

The background of the slide is a faded photograph of a racetrack. In the foreground on the left, a large orange traffic cone is visible. In the distance, a line of trees and other orange cones on the track can be seen under a bright sky.

# FORMULA SAE®

## Dynamic Events Drivers Meeting

May 12, 2016

Michigan International Speedway

Acceleration, Skid-pad, Autocross, Endurance

# General Announcements

- Hot area appropriate behavior and dress
  - Long pants, closed-toe shoes, no running
- Number of team members allowed in hot area
  - 4 with dynamic passes
- Weather
  - Track condition tire requirements (see next slide)
  - Emergency locations – tunnels, listen for announcements

# Weather and Tires

Track Weather Condition	Tire Type	
	Dry	Rain
Dry	✓	
Damp	✓	✓
Wet		✓

Note: If Weather Condition Changes during Endurance, see D.3.8.2 for procedure

# General Safety

- Event captains: Pink vests – find us if any problems or questions
- Dress/other ID for SCCA volunteers
  - Course marshals wear all white, take direction from them while on track
- Data Logging locations (Endurance only)
  - See John or Ed if have data beacons for specific locations to set up before event starts
  - Must be set up and retrieved before/between/after heats only

# Photographers

- No photographers allowed on track during skidpad and acceleration events
  - Photographers may take pictures from roof of suites for acceleration
  - Photographers may take pictures from other side of concrete/fence walls for skid pad
- Designated photographer area for autocross and endurance at Gate 12 behind water barrier wall between course and turn 2
  - Teams may only have photographer in area when car is on track; Spotter required
  - Any photographer **who crosses the** water barrier wall will cause team to be **disqualified** from the dynamic event

# SCCA/SAFETY



Safety Steward:

John Lisiecki

Co-Steward:

Ed Arthur



# SCCA Flags for Acceleration

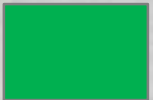


**GREEN** -- Enter the course under direction of the starter.



**CHECKER** -- Your session has been completed

## SCCA Flags for Autocross



**GREEN** -- Enter the course under direction of the starter.



**RED** -- Come to an immediate safe controlled stop on the course. Follow worker directions.

# SCCA Flags for Endurance



**GREEN** -- Your session has started, enter the course under direction of the starter.



**YELLOW** -- Danger, SLOW DOWN, be prepared to take evasive action, NO PASSING unless directed by the corner workers.



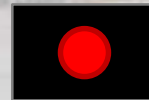
**RED** -- Come to an immediate safe controlled stop on the course



**BLUE** -- Pull into the designated passing zone to be passed by a faster competitor.



**BLACK** -- Pull into the penalty box for discussion with the Chief Marshall/Director of Operations or other official concerning an incident



**MECHANICAL BLACK** -- Pull into the penalty box for a mechanical inspection of your car



**CHECKER** -- Your session has been completed



# Be Prepared: Check the Rules

- All teams are responsible for reading and comprehending the rules prior to competition
- If you do not understand one of the rules or have questions, **find the event Captain before the event starts**
- Foreign Teams and Teams with non-English Speaking Members
  - Please ensure prior to Friday/Saturday that all drivers understand the dynamic-area rules, flags, and procedures
  - Teams with drivers who do not speak English must provide a translator who has to stand near race control while the driver is on course
- The Event Captains have final discretion

# Dynamic Events Layout



# Dynamic Events Schedule

Event	Open	Close	Location	Gate Entrance
THURSDAY				
Practice	12:00 NOON	5:00 PM	Turn 2	Gate 12
Endurance Course Walk	12:00 NOON	2:00 PM	Back Straight	Gate 50
Autocross Course Walk	4:00 PM	7:00 PM	Back Straight	Gate 50
FRIDAY				
Autocross Course Walk	7:30 AM	1:00 PM	Back Straight	Gate 50
Practice	8:00 AM	5:30 PM	Turn 2	Gate 12
Acceleration	9:00 AM	12:30 PM	Pit Road	Mid-Suite Tunnel
Skid Pad	9:00 AM	3:30 PM	Turn 3	Gate 50
Lunch Break *No Events Running*	12:30 PM	1:30 PM	-	-
Autocross	1:30 PM	5:00 PM	Back Straight	Gate 50
SATURDAY				
Endurance Course Walk	7:00 AM	8:30 AM	Back Straight	Gate 50
Endurance	9:00 AM	~5:00 PM	Back Straight	Gate 50
Lunch Break	~12:30 PM	~1:30 PM	-	-
Endurance Course Walk	~12:30 PM	~1:15 PM	Back Straight	Gate 50
Practice	8:00 AM	3:00 PM	Turn 2	Gate 12

*Subject to change due to weather, etc.*



# PRACTICE AREA

Thursday 12:00pm – 5:00pm

Friday 8:00am – 5:30pm

Saturday 8:00am – 3:00pm

Turn 2

Captain:

Frank Putman

Co-Captain:

