



GEOTECHNICAL ENGINEERING • ENVIRONMENTAL ENGINEERING  
CONSTRUCTION TESTING & INSPECTION

January 8, 2020

KA No. 112-19097

**Mr. Darren Berberian**  
**The Pacific Companies**  
430 E. State Street, Suite 100  
Eagle, ID 83616

**RE: Results of Infiltration Testing**  
Proposed Mission Gorge Road Grantville Development  
5901-5927 Mission Gorge Road  
San Diego, California

Dear Mr. Berberian:

In accordance with your request and authorization we have performed infiltration testing at the subject site in San Diego, California. Infiltration testing was performed at four (4) locations within the proposed infiltration areas located at the subject site. The approximate test locations are identified on the attached site plan. In order to perform these tests, four (4) borings were drilled to a depth of approximately five (5) feet below existing site grades. Infiltration testing has been performed at each of the boring locations. Infiltration testing has been performed using open borehole percolation testing. The infiltration rates have been calculated using the Inverse Borehole procedures.

Prior to infiltration testing, approximately four inches of gravel was placed at the bottom of each borehole. The borehole was pre-soaked prior to testing using clean water. The depth of the borehole was measured at each reading to verify the overall depth. The depth of water in the borehole was measured using a water level indicator or well sounder.

### **Infiltration Test Results**

The estimated infiltration rates were determined using the results of open borehole percolation testing at four (4) locations at the subject site. In accordance with the County of San Diego, Infiltration Rate Assessment Methods, infiltration rates have been calculated using the Inverse Borehole procedures. The infiltration rates have been adjusted to reflect vertical flow.

The infiltration testing performed in the near surfaces silty sands encountered in the western portion of the site indicate infiltration rates at the end of the tests of approximately 0.51 and 0.55 inch per hour at a depth of approximately five (5) feet below site grades. Infiltration testing performed in the near surface clayey sands encountered in the eastern portion of the site indicate infiltration rates of 0.20 and 0.29 inch per hour at a depth of approximately five (5) feet below site grades.

Detailed results of the infiltration testing are included as an attachment to this report. The soil infiltration rates are based on tests conducted with clean water. The infiltration rates may vary with time as a result of soil clogging from water impurities. A factor of safety should be incorporated into the design of the

infiltration system to compensate for these factors as determined appropriate by the designer. In addition, routine maintenance consisting of clearing the system of clogged soils and debris should be expected.

If there are any questions or if we can be of further assistance, please do not hesitate to contact our office at (951) 273-1011.

Respectfully submitted,  
**KRAZAN & ASSOCIATES, INC.**

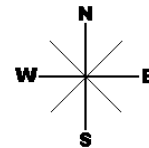
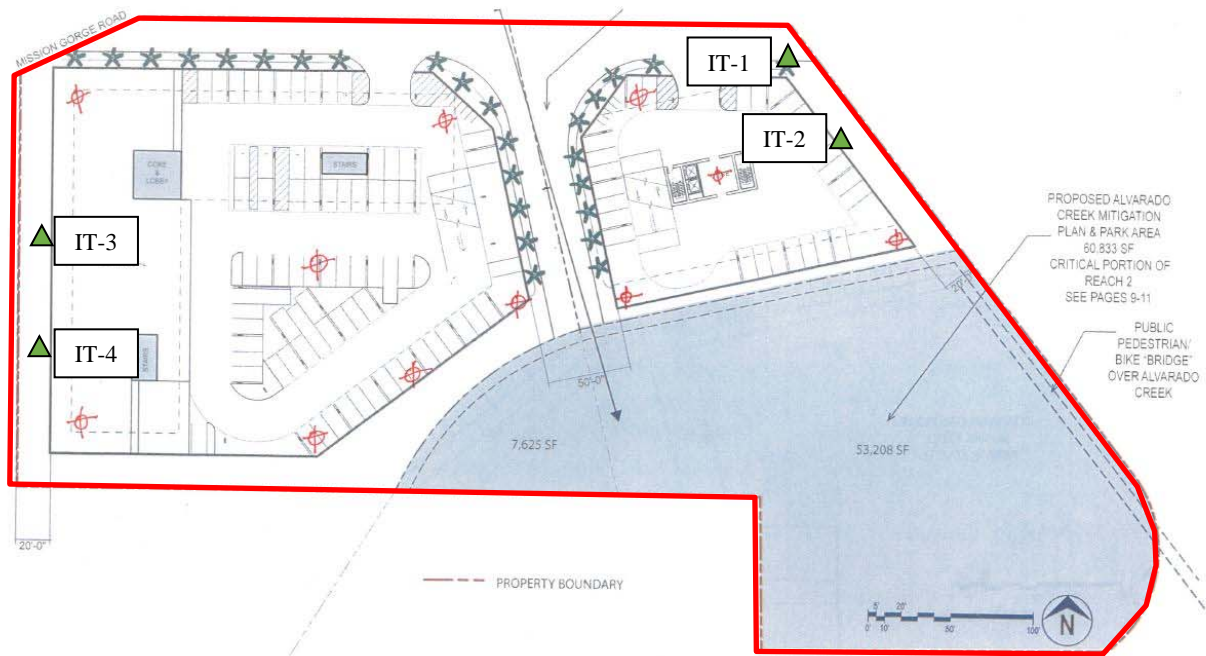


