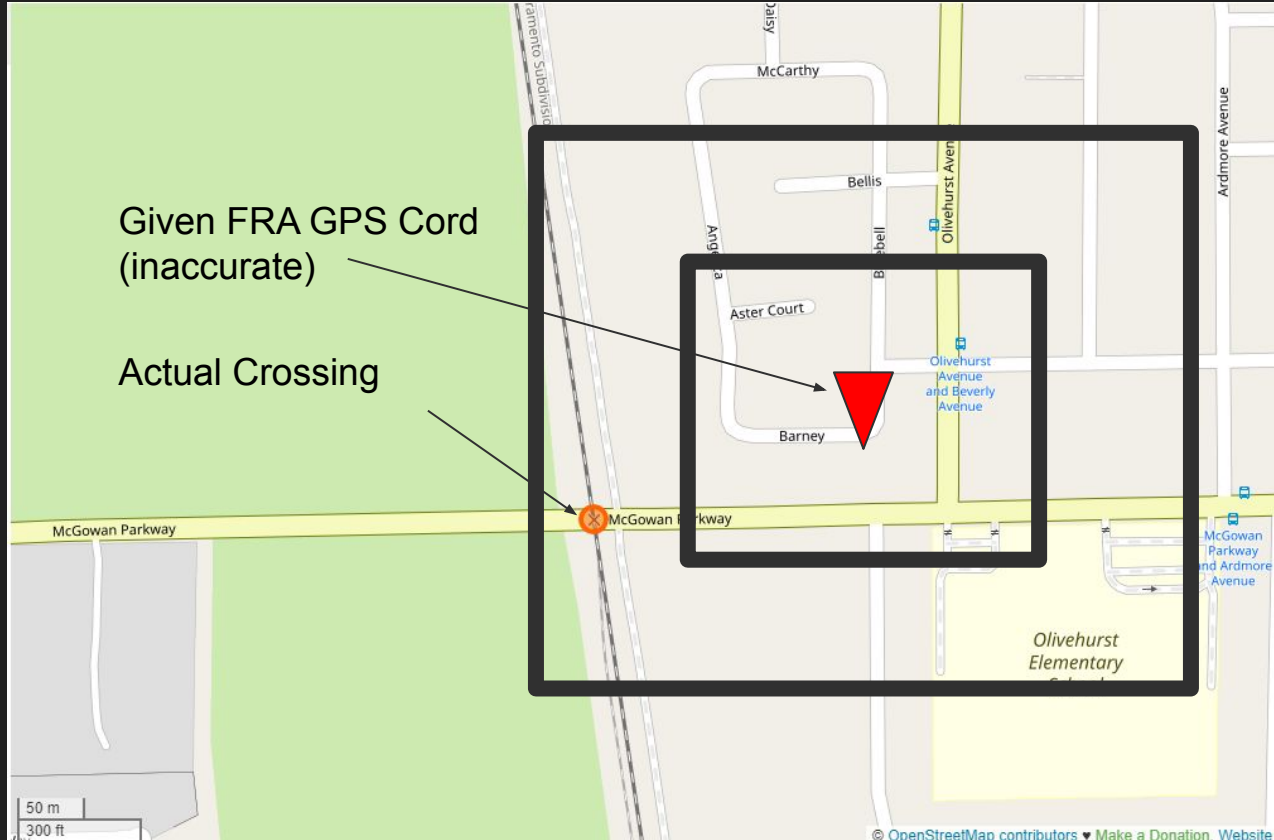# Using OpenStreetMap to Enhance FRA Grade Crossing
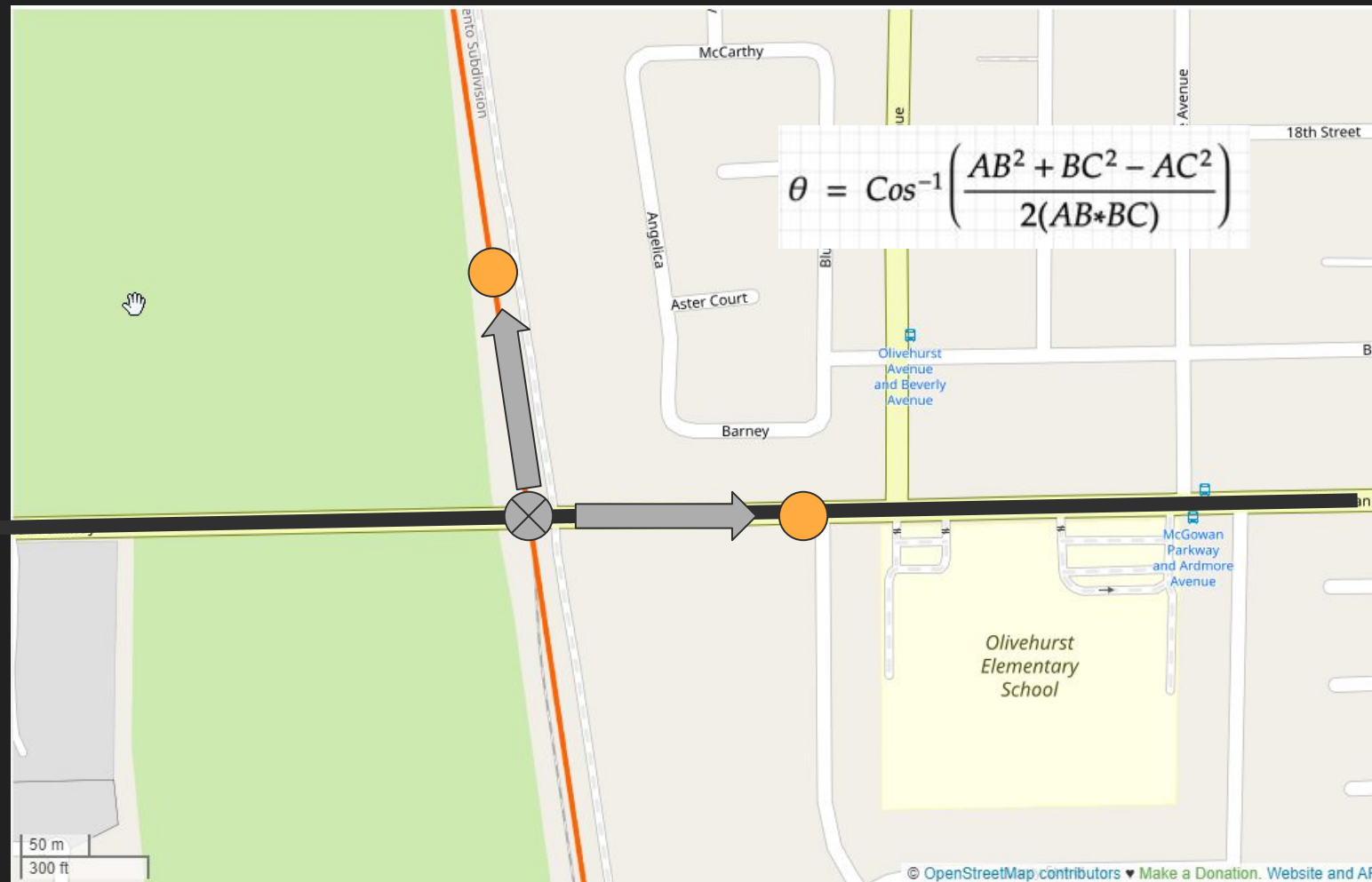
Eric Martz

Filter Crossings to Analyze (saves api usage)

1. Crossings in California
   a. Crossings in CA that have an incident
   b. Crossing in CA that have lat and long coordinates
2. Expand API search area progressively (can set as hyper parameter)
3. Find relevant Nodes and calculate crossing angle
4. Use FRA report to determine impact angle

Given FRA GPS Cord
(inaccurate)

Actual Crossing

Two viable crossings in search area.

$$\theta = Cos^{-1}\left(\frac{AB^2 + BC^2 - AC^2}{2(AB*BC)}\right)$$

McCarthy

Angelica

Aster Court

Barney

18th Street

Olivehurst Avenue and Beverly Avenue

McGowan Parkway and Ardmore Avenue

Olivehurst Elementary School

50 m
300 ft

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Train direction is known via time tables. Incident reports direction as well. Therefore approach angle can be found. The points before the intersection will indicate if it is on the north, south, east, west calculation. The angle calculated should be marked as either left or right.