Testcenter Pferdsfeld
New Automotive Testing Solutions

TRIWO
Automotive Testing

10th of January 2021

Presenting TRIWO Automotive Testing GmbH

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TRIWO AG
Company Profile

The TRIWO Group was founded in 1972. As an owner-led stock corporation, we focus our extensive expertise on the long-term development and management of our three business areas:

- Real Estate
- Automotive Testing
- Airfields

We underline the importance of the long term and sustainable development of our industrial and commercial real estate portfolio. Our service offer includes professional project development and commercial and technical real estate management.

At our manufacturer independent proving grounds, we support our customers from the automotive industry in their project development and trials. Offering a variety of testing tracks and services, our facilities are designed to fulfill your every need: from testing vehicle components to the development of the driver assistant systems of tomorrow.

We are represented through our ca. 200 employees at over 22 locations across Germany.

TRIWO Automotive Testing in Pferdsfeld

Where to find us

Navigation system address:

55566 Bad Sobernheim, Industriepark Pferdsfeld 280

In the former Pferdsfeld military airbase, we are located in the tower building (280). Follow the signs „TRIWO“.

You can‘t miss us.

Feel free to ask us about hotels & shuttle services

Distances	➔ Pferdsfeld
Frankfurt/Main	~ 110 km
Frankfurt/Hahn	~ 35 km
Mainz/Wiesbaden	~ 60 km
Nürburgring	~ 100 km
Hockenheimring	~ 130 km
Koblenz	~ 75 km
Stuttgart	~ 240 km
Cologne	~ 170 km

Pferdsfeld History
German NATO Airbase Pferdsfeld

Photos: Hanns Kirchoff

1939: Opening of the Pferdsfeld Airfield

1951: Use of the airfield from French, Canadian and US Military

1958: Use as a NATO base

1997: Movement of the fleet and suspension of flight operations at Pferdsfeld Airfield

2003: Acquisition through the TRIWO Group and declaration as an industrial area. Usage of the airfield as an automotive testing center through Opel AG

2015: Operation through TRIWO as a manufacturer independent automotive proving ground

