are developed for the safe operation of vehicles within the mine. Road design standards should include; • intersections • road widths • gradients, camber, vertical and horizontal alignment • line of sight stopping distances • HME & LV separation • pedestrian separation and crossings • parking areas • windrows for edge protection • signage • guideposts / delineation • changes in operating conditions • blind spots • visibility issues related to dust, haze etc • externally controlled plant • communications **Personnel:** Senior manager(s) **Method:** Review the traffic management plan documentation. Verify if controls are observed and adequate. Refer to WHS(M)R rr. 34, 35, 36, 617 and 631 and schedule 19 Clause 4.

Point	Standard	Guideline
1.3	The traffic management system sets out the design requirements and standards for traffic signage, guideposts and other traffic control devices within all areas of the mine.	**Intent:** To verify that requirements are developed for the signage and devices to be used for the control and safe operation of all vehicles at the mine. Considerations should include: • Australian Standards • height • night time conditions • signage clutter • control of customised signs **Personnel:** Senior manager(s) **Method:** Review the traffic management plan documentation. Verify if controls are observed and adequate. Refer to WHS(M)R rr. 34, 35, 36, 617 and 631 and schedule 19 Clause 4. AS 1742.2 Manual of uniform traffic control devices – Traffic control devices for general use, and AS/NZS 1906.1:2017 Retroreflective materials and devices for road traffic control purposes – Retroreflective sheeting.
1.4	The traffic management plan includes a risk assessment to identify adequate speed controls. Speed limit variances are limited, controlled and appropriate for the prevailing road conditions and pedestrian hazards.	**Intent:** To verify that speed limits are risk assessed, safe, consistent, practical and relevant. **Personnel:** Senior manager(s) **Method:** Review the traffic management plan documentation for speed controls. Considerations should include: • a speed limit zone map that identifies the speed variances. • the number of speed limits being limited to three or four. • the speed limits utilised are in multiples of 10 km/h. • signage is installed on the left hand side as a minimum, and preferentially on both sides of the road. • repeater signs are installed. Inspect risk assessment documents on speed controls. Verify if controls are observed and adequate. Refer to WHS(M)R rr 34, 35, 36, 617 and 631

Point	Standard	Guideline
1.5	Adequate windrows/bunds are provided on the outer edge of each road in the open pit adjacent to a bank or steep slope. In other areas a risk assessment should assess the need for a windrow or other effective control.	**Intent:** To verify that adequate structures are constructed or installed to prevent vehicles leaving the road. **Personnel:** Senior manager(s) **Method:** Inspect the traffic management plan and roads. The size of windrows should be determined by risk analysis. Verify if controls are observed and adequate. Refer to WHS(M)R rr. 34, 35, 36, 617 and 631 and mines safety significant incident report 277.
1.6	Parking areas are designed and constructed to an appropriate standard.	**Intent:** To verify that parking areas have been designed and constructed to an appropriate standard. The standards should consider; • gradients • capacity • traffic flow • segregation for pedestrians • segregation of HME /LV • shared zones • segregation for buses • driving out forwards • signage • driver change outs **Personnel:** Senior manager(s) **Method:** Inspect the vehicle parking areas. View a plan of the parking design. Verify if controls are observed and adequate. Refer to WHS(M)R rr. 34, 35, 36, 617 and 631.

Point	Standard	Guideline
1.7	Pedestrian controls are designed and provided in all operational areas where vehicles are present.	**Intent:** To verify that pedestrian controls including walkways are provided to avoid pedestrians being hit by vehicles. The considerations include: • Hi-visibility clothing • suitable walkways • protection of walkways • appropriate separation from vehicles • suitable steps and handrails • signage crossing areas **Personnel:** Senior manager(s) **Method:** Inspect high pedestrian traffic areas on the site. Confirm whether a pedestrian network of walkways is provided. Verify if controls are observed and adequate. Refer to WHSA s.20 and WHS(M)R rr. 34, 35, 36, 617 and 631.
1.8	The traffic management plan sets out the requirement for the standard of communication and equipment to be utilised in mobile equipment and in pedestrian interface areas.	**Intent:** To verify that the traffic management plan outlines the requirements for the provision and usage of communication devices within mobile equipment operational areas. **Personnel:** Senior manager(s) **Method:** Review the traffic management plan documentation. Confirm two-way radio communication is maintained and available within vehicles and carried by workers working on foot in mobile equipment areas. Verify if controls are observed and adequate. Refer to WHS(M)R rr. 617 and 631.

