



Draw the radial JQ from the B.C. to radius point Q. Also draw AQ, from the property corner to Q.

From the angles given, AJ is N 23°08'40" W, the tangent to the curve is N 42°48'23" E, so the radial line at the B.C. is N 47°11'37" W. Angle AJQ is therefore 24°02'57"

By the Law of Cosines:

$AQ^2 = 121.377^2 + 682^2 - (2) \cdot (121.377) \cdot (682) \cdot \cos(24^\circ 02' 57") = 573.297$, and in the same triangle, angle AQJ computes to be 4°56'59", so QA is N 52°08'36"W.

Extend DA to P, so that APQ is a right angle. Angle QAP is equal to $180^\circ - 84^\circ 12' 26" - 52^\circ 08' 36" = 43^\circ 38' 58"$, so $PQ = 573.297 \cdot \sin(43^\circ 38' 58") = 395.715$

Angle PEQ is $\arcsin 395.715/649 = 37^\circ 34' 12"$ and QE is N58°13'22" W

Angle PHQ is $\arcsin 395.715/715 = 33^\circ 36' 14"$ so QH is N 62°11'20" W

Next, extend CB to R so that angle BRQ is a right angle. Angle BAQ is 42°53'09" (by difference of bearings). Draw BQ, which, by the Law of Cosines is $\sqrt{[573.297^2 + 604.425^2 - (2) \cdot (573.297) \cdot 604.425] \cdot \cos 42^\circ 53' 09"} = 431.518$. In triangle BAQ, angle ABQ is $\arccos [(604.425^2 + 431.518^2 - 573.297^2) / (2 \cdot (604.425) \cdot (431.518))] = 64^\circ 42' 26"$ and BQ bears N 55°26'59" E {angle BQA could have been calculated as $\arccos [431.518^2 + 573.297^2 - 604.425^2] / (2 \cdot (431.518) \cdot (573.297)) = 72^\circ 24' 25"$ as a check or alternate solution} and by difference of bearings angle RBQ is 50°39'49" so that $RQ = 431.518 \cdot \sin 50^\circ 39' 49" = 333.752$

Angle QFR = $\arcsin 333.752/649 = 30^\circ 56' 52"$ and FQ is N 75°09'56" E

Angle QGR = $\arcsin 333.752/715 = 27^\circ 49' 33"$ and GQ is N 78°17'15" E

The area GCDH is area GCDHQ less the sector HQG.

Area BFEA is area of quadrilateral BFEA plus segment FE of sector FEQ.

However you do your area calculations: CAD, computer, coordinate cross-multiplication, calculus, D.M.D.'s or by breaking down into triangles and circle parts, you should get

Area GCDHQ = 258,458.4 sq.ft., sector HQG = $\pi \cdot 715^2 \cdot (39^\circ 31' 25" / 360) = 176,325.9$ sq. ft., so AREA 1 = $258,458.4 - 176,325.9 = 82,132.5$ sq. ft. = 1.886 Ac.

$FE = 2 \cdot 649 \cdot \sin \cdot \frac{1}{2}(46^\circ 36' 42") = 513.539$

Area BFEA = 102,079.5 sq. ft.; sector FEQ = $\pi \cdot 649^2 \cdot (46^\circ 36' 42" / 360) = 171,329.2$ sq. ft. Area segment FEQ = $171,329.2 - \frac{1}{2} \cdot 513.539 \cdot 649 \cdot \cos \frac{1}{2} \cdot (46^\circ 36' 42") = 18,282.9$ sq. ft., and AREA 2 = 120,362.4 sq. ft. = 2.763 Ac.