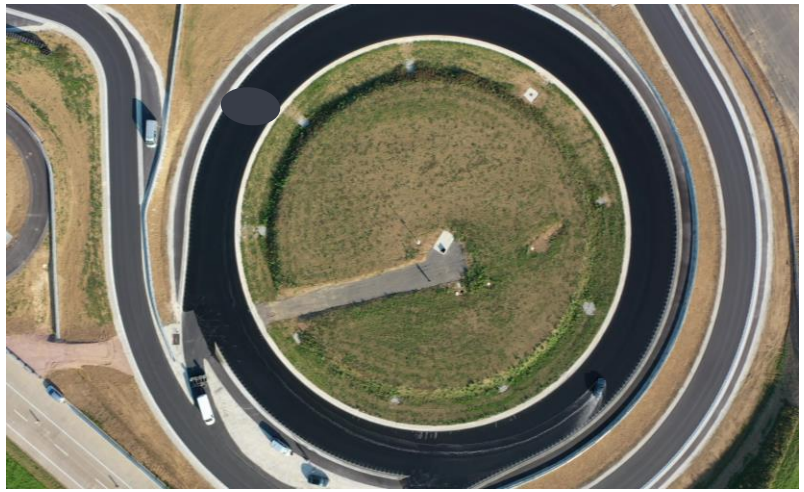
Automotive Testing in Pferdsfeld

Offices, Workshops, Fuel Station, Training, Testing

Automotive Testing in Pferdsfeld

New Tracks for Performance Testing and Driver Trainings

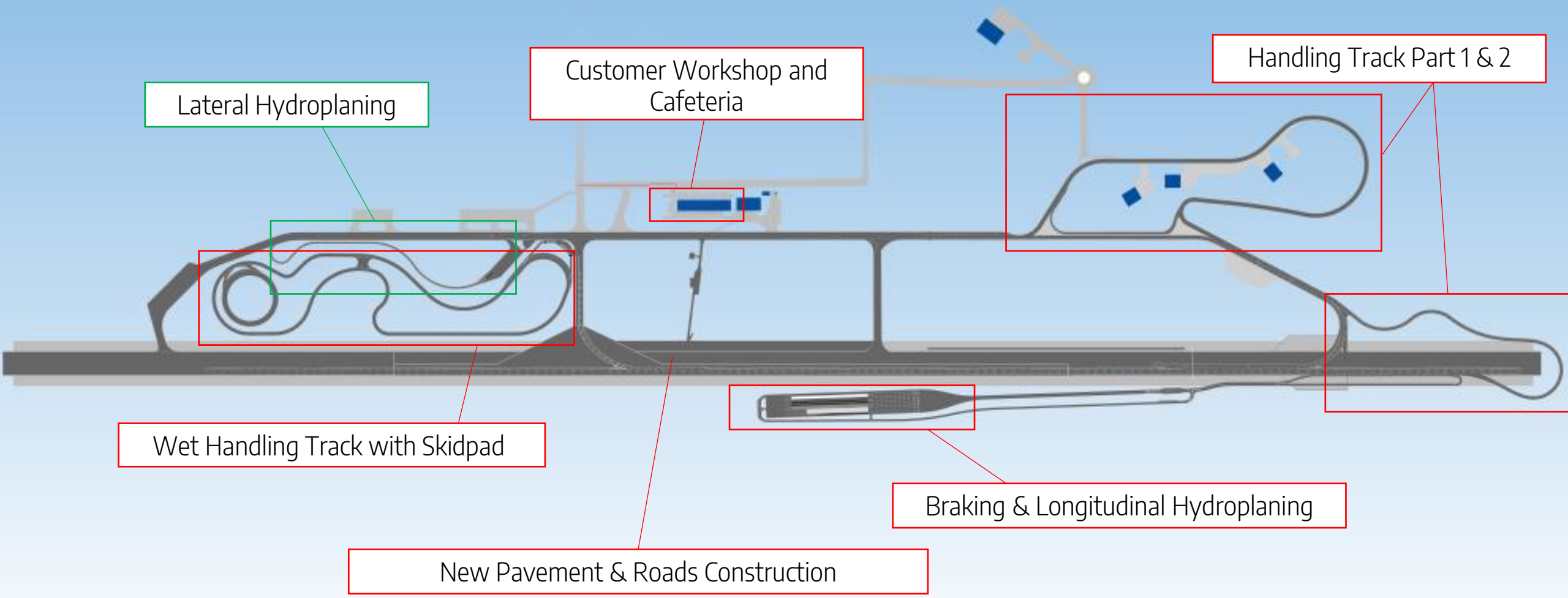


Automotive Testing in Pferdsfeld

Incentives, Events, Track Days, Racing, Product Shows

New Test Tracks
Advanced Testing Solutions



TRIWO Automotive Testing

New Track | Wet Handling & Lateral Hydroplaning

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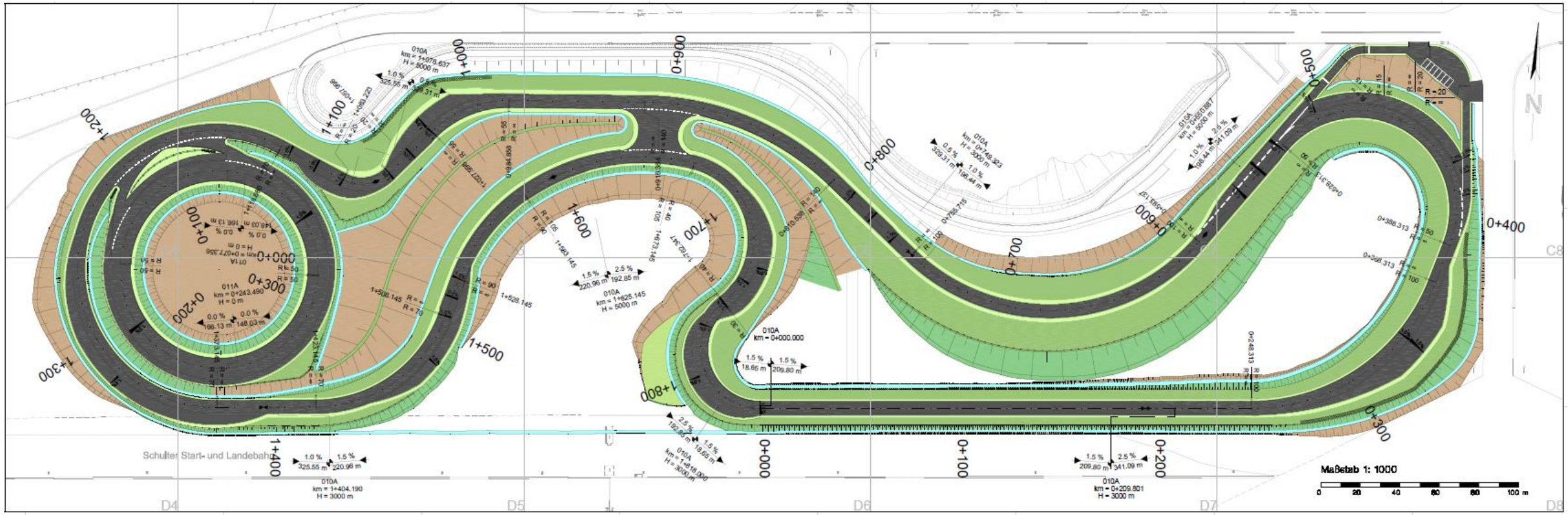
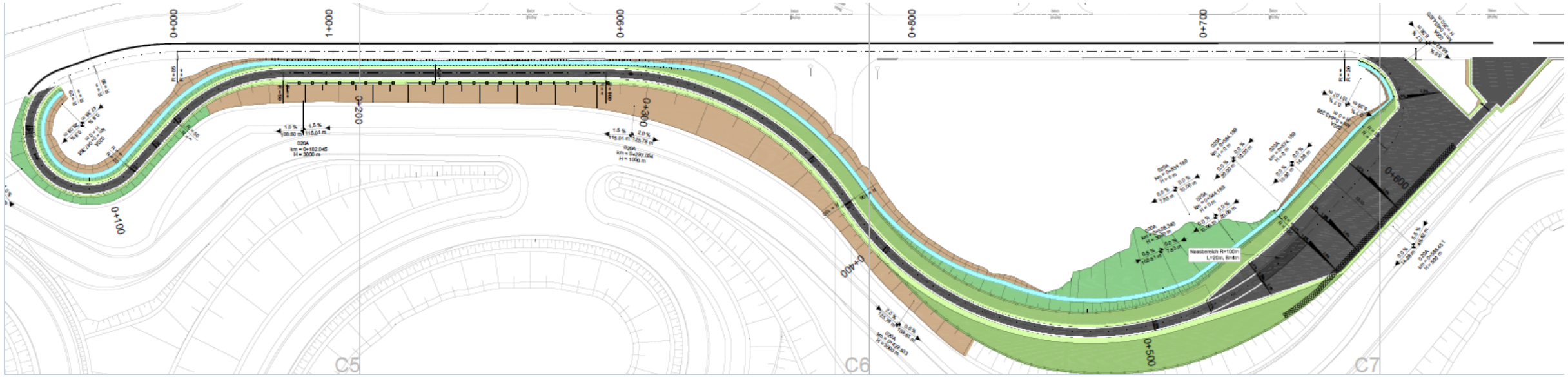
Fact Sheet | New Wet Handling Track

