



LOW MU TILES



ENDURANCE



4WD TERRAIN

AARC is a



company

www.aarconline.com



AUSTRALIA'S UNIQUE VEHICLE PROVING GROUND

The Australian Automotive Research Centre (AARC) offers an extensive range of evaluation facilities to all vehicle and component manufacturers

AARC occupies a 1000 hectare site near Anglesea, 125km south-west of Melbourne and is the largest privately owned and independently operated automotive testing facility in Australia.

Test facilities encompass virtually all driving conditions found in Australia, accommodating vehicles from passenger cars and four wheel drives to heavy trucks and mining equipment. There are many test roads and a variety of surfaces, including a 4.2km hot mixed surface road designed for testing component and vehicle durability.

Other roads and sites include a series of gravel and dirt surfaces designed specifically to test road and in-cabin noise, suspension, braking and traction control

systems, dust entry, cooling systems, chassis durability for trucks, and many other aspects of vehicle performance. There are also areas designed and approved for testing and development relating to Australian Design Rules (ADR).

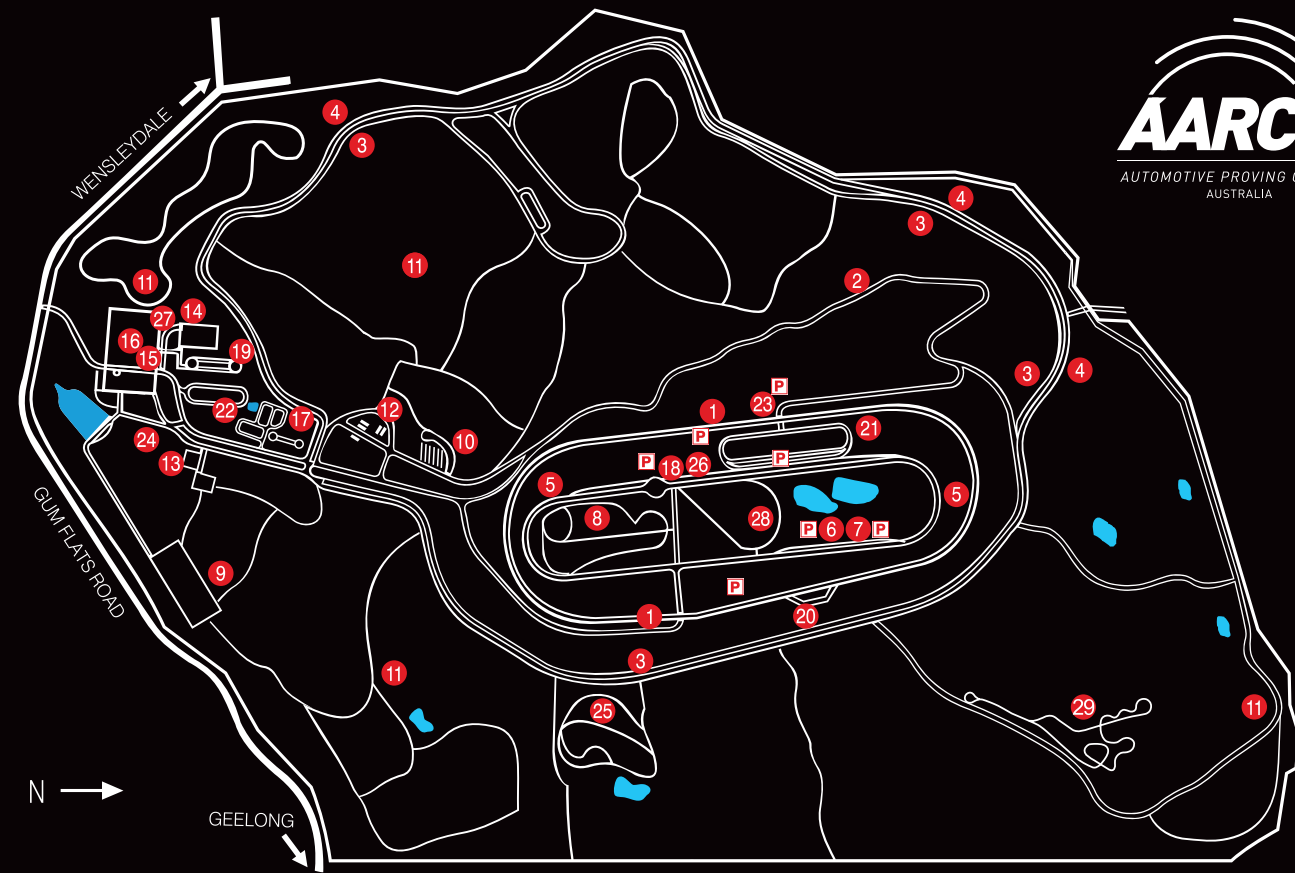
AARC also offers extensive testing for four wheel drive components and vehicles. There are many kilometres of roads and tracks with varied terrain, gradients and surfaces. Test areas include vehicle fording, mud bath, rocky terrain, and approach and departure angles.

Under jointly agreed conditions, AARC allows the construction, by its clients, of engineering test sites specific to that client. This ensures clients can conduct exactly the research and development they require.



