

2022 SCHOOL'S HANDBOOK TRYATHLON

ENERGY BREAKTHROUGH

16-20 NOVEMBER 2022 | MARYBOROUGH, VICTORIA

POWERED BY IMAGINATION

THE PREMIER SCIENCE, TECHNOLOGY, ENGINEERING AND MATHS, ACTIVE LEARNING PROGRAM

A PARTNERSHIP BETWEEN



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1. OVERVIEW

The Tryathlon category was created in 2001 for teams who wanted a taste of the Energy Breakthrough. Since its creation the category has quickly grown in popularity and competitiveness.

Challenge: To excel across a wide variety of challenges, including a Time Trial, Obstacle Rally and Endurance trial. Entrants use the same design requirements as for Human Powered Vehicles (HPVs).



2. CATEGORIES AND CLASSES

CLASS	YEAR LEVEL	TEAM SIZE	GENDER REQUIREMENTS	SCHOOL SIZE
A	Years 1 - 6	Min 4 - Max 10	At least 50% female.	N/a
B	Years 7 - 10	Min 6 - Max 8	At least 50% female.	N/a
C	Years 11-12	Min 6 - Max 8	At least 50% female.	N/a
All Female	Up to Year 12	Min 6 - Max 8	Female only	N/a
Open	Up to Year 12	Min 6 - Max 8	No gender requirements.	N/a

2.1 Team Composition

- All entries are to be team entries and must consist of current school students
- Young people enrolled in a school or young people enrolled in a secondary school certificate/program and under 20 years of age as at 31 December 2017.
- All team members must be familiar with the operation of their vehicle and must participate equally in the assessments at the event in Maryborough.
- Team members do not have to all come from the same school. They could be part of a scout, church, or other community group, however they must all be current school students and be covered by the group's insurance. Where non-school teams have riders

from other schools participating in Energy Breakthrough, they must have written approval from the Principal of the school.

- [Non-school teams are encouraged to be auspiced by, or connected to a school or education provider. Where they are not connected to a school or education provider they need to apply for an exemption.](#)

Teams in the Tryathlon A categories will consist of:

- a minimum of six (6) and a maximum of ten (10) riders.
- of whom at least half must be female.

Teams in the Tryathlon B/C categories will consist of:

- a minimum of six (6) and a maximum of eight (8) riders.
- of whom at least half must be female.

Teams in the Tryathlon Open classes will consist of:

- a minimum of six (6) and a maximum of eight (8) riders.
- no gender requirements.

Teams in the Tryathlon All Female classes will consist of:

- a minimum of six (6) and a maximum of eight (8) riders.
- A gender requirement of all females.

2.2 Category caps, changes and waitlists:

- A maximum of three entries per school will be accepted in any category.
- Additional entries from a school will be placed on a waiting list and will be notified if accepted into the event.
- Teams registered in the Tryathlon A or B/C class who request a transfer to the Tryathlon Open class will incur a 15 lap penalty in the endurance trial.
- Only one entry per school will be accepted in the Tryathlon Open classes.
- Schools that have an existing entry in the Tryathlon Open classes will not be able to enter additional teams into this class.
- Schools who won their class overall in the event previous, will be entitled to a guaranteed place for the following year. Team Managers will receive an email to advise of the process. If the team accepts the entry an invoice will be issued. If the overall winner of a class does not want their automatic entry, this WILL NOT pass onto the second placed team.
- Correspondence regarding the status of entries on a waiting list will be made directly to a Team Manager only.

3. ASSESSMENT

3.1 Overview

The Energy Breakthrough is unique in that all teams must compete across three areas of assessment: Design and Construction, Display and Presentation and Trials.

In the Tryathlon, Teams participate in the **Display & Presentation Design & Construction** sections, but also in three physical tests: Time Trial, Obstacle Rally and an 8 Hour Endurance Trial.

All sections must be attempted and points are awarded in the following sections:

SECTION	POINTS
Display & Presentation	20
Design & Construction	20
Time trial	15
Obstacle	15
Endurance Trial	30
Total	100

It is the responsibility of each team to ensure they complete all sections.

The schedules for each of these sections are outlined in this Handbook and further details are provided in an Information Kit distributed in November.

3.2 Scrutineering

All vehicles must go through scrutineering which entails a safety inspection to ensure the vehicles are safe and meet all the design specifications outlined in the relevant Section of this Handbook. These checks ensure that the vehicle is safe for the occupant, other teams and spectators.