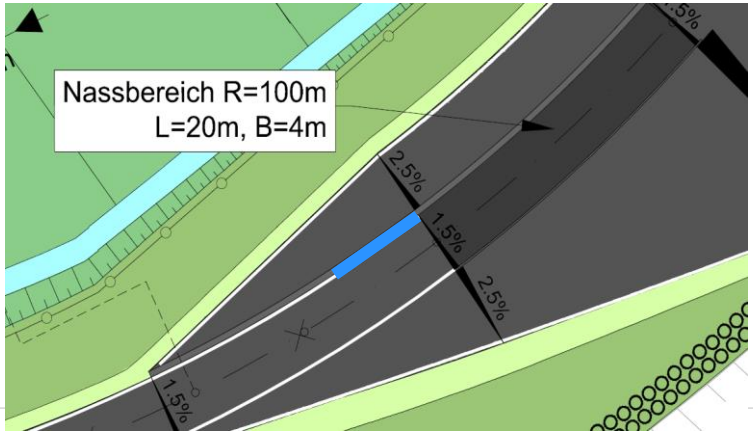


- Length: 1,8 km, | Watered width: 6,5 m | Safety zones | Constantly low held μ level
- Various programmable sections with constant water levels | Watering through curb stones
- An immense underground water supply of 2.600 m_3 offers differing treatment levels to ensure optimal water quality and temperature. Furthermore, this system guarantees a precise control of the water levels on all areas of the track, in all possible weather conditions.
- Skidpad with a 50m radius, two different lanes and friction values.

Fact Sheet | New Lateral Hydroplaning Test Track



- Separate module with a length of 1,1 km
- 4m x 20 m watered test zone with 10 m watered “tread fill” area in front of the test zone
- Variable water depths up to 18 mm
- Comfortable, wide safety zone



New Track | Braking Tracks

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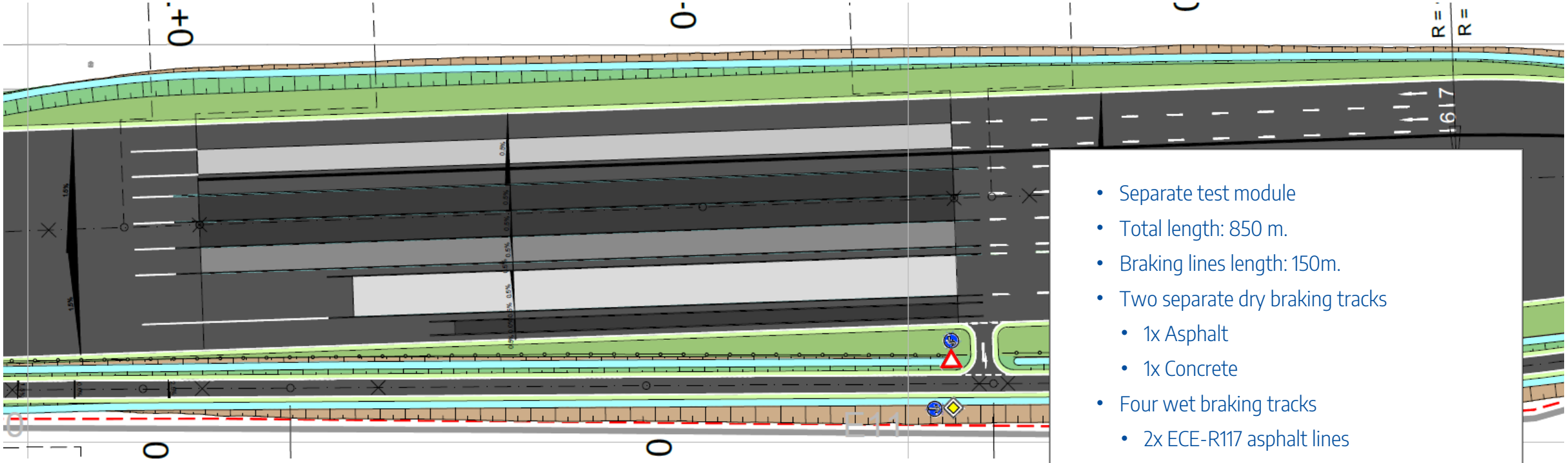
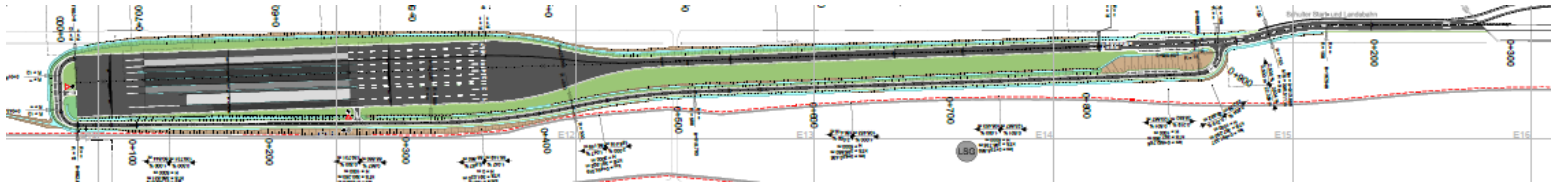
Fact Sheet | New Braking Tracks