PROVING GROUND FACILITIES

- | | | |
|--------------------------------------|--------------------------------|--------------------------------|
| 1 HIGHWAY CIRCUIT: Bitumen-4.2km | 14 HEAVY VEHICLE MANOEUVRING | 18 NOISE TEST SITE |
| 2 GRADIENT SECTION: Bitumen-2.2km | 15 TILT TABLE | 19 IMPACT TEST FACILITY |
| 3 SECOND CLASS SURFACE (Gravel No.1) | 16 CONFERENCE ROOMS | 20 WATER BATH |
| 4 SECOND CLASS SURFACE (Gravel No.2) | | 21 ROUGH COURSE |
| 5 ADR TYPE APPROVAL CIRCUIT: 3.2km | | 22 COOLING CIRCUIT |
| 6 LOW MU CERAMIC TILES | 17 VEHICLE VALIDATION PRECINCT | 23 PRODUCT LAUNCH AREA |
| 7 LOW MU BASALT TILES | FORDING BATH | 24 LINFOX CENTRE |
| 8 VEHICLE HANDLING (Gravel) | 30% SIDE SLOPE | 25 RIDE AND HANDLING |
| 9 4WD INTRODUCTION | COMPOUND ARTICULATION GAUGE | 26 N.V.H. ROAD |
| 10 4WD GRADIENTS | LANDING CRAFT RAMP | 27 WORKSHOPS & OFFICES |
| 11 4WD TRACKS | 450MM WHEEL DROP | 28 DYNAMIC HANDLING FACILITY |
| 12 PARK BRAKE FACILITIES | WHEEL UP RAMP | 29 OFF ROAD ENDURANCE FACILITY |
| 13 CONSTRUCTION/STORAGE YARD | SIMPLE ARTICULATION GAUGE | P DESIGNATED PARKING AREAS |
| | CHASSIS TWIST COURSE | |



SUMMER
December to February
Temp. range 15-40°C
Average maximum 24°C



AUTUMN
March to May
Temp. range 11-35°C
Average maximum 19.5°C



WINTER
June to August
Temp. range 4-22°C
Average maximum 13°C

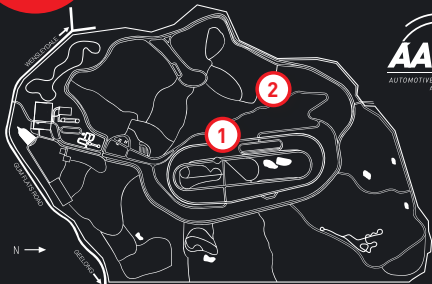


SPRING
September to November
Temp. range 8-32°C
Average maximum 17°C



AVE. ANNUAL RAINFALL
1965 to 2004 – 801mm
2005 to 2009 – 651.6mm

1 HIGHWAY CIRCUIT



TECHNICAL SPECIFICATIONS



4.2km long
& 7.6m wide



11.2m
wide superelevated curves



Hotmix
follows natural
topography

Extra lane of 10mm spray seal surface
on each curve to give overall width of 11.2m.

Fully fenced preventing wildlife entering
circuit, allowing testing 24 hours a day.

Suitable for use in testing by cars, trucks and
motorcycles for:

- component and vehicle durability and
general development
- Lane Keeping Assist and associated Driver
Assistance functions
- product launches and demonstrations.



11.2M WIDE CURVES



EVEN 5% INCLINE

2 GRADIENT SECTION

TECHNICAL SPECIFICATIONS



2.2km long
by 6m wide



Hotmix
surface



5% - 10%
decline & even 5% incline



Can be linked to Highway Circuit and
2nd Class Road to significantly increase
testing distance.

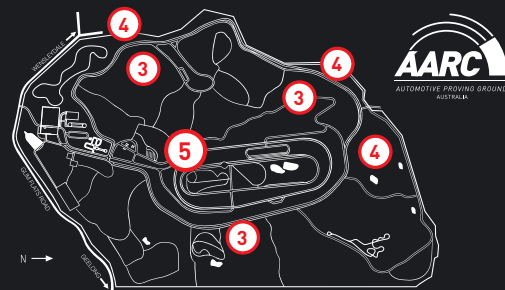
Winding road that can be closed to operate in
the opposite direction if required.

Suitable for use in testing by cars, trucks,
buses and motorcycles for:

- component and vehicle durability and
general development.
- engine retardation, engine torque and
general driveability.



3 4 SECOND CLASS SURFACE — GRAVEL



TECHNICAL SPECIFICATIONS



9.6km
long gravel roads



2 x 8m
wide roads



Follows
natural topography

1 x 1km gradient section
18% grade has 10mm spray seal surface.

Suitable for use in testing by cars, trucks, buses, military vehicles and mining equipment.

Test general durability, dust entry, traction control, electronic stability control programs, body damage, stone chipping etc.