Gary Godula

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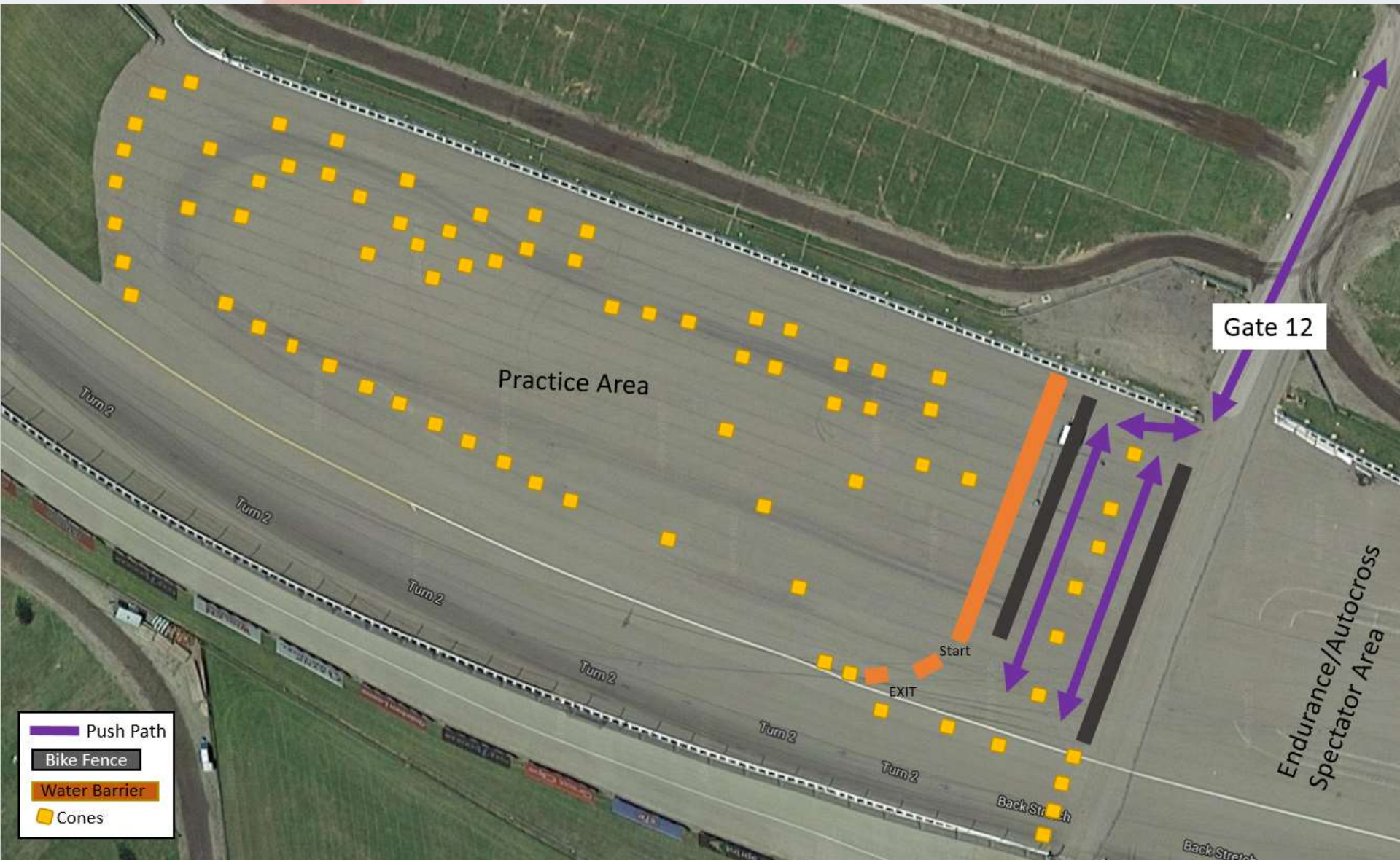
# Dynamic Practice Area

**PURPOSE:** Provide teams a safe, controlled, and reduced-speed environment for the purposes of vehicle testing (shake down), data gathering (tire temps/logging), dynamic brake bias/sway bar adjustments, driver practice, and crew practice, familiarization, and training.

## **General Rules:**

- Team safety briefing prior to each practice session
- Engine start only in designated hot area. Team member (dynamic pass) with fire extinguisher at the ready.
- Practice is “first come, first serve only”
- Practice session duration is 5 minutes (may be reduced at Event Captain’s discretion)
- Only SCCA personnel or Emergency Crews are allowed to respond to practice area emergencies. Response instructions will be provided by Event Captains.

# Practice Layout





# ACCELERATION

Friday

9:00am – 12:30pm

Pit Road

Captain:

Bob Goppold

Assistant Captain:

Steve Balanecki

Assistant Captain:

Reid Collins

# Acceleration Layout

N →



# Acceleration Event

- New location for 2016 – Pit Road
  - GET BRAKING DONE IN A STRAIGHT LINE!!!!!!
  - There are TWO Opportunities to Exit to Return Lane
- 2 drivers per team, 2 runs each
- Three Staging Lanes - Priority Order - 2<sup>nd</sup> Run, First Driver, Second Driver
- Event Flow
  - Team may use Prep Area
  - Enter Staging Lanes ONLY when car is ready to run!
  - Staging Lanes are under Event Control and for confirming Safety Equipment
  - Event Worker will call Car to Start Line – STOP AT START LINE!!!
  - Green Flag gives Permission to Start - Timing starts when timing beacon is triggered
  - Double Cones at Finish Line / Checkered Flag
  - Brake – Turn – Repeat
  - Driver can take second run immediately or exit
- If first right turn exit through wall cannot be made, take the second right turn.
- GET BRAKING DONE IN A STRAIGHT LINE!!!!!!
  - If your car cannot slow sufficiently, COME TO A CONTROLLED STOP – WAIT FOR EVENT WORKERS
- Ends at 12:30pm