- Separate test module
- Total length: 850 m.
- Braking lines length: 150m.
- Two separate dry braking tracks
  - 1x Asphalt
  - 1x Concrete
- Four wet braking tracks
  - 2x ECE-R117 asphalt lines
  - 1x Concrete
  - 1x Tiles
- Tiles track (8 m x 120 m) with high-μ side stripes
- 100 m longitudinal hydroplaning test track with variable water depth

New Track | Handling Track Part 1 & 2

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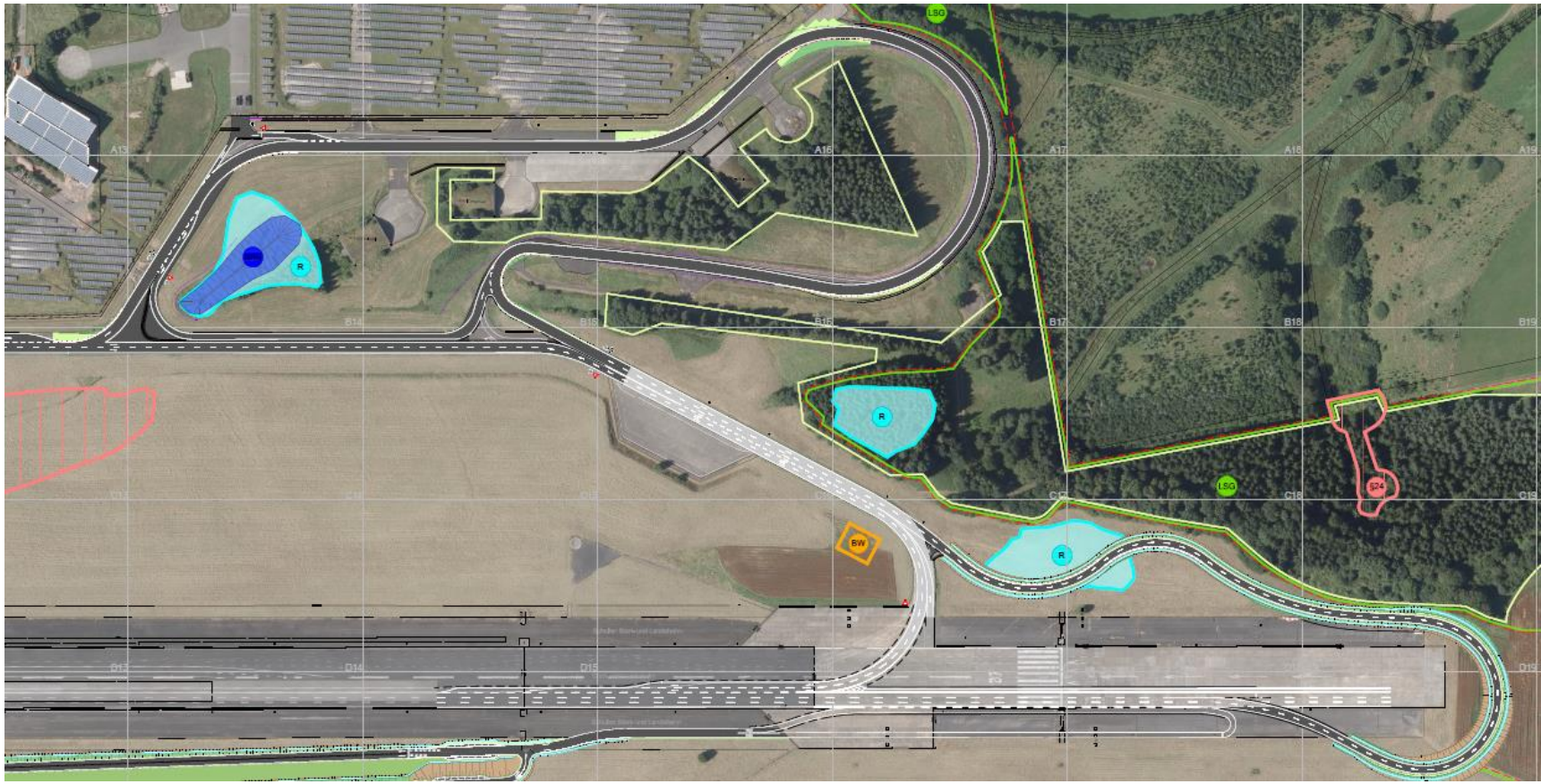
Fact Sheet | Handling Tracks