9.6KMS OF GRAVEL



ADR COMPLIANT

Designed for high Mu brake tests to:

- **ADR:**
ADR 31/04 Brake systems for passenger vehicles and ADR 35/06 Commercial vehicle brake systems
- **CHINA:**
GB12676-2014 & GB/T13594-2003 Braking for vehicles & trailers (China)
- **UN GTR:**
Global Technical Regulation No. 03 – Motorcycle brake systems
- **ECE:**
ECE R13.11 – Vehicles of categories M, N and O with regard to braking
ECER13-H-01 – Passenger Cars with regard to braking
ECE R78.04 – Vehicles of categories L1, L2, L3, L4 and L5 with regard to braking
ECE R131 – Motor Vehicles with regard to the Advanced Emergency Braking Systems (AEBS)
ECE R139.00 – Passenger cars with regard to Brake Assist Systems (BAS)
ECE R 140.00 – Passenger cars with regard to Electronic Stability Control (ESC) Systems

5 ADR TYPE APPROVAL CIRCUIT

TECHNICAL SPECIFICATIONS



3.2km long
by 7.6m wide



Hotmix
surface



Global
regulations compliant



Even grade 0.75%.

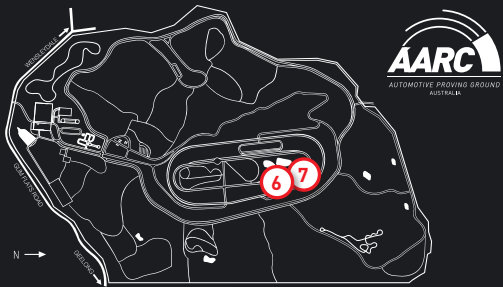
Curves 125m radius 7% superelevation.

200m section simulates wet road conditions.

Compliance with Australian Design Rules:

- ADR 31/04 Brake systems for passenger vehicles
- ADR 35/06 Commercial vehicle brake systems

6 LOW MU CERAMIC TILES



TECHNICAL SPECIFICATIONS



120m long
by 4m wide



0.1 Mu
friction coefficient



Wet surface
& split use testing

Water application to surface.

Co-efficient of friction of surface 0.1 Mu.

Hotmix surface adjacent to tiled area to allow split use testing, both wet and dry.

Suitable for use by cars for development of ABS, traction control systems and electronic stability program systems.



CERAMIC TILES



WET & DRY TESTING

Test for low Mu requirements for the following regulations:

- **ADR:**
ADR 31/04 Brake systems for passenger vehicles and ADR 35/06 Commercial vehicle brake systems
- **CHINA:**
GB12676-2014 & GB/T13594-2003 Braking for vehicles & trailers (China)
- **UN GTR:**
Global Technical Regulation No. 03 – Motorcycle brake systems
- **ECE:**
ECE R13.11 – Vehicles of categories M, N and O with regard to braking
ECER13-H-01 – Passenger Cars with regard to braking
ECE R78.04 – Vehicles of categories L1, L2, L3, L4 and L5 with regard to braking
ECE R131 – Motor Vehicles with regard to the Advanced Emergency Braking Systems (AEBS)
ECE R139.00 – Passenger cars with regard to Brake Assist Systems (BAS)
ECE R 140.00 – Passenger cars with regard to Electronic Stability Control (ESC) Systems



7 LOW MU BASALT TILES

TECHNICAL SPECIFICATIONS



120m long
by 4m wide



0.3 Mu
friction coefficient



Wet surface
& split use testing



Overall length 120 metres long:

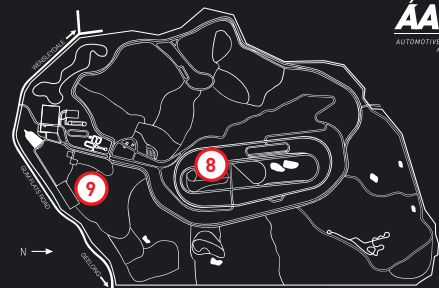
- 1st section tiles 70m long x 4m wide
- 2nd section tiles 50m long x 8m wide

Hotmix surface adjacent to tiled area to allow split use testing, both wet and dry.

Suitable for use by cars for development of ABS, traction control systems and electronic stability program systems.

Approved by the UK's Vehicle Certification Authority (VCA) for ECE Regulation 13.10, Annex 13, Appendix 4 and ECE Regulation 13H, Annex 6, Appendix 4.

8 VEHICLE HANDLING — GRAVEL



TECHNICAL SPECIFICATIONS



30m long
hotmix section for
split surface tests



Various radii
curves



Surfaces
coarse aggregate
to fine gravel

Two areas, each approx. 1km in length.

Suitable for use by cars, trucks, military vehicles, motorcycles for ABS system, traction control systems, electronic stability program systems and suspension development.



Several flat gravel roads, includes:

- curves of various radii
- straight sections of several hundred metres.
- 1 large flat area.
- 1 x 30m long x 3m wide hotmix section to allow split braking on gravel and bitumen.
- different surfaces including coarse aggregate and fine gravel.

