



FIRST® ENERGIZESM
presented by Qualcomm

firstinspires.org/robotics/ftc

2022-2023 FIRST® Tech Challenge

Remote Field Requirements Guide



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Raytheon Technologies

Revision History		
Revision	Date	Description
1	9/10/2022	Initial Release

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Introduction

What is FIRST® Tech Challenge?

FIRST® Tech Challenge is a student-centered program that focuses on giving students a unique and stimulating experience. Each year, teams engage in a new game where they design, build, test, and program autonomous and driver operated robots that must perform a series of tasks. Participants and alumni of FIRST programs gain access to education and career discovery opportunities, connections to exclusive scholarships and employers, and a place in the FIRST community for life. To learn more about FIRST® Tech Challenge and other FIRST® Programs, visit www.firstinspires.org.

Gracious Professionalism®

FIRST® uses this term to describe our programs' intent.

Gracious Professionalism® is a way of doing things that encourages high-quality work, emphasizes the value of others, and respects individuals and the community.

Watch Dr. Woodie Flowers explain *Gracious Professionalism* in this [short video](#).

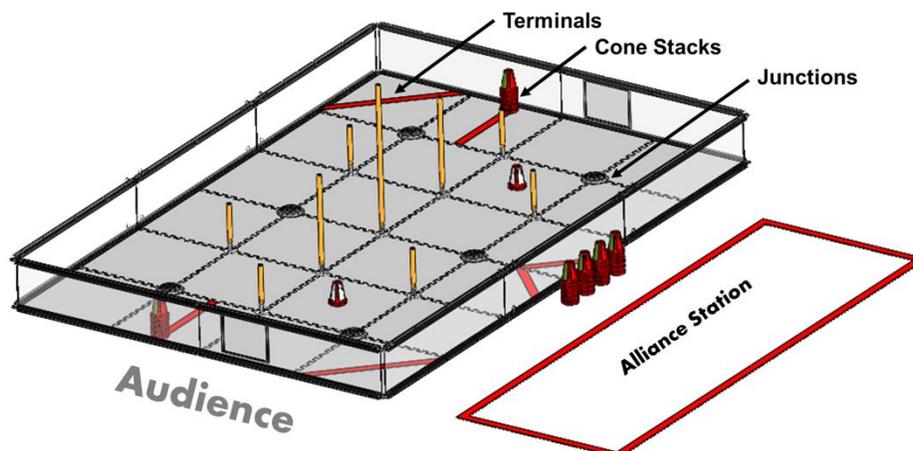
How to Use This Document

Teams competing remotely in the POWERPLAYSM presented by Raytheon Technologies season must follow the field requirements outlined in this manual. Teams are allowed some flexibility in how their field is set up based on the resources they have access to. This guide outlines the allowable options for remote field setup.

The “Field Description” section of this document lists all of the game and scoring elements used in the remote game. Using all of these elements enables a team to participate in all scoring aspects of POWERPLAY.

The “Remote Gameplay Minimum Requirements” section walks through the bare minimum requirements to participate in the season remotely. The minimum requirements do not include every game element, and therefore there are some activities that teams cannot participate in using the absolute minimum requirements.

Questions about the requirements should be referred to the Remote Game forum. Teams that need access to the forum must email firsttechchallenge@firstinspires.org.



Playing Field Overview

The above figure shows all of the purchased game and scoring elements, floor tiles, and the AndyMark field perimeter.