# Acceleration Scoring

- Cone down and out is 2 second penalty
- Off course is a DNF for that run – no rerun
- Failure to Observe Event Procedures can result in loss of fastest run time



# SKID-PAD

Friday

9:00am – 3:30pm

*Lunch Break: 12:30-1:30*

Turn 3

Captain:

Steve Taylor

Captain:

Seth Goslawski

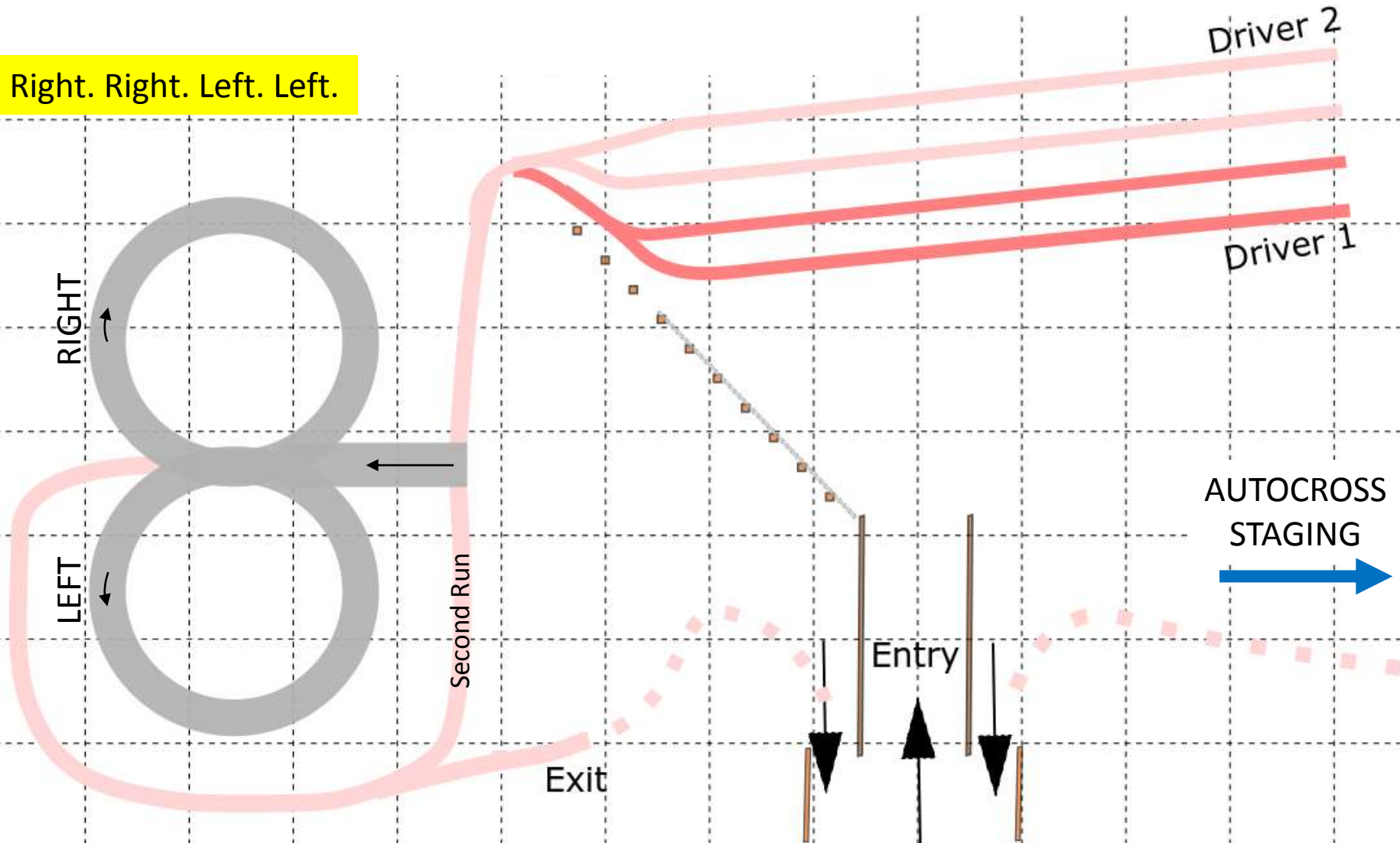
# Skid-Pad Event

- New for 2016 – only one Skid Pad set up
  - Time extended to accommodate but must maintain steady flow of teams in order for every team to get all 4 runs
  - Consider getting 1-2 runs in AM to ensure a score
- Course will be shut down for lunch break at ~12:30-1:30
- 2 drivers per team, 2 runs each
- First drivers are prioritized over Second drivers
- Flow of Event
  - Team pushes car into appropriate Driver line
  - Staging worker will call for car when ready
  - Starter person has a green flag; they will help stage car at start point and release car
  - Driver drives right circle twice then left circle twice
  - During second left circle, the middle cone will be pulled so driver can exit
  - Driver can take second run immediately or exit (other teams can be run in between driver's 1<sup>st</sup> and 2<sup>nd</sup> runs)
- Ends at 3:30. If event has steady flow of teams during entire open time, Captain has the option to extend the end time by 0.5 hours.