COARSE AGGREGATE TO FINE GRAVEL



ROCKY TERRAIN & MUD BATH



9 4WD INTRODUCTION

TECHNICAL SPECIFICATIONS



Vehicle
familiarisation, testing
& comparison



Varied
terrain & gradients
& rocky section



Mud & water
crossings



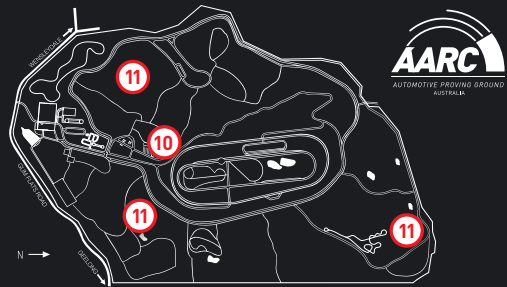
Allows vehicle familiarisation, testing and comparisons of various features. Can be linked to other tracks that return to the Introduction area.

Varied terrain with a range of gradients and surfaces. Vehicle fording, mud bath, rocky section, articulation.

Ramp over, approach and departure angles.

Suitable for some crossover vehicles, 4WD passenger vehicles, fire tankers, military vehicles, heavy trucks.

10 4WD GRADIENTS



TECHNICAL SPECIFICATIONS



27% to 60%
vehicle incline
capability



3 surfaces
gravel, clay,
concrete



4 tests
Hill hold, Descent,
Traction, Retardation

Vehicle familiarisation, testing and comparisons, retardation systems, hill descent, hill hold systems, traction control systems.

Linked to an extensive network of 4WD tracks and trails.

Suitable for some crossover vehicles, 4WD passenger vehicles, fire tankers, military vehicles, heavy trucks.



UP TO 60% INCLINE

4WD BUSH TRAILS & TRACKS



11 4WD TRACKS

TECHNICAL SPECIFICATIONS



Australian
4WD tracks
& trails



Slopes
gullies, ridge
lines, etc.



All weather
conditions
suitable



Replicates typical Australian 4WD country:

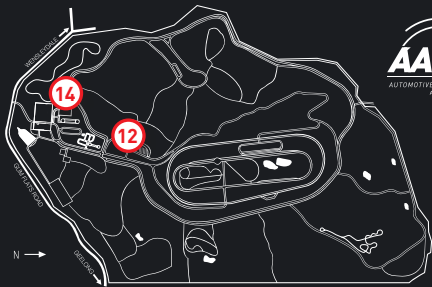
- forest, bush trails and tracks
- follows natural topography, gullies, ridge lines etc.
- some sections suitable for all weather conditions

Some tracks link up with 4WD Introduction Area and 4WD Gradient Section.

Vehicle familiarisation, testing and comparisons, retardation systems, hill descent, hill hold systems, traction control systems.

Suitable for some crossover vehicles, 4WD passenger vehicles, fire tankers, military vehicles, heavy trucks.

12 PARK BRAKE FACILITIES



TECHNICAL SPECIFICATIONS



Concrete
grades



Australian
design rules
compliant



Up to 30%
grades

Park brake compliance with Australian Design Rules.

12, 18, 20, 30% grades.

Suitable for cars, trucks, buses.



UP TO 30% GRADE



STABILIZED CEMENT SURFACE



14 HEAVY VEHICLE MANOEUVRING

TECHNICAL SPECIFICATIONS



Heavy vehicle
design



100m x 60m
stabilized
cement surface



Steering systems
figure eights,
lock to lock turns, etc.



Designed for heavy vehicles.

Stabilized cement surface 100m x 60m with at least 50m radius clear of any vegetation and obstructions.

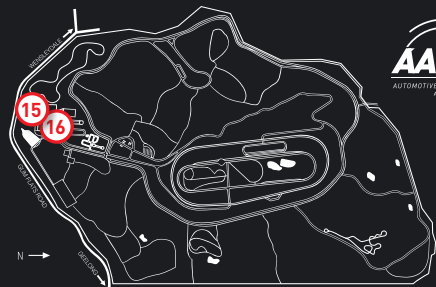
Used for steering systems, specific manoeuvres, figure eights and lock to lock turns.

Noise testing of mining equipment.

Vehicle tracking of new vehicle technologies.



15

TILT
TABLE

TECHNICAL SPECIFICATIONS

**Vehicle Stability**
& load restraint
testing**Suitable**
for light & heavy
loads**40°**
tilt (up to)

The Tilt Table is suitable for vehicle stability and/or load restraint mechanism testing.

Suitable for light and heavy vehicles.

Operated by experienced AARC Staff.

Computer printout of results of each test.

TILTS UP TO 40 DEGREES



SEATS UP TO 35



16

CONFERENCE
ROOMS

TECHNICAL SPECIFICATIONS

**3 Rooms**
seats up to 35 people**Whiteboards**
projection screens &
flatscreen TVs**Conference**
or classrooms

Several purpose built rooms:

- Two 8m x 8m in size
- One 8m x 4m in size

Equipment includes whiteboards and projector screens

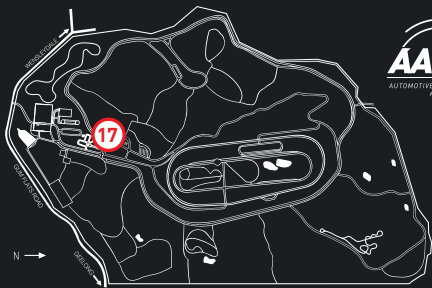
Suitable for:

- Group discussions
- Media briefing
- Product trials

Kitchen attached for tea, coffee etc.
Arrangements for catering on site can be made to suit your requirements.