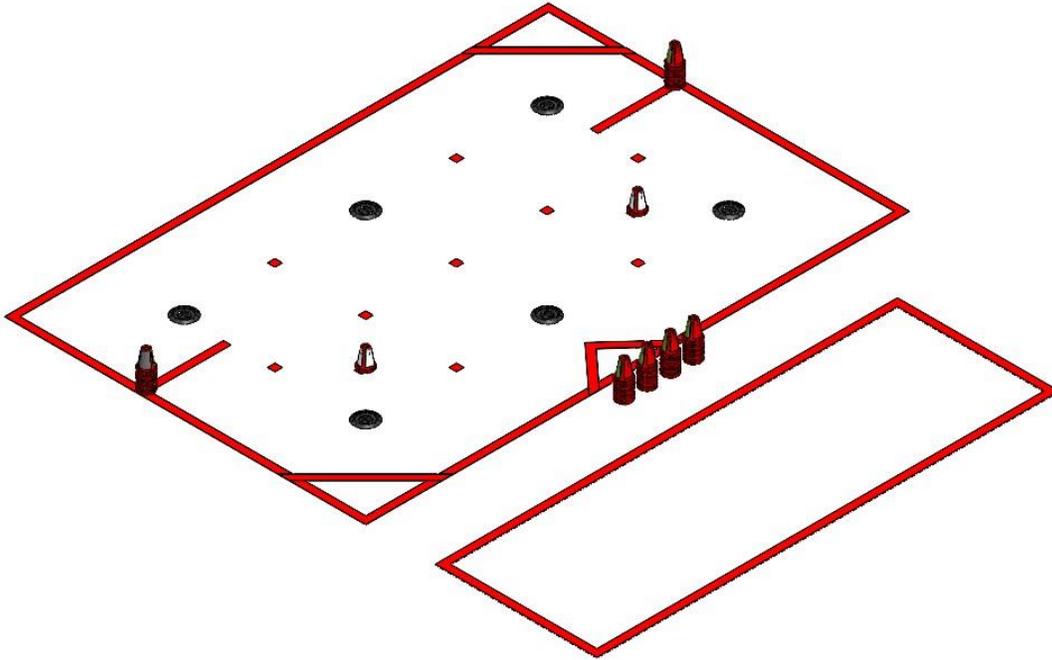
Field Description

Overview

The Remote Competition field for POWERPLAYSM consists of the following elements:

1. Scoring Elements
 - a. Cones
 - b. Beacon
2. Playing Field Surface
3. Playing Field Boundary
4. Taped Areas
 - a. Alliance Station
 - b. Terminals
 - c. Substation
 - d. Cone Stacks
5. Field Elements
 - a. Junctions
 - i. Ground Junction
 - ii. Low Junction
 - iii. Medium Junction
 - iv. High Junction
 - b. Signals
 - c. Navigation Images

Remote Gameplay Minimum Requirements



The above figure shows the minimum required elements to complete in POWERPLAYSM

Minimum Purchase from AndyMark

- Cones (32)
- Ground Junctions (6)
- Stickers (1 set)

The Remote Game Kit can be purchased through AndyMark®: www.andymark.com/FTC

DIY Option (Additional Purchase/DIY Option)

Teams may create the Low, Medium, and High Junctions using PVC pipe as outlined in the [Do it Yourself \(DIY\) Field Element Guide](#).

Reminder: The Low, Medium, and High Junctions are not part of the minimum purchase requirements. Therefore, a team who does not purchase the Low, Medium, and High Junctions from AndyMark, or create DIY versions, cannot compete a Circuit as part of gameplay.

Field Boundary Requirements – Taped Boundary

The minimum requirement is to have a taped boundary to define the Playing Field area. This option involves defining the field boundary by using tape to mark off the 141" x 94" (3.58 m x 2.39 m) space. The tape should be placed such that the outer edge of the tape defines the playing field area. See Appendix B for taping instructions.

2" wide Gaffers tape is recommended, but any type or color of tape is acceptable. Below are examples of tape that can be used.

- Gaffers Tape: <https://www.findtape.com/gaffer-tape?tref=hp>
- Stucco Tape: <https://www.findtape.com/Shurtape-PE-444-Stucco-Masking-Film-Tape/p372/?idx=1&tid=2&info=stucco>
- Masking Tape: <https://www.findtape.com/Shurtape-CP-106-Economy-Grade-Masking-Tape/p364/?idx=2&tid=2&info=masking%2520tape>

Scoring Zone Requirements

The Substation and Terminals are taped off areas within the Field Boundary. 2" wide Gaffers tape is recommended but any type and color of tape is acceptable. Please see Appendix B for the Scoring Zone tape guide.

Playing Field Surface

The playing field surface is the area within the field boundary where the robots will be driving and competing. Teams have the option of playing on any surface type available such as carpet, cement, etc. If teams competing remotely switch to traditional events during the season, they must plan for a difference in how the robot drives/performs as soft tiles are used in the traditional event format.