Scrutineering is led by Scrutineers, with support from experienced volunteers.

Where entries do not comply with specifications, or are considered unsafe, scrutineers will provide assistance and/or direction with work required in order to comply.

Schedules and locations for teams to complete scrutineering and other judging assessments are provided in the *Information Kit distributed to schools in early November*.

Organisers will assume that teams will have arrived in Maryborough and be available from 12 noon on the day of the assessment. Late arrivals will be accepted only by negotiation.

3.3 VicRoads Participant Licence

All team members are required to present their Licence to the VicRoads station at the start of Scrutineering & Design and Construction process at Maryborough.

If no licence is presented, any number of riders in your team will be required to demonstrate competence in vehicle control by undergoing a tough test. Safety is the number one priority at the Energy Breakthrough.

By signing the Licence, the Team Manager and Principal both certify that the student has completed the necessary track safety, vehicle maneuverability training and has read and is familiar with the Trial regulations.

Download the VicRoads Participant License under ‘School Zone’.

3.4 Design and Construction



3.4.1 Purpose

Teams will be required to demonstrate to judges that all members have developed a thorough understanding of the Design and Construction aspects of their entry.

The focus of the Design and Construction is to assess the team's understanding of the vehicle and the concepts involved in its design and construction.

To this end, teams who have simply purchased a recumbent bicycle (complete or in kit form) and carried out basic modifications, will not score as well as teams who have built a vehicle from scratch. Consideration will be given to teams who have 'Inherited' a vehicle from previous teams but who have improved the design and/or construction in some way.

3.4.2 Criteria

As part of the Design and Construction assessment, teams will be required to:

- discuss and explain design and construction processes.
- show all rider safety equipment, including each person's gloves, helmets and glasses.
- show copies of relevant design drawings.

The focus for Design and Construction assessment will be:

- **Effort and input** – this is based on issues such as whether the vehicle bought, made from new, modified from the previous year and to what extent the students were involved in the various aspects of design and construction. Teams can show design drawings and models to demonstrate work undertaken by students.
- **Innovation and Quality** – how effective/clever the design concepts are; the materials used; construction methods and types of gears, brakes and steering.
- **Understanding** –the students' understanding of the vehicle design and key design concepts incorporated, the materials, components, running set-up.
- **Safety: Design and Understanding** – the use of restraints, roll bars, rider protection and visibility.
- **Practicality, Stability & On-road Performance** – vehicle reliability, handling, lighting.
- **Driver Training and Skills Development** – presentation of licences for each team member, skills covered in driver training including driving at night, in the wet, etc.
- **Understanding of Environmental Issues** –the relationship between transport and issues including greenhouse, air pollution and the importance of renewable energy, etc.
- **Vehicle Weight** – Weight is an important factor in efficiency and HPV's will be weighed and scored based on their weight compared to other teams and the rules.

3.5 Display and Presentation



3.5.1 Purpose

The purpose of the Display and Presentation is for team members to demonstrate their knowledge and understanding of their entry.

Judges consider the different approaches taken in the presentations, such as some students reading from notes versus student presentations with limited reference to prepared notes. Schools are encouraged to be innovative in their presentations. However, care needs to be taken to ensure that ‘distractions’ do not overtake the real purpose, that is, *‘students demonstrating their understandings’*.

The presentation [should be the result of student work and](#) designed in a way that ensures information is well presented by students and enables the students to demonstrate their knowledge, understanding and involvement in all aspects of the entry.

3.5.2 Format

Each team will be required to present for a maximum of 20 minutes to a panel of judges. This will be followed by up to 10 minutes of questions from the judges.

This oral report will relate to the development of the team entry, including ideas that did not work and why.

The judging panel consists of three members: a community representative, a young person with an interest in education and/ or technology and an education/teacher representative. Judges will ask questions of team members following their presentation.

All registered team members are required to participate equally in the presentation. Teams may choose to include up to two (2) additional students (i.e. support crew) to join their registered team members in their presentations. However, the presentation roles must still be shared equally by all participating team members.

[Each team may use one only wall \(3m x 2M\) for their display and this](#) may include photos, videos, models, prototypes etc to explain the involvement of students, school, community and/or industry in the program and the development of their entry. To reduce interference from nearby panels, no public address or small music (CD) systems will be allowed without prior approval of the Display & Presentation Coordinator.

