

Table 3-3
 Summary of Vertical Hydraulic Gradients
 Groundwater Remedial Investigation Report
 Garfield Avenue Group of Sites
 PPG, Jersey City, New Jersey

| Well ID | Measurement Date | Screened Zone | Screen Reference | Top of Screen (feet below reference) | Bottom of Screen (feet below reference) | Top of Screen Elevation (feet) | Bottom of Screen Elevation (feet) | Screen Midpoint Elevation (feet) | Original Top of Casing Elevation ¹ (feet) | Water Level Reference Point | Water Level Reference Point Elevation ² (feet) (Riser or Inner Casing) | Groundwater Levels (May 31 - June 11, 2018) | | Is Screen Saturated? | Saturated Screen Midpoint Elevation (feet) | Distance Between Saturated Screen Midpoints (feet) | Vertical Hydraulic Gradient ³ | Vertical Groundwater Flow Direction |
|------------------|------------------|---------------|------------------|---|--|-----------------------------------|--------------------------------------|-------------------------------------|---|-----------------------------|---|--|---------------------------------|----------------------|---|---|--|-------------------------------------|
| | | | | | | | | | | | | DTW (feet btc) | Groundwater Elevation (feet) | | | | | |
| MW-MORRIS1A | 2018-05-29 | S | Top of Casing | 10 | 20 | 1.81 | -8.19 | -3.19 | 11.81 | PVC Riser | 14.43 | 2.00 | 12.43 | Y | -3.19 | 21.37 | -0.2068 | S to I |
| 114-MC-PZ103 | 2018-05-29 | I | Top of Casing | 37 | 42 | -22.06 | -27.06 | -24.56 | 14.94 | PVC Riser | 11.98 | 3.97 | 8.01 | Y | -24.56 | 22.51 | -0.0173 | I to D |
| MW6C | 2018-05-29 | D | Top of Casing | 55 | 65 | -42.07 | -52.07 | -47.07 | 12.93 | Top of Casing | 12.90 | 5.28 | 7.62 | Y | -47.07 | 38.78 | 0.0436 | BR to D |
| 114-MW6D | 2018-05-29 | BR | Top of Casing | 86 | 111 | -73.35 | -98.35 | -85.85 | 12.65 | Top of Casing | 12.69 | 3.38 | 9.31 | Y | -85.85 | - | - | - |
| 114-P1A-MW101S | 2018-05-29 | S | Top of Casing | 5 | 15 | 9.33 | -0.67 | 4.33 | 14.33 | Top of Casing | 14.33 | 4.18 | 10.15 | Y | 4.33 | 19.93 | -0.0893 | S to I |
| 114-P1A-MW101I | 2018-05-29 | I | Top of Casing | 25 | 35 | -10.60 | -20.60 | -15.60 | 14.40 | Top of Casing | 14.40 | 6.03 | 8.37 | Y | -15.60 | - | - | - |
| 114-P1C-MW101S | 2018-05-29 | S | Top of Casing | 2 | 12 | 11.66 | 1.66 | 6.66 | 13.66 | Top of Casing | 13.68 | 4.29 | 9.39 | N | 5.53 | 24.72 | -0.0340 | S to I |
| 114-P1C-MW101I | 2018-05-29 | I | Top of Casing | 30 | 35 | -16.69 | -21.69 | -19.19 | 13.31 | Top of Casing | 13.31 | 4.76 | 8.55 | Y | -19.19 | - | - | - |