Teams may opt to purchase soft tiles, which are used in traditional events. They can be purchased directly through [AndyMark](#).

Field Boundary

POWERPLAYSM remote version is played on an approximately 12 ft x 8 ft (3.65m x 2.44m) field. The Boundary of the Field can be defined in one of three ways, official perimeter walls, DIY perimeter walls, or a simple tape outline. Any of these options are acceptable for official gameplay.

1. Option 1 – Official AndyMark or IFI Field Perimeter.
 - Remote uses a subset of a standard *FIRST* Tech Challenge perimeter, two panels from the standard 12 ft x 12 ft field are not used.
 - AndyMark Field Perimeter: <https://www.andymark.com/products/first-tech-challenge-perimeter-kit>
IFI Field Perimeter: <https://www.vexrobotics.com/278-1501.html>

2. Option 2 – DIY Field Perimeter

This is a lower cost alternative to the commercially available perimeter walls. *FIRST* has made DIY guides available to build the perimeter walls with recommendations on where to purchase materials. Teams can use this guide or opt to build their own DIY walls.

- DIY Build Guide: <https://www.firstinspires.org/resource-library/ftc/game-and-season-info>

3. Option 3 – Taped Boundary

The minimum requirement is to have a taped boundary to define the Playing Field area. This option involves defining the field boundary by using tape to mark off the 141" x 94" (3.58 m x 2.39 m) space. The tape should be placed such that the outer edge of the tape defines the playing field area. See the Scoring Zone Requirements section for taping instructions.

Navigation Images

On a traditional field, there are a total of 4 navigation images placed on the outside walls of the 12 ft x 12 ft playing field perimeter. For remote gameplay, teams may use a total of 2 navigation images. Navigation images are not a requirement in remote gameplay; however, they are helpful in robot navigation during the autonomous period of the match. Images can be downloaded from the [game and season page](#).



Image B6
Blue Alliance Rear Wall

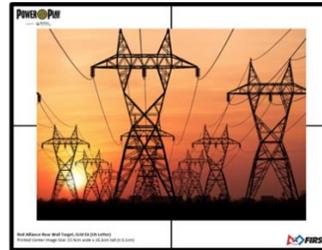


Image E6
Red Alliance Rear Wall

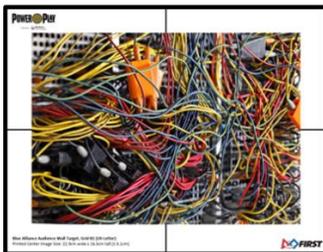


Image B1
Blue Alliance
Audience Wall

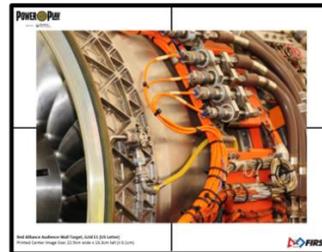


Image E1
Red Alliance
Audience Wall

Images are labeled corresponding to the centers of the tile nomenclature listed in Appendix B, figure B-1.

Image B1 – The center of the image is on the *Playing Field Wall* closest to the *Audience* and is aligned to the center of the second *Tile* in from the blue *Alliance Station*.

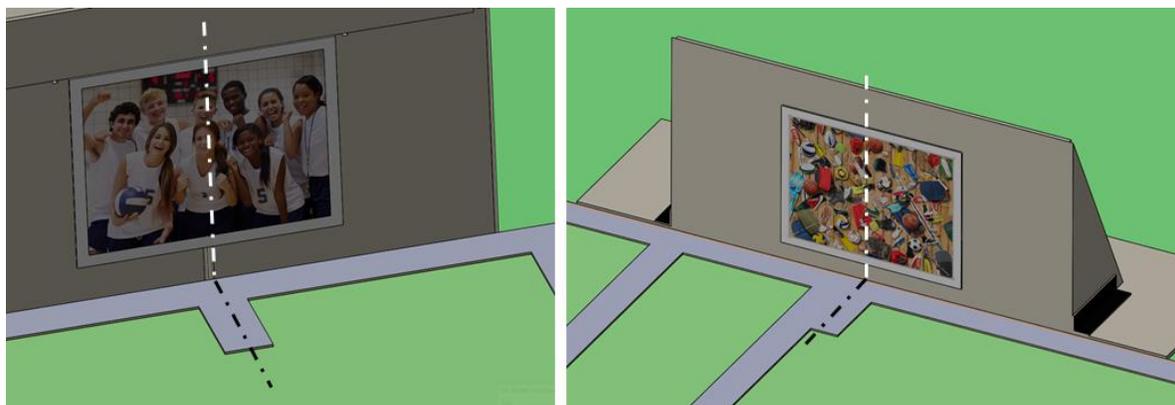
Image B6 – The center of the image is on the *Playing Field Wall* opposite of Image B1 and is aligned to the center of the second *Tile* in from the blue *Alliance Station*.

Image E1 – The center of the image is on the *Playing Field Wall* closest to the *Audience* and is aligned to the center of the second *Tile* in from the red *Alliance Station*.

Image E6 – The center of the image is on the *Playing Field Wall* opposite of Image E1 and is aligned to the center of the second *Tile* in from the red *Alliance Station*.

Do not print the images from this manual for practice purposes, as they are not to the same scale as *Teams* will see in actual competition. Please refer to the [website](#) for printable versions of these images.

If a team is not using perimeter walls, they will need to place the navigation images on a vertical surface such as a cardboard box. The base of the tower goal can be used as one of the vertical surfaces. The center of the images should be aligned with the center of the short tape sections.



Field Requirements Chart

This chart is a quick visual aid to help teams understand what is needed to complete remotely.

Item	AndyMark Only	AndyMark or DIY	DIY Only	Required/Optional
Cones	X			Required
Signal	X			Required
Ground Junction	X			Required
Low Junction		X		Optional
Medium Junction		X		Optional
High Junction		X		Optional
Playing Field Boundary		X		Required
Team Scoring Element			X	Optional
Navigation Targets			X	Optional

FIRST Tech Challenge Remote Scoring System

Teams are responsible for scoring their own matches during a remote event. Teams can score their matches electronically or use paper scoring sheets:

- Option 1 – Use the cloud-based FTC scoring system to score a team’s matches
 - Requires a stable, reliable Internet connection
 - Requires a device (smartphone, tablet, Chromebook, laptop, or desktop computer) to enter scores during the match
 - Must be connected to the Internet
 - Must have a web browser
 - Can be used to play match audio cues
 - Team can optionally have a second device to act as a field/team display during the match
 - Must be connected to Internet
 - Must have a web browser
 - Can be used to play match audio cues

- Option 2 – Use paper scoresheets to score a team’s matches
 - Scoresheets can be downloaded from <https://www.firstinspires.org/resource-library/ftc/game-and-season-info>. After a match is complete, a team’s score must eventually be entered into the FTC scoring system
 - A program delivery partner, event admin, or team admin who has Internet access can be designated to enter in the score for the team
 - Scores must be entered before the close of the remote event’s submission window

For detailed information, please refer to the FTC Live Cloud Scoring Guide, which is available from the [game and season page](#).

Appendix A – Resources

Game Forum Q&A

<https://ftc-qa.firstinspires.org/>

Anyone may view questions and answers within the *FIRST*® Tech Challenge game Q&A forum without a password. To submit a new question, you must have a unique Q&A system user name and password for your team.

Volunteer Forum

Volunteers can request access to role specific volunteer forums by emailing FTCTrainingSupport@firstinspires.org. You will receive access to the forum thread specific to your role.

FIRST Tech Challenge Game Manuals

Part 1 and 2 - <https://www.firstinspires.org/resource-library/ftc/game-and-season-info>

FIRST Headquarters Pre-Event Support

Phone: 603-666-3906

Mon – Fri

8:30am – 5:00pm

Email: Firsttechchallenge@firstinspires.org

FIRST Websites

FIRST homepage – www.firstinspires.org

[FIRST Tech Challenge Page](#) – For everything *FIRST* Tech Challenge.

[FIRST Tech Challenge Volunteer Resources](#) – To access public volunteer manuals.

[FIRST Tech Challenge Event Schedule](#) – Find *FIRST* Tech Challenge events in your area.

FIRST Tech Challenge Social Media

[FIRST Tech Challenge Twitter Feed](#) - If you are on Twitter, follow the *FIRST* Tech Challenge Twitter feed for news updates.

[FIRST Tech Challenge Facebook page](#) - If you are on Facebook, follow the *FIRST* Tech Challenge page for news updates.

[FIRST Tech Challenge YouTube Channel](#) – Contains training videos, game animations, news clips, and more.

[FIRST Tech Challenge Blog](#) – Weekly articles for the *FIRST* Tech Challenge community, including outstanding volunteer recognition!

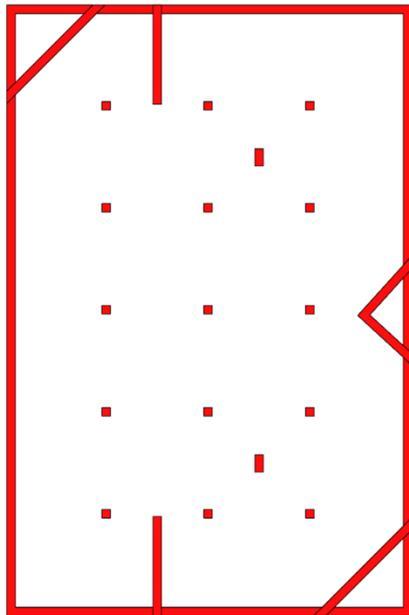
[FIRST Tech Challenge Team Email Blasts](#) – contain the most recent *FIRST* Tech Challenge news for teams.

Feedback

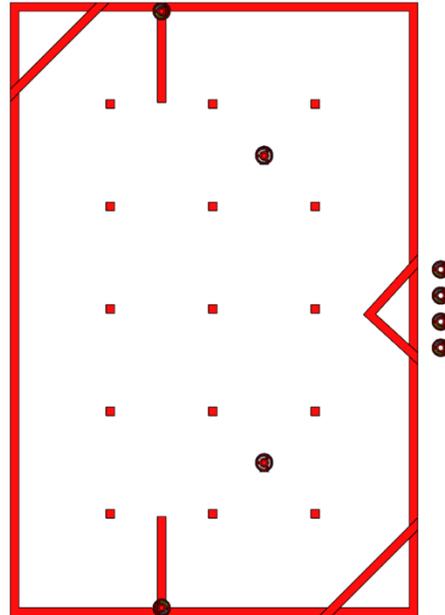
We strive to create support materials that are the best they can be. If you have feedback about this manual, please email firsttechchallenge@firstinspires.org. Thank you!

Appendix B – Taped Field Boundary and Scoring Zone Measurements

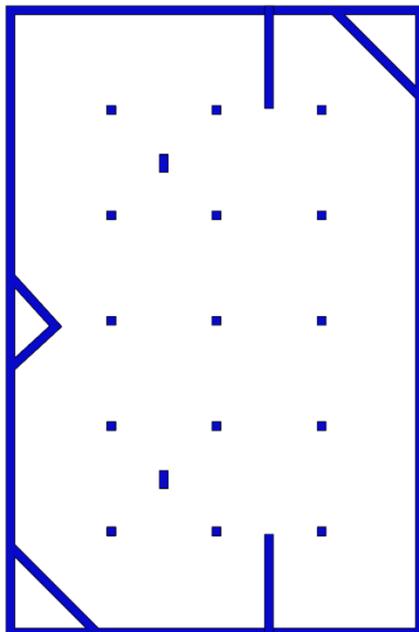
Minimum Tape Requirements



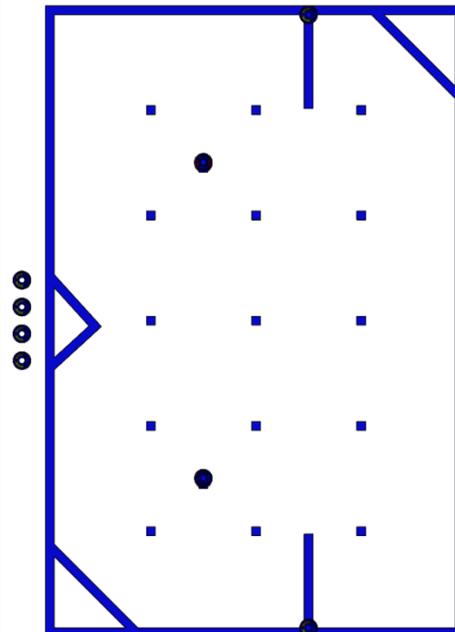
Red side tape layout



Red side setup

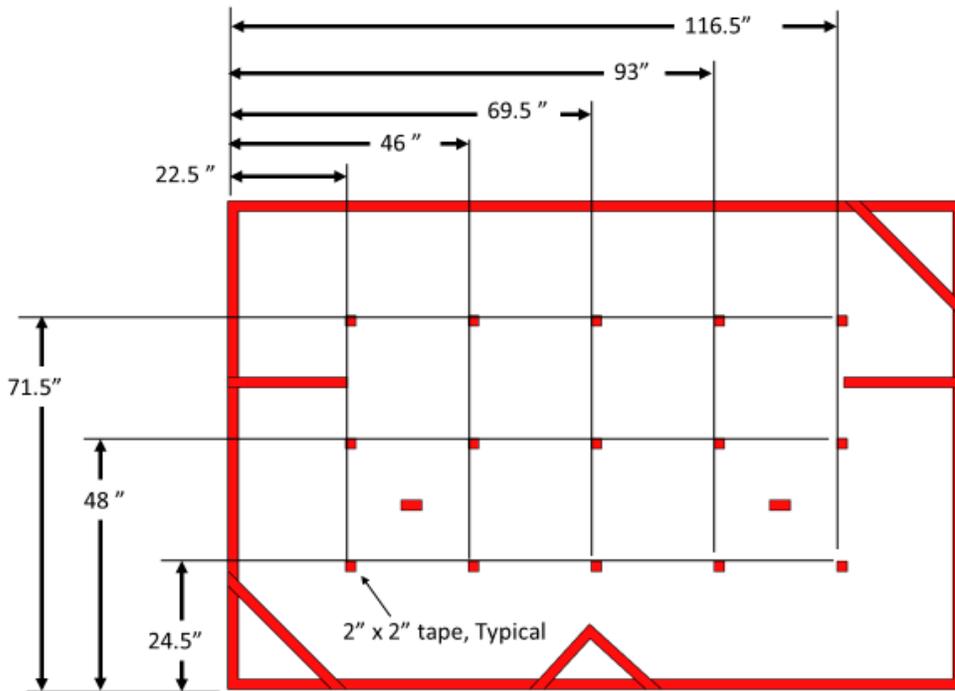
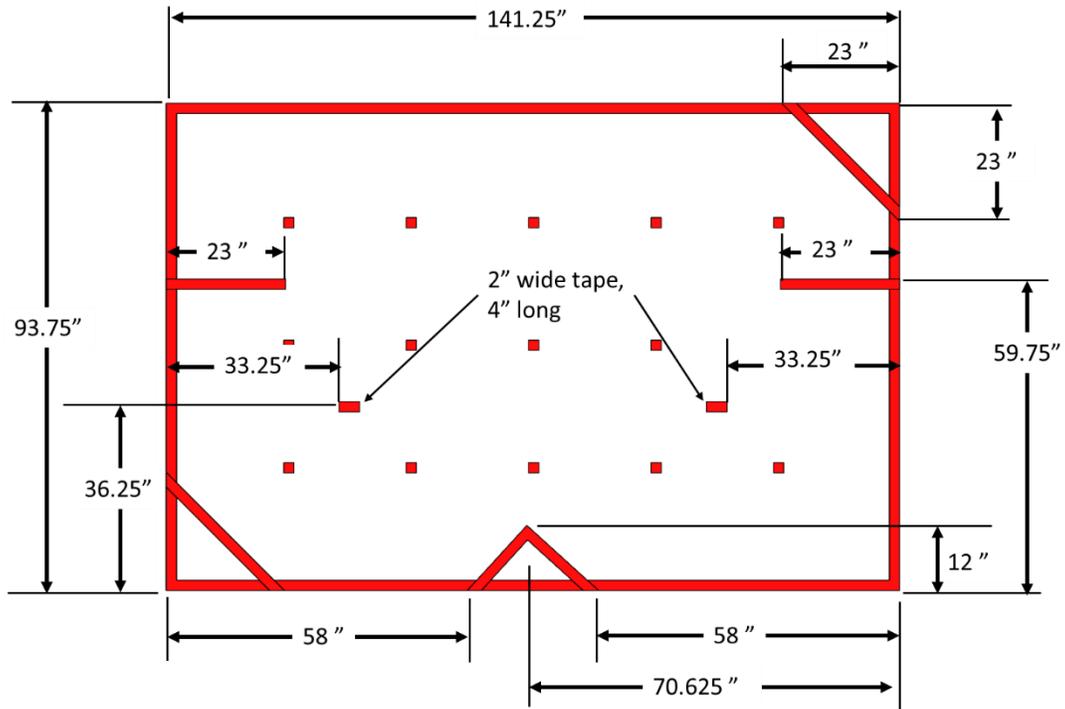