VEHICLE VALIDATION PRECINCT



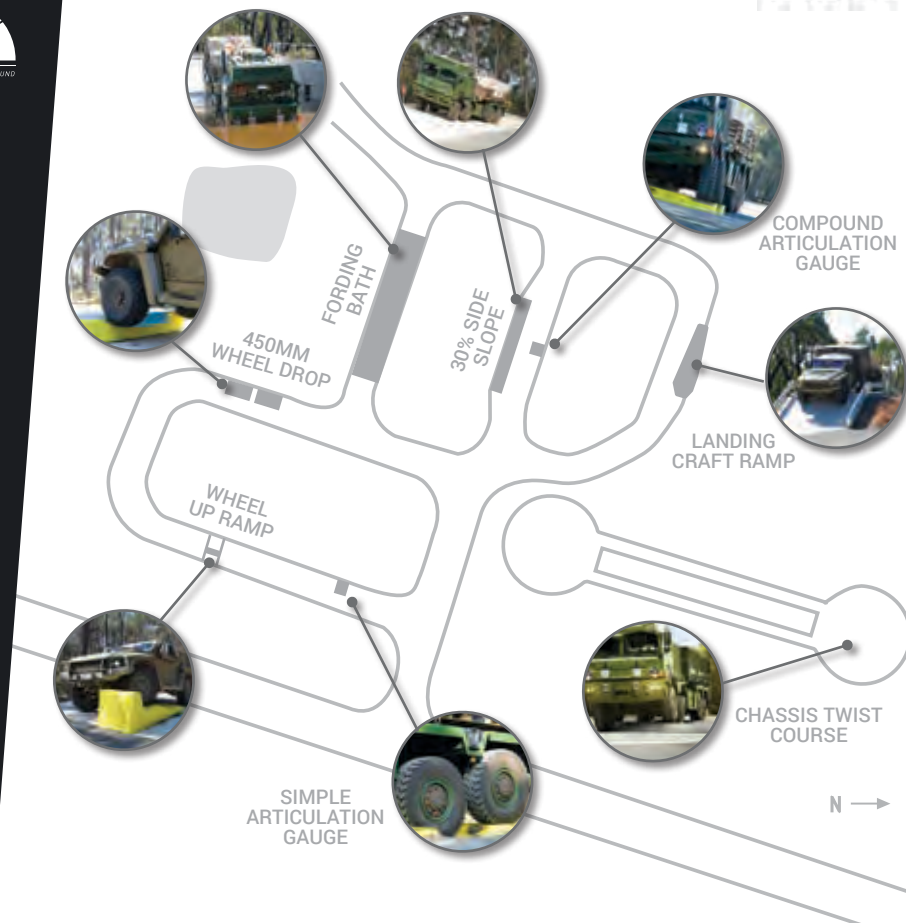
The newly completed Vehicle Validation Precinct (VVP) at AARC has been developed in response to the present and future testing needs of tenants and other users of the proving ground.

It encompasses facilities suitable for use by cars, trucks and military vehicles to Land 400 specifications.

Facilities include:

- Fording Bath to 2.4m
- 30% Side Slope
- Compound Articulation Gauge
- Landing Craft Ramp
- 450mm Wheel Drop
- Wheel Up Ramp
- Simple Articulation Gauge
- Chassis Twist Course

8 FACILITIES - LAND 400 SPECIFICATIONS



VEHICLE VALIDATION PRECINCT



FORDING BATH




Concrete Fording Bath with width of 6.5m.

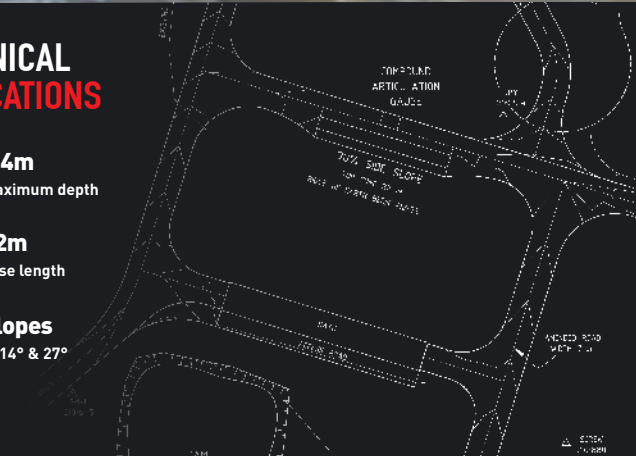
Water depth variable to 2.4m.

Ascend/descend gradient of 14° at one end.
Ascend/descend gradient of 27° at the other end.

Fitted with rails on both sides for the safety of observers.

TECHNICAL SPECIFICATIONS

-  **2.4m**
maximum depth
-  **12m**
base length
-  **Slopes**
of 14° & 27°





VEHICLE VALIDATION PRECINCT






30% SIDE SLOPE

Concrete side slope of 30% gradient.

Length of 36m.

