



Client: Rio Verde Country Club  
Spring 2025 Report

|                          | <u>3/11/24</u> | <u>3/3/25</u> |
|--------------------------|----------------|---------------|
| Humidity/Air Temperature | 24%/78°        | 37%/62°       |
| Green Temperature        | (avg)65°       | (avg)59°      |
| Fairway Temperature      | (avg)61°       | (avg)60°      |

| <b>WATER</b> | <b>Acceptable Range<br/>For Water Sample</b> | <b>Quail Run<br/><u>3/11/24</u></b> | <b>White Wing<br/><u>3/11/24</u></b> | <b>Quail Run<br/><u>3/3/25</u></b> | <b>White Wing<br/><u>3/3/25</u></b> |
|--------------|----------------------------------------------|-------------------------------------|--------------------------------------|------------------------------------|-------------------------------------|
| pH           | 6.0-6.5                                      | 7.95                                | 7.32                                 | 8.00                               | 8.03                                |
| EC           | <2.25 mmhos/cm                               | 1.29                                | 1.64                                 | 1.34                               | 0.98                                |
| Sodium       |                                              | 257.43                              | 266.09                               | 222.09                             | 167.30                              |
| Calcium      | 20 - 60 ppm                                  | 26.15                               | 47.17                                | 31.68                              | 23.99                               |
| Magnesium    | 10 - 25 ppm                                  | 10.08                               | 26.66                                | 15.57                              | 13.00                               |
| Potassium    | 5 - 20 ppm                                   | 15.57                               | 42.76                                | 21.05                              | 13.40                               |
| Phosphorus   | 0.1 - 0.4 ppm                                | 1.73                                | 4.50                                 | 2.34                               | 1.42                                |
| Nitrate      | 5 - 50 ppm                                   | 2.59                                | 17.30                                | 8.78                               | 4.40                                |
| Sulfur       | 30 - 90 ppm                                  | 259.40                              | 74.84                                | 139.21                             | 94.35                               |
| Bicarbonate  | <120 ppm                                     | 239.13                              | 270.54                               | 250.14                             | 233.06                              |
| Boron        | <0.67 ppm                                    | 0.91                                | 0.40                                 | 0.51                               | 0.34                                |
| Chloride     | <177 ppm                                     | 166.63                              | 352.84                               | 195.74                             | 124.59                              |



| <b>QUAIL RUN TEES</b>     | <b>Acceptable Range For<br/>Alkaline Soils Sample</b> | <b>1,5,18(avg)<br/>3/11/24</b> | <b>5,9,13(avg)<br/>3/3/25</b> |
|---------------------------|-------------------------------------------------------|--------------------------------|-------------------------------|
| Organic Matter (Humus)    | 2 - 3%                                                | 2.64                           | 1.29                          |
| Sulfur                    | 12 - 16 ppm                                           | 36.33                          | 49.33                         |
| Olsen - Phosphorus        | 13 - 20 ppm                                           | 8.67                           | 2.33                          |
| Calcium - TEC of 6 - 12   | 1,000 lbs/acre                                        | 2,381.33                       | 2,116.00                      |
| Magnesium                 | >7% base saturation or at<br>least 200 lbs/acre       | 9.46%/200.66                   | 9.19%/204                     |
| Potassium - TEC of 0 - 35 | 100 ppm                                               | 180.67                         | 234.00                        |
| Manganese                 | >50 ppm                                               | 23.00                          | 47.33                         |

| <b>QUAIL RUN FAIRWAYS</b> | <b>Acceptable Range For<br/>Alkaline Soils Sample</b> | <b>1,5,18(avg)<br/>3/11/24</b> | <b>5,9,13(avg)<br/>3/3/25</b> |
|---------------------------|-------------------------------------------------------|--------------------------------|-------------------------------|
| Organic Matter (Humus)    | 2 - 3%                                                | 3.66                           | 3.16                          |
| Sulfur                    | 12 - 16 ppm                                           | 86.67                          | 140.00                        |
| Olsen - Phosphorus        | 13 - 20 ppm                                           | 11.33                          | 10.67                         |
| Calcium - TEC of 6 - 12   | 1,000 lbs/acre                                        | 3,540.00                       | 3,436.67                      |
| Magnesium                 | >7% base saturation or at<br>least 200 lbs/acre       | 8.87%/277.33                   | 9.03%/292                     |
| Potassium - TEC of 0 - 35 | 100 ppm                                               | 266.00                         | 289.33                        |
| Manganese                 | >50 ppm                                               | 39.67                          | 28.33                         |