# Skid Pad Layout

Right. Right. Left. Left.



Layout is subject to change, Map is not to scale

GATE 50

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# Skid-Pad Scoring

- Only the second lap of each circle is timed
- Score is the average of 2<sup>nd</sup> lap on each circle
- Down or out cones are 0.25 second penalty
  - Rerun and exit lane cones also count
- Off course = DNF
- Incorrect laps = DNF

# Course Walk Schedule

- **COURSE IS DEFINED BY CONES, NOT CHALK**
- Thursday
  - Endurance 12:00-2:00 PM (weather dependent)
  - Autocross 4:00-7:00 PM (weather dependent)
- Friday
  - Autocross 7:30 AM-1:00 PM
  - Endurance After set up, depending on time  
**will be announced**
- Saturday
  - Endurance 7:00-8:30 AM tentative
  - Endurance Lunch (~12:30-1:30PM)
- **Listen to announcements for any time changes**



# AUTOCROSS

Friday

1:30pm – 5:00pm

Back Straight

Captain:

Matt Kalmus

Captain:

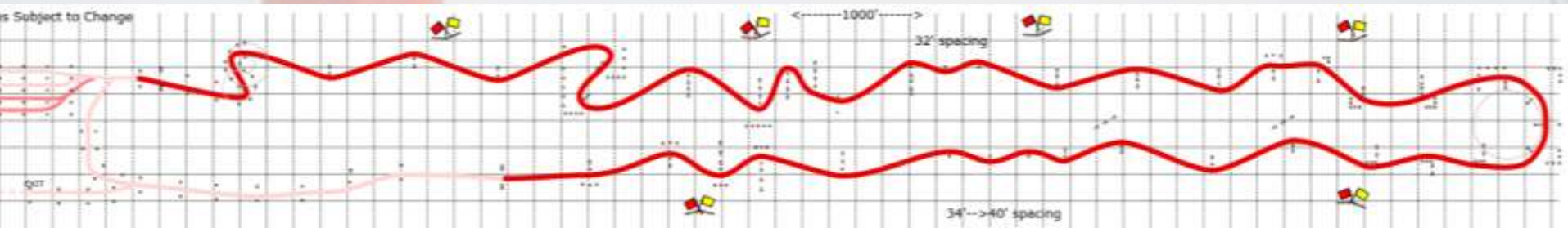
Corry Johnson

# Autocross Event

- Solo Course: ~0.6-0.65 mi/lap
- 2 drivers per team, 2 runs each
- First drivers are prioritized over Second drivers
- Flow of Event
  - Team pushes car into appropriate Driver line; car can be started any time
  - Staging worker will call for car when ready, car slowly drives to start line
  - Green flag releases car onto track. Timing wire is 20 ft after flag
  - Driver completes course. Follow the cones – *NOT* the chalk
  - Checkered flag is shown after end timing line. Car must SLOW DOWN at checkered flag
  - Driver can take second run immediately or exit and return to the appropriate driver line later
- Red Flag Procedure
  - A red flag will be shown if a car has an issue on track that causes a safety concern. Other cars on track will get a re-run.
  - When you see the red flag, SLOW DOWN and carefully drive back / follow-direction to staging for a re-run



