

### 8.1.3 Road Edge Windrows

Windrows shall be provided to all vertical drops, impact hazards and critical infrastructure considering the trajectory of an out-of-control vehicle.

Windrow height must be the greater of:

- At least 1m or 66% of the diameter of the largest tyre being used in that area for triangular berms; or

at least 0.7m or 50% of the diameter of the largest tyre being used in that area where trapezoidal berms are used and where the 'roof' dimension of the trapezoid is the greater of 1m or 75% of its height. Refer to Figure 2 below.

- For Ultra Class trucks this equates to a minimum requirement of a trapezoidal berm dimensions equal to 2m high and 6.3m wide and a maximum design specification equal to 2.7m high for triangular berms (as per the Recognised Standard 19). Refer to Figure 2 below.

- The haul road design is to allow 7.5m width for operational tolerances

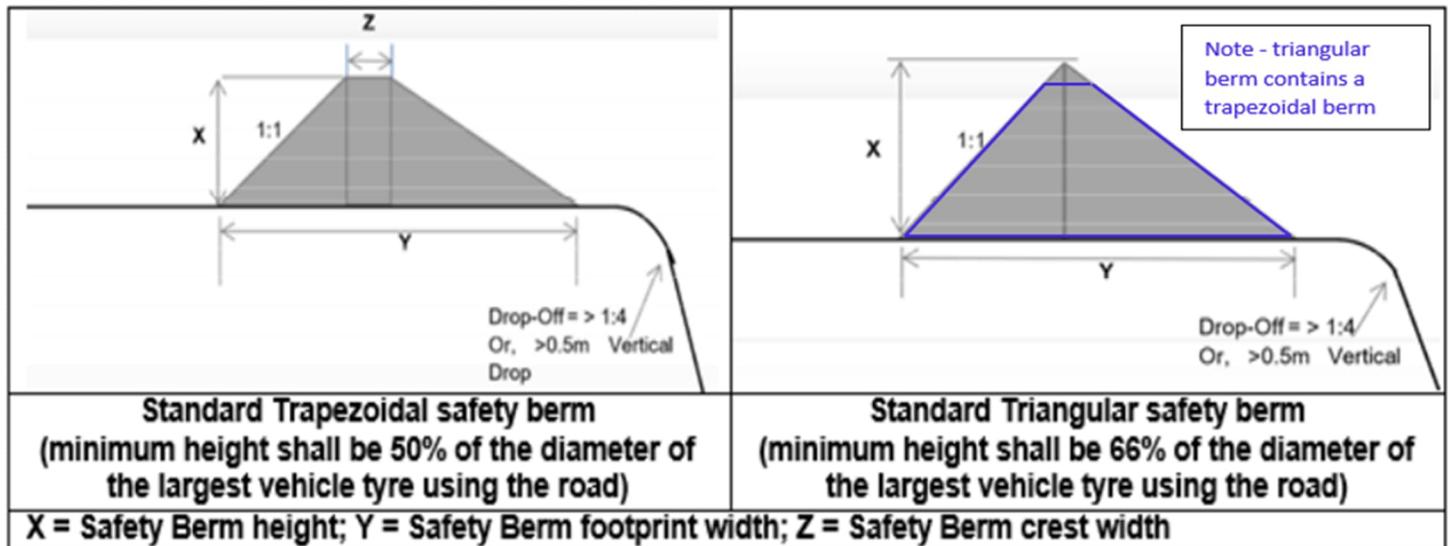


Figure 2: Design requirements for standard Trapezoidal and Triangular safety berms.

Reference: Recognised standard 19 Design and construction of mine roads August 2019 Coal, Mining Safety and Health Act 1999, Department of Natural Resources, Mine and Energy.

Note: Safety berm footprint width is based on a roadside facing batter angle of 45° and an outer side batter angle of 37°.

Typical dimensions which satisfy these requirements are shown in Table 1 and illustrated in the standard drawings in Appendix 2.

Windrows within 15m of intersections shall be reduced to a height of 1.0m and be free from visual obstructions such as debris and vegetation.

Windrow Crests shall be flattened on main roads and should be flattened on in pit, minor and service roads to meet the guidelines in Table 1. This allows for the safe carriage of services and utilities such as:

dewatering pipe (poly pipe) and various forms of signage & delineation where required.

### 8.1.4 Tracked Equipment Windrows

In areas which have exclusive access by excavators, edges with a vertical drop-off greater than 0.5 metre, or a roadside edge / low wall batter steeper than 1:4 (vertical : horizontal) shall have a triangular berm of at least track frame height and up to 1.5m maximum. If access to the excavator bench is required by mobile equipment, the minimum height of the windrow shall be the greater of the excavator window design or 50% of the tyre diameter of the largest vehicle entering the bench.

Dozer berms must be at least 1.8m and berms for drills must be at least 0.8m.

### 8.1.5 Centre Bunds

Centre bunds shall be built 1.0m in height and 15m minimum length and set-back 5m from the edge of the intersecting road. Specific configuration of centre bunds for each intersection type can be seen in Figure 8 and Figure 10.

Centre bunds are required:

- On approaches at an intersection on a Main Road, In-Pit Road and minor / service road intersections with Main and In Pit Roads.
- On all left hand corners on downhill ramps on Main Roads and In-Pit Roads. Centre bunds on corners shall continue for the length of the corner and should start 20m prior to the corner, unless on a switchback ramp where it should start at the corner. Centre bunds on corners must be half the wheel height of the largest vehicle using the road.
- May also be used elsewhere as deemed appropriate.

Earth filled tyres may be used as an alternative to an earth bund on intersections provided the tread width does not exceed 1.0m (i.e. CAT 777 tyres and narrower). Wider tyres can be trenched / recessed into the roadway to achieve 1.0m height. Tyres shall not be used at intersections on grade.

### 8.1.6 Windrows along a High Risk Edge

Where there is the possibility of a vehicle colliding perpendicular/square to a windrow on an outside road edge and this windrow prevents the vehicle from proceeding over a low wall or vertical drop (such as a T-intersection with the through road running along a highwall edge), the dimensions of the windrow must be maximised in order to arrest a loaded haul truck. Windrows up to the full height of the runaway vehicle may be necessary depending on the potential speed and load. As a minimum a base width of 12m, top width of 7m and height of 4m is required (Reference: Incident Investigation Report MACEV09110038, 14 November 2009).

### 8.1.7 Stand-offs

Road corridors need to accommodate the road cross section plus any stand-offs necessary. Stand-offs of roadways from highwalls, lowwalls and endwalls are set as per MAC-STE-STD-149 Working Near Slopes and Crests Standard. Encroachment of roads within 10m of a low wall must have a 2m high catch bund between the road edge and low wall toe and the dump above must be closed and block tipped out.

Encroachment of roadways within 10m of overhead power lines shall meet the requirements of MAC-ELC-STD-001 High Voltage.

### 8.1.13 Material for Haul Road Windrow Construction

Material used to construct the edge protection must suit local geotechnical requirements. Typically, this would be:

For roads, using unconsolidated, predominantly coarse, competent material from the mine (never fine clays or sands unless for profiling the outer surface) that has been compacted or shaped in accordance with geotechnical requirements.

Document Reference - MAC-STE-STD-002