| <b>QUAIL RUN GREENS</b>   | <b>Acceptable Range For<br/>Alkaline Soils Sample</b> | <b>1,5,18(avg)<br/>3/11/24</b> | <b>5,9,13(avg)<br/>3/3/25</b> |
|---------------------------|-------------------------------------------------------|--------------------------------|-------------------------------|
| Organic Matter (Humus)    | 2 - 3%                                                | 1.00                           | 0.38                          |
| Sulfur                    | 12 - 16 ppm                                           | 21.00                          | 40.33                         |
| Olsen - Phosphorus        | 13 - 20 ppm                                           | 4.33                           | 5.00                          |
| Calcium - TEC of 6 - 12   | 1,000 lbs/acre                                        | 1,891.33                       | 1,744.67                      |
| Magnesium                 | >7% base saturation or at<br>least 200 lbs/acre       | 7.56%/125.33                   | 8.85%/133.33                  |
| Potassium - TEC of 0 - 35 | 150 ppm                                               | 184.67                         | 161.33                        |
| Manganese                 | >50 ppm                                               | 44.67                          | 11.33                         |

| <b>QUAIL RUN TEES</b> | <b>Acceptable Range For<br/>Saturated Paste Sample</b> | <b>1<br/>3/11/24</b> | <b>5<br/>3/3/25</b> |
|-----------------------|--------------------------------------------------------|----------------------|---------------------|
| Nitrate-Bermudagrass  | 5 - 10 ppm                                             | <0.5                 | <0.5                |
| Phosphorus            | 2 - 10 ppm                                             | 6.18                 | 2.43                |
| Potassium             | 40 - 100 ppm                                           | 32.66                | 23.61               |
| Calcium               | 60 - 200 ppm                                           | 61.37                | 33.68               |
| Magnesium             | 20 - 70 ppm                                            | 8.74                 | 7.03                |
| Sodium                | 0 - 30 ppm                                             | 189.67               | 363.17              |
| Soluble Salts         | <1,920 ppm                                             | 746.00               | 1,079.00            |
| Bicarbonate           | <60 ppm                                                | 187.06               | 273.68              |
| Chloride              | <1,000 ppm                                             | 146.00               | 316.00              |
| SAR                   | <4%                                                    | 6.00                 | 14.86               |

| <b>QUAIL RUN FAIRWAYS</b> | <b>Acceptable Range For<br/>Saturated Paste Sample</b> | <b>1<br/>3/11/24</b> | <b>5<br/>3/3/25</b> |
|---------------------------|--------------------------------------------------------|----------------------|---------------------|
| Nitrate-Bermudagrass      | 5 - 10 ppm                                             | <0.5                 | 13.70               |
| Phosphorus                | 2 - 10 ppm                                             | 3.16                 | 2.03                |
| Potassium                 | 40 - 100 ppm                                           | 26.82                | 55.24               |
| Calcium                   | 60 - 200 ppm                                           | 40.85                | 103.59              |
| Magnesium                 | 20 - 70 ppm                                            | 7.50                 | 18.19               |
| Sodium                    | 0 - 30 ppm                                             | 192.92               | 437.04              |
| Soluble Salts             | <1,920 ppm                                             | 634.00               | 1463.00             |
| Bicarbonate               | <60 ppm                                                | 207.60               | 241.38              |
| Chloride                  | <1,000 ppm                                             | 80.00                | 274.00              |
| SAR                       | <4%                                                    | 7.28                 | 10.41               |

| <b>QUAIL RUN GREENS</b> | <b>Acceptable Range For<br/>Saturated Paste Sample</b> | <b>1,5,18(avg)<br/>3/11/24</b> | <b>5,9,13(avg)<br/>3/3/25</b> |
|-------------------------|--------------------------------------------------------|--------------------------------|-------------------------------|
| Nitrate -Bermudagrass   | 1-3 ppm                                                | <1.46                          | 1.33                          |
| Phosphorus              | 2 - 7 ppm                                              | 1.49                           | 2.25                          |
| Potassium               | 25-40 ppm                                              | 6.64                           | 9.71                          |
| Calcium                 | 50- 75 ppm                                             | 14.91                          | 30.53                         |
| Magnesium               | 15-30 ppm                                              | 2.32                           | 6.19                          |
| Sodium                  | 0 - 30 ppm                                             | 89.63                          | 100.56                        |
| Soluble Salts           | <1,000 ppm                                             | 302.00                         | 428.33                        |
| Bicarbonate             | <60 ppm                                                | 66.99                          | 131.60                        |
| Chloride                | <200 ppm                                               | 52.00                          | 40.00                         |
| SAR                     | <4%                                                    | 5.76                           | 4.48                          |