# Autocross Layout

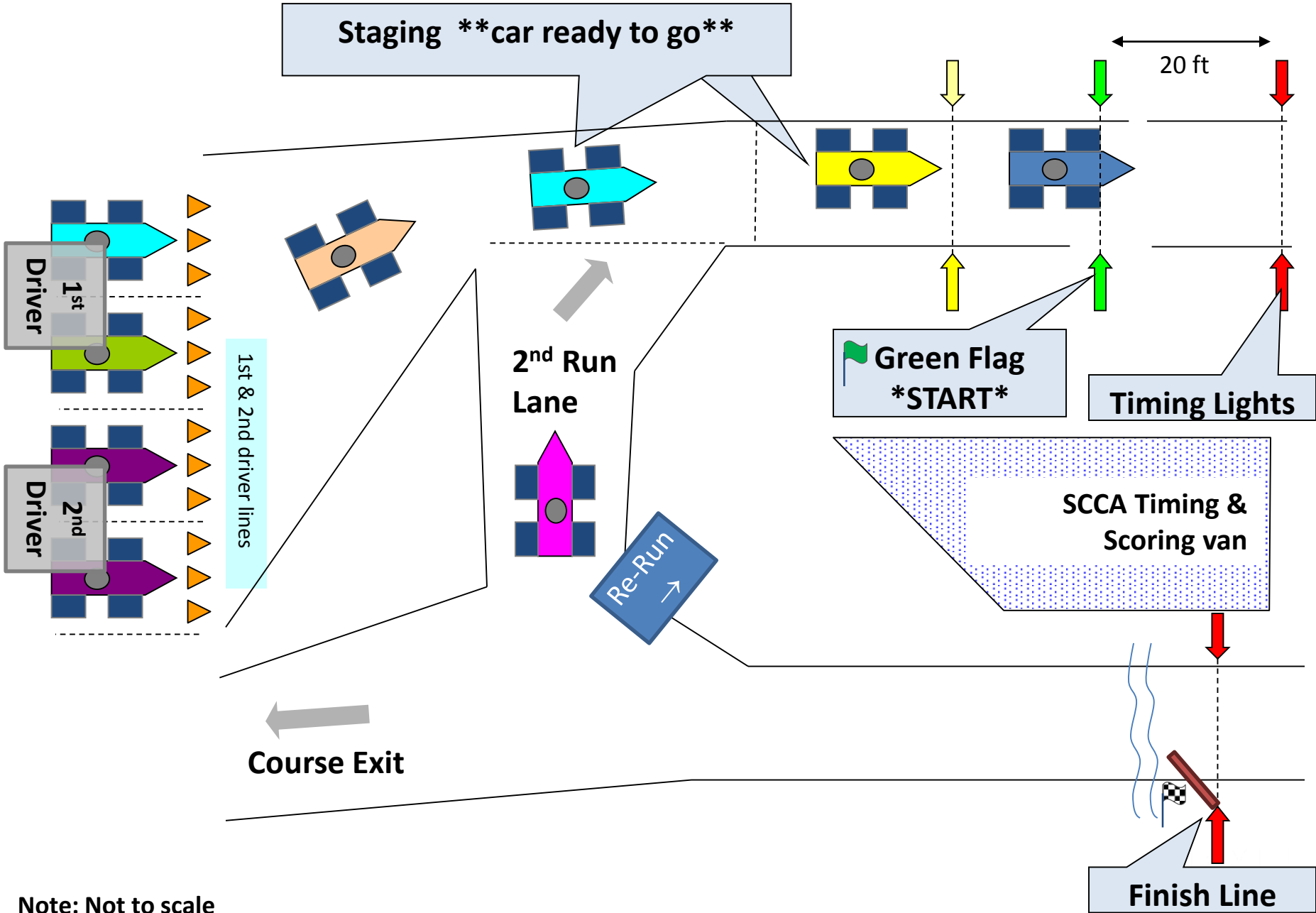


Track map was posted to SAE.org earlier this year  
<http://students.sae.org/cds/formulaseries/fsae/>

Course is subject to change, Map is not to scale



# Auto-X staging, timing, start & finish area diagram



# Autocross End Time Note

- The Autocross captain will try to accommodate as many teams having an opportunity to run as possible, and reserves the right to extend the event up to 1-hour due to unforeseen track events.
- However, if there are times when no cars are staged and ready to run it will be deemed that all cars received an opportunity and teams should expect the event to end at 5:00pm.

# Autocross Scoring

- Cone down and out = 2 second penalty
- Off course = 20 second penalty
  - If you can safely enter course through same gate you left, there is no penalty
- Missed Slalom is considered an off course
- Cars that stall and cannot restart on course will be DNF for that lap – no rerun

# ENDURANCE & FUEL EFFICIENCY

Saturday

9:00am – ~5:00pm

Back Straight

Fuel Captain:

Herb Seubert

Co-Captain:

Mike Thodoroff

Co-Captain:

Rob Egenolf

Efficiency Captain:

Alba Colon

Co-Captain:

Mark Scott

Endurance Captain:

Laura Klauser

Endurance Captain:

Matt Kalmus

# Endurance Event – Weather

- Teams are required to have the appropriate tire for weather condition at the start of their run
- If the weather condition changes while a team is mid-run, a tire change may be allowed or required
- See below table for possible weather change scenarios
- SCCA Safety Stewards can require immediate tire changes if conditions create an unsafe environment

Track Condition at start of run	Team's Current Tire Choice	Mid run Track Condition Change	Tire Change?	Additional Time Granted	Tire Change Allowed at Driver Change?
Dry	Dry	Damp	Optional	10 minutes	Yes
Dry	Dry	Wet	Mandatory	10 minutes	Yes
Damp	Dry	Wet	Mandatory	10 minutes	Yes
Damp	Rain	Wet	---	---	---
Damp	Dry	Dry	---	---	---
Damp	Rain	Dry	Optional	zero	No
Wet	Rain	Damp	Optional	zero	No
Wet	Rain	Dry	Optional	zero	No

# Endurance Run Order



- The Run Order will be posted Friday evening once the Autocross event is over and preliminary scores processed
- Only teams who have completed all four areas of tech by 5:30pm on Friday are eligible to participate in Endurance
- Run order will be slowest to fastest Autocross times (including penalties)
- Teams who did not participate in any dynamic event prior to Endurance will run first at 9am
- Lunch will begin at approximately 12:30pm, depending on cars on track
  - Teams scheduled immediately after lunch must keep their equipment in the dynamic area during lunch
- Any team that runs out of order in Endurance will receive a 2 minute penalty



# Fuel for the Event

- The Announcer will call batches of teams to fuel their car based on run order
- Endurance cars will be filled in the sequence of their scheduled run time
- Process is similar to other fills. Car enters the fuel bay, driver removes fuel cap, confirms fuel type and fill line
- Car is filled to bottom most part of the fill line. Driver confirms fill, installs fuel cap.  
NOTE – no vehicle shaking will be allowed before or after running endurance
- Cars must proceed directly to Endurance (Dynamic Gate 50) after leaving Fuel area