The presentation should be designed in a way that ensures information is well presented by students and enables the students to demonstrate their knowledge, understanding and involvement in all aspects of the entry.

3.5.3 Schedule

A specific time for each team to complete their Display & Presentation will be included in communicated to schools in early November. Each team is allocated time to set up their display prior to their time.

Event schedules will require teams to have arrived and be available from 12 noon on the day of the assessment. Late arrivals will be accepted only by negotiation.

3.5.4 Criteria

The assessment covers both oral and visual presentation.

Judges are asked to look for evidence of:

- Student involvement.
- Levels of participation.
- Team work and enthusiasm.
- Individual contributions.
- Understanding of the project.

It is understood that the levels of student involvement in the technical and practical activities related to the design and building of an entry will vary with age.



The oral presentation will be assessed according to:

Presentation Style:

The introduction and outline of the presentation; awareness of the audience; style of presentation (reading from notes or reciting); clarity of language; use of materials, diagrams and models covered.

Team Work:

The effectiveness of leader's role; sharing of knowledge and responsibility in the team; acknowledgment of individual team members' role; team attitude and enthusiasm and the extent to which the presentation reflects the students' own work.

Knowledge and Understanding:

Knowledge of the aims and values of the Energy Breakthrough; highlights of the school and community participation; team planning; preparation and training and technical aspects of the development of the vehicle.

Development of a Story:

About the entry, including the challenges; the preparations; the school and community's involvement and the students' achievements.

The visual display will be judged according to:

Layout and Organisation:

The range of visual media and written text depicting vehicle development; the arrangement of items; the variety of information presented and the acknowledgment of sponsorship/financial support received.

Effective use of Display:

The effective use of diagrams, models, photos, text, drawings, etc. to convey message.

3.6 The Trials

In this section, the operation of each entry will be tested. **Tryathlon** teams will tackle a Time Trial, Obstacle Course and an 8-hour Endurance Trial.

Challenge 1: Time Trial

Location: Track 1 (Location to be advised)

Circuit Length: Approx. 600 metres per lap

Event Format: One round – 8 Riders

- There will be three or four teams per heat, each from the same class.
- Riders will each complete one lap of the Time Trial circuit before changing over in the allocated pit areas under the direction of the track marshals.
- For Tryathlon A teams with 9 or 10 riders, 8 riders will participate in this challenge. It is a requirement that those riders omitted from this challenge will participate in the Obstacle Rally.

Points Allocation for Time Trial

- Points will be allocated on the total team time recorded.
That is: 15 points to the team recording the fastest time.

$$\text{Time Trial Score} = 15 - \left[\left(\frac{X - Y}{Y} \right) \times 15 \right]$$

- Where Y = fastest team time recorded & X = team's own time

Challenge 2: Obstacle

Venue: Track 1 – Front Straight (Near Main Stage)

Circuit Length: Approx. 600 metres per lap

Event Format: One round – 8 Riders.

- Each team will complete the Obstacle Rally, which will incorporate several stations or control challenges:

Minefield

- The classic test of handling! How fast can your riders navigate a scattering of witches hats across the track, without hitting one. There is typically two or three paths through, so take your pick and commit!

Rumble Strip

- It's been part of the Tryathlon for a number of years now and creates a great buzz for the riders. There's a 'chicken run' here if riders aren't too sure.

Ramps

- This is a technical challenge with a difference, with riders needing to keep a steady hand as they manoeuvre their vehicles onto 5 metre long ramps. The ramps aren't high and they certainly aren't dangerous, but it's a unique test of skill!

See-Saws

- This was added in 2017 with four see-saws where riders ride onto and off a ramp that is at a gentle slope. This is best done at slow speeds and it will be positioned at a slow part of the course for best effect. Each team will be assigned a ramp, numbered 1 – 4, so that there is no queuing or potential damage to vehicles.

If you wish to arrange a test session with any of the obstacles or receive plans to build similar ones for your own training, please contact the EB team via enquiries@eb.org.au

- New obstacles may also be introduced each year to keep the challenges 'fresh' and exciting!

- Riders will each complete one lap of the Obstacle Rally circuit before changing over in the allocated pit areas under the direction of the track marshals.
- For Tryathlon A teams with 9 or 10 riders, 8 riders will participate in this challenge. It is a requirement that those riders omitted from this challenge will participate in the Time Trial.