| <b>WHITE WING TEES</b>    | <b>Acceptable Range For<br/>Alkaline Soils Sample</b> | <b>1,5,17(avg)<br/>3/11/24</b> | <b>4,9,13(avg)<br/>3/3/25</b> |
|---------------------------|-------------------------------------------------------|--------------------------------|-------------------------------|
| Organic Matter (Humus)    | 2 - 3%                                                | 2.62                           | 2.53                          |
| Sulfur                    | 12 - 16 ppm                                           | 56.67                          | 77.33                         |
| Olsen - Phosphorus        | 13 - 20 ppm                                           | <5.0                           | <2                            |
| Calcium - TEC of 6 - 12   | 1,000 lbs/acre                                        | 2,329.33                       | 2,342.00                      |
| Magnesium                 | >7% base saturation or at<br>least 200 lbs/acre       | 10.2%/199.33                   | 10.0%/238.66                  |
| Potassium - TEC of 0 - 35 | 100 ppm                                               | 209.00                         | 306.33                        |
| Manganese                 | >50 ppm                                               | 23.67                          | 22.00                         |

| <b>WHITE WING FAIRWAYS</b> | <b>Acceptable Range For<br/>Alkaline Soils Sample</b> | <b>1,5,17(avg)<br/>3/11/24</b> | <b>4,9,13(avg)<br/>3/3/25</b> |
|----------------------------|-------------------------------------------------------|--------------------------------|-------------------------------|
| Organic Matter (Humus)     | 2 - 3%                                                | 3.84                           | 3.83                          |
| Sulfur                     | 12 - 16 ppm                                           | 128.67                         | 127.00                        |
| Olsen - Phosphorus         | 13 - 20 ppm                                           | 10.33                          | 9.00                          |
| Calcium - TEC of 6 - 12    | 1,000 lbs/acre                                        | 3,867.33                       | 3,306.67                      |
| Magnesium                  | >7% base saturation or at<br>least 200 lbs/acre       | 9.55%/320.66                   | 9.41%/288.66                  |
| Potassium - TEC of 0 - 35  | 100 ppm                                               | 331.00                         | 287.33                        |
| Manganese                  | >50 ppm                                               | 28.00                          | 21.67                         |

| <b>WHITE WING GREENS</b>  | <b>Acceptable Range For<br/>Alkaline Soils Sample</b> | <b>1,5,17(avg)<br/>3/11/24</b> | <b>4,9,13(avg)<br/>3/3/25</b> |
|---------------------------|-------------------------------------------------------|--------------------------------|-------------------------------|
| Organic Matter (Humus)    | 2 - 3%                                                | 0.93                           | 1.22                          |
| Sulfur                    | 12 - 16 ppm                                           | 21.00                          | 23.67                         |
| Olsen - Phosphorus        | 13 - 20 ppm                                           | 6.00                           | 4.33                          |
| Calcium - TEC of 6 - 12   | 1,000 lbs/acre                                        | 1,723.33                       | 1,886.00                      |
| Magnesium                 | >7% base saturation or at<br>least 200 lbs/acre       | 9.41%/143.33                   | 8.9%/153.33                   |
| Potassium - TEC of 0 - 35 | 150 ppm                                               | 162.00                         | 254.67                        |
| Manganese                 | >50 ppm                                               | 48.00                          | 44.00                         |

| <b>WHITE WING TEES</b> | <b>Acceptable Range For<br/>Saturated Paste Sample</b> | <b>1<br/>3/11/24</b> | <b>4<br/>3/3/25</b> |
|------------------------|--------------------------------------------------------|----------------------|---------------------|
| Nitrate-Ryegrass       | 5 - 10 ppm                                             | <0.5                 | 7.90                |
| Phosphorus             | 2 - 10 ppm                                             | 2.82                 | 3.69                |
| Potassium              | 40 - 100 ppm                                           | 38.08                | 38.77               |
| Calcium                | 60 - 200 ppm                                           | 75.18                | 57.11               |
| Magnesium              | 20 - 70 ppm                                            | 9.76                 | 12.02               |
| Sodium                 | 0 - 30 ppm                                             | 112.00               | 363.97              |
| Soluble Salts          | <1,920 ppm                                             | 601.00               | 1,178.00            |
| Bicarbonate            | <60 ppm                                                | 180.17               | 255.95              |
| Chloride               | <1,000 ppm                                             | 58.00                | 317.00              |
| SAR                    | <4%                                                    | 3.23                 | 11.42               |