TECHNICAL SPECIFICATIONS

-  Lateral stability
-  36m length
-  Width of 5m




LANDING CRAFT RAMP

Width of 4m.

Ramp angle of 26°.

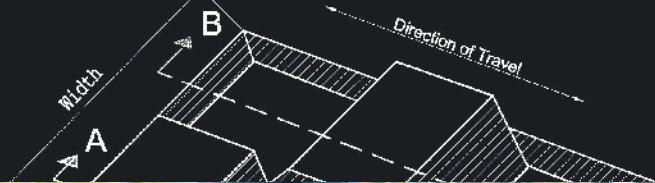
Fitted with safety rails.

TECHNICAL SPECIFICATIONS

-  Concrete ramp
-  26° angle
-  4m wide



VEHICLE VALIDATION PRECINCT



SIMPLE ARTICULATION GAUGE

Width of 3m.

Concrete obstacle with maximum height of 300mm.

TECHNICAL SPECIFICATIONS




-  Concrete trench obstacle
-  Suspension system
-  300mm maximum height

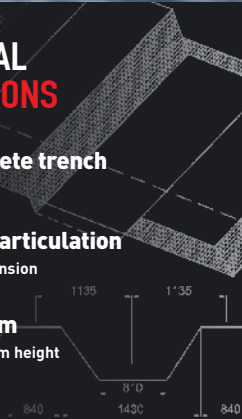
COMPOUND ARTICULATION GAUGE

Width of 3m.

Concrete obstacle with maximum height of 475mm.

TECHNICAL SPECIFICATIONS

-  Concrete trench obstacle
-  Tests articulation of suspension
-  475mm maximum height





VEHICLE VALIDATION PRECINCT



VEHICLE VALIDATION PRECINCT



450MM WHEEL DROP

Width of 3m.

Approach from either
end of obstacle.

TECHNICAL SPECIFICATIONS



**Concrete
obstacle**



**450mm
drop/climb**



3m wide

WHEEL UP RAMP

Width of 900mm.

Wheel ramp heights of
225mm and 455mm.

Left or right wheel can
mount the obstacle.

TECHNICAL SPECIFICATIONS



**Concrete
obstacle**



**Pivot turn
in both directions**



**Ramps at
225mm and 455mm**

CHASSIS TWIST COURSE

Rebuilt and upgraded in 2016.

Concrete ribs at 45° to direction of travel. Each Rib has a
height of 150mm at one end and 330mm at the other end.

One metre of flat concrete surface beyond ribs along
full length of the course. Concrete turning circles of
30m diameter at each end of the course.

TECHNICAL SPECIFICATIONS



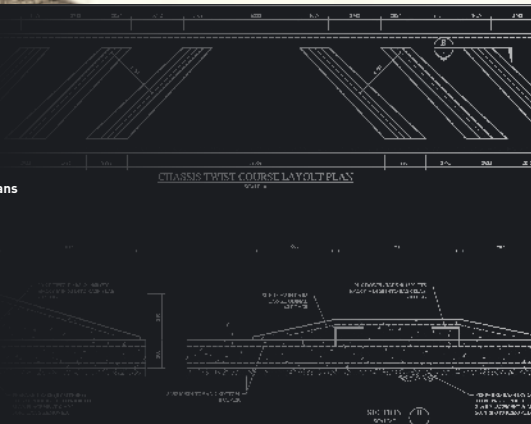
**Trucks
buses, cars & caravans**



**Chassis
systems**



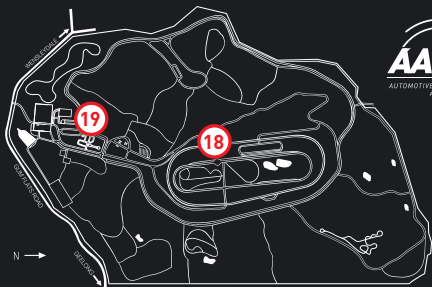
**Suspension
testing**





18

NOISE TEST SITE



TECHNICAL SPECIFICATIONS



ADR 83/00
external noise



Flat
hotmix surface



Drive
by noise

Assess drive by noise specifically for Australian Design Rules Certification – ADR 83/00 External Noise.

Clear of vegetation and external obstructions to ensure no disturbance from wind and related sounds.

Suitable for use by cars, trucks, buses, motorcycles.



ADR 83/00



19

IMPACT TEST FACILITY

TECHNICAL SPECIFICATIONS



Durability & stress

road impacts, railway lines, cattle grids



Rope road section

& noise deflection wall



Specific impacts

tailored to customer requirements



Durability and stress from road impacts, railway lines, cattle grids.

Noise deflection wall – impact noise levels.

Rope road section.

Operation of truck airbag suspensions.

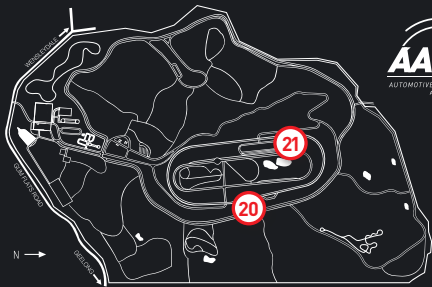
AARC can build specific impacts tailor-made for customer requirements.