# FSAE Fuel Station Overall Area, covering All Days

-  Fuel Fill Lines
-  Fuel Economy Assessment



Exits to Dynamic Events  
(Practice, Brake, Noise,  
Acceleration, Skidpad,  
Autocross, Endurance)

Return from Endurance

Gate 55A  
To Endurance

Emergency  
Exit (cones)

Bicycle Racks

Bicycle Racks

Power Box

FUEL STATION  
(details on next slide)

T  
a  
b  
l  
e

Tilt  
Canopy

Fire Marshall

Fuel Captain

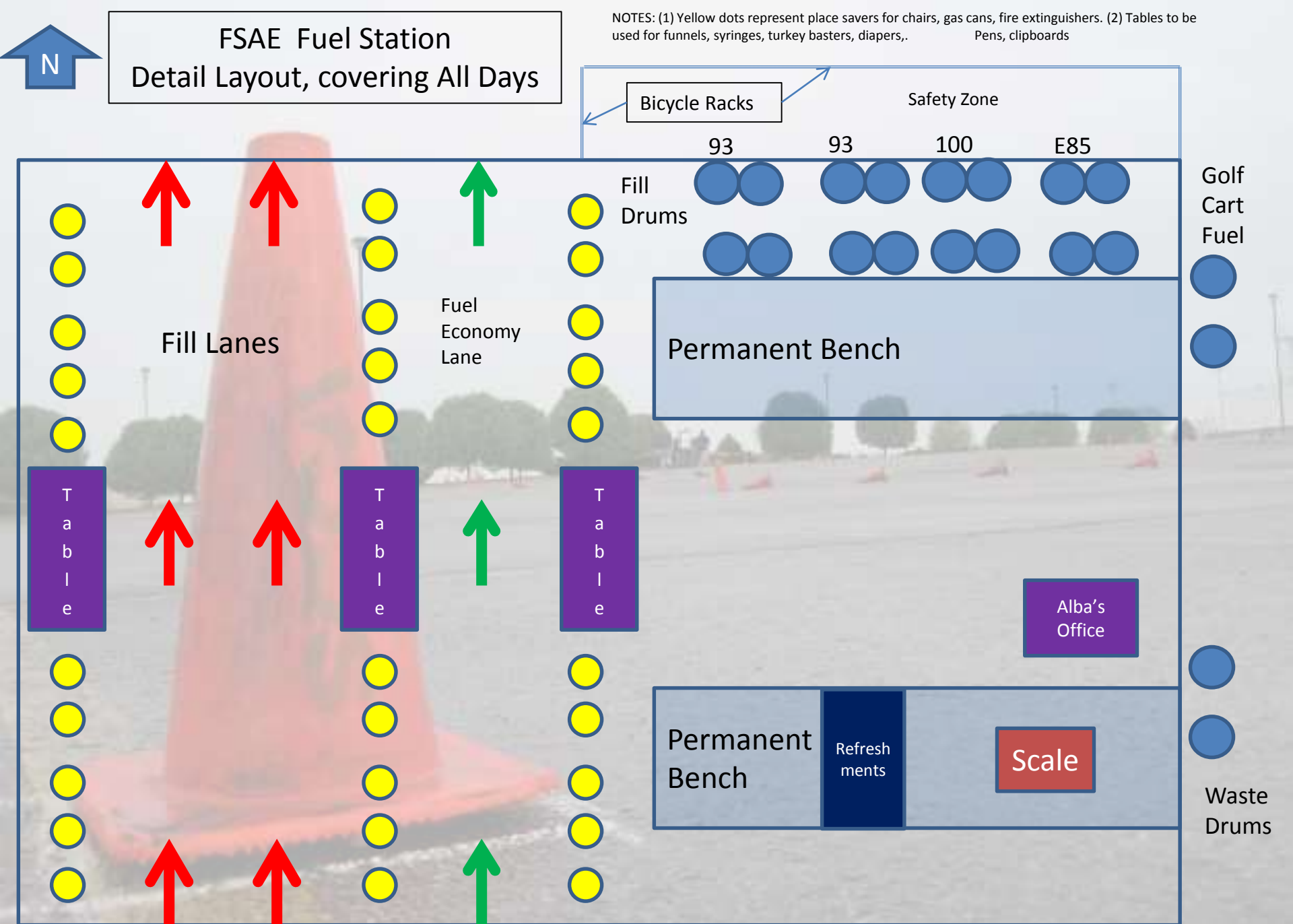
Emergency  
Fuel Drain /  
Repair Area

Porta  
John

Permanent Fencing

From Paddocks / Garages

Screener  
Canopy



# Arrive at the Dynamic Area

- Dynamic Gate workers control how many teams are inside the hot area – you may have to wait outside the gate depending on event flow
- Once inside the hot area you will be directed to a parking spot for your equipment
- Toolboxes are allowed into dynamic area ONLY in the “parking area” located in the space previously used by skid pad
  - We suggest teams bring alternate tires if weather forecast is unclear
- Teams may work on cars prior to starting endurance – Note all changes must be approved by Tech
- Cars can be started anywhere in the dynamic area, BUT car CANNOT move under its own power until entering the track
- People in pink vests are there to help direct you and answer questions