- Variable course length
  - Short Connection ~ 1.600 m
  - Extended Handling course ~ 4.000 m
  - Further options in 5.170 m and 6.710 m
- New pavements
- Optimized track layouts
- Improved safety standards
  - New guardrails and safety walls with motorcycle protection
  - High performance rails and stacks of tires (sixpacks) in critical areas
  - Traffic light system
  - Video surveillance



Fact Sheet | New Roads and New Surfaces

~ 108.000 m² Surface Renovation

- ~ 77.000 m² new pavement on the runway
- ~ 17.000 m ² concrete surface renovation on the runway
- ~ 14.000 m ² new pavement on the handling course

~ 58.500 m² Construction of New Roads

- ~ 6.500 m² handling track and lateral hydroplaning
- ~ 20.000 m² wet handling
- ~ 32.000 m² braking tracks

Construction Site | 2.000 m² New Customer Workshop

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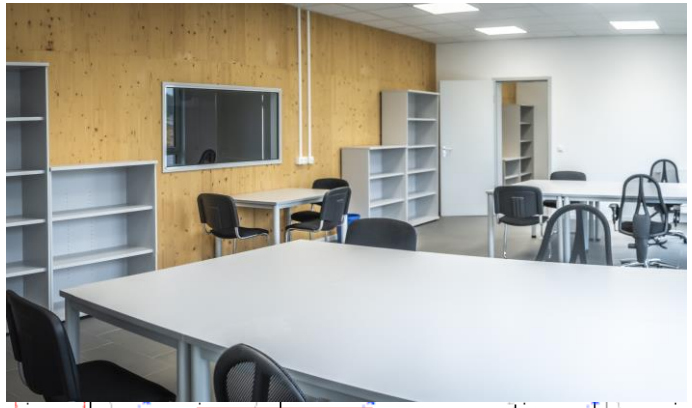
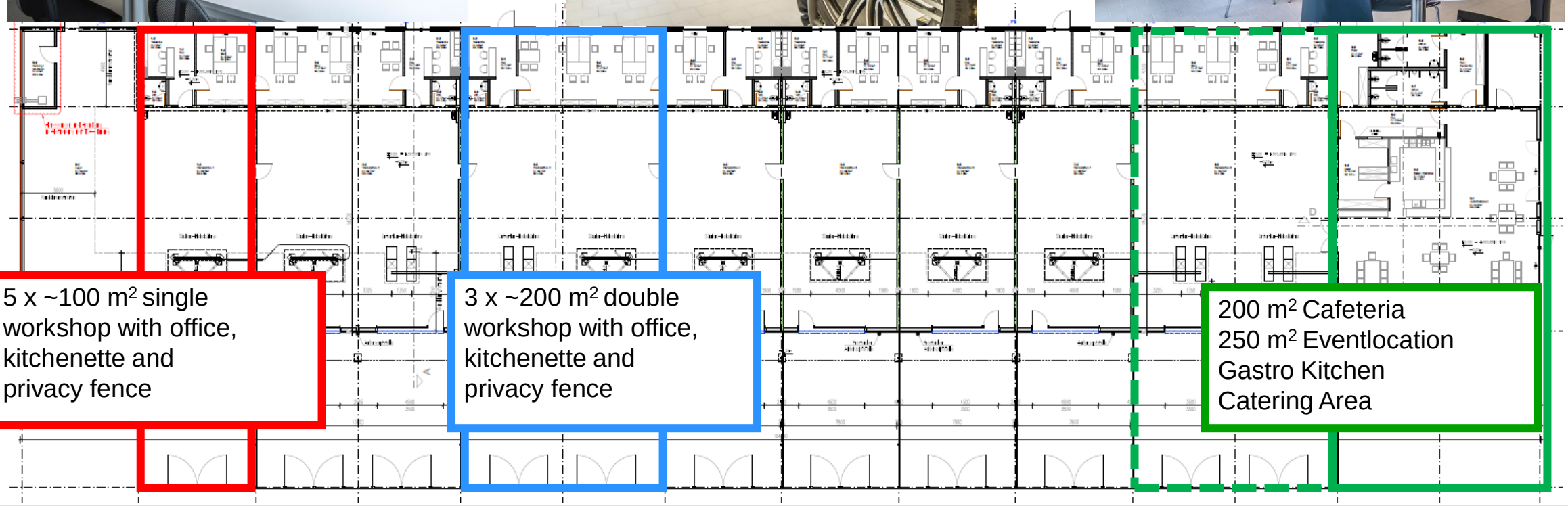
Fact Sheet | Customer Workshop