James M. Kellogg, PE, GE  
Managing Engineer  
RCE No. 65092, GE No. 2902




*Jorge Pelayo*  
Jorge A. Pelayo, E.I.T.  
Staff Engineer

Attachment: Infiltration Test Results



▲ APPROXIMATE INFILTRATION TEST LOCATION

|  |                                 |                               |   |
|--|---------------------------------|-------------------------------|---|
| <b>PERCOLATION TEST<br/>LOCATION SITE MAP</b><br><br><b>PROPOSED GRANTVILLE<br/>DEVELOPMENT AT MISSION<br/>GORGE ROAD</b><br><b>5901 – 5927 MISSION GORGE<br/>ROAD</b><br><b>SAN DIEGO, CALIFORNIA</b> | <b>Scale:</b><br>NTS            | <b>Date:</b><br>January, 2020 |  |
|  | <b>Drawn by:</b><br>JP          | <b>Approved by:</b><br>JK     |   |
|  | <b>Project No.</b><br>112-19097 | <b>Figure No.</b><br>1        |   |

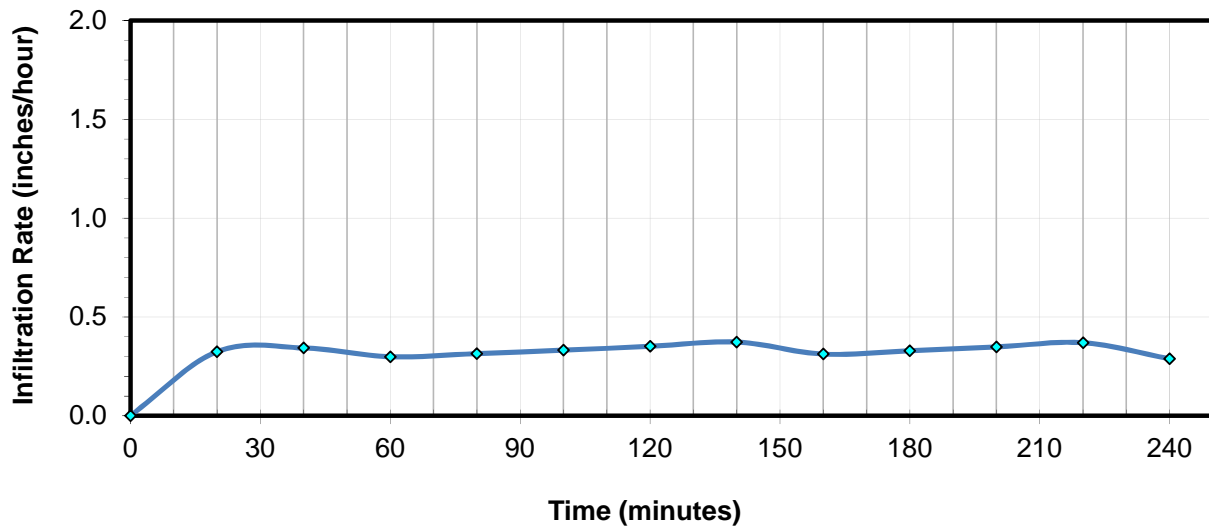
# RESULTS OF INFILTRATION TESTS - REVERSE BOREHOLE