Point	Standard	Guideline
1.9	Measures are implemented at all mine access points for preventing inadvertent access and controlling contractors, customers and visitors to site.	**Intent:** To verify the existence of a means to prevent inadvertent access of unauthorised persons into the mine. **Personnel:** Senior manager(s) **Method:** Inspect the mine access road signage and control measures utilised to restrict access. Mines in close proximity to local communities or where there is a likelihood of the public inadvertently accessing the mine operations should provide security fences, gates and/or earth bunding to restrict access. Verify if controls are observed and adequate. Refer to WHSA s.20 and WHS(M)R rr. 34, 35, 36, 617 and 631.
1.10	The traffic management system sets out the design requirements for the standard of lighting for all low light/ night operations. Standards include road markings and clear zones free from hazards on each side of the road.	**Intent:** To verify that adequate lighting is provided within the mine. Particular consideration needs to be given to: • pedestrian and parking facilities • intersections • dumping areas • excavation areas • areas of high activity **Personnel:** Senior manager(s) **Method:** Review the traffic management system documentation to identify lighting standards. Verify if controls are observed and adequate. Refer to WHS(M)R rr. 617 and 631.

Point	Standard	Guideline
1.11	A maintenance programme has been established for the inspection, repair and resurfacing of all sealed and unsealed roads. The maintenance activities are managed in a safe manner.	**Intent:** To verify that sealed and unsealed roads are maintained in a safe condition and systems are in place to ensure road maintenance activities are carried out in a safe manner. Considerations should include: • temporary road works • pedestrians on the roadways installing or cleaning guideposts or signage • control of single lane roads • vegetation growth obscuring signage/guideposts/traffic • repair of roads affected by adverse weather • providing adequate drainage **Personnel:** Senior manager(s) **Method:** Inspect the mine haul roads and other vehicle operating areas. Confirm roads are regularly inspected for damage, instability, and potential collapse, etc. Confirm road maintenance equipment is available and roads are maintained in a safe condition. Verify if controls are observed and adequate. Refer to WHS(M)R rr. 617 and 631, and mines safety significant incident report 121.
1.12	Suitable protection or segregation is in place at every vehicle interface with infrastructure and ground level hazards such as covered sumps, soak wells, and drains not designed to support any vehicle.	**Intent:** To verify that adequate protection is provided to prevent damage to the installed infrastructure in vehicle access areas. Also to prevent vehicle access to hazardous installations such as covered soak wells, sumps, and drains where the cover is not designed to support any vehicle. The following should also be considered: • restricted height areas • falling object protection **Personnel:** Senior manager(s) **Method:** Inspect buildings, tanks, hydrants, lighting towers, covered drains, soak wells and sumps etc. Confirm bollard devices or segregation barriers are installed. Verify if controls are observed and adequate. Refer to WHSA s.20 and WHS(M)R rr. 34, 35, 36, 617 and 631.