New Technical Equipment
Up to 300 kW Charging Stations

Photos: alpitronic GmbH

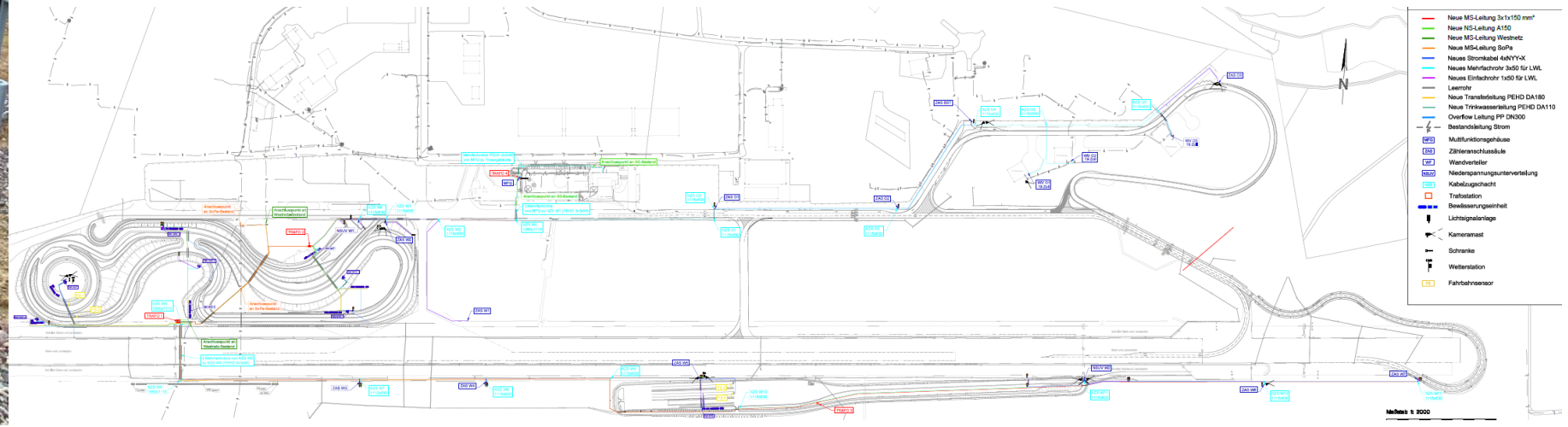
150 kW Charger		300 kW Charger	
			
CCS2	GB/T	CCS2	CHAdeMO

New Technical Equipment
Fiber Optic Network around the Proving Ground

- 26 fiber optic connection throughout the proving grounds
- All connection columns equipped with industry switches and power supply
- Antenna masts for 5G antennas

→ Plug and Play

→ 5G ready



Adjusted Operational Processes
Proving Ground Safety

- Risk Management
- Driver Accreditation Process
- Occupational Safety
- Traffic Control
- Dispatching
- Traffic Light Systems
- Video surveillance
- Emergency Vehicle (E-Unit: Fire & Health)
- Security Service

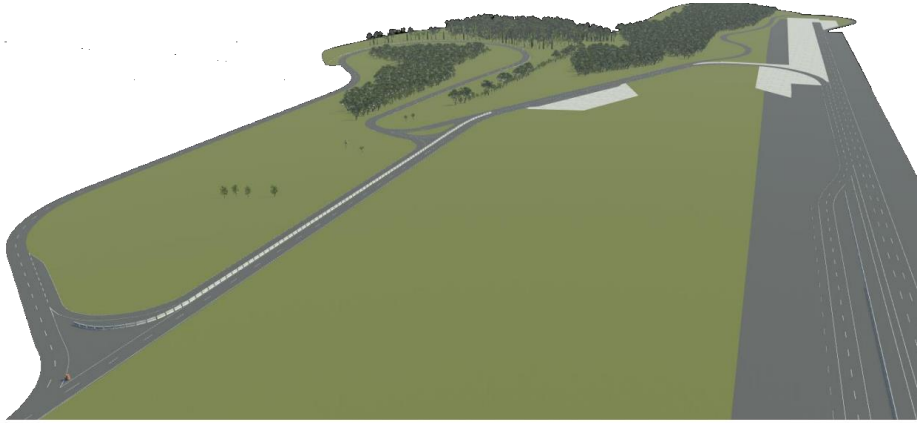
Photo: mh-Sportpromotion

TRIWO Partnerships
Proving Ground Digital Mapping by

Fraunhofer ITWM

Highly accurate digital twin of the proving ground in various formats available.

Our collaboration with the leading experts from Fraunhofer Institute guarantees best possible support for your specific simulation and data requirements.



TRIWO Partnerships
Test solutions for active vehicle safety by 4activeSYSTEMS

4activeFB-large for C2C testing (passenger vehicles)