|                 |                    |      |          |
|-----------------|--------------------|------|----------|
| Project #       | 11219097           | Date | 1/8/2020 |
| Project Name    | Mission Gorge Road |      |          |
| Project Address | San Diego, CA      |      |          |

|                |      |                     |    |                |   |
|----------------|------|---------------------|----|----------------|---|
| Test No:       | IT-1 | Total Depth (in.)   | 60 | Test Size (in) | 8 |
| Depth To Water | 9'   | Soil Classification | SC |                |   |

| Reading                              | Elapsed Time(min.) | Incremental Time (min.) | Initial Depth To Water(in.) | Final Depth To Water(in.) | Incremental Fall of Water(in.) | Incremental Infiltration Rate (in/hr) |
|--------------------------------------|--------------------|-------------------------|-----------------------------|---------------------------|--------------------------------|---------------------------------------|
| Start                                | 0                  | 0.00                    |                             | 2.0                       | --                             | --                                    |
| 1                                    | 20.00              | 20.00                   | 2.0                         | 5.0                       | 3.00                           | 0.32                                  |
| 2                                    | 40.00              | 20.00                   | 5.0                         | 8.0                       | 3.00                           | 0.34                                  |
| 3                                    | 60.00              | 20.00                   | 8.0                         | 10.5                      | 2.50                           | 0.30                                  |
| 4                                    | 80.00              | 20.00                   | 10.5                        | 13.0                      | 2.50                           | 0.31                                  |
| 5                                    | 100.00             | 20.00                   | 13.0                        | 15.5                      | 2.50                           | 0.33                                  |
| 6                                    | 120.00             | 20.00                   | 15.5                        | 18.0                      | 2.50                           | 0.35                                  |
| 7                                    | 140.00             | 20.00                   | 18.0                        | 20.5                      | 2.50                           | 0.37                                  |
| 8                                    | 160.00             | 20.00                   | 20.5                        | 22.5                      | 2.00                           | 0.31                                  |
| 9                                    | 180.00             | 20.00                   | 22.5                        | 24.5                      | 2.00                           | 0.33                                  |
| 10                                   | 200.00             | 20.00                   | 24.5                        | 26.5                      | 2.00                           | 0.35                                  |
| 11                                   | 220.00             | 20.00                   | 26.5                        | 28.5                      | 2.00                           | 0.37                                  |
| 12                                   | 240.00             | 20.00                   | 28.5                        | 30.0                      | 1.50                           | 0.29                                  |
|                                      |                    |                         |                             |                           |                                |                                       |
|                                      |                    |                         |                             |                           |                                |                                       |
|                                      |                    |                         |                             |                           |                                |                                       |
|                                      |                    |                         |                             |                           |                                |                                       |
| Infiltration Rate in Inches per Hour |                    |                         |                             |                           |                                | 0.29                                  |