Suitable for use by cars, trucks.



ROAD IMPACTS

20 WATER BATH



TECHNICAL SPECIFICATIONS



20m long
by 4m wide



Up to 600mm
depth for water entry
to vehicles



Brake recovery
post immersion

Depth up to 600mm.

Brake recovery post immersion.

Water entry to vehicles and components.

Suitable for use by cars, trucks, buses.



UP TO 600MM DEPTH

ROAD IMPACTS & OBSTACLES



21 ROUGH COURSE

TECHNICAL SPECIFICATIONS



200m x 4m
rough straight and
curved sections, and
large and small
concrete corrugations



800m
hotmix loop with
42m radius



50m
Chassis Twist section,
300mm obstacles



Accelerated durability testing
and stress analysis.

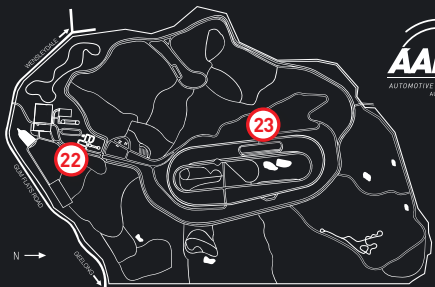
200m x 4m sections of:

- Rough Road
- Corrupt Highway (bumped straight 30mm obstacles)
- Bluestone pitchers
- Bumped Curve (50mm obstacles)
- Small concrete corrugations
- Large Sinusoid corrugations with offset.

40m concrete brake pad.

Suitable for use by cars, trucks, buses, caravans, trailers for a range of testing from rattles and squeaks to suspension, new components and accessory items such as roof racks.

22 COOLING CIRCUIT



TECHNICAL SPECIFICATIONS



600m long x 7.3m
4WD tracks & trails



38m radius
curves



Tyre noise
& radiator
effectiveness

600m long x 7.3m wide hotmix level oval circuit.

Curves 38m radius.

Measure radiator effectiveness in a vehicle towing a mobile dynamometer, applying an adjustable load.

Suitable for use to test for tyre noise and general testing of cars, trucks and buses.



600M LONG CIRCUIT



23 PRODUCT LAUNCH AREA

TECHNICAL SPECIFICATIONS



Ideal
Australian environment
for product launch



Great location
Close to Highway
Circuit & 5% Gradient



Marquee
display friendly

Make your event one to remember by hosting it at the Australian Automotive Research Centre.



AARC's facilities can support:

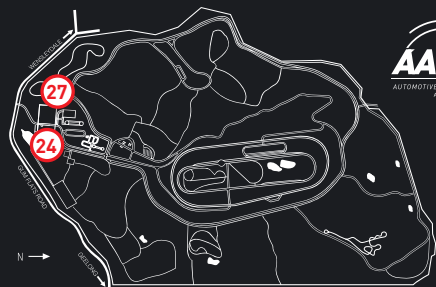
- Product launches
- Media briefings and conferences
- Technology showcase
- Corporate VIP Days
- Educational events

We will be pleased to assist you with:

- Advice and support regarding event logistics
- Test drivers
- Vehicle loading and unloading
- Catering
- Marquee hire and set up
- Film production



LINFOX CENTRE



TECHNICAL SPECIFICATIONS



Bush Setting
environment



4WD demos
product launch
& BBQs



Kitchen
& toilet amenities

Bush setting environment.

Barbeques and small kitchen area.

Toilet amenities.

Suitable for product launches, 4WD demonstrations, awards.



BBQ AREA



WORKSHOPS & OFFICES

TECHNICAL SPECIFICATIONS



Hoists
can be provided



Electric vehicle
chargers in
close proximity



Kitchen
& office facilities



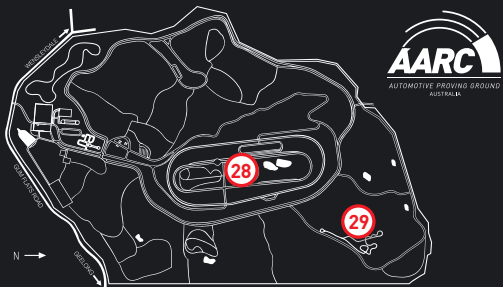
To support the testing that is conducted on the tracks and facilities on site, workshops are available for casual hire as well as short term and long term leasing.

The workshops are suitable for the preparation and evaluation of tests, as well as maintenance work, and can accommodate cars, caravans, heavy trucks, defence vehicles and mining equipment.

Features that can be provided include:

- Hoists
- Roller Shutters up to 4.7m high x 4.2m wide
- Close proximity to electric vehicle chargers
- Office and kitchen facilities

28 DYNAMIC HANDLING FACILITY



TECHNICAL SPECIFICATIONS



62,500m²
asphalt area
with 1% grade



7,500m²
can be wet
with sprinklers



ABS testing
stability programs,
traction control, etc.

Large asphalt area of 62,500m² with 1% grade across the area.

An area of 7500m² can be wet down with large sprinklers, sloping in one direction, with the remainder sloping in the opposite direction.