Points Allocation for Obstacle

$$\text{Obstacle Rally Score} = 15 - \left[\left(\frac{X - Y}{Y} \right) \times 15 \right] - \text{Penalty}$$

- Where Y = fastest team time recorded (in seconds) & X = teams own time (in seconds).

Obstacle - Penalties & Infringements:

Infringement	Penalty Points
Contact with hay bale or barrier, loose seat belt and/or helmet,	0.2
Careless driving, contact with other vehicle, no seat belt, no helmet, incorrect pit change over	0.5
Very dangerous driving	1

Challenge 3: Endurance Trial

Venue: Regional Roads Track

Circuit Length: 1.1 km per lap

Duration: 8 hours

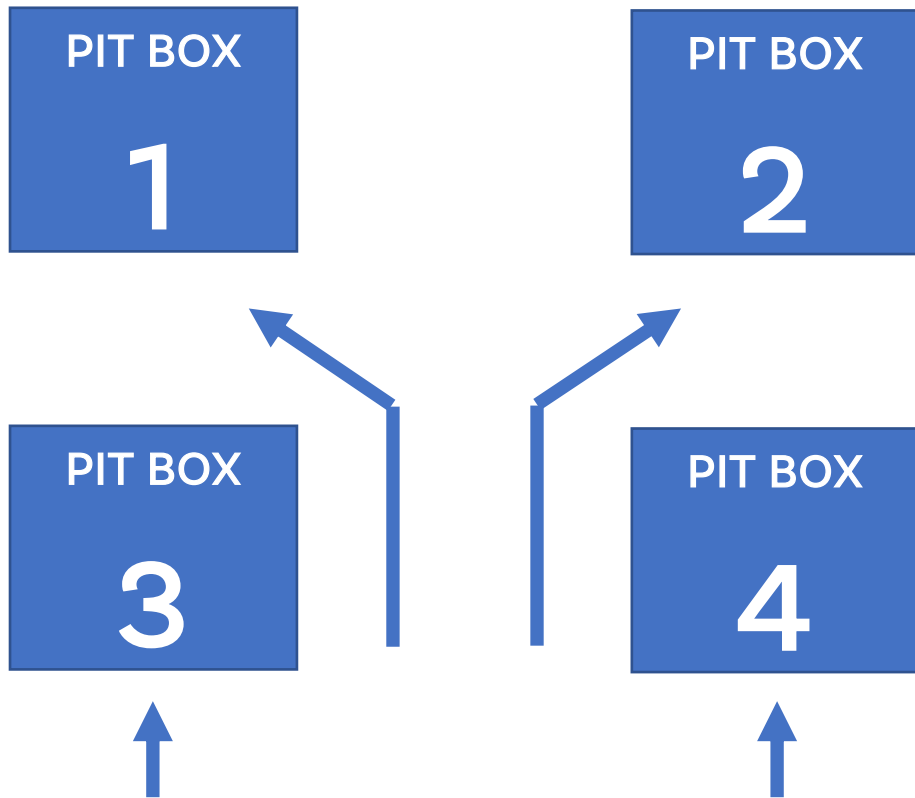
- Teams will compete over eight hour and each rider is encouraged to complete at least 30 minutes riding.
- Teams assemble as directed and the trial will commence with a rolling start behind the lead vehicle.
- For Tryathlon A teams with 9 or 10 riders, all riders may participate in this challenge.