Point	Standard	Guideline
1.13	Movement around high voltage installations and overhead power line corridors is restricted and controlled to prevent inadvertent contact by mobile plant.	**Intent:** To verify that adequate controls are provided to prevent vehicles contacting, or coming too close to, high voltage equipment and overhead power lines. High voltage installations and overhead power line corridors must be identified, signposted / delineated and access restricted to prevent inadvertent contact by mobile plant. **Personnel:** Senior manager(s) **Method:** Inspect the high voltage areas and power line corridors. Confirm that high voltage installations are located away from roadways and other vehicle operating areas. Verify the installation of marker bollards, height clearance signage or warning signage at each vehicle and power line crossing and/or high voltage installation access point. Verify if controls are observed and adequate. Refer to WHSA s.20 and WHS(M)R rr. 34, 35, 36, 166A, 617 and 631 and mining safety bulletin 51.
1.14	There is standard procedure and design for loading and dumping operations at ROMs, stockpiles and waste dumps.	**Intent:** To verify that loading and dumping operations are carried out in a safe and consistent manner. Procedures and controls should include: • the size and configuration of the benches, digging, tipping and stockpile areas • bench and stockpile height • the segregation of HVs, LVs and pedestrians • vehicle control and flow • geotechnical considerations • control of dumping limits • appropriate signage • positive communications **Personnel:** Senior manager(s) **Method:** Sight procedure. Verify if controls are observed and adequate. Refer to WHSA s.20 and WHS(M)R rr. 34, 35, 36, 617 and 631.

Point	Standard	Guideline
1.15	Resources are available and used for dust suppression on unsealed roads.	**Intent:** To verify that driver visibility is maintained by managing and suppressing dust on operational roads. **Personnel:** Senior manager(s) **Method:** Inspect the mine haul roads. Confirm whether there is adequate means and equipment available for dust suppression, which is being utilised to minimise dust creation. Confirm that there is a maintenance program in place. Verify if controls are observed and adequate. Refer to WHSA s.20 and WHS(M)R rr. 34, 35, 36, 617 and 631.
1.16	The traffic management system considers significant environmental factors.	**Intent:** To verify that procedures and controls take into account: • general wet weather conditions • strong winds • severe weather events e.g. cyclones and electrical storms • lightning • glare and sunstrike • fog/poor visibility **Personnel:** Senior manager(s) **Method:** Sight procedure/controls (e.g. run culverts and flood ways). Verify if controls are observed and adequate. Refer to WHS A s.20 and WHS(M)R rr. 34, 35, 36, 617 and 631 and mining safety bulletin 183.
1.17	Evidence that journey management plans are in place and are being applied.	**Intent:** To verify that the mine has an effective journey management plan in place. **Personnel:** Senior manager(s) **Method:** Sight procedure/controls. Verify if controls are observed and adequate. Refer to WHSA s.20 and WHS(M)R rr. 34, 35, 36, 617 and 631.

2 Vehicles

To ensure vehicles are safe and fit for purpose.

Point	Standard	Guideline
2.1	There is a register of mobile equipment, including permanent contractor's equipment and a system to manage the condition and maintenance of internal and itinerant mobile equipment on the mine site.	**Intent:** To verify that all the relevant equipment details are readily available. Considerations include: • register is current • equipment is uniquely identifiable **Personnel:** Senior manager(s) **Method:** View the register of mobile equipment. Check that all relevant mobile plant is included. Refer to WHSA s.21 and WHS(M)R rr. 617 and 631 and schedule 19 clause 4.
2.2	The mobile equipment is fit for purpose i.e. selected according to the limitations imposed by the site operating conditions. The equipment is operated within its design capacity. A system to identify hazards associated with mobile equipment is in place. Any modifications to vehicles are designed by a competent person.	**Intent:** To verify that all vehicles operating at the mine are fit for purpose. Vehicle considerations include: • selection process for vehicles • compatible with the site conditions • used within vehicle design specifications • risk assessment processes are in place for all mobile equipment • OEM manuals are accessible **Personnel:** Senior manager(s) **Method:** View a selection of documents, consider road widths, gradients, curves, braking characteristics, compaction rates. Consider the configuration of primary haulage units, water trucks, service trucks, etc. which may not always be suitable for the operating conditions. Interview operations and engineering management. Verify if controls are observed and adequate. Refer to WHSA s.21 and WHS(M)R rr. 34, 35, 36, 617 and 631.