# Stage for Start

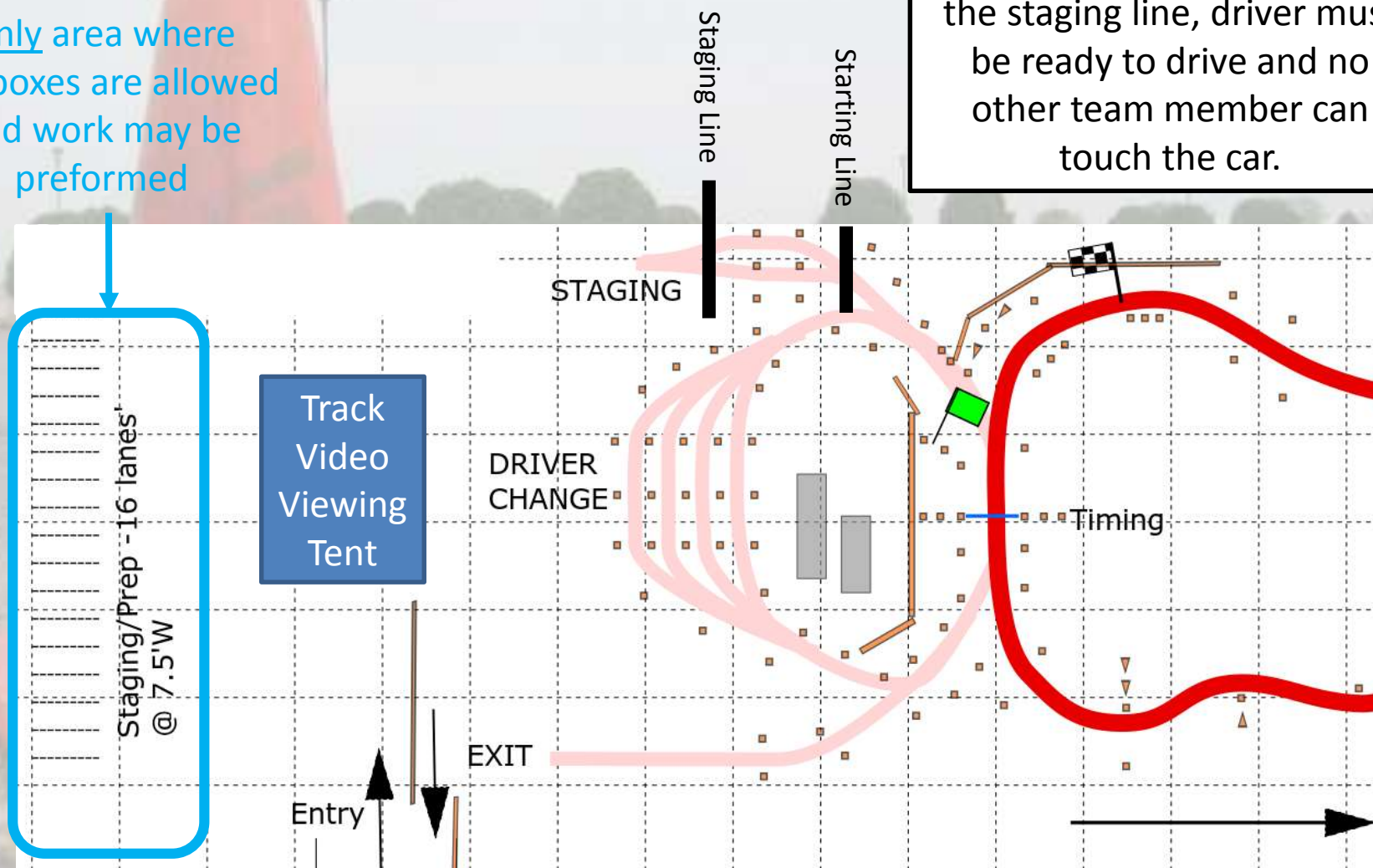
- Car must be “race ready” when called to staging
  - No external batteries, laptops, pressure gauges, baffles, tire wraps, etc.
  - Only the car, push-bar/fire extinguisher, anything for driver seating position adjustment during driver change and the team members is allowed
- Team will be directed into one of the three staging lines
- Transponder will be checked
- Next team to go out on track will be called to the starting line
  - If this car cannot start or drive to the staging line, the next car will be called and the non-start car will receive the out of order penalty
  - If the non-start car is able to start/move before the car ahead of it goes on track, it will not receive the out of order penalty despite entering the track in the wrong order
- Teams that cannot run at their designed time slot (due to no-start, etc) must run before the 20th run order after them in their heat (Ex: The team that is in the run order position 10 must run before run order position 30).
  - If fewer than 20 cars remain, we will provide a 15 minute window
- Volunteers guide staging but are not required to give teams run time warning



# Endurance Staging

Only area where toolboxes are allowed and work may be preformed

Once car has been pushed to the staging line, driver must be ready to drive and no other team member can touch the car.