IT-1



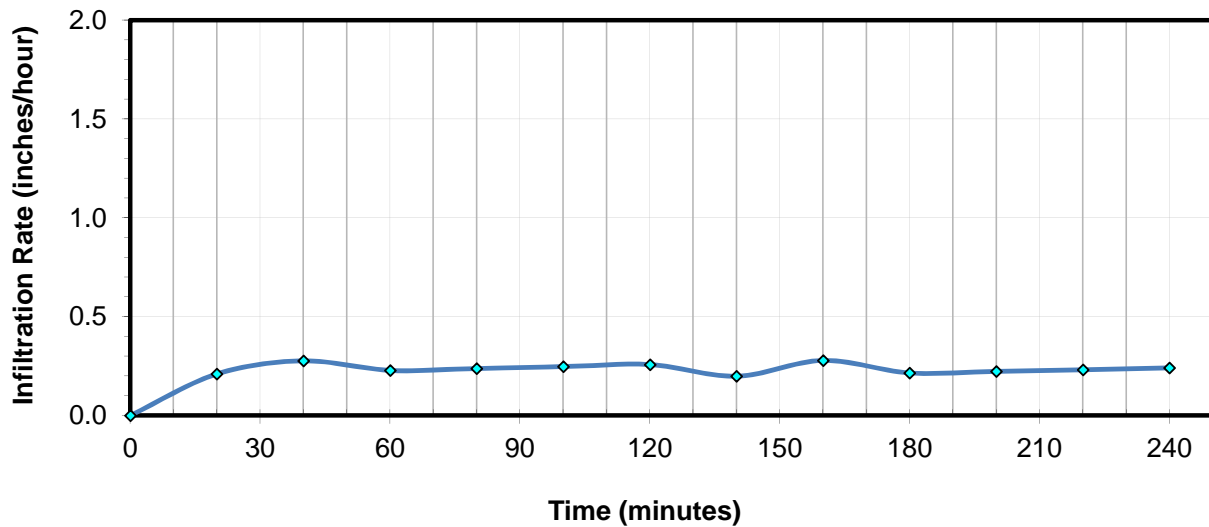
# RESULTS OF INFILTRATION TESTS - REVERSE BOREHOLE

|                 |                    |      |          |
|-----------------|--------------------|------|----------|
| Project #       | 11219097           | Date | 1/8/2020 |
| Project Name    | Mission Gorge Road |      |          |
| Project Address | San Diego, CA      |      |          |

|                |      |                     |    |                |   |
|----------------|------|---------------------|----|----------------|---|
| Test No:       | IT-2 | Total Depth (in.)   | 60 | Test Size (in) | 8 |
| Depth To Water | 9'   | Soil Classification | SC |                |   |

| Reading                              | Elapsed Time(min.) | Incremental Time (min.) | Initial Depth To Water(in.) | Final Depth To Water(in.) | Incremental Fall of Water(in.) | Incremental Infiltration Rate (in/hr) |
|--------------------------------------|--------------------|-------------------------|-----------------------------|---------------------------|--------------------------------|---------------------------------------|
| Start                                | 0                  | 0.00                    |                             | 2.0                       | --                             | --                                    |
| 1                                    | 20.00              | 20.00                   | 2.0                         | 4.0                       | 2.00                           | 0.21                                  |
| 2                                    | 40.00              | 20.00                   | 4.0                         | 6.5                       | 2.50                           | 0.28                                  |
| 3                                    | 60.00              | 20.00                   | 6.5                         | 8.5                       | 2.00                           | 0.23                                  |
| 4                                    | 80.00              | 20.00                   | 8.5                         | 10.5                      | 2.00                           | 0.24                                  |
| 5                                    | 100.00             | 20.00                   | 10.5                        | 12.5                      | 2.00                           | 0.25                                  |
| 6                                    | 120.00             | 20.00                   | 12.5                        | 14.5                      | 2.00                           | 0.26                                  |
| 7                                    | 140.00             | 20.00                   | 14.5                        | 16.0                      | 1.50                           | 0.20                                  |
| 8                                    | 160.00             | 20.00                   | 16.0                        | 18.0                      | 2.00                           | 0.28                                  |
| 9                                    | 180.00             | 20.00                   | 18.0                        | 19.5                      | 1.50                           | 0.22                                  |
| 10                                   | 200.00             | 20.00                   | 19.5                        | 21.0                      | 1.50                           | 0.22                                  |
| 11                                   | 220.00             | 20.00                   | 21.0                        | 22.5                      | 1.50                           | 0.23                                  |
| 12                                   | 240.00             | 20.00                   | 22.5                        | 24.0                      | 1.50                           | 0.24                                  |
|                                      |                    |                         |                             |                           |                                |                                       |
|                                      |                    |                         |                             |                           |                                |                                       |
|                                      |                    |                         |                             |                           |                                |                                       |
|                                      |                    |                         |                             |                           |                                |                                       |
| Infiltration Rate in Inches per Hour |                    |                         |                             |                           |                                | 0.20                                  |