| 114-P1B-MW101S | 2018-05-29 | S | Top of Casing | 4 | 14 | 11.38 | 1.38 | 6.38 | 15.38 | Top of Casing | 13.30 | 2.34 | 10.96 | N | 6.17 | 17.86 | -0.1629 | S to I |
| 114-P1B-MW101I | 2018-05-29 | I | Top of Casing | 23 | 33 | -6.69 | -16.69 | -11.69 | 16.31 | Top of Casing | 14.13 | 6.08 | 8.05 | Y | -11.69 | - | - | - |
| 114-P2B1-MW101S | 2018-05-29 | S | Top of Casing | 3 | 13 | 11.99 | 1.99 | 6.99 | 14.99 | Top of Casing | 15.01 | 4.84 | 10.17 | N | 6.08 | 27.15 | -0.0755 | S to I |
| 114-P2B1-MW101I | 2018-05-29 | I | Top of Casing | 30 | 40 | -16.07 | -26.07 | -21.07 | 13.93 | Top of Casing | 13.95 | 5.83 | 8.12 | Y | -21.07 | - | - | - |
| 114-P1-IRM-27D | 2018-05-29 | D | Top of Casing | 33 | 53 | -19.74 | -39.74 | -29.74 | 13.26 | Top of Casing | 13.26 | 6.11 | 7.15 | Y | -29.74 | 45.34 | 0.0734 | BR to D |
| 114-MW7D | 2018-06-01 | BR | Top of Casing | 85 | 90 | -72.58 | -77.58 | -75.08 | 12.42 | Top of Casing | 11.92 | 1.44 | 10.48 | Y | -75.08 | - | - | - |
| 114-P2B3-MW101S | 2018-05-29 | S | Top of Casing | 6 | 16 | 7.89 | -2.11 | 2.89 | 13.89 | Top of Casing | 13.93 | 3.44 | 10.49 | Y | 2.89 | 19.99 | -0.0980 | S to I |
| 114-P2B3-MW101I | 2018-05-29 | I | Top of Casing | 25 | 35 | -12.10 | -22.10 | -17.10 | 12.90 | Top of Casing | 12.93 | 4.40 | 8.53 | Y | -17.10 | - | - | - |
| 114-P2B4-MW102S | 2018-05-29 | S | Top of Casing | 6 | 16 | 6.49 | -3.51 | 1.49 | 12.49 | PVC Riser | 13.44 | 3.11 | 10.33 | Y | 1.49 | 20.63 | -0.0974 | S to I |
| 114-P2B4-MW102I | 2018-05-29 | I | Top of Casing | 26 | 36 | -14.14 | -24.14 | -19.14 | 11.86 | Top of Casing | 11.86 | 3.54 | 8.32 | Y | -19.14 | - | - | - |
| 114-P2B4-MW103S | 2018-05-29 | S | Top of Casing | 6 | 16 | 9.26 | -0.74 | 4.26 | 15.26 | Top of Casing | 15.30 | 4.84 | 10.46 | Y | 4.26 | 20.23 | -0.0914 | S to I |
| 114-P2B4-MW103I | 2018-05-29 | I | Top of Casing | 24 | 34 | -10.97 | -20.97 | -15.97 | 13.03 | Top of Casing | 13.05 | 4.44 | 8.61 | Y | -15.97 | - | - | - |
| 114-P2A-MW102S | 2018-05-29 | S | Top of Casing | 10 | 20 | 3.68 | -6.32 | -1.32 | 13.68 | Top of Casing | 13.70 | 4.09 | 9.61 | Y | -1.32 | 18.07 | -0.0133 | S to I |
| 114-P2A-MW102I | 2018-05-29 | I | Top of Casing | 27.5 | 37.5 | -14.39 | -24.39 | -19.39 | 13.11 | Top of Casing | 13.12 | 3.75 | 9.37 | Y | -19.39 | - | - | - |
| 114-P2A-MW103S | 2018-05-29 | S | Top of Casing | 8 | 18 | 7.92 | -2.08 | 2.92 | 15.92 | Top of Casing | 15.98 | 6.34 | 9.64 | Y | 2.92 | 24.53 | -0.0143 | S to I |
| 114-P2A-MW103I | 2018-05-29 | I | Top of Casing | 32 | 42 | -16.61 | -26.61 | -21.61 | 15.39 | Top of Casing | 15.41 | 6.12 | 9.29 | Y | -21.61 | - | - | - |
| 114-P2A-MW104S | 2018-05-29 | S | Top of Casing | 10 | 20 | 2.84 | -7.16 | -2.16 | 12.84 | Top of Casing | 12.83 | 3.51 | 9.32 | Y | -2.16 | 18.74 | 0.0149 | I to S |
| 114-P2A-MW104I | 2018-05-29 | I | Top of Casing | 30 | 40 | -15.90 | -25.90 | -20.90 | 14.10 | Top of Casing | 14.10 | 4.50 | 9.60 | Y | -20.90 | - | - | - |
| 132-P3A-MW103S | 2018-05-29 | S | Top of Casing | 6 | 16 | 9.11 | -0.89 | 4.11 | 15.11 | Top of Casing | 15.11 | 4.51 | 10.60 | Y | 4.11 | 29.91 | -0.1046 | S to I |
| 132-P3A-MW103I | 2018-05-29 | I | Top of Casing | 34 | 44 | -20.80 | -30.80 | -25.80 | 13.20 | Top of Casing | 13.21 | 5.74 | 7.47 | Y | -25.80 | - | - | - |
| 132-P3A-MW104S | 2018-05-29 | S | Top of Casing | 6 | 16 | 8.80 | -1.20 | 3.80 | 14.80 | Top of Casing | 14.80 | 3.43 | 11.37 | Y | 3.80 | 33.92 | -0.1103 | S to I |
| 132-P3A-MW104I | 2018-05-29 | I | Top of Casing | 38 | 48 | -25.12 | -35.12 | -30.12 | 12.88 | Top of Casing | 12.88 | 5.25 | 7.63 | Y | -30.12 | 24.49 | 0.0024 | D to I |
| 132-P3A-MW104D-2 | 2018-05-29 | D | Top of Casing | 67 | 72 | -52.11 | -57.11 | -54.61 | 14.89 | Top of Casing | 14.89 | 7.20 | 7.69 | Y | -54.61 | - | - | - |
| 137-P3B-MW101S | 2018-05-29 | S | Top of Casing | 6 | 16 | 8.65 | -1.35 | 3.65 | 14.65 | Top of Casing | 14.61 | 4.14 | 10.47 | Y | 3.65 | 30.65 | -0.1005 | S to I |
| 137-P3B-MW101I | 2018-05-29 | I | Top of Casing | 35 | 45 | -22.00 | -32.00 | -27.00 | 13.00 | Top of Casing | 13.00 | 5.61 | 7.39 | Y | -27.00 | - | - | - |
| 137-P3B-MW102S | 2018-05-29 | S | Top of Casing | 7 | 17 | 7.16 | -2.84 | 2.16 | 14.16 | Top of Casing | 14.16 | 5.46 | 8.70 | Y | 2.16 | 33.23 | 0.0024 | I to S |
| 137-P3B-MW102I | 2018-05-29 | I | Top of Casing | 39 | 49 | -26.07 | -36.07 | -31.07 | 12.93 | Top of Casing | 12.94 | 4.16 | 8.78 | Y | -31.07 | - | - | - |
| 133-P3C-MW101S | 2018-05-29 | S | Top of Casing | 4 | 14 | 8.26 | -1.74 | 3.26 | 12.26 | PVC Riser | 12.16 | 2.59 | 9.57 | Y | 3.26 | 28.16 | -0.0831 | S to I |
| 133-P3C-MW101I | 2018-05-29 | I | Top of Casing | 32 | 42 | -19.90 | -29.90 | -24.90 | 12.10 | PVC Riser | 12.02 | 4.79 | 7.23 | Y | -24.90 | - | - | - |
| 133-P3C-MW102S | 2018-05-29 | S | Top of Casing | 4 | 14 | 8.66 | -1.34 | 3.66 | 12.66 | PVC Riser | 12.57 | 3.16 | 9.41 | Y | 3.66 | 32.39 | -0.0621 | S to I |
| 133-P3C-MW102I | 2018-05-29 | I | Top of Casing | 36 | 46 | -23.73 | -33.73 | -28.73 | 12.27 | PVC Riser | 12.18 | 4.78 | 7.40 | Y | -28.73 | - | - | - |
| 135-MW1AR | 2018-05-29 | S | Top of Casing | 10 | 15 | -0.29 | -5.29 | -2.79 | 9.71 | Top of Casing | 9.71 | 1.70 | 8.01 | Y | -2.79 | 19.07 | -0.0409 | S to I |
| 135-MW1B | 2018-05-29 | I | Top of Casing | 29 | 34 | -19.36 | -24.36 | -21.86 | 9.64 | Top of Casing | 9.64 | 2.41 | 7.23 | Y | -21.86 | 69.30 | 0.0101 | D to I |
| 135-MW1C | 2018-05-29 | D | Top of Casing | 98 | 103 | -88.66 | -93.66 | -91.16 | 9.34 | Top of Casing | 9.34 | 1.41 | 7.93 | Y | -91.16 | - | - | - |
| 135-MW2A | 2018-05-29 | S | Top of Casing | 3 | 16.5 | 5.74 | -7.76 | -1.01 | 8.74 | Top of Casing | 8.74 | 0.77 | 7.97 | Y | -1.01 | 20.84 | -0.0451 | S to I |
| 135-MW2B | 2018-05-29 | I | Top of Casing | 28 | 33 | -19.35 | -24.35 | -21.85 | 8.65 | Top of Casing | 8.65 | 1.62 | 7.03 | Y | -21.85 | - | - | - |
| 135-P3C-MW102S | 2018-05-29 | S | Top of Casing | 10 | 15 | 0.99 | -4.01 | -1.51 | 10.99 | Top of Casing | 10.99 | 2.81 | 8.18 | Y | -1.51 | 18.05 | -0.0476 | S to I |
| 135-MW3BR | 2018-05-29 | I | Top of Casing | 28 | 33 | -17.06 | -22.06 | -19.56 | 10.94 | Top of Casing | 10.94 | 3.62 | 7.32 | Y | -19.56 | - | - | - |
| MW8S | 2018-05-29 | S | Top of Casing | 7 | 12 | 1.39 | -3.61 | -1.11 | 8.39 | Top of Casing | 8.39 | 5.14 | 3.25 | Y | -1.11 | 34.37 | 0.1117 | I to S |
| MW8D | 2018-05-29 | I | Top of Casing | 39 | 49 | -30.48 | -40.48 | -35.48 | 8.52 | Top of Casing | 8.52 | 1.43 | 7.09 | Y | -35.48 | 36.13 | -0.0180 | I to D |
| MW8F | 2018-05-29 | D | Top of Casing | 78 | 83 | -69.11 | -74.11 | -71.61 | 8.89 | Top of Casing | 8.89 | 2.45 | 6.44 | Y | -71.61 | - | - | - |
| 114-MW20A | 2018-05-29 | S | Top of Casing | 3 | 15 | 9.17 | -2.83 | 3.17 | 12.17 | Top of Casing | 12.17 | 8.00 | 4.17 | N | 0.67 | 26.01 | 0.1123 | I to S |
| 114-MW20B | 2018-05-29 | I | Top of Casing | 35 | 40 | -22.84 | -27.84 | -25.34 | 12.16 | Top of Casing | 12.16 | 5.07 | 7.09 | Y | -25.34 | 43.09 | 0.0167 | D to I |
| 114-MW20C | 2018-05-29 | D | Top of Casing | 78 | 83 | -65.93 | -70.93 | -68.43 | 12.07 | Top of Casing | 12.07 | 4.26 | 7.81 | Y | -68.43 | - | - | - |
| MW7S | 2018-05-29 | S | Top of Casing | 2 | 12 | 8.29 | -1.71 | 3.29 | 10.29 | Top of Casing | 10.29 | 4.66 | 5.63 | N | 1.96 | 34.09 | 0.0308 | I to S |
| MW7D | 2018-05-29 | I | Top of Casing | 38 | 48 | -27.13 | -37.13 | -32.13 | 10.87 | Top of Casing | 10.87 | 4.19 | 6.68 | Y | -32.13 | - | - | - |

**Table 3-3
Summary of Vertical Hydraulic Gradients
Groundwater Remedial Investigation Report
Garfield Avenue Group of Sites
PPG, Jersey City, New Jersey**

| Well ID | Measurement Date | Screened Zone | Screen Reference | Top of Screen (feet below reference) | Bottom of Screen (feet below reference) | Top of Screen Elevation (feet) | Bottom of Screen Elevation (feet) | Screen Midpoint Elevation (feet) | Original Top of Casing Elevation ¹ (feet) | Water Level Reference Point | Water Level Reference Point Elevation ² (feet) (Riser or Inner Casing) | Groundwater Levels (May 31 - June 11, 2018) | | Is Screen Saturated? | Saturated Screen Midpoint Elevation (feet) | Distance Between Saturated Screen Midpoints (feet) | Vertical Hydraulic Gradient ³ | Vertical Groundwater Flow Direction |
|--------------|------------------|---------------|------------------|---|--|-----------------------------------|--------------------------------------|-------------------------------------|---|-----------------------------|---|--|---------------------------------|----------------------|---|---|--|-------------------------------------|
| | | | | | | | | | | | | DTW (feet btc) | Groundwater Elevation (feet) | | | | | |
| 114-MW22A | 2018-05-29 | S | Top of Casing | 7 | 19 | 4.83 | -7.17 | -1.17 | 11.83 | Top of Casing | 11.90 | 4.08 | 7.82 | Y | -1.17 | 17.11 | -0.0544 | S to I |
| 114-MW22B | 2018-05-29 | I | Top of Casing | 28 | 33 | -15.78 | -20.78 | -18.28 | 12.22 | Top of Casing | 12.23 | 5.34 | 6.89 | Y | -18.28 | - | - | - |
| 114-MW41A | 2018-06-01 | S | Top of Casing | 10 | 15 | 8.24 | 3.24 | 5.74 | 18.24 | Top of Casing | 18.24 | 8.20 | 10.04 | Y | 5.74 | 12.57 | -0.2037 | S to I |
| 114-MW41B | 2018-06-01 | I | Top of Casing | 22 | 27 | -4.33 | -9.33 | -6.83 | 17.67 | Top of Casing | 17.67 | 10.19 | 7.48 | Y | -6.83 | - | - | - |
| 114-MW2B1-2 | 2018-05-29 | S | Top of Casing | 16 | 26 | 7.96 | -2.04 | 2.96 | 23.96 | Top of Casing | 23.96 | 15.22 | 8.74 | Y | 2.96 | 14.51 | -0.0999 | S to I |
| 114-MW2B1-2I | 2018-05-29 | I | Top of Casing | 33 | 38 | -9.05 | -14.05 | -11.55 | 23.95 | Top of Casing | 23.95 | 16.66 | 7.29 | Y | -11.55 | - | - | - |
| 114-MW37A | 2018-06-11 | S | Top of Casing | 10 | 15 | 0.87 | -4.13 | -1.63 | 10.87 | Top of Casing | 10.87 | 4.20 | 6.67 | Y | -1.63 | 20.08 | -0.0040 | S to I |
| 114-MW37B | 2018-06-11 | I | Top of Casing | 30 | 35 | -19.21 | -24.21 | -21.71 | 10.79 | Top of Casing | 10.79 | 4.20 | 6.59 | Y | -21.71 | - | - | - |
| 114-MW38A | 2018-06-11 | S | Top of Casing | 20 | 25 | 0.51 | -4.49 | -1.99 | 20.51 | Top of Casing | 20.51 | 12.45 | 8.06 | Y | -1.99 | 16.96 | -0.0890 | S to I |
| 114-MW38B | 2018-06-11 | I | Top of Casing | 37 | 42 | -16.45 | -21.45 | -18.95 | 20.55 | Top of Casing | 20.55 | 14.00 | 6.55 | Y | -18.95 | - | - | - |
| 114-MW36A | 2018-05-29 | S | Top of Casing | 10 | 15 | 0.69 | -4.31 | -1.81 | 10.69 | Top of Casing | 10.69 | 3.88 | 6.81 | Y | -1.81 | 20.76 | 0.0116 | I to S |
| 114-MW36B | 2018-05-29 | I | Top of Casing | 30 | 35 | -20.07 | -25.07 | -22.57 | 9.93 | Top of Casing | 9.93 | 2.88 | 7.05 | Y | -22.57 | - | - | - |
| 114-MW25A | 2018-05-29 | S | Top of Casing | 9 | 14 | 0.88 | -4.12 | -1.62 | 9.88 | Top of Casing | 9.88 | 2.98 | 6.90 | Y | -1.62 | 20.80 | 0.0029 | I to S |
| 114-MW25B | 2018-05-29 | I | Top of Casing | 30 | 35 | -19.92 | -24.92 | -22.42 | 10.08 | Top of Casing | 10.08 | 3.12 | 6.96 | Y | -22.42 | 12.31 | 0.0447 | D to I |
| 114-MW25C | 2018-05-29 | D | Top of Casing | 42 | 47 | -32.23 | -37.23 | -34.73 | 9.77 | Top of Casing | 9.77 | 2.26 | 7.51 | Y | -34.73 | - | - | - |
| 114-MW24AR | 2018-05-29 | S | Top of Casing | 9 | 14 | 2.36 | -2.64 | -0.14 | 11.36 | Top of Casing | 11.36 | 3.58 | 7.78 | Y | -0.14 | 20.95 | -0.0344 | S to I |
| 114-MW24B | 2018-05-29 | I | Top of Casing | 30 | 35 | -18.59 | -23.59 | -21.09 | 11.41 | Top of Casing | 11.56 | 4.50 | 7.06 | Y | -21.09 | - | - | - |
| 114-MW27A | 2018-05-29 | S | Top of Casing | 11 | 16 | -0.65 | -5.65 | -3.15 | 10.35 | Top of Casing | 10.35 | 3.52 | 6.83 | Y | -3.15 | 19.15 | -0.0350 | S to I |
| 114-MW27B | 2018-05-29 | I | Top of Casing | 30 | 35 | -19.80 | -24.80 | -22.30 | 10.20 | Top of Casing | 10.20 | 4.04 | 6.16 | Y | -22.30 | - | - | - |
| 114-MW19B | 2018-05-29 | I | Top of Casing | 45 | 50 | -32.38 | -37.38 | -34.88 | 12.62 | PVC Riser | 12.66 | 5.28 | 7.38 | Y | -34.88 | 51.09 | 0.0023 | D to I |
| 114-MW19C | 2018-05-29 | D | Top of Casing | 96 | 101 | -83.47 | -88.47 | -85.97 | 12.53 | PVC Riser | 12.53 | 5.03 | 7.50 | Y | -85.97 | - | - | - |

Notes:

¹Original Top of Casing Elevation at well completion; casing may have been subsequently modified due to site activities.

²Reference elevation at time of water level gauging.

³Negative value indicates downward vertical groundwater flow direction.

Vertical Elevation Datum = feet in the North American Vertical Datum of 1988 (NAVD88).

- = Not Applicable

BR = Bedrock water-bearing zone

btc = Below top of casing

D = Deep water-bearing zone

DTW = Depth to Groundwater

I = Intermediate water-bearing zone

N = No

PVC = polyvinyl chloride

S = Shallow water-bearing zone

Y = Yes