# Driver 1 Drives

- Driver 1 is called to start: start the car and slowly drive to the green flagger
- The other three team members should move away from the staging line to the track video viewing area in the parking area
- The green flagger waits for an opening on the track and then sends the car out for first 11km
- Watch for flags – passing only allowed in passing zones
  - COURSE TO LEFT (inside lane), STAY RIGHT if blue-flagged
- If you hit a barrier, you will be towed off the course and will not be permitted back on the track
  - For severe hits an Ambulance will be called to check the driver before they are allowed to exit the vehicle

# Driver Change

- At the end of his/her last lap Driver 1 will be shown a checkered flag to enter driver change
  - Driver change volunteers direct the car into the correct lane and the driver turns the car off
  - Each team has three minutes to swap drivers
  - Hand tools are only permitted to adjust seating position – car must start on its own (only tool allowance exception is for tire change due to weather)
- Once Driver 2 is ready, driver starts their car and waits to be called to staging.

# Driver 2 Drives

- Driver 2 is called to staging and then to the start line
  - Staging workers will direct
- The green flagger waits for an opening on the track and sends the car out
- Driver 2 completes 11 km
- Watch for flags – passing only allowed in passing zones
  - COURSE TO LEFT (inside lane), STAY RIGHT if blue-flagged
- If you hit a barrier, you will be towed off the course and will not be permitted back on the track
  - For severe hits an Ambulance will be called to check the driver before they are allowed to exit the vehicle

# Finishing the Event

- On the last lap the driver is shown a checkered flag and exits
- As soon as the exit is cleared, shut down the car and stop. Do not drive (or coast) to team equipment area
- Hooray! You just completed Endurance
- Gather your team and equipment and head to the dynamic gate for instructions to proceed to fuel



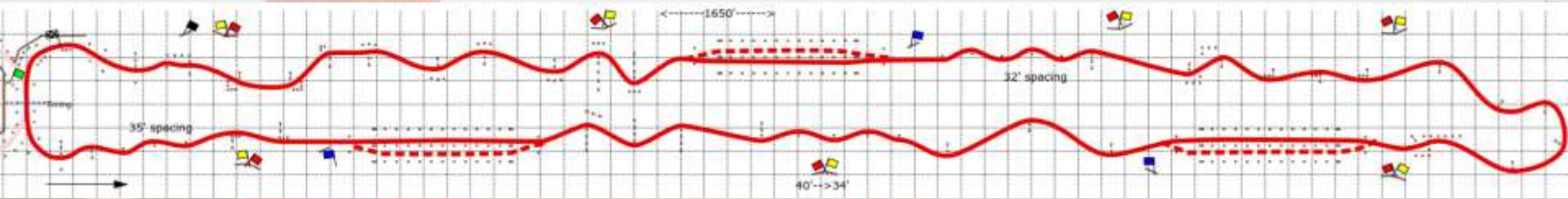
# Refuel for Efficiency Points

- Cars that did not complete endurance still need to report to fuel for points for Efficiency score
- Car returns directly to fuel bay
- Driver exits car, hoists a full gas can with the appropriate fuel grade, and is escorted to obtain the initial can weight
- Driver returns the can to the car, removes the fuel cap, confirms fuel type and fill line.
- Car is filled to bottom-most part of line. Driver confirms fill and installs fuel cap.
- Driver returns to the scale, carrying the gas can. The new can weight is registered, along with the driver signature, which defines the correct and accurate Fuel Efficiency score.

# Scoring Notes

- Cone down and out = 2 second penalty
- Off course = 20 second penalty
  - If you can safely enter course through same (or prior) gate you exited, there is no penalty
- The Endurance penalties are not assigned to the lap that they were received. There will be a total number of cones and off courses listed for teams for the event.
- No outside data for protests – video footage, data logging, etc. Event captain does not have time to review entire endurance run video for every team.
- Endurance Tmax rule gives the ability to pull a team out of the event, but is not a requirement that we do so
  - We will never pull a team without a warning – the team will be black flagged and offered the chance to correct

# Endurance Layout



Track map was posted to SAE.org earlier this year  
<http://students.sae.org/cds/formulaseries/fsae/>

Course is subject to change, Map is not to scale



# Endurance Red Flag Protocol

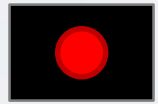
- Safely bring vehicle to a complete stop & turn off the car
- Everyone will be towed into the driver change area
- Driver must stay fully belted in car
- The lap in which the red flag was shown will not count in time or fuel economy calculations
- Restart rules are the same as driver change
- Teams involved with a red flagged track will not be able to add any fuel to their vehicle



# Black Flag Protocol

- Exit the track on the lap you see the black flag – do not go another lap
- You will be guided into the black flag penalty box located next to driver change
- The Black Flag Marshall will talk to you about why you were brought in
  - If you are assessed a time penalty, it will happen at this time.
  - The driver has the choice to leave the car running or not during this penalty – driver change restart rules apply
- The clock is still running while you are off the course
- You will be released onto track once the time is up with the guidance of the staging workers





# Mechanical Flag Protocol

- Exit the track on the lap you see the mechanical flag (or meatball) – do not go a second lap
- You will be directed into a lane in the driver change area and your car will be inspected by Tech
- The time off course will not count towards your overall time
- If the issue is deemed OK, you will be released back on track with the guidance of the staging worker
- If the issue is deemed a failure, the team will be disqualified and will not be able to complete the event

# QUESTIONS?

Event Captains are available for questions  
right after this meeting.

Please clarify any unclear rules/directions  
at this time.

Presentation is posted at: