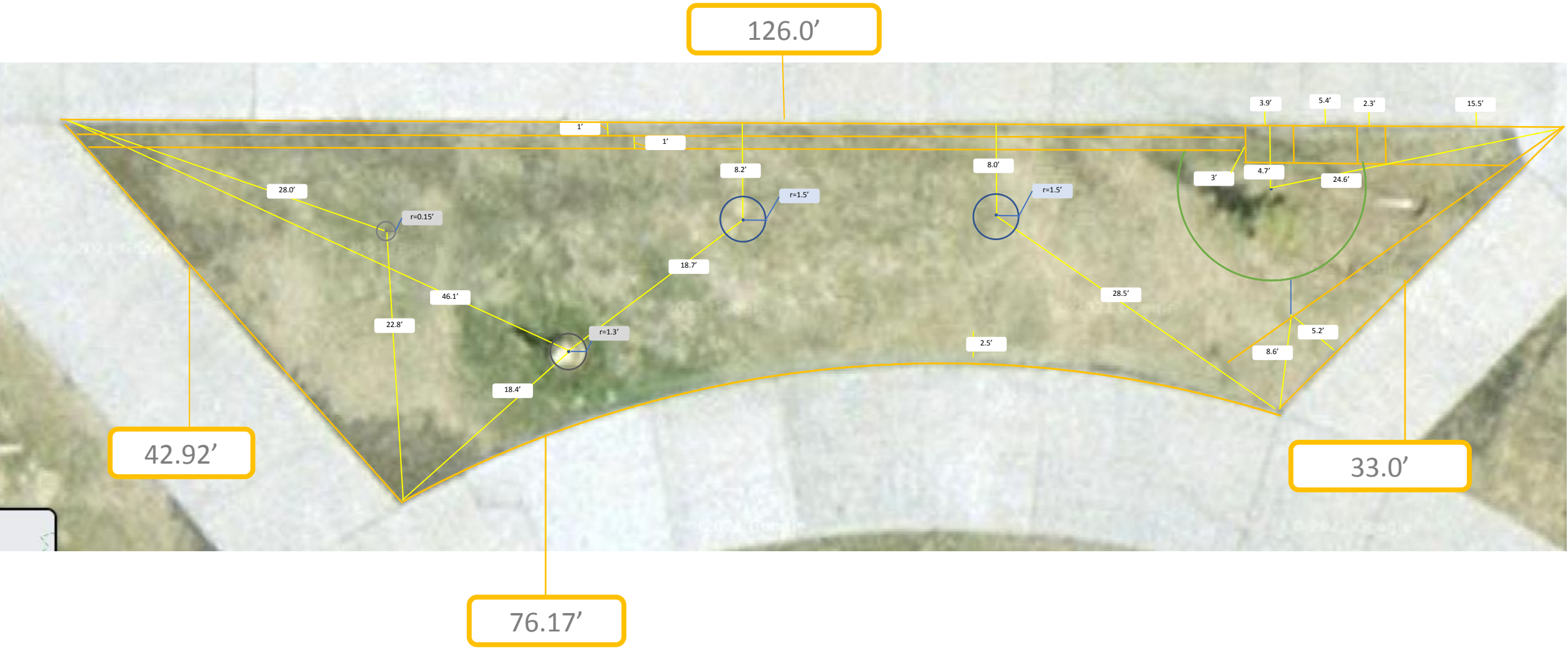


# Project 1

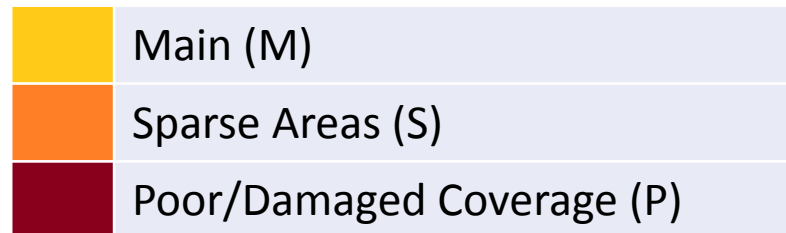
Group 3

STAT402: Project 1

Plot Area

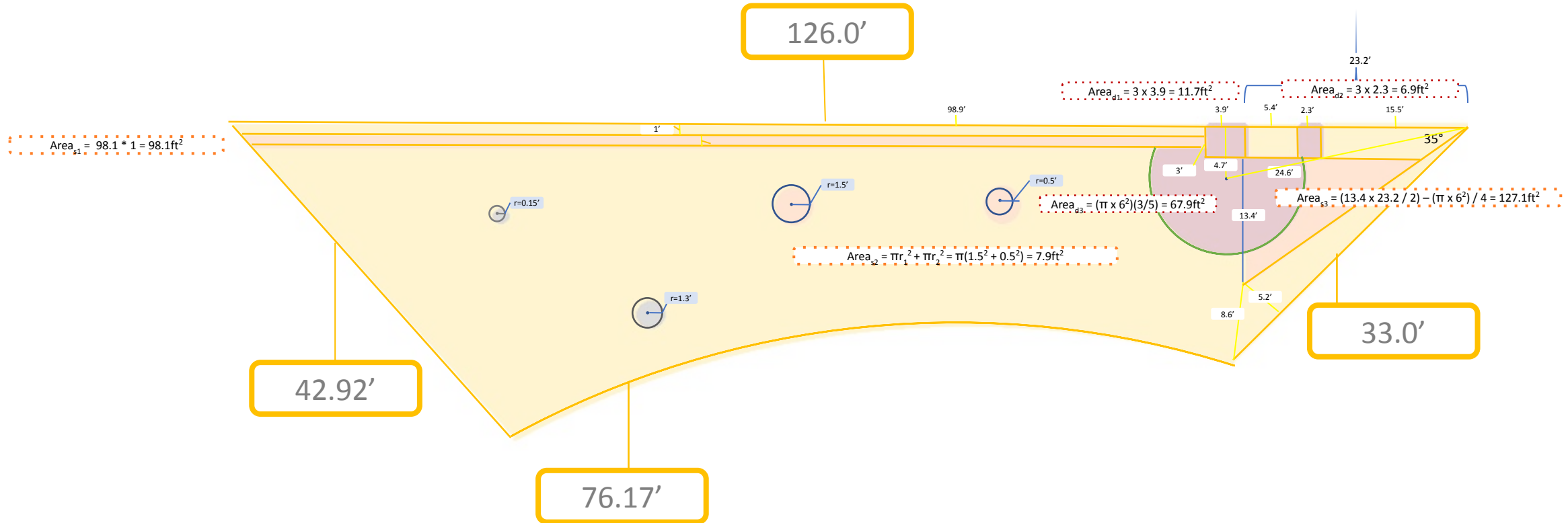


## Stratum Breakout



# STAT402: Project 1

## Final Stratum Areas by Sample Allocation



$$\text{AREA}_M = 2412 - 320 = 2092 \text{ft}^2$$

$$\text{AREA}_S = 1580 / 9 = 175.6 \text{ft}^2$$

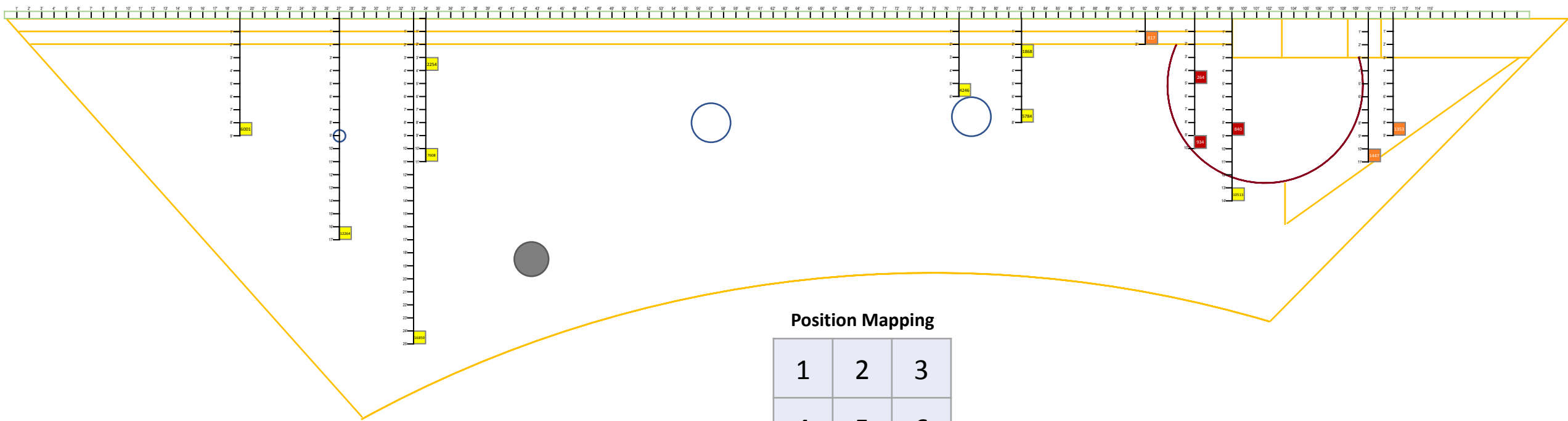
$$\text{AREA}_P = 1239 / 9 = 137.7 \text{ft}^2$$

$$\text{AREA}_{\text{NONE}} = 61 / 9 = 6.8 \text{ft}^2$$

# STAT402: Project 1

## Sample Assignments & Map

BILLY					STEFANO					BRIA				
	Sample #	Right (ft)	Down (ft)	Position		Sample #	Right (ft)	Down (ft)	Position		Sample #	Right (ft)	Down (ft)	Position
1	M1873	82'	3'	6	1	M4235	77'	5'	9	1	S1355	112'	8'	3
2	P265	96'	4'	2	2	M2254	34'	3'	1	2	M10521	99'	13'	9
3	S1453	110'	10'	7	3	P841	99'	8'	2	3	M7616	34'	10'	9
4	M6001	19'	8'	1	4	M16866	33'	24'	8	4	M13267	27'	16'	4
5	M5792	82'	7'	9	5	S817	92'	1'	1	5	P939	96'	9'	6



Position Mapping

1	2	3
4	5	6
7	8	9

# STAT402: Project 1

## Data

BILLY

	Sample #	Right (ft)	Down (ft)	Position	Count
1	M1873	82'	3'	6	135
2	P265	96'	4'	2	73
3	S1453	110'	10'	7	181
4	M6001	19'	8'	1	140
5	M5792	82'	7'	9	217

STEFANO

	Sample #	Right (ft)	Down (ft)	Position	Count
1	M4235	77'	5'	9	293
2	M2254	34'	3'	1	232
3	P841	99'	8'	2	128
4	M16866	33'	24'	8	299
5	S817	92'	1'	1	267

BRIA

	Sample #	Right (ft)	Down (ft)	Position	Count
1	S1355	112'	8'	3	418
2	M10521	99'	13'	9	367
3	M7616	34'	10'	9	330
4	M13267	27'	16'	4	328
5	P939	96'	9'	6	228

## FINAL DATA

Main	Sparse	Poor
$n = 9$	$n = 3$	$n = 3$
293	297	128
232	181	73
299	418	228
135		
140		
217		
367		
330		
328		



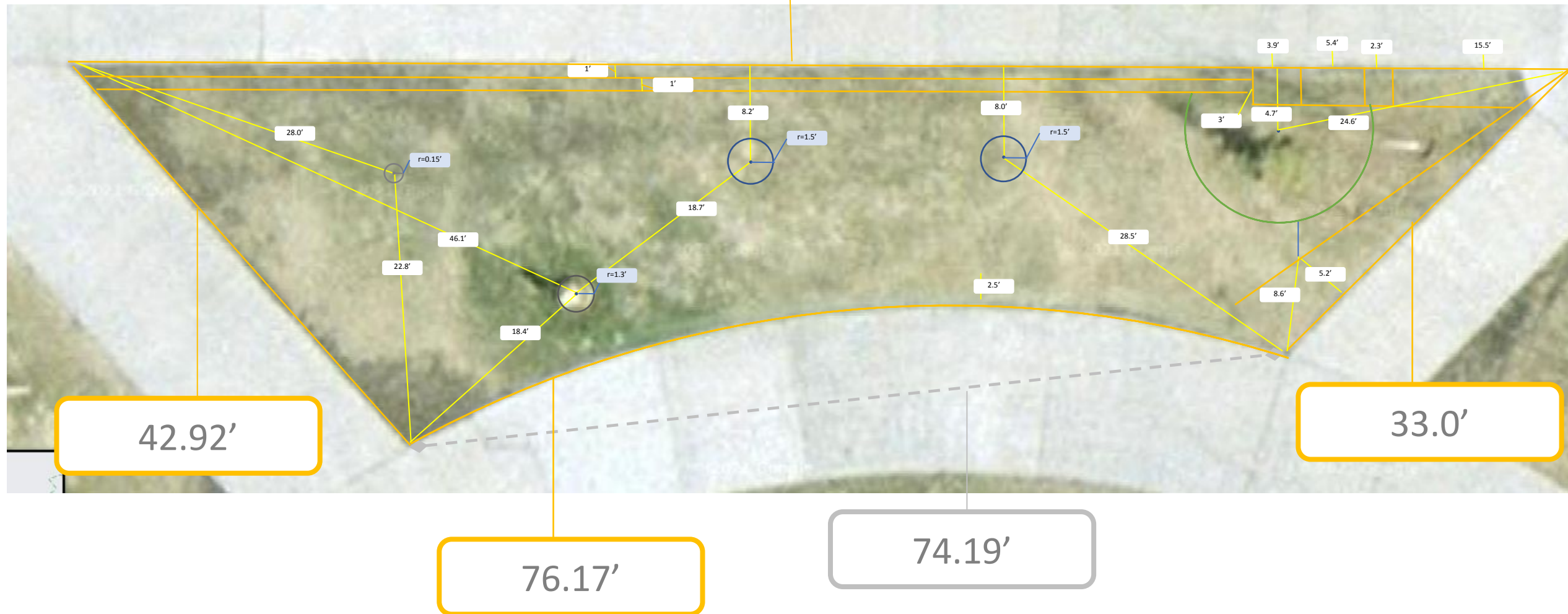


# APPENDIX

- Plot Measurements & Calculations
- Sample Location Mapping
- R Code

## Plot Area Measurements

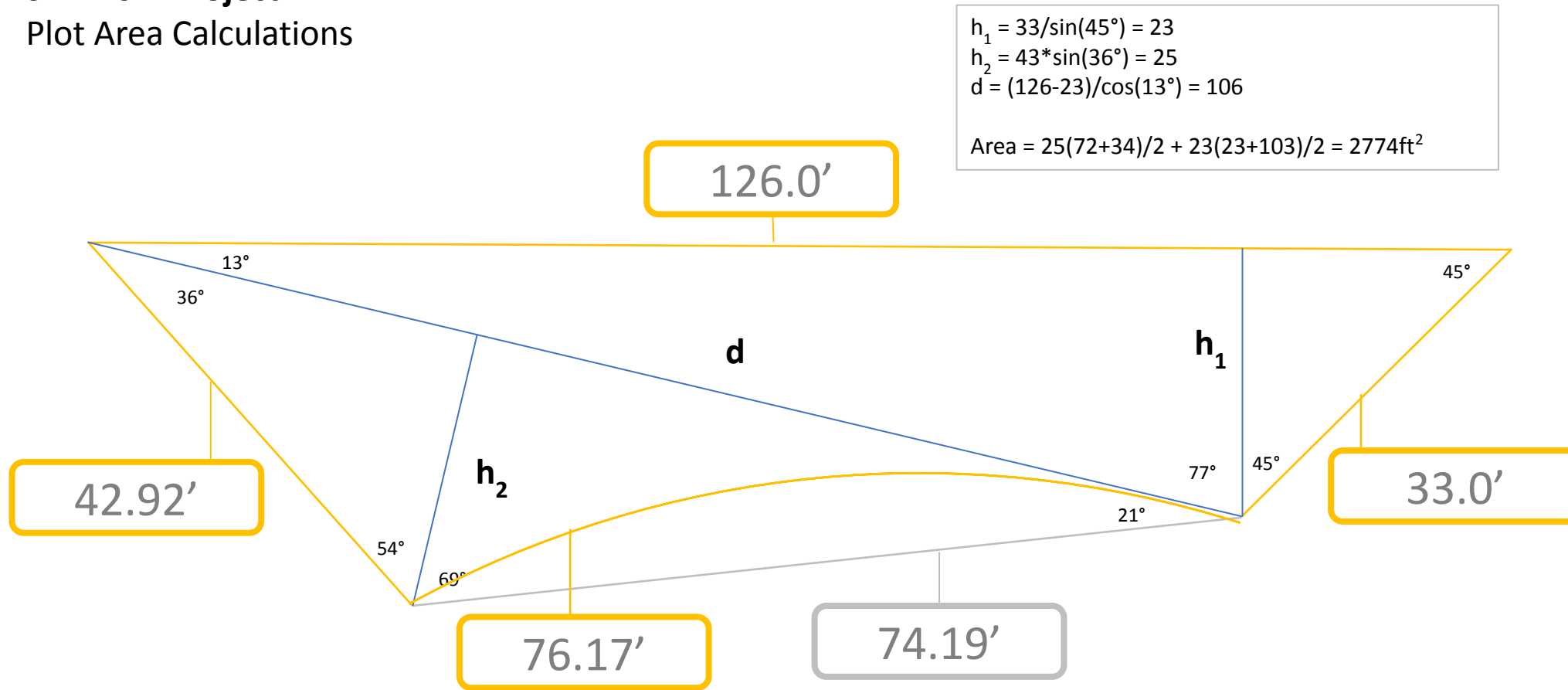
$$\begin{aligned} a &= 74.19' \\ d &= 192.3' \\ r &= D/2 = 96.15' \\ \theta &= \cos^{-1}[1 - a^2/(2r^2)] = 0.7921 \text{ rad} \\ s &= r\theta = 96.15 * 0.7921 = 76.17' \end{aligned}$$





## STAT402: Project 1

### Plot Area Calculations



$$\begin{aligned}h_1 &= 33/\sin(45^\circ) = 23 \\h_2 &= 43*\sin(36^\circ) = 25 \\d &= (126-23)/\cos(13^\circ) = 106\end{aligned}$$

$$\text{Area} = 25(72+34)/2 + 23(23+103)/2 = 2774\text{ft}^2$$

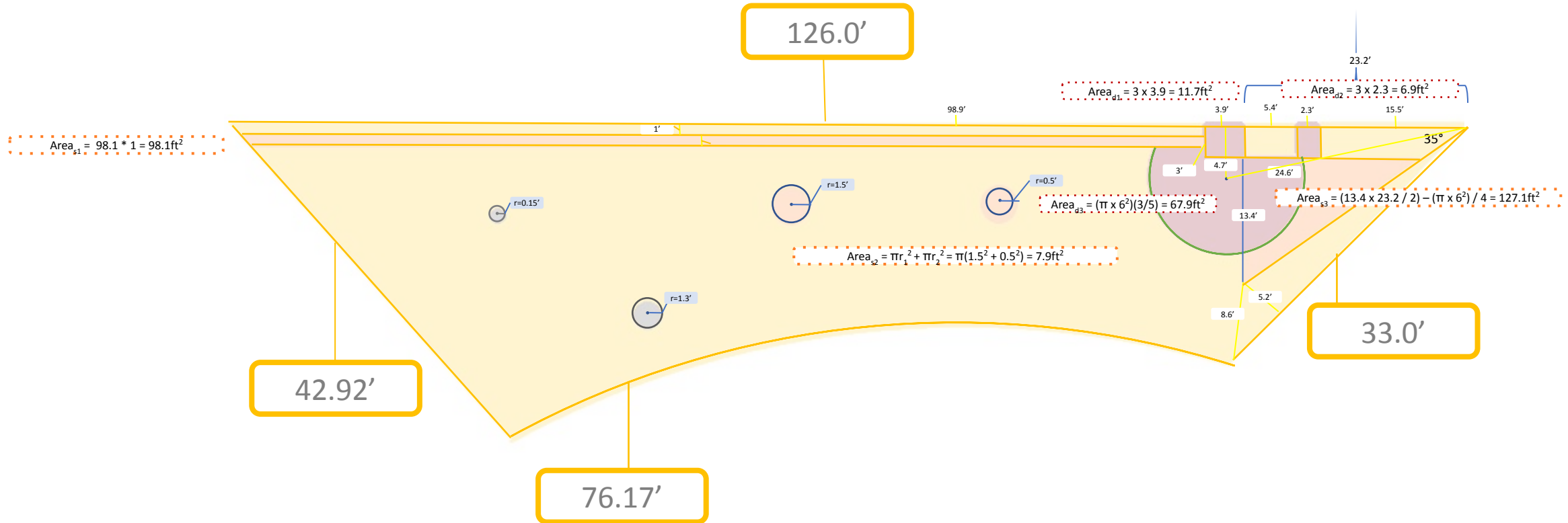
$$\begin{aligned}a &= 74.19' \\d &= 192.3' \\r &= D/2 = 96.15' \\\theta &= \cos^{-1}[1 - a^2/(2r^2)] = 0.7921 \text{ rad} \\s &= r\theta = 96.15 * 0.7921 = 76.17'\end{aligned}$$

$$\begin{aligned}h_3 &= r*\cos(\theta/2) = 96.15*\cos(0.79/2) = 88.7' \\A_{\text{sec}} &= (r^2 * \theta)/2 = (96^2 * 0.79)/2 = 3652\text{ft}^2 \\A_{\text{tri}} &= h_3 * (74.19/2) = 88.7 * (74.19/2) = 3290\text{ft}^2 \\A_{\text{remove}} &= 3652-3290 = 362\text{ft}^2\end{aligned}$$

$$\text{Area}_{\text{all}} = 2774 - 362 = 2412\text{ft}^2$$

# STAT402: Project 1

## Plot Area Totals



$$\text{AREA}_M = 2412 - 233 - 87 - 5 = 2087 \text{ ft}^2$$

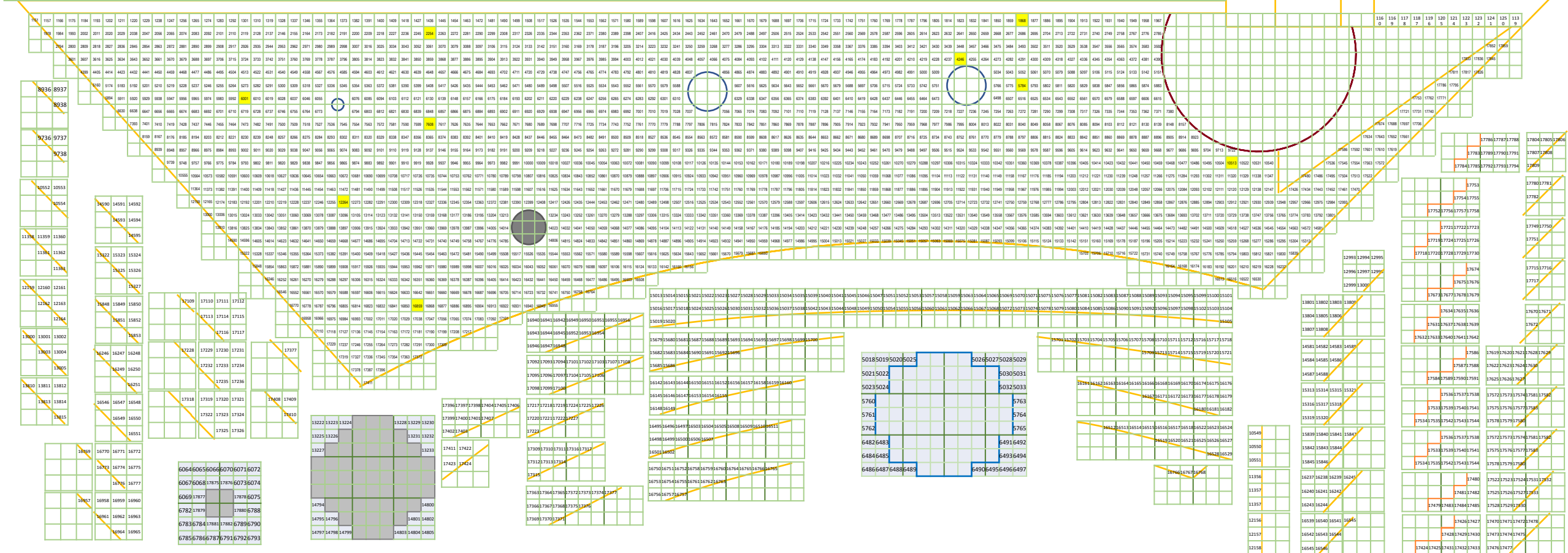
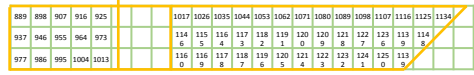
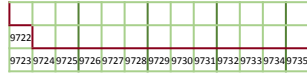
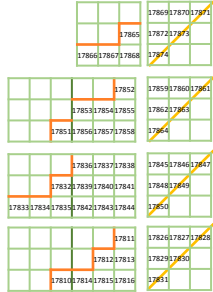
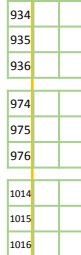
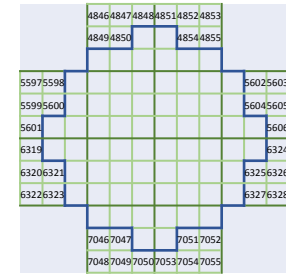
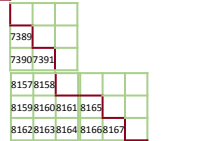
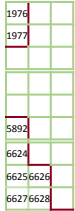
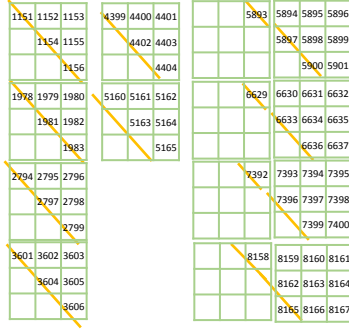
$$\text{AREA}_S = 98.1 + 7.9 + 127.1 = 233.1 \text{ ft}^2$$

$$\text{AREA}_P = 11.7 + 6.9 + 67.9 = 86.5 \text{ ft}^2$$

$$\text{AREA}_{\text{NONE}} = \pi * (0.15^2 + 1.3^2) = 5.4 \text{ ft}^2$$

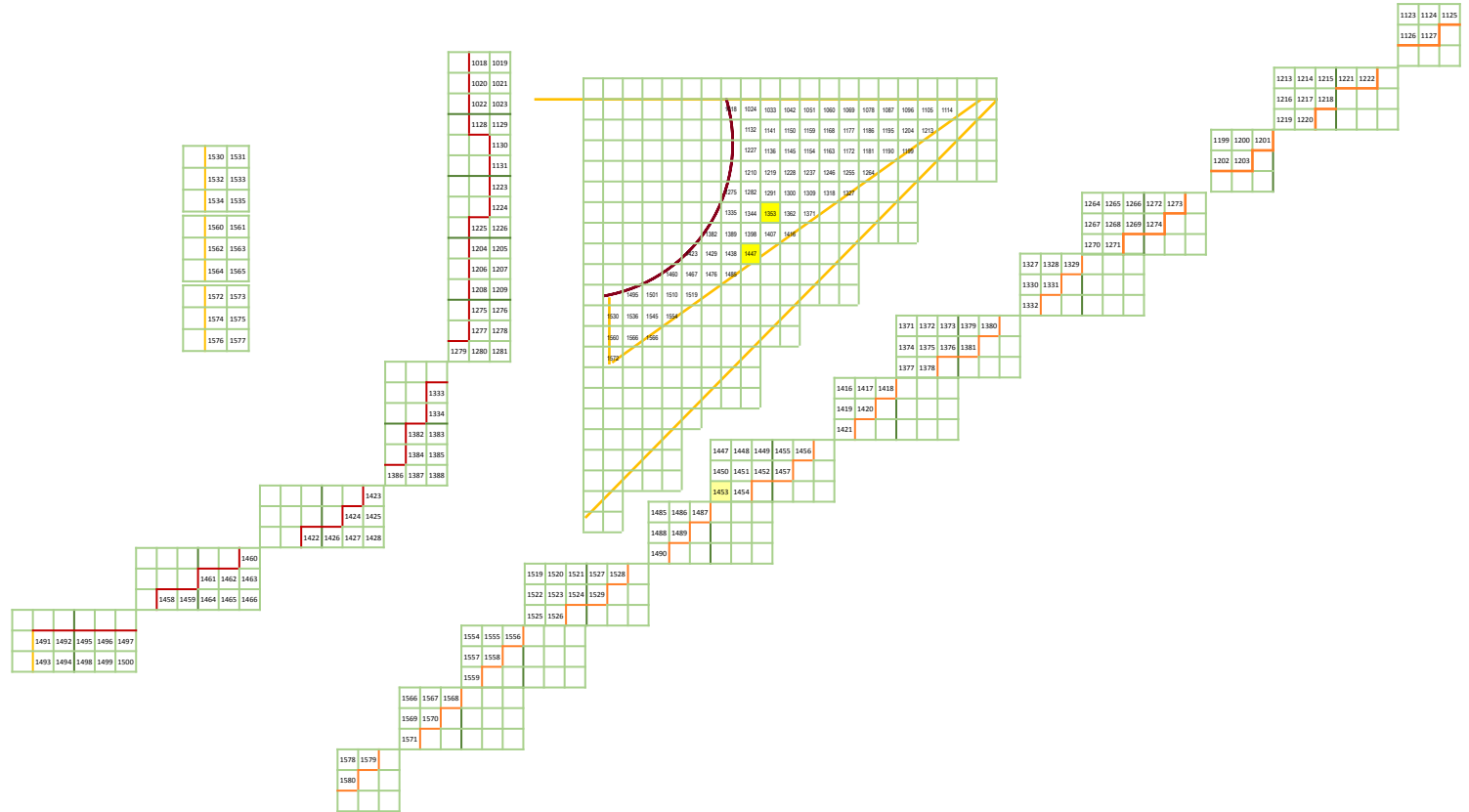
$$n = 9$$

SAMPLES
1873
5792
6001
16866
2254
4235
13267
10521
7616



$$n = 3$$

1355



$$n = 3$$

SAMPLES
265
841
939