Blue side tape layout

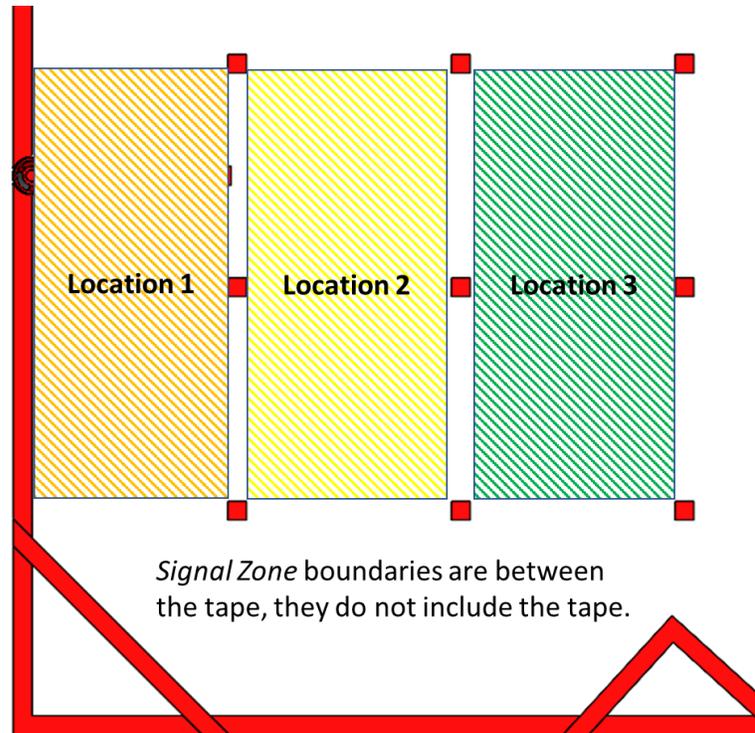


Blue side setup

B-1 Tape Lines – Minimum Requirement.