IT-2



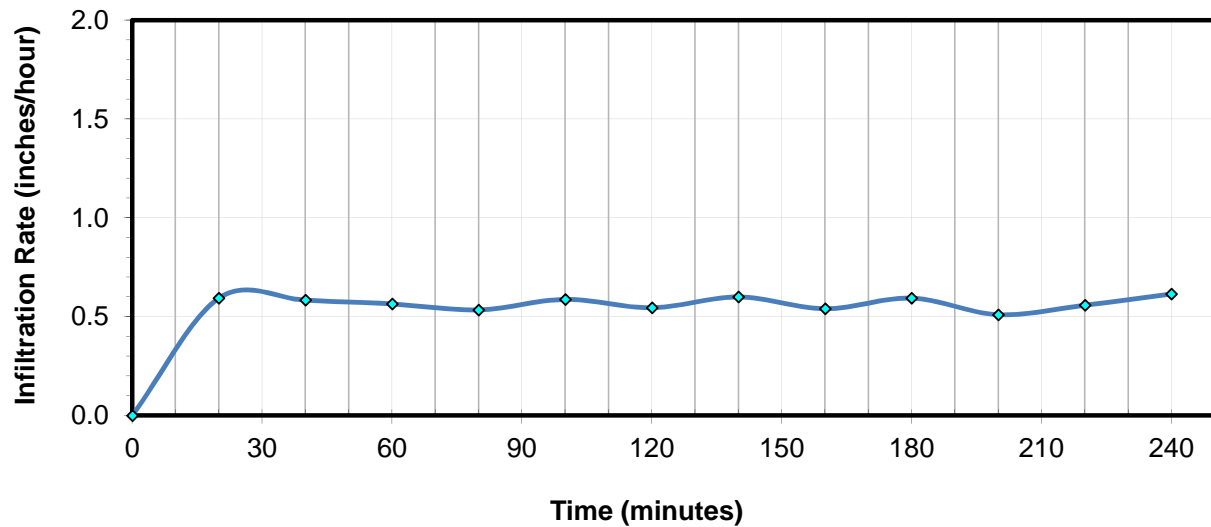
# RESULTS OF INFILTRATION TESTS - REVERSE BOREHOLE

|                 |                    |      |          |
|-----------------|--------------------|------|----------|
| Project #       | 11219097           | Date | 1/8/2020 |
| Project Name    | Mission Gorge Road |      |          |
| Project Address | San Diego, CA      |      |          |

|                |      |                     |    |                |   |
|----------------|------|---------------------|----|----------------|---|
| Test No:       | IT-3 | Total Depth (in.)   | 60 | Test Size (in) | 8 |
| Depth To Water | 9'   | Soil Classification | SM |                |   |

| Reading                              | Elapsed Time(min.) | Incremental Time (min.) | Initial Depth To Water(in.) | Final Depth To Water(in.) | Incremental Fall of Water(in.) | Incremental Infiltration Rate (in/hr) |
|--------------------------------------|--------------------|-------------------------|-----------------------------|---------------------------|--------------------------------|---------------------------------------|
| Start                                | 0                  | 0.00                    |                             | 4.0                       | --                             | --                                    |
| 1                                    | 20.00              | 20.00                   | 4.0                         | 9.0                       | 5.00                           | 0.59                                  |
| 2                                    | 40.00              | 20.00                   | 9.0                         | 13.5                      | 4.50                           | 0.58                                  |
| 3                                    | 60.00              | 20.00                   | 13.5                        | 17.5                      | 4.00                           | 0.56                                  |
| 4                                    | 80.00              | 20.00                   | 17.5                        | 21.0                      | 3.50                           | 0.54                                  |
| 5                                    | 100.00             | 20.00                   | 21.0                        | 24.5                      | 3.50                           | 0.59                                  |
| 6                                    | 120.00             | 20.00                   | 24.5                        | 27.5                      | 3.00                           | 0.55                                  |
| 7                                    | 140.00             | 20.00                   | 27.5                        | 30.5                      | 3.00                           | 0.60                                  |
| 8                                    | 160.00             | 20.00                   | 30.5                        | 33.0                      | 2.50                           | 0.54                                  |
| 9                                    | 180.00             | 20.00                   | 33.0                        | 35.5                      | 2.50                           | 0.59                                  |
| 10                                   | 200.00             | 20.00                   | 35.5                        | 37.5                      | 2.00                           | 0.51                                  |
| 11                                   | 220.00             | 20.00                   | 37.5                        | 39.5                      | 2.00                           | 0.56                                  |
| 12                                   | 240.00             | 20.00                   | 39.5                        | 41.5                      | 2.00                           | 0.62                                  |
|                                      |                    |                         |                             |                           |                                |                                       |
|                                      |                    |                         |                             |                           |                                |                                       |
|                                      |                    |                         |                             |                           |                                |                                       |
|                                      |                    |                         |                             |                           |                                |                                       |
| Infiltration Rate in Inches per Hour |                    |                         |                             |                           |                                | 0.51                                  |