Points Allocation - Endurance Trial

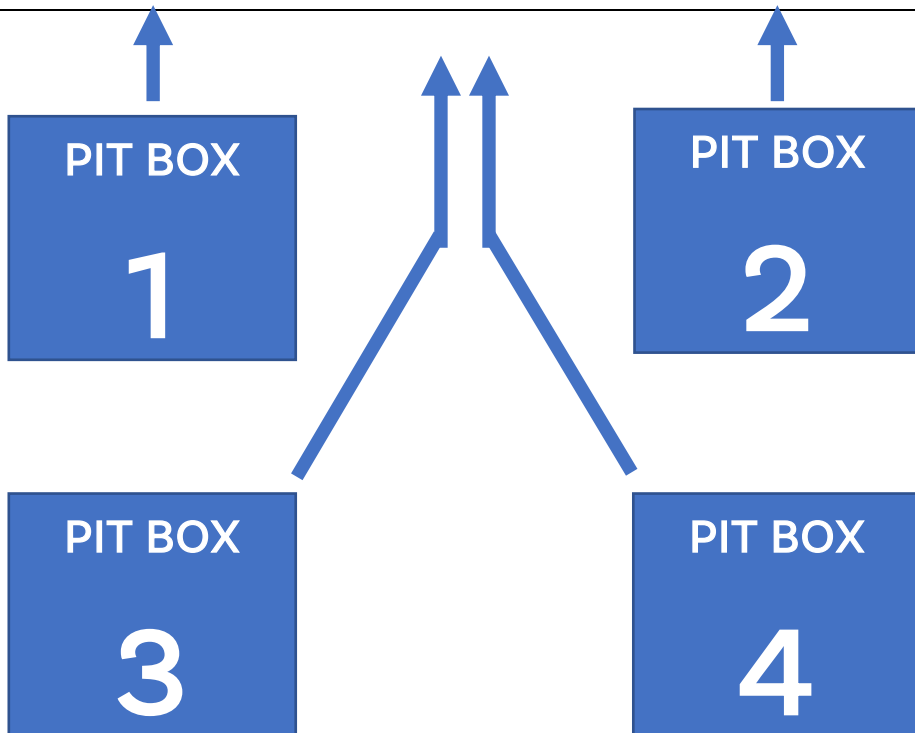
- Points will be allocated on distance completed by the team. That is, 30 points to the team recording most laps.
- Other finishers: (X/Y) multiplied by 30 = points
- Where Y = highest number of laps recorded & X = team's number of laps.

TRY-ATHLON PIT PROCEDURES FOR
TIME TRIAL AND SPRINT EVENTS

Pit Entry:



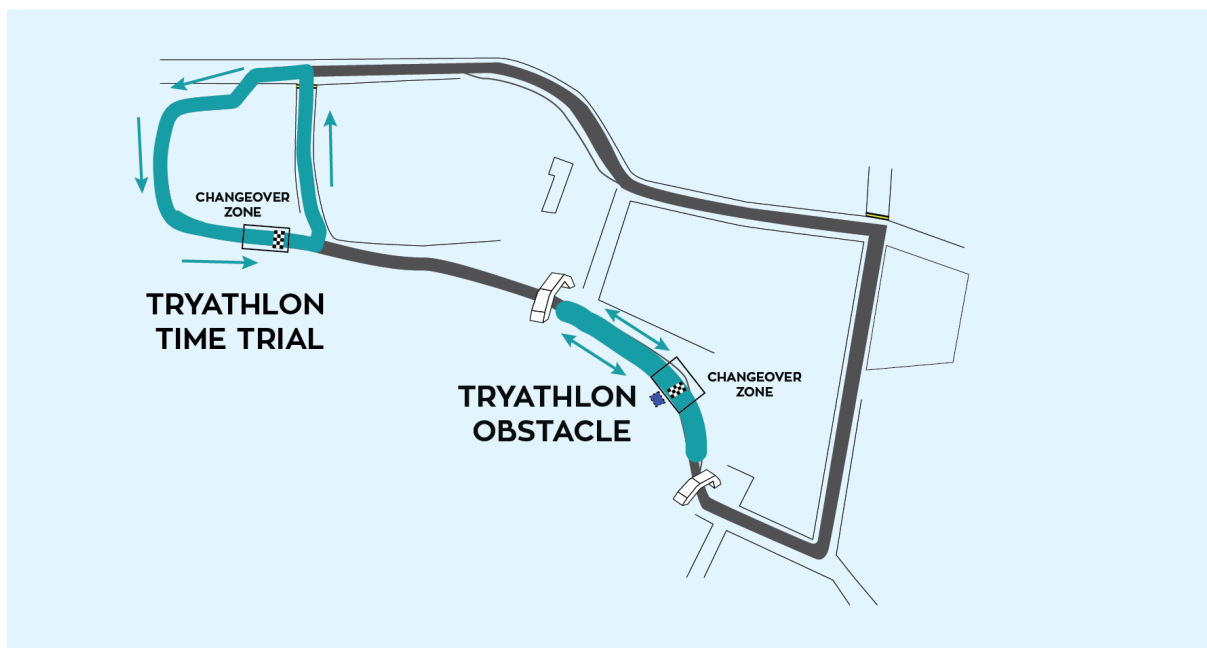
Pit Exit:



3.6.1 The Circuits

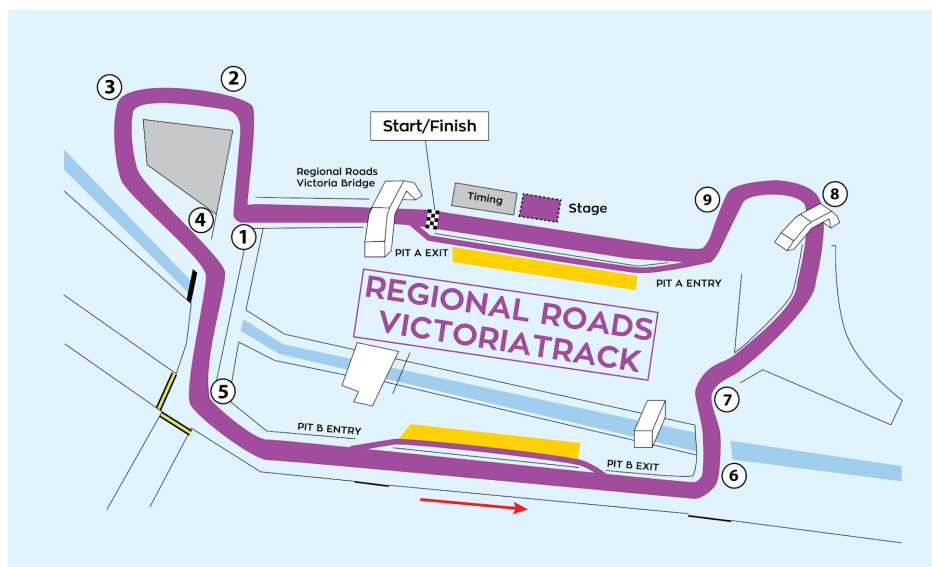
There are two tracks in Princes Park, Maryborough surrounding the beautiful Lake Victoria. On both tracks there are some unlit sections at night, and the sealed surfaces are not “billiard table smooth”.

Track 1



Track 1, shown above, is a challenging 1.76 km street circuit that reflects real-world conditions.

Track 1 will be used for the Tryathlon Obstacle & Time Trial races.



Track 2

The **Regional Roads Track (RRV Track)**, shown above, is located between the Maryborough Caravan Park and the Princes Park oval. It is approximately 1.1 km long and includes a number of challenging left and right hand bends.

This track will be used by the HPVA’s and the Tryathlon Endurance teams.

TRYATHLON PROGRAM

WEDNESDAY 16 NOVEMBER

3.00 pm – 5.00pm Registration open

Location: Administration Centre

THURSDAY 17 NOVEMBER

All Day Teams arrive and set up camp.

9.00 am Registration Opens

Location: Administration Centre

9.00 am - 5.30 pm Scrutineering, Design and Construction

Location: Scrutineering Area

9.00 am - 5.30 pm Display and Presentation

Location: Display & Presentation marquees

6.00 pm – 6.30 pm Team Managers and Marshals Meeting

Location: Volunteer Marquee, Track 1

All teams should have arrived and registered by 12noon on Thursday.

Display & Presentation and Design & Construction schedules will be prepared with this in mind.

FRIDAY 18 NOVEMBER

	9.00AM – 11.00AM	11AM – 1PM	2PM – 4PM
Obstacle Rally	A Class	Open Class	B/C Class
Time Trial	B/C Class	A Class	Open Class
Marshals	All schools will be required to provide marshals for these sessions. Schedules will be released in November.		

8:45 pm Assembly for Night Practice

Location: Pit Lane, Regional Roads Track

Note: Tryathlon teams will be sharing pit spaces (not tools and resources) with HPV A teams during this Practice Session.

9.00 – 10.30 pm Night Practice

Location: Regional Roads Track

SATURDAY 20 NOVEMBER

1.30 pm Assembly of Starting Grid

Location: Front Straight, Regional Roads Track

2.00 pm - 10.00 pm Tryathlon Endurance

Location: Regional Roads Track

11.00 pm Tryathlon Presentation Ceremony

Location: Regional Roads Track

SUNDAY 21 NOVEMBER

All Day No activities, Pack up and depart.

Please note Schedules are subject to change.