| <b>WHITE WING FAIRWAYS</b> | <b>Acceptable Range For<br/>Saturated Paste Sample</b> | <b>1<br/>3/11/24</b> | <b>4<br/>3/3/25</b> |
|----------------------------|--------------------------------------------------------|----------------------|---------------------|
| Nitrate-Ryegrass           | 5 - 10 ppm                                             | <0.5                 | 6.20                |
| Phosphorus                 | 2 - 10 ppm                                             | 2.89                 | 2.02                |
| Potassium                  | 40 - 100 ppm                                           | 33.21                | 50.15               |
| Calcium                    | 60 - 200 ppm                                           | 53.79                | 107.90              |
| Magnesium                  | 20 - 70 ppm                                            | 8.27                 | 20.38               |
| Sodium                     | 0 - 30 ppm                                             | 136.43               | 367.01              |
| Soluble Salts              | <1,920 ppm                                             | 620.00               | 1,348.00            |
| Bicarbonate                | <60 ppm                                                | 154.59               | 221.92              |
| Chloride                   | <1,000 ppm                                             | 106.00               | 239.00              |
| SAR                        | <4%                                                    | 4.57                 | 8.49                |

| <b>WHITE WING GREENS</b> | <b>Acceptable Range For<br/>Saturated Paste Sample</b> | <b>1,5,17(avg)<br/>3/11/24</b> | <b>4,9,13(avg)<br/>3/3/25</b> |
|--------------------------|--------------------------------------------------------|--------------------------------|-------------------------------|
| Nitrate - Poa Trivialis  | 1-3 ppm                                                | 1.00                           | 5.67                          |
| Phosphorus               | 2 - 7 ppm                                              | 1.83                           | 1.51                          |
| Potassium                | 25-40 ppm                                              | 6.34                           | 14.83                         |
| Calcium                  | 50- 75 ppm                                             | 12.01                          | 19.17                         |
| Magnesium                | 15-30 ppm                                              | 2.29                           | 3.56                          |
| Sodium                   | 0 - 30 ppm                                             | 81.65                          | 107.61                        |
| Soluble Salts            | <1,000 ppm                                             | 286.00                         | 434.00                        |
| Bicarbonate              | <60 ppm                                                | 70.59                          | 88.19                         |
| Chloride                 | <200 ppm                                               | 42.50                          | 67.33                         |
| SAR                      | <4%                                                    | 5.67                           | 5.92                          |



## Nutrient Deficiencies

|                       |       |    | P         | Na             |
|-----------------------|-------|----|-----------|----------------|
| WHITE WING COURSE     | TEE   | 4  | < 2       | 511            |
| WHITE WING COURSE     | TEE   | 9  | < 2       | 386            |
| WHITE WING COURSE     | TEE   | 13 | < 2       | 469            |
| WHITE WING COURSE     | GREEN | 4  | < 2       | 177            |
| WHITE WING COURSE     | GREEN | 9  | 5         | 200            |
| WHITE WING COURSE     | GREEN | 13 | 6         | 223            |
| QUAIL RUN COURSE      | TEE   | 5  | 3         | 537            |
| QUAIL RUN COURSE      | TEE   | 9  | < 2       | 541            |
| QUAIL RUN COURSE      | TEE   | 13 | < 2       | 457            |
| QUAIL RUN COURSE      | GREEN | 5  | < 2       | 163            |
| QUAIL RUN COURSE      | GREEN | 9  | 8         | 215            |
| QUAIL RUN COURSE      | GREEN | 13 | 5         | 165            |
| <b>Desired Values</b> |       |    | <b>13</b> | <b>&lt;100</b> |

Phosphorus can be added in the form of 11-55-00 at a rate of 3 pounds of product per 1,000 sq ft or 125 pounds of product per acre on tees and greens. Consider Earthworks or NatureSafe on the Quail Run Course Greens

### Comments and Next Level Cultural Practices

- White Wing Course greens are slightly low in Magnesium. I don't think it is a pressing time to apply Pro-Mag 36, however, next time you apply potassium, you could use a 0-0-22 on those greens only.
- I collected a sample from Quail Run Course Green #13 to analyze Organic Material in the top 2 ½". The plan is to collect a sample on that green monthly as an "experiment" in how to exactly use the **2-4-6 OM USGA** recommended testing. The idea is to track the newly renovated greens to help you control the top layer build up of thatch and excess organic material.
- Your plan to address sodium levels in the soil of Gypsum applications every 3-4 weeks followed by 0-0-50 applications will help. The gypsum applications on the greens should be followed by a heavy watering. The sodium must be removed from the root-zone to change turf health. The product added to the newly renovated greens-mix, **Profile**, is designed to help the sand hold water. When it does that, it also holds in the negativity in your irrigation water.
- *I would recommend aerification practices that are at least below the 4" top layer (90/10 WCS&G PHX sand/Profile) that was added. That will help water push into the original greens-mix and out the drain lines.*