IT-3



# RESULTS OF INFILTRATION TESTS - REVERSE BOREHOLE

|                 |                    |      |          |
|-----------------|--------------------|------|----------|
| Project #       | 11219097           | Date | 1/8/2020 |
| Project Name    | Mission Gorge Road |      |          |
| Project Address | San Diego, CA      |      |          |

|                |      |                     |    |                |   |
|----------------|------|---------------------|----|----------------|---|
| Test No:       | IT-4 | Total Depth (in.)   | 60 | Test Size (in) | 8 |
| Depth To Water | 9'   | Soil Classification | SM |                |   |

| Reading                              | Elapsed Time(min.) | Incremental Time (min.) | Initial Depth To Water(in.) | Final Depth To Water(in.) | Incremental Fall of Water(in.) | Incremental Infiltration Rate (in/hr) |
|--------------------------------------|--------------------|-------------------------|-----------------------------|---------------------------|--------------------------------|---------------------------------------|
| Start                                | 0                  | 0.00                    |                             | 4.0                       | --                             | --                                    |
| 1                                    | 20.00              | 20.00                   | 4.0                         | 9.0                       | 5.00                           | 0.59                                  |
| 2                                    | 40.00              | 20.00                   | 9.0                         | 13.5                      | 4.50                           | 0.58                                  |
| 3                                    | 60.00              | 20.00                   | 13.5                        | 17.5                      | 4.00                           | 0.56                                  |
| 4                                    | 80.00              | 20.00                   | 17.5                        | 21.5                      | 4.00                           | 0.62                                  |
| 5                                    | 100.00             | 20.00                   | 21.5                        | 25.0                      | 3.50                           | 0.60                                  |
| 6                                    | 120.00             | 20.00                   | 25.0                        | 28.0                      | 3.00                           | 0.55                                  |
| 7                                    | 140.00             | 20.00                   | 28.0                        | 31.0                      | 3.00                           | 0.61                                  |
| 8                                    | 160.00             | 20.00                   | 31.0                        | 33.5                      | 2.50                           | 0.55                                  |
| 9                                    | 180.00             | 20.00                   | 33.5                        | 36.0                      | 2.50                           | 0.61                                  |
| 10                                   | 200.00             | 20.00                   | 36.0                        | 38.5                      | 2.50                           | 0.67                                  |
| 11                                   | 220.00             | 20.00                   | 38.5                        | 40.5                      | 2.00                           | 0.59                                  |
| 12                                   | 240.00             | 20.00                   | 40.5                        | 42.5                      | 2.00                           | 0.65                                  |
|                                      |                    |                         |                             |                           |                                |                                       |
|                                      |                    |                         |                             |                           |                                |                                       |
|                                      |                    |                         |                             |                           |                                |                                       |
|                                      |                    |                         |                             |                           |                                |                                       |
| Infiltration Rate in Inches per Hour |                    |                         |                             |                           |                                | 0.55                                  |

IT-4