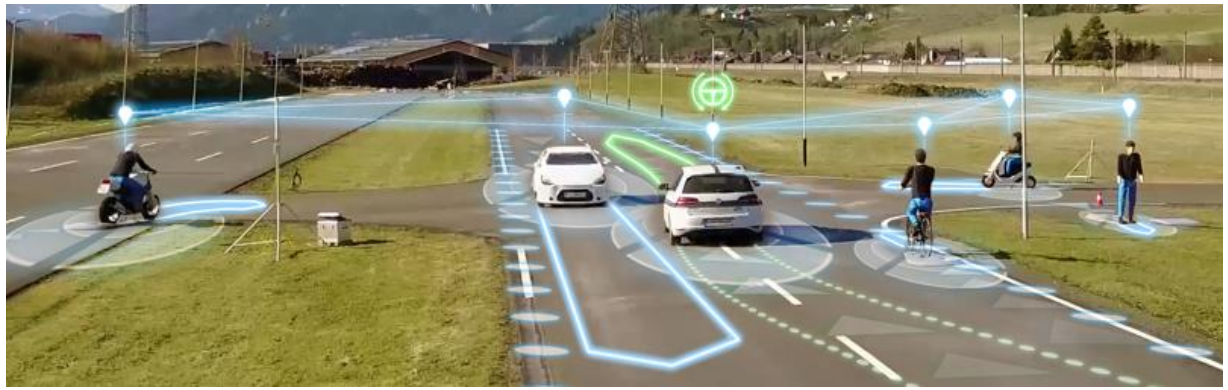
- Fulfils all Euro NCAP C2C specifications
- Fully synchronised operation with all driving robots
- Allows testing in rough conditions

4activeFB-small for VRU-Testing (pedestrian, cyclist, motorcycle)

- Designed according to NCAP VRU specs
- Full synchro mode with all relevant driving robots
- Allows testing in rough conditions

4activeSB for VRU

- Speeds up to 20 km/h
- Full synchro mode with all relevant driving robots and dGNSS-systems
- Easy transport and set up



TRIWO Partnerships

High-precision Inertial + GNSS measurement-technology solutions by DTC Navigation Solutions

High-performance products. Consulting. Service.

Professional ADAS Test equipment: Service and rental at the testcenter

- Inertial Navigation-systems for ADAS & Georeferencing
- Lidar-systems
- Automotive Video-systems
- RTK-Service
- Accessories

RT3000v3 – Complete measurement solution with built-in RT range functionality

RT1003 – Miniature INS for testing vehicles with limited space

RT500 – Reliable and consistent measurement data for low-dynamics tests

Moshon-Data Demo-Targets such as the MD-SF Slab Foam Target

DTC – Your full-service solution partner for measurement technology used for autonomous driving and ADAS testing.

Official distribution partner of

OXTS Inertial+GNSS · Moshon DATA · OUSTER · pozyx

TRIWO Partnerships

Proving Ground Instrumentations by iMAR NAVIGATION & CONTROL

Automotive Testing

- Vehicle Dynamics, Function Validation, Sensor Verification, ADAS, xNCAP

Test Equipment

- GNSS/INS Systems, DGPS/RTK Base Stations, Communication Hardware, Traffic Simulation Vehicle, Drive-by-Wire and more

Test Automation and scenario-based Testing

- Holistic Toolchain for Test Automation of xNCAP and Scenario-Based Tests, Specific Scenario Generator, Interfaces to OpenX and Tools from IPG, AVL, iAV, Control of Steering Robots, Target Mover, Traffic Simulation Vehicle

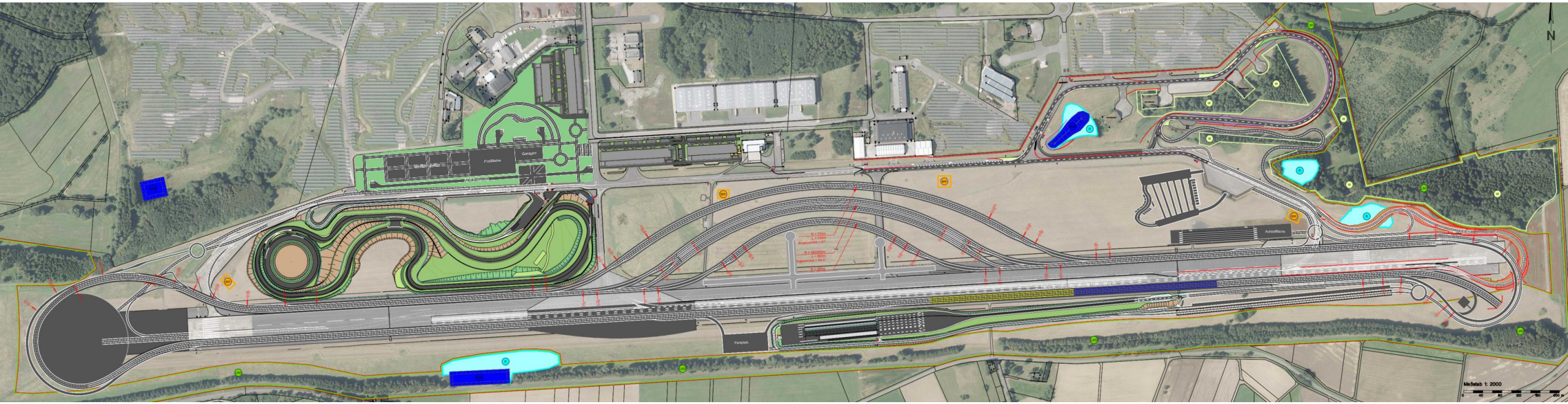
Engineering and Operating Services

- Hardware and Scenario Set-Up, Scenario Generation. Control Center Installation, Communication Organisation, Education and Training