ABS TESTING

Designed for use by cars for the development and testing of ABS, traction control, electronic stability programs, vehicle handling.

Also designed to test for the requirements for GTR 8 Global Technical Regulation No. 08 – Electronic Stability Control Systems (ADR31/03) and ECE R13H ESC.

40% GRADIENTS

29 OFF ROAD ENDURANCE FACILITY

TECHNICAL SPECIFICATIONS



Moguls
and potholes



1.5km
course



40% slopes
and pinch

Off Road accelerated durability testing and stress analysis.

Course components include:

- Broken concrete
- Potholes
- Washouts
- Steps
- Moguls
- Pinch
- 40% Gradients



HISTORY – A PROUD HERITAGE

The Anglesea Proving Ground was established in 1961 by US manufacturer International Harvester to develop their trucks, tractors and agricultural machinery for the Australian market.

Linfox purchased the proving ground in 1991 and originally used the site as a driver training facility for its employees.

Establishment of AARC soon followed, with foundations laid by International Harvester built upon and expanded to create what is today the largest privately owned and independently operated automotive testing facility in Australia.



Use the QR code on the left to learn more about the AARC story.



PREPARING FOR AN AUTONOMOUS FUTURE

As the automotive industry is moving towards greater vehicle autonomy AARC is updating existing facilities and planning to construct new test sites that support the development of digital technologies.

These developments include a 5G communications network, roadside hardware, new dynamic handling area and real life urban settings comprising of intersections, buildings and

simulated pedestrians. An auditorium, virtual reality studio and data control centre will also be created.

This will provide Australian manufacturers, researchers, regulators and infrastructure providers with access to a living laboratory for autonomous vehicles and ensure evaluation work can be thoroughly conducted in a controlled environment before being trialled on public roads.



CONTACTS AND BOOKINGS

ARI SUSS

AARC GENERAL MANAGER

T +61 (3) 9869 8588

M +61 (0) 411 883 663

E Ari_Suss@aarconline.com

DAVID KELLY

AARC MANAGER

T +61 (3) 5288 7306

M +61 (0) 439 114 075

E David_Kelly@aarconline.com

AARC OFFICE

T +61 (3) 5288 7306

F +61 (3) 5288 7225

E Jenni_Troup@aarconline.com

AARC LOCATION

445 Gum Flats Road
Wensleydale, Victoria
Australia 3241

POSTAL ADDRESS

PO Box 24, Anglesea
Victoria, Australia 3230

DIRECTIONS

FROM MELBOURNE

Follow Princes Freeway M1 towards Geelong. Keep right on Princes Freeway/Geelong Ring Road M1 towards Colac/Great Ocean Road. Continue on Princes Highway A1 towards Colac. Exit left onto Cape Otway Road C135 and travel 20km through the township of Moriac. Turn left onto Wensleydale Station Road (adjacent to Wurdee Boluc Reservoir) and travel 6.7km. Turn left onto Gum Flats Road (gravel surfaced) and travel 4.5km to AARC, which is on your left.

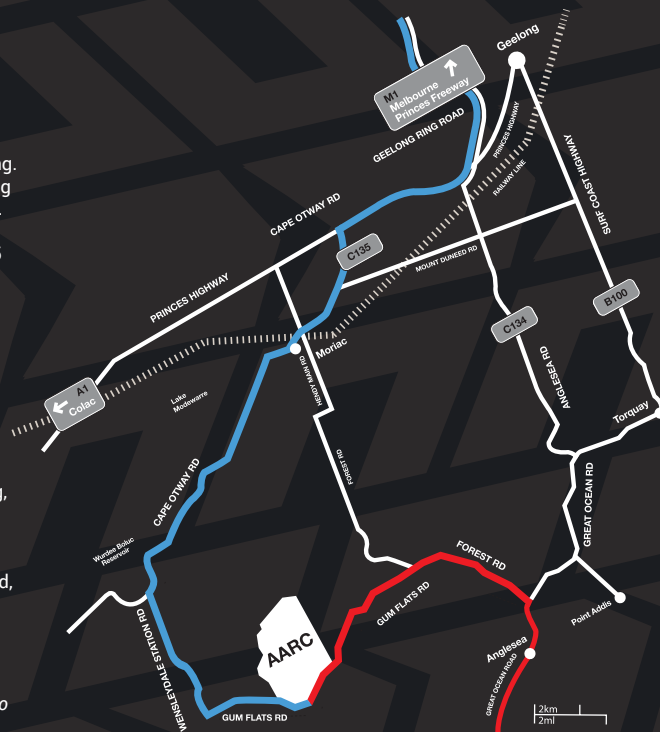
FROM ANGLESEA

Follow Great Ocean Road towards Geelong. Turn left at Forest Road, 3.5km from Anglesea. Travel 5.5km then turn left onto Gum Flats Road. Travel 9.2km along Gum Flats Road, which is mostly gravel surfaced, to AARC, which is on your right.

Speed limit to ALL users on unsealed roads to AARC is 80km/h.

*The AARC hours are 7.30am-5pm weekdays.
No admittance after 4pm, unless scheduled.*

www.aarconline.com



AARC is a **LINFOX** company

CONNECT WITH US

