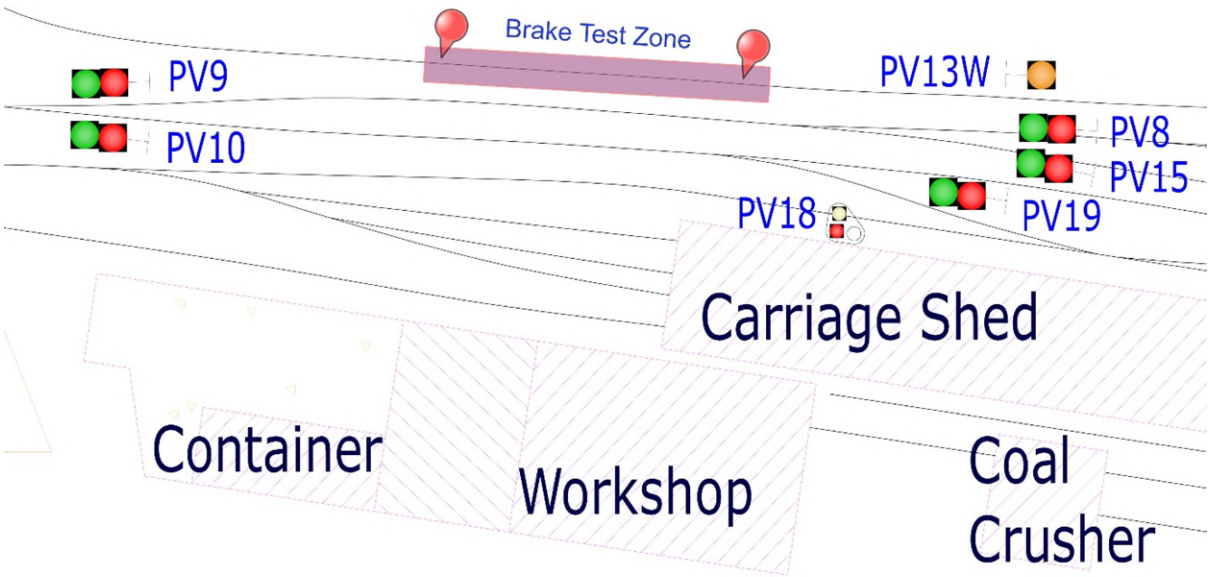
Purpose:	To determine braking distance of "Murdoch" and a rake of 3 "unbraked" wagons within a set of defined parameters
Reference:	Clause 10 of the AALS Code of Practice for the Safe Operation of Miniature Railways, Road Vehicles and Plant.
Location:	QSMEE property at 122 Warner Road, Warner, Qld 4500
Braking Zone:	8.00m in length, refer to the attached site map
Gradient:	Not applicable



Test No.1 (Controlled or non-emergency braking)

Date:	21 June 2022
Weather:	Fine
Driver:	Don Bell
Experience:	High
Guard:	Alan Fuller
Witness:	Chris Hillyard and Alan Robertson
Loco:	Murdoch – petrol/hydraulic
Wagons:	No's 9, 13 and 15
Overall length:	9.50m buffer to buffer

Controlled Braking no Passengers

Guard:	0
Passengers:	0
Braking distance achieved :	6.0m

Controlled Braking with Passengers

Guard:	1
No. of passengers:	8
Average weight:	90kg each
Braking distance achieved:	8.0m

Note 1: Controlled braking defined as reduction of forward throttle until the train comes to a complete stop

Note 2: Braking applied by driver at marker 1 in the nominated braking zone

Note 3: There are no warnings/actions by the guard

Test No.2 (Emergency braking)

Emergency Braking with Passengers

Guard:	1
No. of passengers:	8
Average weight:	90kg each
Braking distance achieved:	Multiple tests vary from 5.30m to 5.90m
Braking Method:	The controlled application of reverse throttle

Note 4: Guard signals an emergency stop somewhere outside the boundaries of braking zone

Note 5: Guard utilized whistle or applied emergency brake or both to advise driver

Observations

1. Due in part to the length of the train, the guard's vision is restricted and limits the guards effectiveness to monitor the passengers only and can not provide any substantial assistance to the driver to monitor the track ahead
2. Drivers should be educated and tested in the technique of reverse throttling as an emergency braking method
3. Application of a deliberate reverse throttle significantly reduces the braking distance

Queries

1. Further testing required to determine if guard's whistle can reasonably be heard by the driver?
2. With the additional weight of the 3 wagon train what is the effectiveness of a guard's handbrake?
3. Will the addition of air brakes to wagons reduce the braking distance by how much?
4. What is the maximum number of wagons before Murdoch is unable to stop within the nominated braking zone

Supplementary Test No.1

Date:	28 June 2022
Weather:	Fine
Driver:	Royce Harvey
Experience:	Intermediate
Guard:	Briley
Instructor:	Garry Menzies
Witness:	Alan Robertson
Loco:	Murdoch – petrol/hydraulic
Wagon no:	15
Overall length:	4.9 m buffer to buffer

Controlled Braking with Passengers

Guard:	1
No. of passengers:	1
Average weight:	90kg each
Braking distance achieved:	6.9m

Supplementary Test No.2

Date:	28 June 2022
Weather:	Fine
Driver:	Kelvin Taylor
Experience:	Intermediate
Guard:	Briley
Instructor:	Garry Menzies
Witness:	Alan Robertson
Loco:	Murdoch – petrol/hydraulic
Wagon no:	15
Overall length:	4.9 m buffer to buffer

Controlled Braking with Passengers

Guard:	1
No. of passengers:	1
Average weight:	90kg each
Braking distance achieved:	6.4m

Note 1: Testing conducted during driver's test

Note 2: Emergency braking initiated at instructor's whistle

Note 3: location of emergency was at instructor's discretion and not within the current braking zone

Note 4: The Supplementary Tests were performed during the individuals licence testing