sales@imar-navigation.de

Further Track-Developments | Outlook

New Constructions under Consideration & Preparation

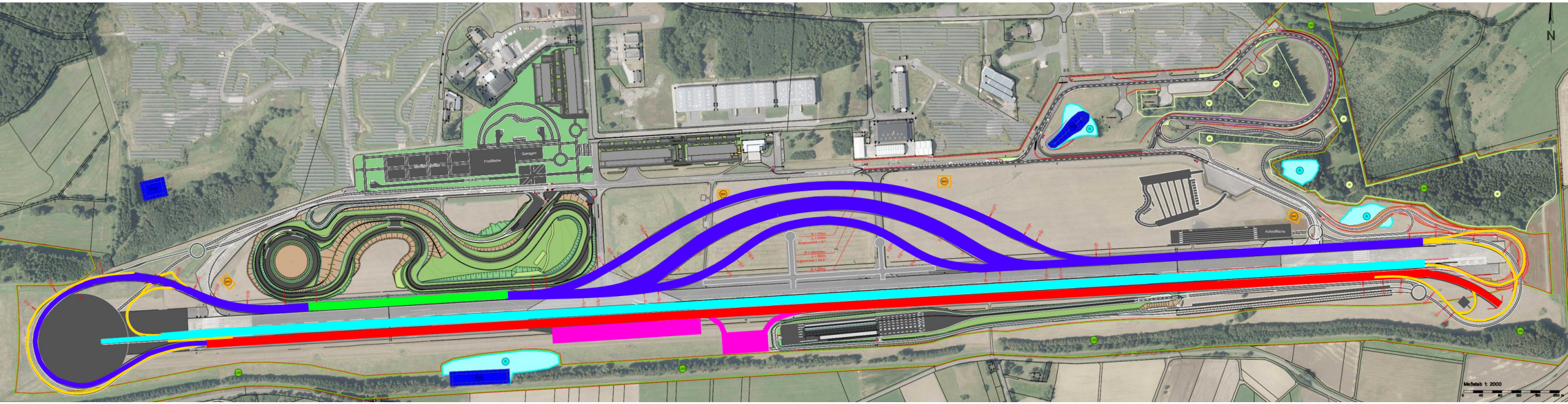


Highlights of the proving ground concept

- RAA highway simulation
- City simulation
- RAL normal road simulation
- 220 m skidpad and many more

The requirements for the tracks collected and designed in various customer workshops.
Contact us for any discussions!
We are still collecting input to finalize the design.

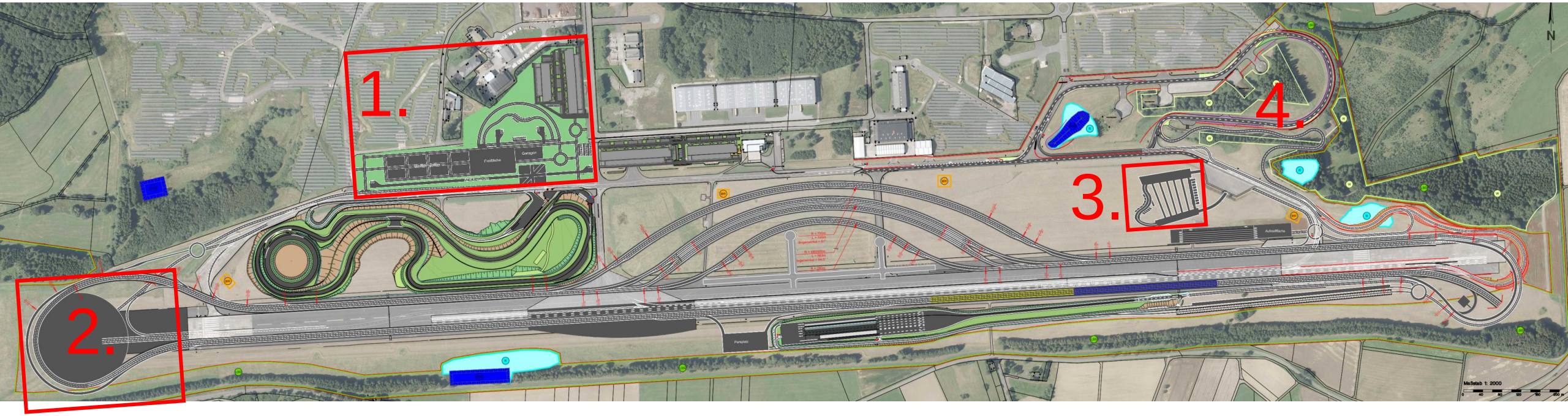
Further Track-Developments | Outlook
Forward-looking Highway Simulation



> 9 km highway simulation with different combinable, multi purpose sections. Some highlights:

- Curvy higways r 280 m to 700 m & up to 69° arc angle
- Low-µ area and rain simulation area
- High speed track
- Slow testing higway sections (traffic jam ...)
- Simulation areas (construction area, parking places...)
- Slow testing setions (traffic jam ...)

Further Track-Developments | Outlook
Selection of further Highlights



1. ~7,5 ha city simulation
2. r 220 m Skidpad
3. Hillclimb section with hill parking scenarios
4. Normal road simulation

We are looking for long-lasting partnerships to finalize the design, to build and run testing infrastructures of future purposes.

See you on the track in Pferdsfeld

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