Point	Standard	Guideline
2.3	Vehicle pre-start checks are carried out on all vehicles prior to use. (If this is not in place an adequate risk assessment should identify the frequency of pre-start checks). The operating procedures and machinery pre-start checks prohibit the use of mobile equipment in a mine where defective equipment presents an unacceptable risk (e.g. brakes, steering, warning signal, lights or seat belts are not in working order).	**Intent:** To verify vehicle operators examine and confirm the vehicle is safe for use prior to operation. Considerations include: • braking systems • steering systems • lighting, flashing lights and indicators • seating and seatbelts • audible warning signals • tyre condition • equipment identification numbers for adequate positive communications **Personnel:** Senior manager(s) **Method:** View procedures and vehicle prestart sheets. For the standard to be met the checking process must include a means of reporting defects to management and a stand down category for the failure of critical systems i.e. category A faults documented for stoppage. Verify if controls are observed and adequate. Refer to WHSA s.21 and WHS(M)R rr. 34, 35, 36, 617 and 631.
2.4	There is an effective preventative maintenance program for mobile equipment which is carried out at predetermined intervals of time or distance.	**Intent:** To verify that mobile equipment is maintained in a safe operating condition and in line with OEM requirements. **Personnel:** Senior manager(s) **Method:** View written program, maintenance records and interview maintenance workers. Verify if controls are observed and adequate. Refer to WHS(M)R rr. 617 and 631.

Point	Standard	Guideline
2.5	Vehicle critical systems (e.g. braking and steering) are inspected, maintained, repaired or replaced in accordance with the manufacturer's recommendations.	**Intent:** To verify that the critical systems (e.g. brake and steering components) will function as designed. **Personnel:** Senior manager(s) **Method:** View manufacturer's service documents and equipment service records to verify that components are checked and maintained to the required standard. Verify if controls are observed and adequate. Refer to WHSA s.21 and WHS(M)R rr. 617 and 631, mining safety bulletin No. 84, and mines safety significant incident report No. 128.

3 People

To ensure workers are competent and fit for work.

Point	Standard	Guideline
3.1	There is a system in place to ensure each vehicle driver is trained and competent for each type of vehicle they use.	**Intent:** To verify that mobile equipment operations are carried out in a safe and consistent manner through the training and assessment of operators for their competency. **Personnel:** Senior manager(s) **Method:** Sight training matrix and a sample of theory and practical vehicle operator assessments to confirm operators are being assessed for competency. Refer to WHSA s.19 and WHS(M)R rr. 39 and 617 and 631.
3.2	The traffic management plan sets out the requirements for managing human and organisational factors and fitness for work requirements.	**Intent:** To verify that the traffic management plan addresses operator suitability and fitness for work for operating vehicles. Considerations include: • pre-employment medicals • random and 'for cause' drug and alcohol testing • fatigue • distractions • psychosocial factors **Personnel:** Senior manager(s) **Method:** Review the traffic management plan documentation. Confirm that pre-employment standards are established covering past experience, medical fitness and licence requirements. Identify whether the plan defines standards for monitoring and testing for drugs; alcohol; fatigue and other worker safety factors. Verify if controls are observed and adequate. Refer to WHSA s.19 and WHS(M)R rr. 617, 631, 640 and 641.

Point	Standard	Guideline
3.3	Driver monitoring for fatigue is undertaken.	**Intent:** To verify that a system is in place to monitor the fatigue of workers operating mobile equipment. **Personnel:** Senior manager(s) **Method:** Review the monitoring system. Review the results of this monitoring and subsequent actions. Refer to WHSA s.19 and WHS(M)R rr. 34, 35, 36, 617 and 631
3.4	Road standards and other traffic management controls are inspected on a shift and/or daily basis (as applicable).	**Intent:** To verify that road standards and other traffic management controls are checked and maintained in a safe condition on a regular basis. **Personnel:** Senior manager(s) **Method:** Inspect road standards and other traffic management controls (such as aspects addressed in audit point 1.1), and validate findings against those conducted by the shift supervisor and against daily inspection reports. Ensure appropriate actions are taken, in a timely manner, where required. Refer to WHSA s.20 and WHS(M)R rr. 617, 631 and 634A.