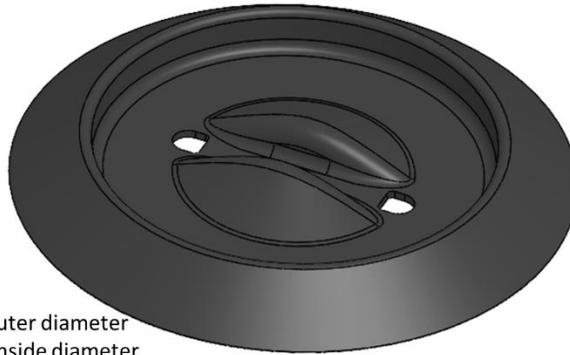
B-2 Field dimensions



B-3 Signal Zones, typical

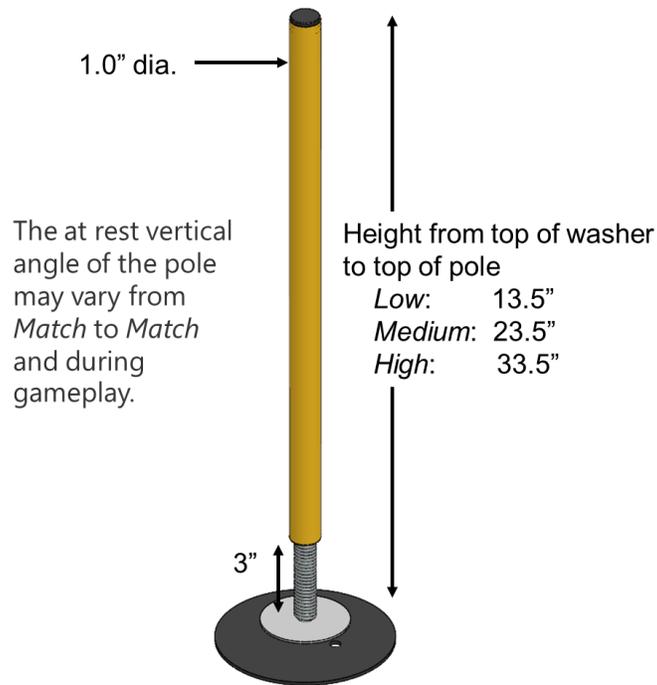
This image shows locations for the left side of a red field.

Appendix C – Game Elements

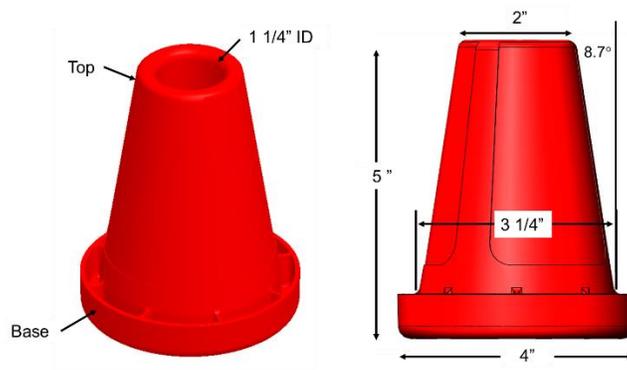


6.0 inch outer diameter
 4.25 inch inside diameter
 0.56 inch tall

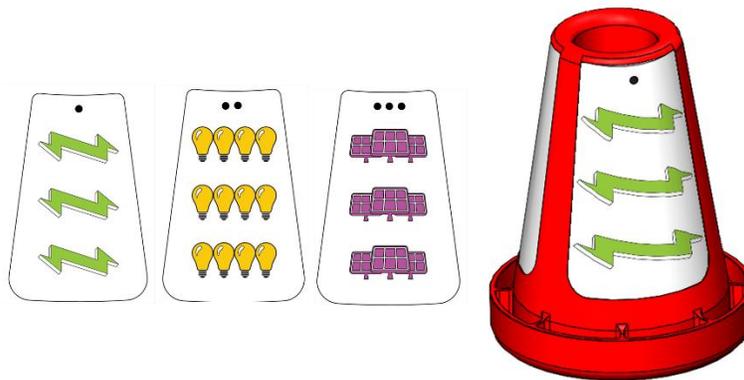
C-1 Ground Junction



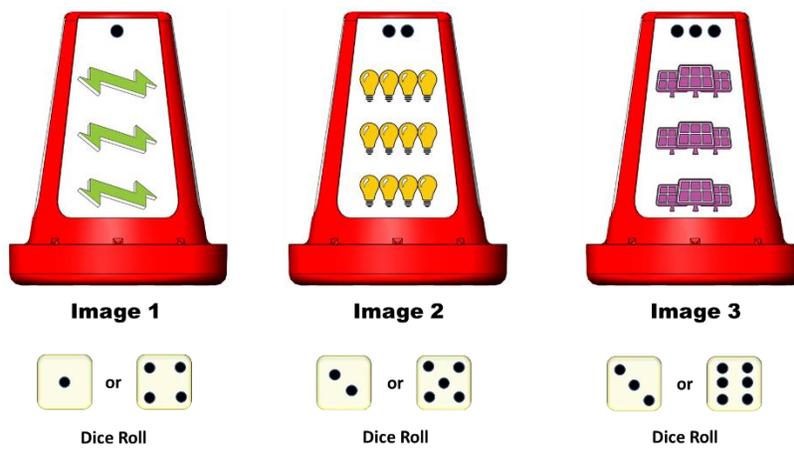
C-2 Junctions



C-3 Cone



C-4 Signal



C-5 Randomization